

# Kollmorgen Essentials™ Servo System

## Selection Guide



**KOLLMORGEN**

A REGAL REYNORD BRAND

# Kollmorgen: Your Partner, In Motion.

Every solution comes from a real understanding of the challenges facing machine designers and users.

Innovators consistently rate Kollmorgen as one of their best motion systems manufacturing partners. Whether you are looking for classic servo motors, direct-drive servo motors, stepper motors, drives & amplifiers, gearing, actuation, or multi-axis motion controllers, Kollmorgen is one of the few companies in the world that actually designs and manufactures all of these products.

Our customers are leaders in many industries such as Aerospace & Defense, Printing, Packaging & Converting, Food & Beverage Processing, Medical Imaging, In Vitro Diagnostics & Laboratory Automation, Pharmaceutical Manufacturing, Material Forming and Cutting, Oil & Gas, and Robotics. Kollmorgen is also a leader in Warehouse Automation, including complete AGV systems, software, awareness and autonomy.

Our Automation Solutions can be found on Mars and in space, ships and submarines, O&G drilling and metrology, surgical robots and laser eye surgery, even inside artificial hearts. These are just a few applications that demand high-performance and high-quality while satisfying their specific needs.

Because motion matters, it's our focus: Motion can distinctly differentiate a specific machine and deliver a marketplace advantage by increasing its performance and dramatically improving Overall Equipment Effectiveness (OEE).

High-performance motion can make your customer's machine more reliable and energy-efficient, enhance accuracy and improve operator safety. Motion also represents endless possibilities for innovation.

We've always understood this potential, and thus have kept motion at our core and in our Vision, Mission & Values, relentlessly developing products that offer precise control of torque, velocity and position accuracy in machines that rely on complex motion.

### Removing the Barriers of Design, Sourcing, and Time

At Kollmorgen, we know that OEM engineers can achieve a lot more when obstacles aren't in the way. So, we clear obstacles in three important ways:

#### Integrating Standard and Custom Products

The optimal solution is often not clear-cut. Our application expertise allows us to modify standard products or develop totally custom solutions across our whole product portfolio so that designs can take flight.

#### Providing Motion Solutions, Not Just Components

As companies reduce their supplier base and focus their engineering manpower on the product design, they need a total system supplier with a wide range of integrated solutions. Kollmorgen offers complete solutions as well as motion subsystems that combine programming software, engineering services and best-in-class motion components.

#### Global Footprint

With direct sales, engineering support, manufacturing facilities, and distributors spanning the Americas, Europe, the Middle East, and Asia, we're close to OEMs worldwide. Our proximity helps speed delivery and lend support where and when they're needed.

### Financial and Operational Stability

Kollmorgen is part of Regal Rexnord. A key driver in the growth of all Regal Rexnord segments is the Regal Rexnord Business System, which relies on the principle of "kaizen" – or continuous improvement. Using world-class tools, cross-disciplinary teams of exceptional people evaluate processes and develop plans that result in superior performance.

## Kollmorgen: Your partner. In Motion.

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# Essentials Servo System

The Kollmorgen Essentials™ Motion System gives you Kollmorgen's renowned performance, quality and reliability at an unprecedented value.

The Kollmorgen Essentials motion system joins a comprehensive portfolio of versatile, compatible motion solutions — giving machine builders a choice of performance characteristics, features and options, cost-effective standard modifications, functional safety capabilities, environmentally resilient designs and more.

With the Kollmorgen Essentials motion system joining the complete Kollmorgen motion technology portfolio, machine designers gain a new perspective: the ability to meet practically any motion requirement and budget, today and tomorrow, with solutions and expertise from one proven partner.



## The Benefits of the Essentials Servo System

### Uncompromising Performance

- » Industry-leading torque density, efficiency and reliability
- » Minimal cogging for smooth operation, even at low speeds
- » SFD-M high-resolution absolute multi-turn feedback as standard — comparable to Hiperface and EnDat feedback devices
- » Dual STO safety and motion synchronization capable

### Exceptional Value In Complete Motion Solutions

- » Priced to succeed in the mid-market space
- » Multi-Ethernet feature enables compatibility with various Controls solutions within the same SKU
- » Access full parameters and tuning options in Workbench for complex axes
- » Standard batteryless, Single-cable multi-turn feedback — eliminates extra cost and complexity of a dedicated feedback power cable
- » Pre-configured to work seamlessly within Kollmorgen Automation Suite

### Confident, Fast Path to Market Success

- » Count on one supplier for all your motion needs, from simple to more complex axes
- » Reduced SKUs, shorter lead times and Finished-Goods inventory ensure confidence in your supply chain
- » The new Express Setup layout with Workbench provides a pre-configured plug + play solution to enable simplified commissioning
- » The system is designed and manufactured by Kollmorgen, with each configuration validated to deliver optimum performance
- » Rely on Kollmorgen's 100+ years of leadership and financial stability

## Essentials Integration with Kollmorgen Automated Motion Control Solutions



# ► Essentials Servo Drive

## Essentials Drive: Plug In. Power Up. Perform.

The Kollmorgen Essentials™ Drive delivers unmatched flexibility and speed for modern machine builders. With universal connectivity—including EtherCAT®, PROFINET®, and EtherNet/IP™—in a single drive, it seamlessly integrates with Kollmorgen Automation Suite and most Industrial Ethernet controllers.

Built-in synchronization capabilities via EtherCAT, CIP Sync and PROFINET IRT ensure precise, coordinated motion across multi-axis systems, ideal for packaging and material handling applications.

Designed for rapid deployment, the drive supports simplified installation and maintenance with single-cable feedback via SFD-M, DC bus sharing for energy efficiency as well as reduced wiring complexity and commissioning in under 20 minutes using our intuitive Express Setup layout and Quick Tune functionality within our industry-best Workbench software.





## The Benefits of Essentials Servo Drives

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### Universal Connectivity & Integration for Advanced Motion Control

- » Supports EtherCAT®, PROFINET®, and EtherNet/IP™ — all in one drive
  - » Built-in synchronization capabilities via EtherCAT, CIP Sync and PROFINET IRT
  - » Seamlessly integrates with Kollmorgen Automation Suite and most Industrial Ethernet based motion controllers.
  - » High speed digital inputs for registration capability in the packaging and material forming industries
  - » USB-C service port for fast configuration and diagnostics.
- 

### Simplified Commissioning, Faster Time to Market

- » Optimized for single-cable feedback via SFD-M Multi-Turn absolute encoder (24-bit single-turn + batteryless 16-bit multi-turn resolution)
  - » Capable of DC Bus Sharing for energy efficiency, reduced wiring and reduction of components like braking resistors
  - » Commissioning in less than 20 minutes – our Express Setup layout within industry-best Workbench commissioning software enables our customers to deliver machines faster to market
  - » Quick Tune functionality offers one-button tuning, while full Workbench functionality remains available for advanced tuning and diagnostics
- 

### Easy-to-use Graphical User Interface (GUI) for Faster Commissioning and Troubleshooting

- » Express Setup allows quick and easy setup for less experienced engineers.
- » Auto-complete of programmable commands saves looking up parameter names.
- » Full setup included with multi-function bode plot allowing users to quickly evaluate performance
- » Six-channel real time software oscilloscope commissions and diagnoses quickly.
- » One-click capture and sharing of program plots and parameter settings allow you to send machine performance data instantly.

# Essentials Servo Drive

## Essentials Means Unparalleled Connectivity

### Kollmorgen Essentials Drive

Kollmorgen's Essentials Drive includes all of the performance described previously, and is optimized to interface to a single-connector motor with Kollmorgen's Smart Feedback Device options (SFD-M or SFD3)

### Multi-Protocol Support

No need to find the correct communication protocol option for your machine! All Essentials drives support multiple communication protocols out of the box. Just select between EtherNet/IP CIP Sync, EtherCAT or PROFINET IRT during setup.

### Super-fast setup

Get your application up and running in 20 minutes or less with Kollmorgen's Express Setup layout within WorkBench, a simple, graphical configuration tool for PC that supports you throughout the entire commissioning process.

### Versatile I/O

Each Kollmorgen Essentials Drive offers two fast digital inputs with  $<1 \mu s$  reaction time, which can also be utilized for a secondary, incremental feedback solution. Two standard digital inputs and outputs are also built-in.

### STO

Safety is always essential!

All Essentials drives come equipped with the certified safety function Safe Torque Off (STO), up to SIL 2 / PL d.

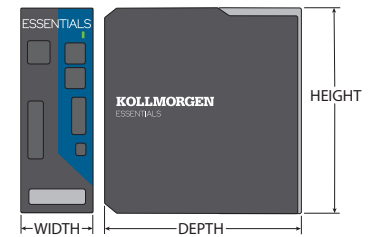


Essentials 3/6 Amp  
120/240 Vac

Essentials 12 Amp  
120/240 Vac



120/240 Vac	Continuous Current	Peak Current	Typical Shaft Power	Height	Width	Depth
	(Arms)	(Arms)	(kW)			
KED-SPM-6V03	3	9	0.625	172 (6.77)	60 (2.36)	165 (6.50)
KED-SPM-6V06	6	18	1.25			
KED-SPM-6V12	12	30	2.5	200 (7.9)	70 (2.75)	202 (7.95)



# Essentials Drive Connector Layout

Top View



**Reset Button**

**Service Port:**  
» Workbench connection (USB-C)

Front View



**24 Vdc Logic Supply  
STO Inputs**

**Industrial Ethernet:**  
» EtherCAT®  
» Profinet® IRT  
» Ethernet/IP™ CIP Sync

**Power Output:**  
» Motor power  
» Brake

**Digital Input/Output:**  
2 x High-Speed Digital Inputs 24 V (sinking)  
2 x Slow Digital Inputs 24 V (sinking)  
2 x Digital Outputs (sourcing)  
1 x Digital Input Ground

**Feedback port**  
» SFD-M/SFD-3

**Physical Earth (PE)**  
Also where shield/screens are mounted

Bottom View



**DC Link & Brake Resistor**

**AC Mains (in and out):**  
120/240 Vac or 240/480 Vac

# Essentials Servo Drive

## Kollmorgen Essentials Drive Model Nomenclature

**KED - S P M - 6V 03 S - A 1 00 - 0000 - A**

### Family

KED Kollmorgen Essentials Drive Series

### Format

S Servo IP20

### Drive Version

P Position Indexer / Motion Tasking

### Connectivity

M Multi-Ethernet (EtherCAT, EtherNet/IP, PROFINET)

### Voltage

6V 120/240 VAC, 1 $\phi$ /3 $\phi$

7V 240/480 VAC, 3 $\phi$

### Current Rating

03 3 A<sub>RMS</sub> cont., 9 A<sub>RMS</sub> peak

06 6 A<sub>RMS</sub> cont., 18 A<sub>RMS</sub> peak

12 12 A<sub>RMS</sub> cont., 30 A<sub>RMS</sub> peak

### Connectors

A Connectors included

### Customization

0000 Standard

### Connector options

00 2 wire feedback (SFD-M, SFD3)

### Functional Safety (FS)

1 Dual-channel STO (SIL2, PLd)

### Platform Revision

A Reserved

### Options

S Single Axis

Available 2026

### Kollmorgen Essentials Drive Options 120/240 VAC, 1 $\phi$ /3 $\phi$

- KED-SPM-6V03S-A100-0000-A
- KED-SPM-6V06S-A100-0000-A
- KED-SPM-6V12S-A100-0000-A

### Kollmorgen Essentials Drive Options 240/480 VAC, 3 $\phi$

- KED-SPM-7V03S-A100-0000-A
- KED-SPM-7V06S-A100-0000-A
- KED-SPM-7V12S-A100-0000-A



# KOLLMORGEN WorkBench

with Express Setup for Essentials



Our simple Graphical User Interface (GUI), Kollmorgen WorkBench, is designed to expedite and streamline the user's experience with the Essentials family of servo drives. From easy application selection and reduced math, to a sleek six-channel scope; the user interface is extremely easy to use. The new Express Setup view guides you quickly through system commissioning. Configuring fieldbus protocols, power, motors and I/O is a breeze. Easy as 1 - 2 - 3!



1 Launch WorkBench and connect the drive. Once connected, the Express Setup pane is opened.



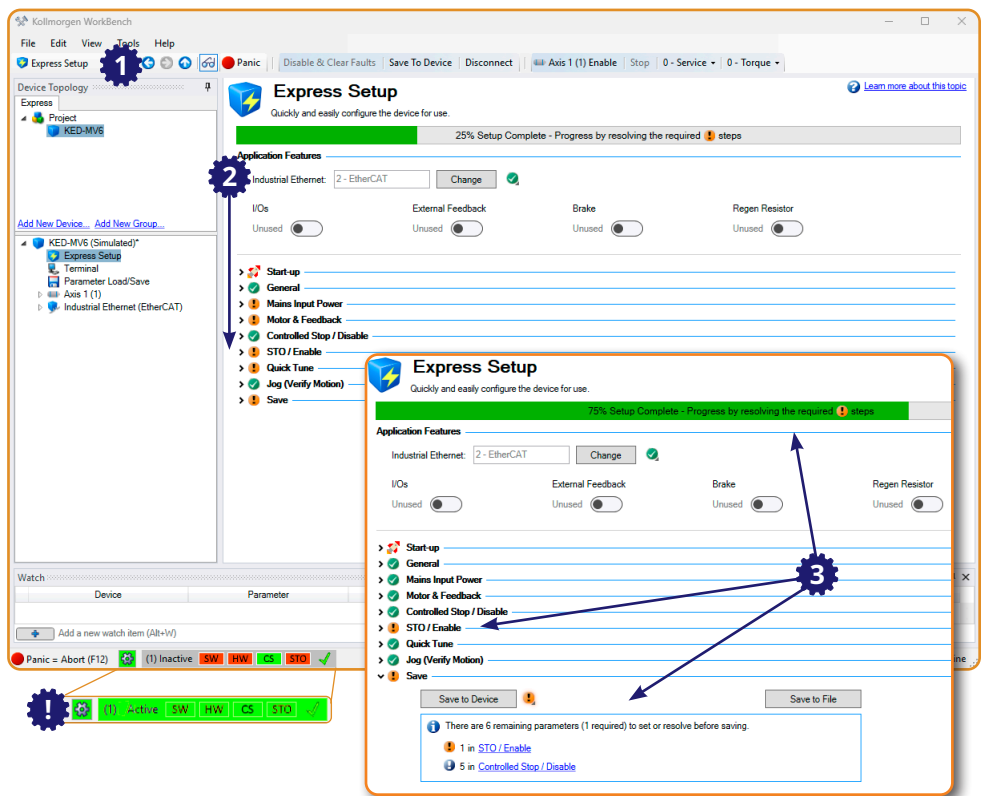
2 Express Setup quickly guides you through the required settings to have your system up and running in minutes.



