YASKAWA

AC Servo Drive

Safety Module
USER'S Manual

Type: SGDV-OSA01A
SGDV-OSA01A000FT900

Supplement for using with Σ-7S / Σ-7W SERVOPACK
(400V-Input Power models)

Remarks	Distribution				Section in charge		
					Servo Drives Power Technology Sect. Servo Drives Technology Dept. Moton Control Division		
					Approve	Check	Draw
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About this Manual

This manual provides information required for designing and maintaining the Safety Module for Σ-7 (400V input power models) SERVOPACKs.

In case of using Σ-V Series, Large-Capacity Σ-V Series, and Σ-7 Series SERVOPACKs (100V or 200V-Power input models), please refer to following manual.

Name	Number
AC Servo Drives Σ-V Series / Σ-V Series for Large-Capacity Models / Σ-7 Series AC Servo Drives USER'S MANUAL Safety Module, Model : SGDV-OSA01A	SIEP C720829 06

Be sure to refer to this manual and perform design and maintenance to select devices correctly.
Keep this manual in a location where it can be accessed for reference whenever required.

■ IMPORTANT Explanations

The following icon is displayed for explanations requiring special attention.

・ Indicates important information that should be memorized, as well as precautions, such as alarm displays, that do not involve potential damage to equipment.

◆Notation Used in this Manual

■ Notation for Reverse Signals

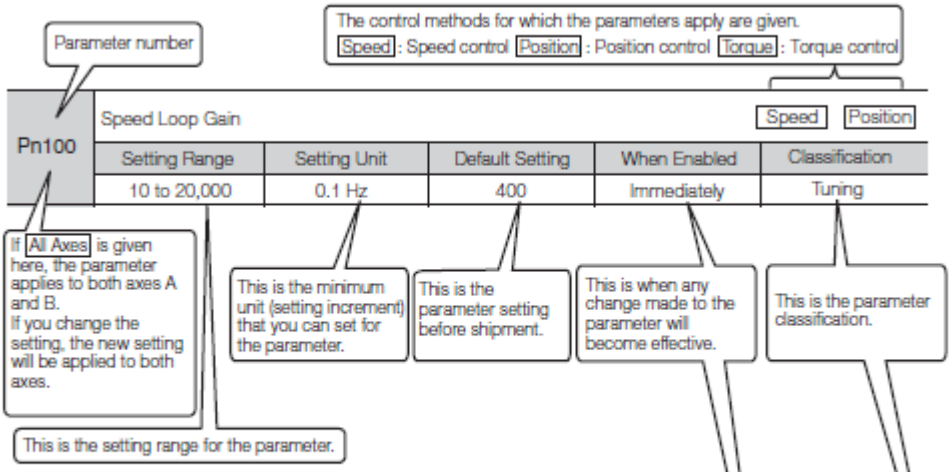
The names of reverse signals (i.e., ones that are valid when low) are written with a forward slash (/) before the signal abbreviation.

Notation Example
BK is written as /BK.

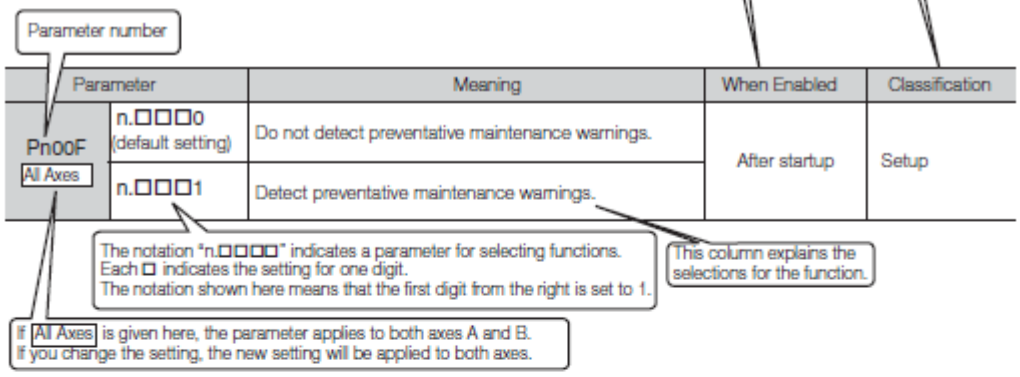
■Notation for Parameters

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

- **Parameters for Numeric Settings**



- **Parameters for Selecting Functions**



Notation Example

Notation Examples for Pn002

n . 0 0 0 0

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

Note

All Axes is only for SGD7W model.

Related Manuals

・ Manuals Related to the Σ-7S / Σ-7W SERVOPACKs with 400 V-Input Power
Refer to the following manuals as required.

Name	Selecting Models and Peripheral Devices	Ratings and Specifi-cations	System Design	Panels and Wiring	Trial Operation	Trial Operation and Servo Adjustment	Mainte-nance and Inspection
Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with 400 V-Input Power and MECHATROLINK-III Communications References RJ-45 Connectors Product Manual (SIEP S800002 14)	✓	✓	✓	✓	✓	✓	✓
Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with 400 V-Input Power and CoE Communications References Product Manual (SIEP S800001 80)	✓	✓	✓	✓	✓	✓	✓
Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with 400 V-Input Power and MECHATROLINK-III Communications References RJ-45 Connectors Product Manual (SIEP S800002 20)	✓	✓	✓	✓	✓	✓	✓
Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with 400 V-Input Power and CoE Communications References Product Manual (SIEP S800001 19)	✓	✓	✓	✓	✓	✓	✓
Σ-7-Series AC Servo Drive Rotary Servomotor with 400 V-Input Power Product Manual (SIEP S800001 86)	✓	✓	✓	✓			✓
Σ-7-Series AC Servo Drive Linear Servomotor with 400 V-Input Power Product Manual (SIEP S800001 81)	✓	✓	✓	✓			✓
Σ-7-Series AC Servo Drive Digital Operator Operating Manual (SIEP S800001 33)					✓	✓	
AC Servo Drive Engineering Tool SigmaWin+ Operation Manual (SIET S800001 34)					✓	✓	
Σ-7-Series AC Servo Drive MECHATROLINK-III Communications Standard Servo Profile Command Manual (SIEP S800001 31)			✓		✓	✓	
AC Servo Drives Rotary Servomotors Safety Precautions (TOBP C230260 00)				✓			✓
AC Servo Drives Linear Servomotors Safety Precautions (TOBP C230800 00)				✓			✓
Σ-V Series/Σ-V Series for Large-Capacity Models/Σ-7 Series Option Module Safety Precautions (TOBP C720829 00)				✓			
Σ-V Series AC SERVOPACK Safety Module with FT900 Specification Installation Guide (TOBP C720829 09)				✓			
Σ Series Digital Operator Safety Precautions (TOBP C730800 00)							✓

■ Safety Information

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

⚠ WARNING

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

⚠ CAUTION

Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.
In some situations, the precautions indicated could have serious consequences if not heeded.

PROHIBITED

Indicates prohibited actions that must not be performed. For example, this symbol would be used to indicate that fire is prohibited as follows:

MANDATORY

Indicates compulsory actions that must be performed. For example, this symbol would be used as follows to indicate that grounding is compulsory:

Safety Precautions

These safety precautions are very important. Read them before performing any procedures such as checking products on delivery, storage and transportation, installation, wiring, operation and inspection, or disposal. Be sure to always observe these precautions thoroughly.

⚠ WARNING

- Never touch any rotating motor parts while the motor is running.
  Failure to observe this warning may result in injury.
- Before starting operation with a machine connected, make sure that an emergency stop can be applied at any time.
  Failure to observe this warning may result in injury or damage to the product.
- Never touch the inside of the SERVOPACKs.
  Failure to observe this warning may result in electric shock.
- Do not remove the cover of the power supply terminal block while the power is ON.
  Failure to observe this warning may result in electric shock.
- After the power is turned OFF or after a voltage resistance test, do not touch terminals while the CHARGE lamp is ON.
  Residual voltage may cause electric shock.
- Follow the procedures and instructions provided in this manual for trial operation.
  Failure to do so may result not only in faulty operation and damage to equipment, but also in personal injury.
- The multi-turn serial data output range for the Σ-V Series, Large-Capacity Σ-V Series, and Σ-7 Series absolute position detecting system is different from that of earlier systems with 15-bit and 12-bit encoders. In particular, change the system to configure the Σ Series infinite-length positioning system with the Σ-V Series, Large-Capacity Σ-V Series, or Σ-7 Series.
- The multi-turn limit value need not be changed except for special applications.
  Changing it inappropriately or unintentionally can be dangerous.
- If the Multi-turn Limit Disagreement alarm occurs, check the setting of parameter Pn205 in the SERVOPACK to be sure that it is correct.
  If Fn013 is executed when an incorrect parameter value is set, an incorrect value will be set in the encoder.
  The alarm will disappear even if an incorrect value is set, but incorrect positions will be detected, resulting in a dangerous situation where the machine will move to unexpected positions.
- Do not remove the front cover, cables, connectors, or optional items from the upper front of the SERVOPACK while the power is ON.
  Failure to observe this warning may result in electric shock.
- Do not damage, press, exert excessive force on, or place heavy objects on the cables.
  Failure to observe this warning may result in electric shock, stopping operation of the product, or fire.
- Provide an appropriate stopping device on the machine side to ensure safety.
  The holding brake on a servomotor with a brake is not a braking device for ensuring safety.
  Failure to observe this warning may result in injury.
- Connect the ground terminal according to local electrical codes (100 Ω or less for a SERVOPACK with a 100 V, 200 V power supply, 10 Ω or less for a SERVOPACK with a 400 V power supply).
  Improper grounding may result in electric shock or fire.

⚠ WARNING

- Installation, disassembly, or repair must be performed only by authorized personnel.
  Failure to observe this warning may result in electric shock or injury.
- Engineers designing a mechanical system using the safety functions of the Safety Module must have complete knowledge of the relative safety standards and a full understanding of the safety functions of the Safety Module.
  Improper use may result in injury or damage to the product.
- When creating a safety design for a mechanical system using the safety functions of the Safety Module, always perform risk assessment of the system to identify residual risks.
  Improper use may result in injury or damage to the product.
- The dynamic brake is not a safety-related part of a control system. Create the safety design of the mechanical system in such a way that any trouble in the dynamic brake function does not create a hazard when the safety functions of the Safety Module operate.
  Improper use may result in injury or damage to the product.
- Connect device conforming to the relative safety standards to the connector for Safety Request Input Signals.
  Improper use may result in injury or damage to the product.
- The safety functions of the Safety Module are not for emergency stopping. To use the safety functions for emergency stopping, separately shut OFF the power supply from the electromechanical section to the motor.
  Improper use may result in injury or damage to the product.
- The safety functions of the Safety Module are not for shutting OFF the power supply to the SERVOPACK and do not provide electrical isolation. Be sure to separately shut OFF the power supply to the SERVOPACK when performing maintenance or inspection of the SERVOPACK.
  Failure to observe this warning may result in electric shock.
- Be sure to check the safety-related parameters before using the safety functions of the Safety Module.
  Improper use may result in injury or damage to the product.
- If the Safety Module or SERVOPACK is changed when starting the servo system or during maintenance or inspection, be sure to check the operation of the safety functions in the actual application after performing wiring.
  Improper use may result in injury or damage to the product.
- If the HWBB function of the SERVOPACK is not used, the safety function jumper connector shall be connected to the connector (CN8) of the SERVOPACK. However if the safety jumper connector is connected unintentionally, the safety functions may not operate properly, which may result in injury or damage to the product.

■Storage and Transportation

⚠ CAUTION
・Do not store or install the product in the following locations. Failure to observe this caution may result in fire, electric shock, or damage to the product. ・Locations subject to direct sunlight ・Locations subject to ambient operating temperatures outside the range specified in the storage/installation temperature conditions ・Locations subject to humidity outside the range specified in the storage/installation humidity conditions ・Locations subject to condensation as the result of extreme changes in temperature ・Locations subject to corrosive or flammable gases ・Locations subject to dust, salts, or iron dust ・Locations subject to exposure to water, oil, or chemicals ・Locations subject to shock or vibration ・Do not hold the product by the cables, motor shaft or detector while transporting it. Failure to observe this caution may result in injury or malfunction. ・Do not place any load exceeding the limit specified on the packing box. Failure to observe this caution may result in injury or malfunction. ・If disinfectants or insecticides must be used to treat packing materials such as wooden frames, pallets, or plywood, 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.

■Installation

⚠ CAUTION
・Never use the product in an environment subject to water, corrosive gases, inflammable gases, or combustibles. Failure to observe this caution may result in electric shock or fire. ・Do not step on or place a heavy object on the product. Failure to observe this caution may result in injury. ・Do not cover the inlet or outlet ports and prevent any foreign objects from entering the product. Failure to observe this caution may cause internal elements to deteriorate resulting in malfunction or fire. ・Be sure to install the product in the correct direction. Failure to observe this caution may result in malfunction. ・Provide the specified clearances between the SERVOPACK and the control panel or with other devices. Failure to observe this caution may result in fire or malfunction. ・Do not apply any strong impact. Failure to observe this caution may result in malfunction.

■Wiring

⚠ CAUTION
・Be sure to wire correctly and securely. Failure to observe this caution may result in motor overrun, injury, or malfunction. ・Do not connect a commercial power supply to the U, V, or W terminals for the servomotor connection. Failure to observe this caution may result in injury or fire. ・Securely connect the main circuit power supply terminal screws, control power supply terminal screws, and servomotor connection terminal screws. Failure to observe this caution may result in fire. ・Do not bundle or run the main circuit cables together with the input/output signal cables or the encoder cables in the same duct. Keep them separated by at least 30 cm. Failure to observe this caution may result in malfunction. ・Use shielded twisted-pair wires or multi-core shielded twisted-pair wires for input/output signal cables and the encoder cables. ・I/O signal cables must be no longer than 3 m, encoder cables must be no longer than 50 m, and control power supply cables for the SERVOPACK with a 400 V power supply (+24 V, 0 V) must be no longer than 10 m. ・Do not touch the power terminals while the CHARGE lamp is ON after turning power OFF because high voltage may still remain in the SERVOPACK. Make sure the CHARGE lamp is OFF first before starting an inspection. ・Observe the following precautions when wiring main circuit terminal blocks of the SERVOPACK. ・Remove the detachable main circuit terminal blocks from the SERVOPACK prior to wiring. ・Insert only one main power line per opening in the main circuit terminals. ・Make sure that no part of the core wire comes into contact with (i.e., short-circuit) adjacent wires. ・Install a battery at either the host controller or the SERVOPACK, but not both. It is dangerous to install batteries at both ends simultaneously, because that sets up a loop circuit between the batteries. ・Always use the specified power supply voltage. An incorrect voltage may result in fire or malfunction. ・Take appropriate measures to ensure that the input power supply is supplied within the specified voltage fluctuation range. Be particularly careful in places where the power supply is unstable. An incorrect power supply may result in damage to the product. ・Install external breakers or other safety devices against short-circuiting in external wiring. Failure to observe this caution may result in fire. ・Take appropriate and sufficient countermeasures for each form of potential interference when installing systems in the following locations. ・Locations subject to static electricity or other forms of noise ・Locations subject to strong electromagnetic fields and magnetic fields ・Locations subject to possible exposure to radioactivity ・Locations close to power supplies Failure to observe this caution may result in damage to the product. ・Do not reverse the polarity of the battery when connecting it. Failure to observe this caution may damage the battery, the SERVOPACK, the servomotor, or cause an explosion. Wiring or inspection must be performed by a technical expert. ・Use a 24-VDC power supply with double insulation or reinforced insulation.

