

AKD Servo Systems

When you need precise position control, choose from Kollmorgen's broad portfolio of AKD servo system components. Our unparalleled product line breadth provides great flexibility for any application. Whether it's any combination of motors and drives, cables, controller, electric cylinders or gearheads, all components are plug-and-play for easy, seamless integration. These best-in-class servo systems can be matched with single-axis or multi-axis motion controllers for a system solution that's precise, reliable and durable.

The Benefits of AKD Servo Systems

<ul style="list-style-type: none"> Optimized AKM and Direct Drive Motor Windings to AKD Servo Drive 	<ul style="list-style-type: none"> Same size AKM servomotor delivers up to 47% more shaft power than before Reduction in drive size and motor size Reduction in system cost
<ul style="list-style-type: none"> Plug-and-Play Motor-Recognition Drive Commissioning for AKM, Cartridge DDR, and DDR Motor Families Industry-Leading and Patent Pending Auto-Tuning Algorithms 	<ul style="list-style-type: none"> Reduction in set-up time for each servo system Immediate and adaptive response to dynamic loads optimizes performance in seconds Precise control of all motor types Compensation for stiff and compliant transmissions and couplings
<ul style="list-style-type: none"> New Lower Cost Multi-Turn Feedback Option 	<ul style="list-style-type: none"> Improve machine precision with high resolution and improved accuracy Reduce cycle time and sensor-and-wiring costs by eliminating traditional homing methods
<ul style="list-style-type: none"> Industry-Leading Motor Power Density 	<ul style="list-style-type: none"> Don't let motor size dictate the size of your machine Fit more motor into a smaller space than you thought possible
<ul style="list-style-type: none"> AKM Servomotor Offers 28 Frame-Stack Combinations and Nearly 120 Standard Windings in a Single Motor Line Cartridge DDR Motor Offers 17 Frame-Stack Combinations and 31 Windings Cartridge DDR Motor Offers 12 Frame-Stack Combinations and 12 Windings 	<ul style="list-style-type: none"> Over 50,000 standard motor variations including a wide range of mounting, connectivity, feedback and other options Flexibility provides choices to help you find an exact-fit solution Simplifies or eliminates mechanical modifications and engineering adaptation
<ul style="list-style-type: none"> New IP67 Protection Class Option for AKM 	<ul style="list-style-type: none"> Apply AKM servomotor into hostile industrial applications with confidence and long-term reliability

AKM Servomotor

The AKM brushless servomotor stands alone in the marketplace in terms of flexibility and performance advantages. Kollmorgen's culture of continuous improvement has paid dividends again. The AKM servomotor's innovative design has been polished and optimized. With the new AKD servo drive amplifier, the AKM servomotor sets a new standard of refined servo performance, designed to deliver precise motion and more power for your money. Nowhere else will you find a more versatile and complete servo family to meet your needs and exceed your expectations.



AKM Features

- 0.16 to 180 Nm continuous stall torque (1.4 to 1590 lb-in)
- 8 frame sizes (40 to 260 mm)
- 28 frame-stack length combinations
- 117 'standard' windings tailored for 75 Vdc and 120/240/400/480 Vac operation
- Flexible flange mount and shaft options
- Industry leading low-cogging contributing to extreme smoothness
- Numerous feedback options for high-performance and precision or rugged environment
- Unmatched customization – special windings, special shafts, and much more

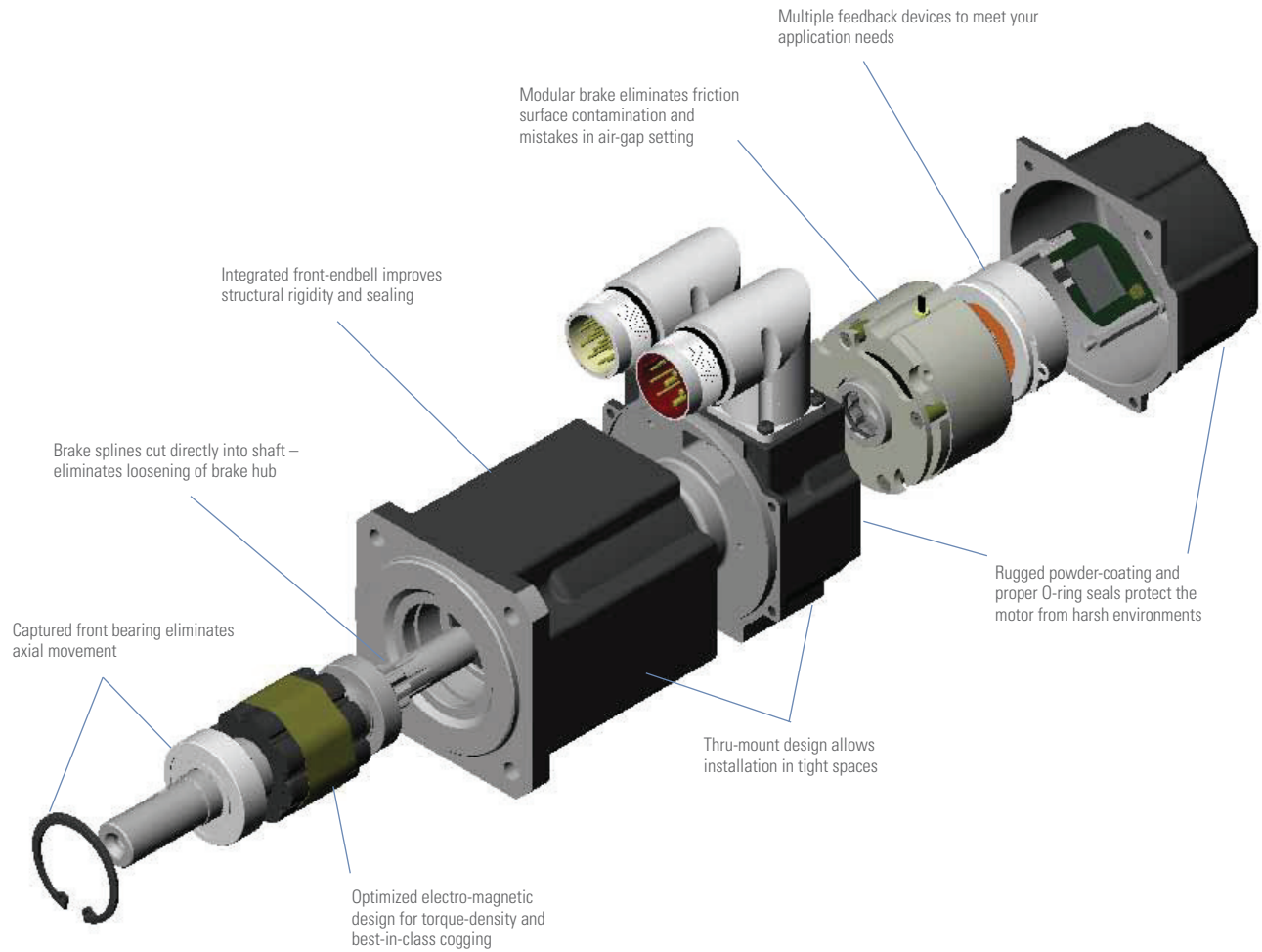
AKD Servo Drive with AKM Servomotor Plug-and-Play Feedback

These feedback devices include electronic motor nameplates allowing plug-and-play commissioning, eliminating the need for drive parameter set-up and servo loop tuning in most applications.

Performance Data

AKM Servomotor	Single-turn Absolute			Multi-turn Absolute		
	Accuracy (arc-min)	Resolution (bits)	Motor Key	Accuracy (arc-min)	Resolution (bits)	Motor Key
AKM1	16	24	C	–	–	–
AKM2-3	9	24	C	8	20	LB
AKM4-8	9	24	C	4.66	21	LB
AKM2-4	1.0	27	DA	1.0	27	DB
AKM5-8	0.333	27	DA	0.333	27	DB

AKM (Exploded) 3D Model Shows Key Design Features



AKM Servomotor

Performance Data

AKM Servomotor	AKD Servo Drive	Frame Size NEMA/ mm	Cont.Torque at stall Tos Nm (lb-in)	Peak Torque at stall Tps Nm (lb-in)	Rated Speed Nrt'd RPM	Max System Speed RPM	Power Prtd Watts	Inertia (Jm) Kg-cm ² (lb-in-s ² x10 ⁻²)	
120 Vac	AKM11B	AKD-X00306	17/ 40	0.18 (1.59)	0.61 (5.4)	4000	8000	80	0.017 (0.0015)
	AKM11C	AKD-X00306	17/ 40	0.19 (1.68)	0.62 (5.5)	6000	8000	110	0.017 (0.0015)
	AKM12C	AKD-X00306	17/ 40	0.31 (2.74)	1.08 (9.56)	4000	8000	130	0.031 (0.00274)
	AKM12E	AKD-X00306	17/ 40	0.31 (2.74)	0.91 (8.05)	8000	8000	230	0.031 (0.00274)
	AKM13C	AKD-X00306	17/ 40	0.41 (3.63)	1.46 (12.9)	3000	6150	130	0.045 (0.0040)
	AKM13D	AKD-X00306	17/ 40	0.40 (3.54)	1.36 (12.0)	7000	8000	270	0.045 (0.0040)
	AKM21C	AKD-X00306	23/ 60	0.48 (4.25)	1.48 (13.1)	2500	5620	120	0.107 (0.0095)
	AKM21E	AKD-X00306	23/ 60	0.47 (4.16)	1.21 (10.7)	7000	8000	300	0.107 (0.0095)
	AKM22C	AKD-X00306	23/ 60	0.84 (7.43)	2.39 (21.2)	1000	2820	90	0.161 (0.0142)
	AKM22E	AKD-X00306	23/ 60	0.87 (7.70)	2.42 (21.4)	3500	5410	290	0.161 (0.0142)
	AKM23D	AKD-X00306	23/ 60	1.15 (10.2)	3.89 (34.4)	1500	3270	180	0.216 (0.0191)
	AKM23F	AKD-X00606	23/ 60	1.18 (10.4)	3.88 (34.3)	4500	6290	500	0.216 (0.0191)
	AKM24D	AKD-X00306	23/ 60	1.40 (12.4)	4.84 (42.8)	1500	2700	210	0.270 (0.0239)
	AKM24F	AKD-X00606	23/ 60	1.41 (12.5)	4.82 (42.7)	3000	4720	420	0.270 (0.0239)
	AKM31E	AKD-X00306	na/ 80	1.20 (10.6)	3.23 (28.6)	2500	4240	310	0.330 (0.0292)
	AKM32E	AKD-X00306	na/ 80	2.04 (18.1)	5.97 (52.8)	1000	2350	210	0.590 (0.0522)
	AKM32H	AKD-X00606	na/ 80	2.10 (18.6)	6.22 (55.1)	3000	4460	620	0.590 (0.0522)
	AKM33H	AKD-X00606	na/ 80	2.87 (25.4)	8.55 (75.7)	2500	3310	690	0.850 (0.0752)
	AKM41E	AKD-X00306	34/ 90	2.01 (17.8)	5.33 (47.2)	1200	2420	240	0.810 (0.0717)
	AKM41H	AKD-X00606	34/ 90	2.05 (18.1)	5.49 (48.6)	3000	4460	580	0.810 (0.0717)
	AKM43H	AKD-X00606	34/ 90	4.82 (42.7)	14.0 (124)	1200	1920	560	2.09 (0.185)
	AKM43L	AKD-X01206	34/ 90	4.73 (41.9)	11.7 (104)	3000	4020	1190	2.09 (0.185)
	AKM44H	AKD-X00606	34/ 90	5.89 (43.3)	17.0 (150)	1000	1620	570	2.73 (0.242)
	AKM51H	AKD-X00606	42/ 115	4.79 (42.4)	11.7 (104)	1200	2150	560	3.42 (0.303)
	AKM51L	AKD-X01206	42/ 115	4.89 (43.3)	10.6 (93.8)	3000	4150	1240	3.42 (0.303)
	AKM52L	AKD-X01206	42/ 115	8.67 (76.7)	19.6 (173)	1500	2290	1240	6.22 (0.551)
AKM53L	AKD-X01206	42/ 115	11.6 (103)	26.5 (235)	1200	1740	1350	9.12 (0.807)	
AKM54L	AKD-X01206	42/ 115	13.5 (119)	31.3 (277)	1200	1510	1630	11.9 (1.06)	
240 Vac	AKM11B	AKD-X00306	17/ 40	0.18 (1.59)	0.61 (5.4)	8000	8000	140	0.017 (0.0015)
	AKM12C	AKD-X00306	17/ 40	0.31 (2.74)	1.08 (9.56)	8000	8000	230	0.031 (0.00274)
	AKM13C	AKD-X00306	17/ 40	0.41 (3.63)	1.46 (12.9)	8000	8000	300	0.045 (0.0040)
	AKM21C	AKD-X00306	23/ 60	0.48 (4.25)	1.48 (13.1)	8000	8000	320	0.107 (0.0095)
	AKM22C	AKD-X00306	23/ 60	0.84 (7.43)	2.73 (24.2)	3500	5650	290	0.161 (0.0142)
	AKM22E	AKD-X00306	23/ 60	0.87 (7.70)	2.42 (21.4)	8000	8000	580	0.161 (0.0142)
	AKM23D	AKD-X00306	23/ 60	1.15 (10.2)	3.89 (34.4)	5000	6540	530	0.216 (0.0191)
	AKM23F	AKD-X00606	23/ 60	1.18 (10.4)	3.88 (34.3)	8000	8000	780	0.216 (0.0191)
	AKM24D	AKD-X00306	23/ 60	1.40 (12.4)	4.84 (42.8)	4000	5410	540	0.270 (0.0239)
	AKM24F	AKD-X00606	23/ 60	1.41 (12.5)	4.82 (42.7)	8000	8000	930	0.270 (0.0239)
	AKM31C	AKD-X00306	na/ 80	1.15 (10.2)	3.87 (34.3)	2500	4050	290	0.330 (0.0292)
	AKM31E	AKD-X00306	na/ 80	1.20 (10.6)	3.23 (28.6)	6000	8000	600	0.330 (0.0292)
	AKM32E	AKD-X00306	na/ 80	2.04 (18.1)	5.97 (52.8)	3000	4710	600	0.590 (0.0522)
	AKM32H	AKD-X00606	na/ 80	2.10 (18.6)	6.22 (55.1)	7000	8000	1060	0.590 (0.0522)
	AKM33E	AKD-X00306	na/ 80	2.80 (24.8)	8.95 (79.2)	2000	3130	550	0.850 (0.0752)
	AKM33H	AKD-X00606	na/ 80	2.87 (25.4)	8.55 (75.7)	5500	6640	1300	0.850 (0.0752)
	AKM41E	AKD-X00306	34/ 90	2.01 (17.8)	5.33 (47.2)	3000	4850	570	0.810 (0.0717)
	AKM41H	AKD-X00606	34/ 90	2.05 (18.1)	5.49 (48.6)	6000	6000	1010	0.810 (0.0717)
	AKM42E	AKD-X00306	34/ 90	3.42 (30.3)	9.74 (86.2)	1800	2740	590	1.45 (0.128)
	AKM42G	AKD-X00606	34/ 90	3.51 (31.1)	11.0 (97.4)	3500	4660	1060	1.45 (0.128)
	AKM43H	AKD-X00606	34/ 90	4.82 (42.7)	14.0 (124)	3000	3850	1210	2.09 (0.185)
	AKM43L	AKD-X01206	34/ 90	4.73 (41.9)	11.7 (104)	6000	6000	1590	2.09 (0.185)
	AKM44E	AKD-X00306	34/ 90	5.79 (51.2)	16.5 (146)	1200	1680	660	2.73 (0.242)
	AKM44H	AKD-X00606	34/ 90	5.89 (43.3)	17.0 (150)	2500	3250	1220	2.73 (0.242)

Note 1: Refer to page 66 for matching cables.
 Note 2: For complete AKD and AKM model nomenclature, refer to pages 67 and 68 respectively.
 Note 3: Max mechanical speeds: 8000 RPM for AKM1, 2, 3 and 6000 RPM for AKM4, 5, 6, 7.

