YASKAWA

# AC SERVO DRIVES
## SIGMA-7 SERIES

EN
DE

## Experience and Innovation

**Since 1915 YASKAWA has manufactured and supplied products for machine building and industrial automation. Our standard products as well as tailor-made solutions are well known and have a high reputation for outstanding quality and reliability.**

**YASKAWA is the leading global manufacturer of inverter drives, servo drives, machine controllers, medium voltage inverters, and industrial robots.**

**We have always been a pioneer in motion control and drive technology, launching product innovations, which optimise the productivity and efficiency of both machines and systems.**

YASKAWA Eschborn, Germany

Today YASKAWA produces more than 1.8 million inverters per year. Considering this, YASKAWA is probably the biggest inverter manufacturer in the world.


YASKAWA Motoman Robots

Furthermore, with a yearly production of more than 800,000 servo motors and 20,000 robots YASKAWA offers a wide range of products for drive automation processes in many different industries such as mining, steel, machine tools, automotive, packaging, woodworking, textiles and semiconductors.

YASKAWA technology is used in all fields of machine building and industrial automation and has a high reputation for their outstanding performance and quality.

## Wherever You Are – Our Local Support is Near.

Employing more than 14,600 People Worldwide

More than 1,350 Employees in Worldwide Service Network

More than 1,500 Employees in Europe

## The New Sigma-7 Series

Quick – Fast – Reliable

**The development of the new Sigma-7 series focused on three main goals: consistently fast commissioning, high production output and maximum operational reliability. The series offers a powerful response to today's market requirements for both machine constructors and final customers in the production industry. Sigma-7 offers particularly great potential for packaging plants, semiconductor manufacturing, wood processing and digital printing machines.**

### QUICK SETUP IN JUST 3 MINUTES

Presets in the amplifier software simplify commissioning. A ‚tuning-less' function allows immediate use of the Sigma-7 without the need for complex parametrisation or special knowledge of control equipment, while an auto-tuning function ensures quick adjustment.

### SPACE SAVINGS

New book-style housing supports gap-free, side-by-side installation of amplifiers even in small spaces. This makes it possible to realize a high performance density inside a cabinet. The needed space is reduced to a minimum, allowing it and the drive electronics to be integrated in the machine.

### ECO FRIENDLY

Sigma-7 motor efficiency reduces heat generation by up to 20%. The possible DC Power coupling of axes allows energy sharing and energy savings of up to 30%.

### COST SAVINGS

Sigma-7 reduces the overall costs by providing faster machine setup, higher throughput with more products in less time and reduced machine downtimes due to the high reliability of our products.

## 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 safety module SGDV-OSA01A

## 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 precice 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 –
# Next Generation Servo Systems

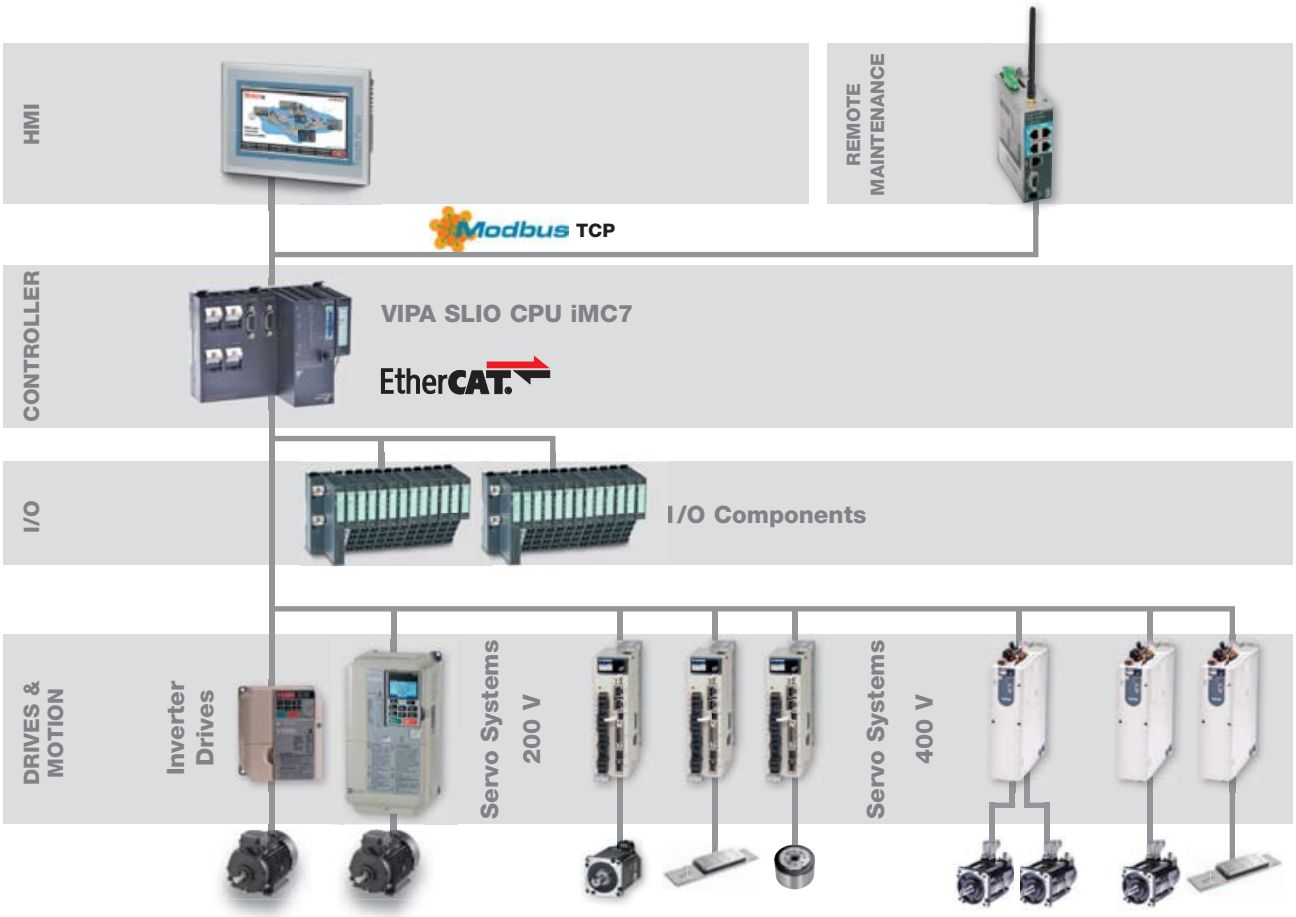
**With more than 9 million servo systems in the field, YASKAWA has a lot of experience and technical know-how in Motion and Control. The Result: Excellent performance and an extremely low fault rate. With the new Sigma-7 series, YASKAWA has managed to create a masterpiece in reliable precision performance. Thanks to its new features, start-up is possible in just a few minutes. Quick, application specific drive adjustments and maximised product output are guaranteed.**