■Operation

⚠ CAUTION
・ Always use the servomotor and SERVOPACK in one of the specified combinations. Failure to observe this caution so may result in fire or malfunction. ・ Conduct trial operation on the servomotor alone with the motor shaft disconnected from the machine to avoid accidents. Failure to observe this caution may result in injury. ・ During trial operation, confirm that the holding brake works correctly. Furthermore, secure system safety against problems such as signal line disconnection. ・ Before starting operation with a machine connected, change the settings to match the parameters of the machine. Starting operation without matching the proper settings may cause the machine to run out of control or malfunction. ・ Do not frequently turn power ON and OFF. Since the SERVOPACK has a capacitor in the power supply, a high charging current flows when power is turned ON. Frequently turning power ON and OFF causes main power devices like capacitors and fuses to deteriorate, resulting in unexpected problems. ・ When using JOG operations (Fn002), search operations (Fn003), or EasyFFT operations (Fn206), the dynamic brake function does not work for reverse overtravel or forward overtravel. Take necessary precautions. ・ When using the servomotor for a vertical axis, install safety devices to prevent workpieces from falling due to alarms or overtravels. Set the servomotor so that it will stop in the zero clamp state when overtravel occurs. Failure to observe this caution may cause workpieces to fall due to overtravel. ・ When not using turning-less function, set to the correct moment of inertia ratio (Pn103). Setting to an incorrect moment of inertia ratio may cause machine vibration. ・ Do not touch the SERVOPACK heatsinks, regenerative resistor, or servomotor while power is ON or soon after the power is turned OFF. Failure to observe this caution may result in burns due to high temperatures. ・ Do not make any extreme adjustments or setting changes of parameters. Failure to observe this caution may result in injury or damage to the product due to unstable operation. ・ When an alarm occurs, remove the cause, reset the alarm after confirming safety, and then resume operation. Failure to observe this caution may result in damage to the product, fire, or injury. ・ Do not use the brake of the servomotor for braking. Failure to observe this caution may result in malfunction. ・ An alarm or warning may be generated if communications are executed with the host controller during operation using the digital operator. If an alarm or warning is generated, the process currently being executed may be aborted and the system may stop.

■Maintenance and Inspection

⚠ CAUTION
・Do not disassemble the SERVOPACK. Failure to observe this caution may result in electric shock or injury. ・Do not change wiring while the power is ON. Failure to observe this caution may result in electric shock or injury. ・When replacing the SERVOPACK, resume operation only after copying the previous SERVOPACK parameters to the new SERVOPACK. Failure to observe this caution may result in damage to the product.

■Disposal

⚠ CAUTION
・When disposing of the products, treat them as ordinary industrial waste.

■General Precautions

Observe the following general precautions to ensure safe application.
・The products shown in illustrations in this manual are sometimes shown without covers or protective guards. Always replace the cover or protective guard as specified first, and then operate the products in accordance with the manual. ・The drawings presented in this manual are typical examples and may not match the product you received. ・If the manual must be ordered due to loss or damage, inform your nearest Yaskawa representative or one of the offices listed on the back of this manual.

Warranty

(1) Details of Warranty

■ Warranty Period

The warranty period for a product that was purchased (hereinafter called “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 warranty period above. 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.

1. 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
2. Causes not attributable to the delivered product itself
3. Modifications or repairs not performed by Yaskawa
4. Abuse of the delivered product in a manner in which it was not originally intended
5. Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
6. Events for which Yaskawa is not responsible, such as natural or human-made disasters

(2) Limitations of Liability

1. 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.
2. 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.
3. 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.
4. 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.

(3) Suitability for Use

1. 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.
2. The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
3. 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
4. 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.
5. 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.
6. Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

(4) Specifications Change

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

Harmonized Standards

■North American Safety Standards (UL)



	Model	UL * Standards
SERVOPACK	SGD7S, SGD7W	UL61800-5-1

* Underwriters Laboratories Inc.

Note: Applicable when the Safety Module is attached to the SERVOPACKs for use with the MECHATROLINK-III communications reference, the CoE communication reference type of Σ-7 SERVOPACK with 400 V-Input Power model.

■European Directives

	Model	European Directives	Harmonized Standards
SERVOPACK	SGD7S, SGD7W	Machinery Directive 2006/42/EC	EN ISO13849-1: 2015
		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

Note: Applicable when the Safety Module is attached to the SERVOPACKs for use with the MECHATROLINK-III communications reference, the CoE communication reference type of Σ-7 SERVOPACK with 400 V-Input Power model.

■Safety Standards

	Model	Safety Standards	Standards
SERVOPACK	SGD7S, SGD7W	Safety of Machinery	EN ISO13849-1: 2015
		Functional Safety	IEC 61508 series IEC 62061 IEC 61800-5-2
		EMC	IEC 61326-3-1

Note: Applicable when the Safety Module is attached to the SERVOPACKs for use with the MECHATROLINK-III communications reference, the CoE communication reference type of Σ-7 SERVOPACK with 400 V-Input Power model.

■Safe Performance

(1) Safe Performance：CN8□ of SERVOPACK (SGD7S:CN8, SGD7W:CN8A/CN8B)

Items	Standards	Performance Level
Safety Integrity Level	IEC 61508	SIL3
	IEC 62061	SILCL3
Probability of dangerous failure per hour	IEC 61508 IEC 62061	PFH = 4.40×10^{-9} [1/h] (4.40% of SIL3)
Performance Level	EN ISO 13849-1	PL e (Category 3)
Mean time to dangerous failure of each channel	EN ISO 13849-1	MTTFd: High
Average diagnostic coverage	EN ISO 13849-1	DCavg: Medium
Stop category	IEC 60204-1	Stop category 0
Safety function	IEC 61800-5-2	STO
Mission time	IEC 61508	10 years
Hardware Fault Tolerance	IEC 61508	HFT = 1
Subsystem	IEC 61508	B

Note : Safe performance of SERVOPACK's the CN8□ safety function (STO)
This specification is applied when to use HWBB-input from the CN8□ of SERVOPACK.

(2) Safe Performance：Safety Module

Items	Standards	Performance Level
Safety Integrity Level	IEC 61508	SIL2
	IEC 62061	SILCL2
Probability of dangerous failure per hour	IEC 61508 IEC 62061	PFH = 3.3×10^{-7} [1/h] (3.3% of SIL2)
Performance Level	EN ISO 13849-1	PL d (Category 2)
Mean time to dangerous failure of each channel	EN ISO 13849-1	MTTFd: High
Average diagnostic coverage	EN ISO 13849-1	DCavg: Medium
Safety function	IEC 61800-5-2	STO/SS1/SS2/SLS
Mission time	IEC 61508	10 years
Hardware Fault Tolerance	IEC 61508	HFT = 1
Subsystem	IEC 61508	B

Note : Safe performance of the Safety Module Safety function A (CN21) and Safety function B (CN22)

IMPORTANT	Safe Performance with a combination the SERVOPACK and the Safety Module

SERVOPACK		Safety Module	(1)Safe Performance : SERVOPACK CN8□ (*1)	(2)Safe Performance : Safety Module (*1)
SGD7S (400V)		SGDV-OSA01A	CN8 : Not apply (*3)	Apply
		SGDV-OSA01A000FT900	CN8 : Apply	Apply
SGD7W (400V)	Axis A(*2)	SGDV-OSA01A	Apply	Apply
	Axis B(*2)	—	CN8B : Apply	—
SGD7W (400V)	Axis A	SGDV-OSA01A000FT900	CN8A : Apply	Apply
	Axis B	—	CN8B : Apply	—

*1：Refer to "■Safe Performance" for the details of the safe performance.
*2：When the Safety Module is attached to the SGD7W, the Safety Module operates for Axis A only.
*3：A safety jumper connector shoud be connected for not applied CN8□.

Description of Technical Terms

The following table shows the meanings of terms used in this manual.

Term	Meaning
Servomotor	Σ-V Series/ Σ-7 Series: SGMJV, SGMAV, SGMVV, SGMPS, SGMGV, SGMSV, or SGMCS (Direct Drive) servomotor Σ-7 Series: SGM7J, SGM7A, SGM7P, or SGM7G servomotor Linear Σ Series: SGLGW, SGLFW, SGLTW, or SGLC servomotor
SERVOPACK	Σ-7 Series SGD7S or SGD7W SERVOPACK
Servo Drive	A set including a servomotor and SERVOPACK (i.e., a servo amplifier)
Servo System	A servo control system that includes the combination of a servo drive with a host controller and peripheral devices
M-Ⅲ communications reference model	SGD7S SERVOPACK with a MECHATROLINK-Ⅲ communications reference interface
CoE communications reference model	SGD7S SERVOPACK with a CoE(CANOpen Over EtherCAT) communications reference interface
Safety Option Module	Generic term for an Option Module that provides safety functions and is mounted on a SGD7S SERVOPACK
Safety Module	The option module that provides safety functions specified in this manual.
Digital Operator	Handy type operator connected to SERVOPACKs
Servo ON	Power to motor ON
Servo OFF	Power to motor OFF
BaseBlock (BB)	Power supply to motor is turned OFF by shutting OFF the base current to the power transistor that supplies power to the motor.
Hardwire BaseBlock Function (HWBB)	Safety function in the SERVOPACK This is the safety function that is equivalent to the Safe Torque Off function defined in IEC 61800-5-2.
Safe Torque Off (STO)	This is one of safety functions defined in IEC 61800-5-2. This is the safety function that shuts OFF power supply to the motor.
Safe Stop 1 (SS1)	This is one of safety functions defined in IEC 61800-5-2. This is the safety function that starts deceleration of the motor and executes the STO function after a specified time has passed.
Safe Stop 2 (SS2)	This is one of safety functions defined in IEC 61800-5-2. This is the safety function that starts deceleration of the motor and prevents the motor from stopping at a distance greater than the allowable deviation from the specified position after a specified time has passed.
Safely-Limited Speed (SLS)	This is one of safety functions defined in IEC 61800-5-2. This is the safety function that prevents the motor speed from exceeding the specified speed.

Term	Meaning	
Safe BaseBlock Function (SBB function)	This is one of safety functions in the Safety Module. This is the safety function that is equivalent to the Safe Torque Off function defined in IEC 61800-5-2.	
Safe BaseBlock with Delay Function (SBB-D function)	This is one of safety functions in the Safety Module. This is the safety function that is equivalent to the Safe Stop 1 function defined in IEC 61800-5-2.	
Safe Position Monitor with Delay Function (SPM-D function)	This is one of safety functions in the Safety Module. This is the safety function that is equivalent to the Safe Stop 2 function defined in IEC 61800-5-2.	
Safely Limited Speed with Delay Function (SLS-D function)	Stopping function in the Safety Module. This is the safety function that is equivalent to the Safely-Limited Speed function defined in IEC 61800-5-2.	
Safe (HWBB) state	The Safety Module is shutting OFF power supply to the motor by executing the HWBB function of SGDV/SGD7S or SGD7W SERVOPACK.	
Safe State	Safe state depends on safety functions used.	
	SBB function	Safe (HWBB) state
	SBB-D function	Safe (HWBB) state
	SPM-D function	When monitoring positions or in a safe (HWBB) state
	SLS-D function	When monitoring constant-speed operation or in a safe (HWBB) state
Deceleration Monitoring	The Safety Module is monitoring deceleration operation of the motor.	
Position Monitoring	The Safety Module is monitoring distance that the motor moved.	
Constant-speed Monitoring	The Safety Module is monitoring constant-speed operation of the motor.	
Safety-related Module Parameter	Parameter related to the safety functions of the Safety Module.	
Safety-related Servo Parameter	These parameters contain the information related to the safety functions of SERVOPACKs and servomotors, and are managed by the Safety Module.	
System Reset	Reset the servo system by shutting OFF the power or executing software reset (Fn030).	
Parameter Recalculation	Recalculation of parameter by CONFIG command via MECHATROLINK-III or by the request from the Command Option Module.	
Proof Test	Scheduled tests defined in IEC 61508-4. This is the test that is used to detect the failure of the safety-related system.	
Axis A Axis B	In this manual, the axes are called axis A and axis B. However, they are displayed as “axis 1,” “axis 2,” “AXIS#00,” or “AXIS#01” on the Engineering Tool.	

Outline of this manual

Following contents are described in each content.
When to use this product, you should refer both this manual and shown manual at following table.

Content		This manual	AC Servo Drives Σ-V Series/Σ-V Series for Large-Capacity Models/Σ-7 Series USER'S MANUAL Safety Module Model: SGDV-OSA01A
			SIEP C720829 06
Checking Products	Checking Products on Delivery	1.1	1,1
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	Nameplate Location	–	1.3
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	Part Names	–	2.3
	Internal Block Diagram	2.3	2.4
SERVOPACK Installation	SERVOPACK Installation Environment and Harmonized Standards	–	3.1
	SERVOPACK Installation	–	3.2
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Wiring and Connection	System Configuration Diagram	–	4.1
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Precautions and Basic Settings Required before Starting Operation	Safety Precautions for Using the Safety Module	–	5.1
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	Limitations	–	5.3
	Basic Settings Required before Starting Operation	–	5.4
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	Safe BaseBlock with Delay Function (SBB-D Function)	–	6.4
	Safe Position Monitor with Delay Function (SPM-D Function)	–	6.5
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	Application Example of Safety Functions	–	6.8
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	Safety-related Servo Parameters	–	7.3
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	Related Utility Functions	–	8.7

Content		This manual	AC Servo Drives Σ-V Series/Σ-V Series for Large-Capacity Models/Σ-7 Series USER'S MANUAL Safety Module Model: SGDV-OSA01A
			SIEP C720829 06
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	Monitoring Over the Network	-	9.3
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	Returning Method	-	10.4
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	Safety-related Servo Parameters	-	12.2
	Parameters Related Active Mode Function	12.3	12.3
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1. Checking Products

1.1. Checking Products on Delivery

■When the Safety Module is Not Connected to the SERVOPACK

1. Check the nameplate (ratings) to confirm that the product is the one that was ordered.
   For the nameplate (ratings), refer to ***1.2 Nameplate (Ratings) and Model Designation.***

2. Mount the Safety Module to the SERVOPACK as described in the enclosed ***Σ-V Series AC SERVOPACK Safety Module with FT900 Specification Installation Guide.***

3. Treatment of the connector (CN8□) of the SERVOPACK

The handling of CN8□ of the SERVOPACK by combination of the Safety Module is as follows.

