YASKAWA

Sigma 7 200V & 400V

Drives & Motion Division

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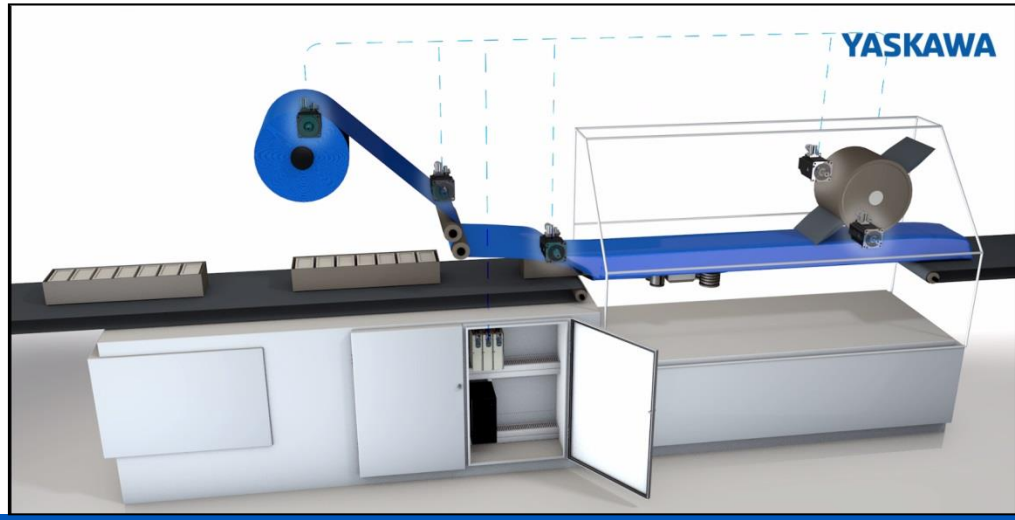
New Sigma 7Servo System

The development of the new Sigma-7 Series focused on three main goals:

- **Quick Installation & commissioning**
- **High production output**
- **Maximum operational reliability**

Quick – Fast – Reliable



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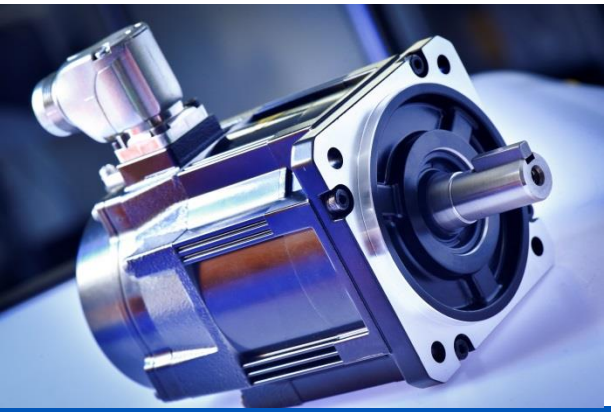
Quick “Installation & Setup”

Market need

- **Shorter time to machine/ time to market required**
- **Growing variants of products to be managed by same machine type**

Machine

➔ Quick Setup of machines
➔ Quick adaption on changed format
➔ Quick by flexible machine design & modularization



Sigma-7

➔ Tuning Pre-set function
Automatically adjustments to the load
➔ Auto Tuning
➔ Simplified installation

Quick

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Quick “Installation & Setup”

New Sigma-7 Servo System

Quick
Quick Setup in just ➔ 3 Minutes

- **Preset** parameter in the amplifier software simplify commissioning
- **Tuning-less-function** allows immediate use of Sigma-7
  - no complex parameterization
  - without special knowledge of control technology
- The **Auto-Tuning Function** ensures rapid adaptation to the load
- **Daisy-Chain-Wiring** allows convenient connection from device to device and reduces installation time
- **European Connector with Quick Locking** works on the principle Plug & Turn for easy and simple wiring.

