# FRAMELESS SERVO MOTORS
# SERIES NK, K, SKW, HKW, TK

Parker

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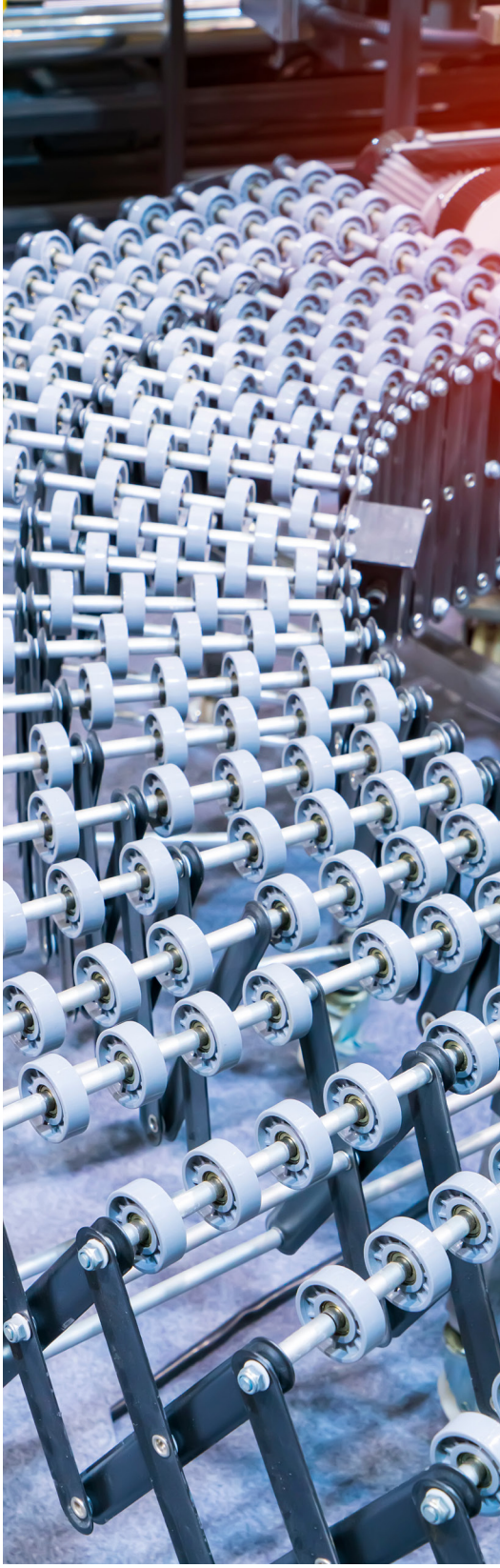

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## Overview

Frameless servomotor is an innovative and comprehensive approach enabling the complete integration of the permanent magnets AC motor in a simplified mechanical system. This approach ensures that the size constraints of the machine are utilized to maximum effect. This delivers a more accurate, reliable and robust solution than traditional construction methods.
Different ranges of products are available to meet the design needs of many different mechanical systems in a host of different applications. Other more bespoke adaptations can be developed upon request.

## Advantages

- Global cost reduction
- Increased reliability
- Compact footprint of the machine
- High stiffness and robustness of the system
- Direct drive for more accurate and dynamic motion
- Simple machine design
- Reduced weigth of the system
- Reduced maintenance
- Integration assistance

## Applications

- Machine tools
- Medical
- Marine & Submarine
- Rotating Table
- Special Machine
- Handling & Robotics
- Mixer
- Winch
- Compressor

## Overview

| Series | NK | | K | SKW | HKW | TK | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Web | www.parker.com/eme/nk | | www.parker.com/eme/k | www.parker.com/eme/skw | www.parker.com/eme/hkw | www.parker.com/eme/tk | |
| Cooling | Natural Cooling | Water Cooling | Natural Cooling | Water cooling | Water Cooling | Natural Cooling | Water Cooling |
| Power [kW] | 0.43 to 7.5 | 3.8 to 34 | 0.06 to 2 | 0.2 to 7.5 | 2.3 to 276 | 7.9 to 58 | 23 to 162 |
| Torque [Nm] | 2 to 41 | 3.1 to 90 | 0 .07 to 23 | 4 to 36 | 4.5 to 1840 | 246 to 9400 | 480 to 21700 |
| Max Speed [$min^{-1}$] | 5700 | 15000 | 10000 | 12000 | 50000 | 310 | 895 |
| Diameter [mm] | 62/80/111/143 | | 32/44/64/89/178 | 73/82/91/96 | 85/108/155/195/242/310 | 385/565/795 | |
| Power Supply | 24 - 48 VAC please contact us<br>230 - 400 VAC | | 12 - 24 - 48 - 96 VDC;<br>240 VAC only for size K178 | 400 VAC | 400 VAC | 400 VAC | |
| Main Characteristics/ Performances | • Low cogging<br>• Compact in diameter<br>• Embedded magnets<br>• Oil proof on request | | • Low voltage<br>• Compact in Length<br>• Glued magnets<br>• Integrated Hall Effect sensor as an option<br>• Large hollow shaft | • Medium speed<br>• Glued magnets<br>• Winding potted in epoxy resin<br>• Large hollow shaft<br>• Oil proof<br>• For original equipment manufacturer | • High speed<br>• High power<br>• Constant power running (Field weakening mode)<br>• Embedded magnets<br>• Winding potted in epoxy resin<br>• Medium hollow shaft<br>• Oil proof on request | • High torque<br>• High power<br>• Glued magnets<br>• Winding potted in epoxy resin<br>• Very large hollow shaft<br>• Oil proof on request<br>• Coating against corrosion on request | |

# FRAMELESS SERVO MOTOR - NK SERIES

## Description

NK Series Servo motors are an innovative direct drive solution designed for industrial applications. NK Series brushless servomotors combine exceptionally precise and quality motion, high dynamic performance with a compact footprint, allowing complete integration into a mechanical system.
NK motors are suite to applications where constant speed is needed due to their low cogging characteristic. Support with customisation and integration are possible on request.

## Advantages

- Low cogging solution
- Compact diameter
- Oil-proof on request
- Global cost reduction
- Increased reliability and reduced maintenance
- High dynamic performance and power density: increased productivity and reduced size when compared to induction motors
- Simple, light and compact machine design
- No coupling systems needed
- Greater stiffness and robustness of the system
- Low noise level
- Integration assistance

## Application

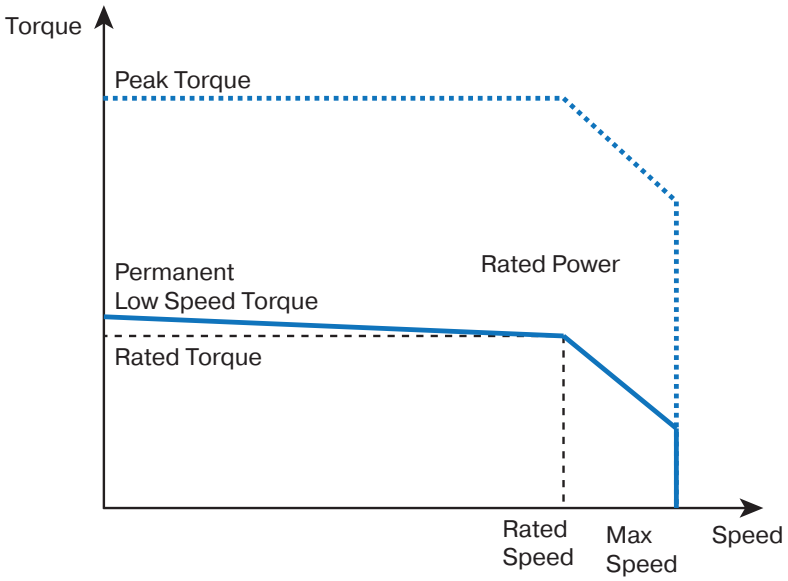
- Medical
- Machine Tools
- Submarine
- Packaging Machinery
- Pump
- Compressor
- Winch
- Special Machine
- Electric Cylinder

## Technical Characteristics Overview

| Cooling | | Natural cooling | Water cooling |
|---|---|---|---|
| Power | [kW] | 0.43...7.5 | 3.8...34 |
| Torque | [Nm] | 2...41 | 3.1...90 |
| Max Speed | [$min^{-1}$] | 5700 | 15000 |
| Number of poles | | 10 | 10 |
| Diameter | [mm] | 62/80/111/143 | |
| Power supply* | [VAC] | 24/48/230/400 | 24/48/230/400 |

* for 24 - 48 Vac please contact us.

## Torque/Speed Curve




## Technical Data

| Motor | Rated Power Pn | Rated Torque Mn | Rated Current In | Low speed torque Mo | Low Speed Current Io | Peak Torque M peak | Peak Current I peak | Max. Speed N max | Frequency at max speed | Moment of Inertia J |
|---|---|---|---|---|---|---|---|---|---|---|
| | [kW] | [Nm] | [Arms] | [Nm] | [Arms] | [Nm] | [Arms] | [min$^{-1}$] | [Hz] | [kgmm$^2$] |
| **230VAC power supply - single or three-phased** | | | | | | | | | | |
| NK310E_P | 0.43 | 1.8 | 1.27 | 2 | 1.4 | 6.6 | 5.6 | 2300 | 192 | 79 |
| NK310E_K | 0.69 | 1.65 | 2.06 | 2 | 2.4 | 6.6 | 9.7 | 4000 | 333 | 79 |
| NK420E_P | 0.85 | 3.53 | 2.41 | 4 | 2.7 | 13.4 | 10.9 | 2300 | 192 | 290 |
| NK420E_J | 1.31 | 3.14 | 3.74 | 4 | 4.7 | 13.4 | 18.9 | 4000 | 333 | 290 |
| NK430E_J | 1.57 | 4.68 | 4.53 | 5,5 | 5.2 | 18.7 | 21.0 | 3200 | 267 | 426 |
| NK430E_F | 1.80 | 4.29 | 5.28 | 5,5 | 6.6 | 18.7 | 26.6 | 4000 | 333 | 426 |
| NK620E_R | 1.71 | 7.42 | 4.99 | 8 | 5.3 | 26.6 | 21.2 | 2200 | 183 | 980 |
| NK620E_J | 2.55 | 6.08 | 7.82 | 8 | 9.9 | 26.6 | 39.5 | 4000 | 333 | 980 |
| NK630E_R | 1.63 | 10.7 | 4.75 | 12 | 5.3 | 39.9 | 21.0 | 1450 | 121 | 1470 |
| NK630E_K | 2.70 | 9.21 | 7.8 | 12 | 9.9 | 39.9 | 39.4 | 2800 | 233 | 1470 |
| NK630E_G | 3.48 | 8.31 | 10.1 | 12 | 13.9 | 39.9 | 55.7 | 4000 | 333 | 1470 |
| NK820E_L | 4.99 | 13.2 | 14.8 | 16 | 17.6 | 49.9 | 69.2 | 3600 | 300 | 3200 |
| NK840E_J | 5.27 | 22.9 | 15.7 | 28 | 18.9 | 91.8 | 74.8 | 2200 | 183 | 6200 |
| NK860E_F | 6.53 | 32.8 | 21.8 | 41 | 27.0 | 136.0 | 107.6 | 1900 | 158 | 9200 |
| NK860E_D | 7.48 | 27.5 | 22.5 | 41 | 33.0 | 136.0 | 131.6 | 2600 | 217 | 9200 |