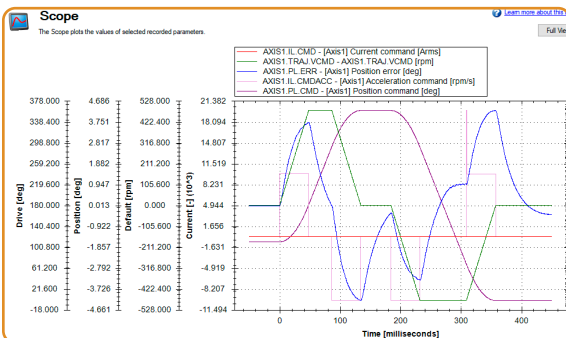
3 Express Setup monitors the setup process and ensures all required settings have been addressed before enabling the system.



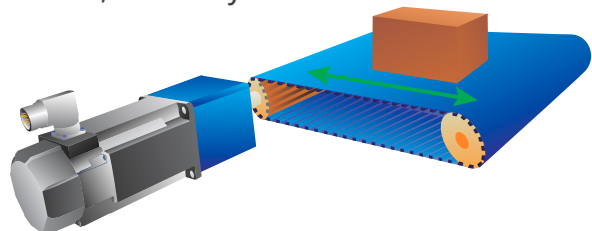
4 Your system is up and running!



5 Switch to Full Setup mode to reveal and explore all of the available WorkBench features:



“Real-time” Oscilloscope, Application Selection, Motion Tasks, Performance Tuning, Cogging Compensation, and many more...



# ▶ Essentials Servo Motor

## Essentials Motor: One Motor, Endless Possibilities

The Kollmorgen Essentials™ Motor is engineered for versatility, performance, and simplicity. Featuring integrated SFD-M multi-turn absolute feedback and a universal IEC mount with an adaptable shaft option, it empowers machine builders to streamline inventory and reduce complexity.

When paired with the Essentials Drive, a single platform can address up to 12 configuration needs—eliminating costly downtime waiting for specialized products and reducing part variability by 90%. With plug-and-play commissioning via onboard memory in the feedback device, and a single-cable design, installation is effortless.

Available in power ranges from 200W to 4000W and speeds up to 6000 rpm, this motor is built to meet global demands in the packaging, material handling, and factory automation markets—reliably and efficiently.





## The Benefits of Essentials Servo Motors

- Versatile Functionality, Streamlined Supply Chain**
- » Integrated multi-turn absolute encoder feedback enables machine builders to use same motor for requirements spanning from high-resolution for precision control to long linear travels or high gear ratios.
  - » Industry-common IEC motor mount and innovative key kit supports adaptable motor mounting to standard mechanical interfaces such as gearboxes and coupling types requiring either smooth or keyed shafts
  - » When paired with our Essentials drive, featuring multi-Ethernet protocol capability, machine builders and integrators can use 1 platform to solve 12 different configuration requirements, which is a 90% configuration reduction (2 feedback capabilities – single-turn or multi-turn, 2 shaft configurations – smooth or keyed, 3 communication protocols – EtherCAT®, Ethernet/IP® and PROFINET®)
  - » Optional 24 Vdc brake and field-installable IP65 shaft seal kits available

- Simplified Commissioning, Faster Time to Market**
- » Single cable design with SpeedTec® connectors and batteryless multi-turn functionality simplifies installation and long-term maintenance while ensuring high reliability
  - » Onboard memory in our smart feedback device (SFD-M) enables “plug-and-play” parametrization with Kollmorgen drives

## Trusted Performance and Quality

- » System offerings ranging from 200W to 4000W with windings optimized for 120, 240, 400 or 480 VAC inputs to support the most common, global application requirements
- » Rated speeds of 3000 rpm with maximum speed capability up to 6000 rpm to meet the demands of common packaging, material handling and warehouse automation applications.
- » Solutions designed and manufactured within Kollmorgen facilities. Reliable solutions, readily available.

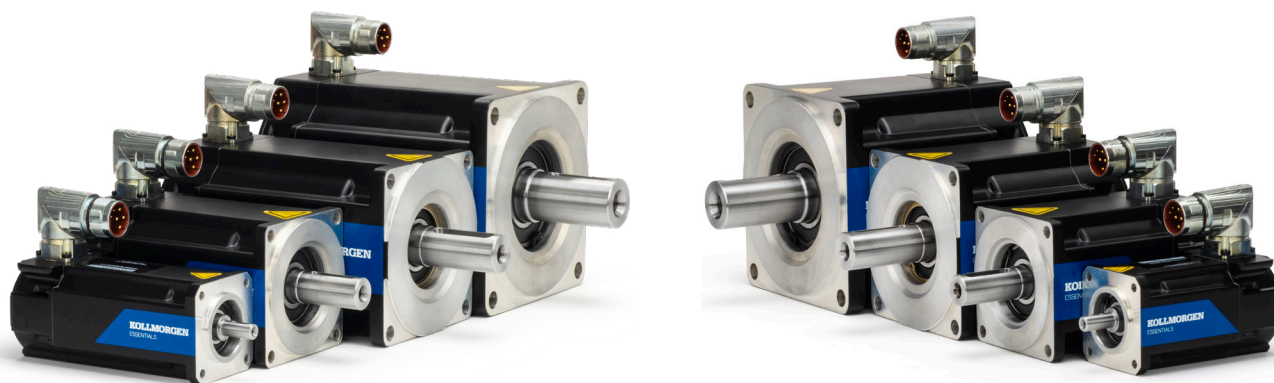


# ▶ Essentials<sup>®</sup> Servo Motor

## Essentials Motors Offer High Performance at an Exceptional Value

The Essentials high-performance motor series offers a curated selection of mounting, connectivity and feedback options intended to suit the widest range of applications while providing the best value to our customers. These motors offer superb flexibility to meet application needs with:

- 4 frame sizes (58 to 138 mm)
- 2 rated power options per frame size
- Multi-turn absolute SFD-M encoder (Smart Feedback Device)



### Features

#### Torque

0.74 to 17.4 Nm continuous stall torque (6.55 to 154 lb-in) in 14 frame/stack/winding combinations.

#### Speed

Rated speeds of 3000 rpm, with maximum speeds up to 6000 rpm, meet application requirements of the warehouse automation, packaging and material handling industries.

#### Voltage

Essentials motors can be applied to all standard global voltages. Windings are specifically tailored to work with drives powered by 120, 240, 400 or 480 VAC.

#### Mounting

The Essentials shaft-mount is designed to meet industry-common IEC standards. The innovative key kit provides users with smooth or keyed shaft adaptability within a singular SKU, enabling them to stock a versatile system to solve numerous application requirements.

#### Feedback

Essentials motors include the SFD-M multi-turn absolute feedback device, offering 24-bit single-turn and 16-bit batteryless multi-turn resolution.

#### Connectivity

Single, rotatable IP65 connector (combined power, brake and feedback) is provided to minimize cabling requirements and reduce setup time.

#### Thermal

Windings are rated conservatively at 100°C rise over a 40°C ambient while using 155°C (class F) insulation materials. Motors meet applicable UL, CSA, and CE requirements and include thermistors.

#### Additional Options:

- » 24 Vdc Holding Brakes
- » Field-installable IP65 shaft seal kit available (additional accessory)

## Kollmorgen Essentials™ Servo Motor Features



# Essentials<sup>®</sup> Servo Motor Family

Offering a broad power range along with durability and economy

## KEM-2V020/KEM-xV040

Flange: 58 mm  
Power: 200 - 400 W  
Rated Speed: 3000 RPM  
Max Speed: 6000 RPM  
Continuous Torque: 0.74 - 1.4 Nm



**KEM-4Vxxx**  
Available 2026

## KEM-xV075/KEM-xV100

Flange: 84 mm  
Power: 750 - 1000 W  
Rated Speed: 3000 RPM  
Max Speed: 6000 RPM  
Continuous Torque: 2.74 - 3.63 Nm



## KEM-xV150/KEM-xV250

Flange: 108 mm  
Power: 1500-2000 W  
Rated Speed: 3000 RPM  
Max Speed: 5000 RPM  
Continuous Torque: 5.9 - 10.1 Nm

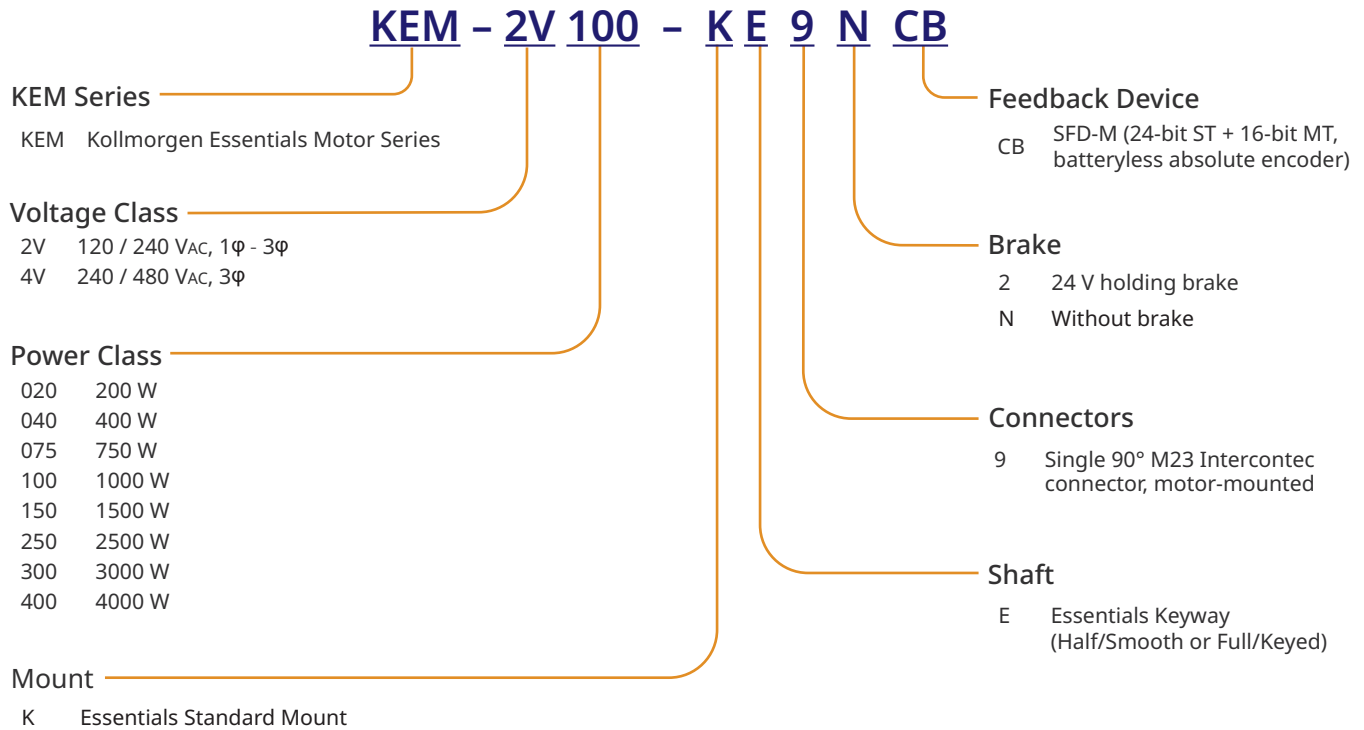


## KEM-xV300/KEM-4V400

Flange: 138 mm  
Power: 3000 - 4000 W  
Rated Speed: 3000 RPM  
Max Speed: 4000 RPM  
Continuous Torque: 11.5 - 17.4 Nm



## Kollmorgen Essentials Brushless Servo Motor Nomenclature



### Kollmorgen Essentials Motor Options 120/240 VAC Rated

- KEM-2V020-KE9NCB
- KEM-2V020-KE92CB
- KEM-2V040-KE9NCB
- KEM-2V040-KE92CB
- KEM-2V075-KE9NCB
- KEM-2V075-KE92CB
- KEM-2V100-KE9NCB
- KEM-2V100-KE92CB
- KEM-2V150-KE9NCB
- KEM-2V150-KE92CB
- KEM-2V250-KE9NCB
- KEM-2V250-KE92CB
- KEM-2V300-KE9NCB
- KEM-2V300-KE92CB

### Available 2026

### Kollmorgen Essentials Drive Options 240/480 VAC Rated

- KEM-4V040-KE9NCB
- KEM-4V040-KE92CB
- KEM-4V075-KE9NCB
- KEM-4V075-KE92CB
- KEM-4V100-KE9NCB
- KEM-4V100-KE92CB
- KEM-4V150-KE9NCB
- KEM-4V150-KE92CB
- KEM-4V250-KE9NCB
- KEM-4V250-KE92CB
- KEM-4V300-KE9NCB
- KEM-4V300-KE92CB
- KEM-4V400-KE9NCB
- KEM-4V400-KE92CB

