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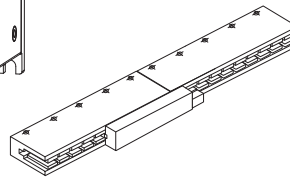
Σ-7-Series AC Servo Drive
Σ-7C SERVOPACK
Troubleshooting Manual

Model: SGD7C-□□□AMAA□□□□□□□
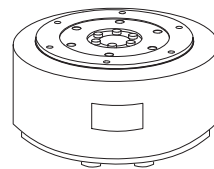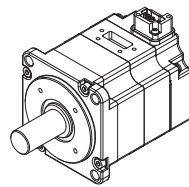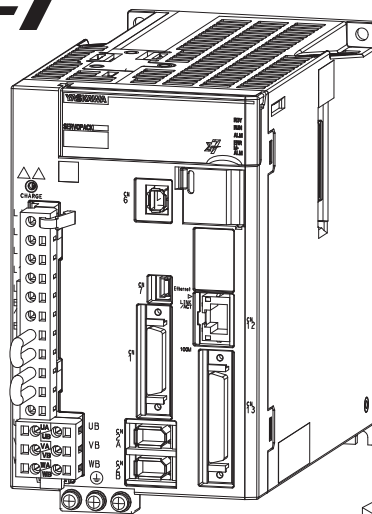
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About this Manual

Two manuals are provided for the Σ-7-Series AC Servo Drive Σ-7C SERVOPACKs. Information required from SERVOPACK selection through system commissioning is provided in the *Product Manual*. This manual provides information required to troubleshoot errors in Σ-7C SERVOPACKs.

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

This manual describes the methods to confirm and correct errors that may occur in Σ-7C SERVO-PACKs in the following order.

Refer to the required chapters.

Chapter	Chapter Title	Contents
1	Introduction to Troubleshooting	Describes the flow to use to check problems that have occurred and the errors that can occur in the SERVOPACK.
2	Troubleshooting Errors with Indicators and Displays	Describes how to use the indicators and display on the SERVOPACK to troubleshoot errors.
3	Troubleshooting Errors with Engineering Tools	Describes how to connect Engineering Tools to the SERVOPACK and use them to troubleshoot errors.
4	Troubleshooting Errors in the Servo Section	Describes how to troubleshoot alarms and warnings that have occurred in the Servo Section.
5	Troubleshooting Errors in the Controller Section	Describes how to troubleshoot alarms and warnings that have occurred in the Controller Section.
6	Troubleshooting Communications Errors	Describes how to troubleshoot problems in connecting the SERVO-PACK and MPE720.
7	Troubleshooting Motion Control Errors	Describes errors that can occur when programming and debugging and how to correct them.
8	System Registers	Describes the information that is stored in system registers for the Controller Section.
9	Convenient Functions	Describes functions that are convenient for troubleshooting.

Related Documents

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

System

① Machine Controller and Servo Drive General Catalog

Components

Catalogs

Machine Controllers

② MP3300 Catalog

Servo Drives

③ Σ-7-Series Catalog

Manuals

Machine Controllers

④ Built-in Function Manuals

⑤ Option Module User's Manuals

SERVOPACKs with Built-in Controllers: Σ-7C

⑥ Enclosed Documents

⑦ Σ-7-Series Σ-7C SERVOPACK Product Manual

④ Built-in Function Manuals

⑧ Σ-7-Series Σ-7C SERVOPACK Troubleshooting Manual (this manual)

SERVOPACKs: Σ-7S/Σ-7W

⑥ Enclosed Documents

⑨ Σ-7-Series Σ-7S and Σ-7W SERVOPACK Product Manuals

⑩ Σ-7-Series Σ-7S and Σ-7W SERVOPACK Hardware Option Specification Product Manuals

⑪ Σ-7-Series Σ-7S and Σ-7W SERVOPACK FT/EX Specification Product Manuals

⑫ Option Module User's Manuals

Servomotors

⑬ Enclosed Documents

⑭ Σ-7-Series Servomotor Product Manuals

Other Documents

⑮ Σ-7-Series Peripheral Device Selection Manual

⑯ Σ-7-Series MECHATROLINK Communications Command Manuals

⑰ Programming Manuals

⑱ Σ-7-Series Engineering Tool Operation Manuals

⑲ Distributed I/O Module User's Manuals

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.
② MP3300 Catalog	Machine Controller MP3300	KAEP C880725 03	Provides detailed information on MP3300 Machine Controllers, including features and specifications.
③ Σ-7-Series Catalog	AC Servo Drives Σ-7 Series	KAEP S800001 23	Provides detailed information on 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 Manual	SIEP S800002 03	Provides detailed information on the specifications, system configuration, and application methods of the Motion Control Function Modules (SVD, SVC4, and SVR4) for Σ-7-Series Σ-7C SERVOPACKS.
	Machine Controller MP3000 Series Communications User's Manual	SIEP C880725 12	Provides detailed information on the specifications, system configuration, and communications connection methods for the Ethernet communications that are used with MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
⑤ Option Module User's Manuals	Machine Controller MP2000 Series Communication Module User's Manual	SIEP C880700 04	Provide detailed information on the specifications and communications methods for the Communications Modules that can be mounted to MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP2000 Series 262IF-01 FL-net Communication Module User's Manual	SIEP C880700 36	
	Machine Controller MP2000 Series 263IF-01 EtherNet/IP Communication Module User's Manual	SIEP C880700 39	
	Machine Controller MP2000 Series I/O Module User's Manual	SIEP C880700 34	Provide detailed information on the specifications and communications methods for the I/O Modules that can be mounted to MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP2000 Series AI-01/AO-01 Analog Input/ Analog Output Module User's Manual	SIEP C880700 26	
	Machine Controller MP2000 Series CNTR-01 Counter Module User's Manual	SIEP C880700 27	

Classification	Document Name	Document No.	Description
⑥ Enclosed Documents	Σ-7-Series AC Servo Drive Σ-7S and Σ-7W SERVOPACK Safety Precautions	TOMP C710828 00	Provides detailed information for the safe usage of Σ-7-Series SERVOPACKs.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Safety Precautions Option Module	TOBP C720829 00	Provides detailed information for the safe usage of Option Modules.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Command Option Module	TOBP C720829 01	Provides detailed procedures for installing a Command Option Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Fully-closed Module	TOBP C720829 03	Provides detailed procedures for installing the Fully-closed Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Safety Module	TOBP C720829 06	Provides detailed procedures for installing the Safety Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide INDEXER Module	TOBP C720829 02	Provides detailed procedures for installing the Indexer Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide DeviceNet Module	TOBP C720829 07	Provides detailed procedures for installing the DeviceNet Module in a SERVOPACK.
⑦ Σ-7-Series Σ-7C SERVOPACK Product Manual	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Product Manual	SIEP S800002 04	Provides detailed information on selecting Σ-7-Series Σ-7C SERVO-PACKs and information on installing, connecting, setting, performing trial operation for, tuning, and monitoring the Servo Drives.
⑧ Σ-7-Series Σ-7C SERVOPACK Troubleshooting Manual	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Troubleshooting Manual	This manual (SIEP S800002 07)	Provides detailed troubleshooting information for Σ-7-Series Σ-7C SERVOPACKS.

Classification	Document Name	Document No.	Description
⑨ Σ-7-Series Σ-7S/Σ-7W SERVOPACK Product Manuals	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual	SIEP S800001 28	Provide detailed information on selecting Σ-7-Series SERVO- PACKs and information on install- ing, connecting, setting, performing trial operation for, tuning, and mon- itoring the Servo Drives.
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-II Communications References Product Manual	SIEP S800001 27	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual	SIEP S800001 26	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with Indexer Module Product Manual	SIEP S800001 64	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with DeviceNet Module Product Manual	SIEP S800001 70	
	Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with MECHATROLINK-III Communications References Product Manual	SIEP S800001 29	
⑩ Σ-7-Series Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Product Manuals	Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual	SIEP S800001 73	Provides detailed information on Hardware Options for Σ-7-Series SERVOPACKs.
	Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with Hardware Option Specifications HWBB Function Product Manual	SIEP S800001 72	
⑪ Σ-7-Series Σ-7S/ Σ-7W SERVOPACK with FT/EX Specification Product Manuals	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Indexing Application Product Manual	SIEP S800001 84	Provides detailed information on the FT/EX Option for Σ-7-Series SERVOPACKs.
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Tracking Application Product Manual	SIEP S800001 89	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual	SIEP S800001 91	
⑫ Option Module User's Manual	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series User's Manual Safety Module	SIEP C720829 06	Provides details information required for the design and mainte- nance of a Safety Module.

Classification	Document Name	Document No.	Description
⑬ Enclosed Documents	AC Servo Drive Rotary Servomotor Safety Precautions	TOBP C230260 00	Provides detailed information for the safe usage of Rotary Servomotors and Direct Drive Servomotors.
	AC Servomotor Linear Σ Series Safety Precautions	TOBP C230800 00	Provides detailed information for the safe usage of Linear Servomotors.
⑭ Σ-7-Series Servomotor Product Manual	Σ-7-Series AC Servo Drive Rotary Servomotor Product Manual	SIEP S800001 36	Provide detailed information on selecting, installing, and connecting the Σ-7-Series Servomotors.
	Σ-7-Series AC Servo Drive Linear Servomotor Product Manual	SIEP S800001 37	
	Σ-7-Series AC Servo Drive Direct Drive Servomotor Product Manual	SIEP S800001 38	
⑮ Σ-7-Series Peripheral Device Selection Manual	Σ-7-Series AC Servo Drive Peripheral Device Selection Manual	SIEP S800001 32	Describes the peripheral devices for a Σ-7-Series Servo System.
⑯ Σ-7-Series MECHATROLINK Communications Command Manuals	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 AC Servo Drive MECHATROLINK-III Communications Standard Servo Profile Command Manual	SIEP S800001 31	Provides detailed information on the MECHATROLINK-III communications standard servo profile commands that are used for a Σ-7-Series Servo System.
⑰ Programming Manuals	Machine Controller MP3000 Series Ladder Programming Manual	SIEP C880725 13	Provides detailed information on the ladder programming specifications and instructions for MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP3000 Series Motion Programming Manual	SIEP C880725 14	Provides detailed information on the motion programming and sequence programming specifications and instructions for MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.

Classification	Document Name	Document No.	Description
⑱ Σ-7-Series Operation Interface Operating Manuals	Machine Controller MP2000/MP3000 Series 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 procedures 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 procedures for the SigmaWin+ Engineering Tool for a Σ-7-Series Servo System.
⑲ Distributed I/O Module User's Manuals	MECHATROLINK-III Compatible I/O Module User's Manual	SIEP C880781 04	Describes the functions, specifications, operating methods, and MECHATROLINK-III communications for the Remote I/O Modules for MP2000/MP3000-Series Machine Controllers.

Using This Manual

◆ Technical Terms Used in This Manual

The following terms are used in this manual.

Term	Meaning
Servomotor	A Σ-7-Series Rotary Servomotor, Direct Drive Servomotor, or Linear Servomotor.
Rotary Servomotor	A generic term used for a Σ-7-Series Rotary Servomotor (SGMMV, SGM7J, SGM7A, SGM7P, or SGM7G) or a Direct Drive Servomotor (SGMCV or SGMCS). The descriptions will specify when Direct Drive Servomotors are excluded.
Linear Servomotor	A Σ-7-Series Linear Servomotor (SGLG, SGLF, or SGLT).
SERVOPACK	A Σ-7-Series Σ-7C Servo Amplifier.
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.
MPE720	The Engineering Tool or a personal computer running the Engineering Tool.
PLC	A Programmable Logic Controller.
Servo Section	The part of a Σ-7C SERVOPACK that provides servo functionality.
Controller Section	The part of a Σ-7C SERVOPACK that provides controller functionality.
CPU	The CPU built into the Controller Section of a Σ-7C SERVOPACK.
Motion Control Function Module	The SVD, SVC4, or SVR4 Function Module in the CPU.
SVD	The Motion Control Function Module for the two axes of a Σ-7C SERVOPACK that connects to the Controller Section and Servo Section of the Σ-7C SERVOPACK through a bus.
SVC4	The Motion Control Function Module that uses MECHATROLINK-III communications to perform motion control of MECHATROLINK-III slave devices.
Communications Function Module	The Function Module in a Communications Module or the Function Module in the 218IFD built into the CPU.

◆ Differences in Terms for Rotary Servomotors and Linear Servomotors

There are differences in the terms that are used for Rotary Servomotors and Linear Servomotors. This manual primarily describes Rotary Servomotors. If you are using a Linear Servomotor, you need to interpret the terms as given in the following table.

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

◆ Engineering Tools Used in This Manual

In this manual, the operations of MPE720 and SigmaWin+ are described using screen captures of MPE720 version 7 and SigmaWin+ version 7.

◆ 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.

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

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

Example Indicates operating or setting examples.

Information Indicates supplemental information to deepen understanding or useful information.

Safety Precautions

◆ Safety Information

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

◆ Safety Precautions That Must Always Be Observed

■ General Precautions

<table>
<tr><td align="center">⚠ DANGER</td></tr>
<tr><td>

- 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.

</td></tr>
</table>

<table>
<tr><td align="center">⚠ WARNING</td></tr>
<tr><td>

- 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 installation must be suitable and it must be performed only by an experienced technician.
  There is a risk of electric shock or injury.
- Before connecting the machine and starting operation, make sure that an emergency stop procedure has been provided and is working correctly.
  There is a risk of injury.
- Do not touch anything inside the SERVOPACK.
  There is a risk of electric shock.

</td></tr>
</table>

<table>
<tr><td align="center">⚠ CAUTION</td></tr>
<tr><td>

- 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.
- 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.

</td></tr>
</table>

NOTICE

- Do not attempt to use a SERVOPACK or Servomotor that is damaged or that has missing parts.
- Install external emergency stop circuits that shut OFF the power supply and stops operation immediately when an error occurs.
- In locations with poor power supply conditions, install the necessary protective devices (such as AC reactors) to ensure that the input power is supplied within the specified voltage range.
  There is a risk of damage to the SERVOPACK.
- Use a Noise Filter to minimize the effects of electromagnetic interference.
  Electronic devices used near the SERVOPACK may be affected by electromagnetic interference.
- Always use a Servomotor and SERVOPACK in one of the specified combinations.
- Do not touch a SERVOPACK or Servomotor with wet hands.
  There is a risk of product failure.

■ Storage Precautions

⚠ CAUTION

- Do not place an excessive load on the product during storage. (Follow all instructions on the packages.)
  There is a risk of injury or damage.

NOTICE

- Do not install or store the product in any of the following locations.
  - Locations that are subject to direct sunlight
  - Locations that are subject to ambient temperatures that exceed product specifications
  - Locations that are subject to relative humidities that exceed product specifications
  - Locations that are subject to condensation as the result of extreme changes in temperature
  - Locations that are subject to corrosive or flammable gases
  - Locations that are near flammable materials
  - Locations that are subject to dust, salts, or iron powder
  - Locations that are subject to water, oil, or chemicals
  - Locations that are subject to vibration or shock that exceeds product specifications
  - Locations that are subject to radiation

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

■ Transportation Precautions

⚠ CAUTION

- Transport the product in a way that is suitable to the mass of the product.
- Do not use the eyebolts on a SERVOPACK or Servomotor to move the machine.
  There is a risk of damage or injury.
- When you handle a SERVOPACK or Servomotor, be careful of sharp parts, such as the corners.
  There is a risk of injury.
- Do not place an excessive load on the product during transportation. (Follow all instructions on the packages.)
  There is a risk of injury or damage.

NOTICE

- Do not hold onto the front cover or connectors when you move a SERVOPACK.
  There is a risk of the SERVOPACK falling.
- A SERVOPACK or Servomotor is a precision device. Do not drop it or subject it to strong shock.
  There is a risk of failure or damage.
- Do not subject connectors to shock.
  There is a risk of faulty connections or damage.
- If disinfectants or insecticides must be used to treat packing materials such as wooden frames, plywood, or pallets, the packing materials must be treated before the product is packaged, and methods other than fumigation must be used.
  Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.
  If the electronic products, which include stand-alone products and products installed in machines, are packed with fumigated wooden materials, the electrical components may be greatly damaged by the gases or fumes resulting from the fumigation process. In particular, disinfectants containing halogen, which includes chlorine, fluorine, bromine, or iodine can contribute to the erosion of the capacitors.
- Do not overtighten the eyebolts on a SERVOPACK or Servomotor.
  If you use a tool to overtighten the eyebolts, the tapped holes may be damaged.

◼ Installation Precautions

⚠ CAUTION

- Install the Servomotor or SERVOPACK in a way that will support the mass given in technical documents.
- Install SERVOPACKs, Servomotors, regenerative resistors, and External Dynamic Brake Resistors on nonflammable materials.
  Installation directly onto or near flammable materials may result in fire.
- Provide the specified clearances between the SERVOPACK and the control panel as well as with other devices.
  There is a risk of fire or failure.
- Install the SERVOPACK in the specified orientation.
  There is a risk of fire or failure.
- Do not step on or place a heavy object on the product.
  There is a risk of failure, damage, or injury.
- Do not allow any foreign matter to enter the SERVOPACK or Servomotor.
  There is a risk of failure or fire.

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.

- 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.

- Never install the SERVOPACK in an atmosphere containing halogen (fluorine, chlorine, bromine, or iodine).
  There is a risk of failure or damage.

■ Wiring Precautions

⚠ DANGER

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

⚠ WARNING

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

- Check all wiring and power supplies carefully.
  Incorrect wiring or incorrect voltage application to the output circuits may cause short-circuit failures. If a short-circuit failure occurs as a result of any of these causes, the holding brake will not work. This could damage the machine or cause an accident that may result in death or injury.

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

  There is a risk of failure or fire.

- If you use a SERVOPACK with the Dynamic Brake Hardware Option, connect an External Dynamic Brake Resistor that is suitable for the machine and equipment specifications to the specified terminals.
  There is a risk of unexpected operation, machine damage, burning, or injury when an emergency stop is performed.

⚠ CAUTION

- Wait for at least six minutes after turning OFF the power supply (with a SERVOPACK for a 100-VAC 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 after turning OFF the power supply because high voltage may still remain in the SERVOPACK.
  There is a risk of electric shock.

- Observe the precautions and instructions for wiring and trial operation precisely as described in this document.
  Failures caused by incorrect wiring or incorrect voltage application in the brake circuit may cause the SERVOPACK to fail, damage the equipment, or cause an accident resulting in death or injury.

- Check the wiring to be sure it has been performed correctly.
  Connectors and pin layouts are sometimes different for different models. Always confirm the pin layouts in technical documents for your model before operation.
  There is a risk of failure or malfunction.

- Connect wires to power supply terminals and motor connection terminals securely with the specified methods and tightening torque.
  Insufficient tightening may cause wires and terminal blocks to generate heat due to faulty contact, possibly resulting in fire.

- Use shielded twisted-pair cables or screened unshielded multi-twisted-pair cables for I/O Signal Cables and Encoder Cables.

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

- Install molded-case circuit breakers and other safety measures to provide protection against short circuits in external wiring.
  There is a risk of fire or failure.

- In places with poor power supply conditions, ensure that the input power is supplied within the specified voltage range.
  There is a risk of equipment damage.

- Provide sufficient shielding when using the SERVOPACK in the following locations.
  - Locations that are subject to noise, such as from static electricity
  - Locations that are subject to strong electromagnetic or magnetic fields
  - Locations that are subject to radiation
  - Locations that are near power lines
  There is a risk of equipment damage.

- Configure the circuits to turn ON the control power supply to the SERVOPACK before the 24-V I/O power supply.
  If the control power supply to the SERVOPACK is turned ON after the external power supply, e.g., the 24-V I/O power supply, the outputs from the SERVOPACK may momentarily turn ON when the power supply to the SERVOPACK turns ON. This can result in unexpected operation that may cause injury or device damage.

- Provide emergency stop circuits, interlock circuits, limit circuits, and any other required safety measures in control circuits outside of the SERVOPACK.
  There is a risk of injury or equipment damage.

- If you use MECHATROLINK I/O Modules, use the establishment of MECHATROLINK communications as an interlock output condition.
  There is a risk of equipment damage.

- Select the I/O signal wires for external wiring to connect the SERVOPACK to external devices based on the following criteria:
  - Mechanical strength
  - Noise interference
  - Wiring distance
  - Signal voltage

⚠ CAUTION

- Separate the I/O signal cables for control circuits from the power cables both inside and outside the control panel to reduce the influence of noise from the power cables.
  If the I/O signal lines and power lines are not separated properly, malfunction may occur.

  Example of Separated Cables

  Steel separator

  Power cables
  ○○○○

  I/O signal cables in control circuits
  ○○○○
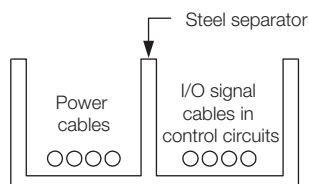
NOTICE

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

■ Operation Precautions

⚠ WARNING

- Before starting operation with a machine connected, change the settings of the switches and parameters to match the machine.
  Unexpected machine operation, failure, or personal injury may occur if operation is started before appropriate settings are made.
- Do not radically change the settings of the parameters.
  There is a risk of unstable operation, machine damage, or injury.
- Install limit switches or stoppers at the ends of the moving parts of the machine to prevent unexpected accidents.
  There is a risk of machine damage or injury.
- For trial operation, securely mount the Servomotor and disconnect it from the machine.
  There is a risk of injury.
- Forcing the motor to stop for overtravel is disabled when the Jog (Fn002), Origin Search (Fn003), or Easy FFT (Fn206) utility function is executed. Take necessary precautions.
  There is a risk of machine damage or injury.
- When an alarm occurs, the Servomotor will coast to a stop or stop with the dynamic brake according to the SERVOPACK Option and settings. The coasting distance will change with the moment of inertia of the load and the resistance of the External Dynamic Brake Resistor. Check the coasting distance during trial operation and implement suitable safety measures on the machine.
- Do not enter the machine's range of motion during operation.
  There is a risk of injury.
- Do not touch the moving parts of the Servomotor or machine during operation.
  There is a risk of injury.

⚠ CAUTION

- Design the system to ensure safety even when problems, such as broken signal lines, occur. For example, the P-OT and N-OT signals are set in the default settings to operate on the safe side if a signal line breaks. Do not change the polarity of this type of signal.
- When overtravel occurs, the power supply to the motor is turned OFF and the brake is released. If you use the Servomotor to drive a vertical load, set the Servomotor to enter a zero-clamped state after the Servomotor stops. Also, install safety devices (such as an external brake or counterweight) to prevent the moving parts of the machine from falling.
- Always turn OFF the servo before you turn OFF the power supply. If you turn OFF the main circuit power supply or control power supply during operation before you turn OFF the servo, the Servomotor will stop as follows:
  - If you turn OFF the main circuit power supply during operation without turning OFF the servo, the Servomotor will stop abruptly with the dynamic brake.
  - If you turn OFF the control power supply without turning OFF the servo, the stopping method that is used by the Servomotor depends on the model of the SERVOPACK. For details, refer to the manual for the SERVOPACK.
  - If you use a SERVOPACK with the Dynamic Brake Hardware Option, the Servomotor stopping methods will be different from the stopping methods used without the Option or with other Hardware Options. For details, refer to the *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual*.
- Do not use the dynamic brake for any application other than an emergency stop.
  There is a risk of failure due to rapid deterioration of elements in the SERVOPACK and the risk of unexpected operation, machine damage, burning, or injury.
- Implement interlock signals and other safety circuits external to the SERVOPACK to ensure safety in the overall system even if the following conditions occur.
  - SERVOPACK failure or errors caused by external factors
  - Shutdown of operation due to SERVOPACK detection of an error in self-diagnosis and the subsequent turning OFF or holding of output signals
  - Holding of the ON or OFF status of outputs from the SERVOPACK due to fusing or burning of output relays or damage to output transistors
  - Voltage drops from overloads or short-circuits in the 24-V output from the SERVOPACK and the subsequent inability to output signals
  - Unexpected outputs due to errors in the power supply, I/O, or memory that cannot be detected by the SERVOPACK through self-diagnosis.
  There is a risk of injury, device damage, or burning.
- Observe the setting methods that are given in the manual for the following parameters.
  - Parameters for absolute position detection when the axis type is set to a finite-length axis
  - Parameters for simple absolute infinite-length position control when the axis type is set to an infinite-length axis
    📖 Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Motion Control Manual (Manual No.: SIEP S800002 03)

 If any other methods are used, offset in the current position when the power supply is turned OFF and ON again may result in device damage.
- OL□□□48 (Zero Point Position Offset in Machine Coordinate System) is always valid when the axis type is set to a finite-length axis. Do not change the setting of OL□□□48 while the machine is operating.
  There is a risk of machine damage or an accident.

⚠ CAUTION

- Always check to confirm the paths of axes when any of the following axis movement instructions are used in programs to ensure that the system operates safely.
  - Positioning (MOV)
  - Linear Interpolation (MVS)
  - Circular Interpolation (MCC or MCW)
  - Helical Interpolation (MCC or MCW)
  - Set-Time Positioning (MVT)
  - Linear Interpolation with Skip Function (SKP)
  - Zero Point Return (ZRN)
  - External Positioning (EXM)

  Example
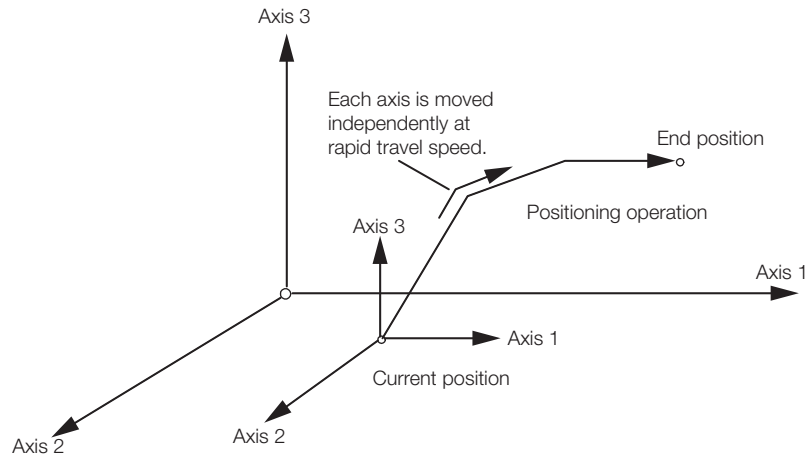
  Example of Basic Path for Positioning (MOV) Instruction

  There is a risk of injury or equipment damage.

- The same coordinate word will create a completely different travel operation in Absolute Mode and in Incremental Mode. Make sure that the ABS and INC instructions are used correctly before you start operation.
  There is a risk of injury or equipment damage.

- The travel path for the Positioning (MOV) instructions will not necessarily be a straight line. Check to confirm the paths of the axis when this instruction is used in programs to ensure that the system operates safely.
  There is a risk of injury or equipment damage.

- The Linear Interpolation (MVS) instruction can be used on both linear axes and rotary axes. However, if a rotary axis is included, the linear interpolation path will not necessarily be a straight line. Check to confirm the paths of the axis when this instruction is used in programs to ensure that the system operates safely.
  There is a risk of injury or equipment damage.

- The linear interpolation for the Helical Interpolation (MCW and MCC) instructions can be used for both linear axes and rotary axes. However, depending on how the linear axis is taken, the path of helical interpolation will not be a helix. Check to confirm the paths of the axis when this instruction is used in programs to ensure that the system operates safely.
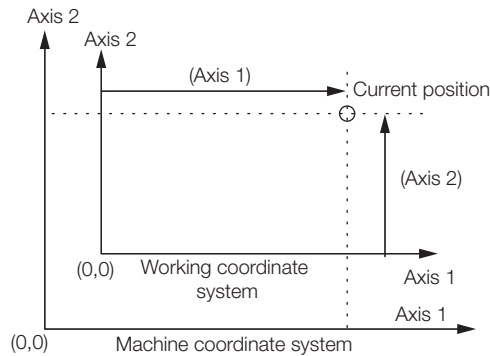 There is a risk of injury or equipment damage.

⚠ CAUTION

- Unexpected operation may occur if the following coordinate instructions are specified incorrectly. Always confirm that the following instructions are specified correctly before you begin operation.
  - Absolute Mode (ABS)
  - Incremental Mode (INC)
  - Current Position Set (POS)

  Example

  Example of Working Coordinate System Created
  with the Set Current Position (POS) Instruction

  There is a risk of injury or equipment damage.

- The Set Current Position (POS) instruction creates a new working coordinate system. Therefore, unexpected operation may occur if the POS instruction is specified incorrectly. When you use the POS instruction, always confirm that the working coordinate system is in the correct position before you begin operation.
  There is a risk of injury or equipment damage.

- The Move on Machine Coordinates (MVM) instruction temporarily performs positioning to a coordinate position in the machine coordinate system. Therefore, unexpected operation may occur if the instruction is executed without confirming the origin position in the machine coordinate system first. When you use the MVM instruction, always confirm that the machine origin is in the correct position before you begin operation.
  There is a risk of injury or equipment damage.

NOTICE

- When you adjust the gain during system commissioning, use a measuring instrument to monitor the torque waveform and speed waveform and confirm that there is no vibration.
  If a high gain causes vibration, the Servomotor will be damaged quickly.

- Do not frequently turn the power 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.

⚠ **WARNING**

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

⚠ **CAUTION**

- Wait for at least six minutes after turning OFF the power supply (with a SERVOPACK for a 100-VAC 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 after turning OFF the power supply because high voltage may still remain in the SERVOPACK.
  There is a risk of electric shock.
- Before you replace a SERVOPACK, back up the settings of the SERVOPACK parameters. Copy the backed up parameter settings to the new SERVOPACK and confirm that they were copied correctly.
  If you do not copy backed up parameter settings or if the copy operation is not completed normally, normal operation may not be possible, possibly resulting in machine or equipment damage.
- Do not attempt to disassemble or repair the SERVOPACK.
  There is a risk of electrical shock, injury, or device damage.

NOTICE

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

■ Troubleshooting Precautions

⚠ **DANGER**

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

⚠ **WARNING**

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

⚠ CAUTION

- When an alarm occurs, remove the cause of the alarm and ensure safety. Then reset the alarm or turn the power supply OFF and ON again to restart operation.
  There is a risk of injury or machine damage.
- If the Servo ON signal is input to the SERVOPACK and an alarm is reset, the Servomotor may suddenly restart operation. Confirm that the servo is OFF and ensure safety before you reset an alarm.
  There is a risk of injury or machine damage.
- Always insert a magnetic contactor in the line between the main circuit power supply and the main circuit power supply terminals on the SERVOPACK so that the power supply can be shut OFF at the main circuit power supply.
  If a magnetic contactor is not connected when the SERVOPACK fails, a large current may flow, possibly resulting in fire.
- If an alarm occurs, shut OFF the main circuit power supply.
  There is a risk of fire due to a regenerative resistor overheating as the result of regenerative transistor failure.
- Install a ground fault detector against overloads and short-circuiting or install a molded-case circuit breaker combined with a ground fault detector.
  There is a risk of SERVOPACK failure or fire if a ground fault occurs.
- The holding brake on a Servomotor will not ensure safety if there is the possibility that an external force (including gravity) may move the current position and create a hazardous situation when power is interrupted or an error occurs. If an external force may cause movement, install an external braking mechanism that ensures safety.

■ Disposal Precautions

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

■ General Precautions

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

Warranty

◆ Details of Warranty

■ Warranty Period

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

■ Warranty Scope

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

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

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

◆ Limitations of Liability

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

◆ Suitability for Use

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

◆ Specifications Change

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

Compliance with UL Standards and EU Directives

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

◆ North American Safety Standards (UL)

Product	Model	North American Safety Standards (UL File No.)
SERVOPACKs	SGD7C	UL 61800-5-1 (E147823) CSA C22.2 No.274
Rotary Servomotors	• SGMMV • SGM7A • SGM7J • SGM7P • SGM7G	UL 1004-1 UL 1004-6 (E165827)
Direct Drive Servomotors	• SGMCV • SGMCS	UL 1004-1 UL 1004-6 (E165827)
Linear Servomotors	• SGLGW • SGLFW • SGLFW2* • SGLTW	UL 1004 (E165827)

* Certification is pending.

◆ European Directives

Product	Model	European Directive	Harmonized Standards
SERVOPACKs	SGD7C	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3
		Low Voltage Directive 2006/95/EC	EN 50178 EN 61800-5-1
Rotary Servomotors	SGMMV	EMC Directive 2004/104/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61800-3
		Low Voltage Directive 2006/95/EC	EN 60034-1 EN 60034-5
	• SGM7J • SGM7A • SGM7P • SGM7G	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3
		Low Voltage Directive 2006/95/EC	EN 60034-1 EN 60034-5
Direct Drive Servomotors	• SGMCV • SGMCS-□□B, □□C, □□D, □□E (Small-Capacity, Coreless Servomotors)	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4* EN 61800-3*
		Low Voltage Directive 2006/95/EC	EN 60034-1 EN 60034-5
Linear Servomotors	• SGLG • SGLF • SGLFW2 • SGLT	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4
		Low Voltage Directive 2006/95/EC	EN 60034-1

* Only the SGMCV is certified.

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

Contents

1 Introduction to Troubleshooting

2 Troubleshooting Errors with Indicators and Displays

3 Troubleshooting Errors with Engineering Tools

8 System Registers

9 Convenient Functions

Revision History

Introduction to Troubleshooting

1

This chapter outlines the flow of the checks to make when an error occurs while you are using a SERVOPACK. It also describes the types of errors that can occur in a SERVO-PACK.

1.1 Basic Troubleshooting Procedure

When a problem occurs, it is important to recover normal system operation as soon as possible by finding the cause of the problem and taking the necessary measures. The basic troubleshooting procedure is outlined below.

Step 1
Check the following items visually. • Machine movement, or status if stopped • Power supply status • I/O device status • Wiring conditions • Status of indicators and display on Units or Modules • Switch settings (e.g., DIP switches) • Parameter settings and program contents

↓

Step 2
See if the problem changes when the following operations are performed. • Stop the SERVOPACK. • Reset the alarms. • Turn the power supply OFF and ON again.

↓

Step 3
Isolate the location of the problem from the results of steps 1 and 2. • Is the cause of the problem inside or outside the SERVO-PACK? • Software or hardware? • Sequence control or motion control? • Ethernet communications or MECHATROLINK communications?

1.2 SERVOPACK Errors

A Σ-7C SERVOPACK contains a Servo Section and a Controller Section. Errors can occur in either section. This section describes errors that can occur in the Servo Section and the Controller Section.

1.2.1 Servo Section Errors

There are two types of errors that can occur in the Servo Section: alarms and warnings. If an alarm or warning occurs, an error code will be displayed on the 7-segment display for the Servo Section. Alarms are fatal errors, i.e., SERVOPACK operation must be stopped. Warnings are non-fatal, and are displayed to warn you before an error occurs.

1.2.2 Controller Section Errors

Errors and alarms can occur in the Controller Section. If an error or alarm occurs, an error code will be displayed on the 7-segment display for the Controller Section. Errors mainly indicate failures related to hardware. Alarms occur for software, such as operation errors, I/O errors, and communications errors that occur when programming or during communications.

Introduction to Troubleshooting

1

Troubleshooting Errors with Indicators and Displays

2

This chapter describes the information that appears on the displays when errors occur in the SERVOPACK.

2.1 Servo Section Display

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

Alarms and warnings are displayed here.
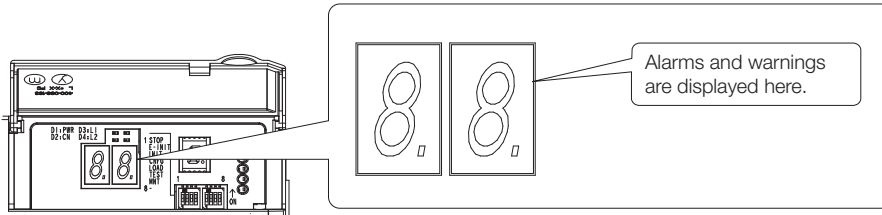
SERVOPACK with the Front Cover Open

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

Example: Alarm A.C90

Status display → Not lit. → *A.* → Not lit. → *C* → Not lit. → *9* → Not lit. → *0* → Not lit.
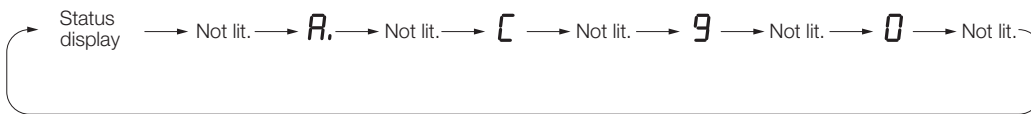
2.2 Controller Section Display

You can use the Controller Section display to check the error status of the Controller Section.

After you check the error status, you can access the contents of the system registers to identify the location to correct in the program.

Refer to the following chapter for details on the system registers.

☞ *Chapter 8 System Registers*

The Controller Section has the following display and three indicators.

- Display
- Status indicators
- USB status indicator
- Ethernet status indicators

Note: Refer to the following manual for details on the indicators on the Controller Section and the layout of the three indicators (part names).

📖 Σ-7-Series Σ-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)

Display
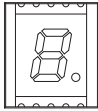
Status Indicators

- RDY
- RUN
- ALM
- ERR
- M-ALM

USB Status Indicator

Ethernet Status Indicators
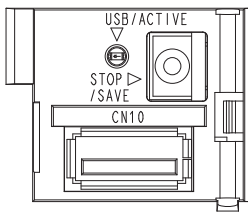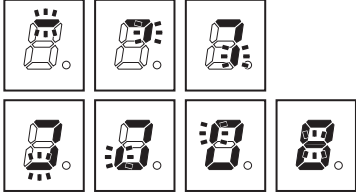
Ethernet Status Indicators
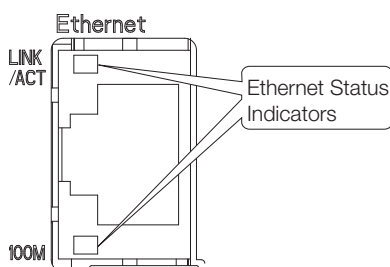
2.2.1 Display

The display shows the execution or error status of the Controller Section.

Color	Display	Description	Status
Red		Initializing (The RDY status indicator is not lit.)	Normal startup is being performed after the power was turned ON or after the system was reset.
		Normal operation (The RDY status indicator is lit.)	Normal operation is being performed.
		CPU stopped	The CPU is stopped.
	"P" flashing.	Waiting for Servo Initialization	The control power supply to the Servo Section is OFF, or Servo Section initialization is in progress.
		USB memory batch transfer	Save/load is being started.
			Save/load is in progress.
			Save/load was completed. After 2 seconds, the display will indicate the status of the CPU.
	A three-digit number will be displayed after 𝐶𝐸. or 𝐶𝐴.	A system error occurred.	Errors Refer to the following chapter for details. ☞ Chapter 5 Troubleshooting Errors in the Controller Section
		An alarm occurred.	

2.2.2 Status Indicators

You can check the status of the Controller Section with these indicators.

- ▫ RDY
- ▫ RUN
- ▫ ALM
- ▫ ERR
- ▫ M-ALM

The display patterns of the status indicators are given in the following table.

	Indicator Status					Controller Section Status	Description
	RDY (green)	RUN (green)	ALM (red)	ERR (red)	M-ALM (red)		
Normal	O	O	●	●	O	Hardware reset	Normally the CPU will start within 10 s. If this status continues for more than 10 s, there is an error in the user program or a hardware failure. Refer to the following chapter for information on system errors. ☞ *Chapter 8 System Registers*
	O	O	O	O	O	Initialization	
	O	●	O	O	O	Drawing A is being executed.	
	●	O	O	O	O	The user programs are stopped (offline stop mode).	• The stop operation was performed from the MPE720. • This is the status after the STOP switch is turned ON. It is not an error.
	●	●	O	O	O	The user programs are being executed normally.	Normal operation is in progress.
Error	O	O	O	●	O	A serious failure occurred.	If the ERR indicator is lit, there is a hardware failure or a user program error. Refer to the following section for the corrective actions to take when the ERR indicator is lit. ☞ *8.3 Troubleshooting for the ERR Indicator* on page 8-5
	O	O	O	★	O	Software Errors: Number of Flashes 2: Machine check exception 3: DSI (writing) exception 4: ISI exception 5: Alignment exception 6: DDR DRAM memory error exception 7: DTLB exception 8: ITLB exception	A hardware failure has occurred. Replace the SERVOPACK.
	O	O	★	★	O	Hardware Errors: Number of Flashes 2: RAM diagnostic error 3: ROM diagnostic error 4: CPU Function Module diagnostic error 5: FPU Function Module diagnostic error	
	–	–	–	–	●	Motion error	If the M-ALM indicator is lit, there is an error in the Motion Control Function Module. Refer to the following sections for details on motion errors. ☞ *7.1 Troubleshooting Motion Errors* on page 7-2
Alarms	●	●	●	O	–	Operation error I/O error M-III station address duplication	If the ALM indicator is lit, there is an operation error, an I/O error, or an error for an M-III station address duplication. Refer to the following section for the corrective actions to take when the ALM indicator is lit. ☞ *8.4 Troubleshooting for the ALM Indicator* on page 8-6

Note: O: Not lit, ●: Lit, ★: Flashing, –: Any status

Troubleshooting Errors with Indicators and Displays

2

2.2.3 USB Status Indicator

This indicator shows the status of USB memory.

Indicator Name	Indicator Status	Description	Status
USB ACTIVE	◎ (Not lit.)	No USB memory device	No USB memory device has been inserted.
	◉ (Lit.)	USB memory device inserted	A USB memory device is inserted.
	☀ (Flashing.)	Accessing USB memory	The USB memory is being accessed.

Check the USB status indicator using the above table. If the indicator is not lit, there may be an error in the communications status with the USB memory device.

Indicator Status	Cause	Correction
Not lit.	The USB memory device is not properly seated in the USB connector.	Remove the USB memory device and insert it into the USB connector again.
	The USB memory device failed.	Replace the USB memory device.
	The USB connector is faulty.	Replace the SERVOPACK.

2.2.4 Ethernet Connector Indicators

You can check the error status of Ethernet communications with the Ethernet connector indicators.

This section describes the indicator lighting patterns.
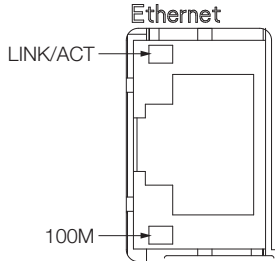
Indicator Name	Color	Indicator Status	Description
LINK/ACT	Yellow	Not lit.	There is no Ethernet connection.
		Lit.	An Ethernet link is established.
		Flashing.	Ethernet communications are in progress.*
100M	Green	Not lit.	There is a 10M connection.
		Lit.	There is a 100M connection.

* If a communications error occurs when message communications are used with a UDP connection type, communications data may be lost or communications may stop when the LINK/ACT indicator for the Ethernet connector lights or flashes because UDP does not use connections. If this occurs, use the following corrections.
• Use straight or crossover 100Base-TX (category 5 or higher) Ethernet cables.
• Separate the Ethernet cables from power cables.

If the above corrections do not solve the problem, use a TCP connection type. If you use a UDP connection type, write the program to retry Send Message Execute Commands with the MSG-SNDE message function. Refer to the following section for information on resend programming for the MSG-SNDE message function of the MP Series.

☞ *6.2 Troubleshooting Problems with Message Communications* on page 6-11

If the LINK/ACT status indicator is not lit, there may be an error in the communications with the Ethernet.

LINK/ACT Status Indicator	Cause	Correction
Not lit.	The Ethernet cable is not connected properly.	Remove the Ethernet cable and insert it into the Ethernet connector again.
	The Ethernet cable has a broken wire.	Replace the Ethernet cable.
	The power to the hub or other Ethernet device that is connected to the SERVOPACK with an Ethernet cable is not turned ON.	Turn ON the power to the hub or Ethernet device to which the Ethernet cable is connected to.

Troubleshooting Errors with Engineering Tools

3

This chapter describes how to use Engineering Tools to investigate errors that occur in the SERVOPACK.

3.1 Using the MPE720 to Investigate Errors

You can use the System Monitor Dialog Box to investigate errors in the Controller Section.

This section describes how to investigate and correct scan time exceeded errors, operation errors, and I/O errors. You can investigate these errors with the System Monitor Dialog Box.

3.1.1 Investigating Alarms and Errors

If the ALM or ERR indicator display in the System Monitor Dialog Box is lit, a system error has occurred in the Controller Section.

Display in the System Monitor Dialog Box	Meaning	Correction
The ALM indicator is lit red.	A system error has occurred in the Controller Section. Operation is not possible.	Check the contents of SB000402 to identify the location of the error and correct the error.
The ERR indicator is lit red.	An operation error or I/O error has occurred.	Check the contents of SB000403 to identify the location of the error and correct the error.

3.1.2 Investigating and Correcting Scan Time Exceeded Errors

The Scan Time Exceeded error occurs when the current value exceeds the setting.

If a scan time exceeded error occurs, you can check detailed error information in the System Monitor Dialog Box.

The confirmation and correction procedure is given below for when a Scan Time Exceeded error occurs.

1. Click **Check CPU performance** in the System Monitor Dialog Box.
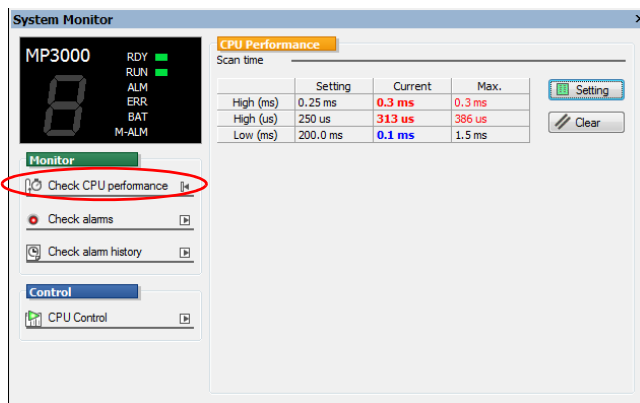
2. Click the **Setting** Button.
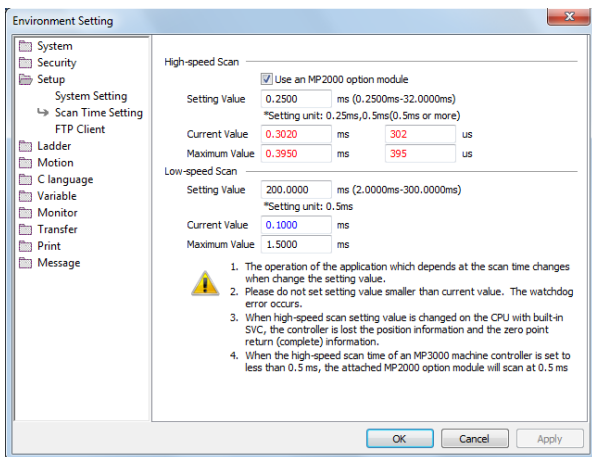
> **Information** When a Scan Time Exceeded error occurs, the current or maximum value will be displayed in red characters.

Display in the Environment Setting Dialog Box	Meaning	Correction
The current value is red.	The current scan time has exceeded the scan time setting.	Review the settings.
The maximum value is red.	The maximum scan time has exceeded the scan time setting.	

3.1.3 Investigating and Correcting Operation Errors

An Operation Error occurs when there is an operational error in a ladder program or motion program.

If an Operation Error occurs, you can check detailed error information in the System Monitor Dialog Box.

The confirmation and correction procedure is given below for when an Operation Error is caused by a divisor that is set to 0 in a Divide instruction.

> **Note** If there are Operation Errors in multiple programs at the same time, correcting the error displayed in the System Monitor Dialog Box will not clear the error information. This may cause the dialog box to show outdated information about the error. Click the Reset Button to clear the information from previous errors.

1. Click **Check alarms** in the System Monitor Dialog Box.

Information on current alarms will be displayed.

Troubleshooting Errors with Engineering Tools

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2. Click the **Analyze** Button.

The MPE720 Ver. 7 Dialog Box will be displayed.

3. Click the **Yes** Button.
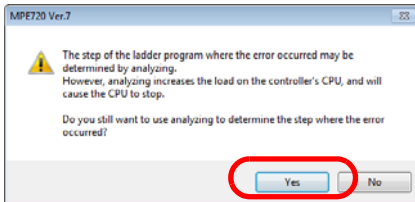
The location of the alarm will be displayed in the **Name of program where alarm occurred** and **Execution step where alarm occurred** Boxes in the **Detail** Area.

4. Click the **Jump** Button.
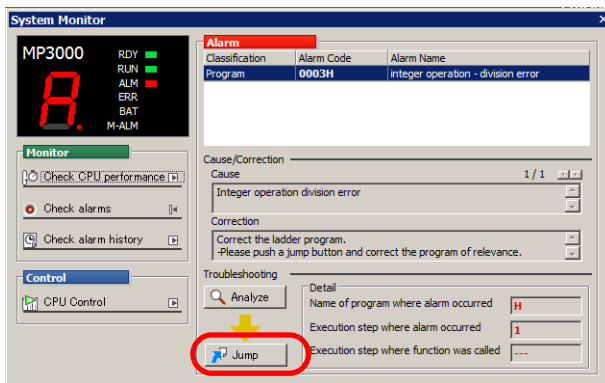
The relevant location on the drawing where the alarm occurred will be displayed.

5. Change the divisor from 0 to 1 where the operation error exists.
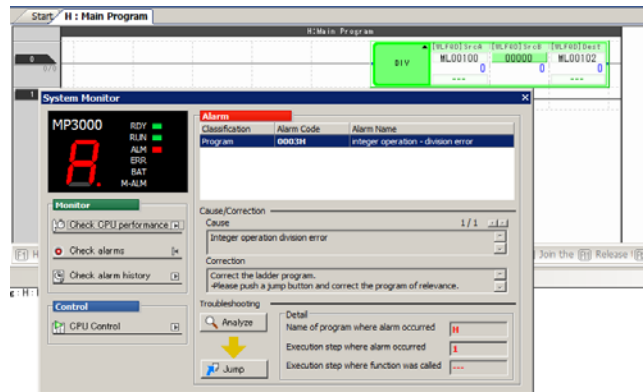
6. Make the Ladder Editor Tab Page the active view and press the **F4** Key.
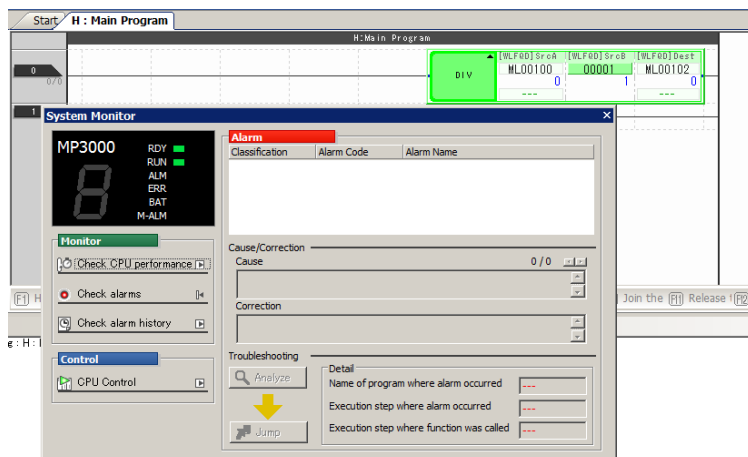
This will compile the program and clear the operation error.

