PMI ENGINEERING DATA

Type U12M4

All Nominals at 25°c Ambient Except Where Otherwise Stated.

1.0 MOTOR RATINGS

1.1 Continuous Torque @ Rated Speed—55 Oz.-In.
1.2 Pulse Torque (50 ms @ 1% Duty Cycle)—1200 Oz.-In.
1.3 Rated Speed—3650 RPM
1.4 Rated Voltage[1]—48 VDC
1.5 Power Out @ Rated Speed—147 Watts
1.6 Rated Current—4.4 Amperes
1.7 Maximum Continuous Stall Current—7.5 Amperes
1.8 Terminal Resistance—0.75 Ohms

2.0 MOTOR CONSTANTS

2.1 Torque Constant (K_T)—15.6 Oz.-In./Ampere
2.2 Emf Constant (K_E)—11.5 Volts/1000 RPM
2.3 Damping Constant (K_D)—3.1 Oz.-In./1000 RPM
2.4 Total Inertia (J_M)—0.020 Oz.-In. Sec.^{2}
2.5 Regulation @ Constant Voltage (R_M)[2]—5.85 RPM/Oz.-In.
2.6 Armature Inductance (L_A)—< 100 μHenries
2.7 Average Friction Torque (T_F)—4.0 Oz.-In.
2.8 Mechanical Time Constant[2]—0.0126 Sec.
2.9 Power Rate[3]—507 KW/Sec.

3.0 THERMAL RESISTANCE

3.1 Uncooled
3.1.1 Armature-to-Case ($\theta_{A\text{-}C}$)—1.15° C/Watt
3.1.2 Case-to-Ambient ($\theta_{C\text{-}A}$)
3.1.2.1 With 8x16x3/8 Alum. Heat Sink—0.87° C/Watt
3.1.2.2 With 14x14x3/8 Alum. Heat Sink—0.70° C/Watt
3.2 Forced Cooling
3.2.1 Armature-to-Ambient (θ_T)
3.2.1.1 With Mass Air Flow of 0.4 lbs./min.—0.8° C/Watt
3.2.1.2 With Mass Air Flow of 0.8 lbs./min.—0.51° C/Watt
3.2.1.3 With Mass Air Flow of 2.0 lbs./min.—0.28° C/Watt

4.0 WEIGHT

4.1 8 lbs.

NOTES

1. Motor is tested at this voltage for convenience. Other voltages may be used provided maximum armature dissipation is not exceeded. ($P_{MAX} = P_{IN} - P_{OUT}$ = Constant).
2. The speed-torque curve is obtained by using the maximum terminal resistance of the motor at 150° C armature temperature. (Worst condition)
3. Calculated from the formula,

$$7.01 \times 10^{-3} \times \frac{(\text{Pulse Torque})^2}{\text{Inertia}}$$

GENERAL

1. Maximum allowable armature dissipation,

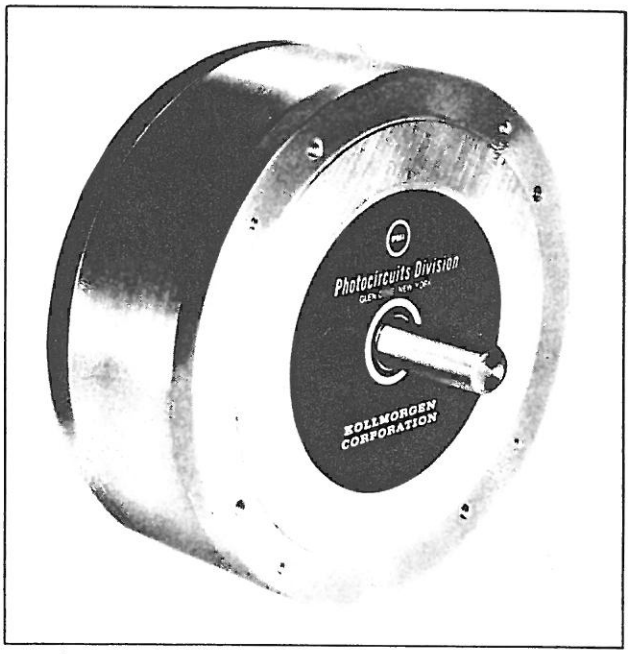
$$P_{MAX} = \frac{150° C - T_{AMBIENT}\ (° C)}{\theta_{A\text{-}C} + \theta_{C\text{-}A}}$$