# Essentials Motor Specifications

## KEM-2V020/KEM-xV040 (200W/400W) Performance Data – Up to 480 Vac (640 Vdc Bus)

### KEM-2V020/KEM-xV040 - 58 mm Flange Series

				KEM-2V-				KEM-4V-	
				020		040		040	
Parameters	Tol	Symbol	Units	No Brake	w/ Brake	No Brake	w/ Brake	No Brake	w/ Brake
Max Rated Voltage	Max	-	Vac	240		240		480	
Continuous Torque for $\Delta T$ winding = 100°C ①②⑦	Nom	$T_{CS}$	Nm	0.74	0.73	1.40	1.32	1.37	1.29
			lb-in	6.5	6.5	12.4	11.7	12.1	11.4
Continuous Current for $\Delta T$ winding = 100°C ①②⑦	Nom	$I_{CS}$	$A_{RMS}$	1.56	1.54	2.50	2.36	1.45	1.37
Continuous Torque for $\Delta T$ winding = 60°C ②⑦	Nom	$T_{CS}$	Nm	0.59	0.58	1.12	1.06	1.10	1.03
			lb-in	5.2	5.1	9.9	9.4	9.7	9.1
Max Mechanical Speed ⑤	Nom	$N_{max}$	rpm	6000		6000		6000	
Peak Torque ①②	Nom	$T_p$	Nm	2.09		3.96		3.89	
			lb-in	18.5		35		34.4	
Peak Current	Nom	$I_p$	$A_{RMS}$	4.7		7.50		4.35	
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	0.74	0.72	1.37	1.30	1.36	1.28
			lb-in	6.5	6.4	12.1	11.5	12.0	11.3
Rated Speed		$N_{Rtd}$	rpm	1000		1000		500	
Rated Power (speed) ①②⑦		$P_{Rtd}$	W	0.08	0.08	0.14	0.14	0.07	
			Hp	0.11	0.11	0.19	0.19	0.09	
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	0.70	0.67	1.30	1.25	1.33	1.27
			lb-in	6.2	5.9	11.5	11.1	11.8	11.2
Rated Speed		$N_{Rtd}$	rpm	3000		3000		1500	
Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	0.22	0.21	0.41	0.39	0.21	0.20
			Hp	0.30	0.28	0.55	0.52	0.28	0.27
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	-	-	-	-	1.28	1.23
			lb-in	-	-	-	-	11.3	10.9
Rated Speed		$N_{Rtd}$	rpm	-		-		3000	
Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	-	-	-	-	0.40	0.39
			Hp	-	-	-	-	0.54	0.52
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	-	-	-	-	1.27	1.22
			lb-in	-	-	-	-	11.2	10.8
Rated Speed		$N_{Rtd}$	rpm	-		-		3000	
Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	-	-	-	-	0.40	0.38
			Hp	-	-	-	-	0.54	0.51

Notes:

- ① Motor winding temperature rise,  $\Delta T = 100^\circ\text{C}$ , at  $40^\circ\text{C}$  ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of  $V_{bus}$ .
- ⑥ Measured at  $25^\circ\text{C}$ .
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.047 Nm, and increase  $T_f$  by the same amount.
- ⑧ Brake option increases weight by 0.27 kg (0.60 lb).

## KEM-2V020/KEM-xV040 (200W/400W) Motor Parameters

KEM-2V020/KEM-xV040 - 58 mm Flange Series				KEM-2V-	KEM-2V-	KEM-4V-
Parameters	Tol	Symbol	Units	020	040	
Torque Constant ①	±10%	K <sub>t</sub>	Nm/A <sub>rms</sub>	0.48	0.57	0.96
			lb-in/A <sub>rms</sub>	4.25	5.0	8.5
Back EMF Constant ②	±10%	K <sub>e</sub>	V <sub>rms</sub> /krpm	30.9	36.6	62.0
Motor Constant	Nom	K <sub>m</sub>	N-m/√W	0.110	0.175	0.170
			lb-in/√W	0.97	1.55	1.52
Resistance (line-line) ③	±10%	R <sub>m</sub>	ohm	12.9	7.0	20.8
Inductance (line-line)		L	mH	21.2	14.1	40.4
Inertia (includes SFD-M feedback) ③	±10%	J <sub>m</sub>	kg-cm <sup>2</sup>	0.118	0.209	
			lb-in-s <sup>2</sup>	1.0E-04	1.8E-04	
Optional Brake Inertia (additional)	±10%	J <sub>m</sub>	kg-cm <sup>2</sup>	0.018		
			lb-in-s <sup>2</sup>	1.6E-05		
Weight (w/o brake) ④		W	kg	1.08	1.48	
			lb	2.4	3.3	
Static Friction ⑤⑦		T <sub>f</sub>	Nm	0.012	0.018	
			lb-in	0.11	0.16	
Viscous Damping ①		K <sub>dv</sub>	Nm/krpm	0.004	0.008	
			lb-in/krpm	0.035	0.071	
Thermal Time Constant		TCT	minutes	7	9	
Thermal Resistance		R <sub>thw-a</sub>	°C/W	1.47	1.06	
Pole Pairs				6		
Heat Sink Size ④				10"x10"x0.25" Aluminum Plate		

Notes:

- ① Motor winding temperature rise, ΔT = 100°C, at 40°C ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of V<sub>bus</sub>.
- ⑥ Measured at 25°C.
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.047 Nm, and increase T<sub>f</sub> by the same amount.
- ⑧ Brake option increases weight by 0.27 kg (0.60 lb).

# Essentials Motor Specifications

## KEM-xV075/KEM-xV100 (750W/1000W) Performance Data – Up to 480 Vac (640 Vdc Bus)

### KEM-xV075/KEM-xV100 – 84 mm Flange Series

Parameters	Tol	Symbol	Units	KEM-2V-				KEM-4V-			
				075		100		075		100	
				No Brake	w/ Brake	No Brake	w/ Brake	No Brake	w/ Brake	No Brake	w/ Brake
Max Rated Voltage	Max	-	Vac	240		240		480		480	
Continuous Torque for $\Delta T$ winding = 100°C ①②⑦	Nom	$T_{CS}$	Nm	2.74	2.67	3.63	3.57	2.68	2.61	3.64	3.57
			lb-in	24.2	23.6	32.1	31.6	23.7	23.1	32.2	31.6
Continuous Current for $\Delta T$ winding = 100°C ①②⑦	Nom	$I_{CS}$	$A_{RMS}$	3.85	3.76	4.76	4.67	2.47	2.41	3.06	3.00
Continuous Torque for $\Delta T$ winding = 60°C ②⑦	Nom	$T_{CS}$	Nm	2.19	2.14	2.90	2.86	2.14	2.09	2.91	2.86
			lb-in	19.4	18.9	25.7	25.3	18.9	18.5	25.8	25.3
Max Mechanical Speed ⑤	Nom	$N_{max}$	rpm	6000		6000		6000		6000	
Peak Torque ①②	Nom	$T_p$	Nm	7.2		9.7		7.0		9.7	
			lb-in	64		86		62		86	
Peak Current	Nom	$I_p$	$A_{RMS}$	11.6		14.3		7.4		9.2	
120 Vac Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	2.69	2.62	3.56	3.48	2.65	2.58	3.61	3.53
			lb-in	23.8	23.2	31.5	30.8	23.5	22.8	31.9	31.2
120 Vac Rated Speed		$N_{Rtd}$	rpm	1000		1000		500		500	
120 Vac Rated Power (speed) ①②⑦		$P_{Rtd}$	W	0.28	0.27	0.37	0.36	0.14	0.14	0.19	0.18
			Hp	0.38	0.36	0.50	0.48	0.19	0.19	0.25	0.24
240 Vac Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	2.52	2.44	3.30	3.19	2.55	2.48	3.46	3.37
			lb-in	22.3	21.6	29.2	28.2	22.6	21.9	30.6	29.8
240 Vac Rated Speed		$N_{Rtd}$	rpm	3000		3000		2000		2000	
240 Vac Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	0.79	0.77	1.04	1.00	0.53	0.52	0.72	0.71
			Hp	1.06	1.03	1.39	1.34	0.71	0.70	0.97	0.95
400 Vac Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	-	-	-	-	2.44	2.37	3.29	3.19
			lb-in	-	-	-	-	21.6	21.0	29.1	28.2
400 Vac Rated Speed		$N_{Rtd}$	rpm	-	-	-	-	3000		3000	
400 Vac Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	-	-	-	-	0.77	0.74	1.03	1.00
			Hp	-	-	-	-	1.03	0.99	1.38	1.34
480 Vac Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	-	-	-	-	2.43	2.36	3.25	3.15
			lb-in	-	-	-	-	21.5	20.9	28.8	27.9
480 Vac Rated Speed		$N_{Rtd}$	rpm	-	-	-	-	3000		3000	
480 Vac Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	-	-	-	-	0.76	0.74	1.02	0.99
			Hp	-	-	-	-	1.02	0.99	1.37	1.33

Notes:

- ① Motor winding temperature rise,  $\Delta T = 100^\circ\text{C}$ , at  $40^\circ\text{C}$  ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of  $V_{bus}$ .
- ⑥ Measured at  $25^\circ\text{C}$ .
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.071 Nm, and increase  $T_i$  by the same amount.
- ⑧ Brake option increases weight by 0.69 kg (1.52 lb).

## KEM-xV075/KEM-xV100 (750W/1000W) Motor Parameters

KEM-xV075/KEM-xV100 – 84 mm Flange Series				KEM-2V-	KEM-4V-	KEM-2V-	KEM-4V-
Parameters	Tol	Symbol	Units	075		100	
Torque Constant ①	±10%	K <sub>t</sub>	Nm/A <sub>rms</sub>	0.72	1.1	0.77	1.2
			lb-in/A <sub>rms</sub>	6.4	9.7	6.8	10.6
Back EMF Constant ②	±10%	K <sub>e</sub>	V <sub>rms</sub> /krpm	46.4	71	50	78
Motor Constant	Nom	K <sub>m</sub>	N-m/√W	0.325	0.32	0.41	0.41
			lb-in/√W	2.88	2.82	3.63	3.63
Resistance (line-line) ⑥	±10%	R <sub>m</sub>	ohm	3.28	8.0	2.35	5.7
Inductance (line-line)		L	mH	9.9	22.9	7.5	18.2
Inertia (includes SFD-M feedback) ③	±10%	J <sub>m</sub>	kg-cm <sup>2</sup>	0.950		1.350	
			lb-in-s <sup>2</sup>	8.4E-04		1.2E-03	
Optional Brake Inertia (additional)	±10%	J <sub>m</sub>	kg-cm <sup>2</sup>	0.070			
			lb-in-s <sup>2</sup>	6.2E-05			
Weight (w/o brake) ⑧		W	kg	2.61		3.11	
			lb	5.8		6.9	
Static Friction ①⑦		T <sub>f</sub>	Nm	0.037		0.042	
			lb-in	0.33		0.37	
Viscous Damping ①		K <sub>dv</sub>	Nm/krpm	0.014		0.017	
			lb-in/krpm	0.124		0.150	
Thermal Time Constant		TCT	minutes	12		15	
Thermal Resistance		R <sub>thw-a</sub>	°C/W	0.95		0.87	
Pole Pairs				5			
Heat Sink Size ④				10"x10"x0.25" Aluminum Plate			

Notes:

- ① Motor winding temperature rise, ΔT = 100°C, at 40°C ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of V<sub>bus</sub>.
- ⑥ Measured at 25°C.
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.071 Nm, and increase T<sub>f</sub> by the same amount.
- ⑧ Brake option increases weight by 0.69 kg (1.52 lb).

# Essentials Motor Specifications

## KEM-xV150/KEM-xV250 (1500W/2500W) Performance Data – Up to 480 Vac (640 Vdc Bus)

### KEM-xV150/KEM-xV250 – 108 mm Flange Series

Parameters				KEM-2V-				KEM-4V-			
				150		250		150		250	
	Tol	Symbol	Units	No Brake	w/ Brake	No Brake	w/ Brake	No Brake	w/ Brake	No Brake	w/ Brake
Max Rated Voltage	Max	-	Vac	240		240		480		480	
Continuous Torque for $\Delta T$ winding = 100°C ①②⑦	Nom	$T_{CS}$	Nm	5.9		10.1		5.8	5.7	10.1	10.1
			lb-in	52		89		51	50	89	89
Continuous Current for $\Delta T$ winding = 100°C ①②⑦	Nom	$I_{CS}$	$A_{RMS}$	8.0	7.9	10.9	10.9	4.58	4.56	6.9	6.9
				4.72		8.1		4.64	4.56	8.1	8.1
Continuous Torque for $\Delta T$ winding = 60°C ②⑦	Nom	$T_{CS}$	Nm	4.72		8.1		4.64	4.56	8.1	8.1
			lb-in	41.8		72		41.1	40.4	72	72
Max Mechanical Speed ⑥	Nom	$N_{max}$	rpm	5000		5000		5000		5000	
Peak Torque ①②	Nom	$T_p$	Nm	13.3		23.4		13.1		23.4	
			lb-in	118		207		116		207	
Peak Current	Nom	$I_p$	$A_{RMS}$	20.0		27.2		11.5		17.2	
Rated Torque (speed) ①②⑦		$T_{rtd}$	Nm	5.6	9.8	9.7	5.7	10.0			
			lb-in	49.6	87	86	50	89			
Rated Speed		$N_{rtd}$	rpm	1500		1000		500		500	
Rated Power (speed) ①②⑦		$P_{rtd}$	W	0.88	1.03	1.02	0.3	0.52			
			Hp	1.18	1.38	1.37	0.4	0.7			
Rated Torque (speed) ①②⑦		$T_{rtd}$	Nm	5.1	8.6	8.5	5.4	9.6	9.5		
			lb-in	45.1	76	75	47.8	85	84		
Rated Speed		$N_{rtd}$	rpm	3000		3000		2000		1500	
Rated Power (speed) ①②⑦		$P_{rtd}$	kW	1.6	2.7	2.67	1.13	1.51	1.49		
			Hp	2.15	3.62	3.58	1.52	2.02	2.00		
Rated Torque (speed) ①②⑦		$T_{rtd}$	Nm	-	-	-	5.0	4.98	8.5	8.4	
			lb-in	-	-	-	44.3	44.1	75	74	
Rated Speed		$N_{rtd}$	rpm	-		-		3000		3000	
Rated Power (speed) ①②⑦		$P_{rtd}$	kW	-	-	-	1.57	1.56	2.67	2.64	
			Hp	-	-	-	2.11	2.09	3.58	3.54	
Rated Torque (speed) ①②⑦		$T_{rtd}$	Nm	-	-	-	4.94	4.90	8.3	8.2	
			lb-in	-	-	-	43.7	43.4	73	73	
Rated Speed		$N_{rtd}$	rpm	-		-		3000		3000	
Rated Power (speed) ①②⑦		$P_{rtd}$	kW	-	-	-	1.55	1.54	2.61	2.58	
			Hp	-	-	-	2.08	2.07	3.50	3.46	

Notes:

- ① Motor winding temperature rise,  $\Delta T = 100^\circ\text{C}$ , at  $40^\circ\text{C}$  ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of Vbus.
- ⑥ Measured at  $25^\circ\text{C}$ .
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.13 Nm, and increase  $T_r$  by the same amount.
- ⑧ Brake option increases weight by 1.2 kg (2.64 lb).

