Kollmorgen Frameless Motor Selection Guide

KBM™ Series Brushless Motors

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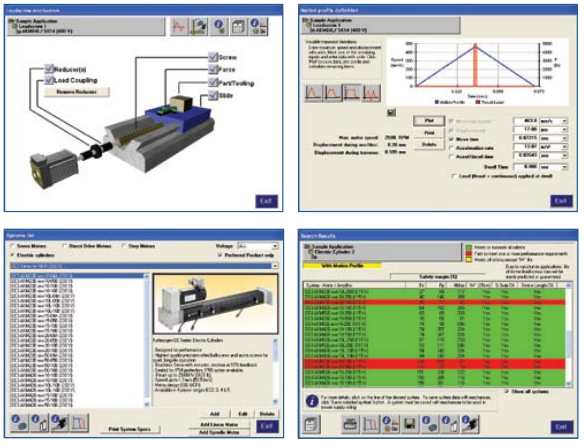
MOTIONEERING® Application

Features

- Group multiple mechanisms within a "Project" – organize and combine data for power supply and regeneration sizing
- Types of mechanisms for analysis include lead screw, rack and pinion, conveyor, nip rolls, rotary and direct drive linear motor
- Motion profile options include simple triangle, 1/3-1/3-1/3 trapezoidal, variable traverse trapezoidal, and more
- Search results display shows color highlighted solution set of options for easy evaluation of system specifications and selection



Supported Operating Systems

- Microsoft® Windows 2000, XP, Vista

MOTIONEERING 6.0 includes

- Electric cylinder sizing and selection with AKM servomotor systems
- Rodless actuator with AKM servomotor systems (performance curves included)
- Precision table with AKM servomotor systems (performance curves included)
- PDF report functionality (includes application, drive, motor, positioner, and system specifications all in one easy-to-read report)

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KOLLMORGEN®

Because Motion Matters™

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 knock them down 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 have less engineering manpower, they need a total system supplier with a wide range of integrated solutions. Kollmorgen is in full response mode with complete solutions that combine programming software, engineering services and best-in-class motion components.

Global Footprint

With direct sales, engineering support, manufacturing facilities, and distributors across North America, Europe, 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 Danaher Corporation, our $13B parent company. A key driver in the growth of all Danaher divisions is the Danaher 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.

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KBM™ Series Frameless Kit Brushless Motor

The KBM frameless motor series is our newest direct drive technology. KBM kit models are engineered to provide the high-performance, long life and simple installation that today's design engineers demand. Optional latching digital Hall effect sensors are pre-aligned and factory installed with added axial rotor length to achieve proper triggering. Choice of insulation allows operation over a wide range of line input voltage. Our detailed selection guide provides a variety of pre-engineered options and configurations that are currently available.

For customized features, contact Kollmorgen to help us understand exactly what you need and how we can further optimize any KBM or engineer a new custom motor solution for the unique requirements of your application. We are experts in providing optimized solutions such as special winding configurations, tailored mounting features, diameter and stack length dimensional adjustments, or material variations.

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The Benefits of KBM Frameless Motor

• Industry-Leading Frameless Motor Performance	• Advanced electromagnetic designs deliver maximum torque density which minimizes required motor space envelope • Extremely smooth rotation with minimal cogging and low total harmonic distortion (THD) • Broad operating speed range and rapid acceleration
• Quality Construction Ensures Reliability and Safe Operation	• Redundant magnet attachment to rotor on high-speed models – adhesive bonding and Kevlar® branding • 155°C motor winding temperature rating with integral thermistor allows continuous safe operation for demanding applications • Designed with UL-recommended insulation systems to simplify system regulatory approval • RoHS compliant material selection
• Highly Configurable Design Minimizes Time to Solution	• 14 frame sizes with multiple stack lengths • Standard sensor feedback using Hall effect sensors • Standard high and low voltage insulation • Multiple standard windings with custom windings available upon request • Mechanical interface changes easily accommodated

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KBM Series Overview

Kollmorgen, the global leader in direct drive motor technology, is pleased to offer KBM series frameless kit brushless motors. With a wide variety of sizes and torque ranges available, KBM models are engineered to provide the high-performance, long life and simple installation that today's design engineers demand.

Quality Construction

- Fully encapsulated stator windings
- 155°C internal winding temperature continuous capability
- PTC thermistor (avalanche-type) overload protection
- Rare-earth neodymium-iron-boron magnets
- Fail-safe bands over rotor magnets*
- RoHS compliant

Available Options (No engineering fees apply)

Sensor Feedback (KBMS models)

Latching digital Hall effect sensors are pre-aligned and factory installed on the lead end of the stator. Wiring instructions and electrical timing diagrams are included in this selection guide. KBMS models include added axial rotor length to achieve proper sensor triggering.

Choice of Insulation System

S (standard) – acceptable for applications up to 240 Vac drive amplifier supply.
H (high voltage) – required for applications >240 Vac and up to 480 Vac drive amplifier supply.

Allowed Modifications See page 78. (Engineering fees apply. Consult Kollmorgen Customer Support for guidance or to obtain a quotation. Unit price increase may apply, depending upon extent of modification.)

Various Windings

Motor windings may be optimized to provide desired speed and torque performance according to the unique voltage and current requirements of a customer's application. Kollmorgen engineers must confirm electrical feasibility and manufacturability of each special winding arrangement prior to quotation.

Rotor Hub Dimensions

Rotor hubs may be provided with different customer-designated hole patterns, mounting features or smaller inner bore diameters. Standard KBM(S) models shown within this selection guide include the largest available inner rotor bore diameter.

Rotor Hub Material

Standard configuration KBM(S) rotor hubs are constructed from non-plated cold rolled steel. If plating, coating, cleaning or alternate material is desired, Kollmorgen engineers must confirm feasibility and pricing adjustment prior to quotation.

Stator Sleeve Material

Standard configuration KBM(S)-10, 14, 17, 25, 35, 45, 163 and 260 size stators are designed with uncoated aluminum sleeves around the stator lamination stack. If coating or plating is desired for the aluminum stator sleeve, Kollmorgen engineers must confirm feasibility and pricing adjustment prior to quotation. Stator sleeves are only utilized for the sizes listed above.

Agency (UL/CE) Information

KBM(S) motors are designed to facilitate UL or CE certification in the customer's higher-level assembly. Stator insulation systems are constructed entirely from agency-approved materials and are designed in full compliance with agency creepage and clearance dimensional guidelines. Dielectric strength between winding circuit and grounded metal stator surface is tested at agency-specified voltage level. Because a frameless motor's compliance with agency requirements is dependent upon correct installation and proper design of the surrounding enclosure by the user, please review Kollmorgen's recommended mounting and installation guidelines on page 70.

* Does not apply to KBM 163 and KBM 260.

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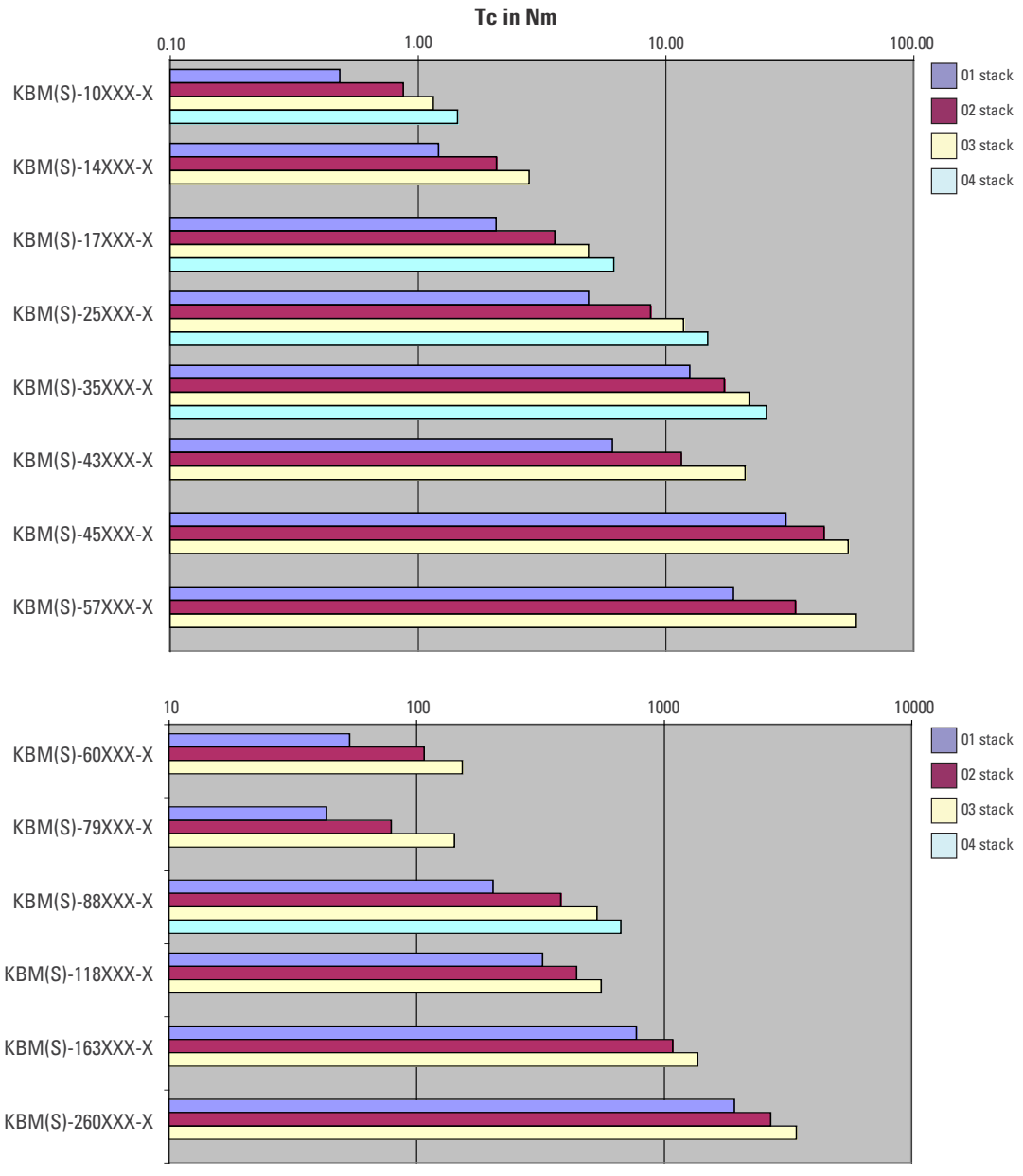
KBM(S) Continuous Torque Overview

Select from our wide variety of sizes and torque ranges to suit your application needs.



For more detailed and interactive 3D models with 2D products views, visit www.kollmorgen.com/kbm

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AKD™ Servo Drive

Our AKD series is a complete range of Ethernet-based servo drives that are fast, feature-rich, flexible and integrate quickly and easily into any application.* AKD ensures plug-and-play commissioning for instant, seamless access to everything in your machine. And, no matter what your application demands, AKD offers industry-leading servo performance, communication options, and power levels, all in a smaller footprint.

This robust, technologically advanced family of drives delivers optimized performance when paired with our best-in-class components, producing higher quality results at greater speeds and more uptime.

* Patents pending.

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The Benefits of AKD Servo Drive

• Optimized Performance in Seconds	• Auto-tuning is one of the best and fastest in the industry • Automatically adjusts all gains, including observers • Immediate and adaptive response to dynamic loads • Precise control of all motor types • Compensation for stiff and compliant transmission and couplings
• Greater Throughput and Accuracy	• Up to 27-bit-resolution feedback yields unmatched precision and excellent repeatability • Very fast settling times result from a powerful dual processor system that executes industry-leading and patent pending servo algorithms with high resolution • Advanced servo techniques such as high-order observer and bi-quad filters yield industry-leading machine performance • Highest bandwidth torque-and-velocity loops. Fastest digital current loop in the market
• Easy-to-Use Graphical User Interface (GUI) for Faster Commissioning and Troubleshooting	• Six-channel real-time software oscilloscope commissions and diagnoses quickly • Multi-function Bode Plot allows users to quickly evaluate performance • Auto-complete of programmable commands saves looking up parameter names • One-click capture and sharing of program plots and parameter settings allow you to send machine performance data instantly • Widest range of programming options in the industry
• Flexible and Scalable to Meet Any Application	• 3 to 96 Arms continuous current; 9 to 192 Arms peak • Very high power density enables an extremely small package • True plug-and-play with all standard Kollmorgen servomotors and positioners • Supports a variety of single and multi-turn feedback devices—Smart Feedback Device (SFD), EnDat2.2, 01, BiSS, analog Sine/Cos encoder, incremental encoder, HIPERFACE®, and resolver • Tightly integrated Ethernet motion buses without the need to add large hardware: EtherCAT®, SynqNet®, Modbus/TCP, and CANopen® • Scalable programmability from base torque-and-velocity through multi-axis master

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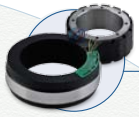
AKD Servo Drive

The AKD servo drive delivers cutting-edge technology and performance with one of the most compact footprints in the industry. These feature-rich drives provide a solution for nearly any application, from basic torque-and-velocity applications, to indexing, to multi-axis programmable motion with embedded Kollmorgen Automation Suite™. The versatile AKD sets the standard for power density and performance.



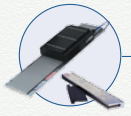
KBM™ Frameless Motors

Micron™ Gearheads

AKM™ Servomotors

Cartridge Direct Drive Rotary™ Motors

Housed Direct Drive Rotary Motors



Direct Drive Linear Motors

Linear Positioners

Multi-Axis Precision Tables

Best-in-Class Components

AKD works seamlessly with Kollmorgen motors and positioners – well-known for quality, reliability, and performance.

AKD™ Servo Drive

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Modbus/TCP

SynqNet EtherCAT CANopen

UL LISTED CE ISO International Organization for Standardization RoHS

Industry-leading power density

General Specifications

120 / 240 Vac 1 & 3Ø (85 -265 V)	Continuous Current (Arms)	Peak Current (Arms)	Drive Continuous Output Power Capacity (Watts)	Internal Regen (Watts)	(Ohms)	Height mm (in)	Width mm (in)	Depth mm (in)	Depth with Cable Bend Radius mm (in)
AKD-■00306	3	9	1100	0	0	168 (6.61)	57 (2.24)	153 (6.02)	184 (7.24)
AKD-■00606	6	18	2000	0	0	168 (6.61)	57 (2.24)	153 (6.02)	184 (7.24)
AKD-■01206	12	30	4000	100	15	195 (7.68)	76 (2.99)	186 (7.32)	215 (8.46)
AKD-■02406	24	48	8000	200	8	250 (9.84)	100 (3.94)	230 (9.06)	265 (10.43)

480 Vac 3Ø (342 -528 V)	Continuous Current (Arms)	Peak Current (Arms)	Drive Continuous Output Power Capacity (Watts)	Internal Regen (Watts)	(Ohms)	Height mm (in)	Width mm (in)	Depth mm (in)	Depth with Cable Bend Radius mm (in)
AKD-■00307	3	9	2000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■00607	6	18	4000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■01207	12	30	8000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■02407	24	48	16,000	200	23	310 (12.20)	105 (4.13)	229 (9.02)	264 (10.39)
AKD-■04807	48	96	32,000	400	*Coming Soon*				
AKD-■09607	96	192	64,000	800	*Coming Soon*				

Note: For complete AKD model nomenclature, refer to page 78.

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Optimized Solutions

With Kollmorgen, there's always a way. Because we have decades of experience in developing optimized solutions for motion applications, you can be confident that we can provide the answer to your motion challenges. We have a huge breadth of standard products that can be modified in varying degrees, or we can develop custom motor and electronic products for true optimization.

Working with our proven portfolio of products, we can deliver solutions quickly, often with recognized cost efficiencies and reduced lead times. That means rapid prototyping, a shorter design cycle and getting to market faster. We do it all, because motion matters.

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Optimized Solutions

Whether it's modifying a product from our standard product portfolio or a white sheet design for a custom solution to achieve true optimization, you can rely on decades of Kollmorgen expertise to solve your motion challenges and help you build a differentiated machine.

Standard Products

Because our application expertise runs deep and our product portfolio is so broad, we can take any standard product or existing design baseline and modify it a lot or a little to suit many needs – in a very rapid time frame. This approach ensures quality, performance and reliability by leveraging our proven track record.

Kollmorgen application engineers have a great deal of experience helping OEM engineers achieve their objectives. Typical modifications of frameless kit motor designs include winding changes, tailored mounting features, diameter and stack length adjustments, material changes, insulation changes, magnetic circuit optimization, lead bundle changes, commutation sensor choices and thermal sensor choices.

Custom Products

With motion as our core capability, we bring a significant history of innovation to today's engineering challenges. We leverage our design and engineering excellence and technical knowledge to deliver creative new solutions for virtually any need. Our vast experience also helps us deliver a custom product in a surprisingly short time. If you can conceive it, we can make it happen.

Motor Solutions

- Designed for agency compliance (UL, CE)
- Voltage ratings from 48 Vdc – 600 Vdc, with capabilities in 800 Vdc and up
- Continuous torques from 0.5 Nm – 29,000 Nm
- Proven performance and reliability in a customizable package

Why You Should Partner with Kollmorgen

- Experienced engineers help define your needs and identify the optimal Kollmorgen products and technologies
- Products optimized or developed by cross-functional teams to meet customer needs
- Rapid prototyping with smooth transition from prototype designs to sustainable and cost-effective manufacturing
- Proven technology building blocks to mitigate risks of customization
- Superior quality, performance, and reliability

Motors and Electronics

Optimized for	Application
Reliability	Implantable heart pumps, military, remote equipment
Precision	Pick and place, satellite tracking, film processing
Package Size	Medical imaging, ground based telescopes, aircraft instrumentation
Weight	Land vehicles, portable equipment, aircraft
Smooth Operation	Medical respirators, high precision robotics, printing and textile machines
Harsh Environments	Deep sea, outer space, high shock and vibration, extreme temperatures

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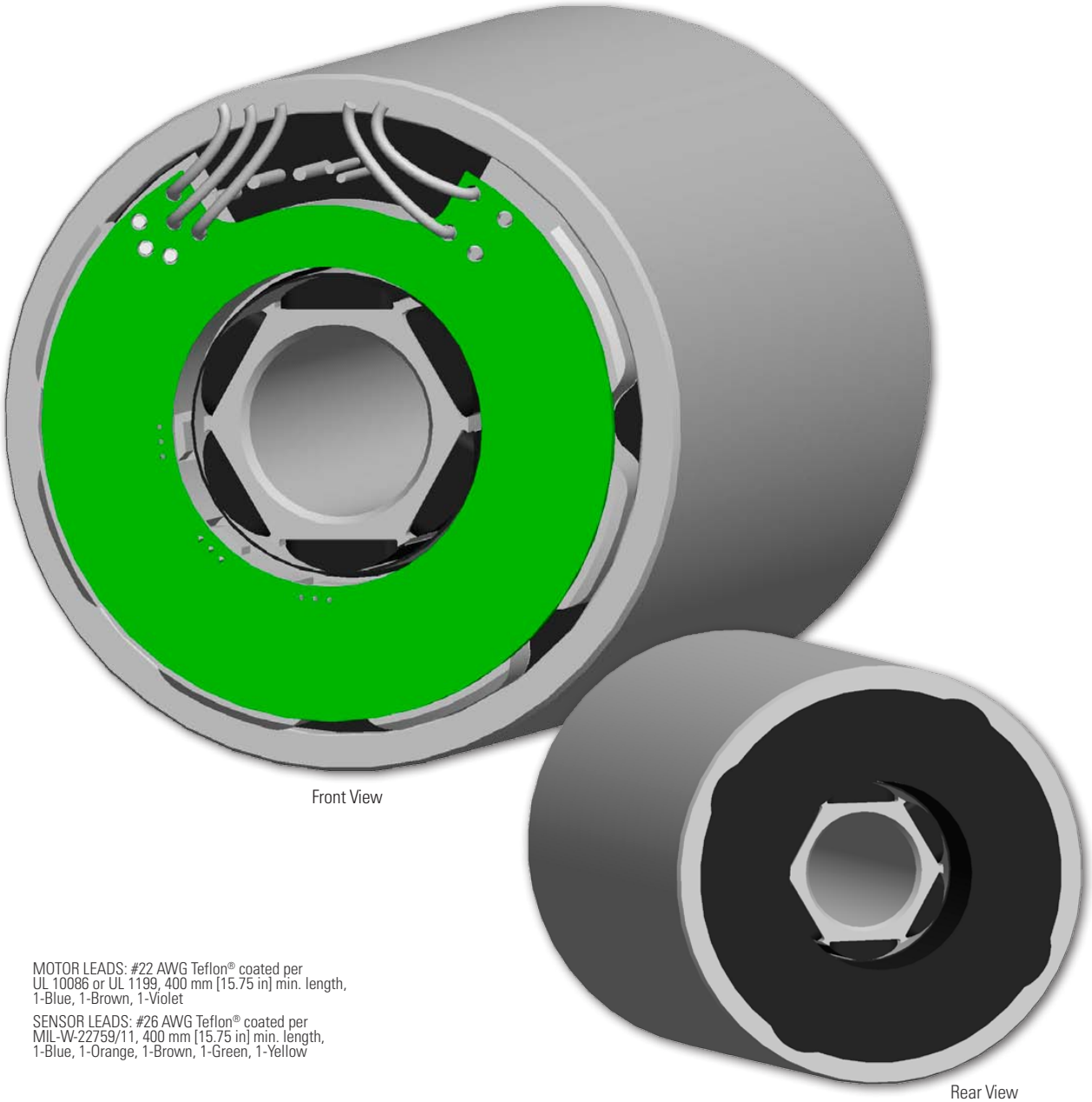
KBM 10 Frameless Motors

The KBM(S)-10 series is designed to operate over a broad speed range with high acceleration. Designed for maximum torque density with minimal cogging by using a variable air gap, the KBM(S)-10 is an ideal choice to meet or exceed your compact frameless motor application needs.



Front View

Rear View

MOTOR LEADS: #22 AWG Teflon® coated per UL 10086 or UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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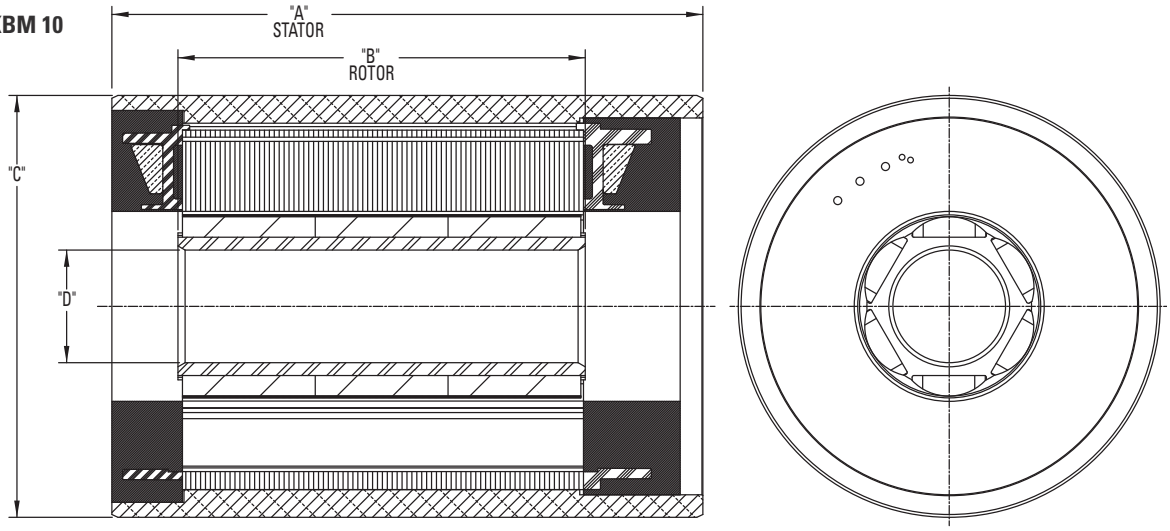
KBM 10 Outline Drawings

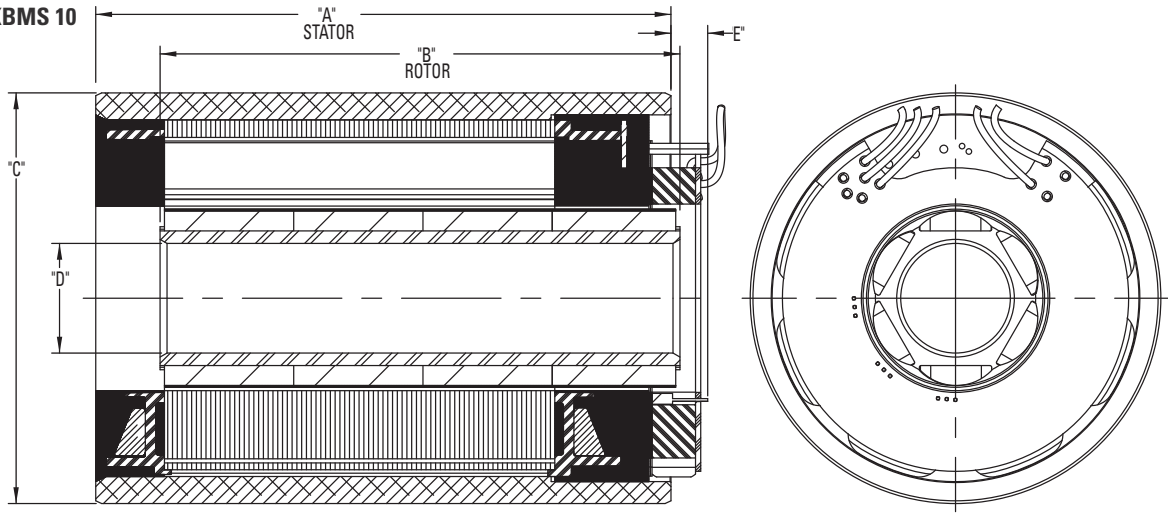
KBM 10



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]
KBM-10X01	46.00 [1.811]	20.14 [.793]	59.963 [2.3607]	16.009 [.6303]
KBM-10X02	65.00 [2.559]	39.02 [1.536]	59.963 [2.3607]	16.009 [.6303]
KBM-10X03	84.00 [3.307]	57.89 [2.279]	59.963 [2.3607]	16.009 [.6303]
KBM-10X04	103.00 [4.055]	76.77 [3.022]	59.963 [2.3607]	16.009 [.6303]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 10



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]
KBMS-10X01	46.00 [1.811]	38.17 [1.503]	59.963 [2.3607]	16.009 [.6303]	5.75 [.226]
KBMS-10X02	65.00 [2.559]	57.05 [2.246]	59.963 [2.3607]	16.009 [.6303]	5.75 [.226]
KBMS-10X03	84.00 [3.307]	75.92 [2.989]	59.963 [2.3607]	16.009 [.6303]	5.75 [.226]
KBMS-10X04	103.00 [4.055]	94.80 [3.732]	59.963 [2.3607]	16.009 [.6303]	5.75 [.226]

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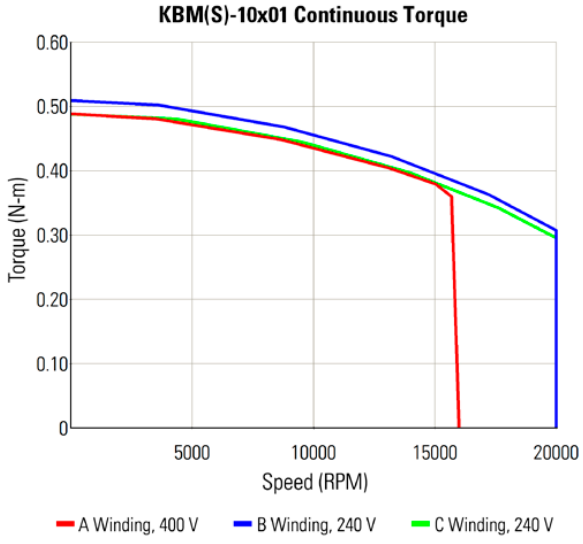
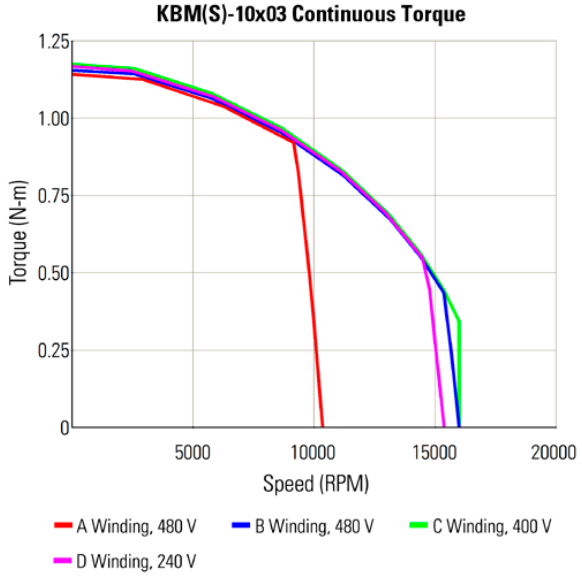
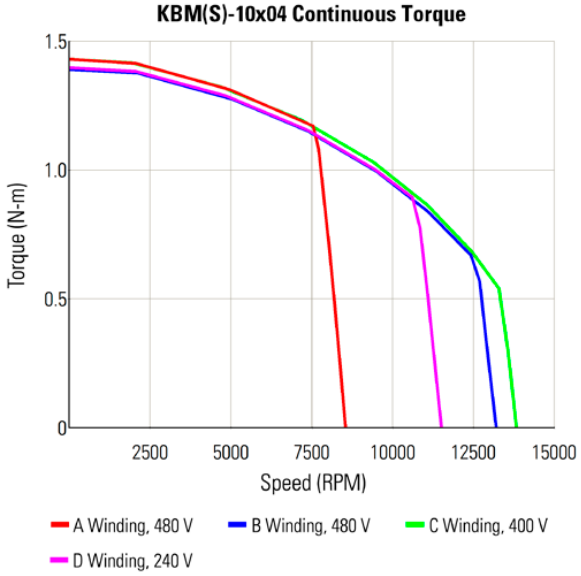
KBM 10 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.







