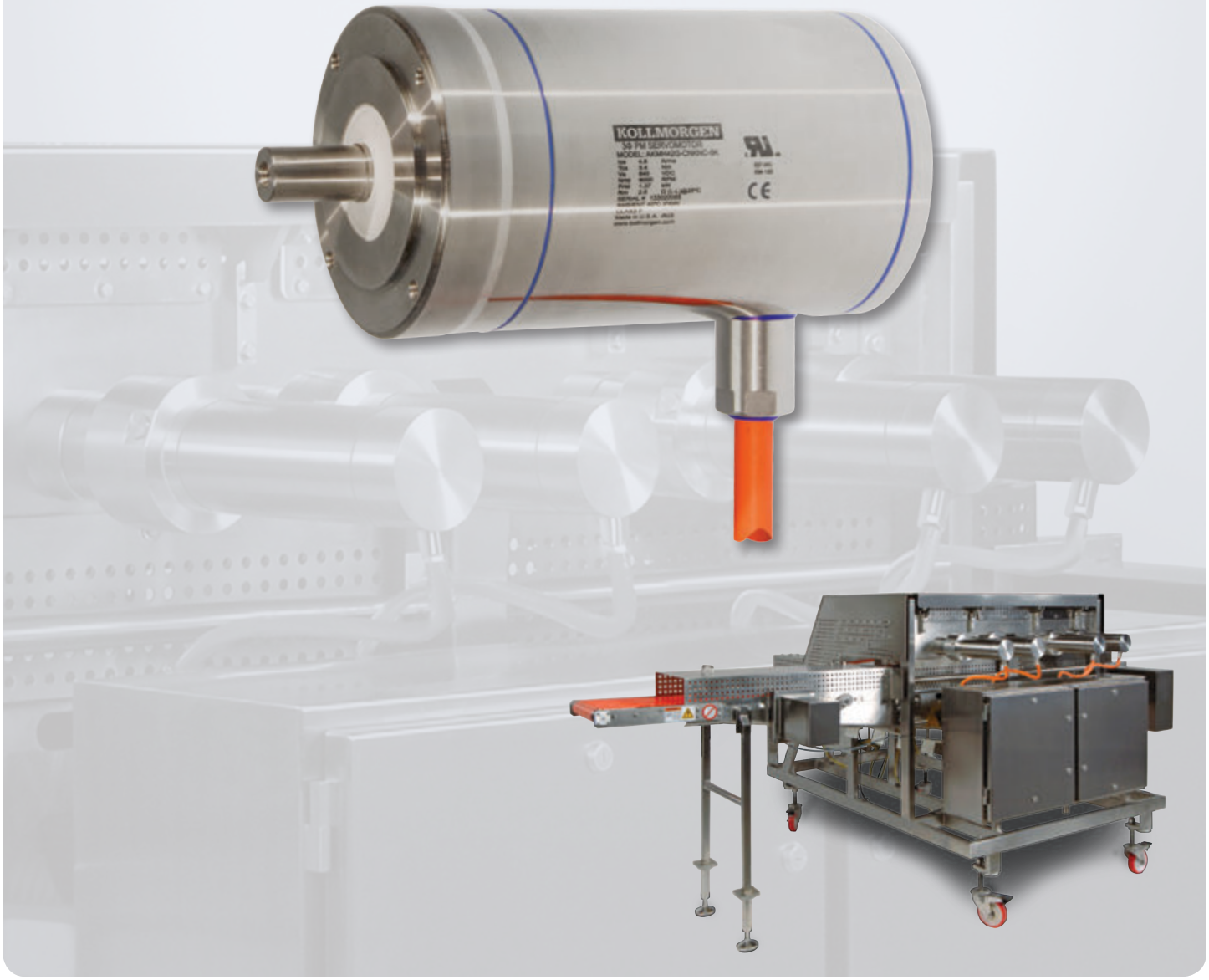
Kollmorgen AKMH™ Stainless Steel Washdown Motor Selection Guide



with AKD™ Servo Drive Systems

KOLLMORGEN®

Because Motion Matters™

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

The ever-escalating demands of the marketplace mean increased pressure on machine designers and users at every turn. Time constraints. Demands for better performance. Having to think about the next-generation machine even before the current one is built. While expectations are enormous, budgets are not. Kollmorgen's innovative motion solutions and broad range of quality products help engineers not only overcome these challenges but also build truly differentiated machines.

Because motion matters, it's our focus. Motion can distinctly differentiate a machine and deliver a marketplace advantage by improving its performance. This translates to overall increased efficiency on the factory floor. Perfectly deployed machine motion can make your customer's machine more reliable and efficient, enhance accuracy and improve operator safety. Motion also represents endless possibilities for innovation. We've always understood this potential, and thus have kept motion at our core, relentlessly developing products that offer precision control of speed, accuracy and position in machines that rely on complex motion.

Removing the Barriers of Design, Sourcing, and Time

At Kollmorgen, we know that OEM engineers can achieve a lot more when obstacles aren't in the way. So, we 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 spanning the Americas, 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. 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.

Table of Contents

AKMH™ Washdown Motors

Kollmorgen has designed custom motors for challenging environments for over 70 years. The most notable were the motors used in Jason Jr., the ROV that was used to explore the Titanic. The culmination of these experiences has been leveraged in the AKMH series of motors. Designed for food contact and splash zones, the AKMH reduces cleaning time and maintenance, thus directly contributing to higher overall OEE for machines.

Reduced Recall Risk. The Food Modernization Safety Act (FMSA) gives the US federal government the ability to shutdown facilities, recall food products, and levy stiff fines to ensure public safety in regards to food product manufacturing. The AKMH is designed to meet the toughest hygienic requirements in the industry in order to reduce the possibility of food borne illnesses and costly recalls.

Designed for Fast Cleaning and Increased Uptime. The AKMH stainless steel motor is designed to meet the standards for IP69K, EHEDG, and 3A and is built with FDA approved, food-grade materials. The careful elimination of flat surfaces, cracks, and cr vices prevents the build-up of foreign material and bacteria. The AKMH housing and cable can endure daily wash downs with high pressure, high temperature, and caustic chemicals. The robust design means that guards and covers are not required to protect the motor from harsh cleaning regimens. These AKMH features constitute quicker cleaning, keeping your machine running, and increasing the OEE of your manufacturing line.

Bottom Line. The Stainless Steel AKMH series is designed for strict aseptic machine applications. The AKMH comes in 19 standard motor sizes, with multiple standard windings for each to fit the ma y motor applications found in food, beverage, and pharmaceutical industries. Kollmorgen's AKMH helps maintain the highest standard of machine cleanliness, increases OEE, and reduces the possibility of devastating recalls.

The Benefits of AKMH Motors

- Increase your machine's OEE through superior wash-down design reliability
- Reduce your machine's cost of ownership due to reduced cleaning time and increased reliability
- Enhance the value of your machine by lowering your customer's risk of recall… due to the superior hygienic design of the AKMH

- IP69K certification for motor and cabl
- Unique design technique to eliminate condensation
- FDA Approved, food-grade O-ring seals
- All exposed surfaces are 316L Stainless Steel, superior to 303/304 for hygiene & corrosion resistance
- Round design with no nooks or crannies
- Sloped rear cover to eliminate puddling, even in vertical mounting
- No external hardware (no bolts, washers, or screws) to trap soil or pathogens or fall into food
- Smooth surface meeting EHEDG & 3A criteria, promotes rapid cleaning and no harboring of pathogens
- FDA Approved, food-grade bearing lube
- FDA Approved, food-grade shaft seal
- Cable designed to elminate the need for conduit
- No protective covers needed for washdown; no secondary cleaning disassembly required
- FDA approved, food-grade tubing option for applications where the cable is in the food zone
- Single cable for increased reliability, faster cleaning, and fewer places to harbor pathogens
- Hygienic marking method eliminates harboring of pathogens
- Hygienic, IP69K shaft seal, that includes special shaft treatment for long life

- Our customizable fit will meet your needs, so you spend less time tweaking your machine's mechanicals
- Innovative design features to reduce the cost and time associated with installation
- Industry leading configurability for optimized performance

- 19 frame/stack length combinations
- Windings designed to optimize the performance of your machine
- Cables designed for direct connection to the AKD drive family (plug & play)
- Face and flange mounts vailable in both IEC and NEMA standards
- Rated speeds to 8000 rpm
- Continuous torques to 22 Nm
- Peak torques to 92 Nm
- Cables designed to meet NFPA 79 without the need for additional thermal overload protection
- Configurable cable lengths to 15 meters; no inte mediate junction boxes needed
- All digital feedback with digital nameplate for auto-setup
- Brake option
- Multi-turn absolute feedback option, single-turn absolute feedback standard
- UL/CE/RoHS/IP69K/BISSC certification
- EHEDG/NSF/USDA certifications pendin

Specify only Kollmorgen AKMH systems to ensure:

- Reduced risk of food recall
- Reduced cleaning time, higher OEE
- Highest reliability

AKMH Design Features

The key benefits of AKMH clean design features:

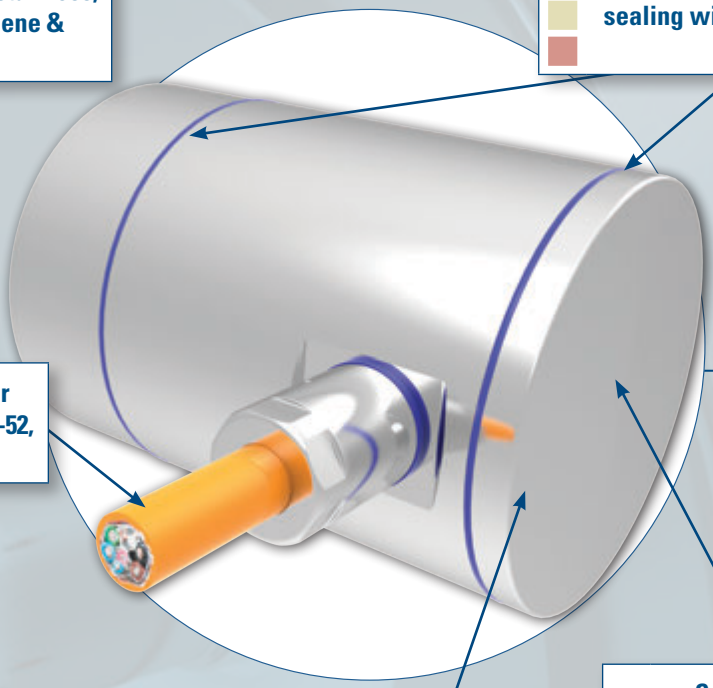
- Reduces risk of food recall
- Increases reliability in wash-down application
- Reduces cleaning time: higher OEE

No protective covers required for washdown... no secondary cleaning disassembly required

Smooth surface meeting EHEDG & 3A criteria, promotes rapid cleaning and no harboring of pathogens

All exposed surfaces are 316 stainless, superior to 304/303 for hygiene & corrosion resistance

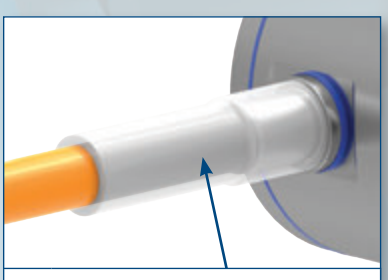
External O-ring and gasket sealing with blue FDA approved materials



Chemical resistant cable for pH of 2-12, meeting IEC60364-5-52, UL, CSA, CE, RoHS

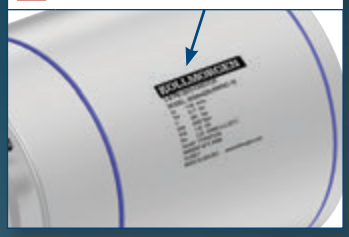
Conical end cover to eliminate water puddling, even in vertical mounting

No external hardware (no bolts, washers, or screws) to trap soil & pathogens or fall into food



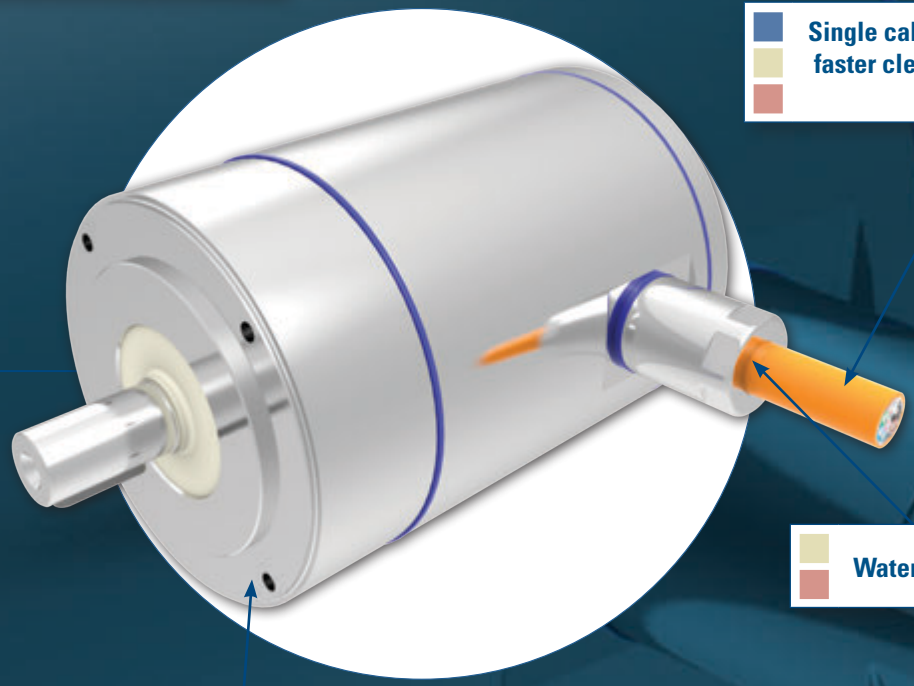
FDA food-grade approved tubing over cable for food zone applications

Hygienic marking method eliminates harboring of pathogens



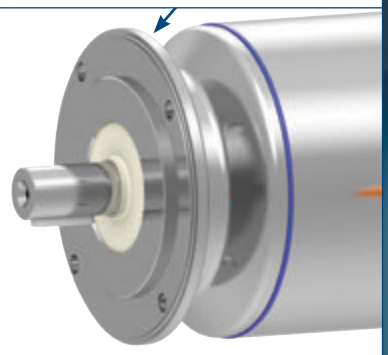
Unique design technique to eliminate condensation

Single cable for increased reliability, faster cleaning, and fewer places to harbor pathogens

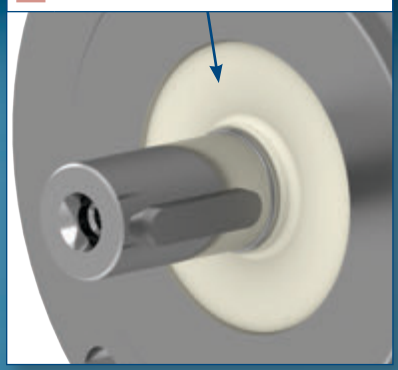


Water-tight cable exit

Face Mount for most hygienic design, Flange Mount option for easy mounting



Hygienic, IP69K shaft seal, special shaft treatment for long life



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. With Kollmorgen servo components, we can help you increase your machine's OEE by 50%.

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 24 Arms continuous current; 9 to 48 Arms peak • Very high power density enables an extremely small package • True plug-and-play with all standard Kollmorgen servomotors and actuators • 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, EtherNet/IP, PROFINET, and CANopen® • Scalable programmability from base torque-and-velocity through multi-axis master

AKD Servo Drive

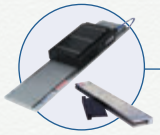
The AKD servo drive delivers cutting-edge technology and performance with one of the most compact footprints in the industry. These feature-rich drives provide a solution for nearly any application, from basic torque-and-velocity applications, to indexing, to multi-axis programmable motion with embedded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

Micron™ Gearheads

AKM™ Servomotors

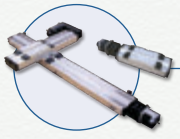
Kollmorgen Cartridge DDR™ Motors

Housed Direct Drive Rotary Motors



Direct Drive Linear Motors*

Linear Actuators



Multi-Axis Precision Tables

Best-in-Class Components
AKD works seamlessly with Kollmorgen motors and actuators–well-known for quality, reliability, and performance.