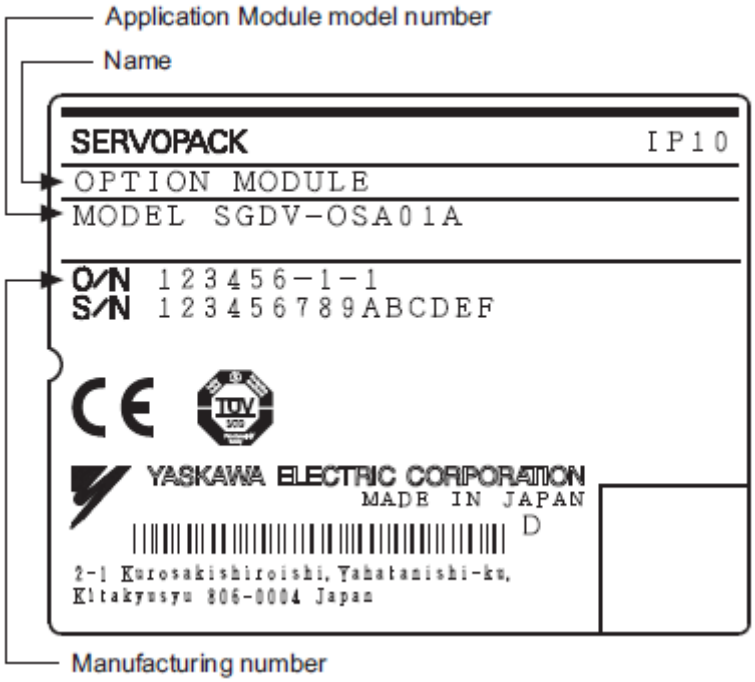
SERVOPACK \ Safety Module		SGDV-OSA01A	SGDV-OSA01A000FT900
SGD7S (400V)	CN8	Not available (*1)	Available
SGD7W (400V)	Axis A(CN8A)	Not available (*1)	Available
	Axis B(CN8B)	Available	Available

*1 : The safety jumper connector should be connected because of not available.

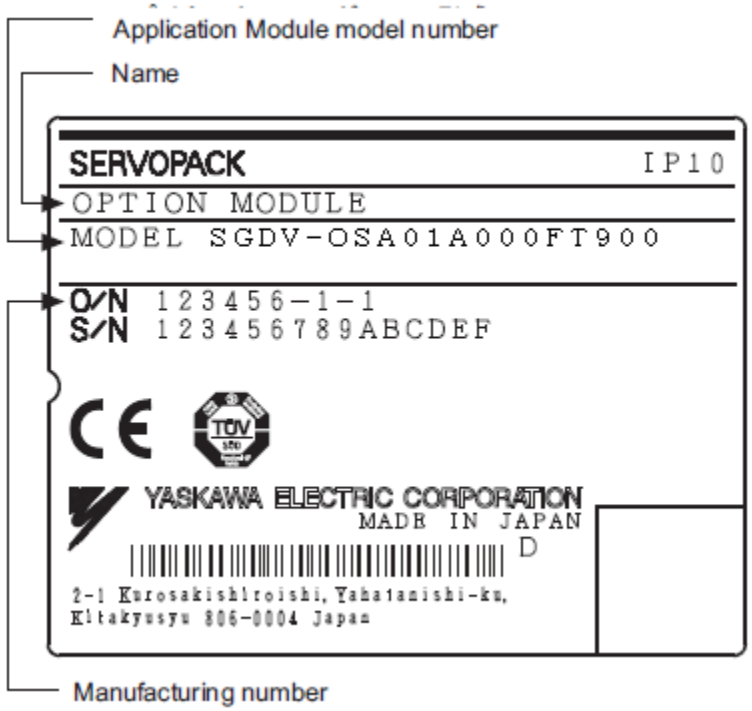
1.2. Nameplate (Ratings) and Model Designation

■Nameplate (Ratings) Example

・SGDV-OSA01A



・SGDV-OSA01A000FT900



■Model Designation

SGDV-OSA01A000FT900

Series	
SGDV	Σ-V Series

1st + 2nd digits: Module Type	
Code	Module
OS	Safety Option Module

3rd + 4th + 5th digits: Interface Specifications	
Code	Interface
A01	Safery Module

6th digit: Design Revision Order

7+8+9 digits : Hardware Option	
Code	Option specification
000	Standard

10～14 digits : FT Specification	
00000	Stantard
FT900	FT900 specification

＊If from 7 to 14 digits are all zero (i.e. Standard model), they are omitted.

2. Specifications

2.1. Overview

The Safety Module is an Option Module that is connected to a Σ-V Series, Large-Capacity Σ-V Series, or Σ-7 Series SERVOPACK. By using the Hard Wire BaseBlock function of the SERVOPACK, the following four safety functions, which are defined in functional safety standards, can be achieved.

Function	Remarks
Safe BaseBlock Function (SBB function)	This is a safety function that is equivalent to the Safe Torque Off function defined in IEC 61800-5-2.
Safe BaseBlock with Delay Function (SBB-D function)	This is a safety function that is equivalent to the Safe Stop 1 function defined in IEC 61800-5-2.
Safe Position Monitor with Delay Function (SPM-D function)	This is a safety function that is equivalent to the Safe Stop 2 function defined in IEC 61800-5-2.
Safely Limited Speed with Delay Function (SLS-D function)	This is a safety function that is equivalent to the Safely-Limited Speed function defined in IEC 61800-5-2.

When the Safety Module is attached to the SGD7W, the Safety Module operates for Axis A only. Axis B is not related to the Safety Module.

When using the combination of the Σ-7S SERVOPACK with 400 V-Input Power model and the Safety Module(SGDV-OSA01A000FT900), in addition to the above functions, Hardware BaseBlock Function (HWBB) of SERVOPACK CN8 is available.

Function	Remarks
Hardwire BaseBlock Function (With HWBB input of SERVOPACK CN8)	This is a safety function that is equivalent to the Safe Torque Off function defined in IEC 61800-5-2.

When using the combination of the Σ-7W SERVOPACK with 400 V-Input Power model and the Safety Module(SGDV-OSA01A000FT900), in addition to the above functions, Hardware BaseBlock Function (HWBB) of SERVOPACK CN8A(Axis A) is available.

Function	Remarks
Hardwire BaseBlock Function (With HWBB input of SERVOPACK CN8A)	This is a safety function that is equivalent to the Safe Torque Off function defined in IEC 61800-5-2.

In the other hands, Hardware BaseBlock Function (HWBB) of SERVOPACK CN8B(Axis B) is available regardless of the Safety Module models.

2.2. Specifications

2.2.1. Applicable SERVOPACK

■SGDV-OSA01A

In addition to the SERVOPACKs that are listed in the manual of the Safety Module, following SERVOPACKs can be applied.

・Σ-7S SERVOPACK with 400 V-Input Power model

Applicable Servomotor	Model	Specification
Rotational motor Linear motor	SGD7S-□□□D20	MECHATROLINK-Ⅲ communication reference
	SGD7S-□□□DA0	CoE communication reference

・Σ-7W SERVOPACK with 400 V-Input Power model

Applicable Servomotor	Model	Specification
Rotational motor Linear motor	SGD7W-□□□D20	MECHATROLINK-Ⅲ communication reference
	SGD7W-□□□DA0	CoE communication reference

■SGDV-OSA01A000FT900

Following SERVOPACKs can only be applied.
The SERVOPACKs that are listed in the manual of the Safety Module are not applied.

・Σ-7S SERVOPACK with 400 V-Input Power model

Applicable Servomotor	Model	Specification
Rotational motor Linear motor	SGD7S-□□□D20	MECHATROLINK-Ⅲ communication reference
	SGD7S-□□□DA0	CoE communication reference

・Σ-7W SERVOPACK with 400 V-Input Power model

Applicable Servomotor	Model	Specification
Rotational motor Linear motor	SGD7W-□□□D20	MECHATROLINK-Ⅲ communication reference
	SGD7W-□□□DA0	CoE communication reference

2.2.2. Specifications of Safety Module

<table>
<tr><td colspan="4">Applicable Safety Module</td><td colspan="2">SGDV-OSA01A
SGDV-OSA01A000FT900</td></tr>
<tr><td colspan="4">Placement</td><td colspan="2">Attached to the SERVOPACK</td></tr>
<tr><td>Power Specification</td><td colspan="3">Power Supply Method</td><td colspan="2">Supplied from the control power supply of the SERVOPACK.</td></tr>
<tr><td rowspan="5">Operating Conditions</td><td colspan="3">Surrounding Air/Storage Temperature</td><td colspan="2">0° C to +55℃/ -20° C to +85℃</td></tr>
<tr><td colspan="3">Ambient/Storage Humidity</td><td colspan="2">90% RH or less (with no condensation)</td></tr>
<tr><td colspan="3">Vibration/Shock Resistance</td><td colspan="2">4.9 m/s^2 / 19.6 m/s^2</td></tr>
<tr><td colspan="3">Protection Class/ Pollution Degree</td><td colspan="2">Protection class: IP10, Pollution degree: 2
An environment that satisfies the following conditions.
・ Free of corrosive or explosive gases
・ Free of exposure to water, oil or chemicals
・ Free of dust, salts or iron dust</td></tr>
<tr><td colspan="3">Altitude</td><td colspan="2">1000 m or less</td></tr>
<tr><td colspan="3">Others</td><td colspan="2">Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to
radioactivity</td></tr>
<tr><td rowspan="14">Safety Functions</td><td colspan="5">Number of Functions: 2</td></tr>
<tr><td rowspan="6">Safety Function A (CN21)</td><td rowspan="2">Inputs</td><td>Number of Channels</td><td colspan="2">2</td></tr>
<tr><td>Function</td><td colspan="2">Safety Request Input Signal (SRI-A1, SRI-A2)</td></tr>
<tr><td rowspan="2">Output</td><td>Number of Channels</td><td colspan="2">1</td></tr>
<tr><td>Function</td><td colspan="2">External Device Monitor Output Signal (EDM-A)</td></tr>
<tr><td colspan="2" rowspan="5">Stopping Methods</td><td>Safety Functions (IEC61800-5-2)</td><td>Function names of Safety Module</td></tr>
<tr><td>Safe Torque Off (STO)</td><td>Safe BaseBlock Function (SBB function)</td></tr>
<tr><td>Safe Stop 1 (SS1)</td><td>Safe BaseBlock with Delay Function (SBB-D function)</td></tr>
<tr><td>Safe Stop 2 (SS2)</td><td>Safe Position Monitor with Delay Function (SPM-D function)</td></tr>
<tr><td>Safely-Limited Speed (SLS)</td><td>Safely Limited Speed with Delay Function (SLS-D function)</td></tr>
<tr><td rowspan="6">Safety Function B (CN22)</td><td rowspan="2">Inputs</td><td>Number of Channels</td><td colspan="2">2</td></tr>
<tr><td>Function</td><td colspan="2">Safety Request Input Signal (SRI-B1, SRI-B2)</td></tr>
<tr><td rowspan="2">Output</td><td>Number of Channels</td><td colspan="2">1</td></tr>
<tr><td>Function</td><td colspan="2">External Device Monitor Output Signal (EDM-B)</td></tr>
<tr><td colspan="2" rowspan="5">Stopping Methods</td><td>Safety Functions (IEC61800-5-2)</td><td>Function names of Safety Module</td></tr>
<tr><td>Safe Torque Off (STO)</td><td>Safe BaseBlock Function (SBB function)</td></tr>
<tr><td>Safe Stop 1 (SS1)</td><td>Safe BaseBlock with Delay Function (SBB-D function)</td></tr>
<tr><td>Safe Stop 2 (SS2)</td><td>Safe Position Monitor with Delay Function (SPM-D function)</td></tr>
<tr><td>Safely-Limited Speed (SLS)</td><td>Safely Limited Speed with Delay Function (SLS-D function)</td></tr>
<tr><td colspan="4">Others</td><td colspan="2">Active Mode Function</td></tr>
<tr><td colspan="4">Response Time</td><td colspan="2">Max. 200 ms</td></tr>
<tr><td colspan="4">Proof Test Interval</td><td colspan="2">10 years</td></tr>
</table>

2.2.3. Safety functions specifications of applicable SERVOPACK

2.2.3.1. Σ-7S SERVOPACK with 400 V-Input Power model

When using the combination of the Σ-7S SERVOPACK with 400 V-Input Power model and SGDV-OSA01A000FT900, ***Hard Wire BaseBlock Function*** (HWBB) of SERVOPACK CN8 is available.
In this case, the safety functions specifications and the safe performance are same regardless of whether the Safety module is used.
The specifications of when using HWBB function from SERVOPACK CN8 is shown below.

Safety Functions	Number of Functions: 1				
	Safety Function A (CN8)	Inputs	Number of Channels	2	
			Function	Safety Request Input Signal (HWBB1, HWBB2)	
		Output	Number of Channels	1	
			Function	External Device Monitor Output Signal (EDM1)	
		Stopping Methods		Safety Functions (IEC61800-5-2)	Function names of SERVOPACK
				Safe Torque Off (STO)	Hard Wire Base Block (HWBB function)
Response Time				Max. 8 ms	
Proof Test Interval				10 years	

In addition, when using SGDV-OSA01A, SERVOPACK CN8 is not available. In this case, connect the Safety-jumper connector to the CN8.

2.2.3.2. Σ-7W SERVOPACK with 400 V-Input Power model

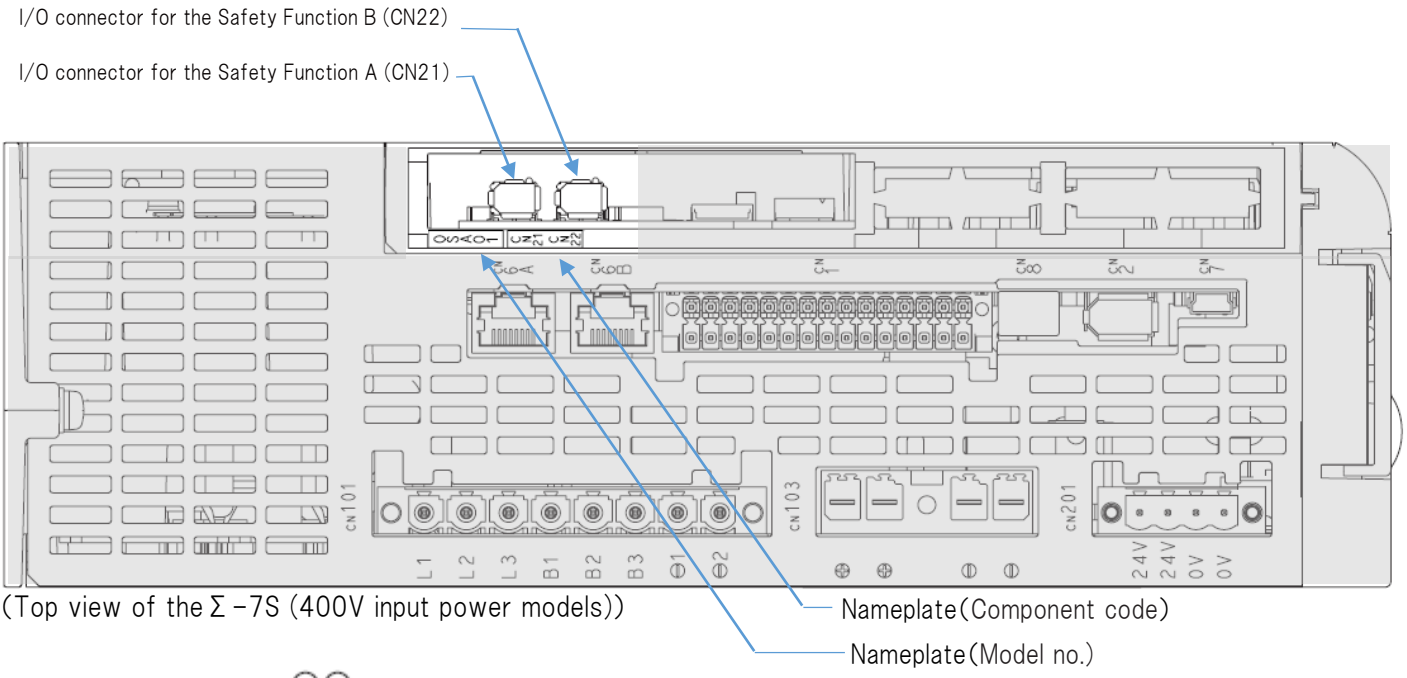
When using the combination of the Σ-7W SERVOPACK with 400 V-Input Power model and SGDV-OSA01A000FT900, ***Hard Wire BaseBlock Function*** (HWBB) of SERVOPACK CN8A and CN8B are available.
In this case, the safety functions specifications and the safe performance are same regardless of whether the Safety module is used.
The specifications of when using HWBB function from SERVOPACK CN8A/CN8B are shown below.

