2796 Culver Ave., Dayton, Ohio 45429
PH: 513/294-1041 FAX: 294-8336

**GEARMOTORS**
**DC PERMANENT MAGNET**
**HIGH QUALITY INDUSTRIAL**

**MODEL HIL**
**BULLETIN 276A220/228**

SUPERSEDES 276A120/132

## ELECTRICAL SPECIFICATIONS

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

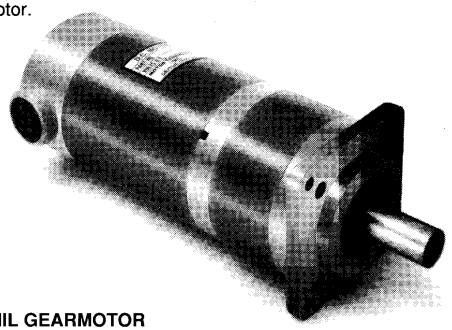
**Speed:** Motor input speeds up to 5290 RPM can be used to drive this precision planetary geartrain, of ratios from 3.81 to 170.

**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.

For the engineer who likes the dimensions and performance capabilities of the Motor Technology HIR planetary gearmotor (Bulletin 276A200/208) but requires more torque output at higher speeds, the HIL offers a ready-made solution. Common usages include robotic drives, industrial actuators, medical machines and instruments, automatic welding equipment, valve controls, etc. Pinions, splines, keyways, RFI/EMI filters, brakes and other modifications are available. For higher ratios and greater torque output from the HIL gearmotor, see Bulletin 276A229/235. Bulletin 275A107 contains complete information on the HIL motor.



MODEL HIL GEARMOTOR

## MECHANICAL SPECIFICATIONS

**Rating:** 0.33 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°.

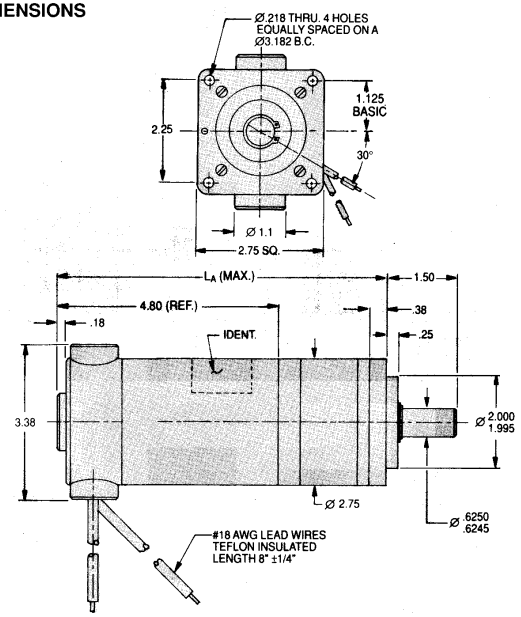
**Shaft:** Precision ground 8620 alloy steel per QQ-S-624, heat treated and case hardened.

**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:** 5.48 to 6.70 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 HIL GEARMOTOR PART NUMBERS (Add armature dash number; see below.) |
|---|---|---|---|---|
| 3.81 | 18.8 | 3.54 | 6.733 | 276A220– |
| 5.54 | 27.3 | 5.15 | 6.733 | 276A221– |
| 14.5 | 66.3 | 12.5 | 7.218 | 276A222– |
| 21.1 | 96.5 | 18.2 | 7.218 | 276A223– |
| 30.7 | 141 | 26.5 | 7.218 | 276A224– |
| 55.3 | 236 | 44.5 | 7.703 | 276A225– |
| 80.3 | 342 | 64.6 | 7.703 | 276A226– |
| 117 | 498 | 94.1 | 7.703 | 276A227– |
| 170 | 500 | 136 | 7.703 | 276A228– |

[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 HIL ARMATURE DATA[3]

| 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 | 3680 | 60 | 433 | 1.75 | 14.9 | 99 | –1 |
| 12 | 2760 | 80 | 325 | 1.19 | 14.4 | 56 | –2 |
| 27 | 4970 | 77 | 585 | 1.20 | 11.4 | 80 | –3 |
| 27 | 3820 | 113 | 450 | .83 | 12.5 | 48 | –4 |
| 27 | 3100 | 91 | 365 | .63 | 8.2 | 31 | –5 |
| 50 | 4600 | 86 | 541 | .58 | 6.3 | 37 | –6 |
| 50 | 3680 | 100 | 433 | .43 | 5.8 | 24 | –7 |
| 50 | 2880 | 80 | 338 | .30 | 3.6 | 15 | –8 |
| 115 | 5290 | 71 | 622 | .31 | 2.7 | 21 | –9 |
| 115 | 4230 | 98 | 498 | .23 | 2.8 | 14 | –10 |
| 115 | 3310 | 98 | 389 | .16 | 2.2 | 8.3 | –11 |
| 180 | 4140 | 100 | 487 | .14 | 1.8 | 8.4 | –12 |
| 180 | 3310 | 97 | 390 | .10 | 1.4 | 5.4 | –13 |
| 180 | 2630 | 78 | 309 | .08 | .89 | 3.4 | –14 |
| 180 | 2070 | 60 | 244 | .05 | .55 | 2.1 | –15 |

[3] For complete HIL motor data and tolerances see Bulletin 275A107.

### HOW TO SELECT A UNIT

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

1. Assume motor speed of 4,000 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: 276A224-4), making sure to include the armature dash number. Note any modifications as exceptions to the standard.