AKD™ Servo Drive

Modbus/TCP

Industry-leading power density

General Specifications

120 / 240 Vac 1 & 3 Phase (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)

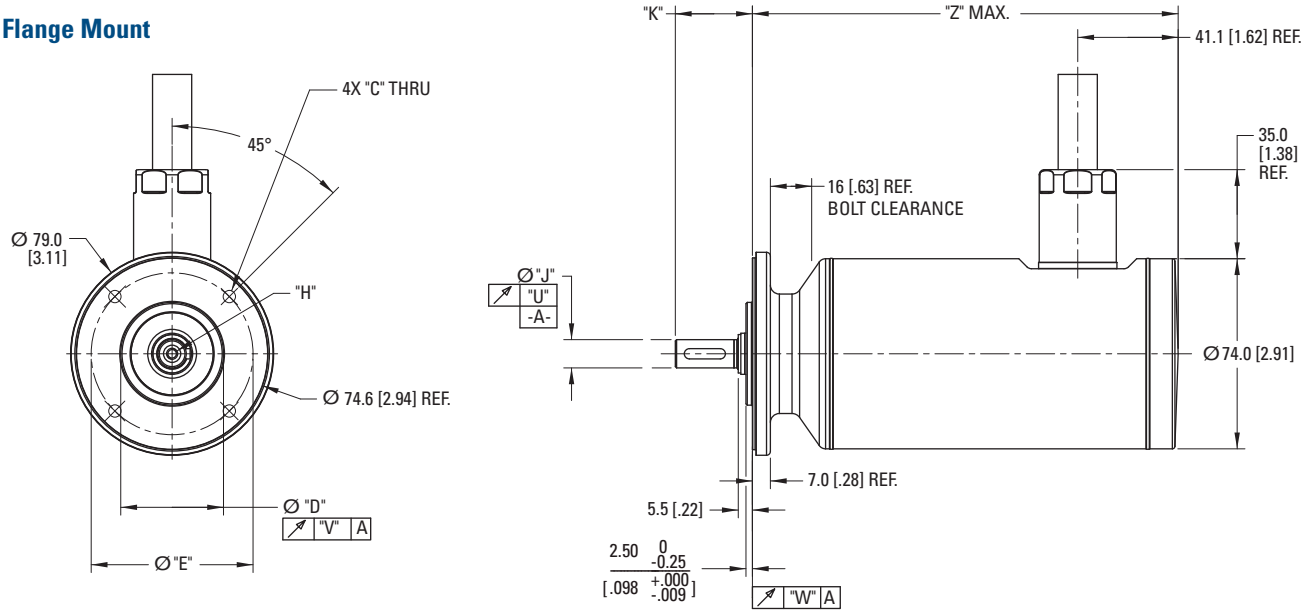
240/480 Vac 3 Phase (187-528 V)	Continuous Current (Arms)	Peak Current (Arms)	Drive Continuous Output Power Capacity (Watts)	Internal Regen (Watts)	(Ohms)	Height mm (in)	Width mm (in)	Depth mm (in)	Depth with Cable Bend Radius mm (in)
AKD-■00307	3	9	2000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
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)
S748	48	96	35,000	–	–	385 (15.16)	190 (7.48)	244 (9.61)	285 (11.22)
S772	72	140	50,000	–	–	385 (15.16)	190 (7.48)	244 (9.61)	285 (11.22)

Note: For complete AKD model nomenclature, refer to page 42

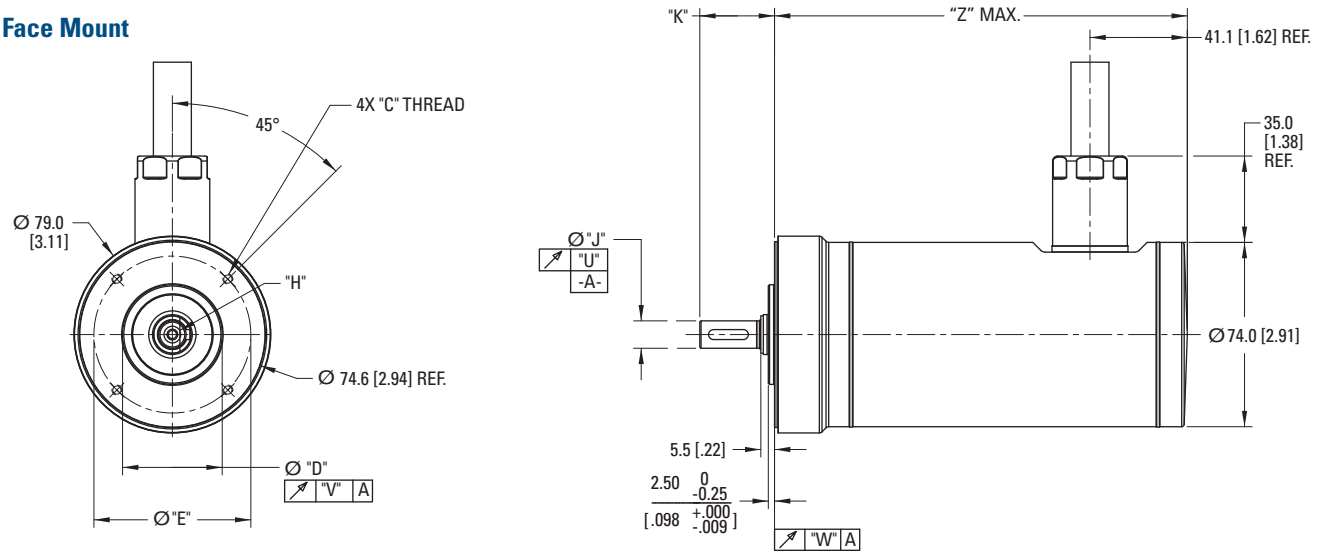
AKMH2x Outline Drawings

AKMH2x Frame

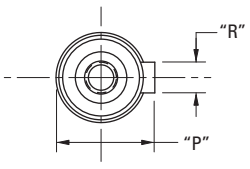
Flange Mount

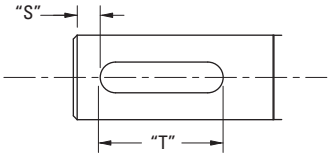


Face Mount



AKMH2x			
Code	**Mount Type**	**Standard**	**Shaft**
AC	Flange	Metric	Closed Keyway
AN	Flange	Metric	Smooth
BN	Flange	NEMA 23	Smooth
CC	Face	Metric	Closed Keyway
CN	Face	Metric	Smooth
DN	Face	NEMA 23	Smooth





AKMH2x Dimension Data

AKMH2x Dimension Data

Mounting Code	"C"	"D"	"E"	"H"	"J"	"K"
AC	4.80 [.189]	40 +0.011 -0.005 [1.5748 +.0004 -.0002] j6	63 [2.480]	D M4 DIN 332	11 +0.012 +0.001 [.4331 +.0004 +.0001] k6	30.0 [1.18]
AN	4.80 [.189]	40 +0.011 -0.005 [1.5748 +.0004 -.0002] j6	63 [2.480]	D M4 DIN 332	11 +0.012 +0.001 [.4331 +.0004 +.0001] k6	30.0 [1.18]
BN	5.10 [.201]	38.10 0 -0.05 [1.500 +.000 -.002]	66.68 [2.625]	–	9.524 +0 -0.013 [.3750 +.0000 -.0005]	31.8 [1.25]
CC	M4 x 0.7 x 8.0 [.31]	40 +0.011 -0.005 [1.5748 +.0004 -.0001] j6	63 [2.480]	D M4 DIN 332	11 +0.012 +0.001 [.4331 +.0004 +.0001] k6	30.0 [1.18]
CN	M4 x 0.7 x 8.0 [.31]	40 +0.011 -0.005 [1.5748 +.0004 -.0001]	63 [2.480]	D M4 DIN 332	11 +0.012 +0.001 [.4331 +.0004 +.0001] k6	30.0 [1.18]
DN	UNC 10-24 x 8.0 [.31]	38.1 +0 -0.050 [1.5 +.0000 -.0019] j6	66.68 [2.625]	–	9.524 +0 -0.013 [.3750 +.0000 -.0005]	31.8 [1.25]

Mounting Code	"P"	"R"	"S"	"T"	"U"	"V"	"W"
AC	12.5 0 -0.13 [.492 +.000 -.005]	4 0 -0.030 [.157 +.0000 -.0010]	3.50 [.138]	16 0 -0.20 [.630 +.000 -.007]	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]
AN	–	–	–	–	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]
BN	–	–	–	–	0.051 [.0020]	0.10 [.004]]	0.10 [.004]
CC	12.5 0 -0.13 [.492 +.000 -.005]	4 0 -0.030 [.157 +.0000 -.0010]	3.50 [.138]	16 0 -0.20 [.630 +.000 -.007]	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]
CN	–	–	–	–	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]
DN	–	–	–	–	0.051 [.0020]	0.10 [.004]]	0.10 [.004]

	Z MAX		
MODEL	SFD W/O Brake	Hiperface W/O Brake	Hiperface W/ Brake
AKMH21	167.2 [6.58]	180.2 [7.09]	214.2 [8.43]
AKMH22	186.2 [7.33]	199.2 [7.84]	233.2 [9.18]
AKMH23	205.2 [8.08]	218.2 [8.59]	252.2 [9.93]
AKMH24	224.2 [8.83]	237.2 [9.34]	271.2 [10.68]

Note: Dimensions are in mm [inches]. Product designed in metric. English conversions provided for reference only.

AKMH2x Performance Data

AKMH2x Performance Data – Up to 640 Vdc

					AKMH21			AKMH22			AKMH23			AKMH24		
	Parameters	Tol	Symbol	Units	C	E	G	C	E	G	D	E	F	D	E	F
	Max Rated DC Bus Voltage	Max	Vbus	Vdc	640	160	75	640	320	160	640	320	320	640	320	320
	Continuous Torque (Stall) for ΔT winding = 100°C ①②	Nom	T_{cs}	Nm	0.317	0.329	0.335	0.633	0.654	0.661	0.897	0.904	0.917	1.12	1.12	1.13
				lb-in	2.8	2.9	3.0	5.6	5.8	5.8	7.9	8.0	8.1	9.9	9.9	10.0
	Continuous Current (Stall) for ΔT winding = 100°C ①②	Nom	I_{cs}	A_{rms}	1.31	2.56	4.04	1.18	2.33	4.09	1.88	2.36	3.67	1.90	2.39	3.34
	Continuous Torque (Stall) for ΔT winding = 60°C ②	Nom	T_{cs}	Nm	0.254	0.263	0.268	0.506	0.523	0.529	0.718	0.723	0.734	0.892	0.893	0.902
				lb-in	2.2	2.3	2.4	4.5	4.6	4.7	6.4	6.4	6.5	7.9	7.9	8.0
	Max Mechanical Speed ⑤	Nom	N_{max}	rpm	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
	Peak Torque ①②	Nom	T_p	Nm	1.57	1.59	1.60	3.03	3.07	3.09	4.35	4.37	4.41	5.50	5.51	5.53
				lb-in	13.9	14.1	14.2	26.8	27.2	27.4	38.5	38.7	39.0	48.7	48.8	48.9
	Peak Current	Nom	I_p	A_{rms}	7.9	15.6	24.4	7.0	13.7	24.1	11.0	13.9	21.6	11.1	14.0	19.5
75 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	0.324	0.318	-	0.647	0.632	-	-	0.900	-	-	1.12
				lb-in	-	2.9	2.8	-	5.7	5.6	-	-	7.97	-	-	9.9
	Rated Speed		N_{rtd}	rpm	-	2000	4000	-	1000	2500	-	-	1500	-	-	1000
	Rated Power (speed) ①②		P_{rtd}	kW	-	0.068	0.13	-	0.07	0.17	-	-	0.14	-	-	0.12
				Hp	-	0.091	0.18	-	0.09	0.22	-	-	0.19	-	-	0.16
160 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	0.311	0.28	-	0.627	0.601	0.473	0.881	0.865	0.806	1.11	1.10	1.09
				lb-in	2.8	2.5	-	5.6	5.3	4.2	7.8	7.7	7.1	9.8	9.7	9.6
	Rated Speed		N_{rtd}	rpm	2500	7000	-	1000	3500	7000	1500	2500	4500	1500	2000	3000
	Rated Power (speed) ①②		P_{rtd}	kW	0.08	0.21	-	0.07	0.22	0.35	0.14	0.23	0.38	0.17	0.23	0.34
				Hp	0.11	0.28	-	0.09	0.30	0.46	0.19	0.30	0.51	0.23	0.31	0.46
320 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	0.255	-	-	0.583	0.41	-	0.765	0.688	0.593	1.04	0.98	0.839
				lb-in	2.3	-	-	5.2	3.7	-	6.8	6.1	5.2	9.2	8.7	7.4
	Rated Speed		N_{rtd}	rpm	8000	-	-	3500	8000	-	5000	6500	8000	4000	5500	8000
	Rated Power (speed) ①②		P_{rtd}	kW	0.21	-	-	0.21	0.35	-	0.40	0.47	0.50	0.44	0.57	0.70
				Hp	0.29	-	-	0.29	0.46	-	0.54	0.63	0.67	0.58	0.76	0.94
560 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	0.255	-	-	0.400	-	-	0.58	-	-	0.83	-	-
				lb-in	2.3	-	-	3.5	-	-	5.1	-	-	7.3	-	-
	Rated Speed		N_{rtd}	rpm	8000	-	-	8000	-	-	8000	-	-	8000	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.21	-	-	0.34	-	-	0.49	-	-	0.70	-	-
				Hp	0.29	-	-	0.45	-	-	0.65	-	-	0.93	-	-
640 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	0.255	-	-	0.400	-	-	0.58	-	-	0.83	-	-
				lb-in	2.3	-	-	3.5	-	-	5.1	-	-	7.3	-	-
	Rated Speed		N_{rtd}	rpm	8000	-	-	8000	-	-	8000	-	-	8000	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.21	-	-	0.34	-	-	0.49	-	-	0.70	-	-
				Hp	0.29	-	-	0.45	-	-	0.65	-	-	0.93	-	-

See following page for notes.

AKMH2x Performance Data – Up to 640 Vdc (Continued)

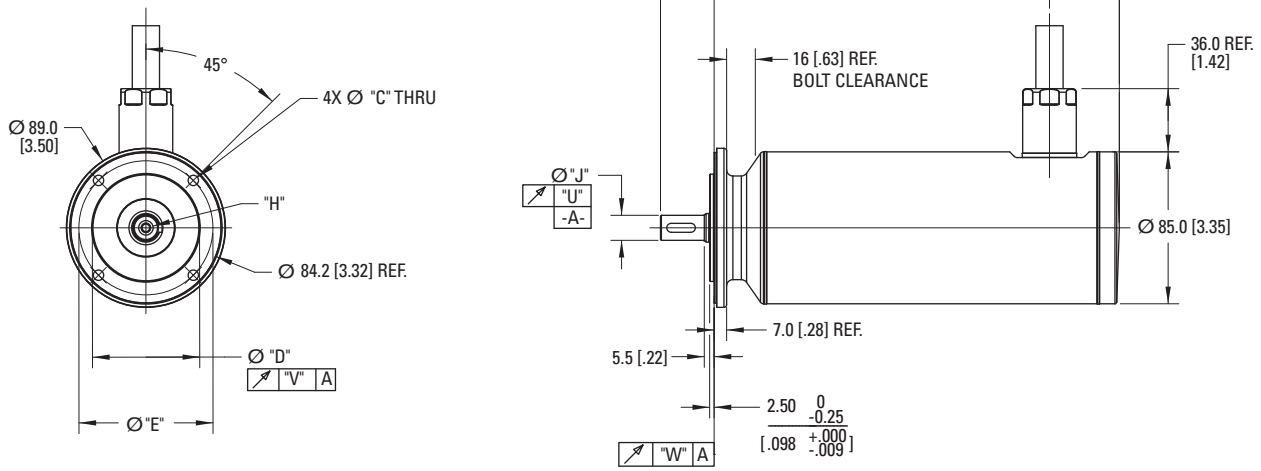
				AKMH21			AKMH22			AKMH23			AKMH24		
Parameters	**Tol**	**Symbol**	**Units**	**C**	**E**	**G**	**C**	**E**	**G**	**D**	**E**	**F**	**D**	**E**	**F**
Torque Constant ①	±10%	K_t	Nm/A_{rms}	0.30	0.16	0.10	0.61	0.32	0.18	0.52	0.42	0.27	0.63	0.50	0.36
			$lb\text{-}in/A_{rms}$	2.7	1.4	0.9	5.4	2.8	1.6	4.6	3.7	2.4	5.6	4.5	3.2
Back EMF Constant ⑥	±10%	K_e	V/k_{rpm}	19.5	10.2	6.6	39	20.4	11.7	33.8	27.0	17.6	40.8	32.4	23.4
Motor Constant	Nom	K_m	N-m/√W	0.069	0.070	0.070	0.11	0.11	0.11	0.14	0.15	0.15	0.17	0.18	0.17
			lb-in/√W	0.61	0.62	0.62	0.99	1.00	0.98	1.28	1.30	1.29	1.5	1.6	1.5
Resistance (line-line) ⑥⑦	±10%	R_m	ohm	13	3.44	1.46	20.00	5.24	1.79	8.79	5.46	2.36	9.04	5.46	2.96
Inductance (line-line)		L	mH	19	5.2	2.18	35.5	9.7	3.19	17.3	11.1	4.68	18.7	11.8	6.16
Inertia (includes Resolver feedback) ③	±10%	J_m	$kg\text{-}cm^2$	0.107			0.161			0.216			0.27		
			$lb\text{-}in\text{-}s^2$	9.5E-05			1.4E-04			1.9E-04			2.4E-04		
Optional Brake Inertia (additional)	±10%	J_m	$kg\text{-}cm^2$	0.012			0.012			0.012			0.012		
			$lb\text{-}in\text{-}s^2$	1.1E-05			1.1E-05			1.1E-05			1.1E-05		
Weight ⑧⑨		W	kg	3.6			4.1			4.6			5.1		
			lb	7.9			9.0			10.1			11.2		
Static Friction ①		T_f	Nm	0.0810			0.084			0.086			0.089		
			lb-in	0.717			0.74			0.76			0.79		
Viscous Damping ①		K_{dv}	Nm/k_{rpm}	0.0046			0.0055			0.0065			0.0074		
			$lb\text{-}in/k_{rpm}$	0.041			0.05			0.06			0.07		
Thermal Time Constant		TCT	minutes	29.0			32			34			37		
Thermal Resistance		$R_{thw\text{-}a}$	°C/W	2.12			1.73			1.6			1.55		
Pole Pairs				3			3			3			3		
Heat Sink Size				10"x10"x1/4" Aluminum Plate			10"x10"x1/4" Aluminum Plate			10"x10"x1/4" Aluminum Plate			10"x10"x1/4" Aluminum Plate		

