

**GEARMOTORS
DC PERMANENT MAGNET
HIGH QUALITY INDUSTRIAL**

2796 Culver Ave., Dayton, Ohio 45429
PH: 937/294-1041 FAX: 294-8336

**MODEL FIR
BULLETIN 211A220/232**

ELECTRICAL SPECIFICATIONS

Voltage: 12, 27, 50, 115 and 180 VDC are standard. Other voltages available. Reverse side of sheet shows complete FIR gearmotor data.

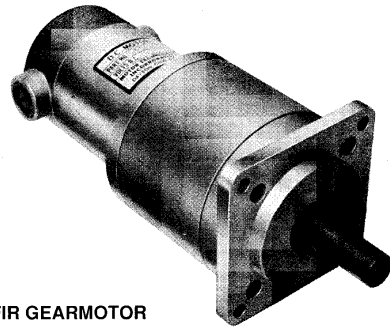
Speed: Motor input speeds up to 7240 RPM can be used to drive this precision planetary geartrain, of ratios from 3.81 to 940.

Connection Method: Two #18 AWG stranded leads, teflon insulated, 8" long are standard. Terminal type connections are available.

Rotation: Counter clockwise when viewed from shaft end, when positive lead (red) is plus and negative lead (black) is minus.

Reversibility: Unit reverses rotation when voltage is reversed.

The Motor Technology, Inc. new Model FIR planetary gearmotor is designed and built to provide high efficiency, reliable performance and durability in a small package size. Common usages include robotic drives, industrial actuators, medical machines and instruments, automatic welding equipment, valve controls, etc. Where the need for dependability is paramount, the new FIR gearmotor is an excellent choice. For pinions, splines, keyways, RFI/EMI filters, brakes or any modifications you may need, consult with M.T.I. application engineers. For additional FIR motor information see Bulletin 210A101.



MODEL FIR GEARMOTOR

MECHANICAL SPECIFICATIONS

Rating: 0.083 hp with torques to 500 lb. in.

Gears: Precision manufactured and heat treated, high nickel alloy steel.

Bearings: Output shaft supported by double shielded ball bearings, but needle bearings are readily available. All planet gears are mounted on anti-friction bearings.

Backlash: Less than 3°.

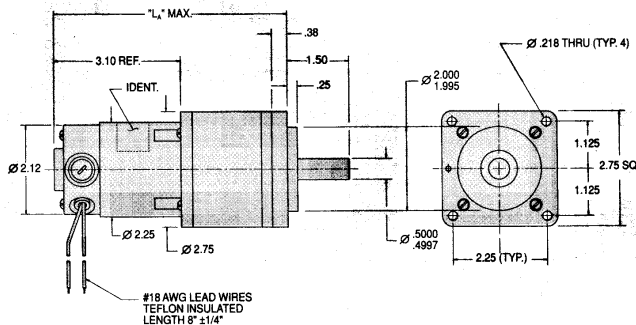
Shaft: Precision ground 8620 alloy steel per QQ-S-624, heat treated and case hardened.

Protection: Aluminum parts finished with iridite chemical film. Ring gear tin-zinc plated, chromate finish per MIL-C-81562B, class 2, type 2.

Lubrication: Motor bearings life lubricated per MIL-G-3278. Gearbox lubricated with grease per MIL-G-23827A. Special lubricants are available.

Weight: 3.13 to 6.00 pounds, depending on ratios.

DIMENSIONS



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BASIC GEARMOTOR DATA — STANDARD PART NUMBERS

SPEED REDUCTION RATIO	MAXIMUM ¹ CONT. DUTY TORQUE LB.IN.	TORQUE ² MULTIPLIER	LENGTH L _a DIMENSION	STANDARD FIR GEARMOTOR PART NUMBERS (Add armature dash number; see below.)
3.81	3.54	3.54	4.765	211A220-
5.54	5.15	5.15	4.765	211A221-
14.5	12.5	12.5	5.250	211A222-
21.1	18.2	18.2	5.250	211A223-
30.7	26.5	26.5	5.250	211A224-
55.3	44.5	44.5	5.735	211A225-
80.3	64.6	64.6	5.735	211A226-
117	94.1	94.1	5.735	211A227-
170	136	136	5.735	211A228-
306	228	228	6.220	211A229-
445	333	333	6.220	211A230-
647	484	484	6.220	211A231-
940	500	703	6.220	211A232-

¹ This rating is for gearbox only. To determine output of any motor-gearbox combination, multiply motor torque by the torque multiplier for that ratio.

² Torque multiplier ratio is the gear ratio multiplied by its efficiency.

BASIC FIR ARMATURE DATA³

INPUT VOLTAGE DC	NO-LOAD SPEED RPM	RATED TORQUE OZ.IN.	STALL TORQUE OZ.IN.	NO-LOAD CURRENT AMPS MAX.	RATED TORQUE CURRENT AMPS	STALL CURRENT AMPS	ARMATURE DASH NUMBERS
12	6050	15	151	1.99	7.73	62.1	-1
12	4800	21	120	1.51	7.87	39.1	-2
12	3810	25	95	1.10	7.10	24.6	-3
27	6800	13	170	1.03	3.49	34.9	-4
27	5400	18	135	.78	3.44	22.0	-5
27	4285	26	107	.58	3.66	13.9	-6
50	6300	14	157	.50	1.87	16.2	-7
50	5000	20	125	.39	1.88	10.2	-8
50	3970	25	99	.28	1.78	6.41	-9
115	7240	12	181	.26	.83	9.29	-10
115	5750	17	144	.20	.81	5.85	-11
115	4700	21	114	.15	.83	3.80	-12
115	3820	25	90	.11	.74	2.45	-13
180	4860	22	112	.09	.52	2.47	-14
180	3980	25	89	.06	.49	1.61	-15

³ For complete FIR motor data and tolerances see Bulletin 210A101.

HOW TO SELECT A UNIT

The complete part number must include a standard FIR gearmotor part number (above) plus an applicable FIR armature dash number from the basic motor data chart (left). Use the following trial and error technique to start:

1. Assume motor speed of 5,000 RPM and divide it by the required output speed to get approximate ratio.
2. From ratios charted above, select closest one.
3. Check maximum torque rating of that ratio with your actual requirement. Adjust ratio and motor speed up or down as needed.
4. Calculate output torque by multiplying motor torque by the "torque multiplier" of the ratio selected.
5. Select armature from voltage, load and speed required.

HOW TO ORDER: Order by standard part number (example: 211A226-4), making sure to include the armature dash number. Note any modifications as exceptions to the standard.