Model Designations

SGD7S - R70 A A0 A 001

Sigma-7 Series SERVOPACKs	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specifications
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5	0.75 kW
7R6	1.0 kW
120	1.5 kW

*1: You can use these models with either a single-phase or three-phase power supply input.

4th digit - Voltage

Code	Specifications
A	200 VAC

5th + 6th digit - Interface *

Code	Specifications
00	Analog voltage/pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
A0	EtherCAT communication reference

7th digit - Design Revision Order

Code	Specifications
A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	
002	Varnished	

* The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

Ratings and Specifications

Ratings

Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [Arms]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	20.1	43.8	53.6	65.8	111.9	113.8	263.7
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22	27
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8	326.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

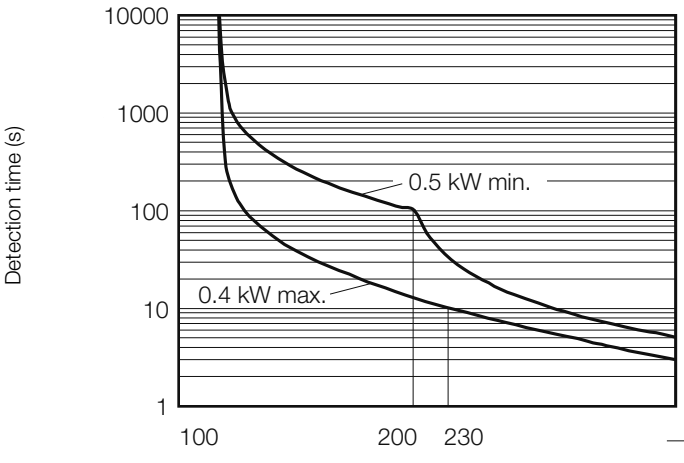
SERVOPACK Overload Protection Characteristics

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

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note:

0.5 kW min:
SERVOPACK model: SGD7S-3R8, -5R5, -7R6, -120, -180, -200, -330, -470, -550, -590-, or -780

0.4 kW max:
SERVOPACK model: SGD7S-R70, -R90, -1R6, -2R8

$$\frac{\text{Instantaneous maximum output current}}{\text{Continuous output current}} \times 100\%$$

(Instantaneous maximum output current)

Note:

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

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

Specifications

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient Air Temperature	-5°C to 55°C With derating, usage is possible between 55°C and 60°C. Refer to the following section for Derating Specifications on page 238.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Degree of Protection	Degree	SERVPOACK Model: SGD7S-
		IP 20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A
		IP 10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications on page 238.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1, EN50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3	
Mounting		Mounting	SERVOPACK Model: SGD7S
		Base-mounted	All Models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%) Continued on next page.	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ± 25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

Specifications

Item		Specification
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile
	Physical Layer	100BASE-TX (IEEE 802.3)
	Communications Connectors	CN6A (RJ45): EtherCAT signal input connector CN6B (RJ45): EtherCAT signal output connector
	Cable	Category 5, 4 shielded twisted pairs * The cable is automatically detected with AUTO MDIX.
	Sync Manager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)
	Distributed Clocks	Free-Run Mode and DC Mode (Can be switched.) Applicable DC cycles: 125 µs to 4 ms in 125-µs increments
	Slave Information Interface	256 bytes (read-only)
	Indicators	EtherCAT communications in progress: Link/Activity x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signa
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error , etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-closed Modules

Note:

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

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

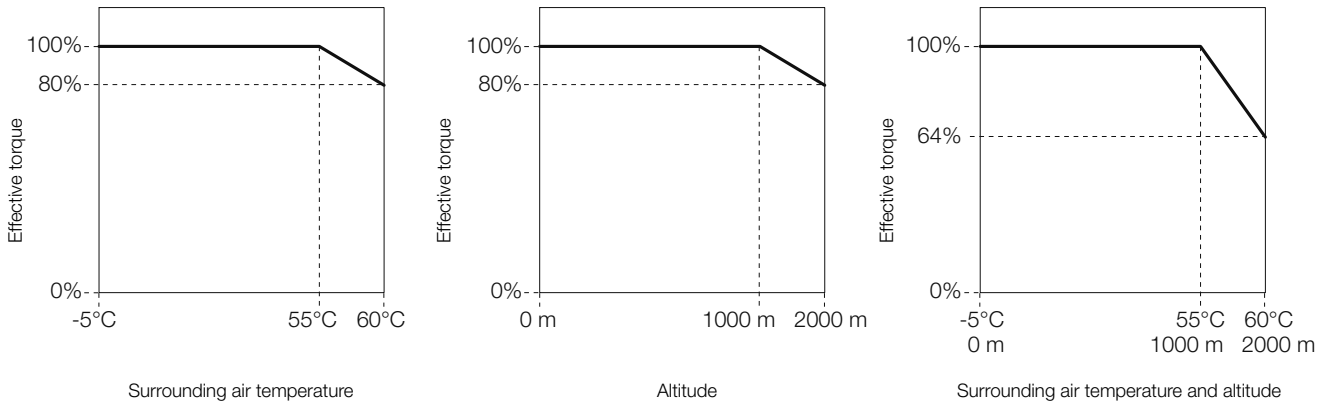
$$\text{Coeficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

SGD7S-R70A, -R90A, -1R6A, and -2R8A



SGD7S-3R8A, -5R5A, -7R6A and -120A