## SERVOPACKs

- Single- & Double Axis Amplifier
- One amplifier for Linear & Rotary Motors
- SIL 3 for STO, PL-e CAT 3
- Speed frequency response: 3.1 kHz
- Advanced Safety functions SS1, SS2, SLS
- Feedback options
- Ripple compensation, vibration suppression, etc.

## 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 SMG7A up to 7 kW
  - Medium inertia SGM7J up to 750 W
  - Medium inertia SGM7G up to 15 kW



## Total System Solutions

**With the combined know-how of YASKAWA and VIPA, we can offer our customers Total System Solutions as well as individual components for many applications in the automation industry.**

## Machine Controllers – MP 3200 IEC & MP 3300 IEC

High performance machine controller for automation technology. YASKAWA machine controllers manage complex systems with servo and inverter drives. High-speed communication provides high-performance and high-accuracy motion control, even for complex movements.

- Up to 62 axes
- Communication: Modbus TCP/IP, MECHATROLINK-III, Ethernet (100 Mbps)
- PLCOpen function blocks
- Reusable code library

## iMC7 + SPEED7 Studio + Sigma-7 – High Performance Motion Control System

YASKAWA's Experience in Motion Control, combined with VIPA's Experience in PLC technology, is the foundation for a new standard in automation technology. SLIO CPU iMC7, a PLC with integrated Motion Control functions.

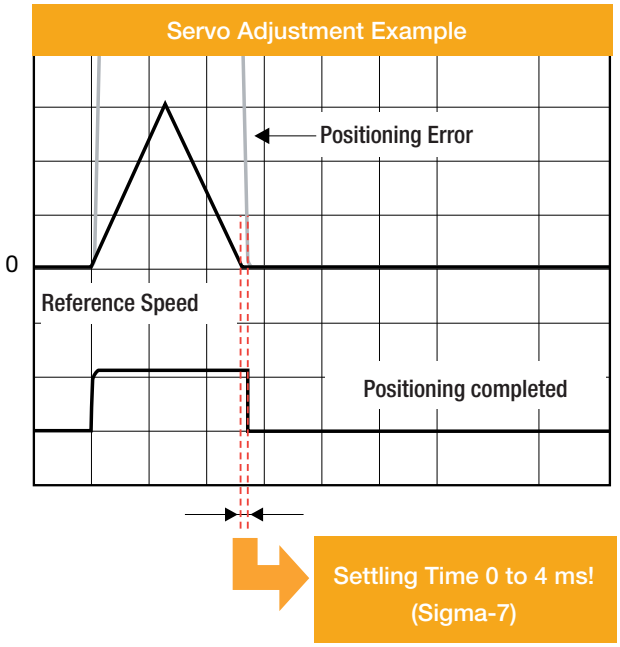
- High Performance PLC combined with High Performance drive technology
- Programmable with SPEED7 Studio by VIPA: Hardware configuration, Communication, PLC Programming, Motion Control, Visualisation, etc.
- Real time Ethernet-Communication Interface EtherCAT
- Connection with I/O's, Sigma-7 Servo Drives and Inverter Drives
- Control and Drive Technology solutions from one source

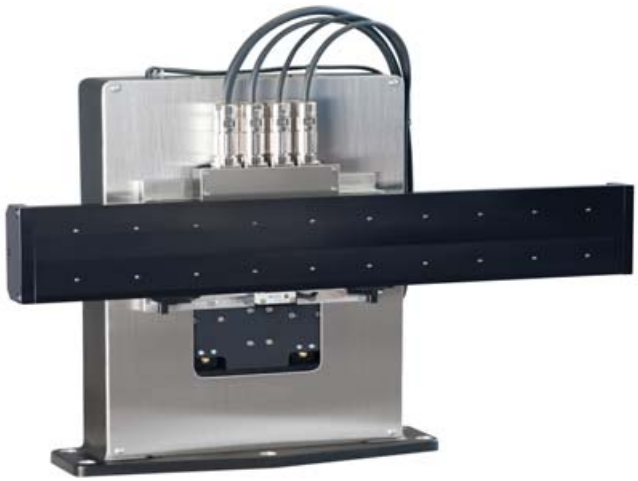
## VIPA Touchpanels

VIPA professional touch panels with display sizes from 4.3" to 12.1", operating system Windows Embedded CE 6.0 and Runtime Movicon 11 can be used universally. VIPA eco panels in 4 different display sizes from 4.3" to 15" are designed for maximum reliability and flexibility, as well as longevity and quality.

