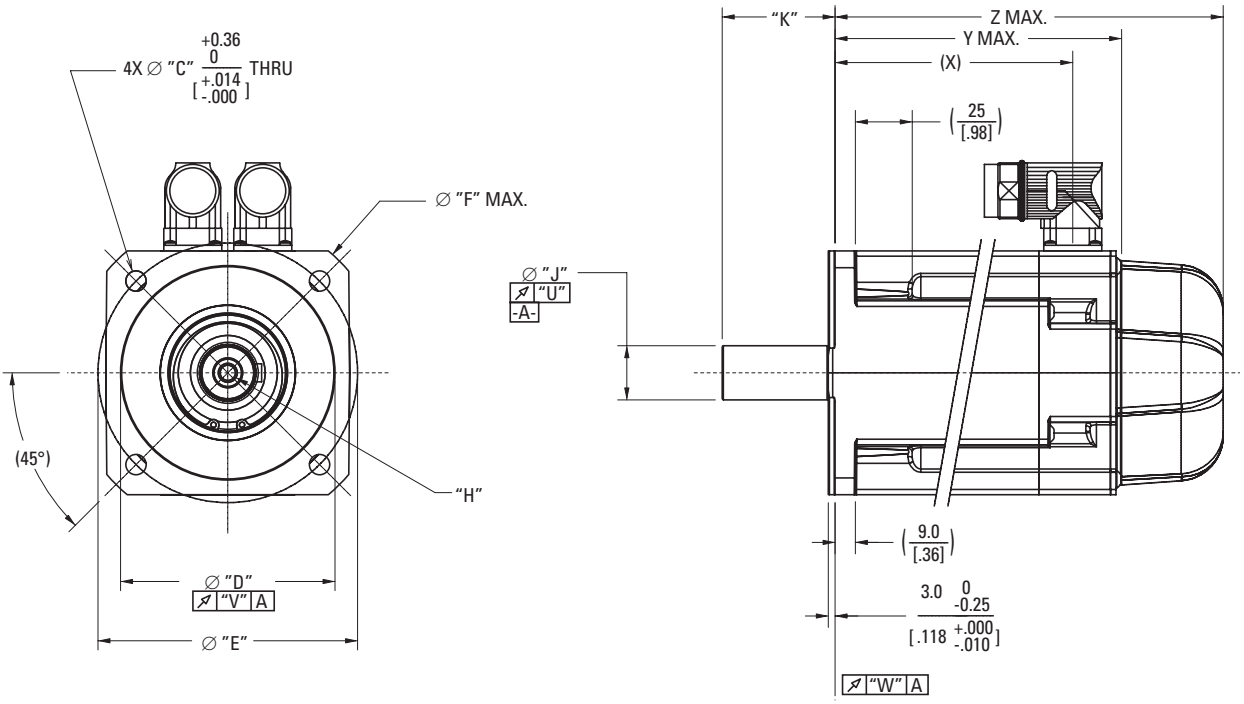
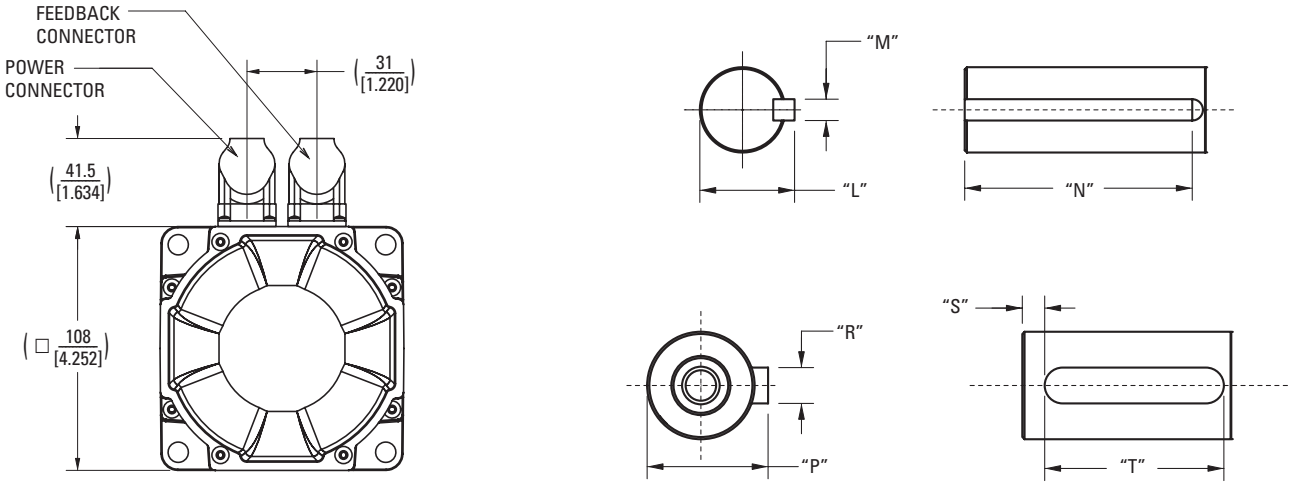
AKM5x Outline Drawings