# Technical Data

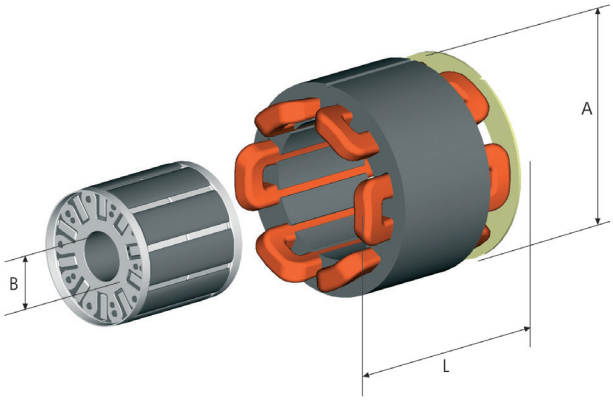
| Motor | Rated Power Pn | Rated Torque Mn | Rated Current In | Low speed torque Mo | Low speed Current Io | Peak Torque M peak | Peak Current I peak | Max. Speed N max | Frequency at max speed | Moment of Inertia J |
|---|---|---|---|---|---|---|---|---|---|---|
| | [kW] | [Nm] | [Arms] | [Nm] | [Arms] | [Nm] | [Arms] | [min$^{-1}$] | [Hz] | [kgmm$^2$] |
| **400VAC power supply - three-phased** | | | | | | | | | | |
| NK310E_P | 0.689 | 1.65 | 1.2 | 2 | 1.4 | 6.6 | 5.6 | 4000 | 333 | 79 |
| NK420E_V | 0.753 | 3.6 | 1.2 | 4 | 1.4 | 13.4 | 5.5 | 2000 | 167 | 290 |
| NK420E_P | 1.31 | 3.14 | 2.2 | 4 | 2.7 | 13.4 | 10.9 | 4000 | 333 | 290 |
| NK430E_V | 0.563 | 5.38 | 1.4 | 5.5 | 1.4 | 18.7 | 5.6 | 1000 | 83 | 426 |
| NK430E_P | 1.5 | 4.77 | 2.5 | 5.5 | 2.8 | 18.7 | 11.3 | 3000 | 250 | 426 |
| NK430E_L | 1.8 | 4.29 | 3.0 | 5.5 | 3.8 | 18.7 | 15.1 | 4000 | 333 | 426 |
| NK620E_V | 1.57 | 7.52 | 2.7 | 8 | 2.8 | 26.6 | 11.3 | 2000 | 167 | 980 |
| NK620E_R | 2.52 | 6.17 | 4.3 | 8 | 5.3 | 26.6 | 21.2 | 3900 | 325 | 980 |
| NK620E_J | 2.45 | 4.1 | 5.6 | 8 | 9.9 | 26.6 | 39.5 | 5700 | 475 | 980 |
| NK630E_V | 1.53 | 10.8 | 2.4 | 12 | 2.6 | 39.9 | 10.5 | 1350 | 113 | 1470 |
| NK630E_R | 2.64 | 9.34 | 4.2 | 12 | 5.3 | 39.9 | 21.0 | 2700 | 225 | 1470 |
| NK630E_N | 3.18 | 7.6 | 5.3 | 12 | 7.9 | 39.9 | 31.7 | 4000 | 333 | 1470 |
| NK820E_X | 2.93 | 14.7 | 4.8 | 16 | 5.2 | 49.9 | 20.3 | 1900 | 158 | 3200 |
| NK820E_R | 5.29 | 12.9 | 9.1 | 16 | 11.0 | 49.9 | 43.2 | 3900 | 325 | 3200 |
| NK840E_Q | 5.09 | 23.2 | 8.5 | 28 | 10.1 | 91.8 | 39.9 | 2100 | 175 | 6200 |
| NK840E_K | 6.8 | 18.6 | 11.5 | 28 | 16.8 | 91.8 | 66.5 | 3500 | 292 | 6200 |
| NK860E_J | 7.48 | 27.5 | 12.7 | 41 | 18.5 | 136.0 | 74.0 | 2600 | 217 | 9200 |
| **400 VAC power supply - three-phased - water cooled** | | | | | | | | | | |
| NK310W_F | 3.8 | 2.5 | 7.4 | 3.1 | 8.9 | 5.89 | 18.0 | 15000 | 1250 | 79 |
| NK420W_D | 4.9 | 4.64 | 12.6 | 6.1 | 16.3 | 12.6 | 36.4 | 12000 | 1000 | 290 |
| NK430W_D | 7.4 | 7.26 | 14.1 | 9.6 | 18.3 | 18.9 | 38.9 | 10000 | 833 | 420 |
| NK620W_C | 7.7 | 10.7 | 20.7 | 15 | 29 | 23.5 | 48.0 | 10000 | 833 | 980 |
| NK630W_D | 11.8 | 17.8 | 31.2 | 23 | 40.1 | 38.7 | 72.8 | 8000 | 667 | 1470 |
| NK820W_G | 12.6 | 19 | 35.2 | 24 | 44.1 | 37.9 | 75.0 | 8000 | 667 | 3200 |
| NK840W_D | 26.4 | 42.7 | 52.7 | 53 | 65.3 | 75.8 | 100.0 | 6500 | 542 | 6200 |
| NK860W_D | 34.8 | 83.2 | 64.6 | 90 | 70.2 | 140 | 123.2 | 4000 | 333 | 9200 |

# Associated Drives

| Motor | Compax3 | PSD1 | SLVD-N | AC890 | AC30 |
|---|---|---|---|---|---|
| 230 VAC power supply - single or three-phased | | | | | |
| NK310E_P.. | C3S025V2.. | PSD1SW1200 | SLVD2N | 890SD-231300B... | - |
| NK310E_K.. | C3S025V2.. | PSD1SW1200 | SLVD2N | 890SD-231550B... | - |
| NK420E_P.. | C3S063V2.. | PSD1SW1300 | SLVD5N | 890SD-231550B... | - |
| NK420E_J.. | C3S063V2.. | - | SLVD5N | 890SD-231700B... | - |
| NK430E_J.. | C3S063V2.. | PSD1SW1300 | SLVD7N | 890SD-231700B... | - |
| NK430E_F.. | C3S100V2.. | - | SLVD7N | 890SD-232165B... | - |
| NK620E_R.. | C3S063V2.. | PSD1SW1300 | SLVD7N | 890SD-231700B... | - |
| NK620E_J.. | C3S100V2.. | - | SLVD10N | 890SD-232165B... | - |
| NK630E_R.. | C3S063V2.. | - | SLVD7N | 890SD-231700B... | - |
| NK630E_K.. | C3S100V2.. | - | SLVD10N | 890SD-232165B... | - |
| NK630E_G.. | C3S150V2.. | - | SLVD15N | 890SD-232240C... | - |
| NK820E_L.. | - | - | - | 890SD-232240C... | - |
| NK840E_J.. | - | - | - | 890SD-232240C... | - |
| NK860E_F.. | - | - | - | 890SD-232300C... | - |
| NK860E_D.. | - | - | - | - | - |
| **400 VAC power supply - three-phased** | | | | | |
| NK310E_P.. | C3S015V4.. | PSD1MW1300 | - | 890SD-531450B... | 31V4-D0004-B... |
| NK420E_V.. | C3S015V4.. | PSD1MW1300 | - | 890SD-531450B... | 31V4-D0004-B... |
| NK420E_P.. | C3S038V4.. | PSD1MW1300 | - | 890SD-531450B... | 31V4-D0004-B... |
| NK430E_V.. | C3S015V4.. | PSD1MW1300 | - | 890SD-531450B... | 31V4-D0004-B... |
| NK430E_P.. | C3S038V4.. | PSD1MW1300 | - | 890SD-531450B... | 31V4-D0004-B... |
| NK430E_L.. | C3S038V4.. | PSD1MW1300 | - | 890SD-532100B... | 31V4-D0005-B... |
| NK620E_V.. | C3S038V4.. | PSD1MW1300 | - | 890SD-531450B... | 31V4-D0004-B... |
| NK620E_R.. | C3S075V4.. | PSD1MW1400 | - | 890SD-532100B... | 31V4-D0006-B... |
| NK620E_J.. | C3S150V4.. | PSD1MW1600 | - | 890SD-532160B... | 31V4-D0006-B... |
| NK630E_V.. | C3S038V4.. | PSD1MW1300 | - | 890SD-531450B... | 31V4-D0004-B... |
| NK630E_R.. | C3S075V4.. | PSD1MW1400 | - | 890SD-532100B... | 31V4-D0006-B... |
| NK630E_N.. | C3S150V4.. | PSD1MW1600 | - | 890SD-532160B... | 31V4-D0010-B... |
| NK820E_X.. | C3S075V4.. | PSD1MW1400 | - | 890SD-532100B... | 31V4-D0006-B... |
| NK820E_R.. | C3S150V4.. | PSD1MW1600 | - | 890SD-532160B... | 31V4-D0012-B... |
| NK840E_Q.. | C3S150V4.. | PSD1MW1600 | - | 890SD-532160B... | 31V4-D0012-B... |
| NK840E_K.. | C3S300V4.. | PSD1MW1800 | - | 890SD-532240C... | 31V4-E0023-B... |
| NK860E_J.. | C3S300V4.. | PSD1MW1800 | - | 890SD-532240C... | 31V4-E0023-B... |
| **400 VAC power supply - three-phased - water cooled** | | | | | |
| NK310W_F.. | C3S150V4.. | PSD1MW1600 | - | 890SD-532160B... | 31V4-E0016-B... |
| NK420W_D.. | C3S300V4.. | PSD1MW1800 | - | 890SD-532240C... | 31V4-E0023-B... |
| NK430W_D.. | C3S300V4.. | PSD1MW1800 | - | 890SD-532240C... | 31V4-F0032-B... |
| NK620W_C.. | C3S300V4.. | PSD1MW1800 | - | 890SD-53230SC... | 31V4-G0045-B... |
| NK630W_D.. | C3H050V4.. | - | - | 890SD-532590D... | 31V4-G0060-B... |
| NK820W_G.. | C3H050V4.. | - | - | 890SD-532590D... | 31V4-G0060-B... |
| NK840W_D.. | C3H090V4.. | - | - | 890SD-432730E... | 31V4-H0105-B... |
| NK860W_D.. | C3H090V4.. | - | - | 890SD-432730E... | 31V4-G0073-B... |

## Dimensions

| Motor | Dimensions [mm] | | |
|---|---|---|---|
| | A | B | L |
| NK310 | 62 | 14 | 77 |
| NK420 | 80 | 20 | 94 |
| NK430 | | | 119 |
| NK620 | 111 | 26 | 106 |
| NK630 | | | 135 |
| NK820 | 143 | 40 | 119 |
| NK840 | | | 179 |
| NK860 | | | 242 |
| NK310W | 82 | 14 | 85 |
| NK420W | 100 | 20 | 102 |
| NK430W | | | 127 |
| NK620W | 131 | 26 | 114 |
| NK630W | | | 143 |
| NK820W | 163 | 40 | 120 |
| NK840W | | | 180 |
| NK860W | | | 243 |




## Option

Several types of sensor are available for use with servo motor kits depending upon the needs of the application, such as environment, resolution and accuracy: resolver, high resolution sensor, optical encoder...