3.1.4 Investigating and Correcting I/O Errors

I/O errors are errors that occur in the Input and Output Modules.

If an I/O error occurs, check the meaning of the error in the System Monitor Dialog Box.

The confirmation and correction procedure is given below for when an I/O Error occurs.

1. Click **Check alarms** in the System Monitor Dialog Box.
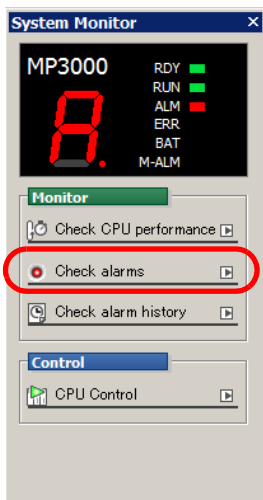
Information on current alarms will be displayed.

2. Click the **Analyze** Button.

The location of the alarm will be displayed in the **Rack No.**, **Unit No.**, **Slot No.**, **Module name**, and **Sub module name** Boxes in the **Detail** Area.

3. Confirm the rack and slot information, then set the system register addresses from SW00208 to SW00215 in the register list and check the contents.
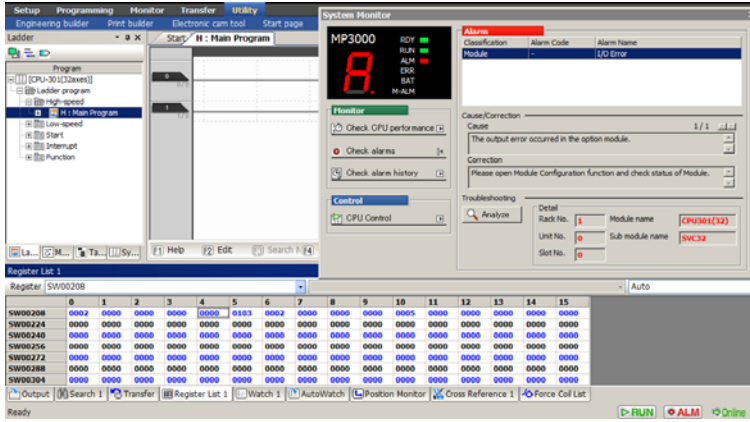
Refer to the following section for details on system I/O error status.

☞ *8.5.5 System I/O Error Status* on page 8-14

4. Use the contents in the system registers to determine the status of the error.

Information

Table 3.1 SVC4 Error Status Details

Item	Code	Remarks
Error code	0	No error
	1	Station error
ST#n	0	Communications normal
	1	Communications error at station n

5. Establish communications with ST#1.

This concludes the troubleshooting procedure for I/O errors.

3.2 Using the SigmaWin+ to Investigate Errors

You can investigate errors (i.e., alarms and warnings) that occur in the Servo Section in the Alarm Display Dialog Box.

Use the following procedure to investigate alarms in the Alarm Display Dialog Box.

1. Select **Display Alarm** in the Menu Dialog Box.
   The Alarm Display Dialog Box will be displayed.

2. The axis number and information on the alarm that was displayed in the **Alarm** Area will be displayed.
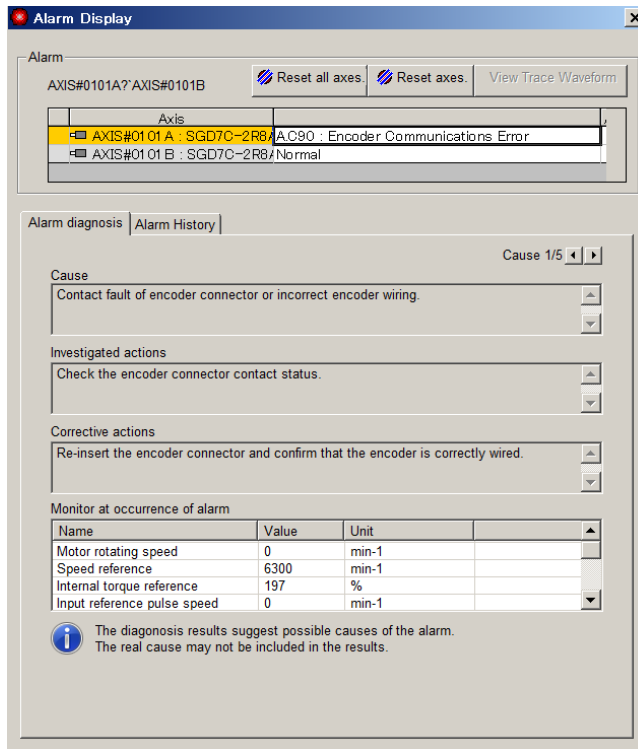
3. Click the **Alarm Diagnosis** Tab to check the cause, confirmation method, and correction for the alarm.
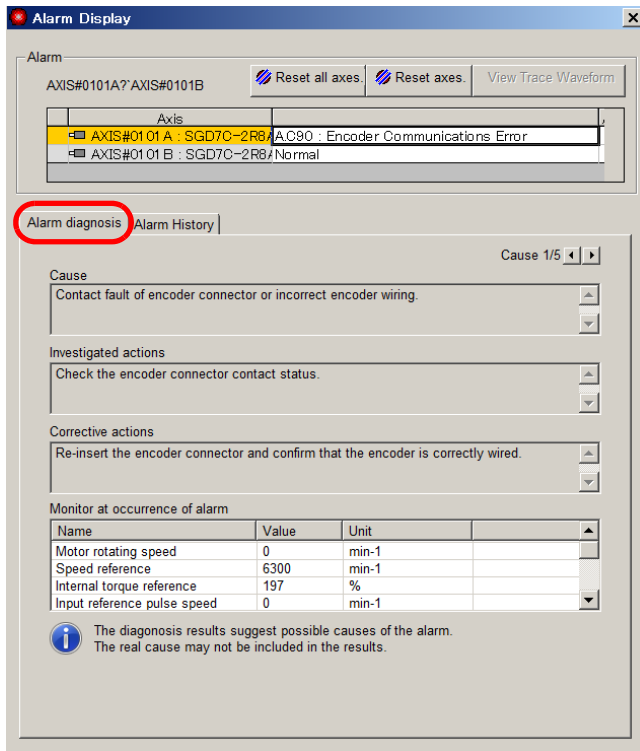
4. If there is more than one cause, click the ◀ or ▶ Button to change the display.
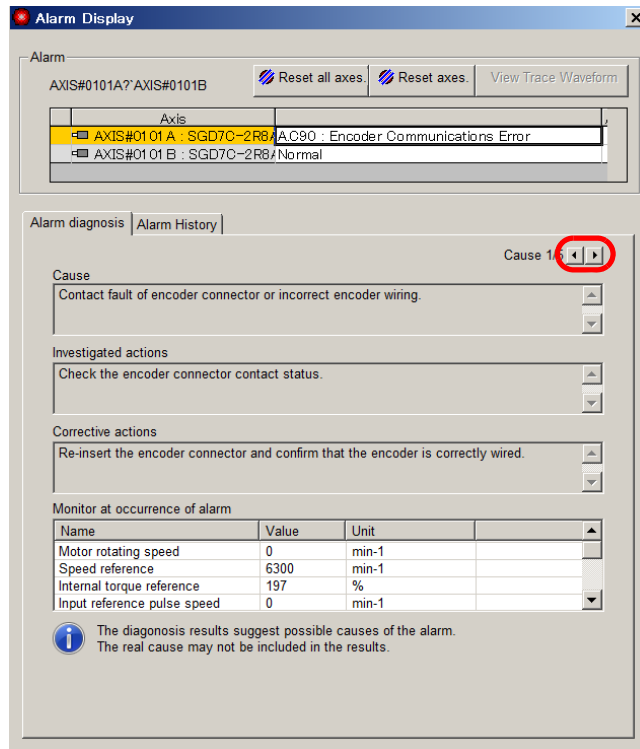
5. After you finish checking the alarm, click the **Close** Button.

This concludes the procedure to investigate alarms.

Troubleshooting Errors in the Servo Section

4

This chapter provides information on the meaning of, causes of, and corrections for alarms and warnings that are related to the Servo Section.

4.1 Troubleshooting Alarms in the Servo Section

This section provides a list of the alarms that are related to the Servo Section and describes the causes and corrections.

4.1.1 List of Alarms

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

Servomotor Stopping Method for Alarms

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

📖 Σ-7-Series Σ-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)

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.

Alarms for Both Axes

If "All Axes" is given below the alarm number, the alarm applies to both axes. If an alarm occurs for one axis, the same alarm status will occur for the other axis.

List of Alarms

Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.020	Parameter Checksum Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
A.021 All Axes	Parameter Format Error	There is an error in the parameter data format in the SERVOPACK.	Gr.1	No
A.022 All Axes	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 All Axes	Main Circuit Detector Error	There is an error in the detection data for the main circuit.	Gr.1	Yes
A.040	Parameter Setting Error	A parameter setting is outside of the setting range.	Gr.1	No
A.042	Parameter Combination Error	The combination of some parameters exceeds the setting range.	Gr.1	No
A.04A	Parameter Setting Error 2	There is an error in the bank member or bank data settings.	Gr.1	No
A.050	Combination Error	The capacities of the SERVOPACK and Servomotor do not match.	Gr.1	Yes
A.051	Unsupported Device Alarm	An unsupported device was connected.	Gr.1	No
A.070	Motor Type Change Detected	The connected motor is a different type of motor from the previously connected motor.	Gr.1	No

Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.080	Linear Encoder Pitch Setting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Gr.1	No
A.0b0	Invalid Servo ON Command Alarm	The servo was turned ON after executing a utility function that supplies power to the motor.	Gr.1	Yes
A.100	Overcurrent Detected	An overcurrent flowed through the power transistor or the heat sink overheated.	Gr.1	No
A.101	Motor Overcurrent Detected	The current to the motor exceeded the allowable current.	Gr.1	No
A.300 All Axes	Regeneration Error	There is an error related to regeneration.	Gr.1	Yes
A.320 All Axes	Regenerative Overload	A regenerative overload occurred.	Gr.2	Yes
A.330 All Axes	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 All Axes	Overvoltage	The main circuit DC voltage is too high.	Gr.1	Yes
A.410 All Axes	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.520	Vibration Alarm	Abnormal oscillation was detected in the motor speed.	Gr.1	Yes
A.521	Autotuning Alarm	Vibration was detected during autotuning for the tuning-less function.	Gr.1	Yes
A.550	Maximum Speed Setting Error	The setting of Pn385 (Maximum Motor Speed) is greater than the maximum motor speed.	Gr.1	Yes
A.710	Instantaneous Overload	The Servomotor was operating for several seconds to several tens of seconds under a torque that largely exceeded the rating.	Gr.2	Yes
A.720	Continuous Overload	The Servomotor was operating continuously under a torque that exceeded the rating.	Gr.1	Yes
A.730 / A.731	Dynamic Brake Overload	When the dynamic brake was applied, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Gr.1	Yes
A.740 All Axes	Inrush Current Limiting Resistor Overload	The main circuit power supply was frequently turned ON and OFF.	Gr.1	Yes
A.7A1 All Axes	Internal Temperature Error 1 (Control Board Temperature Error)	The surrounding temperature of the control PCB is abnormal.	Gr.2	Yes
A.7A2 All Axes	Internal Temperature Error 2 (Power Board Temperature Error)	The surrounding temperature of the power PCB is abnormal.	Gr.2	Yes
A.7A3	Internal Temperature Sensor Error	An error occurred in the temperature sensor circuit.	Gr.2	No
A.7Ab All Axes	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Gr.1	Yes
A.810	Encoder Backup Alarm	The power supplies to the encoder all failed and the position data was lost.	Gr.1	No
A.820	Encoder Checksum Alarm	There is an error in the checksum results for encoder memory.	Gr.1	No
A.830	Encoder Battery Alarm	The battery voltage was lower than the specified level after the control power supply was turned ON.	Gr.1	Yes

Troubleshooting Errors in the Servo Section

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.840	Encoder Data Alarm	There is an internal data error in the encoder.	Gr.1	No
A.850	Encoder Overspeed	The encoder was operating at high speed when the power was turned ON.	Gr.1	No
A.860	Encoder Overheated	The internal temperature of encoder is too high.	Gr.1	No
A.861	Motor Overheated	The internal temperature of motor is too high.	Gr.1	No
A.890	Encoder Scale Error	A failure occurred in the linear encoder.	Gr.1	No
A.891	Encoder Module Error	An error occurred in the linear encoder.	Gr.1	No
A.b33	Current Detection Error 3	An error occurred in the current detection circuit.	Gr.1	No
A.bF0 All Axes	System Alarm 0	Internal program error 0 occurred in the SERVOPACK.	Gr.1	No
A.bF1 All Axes	System Alarm 1	Internal program error 1 occurred in the SERVOPACK.	Gr.1	No
A.bF2 All Axes	System Alarm 2	Internal program error 2 occurred in the SERVOPACK.	Gr.1	No
A.bF3 All Axes	System Alarm 3	Internal program error 3 occurred in the SERVOPACK.	Gr.1	No
A.bF4 All Axes	System Alarm 4	Internal program error 4 occurred in the SERVOPACK.	Gr.1	No
A.bF5 All Axes	System Alarm 5	Internal program error 5 occurred in the SERVOPACK.	Gr.1	No
A.bF6 All Axes	System Alarm 6	Internal program error 6 occurred in the SERVOPACK.	Gr.1	No
A.bF7 All Axes	System Alarm 7	Internal program error 7 occurred in the SERVOPACK.	Gr.1	No
A.bF8 All Axes	System Alarm 8	Internal program error 8 occurred in the SERVOPACK.	Gr.1	No
A.C10	Servomotor Out of Control	The Servomotor ran out of control.	Gr.1	Yes
A.C20	Phase Detection Error	The detection of the phase is not correct.	Gr.1	No
A.C21	Polarity Sensor Error	An error occurred in the polarity sensor.	Gr.1	No
A.C22	Phase Information Disagreement	The phase information does not match.	Gr.1	No
A.C50	Polarity Detection Failure	The polarity detection failed.	Gr.1	No
A.C51	Overtravel Detected during Polarity Detection	The overtravel signal was detected during polarity detection.	Gr.1	Yes
A.C52	Polarity Detection Not Completed	The servo was turned ON before the polarity was detected.	Gr.1	Yes
A.C53	Out of Range of Motion for Polarity Detection	The travel distance exceeded the setting of Pn48E (Polarity Detection Range).	Gr.1	No
A.C54	Polarity Detection Failure 2	The polarity detection failed.	Gr.1	No
A.C80	Encoder Clear Error or Multiturn Limit Setting Error	The multiturn data for the absolute encoder was not correctly cleared or set.	Gr.1	No
A.C90	Encoder Communications Error	Communications between the encoder and SERVOPACK is not possible.	Gr.1	No
A.C91	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculating the position data of the encoder.	Gr.1	No

Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.C92	Encoder Communications Timer Error	An error occurred in the communications timer between the encoder and SERVOPACK.	Gr.1	No
A.CA0	Encoder Parameter Error	The parameters in the encoder are corrupted.	Gr.1	No
A.Cb0	Encoder Echoback Error	The contents of communications with the encoder are incorrect.	Gr.1	No
A.CC0	Multiturn Limit Disagreement	Different multiturn limits have been set in the encoder and the SERVOPACK.	Gr.1	No
A.d00	Position Deviation Overflow	The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation while the servo was ON.	Gr.1	Yes
A.d01	Position Deviation Overflow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Gr.1	Yes
A.d02	Position Deviation Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the error counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if a position reference is input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded before the limit is cleared.	Gr.2	Yes
A.d30	Position Data Overflow	The position feedback data exceeded ±1,879,048,192.	Gr.1	No
A.E00	Built-in Controller Initialization Timeout Error	An initialization timeout error occurred in the Controller Section.	Gr.2	Yes
A.E02 All Axes	Built-in Controller Synchronization Error 1	A synchronization error occurred between the Controller Section and SERVOPACK.	Gr.1	Yes
A.E03	Controller Section Communications Data Error (Checksum Error)	A synchronization error occurred in the Controller Section.	Gr.1	Yes
A.E50*	Built-in Controller Synchronization Error 3	A synchronization error occurred in the Controller Section.	Gr.2	Yes
A.E51 All Axes	Built-in Controller Synchronization Failure	Synchronization failed in the Controller Section.	Gr.2	Yes
A.E61 All Axes	Built-in Controller Synchronization Error 4	An error occurred in the transmission cycle of the Controller Section.	Gr.2	Yes
A.EA2 All Axes	Built-in Controller Synchronization Error 2	A synchronization error occurred between the Controller Section and Servo Section.	Gr.1	Yes
A.Ed1	Built-in Controller Command Timeout Error	A timeout occurred for a communications command in the Controller Section.	Gr.2	Yes
A.F10 All Axes	Power Supply Line Open Phase	The voltage was low for more than one second for phase R, S, or T when the main power supply was ON.	Gr.2	Yes
A.F50	Servomotor Main Circuit Cable Disconnection	The Servomotor did not operate or power was not supplied to it even though the servo was turned ON.	Gr.1	Yes

Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
FL-1* [All Axes]	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
FL-2* [All Axes]				
FL-3* [All Axes]				
FL-4* [All Axes]				
FL-5* [All Axes]				
FL-6* [All Axes]				

* These alarms are not stored in the alarm history. They are only displayed on the panel display.

4.1.2 Troubleshooting Alarms

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

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.020: Parameter Checksum Error (There is an error in the parameter data in the SER-VOPACK.)	The power supply voltage suddenly dropped.	Measure the power supply voltage.	Set the power supply voltage within the specified range, and initialize the parameter settings.	*1
	The power supply was shut OFF while writing parameter settings.	Check the timing of shutting OFF the power supply.	Initialize the parameter settings and then set the parameters again.	
	The number of times that parameters were written exceeded the limit.	Check to see if the parameters were frequently changed from the host controller.	The SERVOPACK may be faulty. Replace the SERVOPACK. Reconsider the method for writing the parameters.	–
	A malfunction was caused by noise from the AC power supply, ground, static electricity, or other source	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, noise may be the cause.	Implement countermeasures against noise.	*1
	Gas, water drops, or cutting oil entered the SERVOPACK and caused failure of the internal components.	Check the installation conditions.	The SERVOPACK may be faulty. Replace the 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 Format Error (There is an error in the parameter data format in the SERVOPACK.)	The software version of the SERVOPACK that caused the alarm is older than the software version of the parameters specified to write.	Read the product information to see if the software versions are the same. If they are different, it could be the cause of the alarm.	Write the parameters from another SERVOPACK with the same model and the same software version, and then turn the power OFF and ON again.	*1
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.022: System Checksum Error (There is an error in the parameter data in the SERVO-PACK.)	The power supply voltage suddenly dropped.	Measure the power supply voltage.	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
	The power supply was shut OFF while setting a utility function.	Check the timing of shutting OFF the power supply.	The SERVOPACK may be faulty. Replace the 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.024: System Alarm (An internal program error occurred in the SERVO-PACK.)	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

Troubleshooting Errors in the Servo Section

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.025: System Alarm (An internal program error occurred in the SERVO-PACK.)	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SER-VOPACK.	–
A.030: Main Circuit Detector Error	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SER-VOPACK.	–
A.040: Parameter Setting Error (A parameter setting is outside of the setting range.)	The SERVOPACK and Servomotor capacities do not match each other.	Check the combination of the SERVOPACK and Servomotor capacities.	Select a proper combination of SERVOPACK and Servomotor capacities.	*1
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SER-VOPACK.	–
	A parameter setting is outside of the setting range.	Check the setting ranges of the parameters that have been changed.	Set the parameters to values within the setting ranges.	–
	The electronic gear ratio is outside of the setting range.	Check the electronic gear ratio. The ratio must be within the following range: 0.001 < (Pn20E/Pn210) < 64,000.	Set the electronic gear ratio in the following range: 0.001 < (Pn20E/Pn210) < 64,000.	*1
	A pin number that does not exist on the SERVOPACK was allocated in Pn590 to Pn5BC. (An alarm will not occur, however, if the signal is disabled.)	For input signals (Pn590 to Pn599), make sure that the allocated pin numbers are between 003 and 014. For output signals (Pn5B0 to Pn5BC), make sure that the allocated pin numbers are between 023 and 031.	Allocate pins that actually exist in Pn590 to Pn5BC.	*1
A.042: Parameter Combination Error	The speed of program jogging went below the setting range when the electronic gear ratio (Pn20E/Pn210) or the Servomotor was changed.	Check to see if the detection conditions[2] are satisfied.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	*1
	The speed of program jogging went below the setting range when Pn533 or Pn585 (Program Jogging Movement Speed) was changed.	Check to see if the detection conditions[2] are satisfied.	Increase the setting of Pn533 or Pn585.	*1
	The travel speed of advanced autotuning went below the setting range when the electronic gear ratio (Pn20E/ Pn210) or the Servomotor was changed.	Check to see if the detection conditions[3] are satisfied.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	*1

Continued from previous page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.04A: Parameter Setting Error 2	For 4-byte parameter bank members, there are two consecutive members with nothing registered.	–	Change the number of bytes for bank members to an appropriate value.	–
	The total amount of bank data exceeds 64 (Pn900 × Pn901 > 64).	–	Reduce the total amount of bank data to 64 or less.	–
A.050: Combination Error (The capacities of the SERVOPACK and Servomotor do not match.)	The SERVOPACK and Servomotor capacities do not match each other.	$1/4 \leq \dfrac{\text{Servomotor capacity}}{\text{SERVOPACK capacity}} \leq 4$ Confirm that the above conditions are met. However, the above formula does not apply to the following products. • SGD7W-2R8A SERVOPACK and SGM7J-A5A Servomotor • SGD7W-2R8A SERVOPACK and SGM7A-A5A Servomotor	Select a proper combination of the SERVOPACK and Servomotor capacities.	*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	The motor parameter file was not written to the linear encoder. (This applies only when not using a Serial Converter Unit.)	Check to see if the motor parameter file was written to the linear encoder.	Write the motor parameter file to the linear encoder.	*1
	An unsupported Serial Converter Unit or encoder is connected to the SERVOPACK.	Check the product combination specifications.	Change to a correct combination of models.	–
A.070: Motor Type Change Detected (The connected motor is a different type of motor from the previously 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.080: Linear Encoder Pitch Setting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Check the setting of Pn282.	Correct the setting of Pn282.	*1
A.0b0: Invalid Servo ON Command Alarm	The servo was turned ON after executing a utility function that supplies power to the motor.	–	Turn the power supply to the SERVOPACK OFF and ON again. Or, execute a software reset.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.100: Overcurrent Detected (An overcurrent flowed through the power transistor or the heat sink overheated.)	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
	There is a short-circuit or ground fault in a Main Circuit Cable.	Check for short-circuits across 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 Servomotor.	
	There is a short-circuit or ground fault inside the SERVOPACK.	Check for short-circuits across the Servomotor connection terminals U, V, and W on the SERVO-PACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	
	The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
	The dynamic brake (DB, emergency stop executed from the SERVOPACK) was frequently activated, or a DB overload alarm occurred.	Check the power consumed by the DB resistor to see how frequently the DB is being used. Or, check the alarm display to see if a DB overload alarm (A.730 or A.731) has occurred.	Change the SERVOPACK model, operating methods, or the mechanisms so that the dynamic brake does not need to be used so frequently.	–
	The regenerative processing capacity was exceeded.	Check the regenerative load ratio on the Sig-maWin+ Motion Monitor Tab Page to see how frequently the regenerative resistor is being used.	Recheck the operating conditions and load.	*4
	The SERVOPACK regenerative resistance is too small.	Check the regenerative load ratio on the Sig-maWin+ Motion Monitor Tab Page to see how frequently the regenerative resistor is being used.	Change the regenerative resistance to a value larger than the SERVO-PACK minimum allowable resistance.	
	A heavy load was applied while the Servomotor was stopped or running at a low speed.	Check to see if the operating conditions exceed Servo Drive specifications.	Reduce the load applied to the Servomotor. Or, increase the operating speed.	–
	A malfunction was caused by noise.	Improve the noise environment, e.g. by improving the wiring or installation conditions, and check to see if the alarm still occurs.	Implement countermeasures against noise, such as correct wiring of the FG. Use an FG wire size equivalent to the SERVO-PACK's main circuit wire size.	–

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.100: Overcurrent Detected (An overcurrent flowed through the power transistor or the heat sink overheated.)	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.101: Motor Overcurrent Detected (The current to the motor exceeded the allowable current.)	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
	There is a short-circuit or ground fault in a Main Circuit Cable.	Check for short-circuits across cable phases U, V, and W, or between the ground and cable phases U, V, and W.	The cable may be short-circuited. Replace the cable.	
	There is a short-circuit or ground fault inside the Servomotor.	Check for short-circuits across Servomotor phases U, V, and W, or between the ground and Servomotor phases U, V, or W.	The Servomotor may be faulty. Replace the Servomotor.	
	There is a short-circuit or ground fault inside the SERVOPACK.	Check for short-circuits across the Servomotor connection terminals U, V, and W on the SERVOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SERVOPACK.	
	A heavy load was applied while the Servomotor was stopped or running at a low speed.	Check to see if the operating conditions exceed Servo Drive specifications.	Reduce the load applied to the Servomotor. Or, increase the operating speed.	–
	A malfunction was caused by noise.	Improve the noise environment, e.g. by improving the wiring or installation conditions, and check to see if the alarm still occurs.	Implement countermeasures against noise, such as correct wiring of the FG. Use an FG wire size equivalent to the SERVOPACK's main circuit wire size.	–
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

Troubleshooting Errors in the Servo Section

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.300: Regeneration Error	The jumper between the regenerative resistor terminals (B2 and B3) was removed.	Confirm to see if the jumper is connected between power supply terminals B2 and B3.	Correctly connect a jumper.	*1
	The External Regenerative Resistor is not wired correctly, or was removed or disconnected.	Check the wiring of the External Regenerative Resistor.	Correct the wiring of the External Regenerative Resistor.	
	A failure occurred in the SERVOPACK.	–	While the main circuit power supply is OFF, turn the control power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.320: Regenerative Overload	The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	–
	The external regenerative resistance value or regenerative resistor capacity is too small, or there has been a continuous regeneration state.	Check the operating conditions or the capacity using the SigmaJunmaSize+ Capacity Selection Software or other means.	Change the regenerative resistance value or capacity. Reconsider the operating conditions using the SigmaJunmaSize+ Capacity Selection Software or other means.	*4
	There was a continuous regeneration state because a negative load was continuously applied.	Check the load applied to the Servomotor during operation.	Reconsider the system including the servo, machine, and operating conditions.	–
	The setting of Pn600 (Regenerative Resistor Capacity) is smaller than the capacity of the External Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn600.	Correct the setting of Pn600.	*1
	The setting of Pn603 (Regenerative Resistance) is smaller than the capacity of the External Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn603.	Correct the setting of Pn603.	*1
	The external regenerative resistance is too high.	Check the regenerative resistance.	Change the regenerative resistance to a correct value or use an External Regenerative Resistor of an appropriate capacity.	*4
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Refer- ence
A.330: Main Circuit Power Supply Wiring Error (Detected when the main circuit power supply is turned ON.)	The regenerative resistor was discon- nected when the SERVOPACK power supply voltage was high.	Measure the resistance of the regenerative resistor using a measuring instru- ment.	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.	–
	DC power was sup- plied when an AC power supply input was specified in the settings.	Check the power supply to see if it is a DC power supply.	Correct the power supply setting to match the actual power supply.	*1
	AC power was sup- plied when a DC power supply input was specified in the settings.	Check the power supply to see if it is an AC power supply.	Correct the power supply setting to match the actual power supply.	
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SER- VOPACK.	–
A.400: Overvoltage (Detected in the main circuit power supply section of the SERVOPACK.)	The power supply voltage exceeded the specified range.	Measure the power sup- ply 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 sup- ply 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.	–
	The voltage for AC power supply was too high during accelera- tion or deceleration.	Check the power supply voltage and the speed and torque during opera- tion.	Set the AC power supply voltage within the speci- fied range.	–
	The external regener- ative resistance is too high for the operating conditions.	Check the operating con- ditions and the regenera- tive resistance.	Select a regenerative resistance value that is appropriate for the oper- ating conditions and load.	*4
	The moment of inertia ratio or mass ratio exceeded the allow- able value.	Check to see if the moment of inertia ratio or mass ratio is within the allowable range.	Increase the deceleration time, or reduce the load.	–
	A failure occurred in the SERVOPACK.	–	While the main circuit power supply is OFF, turn the control power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVO- PACK may be faulty. Replace the SERVO- PACK.	–

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.410: Undervoltage (Detected in the main circuit power supply section of the SERVOPACK.)	The power supply voltage went below the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	–
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	–
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	*1
	The SERVOPACK fuse is blown out.	–	Replace the SERVOPACK and connect a reactor to the DC reactor terminals ($\ominus$1 and $\ominus$2) on the SERVOPACK.	–
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.510: Overspeed (The motor exceeded the maximum speed.)	The order of phases U, V, and W in the motor wiring is not correct.	Check the wiring of the Servomotor.	Make sure that the Servomotor is correctly wired.	–
	A reference value that exceeded the over-speed detection level was input.	Check the input reference.	Reduce the reference value. Or, adjust the gain.	–
	The motor exceeded the maximum speed.	Check the waveform of the motor speed.	Reduce the speed reference input gain and adjust the servo gain. Or, reconsider the operating conditions.	
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.520: Vibration Alarm	Abnormal oscillation was detected in the motor speed.	Check for abnormal motor noise, and check the speed and torque waveforms during operation.	Reduce the motor speed. Or, reduce the setting of Pn100 (Speed Loop Gain).	*1
	The setting of Pn103 (Moment of Inertia Ratio) is greater than the actual moment of inertia or was greatly changed.	Check the moment of inertia ratio or mass ratio.	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	*1
	The vibration detection level (Pn312 or Pn384) is not suitable.	Check that the vibration detection level (Pn312 or Pn384) is suitable.	Set a suitable vibration detection level (Pn312 or Pn384).	*1
A.521: Autotuning Alarm (Vibration was detected while executing the custom tuning, EasyFFT, or the tuning-less function.)	The Servomotor vibrated considerably while performing the tuning-less function.	Check the waveform of the motor speed.	Reduce the load so that the moment of inertia ratio is within the allowable value. Or increase the load level or reduce the rigidity level in the tuning-less level settings.	*1
	The Servomotor vibrated considerably while performing custom tuning or EasyFFT.	Check the waveform of the motor speed.	Check the operating procedure of corresponding function and implement corrections.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Refer-ence
A.550: Maximum Speed Setting Error	The setting of Pn385 (Maximum Motor Speed) is greater than the maximum speed.	Check the setting of Pn385, and the upper limits of the maximum motor speed setting and the encoder output resolution setting.	Set Pn385 to a value that does not exceed the maximum motor speed.	*1
A.710: Instantaneous Overload A.720: Continuous Overload	The wiring is not correct or there is a faulty contact in the motor or encoder wiring.	Check the wiring.	Make sure that the Servomotor and encoder are correctly wired.	*1
	Operation was performed that exceeded the overload protection characteristics.	Check the motor overload characteristics and operation reference.	Reconsider the load and operating conditions. Or, increase the motor capacity.	–
	An excessive load was applied during operation because the Servomotor was not driven because of mechanical problems.	Check the operation reference and motor speed.	Correct the mechanical problem.	–
	There is an error in the setting of Pn282 (Linear Encoder Scale Pitch).	Check the setting of Pn282.	Correct the setting of Pn282.	*1
	There is an error in the setting of Pn080 = n.☐☐X☐ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.☐☐X☐.	Set Pn080 = n.☐☐X☐ to an appropriate value.	*1
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.730 and A.731: Dynamic Brake Overload (An excessive power consumption by the dynamic brake was detected.)	The Servomotor was rotated by an external force.	Check the operation status.	Implement measures to ensure that the motor will not be rotated by an external force.	–
	When the Servomotor was stopped with the dynamic brake, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Check the power consumed by the DB resistor to see how frequently the DB is being used.	Reconsider the following: • Reduce the Servomotor reference speed. • Decrease the moment of inertia ratio or mass ratio. • Reduce the frequency of stopping with the dynamic brake.	–
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.740: Inrush Current Limiting Resistor Overload (The main circuit power supply was frequently turned ON and OFF.)	The allowable frequency of the inrush current limiting resistor was exceeded when the main circuit power supply was turned ON and OFF.	–	Reduce the frequency of turning the main circuit power supply ON and OFF.	–
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.7A1: Internal Temperature Error 1 (Control Board Temperature Error)	The surrounding air temperature is too high.	Check the surrounding temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installation conditions.	*1
	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	–
	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	–
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifications.	*1
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.7A2: Internal Temperature Error 2 (Power Board Temperature Error)	The surrounding temperature is too high.	Check the surrounding air temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installation conditions.	*1
	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	–
	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	–
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifications.	*1
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.7A3: Internal Temperature Sensor Error (An error occurred in the temperature sensor circuit.)	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Refer- ence
A.7Ab: SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVOPACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SER- VOPACK.	–
A.810: Encoder Backup Alarm (Detected at the encoder, but only when an absolute encoder is used.)	The power to the absolute encoder was turned ON for the first time.	Check to see if the power supply was turned ON for the first time.	Set up the encoder.	*1
	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.	
	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 con- nector 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 SER- VOPACK.	–
A.820: Encoder Check- sum Alarm (Detected at the encoder.)	A failure occurred in the encoder.	–	■When Using an Abso- lute Encoder Set up the encoder again. If the alarm still occurs, the Servomotor may be faulty. Replace the Servo- motor. ■When Using a Single- turn Absolute Encoder or Incremental Encoder • The Servomotor may be faulty. Replace the Ser- vomotor. • The linear encoder may be faulty. Replace the linear encoder.	*1
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SER- VOPACK.	–
A.830: Encoder Battery Alarm (The abso- lute encoder bat- tery voltage was lower than the specified level.)	The battery connec- tion is faulty or a bat- tery is not connected.	Check the battery con- nection.	Correct the battery con- nection.	*1
	The battery voltage is lower than the speci- fied value (2.7 V).	Measure the battery volt- age.	Replace the battery.	*1
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SER- VOPACK.	–

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.840: Encoder Data Alarm (Detected at the encoder.)	The encoder malfunctioned.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servomotor or linear encoder.	–
	An error occurred in reading data from the linear encoder.	–	The linear encoder is not mounted within an appropriate tolerance. Correct the mounting of the linear encoder.	–
	Excessive speed occurred in the linear encoder.	–	Control the motor speed within the range specified by the linear encoder manufacturer and then turn ON the control power supply.	–
	The encoder malfunctioned due to noise.	–	Correct the wiring around the encoder by separating the Encoder Cable from the Servomotor Main Circuit Cable or by grounding the encoder.	–
	The polarity sensor is not wired correctly.	Check the wiring of the polarity sensor.	Correct the wiring of the polarity sensor.	–
	The polarity sensor failed.	–	Replace the polarity sensor.	–
A.850: Encoder Overspeed (Detected at the encoder when the control power supply is turned ON.)	Rotary Servomotor: The Servomotor speed was 200 min^{-1} or higher when the control power supply was turned ON.	Check the motor speed when the power supply is turned ON.	Reduce the Servomotor speed to a value less than 200 min^{-1}, and turn ON the control power supply.	–
	Linear Servomotor: The Servomotor exceeded the specified speed when the control power supply was turned ON.	Check the motor speed when the power supply is turned ON.	Control the motor speed within the range specified by the linear encoder manufacturer and then turn ON the control power supply.	–
	A failure occurred in the encoder.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servomotor or linear encoder.	–
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.860: Encoder Overheated (Detected when a Rotary Servomotor, Absolute Linear Encoder, or Direct Drive Servomotor is connected. However, this alarm is not detected for an SGMCS Servomotor with an Incremental Encoder.) (Detected at the encoder.)	The surrounding temperature around the Servomotor is too high.	Measure the surrounding temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40° or less.	–
	The Servomotor load is greater than the rated load.	Use the accumulated load ratio to check the load.	Operate the Servo Drive so that the motor load remains within the specified range.	*1
	A failure occurred in the encoder.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or absolute linear encoder may be faulty. Replace the Servomotor or absolute linear encoder.	–
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.861: Motor Overheated	The surrounding temperature around the Servomotor is too high.	Measure the surrounding temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40° or less.	–
	The Servomotor load is greater than the rated load.	Check the load with the accumulated load ratio on the Motion Monitor Tab Page on the SigmaWin+.	Operate the Servo Drive so that the motor load remains within the specified range.	*1
	A failure occurred in the Serial Converter Unit.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Serial Converter Unit may be faulty. Replace the Serial Converter Unit.	–
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.890: Encoder Scale Error	A failure occurred in the linear encoder.	–	The linear encoder may be faulty. Replace the linear encoder.	–
A.891: Encoder Module Error	A failure occurred in the linear encoder.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the linear encoder may be faulty. Replace the linear encoder.	–
A.b33: Current Detection Error 3	A failure occurred in the current detection circuit.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

Troubleshooting Errors in the Servo Section

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

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

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Continued from previous page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.C50: Polarity Detection Failure	The parameter settings are not correct.	Check the linear encoder specifications and feedback signal status.	The settings of Pn282 (Linear Encoder Scale Pitch) and Pn080 = n.□□X□ (Motor Phase Sequence Selection) may not match the installation. Set the parameters to correct values.	*1
	There is noise on the scale signal.	Check to make sure that the frame grounds of the Serial Converter Unit and Servomotor are connected to the FG terminal on the SERVOPACK and that the FG terminal on the SERVOPACK is connected to the frame ground on the power supply. And, confirm that the shield is properly processed on the Linear Encoder Cable. Check to see if the detection reference is repeatedly output in one direction.	Implement appropriate countermeasures against noise for the Linear Encoder Cable.	–
	An external force was applied to the Moving Coil of the motor.	–	The polarity cannot be properly detected if the detection reference is 0 and the speed feedback is not 0 because of an external force, such as cable tension, applied to the Moving Coil. Implement measures to reduce the external force so that the speed feedback goes to 0. If the external force cannot be reduced, increase the setting of Pn481 (Polarity Detection Speed Loop Gain).	–
	The linear encoder resolution is too low.	Check the linear encoder scale pitch to see if it is within 100 μm.	If the linear encoder scale pitch is 100 μm or higher, the SERVOPACK cannot detect the correct speed feedback. Use a linear encoder scale pitch with higher resolution. (We recommend a pitch of 40 μm or less.) Or, increase the setting of Pn485 (Polarity Detection Reference Speed). However, increasing the setting of Pn485 will increase the Servomotor movement range that is required for polarity detection.	–

Continued on next page.

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

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.C90: Encoder Communications Error	There is a faulty contact in the connector or the connector is not wired correctly for the encoder.	Check the condition of the encoder connector.	Reconnect the encoder connector and check the encoder wiring.	*1
	There is a cable disconnection or short-circuit in the encoder. Or, the cable impedance is outside the specified values.	Check the condition of the Encoder Cable.	Use the Encoder Cable within the specified specifications.	–
	One of the following has occurred: corrosion caused by improper temperature, humidity, or gas, a short-circuit caused by entry of water drops or cutting oil, or faulty contact in connector caused by vibration.	Check the operating environment.	Improve the operating environmental, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	*1
	A malfunction was caused by noise.	–	Correct the wiring around the encoder by separating the Encoder Cable from the Servomotor Main Circuit Cable or by grounding the encoder.	*1
	A failure occurred in the SERVOPACK.	–	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If no alarm occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.C91: Encoder Communications Position Data Acceleration Rate Error	Noise entered on the signal lines because the Encoder Cable is bent or the sheath is damaged.	Check the condition of the Encoder Cable and connectors.	Check the Encoder Cable to see if it is installed correctly.	*1
	The Encoder Cable is bundled with a high-current line or installed near a high-current line.	Check the installation condition of the Encoder Cable.	Confirm that there is no surge voltage on the Encoder Cable.	–
	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Check the installation condition of the Encoder Cable.	Properly ground the machine to separate it from the FG of the encoder.	–

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Refer-ence
A.C92: Encoder Commu-nications Timer Error	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 con-ditions.	Reduce machine vibra-tion. Correctly install the Ser-vomotor or linear encoder.	–
	A failure occurred in the encoder.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo-motor or linear encoder.	–
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.CA0: Encoder Parame-ter Error	A failure occurred in the encoder.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo-motor or linear encoder.	–
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.Cb0: Encoder Echoback Error	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 shielded twisted-pair cables with conductors of at least 0.12 mm^2 (stranded wire).	–
	The Encoder Cable is too long and noise entered on it.	–	• Rotary Servomotors: The Encoder Cable wiring distance must be 50 m max. • Linear Servomotors: The Encoder Cable wiring distance must be 20 m max.	–
	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Check the condition of the Encoder Cable and connectors.	Properly ground the machine to separate it from the FG of the encoder.	–
	Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibration. Correctly install the Servomotor or linear encoder.	–
	A failure occurred in the encoder.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servomotor or linear encoder.	–
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.CC0: Multiturn Limit Disagreement	When using a Direct Drive Servomotor, the setting of Pn205 (Multiturn Limit) does not agree with the encoder.	Check the setting of Pn205.	Correct the setting of Pn205 (0 to 65,535).	*1
	The multiturn limit of the encoder is different from that of the SERVOPACK. Or, the multiturn limit of the SERVOPACK has been changed.	Check the setting in Pn205 of the SERVOPACK.	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 on next page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.d00: Position Deviation Overflow (The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation while the servo was ON.)	The Servomotor U, V, and W wiring is not correct.	Check the wiring of the Servomotor's Main Circuit Cables.	Make sure that there are no faulty connections in the wiring for the Servomotor and encoder.	–
	The position reference speed is too fast.	Reduce the position reference speed and try operating the SERVOPACK.	Reduce the position reference speed or the reference acceleration rate, or reconsider the electronic gear ratio.	*1
	The acceleration of the position reference is too high.	Reduce the reference acceleration and try operating the SERVOPACK.	Reduce the acceleration rate of the position reference using a Controller Section motion command. Or, smooth the position reference acceleration rate by selecting the position reference filter (ACCFIL) with a Controller Section motion command.	–
	The setting of Pn520 (Position Deviation Overflow Alarm Level) is too low for the operating conditions.	Check Pn520 (Position Deviation Overflow Alarm Level) to see if it is set to an appropriate value.	Optimize the setting of Pn520.	*1
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.d01: Position Deviation Overflow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Check the position deviation while the servo is OFF.	Optimize the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON).	*1
A.d02: Position Deviation Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the error counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if a position reference is input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded.	–	Optimize the setting of Pn520 (Position Deviation Overflow Alarm Level). Or, adjust the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON).	
A.d30: Position Data Overflow	The position data exceeded ±1,879,048,192.	Check the input reference pulse counter.	Reconsider the operating specifications.	–

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.E00: Built-in Controller Initialization Time-out Error (An initialization timeout error occurred in the Controller Section.)	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.E02: Built-in Controller Synchronization 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.E03: Controller Section Communications Data Error (A synchronization error occurred in the Controller Section.)	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.E50:[5] Built-in Controller Synchronization Error 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.E51: Built-in Controller Synchronization Failure	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.E61: Built-in Controller Synchronization Error 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.EA2: Built-in Controller Synchronization 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.	–
A.Ed1: Built-in Controller Command Time-out Error	A timeout occurred for a communications command in the Controller Section.	Check the motor status when the command is executed.	Execute the SV_ON or SENS_ON command only when the motor is not operating.	–
		Check the linear encoder status when the command is executed.	Execute the SENS_ON command only when a linear encoder is connected.	–

Continued on next page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
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.)	The three-phase power supply wiring is not correct.	Check the power supply 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 supply.	Balance the power supply by changing phases.	–
	A single-phase power supply was input without specifying a signal-phase AC power supply input (Pn00B = n.□1□□).	Check the power supply and the parameter setting.	Match the parameter setting to the power supply.	*1
	A failure occurred in the SERVOPACK.	–	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.F50: Servomotor Main Circuit Cable Disconnection (The Servomotor did not operate or power was not supplied to it even though the servo was turned ON.)	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
	The wiring is not correct or there is a faulty contact in the motor wiring.	Check the wiring.	Make sure that the Servomotor is correctly wired.	*1
FL-1:[*5] System Alarm FL-2:[*5] System Alarm FL-3:[*5] System Alarm FL-4:[*5] System Alarm FL-5:[*5] System Alarm 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.	–

*1. Refer to the following manual for details.
  📖 Σ-7-Series Σ-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)

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

  • $Pn533 \text{ [min}^{-1}] \times \dfrac{\text{Encoder Resolution}}{6 \times 10^5} \leq \dfrac{Pn20E}{Pn210}$

  • $\text{Maximum Motor Speed [min}^{-1}] \times \dfrac{\text{Encoder Resolution}}{\text{Approx. } 3.66 \times 10^{12}} \geq \dfrac{Pn20E}{Pn210}$

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

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

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

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*3. Detection Conditions
  • Rotary Servomotors
    If either of the following conditions is detected, an alarm will occur.

  • Rated motor speed [min⁻¹] × 1/3 × $\dfrac{\text{Encoder Resolution}}{6 \times 10^5}$ ≤ $\dfrac{\text{Pn20E}}{\text{Pn210}}$

  • Maximum Motor Speed [min⁻¹] × $\dfrac{\text{Encoder Resolution}}{\text{Approx. } 3.66 \times 10^{12}}$ ≥ $\dfrac{\text{Pn20E}}{\text{Pn210}}$

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

  • $\dfrac{\text{Rated motor speed [mm/s]} \times 1/3}{\text{Linear encoder pitch [μm]}}$ × $\dfrac{\text{Resolution of Serial Converter Unit}}{10}$ ≤ $\dfrac{\text{Pn20E}}{\text{Pn210}}$

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

*4. Refer to the following manual for details.
   📖 Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

*5. These alarms are not stored in the alarm history. They are only displayed on the panel display.

4.2 Troubleshooting Warnings in the Servo Section

If a warning occurs in the Servo Section, 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.

4.2.1 List of Warnings

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

If "All Axes" is given below the warning number, the warning applies to both axes. If a warning occurs for one axis, the same warning status will occur for the other axis.

Warning Number	Warning Name	Meaning	Resetting
A.900	Position Deviation Overflow	The position deviation exceeded the parameter settings (Pn520 × Pn51E/100).	Required.
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation exceeded the parameter settings (Pn526 × Pn528/100) when the servo was turned ON.	Required.
A.910	Overload	This warning occurs before an overload alarm (A.710 or A.720) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.911	Vibration	Abnormal vibration was detected during motor operation. The detection level is the same as A.520. Set whether to output an alarm or a warning by setting Pn310 (Vibration Detection Selections).	Required.
A.912 All Axes	Internal Temperature Warning 1 (Control Board Temperature Error)	The surrounding temperature of the control PCB is abnormal.	Required.
A.913 All Axes	Internal Temperature Warning 2 (Power Board Temperature Error)	The surrounding temperature of the power PCB is abnormal.	Required.
A.920 All Axes	Regenerative Overload	This warning occurs before an A.320 alarm (Regenerative Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.921	Dynamic Brake Overload	This warning occurs before an A.731 alarm (Dynamic Brake Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.923 All Axes	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Required.
A.930	Absolute Encoder Battery Error	This warning occurs when the voltage of absolute encoder's battery is low.	Required.
A.942	Speed Ripple Compensation Information Disagreement	The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	Required.
A.94A	Built-in Controller Data Setting Warning 1 (Parameter Number Error)	There is an error in the parameter number.	Automatically reset.
A.94b	Built-in Controller Data Setting Warning 2 (Data Out of Range)	The command data is out of range.	Automatically reset.

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Warning Number	Warning Name	Meaning	Resetting
A.94C	Built-in Controller Data Setting Warning 3 (Calculation Error)	A calculation error was detected.	Automatically reset.
A.94d	Built-in Controller Data Setting Warning 4 (Parameter Size)	The data sizes do not match.	Automatically reset.
A.94E	Built-in Controller Data Setting Warning 5 (Latch Mode Error)	A latch mode error was detected.	Required.
A.95A	Built-in Controller Command Warning 1 (Unsatisfied Command Conditions)	A command was sent when the conditions for sending a command were not satisfied.	Automatically reset.
A.95b	Built-in Controller Command Warning 2 (Unsupported Command)	An unsupported command was sent.	Automatically reset.
A.95d	Built-in Controller Command Warning 4 (Command Interference)	There was command interference, particularly latch command interference.	Automatically reset.
A.95E	Built-in Controller Command Warning 5 (Subcommand Not Possible)	The subcommand and main command interfere with each other.	Automatically reset.
A.95F	Built-in Controller Command Warning 6 (Undefined Command)	An undefined command was sent.	Automatically reset.
A.971 [All Axes]	Undervoltage	This warning occurs before an A.410 alarm (Undervoltage) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.97A	Built-in Controller 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 [All Axes]	Preventative Maintenance Warning	One of the consumable parts has reached the end of its service life.	Required.