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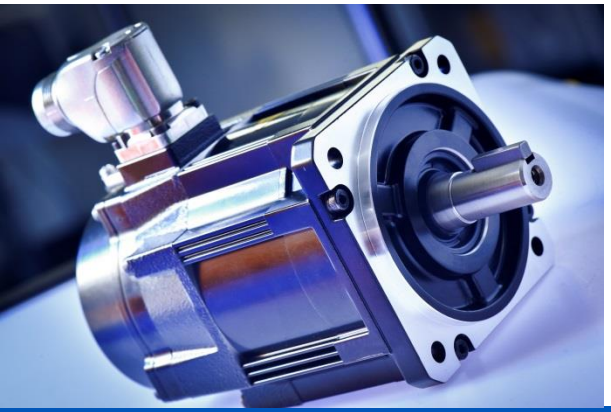
Fast Machines

Market need

- **More Profit due to more product in less time & continuous production**
- **Higher machine efficiency**

Machine

➔ High machine throughput
➔ Synchronization of a high number of axis
➔ Automatically adjustments to the load



Sigma-7

➔ Shorter settling time
➔ Vibration suppression
➔ Real time Ethernet
➔ Auto Tuning
➔ Faster, more accurate

Fast

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Complete Solutions from a Single Source

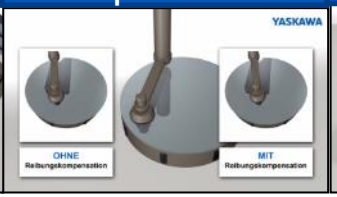
New Sigma-7 Servo System

Fast
High Machine Throughput ➔ 1000 Teabags / Minute

Machines with high throughput set high standards for Servo-Systems.

The advantages with Sigma-7:

- A high **Control Performance**
- Speed + accuracy at the same time
- **Synchronizing** of a high number of axes
- Vibration suppression fast positioning
- **Automatic adjustments to the load**

Vibration-suppression	Friction-compensation	Ripple-compensation
		

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Reliable Machines

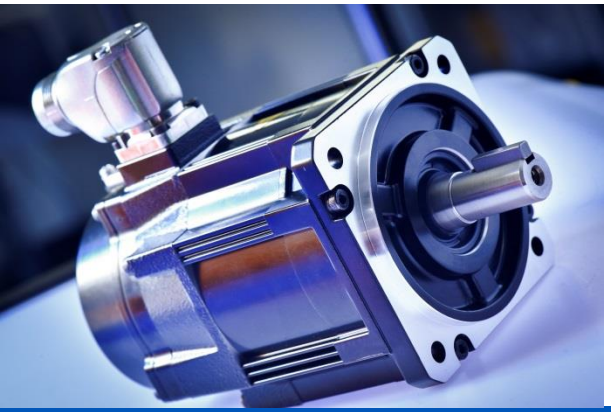
Market need

- **Stable production and a high machine availability**
- **Less machine stand still time within long time period**
- **Penalties for down time**

Machine

➔ Less machine stand still time
➔ High degree of RELIABILITY

Sigma-7



➔ Assembled and tested with great care
➔ Fulfill high quality standards
➔ Proven reliability
  ➔ 20 million units in the field

Reliable

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Complete Solutions from a Single Source

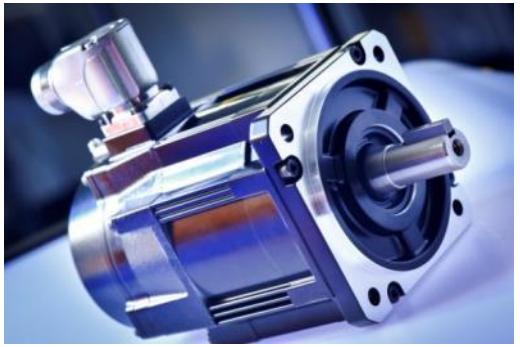
New Sigma-7 Servo System

Reliable

Stable Production, less machine stand still time

➔ „designed“ for 60.000 h operation time

- Over 25 years experience with more than 12 million devices in the field.
- The highest quality standards in production (**34 ppm**)
- Sigma-7 was developed for more than **60.000 hour operation time** and specified for 55 °C ambient temperature in the cabinet (typical are 20.000 hour)



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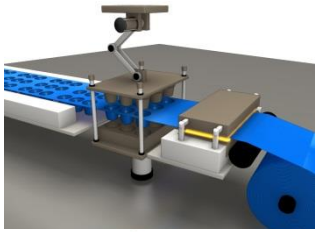
The Advantage

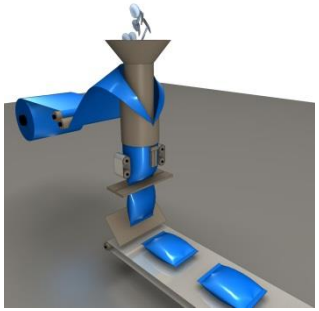
The value of a machine is increasing by efficiency, the flexibility, ease of use and the reliability.