## Savings through Performance

With a best in class frequency response of 3.1 kHz, Sigma-7 SERVOPACKS can reduce settling time to less than 4 ms. Compared to a standard system with for example 50 ms settling time, a Pick & Place unit based on Sigma-7 components can save a significant amount of money.



## Shorter Settling Time increases your Revenue

Pick and Place Example with 50 ms Settling Time

| Axis Length | Move | Settle | Move | Settle | Time per Part | Parts per Minute | Parts per Hour | Price per Part | Revenue per Hour |
|---|---|---|---|---|---|---|---|---|---|
| X = 200 mm | 0.5 s | 0.05 s | 0.5 s | 0.05 s | 1.6 s | 37.5 | 2250 | € 0.1 | € 225.00 |
| X = 200 mm | 0.2 s | 0.05 s | 0.2 s | 0.05 s | | | | | |
| Total | 0.5 s | 0.1 s | 0.7 s | 0.1 s | | | | | |

Pick and Place Example with 4 ms Settling Time

| Axis Length | Move | Settle | Move | Settle | Time per Part | Parts per Minute | Parts per Hour | Price per Part | Revenue per Hour |
|---|---|---|---|---|---|---|---|---|---|
| X = 200 mm | 0.5 s | 0.004 s | 0.5 s | 0.004 s | 1.416 s | 42.37 | 2542 | € 0.1 | € 254.24 |
| X = 200 mm | 0.2 s | 0.004 s | 0.2 s | 0.004 s | | | | | |
| Total | 0.5 s | 0.008 s | 0.7 s | 0.008 s | | | | | |

Revenue per Hour: **29.24 €**

Revenue per 16 Hours: **467.84 €**

Revenue per 5 Days: **2,339.20 €**

Revenue per Year: **116,690.00 €**

# Safety in Motion

**Machine movements represent a major source of hazard for operators and personnel carrying out maintenance tasks. Typical situations requiring safe machine states occur during commissioning, in setup mode, troubleshooting and when operating or maintenance personnel are required to approach the machine.**

- Sigma-7 servo drive functionality allows smooth integration of the mandatory legal safety standards.
- The STO function is implemented by default in all Sigma-7 series servo amplifiers.
- The optional Safety module SGDV-OSA01A allows the expansion of SS1, SS2 and SLS safety functions (SIL2, PLd).

With the coming into effect of the standard EN ISO 13489 1:2008 “Safety of machinery – Safety-related parts of control systems”, the construction of safe machines will now be assessed either according to the performance level (PL a – e) or according to the safety integrity level (SIL 1 – 4).

The safety relevant functions for variable speed drives are defined in the standard IEC 61800-5-2.

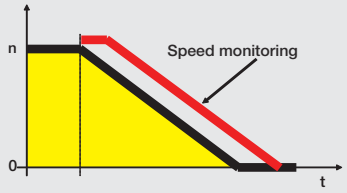
The Sigma-7 series of servo drives enables you to realize safe and cost-effective automated motion applications.

**SIL3**

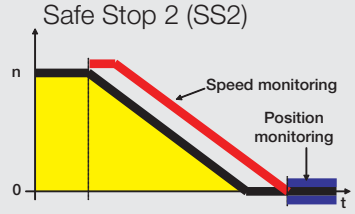
| | Safety Standards | Performance Level & Category |
|---|---|---|
| Safety of machinery | EN ISO 13849-1 | PL-e (CAT3) |
| | IEC 60204-1 | Stop Category 0 |
| Functional Safety | IEC 61508 | SIL 3 |
| | IEC 62061 | SIL CL3 |
| | IEC 61800-5-2 | STO |

Safe Torque Off (STO)

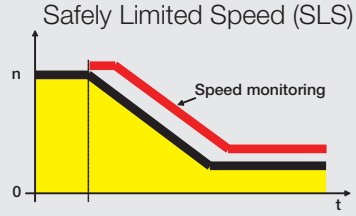

Safe Stop 1 (SS1)




Safe Stop 2 (SS2)



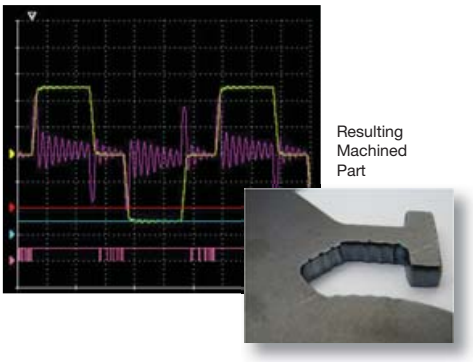

Safely Limited Speed (SLS)



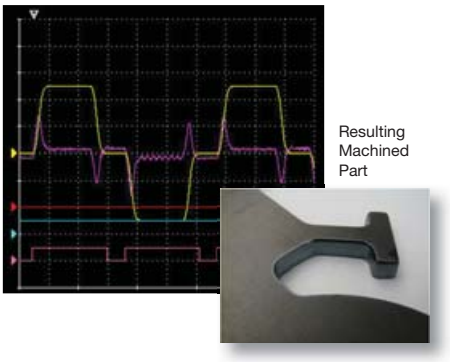
## Enhanced Vibration Suppression

**Existing functions to minimize vibration have been enhanced and new ones added, thus improving tracking and further improving settling time. Vibration and noise during operation have also been reduced, along with vibration when stopping, resulting in very smooth edges of machined parts.**

Without Vibration Suppression




With Vibration Suppression




### Tuning-less function
**"Get up and run" quickly after connecting the motor.**

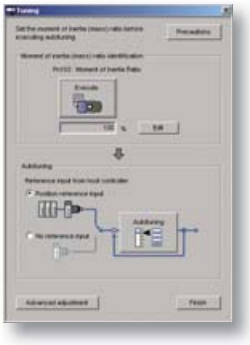
Even without servo adjustment and with load changes, an oscillation- and vibration-free drive is possible with up to 30 times the load moment of inertia.