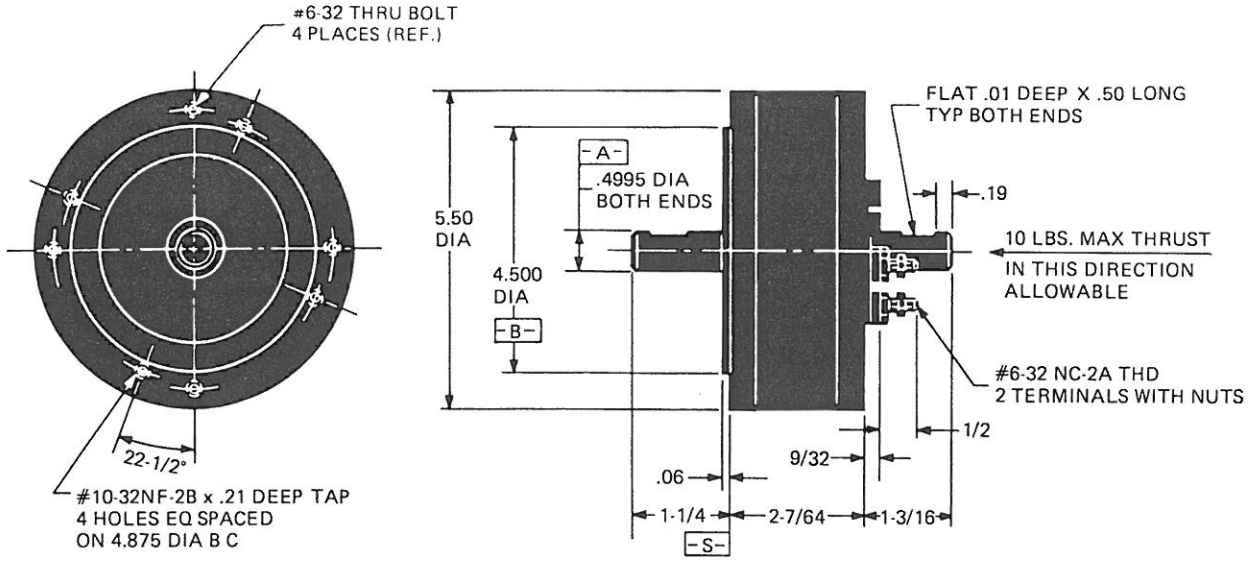
2. The curves for forced cooling operation were obtained by modifying the mechanical configuration of the motor to accept the required air flow. These motors are available on special request.

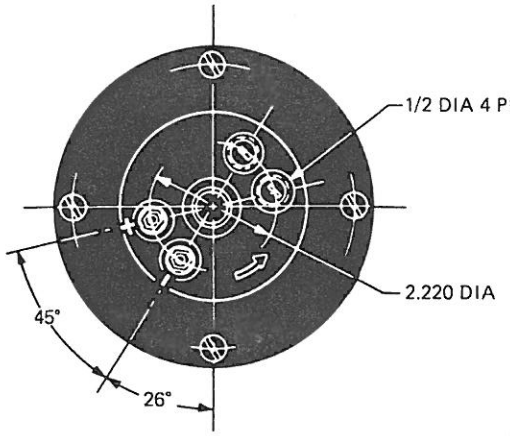
   The maximum allowable armature dissipation in this case is calculated as follows:

$$P_{MAX} = \frac{150° C - T_{AMBIENT}\ (° C)}{\theta_T}$$

3. Mass Air Flow (lbs./min.) = Air Volume (cfm) x Density (lbs./ft.^{3})



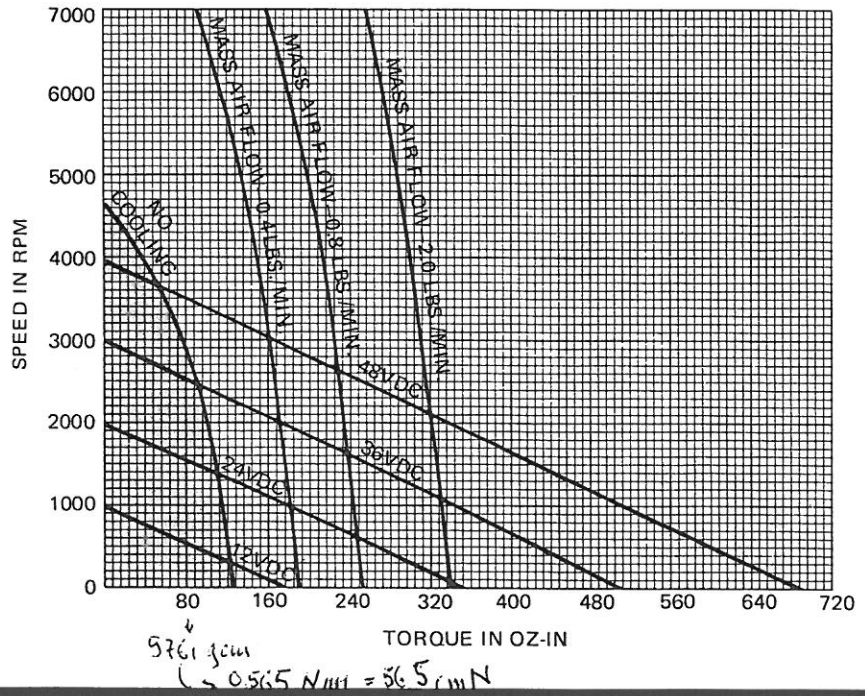




U12M4 MECHANICAL SPECIFICATIONS

1. Shaft diameter "A" runout not to exceed .001" per inch.
2. Pilot diameter "B" concentric to "A" within .003" T.I.R.
3. Mounting surface "S" perpendicular to "A" within .007".
4. Shaft end play .004" maximum under a reversal of 5 pounds thrust.
5. Recommended maximum radial load of 30 pounds at rated speed.

AVERAGE PERFORMANCE CHARACTERISTICS



☐ Limit of allowance continuous operation (uncooled)

The run current at any operating condition is obtained as follows:

$$I_{RUN} = \frac{\frac{N}{K_D \times 1000 + T_F + T_L}}{K_T}$$

9761 rpm
0.565 Nmm = 56.5 mN