Safety Functions	Number of Functions: 2				
	Safety Function A (CN8A) Axis A	Inputs	Number of Channels	2	
			Function	Safety Request Input Signal (HWBB_A1, HWBB_A2)	
		Output	Number of Channels	1	
			Function	External Device Monitor Output Signal (EDM_A)	
		Stopping Methods		Safety Functions (IEC61800-5-2)	Function names of SERVOPACK
				Safe Torque Off (STO)	Hard Wire Base Block (HWBB function)
	Safety Function A (CN8) Axis B	Inputs	Number of Channels	2	
			Function	Safety Request Input Signal (HWBB_B1, HWBB_B2)	
		Output	Number of Channels	1	
			Function	External Device Monitor Output Signal (EDM_B)	
		Stopping Methods		Safety Functions (IEC61800-5-2)	Function names of SERVOPACK
				Safe Torque Off (STO)	Hard Wire Base Block (HWBB function)
Response Time				Max. 8 ms	
Proof Test Interval				10 years	

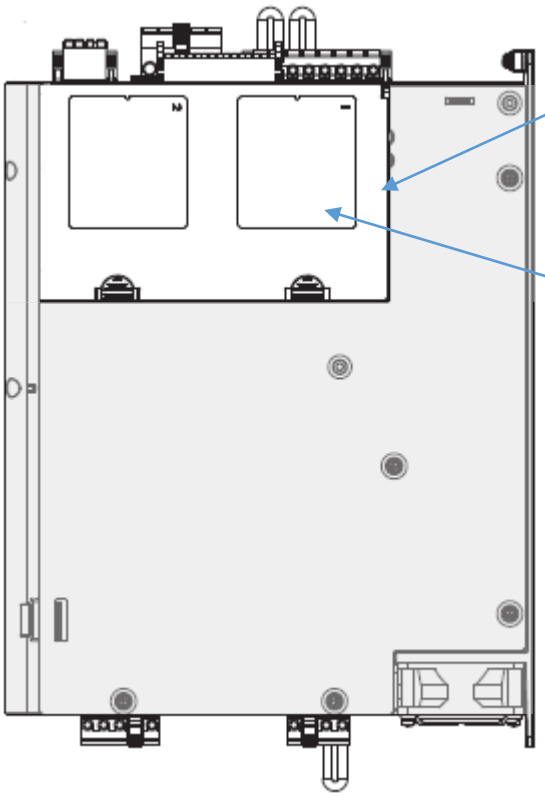
2.3. Part Names

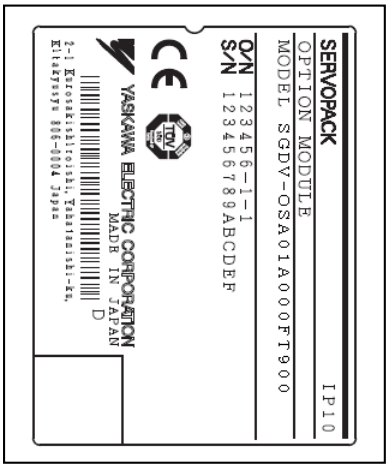
The following figure shows the part names of the Safety Module.

■ Σ-7S (400V input power models)



(Top view of the Σ-7S (400V input power models))



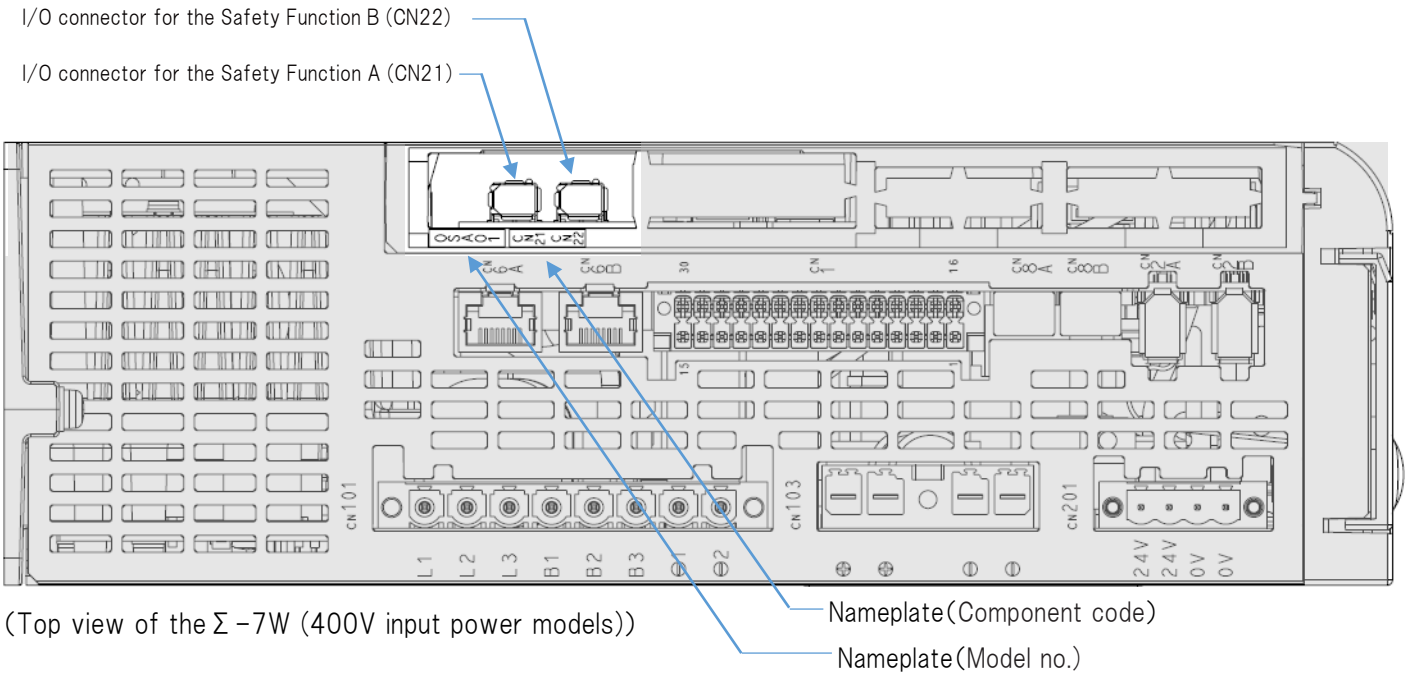


(Direction of the nameplate)

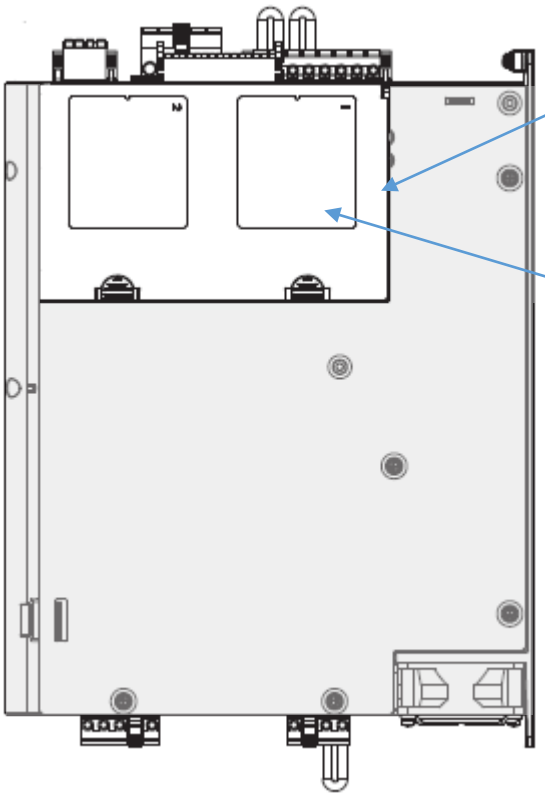
(Side view of the Σ-7S (400V input power models))

Note: For the names of the SERVOPACK parts, refer to the manual for your SERVOPACK.

■ Σ-7W (400V input power models)



(Top view of the Σ-7W (400V input power models))



(Direction of the nameplate)

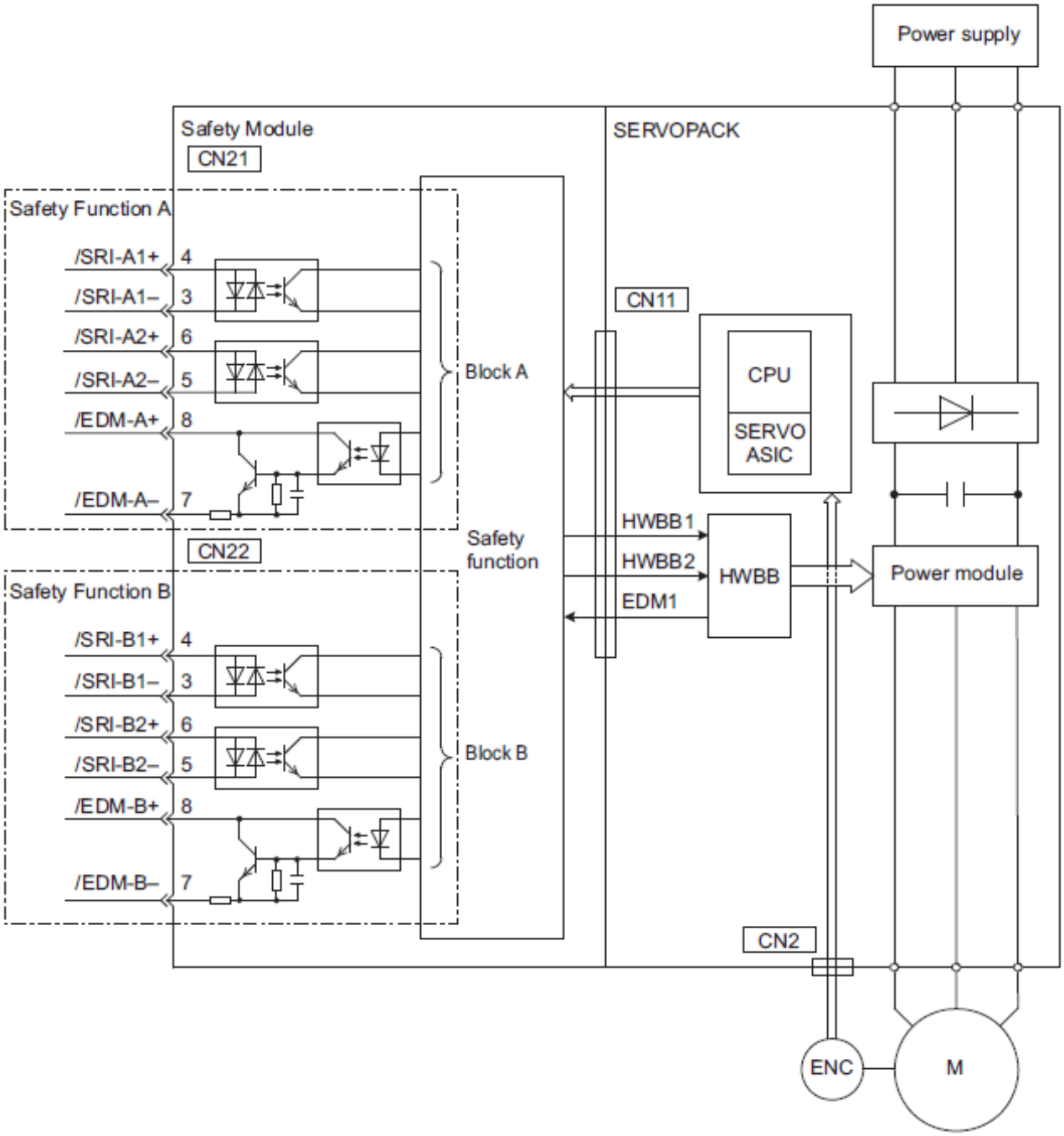
(Side view of the Σ-7W (400V input power models))

Note: For the names of the SERVOPACK parts, refer to the manual for your SERVOPACK.