Performance Data

AKM Servomotor	AKD Servo Drive	Frame Size NEMA/ mm	Cont.Torque at stall Tcs Nm (lb-in)	Peak Torque at stall Tps Nm (lb-in)	Rated Speed Nrt'd RPM	Max System Speed RPM	Power Prtd Watts	Inertia (Jm) Kg-cm ² (lb-in-s ² x10 ⁻²)	
240 Vac	AKM51H	AKD-X00606	42/ 115	4.79 (42.4)	11.7 (104)	3000	4030	1220	3.42 (0.303)
	AKM51L	AKD-X01206	42/ 115	4.89 (43.3)	10.6 (93.8)	6000	6000	1260	3.42 (.0303)
	AKM52H	AKD-X00606	42/ 115	8.48 (75.1)	21.6 (191)	1800	2390	1420	6.22 (0.551)
	AKM52L	AKD-X01206	42/ 115	8.67 (76.7)	19.6 (173)	3500	4580	2350	6.22 (0.551)
	AKM53H	AKD-X00606	42/ 115	10.5 (92.9)	27.8 (246)	1500	1970	1650	9.12 (0.807)
	AKM53L	AKD-X01206	42/ 115	11.6 (103)	26.5 (235)	2500	3450	2510	9.12 (0.807)
	AKM54H	AKD-X00606	42/ 115	14.2 (126)	37.5 (332)	1000	1340	1400	11.9 (1.06)
	AKM54L	AKD-X01206	42/ 115	13.5 (119)	31.3 (277)	2500	3030	3010	11.9 (1.06)
	AKM62H	AKD-X00606	na/ 142	11.9 (105)	29.61 (262)	1000	1560	1170	16.9 (1.50)
	AKM62L	AKD-X01206	na/ 142	12.2 (108)	26.3 (233)	2500	3380	2620	16.9 (1.50)
	AKM63L	AKD-X01206	na/ 142	16.8 (149)	39.3 (348)	1500	2260	2330	24.2 (2.14)
	AKM63N	AKD-X02406	na/ 142	17.0 (150)	40.3 (357)	3000	3450	4080	24.2 (2.14)
	AKM64L	AKD-X01206	na/ 142	19.7 (174)	44.4 (393)	1500	2070	2890	31.6 (2.80)
	AKM64Q	AKD-X02406	na/ 142	19.5 (173)	43.1 (381)	3000	3440	4810	31.6 (2.80)
	AKM65L	AKD-X01206	na/ 142	24.6 (218)	55.4 (490)	1300	1660	3040	40.0 (3.54)
	AKM65P	AKD-X02406	na/ 142	24.5 (217)	53.9 (477)	2400	2750	4790	40.0 (3.54)
	AKM72P	AKD-X02406	na/ 180	29.5 (261)	65.8 (606)	1800	2170	4500	64.5 (5.71)
	AKM72Q	AKD-X02406	na/ 180	24.5 (217)	56.0 (496)	2000	2730	4860	64.5 (5.71)
	AKM73P	AKD-X02406	na/ 180	41.4 (366)	95.3 (828)	1300	1610	4700	92.1 (8.15)
	AKM73Q	AKD-X02406	na/ 180	33.0 (292)	76.1 (674)	1500	2020	5250	92.1 (8.15)
AKM74Q	AKD-X02406	na/ 180	46.8 (414)	90.7 (803)	1200	1710	5380	120 (10.6)	
400 Vac	AKM22C	AKD-X00307	23/ 60	0.84 (7.43)	2.73 (24.2)	8000	8000	570	0.161 (0.0142)
	AKM23D	AKD-X00307	23/ 60	1.15 (10.2)	3.89 (34.4)	8000	8000	760	0.216 (0.0191)
	AKM24D	AKD-X00307	23/ 60	1.40 (12.4)	4.84 (42.8)	8000	8000	920	0.270 (0.0239)
	AKM31C	AKD-X00307	na/ 80	1.15 (10.2)	3.87 (34.3)	5000	7100	520	0.330 (0.0292)
	AKM32E	AKD-X00307	na/ 80	2.04 (18.1)	5.97 (52.8)	6500	8000	1020	0.590 (0.0522)
	AKM33E	AKD-X00307	na/ 80	2.80 (24.8)	8.95 (79.2)	4500	5490	1100	0.850 (0.0752)
	AKM41E	AKD-X00307	34/ 90	2.01 (17.8)	5.33 (47.2)	6000	6000	990	0.810 (0.0717)
	AKM42E	AKD-X00307	34/ 90	3.42 (30.3)	9.74 (86.2)	3500	4790	1030	1.45 (0.128)
	AKM42G	AKD-X00607	34/ 90	3.51 (31.1)	11.0 (97.4)	6000	6000	1470	1.45 (0.128)
	AKM43H	AKD-X00607	34/ 90	4.82 (42.7)	14 (124)	5500	6000	1620	2.09 (0.185)
	AKM44E	AKD-X00307	34/ 90	5.79 (51.2)	16.5 (146)	2000	2940	1010	2.73 (0.242)
	AKM44H	AKD-X00607	34/ 90	5.89 (43.3)	17.0 (150)	4500	5710	1640	2.73 (0.242)
	AKM51H	AKD-X00607	42/ 115	4.79 (42.4)	11.7 (104)	6000	6000	1230	3.42 (0.303)
	AKM52H	AKD-X00607	42/ 115	8.48 (75.1)	21.6 (191)	3500	4180	2290	6.22 (0.551)
	AKM52L	AKD-X01207	42/ 115	8.67 (76.7)	19.6 (173)	6000	6000	2050	6.22 (0.551)
	AKM53H	AKD-X00607	42/ 115	10.5 (92.9)	27.8 (246)	3000	3450	2770	9.12 (0.807)
	AKM53L	AKD-X01207	42/ 115	11.6 (103)	26.5 (235)	5000	6000	3140	9.12 (0.807)
	AKM54H	AKD-X00607	42/ 115	14.2 (126)	37.5 (332)	1800	2340	2350	11.9 (1.06)
	AKM54L	AKD-X01207	42/ 115	13.5 (119)	31.3 (277)	4500	5310	3830	11.9 (1.06)
	AKM62H	AKD-X00607	na/ 142	11.9 (105)	29.6 (262)	2000	2730	2140	16.9 (1.50)
	AKM62L	AKD-X01207	na/ 142	12.2 (108)	26.3 (233)	5000	5920	3880	16.9 (1.50)
	AKM63L	AKD-X01207	na/ 142	16.8 (149)	39.3 (348)	3000	3950	4040	24.2 (2.14)
	AKM63N	AKD-X02407	na/ 142	17.0 (150)	40.3 (357)	5000	6000	4900	24.2 (2.14)
	AKM64L	AKD-X01207	na/ 142	19.7 (174)	44.4 (393)	3000	3640	4900	31.6 (2.80)
	AKM64Q	AKD-X02407	na/ 142	19.5 (173)	43.1 (381)	5000	6000	5600	31.6 (2.80)
	AKM65L	AKD-X01207	na/ 142	24.6 (218)	55.4 (490)	2500	2910	5030	40.0 (3.54)
	AKM65P	AKD-X02407	na/ 142	24.5 (217)	53.9 (477)	4000	4820	6240	40.0 (3.54)
	AKM72L	AKD-X01207	na/ 180	30.0 (266)	70.5 (624)	1500	2300	3970	64.5 (5.71)
	AKM72P	AKD-X02407	na/ 180	29.5 (261)	68.5 (606)	3000	3800	6280	64.5 (5.71)
	AKM72Q	AKD-X02407	na/ 180	24.5 (217)	56.0 (496)	4000	4780	6830	64.5 (5.71)
	AKM73L	AKD-X01207	na/ 180	41.7 (369)	95.4 (844)	1400	1720	5060	92.1 (8.15)
	AKM73P	AKD-X02407	na/ 180	41.4 (366)	93.5 (828)	2400	2820	7130	92.1 (8.15)
	AKM73Q	AKD-X02407	na/ 180	33.0 (292)	76.1 (674)	3000	3550	7920	92.1 (8.15)
	AKM74L	AKD-X01207	na/ 180	49.7 (440)	114 (1010)	1200	1450	5470	120 (10.6)
	AKM74P	AKD-X02407	na/ 180	52.3 (463)	125 (1110)	1800	2110	7050	120 (10.6)
AKM74Q	AKD-X02407	na/ 180	46.8 (414)	90.7 (803)	2500	3000	8250	120 (10.6)	

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and AKM model nomenclature, refer to pages 67 and 68 respectively.

Note 3: Max mechanical speeds: 8000 RPM for AKM1, 2, 3 and 6000 RPM for AKM4, 5, 6, 7.

AKM Servomotor

Performance Data

AKM Servomotor	AKD Servo Drive	Frame Size NEMA/ mm	Cont.Torque at stall Tcs Nm (lb-in)	Peak Torque at stall Tps Nm (lb-in)	Rated Speed Nrtd RPM	Max System Speed RPM	Power Prtd Watts	Inertia (Jm) Kg-cm ² (lb-in-s ² x10 ⁻²)	
480 Vac	AKM22C	AKD-X00307	23/ 60	0.84 (7.43)	2.34 (20.7)	8000	8000	570	0.161 (0.0142)
	AKM23D	AKD-X00307	23/ 60	1.15 (10.2)	3.89 (34.4)	8000	8000	760	0.216 (0.0191)
	AKM24D	AKD-X00307	23/ 60	1.40 (12.4)	4.84 (42.8)	8000	8000	920	0.270 (0.0239)
	AKM31C	AKD-X00307	na/ 80	1.15 (10.2)	3.35 (29.7)	6000	8000	570	0.330 (0.0292)
	AKM32E	AKD-X00307	na/ 80	2.04 (18.1)	5.97 (52.8)	8000	8000	1020	0.590 (0.0522)
	AKM33E	AKD-X00307	na/ 80	2.80 (24.8)	8.95 (79.2)	5000	6280	1190	0.850 (0.0752)
	AKM41E	AKD-X00307	34/ 90	2.01 (17.8)	5.33 (47.2)	6000	6000	990	0.810 (0.0717)
	AKM42E	AKD-X00307	34/ 90	3.42 (30.3)	9.74 (86.2)	4000	5470	1140	1.45 (0.128)
	AKM42G	AKD-X00607	34/ 90	3.51 (31.1)	11.0 (97.4)	6000	6000	1470	1.45 (0.128)
	AKM43H	AKD-X00607	34/ 90	4.82 (42.7)	14.0 (124)	6000	6000	1620	2.09 (0.185)
	AKM44E	AKD-X00307	34/ 90	5.79 (51.2)	16.5 (146)	2500	3370	1200	2.73 (0.242)
	AKM44H	AKD-X00607	34/ 90	5.89 (43.3)	17.0 (150)	5500	6000	1690	2.73 (0.242)
	AKM51H	AKD-X00607	42/ 115	4.79 (42.4)	11.7 (104)	6000	6000	1230	3.42 (0.303)
	AKM52H	AKD-X00607	42/ 115	8.48 (75.1)	21.6 (191)	4000	4780	2420	6.22 (0.551)
	AKM52L	AKD-X01207	42/ 115	8.67 (76.7)	19.6 (173)	6000	6000	2050	6.22 (0.551)
	AKM53H	AKD-X00607	42/ 115	10.5 (92.9)	27.8 (246)	3000	3940	2770	9.12 (0.807)
	AKM53L	AKD-X01207	42/ 115	11.6 (103)	26.5 (235)	6000	6000	2540	9.12 (0.807)
	AKM54H	AKD-X00607	42/ 115	14.2 (126)	37.5 (332)	2000	2680	2560	11.9 (1.06)
	AKM54L	AKD-X01207	42/ 115	13.5 (119)	31.3 (277)	5000	6000	3690	11.9 (1.06)
	AKM62H	AKD-X00607	na/ 142	11.9 (105)	29.6 (262)	2400	3120	2480	16.9 (1.50)
	AKM62L	AKD-X01207	na/ 142	12.2 (108)	26.3 (233)	6000	6000	3610	16.9 (1.50)
	AKM63L	AKD-X01207	na/ 142	16.8 (149)	39.3 (348)	3500	5410	4400	24.2 (2.14)
	AKM63N	AKD-X02407	na/ 142	17.0 (150)	40.3 (357)	6000	6000	4400	24.2 (2.14)
	AKM64L	AKD-X01207	na/ 142	19.7 (174)	44.4 (393)	3500	4160	5280	31.6 (2.80)
	AKM64Q	AKD-X02407	na/ 142	19.5 (173)	43.1 (381)	6000	6000	4620	31.6 (2.80)
	AKM65L	AKD-X01207	na/ 142	24.6 (218)	55.4 (490)	2800	3320	5450	40.0 (3.54)
	AKM65P	AKD-X02407	na/ 142	24.5 (217)	53.9 (477)	4500	5500	6360	40.0 (3.54)
	AKM72L	AKD-X01207	na/ 180	30.0 (266)	70.5 (624)	1800	2630	4580	64.5 (5.71)
	AKM72P	AKD-X02407	na/ 180	29.5 (261)	68.5 (606)	3000	4340	6680	64.5 (5.71)
	AKM72Q	AKD-X02407	na/ 180	24.5 (217)	56.0 (496)	4500	5460	6640	64.5 (5.71)
AKM73L	AKD-X01207	na/ 180	41.7 (369)	95.4 (844)	1500	1970	5620	92.1 (8.15)	
AKM73P	AKD-X02407	na/ 180	41.4 (366)	93.5 (828)	2400	3220	7130	92.1 (8.15)	
AKM73Q	AKD-X02407	na/ 180	33.0 (292)	76.1 (674)	3500	4050	8060	92.1 (8.15)	
AKM74L	AKD-X01207	na/ 180	49.7 (440)	114 (1010)	1400	1660	6080	120 (10.6)	
AKM74P	AKD-X02407	na/ 180	52.3 (463)	125 (1110)	1800	2420	7050	120 (10.6)	
AKM74Q	AKD-X02407	na/ 180	46.8 (414)	90.7 (803)	3000	3430	8580	120 (10.6)	

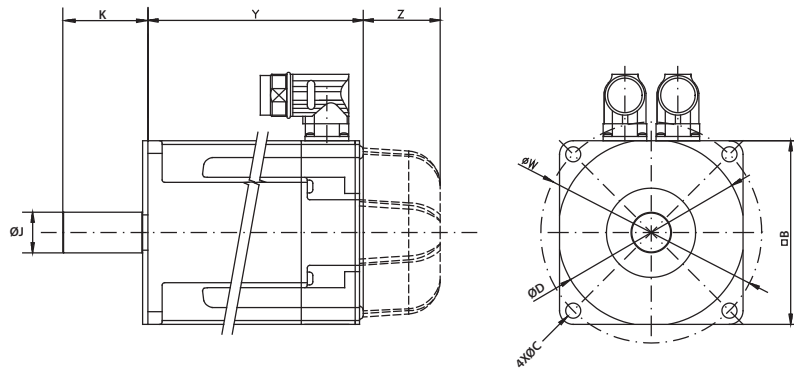
Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and AKM model nomenclature, refer to pages 67 and 68 respectively.

Note 3: Max mechanical speeds: 8000 RPM for AKM1, 2, 3 and 6000 RPM for AKM4, 5, 6, 7.

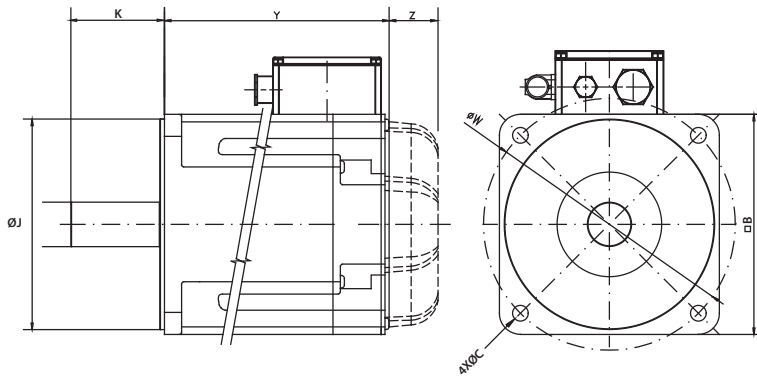
Model with Power Connector

Outline indicative of AKM11 - AKM74



Model with Terminal Box

Outline indicative of AKM82 - AKM84



Dimensions (mm)

Model	Shaft **	Shaft Length	Mount Hole **	Length 1 stack (AKMx1)	Length 2 stack (AKMx2)	Length 3 stack (AKMx3)	Length 4 stack (AKMx4)	Length 5 stack (AKMx5)	Brake Adder	Sine Enc. Adder *
	"J"	"K"	"C"	"V"	"V"	"V"	"V"	"V"		
AKM1	8	25	4.3	79	98	117	n/a	n/a	n/a	n/a
AKM2	9	20	4.8	95.4	114.4	133.4	152.4	n/a	34.1	0
AKM3	14	30	5.8	109.8	140.8	171.8	n/a	n/a	30.5	0
AKM4	19	40	7	118.8	147.8	176.8	205.8	n/a	33.5	0
AKM5	24	50	9	127.5	158.5	189.5	220.5	n/a	45	18.5
AKM6	32	58	11	n/a	153.7	178.7	203.7	228.7	47	18.5
AKM7	38	80	13.5	n/a	192.5	226.5	260.5	n/a	42	9.5
AKM8	48	110	18.5	n/a	263.4	343.9	424.4	n/a	66	0

Model	Frame Square "B"	Mount Pilot **	Mount B.C. **
AKM1	40	30	36
AKM2	58	40	63
AKM3	70	60	75
AKM4	84	80	100

Model	Frame Square "B"	Mount Pilot **	Mount B.C. **
AKM5	108	110	130
AKM6	138	130	165
AKM7	188	180	215
AKM8	260	250	300

* AKM5x w/ Sine Enc. and brake, plus adders, -2.0 mm.
 AKM6x w/ Sine Enc. and brake, plus adders, +0.5 mm.
 AKM7x w/ Sine Enc. and brake, plus adders, +9.3 mm.

** Assumes the "A" international mount, other mounts available see AKM selection guide online.

Direct Drive Technology (DDT)

Conventional servo systems commonly have a mechanical transmission which can consist of gears, gearheads, belts/pulleys or cams connected between the motor and the load.

With direct drive technology, the mechanical transmission is eliminated and the motor is coupled directly to the load.

Why Use Direct Drive Technology?

Increased Accuracy and Repeatability

A “precision” planetary gearhead could have a backlash of 1 arc-minute. This can result in the load moving by 1 arc-minute with an absolutely stationary drive motor. Kollmorgen’s standard direct drive rotary (DDR) servomotors have repeatability better than 1 arc-second. Therefore, a direct drive motor can hold a position 60 times better than a conventional motor/gearhead.

The increased accuracy of direct drive technology results in a higher quality product out of the machine:

- Print registration is more accurate
- Cut or feed lengths can be held more precisely
- Coordination with other machine axes is more accurate
- Indexing location is more exact
- Tuning issues due to backlash are eliminated

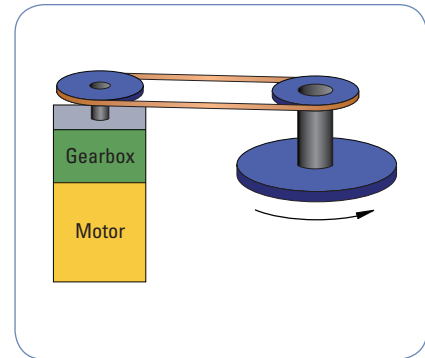
Higher Bandwidth

Mechanical transmission components impose a limit on how fast a machine can start and stop and also extend the required settling time. These factors limit the possible throughput of a machine.

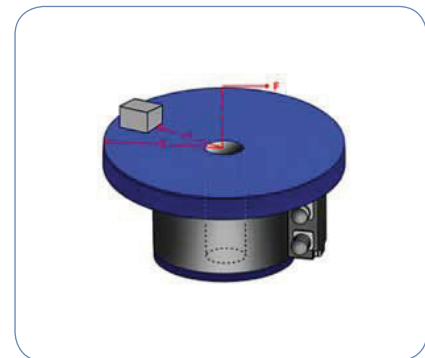
Direct drive technology removes these limitations and allows for much faster start/stop cycles and also provides greatly reduced settling time. This will allow a greater throughput from the machine. Users of direct drive systems have reported up to a 2X increase in throughput.