- Quick — OEM → Faster Machine Setup



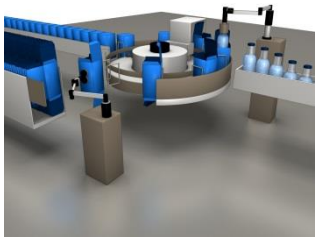
→ € More

- Fast — End User → More products in less time



→ € More

- Reliable — End User → Reduce machine downtime



→ € More

Highest throughput with Sigma-7
Quick, Fast & Reliable

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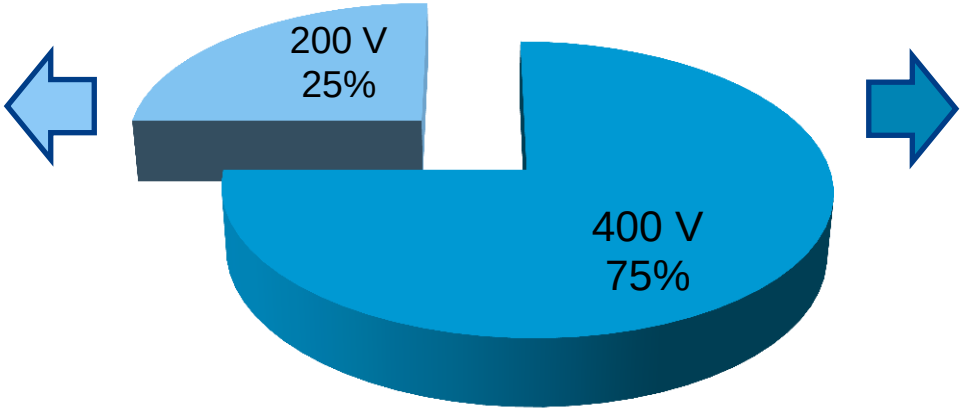
Servo Market & Sigma-7

EMEA Servo Market Voltage Split



200V

Single-phase*
& three-phase
power input

400V

Three-phase
power input

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

(*) single phase amplifier up to 1.5 kW are the most needed 200V types in Europe

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YASKAWA

Sigma-7 200V

Drives & Motion Division

Yaskawa Europe GmbH

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Sigma-7 200V Amplifier

50 W — Wide Power range — 15 kW

General

SIL 3 for STO, Pl-e, CAT 3
Speed frequency response: 3.1kHz
One amplifier for Linear & Rotary Motors
Advanced Safety functions SS1, SS2, SLS
Feedback options
Enhanced ripple compensation
vibration suppression, etc.

200V

Single-axis: *Model Σ-7S*

I/F: Pulse-train and analog input

MECHATROLINK-Ⅱ,

MECHATROLINK-Ⅲ

Embedded EtherCAT

Dual-axis: *Model Σ-7W*

Capacity: AC200V: 200W x 2 - 1kW x 2

I/F: MECHATROLINK-Ⅲ

Safety: STO

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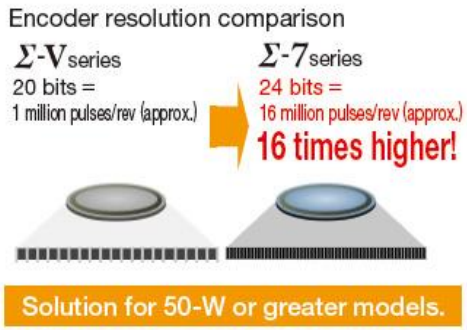
Sigma-7 200V Motor

50 W — Wide Power range — 15 kW

General

200V Servomotor

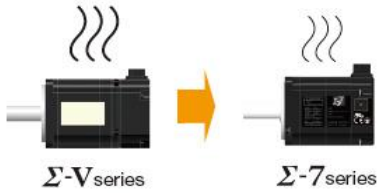
Flange compatible with Sigma 5
Downsizing by up to 20%
24-bit high-resolution encoder installed
High efficiency, low heat generation



200V

Low-inertia ***Model SGM7A*** **: 50W-7kW (*)**
Middle-inertia ***Model SGM7J*** **: 50W-750W**
Middle-inertia ***Model SGM7G*** **: 300W-15kW (*)**

Same cables as for Sigma 5 & optional



(*) single phase amplifier up to 1.5 kW are the most needed 200V types in Europe

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The Model availability

Sigma-7 200V (already released)