Notes:
① Motor winding temperature rise, ΔT=100°C, at 40°C ambient.
② All data referenced to sinusoidal commutation.
③ Add parking brake if applicable for total inertia.
④ Motor with standard heat sink.
⑤ May be limited at some values of Vbus.
⑥ Measured at 25°C.
⑦ Resistance is measured with 1 meter of cable.
⑧ Face mount adds 0.4 kg [0.9 lbs]
⑨ Brake options adds 0.5 kg [1.1 lbs]

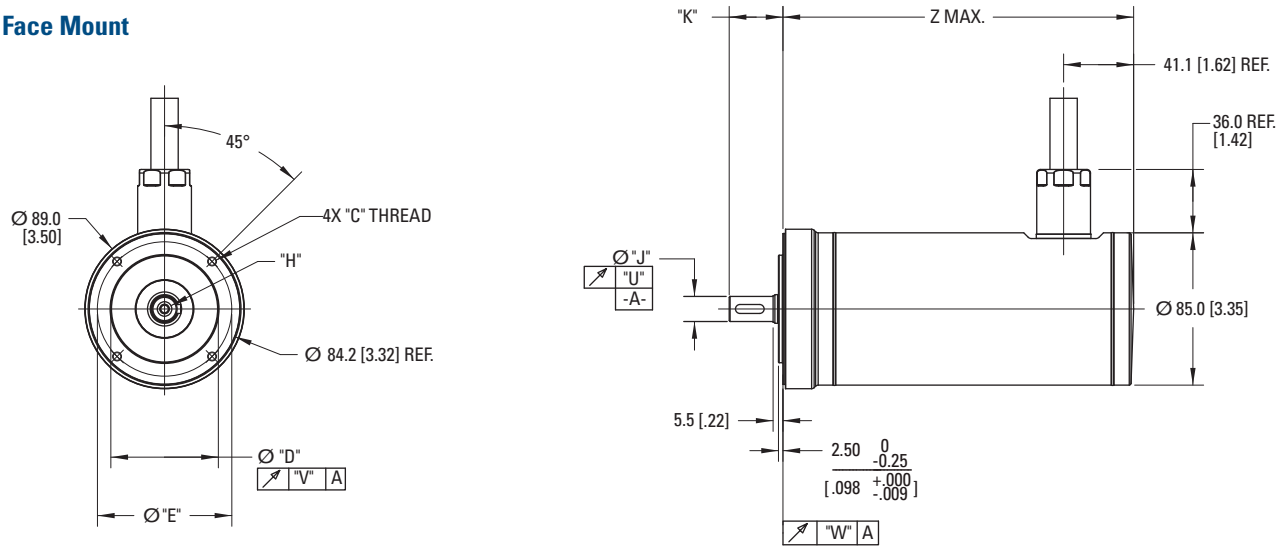
AKMH3x Outline Drawings

AKMH3x Frame

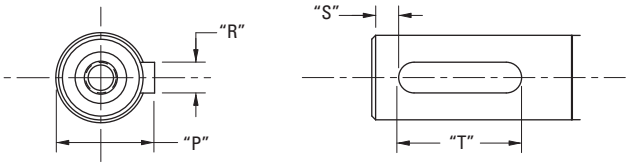
Flange Mount



Face Mount



AKMH3x			
Code	**Mount Type**	**Standard**	**Shaft**
AC	Flange	IEC 75	Closed Keyway
AN	Flange	IEC 75	Smooth
CC	Face	IEC 75	Closed Keyway
CN	Face	IEC 75	Smooth



AKMH3x Dimension Data

AKMH3x Dimension Data

Mounting Code	"C"	"D"	"E"	"H"	"J"	"K"	"P"
AC	5.80 [.228]	60 +0.012 -0.007 j6 [2.3622 +.0004 -.0002]	75 [2.953]	D M5 DIN 332	14 +0.012 +0.001 k6 [.5512 +.0004 +.0001]	30.0 [1.181]	16 0 -0.13 [.630 +.000 -.005]
AN	5.80 [.228]	60 +0.012 -0.007 j6 [2.3622 +.0004 -.0002]	75 [2.953]	D M5 DIN 332	14 +0.012 +0.001 k6 [.5512 +.0004 +.0001]	30.0 [1.181]	–
CC	M5 x 0.8 x 10.0 [.39]	60 +0.012 -0.007 j6 [2.3622 +.0004 -.0002]	75 [2.953]	D M5 DIN 332	14 +0.012 +0.001 k6 [.5512 +.0004 +.0001]	30.0 [1.181]	16 0 -0.13 [.630 +.000 -.005]
CN	M5 x 0.8 x 10.0 [.39]	60 +0.012 -0.007 j6 [2.3622 +.0004 -.0002]	75 [2.953]	D M5 DIN 332	14 +0.012 +0.001 k6 [.5512 +.0004 +.0001]	30.0 [1.181]	–

Mounting Code	"R"	"S"	"T"	"U"	"V"	"W"
AC	5 0 -0.03 N9 [.197 +.000 -.001]	3.50 [0.0138]	16 0 -0.20 [.630 +.000 -.007]	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]
AN	–	–	–	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]
CC	5 0 -0.03 N9 [.197 +.000 -.001]	3.50 [0.0138]	16 0 -0.20 [.630 +.000 -.007]	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]
CN	–	–	–	0.035 [.0013]	0.080 [.0031]	0.080 [.0031]

	Z MAX		
MODEL	SFD W/O Brake	Hiperface W/O Brake	Hiperface W/ Brake
AKMH31	166.5 [6.56]	182.5 [7.19]	214.0 [8.43]
AKMH32	197.5 [7.78]	213.5 [8.41]	245.0 [9.65]
AKMH33	228.5 [9.00]	244.5 [9.63]	276.0 [10.87]

Note 1: Dimensions are in mm [inches].
Note 2: Product designed in metric. English conversions provided for reference only.

AKMH3x Performance Data

AKMH3x Performance Data – Up to 640 Vdc

					AKMH31			AKMH32			AKMH33		
	Parameters	Tol	Symbol	Units	C	E	H	C	E	H	C	E	H
	Max Rated DC Bus Voltage	Max	Vbus	Vdc	640	320	160	640	640	320	640	640	320
	Continuous Torque (Stall) for ΔT winding = 100°C ①②	Nom	T_{cs}	Nm	1.00	1.04	1.08	1.72	1.77	1.82	2.25	2.32	2.38
				lb-in	8.85	9.2	9.6	15.2	15.7	16.1	19.9	20.5	21.1
	Continuous Current (Stall) for ΔT winding = 100°C ①②	Nom	I_{cs}	A_{rms}	1.29	2.76	5.51	1.30	2.56	4.98	1.27	2.20	4.80
	Continuous Torque (Stall) for ΔT winding = 60°C ②	Nom	T_{cs}	Nm	0.80	0.83	0.86	1.38	1.42	1.46	1.80	1.86	1.90
				lb-in	7.08	7.36	7.65	12.2	12.5	12.9	16	16	17
	Max Mechanical Speed ⑤	Nom	N_{max}	rpm	8000	8000	8000	8000	8000	8000	8000	8000	8000
	Peak Torque ①②	Nom	T_p	Nm	4.41	4.52	4.59	8.10	8.24	8.39	11.5	11.7	11.9
				lb-in	39	40	41	71.7	72.9	74.3	102	103	106
	Peak Current	Nom	I_p	A_{rms}	6.90	15.0	29.3	7.2	14.1	27.5	7.4	12.9	28.1
75 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	1.03	1.04	-	-	1.78	-	-	2.35
				lb-in	-	9.12	9.20	-	-	15.8	-	-	20.8
	Rated Speed		N_{rtd}	rpm	-	750	2000	-	-	1200	-	-	800
	Rated Power (speed) ①②		P_{rtd}	kW	-	0.08	0.22	-	-	0.22	-	-	0.20
				Hp	-	0.11	0.29	-	-	0.30	-	-	0.26
160 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	0.96	0.88	-	-	1.66	-	-	2.20
				lb-in	-	8.45	7.80	-	-	14.7	-	-	19.5
	Rated Speed		N_{rtd}	rpm	-	2500	6000	-	-	3000	-	-	2500
	Rated Power (speed) ①②		P_{rtd}	kW	-	0.25	0.55	-	-	0.52	-	-	0.58
				Hp	-	0.34	0.74	-	-	0.70	-	-	0.77
320 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	0.95	0.86	-	1.66	1.57	1.13	2.22	2.20	1.64
				lb-in	8.43	7.57	-	14.7	13.9	10.0	19.6	19.5	14.5
	Rated Speed		N_{rtd}	rpm	2500	6000	-	1500	3500	7000	1000	2000	5500
	Rated Power (speed) ①②		P_{rtd}	kW	0.25	0.54	-	0.26	0.57	0.83	0.23	0.46	0.94
				Hp	0.33	0.72	-	0.35	0.77	1.11	0.31	0.62	1.27
560 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	0.86	-	-	1.57	1.10	-	2.14	1.82	-
				lb-in	8.0	-	-	13.9	9.7	-	18.9	16.1	-
	Rated Speed		N_{rtd}	rpm	5000	-	-	3000	7000	-	2000	4500	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.45	-	-	0.49	0.81	-	0.45	0.86	-
				Hp	0.61	-	-	0.66	1.08	-	0.60	1.15	-
640 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	0.82	-	-	1.52	0.92	-	2.09	1.72	-
				lb-in	7.0	-	-	13.5	8.1	-	18.5	15.2	-
	Rated Speed		N_{rtd}	rpm	6000	-	-	3500	8000	-	2500	5000	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.51	-	-	0.56	0.77	-	0.55	0.90	-
				Hp	0.69	-	-	0.75	1.03	-	0.73	1.21	-

See following page for notes.

AKMH3x Performance Data – Up to 640 Vdc (Continued)

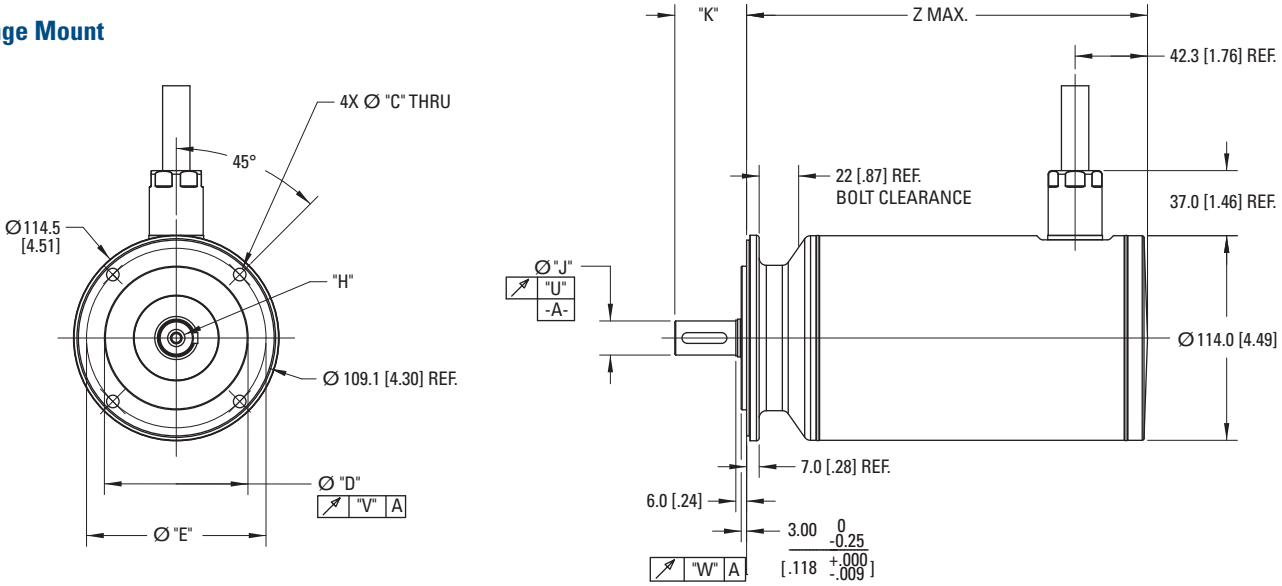
				AKMH31			AKMH32			AKMH33		
Parameters	**Tol**	**Symbol**	**Units**	**C**	**E**	**H**	**C**	**E**	**H**	**C**	**E**	**H**
Torque Constant ①	±10%	K_t	Nm/A_{rms}	0.85	0.41	0.21	1.40	0.73	0.39	1.86	1.10	0.52
			$lb\text{-}in/A_{rms}$	7.5	3.6	1.9	12.4	6.5	3.4	16.5	9.7	4.6
Back EMF Constant ⑥	±10%	K_e	V/k_{rpm}	54.5	26.1	13.7	89.8	47.1	24.8	120	70.6	33.4
Motor Constant	Nom	K_m	N-m/√W	0.15	0.15	0.15	0.23	0.24	0.24	0.29	0.30	0.30
			lb-in/√W	1.3	1.4	1.3	2.1	2.1	2.1	2.6	2.6	2.7
Resistance (line-line) ⑥	±10%	R_m	ohm	21.4	4.76	1.31	23.8	6.32	1.71	26.6	9.03	1.98
Inductance (line-line)		L	mH	37.5	8.6	2.4	46.5	12.8	3.53	53.6	18.5	4.1
Inertia (includes Resolver feedback) ③	±10%	J_m	$kg\text{-}cm^2$	0.33			0.59			0.85		
			$lb\text{-}in\text{-}s^2$	2.9E-04			5.2E-04			7.5E-04		
Optional Brake Inertia (additional)	±10%	J_m	$kg\text{-}cm^2$	0.012			0.012			0.012		
			$lb\text{-}in\text{-}s^2$	1.1E-05			1.1E-05			1.1E-05		
Weight ⑦⑧		W	kg	4.1			5.0			5.9		
			lb	9.0			11.0			13.0		
Static Friction ①		T_f	Nm	0.093			0.099			0.105		
			lb-in	0.82			0.88			0.93		
Viscous Damping ①		K_{dv}	Nm/k_{rpm}	0.0177			0.003			0.004		
			$lb\text{-}in/k_{rpm}$	0.002			0.03			0.04		
Thermal Time Constant		TCT	minutes	24			32			40		
Thermal Resistance		$R_{thw\text{-}a}$	°C/W	1.4			1.26			1.19		
Pole Pairs				4			4			4		
Heat Sink Size				10"x10"x1/4" Aluminum Plate			10"x10"x1/4" Aluminum Plate			10"x10"x1/4" Aluminum Plate		

Notes:
① Motor winding temperature rise, ΔT=100°C, at 40°C ambient.
② All data referenced to sinusoidal commutation.
③ Add parking brake if applicable for total inertia.
④ Motor with standard heat sink.
⑤ May be limited at some values of Vbus.
⑥ Measured at 25°C.
⑦ Face motor adds 0.4kg (0.9 lbs)
⑧ Brake motor adds 0.7kg (1.6 lbs)