## KEM-xV150/KEM-xV250 (1500W/2500W) Motor Parameters

KEM-xV150/KEM-xV250 – 108 mm Flange Series				KEM-2V-	KEM-4V-	KEM-2V-	KEM-4V-
Parameters	Tol	Symbol	Units	150		250	
Torque Constant ①	±10%	K <sub>t</sub>	Nm/A <sub>rms</sub>	0.75	1.27	0.94	1.49
			lb-in/A <sub>rms</sub>	6.6	11.2	8.3	13.2
Back EMF Constant ②	±10%	K <sub>e</sub>	V <sub>rms</sub> /krpm	48.5	82	61	97
Motor Constant	Nom	K <sub>m</sub>	N-m/√W	0.59	0.92	0.58	0.93
			lb-in/√W	5.3	8.2	5.1	8.2
Resistance (line-line) ③	±10%	R <sub>m</sub>	ohm	1.06	3.19	0.69	1.72
Inductance (line-line)		L	mH	5.4	15.5	4.0	10.0
Inertia (includes SFD-M feedback) ③	±10%	J <sub>m</sub>	kg-cm <sup>2</sup>	4.10		7.8	
			lb-in-s <sup>2</sup>	3.6E-05		6.9E-03	
Optional Brake Inertia (additional)	±10%	J <sub>m</sub>	kg-cm <sup>2</sup>	0.200			
			lb-in-s <sup>2</sup>	1.8E-04			
Weight (w/o brake) ③		W	kg	4.40		6.4	
			lb	9.7		14.1	
Static Friction ①⑦		T <sub>f</sub>	Nm	0.065		0.078	
			lb-in	0.58		0.69	
Viscous Damping ①		K <sub>dv</sub>	Nm/krpm	0.023		0.033	
			lb-in/krpm	0.204		0.292	
Thermal Time Constant		TCT	minutes	14		19	
Thermal Resistance		R <sub>thw-a</sub>	°C/W	0.69		0.57	
Pole Pairs				5			
Heat Sink Size ④				12"x12"x0.5" Aluminum Plate			

Notes:

- ① Motor winding temperature rise, ΔT = 100°C, at 40°C ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of V<sub>bus</sub>.
- ⑥ Measured at 25°C.
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.13 Nm, and increase T<sub>f</sub> by the same amount.
- ⑧ Brake option increases weight by 1.2 kg (2.64 lb).

# Essentials Motor Specifications

## KEM-xV300/KEM-4V400 (3000W/4000W) Performance Data – Up to 480 Vac (640 Vdc Bus)

### KEM-xV300/KEM-4V400 – 138 mm Flange Series

				KEM-2V-		KEM-4V-			
				300		300		400	
Parameters	Tol	Symbol	Units	No Brake	w/ Brake	No Brake	w/ Brake	No Brake	w/ Brake
Max Rated Voltage	Max	-	Vac	240		480		480	
Continuous Torque for $\Delta T$ winding = 100°C ①②⑦	Nom	$T_{CS}$	Nm	11.5	11.4	11.8	11.7	17.4	17.2
			lb-in	102	101	104	104	154	152
Continuous Current for $\Delta T$ winding = 100°C ①②⑦	Nom	$I_{CS}$	$A_{RMS}$	12.0	11.9	7.4	7.3	11.5	11.4
Continuous Torque for $\Delta T$ winding = 60°C ②⑦	Nom	$T_{CS}$	Nm	9.2	9.1	9.4	9.4	13.9	13.8
			lb-in	81	81	83	83	123	122
Max Mechanical Speed ⑤	Nom	$N_{max}$	rpm	4000		4000		4000	
Peak Torque ①②	Nom	$T_p$	Nm	26.8		27.3		40.5	
			lb-in	237		242		358	
Peak Current	Nom	$I_p$	$A_{RMS}$	30.0		18.5		28.9	
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	11.1	11.0	11.6	11.5	16.9	16.6
			lb-in	98	97	103	102	150	147
Rated Speed		$N_{Rtd}$	rpm	1000		500		800	
Rated Power (speed) ①②⑦		$P_{Rtd}$	W	1.16	1.15	0.61	0.60	1.42	1.39
			Hp	1.56	1.54	0.82	0.80	1.90	1.86
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	9.6	9.5	11.1	11.0	15.7	15.4
			lb-in	85	84	98	97	139	136
Rated Speed		$N_{Rtd}$	rpm	3000		1500		1800	
Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	3.02	2.98	1.74	1.73	2.96	2.9
			Hp	4.05	4.00	2.33	2.32	3.97	3.89
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	-	-	9.8	9.7	13.5	13.2
			lb-in	-	-	87	86	119	117
Rated Speed		$N_{Rtd}$	rpm	-		3000		3000	
Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	-	-	3.08	3.05	4.24	4.15
			Hp	-	-	4.13	4.09	5.69	5.57
Rated Torque (speed) ①②⑦		$T_{Rtd}$	Nm	-	-	9.7	9.5	13.1	12.8
			lb-in	-	-	86	84	116	113
Rated Speed		$N_{Rtd}$	rpm	-		3000		3000	
Rated Power (speed) ①②⑦		$P_{Rtd}$	kW	-	-	3.05	2.98	4.12	4.02
			Hp	-	-	4.09	4.00	5.53	5.39

Notes:

- ① Motor winding temperature rise,  $\Delta T = 100^\circ\text{C}$ , at  $40^\circ\text{C}$  ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of  $V_{bus}$ .
- ⑥ Measured at  $25^\circ\text{C}$ .
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.25 Nm, and increase  $T_p$  by the same amount.
- ⑧ Brake option increases weight by 2.2 kg (4.84 lb).

## KEM-xV300/KEM-4V400 (3000W/4000W) Motor Parameters

KEM-xV300/KEM-4V400 – 138 mm Flange Series				KEM-2V-	KEM-4V-	KEM-4V-
Parameters	Tol	Symbol	Units	300	400	400
Torque Constant ①	±10%	$K_t$	Nm/A <sub>rms</sub>	0.97	1.61	1.52
			lb-in/A <sub>rms</sub>	8.6	14.2	13.5
Back EMF Constant ②	±10%	$K_e$	V <sub>rms</sub> /krpm	63	104	99
Motor Constant	Nom	$K_m$	N-m/√W	1.02	1.04	1.35
			lb-in/√W	9.0	9.2	11.9
Resistance (line-line) ③	±10%	$R_m$	ohm	0.61	1.59	0.85
Inductance (line-line)		L	mH	3.39	9.40	5.40
Inertia (includes SFD-M feedback) ④	±10%	$J_m$	kg-cm <sup>2</sup>	15.8		22.9
			lb-in-s <sup>2</sup>	1.4E-02		2.0E-02
Optional Brake Inertia (additional)	±10%	$J_m$	kg-cm <sup>2</sup>	1.0		
			lb-in-s <sup>2</sup>	8.9E-04		
Weight (w/o brake) ⑤		W	kg	6.5		10.1
			lb	14.3		22.3
Static Friction ⑥⑦		$T_f$	Nm	0.120		0.180
			lb-in	1.06		1.59
Viscous Damping ⑧		$K_{dv}$	Nm/krpm	0.050		0.075
			lb-in/krpm	0.443		0.664
Thermal Time Constant		TCT	minutes	16		18
Thermal Resistance		$R_{thw-a}$	°C/W	0.53		0.41
Pole Pairs				5		
Heat Sink Size ④				18"x18"x0.5" Aluminum Plate		

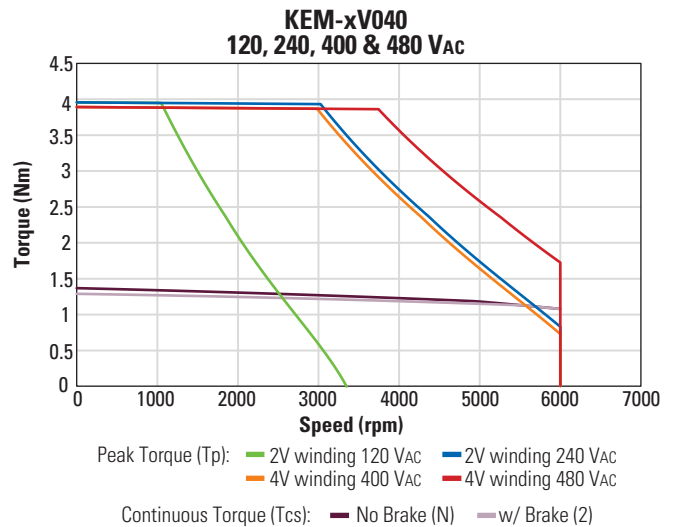
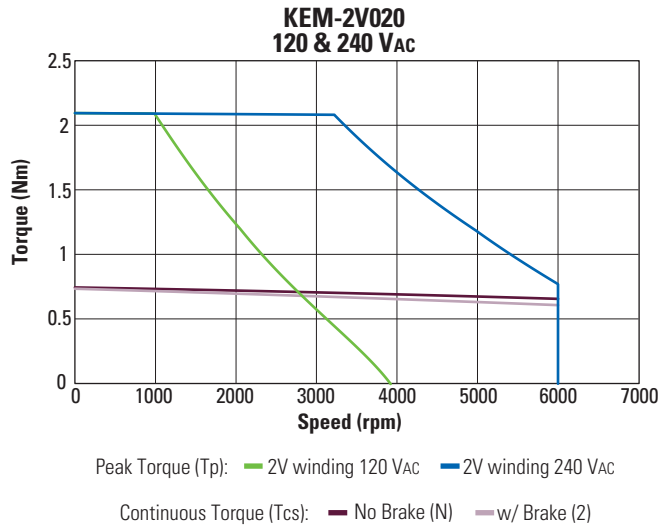
Notes:

- ① Motor winding temperature rise, ΔT = 100°C, at 40°C ambient.
- ② All data referenced to sinusoidal commutation.
- ③ Add brake inertia if applicable for total inertia.
- ④ Motor with standard heat sink.
- ⑤ May be limited at some values of V<sub>bus</sub>.
- ⑥ Measured at 25°C.
- ⑦ For motors with optional shaft seal, reduce torque shown by 0.25 Nm, and increase T<sub>f</sub> by the same amount.
- ⑧ Brake option increases weight by 2.2 kg (4.84 lb).

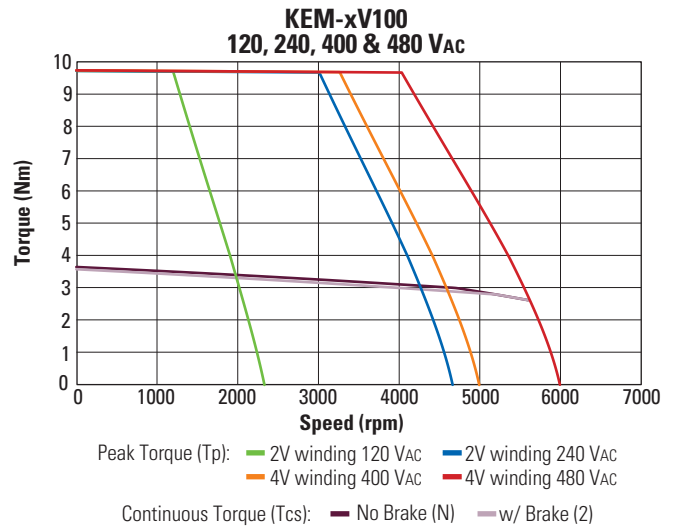
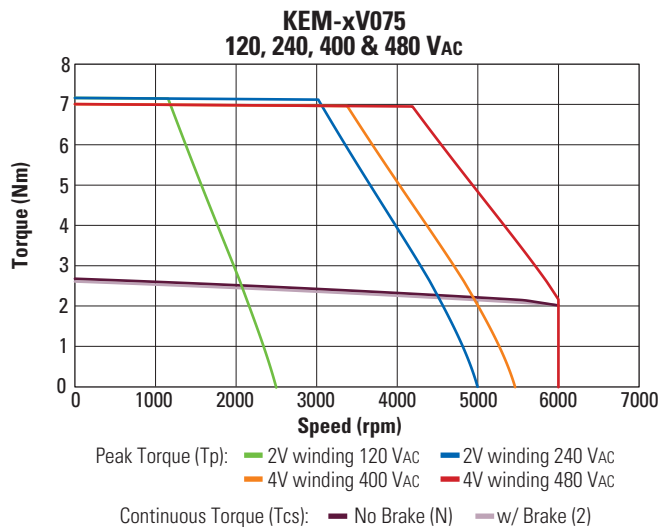
# Essentials Motor Specifications