Improved Reliability and Zero Maintenance

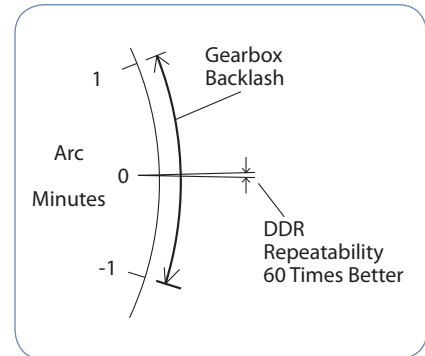
Gears, belts, and other mechanical transmission parts break. By eliminating these parts and using DDR motors, the reliability of the machine is improved. Gearheads require periodic lubrication and/or replacement in aggressive start/stop applications. Belts require periodic tightening. There are no time-wear components in a direct drive motor and consequently they require zero maintenance.



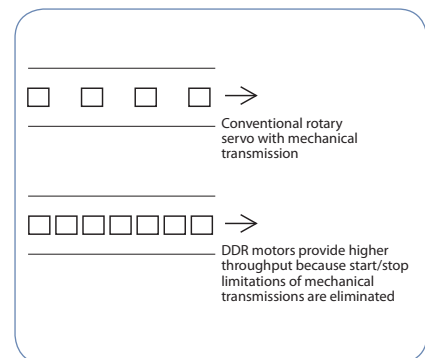
Servomotor and gearhead



Direct drive motor



Improved repeatability



Increased throughput

Fewer Parts

With direct drive motors, all you need is the motor and the mounting bolts. This often replaces many parts including brackets, guards, belts, pulleys, tensioners, couplings, and bolts, resulting in:

- Fewer parts on the BOM. Fewer parts to purchase, schedule, inventory and control, and fewer parts to assemble.
- Assembly time of the servo drops from several hours with the mechanical transmission to several minutes with the DDR.
- Reduced cost. Although a direct drive motor may carry a small price-premium compared to a motor/gearhead with the same torque, consider that there is an overall cost reduction when eliminating the parts and labor of all the extra components required in a servo system with mechanical transmission.

No Inertia Matching

Servo systems with mechanical transmissions require inertia matching that limits the reflected load inertia at 5 to 10 times the motor inertia. If this limitation is not met, the system becomes difficult to control due to instability issues. Inertia matching limitations of mechanical transmission systems often force machine designers to use a larger motor than would otherwise be required just to satisfy the inertia matching requirement.

Such sizing conventions are not required with direct drive technology. Since the motor is directly connected to the load, the inertia of the motor and the load become a common inertia. Therefore, no inertia matching is required when using DDR. DDR applications have run with inertia ratios greater than 11,000:1.

Reduced Audible Noise

Machines with DDR motors have audible noise levels as low as 20 dB less than the same machine with a mechanical transmission.

Three DDR Product Categories to Choose From

Kollmorgen's 50 years of electromagnetic and electromechanical design experience combined with our quality and service, allowed us to refine and expand DDR technology into three product categories for easy installation, use, and short lead times: [Frameless DDR](#), [Housed DDR](#), and the [Cartridge DDR](#). This allows you to select the right DDR solution for your application.

F Series Frameless DDR

Frameless motors include a rotor and stator as separate components which are integrated into, ride on the bearings of, and become a part of the driven load. Frameless motors offer the most compact and lightweight DDR solution available. The "F" series is Kollmorgen's latest frameless DDR product. It provides excellent torque/volume with the use of a proprietary neodymium-iron magnet rotor structure and skewed armature assembly. The F series is the first UL recognized parts set available on the market. This provides OEMs with the benefits of UL component ratings for easier agency approval on their machines.

Housed DDR

The Housed DDR is a housed motor assembly featuring a factory aligned high-resolution feedback device and precision bearings, allowing it to function as the core of rotary indexing and rate table applications. The system can also be used as a flexible indexer, providing programmable, rapid indexing far exceeding the throughput and accuracy of conventional mechanical or variable reluctance technology indexers.

Cartridge DDR

This motor is the first in the industry to combine the space-saving and performance advantages of frameless DDR technology with the ease of installation of a full-frame motor. Consisting of a rotor, stator, and factory-aligned high-resolution feedback device, the motor uses the machine's bearings to support the rotor. An innovative compression coupling engages the rotor to the load and the frame of the motor mounts to the machine with a bolt circle and pilot diameter just like a conventional servomotor, saving space and design time and simplifying the overall system.

DDR Applications

Format	Where Used
Frameless DDR	Application where size and weight must be absolutely minimized
Housed DDR	Applications where the load rides on the motor's bearings such as indexing or rate tables
Cartridge DDR	Any application with existing bearings

Cartridge Direct Drive Rotary (DDR) Motor

The Cartridge Direct Drive Rotary (DDR) motor is the first in the industry to combine the space-saving and performance advantages of frameless DDR technology with the ease of installation of a full-frame motor. Cartridge DDR motors also feature an advanced electromagnetic design that provides up to 50% more torque density than comparably sized conventional servomotors.

Consisting of a rotor, stator and factory-aligned high-resolution feedback device, the Cartridge DDR motor uses the machine's bearings to support the rotor.

An innovative compression coupling secures the Cartridge DDR's rotor to the machine shaft, and the Cartridge DDR's housing is bolted to the machine frame with a bolt circle and pilot – just like a conventional servomotor – saving space and design time and simplifying the overall system.

Conventional servo systems typically include a number of mechanical transmission components that limit the performance and reliability, and drive up cost of operation. Cartridge DDR motors eliminate all mechanical transmission parts, resulting in the following features:

Cartridge DDR Features

- Assembles as quickly as 5 minutes
- 5 frame sizes, multiple lengths
- Continuous torque range: 4.57 Nm (3.37 lb-ft) to 510 Nm (373 lb-ft), accommodates a wide range of high-power application requirements
- Optimized torque output with high-pole count efficient electromagnetic design
- Integrated high resolution sine encoder
- 134,217,728 counts/rev
- Speeds up to 2,500 RPM meets most medium speed and high-torque application requirements
- Direct load connection eliminates gearheads, belts and pulleys
- Low cogging for smooth low-speed rotation
- Zero backlash and compliance provides more responsive system performance



The Cartridge DDR Advantage – Press Feed Machine

Consider how Cartridge DDR technology improves a press feed machine:

Reduced Assembly Time

The assembly time for the original mechanical transmission system was 4 hours. In contrast, the Cartridge DDR motor is installed in less than 5 minutes, resulting in a significant cost savings in labor.

Reduced Parts Count

The original mechanical transmission system comprises 2 bracket pieces, 12 bolts, 2 pulleys, 2 set screws, 2 keys, a timing belt, a housing to protect operators from the timing belt, a tension system for the timing belt, and motor/gearhead. With the Cartridge DDR system, this is all replaced by the motor and 4 mounting bolts, resulting in fewer parts to maintain and cost savings.

Improved Accuracy

The best planetary gearheads have a backlash between 1 and 2 arc-minutes. Over the life of the gearhead, the backlash will increase. The Cartridge DDR system has an absolute accuracy of 26 arc-seconds and a repeatability of 0.7 arc-seconds. The press feed machine with the Cartridge DDR has a feed accuracy of +/- 0.0005 inch where the press feed machine with the mechanical transmission has a feed accuracy of 0.002 inch. Therefore, there was an overall four times improvement in machine accuracy with the Cartridge DDR system.

Increased Throughput

The cycle rate of the Cartridge DDR system is two times better than the mechanical transmission. This results in an increase in throughput of 100 percent.

Improved Reliability and Simplified Maintenance

The Cartridge DDR system eliminates parts that wear, change over time, or fail. Gearheads are prone to wear, and backlash increases over time. Belts and pulleys stretch and require maintenance to maintain proper belt tension. By eliminating these components, the Cartridge DDR system delivers greater system reliability.

Press Feed Example

Gearheads have a finite life span, especially in a demanding cyclic application such as a press feed. On this machine, the gearhead must be replaced every 10,000 hours and the belt must be tensioned every 2,000 hours. By contrast, the Cartridge DDR motor has no wear components and requires no maintenance thus simplifying the maintenance schedule for the machine, including operating costs.

Reduced Audible Noise

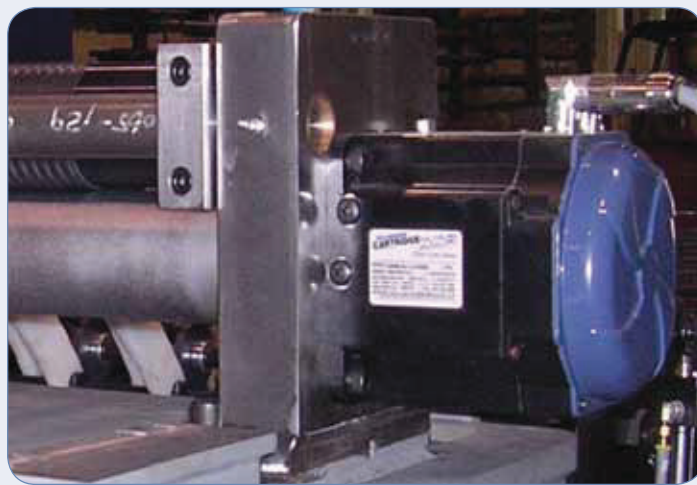
The Cartridge DDR system has as much as a 20 dB reduction in noise compared to a mechanical transmission servo system. This can dramatically reduce the overall noise level of the machine. A quieter machine gives the perception of quality. This is rightfully so as the noise emitted by gears and belts is caused by the wearing of the parts.

Total Reduced Cost

A Cartridge DDR motor typically costs 20 percent more than a comparable motor/gearhead combination. However, the elimination of parts and assembly time typically results in a lower total cost for the Cartridge DDR solution.



Press feed machine built with a conventional servomotor, gearhead, belt and pulleys.



Same machine with a Cartridge DDR motor installed. Here, the shaft of the driven roll is extended into the Cartridge DDR motor and the motor applies torque directly to the driven roll.

Cartridge Direct Drive Rotary Motor (DDR)

240 Vac Performance Data

Cartridge DDR Motor	AKD Servo Drive	Frame Size	Continuous Torque	Peak Torque	Maximum Speed	Weight	Inertia (Jm)
		mm (in)	Nm (lb-in)	Nm (lb-in)	RPM	kg (lb)	kg-cm ² (lb-in-s ² x10 ⁻³)
C041A	AKD-X00306	108 (4.25)	4.57 (40.4)	12.3 (109)	1750	4.08 (9.00)	5.86 (5.19)
C041B	AKD-X00606	108 (4.25)	4.52 (40.0)	12.2 (108)	2500	4.08 (9.00)	5.86 (5.19)
C042A	AKD-X00606	108 (4.25)	8.25 (73.0)	22.2 (196)	1700	5.67 (12.5)	8.87 (7.85)
C042B	AKD-X01206	108 (4.25)	8.45 (74.8)	22.8 (202)	2500	5.67 (12.5)	8.87 (7.85)
C043A	AKD-X00606	108 (4.25)	11.1 (98.2)	30.0 (265)	1250	7.26 (16.0)	11.9 (10.5)
C043B	AKD-X01206	108 (4.25)	11.2 (99.1)	30.2 (267)	2500	7.26 (16.0)	11.9 (10.5)
C044A	AKD-X00606	108 (4.25)	13.9 (123)	37.4 (331)	1050	8.84 (19.5)	14.9 (13.2)
C044B	AKD-X01206	108 (4.25)	14.1 (125)	37.9 (335)	2150	8.84 (19.5)	14.9 (13.2)
C051A	AKD-X00606	138 (5.43)	11.7 (104)	30.2 (267)	1200	8.39 (18.5)	27.4 (24.2)
C051B	AKD-X01206	138 (5.43)	11.9 (105)	30.6 (271)	2450	8.39 (18.5)	27.4 (24.2)
C052C	AKD-X00606	138 (5.43)	16.9 (150)	43.1 (381)	950	10.7 (23.5)	35.9 (31.8)
C052D	AKD-X01206	138 (5.43)	16.5 (146)	42.3 (374)	2050	10.7 (23.5)	35.9 (31.8)
C053A	AKD-X01206	138 (5.43)	21.0 (186)	54.1 (479)	1350	13.2 (29.0)	44.3 (39.2)
C053B	AKD-X02406	138 (5.43)	20.2 (179)	50.1 (443)	2500	13.2 (29.0)	44.3 (39.2)
C054A	AKD-X01206	138 (5.43)	24.9 (220)	63.8 (565)	1200	15.4 (34.0)	52.8 (46.7)
C054B	AKD-X02406	138 (5.43)	23.8 (211)	61.2 (542)	2500	15.4 (34.0)	52.8 (46.7)
C061A	AKD-X01206	188 (7.40)	33.8 (299)	86.8 (768)	900	18.6 (41.0)	94.1 (83.2)
C061B	AKD-X02406	188 (7.40)	32.6 (288)	75.6 (669)	1950	18.6 (41.0)	94.1 (83.2)
C062C	AKD-X01206	188 (7.40)	48.4 (428)	117 (1040)	700	23.6 (52.0)	126 (112)
C062B	AKD-X02406	188 (7.40)	44.6 (395)	102 (900)	1400	23.6 (52.0)	126 (112)
C063C	AKD-X01206	188 (7.40)	61.8 (547)	157 (1380)	550	29.0 (63.0)	157 (139)
C063B	AKD-X02406	188 (7.40)	59.0 (522)	136 (1200)	1050	29.0 (63.0)	157 (139)
C091A	AKD-X02406	246 (9.68)	50.2 (444)	120 (1060)	600	27.7 (61.0)	280 (248)
C092C	AKD-X02406	246 (9.68)	102 (900)	231 (2050)	450	41.3 (91.0)	470 (416)
C093C	AKD-X02406	246 (9.68)	139 (1230)	317 (2800)	350	54.4 (120)	660 (584)
C131C	AKD-X02406	350 (13.8)	189 (1670)	395 (3500)	250	63.5 (140)	1240 (1100)
C132C	AKD-X02406	350 (13.8)	362 (3200)	818 (7240)	120	101 (223)	2250 (1990)
C133C	AKD-X02406	350 (13.8)	499 (4410)	1070 (9890)	100	132 (292)	3020 (2670)

400/480 Vac Systems Performance Data

Cartridge DDR Motor	AKD Servo Drive	Frame Size mm (in)	Continuous Torque Nm (lb-in)	Peak Torque Nm (lb-in)	Maximum Speed		Weight kg (lb)	Inertia (Jm) kg-cm ² (lb-in-s ² x10 ⁻³)
					RPM			
					400 Vac	480 Vac		
CH041A	AKD-X00307	108 (4.25)	4.56 (40.4)	11.3 (100)	2500	2500	4.08 (9.00)	5.86 (5.19)
CH042A	AKD-X00607	108 (4.25)	8.26 (73.1)	19.0 (168)	2500	2500	5.67 (12.5)	8.87 (7.85)
CH043A	AKD-X00607	108 (4.25)	11.1 (98.2)	25.3 (224)	2250	2500	7.26 (16.0)	11.9 (10.5)
CH044A	AKD-X00607	108 (4.25)	13.9 (123)	31.6 (280)	1850	2250	8.84 (19.5)	14.9 (13.2)
CH051A	AKD-X00607	138 (5.43)	11.7 (104)	28.0 (248)	2100	2500	8.39 (18.5)	27.4 (24.2)
CH052C	AKD-X00607	138 (5.43)	16.9 (150)	43.1 (381)	1750	2100	10.7 (23.5)	35.9 (31.8)
CH053A	AKD-X01207	138 (5.43)	21.0 (186)	54.1 (479)	2350	2500	13.2 (29.0)	44.3 (39.2)
CH054A	AKD-X01207	138 (5.43)	24.9 (220)	63.8 (565)	2100	2500	15.4 (34.0)	52.8 (46.7)
CH061A	AKD-X01207	188 (7.40)	33.8 (299)	86.8 (768)	1600	1900	18.6 (41.0)	94.1 (83.2)
CH062C	AKD-X01207	188 (7.40)	48.4 (428)	117 (1040)	1250	1550	23.6 (52.0)	126 (112)
CH063C	AKD-X01207	188 (7.40)	61.8 (547)	157 (1380)	950	1150	29.0 (63.0)	157 (139)
CH063B	AKD-X02407	188 (7.40)	59.0 (522)	136 (1200)	1850	2200	29.0 (63.0)	157 (139)
CH091A	AKD-X02407	246 (9.68)	50.2 (444)	120 (1060)	1200	1500	27.7 (61.0)	280 (248)
CH092C	AKD-X02407	246 (9.68)	102 (900)	231 (2050)	800	1000	41.3 (91.0)	470 (416)
CH093C	AKD-X02407	246 (9.68)	139 (1230)	317 (2800)	700	800	54.4 (120)	660 (584)
CH131C	AKD-X02407	350 (13.8)	189 (1670)	395 (3500)	500	600	63.5 (140)	1240 (1100)
CH131B	AKD-X04807*	350 (13.8)	190 (1680)	396 (3500)	800	1000	63.5 (140)	1240 (1100)
CH132C	AKD-X02407	350 (13.8)	362 (3200)	818 (7240)	250	300	101 (223)	2250 (1990)
CH132B	AKD-X04807*	350 (13.8)	361 (3190)	759 (6720)	400	500	101 (223)	2250 (1990)
CH133C	AKD-X02407	350 (13.8)	499 (4410)	1070 (9480)	200	250	132 (292)	3020 (2670)
CH133B	AKD-X04807*	350 (13.8)	510 (4510)	1090 (9700)	350	400	132 (292)	3020 (2670)

Cartridge DDR C09 and C13 Dimensions

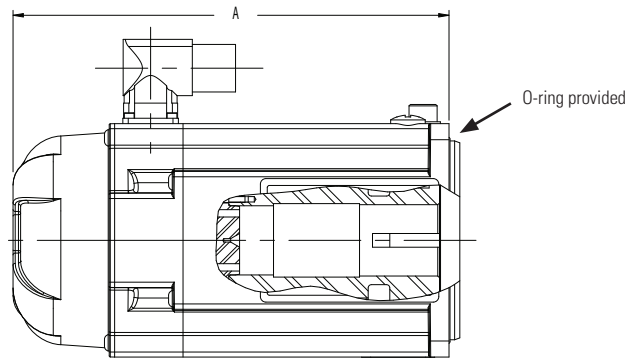
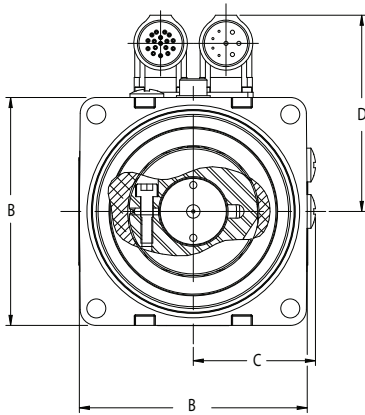
Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and Cartridge DDR motor model nomenclature, refer to pages 63 and 65 respectively.

