



AC SERVO DRIVES SIGMA-7 SERIES

EN

DE



Sigma-7 Overview

The Ultimate Experience: The YASKAWA Sigma-7 Servo Drive Series

The YASKAWA Sigma-7 Servo Drive series offers standard rotary motors as well as linear and rotary direct drives and linear sliders. This broad variety of drive systems covers all market demands with regard to compact size, high dynamics, high efficiency, low maintenance and outstanding reliability.

YASKAWA has improved the function for tuning-free operation even further. Without adjusting gains reliable operation is assured. So a machine can run free of any vibrations even with a inertia-to-loads ratio of 30:1. The system also operates reliably with dynamic load changes. The tuning functions of the Sigma-5 series have also been significantly improved and allow time-saving start-up.

The Sigma-7 servodrives comply with today's standards of functional safety. They are certified for SIL 3, PL-e Category 3 for Stop Category 0 (Safe Torque Off). Optionally, functions like stop categories 1 (SS1) and 2 (SS2) as well as Safely Limited Speed (SLS) are available.

The Sigma-7 motors provide high efficiency: the length is reduced by up to 20% compared to Sigma-5 motors with same capacity, and heat generation is significantly reduced. The motors with their extremely high resolution of 24 bit fulfill the highest requirements of constant velocity and precision.

Result: Reduced cycle time – maximum throughput, improved product quality, enhanced machine wear resistance, shortened initial set-up time, lower life cycle cost.

- Servo Motors · SERVOPACKS
- Linear Motors · Linear Sliders
- Out-of-the-Box Solutions
- Programming Software
- Motion Control Solutions
- Flexible Connectivity



Seven Reasons for Sigma-7

The Sigma Series of Servo Drives has evolved into the Sigma-7 Servo Drives, which provides you with the ultimate experience in seven key areas and delivers the optimal solution that only YASKAWA can offer.



1

Comprehensive Motor and Amplifier Power Range

Wide power range

- ▶ Very compact motors from 50 W to 15 kW
- ▶ Linear motors iron core and ironless with a peak force up to 7560 N

2

Savings through Performance

Lower production costs

- ▶ Speed loop bandwidth of 3.1 kHz
- ▶ Shorter settling time, reduced positioning time, higher throughput

No additional cooling necessary

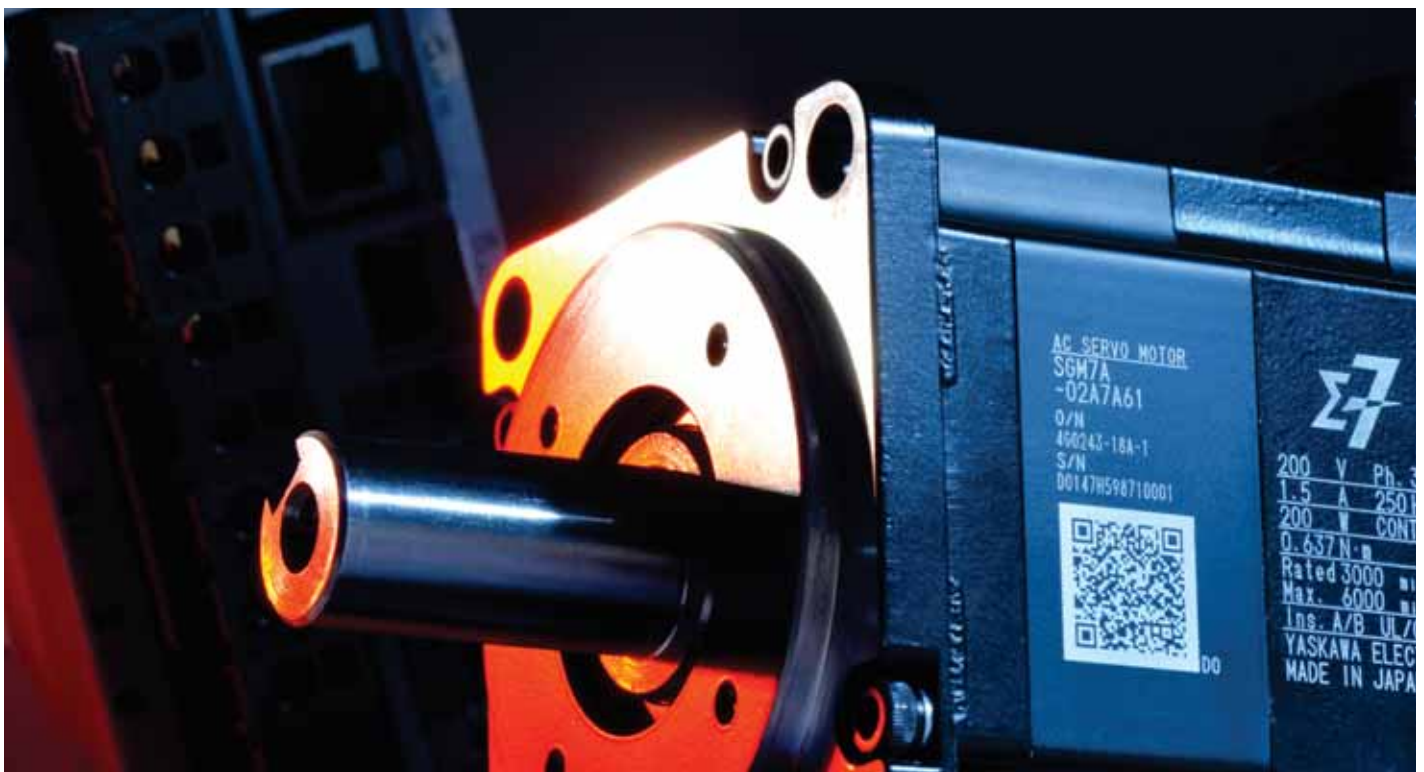
- ▶ Ambient temperature -5 – 55 °C (max. 60 °C with derating)

