

# BD/BL GEARMOTORS

DC Permanent Magnet Planetary Gearmotors

# A-2430



## general design specification

### torque rating:

1.875" flange:	3.00" flange:
100 lb. in., continuous duty	550 lb. in., continuous duty

### weight:

1.875" flange:	3.00" flange:
1.4 to 2.0 lbs. depending on ratio	5.6 to 6.3 lbs. depending on ratio

**gears:** Planetary gearing system. All gears are heat treated and ride on ball or roller bearings for greatest efficiency and long life

**shaft:** Carbon steel shaft per ASTM A304 with 18-tooth spline serrations per ANS B92.1-1970 heat-treated to RC 45-48 (1.875" flange) and RC 29-33 (3.00" flange)

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

**gear inertia:**  $1.4 \times 10^{-5}$  oz. in. sec.<sup>2</sup> @ input max

**bearings:** Output shaft uses double-shielded, life-lubricated ball bearings for -55°C to +85°C operation. Special lubricants available for temperature extremes

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

**mounting flange:** Cold drawn steel

**geartrain housing:** Stress-proof steel

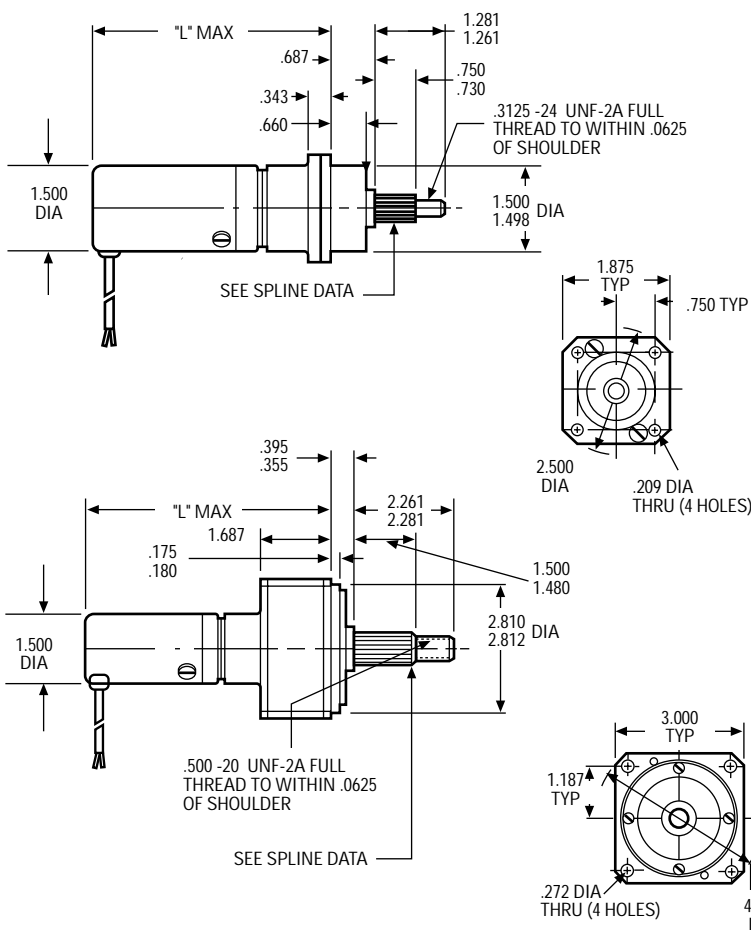
**marking:** Per MIL-STD-130

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

### options available:

- Electromechanical brakes
- RFI filters to meet MIL-I-6181, MIL-1-26600 or MIL-STD-461
- Integral tachometer generators (see Bulletins A-2415 and A-2416 for details)