AKM5x Frame





AKM5x Dimension Data

AKM5x Dimension Data

Mounting Code	"C"	"D"	"E"	"F"	"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 +.0006 +.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 +.0006 +.0001]	50.0 [1.97]	–
BK	8.33 [.328]	55.563 0 -0.051 [2.1874 +.0000 -.0020]	125.73 [4.950]	–	–	19.05 0 +0.013 [.7500 +.0000 +.0005]	57.15 ± 0.79 [2.250 ± .031]	21.15 0 -0.43 [.83 +.000 -.017]
CC	9 [.354]	95 +0.013 -0.009 j6 [3.7402 +.0005 -.0003]	115 [4.528]	140 [5.512]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0006 +.0001]	50.0 [1.97]	–
CN	9 [.354]	95 +0.013 -0.009 j6 [3.7402 +.0005 -.0003	115 [4.528]	140 [5.512]	D M8 DIN 332	24 +0.015 +0.002 k6 [.9449 +.0006 +.0001]	50.0 [1.97]	–
DK	8.33 [.328]	63.5 0 -0.05 [2.500 +.000 -.002]	127 [5.000]	–	–	19.05 +0 +0.013 [.7500 +.0000 +.0005]	57.15 ± 0.79 [2.250 ± .031]	21.15 0 -0.43 [.83 +.000 -.017]
EK	8.33 [.328]	55.563 0 -0.051 [2.1874 +.0000 -.0020]	125.73 [4.950]	–	–	15.875 0 +0.013 [.6250 +.0000 +.0005]	44.45 [1.750]	17.91 0 -0.43 [.705 +.000 -.017]
GC	9 [.354]	110 +0.013 -0.009 j6 [4.3307 +.0005 -.0003]	130 [5.118]	–	D M6 DIN 332	19 +0.015 +0.002 k6 [.7480 +.0006 +.0001]	40 [1.57]	–
GN	9 [354]	110 +0.013 -0.009 j6 [4.3307 +.0005 -.0003]	130 [5.118]	–	D M6 DIN 332	19 +0.015 +0.002 k6 [.7480 +.0006 +.0001]	40.0 [1.57]	–
HC	9 [.354]	95 +0.013 -0.009 j6 [3.7402 +.0005 -.0003	115 [4.528]	140 [5.512]	D M6 DIN 332	19 +0.015 +0.002 k6 [.7480 +.0006 +.0001]	40 [1.57]	–
HN	9 [354]	95 +0.013 -0.009 j6 [3.7402 +.0005 -.0003	115 [4.528]	140 [5.512]	D M6 DIN 332	19 +0.015 +0.002 k6 [.7480 +.0006 +.0001]	40.0 [1.57]	–

Continued on the following page

MODEL	Z MAX SINE ENCODER (NO BRAKE)	Z MAX SINE ENCODER (W/ BRAKE)	(X)	Y MAX	Z MAX (W/ BRAKE)
AKM51	146.0 [5.75]	189.0 [7.44]	105.3 [4.15]	127.5 [5.02]	172.5 [6.79]
AKM52	177.0 [6.97]	220.0 [8.66]	136.3 [5.37]	158.5 [6.24]	203.5 [8.01]
AKM53	208.0 [8.19]	251.0 [9.88]	167.3 [6.59]	189.5 [7.46]	234.5 [9.23]
AKM54	239.0 [9.41]	282.0 [11.10]	198.3 [7.81]	220.5 [8.68]	265.5 [10.45]