## Order Code NK Series

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| **Order example** | **NK310** | **E** | **A** | **P** | **R1** | **0** | **00** |

| | | |
|---|---|---|
| 1 | Motor type | |
| | NK310<br>NK420<br>NK430<br>... | see table "Technical Data" |
| 2 | Cooling | |
| | E | Natural cooling |
| | W | Water cooling |
| 3 | Feedback sensors/Motors | |
| | A | 2 pole resolver |
| | K | Without sensor (standard) |
| | P | Absolute single-turn encoder HIPERFACE DSL SIL2 - EKS36 |
| | Q | Absolute multi-turn encoder HIPERFACE DSL SIL2 - EKM36 |
| | R | Absolute single-turn HIPERFACE encoder 128 ppt SKS36 |
| | S | Absolute multi-turn HIPERFACE encoder 128 ppt SKM36 |

| | | |
|---|---|---|
| 4 | Motor type | |
| | P<br>T<br>J<br>... | see table "Technical Data" |
| 5 | Fix code | |
| | R1 | |
| 6 | Thermal protection + Brake/Motors | |
| | 0 | Without (standard) |
| | 1 | PTC |
| | 6 | KTY |
| 7 | Mechanical characteristics/Motors | |
| | 00 | Standard |
| | XX | Customization (on request) |

# Feedback Sensors

| **2 poles resolver - option A** |
|---|
| • Accuracy: ±10' max |
| • Transformation ratio: 0.5 ±5 % |
| • Max. operating speed: 17 000 $min^{-1}$ |
| • Working temperature range: -55...+155 °C |
| **Single turn / Multiturn absolute encoder HIPERFACE SKS/SKM36 - option R/S** |
| • Number of sine/cosine periods per revolution: 128 |
| • Absolute position per revolution: 4096 (12 bits) |
| • Number of absolutely encodable revolutions: 4096 (SKM36) |
| • Max. operating speed SKS36: 12 000 $min^{-1}$ |
| • Max. operating speed SKM36: 9000 $min^{-1}$ |
| • Working temperature range: -20...+110 °C |
| **Single turn / Multiturn absolute encoder HIPERFACE EKS/EKM36 - option P/Q** |
| • Up to 20 bit resolution per revolution |
| • Number of absolutely encodable revolutions: 4096 (EKM) |
| • SIL2 certified |
| • Max. operating speed: 12 000 $min^{-1}$ (EKS), 9000 $min^{-1}$ (EKM) |
| • Working temperature range: -20...+115 °C |

# FRAMELESS SERVO MOTOR - K SERIES

## Description

K Series frameless motor are the ideal solution for machine designs that require high performance at low voltages. Kit motors allow for direct integration without any mechanical transmission device, eliminating parts that add size and complexity. Use of Frameless Kit Motors results in a smaller, more reliable system.

## Advantages

- Low voltage
- Compact size (length)
- Large hollow shaft
- Integrated Hall Effect sensor as an option
- Global cost reduction
- Increased reliability and reduced maintenance
- High dynamic performance and power density: increased productivity and reduced size when compared to induction motors
- Simple, light and compact machine design
- No coupling systems needed
- Greater stiffness and robustness of the system
- Low noise level
- Integration assistance available

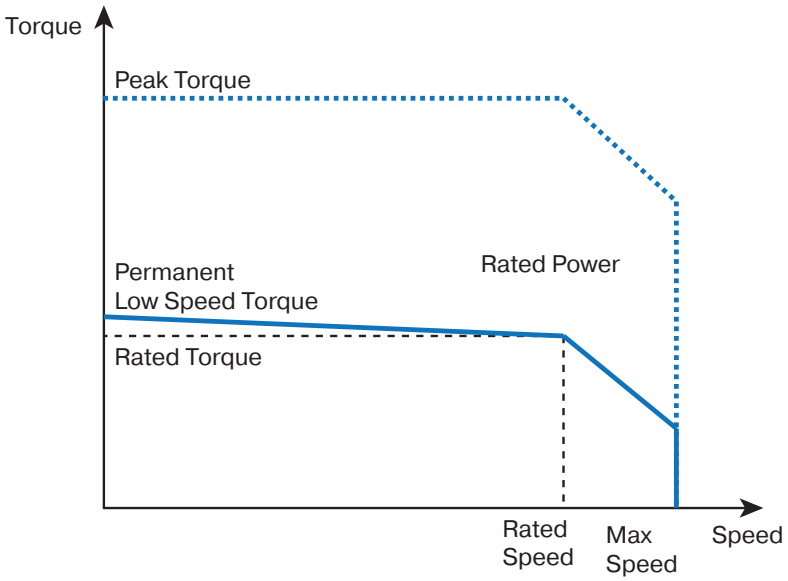
## Application

- Medical
- Hand Tool
- Packaging Machinery
- Rotating Table
- Special Machines
- Pump
- Compressor

## Technical Characteristics Overview

| | | |
|---|---|---|
| Cooling | | Natural cooling |
| Power | [kW] | 0.06...2 |
| Torque | [Nm] | 0.07...23 |
| Max Speed | [$min^{-1}$] | 10000 |
| Number of poles | | 4 (K32) / 6 (K44) / 8 (K64) / 12 (K89) / 18 K178) |
| Diameter | [mm] | 32/44/64/89/178 |
| Power supply | [V*C] | 12/24/48/96 VDC<br>240 VAC only for size K178 |

## Torque/Speed Curve




## Technical Data

| Motor | Rated Power Pn [kW] | Rated Torque Mn [Nm] | Rated Speed Nn [min$^{-1}$] | Rated Current In [Arms] | Low speed torque Mo [Nm] | Low speed Current Io [Arms] | Peak Torque M peak [Nm] | Peak Current I peak [Arms] | Max. Speed N max [min$^{-1}$] | Frequency at max speed [Hz] | Moment of Inertia J [kgmm$^2$] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **24 VDC power supply** | | | | | | | | | | | |
| K032050-7Y_ | 0.059 | 0.072 | 7795 | 3.1 | 0.074 | 3.2 | 0.26 | 11.2 | 10000 | 333 | 0.32 |
| K032050-8Y_ | 0.042 | 0.074 | 5473 | 2.5 | 0.075 | 2.5 | 0,26 | 8.8 | 8155 | 272 | 0.32 |
| K032050-EY_ | 0.020 | 0.074 | 2515 | 1.6 | 0.075 | 1.6 | 0,26 | 5.5 | 5126 | 171 | 0.32 |
| K032100-7Y_ | 0.049 | 0.12 | 3744 | 2.7 | 0.13 | 2.7 | 0.44 | 9.6 | 5320 | 177 | 0.63 |
| K032100-8Y_ | 0.034 | 0.13 | 2572 | 2.1 | 0.13 | 2.2 | 0.45 | 7.6 | 4111 | 137 | 0.63 |
| K032100-EY_ | 0.014 | 0.13 | 1071 | 1.3 | 0.13 | 1.4 | 0.45 | 4.7 | 2584 | 86 | 0.63 |
| K032200-7Y_ | 0.036 | 0.20 | 1704 | 2.2 | 0.21 | 2.2 | 0,72 | 7.8 | 2649 | 88 | 1.3 |
| K032200-8Y_ | 0.024 | 0.21 | 1118 | 1.7 | 0.21 | 1.7 | 0.73 | 6.1 | 2047 | 68 | 1.3 |
| K032200-EY_ | 0.008 | 0.21 | 365 | 1.1 | 0.21 | 1.1 | 0.73 | 3.9 | 1287 | 43 | 1.3 |
| K044050-7Y_ | 0.073 | 0.19 | 3763 | 4.1 | 0.19 | 4,2 | 0.66 | 14.6 | 5361 | 268 | 1.4 |
| K044050-8Y_ | 0.053 | 0.19 | 2723 | 3.3 | 0.19 | 3,3 | 0.66 | 11.6 | 4288 | 214 | 1.4 |
| K044050-EY_ | 0.023 | 0.19 | 1173 | 2.1 | 0.19 | 2.1 | 0.66 | 7.3 | 2680 | 134 | 1.4 |
| K044100-7Y_ | 0.061 | 0.33 | 1771 | 3.6 | 0.33 | 3.6 | 1.16 | 12.6 | 2657 | 133 | 2.9 |
| K044100-8Y_ | 0.043 | 0.33 | 1250 | 2.8 | 0.33 | 2.9 | 1.15 | 10.1 | 2126 | 106 | 2.9 |
| K044100-EY_ | 0.016 | 0.33 | 474 | 1.8 | 0.33 | 1.8 | 1.16 | 6.3 | 1329 | 66 | 2.9 |
| K044200-7Y_ | 0.045 | 0.53 | 804 | 2.9 | 0.54 | 2.9 | 1.88 | 10.3 | 1334 | 67 | 5.8 |
| K044200-8Y_ | 0.030 | 0.53 | 539 | 2.3 | 0.53 | 2.3 | 1.87 | 8.2 | 1068 | 53 | 5.8 |
| K044200-EY_ | 0.008 | 0.54 | 145 | 1.5 | 0.54 | 1.5 | 1.88 | 5.1 | 667 | 33 | 5.8 |