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	Reference
A.911	Pn310 = n.□□□X (Vibration Detection Selection)	*
A.923	– (Not affected by the setting of Pn008 = n.□X□□.)	–
A.930	Pn008 = n.□□□X (Low Battery Voltage Alarm/Warning Selection)	*
A.942	Pn423 = n.□□X□ (Speed Ripple Compensation Information Disagreement Warning Detection Selection)	*
A.94A to A.95F and A.97A to A.97b	Pn800=n.□□X□ (Warning Check Masks)	*
A.971	Pn008 = n.□□X□ (Function Selection for Undervoltage) (Not affected by the setting of Pn008 = n.□X□□.)	*
A.9A0	Pn00D = n.X□□□ (Overtravel Warning Detection Selection) (Not affected by the setting of Pn008 = n.□X□□.)	*
A.9b0	Pn00F = n.□□□X (Preventative Maintenance Selection)	*

* Refer to the following manual for details.
  📖 Σ-7-Series Σ-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)

4.2.2 Troubleshooting Warnings

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

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

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

Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Refer- ence
A.912: Internal Temperature Warning 1 (Control Board Temperature Error)	The surrounding temperature is too high.	Check the surrounding temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installation conditions.	*
	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	–
	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	–
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifications.	*
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.913: Internal Temperature Warning 2 (Power Board Temperature Error)	The surrounding temperature is too high.	Check the surrounding air temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installation conditions.	*
	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	–
	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	–
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifications.	*
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

Troubleshooting Errors in the Servo Section

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.920: Regenerative Overload (warning before an A.320 alarm occurs)	The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	–
	There is insufficient external regenerative resistance, regenerative resistor capacity, or SERVOPACK capacity, or there has been a continuous regeneration state.	Check the operating conditions or the capacity using the SigmaJunmaSize+ Capacity Selection Software or another means.	Change the regenerative resistance value, regenerative resistance capacity, or SERVOPACK capacity. Reconsider the operating conditions using the SigmaJunmaSize+ Capacity Selection Software or other means.	–
	There was a continuous regeneration state because a negative load was continuously applied.	Check the load applied to the Servomotor during operation.	Reconsider the system including the servo, machine, and operating conditions.	–
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 external force.	–
	When the Servomotor was stopped with the dynamic brake, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Check the power consumed by the DB resistor to see how frequently the DB is being used.	Reconsider the following: • Reduce the Servomotor reference speed. • Decrease the moment of inertia or mass. • Reduce the frequency of stopping with the dynamic brake.	–
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.923: SERVOPACK Built-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.	–
A.930: Absolute Encoder Battery Error (The absolute encoder battery voltage was lower than the specified level.) (Detected only when an absolute encoder is connected.)	The battery connection is faulty or a battery is not connected.	Check the battery connection.	Correct the battery connection.	*
	The battery voltage is lower than the specified value (2.7 V).	Measure the battery voltage.	Replace the battery.	*
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.942: Speed Ripple Compensation Information Disagreement	The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	–	Reset the speed ripple compensation value on the SigmaWin+.	*
		–	Set Pn423 to n.□□1□ (Do not detect A.942 alarms). However, changing the setting may increase the speed ripple.	*
		–	Set Pn423 to n.□□□0 (Disable speed ripple compensation). However, changing the setting may increase the speed ripple.	*
A.94A: Built-in Controller Data Setting Warning 1 (Parameter Number Error)	An invalid parameter number was used.	Check the command that caused the warning.	Use the correct parameter number.	*
A.94b: Built-in Controller Data Setting Warning 2 (Data Out of Range)	The set command data was clamped to the minimum or maximum value of the setting range.	Check the command that caused the warning.	Set the parameter within the setting range.	*
A.94C: Built-in Controller Data Setting Warning 3 (Calculation Error)	The calculation result of the setting is not correct.	Check the command that caused the warning.	Set the parameter within the setting range.	*
A.94d: Built-in Controller Data Setting Warning 4 (Parameter Size)	The parameter size set in the command is not correct.	Check the command that caused the warning.	Set the correct parameter size.	*
A.94E: Built-in Controller Data Setting Warning 5 (Latch Mode Error)	A latch mode error was detected.	Check the command that caused the warning.	Correct the setting of Pn850.	*
A.95A: Built-in Controller Command Warning 1 (Unsatisfied Command Conditions)	The command conditions are not satisfied.	Check the command that caused the warning.	Send the command after the command conditions are satisfied.	*
A.95b: Built-in Controller Command Warning 2 (Unsupported Command)	An unsupported command was received.	Check the command that caused the warning.	Do not send unsupported commands.	*
A.95d: Built-in Controller Command Warning 4 (Command Interference)	The command sending conditions for latch-related commands was not satisfied.	Check the command that caused the warning.	Send the command after the command conditions are satisfied.	*

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.95E: Built-in Controller Command Warning 5 (Subcommand Not Possible)	The command sending conditions for subcommands was not satisfied.	Check the command that caused the warning.	Send the command after the command conditions are satisfied.	*
A.95F: Built-in Controller Command Warning 6 (Undefined Command)	An undefined command was sent.	Check the command that caused the warning.	Do not send undefined commands.	*
A.971: Undervoltage	For a 200-V SERVOPACK, the AC power supply voltage dropped below 140 V.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	–
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	–
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	*
	The SERVOPACK fuse is blown out.	–	Replace the SERVOPACK and connect a reactor.	*
	A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A.97A: Built-in Controller Command Warning 7 (Phase Error)	A command that cannot be executed in the current phase was sent.	–	Send the command after the conditions are satisfied.	–
A.97b: Data Clamp Out of Range	The set command data was clamped to the minimum or maximum value of the setting range.	–	Set the command data within the setting ranges.	–
A.9A0: Overtravel (Overtravel status was detected.)	Overtravel was detected while the servo was ON.	Check the status of the overtravel signals on the input signal monitor.	Even if an overtravel signal is not shown by the input signal monitor, momentary overtravel may have been detected. Take the following precautions. • Do not specify movements that would cause overtravel from the SVD. • Check the wiring of the overtravel signals. • Implement countermeasures against noise.	*
A.9b0: Preventative Maintenance Warning	One of the consumable parts has reached the end of its service life.	–	Replace the part. Contact your Yaskawa representative for replacement.	*

* Refer to the following manual for details.
  📖 Σ-7-Series Σ-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)

Troubleshooting Based on the Operation and Conditions of the Servomotor

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

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

Problem	Possible Cause	Confirmation	Correction	Reference
Servomotor Does Not Start	The control power supply is not turned ON.	Measure the voltage between control power supply terminals.	Correct the wiring so that the control power supply is turned ON.	–
	The main circuit power supply is not turned ON.	Measure the voltage between the main circuit power input terminals.	Correct the wiring so that the main circuit power supply is turned ON.	–
	The I/O signal connector (CN1) pins are not wired correctly or are disconnected.	Check the wiring condition of the I/O signal connector (CN1) pins.	Correct the wiring of the I/O signal connector (CN1) pins.	*
	The wiring for the Servomotor Main Circuit Cables or Encoder Cable is disconnected.	Check the wiring conditions.	Wire the Serial Converter Unit correctly.	–
	There is an overload on the Servomotor.	Operate the Servomotor with no load and check the load status.	Reduce the load or replace the Servomotor with a Servomotor with a larger capacity.	–
	The type of encoder that is being used does not agree with the setting of Pn002 = n.☐X☐☐ (Encoder Usage).	Check the type of the encoder that is being used and the setting of Pn002 = n.☐X☐☐.	Set Pn002 = n.☐X☐☐ according to the type of the encoder that is being used.	*
	There is a mistake in the input signal allocations (Pn50A, Pn50B, Pn511, Pn516, or Pn590 to Pn599).	Check the input signal allocations (Pn50A, Pn50B, Pn511, Pn516, and Pn590 to Pn599).	Correctly allocate the input signals (Pn50A, Pn50B, Pn511, Pn516, and Pn590 to Pn599).	*
	The servo is not ON.	Check if the servo was turned ON.	Turn ON the servo.	–
	The SENS_ON (Turn ON Servo) command was not sent.	Check the commands sent from the host controller.	Send the commands to the SERVOPACK in the correct sequence.	–
	The P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal is still OFF.	Check the P-OT and N-OT signals.	Turn ON the P-OT or N-OT signal.	*
	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.	–	Replace the SERVOPACK.	–

Troubleshooting Errors in the Servo Section

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Problem	Possible Cause	Confirmation	Correction	Reference
Servomotor Does Not Start	The polarity detection was not executed.	Check the setting of Pn080 =n.□□□X (Polarity Sensor Selection).	Correct the parameter setting.	*
		Check the servo ON input.	• If you are using an incremental linear encoder, input a servo ON signal. • If you are using an absolute linear encoder, execute polarity detection.	*
Servomotor Moves Instantaneously, and Then Stops	There is a mistake in the Servomotor wiring.	Check the wiring.	Wire the cable correctly.	–
	There is a mistake in the wiring of the encoder or Serial Converter Unit.	Check the wiring.	Wire the cable correctly.	–
	There is a mistake in the linear encoder wiring.	Check the wiring.	Wire the cable correctly.	–
	The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282.	Correct the setting of Pn282.	*
	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the directions.	Change the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Match the linear encoder direction and Servomotor direction.	*
	Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between ±10°.	Correct the settings for the polarity detection-related parameters.	–
Servomotor Operation Is Unstable	There is a faulty connection in the Servomotor wiring.	The connector connections for the power line (U, V, and W phases) and the encoder or Serial Converter Unit may be unstable. Check the wiring.	Tighten any loose terminals or connectors and correct the wiring.	–
Servomotor Moves without a Reference Input	A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–
	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the directions.	Change the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Match the linear encoder direction and Servomotor direction.	*
	Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between ±10°.	Correct the settings for the polarity detection-related parameters.	–

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Problem	Possible Cause	Confirmation	Correction	Reference
Dynamic Brake Does Not Operate	The setting of Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms) is not suitable.	Check the setting of Pn001 = n.□□□X.	Set Pn001 = n.□□□X correctly.	–
	The dynamic brake resistor is disconnected.	Check the moment of inertia, motor speed, and dynamic brake frequency of use. If the moment of inertia, motor speed, or dynamic brake frequency of use is excessive, the dynamic brake resistance may be disconnected.	Replace the SERVO-PACK. To prevent disconnection, reduce the load.	–
	There was a failure in the dynamic brake drive circuit.	–	There is a defective component in the dynamic brake circuit. Replace the SERVOPACK.	–
Abnormal Noise from Servomotor	The Servomotor vibrated considerably while performing the tuning-less function with the default settings.	Check the waveform of the motor speed.	Reduce the load so that the moment of inertia ratio or mass ratio is within the allowable value, or increase the load level or reduce the rigidity level in the tuning-less level settings.	*
	The machine mounting is not secure.	Check to see if there are any loose mounting screws.	Tighten the mounting screws.	–
	The machine mounting is not secure.	Check to see if there is misalignment in the coupling.	Align the coupling.	–
		Check to see if the coupling is balanced.	Balance the coupling.	–
	The bearings are defective.	Check for noise and vibration around the bearings.	Replace the Servomotor.	–
	There is a vibration source at the driven machine.	Check for any foreign matter, damage, or deformation in the machine's moving parts.	Consult with the machine manufacturer.	–
	Noise interference occurred because of incorrect I/O signal cable specifications.	Check the I/O signal cables to see if they satisfy specifications. Use shielded twisted-pair 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.	Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	–
	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if is satisfies specifications. Use shielded twisted-pair cables with conductors of at least 0.12 mm^2 (stranded wire).	Use cables that satisfy the specifications.	–

Troubleshooting Errors in the Servo Section

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Problem	Possible Cause	Confirmation	Correction	Reference
Abnormal Noise from Servomotor	Noise interference occurred because the Encoder Cable is too long.	Check the length of the Encoder Cable.	• Rotary Servomotors: The Encoder Cable length must be 50 m max. • Linear Servomotors: Make sure that the Serial Converter Unit cable is no longer than 20 m and that the Linear Encoder Cable and the Sensor Cable are no longer than 15 m each.	–
	Noise interference occurred because the Encoder Cable is damaged.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	–
	The Encoder Cable was subjected to excessive noise interference.	Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable layout so that no surge is applied by high-current lines.	–
	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	–
	There is a SERVOPACK pulse counting error due to noise.	Check to see if there is noise interference on the signal line from the encoder.	Implement countermeasures against noise for the encoder wiring.	–
	The encoder was subjected to excessive vibration or shock.	Check to see if vibration from the machine occurred. Check the Servomotor installation (mounting surface precision, securing state, and alignment). Check the linear encoder installation (mounting surface precision and securing method).	Reduce machine vibration. Improve the mounting state of the Servomotor or linear encoder.	–
	A failure occurred in the encoder.	–	Replace the Servomotor.	–
	A failure occurred in the Serial Converter Unit.	–	Replace the Serial Converter Unit.	–
	A failure occurred in the linear encoder.	–	Replace the linear encoder.	–

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

Troubleshooting Errors in the Servo Section

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Problem	Possible Cause	Confirmation	Correction	Reference
Absolute Encoder Position Deviation Error (There is deviation between the position where the power supply was turned OFF that was stored in the SVD, and the position where the power supply was next turned ON.)	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if is satisfies specifications. Use shielded 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.	Check the length of the Encoder Cable.	• Rotary Servomotors: The Encoder Cable length must be 50 m max. • Linear Servomotors: Make sure that the Serial Converter Unit cable is no longer than 20 m and that the Linear Encoder Cable and the Sensor Cable are no longer than 15 m each.	–
	Noise interference occurred because the Encoder Cable is damaged.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	–
	The Encoder Cable was subjected to excessive noise interference.	Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable layout so that no surge is applied by high-current lines.	–
	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	–
	There is a SERVOPACK pulse counting error due to noise.	Check to see if there is noise interference on the I/O signal line from the encoder or Serial Converter Unit.	Implement countermeasures against noise for the encoder or Serial Converter Unit wiring.	–
	The encoder was subjected to excessive vibration or shock.	Check to see if vibration from the machine occurred. Check the Servomotor installation (mounting surface precision, securing state, and alignment). Check the linear encoder installation (mounting surface precision and securing method).	Reduce machine vibration. Improve the mounting state of the Servomotor or linear encoder.	–
	A failure occurred in the encoder.	–	Replace the Servomotor or linear encoder.	–
	A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–

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Problem	Possible Cause	Confirmation	Correction	Reference
Overtravel Occurred	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal was input.	Check the external power supply (+24 V) voltage for the input signals.	Correct the external power supply (+24 V) voltage for the input signals.	–
		Check the operating condition of the overtravel limit switches.	Make sure that the overtravel limit switches operate correctly.	–
		Check the wiring of the overtravel limit switches.	Correct the wiring of the overtravel limit switches.	*
		Check the settings of the overtravel input signal allocations (Pn50A/Pn50B or Pn590/Pn591).	Set the parameters to correct values.	*
	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal malfunctioned.	Check for fluctuation in the external power supply (+24 V) voltage for the input signals.	Eliminate fluctuation from the external power supply (+24 V) voltage for the input signals.	–
		Check to see if the operation of the overtravel limit switches is unstable.	Stabilize the operating condition of the overtravel limit switches.	–
		Check the wiring of the overtravel limit switches (e.g., check for cable damage and loose screws).	Correct the wiring of the overtravel limit switches.	–
	There is a mistake in the allocation of the P-OT or N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal in Pn50A = n.X□□□ or Pn50B = n.□□□X.	Check to see if the P-OT signal is allocated in Pn50A = n.X□□□.	If another signal is allocated in Pn50A =n.X□□□, allocate the P-OT signal instead.	*
		Check to see if the N-OT signal is allocated in Pn50B = n.□□□X.	If another signal is allocated in Pn50B =n.□□□X, allocate the N-OT signal instead.	
	The selection of the Servomotor stopping method is not correct.	Check the servo OFF stopping method set in Pn001 = n.□□□X or Pn001 = n.□□X□.	Select a Servomotor stopping method other than coasting to a stop.	*
		Check the torque control stopping method set in Pn001 = n.□□□X or Pn001 = n.□□X□.	Select a Servomotor stopping method other than coasting to a stop.	
Improper Stop Position for Overtravel (OT) Signal	The limit switch position and dog length are not appropriate.	–	Install the limit switch at the appropriate position.	–
	The overtravel limit switch position is too close for the coasting distance.	–	Install the overtravel limit switch at the appropriate position.	–

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Problem	Possible Cause	Confirmation	Correction	Reference
Position Deviation (without Alarm)	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if is satisfies specifications. Use shielded 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.	Check the length of the Encoder Cable.	• Rotary Servomotors: The Encoder Cable length must be 50 m max. • Linear Servomotors: Make sure that the Serial Converter Unit cable is no longer than 20 m and that the Linear Encoder Cable and the Sensor Cable are no longer than 15 m each.	–
	Noise interference occurred because the Encoder Cable is damaged.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	–
	The Encoder Cable was subjected to excessive noise interference.	Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable layout so that no surge is applied by high-current lines.	–
	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	–
	There is a SERVOPACK pulse counting error due to noise.	Check to see if there is noise interference on the I/O signal line from the encoder or Serial Converter Unit.	Implement countermeasures against noise for the encoder wiring or Serial Converter Unit wiring.	–
	The encoder was subjected to excessive vibration or shock.	Check to see if vibration from the machine occurred. Check the Servomotor installation (mounting surface precision, securing state, and alignment). Check the linear encoder installation (mounting surface precision and securing method).	Reduce machine vibration. Improve the mounting state of the Servomotor or linear encoder.	–
	The coupling between the machine and Servomotor is not suitable.	Check to see if position offset occurs at the coupling between machine and Servomotor.	Correctly secure the coupling between the machine and Servomotor.	–

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Problem	Possible Cause	Confirmation	Correction	Reference
Position Deviation (without Alarm)	Noise interference occurred because of incorrect I/O signal cable specifications.	Check the I/O signal cables to see if they satisfy specifications. Use shielded 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.	Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	–
	An encoder fault occurred. (The pulse count does not change.)	–	Replace the Servomotor or linear encoder.	–
	A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–
Servomotor Overheated	The surrounding air temperature is too high.	Measure the surrounding temperature around the Servomotor.	Reduce the surrounding air temperature to 40°C or less.	–
	The surface of the Servomotor is dirty.	Visually check the surface for dirt.	Clean dirt, dust, and oil from the surface.	–
	There is an overload on the Servomotor.	Check the load status with a monitor.	If the Servomotor is overloaded, reduce the load or replace the Servo Drive with a SERVOPACK and Servomotor with larger capacities.	–
	Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between ±10°.	Correct the settings for the polarity detection-related parameters.	–

* Refer to the following manual for details.
   Σ-7-Series Σ-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)

Troubleshooting Errors in the Controller Section

5

This chapter provides information on the meaning of, causes of, and corrections for errors and alarms that are related to the Controller Section.

5.1 List of Alarms and Errors

If an alarm or error occurs, you can check the meaning of the error on the 7-segment display. The following table shows the display patterns on the 7-segment display and the errors that are displayed.

Display	Classification	Error/Alarm
CE followed by the error code	System errors	A 3-digit error code will be displayed after "CE." CE001: Watchdog Timer Timeout CE051: Module Synchronization Error CE071: Unsupported Module Detected Error CE081: CPU Fatal Internal Temperature Error 1 CE082: CPU Fatal Internal Temperature Error 2 CE090: Hardware Error 1 CE091: Hardware Error 2 CE092: Hardware Error 3
CA followed by the error code	Alarms	A 3-digit error code will be displayed after "CA." CA001: Operation Error in DWG.A CA002: Operation Error in DWG.I CA003: Operation Error in DWG.H CA005: Operation Error in DWG.L CA101: I/O Error on Rack 1 CA230: Hardware Error 4 CA241: Internal Temperature Rise Detected CA242: EDLC Voltage Error CA301: USB Writing Error CA302: USB Reading Error CA303: Security Error CA304: User Program Memory Diagnosis Error CA305: No Batch Load Folder CA306: Load File-Model Inconsistency Error CA307: Load Error for Load Prohibition (Program Write Protection) CA308: Load File Writing Error CA309: Flash Memory Save Error CA30A: Save File Reading Error CA30B: No USB Memory Device Error CA370: Logging Folder Creation Error CA371: Logging File Creation Error CA372: Logging File Writing Error CA401: M-III Restriction Condition Error CA404: M-III Station Address Duplication

5.2 Troubleshooting Alarms and Error

The following table describes the causes and corrections for alarms and errors that appear on the display.

Alarm Code and Alarm Name (Alarm Description)	Cause	Confirmation	Correction
CE001: Watchdog Timer Timeout	There is an infinite loop in a ladder program.	Check the FOR and WHILE instructions to see if there is the possibility of an infinite loop. Turn ON the STOP switch and turn the power supply OFF and ON again.	Correct the ladder program.
	The maximum values of the scan times do not meet the following conditions. • The settings of both the high-speed (H) scan and the low-speed (L) scan must not exceed the maximum values. • The settings must not exceed 1.25 times the maximum values.	Check the relation between the settings and maximum values of both the high-speed (H) scan and the low-speed (L) scan. You can check the settings and maximum values of the high-speed (H) scan and the low-speed (L) scan in SW00004 to SW00012.	Check the settings of the scan times.
	The Controller Section is faulty.	Turn the power supply OFF and ON again and see if the alarm still occurs. If the alarm still occurs, the SERVOPACK may be faulty.	Replace the SERVOPACK.
CE051: Module Synchronization Error	A synchronization error occurred for an Option Module.	Turn the power supply OFF and ON again to see if an alarm occurs. If an alarm occurs even after the power supply is turned OFF and ON again several times, the Option Module may be faulty.	Check the SW00076 system register to identify the Option Module with the error and replace the Option Module.
CE071: Unsupported Module Detected Error	A Module that cannot be used is mounted.	Check for a Module that cannot be used (i.e., is not supported).	Remove the Module that cannot be used.
CE081: CPU Fatal Internal Temperature Error 1	The temperature continued to increase after CA241 was detected and is approaching the permissible temperature of the internal parts.	Check SB00041F (Temperature Warning).	Change the installation environment to reduce the surrounding air temperature of the CPU. If the CPU temperature increases and causes an error, turn OFF the power supply to the SERVOPACK and improve the installation environment.
CE082: CPU Fatal Internal Temperature Error 2	The temperature continued to increase after CE081 was detected and has reached the permissible temperature of the internal parts.		
CE090: Hardware Error 1	A hardware error occurred.	Turn the power supply OFF and ON again.	If the error continues to occur even after the power supply is turned OFF and ON again several times, the hardware is faulty. Replace the SERVOPACK.
CE091: Hardware Error 2			
CE092: Hardware Error 3			

Alarm Code and Alarm Name (Alarm Description)	Cause	Confirmation	Correction
CA001: Operation Error in DWG.A	An operation occurred in DWG.A.	Check the error that occurred in SW00081 (Error Code).	Correct the ladder program.
CA002: Operation Error in DWG.I	An operation occurred in DWG.I.	Check the error that occurred in SW00083 (Error Code).	
CA003: Operation Error in DWG.H	An operation occurred in DWG.H.	Check the error that occurred in SW00085 (Error Code).	
CA005: Operation Error in DWG.L	An operation occurred in DWG.L.	Check the error that occurred in SW00089 (Error Code).	
CA101: I/O Error on Rack 1	An I/O error occurred on the main rack (rack 1).	Check the error that occurred in System I/O Error Status (SW09560 to SW13699) and determine the I/O Module in which the error occurred.	Remove cause of the I/O error based on the specific error that occurred.
CA230: Hardware Error 4	A hardware error occurred.	Turn the power supply OFF and ON again.	If the error continues to occur even after the power supply is turned OFF and ON again several times, the hardware is faulty. Replace the SERVOPACK.
CA241: Internal Temperature Rise Detected	The temperature of the Controller Section is close to the operating limit temperature.	Check SB00041F (Temperature Warning).	Change the installation environment to reduce the temperature around the Controller Section. If the Controller Section temperature increases and causes an error, turn OFF the power supply to the SERVOPACK and improve the installation environment.
CA242: EDLC Voltage Error	An overvoltage was applied to the electric double-layer capacitor.	Check SW15808 (Capacity of Electric Double-Layer Capacitor) and SB158100 (Voltage Status).	The electric double-layer capacitor is faulty. Replace the SERVOPACK.
CA301: USB Writing Error	Data could not be written to a file in USB memory.	Check to see if the USB memory device is inserted properly.	Insert the USB memory device again.
		Check the USB memory device.	Check the capacity of the USB memory and see if there is available space.
CA302: USB Reading Error	Data could not be read from a file in USB memory.	Check to see if the USB memory device is inserted properly.	Insert the USB memory device again.
		Check the USB memory device.	Check the capacity of the USB memory and see if there is available space.
CA303: Security Error	Loading was attempted when online security was enabled.	Check the online security settings.	Release online security.

Alarm Code and Alarm Name (Alarm Description)	Cause	Confirmation	Correction
CA304: User Program Memory Diagnosis Error	An error was found in the user memory data saved in flash memory.	Turn ON the INIT switch, turn the power supply OFF and ON again, and try saving to flash memory again. If the alarm still occurs, the flash memory may be faulty.	Replace the SERVO-PACK.
CA305: No Batch Load Folder	There is no batch load data in the USB memory.	Check the USB memory device.	Transfer the project from the MPE720 to USB memory again.
CA306: Load File-Model Inconsistency Error	The model of the file for batch loading from USB memory does not match.	Check the USB memory device.	Transfer the project from the MPE720 to USB memory again.
CA307: Load Error for Load Prohibition (Program Write Protection)	Batch loading was attempted when the program was write protected.	Check the Program Write Protection Setting in the System Settings under the Environment Settings.	Change the Program Write Protection Setting to enable writing and try the batch load operation again.
CA308: Load File Writing Error	Data could not be written to the SERVOPACK for a batch loading operation.	Check the available space in the SERVOPACK.	Review the batch transfer data.
CA309: Flash Memory Save Error	Data could not be saved to flash memory in the SER-VOPACK for a batch loading operation.	Turn the power supply OFF and ON again and try the batch loading operation again. If saving the data to flash memory fails even after several attempts, the SER-VOPACK may be faulty.	Replace the SERVO-PACK.
CA30A: Save File Reading Error	Data could not be read from the SERVOPACK for a batch saving operation.	Turn the power supply OFF and ON again and try the batch saving operation again. (Check this by turning ON the INIT switch.) If reading data fails even after several attempts, the SERVOPACK may be faulty.	Replace the SERVO-PACK.
CA30B: No USB Memory Device Error	• A USB memory device was not inserted in the SERVOPACK when a batch loading operation was performed. • A USB memory device was not inserted in the SERVOPACK when a batch saving operation was performed.	Check to see if the USB memory device is inserted properly.	Insert the USB memory device again.
CA370: Logging Folder Creation Error	A folder could not be created in USB memory.	Check to see if the USB memory device is inserted properly.	Insert the USB memory device again.
		Check the USB memory device.	Check the capacity of the USB memory and see if there is available space.
CA371: Logging File Creation Error	A file could not be created in USB memory.	Check to see if the USB memory device is inserted properly.	Insert the USB memory device again.
		Check the USB memory device.	Check the capacity of the USB memory and see if there is available space.

Troubleshooting Errors in the Controller Section

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Alarm Code and Alarm Name (Alarm Description)	Cause	Confirmation	Correction
CA372: Logging File Writing Error	Data could not be written to a file in USB memory.	Check to see if the USB memory device is inserted properly.	Insert the USB memory device again.
		Check the USB memory device.	Check the capacity of the USB memory and see if there is available space.
CA401: M-III Restriction Condition Error	The high-speed scan time does not meet the restriction conditions.	Check the MECHATROLINK-III transmission cycle and high-speed scan time of SVC4.	Change to a setting that meets the restriction conditions.
CA404: M-III Station Address Duplication	The same station address was set for more than one of the slave devices connected to the SVC4.	Check system register SB00041C.	Set the slave device station addresses so that they are correct.

Troubleshooting Communications Errors

6

This chapter describes how to troubleshoot errors in communications.

6.1 Troubleshooting Connection Problems with the MPE720

Use the following flowchart to troubleshoot the problem when you cannot go online with the SERVOPACK from the MPE720.

```
                    ( START )
                        │
                        ▼
        ┌─────────────────────────────┐
        │ Check the error that occurs │      ☞ 6.1.1 Checking for Errors on page 6-3
        │ when the MPE720 version 7   │ ◄──
        │ attempts to go online.      │
        └─────────────────────────────┘
                        │
                        ▼
```

Is the message "Cannot connect to the controller" displayed? — NO → Is the message "Failed to communicate with controller" displayed? — NO → Is the message "It is not possible to connect, because the controller type is different" displayed? — NO

YES (from first) ↓

Check to see if the IP address of the PC has been manually set to the appropriate value.

☞ 6.1.2 Checking the IP Address of the PC on page 6-4

Check to see if the communications settings of the MPE720 are appropriate.

☞ 6.1.3 Checking the Communications Settings on page 6-6

Check to see if the communications process settings of the MPE720 are appropriate.

☞ 6.1.4 Checking the Communications Platform on page 6-8

YES (from third) ↓

Connect to the Ethernet network by selecting a PLC folder or a project that is appropriate for the target Σ-7C SERVOPACK.

Is the message "Communication timeout error" displayed? — YES → Check the scan time and correct the setting.

☞ 6.1.5 Communications Timeout Errors on page 6-10

NO ↓

(END)

6.1.1 Checking for Errors

When the MPE720 cannot go online with the SERVOPACK, the Error Generating Information Dialog Box will be displayed. This information can be used to identify the error.

Connection Errors

The following Error Generating Information Dialog Box will be displayed if the IP address of the PC is automatically assigned or if the IP address of the PC is not set correctly due to the communications settings or communications process.
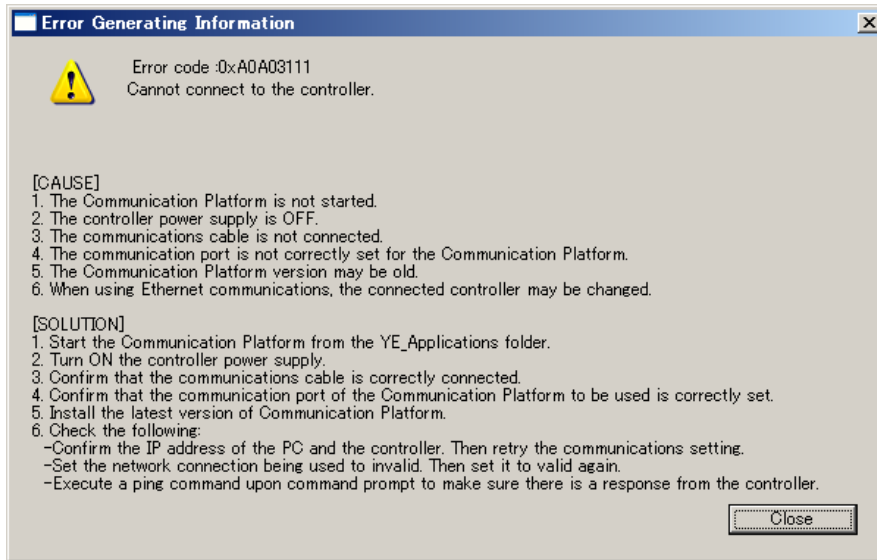
Communications Errors

The following Error Generating Information Dialog Box will be displayed if the IP address of the SERVOPACK is not set correctly in the communications settings.

Troubleshooting Communications Errors

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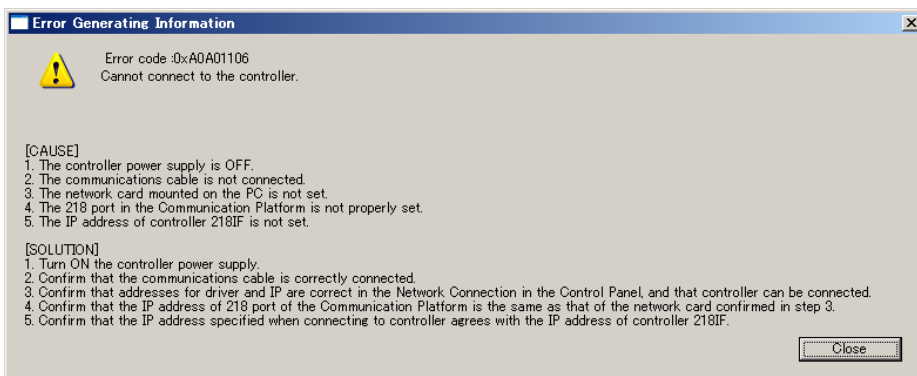
Model Errors

The following Error Generating Information Dialog Box will be displayed if you attempt to connect through Ethernet and the model of the SERVOPACK in the current project is different from the target SERVOPACK. Select a project that is appropriate for the SERVOPACK to connect through Ethernet.
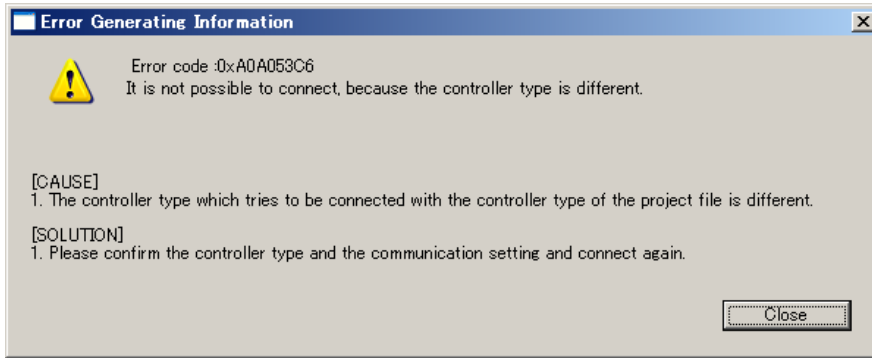
6.1.2 Checking the IP Address of the PC

The procedure for checking and correcting the network settings of the PC (e.g., the IP address) is given below.

1. Display the Local Area Connection Properties Dialog Box on the PC.

   Example   Windows 7
   On the PC, select **Control Panel** – **Network and Internet** - **Network and Sharing Center** – **Local Area Connection** from the Windows Start Menu and then click the **Properties** Button.

2. Select the **Internet Protocol (TCP/IP)** Check Box from the list and then click the **Properties** Button.
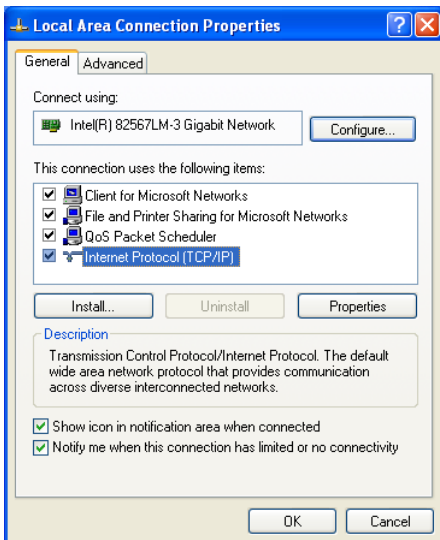
3. In the Internet Protocol Properties (TCP/IP) Dialog Box, select the **Use the following IP address** Option.
Enter the settings in the IP address Box and Subnet mask Box as required.
If you change any settings, continue to step 4.
If you have not changed any settings, click the **OK** Button to conclude checking of the IP address of the PC.
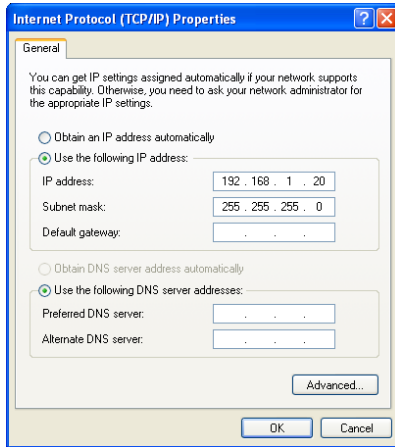
4. Click the **Details** Button on the Support Tab Page of the Local Area Connection Status Dialog Box.
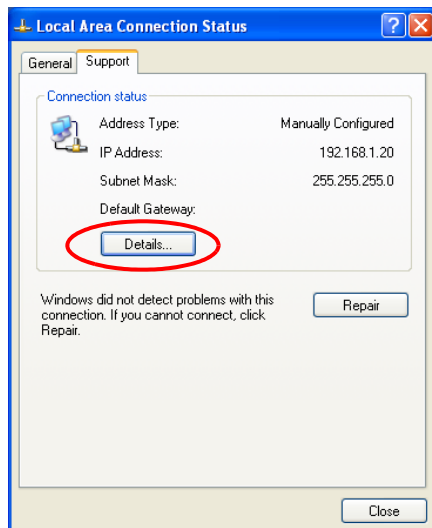
5. Check the actual IP address and subnet mask.

Example   Windows 7
On the PC, select **Control Panel** − **Network and Internet** − **Network Connection** - **Network and Sharing Center** − **Local Area Connection Status** from the Windows Start Menu and then click the **Details** Button.
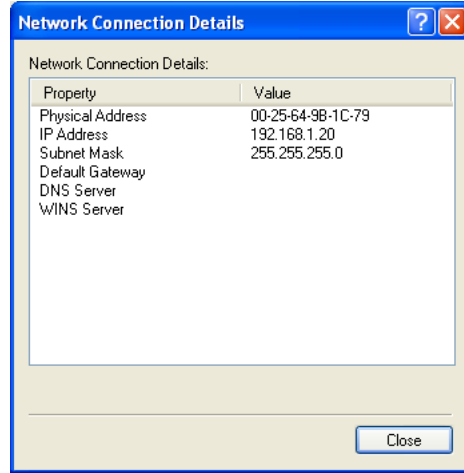
If the values are the same as those that were set in step 3, click the **Close** Button to close the dialog box.

Information   If the displayed values differ from the values that were set in step 3, restart the PC to enable the settings that were made manually.

6.1.3   Checking the Communications Settings

The procedure for checking and correcting the communications settings of MPE720 version 7 is given below.

1. Display the dialog box to set the IP address on the PC.
Refer to the following section for details on checking the IP address.
☞ *6.1.2 Checking the IP Address of the PC* on page 6-4

2. Start MPE720 version 7 and select **Communications Setting.**
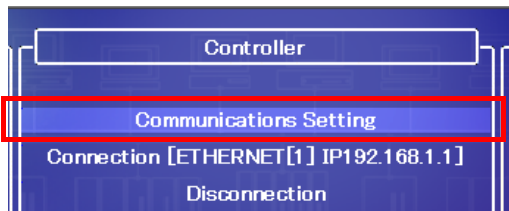
The Communications Setting Dialog Box will be displayed.
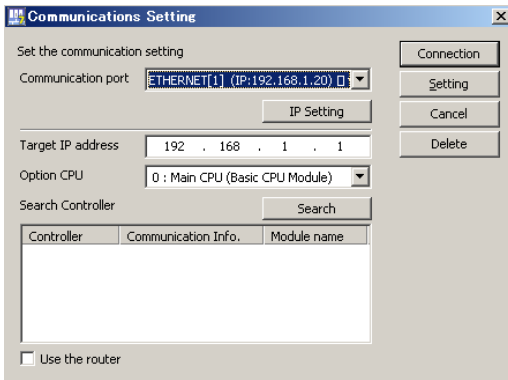
3. Make sure that the IP address of the PC and the appropriate communications port type are selected in the **Communication port** Box in the Communications Setting Dialog Box of MPE720 version 7.

If the communications port type is not appropriate, select the appropriate communications port from the list.

If the appropriate communications port or IP address is not displayed, refer to the following section.

☞ *6.1.4 Checking the Communications Platform* on page 6-8

Communications port type:
Ethernet
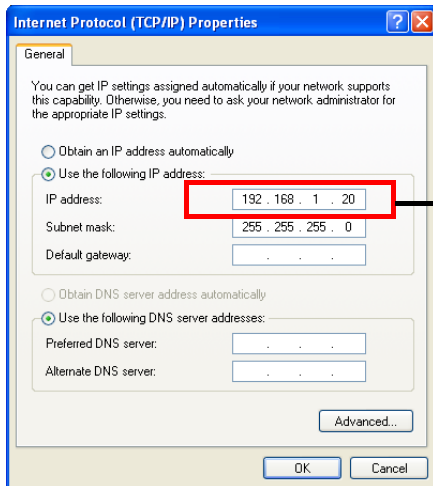
IP address of the PC

Dialog Box to Set the IP Address on the PC
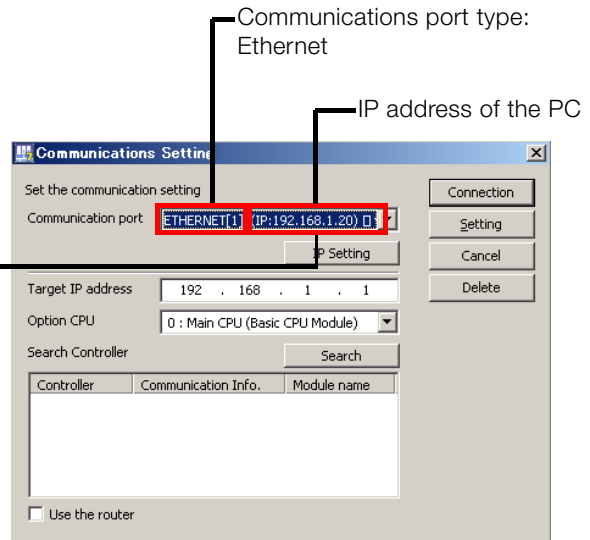
Communications Setting Dialog Box of MPE720 Version 7

4. Make sure that the IP address of the SERVOPACK is properly set in the **Target IP address** Box in the Communications Setting Dialog Box of MPE720 version 7.

Troubleshooting Communications Errors

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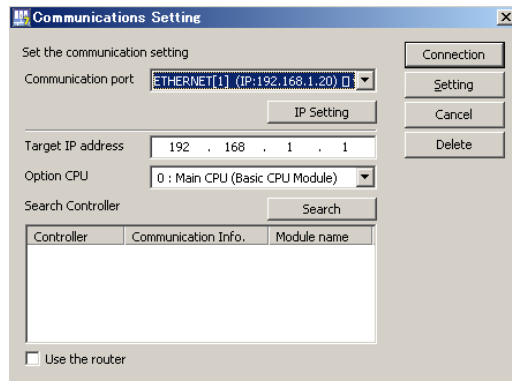
Information
1. When the E-INIT or INIT switch on the SERVOPACK is ON, the network settings of the SERVOPACK will be as given below.
   In this case, the definition data that is saved in the flash memory of the SERVOPACK will be ignored.
   IP address: 192.168.1.1
   Subnet mask: 255.255.255.0
   Default gateway: 0.0.0.0
2. When the E-INIT and INIT switch on the SERVOPACK are OFF, the definitions that are saved in flash memory will be used for the network settings of the SERVOPACK.
   The IP address of the SERVOPACK will be the address that was set in the 218IFD Detail Definition Dialog Box from the MPE720 and saved in flash memory.

Transmission Parameters
IP Address   :   192 . 168 . 1 . 1   (0-255)
Subnet Mask   :   255 . 255 . 255 . 0   (0-255)
Gateway IP Address :   0 . 0 . 0 . 0   (0-255)
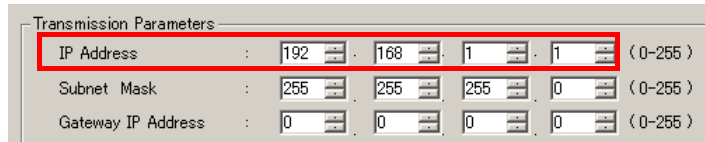
Note
1. If the settings that were found in step 4 are not appropriate, correct the settings in the Detail Definition Dialog Box of each Module using the MPE720 and save the data to flash memory.
2. To reset the IP address from the Module's Detail Definition Dialog Box, turn OFF the E-INITand INIT switches on the SERVOPACK and turn the power supply OFF and ON again.
3. If the MPE720 cannot be placed online in this state, temporarily turn ON the E-INIT or INIT switch on the SERVOPACK to establish a connection from the MPE720 with the default network settings and check the settings.

This concludes the procedure to check the communications settings

6.1.4 Checking the Communications Platform

The procedure for checking and correcting the communications platform settings on the MPE720 is given below.

1. Display the dialog box to set the IP address on the PC.
Refer to the following section for details on checking the IP address.
☞ *6.1.2 Checking the IP Address of the PC* on page 6-4

2. Start the communications platform.
Note: This operation can be skipped if the communications platform has already been started.

Example
Windows 7
On the PC, select **All Programs** – **YE_Applications** – **Communication Manager** from the Windows Start Menu.

3. Double-click the communications platform indicator in the task bar of the PC to display the Communication Platform Window.

4. Make sure that the **Status** Column for MPE720 version 7 in the Communication Platform Window shows **Ready.**
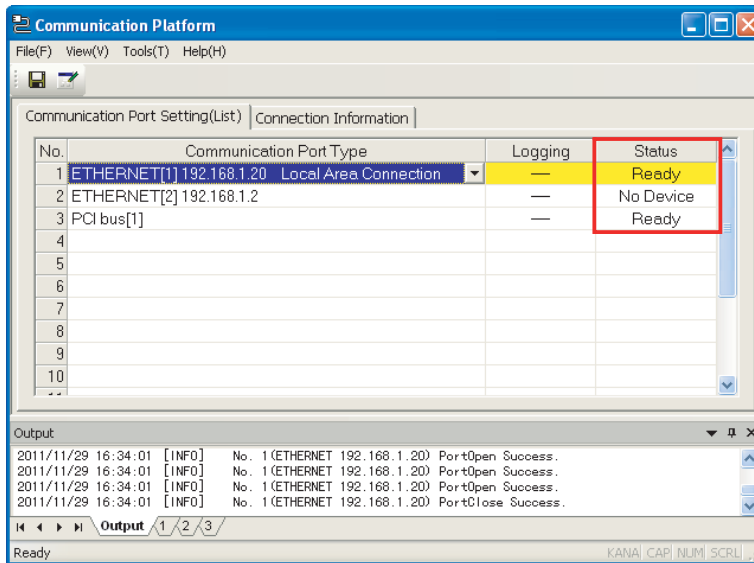
Note	When the **Status** Column Does Not Show **Ready** The LAN driver of the PC may be faulty. Perform troubleshooting with Windows Device Manager.

5. Double-click the number in the **No.** Column displayed on the Communication Port Setting (List) Tab Page to display the Port Setting Dialog Box.

6. Make sure that the IP address of the PC is displayed in the **IP Address** Box in the Port Setting Dialog Box.
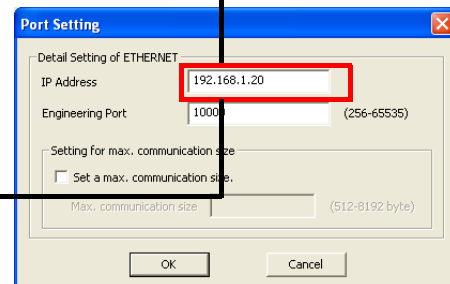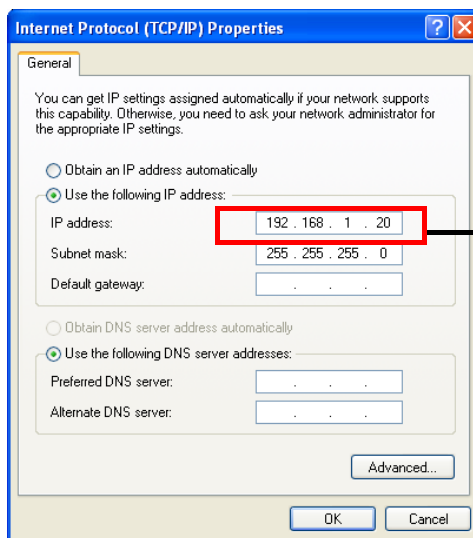
IP address of the PC

Information	If the IP Address Box shows any address other than the IP address of the PC, enter the IP address of the PC in the box and then click the **OK** Button.

Troubleshooting Communications Errors

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7. Save the communications platform. The settings will be enabled immediately.

Click the 💾 Icon to save the
communications process.
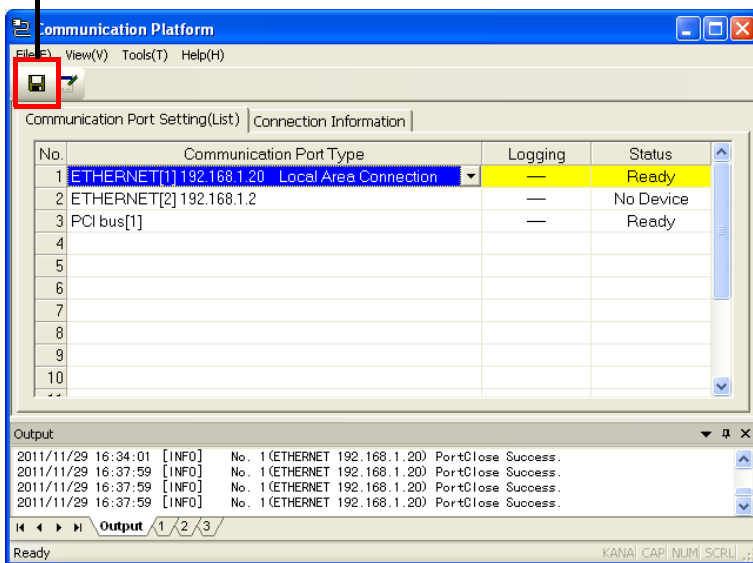
6.1.5 Communications Timeout Errors

Communications with the MPE720 are processed with a lower priority than the high-speed scan. Because of this, communications with MPE720 may time out if the high-speed scan time is too short.

Set a value for the high-speed scan that is sufficiently long compared with the current and maximum values during operation of the application.

The setting, current value, and maximum value of the high-speed scan can be checked and set in the Environment Setting Dialog Box of MPE720 version 7.

6.2 Troubleshooting Problems with Message Communications

Use the following flowchart to troubleshoot problems in message communications with host controllers or PCs.

```
                    ┌──────────────┐
                    │    START     │
                    └──────┬───────┘
                           │
                           ▼
                    ╱─────────────╲         YES      ┌───────────────────────────┐
                   ╱ Message commu- ╲ ──────────────▶│ Check the message functions│
                   ╲ nications start? ╱               │ and Ethernet communications│
                    ╲───────────────╱                │ mode.                      │
                           │                          └───────────────────────────┘
                           │ NO
                           │                          ☞ 6.2.3 Communications
                           │                             Stopped during Mes-
                           │                             sage Communications
                           ▼                             on page 6-34
                    ╱─────────────╲         NO       ┌───────────────────────────┐
                   ╱ Is the E-INIT  ╲ ──────────────▶│ Turn OFF the E-INIT switch │
                   ╲ switch on the  ╱                 │ on the front of the        │
                   ╱ SERVOPACK      ╲                 │ SERVOPACK, and then        │
                   ╲ set to OFF?    ╱                 │ turn the power supply OFF  │
                    ╲───────────────╱                 │ and ON again. (This does   │
                           │ YES                      │ not apply when the local   │
                           │                          │ IP address is set on the   │
                           │                          │ rotary switches.)          │
                           │                          └───────────────────────────┘
                           │
                           │              ☞ 6.2.1 Checking the Switch
                           │                 Settings on page 6-14
                           ▼
               ┌────────────────────────┐
               │ Check the Transmission │
               │ Status and Error Status│
               │ Boxes on the Module's  │
               │ Detail Definition      │
               │ Dialog Box on MPE720   │
               │ version 7.             │
               └───────────┬────────────┘
                           │
                           ▼
                    ╱─────────────╲         NO       ┌───────────────────────────┐
                   ╱ Is 0: No error ╲ ──────────────▶│ Check the error status.   │
                   ╲ displayed in the ╱               └───────────────────────────┘
                   ╱ Error Status Box?╲
                    ╲───────────────╱                ☞ Checking the Error Status and
                           │ YES                         Transmission Status on page 6-15
                           ▼
                      ╱────────╲                           ╱────────╲
                     │   A1    │                          │   A2    │ ── To the next page
                      ╲────────╱                           ╲────────╱
```

From the previous page

A1

A2

Is "---" (no display) displayed in the **Transmission Status** Box?