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

AKM5x Dimension Data

AKM5x Dimension Data (continued)

Mounting Code	"M"	"N"	"P"	"R"	"S"	"T"	"U"	"V"	"W"
AC	–	–	27 $^{0}_{-0.29}$ [1.063 $^{+.000}_{-.001}$]	8 $^{0}_{-0.036}$ N9 [.3150 $^{+.0000}_{-.0014}$]	5.00 [1.97]	40 $^{0}_{-0.30}$ [1.575 $^{+.000}_{-.012}$]	0.040 [.0015]	0.100 [.0039]	0.100 [.0039]
AN	–	–	–	–	–	–	0.040 [.0015]	0.100 [.0039]	0.100 [.0039]
BK	4.763 $^{0}_{-0.050}$ [.1875 $^{+.0000}_{-.0020}$]	38.1 ± 0.25 [1.500 ± .010]	–	–	–	–	0.051 [.0020]	0.10 [.004]	0.10 [.004]
CC	–	–	27 $^{0}_{-0.29}$ [1.063 $^{+.000}_{-.011}$]	8 $^{0}_{-0.036}$ N9 [.3150 $^{+.0000}_{-.0014}$]	5.00 [1.97]	40 $^{0}_{-0.30}$ [1.575 $^{+.000}_{-.012}$]	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
CN	–	–	–	–	–	–	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
DK	4.763 $^{0}_{-0.050}$ [.1875 $^{+.0000}_{-.0020}$]	34.93 ± 0.25 [1.375 ± .010]	–	–	–	–	0.051 [.0020]	0.05 [.002]	0.10 [.004]
EK	4.763 $^{0}_{-0.050}$ [.1875 $^{+.0000}_{-.0020}$]	38.1 ± 0.25 [1.500 ± .010]	–	–	–	–	0.051 [.0020]	0.10 [.004]	0.10 [.004]
GC	–	–	21.5 $^{0}_{-0.13}$ [.846 $^{+.000}_{-.005}$]	6 $^{0}_{-0.03}$ N9 [.236 $^{+.000}_{-.001}$]	4.00 [.157]	32 $^{0}_{-0.30}$ [1.260 $^{+.000}_{-.012}$]	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
GN	–	–	–	–	–	–	–	–	–
HC	–	–	21.5 $^{0}_{-0.13}$ [.846 $^{+.000}_{-.005}$]	6 $^{0}_{-0.03}$ N9 [.236 $^{+.000}_{-.001}$]	4.00 [.157]	32 $^{0}_{-0.30}$ [1.260 $^{+.000}_{-.012}$]	0.040 [.0015]	0.080 [.0031]	0.080 [.0031]
HN	–	–	–	–	–	–	–	–	–