# Technical Data

| Motor | Rated Power Pn | Rated Torque Mn | Rated Speed Nn | Rated Current In | Low speed torque Mo | Low speed Current Io | Peak Torque M peak | Peak Current I peak | Max. Speed N max | Frequency at max speed | Moment of Inertia J |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [kW] | [Nm] | [min$^{-1}$] | [Arms] | [Nm] | [Arms] | [Nm] | [Arms] | [min$^{-1}$] | [Hz] | [kgmm$^2$] |
| **24 VDC power supply** | | | | | | | | | | | |
| K064050-8Y_ | 0.058 | 0.53 | 1053 | 4.0 | 0.53 | 4.0 | 1.86 | 14.0 | 1830 | 122 | 9 |
| K064050-9Y_ | 0.039 | 0.53 | 700 | 3.2 | 0.53 | 3.2 | 1.85 | 11.1 | 1464 | 98 | 9 |
| K064050-EY_ | 0.022 | 0.53 | 396 | 2.5 | 0.53 | 2.5 | 1.87 | 8.8 | 1144 | 76 | 9 |
| K064100-8Y_ | 0.047 | 0.93 | 484 | 3.5 | 0.94 | 3.5 | 3.29 | 12.3 | 915 | 61 | 18 |
| K064100-9Y_ | 0.030 | 0.93 | 305 | 2.8 | 0.93 | 2.8 | 3.28 | 9.8 | 732 | 49 | 18 |
| K064100-EY_ | 0.015 | 0.94 | 152 | 2.2 | 0.94 | 2.2 | 3.30 | 7.7 | 572 | 38 | 18 |
| K064200-8Y_ | 0.033 | 1.56 | 204 | 2.9 | 1.57 | 2.9 | 5.50 | 10.3 | 457 | 30 | 36 |
| K064200-9Y_ | 0.018 | 1.56 | 113 | 2.3 | 1.56 | 2.3 | 5.47 | 8.2 | 366 | 24 | 36 |
| K064200-EY_ | 0.006 | 1.57 | 36 | 1.8 | 1.57 | 1.8 | 5.51 | 6.5 | 286 | 19 | 36 |
| K089050-6Y_ | 0.117 | 1.33 | 839 | 7.5 | 1.34 | 7.6 | 4.72 | 26.6 | 1373 | 137 | 37 |
| K089050-7Y_ | 0.082 | 1.32 | 597 | 6.0 | 1.33 | 6.1 | 4.66 | 21.3 | 1115 | 112 | 37 |
| K089050-9Y_ | 0.030 | 1.31 | 216 | 3.8 | 1.32 | 3.9 | 4.62 | 13.5 | 714 | 71 | 37 |
| K089100-6Y_ | 0.098 | 2.35 | 396 | 6.6 | 2.37 | 6.7 | 8.32 | 23.4 | 686 | 69 | 78 |
| K089100-7Y_ | 0.066 | 2.33 | 272 | 5.3 | 2.34 | 5.4 | 8.22 | 18.8 | 558 | 56 | 78 |
| K089100-9Y_ | 0.019 | 2.32 | 77 | 3.4 | 2.32 | 3.4 | 8.15 | 11.9 | 357 | 36 | 78 |
| K089200-4Y_ | 0.153 | 3.9 | 379 | 8.8 | 3.9 | 8.9 | 13.7 | 31.3 | 558 | 56 | 150 |
| K089200-7Y_ | 0.045 | 3.9 | 111 | 4.4 | 3.9 | 4.5 | 13.7 | 15.6 | 279 | 28 | 150 |
| K089200-9Y_ | 0.004 | 3.9 | 11 | 2.8 | 3.9 | 2.8 | 13.6 | 9.9 | 178 | 18 | 150 |
| K178050-6Y_ | 0.217 | 7.0 | 297 | 13.9 | 7.0 | 14.0 | 26.8 | 53.3 | 486 | 73 | 470 |
| K178050-8Y_ | 0.100 | 7.0 | 137 | 8.8 | 7.0 | 8.8 | 26.7 | 33.6 | 307 | 46 | 470 |
| K178050-EY_ | 0.024 | 7.0 | 33 | 5.6 | 7.0 | 5.6 | 26.6 | 21.2 | 194 | 29 | 470 |
| K178100-8Y_ | 0.077 | 13.6 | 54 | 8.6 | 13.7 | 8.6 | 48.0 | 30.2 | 153 | 23 | 920 |
| K178100-9Y_ | 0.035 | 13.7 | 24 | 6.8 | 13.7 | 6.8 | 48.0 | 23.9 | 121 | 18 | 920 |
| K178200-8Y_ | 0.047 | 23.2 | 19 | 7.3 | 23.2 | 7.3 | 81.5 | 25.7 | 77 | 12 | 1800 |
| K178200-9Y_ | 0.009 | 23.2 | 4 | 5.8 | 23.2 | 5.8 | 81.6 | 20.3 | 61 | 9 | 1800 |
| **240 VAC power supply** | | | | | | | | | | | |
| K178050-6Y_ | 1.43 | 4.6 | 3000 | 9.1 | 7.0 | 14.0 | 26.8 | 53.3 | 3000 | 450 | 470 |
| K178050-8Y_ | 1.43 | 4.6 | 3000 | 5.7 | 7.0 | 8.8 | 26.7 | 33.6 | 3000 | 450 | 470 |
| K178050-EY_ | 1.39 | 5.4 | 2477 | 4.3 | 7.0 | 5.6 | 26.6 | 21.2 | 2818 | 423 | 470 |
| K178100-8Y_ | 2.05 | 9.8 | 2006 | 6.1 | 13.7 | 8.6 | 48.0 | 30.2 | 2225 | 334 | 920 |
| K178100-9Y_ | 1.82 | 11.3 | 1531 | 5.7 | 13.7 | 6.8 | 48.0 | 23.9 | 1761 | 264 | 920 |
| K178100-EY_ | 1.51 | 12.1 | 1192 | 4.8 | 13.6 | 5.4 | 47.8 | 19.1 | 1409 | 211 | 920 |
| K178200-8Y_ | 2.00 | 19.2 | 994 | 6.1 | 23.2 | 7.3 | 81.5 | 25.7 | 1112 | 167 | 1800 |
| K178200-9Y_ | 1.66 | 20.6 | 768 | 5.1 | 23.2 | 5.8 | 81.6 | 20.3 | 881 | 132 | 1800 |
| K178200-EY_ | 1.34 | 21.3 | 601 | 4.3 | 23.1 | 4.6 | 81.3 | 16.2 | 705 | 106 | 1800 |

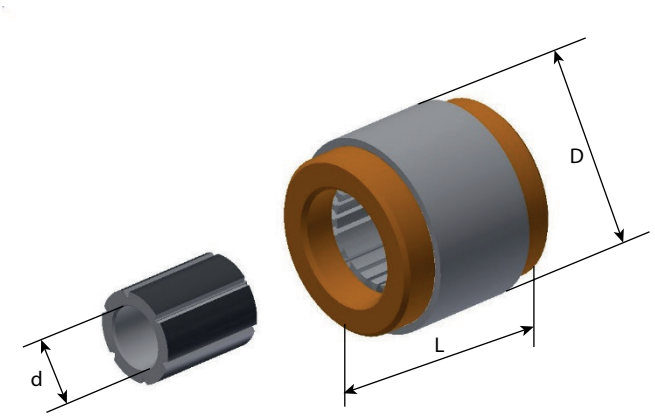
Other power voltages are possible – see technical manual or consult us

# Associated Drives

| **230 VAC power supply - single or three-phased** | | |
|---|---|---|
| **Motor** | **Compax3** | **AC890** |
| K178050-6Y_ | C3S150V2... | 890SD-232240C... |
| K178050-8Y_ | C3S100V2... | 890SD-232165B... |
| K178050-EY_ | C3S100V2... | 890SD-232110B... |
| K178100-8Y_ | C3S100V2... | 890SD-232165B... |
| K178100-9Y_ | C3S100V2... | 890SD-232110B... |
| K178100-EY_ | C3S063V2... | 890SD-232110B... |
| K178200-8Y_ | C3S100V2... | 890SD-232110B... |
| K178200-9Y_ | C3S063V2... | 890SD-232110B... |
| K178200-EY_ | C3S063V2... | 890SD-232110B... |

## Dimensions

| Motor | Dimensions [mm] | | |
|---|---|---|---|
| | D | d | L |
| K032050 | 31.76 | 7.62 | 25.9 |
| K032100 | | | 38.6 |
| K032200 | | | 64.0 |
| K044050 | 44.45 | 13.96 | 29.15 |
| K044100 | | | 41.85 |
| K044200 | | | 67.25 |
| K064050 | 63.5 | 23.51 | 32.4 |
| K064100 | | | 45.1 |
| K064200 | | | 70.5 |
| K089050 | 88.9 | 40.63 | 33.0 |
| K089100 | | | 45.7 |
| K089200 | | | 71.1 |
| K178050 | 177.8 | 95.74 | 53.95 |
| K178100 | | | 66.65 |
| K178200 | | | 92.05 |




## Order Code K Series

| | 1 | 2 | 3 | 4 | 5 | 6 | | 7 |
|---|---|---|---|---|---|---|---|---|
| **Order example** | **K** | **32** | **50** | **E** | **Y** | **1** | **-** | **CE** |

| | | |
|---|---|---|
| 1 | Motor Series | |
| | K | |
| 2 | Motor Size | |
| | 32<br>44<br>... | see table "Technical Data" |
| 3 | Motor Stack Length | |
| | 50 | 0.50 in |
| | 100 | 1.00 in |
| | 200 | 2.00 in |

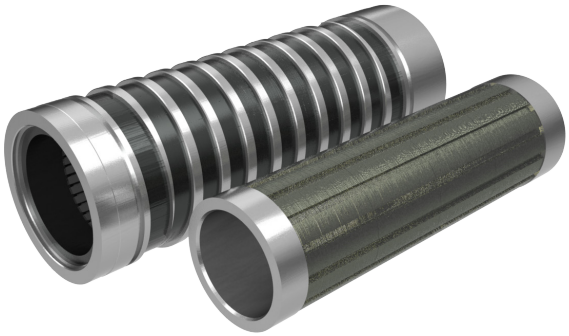
| | | |
|---|---|---|
| 4 | Winding | |
| | 7<br>8<br>... | see table "Technical Data" |
| 5 | Connection | |
| | Y | Star connection |
| 6 | Commutation - Hall effect sensor | |
| | 1 | Without Hall effect sensor |
| | 2 | With Hall effect sensor [1] |
| 7 | Certification | |
| | CE | CE Conformity |

[1] Option Hall sensor is not available with motor size K178

# FRAMELESS SPINDLE SERVO MOTOR - SKW SERIES

## Description

SKW motors are compact and highly dynamic permanent magnet synchronous servomotors for mono and multi spindle applications up to 21 kW.
Delivered as separate components to be integrated into the mechanical structure of the machine, SKW motors offer constant torque capabilities over a wide speed range with very small dimensions.
SKW motors are available for original equipment manufacturers over 50 motors/ year. Please contact Parker.



## Advantages

- Compactness (small external diameter)
- Large hollow shaft
- Increased internal diameter compared to other solutions: increased rigidity and greater capacity for bar stock handling in automatic lathes
- High resistance (Oil proof)
- Compatible with cost effective sensorless drives from Parker and third parties
- Accurate speed for the spindle
  - for the best surface finish
  - for a shorter cycle time
  - for a longer tool life time
- Cold permanent magnet technology: reduced heating in the bearings compared to induction motors, low dilatation effect
- Global cost reduction
- Increased reliability and reduced maintenance
- High dynamic performance and power density: increased productivity and reduced size when compared to induction motors
- Simple, light and compact machine design
- No coupling systems needed
- Greater stiffness and robustness of the system
- Low noise level
- Integration assistance available

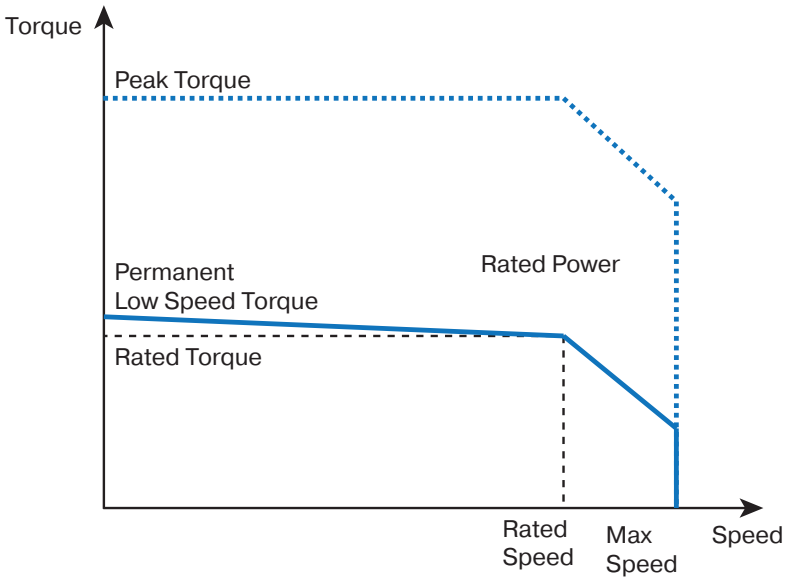
## Applications

- Machine Tools (electro spindle)
- Multi Spindle Lathes

## Technical Characteristics Overview

| | | |
|---|---|---|
| Cooling | | Water cooling |
| Power | [kW] | 0.2...7.5 |
| Torque | [Nm] | 4...36 |
| Max Speed | [$min^{-1}$] | 12000 |
| Number of poles | | 10 |
| Diameter | [mm] | 73/82/91/96 |
| Power supply | [VAC] | 400 |