NO →

Is *IDLE* displayed in the **Transmission Status** Box?

NO →

YES ↓

YES ↓

Set the connection parameters on the Transmission Parameters Tab Page of the Module's Detail Definition Dialog Box.

Perform the following operations.
• Create a message function.
• Execute the message function.
• Set the input items and parameters correctly for the message function.

☞ *Checking the Connection Parameters* on page 6-18

☞ *Checking Message Functions (MSG-SNDE and MSG-RCVE)* on page 6-21

Save the data to flash memory and then turn the power supply OFF and ON again.

Check the **Connection Type** Box in the Module's Detail Definition Dialog Box.

Is *TCP* displayed in the **Connection Type** Box?

NO → (When using the UDP protocol)

Check the following.
• Does the remote device exist and is the power to the remote device turned ON?
• Was the data saved to flash memory and the power supply turned OFF and ON again after setting the parameters?

YES ↓

(When using the TCP protocol)

B1

B2

To the next page

From the previous page

B1   B2

Is *WAIT* displayed in the **Transmission Status** Box?   — NO →   Is the local station the master station (i.e., uses the MSG-SNDE function)?   — NO →

YES ↓   YES ↓

Check the following.
• Does the remote device exist and is the power to the remote device turned ON?
• Was the data saved to flash memory and the power supply turned OFF and ON again after setting the parameters?

Check the processing results and the status of the message send function.

☞ *Checking Message Functions (MSG-SNDE and MSG-RCVE)* on page 6-21

Check the processing results and the status of the message receive function.

☞ *Checking Message Functions (MSG-SNDE and MSG-RCVE)* on page 6-21

Check other items.

☞ *6.2.4 Other Problems during Message Communications* on page 6-36

END

Troubleshooting Communications Errors

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6.2.1 Checking the Switch Settings

If message communications with a host controller do not start even though a connection from the MPE720 can be established properly, check the following switch settings.

Device Code	Pin Name	Status	Operating Mode	Default	Remarks
S1_6	STOP	ON	Stops the user programs.	OFF	Turn ON the pin to stop execution of the user programs.
		OFF	Executes the user programs.		
S1_5	E-INIT	ON	Sets the IP address to 192.168.001.□□□.	OFF	The setting of □□□ is determined by the rotary switch setting.
		OFF	Sets the IP address that is set in the MPE720.		
S1_4	INIT	ON	Clears the memory.	OFF	Turn OFF the pin to execute the programs that are stored in flash memory.
		OFF	Normal operation		
S1_3	CNFG	ON	Configuration Mode	OFF	Turn ON the pin to perform self configuration. Turn OFF the pin to operate according to the definitions that are stored in flash memory.
		OFF	Normal operation		
S1_2	LOAD	ON	Loads data.	OFF	Turn ON the pin and then turn ON the power to batch load data from the USB memory to the SERVOPACK.
		OFF	Does not load data.		
S1_1	D-RST	ON	Reserved.	OFF	Keep this pin OFF at all times.
		OFF	Normal operation		

6.2.2 Message Communications Errors

This section describes errors that can occur in message communications.

Checking the Error Status and Transmission Status

If message communications with a host controller or PC do not start, get a general idea of the error in the status information in the Module's Detail Definition Dialog Box on the MPE720.

CNO	Trans Status	Error Status	Send Count	Receive Count	Error Count	Response Time(ms)	Connection Type	Protocol Type	Code	
01	IDLE	0:No error	0	0	0	0	TCP	Extended MEMOBUS	BIN	
02	------									
03	------									
04	------									

◆ Error Status Box = 0: No Error

Get a general idea of the error by referring to the **Trans Status** Column.

■ When the TCP Protocol Is Selected

Trans Status (Transmission Status)	Status	Cause	Correction	Reference
- - - - -	Message communications are not set.	Connection parameters have not been set.	Set the connection parameters.	*Checking the Connection Parameters* on page 6-18
		The data was not saved to flash memory or the power supply to the Module was not turned OFF and ON again after changing the connection parameters.	Save the data to flash memory and turn the power supply OFF and ON again to the Module after setting connection parameters.	
IDLE	Standby mode for executing message functions.	No message functions have been created in the ladder programs.	Create message functions in a ladder program.	*Checking Message Functions (MSG-SNDE and MSG-RCVE)* on page 6-21
		Message functions have been created in a ladder program but they have not been executed.	Create and execute message functions in a ladder program.	
		There is an error in a message function parameter setting (PARAM☐☐).	Set the message function parameter (PARAM☐☐) correctly.	
WAIT	Waiting for establishment of TCP connection with the remote device	The remote device is not connected or the power to the remote device is OFF.	Connect the remote device and turn ON the power to the remote device.	–
		The remote device does not have a communications function or setting for communicating with the SERVOPACK or there is an error in communications settings.	Check the communications function or setting and the communications settings of the remote device.	–
		There is an error in the connection parameter settings in the SERVOPACK.	Check the connection parameter settings in the SERVOPACK.	*Checking the Connection Parameters* on page 6-18
CONNECT	Data communications with the remote device are enabled.	There is an error in the communications protocol.	Check the error status of the message function.	*Checking Message Functions (MSG-SNDE and MSG-RCVE)* on page 6-21

Troubleshooting Communications Errors

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■ When the UDP Protocol Is Selected

Trans Status (Transmission Status)	Status	Cause	Correction	Reference
- - - - -	Message communications are not set.	Connection parameters have not been set.	Set the connection parameters.	*Checking the Connection Parameters* on page 6-18
		The data was not saved to flash memory or the power supply to the Module was not turned OFF and ON again after changing the connection parameters.	Save the data to flash memory and turn the power supply OFF and ON again to the Module after setting connection parameters.	
IDLE	Standby mode for executing message functions.	No message functions have been created in the ladder programs.	Create message functions in a ladder program.	*Checking Message Functions (MSG-SNDE and MSG-RCVE)* on page 6-21
		Message functions have been created in a ladder program but they have not been executed.	Create and execute message functions in a ladder program.	
		There is an error in a message function parameter setting (PARAM□□).	Set the message function parameter (PARAM□□) correctly.	
CONNECT	Data communications with the remote device are enabled.	The remote device is not connected or the power to the remote device is OFF.	Connect the remote device and turn ON the power to the remote device.	–
		The remote device does not have a communications function or setting for communicating with the SERVOPACK or there is an error in communications settings.	Check the communications function or setting and the communications settings of the remote device.	–
		There is an error in the connection parameter settings in the SERVOPACK.	Check the connection parameter settings in the SERVOPACK.	*Checking the Connection Parameters* on page 6-18
		There is an error in the communications protocol.	Check the error status of the message function.	*Checking Message Functions (MSG-SNDE and MSG-RCVE)* on page 6-21

◆ When Error Status Box Shows an Error

Check the nature of the error in the error status. The following tables list the most frequent error status.

| Information | The **Error Status** Column gives the most recent error. The error information is retained even after recovering from the error and starting normal communications. |

■ When the TCP Protocol Is Selected

Error Status	Description	Cause	Correction
2: Local Port Number Error	Setting error in local station port number	The port number of a broken TCP connection was bound.	Correct the application so that at least one minute elapses after completion of the execution of the Abort command before the Execute command is turned ON in the message function in the SERVOPACK.
		A command was simultaneously executed by another message function for the same remote device before the connection was ended.	Correct the program so that no more than one message function is executed for each connection at any one time.
4: M-SND Connection Error	TCP connection error when using the Send Message function	The TCP connection request from the SERVOPACK was rejected by the remote device.	Make sure that the network settings of the remote device are set to open a port for communicating with the SERVOPACK. (Settings to check: The port number for communicating with the SERVOPACK, TCP/UDP selection, etc.)
5: M-RCV Connection Error	TCP connection error when using the Receive Message function	An error has occurred in the SERVOPACK while processing a TCP connection request from the remote device.	Make sure that the network settings of the remote device are set correctly for communicating with the SERVOPACK.
7: TCP Data Send Error	Data sending error	The remote device is not connected or the power to the remote device is OFF.	Make sure that the power to the remote device is ON and that the remote device is connected to the SERVOPACK with Ethernet cables.
9: TCP Data Receive Error	Data reception error	A TCP connection close request was received from the remote device.	If the close request was unexpected, correct the connection closing sequence at the remote device.
12: Data Conversion Error	Error in protocol conversion	There was a protocol data format error.	Match the settings for the protocol type and code (BIN, RTU, or ASCII) between the remote device and the SERVOPACK.

■ When the UDP Protocol Is Selected

Error Status	Description	Cause	Correction
12: Data Conversion Error	Error in protocol conversion	There was a protocol data format error.	Match the settings for the protocol type and code (BIN, RTU, or ASCII) between the remote device and the SERVOPACK.

Checking the Connection Parameters

If message communications with a host controller or PC do not start, the connection parameter settings in the Module's Detail Definition Dialog Box may be incorrect.

Use the following procedure to check the connection parameter settings.

1. Start MP720 version 7 and go online with the SERVOPACK.

2. Select **Module configuration** from the Setup Menu.
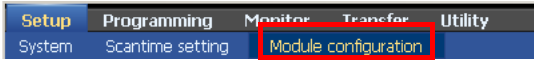
The Module Configuration Tab Page is displayed.

3. Double-click the cell for 218IFD in the Module Configuration Definition Dialog Box.

The Module's Detail Definition Dialog Box will be displayed.

4. Check the connection parameter settings.

Connection parameter settings

Table 6.1 Connection Parameter Check Items

Item	What to Check	Remarks
Local Port	Set the port number to use to send data to the remote node.	–
Node IP Address	Set the IP address of the remote station.	Set 000.000.000.000 to use the unpassive open mode.
Node Port	Set the port number from which the remote station sends data.	To change the port number of the remote station dynamically, use the unpassive open mode. To use the unpassive open mode, set 0000.
Connect Type	Set the connection type of the remote station.	–
Protocol Type	Set the protocol type that is supported by the remote station.	–
Code	Set the code type of the remote station.	–

Information   Unpassive Open Mode
To use unpassive open mode, set the connection parameters as follows:
• Set the IP address of the remote station (Node IP Address) to 000.000.000.000.
• Set the port number of the remote station (Node Port) to 0.
In unpassive open mode, the 218IFD connects to any station that attempts to access the relevant connection number. If more than one station attempts access, the connection will be established with the station that sent the connection request first.
When a connection is established in unpassive open mode, a connection request from another station will break the current connection and establish a connection with the station that sent the connection request later.

Example   Using the 218IFD
Click the **Detail Setting** Button to display the Automatically Reception Dialog Box.
Select the **Disable** Option to use message functions.
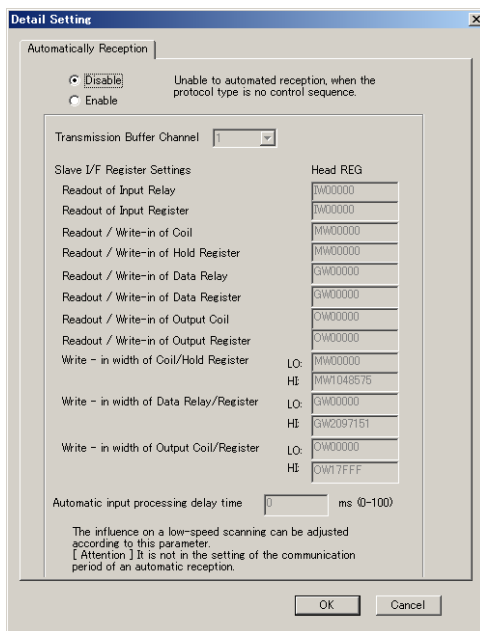
Note: If message functions are used with the **Enable** Option selected, communications may not be performed properly.

5. Click the **Status** Tab to display the Status Tab Page.
Make sure that the following items are the same as those on the Transmission Parameters Tab Page in the Module's Detail Definition Dialog Box.
- Connect Type
- Protocol Type
- Code

CNO	Trans Status	Error Status	Send Count	Receive Count	Error Count	Response Time(ms)	Connection Type	Protocol Type	Code	Node Name
01	IDLE	0:No error	0	0	0	0	TCP	Extended MEMOBUS	BIN	
02	------									
03	------									
04	------									

If the settings are different, the data may not have been saved to flash memory or the power supply to the Module may not have been turned OFF and ON again after changing or adding connection parameter settings.
Save the data to flash memory, turn the power supply to the Module OFF and ON again, and then check the settings again.

Important

When the transmission parameter or connection parameter settings are changed, the new settings are enabled only after the data is saved to flash memory and the power supply to the Module is turned OFF and ON again.
The parameter settings that are displayed on the MPE720 will be updated when you execute *Save* or *Save to Flash,* but you must always turn the power supply to the Module OFF and ON again to enable the new parameter settings.

Checking Message Functions (MSG-SNDE and MSG-RCVE)

If message communications with a host controller or PC do not start, the specific error can be determined by checking the processing results and status of the message functions.

The procedures for checking the processing results, status, and parameter settings of the message functions are given below.

◆ Checking the Processing Results and Status

The processing results and status of a message function can be checked with the parameters in the following table.

Item	Description
Processing Result (PARAM00)	Gives the error that has occurred when the message function was executed. This information is useful for troubleshooting errors that can occur when message function parameters are not properly set.
Status (PARAM01)	This information is useful when a Transmission Section Error (88□□ hex), which cannot be isolated with the processing results in PARAM00, has occurred.
Detail Error Code (PARAM02 and PARAM03)	Supplemental information for PARAM00 (Processing Result). These parameters give the error code from the remote device.

The procedures for checking the processing results, status, and corrections when using the Send Message and Receive Message functions are given below.
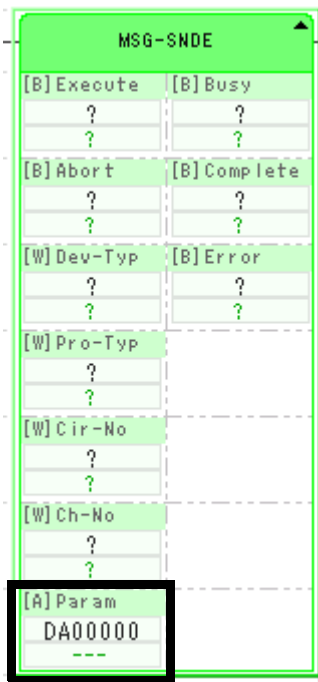
Send Message Function
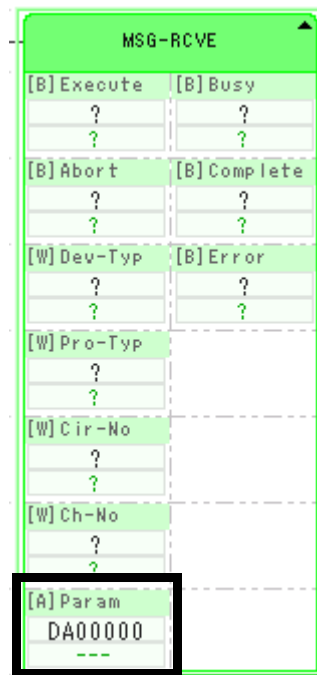
Receive Message Function

> **Note**
> Use the register list on the MPE720 to check the contents of the registers.

Example   The parameter list with the first address set to DA00000 is shown below.

Parameter List

Register	F · · · · · · · · · · · 0	
DW00000	PARAM00	Processing Result
DW00001	PARAM01	Status
.	.	
.	.	
.	.	
.	.	

■ Checking the Processing Result (PARAM00) for the Send Message Function (MSG-SNDE)

The errors that may be given by the processing result of the Send Message function are listed in the following table.

• Processing Results Other Than a Transmission Section Error (88□□ Hex)

Processing Result Value	Error	Cause	Correction
81□□ hex	Function code error	An unused function code was sent from the local station.	Check PARAM12 (function code).
		An unused function code was received from a remote station.	Check whether the remote station sent valid data.
82□□ hex	Address setting error	One of the following parameter settings is outside of the setting range. PARAM14 and PARAM15 (remote data address) PARAM20 and PARAM21 (local data address)	Check the parameter settings that are given on the left.
83□□ hex	Data size error	The send data size of the local station is outside of the setting range.	Check PARAM17 (data size).
		The receive data size from the remote station is outside of the setting range.	Check whether the remote station is sending data of a valid size.
84□□ hex	Circuit number setting error	The circuit number is outside of the setting range.	Check Cir-No (circuit number) in MSG-SNDE. The device may be set incorrectly. Also check the transmission device type (Dev-Typ) in the MSG-SNDE function.
85□□ hex	Channel number setting error	The transmission buffer channel number is outside of the setting range.	Check Ch-No (transmission buffer channel number) in MSG-SNDE.
86□□ hex	Connection number error	The connection number is outside of the setting range.	Check PARAM10 (connection number).
89□□ hex	Device select error	An unavailable device is set.	Check Dev-Typ (transmission device type) in MSG-SNDE and select the appropriate device type.
C0□□ hex	Register type error	The register type for the remote station is outside of the setting range.	Check PARAM16 (remote station register type) and set the correct register type.
C1□□ hex	Data type error	The data type is outside of the setting range. This error occurs when using function code 434D hex or 434E hex.	Check the remote address table and set the correct data type.
C2□□ hex	Local register type error	The register type for the local station is outside of the setting range.	Check PARAM22 (local station register type) and set the correct register type.

• Processing Results of Transmission Section Errors (88□□ Hex)

Processing Result Value	Error	Cause	Correction
88□□H	Transmission section error (An error response was returned from the transmission section or transmission device.)	Communications are not enabled in the remote station.	Check the communications settings in the remote station.
		More than one MSG-SNDE was executed simultaneously for the same Cir-No (circuit number) and Ch-No (transmission buffer channel number).	Correct the ladder program so that no more than one MSG-SNDE is executed simultaneously.
		More than one MSG-SNDE was executed simultaneously for the same Cir-No (circuit number) and PARAM10 (connection number).	Correct the ladder program so that no more than one MSG-SNDE is executed simultaneously.
		The MSG-SNDE was executed when the 218IFD was not ready to receive message send or receive requests (i.e., not in RUN status).	Adjust the timing for executing the MSG-SNDE for the first time in the ladder program, for example by using a timer command.

■ Checking the Processing Result (PARAM00) for the Receive Message Function (MSG-RCVE)

The errors that may be given by the processing result of the Receive Message function are listed in the following table.

• Processing Results Other Than a Transmission Section Error (88□□ Hex)

Processing Result Value	Error	Cause	Correction
81□□ hex	Function code error	An unused function code was received from a remote station.	Check whether the remote station sent valid data.
82□□ hex	Address setting error	Data for an address that is outside of the setting range was received from the remote station.	Check whether the remote station sent valid data.
		One of the following settings is outside of the setting range. PARAM14 and PARAM15 (remote data address) PARAM20 and PARAM21 (local data address)	Check the settings that are given on the left.
83□□ hex	Data size error	The receive data size from the remote station is outside of the setting range.	Check whether the remote station is sending data of a valid size.
84□□ hex	Circuit number setting error	The circuit number is outside of the setting range.	Check Cir-No (circuit number) in MSG-RCVE. The device may be set incorrectly. Also check the transmission device type (Dev-Typ) in the MSG-RCVE function.
85□□ hex	Channel number setting error	The transmission buffer channel number is outside of the setting range.	Check Ch-No (transmission buffer channel number) in MSG-RCVE.
86□□ hex	Connection number error	The connection number is outside of the setting range.	Check PARAM10 (connection number).
89□□ hex	Device select error	An unavailable device is set.	Check Dev-Typ (transmission device type) in MSG-RCVE and select the appropriate device type.
C0□□ hex	Register type error	The register type specified by the remote (sending) station is out of range.	Check the register type for the remote station specified at the local station and set the correct register type.
C1□□ hex	Data type error	The data type is outside of the setting range. This error occurs when using function code 434D hex or 434E hex.	Check the remote address table set at the sending station and set the correct data type.

• Processing Results of Transmission Section Errors (88□□ Hex)

Processing Result Value	Error	Cause	Correction
88□□ hex	Transmission section error (An error response was returned from the transmission section or transmission device.)	Communications are not enabled in the remote station.	Check the communications settings in the remote station.
		More than one MSG-RCVE was executed simultaneously for the same Cir-No (circuit number) and Ch-No (transmission buffer channel number).	Correct the ladder program so that no more than one MSG-RCVE is executed simultaneously.
		More than one MSG-RCVE was executed simultaneously for the same Cir-No (circuit number) and PARAM10 (connection number).	Correct the ladder program so that no more than one MSG-RCVE is executed simultaneously.
		The MSG-RCVE was executed when the 218IFD was not ready to receive message send or receive requests (i.e., not in RUN status).	Adjust the timing for executing the MSG-RCVE for the first time in the ladder program, for example by using a timer command.

■ Checking the Status (PARAM01)

If the value of the processing result (PARAM00) is 88□□ hex, indicating that a transmission section error occurred, check the status in PARAM01 to isolate the error.
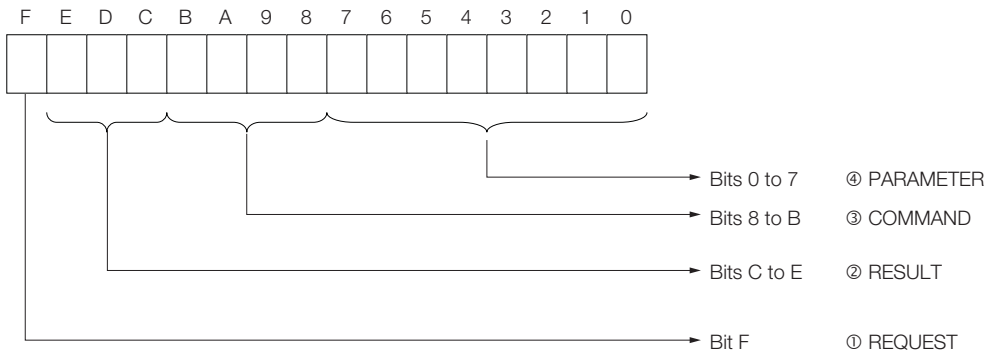
① REQUEST

This bit shows the request processing status of the message function.

Bit Status	Meaning
0	Processing is being requested.
1	Processing request was ended.

② RESULT (Processing Result)

These bits show the result of executing the message function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.[1]
5	SEQ_NG	A command sequence error occurred.[2]
6	RESET_NG	A reset occurred.[2]
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

*1. When this error occurs, detailed information is given in ④ PARAMETER.

*2. This error occurs if the message function is executed while the 218IFD is not ready to receive message send or receive requests.

③ COMMAND

These bits show the processing command of the message function. The processing that was executed by the command can be determined from this information.

Code	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when the response is received.
9	M_REC	MEMOBUS command reception: Sends a response when the MEMOBUS command is received.
C	MR_SEND	MEMOBUS response transmission

④ PARAMETER

When the RESULT is 4 (FMT_NG: parameter formatting error), these bits give one of the error codes from the following table.

RESULT	Cod (Hex)	Meaning
When RESULT is 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection number

■ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code based on the contents of PARAM00 (Processing Result).

Value of Processing Result (PARAM00)	Error	Detail Error Code	Description
81□□ hex	Function code error	1	Gives the same value as the value of the detail result.
82□□ hex	Address setting error	2	
83□□ hex	Data size error	3	
84□□ hex	Circuit number setting error	4	
85□□ hex	Channel number setting error	5	
86□□ hex	Connection number error	6	
88□□ hex	Transmission section error	8	
89□□ hex	Device select error	9	
8A□□ hex	Remote node error	0 to FF	Gives the error code stored in the error message sent by the remote device. Refer to the manual for the remote device with which communications are being performed for details on the error code.

Note: 1. The detail error code is updated only when the Complete or Error bit of the function turns ON.

2. The detail error code is updated only when the transmission section or transmission device detects an error.
If the Controller Section detects an error, the detail error code will be set to 0, even if processing results in an error.

■ Status 1 (PARAM04)

This parameter gives the Transmission Status listed in the following table as Status 1 of the 218IFD.

Status 1 Value	Status
1 (IDLE)	The connection is idle.
2 (WAIT)	The connection is waiting to be established.
3 (CONNECT)	The connection is established.
–	–

Note: The status is updated when the function is executed in each scan.

■ Status 2 (PARAM05)

This parameter gives the Latest Error Status listed in the following table as Status 2 of the 218IFD.

This parameter gives information on the latest error that occurred.

Status 2 Value	Meaning	Remarks
0	No error	Normal
1	Socket creation error	A socket could not be created.
2	Local port number error	Setting error in local station port number
3	Changing socket attribute error	A system error occurred while setting the socket attribute.
4	Connection error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection error	M-RCV: An error occurred while passively opening a TCP connection.
6	System error	A socket polling error occurred while receiving data.
7	TCP data send error	The remote station does not exist.
8	UDP data send error	The data send request command was sent to a socket that does not exist.
9	TCP data receive error	A disconnection request was received from the remote station.
10	UDP data receive error	A data receive request was executed for a socket that does not exist.
11	Changing socket option error	A system error occurred while changing the socket options.
12	Data conversion error	Error in protocol conversion

Note: The status is updated when the function is executed in each scan.

■ Status 3 (PARAM06)

This parameter gives the Send Count listed in the following table as Status 3 of the 218IFD.

Status 3 Value	Meaning	Remarks
0 to 65,535	Send Count	Counts the number of times a message was sent over the transmission path.

Note: The status is updated when the function is executed in each scan.

■ Status 4 (PARAM07)

This parameter gives the Receive Count listed in the following table as Status 4 of the 218IFD.

Status 4 Value	Meaning	Remarks
0 to 65,535	Receive Count	Counts the number of times a message was received over the transmission path.

Note: The status is updated when the function is executed in each scan.

■ Status 5 (PARAM08)

This parameter gives the Error Counter listed in the following table as Status 5 of the 218IFD.

Status 5 Value	Meaning	Remarks
0 to 65,535	Error Counter	Counts the number of errors that occurred during message processing.

Note: The status is updated when the function is executed in each scan.

◆ Checking the Input Items to the Message Function

If message communications with a PLC, touch panel, or PC do not start, the message function may not have been executed properly due to incorrect input items to the message function.

Use the following procedure to check the input items to the message function.
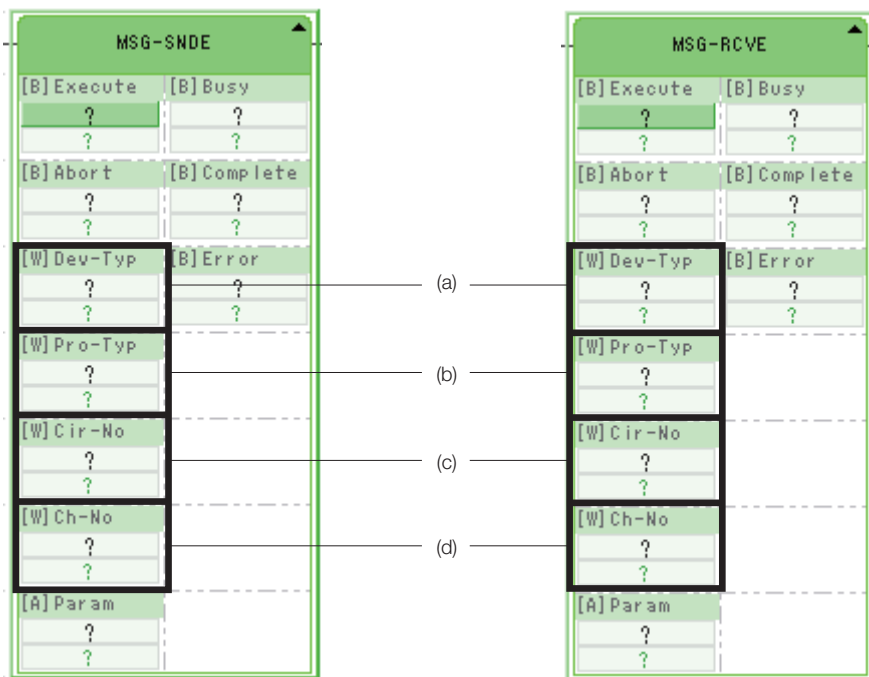
■ Dev-Typ (Transmission Device Type)

Specify the type code of the transmission device.

Device	Type Code (Decimal)
218IFD	16

■ Pro-Typ (Transmission Protocol)

Specify the type code of the transmission protocol.

Type Code	Transmission Protocol	Remarks
1	MEMOBUS	• If the protocol type is set to Extended MEMOBUS, MEMOBUS, MELSEC, or MODBUS/TCP on the Connection Parameter Tab Page in the Module's Detail Definition Dialog Box, set 1 for the type code. • The transmission protocol that is set here is used between the SERVOPACK and the 218IFD. The Communications Function Module converts the data to the protocol that is set in the connection parameters.
2	No-protocol communications 1 (unit: words)	Receives data in word units in a no-protocol transmission. A response is not sent to the remote station.
3	No-protocol communications 2 (unit: bytes)	Receives data in byte units in a no-protocol transmission. A response is not sent to the remote station.

◆ Cir-No (Circuit Number)

Specify the circuit number for the transmission device.

Specify the same circuit number as displayed on the MPE720 Module Configuration Definition Tab Page.

The following table gives the valid circuit numbers.

Transmission Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Transmission Buffer Channel Number)

Specify the channel number of the transmission buffer.

You can specify any channel number provided it is within the valid range.

> **Note**
> When executing more than one function simultaneously, do not use the same channel number with the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Transmission Device	Valid Channel Numbers
218IFD	1 to 10

If the transmission device is the 218IFD, there are 10 channels of transmission buffers available for both transmission and reception. Therefore, 10 connections can be used for sending and receiving at the same time by using channels 1 to 10.

> **Note**
> There must be as many MSG-RCVE or MSG-SNDE functions as the number of connections used at the same time.

◆ Checking the Message Function Parameters

If message communications with a host controller or PC do not start, the message function may not have been executed properly due to incorrect parameters in the message function.

Use the following procedure to check the parameters in the message function.

Use the register list on the MPE720 to check the contents of the registers.
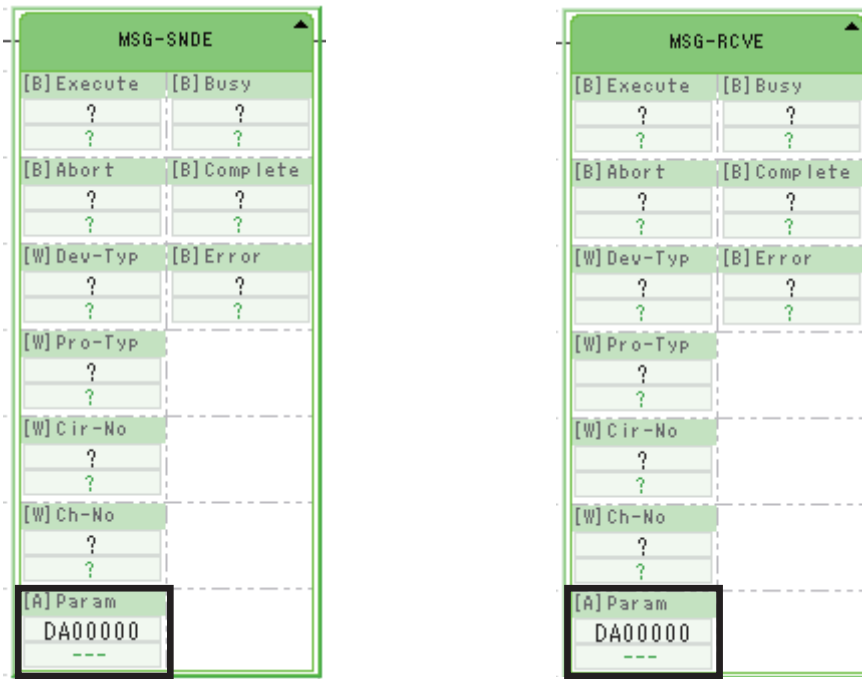
MSG-SNDE		MSG-RCVE	
[B] Execute	[B] Busy	[B] Execute	[B] Busy
?	?	?	?
?	?	?	?
[B] Abort	[B] Complete	[B] Abort	[B] Complete
?	?	?	?
?	?	?	?
[W] Dev-Typ	[B] Error	[W] Dev-Typ	[B] Error
?	?	?	?
?	?	?	?
[W] Pro-Typ		[W] Pro-Typ	
?		?	
?		?	
[W] Cir-No		[W] Cir-No	
?		?	
?		?	
[W] Ch-No		[W] Ch-No	
?		?	
?		?	
[A] Param		[A] Param	
DA00000		DA00000	
---		---	

Example The parameter list with the first address set to DA00000 is shown below.

Parameter List
F ··· ···· ···· ··· 0

Register	Parameter List
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00023	PARAM23
DW00024	PARAM24
DW00025	PARAM25
DW00026	PARAM26
DW00027	PARAM27
DW00028	PARAM28

■ Send Message Function (MSG-SNDE)

The parameters for the Send Message function are checked according to the following two transmission protocols.

• Parameter List When Pro-Type (Transmission Protocol) Is MEMOBUS

Parame-ter No.	IN/OUT*	Item	Description and What to Check
10	IN	Connection number	Set the remote station to which to send the message. (Set the connection number that is set in the connection parameters.) Make sure that the setting is within the following setting range. 218IFD: 1 to 20
11	IN	Option	Specify the options. The meaning of this parameter depends on the protocol.
12	IN	Function code	Set the function code to send.
14	IN	Remote data address, lower word	Set the data address to read or write at the remote station. (Specify the word address to access registers, and specify the bit address to access relays or coils.)
15	IN	Remote data address, upper word	
16	IN	Remote station register type	Set the register type to read or write at the remote station.
17	IN	Data size	Set the size of data to read or write. (Specify the size in words for registers, and in bits for relays or coils.)
18	IN	Remote CPU module number	Set the CPU number at the remote station.
20	IN	Local data address, lower word	Set the data address to store read data or write data in the local station. (Specify the word address to access registers, and specify the bit address to access relays or coils.)
21	IN	Local data address, upper word	
22	IN	Local station register type	Set the register type to store read data or write data in the local station.

* IN: Input item

Note: Refer to the following manual for what to check in parameters 10 to 22 according to the protocol type that is being used.
📖 MP3000 Series Communications User's Manual (Manual No.: SIEP C880725 12)

• Parameter List When Pro-Type (Transmission Protocol) Is No-protocol 1 or No-protocol 2

Parame-ter No.	IN/OUT*	Item	Description and What to Check
10	IN	Connection number	Set the remote station to which to send the message. (Set the connection number that is set in the connection parameters.) Make sure that the setting is within the following setting range. 218IFD: 1 to 20
11 to 16	–	Not used.	–
17	IN	Data size	Set the size of data to write. (Specify the size in words for No protocol 1, and in bits for No-protocol 2.)
18	–	Not used.	–
20	IN	Local data address, lower word	Set the data address to store write data in the local station.
21	IN	Local data address, upper word	
22	IN	Local station register type	Set the register type to store write data in the local station.

* IN: Input item

■ **Receive Message Function (MSG-RCVE)**

The parameters for the Receive Message function are checked according to the following two transmission protocols.

• Parameter List When Pro-Type (Transmission Protocol) Is MEMOBUS

Parameter No.	IN/OUT*	Item	Description and What to Check
10	IN	Connection number	Set the remote station from which to send the message. (Set the connection number that is set in the connection parameters.) Make sure that the setting is within the following setting range. 218IFD: 1 to 20
11	OUT	Option	Gives the optional settings. The meaning of this option depends on the protocol being used.
12	OUT	Function code	Contains the function code that was requested from the sending side.
14	OUT	Data address, lower word	Contains the start address of the data requested from the sending side. (Contains the word address for register access, or contains the bit address for relay or coil access.)
15	OUT	Data address, upper word	
16	OUT	Register type	Contains the register type that was requested by the sending side.
17	OUT	Data size	Contains the size of read or write data that was requested by the sending side. (Contains the size in words for registers, and in bits for relays or coils.)
18	OUT	Remote CPU module number	Contains the remote CPU number.
20	IN	Coil offset, lower word	Set the offset to the word address of the coil.
21	IN	Coil offset, upper word	
22	IN	Input relay offset, lower word	Set the offset to the word address of the input relay.
23	IN	Input relay offset, upper word	
24	IN	Input register offset, lower word	Set the offset to the word address of the input register.
25	IN	Input register offset, higher word	
26	IN	Holding register offset, lower word	Set the offset to the word address of the holding register.
27	IN	Holding register offset, higher word	
28	IN	Data relay offset, lower word	Set the offset to the word address of the data relay.
29	IN	Data relay offset, upper word	
30	IN	Data register offset, lower word	Set the offset to the word address of the data register.
31	IN	Data register offset, upper word	
32	IN	Output coil offset, lower word	Set the offset to the word address of the output coil.
33	IN	Output coil offset, upper word	
34	IN	Output register offset, lower word	Set the offset to the word address of the output register.
35	IN	Output register offset, higher word	

Continued from previous page.

Parameter No.	IN/OUT*	Item	Description and What to Check
36	IN	M writing range lower limit, lower word	Set the word address of the lower limit for the writing range for holding registers and coils.
37	IN	M writing range lower limit, upper word	
38	IN	M writing range upper limit, lower word	Set the word address of the upper limit for the writing range for holding registers and coils.
39	IN	M writing range upper limit, upper word	
40	IN	G writing range lower limit, lower word	Set the word address of the lower limit for the writing range for data registers and data relays.
41	IN	G writing range lower limit, upper word	
42	IN	G writing range upper limit, lower word	Set the word address of the upper limit for the writing range for data registers and data relays.
43	IN	G writing range upper limit, upper word	
44	IN	O writing range lower limit, lower word	Set the word address of the lower limit for the writing range for output registers and output coils.
45	IN	O writing range lower limit, upper word	
46	IN	O writing range upper limit, lower word	Set the word address of the upper limit for the writing range for output registers and output coils.
47	IN	O writing range upper limit, upper word	

* IN: Input item, OUT: Output item

Note: Refer to the following manual for what to check in parameters 04 to 11 according to the protocol type that is being used.

☉ MP3000 Series Communications User's Manual (Manual No.: SIEP C880725 12)

• Parameter List When Pro-Type (Transmission Protocol) Is No-protocol 1 or No-protocol 2

Parameter No.	IN/OUT*	Item	Description and What to Check
10	IN	Connection number	Set the remote station from which to send the message. (Set the connection number that is set in the connection parameters.) Make sure that the setting is within the following setting range. 218IFD: 1 to 20
11 to 16	–	Not used.	–
17	OUT	Data size	Contains the size of read or write data that was requested by the sending side. (Contains the size in words for registers, and in bits for relays or coils.)
18 to 35	–	Not used.	–
36	IN	M writing range lower limit, lower word	Set the word address of the lower limit for the writing range for the holding registers.
37	IN	M writing range lower limit, upper word	
38	IN	M writing range upper limit, lower word	Set the word address of the upper limit for the writing range for holding registers.
39	IN	M writing range upper limit, upper word	
40 to 47	–	Not used.	–

* IN: Input item, OUT: Output item

6.2.3 Communications Stopped during Message Communications

There are two general causes for message communications to be cut off.

No Error in Message Function

The following table shows the possible causes for message communications to stop during normal communications when no error is indicated in the error status in the Module's detailed definition or in the processing result of the message function.

Communica-tions Function Module	Condition	Cause	Correction
218IFD	The communications mode of the remote station that is connected to the Ethernet Module is set to a fixed speed in 10Base-T/ 100Base-TX half-duplex communications,[1] and there is high traffic on the network.	There is high traffic on the network with frequent data collisions, and the data that was sent from the local or remote station was lost.	1. Set the communications mode of the remote station to auto-negotiation and perform full-duplex communications. 2. Divide the network into segments using a switching hub to reduce the traffic on the network. 3. Adjust the send timing at the master devices so that multiple devices do not start communications at the same time. This does not apply when the no-protocol communications is specified as the protocol type.
	The communication mode of the remote station that is connected to the Ethernet Module is set to a fixed speed in 10Base-T/ 100Base-TX full-duplex communications.[2]	Communications between the Ethernet Module and the remote station cannot be performed properly because the communications modes of the two stations are different, and the data that was sent from the local or remote station was lost.	1. Set the communications mode of the remote station to auto-negotiation and perform full-duplex communications. 2. Set the communications mode of the remote station to a fixed speed and perform 10Base-T/100Base-TX half-duplex communications.

*1. When connected to a hub, the communications mode of the hub is set to a fixed speed in 10Base-T/100Base-TX half-duplex communications.

*2. When connected to a hub, the communications mode of the hub is set to a fixed speed in 10Base-T/100Base-TX full-duplex communications.

Error in Message Function

The following table shows the possible causes for message communications to stop during normal communications when an error is indicated in the error status of the Module's detailed definition or in the processing result of the message function.

Communications Function Module	Condition	Cause	Correction
218IFD	Communications are performed simultaneously with multiple remote stations.	The connection parameters and message functions were not prepared for the number of remote stations to communicate with.	Prepare the connection parameters and message functions for the number of remote stations to communicate with. (Communications with only one station (one connection) at one time is possible with one set of connection parameters and one message function.)
	Multiple message functions are being executed simultaneously.	More than one message function was executed simultaneously for the same Cir-No (circuit number) and Ch-No (transmission buffer channel number) or PARAM02 (connection number).	Correct the ladder program so that no more than one message function is executed simultaneously. If the communications stop due to this cause, the error can be checked in the processing result of the message function. Refer to the following section for details on the processing results of message functions. ☞ ◆ *Checking the Processing Results and Status* on page 6-21
	There is a connection for which automatic reception is enabled.	A message function and automatic reception were executed at the same time for the same connection or transmission buffer channel.	Execute only automatic reception or only message functions according to the application. Automatic reception can be enabled for connection numbers 1 to 10. It is disabled by default.

6.2.4 Other Problems during Message Communications

If the problem cannot be resolved with the corrections that are given in *6.2.1 Checking the Switch Settings* on page 6-14 to *6.2.3 Communications Stopped during Message Communications* on page 6-34, perform troubleshooting with the following table.

Communications Function Module	Error	Cause	Correction
218IFD	In a configuration where the remote station is the master station and the local station is the slave station, the remote station cannot write to certain register addresses in the SERVOPACK.	There are errors in the following parameter settings of the MSG-RCVE function. • PARAM36 and PARAM37 (M writing range lower limit) • PARAM38 and PARAM39 (M writing range upper limit) • PARAM40 and PARAM41 (G writing range lower limit) • PARAM42 and PARAM43 (G writing range upper limit) • PARAM44 and PARAM45 (O writing range lower limit) • PARAM46 and PARAM47 (O writing range upper limit)	Correct the parameter settings of the MSG-RCVE function where the errors exist. Refer to the following manual for details on the parameters of the MSG-RCVE function. 📖 MP3000 Series Communications User's Manual (Manual No.: SIEP C880725 12)
	In a configuration where the local station is the master station and the remote station is the slave station, the SERVOPACK cannot read or write from/to certain register addresses in the remote station.	An attempt has been made to access special registers or memory-protected registers in the remote station.	Check the specifications of the device that is used as the remote station.
	The addresses of the registers to read/write from the local station to the remote station and those of the registers to read/write from the remote station to the local station are inconsistent.	There are errors in the following parameter settings of the MSG-RCVE function. • PARAM20 and PARAM21 (coil offset) • PARAM22 and PARAM23 (input relay offset) • PARAM24 and PARAM25 (input register offset) • PARAM26 and PARAM27 (hold register offset) • PARAM28 and PARAM29 (data relay offset) • PARAM30 and PARAM31 (data register offset) • PARAM32 and PARAM33 (output coil offset) • PARAM34 and PARAM35 (output register offset)	Correct the parameter settings of the MSG-RCVE function where the errors exist. Refer to the following manual for details on the parameters of the MSG-RCVE function. 📖 MP3000 Series Communications User's Manual (Manual No.: SIEP C880725 12)
	I/O message communications do not start.	There are no slave settings (message receive settings and instructions) at the remote station.	Make the necessary slave settings (message receive settings and instructions) at the remote station. (I/O message communications can be used to execute the Send Message function without a ladder program. Two connections are used to read and write registers. For this reason, receive settings (message receive settings and instructions) for two connections are required at the remote station.)

Troubleshooting Motion Control Errors

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This chapter describes errors that can occur when programming and debugging and how to correct them.

7.1 Troubleshooting Motion Errors

Motion errors are errors that are detected in motion control. If a motion error occurs in the SVC4 Function Module, the M-ALM indicator on the Controller Section of the SERVOPACK will light red.

You can check motion errors in the following motion parameters: Warnings (IL□□□02), Alarms (IL□□□04), and Command Error End (IW□□□09 bit 3).

The following figure illustrates motion errors.
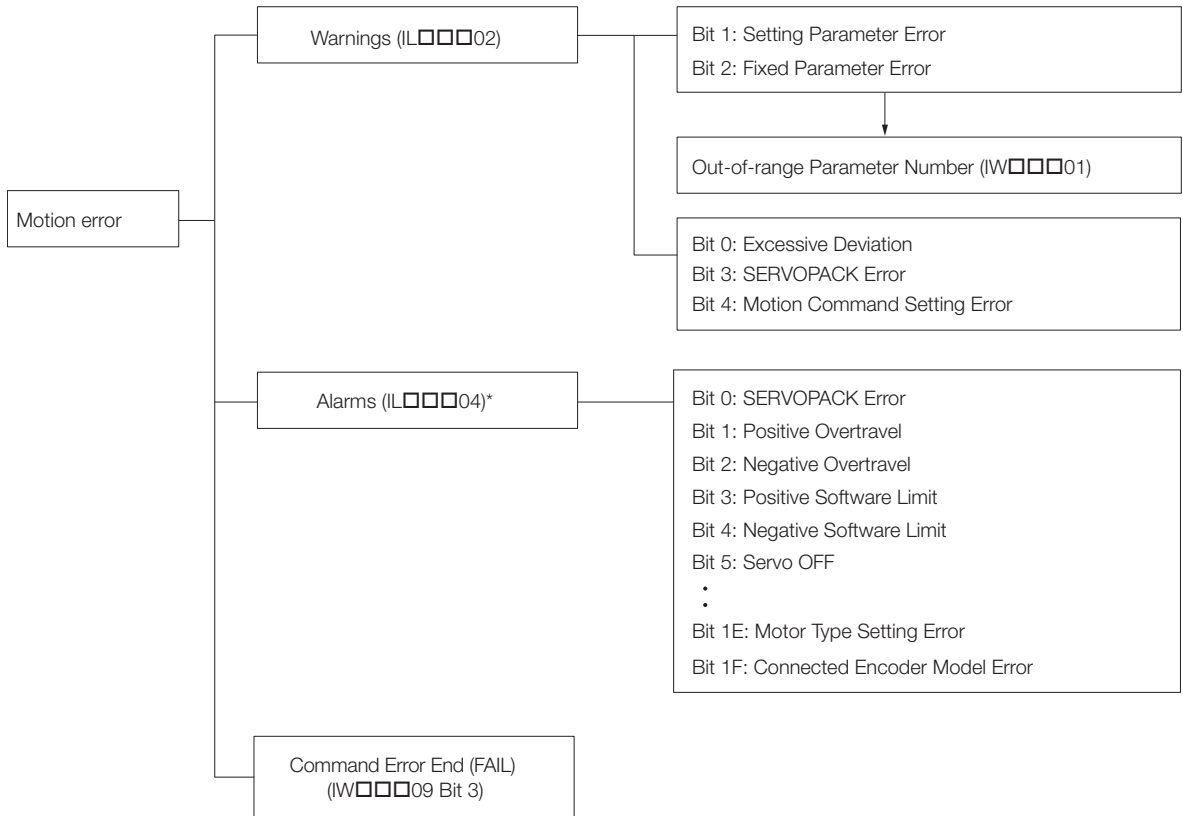
* Refer to the following section for details on the Alarms (IL□□□04) parameter.
☞ *Alarms (IL□□□04) and Corrections* on page 7-6

7.1.1 Troubleshooting Motion Errors

This section describes the details of and corrections for motion errors.

Warnings (IL□□□02)

The following table lists the bits in the Warnings (IL□□□02) parameter.

Register Address	Name	Contents	SVD	SVC4	SVR4
IL□□□02	Warnings	Bit 0: Excessive Deviation	√	√	–
		Bit 1: Setting Parameter Error	√	√	√
		Bit 2: Fixed Parameter Error	√	√	√
		Bit 3: SERVOPACK Error	√	√	–
		Bit 4: Motion Command Setting Error	√	√	√
		Bit 5: Reserved.	–	–	–
		Bit 6: Positive Overtravel	√	√	–
		Bit 7: Negative Overtravel	√	√	–
		Bit 8: Servo ON Incomplete	√	√	–
		Bit 9: SERVOPACK Communications Warning	–	√	–
		Bit A: SERVOPACK Stop Signal Active	√	√	–
		Bits B to 1F: Reserved.	–	–	–

Note: "IW□□□00" indicates the first input register address plus 00.

◆ Troubleshooting Warnings (IL□□□02)

■ Bit 0: Excessive Deviation [SVD] [SVC4]

Detection Timing	Anytime except during speed or torque control. This warning is detected only when bit 0 (Excessive Deviation Error Level Setting) in the OW□□□01 setting parameter is set to 1 (Warning).
Processing When Warning Occurs	The current travel command is continued. Travel commands can be executed.
Details and Cause	The position deviation exceeded the OL□□□22 setting parameter (Excessive Deviation Detection Value). The following are possible causes. • Response was poor because the position loop or speed loop gain is not suitable. • The value of OL□□□22 (Excessive Deviation Detection Value) is too small. • The capacity of the motor is too small for the load. • The slave SERVOPACK malfunctioned.
Correction	Check the following and make suitable corrections where necessary. • Check the position loop or speed loop gain. • Check the OL□□□22 (Excessive Deviation Detection Value) parameter. • Check the capacity of the motor.

Note: The deviation is not checked if the OL□□□22 (Excessive Deviation Detection Value) parameter is set to 0.

■ Bit 1: Setting Parameter Error [SVD] [SVC4] [SVR4]

Detection Timing	At execution of a motion command.
Processing When Warning Occurs	The number of the setting parameter in which an error was detected is reported in the IW□□□01 monitor parameter (Out-of-range Parameter Number).
Details and Cause	The following are possible causes. • The setting of the setting parameter exceeds the range. • The value of the setting parameter that was specified when a motion command was executed was not correct.
Correction	Check the setting of the setting parameter that was reported in the IW□□□01 monitor parameter (Out-of-range Parameter Number).