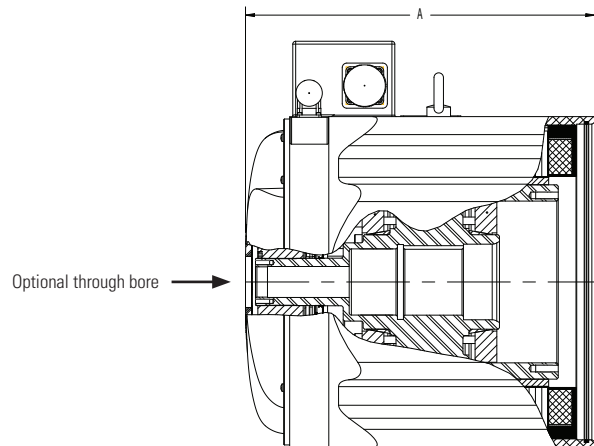
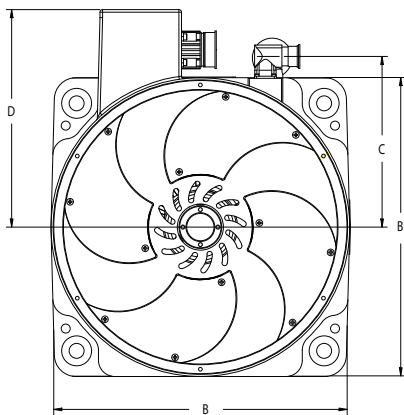
*Coming soon

Cartridge DDR C04, C05 and C06 Dimensions

Cartridge DDR Motor	A mm (in)	B mm (in)	C mm (in)	D mm (in)
C(H)041	171 (6.73)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)042	202 (7.95)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)043	233 (9.17)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)044	264 (10.4)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)051	195 (7.68)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)052	220 (8.66)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)053	245 (9.65)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)054	270 (10.6)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)061	226 (8.90)	188 (7.40)	99 (3.88)	133 (5.25)
C(H)062	260 (10.2)	188 (7.40)	99 (3.88)	133 (5.25)
C(H)063	294 (11.6)	188 (7.40)	99 (3.88)	133 (5.25)



Cartridge DDR Motor	A mm (in)	B mm (in)	C mm (in)	D mm (in)
C(H)091	204 (8.03)	246 (9.68)	149 (5.88)	182 (7.18)
C(H)092	253 (9.96)	246 (9.68)	149 (5.88)	182 (7.18)
C(H)093	302 (11.9)	246 (9.68)	149 (5.88)	182 (7.18)
C(H)131	231 (9.09)	350 (13.8)	200 (7.87)	256 (10.1)
C(H)132	301 (11.9)	350 (13.8)	200 (7.87)	256 (10.1)
C(H)133	370 (14.6)	350 (13.8)	200 (7.87)	256 (10.1)



Housed Direct Drive Rotary (DDR) Motor

Housed DDR motors are multi-pole (16 to 32) hollow shaft motors with their own bearings and high-resolution encoder system. They are coupled directly to the load and enable very precise and repeatable systems. Housed DDR motors are maintenance free and run more quietly and with better dynamics than systems that use gears, belts, cams or other mechanical transmission components.

Housed DDR Features

- 4 frame sizes
- Robust cross-roller bearing
- Dual bearing option
- IP67 option
- Continuous torque range: 5.8 Nm (4.3 lb-ft) to 339 Nm (250 lb-ft)
- Optimized torque output with high-pole count efficient electromagnetic design
- Integrated high-resolution sine-encoder
- 134,217,728 counts per rev resolution, 27 bits
- Feedback accuracy: +/- 26 arc-sec
- Repeatability better than 1 arc second

Housed DDR Benefits

- Transmission elements such as couplings, toothed belts, spindles, and other fitted components can be eliminated
- Mechanical design is made much simpler
- Power transmission without backlash
- More compact machinery assemblies
- Increased performance for the entire system

Housed DDR Motor Advantage

Consider how a Housed DDR motor improved a medical manufacturing machine.

Product is located at the steel pins on the outside of the machine's turret as shown. The 115 kg load wheel has an inertia of 20 kg-m². There are 96 steel pins for an index angle of 3.5 degrees to move.

The move is accomplished in less than 100 ms.

Realized Housed DDR Motor Benefits

The Direct Drive Advantage

The following improvements were observed compared to the previous design that used a mechanical indexer:

Improved Repeatability

The Housed DDR motor demonstrated a repeatability better than 1 arc-second which was substantially better than the mechanical indexer.

No Degradation

Direct drive system performance, accuracy and repeatability do not degrade over time as they do with a mechanical indexer. With a mechanical indexer, as parts wear over time, the accuracy and repeatability degrade.

Immediate Stop

The direct drive system can immediately stop if there is a process error. The mechanical indexer required several cycles to stop which could cause tooling and machine damage.



Greatly Reduced Audible Noise

With the mechanical indexer, the noise was at a level such that two people would have to yell to hear each other. By contrast, if you turned your back to the Housed DDR motor, you could barely detect that it was running.

Easy Profile Change

Motion parameters such as index angle, speed, acceleration, and dwell are very simple to change with the Housed DDR motor. The mechanical indexer does not support flexible motion profiles.

Better Value

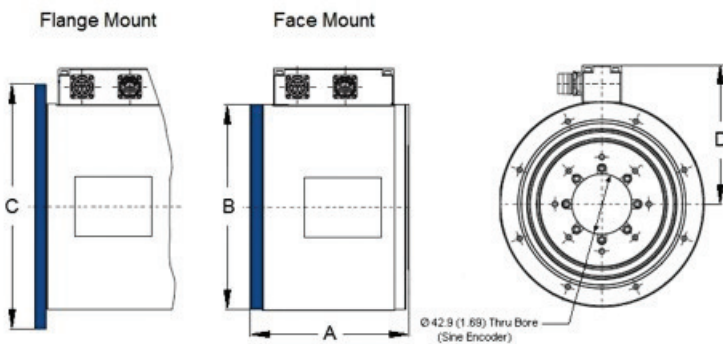
The Housed DDR motor is attractively priced compared to the mechanical indexer it replaced. When the other advantages listed above are also considered, the Housed DDR motor was the obvious choice.

240 Vac Performance Data

Housed DDR Motor	AKD Servo Drive	Frame Size mm (in)	Continuous Torque Nm (lb-in)	Peak Torque Nm (lb-in)	Maximum Speed (RPM)	Weight kg (lb)	Inertia (Jm) cm ² (lb-in-s ² x10 ⁻³)
D061	AKD-X00606	175 (6.90)	5.3 (46.9)	16.9 (150)	500	9.4 (20.7)	61 (54.0)
D062	AKD-X00606	175 (6.90)	9.8 (86.7)	33.5 (296)	500	11.3 (24.9)	71 (62.8)
D063	AKD-X00606	175 (6.90)	17.7 (157)	64.4 (570)	500	13.8 (30.4)	86 (76.1)
D081	AKD-X00606	217 (8.55)	15.9 (141)	45.0 (398)	500	17.9 (39.4)	144 (127)
D082	AKD-X00606	217 (8.55)	25.9 (229)	92.2 (816)	300	21.5 (47.3)	194 (172)
D083	AKD-X00606	217 (8.55)	50.4 (446)	160 (1420)	250	28.8 (63.4)	301 (266)
D101	AKD-X00606	280 (11.0)	34.6 (306)	129 (1140)	300	31.5 (69.3)	693 (613)
D102	AKD-X00606	280 (11.0)	63.4 (561)	227 (2010)	200	43.8 (96.4)	992 (878)
D103	AKD-X01206	280 (11.0)	115 (1020)	501 (4430)	120	60.8 (134)	1750 (1550)
D141	AKD-X01206	362 (14.2)	108 (956)	367 (3250)	200	59.4 (131)	1630 (1440)
D142	AKD-X01206	362 (14.2)	183 (1620)	519 (4590)	120	86.6 (191)	2740 (2430)
D143	AKD-X02406	362 (14.2)	339 (3000)	1340 (11,900)	60	146 (321)	5420 (4800)

400/480 Vac Performance Data

Housed DDR Motor	AKD Servo Drive	Frame Size mm (in)	Continuous Torque Nm (lb-in)	Peak Torque Nm (lb-in)	Maximum Speed RPM	Weight kg (lb)	Inertia (Jm) cm ² (lb-in-s ² x10 ⁻³)
DH061	AKD-X00607	175 (6.90)	5.3 (46.9)	16.9 (150)	800	9.4 (20.7)	61 (54.0)
DH062	AKD-X00607	175 (6.90)	9.8 (86.7)	33.5 (296)	800	11.3 (24.9)	71 (62.8)
DH063	AKD-X00607	175 (6.90)	17.7 (157)	64.4 (570)	800	13.8 (30.4)	86 (76.1)
DH081	AKD-X00607	217 (8.55)	15.9 (141)	45.0 (398)	500	17.9 (39.4)	144 (127)
DH082	AKD-X00607	217 (8.55)	25.9 (229)	92.2 (816)	500	21.5 (47.3)	194 (172)
DH083	AKD-X00607	217 (8.55)	50.4 (446)	160 (1420)	500	28.8 (63.4)	301 (266)
DH101	AKD-X00607	280 (11.0)	34.6 (306)	129 (1140)	300	31.5 (69.3)	693 (613)
DH102	AKD-X00607	280 (11.0)	63.4 (561)	227 (2010)	300	43.8 (96.4)	992 (878)
DH103	AKD-X01207	280 (11.0)	115 (1020)	501 (4430)	250	60.8 (134)	1750 (1550)
DH141	AKD-X01207	362 (14.2)	108 (956)	367 (3250)	300	59.4 (131)	1630 (1440)
DH142	AKD-X01207	362 (14.2)	183 (1620)	519 (4590)	300	86.6 (191)	2740 (2430)
DH143	AKD-X02407	362 (14.2)	339 (3000)	1340 (11,900)	120	146.0 (321)	5420 (4800)



Dimensions

DDR	A mm (in)	B mm (in)	C mm (in)	D mm (in)
D(H)061	130 (5.12)	175 (6.90)	220 (8.66)	126 (4.95)
D(H)062	140 (5.55)	175 (6.90)	220 (8.66)	126 (4.95)
D(H)063	164 (6.46)	175 (6.90)	220 (8.66)	126 (4.95)
D(H)081	145 (5.71)	217 (8.55)	260 (10.2)	147 (5.80)
D(H)082	165 (6.50)	217 (8.55)	260 (10.2)	147 (5.80)
D(H)083	206 (8.11)	217 (8.55)	260 (10.2)	147 (5.80)
D(H)101	153 (6.02)	280 (11.0)	330 (13.0)	181 (7.11)
D(H)102	185 (7.28)	280 (11.0)	330 (13.0)	181 (7.11)
D(H)103	248 (9.76)	280 (11.0)	330 (13.0)	181 (7.11)
D(H)141	153 (6.02)	362 (14.2)	406 (16.0)	218 (8.59)
D(H)142	217 (8.52)	362 (14.2)	406 (16.0)	218 (8.59)
D(H)143	344 (13.50)	362 (14.2)	406 (16.0)	218 (8.59)

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and Housed DDR motor model nomenclature, refer to pages 67 and 70 respectively.

Linear Positioning System

Kollmorgen is also the market leader in precise linear positioning, backed by 40 years of experience of providing innovative solutions customers can count on everyday. We offer linear positioners that range from 20 N (5 lb) of thrust and 100 mm (4 in) length, up to 25 kN (5600 lb) and 1.5 m length (unlimited length for linear motors) with precision better than a single thread of human hair (≤ 0.1 mm/0.004 in). Our linear positioner families leverage the breadth of our AKM servomotor product line, which provides a wide range of solutions for nearly any application.

Electric Cylinders (EC)

Primarily designed to apply a force through an extendable rod, electric cylinders are a clean and efficient replacement for hydraulic actuators and pneumatic cylinders, and an alternative to many types of linear transmissions. A wide variety of mounting and coupling alternatives significantly increases their problem solving potential.

Rodless Actuators

Long travel, quiet operation, and high moment loading differentiates rodless actuators from other mechanical transmissions.

Precision Tables

Positioning tables are used when accurate and repeatable motion is critical (1 part per 10,000 or better). These tables offer a wide variety of single and multi-axis configurations, open and closed frame tables, ball or lead screw driven, and overhung and constant support for Kollmorgen geometry configurations.

Direct Drive Linear (DDL) Motor

Directly coupling a linear motor to the driven load offers many advantages, including eliminating all mechanical transmissions, such as ball/lead screws, rack & pinions, belts/pulleys, and eliminating gearboxes. This in turn also eliminates backlash and compliance, and other problems associated with these mechanicals transmissions.

DDL Benefits

- Zero maintenance
- No ball screws, gearboxes, rack and pinions, belts/pulleys
- Zero backlash and compliance
- High stiffness
- High positional accuracy
- Compact mechanical assembly
- Reduced parts count in machine
- Very smooth velocity
- Quiet operation



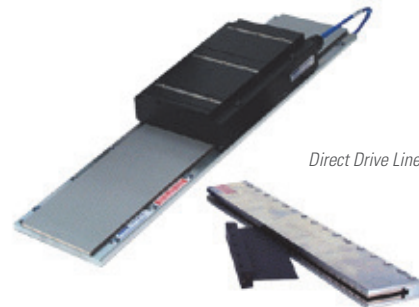
Electric Cylinders



Rodless Actuators



Precision Tables



Direct Drive Linear Motors

Performance Data

	Minimum Stroke mm (in)	Maximum Stroke mm (in)	Repeatability mm (in)	Maximum Thrust kN (lbf)	Maximum Payload kN (lbf)	Maximum Speed mm/s (in/s)
Electric cylinders	50 (2.0)	1500 (60)	0.013 (0.0005)	25 (5620)	Designed to push and pull	1300 (51)
Rodless actuators	150 (6.0)	2700 (106)	0.1 (0.004)	3.1 (700)	1.33 (300)	3000 (120)
Precision tables	50 (2.0)	1500 (60)	0.004 (0.00016)	2.0 (440)	6.2 (1400)	1300 (51)
Direct drive linear motors*	64 (2.5)	Unlimited	1×10^{-6} (3.9×10^{-8})	15.6 (3500)	Customer design limited	5000 (200)

* We offer hundreds of custom and semi-custom solutions for direct drive linear (DDL) applications.

Precision Tables DS4 / DS6 Series

Precision positioning tables are best suited for applications where the accuracy and repeatability requirements are more important than axial thrust of the drive train. Precision positioning tables can also be used in less precise applications where adequate moment load support is necessary, and are ideal building blocks for complete multi-axis positioning systems.

The DS4 and DS6 are Kollmorgen's most versatile and modular line of positioning tables.

Combined with the AKD Servo Drive and AKM Servomotors, DS4 and DS6 Systems Offer

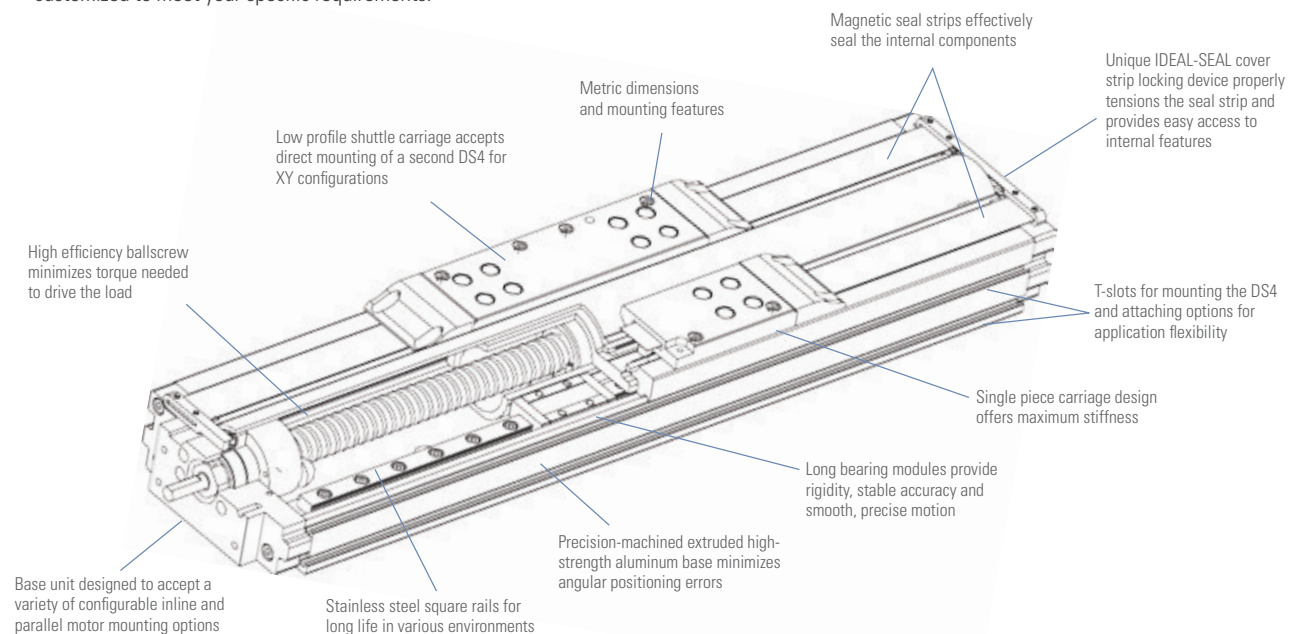
- An optimized electromechanical solution suitable for demanding high precision positioning
- Performance and versatility in a compact package
- Outstanding industrial durability
- Tremendous configuration flexibility
- Industry-leading price vs. performance value



DS Series Design Features

Following are several features that make the DS Series the positioning table of choice for the most demanding applications:

- Travel lengths from 50 mm to 2 m cover a wide range of applications.
- Precision ballscrew drive, with 5 mm, 10 mm and 25 mm leads, offers high speed and efficiency, excellent repeatability and accuracy, and mechanical advantage.
- Proven magnetic stainless steel seal strip technology effectively seals the internal components of the DS Series, protecting the ballscrew and ways from contaminants. This feature also contains ballscrew and way lubrication within the DS Series.
- Easily configurable modular design and option set, including a variety of motor mounting orientations, motor sizes and type, ballscrew leads, coupling types and sizes, encoder feedback options, limit/home sensor types, and shaft brakes allow the DS Series to be customized to meet your specific requirements.