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KBM 10 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-10XXX PERFORMANCE DATA & MOTOR PARAMETERS																
Motor Parameter	Symbol	Units	KBM(S)-10X01-X			KBM(S)-10X02-X			KBM(S)-10X03-X				KBM(S)-10X04-X			
			A	B	C	A	B	C	A	B	C	D	A	B	C	D
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	0.487	0.509	0.492	0.876	0.899	0.868	1.16	1.16	1.19	1.18	1.45	1.41	1.44	1.41
		lb-ft	0.359	0.376	0.363	0.646	0.663	0.640	0.854	0.859	0.880	0.870	1.07	1.04	1.06	1.04
Continuous Current	Ic	Arms	1.73	3.37	5.21	1.53	3.00	5.14	1.54	2.40	3.10	4.66	1.60	2.40	3.10	4.21
Peak Stall Torque (25°C winding temp)	Tp	N-m	1.17	1.19	1.23	2.33	2.48	2.24	3.46	3.53	3.58	3.69	4.66	4.75	4.80	4.91
		lb-ft	0.860	0.880	0.910	1.72	1.83	1.65	2.55	2.60	2.64	2.72	3.44	3.50	3.54	3.62
Peak Current	Ip	Arms	4.33	8.70	13.8	4.33	8.65	15.5	4.86	7.73	9.72	15.5	5.46	8.70	10.9	15.5
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	550	600	575	740	785	710	780	740	725	850	820	860	835	910
	HP Rated	HP	0.737	0.804	0.771	0.992	1.05	0.952	1.05	0.992	0.972	1.14	1.10	1.15	1.12	1.22
Speed at Rated Power	N Rated	RPM	15200	18500	18600	11000	15200	17000	8500	14300	14500	13000	7050	11500	12000	9500
Torque Sensitivity (2)	Kt	N-m / Arms	0.287	0.154	0.097	0.585	0.307	0.173	0.767	0.498	0.399	0.259	0.930	0.603	0.480	0.345
		lb-ft / Arms	0.212	0.114	0.071	0.431	0.227	0.127	0.566	0.367	0.294	0.191	0.686	0.445	0.354	0.255
Back EMF Constant (3)	Kb	Vpk / kRPM	24.6	13.2	8.25	50.0	26.3	14.8	65.6	42.6	34.1	22.1	79.5	51.5	41.0	29.5
Motor Constant	Km	N-m/√watt	0.065	0.068	0.066	0.107	0.110	0.106	0.136	0.137	0.140	0.138	0.168	0.164	0.168	0.164
		lb-ft /√watt	0.048	0.050	0.048	0.079	0.081	0.078	0.100	0.101	0.103	0.102	0.124	0.121	0.124	0.121
Resistance (line to line)	Rm	Ohms	13.0	3.42	1.44	20.0	5.22	1.77	21.2	8.77	5.44	2.34	20.4	9.02	5.44	2.94
Inductance	Lm	mH	19	5.2	2.2	36	9.7	3.2	41	17	11	4.7	44	19	12	6.2
Inertia (KBM)	Jm	Kg-m²	4.92E-6			1.03E-5			1.55E-5				2.01E-5			
		lb-ft-s²	3.63E-6			7.60E-6			1.14E-5				1.48E-5			
Weight (KBM)	Wt	Kg	0.379			0.658			0.943				1.22			
		lb	0.835			1.45			2.08				2.68			
Inertia (KBMS)	Jm	Kg-m²	1.03E-5			1.49E-5			2.02E-5				2.55E-5			
		lb-ft-s²	7.56E-6			1.10E-5			1.49E-5				1.88E-5			
Weight (KBMS)	Wt	Kg	0.425			0.703			0.990				1.26			
		lb	0.936			1.55			2.18				2.78			
Max Static Friction	Tf	N-m	8.70E-3			1.63E-2			2.22E-2				3.44E-2			
		lb-ft	6.42E-3			1.20E-2			1.64E-2				2.54E-2			
Cogging Friction (peak-to-peak)	Tcog	N-m	7.20E-3			1.63E-2			1.69E-2				2.44E-2			
		lb-ft	5.31E-3			1.20E-2			1.25E-2				1.80E-2			
Viscous Damping	Fi	N-m/ kRPM	4.31E-3			5.17E-3			6.10E-3				6.96E-3			
		lb-ft / kRPM	3.18E-3			3.81E-3			4.50E-3				5.13E-3			
Thermal Resistance (4)	TPR	°C / watt	1.43			1.19			1.10				1.07			
Number of Poles	P	-	6			6			6				6			
Recommended Drive	AKD-■_____		00307	00606	00606	00307	00307	00606	00307	00307	00607	00606	00307	00307	00607	00606
Voltage Req'd at Rated Output	Vac Input	VAC	400	240	240	480	400	240	480	480	400	240	480	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	1.17	1.19	1.23	2.33	2.48	2.24	3.46	3.53	3.58	3.69	4.66	4.75	4.80	4.91
		lb-ft	0.860	0.880	0.910	1.72	1.83	1.65	2.55	2.60	2.64	2.72	3.44	3.50	3.54	3.62

*Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 10" x 10" x 1/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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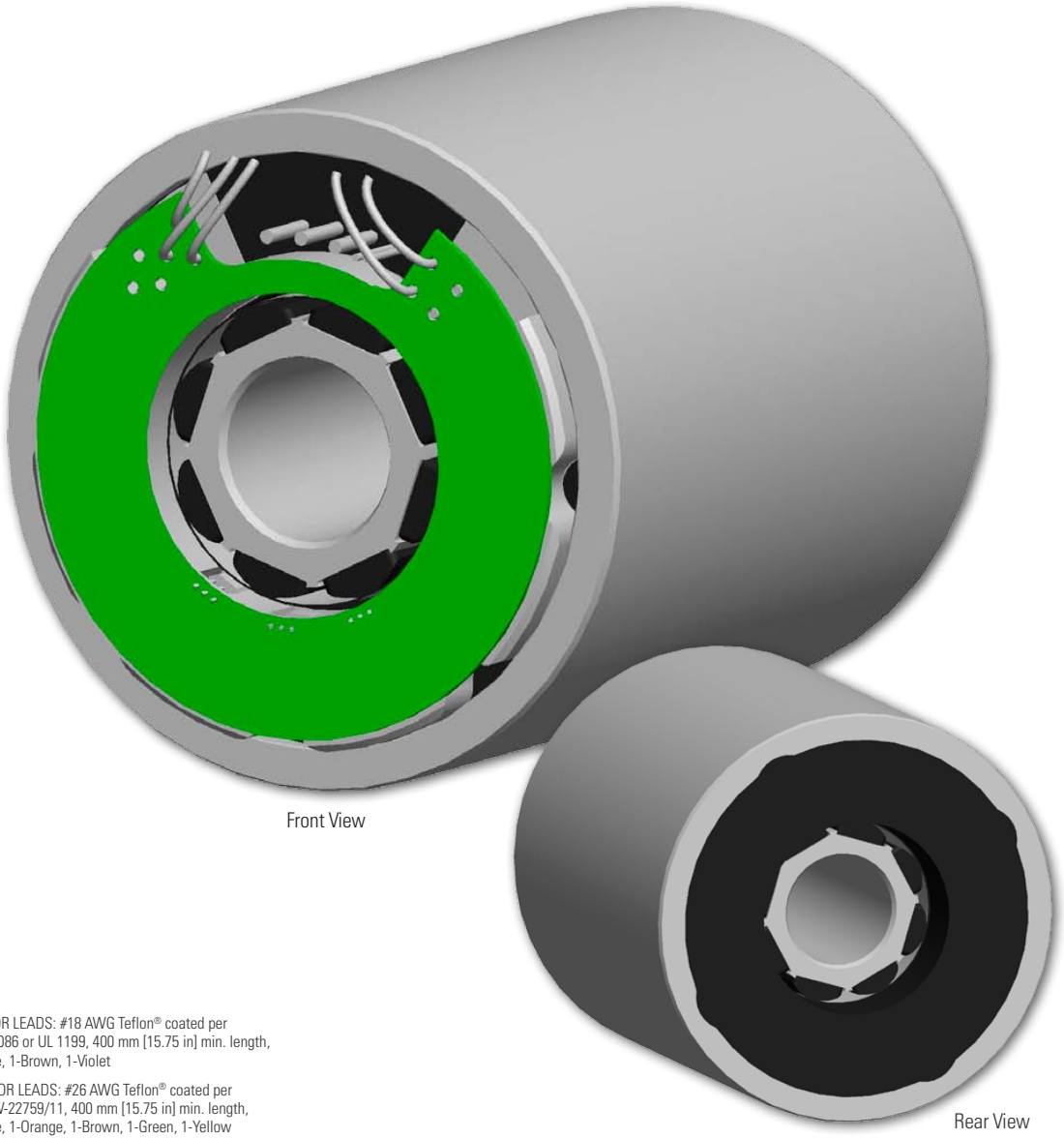
KBM 14 Frameless Motors

The KBM(S)-14 series is designed to operate over a broad speed range with high acceleration. Designed for maximum torque density with minimal cogging by using a variable air gap, the KBM(S)-14 is an ideal choice to meet or exceed your compact frameless motor application needs.



Front View

Rear View

MOTOR LEADS: #18 AWG Teflon® coated per UL 10086 or UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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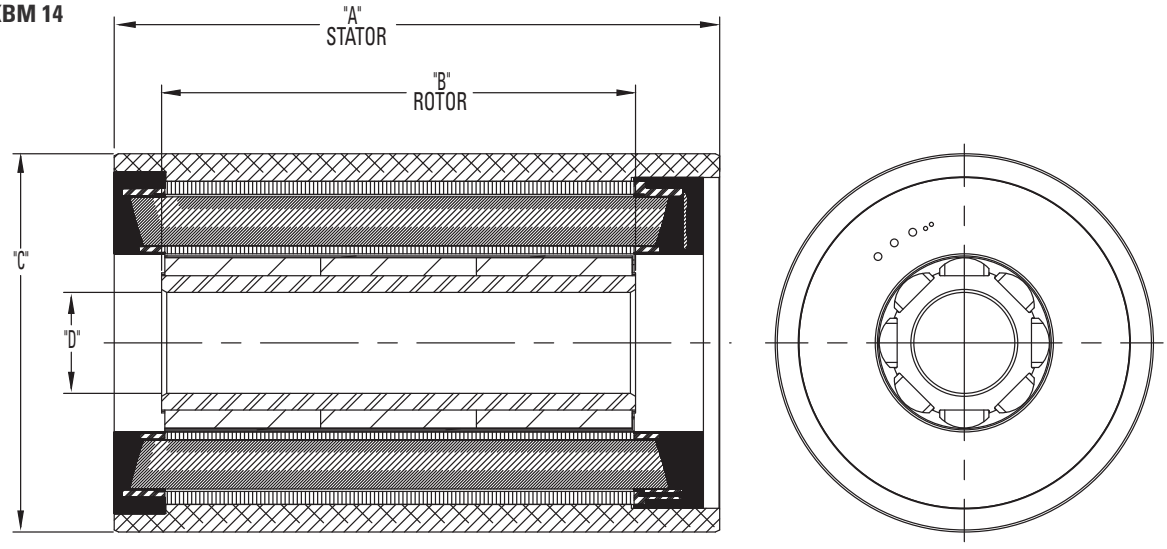
KBM 14 Outline Drawings

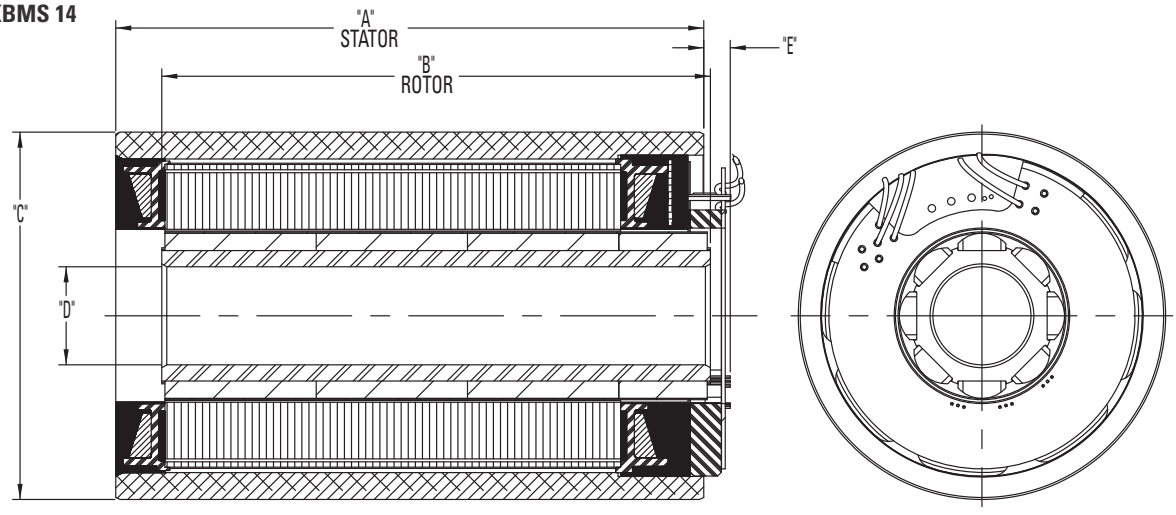
KBM 14



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]
KBM-14X01	58.00 [2.283]	32.16 [1.266]	74.963 [2.9513]	20.010 [0.7878]
KBM-14X02	89.00 [3.504]	63.04 [2.482]	74.963 [2.9513]	20.010 [0.7878]
KBM-14X03	120.00 [4.724]	93.93 [3.698]	74.963 [2.9513]	20.010 [0.7878]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 14



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]
KBMS-14X01	58.00 [2.283]	50.19 [1.976]	74.963 [2.9513]	20.010 [0.7878]	5.75 [.226]
KBMS-14X02	89.00 [3.504]	81.08 [3.192]	74.963 [2.9513]	20.010 [0.7878]	5.75 [.226]
KBMS-14X03	120.00 [4.724]	111.96 [4.408]	74.963 [2.9513]	20.010 [0.7878]	5.75 [.226]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

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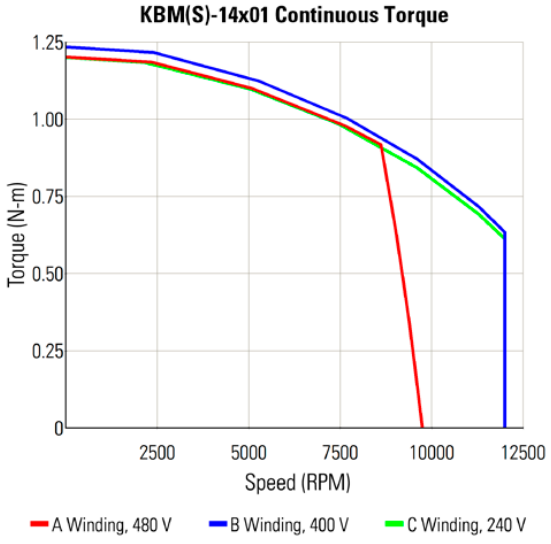
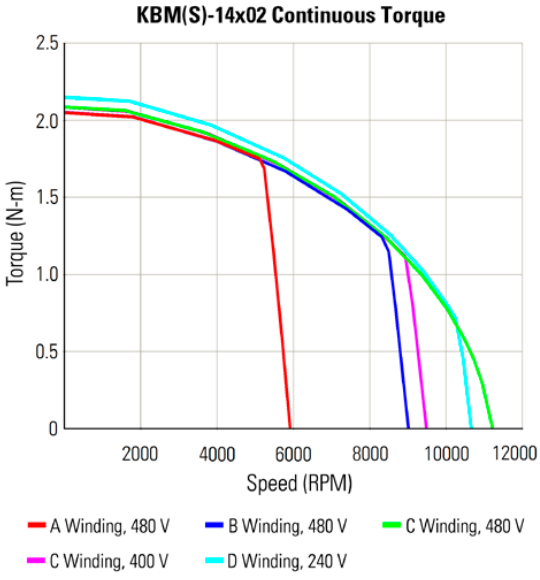
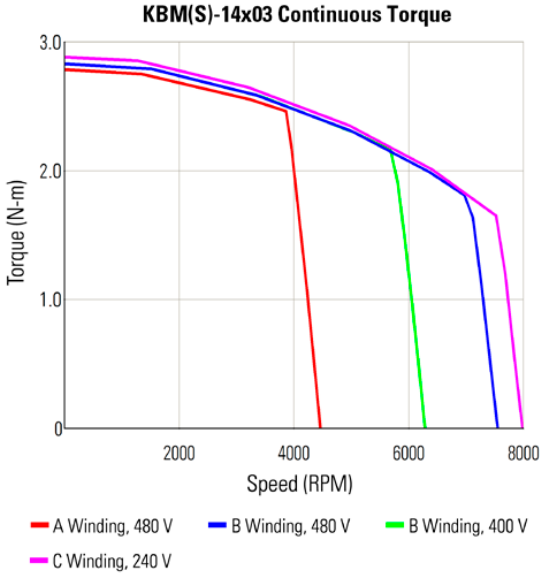
KBM 14 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.







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KBM 14 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-14XXX PERFORMANCE DATA & MOTOR PARAMETERS														
Motor Parameter	Symbol	Units	KBM(S)-14X01-X			KBM(S)-14X02-X					KBM(S)-14X03-X			
			A	B	C	A	B	C		D	A	B		C
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	1.22	1.25	1.21	2.08	2.08	2.11		2.17	2.82	2.87		2.92
		lb-ft	0.897	0.919	0.890	1.53	1.53	1.56		1.60	2.08	2.12		2.15
Continuous Current	Ic	Arms	1.53	3.25	6.25	1.59	2.42	3.10		5.97	1.64	2.81		6.04
Peak Stall Torque (25°C winding temp)	Tp	N-m	3.28	3.43	3.59	6.67	6.83	6.98		7.31	10.1	10.5		10.5
		lb-ft	2.42	2.53	2.65	4.92	5.04	5.15		5.39	7.46	7.72		7.76
Peak Current	Ip	Arms	4.32	9.63	19.4	5.39	8.57	10.9		21.8	6.12	10.9		24.5
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	735	700	915	845	1000	585	1000	975	875	1215	1175	1230
	HP Rated	HP	0.986	0.956	1.22	1.13	1.35	0.786	1.34	1.30	1.18	1.63	1.58	1.65
Speed at Rated Power	N Rated	RPM	7950	12000	13500	4900	7700	10250	8000	8900	3600	6500	5225	6600
Torque Sensitivity (2)	Kt	N-m / Arms	0.815	0.394	0.199	1.34	0.882	0.699		0.374	1.78	1.05		0.498
		lb-ft / Arms	0.601	0.290	0.147	0.990	0.650	0.516		0.276	1.31	0.776		0.367
Back EMF Constant (3)	Kb	Vpk / kRPM	69.7	33.6	17.0	115	75.4	59.8		31.9	152	90.0		42.6
Motor Constant	Km	N-m/√watt	0.144	0.148	0.143	0.225	0.224	0.227		0.235	2.79	2.79		2.87
		lb-ft /√watt	0.106	0.109	0.106	0.166	0.165	0.168		0.173	2.06	2.06		2.12
Resistance (line to line)	Rm	Ohms	21.4	4.74	1.29	23.8	10.3	6.30		1.69	26.6	9.01		1.96
Inductance	Lm	mH	38	8.6	2.4	47	20	13		3.6	54	19		4.1
Inertia (KBM)	Jm	Kg-m²	2.41E-5			4.88E-5					7.31E-5			
		lb-ft-s²	1.78E-5			3.60E-5					5.39E-5			
Weight (KBM)	Wt	Kg	0.898			1.59					2.98			
		lb	1.98			3.50					6.58			
Inertia (KBMS)	Jm	Kg-m²	3.36E-5			5.56E-5					8.81E-5			
		lb-ft-s²	2.48E-5			4.10E-5					6.50E-5			
Weight (KBMS)	Wt	Kg	1.00			1.68					3.08			
		lb	2.20			3.70					6.78			
Max Static Friction	Tf	N-m	2.71E-2			4.75E-2					7.73E-2			
		lb-ft	2.00E-2			3.50E-2					5.70E-2			
Cogging Friction (peak-to-peak)	Tcog	N-m	1.72E-2			3.25E-2					5.78E-2			
		lb-ft	1.27E-2			2.40E-2					4.26E-2			
Viscous Damping	Fi	N-m/ kRPM	1.88E-3			2.82E-3					3.76E-3			
		lb-ft / kRPM	1.39E-3			2.08E-3					2.77E-3			
Thermal Resistance (4)	TPR	°C / watt	1.11			0.920					0.780			
Number of Poles	P	-	8			8					8			
Recommended Drive	AKD-■_ _ _ _ _		00307	00607	01206	00307	00307	00607		01206	00307	00307		01206
Voltage Req'd at Rated Output	Vac Input	VAC	480	400	240	480	480	480	400	240	480	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	3.28	3.43	3.59	6.67	6.83	6.98	6.98	7.31	10.1	9.08	9.08	10.5
		lb-ft	2.42	2.53	2.65	4.92	5.04	5.15	5.15	5.39	7.46	12.3	12.3	7.76

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 10" x 10" x 1/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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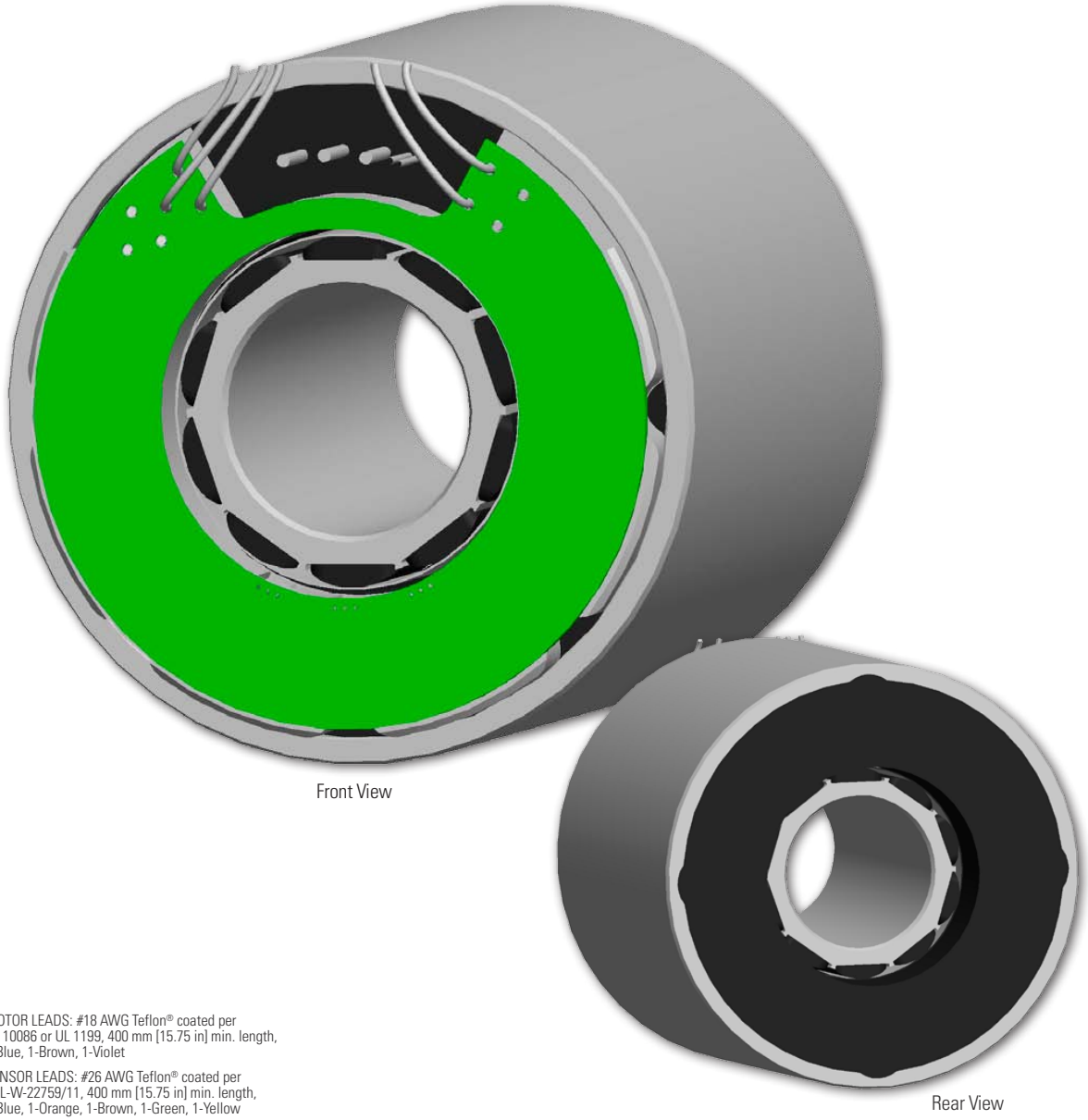
KBM 17 Frameless Motors

The KBM(S)-17 series is designed to operate over a broad speed range with high acceleration. Designed for maximum torque density with minimal cogging by using a variable air gap, the KBM(S)-17 is an ideal choice to meet or exceed your compact frameless motor application needs.



Front View

Rear View

MOTOR LEADS: #18 AWG Teflon® coated per UL 10086 or UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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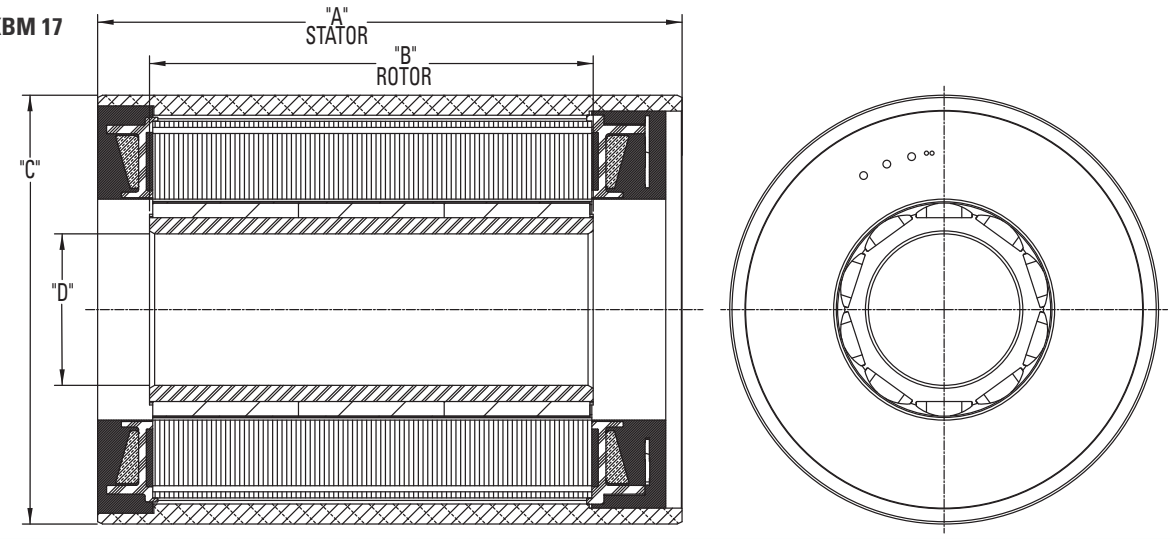
KBM 17 Outline Drawings

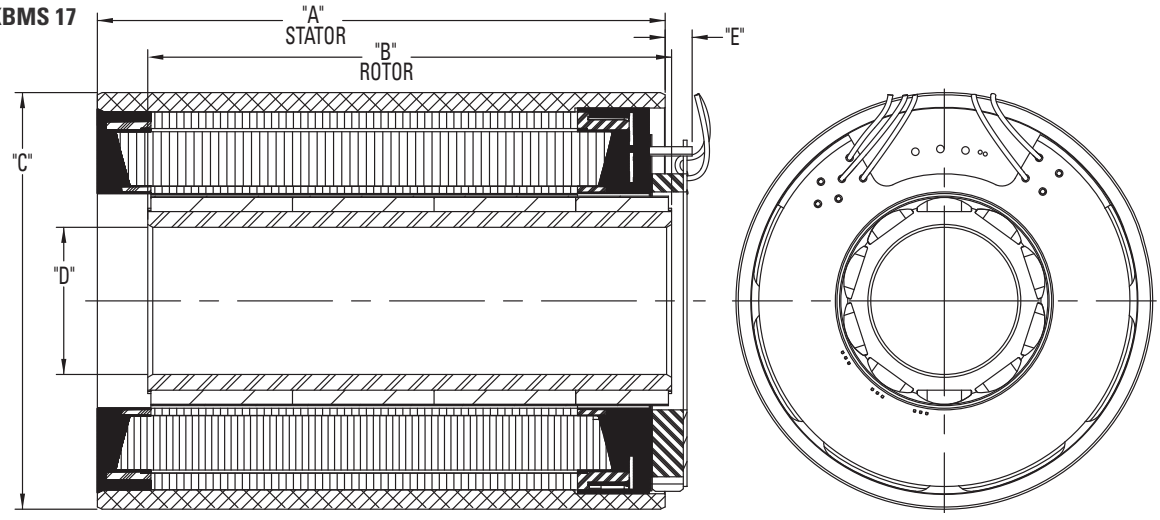
KBM 17



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]
KBM-17X01	57.80 [2.276]	30.15 [1.187]	84.963 [3.345]	30.010 [1.1815]
KBM-17X02	86.80 [3.417]	59.03 [2.324]	84.963 [3.345]	30.010 [1.1815]
KBM-17X03	115.80 [4.559]	87.91 [3.461]	84.963 [3.345]	30.010 [1.1815]
KBM-17X04	144.80 [5.701]	116.79 [4.598]	84.963 [3.345]	30.010 [1.1815]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 17



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]
KBMS-17X01	57.80 [2.276]	49.07 [1.932]	84.963 [3.345]	30.010 [1.1815]	5.75 [.226]
KBMS-17X02	86.80 [3.417]	77.95 [3.069]	84.963 [3.345]	30.010 [1.1815]	5.75 [.226]
KBMS-17X03	115.80 [4.559]	106.83 [4.206]	84.963 [3.345]	30.010 [1.1815]	5.75 [.226]
KBMS-17X04	144.80 [5.701]	135.71 [5.353]	84.963 [3.345]	30.010 [1.1815]	5.75 [.226]

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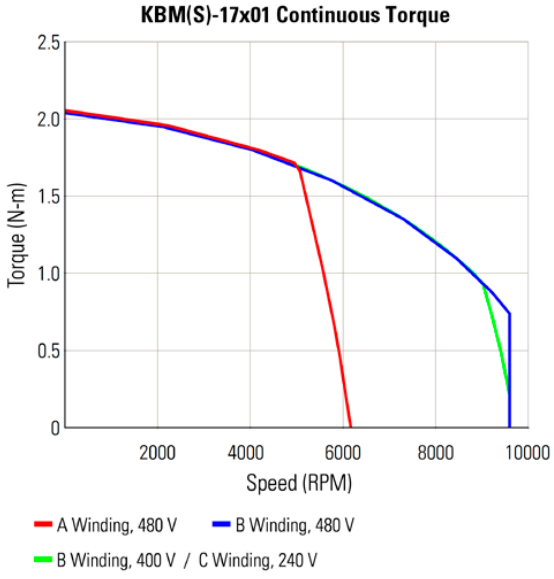
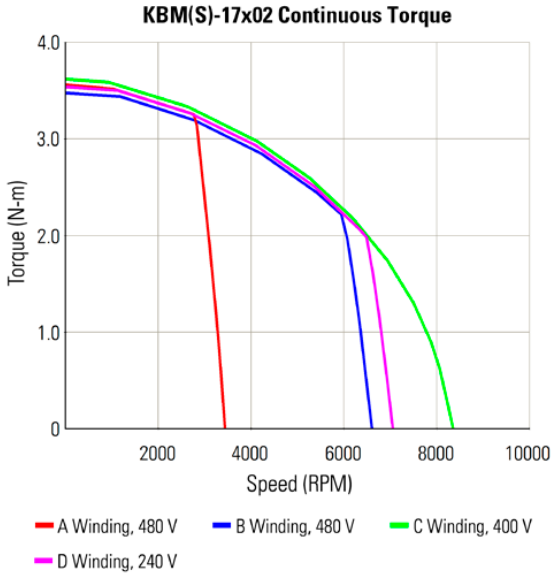
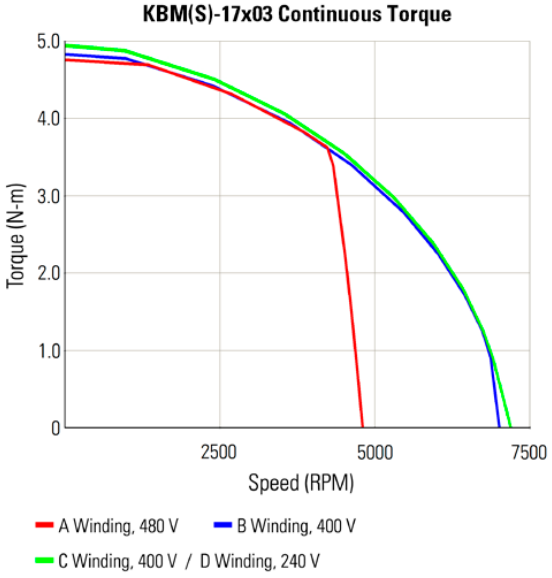
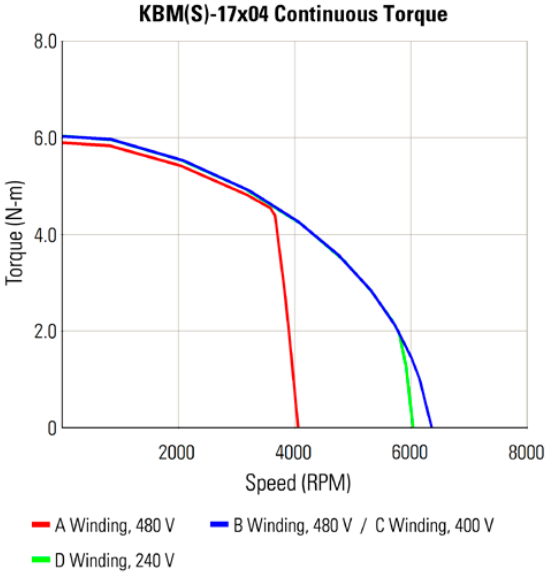
KBM 17 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.