Troubleshooting Motion Control Errors

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■ Bit 2: Fixed Parameter Error `SVD` `SVC4` `SVR4`

Detection Timing	When saving the fixed parameters.
Processing When Warning Occurs	The number of the fixed parameter in which an error was detected is reported in the IW□□□01 monitor parameter (Out-of-range Parameter Number). Bit 0 (Motion Operation Ready) in the IW□□□01 monitor parameter changes to 0 (Motion Operation Not Ready).
Details and Cause	A setting range error or operation error occurred in internal processing that used more than one fixed parameter.
Correction	Check the setting of the fixed parameter that was reported in the IW□□□01 monitor parameter (Out-of-range Parameter Number).

Note: The following fixed parameters are related to a fixed parameter error for the electronic gear. Check the settings of these parameters.
Bit 0 (Axis Selection) and bit 9 (Simple Absolute Infinite Axis Position Management) in the Function Selection Flags 1 parameter, and the Reference Unit Selection, Travel Distance per Machine Rotation, Servomotor Gear Ratio Term, Machine Gear Ratio Term, Infinite-length Axis Reset Position, Encoder Selection, Number of Pulses per Motor Rotation, and Maximum Number of Absolute Encoder Rotations parameters

■ Bit 3: SERVOPACK Error `SVD` `SVC4`

Detection Timing	Anytime
Processing When Warning Occurs	The current travel command is continued. Travel commands can be executed.
Details and Cause	This warning indicates that a warning occurred in the slave SERVOPACK. Check the nature of the warning in bits 8 to B (Command Error Status) and bits C to F (Communications Error Status) of the IW□□□2C monitor parameter, and the IW□□□2D monitor parameter (SERVOPACK Alarm Code).
Correction	Check the nature of the slave SERVOPACK warning and eliminate the cause.

■ Bit 4: Motion Command Setting Error `SVD` `SVC4` `SVR4`

Detection Timing	At start of motion command execution.
Processing When Warning Occurs	The motion command is disabled.
Details and Cause	An unsupported motion command code was set.
Correction	Correct the motion command code.

■ Bit 6: Positive Overtravel and Bit 7: Negative Overtravel `SVD` `SVC4`

Detection Timing	During execution of a travel command. Overtravel detection is enabled while the OT signal in travel direction is OFF.
Processing When Warning Occurs	• Stop processing is performed in the slave SERVOPACK. The stop method and the operation after stopping depend on the user-defined settings of the slave SERVOPACK. • Controller Section Processing The current travel command is continued.
Details and Cause	The following are possible causes. • A command was issued that caused a travel limit of the machine to be exceeded for one of the following: A command from a user program Manual operation that exceeds the travel limit • An error in the overtravel signal
Correction	• Check the following items: Check the overtravel signal. Check programmed and manual operation. • After completing the above checks, return the axis to eliminate the overtravel condition.

■ Bit 8: Servo ON Incomplete `SVD` `SVC4`

Detection Timing	Anytime
Processing When Warning Occurs	Travel commands cannot be executed.
Details and Cause	The power to the Servomotor was not turned ON even though bit 0 (Servo ON) of the OW□□□00 setting parameter was turned ON. The following are possible causes. • The change in the Servo ON command from OFF to ON was not detected. • There is an alarm in the slave SERVOPACK. • The main circuit power supply to the slave SERVOPACK is OFF.
Correction	Turn ON the Servo ON command again. Check the slave SERVOPACK for alarms and check the power supply status and stop signal status.

■ Bit 9: SERVOPACK Communications Warning `SVC4`

Detection Timing	Anytime
Processing When Warning Occurs	The current travel command is continued. Travel commands can be executed.
Details and Cause	This bit shows individual errors in MECHATROLINK communications.
Correction	When the communications error stops, normal status is recovered automatically. If warnings occur frequently, reroute the MECHATROLINK cable, change the ground, or implement other noise countermeasures.

Note: If communications errors occur consecutively, an alarm will be shown in IL□□□04 bit 11 (SERVOPACK Communications Error).

■ Bit A: SERVOPACK Stop Signal Active `SVD` `SVC4`

Detection Timing	Anytime
Processing When Warning Occurs	The power supply to the Servomotor is turned OFF and travel commands are not executed.
Details and Cause	The stop signal (or an HWBB for Σ-V/Σ-7-Series SERVOPACKs) was received by the slave SERVOPACK.
Correction	Confirm safety, and then disable the stop signal.

Alarms (IL□□□04) and Corrections

This section describes the alarms that are given in IL□□□04 and the corrections for them.

◆ Alarms in IL□□□04

The following table lists the bits in the Alarms (IL□□□04) parameter.

IL□□□04	Alarm Meaning	SVD	SVC4	SVR4
Bit 0	SERVOPACK Error	√	√	–
Bit 1	Positive Overtravel	√	√	–
Bit 2	Negative Overtravel	√	√	–
Bit 3	Positive Software Limit	√	√	–
Bit 4	Negative Software Limit	√	√	–
Bit 5	Servo OFF	√	√	√
Bit 6	Positioning Time Exceeded	√	√	–
Bit 7	Excessive Positioning Travel Distance	√	√	–
Bit 8	Excessive Speed	√	√	–
Bit 9	Excessive Deviation	√	√	–
Bit A	Filter Type Change Error	√	√	–
Bit B	Filter Time Constant Change Error	√	√	–
Bit C	Reserved.	–	–	–
Bit D	Zero Point Unset	√	√	–
Bit E	Reserved.	–	–	–
Bit F	Reserved.	–	–	–
Bit 10	SERVOPACK Synchronized Communications Error	–	√	–
Bit 11	SERVOPACK Communications Error	–	√	–
Bit 12	SERVOPACK Communications Timeout Error	√	√	–
Bit 13	Excessive Absolute Encoder Rotations	√	√	–
Bit 14	Reserved.	–	–	–
Bit 15	Reserved.	–	–	–
Bit 16	Scan Setting Error	√	√	–
Bit 17	Reserved.	–	–	–
Bit 18	Reserved.	–	–	–
Bit 19	Reserved.	–	–	–
Bit 1A	Reserved.	–	–	–
Bit 1B	Reserved.	–	–	–
Bit 1C	Cyclic Communications Initialization Incomplete	–	√	–
Bit 1D	Detected SERVOPACK Model Error	–	√	–
Bit 1E	Motor Type Setting Error	√	√	–
Bit 1F	Connected Encoder Model Error	√	√	–

◆ Corrections for Alarms (IL□□□04)

■ Bit 0: SERVOPACK Error `SVD` `SVC4`

Detection Timing	Slave SERVOPACK alarms are always detected in the alarm control section.
Processing When Alarm Occurs	The current command is canceled. If a SERVOPACK Error alarm occurs during execution of a POSING command, the POSING operation is canceled and the axis decelerates to a stop. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	The cause depends on the specific alarm. The specific alarm is given in IW□□□2D (SERVOPACK Alarm Code).
Correction	• Check the specific slave SERVOPACK alarm and eliminate the cause. • Reset the alarm.

Note: This bit changes to 1 when an alarm that is classified as a SERVOPACK alarm occurs in MECHATROLINK communications.

■ Bit 1: Positive Overtravel and Bit 2: Negative Overtravel `SVD` `SVC4`

Detection Timing	These alarms are always detected by the position control section during execution of a motion command.
Processing When Alarm Occurs	• Stop processing is performed in the slave SERVOPACK. The stop method and the operation after stopping depend on the user-defined settings of the slave SERVOPACK. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON. • Controller Section Processing The command is canceled and the axis decelerates to a stop. Followup processing to align the command position with the current machine position in every scan cycle is performed.
Details and Cause	The following are possible causes. • A command was issued that caused a travel limit of the machine to be exceeded for one of the following: A command from a user program Manual operation that exceeds the travel limit • An error in the overtravel signal
Correction	• Check the following items: Check the overtravel signal. Check programmed and manual operation. • After checking the above items, clear the motion command code and reset the alarm. Then return the axis to eliminate the overtravel condition. (Commands in the overtravel direction will be disabled. If you attempt to execute one, the alarm will occur again.)

Note: For a vertical axis, we recommend that you make the following settings in the slave SERVOPACK to prevent falling or oscillation at the overtravel boundary.
    • Using an emergency stop to decelerate to a stop
    • Implementing a zero clamp after decelerating to a stop

■ Bit 3: Positive Software Limit and Bit 4: Negative Software Limit `SVD` `SVC4`

Detection Timing	Detection is enabled when a motion command is used. These alarms are detected by the position control section. Detection is enabled after completion of a Zero Point Return or a Set Zero Point command.
Processing When Alarm Occurs	The axis decelerates to a stop at the software limit. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	A command was issued that caused a software limit for the machine to be exceeded for one of the following: A command from a user program that exceeds the travel limit Manual operation that exceeds the travel limit
Correction	• Check programmed and manual operation. • After checking the above item, clear the motion command code and reset the alarm. Then return the axis to within the software limit. (Commands in the direction of the software limit will be disabled. If you attempt to execute one, the alarm will occur again.)

■ Bit 5: Servo OFF [SVD] [SVC4] [SVR4]

Detection Timing	This alarm is detected when a travel command is attempted when the power to the Servomotor is OFF.
Processing When Alarm Occurs	The specified travel command is not executed. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	A travel command (Positioning, External Positioning, Jog, or STEP Operation) was issued when the power to the Servomotor was OFF.
Correction	Clear the motion command code, reset the alarm, and then turn ON the power to the Servomotor.

■ Bit 6: Positioning Time Exceeded [SVD] [SVC4]

Detection Timing	Positioning was not completed within the time set in OW□□□26 (Positioning Completion Check Time) after the completion of pulse distribution.
Processing When Alarm Occurs	The current command is forced to end. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	The following are possible causes. • Response was poor or oscillation occurred because the position loop or speed loop gain is not suitable. • The time in OW□□□26 (Positioning Completion Check Time) is too short. • The capacity of the Servomotor is too small for the load. • The slave SERVOPACK and Servomotor are not connected correctly.
Correction	Check the following items: • Check the parameters that are related to the characteristics (gains) of the slave SERVOPACK. • Check the connection between the slave SERVOPACK and Servomotor. • See if the capacity of the Servomotor is sufficient. • Check the time in OW□□□26 (Positioning Completion Check Time).

Note: The positioning time is not checked if the OW□□□26 (Positioning Completion Check Time) parameter is set to 0.

■ Bit 7: Excessive Positioning Travel Distance [SVD] [SVC4]

Detection Timing	This alarm is detected when a positioning command is executed.
Processing When Alarm Occurs	Travel commands are not executed. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	A motion command (Positioning, STEP Operation, or External Positioning) that exceeded the positioning travel limit was issued.
Correction	Check the axis travel distance specification in the positioning command.

The positioning travel limits depend on the setting of fixed parameter No. 4 (Reference Unit Selection) as given below.

Setting of Fixed Parameter No. 4	0	1	2	3	4
Reference unit	pulse	mm	deg	inch	μm
Positioning travel limit	2147483647				

■ Bit 8: Excessive Speed [SVD] [SVC4]

Detection Timing	This alarm is detected when a travel command is executed.
Processing When Alarm Occurs	Travel commands are not executed. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	The reference speed (or, for interpolation, the distributed travel distance for one scan) that was sent to the slave SERVOPACK with MECHATROLINK communications exceeded the allowed upper limit.
Correction	Check the speed reference, travel distance per scan for the interpolation reference, and the speed compensation setting.

■ Bit 9: Excessive Deviation `SVD` `SVC4`

Detection Timing	Anytime except during speed or torque control.
Processing When Alarm Occurs	Travel commands are not executed. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	The following are possible causes. • Response was poor because the position loop or speed loop gain is not suitable. • The value of OL□□□22 (Excessive Deviation Detection Value) is too small. • The capacity of the motor is too small for the load. • A failure occurred in the slave SERVOPACK.
Correction	Check the following and make suitable corrections where necessary. If recovery is not possible, contact the maintenance division. • Check the position loop or speed loop gain. • Check the OL□□□22 (Excessive Deviation Detection Value) parameter. • Check the capacity of the motor.

Note: The deviation is not checked if the OL□□□22 (Excessive Deviation Detection Value) parameter is set to 0.

■ Bit 10: SERVOPACK Synchronized Communications Error `SVC4`

Detection Timing	This error is detected by the communications control section during synchronized MECHATROLINK communications between the SERVOPACK and the slave SERVO-PACK.
Processing When Alarm Occurs	The current command is canceled.
Details and Cause	Data was not updated correctly in either the SERVOPACK or the slave SERVOPACK.
Correction	Check the MECHATROLINK cable connections, and then reset the alarm.

■ Bit 11: SERVOPACK Communications Error `SVC4`

Detection Timing	This error is detected by the communications control section during MECHATROLINK communications between the SERVOPACK and the slave SERVO-PACK.
Processing When Alarm Occurs	• The current command is canceled. • The servo is turned OFF.
Details and Cause	MECHATROLINK communications stopped due to a cable disconnection, MECHATROLINK communications error (e.g., noise in the communications channel), power supply interruption, or other problem.
Correction	Check the MECHATROLINK cable connections, and then reset the alarm.

■ Bit A: Filter Type Change Error `SVD` `SVC4`

Detection Timing	Always detected. (This alarm is detected by the motion command processing section.)
Processing When Alarm Occurs	The Change Filter Type command is not executed. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	An error will occur if the Change Filter Type command is specified when pulse distribution has not been completed for a command (i.e., when bit 0 in IW□□□0C is OFF).
Correction	Correct the program so that the Change Filter Type command is executed only after pulse distribution is completed (i.e., only when bit 0 in IW□□□0C is ON).

Note: The current command will not stop even if this error occurs. To stop the current command, program stop processing in a user program.

Troubleshooting Motion Control Errors

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■ Bit B: Filter Time Constant Change Error [SVD] [SVC4]

Detection Timing	Always detected. (This alarm is detected by the motion command processing section.)
Processing When Alarm Occurs	Commands are not executed. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	An error will occur if the Change Filter Time Constant command is specified when pulse distribution has not been completed for a command (i.e., when bit 0 in IW□□□0C is OFF).
Correction	Correct the program so that the Change Filter Time Constant command is executed only after pulse distribution is completed (i.e., only when bit 0 in IW□□□0C is ON).

Note: The current command will not stop even if this error occurs. To stop the current command, program stop processing in a user program.

■ Bit D: Zero Point Unset (Zero point unsetting) [SVD] [SVC4]

Detection Timing	Detection of this alarm is enabled only when an absolute encoder and an infinite-length axis are used. The alarm is detected when the following command is set in OW□□□08 (Motion Commands).
	    Commands: Positioning, External Positioning, Interpolation, Latch, or Issue Phase
	        Reference

Processing When Alarm Occurs	The command that was set is not executed. Bit 3 (Command Error End) in IW□□□09 (Motion Command Status) turns ON.
Details and Cause	A travel command was set when the origin was not set (i.e., when bit 5 of IW□□□0C was OFF).
Correction	Clear the motion command, reset the alarm, and then perform an operation to set the origin.

■ Bit 12: SERVOPACK Communications Timeout Error [SVD] [SVC4]

Detection Timing	This alarm is detected during execution of travel commands. This alarm is detected by the MECHATROLINK communications control section when the servo command/response check is performed in the processing sections.
Processing When Alarm Occurs	The current command is canceled.
Details and Cause	The servo command in MECHATROLINK communications was not completed within the specified time (5 seconds).
Correction	Check for alarms in the slave SERVOPACK with MECHATROLINK Communications.

Note: This alarm occurs in the slave SERVOPACK with MECHATROLINK Communications when Module assignment is completed but the power supply to the slave SERVOPACK is not turned ON.

■ Bit 13: Excessive Absolute Encoder Rotations [SVD] [SVC4]

Detection Timing	Detection of this alarm is enabled only when an absolute encoder, finite-length axis, and electronic gear are used. This alarm is detected by the position control section when the power supply is turned ON.
Processing When Alarm Occurs	The absolute position information that is read from the absolute encoder when the SEN signal turns ON is ignored.
Details and Cause	An operation error occurred when converting the absolute position information that was read from the absolute encoder when the power supply was turned ON from pulses to reference units.
Correction	Correct the settings of the gear ratio, encoder pulses, and other related fixed parameters.

■ Bit 16: Scan Setting Error [SVD] [SVC4]

Detection Timing	This alarm is detected when the slave SERVOPACK is started, when the high-speed scan setting is changed or saved, or when the MECHATROLINK communications definitions are changed or saved.
Processing When Alarm Occurs	A communications error will occur for all slave SERVOPACKs and I/O stations connected to the MECHATROLINK.
Details and Cause	The high-speed scan cycle setting and the MECHATROLINK transmission cycle setting are not an integer multiple of 1, or an integer fraction of 1.
Correction	Check the settings for the high-speed scan or the MECHATROLINK transmission cycle.

■ Bit 1C: Cyclic Communications Initialization Incomplete [SVC4]

Detection Timing	This error is detected by the MECHATROLINK communications control section during MECHATROLINK communications.
Processing When Alarm Occurs	Communications with the slave station in which this error occurred are not possible.
Details and Cause	Slave stations are being allocated with MECHATROLINK communications, but a slave station could not join communications because it was not connected or because it was connected while communications were already in progress.
Correction	Turn the power supply to the SERVOPACK OFF and ON again, or execute Reset Network (OW□□□00 Bit C).

■ Bit 1D: Detected SERVOPACK Model Error [SVC4]

Detection Timing	This alarm is detected when trying to establish MECHATROLINK communications with a slave SERVOPACK.
Processing When Alarm Occurs	Communications with the slave SERVOPACK in which this error occurred are not possible.
Details and Cause	The SERVOPACK that is actually connected does not match the slave SERVOPACK model assigned in the SVC definitions.
Correction	• Change the slave SERVOPACK model selection so that it matches the actual slave SERVOPACK. • If the slave SERVOPACK model is not supported by the newest version of the MPE720, specify it as a wildcard SERVOPACK.

■ Bit 1E: Motor Type Setting Error [SVD] [SVC4]

Detection Timing	This alarm is detected when communications is established with the SERVOPACK.
Processing When Alarm Occurs	No special processing is performed.
Details and Cause	The setting (rotary/linear) of the Motor Type fixed parameter does not agree with the setting in the slave SERVOPACK.
Correction	Check the settings and model number of the slave SERVOPACK.

■ Bit 1F: Connected Encoder Model Error [SVD] [SVC4]

Detection Timing	This alarm is detected when communications is established with the slave SERVO-PACK.
Processing When Alarm Occurs	No special processing is performed.
Details and Cause	The setting (rotary/linear) of the Motor Type fixed parameter does not agree with the Servomotor that is connected to the slave SERVOPACK.
Correction	Check the Servomotor.

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Causes of Command Error End Alarms (IW□□□09 Bit 3)

Bit 3 (Command Error End) of the IW□□□09 monitor parameter will turn ON when a motion command cannot be executed for some reason or if execution does not end normally. The reasons that cause this bit to turn ON depend on the motion command.

The following table gives the reasons that cause this bit to turn ON for each motion command.

Motion Command Code		Reason for Command Error End	Warnings (W) and Alarms (A) That Occur at the Same Time
1	POSING (Positioning)	The positioning travel distance exceeded the allowed value.	A: Excessive Positioning Travel Distance
		An absolute infinite-length axis is being used but the origin is not set.	A: Zero Point Unset
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
2	EX_POSING (External Positioning)	The positioning travel distance exceeded the allowed value.	A: Excessive Positioning Travel Distance
		An absolute infinite-length axis is being used but the origin is not set.	A: Zero Point Unset
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		Writing the slave SERVOPACK parameters was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error
		An external signal selection is not within the setting range.	W: Setting Parameter Error
3	ZRET (Origin Return)	The machine is locked.	–
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		Reading or writing the slave SERVOPACK parameters was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error
		The origin return method is not set within the setting range.	W: Setting Parameter Error
		The origin return method is set to P-OT, but the approach speed is negative.	W: Setting Parameter Error
		The origin return method is set to N-OT, but the approach speed is positive.	W: Setting Parameter Error
		The origin return method is set to DEC1 + phase-C pulse, ZERO signal, DEC1 + ZERO signal, or Phase-C pulse, but the OT signal in the origin return direction is ON.	OT alarm or OT warning in the origin return direction

Motion Command Code		Reason for Command Error End	Warnings (W) and Alarms (A) That Occur at the Same Time
4 · 5	INTERPOLATE (Interpolation) END_OF_INTERPOLATE (Last Interpolation Segment)	The travel distance for one scan exceeded the allowable segment for a slave SERVOPACK with MECHATROLINK Communications or the speed feedforward value exceeded the maximum speed.	A: Excessive Speed
		An absolute infinite-length axis is being used but the origin is not set.	A: Zero Point Unset
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
6	LATCH (Latch)	The travel distance for one scan exceeded the allowable segment for a slave SERVOPACK with MECHATROLINK Communications or the speed feedforward value exceeded the maximum speed.	A: Excessive Speed
		An absolute infinite-length axis is being used but the origin is not set.	A: Zero Point Unset
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Latch signal is set outside of the setting range.	W: Setting Parameter Error
7	FEED (Constant Speed Feed)	Machine locked.	–
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
8	STEP (STEP Operation)	The positioning travel distance exceeded the allowed value.	A: Excessive Positioning Travel Distance
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
9	ZSET (Set Zero Point)	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
10 · 11	ACC (Change Linear Acceleration Time Constant) DCC (Change Linear Deceleration Time Constant)	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		The command was executed when pulse distribution was not completed (i.e., when DEN was OFF).	–
		Writing the slave SERVOPACK parameters was not completed within the specified time.	A: Servo Command Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error
12	SCC (Change Filter Time Constant)	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		The command was executed when pulse distribution was not completed (i.e., when DEN was OFF).	A: Filter Time Constant Change Error
		Writing the slave SERVOPACK parameters was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error

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Motion Command Code		Reason for Command Error End	Warnings (W) and Alarms (A) That Occur at the Same Time
13	CHG_FILTER (Change Filter Type)	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		The command was executed when pulse distribution was not completed (i.e., when DEN was OFF).	A: Filter Time Constant Change Error
		The filter type is set outside of the setting range.	W: Setting Parameter Error
14 · 15 · 16	KVS (Change Speed Loop Gain) KPS (Change Position Loop Gain) KFS (Change Feed-forward)	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		Writing the slave SERVOPACK parameters was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error
17 · 18	PRM_RD (Read SERVOPACK Parameter) PRM_WR (Write SERVOPACK Parameter)	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		Reading the slave SERVOPACK parameter was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error
		The slave SERVOPACK parameter number or parameter size is set outside of the setting range.	W: Setting Parameter Error
19 · 20	ALM_MON (Monitor Alarms) ALM_HIST (Monitor Alarm History)	The command to the slave SERVOPACK was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		The slave SERVOPACK alarm monitor number was set outside of the setting range.	W: Setting Parameter Error
21	ALMHIST_CLR (Clear Alarm History)	The command to the slave SERVOPACK was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
22	ABS_RST (Reset Absolute Encoder)	The command was issued when the power to the Servomotor was ON.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		The command to the slave SERVOPACK was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
23	VELO (Issue Speed Reference)	The command was issued for a MECHATROLINK-I connection.	–
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
24	TRQ (Issue Torque Reference)	The command was issued for a MECHATROLINK-I connection.	–
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
25	PHASE (Issue Phase Reference)	An absolute infinite-length axis is being used but the origin is not set.	A: Zero Point Unset
		The power to the Servomotor is OFF.	A: Servo OFF
		An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error

Continued from previous page.

Motion Command Code		Reason for Command Error End	Warnings (W) and Alarms (A) That Occur at the Same Time
26	KIS (Change Position Loop Integral Time)	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		Writing the slave SERVOPACK parameters was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error
–	SERVOPACK parameter auto-write when other travel commands are executed*	An alarm has occurred.	–
		Communications are not synchronized.	A: SERVOPACK Synchronized Communications Error
		Writing the slave SERVOPACK parameters was not completed within the specified time.	A: SERVOPACK Communications Timeout Error
		An A.94 or A.95 warning occurred in the slave SERVOPACK.	W: SERVOPACK Error
		Pulse distribution is not completed (i.e., DEN is OFF).	–

* This applies when the SERVOPACK Parameter Auto-Write fixed parameter is set to 0 (Enabled) and the setting of the Filter Time Constant, Acceleration Rate/Acceleration Time Constant, or Deceleration Rate/Deceleration Time Constant parameter is changed at the same time as the travel command is set.

7.1.2 Checking Status and Alarms of a SERVOPACK

Use the MPE720 to check the status and alarms of a SERVOPACK.

This section gives the items that can be checked in the SERVOPACK status and alarm information.

SERVOPACK Status Monitor (IW□□□2C) Table

The status of a SERVOPACK with MECHATROLINK-III Communications References can be monitored in the SERVOPACK Status Monitor parameter (IW□□□2C).

Bit	Status	Meaning	SVD	SVD 4	SVR 4
Bit 0	Drive Alarm (D_ALM)	0: No drive alarm. 1: Drive alarm occurred.	√	√	–
Bit 1	Drive Warning (D_WAR)	0: No drive warning. 1: Drive warning occurred.	√	√	–
Bit 2	Command Ready (CMDRDY)	0: Commands cannot be received (busy). 0: Commands can be received (ready).	√	√	–
Bit 3	Alarm Clear Execution Completed (ALM_CL-R_CMP)	0: Servo OFF (base block active) 1: Servo ON (base block not active)	√	√	–
Bit 4 and Bit 5	Reserved.	–	√	√	–
Bit 6 and Bit 7	Echo-back of Command ID (RCMD_ID)	This parameter reports the echo-back value of the command ID of a MECHATROLINK-III command.	√	√	–
Bit 8 to Bit F	Reserved.	–	√	√	–

SERVOPACK Alarm Code (IW□□□2D) Tables

If bit 0 (SERVOPACK Error) in IL□□□04 (Alarms) is ON, an alarm has occurred in the SERVOPACK with MECHATROLINK-III Communications References. You can monitor IW□□□2D (SERVOPACK Alarm Code) to determine what alarm occurred.

The alarm codes are listed in the following tables. Refer to the following section for corrective measures.

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◆ Σ-7-Series SERVOPACKs

Register Address	Name	Code	Meaning
IW□□□2D	SERVOPACK Alarm Code	020	Parameter Checksum Error
		021	Parameter Format Error
		022	System Checksum Error
		024	System Alarm
		025	System Alarm
		030	Main Circuit Detector Error
		040	Parameter Setting Error
		041	Encoder Output Pulse Setting Error
		042	Parameter Combination Error
		044	Semi-closed/Fully-closed Loop Control Parameter Setting Error
		050	Combination Error
		051	Unsupported Device Alarm
		070	Motor Type Change Detected
		080	Linear Encoder Pitch Setting Error
		0B0	Invalid Servo ON Command Alarm
		100	Overcurrent Detected
		300	Regeneration Error
		320	Regenerative Overload
		330	Main Circuit Power Supply Wiring Error
		331	Power Supply Monitor Input Signal Error
		400	Overvoltage
		410	Undervoltage
		450	Main-Circuit Capacitor Overvoltage
		510	Overspeed
		511	Encoder Output Pulse Overspeed
		520	Vibration Alarm
		521	Autotuning Alarm
		550	Maximum Speed Setting Error
		710	Instantaneous Overload
		720	Continuous Overload
		730, 731	Dynamic Brake Overload
		740	Inrush Current Limiting Resistor Overload
		7A1	Internal Temperature Error 1 (Control Board Temperature Error)
		7A2	Internal Temperature Error 2 (Power Board Temperature Error)
		7A3	Internal Temperature Sensor Error
		7AB	SERVOPACK Built-in Fan Stopped
		810	Encoder Backup Alarm
		820	Encoder Checksum Alarm
		830	Encoder Battery Alarm
		840	Encoder Data Alarm
		850	Encoder Overspeed
		860	Encoder Overheated
		861	Overheating
		890	Encoder Scale Error
		891	Encoder Module Error
		8A0	External Encoder Error
		8A1	External Encoder Module Error
		8A2	External Incremental Encoder Sensor Error
		8A3	External Absolute Encoder Position Error

Continued from previous page.

Register Address	Name	Code	Meaning
IW□□□2D	SERVOPACK Alarm Code	8A5	External Encoder Overspeed
		8A6	External Encoder Overheated
		B10	Speed Reference A/D Error
		B11	Speed Reference A/D Data Error
		B20	Torque Reference A/D Error
		B33	Current Detection Error 3
		BF0	System Alarm 0
		BF1	System Alarm 1
		BF2	System Alarm 2
		BF3	System Alarm 3
		BF4	System Alarm 4
		C10	Servomotor Out of Control
		C20	Phase Detection Error
		C21	Polarity Sensor Error
		C22	Phase Information Disagreement
		C50	Polarity Detection Failure
		C51	Overtravel Detected during Polarity Detection
		C52	Polarity Detection Not Completed
		C53	Out of Range of Motion for Polarity Detection
		C54	Polarity Detection Failure 2
		C80	Encoder Clear Error or Multiturn Limit Setting Error
		C90	Encoder Communications Error
		C91	Encoder Communications Position Data Acceleration Rate Error
		C92	Encoder Communications Timer Error
		CA0	Encoder Parameter Error
		CB0	Encoder Echoback Error
		CC0	Multiturn Limit Disagreement
		CF1	Reception Failed Error in Feedback Option Module Communications
		CF2	Timer Stopped Error in Feedback Option Module Communications
		D00	Position Deviation Overflow
		D01	Position Deviation Overflow Alarm at Servo ON
		D02	Position Deviation Overflow Alarm for Speed Limit at Servo ON
		D10	Motor-Load Position Deviation Overflow
		D30	Position Data Overflow
		E72	Feedback Option Module Detection Failure
		EB1	Safety Function Signal Input Timing Error
		F10	Power Supply Line Open Phase
		F50	Servomotor Main Circuit Cable Disconnection

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◆ Σ-V-Series SERVOPACKs

Register Address	Name	Code	Meaning
IW□□□2D	SERVOPACK Alarm Code	020	Parameter Checksum Error
		021	Parameter Format Error
		022	System Checksum Error
		023	Parameter Password Error
		030	Main Circuit Detector Error
		040	Parameter Setting Error
		041	Encoder Output Pulse Setting Error
		042	Parameter Combination Error
		044	Semi-closed/Fully-closed Loop Control Parameter Setting Error
		050	Combination Error
		051	Unsupported Device Alarm
		0B0	Invalid Servo ON Command Alarm
		100	Overcurrent Detected
		300	Regeneration Error
		320	Regenerative Overload
		330	Main Circuit Power Supply Wiring Error
		400	Overvoltage
		410	Undervoltage
		510	Overspeed
		511	Encoder Output Pulse Overspeed
		520	Vibration Alarm
		521	Autotuning Alarm
		710	Maximum Momentary Overload
		720	Maximum Continuous Overload
		730 731	Dynamic Brake Overload
		740	Inrush Current Limiting Resistor Overload
		7A0	Heat Sink Overheated
		7AB	SERVOPACK Built-in Fan Stopped
		810	Encoder Backup Alarm
		820	Encoder Checksum Alarm
		830	Encoder Battery Alarm
		840	Encoder Data Alarm
		850	Encoder Overspeed
		860	Encoder Overheated
		891	Encoder Module Error
		8A0	External Encoder Scale Error
		8A1	External Encoder Module Error
		8A2	External Incremental Encoder Sensor Error
		8A3	External Absolute Encoder Position Error
		B10	Speed Reference A/D Error
		B11	Speed Reference A/D Data Error
		B20	Torque Reference A/D Error
		B31	Current Detection Error 1
		B32	Current Detection Error 2
		B33	Current Detection Error 3
		BF0	System Alarm 0 (Scan C Error)
		BF1	System Alarm 1 (CPU Stack Memory Error)
		BF2	System Alarm 2 (Current Control Processing Section Program Error)

Register Address	Name	Code	Meaning
IW□□□2D	SERVOPACK Alarm Code	BF3	System Alarm 3 (Scan A Error)
		BF4	System Alarm 4 (CPU WDT Error)
		C10	Runaway Prevention Detected
		C20	Phase Detection Error[1]
		C21	Polarity Sensor Error[1]
		C22	Phase Information Disagreement[1]
		C50	Polarity Detection Failure[1]
		C51	Overtravel Detected during Polarity Detection[1]
		C52	Polarity Detection Not Completed[1]
		C53	Out of Range of Motion for Polarity Detection
		C54	Polarity Detection Failure 2
		C80	Encoder Clear Error or Multiturn Limit Setting Error
		C90	Encoder Communications Error
		C91	Encoder Communications Position Data Acceleration Rate Error
		C92	Encoder Communications Timer Error
		CA0	Encoder Parameter Error
		CB0	Encoder Echoback Error
		CC0	Multiturn Limit Disagreement
		CF1	Fully-closed Serial Conversion Unit Communications Error[1]
		CF2	Fully-closed Serial Conversion Unit Communications Error[1]
		D00	Position Deviation Overflow
		D01	Position Deviation Overflow Alarm at Servo ON
		D02	Position Deviation Overflow Alarm for Speed Limit at Servo ON
		D10	Motor-Load Position Deviation Overflow
		EB0	Safety Function Drive Monitor Circuit Error[2]
		EB1	Safety Function Signal Input Timing Error
		EB2	Safety Function Drive Internal Signal Error[2]
		EB3	Safety Function Drive Communications Error 1[2]
		EB4	Safety Function Drive Communications Error 2[2]
		EB5	Safety Function Drive Communications Error 3[2]
		EB6	Safety Function Drive Communications Data Error[2]
		EC7	Safety Option Card Stop Command Error[2]
		F10	Power Supply Line Open Phase
		- -	Not an error.

*1. These alarm codes are possible only when the feedback option is used.
*2. These alarm codes are possible only when the safety function is used.

7.2 Troubleshooting Motion Program Alarms

This section describes how to troubleshoot alarms that can occur for motion programs.

7.2.1 Checking for Motion Program Alarms

You can check the alarm codes, alarm names, and corrections for any alarms in motion programs in the Motion Alarm Dialog Box.

There are two ways to display the Motion Alarm Dialog Box.

Using the Drive Control Panel

Right-click in the Drive Control Panel Tab Page and select **Motion Alarm** from the pop-up menu.
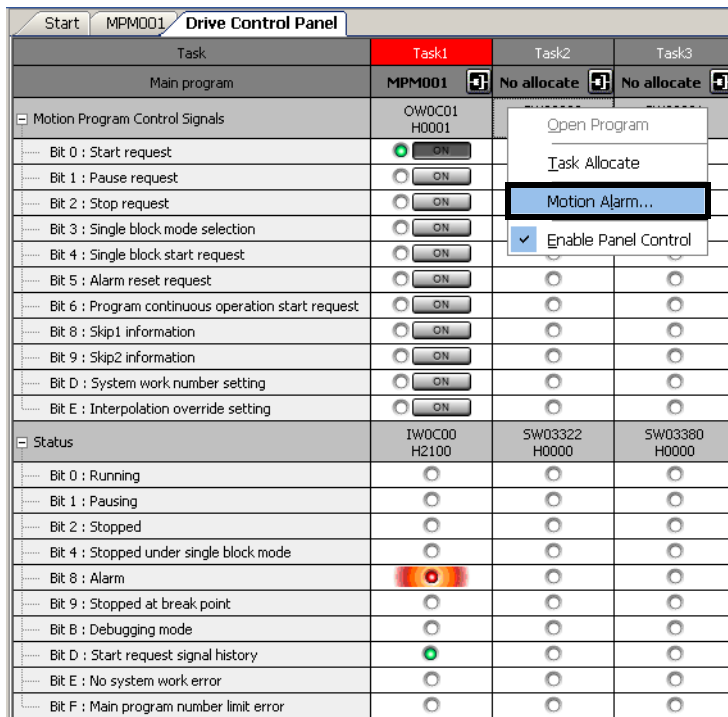
Using the Motion Editor

Right-click in the Motion Editor Tab Page and select *Motion Alarm* from the pop-up menu.
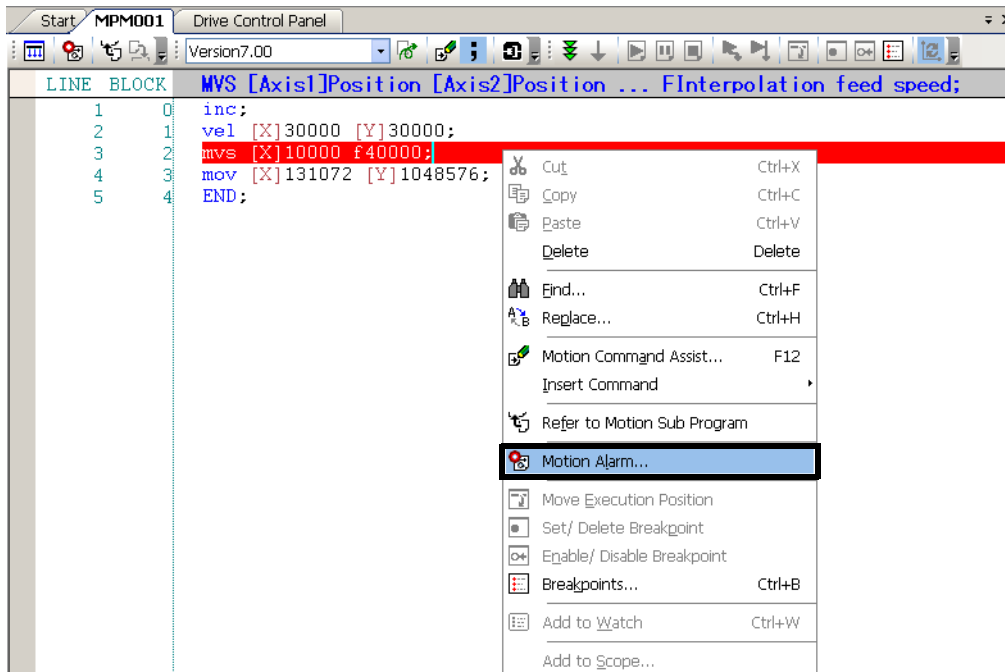
◆ Motion Alarm Dialog Box Details

This section describes the Motion Alarm Dialog Box.
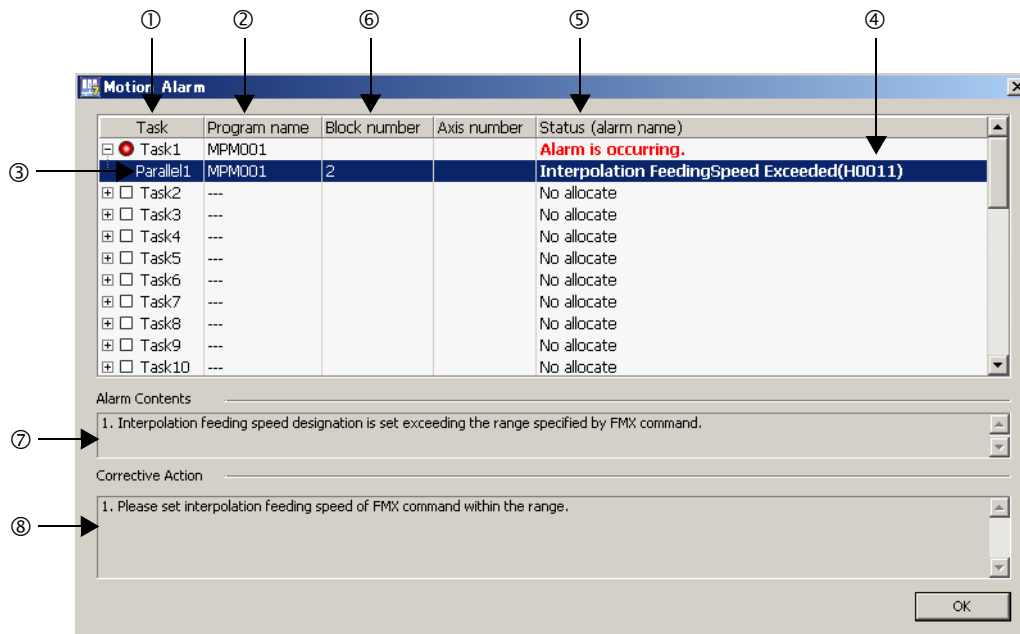
① **Task**

If the alarm occurred in a motion program that was registered for execution in the M-EXECU-TOR, then this column will show the M-EXECUTOR task.

If the alarm occurred in a motion program that was called from a ladder program with an MSEE instruction, then this column will show ---.

② **Program Name**

If the alarm occurred in a motion program that was registered for execution in the M-EXECU-TOR, then this column will show the name of the program registered in the M-EXECUTOR.

If the alarm occurred in a motion program that was called from a ladder program with an MSEE instruction, then this column will show ---.

③ Fork

When a PFORK parallel execution instruction is used in a motion program, sometimes more than one alarm will occur at the same time. Refer to the following manual for details on parallel execution instructions.

📖 MP3000 Series Motion Programming Manual (Manual No.: SIEP C880725 14)

④ Alarm Code

This column displays the alarm codes.

⑤ Status (Alarm Name)

This column displays the status and the names of the alarms.

⑥ Block No.

This column displays the numbers of the blocks where the alarms occurred.
Double-click the block number to jump to the program where the alarms occurred.
The block numbers are displayed in the Motion Editor Tab Page.

Block Number
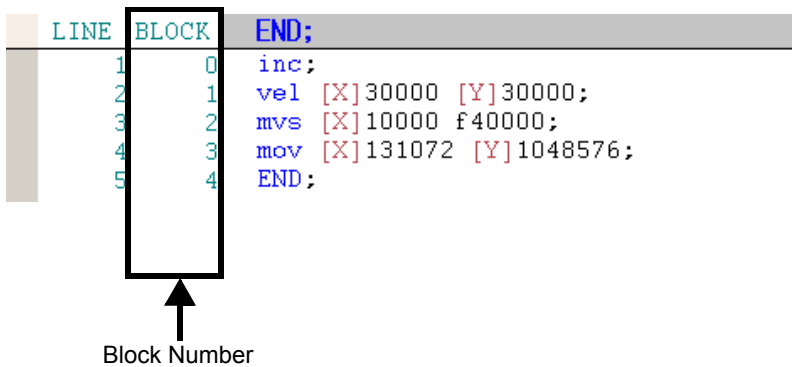
⑦ Alarm Meaning

This column displays a description of the alarm.

⑧ Correction

This column displays instructions to correct the error that caused the alarm to occur.
If an alarm occurs in a motion program, use the alarm code to isolate the cause.

7.2.2 Structure of Motion Program Alarms

You can monitor for motion program alarms in the SL26000 to SL26510 system registers.

The structure of the motion program alarm data stored in the system registers is shown below.

Bit 1F Bit 18	Bit 17 Bit 10	Bit F Bit 0
Circuit Information (1 to 32)	Alarm Axis Information (1 to 32)	Alarm Code Program alarm: 0□□□ hex Axis alarm: 1□□□ hex
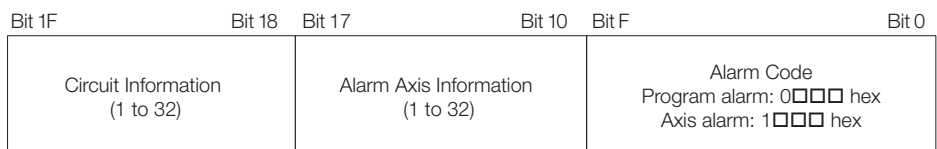
Information
You can also monitor for motion program alarms in the SW03268 system register.
The structure of the motion program alarm data stored in the SW03268 system register is shown below.

Bit F Bit 8	Bit 7 Bit 0
Alarm Axis Information (1 to 32)	Alarm Code (Axis alarm when bit 7 is ON.)
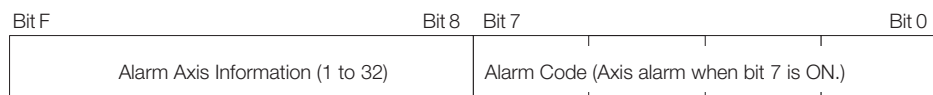
Note: The system register addresses depend on the system work number. Refer to the following section for details.

Example
Alarm Indications

Alarm (Example)	Expansion Motion Program Alarm	Motion Program Alarm
Program Alarm	000000□□ hex	00□□ hex
Circuit 2 Axis 3 Axis Alarm	020310□□ hex	03□□ hex

7.2.3 Troubleshooting Motion Program Alarms

The following table describes troubleshooting for motion program alarms.

Alarm Code		Alarm Name	Alarm Meaning	Correction
Program Alarms	0002 hex	Division error	The data was divided by 0.	Correct the motion program.
	0010 hex	Turn specified instead of radius	A number of turns (T) was specified instead of a radius for a circular or helical interpolation instruction.	• Convert the radius setting to a center point coordinate setting to execute the circular or helical interpolation instruction. • Do not specify a number of turns.
	0011 hex	Interpolation feed speed over limit	The interpolation feed speed exceeded the setting range of the FMX instruction.	Correct the feed speed of the interpolation instruction.
	0012 hex	No interpolation feed speed setting	The interpolation feed speed has never been set. (If you set it once, further settings can be omitted within the same program.)	Set the feed speed of the interpolation instruction.
	0013 hex	Range exceeded after acceleration parameter conversion.	The indirectly designated acceleration parameter exceeded the setting range.	Change the value of the register that is used for the indirect designation.
	0014 hex	Circular arc length exceeded LONG_MAX	The circular arc length that was specified for a circular or helical interpolation instruction exceeded the setting range.	Correct the circular arc length setting for the circular or helical interpolation instruction.
	0015 hex	No vertical axis set for the circular arc plane.	The vertical axis was not set for a circular or helical interpolation instruction.	Set the vertical axis with the PLN instruction.
	0016 hex	No horizontal axis set for the circular arc plane	The horizontal axis was not set for a circular or helical interpolation instruction.	Set the horizontal axis with the PLN instruction.
	0017 hex	Number of axes over limit	The number of specified axes exceeds the limit of a circular interpolation instruction (2 axes max.) or a helical interpolation instruction (3 axes max.).	Correct the axis setting of the circular or helical interpolation instruction.
	0018 hex	Number of turns over limit	The number of turns that was specified for a circular or helical interpolation instruction exceeded the setting range.	Correct the number of turns setting of the circular or helical interpolation instruction.
	0019 hex	Radius exceeded LONG_MAX	The radius that was specified for a circular or helical interpolation instruction exceeded the setting range.	Correct the radius setting for the circular or helical interpolation instruction.
	001A hex	Center point setting error	The correct center point was not set for a circular or helical interpolation instruction.	Specify a correct center point for the circular or helical interpolation instruction.
	001B hex	Emergency stop	The axis movement instruction was stopped due to a Request for Stop of Program.	Turn OFF the Request for Stop of Program motion program control signal, and turn ON the Alarm Reset Request.
	001C hex	Linear interpolation travel distance exceeded LONG_MAX	The travel distance that was specified for a linear interpolation instruction exceeded the setting range.	Correct the travel distance for the linear interpolation instruction.
	001D hex	FMX is not defined.	There was no FMX instruction executed in a motion program that includes an interpolation instruction.	Execute an FMX instruction. An FMX instruction is required for each program that contains an interpolation instruction.
	001E hex	T address out of range	The address setting in an IAC/IDC/FMX instruction exceeds the setting range.	Correct the setting in the IAC/IDC/FMX instruction.

Troubleshooting Motion Control Errors

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	Alarm Code	Alarm Name	Alarm Meaning	Correction
Program Alarms	001F hex	P address out of range	The address setting in an IFP instruction exceeds the setting range.	Correct the setting in the IFP instruction.
	0021 hex	PFORK execution error	Motion instructions were executed at the same time in the second fork of the PFORK instruction in the calling motion program and the second fork of the PFORK instruction in the subprogram.	Correct the motion program or the subprogram.
	0022 hex	Indirect designation register range error	The specified register address exceeds the range of the register size.	Correct the motion program.
	0023 hex	Travel distance out of range	The decimal-format axis travel distance specified in an axis movement instruction exceeds the allowed range.	Correct the axis travel distance.
	0024 hex	Interpolation override out of range	The interpolation override setting exceeded the setting range.	Correct the Interpolation Override Setting.
	0026 hex	PFORK number of parallel forks error	The number of parallel forks exceeded the number set for the parallel mode.	• Correct the motion program. • Correct the parallel mode setting.
	0028 hex	No composite travel distance for linear interpolation setting when target axis setting for interpolation feed speed was enabled	The composite travel distance was not set for a linear interpolation instruction when the target axis setting for interpolation feed speed was enabled.	Set the composite travel distance for the linear interpolation instruction when the target axis setting for interpolation feed speed is enabled.
	007F hex	Refer to the expansion alarm registers.	A vision alarm occurred.	Check the expansion motion program alarm and correct the problem.

Alarm Code		Alarm Name	Alarm Meaning	Correction
Axis Alarms*	0080 hex	Logical axis use prohibited	More than one motion language instruction was executed for the same axis.	Correct the motion program.
	0081 hex	The infinite length axis setting exceeded POS-MAX.	The travel distance setting for infinite length axis exceeded the POSMAX setting.	• Correct the infinite-length counter maximum setting in the fixed parameter. • Correct the motion program.
	0082 hex	The axis travel distance exceeded LONG_MAX	The axis travel distance setting exceeded the allowed range.	Correct the motion program.
	0084 hex	Duplicated motion command	More than one instruction was executed for the same axis.	Check for and remove simultaneous references for the same axis from other programs.
	0085 hex	Motion command response error	A response for a different motion command was reported by the Motion Control Function Module when a motion instruction was executed.	• Remove the cause of the alarm at the target axis. • If the servo is not ON, turn ON the servo. • Check for and remove simultaneous references for the same axis from other programs.
	0087 hex	VEL setting out of range	The setting in the VEL instruction exceeds the allowed range.	Correct the VEL instruction.
	0088 hex	INP setting out of range	The setting in the INP instruction exceeds the allowed range.	Correct the INP instruction.
	0089 hex	ACC/SCC/DCC setting out of range	The setting in the ACC/SCC/DCC instruction exceeds the allowed range.	Correct the ACC/SCC/DCC instruction.
	0090 hex	Exceeded IFMX (maximum interpolation feed speed setting for individual axes)	The interpolation feed speed for the axis that was specified for the IFMX instruction exceeded the speed setting in the IFMX instruction.	Correct the speed setting in the IFMX instruction.
	008A hex	No time setting in MVT instruction	The T setting in the MVT instruction is zero.	Correct the MVT instruction.
	008B hex	Command cannot be executed.	The specified motion instruction cannot be executed on the target Motion Control Function Module.	Correct the motion program.
	008C hex	Distribution incomplete	A motion instruction was executed when the Motion Control Function Module had not completed distribution for a previous instruction.	Correct the motion program so that the motion language instruction is executed when the Distribution Completed Bit is ON.
	008D hex	Motion command error termination	The Motion Control Function Module is in Command Error status.	• Clear the error at the target axis. • Correct the motion program.
	008E hex	Servo ON Incomplete	An axis motion instruction was executed when the power to the Servomotor was OFF.	• Clear the error at the target axis. • Correct the motion program so that the motion instruction is executed when the power to the Servomotor is ON.
	008F hex	Axis alarm occurred	An alarm occurred in the Motion Control Function Module to which a command was sent.	Clear the error at the target axis.