## Essentials Motor Performance Curves

### KEM-2V020/KEM-xV040 Performance Curves



### KEM-xV075/KEM-xV100 Performance Curves

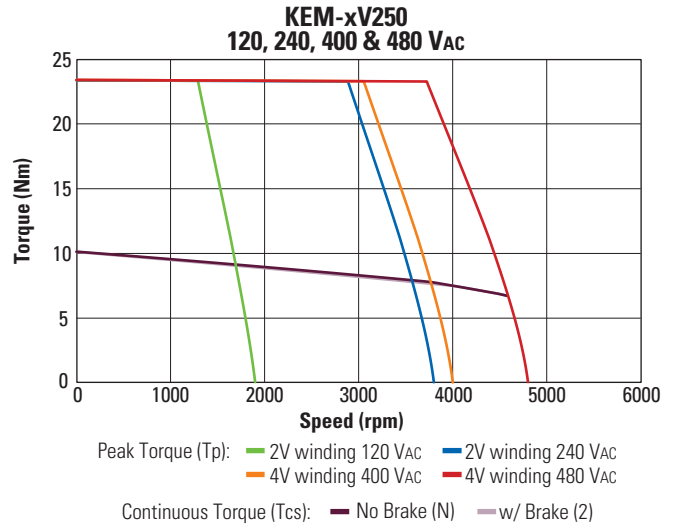
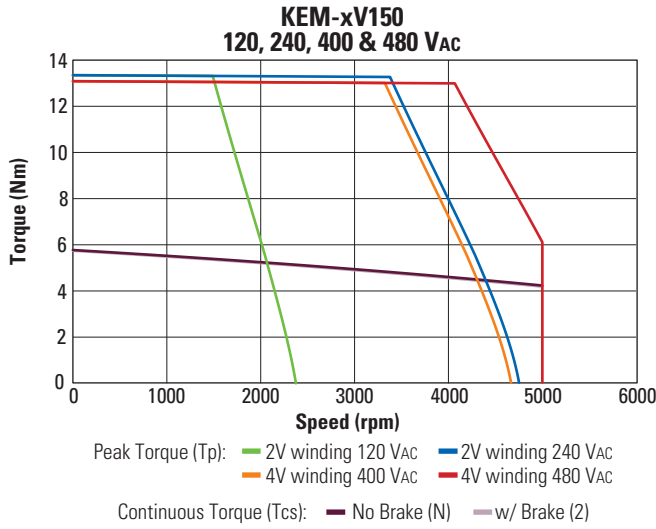


#### NOTE

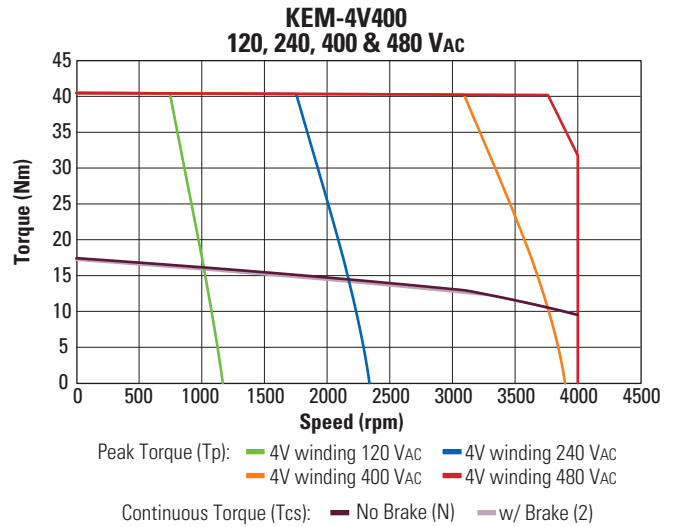
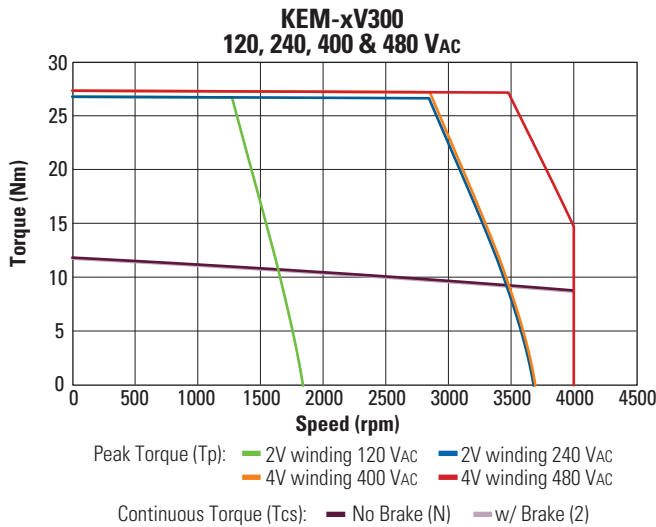
The on-line Performance Curve Generator tool provides the most accurate information for specific models and is located at <https://www.kollmorgen.com/en-us/service-and-support/technical/performance-curve-generator>.

## Essentials Motor Performance Curves (Continued)

### KEM-xV150/KEM-xV250 Performance Curves



### KEM-xV300/KEM-4V400 Performance Curves

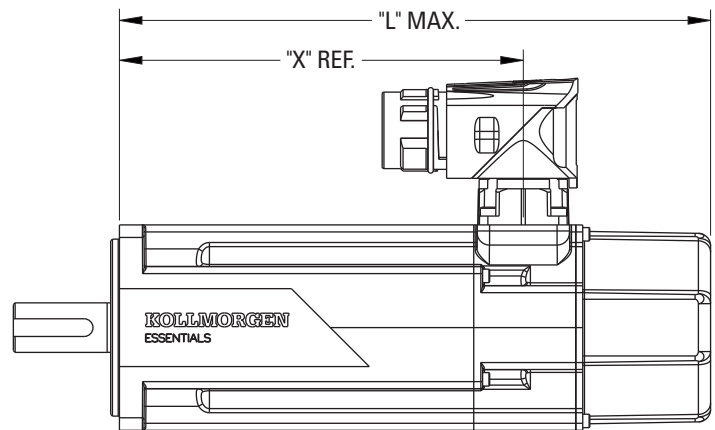
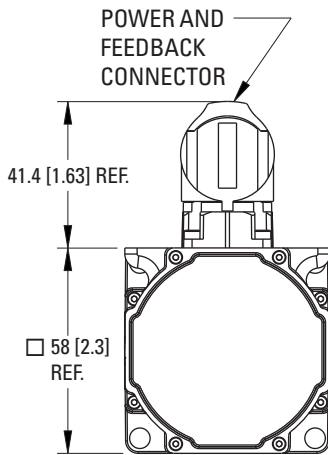
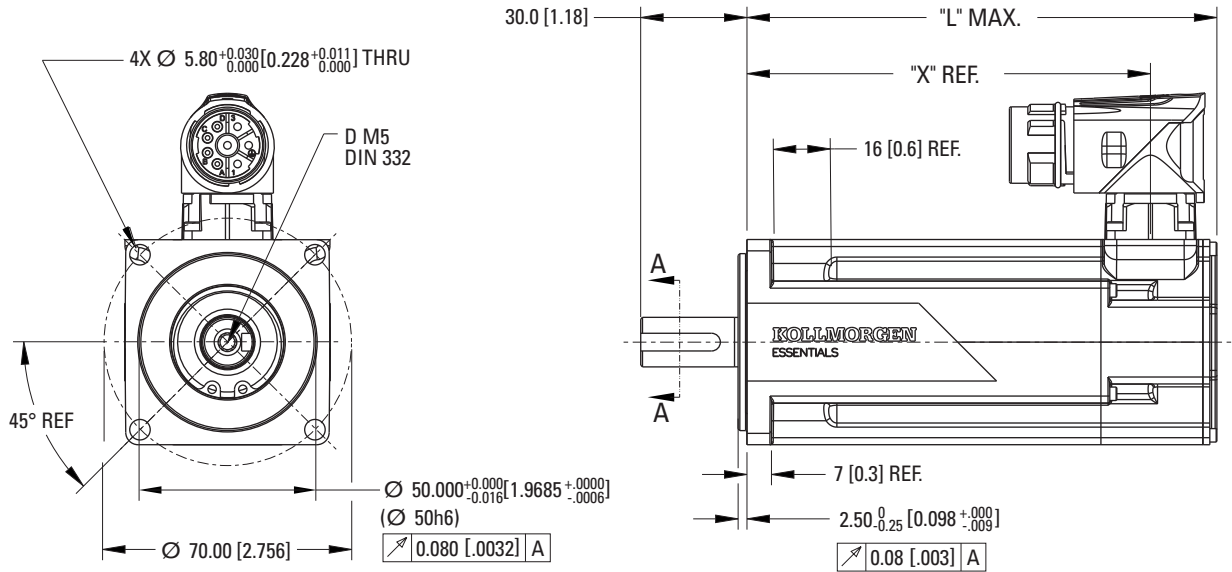


**NOTE**

The on-line Performance Curve Generator tool provides the most accurate information for specific models and is located at <https://www.kollmorgen.com/en-us/service-and-support/technical/performance-curve-generator>.

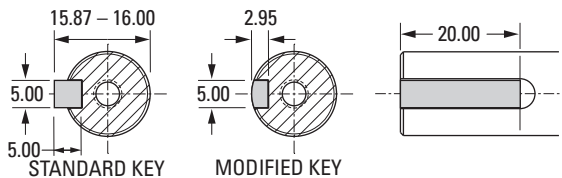
# Essentials Motor Specifications

## KEM-2V020/KEM-xV040 Dimensional Drawings and Data



### Shaft Key Dimensions

NOTE:  
EACH MOTOR PACKAGE CONTAINS  
1X MODIFIED KEY - RECTANGULAR METRIC (5.00 X 2.95 X 20.00)  
1X STANDARD KEY - RECTANGULAR METRIC (5.00 X 5.00 X 20.00)

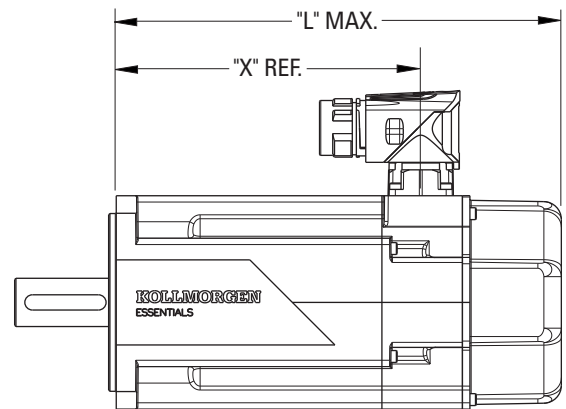
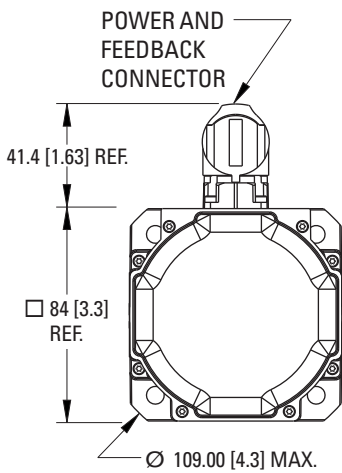
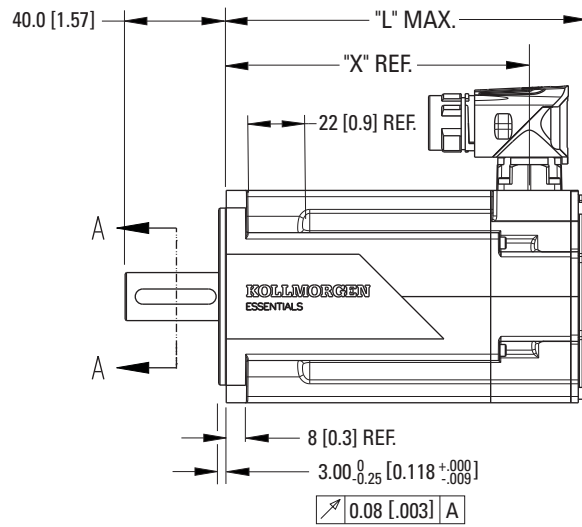
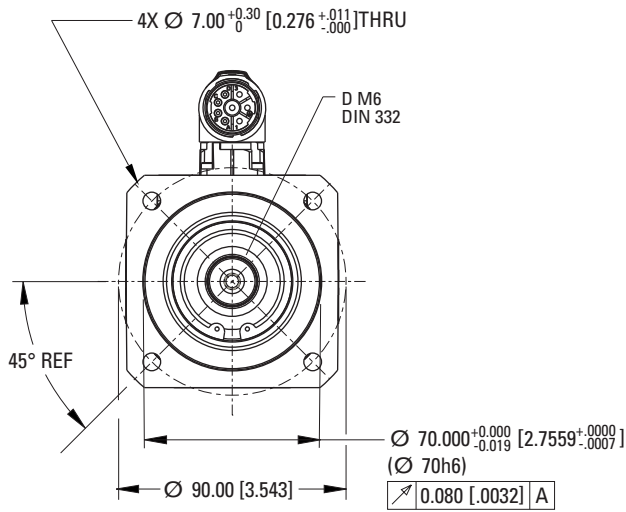


### "L" and "X" Dimensional Data

Model	"X" REF.	No Brake	Brake
		"L" MAX.	"L" MAX.
KEM-2V020	85.60 [3.370]	104.90 [4.130]	139.00 [5.472]
KEM-xV040	114.10 [4.492]	133.40 [5.252]	167.50 [6.594]