Amplifier: ***(200V types up to 1.5kW single phase input on stock, above 1.5kW non stock items, on request only)***

Model SGD7S-xxxA00A analog / pulse train
Model SGD7S-xxxA10A Mechatrolink II
Model SGD7S-xxxA20A Mechatrolink III
Model SGD7S-xxxAA0A EtherCAT embedded
Model SGD7W-xxxA20A Mechatrolink III, double axis on request

Motors:
Model SGM7A **: 50W-1.5 kW**
Model SGM7J **: 50W-750W**
Model SGM7G **: 300W-1.5kW**

Cables:
Same as Sigma 5 and optional cable
Filter:
New EMC Filter available

Available on stock up to 1.5 kW

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YASKAWA

Sigma-7 400V

Drives & Motion Division

Yaskawa Europe GmbH

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Made for Europe!

The new generation of Sigma-7 combines European Standards with Japanese Virtues.

- European form and connectivity.
- Extreme Compact.
- Embedded Ethernet based Fieldbus.
- European Standard and Advanced Safety.
- Outstanding Reliability.
- Highest Performance.

QUICK

Improve your Installation Efficiency

FAST

Improve your Performance Efficiency

RELIABLE

Improve your Production Efficiency

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Sigma-7 400V Amplifier

50 W — Wide Power range — 15 kW

General

SIL3

SIL 3 for STO, Pl-e, CAT 3
Speed frequency response: 3.1kHz
One amplifier for Linear & Rotary Motors
Advanced Safety functions SS1, SS2, SLS

Enhanced ripple compensation
vibration suppression, etc.

400V

Single-axis: *Model Σ-7S* (Step 1 up to 3kW)

I/F: Embedded EtherCAT, MECHATROLINK-Ⅲ

New size => book style, "Side by Side" mounting

European connectors (for input and output)

Direct brake connection (additional type)

Daisy chain connection, for 24V DC, and DC Power input

Feedback options

Dual-axis: *Model Σ-7W**

Capacity:	**AC400V: 750W x 2 & 1.5 kW x 2**
I/F:	**EtherCAT, MECHATROLINK-Ⅲ, (Profinet*)**
Safety:	**STO SIL3 for both axis + Advanced Safety module (for one axis)**

* Scheduled. 2017

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Sigma-7 400V Motor

50 W — Wide Power range — 15 kW

◆Servomotor

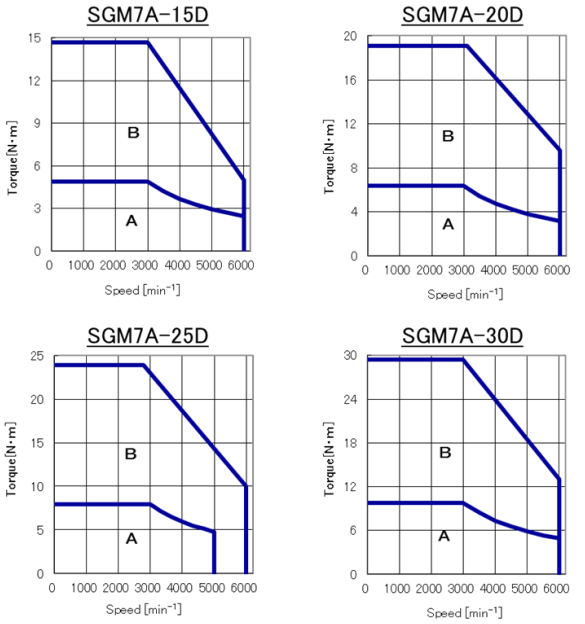
General

Flange compatible with Sigma 5
Downsizing by up to 20%
24-bit high-resolution encoder installed
High efficiency, low heat generation

400V

Low-inertia ***Model SGM7A*** **: 400W - 7kW**
Middle-inertia ***Model SGM7J*** **: 200W - 1,5 kW**
Middle-inertia ***Model SGM7G*** **: 450W - 15kW**

Improved Max speed up to 6000 rpm
Improved speed torque characteristics
New European IP 67 connectors
M12 connectors for Encoder cables
M17, M23, M40 connectors for Power



- ***Quick, easy and simple wiring***
- ***More compact***
- ***Even Faster***

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Sigma-7 400V Double Axis Amplifier