* If an axis alarm occurs, the axis number is stored in bits 8 to C.

Troubleshooting Motion Control Errors

7

System Registers

8

This chapter describes the system registers that must be checked to determine the causes of errors when they occur.

8.1 Overall Configuration of the System Registers

The indicators for the Controller Section of the SERVOPACK show the operating status and error status of the Controller Section. You can use the system registers to obtain more detailed information on errors. The contents of the system registers will allow you to isolate errors and implement corrections.

The following table shows the overall configuration of the system registers. Refer to the sections that are given in the righthand column for details.

Register Address	Contents	Details
SW00000 to SW00029	System Service Registers	–
SW00030 to SW00049	System Status	*8.5.1 CPU System Status* on page 8-7
SW00050 to SW00079	System Error Status	*8.5.2 System Error Status* on page 8-9
SW00080 to SW00089	User Operation Error Status	*8.5.3 User Operation Error Status in Ladder Programs* on page 8-10
SW00090 to SW00103	System Service Execution Status	*Detailed User Operation Error Status* on page 8-13
SW00104 to SW00109	Reserved.	–
SW00110 to SW00189	Detailed User Operation Error Status	*Detailed User Operation Error Status* on page 8-13
SW00190 to SW00199	Reserved.	–
SW00200 to SW00503	System I/O Error Status	*8.5.5 System I/O Error Status* on page 8-14
SW00504, SW00505	Reserved.	–
SW00506, SW00507	Security Status	*8.5.6 Security Status* on page 8-14
SW00508 to SW00649	Reserved.	–
SW00650 to SW00667	USB-Related System Status	*8.5.7 USB-Related System Status* on page 8-15
SW00668 to SW00693	Reserved.	–
SW00694 to SW00697	Message Relaying Status	*8.5.8 Message Relaying Status* on page 8-15
SW00698 to SW00789	Interrupt Status	*8.5.10 Interrupt Status* on page 8-30
SW00790 to SW00799	Reserved.	–
SW00800 to SW01095	Module Information	*8.5.11 Module Information* on page 8-32
SW01096 to SW01442	Reserved.	–
SW01443 to SW03199	Reserved.	–
SW03200 to SW05119	Motion Program Information	*8.5.12 Motion Program Execution Information* on page 8-39
SW05120 to SW05247	Used by the system (system memory read).	–
SW05248 to SW08191	Reserved.	–

Register Address	Contents	Details
SW08192 to SW09215	Extended Motion Program Information	*8.5.12 Motion Program Execution Information* on page 8-39
SW09216 to SW09559	Reserved.	–
SW09560 to SW13699	Extended System I/O Error Status	*8.5.5 System I/O Error Status* on page 8-14
SW13700 to SW15795	Extended Module Information	*8.5.11 Module Information* on page 8-32
SW15796 to SW15800	Reserved.	–
SW15801 to SW15997	Reserved.	–
SW15998 to SW16011	Extended System Service Execution Status	*8.5.4 System Service Execution Status* on page 8-13
SW16012 to SW16199	Reserved.	–
SW16200 to SW17999	Alarm History Information	*8.5.14 Alarm History Information* on page 8-51
SW18000 to SW19999	Reserved.	–
SW20000 to SW22063	Product Information	*8.5.15 Product Information* on page 8-53
SW22064 to SW22999	Reserved.	–
SW23000 to SW23159	Unit and Rack Information	*8.5.16 Unit and Rack Information* on page 8-53
SW23160 to SW23999	Reserved.	–
SW24000 to SW24321	Data Logging Execution Status	*8.5.17 Data Logging Execution Status* on page 8-55
SW24322 to SW24999	Reserved.	–
SW25000 to SW25671	Automatic Reception Status for Ethernet Communications	*8.5.18 Automatic Reception Status (Ethernet Communications)* on page 8-56
SW25672 to SW65535	Reserved.	–

8.2 Viewing the Contents of the System Registers

To view the contents of the system registers, start the MPE720 Engineering Tool and display a register list.

Use the following procedure to display the register list.

1. Display the Register List 1 Pane in MPE720 version 7.0.
By default, there will be a Register List 1 Tab at the bottom of the Pane.
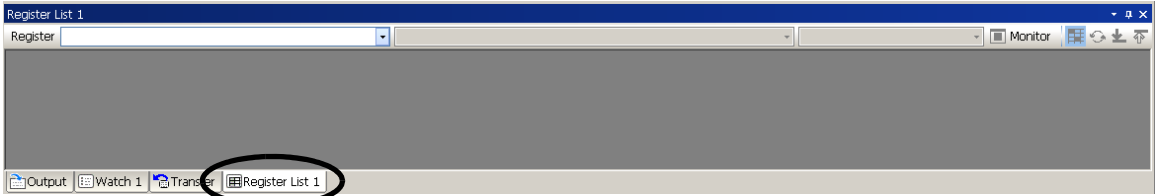
2. Enter the register address of the first system register to display in the Register Box in the form SW□□□□□. The contents of the system registers starting with the specified first register will be displayed.
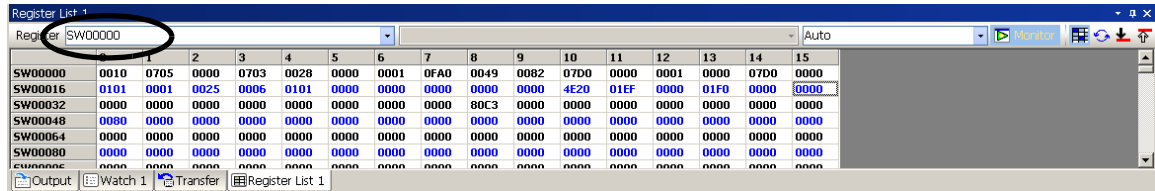
Note: By default, the data type will be decimal. Right-click in the list and select **Hexadecimal** from the pop-up menu to display hexadecimal values (as shown above).

8.3 Troubleshooting for the ERR Indicator

If the ERR indicator on the SERVOPACK is lit, a serious error (hardware failure or user program error) may have occurred. Stop the SERVOPACK (turn ON pin 6 on the DIP switch) and use the following flowchart to investigate the problem.

```
                    ┌─────────┐
                    │  START  │
                    └────┬────┘
                         │
          ┌──────────────────────────┐
          │     Check SW00050.       │
          └──────────────┬───────────┘
                         │
          ╱──────────────────────────╲    No                          ┌─────────────────┐
          ╲  SW00050 = 0001 hex?      ╱──────────────────────────────▶│  Replace the    │
          ╱──────────────────────────╲   (Hardware failure)           │  SERVOPACK.     │
                         │                                             └─────────────────┘
                    Yes  │ (Watchdog timer error)                              ▲
          ┌──────────────────────────┐                                        │
          │     Check SW00055.       │                                   YES (Hardware failure)
          └──────────────┬───────────┘                                        │
                         │                                                     │
          ╱──────────────────────────╲  No         ┌──────────────────┐   ╱──────────────╲   NO
          ╲  SW00055 ≠ 0000?          ╱────────────▶│ Check scan time  │──▶╲ Scan times OK?╱────┐
          ╱──────────────────────────╲  (System    │    setting.      │   ╱──────────────╲     │
                         │             error)       └──────────────────┘                        │
                    Yes  │ (User program error)                                                  ▼
          ╱──────────────────────────╲  No      ┌───────────────────────────┐      ┌────────────────┐
          ╲  SW00055 = 0008 hex?      ╱─────────▶│ • Check SW00055 to        │      │ Increase scan  │
          ╱──────────────────────────╲ (Program  │   determine drawing type  │      │ time setting.  │
                         │            error in    │   (H, L, I, or A).        │      └────────────────┘
                    Yes  │ (Program   drawing)    │ • Check SW00056 to        │
                         │ error in function)     │   determine drawing       │
          ┌──────────────────────────┐            │   number.                 │
          │ Confirm that SW00056 =   │            └──────────────┬────────────┘
          │ 8000 hex.                │                           │
          └──────────────┬───────────┘            ┌──────────────────────────┐
                         │                         │ Investigate drawing.      │
          ┌──────────────────────────┐            │ If there is no error in   │
          │ Check SW00057 to         │            │ drawing, check scan time  │
          │ determine type of drawing│            │ setting.                  │
          │ (H, L, I, A, or function)│            └──────────────────────────┘
          │ that called function.    │
          └──────────────┬───────────┘
                         │
          ╱──────────────────────────╲  No (Called by function.)
          ╲  SW00057 ≠ 0008 hex?      ╱───────────────────────────┐
          ╱──────────────────────────╲                            │
                         │                                         │
              Yes (Called by drawing.)                             │
          ┌──────────────────────────┐                            │
          │ Check SW00058 to         │          ┌─────────────────────────────┐
          │ determine number of      │          │ Check SW00059 to determine  │
          │ drawing that called      │          │ number of step that called  │
          │ function.                │          │ function.                   │
          └──────────────┬───────────┘          └──────────────┬──────────────┘
                         │                                      │
          ┌──────────────────────────┐          ┌─────────────────────────────┐
          │ Open drawing on          │          │ It is not possible to       │
          │ MPE720 Ladder Editor.    │          │ isolate calling function.   │
          └──────────────┬───────────┘          │ Check step in all functions │
                         │                       │ to see if a function is     │
          ┌──────────────────────────┐          │ being called.               │
          │ Check SW00059 to         │          └──────────────┬──────────────┘
          │ determine number of step │                         │
          │ that called function.    │                         │
          └──────────────┬───────────┘                         │
                         │                                      │
          ┌──────────────────────────┐                         │
          │ Check name of function   │                         │
          │ on step.                 │                         │
          └──────────────┬───────────┘                         │
                         └─────────────┬────────────────────────┘
                                       │
          ┌──────────────────────────────────────────────────────────────────────┐
          │ Debug the function.                                                     │
          │ (Check for infinite loops or other processing that can cause watchdog   │
          │ timer errors.)                                                          │
          │ If there are no errors in function, check the scan time setting.        │
          └──────────────────────────────────────────────────────────────────────┘
```

Note: Refer to the following section for the contents of SW00050 to SW00059.
☞ *8.5.2 System Error Status* on page 8-9

8.4 Troubleshooting for the ALM Indicator

If the ALM indicator (or RDY + RUN + ALM indicators) on the SERVOPACK is lit, a serious error (hardware failure, user operation error, or I/O error) may have occurred. Stop the SERVOPACK (turn ON pin 6 on the DIP switch) and use the following flowchart to investigate the problem.

```
                        ( START )
                            │
                   ┌─────────────────┐
                   │ Check SW00041.  │
                   └─────────────────┘
                            │
              ┌──────────────────────┐    No      ┌──────────────────────┐   No              ┌──────────────────┐
              < SW00041 Bit 8 = 1?   >─────────→  < SW00041 Bit 9 = 1?   >──────────────→    ( Replace the     )
              └──────────────────────┘            └──────────────────────┘ (Hardware failure) ( SERVOPACK.      )
                            │                               │
                 Yes (User operation error)          Yes (I/O error)
                            │                               │
    ┌────────────────────────────────────┐      ┌────────────────────────────┐
    │ Check SW00080 to SW00088 to        │      │ Check I/O Error Status in  │
    │ determine type of drawing where    │      │ SW00200 to SW00247 to      │
    │ error count is increasing (1).     │      │ identify and correct I/O   │
    └────────────────────────────────────┘      │ error.                     │
                            │                    └────────────────────────────┘
    ┌────────────────────────────────────┐
    │ Check following register for       │
    │ drawing type to obtain error       │
    │ code (2).                          │
    │   DWG.A  : SW00111                 │
    │   DWG.I  : SW00127                 │
    │   DWG.H  : SW00143                 │
    │   DWG.L  : SW00175                 │
    └────────────────────────────────────┘
                            │
    ┌────────────────────────────────────┐
    │ Check following register for       │
    │ drawing type (1) to obtain error   │
    │ drawing number.                    │
    │   DWG.A  : SW00122                 │
    │   DWG.I  : SW00138                 │
    │   DWG.H  : SW00154                 │
    │   DWG.L  : SW00186                 │
    └────────────────────────────────────┘
                            │
              ┌──────────────────────┐   No (Operation error in drawing)
              < Drawing number =     >───────────────────────────────┐
              < 8000 hex?            >                               │
              └──────────────────────┘                               │
                            │                                        │
              Yes (Operation error in function)                      │
                            │                          ┌────────────────────────────┐
    ┌────────────────────────────────────┐            │ Open drawing with drawing  │
    │ Check following register for       │            │ number on MPE720 Ladder    │
    │ drawing type (1) to obtain number  │            │ Editor.                    │
    │ of calling drawing.                │            └────────────────────────────┘
    │   DWG.A  : SW00123                 │                          │
    │   DWG.I  : SW00139                 │            ┌────────────────────────────┐
    │   DWG.H  : SW00155                 │            │ Debug drawing based on     │
    │   DWG.L  : SW00187                 │            │ error code (2).            │
    └────────────────────────────────────┘            └────────────────────────────┘
                            │
    ┌────────────────────────────────────┐
    │ Open drawing with drawing number   │
    │ on MPE720 Ladder Editor.           │
    └────────────────────────────────────┘
                            │
    ┌────────────────────────────────────┐
    │ Check following register for       │
    │ drawing type (1) to obtain step    │
    │ number in calling drawing.         │
    │   DWG.A  : SW00124                 │
    │   DWG.I  : SW00140                 │
    │   DWG.H  : SW00156                 │
    │   DWG.L  : SW00188                 │
    └────────────────────────────────────┘
                            │
    ┌────────────────────────────────────┐
    │ Debug the function at step         │
    │ based on error code (2).           │
    └────────────────────────────────────┘
```

Note: 1. Refer to the following section for the contents of SW00041.
         ☞ *8.5.2 System Error Status* on page 8-9
      2. Refer to the following section for the contents of SW00080 to SW00088 and SW00110 to SW00188.
         ☞ *8.5.3 User Operation Error Status in Ladder Programs* on page 8-10
      3. Refer to the following section for the contents of SW00200 to SW00247.
         ☞ *8.5.5 System I/O Error Status* on page 8-14

8.5 System Register Configuration and Error Status

This section describes the configuration of the system registers and errors.

8.5.1 CPU System Status

The system operating status and errors are stored in registers SW00040 to SW00048. You can check the system status to determine whether the cause of the error is hardware or software related.

Name	Register Address			Contents
Reserved.	SW00030 to SW00039		–	
CPU Status	SW00040	SB000400	READY	0: Error, 1: Ready
		SB000401	RUN	0: Stopped, 1: Running
		SB000402	ALARM	0: Normal, 1: Alarm
		SB000403	ERROR	0: Normal, 1: Error
		SB000404	Reserved.	–
		SB000405	M-ALM	0: Normal, 1: Axis alarm
		SB000406	FLASH	0: INIT start, 1: Flash operation
		SB000407	WEN	0: Writing disabled, 1: Writing enabled
		SB000408 and SB000409	Reserved.	–
		SB00040A	Flash Save Request from MPE720	0: Not saving data to flash memory, 1: Saving data to flash memory
		SB00040B to SB00040D	Reserved.	–
		SB00040E	Operation Stop Request from MPE720	0: RUN selected, 1: STOP selected
		SB00040F	Run Switch Status at Power ON	0: STOP, 1: RUN
CPU Error Status	SW00041	SB000410	Serious Failure	0: Normal, 1: Serious failure
		SB000411 and SB000412	Reserved.	–
		SB000413	Exception Error	0: Normal, 1: Exception error
		SB000414 to SB000417	Reserved.	–
		SB000418	User Operation Error	0: Normal, 1: User operation error
		SB000419	I/O Error	0: Normal, 1: I/O error
		SB00041A and SB00041B	Reserved.	–
		SB00041C	MECHATROLINK-III Station Address Duplication	0: Normal 1: MECHATROLINK-III slave device station address duplication
		SB00041D	MECHATROLINK-III Restrictions Error	0: Normal, 1: Restrictions error in MECHATROLINK-III transmission cycle
		SB00041E and SB00041F	Reserved.	–
H Scan Exceeded Counter	SW00044			H Scan Exceeded Count

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Name	Register Address		Contents	
L Scan Exceeded Counter	SW00046		L Scan Exceeded Count	
Reserved.	SW00047		Reserved.	–
Hardware Configuration Status	SW00048	SB000480	Reserved.	–
		SB000481	LOAD	Mode switch 1 setting status: 0: OFF, 1: ON
		SB000482	CNFG	
		SB000483	INIT	
		SB000484	E-INIT	
		SB000485	STOP	
		SB000486	Reserved.	–
		SB000487	Battery Alarm	–
		SB000488 and SB000489	Reserved.	–
		SB00048A	MNT	Mode switch 2 setting status: 0: OFF, 1: ON
		SB00048B	TEST	
		SB00048C to SB00048F	Reserved.	–
Reserved.	SW00049		Reserved.	–

8.5.2 System Error Status

The data in these registers give the error status of the system.

Detailed error status is available in system registers SW00050 to SW00079.

Name	Register Address	Contents	
32-bit Error Code	SW00050	0001 hex	Watchdog timer error
		0051 hex	Module synchronization error
	SW00051	For system error analysis	
32-bit Error Address	SW00052 and SW00053	For system error analysis	
Program Error Task	SW00054	0000 hex	system
		0001 hex	DWG.A
		0002 hex	DWG.I
		0003 hex	DWG.H
		0005 hex	DWG.L
Program Type	SW00055	0000 hex	system
		0001 hex	DWG.A
		0002 hex	DWG.I
		0003 hex	DWG.H
		0005 hex	DWG.L
		0008 hex	Function
		000F hex	Motion program/sequence program
Program Error Drawing Number	SW00056	FFFF hex	Ladder program parent drawing
		8000 hex	Ladder program function
		□□00 hex	Ladder program child drawing (□□ hex: Child drawing No.)
		xxyy hex	Ladder program grandchild drawing (xx hex: Child drawing No., yy hex: Grandchild drawing No.)
		F□□□ hex	Motion program or sequence program (□□□ hex: Program No.)
Drawing Type of Calling Program	SW00057	Type of the calling drawing in which the error occurred	
		0001 hex	DWG.A
		0002 hex	DWG.I
		0003 hex	DWG.H
		0005 hex	DWG.L
		0008 hex	Function
		000F hex	Motion program/sequence program
Drawing No. of Calling Program	SW00058	Number of the calling drawing in which the error occurred	
		FFFF hex	Parent drawing
		8000 hex	Function
		□□00 hex	Child drawing (□□ hex: Child drawing No.)
		xxyy hex	Grandchild drawing (xx hex: Child drawing No., yy hex: Grandchild drawing No.)
Drawing Step No. in Calling Program	SW00059	Step number in the calling drawing in which the error occurred This is set to 0 if the error occurs in the parent drawing.	

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Name	Register Address	Contents	
Error Data	SW00060 and SW00061	Reserved.	
	SW00062 to SW00065	Name of Task That Caused The Error	
	SW00066 and SW00067	Reserved.	
	SW00068	Year When Error Occurred	
	SW00069	Month When Error Occurred	
	SW00070	Day of Week When Error Occurred	
	SW00071	Day When Error Occurred	
	SW00072	Hour When Error Occurred	
	SW00073	Minutes When Error Occurred	
	SW00074	Seconds When Error Occurred	
	SW00075	Milliseconds When Error Occurred	
	SW00076	xyzzH	Slot Where the Module Synchronization Error Was Detected (x: Rack number from 1 to 7, y: unit number from 1 to 4, zz: slot number from 01 to 09)
	SW00077 to SW00079	Reserved.	

8.5.3 User Operation Error Status in Ladder Programs

The user operation error status shows operation errors in the ladder programs.

Broadly speaking, the user operation error status includes two main types of status.

Operation errors can be confirmed in system registers SW00080 to SW00089 (user operation error status) and SW00110 to SW00189 (user operation error status details).

Drawing Type	Error	Register Address	Contents
DWG.A	Error Count	SW00080	• Error Count
	Error Code	SW00081	Gives the number of errors that have occurred.
DWG.I	Error Count	SW00082	
	Error Code	SW00083	• Error Code
DWG.H	Error Count	SW00084	Gives the details of the error.
	Error Code	SW00085	0□□□ hex: Operation error
Reserved.		SW00086, SW00087	☞ ◆ *User Operation Error Code -1: Operation Errors* on page 8-11
DWG.L	Error Count	SW00088	x□□□ hex (x = 1, 2, 3): Index error
	Error Code	SW00089	☞ ◆ *User Operation Error Code -2: Index Errors* on page 8-12

◆ User Operation Error Code -1: Operation Errors

	Error Code	Error	Operation When an Error Occurs*
Integer Operations	0001 hex	Integer operation underflow	[-32768]
	0002 hex	Integer operation overflow	[32767]
	0003 hex	Integer operation division error	[The A register stays the same.]
	0009 hex	Double-length integer operation underflow	[-2147483648]
	000A hex	Double-length integer operation overflow	[2147483647]
	000B hex	Double-length integer operation division error	[The A register stays the same.]
	000C hex	Quadruple-length integer operation under-flow	[-9223372036854775808]
	000D hex	Quadruple-length integer operation over-flow	[9223372036854775807]
	000E hex	Quadruple-length integer operation divi-sion error	[The A register stays the same.]
	0101 hex to 010E hex	Integer operation error in Operation Error Drawing	[The A register stays the same.]
Real Number Operations	0010 hex	Non-numerical integer storage error	Data is not stored. [00000]
	0011 hex	Integer storage underflow	Data is not stored. [-32768]
	0012 hex	Integer storage overflow	Data is not stored. [+32767]
	0021 hex	Real number storage underflow	Data is not stored. [-1.0E+38]
	0022 hex	Real number storage overflow	Data is not stored. [1.0E+38]
	0023 hex	Real number operation division by zero error	Data is not stored. [F register stays the same]
	0030 hex	Invalid real number operation (non-numeric)	Data is not stored.
	0031 hex	Real number operation exponent under-flow	0.0
	0032 hex	Real number operation exponent overflow	Maximum value
	0033 hex	Real number operation division error (0/0)	Operation is not executed.
	0034 hex	Real number storage exponent underflow	Stores 0.0.
	0040 hex to 0059 hex	Real number operation error in standard system function	Operation is aborted and output is set to 0.0.

0040 hex: SQRT	0047 hex: EXP	004E hex: PD	0055 hex: SLAU
0041 hex: SIN	0048 hex: LN	004F hex: PID	0056 hex: REM
0042 hex: COS	0049 hex: LOG	0050 hex: LAG	0057 hex: RCHK
0043 hex: TAN	004A hex: DZA	0051 hex: LLAG	0058 hex: BSRCH
0044 hex: ASIN	004B hex: DZB	0052 hex: FGN	0059 hex: SORT
0045 hex: ACOS	004C hex: LIM	0053 hex: IFGN	–
0046 hex: ATAN	004D hex: PI	0054 hex: LAU	

* The numeric values given in brackets [ ] are set by the system in the Changed A Register or Changed F Register before the operation error drawing is executed.

◆ User Operation Error Code -2: Index Errors

	Error Code	Error		Operation When an Error Occurs	
Integer and Real Number Operations	1000 hex	Index error in drawing		Re-executed as if i and j were set to 0. (Both i and j registers stay the same.)	
	2000 hex	Index error in function		Re-executed as if i and j were set to 0. (Both i and j registers stay the same.)	
	3000 hex	Index error in motion program or sequence program		Re-executed as if i and j were set to 0. (Both i and j registers stay the same.)	
Real Number Operations	x040 hex to x059 hex (x = 1, 2, 3)	Real number operation error in standard system function		Operation is aborted and output is set to 0.0.	
		x040 hex: SQRT	x047 hex: EXP	x04E hex: PD	x055 hex: SLAU
		x041 hex: SIN	x048 hex: LN	x04F hex: PID	x056 hex: REM
		x042 hex: COS	x049 hex: LOG	x050 hex: LAG	x057 hex: RCHK
		x043 hex: TAN	x04A hex: DZA	x051 hex: LLAG	x058 hex: BSRCH
		x044 hex: ASIN	x04B hex: DZB	x052 hex: FGN	x059 hex: SORT
		x045 hex: ACOS	x04C hex: LIM	x053 hex: IFGN	–
		x046 hex: ATAN	x04D hex: PI	x054 hex: LAU	
Integer Operations	x060 hex to x0C9 hex (x = 1, 2, 3)	Integer operation error in standard system function		Operation is aborted and output is set to input. [A register stays the same.]	
		x06D hex: PI	x091 hex: ROTR	x0A0 hex: BEXTEND	x0B1 hex: SPEND
		x06E hex: PD	x092 hex: MOVB	x0A1 hex: BPRESS	x0C0 hex: TBLBR
		x06F hex: PID	x093 hex: MOVW	x0A2 hex: SORT	x0C1 hex: TBLBW
		x070 hex: LAG	x094 hex: SETW	x0A4 hex: SORT	x0C2 hex: TBLSRL
		x071 hex: LLAG	x095 hex: XCHG	x0A6 hex: RCHK	x0C3 hex: TBLSRC
		x072 hex: FGN	x096 hex: LIMIT	x0A7 hex: RCHK	x0C4 hex: TBLCL
		x073 hex: IFGN	x097 hex: LIMIT	x0A8 hex: COPYW	x0C5 hex: TBLMW
		x074 hex: LAU	x098 hex: DZA	x0A9 hex: ASCII	x0C6 hex: QTBLR
		x075 hex: SLAU	x099 hex: DZA	x0AA hex: BINASC	x0C7 hex: QTBLRI
		x076 hex: FGN	x09A hex: DZB	x0AB hex: ASCBIN	x0C8 hex: QTBLW
		x077 hex: IFGN	x09B hex: DZB	x0AC hex: BSRCH	x0C9 hex: QTBLWI
		x08E hex: INS	x09C hex: PWM	x0AD hex: BSRCH	
		x08F hex: OUTS	x09E hex: SHFTL	x0AE hex: TIMEADD	–
		x090 hex: ROTL	x09F hex: SHFTR	x0AF hex: TIMSUB	

Detailed User Operation Error Status

The data in these registers give details when a user operation error occurs in a user program.

Name	Register Address				Remarks
	DWG.A	DWG.I	DWG.H	DWG.L	
Error Count	SW00110	SW00126	SW00142	SW00174	• Error Drawing No.
Error Code	SW00111	SW00127	SW00143	SW00175	FFFF hex: Parent drawing
Error A Registers	SW00112	SW00128	SW00144	SW00176	□□00 hex: Child drawing (□□ hex: Child drawing No.)
	SW00113	SW00129	SW00145	SW00177	xxyy hex: Grandchild drawing (xx hex: Child drawing No., yy hex: Grandchild drawing No.)
Changed A Registers	SW00114	SW00130	SW00146	SW00178	8000 hex: Function
	SW00115	SW00131	SW00147	SW00179	F□□□ hex: Motion program or sequence program (□□□ hex: Program No.)
Error F Registers	SW00116	SW00132	SW00148	SW00180	
	SW00117	SW00133	SW00149	SW00181	
Changed F Registers	SW00118	SW00134	SW00150	SW00182	• Calling Drawing No.
	SW00119	SW00135	SW00151	SW00183	Number of the calling drawing in which the operation error occurred
Address Where Error Occurred	SW00120	SW00136	SW00152	SW00184	• Calling Drawing Step No.
	SW00121	SW00137	SW00153	SW00185	Step number in the calling drawing in which the operation error occurred
Error Drawing No.	SW00122	SW00138	SW00154	SW00186	This number is set to 0 if the error occurs in the parent drawing.
Calling Drawing No.	SW00123	SW00139	SW00155	SW00187	
Calling Drawing Step No.	SW00124	SW00140	SW00156	SW00188	• Error Step No.
Error Step No.	SW00125	SW00141	SW00157	SW00189	Step number when the operation error occurred

8.5.4 System Service Execution Status

The data in these registers give the execution status of the system.

Detailed execution status is available in system registers SW00090 to SW00103.

Name	Register Address		Remarks	
Reserved.	SW00090 to SW00097		–	
Data Trace Definition Existence	SW00098	SB000980	Group 1	0: Definition does not exist. 1: Definition exists.
		SB000981	Group 2	
		SB000982	Group 3	
		SB000983	Group 4	
		SB000984 to SB00098F	Reserved.	
Data Trace Execution Status	SW00099	SB000990	Group 1	0: Tracing in progress 1: Tracing stopped
		SB000991	Group 2	
		SB000992	Group 3	
		SB000993	Group 4	
		SB000994 to SB00099F	Reserved.	
Group 1 Record No.	SW00100		Latest record number in group 1	
Group 2 Record No.	SW00101		Latest record number in group 2	
Group 3 Record No.	SW00102		Latest record number in group 3	
Group 4 Record No.	SW00103		Latest record number in group 4	

8.5.5 System I/O Error Status

The data in these registers give the I/O errors in the system.

Detailed I/O error status is available in system registers SW00200 to SW00503.

Name	Register Address	Remarks
I/O Error Count	SW00200	Number of I/O error occurrences
Input Error Count	SW00201	Number of input error occurrences
Input Error Address	SW00202	Latest input error address (register address in IW☐☐☐☐☐)
Output Error Count	SW00203	Number of output error occurrences
Output Error Address	SW00204	Latest output error address (register address in OW☐☐☐☐☐)
Reserved.	SW00205 to SW00207	–
I/O Error Status	SW00208 to SW00215	Error status of Rack 1, Slot 0
	SW00216 to SW00223	Reserved.
	SW00224 to SW00231	Error status of Rack 1, Slot 1 (Depends on the Modules that are mounted and the error code.)
	SW00232 to SW00503	Reserved.

8.5.6 Security Status

The security status refers to the execution state of online security.

Detailed information on the security status is available in system registers SW00506 and SW00507.

Name	Register Address		Description	
Security Status	SW00506		0: Security disabled, 1: Security enabled	
Security Read Protection Information	SW00507	SB005070 to SB005073	Restriction rights for file reading	☐☐☐☐H — Restriction rights level (0 to 7), Reserved., File reading restriction 0: Not restricted 1: Restricted, Reserved.
		SB005074 to SB005076	Reserved.	
		SB005077	File reading restriction	
		SB005078 to SB00507F	Reserved.	

8.5.7 USB-Related System Status

The data in these registers give information on the USB memory and give the error status.

Name	Register Address		Remarks
Available USB Memory	SL00650		Unit: Kilobytes
Total USB Memory	SL00652		
USB Status	SW00654	SB006540	0: No USB memory device 1: USB memory device inserted
		SB006541	0: Not supplying power 1: Supplying power
		SB006542	0: Cannot recognize USB memory device 1: Recognized USB memory device
		SB006543	0: Not accessing USB memory device 1: Accessing USB memory device
		SB006544	0: - 1: Checking FAT file system
		SB006545 to SB00654F	Reserved.
FAT Type	SW00655	0001 hex	FAT12
		0002 hex	FAT16
		0003 hex	FAT32
Reserved.	SW00656 and SW00657		–
Batch Load and Batch Save	SW00658	SB006580	1: Batch load in progress
		SB006581	1: USB memory read error
		SB006582	1: Load file model mismatch error
		SB006583	1: Load file write error
		SB006584	1: Save to flash memory error
		SB006585	1: Folder for batch loading does not exist.
		SB006586	1: Loading error due to program write protection
		SB006587	Reserved.
		SB006588	1: Batch save in progress
		SB006589	1: USB memory write error
		SB00658A	1: Save file read error
		SB00658B	1: Security error
		SB00658C to SB00658F	Reserved.
Reserved.	SW00659		–

8.5.8 Message Relaying Status

The data in these registers give the status of the command or response in the message function.

Name	Register Address	Description
Message Relaying Information	SW00694	Normally processed command message counter
	SW00695	Command message error counter
	SW00696	Normally processed response message counter
	SW00697	Response message error counter

8.5.9 Error Status for Individual Products

Classification	Abbreviation	I/O	Interrupt	Remarks
CPU	Σ-7C	O	×	CF, Ethernet, USB [CPU, SVR, SVC, 218IFD, M-EXECUTOR]
Communications Modules	217IF-01	×	×	RS-232C, RS-422 [217IF, 217IF]
	218IF-01	×	×	RS-232C, Ethernet (10Mbps) [217IF, 218IF]
	218IF-02	×	×	RS-232C, Ethernet (100Mbps) [217IF, 218IFB]
	260IF-01	O	×	RS-232C, DeviceNet [217IF, 260IF]
	261IF-01	O	×	RS-232C, PROFIBUS (Slave) [217IF, 216IFS]
	262IF-01	O	×	FL-net [FL-net]
	263IF-01	O	×	EtherNet/IP [EtherNetIP]
	264IF-01	O	×	EtherCAT (Slave) [EtherCAT-S]
	265IF-01	O	×	CompoNet [CompoNet-M]
	266IF-01	O	×	PROFINET [PROFINET-M]
	266IF-02	O	×	PROFINET [PROFINET-S]
	267IF-01	O	×	CC-Link [CC-Link-M]
I/O Modules	LIO-01	O	O	16 inputs, 16 outputs, 1 pulse input channel (sink outputs) [LIO or CNTR]
	LIO-02	O	O	16 inputs, 16 outputs, 1 pulse input channel (source outputs) [LIO or CNTR]
	LIO-04	O	O	32 inputs, 32 outputs (sink outputs) [LIO32]
	LIO-05	O	O	32 inputs, 32 outputs (source outputs) [LIO32]
	LIO-06	O	O	8 inputs, 8 outputs, 1 analog input channel, 1 analog output channel, 1 pulse input channel [MIXIO or CNTR-A]
	DO-01	O	×	64 outputs (sink outputs) [DO]
	AI-01	O	×	8 analog inputs [AI]
	AO-01	O	×	8 analog outputs [AVO]
	CNTR-01	O	O	2 pulse input channels [CNTR01]

Note: O: Supported, ×: Not supported.

CPU Error Status

The following table lists the registers that are related to errors in the CPU.

Name	Register Address	Remarks
I/O Error Count	SW00200	Number of I/O error occurrences
Input Error Count	SW00201	Number of input error occurrences
Input Error Address	SW00202	Latest input error address (register address in IW□□□□□)
Output Error Count	SW00203	Number of output error occurrences
Output Error Address	SW00204	Latest output error address (register address in OW□□□□□)
Reserved.	SW00205	Not used.
	SW00206	
	SW00207	
I/O Error Status	SW00208 to SW00221	CPU error status
	SW00222 and SW00223	Reserved.
	SW00224 to SW00231	Error status of Slot 1 (Depends on the Modules that are mounted and the error code.)

The CPU error status is illustrated in the following figure.
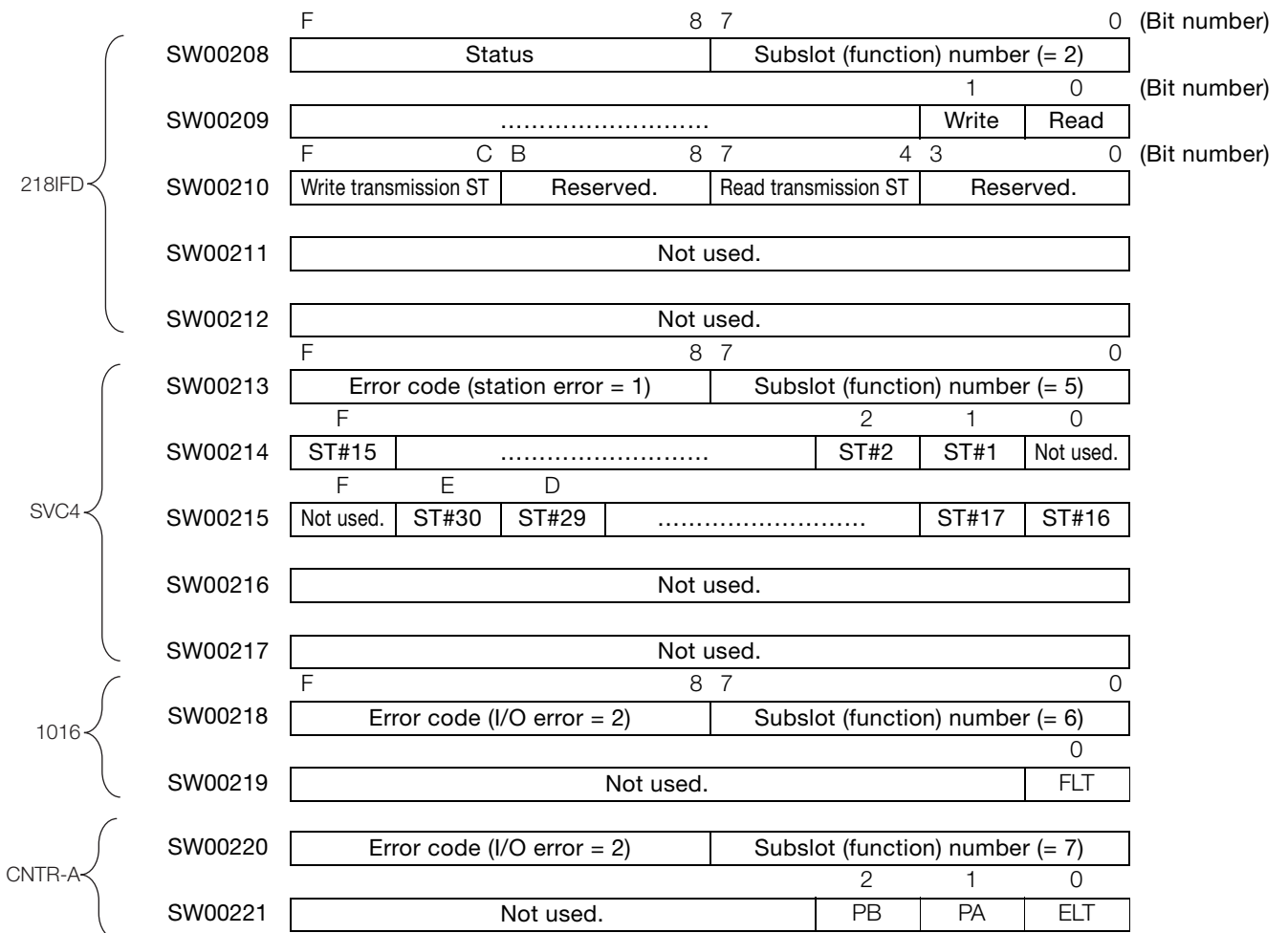
Table 8.1 218IFD Error Status Details

Item	Code	Remarks
Error Code	0	Normal
	1	Station error
Read/write	0	Communications normal
	1	Communications error
Read/write transmission ST	0□0	No error
	0□4	Parameter formatting error
	0□5	Command sequence error
	0□6	Reset
	0□7	Data reception error
	0□8	Data sending error
	0□A	Connection error

Table 8.2 SVC/SVC32 Error Status Details

Item	Code	Remarks
Error Code	0	No error
	1	Station error
ST#n	0	Communications normal
	1	Communications error at station n

Table 8.3 Error Status of 1016

Item	Code	Remarks
Error Code	0	No error
	2	I/O error
FLT	0	Oscillator normal
	1	Oscillator error

Table 8.4 CNTR-A Error Status

Item	Code	Remarks
Error Code	0	No error
	2	I/O error
FLT	0	Counter ASIC normal
	1	Counter ASIC normal
PA	0	Phase A normal
	1	Phase A disconnection detected
PB	0	Phase B normal
	1	Phase B disconnection detected

Error Status for Communications Modules

This section shows the error status for the 12 models of Communications Modules.

◆ 217IF-01 Error Status

SW00□□□ + 0	Not used.
SW00□□□ + 1	Not used.
SW00□□□ + 2	Not used.
SW00□□□ + 3	Not used.
SW00□□□ + 4	Not used.
SW00□□□ + 5	Not used.
SW00□□□ + 6	Not used.
SW00□□□ + 7	Not used.

◆ 218IF-01 Error Status

SW00□□□ + 0	Not used.
SW00□□□ + 1	Not used.
SW00□□□ + 2	Not used.
SW00□□□ + 3	Not used.
SW00□□□ + 4	Not used.
SW00□□□ + 5	Not used.
SW00□□□ + 6	Not used.
SW00□□□ + 7	Not used.

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◆ 218IF-02 Error Status

SW00□□□ + 0	Not used.
SW00□□□ + 1	Not used.
SW00□□□ + 2	Not used.
SW00□□□ + 3	Not used.
SW00□□□ + 4	Not used.
SW00□□□ + 5	Not used.
SW00□□□ + 6	Not used.
SW00□□□ + 7	Not used.

◆ 260IF-01 Error Status

(260IF)	F	8	7		0	(Bit number)
SW00□□□ + 0	Error code (station error = 1)		Subslot (function) number (= 2)			

	F			0	(Bit number)
SW00□□□ + 1	ST#15	………………………		ST#0	
SW00□□□ + 2	ST#31	………………………		ST#16	
SW00□□□ + 3	ST#47	………………………		ST#32	
SW00□□□ + 4	ST#63	………………………		ST#48	
SW00□□□ + 5	Not used.				
SW00□□□ + 6	Not used.				
SW00□□□ + 7	Not used.				

Table 8.5 260IF-01 Error Status Details

Item	Code	Remarks
Error Code	0	No error
	1	Station error
ST#n	0	Communications normal
	1	Communications error at station n

◆ 261IF-01 Error Status

(261IFS)	F	8 7	0 (Bit number)
SW00□□□ + 0	Error code (station error = 1)	Subslot (function) number (= 2)	

	F		0 (Bit number)
SW00□□□ + 1	ST#16	....	ST#1
SW00□□□ + 2	ST#32	....	ST#17
SW00□□□ + 3	ST#48	....	ST#33
SW00□□□ + 4	ST#64	....	ST#49
SW00□□□ + 5	Not used.		
SW00□□□ + 6	Not used.		
SW00□□□ + 7	Not used.		

Table 8.6 261 IFS Error Status Details

Item	Code	Remarks
Error Code	0	No error
	1	Station error
ST#n	0	Communications normal
	1	Communications error at station n

◆ 262IF-01 Error Status

(FL-net)	F	8 7	0 (Bit number)
SW00□□□ + 0	Error code (station error = 1)	Subslot (function) number (= 1)	

	F		0 (Bit number)
SW00□□□ + 1	Logic #32	....	Logic #1
SW00□□□ + 2	Logic #32	....	Logic #32
SW00□□□ + 3	Logic #32	....	Logic #32
SW00□□□ + 4	Logic #32	....	Logic #32
SW00□□□ + 5	Not used.		
SW00□□□ + 6	Not used.		
SW00□□□ + 7	Not used.		

Table 8.7 FL-net Error Status Details

Item	Code	Remarks
Error Code	0	No error
	1	Station error
Logic #n	0	Communications normal
	1	Communications error at station n

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◆ 263IF-01 Error Status

(EtherNetIP)	F	8 7	0 (Bit number)
SW00□□□ + 0	Error code (station error = 1)	Subslot (function) number (= 1)	

	F		0 (Bit number)
SW00□□□ + 1	CNO#16	………………………	CNO#1
SW00□□□ + 2	ST#32	………………………	ST#17
SW00□□□ + 3	ST#48	………………………	ST#33
SW00□□□ + 4	ST#64	………………………	ST#49
SW00□□□ + 5	Not used.		
SW00□□□ + 6	Not used.		
SW00□□□ + 7	Not used.		

Table 8.8 EtherNet/IP Error Status Details

Item	Code	Remarks
Error Code	0	No error
	1	Station error
CNO#n	0	Communications normal
	1	Communications error at station n

◆ 264IF-01 Error Status

(EtherCAT-S)	F	8 7	0 (Bit number)
SW00□□□ + 0	Error code (station error = 1)	Subslot (function) number (= 1)	

			(Bit number)
SW00□□□ + 1	Reserved.		
SW00□□□ + 2	Communications error code		
SW00□□□ + 3	Communications phase		
SW00□□□ + 4	Data valid flags		
SW00□□□ + 5	Not used.		
SW00□□□ + 6	Not used.		
SW00□□□ + 7	Not used.		

Table 8.9 EtherCAT-S Error Status Details

Item	Code	Remarks
Error Code	0	No error
	1	Station error
Communications phase	0	Non-INIT
	1	INIT
	2	PRE-OPERATIONAL
	3	SAFE-OPERATIONAL
	4	OPERATIONAL
Data valid flags	Bit 0	0: Process data not communicated 1: Process data communications in progress
	Bit 1 to Bit F	Reserved.

◆ 265IF-01 Error Status

(CompoNet-M)	F	8	7	0	(Bit number)

SW00□□□ + 0	Error code (station error = 1) | Subslot (function) number (= 1)
SW00□□□ + 1	Reserved.
SW00□□□ + 2	Communications status flags
SW00□□□ + 3	Module status code
SW00□□□ + 4	Network status code
SW00□□□ + 5	Not used.
SW00□□□ + 6	Not used.
SW00□□□ + 7	Not used.

Table 8.10 CompoNet-M Error Status Details

Item	Code	Remarks
Error Code	0	No error
	1	Station error
Communications status flags	Bit 0	0: Communications error or no communications 1: All communications normal
	Bit 1	0: No slave communications error 1: Slave communications error
	Bit 2	0: No repeater communications error 1: Repeater communications error
	Bit 3 to Bit F	Reserved.
Module status code	0	–
	1	–
	2	Normal status
	3	Minor error
	4	Fatal error
Network status code	0	Power OFF/startup
	1	Communications startup
	2	Communicating
	3	Minor communications error
	4	Fatal communications error

◆ PROFINET-M Error Status
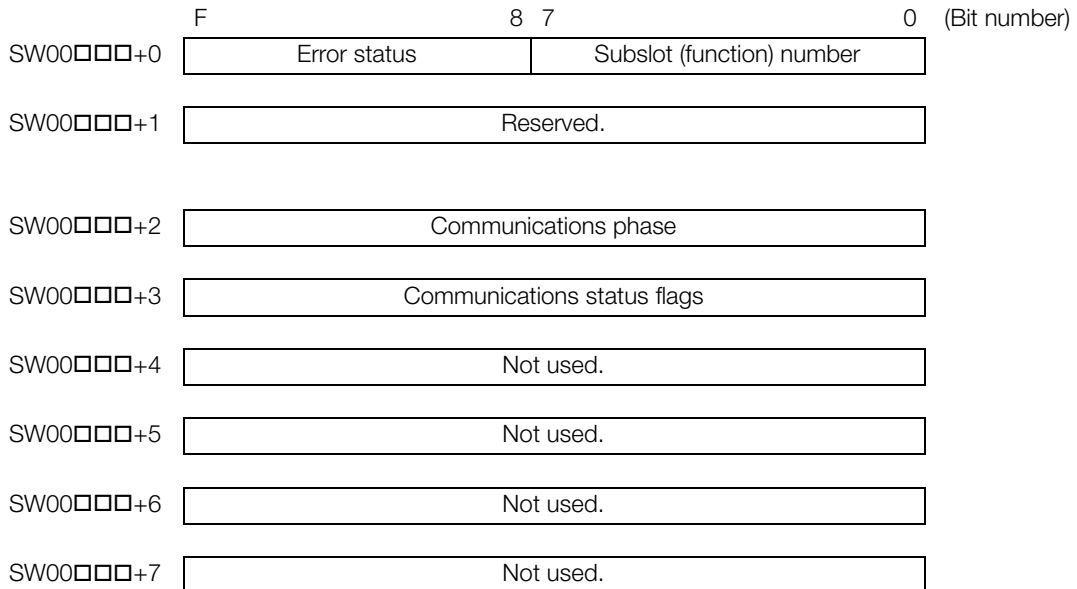
	F	8	7	0	(Bit number)

SW00□□□+0	Error status	Subslot (function) number

SW00□□□+1	Reserved.

SW00□□□+2	Communications phase

SW00□□□+3	Communications status flags

SW00□□□+4	Not used.

SW00□□□+5	Not used.

SW00□□□+6	Not used.

SW00□□□+7	Not used.

Note: The system register addresses depend on the rack and slot where the Module is mounted.
(The first part (SW00□□□) of the system register addresses when rack 1 and slot 1 are used is SW00224.)

Table 8.11 PROFINET-M Error Status Details

Item	Code	Remarks
Subslot No.	1	1: PROFINET
Error Status	0	Normal
	1	Station error

◆ PROFINET-S Error Status

| | F | 8 | 7 | 0 | (Bit number) |

	F ... 8	7 ... 0
SW00□□□+0	Error status	Subslot (function) number
SW00□□□+1	Reserved.	
SW00□□□+2	Communications phase	
SW00□□□+3	Communications status flags	
SW00□□□+4	Not used.	
SW00□□□+5	Not used.	
SW00□□□+6	Not used.	
SW00□□□+7	Not used.	

Note: The system register addresses depend on the rack and slot where the Module is mounted.
(The first part (SW00□□□) of the system register addresses when rack 1 and slot 1 are used is SW00224.)

Table 8.12 PROFINET-S Error Status Details

Item	Code	Remarks
Subslot No.	1	1: PROFINET
Error Status	0	Normal
	1	Station error

◆ CC-Link-M Error Status

| | F | 8 | 7 | 0 | (Bit number) |

	F ... 8	7 ... 0
SW00□□□+0	Error status	Subslot (function) number
SW00□□□+1	ST# 16	ST# 1
SW00□□□+2	ST# 32	ST# 17
SW00□□□+3	ST# 48	ST# 33
SW00□□□+4	ST# 64	ST# 49
SW00□□□+5	Not used.	
SW00□□□+6	Not used.	
SW00□□□+7	Not used.	

Note: The system register addresses depend on the rack and slot where the Module is mounted.
(The first part (SW00□□□) of the system register addresses when rack 1 and slot 1 are used is SW00224.)

Table 8.13 CC-Link-M Error Status Details

Item	Code	Remarks
Subslot No.	1	1: CC-Link
Error Status	0	Normal
	1	Station error
Station n	0	Communications normal
	1	Communications error at station n

Error Status for I/O Modules

This section shows the error status for the seven models of I/O Modules.

◆ LIO-01/LIO-02 Error Status

(LIO)	F	8	7	0	(Bit number)
SW00□□□ + 0	Error code (I/O error = 2)		Subslot (function) number (= 1)		

(CNTR)	F	8	7	0	(Bit number)
SW00□□□ + 1	Not used.		Subslot (function) number (= 2)		

SW00□□□ + 2	Not used.

SW00□□□ + 3	Not used.

SW00□□□ + 4	Not used.

SW00□□□ + 5	Not used.

SW00□□□ + 6	Not used.

SW00□□□ + 7	Not used.

