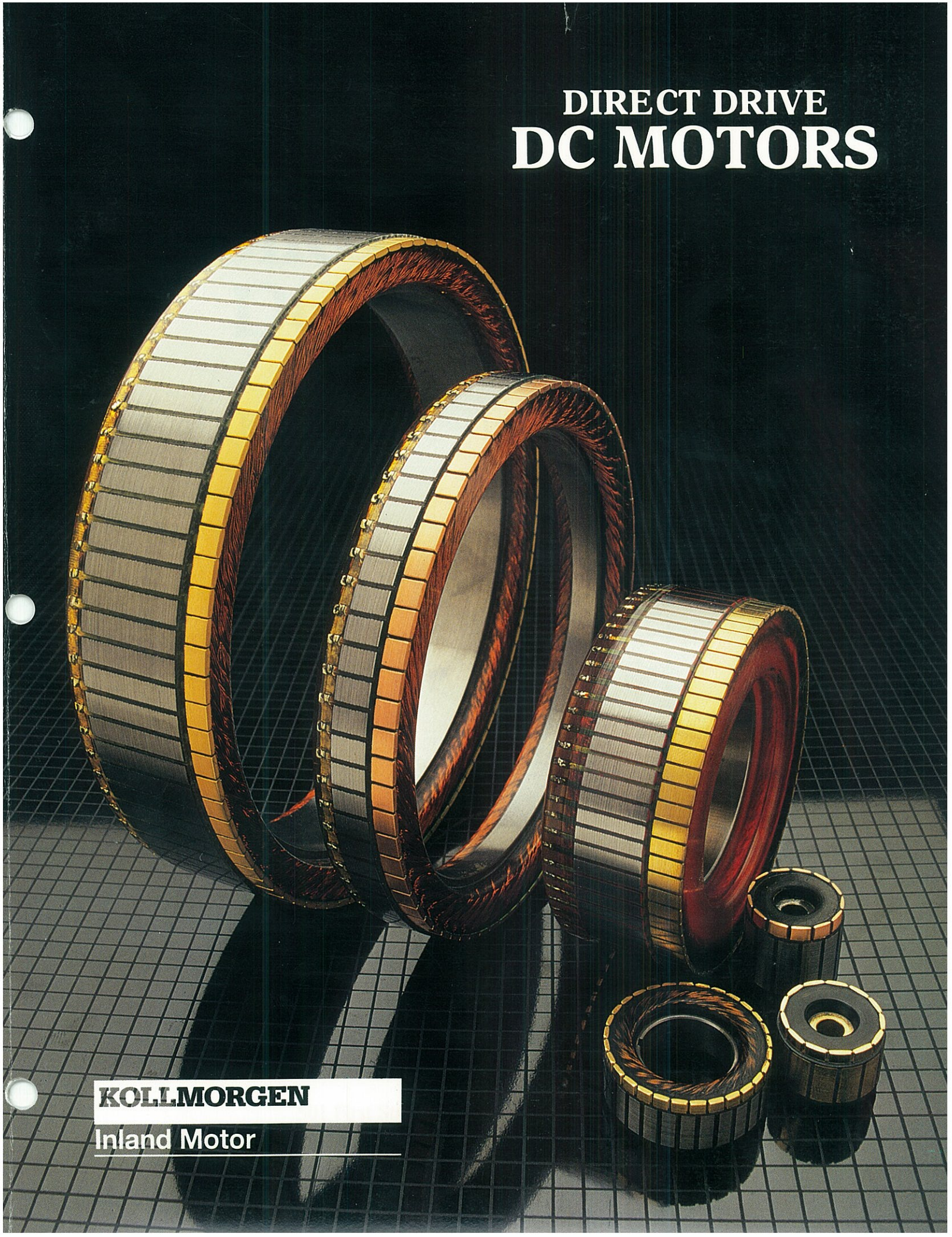
DIRECT DRIVE
DC MOTORS



KOLLMORGEN

Inland Motor

INTRODUCTION

The direct-drive DC torque motor is a servo actuator which can be directly attached to the load it drives. It has a permanent magnet (PM) field and a wound armature which act together to convert electrical power to torque. This torque can then be utilized in positioning or speed-control systems. In general, torque motors are designed for three different types of operation:

1) high stall torque ("stand-still" operation) for positioning systems;
2) high torque at low speeds for speed-control systems, and
3) optimum torque at high speed for positioning, rate, or tensioning systems.

FEATURES of DIRECT-DRIVE DC TORQUE MOTORS

Direct-drive torque motors are particularly suited for servo-system applications where it is desirable to minimize size, weight, power and response time, and to maximize rate and position accuracies. Torque motors have the following important advantages over other servo-system actuators.

High Torque-to-Inertia Ratio at the Load

A direct-drive motor provides the highest practical torque-to-inertia ratio where it counts — at the load. Because the torque motor is mounted directly on the driven shaft or is directly coupled to the load, there is no gear train. In a geared system, reflected output torque is proportional to the gear reduction while reflected output inertia is proportional to the square of the gear reduction. Thus, the torque-to-inertia ratio in a geared system is less than that of a gearless system by a factor equal to the gear-train ratio. The higher torque-to-inertia ratio of direct-drive motors makes them ideally suited for high acceleration applications with rapid starts and stops.

High Torque-to-Power Ratio

Most torque motors are designed with a large number of poles and a high volume of copper to achieve a high torque-to-power ratio. Thus, input power requirements are usually low.

Low Electrical Time Constant

Typical torque motor design features — such as high-level magnetic saturation of the armature core and the use of a large number of poles — keep armature inductance at very low values. Consequently, the electrical time constant (the ratio of armature inductance to armature resistance) is very low, allowing the motor to respond rapidly at all operating speeds.

High Linearity

In a DC torque motor, torque increases directly with input current at all speeds and angular positions. The theoretical speed-torque characteristic is a set of parallel straight lines (See Figure 1-1). This torque linearity is maintained even at low excitation, assuring no dead-band created by torque non-linearities.

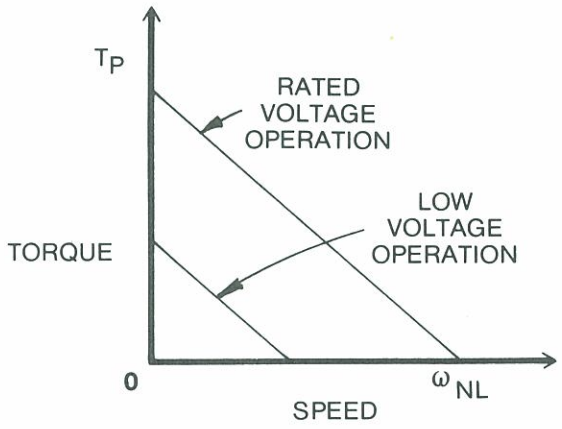


Figure 1-1

Reliability and Long Life

Basic simplicity and an absolute minimum of moving parts make a torque motor inherently reliable. Extensive design and production experience have placed Inland's motors in most major defense programs in the last two decades. These include applications in all conditions and environments, ranging from thousands of feet underwater to years of unattended operation in outer space.

Compact, Adaptable Design

Frameless torque motors are built to be "designed-in" as an integral part of a system, thus saving the weight and space associated with conventional motor frames or housings. This frameless design allows the motors to be mounted anywhere along the driven shaft. The "pancake" configuration (thin, compared to diameter) minimizes the volume required for mounting and offers a convenient packaging arrangement for combinations of torque motors and tachometer generators.

Inland also supplies housed motors, complete with housing, shaft and bearings for use in similar applications.

SYSTEM PERFORMANCE CHARACTERISTICS

The same features which give torque motors an advantage over other types of servo actuators also allow the designer to obtain the following system performance characteristics:

High Servo Stiffness

The direct-drive torque motor is coupled directly to the load, thus eliminating gears and backlash errors. The resulting high coupling stiffness and associated high mechanical resonance frequency yield high servo stiffness.

Fast Response

The low electrical time constant of torque motors allows torque to develop very rapidly when voltage is applied. This fast response is an important aid to servo stiffness.

High Resolution

The direct-drive use of torque motors allows them to position a shaft more precisely than a geared system. With typical gearing, the backlash contributes to a "dead zone" which falls in the region of the system null point and reduces positional accuracy. In a direct-drive system, however, the positional accuracy is, in practice, limited only by the error-detecting transducer system.

Low Speeds with High Accuracy

Because of the high coupling stiffness and high resolution of direct-drive torque motors, it is possible to achieve high accuracy at low speeds. An example is a table for testing rate and integrating gyros. This table has a speed range of 0.017 rpm to 100 rpm with absolute instantaneous accuracy over this speed range of 0.1 percent.

Smooth, Quiet Operation

Torque motors exhibit smooth, quiet operation when they are run at low speeds. They typically have a large number of slots per pole to reduce cogging and allow for smooth operation.

MOTOR SELECTION

Frameless or Housed?

Both the torque motor section and the servo motor section of this catalog are divided into subsections of frameless motors and housed motors.

Housed motors have a traditional configuration including frame, bearings and shaft. In use, the housed motor shaft is coupled to the system element being driven. Housed motors are ideal for use in harsh environments or other applications requiring totally closed units.

The frameless motor concept was developed to meet the need for motors with a large hole through the center. This need is still one of the main reasons that the large diameter, narrow width frameless configuration is often selected over the traditional housed configuration. The large rotor bore can be used as a route for lead wires, as a mounting area for other hardware such as tachometer generators or resolvers, or as an optical path.

Frameless motors are built to be "designed in" as an integral part of the system hardware. They are generally supplied as three separate components: stator (field) assembly, rotor (armature) assembly and brush ring or brush segment assembly (See Figures 1-2, 1-3). The frameless motor can be integrated into the customer hardware rather than coupling a motor shaft to the element being driven. This allows significant savings in space and weight over housed motors by eliminating the motor housings, bearings and shaft. Also, since the frameless motor can be mounted on the driven shaft, the coupling stiffness is improved. The backlash normally associated with couplings or gear trains is eliminated from the drive system.

Torque Motor or Servo Motor?

A torque motor is typically described as having a "pancake" configuration, i.e., a large diameter and a narrow width. This configuration generally has a large number of poles to increase the torque available in a given volume. This large number of poles, however, also causes more commutation arcing as speed increases than for a motor with few poles. Torque motors are most

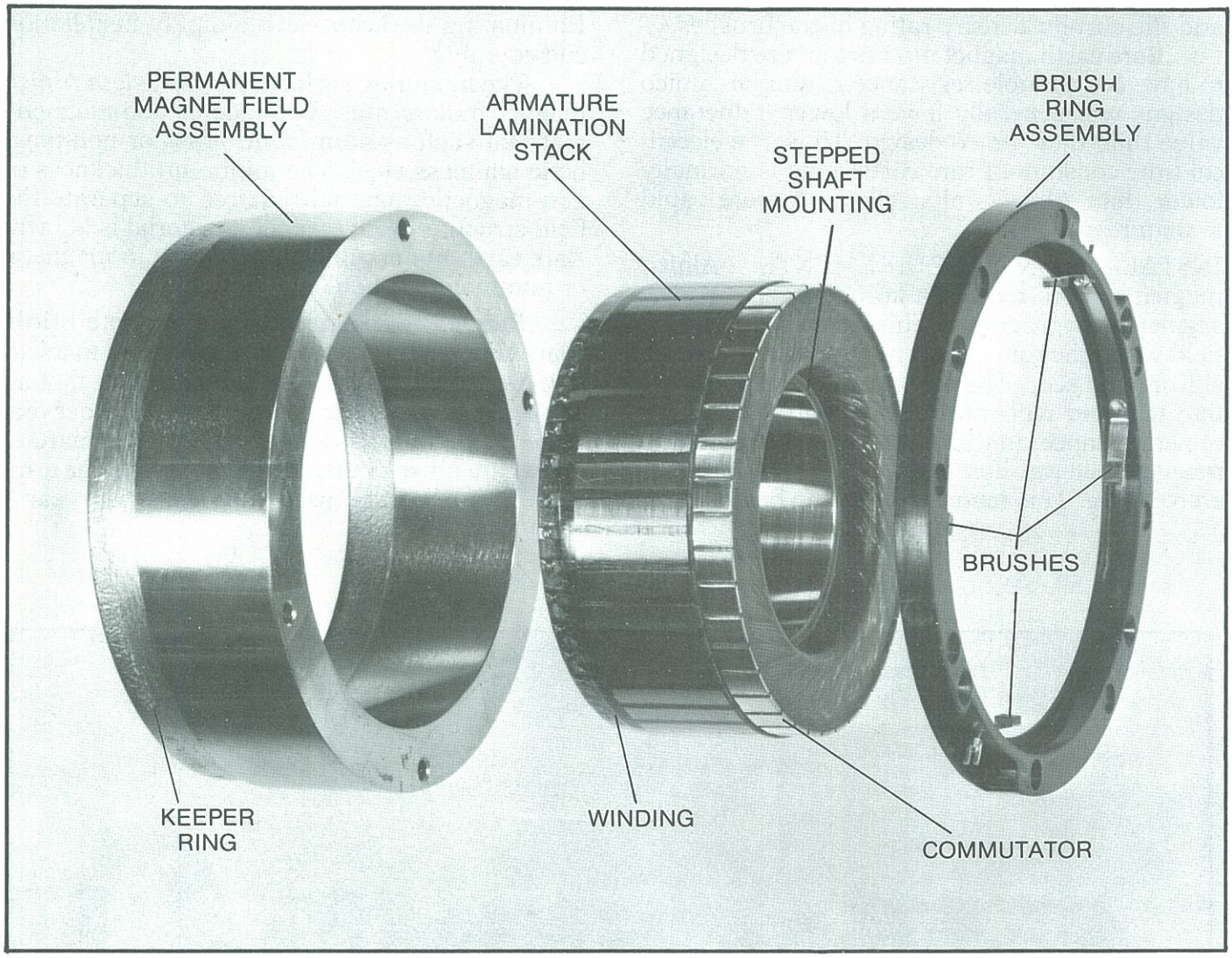


Figure 1-2

Details of a frameless Alnico torque motor, showing hole for axial-shaft mounting.

commonly used in positioning and slow-speed rate applications where commutation is not a limitation.

A servo motor is characterized by a long, small diameter configuration. Lengthening a motor while maintaining a small diameter allows a significant increase in torque while minimizing the increase in rotor inertia. The end result is an improved mechanical time constant and, therefore, improved motor response. Servo motors are most commonly used in running applications where good high-speed commutation is demanded and operation at or near stall is not required.

Magnet Material?

The motors in this catalog are manufactured with one of two magnet materials: Alnico or rare earth (Samarium Cobalt). Model numbers preceded by "T", "NT" or "OT" have Alnico magnets and models preceded by "QT" have rare earth magnets. These magnet materials have different characteristics which determine their suitability for various applications. This section will examine the differences in magnet material in the areas of performance, installation requirements, leakage flux, and weight and volume.

PERFORMANCE: A major advantage of rare earth magnet motors is maintenance of magnetic characteristics in overcurrent conditions. In Alnico magnet motors, exceeding the rated current I_P to develop more torque may demagnetize the permanent magnet field and cause a permanent reduction in torque per unit current. The degree of demagnetization is determined by the magnitude of the overload current. In rare earth magnet units, currents in excess of I_P can be applied for short duration to develop higher torque with-

out demagnetization of the PM field. The limits now become the thermal capacity of the motor and the current density rating of the brushes.

Rare earth magnet motors that are designed to have comparable resistance to similar Alnico designs will generally have a lower inductance value than that Alnico design. Thus, the electrical time constant of rare earth units is normally lower than Alnico units, allowing more rapid system response.

INSTALLATION REQUIREMENTS: Alnico magnet motors require a keeper ring or keeper segments to provide a return flux path for the field when the rotor is not in place. Removing or shifting the keeper before inserting the armature into the field will cause significant degradation of performance. In rare earth magnet motors the magnet material has much higher intrinsic coercive force. This feature makes the field assembly immune to the effects of an open magnetic circuit and therefore a keeper is not required. Eliminating the keeper can simplify installation considerably.

The mounting surfaces for frameless Alnico magnet motors must be made of non-magnetic material such as aluminum, brass or non-magnetic stainless steel. The minimum thickness of non-magnetic material required to separate the field structure from magnetic material is ¼ inch. Rare earth motors may be mounted in magnetic or non-magnetic housings.

Rare earth magnet material is more brittle than Alnico, and care must be exercised to avoid chipping or cracking. Because rare earth motors are designed with the magnets on the inner diameter of the stator assembly facing the armature, extra care must be taken when inserting the armature into the field assembly. Most rare earth

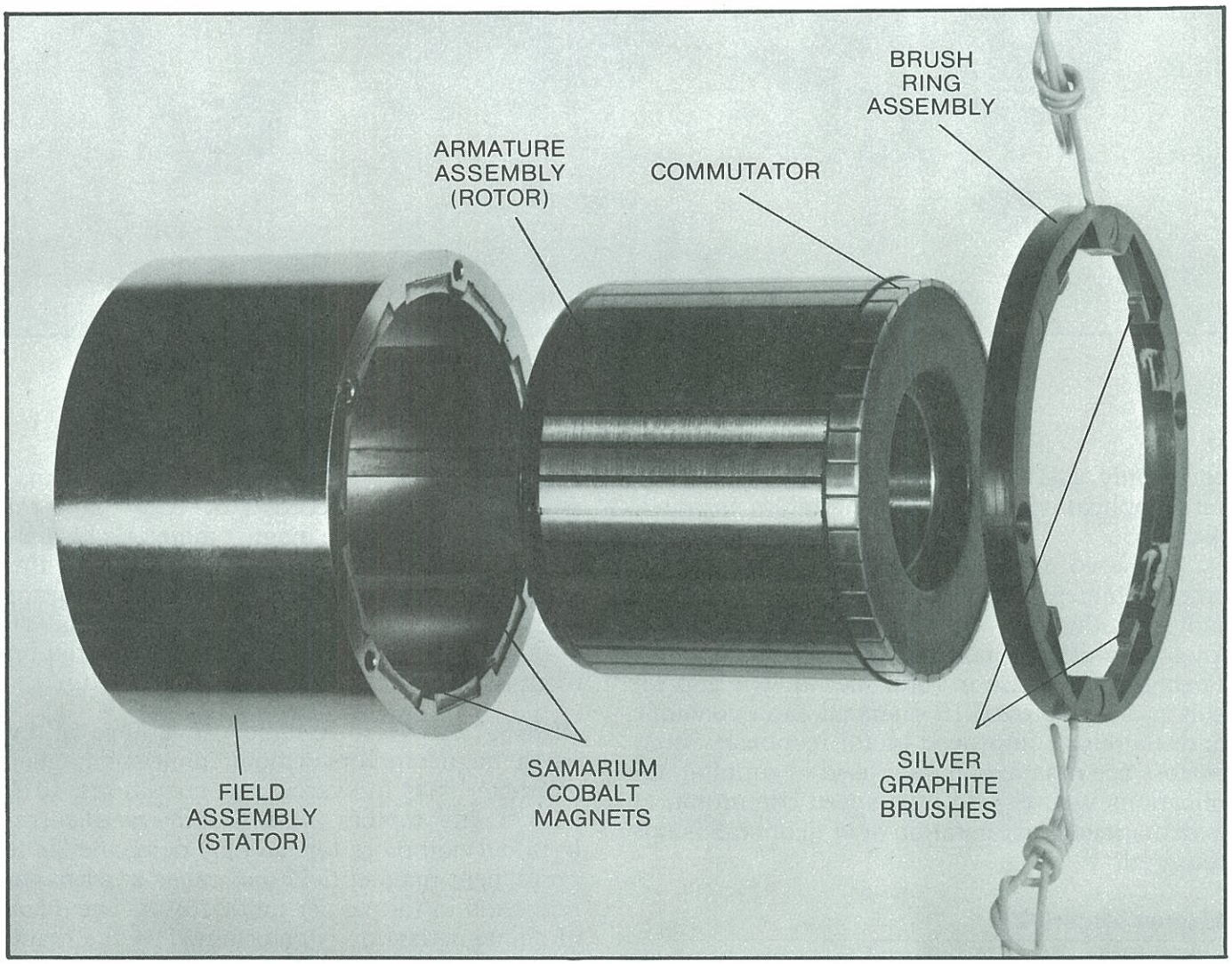
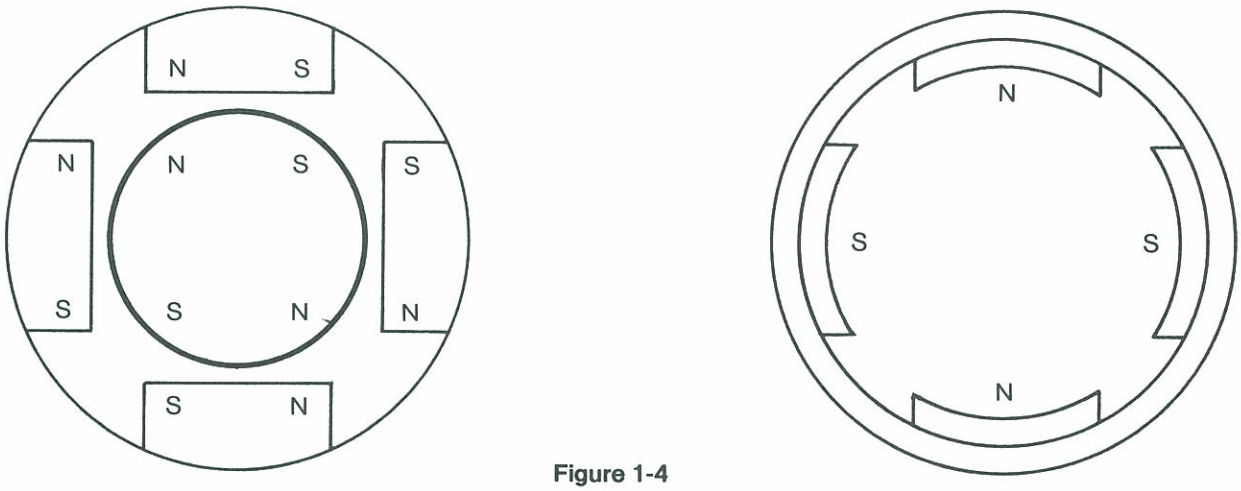


Figure 1-3

Details of a frameless rare earth torque motor.

units have larger radial air gaps than similar size Alnico units. The larger air gap of rare earth units makes rotor-to-stator concentricity less critical (See Figure 1-4).



ALNICO DESIGN

RARE EARTH DESIGN

Figure 1-4
Alnico and rare earth field designs.

LEAKAGE FLUX: In the rare earth field assembly design, the magnets are magnetized in a radial direction. The Alnico field assembly is magnetized in a circumferential direction. The radial orientation of the rare earth design, along with the unique properties of the magnet material, combine to reduce the leakage flux in the motor. This not only improves the motor performance because motor flux is retained within the magnetic circuit of the motor, but there is also a much lower flux density around the outside of the motor. There is, therefore, less interference in surrounding wires, electronics and electromagnetic devices.

WEIGHT AND VOLUME: Alnico motors have a maximum torque available from a given volume because the magnets will demagnetize if the peak current (I_P) is exceeded. To increase the torque available the motor volume must be increased. Typically, this is accomplished by increasing the diameter or the length of the motor. As the volume increases, so does the weight.

Rare earth motor designs can produce more torque per volume than Alnico designs of the same dimensions. This occurs because rare earth units can be designed with a thinner stator assembly. The rotor therefore has a larger diameter while the outer diameter of the stator remains the same. Such a motor with an increased rotor diameter will produce more torque than an Alnico design of the same dimensions for the same input power.

A comparison between Alnico and rare earth designs is possible using three motors from the catalog.

The T-7203, an Alnico design, is rated for 22 lb.ft. If more torque is required, a larger motor must be used. Assuming a particular application requires 40 lb.ft., the T-9902 can be used. A comparison of the two follows:

	T-7203	T-9902
Peak Torque (lb.ft.)	22	40
Power (watts)	530	512
Motor Constant (lb. ft. / $\sqrt{\text{watt}}$)	0.96	1.77
Outer Diameter (in.)	9.00	12.00
Inner Diameter (in.)	5.157	8.00
Length (in.)	2.562	2.500
Weight (lbs.)	18.3	32.3

By using a rare earth design to provide the 40 lb.ft. of torque, the QT-7801 can be used within the same dimensions as the T-7203. Our comparison is now expanded to include the rare earth design:

	T-7203	QT-7801	T-9902
Peak Torque (lb.ft.)	22	40	40
Power (watts)	530	800	512
Motor Constant (lb.ft. / $\sqrt{\text{watt}}$)	0.96	1.41	1.77
Outer Diameter (in.)	9.00	9.00	12.00
Inner Diameter (in.)	5.157	5.157	8.00
Length (in.)	2.562	2.396	2.500
Weight (lbs.)	18.3	20	32.3

The rare earth design requires an increase in power and a slight increase in weight, but will provide significantly improved torque-to-weight and torque-to-volume ratios. This is due not only to the capability of momentary excess current without demagnetization, but also the

improved motor constant (K_M) which results from a larger rotor diameter and a higher flux density.

Size Constants

There are fourteen motor parameters, or size constants, listed on the individual data page for each motor. These parameters are dependent upon the size and shape of the model, but are independent of the winding used. Following is a brief description of each parameter.

PEAK TORQUE (T_P) is the nominal value of developed torque with the rated current I_P applied to the motor. In Alnico magnet motors, exceeding the rated current I_P to develop more torque may demagnetize the permanent magnet (PM) field and cause a permanent reduction in torque per unit current. The extent of demagnetization is determined by the magnitude of the overload current. In rare earth magnet units, however, currents in excess of I_P can be applied to develop higher torque without demagnetization of the PM field.

POWER INPUT, STALLED AT T_P (P_P) is the value of I^2R power when the armature resistance R_M is measured at 25°C and the current is I_P.

MOTOR CONSTANT (K_M) is the ratio of peak torque to the square root of power input at stall and 25°C;

$$K_M = \frac{T_P}{\sqrt{P_P}}.$$

This ratio is useful during the initial selection of a motor because it indicates the ability of a motor to convert electrical power into torque. K_M also defines the slope of the developed torque versus speed characteristic at constant voltage, which is

$$F_0 = \frac{T_P}{\omega_{NL}} \quad \text{where} \quad F_0 = 1.356 K_M^2$$

with torque in pound-feet.

NO LOAD SPEED at V_P (ω_{NL}) is the theoretical speed at which a motor will operate without any external load and with nominal voltage V_P applied. The actual value of no load speed is slightly less than ω_{NL} because of the effects of brush friction and magnetic drag (T_f) and the effects of viscous drag ($F_I \omega$).

ELECTRICAL TIME CONSTANT (τ_E) is the ratio of armature inductance L_M to armature resistance R_M. This value of time constant is a maximum because it applies only if the motor power source has negligible impedance. Usually, the inductance in a power source is negligible but the power source resistance R_S is not negligible. Then the applicable time constant is

$$\frac{L_M}{R_M + R_S}$$

which is less than τ_E.

STATIC FRICTION (T_f) is the sum of the retarding torques at stall within the motor. These retarding torques change the value of the developed torque to the value of the net output torque that is available to a system. Static friction subtracts from developed torque when rotor displacement is in the same direction as developed torque and adds to developed torque when displacement is opposite the developed torque. Static friction is the sum of brush-commutator friction and magnetic friction, which includes cogging torque and hysteresis drag. Factory acceptance tests for static friction are performed by measuring the current required to start a motor. The corresponding value of starting friction, or static friction, is determined by multiplying the measured starting current by the measured torque sensitivity of the motor. In general, static friction is about 2% of T_P in sizes up to the T-5730. This percentage decreases for larger units, being only about 0.5% for the largest models.

VISCOUS DAMPING COEFFICIENTS (F_0 and F_I) are of considerable importance in control systems. The sum of F_0 and F_I is approximately equal to the total viscous damping coefficient F, which represents the loss in motor torque per unit speed. The coefficient F_0 gives an indication of the torque lost due to back EMF in the unit. The constant F_0 can be understood by analysis of the current diagram in Figure 1-5 and the torque-speed relationship in Figure 1-6. Rotation of the motor armature generates a back EMF, V_B, which is directly proportional to speed and which opposes the applied voltage V_S. The net voltage which produces current flow in the circuit is $V_S - V_B$. Under steady-state conditions, current in the circuit is zero when the speed reaches the theoretical value

$$\omega_0 = \frac{V_S}{K_B}$$

making $V_B = V_S$. With zero current, the developed torque (which is proportional to current) is also zero. At any speed ω other than ω_0, the steady-state current is

$$I = \frac{(V_S - V_B)}{(R_S + R_M)}$$

and the developed torque is

$$T = \frac{K_T(V_S - V_B)}{R_S + R_M}.$$

Substituting $K_B\omega$ for V_B and rearranging the terms yields

$$T = \frac{K_T V_S}{R_S + R_M} - \frac{K_T K_B \omega}{R_S + R_M} .$$

The term

$$\frac{K_T V_S}{R_S + R_M}$$

represents the torque which is constant and independent of speed that would be developed if Vs were applied to a theoretical motor with no back EMF and no rotational losses. The term

$$\frac{K_T K_B \omega}{R_S + R_M}$$

is a component of viscous drag, or the torque which is lost due to back EMF. This term is represented as $F_B\omega$, where the coefficient F_B equals

$$\frac{K_T K_B}{R_S + R_M} .$$

As R_S approaches zero, F_B becomes the zero source impedance coefficient

$$F_0 = \frac{K_T K_B}{R_M} .$$

The coefficient F_I gives an indication of the torque lost due to rotational losses (mainly eddy current losses) which are proportional to speed. The losses are represented by $F_I\omega$, where the coefficient F_I is determined experimentally for each motor model. F_I is usually 3% to 5% of F_0. The total viscous damping coefficient, or torque loss per unit speed, is

$$F = F_B + F_I = \frac{K_T K_B}{R_S + R_M} + F_I .$$

The minimum value of F is F_I when the source impedance is infinite. The maximum value of F is $F_0 + F_I$ when the source impedance is zero. In usual torque motor applications, the damping effect of F is insufficient for system stability. Therefore, additional damping in the form of circuit compensation or tachometer generator damping is used.

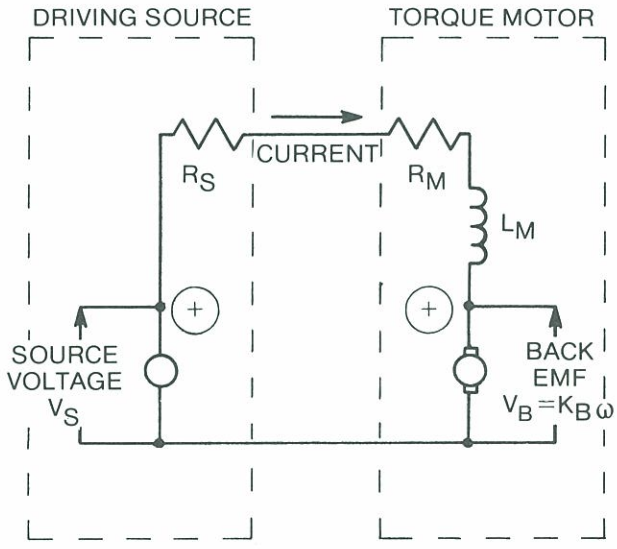


Figure 1-5

Equivalent circuits of driving source and torque motor, showing effect of source resistance (impedance) on motor back EMF relations.

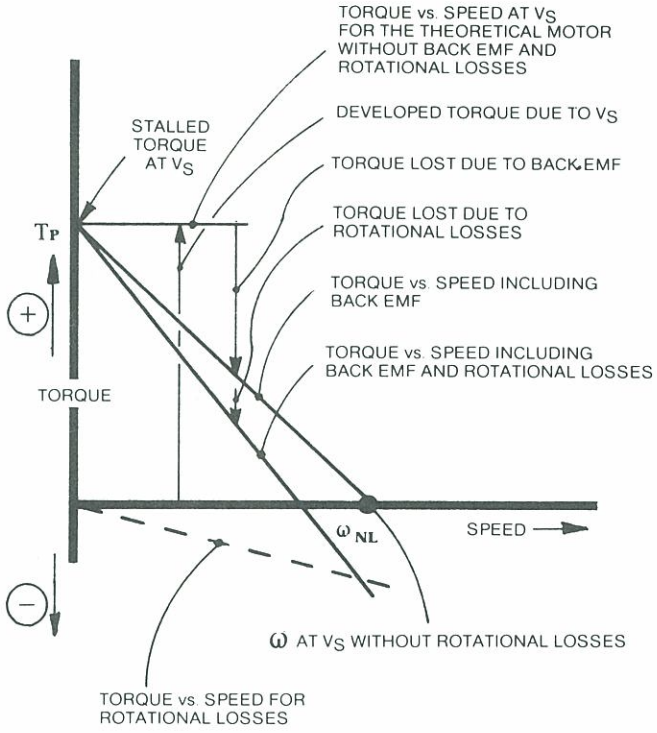


Figure 1-6

Effect of back EMF and friction on motor output torque and speed.

MAXIMUM WINDING TEMPERATURE is the maximum temperature that the motor winding is allowed to reach. This temperature is the sum of the ambient temperature and the temperature rise in the motor windings due to motor operation. The minimum operating temperature for standard motors is −40°C. Alnico magnet designs are available in either 105°C or 155°C winding temperature ratings. Rare earth magnet motors are usually designed with a maximum winding temperature of +155°C. Special units of either type can be supplied with operating temperatures up to +200°C.

TEMPERATURE RISE PER WATT (TPR) is essentially the "worst case" ratio of winding temperature rise to average power continuously dissipated from the armature. TPR is useful in selecting the smallest motor size for an application. Unless otherwise indicated, the TPR values listed for frameless motors with model numbers up to T-9908 are based experimentally on the average I^2R loss in an armature suspended in air without heat sink or forced air cooling. In a typical application, the actual value of temperature rise per watt may be much smaller than the listed TPR because the armature may be mounted on a shaft with good heat conductivity or may be air cooled. In many cases, the actual value is 25% to 50% of the listed TPR. For frameless units larger than the T-9908, the listed TPR value is determined with the unit mounted on a standard test fixture. The listed TPR value for housed motors is based on testing of the assembled unit.

RIPPLE TORQUE (T_R) is a small variation in average torque during rotation of the armature. This variation is due to the fact that commutation is done in discrete steps. As the armature rotates, its field is rotated through a small angular displacement before commutation restores the field to its original position. The resulting ripple effect is diagrammed in Figure 1-7. T_R is expressed as a percentage of average torque. This ripple is also seen as an equally small percentage of variation in torque per current sensitivity, or gain, in a system.

RIPPLE FREQUENCY is the number of ripple cycles in one revolution of the armature. This fundamental frequency is equal to the number of commutator bars used in the design. Higher frequency components may also be present due to the non-sinusoidal form of the ripple torque.

NUMBER OF POLES is the number of magnetic poles used in the design of the permanent magnet field.

ROTOR INERTIA (J_M) is the moment of inertia of the armature about its axis of rotation.

MOTOR WEIGHT is the total weight of the motor parts. For frameless motors, the weight includes the armature, field assembly and brush assembly, but does not include any keepers. For housed motors the weight includes the armature, field assembly, brush assembly, housing, bearings, shaft, and any other housing components.

Winding Constants

There are six parameters, or winding constants, listed on the individual data page for each motor which vary according to the winding that is used in the model. The variations are governed by the number of wire turns per coil and the wire size.

In most cases, values for more than one winding are listed. If none of the specified windings are suitable for a given application, additional windings are available by consulting the factory. The winding constants for different gage wire may be calculated by the method shown in Table 1-1. Following is a brief description of each winding parameter:

VOLTAGE, STALLED AT T_P (V_P) is the nominal voltage required to develop peak torque when

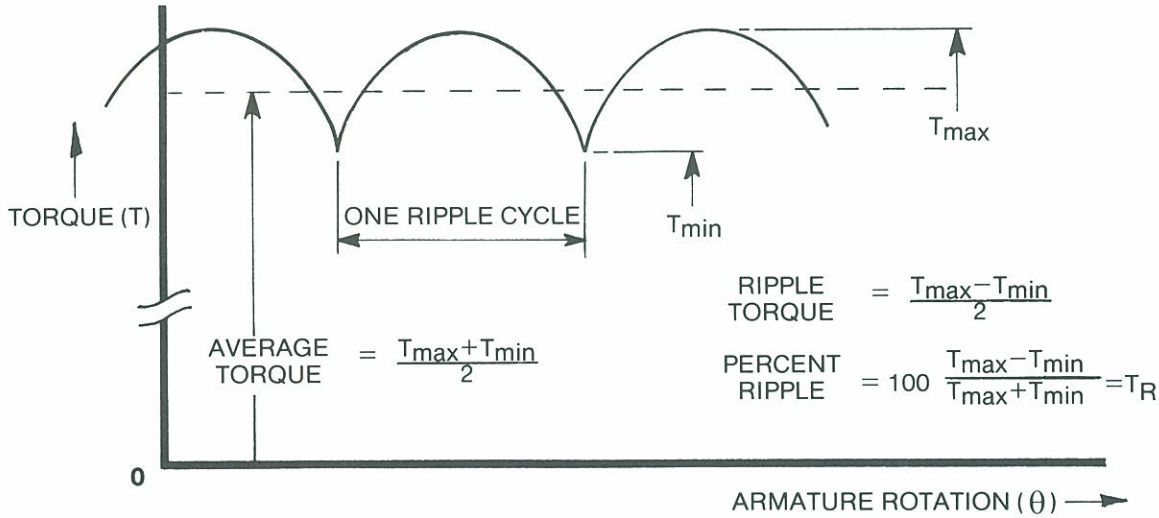


Figure 1-7

Definition of torque ripple percentage factor listed in data sheets.

the rotor speed is zero and the winding temperature is 25°C. As such, V_P is the product of I_P and R_M. At any temperature greater than 25°C, the required voltage is greater than V_P because resistance increases with temperature. To maintain peak torque, therefore, the voltage must be increased.

PEAK CURRENT (I_P) is the current required to obtain the rated torque T_P from the motor. For Alnico magnet motors, I_P is the maximum allowable value of current that can be used in the designated winding. In these units, exceeding the value of I_P may demagnetize the permanent magnet field to some extent and cause a permanent reduction in torque per unit current. If it is desired to operate Alnico units at current values in excess of I_P, the factory should be consulted for additional information. Rare earth magnet motors can be operated at current values greater than I_P without demagnetization of the PM field. The limits of thermal capacity of the motor and the current density rating of the brushes must not be exceeded.

TORQUE SENSITIVITY (K_T) is the ratio of developed torque to armature input current for the designated winding. This torque-current relationship prevails regardless of armature speed. Thus, any value of current in a winding will develop a corresponding value of torque whether the armature is at standstill or is running forward or backward at any speed. Normally the tolerances on K_T are ±10%.

BACK EMF CONSTANT (K_B) is the ratio of voltage generated in the armature to the speed of the armature. Since both K_B and K_T are determined by the same factors, K_B is directly proportional to K_T. Normally the tolerances on K_B are ±10%. K_B is expressed in volts per rad/s.

DC RESISTANCE (R_M) is the resistance measured between the motor terminals at 25°C as shown in Figure 1-8. The normal tolerances on R_M are ±12.5%. Approximately three-fourths of this tolerance is due to changes in brush resistance that occur with commutation. The remaining one-fourth of the tolerance is due to variations in the winding resistance. Since the actual temperature of a motor in a given application is usually different from the 25°C at which R_M is stated, it is useful to know that the change in resistance of copper wire per unit change in temperature is approximately 0.4% per °C.

INDUCTANCE (L_M) is the series equivalent of armature inductance as measured at the motor terminals. It is usually measured at 60 Hz and normally has tolerances of ±30%.

Winding Designation

In many applications, the motor is not the first element of a system to be specified. If a power supply or amplifier is specified before the motor, the motor must be selected to match the voltage and current characteristics of the system. Variations in the rated voltage and current for a given motor model are achieved by changing the number of turns and the size of the wire used for the winding. In this manner, a "family" of motors is developed which differ only in the values of the winding constants discussed in the previous section. The peak voltage, torque sensitivity and back EMF constant vary in direct proportion

WINDING CONSTANT		NEW VALUE FOR HEAVIER WIRE	NEW VALUE FOR FINER WIRE
DC Resistance (25°C)	R_M	$R_M / (1.59)^n$	$R_M \times (1.59)^n$
Voltage, stalled at T_P	V_P	$V_P / (1.26)^n$	$V_P \times (1.26)^n$
Peak current	I_P	$I_P \times (1.26)^n$	$I_P / (1.26)^n$
Torque Sensitivity	K_T	$K_T / (1.26)^n$	$K_T \times (1.26)^n$
Back EMF Constant	K_B	$K_B / (1.26)^n$	$K_B \times (1.26)^n$
Inductance	L_M	$L_M / (1.59)^n$	$L_M \times (1.59)^n$

Table 1-1 illustrates the method used to calculate new winding parameters from an existing set of winding parameters. "n" is an integer representing the difference in wire gage between the existing winding and the desired winding, that is, the number of wire sizes larger or smaller than the existing wire. The factors 1.26 and 1.59 are used to calculate the new winding parameters because each step in the wire gage system involves the same degree of change in wire cross-section and in resistance per unit length. If the new winding being calculated is outside the extremes of the windings listed on the data page, the factory should be consulted. There are limitations on wire size because it can be too fine to work with or too large to fit in the lamination slot.

Table 1-1

to the number of turns in the winding. The peak current varies inversely with the number of turns, and the resistance and inductance vary as the square of the number of turns. When a new winding is designed, the number of turns and the wire size are chosen so that approximately the same total volume of copper is used. This means that the motor size constants, such as peak torque, motor constant, etc., do not change as a result of a winding change.

Different windings are specified by a letter which follows the model number of the unit. For example, a T-5730 can be specified with a 19.8 volt winding as a T-5730-A, or with a 37.8 volt winding as a T-5730-C. In order for a model number to be complete, it must include a winding designation letter.

The individual data page for each unit usually lists several windings. If none of the specified windings are suitable for the system requirements, an alternate winding can be derived by the procedure shown in Table 1-1. If an alternate winding is determined in this manner, the factory should be consulted to verify that a unit with the new winding parameters can be manufactured.

Electro-magnetic interference (EMI) can be transmitted from a source to a sensitive location in four ways: (1) direct conduction along wires; (2) capacitive coupling between source wires and nearby leads; (3) inductive coupling between wires, and (4) direct radiation due to an "antenna effect."

The first three of these transmission pathways are of particular interest in the application of torque motors. These pathways are illustrated in Figure 1-9, in which noise voltages are: (1) conducted along the motor supply leads from the amplifier; (2) transferred to nearby tachometer generator leads by capacitive coupling, and (3) transferred to nearby tachometer generator leads by inductive coupling. Because the tachometer generator leads terminate at the input of the preamplifier, voltages of a few microvolts may be sufficient to interfere with proper system operation.

The simplest way to correct such brush noise conditions is to keep the armature leads separated from the generator leads. If this does not sufficiently attenuate the noise, or if it is not feasible to separate the cables, the use of a

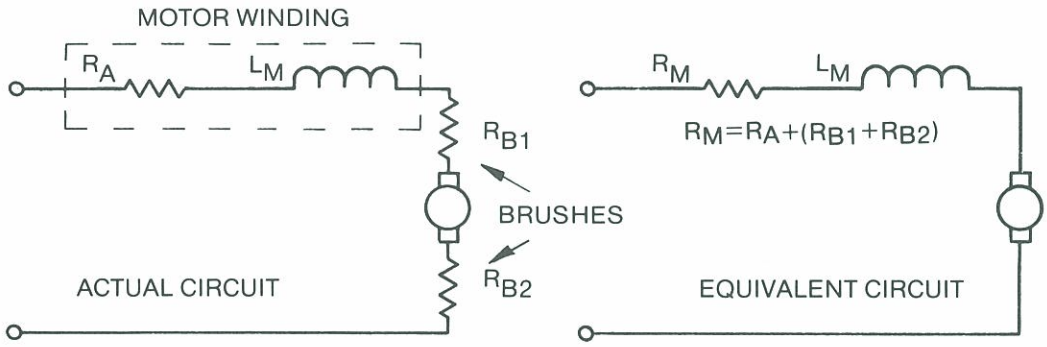


Figure 1-8

Motor terminal-resistance R_M is the sum of armature and brush resistance. The equivalent circuit is used for servo design calculations.

BRUSH NOISE CONSIDERATIONS

In a DC motor, the direction of current flow in each armature coil is reversed for each change in the magnetic circuit polarity. This switching process is known as commutation. As the motor operates it generates a self-induced EMF which can produce electrical noise at the brushes. By careful design of the torque motor, brush noise can be minimized. However, arcing transients may occasionally find their way into sensitive control circuits and produce undesirable results.

shielded, twisted pair, carefully grounded at the preamplifier end only, is recommended for the tachometer generator leads. In some cases, it may be desirable to also use a shielded, grounded pair for the armature leads, as in Figure 1-10.

The most important factor in the elimination of brush noise is a *continuous system ground*. The preamplifier, amplifier and cable points should all be connected to a common ground. In some cases it may be necessary to provide a separate ground bus.

Another method of reducing brush noise is by connecting a capacitor across the input terminals *as close to the brush ring as possible.* The value of this capacitor should not exceed

$$C = \frac{500L_M}{R_M^2}$$

where L_M is in millihenries, R_M is in ohms, and C is in microfarads.

opposite the brush ring assembly. The structures designed to support the field assembly must be sufficiently strong to avoid any distortion of the field assembly when it is bolted in place. The field assemblies of Alnico magnet motors must be mounted in non-magnetic structures in order to preserve the specified performance characteristics. Satisfactory materials are aluminum, brass and non-magnetic stainless steel. The minimum thickness of non-magnetic

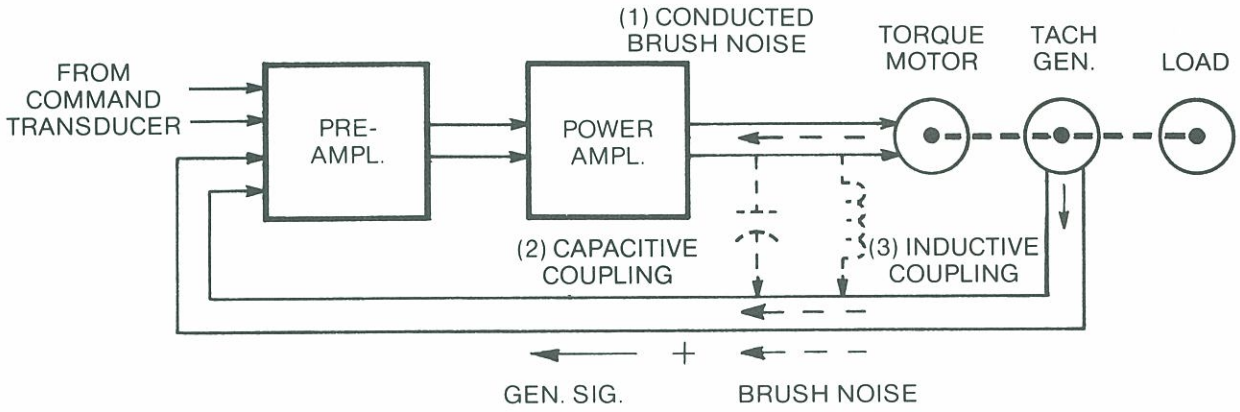


Figure 1-9

Methods by which electromechanical interference is transmitted to control circuitry.

HOUSING DESIGN for FRAMELESS MOTORS

The frameless motors in this catalog fall into three basic configuration categories: frameless, frameless with armature adapter machined to existing mounting dimensions (See Figure 1-11) and units with a partial housing and mounting flange or tabs (See Figure 1-12).

For the purely frameless units and units with armature adapters, a housing for the field structure must be incorporated into the system design. In general, the field structure is piloted on the outer diameter and is mated on the face material required to separate the field structure from magnetic material is ¼ inch. Samarium Cobalt motors may be mounted in magnetic or non-magnetic housings.

Units with a partial housing do not require a special field housing. They can be bolted onto a flat plate, and thus are ideal for mounting on the exposed end of a shaft. Mounting features for this arrangement include round or square flanges or tabs.

To maintain the integrity of the mechanical and magnetic structure of the motor, the armature should be mounted on a shaft in such a way as to minimize eccentricity around any point in

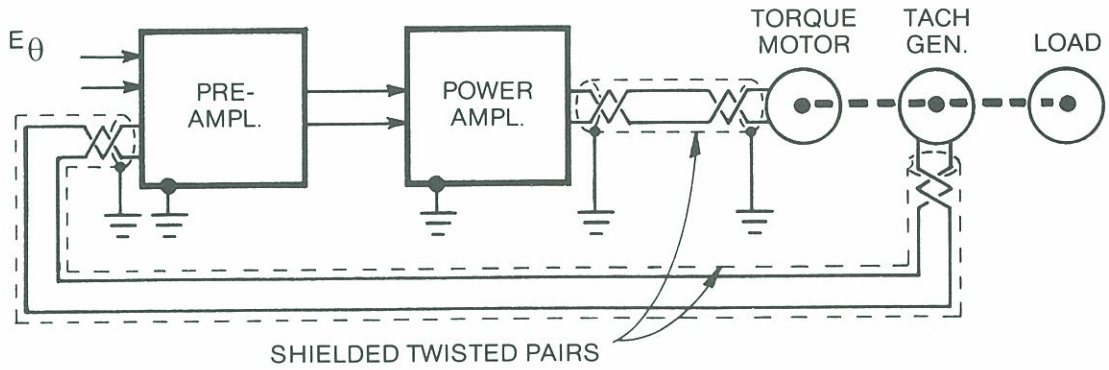


FIGURE 1-10

Recommended methods of protection against EMI.

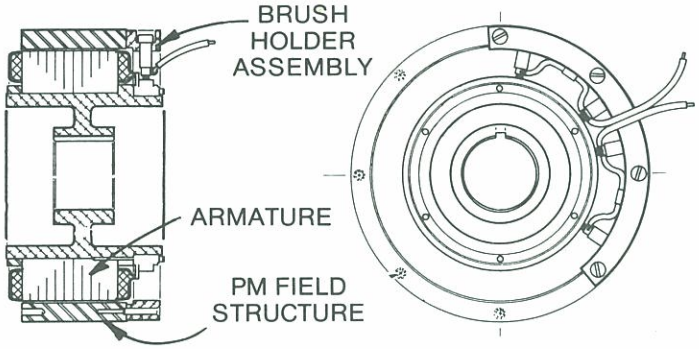


Figure 1-11

Frameless torque motor with armature adapter machined to existing mounting dimensions.

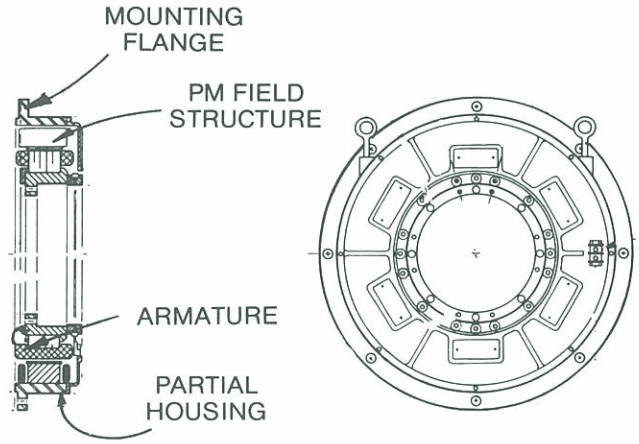


Figure 1-12

Frameless unit with partial housing.

the armature plane. Each individual data page specifies a required concentricity between the stator and rotor. This mounting requirement stems from a maximum run-out of one-third of the air gap dimension.

The rotor bore, as indicated on the individual data pages, may be used as a pilot for shaft mounting. Standard rotor-to-shaft mounting methods include shrink fits, interference fits, adhesives (such as Loctite®)* and axial clamping of both sides of the laminations. Units can be supplied with keyways or with adapter hubs suitable for mounting directly onto the customer's shaft.

*Trademark of Loctite Corp., Newington, CT

MOTOR HANDLING and STORAGE

Frameless Motors

Because frameless DC motors are designed to be an integral part of system equipment, they require some special handling procedures. Improper handling in shipping or installation can substantially degrade motor performance.

When received, a frameless motor should be unpacked carefully to avoid damaging the brush ring assembly or the commutator surface. Precautions must be taken to avoid bending any of the brush springs or scoring the mounting diameters. The commutator surface must remain free of scratches, fingerprints and oils. For Alnico magnet motors, DO NOT LOOSEN OR REMOVE THE FLUX KEEPERS until installation (See page *xvii* for details). If motors must be transported, they should be packed in the original shipping packages for protection against shock and vibration. Electrical performance tests and mechanical inspection of parts for critical dimensions are performed at the factory before shipment. If performance tests are required by the customer at receiving inspection, they should be limited to those tests described on the Inland test data form which accompanies each unit.

Inland motor parts are tested, assigned serial numbers and guaranteed only as matched sets. Tested performance is not valid if parts are interchanged between motors.

In storage, containers and racks should be of non-magnetic materials. Field assemblies should be spaced a minimum of ½ inch apart. Motor parts should be protected against exposure to, or contact with, small magnetic particles such as iron filings, chips or dust. If such particles are attracted to the magnetic areas of the motor, they are very difficult to remove. In addition, should any material lodge in or across the motor airgap, performance may be seriously degraded.

Storing motor parts in normal factory ambient temperatures is acceptable. For extended storage, corrosion should be guarded against by storing the parts in a sealed plastic bag together with a desiccant suitable for protecting the motor against excessive humidity. The original packaging by the factory is adequate if it is kept intact.

Housed Motors

Inland housed motors require handling similar to that of conventional frame-type motors. Care should be taken to protect the unit against exposure to small magnetic particles such as iron filings, chips or dust.

As with frameless units, storage at factory ambient temperatures is acceptable. For extended storage, motors should be packaged with a desiccant to protect against excessive humidity. The original packaging by the factory is adequate if it is kept intact.

INSTALLATION

The exact manner in which frameless torque motors are installed varies with the motor. However, there are five basic methods, each of which depends upon the particular motor configuration: rare earth frameless, Alnico frameless and partially housed frameless with shipping clamp plate, clamp bolt or pole piece clamp.

The procedure to be followed when installing frameless rare earth magnet motors is as follows:

1) Insert the permanent magnet field assembly into the housing cavity allocated for it. If the housing material is magnetic, exert care to avoid sudden impact of stator against the housing.
2) Secure the field assembly to the housing with mounting screws. The screw size is specified on the motor drawing, but the screws are not provided.
3) Guide the rotor into its final position within the field assembly, being careful to avoid scratching the commutator surface or chipping the magnets. If possible, it is recommended that the rotor be wrapped with a piece of polyester film (such as Mylar®)* thinner than the air gap before it is inserted. Once the rotor is in place the polyester film should be removed.
4) Install the brush ring. Take care in slipping the brushes over the commutator. Avoid bending the brush springs or scratching the commutator surface. For proper position, line up the numbers marked on the stator and brush ring assembly. Then secure the brush ring assembly in place with the mounting screws provided.