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KBM 17 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-17XXX PERFORMANCE DATA & MOTOR PARAMETERS																		
Motor Parameter	Symbol	Units	KBM(S)-17X01-X				KBM(S)-17X02-X				KBM(S)-17X03-X				KBM(S)-17X04-X			
			A	B		C	A	B	C	D	A	B	C	D	A	B	C	D
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	2.08	2.06		2.07	3.58	3.52	3.57	3.58	4.89	4.90	5.00	5.00	6.20	6.12	5.90	5.90
		lb-ft	1.53	1.52		1.53	2.64	2.60	2.64	2.64	3.61	3.62	3.69	3.69	4.57	4.52	4.35	4.35
Continuous Current	Ic	Arms	1.65	3.11		6.10	1.59	3.00	5.27	6.25	3.02	5.32	6.14	10.4	3.26	5.53	6.20	9.56
Peak Stall Torque (25°C winding temp)	Tp	N-m	5.95	6.14		6.35	12.2	12.3	12.7	12.8	18.5	18.8	18.8	19.0	23.7	23.7	23.7	24.0
		lb-ft	4.39	4.53		4.68	9.00	9.05	9.38	9.45	13.6	13.9	13.9	14.0	17.5	17.5	17.5	17.7
Peak Current	Ip	Arms	5.45	10.9		21.8	6.08	12.2	21.9	24.5	13.8	24.4	27.2	48.0	14.5	25.0	28.1	44.0
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	810	715	955	855	835	1270	790	1290	1440	890	965	1275	1520	1075	975	1550
	HP Rated	HP	1.09	0.958	1.280	1.15	1.12	1.70	1.06	1.73	1.93	1.19	1.29	1.71	2.04	1.44	1.31	2.08
Speed at Rated Power	N Rated	RPM	4650	9600	8125	9050	2600	5450	7560	5600	3950	6500	6480	6100	3350	5700	5775	5000
Torque Sensitivity (2)	Kt	N-m / Arms	1.29	0.681		0.355	2.31	1.21	0.709	0.565	1.66	0.948	0.849	0.496	1.96	1.14	1.01	0.661
		lb-ft / Arms	0.948	0.502		0.262	1.70	0.890	0.523	0.416	1.22	0.699	0.626	0.366	1.45	0.841	0.748	0.487
Back EMF Constant (3)	Kb	Vpk / kRPM	110	58.2		30.4	197	103	60.6	48.3	142	81.1	72.6	42.5	168	97.5	86.8	56.5
Motor Constant	Km	N-m/√watt	0.227	0.227		0.232	0.359	0.353	0.365	0.359	0.461	0.462	0.478	0.471	0.544	0.557	0.555	0.557
		lb-ft /√watt	0.168	0.167		0.171	0.265	0.261	0.270	0.265	0.340	0.341	0.353	0.348	0.401	0.411	0.409	0.411
Resistance (line to line)	Rm	Ohms	21.3	6.02		1.56	27.5	7.78	2.51	1.65	8.61	2.81	2.10	0.740	8.64	2.80	2.23	0.940
Inductance	Lm	mH	66	18		5.0	97	27	9.2	6.0	33	11	8.8	2.9	34	12	9.1	3.8
Inertia (KBM)	Jm	Kg-m²	5.12E-5				9.54E-5				1.42E-4				2.03E-4			
		lb-ft-s²	3.78E-5				7.04E-5				1.05E-4				1.50E-4			
Weight (KBM)	Wt	Kg	1.05				1.87				2.65				3.62			
		lb	2.31				4.12				5.85				7.98			
Inertia (KBMS)	Jm	Kg-m²	8.62E-5				1.28E-4				1.75E-4				2.40E-4			
		lb-ft-s²	6.36E-5				9.45E-5				1.29E-4				1.77E-4			
Weight (KBMS)	Wt	Kg	1.16				1.97				2.76				3.72			
		lb	2.55				4.35				6.08				8.20			
Max Static Friction	Tf	N-m	4.23E-2				7.59E-2				.130				.165			
		lb-ft	3.12E-2				5.60E-2				9.60E-2				.122			
Cogging Friction (peak-to-peak)	Tcog	N-m	3.19E-2				5.61E-2				.102				.127			
		lb-ft	2.35E-2				4.14E-2				7.50E-2				9.40E-2			
Viscous Damping	Fi	N-m/ kRPM	8.45E-3				1.22E-2				1.60E-2				1.98E-2			
		lb-ft / kRPM	6.23E-3				9.00E-3				1.18E-2				1.46E-2			
Thermal Resistance (4)	TPR	°C / watt	0.970				0.800				0.700				0.650			
Number of Poles	P	-	10				10				10				10			
Recommended Drive	AKD-■_ _ _ _ _		00307	00607		01206	00307	00307	00607	01206	00607	00607	01207	01206	00607	00607	01207	01206
Voltage Req'd at Rated Output	Vac Input	VAC	480	480	400	240	480	480	400	240	480	480	400	240	480	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	5.95	6.14	6.14	6.35	12.2	9.90	11.1	12.8	18.5	14.6	18.8	14.0	23.7	19.5	23.7	18.4
		lb-ft	4.39	4.53	4.53	4.68	9.00	7.30	8.18	9.45	13.6	10.8	13.9	10.3	17.5	14.4	17.5	13.6

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 10" x 10" x 1/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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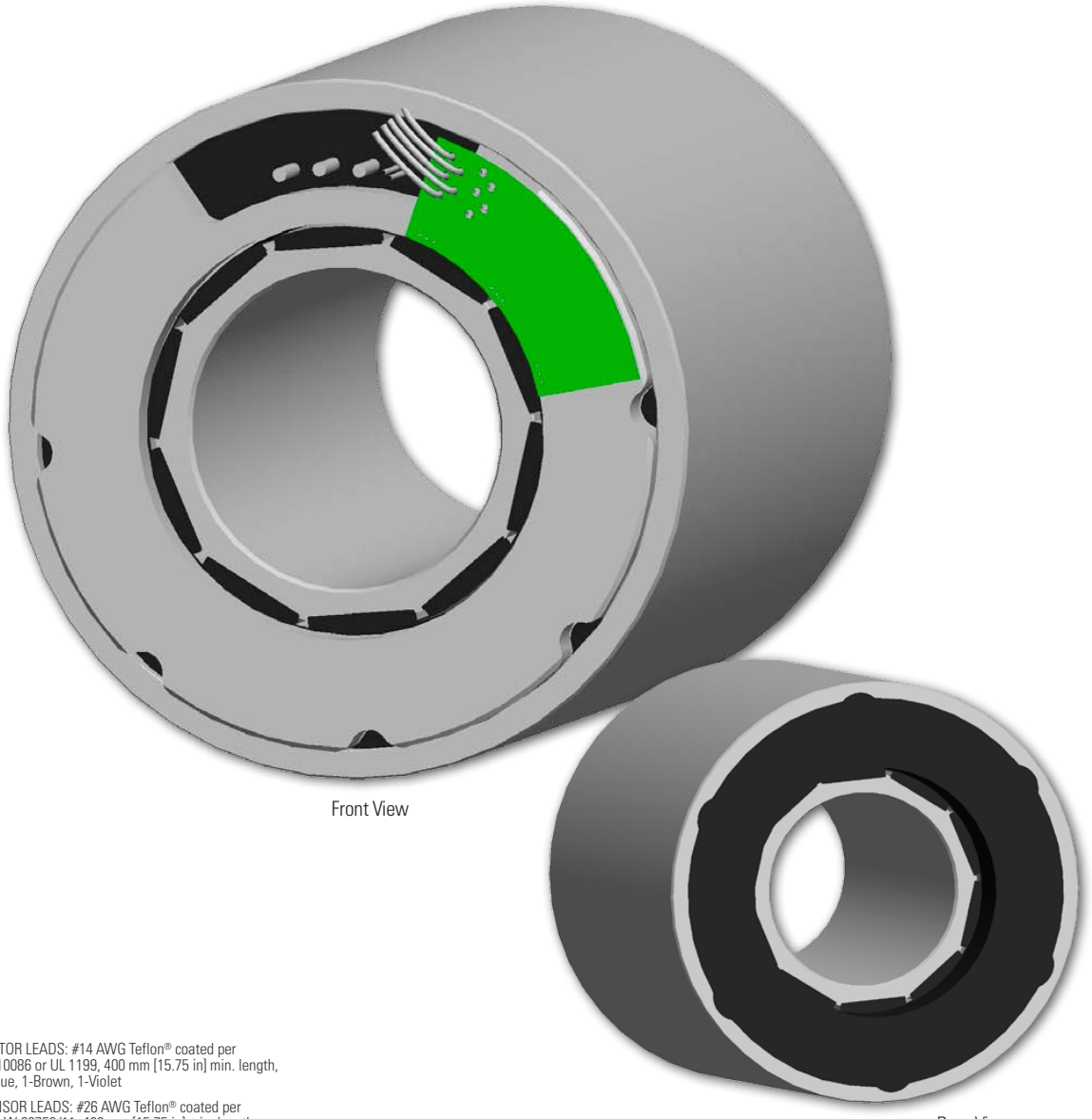
KBM 25 Frameless Motors

The KBM(S)-25 series is designed to operate over a broad speed range with high acceleration. Designed for maximum torque density with minimal cogging by using a variable air gap, the KBM(S)-25 is an ideal choice to meet or exceed your compact frameless motor application needs.



Front View

Rear View

MOTOR LEADS: #14 AWG Teflon® coated per UL 10086 or UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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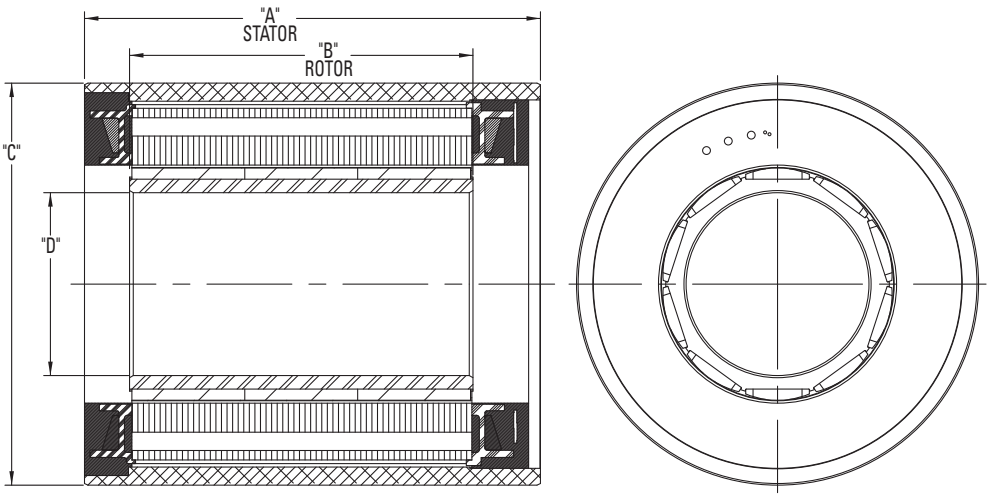
KBM 25 Outline Drawings

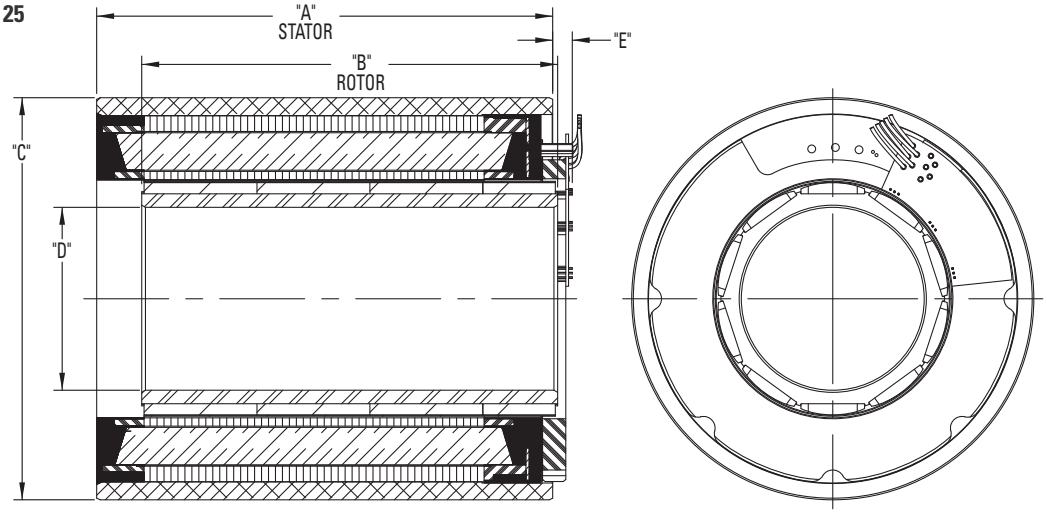
KBM 25



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]
KBM-25X01	62.70 [2.469]	32.16 [1.266]	109.965 [4.3293]	50.012 [1.9689]
KBM-25X02	93.70 [3.689]	63.05 [2.482]	109.965 [4.3293]	50.012 [1.9689]
KBM-25X03	124.70 [4.909]	93.93 [3.698]	109.965 [4.3293]	50.012 [1.9689]
KBM-25X04	155.70 [6.130]	124.82 [4.914]	109.965 [4.3293]	50.012 [1.9689]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 25



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]
KBMS-25X01	62.70 [2.469]	51.97 [2.046]	109.965 [4.3293]	50.012 [1.9689]	5.75 [.226]
KBMS-25X02	93.70 [3.689]	82.86 [3.262]	109.965 [4.3293]	50.012 [1.9689]	5.75 [.226]
KBMS-25X03	124.70 [4.909]	113.74 [4.478]	109.965 [4.3293]	50.012 [1.9689]	5.75 [.226]
KBMS-25X04	155.70 [6.130]	144.63 [5.694]	109.965 [4.3293]	50.012 [1.9689]	5.75 [.226]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

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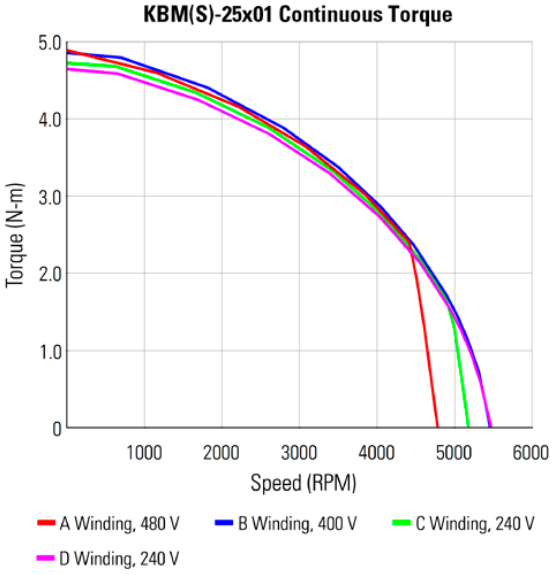
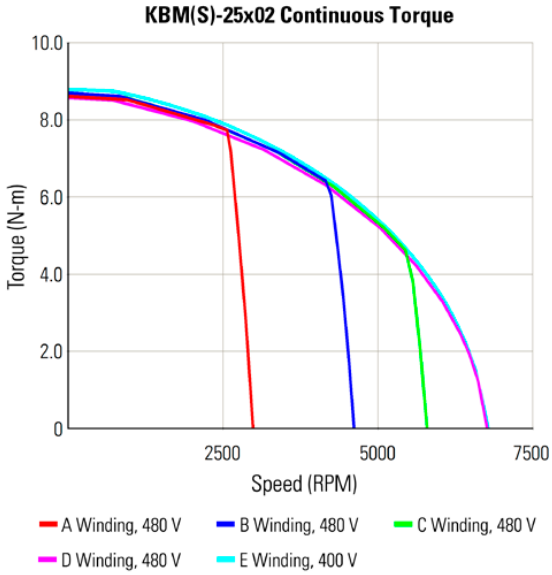
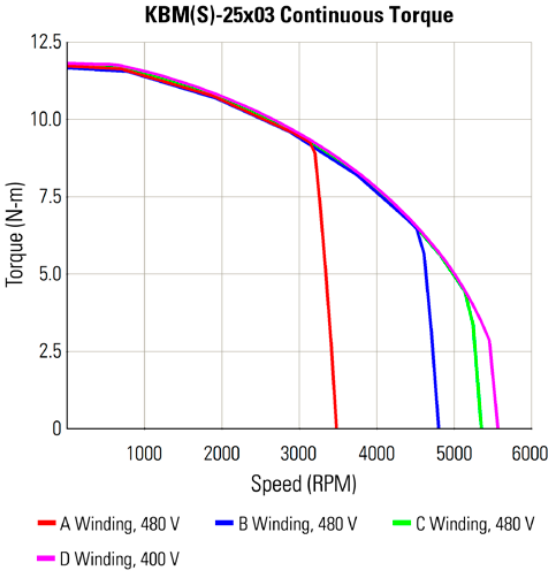
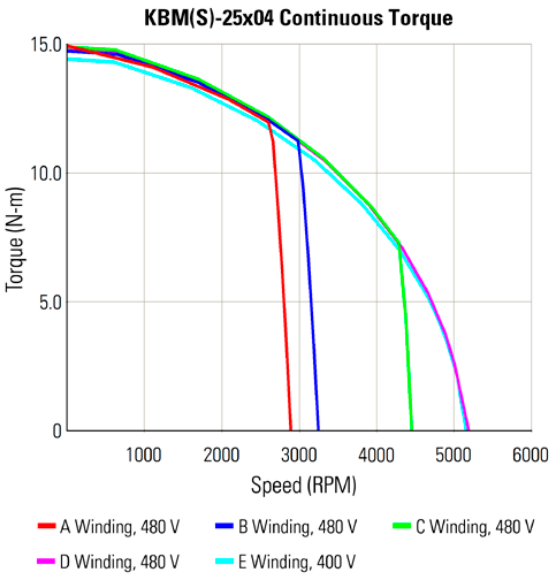
KBM 25 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.









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KBM 25 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-25XXX PERFORMANCE DATA & MOTOR PARAMETERS																				
Motor Parameter	Symbol	Units	KBM(S)-25X01-X				KBM(S)-25X02-X					KBM(S)-25X03-X				KBM(S)-25X04-X				
			A	B	C	D	A	B	C	D	E	A	B	C	D	A	B	C	D	E
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	4.90	4.96	4.85	4.75	8.70	8.75	8.75	8.62	8.85	11.9	11.9	11.9	11.9	14.8	14.9	15.0	14.9	14.6
		lb-ft	3.62	3.66	3.58	3.50	6.42	6.45	6.45	6.36	6.53	8.75	8.75	8.75	8.80	10.9	11.0	11.1	11.0	10.8
Continuous Current	Ic	Arms	3.10	5.34	6.45	7.95	3.33	5.18	6.50	8.00	10.2	5.30	7.27	8.20	10.2	5.50	6.25	8.70	10.7	12.8
Peak Stall Torque (25°C winding temp)	Tp	N-m	14.4	14.6	15.0	14.9	29.4	29.7	29.7	29.8	29.8	42.2	42.3	42.4	42.6	54.4	53.8	54.4	54.8	53.8
		lb-ft	10.6	10.8	11.1	11.0	21.7	21.9	21.9	22.0	22.0	31.1	31.2	31.3	31.4	40.1	39.7	40.1	40.4	39.7
Peak Current	Ip	Arms	10.9	19.3	27.6	34.3	13.9	22.0	27.8	35.1	43.3	23.9	33.0	37.0	47.0	25.0	27.5	38.5	48.5	62.5
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	1110	730	1025	1100	1765	2545	2535	1790	1850	2700	2890	2585	2605	2865	3090	3255	1990	1940
	HP Rated	HP	1.49	0.979	1.37	1.42	2.37	3.41	3.40	2.40	2.48	3.62	3.87	3.47	3.49	3.84	4.14	4.36	2.67	2.60
Speed at Rated Power	N Rated	RPM	3800	4900	4225	4000	2300	4000	5000	6000	6000	2900	4150	4725	2700	2400	2700	3850	4700	4700
Torque Sensitivity (2)	Kt	N-m / Arms	1.66	0.950	0.766	0.613	2.67	1.73	1.38	1.11	0.890	2.29	1.66	1.49	1.19	2.76	2.46	1.79	1.44	1.08
		lb-ft / Arms	1.22	0.701	0.565	0.452	1.97	1.27	1.02	0.818	0.656	1.69	1.22	1.10	0.881	2.03	1.81	1.32	1.06	0.799
Back EMF Constant (3)	Kb	Vpk / kRPM	142	81.2	65.5	52.4	229	148	118	94.8	76.1	196	142	127	102	236	210	153	123	92.6
Motor Constant	Km	N-m/√watt	0.452	0.458	0.445	0.439	0.729	0.733	0.733	0.723	0.742	0.939	0.936	0.944	0.947	1.11	1.12	1.13	1.13	1.10
		lb-ft /√watt	0.334	0.338	0.328	0.324	0.538	0.541	0.541	0.533	0.547	0.693	0.690	0.696	0.698	0.822	0.827	0.834	0.832	0.809
Resistance (line to line)	Rm	Ohms	8.98	2.87	1.97	1.30	8.96	3.70	2.35	1.57	0.960	3.97	2.10	1.66	1.06	4.08	3.20	1.66	1.08	0.650
Inductance	Lm	mH	37	12	7.9	5.2	45	19	12	7.8	5.0	21	11	9.1	5.7	23	18	10	6.2	3.5
Inertia (KBM)	Jm	Kg-m²	2.66E-4				5.15E-4					7.66E-4				1.02E-3				
		lb-ft-s²	1.96E-4				3.80E-4					5.65E-4				7.50E-4				
Weight (KBM)	Wt	Kg	1.79				3.27					4.72				6.17				
		lb	3.95				7.22					10.4				13.6				
Inertia (KBMS)	Jm	Kg-m²	4.34E-4				6.78E-4					9.31E-4				1.18E-3				
		lb-ft-s²	3.20E-4				5.00E-4					6.87E-4				8.72E-4				
Weight (KBMS)	Wt	Kg	2.02				3.50					4.90				6.35				
		lb	4.45				7.72					10.8				14.0				
Max Static Friction	Tf	N-m	9.25E-2				0.163					0.226				0.289				
		lb-ft	6.82E-2				0.120					0.167				0.213				
Cogging Friction (peak-to-peak)	Tcog	N-m	7.61E-2				0.132					0.183				0.230				
		lb-ft	5.61E-2				9.70E-2					0.135				0.170				
Viscous Damping	Fi	N-m/ kRPM	3.09E-2				3.95E-2					5.19E-2				5.74E-2				
		lb-ft / kRPM	2.28E-2				2.91E-2					3.83E-2				4.23E-2				
Thermal Resistance (4)	TPR	°C / watt	0.680				0.560					0.500				0.450				
Number of Poles	P	-	10				10					10				10				
Recommended Drive	AKD-■_ _ _ _ _		00607	00607	01206	01206	00607	00607	01207	01207	01207	00607	01207	01207	01206	00607	01207	01207	01207	02407
Voltage Req'd at Rated Output	Vac Input	VAC	480	400	240	240	480	480	480	480	400	480	480	480	240	480	480	480	480	400
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	14.4	14.0	15.0	13.8	29.4	26.2	29.7	27.6	23.0	36.0	41.5	38.3	32.0	44.0	53.8	47.0	39.5	45.0
		lb-ft	10.6	10.3	11.1	10.2	21.7	19.3	21.9	20.4	17.0	26.6	30.6	28.2	23.6	32.5	39.7	34.7	29.1	33.2

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curve.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 12" x 12" x 1/2" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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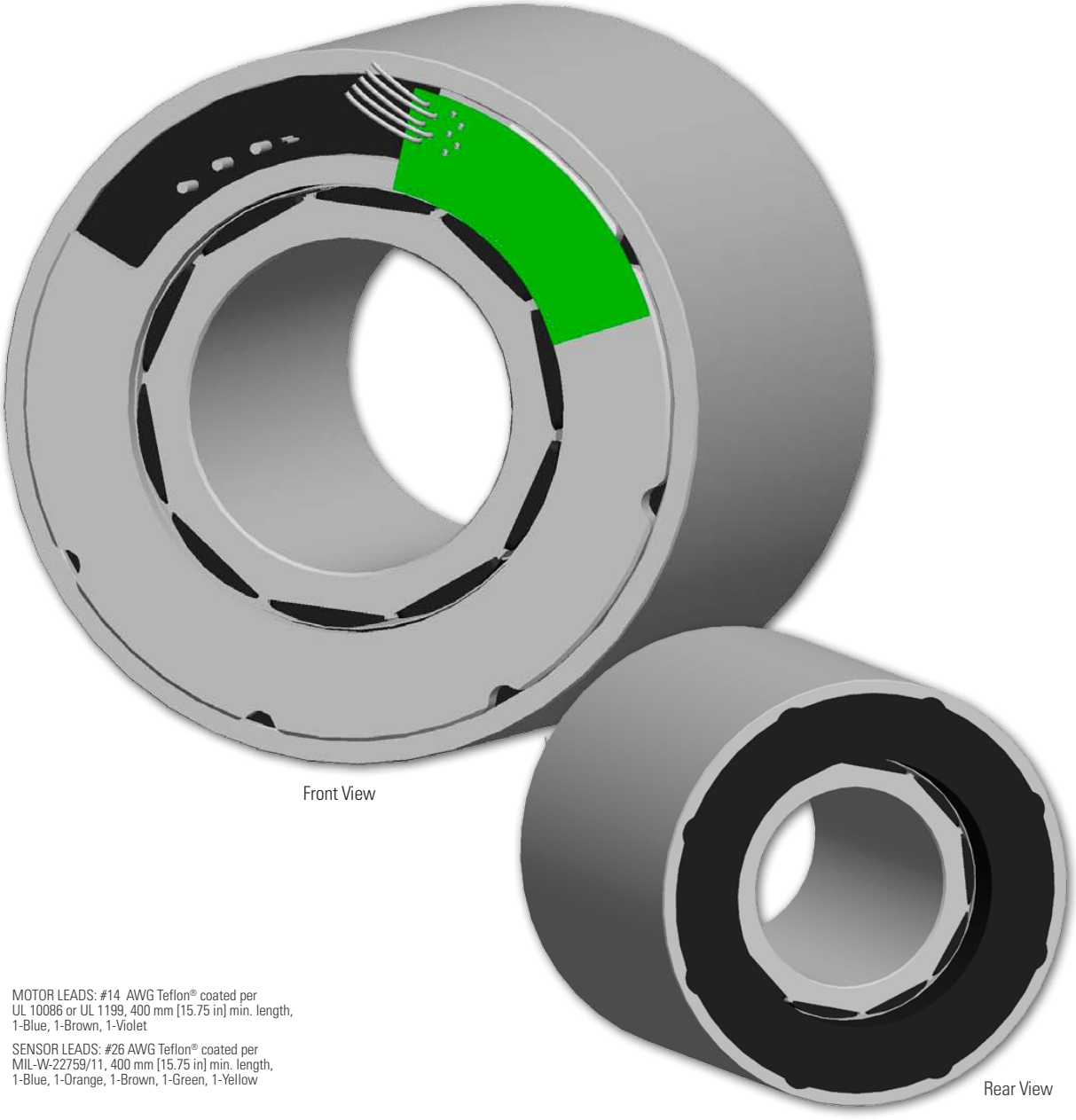
KBM 35 Frameless Motors

The KBM(S)-35 series is designed to operate over a broad speed range with high acceleration. Designed for maximum torque density with minimal cogging by using a variable air gap, the KBM(S)-35 is an ideal choice to meet or exceed your compact frameless motor application needs.