Table 8.14 LIO-01/LIO-02 Error Status Details

Item	Code	Remarks
Error Code	0	No error
	2	I/O error Cause of Error • Fuse error

◆ LIO-04/LIO-05 Error Status

(LIO32)	F	8	7	0	(Bit number)
SW00□□□ + 0	Error code (I/O error = 2)		Subslot (function) number (= 1)		

SW00□□□ + 1	Not used.

SW00□□□ + 2	Not used.

SW00□□□ + 3	Not used.

SW00□□□ + 4	Not used.

SW00□□□ + 5	Not used.

SW00□□□ + 6	Not used.

SW00□□□ + 7	Not used.

Table 8.15 LIO-04/LIO-05 Error Status Details

Item	Code	Remarks
Error Code	0	No error
	2	I/O error Cause of Error • Fuse error

◆ LIO-06 Error Status

| (MIXIO) | F | 8 | 7 | | | 0 | (Bit number) |

SW00□□□ + 0	Error code (I/O error = 2)	Subslot (function) number (= 1)

| | | | 3 | 2 | 1 | 0 | (Bit number) |

SW00□□□ + 1	Not used.	ADJO	ADJI	FUSE	FLT

(CNTR-A)

SW00□□□ + 2	Error code (I/O error = 2)	Subslot (function) number (= 2)

| | | | 2 | 1 | 0 | (Bit number) |

SW00□□□ + 3	Not used.	PB	PA	FLT

SW00□□□ + 4	Not used.
SW00□□□ + 5	Not used.
SW00□□□ + 6	Not used.
SW00□□□ + 7	Not used.
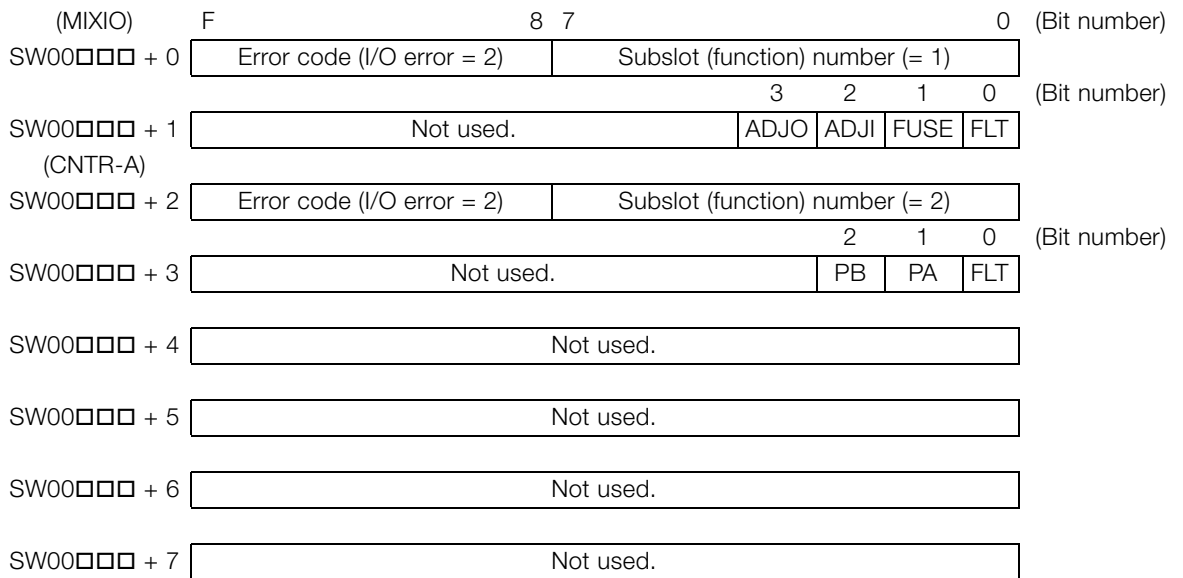
Table 8.16 MIXIO Error Status Details

Item	Code	Remarks
Error Code	0	No error
	2	I/O error
FLT	0	Oscillator and ASIC for AO are normal.
	1	Oscillator error or error in ASIC for AO
FUSE	0	Fuse normal
	1	Fuse error
ADJI	0	AI shipping adjustment value normal
	1	AI shipping adjustment value not set or adjustment value error
ADJO	0	AO shipping adjustment value normal
	1	AO shipping adjustment value not set or adjustment value error

Valid Ranges for AI/AO Adjustment Values

Offset: -9,999 to 9,999

Gain: 0.0001 to 1.9999

Table 8.17 CNTR-A Error Status Details

Item	Code	Remarks
Error Code	0	No error
	2	I/O error
FLT	0	Counter ASIC normal
	1	Counter ASIC error
PA	0	Phase A normal
	1	Phase A disconnection detected
PB	0	Phase B normal
	1	Phase B disconnection detected

◆ DO-01 Error Status

(DO)	F	8 7	0	(Bit number)
SW00□□□ + 0	Error code (I/O error = 2)	Subslot (function) number (= 1)		
SW00□□□ + 1	Not used.			
SW00□□□ + 2	Not used.			
SW00□□□ + 3	Not used.			
SW00□□□ + 4	Not used.			
SW00□□□ + 5	Not used.			
SW00□□□ + 6	Not used.			
SW00□□□ + 7	Not used.			

Table 8.18 DO-01 Error Status Details

Item	Code	Remarks
Error Code	0	No error
	2	I/O error Cause of Error • Fuse error

◆ AI-01 Error Status

(AI)	F	8 7	0	(Bit number)
SW00□□□ + 0	Not used.	Subslot (function) number (= 1)		
SW00□□□ + 1	Not used.			
SW00□□□ + 2	Not used.			
SW00□□□ + 3	Not used.			
SW00□□□ + 4	Not used.			
SW00□□□ + 5	Not used.			
SW00□□□ + 6	Not used.			
SW00□□□ + 7	Not used.			

◆ AO-01 Error Status

(AVO)	F	8 7	0	(Bit number)
SW00□□□ + 0	Error code (I/O error = 2)	Subslot (function) number (= 1)		

		1 0	(Bit number)
SW00□□□ + 1	Not used.	FLT ADJO	

SW00□□□ + 2	Not used.
SW00□□□ + 3	Not used.
SW00□□□ + 4	Not used.
SW00□□□ + 5	Not used.
SW00□□□ + 6	Not used.
SW00□□□ + 7	Not used.

Table 8.19 AO-01 Error Status Details

Item	Code	Remarks
Error Code	0	No error
	2	I/O error
ADJO	0	AO shipping adjustment value normal
	1	AO shipping adjustment value not set or adjustment value error
FLT	0	Oscillator normal
	1	Oscillator error

Valid Ranges for AO Adjustment Value

Offset: -9,999 to 9,999

Gain: 0.0001 to 1.9999

◆ CNTR-01 Error Status

(CNTR01)	F	8 7	0	(Bit number)
SW00□□□ + 0	Not used.	Subslot (function) number (= 1)		

SW00□□□ + 1	Not used.
SW00□□□ + 2	Not used.
SW00□□□ + 3	Not used.
SW00□□□ + 4	Not used.
SW00□□□ + 5	Not used.
SW00□□□ + 6	Not used.
SW00□□□ + 7	Not used.

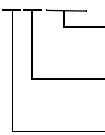System Registers

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8.5.10 Interrupt Status

The data in these registers give the status of information on interrupts from each I/O Module. Detailed interrupt information is available in system registers SW00698 to SW00789.

Register Configuration

Name	Register Address	Remarks
Interrupt Detection Count	SW00698	–
Module Where an Interrupt Occurred	SW00699	Number of Modules with a single interrupt
Interrupt Modules	SW00700 to SW00702	Interrupt Module 1
	SW00703 to SW00705	Interrupt Module 2
	⋮	⋮
	SW00787 to SW00789	Interrupt Module 30

Details

The following table gives details on the Interrupt Module.

Register Address	Remarks
SW007□□ + 0	Rack No., Unit No., Slot No. □□□□H 01 to 09: Gives the slot number where the Module in which the interrupt occurred is mounted. 1 to 4: Gives the unit number of the Module in which the interrupt occurred. 1 to 7: Gives the Rack number where the Module in which the interrupt occurred is mounted.
SW007□□ + 1	Interrupt Type 1: Reserved. 2: DI interrupt for LIO-01, LIO-02, LIO-04, or LIO-05 3: Counter interrupt for LIO-01, LIO-02, LIO-06, or CNTR-01
SW007□□ + 2	Register value for hardware interrupt cause Depends on the hardware.

◆ Hardware Interrupt Cause Register Values

■ Interrupt Type = 1 (CPU I/O)

Bit	Meaning
0 to F	Reserved.

■ Interrupt Type = 2 (LIO-01 or LIO-02/LIO)

Bit	Meaning
0 to 4	Reserved.
5	LIO-01 or LIO-02 interrupt input 1 = Interrupt input, 0 = No interrupt input
6 to F	Reserved.

■ Interrupt Type = 2 (LIO-04 or LIO-05/LIO32)

Bit	Meaning
0 to 8	Reserved.
9	LIO-04 or LIO-05 interrupt input 1 1 = Interrupt input, 0 = No interrupt input
A	LIO-04 or LIO-05 interrupt input 2 1 = Interrupt input, 0 = No interrupt input
B	LIO-04 or LIO-05 interrupt input 3 1 = Interrupt input, 0 = No interrupt input
C	LIO-04 or LIO-05 interrupt input 4 1 = Interrupt input, 0 = No interrupt input
D to F	Reserved.

■ Interrupt Type = 2 (LIO-06/MIXIO)

Bit	Meaning
0 to 4	Reserved.
5	MIXIO interrupt input 1 = Interrupt input, 0 = No interrupt input
6 to F	Reserved.

■ Interrupt Type = 2 (1016)

Bit	Meaning
0 to 4	Reserved.
5	1016 interrupt input 1 = Interrupt input, 0 = No interrupt input
6 to F	Reserved.

■ Interrupt Type = 3 (CNTR-A)

Bit	Meaning
0 to 3	Reserved.
4	Counter mismatch status 1 = Counter agreement, 0 = Counter disagreement
5 to F	Reserved.

■ Interrupt Type = 3 (LIO-01/CNTR)

Bit	Meaning
0 to 3	Reserved.
4	Counter agreement status 1 = Counter agreement, 0 = Counter disagreement
5 to F	Reserved.

■ Interrupt Type = 3 (LIO-06/CNTR-A)

Bit	Meaning
0 to 3	Reserved.
4	Counter agreement status 1 = Counter agreement, 0 = Counter disagreement
5 to F	Reserved.

■ Interrupt Type = 3 (CNTR-01/CNTR01)

Bit	Meaning
0	Counter agreement status 1 = Counter agreement, 0 = Counter disagreement
1 to F	Reserved.

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8.5.11 Module Information

The data in these registers give hardware information on the Modules that are used in the SER-VOPACK.

Configuration

◆ CPU

Name	Register Address	Remarks
CPU Information	SW00800	CPU ID
	SW00801	Hardware Version (BCD)
	SW00802	Software Version (BCD)
	SW00803	Number of Sub-slots (hex)
	SW00804	Function Module 1 ID (hex)
	SW00805	Function Module 1 Status
	SW00806	Function Module 2 ID (hex)
	SW00807	Function Module 2 Status
	SW00808	Function Module 3 ID (hex)
	SW00809	Function Module 3 Status
	SW00810	Function Module 4 ID (hex)
	SW00811	Function Module 4 Status
	SW00812	Function Module 5 ID (hex)
	SW00813	Function Module 5 Status
	SW00814	Function Module 6 ID (hex)
	SW00815	Function Module 6 Status
Option Module Information	SW00816 to SW01095	Option Module information (Depends on CPU model and mounted Option Modules.)

◆ Option Module

Name	Register Address	Remarks
Module Information	SW00□□□ + 0	Option Module ID
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (hex)
	SW00□□□ + 4	ID of Function Module 1 (hex)
	SW00□□□ + 5	Status of Function Module 1
	SW00□□□ + 6	ID of Function Module 2 (hex)
	SW00□□□ + 7	Status of Function Module 2

◆ Function Module Status Details

Value	Text Displayed in MPE720 Module Configuration Definition	Status
0	None	There is no Function Module Definition and a Module is not mounted.
1	Empty	There is a Function Module Definition, but the Module is not mounted.
2	Operating (Driving)	The Function Module is operating normally.
3	Standby (Reserved.)	The Module is on standby.
4	Failure	An error was detected in the Module.
5	× Module name	The mounted Module does not match the definition.
6	Waiting for initialization	The Module is mounted, but there is no Detailed Function Module Definition.
7	Driving Stop	Local I/O is stopped.
8	Duplicate Address	The same station address is set for more than one of the connected MECHATROLINK-III slave devices.
9 or higher	–	Reserved.

CPU Information

◆ Σ-7C

Name	Register Address	Remarks		
CPU Information	SW00800	CPU ID		
	SW00801	Hardware Version (BCD)		
	SW00802	Software Version (BCD)		
	SW00803	Number of Sub-slots (hex)		
	SW00804	Function Module 1 ID (hex)		
	SW00805	Function Module 1 Status		
	SW00806	Function Module 2 ID (hex)		
	SW00807	Function Module 2 Status		
	SW00808	Function Module 3 ID (hex)		
	SW00809	Function Module 3 Status		
	SW00810	Function Module 4 ID (hex)		
	SW00811	Function Module 4 Status		
	SW00812	Function Module 5 ID (hex)		
	SW00813	Function Module 5 Status		
	SW00814	Function Module 6 ID (hex)		
	SW00815	Function Module 6 Status		
Option Module Information	SW00816	Rack 1	Slot 1	Module ID
	SW00817			Hardware Version (BCD)
	SW00818			Software Version (BCD)
	SW00819			Number of Sub-slots
	SW00820			ID of Function Module 1
	SW00821			Status of Function Module 1
	SW00822			ID of Function Module 2
	SW00823			Status of Function Module 2
	SW00824 to SW00831		Slot 2	Same as above.

Option Module Information

◆ 217IF-01

Name	Register Address	Remarks
267IF-01 Information	SW00□□□ + 0	Module ID (8280 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	217IF Function Module ID (8520 hex)
	SW00□□□ + 5	217IF Function Module Status
	SW00□□□ + 6	217IF Function Module ID (8520 hex)
	SW00□□□ + 7	217IF Function Module Status

◆ 218IF-01

Name	Register Address	Remarks
218IF-01 Information	SW00□□□ + 0	Module ID (8180 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0002 hex)
	SW00□□□ + 4	218IF Function Module ID (8620 hex)
	SW00□□□ + 5	218IF Function Module Status
	SW00□□□ + 6	218IF Function Module ID (8620 hex)
	SW00□□□ + 7	218IF Function Module Status

◆ 218IF-02

Name	Register Address	Remarks
218IF-02 Information	SW00□□□ + 0	Module ID (8181 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0002 hex)
	SW00□□□ + 4	218IFB Function Module ID (8622 hex)
	SW00□□□ + 5	218IFB Function Module Status
	SW00□□□ + 6	218IFB Function Module ID (8622 hex)
	SW00□□□ + 7	218IFB Function Module Status

◆ 260IF-01

Name	Register Address	Remarks
260IF-01 Information	SW00□□□ + 0	Module ID (8380 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0002 hex)
	SW00□□□ + 4	260IF Function Module ID (8B20 hex)
	SW00□□□ + 5	260IF Function Module Status
	SW00□□□ + 6	260IF Function Module ID (8B20 hex)
	SW00□□□ + 7	260IF Function Module Status

◆ 261IF-01

Name	Register Address	Remarks
261IF-01 Information	SW00□□□ + 0	Module ID (8480 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0002 hex)
	SW00□□□ + 4	261IFS Function Module ID (8C21 hex)
	SW00□□□ + 5	261IFS Function Module Status
	SW00□□□ + 6	261IFS Function Module ID (8C21 hex)
	SW00□□□ + 7	261IFS Function Module Status

◆ 262IF-01

Name	Register Address	Remarks
262IF-01 Information	SW00□□□ + 0	Module ID (8DA0 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	FL-net Function Module ID (8D20 hex)
	SW00□□□ + 5	FL-net Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

◆ 263IF-01

Name	Register Address	Remarks
263IF-01 Information	SW00□□□ + 0	Module ID (8BA8 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	EtherNetIP Function Module ID (8B28 hex)
	SW00□□□ + 5	EtherNetIP Function Module Status
	SW00□□□ + 6	Reserved.

◆ 264IF-01

Name	Register Address	Remarks
264IF-01 Information	SW00□□□ + 0	Module ID (87A0 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	EtherCAT-S Function Module ID (8720 hex)
	SW00□□□ + 5	EtherCAT-S Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

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◆ 265IF-01

Name	Register Address	Remarks
265IF-01 Information	SW00□□□ + 0	Module ID (8BA4 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	CompoNet-M Function Module ID (8B24 hex)
	SW00□□□ + 5	CompoNet-M Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

◆ LIO-01

Name	Register Address	Remarks
LIO-01 Information	SW00□□□ + 0	Module ID (8080 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0002 hex)
	SW00□□□ + 4	LIO Function Module ID (8050 hex)
	SW00□□□ + 5	LIO Function Module Status
	SW00□□□ + 6	CNTR Function Module ID (8230 hex)
	SW00□□□ + 7	CNTR Function Module Status

◆ LIO-02

Name	Register Address	Remarks
LIO-02 Information	SW00□□□ + 0	Module ID (8081 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0002 hex)
	SW00□□□ + 4	LIO Function Module ID (8050 hex)
	SW00□□□ + 5	LIO Function Module Status
	SW00□□□ + 6	CNTR Function Module ID (8230 hex)
	SW00□□□ + 7	CNTR Function Module Status

◆ LIO-04

Name	Register Address	Remarks
LIO-04 Information	SW00□□□ + 0	Module ID (80D5 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	LIO32 Function Module ID (8055 hex)
	SW00□□□ + 5	LIO32 Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

◆ LIO-05

Name	Register Address	Remarks
LIO-05 Information	SW00□□□ + 0	Module ID (80D6 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	LIO32 Function Module ID (8055 hex)
	SW00□□□ + 5	LIO32 Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

◆ LIO-06

Name	Register Address	Remarks
LIO-06 Information	SW00□□□ + 0	Module ID (80D7 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0002 hex)
	SW00□□□ + 4	MIXIO Function Module ID (8056 hex)
	SW00□□□ + 5	MIXIO Function Module Status
	SW00□□□ + 6	CNTR-A Function Module ID (8232 hex)
	SW00□□□ + 7	CNTR-A Function Module Status

◆ DO-01

Name	Register Address	Remarks
DO-01 Information	SW00□□□ + 0	Module ID (80D4 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	DO Function Module ID (8054 hex)
	SW00□□□ + 5	DO Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

◆ AI-01

Name	Register Address	Remarks
AI-01 Information	SW00□□□ + 0	Module ID (80D0 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	AI Function Module ID (8051 hex)
	SW00□□□ + 5	AI Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

8.5.11 Module Information

◆ AO-01

Name	Register Address	Remarks
AO-01 Information	SW00□□□ + 0	Module ID (80D1 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	AVO Function Module ID (8052 hex)
	SW00□□□ + 5	AVO Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

◆ CNTR-01

Name	Register Address	Remarks
CNTR-01 Information	SW00□□□ + 0	Module ID (82B0 hex)
	SW00□□□ + 1	Hardware Version (BCD)
	SW00□□□ + 2	Software Version (BCD)
	SW00□□□ + 3	Number of Sub-slots (0001 hex)
	SW00□□□ + 4	CNTR01 Function Module ID (8231 hex)
	SW00□□□ + 5	CNTR01 Function Module Status
	SW00□□□ + 6	Reserved.
	SW00□□□ + 7	Reserved.

8.5.12 Motion Program Execution Information

The data in these registers give the execution status of the motion programs.

This section gives the register configuration of and details on the motion program execution information.

◆ Register Configuration

Register Address	Name	Reference
SW03200	Number of Currently Executing Program for Work 1	–
SW03201	Number of Currently Executing Program for Work 2	–
SW03202	Number of Currently Executing Program for Work 3	–
SW03203	Number of Currently Executing Program for Work 4	–
SW03204	Number of Currently Executing Program for Work 5	–
SW03205	Number of Currently Executing Program for Work 6	–
SW03206	Number of Currently Executing Program for Work 7	–
SW03207	Number of Currently Executing Program for Work 8	–
SW03208	Number of Currently Executing Program for Work 9	–
SW03209	Number of Currently Executing Program for Work 10	–
SW03210	Number of Currently Executing Program for Work 11	–
SW03211	Number of Currently Executing Program for Work 12	–
SW03212	Number of Currently Executing Program for Work 13	–
SW03213	Number of Currently Executing Program for Work 14	–
SW03214	Number of Currently Executing Program for Work 15	–
SW03215	Number of Currently Executing Program for Work 16	–
SW03216	Number of Currently Executing Program for Work 17	–
SW03217	Number of Currently Executing Program for Work 18	–
SW03218	Number of Currently Executing Program for Work 19	–
SW03219	Number of Currently Executing Program for Work 20	–
SW03220	Number of Currently Executing Program for Work 21	–
SW03221	Number of Currently Executing Program for Work 22	–
SW03222	Number of Currently Executing Program for Work 23	–
SW03223	Number of Currently Executing Program for Work 24	–

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Register Address	Name	Reference
SW03224	Number of Currently Executing Program for Work 25	–
SW03225	Number of Currently Executing Program for Work 26	–
SW03226	Number of Currently Executing Program for Work 27	–
SW03227	Number of Currently Executing Program for Work 28	–
SW03228	Number of Currently Executing Program for Work 29	–
SW03229	Number of Currently Executing Program for Work 30	–
SW03230	Number of Currently Executing Program for Work 31	–
SW03231	Number of Currently Executing Program for Work 32	–
SW03232 to SW03263	Program Running Bits	◆ *Details* on page 8-42
SW03264 to SW03321	Work 1 Program Information	• *System Work Numbers 1 to 8* on page 8-43
SW03322 to SW03379	Work 2 Program Information	
SW03380 to SW03437	Work 3 Program Information	
SW03438 to SW03495	Work 4 Program Information	
SW03496 to SW03553	Work 5 Program Information	
SW03554 to SW03611	Work 6 Program Information	
SW03612 to SW03669	Work 7 Program Information	
SW03670 to SW03727	Work 8 Program Information	
SW03728 to SW03785	Work 9 Program Information	• *System Work Numbers 9 to 16* on page 8-45
SW03786 to SW03843	Work 10 Program Information	
SW03844 to SW03901	Work 11 Program Information	
SW03902 to SW03959	Work 12 Program Information	
SW03960 to SW04017	Work 13 Program Information	
SW04018 to SW04075	Work 14 Program Information	
SW04076 to SW04133	Work 15 Program Information	
SW04134 to SW04191	Work 16 Program Information	
SW04192 to SW04249	Work 17 Program Information	• *System Work Numbers 17 to 24* on page 8-47
SW04250 to SW04307	Work 18 Program Information	
SW04308 to SW04365	Work 19 Program Information	
SW04366 to SW04423	Work 20 Program Information	
SW04424 to SW04481	Work 21 Program Information	
SW04482 to SW04539	Work 22 Program Information	
SW04540 to SW04597	Work 23 Program Information	
SW04598 to SW04655	Work 24 Program Information	
SW04656 to SW04713	Work 25 Program Information	• *System Work Numbers 25 to 32* on page 8-49
SW04714 to SW04771	Work 26 Program Information	
SW04772 to SW04829	Work 27 Program Information	
SW04830 to SW04887	Work 28 Program Information	
SW04888 to SW04945	Work 29 Program Information	
SW04946 to SW05003	Work 30 Program Information	
SW05004 to SW05061	Work 31 Program Information	
SW05062 to SW05119	Work 32 Program Information	

Register Address	Name	Reference
SW08192 to SW08223	Work 1 Extended Program Information	• *System Work Numbers 1 to 8* on page 8-43
SW08224 to SW08255	Work 2 Extended Program Information	
SW08256 to SW08287	Work 3 Extended Program Information	
SW08288 to SW08319	Work 4 Extended Program Information	
SW08320 to SW08351	Work 5 Extended Program Information	
SW08352 to SW08383	Work 6 Extended Program Information	
SW08384 to SW08415	Work 7 Extended Program Information	
SW08416 to SW08447	Work 8 Extended Program Information	
SW08448 to SW08479	Work 9 Extended Program Information	• *System Work Numbers 9 to 16* on page 8-45
SW08480 to SW08511	Work 10 Extended Program Information	
SW08512 to SW08543	Work 11 Extended Program Information	
SW08544 to SW08575	Work 12 Extended Program Information	
SW08576 to SW08607	Work 13 Extended Program Information	
SW08608 to SW08639	Work 14 Extended Program Information	
SW08640 to SW08671	Work 15 Extended Program Information	
SW08672 to SW08703	Work 16 Extended Program Information	
SW08704 to SW08735	Work 17 Extended Program Information	• *System Work Numbers 17 to 24* on page 8-47
SW08736 to SW08767	Work 18 Extended Program Information	
SW08768 to SW08799	Work 19 Extended Program Information	
SW08800 to SW08831	Work 20 Extended Program Information	
SW08832 to SW08863	Work 21 Extended Program Information	
SW08864 to SW08895	Work 22 Extended Program Information	
SW08896 to SW08927	Work 23 Extended Program Information	
SW08928 to SW08959	Work 24 Extended Program Information	
SW08960 to SW08991	Work 25 Extended Program Information	• *System Work Numbers 25 to 32* on page 8-49
SW08992 to SW09023	Work 26 Extended Program Information	
SW09024 to SW09055	Work 27 Extended Program Information	
SW09056 to SW09087	Work 28 Extended Program Information	
SW09088 to SW09119	Work 29 Extended Program Information	
SW09120 to SW09151	Work 30 Extended Program Information	
SW09152 to SW09183	Work 31 Extended Program Information	
SW09184 to SW09215	Work 32 Extended Program Information	

System Registers

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8.5.12 Motion Program Execution Information

◆ Details

The following table gives details on the Program Execution Bits from system register addresses SW03232 to SW03263.

The program is being executed when the corresponding bit is 1.

Register Address	Contents
SW03232	MP□016 (Bit F) to MP□001 (Bit 0)
SW03233	MP□032 (Bit F) to MP□017 (Bit 0)
SW03234	MP□048 (Bit F) to MP□033 (Bit 0)
SW03235	MP□064 (Bit F) to MP□049 (Bit 0)
SW03236	MP□080 (Bit F) to MP□065 (Bit 0)
SW03237	MP□096 (Bit F) to MP□081 (Bit 0)
SW03238	MP□112 (Bit F) to MP□097 (Bit 0)
SW03239	MP□128 (Bit F) to MP□113 (Bit 0)
SW03240	MP□144 (Bit F) to MP□129 (Bit 0)
SW03241	MP□160 (Bit F) to MP□145 (Bit 0)
SW03242	MP□176 (Bit F) to MP□161 (Bit 0)
SW03243	MP□192 (Bit F) to MP□177 (Bit 0)
SW03244	MP□208 (Bit F) to MP□193 (Bit 0)
SW03245	MP□224 (Bit F) to MP□209 (Bit 0)
SW03246	MP□240 (Bit F) to MP□225 (Bit 0)
SW03247	MP□256 (Bit F) to MP□241 (Bit 0)
SW03248	MP□272 (Bit F) to MP□257 (Bit 0)
SW03249	MP□288 (Bit F) to MP□273 (Bit 0)
SW03250	MP□304 (Bit F) to MP□289 (Bit 0)
SW03251	MP□320 (Bit F) to MP□305 (Bit 0)
SW03252	MP□336 (Bit F) to MP□321 (Bit 0)
SW03253	MP□352 (Bit F) to MP□337 (Bit 0)
SW03254	MP□368 (Bit F) to MP□353 (Bit 0)
SW03255	MP□384 (Bit F) to MP□369 (Bit 0)
SW03256	MP□400 (Bit F) to MP□385 (Bit 0)
SW03257	MP□416 (Bit F) to MP□401 (Bit 0)
SW03258	MP□432 (Bit F) to MP□417 (Bit 0)
SW03259	MP□448 (Bit F) to MP□433 (Bit 0)
SW03260	MP□464 (Bit F) to MP□449 (Bit 0)
SW03261	MP□480 (Bit F) to MP□465 (Bit 0)
SW03262	MP□496 (Bit F) to MP□481 (Bit 0)
SW03263	MP□512 (Bit F) to MP□497 (Bit 0)

◆ Registers Used for System Work Numbers 1 to 32

The registers that are used for system work numbers 1 to 32 are given in the following table.
Two system registers are given in the register table for the alarm code, but we recommend that
you use system registers SL26□□□. You can use the system registers that are given in paren-
theses to check for alarms in most cases, but they do not report all alarms.
Refer to the following section for details on alarm codes.

☞ 7.2.3 Troubleshooting Motion Program Alarms on page 7-23

• System Work Numbers 1 to 8

System Work Number		Work 1	Work 2	Work 3	Work 4	Work 5	Work 6	Work 7	Work 8
Executing Main Program No.		SW03200	SW03201	SW03202	SW03203	SW03204	SW03205	SW03206	SW03207
Status		SW03264	SW03322	SW03380	SW03438	SW03496	SW03554	SW03612	SW03670
Control Signals		SW03265	SW03323	SW03381	SW03439	SW03497	SW03555	SW03613	SW03671
Fork 0	Program No.	SW03266	SW03324	SW03382	SW03440	SW03498	SW03556	SW03614	SW03672
	Block No.	SW03267	SW03325	SW03383	SW03441	SW03499	SW03557	SW03615	SW03673
	Alarm Code	SL26000 (SW03268)	SL26016 (SW03326)	SL26032 (SW03384)	SL26048 (SW03442)	SL26064 (SW03500)	SL26080 (SW03558)	SL26096 (SW03616)	SL26112 (SW03674)
Fork 1	Program No.	SW03269	SW03327	SW03385	SW03443	SW03501	SW03559	SW03617	SW03675
	Block No.	SW03270	SW03328	SW03386	SW03444	SW03502	SW03560	SW03618	SW03676
	Alarm Code	SL26002 (SW03271)	SL26018 (SW03329)	SL26034 (SW03387)	SL26050 (SW03445)	SL26066 (SW03503)	SL26082 (SW03561)	SL26098 (SW03619)	SL26114 (SW03677)
Fork 2	Program No.	SW03272	SW03330	SW03388	SW03446	SW03504	SW03562	SW03620	SW03678
	Block No.	SW03273	SW03331	SW03389	SW03447	SW03505	SW03563	SW03621	SW03679
	Alarm Code	SL26004 (SW03274)	SL26020 (SW03332)	SL26036 (SW03390)	SL26052 (SW03448)	SL26068 (SW03506)	SL26084 (SW03564)	SL26100 (SW03622)	SL26116 (SW03680)
Fork 3	Program No.	SW03275	SW03333	SW03391	SW03449	SW03507	SW03565	SW03623	SW03681
	Block No.	SW03276	SW03334	SW03392	SW03450	SW03508	SW03566	SW03624	SW03682
	Alarm Code	SL26006 (SW03277)	SL26022 (SW03335)	SL26038 (SW03393)	SL26054 (SW03451)	SL26070 (SW03509)	SL26086 (SW03567)	SL26102 (SW03625)	SL26118 (SW03683)
Fork 4	Program No.	SW03278	SW03336	SW03394	SW03452	SW03510	SW03568	SW03626	SW03684
	Block No.	SW03279	SW03337	SW03395	SW03453	SW03511	SW03569	SW03627	SW03685
	Alarm Code	SL26008 (SW03280)	SL26024 (SW03338)	SL26040 (SW03396)	SL26056 (SW03454)	SL26072 (SW03512)	SL26088 (SW03570)	SL26104 (SW03628)	SL26120 (SW03686)
Fork 5	Program No.	SW03281	SW03339	SW03397	SW03455	SW03513	SW03571	SW03629	SW03687
	Block No.	SW03282	SW03340	SW03398	SW03456	SW03514	SW03572	SW03630	SW03688
	Alarm Code	SL26010 (SW03283)	SL26026 (SW03341)	SL26042 (SW03399)	SL26058 (SW03457)	SL26074 (SW03515)	SL26090 (SW03573)	SL26106 (SW03631)	SL26122 (SW03689)
Fork 6	Program No.	SW03284	SW03342	SW03400	SW03458	SW03516	SW03574	SW03632	SW03690
	Block No.	SW03285	SW03343	SW03401	SW03459	SW03517	SW03575	SW03633	SW03691
	Alarm Code	SL26012 (SW03286)	SL26028 (SW03344)	SL26044 (SW03402)	SL26060 (SW03460)	SL26076 (SW03518)	SL26092 (SW03576)	SL26108 (SW03634)	SL26124 (SW03692)
Fork 7	Program No.	SW03287	SW03345	SW03403	SW03461	SW03519	SW03577	SW03635	SW03693
	Block No.	SW03288	SW03346	SW03404	SW03462	SW03520	SW03578	SW03636	SW03694
	Alarm Code	SL260014 (SW03289)	SL26030 (SW03347)	SL26046 (SW03405)	SL26062 (SW03463)	SL26078 (SW03521)	SL26094 (SW03579)	SL26110 (SW03637)	SL26126 (SW03695)
Logical Axis 1 Program Current Position		SL03290	SL03348	SL03406	SL03464	SL03522	SL03580	SL03638	SL03696
Logical Axis 2 Program Current Position		SL03292	SL03350	SL03408	SL03466	SL03524	SL03582	SL03640	SL03698
Logical Axis 3 Program Current Position		SL03294	SL03352	SL03410	SL03468	SL03526	SL03584	SL03642	SL03700
Logical Axis 4 Program Current Position		SL03296	SL03354	SL03412	SL03470	SL03528	SL03586	SL03644	SL03702
Logical Axis 5 Program Current Position		SL03298	SL03356	SL03414	SL03472	SL03530	SL03588	SL03646	SL03704

8.5.12 Motion Program Execution Information

System Work Number	Work 1	Work 2	Work 3	Work 4	Work 5	Work 6	Work 7	Work 8
Logical Axis 6 Program Current Position	SL03300	SL03358	SL03416	SL03474	SL03532	SL03590	SL03648	SL03706
Logical Axis 7 Program Current Position	SL03302	SL03360	SL03418	SL03476	SL03534	SL03592	SL03650	SL03708
Logical Axis 8 Program Current Position	SL03304	SL03362	SL03420	SL03478	SL03536	SL03594	SL03652	SL03710
Logical Axis 9 Program Current Position	SL03306	SL03364	SL03422	SL03480	SL03538	SL03596	SL03654	SL03712
Logical Axis 10 Program Current Position	SL03308	SL03366	SL03424	SL03482	SL03540	SL03598	SL03656	SL03714
Logical Axis 11 Program Current Position	SL03310	SL03368	SL03426	SL03484	SL03542	SL03600	SL03658	SL03716
Logical Axis 12 Program Current Position	SL03312	SL03370	SL03428	SL03486	SL03544	SL03602	SL03660	SL03718
Logical Axis 13 Program Current Position	SL03314	SL03372	SL03430	SL03488	SL03546	SL03604	SL03662	SL03720
Logical Axis 14 Program Current Position	SL03316	SL03374	SL03432	SL03490	SL03548	SL03606	SL03664	SL03722
Logical Axis 15 Program Current Position	SL03318	SL03376	SL03434	SL03492	SL03550	SL03608	SL03666	SL03724
Logical Axis 16 Program Current Position	SL03320	SL03378	SL03436	SL03494	SL03552	SL03610	SL03668	SL03726
Logical Axis 17 Program Current Position	SL08192	SL08224	SL08256	SL08288	SL08320	SL08352	SL08384	SL08416
Logical Axis 18 Program Current Position	SL08194	SL08226	SL08258	SL08290	SL08322	SL08354	SL08386	SL08418
Logical Axis 19 Program Current Position	SL08196	SL08228	SL08260	SL08292	SL08324	SL08356	SL08388	SL08420
Logical Axis 20 Program Current Position	SL08198	SL08230	SL08262	SL08294	SL08326	SL08358	SL08390	SL08422
Logical Axis 21 Program Current Position	SL08200	SL08232	SL08264	SL08296	SL08328	SL08360	SL08392	SL08424
Logical Axis 22 Program Current Position	SL08202	SL08234	SL08266	SL08298	SL08330	SL08362	SL08394	SL08426
Logical Axis 23 Program Current Position	SL08204	SL08236	SL08268	SL08300	SL08332	SL08364	SL08396	SL08428
Logical Axis 24 Program Current Position	SL08206	SL08238	SL08270	SL08302	SL08334	SL08366	SL08398	SL08430
Logical Axis 25 Program Current Position	SL08208	SL08240	SL08272	SL08304	SL08336	SL08368	SL08400	SL08432
Logical Axis 26 Program Current Position	SL08210	SL08242	SL08274	SL08306	SL08338	SL08370	SL08402	SL08434
Logical Axis 27 Program Current Position	SL08212	SL08244	SL08276	SL08308	SL08340	SL08372	SL08404	SL08436
Logical Axis 28 Program Current Position	SL08214	SL08246	SL08278	SL08310	SL08342	SL08374	SL08406	SL08438
Logical Axis 29 Program Current Position	SL08216	SL08248	SL08280	SL08312	SL08344	SL08376	SL08408	SL08440
Logical Axis 30 Program Current Position	SL08218	SL08250	SL08282	SL08314	SL08346	SL08378	SL08410	SL08442
Logical Axis 31 Program Current Position	SL08220	SL08252	SL08284	SL08316	SL08348	SL08380	SL08412	SL08444
Logical Axis 32 Program Current Position	SL08222	SL08254	SL08286	SL08318	SL08350	SL08382	SL08414	SL08446

• System Work Numbers 9 to 16

System Work Number		Work 9	Work 10	Work 11	Work 12	Work 13	Work 14	Work 15	Work 16
Executing Main Program No.		SW03208	SW03209	SW03210	SW03211	SW03212	SW03213	SW03214	SW03215
Status		SW03728	SW03786	SW03844	SW03902	SW03960	SW04018	SW04076	SW04134
Control Signals		SW03729	SW03787	SW03845	SW03903	SW03961	SW04019	SW04077	SW04135
Fork 0	Program No.	SW03730	SW03788	SW03846	SW03904	SW03962	SW04020	SW04078	SW04136
	Block No.	SW03731	SW03789	SW03847	SW03905	SW03963	SW04021	SW04079	SW04137
	Alarm Code	SL26128 (SW03732)	SL26144 (SW03790)	SL26160 (SW03848)	SL26176 (SW03906)	SL26192 (SW03964)	SL26208 (SW04022)	SL26224 (SW04080)	SL26240 (SW04138)
Fork 1	Program No.	SW03733	SW03791	SW03849	SW03907	SW03965	SW04023	SW04081	SW04139
	Block No.	SW03734	SW03792	SW03850	SW03908	SW03966	SW04024	SW04082	SW04140
	Alarm Code	SL26130 (SW03735)	SL26146 (SW03793)	SL26162 (SW03851)	SL26178 (SW03909)	SL26194 (SW03967)	SL26210 (SW04025)	SL26226 (SW04083)	SL26242 (SW04141)
Fork 2	Program No.	SW03736	SW03794	SW03852	SW03910	SW03968	SW04026	SW04084	SW04142
	Block No.	SW03737	SW03795	SW03853	SW03911	SW03969	SW04027	SW04085	SW04143
	Alarm Code	SL26132 (SW03738)	SL26148 (SW03796)	SL26164 (SW03854)	SL26180 (SW03912)	SL26196 (SW03970)	SL26212 (SW04028)	SL26228 (SW04086)	SL26244 (SW04144)
Fork 3	Program No.	SW03739	SW03797	SW03855	SW03913	SW03971	SW04029	SW04087	SW04145
	Block No.	SW03740	SW03798	SW03856	SW03914	SW03972	SW04030	SW04088	SW04146
	Alarm Code	SL26134 (SW03741)	SL26150 (SW03799)	SL26166 (SW03857)	SL26182 (SW03915)	SL26198 (SW03973)	SL26214 (SW04031)	SL26230 (SW04089)	SL26246 (SW04147)
Fork 4	Program No.	SW03742	SW03800	SW03858	SW03916	SW03974	SW04032	SW04090	SW04148
	Block No.	SW03743	SW03801	SW03859	SW03917	SW03975	SW04033	SW04091	SW04149
	Alarm Code	SL26136 (SW03744)	SL26152 (SW03802)	SL26168 (SW03860)	SL26184 (SW03918)	SL26200 (SW03976)	SL26216 (SW04034)	SL26232 (SW04092)	SL26248 (SW04150)
Fork 5	Program No.	SW03745	SW03803	SW03861	SW03919	SW03977	SW04035	SW04093	SW04151
	Block No.	SW03746	SW03804	SW03862	SW03920	SW03978	SW04036	SW04094	SW04152
	Alarm Code	SL26138 (SW03747)	SL26154 (SW03805)	SL26170 (SW03863)	SL26186 (SW03921)	SL26202 (SW03979)	SL26218 (SW04037)	SL26234 (SW04095)	SL26250 (SW04153)
Fork 6	Program No.	SW03748	SW03806	SW03864	SW03922	SW03980	SW04038	SW04096	SW04154
	Block No.	SW03749	SW03807	SW03865	SW03923	SW03981	SW04039	SW04097	SW04155
	Alarm Code	SL26140 (SW03750)	SL26156 (SW03808)	SL26172 (SW03866)	SL26188 (SW03924)	SL26204 (SW03982)	SL26220 (SW04040)	SL26236 (SW04098)	SL26252 (SW04156)
Fork 7	Program No.	SW03751	SW03809	SW03867	SW03925	SW03983	SW04041	SW04099	SW04157
	Block No.	SW03752	SW03810	SW03868	SW03926	SW03984	SW04042	SW04100	SW04158
	Alarm Code	SL26142 (SW03753)	SL26158 (SW03811)	SL26174 (SW03869)	SL26190 (SW03927)	SL26206 (SW03985)	SL26222 (SW04043)	SL26238 (SW04101)	SL26254 (SW04159)
Logical Axis 1 Program Current Position		SL03754	SL03812	SL03870	SL03928	SL03986	SL04044	SL04102	SL04160
Logical Axis 2 Program Current Position		SL03756	SL03814	SL03872	SL03930	SL03988	SL04046	SL04104	SL04162
Logical Axis 3 Program Current Position		SL03758	SL03816	SL03874	SL03932	SL03990	SL04048	SL04106	SL04164
Logical Axis 4 Program Current Position		SL03760	SL03818	SL03876	SL03934	SL03992	SL04050	SL04108	SL04166
Logical Axis 5 Program Current Position		SL03762	SL03820	SL03878	SL03936	SL03994	SL04052	SL04110	SL04168
Logical Axis 6 Program Current Position		SL03764	SL03822	SL03880	SL03938	SL03996	SL04054	SL04112	SL04170
Logical Axis 7 Program Current Position		SL03766	SL03824	SL03882	SL03940	SL03998	SL04056	SL04114	SL04172
Logical Axis 8 Program Current Position		SL03768	SL03826	SL03884	SL03942	SL04000	SL04058	SL04116	SL04174

System Registers

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8.5.12 Motion Program Execution Information

System Work Number	Work 9	Work 10	Work 11	Work 12	Work 13	Work 14	Work 15	Work 16
Logical Axis 9 Program Current Position	SL03770	SL03828	SL03886	SL03944	SL04002	SL04060	SL04118	SL04176
Logical Axis 10 Program Current Position	SL03772	SL03830	SL03888	SL03946	SL04004	SL04062	SL04120	SL04178
Logical Axis 11 Program Current Position	SL03774	SL03832	SL03890	SL03948	SL04006	SL04064	SL04122	SL04180
Logical Axis 12 Program Current Position	SL03776	SL03834	SL03892	SL03950	SL04008	SL04066	SL04124	SL04182
Logical Axis 13 Program Current Position	SL03778	SL03836	SL03894	SL03952	SL04010	SL04068	SL04126	SL04184
Logical Axis 14 Program Current Position	SL03780	SL03838	SL03896	SL03954	SL04012	SL04070	SL04128	SL04186
Logical Axis 15 Program Current Position	SL03782	SL03840	SL03898	SL03956	SL04014	SL04072	SL04130	SL04188
Logical Axis 16 Program Current Position	SL03784	SL03842	SL03900	SL03958	SL04016	SL04074	SL04132	SL04190
Logical Axis 17 Program Current Position	SL08448	SL08480	SL08512	SL08544	SL08576	SL08608	SL08640	SL08672
Logical Axis 18 Program Current Position	SL08450	SL08482	SL08514	SL08546	SL08578	SL08610	SL08642	SL08674
Logical Axis 19 Program Current Position	SL08452	SL08484	SL08516	SL08548	SL08580	SL08612	SL08644	SL08676
Logical Axis 20 Program Current Position	SL08454	SL08486	SL08518	SL08550	SL08582	SL08614	SL08646	SL08678
Logical Axis 21 Program Current Position	SL08456	SL08488	SL08520	SL08552	SL08584	SL08616	SL08648	SL08680
Logical Axis 22 Program Current Position	SL08458	SL08490	SL08522	SL08554	SL08586	SL08618	SL08650	SL08682
Logical Axis 23 Program Current Position	SL08460	SL08492	SL08524	SL08556	SL08588	SL08620	SL08652	SL08684
Logical Axis 24 Program Current Position	SL08462	SL08494	SL08526	SL08558	SL08590	SL08622	SL08654	SL08686
Logical Axis 25 Program Current Position	SL08464	SL08496	SL08528	SL08560	SL08592	SL08624	SL08656	SL08688
Logical Axis 26 Program Current Position	SL08466	SL08498	SL08530	SL08562	SL08594	SL08626	SL08658	SL08690
Logical Axis 27 Program Current Position	SL08468	SL08500	SL08532	SL08564	SL08596	SL08628	SL08660	SL08692
Logical Axis 28 Program Current Position	SL08470	SL08502	SL08534	SL08566	SL08598	SL08630	SL08662	SL08694
Logical Axis 29 Program Current Position	SL08472	SL08504	SL08536	SL08568	SL08600	SL08632	SL08664	SL08696
Logical Axis 30 Program Current Position	SL08474	SL08506	SL08538	SL08570	SL08602	SL08634	SL08666	SL08698
Logical Axis 31 Program Current Position	SL08476	SL08508	SL08540	SL08572	SL08604	SL08636	SL08668	SL08700
Logical Axis 32 Program Current Position	SL08478	SL08510	SL08542	SL08574	SL08606	SL08638	SL08670	SL08702

• System Work Numbers 17 to 24

System Work Number		Work 17	Work 18	Work 19	Work 20	Work 21	Work 22	Work 23	Work 24
Executing Main Program No.		SW03216	SW03217	SW03218	SW03219	SW03220	SW03221	SW03222	SW03223
Status		SW04192	SW04250	SW04308	SW04366	SW04424	SW04482	SW04540	SW04598
Control Signals		SW04193	SW04251	SW04309	SW04367	SW04425	SW04483	SW04541	SW04599
Fork 0	Program No.	SW04194	SW04252	SW04310	SW04368	SW04426	SW04484	SW04542	SW04600
	Block No.	SW04195	SW04253	SW04311	SW04369	SW04427	SW04485	SW04543	SW04601
	Alarm Code	SL26256 (SW04196)	SL26272 (SW04254)	SL26288 (SW04312)	SL26304 (SW04370)	SL26320 (SW04428)	SL26336 (SW04486)	SL26352 (SW04544)	SL26368 (SW04602)
Fork 1	Program No.	SW04197	SW04255	SW04313	SW04371	SW04429	SW04487	SW04545	SW04603
	Block No.	SW04198	SW04256	SW04314	SW04372	SW04430	SW04488	SW04546	SW04604
	Alarm Code	SL26258 (SW04199)	SL26274 (SW04257)	SL26290 (SW04315)	SL26306 (SW04373)	SL26322 (SW04431)	SL26338 (SW04489)	SL26354 (SW04547)	SL26370 (SW04605)
Fork 2	Program No.	SW04200	SW04258	SW04316	SW04374	SW04432	SW04490	SW04548	SW04606
	Block No.	SW04201	SW04259	SW04317	SW04375	SW04433	SW04491	SW04549	SW04607
	Alarm Code	SL26260 (SW04202)	SL26276 (SW04260)	SL26292 (SW04318)	SL26308 (SW04376)	SL26324 (SW04434)	SL26340 (SW04492)	SL26356 (SW04550)	SL26372 (SW04608)
Fork 3	Program No.	SW04203	SW04261	SW04319	SW04377	SW04435	SW04493	SW04551	SW04609
	Block No.	SW04204	SW04262	SW04320	SW04378	SW04436	SW04494	SW04552	SW04610
	Alarm Code	SL26262 (SW04205)	SL26278 (SW04263)	SL26294 (SW04321)	SL26310 (SW04379)	SL26326 (SW04437)	SL26342 (SW04495)	SL26358 (SW04553)	SL26374 (SW04611)
Fork 4	Program No.	SW04206	SW04264	SW04322	SW04380	SW04438	SW04496	SW04554	SW04612
	Block No.	SW04207	SW04265	SW04323	SW04381	SW04439	SW04497	SW04555	SW04613
	Alarm Code	SL26264 (SW04208)	SL26280 (SW04266)	SL26296 (SW04324)	SL26312 (SW04382)	SL26328 (SW04440)	SL26344 (SW04498)	SL26360 (SW04556)	SL26376 (SW04614)
Fork 5	Program No.	SW04209	SW04267	SW04325	SW04383	SW04441	SW04499	SW04557	SW04615
	Block No.	SW04210	SW04268	SW04326	SW04384	SW04442	SW04500	SW04558	SW04616
	Alarm Code	SL26266 (SW04211)	SL26282 (SW04269)	SL26298 (SW04327)	SL26314 (SW04385)	SL26330 (SW04443)	SL26346 (SW04501)	SL26362 (SW04559)	SL26378 (SW04617)
Fork 6	Program No.	SW04212	SW04270	SW04328	SW04386	SW04444	SW04502	SW04560	SW04618
	Block No.	SW04213	SW04271	SW04329	SW04387	SW04445	SW04503	SW04561	SW04619
	Alarm Code	SL26268 (SW04214)	SL26284 (SW04272)	SL26300 (SW04330)	SL26316 (SW04388)	SL26332 (SW04446)	SL26348 (SW04504)	SL26364 (SW04562)	SL26380 (SW04620)
Fork 7	Program No.	SW04215	SW04273	SW04331	SW04389	SW04447	SW04505	SW04563	SW04621
	Block No.	SW04216	SW04274	SW04332	SW04390	SW04448	SW04506	SW04564	SW04622
	Alarm Code	SL26270 (SW04217)	SL26286 (SW04275)	SL26302 (SW04333)	SL26318 (SW04391)	SL26334 (SW04449)	SL26350 (SW04507)	SL26366 (SW04565)	SL26382 (SW04623)
Logical Axis 1 Program Current Position		SL04218	SL04276	SL04334	SL04392	SL04450	SL04508	SL04566	SL04624
Logical Axis 2 Program Current Position		SL04220	SL04278	SL04336	SL04394	SL04452	SL04510	SL04568	SL04626
Logical Axis 3 Program Current Position		SL04222	SL04280	SL04338	SL04396	SL04454	SL04512	SL04570	SL04628
Logical Axis 4 Program Current Position		SL04224	SL04282	SL04340	SL04398	SL04456	SL04514	SL04572	SL04630
Logical Axis 5 Program Current Position		SL04226	SL04284	SL04342	SL04400	SL04458	SL04516	SL04574	SL04632
Logical Axis 6 Program Current Position		SL04228	SL04286	SL04344	SL04402	SL04460	SL04518	SL04576	SL04634
Logical Axis 7 Program Current Position		SL04230	SL04288	SL04346	SL04404	SL04462	SL04520	SL04578	SL04636
Logical Axis 8 Program Current Position		SL04232	SL04290	SL04348	SL04406	SL04464	SL04522	SL04580	SL04638