2.4. Internal Block Diagram

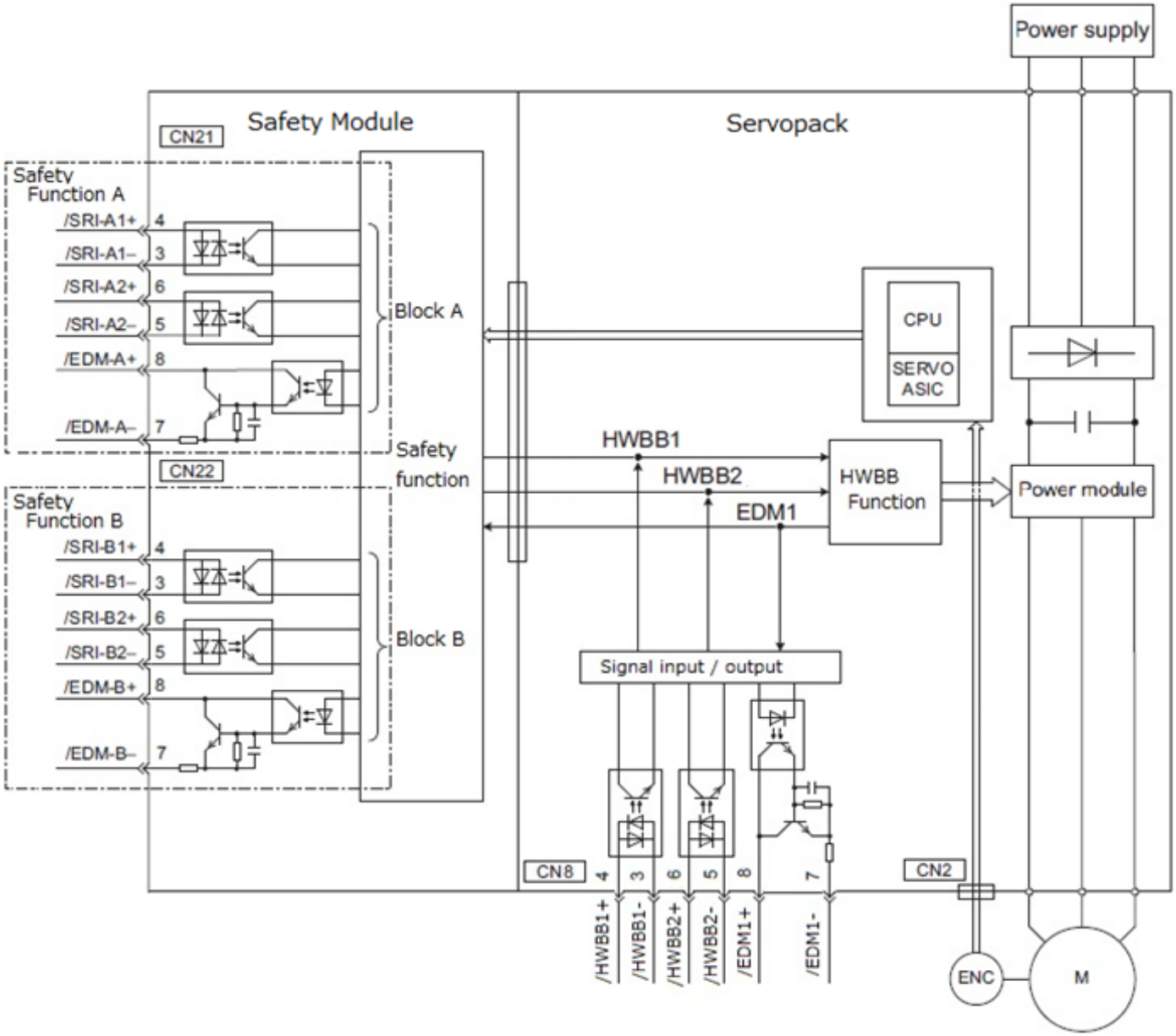
2.4.1. SGD7S-□□□D□0□ + SGDV-OSA01A

This figure shows a typical internal block diagram.
The CN8 of the SERVOPACK is not available. Connect the jumper-connector to the CN8.



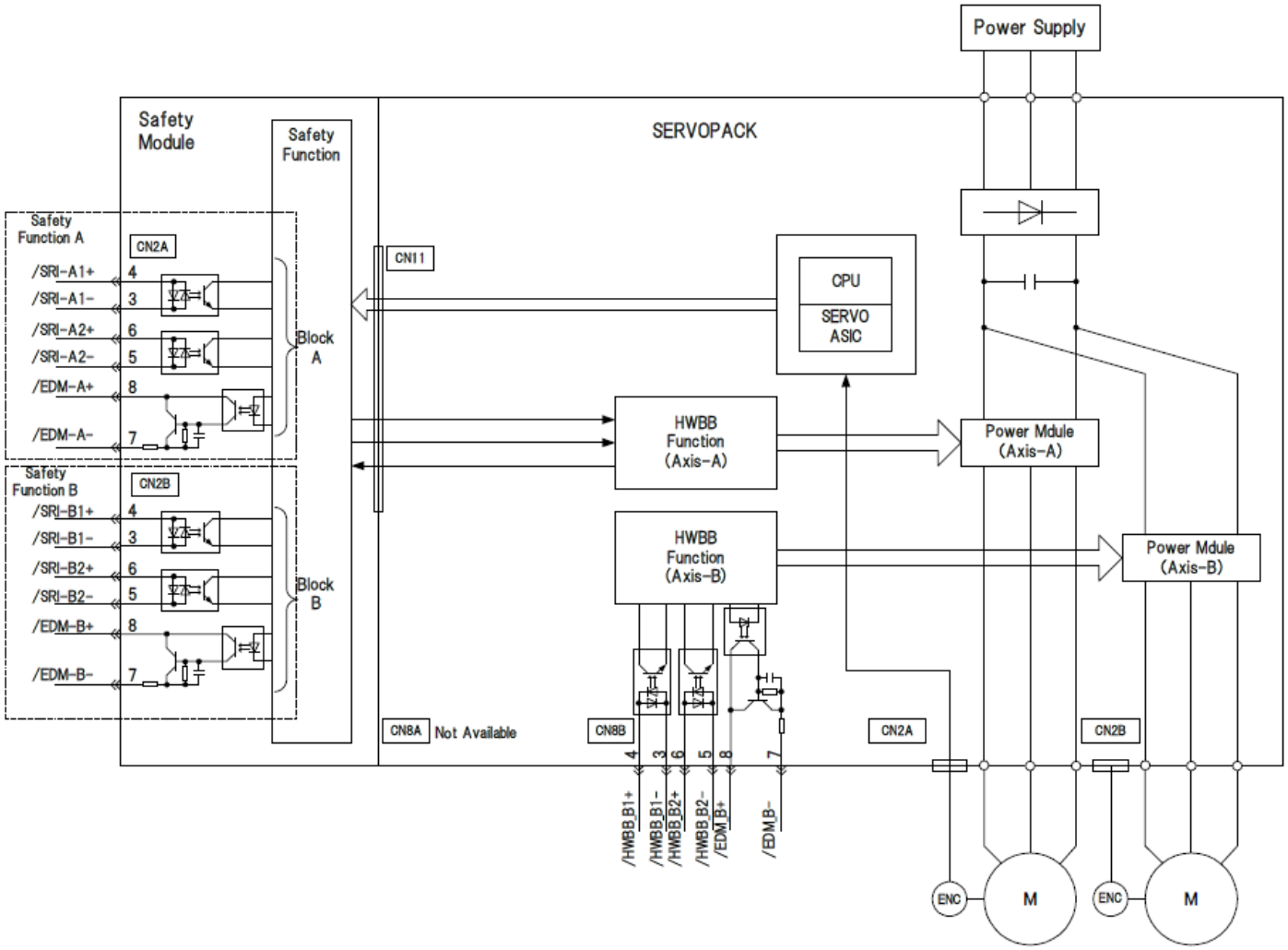
2.4.2. SGD7S-□□□D□0□ + SGDV-OSA01A000FT900

This figure shows in case of using the CN8 of the SERVOPACK.
If the CN8 is not used (i.e. connected the jumper connector), its internal block diagram is same as chapter 2.4.1.



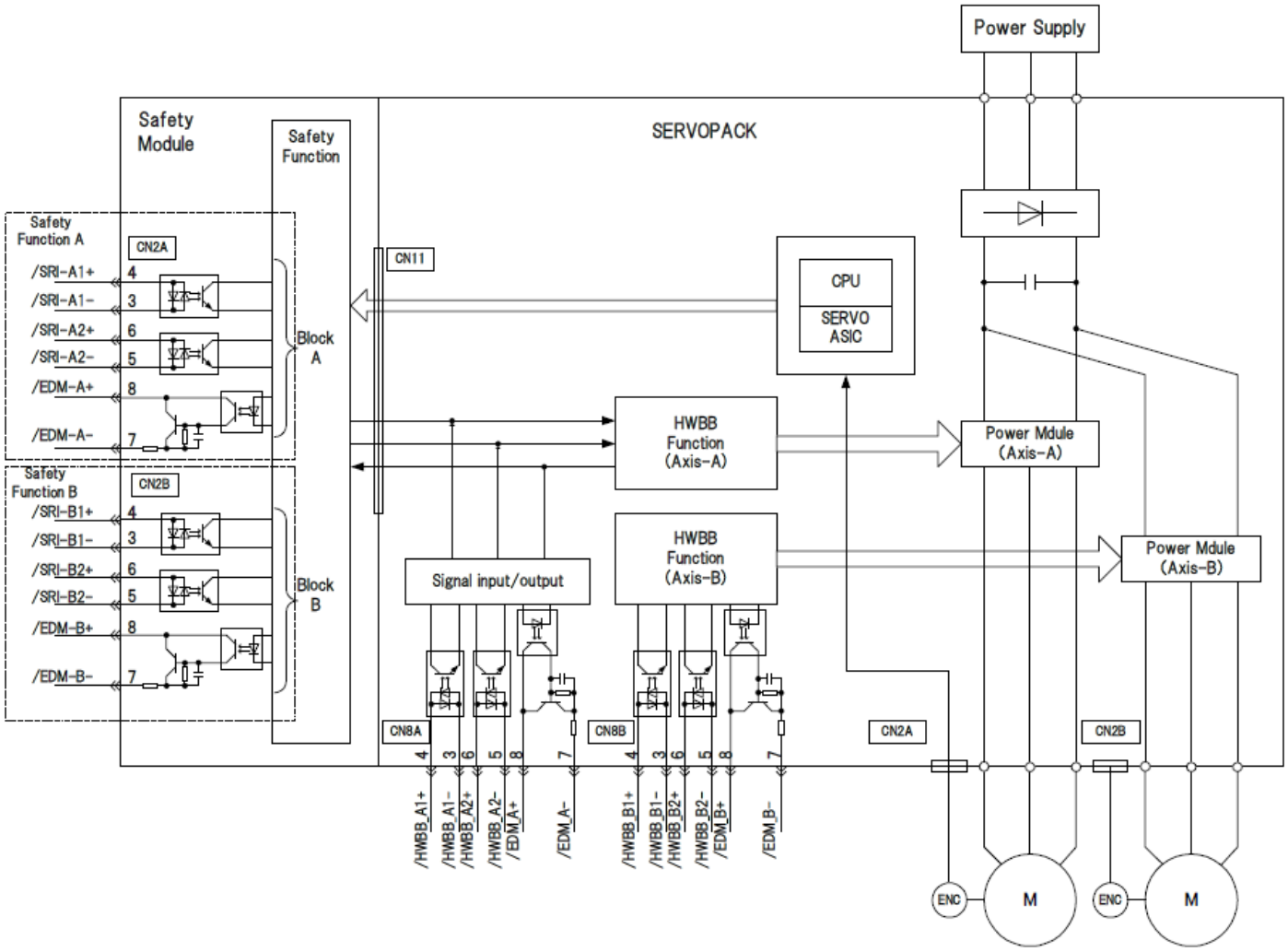
2.4.3. SGD7W-□□□D□0□ + SGDV-OSA01A

SERVOPACK CN8A is not available. The safety jumper connector should be connected to CN8A.



2.4.4. SGD7W-□□□D□0□ + SGDV-OSA01A000FT900

This figure shows in case of using the CN8A of the SERVOPACK.
If the CN8A is not used (i.e. connected the jumper connector), its internal block diagram is same as chapter 2.4.3.



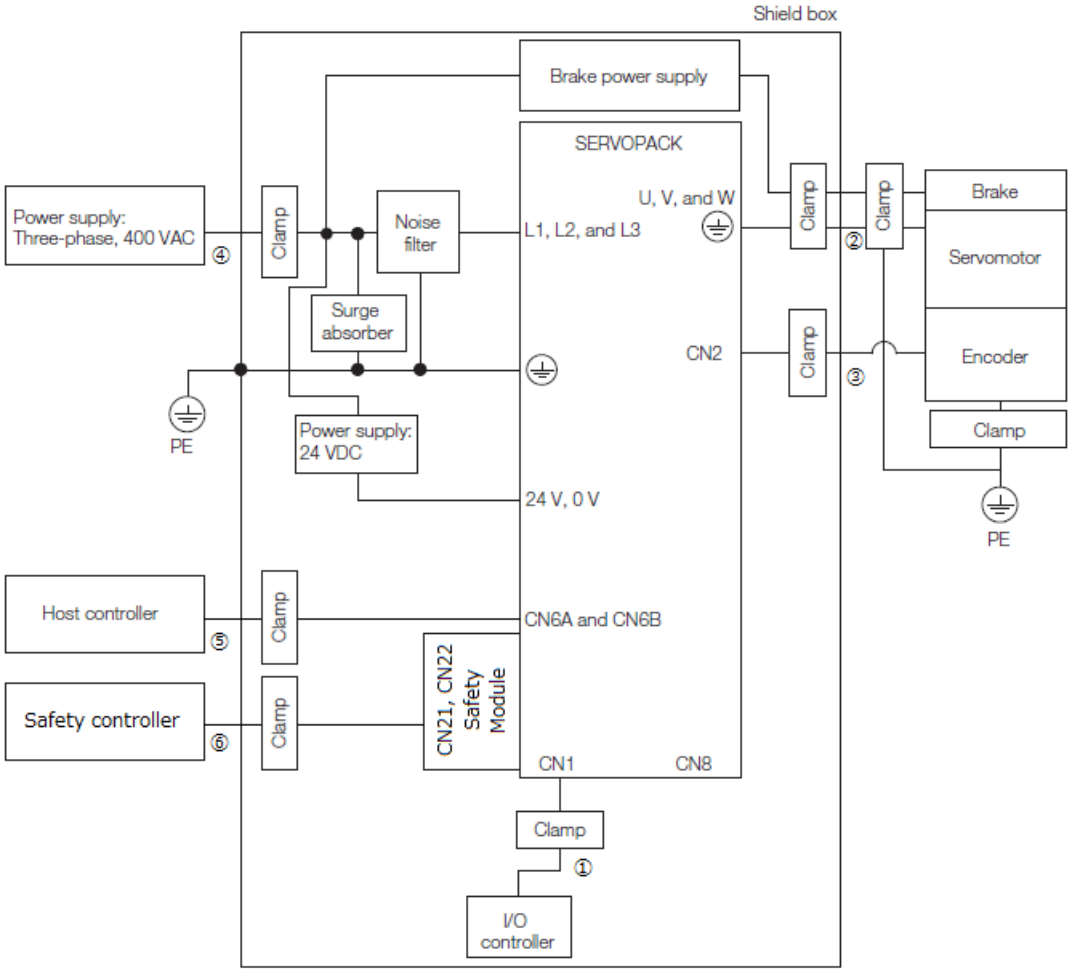
3. SERVOPACK Installation

3.1. EMC Installation Conditions

This section gives the installation conditions that were used for EMC certification testing.
The EMC installation conditions that are given here are the conditions that were used to pass testing criteria at Yaskawa. The EMC level may change under other conditions, such as the actual installation structure and wiring conditions. These Yaskawa products are designed to be built into equipment. Therefore, you must implement EMC measures and confirm compliance for the final equipment.
The applicable standards are EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3 (category C2, second environment).