## Torque/Speed Curve




## Technical Data

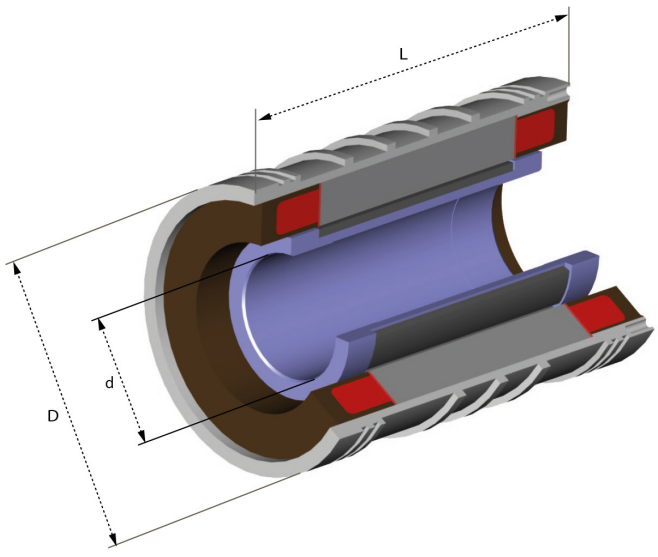
| Motor | Rated Power Pn | Rated Torque Mn | Rated Speed Nn | Rated Current In | Low speed torque Mo | Low speed Current Io | Peak Torque M peak | Peak Current I peak | Max. Speed N max | Frequency at max speed | Moment of Inertia J |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [kW] | (Nm) | [min$^{-1}$] | [Arms] | [Nm] | [Arms] | [Nm] | [Arms] | [min$^{-1}$] | [Hz] | [kgmm$^2$] |
| **400 VAC power supply - three-phased** | | | | | | | | | | | |
| SKW073-050-LAM | 3.1 | 4.0 | 7470 | 10.4 | 4.0 | 10.2 | 8.3 | 20.0 | 12000 | 1000 | 170 |
| SKW073-100-LAM | 6.3 | 8.8 | 6810 | 21.1 | 10.0 | 23.2 | 17.8 | 40.0 | 12000 | 1000 | 280 |
| SKW073-150-LAM | 9.7 | 13.5 | 6820 | 27.3 | 15.4 | 30.4 | 28.4 | 53.8 | 11000 | 917 | 390 |
| SKW073-200-LAM | 13.0 | 19.3 | 6450 | 40.9 | 21.8 | 45.2 | 37.8 | 75,.8 | 11000 | 917 | 500 |
| SKW082-046-LAM | 5.1 | 4.0 | 12000 | 10.2 | 4.4 | 10.7 | 8.6 | 20.0 | 12000 | 1000 | 370 |
| SKW082-092-LAM | 10.7 | 9.3 | 11000 | 21.6 | 10.1 | 22.8 | 23.0 | 48.6 | 11000 | 917 | 670 |
| SKW082-138-LAM | 15.3 | 14.6 | 10000 | 30.6 | 15.8 | 32.3 | 31.0 | 60.0 | 10000 | 833 | 970 |
| SKW082-184-LAM | 21.2 | 20.3 | 10000 | 44.7 | 22.2 | 47.7 | 44.2 | 90.0 | 10000 | 833 | 1300 |
| SKW091-046-LAM | 6.9 | 5.5 | 12000 | 14.3 | 6.5 | 16.3 | 10.7 | 28.2 | 12000 | 1000 | 370 |
| SKW091-092-LAM | 15.4 | 12.2 | 12000 | 29.4 | 15.1 | 35.4 | 23.0 | 55.6 | 12000 | 1000 | 670 |
| SKW091-138-LAM | 20.8 | 19.9 | 10000 | 40.1 | 23.8 | 47.1 | 36.1 | 73.3 | 10000 | 833 | 970 |
| SKW091-184-LAM | 28.0 | 26.8 | 10000 | 56.8 | 31.9 | 66.4 | 48.1 | 103.4 | 10000 | 833 | 1300 |
| SKW096-046-LAM | 3.6 | 6.9 | 5010 | 12.9 | 7.1 | 13.1 | 13.7 | 26.0 | 10000 | 833 | 1000 |
| SKW096-092-LAM | 7.8 | 16.3 | 4570 | 28.1 | 16.8 | 28.7 | 33.8 | 60.0 | 10000 | 833 | 1800 |
| SKW096-138-LAM | 11.7 | 26.4 | 4240 | 41.4 | 27.4 | 42.4 | 54.3 | 87.9 | 9000 | 750 | 2500 |
| SKW096-184-LAM | 16.2 | 36.0 | 4300 | 59.6 | 37.4 | 61.2 | 70.6 | 120.0 | 9000 | 750 | 3300 |

## Associated Drives

| Product Code | Drive Reference | | |
|---|---|---|---|
| | AC30 | AC890 | Compax3 |
| SKW073_050LAM | 31V-4E0023-B...<br>(16A@ , OL 180% /3s) | 890SD-532240C<br>(16A@8kHz, OL 200%/4s) | C3S150V4... |
| SKW073_100LAM | 31V-4F0038-B...<br>(32A@ , OL 180% / 3s) | 890SD-532390D<br>(26A@8kHz, OL 200%/4s) | C3S300V4... |
| SKW073_150LAM | 31V-4G0060-B...<br>(45A@ , OL 180% / 3s) | 890SD-532450D<br>(28A@8kHz, OL 200%/4s) | C3S300V4... |
| SKW073_200LAM | 31V-4H0105-B...<br>(87A@ , OL 180% / 3s) | 890SD-532590D<br>(50A@4kHz, OL 200%/4s) | C3H050V4... |
| SKW082_046LAM | 31V-4E0023-B...<br>(16A@ , OL 180% /3s) | 890SD-532240C<br>(16A@8kHz, OL 200%/4s) | C3S150V4... |
| SKW082_092LAM | 31V-4F0038-B...<br>(32A@ , OL 180% / 3s) | 890SD-532390D<br>(26A@8kHz, OL 200%/4s) | C3S300V4... |
| SKW082_138LAM | 31V-4G0060-B...<br>(45A@ , OL 180% / 3s) | 890SD-532450D<br>(38A@4kHz, OL 200%/4s) | C3S300V4... |
| SKW082_184LAM | 31V-4H0105-B...<br>(87A@ , OL 180% / 3s) | 890SD-532590D<br>(50A@4kHz, OL 200%/4s) | C3H050V4... |
| SKW091_046LAM | 31V-4F0032-B...<br>(23A@ , OL 180% / 3s) | 890SD-532240C<br>(16A@8kHz, OL 200%/4s) | C3S300V4... |
| SKW091_092LAM | 31V-4G0073-B...<br>(60A@ , OL 180% / 3s) | 890SD-532450D<br>(38A@4kHz, OL 200%/4s) | C3H050V4... |
| SKW091_138LAM | 31V-4H0105-B...<br>(87A@ , OL 180% / 3s) | 890SD-532450D<br>(38A@4kHz, OL 200%/4s) | C3H050V4... |
| SKW091_184LAM | 31V-4H0145-B...<br>(145A@ , OL 110% / 60s) | 890SD-432730E<br>(76A@4kHz, OL110%/60s) | C3H090V4... |
| SKW096_046LAM | 31V-4F0032-B...<br>(23A@ , OL 180% / 3s) | 890SD-532240C<br>(16A@8kHz, OL 200%/4s) | C3S150V4... |
| SKW096_092LAM | 31V-4G0060-B...<br>(45A@ , OL 180% / 3s) | 890SD-532450D<br>(28A@8kHz, OL 200%/4s) | C3S300V4... |
| SKW096_138LAM | 31V-4G0073-B...<br>(60A@ , OL 180% / 3s) | 890SD-532590D<br>(50A@4kHz, OL 200%/4s) | C3H050V4... |
| SKW096_184LAM | 31V-4H0145-B...<br>(145A@ , OL 110% / 60s) | 890SD-432730E<br>(76A@4kHz, OL110%/60s) | C3H090V4... |

## Dimensions

| Product Code | Dimensions [mm] | | |
|---|---|---|---|
| | Total length L | Hollow shaft diameter d | External diameter D |
| SKW073_050LAM | 114 | 35 | 80 |
| SKW073_100LAM | 164 | 35 | 80 |
| SKW073_150LAM | 219 | 35 | 80 |
| SKW073_200LAM | 274 | 35 | 80 |
| SKW082_046LAM | 104 | 44 | 96 |
| SKW082_092LAM | 150 | 44 | 96 |
| SKW082_138LAM | 201 | 44 | 96 |
| SKW082_184LAM | 252 | 44 | 96 |
| SKW091_046LAM | 104 | 44 | 102 |
| SKW091_092LAM | 155 | 44 | 102 |
| SKW091_138LAM | 206 | 44 | 102 |
| SKW091_184LAM | 262 | 44 | 102 |
| SKW096_046LAM | 104 | 60 | 108 |
| SKW096_092LAM | 155 | 60 | 108 |
| SKW096_138LAM | 206 | 60 | 108 |
| SKW096_184LAM | 262 | 60 | 108 |



# Order Code SKW Series

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| **Order example** | **SK** | **W** | **073** | **S** | **050** | **LAM** | **R** | **3** | **000** |

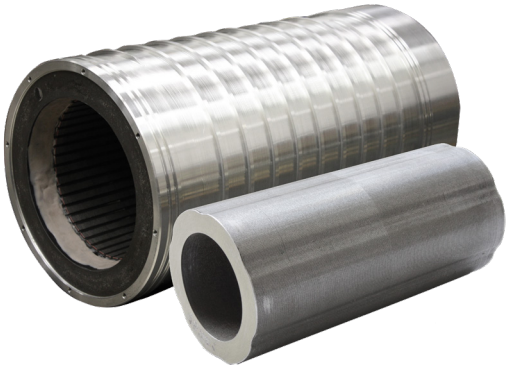
| | | |
|---|---|---|
| 1 | Product series | |
| | SK | Frameless permanent magnet servomotors |
| 2 | Cooling method | |
| | W | Water cooling (standard) |
| 3 | External diameter without water jacket | |
| | 073 | 73 mm |
| | 082 | 82 mm |
| | 091 | 91 mm |
| | 096 | 96 mm |
| 4 | Element | |
| | - | Motor (stator + rator) |
| | S | Stator |
| | R | Rotor |
| 5 | Active part length | |
| | 050<br>... | See table "Dimensions" |
| 6 | Torque/Speed characteristics | |
| | LAM<br>... | See table "Technical Data"<br>(other characteristics on request) |
| 7 | Unused character | |
| | R | |
| 8 | Mechanical option | |
| | 2 | Without water jacket, with hub (only on request) |
| | 3 | With water jacket, with hub (standard) |
| 9 | Option | |
| | 000 | Standard motor |

# FRAMELESS HIGH SPEED MOTOR HKW SERIES

## Description

HKW motors are high performance permanent magnet synchronous servomotors for spindle applications up to 276 kW.