AKM5x Performance Data

AKM5x Performance Data – Up to 640 Vdc

					AKM51			AKM52				AKM53				AKM54			
	Parameters	Tol	Sym	Units	E	H	L	E	H	L	M	G	H	L	P	H	K	L	N
	Max Rated DC Bus Voltage	Max	Vbus	Vdc	640	640	320	640	640	640	320	640	640	640	320	640	640	560	320
	Continuous Torque (Stall) for ΔT winding = 100°C ①②⑦⑧⑨	Nom	T_{cs}	Nm	4.70	4.79	4.89	8.34	8.48	8.67	8.60	11.4	11.5	11.6	11.4	14.2	14.4	14.1	14.1
				lb-in	41.6	42.4	43.3	73.8	75.1	76.7	76.1	101	102	103	101	126	127	125	125
	Continuous Current (Stall) for ΔT winding = 100°C ①②⑦⑧⑨	Nom	I_{cs}	A_{rms}	2.75	6.0	11.9	2.99	5.9	11.6	13.1	4.77	6.6	11.8	19.1	5.5	9.7	12.5	17.8
	Continuous Torque (Stall) for ΔT winding = 60°C ②	Nom	T_{cs}	Nm	3.76	3.83	3.91	6.67	6.78	6.94	6.88	9.10	9.21	9.28	9.10	11.5	11.5	11.3	11.3
				lb-in	33.3	33.9	34.6	59.0	60.0	61.4	61.0	80.5	81.5	82.1	80.5	102	102	100	100
	Max Mechanical Speed ⑤	Nom	N_{max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
	Peak Torque ①②	Nom	T_p	Nm	11.6	11.7	12.0	21.3	21.6	22.0	21.9	29.7	30.0	30.3	29.8	37.5	38.4	37.5	37.6
				lb-in	103	104	106	189	191	195	194	263	266	268	264	332	340	332	333
	Peak Current	Nom	I_p	A_{rms}	8.24	18.0	35.7	9.00	17.7	34.8	39.4	14.3	19.8	35.4	57.4	16.5	29.2	37.5	53.4
75 Vdc	Rated Torque (speed) ①②⑦⑧⑨⑩		T_{rtd}	Nm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				lb-in	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rated Speed		N_{rtd}	rpm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rated Power (speed) ①②⑦⑧⑨		P_{rtd}	kW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160 Vdc	Rated Torque (speed) ①②⑦⑧⑨⑩		T_{rtd}	Nm	-	4.46	3.95	-	-	7.89	-	-	-	13.0	-	-	-	-	-
				lb-in	-	39.4	35.0	-	-	69.9	-	-	-	115	-	-	-	-	-
	Rated Speed		N_{rtd}	rpm	-	1200	3000	-	-	1500	-	-	-	1200	-	-	-	-	-
	Rated Power (speed) ①②⑦⑧⑨		P_{rtd}	kW	-	0.56	1.24	-	-	1.24	-	-	-	1.63	-	-	-	-	-
				Hp	-	0.75	1.66	-	-	1.66	-	-	-	2.18	-	-	-	-	-
320 Vdc	Rated Torque (speed) ①②⑦⑧⑨⑩		T_{rtd}	Nm	4.41	3.87	2.00	-	7.53	6.40	5.20	10.7	10.5	9.59	5.88	13.4	12.7	11.5	9.85
				lb-in	39.0	34.3	17.7	-	66.6	56.6	46.0	94.5	93.0	84.9	52.0	118	112	102	87.2
	Rated Speed		N_{rtd}	rpm	1200	3000	6000	-	1800	3500	4500	1000	1500	2500	5000	1000	1800	2500	3500
	Rated Power (speed) ①②⑦⑧⑨		P_{rtd}	kW	0.55	1.22	1.26	-	1.42	2.35	2.45	1.12	1.65	2.51	3.08	1.4	2.39	3.00	3.61
				Hp	0.74	1.63	1.69	-	1.90	3.15	3.28	1.50	2.21	3.36	4.13	1.87	3.20	4.03	4.84
560 Vdc	Rated Torque (speed) ①②⑦⑧⑨⑩		T_{rtd}	Nm	3.98	1.97	-	7.61	6.26	3.27	-	9.85	8.83	6.00	-	12.6	10.05	8.13	-
				lb-in	35.2	17.4	-	67.3	55.4	2.89	-	87.2	78.2	53.1	-	112	88.9	72.0	-
	Rated Speed		N_{rtd}	rpm	2500	6000	-	1500	3500	6000	-	2000	3000	5000	-	1800	3500	4500	-
	Rated Power (speed) ①②⑦⑧⑨		P_{rtd}	kW	1.04	1.24	-	1.20	2.30	2.06	-	2.06	2.77	3.14	-	2.38	3.68	3.83	-
				Hp	1.40	1.66	-	1.60	3.08	2.76	-	2.77	3.72	4.21	-	3.18	4.94	5.14	-
640 Vdc	Rated Torque (speed) ①②⑦⑧⑨⑩		T_{rtd}	Nm	3.80	1.97	-	7.28	5.77	3.27	-	9.50	8.82	4.05	-	12.2	9.25	-	-
				lb-in	33.6	17.4	-	64.4	51.1	28.9	-	84.0	78.0	35.8	-	108	81.9	-	-
	Rated Speed		N_{rtd}	rpm	3000	6000	-	2000	4000	6000	-	2400	3000	6000	-	2000	4000	-	-
	Rated Power (speed) ①②⑦⑧⑨		P_{rtd}	kW	1.19	1.24	-	1.52	2.42	2.06	-	2.39	2.77	2.55	-	2.56	3.87	-	-
				Hp	1.60	1.66	-	20.4	3.24	2.76	-	3.20	3.71	3.41	-	3.43	5.19	-	-