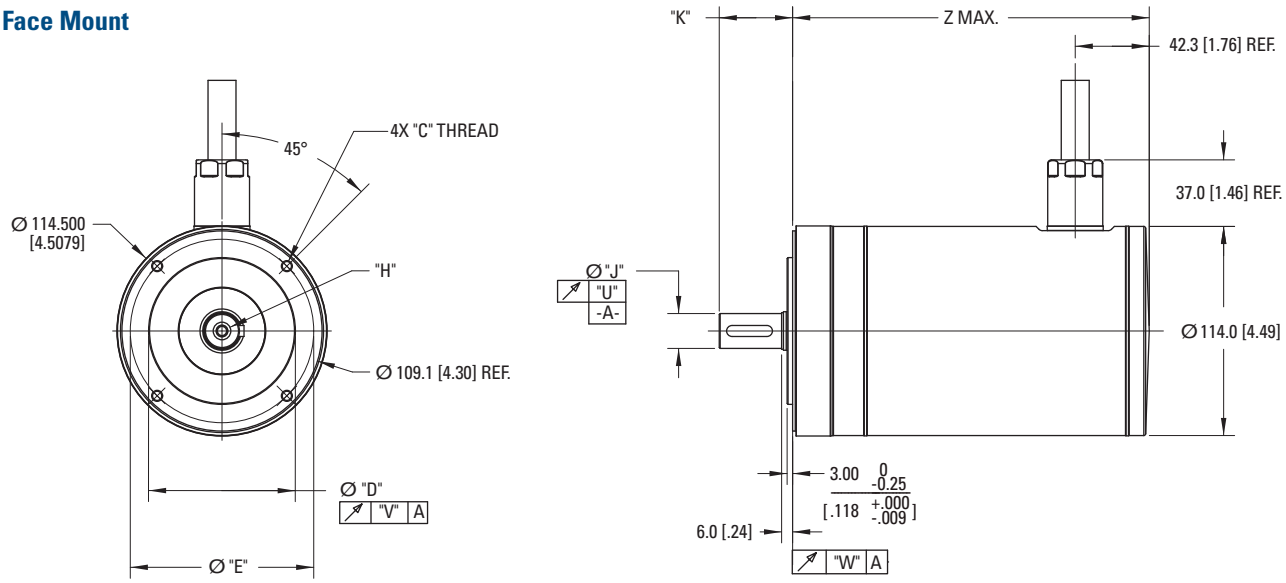
AKMH4x Outline Drawings

AKMH4x Frame

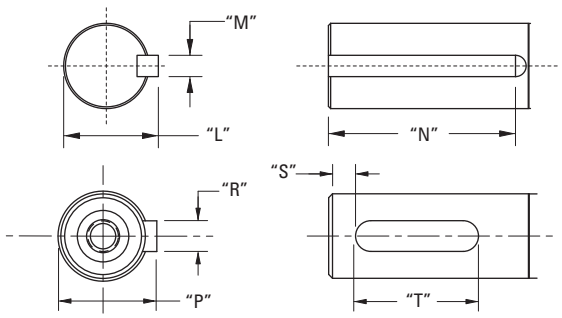
Flange Mount



Face Mount



AKMH4x			
Code	**Mount Type**	**Standard**	**Shaft**
AC	Flange	IEC 100	Closed Keyway
AN	Flange	IEC 100	Smooth
BK	Flange	NEMA 42	Open Keyway
BN	Flange	NEMA 42	Smooth
CC	Face	IEC 100	Closed Keyway
CN	Face	IEC 100	Smooth
DK	Face	NEMA 42	Open Keyway
DN	Face	NEMA 42	Smooth



AKMH4x Dimension Data

AKMH4x Dimension Data

Mounting Code	"C"	"D"	"E"	"H"	"J"	"K"	"L"
AC	7 [.276]	80 +0.012 -0.007 +.0004 -.0002 [3.1496] j6	100 [3.937]	D M6 DIN 332	19 +0.015 +0.002 +.0005 +.0001 [.7480] k6	40.0 [1.57]	–
AN	7 [.276]	80 +0.012 -0.007 +.0004 -.0002 [3.1496] j6	100 [3.937]	D M6 DIN 332	19 +0.015 +0.002 +.0005 +.0001 [.7480] k6	40.0 [1.57]	–
BK	6.91 [.272]	73.025 0 -0.051 +.0000 -.0020 [2.8750]	98.43 [3.875]	–	15.875 0 -0.013 +.0000 -.0005 [.6250]	52.40 [2.06]	17.92 0 -0.43 +.000 -.017 [.706]
BN	6.91 [.272]	73.025 0 -0.051 +.0000 -.0020 [2.8750]	98.43 [3.875]	–	15.875 0 -0.013 +.0000 -.0005 [.6250]	52.40 [2.06]	–
CC	M6 x 1 x 12 [.472]	80 +0.012 -0.007 +.0004 -.0002 [3.1496] j6	100 [3.937]	D M6 DIN 332	19 +0.015 +0.002 +.0005 +.0001 [.7480] k6	40.0 [1.57]	–
CN	M6 x 1 x 12 [.472]	80 +0.012 -0.007 +.0004 -.0002 [3.1496] j6	100 [3.937]	D M6 DIN 332	19 +0.015 +0.002 +.0005 +.0001 [.7480] k6	40.0 [1.57]	–
DK	UNC 1/4 - 20 x 12.3 [.484]	73.025 0 -0.051 +.0000 -.0020 [2.8750]	98.43 [3.875]	–	15.875 0 -0.013 +.0000 -.0005 [.6250]	52.40 [2.06]	17.92 0 -0.43 +.000 -.017 [.706]
DN	UNC 1/4 - 20 x 12.3 [.484]	73 0 -0.051 +.0000 -.0020 [2.8750] j6	98.43 [3.875]	–	15.875 0 -0.013 +.0000 -.0005 [.6250]	52.40 [2.06]	–

Mounting Code	"M"	"N"	"P"	"R"	"S"	"T"	"U"	"V"	"W"
AC	–	–	21.5 0 -0.13 +.000 -.005 [.846]	6 0 -0.03 +.000 -.001 [.236] N9	4.00 [1.57]	25 0 -0.30 +.000 -.011 [.984]	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
AN	–	–	–	–	–	–	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
BK	4.762 0 -0.050 +.0000 -.0020 [.1875]	34.93 ± 0.25 [1.375 ± .010]	–	–	–	–	0.051 [.0020]	0.10 [.004]	0.10 [.004]
BN	–	–	–	–	–	–	0.051 [.0020]	0.10 [.004]	0.10 [.004]
CC	–	–	21.5 0 -0.13 +.000 -.005 [.846]	6 0 -0.03 +.000 -.001 [.236] N9	4.00 [1.57]	25 0 -0.30 +.000 -.011 [.984]	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
CN	–	–	–	–	–	–	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
DK	4.762 0 -0.050 +.0000 -.0020 [.1875]	34.93 ± 0.25 [1.375 ± .010]	–	–	–	–	0.051 [.0020]	0.10 [.004]	0.10 [.004]
DN	–	–	–	–	–	–	0.051 [.0020]	0.10 [.004]	0.10 [.004]

	Z MAX		
MODEL	SFD W/O Brake	Hiperface W/O Brake	Hiperface W/ Brake
AKMH41	166.7 [6.56]	182.7 [7.19]	217.0 [8.54]
AKMH42	195.7 [7.70]	211.7 [8.33]	246.0 [9.69]
AKMH43	224.7 [8.85]	240.7 [9.48]	275.0 [10.83]
AKMH44	253.7 [9.99]	269.7 [10.62]	304.0 [11.97]

Note 1: Dimensions are in mm [inches].
Note 2: Product designed in metric. English conversions provided for reference only.

AKMH4x Performance Data

AKMH4x Perfomance Data – Up to 640 Vdc

					AKMH41			AKMH42				AKMH43			AKMH44		
	Parameters	Tol	Sym	Units	C	E	H	C	E	H	J	E	H	L	E	H	K
	Max Rated DC Bus Voltage	Max	Vbus	Vdc	640	640	640	640	640	640	640	640	640	640	640	640	640
	Continuous Torque (Stall) for ΔT winding = 100°C ①②	Nom	T_{cs}	Nm	1.85	1.90	1.94	3.19	3.27	3.40	3.43	4.56	4.68	4.59	5.64	5.77	5.76
				lb-in	16.4	16.8	17.2	28.2	28.9	30.1	30.4	40.3	41.4	40.6	50.0	51.1	51.0
	Continuous Current (Stall) for ΔT winding = 100°C ①②	Nom	I_{cs}	A_{rms}	1.54	2.89	5.82	1.42	2.77	6.10	8.56	2.79	5.52	11.4	2.89	5.68	10.2
	Continuous Torque (Stall) for ΔT winding = 60°C ②	Nom	T_{cs}	Nm	1.48	1.52	1.55	2.55	2.62	2.72	2.74	3.65	3.74	3.67	4.52	4.62	4.61
				lb-in	13.1	13.5	13.7	22.6	23.2	24.1	24.3	32.3	33.1	32.5	40.0	40.9	40.8
	Max Mechanical Speed ⑤	Nom	N_{max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
	Peak Torque ①②	Nom	T_p	Nm	6.82	6.95	7.00	12.6	12.8	13.1	13.1	18.3	18.7	18.4	23.5	23.5	23.5
				lb-in	60.4	61.5	62.0	112	113	116	116	162	165	163	208	208	208
	Peak Current	Nom	I_p	A_{rms}	7.3	14.3	28.0	7.00	13.7	30.0	42.0	13.7	27.2	55.8	14.5	28.1	50.5
75 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	-	1.89	-	-	-	-	-	-	-	-	-	-
				lb-in	-	-	16.7	-	-	-	-	-	-	-	-	-	-
	Rated Speed		N_{rtd}	rpm	-	-	1000	-	-	-	-	-	-	-	-	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	-	-	0.20	-	-	-	-	-	-	-	-	-	-
				Hp	-	-	0.27	-	-	-	-	-	-	-	-	-	-
160 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	1.85	1.77	-	-	3.09	2.94	-	-	3.69	-	-	4.83
				lb-in	-	16.0	15.7	-	-	27.3	26.0	-	-	32.7	-	-	42.7
	Rated Speed		N_{rtd}	rpm	-	1200	3000	-	-	2000	3000	-	-	3000	-	-	2000
	Rated Power (speed) ①②		P_{rtd}	kW	-	0.23	0.56	-	-	0.65	0.92	-	-	1.16	-	-	1.01
				Hp	-	0.31	0.75	-	-	0.87	1.24	-	-	1.55	-	-	1.36
320 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	1.78	1.74	1.47	-	2.99	2.63	2.23	4.15	3.77	2.39	5.13	4.59	3.1
				lb-in	15.8	15.4	13.0	-	26.5	23.3	19.7	36.7	33.4	21.2	45.0	40.6	27.4
	Rated Speed		N_{rtd}	rpm	1200	3000	6000	-	1800	4500	6000	1500	3000	6000	1200	2500	5000
	Rated Power (speed) ①②		P_{rtd}	kW	0.22	0.55	0.92	-	0.56	1.24	1.40	0.65	1.18	1.50	0.64	1.20	1.62
				Hp	0.30	0.73	1.24	-	0.76	1.66	1.88	0.87	1.59	2.01	0.86	1.61	2.18
560 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	1.68	1.44	-	2.98	2.72	2.21	-	3.83	2.44	-	4.76	3.13	-
				lb-in	14.9	12.7	-	26.4	24.1	19.6	-	33.9	21.6	-	42.1	27.7	-
	Rated Speed		N_{rtd}	rpm	3000	6000	-	1500	3500	6000	-	2500	6000	-	2000	5000	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.53	0.90	-	0.47	1.00	1.39	-	1.00	1.53	-	1.00	1.64	-
				Hp	0.71	1.21	-	0.63	1.34	1.86	-	1.34	2.06	-	1.34	2.20	-
640 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	1.65	1.44	-	2.91	2.62	2.21	-	3.68	2.44	-	4.52	2.58	-
				lb-in	14.6	12.7	-	25.8	23.2	19.6	-	32.6	21.6	-	40.0	22.8	-
	Rated Speed		N_{rtd}	rpm	3500	6000	-	2000	4000	6000	-	3000	6000	-	2500	6000	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.60	0.90	-	0.61	1.10	1.39	-	1.16	1.53	-	1.18	1.62	-
				Hp	0.81	1.21	-	0.82	1.47	1.86	-	1.55	2.06	-	1.59	2.17	-

See following page for notes.

AKMH4x Performance Data – Up to 640 Vdc (Continued)

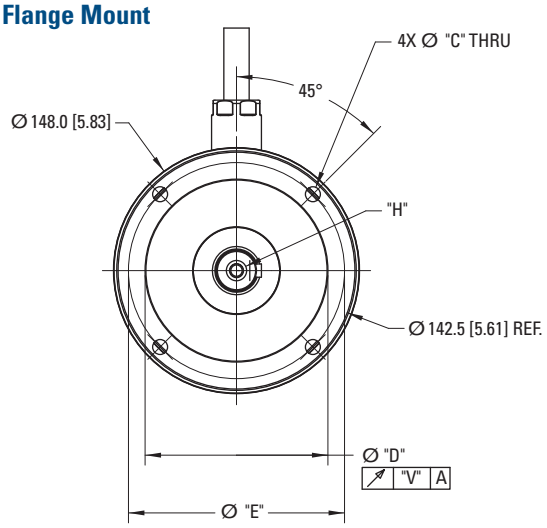
				AKMH41			AKMH42				AKMH43			AKMH44		
Parameters	**Tol**	**Sym**	**Units**	**C**	**E**	**H**	**C**	**E**	**H**	**J**	**E**	**H**	**L**	**E**	**H**	**K**
Torque Constant ①	±10%	K_t	Nm/A_{rms}	1.34	0.71	0.37	2.4	1.26	0.59	0.430	1.72	0.89	0.42	2.04	1.06	0.59
			lb-in/ A_{rms}	11.9	6.3	3.3	21.2	11.2	5.3	3.78	15.2	7.9	3.8	18.1	9.4	5.2
Back EMF Constant ⑥	±10%	K_e	V/k_{rpm}	86.3	45.6	23.7	154	80.9	38.3	27.5	111	57.4	27.5	132	68	37.8
Motor Constant	Nom	K_m	N-m/√W	0.24	0.24	0.24	0.37	0.37	0.38	0.39	0.48	0.50	0.46	0.57	0.58	0.58
			lb-in/√W	2.1	2.1	2.1	3.3	3.3	3.3	3.4	4.2	4.4	4.1	5.0	5.1	5.1
Resistance (line-line) ⑥	±10%	R_m	ohm	21.3	6.04	1.58	27.5	7.80	1.67	0.82	8.63	2.12	0.572	8.66	2.25	0.697
Inductance (line-line)		L	mH	66.1	18.4	5.0	97.4	26.8	6.0	3.10	32.6	8.8	2.0	33.9	9.1	2.8
Inertia (includes Resolver feedback) ③	±10%	J_m	$kg\text{-}cm^2$	0.81			1.45				2.09			2.73		
			$lb\text{-}in\text{-}s^2$	7.2E-04			1.3E-03				1.9E-03			2.4E-03		
Optional Brake Inertia (additional)	±10%	J_m	$kg\text{-}cm^2$	0.068			0.068				0.068			0.068		
			$lb\text{-}in\text{-}s^2$	6.0E-05			6.0E-05				6.0E-05			6.0E-05		
Weight ⑦⑧		W	kg	6.1			7.4				8.8			10.2		
			lb	13.4			16.3				19.4			22.5		
Static Friction ①		T_f	Nm	0.214			0.23				0.238			0.25		
			lb-in	1.89			2.00				2.11			2.21		
Viscous Damping ①		K_{dv}	Nm/k_{rpm}	0.009			0.013				0.017			0.021		
			lb-in/ k_{rpm}	0.08			0.12				0.15			0.19		
Thermal Time Constant		TCT	minutes	40			51				63			74		
Thermal Resistance		R_{thw-a}	°C/W	0.988			0.93				0.80			0.72		
Pole Pairs				5			5				5			5		
Heat Sink Size				10"x10"x1/4" Aluminum Plate			10"x10"x1/4" Aluminum Plate				10"x10"x1/4" Aluminum Plate			10"x10"x1/4" Aluminum Plate		

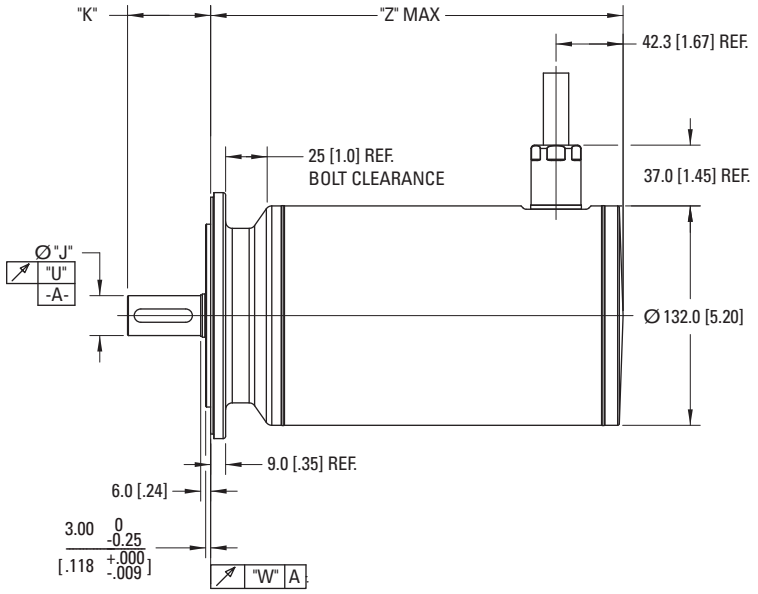
Notes:
① Motor winding temperature rise, ΔT=100°C, at 40°C ambient.
② All data referenced to sinusoidal commutation.
③ Add parking brake if applicable for total inertia.
④ Motor with standard heat sink.
⑤ May be limited at some values of Vbus.
⑥ Measured at 25°C.
⑦ Face motor adds 0.8kg (1.9 lbs)
⑧ Brake motor adds 1.14 kg (2.5 lbs)