Frameless Alnico units should be installed as follows:

1) Insert the permanent magnet field assembly into the housing cavity allocated for it. DO NOT LOOSEN OR REMOVE THE KEEPER.
2) Guide the rotor into its final position within the field assembly, being careful to avoid damage to the commutator surface.
3) Remove the keeper ring using the jack screw as shown in Figure 1-13.
4) Secure the field assembly to the housing with mounting screws. The screw size is specified on the motor drawing, but the screws are not provided.
5) Install the brush ring. Take care in slipping the brushes over the commutator. Avoid bending the brush springs or scratching the commutator surface. For proper position, line up the numbers marked on the stator and brush ring assembly. Then secure the brush ring assembly in place with the mounting screws provided.

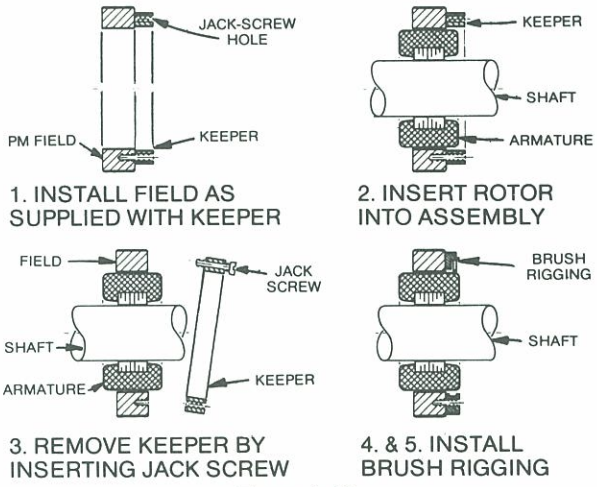


Figure 1-13
Keeper removal.

For partially housed Alnico units with shipping clamp-plates, typified by type T-10036 (See Figure 1-14) the rotor must not be removed from the stator or partial demagnetization and change of motor torque characteristics will occur. The field and armature assemblies are installed into the shaft and the field support as a single unit. The clamp plate is then removed to permit rotation of the armature. After removing the clamp plate, be sure to tighten the mounting bolts.

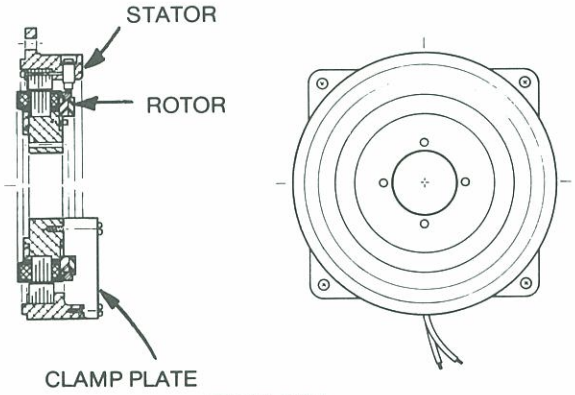


Figure 1-14
Clamp-plate motor, type T-10036.

*Trademark of DuPont, Wilmington, DE.

Partially housed Alnico units with clamp-bolt or pole-piece clamp are similar to each other in that the accessory clamp elements are simple screws. In the case of the clamp-bolt types, which are typified by the T-10035 motor (See Figure 1-15), securing the clamping bolts moves the rotor axially a sufficient amount to lock the rotor and field together at an existing interface.

The pole-piece clamp type, typified by the T-18002 motor (See Figure 1-16), locks the rotor to the field at the air gap by forcing a number of movable field pole-pieces radially inward until clamping action takes place. After installation of this type motor, the clamping set screws are loosened, and the main pole-piece stud nuts are retightened to secure the pole pieces in their proper position.

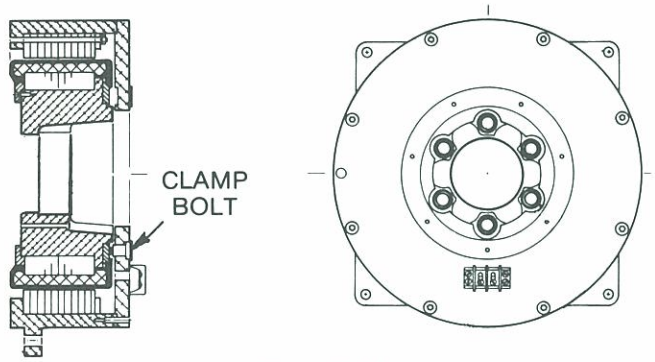


Figure 1-15
Clamp-bolt motor, type T-10035.

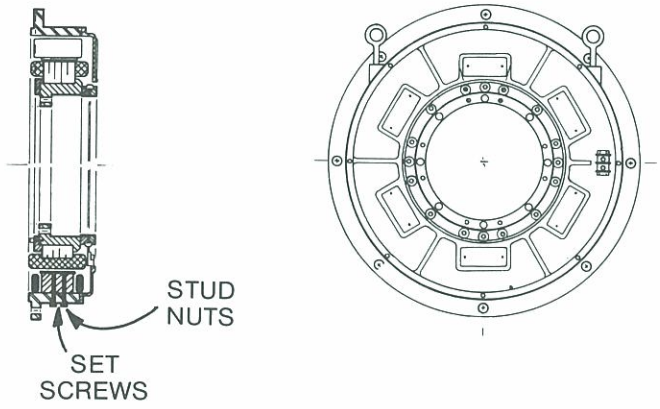


Figure 1-16
Pole-piece clamp motor, type T-18002.

TORQUE MOTORS

Torque motors are typically used in positioning or slow-speed rate applications where the accuracy is critical. The large diameter, narrow width configuration delivers high torque in small volume.

This section contains both frameless and housed versions of the basic torque motor.

Frameless Torquer Selection Guide (oz. in.)

MODEL NUMBER	Peak Torque @ Stall		Motor Constant	No Load Speed	Electrical Time Constant	Friction	Rotor Inertia	Physical Dimensions			Weight
	T_P oz. in.	P_P watts	K_M oz. in./$\sqrt{watt}$	ω_{NL} rad/sec	τ_e msec.	T_f oz. in.	J_M oz. in. sec.^{2}	OD in.	ID in.	Length in.	oz.
NT-0786	2.8	46	0.41	2300	0.13	0.20	4.5×10^{-5}	1.13	0.19	0.38	1.4
QT-0717	3.84	53	0.529	1940	0.12	0.25	4.5×10^{-5}	1.13	0.19	0.38	1.4
T-0709	6.6	60	0.85	1300	0.26	0.25	1.1×10^{-4}	1.13	0.19	0.56	1.6
QT-0707	7.7	50	1.09	925	0.25	0.30	1.1×10^{-4}	1.13	0.19	0.56	1.6
T-2003	9.5	41	1.48	610	0.10	0.40	1.6×10^{-3}	2.46	1.50	0.31	2.5
NT-0796	10.6	73	1.24	990	0.35	0.40	1.64×10^{-4}	1.13	0.19	0.75	2.3
QT-1106	11	49	1.57	636	0.14	0.60	3.2×10^{-4}	1.38	0.50	0.39	1.5
QT-1204	11	57	1.46	732	0.11	0.6	4.2×10^{-4}	1.50	0.63	0.39	1.7
QT-0706	12.3	63	1.55	725	0.32	0.40	1.6×10^{-4}	1.13	0.19	0.75	2.5
T-1218	15	63	1.9	580	0.31	0.5	6.0×10^{-4}	1.50	0.63	0.51	2.3
T-1259	15	40	2.4	374	0.50	0.50	5.7×10^{-4}	1.50	0.46	0.51	2.4
QT-1207	20	81.8	2.21	580	0.20	0.70	6.0×10^{-4}	1.50	0.63	0.51	2.3
T-1292	20	64	2.51	450	0.37	0.55	9.0×10^{-4}	1.75	0.62	0.53	2.8
T-1352	20	60	2.58	400	0.34	0.7	8.8×10^{-4}	1.94	0.62	0.51	4.3
T-1410	21	49	3.0	360	0.31	0.7	1.5×10^{-3}	1.94	0.62	0.51	5
NT-1319	24	64	3.0	375	0.29	0.8	8.8×10^{-4}	1.94	0.62	0.51	4.3
T-1915	24	36	4.0	209	0.22	1.9	4.0×10^{-3}	2.47	1.25	0.47	5
T-1242	25	55	3.4	307	0.68	1.1	1.5×10^{-3}	1.50	0.63	0.96	5.5
T-3001	26.5	9.6	8.55	51	0.23	2.8	1.5×10^{-2}	3.62	2.18	0.42	8
NT-1372	30	52	4.15	245	0.3	1.8	9.0×10^{-4}	1.94	0.62	0.54	4.4
QT-2406	30	53.5	4.1	250	0.13	1.8	5.4×10^{-3}	2.78	1.80	0.44	3.9
T-2413	30	50.5	4.22	238	0.20	1.7	6.0×10^{-3}	2.78	1.80	0.44	4
T-2509	30	48	4.33	220	0.25	1.0	6.0×10^{-3}	3.00	1.75	0.37	4.5
T-2804	30	67	3.66	320	0.30	1.5	8.6×10^{-3}	3.38	2.25	0.41	5.1
NT-1383	32	83	3.5	368	0.5	1.0	1.1×10^{-3}	1.94	0.62	0.67	6
T-2157	35	41	5.45	160	0.60	1.1	6.2×10^{-3}	2.81	1.00	0.62	8.8
T-1342	40	98	4.05	340	0.30	1.0	1.6×10^{-3}	1.94	0.62	0.84	7.6
QT-2104	48	39	7.7	114	0.50	1.8	6.0×10^{-3}	2.81	1.00	0.62	9.2
QT-2502	48	27	9.25	79	0.184	2.5	1.05×10^{-2}	3.00	1.75	0.61	9
QT-1217	50	165	3.9	467	0.38	1.1	1.5×10^{-3}	1.50	0.63	0.96	5.5
QT-1906	50	115	4.66	326	0.174	1.0	3.4×10^{-3}	2.38	1.25	0.50	5
QT-2202	52	40	8.28	107	0.844	2.5	8.5×10^{-3}	2.81	1.00	0.62	11
T-2314	54	57.5	7.1	150	0.66	1.7	9.0×10^{-3}	2.88	1.00	0.58	11
QT-1401	55	217	3.74	557	0.21	1.8	1.3×10^{-3}	1.94	0.63	0.54	4.4
T-1911	60	60	7.75	143	0.40	2.5	8.8×10^{-3}	2.34	1.25	0.85	9.5
T-2170	60	33.8	10.5	79	0.91	1.5	1.1×10^{-2}	2.81	1.00	1.00	13.8
QT-2504	60	55	8.1	128	0.29	1.8	1.1×10^{-2}	3.00	1.75	0.53	8
T-2516	60	55	8.1	127	0.43	1.8	1.1×10^{-2}	3.00	1.75	0.53	8
QT-1404	65	98	6.55	214	0.238	3.0	2.55×10^{-3}	1.94	0.63	0.84	8.4
QT-2105	75	35	12.8	65	0.77	3.0	1.1×10^{-2}	2.81	1.00	1.00	13.5
T-1421	77.4	112	7.31	205	0.55	2.0	2.3×10^{-3}	1.94	0.62	1.20	15
T-2809	85	103	8.4	170	0.30	3.5	2.0×10^{-2}	3.38	2.25	0.71	11
NT-1308	90	255	5.65	407	0.40	3.0	3.5×10^{-3}	1.94	0.62	1.86	16.1
QT-1903	90	107	8.7	167	0.22	2.8	8.8×10^{-3}	2.38	1.25	0.85	9.5
T-2719	97	37.5	15.8	54	0.77	4.3	2.2×10^{-2}	3.38	1.69	0.69	15

Continued on next page.

Frameless Torquers (oz. in.) cont.

MODEL NUMBER	Peak Torque @ Stall		Motor Constant	No Load Speed	Electrical Time Constant	Friction	Rotor Inertia	Physical Dimensions			Weight
	T_P oz. in.	P_P watts	K_M oz. in./$\sqrt{watt}$	ω_{NL} rad/sec	τ_e msec.	T_f oz. in.	J_M oz. in. sec.^{2}	OD in.	ID in.	Length in.	oz.
T-2967	100	67.5	12.2	95	1.2	2	3.5×10^{-2}	3.73	1.64	0.89	17.5
QT-4101	100	76	11.5	107	0.15	4.0	4.7×10^{-2}	4.59	3.33	0.43	9.5
T-2215	108	41	16.9	54	1.74	3.3	1.7×10^{-2}	2.81	1.00	1.13	20
T-2171	120	50	17.0	57	1.5	3.0	1.9×10^{-2}	2.81	1.00	1.50	25
QT-3104	149.5	97.2	15.2	92	0.38	3.0	3.4×10^{-2}	3.63	2.50	0.80	14
T-4601	153.6	200	10.94	184	0.467	4.8	9.2×10^{-2}	5.13	4.00	0.58	13.3
QT-1406	157	347	8.42	313	0.277	3.5	3.73×10^{-3}	1.94	0.63	1.11	12
T-2955	163	77	18.6	67	1.6	2.5	4.42×10^{-2}	3.73	1.64	1.09	24
QT-4602	163	211	11.33	183	0.265	5.0	8.26×10^{-2}	5.13	4.00	0.56	13.3
T-3203	192	87	20.54	63	2.3	3.8	6.72×10^{-2}	4.09	2.00	1.09	25.6
T-3910	192	50	26.88	36	0.84	8.06	6.5×10^{-2}	4.56	2.94	0.69	17.6
T-4436	192	70	23.04	51	0.70	5.76	1.06×10^{-1}	5.13	3.50	0.65	19.2
T-2987	211	113	19.97	75	2.13	5.76	6.1×10^{-2}	3.73	1.64	1.34	32

Frameless Torquer Selection Guide (lb. ft.)

MODEL NUMBER	Peak Torque @ Stall		Motor Constant	No Load Speed	Electrical Time Constant	Friction	Rotor Inertia	Physical Dimensions			Weight
	T_P lb. ft.	P_P watts	K_M lb. ft./$\sqrt{watt}$	ω_{NL} rad/sec	τ_e msec.	T_f lb. ft.	J_M lb. ft. sec^2	OD. in.	ID in.	Length in.	lbs.
T-2950	1.2	79	0.135	48	2.13	0.017	2.9×10^{-4}	3.73	1.64	1.34	2.2
T-3912	1.2	34.8	0.201	21.6	1.25	0.05	6.1×10^{-4}	4.56	2.94	0.88	1.9
NT-2146	1.25	75	0.15	42.1	1.5	0.04	1.4×10^{-4}	2.81	0.88	2.51	3.0
T-5403	1.3	120	0.119	68	0.67	0.04	8.6×10^{-4}	6.13	4.50	0.67	1.2
T-3208	1.5	113	0.14	56	3.0	0.027	4×10^{-4}	4.09	2.00	1.34	2.4
T-4412	1.5	120	0.139	58	0.84	0.04	6.2×10^{-4}	5.13	3.50	0.78	1.5
T-2959	1.7	110	0.16	47	2.5	0.026	3.3×10^{-4}	3.73	1.64	1.59	2.5
T-4036	1.8	87.8	0.19	36	1.79	0.035	8.7×10^{-4}	5.13	2.39	1.25	2.9
T-5406	2	52	0.28	19.2	1.5	0.12	1.5×10^{-3}	6.13	4.50	1.17	3.0
T-8902	2.08	61	0.27	21.6	0.40	0.05	5.4×10^{-3}	9.69	7.94	0.81	4.5
QT-7602	2.1	16.7	0.514	5.9	0.58	0.30	6.0×10^{-3}	8.50	6.88	1.30	7.3
QT-3801	2.4	187	0.175	57.5	0.58	0.05	3.6×10^{-4}	4.50	2.67	0.69	1.3
T-2406	2.5	285	0.15	84	1.75	0.05	1.6×10^{-4}	3.18	1.44	1.55	1.9
QT-3102	2.5	263	0.154	77	1.2	0.041	4.1×10^{-4}	3.73	1.64	1.24	2
QT-2404	3	260	0.19	64	1.04	0.062	2.0×10^{-4}	3.18	1.00	1.53	2.4
QT-3103	3.3	190	0.24	39	1.52	0.057	5.7×10^{-4}	3.73	1.64	1.70	3.1
T-4076	3.6	127	0.32	26	2.7	0.052	1.4×10^{-3}	5.13	2.39	1.75	5.6
QT-3403	4	126	0.357	23.2	2.1	0.10	9.8×10^{-4}	4.10	2.00	1.80	4
QT-7004	4	58.2	0.524	10.7	2.0	0.20	6.3×10^{-3}	7.73	5.25	0.94	4.2
QT-6302	4.2	67	0.51	12	1.44	0.16	6.3×10^{-3}	7.00	4.73	1.29	6.3
QT-4402	4.2	160	0.335	27.7	1.10	0.12	1.52×10^{-3}	5.13	3.25	1.23	3.0
QT-3802	4.8	256	0.30	39.3	0.84	0.10	7.2×10^{-4}	4.50	2.67	1.07	2.6
QT-2603	5	313	0.28	46	2.1	0.10	4.0×10^{-4}	3.18	1.14	2.35	3.5
QT-5404	5	227	0.33	33	0.60	0.15	1.9×10^{-3}	6.13	4.50	1.17	2.9
T-6204	6	103	0.59	12.8	2.49	0.15	6.5×10^{-3}	7.20	3.95	1.32	7.0
T-7501	6.5	177	0.49	20	1.60	0.25	1.1×10^{-2}	8.69	5.94	1.26	7.5
T-5730	7	261	0.433	28	3.13	0.09	5.0×10^{-3}	7.20	3.95	1.63	7.3
QT-7201	9	490	0.41	40	0.79	0.15	5.6×10^{-3}	8.20	5.94	1.08	4
T-6205	10	125	0.87	9.2	2.6	0.35	9.0×10^{-3}	7.20	3.95	1.97	10
QT-12901	10	135	0.86	10	0.37	0.4	2.4×10^{-2}	13.63	12.13	1.10	5
QT-6202	11	330	0.61	22	1.8	0.18	5.8×10^{-3}	7.20	3.95	1.24	6.2
T-7202	11	325	0.61	22	3.15	0.15	1.0×10^{-2}	9.00	5.37	1.63	10.3
T-15602	11	198	0.78	13.3	2.2	0.25	8.0×10^{-2}	16.50	13.88	1.34	13
T-11306	12.4	260	0.77	16	1.0	0.37	2.0×10^{-2}	11.97	10.25	1.00	7.2
T-8905	13.6	666	0.53	36.2	1.38	0.22	1.5×10^{-2}	9.69	7.63	1.47	9.9
T-5745	14	357	0.74	18.8	5.3	0.15	8.0×10^{-3}	7.20	3.95	2.37	15
T-13301	14.4	260	0.9	13	1.0	0.4	3.2×10^{-2}	14.00	12.25	1.05	8.5
QT-6301	20	576	0.83	21	2.1	0.25	1.0×10^{-2}	7.00	4.73	1.99	9
QT-9704	20	235	1.3	8.6	1.5	0.72	2.5×10^{-2}	11.00	8.00	1.56	10.5
T-9901	20	400	1.0	14.5	4.0	0.25	2.5×10^{-2}	12.00	8.00	1.75	15
T-11308	20	218	1.35	8	1.4	0.71	3.0×10^{-2}	11.97	10.05	1.27	9
T-7203	22	530	0.96	18	5.7	0.25	1.9×10^{-2}	9.00	5.16	2.55	18.3
QT-11302	22	232	1.44	7.8	0.93	1.0	3.0×10^{-2}	11.97	10.05	1.28	8.7
QT-7802	23	620	0.92	19.9	2.45	0.37	1.6×10^{-2}	9.00	5.37	1.65	10.2
QT-6205	25	627	1.0	18.5	2.41	0.35	1.0×10^{-2}	7.20	3.95	1.99	12

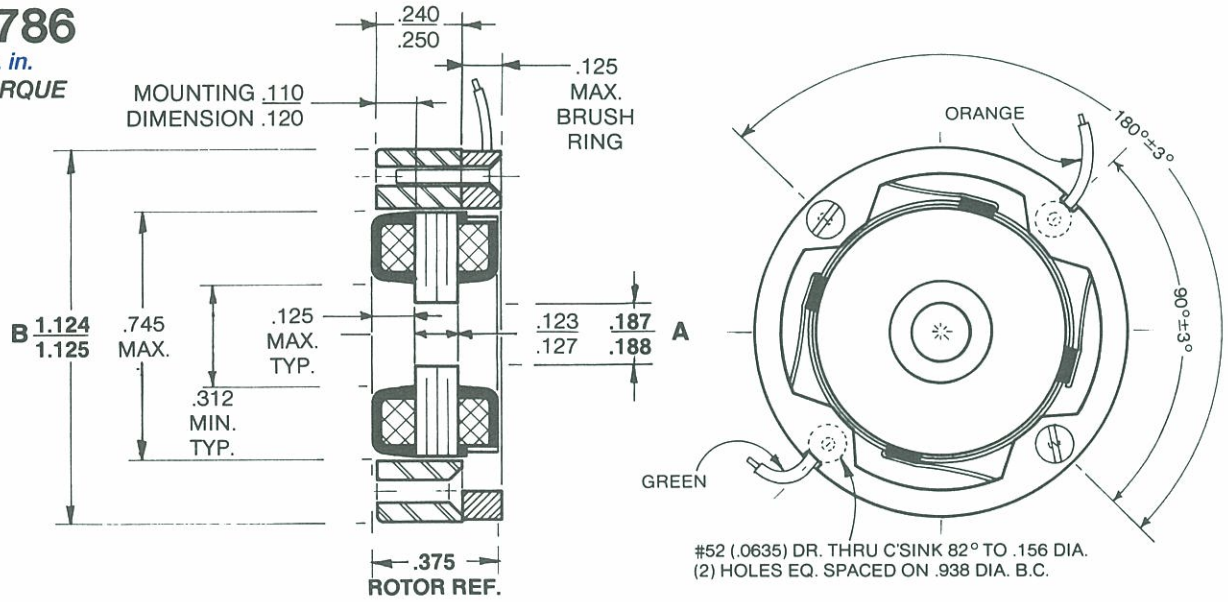
Continued on next page.

Frameless Torquers (lb. ft.) cont.

MODEL NUMBER	Peak Torque @ Stall		Motor Constant	No Load Speed	Electrical Time Constant	Friction	Rotor Inertia	Physical Dimensions			Weight
	T_P lb. ft.	P_P watts	K_M lb. ft./$\sqrt{watt}$	ω_{NL} rad/sec	τ_e msec.	T_f lb. ft.	J_M lb. ft. sec^2	OD. in.	ID in.	Length in.	lbs.
QT-7003	25	520	1.1	15	2.4	0.35	1.3×10^{-2}	7.73	5.25	1.94	10.3
QT-6401	26	657	1.01	18.7	3.3	0.40	1.2×10^{-2}	7.75	4.25	2.10	12.6
T-7250	27.5	582	1.14	15	6.5	0.21	2.3×10^{-2}	9.00	5.16	2.94	22.5
T-15603	30	450	1.41	11	3.6	0.35	0.14	16.50	13.88	1.84	22
T-10036	35	740	1.28	16	3.5	0.5	6.0×10^{-2}	13.70	3.50	3.62	52.5
QT-6207	40	655	1.56	12	3.0	0.60	2.0×10^{-2}	7.20	3.95	3.49	24
T-9902	40	512	1.77	9.5	6.3	0.65	5.0×10^{-2}	12.00	8.00	2.50	32.3
QT-7801	46	800	1.63	12.8	3.8	0.50	2.8×10^{-2}	9.00	5.16	2.40	20
QT-11301	50	331	2.76	4.9	1.2	1.6	6.0×10^{-2}	11.97	10.05	2.40	17.5
QT-17301	54	386	2.75	5.3	1.56	1.2	0.13	18.25	15.75	1.30	18
QT-7809	60	615	2.42	7.5	4.36	0.83	4.1×10^{-2}	9.00	5.16	3.40	31
T-9908	70	720	2.61	7.8	6.4	0.6	0.11	12.00	7.75	3.65	50
T-10020	100	930	3.3	7	7.5	2	0.18	13.70	3.50	6.12	110
T-10035	100	1040	3.10	7.7	5.77	1.0	0.178	13.25	3.38	5.31	95.5
QT-11303	100	499	4.5	3.6	0.76	2.5	0.11	12.25	10.05	4.60	39
QT-12506	123	794	4.36	4.8	3.24	1.2	0.17	14.00	10.50	3.00	42
T-10071	150	1470	3.9	7.2	6.6	1.8	0.22	13.70	3.50	7.45	145
QT-12505	200	1095	6.04	4	3.78	1.6	0.27	14.00	10.50	4.48	67
T-12008	201	2628	3.93	9.6	8.33	1.0	0.50	16.06	6.00	7.50	194
T-18002	300	1452	7.85	3.6	20.0	3.0	1.40	23.69	10.35	5.94	300
QT-23502	700	1310	19	1.4	4.8	7.0	2.9	25.45	20.59	6.00	230
T-18004	900	3435	15.3	2.8	25.0	4.0	3.10	23.56	9.38	10.56	650
T-24005	1000	7000	12	5	12.5	5	8	30.00	18.00	8.00	730
T-36010	1500	4900	21	2.4	14	10	15	41.75	27.75	6.75	820
T-18031	1600	5600	21.4	2.5	23	6	4.2	23.51	9.38	14.75	850
T-36001	3000	6300	37.8	1.6	22	12	26	41.75	25.62	10.25	1360

NT-0786

2.8 oz. in.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .0015 (.003 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#28 AWG TYPE 'ET' TEFLON COATED PER MIL W-16878, 23" MIN. LG.
(FREE TO EXIT FACE AND/OR O.D.)

SIZE CONSTANTS

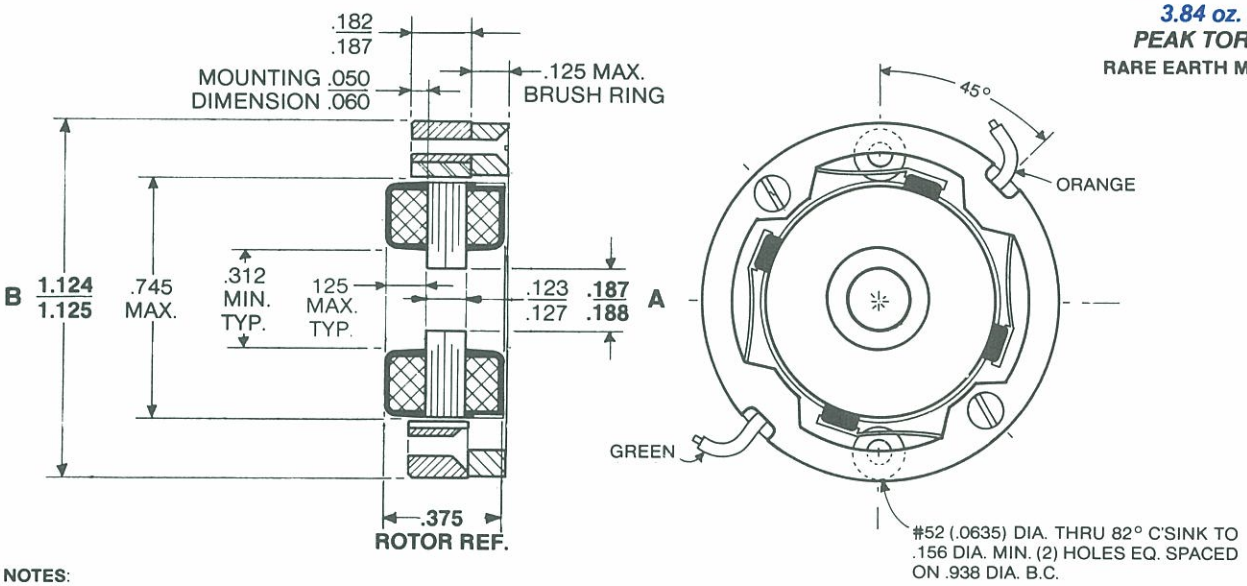
		Value	Units
Peak Torque Rating - T_P		2.8	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		46	WATTS
Motor Constant - K_M		0.41	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		2300	RAD/S
Electrical Time Constant - τ_E		0.13	MS
Static Friction (Max.) - T_F		0.20	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.2×10^{-3}	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	6.0×10^{-5}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		45	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		4.5×10^{-5}	OZ.IN.S^2
Motor Weight		1.4	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	11.8	18.8	29.6	37.5			
Peak Current - I_P	AMPERES	Rated	3.93	2.50	1.56	1.25			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	0.712	1.12	1.79	2.24			
Back EMF Constant - K_B	V per RAD/S	±10%	0.005	0.008	0.013	0.016			
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.00	7.50	19.0	30.0			
Inductance - L_M	mH	±30%	0.40	1.0	2.5	4.0			

QT-0717

3.84 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .0015(.003 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:

#28 AWG TYPE "ET" TEFLON COATED PER MIL W-16878, 23" MIN. LENGTH (FREE TO EXIT FACE AND/OR O.D.)

SIZE CONSTANTS

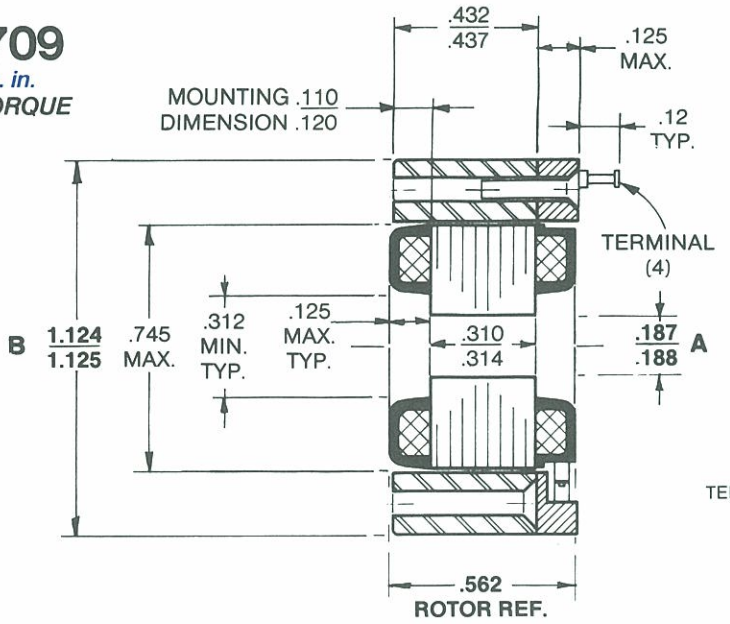
		Value	*Units*
Peak Torque Rating - T_P		3.84	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		53	WATTS
Motor Constant - K_M		0.529	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		1940	RAD/S
Electrical Time Constant - τ_E		0.120	MS
Static Friction (Max.) - T_F		0.25	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.98×10^{-3}	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	3.0×10^{-4}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		45	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		4.50×10^{-5}	OZ.IN.S^2
Motor Weight		1.4	OZ.

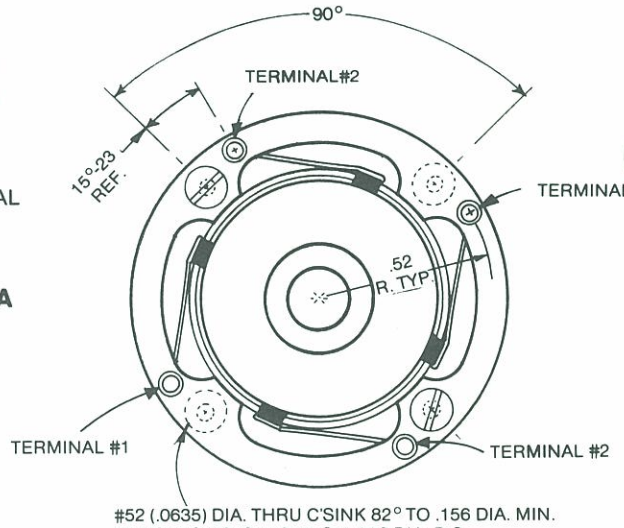
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	19.9	50.3	25.1	9.93	31.4		
Peak Current - I_P	AMPERES	Rated	2.65	1.06	2.11	5.20	1.68		
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	1.45	3.64	1.82	0.738	2.29		
Back EMF Constant - K_B	V per RAD/S	±10%	0.010	0.026	0.013	0.005	0.016		
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.50	47.5	11.9	1.91	18.7		
Inductance - L_M	mH	±30%	0.90	5.7	1.4	0.23	2.2		

T-0709

6.6 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SUPPLIED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINALS #1, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

SIZE CONSTANTS

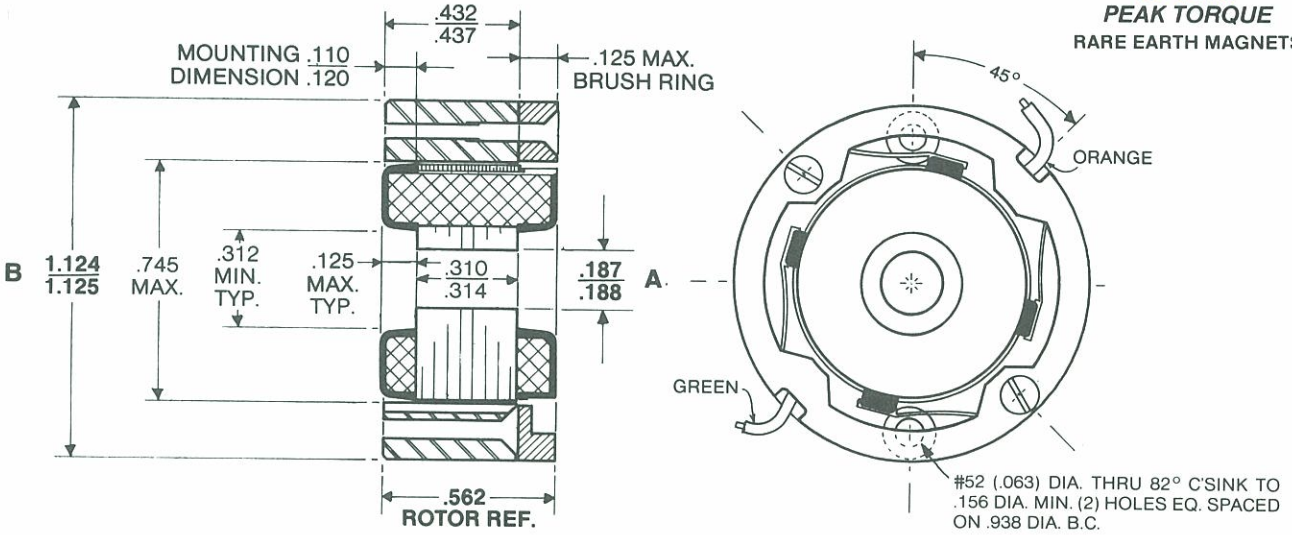
		Value	Units
Peak Torque Rating - T_P		6.6	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		60	WATTS
Motor Constant - K_M		0.85	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		1300	RAD/S
Electrical Time Constant - τ_E		0.26	MS
Static Friction (Max.) - T_F		0.25	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.005	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	1.4×10^{-4}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		34	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.1×10^{-4}	OZ.IN.S^2
Motor Weight		1.6	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	27.6	13.9	17.5	20.6	35.5	44.9	
Peak Current - I_P	AMPERES	Rated	2.12	3.93	3.44	2.77	1.74	1.33	
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	3.12	1.68	1.92	2.4	3.8	4.95	
Back EMF Constant - K_B	V per RAD/S	±10%	0.022	0.012	0.014	0.017	0.027	0.035	
DC Resistance (25°C) - R_M	OHMS	±12.5%	13.0	3.5	5.1	7.4	20.4	33.8	
Inductance - L_M	mH	±30%	3.4	0.95	1.4	2.2	4.9	8.5	

QT-0707

7.7 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .0015(.003 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE "ET" TEFLON COATED PER MIL W-16878, 23" MIN. LENGTH. (FREE TO EXIT FACE AND/OR O.D.)

SIZE CONSTANTS

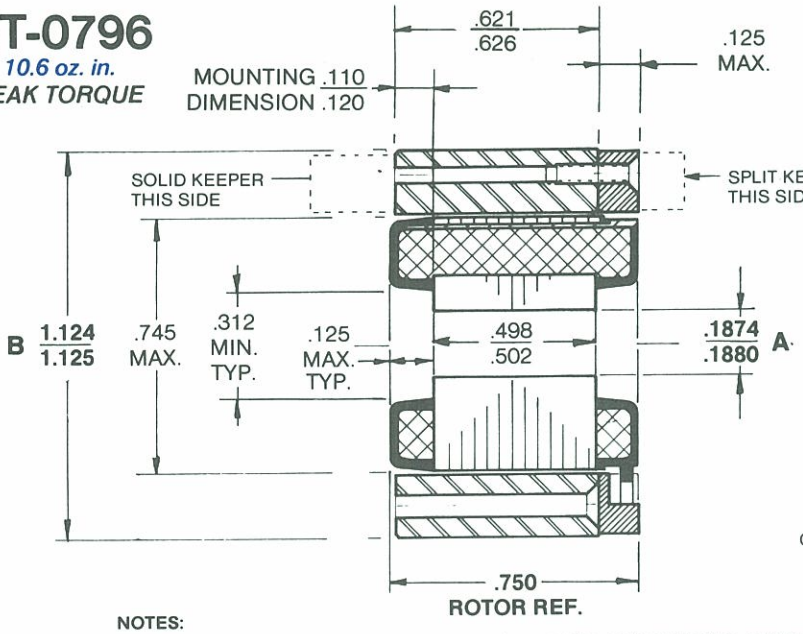
		Value	Units
Peak Torque Rating - T_P		7.7	OZ.IN.
Power Input, Stalled at T_P (25°C) - P_P		50	WATTS
Motor Constant - K_M		1.09	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		925	RAD/S
Electrical Time Constant - τ_E		0.25	MS
Static Friction (Max.) - T_F		0.30	OZ.IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.0083	OZ.IN. PER RAD/S
	Infinite Impedance - F_I	0.0001	OZ.IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		33	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.1×10^{-4}	OZ.IN.S^2
Motor Weight		1.6	OZ.

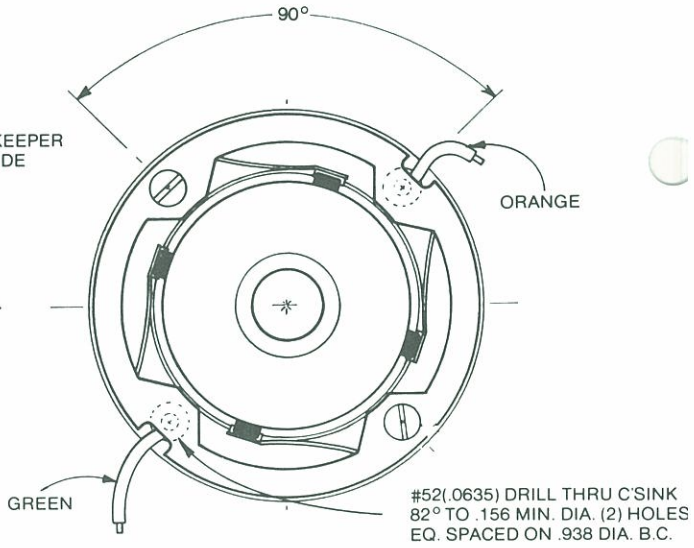
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	33.3	26.6	21.0	16.5	13.3	10.5	8.32
Peak Current - I_P	AMPERES	Rated	1.50	1.90	2.39	3.00	3.79	4.78	5.86
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	5.13	4.06	3.22	2.57	2.03	1.61	1.31
Back EMF Constant - K_B	V per RAD/S	±10%	0.036	0.029	0.023	0.018	0.014	0.012	0.009
DC Resistance (25°C) - R_M	OHMS	±12.5%	22.2	14.0	8.80	5.50	3.50	2.20	1.42
Inductance - L_M	mH	±30%	5.5	3.4	2.2	1.4	0.85	0.55	0.36

NT-0796

10.6 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR WITH (2) KEEPERS. **CAUTION:** DO NOT REMOVE KEEPERS UNTIL ROTOR AND STATOR ARE FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .0015 (.003 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD. WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — **CAUTION:** MAXIMUM LEAD TEMPERATURE NOT TO EXCEED 400°F.
5. — TYPICAL BRUSH LIFE > 10^7.
6. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE 'ET' TEFLON COATED PER MIL W-16878 23"MIN. LG.
(FREE TO EXIT FACE AND/OR O.D.)

SIZE CONSTANTS

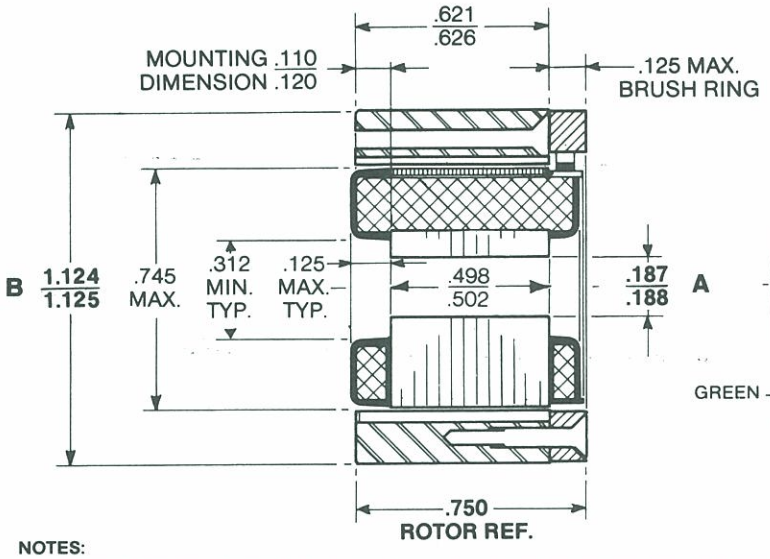
		Value	Units
Peak Torque Rating - T_P		10.6	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		73	WATTS
Motor Constant - K_M		1.24	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		990	RAD/S
Electrical Time Constant - τ_E		0.35	MS
Static Friction (Max.) - T_F		0.40	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.0107	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	2×10^{-4}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		25	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.64×10^{-4}	OZ.IN.S^2
Motor Weight		2.3	OZ.

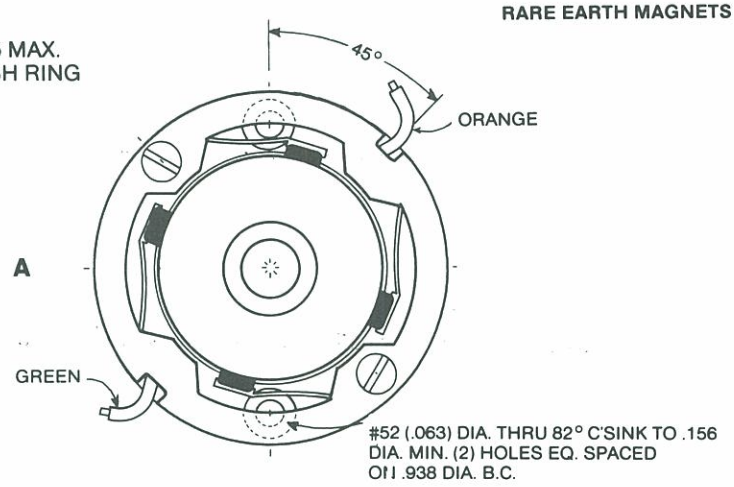
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	21.8	27.6	13.8				
Peak Current - I_P	AMPERES	Rated	3.36	2.65	5.30				
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	3.15	4.00	2.00				
Back EMF Constant - K_B	V per RAD/S	±10%	0.022	0.028	0.014				
DC Resistance (25°C) - R_M	OHMS	±12.5%	6.5	10.4	2.60				
Inductance - L_M	mH	±30%	2.3	3.7	0.93				

QT-0706

12.3 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY. STATOR ASSEMBLY MUST BE MOUNTED WITH MAGNETIC STEEL SCREWS.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .0015(.003 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE $\times 10^7$ REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE "ET" TEFLON COATED PER MIL W-16878, 23" MIN. LENGTH. (FREE TO EXIT FACE AND/OR O.D.)

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		12.3	OZ.IN.
Power Input, Stalled at T_P (25°C) - P_P		63	WATTS
Motor Constant - K_M		1.55	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		725	RAD/S
Electrical Time Constant - τ_E		0.315	MS
Static Friction (Max.) - T_F		0.40	OZ.IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.017	OZ.IN. PER RAD/S
	Infinite Impedance - F_I	0.0002	OZ.IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		25	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.6×10^{-4}	OZ.IN.S^2
Motor Weight		2.5	OZ.

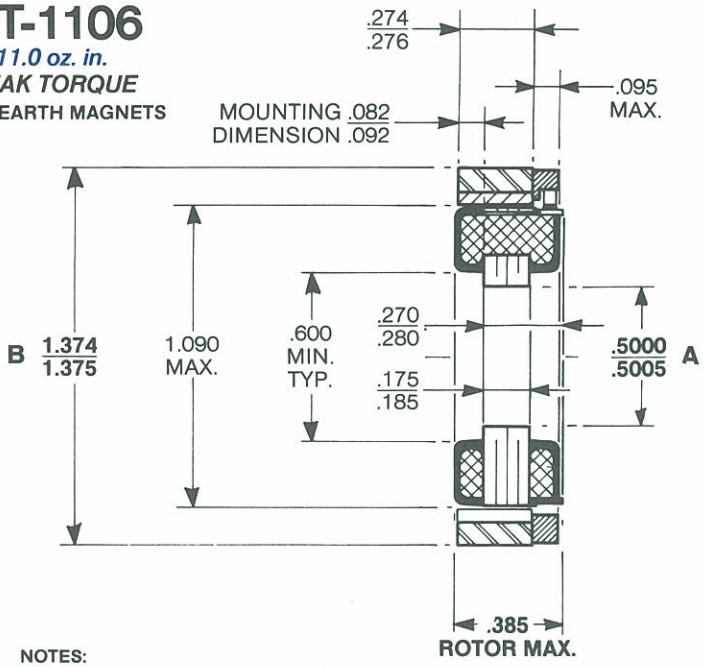
WINDING CONSTANTS

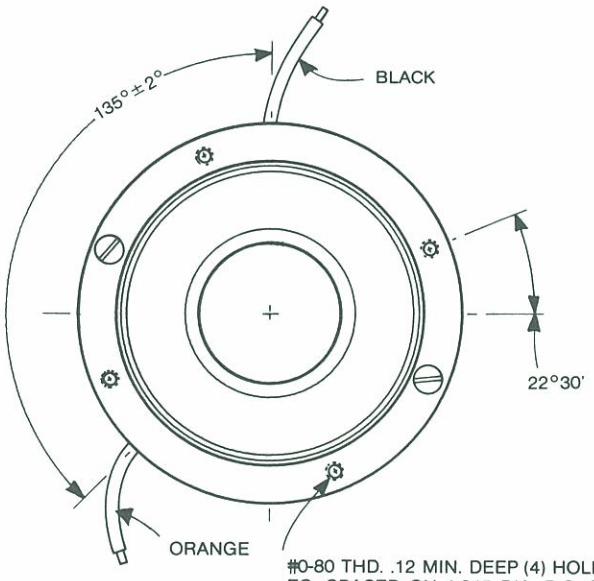
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	42.0	33.4	26.5	21.0	16.7	10.5	52.8
Peak Current - I_P	AMPERES	Rated	1.50	1.90	2.39	3.00	3.79	6.14	1.19
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	8.20	6.50	5.16	4.10	3.25	2.00	10.3
Back EMF Constant - K_B	V per RAD/S	±10%	0.058	0.046	0.036	0.029	0.023	0.014	0.073
DC Resistance (25°C) - R_M	OHMS	±12.5%	28.0	17.6	11.1	7.00	4.40	1.71	44.4
Inductance - L_M	mH	±30%	8.8	5.6	3.53	2.2	1.4	0.52	14

QT-1106

11.0 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





#0-80 THD. .12 MIN. DEEP (4) HOLES EQ. SPACED ON 1.245 DIA. B.C. ON OPPOSITE SIDE.

NOTES:

1. — MOTOR TO BE SUPPLIED AS THREE SEPARATE COMPONENTS: STATOR ASSEMBLY, ROTOR ASSEMBLY, AND BRUSH RING ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#26 AWG PER MIL W-16878/7, 12" MIN. LENGTH.

SIZE CONSTANTS

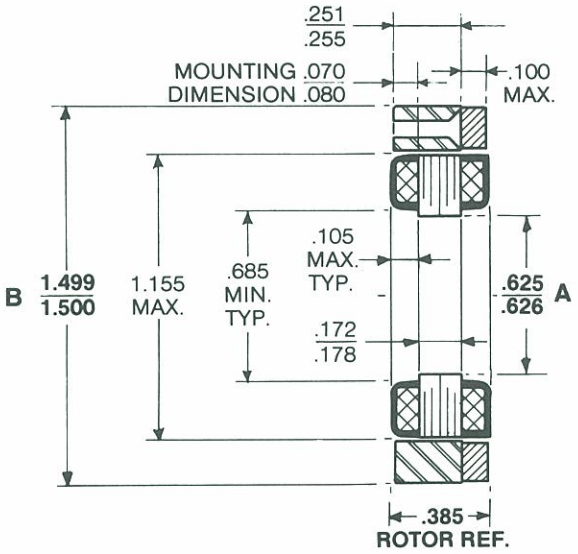
		Value	Units
Peak Torque Rating - T_P		11.0	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		49	WATTS
Motor Constant - K_M		1.57	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		636	RAD/S
Electrical Time Constant - τ_E		0.139	MS
Static Friction (Max.) - T_F		0.60	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.73×10^{-2}	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	1.00×10^{-3}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		19	°C/WATT
Ripple Torque (Average to Peak) - T_R		6.0	PERCENT
Ripple Frequency - (Fundamental)		29	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		3.20×10^{-4}	OZ.IN.S^2
Motor Weight		1.5	OZ.

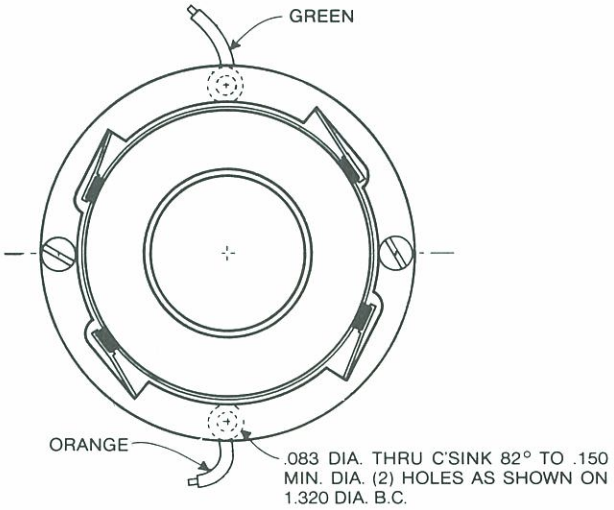
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	19.8						
Peak Current - I_P	AMPERES	Rated	2.50						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	4.40						
Back EMF Constant - K_B	V PER RAD/S	±10%	0.0311						
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.90						
Inductance - L_M	mH	±30%	1.1						

QT-1204

11 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#26 AWG TYPE "E" TEFLON COATED, 16" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		11	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		57	WATTS
Motor Constant - K_M		1.46	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		732	RAD/S
Electrical Time Constant - τ_E		0.11	MS
Static Friction (Max.) - T_F		0.6	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.015	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.001	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		25	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		29	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		4.2×10^{-4}	OZ.IN.S^2
Motor Weight		1.65	OZ.

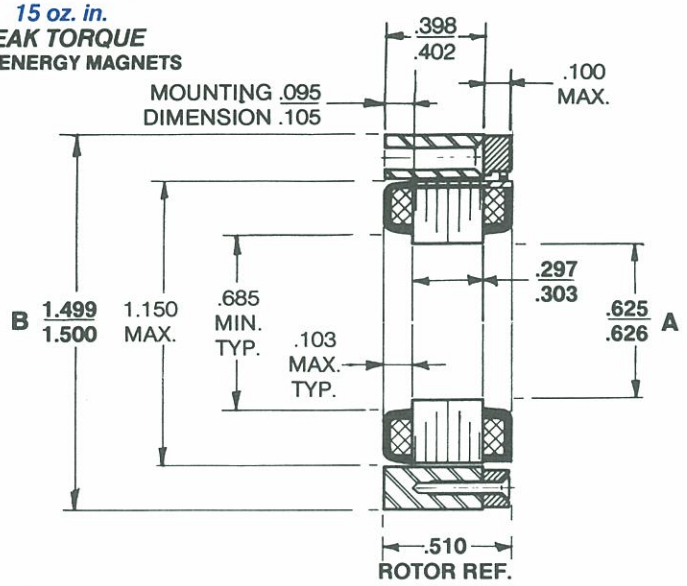
WINDING CONSTANTS

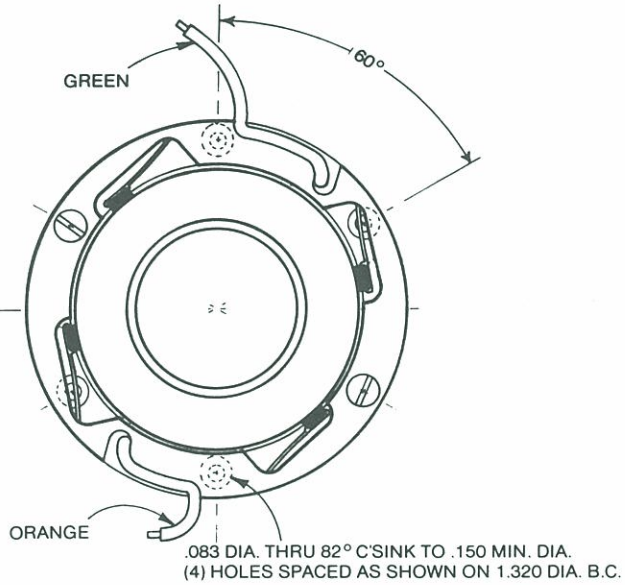
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	18.3	29.0	9.15				
Peak Current - I_P	AMPERES	Rated	3.10	1.97	6.20				
Torque Sensitivity - K_T	OZ.IN/AMP	±10%	3.56	5.59	1.78				
Back EMF Constant - K_B	V per RAD/S	±10%	0.025	0.039	0.013				
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.9	14.7	1.48				
Inductance - L_M	mH	±30%	0.65	1.6	0.16				

T-1218

15 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#26 AWG TYPE 'E' TEFLON COATED
16" MIN. LG.

