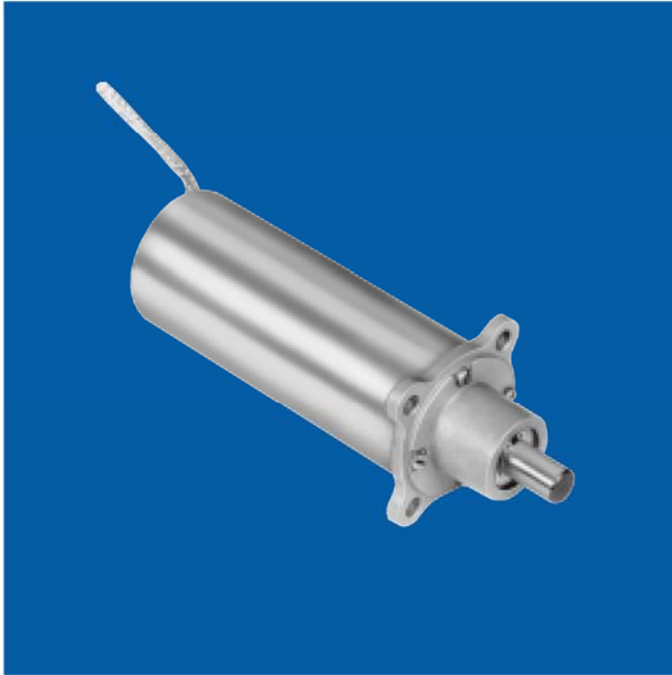


LL GEARMOTORS

DC Permanent Magnet Planetary Gearmotors

A-2030



general design specification

torque rating: Up to 1,250 oz. in. maximum continuous torque

weight: 6 to 15 ounces depending on ratio

gears: Planetary gearing system. All gears are heat treated for consistently reliable performance and long life

shaft: Precision-ground, No. 416 nitrided stainless steel.
Options: length, smaller diameter, flats, pinions, gears, holes (through or tapped), threaded ends and tapers. Type of steel used may change depending upon variation selected

backlash: Varies with reduction but average unit will have less than 3°

gear inertia: 4.2×10^{-6} oz. in. sec.² @ input max

bearings: .250" dia. shaft uses double-shielded, life-lubricated ball bearings for -55°C to +85°C operation. A .313" dia. shaft uses needle bearings. Special lubricants available for temperature extremes

cables/leads: 8" shielded cable per MIL-C-7078 #22 AWG conductors per MIL-W-16878/4

cover: Brass

mounting flange: Die-cast aluminum

marking: Per MIL-STD-130

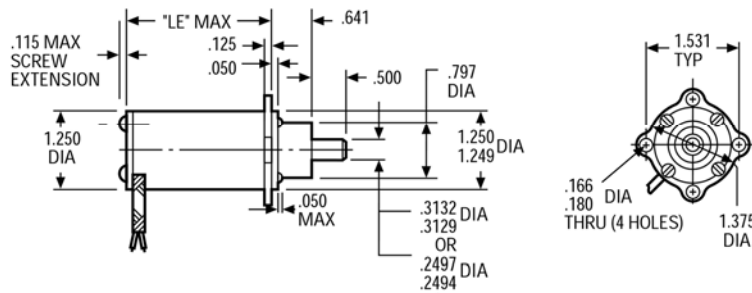
life: 1,000 hours continuous duty for 27 VDC units

options available:

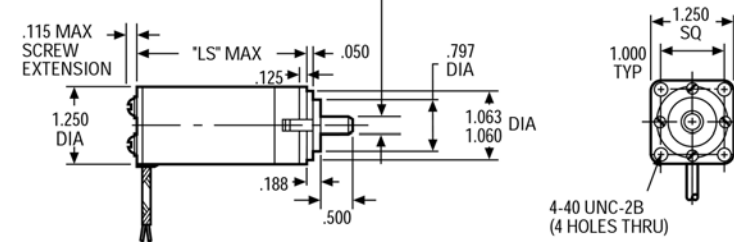
- Internal slip clutch
- RFI filters to meet MIL-I-6181, MIL-I-26600 or MIL-STD-461
- Integral tachometer generators (See A-2016 for details)
- Electromechanical brakes