AKMH5x Outline Drawings

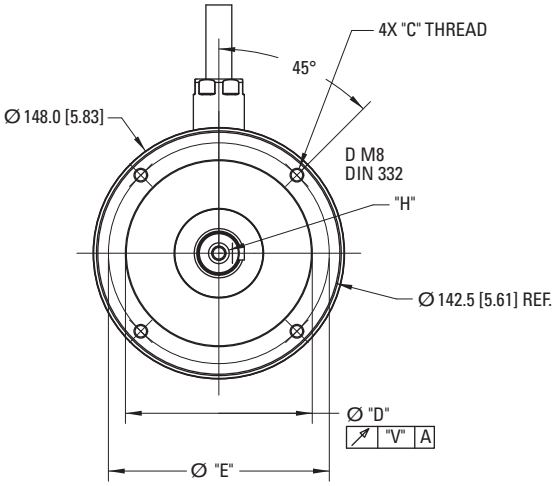
AKMH5x Frame

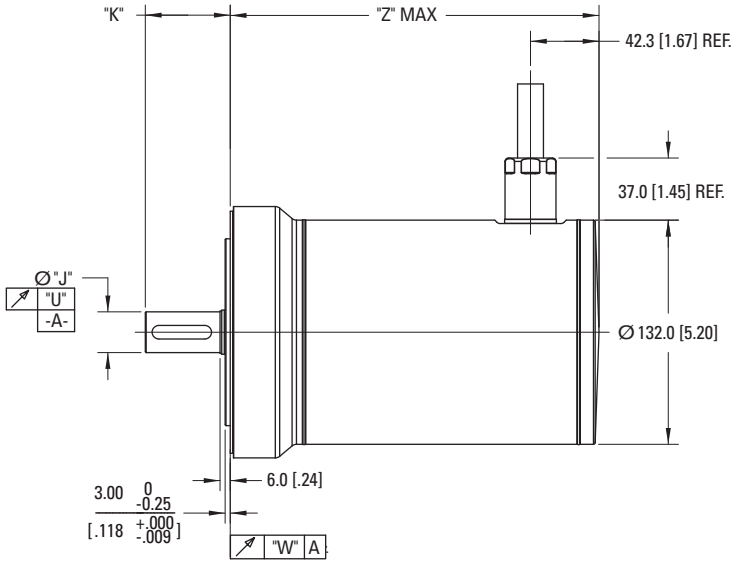
Flange Mount



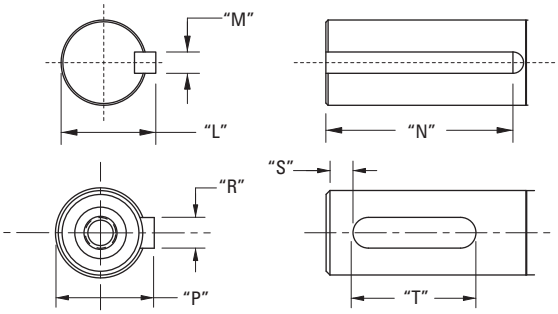


Face Mount





AKMH5x			
Code	**Mount Type**	**Standard**	**Shaft**
AC	Flange	IEC 130	Closed Keyway
AN	Flange	IEC 130	Smooth
BK	Flange	NEMA 42	Open Keyway
BN	Flange	NEMA 42	Smooth
CC	Face	IEC 130	Closed Keyway
CN	Face	IEC 130	Smooth
DK	Face	NEMA 42	Open Keyway
DN	Face	NEMA 42	Smooth
GC	Flange	IEC 115	Closed Keyway
GN	Flange	IEC 115	Smooth
HC	Face	IEC 115	Closed Keyway
HN	Face	IEC 115	Smooth



AKMH5x Dimension Data

AKMH5x Dimension Data

Mounting Code	"C"	"D"	"E"	"H"	"J"	"K"	"L"
AC	9 [.354]	110 +0.013 -0.009 j6 [4.3307 +.0005 -.0003]	130 [5.118]	D M8 DIN 332	24 +0.015 -0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–
AN	9 [354]	110 +0.013 -0.009 j6 [4.3307 +.0005 -.0003]	130 [5.118]	D M8 DIN 332	24 +0.015 -0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–
BK	8.33 [.328]	55.560 0 -0.051 [2.1874 +.0000 -.0020]	125.73 [4.950]	–	19.05 0 -0.013 [.7500 +.0000 -.0005]	57.15 [2.250]	21.15 0 -0.43 [.833 +.000 -.017]
BN	8.33 [.328]	55.560 0 -0.051 j6 [2.1874 +.0000 -.0020	125.73 [4.950]	–	19.05 0 -0.013 k6 [.7500 +.0000 -.0005]	57.15 [2.250]	–
CC	M8 x 1.25 x 16.0 [.63]	110 +0.013 -0.009 j6 [4.3307 +.0005 -.0003]	130 [5.118]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–
CN	M8 x 1.25 x 16.0 [.63]	110 +0.013 -0.009 j6 [4.3307 +.0005 -.0003	130 [5.118]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–
DK	UNC 3/8 - 16 x 19.05 [.750]	55.563 0 -0.051 [2.1874 +.0000 -.0020]	125.73 [4.950]	–	19.05 0 -0.013 [.7500 +.0000 -.0005]	57.15 [2.250]	21.15 0 -0.43 [.833 +.000 -.017]
DN	UNC 3/8 - 16 x 19.05 [.750]	55.563 0 -0.051 j6 [2.1874 +.0000 -.0020	125.73 [4.950]	–	19.05 0 -0.013 [.7500 +.0000 -.0005]	57.15 [2.250]	–
GC	9 [.354]	95 +0.013 -0.009 j6 [3.4702 +.0005 -.0003]	115 [4.528]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–
GN	9 [354]	95 +0.013 -0.009 j6 [3.4702 +.0005 -.0003]	115 [4.528]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–
HC	M8 x 1.25 x 16.0 [.63]	95 +0.013 -0.009 j6 [3.7402 +.0005 -.0003	115 [4.528]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–
HN	M8 x 1.25 x 16.0 [.63]	95 +0.013 -0.009 j6 [3.7402 +.0005 -.0003	115 [4.528]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0005 +.0001]	50.0 [1.97]	–

Continued on the following page

Note 1: Dimensions are in mm [inches].
Note 2: Product designed in metric. English conversions provided for reference only.

AKMH5x Dimension Data

AKMH5x Dimension Data (continued)

Mounting Code	"M"	"N"	"P"	"R"	"S"	"T"	"U"	"V"	"W"
AC	–	–	27 $^{0}_{-0.29}$ [1.063 $^{+.000}_{-.011}$]	8 $^{0}_{-0.036}$ N9 [.3150 $^{+.0000}_{-.0014}$]	4.00 [.157]	35 $^{0}_{-0.30}$ [1.378 $^{+.000}_{-.011}$]	0.040 [.0015]	0.100 [.0039]	0.100 [.0039]
AN	–	–	–	–	–	–	0.040 [.0015]	0.100 [.0039]	0.100 [.0039]
BK	4.762 $^{0}_{-0.050}$ [.1875 $^{+.0000}_{-.0019}$]	38.1 ± 0.25 [1.500 ± .009]	–	–	–	–	0.051 [.0020]	0.100 [.0039]	0.100 [.0039]
BN	–	–	–	–	–	–	0.051 [.0020]	0.100 [.0039]	0.100 [.0039]
CC	–	–	27 $^{0}_{-0.29}$ [1.063 $^{+.000}_{-.011}$]	8 $^{0}_{-0.036}$ N9 [.3150 $^{+.0000}_{-.0014}$]	4.00 [.157]	35 $^{0}_{-0.30}$ [1.378 $^{+.000}_{-.011}$]	0.040 [.0015]	0.100 [.0039]	0.100 [.0039]
CN	–	–	–	–	–	–	0.040 [.0015]	0.100 [.0039]	0.100 [.0039]
DK	4.762 $^{0}_{-0.050}$ [.1875 $^{+.0000}_{-.0019}$]	38.1 ± 0.25 [1.500 ± .009]	–	–	–	–	0.051 [.0020]	0.100 [.0039]	0.100 [.0039]
DN	–	–	–	–	–	–	0.051 [.0020]	0.100 [.0039]	0.080 [.0031]
GC	–	–	27 $^{0}_{-0.29}$ [1.063 $^{+.000}_{-.011}$]	8 $^{0}_{-0.036}$ N9 [.3150 $^{+.0000}_{-.0014}$]	4.00 [.157]	35 $^{0}_{-0.30}$ [1.378 $^{+.000}_{-.011}$]	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
GN	–	–	–	–	–	–	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
HC	–	–	27 $^{0}_{-0.29}$ [1.063 $^{+.000}_{-.011}$]	8 $^{0}_{-0.036}$ N9 [.3150 $^{+.0000}_{-.0014}$]	4.00 [.157]	35 $^{0}_{-0.30}$ [1.378 $^{+.000}_{-.011}$]	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
HN	–	–	–	–	–	–	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]

	Z MAX		
MODEL	SFD W/O Brake	Hiperface W/O Brake	Hiperface W/ Brake
AKMH51	187.4 [7.38]	198.4 [7.81]	240.4 [9.46]
AKMH52	218.4 8.60]]	229.4 [9.03]	271.4 [10.69]
AKMH53	249.4 [9.82]	260.4 [10.25]	302.4 [11.91]
AKMH54	280.4 [11.04]	291.4 [11.47]	333.4 [13.13]

Note 1: Dimensions are in mm [inches].
Note 2: Product designed in metric. English conversions provided for reference only.

Notes

AKMH5x Performance Data

AKMH5x Performance Data – Up to 640 Vdc

					AKMH51			AKMH52				AKMH53			AKMH54		
	Parameters	Tol	Sym	Units	E	H	L	E	H	L	M	H	L	P	H	L	P
	Max Rated DC Bus Voltage	Max	Vbus	Vdc	640	640	320	640	640	640	320	640	640	320	640	640	320
	Continuous Torque (Stall) for ΔT winding = 100°C ①②	Nom	T_{cs}	Nm	3.3	3.39	3.47	6.15	6.29	6.45	6.39	8.60	8.68	8.49	10.5	10.4	10.6
				lb-in	29.2	30.0	30.7	54.4	55.7	57.1	56.6	76.1	76.8	75.1	92.9	92.2	94.1
	Continuous Current (Stall) for ΔT winding = 100°C ①②	Nom	I_{cs}	A_{rms}	2.28	5.02	10.0	2.43	4.81	9.5	10.7	5.29	9.43	15.2	4.35	9.82	15.3
	Continuous Torque (Stall) for ΔT winding = 60°C ②	Nom	T_{cs}	Nm	2.64	2.71	2.78	4.92	5.03	5.16	5.11	6.88	6.94	6.79	8.40	8.34	8.50
				lb-in	23.8	24.0	24.6	43.5	44.5	45.7	45.2	60.9	61.5	60.1	74.3	73.8	75.3
	Max Mechanical Speed ⑤	Nom	N_{max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
	Peak Torque ①②	Nom	T_p	Nm	15.0	15.0	15.2	28.9	29.1	29.5	29.4	41.8	42.0	41.7	53.3	53.3	55.1
				lb-in	133	133	135	256	258	261	260	370	372	369	472	472	488
	Peak Current	Nom	I_p	A_{rms}	13.8	30.0	59.5	15.0	29.5	58.0	65.5	33.0	59.0	95.5	27.5	62.5	98.0
75 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	-	-	-	-	-	-	-	-	-	-	-	-
				lb-in	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rated Speed		N_{rtd}	rpm	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	-	-	-	-	-	-	-	-	-	-	-	-	-
				Hp	-	-	-	-	-	-	-	-	-	-	-	-	-
160 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	-	2.82	-	-	-	-	-	-	-	-	-	-
				lb-in	-	-	25.0	-	-	-	-	-	-	-	-	-	-
	Rated Speed		N_{rtd}	rpm	-	-	3000	-	-	-	-	-	-	-	-	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	-	-	0.89	-	-	-	-	-	-	-	-	-	-
				Hp	-	-	1.19	-	-	-	-	-	-	-	-	-	-
320 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	3.11	2.75	1.45	-	5.32	3.53	1.18	-	4.09	2.09	9.31	5.13	2.52
				lb-in	27.5	24.3	12.8	-	47.1	31.2	10.4	-	36.2	18.5	102	45.4	22.3
	Rated Speed		N_{rtd}	rpm	1200	3000	5500	-	1800	3500	4500	-	3000	3500	1000	2500	3000
	Rated Power (speed) ①②		P_{rtd}	kW	0.39	0.86	0.84	-	1.00	1.29	0.556	-	1.28	0.77	3.00	1.34	0.79
				Hp	0.52	1.16	1.12	-	1.34	1.73	0.745	-	1.72	1.03	4.03	1.80	1.06
560 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	2.83	1.41	-	5.39	3.44	1.19	-	4.06	2.14	-	7.62	2.47	-
				lb-in	25.0	12.5	-	47.7	30.4	10.5	-	35.9	18.9	-	67.4	21.9	-
	Rated Speed		N_{rtd}	rpm	2500	5500	-	1500	3500	4500	-	3000	3500	-	1800	3000	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.74	0.81	-	0.85	1.26	0.56	-	1.28	0.78	-	1.44	0.78	-
				Hp	0.99	1.09	-	1.13	1.69	0.75	-	1.71	1.05	-	1.93	1.04	-
640 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	2.68	1.41	-	5.08	2.44	1.19	-	2.12	2.14	-	7.09	-	-
				lb-in	23.7	12.5	-	45.0	21.6	10.5	-	18.8	18.9	-	62.7	-	-
	Rated Speed		N_{rtd}	rpm	3000	5500	-	2000	4000	4500	-	3500	3500	-	2000	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	0.84	0.81	-	1.06	1.02	0.561	-	0.78	0.78	-	1.48	-	-
				Hp	1.13	1.09	-	1.43	1.37	0.752	-	1.04	1.05	-	1.99	-	-

See following page for notes.

AKMH5x Performance Data – Up to 640 Vdc (Continued)

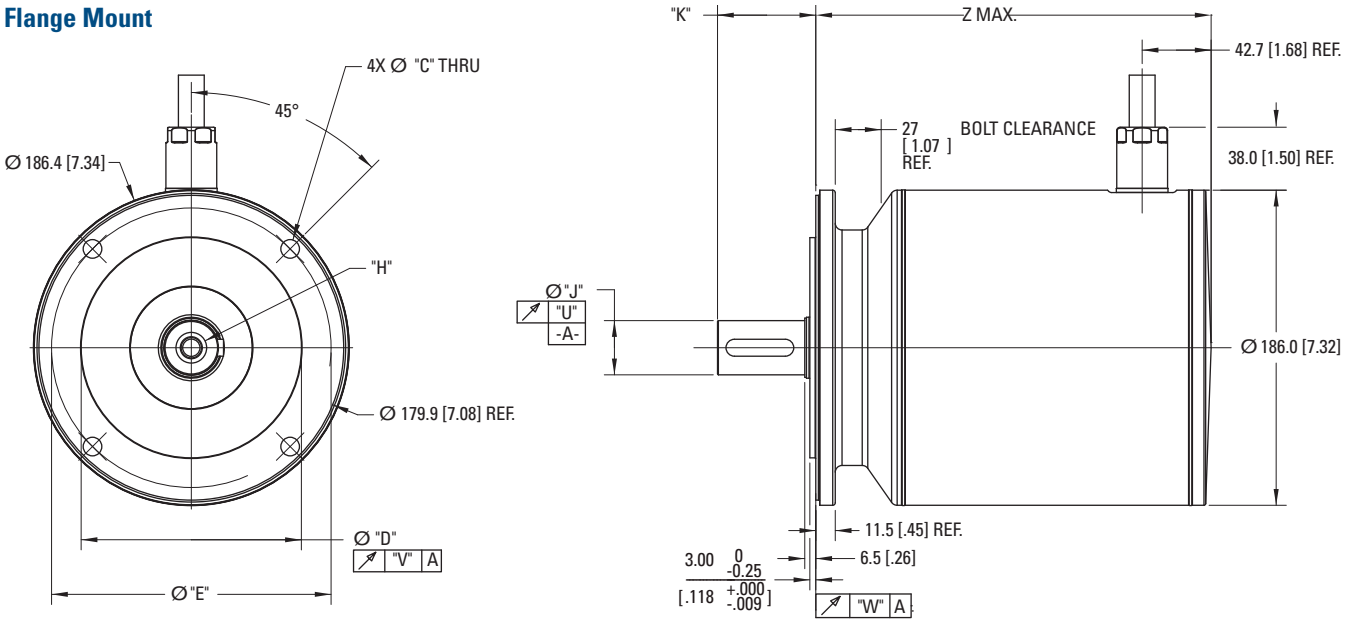
				AKMH51			AKMH52				AKMH53			AKMH54		
Parameters	**Tol**	**Sym**	**Units**	**E**	**H**	**L**	**E**	**H**	**L**	**M**	**H**	**L**	**P**	**H**	**L**	**P**
Torque Constant ①	±10%	K_t	Nm/A_{rms}	1.72	0.800	0.410	2.79	1.44	0.75	0.66	1.75	0.99	0.60	2.57	1.13	0.74
			lb-in/A_{rms}	15.2	7.1	3.6	24.7	12.7	6.64	5.8	15.5	8.76	5.31	22.7	10.0	6.5
Back EMF Constant ⑥	±10%	K_e	V/k_{rpm}	110	51.3	26.6	179	92.7	48.3	42.4	112	63.9	38.4	166	72.9	47.3
Motor Constant	Nom	K_m	N-m/√W	0.47	0.46	0.44	0.76	0.76	0.77	0.76	0.98	0.96	0.90	1.17	1.13	1.07
			lb-in/√W	4.1	4.1	3.9	6.7	6.8	6.8	6.7	8.7	8.5	8.0	10.4	10.0	9.5
Resistance (line-line) ⑥⑨	±10%	R_m	ohm	9.0	2.0	0.58	8.98	2.37	0.627	0.507	2.12	0.707	0.297	3.2	0.667	0.317
Inductance (line-line)		L	mH	36.6	7.9	2.1	44.7	11.9	3.24	2.50	11.4	3.64	1.30	18.3	3.50	1.50
Inertia (includes Resolver feedback) ③	±10%	J_m	kg-cm^2	3.42			6.22				9.12			11.92		
			lb-in-s^2	3.0E-03			5.5E-03				8.1E-03			0.011		
Optional Brake Inertia (additional)	±10%	J_m	kg-cm^2	0.173			0.173				0.173			0.173		
			lb-in-s^2	1.5E-04			1.5E-04				1.5E-04			1.5E-04		
Weight ⑦⑧		W	kg	8.9			11.1				13.4			15.7		
			lb	19.6			24.5				29.5			34.6		
Static Friction ①		T_f	Nm	0.622			0.64				0.658			0.677		
			lb-in	5.50			5.66				5.82			5.99		
Viscous Damping ①		K_{dv}	Nm/k_{rpm}	0.033			0.042				0.052			0.061		
			lb-in/k_{rpm}	0.29			0.37				0.46			0.54		
Thermal Time Constant		TCT	minutes	46			58				69			80		
Thermal Resistance		R_{thw-a}	°C/W	1			0.91				0.86			0.82		
Pole Pairs				5			5				5			5		
Heat Sink Size				12"x12"x1/2" Aluminum Plate			12"x12"x1/2" Aluminum Plate				12"x12"x1/2" Aluminum Plate			12"x12"x1/2" Aluminum Plate		