System Work Number	Work 17	Work 18	Work 19	Work 20	Work 21	Work 22	Work 23	Work 24
Logical Axis 9 Program Current Position	SL04234	SL04292	SL04350	SL04408	SL04466	SL04524	SL04582	SL04640
Logical Axis 10 Program Current Position	SL04236	SL04294	SL04352	SL04410	SL04468	SL04526	SL04584	SL04642
Logical Axis 11 Program Current Position	SL04238	SL04296	SL04354	SL04412	SL04470	SL04528	SL04586	SL04644
Logical Axis 12 Program Current Position	SL04240	SL04298	SL04356	SL04414	SL04472	SL04530	SL04588	SL04646
Logical Axis 13 Program Current Position	SL04242	SL04300	SL04358	SL04416	SL04474	SL04532	SL04590	SL04648
Logical Axis 14 Program Current Position	SL04244	SL04302	SL04360	SL04418	SL04476	SL04534	SL04592	SL04650
Logical Axis 15 Program Current Position	SL04246	SL04304	SL04362	SL04420	SL04478	SL04536	SL04594	SL04652
Logical Axis 16 Program Current Position	SL04248	SL04306	SL04364	SL04422	SL04480	SL04538	SL04596	SL04654
Logical Axis 17 Program Current Position	SL08704	SL08736	SL08768	SL08800	SL08832	SL08864	SL08896	SL08928
Logical Axis 18 Program Current Position	SL08706	SL08738	SL08770	SL08802	SL08834	SL08866	SL08898	SL08930
Logical Axis 19 Program Current Position	SL08708	SL08740	SL08772	SL08804	SL08836	SL08868	SL08900	SL08932
Logical Axis 20 Program Current Position	SL08710	SL08742	SL08774	SL08806	SL08838	SL08870	SL08902	SL08934
Logical Axis 21 Program Current Position	SL08712	SL08744	SL08776	SL08808	SL08840	SL08872	SL08904	SL08936
Logical Axis 22 Program Current Position	SL08714	SL08746	SL08778	SL08810	SL08842	SL08874	SL08906	SL08938
Logical Axis 23 Program Current Position	SL08716	SL08748	SL08780	SL08812	SL08844	SL08876	SL08908	SL08940
Logical Axis 24 Program Current Position	SL08718	SL08750	SL08782	SL08814	SL08846	SL08878	SL08910	SL08942
Logical Axis 25 Program Current Position	SL08720	SL08752	SL08784	SL08816	SL08848	SL08880	SL08912	SL08944
Logical Axis 26 Program Current Position	SL08722	SL08754	SL08786	SL08818	SL08850	SL08882	SL08914	SL08946
Logical Axis 27 Program Current Position	SL08724	SL08756	SL08788	SL08820	SL08852	SL08884	SL08916	SL08948
Logical Axis 28 Program Current Position	SL08726	SL08758	SL08790	SL08822	SL08854	SL08886	SL08918	SL08950
Logical Axis 29 Program Current Position	SL08728	SL08760	SL08792	SL08824	SL08856	SL08888	SL08920	SL08952
Logical Axis 30 Program Current Position	SL08730	SL08762	SL08794	SL08826	SL08858	SL08890	SL08922	SL08954
Logical Axis 31 Program Current Position	SL08732	SL08764	SL08796	SL08828	SL08860	SL08892	SL08924	SL08956
Logical Axis 32 Program Current Position	SL08734	SL08766	SL08798	SL08830	SL08862	SL08894	SL08926	SL08958

• System Work Numbers 25 to 32

System Work Number		Work 25	Work 26	Work 27	Work 28	Work 29	Work 30	Work 31	Work 32
Executing Main Program No.		SW03224	SW03225	SW03226	SW03227	SW03228	SW03229	SW03230	SW03231
Status		SW04656	SW04714	SW04772	SW04830	SW04888	SW04946	SW05004	SW05062
Control Signals		SW04657	SW04715	SW04773	SW04831	SW04889	SW04947	SW05005	SW05063
Fork 0	Program No.	SW04658	SW04716	SW04774	SW04832	SW04890	SW04948	SW05006	SW05064
	Block No.	SW04659	SW04717	SW04775	SW04833	SW04891	SW04949	SW05007	SW05065
	Alarm Code	SL26384 (SW04660)	SL26400 (SW04718)	SL26416 (SW04776)	SL26432 (SW04834)	SL26448 (SW04892)	SL26464 (SW04950)	SL26480 (SW05008)	SL26496 (SW05066)
Fork 1	Program No.	SW04661	SW04719	SW04777	SW04835	SW04893	SW04951	SW05009	SW05067
	Block No.	SW04662	SW04720	SW04778	SW04836	SW04894	SW04952	SW05010	SW05068
	Alarm Code	SL26386 (SW04663)	SL26402 (SW04721)	SL26418 (SW04779)	SL26434 (SW04837)	SL26450 (SW04895)	SL26466 (SW04953)	SL26482 (SW05011)	SL26498 (SW05069)
Fork 2	Program No.	SW04664	SW04722	SW04780	SW04838	SW04896	SW04954	SW05012	SW05070
	Block No.	SW04665	SW04723	SW04781	SW04839	SW04897	SW04955	SW05013	SW05071
	Alarm Code	SL26388 (SW04666)	SL26404 (SW04724)	SL26420 (SW04782)	SL26436 (SW04840)	SL26452 (SW04898)	SL26468 (SW04956)	SL26484 (SW05014)	SL26500 (SW05072)
Fork 3	Program No.	SW04667	SW04725	SW04783	SW04841	SW04899	SW04957	SW05015	SW05073
	Block No.	SW04668	SW04726	SW04784	SW04842	SW04900	SW04958	SW05016	SW05074
	Alarm Code	SL26390 (SW04669)	SL26406 (SW04727)	SL26422 (SW04785)	SL26438 (SW04843)	SL26454 (SW04901)	SL26470 (SW04959)	SL26486 (SW05017)	SL26502 (SW05075)
Fork 4	Program No.	SW04670	SW04728	SW04786	SW04844	SW04902	SW04960	SW05018	SW05076
	Block No.	SW04671	SW04729	SW04787	SW04845	SW04903	SW04961	SW05019	SW05077
	Alarm Code	SL26392 (SW04672)	SL26408 (SW04730)	SL26424 (SW04788)	SL26440 (SW04846)	SL26456 (SW04904)	SL26472 (SW04962)	SL26488 (SW05020)	SL26504 (SW05078)
Fork 5	Program No.	SW04673	SW04731	SW04789	SW04847	SW04905	SW04963	SW05021	SW05079
	Block No.	SW04674	SW04732	SW04790	SW04848	SW04906	SW04964	SW05022	SW05080
	Alarm Code	SL26394 (SW04675)	SL26410 (SW04733)	SL26426 (SW04791)	SL26442 (SW04849)	SL26458 (SW04907)	SL26474 (SW04965)	SL26490 (SW05023)	SL26506 (SW05081)
Fork 6	Program No.	SW04676	SW04734	SW04792	SW04850	SW04908	SW04966	SW05024	SW05082
	Block No.	SW04677	SW04735	SW04793	SW04851	SW04909	SW04967	SW05025	SW05083
	Alarm Code	SL26396 (SW04678)	SL26412 (SW04736)	SL26428 (SW04794)	SL26444 (SW04852)	SL26460 (SW04910)	SL26476 (SW04968)	SL26492 (SW05026)	SL26508 (SW05084)
Fork 7	Program No.	SW04679	SW04737	SW04795	SW04853	SW04911	SW04969	SW05027	SW05085
	Block No.	SW04680	SW04738	SW04796	SW04854	SW04912	SW04970	SW05028	SW05086
	Alarm Code	SL26398 (SW04681)	SL26414 (SW04739)	SL26430 (SW04797)	SL26446 (SW04855)	SL26462 (SW04913)	SL26478 (SW04971)	SL26494 (SW05029)	SL26510 (SW05087)
Logical Axis 1 Program Current Position		SL04682	SL04740	SL04798	SL04856	SL04914	SL04972	SL05030	SL05088
Logical Axis 2 Program Current Position		SL04684	SL04742	SL04800	SL04858	SL04916	SL04974	SL05032	SL05090
Logical Axis 3 Program Current Position		SL04686	SL04744	SL04802	SL04860	SL04918	SL04976	SL05034	SL05092
Logical Axis 4 Program Current Position		SL04688	SL04746	SL04804	SL04862	SL04920	SL04978	SL05036	SL05094
Logical Axis 5 Program Current Position		SL04690	SL04748	SL04806	SL04864	SL04922	SL04980	SL05038	SL05096
Logical Axis 6 Program Current Position		SL04692	SL04750	SL04808	SL04866	SL04924	SL04982	SL05040	SL05098
Logical Axis 7 Program Current Position		SL04694	SL04752	SL04810	SL04868	SL04926	SL04984	SL05042	SL05100
Logical Axis 8 Program Current Position		SL04696	SL04754	SL04812	SL04870	SL04928	SL04986	SL05044	SL05102

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System Work Number	Work 25	Work 26	Work 27	Work 28	Work 29	Work 30	Work 31	Work 32
Logical Axis 9 Program Current Position	SL04698	SL04756	SL04814	SL04872	SL04930	SL04988	SL05046	SL05104
Logical Axis 10 Program Current Position	SL04700	SL04758	SL04816	SL04874	SL04932	SL04990	SL05048	SL05106
Logical Axis 11 Program Current Position	SL04702	SL04760	SL04818	SL04876	SL04934	SL04992	SL05050	SL05108
Logical Axis 12 Program Current Position	SL04704	SL04762	SL04820	SL04878	SL04936	SL04994	SL05052	SL05110
Logical Axis 13 Program Current Position	SL04706	SL04764	SL04822	SL04880	SL04938	SL04996	SL05054	SL05112
Logical Axis 14 Program Current Position	SL04708	SL04766	SL04824	SL04882	SL04940	SL04998	SL05056	SL05114
Logical Axis 15 Program Current Position	SL04710	SL04768	SL04826	SL04884	SL04942	SL05000	SL05058	SL05116
Logical Axis 16 Program Current Position	SL04712	SL04770	SL04828	SL04886	SL04944	SL05002	SL05060	SL05118
Logical Axis 17 Program Current Position	SL08960	SL08992	SL09024	SL09056	SL09088	SL09120	SL09152	SL09184
Logical Axis 18 Program Current Position	SL08962	SL08994	SL09026	SL09058	SL09090	SL09122	SL09154	SL09186
Logical Axis 19 Program Current Position	SL08964	SL08996	SL09028	SL09060	SL09092	SL09124	SL09156	SL09188
Logical Axis 20 Program Current Position	SL08966	SL08998	SL09030	SL09062	SL09094	SL09126	SL09158	SL09190
Logical Axis 21 Program Current Position	SL08968	SL09000	SL09032	SL09064	SL09096	SL09128	SL09160	SL09192
Logical Axis 22 Program Current Position	SL08970	SL09002	SL09034	SL09066	SL09098	SL09130	SL09162	SL09194
Logical Axis 23 Program Current Position	SL08972	SL09004	SL09036	SL09068	SL09100	SL09132	SL09164	SL09196
Logical Axis 24 Program Current Position	SL08974	SL09006	SL09038	SL09070	SL09102	SL09134	SL09166	SL09198
Logical Axis 25 Program Current Position	SL08976	SL09008	SL09040	SL09072	SL09104	SL09136	SL09168	SL09200
Logical Axis 26 Program Current Position	SL08978	SL09010	SL09042	SL09074	SL09106	SL09138	SL09170	SL09202
Logical Axis 27 Program Current Position	SL08980	SL09012	SL09044	SL09076	SL09108	SL09140	SL09172	SL09204
Logical Axis 28 Program Current Position	SL08982	SL09014	SL09046	SL09078	SL09110	SL09142	SL09174	SL09206
Logical Axis 29 Program Current Position	SL08984	SL09016	SL09048	SL09080	SL09112	SL09144	SL09176	SL09208
Logical Axis 30 Program Current Position	SL08986	SL09018	SL09050	SL09082	SL09114	SL09146	SL09178	SL09210
Logical Axis 31 Program Current Position	SL08988	SL09020	SL09052	SL09084	SL09116	SL09148	SL09180	SL09212
Logical Axis 32 Program Current Position	SL08990	SL09022	SL09054	SL09086	SL09118	SL09150	SL09182	SL09214

8.5.13 Peripheral Function Status

Name	Register Address	Remarks
CPU Temperature	SW15801	Decimal 1 = 1°C
Reserved.	SW15802 to SW15807	–
Capacity of Electric Double-Layer Capacitor	SW15808	The remaining capacity of capacitor. Decimal 1 = 1 mV
Calendar Low Voltage Detection Status When Power Is ON	SW15809	0: No low voltage detection, 1: Low voltage detection enabled*
Voltage Status	SW15810	SB158100: 0 = Normal, 1 = Error (EDLC exceeded 3.0 V.)
Reserved.	SW15811 to SW15997	–

* The calendar will reset to the default values when the low voltage is detected.

8.5.14 Alarm History Information

This section gives the register configuration of and details on the alarm history information in the system registers.
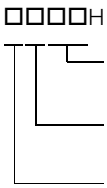
Register Configuration

Name	Register Address	Remarks	
Current Alarm	SW16200	Cleared when the power is turned ON.	
Alarm History Entries	SW16201	Number of alarm history entries	
Clear Alarm	SW16202	1: Alarm cleared 2: Current alarm and history cleared	
Alarm History	SW16203 to SW16218	Alarm History Entry 1	Refer to the following section for details. ☞ *Details* on page 8-51
	SW16219 to SW16231	Alarm History Entry 2	
	⋮	⋮	
	SW17787 to SW17802	Alarm History Entry 100	
Reserved.	SW17803 to SW17999	–	

Details

The registers for the alarm history entries are structured as shown below. This example shows the system register addresses for alarm history entry 1.

Register Address	Remarks	Register Address Example
SW□□□□□ + 0	□□□□H 01 to 09: Gives the slot number where the Module in which the alarm occurred is mounted. 1 to 4: Gives the unit number of the Module in which the alarm occurred. 1 to 7: Gives the Rack number where the Module in which the alarm occurred is mounted.	SW16203
SW□□□□□ + 1	Alarm Code	SW16204

Continued on next page.

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Register Address	Remarks	Register Address Example
SW□□□□□ + 2	Alarm Details Format Type 1: Operation error 2: I/O error 3: Other error	SW16205
SW□□□□□ + 3	Year when alarm occurred	SW16206
SW□□□□□ + 4	Month when alarm occurred	SW16207
SW□□□□□ + 5	Day when alarm occurred	SW16208
SW□□□□□ + 6	Hour when alarm occurred	SW16209
SW□□□□□ + 7	Minutes when alarm occurred	SW16210
SW□□□□□ + 8	Seconds when alarm occurred	SW16211
SW□□□□□ + 9	Alarm details The displayed information depends on the alarm details format type. ☞ Alarm Details on page 8-52	SW16212
SW□□□□□ + 10		SW16213
SW□□□□□ + 11		SW16214
SW□□□□□ + 12		SW16215
SW□□□□□ + 13		SW16216
SW□□□□□ + 14	Reserved.	SW16217
SW□□□□□ + 15	Reserved.	SW16218

Alarm Details

Alarm details are given based on the alarm details format type.

• When the Alarm Details Format Type Is 1 (Operation Error)

Register Address	Remarks	Register Address Example
SW□□□□□ + 9	Error Drawing No.	SW16212
SW□□□□□ + 10	Calling Drawing No.	SW16213
SW□□□□□ + 11	Calling Drawing Step No.	SW16214
SW□□□□□ + 12	Reserved.	SW16215
SW□□□□□ + 13	Reserved.	SW16216

• When the Alarm Details Format Type Is 2 (I/O Error)

Register Address	Remarks	Register Address Example
SW□□□□□ + 9	Depends on the specifications of the Option Module.	SW16212
SW□□□□□ + 10	Depends on the specifications of the Option Module.	SW16213
SW□□□□□ + 11	Depends on the specifications of the Option Module.	SW16214
SW□□□□□ + 12	Depends on the specifications of the Option Module.	SW16215
SW□□□□□ + 13	Depends on the specifications of the Option Module.	SW16216

• When the Alarm Details Format Type Is 3 (Other Errors)

Register Address	Remarks	Register Address Example
SW□□□□□ + 9	Reserved.	SW16212
SW□□□□□ + 10	Reserved.	SW16213
SW□□□□□ + 11	Reserved.	SW16214
SW□□□□□ + 12	Reserved.	SW16215
SW□□□□□ + 13	Reserved.	SW16216

8.5.15 Product Information

The data in these registers give information on the SERVOPACK.

Name	Register Address	Remarks
Serial ID Information	SW20000	CPU serial ID (15 ASCII characters + NULL character)
	SW20001	
	SW20002	
	SW20003	
	SW20004	
	SW20005	
	SW20006	
	SW20007	
	SW20008 to SW20015	Reserved.
Reserved.	SW20016 to SW22063	–

8.5.16 Unit and Rack Information

The data in these registers give hardware information on the Racks and Units for Racks 1 and 5 to 7.

Register Configuration

Name	Register Address	Remarks	
Rack Information	SW23000	Rack 1	0: Rack not mounted, 1: Rack mounted
	SW23001		Rack Status Refer to the following section for details. ☞ *Rack Status Details* on page 8-53
	SW23002 to SW23039		Reserved.

Rack Status Details

The possible Rack status values are listed in the following table.

Value	Status
0	No Rack has been set up.
1	A Rack has been set up, but has not been mounted.
2	A Rack has been set up, and a Rack that matches the settings has been mounted.
3 and higher	Reserved.

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Rack Status Details

The possible Unit status values are listed in the following table.

Value	Status
0	No Unit has been set up.
1	A Unit has been set up, but it has not been mounted.
2	A Unit has been set up, and a Unit that matches the settings has been mounted.
3 and 4	Reserved.
5	A Unit has been set up, but the Unit mounted does not match the settings.
6 and higher	Reserved.

Information Refer to the Module Configuration Definitions Tab Page for details on Unit settings.

8.5.17 Data Logging Execution Status

The data in these registers give the execution status of data logging.

Name		Register Address		Remarks
Data Logging Definition Existence	SW24000		SB240000	0: Logging 1 definition does not exist, 1: Logging 1 definition exists
			SB240001	0: Logging 2 definition does not exist, 1: Logging 2 definition exists
Data Logging Execution Status	SW24001		SB240010	0: Logging 1 is in progress, 1: Logging 1 is stopped
			SB240011	0: Logging 2 is in progress, 1: Logging 2 is stopped
			SB240012	0: Logging 3 is in progress, 1: Logging 3 is stopped
			SB240013	0: Logging 4 is in progress, 1: Logging 4 is stopped
			SB240014 to SB240017	Reserved.
			SB240018	0: Logging 1 is not waiting for trigger condition, 1: Logging 1 is waiting for trigger condition
			SB240019	0: Logging 2 is not waiting for trigger condition, 1: Logging 2 is waiting for trigger condition
			SB24001A	0: Logging 3 is not waiting for trigger condition, 1: Logging 3 is waiting for trigger condition
			SB24001B	0: Logging 4 is not waiting for trigger condition, 1: Logging 4 is waiting for trigger condition
			SB24001C to SB24001F	Reserved.
Data Logging Execution Status Details	Logging 1	SL24002		File update counter
		SQ24004		Latest record number
		SW24008		Overrun counter
		SW24009		Error Code 0000 hex: No error, 0001 hex: No USB memory device (at start of logging), 0002 hex: No USB memory device (while logging is in progress), 0003 hex: Directory creation error, 0004 hex: File creation error, 0005 hex: File write error
		SW24010 to SW24011		Reserved.
		SW24012 to SW24043		Latest folder name
		SW24044 to SW24065		Latest file name (includes extension such as □□□.csv)
	Logging 2	SW24066 to SW24129		Same as Logging 1.
	Logging 3	SW24130 to SW24193		Same as Logging 1.
	Logging 4	SW24194 to SW24257		Same as Logging 1.
Reserved.		SW24258 to SW24321		–

8.5.18 Automatic Reception Status (Ethernet Communications)

The data in these registers give the execution status of automatic reception (message functions).

Circuit Number	Name	Register Address	Name
Circuit 1	Common Status	SW25000	Rack No.
		SW25001	Unit No.
		SW25002	Slot No.
		SW25003	Subslot No.
	CH1 Status	SW25004	Transmission Status Refer to the following section for details. ☞ *Transmission Status* on page 8-61
		SW25005	Latest Error Status Refer to the following section for details. ☞ *Error Status* on page 8-62
		SW25006	Send Count
		SW25007	Receive Count
		SW25008	Error Counter
		SW25009	Reserved.
		SW25010	Reserved.
		SW25011	Reserved.
	CH2 Status	SW25012 to SW25019	Same as CH1 Status.
	CH3 Status	SW25020 to SW25027	Same as CH1 Status.
	CH4 Status	SW25028 to SW25035	Same as CH1 Status.
	CH5 Status	SW25036 to SW25043	Same as CH1 Status.
	CH6 Status	SW25044 to SW25051	Same as CH1 Status.
	CH7 Status	SW25052 to SW25059	Same as CH1 Status.
	CH8 Status	SW25060 to SW25067	Same as CH1 Status.
	CH9 Status	SW25068 to SW25075	Same as CH1 Status.
	CH10 Status	SW25076 to SW25083	Same as CH1 Status.
Circuit 2	Common Status	SW25084	Rack No.
		SW25085	Unit No.
		SW25086	Slot No.
		SW25087	Subslot No.

Circuit Number	Name	Register Address	Name
Circuit 2	CH1 Status	SW25088	Transmission Status Refer to the following section for details. ☞ *Transmission Status* on page 8-61
		SW25089	Latest Error Status Refer to the following section for details. ☞ *Error Status* on page 8-62
		SW25090	Send Count
		SW25091	Receive Count
		SW25092	Error Counter
		SW25093	Reserved.
		SW25094	Reserved.
		SW25095	Reserved.
	CH2 Status	SW25096 to SW25103	Same as CH1 Status.
	CH3 Status	SW25104 to SW25111	Same as CH1 Status.
	CH4 Status	SW25112 to SW25119	Same as CH1 Status.
	CH5 Status	SW25120 to SW25127	Same as CH1 Status.
	CH6 Status	SW25128 to SW25135	Same as CH1 Status.
	CH7 Status	SW25136 to SW25143	Same as CH1 Status.
	CH8 Status	SW25144 to SW25151	Same as CH1 Status.
	CH9 Status	SW25152 to SW25159	Same as CH1 Status.
	CH10 Status	SW25160 to SW25167	Same as CH1 Status.
Circuit 3	Common Status	SW25168	Rack No.
		SW25169	Unit No.
		SW25170	Slot No.
		SW25171	Subslot No.
	CH1 Status	SW25172	Transmission Status Refer to the following section for details. ☞ *Transmission Status* on page 8-61
		SW25173	Latest Error Status Refer to the following section for details. ☞ *Error Status* on page 8-62
		SW25174	Send Count
		SW25175	Receive Count
		SW25176	Error Counter
		SW25177	Reserved.
		SW25178	Reserved.
		SW25179	Reserved.
	CH2 Status	SW25180 to SW25187	Same as CH1 Status.
	CH3 Status	SW25188 to SW25195	Same as CH1 Status.
	CH4 Status	SW25196 to SW25203	Same as CH1 Status.

System Registers

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Circuit Number	Name	Register Address	Name
Circuit 3	CH5 Status	SW25204 to SW25211	Same as CH1 Status.
	CH6 Status	SW25212 to SW25219	Same as CH1 Status.
	CH7 Status	SW25220 to SW25227	Same as CH1 Status.
	CH8 Status	SW25228 to SW25235	Same as CH1 Status.
	CH9 Status	SW25236 to SW25243	Same as CH1 Status.
	CH10 Status	SW25244 to SW25251	Same as CH1 Status.
Circuit 4	Common Status	SW25252	Rack No.
		SW25253	Unit No.
		SW25254	Slot No.
		SW25255	Subslot No.
	CH1 Status	SW25256	Transmission Status Refer to the following section for details. ☞ Transmission Status on page 8-61
		SW25257	Latest Error Status Refer to the following section for details. ☞ Error Status on page 8-62
		SW25258	Send Count
		SW25259	Receive Count
		SW25260	Error Counter
		SW25261	Reserved.
		SW25262	Reserved.
		SW25263	Reserved.
	CH2 Status	SW25264 to SW25271	Same as CH1 Status.
	CH3 Status	SW25272 to SW25279	Same as CH1 Status.
	CH4 Status	SW25280 to SW25287	Same as CH1 Status.
	CH5 Status	SW25288 to SW25295	Same as CH1 Status.
	CH6 Status	SW25296 to SW25303	Same as CH1 Status.
	CH7 Status	SW25304 to SW25311	Same as CH1 Status.
	CH8 Status	SW25312 to SW25319	Same as CH1 Status.
	CH9 Status	SW25320 to SW25327	Same as CH1 Status.
	CH10 Status	SW25328 to SW25335	Same as CH1 Status.
Circuit 5	Common Status	SW25336	Rack No.
		SW25337	Unit No.
		SW25338	Slot No.
		SW25339	Subslot No.

Circuit Number	Name	Register Address	Name
Circuit 5	CH1 Status	SW25340	Transmission Status Refer to the following section for details. ☞ *Transmission Status* on page 8-61
		SW25341	Latest Error Status Refer to the following section for details. ☞ *Error Status* on page 8-62
		SW25342	Send Count
		SW25343	Receive Count
		SW25344	Error Counter
		SW25345	Reserved.
		SW25346	Reserved.
		SW25347	Reserved.
	CH2 Status	SW25348 to SW25355	Same as CH1 Status.
	CH3 Status	SW25356 to SW25363	Same as CH1 Status.
	CH4 Status	SW25364 to SW25371	Same as CH1 Status.
	CH5 Status	SW25372 to SW25379	Same as CH1 Status.
	CH6 Status	SW25380 to SW25387	Same as CH1 Status.
	CH7 Status	SW25388 to SW25395	Same as CH1 Status.
	CH8 Status	SW25396 to SW25403	Same as CH1 Status.
	CH9 Status	SW25404 to SW25411	Same as CH1 Status.
	CH10 Status	SW25412 to SW25419	Same as CH1 Status.
Circuit 6	Common Status	SW25420	Rack No.
		SW25421	Unit No.
		SW25422	Slot No.
		SW25423	Subslot No.
	CH1 Status	SW25424	Transmission Status Refer to the following section for details. ☞ *Transmission Status* on page 8-61
		SW25425	Latest Error Status Refer to the following section for details. ☞ *Error Status* on page 8-62
		SW25426	Send Count
		SW25427	Receive Count
		SW25428	Error Counter
		SW25429	Reserved.
		SW25430	Reserved.
		SW25431	Reserved.
	CH2 Status	SW25432 to SW25439	Same as CH1 Status.
	CH3 Status	SW25440 to SW25447	Same as CH1 Status.
	CH4 Status	SW25448 to SW25455	Same as CH1 Status.

Circuit Number	Name	Register Address	Name
Circuit 6	CH5 Status	SW25456 to SW25463	Same as CH1 Status.
	CH6 Status	SW25464 to SW25471	Same as CH1 Status.
	CH7 Status	SW25472 to SW25479	Same as CH1 Status.
	CH8 Status	SW25480 to SW25487	Same as CH1 Status.
	CH9 Status	SW25488 to SW25495	Same as CH1 Status.
	CH10 Status	SW25496 to SW25503	Same as CH1 Status.
Circuit 7	Common Status	SW25504	Rack No.
		SW25505	Unit No.
		SW25506	Slot No.
		SW25507	Subslot No.
	CH1 Status	SW25508	Transmission Status Refer to the following section for details. ☞ Transmission Status on page 8-61
		SW25509	Latest Error Status Refer to the following section for details. ☞ Error Status on page 8-62
		SW25510	Send Count
		SW25511	Receive Count
		SW25512	Error Counter
		SW25513	Reserved.
		SW25514	Reserved.
		SW25515	Reserved.
	CH2 Status	SW25516 to SW25523	Same as CH1 Status.
	CH3 Status	SW25524 to SW25531	Same as CH1 Status.
	CH4 Status	SW25532 to SW25539	Same as CH1 Status.
	CH5 Status	SW25540 to SW25547	Same as CH1 Status.
	CH6 Status	SW25548 to SW25555	Same as CH1 Status.
	CH7 Status	SW25556 to SW25563	Same as CH1 Status.
	CH8 Status	SW25564 to SW25571	Same as CH1 Status.
	CH9 Status	SW25572 to SW25579	Same as CH1 Status.
	CH10 Status	SW25580 to SW25587	Same as CH1 Status.
Circuit 8	Common Status	SW25588	Rack No.
		SW25589	Unit No.
		SW25590	Slot No.
		SW25591	Subslot No.

Circuit Number	Name	Register Address	Name
Circuit 8	CH1 Status	SW25592	Transmission Status Refer to the following section for details. ☞ *Transmission Status* on page 8-61
		SW25593	Latest Error Status Refer to the following section for details. ☞ *Error Status* on page 8-62
		SW25594	Send Count
		SW25595	Receive Count
		SW25596	Error Counter
		SW25597 to SW25599	Reserved.
	CH2 Status	SW25600 to SW25607	Same as CH1 Status.
	CH3 Status	SW25608 to SW25615	Same as CH1 Status.
	CH4 Status	SW25616 to SW25623	Same as CH1 Status.
	CH5 Status	SW25624 to SW25631	Same as CH1 Status.
	CH6 Status	SW25632 to SW25639	Same as CH1 Status.
	CH7 Status	SW25640 to SW25647	Same as CH1 Status.
	CH8 Status	SW25648 to SW25655	Same as CH1 Status.
	CH9 Status	SW25656 to SW25663	Same as CH1 Status.
	CH10 Status	SW25664 to SW25671	Same as CH1 Status.

Transmission Status

Register Value	Status	Description
0	–	Unused connection
1	IDLE	Standby mode for executing message functions
2	WAIT	Waiting to establish a connection
3	CONNECT	Ready to send and receive data

Error Status

Register Value	Status	Description
0	No error	Normal
1	Socket creation error	System error
2	Local port number error	Local port number setting error (The same address is bound during disconnection of the TCP connection.)
3	Changing socket attribute error	System error (for TCP)
4	Connection error (M-SND)	Connection error (The connection was rejected by the remote station when establishing a connection with an unpassive open for TCP.)
5	Connection error (M-RCV)	Connection error (with a passive open for TCP)
6	System error	System error
7	TCP data send error	Data sending error (The remote station does not exist or has not started when using TCP.)
8	UDP data send error	Data sending error (for UDP)
9	TCP data receive error	Data reception error (The SERVOPACK received a request to disconnect from the remote station for TCP.)
10	UDP data receive error	Data reception error (for UDP)
11	Changing socket option error	System error
12	Data conversion error	Data conversion error

Convenient Functions

9

This chapter provides information on monitoring SERVOPACK product information and SERVOPACK status.

9.1	Resetting Alarms

If an alarm occurs in the Servo Section, remove the cause of the alarm and then turn ON bit F (Clear Alarm) of OW□□□00 in the Controller Section to clear the alarm.

Refer to the following manual for details.

📖 Σ-7-Series Σ-7C SERVOPACK Motion Control User's Manual (Manual No.: S800002 03)

> **Important**
>
> Be sure to eliminate the cause of an alarm before you reset the alarm.
> If you reset the alarm and continue operation without eliminating the cause of the alarm, it may result in damage to the equipment or fire.

Convenient Functions

9

9.2 Resetting the Absolute Encoder

In a system that uses an absolute encoder, the multiturn data must be reset at startup. An alarm related to the absolute encoder (A.810 or A.820) will occur when the absolute encoder must be reset, such as when the power supply is turned ON. When you reset the absolute encoder, the multiturn data is reset and any alarms related to the absolute encoder are cleared.

Reset the absolute encoder in the following cases.
- When starting the system for the first time
- When an A.810 alarm (Encoder Backup Alarm) occurs
- When an A.820 alarm (Encoder Checksum Alarm) occurs
- When you want to reset the multiturn data in the absolute encoder

---

⚠ CAUTION

- The multiturn data will be reset to a value between -2 and +2 rotations when the absolute encoder is reset. The reference position of the machine system will change. Adjust the reference position in the host controller to the position that results from resetting the absolute encoder.
  If the machine is started without adjusting the position in the host controller, unexpected operation may cause personal injury or damage to the machine.

Information The multiturn data will always be zero in the following cases. It is never necessary to reset the absolute encoder in these cases.
- When you use a single-turn absolute encoder
- When the encoder is set to be used as a single-turn absolute encoder (Pn002 = n.☐2☐☐)
Absolute encoder-related alarms (A.810 and A.820) will not occur.

9.2.1 Precautions

- You cannot use the ALM_CLR (Clear Alarm) command from the SERVOPACK to clear the A.810 alarm (Encoder Backup Alarm) or the A.820 alarm (Encoder Checksum Alarm). Always reset the absolute encoder to clear these alarms.
- If an A.8☐☐ alarm (Internal Encoder Monitoring Alarm) occurs, turn OFF the power supply to reset the alarm.

9.2.2 Preparations

Always check the following before you reset an absolute encoder.
- The parameters must not be write prohibited.
- The servo must be OFF.

9.2.3 Applicable Tools

The following table lists the tools that you can use to reset the absolute encoder and the applicable tool functions.

Tool	Function	Reference
SigmaWin+	*Setup – Absolute Encoder Reset*	☞ *9.2.4 Operating Procedure* on page 9-5

Information
: You can reset the absolute encoder using the MEM_WR (Write Memory) command. Refer to the following manual for information on the MEM_WR (Write Memory) command.
📖 Σ-7-Series MECHATROLINK-III Communications Standard Servo Profile Command Manual (Manual No.: SIEP S800001 31)

9.2.4 Operating Procedure

Use the following procedure to perform reset an absolute encoder.

1. Confirm that the servo is OFF.

2. Click the 🖳 **Servo Drive** Button in the workspace of the Main Window of the SigmaWin+.

3. Select **Absolute Encoder Reset** in the Menu Dialog Box.
   The Absolute Encoder Reset Dialog Box will be displayed.

4. Click the **Continue** Button.
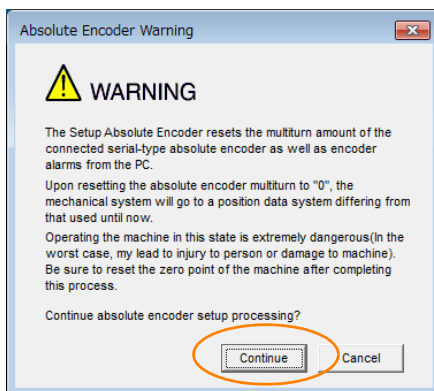
Click the **Cancel** Button to cancel resetting the absolute encoder. The Main Window will return.

5. Click the **Execute setting** Button.
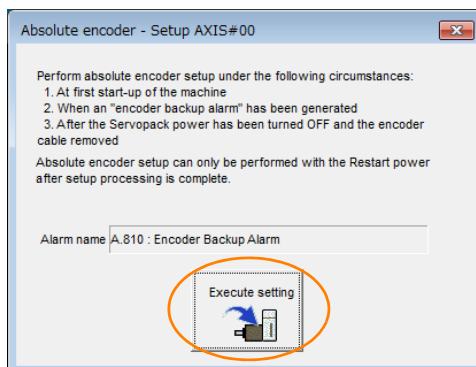
The current alarm code and name will be displayed in the **Alarm name** Box.

6. Click the **Continue** Button.
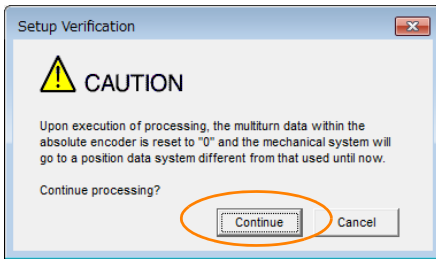
Click the **Cancel** Button to cancel resetting the absolute encoder. The previous dialog box will return.

7. Click the **OK** Button.
The absolute encoder will be reset.

When Resetting Fails
If you attempted to reset the absolute encoder when the servo was ON in the SERVOPACK, the following dialog box will be displayed and processing will be canceled.
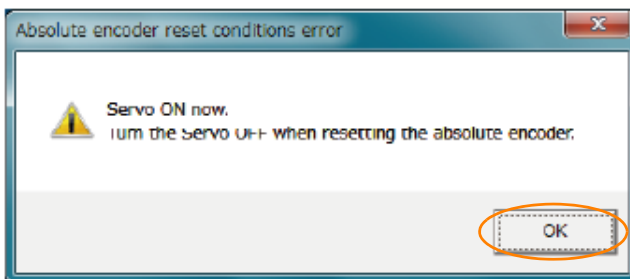
Click the **OK** Button. The Main Window will return. Turn OFF the servo and repeat the procedure from step 1.

When Resetting Is Successful
The following dialog box will be displayed when the absolute encoder has been reset.
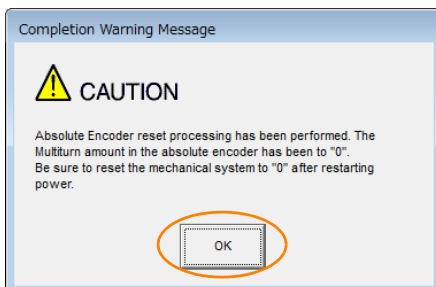
The Main Window will return.

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

This concludes the procedure to reset the absolute encoder.

9.3 Clearing a Multiturn Limit Disagreement Alarm

If you change the multiturn limit in Pn205 (Multiturn Limit), an A.CC0 alarm (Multiturn Limit Disagreement) will be displayed because the setting disagrees with the value in the encoder.

Display	Name	Meaning
A.CC0	Multiturn Limit Disagreement	Different multiturn limits are set in the encoder and SERVOPACK.

If this alarm is displayed, use the following procedure to change the multiturn limit in the encoder to the same value as the setting of Pn205.

9.3.1 Applicable Tools

The following table lists the tools that you can use to set the multiturn limit and the applicable tool functions.

Tool	Function	Operating Procedure Reference
SigmaWin+	*Setup – Multiturn Limit Setting*	☞ *9.3.2 Operating Procedure* on page 9-7

You can also use the MEM_WR (Write Memory) command. Refer to the following manual for information on the MEM_WR (Write Memory) command.

📖 Σ-7-Series MECHATROLINK-III Communications Standard Servo Profile Command Manual (Manual No.: SIEP S800001 31)

9.3.2 Operating Procedure

Use the following procedure to adjust the multiturn limit setting.

1. Click the 🖳 **Servo Drive** Button in the workspace of the Main Window of the SigmaWin+.

2. Select the **Multiturn Limit Setting** in the Menu Dialog Box.
   The Multiturn Limit Setting Dialog Box will be displayed.

3. Click the **Continue** Button.
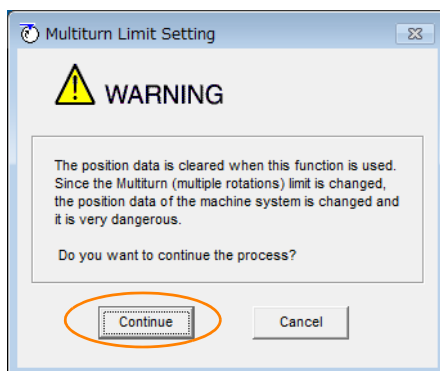
Click the **Cancel** Button to cancel setting the multiturn limit.
The Main Window will return.

4. Change the setting.
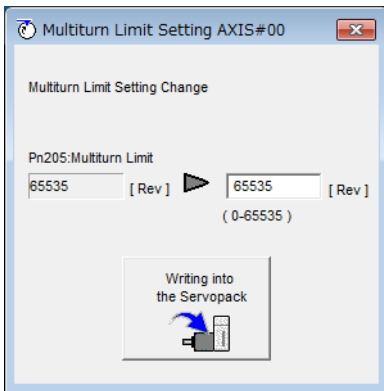
5. Click the **Writing into the Servopack** Button.

6. Click the **OK** Button.
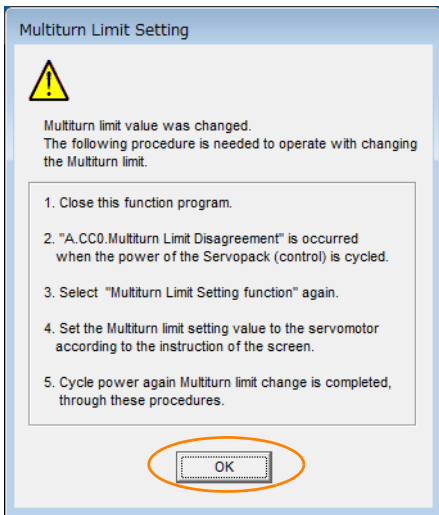
7. Turn the power supply to the SERVOPACK OFF and ON again.
An A.CC0 alarm (Multiturn Limit Disagreement) will occur because setting the multiturn limit in the Servomotor is not yet completed even though the setting has been changed in the SERVOPACK.

8. Display the Multiturn Limit Setting in the Menu Dialog Box.

9. Click the **Continue** Button.
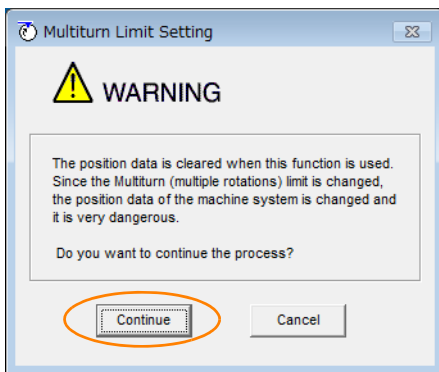
10. Click the **Writing into the servomotor** Button.
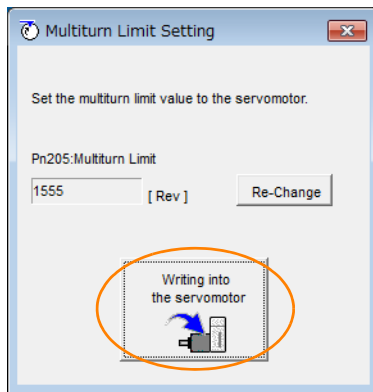
Click the **Re-change** Button to change the setting.

11. Click the **OK** Button.
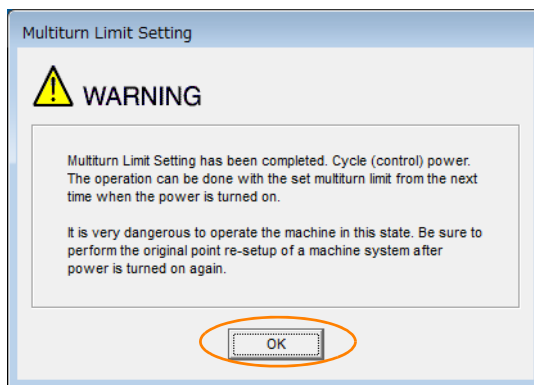
This concludes the procedure to set the multiturn limit.

9.4 Resetting Motor Type Alarms

The SERVOPACK automatically determines the type of motor that is connected to it. If the type of motor that is connected is changed, an A.070 alarm (Motor Type Change Detected) will occur the next time the SERVOPACK is started. If an A.070 alarm occurs, you must set the parameters to match the new type of motor.

An A.070 alarm is reset by executing the Reset Motor Type Alarm utility function.

Information
1. This utility function is the only way to reset an A.070 alarm (Motor Type Change Detected). The alarms are not reset when you reset other alarms or when you turn OFF the power supply to the SERVOPACK.
2. If an A.070 alarm occurs, first set the parameters according to the newly connected motor type and then execute the Reset Motor Type Alarm utility function.

9.4.1 Preparations

Always check the following before you reset a motor type alarm.
• The parameters must not be write prohibited.

9.4.2 Applicable Tools

The following table lists the tools that you can use to clear the motor type alarm and the applicable tool functions.

Tool	Function	Reference
SigmaWin+	*Alarm – Reset Motor Type Alarm*	☞ *9.4.3 Operating Procedure* on page 9-10

9.4.3 Operating Procedure

Use the following procedure to reset Motor Type alarm.

1. Click the 🖳 **Servo Drive** Button in the workspace of the Main Window of the SigmaWin+.

2. Select **Reset Motor Type Alarm** in the Menu Dialog Box.
   The Reset Motor Type Alarm Dialog Box will be displayed.

3. Click the **Clear** Button.
   The alarm will be cleared.

This concludes the procedure to reset Motor Type alarms.

9.5　Alarm Tracing

Alarm tracing records data in the SERVOPACK from before and after an alarm occurs. This data helps you to isolate the cause of the alarm.

You can display the data recorded in the SERVOPACK as a trace waveform on the SigmaWin+.

Information
- Alarms that occur when the power supply is turned ON are not recorded.
- Alarms that occur during the recording of alarm trace data are not recorded.
- Alarms that occur while utility functions are being executed are not recorded.

9.5.1　Data for Which Alarm Tracing Is Performed

Two types of data are recorded for alarm tracing: numeric data and I/O signal ON/OFF data.

Numeric Data	ON/OFF Data
Torque reference	ALM
Feedback speed	Servo ON command (/S-ON)
Reference speed	Proportional control command (/P-CON)
Position reference speed	Forward torque command (/P-CL)
Position deviation	Reverse torque command (/N-CL)
Motor-load position deviation	G-SEL1 signal (/G-SEL1)
Main circuit bus voltage	ACON

9.5.2　Applicable Tools

The following table lists the tools that you can use to perform alarm tracing and the applicable tool functions.

Tool	Function	Operating Procedure Reference
SigmaWin+	*Alarm – Alarm Tracing*	📖 AC Servo Drive Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

9.6 Displaying the Alarm History

The alarm history displays up to the last ten alarms that have occurred in the SERVOPACK. Alarms are displayed for the selected axis.

Note: The following alarms are not displayed in the alarm history: A.E50 (Controller Section Synchronization Error 3) and FL-1 to FL-6.

9.6.1 Preparations

No preparations are required.

9.6.2 Applicable Tools

The following table lists the tools that you can use to display the alarm history and the applicable tool functions.

Tool	Function	Reference
SigmaWin+	*Alarm – Display Alarm*	☞ *Operating Procedure* on page 9-12

9.6.3 Operating Procedure

Use the following procedure to display the alarm history.

1. Click the 🖳 **Servo Drive** Button in the workspace of the Main Window of the SigmaWin+.

2. Select **Display Alarm** in the Menu Dialog Box.
   The Alarm Display Dialog Box will be displayed.

3. Click the **Alarm History** Tab.
   The following display will appear and you can check the alarms that occurred in the past.
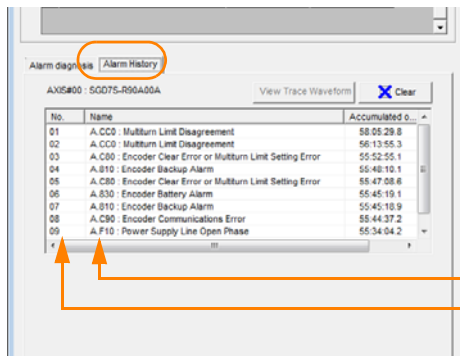
Alarm number: Alarm name

Alarms in order of occurrence
(Older alarms have higher numbers.)

Information
1. If the same alarm occurs consecutively within one hour, it is not saved in the alarm history. If it occurs after an hour or more, it is saved.
2. You can clear the alarm history by clicking the **Clear** Button. The alarm history is not cleared when alarms are reset or when the SERVOPACK main circuit power is turned OFF.

This concludes the procedure to display the alarm history.

9.7 Clearing the Alarm History

You can clear the alarm history that is recorded in the SERVOPACK. You can specify the axis for which to delete the history.

The alarm history is not cleared when alarms are reset or when the SERVOPACK main circuit power is turned OFF. You must perform the following procedure.

9.7.1 Preparations

Always check the following before you clear the alarm history.
• The parameters must not be write prohibited.

9.7.2 Applicable Tools

The following table lists the tools that you can use to clear the alarm history and the applicable tool functions.

Tool	Function	Reference
SigmaWin+	*Alarm − Display Alarm*	☞ *Operating Procedure* on page 9-13

9.7.3 Operating Procedure

Use the following procedure to reset the alarm history.

1. Click the 🖳 **Servo Drive** Button in the workspace of the Main Window of the SigmaWin+.

2. Select **Display Alarm** in the Menu Dialog Box.
   The Alarm Display Dialog Box will be displayed.

3. Click the **Alarm History** Tab.

4. Click the **Clear** Button.
   The alarm history will be cleared.
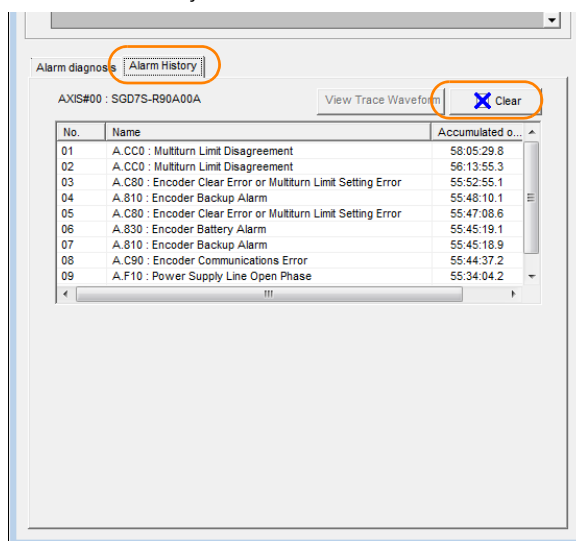
This concludes the procedure to reset the alarm history.

Revision History

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

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Σ-7-Series AC Servo Drive
Σ-7C SERVOPACK
Troubleshooting Manual

YASKAWA

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