See following page for notes.

AKM5x Performance Data – Up to 640 Vdc (Continued)

				AKM51			AKM52				AKM53				AKM54			
Parameters	**Tol**	**Sym**	**Units**	**E**	**H**	**L**	**E**	**H**	**L**	**M**	**G**	**H**	**L**	**P**	**H**	**K**	**L**	**N**
Torque Constant ①	±10%	K_t	Nm/A_{rms}	1.72	0.80	0.41	2.79	1.44	0.75	0.66	2.39	1.75	0.99	0.60	2.6	1.50	1.13	0.80
			lb-in/A_{rms}	15.2	7.1	3.6	24.7	12.7	6.6	5.8	21.2	15.5	8.8	5.3	22.7	13.3	10.0	7.1
Back EMF Constant ⑥	±10%	K_e	V/k_{rpm}	110	51.3	26.6	179	92.7	48.3	42.4	154	112	63.6	38.4	166	96.6	72.9	51.3
Motor Constant	Nom	K_m	N-m/√W	0.469	0.465	0.447	0.761	0.767	0.784	0.770	0.979	0.986	0.973	0.926	1.19	1.18	1.14	1.14
			lb-in/√W	4.15	4.12	3.96	6.73	6.79	6.94	6.81	8.67	8.73	8.61	8.19	10.5	10.4	10.1	10.1
Resistance (line-line) ⑥	±10%	R_m	ohm	8.98	1.97	0.56	8.96	2.35	0.61	0.49	3.97	2.1	0.69	0.28	3.2	1.08	0.65	0.33
Inductance (line-line)		L	mH	36.6	7.9	2.1	44.7	11.9	3.24	2.5	21.3	11.4	3.64	1.3	18.3	6.2	3.5	1.8
Inertia (includes Resolver feedback) ③	±10%	J_m	kg-cm²	3.4			6.2				9.1				12			
			lb-in-s²	3.0E-03			5.5E-03				8.1E-03				0.011			
Optional Brake Inertia (additional)	±10%	J_m	kg-cm²	0.17			0.17				0.17				0.17			
			lb-in-s²	1.5E-04			1.5E-04				1.5E-04				1.5E-04			
Weight		W	kg	4.2			5.8				7.4				9			
			lb	9.3			12.8				16.3				19.8			
Static Friction ①⑩		T_f	Nm	0.022			0.04				0.058				0.077			
			lb-in	0.19			0.35				0.51				0.68			
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	20			24				28				31			
Thermal Resistance		R_{thw-a}	°C/W	0.68			0.56				0.50				0.45			
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 Brake motor option reduces continuous torque ratings by:
AKM51 = 0.15 Nm AKM52 = 0.26 Nm AKM53 = 0.35 Nm AKM54 = 0.43 Nm
⑧ Non-Resolver feedback options reduce continuous torque ratings by:
AKM51 = 0.15 Nm AKM52 = 0.34 Nm AKM53 = 0.58 Nm AKM54 = 0.86 Nm
⑨ Motors with non-resolver feedback and brake option, reduce continuous torque by:
AKM51 = 0.39 Nm AKM52 = 0.76 Nm AKM53 = 1.13 Nm AKM54 = 1.55 Nm
⑩ For motors with optional shaft seal, reduce torque shown by 0.013 Nm (0.1.2 lb-in), and increase T_f by the same amount.

Additional Notes: See system data beginning on page 14 for typical torque/speed performance.
Additional windings can be found through our online Motioneering sizing and selection software tool. See page 73 for more information.