SIZE CONSTANTS

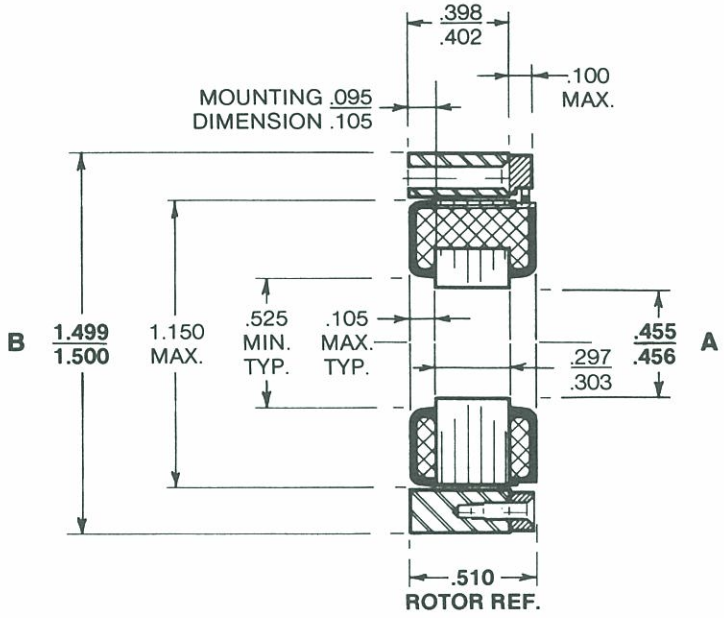
		Value	Units
Peak Torque Rating - T_P		15	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		63	WATTS
Motor Constant - K_M		1.9	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		580	RAD/S
Electrical Time Constant - τ_E		0.31	MS
Static Friction (Max.) - T_F		0.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.025	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.002	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		19	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		29	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		6×10^{-4}	OZ.IN.S^2
Motor Weight		2.3	OZ.

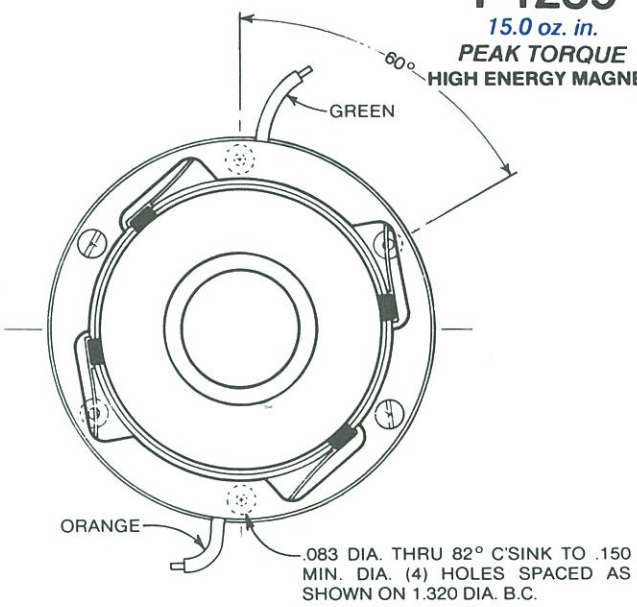
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	50.0	26.1	64.0	20.1	16.0	12.5	79.0
Peak Current - I_P	AMPERES	Rated	1.25	2.75	1.0	3.1	3.8	5.0	0.79
Torque Sensitivity - K_T	OZ.IN/AMP.	±10%	12	5.5	15.1	4.8	4.0	3.0	19.0
Back EMF Constant - K_B	V per RAD/S	±10%	0.085	0.039	0.107	0.034	0.028	0.021	0.134
DC Resistance (25°C) - R_M	OHMS	±12.5%	40.0	9.5	64.0	6.5	4.2	2.5	100
Inductance - L_M	mH	±30%	12.3	2.9	20.0	2.0	1.3	0.77	32.0

T-1259

15.0 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#26 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 16" MIN. LG.

SIZE CONSTANTS

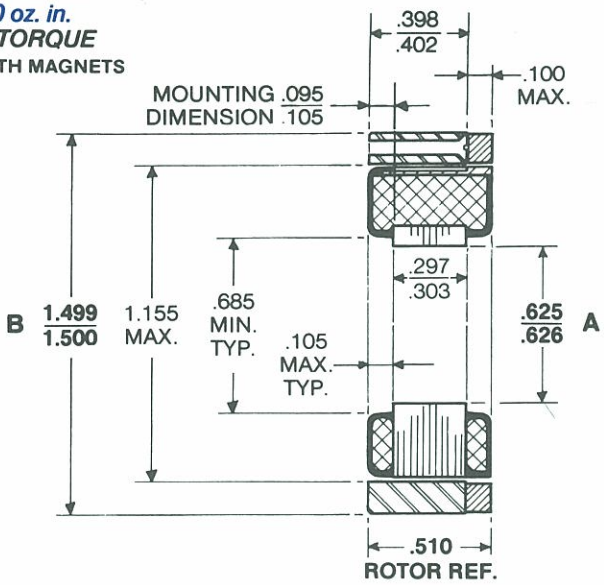
		Value	Units
Peak Torque Rating - T_P		15.0	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		40	WATTS
Motor Constant - K_M		2.4	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		374	RAD/S
Electrical Time Constant - τ_E		0.50	MS
Static Friction (Max.) - T_F		.50	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.041	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.002	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		19	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		29	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		.00057	OZ.IN.S^2
Motor Weight		2.4	OZ.

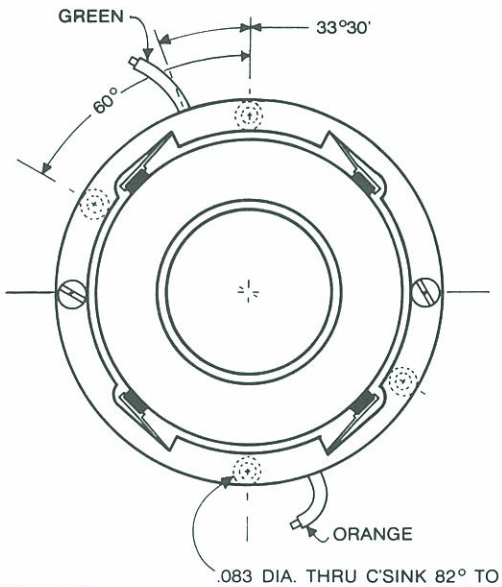
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	20.1	25.4	40.2				
Peak Current - I_P	AMPERES	Rated	1.97	1.56	0.985				
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	7.60	9.6	15.2				
Back EMF Constant - K_B	V per RAD/S	±10%	0.0537	0.068	0.107				
DC Resistance (25°C) - R_M	OHMS	±12.5%	10.2	16.3	40.8				
Inductance - L_M	mH	±30%	5.10	8.2	20.4				

QT-1207

20.0 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

.083 DIA. THRU C'SINK 82° TO .150 MIN. DIA. (4) HOLES AS SHOWN ON 1.320 BASIC DIA. B.C.

LEADS:
#26 AWG TYPE "E" TEFLON COATED, 16" MIN. LENGTH.

SIZE CONSTANTS

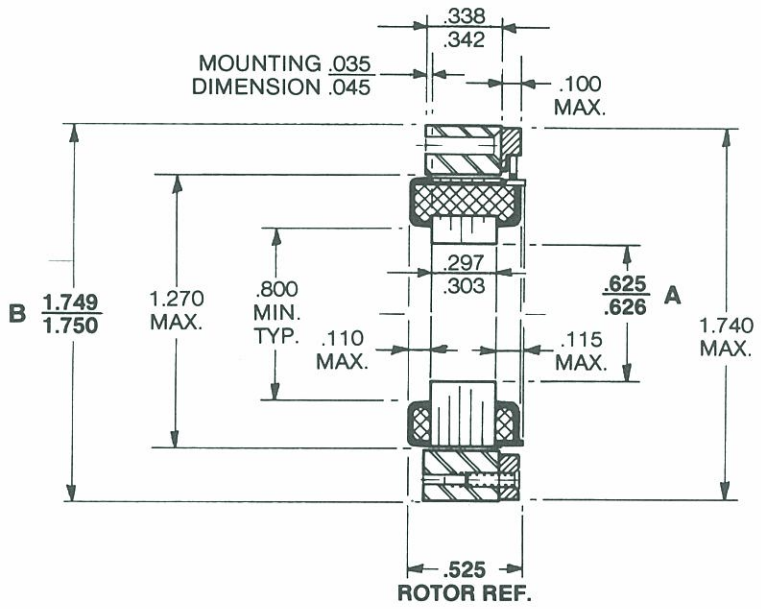
		Value	Units
Peak Torque Rating - T_P		20.0	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		81.8	WATTS
Motor Constant - K_M		2.21	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		580	RAD/S
Electrical Time Constant - τ_E		0.20	MS
Static Friction (Max.) - T_F		0.70	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.035	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.002	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		19	°C/WATT
Ripple Torque (Average to Peak) - T_R		7.0	PERCENT
Ripple Frequency (Fundamental)		29	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		6.0×10^{-4}	OZ.IN.S^2
Motor Weight		2.3	OZ.

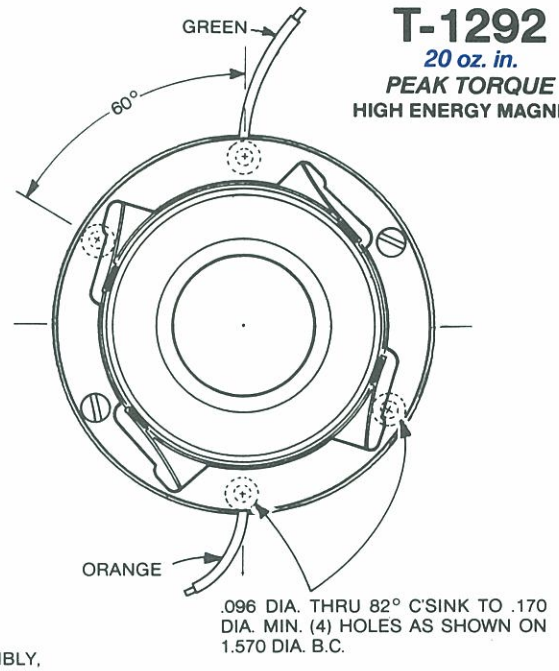
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	57.3	45.0	36.4	28.6	22.5	17.9	14.3
Peak Current - I_P	AMPERES	Rated	1.43	1.80	2.29	2.86	3.52	4.36	5.72
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	14.0	11.1	8.75	7.00	5.68	4.59	3.50
Back EMF Constant - K_B	V per RAD/S	±10%	.099	.078	.062	.049	.040	.032	.025
DC Resistance (25°C) - R_M	OHMS	±12.5%	40.0	25.0	15.9	10.0	6.40	4.10	2.50
Inductance - L_M	mH	±30%	7.9	5.0	3.1	2.0	1.3	0.85	0.49

T-1292

20 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





.096 DIA. THRU 82° C'SINK TO .170 DIA. MIN. (4) HOLES AS SHOWN ON 1.570 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITH .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE VOLTAGE APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE "E" TEFLON COATED
36" MIN. LENGTH.

SIZE CONSTANTS

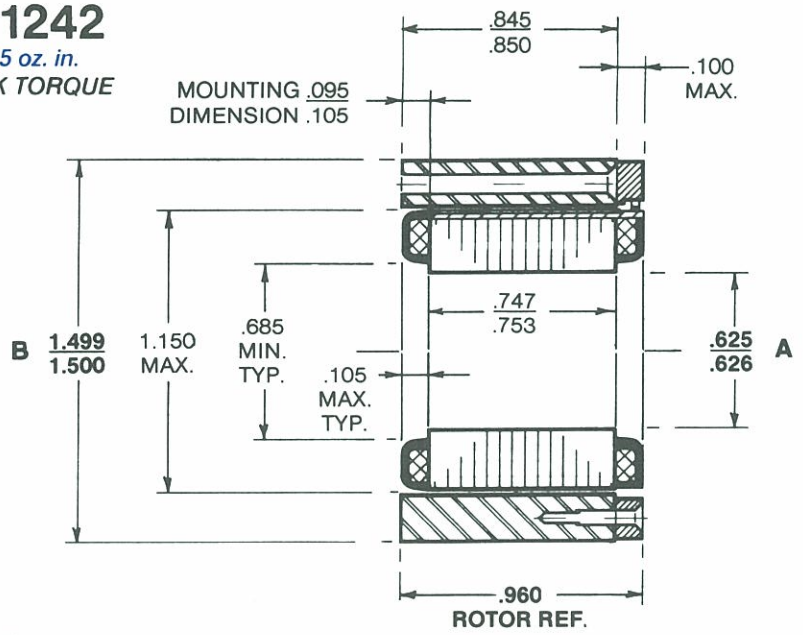
		Value	Units
Peak Torque Rating - T_P		20	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		64	WATTS
Motor Constant - K_M		2.51	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		450	RAD/S
Electrical Time Constant - τ_E		0.369	MS
Static Friction (Max.) - T_F		0.55	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.0445	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	2.20×10^{-3}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		17	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		9.00×10^{-4}	OZ.IN.S^2
Motor Weight		2.8	OZ.

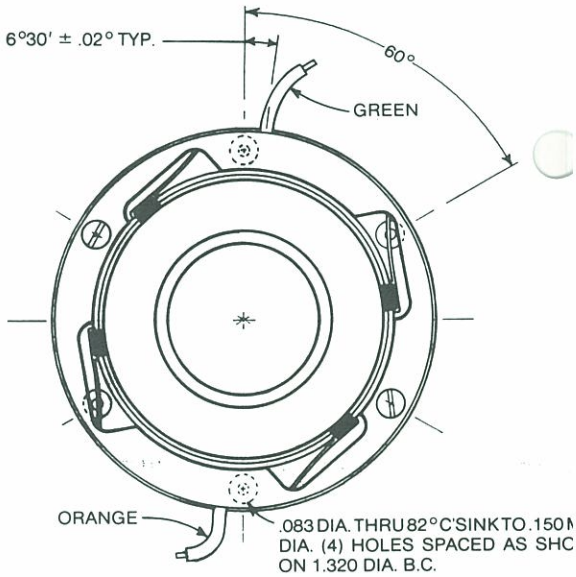
WINDING CONSTANTS

			Winding Designation						
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	20.3	25.7					
Peak Current - I_P	AMPERES	Rated	3.13	2.52					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	6.40	7.94					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.0452	0.0561					
DC Resistance (25°C) - R_M	OHMS	±12.5%	6.50	10.2					
Inductance - L_M	mH	±30%	2.4	3.7					

T-1242

25 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#26 AWG TYPE "E" TEFLON COATED PER MIL W-16878 16" MIN. LG.

SIZE CONSTANTS

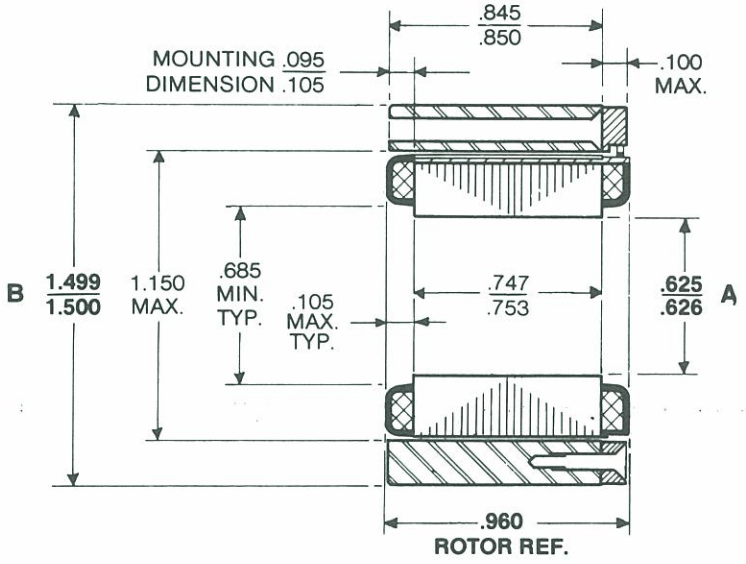
		Value	Units
Peak Torque Rating - T_P		25	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		55	WATTS
Motor Constant - K_M		3.4	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		307	RAD/S
Electrical Time Constant - τ_E		0.68	MS
Static Friction (Max.) - T_F		1.1	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.082	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.005	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		12	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		29	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		0.0015	OZ.IN.S^2
Motor Weight		5.5	OZ.

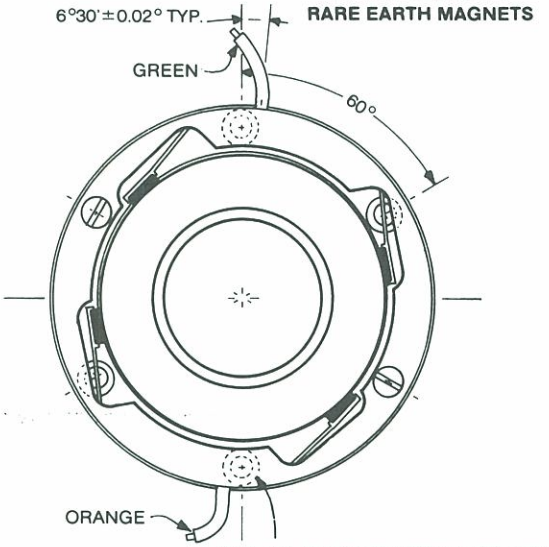
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	22.8	35.1	29.0	44.9			
Peak Current - I_P	AMPERES	Rated	2.40	1.50	1.95	1.20			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	10.5	16.5	12.9	21.0			
Back EMF Constant - K_B	V per RAD/S	±10%	0.074	0.117	0.091	0.148			
DC Resistance (25°C) - R_M	OHMS	±12.5%	9.50	23.4	14.9	37.4			
Inductance - L_M	mH	±30%	6.5	16	9.8	26			

QT-1217

50 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





.083 DIA. THRU 82° C'SINK TO .150 MIN. DIA. (4) HOLES SP. AS SHOWN ON 1.320 DIA. B.C.

NOTES:
1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#26 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 16" MIN. LENGTH.

SIZE CONSTANTS

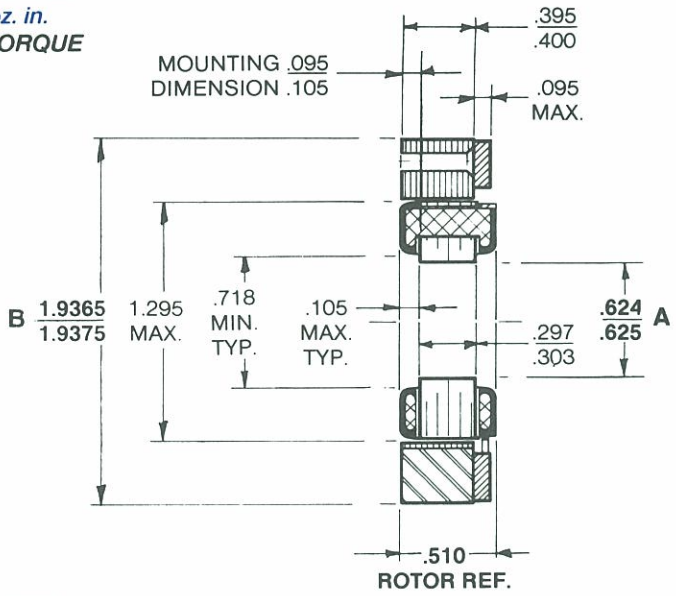
		Value	Units
Peak Torque Rating - T_P		50	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		165	WATTS
Motor Constant - K_M		3.9	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		467	RAD/S
Electrical Time Constant - τ_E		0.38	MS
Static Friction (Max.) - T_F		1.1	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.11	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.003	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		12	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		29	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		0.0015	OZ.IN.S^2
Motor Weight		5.5	OZ.

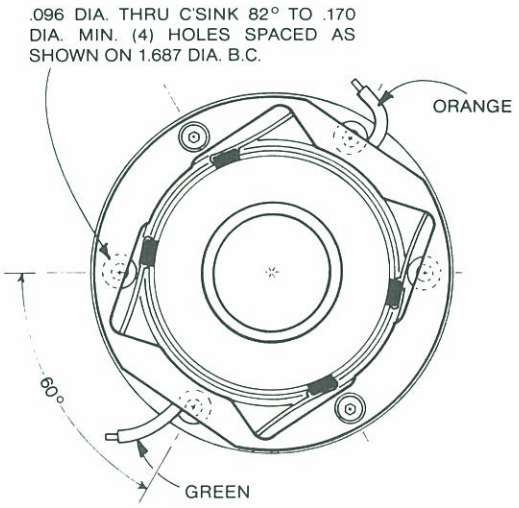
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	33.0	20.8					
Peak Current - I_P	AMPERES	Rated	5.00	7.85					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	10.0	6.36					
Back EMF Constant - K_B	V per RAD/S	±10%	0.0706	0.045					
DC Resistance (25°C) - R_M	OHMS	±12.5%	6.60	2.65					
Inductance - L_M	mH	±30%	2.5	1.0					

T-1352

20 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE 'E' TEFLON COATED PER MIL W-16878 10" MIN. LG.

SIZE CONSTANTS

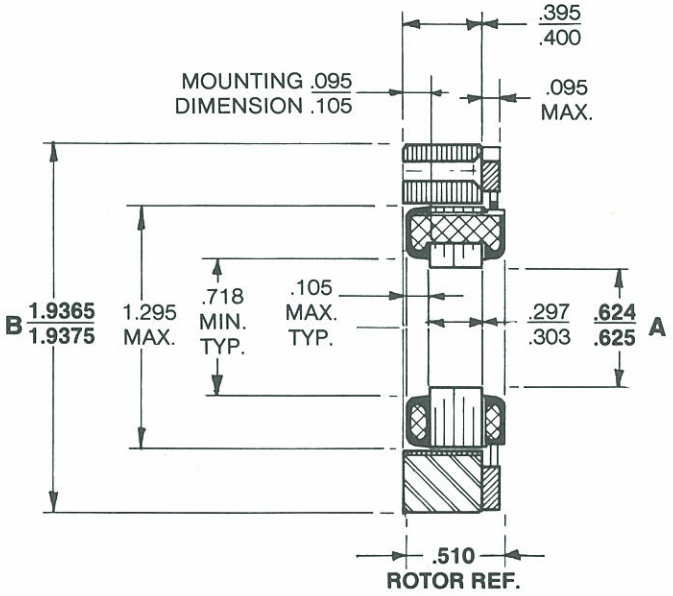
		Value	Units
Peak Torque Rating - T_P		20	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		60	WATTS
Motor Constant - K_M		2.58	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		400	RAD/S
Electrical Time Constant - τ_E		0.34	MS
Static Friction (Max.) - T_F		0.7	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.049	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	4.6×10^{-3}	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		15.6	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		8.8×10^{-4}	OZ.IN.S^2
Motor Weight		4.3	OZ.

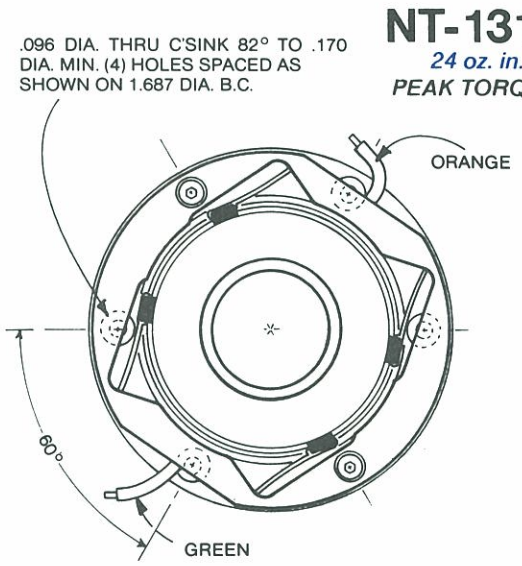
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	26.0	31.0	40.6	49.4	63.7	79.6	97.8
Peak Current - I_P	AMPERES	Rated	2.3	1.8	1.5	1.2	0.90	0.73	0.60
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	8.7	11.0	13.7	16.5	22.3	27.5	33.6
Back EMF Constant - K_B	V per RAD/S	±10%	0.061	0.078	0.097	0.116	0.157	0.194	0.237
DC Resistance (25°C) - R_M	OHMS	±12.5%	11.3	17.2	27.1	41.2	70.8	109	163
Inductance - L_M	mH	±30%	4.0	6.0	10.0	13.0	24.0	36.0	54.0

NT-1319

24 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — HIGH PERMEABILITY LAMINATION MATERIAL.

LEADS:
#28 AWG TYPE "E" TEFLON COATED
10" MIN. LG.

SIZE CONSTANTS

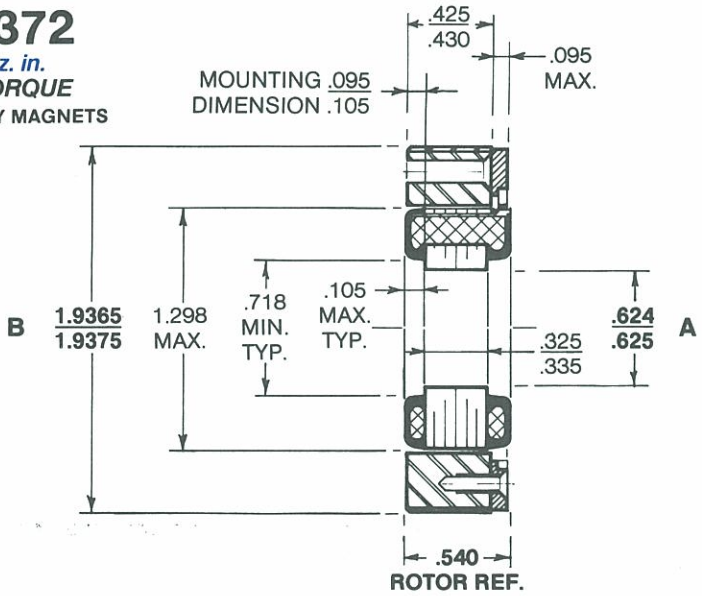
		Value	Units
Peak Torque Rating - T_P		24	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		64	WATTS
Motor Constant - K_M		3.0	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		375	RAD/S
Electrical Time Constant - τ_E		0.29	MS
Static Friction (Max.) - T_F		0.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.064	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.005	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		15.6	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		8.8×10^{-4}	OZ.IN.S^2
Motor Weight		4.3	OZ.

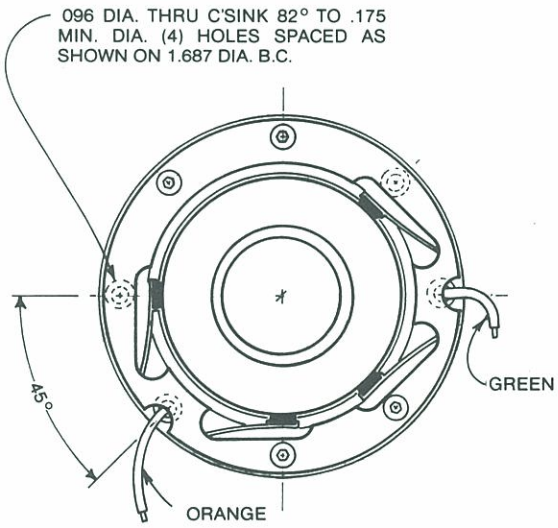
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	27.6	21.5	17.2	34.4	55.2		
Peak Current - I_P	AMPERES	Rated	2.3	2.95	3.73	1.86	1.15		
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	10.5	8.15	6.45	12.9	21.0		
Back EMF Constant - K_B	V per RAD/S	±10%	0.074	0.058	0.046	0.091	0.148		
DC Resistance (25°C) - R_M	OHMS	±12.5%	12.0	7.30	4.60	18.5	48.0		
Inductance - L_M	mH	±30%	3.5	2.1	1.32	5.3	14		

NT-1372

30.0 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7.
5. — HIGH PERMEABILITY LAMINATION MATERIAL.
6. — "A" WINDING DESIGNED FOR PEAK TORQUE TO 150 RAD/SEC.

LEADS:
#28 AWG TYPE 'E' TEFLON COATED PER MIL W-16878 10" MIN. LG.

SIZE CONSTANTS

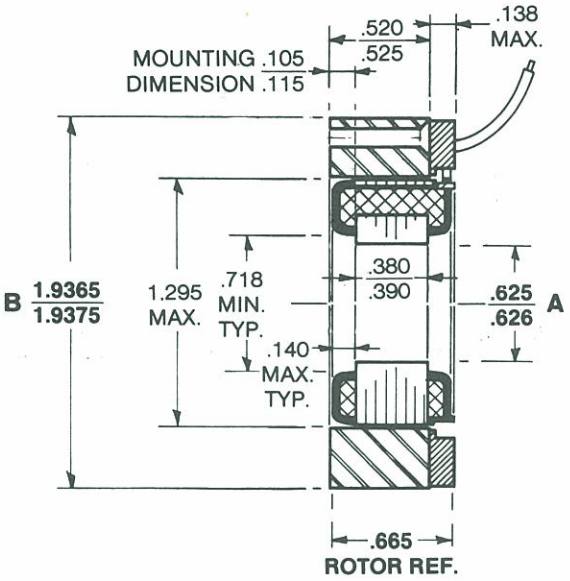
		Value	Units
Peak Torque Rating - T_P		30.0	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		52	WATTS
Motor Constant - K_M		4.15	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		245	RAD/S
Electrical Time Constant - τ_E		0.3	MS
Static Friction (Max.) - T_F		1.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.122	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	4×10^{-3}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		15.6	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		9.0×10^{-4}	OZ.IN.S^2
Motor Weight		4.4	OZ.

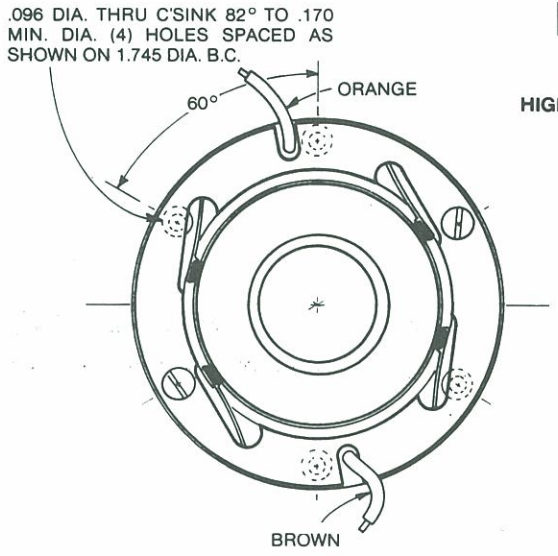
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	17.4	13.7	21.8	27.4	10.9		
Peak Current - I_P	AMPERES	Rated	3.0	3.8	2.4	1.9	4.81		
Torque Sensitivity - K_T	OZ. IN./AMP.	±10%	10.0	7.92	12.5	15.8	6.24		
Back EMF Constant - K_B	V per RAD/S	±10%	0.0706	0.056	0.088	0.112	0.044		
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.8	3.6	9.1	14.4	2.26		
Inductance - L_M	mH	±30%	1.7	1.1	2.7	4.4	0.69		

NT-1383

32 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITVE CURRENT APPLIED TO BROWN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.
6. — HIGH PERMEABILITY LAMINATION MATERIAL.

LEADS:
#24 AWG TYPE "E" TEFLON COATED PER MIL W-16878 6" MIN. L.G.

SIZE CONSTANTS

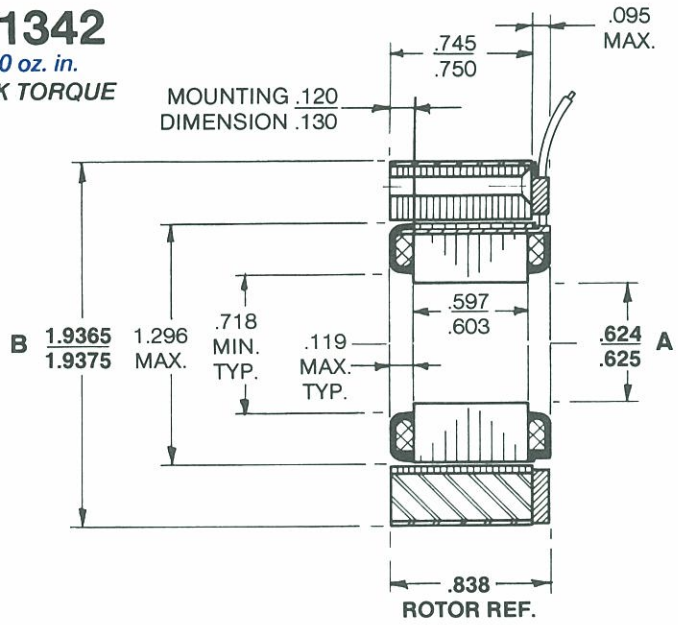
		Value	Units
Peak Torque Rating - T_P		32	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		83	WATTS
Motor Constant - K_M		3.5	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		368	RAD/S
Electrical Time Constant - τ_E		0.5	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.087	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.015	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		14.7	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		1.1×10^{-3}	OZ.IN.S^2
Motor Weight		6	OZ.

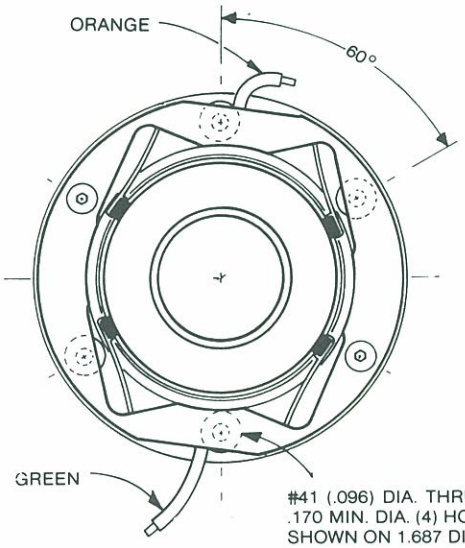
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	32.0	25.3	20.1	40.3			
Peak Current - I_P	AMPERES	Rated	2.60	3.34	4.26	2.08			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	12.3	9.60	7.52	15.4			
Back EMF Constant - K_B	V per RAD/S	±10%	0.087	0.068	0.053	0.109			
DC Resistance (25°C) - R_M	OHMS	±12.5%	12.3	7.60	4.73	19.4			
Inductance - L_M	mH	±30%	6.0	3.6	2.2	9.4			

T-1342

40 oz. in.
PEAK TORQUE





#41 (.096) DIA. THRU C'SINK 82° TO .170 MIN. DIA. (4) HOLES SPACED AS SHOWN ON 1.687 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE "E" TEFLON COATED
10" MIN. LG.

SIZE CONSTANTS

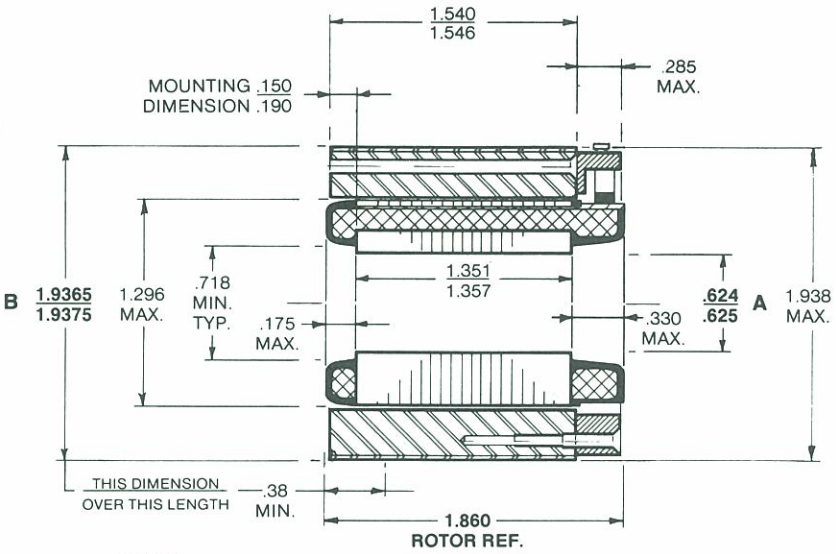
		Value	Units
Peak Torque Rating - T_P		40	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		98	WATTS
Motor Constant - K_M		4.05	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		340	RAD/S
Electrical Time Constant - τ_E		0.30	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.12	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.007	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		13.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		1.6×10^{-3}	OZ.IN.S^2
Motor Weight		7.6	OZ.

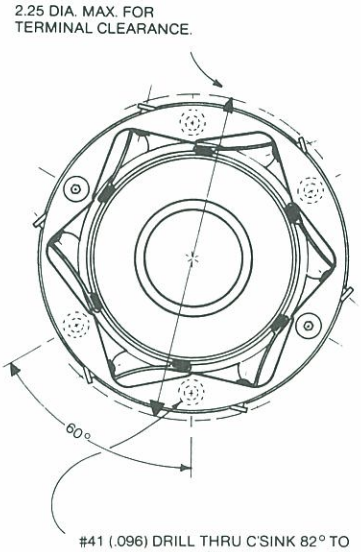
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	12.8	29.5	37.2	47.0	59.2	74.8	94.7
Peak Current - I_P	AMPERES	Rated	7.6	3.31	2.62	2.1	1.65	1.3	1.0
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	5.24	12.1	15.2	19.2	24.2	30.5	38.5
Back EMF Constant - K_B	V per RAD/S	±10%	0.037	0.086	0.11	0.14	0.17	0.22	0.27
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.67	8.9	14.2	22.6	35.9	57.2	91.0
Inductance - L_M	mH	±30%	0.5	3.0	4.8	7.6	12	19	31

NT-1308

90 oz. in.
PEAK TORQUE





#41 (.096) DRILL THRU C'SINK 82° TO .180 DIA. (4) HOLES SPACED AS SHOWN ON 1.687 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS TWO SEPARATE COMPONENTS: STATOR ASSEMBLY WITH ROTOR IN PLACE AND BRUSH RING ASSEMBLY. REMOVE MYLAR SHIMS FROM AIR GAP AFTER ROTOR AND STATOR ARE SECURELY MOUNTED. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" MUST BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO #1 TERMINALS WITH RESPECT TO #2 TERMINALS, ROTATION SHALL BE C.C.W. FACING BRUSH RING END. MAXIMUM SOLDER TEMPERATURE 400°F.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — FULL COMPLEMENT OF BRUSHES FOR IMPROVED HIGH CURRENT OPERATION.

SIZE CONSTANTS

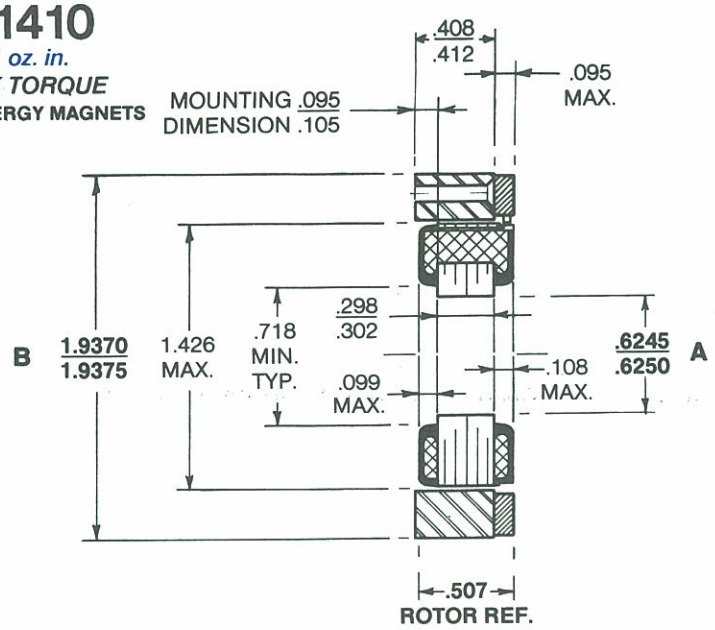
		Value	Units
Peak Torque Rating - T_P		90	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		255	WATTS
Motor Constant - K_M		5.65	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		407	RAD/S
Electrical Time Constant - τ_E		0.40	MS
Static Friction (Max.) - T_F		3.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.22	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.019	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		9	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		3.5×10^{-3}	OZ.IN.S^2
Motor Weight		16.1	OZ.

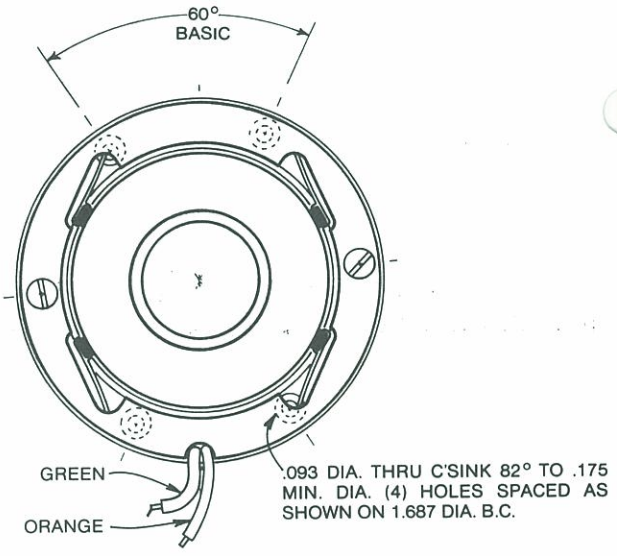
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	22.0	28.8					
Peak Current - I_P	AMPERES	Rated	11.6	9.3					
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	7.8	9.70					
Back EMF Constant - K_B	V per RAD/S	±10%	0.055	0.069					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.9	3.1					
Inductance - L_M	mH	±30%	0.78	1.22					

T-1410

21 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE "E" TEFLON COATED
12" MIN. LG.

SIZE CONSTANTS

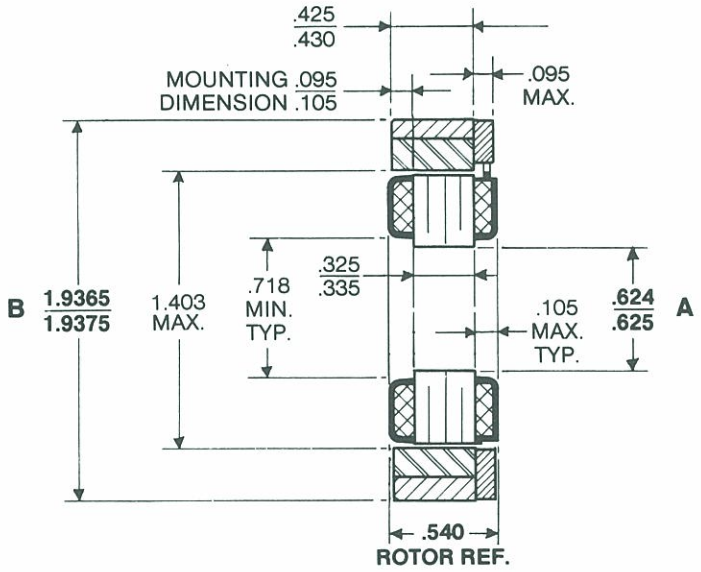
		Value	Units
Peak Torque Rating - T_P		21	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		49	WATTS
Motor Constant - K_M		3.0	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		360	RAD/S
Electrical Time Constant - τ_E		.31	MS
Static Friction (Max.) - T_F		.7	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	.064	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	.004	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		15	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		37	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		.0015	OZ.IN.S^2
Motor Weight		5	OZ.

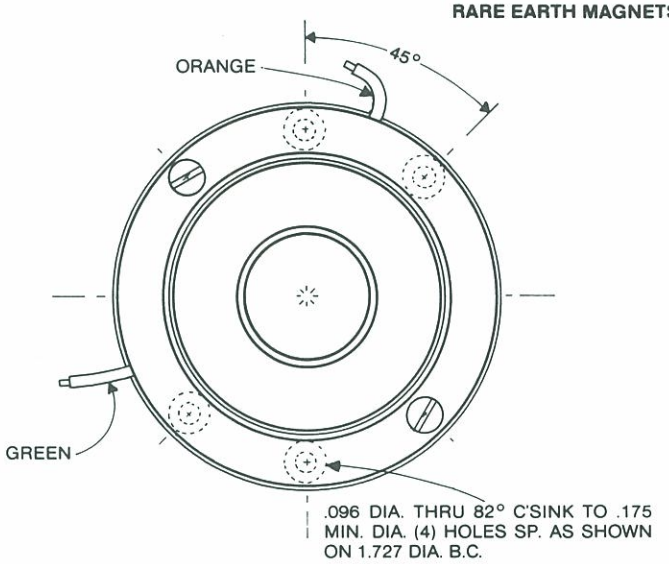
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	28.0	35.6					
Peak Current - I_P	AMPERES	Rated	1.75	1.40					
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	12.0	15.0					
Back EMF Constant - K_B	V per RAD/S	±10%	.085	.107					
DC Resistance (25°C) - R_M	OHMS	±12.5%	16.0	25.4					
Inductance - L_M	mH	±30%	5.0	7.9					

QT-1401

55 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE "E" TEFLON COATED PER MIL W-16878 10" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		55	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		217	WATTS
Motor Constant - K_M		3.74	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		557	RAD/S
Electrical Time Constant - τ_E		0.21	MS
Static Friction (Max.) - T_F		1.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.100	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	4.0×10^{-3}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		15	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		31	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		1.3×10^{-3}	OZ.IN.S^2
Motor Weight		4.4	OZ.

WINDING CONSTANTS

Winding Designation

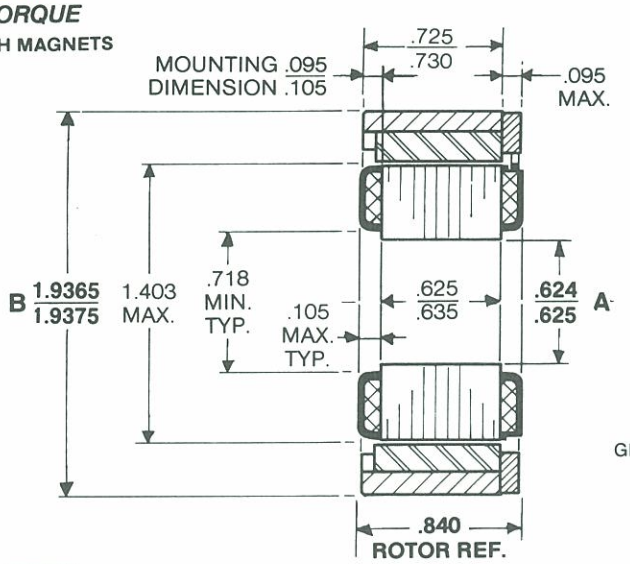
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	35.4	28.1	22.3	17.7			
Peak Current - I_P	AMPERES	Rated	6.11	7.72	9.78	12.2			
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	9.00	7.13	5.63	4.50			
Back EMF Constant - K_B	V per RAD/S	±10%	0.0636	0.050	0.040	0.0318			
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.80	3.64	2.28	1.45			
Inductance - L_M	mH	±30%	1.2	0.75	0.47	0.30			

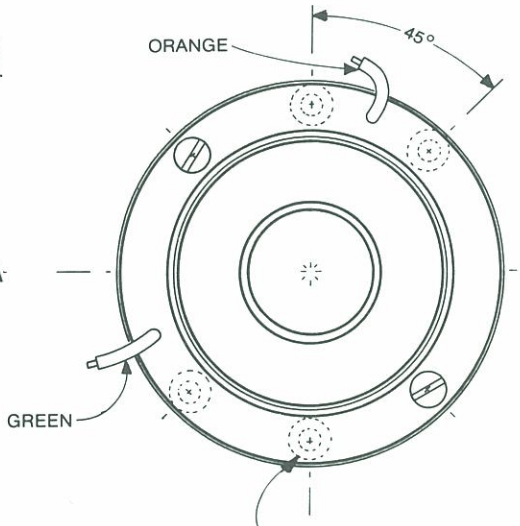
QT-1404

65 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS





.096 DIA. THRU 82° C'SINK TO .175 MIN. DIA. (4) HOLES SP. AS SHOWN ON 1.727 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:

#28 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 10" MIN. LENGTH.

SIZE CONSTANTS

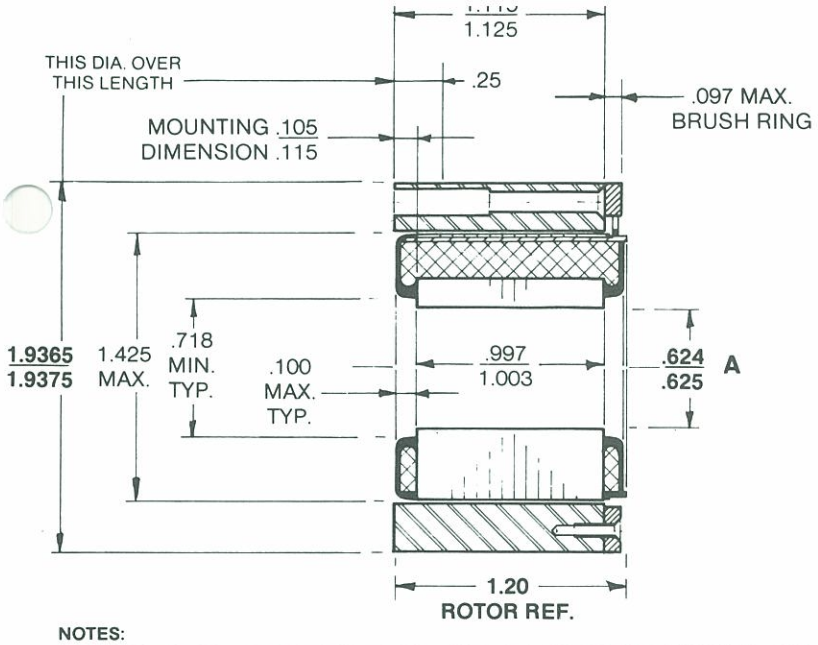
		Value	Units
Peak Torque Rating - T_P		65	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		98	WATTS
Motor Constant - K_M		6.55	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		214	RAD/S
Electrical Time Constant - τ_E		0.238	MS
Static Friction (Max.) - T_F		3.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.303	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.012	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		13	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		31	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		2.55×10^{-3}	OZ.IN.S^2
Motor Weight		8.4	OZ.

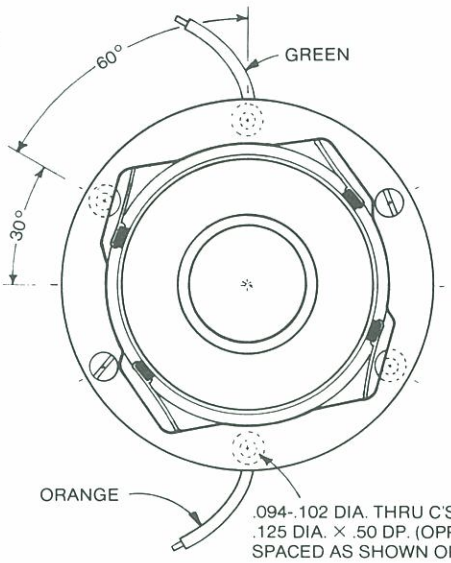
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	13.6	17.1	27.2				
Peak Current - I_P	AMPERES	Rated	7.20	5.76	3.60				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	9.00	11.3	18.0				
Back EMF Constant - K_B	V per RAD/S	±10%	0.064	0.080	0.128				
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.89	2.98	7.56				
Inductance - L_M	mH	±30%	0.45	0.70	1.8				

T-1421

77.4 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR SUPPLIED AS **TWO** SEPARATE COMPONENTS: STATOR ASSEMBLY WITH ROTOR ASSEMBLY IN PLACE (HELD BY MYLAR SHIMS) AND BRUSH RING ASSEMBLY. REMOVE MYLAR SHIMS AFTER ROTOR AND STATOR ARE SECURELY MOUNTED. **DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.**
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE 'EE' TEFLON COATED PER MIL W-16878 10" MIN. LG.

SIZE CONSTANTS

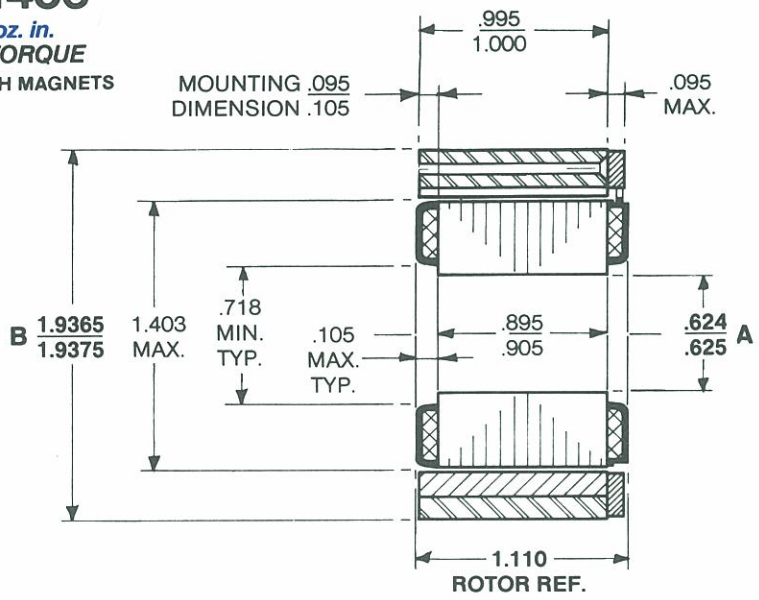
		Value	Units
Peak Torque Rating - T_P		77.4	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		112	WATTS
Motor Constant - K_M		7.31	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		205	RAD/S
Electrical Time Constant - τ_E		0.55	MS
Static Friction (Max.) - T_F		2.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.38	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.01	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		37	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		2.3×10^{-3}	OZ.IN.S^2
Motor Weight		15	OZ.

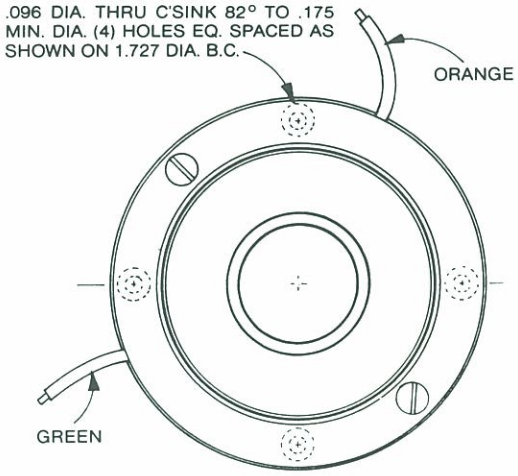
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	24.8						
Peak Current - I_P	AMPERES	Rated	4.5						
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	17.2						
Back EMF Constant - K_B	V per RAD/S	±10%	0.121						
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.5						
Inductance - L_M	mH	±30%	3.0						

QT-1406

157 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 10" MIN. LENGTH.