DS Series precision tables can be ordered in a variety of multi-axis configurations including XY, XZ, and XYZ or cartesian arrangements. Consult Kollmorgen applications engineering for standard and custom configurations.

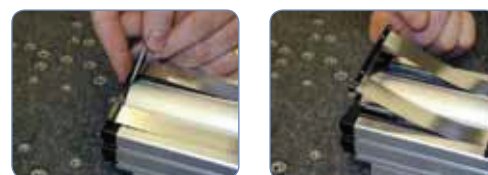
A second option is to order standard multi-axis brackets and assemble the axes yourself.



All DS4 and DS6 tables will bolt directly together in a standard XY without modification.

Unique IDEAL-SEAL Magnetic Cover Strip Locking Device

- Entire length of lead screw and linear bearing system are protected, providing both operator safety and protection from contaminants.
- Seal strips are always properly tensioned, drastically decreasing wear that requires regular field repair.
- Allows easy access to interior of DS4 for mounting and maintenance.
- No small hardware or springs to lose, and no exposure to the sharp ends of the strips, which are problems for similar seal end-cap designs.



Configurable Options

DS Series	
Servomotor options	AKM23D, AKM42G
Grades	Precision* (up to 600 mm), commercial
Motor orientations	In-line, parallel right/left/under
Couplings options** (inline configurations)	Bellows
Transmission ratio (parallel configurations)	1:1
Limit sensors	PNP (sinking) inductive proximity sensors, 5-30 Vdc
Home sensor	PNP (sinking) inductive proximity sensors, 5-30 Vdc
Shaft brake	Electromagnetic power of holding brake, 24 Vdc
Linear encoder options	1.0, 0.5 and 0.1 motion resolution, modular incremental type

* Additional lead time applies to precision grade. Contact customer support for details.
 ** Additional couplings available. Contact customer support for details.



Limit Sensor



Linear Encoder



Toe Clamp

Accessories

DS Series	
Toe clamps	Provide convenient external mounting to a base plate or to riser blocks
Narrow riser blocks	Raise unit for clearance of larger motor options, utilizing internal base mounting features on the side
Wide riser blocks	Allow rising of the unit, independent of base mounting features
Brackets and mounting plates	Facilitate multi-axis configurations
Cable sets	For connection to AKD and other drives

Precision Tables DS4 / DS6 Series

DS4 General Specifications

Travel (mm)	50	100	150	200	250	300	350	400	450	500	550	600	
Overall height, less motor (mm)	47												
Width (mm)	95												
System length, Inline less motor (mm)	317	367	417	467	517	567	617	667	717	767	817	867	
System length, parallel motor mounts (mm)	300	350	400	450	500	550	600	650	700	750	800	850	
Positional accuracy (microns)													
Commercial grade	12	12	14	20	22	24	26	26	28	34	36	40	
Precision grade	8	8	10	12	12	14	14	16	19	21	23	25	
Straightness & flatness (microns)	6	6	9	12	12	14	18	21	23	23	25	25	
Bi-directional repeatability, open loop													
Commercial grade (microns)	+/- 3												
Precision grade (microns)	+/- 1.3												
Load capacity, normal (kg) (max)	170												
Axial load capacity (kg)	90												
Acceleration (max) (m/sec ²)	20												
Moving mass (kg)	0.75												
Total mass (kg)	2.7	3	3.3	3.6	3.9	4.1	4.4	4.7	5	5.3	5.6	5.9	
Ballscrew diameter (mm)	16												
Duty cycle (%)	100												
Ballscrew efficiency	90												
Max. breakaway torque (oz-in)	18												
Max. running torque (oz-in)	16												
Ballscrew lead available (mm)	5, 10												
Input inertia (10 ⁻⁵ kg-m ²)	1.17	1.24	1.67	1.93	2.18	2.43	2.68	2.93	3.19	3.44	3.69	3.94	
Max. ballscrew speed (rev/sec)	80						60		55		50		

DS6 General Specifications

Travel (mm)	100	200	300	400	500	600	700	800	900	1000	1250	1500	1750	2000										
Overall height (mm)	70																							
Width (mm)	150																							
System length, inline less motor (mm)	465	565	665	765	865	965	1065	1165	1265	1365	1615	1865	2115	2365										
System length, parallel motor mounts (mm)	470	570	670	770	870	970	1070	1170	1270	1370	1620	1870	2120	2370										
Positional accuracy (microns)																								
Commercial grade	14	22	28	39	45	48	92	94	103	105	118	134	154	159										
Precision grade	12	14	15	20	25	50	-	-	-	-	-	-	-	-										
Straightness & flatness (microns)	10	14	17	23	30	33	40	46	50	55	76	95	115	135										
Bi-directional repeatability, open loop																								
Commercial grade (microns)	+/- 3						+/-5																	
Precision grade (microns)	+/- 1.3						N/A																	
Load capacity, normal (kg) (max)	630																							
Axial load capacity (kg)																								
Commercial grade	90						200																	
Precision grade	90						N/A																	
Acceleration (max) (m/sec ²)	20																							
Moving mass (kg)	2.8																							
Total mass (kg)	8.9	10.2	11.5	12.8	14.0	15.4	19.4	20.9	22.4	23.9	27.8	31.6	35.4	40.1										
Ballscrew diameter (mm)	16										25													
Duty cycle (%)	100																							
Ballscrew efficiency	90						80																	
Max. breakaway torque (oz-in)	18						55																	
Max. running torque (oz-in)	16						48																	
Ballscrew lead available (mm)	5, 10						5, 10, 25																	
Input inertia (10 ⁻⁵ kg-m ²)	3.8	4.4	5	5.5	6.1	6.7	37	40.4	43.9	47.3	56	64.5	73.2	81.9										
Max. ballscrew speed (rev/sec)	80				60		50		60		50		40		35		24		16		13		11	

*All performance specifications are based upon proper mounting procedures, with the DS table fully supported on a flat surface (flat within 0.008 mm/300 mm). Positional accuracy and repeatability specifications are for inline motor mount models only. Contact customer support for specifications of parallel mount configurations. Above specifications are measured 37.5 mm directly above the center of the carriage. Specifications are based upon operation at 20° C.

120 Vac Performance Data

	Sys #	Precision Table - AKM Servomotor	AKD Servo Drive	Stroke Length Type	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (mm)
DS4	1	DS4-XXX-10G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	104	17.6	210	10.8	210	17.6	600
	2	DS4-XXX- 5G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	195	8.8	210	8.4	210	8.8	600
DS6	3	DS6-XXX-25G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	37	44.0	138	8.2	138	44.0	600
	4	DS6-XXX-10G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	104	17.6	210	12.4	210	17.6	600
	5	DS6-XXX- 5G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	195	8.8	210	8.6	210	8.8	600
DS6	6	DS6-XXX-25G-AKM23D-■■■■	AKD-X00306	≥ 700 mm	41	44.0	138	8.2	154	44.0	800
	7	DS6-XXX-10G-AKM23D-■■■■	AKD-X00306	≥ 700 mm	91	17.6	331	3.1	376	17.6	800
	8	DS6-XXX- 5G-AKM23D-■■■■	AKD-X00306	≥ 700 mm	143	8.8	440	5.0	440	8.8	800

240 Vac Performance Data

	Sys #	Precision Table - AKM Servomotor	AKD Servo Drive	Stroke Length Type	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (mm)
DS4	1	DS4-XXX-10G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	98	31.5	210	31.5	210	31.5	300
	2	DS4-XXX- 5G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	184	15.7	210	15.7	210	15.7	300
DS6	3	DS6-XXX-10G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	98	31.5	210	31.5	210	31.5	300
	4	DS6-XXX- 5G-AKM23D-■■■■	AKD-X00306	≤ 600 mm	184	15.7	210	15.7	210	15.7	300
	5	DS6-XXX-25G-AKM23D-■■■■	AKD-X00306	≥ 700 mm	40	59	154	47	154	59	700
	6	DS6-XXX-10G-AKM23D-■■■■	AKD-X00306	≥ 700 mm	88	23.6	374	18	374	23.6	700
	7	DS6-XXX- 5G-AKM23D-■■■■	AKD-X00306	≥ 700 mm	138	11.8	440	11.8	440	11.8	700
	8	DS6-XXX-10G-AKM42G-■■■■	AKD-X00306	≤ 600 mm	210	28.4	210	28.4	210	28.4	300
	9	DS6-XXX- 5G-AKM42G-■■■■	AKD-X00306	≤ 600 mm	210	14.5	210	14.5	210	14.5	300
	10	DS6-XXX-25G-AKM42G-■■■■	AKD-X00306	≥ 700 mm	114	59	438	35.8	438	59	700
	11	DS6-XXX-10G-AKM42G-■■■■	AKD-X00306	≥ 700 mm	272	23.6	440	23.6	440	23.6	700
	12	DS6-XXX- 5G-AKM42G-■■■■	AKD-X00306	≥ 700 mm	440	11.8	440	11.8	440	11.8	700

Note 1: Performance based on inline motor configuration.

Note 2: Refer to page 66 for matching cables.

Note 3: For complete AKD and DS4 / DS6 Series model nomenclature, refer to pages 67 and 71 respectively.

Electric Cylinders N2 / EC Series

Electric cylinders are thrust-producing devices that are best suited for applications requiring high axial force with the moment and side loads already properly supported.

Kollmorgen has combined the broad product offering of the N2 and EC Series electric cylinders with the industry-leading AKM servomotors and AKD servo drives. The N2 and EC Series of electric cylinders offer a wide range of available thrusts in standard units from 600 lb (N2) to 5620 lb (EC5) across 5 electric cylinder frame sizes.

- Speeds up to 52 in/sec are available and integrated geared options provide the ability to increase thrust capacity for lower speed applications, leveraging the speed capacity of servo systems.
- Multiple servomotor options are available for the product line ranging from NEMA 23 size to NEMA 42 size servos. The combination with the AKM servomotor enables the use of various feedback devices including sine-encoder and the low-cost but high-performance Smart Feedback Device (SFD) when used with the AKD servo drive.
- Windings and voltage operation are not differentiated in MOTIONEERING®. All systems are offered at all voltages (240, 400, 480).
- The AKM servomotor comes mounted on the electric cylinder as specified by the electric cylinder part number. This eliminates time to match the motor to the electric cylinder and eliminates potential mechanical incompatibility.

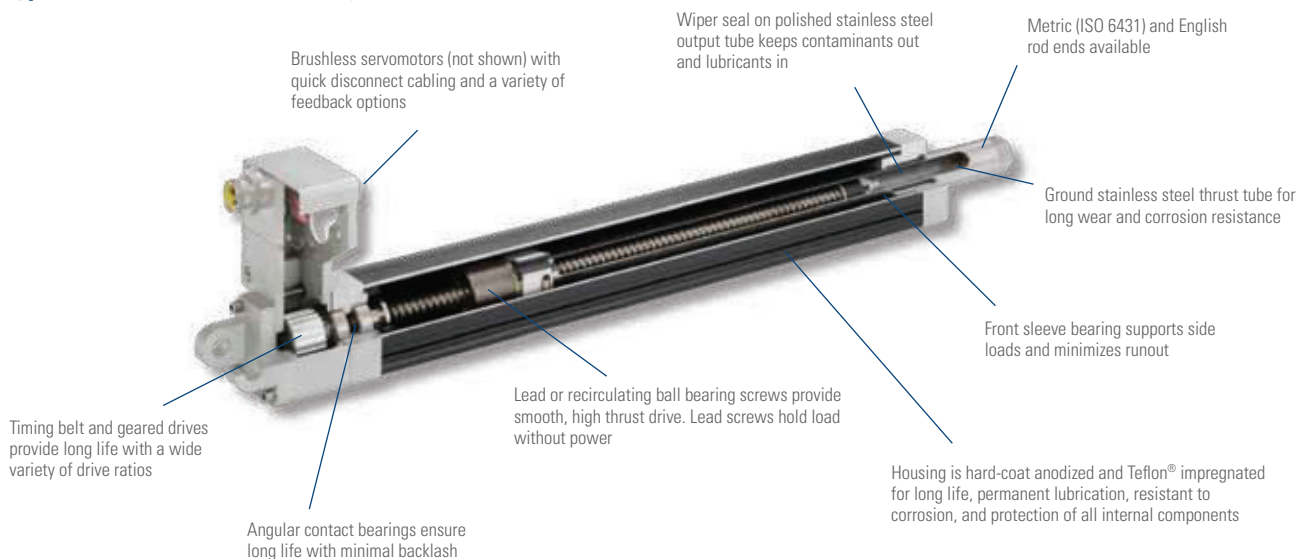
EC Servo Positioners

- Designed for performance
- Highest quality precision rolled ballscrews and Acme screws – for quiet, long-life operation
- Brushless servo with encoder, resolver or SFD feedback
- Sealed for IP54 protection. IP65 option available
- Thrust up to 25,000 N [5,620 lb]
- Speed up to 1.3 m/s [52.5 in/sec]
- Metric design (ISO 6431)
- Available in 5 power ranges – EC1, 2, 3, 4 & 5

N2 Servo Positioners

- Smallest package size
- Time-proven design
- Improved durability over previous designs
- Thrust up to 2,670 N [600 lb]
- Speed up to 0.76 m/s [30 in/sec]
- English dimensions (to NFPA standards)
- Brushless servo with encoder, resolver or SFD feedback

Typical Construction (EC2 cut-away shown)



Kollmorgen offers electric cylinder drive mechanisms designed around either lead or ballscrews. Ballscrews, being the more efficient of the two, utilize ball nuts riding on recirculating ball bearings, resulting in higher speeds, loads and cycle rates. However, the more efficient design of ballscrew technology lends it to being backdriven when power is removed if precautions are not taken (e.g., electric brakes or counter loading).

Lead screws are capable of holding the load in position when power is removed, but are less efficient in operation. Kollmorgen’s guide system prevents rotation of the drive nut, thus eliminating any torque loading to machine linkage.

Electric Cylinders Are Preferred When:

- Positioning an externally guided and supported load
- Moving a load that pivots
- There is a high concentration of airborne contaminants (rodless actuators are inherently less well protected)
- Replacing a hydraulic or pneumatic cylinder with an electromechanical solution



General Specifications

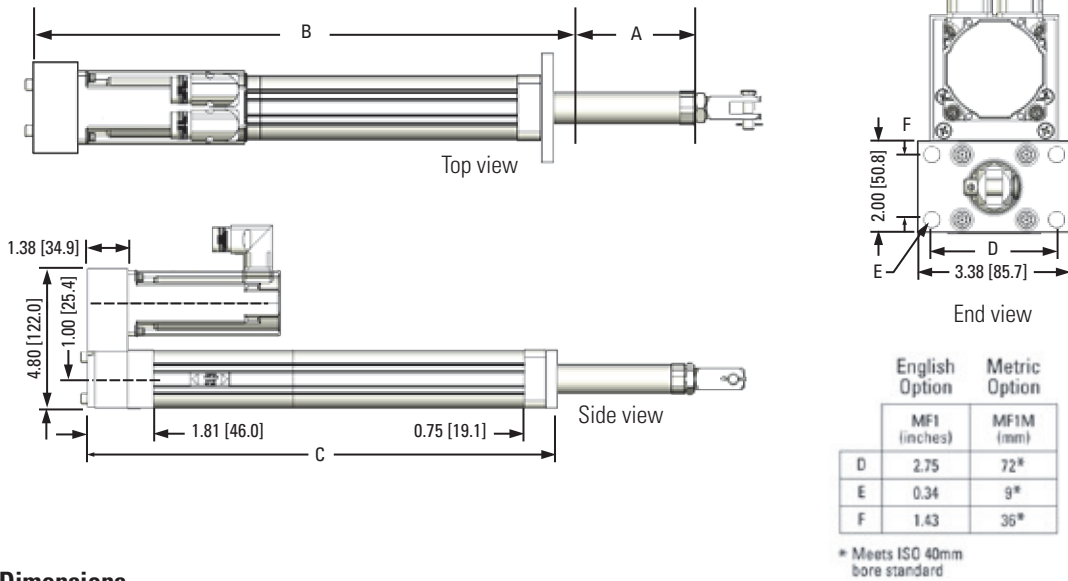
Series	N2		EC1	EC2		EC3		EC4	EC5
Std. maximum stroke length inches (mm)	* 22.5 (571.5)		7.87 (200)	29.53 (750)		39.37 (1000)		59.06 (1500)	59.06 (1500)
Type of screw	Lead	Ball	Ball	Lead	Ball	Lead	Ball	Ball	Ball
Lead	0.2 in, 0.5 in	0.2 in, 0.5 in	1.025 in	4 mm	16, 5 mm	4 mm	16, 10, 5 mm	25, 10 mm	32, 10 mm
Nom. lead screw diameter	0.625 in	0.625 in	0.375 in	16 mm	16 mm	20 mm	20 mm	25 mm	32 mm
Backlash inches (mm)	0.016 (0.40)	0.015 (0.38)	0.015 (0.30)	0.016 (0.40)	0.010 (0.25)	0.016 (0.40)	0.010 (0.25)	0.12 (0.30)	0.12 (0.30)
Dimension Std.	English NFPA Std.		Metric ISO 6431 Std.	Metric ISO 6431 Std.		Metric ISO 6431 Std.		Metric ISO 6431 Std.	Metric ISO 6431 Std.
Bore size (mm)			0.875 in	50		63		80	100
Brushless servomotor	AKM23, NEMA 23		AKM1x, NEMA 17	AKM23, NEMA 23		AKM23, NEMA 23 AKM42, NEMA 34 AKM52, NEMA 42 **		AKM42, NEMA 34 AKM52, NEMA 42 **	AKM42, NEMA 34 AKM52, NEMA 42 **
Max. thrust lb. (N)	600 (2670)		150 (667)	810 (3600)		1620 (7200)		2700 (12,000)	5620 (25,000)
Max. velocity in/sec (m/s)	12 (0.3)	30 (0.76)	13 (0.33)	9.2 (0.23)	50 (1.27)	8.0 (0.20)	50 (1.28)	52.5 (1.33)	52.5 (1.33)
Max. rated duty cycle % (load, speed dependent)	50	100	100	50	100	50	100	100	100
Limit switches	optional		optional	optional		optional		optional	optional
Std. operating temperature range C (F)	32 to 140 (0 to 60)		-30 to +70 (-22 to 158)	-30 to +70 (-22 to 158)		-30 to +70 (-22 to 158)		-30 to +70 (-22 to 158)	-30 to +70 (-22 to 158)
Moisture/contaminants	Humid, but Not Direct Contact		IP54 Std. IP65 Opt.	IP54 Std. IP65 Opt.		IP54 Std. IP65 Opt.		IP54 Std. IP65 Opt.	IP54 Std. IP65 Opt.