Double-axis: Model Σ-7W

- Capacity: 2x 750 W
  2x 1.5 kW
- Step 1 EtherCAT embedded
  “book style” for a small width
- Side by side mounting for less width
- STO SIL3 for both axis
  + Advanced Safety module (for one axis)
- Same footprint as single axis
- **40mm width per axis only!**
- Daisy Chain connectors
- DC Power Input , Energy sharing

Sample available July 2016

SIL3

Time Savings Space Savings Eco Friendliness Cost Savings

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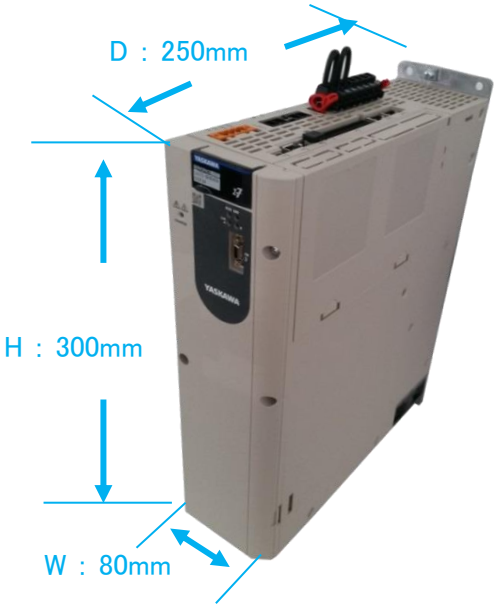
Sigma 7 400V – Dimensions & Mounting

New Shape, New Dimension

- “book style” for a small width
- Side by side mounting for less width
- Same footprint: Model Σ-7S & Σ-7W up to 3kW
- Integrated placeholder for feedback and advanced Safety option cards
- Simple mounting and replacement with new detachable European Connectors



Model Σ-7S & Σ-7W up to 3kW)

Dimension					Mounting
kw	Type	Height (mm)	Width (mm)	Depth (mm)	
0.50	SGD7S-1R9D	300	80	250	“Side by Side”
1.00	SGD7S-3R5D	300	80	250	
1.50	SGD7S-5R4D	300	80	250	
2.00	SGD7S-8R4D	300	80	250	
3.00	SGD7S-120D	300	80	250	
5.00	SGD7S-170D	300	100	250	
2x 0.75	**SGD7W-2R6D**	**300**	**80**	**250**	
2x 1.50	**SGD7W-5R4D**	**300**	**80**	**250**	

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Σ-7 400V System Example – Size Advantage

SGDV-3R5D, -5R4D, -8R4D: 110mm, SGDV-120D: 135mm
In addition 5mm gap between two amplifiers needed

1 pcs Axis 1	2.0 kW
2 pcs Axis 2 + 3	1.0 kW
2 pcs Axis 4 + 5	1.5 kW
2 pcs Axis 6 + 7	3.0 kW

7 Axis
7 Modules

Σ5 840 mm

7 Axis
7 Modules (80mm)

Σ7S 560 mm 33%

With SGD7S 400V type

7 Axis
5 Modules (80mm)

Σ7S + Σ7W 400 mm 52%

With SGD7W 400V

Double axis Release 4th quarter 2016

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Sigma - 7S 400V Design & Structure