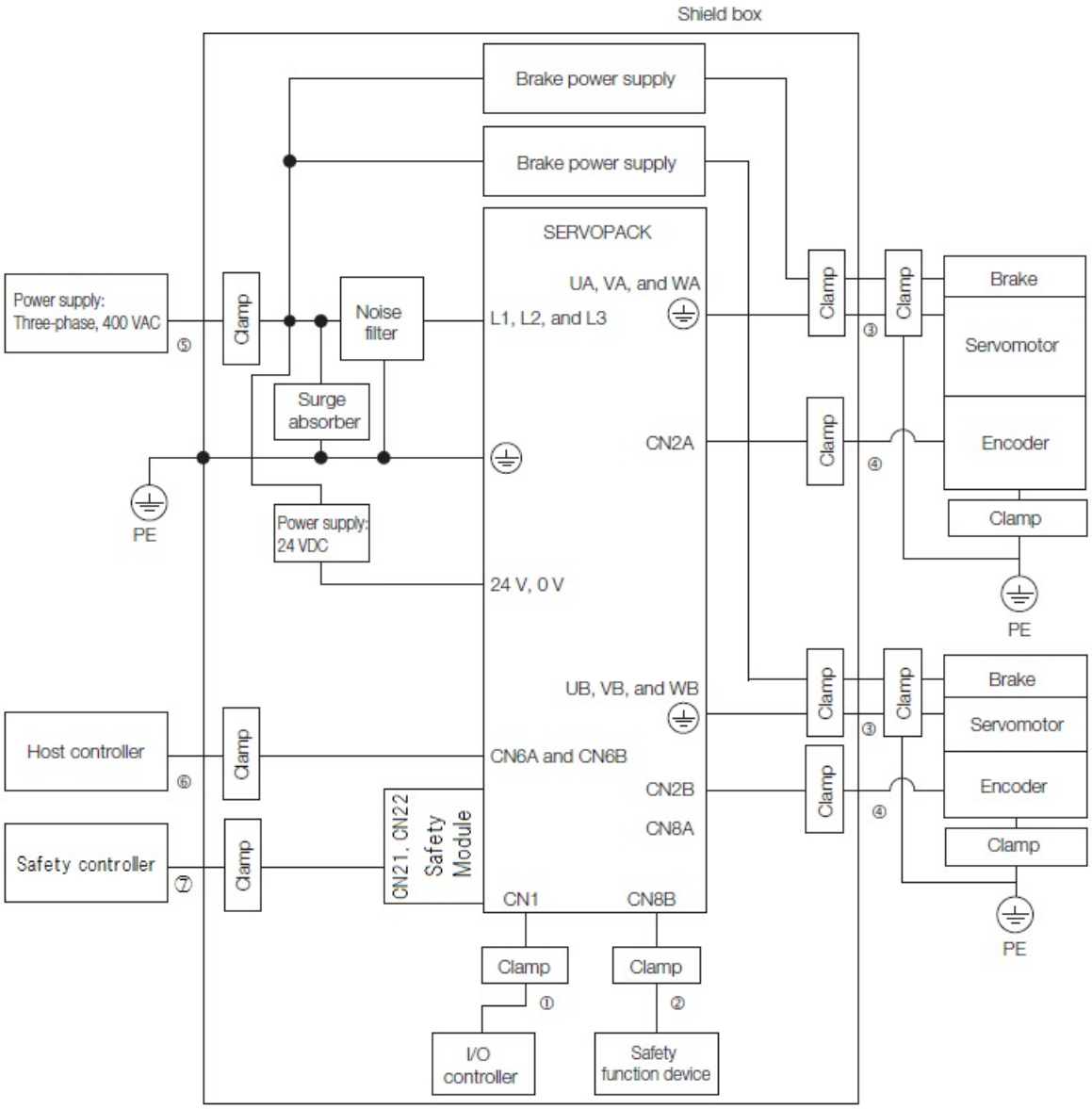
3.1.1. SGDV-OSA01A

■Three-Phase, 400 VAC
・SGD7S-□□□D□0□ + SGDV-OSA01A



Symbol	Cable Name	Specification
①	I/O Signal Cable	Shielded cable
②	Servomotor Main Circuit Cable	Shielded cable
③	Encoder Cable	Shielded cable
④	Main Circuit Power Cable	Shielded cable
⑤	Communications Cable	Shielded cable
⑥	Safety signal cable	Shielded cable

■三相 400V
·SGD7W-□□□D□0□ + SGDV-OSA01A

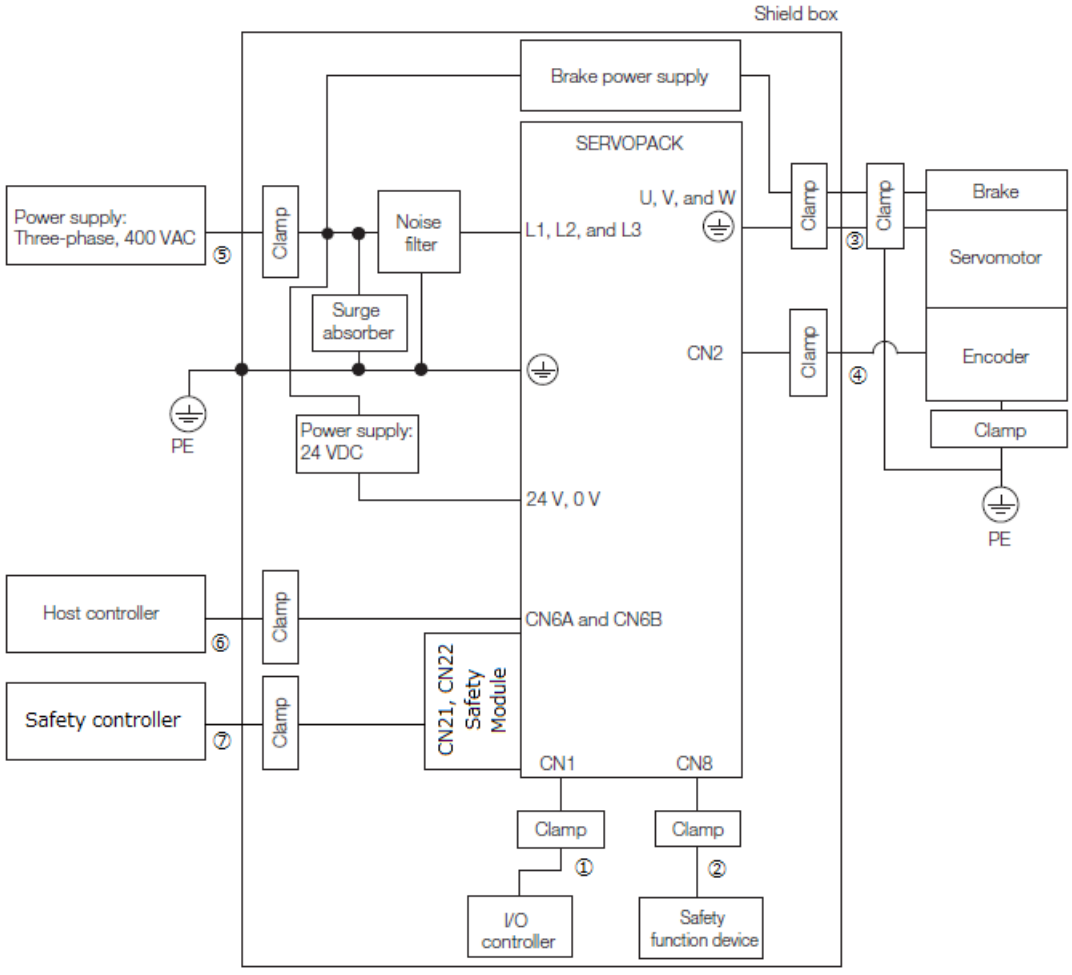


Symbol	Cable Name	Specification
①	I/O Signal Cable	Shielded cable
②	Safety Function Device Cable	Shielded cable
③	Servomotor Main Circuit Cable	Shielded cable
④	Encoder Cable	Shielded cable
⑤	Main Circuit Power Cable	Shielded cable
⑥	Communications Cable	Shielded cable
⑦	Safety Function Device Cable	Shielded cable

3.1.2. SGDV-OSA01A000FT900

This wiring example shows in case of using SGDV-OSA01A000FT900 and applicable SERVOPACK, and the HWBB signal is connected to the CN8 of the SERVOPACK.
If you do not use the CN8 of the SERVOPACK, you shall connect the jumper connector to the CN8. In that case, the wiring is same as the chapter 3.1.1 .

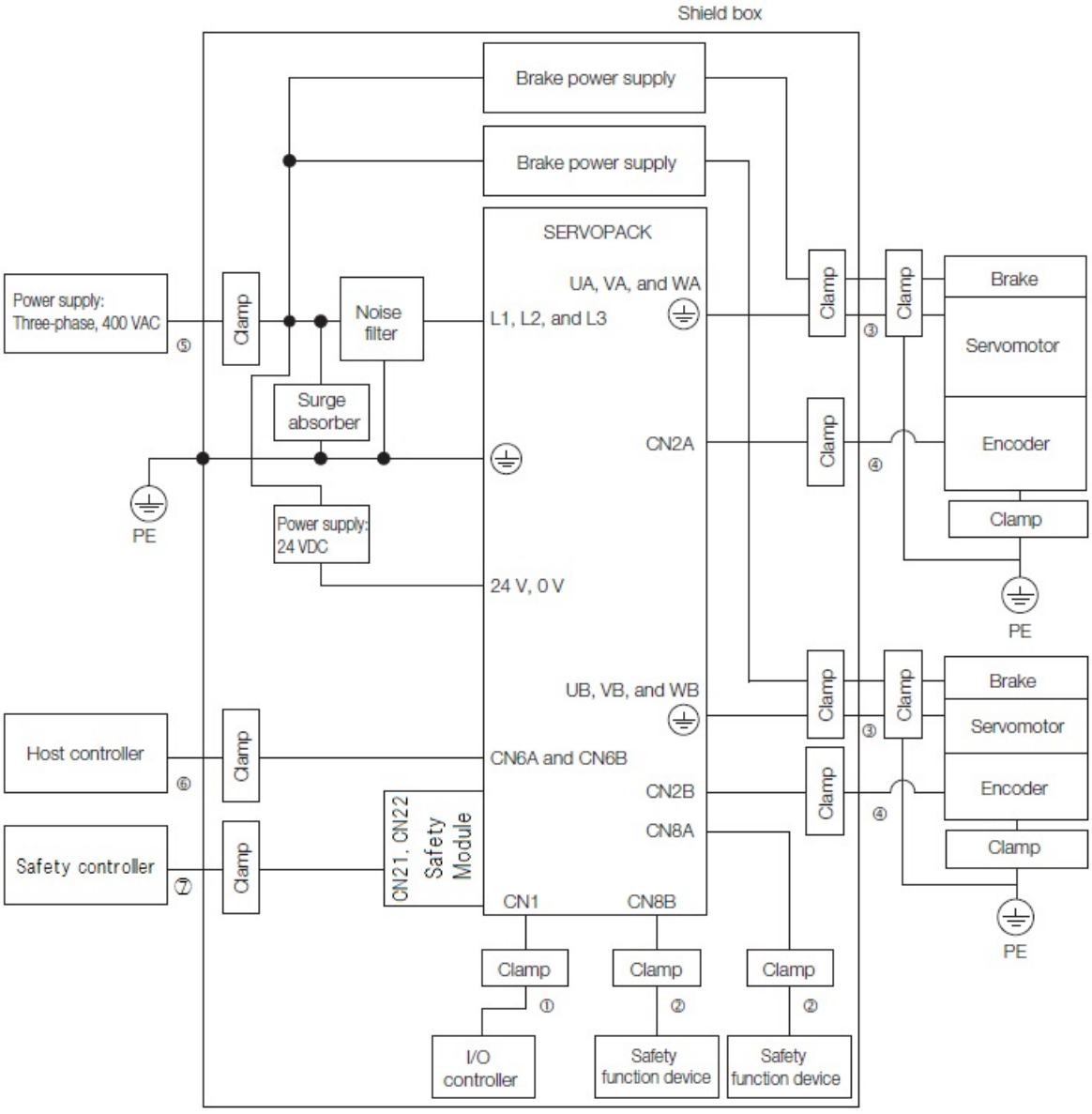
■Three-Phase, 400 VAC
・SGD7S-□□□D□0□ + SGDV-OSA01A000FT900



Symbol	Cable Name	Specification
①	I/O Signal Cable	Shielded cable
②	Safety Function Device Cable	Shielded cable
③	Servomotor Main Circuit Cable	Shielded cable
④	Encoder Cable	Shielded cable
⑤	Main Circuit Power Cable	Shielded cable
⑥	Communications Cable	Shielded cable
⑦	Safety Function Device Cable	Shielded cable

■Three-Phase, 400 VAC

·SGD7W-□□□D□0□ + SGDV-OSA01A000FT900



Symbol	Cable Name	Specification
①	I/O Signal Cable	Shielded cable
②	Safety Function Device Cable	Shielded cable
③	Servomotor Main Circuit Cable	Shielded cable
④	Encoder Cable	Shielded cable
⑤	Main Circuit Power Cable	Shielded cable
⑥	Communications Cable	Shielded cable
⑦	Safety Function Device Cable	Shielded cable

4. Wiring and Connection

The wiring and electrical specifications of CN21/CN22 are same regardless of the Safety Module models.
Refer to manual of the Safety Module.
In addition, when using HWBB function of the CN8□, refer to SERVOPACK's manual about HWBB function.

5. Precautions and Basic Settings Required before Starting Operation

Check the operation of the safety functions with reference to a list shown below.

Safety Module	Combination of the SERVOPACK	CN8	安全機能の動作確認		
			HWBB(CN8)	安全機能 A	安全機能 B
SGDV-OSA01A	SGD7S-□□□D□0□	CN8	Not required (Not available)	✓	✓
	SGD7W-□□□D□0□	CN8A	Not required (Not available)		
		CN8B	✓		
SGDV-OSA01A000FT900	SGD7S-□□□D□0□	CN8	✓		
	SGD7W-□□□D□0□	CN8A	✓		
		CN8B	✓		

✓ : Required.

In addition, for precautions that are not described in this chapter, refer to the manual of the Safety Module.

5.1. Checking the Operation

When starting the system or replacing a SERVOPACK for maintenance or inspection purposes, make sure that the relevant External Device Monitor Output Signal turns ON when the redundant Safety Request Input Signals turn OFF. Failure of the safety functions can be detected by monitoring the Safety Request Input Signals and the External Device Monitor Output Signals.
The following table shows the logic for the Safety Request Input Signals and the External Device Monitor Output Signals.

■HWBB function (CN8) : SGD7S-□□□D□0□

Signal Name	Code	Logic			
HWBB Input signal 1	HWBB1	ON	ON	OFF	OFF
HWBB Input signal 2	HWBB2	ON	OFF	ON	OFF
External Device Monitor Output Signal 1	EDM1	OFF	OFF	OFF	ON

Note :
1. ***EDM1 signal output*** is in unstable condition right after control power for SERVOPACK turns ON (Max. 10 seconds). Execute checking above after 10 seconds passed after control power turns ON.
2. Input both Safety Request Input A and Safety Request Input B as ON "No Safety Function activates". When ***Safety Request Input Signal A*** or ***Safety Request Input Signal B*** is activated (***Safe (HWBB) state***), the ***EDM1*** shows "ON" regardless of the condition of ***HWBB input signal***.