Dimensions

EARED FLANGE



SQUARE FLANGE



A-2030

Standard Part Numbers and Data Type LL

SPEED REDUCTION RATIO	MAXIMUM CONTINUOUS TORQUE (oz. in.)	TORQUE MULTIPLIER RATIO	TYPE LL STANDARD PART NUMBER PREFIX*				dim. LE (in.)	dim. LS (in.)
			EARED FLANGE		SQUARE FLANGE			
			.313" shaft	.260" shaft	.313" shaft	.260" shaft		
18.78:1 27.94:1	20 29	12.0 17.0	5A501 5A503	5A2332 5A2333	5A502 5A504	5A2352 5A2353	2.79	3.23
81.37:1 121.10:1 147.70:1	70 105 128	41.0 62.0 75.0	5A505 5A507 5A509	5A2334 5A2335 5A2336	5A506 5A508 5A510	5A2354 5A2355 5A2356	2.92	3.38
352.60:1 524.60:1 639.90:1 780.60:1	247 366 445 544	145.0 215.0 262.0 320.0	5A511 5A513 5A515 5A517	5A2337 5A2338 5A2339 5A2340	5A512 5A514 5A516 5A518	5A2357 5A2358 5A2359 5A2360	3.19	3.64
1,528.00:1 2,273.00:1 3,382.00:1 4,126.00:1	850 ** 1,250 ** 1,250 ** 1,250 **	500.0 740.0 1,100 1,350	5A519 5A521 5A523 5A525	5A2341 5A2342 5A2343 5A2344	5A520 5A522 5A524 5A526	5A2361 5A2362 5A2363 5A2364	3.56	4.02
6,621.00:1 9,851.00:1 12,016.00:1 17,879.00:1 21,808.00:1	1,250 ** 1,250 ** 1,250 ** 1,250 ** 1,250 **	1,730 2,580 3,150 4,700 5,700	5A527 5A529 5A531 5A533 5A535	5A2345 5A2346 5A2347 5A2348 5A2349	5A528 5A530 5A532 5A534 5A536	5A2365 5A2366 5A2367 5A2368 5A2369	3.69	4.14

.250" dia. shaft units limited to 600 oz. in. maximum continuous duty torque. Use .313" dia. shaft if torque requirements exceed this value
 Max Cont. Torque: The values in this column are based upon gear train strength and capability for 1,000 hrs. minimum life
 Max rated torque of motor selected x torque multiplier ratio must not exceed maximum continuous torque of gearbox
 Max Intermittent Torque = 2 x Max Cont. Torque
 Momentary Stall Torque = 5 x Max Cont. Torque (2,000 oz. in. max)
 Minimum Gearbox Efficiency = Torque Multiplier Ratio divided by Speed Reduction Ratio x 100

*When You Order

Each of the basic motor armature windings (next page) can be used with any of the gear ratios listed above. To order, state the gear train standard part number prefix, plus a motor armature winding dash number. EXAMPLE: 5A501-1 is an 18.78:1 LL gearmotor with a "-1" armature winding, 24 volts, 11,000 rpm, 1.1 oz. in. torque, etc.

Basic Motor Data Type LL

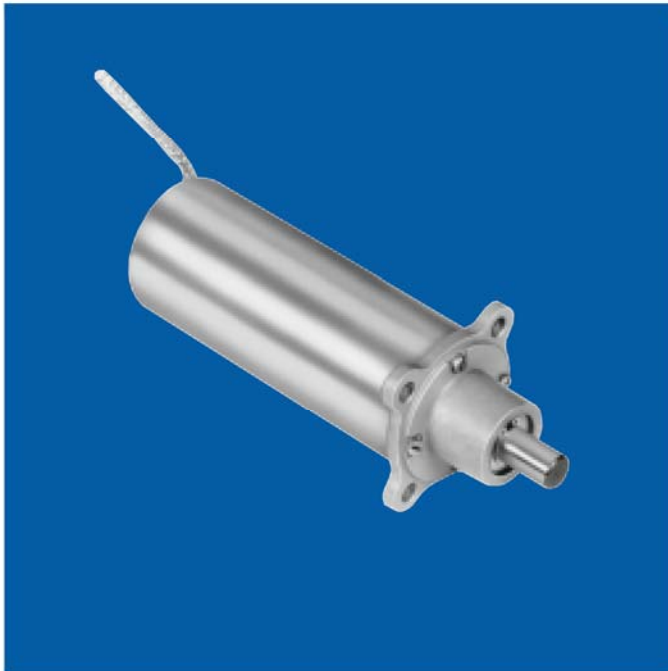
VOLTAGE (VDC)	SPEED no load (rpm)	TORQUE		CURRENT			CONSTANTS		WINDING DASH NUMBER*
		max rated (oz. in.)	** theoretical stall (oz. in.)	max no load (amps)	max rated load (amps)	** nominal stall (amps)	K _T (oz. in./amp)	ARMATURE R (ohms)	
6	7,600-9,400	1.60	5.5	.78	2.00	7.00	.90	.80	-5
12	11,500-14,000	1.10	8.7	.63	1.70	5.30	1.20	1.35	-24
12	9,000-11,000	1.70	6.9	.47	1.50	5.30	1.51	2.13	-3
24	16,000-19,000	.75	11.0	.45	1.00	7.30	1.74	3.12	-21
24	14,400-17,000	.85	11.0	.37	.85	6.50	1.96	3.50	-4
24	12,000-14,500	1.00	8.7	.33	.80	4.50	2.26	5.08	-7
24	10,400-12,300	1.10	6.9	.28	.75	3.00	2.71	7.68	-1
24	7,400-8,900	1.60	5.5	.20	.70	1.70	3.77	13.43	-2
24	6,900-8,200	1.80	4.3	.19	.65	1.20	4.05	18.28	-8
24	6,200-7,400	1.80	3.4	.17	.60	.89	4.52	25.59	-22
24	5,200-6,200	1.20	3.4	.15	.45	.74	5.42	30.70	-10
50	7,600-9,400	1.50	5.7	.10	.25	.92	7.25	51.55	-11
75	14,000-17,000	1.00	8.6	.12	.29	1.60	6.33	45.10	-25
75	9,000-11,000	1.70	6.8	.08	.29	.85	9.36	84.10	-16
75	8,000-10,000	1.80	5.4	.07	.26	.60	10.56	119.40	-12
75	6,500-8,000	1.20	4.3	.06	.20	.37	13.58	194.00	-15
75	4,500-5,300	1.00	3.4	.05	.10	.23	16.89	303.00	-13