Energy savings and higher productivity

- ▶ High peak torque, fast acceleration, no amplifier oversizing
- ▶ Lightweight mechanics

Higher performance

- ▶ Overload 350% for 3 – 5 seconds
- ▶ High peak torque, fast acceleration



3

Safety Features

Smooth integration of mandatory legal safety standards

- ▶ The STO function is implemented by default in all Sigma-7 series servo amplifiers
- ▶ Build safer machines - Sigma-7 satisfies the requirements of SIL 3 and PL-e
- ▶ The safety functions SS1, SS2 and SLS are integrated by using the SGD7S-OSA01A safety module

4

High Efficiency

Very low heat generation

- ▶ Optimized magnetic circuit improves motor efficiency
- ▶ Improved motor efficiency reduces heat generation by about 20%

5

High Accuracy

Next level 24-bit absolute encoder for maximum accuracy

- ▶ Resolution of 16 million pulses per revolution for extremely precise positioning

6

Impressive System Performance

Very high precision teamed up with fast, smooth operation

- ▶ Ripple compensation for highest demands in smoothness and dynamics
- ▶ Even for machines for which speed loop gains cannot be set high

7

Outstanding Reliability

Even more reliability for your production

- ▶ More than 9,000,000 servo systems in the field
- ▶ Improved machine reliability, reduced service and maintenance costs, less downtime



Sigma-7 - The new Benchmark for Servo Drives

50 W

15 kW



Advantage of Sigma-7 SERVOPACKS

- ▶ SIL 3 for STO, PL-e, CAT 3
- ▶ Speed frequency response: 3.1 kHz
- ▶ One amplifier for Linear & Rotary Motors
- ▶ Advanced Safety functions SS1, SS2, SLS
- ▶ Feedback options
- ▶ Ripple compensation, vibration suppression, etc.
- ▶ SERVOPACK with four different embedded network types available:
 - EtherCAT
 - MECHATROLINK-II
 - MECHATROLINK-III
 - Pulse-train reference with analog voltage



Advantage of Sigma-7 Servomotors

- ▶ 24-bit high-resolution encoder installed
- ▶ High efficiency, low heat generation
- ▶ Downsizing by up to 20%
- ▶ Flange compatible with Sigma-5
- ▶ Three motor models available:
 - Low inertia SGM7A from 50 W to 7 kW
 - Medium inertia SGM7J from 50 W to 750 W
 - Medium inertia SGM7G from 300 W to 15 kW





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The Sigma-7 Series is CE-certified,
cULus-listed and RoHS-conform.

International Standards



Safety Standards

Safety Stop

RoHS Directive

RoHS Directive stands for the EU directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

Specifications are subject to change without notice
for ongoing product modifications and improvements.
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Literature No. YEU_MuC_Sigma7-Overview_EN_v1_1114
Printed in Germany, November 2014