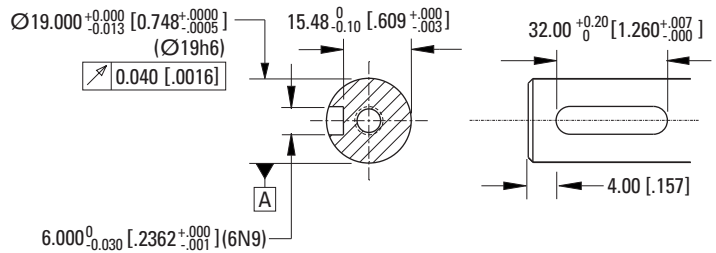
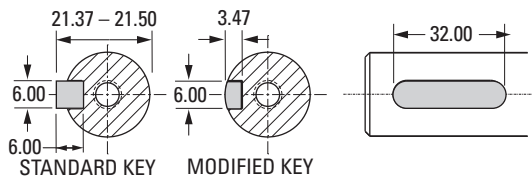
Dimensions in mm [inches]

### KEM-xV075/KEM-xV100 Dimensional Drawings and Data



### Shaft Key Dimensions

NOTE:  
EACH MOTOR PACKAGE CONTAINS  
1X MODIFIED KEY - ROUND METRIC (6.00 X 3.47 X 32.00)  
1X STANDARD KEY - ROUND METRIC (6.00 X 6.00 X 32.00)



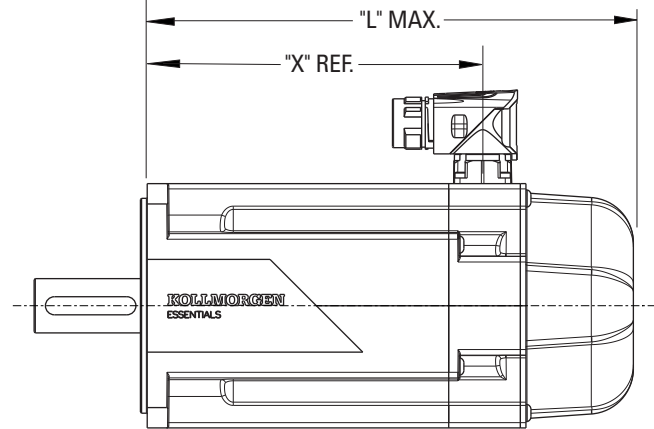
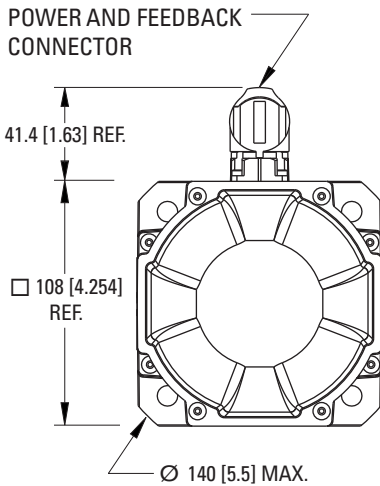
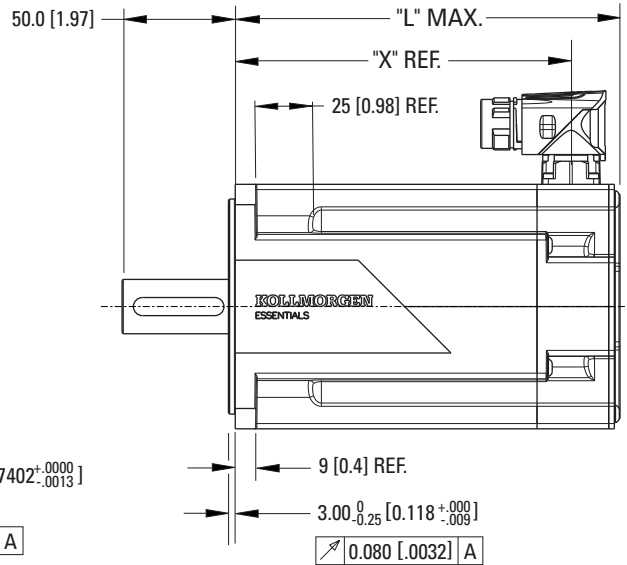
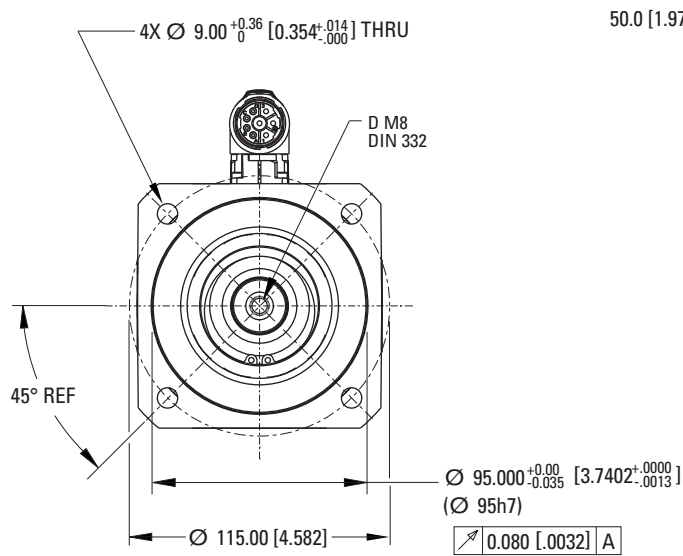
### "L" and "X" Dimensional Data

Model	"X" REF.	No Brake	Brake
		"L" MAX.	"L" MAX.
KEM-xV075	102.40 [4.031]	124.80 [4.913]	158.30 [6.232]
KEM-xV100	119.90 [4.720]	142.30 [5.602]	175.80 [6.921]

Dimensions in mm [inches]

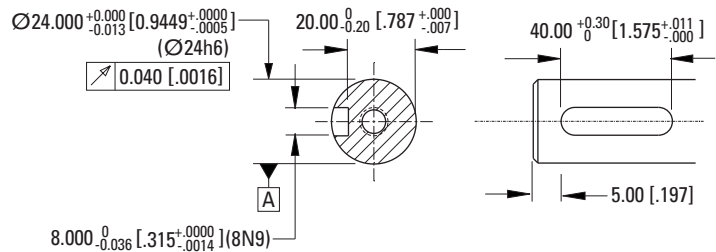
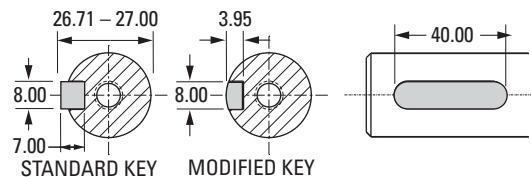
# Essentials Motor Dimensional Drawings

## KEM-xV150/KEM-xV250 Dimensional Drawings and Data



### Shaft Key Dimensions

NOTE:  
EACH MOTOR PACKAGE CONTAINS  
1X MODIFIED KEY - ROUND METRIC (8.00 X 3.95 X 40.00)  
1X STANDARD KEY - ROUND METRIC (8.00 X 7.00 X 40.00)

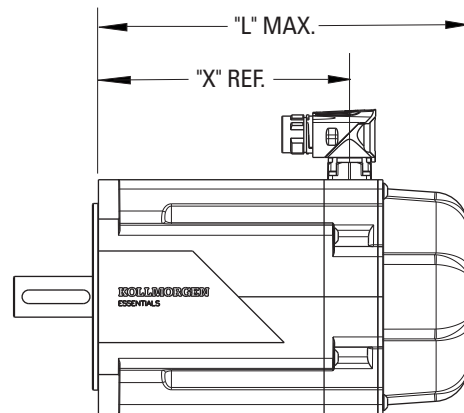
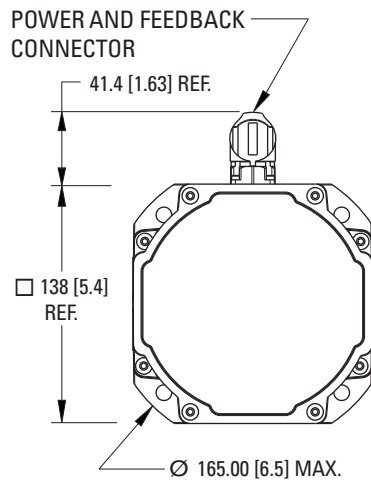
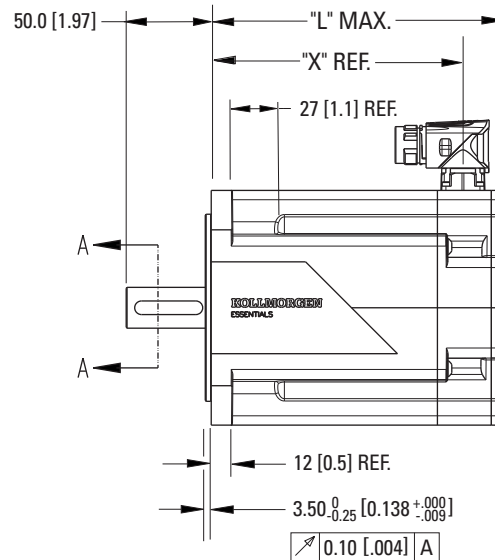
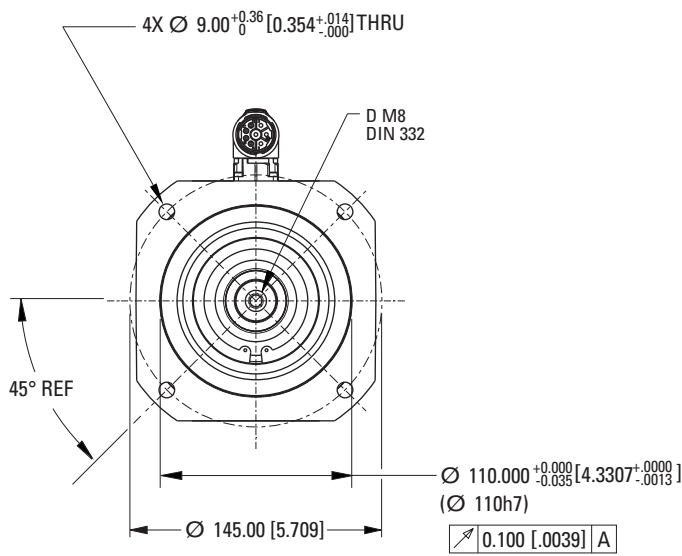


### "L" and "X" Dimensional Data

Model	"X" REF.	No Brake	Brake
		"L" MAX.	"L" MAX.
KEM-xV150	111.30 [4.382]	133.50 [5.256]	178.50 [7.027]
KEM-xV250	148.30 [5.838]	170.50 [6.713]	215.50 [8.484]

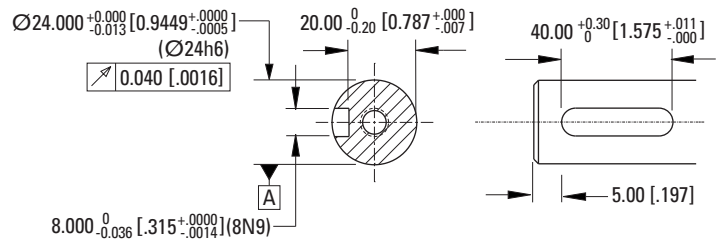
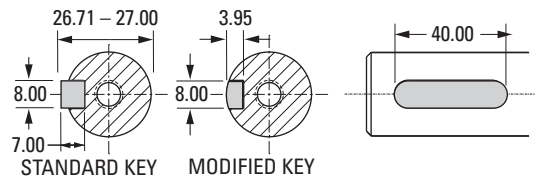
Dimensions in mm [inches]

### KEM-xV300/KEM-4V400 Dimensional Drawings and Data



### Shaft Key Dimensions

NOTE:  
EACH MOTOR PACKAGE CONTAINS  
1X MODIFIED KEY - ROUND METRIC (8.00 X 3.95 X 40.00)  
1X STANDARD KEY - ROUND METRIC (8.00 X 7.00 X 40.00)



### "L" and "X" Dimensional Data

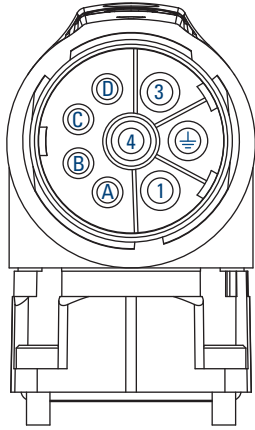
Model	"X" REF.	"L" MAX.	
		No Brake	Brake
KEM-xV300	125.50 [4.941]	148.70 [5.854]	195.70 [7.705]
KEM-4V400	148.00 [5.827]	171.20 [7.740]	218.20 [8.591]

Dimensions in mm [inches]

# Essentials Motor Connector Pinout

## Essentials Motor Connector Pinout

### 9- Connector Pinout – Hybrid combined power and SFD-M feedback



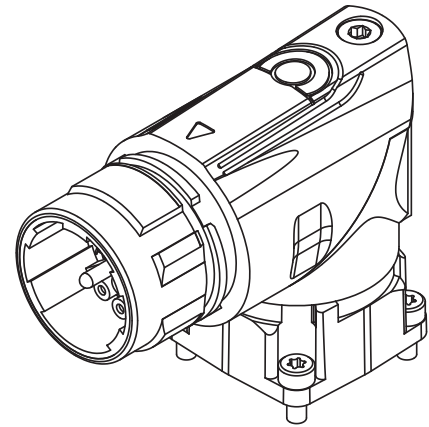
Power + SFD-M / SFD3

#### Power + SFD-M

Pin	Function
1	U
⊥	PE
3	W
4	V
A	Brake +
B	Brake -
C	SFD-M -
D	SFD-M +

Connector Part Number:  
BEDC-110-NN-00-00-1116-000

Mating Connector Part Number:  
BSTA-078-NN-00-42-0100-000



9- Connector

## Brake Option

### Failsafe, Holding Brake

The holding brake is designed to provide static holding torque to the motor shaft with the brake coil de-energized. The brake must first be released (coil energized) prior to commanding motor rotation as determined by its drop-out time. The brake is intended for holding or “parking” of a stationary motor. It is not intended for dynamic braking. There should be absolutely no motion of the rotor when power is removed from the brake coil.