- Settling time: 100 to 150 ms.

### Advanced autotuning
**Minimize settling time with less vibration.**

The reference filter and feedback gain adjustment functions have a new automatic feed forward gain adjustment for optimal adjustment performance. The friction compensation function automatically cancels out the effect of friction on machine characteristics.

- Settling time: 10 ms.



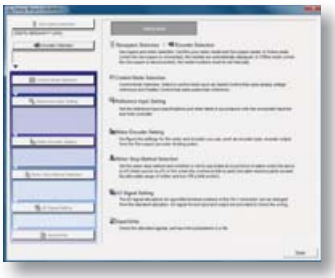
### "One-parameter" tuning
**Fine tuning made easy.**

Fine tuning can tweak machine performance to the max.

- Settling time: 0 to 4 ms.

## Simplify your Life with the Sigma-7 Series

The Sigma-7 Series provides an easy and quick adjustment for your servo solution.
That saves time and money.

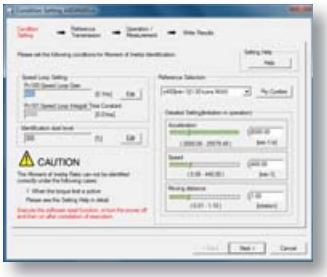


### Software Setup Wizard

Simple parameter setup with wizard guided input.

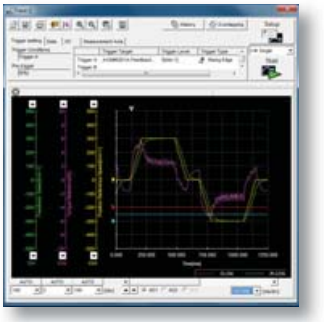
### Wiring check function

The SigmaWin+ wiring check function checks your wiring in a single operation.




### Trace function

Real-time trace of adjustment state facilitates instantaneous monitoring.



### Full of handy functions for startup and more effective operation!

Optimal selection for your application with consideration of moment of inertia, dynamic braking resistance, etc.

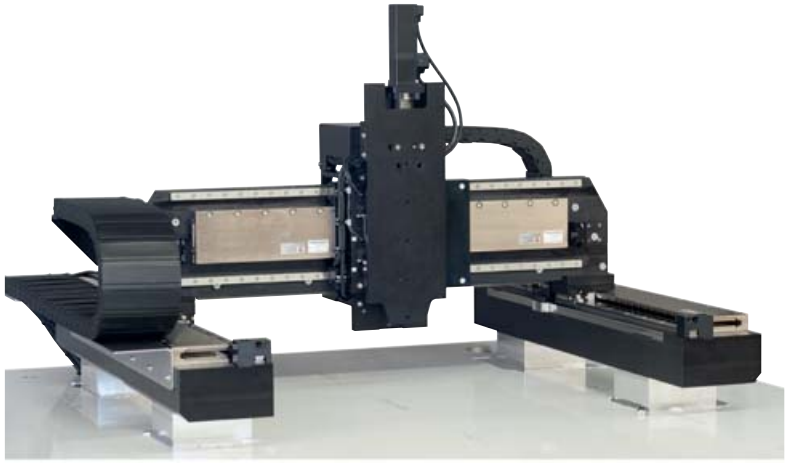
### Maintenance

Faster troubleshooting with alarm diagnostic function – presumes possible causes of alarm and immediately displays suggested corrective actions.

- Unpacking
- Installation and Wiring
- Basic Parameter Setting
- Trial Operation
- Gain and Filter Adjustment (Tuning)
- Operation

## Open for Challenging Applications

**YASKAWA provides equipment for a broad range of applications and offers support in all engineering tasks. This way YASKAWA will find the perfect solution for common tasks and complex automation challenges.**



## Solutions for common tasks

Quick and easy set-up and no configuration effort - these are the benefits of the YASKAWA out-of-the-box solutions. And in case you want to upgrade a solution the whole Sigma-7 system can easily be used for any new task.

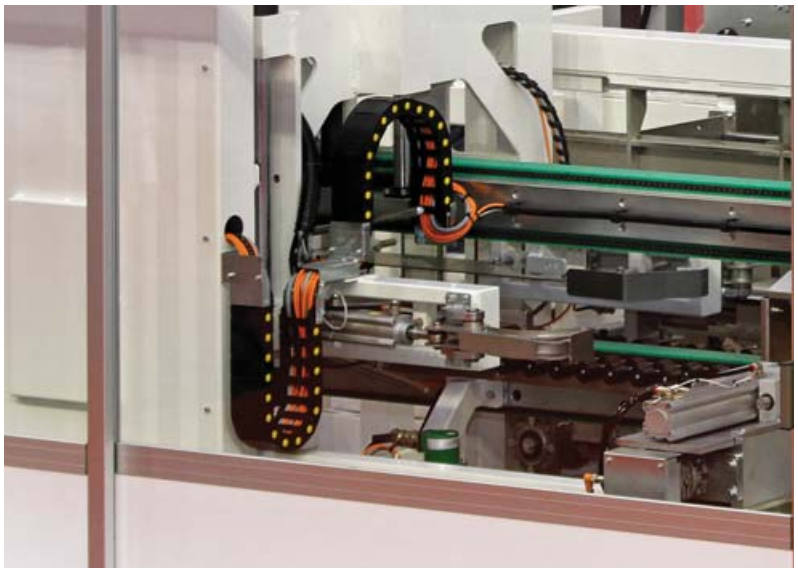
The following solutions are currently available:

- Gantry
- Pick & Place
- Beam

## Complete Solutions

YASKAWA offers comprehensive customized automation solutions with powerful hardware, including controller, visualization, drive concept and industrial robots. Our motion control products are developed to control all functions in machine process control including motion control, PLC functionality, I/O, sequential logic and process algorithms. Controller integration lowers system cost, increases performance, reduces required panel space and unifies programming.