* Requires dual rod-end bearing option for length over 12".
 ** NEMA 42 mount, shaft does not follow a NEMA std.

Electric Cylinders N2 / EC Series

N2 MF1 Front Rectangular Flange Mount

Parallel



N2 Series Dimensions

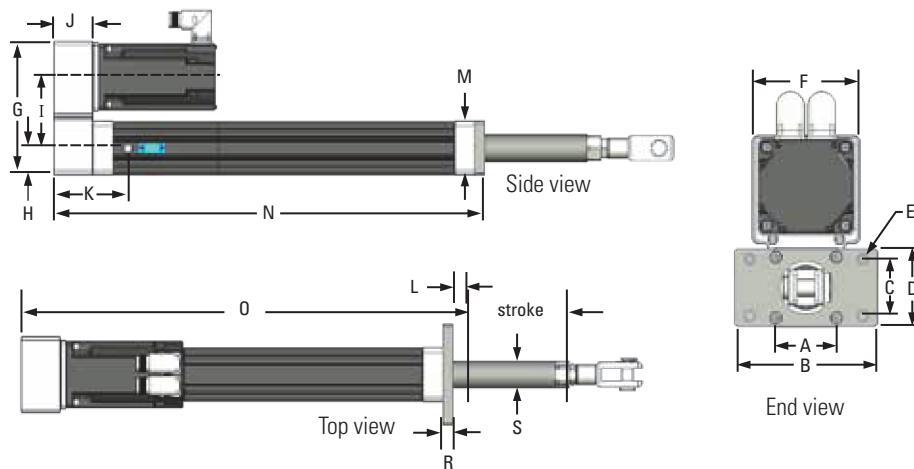
A	Standard Stroke Lengths Available						
inch	2.0	4.0	6.0	8.0	12.0	18.0	24.0
mm	50.8	101.6	152.4	203.2	304.8	457.2	609.6

B	Retract Length	C	Mounting length
inch	5.37 + S	inch	5.06 + S
mm	136.4 + S	mm	128.5 + S

S = stroke

EC MF1 Front Flange

Parallel



Flange Dimensions

In accordance with ISO 6431 for:	
Type	Bore Size
EC1	30 mm
EC2	50 mm
EC3	63 mm
EC4	80 mm
EC5	100 mm

EC Series Dimensions

	A	B	C	D	E	F	G	H
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
EC1	60.0 (2.36)	74.0 (2.91)	28.0 (1.10)	40.0 (1.57)	6.60 (0.26)	48.0 (1.89)	82.6 (3.25)	19.0 (0.75)
EC2	90.0 (3.54)	114.3 (4.50)	45.0 (1.77)	63.5 (2.50)	9.0 (0.35)	79.8 (3.14)	144.0 (5.7)	28.4 (1.12)
EC3	100.0 (3.94)	127.0 (5.00)	50.0 (1.97)	69.1 (2.72)	9.0 (0.35)	95.5 (3.76)	169.7 (6.7)	34.8 (1.37)
EC4	127.0 (5.00)	152.4 (6.00)	69.9 (2.75)	96.3 (3.79)	13.5 (0.53)	127.0 (5.00)	221.0 (8.7)	46.1 (1.81)
EC5	150.0 (5.91)	186.9 (7.36)	75.0 (2.95)	114.3 (4.50)	13.97/14.35 (.555/.565)	127.0 (5.00)	221.0 (8.7)	46.1 (1.81)

	I	J	K	L	M	N Cyl Length	O Retract length
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
EC1	41.8 (1.65)	31.3 (1.23)	–	10.2 (0.40)	38.1 (1.50)	106.8 + S (4.2 + S)	117.0 + S (4.60 + S)
EC2	74.7 (2.94)	41.7 (1.64)	88.6 (3.49)	25.0 (0.98)	56.9 (2.24)	218.5 + S (8.6 + S)	243.4 + S (9.58 + S)
EC3	*87.6/89.7 (*3.45/3.53)	49.3 (1.94)	94.2 (3.71)	25.0 (0.98)	69.6 (2.74)	246.3 + S (9.7 + S)	271.1 + S (10.67 + S)
EC4	111.1 (4.37)	71.9 (2.83)	150.9 (5.94)	41.4 (1.63)	92.2 (3.63)	365.8 + S (14.4 + S)	406.9 + S (16.02 + S)
EC5	111.1 (4.37)	71.9 (2.83)	150.9 (5.94)	35.0 (1.38)	92.2 (3.63)	365.8 + S (14.4 + S)	406.9 + S (16.02 + S)

	P Breather port Hex		Q	R	S
	type	mm (inch)	mm (inch)	mm (inch)	mm (inch)
EC1	–	–	–	10.0 (0.39)	22.2 (0.88)
EC2	1/8 NPT	11.1 (0.44)	34.8 (1.37)	9.5 (0.37)	28.0 (1.10)
EC3	1/8 NPT	11.1 (0.44)	41.1 (1.62)	12.7 (0.50)	35.0 (1.38)
EC4	1/4 NPT	14.0 (0.55)	52.8 (2.08)	12.7 (0.50)	50.0 (1.97)
EC5	1/4 NPT	14.0 (0.55)	52.8 (2.08)	19.1 (0.75)	50.0 (1.97)

* AKM23 / AKM24 dimension.

240 Vac Performance Data

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)
N2	1 N2-AKM23D-■■■■-10-5B *	AKD-X00306	190	12.0	600	11.5	600	12.0	18.0
	2 N2-AKM23D-■■■■-15-5B	AKD-X00306	287	8.0	600	8.0	600	8.0	18.0
	3 N2-AKM23D-■■■■-20-5B	AKD-X00306	382	6.0	600	6.0	600	6.0	18.0
	4 N2-AKM23D-■■■■-25-5B	AKD-X00306	370	4.8	600	4.8	600	4.8	18.0
	5 N2-AKM23D-■■■■-120-5B	AKD-X00306	600	1.0	600	1.0	600	1.0	18.0
	6 N2-AKM23D-■■■■-10-2B *	AKD-X00306	75	30.0	275	24.5	280	30.0	18.0
	7 N2-AKM23D-■■■■-15-2B	AKD-X00306	115	20.0	412	16.4	421	20.0	18.0
	8 N2-AKM23D-■■■■-20-2B	AKD-X00306	152	15.0	545	12.3	545	15.0	18.0
	9 N2-AKM23D-■■■■-25-2B	AKD-X00306	146	12.0	534	9.8	545	12.0	18.0
	10 N2-AKM23D-■■■■-120-2B	AKD-X00306	600	2.5	600	2.5	600	2.5	18.0
	11 N2-AKM23D-■■■■-10-5A	AKD-X00306	86	12.0	305	9.8	312	12.0	18.0
	12 N2-AKM23D-■■■■-15-5A	AKD-X00306	128	8.0	458	6.5	467	8.0	18.0
	13 N2-AKM23D-■■■■-20-5A	AKD-X00306	169	6.0	600	4.9	600	6.0	18.0
	14 N2-AKM23D-■■■■-25-5A	AKD-X00306	165	4.8	593	3.9	600	4.8	18.0
	15 N2-AKM23D-■■■■-120-5A	AKD-X00306	600	1.0	600	1.0	600	1.0	18.0

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)
EC1	1 EC1-AKM11B-■■■■-10-03B *	AKD-X00306	50	13.0	75	13.0	75	13.0	200
	2 EC1-AKM11B-■■■■-20-03B	AKD-X00306	100	6.0	125	6.0	125	6.0	200
	3 EC1-AKM11B-■■■■-40-03B	AKD-X00306	150	3.0	150	3.0	150	3.0	200
	4 EC1-AKM13C-■■■■-10-03B*	AKD-X00306	75	11.5	75	13.0	75	13.0	200
	5 EC1-AKM13C-■■■■-20-03B	AKD-X00306	125	5.9	125	6.0	126	6.0	200

36 Vdc Stepper Performance Data

Sys #	Electric Cylinder - CT Step Motor	Cont. Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)
1	EC1-CTP12XLF10-10-03B	19.7	5.0	75	5.0	200
2	EC1-CTP12XLF10-20-03B	35.4	2.5	125	2.5	200
3	EC1-CTP12XLF10-40-03B	70.8	1.25	150	1.25	200

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD, EC, and N2 Series model nomenclature, refer to pages 67, 73 and 74, respectively.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust).

** Based on critical speed of screw specification.

Electric Cylinders N2 / EC Series

240 Vac Performance Data

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)	Peak Thrust @ Speed (lb @ in/sec)	Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (mm)**	Cylinder Bore Size (EC)				
EC2	16	EC2-AKM23D-■■■■-10-04A *	AKD-X00306	108	9.2	387	7.7	396	9.2	200	50	
	17	EC2-AKM23D-■■■■-15-04A	AKD-X00306	160	6.2	521	5.8	582	6.2	300	50	
	18	EC2-AKM23D-■■■■-20-04A	AKD-X00306	216	4.6	455	4.6	622	4.6	450	50	
	19	EC2-AKM23D-■■■■-50-04A	AKD-X00306	517	1.8	809	1.8	809	1.8	600	50	
	20	EC2-AKM23D-■■■■-100-04A	AKD-X00306	809	0.9	809	0.9	809	0.9	750	50	
	21	EC2-AKM23D-■■■■-10-16B *	AKD-X00306	60	50.5	218	30.9	223	50.5	200	50	
	22	EC2-AKM23D-■■■■-15-16B	AKD-X00306	85	40.1	293	23.4	237	45.0	200	50	
	23	EC2-AKM23D-■■■■-20-16B	AKD-X00306	116	29.5	245	24.5	350	31.0	300	50	
	24	EC2-AKM23D-■■■■-50-16B	AKD-X00306	292	7.3	809	7.3	809	7.3	750	50	
	25	EC2-AKM23D-■■■■-100-16B	AKD-X00306	581	3.7	809	3.7	809	3.7	750	50	
	21	EC2-AKM23D-■■■■-10-05B *	AKD-X00306	186	16.3	697	9.7	712	16.3	200	50	
	22	EC2-AKM23D-■■■■-15-05B	AKD-X00306	272	12.5	809	8.3	809	13.5	300	50	
	23	EC2-AKM23D-■■■■-20-05B	AKD-X00306	370	9.2	782	7.6	809	10.0	300	50	
	24	EC2-AKM23D-■■■■-50-05B	AKD-X00306	809	2.3	809	2.3	809	2.3	750	50	
	EC3	25	EC3-AKM23D-■■■■-15-16B	AKD-X00306	86	39.3	327	20.6	334	42.0	200	63
		26	EC3-AKM23D-■■■■-20-16B	AKD-X00306	119	28.6	448	14.0	459	30.0	300	63
27		EC3-AKM23D-■■■■-50-16B	AKD-X00306	251	6.3	891	6.1	909	6.3	750	63	
28		EC3-AKM23D-■■■■-70-16B	AKD-X00306	349	4.5	1240	4.4	1260	4.5	1000	63	
29		EC3-AKM23D-■■■■-10-10B *	AKD-X00306	98	21.0	349	19.3	356	21.0	300	63	
30		EC3-AKM23D-■■■■-15-10B	AKD-X00306	141	21.0	523	12.9	534	21.0	300	63	
31		EC3-AKM23D-■■■■-20-10B	AKD-X00306	191	17.9	716	8.9	734	20.0	300	63	
32		EC3-AKM23D-■■■■-50-10B	AKD-X00306	404	3.8	1420	3.8	1450	3.8	1000	63	
33		EC3-AKM23D-■■■■-70-10B	AKD-X00306	561	2.8	1620	2.8	1620	2.8	1000	63	
34		EC3-AKM23D-■■■■-10-05B *	AKD-X00306	196	10.3	695	9.7	712	10.3	300	63	
35		EC3-AKM23D-■■■■-15-05B	AKD-X00306	285	10.3	1040	6.4	1070	10.3	300	63	
36		EC3-AKM23D-■■■■-20-05B	AKD-X00306	381	8.9	1430	4.4	1470	10.0	300	63	
37		EC3-AKM23D-■■■■-50-05B	AKD-X00306	800	2.0	1620	2.0	1620	2.0	750	63	
38		EC3-AKM23D-■■■■-70-05B	AKD-X00306	1120	1.4	1620	1.4	1620	1.4	1000	63	
38		EC3-AKM42G-■■■■-10-16B *	AKD-X00606	149	45.0	601	24.4	628	45.0	200	63	
39		EC3-AKM42G-■■■■-15-16B	AKD-X00606	223	30.0	510	24.0	736	30.0	300	63	
40		EC3-AKM42G-■■■■-50-16B	AKD-X00606	690	6.3	1620	6.3	1620	6.3	750	63	
41		EC3-AKM42G-■■■■-70-16B	AKD-X00606	965	4.5	1620	4.5	1620	4.5	1000	63	
42		EC3-AKM42G-■■■■-10-10B *	AKD-X00606	238	28.4	961	15.3	1010	21.0	300	63	
43		EC3-AKM42G-■■■■-15-10B	AKD-X00606	357	18.9	823	14.5	1200	21.0	300	63	
44	EC3-AKM42G-■■■■-50-10B	AKD-X00606	1100	3.9	1620	3.9	1620	3.9	1000	63		
45	EC3-AKM42G-■■■■-70-10B	AKD-X00606	1530	2.8	1620	2.8	1620	2.8	1000	63		
46	EC3-AKM42G-■■■■-15-05B	AKD-X00606	710	10.3	1620	7.7	1620	10.3	300	63		

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and EC Series model nomenclature, refer to pages 67 and 73 respectively.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust).

** Based on critical speed of screw specification.

240 Vac Performance Data

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)	Cylinder Bore Size (EC)	
EC4	48	EC4-AKM42G-■■■■-10-25B *	AKD-X00606	108	52.5	395	36.1	402	52.5	300	80
	49	EC4-AKM42G-■■■■-15-25B	AKD-X00606	143	47.3	593	24.1	603	50.0	300	80
	50	EC4-AKM42G-■■■■-20-25B	AKD-X00606	190	35.4	791	18.1	804	36.0	450	80
	51	EC4-AKM42G-■■■■-50-25B	AKD-X00606	580	5.1	1940	5.1	1960	5.1	1500	80
	52	EC4-AKM42G-■■■■-100-25B	AKD-X00606	1130	2.6	2700	2.6	2700	2.6	1500	80
	53	EC4-AKM42G-■■■■-10-10B *	AKD-X00606	270	21.0	989	14.4	1005	15.3	450	80
	54	EC4-AKM42G-■■■■-15-10B	AKD-X00606	357	18.9	1480	9.6	1500	15.3	450	80
	55	EC4-AKM42G-■■■■-20-10B	AKD-X00606	476	14.2	1980	7.2	2010	14.5	450	80
	56	EC4-AKM42G-■■■■-50-10B	AKD-X00606	1440	2.1	2700	2.1	2700	2.1	1500	80
	57	EC4-AKM42G-■■■■-100-10B	AKD-X00606	2700	1.0	2700	1.0	2700	1.0	1500	80
	58	EC4-AKM52H-■■■■-10-25B *	AKD-X00606	256	36.3	458	30.7	668	36.3	300	80
	59	EC4-AKM52H-■■■■-15-25B	AKD-X00606	384	24.2	844	18.6	1200	24.2	600	80
	60	EC4-AKM52H-■■■■-20-25B	AKD-X00606	512	18.1	874	16.7	1160	18.1	750	80
	61	EC4-AKM52H-■■■■-50-25B	AKD-X00606	1360	5.1	2700	5.1	2700	5.1	1500	80
	62	EC4-AKM52H-■■■■-100-25B	AKD-X00606	2700	2.6	2700	2.6	2700	2.6	1500	80
	63	EC4-AKM52H-■■■■-10-10B *	AKD-X00606	640	14.5	1120	13.1	1670	14.5	450	80
	64	EC4-AKM52H-■■■■-15-10B	AKD-X00606	961	9.7	2090	8.0	2700	9.7	600	80
	65	EC4-AKM52H-■■■■-20-10B	AKD-X00606	1280	7.2	2190	6.7	2700	7.2	750	80
	66	EC4-AKM52H-■■■■-50-10B	AKD-X00606	2700	2.1	2700	2.1	2700	2.1	1500	80
	67	EC4-AKM52L-■■■■-10-25B *	AKD-X01206	240	52.5	422	52.5	700	52.5	300	80
	68	EC4-AKM52L-■■■■-15-25B	AKD-X01206	287	48.3	741	42.9	1090	48.3	300	80
	69	EC4-AKM52L-■■■■-20-25B	AKD-X01206	368	36.3	789	32.2	1040	36.3	450	80
	70	EC4-AKM52L-■■■■-50-25B	AKD-X01206	1370	5.1	2370	5.1	2370	5.1	1500	80
	71	EC4-AKM52L-■■■■-100-25B	AKD-X01206	2700	2.6	2700	2.6	2700	2.6	1500	80
	72	EC4-AKM52L-■■■■-10-10B *	AKD-X01206	650	15.3	1110	15.3	1500	15.3	300	80
73	EC4-AKM52L-■■■■-15-10B	AKD-X01206	860	15.3	1870	15.3	2700	15.3	300	80	
74	EC4-AKM52L-■■■■-20-10B	AKD-X01206	956	14.5	1970	13.0	2610	14.5	300	80	
75	EC4-AKM52L-■■■■-50-10B	AKD-X01206	2700	2.1	2700	2.1	2700	2.1	1500	80	
EC5	76	EC5-AKM42G-■■■■-10-32B *	AKD-X00606	88	52.5	309	46.3	314	52.5	450	100
	77	EC5-AKM42G-■■■■-15-32B	AKD-X00606	121	52.5	463	30.8	471	52.5	450	100
	78	EC5-AKM42G-■■■■-20-32B	AKD-X00606	149	45.4	618	23.1	628	45.4	450	100
	79	EC5-AKM42G-■■■■-50-32B	AKD-X00606	438	6.6	1530	6.6	1530	6.6	1500	100
	80	EC5-AKM42G-■■■■-100-32B	AKD-X00606	880	3.4	3000	3.4	3000	3.4	1500	100
	81	EC5-AKM42G-■■■■-10-10B *	AKD-X00606	270	15.3	989	14.4	1005	15.3	450	100
	82	EC5-AKM42G-■■■■-15-10B	AKD-X00606	400	15.3	1480	9.6	1510	15.3	450	100
	83	EC5-AKM42G-■■■■-20-10B	AKD-X00606	476	14.2	1980	7.2	2010	14.2	600	100
	84	EC5-AKM42G-■■■■-50-10B	AKD-X00606	438	6.6	1530	6.6	1530	6.6	1000	100
	85	EC5-AKM42G-■■■■-100-10B	AKD-X00606	880	3.4	3000	3.4	3000	3.4	1500	100
	86	EC5-AKM52H-■■■■-10-32B *	AKD-X00606	200	46.4	353	42.9	522	46.4	450	100
	87	EC5-AKM52H-■■■■-15-32B	AKD-X00606	300	30.9	935	2.3	935	30.9	750	100
	88	EC5-AKM52H-■■■■-20-32B	AKD-X00606	400	23.2	683	21.0	1010	23.2	750	100
	89	EC5-AKM52H-■■■■-50-32B	AKD-X00606	1080	6.6	3000	5.9	3045	6.6	1500	100
	90	EC5-AKM52H-■■■■-100-32B	AKD-X00606	2070	3.4	3630	3.4	3630	3.4	1500	100
	91	EC5-AKM52H-■■■■-10-10B *	AKD-X00606	641	14.5	1130	13.1	1670	14.5	450	100
	92	EC5-AKM52H-■■■■-15-10B	AKD-X00606	961	9.7	2080	8.0	3000	9.7	750	100
	93	EC5-AKM52H-■■■■-20-10B	AKD-X00606	1281	7.3	2180	6.7	3000	7.3	750	100
	94	EC5-AKM52H-■■■■-50-10B	AKD-X00606	3400	2.1	5620	2.1	5620	2.1	1500	100
	95	EC5-AKM52H-■■■■-100-10B	AKD-X00606	5620	1.0	5620	1.0	5620	1.0	1500	100
	96	EC5-AKM52L-■■■■-15-32B	AKD-X01206	261	52.5	580	52.5	853	52.5	450	100
	97	EC5-AKM52L-■■■■-20-32B	AKD-X01206	299	46.4	616	41.0	911	46.4	450	100
	98	EC5-AKM52L-■■■■-15-10B	AKD-X01206	860	15.3	1890	15.3	2730	15.3	450	100
	99	EC5-AKM52L-■■■■-20-10B	AKD-X01206	956	14.5	1970	12.8	2610	14.5	450	100