SIZE CONSTANTS

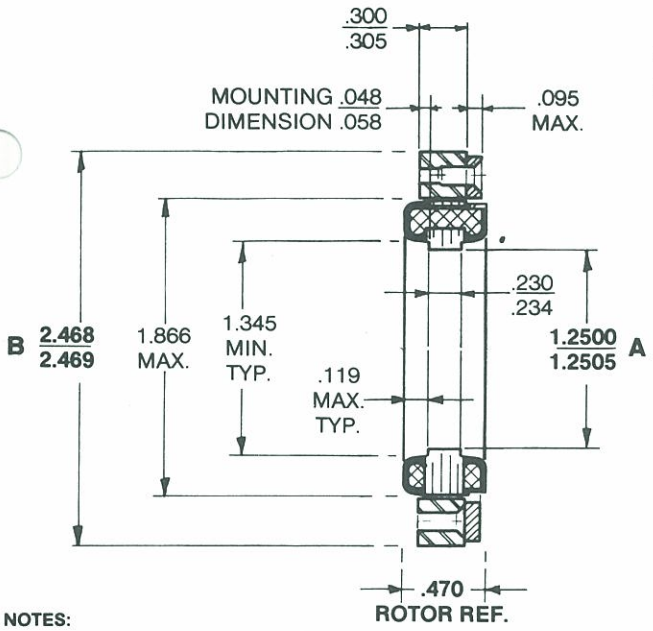
		Value	Units
Peak Torque Rating - T_P		157	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		347	WATTS
Motor Constant - K_M		8.42	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		313	RAD/S
Electrical Time Constant - τ_E		0.277	MS
Static Friction (Max.) - T_F		3.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.501	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.020	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		31	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		3.73×10^{-3}	OZ.IN.S^2
Motor Weight		12	OZ.

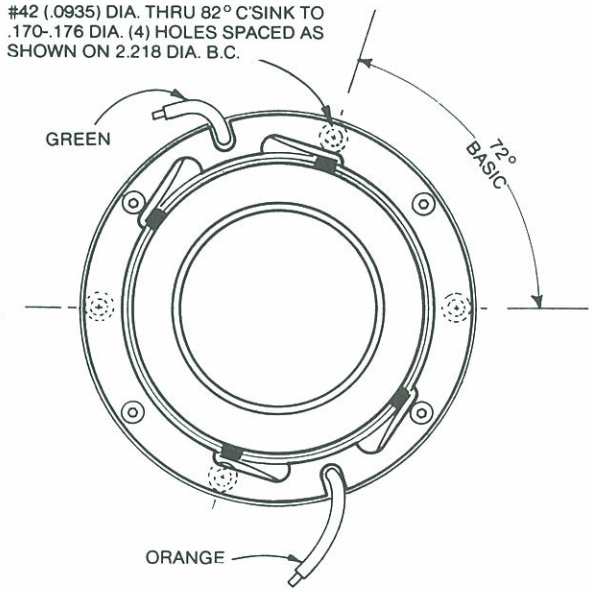
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	35.4	28.2	44.5				
Peak Current - I_P	AMPERES	Rated	9.80	12.3	7.73				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	16.0	12.8	20.3				
Back EMF Constant - K_B	V per RAD/S	±10%	0.113	0.090	0.143				
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.61	2.29	5.76				
Inductance - L_M	mH	±30%	1.0	0.64	1.6				

T-1915

24 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE 'E' TEFLON COATED PER MIL W-16878 12"MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		24	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		36	WATTS
Motor Constant - K_M		4.0	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		209	RAD/S
Electrical Time Constant - τ_E		0.22	MS
Static Friction (Max.) - T_F		1.9	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.115	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.003	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		15	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.004	OZ.IN.S^2
Motor Weight		5	OZ.

WINDING CONSTANTS — Winding Designation

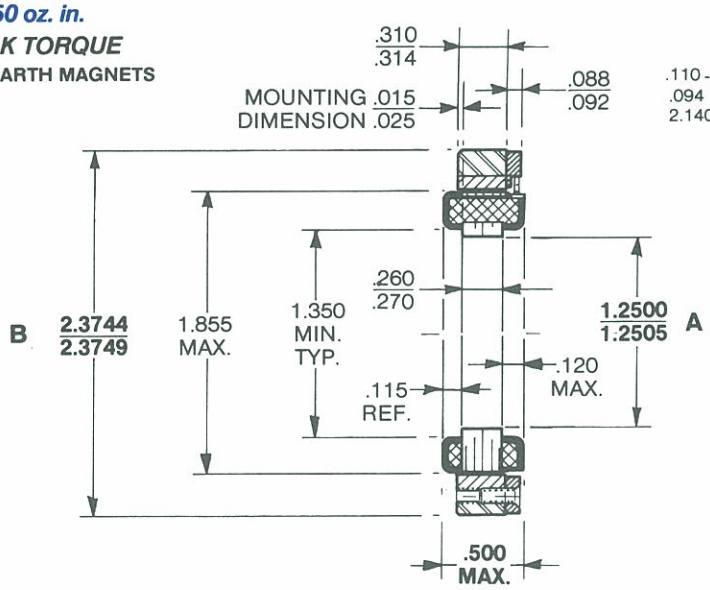
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	39.6	19.8	12.6	9.80	24.9		
Peak Current - I_P	AMPERES	Rated	0.90	1.80	2.79	3.58	1.44		
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	26.8	13.4	8.60	6.70	16.7		
Back EMF Constant - K_B	V per RAD/s	±10%	0.189	0.095	0.061	0.047	0.118		
DC Resistance (25°C) - R_M	OHMS	±12.5%	44.0	11.0	4.50	2.75	17.3		
Inductance - L_M	mH	±30%	9.8	2.4	1.0	0.60	3.8		

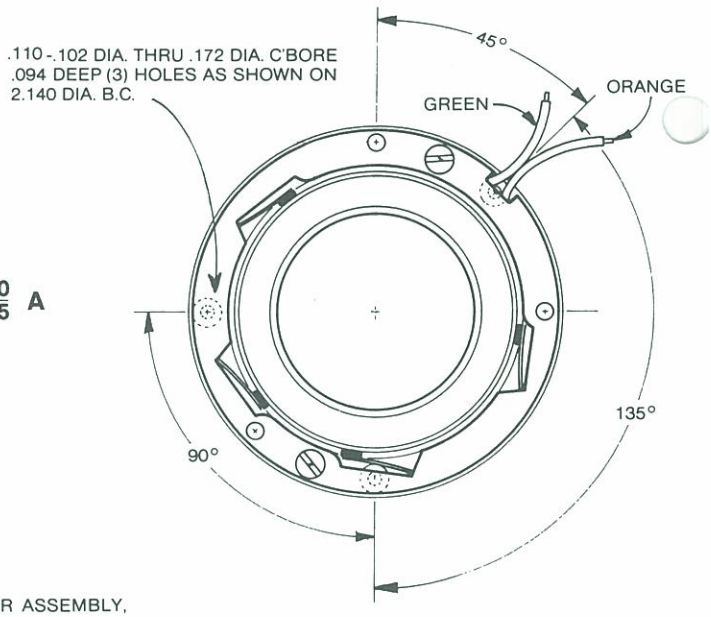
QT-1906

50 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS





NOTES:

1. — MOTOR SHIPPED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .0025 (.005 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE "ET" TEFLON COATED
PER MIL W-16878, 24" MIN. LG.

SIZE CONSTANTS

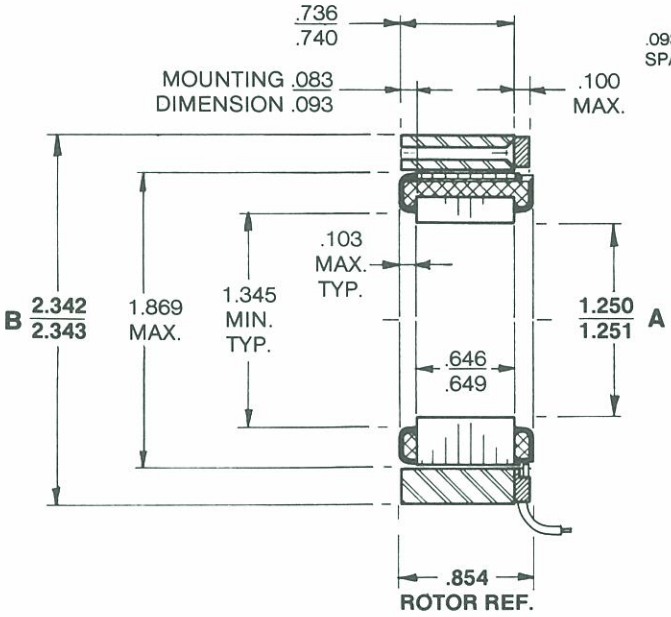
		Value	Units
Peak Torque Rating - T_P		50	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		115	WATTS
Motor Constant - K_M		4.66	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		326	RAD/S
Electrical Time Constant - τ_E		0.174	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.154	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.010	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		14	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		37	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		3.4×10^{-3}	OZ.IN.S^2
Motor Weight		5	OZ.

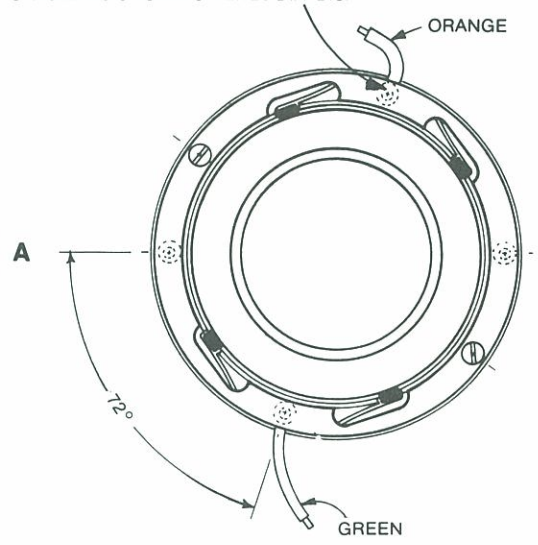
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	23.0	58.0	36.9				
Peak Current - I_P	AMPERES	Rated	5.00	2.00	3.13				
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	10.0	25.0	16.0				
Back EMF Constant - K_B	V per RAD/S	±10%	0.0706	0.177	0.113				
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.60	29.0	11.8				
Inductance - L_M	mH	±30%	0.80	5.0	2.0				

T-1911

60 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE 'E' TEFLON COATED
6" MIN. LG.

SIZE CONSTANTS

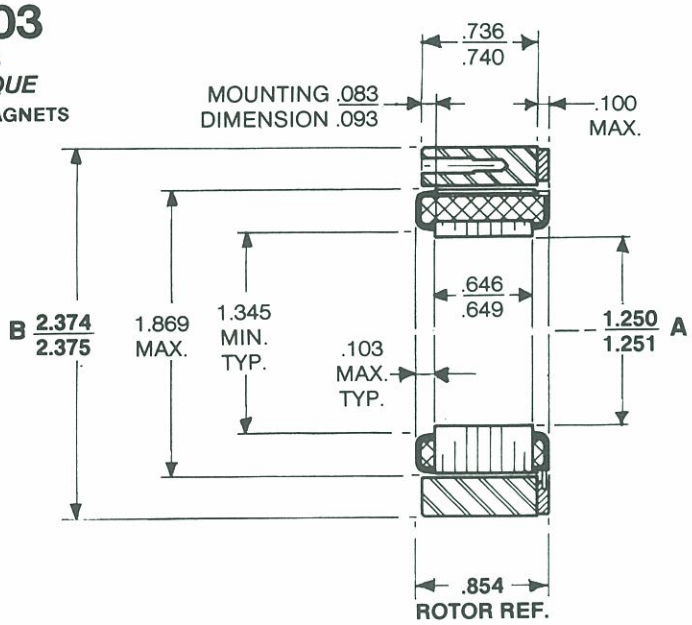
		Value	Units
Peak Torque Rating - T_P		60	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		60	WATTS
Motor Constant - K_M		7.75	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		143	RAD/S
Electrical Time Constant - τ_E		0.40	MS
Static Friction (Max.) - T_F		2.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.424	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.05	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		8.8×10^{-3}	OZ.IN.S^2
Motor Weight		9.5	OZ.

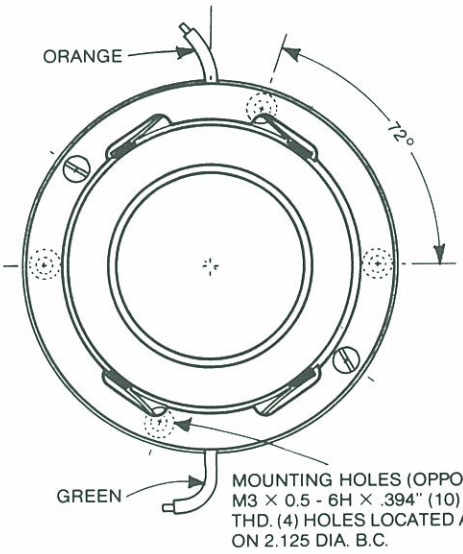
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	60.0	31.2	19.5	15.2	24.0		
Peak Current - I_P	AMPERES	Rated	1.00	2.00	3.20	4.00	2.55		
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	60.0	30.0	19.0	15.0	23.5		
Back EMF Constant - K_B	V per RAD/S	±10%	0.424	0.212	0.134	0.106	0.166		
DC Resistance (25°C) - R_M	OHMS	±12.5%	60.0	15.6	6.10	3.80	9.40		
Inductance - L_M	mH	±30%	24	6.0	2.4	1.5	3.7		

QT-1903

90 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE "E" TEFLON COATED 6" MIN. LENGTH.

SIZE CONSTANTS

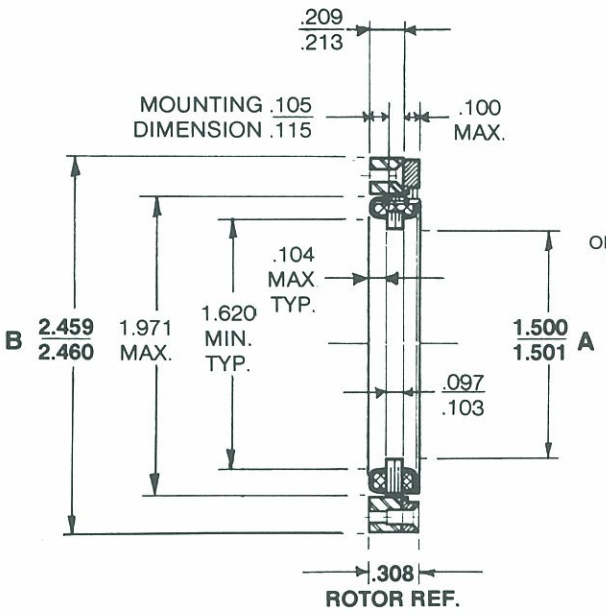
		Value	Units
Peak Torque Rating - T_P		90	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		107	WATTS
Motor Constant - K_M		8.7	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		167	RAD/S
Electrical Time Constant - τ_E		0.22	MS
Static Friction (Max.) - T_F		2.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.539	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.03	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		8.8×10^{-3}	OZ.IN.S^2
Motor Weight		9.5	OZ.

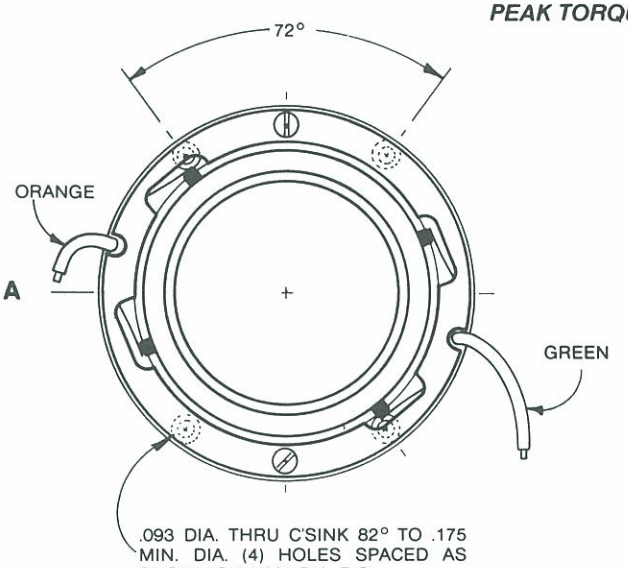
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	30.3	24.1	12.1	60.5			
Peak Current - I_P	AMPERES	Rated	3.52	4.40	8.82	1.76			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	25.6	20.5	10.2	51.2			
Back EMF Constant - K_B	V per RAD/S	±10%	0.181	0.145	0.072	0.362			
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.60	5.5	1.37	34.4			
Inductance - L_M	mH	±30%	1.9	1.2	0.3	7.6			

T-2003

9.5 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE 'E' TEFLON COATED
12" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		9.5	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		41	WATTS
Motor Constant - K_M		1.48	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		610	RAD/S
Electrical Time Constant - τ_E		0.10	MS
Static Friction (Max.) - T_F		0.40	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.0156	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.005	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		20	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		46	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		1.6×10^{-3}	OZ.IN.S^2
Motor Weight		2.5	OZ.

WINDING CONSTANTS

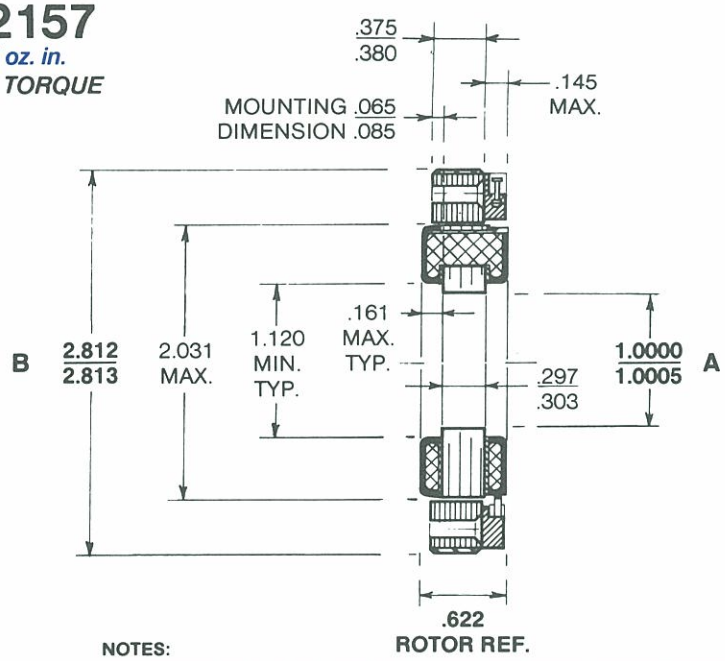
Winding Designation

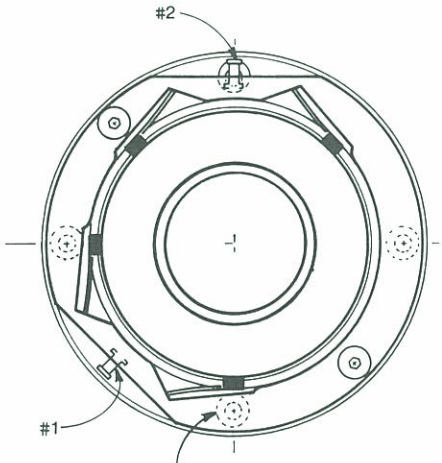
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	32.9	26.4					
Peak Current - I_P	AMPERES	Rated	1.25	1.60					
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	7.6	5.9					
Back EMF Constant - K_B	V per RAD/S	±10%	0.054	0.042					
DC Resistance (25°C) - R_M	OHMS	±12.5%	26.3	16.5					
Inductance - L_M	mH	±30%	2.7	1.6					

T-2157

35 oz. in.

PEAK TORQUE





⅛(.125) DIA. THRU C'SINK 82° TO .230 MIN. DIA. (4) HOLES EQ. SPACED ON 2.500 B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

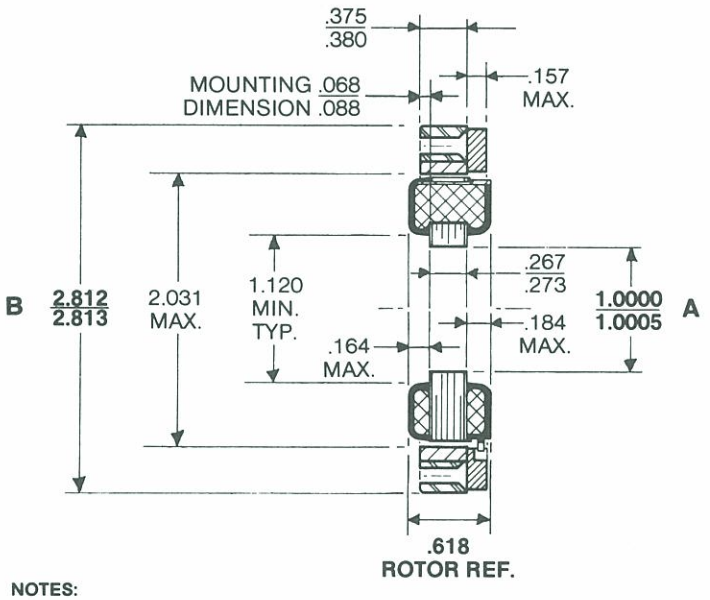
		Value	Units
Peak Torque Rating - T_P		35	OZ.IN.
Power Input, Stalled at T_P(25°C) - P_P		41	WATTS
Motor Constant - K_M		5.45	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		160	RAD/S
Electrical Time Constant - τ_E		0.60	MS
Static Friction (Max.) - T_F		1.1	OZ.IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.21	OZ.IN. PER RAD/S
	Infinite Impedance - F_I	3.6×10^{-2}	OZ.IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		9.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		6.2×10^{-3}	OZ.IN.S^2
Motor Weight		8.8	OZ.

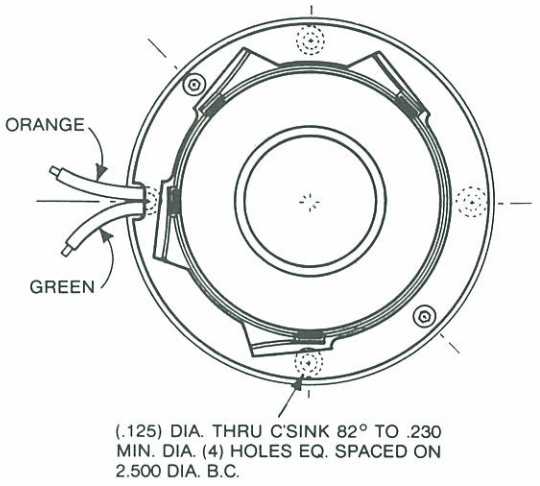
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	6.4	10.0	12.1	18.9	23.8	29.8	61.6
Peak Current - I_P	AMPERES	Rated	6.4	4.0	3.2	2.0	1.6	1.3	0.65
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	5.5	8.8	11.0	17.5	22.0	27.5	54.0
Back EMF Constant - K_B	V per RAD/S	±10%	0.04	0.06	0.08	0.12	0.16	0.19	0.38
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.0	2.5	3.8	9.5	15.0	23.4	95
Inductance - L_M	mH	±30%	0.6	1.5	2.4	6.0	10	15	60

QT-2104

48 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





(.125) DIA. THRU C'SINK 82° TO .230 MIN. DIA. (4) HOLES EQ. SPACED ON 2.500 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#24 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 18" MIN. LENGTH.

SIZE CONSTANTS

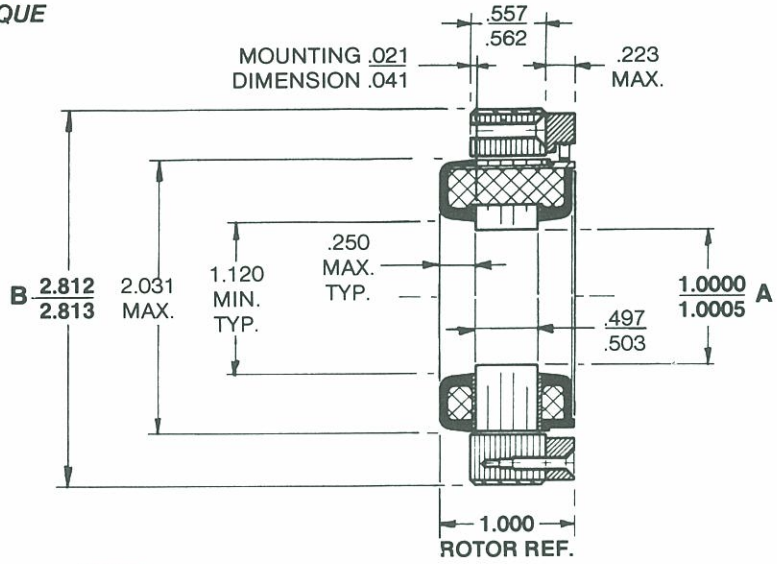
		Value	Units
Peak Torque Rating - T_P		48	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		39	WATTS
Motor Constant - K_M		7.7	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		114	RAD/S
Electrical Time Constant - τ_E		0.50	MS
Static Friction (Max.) - T_F		1.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.42	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.04	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		9	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		0.006	OZ.IN.S^2
Motor Weight		9.2	OZ.

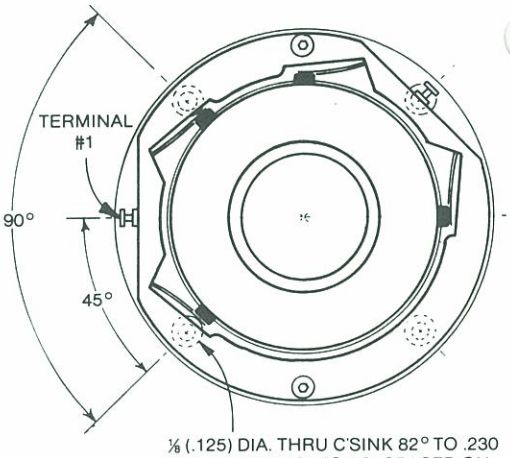
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	17.6	22.3	56.0				
Peak Current - I_P	AMPERES	Rated	2.20	1.74	0.695				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	21.8	27.6	69.1				
Back EMF Constant - K_B	V per RAD/S	±10%	0.154	0.195	0.488				
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.00	12.8	80.6				
Inductance - L_M	mH	±30%	4.0	6.4	40				

T-2170

60 oz. in.
PEAK TORQUE





⅛ (.125) DIA. THRU C'SINK 82° TO .230 MIN. DIA. (4) HOLES EQ. SPACED ON 2.500 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1 ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		60	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		33.8	WATTS
Motor Constant - K_M		10.5	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		79	RAD/S
Electrical Time Constant - τ_E		0.91	MS
Static Friction (Max.) - T_F		1.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.76	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.04	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		7.8	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		1.1×10^{-2}	OZ.IN.S^2
Motor Weight		13.8	OZ.

WINDING CONSTANTS — Winding Designation

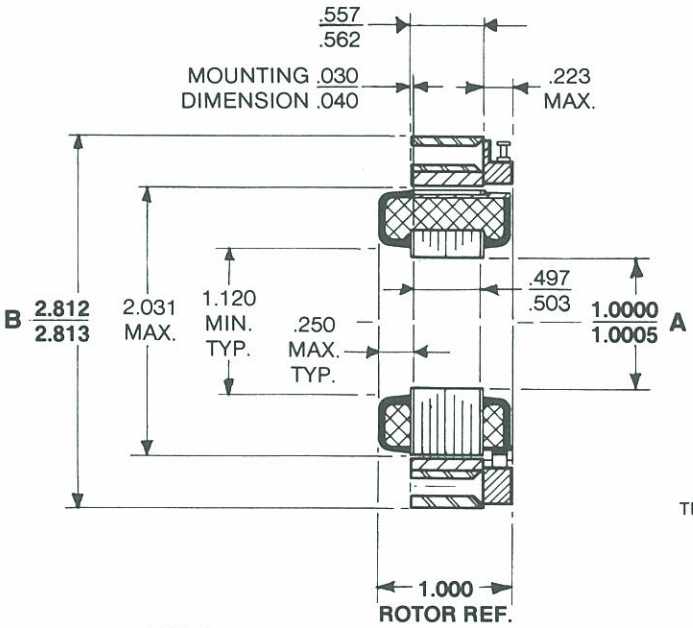
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	10.6	16.5	20.3	25.6	49.9	59.0	80.0
Peak Current - I_P	AMPERES	Rated	3.2	2.0	1.6	1.3	0.61	0.49	0.42
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	18.9	30.5	38.4	46.8	98.0	123	144
Back EMF Constant - K_B	V per RAD/S	±10%	0.13	0.22	0.27	0.33	0.69	0.87	1.0
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.3	8.4	13.0	20.0	81.5	121	191
Inductance - L_M	mH	±30%	3.0	8.0	12	19	80	120	170

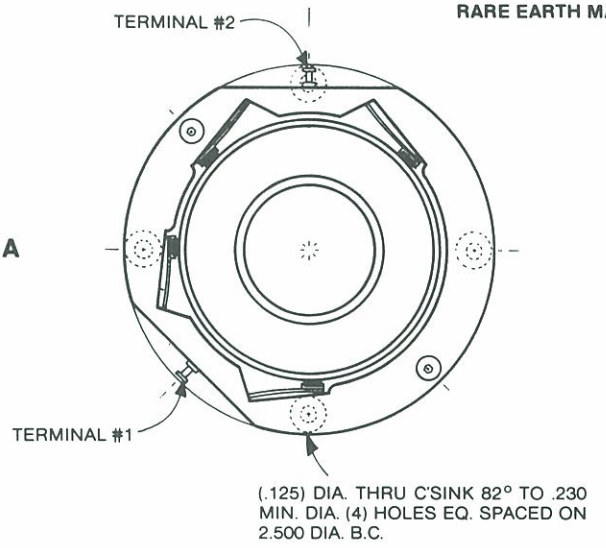
QT-2105

75 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1, WITH RESPECT TO TERMINAL #2, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

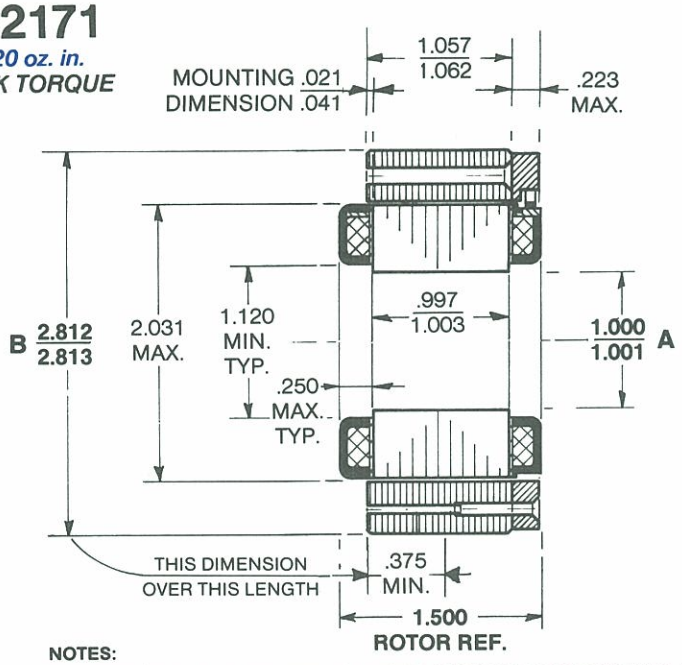
		Value	Units
Peak Torque Rating - T_P		75	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		35	WATTS
Motor Constant - K_M		12.8	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		65	RAD/S
Electrical Time Constant - τ_E		0.77	MS
Static Friction (Max.) - T_F		3.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.16	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.04	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		7.8	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		1.1×10^{-2}	OZ.IN.S^2
Motor Weight		13.5	OZ.

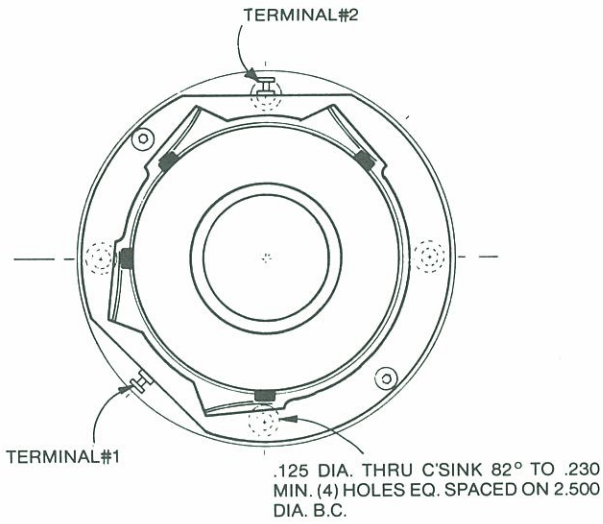
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	21.2	33.0	26.1				
Peak Current - I_P	AMPERES	Rated	1.63	1.03	1.22				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	46.1	72.7	61.2				
Back EMF Constant - K_B	V per RAD/S	±10%	0.326	0.513	0.432				
DC Resistance (25°C) - R_M	OHMS	±12.5%	13.0	32.0	21.4				
Inductance - L_M	mH	±30%	10	25	17.6				

T-2171

120 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR WITH (2) KEEPERS. **CAUTION:** DO NOT REMOVE KEEPERS UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003(.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

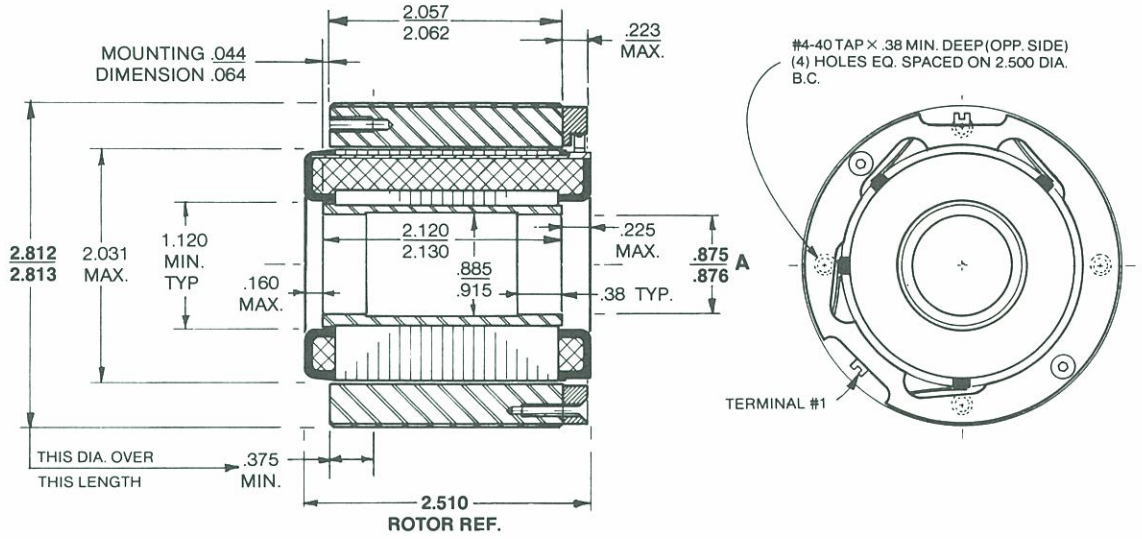
		Value	Units
Peak Torque Rating - T_P		120	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		50	WATTS
Motor Constant - K_M		17.0	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		57	RAD/S
Electrical Time Constant - τ_E		1.5	MS
Static Friction (Max.) - T_F		3.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	2.2	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.08	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		5.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		0.019	OZ.IN.S^2
Motor Weight		25	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	7.5	11.3	18.1	22.9	28.9	35.1	57.4
Peak Current - I_P	AMPERES	Rated	6.8	4.2	2.7	2.1	1.7	1.4	0.84
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	17.7	28.6	44.9	57.2	70.8	88.4	143
Back EMF Constant - K_B	V per RAD/S	±10%	0.125	0.202	0.317	0.404	0.50	0.624	1.00
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.1	2.7	6.7	10.9	17.0	25.1	68.4
Inductance - L_M	mH	±30%	1.6	4.0	10.0	17.0	26.0	40.0	100

NT-2146

1.25 lb. ft.
PEAK TORQUE



1. — MOTOR TO BE SHIPPED AS TWO SEPARATE COMPONENTS: STATOR ASSEMBLY WITH ROTOR IN PLACE AND BRUSH RING ASSEMBLY. **REMOVE MYLAR SHIMS** FROM AIR GAP AFTER ROTOR AND STATOR ARE SECURELY MOUNTED. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003(.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1 ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

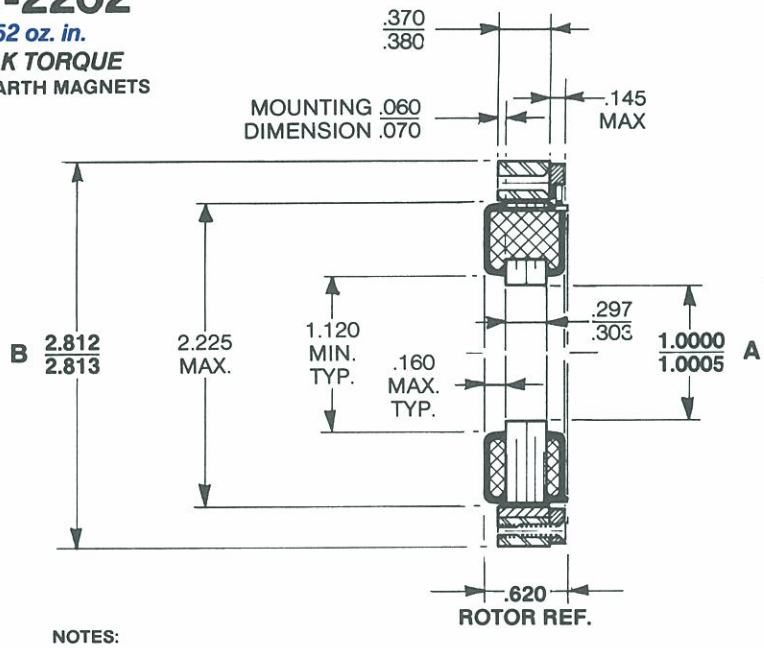
		Value	Units
Peak Torque Rating - T_P		1.25	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		75	WATTS
Motor Constant - K_M		0.15	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		42.1	RAD/S
Electrical Time Constant - τ_E		1.5	MS
Static Friction (Max.) - T_F		0.040	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.03	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.0004	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		9.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		1.4×10^{-4}	LB.FT.S^2
Motor Weight		3.0	LB.

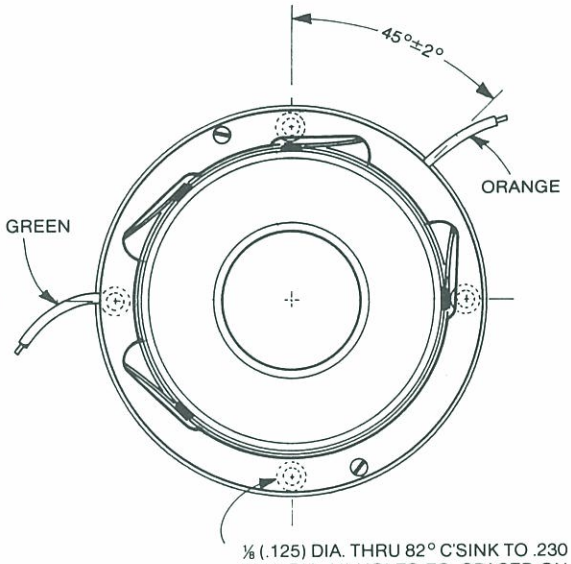
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	14.2	17.9	27.9	88.0	44.2		
Peak Current - I_P	AMPERES	Rated	5.25	4.17	2.66	0.830	1.66		
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.242	0.30	0.470	1.50	0.755		
Back EMF Constant - K_B	V per RAD/S	±10%	0.327	0.41	0.637	2.03	1.02		
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.7	4.2	10.5	106	26.6		
Inductance - L_M	mH	±30%	4.1	6.3	16	160	41		

QT-2202

52 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





⅛ (.125) DIA. THRU 82° C'SINK TO .230 MIN. DIA. (4) HOLES EQ. SPACED ON 2.500 DIA. B.C.

NOTES:

1. — MOTOR TO BE SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND BRUSH RING ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.
4. —TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "EE" TEFLON COATED PER MIL W-16878, 12" MIN. LG.

SIZE CONSTANTS

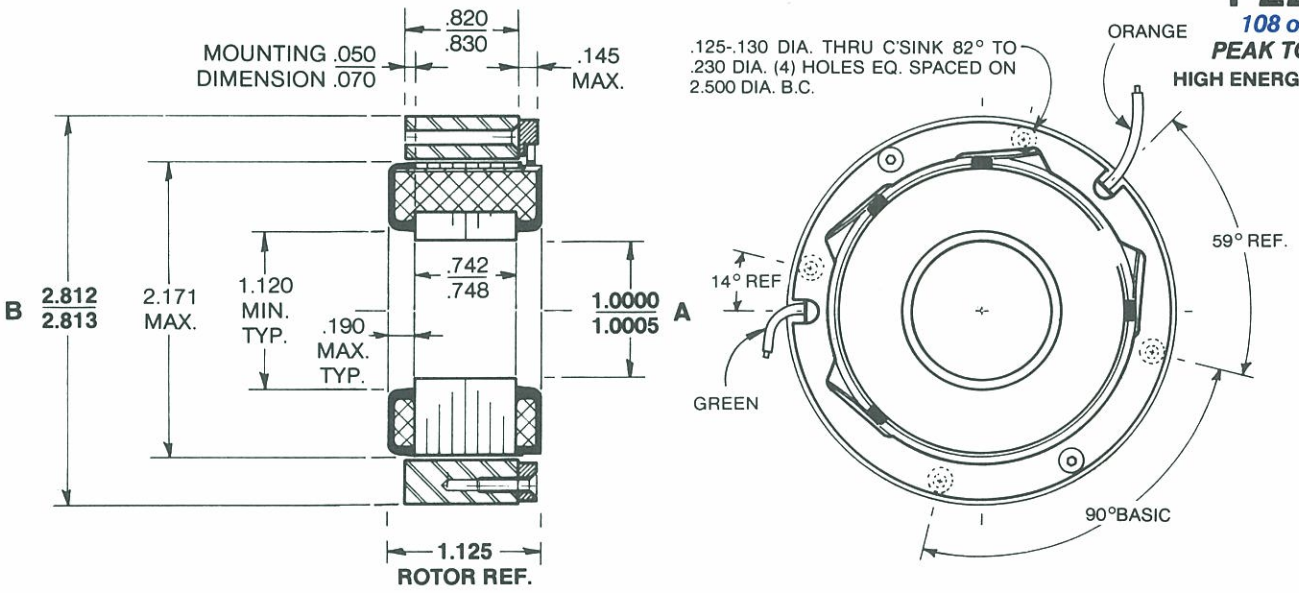
		Value	Units
Peak Torque Rating - T_P		52	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		40	WATTS
Motor Constant - K_M		8.28	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		107	RAD/S
Electrical Time Constant - τ_E		0.844	MS
Static Friction (Max.) - T_F		2.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.484	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.024	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		9	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV
Number of Poles		8	
Rotor Inertia - J_M		8.5×10^{-3}	OZ.IN.S^2
Motor Weight		11	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	24.6						
Peak Current - I_P	AMPERES	Rated	1.60						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	32.5						
Back EMF Constant - K_B	V per RAD/s	±10%	0.230						
DC Resistance (25°C) - R_M	OHMS	±12.5%	15.4						
Inductance - L_M	mH	±30%	13						

T-2215

108 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE"EE"TEFLON COATED PER MIL W-16878, 12" MIN. LG.

SIZE CONSTANTS

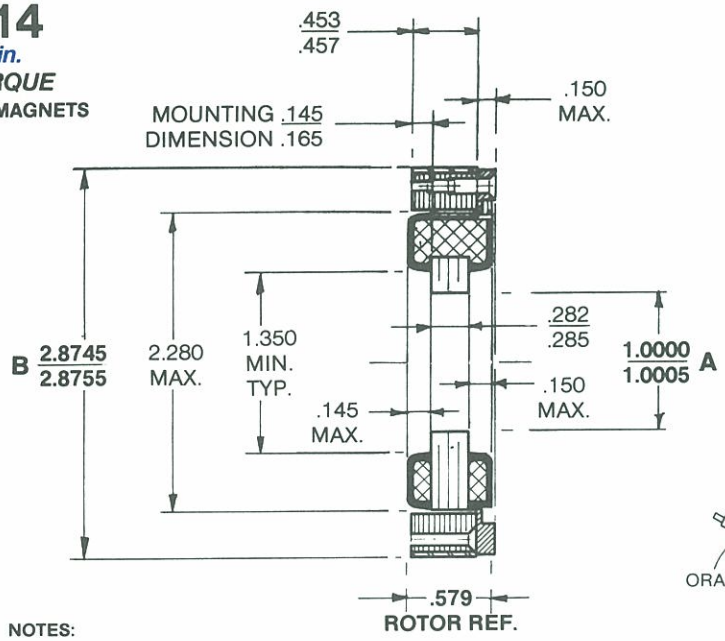
		Value	Units
Peak Torque Rating - T_P		108	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		41	WATTS
Motor Constant - K_M		16.9	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		54	RAD/S
Electrical Time Constant - τ_E		1.74	MS
Static Friction (Max.) - T_F		3.3	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	2.0	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.042	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		6	°C/WATT
Ripple Torque (Average to Peak) - T_R		4.5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		0.017	OZ.IN.S^2
Motor Weight		20	OZ.

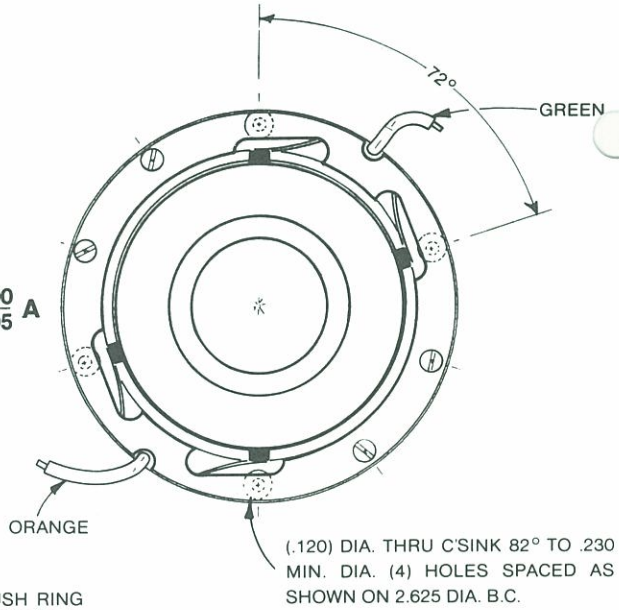
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	18.9	12.0	24.1	48.1			
Peak Current - I_P	AMPERES	Rated	2.2	3.54	1.77	0.885			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	49	30.5	61.0	122			
Back EMF Constant - K_B	V per RAD/S	±10%	0.35	0.215	0.431	0.861			
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.6	3.40	13.60	54.4			
Inductance - L_M	mH	±30%	15	5.8	23	93			

T-2314

54 oz. in.
PEAK TORQUE
HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE 'EE' TEFLON COATED PER MIL W-16878, 12" MIN. LG.

SIZE CONSTANTS

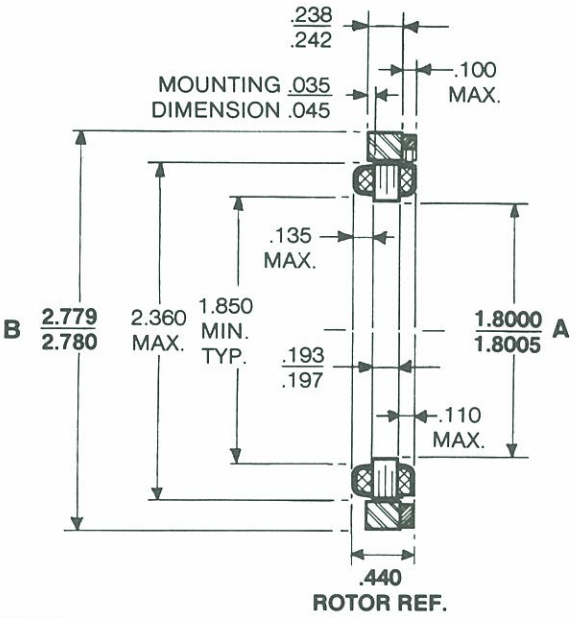
		Value	Units
Peak Torque Rating - T_P		54	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		57.5	WATTS
Motor Constant - K_M		7.1	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		150	RAD/S
Electrical Time Constant - τ_E		0.66	MS
Static Friction (Max.) - T_F		1.7	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.36	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.013	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		8	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.009	OZ.IN.S^2
Motor Weight		11	OZ.

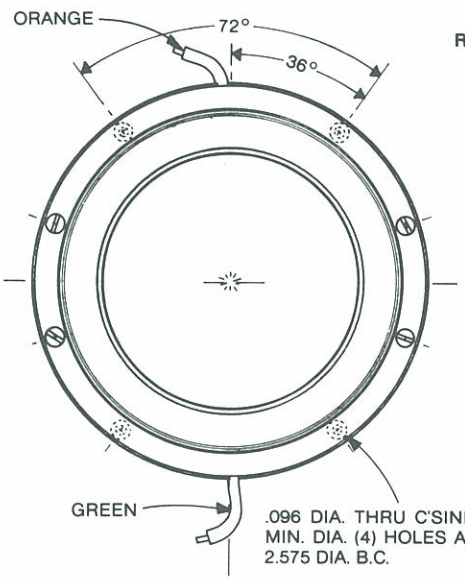
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	40.9	25.4	20.4	50.6			
Peak Current - I_P	AMPERES	Rated	1.41	2.25	2.86	1.12			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	38.4	24.1	18.9	48.2			
Back EMF Constant - K_B	V per RAD/S	±10%	0.271	0.170	0.133	0.340			
DC Resistance (25°C) - R_M	OHMS	±12.5%	29.0	11.3	7.15	45.2			
Inductance - L_M	mH	±30%	19	7.5	4.6	30			

QT-2406

30.0 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002(.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE $\times 10^7$ REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE "E" PER MIL W-16878/7
18" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		30.0	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		53.5	WATTS
Motor Constant - K_M		4.1	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		250	RAD/S
Electrical Time Constant - τ_E		0.13	MS
Static Friction (Max.) - T_F		1.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.12	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.008	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		46	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		5.4×10^{-3}	OZ.IN.S^2
Motor Weight		3.85	OZ.

WINDING CONSTANTS — Winding Designation

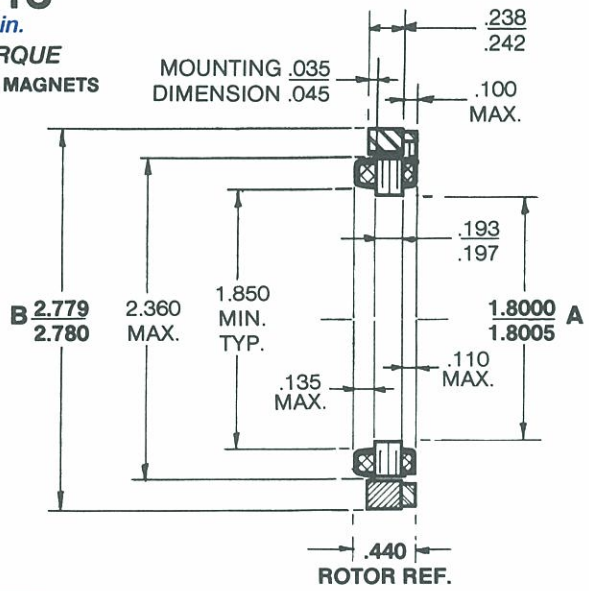
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	34.1	27.4	15.2				
Peak Current - I_P	AMPERES	Rated	1.57	1.97	3.49				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	19.1	15.2	8.60				
Back EMF Constant - K_B	V per RAD/S	±10%	0.135	0.107	0.0607				
DC Resistance (25°C) - R_M	OHMS	±12.5%	21.7	13.9	4.35				
Inductance - L_M	mH	±30%	2.9	2.0	0.59				

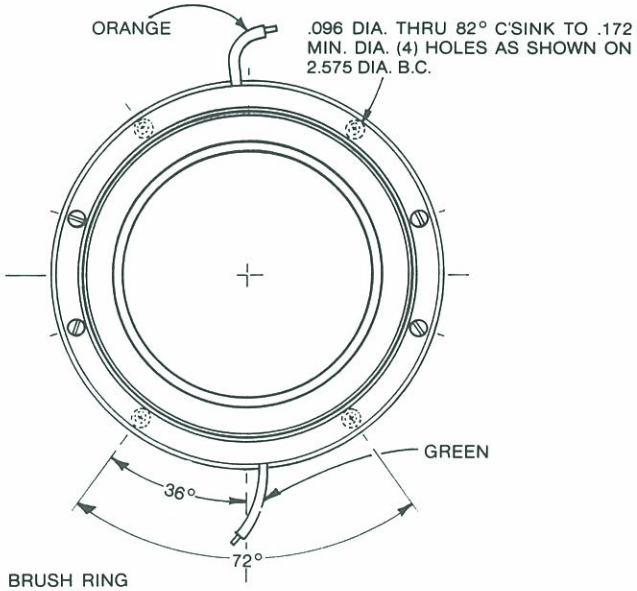
T-2413

30 oz. in.

PEAK TORQUE

HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:

#24 AWG TYPE 'E' TEFLON COATED 18" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		30	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		50.5	WATTS
Motor Constant - K_M		4.22	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		238	RAD/S
Electrical Time Constant - τ_E		0.20	MS
Static Friction (Max.) - T_F		1.7	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.126	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.002	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		46	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.006	OZ.IN.S^2
Motor Weight		4	OZ.