Front View

Rear View

MOTOR LEADS: #14 AWG Teflon® coated per UL 10086 or UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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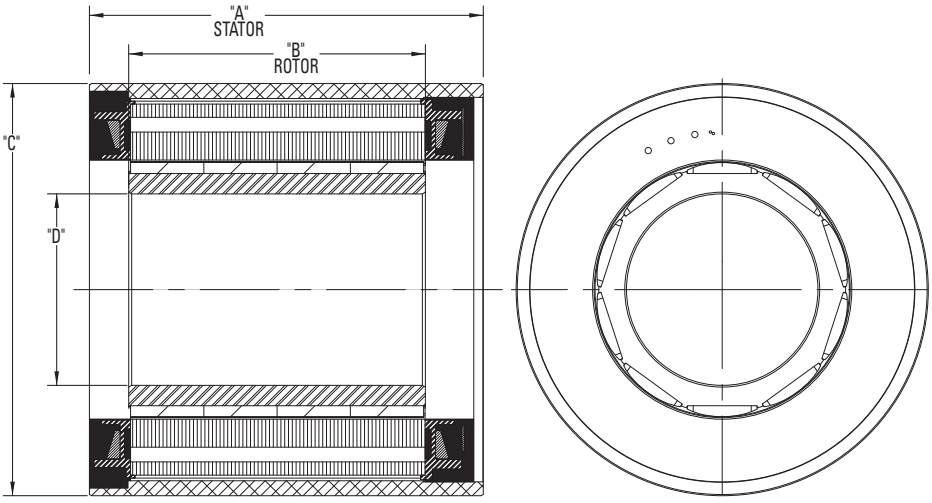
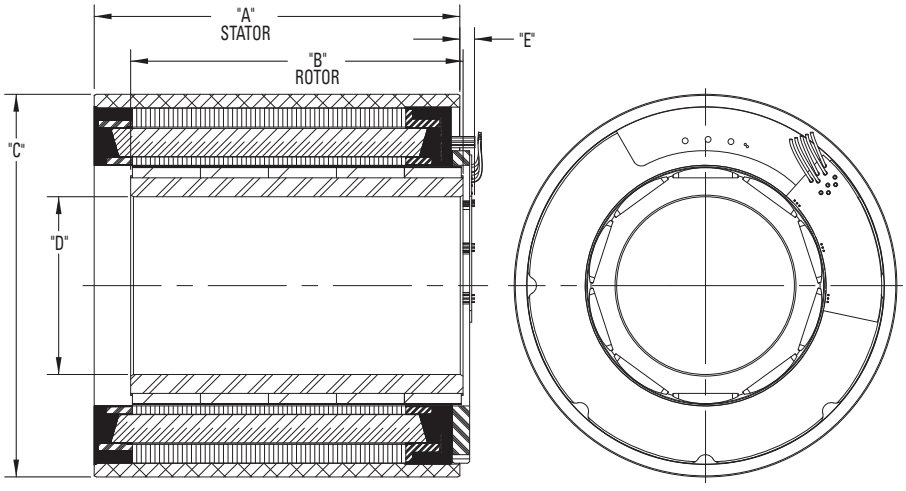
KBM 35 Outline Drawings

KBM 35



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]
KBM-35X01	83.74 [3.297]	51.00 [2.008]	139.956 [5.5101]	65.012 [2.5595]
KBM-35X02	108.74 [4.281]	75.87 [2.987]	139.956 [5.5101]	65.012 [2.5595]
KBM-35X03	133.74 [5.265]	100.74 [3.966]	139.956 [5.5101]	65.012 [2.5595]
KBM-35X04	158.74 [6.250]	125.60 [4.945]	139.956 [5.5101]	65.012 [2.5595]
All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm				

KBMS 35



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]
KBMS-35X01	83.74 [3.297]	71.83 [2.828]	139.956 [5.5101]	65.012 [2.5595]	5.75 [.226]
KBMS-35X02	108.74 [4.281]	96.70 [3.807]	139.956 [5.5101]	65.012 [2.5595]	5.75 [.226]
KBMS-35X03	133.74 [5.265]	121.56 [4.786]	139.956 [5.5101]	65.012 [2.5595]	5.75 [.226]
KBMS-35X04	158.74 [6.250]	146.43 [5.765]	139.956 [5.5101]	65.012 [2.5595]	5.75 [.226]
All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm					

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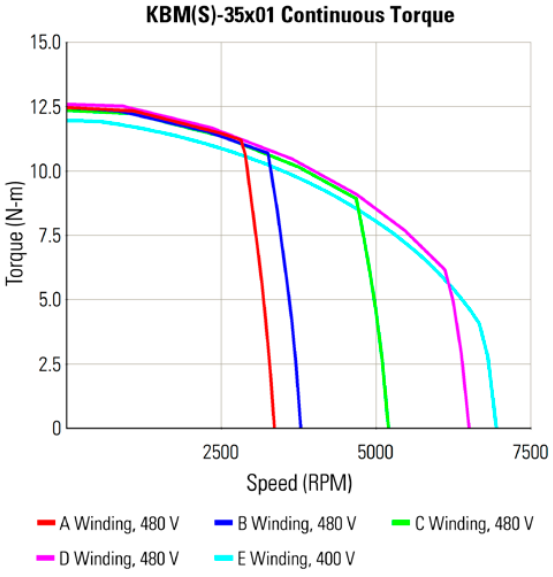
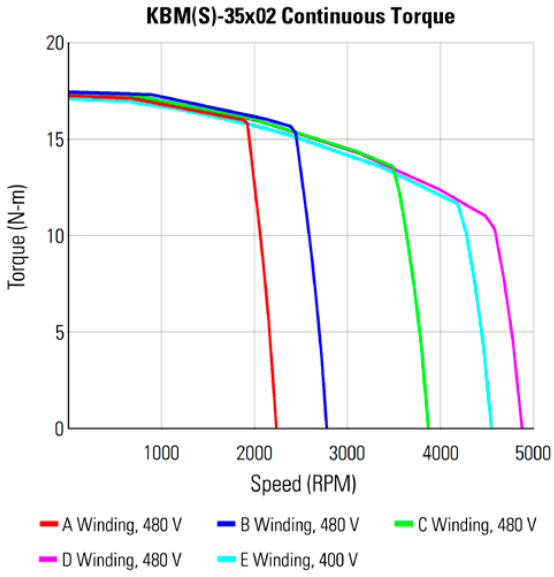
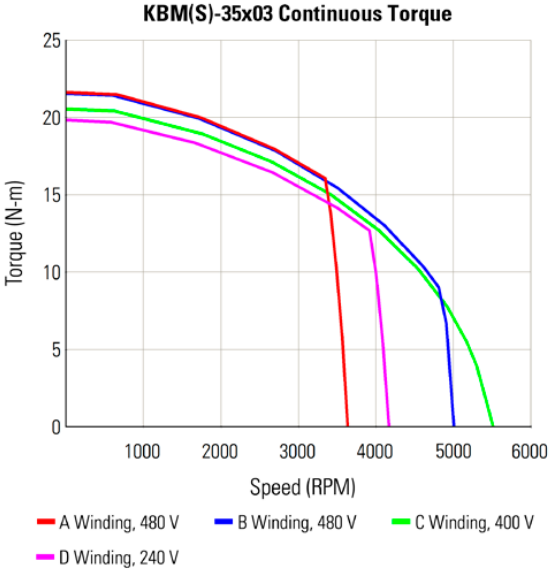
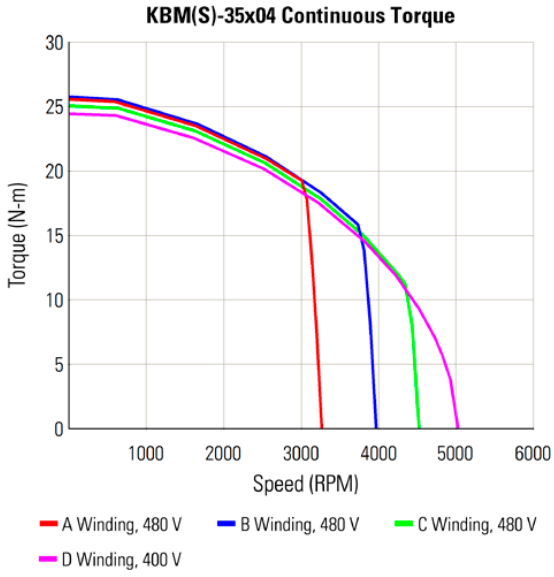
KBM 35 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.









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KBM 35 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-35XXX PERFORMANCE DATA & MOTOR PARAMETERS																				
Motor Parameter	Symbol	Units	KBM(S)-35X01-X					KBM(S)-35X02-X					KBM(S)-35X03-X				KBM(S)-35X04-X			
			A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	12.6	12.7	12.4	12.7	12.2	17.3	17.6	17.5	17.5	17.1	21.8	21.7	20.7	20.0	25.6	25.9	25.3	24.7
		lb-ft	9.26	9.34	9.15	9.34	9.00	12.8	13.0	12.9	12.9	12.6	16.1	16.0	15.3	14.8	18.9	19.1	18.7	18.2
Continuous Current	Ic	Arms	5.41	6.10	8.32	10.6	12.9	4.97	6.30	8.70	10.9	12.1	10.2	14.0	20.2	21.5	10.9	13.3	14.7	19.2
Peak Stall Torque (25°C winding temp)	Tp	N-m	40.9	40.8	41.1	41.2	41.1	58.8	58.8	59.2	59.4	59.4	76.1	76.6	75.2	75.7	92.3	93.0	93.0	91.5
		lb-ft	30.1	30.1	30.3	30.4	30.3	43.4	43.4	43.7	43.8	43.8	56.1	56.5	55.5	55.8	68.1	68.6	68.6	67.5
Peak Current	Ip	Arms	21.9	24.5	34.7	43.5	55.4	22.5	28.0	39.2	49.5	55.4	46.1	64.0	93.1	104	49.0	61.0	68.0	89.0
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	2970	3100	3885	3750	3200	2750	3415	4395	4750	4610	5025	5160	2985	4735	5400	5750	4870	4500
	HP Rated	HP	3.98	4.16	5.21	5.03	4.29	3.69	4.58	5.89	6.37	6.18	6.74	6.92	4.00	6.35	7.24	7.71	6.53	6.03
Speed at Rated Power	N Rated	RPM	2700	2900	4200	5800	6125	1750	2200	3200	4300	3765	3100	4800	5000	3400	2800	3400	4150	4250
Torque Sensitivity (2)	Kt	N-m /Arms	2.37	2.11	1.53	1.23	0.956	3.55	2.87	2.05	1.64	1.46	2.19	1.59	1.05	.956	2.44	2.01	1.76	1.32
		lb-ft /Arms	1.75	1.55	1.13	0.904	0.705	2.62	2.12	1.51	1.21	1.08	1.62	1.17	0.776	0.705	1.80	1.48	1.30	0.975
Back EMF Constant (3)	Kb	Vpk / kRPM	203	180	131	105	81.8	304	246	175	140	125	187	136	90.0	81.8	208	172	151	113
Motor Constant	Km	N-m/√watt	0.954	0.947	0.946	0.963	0.908	1.24	1.27	1.25	1.25	1.23	1.51	1.50	1.43	1.38	1.71	1.73	1.68	1.65
		lb-ft /√watt	0.704	0.699	0.698	0.710	0.670	0.912	0.934	0.921	0.923	0.908	1.11	1.11	1.06	1.02	1.26	1.28	1.24	1.21
Resistance (line to line)	Rm	Ohms	4.13	3.30	1.75	1.08	0.740	5.50	3.43	1.80	1.14	0.940	1.41	0.750	0.360	0.320	1.35	0.900	0.730	0.430
Inductance	Lm	mH	32	25	13	8.5	5.4	44	28	15	9.3	7.4	12	6.2	2.8	2.3	11	7.6	6.1	3.4
Inertia (KBM)	Jm	Kg-m²	1.52E-3					2.28E-3					3.04E-3				3.81E-3			
		lb-ft-s²	1.12E-3					1.68E-3					2.24E-3				2.81E-3			
Weight (KBM)	Wt	Kg	4.68					6.76					8.80				10.9			
		lb	10.3					14.9					19.4				24.0			
Inertia (KBMS)	Jm	Kg-m²	2.17E-3					2.94E-3					3.70E-3				4.46E-3			
		lb-ft-s²	1.60E-3					2.17E-3					2.73E-3				3.29E-3			
Weight (KBMS)	Wt	Kg	5.17					7.21					9.34				11.3			
		lb	11.4					15.9					20.6				25.0			
Max Static Friction	Tf	N-m	0.247					0.346					0.450				0.598			
		lb-ft	0.182					0.255					0.332				0.441			
Cogging Friction (peak-to-peak)	Tcog	N-m	0.197					0.271					0.338				0.399			
		lb-ft	0.145					0.200					0.249				0.294			
Viscous Damping	Fi	N-m/ kRPM	3.76E-2					5.99E-2					7.51E-2				9.40E-2			
		lb-ft /kRPM	2.77E-2					4.42E-2					5.54E-2				6.93E-2			
Thermal Resistance (4)	TPR	°C / watt	0.460					0.410					0.380				0.350			
Number of Poles	P	-	10					10					10				10			
Recommended Drive	AKD-■_ _ _ _ _		00607	01207	01207	01207	02407	00607	01207	01207	01207	02407	01207	02407	02407	02406	01207	02407	02407	02407
Voltage Req'd at Rated Output	Vac Input	VAC	480	480	480	480	400	480	480	480	480	400	480	480	400	240	480	480	480	400
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	37.5	40.8	40.9	34.1	36.3	57.4	58.8	56.0	46.0	55.0	61.6	70.0	49.0	45.0	71.0	87.5	79.0	61.0
		lb-ft	27.7	30.1	30.2	25.1	26.8	42.3	43.4	41.3	33.9	40.6	45.4	51.6	36.1	33.2	52.4	64.5	58.3	45.0

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 18" x 18" x 1/2" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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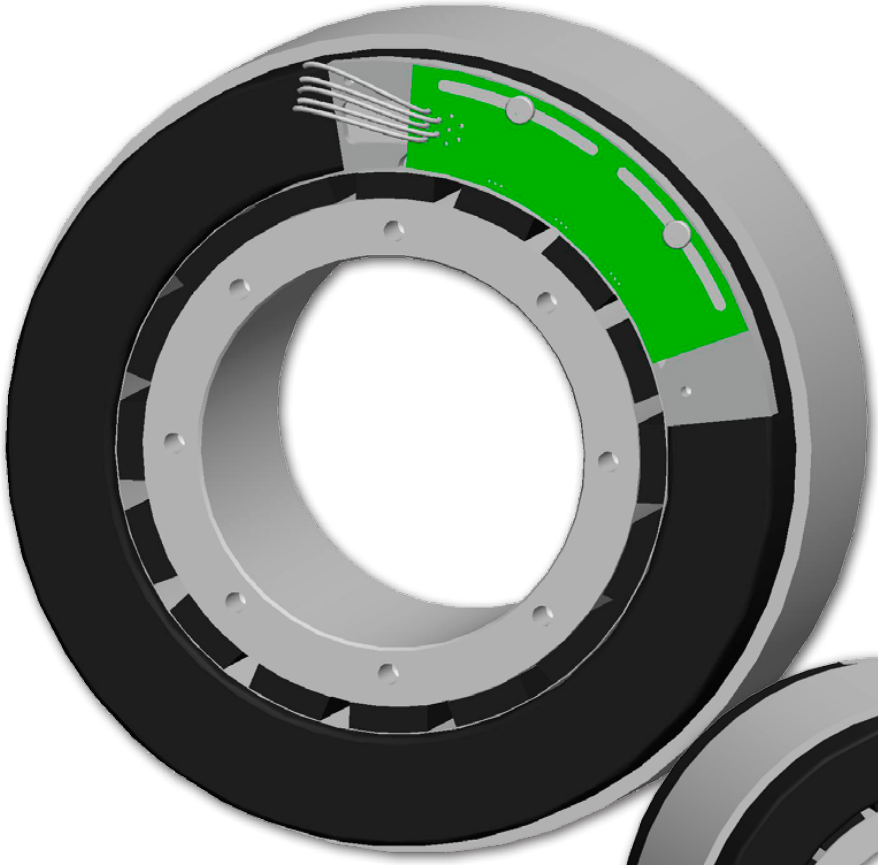
KBM 43 Frameless Motors

The KBM(S)-43 series provides a classic torque motor footprint - large diameter with a short axial length. With a skewed stator, low cogging, and low harmonic distortion these motors produce extremely smooth rotation. In addition, the high pole count and excellent torque / volume ratio makes the KBM(S)-43 an ideal fit for direct drive applications requiring high torque at low to moderate speeds.



Front View

Rear View

MOTOR LEADS: #16 AWG Teflon® coated per UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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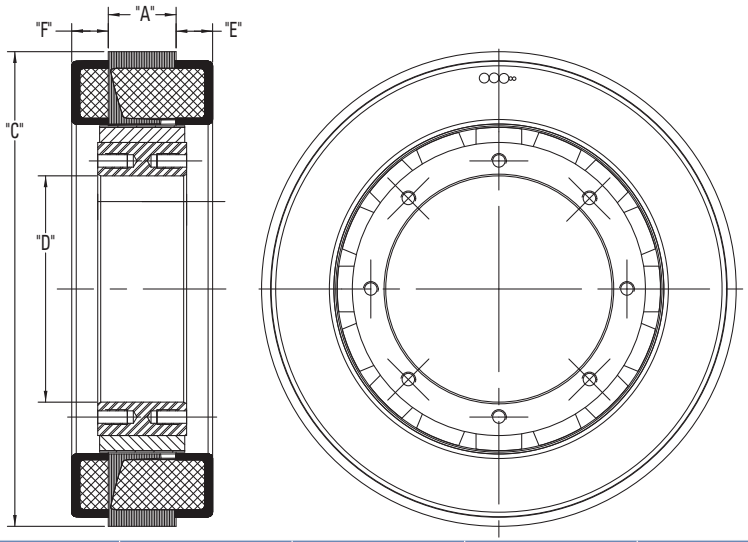
KBM 43 Outline Drawings

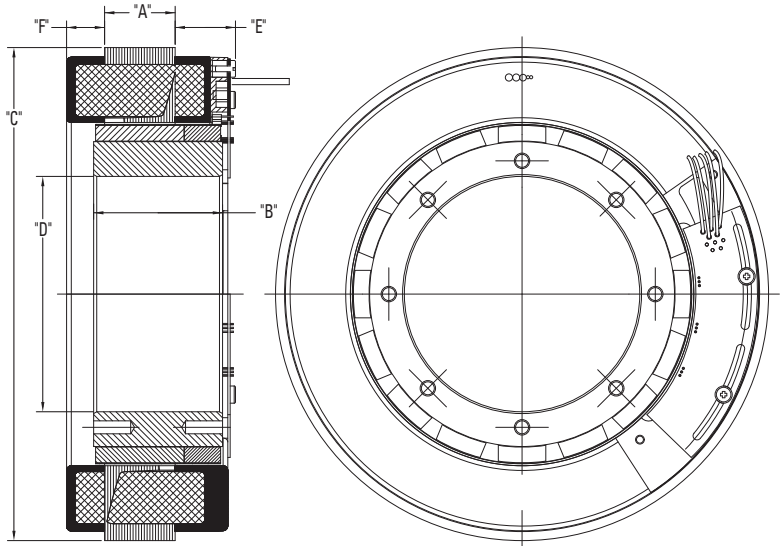
KBM 43



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBM-43X01	11.43 [.450]	18.54 [.730]	159.78 [6.290]	76.28 [3.003]	12.32 [.485]	12.32 [.485]
KBM-43X02	22.86 [.900]	29.97 [1.180]	159.78 [6.290]	76.28 [3.003]	12.32 [.485]	12.32 [.485]
KBM-43X03	45.72 [1.800]	52.83 [2.080]	159.78 [6.290]	76.28 [3.003]	12.32 [.485]	12.32 [.485]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 43



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBMS-43X01	11.43 [.450]	30.35 [1.195]	159.78 [6.290]	76.28 [3.003]	20.32 [.800]	12.32 [.485]
KBMS-43X02	22.86 [.900]	41.78 [1.645]	159.78 [6.290]	76.28 [3.003]	20.32 [.800]	12.32 [.485]
KBMS-43X03	45.72 [1.800]	64.64 [2.545]	159.78 [6.290]	76.28 [3.003]	20.32 [.800]	12.32 [.485]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

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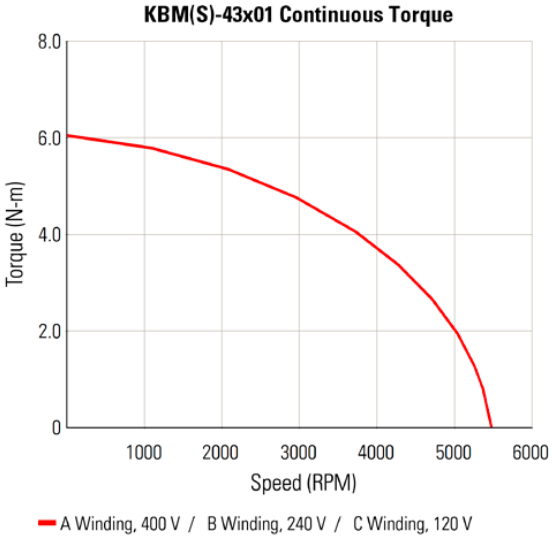
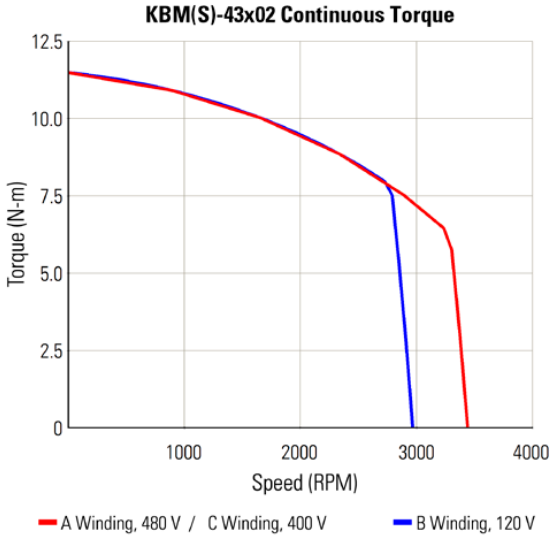
KBM 43 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.





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KBM 43 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-43XXX PERFORMANCE DATA & MOTOR PARAMETERS													
Motor Parameter	Symbol	Units	KBM(S)-43X01-X			KBM(S)-43X02-X				KBM(S)-43X03-X			
			A	B	C	A	B	C	D	A	B	C	D
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	6.11	6.24	6.11	11.6	11.6	11.9	11.9	21.0	20.7	20.9	20.9
		lb-ft	4.51	4.60	4.51	8.57	8.53	8.57	8.57	15.5	15.3	15.4	15.4
Continuous Current	Ic	Arms	5.10	8.60	18.4	5.10	18.3	6.10	10.2	4.78	13.8	5.73	19.2
Peak Stall Torque (25°C winding temp)	Tp	N-m	18.0	18.0	18.0	34.6	34.6	34.6	34.6	64.5	64.5	64.5	64.5
		lb-ft	13.3	13.3	13.3	25.5	25.5	25.5	25.5	47.6	47.6	47.6	47.6
Peak Current	Ip	Arms	18.0	32.2	64.6	18.0	64.6	22.8	36.2	18.0	51.2	22.8	72.5
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	1230	1230	1230	2160	2160	2160	2160	2520	2875	2520	2520
	HP Rated	HP	1.65	1.65	1.65	2.90	2.90	2.90	2.90	3.38	3.85	3.38	3.38
Speed at Rated Power	N Rated	RPM	4750	4750	4750	3000	2650	3000	3000	1500	2275	1500	1500
Torque Sensitivity (2)	Kt	N-m / Arms	1.21	0.721	0.335	2.31	0.641	1.92	1.15	4.43	1.54	3.69	1.11
		lb-ft / Arms	0.890	0.531	0.247	1.70	0.473	1.42	0.851	3.27	1.14	2.73	0.818
Back EMF Constant (3)	Kb	Vpk / kRPM	103	61.6	28.7	197	54.8	164	98.7	379	132	316	94.8
Motor Constant	Km	N-m/√watt	0.580	0.596	0.580	1.00	1.00	1.00	1.00	1.65	1.63	1.69	1.65
		lb-ft /√watt	0.427	0.440	0.425	0.737	0.737	0.737	0.737	1.21	1.20	1.24	1.21
Resistance (line to line)	Rm	Ohms	2.90	0.976	0.226	3.55	0.277	2.35	0.886	4.83	0.595	3.20	0.301
Inductance	Lm	mH	6.8	2.4	0.52	12	0.93	8.3	3.0	19	2.2	13.0	1.2
Inertia (KBM)	Jm	Kg-m²	1.94E-3			2.85E-3				4.75E-3			
		lb-ft-s²	1.43E-3			2.10E-3				3.50E-3			
Weight (KBM)	Wt	Kg	2.26			3.49				5.96			
		lb	4.98			7.70				13.1			
Inertia (KBMS)	Jm	Kg-m²	2.85E-3			3.73E-3				5.69E-3			
		lb-ft-s²	2.10E-3			2.75E-3				4.20E-3			
Weight (KBMS)	Wt	Kg	2.66			3.89				6.35			
		lb	5.86			8.57				14.0			
Max Static Friction	Tf	N-m	0.058			0.108				0.203			
		lb-ft	0.043			0.080				0.150			
Cogging Friction (peak-to-peak)	Tcog	N-m	0.027			0.054				0.102			
		lb-ft	0.020			0.040				0.075			
Viscous Damping	Fi	N-m/ kRPM	0.388			0.561				0.860			
		lb-ft / kRPM	0.286			0.414				1.17			
Thermal Resistance (4)	TPR	°C / watt	0.763			0.629				0.525			
Number of Poles	P	-	16			16				16			
Recommended Drive	AKD-■_ _ _ _ _		00607	01206	02406	00607	02406	01207	01206	00607	02406	00607	02406
Voltage Req'd at Rated Output	Vac Input	VAC	400	240	120	480	120	400	240	480	240	400	120
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	18.0	16.9	14.5	34.6	28.5	34.6	29.0	64.5	60.5	53.0	50
		lb-ft	13.3	12.5	10.7	25.5	21.0	25.5	21.4	47.6	44.6	39.1	36.9

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 12" x 12" x 3/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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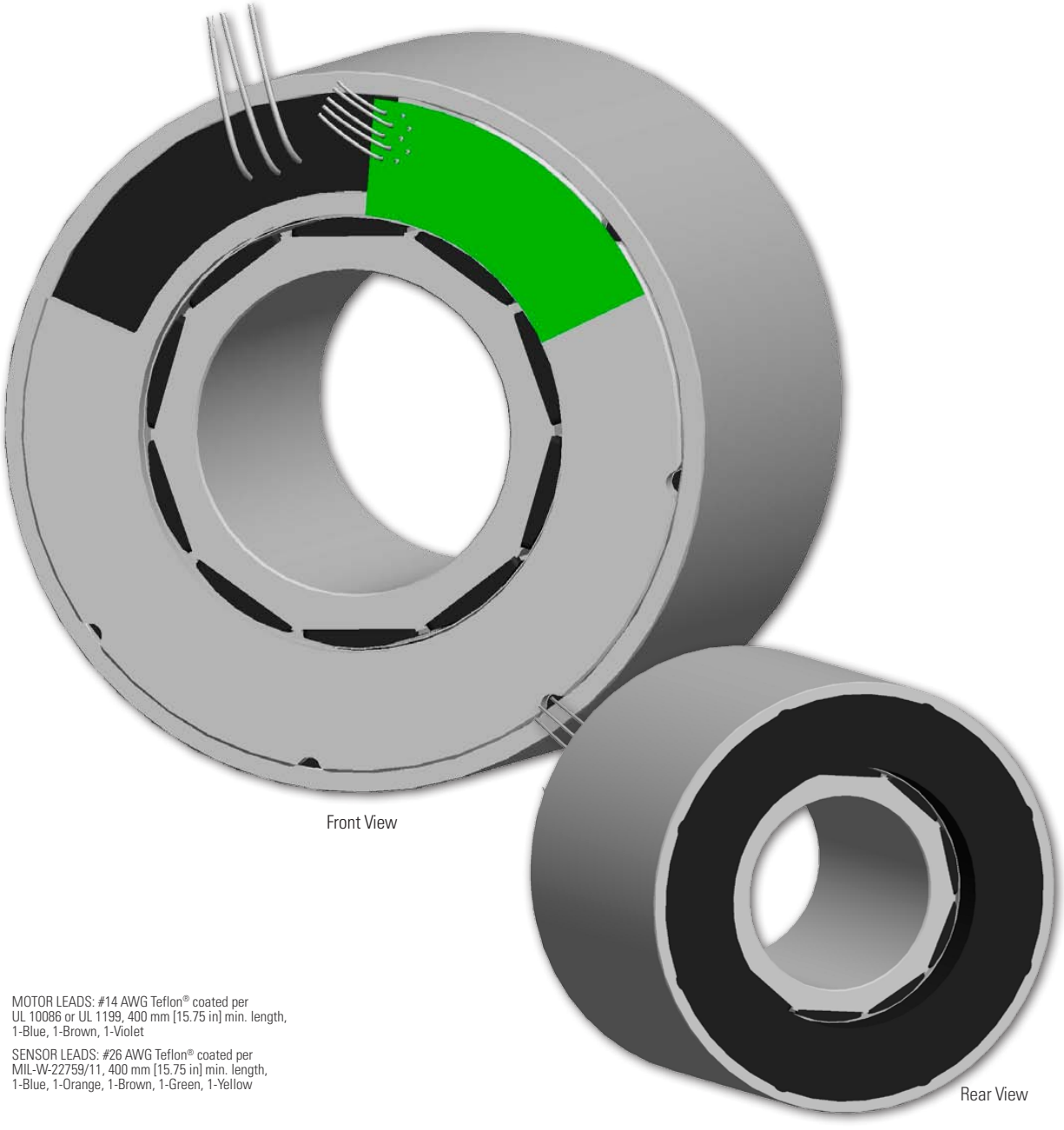
KBM 45 Frameless Motors

The KBM(S)-45 series is designed to operate over a broad speed range with high acceleration. Designed for maximum torque density with minimal cogging by using a variable air gap, the KBM(S)-45 is an ideal choice to meet or exceed your compact frameless motor application needs.