### Essentials Motor Brake Specifications

Motor Family	Holding Torque @20°C	Operating Voltage	Power Consumption @24V, 20°C	Current @24V, 20°C	Inertia	Release Delay Time	Application Delay Time
	Nm	V <sub>DC</sub> ±10%	Watts ±7%	A <sub>DC</sub>	kg-cm <sup>2</sup>	msec	msec
KEM-2V020/KEM-xV040	1.42	24	8.41	0.35	0.013	45	36
KEM-xV075/KEM-xV100	5.3		12.74	0.53	0.058	75	40
KEM-xV150/KEM-xV250	14.5		19.73	0.82	0.166	115	45
KEM-xV300/KEM-4V400	25		25.70	1.07	0.668	155	55

Notes:

- Contamination of the motor internal compartment by oil or other foreign materials will result in failure of the brake. Check the suitability of motor sealing for the working environment.
- Maximal allowed brake backlash is 1.01° (400W), 0.81° (1000W), 0.71° (2000W), 0.51° (4000W).
- Brake Operating Temperature Range: -20° C to 120° C. Sub-zero temperatures present a freezing risk for condensation which could prevent correct brake operation.

# Essentials SFD-M Feedback

## Kollmorgen Essentials™ Drive Feedback Option Specifications

### Feedback Unit Options

Code	Description	Single-turn or Multi-turn	Feedback Type/Size	Feedback Resolution			Accuracy* (arc-sec)
				Device Resolution (Sin/Cos per Rev., Bits or Lines/Rev.)	Essentials Drive Internal Resolution	# of Absolute revs.	
CB	SFD-M Smart Feedback Device Multi-turn	Multi-turn	15	24-Bits	24-Bits	65,536	±60"

\* Accuracy refers to overall system accuracy once installed in the motor. Noise refers to the RMS position noise when at stand-still.

## Kollmorgen Smart Feedback Device, Multi-turn (SFD-M) (CB)

The SFD-M Feedback uses a single motor cable, requiring just one cable between the drive and motor.

The feedback has both power and communication on a single wire pair, reducing overall wiring costs. SFD-M offers 24-bit absolute single-turn resolution, batteryless 16-bit (65,536) multi-turn absolute revolutions and an absolute angular accuracy of +/- 1 arc-min.

In addition, the device includes onboard memory for an electronic motor datasheet which enables device auto-recognition for faster setup and commissioning when paired with any Kollmorgen KED, AKD or AKD2G drive.

### Angle Measurement:

Single-Turn Resolution:  $2^{24} = 16,777,216$  counts per rev

Multi-Turn Absolute Range:  $2^{16} = 65,536$  absolute revolutions\* (batteryless)

Accuracy: < +/- 1 arc-min typical 25° C  
< +/- 3 arc-min worst case

Electrical Noise: <  $2^{-22}$  Rev rms at full bandwidth

Bandwidth: > 2 kHz at -3 dB

> 1 kHz at -45° phase lag

Max Continuous Speed: 10,000 RPM

Velocity Ripple: < 1% p-p (typical)

Velocity Noise: < 0.3 RPM rms at full bandwidth

### Power Supply:

Input Voltage: 7 V - 12 V accepted (at motor terminals)

Input current maximum: 140 mA DC

### Digital Communications:

Baud rate: 2.5 Mbaud

Signaling: RS-485 differential using differential Manchester encoding

Update period: New position sample every 51.2 μs

Error detection: 5-bit CRC and running parity check

### Environmental:

Feedback Operating Temperature: -40 to 120° C

Humidity: 10% to 90% non-condensing

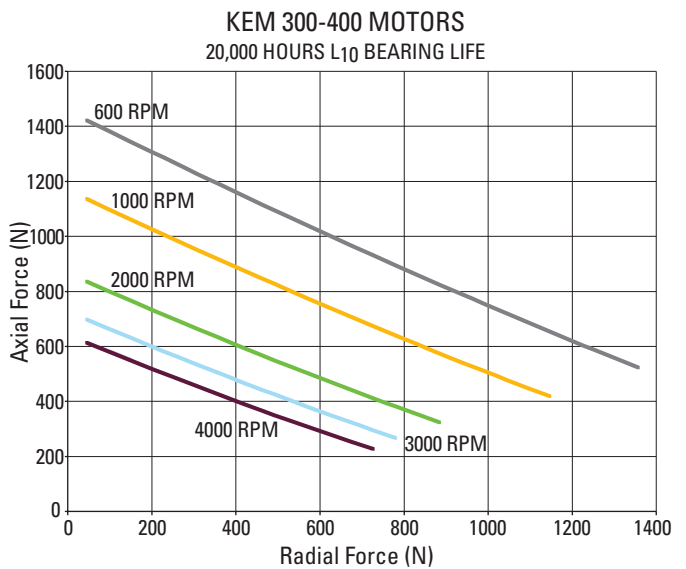
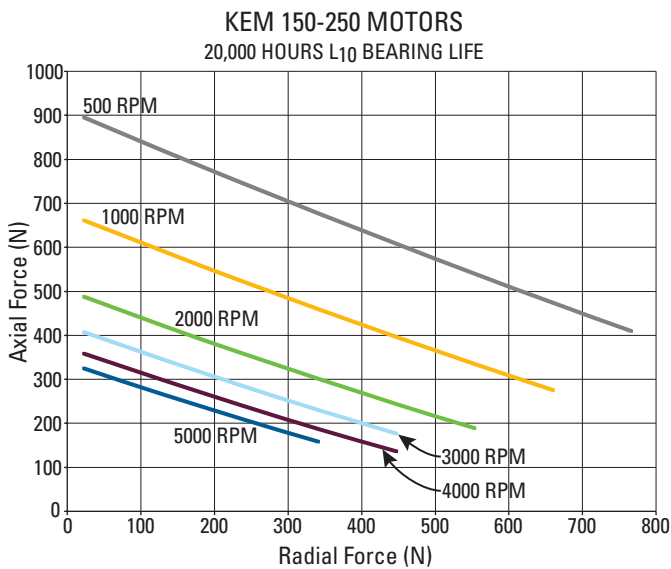
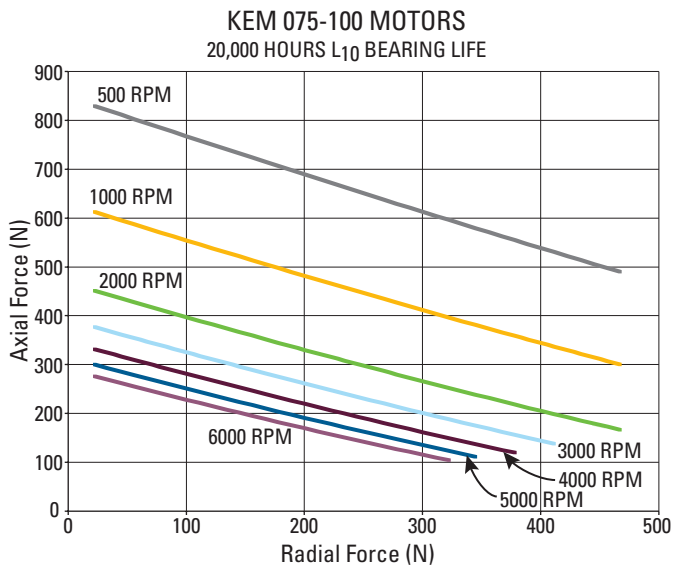
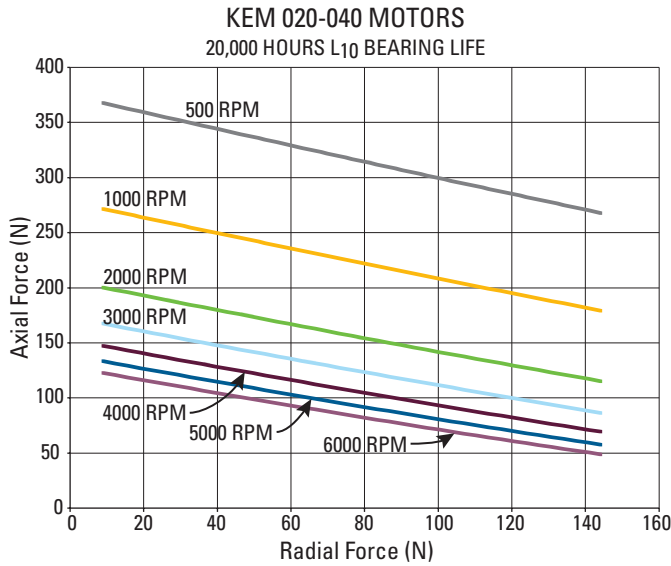
Vibration Resistance: 30g (294 m/s<sup>2</sup>) @ 55-2000 Hz (EN60068-2-6)

Shock Resistance: 100g (981 m/s<sup>2</sup>) @ 6 ms (EN60068-2-27)

\* When paired with AKD, this is limited to 4096 absolute revolutions (12-bits)

# Essentials Technical Guide

## I. L10 Bearing Fatigue



## II. Shaft Loading

Motor	Max. Radial Force (N)	Max. Axial Force (N)
KEM-2V020/xV040	150	600
KEM-xV075/xV100	500	1400
KEM-xV150/xV250	830	1740
KEM-xV300/4V400	1940	2200

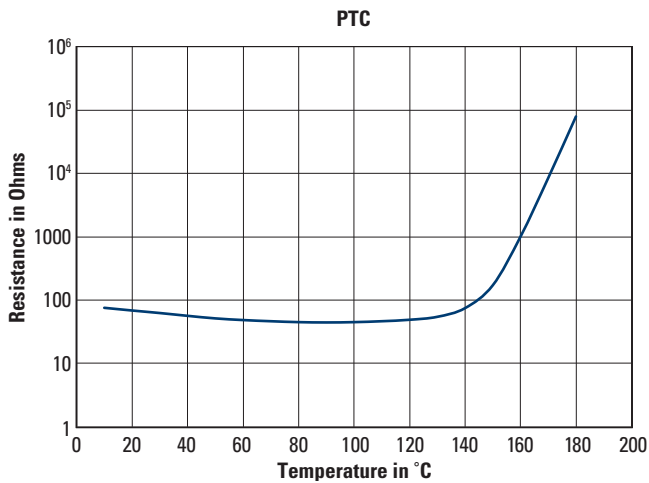
The maximum radial load ratings reflect the following assumptions:

1. Motors are operated with peak torque of the longest member of the frame size.
2. Fully reversed load applied to the end of the smallest diameter standard mounting shaft extension.
3. Infinite life with 99% reliability.
4. Safety factor = 2.

### III. Essentials Motor Thermal Sensor Protective Device

The standard version of each motor is fitted with an electrically isolated PTC Avalanche-Type thermal sensor. The thermal sensors do not provide any protection against short, heavy overloading.

With digital SFD-M (CB) feedback systems, the temperature sensor status is transmitted digitally and evaluated in the drive. Provided that our configured feedback cables are used, the sensor is integrated into the monitoring system of the digital servo amplifiers.



Note:

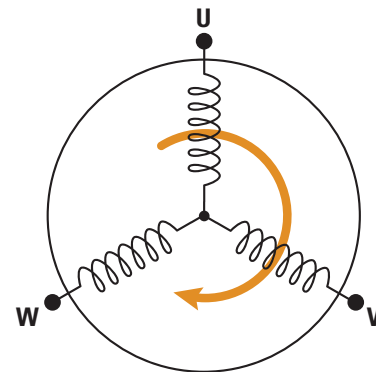
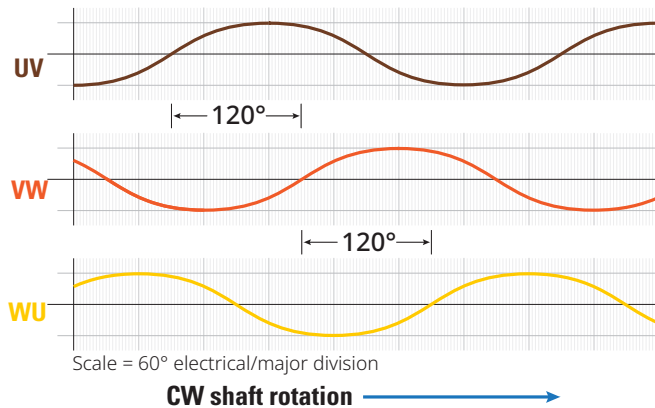
PTC thermistor (155°C ± 5°C switching temperature) installed.  
Resistance at 25°C: ≤550 ohms.  
Switching Resistance: ≥1330 ohms within ±5°C of switch temperature.

### IV. Motor Phasing Diagram

When the motor is rotated clockwise (CW) as viewed from front shaft end, the following BEMF voltage waveforms result:

- » Voltage phase-UV leads Voltage phase-VW by 120-degrees
- » Voltage phase-VW leads Voltage phase-WU by 120-degrees
- » Voltage phase-WU leads Voltage phase-UV by 120-degrees

#### BEMF Waveforms



# Essentials System Cables

High-performance servo systems require high signal integrity. Electrical noise in the system can cause degraded performance or even instability. Therefore, well-designed connectors and cables are as critical to the system as are motors, drives and controls. A system is only as good as its weakest link. Kollmorgen guarantees the performance and quality of its servo systems only when you use Kollmorgen-supplied motors, drives and cables. Not all cables are created equal.

The Kollmorgen Essentials™ Cable not only works with Essentials Motors, but will also work with Kollmorgen AKM and AKM2G motors configured with a “9” connector option for AKM or “A” connector option for AKM2G and SFD-M or SFD-3 feedback.