Delivered as separate components to be integrated into the mechanical structure of the machine, HKW motors benefit from the use of field weakening, in order to achieve both high torque at slow speed, and very high maximum speed at constant power.



## Advantages

- High speed
- High power
- Large hollow shaft
- High resistance (oil proof on request)
- Compatible with Parker drives and third parties
- Accurate speed for the spindle
- for the best surface finish
- for a shorter cycle time
- for a longer tool life time
- Cold permanent magnet technology: reduced heating in the bearings compared to induction motors, low dilatation effect
- Global cost reduction
- Increased reliability and reduced maintenance
- High dynamic performance and power density: increased productivity and reduced size when compared to induction motors
- Simple, light and compact machine design
- No coupling systems needed
- Greater stiffness and robustness of the system
- Low noise level
- Integration assistance available

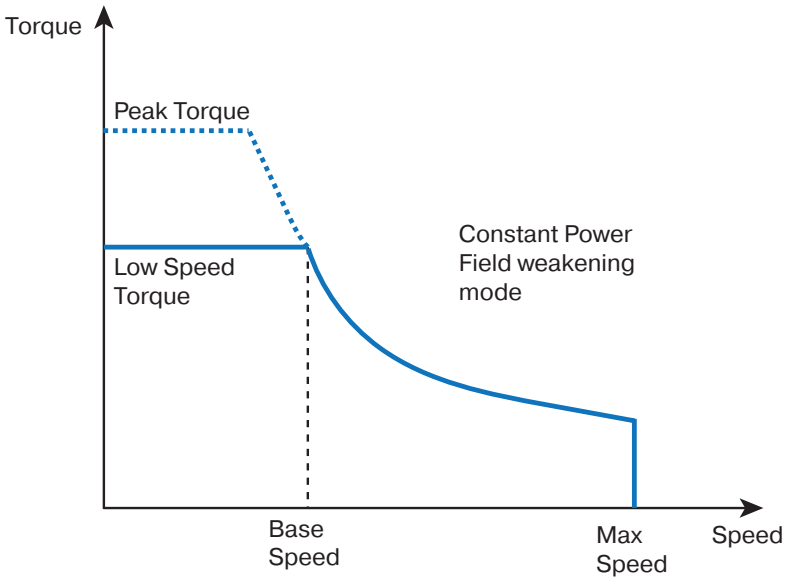
## Applications

- Machines Tools
- Special Machines
- Textile Machines
- Centrifuges
- Compressors

## Technical Characteristics Overview

| Cooling | | Water cooling |
|---|---|---|
| Power | [kW] | 2.3...276 |
| Torque | [Nm] | 4.5...1840 |
| Max Speed | [$min^{-1}$] | 50000 |
| Number of poles | | 4 - HKW085<br>6 - HKW108 / HKW155 / HKW195<br>8 - HKW242<br>16 - HKW310 |
| Diameter | [mm] | 85/108/155/195/242/310 |

## Torque/Speed Curve




## Technical Data

| Motor | S1 Power Ps1 [kW] | Max. Speed Nmax [min$^{-1}$] | Frequency at max speed [Hz] | Low speed torque Mo [Nm] | Low speed Current Io [Arms] | Peak Torque M peak [Nm] | Peak Current I peak [Arms] | Base Speed Nb [min$^{-1}$] | Moment of Inertia J [kgm$^2$] |
|---|---|---|---|---|---|---|---|---|---|
| **400 VAC power supply - three-phased - Water cooled** | | | | | | | | | |
| HKW085_066BAU | 2.3 | 50000 | 1667 | 4.9 | 6.8 | 7.3 | 13.5 | 4480 | 0.00049 |
| HKW085_066BAP | 4.9 | 50000 | 1667 | 4.5 | 12.2 | 7.3 | 27 | 10400 | 0.00049 |
| HKW085_066BAK | 10.2 | 50000 | 1667 | 4.2 | 22.4 | 7.3 | 54 | 23200 | 0.00049 |
| HKW085_099BAQ | 4.7 | 50000 | 1667 | 7.4 | 12.6 | 11 | 25.1 | 6070 | 0.00068 |
| HKW085_099BAL | 10 | 50000 | 1667 | 7.3 | 24.7 | 11 | 50.2 | 13100 | 0.00068 |
| HKW085_099BAI | 15.6 | 50000 | 1667 | 6.8 | 35 | 11 | 78.1 | 21900 | 0.00068 |
| HKW108_140CAI | 10.2 | 30000 | 1500 | 20 | 21.9 | 30 | 33 | 4870 | 0.00143 |
| HKW108_140CAF | 15.6 | 30000 | 1500 | 20 | 32.9 | 30 | 49.6 | 7450 | 0.00143 |
| HKW108_140CAD | 25 | 30000 | 1500 | 20 | 49.4 | 30 | 74.3 | 11900 | 0.00143 |
| HKW155_120CAK | 23 | 24000 | 1200 | 48 | 49.5 | 75 | 82.5 | 4600 | 0.0078 |
| HKW155_120CAH | 32 | 24000 | 1200 | 46 | 65.1 | 75 | 113 | 6640 | 0.0078 |
| HKW155_120CAF | 43 | 24000 | 1200 | 44 | 82.9 | 75 | 151 | 9330 | 0.0078 |
| HKW155_160CAP | 16 | 24000 | 1200 | 68 | 36.3 | 100 | 56.7 | 2250 | 0.0104 |
| HKW155_160CAH | 32 | 24000 | 1200 | 68 | 72.6 | 100 | 113 | 4500 | 0.0104 |
| HKW155_160CAF | 44 | 24000 | 1200 | 66 | 93.8 | 100 | 151 | 6370 | 0.0104 |

# Technical Data

| Motor | S1 Power Ps1 | Max. Speed Nmax | Frequency at max speed | Low speed torque Mo | Low speed Current Io | Peak Torque M peak | Peak Current I peak | Base Speed Nb | Moment of Inertia J |
|---|---|---|---|---|---|---|---|---|---|
| | [kW] | [min$^{-1}$] | [Hz] | [Nm] | [Arms] | [Nm] | [Arms] | [min$^{-1}$] | [kgm$^2$] |
| **400 VAC power supply - three-phased - Water cooled** | | | | | | | | | |
| HKW195_180CAJ | 31 | 20000 | 1000 | 120 | 75.7 | 180 | 137 | 2470 | 0.024 |
| HKW195_180CAF | 52 | 20000 | 1000 | 120 | 126 | 180 | 228 | 4140 | 0.024 |
| HKW195_180CAC | 101 | 20000 | 1000 | 110 | 227 | 180 | 456 | 8770 | 0.024 |
| HKW195_300CAE | 63 | 20000 | 1000 | 200 | 151 | 300 | 274 | 3010 | 0.04 |
| HKW195_300CAC | 105 | 20000 | 1000 | 200 | 252 | 300 | 456 | 5010 | 0.04 |
| HKW195_300CAX | 175 | 20000 | 1000 | 200 | 454 | 300 | 821 | 8350 | 0.04 |
| HKW242_225DAD | 50 | 13000 | 867 | 280 | 112 | 360 | 150 | 1710 | 0.105 |
| HKW242_225DAC | 67 | 13000 | 867 | 275 | 146 | 360 | 199 | 2330 | 0.105 |
| HKW242_225DAB | 101 | 13000 | 867 | 260 | 206 | 360 | 299 | 3710 | 0.105 |
| HKW242_375DAC | 67 | 13000 | 867 | 480 | 154 | 600 | 199 | 1330 | 0.175 |
| HKW242_375DAB | 101 | 13000 | 867 | 480 | 230 | 600 | 299 | 2010 | 0.175 |
| HKW242_375DAA | 200 | 13000 | 867 | 460 | 439 | 600 | 598 | 4150 | 0.175 |
| HKW242_375DBY | 276 | 13000 | 867 | 585 | 578 | 800 | 870 | 4500 | 0.175 |
| HKW310_200HAE | 77 | 8000 | 1067 | 575 | 166 | 900 | 282 | 1280 | 0.23 |
| HKW310_200HAD | 95 | 8000 | 1067 | 565 | 204 | 900 | 353 | 1610 | 0.23 |
| HKW310_200HAC | 115 | 8000 | 1067 | 550 | 265 | 900 | 471 | 2000 | 0.23 |
| HKW310_300HAE | 76 | 8000 | 1067 | 930 | 180 | 1350 | 282 | 780 | 0.34 |
| HKW310_300HAD | 95 | 8000 | 1067 | 920 | 223 | 1350 | 353 | 990 | 0.34 |
| HKW310_300HAC | 120 | 8000 | 1067 | 900 | 290 | 1350 | 471 | 1270 | 0.34 |
| HKW310_400HAF | 62 | 8000 | 1067 | 1250 | 152 | 1800 | 235 | 475 | 0.45 |
| HKW310_400HAC | 120 | 8000 | 1067 | 1250 | 303 | 1800 | 471 | 910 | 0.45 |
| HKW310_400HAY | 230 | 8000 | 1067 | 1080 | 520 | 1800 | 942 | 2030 | 0.45 |
| HKW310_500HBY | 270 | 7000 | 933 | 1840 | 616 | 2700 | 949 | 1400 | 0.56 |

# Associated Drives

540 VDC voltage supply

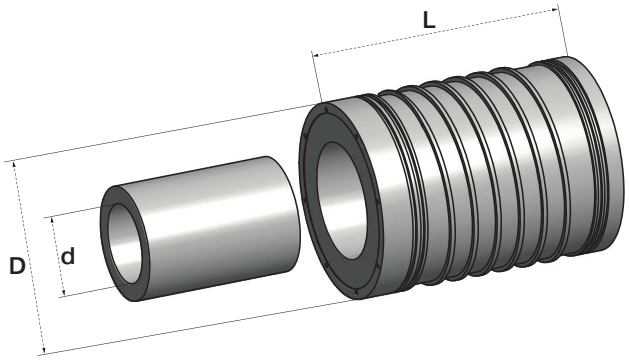
| Motor | PARKER AC890SD | |
|---|---|---|
| | Drive | Speed limit[1] $N_{max}$ [min$^{-1}$] |
| HKW085_066BAU | 890SD-532160B0-B00-... | 13800 |
| HKW085_066BAP | 890SD-232300C0-B00-... | 27500 |
| HKW085_066BAK | 890SD-532450D0-B00-... | 30000 |
| HKW085_099BAQ | 890SD-232300C0-B00-... | 17000 |
| HKW085_099BAL | 890SD-532450D0-B00-... | 30000 |
| HKW085_099BAI | 890SD-432730E0-0... | 30000 |
| HKW108_140CAI | 890SD-532390D0-B00-... | 11300 |
| HKW108_140CAF | 890SD-532590D0-B00-... | 17000 |
| HKW108_140CAD | 890SD-432870E0-0... | 20000 |
| HKW155_120CAP | 890SD-532450D0-B00-... | 7300 |
| HKW155_120CAK | 890SD-432730E0-0... | 10700 |
| HKW155_120CAH | 890SD-433105F... | 14700 |
| HKW155_120CAF | 890SD-433156F... | 19600 |
| HKW155_160CAR | 890SD-532390D0-B00-... | 3500 |
| HKW155_160CAP | 890SD-532590D0-B00-... | 5500 |
| HKW155_160CAH | 890SD-433105F... | 11000 |
| HKW155_160CAF | 890SD-433156F... | 14700 |
| HKW195_180CAJ | 890SD-433156F... | 6200 |
| HKW195_180CAF | 890SD-433316G... | 10400 |
| HKW195_180CAC | 890SD-433520H... | 20000 |
| HKW195_300CAE | 890SD-433361G... | 7500 |
| HKW195_300CAC | 890SD-433520H... | 12400 |
| HKW195_300CAX | consult us | |

| Motor | PARKER AC890SD | |
|---|---|---|
| | Drive | Speed limit[1] $N_{max}$ [min$^{-1}$] |
| HKW242_225DAD | 360 / 302 | 3800 |
| HKW242_225DAC | 360 / 301 | 5100 |
| HKW242_225DAB | 890SD-433361G... | 7600 |
| HKW242_375DAC | 480 / 402 | 3100 |
| HKW242_375DAB | 890SD-433375H... | 4600 |
| HKW242_375DAA | consult us | |
| HKW242_375DBY | consult us | |
| HKW310_200HAE | 890SD-433361G... | 2900 |
| HKW310_200HAD | 890SD-433375H... | 3600 |
| HKW310_200HAC | 890SD-433520H... | 4800 |
| HKW310_300HAE | 890SD-433361G... | 1900 |
| HKW310_300HAD | 890SD-433375H... | 2400 |
| HKW310_300HAC | 890SD-433520H... | 3200 |
| HKW310_400HAF | 890SD-433316G... | 1200 |
| HKW310_400HAC | 890SD-433520H... | 2400 |
| HKW310_400HAY | consult us | |
| HKW310_500HBY | consult us | |