Process monitoring and diagnostics are inherent features of our platform. These advancements increase product throughput and reduce machine downtime. With our systems in the field productivity increases by more than 200% have been achieved. Smoother running and e-stop recovery routines lessen mechanical wear and reduce down time.



# The 200 V Series

## Amplifier

- Single & three-phase input
- Embedded Fieldbus
  - Pulse train / analog input
  - MECHATROLINK-II
  - MECHATROLINK-III
  - EtherCAT
- Single & double axis amplifier

## Motors

- Very compact design
- Available from 50 W to 15 kW


# Product Overview 200 V

## Servomotors

### Rotary

#### SGM7A

- Low inertia, high speed
- 50 W - 7 kW

#### SGM7J

- Medium inertia, high speed
- 50 W - 750 W

#### SGM7G

- Medium inertia, large torque
- 300 W - 15 kW

### Direct Drive

#### SGMCS

- Small capacity, coreless
- Rated: 2 Nm - 35 Nm
  Peak: 6 Nm - 105 Nm

#### SGMCV

- Small capacity, with iron core
- Rated: 4 Nm - 25 Nm
  Peak: 12 Nm - 75 Nm

#### SGMCS

- Medium capacity, with iron core
- Rated: 45 Nm - 200 Nm
  Peak: 135 Nm - 600 Nm

### Linear

#### SGLG

- Coreless model
- Rated: 12.5 N - 750 N
  Peak: 40 N - 3000 N

#### SGLFW2

- Model with F-type iron core
- Rated: 45 N - 2520 N
  Peak: 135 N - 7560 N

#### SGLFW

- Model with F-type iron core
- Rated: 25 N - 1120 N
  Peak: 86 N - 2400 N

#### SGLT

- Model with T-type iron core
- Rated: 130 N - 2000 N
  Peak: 380 N - 7500 N

# SERVOPACKs

## SGD7S-□□□A00A

Analog Voltage/
Pulse Train
Reference

## SGD7S-□□□A10A

MECHATROLINK-II
communication
Reference

## SGD7S-□□□A20A

Single-axis
MECHATROLINK-III
communication
Reference

## SGD7W-□□□A20A

Dual-axis
MECHATROLINK-III
communication
Reference

## SGD7S-□□□AA0A

EtherCAT
communication
Reference

## SGD7S-□□□AE0A

Command Option
Attachable Type

# Option Modules

## SGDV-OSA01A

Safety Module

## SGD7V-OCA03A

INDEXER Module

## SGDV-OCA□A

DeviceNet Module

## SGDV-OFA01A

Fully closed Loop
Module

# Combination of Rotary Servomotors and SERVOPACKs

| Rotary Servomotor Model | | Rated Output [W] | SERVOPACK Model | |
|---|---|---|---|---|
| | | | SGD7S-□□□□ | SGD7W-□□□□ |
| SGM7J (Medium inertia, high speed) 3000 min$^{-1}$ | SGM7J-A5A | 50 | R70A | 1R6A*1, 2R8A*1 |
| | SGM7J-01A | 100 | R90A | |
| | SGM7J-C2A | 150 | 1R6A | 1R6A, 2R8A*1 |
| | SGM7J-02A | 200 | | |
| | SGM7J-04A | 400 | 2R8A | 2R8A, 5R5A*1, 7R6A*1 |
| | SGM7J-06A | 600 | 5R5A | 5R5A, 7R6A |
| | SGM7J-08A | 750 | | |
| SGM7A (Low inertia, high speed) 3000 min$^{-1}$ | SGM7A-A5A | 50 | R70A | 1R6A*1, 2R8A*1 |
| | SGM7A-01A | 100 | R90A | |
| | SGM7A-C2A | 150 | 1R6A | 1R6A*1, 2R8A*1 |
| | SGM7A-02A | 200 | | |
| | SGM7A-04A | 400 | 2R8A | 2R8A, 5R5A*1, 7R6A*1 |
| | SGM7A-06A | 600 | 5R5A | 5R5A, 7R6A |
| | SGM7A-08A | 750 | | |
| | SGM7A-10A | 1,000 | 120A | – |
| | SGM7A-15A | 1,500 | | |
| | SGM7A-20A | 2,000 | 180A | |
| | SGM7A-25A | 2,500 | 200A | |
| | SGM7A-30A | 3,000 | | |
| | SGM7A-40A | 4,000 | 330A | |
| | SGM7A-50A | 5,000 | | |
| | SGM7A-70A | 7,000 | 550A | |
| SGM7G (Medium inertia, large torque) 1500 min$^{-1}$ | SGM7G-03A | 300 | 3R8A | 5R5A*1, 7R6A*1 |
| | SGM7G-05A | 450 | | |
| | SGM7G-09A | 850 | 7R6A | |
| | SGM7G-13A | 1,300 | 120A | – |
| | SGM7G-20A | 1,800 | 180A | |
| | SGM7G-30A | 2,900*2 | 330A | |
| | SGM7G-44A | 4,400 | | |
| | SGM7G-55A | 5,500 | 470A | |
| | SGM7G-75A | 7,500 | 550A | |
| | SGM7G-1AA | 11,000 | 590 A | |
| | SGM7G-1EA | 15,000 | 780 A | |

*1. If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Sigma-7 SERVOPACK.

*2. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.