**Because of brush drop and field distortion, current and torque indicated will not always be attainable

MM GEARMOTORS

DC Permanent Magnet Planetary Gearmotors

A-2030



general design specification

torque rating: Up to 1,250 oz. in. maximum continuous torque

weight: 6 to 15 ounces depending on ratio

gears: Planetary gearing system. All gears are heat treated for consistently reliable performance and long life

shaft: Precision-ground, No. 416 nitrided stainless steel.

Options: length, smaller diameter, flats, pinions, gears, holes (through or tapped), threaded ends and tapers. Type of steel used may change depending upon variation selected

backlash: Varies with reduction but average unit will have less than 3°

gear inertia: 4.2×10^{-6} oz. in. sec.² @ input max

bearings: .250" dia. shaft uses double-shielded, life-lubricated ball bearings for -55°C to +85°C operation. A .313" dia. shaft uses needle bearings. Special lubricants available for temperature extremes

cables/leads: 8" shielded cable per MIL-C-7078 #22 AWG conductors per MIL-W-16878/4

cover: Brass

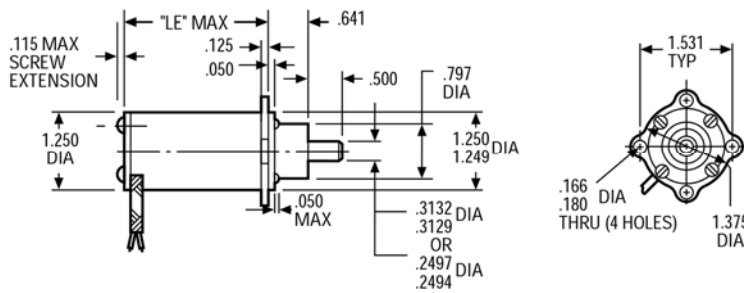
mounting flange: Die-cast aluminum

marking: Per MIL-STD-130

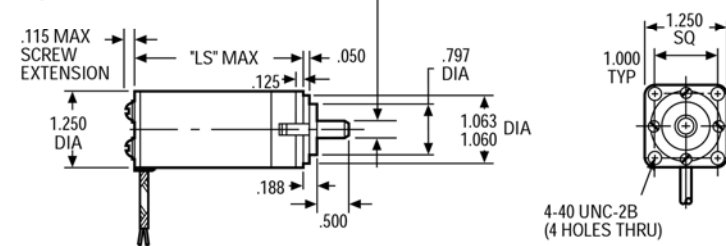
life: 1,000 hours continuous duty for 27 VDC units

Dimensions

EARED FLANGE



SQUARE FLANGE



ROTATION (VIEWED FROM SHAFT END)
 CCW - POSITIVE VOLTAGE TO RED (+), NEGATIVE VOLTAGE TO BLACK (-)
 CW - REVERSE POLARITY

NOTE: Consult factory prior to preparing spec control prints. Dimensions are for reference only

options available:

- Internal slip clutch
- RFI filters to meet MIL-I-6181, MIL-I-26600 or MIL-STD-461
- Integral tachometer generators (See A-2016 for details)
- Electromechanical brakes