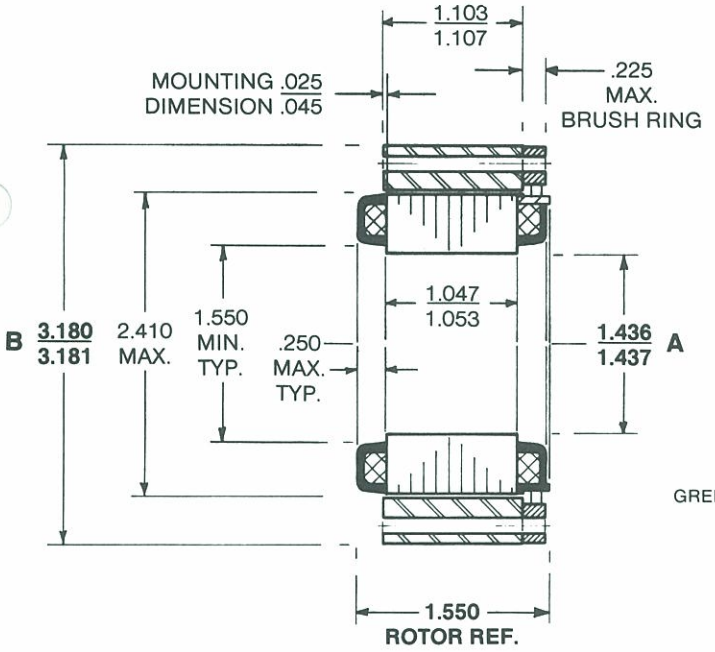
WINDING CONSTANTS — Winding Designation

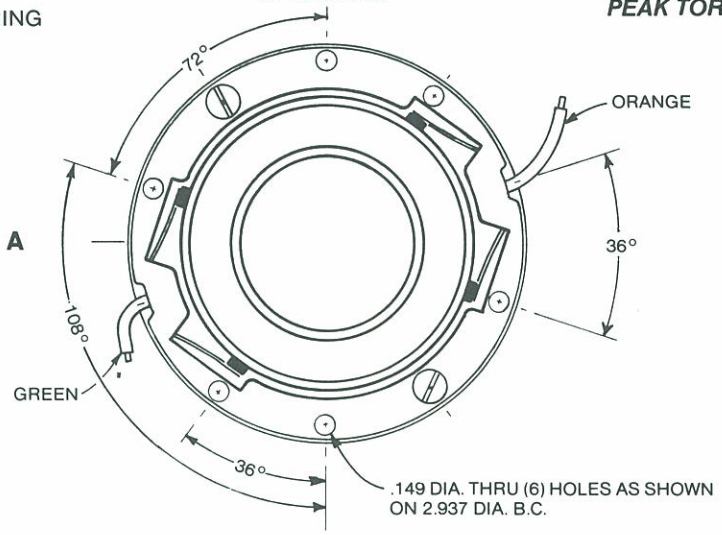
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	32.2	25.6					
Peak Current - I_P	AMPERES	Rated	1.57	1.97					
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	19.1	15.2					
Back EMF Constant - K_B	V per RAD/S	±10%	0.135	0.107					
DC Resistance (25°C) - R_M	OHMS	±12.5%	20.5	13.0					
Inductance - L_M	mH	±30%	4.3	2.6					

T-2406

480 oz. in.
PEAK TORQUE

SPECIAL MAGNET MATERIAL FOR RESISTANCE TO TORQUE SENSITIVITY DEGRADATION AT HIGH POWER INPUT LEVELS.





NOTES:

1. - MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. —TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG TYPE "E" 41/36 STRANDING TEFLON COATED PER MIL W-16878, 24" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		480	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		285	WATTS
Motor Constant - K_M		28.4	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		84	RAD/S
Electrical Time Constant - τ_E		1.75	MS
Static Friction (Max.) - T_F		10	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	5.71	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.1	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.031	OZ.IN.S^2
Motor Weight		31	OZ.

WINDING CONSTANTS — Winding Designation

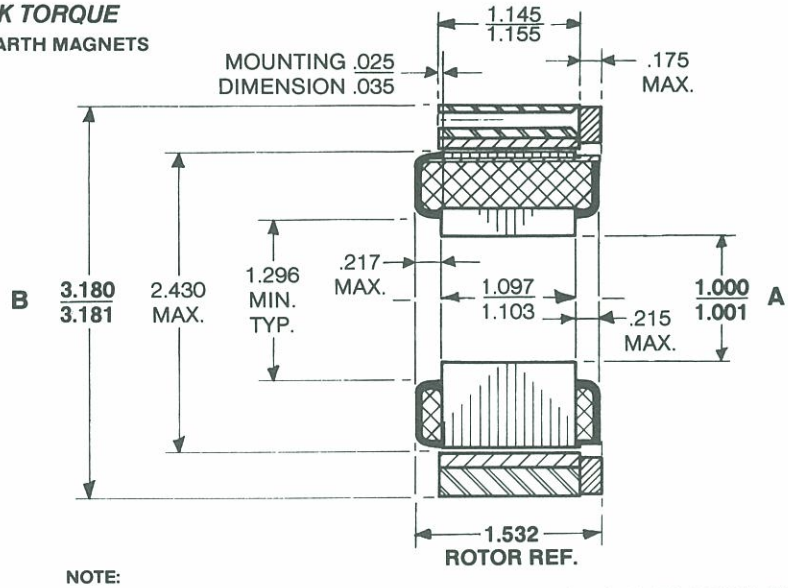
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	28.5	24.3	45.4	57.0			
Peak Current - I_P	AMPERES	Rated	10.0	12.8	6.40	5.00			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	48.0	37.5	75.1	96.0			
Back EMF Constant - K_B	V per RAD/S	±10%	0.339	0.265	0.530	0.678			
DC Resistance(25°C) - R_M	OHMS	±12.5%	2.85	1.9	7.10	11.4			
Inductance - L_M	mH	±30%	5.0	3.1	12	20			

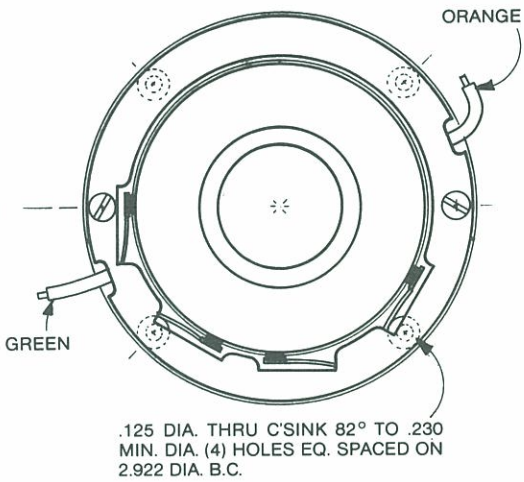
QT-2404

3.0 lb. ft.

PEAK TORQUE

RARE EARTH MAGNETS





.125 DIA. THRU C'SINK 82° TO .230 MIN. DIA. (4) HOLES EQ. SPACED ON 2.922 DIA. B.C.

NOTE:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:

#20 AWG TYPE "E" 41/36 STRANDING TEFLON COATED PER MIL W-16878, 24" MIN. LENGTH.

SIZE CONSTANTS

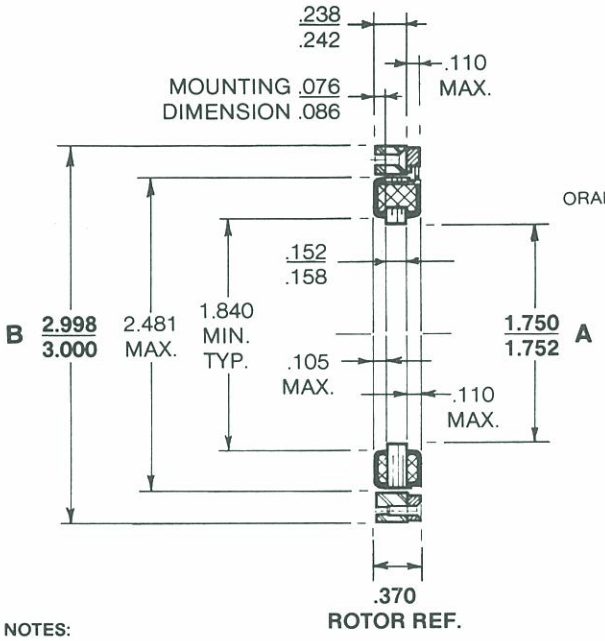
		Value	Units
Peak Torque Rating - T_P		3.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		260	WATTS
Motor Constant - K_M		0.19	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		64	RAD/S
Electrical Time Constant - τ_E		1.04	MS
Static Friction (Max.) - T_F		0.062	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.047	LB. FT. PER RAD/S
	Infinite Impedance - F_I	7.0×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		41	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		2.0×10^{-4}	LB.FT.S^2
Motor Weight		2.4	LB.

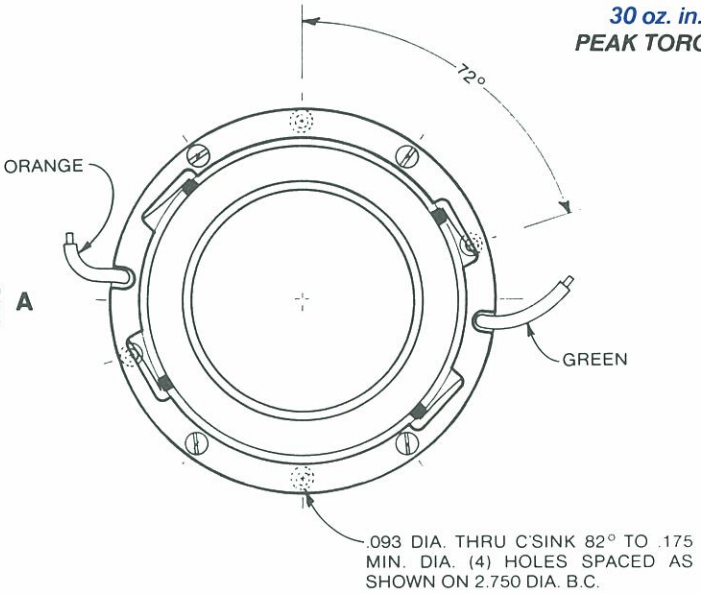
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	26.0	20.6	32.8	41.4	52.0		
Peak Current - I_P	AMPERES	Rated	10.0	12.2	7.86	6.29	5.00		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.30	0.245	0.382	0.477	0.600		
Back EMF Constant - K_B	V per RAD/S	±10%	0.407	0.333	0.518	0.647	0.814		
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.60	1.69	4.17	6.58	10.4		
Inductance - L_M	mH	±30%	2.7	1.8	4.4	6.8	11		

T-2509

30 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#28 AWG TYPE "E" TEFLON COATED
12" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		30	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		48	WATTS
Motor Constant - K_M		4.33	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		220	RAD/S
Electrical Time Constant - τ_E		0.25	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.134	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.01	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		9.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		59	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.006	OZ.IN.S^2
Motor Weight		4.5	OZ.

WINDING CONSTANTS — Winding Designation

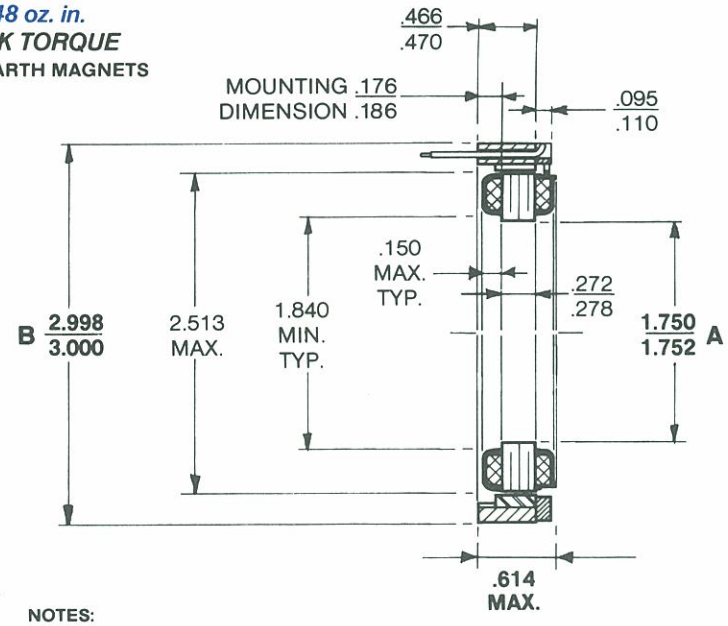
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	30.8	19.1	12.7	38.5			
Peak Current - I_P	AMPERES	Rated	1.54	2.42	3.85	1.21			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	19.5	12.4	7.83	24.8			
Back EMF Constant - K_B	V per RAD/S	±10%	0.138	0.088	0.055	0.175			
DC Resistance(25°C) - R_M	OHMS	±12.5%	20.0	7.9	3.3	31.8			
Inductance - L_M	mH	±30%	5.0	2.0	0.79	8.0			

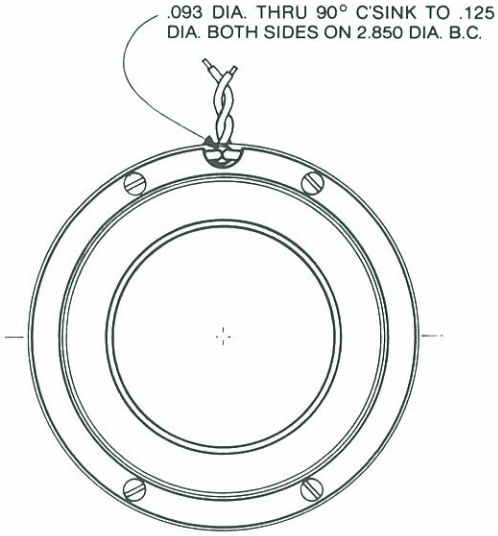
QT-2502

48 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO ORANGE LEAD, WITH RESPECT TO BLACK LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:

#26 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 6" MIN. LENGTH.

SIZE CONSTANTS

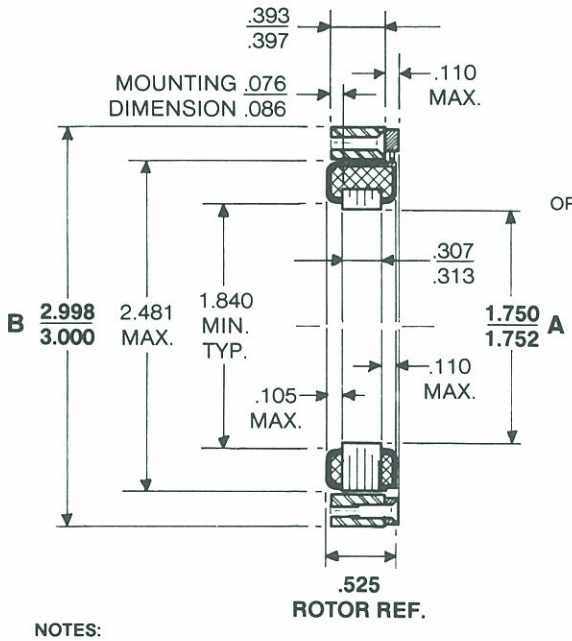
		Value	Units
Peak Torque Rating - T_P		48	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		27	WATTS
Motor Constant - K_M		9.25	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		79	RAD/S
Electrical Time Constant - τ_E		0.184	MS
Static Friction (Max.) - T_F		2.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.604	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.033	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		7.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		59	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		1.05×10^{-2}	OZ.IN.S^2
Motor Weight		9.0	OZ.

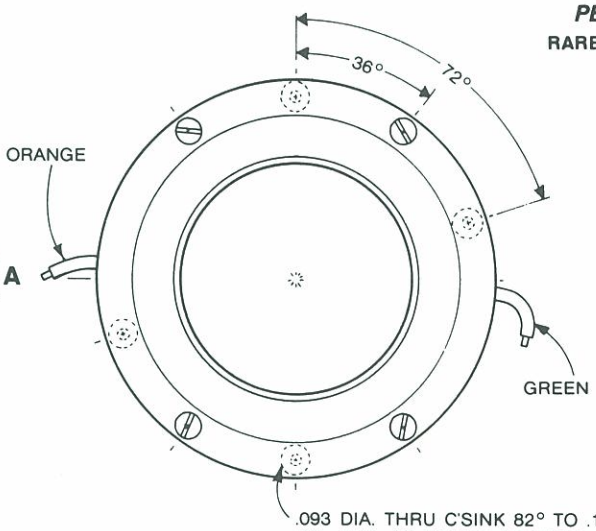
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	19.0						
Peak Current - I_P	AMPERES	Rated	1.40						
Torque Sensitivity - K_T	OZ. IN./AMP.	±10%	34.1						
Back EMF Constant - K_B	V per RAD/S	±10%	0.241						
DC Resistance (25°C) - R_M	OHMS	±12.5%	13.6						
Inductance - L_M	mH	±30%	2.5						

QT-2504

60 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





.093 DIA. THRU C'SINK 82° TO .175 DIA. MIN. (4) HOLES LOCATED AS SHOWN ON 2.750 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#28 AWG TYPE "E" TEFLON COATED
12" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		60	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		55	WATTS
Motor Constant - K_M		8.1	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		128	RAD/S
Electrical Time Constant - τ_E		0.29	MS
Static Friction (Max.) - T_F		1.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.47	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.02	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		7	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		59	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.011	OZ.IN.S^2
Motor Weight		8	OZ.

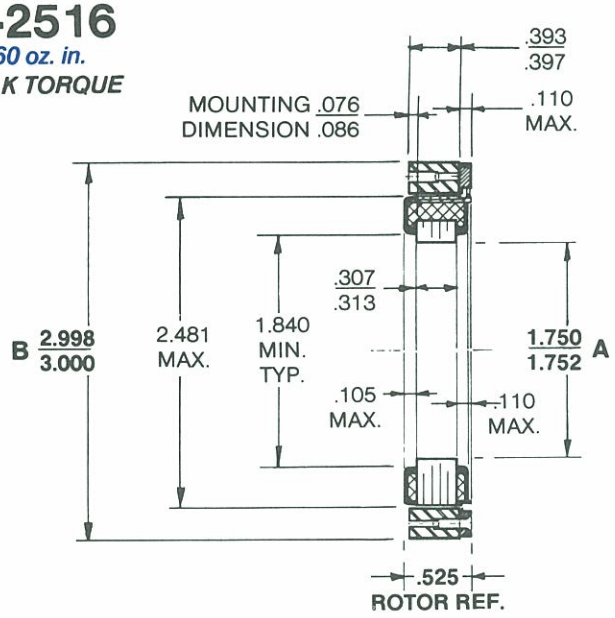
WINDING CONSTANTS — Winding Designation

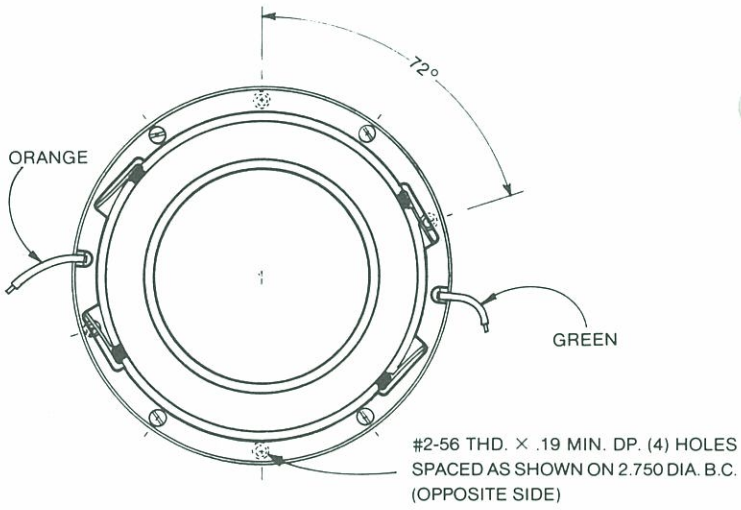
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	22.4	45.0	56.6				
Peak Current - I_P	AMPERES	Rated	2.43	1.22	0.962				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	24.7	49.4	62.4				
Back EMF Constant - K_B	V per RAD/S	±10%	0.174	0.349	0.441				
DC Resistance (25°C) - R_M	OHMS	±12.5%	9.23	36.9	58.8				
Inductance - L_M	mH	±30%	2.7	11	17				

T-2516

60 oz. in.

PEAK TORQUE





NOTES:

1. - MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT RMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**"TO BE CONCENTRIC WITH-IN .002(.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#28 AWG TYPE 'E' TEFLON COATED
12" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		60	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		55	WATTS
Motor Constant - K_M		8.1	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		127	RAD/S
Electrical Time Constant - τ_E		0.43	MS
Static Friction (Max.) - T_F		1.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.47	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.02	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		7.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		59	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.011	OZ.IN.S^2
Motor Weight		8.0	OZ.

WINDING CONSTANTS — Winding Designation

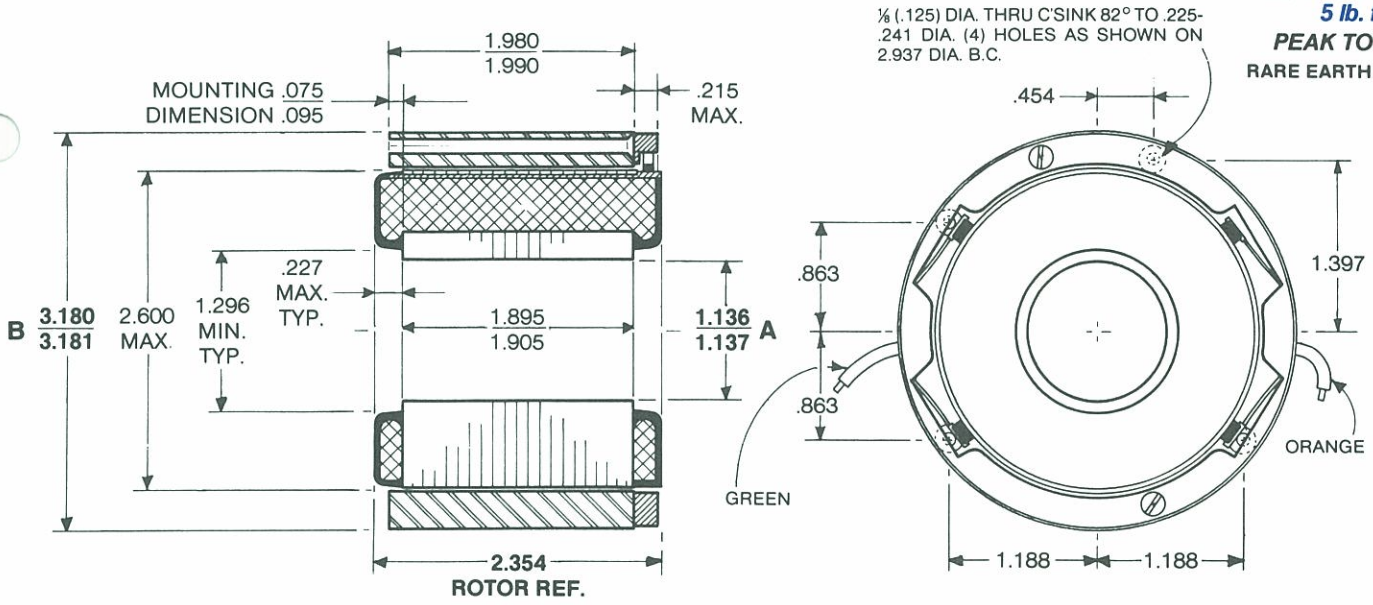
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	35.6	22.6	17.9	14.1	28.4		
Peak Current - I_P	AMPERES	Rated	1.54	2.45	3.08	3.85	1.93		
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	39.0	24.7	19.5	15.6	31.2		
Back EMF Constant - K_B	V per RAD/S	±10%	0.28	0.174	0.138	0.110	0.220		
DC Resistance (25°C) - R_M	OHMS	±12.5%	23.1	9.20	5.80	3.67	14.7		
Inductance - L_M	mH	±30%	10	4.0	2.5	1.6	6.4		

QT-2603

5 lb. ft.

PEAK TORQUE

RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 6" MIN. LENGTH.

SIZE CONSTANTS

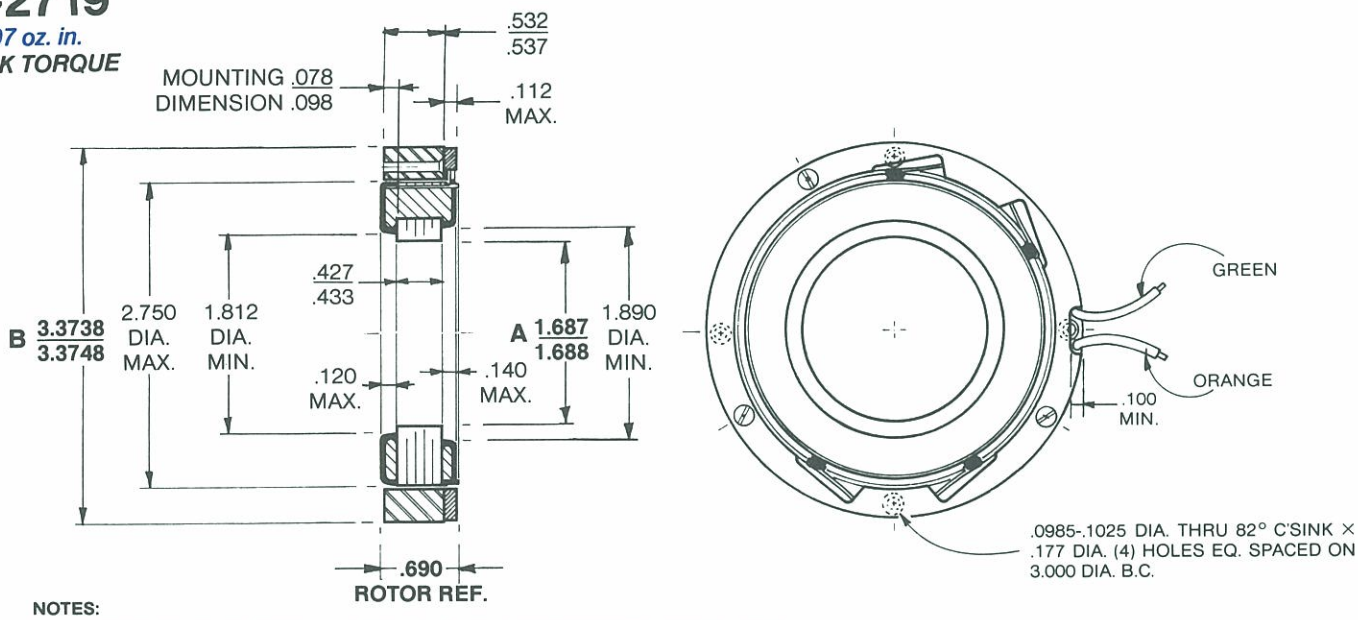
		Value	Units
Peak Torque Rating - T_P		5	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		313	WATTS
Motor Constant - K_M		0.28	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		46	RAD/S
Electrical Time Constant - τ_E		2.1	MS
Static Friction (Max.) - T_F		0.10	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.108	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.0014	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		39	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		4.0×10^{-4}	LB.FT.S^2
Motor Weight		3.5	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	50.0	19.8	39.7	31.5	25.0	63.2	
Peak Current - I_P	AMPERES	Rated	6.25	16.1	8.04	9.78	12.5	4.90	
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.800	0.310	0.622	0.511	0.400	1.02	
Back EMF Constant - K_B	V per RAD/S	±10%	1.08	0.420	0.842	0.693	0.542	1.38	
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.00	1.23	4.94	3.22	2.00	12.9	
Inductance - L_M	mH	±30%	17	2.6	10	6.9	4.2	27	

T-2719

97 oz. in.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#30 AWG TYPE 'E' TEFLON COATED 7-STRAND MIN. 12" MIN. LG.

SIZE CONSTANTS

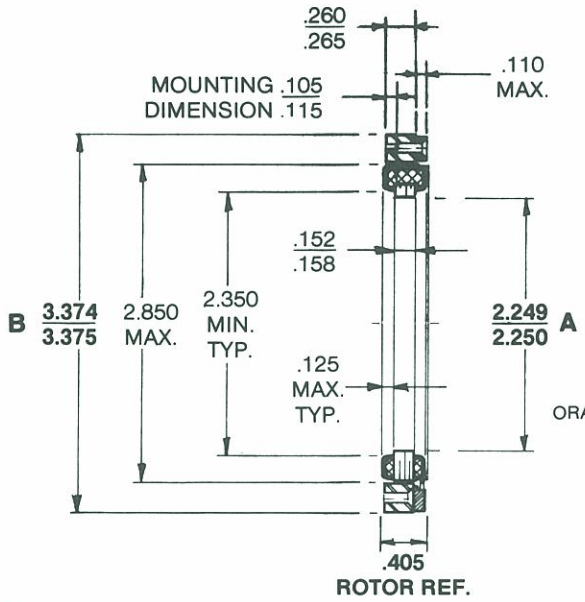
		Value	Units
Peak Torque Rating - T_P		97	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		37.5	WATTS
Motor Constant - K_M		15.8	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		54	RAD/S
Electrical Time Constant - τ_E		0.77	MS
Static Friction (Max.) - T_F		4.25	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.78	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.038	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		5.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		61	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.022	OZ.IN.S^2
Motor Weight		15	OZ.

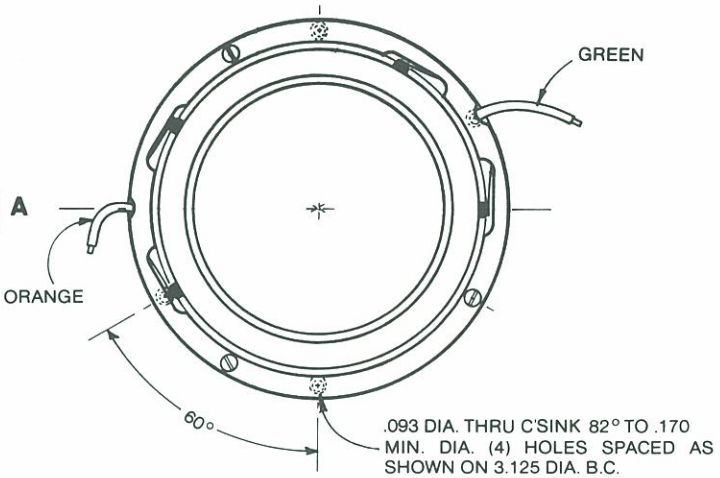
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	31.2	19.6	12.4	62.4	15.6		
Peak Current - I_P	AMPERES	Rated	1.20	1.92	3.03	0.600	2.40		
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	81.0	50.6	32.0	162	40.5		
Back EMF Constant - K_B	V per RAD/S	±10%	0.57	0.36	0.226	1.14	0.286		
DC Resistance (25°C) - R_M	OHMS	±12.5%	26.0	10.2	4.10	104	6.50		
Inductance - L_M	mH	±30%	20	7.8	3.1	80	5.0		

T-2804

30 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#28 AWG TYPE 'EE' TEFLON COATED PER MIL W-16878, 6" MIN. LG.

SIZE CONSTANTS

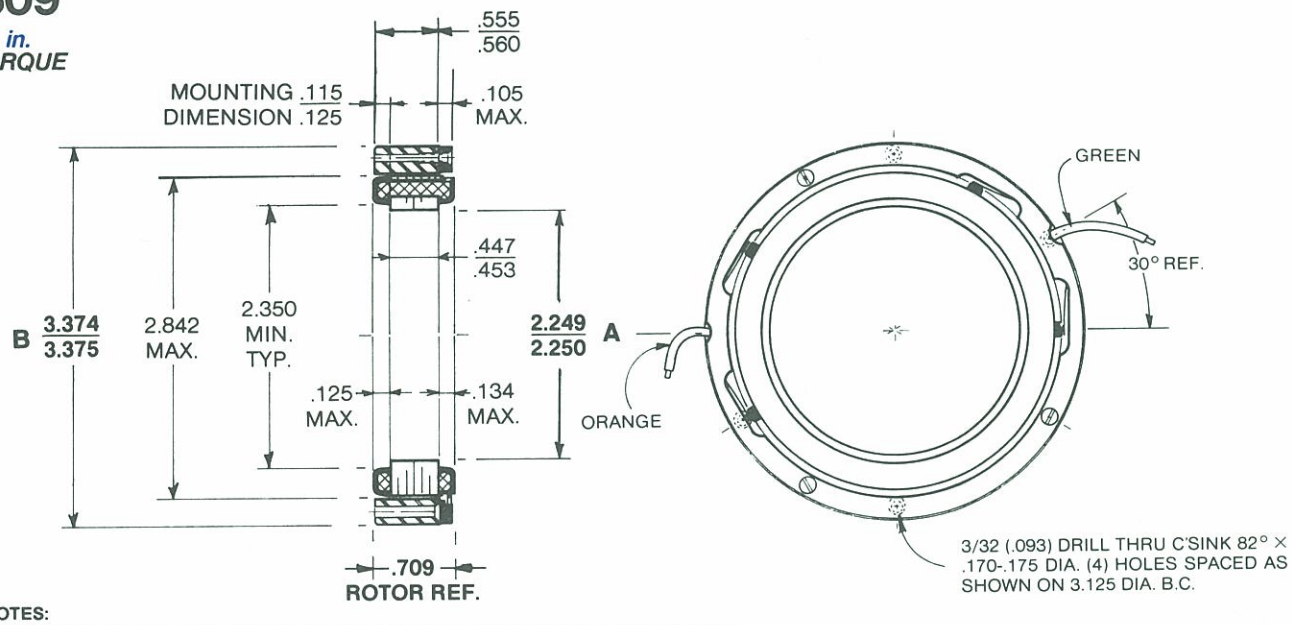
		Value	Units
Peak Torque Rating - T_P		30	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		67	WATTS
Motor Constant - K_M		3.66	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		320	RAD/S
Electrical Time Constant - τ_E		0.30	MS
Static Friction (Max.) - T_F		1.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.095	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.005	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		7.9	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		67	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		8.6×10^{-3}	OZ.IN.S^2
Motor Weight		5.1	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	45.3	56.2	71.2	92.4	115	28.6	33.4
Peak Current - I_P	AMPERES	Rated	1.48	1.2	0.95	0.74	0.59	2.34	2.13
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	20.2	25.0	31.7	40.4	50.5	12.8	14.1
Back EMF Constant - K_B	V per RAD/S	±10%	0.14	0.18	0.22	0.29	0.36	0.09	0.10
DC Resistance (25°C) - R_M	OHMS	±12.5%	30.6	46.8	74.9	125	195	12.2	15.7
Inductance - L_M	mH	±30%	9.0	14	22	36	56	3.6	4.4

T-2809

85 oz. in.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#28 AWG TYPE 'EE' TEFLON COATED PER MIL W-16878, 18" MIN. LG.

SIZE CONSTANTS

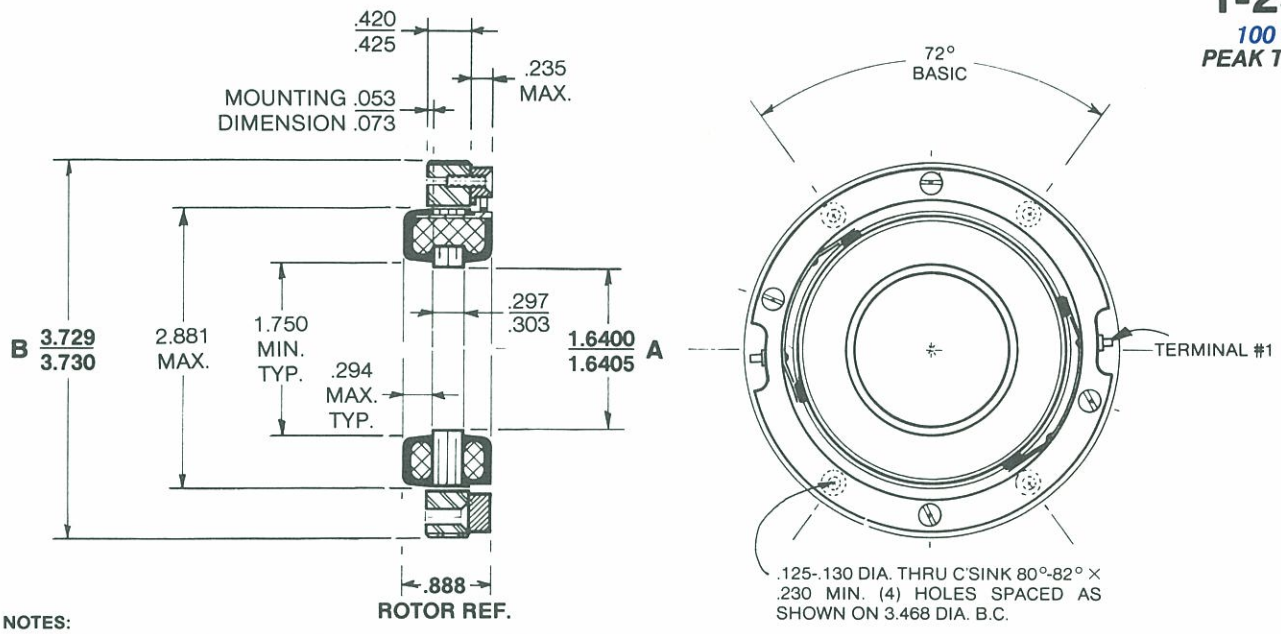
		Value	Units
Peak Torque Rating - T_P		85	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		103	WATTS
Motor Constant - K_M		8.4	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		170	RAD/S
Electrical Time Constant - τ_E		0.300	MS
Static Friction (Max.) - T_F		3.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.49	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.015	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		3.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		67	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.02	OZ.IN.S^2
Motor Weight		11	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	40.6	32.2	64.4	81.3			
Peak Current - I_P	AMPERES	Rated	2.54	3.22	1.61	1.27			
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	33.4	26.4	52.8	66.8			
Back EMF Constant - K_B	V per RAD/S	±10%	0.236	0.186	0.373	0.472			
DC Resistance (25°C) - R_M	OHMS	±12.5%	16.0	10.0	40.0	64.0			
Inductance - L_M	mH	±30%	4.8	3.0	12	19.2			

T-2967

100 oz. in.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING THE BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		67.5	WATTS
Motor Constant - K_M		12.2	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		95	RAD/S
Electrical Time Constant - τ_E		1.2	MS
Static Friction (Max.) - T_F		3.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.04	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.055	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		5.6	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.035	OZ.IN.S^2
Motor Weight		17.5	OZ.

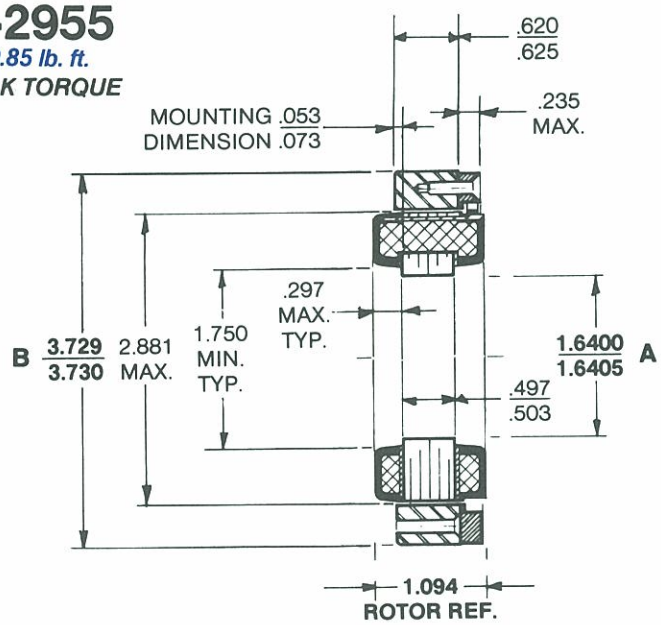
WINDING CONSTANTS — Winding Designation

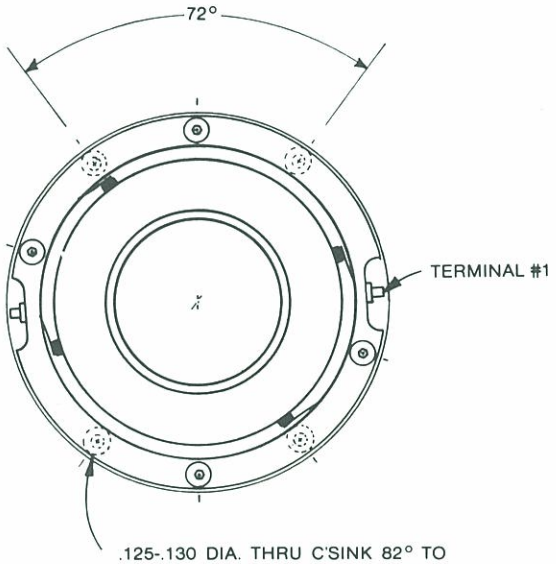
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	21.4	27.2	34.1	11.0	13.5	8.9	53.8
Peak Current - I_P	AMPERES	Rated	3.15	2.5	1.97	6.3	5.0	8.1	1.25
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	31.7	40.2	50.8	15.85	20.0	12.4	80.4
Back EMF Constant - K_B	V per RAD/S	±10%	0.224	0.284	0.359	0.112	0.141	0.0876	0.568
DC Resistance (25°C) - R_M	OHMS	±12.5%	6.8	10.9	17.3	1.75	2.7	1.1	43.0
Inductance - L_M	mH	±30%	8.0	13.0	21.0	2.0	3.2	1.2	52

T-2955

0.85 lb. ft.

PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002(.004T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		0.85	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		77	WATTS
Motor Constant - K_M		0.097	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		67	RAD/S
Electrical Time Constant - τ_E		1.6	MS
Static Friction (Max.) - T_F		0.013	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.013	LB. FT. PER RAD/S
	Infinite Impedance - F_I	5×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		2.3×10^{-4}	LB.FT.S^2
Motor Weight		1.5	LB.

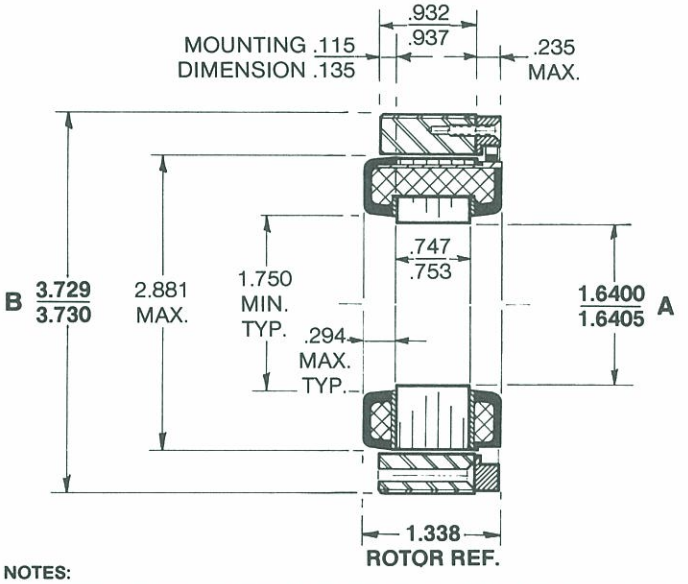
WINDING CONSTANTS — Winding Designation

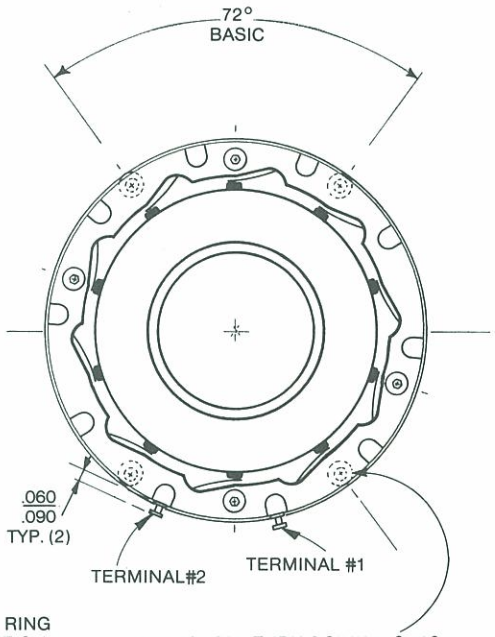
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	12.2	14.9	22.8	28.2	34.5	56.7	89.2
Peak Current - I_P	AMPERES	Rated	6.8	5.5	3.4	2.74	2.13	1.36	0.85
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.125	0.155	0.25	0.31	0.40	0.63	1.0
Back EMF Constant - K_B	V per RAD/S	±10%	0.17	0.21	0.34	0.42	0.54	0.85	1.36
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.8	2.7	6.7	10.3	16.2	41.7	105
Inductance - L_M	mH	±30%	2.7	4.1	11	17	27	68	175

T-2987

1.10 lb .ft

PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION**: DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — FULL COMPLEMENT OF BRUSHES FOR IMPROVED COMMUTATION AT SUBSTANTIAL SPEEDS AND LOADS.

.125-.130 DIA. THRU C'SINK 80°-82° × .230 MIN. (4) HOLES SPACED AS SHOWN ON 3.468 DIA. B.C.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		1.10	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		113	WATTS
Motor Constant - K_M		0.104	LB. FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		75	RAD/S
Electrical Time Constant - τ_E		2.13	MS
Static Friction (Max.) - T_F		3.0×10^{-2}	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.46×10^{-2}	LB. FT. PER RAD/S
	Infinite Impedance - F_I	5.0×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		2.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		3.2×10^{-4}	LB.FT.S^2
Motor Weight		2.0	LB.

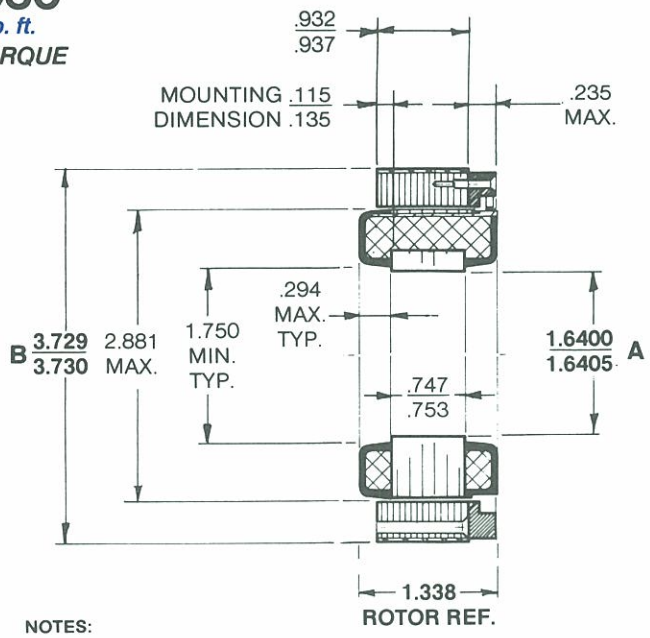
WINDING CONSTANTS

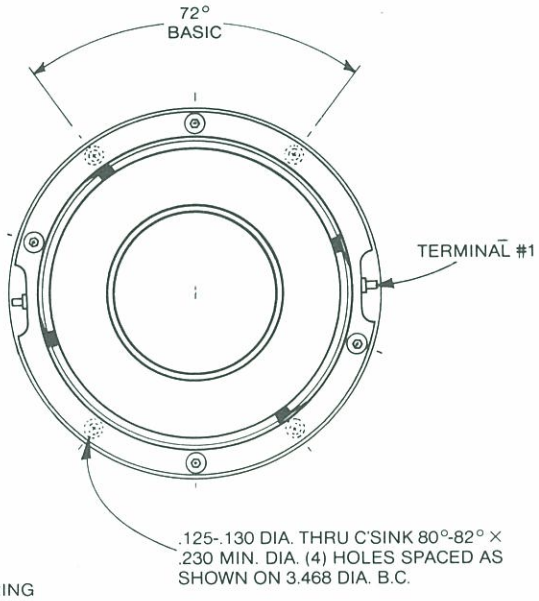
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	14.6	12			18.6	29.7	37.2
Peak Current - I_P	AMPERES	Rated	7.7	10			6.0	3.75	3.00
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.143	0.110			0.183	0.294	0.366
Back EMF Constant - K_B	V per RAD/S	±10%	0.195	0.150			0.248	0.400	0.500
DC Resistance (25°C) -R_M	OHMS	±12.5%	1.90	1.2			3.1	7.9	12.4
Inductance - L_M	mH	±30%	4.05	2.4			6.5	16.5	26

T-2950

1.20 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

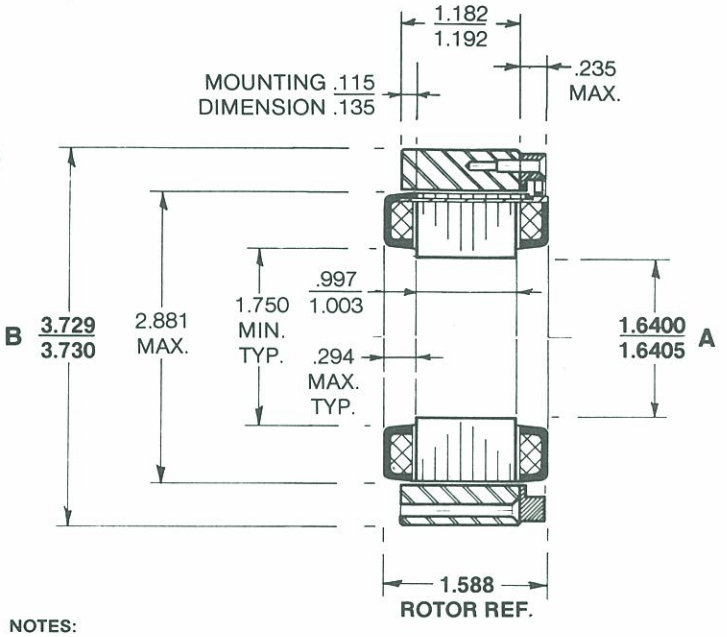
		Value	Units
Peak Torque Rating - T_P		1.20	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		79	WATTS
Motor Constant - K_M		0.135	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		48	RAD/S
Electrical Time Constant - τ_E		2.13	MS
Static Friction (Max.) - T_F		0.017	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.025	LB. FT. PER RAD/S
	Infinite Impedance - F_I	8.0×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		4.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		2.9×10^{-4}	LB.FT.S^2
Motor Weight		2.15	LB.

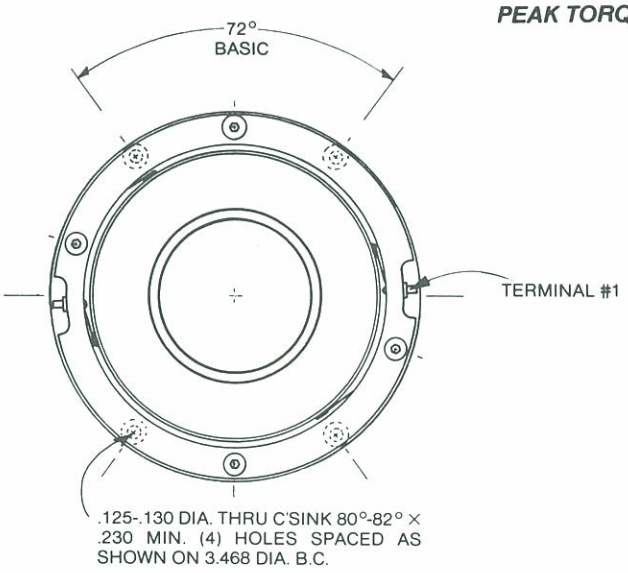
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	24.4	53.7	12.0	15.1	30.2	38.4	60.6
Peak Current - I_P	AMPERES	Rated	3.25	1.43	6.3	5.2	2.6	2.0	1.3
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.37	0.84	0.19	0.23	0.46	0.60	0.92
Back EMF Constant - K_B	V per RAD/S	±10%	0.50	1.14	0.26	0.31	0.63	0.81	1.25
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.5	37.5	1.9	2.9	11.6	19.2	46.7
Inductance - L_M	mH	±30%	16	82	4.1	6.2	25	41	100

T-2959

1.7 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

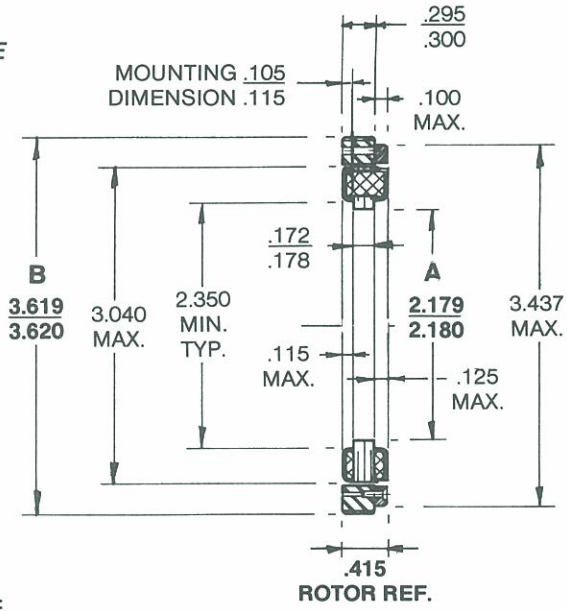
		Value	Units
Peak Torque Rating - T_P		1.7	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		110	WATTS
Motor Constant - K_M		0.16	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		47	RAD/S
Electrical Time Constant - τ_E		2.5	MS
Static Friction (Max.) - T_F		0.026	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.035	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.001	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		4.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		3.3×10^{-4}	LB.FT.S^2
Motor Weight		2.5	LB.

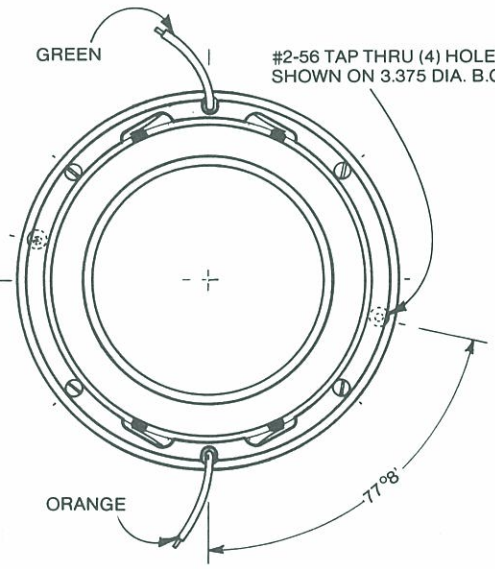
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	15.6	95.0	30.4	24.8	19.3		
Peak Current - I_P	AMPERES	Rated	7.1	1.12	3.55	4.5	5.67		
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.24	1.52	0.475	0.38	0.30		
Back EMF Constant - K_B	V per RAD/S	±10%	0.325	2.06	0.65	0.52	0.40		
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.2	85.0	8.55	5.5	3.4		
Inductance - L_M	mH	±30%	5.5	220	22.0	13.6	8.4		

T-3001

26.5 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#28 AWG TYPE "EE" 7-STRAND TEFLON COATED PER MIL W-16878/SA
12" MIN. LG.