# Model Designations 200 V

## Rotary Servomotors

### SGM7A

Sigma-7 Series Servomotors: SGM7A

SGM7A - 01 A 7 A 2 1

1st + 2nd digit | 3rd | 4th | 5th | 6th | 7th digit

**1st + 2nd digit - Rated Output**

| Code | Specification |
|---|---|
| A5 | 50 W |
| 01 | 100 W |
| C2 | 150 W |
| 02 | 200 W |
| 04 | 400 W |
| 06 | 600 W |
| 08 | 750 kW |
| 10 | 1.0 kW |
| 15 | 1.5 kW |
| 20 | 2.0 kW |
| 30 | 3.0 kW |
| 40 | 4.0 kW |
| 50 | 5.0 kW |
| 70 | 7.0 kW |

**3rd digit - Power Supply Voltage**

| Code | Specification |
|---|---|
| A | 200 VAC |

**4th digit - Serial Encoder**

| Code | Specification |
|---|---|
| 7 | 24-bit absolute |
| F | 24-bit incremental |

**5th digit - Design Revision Order**

| Code | Specification |
|---|---|
| A | |

**6th digit - Shaft End**

| Code | Specification |
|---|---|
| 2 | Straight without key |
| 6 | Straight with key and tap |
| B | With two flat seats |

**7th digit - Options**

| Code | Specification |
|---|---|
| 1 | Without options |
| C | With holding brake (24 VDC) |
| E | With oil seal and holding brake (24 VDC) |
| S | With oil seal |

### SGM7J

Sigma-7 Series Servomotors: SGM7J

SGM7J - 01 A 7 A 2 1

1st + 2nd digit | 3rd | 4th | 5th | 6th | 7th digit

**1st + 2nd digit - Rated Output**

| Code | Specification |
|---|---|
| A5 | 50 W |
| 01 | 100 W |
| C2 | 150 W |
| 02 | 200 W |
| 04 | 400 W |
| 06 | 600 W |
| 08 | 750 W |

**3rd digit - Power Supply Voltage**

| Code | Specification |
|---|---|
| A | 200 VAC |

**4th digit - Serial Encoder**

| Code | Specification |
|---|---|
| 7 | 24-bit absolute |
| F | 24-bit incremental |

**5th digit - Design Revision Order**

| Code | Specification |
|---|---|
| A | |

**6th digit - Shaft End**

| Code | Specification |
|---|---|
| 2 | Straight without key |
| 6 | Straight with key and tap |
| B | With two flat seats |

**7th digit - Options**

| Code | Specification |
|---|---|
| 1 | Without options |
| C | With holding brake (24 VDC) |
| E | With oil seal and holding brake (24 VDC) |
| S | With oil seal |

### SGM7G

Sigma-7 Series Servomotors: SGM7G

SGM7G - 03 A 7 A 2 1

1st + 2nd digit | 3rd | 4th | 5th | 6th | 7th digit

**1st + 2nd digit - Rated Output**

| Code | Specification |
|---|---|
| 03 | 300 W |
| 05 | 450 W |
| 09 | 850 W |
| 13 | 1.3 kW |
| 20 | 1.8 kW |
| 30 | 2.9 kW* |
| 44 | 4.4 kW |
| 55 | 5.5 kW |
| 75 | 7.5 kW |
| 1A | 11 kW |
| 1E | 15 kW |

**3rd digit - Power Supply Voltage**

| Code | Specification |
|---|---|
| A | 200 VAC |

**4th digit - Serial Encoder**

| Code | Specification |
|---|---|
| 7 | 24-bit absolute |
| F | 24-bit incremental |

**5th digit - Design Revision Order**

| Code | Specification |
|---|---|
| A | |

**6th digit - Shaft End**

| Code | Specification | |
|---|---|---|
| 2 | Straight without Key | 0.45 kW |
| | | 1.8 kW |
| | | 2.9 kW |
| 6 | Straight shaft with key and tap | 0.85 kW |
| | | 1.3 kW |

**7th digit - Options**

| Code | Specification |
|---|---|
| 1 | Without options |
| C | With holding brake (24 VDC) |
| E | With oil seal and holding brake (24 VDC) |
| S | With oil seal |

* The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.

# Model Designations 200 V

## SERVOPACKs

### Single Axis Amplifier

**SGD7S - R70 A 00 A 001**

| Sigma-7 Series<br>Sigma-7S Models | 1st ... 3rd | 4th | 5th + 6th | 7th | 8th ... 10th | digit |
|---|---|---|---|---|---|---|

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

| Code | Specification |
|---|---|
| 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*1 | 0.75 kW |
| 7R6 | 1.0 kW |
| 120 | 1.5 kW |
| 180 | 2.0 kW |
| 200 | 3.0 kW |
| 330 | 5.0 kW |
| 470 | 6.0 kW |
| 550 | 7.5 kW |
| 590 | 11 kW |
| 780 | 15 kW |

**4th digit - Voltage**

| Code | Specification |
|---|---|
| A | 200 V AC |

**5th + 6th digit - Interface**

| Code | Specification |
|---|---|
| 00 | Analog Voltage/<br>Pulse Train Reference |
| 10 | MECHATROLINK-II<br>communication Reference |
| 20 | MECHATROLINK-III<br>communication Reference |
| A0 | EtherCAT<br>communication Reference |
| E0 | Command Option Attachable Type |

**7th digit - Design Revision Order**

| | |
|---|---|
| A | |

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

| Code | Specification | Applicable Models |
|---|---|---|
| - | Without Options | All models |
| 001 | Rack-mounted | SGD7S-R70A to -330A |
| | Duct-mounted | SGD7S-470A to -780A |
| 002 | Varnished | All models |
| 008 | Single-phase, 200 V<br>power input | 1.5 kW |
| 00A | Varnished and single-<br>phase power input | All models |