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and EC Series model nomenclature, refer to pages 67 and 73 respectively.

Ratings are based on the AKM servomotor and the matching AKD servo drive. Specifications are based on 240 Vac, 3 phase voltage supply.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust) ** Based on critical speed of screw specification.

Rodless Actuators R-Series



The name rodless actuator comes from this technology's close relationship to electric cylinders, sharing many of the same components. Rather than having a rod, rodless actuators incorporate a carriage supported by linear bearings. Where electric cylinders are designed to extend in and out of the work area delivering force or thrust, rodless actuators are designed to be load carrying mechanisms (up to 300 lb) incorporating ballscrews, leadscrews, or belt drive transmissions with optional integrated gearheads.

Rodless actuators also share many of the fundamental design characteristics of precision positioning tables. Precision tables are designed to carry larger payloads and deliver superior repeatability and accuracy. Rodless actuators offer longer travels and higher speeds at a lower price. Screw driven rodless actuators are also thrust-producing devices that are best for axial force applications where the space is limited and a payload must also be supported or carried. As individual components, rodless actuators are not well suited for moment loading; however, they can be effectively combined into complete Cartesian systems for some multi-axis applications. For higher speed, lower thrust applications, rodless actuators can be repeatability-driven with a timing belt instead of a screw.

Kollmorgen has combined the broad product offering of the R-Series rodless actuators with the industry-leading AKM servomotors and AKD servo drives. The R-Series of rodless actuators offer a wide range of available thrusts in standard units with three basic frame sizes (R2A, R3, R4).

Rodless actuators offer longer travels (up to 108") and higher speeds (belt drives up to a maximum speed of 120 in/sec). Integrated geared options provide the ability to increase thrust capacity for lower speed applications leveraging the speed capacity of servo systems.

Multiple servomotor options are available for the product line, ranging from NEMA 23 size to NEMA 42 size servos. The combination with the AKM servomotor enables the use of various feedback devices including sine-encoder and the low-cost but high-performance Smart Feedback Device (SFD) when used with the AKD servo drive.

The AKM servomotor comes mounted on the rodless actuators as specified by the rodless actuator part number. This eliminates time to match the motor to the electric cylinder and eliminates potential mechanical incompatibility.

The operation of rodless actuators is similar to the electric cylinders described earlier. However, instead of an extending rod, a rodless unit features a moving carriage supported by linear bearings within an extruded aluminum chassis. This gives the rodless actuator the ability to guide and support a load, as well as position it.

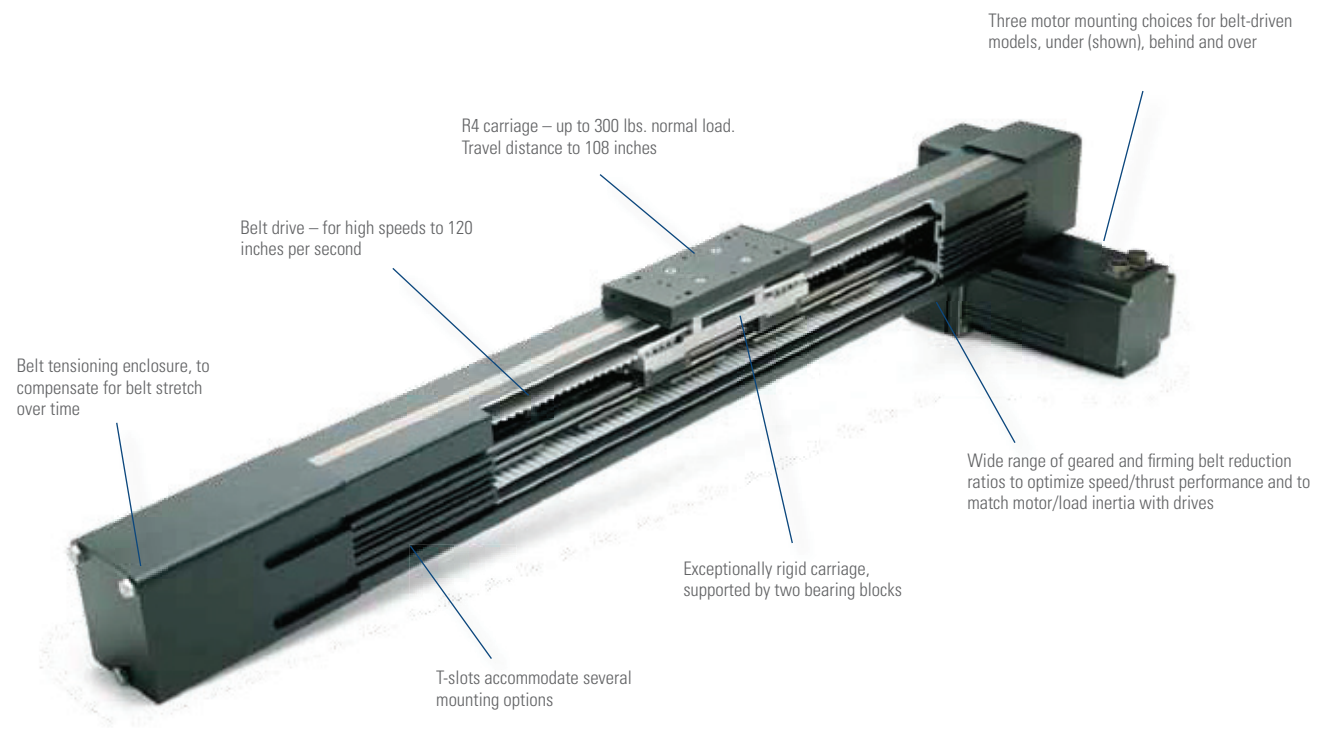
Kollmorgen rodless actuators are designed for outstanding overall performance, value, flexibility and reliability in industrial applications.

Rodless Actuators Are Preferred When:

- A low cost system is needed to both position and guide a load
- It is desired to eliminate external guides and ways
- The shortest overall work envelope (extended length equals retracted length) is required
- Multiple units will be combined into Cartesian systems
- There is a need for a compact cross-sectional linear positioning system

Typical Construction

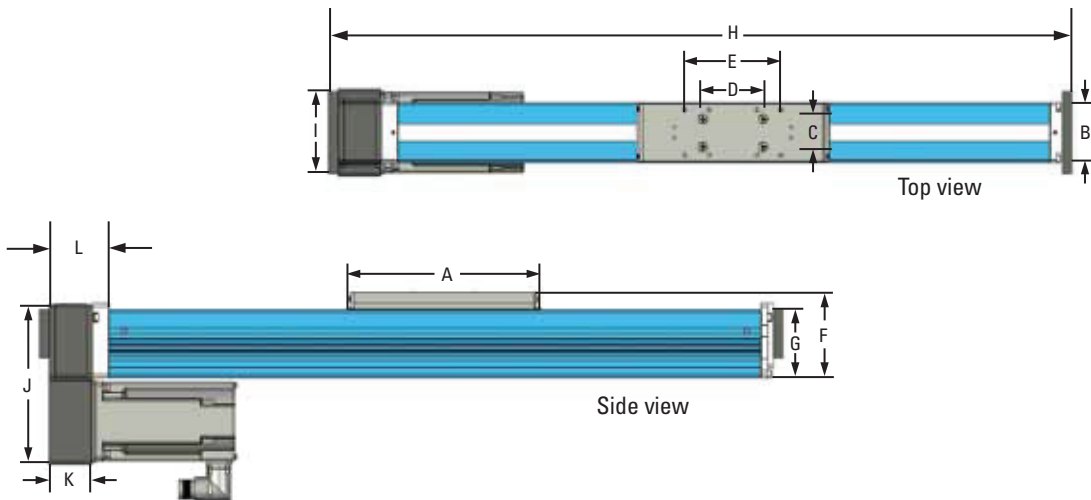
(R4 belt-driven cutaway shown)



Rodless Actuators R-Series

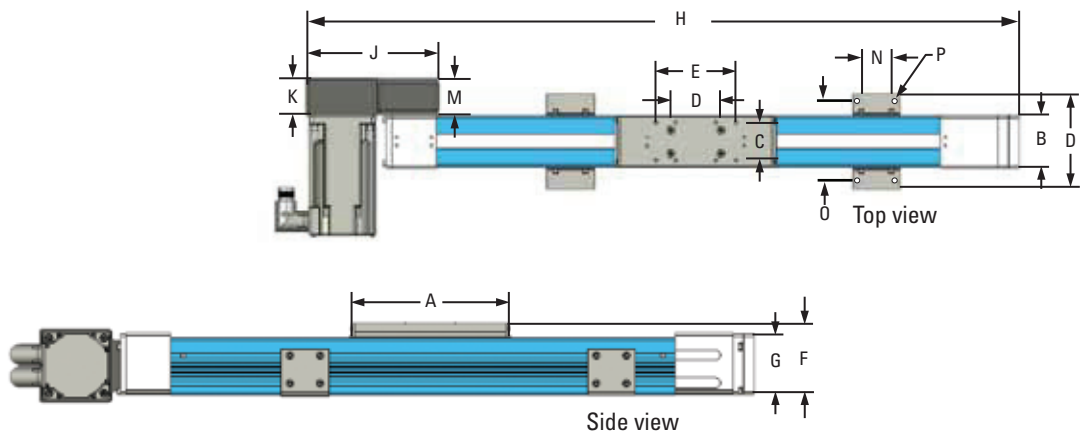
R3 Screw Drive

R3 screw drive with AKM42, parallel below motor orientation and flange mounting shown.



R3 Belt Drive

R3 belt drive with AKM42, behind left motor orientation and angle bracket feet shown.



Carriage Mounting Features

	Metric Version (mm)	English Version (inch)
RA2	8 x M5 x 0.8 x 8.0 deep	8 x 10-32 UNF x 0.31 deep
R3	8 x M5 x 0.8 x 9.6 deep	8 x 10-32 UNF x 0.38 deep
R4	4 x M6 x 1 x 12 deep	4 x 1/4-20 x 0.50 deep

Dimension Data

	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
RA2	210 (8.25)	50.8 (2.00)	31.8 (1.25)	50.8 (2.00)	101.6 (4.00)
R3	197 (7.76)	63.5 (2.50)	47.6 (1.88)	50.8 (2.00)	101.6 (4.00)
R4	197 (7.76)	92.2 (3.63)	63.5 (2.50)	NA	127.0 (5.00)

	F	G	H (Screw)	H (Belt)
	mm (in)	mm (in)	mm (in)	mm (in)
RA2	71.9 (2.83)	50.8 (2.00)	"S" + 345.3 (13.59)	"S" + 378.3 (14.89)
R3	88.8 (3.50)	71.5 (2.82)	"S" + 326.4 (12.85)	"S" + 522.0 (20.55)
R4	71.9 (2.83)	108.0 (4.25)	"S" + 411.8 (16.21)	"S" + 578.6 (22.78)

S = stroke

	I	J	K	L
	mm (in)	mm (in)	mm (in)	mm (in)
RA2	72.1 (2.84)	123.2 (4.85)	43.0 (1.69)	90.7 (3.57)
R3	91.4 (3.60)	168.9 (6.65)	45.5 (1.79)	88.1 (3.47)
R4	127.0 (5.00)	220.7 (8.69)	71.9 (2.83)	147.8 (5.82)

	M	N	O	P
	mm (in)	mm (in)	mm (in)	mm (in)
RA2	50.1 (1.97)	NA	88.8 (3.50)	8.7 (0.34) thru
R3	45.5 (1.79)	47.6 (1.88)	101.6 (4.00)	5.5 (0.22) thru
R4	71.9 (2.83)	63.5 (2.50)	127.0 (5.00)	7.0 (0.28) thru

Rodless Actuators R-Series

General Specifications

Series	R2A			R3			R4	
Std max stroke length (in)	72			108			108	
Cross section (in)	2 x 2			2.5 x 2.8			3.6 x 4.25	
Guide type	Roller Guides			Profile Rail			Profile Rail	
Drive type	Ballscrew	Lead Screw	Belt	Ballscrew	Lead Screw	Belt	Ballscrew	Belt
Screw leads (in/rev)	0.5, 0.2	0.2, 0.125	n/a	0.5, 0.2	0.2, 0.125	n/a	1, 0.25	n/a
Nominal screw diameter (in)	0.625	0.625	n/a	0.625	0.625	n/a	1	n/a
Brushless servomotor	AKM23, NEMA 23			AKM23, NEMA 23, AKM42, NEMA 34			n/a	
Max thrust (lb)	100		72	300		200	700	300
Max velocity (in/sec)	30		80	30		120	40	120
Max carriage load								
Normal (lb)	50			100			300	
Roll moment (lb-in)	50			300			600	
Pitch moment (lb-in)	100			500			1000	
Repeatability (in)	+/-0.001		+/-0.010	+/-0.001		+/-0.010	+/-0.001	+/-0.010
Max duty cycle (speed, load dependent)	100%	60%	100%	100%	60%	100%	100%	100%
Limit sensors	Optional							
Std operating temperature range	-20 deg F to 140 deg F (-28 deg C to 60 deg C)							
Moisture/contamination	IP 44 rated: Splash-proof, protected against ingress of solid particles greater than 0.040 [1 mm] diameter.*							

240 Vac Performance Data

Sys #	Rodless Actuator-Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (in)	
R2A	1	R2A-AKM23D-10-2B*	AKD-X00306	70	30	100	30	100	30	18
	2	R2A-AKM23D-15-2B	AKD-X00306	100	20	100	20	100	20	24
	3	R2A-AKM23D-20-2B	AKD-X00306	100	15	100	15	100	15	30
	4	R2A-AKM23D-10-5B	AKD-X00306	100	12	100	12	100	12	18
	5	R2A-AKM23D-15-5B	AKD-X00306	100	8.0	100	8.0	100	8.0	24
	6	R2A-AKM23D-20-5B	AKD-X00306	100	6.0	100	6.0	100	6.0	30
	7	R2A-AKM23D-10-5A*	AKD-X00306	79	12	100	12	100	12	12
	8	R2A-AKM23D-15-5A	AKD-X00306	100	8.0	100	8.0	100	8.0	18
	9	R2A-AKM23D-20-5A	AKD-X00306	100	6.0	100	6.0	100	6.0	24
	10	R2A-AKM23D-10-T*	AKD-X00306	7.0	80	40	80	40	80	72
	11	R2A-AKM23D-15-T	AKD-X00306	13	80	64	80	64	80	72
	12	R2A-AKM23D-20-T	AKD-X00306	19	80	78	80	87	80	72
R3	13	R3-AKM23D-10-2B*	AKD-X00306	71	30	269	25	275	30	18
	14	R3-AKM23D-15-2B	AKD-X00306	110	20	300	20	300	20	24
	15	R3-AKM23D-20-2B	AKD-X00306	148	15	300	15	300	15	30
	16	R3-AKM23D-50-2B	AKD-X00306	300	6.0	300	6.0	300	6.0	48
	17	R3-AKM23D-10-5B*	AKD-X00306	186	12	300	12	300	12.0	18
	18	R3-AKM23D-15-5B	AKD-X00306	283	8.0	300	8.0	300	8.0	24
	19	R3-AKM23D-20-5B	AKD-X00306	300	6.0	300	6.0	300	6.0	30
	20	R3-AKM23D-50-5B	AKD-X00306	300	2.4	300	2.4	300	2.4	48
	21	R3-AKM23D-10-5A*	AKD-X00306	80	12	250	12	300	12	12
	22	R3-AKM23D-15-5A	AKD-X00306	122	8.0	300	8.0	300	8.0	18
	23	R3-AKM23D-20-5A	AKD-X00306	165	6.0	300	6.0	300	6.0	24
	24	R3-AKM23D-50-5A	AKD-X00306	300	2.4	300	2.4	300	2.4	42
	25	R3-AKM23D-10-8A*	AKD-X00306	131	7.5	300	7.5	300	7.5	18
	26	R3-AKM23D-15-8A	AKD-X00306	199	5.0	300	5.0	300	5.0	30
	27	R3-AKM23D-20-8A*	AKD-X00306	267	3.8	300	3.8	300	3.7	30
	28	R3-AKM23D-50-8A	AKD-X00306	300	1.5	300	1.5	300	1.5	48
	29	R3-AKM23D-10-T*	AKD-X00306	1.2	110	18	110	18	110	108

Note 1: Refer to page 66 for matching cables. Note 2: For complete AKD and R-Series model nomenclature, refer to pages 67 and 75 respectively.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust).