Notes:
① Motor winding temperature rise, ΔT=100°C, at 40°C ambient.
② All data referenced to sinusoidal commutation.
③ Add parking brake if applicable for total inertia.
④ Motor with standard heat sink.
⑤ May be limited at some values of Vbus.
⑥ Measured at 25°C.
⑦ Face motor adds 1.5 kg [3.3 lbs]
⑧ Brake motor adds 1.8 kg [3.9 lbs]
⑨ Resistance is measured with 1 meter of cable.

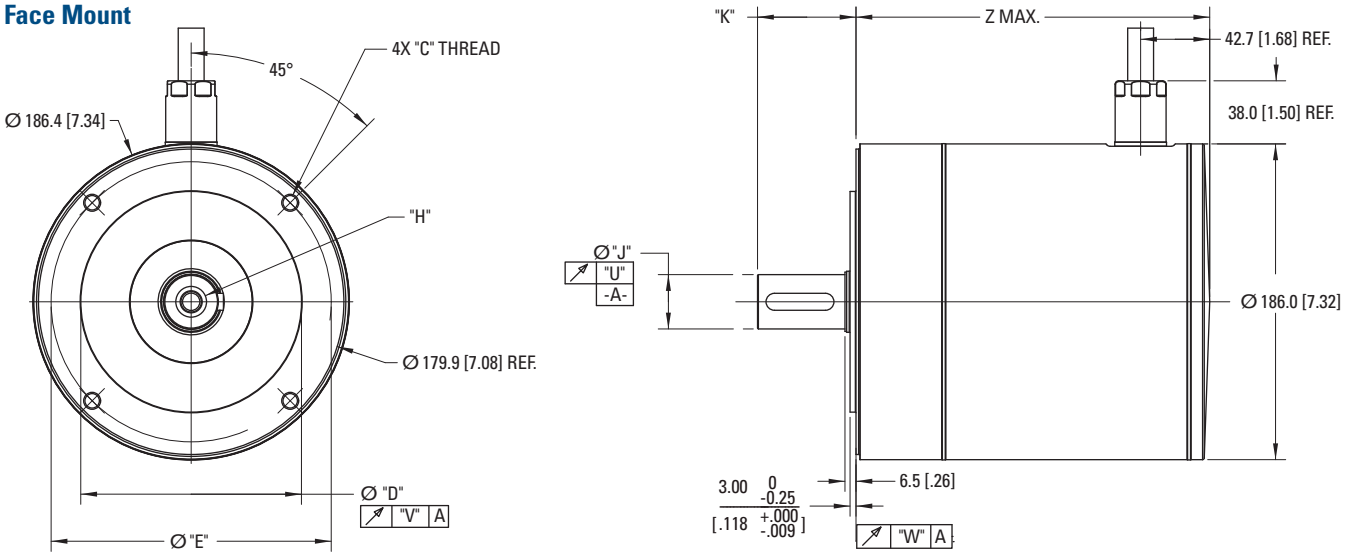
AKMH6x Outline Drawings

AKMH6x Frame

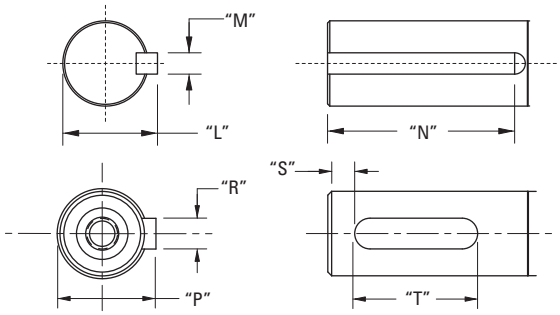
Flange Mount



Face Mount



AKMH6x			
Code	**Mount Type**	**Standard**	**Shaft**
AC	Flange	IEC 165	Closed Keyway
AN	Flange	IEC 165	Smooth
CC	Face	IEC 165	Closed Keyway
CN	Face	IEC 165	Smooth
DK	Face	NEMA 56	Open Keyway
DN	Face	NEMA 56	Smooth



AKMH6x Dimension Data

AKMH6x Dimension Data

Mounting Code	"C"	"D"	"E"	"H"	"J"	"K"	"L"
AC	11.00 [.433]	130 +0.014 -0.011 j6 [5.1181 +.0005 -.0004]	165.00 [6.496]	D M12 DIN 332	32 +0.018 +0.002 k6 [1.2598 +.0007 +.0001]	58 [2.28]	–
AN	11.00 [.433]	130 +0.014 -0.011 j6 [5.1181 +.0005 -.0004]	165.00 [6.496]	D M12 DIN 332	32 +0.018 +0.002 k6 [1.2598 +.0007 +.0001]	58 [2.28]	–
CC	M10 x 1.5 x 20.0 [.79]	130 +0.014 -0.011 j6 [5.1181 +.0005 -.0004]	165.00 [6.496]	D M12 DIN 332	32 +0.018 +0.002 k6 [1.2598 +.0007 +.0001]	58 [2.28]	–
CN	M10 x 1.5 x 20.0 [.79]	130 +0.014 -0.011 j6 [5.1181 +.0005 -.0004]	165.00 [6.496]	D M12 DIN 332	32 +0.018 +0.002 k6 [1.2598 +.0007 +.0001]	58 [2.28]	–
DK	UNC 3/8 - 16 x 19.05 [.750]	114.3 0 -0.076 [4.5000 +.0000 -.0029]	149.23 [5.875]	–	28.580 +0 -0.013 [1.1250 +.0000 -.0005]	69.9 [2.75]	31.39 0 -0.43 [1.236 +.000 -.017]
DN	UNC 3/8 - 16 x 19.05 [.750]	114.3 0 -0.076 [4.5000 +.0000 -.0029]	149.23 [5.875]	–	28.580 +0 -0.013 [1.1250 +.0000 +.0005]	69.9 [2.75]	–

Mounting Code	"M"	"N"	"P"	"R"	"S"	"T"	"U"	"V"	"W"
AC	–	–	35 0 -0.29 [1.378 +.000 -.011]	10 0 -0.036 N9 [.3937 +.0000 -.0014]	5.00 [.197]	40 0 -0.30 [1.575 +.000 -.011]	0.050 [.0019]	0.100 [.0039]	0.100 [.0039]
AN	–	–	–	–	–	–	0.050 [.0019]	0.100 [.0039]	0.100 [.0039]
CC	–	–	35 0 -0.29 [1.378 +.000 -.011]	10 0 -0.036 N9 [.3937 +.0000 -.0014]	5.00 [.197]	40 0 -0.30 [1.575 +.000 -.011]	0.050 [.0019]	0.100 [.0039]	0.100 [.0039]
CN	–	–	–	–	–	–	0.050 [.0019]	0.100 [.0039]	0.100 [.0039]
DK	6.35 0 -0.050 [.2500 +.0000 -.0019]	38.10 ±0.25 [1.500 ±.010]	–	–	–	–	0.050 [.0019]	0.100 [.0039]	0.100 [.0039]
DN	–	–	–	–	–	–	0.050 [.0019]	0.100 [.0039]	0.100 [.0039]

	Z MAX		
MODEL	SFD W/O Brake	Hiperface DSL W/O Brake	Hiperface DSL W/ Brake
AKMH62	209.9 [8.26]	220.9 [8.70]	267.5 [10.53]
AKMH63	234.9 [9.25]	245.9 [9.68]	292.5 [11.52]
AKMH64	259.9 [10.23]	270.9 [10.67]	317.5 [12.50]
AKMH65	284.9 [11.22]	295.9 [11.65]	342.5 [13.48]

Note 1: Dimensions are in mm [inches].
Note 2: Product designed in metric. English conversions provided for reference only.

AKMH6x Performance Data

AKMH6x Performance Data – Up to 640 Vdc

					AKMH62			AKMH63			AKMH64		AKMH65		
	Parameters	Tol	Sym	Units	H	L	M	H	L	M	K	L	K	L	M
	Max Rated DC Bus Voltage	Max	Vbus	Vdc	640	640	640	640	640	640	640	640	640	640	640
	Continuous Torque (Stall) for ΔT winding = 100°C ①②	Nom	T_{cs}	Nm	10.6	10.8	10.9	14.6	14.8	15.0	18.7	19.0	21.9	22.2	22.2
				lb-in	93.8	96	96	129	131	133	165	168	194	196	221
	Continuous Current (Stall) for ΔT winding = 100°C ①②	Nom	I_{cs}	A_{rms}	5.3	11.7	13.1	5.2	10.6	13.0	8.7	12.1	9.1	11.3	12.6
	Continuous Torque (Stall) for ΔT winding = 60°C ②	Nom	T_{cs}	Nm	8.48	8.64	8.72	11.7	11.8	12.0	15.0	15.2	17.5	17.8	17.8
				lb-in	75.0	76.5	77.2	103	105	106	132	135	155	157	157
	Max Mechanical Speed ⑤	Nom	N_{max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
	Peak Torque ①②	Nom	T_p	Nm	39.8	40.1	40.2	57.9	58.4	58.8	75.1	75.6	91.4	92.0	92.0
				lb-in	352	355	356	512	517	520	665	669	809	814	814
	Peak Current	Nom	I_p	A_{rms}	27.1	60.0	67.0	28.0	55.4	69.0	46.0	64.0	49.0	61.0	68.0
75 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	-	-	-	-	-	-	-	-	-	-
				lb-in	-	-	-	-	-	-	-	-	-	-	-
	Rated Speed		N_{rtd}	rpm	-	-	-	-	-	-	-	-	-	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	-	-	-	-	-	-	-	-	-	-	-
				Hp	-	-	-		-	-	-	-	-	-	-
160 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	-	-	-	-	-	-	-	-	-	-	-
				lb-in	-	-	-	-	-	-	-	-	-	-	-
	Rated Speed		N_{rtd}	rpm	-	-	-	-	-	-	-	-	-	-	-
	Rated Power (speed) ①②		P_{rtd}	kW	-	-	-	-	-	-	-	-	-	-	-
				Hp	-	-	-	-	-	-	-	-	-	-	-
320 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	10.5	9.61	9.10	-	13.4	13.3	17.1	16.8	20.2	19.7	19.4
				lb-in	92.9	85.0	80.5	-	119	118	151	149	179	174	172
	Rated Speed		N_{rtd}	rpm	1000	2500	3000	-	1800	2000	1200	1500	1000	1300	1500
	Rated Power (speed) ①②		P_{rtd}	kW	1.10	2.52	2.86	-	2.53	2.79	2.15	2.64	2.12	2.68	3.44
				Hp	1.47	3.37	3.83	-	3.39	3.73	2.88	3.54	2.84	3.60	4.61
560 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	9.93	4.95	3.33	13.6	11.1	7.90	15.6	12.5	17.7	16.0	16.1
				lb-in	87.9	43.8	29.5	120	98.2	69.9	138	111	157	142	142
	Rated Speed		N_{rtd}	rpm	1800	5000	5500	1500	3000	4000	2000	3000	2000	2500	2700
	Rated Power (speed) ①②		P_{rtd}	kW	1.87	2.59	1.92	2.14	3.49	3.31	3.27	3.93	3.71	4.19	5.03
				Hp	2.51	3.47	2.57	2.86	4.67	4.44	4.38	5.26	4.97	5.62	6.74
640 Vdc	Rated Torque (speed) ①②		T_{rtd}	Nm	9.86	3.31	3.33	13.2	9.60	5.70	14.2	10.0	17.1	14.5	13.5
				lb-in	87.3	29.3	29.5	117	85.0	50.4	126	89	151	128	119
	Rated Speed		N_{rtd}	rpm	2000	5500	5500	1800	3500	4500	2500	3500	2500	2800	3000
	Rated Power (speed) ①②		P_{rtd}	kW	2.07	1.91	1.92	2.49	3.52	2.69	3.72	3.67	3.94	4.25	5.69
				Hp	2.77	2.56	2.57	3.34	4.72	3.60	4.98	4.91	5.28	5.70	7.62

See following page for notes.

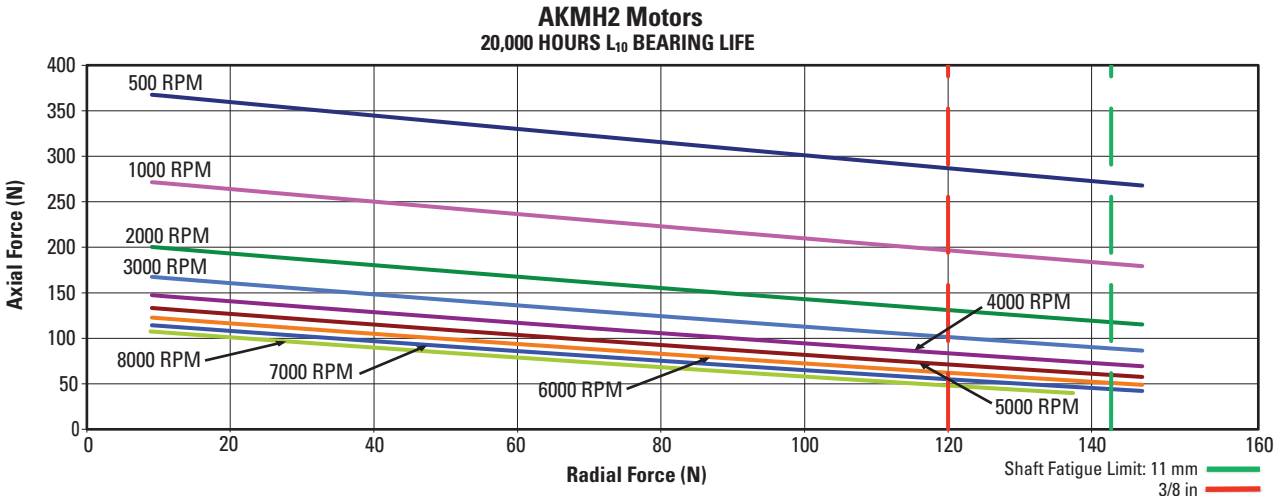
AKMH6x Performance Data – Up to 640 Vdc (Continued)