SIZE CONSTANTS

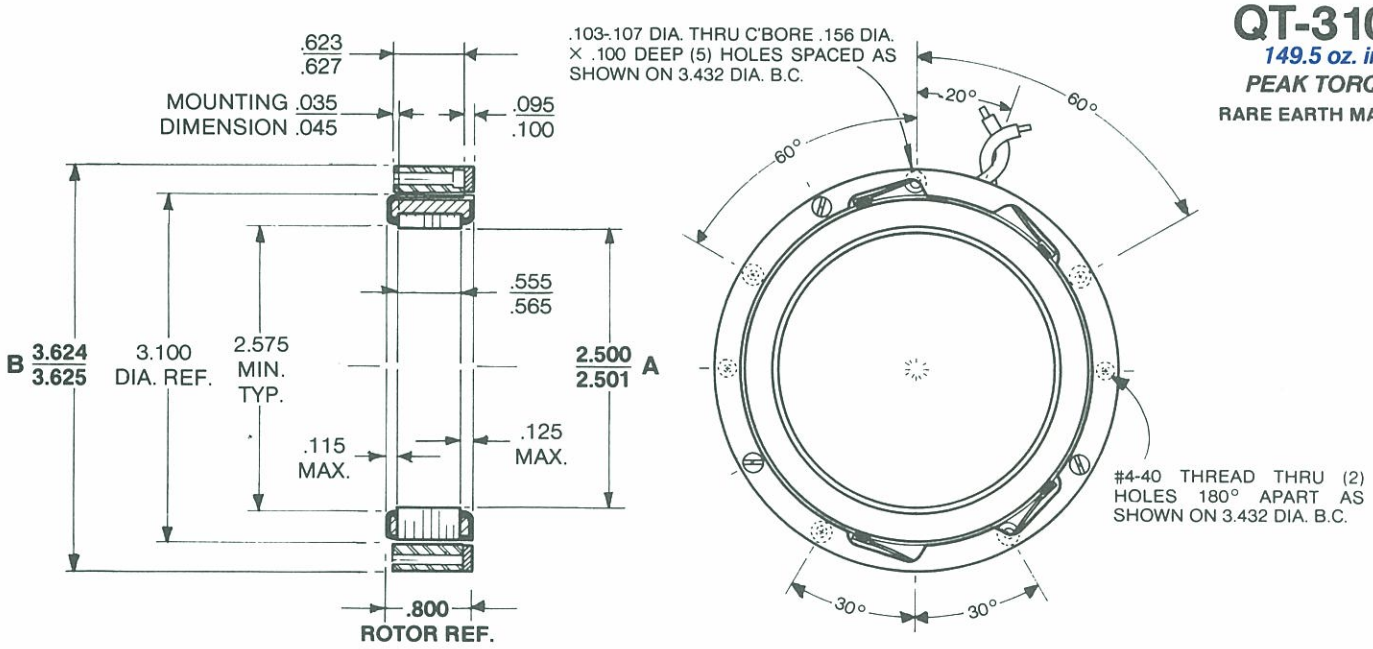
		Value	Units
Peak Torque Rating - T_P		26.5	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		9.6	WATTS
Motor Constant - K_M		8.55	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		51	RAD/S
Electrical Time Constant - τ_E		0.23	MS
Static Friction (Max.) - T_F		2.8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.52	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	3.4×10^{-3}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		6	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		71	CYCLES/REV.
Number of Poles		14	
Rotor Inertia - J_M		0.015	OZ.IN.S^2
Motor Weight		8	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	14.1	35.4	22.4				
Peak Current - I_P	AMPERES	Rated	0.68	0.27	0.43				
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	39.0	98.0	61.5				
Back EMF Constant - K_B	V per RAD/S	±10%	0.275	0.692	0.43				
DC Resistance (25°C) - R_M	OHMS	±12.5%	20.7	131	52				
Inductance - L_M	mH	±30%	4.8	30.4	12				

QT-3104

149.5 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SUPPLIED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .003(.006T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:

#26 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 24" MIN. LENGTH TWISTED.

SIZE CONSTANTS

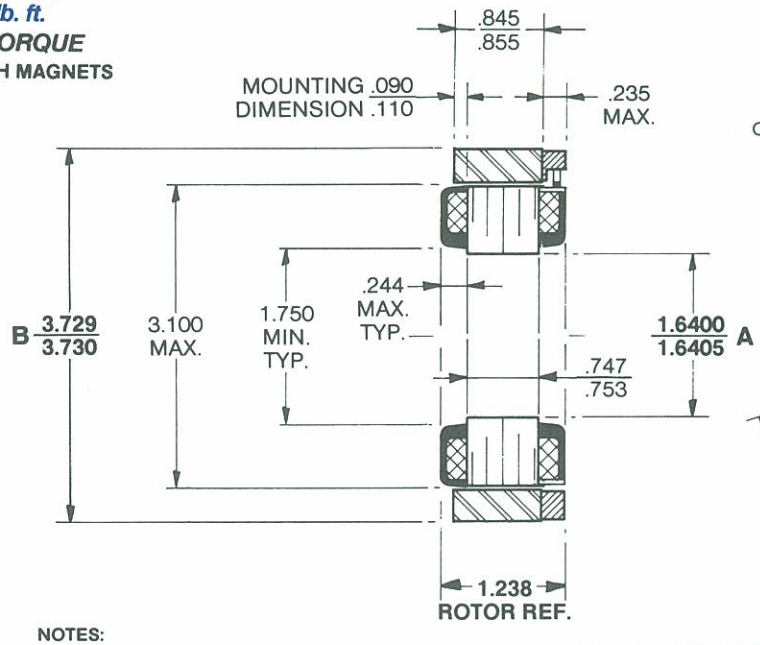
		Value	Units
Peak Torque Rating - T_P		149.5	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		97.2	WATTS
Motor Constant - K_M		15.2	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		92	RAD/S
Electrical Time Constant - τ_E		0.38	MS
Static Friction (Max.) - T_F		3.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.62	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.06	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		61	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.034	OZ.IN.S^2
Motor Weight		14	OZ.

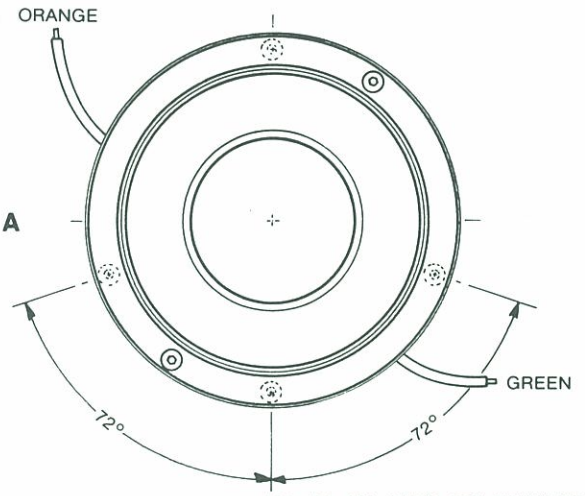
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	26.3	29.6	41.7	37.3	13.2		
Peak Current - I_P	AMPERES	Rated	3.70	3.29	2.37	2.57	7.40		
Torque Sensitivity - K_T	OZ.IN/AMP	±10%	40.4	45.5	63.1	58.1	20.2		
Back EMF Constant - K_B	V per RAD/S	±10%	0.285	0.321	0.446	0.410	0.143		
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.10	9.0	17.6	14.5	1.78		
Inductance - L_M	mH	±30%	2.7	3.4	6.6	5.6	0.68		

QT-3102

2.5 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.125-.130 DIA. THRU 82° C'SINK TO .230 DIA. MIN. (4) HOLES SPACED AS SHOWN ON 3.468 DIA. B.C.

NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: BRUSH RING, ROTOR AND STATOR.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG TYPE "E" TEFLON COATED PER MIL-W-16878 24" MIN. LENGTH.

SIZE CONSTANTS

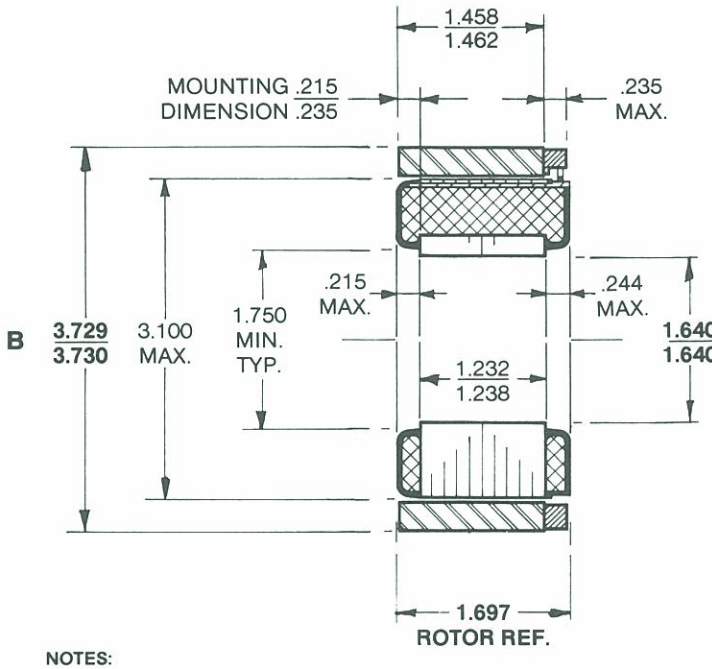
		Value	Units
Peak Torque Rating - T_P		2.5	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		263	WATTS
Motor Constant - K_M		0.154	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		77	RAD/S
Electrical Time Constant - τ_E		1.2	MS
Static Friction (Max.) - T_F		0.041	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.032	LB. FT. PER RAD/S
	Infinite Impedance - F_I	2.5×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		39	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		4.10×10^{-4}	LB.FT.S^2
Motor Weight		2	LB.

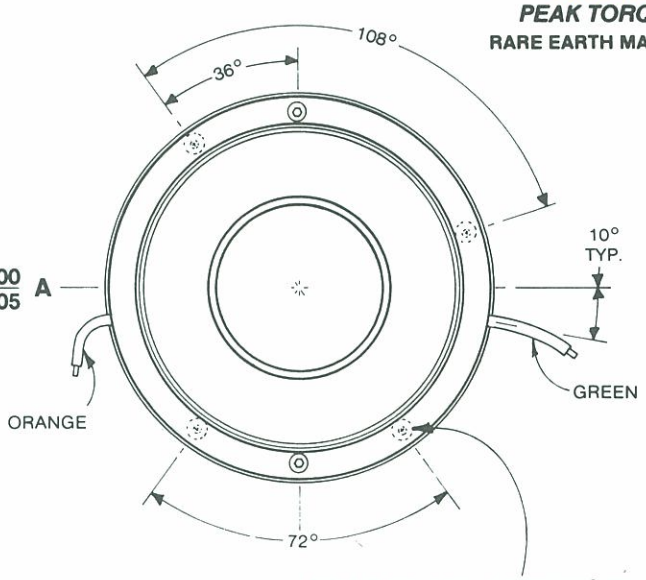
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	47.3	19.9	9.90	16.2			
Peak Current - I_P	AMPERES	Rated	5.56	13.7	29.1	18.0			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.450	0.182	0.086	0.139			
Back EMF Constant - K_B	V PER RAD/S	±10%	0.610	0.247	0.116	0.188			
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.50	1.45	0.34	0.90			
Inductance - L_M	mH	±30%	10	1.6	0.36	0.90			

QT-3103

3.31 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.123-.128 DIA. THRU C'SINK 100° TO .225-.241 DIA. (4) HOLES AS SHOWN ON 3.468 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG TYPE "E" TEFLON COATED PER MIL W-16878 12" MIN. LENGTH.

SIZE CONSTANTS

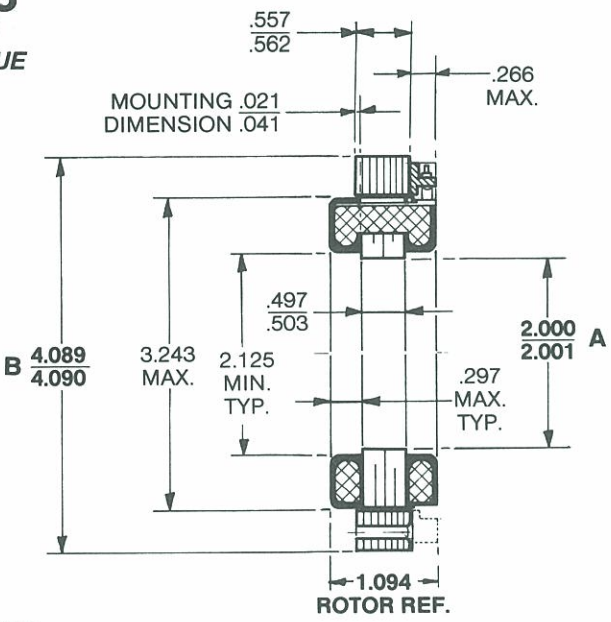
		Value	Units
Peak Torque Rating - T_P		3.31	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		190	WATTS
Motor Constant - K_M		0.240	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P . ω_{NL}		39	RAD/S
Electrical Time Constant - τ_E		1.52	MS
Static Friction (Max.) - T_F		0.057	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.078	LB. FT. PER RAD/S
	Infinite Impedance - F_I	7.3×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		3.8	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		39	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		5.7×10^{-4}	LB.FT.S^2
Motor Weight		3.1	LB.

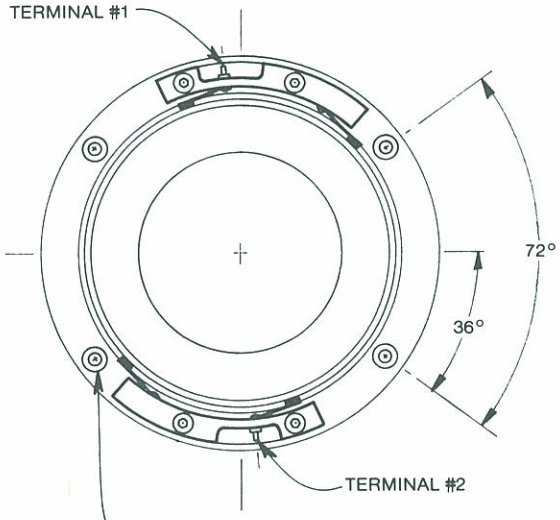
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	54.8	27.4	22.1	17.2			
Peak Current - I_P	AMPERES	Rated	3.47	6.94	8.83	11.4			
Torque Sensitivity - K_T	LB. FT./AMP.	±10%	0.953	0.477	0.375	0.290			
Back EMF Constant - K_B	V per RAD/S	±10%	1.29	0.647	0.508	0.393			
DC Resistance (25°C) - R_M	OHMS	±12.5%	15.8	3.95	2.50	1.51			
Inductance - L_M	mH	±30%	24	6.0	3.7	2.2			

T-3203

1.0 lb. ft.
PEAK TORQUE





(.125) DIA. THRU 82° C'SINK TO .230 DIA. MIN. (4) HOLES SP. AS SHOWN ON 3.750 DIA. B.C.

NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003 (.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1 THE ROTATION SHALL BE C.C.W. FACING THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

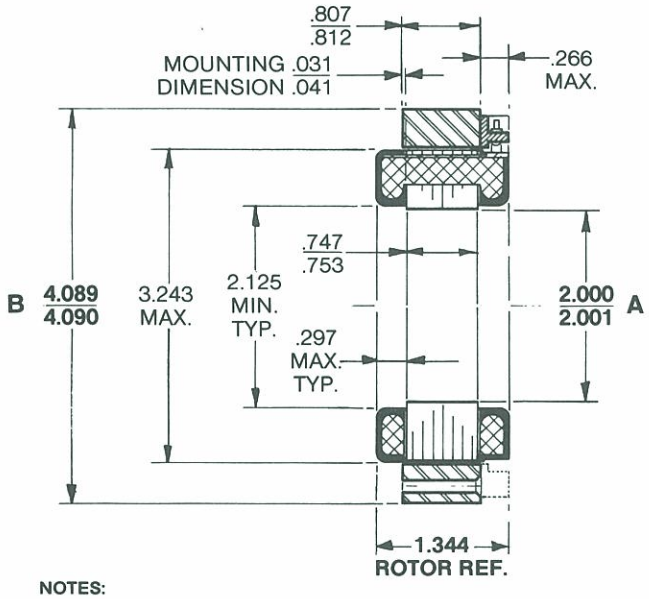
		Value	Units
Peak Torque Rating - T_P		1.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		87	WATTS
Motor Constant - K_M		0.107	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		63	RAD/S
Electrical Time Constant - τ_E		2.3	MS
Static Friction (Max.) - T_F		0.02	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	0.016	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.6×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		3.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		46	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		3.5×10^{-4}	LB.FT.S^2
Motor Weight		1.6	LB.

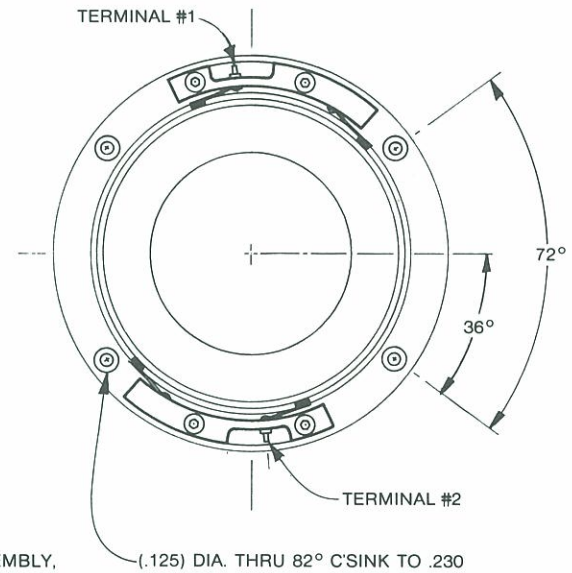
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	12.1	15	18.7	30.6	38.9	48.8	77.0
Peak Current - I_P	AMPERES	Rated	7.1	5.55	4.35	2.86	2.22	1.75	1.12
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.14	0.18	0.23	0.35	0.45	0.57	0.89
Back EMF Constant - K_B	V per RAD/S	±10%	0.19	0.24	0.31	0.48	0.61	0.77	1.2
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.7	2.7	4.3	10.7	17.5	27.9	68.8
Inductance - L_M	mH	±30%	4.0	6.0	10	24	40	64	160

T-3208

1.5 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1 WITH RESPECT TO TERMINAL #2 ROTATION SHALL BE C.C.W. FACING THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		1.5	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		113	WATTS
Motor Constant - K_M		0.14	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		56	RAD/S
Electrical Time Constant - τ_E		3.0	MS
Static Friction (Max.) - T_F		0.027	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	2.7×10^{-2}	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1.0×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		2.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		46	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		4×10^{-4}	LB.FT.S^2
Motor Weight		2.4	LB.

WINDING CONSTANTS — Winding Designation

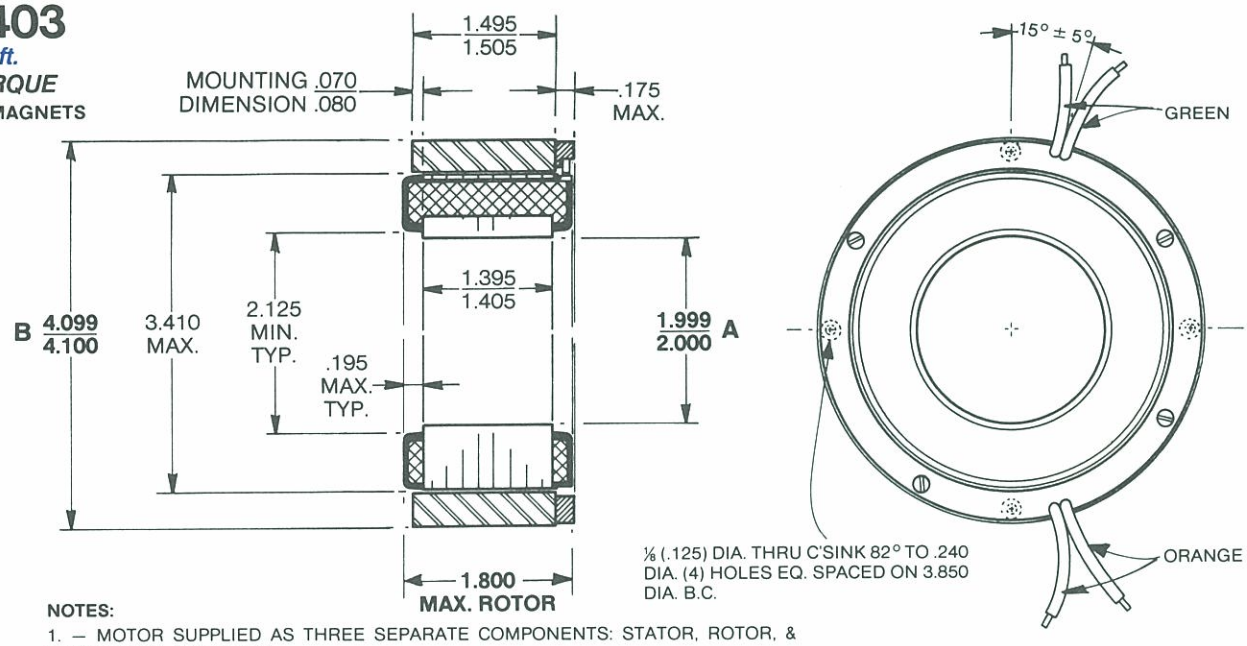
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	15.0	95	19.2	23.9	30.0		
Peak Current - I_P	AMPERES	Rated	7.5	1.15	6.0	4.69	3.75		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.20	1.30	0.25	0.320	0.400		
Back EMF Constant - K_B	V per RAD/S	±10%	0.27	1.76	0.34	0.434	0.540		
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.0	82.5	3.2	5.10	8.00		
Inductance - L_M	mH	±30%	6.0	250	9.4	15	24		

QT-3403

4.0 lb. ft.

PEAK TORQUE

RARE EARTH MAGNETS



NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: STATOR, ROTOR, & BRUSH RING ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — CONNECT GREEN LEADS TOGETHER AND ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. — GOLD PLATED COMMUTATOR.
6. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "ET" TEFLON COATED PER MIL W-16878, 18" MIN. LENGTH.

SIZE CONSTANTS

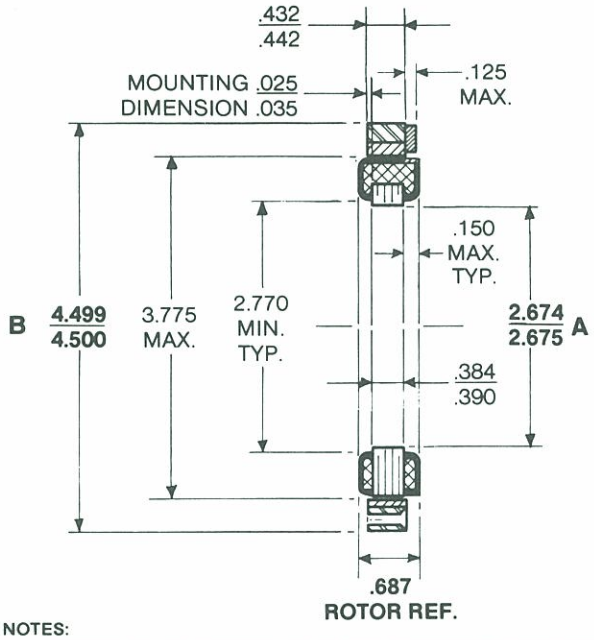
		Value	Units
Peak Torque Rating - T_P		4.0	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		126	WATTS
Motor Constant - K_M		0.357	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		23.2	RAD/S
Electrical Time Constant - τ_E		2.1	MS
Static Friction (Max.) - T_F		0.10	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.173	LB. FT. PER RAD/S
	Infinite Impedance - F_I	3.0×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		49	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		9.8×10^{-4}	LB.FT.S^2
Motor Weight		4	LB.

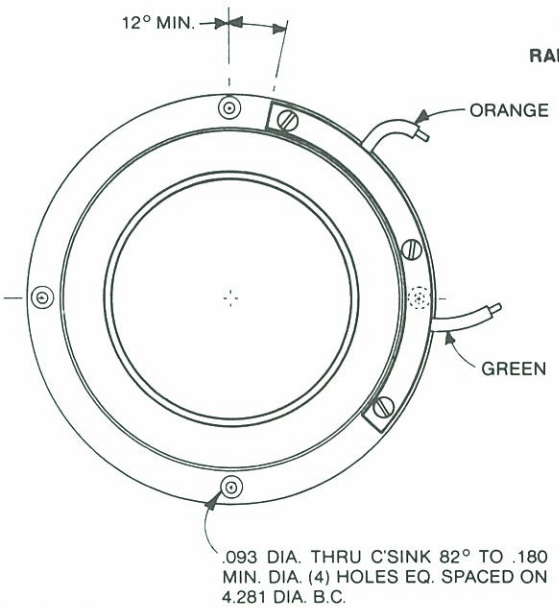
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	22.0	55.6					
Peak Current - I_P	AMPERES	Rated	5.71	2.29					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.700	1.75					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.949	2.37					
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.85	24.3					
Inductance - L_M	mH	±30%	8.2	51					

QT-3801

2.40 lb. ft
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH SEGMENT ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#24 AWG TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

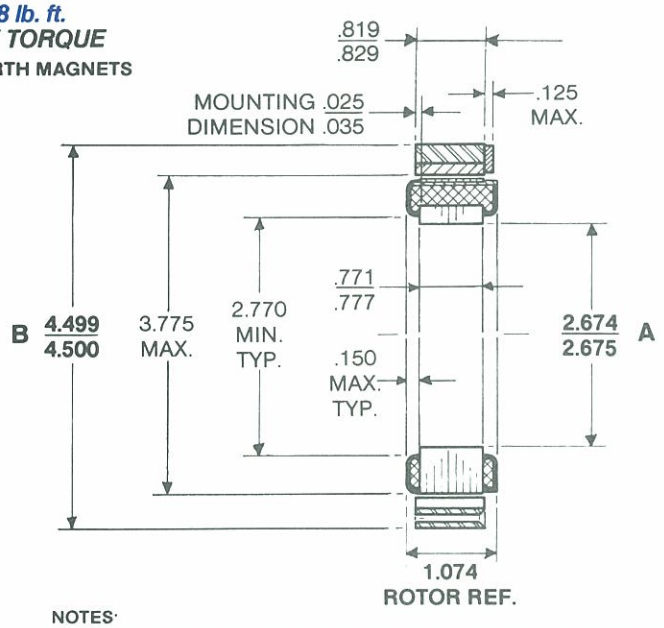
		Value	Units
Peak Torque Rating - T_P		2.40	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		187	WATTS
Motor Constant - K_M		0.175	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		57.5	RAD/S
Electrical Time Constant - τ_E		0.577	MS
Static Friction (Max.) - T_F		0.05	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.042	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1.0×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		3.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		3.60×10^{-4}	LB.FT.S^2
Motor Weight		1.3	LB.

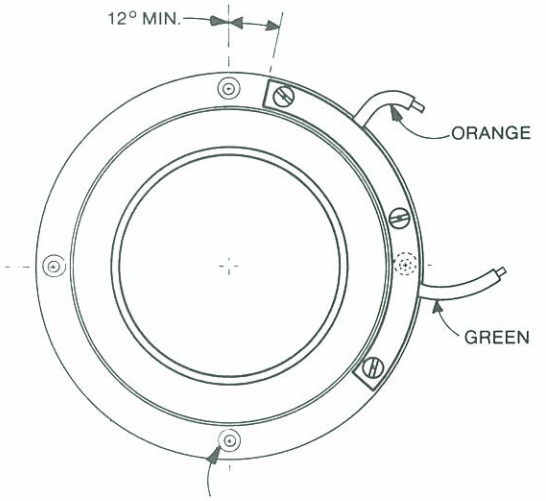
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	62.4	31.2	55.4	24.8	19.6	15.6	
Peak Current - I_P	AMPERES	Rated	3.00	6.00	3.38	7.77	9.41	12.0	
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.800	0.400	0.710	0.309	0.255	0.200	
Back EMF Constant - K_B	V per RAD/S	±10%	1.08	0.542	0.963	0.419	0.346	0.271	
DC Resistance (25°C) - R_M	OHMS	±12.5%	20.8	5.20	16.4	3.19	2.08	1.30	
Inductance - L_M	mH	±30%	12	3.0	9.4	1.8	1.2	0.75	

QT-3802

4.8 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.093 DIA. THRU C'SINK 82° TO .180 MIN. DIA. (4) HOLES EQ. SPACED ON 4.281 DIA. B.C.

NOTES:
1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH SEGMENT ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#24 AWG TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

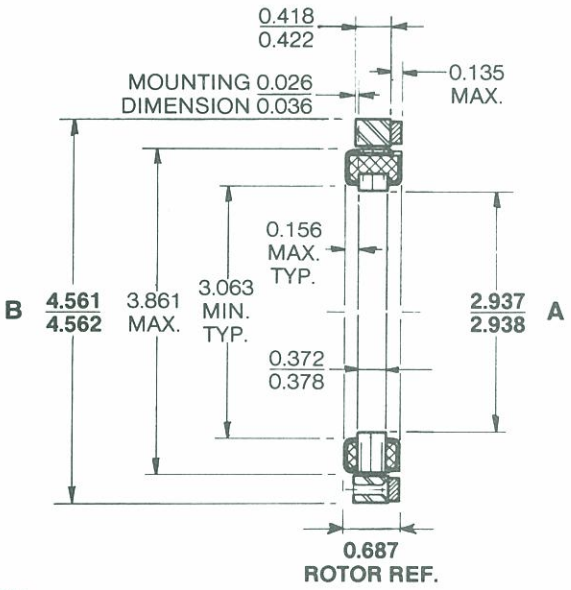
		Value	Units
Peak Torque Rating - T_P		4.8	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		256	WATTS
Motor Constant - K_M		0.30	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		39.3	RAD/S
Electrical Time Constant - τ_E		0.84	MS
Static Friction (Max.) - T_F		0.10	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.122	LB. FT. PER RAD/S
	Infinite Impedance - F_I	2.0×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.64	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		7.2×10^{-4}	LB.FT.S^2
Motor Weight		2.6	LB.

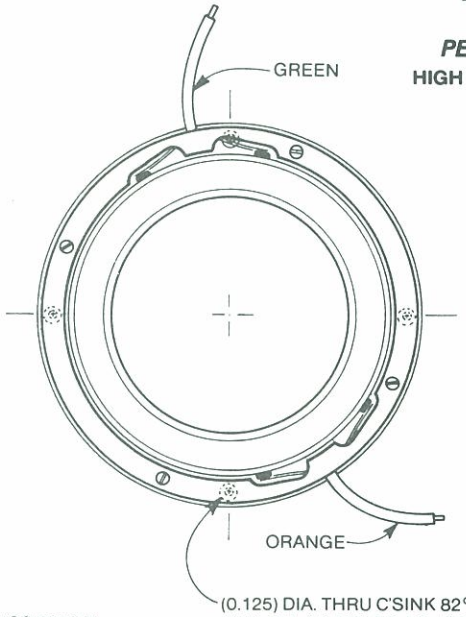
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	42.7	33.9	68.0				
Peak Current - I_P	AMPERES	Rated	6.00	7.77	3.78				
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.800	0.618	1.27				
Back EMF Constant - K_B	V per RAD/S	±10%	1.085	0.838	1.72				
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.11	4.36	18.0				
Inductance - L_M	mH	±30%	6.0	3.6	15				

T-3910

1.0 lb. ft.
PEAK TORQUE
HIGH ENERGY MAGNETS





(0.125) DIA. THRU C'SINK 82° TO 0.260 MIN. DIA. (4) HOLES EQ. SPACED ON 4.188 DIA. B.C.

NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE "E"TEFLON COATED, 6" MIN. LENGTH.

SIZE CONSTANTS

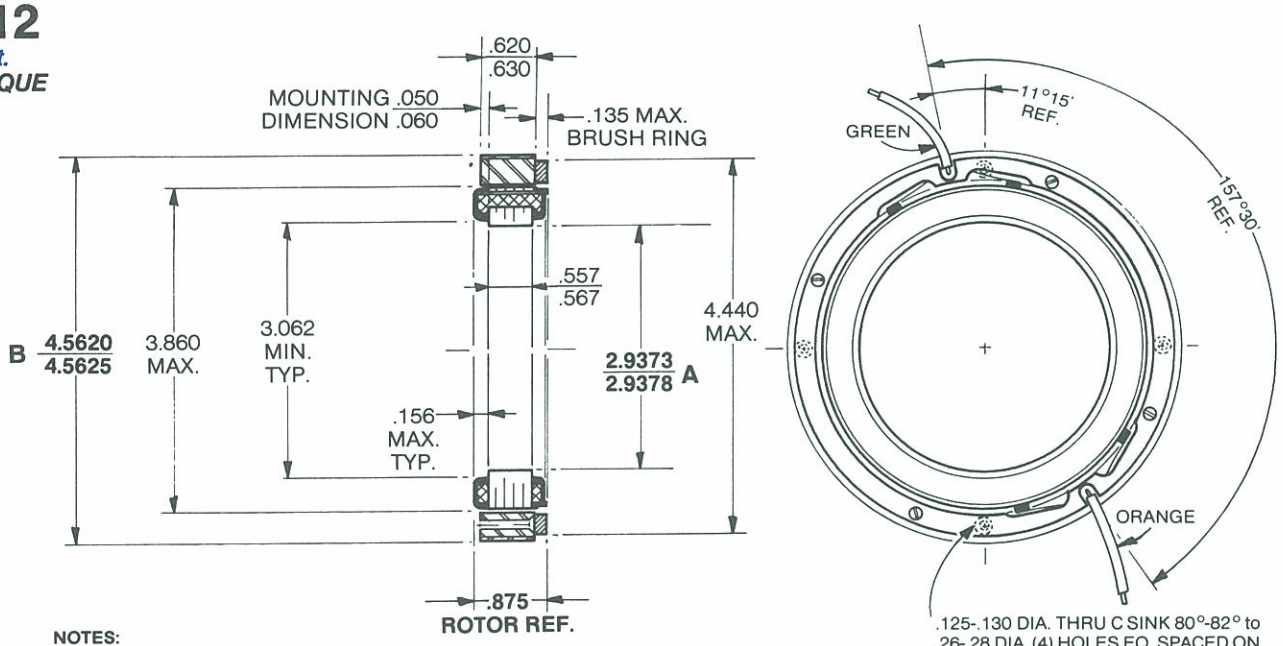
		Value	Units
Peak Torque Rating - T_P		1.0	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		50	WATTS
Motor Constant - K_M		0.14	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		36	RAD/S
Electrical Time Constant - τ_E		0.84	MS
Static Friction (Max.) - T_F		0.042	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.027	LB. FT. PER RAD/S
	Infinite Impedance - F_I	7.3×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		5.9	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		3.4×10^{-4}	LB.FT.S^2
Motor Weight		1.1	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	55.5	34.6	85.9	76.3	42.9	21.8	13.9
Peak Current - I_P	AMPERES	Rated	0.893	1.42	0.565	0.641	1.13	2.25	3.63
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.12	0.703	1.77	1.56	0.885	0.444	0.275
Back EMF Constant - K_B	V per RAD/S	±10%	1.52	0.953	2.40	2.11	1.20	0.602	0.373
DC Resistance (25°C) - R_M	OHMS	±12.5%	62.2	24.4	152	119	38.0	9.70	3.82
Inductance - L_M	mH	±30%	52	20	130	103	32	8.0	3.1

T-3912

1.2 lb. ft.
PEAK TORQUE



NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR WITH-KEEPER, AND BRUSH RING ASSEMBLY. **CAUTION:** DOT NOT REMOVE KEEPER UNLESS ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITH-IN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

.125-.130 DIA. THRU C SINK 80°-82° to .26-.28 DIA. (4) HOLES EQ. SPACED ON 4.188 DIA. B.C.

LEADS:
#24 AWG TYPE "E" TEFLON COATED 8" MIN. LENGTH.

SIZE CONSTANTS

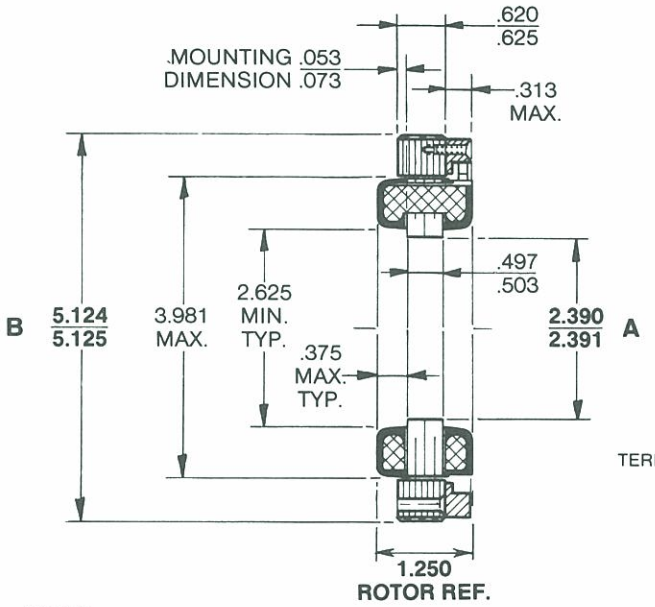
		Value	Units
Peak Torque Rating - T_P		1.2	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		34.8	WATTS
Motor Constant - K_M		0.201	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		21.6	RAD/S
Electrical Time Constant - τ_E		1.25	MS
Static Friction (Max.) - T_F		0.05	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.055	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.0027	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.6	°C/WATT
Ripple Torque (Average to Peak) - T_R		5.0	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		6.11×10^{-4}	LB.FT.S^2
Motor Weight		1.9	LB.

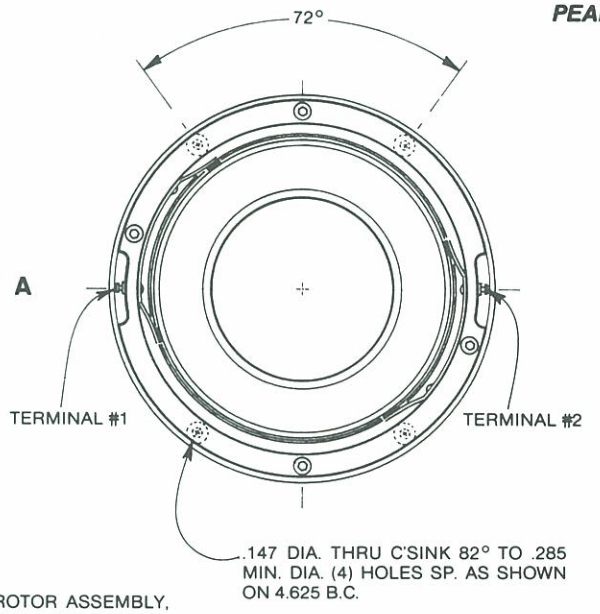
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	10.6	21.2	42.6	85.1	33.8	26.9	
Peak Current - I_P	AMPERES	Rated	3.3	1.67	0.833	0.417	1.06	1.33	
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.36	0.72	1.44	2.88	1.13	0.90	
Back EMF Constant - K_B	V PER RAD/S	±10%	0.49	0.98	1.95	3.90	1.53	1.22	
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.2	12.8	51.2	204	31.9	20.2	
Inductance - L_M	mH	±30%	4.0	16.0	64	250	39	25	

T-4036

1.8 lb. ft. PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNLESS ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1 ROTATION SHALL BE C.C.W. WHEN VIEWED FROM THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

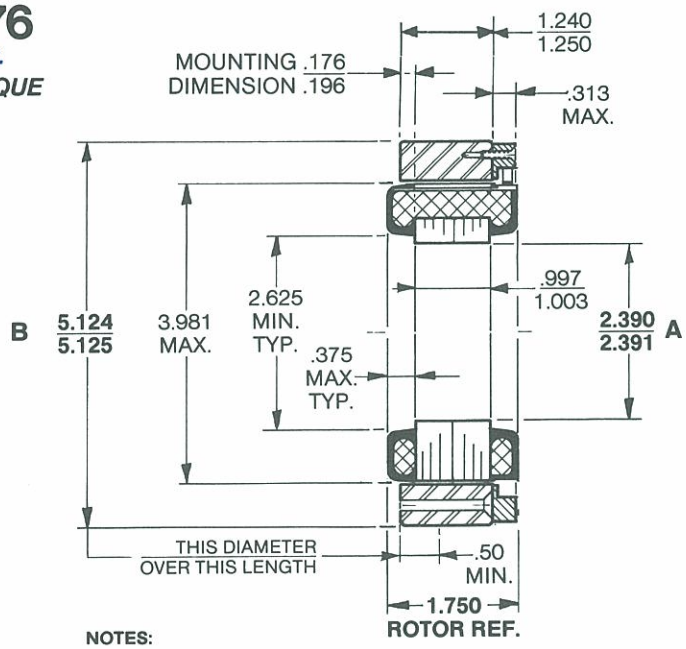
		Value	Units
Peak Torque Rating - T_P		1.8	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		87.8	WATTS
Motor Constant - K_M		0.19	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		36	RAD/S
Electrical Time Constant - τ_E		1.79	MS
Static Friction (Max.) - T_F		0.035	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	0.049	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.001	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		3.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		56	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		8.7×10^{-4}	LB.FT.S^2
Motor Weight		2.9	LB.

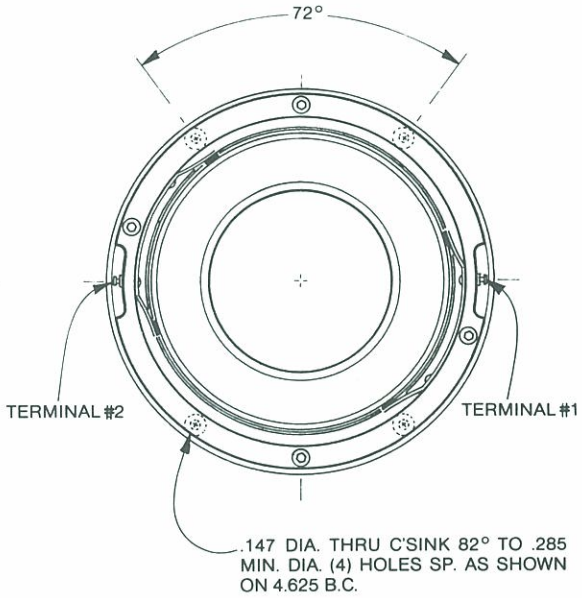
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	15.7	19.7	25.3	31.4	39.4	50.6	100
Peak Current - I_P	AMPERES	Rated	5.60	4.60	3.70	2.90	2.30	1.80	0.90
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.320	0.390	0.490	0.630	0.790	1.00	2.00
Back EMF Constant - K_B	V per RAD/S	±10%	0.434	0.530	0.660	0.850	1.10	1.36	2.70
DC Resistance (25°C) - R_M	OHMS	±12.5	2.80	4.30	6.90	11.0	17.3	28.1	111
Inductance - L_M	mH	±30%	5.0	8.0	13	21	33	52	210

T-4076

3.6 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR WITH (8) KEEPERS. **CAUTION:** DO NOT REMOVE KEEPERS UNLESS ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1 ROTATION SHALL BE C.C.W. WHEN VIEWED FROM THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

SIZE CONSTANTS

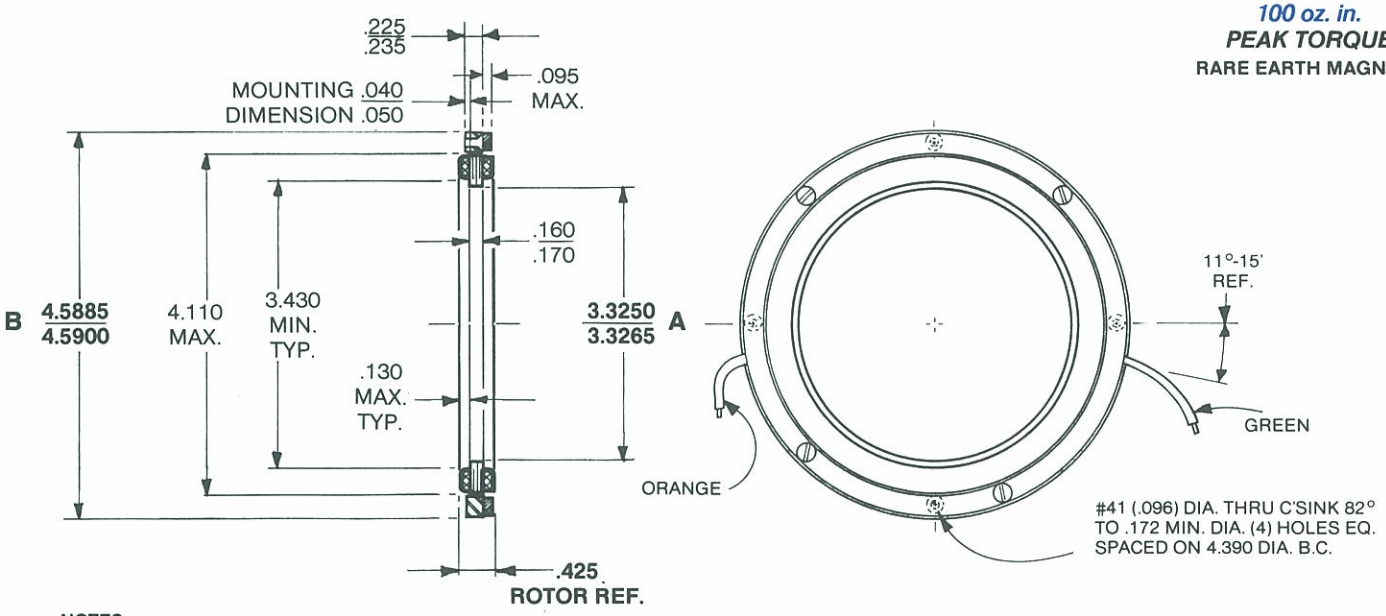
		Value	Units
Peak Torque Rating - T_P		3.6	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		127	WATTS
Motor Constant - K_M		0.32	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		26	RAD/S
Electrical Time Constant - τ_E		2.7	MS
Static Friction (Max.) - T_F		.052	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	0.137	LB. FT. PER RAD/S
	Infinite Impedance - F_I	.002	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.2	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		56	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		.0014	LB.FT.S^2
Motor Weight		5.6	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	27.7	22.0	17.5	69.7	55.2		
Peak Current - I_P	AMPERES	Rated	4.7	5.8	7.60	1.82	2.30		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.77	0.62	0.474	1.98	1.57		
Back EMF Constant - K_B	V per RAD/S	±10%	1.05	0.84	0.643	2.68	2.13		
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.9	3.8	2.30	38.3	24.0		
Inductance - L_M	mH	±30%	16	10.4	6.1	100	66		

QT-4101

100 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE × 10^7 REVS.

LEADS:
#26 AWG TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		76	WATTS
Motor Constant - K_M		11.5	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		107	RAD/S
Electrical Time Constant - τ_E		0.15	MS
Static Friction (Max.) - T_F		4.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.93	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.02	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		6	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency (Fundamental)		79	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		0.047	OZ.IN.S^2
Motor Weight		9.5	OZ.

WINDING CONSTANTS

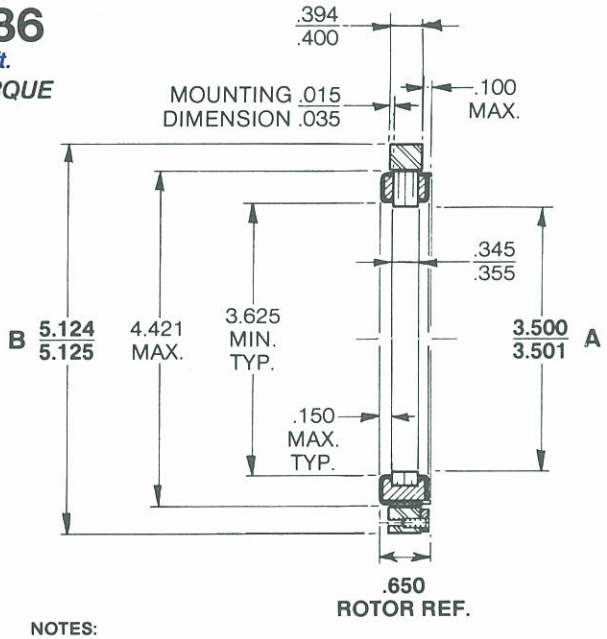
Winding Designation

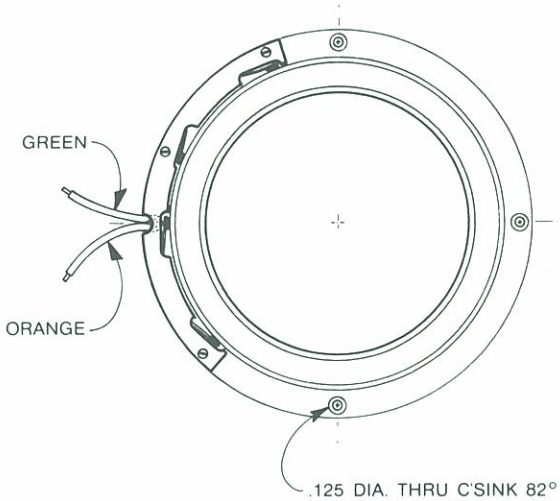
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	19.7						
Peak Current - I_P	AMPERES	Rated	3.97						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	25.2						
Back EMF Constant - K_B	V per RAD/S	±10%	0.18						
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.95						
Inductance - L_M	mH	±30%	0.70						

T-4436

1.0 lb. ft.

PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNLESS ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003 (.006 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE "E" TEFLON COATED 18" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		1.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		70	WATTS
Motor Constant - K_M		0.12	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		51	RAD/S
Electrical Time Constant - τ_E		0.70	MS
Static Friction (Max.) - T_F		0.03	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	0.02	LB. FT. PER RAD/S
	Infinite Impedance - F_I	4.2×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		4.5	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		5.5×10^{-4}	LB.FT.S^2
Motor Weight		1.2	LB.

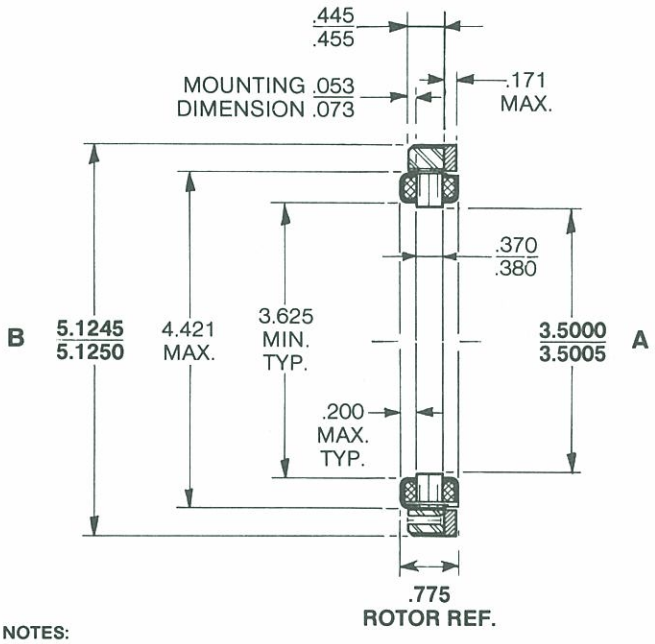
WINDING CONSTANTS — Winding Designation

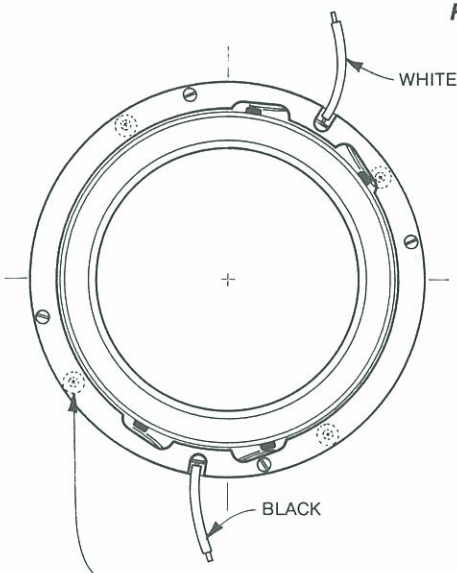
	UNITS	TOLERANCES	A	*B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	21.0	10.7	12.0	23.6			
Peak Current - I_P	AMPERES	Rated	3.33	6.70	6.13	2.96			
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.300	0.150	0.163	0.338			
Back EMF Constant - K_B	V per RAD/S	±10%	0.407	0.203	0.221	0.458			
DC Resistance (25°C) - R_M	OHMS	±12.5%	6.30	1.60	1.95	7.96			
Inductance - L_M	mH	±30%	4.4	1.1	1.3	5.6			

*SPECIAL WINDING. HIGH BRUSH CURRENT DENSITY

T-4412

1.52 lb. ft. PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEAD ROTATION SHALL BE C.C.W. FACING THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

.125 DIA. THRU C'SINK 82° TO .260 MIN. DIA. (4) HOLES SPACED AS SHOWN ON 4.750 DIA. B.C.

LEADS:

#24 AWG TEFLON COATED TYPE "EE" 12" MIN. LENGTH.

SIZE CONSTANTS

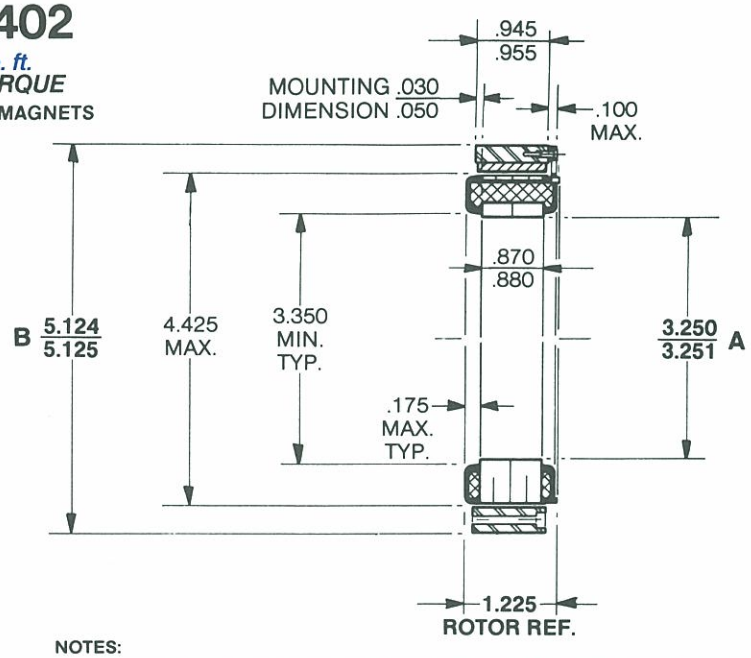
		Value	Units
Peak Torque Rating - T_P		1.52	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		120	WATTS
Motor Constant - K_M		0.139	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		58	RAD/S
Electrical Time Constant - τ_E		0.84	MS
Static Friction (Max.) - T_F		0.04	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	2.6×10^{-2}	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.001	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		2.9	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		71	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		6.2×10^{-4}	LB.FT.S^2
Motor Weight		1.5	LB.