## Dimensions

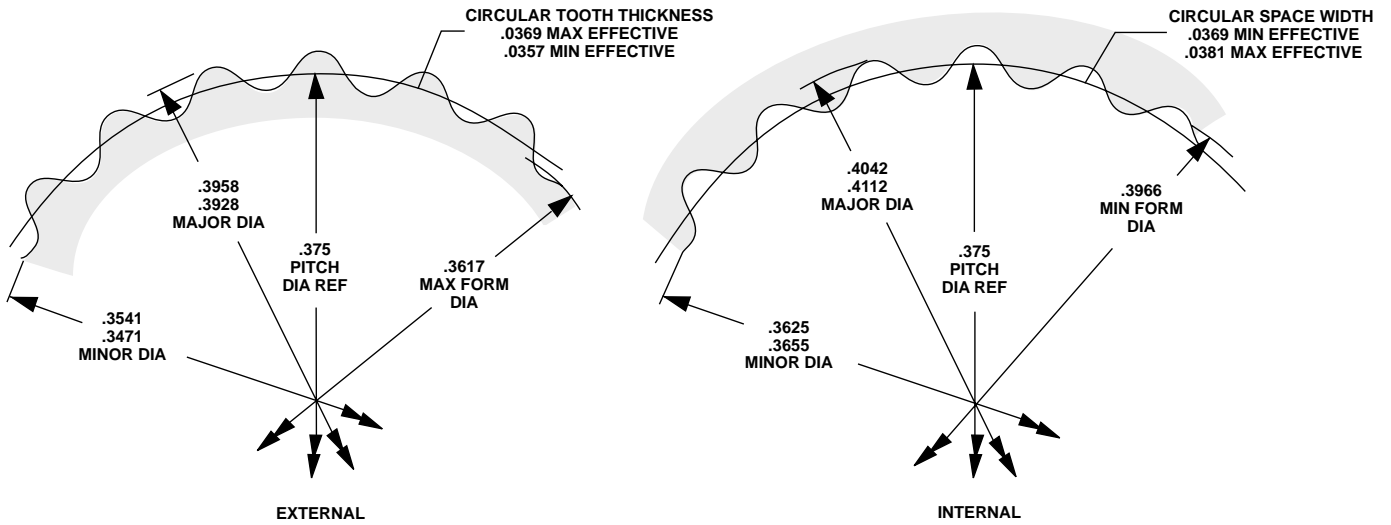


ROTATION (VIEWED FROM SHAFT END)  
 CCW - POSITIVE VOLTAGE TO RED (+), NEGATIVE VOLTAGE TO BLACK (-)  
 CW - REVERSE POLARITY