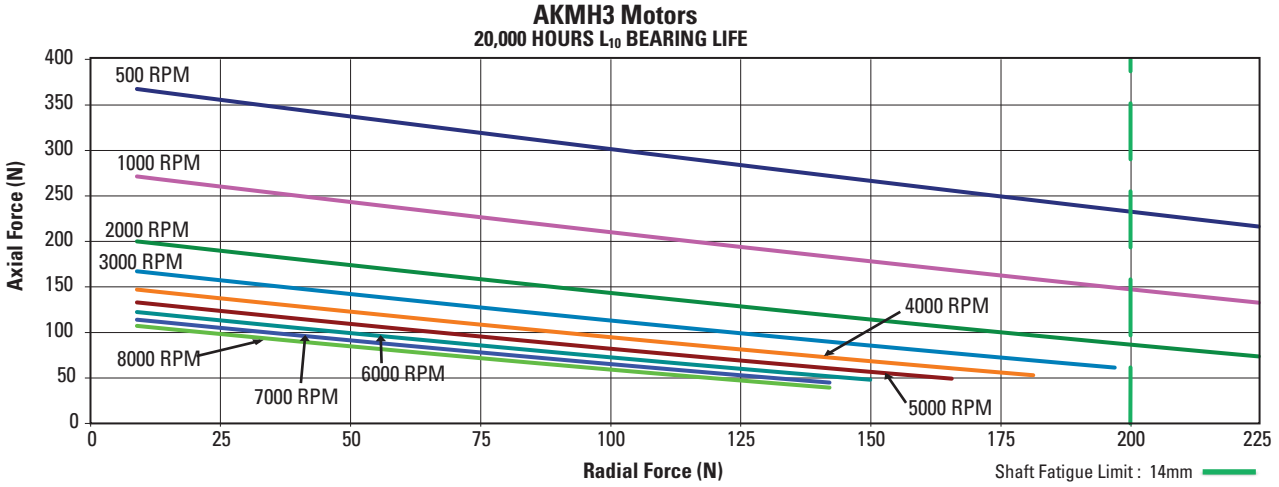
				AKMH62			AKMH63			AKMH64		AKMH65		
Parameters	**Tol**	**Sym**	**Units**	**H**	**L**	**M**	**H**	**L**	**M**	**K**	**L**	**K**	**L**	**M**
Torque Constant ①	±10%	K_t	Nm/A_{rms}	2.20	1.00	0.91	3.00	1.5	1.24	2.28	1.66	2.54	2.1	1.85
			$lb\text{-}in/A_{rms}$	19.5	8.9	8.1	26.6	13.3	11.0	20.2	14.7	22.5	18.3	16.4
Back EMF Constant ⑥	±10%	K_e	V/k_{rpm}	142	65.5	58.8	195	98.2	79.9	147	107	164	133	119
Motor Constant	Nom	K_m	$N\text{-}m/\sqrt{W}$	0.99	0.95	0.97	1.3	1.3	1.3	1.6	1.5	1.8	1.8	1.7
			$lb\text{-}in/\sqrt{W}$	8.7	8.4	8.6	12	11	11	14	14	16	16	15
Resistance (line-line) ⑥⑨	±10%	R_m	ohm	3.32	0.757	0.587	3.45	0.957	0.627	1.43	0.767	1.37	0.92	0.747
Inductance (line-line)		L	mH	25.4	5.40	4.40	28.1	7.40	4.90	11.8	6.2	11.4	7.6	6.1
Inertia (includes Resolver feedback) ③	±10%	J_m	$kg\text{-}cm^2$	16.9			24.2			31.6		40		
			$lb\text{-}in\text{-}s^2$	0.015			0.021			0.028		0.035		
Optional Brake Inertia (additional)	±10%	J_m	$kg\text{-}cm^2$	0.61			0.61			0.61		0.61		
			$lb\text{-}in\text{-}s^2$	5.4E-04			5.4E-04			5.4E-04		5.4E-04		
Weight ⑦⑧		W	kg	19.6			23.1			26.7		30.2		
			lb	43.2			50.9			58.9		66.6		
Static Friction ①		T_f	Nm	1.05			1.1			1.15		1.2		
			lb-in	9.29			9.7			10.2		10.6		
Viscous Damping ①		K_{dv}	Nm/k_{rpm}	0.04			0.06			0.08		0.1		
			$lb\text{-}in/k_{rpm}$	0.35			0.53			0.71		0.9		
Thermal Time Constant		TCT	minutes	58			62			75		88		
Thermal Resistance		$R_{thw\text{-}a}$	°C/W	0.58			0.55			0.53		0.52		
Pole Pairs				5			5			5		5		
Heat Sink Size				18"x18"x1/2" Aluminum Plate			18"x18"x1/2" Aluminum Plate			18"x18"x1/2" Aluminum Plate		18"x18"x1/2" Aluminum Plate		

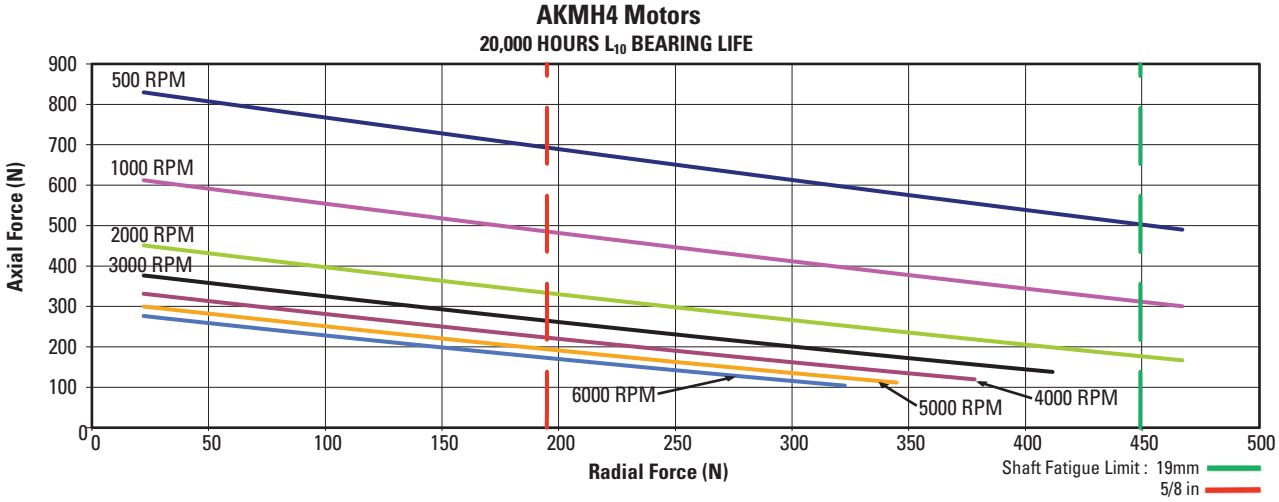
Notes:
① Motor winding temperature rise, ΔT=100°C, at 40°C ambient.
② All data referenced to sinusoidal commutation.
③ Add parking brake if applicable for total inertia.
④ Motor with standard heat sink.
⑤ May be limited at some values of Vbus.
⑥ Measured at 25°C.
⑦ Face motor adds 2.5 kg [5.5 lbs]
⑧ Brake motor adds 3.4 kg [7.5 lbs]
⑨ Resistance is measured with 1 meter of cable.

L10 Bearing Fatigue Life and Shaft Loading

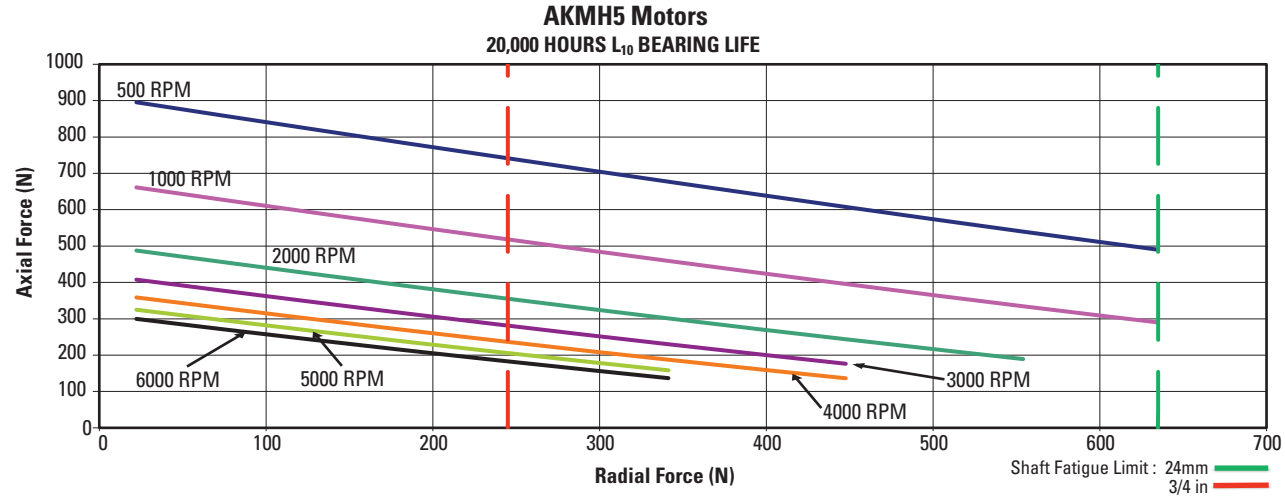
Bearing Fatigue

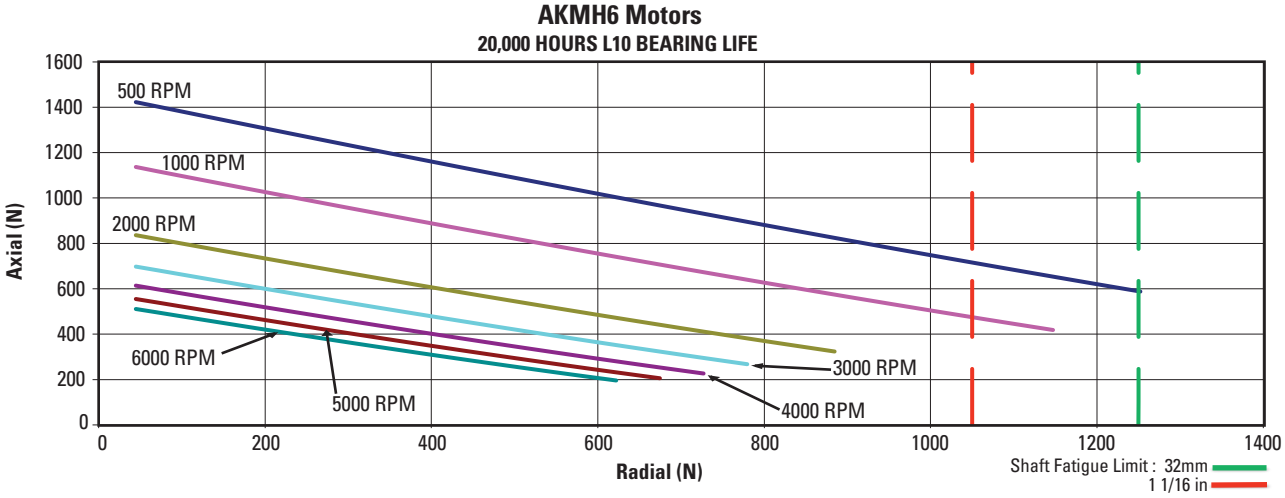






Bearing Fatigue





Shaft Loading

Motor	Max. Radial Force (N)	Max. Axial Force(N)
AKMH2xy-A / C	140	600
AKMH2xy-B / D	120	
AKMH3xy-A / C	200	600
AKMH4xy-A / C	450	1400
AKMH4xy-B / D	195	
AKMH5xy-A / C / G / H	635	1740
AKMH5xy-B / D	245	
AKMH6xy-A / C	1250	2200
AKMH6xy-D	1050	

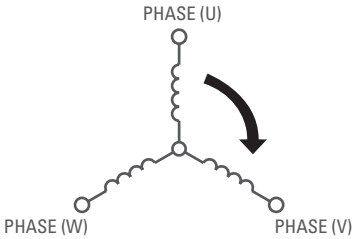
The maximum radial load ratings reflect the following assumptions:

1. Motors are operated with peak torque of the longest member of the frame size.
2. Fully reversed load applied to the end of the smallest diameter standard mounting shaft extension. Excluding AKMH4X-CC which is rated at 240 N max. radial force.
3. Infinite life with 99% reliability.
4. Safety factor = 2.

Feedback Options

Phasing Diagram - All Motors

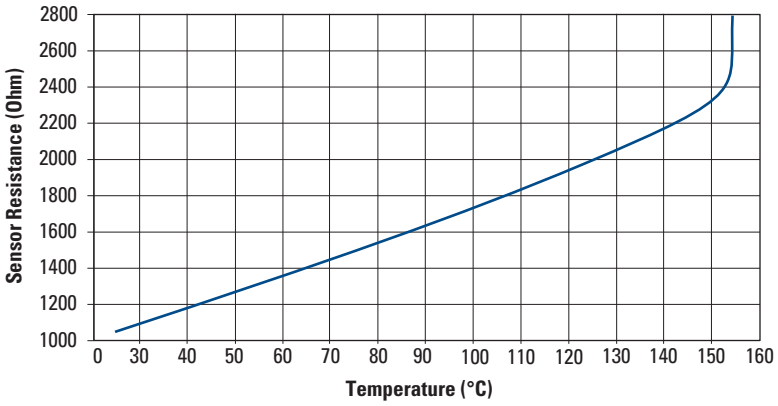
Motor Winding Configuration



General notes:

1 When motor is rotated CW (viewed from drive shaft end), these waveforms result:
Voltage U , leads V , leads W.
Voltage U-W leads Voltage V-W by 60° electrical.

2 The standard version of each motor is fitted with an electrically isolated temperature sensor (rated temperature 155°C ± 5%). The sensor does not provide any protection against short, heavy overloading. The sensor is integrated into the monitoring system of the AKD.
Sensor characteristics diagram:



3 Standard outline drawings showing mounting dimensions and standard winding information are available on our website or by calling the Kollmorgen Customer Support at 1-540-633-3545, or through email at support@kollmorgen.com.

Feedback Summary for AKMH Servomotor with AKD Servo Drive

Feedback Device/ (Motor designation)	Plug & Play, Motor ID	Resolution with AKD Counts/rev	Accuracy: Arc-min (±)
SFD (C-)	Y	16,777,216	9
Hiperface DSL Single-Turn Absolute (GE)	Y	262,144	0.60
Hiperface DSL Multi-Turn Absolute (GF)	Y	262,144	0.60

Brake Option

Holding Brake

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

AKMH Motor Brake Specifications

Motor Family	Minimum Static Torque @120°C		Power Consumption @24V, 20°C	Current @24V, 20°C	Inertia		Closing Time (engage)	Opening Time (release)	Backlash	
									Maximum	Typical
	Nm	lb-in	Watts ±7%	ADC	kg-cm^2	lb-in-sec^2	msec	msec	deg.	deg.
AKMH2	1.42	12.6	8.4	0.35	0.011	0.97E-05	36	35	1.01	0.46
AKMH3	2.5	22.1	10.1	0.42	0.011	0.97E-05	20	50	1.01	0.46
AKMH4	5.3	46.9	12.8	0.53	0.068	6.02E-05	30	75	0.81	0.37
AKMH5	14.5	128	19.5	0.82	0.173	1.53E-04	30	115	0.71	0.31
AKMH6	25	221	25.7	1.07	0.605	5.35E-04	40	155	0.51	0.24

Note 1: Operating Voltage: 24 Vdc ± 10%.
Note 2: Maximum backlash is calculated using worst-case tolerancing, and typical backlash is calculated using statistical tolerancing.

Cable Options

SFD and Hiperface DSL Cable Specifications

Cable Material Specifications and Characteristic

Specifications

- 600V, 125°C, Multi-conductor shielded composite cable
- Four motor power, two brake with shield, two communication conductors with shield plus overall shield
- Motor Power conductors are 14 or 12 AWG, to meet with standards NFPA79 (Electrical standard for Industrial machinery), EN-60204-1 (Safety of Machinery-Electrical equipment of Machines), IEC 60364-5-52 (Wiring Systems) without the use of additional motor overload protection as required by motor rating
- Communication channel, 110 ohm(± 10) nominal impedance, high speed digital communication device
- Agency classifications: UL, CSA, CE, RoHS*
- IP69K Wash-down Rated TPE (Thermo Plastic Elastomer) Jacket material
- Not Food Contact rated
- Bend radius limited to 10X diameter static, no dynamic rating

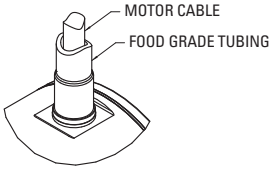
Cable Diameters:

- 0.595" for 12A and less motors (6" Bend radius)
  0.65" for above 12A, but less than 20A (6.5" Bend radius)
- Exceeding the bend radius can potentially permanently damage the equalization capability of the cable
- Color to RAL 2003 standard
- Chemical resistance to most acids and Bases within the PH range of 2 to 12
- Not UV resistant

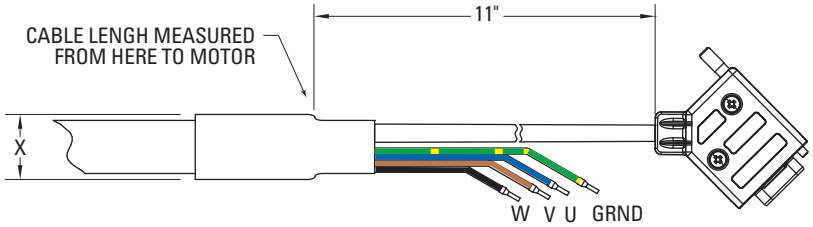
Tubing Specifications

The food-grade tubing option covers the single motor cable to provide an option for applications where the cable needs to be routed through a zone in which it could come in contact with food. This tubing is constructed from FDA approved material and is certified to the NSF 51 standard

Food Grade Tubing Option



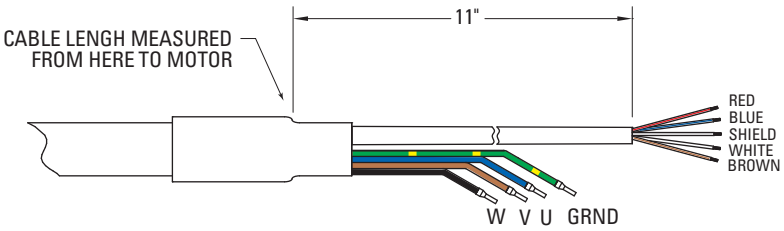
Wire Size Chart	
Current	**"X"**
UP TO 12A	.700 in
12A AND UP	.750 in
Food Grade Tubing	1.0 in

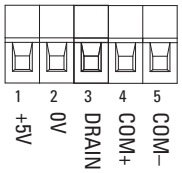


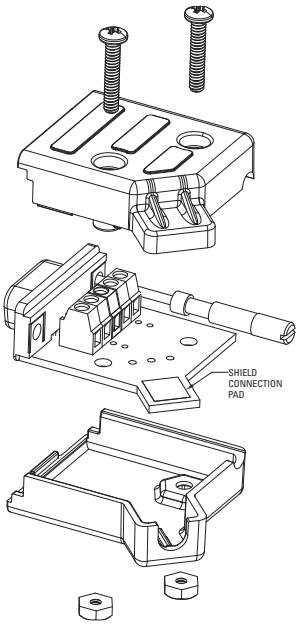
Connector housing can be unscrewed and removed in order to pass cable through bulkhead.