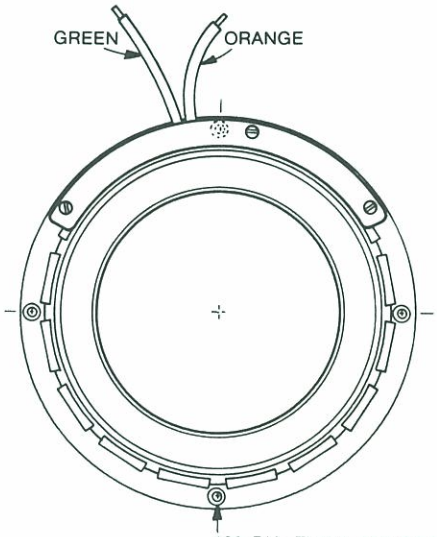
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	31.5	40.8	50.7	62.7	84.0	105	24.8
Peak Current - I_P	AMPERES	Rated	3.80	3.00	2.40	1.90	1.60	1.30	4.55
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.400	0.500	0.630	0.780	0.950	1.20	0.330
Back EMF Constant - K_B	V per RAD/S	±10%	0.542	0.680	0.850	1.10	1.30	1.60	0.450
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.30	13.6	21.3	32.7	53.2	84.1	5.45
Inductance - L_M	mH	±30%	7.0	11	18	27	44	69	5.0

QT-4402

4.24 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.120 DIA. THRU .203 C'BORE × .125 DEEP (4) HOLES EQ. SPACED ON 4.875 DIA. B.C.

NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR, AND BRUSH SEGMENT ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.W. FACING BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE "ET" TEFLON COATED —19 STRAND— PER MIL-W-16878 12" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		4.24	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		160	WATTS
Motor Constant - K_M		0.335	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		27.7	RAD/S
Electrical Time Constant - τ_E		1.10	MS
Static Friction (Max.) - T_F		0.12	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.153	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1.75×10^{-2}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.9	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		71	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		1.52×10^{-3}	LB.FT.S^2
Motor Weight		3.0	LB.

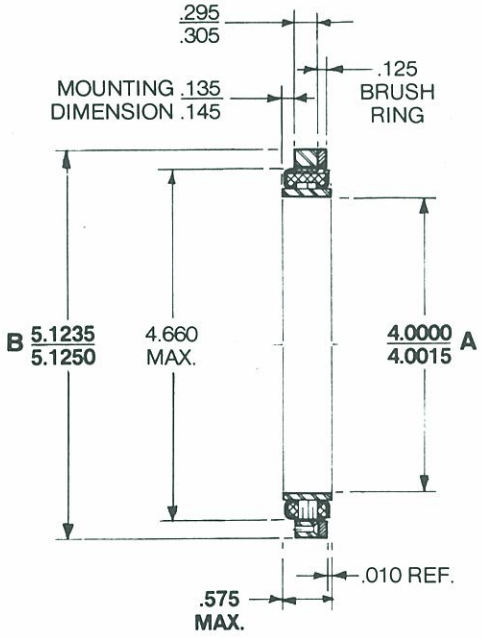
WINDING CONSTANTS — Winding Designation

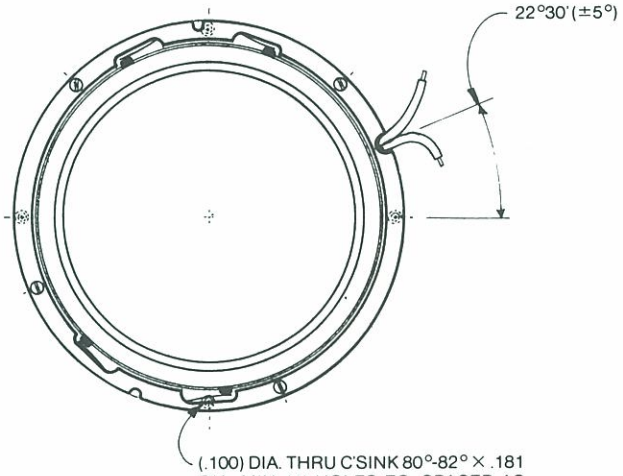
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	40.0						
Peak Current - I_P	AMPERES	Rated	4.00						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.06						
Back EMF Constant - K_B	V PER RAD/S	±10%	1.44						
DC Resistance (25°C) - R_M	OHMS	±12.5%	10.0						
Inductance - L_M	mH	±30%	11						

T-4601

0.80 lb. ft.

PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR WITH KEEPER, AND BRUSH RING ASSEMBLY. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN. .0005 in./in.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, ROTATION SHALL BE C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#26 AWG TYPE 'E' TEFLON COATED
PER MIL W-16878, 18" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		0.80	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		200	WATTS
Motor Constant - K_M		0.057	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		184	RAD/S
Electrical Time Constant - τ_E		0.467	MS
Static Friction (Max.) - T_F		0.025	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	4.33×10^{-3}	LB. FT. PER RAD/S
	Infinite Impedance - F_I	3.0×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.9	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		4.8×10^{-4}	LB.FT.S^2
Motor Weight		0.83	LB.

WINDING CONSTANTS — Winding Designation

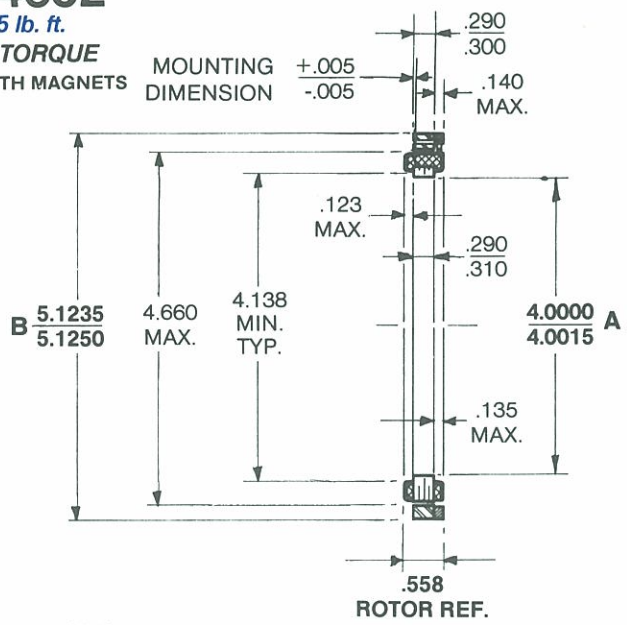
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	59.9	21.6	39.0	49.7	30.4	17.2	
Peak Current - I_P	AMPERES	Rated	3.33	10.0	5.34	4.25	6.45	12.9	
Torque Sensitivity -K_T	LB. FT./AMP	±10%	0.240	0.080	0.150	0.190	0.120	0.062	
Back EMF Constant - K_B	V per RAD/S	±10%	0.325	0.110	0.200	0.260	0.160	0.086	
DC Resistance (25°C) - R_M	OHMS	±12.5%	18.0	2.16	7.30	11.7	4.70	1.33	
Inductance - L_M	mH	±30%	8.4	0.90	3.3	5.1	2.2	0.54	

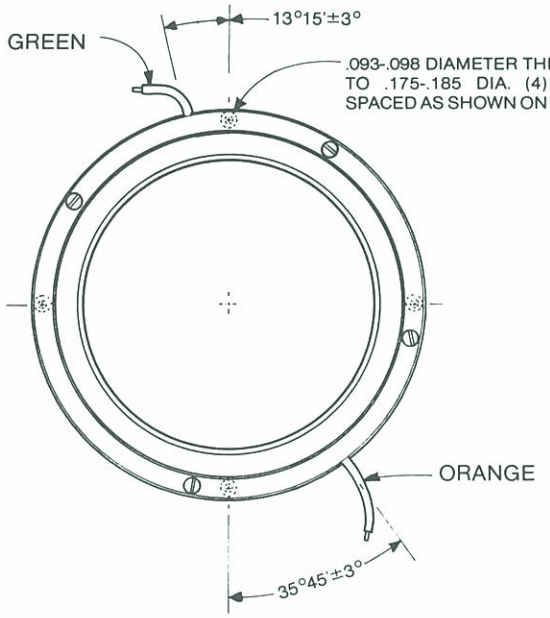
QT-4602

0.85 lb. ft.

PEAK TORQUE

RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003 (.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSIRIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

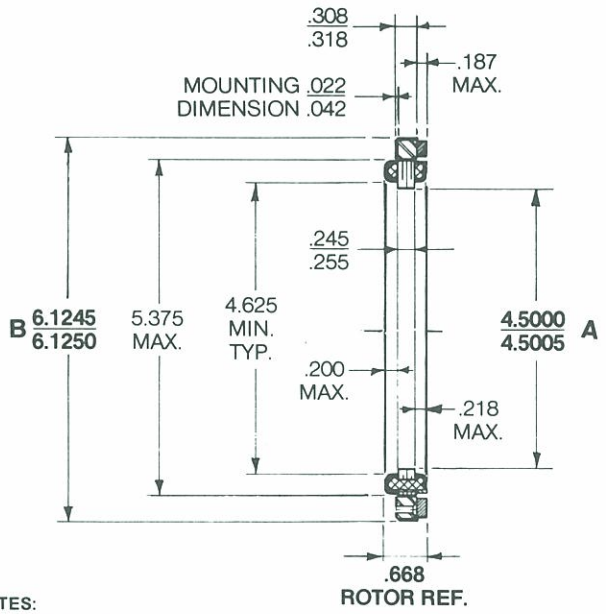
		Value	Units
Peak Torque Rating - T_P		0.85	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		211	WATTS
Motor Constant - K_M		0.059	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		183	RAD/S
Electrical Time Constant - τ_E		0.265	MS
Static Friction (Max.) - T_F		0.026	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	4.62×10^{-3}	LB. FT. PER RAD/S
	Infinite Impedance - F_I	3.00×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		79	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		4.30×10^{-4}	LB.FT.S^2
Motor Weight		0.83	LB.

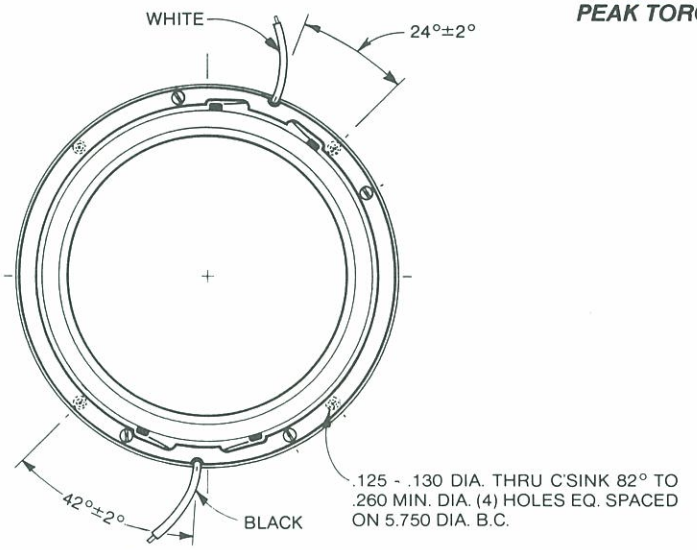
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	49.7	31.3	19.8				
Peak Current - I_P	AMPERES	Rated	4.25	6.38	9.92				
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.200	0.133	0.0857				
Back EMF Constant - K_B	V per RAD/S	±10%	0.271	0.181	0.116				
DC Resistance (25°C) - R_M	OHMS		11.7	4.91	2.00				
Inductance - L_M	mH	±30%	3.1	1.4	0.57				

T-5403

1.30 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR WITH KEEPER, AND BRUSH RING ASSEMBLY. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE 'E' TEFLON COATED 6" MIN. LG.

SIZE CONSTANTS

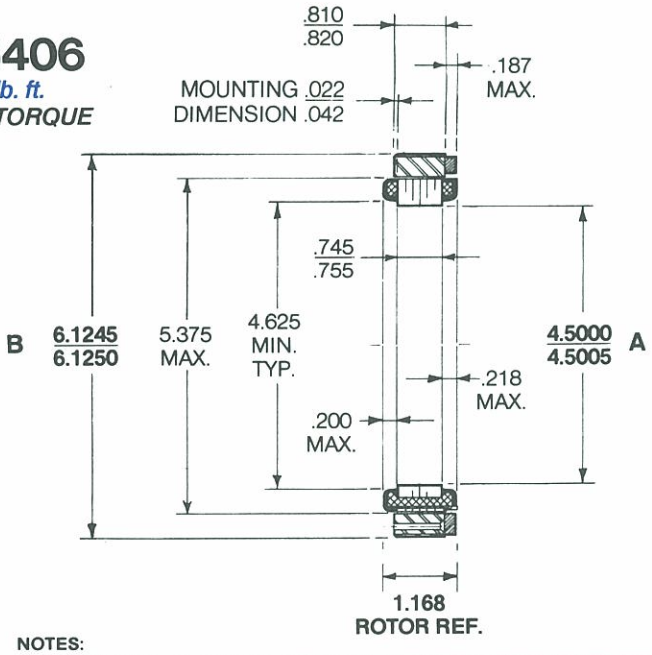
		Value	Units
Peak Torque Rating - T_P		1.30	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		120	WATTS
Motor Constant - K_M		0.119	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		68	RAD/S
Electrical Time Constant - τ_E		0.672	MS
Static Friction (Max.) - T_F		0.04	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.019	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.001	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		3.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		8.6×10^{-4}	LB.FT.S^2
Motor Weight		1.15	LB.

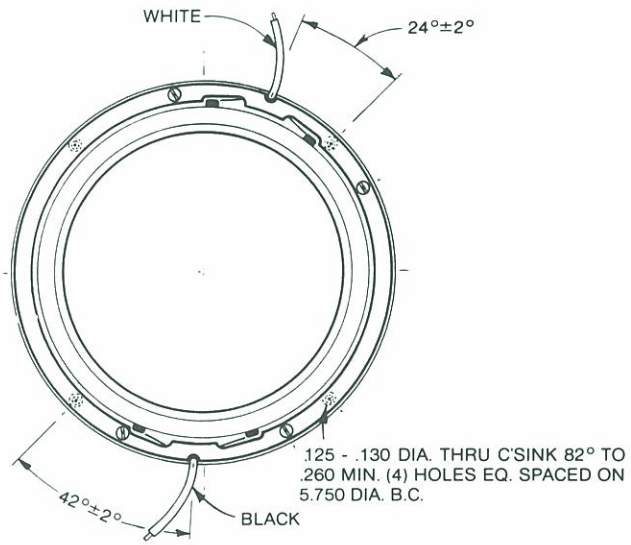
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	40.6	51.7	62.4	80.0	102	25.6	19.5
Peak Current - I_P	AMPERES	Rated	2.96	2.32	1.88	1.50	1.18	4.64	6.10
Torque Sensitivity -K_T	LB. FT./AMP	±10%	0.440	0.560	0.690	0.870	1.10	0.280	0.210
Back EMF Constant - K_B	V per RAD/S	±10%	0.597	0.760	0.940	1.20	1.50	0.380	0.280
DC Resistance (25°C) - R_M	OHMS	±12.5%	13.7	22.3	33.2	53.5	86.9	5.50	3.20
Inductance - L_M	mH	±30%	9.2	15	22	36	58	3.5	2.0

T-5406

2 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR WITH KEEPER, AND BRUSH RING ASSEMBLY. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE 'E' TEFLON COATED
30" MIN. LG.

SIZE CONSTANTS

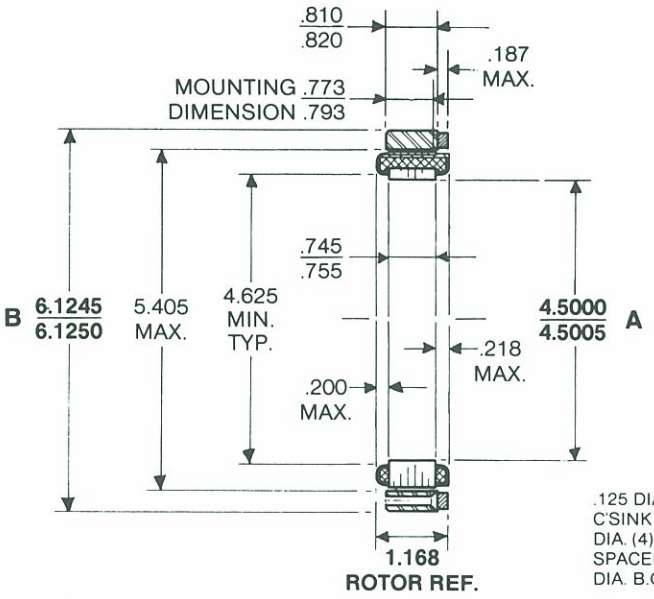
		Value	Units
Peak Torque Rating - T_P		2	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		52	WATTS
Motor Constant - K_M		0.28	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		19.17	RAD/S
Electrical Time Constant - τ_E		1.5	MS
Static Friction (Max.) - T_F		0.12	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.100	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.003	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		2	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		1.5×10^{-3}	LB.FT.S^2
Motor Weight		3.0	LB.

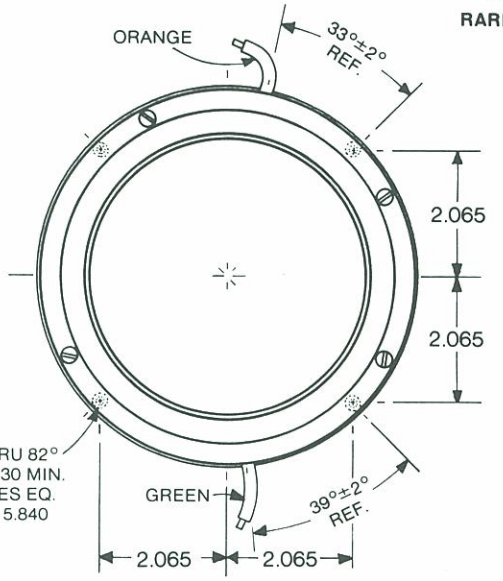
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	26.0	16.3	41.3	52.1			
Peak Current - I_P	AMPERES	Rated	2.00	3.28	1.27	1.02			
Torque Sensitivity -K_T	LB. FT./AMP	±10%	1.00	0.610	1.57	1.96			
Back EMF Constant - K_B	V per RAD/S	±10%	1.36	0.827	2.13	2.66			
DC Resistance (25°C) - R_M	OHMS	±12.5%	13.0	4.96	32.5	51.1			
Inductance - L_M	mH	±30%	20	7.4	49	77			

QT-5404

5.0 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG 19-STRAND TYPE "E" TEFLON COATED PER MIL W-16878 12" MIN. LG.

SIZE CONSTANTS

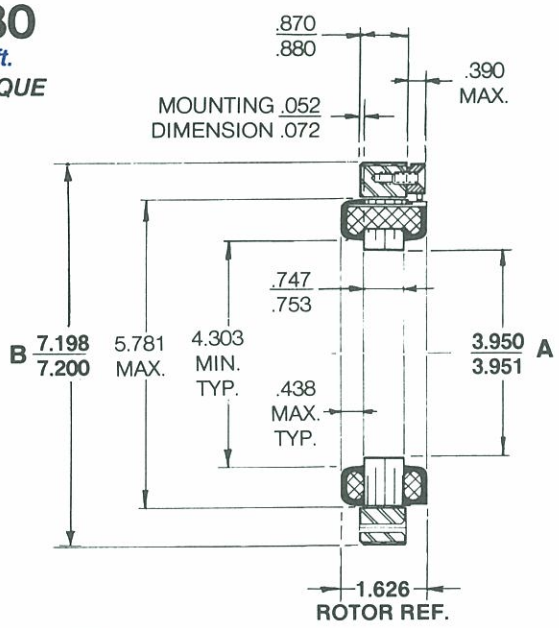
		Value	Units
Peak Torque Rating - T_P		5.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		227	WATTS
Motor Constant - K_M		0.33	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		33	RAD/S
Electrical Time Constant - τ_E		0.60	MS
Static Friction (Max.) - T_F		0.15	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.15	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.003	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		1.9×10^{-3}	LB.FT.S^2
Motor Weight		2.9	LB.

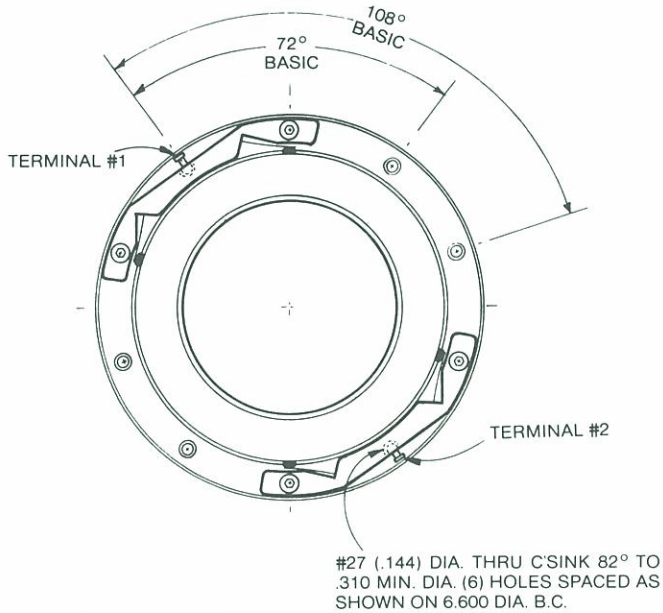
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	18.5	30.8	24.6	64.9	51.6	40.6	
Peak Current - I_P	AMPERES	Rated	12.3	6.15	7.94	3.09	3.97	5.00	
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.405	0.810	0.630	1.62	1.26	1.00	
Back EMF Constant - K_B	V per RAD/S	±10%	0.549	1.10	0.854	2.20	1.71	1.36	
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.50	5.00	3.10	21.0	13.0	8.11	
Inductance - L_M	mH	±30%	0.90	3.6	2.2	14	8.8	5.5	

T-5730

7.00 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SUPPLIED AS FOUR SEPARATE COMPONENTS: ROTOR, (2) BRUSH RING ASSEMBLIES, AND STATOR WITH KEEPER. **CAUTION**: DO NOT REMOVE KEEPER UNLESS ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

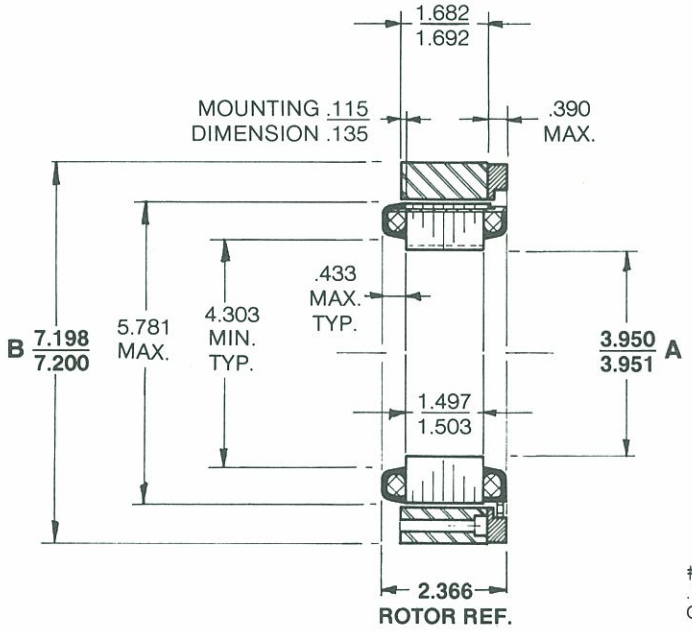
		Value	Units
Peak Torque Rating - T_P		7.00	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		261	WATTS
Motor Constant - K_M		0.433	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		28	RAD/S
Electrical Time Constant - τ_E		3.13	MS
Static Friction (Max.) - T_F		0.09	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.254	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.003	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		2.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		5.0×10^{-3}	LB.FT.S^2
Motor Weight		7.25	LB.

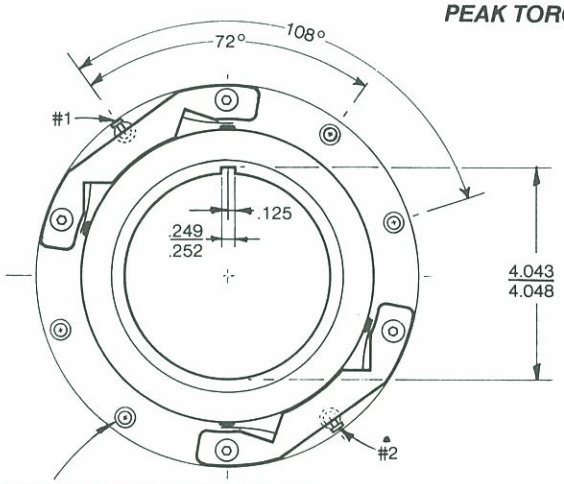
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	19.8	30.6	37.8	45.7	57.4	93.0	113
Peak Current - I_P	AMPERES	Rated	13.2	8.76	7.00	5.38	4.38	2.70	2.12
Torque Sensitivity - K_T	LB. FT./AMP	±10%	0.530	0.800	1.00	1.30	1.60	2.60	3.30
Back EMF Constant - K_B	V per RAD/S	±10%	0.719	1.09	1.36	1.77	2.17	3.53	4.48
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.50	3.50	5.40	8.50	13.1	34.3	53.5
Inductance - L_M	mH	±30%	4.7	10.6	17.2	27.4	40.0	110	174

T-5745

14.0 lb. ft.
PEAK TORQUE





#15 (.180) DIA. THRU (.297) DIA. C'BORE × .188 DEEP (6) HOLES SPACED AS SHOWN ON 6.600 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS **FOUR** SEPARATE COMPONENTS: ROTOR, (2) BRUSH SEGMENT ASSEMBLIES, AND STATOR WITH (2) KEEPERS. **CAUTION:** DO NOT REMOVE KEEPERS UNTIL ROTOR IS FULLY IN PLACE
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINAL #1 ROTATION SHALL BE C.C.W. FACING THE BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		14.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		357	WATTS
Motor Constant - K_M		0.74	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		18.75	RAD/S
Electrical Time Constant - τ_E		5.3	MS
Static Friction (Max.) - T_F		0.15	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.75	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.01	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.008	LB.FT.S^2
Motor Weight		15	LB.

WINDING CONSTANTS

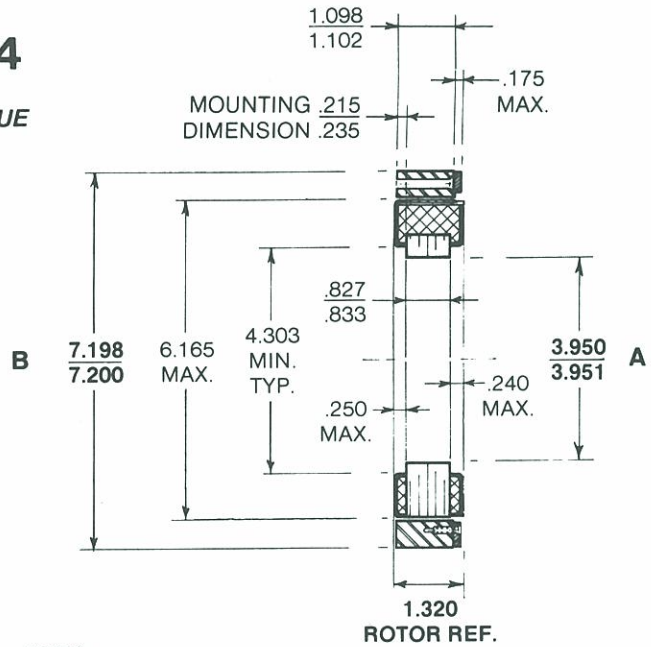
Winding Designation

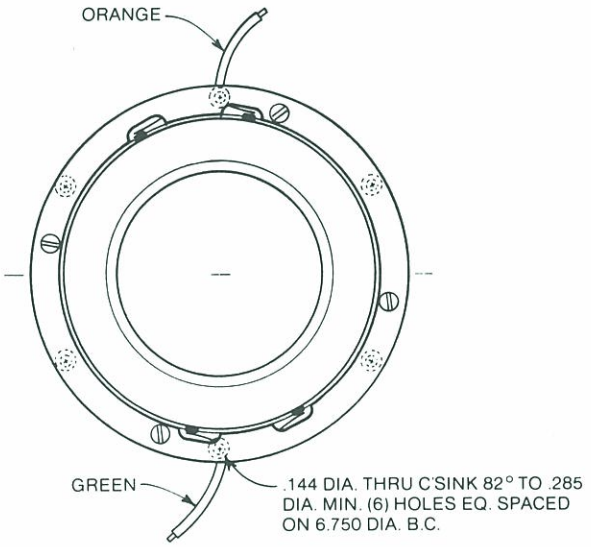
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	21.1	49.3	13.2	33.6	26.7	123	
Peak Current - I_P	AMPERES	Rated	16.9	6.75	28.0	10.5	13.0	2.68	
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.83	2.07	0.5	1.33	1.08	5.22	
Back EMF Constant - K_B	V per RAD/S	±10%	1.125	2.81	0.68	1.8	1.46	7.08	
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.25	7.3	0.47	3.2	2.05	45.9	
Inductance - L_M	mH	±30%	6.6	41.2	2.4	16.9	11.2	260	

T-6204

6.0 lb. ft.

PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#20 AWG TYPE "EE" TEFLON COATED PER MIL W-16878 24"MIN. LG.

SIZE CONSTANTS

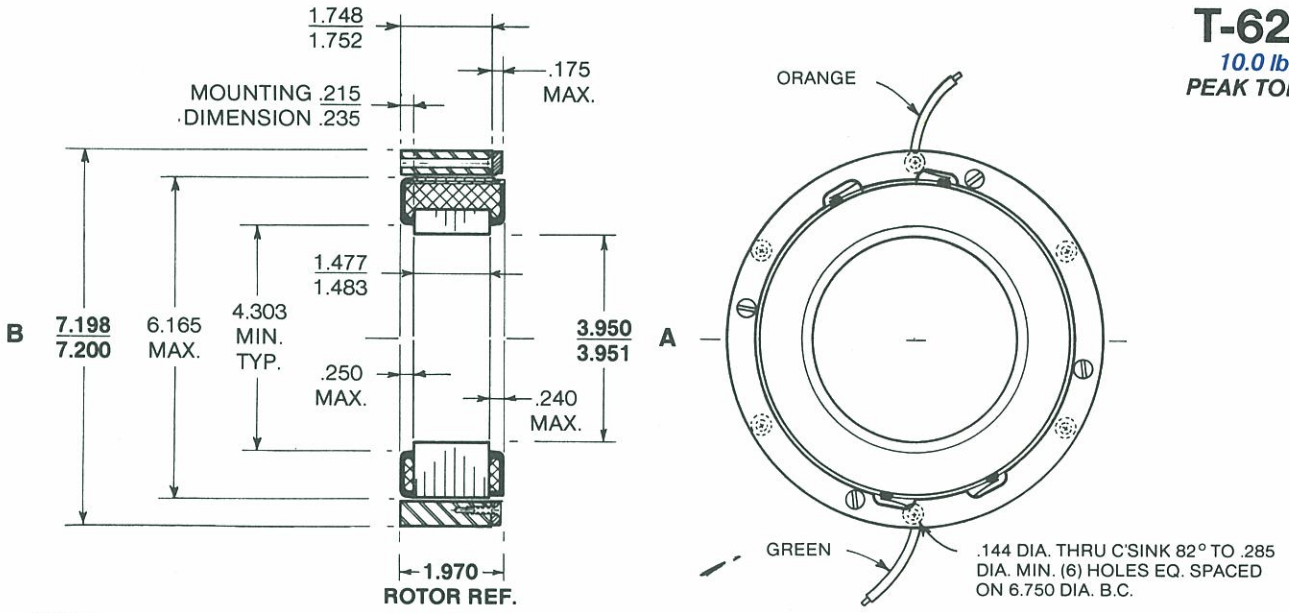
		Value	Units
Peak Torque Rating - T_P		6.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		103	WATTS
Motor Constant - K_M		0.59	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		12.8	RAD/S
Electrical Time Constant - τ_E		2.49	MS
Static Friction (Max.) - T_F		0.15	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.467	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.006	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.8	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		89	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		0.0065	LB.FT.S^2
Motor Weight		7.0	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	22.5	25.6	11.3	51.2	32.2		
Peak Current - I_P	AMPERES	Rated	4.6	3.66	9.65	1.83	2.95		
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	1.30	1.64	0.622	3.28	2.04		
Back EMF Constant - K_B	V per RAD/S	±10%	1.76	2.23	0.843	4.45	2.75		
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.90	7.00	1.17	28.0	10.9		
Inductance - L_M	mH	±30%	12	19	2.8	77	29		

T-6205

10.0 lb. ft.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#20 AWG TYPE "EE" TEFLON COATED PER MIL W-16878 24"MIN. LG.

SIZE CONSTANTS

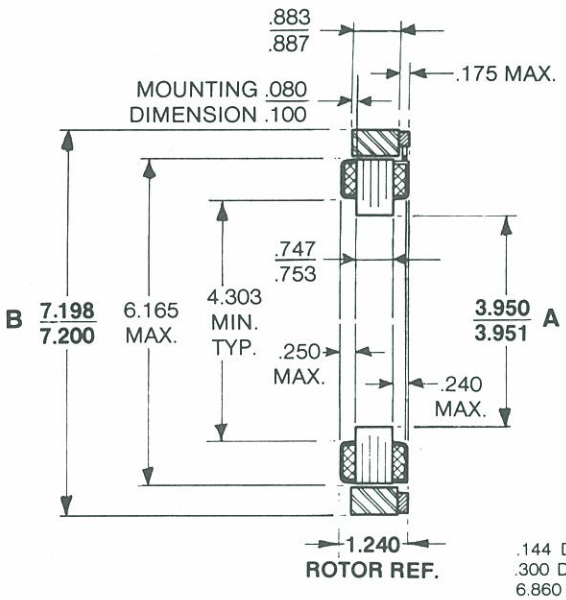
		Value	Units
Peak Torque Rating - T_P		10.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		125	WATTS
Motor Constant - K_M		0.87	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		9.2	RAD/S
Electrical Time Constant - τ_E		2.6	MS
Static Friction (Max.) - T_F		.35	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.09	LB. FT. PER RAD/S
	Infinite Impedance - F_I	.009	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		89	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		0.009	LB.FT.S^2
Motor Weight		10	LB.

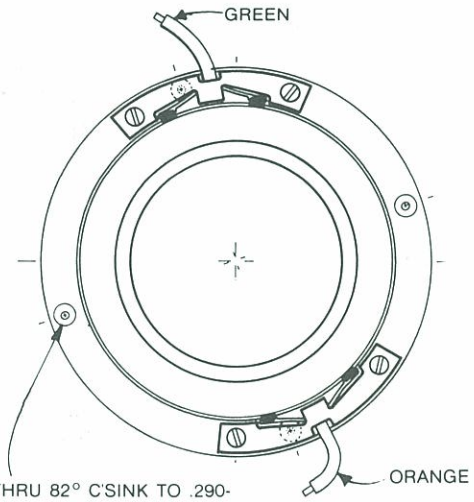
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	20.2	14.0	35.4	71.0	17.8		
Peak Current - I_P	AMPERES	Rated	5.60	9.10	3.47	1.74	7.75		
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	1.79	1.10	2.88	5.76	1.29		
Back EMF Constant - K_B	V per RAD/S	±10%	2.43	1.48	3.90	7.81	1.75		
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.60	1.54	10.2	40.8	2.30		
Inductance - L_M	mH	±30%	10	3.9	27	110	5.2		

QT-6202

11 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.144 DIA. THRU 82° C'SINK TO .290-.300 DIA. (4) HOLES EQ. SPACED ON 6.860 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS FOUR SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND (2) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "EE" TEFLON COATED
12" MIN. LENGTH.

SIZE CONSTANTS

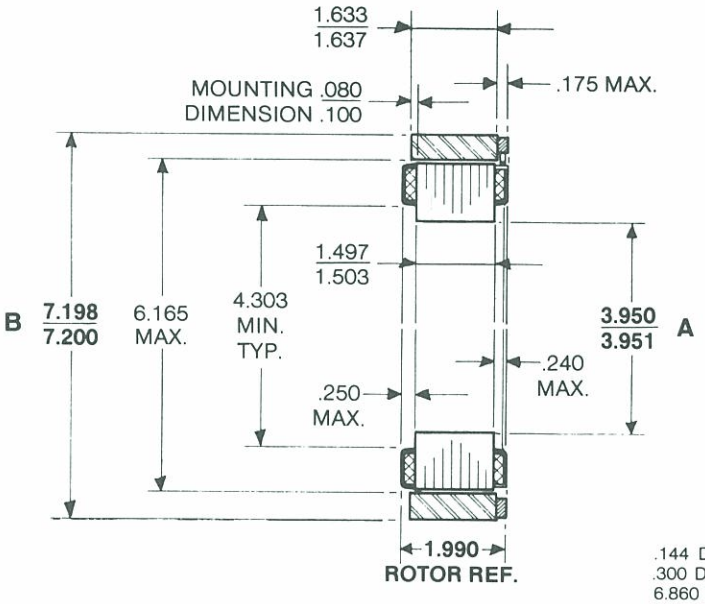
		Value	Units
Peak Torque Rating - T_P		11	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		330	WATTS
Motor Constant - K_M		0.61	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		22	RAD/S
Electrical Time Constant - τ_E		1.8	MS
Static Friction (Max.) - T_F		0.18	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.50	LB. FT. PER RAD/S
	Infinite Impedance - F_I	2.6×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		0.0058	LB.FT.S^2
Motor Weight		6.2	LB.

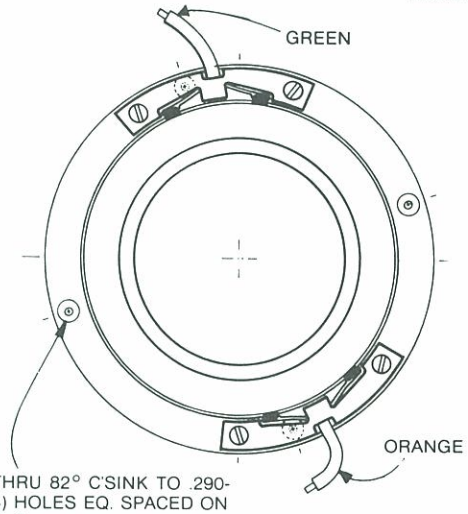
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	34.5	43.5	27.3	21.6			
Peak Current - I_P	AMPERES	Rated	9.57	7.60	12.95	16.9			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.15	1.45	0.850	0.650			
Back EMF Constant - K_B	V per RAD/S	±10%	1.56	1.97	1.15	0.881			
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.60	5.72	2.11	1.28			
Inductance - L_M	mH	±30%	6.5	10	3.6	2.1			

QT-6205

25 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.144 DIA. THRU 82° C'SINK TO .290-.300 DIA. (4) HOLES EQ. SPACED ON 6.860 DIA. B.C.

NOTES:

1. — MOTOR TO BE SUPPLIED AS FOUR SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND (2) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "EE" TEFLON COATED, 12" MIN. LENGTH.

SIZE CONSTANTS

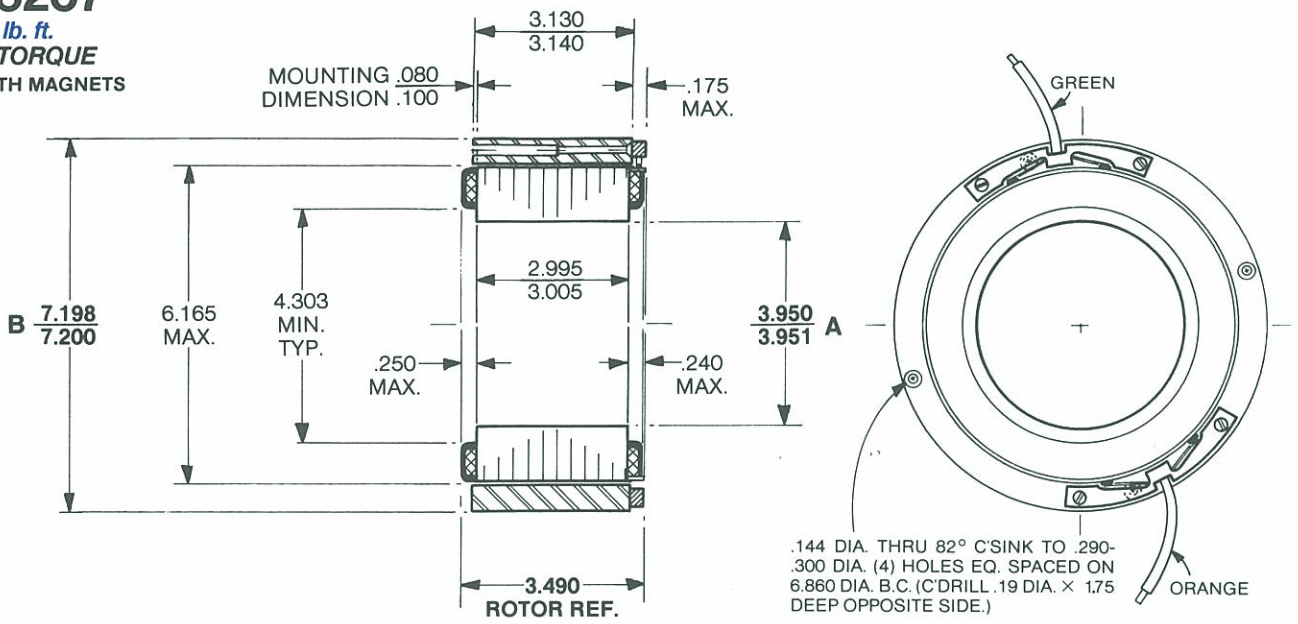
		Value	Units
Peak Torque Rating - T_P		25	LB. FT.
Power Input, Stalled at T_P(25°C) - P_F		627	WATTS
Motor Constant - K_M		1.0	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		18.5	RAD/S
Electrical Time Constant - τ_E		2.41	MS
Static Friction (Max.) - T_F		0.35	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.35	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.005	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		0.01	LB.FT.S^2
Motor Weight		12	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	30.2	48.8	60.3	24.0	38.4		
Peak Current - I_P	AMPERES	Rated	20.8	13.2	10.4	27.8	16.7		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.20	1.90	2.40	0.90	1.50		
Back EMF Constant - K_B	V per RAD/S	±10%	1.63	2.58	3.25	1.22	2.03		
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.45	3.70	5.80	0.863	2.30		
Inductance - L_M	mH	±30%	3.5	8.8	14	2.0	5.5		

QT-6207

40 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR SUPPLIED AS **FOUR** SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND (2) BRUSH RING SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "EE" TEFLON COATED 12" MIN. LENGTH.

SIZE CONSTANTS

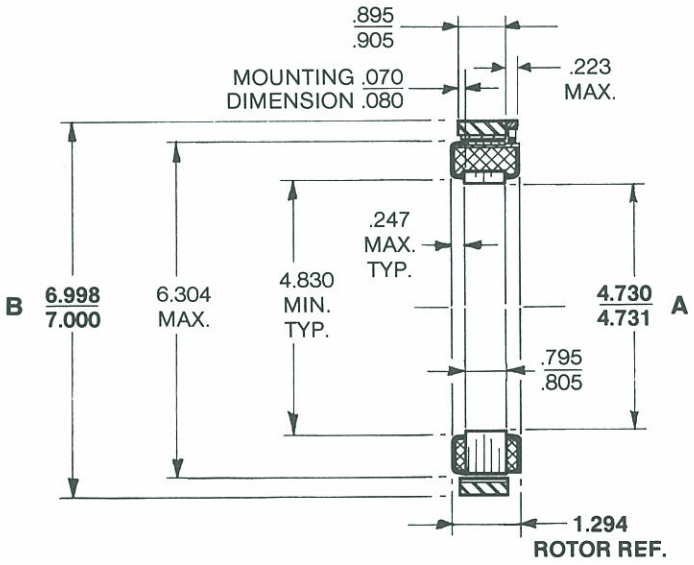
		Value	Units
Peak Torque Rating - T_P		40	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		655	WATTS
Motor Constant - K_M		1.56	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		12	RAD/S
Electrical Time Constant - τ_E		3.0	MS
Static Friction (Max.) - T_F		0.60	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	3.32	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.01	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.75	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		89	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		0.02	LB.FT.S^2
Motor Weight		24	LB.

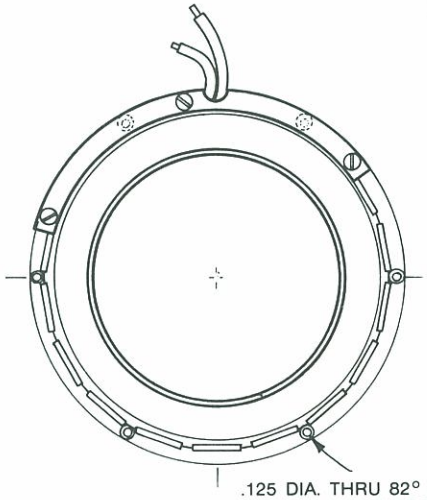
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	39.2						
Peak Current - I_P	AMPERES	Rated	16.7						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	2.40						
Back EMF Constant - K_B	V PER RAD/S	±10%	3.25						
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.35						
Inductance - L_M	mH	±30%	7.0						

QT-6302

800 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH SEGMENT ASSEMBLY, ROTOR ASSEMBLY AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

	Value	Units
Peak Torque Rating - T_P	800	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P	67	WATTS
Motor Constant - K_M	97.7	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}	12	RAD/S
Electrical Time Constant - τ_E	1.44	MS
Static Friction (Max.) - T_F	30	OZ. IN.
Viscous Damping Coefficients — Zero Impedance - F_0	67.6	OZ. IN. PER RAD/S
Viscous Damping Coefficients — Infinite Impedance - F_I	0.75	OZ. IN. PER RAD/S
Maximum Winding Temperature	155	°C
Temperature Rise per Watt - TPR	2.0	°C/WATT
Ripple Torque (Average to Peak) - T_R	5	PERCENT
Ripple Frequency (Fundamental)	89	CYCLES/REV.
Number of Poles	18	
Rotor Inertia - J_M	1.2	OZ.IN.S^2
Motor Weight	100	OZ.

WINDING CONSTANTS

Winding Designation

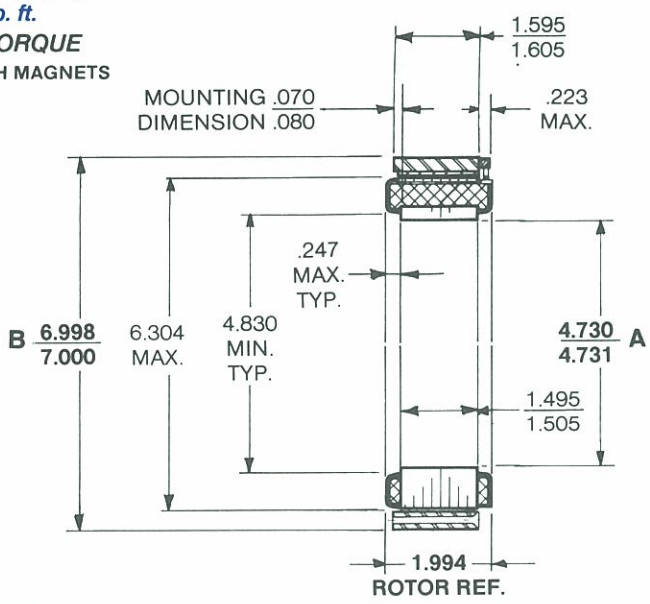
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	21.5						
Peak Current - I_P	AMPERES	Rated	3.10						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	258						
Back EMF Constant - K_B	V per RAD/S	±10%	1.82						
DC Resistance (25°C) - R_M	OHMS	±12.5%	6.95						
Inductance - L_M	mH	±30%	10						

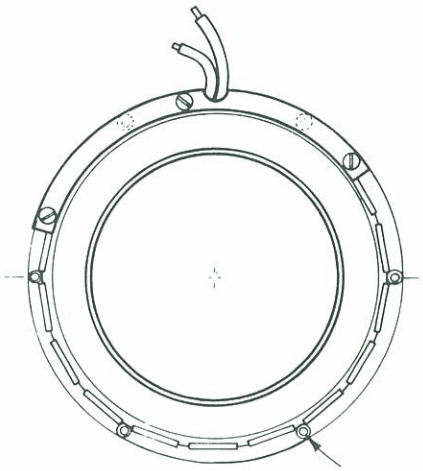
QT-6301

20 lb. ft.

PEAK TORQUE

RARE EARTH MAGNETS





.125 DIA. THRU 82° C'SINK TO
.235 MIN DIA. (6) HOLES
EQ. SPACED ON 6.725 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH SEGMENT ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

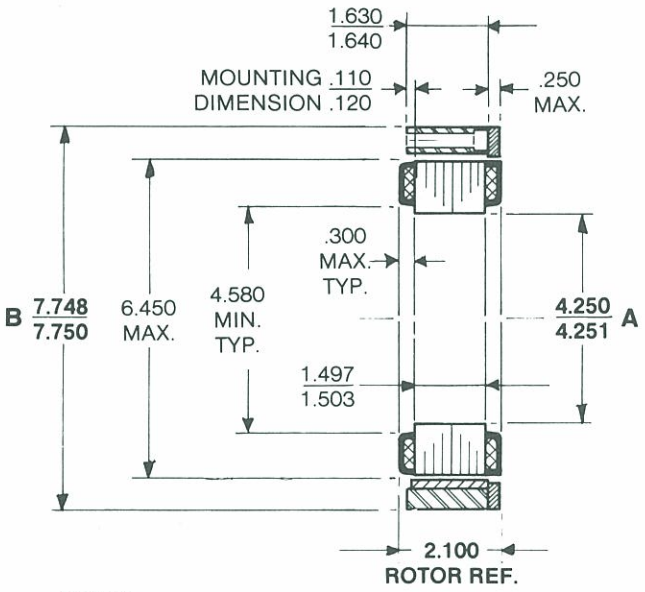
		Value	Units
Peak Torque Rating - T_P		20	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		576	WATTS
Motor Constant - K_M		0.83	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		21	RAD/S
Electrical Time Constant - τ_E		2.1	MS
Static Friction (Max.) - T_F		0.25	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.94	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.007	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		89	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		0.010	LB.FT.S^2
Motor Weight		9	LB.

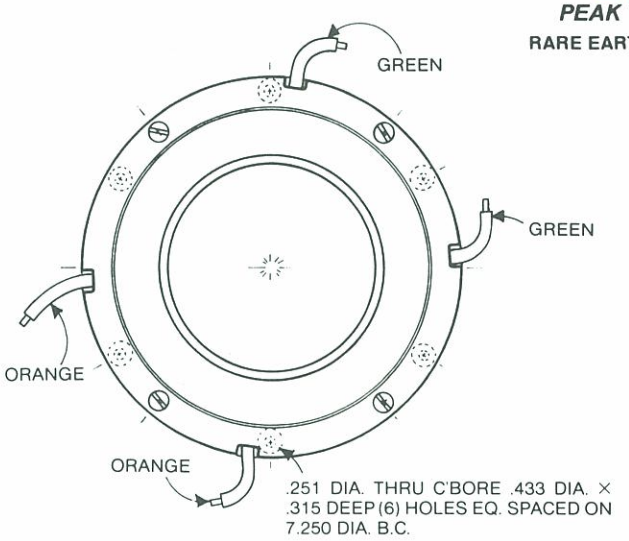
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	45.1						
Peak Current - I_P	AMPERES	Rated	12.4						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.61						
Back EMF Constant - K_B	V per RAD/S	±10%	2.18						
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.64						
Inductance - L_M	mH	±30%	7.8						

QT-6401

26 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — CONNECT (2) GREEN LEADS TOGETHER AND (2) ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

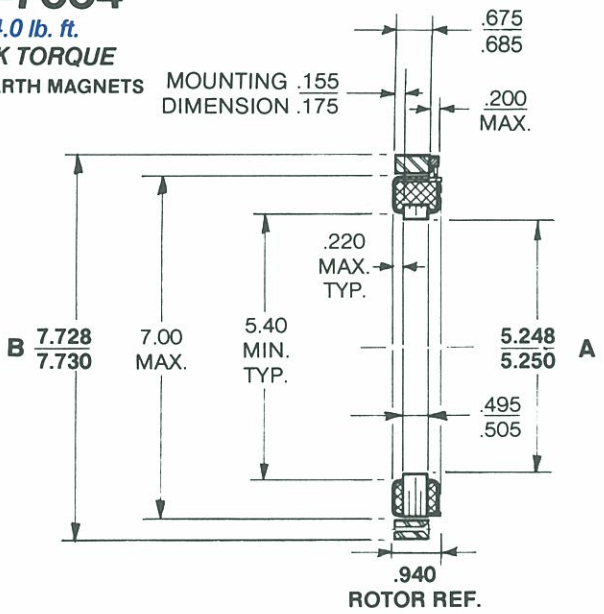
		Value	Units
Peak Torque Rating - T_P		26	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		657	WATTS
Motor Constant - K_M		1.01	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		18.7	RAD/S
Electrical Time Constant - τ_E		3.3	MS
Static Friction (Max.) - T_F		0.40	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.39	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.006	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency (Fundamental)		91	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		0.0124	LB.FT.S^2
Motor Weight		12.6	LB.

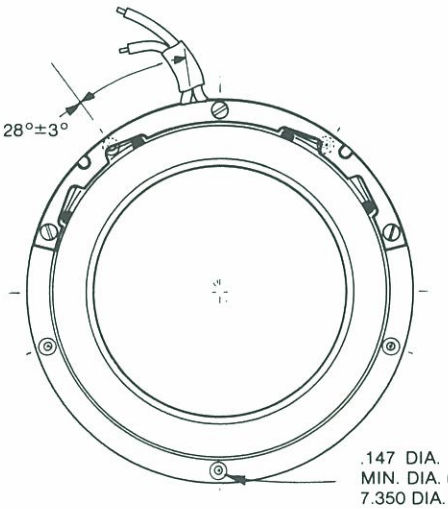
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	28.1	35.3					
Peak Current - I_P	AMPERES	Rated	23.4	18.7					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.11	1.39					
Back EMF Constant - K_B	V per RAD/S	±10%	1.50	1.89					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.20	1.89					
Inductance - L_M	mH	±30%	4.0	6.3					

QT-7004

4.0 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.147 DIA. THRU 82° C'SINK TO .280 MIN. DIA. (5) HOLES EQ. SPACED ON 7.350 DIA. B.C.

NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH SEGMENT ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEAD, WITH RESPECT TO WHITE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 20" MIN. LENGTH.