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

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

### Double Axis Amplifier

**SGD7W - 1R6 A 20 A 001**

| Sigma-7 Series<br>Sigma-7W Models | 1st ... 3rd | 4th | 5th + 6th | 7th | 8th ... 10th | digit |
|---|---|---|---|---|---|---|

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

| Code | Specification |
|---|---|
| Three-phase, 200 V | |
| 1R6*1 | 2 × 0.2 kW |
| 2R8*1 | 2 × 0.4 kW |
| 5R5*1 | 2 × 0.75 kW |
| 7R6 | 2 × 1.0 kW |

**4th digit - Voltage**

| Code | Specification |
|---|---|
| A | 200 V AC |

**5th + 6th digit - Interface**

| Code | Specification |
|---|---|
| 20 | MECHATROLINK-III<br>communication Reference |

**7th digit - Design Revision Order**

| | |
|---|---|
| A | |

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

| Code | Specification | Applicable Models |
|---|---|---|
| - | Without Options | All models |
| 001 | Rack-mounted | |
| 002 | Varnished | |

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

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

# The 400 V Series

## Amplifier

- Space saving Bookstyle for side-by-side mounting
- Embedded Fieldbus
  - EtherCAT
  - MECHATROLINK-III*
- Single & Double Axis Amplifier
- European connectors
- Daisy-Chain-Connection

## Motors

- Plug-and-Turn connectors according to European standards (M12, M17, M23 and M40)
- Available from 200 W - 3 kW (- 5 kW*)

* Available in the second half of 2016


- Connectors for Power Supply, EtherCAT, I/O, Encoder, USB, etc.

- Connector for Digital Operator


- Option units for other Networks, Advanced Safety, Encoder

- Power Connectors for Motor, Brake, Braking Resistor
- Metal Sheet for Motor Cable Shielding

# Product Overview 400 V

## Servomotors

### Rotary

#### SGM7J

- Medium inertia, high speed
- 200 W - 1.5 kW

#### SGM7A

- Low inertia, high speed
- 200 W - 3.0 kW (- 5 kW*)

#### SGM7G

- Medium inertia, low speed, high torque
- 450 W - 2.9 kW (- 4,4 kW*)

### Linear

#### SGLFW2

- Model with F-type iron core
- Rated: 45 N - 2520 N
  Peak: 135 N - 7560 N

## SERVOPACKs

### Single Axis

#### SGD7S-□□□DA0

EtherCAT communication Reference

#### SGD7S-□□□D30

Mechatrolink III communication Reference

### Double Axis

#### SGD7W-□□□DA0A*

EtherCAT communication Reference

#### SGD7W-□□□D30A*

Mechatrolink III communication Reference

## Option Modules

#### SGDV-OSA01A

Safety Module

#### SGDV-OFA01A

Fully closed Loop Module

* Available in the second half of 2016

## Combination of Rotary Servomotors and SERVOPACKs

| Rotary Servomotor Model | | Rated Output [W] | SERVOPACK Model SGD7S-□□□□ |
|---|---|---|---|
| SGM7J (Medium inertia, high speed) 3000 min$^{-1}$ | SGM7J-02D | 200 | 1R9D |
| | SGM7J-04D | 400 | |
| | SGM7J-08D | 750 | 3R5D |
| | SGM7J-15D | 1,500 | 5R4D |
| SGM7A (Low inertia, high speed) 3000 min$^{-1}$ | SGM7A-02D | 200 | 1R9D |
| | SGM7A-04D | 400 | |
| | SGM7A-08D | 750 | 3R5D |
| | SGM7A-10D | 1,000 | |
| | SGM7A-15D | 1,500 | 5R4D |
| | SGM7A-20D | 2,000 | 5R5A |
| | SGM7A-25D | 2,500 | 120D |
| | SGM7A-30D | 3,000 | |
| | SGM7A-50D* | 5,000 | 170D* |
| SGM7G (Medium inertia, large torque) 1500 min$^{-1}$ | SGM7G-05D | 450 | 1R9D |
| | SGM7G-09D | 850 | 3R5D |
| | SGM7G-13D | 1,300 | 5R4D |
| | SGM7G-20D | 1800 | 8R4D |
| | SGM7G-30D | 2,900 | 120D |
| | SGM7G-44D* | 4,400 | 170D* |

## Combination of Linear Servomotors and SERVOPACKs

| Rotary Servomotor Model | | Rated Output Force [N] | SERVOPACK Model SGD7S-□□□□ |
|---|---|---|---|
| SGLFW2 F-Type with iron core | SGLFW2-30D070A | 45.0 | 1R9D |
| | SGLFW2-30D120A | 90.0 | 1R9D |
| | SGLFW2-30D230A | 180.0 | 1R9D |
| | SGLFW2-45D200A | 280.0 | 3R5D |
| | SGLFW2-45D380A | 560.0 | 8R4D |
| | | | 5R4D |
| | SGLFW2-90D200A | 560.0 | 5R4D |
| | SGLFW2-90D380A | 1,120.0 | 120D |
| | SGLFW2-90D560A | 1,680.0 | 170D* |
| | SGLFW2-1DD380A | 1,680.0 | 170D* |