Front View

Rear View

MOTOR LEADS: #14 AWG Teflon® coated per UL 10086 or UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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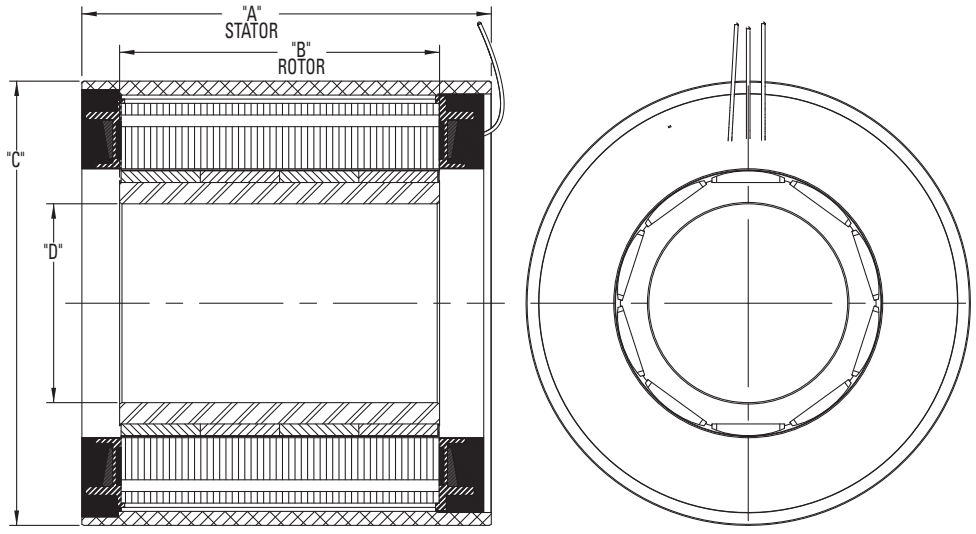
KBM 45 Outline Drawings

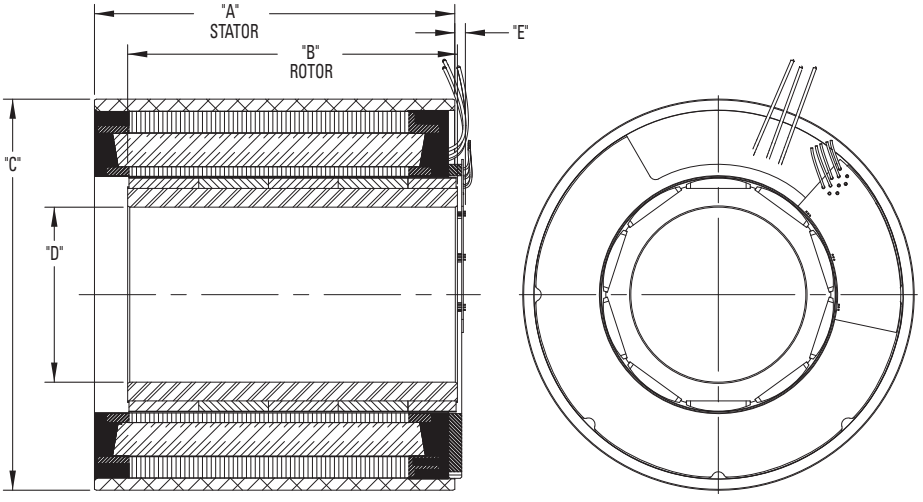
KBM 45



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]
KBM-45X01	107.06 [4.215]	69.04 [2.718]	189.956 [7.4786]	85.018 [3.3471]
KBM-45X02	141.06 [5.554]	102.92 [4.052]	189.956 [7.4786]	85.018 [3.3471]
KBM-45X03	175.05 [6.892]	136.81 [5.386]	189.956 [7.4786]	85.018 [3.3471]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 45



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]
KBMS-45X01	107.06 [4.215]	92.41 [3.638]	189.956 [7.4786]	85.018 [3.3471]	5.75 [.226]
KBMS-45X02	141.06 [5.554]	126.29 [4.972]	189.956 [7.4786]	85.018 [3.3471]	5.75 [.226]
KBMS-45X03	175.05 [6.892]	160.17 [6.306]	189.956 [7.4786]	85.018 [3.3471]	5.75 [.226]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

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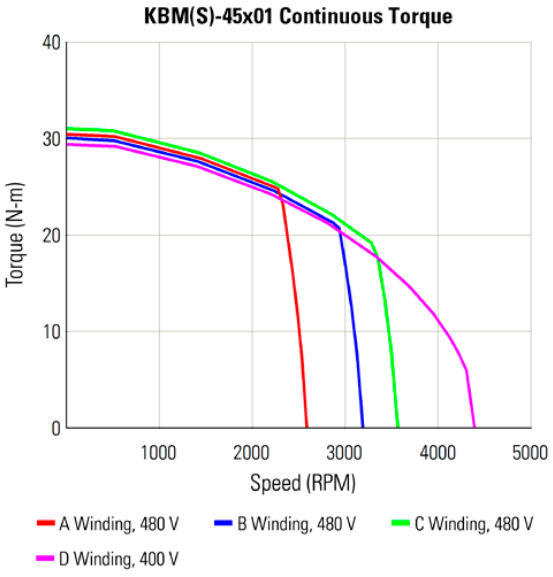
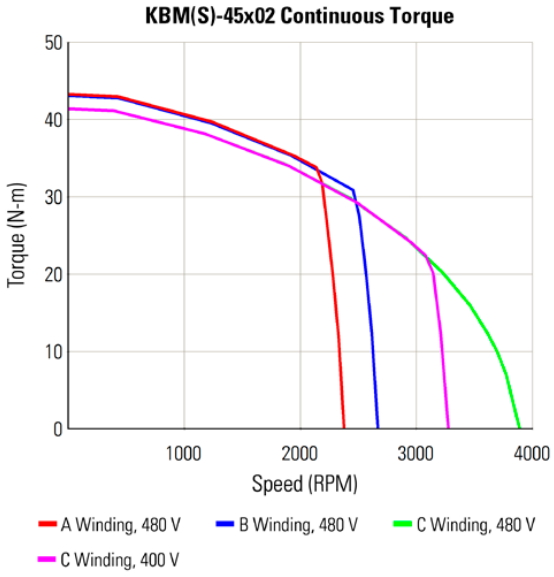
KBM 45 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.





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KBM 45 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-45XXX PERFORMANCE DATA & MOTOR PARAMETERS													
Motor Parameter	Symbol	Units	KBM(S)-45X01-X				KBM(S)-45X02-X				KBM(S)-45X03-X		
			A	B	C	D	A	B	C		A	B	
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	30.7	30.2	31.3	29.7	43.7	43.5	41.9		54.6	53.0	
		lb-ft	22.6	22.3	23.1	21.9	32.3	32.1	30.9		40.3	39.1	
Continuous Current	Ic	Arms	10.2	12.5	14.3	20.2	13.3	14.9	21.1		14.1	19.9	
Peak Stall Torque (25°C winding temp)	Tp	N-m	119	119	119	118	170	171	168		218	215	
		lb-ft	87.6	87.6	88.0	86.7	126	126	124		161	159	
Peak Current	Ip	Arms	46.5	57.5	65.0	93.5	60.5	68.0	97.2		64.5	92.5	
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	5200	5750	6045	4930	6655	7200	4525	6500	7270	7580	7670
	HP Rated	HP	6.97	7.71	8.10	6.61	8.92	9.65	6.07	8.71	9.75	10.2	10.3
Speed at Rated Power	N Rated	RPM	2100	2650	3100	3700	1950	2350	3500	2830	1700	2600	2050
Torque Sensitivity (2)	Kt	N-m / Arms	3.08	2.48	2.24	1.51	3.35	2.98	2.03		3.96	2.72	
		lb-ft / Arms	2.27	1.83	1.65	1.12	2.47	2.20	1.50		2.92	2.01	
Back EMF Constant (3)	Kb	Vpk / kRPM	264	212	191	129	286	255	174		339	233	
Motor Constant	Km	N-m/√watt	2.16	2.11	2.20	2.09	2.80	2.79	2.69		3.36	3.24	
		lb-ft /√watt	1.59	1.56	1.62	1.54	2.07	2.06	1.99		2.48	2.39	
Resistance (line to line)	Rm	Ohms	1.36	0.920	0.690	0.350	0.950	0.760	0.380		0.930	0.470	
Inductance	Lm	mH	21	14	11	5.0	16	12	5.9		16	7.7	
Inertia (KBM)	Jm	Kg-m²	6.10E-3				9.22E-3				1.22E-2		
		lb-ft-s²	4.50E-3				6.80E-3				9.00E-3		
Weight (KBM)	Wt	Kg	12.2				17.5				23.1		
		lb	26.9				38.6				51.0		
Inertia (KBMS)	Jm	Kg-m²	8.35E-3				1.15E-2				1.45E-2		
		lb-ft-s²	6.16E-3				8.47E-3				1.07E-2		
Weight (KBMS)	Wt	Kg	13.2				18.5				24.2		
		lb	29.0				40.7				53.3		
Max Static Friction	Tf	N-m	0.750				0.850				1.09		
		lb-ft	0.553				0.627				0.806		
Cogging Friction (peak-to-peak)	Tcog	N-m	0.630				0.671				0.846		
		lb-ft	0.465				0.495				0.624		
Viscous Damping	Fi	N-m/ kRPM	5.64E-2				0.122				0.188		
		lb-ft / kRPM	4.16E-2				9.01E-2				0.139		
Thermal Resistance (4)	TPR	°C / watt	0.390				0.330				0.300		
Number of Poles	P	-	10				10				10		
Recommended Drive	AKD-■_ _ _ _ _		01207	02407	02407	02407	02407	02407	02407		02407	02407	
Voltage Req'd at Rated Output	Vac Input	VAC	480	480	480	400	480	480	480	400	480	480	400
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	87.4	107	98.0	70.0	147	133	95.0	95	186	134	134
		lb-ft	64.5	78.9	72.3	51.6	109	98.1	70.1	70.1	137	98.8	98.8

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 18" x 18" x 1/2" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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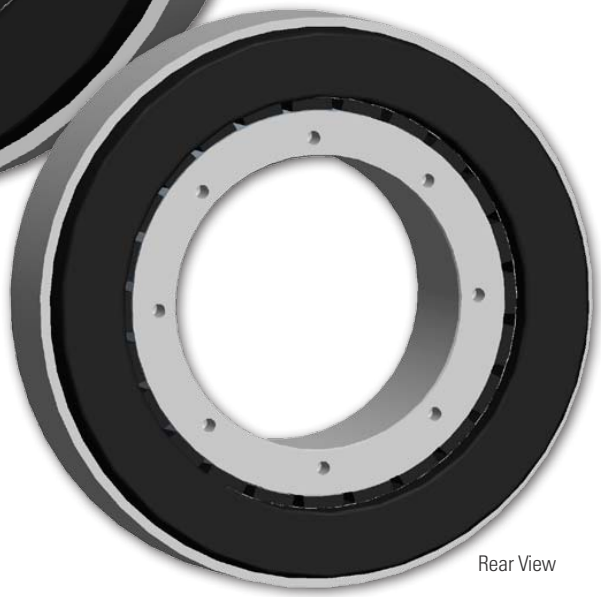
KBM 57 Frameless Motors

The KBM(S)-57 series provides a classic torque motor footprint - large diameter with a short axial length. With a skewed stator, low cogging, and low harmonic distortion these motors produce extremely smooth rotation. In addition, the high pole count and excellent torque / volume ratio makes the KBM(S)-57 an ideal fit for direct drive applications requiring high torque at low to moderate speeds.

Front View



Rear View

MOTOR LEADS: #16 AWG Teflon® coated per UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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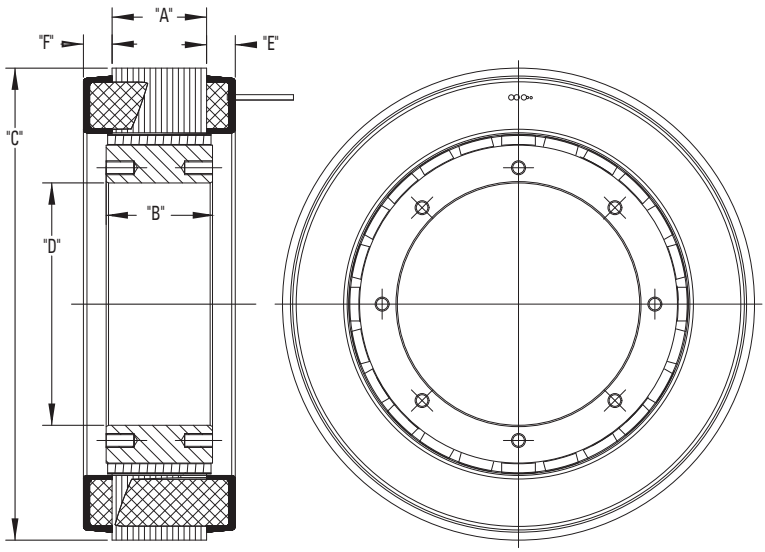
KBM 57 Outline Drawings

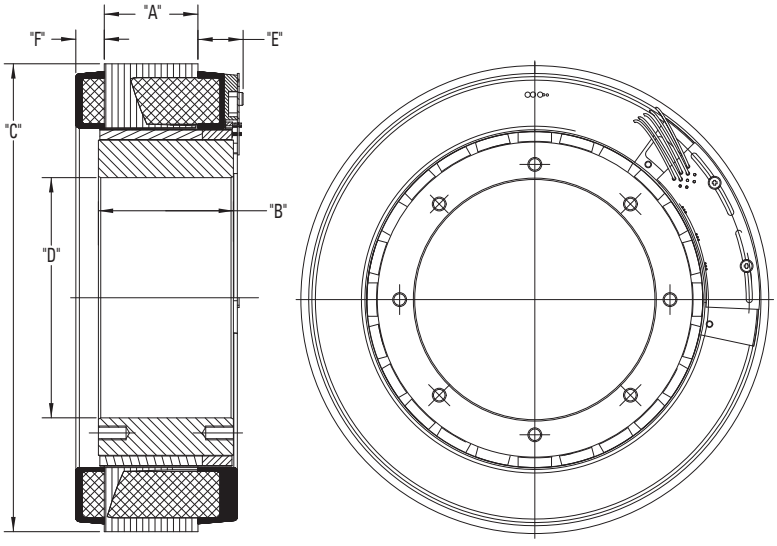
KBM 57



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBM-57X01	20.32 [.800]	25.40 [1.000]	202.90 [7.988]	104.17 [4.101]	12.32 [.485]	12.32 [.485]
KBM-57X02	40.64 [1.600]	45.72 [1.800]	202.90 [7.988]	104.17 [4.101]	12.32 [.485]	12.32 [.485]
KBM-57X03	81.79 [3.220]	86.36 [3.400]	202.90 [7.988]	104.17 [4.101]	12.32 [.485]	12.32 [.485]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 57



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBMS-57X01	20.32 [.800]	38.23 [1.505]	202.90 [7.988]	104.17 [4.101]	20.32 [.800]	12.32 [.485]
KBMS-57X02	40.64 [1.600]	58.54 [2.305]	202.90 [7.988]	104.17 [4.101]	20.32 [.800]	12.32 [.485]
KBMS-57X03	81.79 [3.220]	99.44 [3.915]	202.90 [7.988]	104.17 [4.101]	20.32 [.800]	12.32 [.485]

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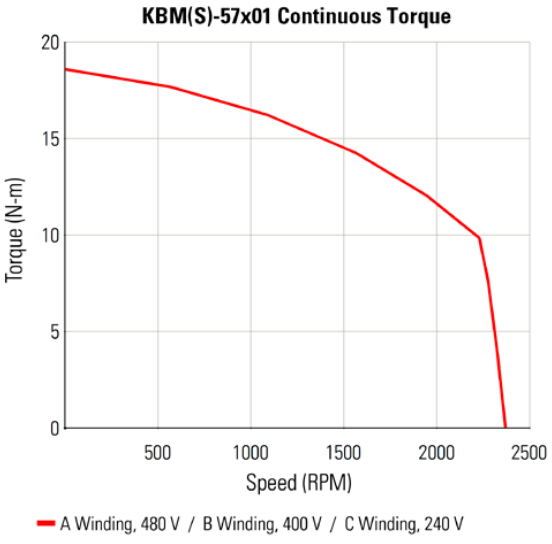
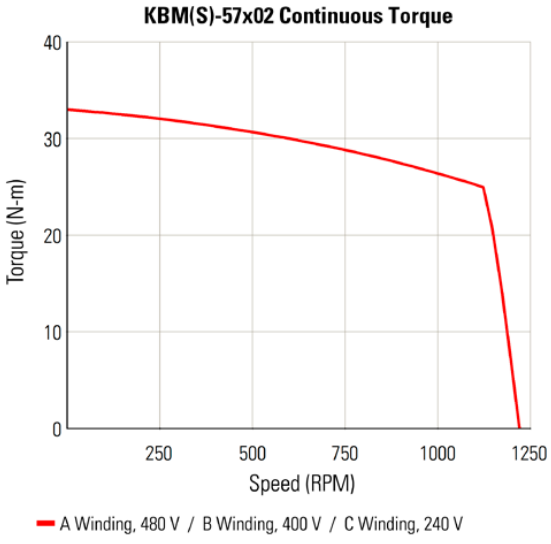
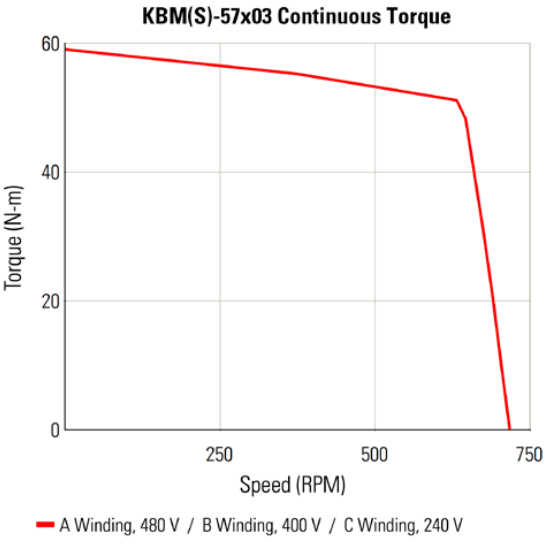
KBM 57 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.







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KBM 57 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-57XXX PERFORMANCE DATA & MOTOR PARAMETERS											
Motor Parameter	Symbol	Units	KBM(S)-57X01-X			KBM(S)-57X02-X			KBM(S)-57X03-X		
			A	B	C	A	B	C	A	B	C
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	18.8	18.8	18.8	33.5	33.5	33.5	60.0	60.0	60.0
		lb-ft	13.9	13.9	13.9	24.7	24.7	24.7	44.2	44.2	44.2
Continuous Current	Ic	Arms	5.68	6.90	11.4	5.23	6.24	11.0	5.47	6.70	11.0
Peak Stall Torque (25°C winding temp)	Tp	N-m	60.0	60.0	60.0	115	115	115	218	218	218
		lb-ft	44.2	44.2	44.2	85.0	85.0	85.0	161	161	161
Peak Current	Ip	Arms	23.4	27.9	47.0	23.4	27.9	47.0	26.1	32.9	52.4
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	2310	2310	2310	2660	2660	2660	3000	3000	3000
	HP Rated	HP	3.10	3.10	3.10	3.57	3.57	3.57	4.02	4.02	4.00
Speed at Rated Power	N Rated	RPM	2050	2050	2050	1015	1015	1015	580	580	580
Torque Sensitivity (2)	Kt	N-m / Arms	3.35	2.76	1.68	6.46	5.42	3.23	11.1	9.08	5.53
		lb-ft / Arms	2.47	2.04	1.24	4.76	4.00	2.38	8.16	6.70	4.08
Back EMF Constant (3)	Kb	Vpk / kRPM	287	236	143	552	463	276	946	777	473
Motor Constant	Km	N-m/√watt	1.49	1.49	1.49	2.51	2.51	2.51	3.71	3.71	3.71
		lb-ft /√watt	1.10	1.10	1.10	1.85	1.85	1.85	2.74	2.74	2.74
Resistance (line to line)	Rm	Ohms	3.39	2.21	0.845	4.40	2.93	1.10	5.92	3.86	1.48
Inductance	Lm	mH	13	9.1	3.4	22	15	5.4	35	23	8.6
Inertia (KBM)	Jm	Kg-m²	6.56E-3			1.18E-2			2.21E-2		
		lb-ft-s²	4.84E-3			8.70E-3			1.63E-2		
Weight (KBM)	Wt	Kg	4.54			7.89			14.5		
		lb	10.0			17.4			32.0		
Inertia (KBMS)	Jm	Kg-m²	9.49E-3			1.49E-2			2.52E-2		
		lb-ft-s²	7.00E-3			1.10E-2			1.86E-2		
Weight (KBMS)	Wt	Kg	5.31			8.62			15.4		
		lb	11.7			19.0			34.0		
Max Static Friction	Tf	N-m	0.176			0.285			0.556		
		lb-ft	0.130			0.210			0.410		
Cogging Friction (peak-to-peak)	Tcog	N-m	0.088			0.149			0.285		
		lb-ft	0.065			0.110			0.210		
Viscous Damping	Fi	N-m/ kRPM	6.51			3.97			3.99		
		lb-ft / kRPM	4.80			2.93			2.94		
Thermal Resistance (4)	TPR	°C / watt	0.530			0.480			0.326		
Number of Poles	P	-	24			24			24		
Recommended Drive	AKD-■_____		00607	01207	02406	00607	01207	02406	00607	01207	02406
Voltage Req'd at Rated Output	Vac Input	VAC	480	400	240	480	400	240	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	46.1	60.0	60.0	100	115	115	175	198	205
		lb-ft	34.0	44.2	44.2	73.8	85.0	85.0	129	146	151

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 12" x 12" x 3/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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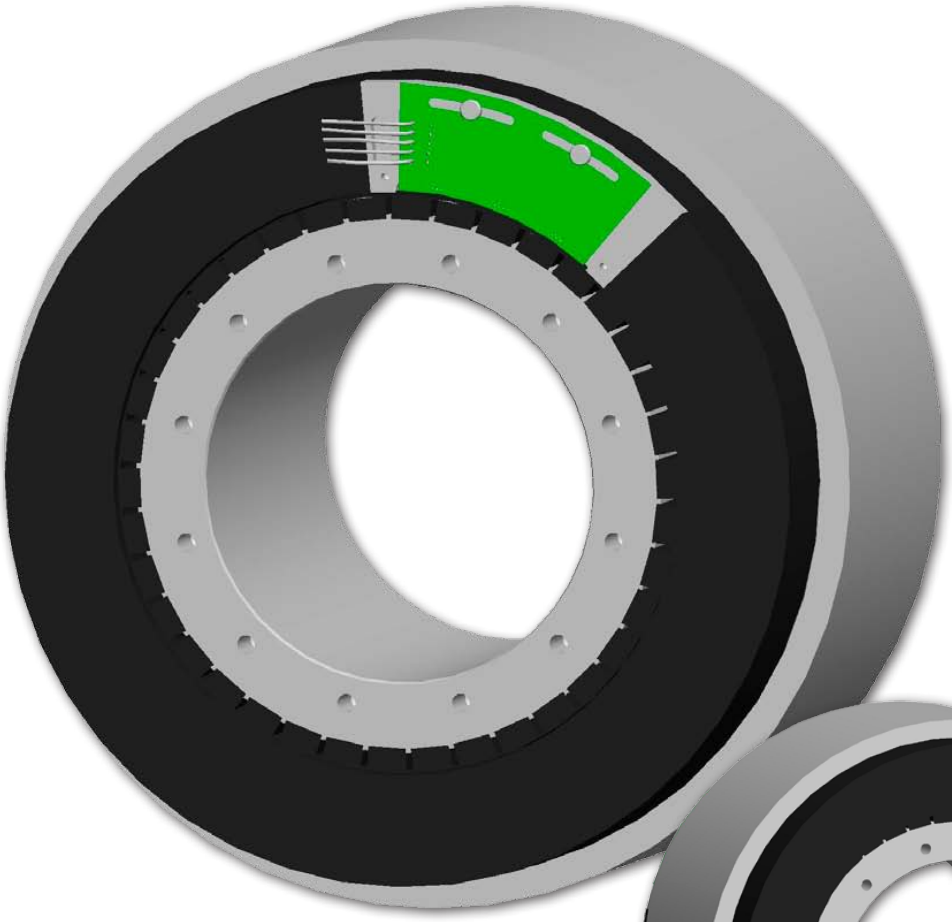
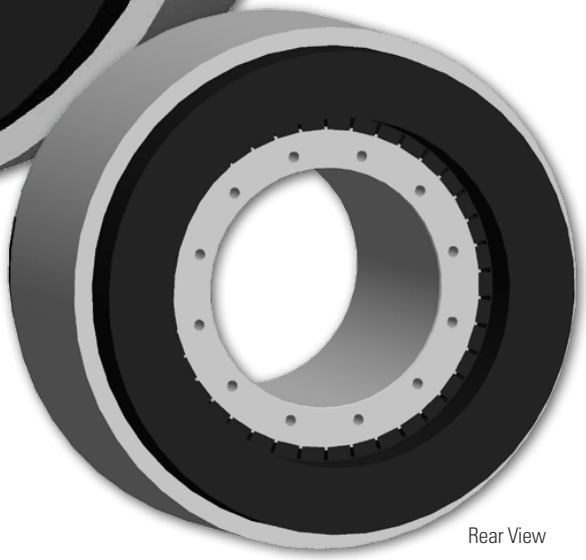
KBM 60 Frameless Motors

The KBM(S)-60 series has a patented slot / pole combination offering extremely high continuous torque capability while still maintaining very low total harmonic distortion. The higher pole count and excellent torque / volume ratio makes the KBM(S)-60 an ideal fit for direct drive applications requiring high torque at low to moderate speeds.



Front View



Rear View

MOTOR LEADS: #14 AWG Teflon® coated per UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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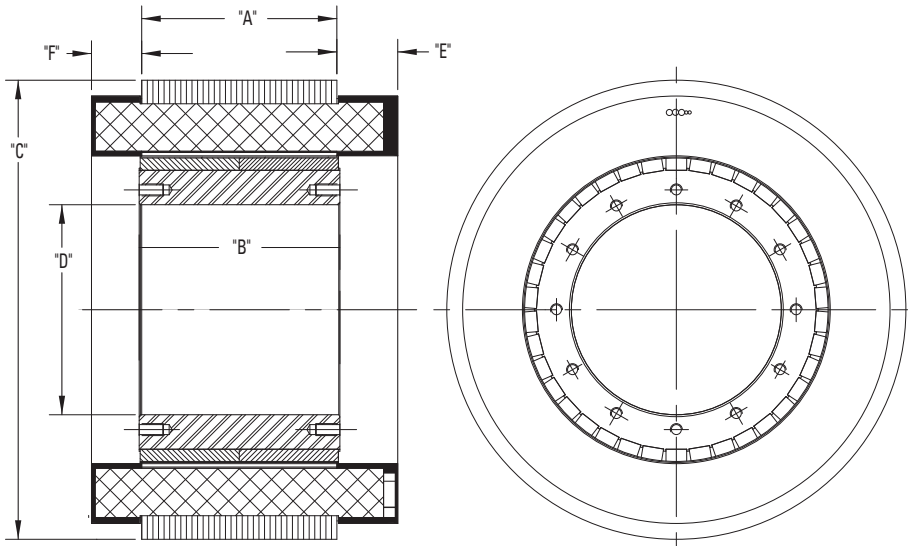
KBM 60 Outline Drawings

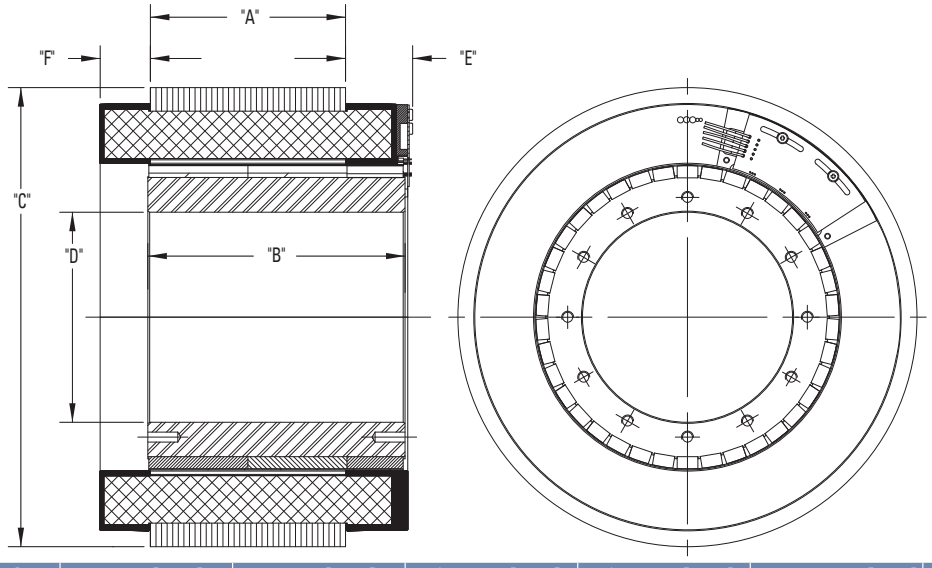
KBM 60



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBM-60X01	48.11 [1.894]	50.88 [2.003]	229.85 [9.049]	105.05 [4.136]	30.48 [1.200]	25.15 [.990]
KBM-60X02	97.71 [3.847]	100.48 [3.956]	229.85 [9.049]	105.05 [4.136]	30.48 [1.200]	25.15 [.990]
KBM-60X03	147.32 [5.800]	150.09 [5.909]	229.85 [9.049]	105.05 [4.136]	30.48 [1.200]	25.15 [.990]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 60



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBMS-60X01	48.11 [1.894]	78.99 [3.110]	229.85 [9.049]	105.05 [4.136]	33.65 [1.325]	25.15 [.990]
KBMS-60X02	97.71 [3.847]	128.78 [5.070]	229.85 [9.049]	105.05 [4.136]	33.65 [1.325]	25.15 [.990]
KBMS-60X03	147.32 [5.800]	178.31 [7.020]	229.85 [9.049]	105.05 [4.136]	33.65 [1.325]	25.15 [.990]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

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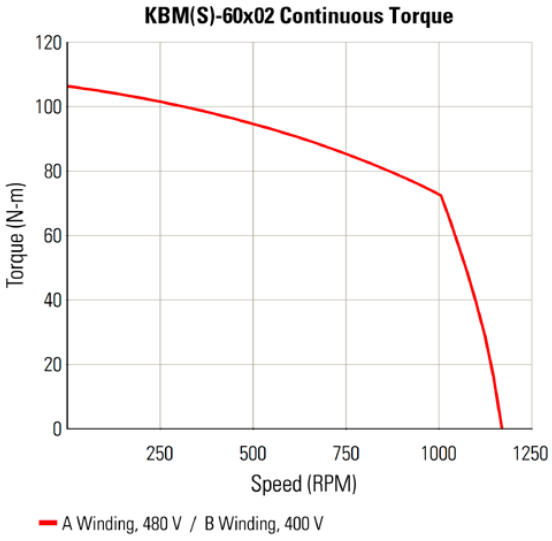
KBM 60 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.