## Essentials Cable Physical Properties

### Bend Radius and Weight Specifications

Cable Type	Main Conductor Size [mm <sup>2</sup> ]	OD [mm]	Bend Radius (min.)		Cable Weight	
			Static [mm]	Dynamic [mm]	Assembled Weight of 1 Meter Cable [kg]	Weight Adder per Meter [kg/m]
H2	1.5	13.2	66	92.4	0.40	0.20
	2.5	14.2	71	99.4	0.55	0.25

Note: Essentials Cables are rated for 80°C and 1000V

### Life Cycle – Lifetime at Specified Conditions

Cable Type	Cycles @ Bend Radius [F x DIA]	Temp from/to [°C]
H2	12E+06	-40/+90

### Certifications/Standards

CE  
CEI 20-35  
Lead-free  
Clean room  
NFPA 79

Oil Resistance  
Flame Resistance  
Silicone-Free  
UL/ULC

## Kollmorgen Essentials™ Cable Nomenclature

**H2 - 51 - 015 - A5 - 00 - XXXX00**

### Cable Version

H2 Mid-flex Hybrid PUR with brake

### Connector Type

51 KED-SPM-6V03S, KED-SPM-6V06S  
52 KED-SPM-6V12S, KED-SPM-7VxxS

### Cable Type

015 1.5 mm<sup>2</sup> power conductors  
025 2.5 mm<sup>2</sup> power conductors

### Length

xxxx00 Length, mm (max. 25 m)  
Stocked Lengths: 1, 3, 6, 9, 12 m  
Examples:  
6 m cable = 006000, 12 m cable = 012000

### Options

00 Standard Option Set

### Motor Mating Connector Type

A5 KEM/AKM, M23 SpeedTec (8)

### Kollmorgen Essentials Cable Options

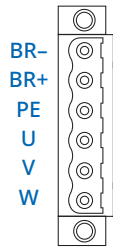
- H2-51-015-A5-xxxx00 for KED-SPM-6V03S, KED-SPM-6V06S
- H2-52-025-A5-xxxx00 for KED-SPM-6V12S, KED-SPM-7VxxS

Each cable option will have 25 SKUs, from 001000 (1 m) up to 025000 (25 m)

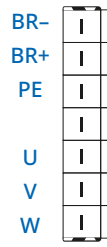
## Essentials System Cable Connector Pinouts

### Drive Connector X1: Motor, Power + Brake

Signal	Description
BR-	Motor holding brake
BR+	Motor holding brake
PE	Protective Earth (motor housing)
U	Motor Phase U
V	Motor Phase V
W	Motor Phase W



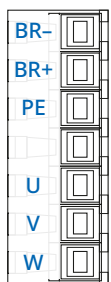
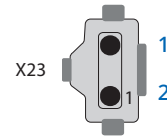
120-240 V



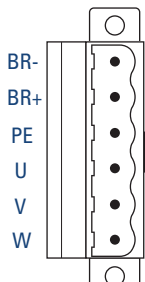
240-480 V

### Drive Connector X23: Feedback Pinouts

Pin	SFD-M
1	COM+
2	COM-

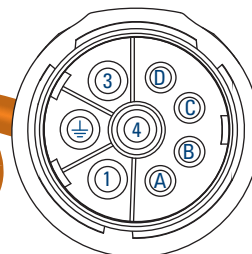


52



51

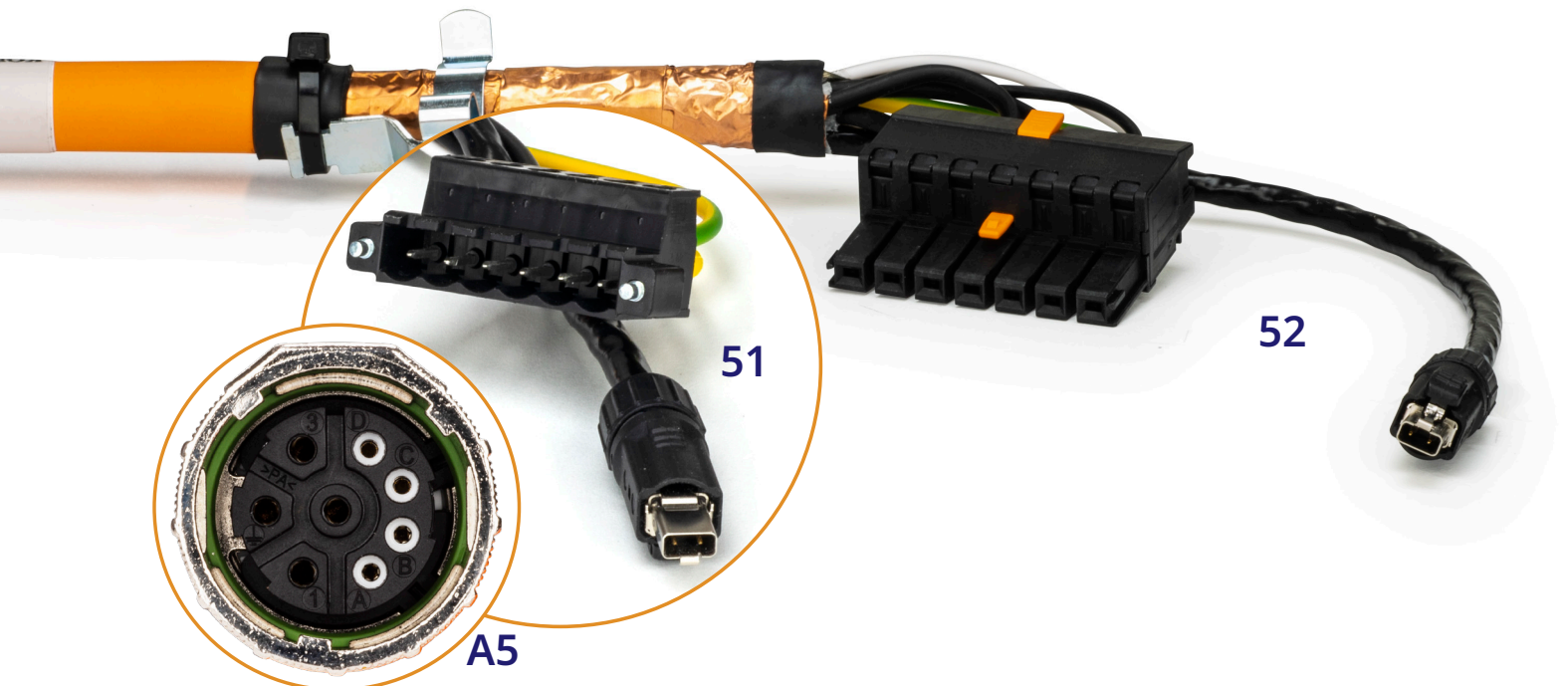
H2 - 5x - 0xx - A5



A5

### Motor Connector Pinout

Pin	Function
1	U
2	PE
3	W
4	V
A	Brake +
B	Brake -
C	SFD+
D	SFD -

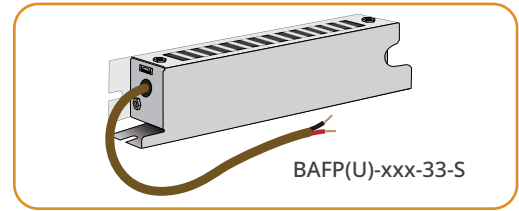


# Essentials Accessories

## Drive Accessories

### Regen Resistors - External IP40

- BAFP(U)-85-33-S 85 W, 33 Ohm, 210 x 60 x 27 mm  
For use with 6V03 and 6V06 drives
- BAFP(U)-100-33-S 100 W, 33 Ohm, 239 x 70 x 27 mm  
For use with 6V12 and 7Vxx drives



### EMC Filters

Drive Model	Filter Order Code			
	≤ 10 m Cable Standard EMC Requirements		> 10 m Cable High EMC Requirements	
	1 phase	3 phase	1 phase	3 phase
6V03	KED-1MF-06	KED-3MF-10	DE-202203	DE-202205
6V06	KED-1MF-10		DE-202204	
6V12	KED-1MF-20	KED-3MF-20	DE-TBD	DE-202206



**Chokes** Motor Chokes are not needed for 6Vxx drive models

### Mating Connectors

- KED-CONKIT-MV36 Connector kit with X3 and X10 connectors for 6V03S, 6V06S
- KED-CONKIT-MV12 Connector kit with X3 and X10 connectors for 6V12S
- KED-CONKIT-HV Connector kit with X3 and X10 connectors for 7VxxS
- KED-CON-X3-MV36 Mating connector X3 (Mains Power) for 6V03S, 6V06S
- KED-CON-X3-MV12 Mating connector X3 (Mains Power) for 6V12
- KED-CON-X3-HV Mating connector X3 (Mains Power) for 7Vxx
- KED-CON-X10 Mating connector X10 (24V in and STO)



### Shield Clamp

KED-SHIELD-25  
Shield clamp for up to 2.5mm<sup>2</sup> cable



## Motor Accessories

### Shaft Key Kit

KEM-020-040-SKK  
KEM-075-100-SKK  
KEM-150-400-SKK

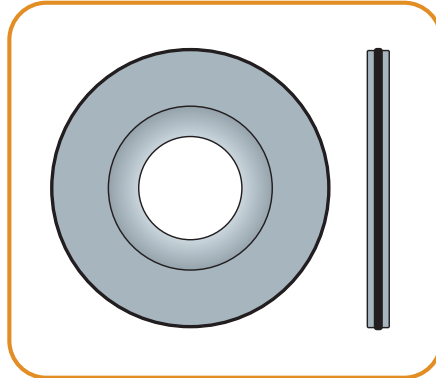
Spare shaft key kits for KEM motors. The middle digits represent the motor variations they support. KEM-150-400-SKK is compatible with 1500 W through 4000 W variations.



### Shaft Seal Kit

KEM-020-040-SSK  
KEM-075-100-SSK  
KEM-150-250-SSK  
KEM-300-400-SSK

Optional shaft seal kits for KEM motors to achieve full IP65 rating. The middle digits represent the motor variations they support.



# Essentials Accessories

## Cable Accessories - Drive-side Connectors for User-customized Cables

These drive-side cable connectors are readily available from electronic component distributors and are not offered by Kollmorgen.

### H2-51-015-A5-00-xxxx00 Drive Side Connector:

X1 - 6V03/6V06  
Phoenix Contact 1763711



X1 - 6V03/6V06  
PE + Motor Ferrules:  
Weidmuller 9019120000  
(4pcs)

Brake Ferrules:  
Weidmuller 0463000000  
(2pcs)



### H2-52-025-A5-00-xxxx00 Drive Side Connector:

X1 - 6V12/7Vxx  
Phoenix Contact 1233112



X1 - 6V12/7Vxx  
PE + Motor Ferrules:  
Weidmuller 9005850000  
(4pcs)

Brake Ferrules:  
Weidmuller 0463000000  
(2pcs)



### H2-5x-0xx-A5-00-xxxx00 Drive-side X23 Connector:

X23  
Amphenol MSPEP2L02A0

Feedback connector installation instructions  
can be found on Essentials webpage in the  
Literature tab



## NOTICE

Essentials Drive and Motor system compatibility and performance cannot be guaranteed by the use of user-customized or third-party cables.

# Complete Motion and Automation Solutions

The highest performance and the right fit for any application.

**SERVO DRIVES**

- AKD<sup>®</sup>-N Decentralized Servo Drive
- Essentials Servo Drives
- AKD<sup>®</sup> Servo Drives
- AKD<sup>®</sup>2G Servo Drives
- PCMM2G Stand Alone Controller

**Kollmorgen Automation Suite™ (KAS)**

**PROGRAMMABLE CONTROL**

KAS Programmable Automation Controllers

AKT2G I/O Block

**SERVO MOTORS**

- DIRECT DRIVE LINEAR**: DDL Motors
- DIRECT DRIVE ROTARY**: Cartridge DDR<sup>®</sup> Motors, Housed DDR<sup>®</sup> Frameless Motors, Frameless Direct Drive Motors, TBM2G & Robotic Motors
- STANDARD ROTARY**: AKM<sup>®</sup>2G Servo Motors, AKM<sup>®</sup> Servo Motors, AKMA Servo Motors, AKMH<sup>™</sup> Servo Motors, Permanent Magnet EP Series, Goldline EB Series
- VALUE**: Essentials Servo Motors
- WASHDOWN**
- HYGIENIC**
- EXPLOSION-PROOF**

**STEPPER SYSTEMS**

- P-Series Stepper Drives
- Stepper Motors

**AUTOMATION FOR AGVs & MOBILE ROBOTS**

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## Online Design Tools



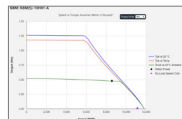
### Product Selector

Quickly choose the ideal products for your application needs.



### Motioneering<sup>®</sup>

Size your motion system based on application requirements and motion profiles.



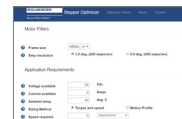
### Performance Curve Generator

Optimize housed and frameless motor windings based on power and environmental factors.



### 3D Models

Visualize products in 3D and download CAD files for use in your design.



### Stepper Optimizer

Interactively choose the most efficient stepper solution for your application.



### AKD2G Safe Dynamic Brake Calculator

Specify and size the right braking components while saving development time.



Learn more and try our design tools now.

## More Expertise for a More Successful Machine

Our global engineering, service and support network provides deep knowledge of all the major industries that rely on advanced motion control and automation technology. We offer world-class engineering expertise, self-service design tools, personalized field service, and easy access to our design, application and manufacturing centers in strategic locations across the globe.

## About Kollmorgen

Kollmorgen, a Regal Rexnord brand, has more than 100 years of motion experience, proven in the industry's highest-performing, most reliable motors, drives, linear actuators, AGV (Automated Guided Vehicle) control solutions, and automation control platforms. We deliver breakthrough solutions that combine exceptional performance, reliability and ease of use, giving machine builders an irrefutable marketplace advantage.

# **KOLLMORGEN**

A REGAL REXNORD BRAND

[www.kollmorgen.com](http://www.kollmorgen.com)

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