■HWBB function (CN8A/CN8B) : SGD7W-□□□D□0□

信号名	記号	論理			
HWBB Input signal 1	HWBB_□1	ON	ON	OFF	OFF
HWBB Input signal 2	HWBB_□2	ON	OFF	ON	OFF
External Device Monitor Output Signal 1	EDM_□	OFF	OFF	OFF	ON

□:CN8A=A, CN8B=B

Note :

1. ***EDMA, EDMB signal outputs*** are in unstable condition right after control power for SERVOPACK turns ON (Max. 10 seconds).
   Execute checking above after 10 seconds passed after control power turns ON.
2. Input both Safety Request Input A and Safety Request Input B as ON "No Safety Function activates".
   When ***Safety Request Input Signal A*** or ***Safety Request Input Signal B*** is activated (***Safe (HWBB) state***), the ***EDM_A*** shows "ON" regardless of the condition of ***HWBB input signal (CN8A:Axis A)***.
   In the other hand, Axis B is not effected from the Safety FunctionsA/B of the Safety Module.

■Safety Function A : Safety Module

Signal Name	Code	Logic			
Safety Request Input Signal A1	SRI-A1	ON	ON	OFF	OFF
Safety Request Input Signal A2	SRI-A2	ON	OFF	ON	OFF
External Device Monitor Output Signal A	EDM-A	OFF	OFF	OFF	ON

■Safety Function B : Safety Module

Signal Name	Code	Logic			
Safety Request Input Signal B1	SRI-B1	ON	ON	OFF	OFF
Safety Request Input Signal B2	SRI-B2	ON	OFF	ON	OFF
External Device Monitor Output Signal B	EDM-B	OFF	OFF	OFF	ON

6. Safety Functions

Refer to the manual of the Safety Module because the Safety functions of the Safety Module are same regardless of the Safety module model.

In addition, in case of using the combination of the SERVOPACK and SGDV-OSA01A000FT900, when using HWBB function of the CN8□, refer to SERVOPACK's manual about HWBB function.

7. Setting Parameters

Refer to the manual of the Safety Module because the parameters related to the safety functions of the Safety Module are same regardless of the Safety module model.
For the parameters of the SERVOPACK, refer to the manual for your SERVOPACK.

8. Utility Functions

Refer to the manual of the Safety Module because the utility functions related to the Safety Module are same regardless of the Safety module model.
For the utility functions of the SERVOPACK, refer to the manual for your SERVOPACK.

9. Monitor Mode

Refer to the manual of the Safety Module because the monitor modes related to the Safety Module are same regardless of the Safety module model.
In addition, in case of using SGDV-OSA01A000FT900, the Monitor ***Un015*** is available and shown in this chapter.

9.1. List of Monitor Modes

The monitor modes related to the Safety Module are shown below. For details on monitor mode, refer to the manual for your SERVOPACK.

Un No.	Display Contents	Reference
Un015	Safety I/O Signal Monitor	9.2.1
Un016 *	Safety Module I/O Signal Monitor	Refer to the manual of the Safety Module. When using SGD7W-□□□D□0□, the monitors are for Axis A only. Do not use the monitors for Axis B.
Un017 *	Safety Module Safety Function Status	
Un018 *	Safety Module System Status	
Un019 *	Time A until Arrival at Safety Speed	
Un01A *	Time B until Arrival at Safety Speed	
Un01B	Active Mode Reference Speed	
Un01C	Safety Module Motor Speed	
Un01D	Safety Module Motor Position	
Un01E	Safety Module Monitoring Speed A	
Un01F	Safety Module Monitoring Speed B	

* When the following alarms are occurred, these parameters are not displayed on the digital operator and the panel.
- Alarm A.C90 (Encoder Communications Error)
- Alarm A.C91 (Encoder Communications Position Data Error)
- Alarm A.C92 (Encoder Communications Timer Error)

9.2. Monitoring from the Panel Operator and Digital Operator

9.2.1. Safety I/O Signal Monitor(Un015)

■When using with SGDV-OSA01A
All digits are always shown as being ***ON(low level)*** (∗ In this case, monitor is not enabled).

■When using the combination of SGD7S-□□□D□0□ and SGDV-OSA01A000FT900
The safety I/O signal monitor (Un015) is displayed as shown below. The top indicates ***OFF (high level)*** and the bottom indicates ***ON (low level)***.
Undefined digits (3rd digit to 8th digit) are always shown as being ***ON (low level)***.

・SGD7S-□□□D□0□

A condition of SGDV-OSA01A000FT900		A condition of HWBB input signal to SERVOPACK CN8		Indication of Un015	
Safety function A	Safety function B	/HWBB1 input	/HWBB2 input	2nd digit	1st digit
Safety Function is not active	Safety Function is not active	ON	ON	ON (low)	ON (low)
		ON	OFF	ON (low)	OFF (high)
		OFF	ON	OFF (high)	ON (low)
		OFF	OFF	OFF (high)	OFF (high)
Safety Function is not active	Safe (HWBB) Condition	No effect	No effect	OFF (high)	OFF (high)
Safe (HWBB) Condition	Safety Function is not active	No effect	No effect	OFF (high)	OFF (high)
Safety-function-part Alarm A.EB0, A.EB2, A.EB3, A.EB4, A.EB5, A.EB6 A.EB7, A.EB8, A.EB9, A.EBA		No effect	No effect	OFF (high)	OFF (high)

In this way, when both the Safety function A and B of the Safety Module are not in the Safe(HWBB) state, Un015 shows a input signal condition of the CN8.
When when either the Safety function A or B of the Safety Module are in the Safe(HWBB) state, Un015 shows only ***OFF (high level)*** regardless of the input signal condition of the CN8

Therefore, when using this monitor, the Safety function of the Safety Module should not be activated.

・SGD7W-□□□D□0□:Axis A

A condition of SGDV-OSA01A000FT900		A condition of HWBB input signal to SERVOPACK CN8A		Indication of Un015 (Axis A)	
Safety function A	Safety function B	/HWBB-A1 input	/HWBB-A2 input	2nd digit	1st digit
安全機能非実行	安全機能非実行	ON	ON	ON (low)	ON (low)
		ON	OFF	ON (low)	OFF (high)
		OFF	ON	OFF (high)	ON (low)
		OFF	OFF	OFF (high)	OFF (high)
安全機能非実行	安全(HWBB)状態	No effect	No effect	OFF (high)	OFF (high)
安全(HWBB)状態	安全機能非実行	No effect	No effect	OFF (high)	OFF (high)
以下のアラームが発生している状態 A.EB0, A.EB2, A.EB3, A.EB4, A.EB5, A.EB6 A.EB7, A.EB8, A.EB9, A.EBA		No effect	No effect	No effect	OFF (high)

In this way, when both the Safety function A and B of the Safety Module are not in the Safe(HWBB) state, Un015 shows a input signal condition of the CN8A.
When when either the Safety function A or B of the Safety Module are in the Safe(HWBB) state, Un015 shows only ***OFF (high level)*** regardless of the input signal condition of the CN8A

Therefore, when using this monitor, the Safety function of the Safety Module should not be activated.

・SGD7W-□□□D□0□: Axis B

A condition of SGDV-OSA01A000FT900		A condition of HWBB input signal to SERVOPACK CN8B		Indication of Un015 (Axis B)	
Safety function A	Safety function B	/HWBB-B1 input	/HWBB-B2 input	2nd digit	1st digit
		ON	ON	ON (low)	ON (low)
		ON	OFF	ON (low)	OFF (high)
		OFF	ON	OFF (high)	ON (low)
		OFF	OFF	OFF (high)	OFF (high)

Un015 shows a input signal condition of the CN8B regardless of the Safety Module condition.

10. Active Mode Function

IMPORTANT	The Active Mode Function is available for Σ-7S (400V) and Axis A of Σ-7W (400V).

The specification of monitoring Active mode function is different from the other SERVOPACKs because Σ-7S SERVOPACK with 400 V-Input Power model has five output signals in the CN1. Other feature is same.
In addition, for Active mode function that are not described in this chapter, refer to the manual of the Safety Module.

10.1. Basic Function

10.1.1. Monitoring Active Mode Function

Whether Active Mode Function is operating can be monitored by the following methods:

- All SERVOPACKs: Allocating the Active Mode output signal (/ACT_MOD) to CN1.
- M-III communications reference model: Using the I/O signal monitor (SVCMD_IO) field.
- Command option attachable type: Depends on the Command Option Module.
  For details, refer to the user's manual of the Command Option Module connected to the SERVOPACK being used.

(1) Active Mode ON Signal

The operation of Active Mode Function can be monitored by allocating the Active Mode ON Signal to an output signal on CN1 of the SERVOPACK.

■Active Mode ON Signal Allocations(Σ-7S SERVOPACK with 400 V-Input Power model,)

Output Signal Names and Parameters	Output Signal	Cn1 Pin No.					Disabled (Not Used)
		1 (2)	23 (24)	25 (26)	27 (28)	29 (30)	
Active Mode ON Signal Pn518.0	/ACT_MOD	1	2	3	4	5	0 (Factory setting)
Pn512.0=1	Polarity inversion						0 (Factory setting: Polarity not inverted)
Pn512.1=1	Polarity inversion						
Pn512.2=1	Polarity inversion						
Pn512.3=1	Polarity inversion						
Pn513.0=1	Polarity inversion						

■Active Mode ON Signal Allocations(Σ-7W SERVOPACK with 400 V-Input Power model, using Σ-7S-compatible I/O signal allocations)

Output Signal Names and Parameters	Output Signal	Cn1 Pin No.				Disabled (Not Used)
		Aixs A: 1 (2)	Axis B: 23(24)	Axis A: 25(26)	Axis B: 27(28)	
Active Mode ON Signal Pn518.0	/ACT_MOD	1		2		0 (Factory setting)
Pn512.0=1	Reverse polarity for CN1-1, CN1-2, CN1-23, and CN1-24					0 (Factory setting: Polarity not inverted)
Pn512.1=1	Reverse polarity for CN1-25, CN1-26, CN1-27, and CN1-28					

Note: /ACT_MOD output signal is for Axis A only.

■Active Mode ON Signal Allocations(Σ-7W SERVOPACK with 400 V-Input Power model, using Multi-Axis Output Signal Allocations)

入出力信号コネクタ(CN1) のピン番号に割り付けられる出力信号とパラメータ設定の関係を以下に示します。

Output signal	Output Signal Name	Parameter
/ACT_MOD	Active Mode ON Signal	Pn5BF

Relationship between Parameter Settings and Pin Numbers (/ACT_MOD)

Parameter		Description	When Enabled	Classification
Pn5BF	n.□000 [Factory setting]	Disable (the signal output is not used).	After restart	Setup
	n.□001 *	Allocate the signal to CN1-1, -2.		
	n.□023 *	Allocate the signal to CN1-23, -24.		
	n.□025 *	Allocate the signal to CN1-25, -26.		
	n.□027 *	Allocate the signal to CN1-27, -28.		
	n.□029 *	Allocate the signal to CN1-29, -30.		

* If Pn5BF is set to n.1□□□ (Output the signal) or n.2□□□ (Invert the signal and output it) and Pn5BF is not set to any of these values, an A.040 alarm (Parameter Setting Error) will occur.

Relationship between Parameter Settings and Polarities (/ACT_MOD)

Parameter		Description	When Enabled	Classification
Pn5BF	n.0□□□ [Factory setting]	Disable (the signal output is not used).	After restart	Setup
	n.1□□□	Output the signal.		
	n.2□□□	Invert the signal and output it.		

(2) MECHATROLINK-III I/O Signal Monitor (SVCMD_IO) Field

If the Active Mode ON Signal is allocated to CN1 in a SERVOPACK with MECHATROLINK-III communications, the operating state of the Active Mode Function can be monitored in IO1 to IO8 in the I/O signal monitor (SVCMD_IO) field. The following tables provide information on the allocation of the output signal monitor and the I/O signal monitor (SVCMD_IO) field. For details on allocation of the Active Mode ON Signal, refer to ***(1) Active Mode ON Signal.***

■Monitor Information Allocation(Σ-7S SERVOPACK with 400 V-Input Power model)

Parameter No.	Name	Setting Range	Units	Factory Setting	When Enabled
Pn868	SVCMD_IO (output signal monitor) Allocation 1	0000 to 1717	—	n.0000	Immediately
Pn869	SVCMD_IO (output signal monitor) Allocation 2	0000 to 1717	—	n.0000	Immediately
Pn86A	SVCMD_IO (output signal monitor) Allocation 3	0000 to 1717	—	n.0000	Immediately

Details	SVCMD_IO (I/O signal monitor) Bit Position Allocation		Remarks
Pn868.0	Allocation of bit position for monitoring the CN1-1, 2 output signal.		—
	0	D24 (IO_STS1)	—
	1	D25 (IO_STS2)	—
	2	D26 (IO_STS3)	—
	3	D27 (IO_STS4)	—
	4	D28 (IO_STS5)	—
	5	D29 (IO_STS6)	—
	6	D30 (IO_STS7)	—
	7	D31 (IO_STS8)	—
Pn868.1	Enables or disables the allocated bit position for monitoring the CN1-1, 2 output signal.		—
	0	Disabled	—
	1	Enabled	—
Pn868.2	Allocation of bit position for monitoring the CN1-23, 24 output signal.		—
	0 ～ 7	Same settings for the CN1-1, 2 output signal	—
Pn868.3	Enables or disables the allocated bit position for monitoring the CN1-23, 24 output signal.		—
	0	Disabled	—
	1	Enabled	—
Pn869.0	Allocation of bit position for monitoring the CN1-25, 26 output signal.		—
	0 ～ 7	Same settings for the CN1-1, 2 output signal	—
Pn869.1	Enables or disables the allocated bit position for monitoring the CN1-25, 26 output signal.		—
	0	Disabled	—
	1	Enabled	—
Pn869.2	Allocation of bit position for monitoring the CN1-27, 28 output signal.		—
	0 ～ 7	Same settings for the CN1-1, 2 output signal	—
Pn869.3	Enables or disables the allocated bit position for monitoring the CN1-27, 28 output signal.		—
	0	Disabled	—
	1	Enabled	—

Details	SVCMD_IO (I/O signal monitor) Bit Position Allocation		Remarks
Pn86A.0	Allocation of bit position for monitoring the CN1-29, 30 output signal.		—
	0 ～ 7	Same settings for the CN1-1, 2 output signal	—
Pn86A.1	Enables or disables the allocated bit position for monitoring the CN1-29, 30 output signal.		—
	0	Disabled	—
	1	Enabled	—
Pn86A.2	—	Reserved (Do not change)	—
Pn86A.2	—	Reserved (Do not change)	—

■Monitor Information

Bit	Name	Description	Value	I/O Status
D24 ～ D31	IO_STS1 ～ IO_STS8	Monitors the CN1 output signal	0	OFF (Output transistor is open.)
			1	ON (Output transistor is closed.)
		Indicates the status of the CN1 output signal. Use any of the Pn868, Pn869 and Pn86A to allocate bit positions for monitoring the CN1 output signal. When using these parameters, if the same bit position is allocated to more than two signals, the logical OR operator is used to send a signal.		

11. Troubleshooting

All alarms of the Safety Module are same regardless of the Safety Module model.
In addition, when using the combination of Σ-7S / Σ-7W SERVOPACK with 400 V-Input Power model and the Safety Module, troubleshooting against several alarms are different.
For alarms that are not described in this chapter, refer to the manual of the Safety Module.

11.1. List of Alarms

Refer to the manual of the Safety Module.