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KBM 60 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-60XXX PERFORMANCE DATA & MOTOR PARAMETERS									
Motor Parameter	Symbol	Units	KBM(S)-60X01-X			KBM(S)-60X02-X		KBM(S)-60X03-X	
			A	B	C	A	B	A	B
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	53.9	53.9	53.9	108	108	154	154
		lb-ft	39.8	39.8	39.8	79.7	79.7	114	114
Continuous Current	Ic	Arms	13.7	16.9	22.7	16.3	19.6	18.6	24.0
Peak Stall Torque (25°C winding temp)	Tp	N-m	127	127	127	255	255	393	393
		lb-ft	93.8	93.8	93.8	188	188	290	290
Peak Current	Ip	Arms	40.0	50.4	78.0	50.4	60.4	63.3	76.8
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	4165	4165	4580	6985	6985	8350	8420
	HP Rated	HP	5.58	5.58	6.14	9.36	9.36	11.2	11.3
Speed at Rated Power	N Rated	RPM	1600	1600	1300	885	885	720	730
Torque Sensitivity (2)	Kt	N-m / Arms	4.04	3.27	2.43	6.79	5.66	8.50	7.01
		lb-ft / Arms	2.98	2.41	1.80	5.01	4.17	6.27	5.17
Back EMF Constant (3)	Kb	Vpk / kRPM	345	280	208	581	484	727	600
Motor Constant	Km	N-m/√watt	3.44	3.44	3.44	5.78	5.78	7.46	7.39
		lb-ft /√watt	2.54	2.54	2.54	4.26	4.26	5.50	5.45
Resistance (line to line)	Rm	Ohms	0.916	0.590	0.335	0.921	0.638	0.867	0.600
Inductance	Lm	mH	8.0	5.1	2.8	11	7.6	11	7.5
Inertia (KBM)	Jm	Kg-m²	1.63E-3			3.17E-2		4.75E-2	
		lb-ft-s²	1.20E-2			2.34E-2		3.50E-2	
Weight (KBM)	Wt	Kg	13.2			25.2		37.2	
		lb	29.0			55.6		82.0	
Inertia (KBMS)	Jm	Kg-m²	2.56E-2			4.20E-2		5.29E-2	
		lb-ft-s²	1.89E-2			3.10E-2		3.90E-2	
Weight (KBMS)	Wt	Kg	15.3			27.9		39.8	
		lb	33.8			61.4		87.7	
Max Static Friction	Tf	N-m	1.36			2.71		4.07	
		lb-ft	1.00			2.00		3.00	
Cogging Friction (peak-to-peak)	Tcog	N-m	1.02			2.03		3.05	
		lb-ft	0.750			1.50		2.25	
Viscous Damping	Fi	N-m/ kRPM	0.230			0.461		0.691	
		lb-ft / kRPM	0.170			0.340		0.510	
Thermal Resistance (4)	TPR	°C / watt	0.336			0.236		0.192	
Number of Poles	P	-	38			38		38	
Recommended Drive	AKD-■_ _ _ _ _		02407	02407	02406	02407	02407	02407	04807
Voltage Req'd at Rated Output	Vac Input	VAC	480	400	240	480	400	480	400
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	127	121	106	248	221	330	393
		lb-ft	93.8	89.2	78.2	183	163	243	290

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 12" x 12" x 3/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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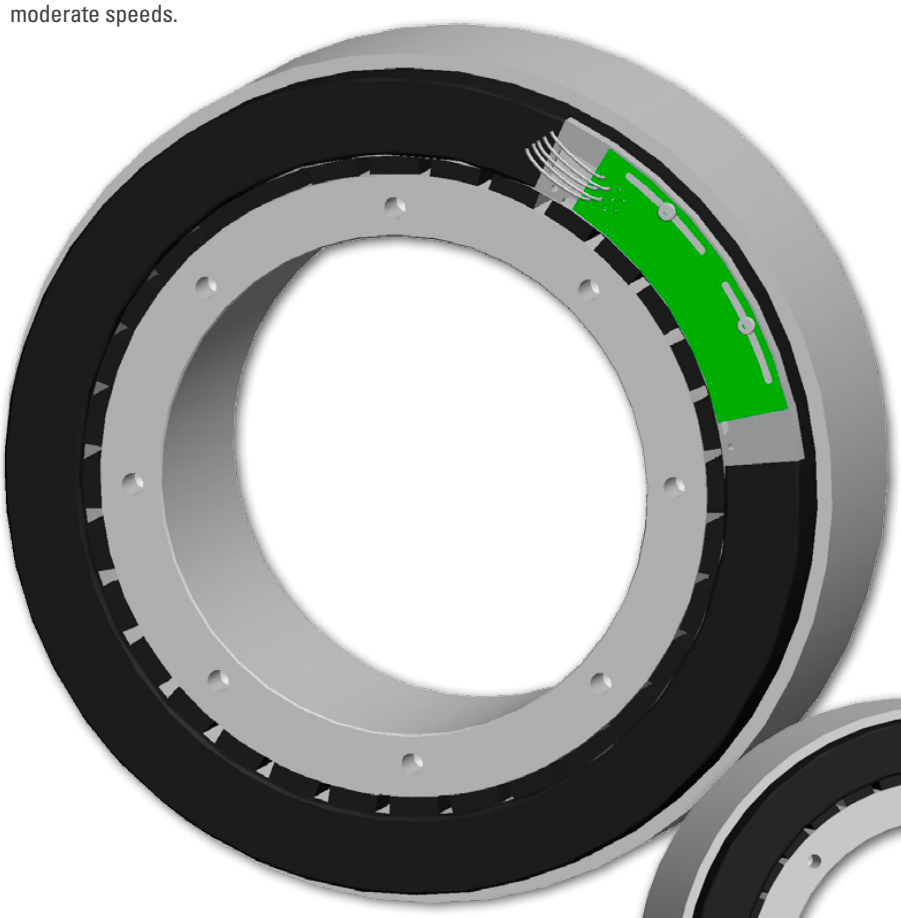
KBM 79 Frameless Motors

The KBM(S)-79 series provides a classic torque motor footprint - large diameter with a short axial length. With a skewed stator, low cogging, and low harmonic distortion these motors produce extremely smooth rotation. In addition, the high pole count and excellent torque / volume ratio makes the KBM(S)-79 an ideal fit for direct drive applications requiring high torque at low to moderate speeds.



Front View

Rear View

MOTOR LEADS: #16 AWG Teflon® coated per UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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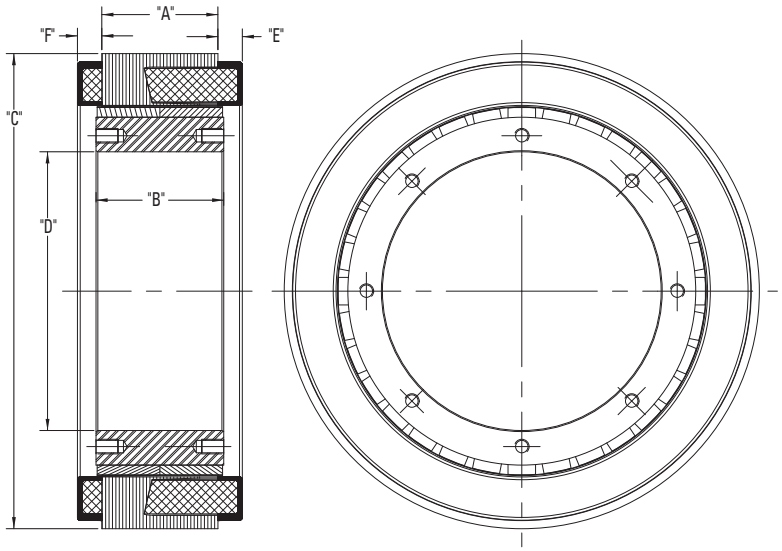
KBM 79 Outline Drawings

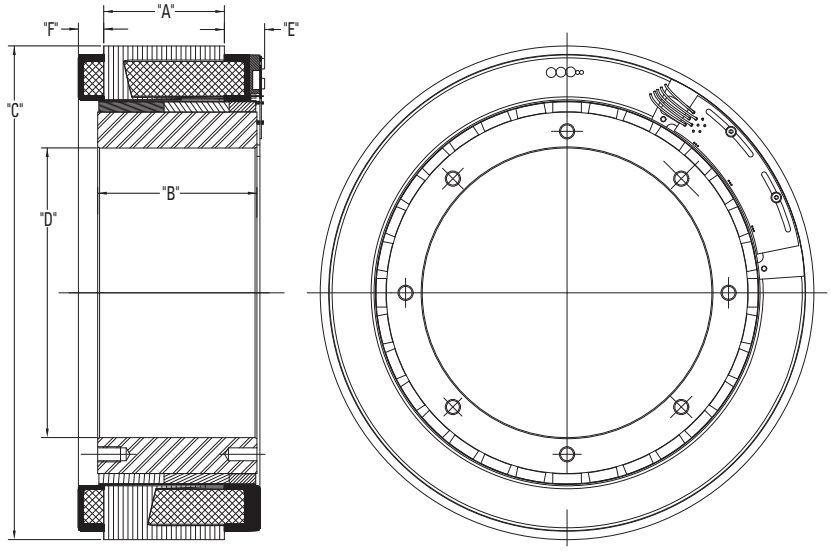
KBM 79



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBM-79X01	31.75 [1.250]	38.10 [1.500]	259.63 [10.221]	152.43 [6.001]	13.34 [.525]	13.34 [.525]
KBM-79X02	63.50 [2.500]	69.85 [2.750]	259.63 [10.221]	152.43 [6.001]	13.34 [.525]	13.34 [.525]
KBM-79X03	127.00 [5.000]	133.35 [5.250]	259.63 [10.221]	152.43 [6.001]	13.34 [.525]	13.34 [.525]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 79



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBMS-79X01	31.75 [1.250]	52.07 [2.050]	259.63 [10.221]	152.43 [6.001]	21.20 [.835]	13.34 [.525]
KBMS-79X02	63.50 [2.500]	83.82 [3.300]	259.63 [10.221]	152.43 [6.001]	21.20 [.835]	13.34 [.525]
KBMS-79X03	127.00 [5.000]	147.07 [5.790]	259.63 [10.221]	152.43 [6.001]	21.20 [.835]	13.34 [.525]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

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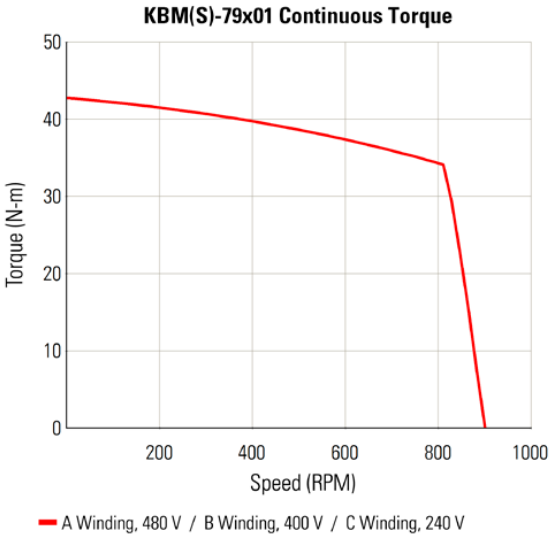
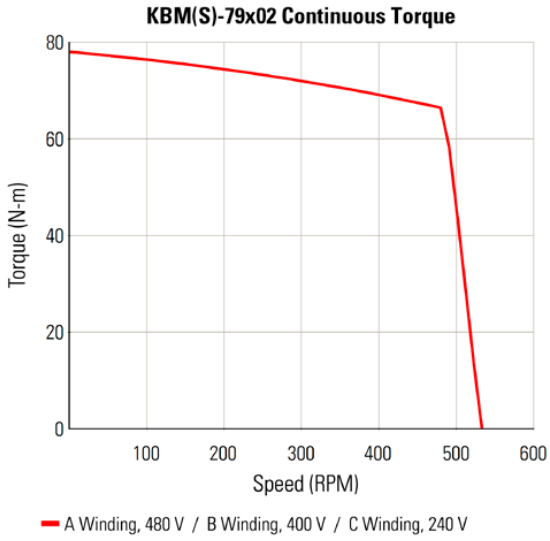
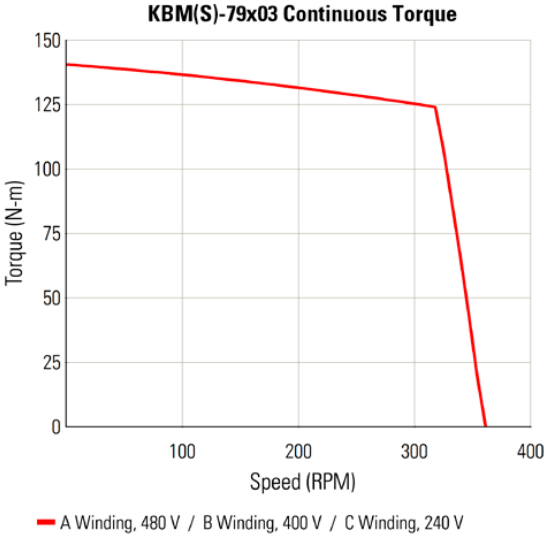
KBM 79 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.







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KBM 79 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-79XXX PERFORMANCE DATA & MOTOR PARAMETERS											
Motor Parameter	Symbol	Units	KBM(S)-79X01-X			KBM(S)-79X02-X			KBM(S)-79X03-X		
			A	B	C	A	B	C	A	B	C
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	43.5	43.5	43.5	79.6	79.6	79.6	143	143	143
		lb-ft	32.1	32.1	32.1	58.7	58.7	58.7	106	106	106
Continuous Current	Ic	Arms	4.95	6.00	10.0	5.40	6.50	11.0	6.76	8.00	13.2
Peak Stall Torque (25°C winding temp)	Tp	N-m	152	152	152	319	319	319	637	637	637
		lb-ft	112	112	112	235	235	235	470	470	470
Peak Current	Ip	Arms	20.8	25.3	41.7	26.1	31.4	52.4	36.7	46.3	73.7
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	2585	2585	2585	2920	2920	2920	3750	3750	3640
	HP Rated	HP	3.47	3.47	3.47	3.91	3.91	3.91	5.03	5.03	4.88
Speed at Rated Power	N Rated	RPM	730	730	730	430	430	430	300	300	290
Torque Sensitivity (2)	Kt	N-m / Arms	8.87	7.34	4.43	14.9	12.4	7.46	21.4	18.1	11.0
		lb-ft / Arms	6.54	5.42	3.27	11.0	9.17	5.50	15.8	13.4	8.10
Back EMF Constant (3)	Kb	Vpk / kRPM	758	628	379	1275	1062	637	1832	1550	939
Motor Constant	Km	N-m/√watt	2.89	2.89	2.89	4.81	4.81	4.81	7.29	7.29	7.29
		lb-ft/√watt	2.13	2.13	2.13	3.55	3.55	3.55	5.38	5.38	5.38
Resistance (line to line)	Rm	Ohms	6.26	4.25	1.56	6.40	4.44	1.60	5.75	3.86	1.47
Inductance	Lm	mH	23	16	5.8	32	22	8.0	34	24	8.9
Inertia (KBM)	Jm	Kg-m²	3.25E-2			5.97E-2			0.114		
		lb-ft-s²	2.40E-2			4.40E-2			8.40E-2		
Weight (KBM)	Wt	Kg	9.21			16.9			32.1		
		lb	20.3			37.3			70.8		
Inertia (KBMS)	Jm	Kg-m²	4.45E-2			7.15E-2			0.125		
		lb-ft-s²	3.28E-2			5.27E-2			9.20E-2		
Weight (KBMS)	Wt	Kg	10.7			18.40			33.5		
		lb	23.5			40.5			73.9		
Max Static Friction	Tf	N-m	0.407			0.746			1.36		
		lb-ft	0.300			0.550			1.00		
Cogging Friction (peak-to-peak)	Tcog	N-m	0.136			0.244			0.447		
		lb-ft	0.100			0.180			0.330		
Viscous Damping	Fi	N-m/kRPM	2.44			15.5			31.2		
		lb-ft /kRPM	1.80			11.4			23.0		
Thermal Resistance (4)	TPR	°C / watt	0.377			0.311			0.220		
Number of Poles	P	-	32			32			32		
Recommended Drive	AKD-■_ _ _ _ _		00607	01207	02406	00607	01207	02406	01207	01207	02406
Voltage Req'd at Rated Output	Vac Input	VAC	480	400	240	480	400	240	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	144	152	152	250	310	296	550	475	475
		lb-ft	106	112	112	184	228	218	406	350	350

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 12" x 12" x 3/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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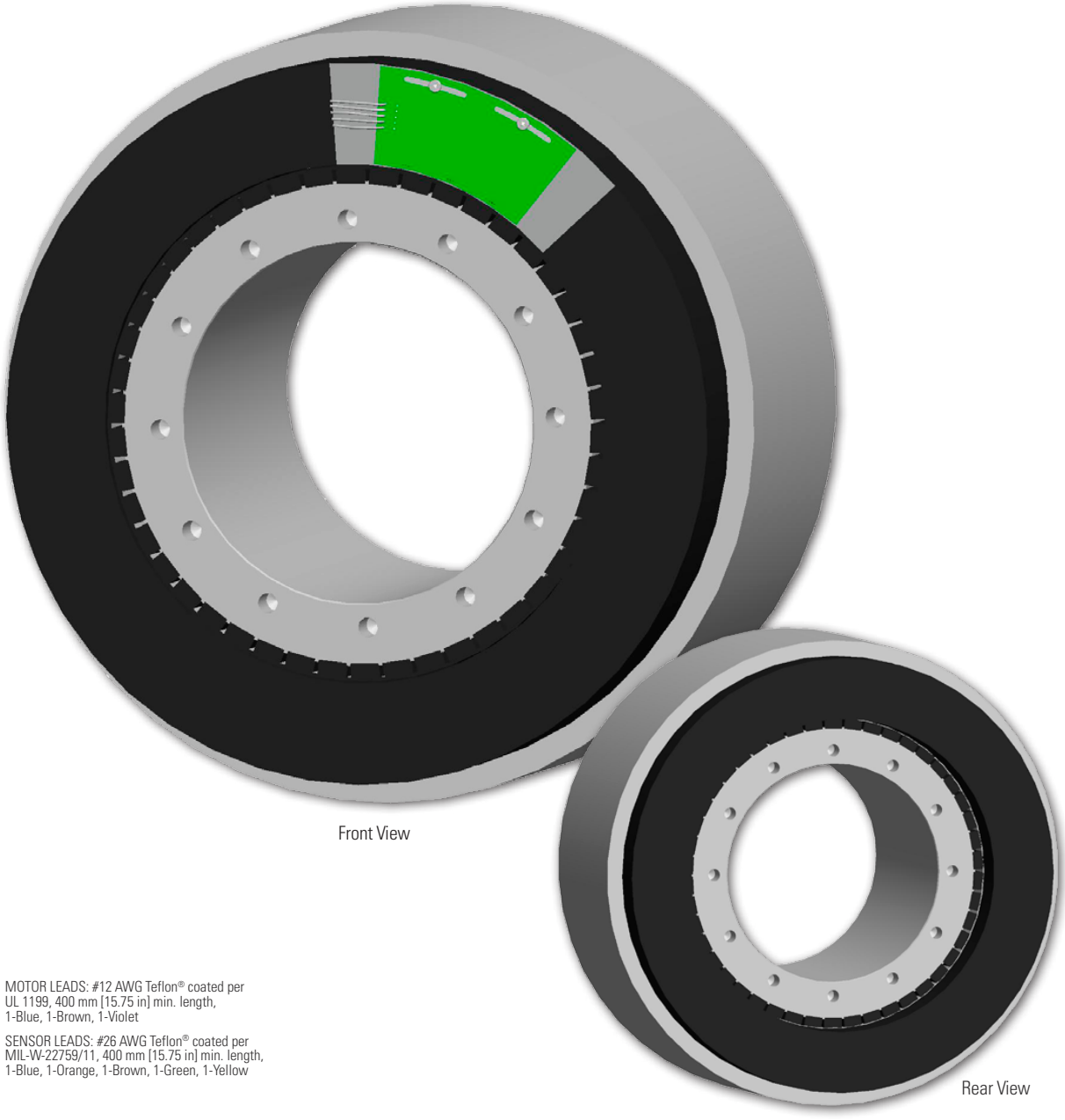
KBM 88 Frameless Motors

The KBM(S)-88 series has a patented slot / pole combination offering extremely high continuous torque capability while still maintaining very low total harmonic distortion. The higher pole count and excellent torque / volume ratio makes the KBM(S)-88 an ideal fit for direct drive applications requiring high torque at low to moderate speeds.



Front View

Rear View

MOTOR LEADS: #12 AWG Teflon® coated per UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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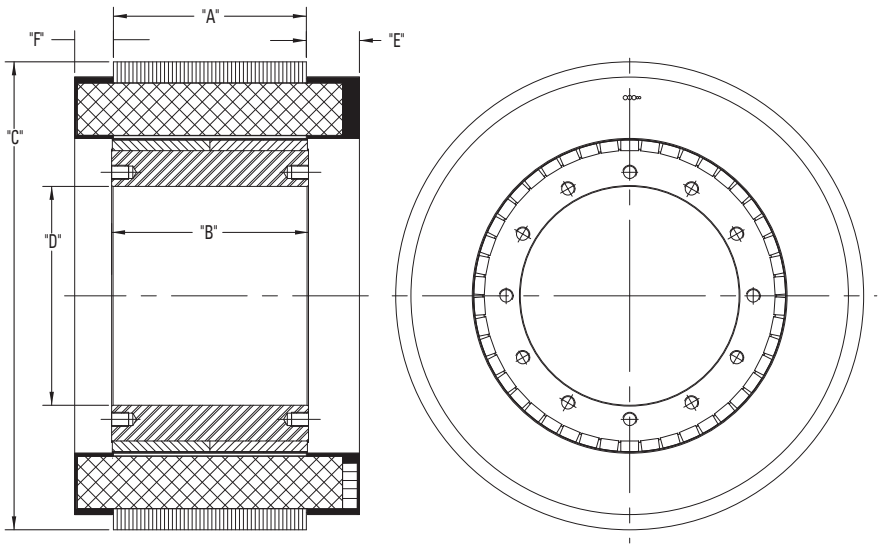
KBM 88 Outline Drawings

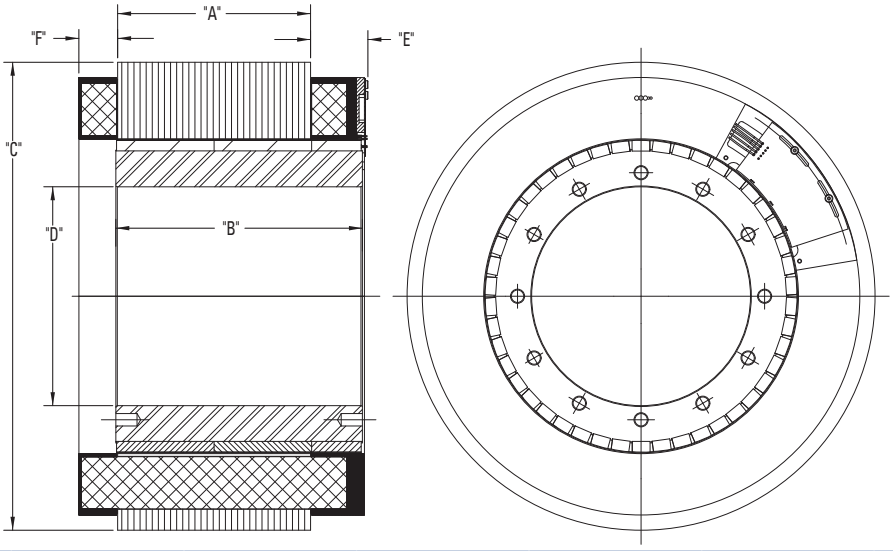
KBM 88



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBM-88X01	67.56 [2.660]	70.36 [2.770]	331.46 [13.049]	155.01 [6.103]	37.59 [1.480]	27.43 [1.080]
KBM-88X02	136.65 [5.380]	139.44 [5.490]	331.46 [13.049]	155.01 [6.103]	37.59 [1.480]	27.43 [1.080]
KBM-88X03	205.74 [8.100]	208.53 [8.210]	331.46 [13.049]	155.01 [6.103]	37.59 [1.480]	27.43 [1.080]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 88



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBMS-88X01	67.56 [2.660]	105.41 [4.150]	331.46 [13.049]	155.01 [6.103]	40.64 [1.600]	27.43 [1.080]
KBMS-88X02	136.65 [5.380]	174.63 [6.875]	331.46 [13.049]	155.01 [6.103]	40.64 [1.600]	27.43 [1.080]
KBMS-88X03	205.74 [8.100]	243.84 [9.600]	331.46 [13.049]	155.01 [6.103]	40.64 [1.600]	27.43 [1.080]

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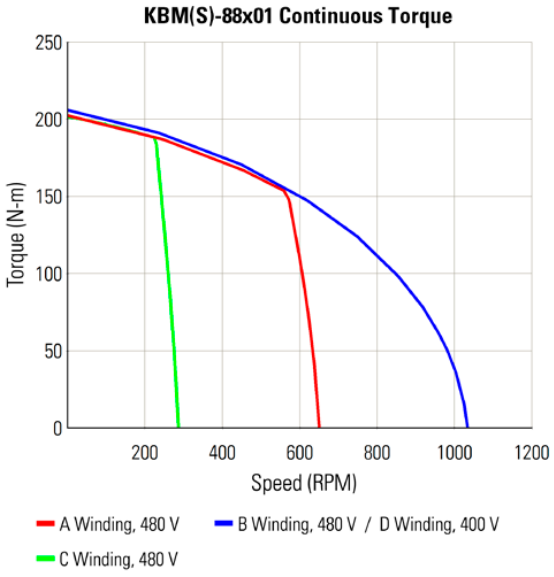
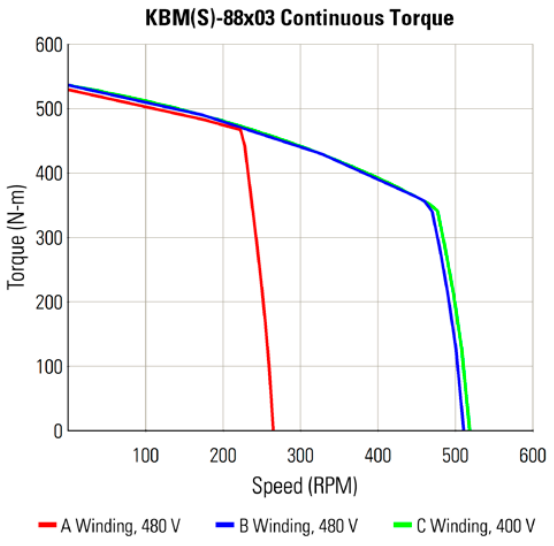
KBM 88 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.





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KBM 88 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-88XXX PERFORMANCE DATA & MOTOR PARAMETERS												
Motor Parameter	Symbol	Units	KBM(S)-88X01-X				KBM(S)-88X02-X			KBM(S)-88X03-X		
			A	B	C	D	A	B	C	A	B	C
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	205	209	205	207	385	385	385	538	545	545
		lb-ft	151	154	151	153	284	284	284	397	402	402
Continuous Current	Ic	Arms	17.1	32.1	7.50	40.2	15.1	32.1	37.9	18.2	35.5	45.2
Peak Stall Torque (25°C winding temp)	Tp	N-m	414	414	414	414	789	789	789	1200	1200	1200
		lb-ft	305	305	305	305	582	582	582	885	885	885
Peak Current	Ip	Arms	40.0	75.4	17.8	94.7	40.0	75.4	89.0	53.1	106	134
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	8250	6600	3870	6600	7950	13430	13430	10450	16000	16000
	HP Rated	HP	11.1	8.85	5.19	8.85	10.7	18.0	18.0	14.0	21.4	21.4
Speed at Rated Power	N Rated	RPM	520	940	205	940	235	550	550	225	425	425
Torque Sensitivity (2)	Kt	N-m / Arms	12.2	6.57	27.7	5.18	25.7	12.1	10.3	30.0	15.5	12.8
		lb-ft / Arms	9.00	4.85	20.5	3.82	19.0	8.95	7.59	22.1	11.5	9.4
Back EMF Constant (3)	Kb	Vpk / kRPM	1044	562	2372	443	2201	1037	880	2563	1329	1092
Motor Constant	Km	N-m/√watt	10.3	10.5	10.2	10.4	16.3	16.3	16.3	20.6	20.9	20.9
		lb-ft /√watt	7.62	7.75	7.60	7.70	12.0	12.0	12.0	15.2	15.4	15.4
Resistance (line to line)	Rm	Ohms	0.930	0.261	4.90	0.164	1.66	0.369	0.262	1.41	0.370	0.250
Inductance	Lm	mH	13	3.7	67	2.3	29	6.4	4.6	26	7.0	4.7
Inertia (KBM)	Jm	Kg-m²	9.84E-2				0.198			0.298		
		lb-ft-s²	7.26E-2				0.146			0.220		
Weight (KBM)	Wt	Kg	37.6				72.6			106		
		lb	83.0				160			234		
Inertia (KBMS)	Jm	Kg-m²	0.146				0.247			0.315		
		lb-ft-s²	0.108				0.182			0.232		
Weight (KBMS)	Wt	Kg	42.6				77.6			111		
		lb	94.0				171			245		
Max Static Friction	Tf	N-m	2.17				4.34			6.51		
		lb-ft	1.60				3.20			4.80		
Cogging Friction (peak-to-peak)	Tcog	N-m	1.63				3.25			4.88		
		lb-ft	1.20				2.40			3.60		
Viscous Damping	Fi	N-m/ kRPM	0.773				1.53			2.30		
		lb-ft / kRPM	0.570				1.13			1.70		
Thermal Resistance (4)	TPR	°C / watt	0.215				0.152			0.124		
Number of Poles	P	-	46				46			46		
Recommended Drive	AKD-■_ _ _ _ _		02407	04807	01207	04807	02407	04807	04807	02407	04807	04807
Voltage Req'd at Rated Output	Vac Input	VAC	480	480	480	400	480	480	400	480	480	400
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	414	414	414	414	789	789	789	1150	1120	1018
		lb-ft	305	305	305	305	582	582	582	848	826	750

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a 20" x 20" x 3/4" heat sink or equivalent.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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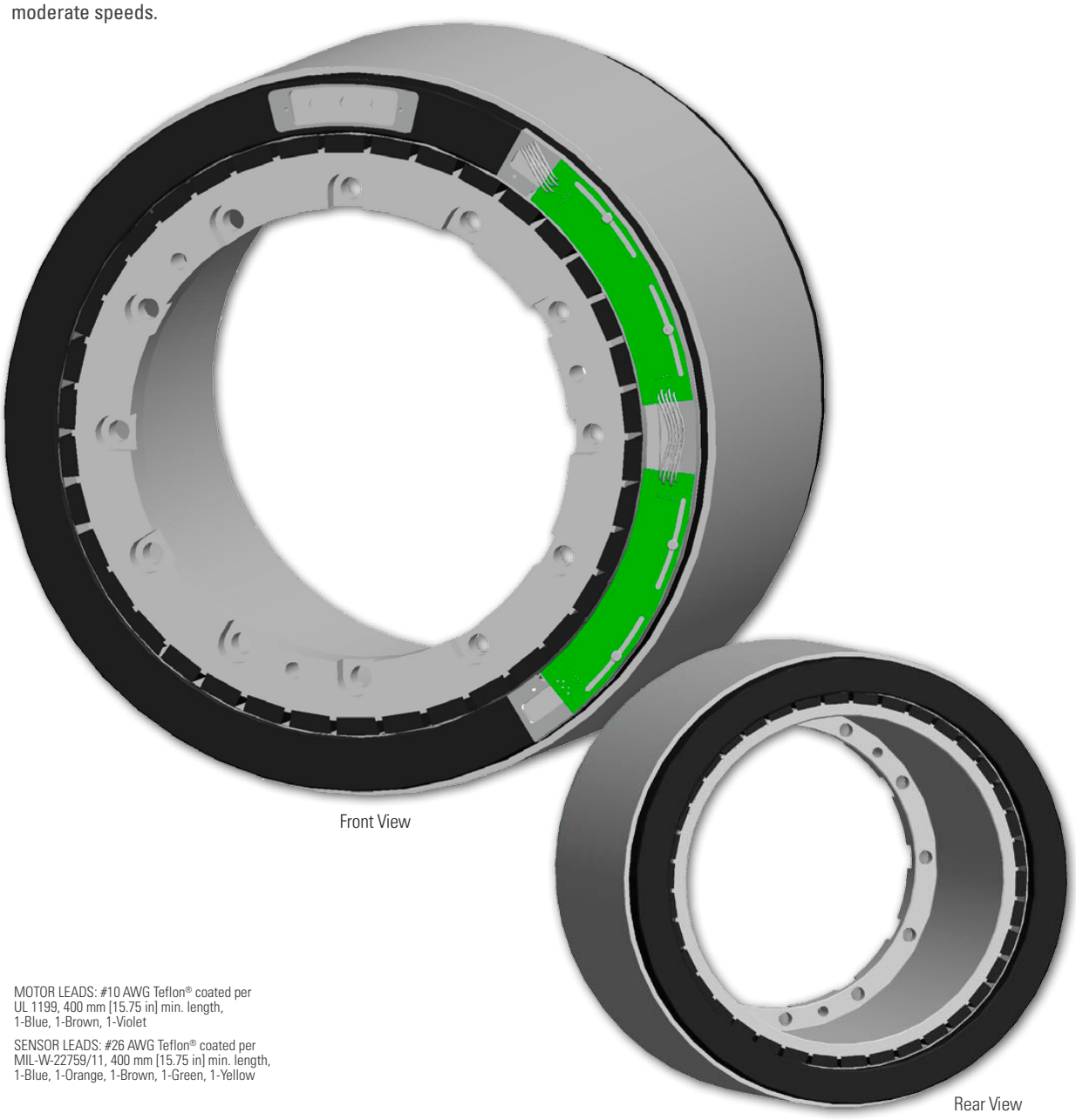
KBM 118 Frameless Motors

The KBM(S)-118 series provides a classic torque motor footprint - large diameter with a short axial length. With a skewed stator, low cogging, and low harmonic distortion these motors produce extremely smooth rotation. In addition, the high pole count and excellent torque / volume ratio makes the KBM(S)-118 an ideal fit for direct drive applications requiring high torque at low to moderate speeds.