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

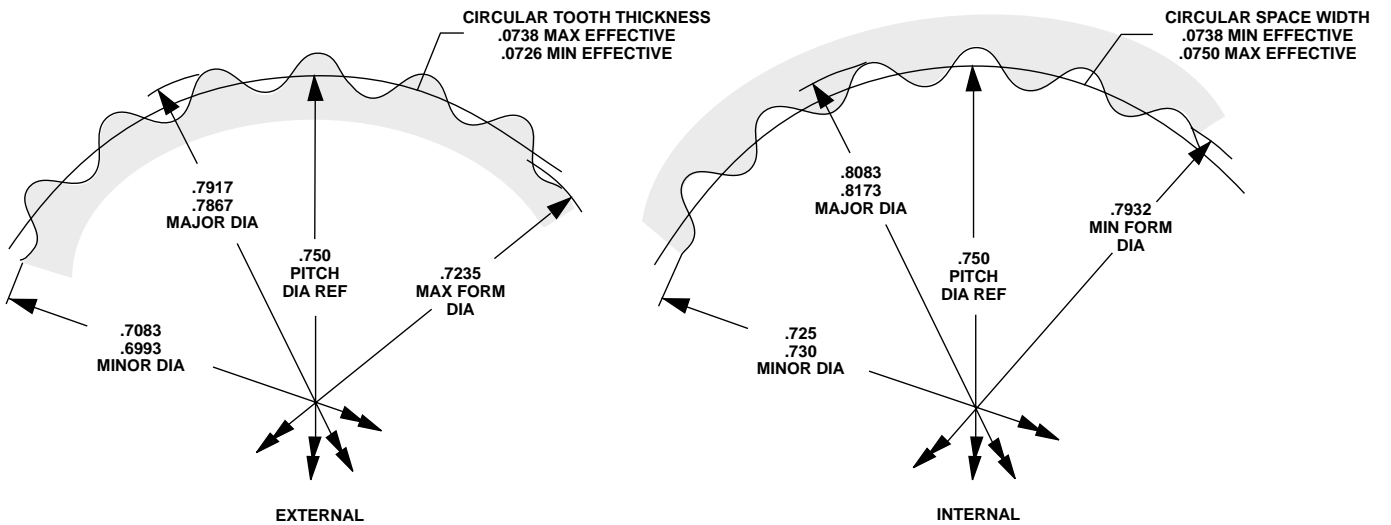
## Spline Data

### 1.875" Flange



INVOLUTE SPLINE PER ANS B92.1-1970 (GLOBE SPEC 3S95)  
 18 TEETH  
 48/96 PITCH  
 45° PRESSURE ANGLE  
 EXTERNAL SPLINE — MIN DIMENSION OVER TWO .040" DIA PINS .4398" REF  
 INTERNAL SPLINE — MAX DIMENSION BETWEEN TWO .040" DIA PINS .3174" REF  
 NOTE: FOR PROTOTYPES, GLOBE MOTORS WILL BROACH THRU-HOLES FOR NON-HARDENED MATING PARTS WITH AN I.D. OF .3575/.3585" AS A STARTING DIAMETER

### 3.00" Flange



INVOLUTE SPLINE PER ANS B92.1-1970 (GLOBE SPEC 3S96)  
 18 TEETH  
 24/48 PITCH  
 45° PRESSURE ANGLE  
 EXTERNAL SPLINE — MIN DIMENSION OVER TWO .080" DIA PINS .8819" REF  
 INTERNAL SPLINE — MAX DIMENSION BETWEEN TWO .080" DIA PINS .6321" REF  
 NOTE: FOR PROTOTYPES, GLOBE MOTORS WILL BROACH THRU-HOLES FOR NON-HARDENED MATING PARTS WITH AN I.D. OF .7195/.7205" AS A STARTING DIAMETER

# BD & BL GEARMOTORS

DC Permanent Magnet Planetary Gearmotors

# A-2430

## Standard Part Numbers and Data 1.875" Flange

SPEED REDUCTION RATIO	TORQUE MULTIPLIER	MAX. CONT. RATING (lb. in.)	TYPE BD		TYPE BL	
			"L" max (in.)	STD. PART NO. PREFIX*	"L" MAX (in.)	STD. PART NO. PREFIX*
3.81:1	3.5	1.1	3.34	102A152	3.72	102A170
5.54:1	5.1	1.6		102A153		102A171
14.5:1	13.0	4.1	3.53	102A156	3.91	102A174
21.1:1	19.0	6.0		102A157		102A175
30.7:1	27.0	8.6		102A158		102A176
55.3:1	47.0	14.6	4.09	102A160	4.47	102A178
80.4:1	68.0	21.0		102A161		102A179
117:1	99.0	31.0		102A162		102A180
170:1	144.0	45.0		102A163		102A181
211:1	171.0	53.0	4.28	102A189	4.66	102A199
306:1	248.0	77.0		102A190		102A200
445:1	360.0	100.0		102A191		102A201
647:1	524.0	100.0		102A192		102A202
941:1	762.0	100.0		102A193		102A203
1,166:1	896.0	100.0	4.47	102A1061	4.85	102A1066
1,696:1	1,305	100.0		102A1062		102A1067
2,466:1	1,900	100.0		102A1063		102A1068
3,584:1	2,760	100.0		102A1064		102A1069
5,211:1	4,000	100.0		102A1065		102A1070

## 3.00" Flange

SPEED REDUCTION RATIO	TORQUE MULTIPLIER	MAX. CONT. RATING (lb. in.)	TYPE BD		TYPE BL	
			"L" max (in.)	STD. PART NO. PREFIX*	"L" MAX (in.)	STD. PART NO. PREFIX*
306:1	248	77	5.38	102A929	5.75	102A939
445:1	360	122		102A930		102A940
647:1	524	164		102A931		102A941
941:1	762	238		102A932		102A942
1,166:1	896	280	5.55	102A933	5.92	102A943
1,696:1	1,305	407		102A934		102A944
2,466:1	1,900	550		102A935		102A945
3,584:1	2,760	550		102A936		102A946
5,211:1	4,000	550		102A937		102A947

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

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

### \*When You Order

Each of the basic motor armature windings (see chart, 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: 102A152-8 is a 3.81:1 BD gearmotor with a "-8" armature winding, 12 volts, 6,700 rpm, 3.5 oz. in. torque, etc.