11.2. Troubleshooting of Alarms

Alarm No.	Alarm Name	Cause	Investigative Action	Corrective Action
A.E74	Safety Option Module Nonsupport	A safety function jumper connector is connected to the CN8. * Excepting the *Σ-7S / Σ-7W SERVOPACK with 400 V-Input Power models.*	Make sure that the safety function jumper connector is not connected to the CN8 in the SERVOPACK.	Remove the safety function jumper connector that is connected to the CN8 in the SERVOPACK.
		A Safety option module that its SERVOPACK(*) does not support is connected. *: This means that excepting the *Σ-7S / Σ-7W SERVOPACK with 400 V-Input Power models.* When the SERVOPACK is not applied to *SGDV-OSA01AFT900*, this alarm occurs.	・Check the model of the Safety Option Module. ・Check for models of the Safety Option Module that are supported by the SERVOPACK.	・Install a Safety Option Module that is supported by the SERVOPACK. ・Replace the Safety Option Module. ・Replace the SERVOPACK
		An error occurred in the system of the Safety Option Module.	—	Replace the Safety Option Module.
A.EB3	HWBB Circuit Malfunction	An error occurred in the HWBB circuit of the SERVOPACK.	■Excepting the *Σ-7S / Σ-7W SERVOPACK with 400 V-Input Power models.* ・Make sure that the safety function jumper connector is not connected to the CN8 of the SERVOPACK.	Remove the safety function jumper connector that is connected to the CN8 of the SERVOPACK.
			■When using the combination of the *Σ-7S / Σ-7W SERVOPACK with 400 V-Input Power models and SGDV-OSA01A(Standard model).(*1)* ・Make sure that the safety function jumper connector is connected to the CN8 of the SERVOPACK.	Connect the safety function jumper connector to the CN8(Σ-7S) or CN8A(Σ-7W) of the SERVOPACK.
			—	・Restart the system. ・Replace the SERVOPACK. ・Replace the Safety Module.

*1：When using the SGDV-OSA01A000FT900, alarm A.EB3 does not occur with this factor.

12. Appendix

12.1. Safety-related Module Parameters

Parameter No.	Name	Setting Range	Units	Factory Setting	When Enabled
Pc00	Safety Function Selection Switch	-	-	n.0002	After resetting the system
Pc00.1	Safety Function A Selection				
	0	No safety function			
	1	Safe BaseBlock Function (SBB function)			
	2	Safe BaseBlock with Delay Function (SBB-D function)		Factory setting	
	3	Safe Position Monitor with Delay Function (SPM-D function)			
	4	Safely Limited Speed with Delay Function (SLS-D function)			
	5～F	Reserved (Do not use.)			
Pc00.2	Safety Function B Selection				
	0	No safety function		Factory setting	
	1	Safe BaseBlock Function (SBB function)			
	2	Safe BaseBlock with Delay Function (SBB-D function)			
	3	Safe Position Monitor with Delay Function (SPM-D function)			
	4	Safely Limited Speed with Delay Function (SLS-D function)			
	5～F	Reserved (Do not use.)			
Pc00.3	Reserved (Do not use.)				
Pc00.4	Reserved (Do not use.)				

Parameter No.	Name	Setting Range	Units	Factory Setting	When Enabled
Pc01	EDM Signal Output Selection Switch	-	-	n.0011	After resetting the system
Pc01.1	EDM Signal A Output Setting				
	0	The EDM-A signal turns ON while the safety function of Safety Function A is operating.			
	1	The EDM-A signal turns ON while Safety Function A is in the safe state.			
	2～F	Reserved (Do not use.)			
Pc01.2	EDM Signal B Output Setting				
	0	The EDM-B signal turns ON while the safety function of Safety Function B is operating.			
	1	The EDM-B signal turns ON while Safety Function B is in the safe state.			
	2～F	Reserved (Do not use.)			
Pc01.3	Reserved (Do not change.)				
Pc01.4	Reserved (Do not change.)				

Parameter No.	Name	Setting Range	Units	Factory Setting	When Enabled
Pc02～Pc0F	Reserved (Do not change.) ＊ When using SGDV-OSA01A000FT900, Pc0A is displayed on the digital operator. In addition, it is not displayed on SigmaWin+. However, do not change it regardless of the display conditions. ＊ Factory setting of reserved parameter is zero.				
Pc10	Deceleration Waiting Time A	0 to 10000	10[ms]	0	After resetting the system
Pc11	Deceleration Monitoring Time A	0 to 10000	10[ms]	500	After resetting the system
Pc12	Limited Speed A on Waiting for Deceleration	0 to 10000	Rotational motor: min^{-1} Linear motor: mm/s	0	After resetting the system
Pc13	Limited Distance A	1 to 65535	edge	10	After resetting the system
Pc14	Limited Constant Speed A	0 to 10000	Rotational motor: min^{-1} Linear motor: mm/s	0	After resetting the system
Pc15～Pc1F	Reserved (Do not change.) ＊ Factory setting of reserved parameter is zero.				
Pc20	Deceleration Waiting Time B	0 to 10000	10[ms]	0	After resetting the system
Pc21	Deceleration Monitoring Time B	0 to 10000	10[ms]	500	After resetting the system
Pc22	Limited Speed B on Waiting for Deceleration	0 to 10000	Rotational motor: min^{-1} Linear motor: mm/s	0	After resetting the system
Pc23	Limited Distance B	1 to 65535	edge	10	After resetting the system
Pc24	Limited Constant Speed B	0 to 10000	Rotational motor: min^{-1} Linear motor: mm/s	0	After resetting the system
Pc25～Pc4F	Reserved (Do not change.) ＊ When using SGDV-OSA01A000FT900, Pc25, Pc27 to Pc2F are displayed on the digital operator. In addition, they are not displayed on SigmaWin+. However, do not change them regardless of the display conditions. ＊ Factory setting of reserved parameter is zero.				

12.2. Safety-related Servo Parameters

Safety-related Servo Parameters are same regardless of the Safety Module models.
Refer to the manual of the Safety Module.

12.3. Parameters Related Active Mode Function

12.3.1. Σ-7S

Parameter No.	SIZE	Name	Setting Range	Units	Factory Setting	When Enabled
Pn518	2	Output Signal Selection 7	—	—	0000	After resetting the system or recalculating parameters
	Active Mode ON Signal Mapping					
	Digit					
	0	0	Disabled			
		1	Outputs the signal from CN1-1, -2 terminal.			
		2	Outputs the signal from CN1-23, -24 terminal.			
		3	Outputs the signal from CN1-25, -26 terminal.			
		4	Outputs the signal from CN1-27, -28 terminal.			
		5	Outputs the signal from CN1-29, -30 terminal.			
		6	Reserved (Do not change.)			
	1	Reserved (Do not change.)				
	2	Reserved (Do not change.)				
	3	Reserved (Do not change.)				
Pn621	2	Application Switch for Safety Function	—	—	0000	After resetting the system or recalculating parameters
	Selection of Active Mode for Safety Function A					
	Digit					
	0	0	Disabled			
		1	Enabled			
		2 ～ F	Reserved (Do not change.)			
	Selection of Active Mode for Safety Function B					
	Digit					
	1	0	Disabled			
		1	Enabled			
		2 ～ F	Reserved (Do not change.)			
	2	Reserved (Do not change.)				
	3	Reserved (Do not change.)				

Parameter No.	SIZE	Name	Setting Range	Units	Factory Setting	When Enabled
Pn622	2	Constant of Deceleration for Safety Function A	1 ～ 30000	Rotational motor : min^{-1}/s Linear motor : mm/s^2	10000	Immediately
Pn623	2	Constant of Deceleration for Safety Function B	1 ～ 30000	Rotational motor : min^{-1}/s Linear motor : mm/s^2	10000	Immediately
Pn624	2	Motor Stop Detection Level for Active Mode	0 ～ 10000	Rotational motor : min^{-1} Linear motor : mm/s	10	Immediately
Pn625	2	Active Mode Hold Time	0 ～ 10000	10ms	100	Immediately
Pn626	4	Position Error Level for Releasing Active Mode	1 ～ 1073741823	1 Reference unit	100	Immediately
Pn628	2	Speed Reference Level for Releasing Active Mode	0 ～ 10000	Rotational motor : min^{-1} Linear motor : mm/s	10	Immediately

12.3.2. Σ-7W

Parameter No.	SIZE	Name	Setting Range	Units	Factory Setting	When Enabled
Pn518	2	Output Signal Selection 7	—	—	0000	After resetting the system or recalculating parameters
	Active Mode ON Signal Mapping					
	Digit					
	0	0	Disabled (the above signal output is not used).			
		1	Axis A: Output the signal from the CN1-1 and CN1-2 output terminals. Axis B: Output the signal from the CN1-23 and CN1-24 output terminals.			
		2	Axis A: Output the signal from the CN1-25 and CN1-26 output terminals. Axis B: Output the signal from the CN1-27 and CN1-28 output terminals.			
		3～6	Reserved settings (Do not use.)			
	1	Refer to the SERVOPACK manuals.				
	2					
	3					
Pn5BF	2	/ACT_MOD (Active Mode On) Signal Allocation	—	—	0000	After resetting the system or recalculating parameters
	Allocated Pin Number					
	Digit					
	0～2	000	Disabled (the above signal output is not used).			
		001	Allocate the signal to CN1-1 and CN1-2.			
		023	Allocate the signal to CN1-23 and CN1-24.			
		025	Allocate the signal to CN1-25 and CN1-26.			
		027	Allocate the signal to CN1-27 and CN1-28.			
		029	Allocate the signal to CN1-29 and CN1-30.			
	Polarity Selection					
	Digit					
	3	0	Disabled (the above signal output is not used).			
		1	Output the above signal.			
		2	Invert the above signal and output it.			

Parameter No.	SIZE	Name	Setting Range	Units	Factory Setting	When Enabled
Pn621	2	Application Switch for Safety Function	—	—	0000	After resetting the system or recalculating parameters
	Selection of Active Mode for Safety Function A					
	Digit					
	0	0	Disabled			
		1	Enabled			
		2 ～ F	Reserved (Do not change.)			
	Selection of Active Mode for Safety Function B					
	Digit					
	1	0	Disabled			
		1	Enabled			
		2 ～ F	Reserved (Do not change.)			
	2	Reserved (Do not change.)				
	3	Reserved (Do not change.)				
Pn622	2	Constant of Deceleration for Safety Function A	1 ～ 30000	Rotational motor : min^{-1}/s Linear motor : mm/s^2	10000	Immediately
Pn623	2	Constant of Deceleration for Safety Function B	1 ～ 30000	Rotational motor : min^{-1}/s Linear motor : mm/s^2	10000	Immediately
Pn624	2	Motor Stop Detection Level for Active Mode	0 ～ 10000	Rotational motor : min^{-1} Linear motor : mm/s	10	Immediately
Pn625	2	Active Mode Hold Time	0 ～ 10000	10ms	100	Immediately
Pn626	4	Position Error Level for Releasing Active Mode	1 ～ 1073741823	1 Reference unit	100	Immediately
Pn628	2	Speed Reference Level for Releasing Active Mode	0 ～ 10000	Rotational motor : min^{-1} Linear motor : mm/s	10	Immediately

12.4. Device Combinations

The models of SERVOPACKs, rotational servomotors and serial converter units listed here can be used in combination with the Safety Module SGDV-OSA01A and SGDV-OSA01A000FT900.

12.4.1. List of applicable SERVOPACKs

■Applicable SERVOPACKs to SGDV-OSA01A

The models of SERVOPACKs that listed on the manual of the Safety Module and listed here can be used in combination with SGDV-OSA01A.

SERVOPACK	
Σ-7S SERVOPACK with 400 V-Input Power model MECHATROLINK-III communication reference, RJ-45 connector type	SGD7S-□□□D30
Σ-7S SERVOPACK with 400 V-Input Power model CoE(CANOpen Over EtherCAT) communication reference	SGD7S-□□□DA0
Σ-7W SERVOPACK with 400 V-Input Power model MECHATROLINK-III communication reference, RJ-45 connector type	SGD7W-□□□D30
Σ-7W SERVOPACK with 400 V-Input Power model CoE(CANOpen Over EtherCAT) communication reference	SGD7W-□□□DA0

■Applicable SERVOPACKs to SGDV-OSA01A000FT900

Only the models of SERVOPACKs listed here can be used in combination with SGDV-OSA01A000FT900.

SERVOPACK	
Σ-7S SERVOPACK with 400 V-Input Power model MECHATROLINK-III communication reference, RJ-45 connector type	SGD7S-□□□D30
Σ-7S SERVOPACK with 400 V-Input Power model CoE(CANOpen Over EtherCAT) communication reference	SGD7S-□□□DA0
Σ-7W SERVOPACK with 400 V-Input Power model MECHATROLINK-III communication reference, RJ-45 connector type	SGD7W-□□□D30
Σ-7W SERVOPACK with 400 V-Input Power model CoE(CANOpen Over EtherCAT) communication reference	SGD7W-□□□DA0

12.4.2. Servomotors

The models of rotational servomotors that listed on the manual of the Safety Module and listed here can be used in combination with SGDV-OSA01A and SGDV-OSA01A000FT900.

Rotational Servomotor Models	
SGM7J Models (Medium Inertia, High Speed), Rated motor speed:3,000 min^{-1}	SGM7J-02D□F
	SGM7J-04D□F
	SGM7J-08D□F
	SGM7J-15D□F
SGM7A Models (Low Inertia, High Speed), Rated motor speed:3,000 min^{-1}	SGM7A-02D□F
	SGM7A-04D□F
	SGM7A-08D□F
	SGM7A-10D□F
	SGM7A-15D□F
	SGM7A-20D□F
	SGM7A-25D□F
	SGM7A-30D□F
	SGM7A-40D□F
	SGM7A-50D□F
SGM7G Models Standard Models (Medium Inertia, Low Speed, High Torque), Rated motor speed:1,500 min^{-1}	SGM7G-05D□F
	SGM7G-09D□F
	SGM7G-13D□F
	SGM7G-20D□F
	SGM7G-30D□F
	SGM7G-44D□F
SGM7G Models High-speed Models (Medium Inertia, High Speed, High Torque) Rated motor speed:1,500 min^{-1}	SGM7G-05D□R
	SGM7G-09D□R
	SGM7G-13D□R
	SGM7G-20D□R

12.4.3. Serial Converter Units

The applicable ***Serial Converter Units*** are same regardless of the Safety Module models.
Refer to the manual of the Safety Module.

Revision History

Rev. No.	Draw	Approve	Date	Revised Content
<0>	K.Ando	T.Kubo	25 June, 2016	First edition
<1>	K.Ando	T.Kubo	13 Sep, 2016	Revision : Front cover : Title
				Revision : About this manual
				Addition : Capter2, Part Names
				Revision : Capter4, Wiring and connection
				Revision : Chapter5, Checking the operation of the Safety functions
				Addition : Chapter10, Active mode monitors
				Addition : Chapter12, Active mode parameters
				Addition : Chapter12, Installation guide
<2>	K.Ando	T.Okubo	2016.11.18	Addition : Σ -7W 400V-Input Power model (All pages revised. Delete : Chapter 12 Installation guide (Refer to Installation guide on “Related Manuals”.