Front View

Rear View

MOTOR LEADS: #10 AWG Teflon® coated per UL 1199, 400 mm [15.75 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 400 mm [15.75 in] min. length, 1-Blue, 1-Orange, 1-Brown, 1-Green, 1-Yellow

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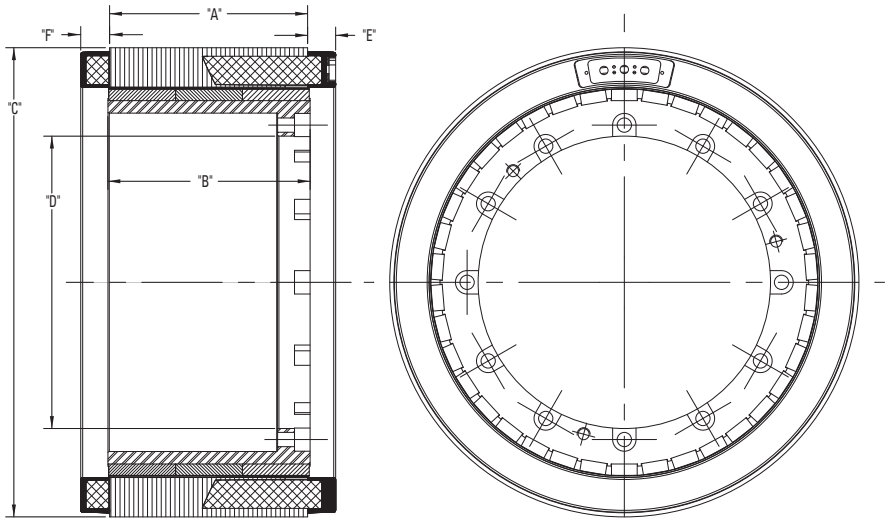
KBM 118 Outline Drawings

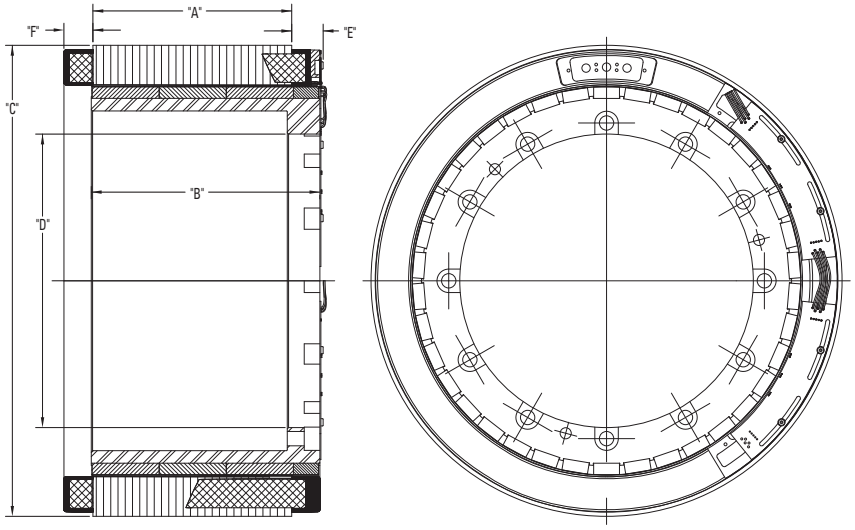
KBM 118



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBM-118X01	101.60 [4.000]	104.14 [4.100]	361.11 [14.217]	225.04 [8.860]	21.59 [.850]	22.23 [.875]
KBM-118X02	152.40 [6.000]	155.58 [6.125]	361.11 [14.217]	225.04 [8.860]	21.59 [.850]	22.23 [.875]
KBM-118X03	203.20 [8.000]	207.26 [8.160]	361.11 [14.217]	225.04 [8.860]	21.59 [.850]	22.23 [.875]
KBM-118X04	254.00 [10.000]	258.69 [10.185]	361.11 [14.217]	225.04 [8.860]	21.59 [.850]	22.23 [.875]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 118



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	"E" MAX mm[inch]	"F" MAX mm[inch]
KBMS-118X01	101.60 [4.000]	123.83 [4.875]	361.11 [14.217]	225.04 [8.860]	26.03 [1.025]	22.23 [.875]
KBMS-118X02	152.40 [6.000]	175.26 [6.900]	361.11 [14.217]	225.04 [8.860]	26.03 [1.025]	22.23 [.875]
KBMS-118X03	203.20 [8.000]	226.70 [8.925]	361.11 [14.217]	225.04 [8.860]	26.03 [1.025]	22.23 [.875]
KBMS-118X04	254.00 [10.000]	278.13 [10.950]	361.11 [14.217]	225.04 [8.860]	26.03 [1.025]	22.23 [.875]

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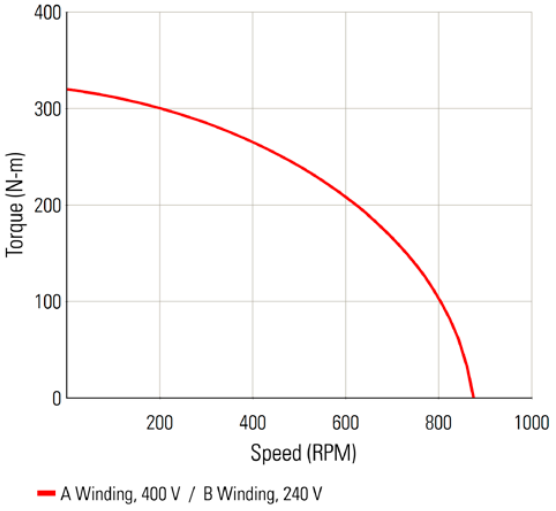
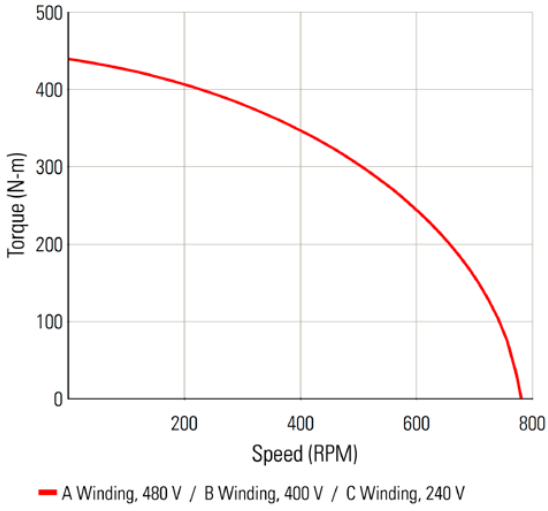
KBM 118 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.

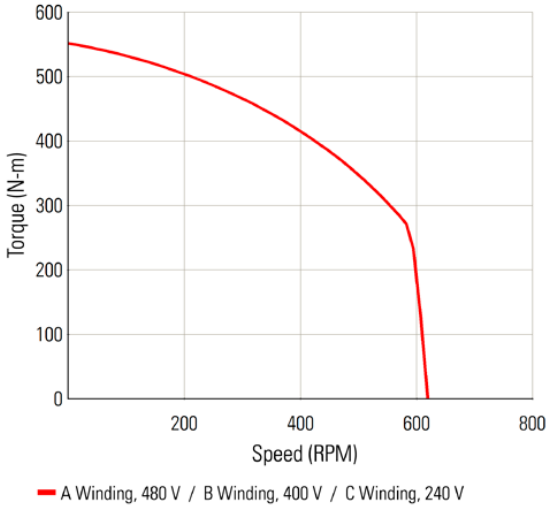
KBM(S)-118x01 Continuous Torque



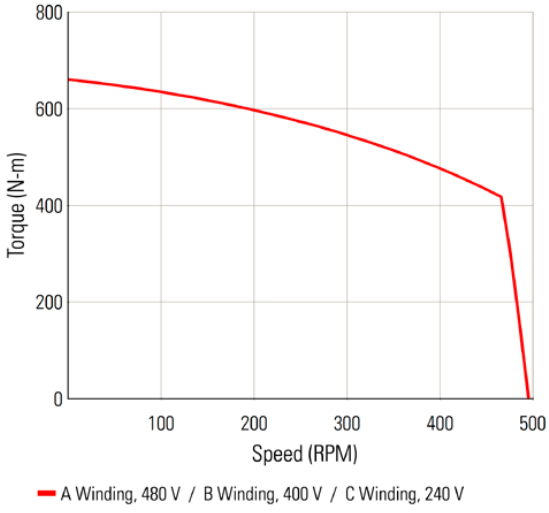
KBM(S)-118x02 Continuous Torque



KBM(S)-118x03 Continuous Torque



KBM(S)-118x04 Continuous Torque



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KBM 118 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-118XXX PERFORMANCE DATA & MOTOR PARAMETERS													
Motor Parameter	Symbol	Units	KBM(S)-118X01-X		KBM(S)-118X02-X			KBM(S)-118X03-X			KBM(S)-118X04-X		
			A	B	A	B	C	A	B	C	A	B	C
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	325	325	446	446	446	560	560	560	672	672	672
		lb-ft	239	239	329	329	329	413	413	413	495	495	495
Continuous Current	Ic	Arms	43.7	76.5	47.0	57.0	94.5	44.0	54.0	89.5	42.8	51.5	86.0
Peak Stall Torque (25°C winding temp)	Tp	N-m	994	994	1451	1451	1451	1932	1932	1932	2400	2400	2400
		lb-ft	733	733	1070	1070	1070	1425	1425	1425	1770	1770	1770
Peak Current	Ip	Arms	151	265	171	206	343	171	206	343	171	206	343.0
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	9000	9000	10350	10350	10350	17000	17000	17000	19850	19850	19850
	HP Rated	HP	12.1	12.1	13.9	13.9	13.9	22.8	22.8	22.8	26.6	26.6	26.6
Speed at Rated Power	N Rated	RPM	785	785	710	710	710	535	535	535	420	420	420
Torque Sensitivity (2)	Kt	N-m / Arms	7.58	4.33	9.66	8.05	4.83	12.8	10.7	6.40	16.0	13.4	8.00
		lb-ft / Arms	5.59	3.20	7.13	5.94	3.56	9.46	7.88	4.72	11.8	9.8	5.90
Back EMF Constant (3)	Kb	Vpk / kRPM	648	371	826	689	413	1096	913	547	1371	1142	684
Motor Constant	Km	N-m/√watt	11.8	11.8	14.6	14.6	14.6	17.1	17.1	17.1	19.4	19.4	19.4
		lb-ft /√watt	8.70	8.70	10.8	10.8	10.8	12.6	12.6	12.6	14.3	14.3	14.3
Resistance (line to line)	Rm	Ohms	0.276	0.088	0.292	0.191	0.073	0.373	0.259	0.093	0.455	0.298	0.112
Inductance	Lm	mH	2.5	0.82	2.7	1.9	0.70	4.3	3.0	1.1	4.5	3.0	1.2
Inertia (KBM)	Jm	Kg-m²	0.267		0.396			0.542			0.648		
		lb-ft-s²	0.197		0.292			0.400			0.478		
Weight (KBM)	Wt	Kg	37.1		53.5			71.7			88.5		
		lb	81.8		118			158			195		
Inertia (KBMS)	Jm	Kg-m²	0.315		0.403			0.591			0.698		
		lb-ft-s²	0.232		0.297			0.436			0.515		
Weight (KBMS)	Wt	Kg	39.2		56.2			73.9			90.7		
		lb	86.4		124			163			200		
Max Static Friction	Tf	N-m	6.39		9.57			12.8			16.0		
		lb-ft	4.71		7.06			9.42			11.8		
Cogging Friction (peak-to-peak)	Tcog	N-m	3.16		4.79			6.39			8.13		
		lb-ft	2.33		3.53			4.71			6.00		
Viscous Damping	Fi	N-m/ kRPM	38.8		59.7			81.3			100		
		lb-ft / kRPM	28.6		44.0			60.0			74.0		
Thermal Resistance (4)	TPR	°C / watt	0.110		0.089			0.078			0.069		
Number of Poles	P	-	38		38			38			38		
Recommended Drive	AKD-■_ _ _ _ _		04807	09607	04807	09607	09607	04807	09607	09607	04807	09607	09607
Voltage Req'd at Rated Output	Vac Input	VAC	400	240	480	400	240	480	400	240	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	700	760	890	1380	895	1261	1835	1184	1470	2282	1485
		lb-ft	516	560	656	1017	660	930	1352	874	1084	1682	1095

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes the motor is housed and mounted to a heat sink.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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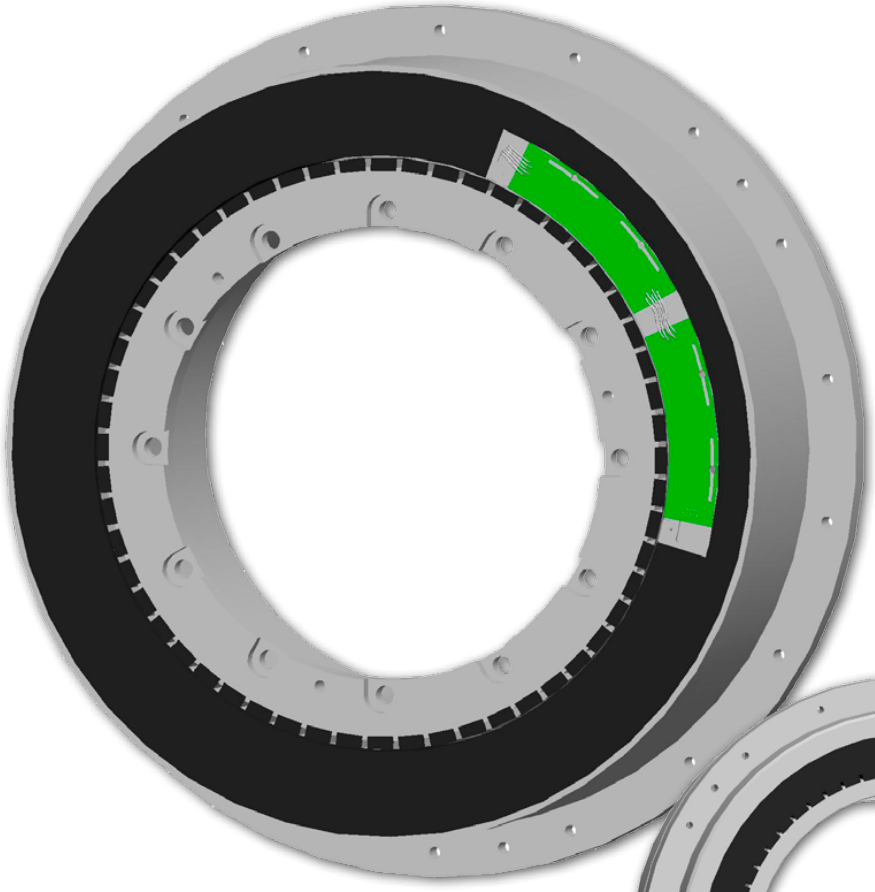
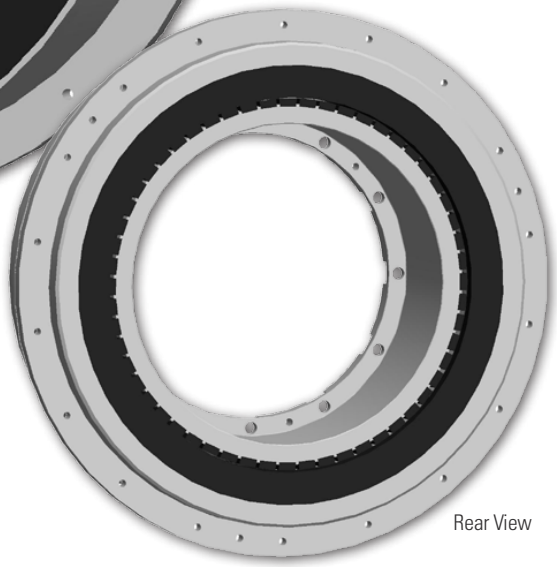
KBM 163 Frameless Motors

The KBM(S)-163 series provides a classic torque motor footprint - large diameter with short axial length, high pole count, and large rotor thru-bore. Aluminum armature sleeve and steel rotor hub provide pilot diameter engagement surfaces and bolted mounting joints for simple installation. With very low cogging, low total harmonic distortion, and high torque capacity, the KBM(S)-163 is a great performer in the most demanding applications.



Front View



Rear View

MOTOR LEADS: #10 AWG Teflon® insulated per UL 1199, 900 mm [35 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 900 mm [35 in] min. length, 1-Blue, 1-Green, 1-Brown, 1-Orange, 1-Yellow

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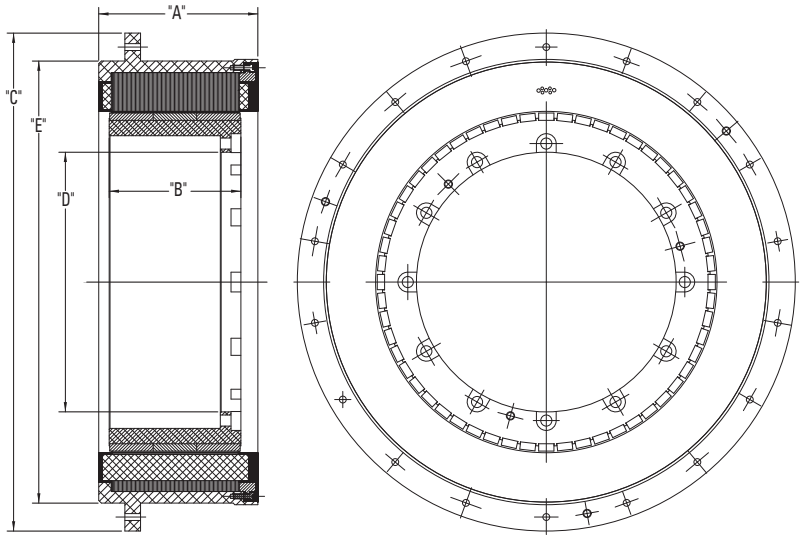
KBM 163 Outline Drawings

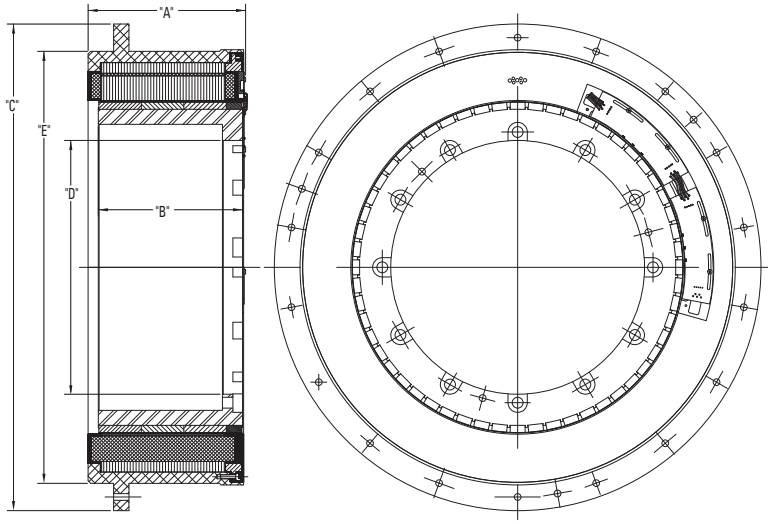
KBM 163



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	∅ "E" mm[inch]
KBM-163X01	142.54 [5.612]	106.93 [4.210]	605.0 [23.82]	315.50 [12.421]	537.08 [21.145]
KBM-163X02	193.34 [7.612]	160.02 [6.300]	605.0 [23.82]	315.50 [12.421]	537.08 [21.145]
KBM-163X03	244.14 [9.612]	213.11 [8.390]	605.0 [23.82]	315.50 [12.421]	537.08 [21.145]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 163



Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	∅ "E" mm[inch]
KBMS-163X01	142.54 [5.612]	126.24 [4.970]	605.0 [23.82]	315.50 [12.421]	537.08 [21.145]
KBMS-163X02	193.34 [7.612]	179.32 [7.060]	605.0 [23.82]	315.50 [12.421]	537.08 [21.145]
KBMS-163X03	244.14 [9.612]	232.41 [9.150]	605.0 [23.82]	315.50 [12.421]	537.08 [21.145]

All dimensions are nominal. For additional dimensional data, 2D and 3D drawings, visit www.kollmorgen.com/kbm

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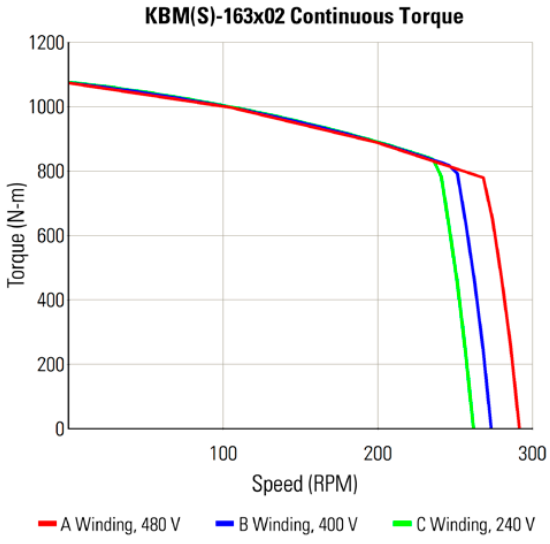
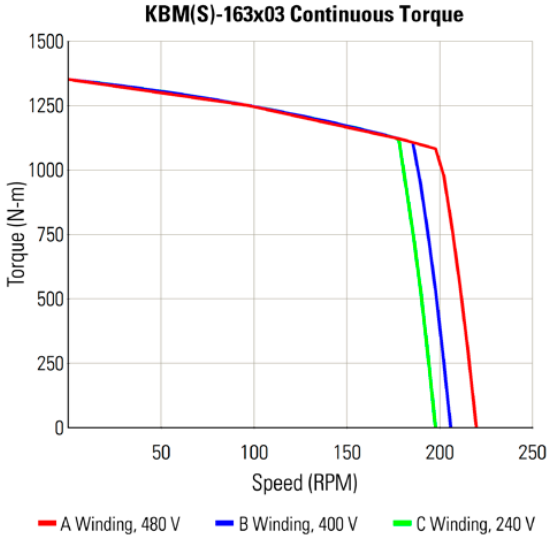
KBM 163 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.





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KBM 163 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-163XXX PERFORMANCE DATA & MOTOR PARAMETERS											
Motor Parameter	Symbol	Units	KBM(S)-163X01-X			KBM(S)-163X02-X			KBM(S)-163X03-X		
			A	B	C	A	B	C	A	B	C
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	776	776	776	1090	1090	1090	1376	1376	1376
		lb-ft	572	572	572	804	804	804	1015	1015	1015
Continuous Current	Ic	Arms	43.3	49.0	78.5	40.6	46.0	73.0	38.6	44.0	70.0
Peak Stall Torque (25°C winding temp)	Tp	N-m	1966	1966	1966	2915	2915	2915	3932	3932	3932
		lb-ft	1450	1450	1450	2150	2150	2150	2900	2900	2900
Peak Current	Ip	Arms	140	158	253	140	158	253	140	157	253
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	17300	17400	17300	20100	19120	18065	20100	18810	17420
	HP Rated	HP	23.2	23.3	23.2	26.9	25.6	24.2	26.9	25.2	23.4
Speed at Rated Power	N Rated	RPM	375	350	335	245	225	215	180	165	160
Torque Sensitivity (2)	Kt	N-m / Arms	18.1	16.1	10.1	27.2	24.2	15.1	36.2	32.2	20.1
		lb-ft / Arms	13.4	11.9	7.4	20.1	17.8	11.1	26.7	23.7	14.8
Back EMF Constant (3)	Kb	Vpk / kRPM	1552	1379	860	2326	2067	1292	3094	2750	1719
Motor Constant	Km	N-m/√watt	25.6	25.6	25.6	32.5	32.5	32.5	38.2	38.2	38.2
		lb-ft /√watt	18.9	18.9	18.9	24.0	24.0	24.0	28.2	28.2	28.2
Resistance (line to line)	Rm	Ohms	0.336	0.267	0.104	0.467	0.372	0.145	0.598	0.476	0.185
Inductance	Lm	mH	4.2	3.3	1.3	6.3	5.0	1.9	8.4	6.6	2.6
Inertia (KBM)	Jm	Kg-m²	1.06			1.57			1.68		
		lb-ft-s²	0.785			1.16			1.24		
Weight (KBM)	Wt	Kg	90.7			131			161		
		lb	200			288			355		
Inertia (KBMS)	Jm	Kg-m²	1.23			1.72			1.83		
		lb-ft-s²	0.905			1.27			1.35		
Weight (KBMS)	Wt	Kg	96.2			136			166		
		lb	212			300			365		
Max Static Friction	Tf	N-m	9.49			14.2			19.0		
		lb-ft	7.00			10.5			14.0		
Cogging Friction (peak-to-peak)	Tcog	N-m	4.07			5.42			8.13		
		lb-ft	3.00			4.00			6.00		
Viscous Damping	Fi	N-m/ kRPM	182			294			407		
		lb-ft / kRPM	134			217			300		
Thermal Resistance (4)	TPR	°C / watt	0.092			0.075			0.065		
Number of Poles	P	-	56			56			56		
Recommended Drive	AKD-■_ _ _ _ _		04807	09607	09607	04807	09607	09607	04807	09607	09607
Voltage Req'd at Rated Output	Vac Input	VAC	480	400	240	480	400	240	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	1583	1966	1710	2375	2915	2520	3165	3932	3400
		lb-ft	1168	1450	1260	1752	2150	1857	2334	2900	2507

* Notes 1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes the motor is housed and mounted to a heat sink.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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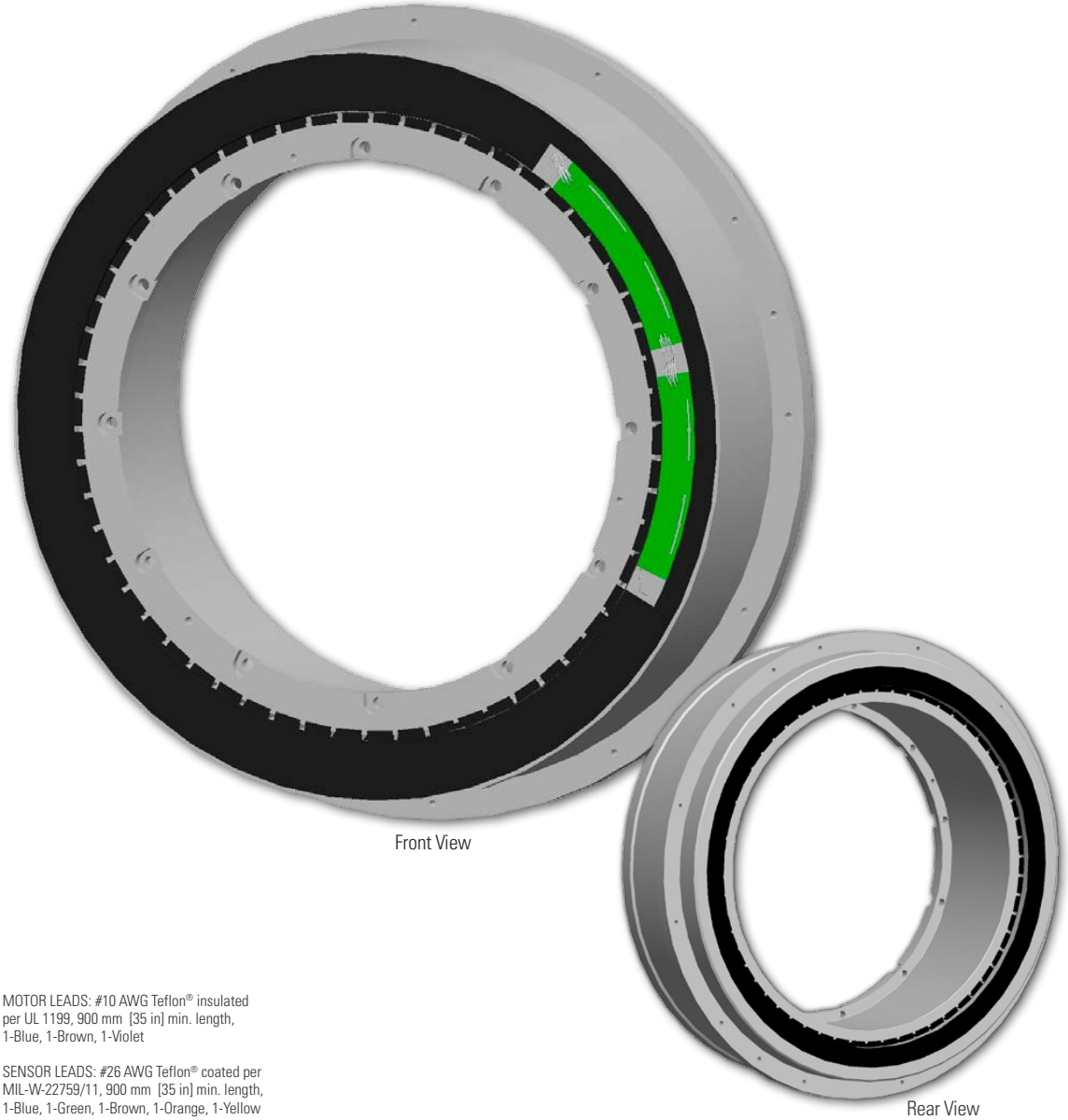
KBM 260 Frameless Motors

The KBM(S)-260 series provides a classic torque motor footprint - large diameter with short axial length, high pole count, and large rotor thru-bore. Aluminum armature sleeve and steel rotor hub provide pilot diameter engagement surfaces and bolted mounting joints for simple installation. With very low cogging, low total harmonic distortion, and high torque capacity, the largest member of the KBM(S) family is a great performer in the most demanding applications.