## Basic Motor Data Type BD

VOLTAGE (VDC)	SPEED no load (rpm)	TORQUE		CURRENT			CONSTANTS		ARMATURE WINDING DASH NUMBER*
		max rated (oz. in.)	** theoretical stall (oz. in.)	max no load (amps)	max rated load (amps)	** nominal stall (amps)	K <sub>t</sub> (oz. in./amp)	R (ohms)	
6	10,000-12,000	2.3	19.0	1.40	4.6	35.00	.67	.18	-3
6	8,000-9,500	3.2	15.0	1.10	4.6	22.00	.86	.29	-4
12	12,500-14,500	1.8	24.0	.85	2.3	27.00	1.10	.46	-5
12	10,000-12,000	2.4	19.0	.70	2.3	17.00	1.39	.74	-6
12	8,000-9,500	3.2	15.0	.55	2.3	11.00	1.74	1.13	-7
12	6,200-7,300	3.5	11.0	.44	2.5	7.00	2.22	1.88	-8
27	11,000-13,000	2.0	22.0	.34	1.0	9.80	2.79	3.04	-9
27	9,000-10,500	2.8	17.0	.27	1.0	6.40	3.47	4.82	-10
27	7,000-8,500	3.6	14.0	.23	1.0	3.90	4.35	7.58	-11
50	10,500-12,500	2.1	20.0	.18	.5	4.60	5.45	12.20	-12
50	8,000-9,500	2.8	16.0	.15	.5	2.90	6.85	19.10	-13
50	6,500-8,000	3.7	13.0	.11	.5	1.80	8.64	30.80	-14
50	5,000-6,500	3.5	10.0	.09	.4	1.20	10.87	48.30	-15
115	13,000-15,500	1.6	18.0	.09	.3	2.30	9.95	56.30	-16
115	11,000-13,000	2.2	14.0	.08	.3	1.50	12.17	87.00	-17
115	9,000-10,500	2.8	11.0	.07	.3	.95	14.97	135.00	-18
115	7,000-8,500	3.6	9.0	.06	.3	.61	18.79	207.00	-19
115	6,000-7,000	2.9	7.0	.05	.2	.40	22.46	332.00	-20
115	4,500-5,500	2.7	6.5	.05	.2	.26	27.29	507.00	-21

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

## Type BL

VOLTAGE (VDC)	SPEED no load (rpm)	TORQUE		CURRENT			CONSTANTS		ARMATURE WINDING DASH NUMBER*
		max rated (oz. in.)	** theoretical stall (oz. in.)	max no load (amps)	max rated load (amps)	** nominal stall (amps)	K <sub>t</sub> (oz. in./amp)	R (ohms)	
6	8,500-10,500	4.0	29.0	1.30	6.50	45.00	.80	.14	-2
6	6,500-8,000	5.0	23.0	1.00	6.50	28.00	1.01	.24	-3
12	10,000-12,500	3.3	37.0	.77	3.50	36.00	1.30	.39	-4
12	8,500-10,500	4.4	29.0	.61	3.50	22.00	1.66	.62	-5
12	6,500-8,000	5.0	23.0	.49	3.50	14.00	2.10	1.00	-6
12	5,100-6,200	5.5	18.0	.40	3.00	9.00	2.63	1.50	-7
27	9,200-11,000	3.7	33.0	.31	1.40	12.00	3.35	2.50	-8
27	7,000-9,000	5.0	27.0	.25	1.40	8.00	4.21	4.10	-9
27	5,500-7,000	6.0	21.0	.20	1.40	5.20	5.24	6.40	-10
50	8,500-10,500	3.8	31.0	.17	.72	5.90	6.57	10.10	-11
50	6,500-8,000	5.0	25.0	.13	.74	3.70	8.23	16.00	-12
50	5,500-7,000	6.5	20.0	.11	.73	2.40	10.34	25.00	-13
50	4,500-5,500	7.5	16.0	.09	.66	1.50	13.05	41.00	-14
50	3,500-4,500	6.0	12.5	.06	.43	.94	16.41	65.00	-15
115	8,500-10,500	4.2	22.0	.08	.34	1.90	15.02	75.00	-16
115	7,000-9,000	5.0	17.0	.07	.40	1.20	18.38	116.00	-17
115	5,500-7,000	5.0	14.0	.05	.28	.77	22.60	180.00	-18
115	4,500-5,500	4.2	11.0	.04	.19	.50	28.37	267.00	-19
115	4,000-5,000	3.5	8.8	.04	.14	.33	33.91	420.00	-20
115	3,000-4,000	2.9	8.1	.03	.10	.21	41.21	645.00	-21

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