* Available in the second half of 2016

# Model Designations 400 V

## Rotary Servomotors

### SGM7A - 02 D 7 F 2 1

Sigma-7 Series Servomotors: SGM7A

1st + 2nd | 3rd | 4th | 5th | 6th | 7th digit

| 1st + 2nd digit - Rated Output | |
|---|---|
| Code | Specification |
| 02 | 200 W |
| 04 | 400 W |
| 08 | 750 W |
| 10 | 1.0 kW |
| 15 | 1.5 kW |
| 20 | 2.0 kW |
| 25 | 2.5 kW |
| 30 | 3.0 kW |
| 50 | 5.0 kW |

| 3rd digit - Power Supply Voltage | |
|---|---|
| Code | Specification |
| D | 400 V AC |

| 4th digit - Serial Encoder | |
|---|---|
| Code | Specification |
| 7 | 24-bit absolute |
| F | 24-bit incremental |

| 5th digit - Design Revision Order | |
|---|---|
| F | |

| 6th digit - Shaft End | |
|---|---|
| Code | Specification |
| 2 | Straight without key |
| 6 | Straight with key and tap |

| 7th digit - Options | |
|---|---|
| Code | Specification |
| 1 | Without options |
| C | With holding brake (24 VDC) |
| F* | With dust seal |
| H* | With dust seal and holding brake (24 VDC) |

* This option is supported only for 1.0-kW to 3.0-kW Servomotors.

### SGM7J - 02 D 7 F 2 1

Sigma-7 Series Servomotors: SGM7J

1st + 2nd | 3rd | 4th | 5th | 6th | 7th digit

| 1st + 2nd digit - Rated Output | |
|---|---|
| Code | Specification |
| 02 | 200 W |
| 04 | 400 W |
| 08 | 750 W |
| 15 | 1.5 kW |

| 3rd digit - Power Supply Voltage | |
|---|---|
| Code | Specification |
| D | 400 V AC |

| 4th digit - Serial Encoder | |
|---|---|
| Code | Specification |
| 7 | 24-bit absolute |
| F | 24-bit incremental |

| 5th digit - Design Revision Order | |
|---|---|
| F | |

| 6th digit - Shaft End | |
|---|---|
| Code | Specification |
| 2 | Straight without key |
| 6 | Straight with key and tap |

| 7th digit - Options | |
|---|---|
| Code | Specification |
| 1 | Without options |
| C | With holding brake (24 VDC) |

### SGM7G - 05 D 7 F 2 1

Sigma-7 Series Servomotors: SGM7G

1st + 2nd | 3rd | 4th | 5th | 6th | 7th digit

| 1st + 2nd digit - Rated Output | |
|---|---|
| Code | Specification |
| 05 | 450 W |
| 09 | 850 W |
| 13 | 1.3 kW |
| 20 | 1.8 kW |
| 30 | 2.9 kW |
| 44 | 4.4 kW *1 |

| 3rd digit - Power Supply Voltage | |
|---|---|
| Code | Specification |
| D | 400 V AC |

| 4th digit - Serial Encoder | |
|---|---|
| Code | Specification |
| 7 | 24-bit absolute |
| F | 24-bit incremental |

| 5th digit - Design Revision Order | |
|---|---|
| F | |

| 6th digit - Shaft End | |
|---|---|
| Code | Specification |
| 2 | Straight without key |
| 6 | Straight with key and tap |
| S*2 | Straight without key |
| K*2 | Straight with key and tap |

| 7th digit - Options | |
|---|---|
| Code | Specification |
| 1 | Without options |
| C | With holding brake (24 VDC) |
| F | With dust seal |
| H | With dust seal and holding brake (24 VDC) |

*2 The shaft end codes are different for 850-W and 1.3-kW Servomotors.
The shaft diameter for 850-W Servomotors is 19 mm.
The shaft diameter for 1.3-kW Servomotors is 22 mm.

*1 Available in the second half of 2016

# SERVOPACKs

## Single Axis Amplifier

**SGD7S - 1R9 D A0 B 000 F64**

| Sigma-7 Series Sigma-7S Models | 1st ... 3rd | 4th | 5th + 6th | 7th | 8th ... 10th | 10th ... 13th | digit |
|---|---|---|---|---|---|---|---|

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

| Code | Specification |
|---|---|
| Three-phase, 400 V | |
| 1R9 | 0.5 kW |
| 3R5 | 1.0 kW |
| 5R4 | 1.5 kW |
| 8R4 | 2.0 kW |
| 120 | 3.0 kW |

**4th digit - Voltage**

| Code | Specification |
|---|---|
| D | 400 V AC |

**5th + 6th digit - Interface**

| Code | Specification |
|---|---|
| A0 | EtherCAT communication Reference |
| 30 | MECHATROLINK-III *, RJ45 |

**7th digit - Design Revision Order**

| | |
|---|---|
| A | |

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

| Code | Specification | Applicable Models |
|---|---|---|
| - | Without Options | All models |

**11th ... 13th digit - FT/EX Specification**

| Code | Specification |
|---|---|
| F64 | 400 V AC |

## Double Axis Amplifier *

**SGD7W - 2R6 D A0 A 000 F64**

| Sigma-7 Series Sigma-7W Models | 1st ... 3rd | 4th | 5th + 6th | 7th | 8th ... 10th | 10th ... 13th | digit |
|---|---|---|---|---|---|---|---|

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

| Code | Specification |
|---|---|
| Three-phase, 400 V | |
| 2R6 | 2 × 0.75 kW |
| 5R4 | 2 × 1.5 kW |

**4th digit - Voltage**

| Code | Specification |
|---|---|
| D | 400 V AC |

**5th + 6th digit - Interface**

| Code | Specification |
|---|---|
| A0 | EtherCAT communication Reference |
| 30 | MECHATROLINK-III, RJ45 |

**7th digit - Design Revision Order**

| | |
|---|---|
| A | |

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

| Code | Specification | Applicable Models |
|---|---|---|
| - | Without Options | All models |

**11th ... 13th digit - FT/EX Specification**

| Code | Specification |
|---|---|
| F64 | 400 V AC |

* Available in the second half of 2016

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