A-2030

Standard Part Numbers and Data Type MM

SPEED REDUCTION RATIO	MAXIMUM CONTINUOUS TORQUE (oz. in.)	TORQUE MULTIPLIER RATIO	TYPE MM STANDARD PART NUMBER PREFIX*				dim. LE (in.)	dim. LS (in.)
			EARED FLANGE		SQUARE FLANGE			
			.313" shaft	.250" shaft	.313" shaft	.250" shaft		
18.78:1 27.94:1	12 17	12.0 17.0	5A537 5A539	5A2292 5A2293	5A538 5A540	5A2312 5A2313	2.44	2.90
81.37:1 121.10:1 147.70:1	41 62 75	41.0 62.0 75.0	5A541 5A543 5A545	5A2294 5A2295 5A2296	5A542 5A544 5A546	5A2314 5A2315 5A2316	2.56	3.02
352.60:1 524.60:1 639.90:1 780.60:1	145 215 262 320	145.0 215.0 262.0 320.0	5A547 5A549 5A551 5A553	5A2297 5A2298 5A2299 5A2300	5A548 5A550 5A552 5A554	5A2317 5A2318 5A2319 5A2320	2.83	3.29
1,528.00:1 2,273.00:1 3,382.00:1 4,126.00:1	500 740 1,100 1,250	500.0 740.0 1,100 1,350	5A555 5A557 5A559 5A561	5A2301 5A2302 5A2303 5A2304	5A556 5A558 5A560 5A562	5A2321 5A2322 5A2323 5A2324	3.20	3.66
6,621.00:1 9,851.00:1 12,016.00:1 17,879.00:1 21,808.00:1	1,250 1,250 1,250 1,250 1,250	1,730 2,580 3,150 4,700 5,700	5A563 5A565 5A567 5A569 5A571	5A2305 5A2306 5A2307 5A2308 5A2309	5A564 5A566 5A568 5A570 5A572	5A2325 5A2326 5A2327 5A2328 5A2329	3.34	3.80

*.250" dia. shaft units limited to 600 oz. in. maximum continuous duty torque. Use .313" dia. shaft if torque requirements exceed this value

Max Cont. Torque: The values in this column are based upon gear train strength and capability for 1,000 hrs. minimum life

Max rated torque of motor selected x torque multiplier ratio must not exceed maximum continuous torque of gearbox

Max Intermittent Torque - 2 x Max Cont. Torque

Momentary Stall Torque - 5 x Max Cont. Torque (2,000 oz. in. max)

Minimum Gearbox Efficiency - Torque Multiplier Ratio divided by Speed Reduction Ratio x 100

*When You Order

Each of the basic motor armature windings (bottom chart) can be used with any of the gear ratios listed above. To order, state the gear train standard part number prefix, plus a motor armature winding dash number. EXAMPLE: 5A537-1 is an 18.78:1 MM gearmotor with a "-1" armature winding, 24 volts, 17,500 rpm, 0.60 oz. in. torque, etc.

Basic Motor Data Type MM

VOLTAGE (VDC)	SPEED no load (rpm)	TORQUE		CURRENT			CONSTANTS		WINDING DASH NUMBER*
		max rated (oz. in.)	** theoretical stall (oz. in.)	max no load (amps)	max rated load (amps)	** nominal stall (amps)	K _t (oz. in./ amp)	ARMATURE R (ohms)	
6	12,000-14,000	.75	4.6	.96	2.00	9.90	.58	.66	-5
12	18,000-21,400	.50	7.4	.69	1.20	11.80	.77	1.11	-24
12	14,500-17,000	.70	5.9	.60	1.20	7.50	.97	1.75	-3
12	12,400-14,700	.75	4.6	.50	1.20	5.10	1.12	2.56	-21
12	11,000-13,000	1.00	4.6	.44	1.20	4.60	1.26	2.87	-4
24	19,200-22,800	.35	7.4	.39	.60	6.30	1.45	4.17	-7
24	16,000-19,000	.60	5.8	.31	.60	3.80	1.74	6.30	-1
24	11,500-14,000	1.00	4.6	.22	.60	2.10	2.42	11.02	-2
24	10,700-12,700	1.00	3.6	.21	.60	1.60	2.60	15.00	-8
24	9,600-11,400	1.00	2.9	.19	.50	1.10	2.90	21.00	-22
24	8,000-10,000	1.00	2.9	.16	.45	.93	3.48	25.20	-10
24	6,000-7,000	.80	2.3	.11	.30	.55	4.65	42.30	-11
50	14,300-17,000	.70	4.8	.14	.30	1.30	4.06	37.00	-25
50	9,500-11,500	1.00	3.8	.09	.30	.71	6.00	69.00	-16
50	8,000-10,000	1.00	3.0	.08	.20	.50	6.77	98.00	-12
50	6,700-8,000	.80	2.4	.06	.16	.30	8.71	159.00	-15
50	4,600-5,500	.80	1.9	.05	.12	.20	10.83	249.00	-13

**Because of brush drop and field distortion, current and torque indicated will not always be attainable
No load current in this chart applies to the gearmotor