Front View

Rear View

MOTOR LEADS: #10 AWG Teflon® insulated per UL 1199, 900 mm [35 in] min. length, 1-Blue, 1-Brown, 1-Violet

SENSOR LEADS: #26 AWG Teflon® coated per MIL-W-22759/11, 900 mm [35 in] min. length, 1-Blue, 1-Green, 1-Brown, 1-Orange, 1-Yellow

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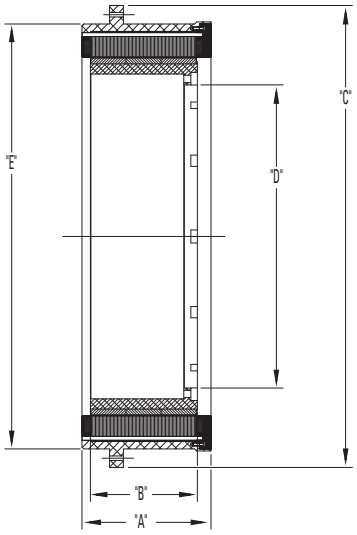
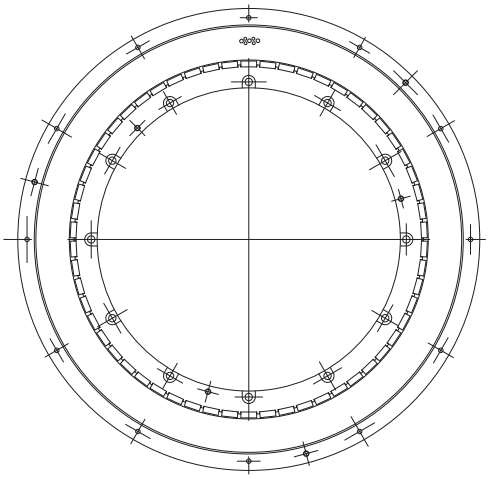
KBM 260 Outline Drawings

KBM 260

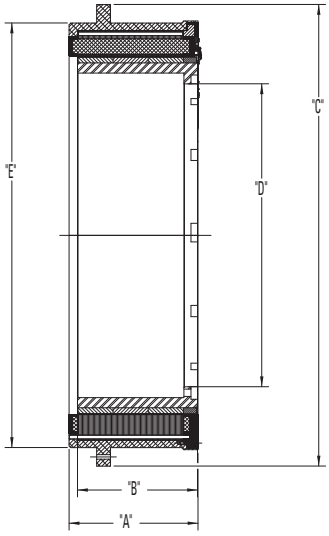


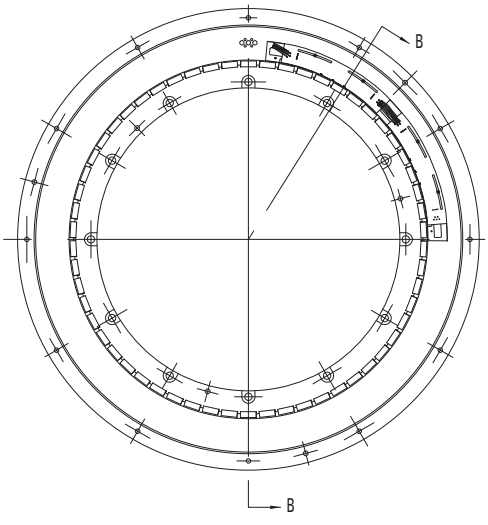


Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	∅ "E" mm[inch]
KBM-260X01	172.62 [6.796]	132.08 [5.200]	850.0 [33.46]	557.85 [21.962]	781.81 [30.780]
KBM-260X02	237.39 [9.346]	196.85 [7.750]	850.0 [33.46]	557.85 [21.962]	781.81 [30.780]
KBM-260X03	302.16 [11.896]	261.62 [10.300]	850.0 [33.46]	557.85 [21.962]	781.81 [30.780]

All dimensions are nominal. For more detailed and interactive 3D models with 2D product views, visit www.kollmorgen.com/kbm

KBMS 260





Model Number	"A" mm[inch]	"B" mm[inch]	∅ "C" mm[inch]	∅ "D" mm[inch]	∅ "E" mm[inch]
KBMS-260X01	172.62 [6.796]	156.21 [6.150]	850.0 [33.46]	557.85 [21.962]	781.81 [30.780]
KBMS-260X02	237.39 [9.346]	220.98 [8.700]	850.0 [33.46]	557.85 [21.962]	781.81 [30.780]
KBMS-260X03	302.16 [11.896]	285.75 [11.250]	850.0 [33.46]	557.85 [21.962]	781.81 [30.780]

All dimensions are nominal. For additional dimensional data, 2D and 3D drawings, visit www.kollmorgen.com/kbm

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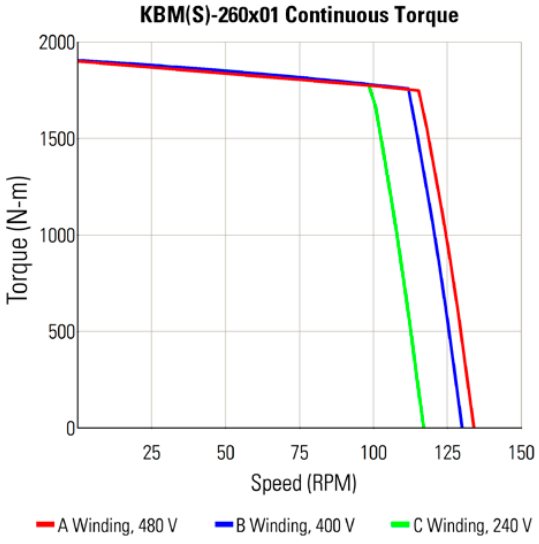
KBM 260 Perfomance Curves

Continuous duty capability for 130°C rise in a 25°C ambient using recommended AKD servo drive and sinusoidal commutation.



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KBM 260 Perfomance Data

KBM(S) Frameless Motor Series

KBM(S)-260XXX PERFORMANCE DATA & MOTOR PARAMETERS											
Motor Parameter	Symbol	Units	KBM(S)-260X01-X			KBM(S)-260X02-X			KBM(S)-260X03-X		
			A	B	C	A	B	C	A	B	C
Continuous Stall Torque at 25°C Amb. (1)	Tc	N-m	1932	1932	1932	2706	2706	2706	3445	3445	3445
		lb-ft	1425	1425	1425	1996	1996	1996	2540	2540	2540
Continuous Current	Ic	Arms	33.1	39.0	58.0	31.0	36.5	54.5	29.5	34.5	52.0
Peak Stall Torque (25°C winding temp)	Tp	N-m	6494	6494	6494	9742	9742	9742	12812	12812	12812
		lb-ft	4790	4790	4790	7185	7185	7185	9450	9450	9450
Peak Current	Ip	Arms	147	171	257	147	171	257	147	171	262
Rated Continuous Output Power at 25°C Amb. (1)	P Rated	Watts	18500	17675	16100	17150	16400	14715	16200	15570	13710
	HP Rated	HP	24.8	23.7	21.6	23.0	22.0	19.7	21.7	20.9	18.4
Speed at Rated Power	N Rated	RPM	105	100	90	68	65	58	50	48	42
Torque Sensitivity (2)	Kt	N-m / Arms	59.3	50.3	33.9	89.0	76.3	50.9	119	102	67.8
		lb-ft / Arms	43.7	37.5	25.0	65.6	56.3	37.5	87.6	75.0	50.0
Back EMF Constant (3)	Kb	Vpk / kRPM	5069	4345	2896	7610	6523	4349	10152	8695	5801
Motor Constant	Km	N-m/√watt	47.1	47.1	47.1	59.8	59.8	59.8	70.4	70.4	70.4
		lb-ft /√watt	34.7	34.7	34.7	44.1	44.1	44.1	51.9	51.9	51.9
Resistance (line to line)	Rm	Ohms	1.06	0.771	0.347	1.48	1.09	0.484	1.90	1.38	0.622
Inductance	Lm	mH	16	12	5.2	24	18	7.8	32	24	10
Inertia (KBM)	Jm	Kg-m²	4.88			7.19			9.56		
		lb-ft-s²	3.60			5.30			7.05		
Weight (KBM)	Wt	Kg	170			249			329		
		lb	375			550			725		
Inertia (KBMS)	Jm	Kg-m²	5.45			7.86			10.2		
		lb-ft-s²	4.02			5.80			7.55		
Weight (KBMS)	Wt	Kg	177			257			336		
		lb	390			567			740		
Max Static Friction	Tf	N-m	28.5			43.0			57.5		
		lb-ft	21.0			31.7			42.4		
Cogging Friction (peak-to-peak)	Tcog	N-m	17.6			27.1			35.9		
		lb-ft	13.0			20.0			26.5		
Viscous Damping	Fi	N-m/ kRPM	620			1010			1380		
		lb-ft / kRPM	457			748			1020		
Thermal Resistance (4)	TPR	°C / watt	0.050			0.041			0.035		
Number of Poles	P	-	58			58			58		
Recommended Drive	AKD-■_ _ _ _ _		04807	04807	09607	04807	04807	09607	04807	04807	09607
Voltage Req'd at Rated Output	Vac Input	VAC	480	400	240	480	400	240	480	400	240
Peak Stall Torque (5) (Motor with AKD servo drive)	Tp Drive	N-m	5000	4500	5790	7500	6700	8680	10000	8960	11562
		lb-ft	3688	3317	4267	5532	4942	6402	7376	6609	8520

* Notes
1) Winding temperature = 155°C at continuous stall, at rated output, and for performance curves.
2) To calculate no-load Kt and Kb at 25°C, multiply by 1.064.
3) Back EMF is peak (not RMS).
4) TPR assumes motor is housed and mounted to a heat sink.
5) Peak torque may be limited by AKD servo drive current, see page 11 for drive ratings or visit www.kollmorgen.com.

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Mounting and Installation Guidelines

Important Note: *The recommendations included in this Kollmorgen selection guide are intended to serve as general installation guidelines, and are for reference purposes only. Kollmorgen assumes no responsibility for incorrect implementation of these techniques, which remain the sole responsibility of the user.*

KBM(S) series motors, as well as any other Kollmorgen frameless brushless motors that are supplied as 2-piece rotor/stator kits, should be installed by the user according to the general guidelines below.

User Interface Responsibilities

To assure proper performance and reliability of the motor when installed in the system, the user is responsible for designing the mounting interface in the following manner:

Bearings

The user-supplied bearing system in the motor application must exhibit sufficient stiffness to maintain a rigid, uniform clearance gap between the rotor and the stator under all operating conditions. Concentricity requirements noted on each model-specific Kollmorgen outline drawing should be considered by the user when sizing and selecting bearings for appropriate radial and preload forces to achieve desired motor running gap clearance and total runout. Bearings with the lowest possible friction and high quality lubricant should be chosen to minimize overall system friction, which allows optimal motor operation.

Stator Mounting Materials

A metallic housing/clamp structure is suggested to rigidly mount the stator to assure best conductive heatsinking path and proper structural integrity. Aluminum alloys are preferred due to their superior thermal conductivity and strength-to-weight ratio, although stainless steel alloys (300 series or equivalent) are an acceptable alternative for applications that are less thermally critical. Carbon steel, cast iron, 400 series stainless alloys and other magnetic flux-conducting ferrous metals are the least desirable choices for stator mounting, but can certainly be used in some cases if proper design choices are considered. Consult a Kollmorgen engineer for assistance if such metals must be used. Plastics or other similar thermally isolating materials are not recommended, since they adversely affect the heatsinking capacity of the system, making it necessary to significantly de-rate the motor's performance.

Rotor Mounting Materials

The magnetized rotor may be mounted to any metallic shaft of the user's choice. Carbon steel and stainless steel are the most commonly used shaft materials, although aluminum alloys are occasionally used if properly designed for the intended torque and thermal operating range. The user's intended method of attaching the rotor to the shaft may influence the optimum material and tolerance choices for the shaft. The user's shaft does not need to carry flux or function as a portion of the magnetic circuit to achieve rated performance when using a Kollmorgen brushless motor.

Grounding

When mounted in the application, the laminated stack (or bare metal outer sleeve) of the stator must be at the same electrical ground potential as the system chassis and the drive amplifier chassis. If this common ground path is not ensured, the application may exhibit electrical noise and also create an electrical shock hazard. The risk of shock is particularly prevalent when using high pole-count motors with large capacitance characteristics. Typically, if the stator is mounted using electrically conductive metallic components, then a robust ground path between stator stack and machine chassis is inherently achieved. Kollmorgen suggests performing a continuity check to confirm proper ground path before enabling the motor system. In some applications, depending on mounting configuration and materials chosen by the user, a separate conductive ground strap may be required. In such cases, the user is responsible for installation of the ground path and electrical verification.

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Wiring

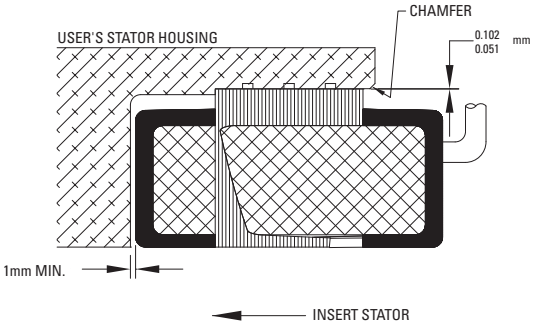
KBM(S) series motors are supplied with UL-compliant unterminated flying leadwires. The user is responsible for proper leadwire routing and connection per the diagrams shown on Kollmorgen drawings. Avoid routing wires across sharp corners, pinch points or edges that may pierce the insulation. Clamp or otherwise secure wire bundle in high vibration applications and avoid wire contact with moving/vibrating surfaces that may abrade the insulation. Provide strain relief for all wire bundles and allow room for a generous bend radius. User assumes responsibility for connector installation, crimping, soldering, shielding, sleeving or any other wire bundling or electrical interface enhancement beyond the configuration shown on the Kollmorgen outline drawing.

Stator Mounting

Kollmorgen suggests the following options for installation of the motor stator depending on torque, vibration and thermal characteristics of the application, as well as cost, ease of assembly and serviceability desired by the user.

Adhesive Bond

In most cases, motors in the general peak torque range up to 750 N-m may have the stator bonded in place using a structural epoxy, such as Hysol® EA934NA, 3M™ Scotchweld™ 2214 or other similar adhesives. Bonding is a preferred installation technique for the KBM(S)-10XXX through KBM(S)-57XXX size stators, although shrink fitting as described in the next section is also an acceptable option. Bonding can certainly be used to secure stators larger than the aforementioned size range if desired, but requires additional design and process considerations. To successfully utilize adhesive bonding, the user's stator enclosure should be designed as a cylindrical cup, as shown in the illustration below, with a small shoulder for axial positioning at one end and open at the opposite end. The shoulder serves as a stop point for the stator to bank against when inserted from the open end, and should generally clear the maximum outer diameter of the winding end turn by no less than 1 mm at all circumferential points. A small internal chamfer at the open end of the housing cup simplifies stator insertion. If using a thick structural epoxy, inner diameter of the housing cup should be approximately 0.051 mm - 0.102 mm larger than the maximum outer diameter of the stator. However, the user should consult the adhesive manufacturer for proper bond line thickness, application process and curing instructions. Small grooves shown in the inner diameter of the housing in the illustration below are intended to serve as adhesive reservoirs for thick structural epoxies, but are considered optional features per the user's discretion. If a retaining compound, such as Loctite® 640™ or other similar adhesive, is preferred instead of a structural epoxy, a much tighter clearance between housing inner diameter and stator outer diameter must be controlled to maintain appropriate bond line thickness. Refer to adhesive manufacturer's guidelines for recommendations. User assumes responsibility for selecting proper adhesive and for designing housing dimensions per expected thermal growth rate at intended temperature extremes of application. Adhesive cure temperatures should not exceed 155°C to avoid damaging the motor stator. Stator and housing surfaces should be cleaned thoroughly prior to bonding to ensure good adhesion.



Adhesive Bond Illustration

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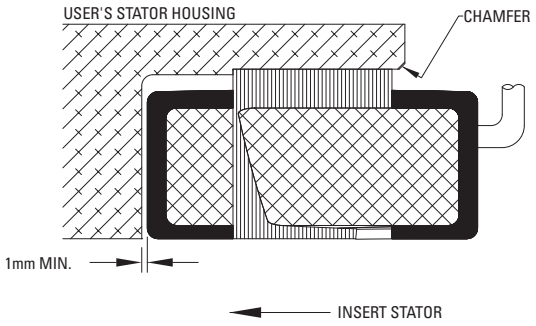
Mounting and Installation Guidelines

Shrink Fit

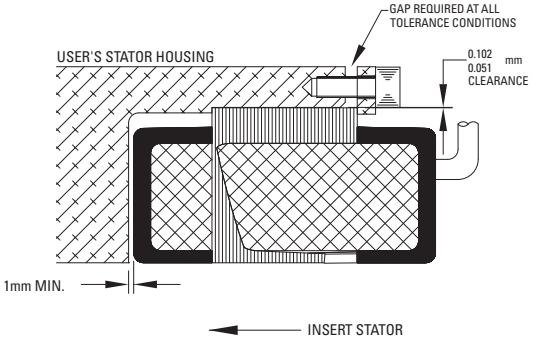
The user's housing may be designed with an inner diameter that is slightly smaller than the outer diameter of the motor stator, providing an interference fit when installed. Pressing the stator into the housing at normal room temperature is not recommended because of its laminated construction. Instead, heating the housing to achieve enough thermal growth to freely slide the stator inside is a more common technique that achieves the desired interference fit when the housing cools. Aluminum or steel housings may be used effectively to shrink fit stators across a broad peak torque range, generally from <1 N-m up to thousands of N-m. It is generally not necessary to shrink fit small diameter motors where bonding is a simpler and equally effective option, although it is acceptable to do so at the user's discretion. For KBM(S) series motors, shrink fit is the preferred installation technique for sizes KBM(S)-60XXX through KBM(S)-118XXX stators. Steel has a lower coefficient of thermal expansion than aluminum, so a steel housing must be heated to a much higher temperature than a comparable aluminum housing to achieve the desired diameter growth and stator installation clearance. In contrast, because aluminum grows much more rapidly than steel at elevated temperatures, the user should take special design precautions regarding size and tolerances to assure that an aluminum housing maintains the required interference fit at the application's extreme high temperature. It is important to design for sufficient dimensional interference fit, which can be influenced greatly by many application variables and design choices, to safely reach the motor's maximum torque while also avoiding crush damage to the stator. The user assumes all responsibility for housing design details, material selection, fit calculations and tolerance analysis for the intended application.



Shrink Fit Illustration

Axial Clamping

For low torque applications, or for applications where the stator may need to be repeatedly installed and removed from the system, axially clamping may be an acceptable option. Kollmorgen does not generally recommend this technique for high shock/vibration applications, extreme temperature applications or for peak torques greater than 50 N-m without special design considerations. The stator enclosure shown in the illustration below is very similar to the bonding technique example shown in the first section, with approximately 0.051 mm – 0.102 mm slip fit clearance between the inner diameter of the housing and the outer diameter of the stator. When inserted, the stator banks against a shoulder inside the housing bore that controls axial position and provides a fixed axial clamping surface. The shoulder should clear the maximum outer diameter of the winding end turn by no less than 1 mm at all circumferential points. A separate clamp ring with the same circumferential clearance is placed over the opposite end of the stator and bolted (typically 4 – 12 fasteners, equally spaced) to the housing enclosure.



Axial Clamping Illustration

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The user should design the enclosure components to ensure that, with the stator installed, an axial clearance gap exists between the clamp ring and the end of housing at all tolerance conditions. Otherwise, the clamp ring could contact the housing before the fasteners are fully tightened, resulting in insufficient axial clamping force against the stator. If desired, the small radial space between the stator outer diameter and the housing inner diameter may be filled with a thermal compound for more efficient conduction to the heatsink. However, use caution to avoid contaminating the axial clamping surfaces with grease that may reduce clamping force. If the user wishes to evaluate this axial clamping technique for motors with higher peak torque ratings, it may be necessary to increase the total surface area of the clamping regions and increase the number of clamping fasteners.

Bolting

Sizes KBM(S)-163XXX through KBM(S)-260XXX are supplied with the stator installed in an aluminum sleeve with flange and through-holes for bolted mounting. User interfaces for these large motors should be designed per the pilot diameters and hole patterns shown on the Kollmorgen model-specific outline drawings. Several of the smaller sizes within this motor family, such as KBM(S)-10XXX through KBM(S)-45XXX range, are also supplied with the stator installed inside an aluminum sleeve, but do not include a stepped flange and are not intended to be bolted in place. For the latter range of sizes, bonding, shrinking or clamping techniques described in previous sections are appropriate.

Rotor Mounting to Shaft

Kollmorgen's KBM(S) series and other frameless brushless motors utilize high-performance rare earth magnets. Use extreme caution when handling or transporting to avoid injury and product damage. The attractive forces between magnetized rotors and nearby metallic objects can be extremely powerful. Improper handling can result in sudden unexpected impacts. The strong magnetic field can also damage nearby computers, display screens and memory storage devices. Keep the rotor in its shipping container or wrapped protectively until ready to install. This practice will help avoid accidents and prevent contamination such as metallic chips or debris that tend to cling to the magnets.

Axial Alignment Control

Kollmorgen's model-specific outline drawings note axial alignment that must be maintained between rotor and stator when mounted to ensure proper motor performance. The user is responsible for designing the rotor shaft, stator enclosure and bearing system to achieve the specified mounting alignment. Machined shoulders on the shaft or grooves for removable retaining rings are common ways of controlling rotor installation position. Maximum diameter of retaining rings or shaft shoulders should be kept below the rotor diameter where magnets are bonded to the steel hub.

Bonding

Generally, for applications where peak torque does not exceed 750 N-m, rotors can be bonded to carbon steel or stainless steel shafts. Retaining compounds, such as Loctite 640 or other similar adhesives, usually require smooth continuous interface diameters and tight fit tolerances. Structural epoxies generally require slightly larger fit clearance to allow a thicker bond line. Epoxies often benefit from grooves in the shaft/rotor interface that function as adhesive reservoirs and may be enhanced by textured machined surfaces via knurling or grit blasting. Always clean the bond joint surfaces thoroughly to ensure good adhesion. Consult adhesive manufacturer for proper bond line thickness, fit tolerances, process details and curing guidelines. To avoid partial demagnetization of the rotor, do not cure rotor/shaft bond joints at temperatures > 180°F unless rotor is nested inside the matching stator or rotor is completely surrounded by a ferrous metal keeper fixture. Contact a Kollmorgen engineer if more information is required on this topic. Before bonding rotors to aluminum shafts, consult with adhesive manufacturer for assistance. A highly flexible adhesive with broad thermal properties may be required.

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Mounting and Installation Guidelines

Axial Clamping

If the user's shaft is designed with a machined shoulder that the rotor can rigidly bank against, the rotor may be axially clamped in place using a locknut. This technique allows the rotor to be installed and removed from the shaft repeatedly, but requires a portion of the shaft to be threaded. Rotors retained by locknuts may be generally suitable for applications up to 400 N-m peak torque, although this estimate may vary greatly depending upon size and type of nut used.

Bolting

Motors ranging from size KBM(S)-43XXX and larger are provided with hole patterns in the rotor hub to facilitate bolted mounting. User shaft interface should be designed per the diameter, length, axial position and hole pattern noted on the Kollmorgen model-specific outline drawing.

Installing Rotor Inside Stator

As previously described, magnetic forces can be extremely powerful and surprise the user when handling or installing the rotor. Extreme caution is required when placing the rotor inside the stator.

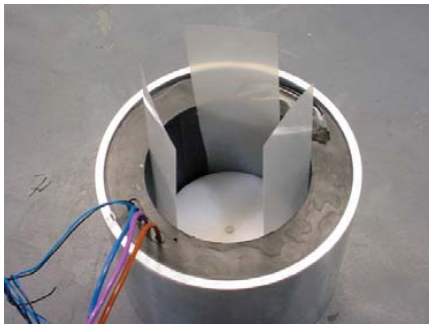
Secure the Stator

Confirm that the stator is securely mounted per the guidelines previously described before attempting to install the rotor. Kollmorgen recommends taping or tying the wiring bundle aside in a safe position to avoid accidental damage.

Protect the Running Gap Surfaces

If left unprotected, the outer surface of the rotor may stick or "pole" to the nearest point on the inner bore of the stator due to magnetic attractive forces as the user attempts to install it. The resulting friction as the rotor slides along the inside of the stator can potentially damage the rotor band, magnets, coatings or stator bore surfaces. To prevent damage and simplify the rotor installation process, Kollmorgen recommends first installing a thin layer of shim material, such as Mylar® film, in the stator's inner bore. See photos below for examples. Mylar (DuPont® Corp. trade name) is a commonly available polyester film, often used as electrical insulation or in laminating processes, and is available in a variety of thicknesses. The Mylar film can be installed as a single piece that is wrapped entirely around the circumference of the stator bore and slightly overlapped, or multiple pieces may be inserted axially at equally spaced points. Optimum film thickness and number of shim layers required is dependent upon the gap clearance between rotor and stator for the specific motor size the user is attempting to install. Appropriately thick Mylar film shim layer(s) will keep the rotor roughly centered inside the stator bore and provides a slick surface to slide the rotor to its intended mounting position without damage.

Single Mylar Shim



Multiple Mylar Shims

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Installing the Rotor

Many of the KBM(S) series rotors are too large to safely lift by hand and the attractive force as the rotor rapidly enters the stator can be too powerful to control by hand. Kollmorgen recommends using a hoist or small overhead crane to lift the rotor into position and stabilize it for safely controlled insertion into the stator. Most large KBM(S) rotors include tapped holes in the steel hub for the user to attach eye bolts to facilitate hoist lifting. Note that swiveled eye bolts, as opposed to fixed ring eye bolts, are recommended for safe lifting with hoist chain and hook interface.

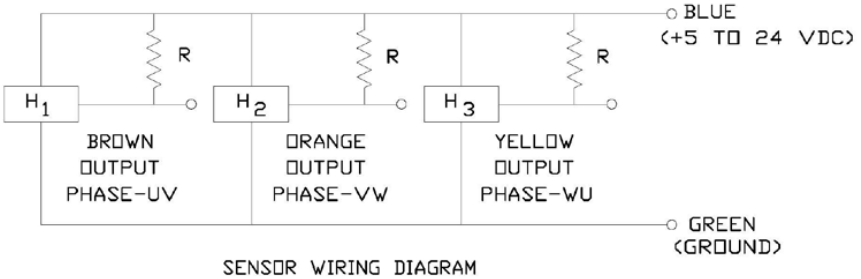
Inspect the Running Gap

After the rotor is properly installed and secured, remove all Mylar shim material. Carefully inspect the running gap for any debris or obstructions. If possible, spin the rotor by hand to confirm that it rotates freely.

Installation Assistance

Customers may contact Kollmorgen for assistance with application or installation problems. See rear cover of this selection guide for contact information. If desired, Kollmorgen can also design and supply custom motor installation fixtures for the user's unique application needs. Fixture solutions are quoted separately on a case-specific basis.

Electrical Wiring Interface

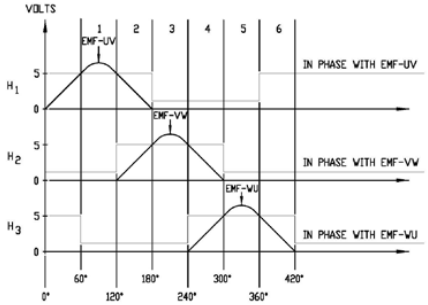


SENSOR WIRING DIAGRAM

STEP	POWER CONNECTION		
	PHASE "U" BLUE	PHASE "V" BROWN	PHASE "W" VIOLET
1	+	−	
2	+		−
3		+	−
4	−	+	
5	−		+
6		−	+

EXCITATION SEQUENCE TABLE

CCW VIEWED LEAD END



SENSOR OUTPUT

CCW VIEWED LEAD END

Typical Radial Running Clearance

	Model KBM(S)													
Nominal Mechanical Air Gap [in]	10X	14X	17X	25X	35X	43X	45X	57X	60X	79X	88X	118X	163X	260X
	0.015	0.017	0.017	0.0174	0.0178	0.025	0.020	0.025	0.025	0.0275	0.025	0.030	0.075	0.075

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Application Profile Questions

MOTOR REQUIREMENTS

Motor Type

- ☐ Housed
- ☐ Frameless
- ☐ Feedback options
  - ☐ Tachometer
  - ☐ Encoder
  - ☐ Resolver
  - ☐ Hall sensors
  - ☐ Other

Operating Environment

Operating temp: Min _____ Max _____

Ambient temp: Min _____ Max _____

Other: _____

Performance Data

Max speed: _____

Max torque: _____

Operating speed: _____

Operating torque: _____

Duty cycle: _____

Mechanical Envelope

Mounting requirements: _____

Dimensional requirements: _____

Inside dimensions: Min _____ Max _____

Outside dimensions: Min _____ Max _____

Weight requirements: _____

Available cooling: _____

Other requirements: _____

CONTROL / DRIVE REQUIREMENTS

Supply Voltage, AC/DC: _____

Peak and Continuous Current: _____

Commutation Type

- ☐ Sinusoidal
- ☐ Six-step

Control Loop Type

- ☐ Control
- ☐ Velocity
- ☐ Position

Operating Environment

Operating temp: Min _____ Max _____

Ambient temp: Min _____ Max _____

Other: _____

Other requirements: _____

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KBM Frameless Motor Nomenclature

KBM(S) - 25 H 01 - A XX

Product Family

KBM Series = Frameless motor
KBMS = Frameless motor with sensors

Motor Frame Size (Armature I.D.)

10	57
14	60
17	79
25	88
35	118
43	163
45	260

Insulation Ratings

H = High voltage insulation (>240 Vac)
S = Standard insulation (≤240 Vac)

Stack Length Specifier

01 = 1
02 = 2
03 = 3
04 = 4

Winding Options

(A, B, C, etc...)

Sequential Number for Available Modifications
(See page 78)

AKD Servo Drive Nomenclature

AKD – B 003 06 – NA AN- 0000

AKD Series

Version

B = Base drive
P = Position indexer (motion tasking)

Current Rating

003 = 3 Amp
006 = 6 Amp
012 = 12 Amp
024 = 24 Amp

Voltage

06 = 120/240 Vac 1Ø/3Ø
07 = 480 Vac 3Ø

Variants

0000 = Standard

Connectivity

AN = Analog command
CN = CANopen
EC = EtherCAT
SQ = SynqNet

Extension

NA = Without extensions

Note: Options shown in bold blue text are considered standard.

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Available KBM(S) Modifications

The following modifications allow our customers to optimize the base model configuration to meet the unique challenges of their application needs. Please consult Kollmorgen Customer Support for information, pricing, and feasibility of desired modifications. Engineering and soft tooling fees may be required. Additional lead time required.

	Generally Available Capability
Speed/Torque Changes	
• Winding Gages	#00 – #48 AWG *(includes lead wire change)*
• Stack Lengths Available *(Rotor length, including magnets, will increase or decrease proportionally)*	6.35 mm (0.25 in) to 610 mm (24 in)
• Pole Count	6 to 64 Poles
• Magnet Materials	Neodymium-Iron-Boron *(base model)* Samarium Cobalt
Installation Features	
• Rotor Hub Geometry	Round, hollow, flanged, keyway, flat Thru bores from 5 mm to 600 mm
• Mounting	Bolt hole diameter and circumferential pattern *(customer specified)*
• Lead Length	400 mm (15.75 in) min *(base model)* 150 mm to 1200+ mm *(customer specified)*
• Lead Colors	Blue / Brown / Violet *(base model)* Other colors to be specified by customer
• Thermal Sensor	Thermistor *(base model)* Thermostat, RTD, Thermocouple Omit thermal sensor
• Connector(s)	None-Flying leads *(base model)* Connector(s) specified by customer
Durability/Harsh Environment	
• Rotor Hub Material	Bare Cold-Rolled Steel *(base model)* Corrosion-resistant Stainless Alloy
• Stator Sleeve Material	Bare Aluminum *(select base models)* Stainless or Carbon Steel
• Armature Potting	Encapsulation *(base model)* Varnish Hi-Temp Encapsulation (200°C)
• Corrosion Protection	Dri-Touch Corrosion Inhibitor *(base model)* Nickel Plating, Passivation, Anodizing Epoxy Paint

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