240 Vac Performance Data

Sys #	Rodless Actuators-Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (in)	
R3	30	R3-AKM23D-■■■■-15-T	AKD-X00306	4.4	110	29	110	29	110	108
	31	R3-AKM23D-■■■■-20-T	AKD-X00306	8.0	110	40	110	41	110	108
	32	R3-AKM23D-■■■■-50-T	AKD-X00306	20	72	90	72	92	72	108
	33	R3-AKM23D-■■■■-70-T	AKD-X00306	30	51	128	51	131	51	108
	34	R3-AKM42G-■■■■-10-2B	AKD-X00606	200	30	300	30	300	30	18
	35	R3-AKM42G-■■■■-15-2B	AKD-X00606	300	20	300	20	300	20	24
	36	R3-AKM42G-■■■■-20-2B	AKD-X00606	300	15	300	15	300	15	30
	37	R3-AKM42G-■■■■-50-2B	AKD-X00606	300	6.0	300	6.0	300	6.0	48
	38	R3-AKM42G-■■■■-10-5B	AKD-X00606	300	12	300	12	300	12	18
	39	R3-AKM42G-■■■■-15-5B	AKD-X00606	300	8.0	300	8.0	300	8.0	24
	40	R3-AKM42G-■■■■-20-5B	AKD-X00606	300	6.0	300	6.0	300	6.0	30
	41	R3-AKM42G-■■■■-50-5B	AKD-X00606	300	2.4	300	2.4	300	2.4	48
	42	R3-AKM42G-■■■■-10-5A	AKD-X00606	221	12	300	12	300	12	12
	43	R3-AKM42G-■■■■-15-5A	AKD-X00606	300	8.0	300	8.0	300	8.0	18
	44	R3-AKM42G-■■■■-20-5A	AKD-X00606	300	6.0	300	6.0	300	6.0	24
	45	R3-AKM42G-■■■■-50-5A	AKD-X00606	300	2.4	300	2.4	300	2.4	42
	46	R3-AKM42G-■■■■-10-8A	AKD-X00606	300	7.5	300	7.5	300	7.5	18
	47	R3-AKM42G-■■■■-15-8A	AKD-X00606	300	5.0	300	5.0	300	5.0	24
	48	R3-AKM42G-■■■■-20-8A	AKD-X00606	300	3.8	300	3.8	300	3.8	30
	49	R3-AKM42G-■■■■-50-8A	AKD-X00606	300	1.5	300	1.5	300	1.5	60
	50	R3-AKM42G-■■■■-10-T	AKD-X00606	15	110	59	110	60	110	108
	51	R3-AKM42G-■■■■-15-T	AKD-X00606	25	110	92	110	93	110	108
	52	R3-AKM42G-■■■■-20-T	AKD-X00606	32	110	124	110	126	110	108
	53	R3-AKM42G-■■■■-50-T	AKD-X00606	66	72	200	72	200	72	108
54	R3-AKM42G-■■■■-70-T	AKD-X00606	94	51	200	51	200	51	108	
R4	55	R4-AKM42G-■■■■-10-1B	AKD-X00606	103	40	384	37	390	40	36
	56	R4-AKM42G-■■■■-15-1B	AKD-X00606	160	27	578	25	588	27	48
	57	R4-AKM42G-■■■■-20-1B	AKD-X00606	210	20	700	20	700	20	60
	58	R4-AKM42G-■■■■-50-1B	AKD-X00606	460	7.8	700	7.8	700	7.8	96
	59	R4-AKM42G-■■■■-100-1B	AKD-X00606	700	4.0	700	4.0	700	4.0	108
	60	R4-AKM42G-■■■■-10-4B	AKD-X00606	440	10.0	700	10.0	700	10	36
	61	R4-AKM42G-■■■■-15-4B	AKD-X00606	630	6.7	700	6.7	700	6.7	48
	62	R4-AKM42G-■■■■-20-4B	AKD-X00606	700	6.7	700	6.7	700	6.7	48
	63	R4-AKM42G-■■■■-50-4B	AKD-X00606	700	6.7	700	6.7	700	6.7	48
	64	R4-AKM42G-■■■■-10-T	AKD-X00606	11	110	47	110	47	110	108
	65	R4-AKM42G-■■■■-15-T	AKD-X00606	18	110	73	110	74	110	108
	66	R4-AKM42G-■■■■-20-T	AKD-X00606	25	110	98	110	100	110	108
	67	R4-AKM42G-■■■■-30-T	AKD-X00606	38	100	150	92	153	100	108
	68	R4-AKM42G-■■■■-50-T	AKD-X00606	56	59	215	54	219	59	108
	69	R4-AKM42G-■■■■-100-T	AKD-X00606	118	30	300	30	300	30	108
	70	R4-AKM52H-■■■■-10-1B	AKD-X00606	246	37	700	37	700	37	36
	71	R4-AKM52H-■■■■-15-1B	AKD-X00606	372	25	700	25	700	25	48
	72	R4-AKM52H-■■■■-20-1B	AKD-X00606	498	18	700	18	700	18	60
	73	R4-AKM52H-■■■■-50-1B	AKD-X00606	700	7.8	700	7.8	700	7.8	96
	74	R4-AKM52H-■■■■-10-4B	AKD-X00606	700	9.2	700	9.2	700	9.2	36
	75	R4-AKM52H-■■■■-15-4B	AKD-X00606	700	6.7	700	6.7	700	6.7	48
	76	R4-AKM52H-■■■■-20-4B	AKD-X00606	700	4.9	700	4.9	700	4.9	60
	77	R4-AKM52H-■■■■-50-4B	AKD-X00606	700	1.9	700	1.9	700	1.9	96
	78	R4-AKM52H-■■■■-10-T	AKD-X00606	30	110	97	110	99	110	108
	79	R4-AKM52H-■■■■-15-T	AKD-X00606	51	110	149	110	152	110	108
	80	R4-AKM52H-■■■■-20-T	AKD-X00606	65	110	201	90	204	110	108
	81	R4-AKM52H-■■■■-30-T	AKD-X00606	95	92	300	60	300	95	108
	82	R4-AKM52H-■■■■-50-T	AKD-X00606	137	54	300	44	300	54	108
	83	R4-AKM52H-■■■■-100-T	AKD-X00606	275	27	300	27	300	27	108

Note 1: Refer to page 66 for matching cables. Note 2: For complete AKD and R-Series model nomenclature, refer to pages 67 and 75 respectively.

Micron™ TRUE Planetary™ Gearhead

Helical gears are known for their quiet and smooth operation along with their ability to transmit higher loads than spur gears. Both of these features of helical gearing result from the improved contact ratio (effective teeth in mesh) over spur gears.

A high torque, whisper quiet helical gearhead has been designed by combining the positive attributes of gear crowning and helical gearing with the planetary construction to create the smoothest operating gearhead on the market.

- Broadest product range of gearheads in the industry
- Innovative gear technology offers size and performance advantages
- RediMount™ system provides error-free and reliable installations

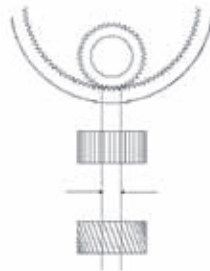
Helical Crowned TRUE Planetary™ Gearing

Features

- High torque capacity
- Low backlash
- Smooth operation
- Greater load sharing
- Whisper quiet

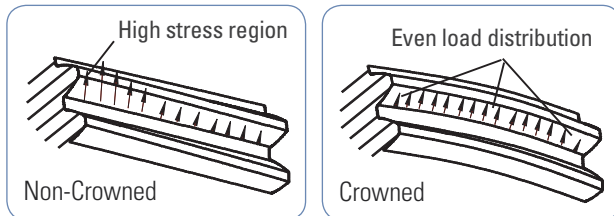
Spur vs. Helical Gearing

Typical contact ratio is 1.5 for spur gearing. Contact ratio for equivalent helical gear is 3.3 – more than double the contact ratio.



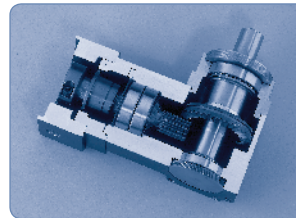
Crowned vs. Non-Crowned

Crowning optimizes the gear mesh alignment within a gear train to increase the torque capacity and reduce noise. It also enhances load distribution on the tooth flank to reduce high stress regions.

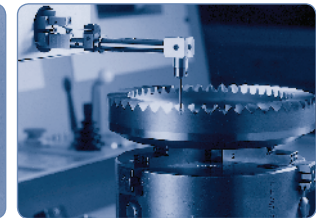


PowerTRUE™ Right Angle Gearheads

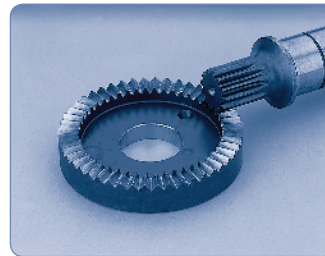
- Lower backlash from single axis mesh adjustment
- A compact design using face gear technology
- Whisper quiet operation due to high contact ratio
- Mesh ratios from 1:1 to 5:1
- Extremely efficient (98%)



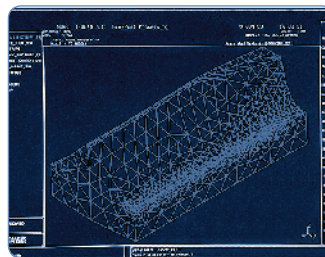
PowerTRUE™ gear technology



Computerized mapping of gear tooth profile



All Micron™ right angle gearheads use the PowerTRUE technology which increases the mesh ratio to 5:1 compared to a maximum of 3:1 typical in bevel gears.



Multiple teeth in the face gear simultaneously mesh with a standard involute pinion. The continuous tooth engagement yields a high contact ratio between the gear and the pinion, increasing torque and efficiency.

NEMA TRUE™		True planetary gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.						
Inline	Frame Size		Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
	English	Metric	1 Stage	2 Stage				
Size 17	NEMA 17	42 mm	170	170	1 Stage	3, 4, 5, 7, 10	93%	13 (8)*
Size 23 / 60	NEMA 23	60 mm	250	275				
Size 34 / 90	NEMA 34	90 mm	700	850	2 Stage	15, 20, 25, 30, 40, 50, 70, 100	88%	15 (9)*
Size 42 / 115	NEMA 42	115 mm	1000	1600				



NEMA TRUE™		True planetary gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.							
Right Angle	Frame Size		Max T Peak (lb-in)			All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
	English	Metric	1 Stage	2 Stage	3 Stage				
Size 23 / 60	NEMA 23	60 mm	360	366	366	1 Stage	1, 2, 3, 4, 5P	98%	13
Size 34 / 90	NEMA 34	90 mm	1110	1110	1110	2 Stage	5T, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	15
Size 42 / 115	NEMA 42	115 mm	2250	2250	2250	3 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	15



XTRUE™		The XTRUE Series is a new precision gearhead employing RediMount™ system that compliments our TRUE planetary gearhead line – already the largest selection of planetary gearheads in the world.						
Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)	
		1 Stage	2 Stage					
XT040	40 mm	162	299	1 Stage	3, 4, 5, 7, 10	93%	13	
XT060	60 mm	483	483					
XT080	80 mm	1460	1550					
XT120	120 mm	2640	2640	2 Stage	15, 20, 25, 30, 40, 50, 70, 100	88%	15	
XT160	160 mm	7750	7750					




EverTRUE™		EverTRUE, employing RediMount™ system, is specifically designed for 24/7 continuous running applications providing 3 times (30,000 hours) service life.						
Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)	
		1 Stage	2 Stage					
ET010	101 mm	4090	4790	1 Stage	4, 5, 7, 10	95%	4	
ET014	141 mm	9430	11,250					
ET018	182 mm	21,600	26,280	2 Stage	16, 20, 25, 28, 35, 40, 50, 70, 100	90%	5	





* High Precision, low backlash versions available, low backlash value in parenthesis (Not available in size 17).
 Note 1: Torque capacity is maximum of frame size stage design, not all ratios have the same rated torque capacity.
 Note 2: Torque capacity is the maximum allowable momentary torque for emergency stopping or heavy shock loading.
 Note 3: Ratio 5P is designed using the compact PowerTrue face gearing technology.
 Note 4: Ratio 5T is designed using a True planetary gear stage for increased torque capacity.
 Note 5: For complete gearhead model nomenclature, refer to page 76.




Micron™ TRUE Planetary™ Gearhead

DuraTRUE™	True planetary gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.							
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	DT60	60 mm	460	460	1 Stage	3, 4, 5, 7, 10	93%	9
	DT90	90 mm	1480	1480				
	DT115	115 mm	2510	2510	2 Stage	15, 20, 25, 30, 40, 50, 70, 100	88%	8
	DT142	142 mm	7380	7380				


DuraTRUE™	True planetary right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.							
	Right Angle	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	DT60	60 mm	460	460	1 Stage	5, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	9
	DT90	90 mm	1480	1480				
	DT115	115 mm	2510	2510	2 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	8
	DT142	142 mm	7380	7380				


Slimline	Slimline right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Face gear technology for compact right angle construction. Dual shaft output version also available.								
	Right Angle	Frame Size Metric	Max T Peak (lb-in)			All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage	3 Stage				
	DT60S	60 mm	460	400	400	1 Stage	1, 2, 3, 4, 5P	98%	8
	DT90S	90 mm	1240	1240	1240	2 Stage	5T, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	9
	DT115S	115 mm	2260	2500	2500	3 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	9
	DT142S	142 mm	5500	6920	7450				

Hollow Shaft	Hollow shaft right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Large diameter/ bolt circle for direct mechanical interface. Face gear technology for compact right angle construction.								
	Right Angle	Frame Size Metric	Max T Peak (lb-in)			All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage	3 Stage				
	DT90H	90 mm	1240	1240	1240	1 Stage	1, 2, 3, 4, 5P	98%	8
	DT115H	115 mm	2500	2500	2500	2 Stage	5T, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	9
	DT142H	142 mm	7660	7660	7660	3 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	9


Note 1: Torque Capacity is maximum of frame size stage design, not all ratios have the same rated torque capacity.
 Note 2: Torque Capacity is the maximum allowable momentary torque for emergency stopping or heavy shock loading.
 Note 3: Ratio 5P is designed using the compact PowerTrue face gearing technology.
 Note 4: Ratio 5T is designed using a True planetary gear stage for increased torque capacity.
 Note 5: For complete gearhead model nomenclature, refer to page 76.




ValueTRUE™	Helical True planetary gearhead, flange mount design with stainless steel housing employing RediMount™ system.							
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	VT006	61 mm	800	910	1 Stage	4, 5, 7, 10	95%	4
	VT075	75 mm	1420	1630				
	VT090	90 mm	1420	1630				
	VT010	101 mm	4090	4790				
	VT115	115 mm	4090	4790				
	VT014	141 mm	9430	11,250	2 Stage	16, 20, 25, 28, 35, 40, 50, 70, 100	93%	5
	VT018	182 mm	21,600	26,280				
	VT022	220 mm	36,980	44,000				

ValueTRUE™	Helical True planetary gearhead, flange mount design with stainless steel housing employing RediMount™ system.							
	Right Angle	Frame Size Metric	Max T Peak (lb-in)		All Sizes*	Gear Ratios Available	Efficiency	Backlash (arc-min)
			2 Stage					
	VTR006	61 mm	870		2 Stage	4, 5, 8, 10, 12, 14, 15, 16, 20, 25, 28, 30, 35, 40, 50	93%	5
	VTR075	75 mm	1570					
	VTR090	90 mm	1570					
	VTR010	101 mm	4580					
	VTR115	115 mm	4580					
	VTR014	141 mm	10,670					
	VTR018	182 mm	24,780					

* 4 and 5:1 ratios not available with VTR006-VTR090.

UltraTRUE™	Helical True planetary inline gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Stainless steel housing, gear-path hobbled into stainless steel housing.							
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	UT006	61 mm	890	1010	1 Stage	4, 5, 7, 10	95%	4
	UT075	75 mm	1580	1810				
	UT090	90 mm	1580	1810				
	UT010	101 mm	4540	5330				
	UT115	115 mm	4540	5330				
	UT014	141 mm	10,480	12,500	2 Stage	16, 20, 25, 28, 35, 40, 50, 70, 100	90%	5
	UT018	182 mm	24,101	29,200				
	UT022	220 mm	41,090	48,890				

UltraTRUE™	Helical True planetary right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Stainless steel housing, gear-path hobbled into stainless steel housing.							
	Right Angle	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	UTR006	61 mm	450	970	1 Stage	1, 2, 3, 4, 5	98%	4
	UTR075	75 mm	1410	1740				
	UTR090	90 mm	1410	1740				
	UTR010	101 mm	2850	5080				
	UTR115	115 mm	2850	5080				
	UTR014	141 mm	6270	11,860	2 Stage	8, 10, 12, 14, 15, 16, 20, 25, 28, 30, 35, 40, 50	93%	5
	UTR018	182 mm	16,910	27,530				

Note 1: Torque capacity is maximum of frame size stage design, not all ratios have the same rated torque capacity.
 Note 2: Torque capacity is the maximum allowable momentary torque for emergency stopping or heavy shock loading.
 Note 3: Ratio 5P is designed using the compact PowerTrue face gearing technology.
 Note 4: Ratio 5T is designed using a True planetary gear stage for increased torque capacity.
 Note 5: For complete gearhead model nomenclature, refer to page 76.