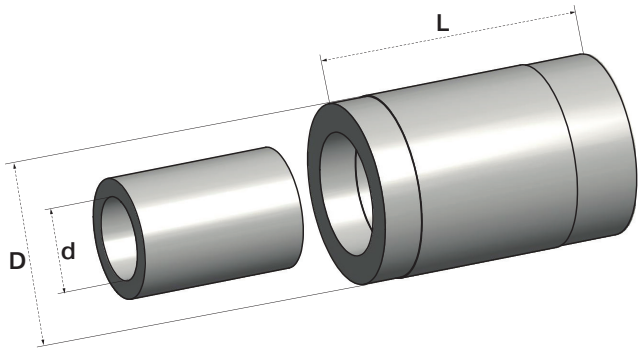
[1] Due to the back emf or the maximal drive frequency

# Dimensions

## Stator with cooling jacket




## Stator without housing




| Dimensions [mm] | Without housing | | | With cooling jacket | | |
|---|---|---|---|---|---|---|
| Product | d | D | L | d | D | L |
| HKW085_066 | 32 | 85 | 134 | 32 | 100 | 136 |
| HKW085_099 | | | 167 | | | 169 |
| HKW108_140 | 47 | 108 | 208 | 47 | 130 | 210 |
| HKW155_120 | 75 | 155.5 | 192 | 75 | 180 | 194 |
| HKW155_160 | | | 232 | | | 234 |
| HKW195_180CAx | 90 | 195 | 274 | 90 | 220 | 276 |
| HKW195_180CAF | | | 283 | | | 285 |
| HKW195_180CAC | | | 291 | | | 293 |
| HKW195_300CAM/J | | | 394 | | | 396 |
| HKW195_300CAE/C | | | 411 | | | 413 |
| HKW195_300CAX | | | 464 | | | 466 |

| Dimensions [mm] | Without housing | | | With cooling jacket | | |
|---|---|---|---|---|---|---|
| Product | d | D | L | d | D | L |
| HKW242_225DAD | 130 | 242 | 322 | 130 | 270 | 324 |
| HKW242_225DAC | | | 330 | | | 332 |
| HKW242_225DAB | | | 333 | | | 335 |
| HKW242_375DAC | | | 480 | | | 482 |
| HKW242_375DAB | | | 477 | | | 479 |
| HKW242_375DAA | | | 513 | | | 515 |
| HKW242_375DBY | | | 513 | | | 515 |
| HKW310_200HAE | 180 | 310 | 328 | 180 | 340 | 330 |
| HKW310_200HAD | | | 322 | | | 324 |
| HKW310_200HAC | | | 325 | | | 327 |
| HKW310_300HAE | | | 428 | | | 430 |
| HKW310_300HAD | | | 422 | | | 424 |
| HKW310_300HAC | | | 425 | | | 427 |
| HKW310_400HAF | | | 525 | | | 527 |
| HKW310_400HAC | | | 525 | | | 527 |
| HKW310_400HAY | | | 540 | | | 542 |
| HKW310_500DBY | | | 640 | | | 642 |

# Order Code HKW Series

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| **Order example** | **HK** | **W** | **155** | **–** | **080** | **CAP** | **R** | **1** | **000** |

| | | |
|---|---|---|
| 1 | Motor type | |
| | HK | Frameless permanent magnet servomotors |
| 2 | Cooling | |
| | W | Water cooling (standard) |
| 3 | External diameter | |
| | 085 | 85 mm |
| | 108 | 108 mm |
| | 155 | 155 mm |
| | 195 | 195 mm |
| | 242 | 242 mm |
| | 310 | 310 mm |
| 4 | Element | |
| | - | Motor (stator + rator) |
| | S | Stator |
| | R | Rotor |
| 5 | Length L [mm] | |
| | 140<br>200<br>... | see table "Dimensions" |

| | | |
|---|---|---|
| 6 | Torque/Speed characteristics | |
| | BAU<br>BAP<br>BAK<br>... | see table "Technical data" |
| 7 | Fix Code | |
| | R | |
| 8 | Mechanical options | |
| | 1 | With housing, without hub * |
| | 3 | With housing, with hub |
| 9 | Interface | |
| | 000 | Standard motor |

* Mechanical option 1 is not available with external diameter 85 mm

# FRAMELESS SERVO MOTOR - TK SERIES

## Description

TK Series torque motors, delivered as separate rotor and stator to be integrated into the mechanical structure of the machine, lead to simplified designs, reduced costs, and increased accuracy.

TK series is distinguished from existing solutions by their exceptional robustness, making them particularly suited to harsh environments.

Benefiting from Parker's unprecedented know-how in the design and manufacture of torque motors, TK series can also be delivered as complete sub-assemblies including frame, cooling system, bearings, feedback sensor, etc.

## Advantages

- Very high torque
- Very large hollow shaft
- Coating against corrosion (on request)
- High resistance (oil proof on request)
- Global cost reduction
- Increased reliability and reduced maintenance
- Simple, light and compact machine design
- No coupling systems needed
- Greater stiffness and robustness of the system
- Low noise level
- Integration assistance available

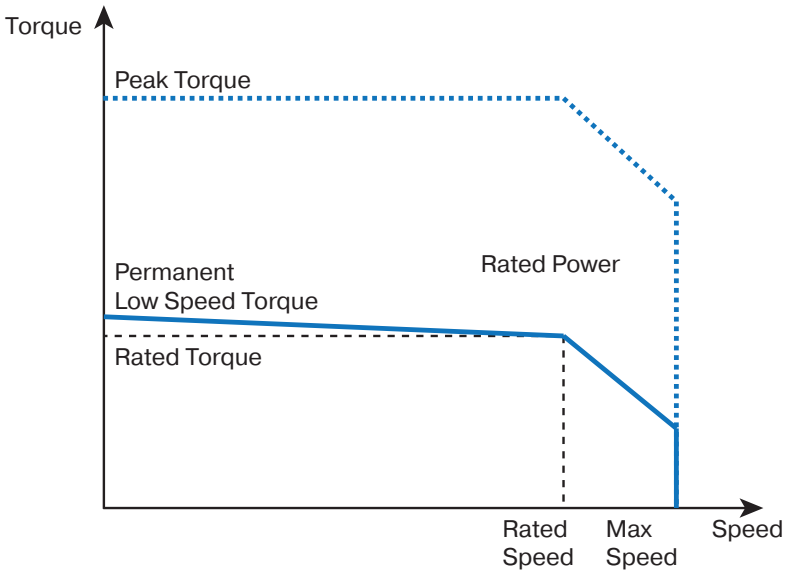
## Applications

- Rotating Table
- Mixer for Pulp & Paper
- Material Forming
- Material Handling
- Machine Tools
- Winch and Marine

## Technical Characteristics Overview

| Cooling | | Natural cooling | Water cooling |
|---|---|---|---|
| Power | [kW] | 7.9...58 | 23...162 |
| Torque | [Nm] | 246...9400 | 480...21700 |
| Speed | [$min^{-1}$] | 310 | 895 |
| Number of poles | | 60 (TK_200) / 90 (TK_300) / 120 (TK_400) | |
| Diameter | [mm] | 385/565/795 | |
| Power supply | [VAC] | 400 | |

## Torque/Speed Curve




## Technical Data

| Motor | Rated Power Pn [kW] | Rated Torque Mn (Nm) | Rated Speed Nn [min⁻¹] | Rated Current In [Arms] | Low speed torque Mo [Nm] | Low speed Current Io [Arms] | Peak Torque M peak [Nm] | Peak Current I peak [Arms] | Max. Speed N max [min⁻¹] | Frequency at max speed [Hz] | Moment of Inertia J [kgm²] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **400 VAC power supply - three-phased - Natural cooling** | | | | | | | | | | | |
| TKA202HS | 7.98 | 246 | 310 | 15.1 | 300 | 17.8 | 1300 | 99.5 | 310 | 155 | 0.18 |
| TKA204HV | 10.5 | 558 | 180 | 20.7 | 610 | 22.2 | 2600 | 122 | 180 | 90 | 0.35 |
| TKA206HS | 16.6 | 832 | 190 | 32.7 | 925 | 35.7 | 3900 | 195 | 190 | 95 | 0.52 |
| TKA302HP | 11.4 | 604 | 180 | 20.5 | 720 | 24 | 2400 | 86 | 180 | 135 | 1.2 |
| TKA304HN | 20.8 | 1240 | 160 | 38.3 | 1470 | 44.6 | 4800 | 157 | 160 | 120 | 2.3 |
| TKA306HM | 26.6 | 1950 | 130 | 48.6 | 2220 | 54.5 | 7200 | 190 | 130 | 97.5 | 3.4 |
| TKA402HP | 20.4 | 1260 | 155 | 37.8 | 1640 | 47.6 | 6600 | 241 | 155 | 155 | 3.5 |
| TKA404HR | 30.5 | 2770 | 105 | 56.9 | 3270 | 65.7 | 13200 | 333 | 105 | 105 | 6.8 |
| TKA406HP | 36.6 | 4370 | 80 | 70.2 | 4880 | 77.3 | 19800 | 394 | 80 | 80 | 10.1 |
| TKA40CHK | 58.1 | 9400 | 59 | 110 | 10100 | 117 | 39600 | 578 | 59 | 59 | 20 |