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

- Option units for Advanced Safety, Encoder

- Connector for Digital Operator

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

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Sigma-7 400V Motor

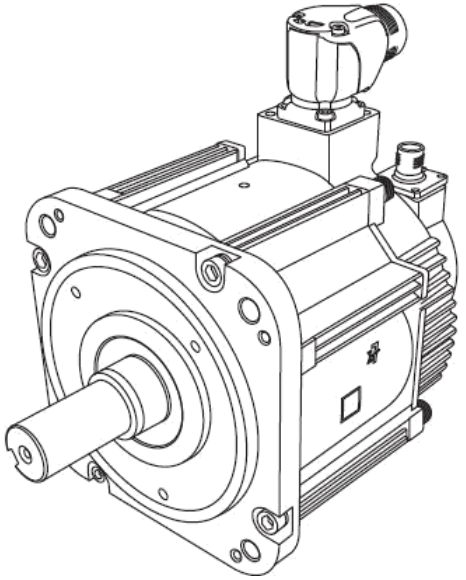
The 1. Step up to 3.0 kW

QUICK

Improve your Installation Efficiency

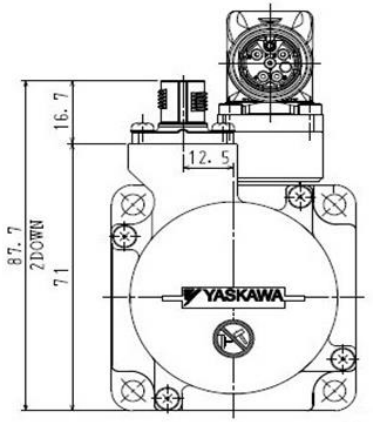
New Rotary servomotor

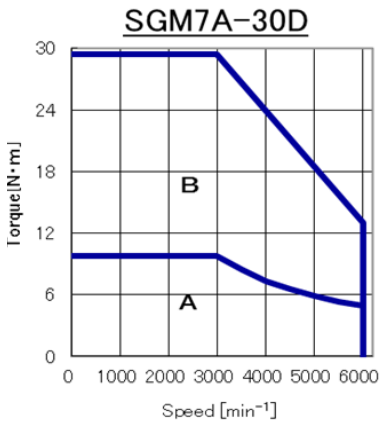
- Flange compatible with Sigma 5
- New European cables
- Improved Max speed up to 6000 rpm
- Improved speed torque characteristics
- New European IP 67 Connectors

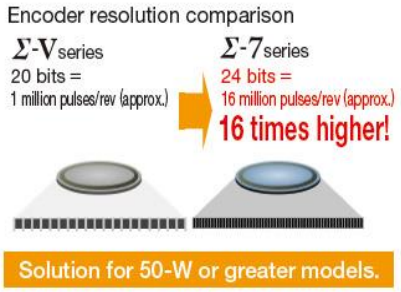


Σ-7 400V

Low-inertia ***Model SGM7A*** **: 400W - 7kW**
Middle-inertia ***Model SGM7J*** **: 200W - 1,5 kW**
Middle-inertia ***Model SGM7G*** **: 450W - 15kW**







- ***Quick, easy and simple wiring***
- ***More compact***
- ***Even Faster***

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New Solution for motor shielding connection

Shielding clamp

KLBUE_4-13.5

Mountable on following Sigma models

- Sigma 5 SGDV
- Sigma 7 200V / 400V

Versions

- KLBUE_4-13.5_SC for Servopacks
  - Sigma 7 400V up to 3.0 kW
  - Sigma 7 200V 1.5 kW 1ph
  - Sigma 5 200V up to 1.5 kW 1ph
- KLBUE_4-13.5_SET for Servopacks
  - Sigma 7 200V up to 750W
  - Sigma-5 200V up to 750W

Time Savings

Cost Savings

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New Cables

Σ-7 400V

QUICK

Improve your Installation Efficiency

New Cables

- Flexible Motor Power Cables
  - Without or including brake wire
  - Standard length 3 /5 /10 /15 /20m
  - M17, M23, M40 straight connectors
- Flexible Encoder Cables
  - **For all Motors same Encoder cable**
  - Straight or angled M12 connectors

Spring clamp for Motor cable shielding

Time Savings

Cost Savings

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New European connectors

400V

New European IP 67 Connectors

Three Motor Power Connectors

- M17 up to 750W
- M23 up to 5kW
- M40 up to 15kW

One Encoder Connector M12

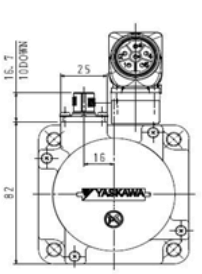
- For all SGM7x Motors with 400V Winding
- Straight & angled

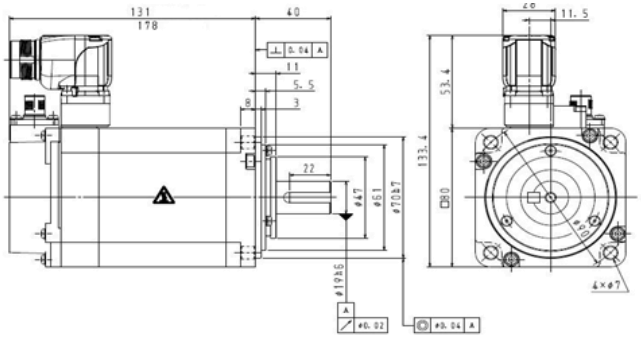
➢ ***High connector availability in Europe!***

QUICK

Improve your Installation Efficiency

The SPEEDCON quick locking works on the principle Plug & Turn.





Time Savings

Cost Savings

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