*(RoHS compliant materials to EU Directive 2002/95/EC)

SFD Cable Wiring



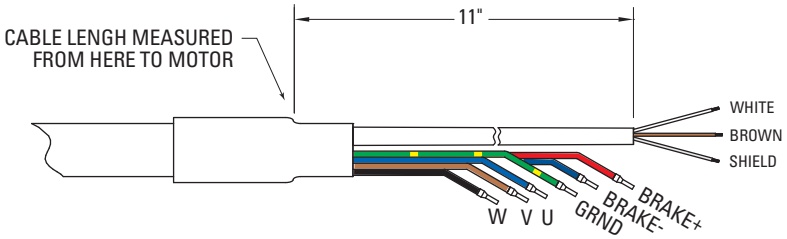


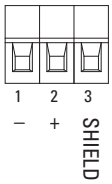


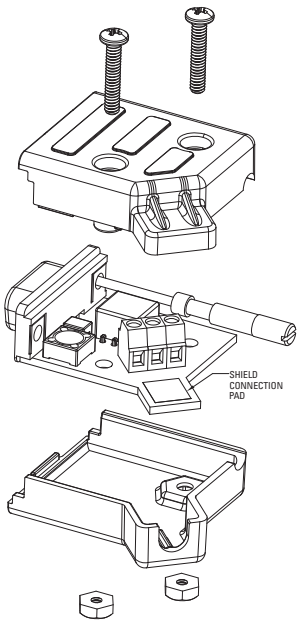
All Motor Power Connections (flying leads	
Function	Color
Phase U	Blue
Phase V	Brown
Phase W	Black
Ground	Green/yellow
Shield	

SFD				
Function	Color	TERMINAL STRIP in Adapter	Pin (Drive)	Pin (Adapter)
+5V	Red	+5V	10	1
0V	Blue	0V	11	2
	Shield	Drain	Housing	3
COM+	White	COM+	6	4
COM-	Brown	COM-	7	5
	Shield		Housing	

Hiperface DSL Cable Wiring







All Motor Power & Brake Connections (flying leads	
Function	Color
Phase U	Blue
Phase V	Brown
Phase W	Black
Ground	Green/yellow
Brake +	Red(18 AWG)
Brake -	Blue (18 AWG)
Shield	

Hiperface DSL			
Function	Color	TERMINAL STRIP in Adapter	Pin (Adapter)
COM-	White	-	1
COM+	Brown	+	2
	Shield	SHIELD	3

AquaTrue Hygienic IP69K Gearhead

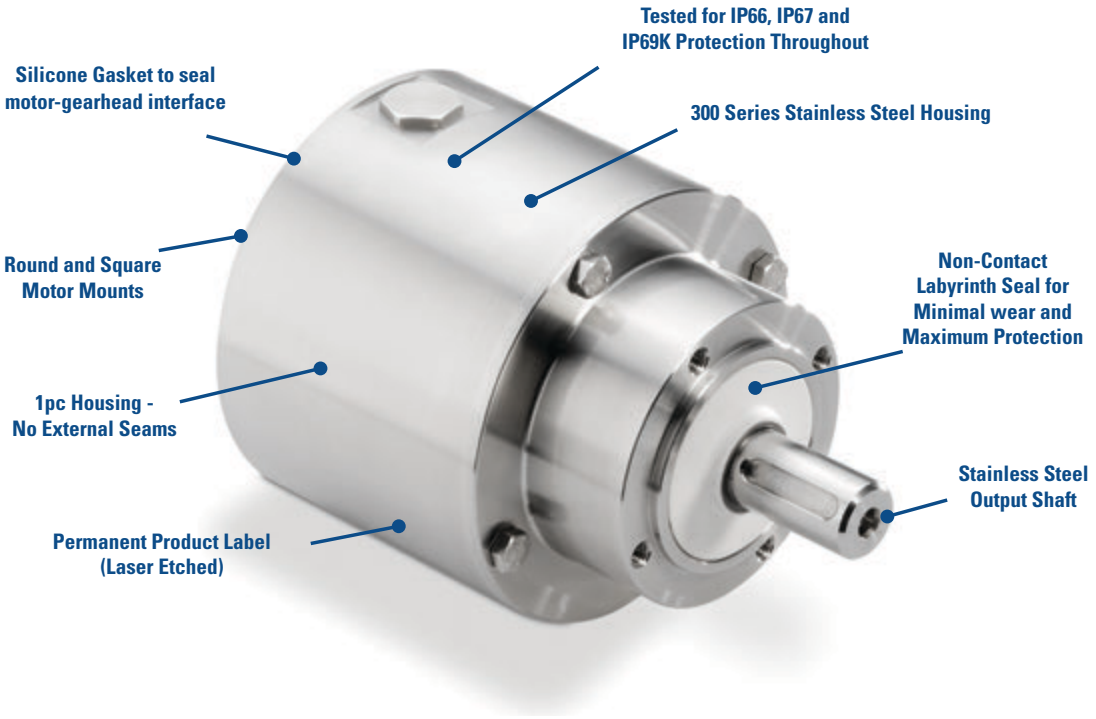
The perfect gearhead to mate to the AKMH Series...

Micron's new AquaTRUE gearhead combines the high performance and torque capacity of Micron's True Planetary gearheads with features specifically designed to meet the stric requirements of applications such as food and beverage handling, packaging and dispensing. The AquaTRUE's IP66/IP67 and IP69K protection is able to handle caustic cleaning chemicals as well as high pressure washdown. Until now, manufacturers have been unable to use gearheads in many applications involving harsh environments because there was not a product available that met those needs. The AquaTRUE is engineered to be placed anywhere in the application's design, regardless of environmental factors. This eliminates the cost of additional components such as enclosers, shielding or mechanical transmissions.
The gearhead's 304 stainless steel housing eliminates the concern for rust or any type of corrosion. The AquaTRUE has a laser etched permanent product label and a smooth, round external housing that is designed without any external seams or corners for bacteria to collect. This makes the AquaTRUE very easy to clean and a perfect fit in a y washdown environment.

- Frame Sizes: 60 mm, 80 mm, 120 mm, 160 mm
- Precision: 13 arc-min max
- Torque Capacity: up to 876 Nm
- Ratio Availability: 3:1 to 10:1 (single stage)

Features and Benefit

- Round Housing
- No External Seams
- 300 Series Stainless Steel
- IP66/IP67 and IP69K Protection on both the input and output
- NSF/ANSI 169 Certificatio
- No corners or areas for bacteria to collect
- No areas of ingress
- Corrosion Resistance
- Can handle high pressure washdown



The AKMH can be ordered with the AquaTRUE gearhead mounted at our factory for a perfectly integrated hygienic gearmotor solution. If you need more power than the AKMH can provide, the addition of an AquaTRUE gearhead will add the power you need while maintaining a hygienic solution. The AKMH/AquaTRUE combination also maintains the IP69K rating. The hygienic stainless steel and food-grade materials make it a perfect fit for all our food and beverage applications.

Example P/N: "AKMH42E-CNKNC-1K + AQT080-003-0-MMR-726"

Model Nomenclature

AKD Servo Drive

AKD – B 003 06 – NB AN – 0000

AKD Series

Version

B = Base drive

C = Central power supply for AKD-N (Requires CB Extention)

N = Decentralized drive (Requires DB, DF, or DS Extention)

P = Position indexer (motion tasking)

T = AKD BASIC Language Programmable drive (Requires IC or NB Extention)

M = Multi-axis Master Drive (Requires MC Extension option, and EC Connectivity option)

Current Rating

003 = 3 Amp

006 = 6 Amp

010 = 10kW (With Version C, this field refers to power.)

012 = 12 Amp

024 = 24 Amp

Voltage

06 = 120/240 Vac 1Ø/3Ø (24 Amp Drive: 240 Vac 3Ø only)

07 = 240/480 Vac 3Ø (Version C: 07 = 400/480 Vac 3Ø I Version N: 07 = 560/680 Vdc)

Variants

0000 = Standard

Connectivity*

	Drive Version Availability
AN = Analog command	B, P, T
CC = CANopen OR EtherCAT	P
CN = CANopen	P
EC = EtherCAT	C, M, N, P
EI = EtherNet/IP	P
PN - PROFINET	P
SQ = SynqNet	B

*Motion Tasking is included as a free upgrade with CC, CN, EC, EI and PN

Extension

CB = without extention

DB = hybrid motor cable

DF = additional EtherCAT port + feedback connector

DS = local STO + feedback connector

IC = Expanded I/O version and SD card slot ("T" version drive only)

NB = Without extensions

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

AKMH Brushless Servomotor

AKMH 4 2 E – A N K N C- 1 K

AKMH Series

Motor Frame Size
2, 3, 4, 5, 6

Rotor Stack Length
1, 2, 3, 4, 5

Winding Type
A, B, C, D, etc.
S = Special

Mount
A, B, C, D, etc.
S = Special

Shaft
C = Closed keyway
N = Smooth shaft
S = Special

Cables
K = Cable Terminated For Connection To AKD
T = Food-grade Tubing Covered Cable Terminated For Connection To AKD

Brake
2 = 24 Vdc brake
N = No brake
S = Special

Feedback Device
C- = Smart Feedback Device (SFD)
GE - Single-turn Absolute Hiperface DSL Encoder
GF - Multi-turn Absolute Hiperface DSL Encoder

Cable Lenth
1 - F (1-15 meters)

Seal
K = IP69K Shaft Seal

Kollmorgen Offers Solutions for Food, Beverage and Pharmaceutical Industries

The Perfect Mix of Performance and Hygiene for Any Industry or Washdown Application.

Kollmorgen's family of high torque density servomotors provides the widest range of features and options in the industry. Our robust selection allows you to select exactly the right motor for your application, without having to over spec and over pay.

Industry regulations place numerous and often stringent demands on system manufacturers. However, depending on your application, the specific requirements for our motion components can range from simple to complex.

It costs too much money to put an over specified motor in a ashdown application. And it takes up too much time and effort to modify a housing for a hygienic application. Why pay for this approach or any other motor that doesn't perform the way you need it to. With Kollmorgen's diverse selection, you don't have to settle for just any motor. You can select the exact motor for your application and get the job done right, achieving optimal results.

Whether you're looking to put your motor near a wet area or plan to expose it to high pressure washdown, the Kollmorgen family of servomotors provides a right fit for our specific application You can select from the robust line-up of AKM™, including the exclusive AKM™ Washdown, AKM™ Food Grade models and AKMH series - all with a proven track record for dependability, superior functionality and high-performance.

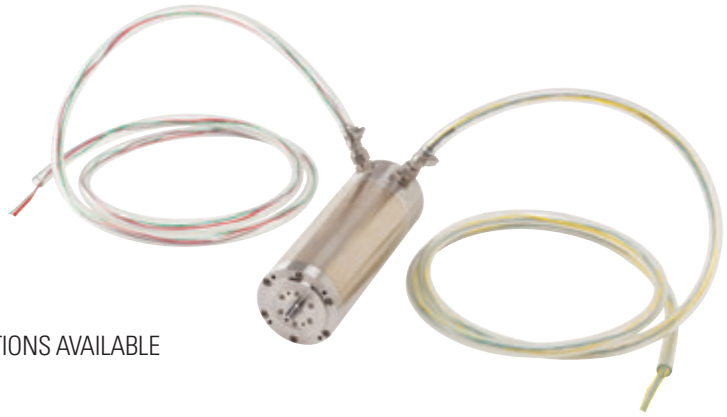
IP69K
All Stainless, Round

- Industry-leading performance
- Certifications ranging from basic IP65 up to IP69K and F A
- Thousands of model options, STANDARD!
- Severe washdown options
- All stainless options (up to 316L)
- Mounts seamlessly with Micron® AquaTRUE™ wash-down planetary gearbox

IP67
Washdown & Food Versions Available

Kollmorgen Has The Solution To Meet Your Specific Application Needs

Specifications and Options	AKM	AKM Washdown	AKM Food	AKMH	Stainless Steel S
Stainless Steel Housing				X	X
Stainless Steel Shaft	X	X	X	X	X
Food Grade Epoxy Paint			X		
Needle Printed Nameplate		X	X		
Laser Etched Nameplate					X
Laser Annealed Nameplate				X	
Coated Laminations					X
Encapsulated Windings	X	X	X	X	
Pressure Compensation Diaphragm					X
Food Grade Bearing Grease			X	X	
Oil Filled					X
Round Housing				X	X
Ingress Protection (IP)	IP65	IP67	IP67	IP69K	Submersible To Depths Of 20,000 Ft
Agency Approvals	UL,CE	UL, CE	UL, CE	UL, CE	
Continuous Stall Torque (Nm)	.19-140	.48-24.5	.48-24.5	.4-22	1-80
Feedback Types	Multiple	Multiple	Multiple	Multiple	Multiple
Optional Holding Brake	X	X	X	X	X
Relative Price	$	$+	$++	$$	$$$$



CO-ENGINEERED SOLUTIONS AVAILABLE

Notes

MOTIONEERING® Application Engine

To help select and size Kollmorgen components, this Windows®-based motor-sizing program takes a systems approach to the selection of brushless DC servomotors, stepper motors and drives. MOTIONEERING application engine, available at www.kollmorgen.com, uses a project concept for the collection and saving of rotary and linear multi-axis load information. This provides the user the flexibility to sum the effects of multiple axes of motion for power supply and shunt regeneration sizing.

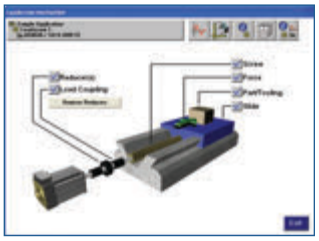
A wide variety of linear and rotary mechanisms are provided including lead screw, rack and pinion, conveyor, nip rolls, cylinder, rotary, and direct data-entry using unique sizing algorithms and product databases criteria.

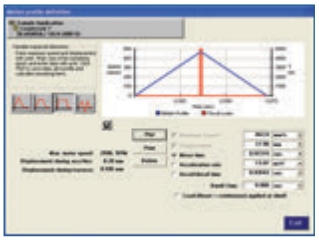
The searchable database consists of hundreds of systems on product combinations including rotary housed and frameless brushless servomotors, direct drive rotary and linear brushless servomotors, linear actuators (electric cylinders, rodless actuators, and precision tables) and stepper systems.

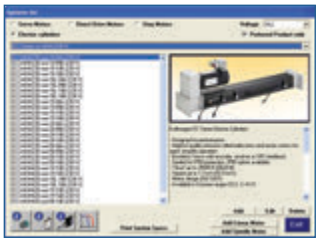
The MOTIONEERING application engine also provides versatile units-of-measure selection options for mechanism and motion profile data-entry, with the ability to convert data into other available units. Online Help explains program functions and the definition of terms and equations used in the program.

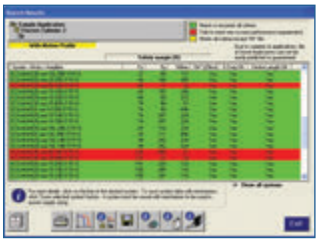
Features

- 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, Windows 7

MOTIONEERING 6.4.0 includes

- ***NEW*** AKMH series Stainless Steel Motors and AKD systems at 120, 240, 400 and 480 V
  - Designed to meet IP69K, EHEDG, 3A, and built with FDA approved food grade materials
  - 19 frame/stack length combinations
  - Continuous torque to 22 Nm
  - Peak torque to 92 Nm
- Corrected length dimensions of some AKM servomotor & gearmotor models
- Corrected CH132 thermal resistance
- Added HIPERFACE DSL sine encoder to search field

Note: Performance curves included for all servomotor systems

About Kollmorgen

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

KOLLMORGEN®

Because Motion Matters™