| Motor | Rated Power Pn [kW] | Rated Torque Mn (Nm) | Rated Speed Nn [min⁻¹] | Rated Current In [Arms] | Low speed torque Mo [Nm] | Low speed Current Io [Arms] | Peak Torque M peak [Nm] | Peak Current I peak [Arms] | Max. Speed N max [min⁻¹] | Frequency at max speed [Hz] | Moment of Inertia J [kgm²] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **400 VAC power supply - three-phased - water cooled** | | | | | | | | | | | |
| TKW202HF | 45 | 480 | 895 | 87.4 | 610 | 107 | 1300 | 306 | 1040 | 520 | 0.18 |
| TKW204HI | 71.1 | 1140 | 595 | 143 | 1300 | 160 | 2600 | 428 | 890 | 445 | 0.35 |
| TKW206HM | 51.3 | 1920 | 255 | 114 | 2000 | 117 | 3900 | 306 | 380 | 190 | 0.52 |
| TKW208HM | 50.9 | 2630 | 185 | 117 | 2700 | 119 | 5200 | 306 | 275 | 137.5 | 0.69 |
| TKW302HP | 23.2 | 1480 | 150 | 49.4 | 1520 | 50.4 | 2400 | 86 | 220 | 165 | 1.2 |
| TKW304HG | 96.4 | 2970 | 310 | 195 | 3250 | 210 | 4800 | 333 | 465 | 348.75 | 2.3 |
| TKW306HF | 113 | 4710 | 230 | 234 | 4950 | 244 | 7200 | 381 | 340 | 255 | 3.4 |
| TKW308HL | 55.7 | 6650 | 80 | 133 | 6740 | 134 | 9600 | 205 | 115 | 86.25 | 4.6 |
| TKW30AHD | 162 | 8110 | 190 | 339 | 8450 | 351 | 12000 | 534 | 280 | 210 | 5.7 |
| TKW402HG | 78.8 | 2840 | 265 | 156 | 3270 | 177 | 6600 | 457 | 375 | 375 | 3.5 |
| TKW404HR | 60.3 | 6780 | 84.9 | 135 | 6900 | 137 | 13200 | 334 | 125 | 125 | 6.8 |
| TKW406HG | 148 | 10100 | 140 | 319 | 10600 | 333 | 19800 | 790 | 210 | 210 | 10.1 |
| TKW408HQ | 59.9 | 14300 | 40.1 | 155 | 14400 | 156 | 26400 | 362 | 60 | 60 | 13.4 |
| TKW40AHM | 88.3 | 17900 | 47 | 220 | 18100 | 221 | 33000 | 511 | 70 | 70 | 16.7 |
| TKW40CHK | 97.5 | 21700 | 43 | 251 | 21900 | 253 | 39600 | 580 | 60 | 60 | 20 |

# Associated Drives

| Motor | AC890 | Compax3 | AC30 Power Stack* | |
|---|---|---|---|---|
| 400 VAC power supply - three-phased - Natural cooling | | | | Irms 4 kHz HD (A) |
| TKA202HS | AC890SD-532240C | C3S300V4 | 710-4J0205-BE-0S-0000 | 156.8 |
| TKA204HV | AC890SD-532300C | C3S300V4 | 710-4G0045-BE-0S-0000 | 35.8 |
| TKA206HS | AC890SD-532390D | C3H050V4 | 710-4G0045-BE-0S-0000 | 35.8 |
| TKA302HP | AC890SD-532300C | C3S300V4 | 710-4G0045-BE-0S-0000 | 35.8 |
| TKA304HN | AC890SD-532590D | C3H050V4 | 710-4H0087-BE-0S-0000 | 64.4 |
| TKA306HM | AC890SD-432730E | C3H090V4 | 710-4H0105-BE-0S-0001 | 78 |
| TKA402HP | AC890SD-532590D | C3H050V4 | 710-4H0087-BE-0S-0000 | 64.4 |
| TKA404HR | AC890SD-432730E | C3H090V4 | 710-4H0145-BE-0S-0000 | 91.5 |
| TKA406HP | AC890SD-433105F | C3H090V4 | 710-4H0145-BE-0S-0000 | 91.5 |
| TKA40CHK | AC890SD-433156F | C3H125V4 | 710-4J0205-BE-0S-0000 | 156.8 |

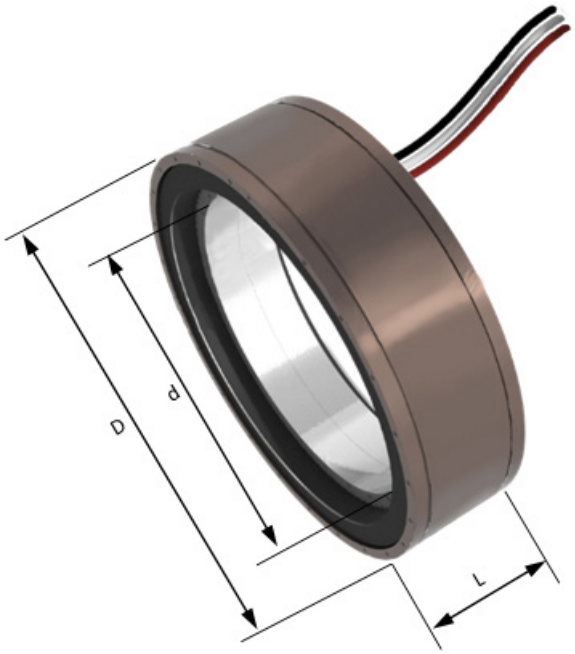
| Motor | AC890 | Compax3 | AC30 Power Stack* | |
|---|---|---|---|---|
| 400 VAC power supply - three-phased - Water cooled | | | | Irms 4 kHz HD (A) |
| TKW202HF | AC890SD-433145F | C3H125V4 | 710-4J0205-BE-0S-0000 | 156.8 |
| TKW204HI | AC890SD-433250G | - | 710-4K0315-BE-0S-0000 | 220 |
| TKW206HM | AC890SD-433156F | C3H125V4 | 710-4K0315-BE-0S-0000 | 220 |
| TKW208HM | AC890SD-433156F | C3H125V4 | 710-4J0260-BE-0S-0000 | 180.4 |
| TKW302HP | AC890SD-432730E | C3H090V4 | 710-4H0105-BE-0S-0000 | 78 |
| TKW304HG | AC890SD-433316G | - | 710-4K0440-BE-0S-0000 | 323 |
| TKW306HF | AC890SD-433361G | - | 710-4L0530-BE-0S-0000 | 400.3 |
| TKW308HL | AC890SD-433216G | C3H155V4 | 710-4J0260-BE-0S-0000 | 180.4 |
| TKW30AHD | AC890SD-433520H | - | 710-4M0650-BE-0S-0000 | 489.7 |
| TKW402HG | AC890SD-433316G | - | 710-4M0650-BE-0S-0000 | 489.7 |
| TKW404HR | AC890SD-433216G | C3H155V4 | 710-4K0315-BE-0S-0000 | 220 |
| TKW406HG | AC890SD-433520H | - | 710-4M0650-BE-0S-0000 | 489.7 |
| TKW408HQ | AC890SD-433250G | - | 710-4K0315-BE-0S-0000 | 220 |
| TKW40AHM | AC890SD-433361G | - | 710-4K0440-BE-0S-0000 | 323 |
| TKW40CHK | AC890SD-433420H | - | 710-4J0205-BE-0S-0000 | 156.8 |

* With AC30 drive you will have to add the following references:
  - Control board: 30A-2S-00
  - I/O option: 7004-02-00

# Dimensions

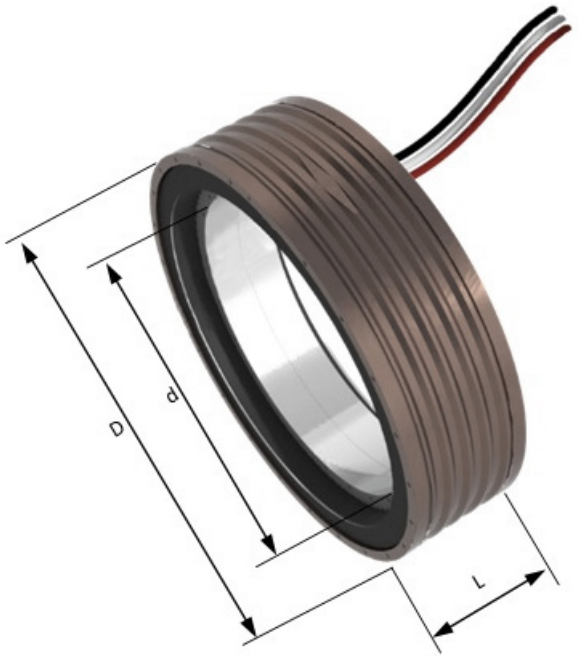
TKA

| Motor | Dimensions [mm] | | |
|---|---|---|---|
| | d | D | L |
| TKA202HS | 250 | 385 | 160 |
| TKA204HV | | | 260 |
| TKA206HS | | | 370 |
| TKA302HP | 420 | 565 | 160 |
| TKA304HN | | | 255 |
| TKA306HM | | | 370 |
| TKA402HP | 620 | 795 | 160 |
| TKA404HR | | | 265 |
| TKA406HP | | | 385 |
| TKA40CHK | | | 700 |




TKW

| Motor | Dimensions [mm] | | |
|---|---|---|---|
| | d | D | L |
| TKW202HF | 250 | 385 | 170 |
| TKW204HI | 250 | 385 | 270 |
| TKW206HM | 250 | 385 | 390 |
| TKW208HM | 250 | 385 | 480 |
| TKW302HP | 420 | 565 | 160 |
| TKW304HG | 420 | 565 | 275 |
| TKW306HF | 420 | 565 | 395 |
| TKW308HL | 420 | 565 | 485 |
| TKW30AHD | 420 | 565 | 650 |
| TKW402HG | 620 | 795 | 180 |
| TKW404HR | 620 | 795 | 280 |
| TKW406HG | 620 | 795 | 400 |
| TKW408HQ | 620 | 795 | 500 |
| TKW40AHM | 620 | 795 | 605 |
| TKW40CHK | 620 | 795 | 710 |



# Order Code TK Series

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Order example** | **TK** | **W** | **20** | **4HG** | **Y** | **Z** | **B** | **2** | **R** | **9** | **0** | **00** |

| | | |
|---|---|---|
| 1 | Motor type | |
| | TK | Frameless torque motors |
| 2 | Cooling method | |
| | W | Water cooling (standard) |
| | A | Natural convection<br>(available with derating, consult us) |
| 3 | Shaft heights | |
| | 20 | 200 mm |
| | 30 | 315 mm |
| | 40 | 400 mm |
| 4 | Torque/Speed characteristics | |
| | 1HL<br>1HC<br>2HL<br>... | see table TK-Series technical data |
| 5 | Feedback sensor | |
| | K | Without sensor |
| | B | Direct Endat encoder |
| 6 | Transportation bridge | |
| | B | Bridges on both sides |
| | C | Bridges on cables output side |
| | D | Bridges on cables output opposite side |
| | Z | Without bridges (standard) |

| | | |
|---|---|---|
| 7 | Cables output | |
| | B | Output towards the rear |
| 8 | Cable length | |
| | 2 | 2 m |
| 9 | Fix code | |
| | R | |
| 10 | Connections | |
| | 1 | Flying cables (3 phases + ground) |
| 11 | Thermal protection | |
| | 0 | 1 PTC 140°C + 1 PTC 150°C + 1 KTY (+1 in reserve) |
| 12 | Mechanical interface | |
| | 00 | Standard motor |

Parker Hannifin Corporation
**Motion Systems Group Europe**
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