SIZE CONSTANTS

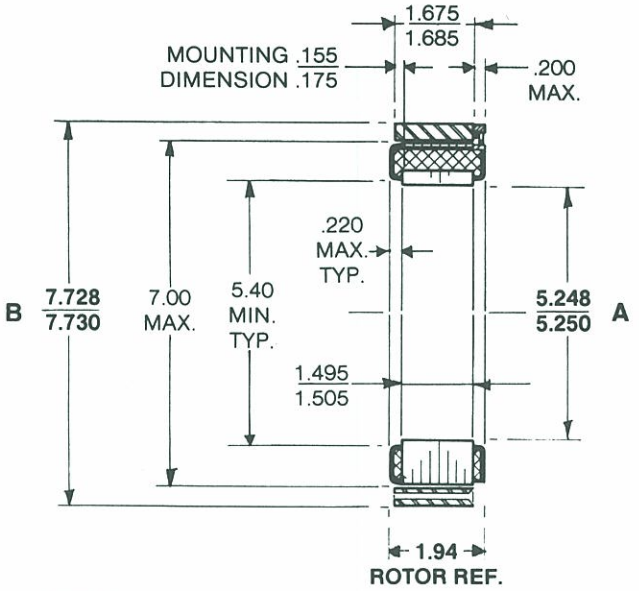
		Value	*Units*
Peak Torque Rating - T_P		4.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		58.2	WATTS
Motor Constant - K_M		0.524	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - $\dot{\omega}_{NL}$		10.7	RAD/S
Electrical Time Constant - τ_E		2.0	MS
Static Friction (Max.) - T_F		0.20	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.37	LB. FT. PER RAD/S
	Infinite Impedance - F_I	4.8×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		91	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		0.0063	LB.FT.S^2
Motor Weight		4.2	LB.

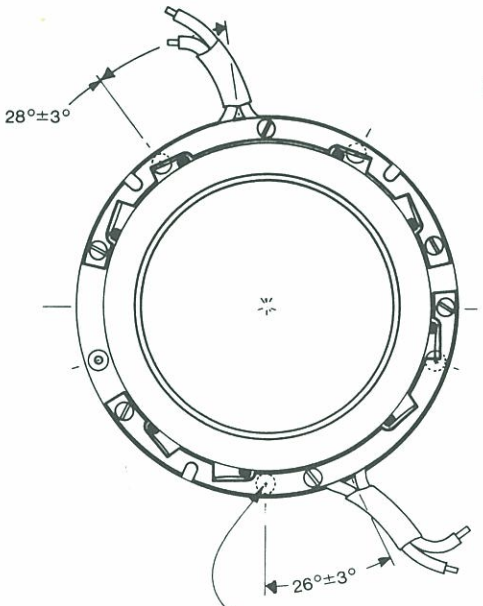
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	26.2	40.9					
Peak Current - I_P	AMPERES	Rated	2.22	1.40					
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	1.80	2.86					
Back EMF Constant - K_B	V per RAD/S	±10%	2.44	3.88					
DC Resistance (25°C) - R_M	OHMS	±12.5%	11.8	29.2					
Inductance - L_M	mH	±30%	24	61					

QT-7003

25 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SUPPLIED AS FOUR SEPARATE COMPONENTS: ROTOR ASSEMBLY STATOR ASSEMBLY, AND (2) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEADS, WITH RESPECT TO WHITE LEADS, ROTATION SHALL BE C.C.W FACING BRUSH RING END.
4. — CONNECT (2) BLACK LEADS TOGETHER AND (2) WHITE LEADS TOGETHER FOR PROPER OPERATION.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

.147 DIA. THRU 82° C'SINK TO .280 MIN. DIA. (5) HOLES EQ. SPACED ON 7.350 DIA. B.C.

LEADS:
#20 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 20" MIN. LENGTH.

SIZE CONSTANTS

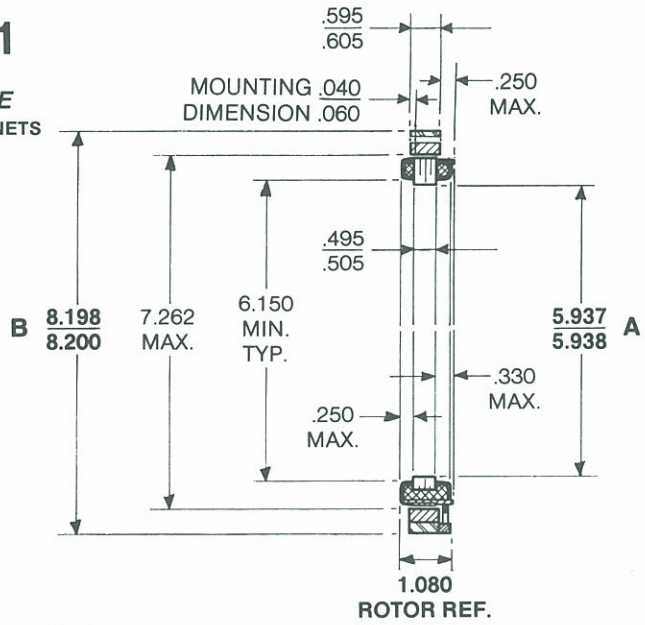
		Value	Units
Peak Torque Rating - T_P		25	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		520	WATTS
Motor Constant - K_M		1.1	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		15	RAD/S
Electrical Time Constant - τ_E		2.4	MS
Static Friction (Max.) - T_F		0.35	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.6	LB. FT. PER RAD/S
	Infinite Impedance - F_I	8.0×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.2	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		91	CYCLES/REV.
Number of Poles		20	
Rotor Inertia - J_M		0.013	LB.FT.S^2
Motor Weight		10.3	LB.

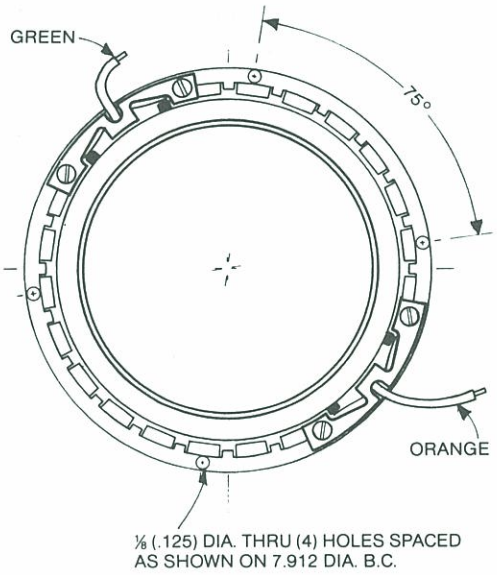
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	21.0	53.0					
Peak Current - I_P	AMPERES	Rated	24.7	9.69					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.01	2.58					
Back EMF Constant - K_B	V per RAD/S	±10%	1.37	3.50					
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.849	5.47					
Inductance - L_M	mH	±30%	2.0	13					

QT-7201

9.0 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS (3) SEPARATE COMPONENTS: ROTOR ASSEMBLY INSIDE STATOR ASSEMBLY AND (2) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R) WHEN MOUNTED.
3. — STATOR MOUNTING SCREWS MUST BE NON-MAGNETIC.
4. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#18 AWG TEFLON COATED PER MIL W-16878, 24" MIN. LENGTH.

SIZE CONSTANTS

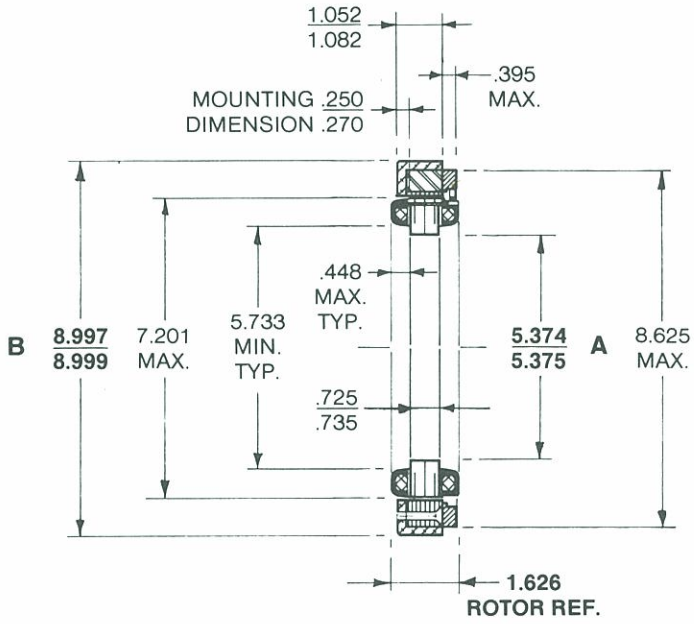
		Value	Units
Peak Torque Rating - T_P		9.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		490	WATTS
Motor Constant - K_M		0.41	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		40	RAD/S
Electrical Time Constant - τ_E		0.79	MS
Static Friction (Max.) - T_F		0.15	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.22	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.0024	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5.0	PERCENT
Ripple Frequency (Fundamental)		107	CYCLES/REV.
Number of Poles		24	
Rotor Inertia - J_M		5.6×10^{-3}	LB.FT.S^2
Motor Weight		4.0	LB.

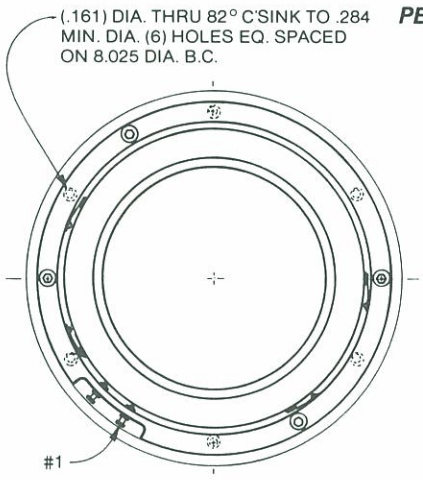
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	30.6						
Peak Current - I_P	AMPERES	Rated	16.1						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.56						
Back EMF Constant - K_B	V per RAD/S	±10%	0.759						
DC Resistance (25°C) - R_M	OHMS	±15%	1.90						
Inductance - L_M	mH	±30%	1.5						

T-7202

11 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		11	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		325	WATTS
Motor Constant - K_M		0.61	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		22	RAD/S
Electrical Time Constant - τ_E		3.15	MS
Static Friction (Max.) - T_F		0.15	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.5	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.005	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.2	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		97	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.010	LB.FT.S^2
Motor Weight		10.3	LB.

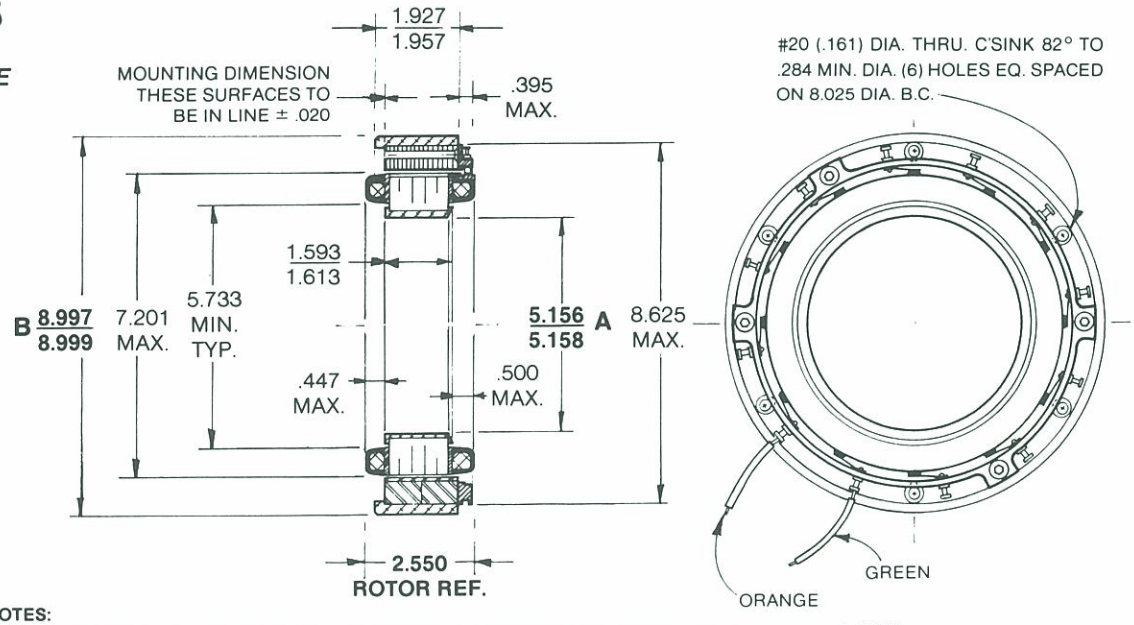
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	29.7	59.5	16.8	19.7	24.2	23.5	47.6
Peak Current - I_P	AMPERES	Rated	11.0	5.5	20.8	16.6	15.1	13.8	6.9
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	1.0	2.0	0.53	0.66	0.73	0.80	1.6
Back EMF Constant - K_B	V per RAD/S	±10%	1.4	2.7	0.72	0.90	0.99	1.1	2.2
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.7	10.8	0.81	1.18	1.6	1.7	6.9
Inductance - L_M	mH	±30%	8.4	34	2.4	3.7	4.5	5.4	22

T-7203

22 lb. ft.

PEAK TORQUE



NOTES:

1. — MOTOR TO BE SUPPLIED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003 (.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — FULL COMPLEMENT OF BRUSHES FOR IMPROVED HIGH CURRENT OPERATION.

LEADS:
#18 AWG TYPE "EE" TEFLON COATED PER MIL W-16878 12" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		22	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		530	WATTS
Motor Constant - K_M		0.96	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		18	RAD/S
Electrical Time Constant - τ_E		5.7	MS
Static Friction (Max.) - T_F		0.25	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.25	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.013	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		97	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.019	LB.FT.S^2
Motor Weight		18.3	LB.

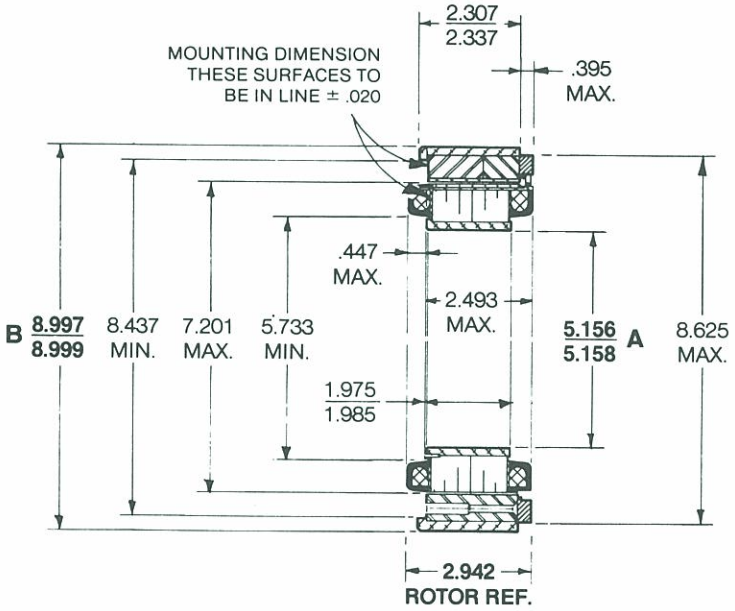
WINDING CONSTANTS — Winding Designation

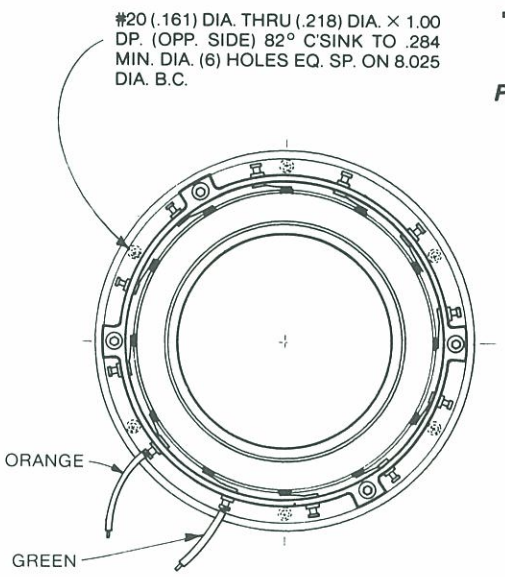
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	24.5	40.9	23.7	50.1	66.7	105	132
Peak Current - I_P	AMPERES	Rated	24.5	12.2	19.0	8.50	7.75	4.75	3.79
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	0.90	1.81	1.16	2.60	2.84	4.64	5.80
Back EMF Constant - K_B	V per RAD/S	±10%	1.22	2.45	1.57	3.53	3.85	6.29	7.86
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.00	3.35	1.25	5.90	8.60	22.2	34.9
Inductance - L_M	mH	±30%	5.0	20.0	8.0	40.0	48.0	130	200

T-7250

27.5 lb. ft.

PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR WITH (2) KEEPERS, AND BRUSH RING ASSEMBLY. **CAUTION:** INSERT ROTOR INTO STATOR PRIOR TO REMOVING KEEPERS.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. —WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — FULL COMPLEMENT OF BRUSHES FOR IMPROVED HIGH CURRENT OPERATION.

LEADS:
#18 AWG TEFLON COATED TYPE "EE"
12" MIN. LG.

SIZE CONSTANTS

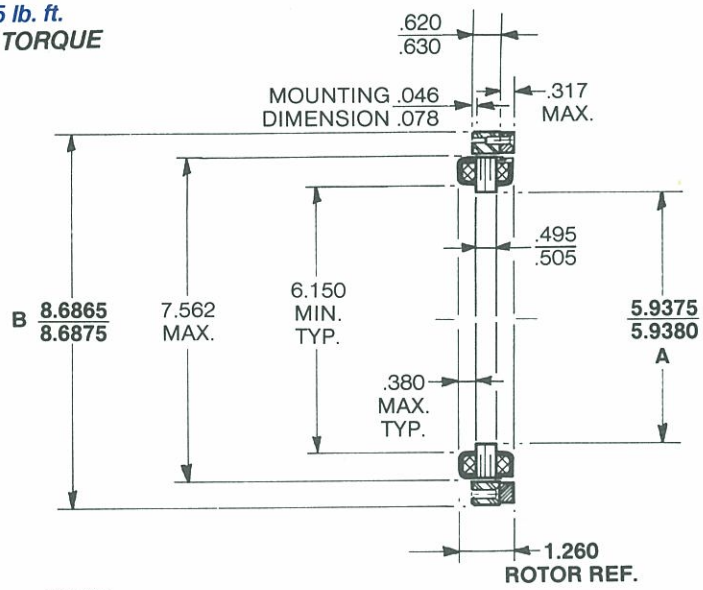
		Value	Units
Peak Torque Rating - T_P		27.5	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		582	WATTS
Motor Constant - K_M		1.14	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		15	RAD/S
Electrical Time Constant - τ_E		6.5	MS
Static Friction (Max.) - T_F		.21	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.75	LB. FT. PER RAD/S
	Infinite Impedance - F_I	.025	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		97	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		.023	LB.FT.S^2
Motor Weight		22.5	LB.

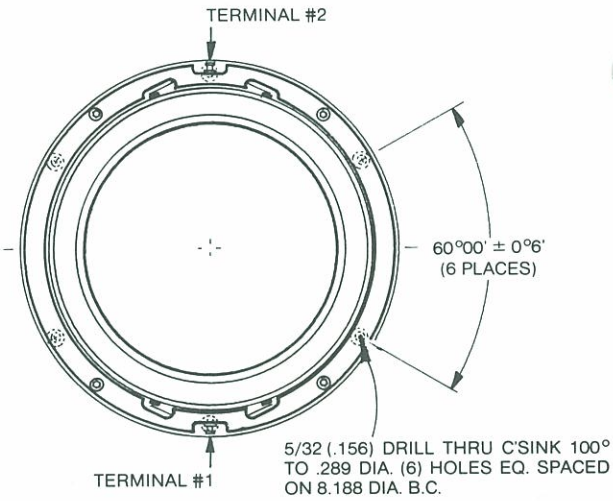
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	23.8	47.7	60.2	95.2	37.8		
Peak Current - I_P	AMPERES	Rated	24.5	12.25	9.55	6.14	15.6		
Torque Sensitivity - K_T	LB. FT./AMP	±10%	1.12	2.24	2.88	4.48	1.76		
Back EMF Constant - K_B	V per RAD/S	±10%	1.52	3.04	3.90	6.07	2.39		
DC Resistance (25°C) - R_M	OHMS	±12.5%	.97	3.88	6.30	15.5	2.42		
Inductance - L_M	mH	±30%	6.3	25	41	100	15		

T-7501

6.5 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH ASSEMBLY, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .0015 (.003 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINAL #1, ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

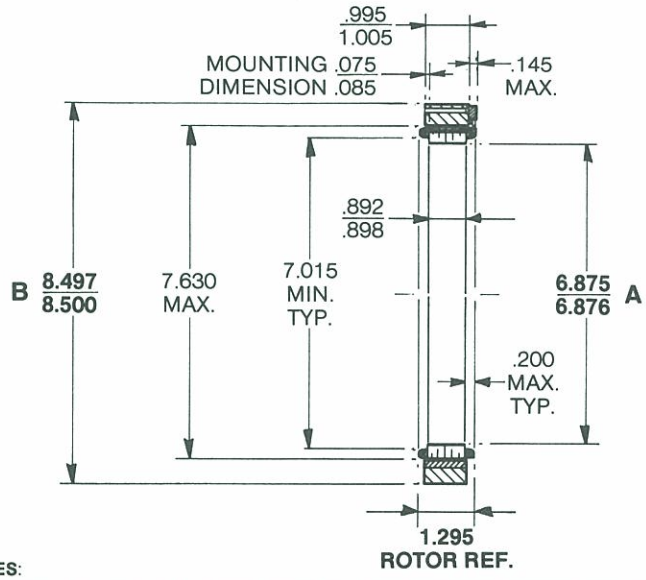
		Value	Units
Peak Torque Rating - T_P		6.5	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		177	WATTS
Motor Constant - K_M		0.49	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		20	RAD/S
Electrical Time Constant - τ_E		1.60	MS
Static Friction (Max.) - T_F		0.25	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.326	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.003	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5.0	PERCENT
Ripple Frequency - (Fundamental)		107	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		0.011	LB.FT.S^2
Motor Weight		7.5	LB.

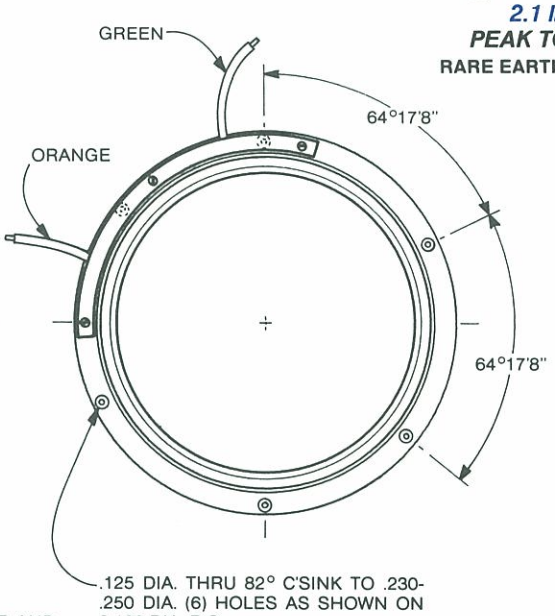
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	42	26	51.4	84.0			
Peak Current - I_P	AMPERES	Rated	4.2	6.8	3.38	2.10			
Torque Sensitivity - K_T	LB. FT./AMP	±10%	1.55	0.96	1.92	3.10			
Back EMF Constant - K_B	V PER RAD/S	±10%	2.1	1.3	2.60	4.2			
DC Resistance (25°C) - R_M	OHMS	±12.5%	10.0	3.8	15.2	40.0			
Inductance - L_M	mH	±30%	16	6	24	64			

QT-7602

2.1 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR AND BRUSH RING SEGMENT.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG TYPE "ET" PER MIL-W 16878, 18" MIN. LG.

SIZE CONSTANTS

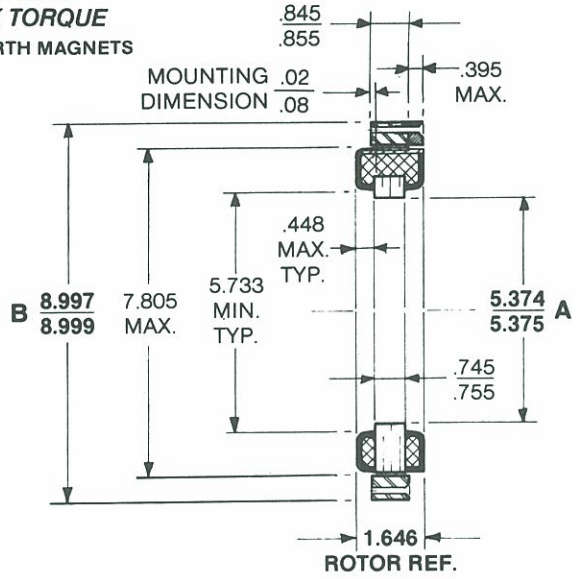
		Value	Units
Peak Torque Rating - T_P		2.1	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		16.7	WATTS
Motor Constant - K_M		0.514	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		5.88	RAD/S
Electrical Time Constant - τ_E		0.576	MS
Static Friction (Max.) - T_F		0.30	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.358	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.015	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		113	CYCLES/REV.
Number of Poles		28	
Rotor Inertia - J_M		6.00×10^{-3}	LB.FT.S^2
Motor Weight		7.3	LB.

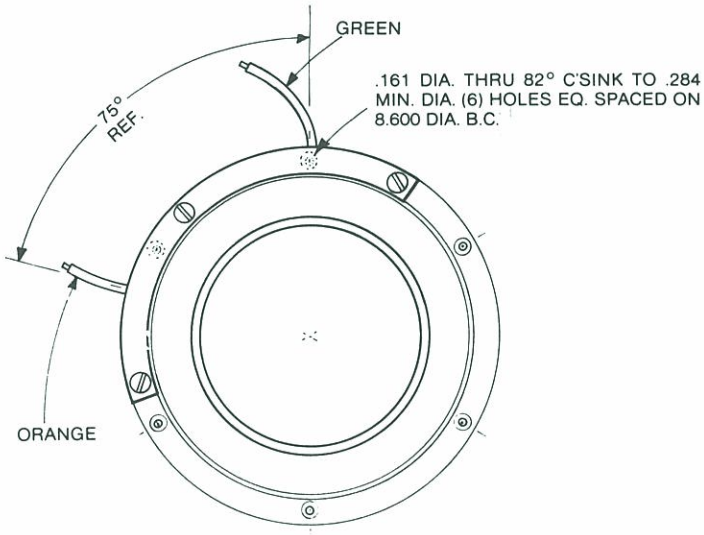
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	23.5						
Peak Current - I_P	AMPERES	Rated	0.712						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	2.95						
Back EMF Constant - K_B	V PER RAD/S	±10%	4.00						
DC Resistance (25°C) - R_M	OHMS	±12.5%	33.0						
Inductance - L_M	mH	±30%	19						

QT-7802

23 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH SEGMENT ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

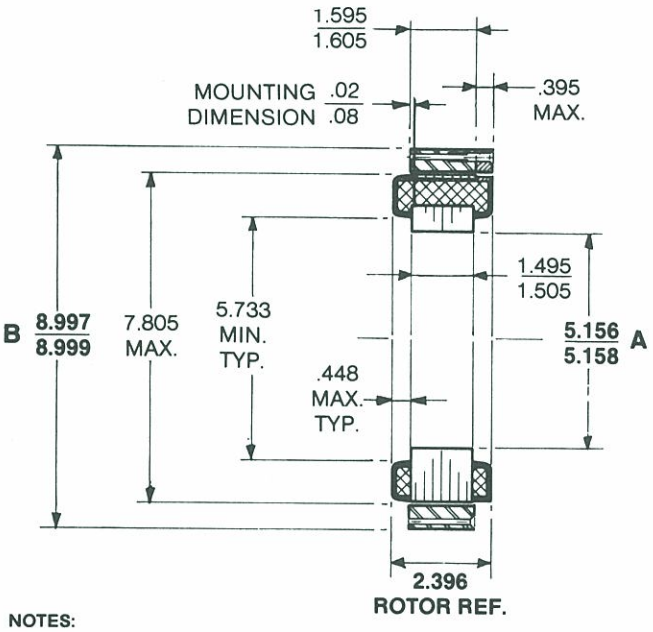
		Value	Units
Peak Torque Rating - T_P		23	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		620	WATTS
Motor Constant - K_M		0.92	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		19.9	RAD/S
Electrical Time Constant - τ_E		2.45	MS
Static Friction (Max.) - T_F		0.37	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.16	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.010	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency (Fundamental)		97	CYCLES/REV.
Number of Poles		24	
Rotor Inertia - J_M		0.0155	LB.FT.S^2
Motor Weight		10.2	LB.

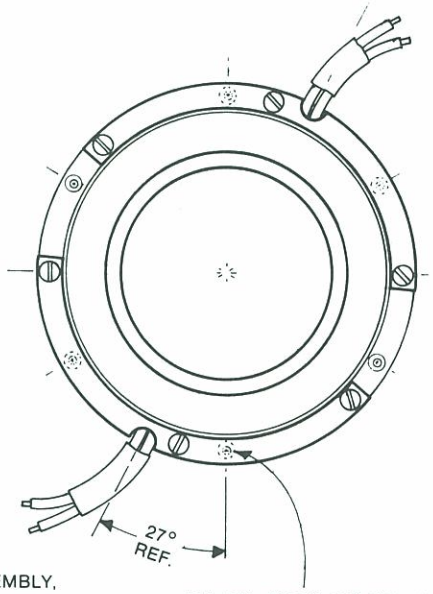
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	31.0	76.8	39.0	24.7			
Peak Current - I_P	AMPERES	Rated	20.0	8.00	15.6	25.7			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.15	2.88	1.47	0.894			
Back EMF Constant - K_B	V per RAD/S	±10%	1.56	3.91	1.99	1.21			
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.55	9.60	2.50	0.96			
Inductance - L_M	mH	±30%	3.8	24	6.2	2.3			

QT-7801

46 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS FOUR SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND (2) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — CONNECT (2) GREEN LEADS TOGETHER AND (2) ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

.161 DIA. THRU 82° C'SINK TO .284 MIN. DIA. (6) HOLES EQ. SPACED ON 8.600 DIA. B.C.

LEADS:

#16 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 30" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		46	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		800	WATTS
Motor Constant - K_M		1.63	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		12.8	RAD/S
Electrical Time Constant - τ_E		3.80	MS
Static Friction (Max.) - T_F		0.50	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	3.59	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.020	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.7	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency (Fundamental)		97	CYCLES/REV.
Number of Poles		24	
Rotor Inertia - J_M		0.028	LB.FT.S^2
Motor Weight		20	LB.

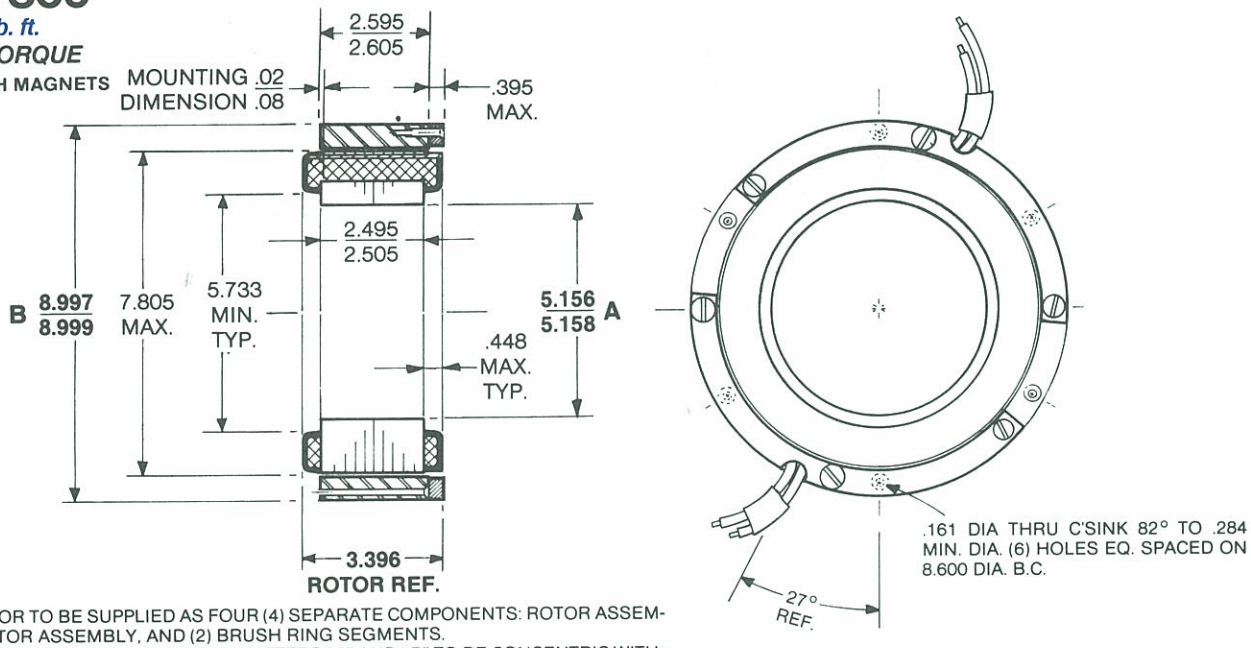
WINDING CONSTANTS

Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	20.0	43.0	63.5		54.3		
Peak Current - I_P	AMPERES	Rated	40.0	20.0	12.4		15.7		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.15	2.30	3.71		2.94		
Back EMF Constant - K_B	V per RAD/S	±10%	1.56	3.12	5.03		3.99		
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.50	2.15	5.12		3.46		
Inductance - L_M	mH	±30%	1.9	7.6	20		12		

QT-7809

60 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SUPPLIED AS FOUR (4) SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND (2) BRUSH RING SEGMENTS.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — CONNECT (2) GREEN LEADS TOGETHER AND (2) ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 30" MIN. LENGTH.

SIZE CONSTANTS

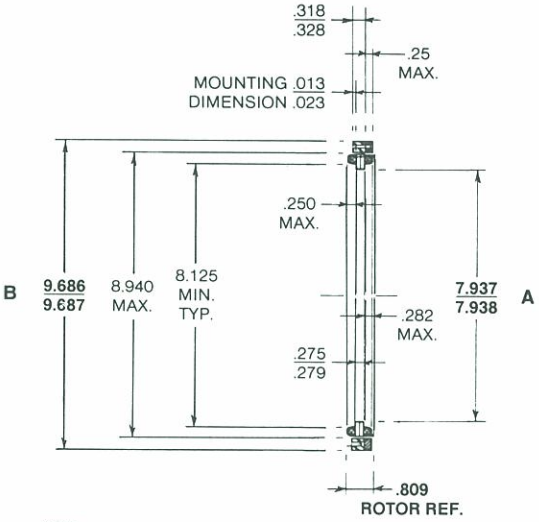
		Value	Units
Peak Torque Rating - T_P		60	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		615	WATTS
Motor Constant - K_M		2.42	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		7.55	RAD/S
Electrical Time Constant - τ_E		4.36	MS
Static Friction (Max.) - T_F		0.83	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	7.95	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.133	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.60	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency (Fundamental)		97	CYCLES/REV.
Number of Poles		24	
Rotor Inertia - J_M		0.041	LB.FT.S^2
Motor Weight		31	LB.

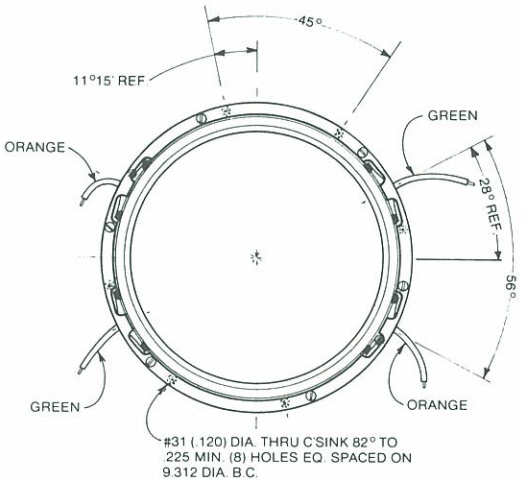
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	31.8	63.7	50.4	40.1	25.3		
Peak Current - I_P	AMPERES	Rated	19.3	9.65	12.3	15.0	24.6		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	3.11	6.22	4.89	4.00	2.44		
Back EMF Constant - K_B	V per RAD/S	±10%	4.22	8.43	6.63	5.42	3.31		
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.65	6.60	4.10	2.67	1.03		
Inductance - L_M	mH	±30%	7.2	29	18	12	4.4		

T-8902

400 oz. in.
PEAK TORQUE





NOTE:

1. – MOTOR TO BE SHIPPED AS TWO SEPARATE COMPONENTS: BRUSH RING ASSEMBLY AND ROTOR SECURED INSIDE STATOR WITH SHIPPING CLAMP. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR.
2. MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. – WITH POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. – CONNECT (2) GREEN LEADS TOGETHER AND (2) ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. – TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#24 AWG TYPE "EE" TEFLON COATED
18" MIN. LG.

SIZE CONSTANTS

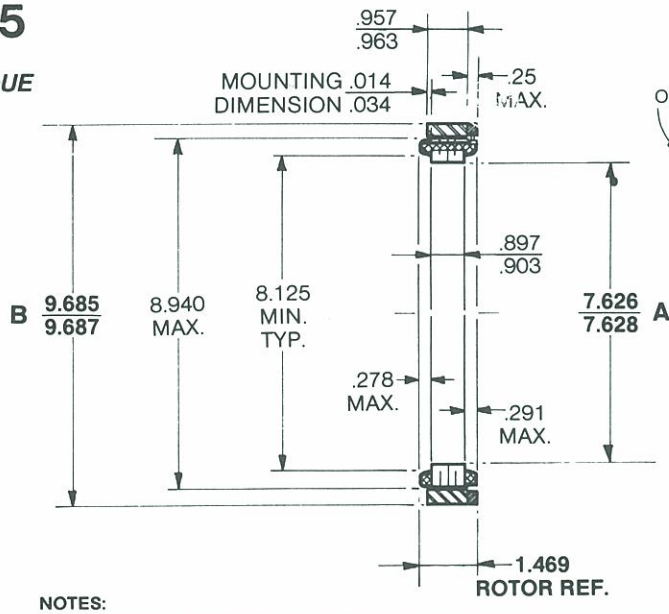
		Value	Units
Peak Torque Rating - T_P		400	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		61	WATTS
Motor Constant - K_M		51.2	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		21.6	RAD/S
Electrical Time Constant - τ_E		0.40	MS
Static Friction (Max.) - T_F		10	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	18.7	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.6	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		143	CYCLES/REV.
Number of Poles		32	
Rotor Inertia - J_M		1.04	OZ.IN.S^2
Motor Weight		72	OZ.

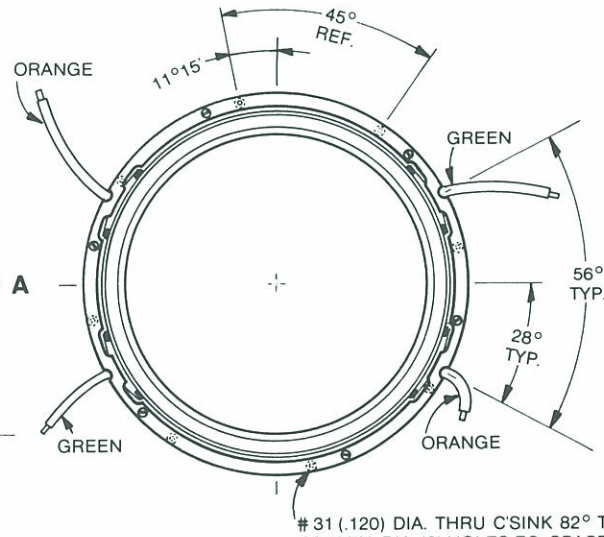
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	17.5						
Peak Current - I_P	AMPERES	Rated	3.5						
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	115						
Back EMF Constant - K_B	V per RAD/S	±10%	0.81						
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.0						
Inductance - L_M	mH	±30%	2.0						

T-8905

13.6 lb. ft.
PEAK TORQUE





31 (.120) DIA. THRU C'SINK 82° TO .225 MIN. DIA. (8) HOLES EQ. SPACED ON 9.312 DIA. B.C.

NOTES:

1. — MOTOR SUPPLIED AS **TWO** SEPARATE COMPONENTS: ROTOR ASSEMBLY SECURED INSIDE STATOR WITH SHIPPING CLAMPS, AND BRUSH RING ASSEMBLY. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE VOLTAGE APPLIED TO GREEN LEADS WITH RESPECT TO ORANGE LEADS ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — FOR PROPER OPERATION CONNECT (2) GREEN LEADS TOGETHER AND (2) ORANGE LEADS TOGETHER.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#24 AWG TYPE "EE" TEFLON COATED PER MIL W-16878, 18" MIN. LG.

SIZE CONSTANTS

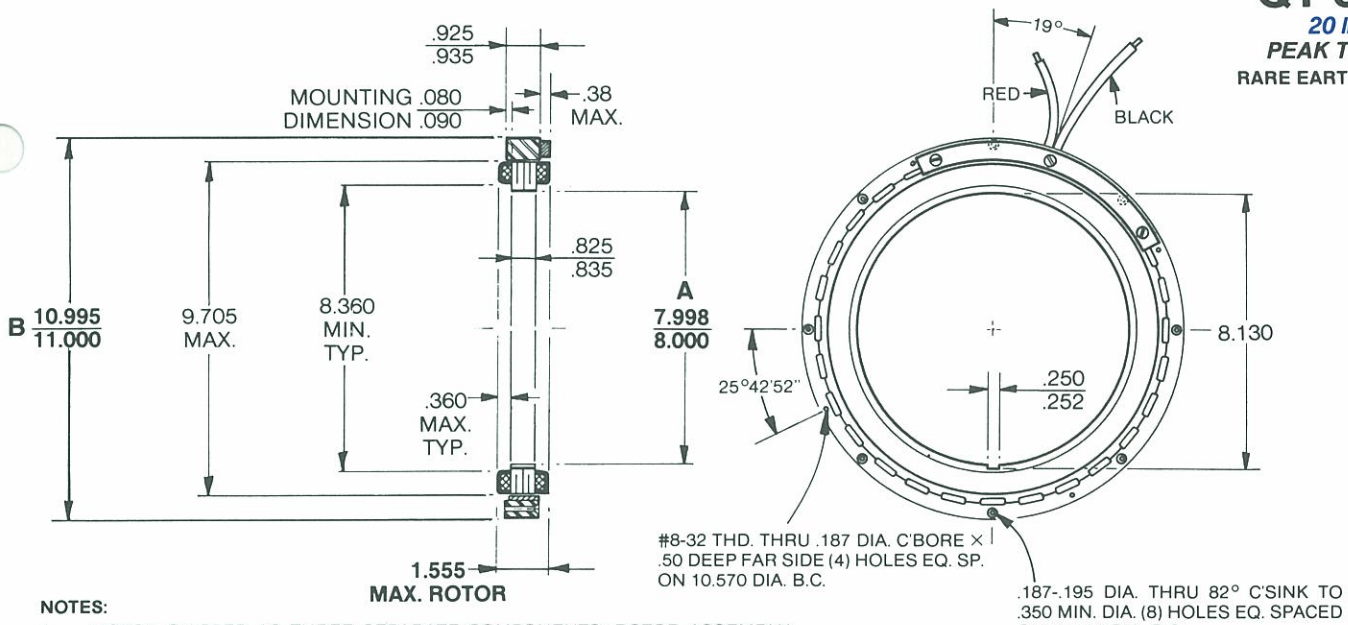
	Value	Units
Peak Torque Rating - T_P	13.6	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P	666	WATTS
Motor Constant - K_M	0.526	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}	36.2	RAD/S
Electrical Time Constant - τ_E	1.38	MS
Static Friction (Max.) - T_F	0.22	LB. FT.
Viscous Damping Coefficients — Zero Impedance - F_0	0.375	LB. FT. PER RAD/S
Viscous Damping Coefficients — Infinite Impedance - F_I	0.011	LB. FT. PER RAD/S
Maximum Winding Temperature	155	°C
Temperature Rise per Watt - TPR	0.80	°C/WATT
Ripple Torque (Average to Peak) - T_R	7	PERCENT
Ripple Frequency - (Fundamental)	143	CYCLES/REV.
Number of Poles	32	
Rotor Inertia - J_M	1.53×10^{-2}	LB.FT.S^2
Motor Weight	9.9	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	47.6						
Peak Current - I_P	AMPERES	Rated	14.0						
Torque Sensitivity - K_T	LB. FT./AMP	±10%	0.970						
Back EMF Constant - K_B	V PER RAD/S	±10%	1.32						
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.40						
Inductance - L_M	mH	±30%	4.7						

QT-9704

20 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR SHIPPED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO BLACK LEAD WITH RESPECT TO RED LEAD, ROTATION SHALL BE C.C.W. AS VIEWED FROM BRUSH END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — GOLD PLATED COMMUTATOR.

LEADS:
#22 AWG TYPE "E" TEFLON COATED —19 STRAND— PER MIL-W-16878 12" MIN. LENGTH.

SIZE CONSTANTS

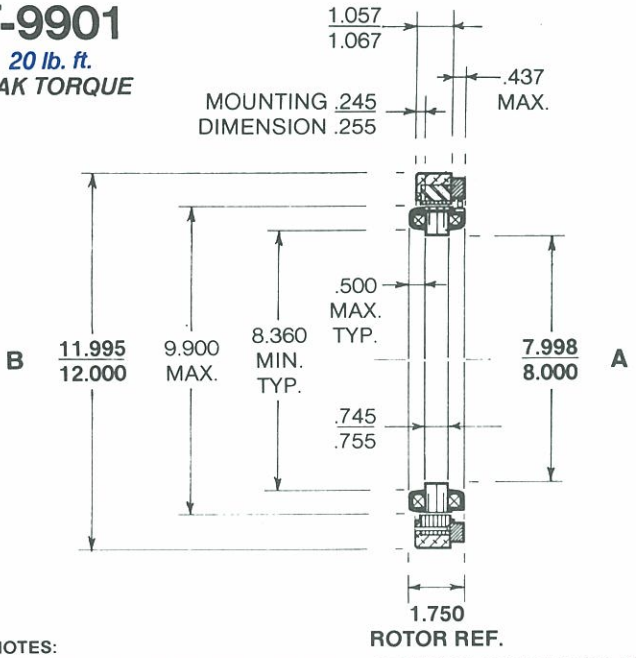
		Value	Units
Peak Torque Rating - T_P		20	LB.FT.
Power Input, Stalled at T_P (25°C) - P_P		235	WATTS
Motor Constant - K_M		1.3	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		8.6	RAD/S
Electrical Time Constant - τ_E		1.5	MS
Static Friction (Max.) - T_F		0.72	LB.FT.
Viscous Damping Coefficients	Zero Impedance - F_0	2.31	LB.FT. PER RAD/S
	Infinite Impedance - F_I	0.05	LB.FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		113	CYCLES/REV.
Number of Poles		28	
Rotor Inertia - J_M		0.025	LB.FT.S^2
Motor Weight		10.5	LB.

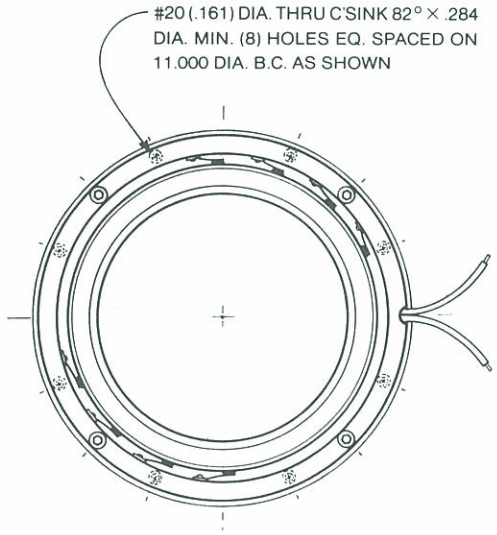
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	27.0	10.9					
Peak Current - I_P	AMPERES	Rated	8.70	21.7					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	2.30	0.920					
Back EMF Constant - K_B	V PER RAD/S	±10%	3.12	1.25					
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.10	0.50					
Inductance - L_M	mH	±30%	4.7	0.75					

T-9901

20 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003(.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "E" TEFLON COATED
12" MIN. LG.

SIZE CONSTANTS

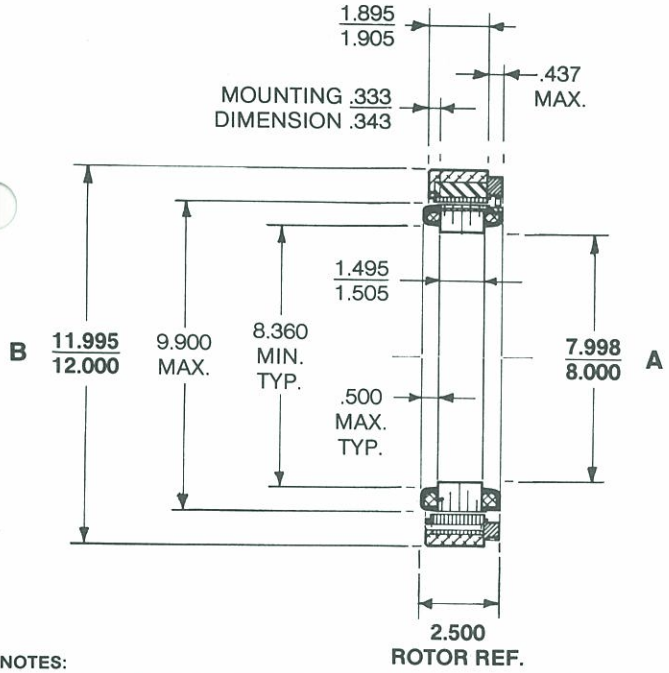
		Value	Units
Peak Torque Rating - T_P		20	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		400	WATTS
Motor Constant - K_M		1.0	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		14.5	RAD/S
Electrical Time Constant - τ_E		4.0	MS
Static Friction (Max.) - T_F		0.25	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.37	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.015	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.55	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		143	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		0.025	LB.FT.S^2
Motor Weight		15	LB.

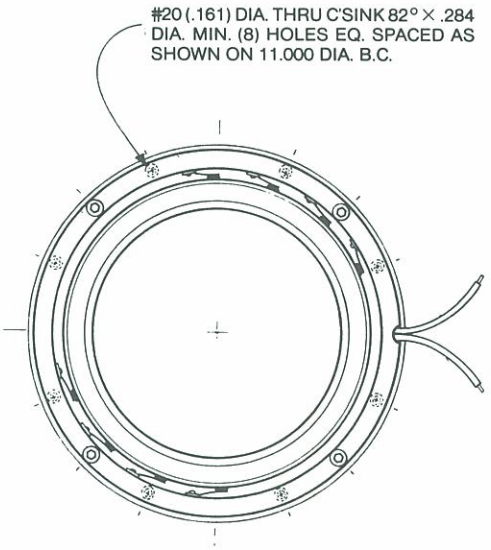
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	26.2	13.2	52.6	105	21.7		
Peak Current - I_P	AMPERES	Rated	15	30.1	7.52	3.76	18.9		
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	1.33	0.665	2.66	5.32	1.06		
Back EMF Constant - K_B	V per RAD/S	±10%	1.8	0.902	3.61	7.21	1.44		
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.75	0.440	7.00	28.0	1.15		
Inductance - L_M	mH	±30%	7	1.8	28	110	4.5		

T-9902

40 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH RING ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003(.006T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:

#16 AWG TYPE "E" TEFLON COATED
12" MIN. LG.

SIZE CONSTANTS

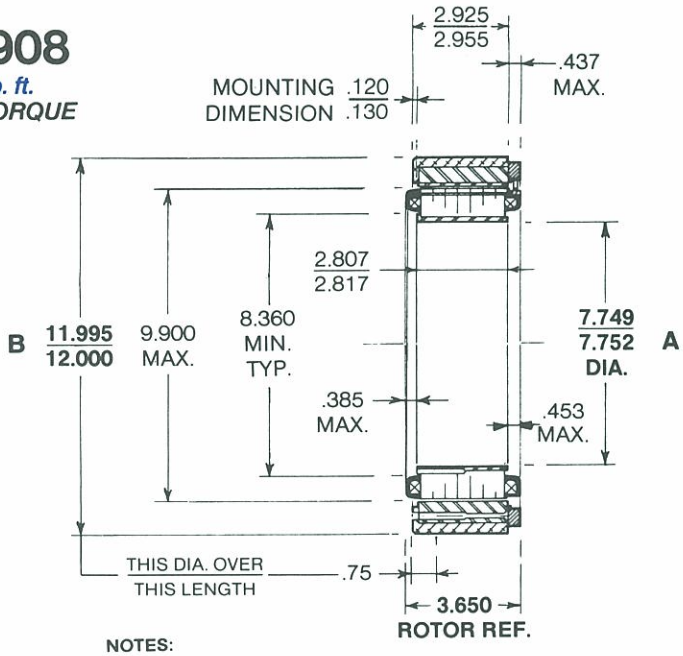
		Value	Units
Peak Torque Rating - T_P		40	LB.FT.
Power Input, Stalled at T_P (25°C) - P_P		512	WATTS
Motor Constant - K_M		1.77	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		9.5	RAD/S
Electrical Time Constant - τ_E		6.3	MS
Static Friction (Max.) - T_F		0.65	LB.FT.
Viscous Damping Coefficients	Zero Impedance - F_0	4.2	LB.FT. PER RAD/S
	Infinite Impedance - F_I	0.03	LB.FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.40	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		143	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		0.05	LB.FT.S^2
Motor Weight		32.3	LB.

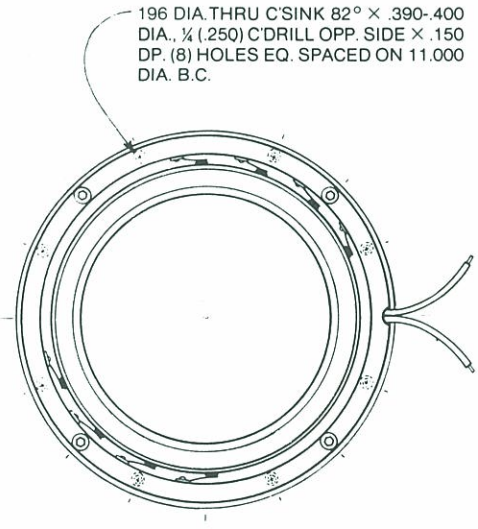
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	53.9	27.0	21.5	135.7	34.2		
Peak Current - I_P	AMPERES	Rated	9.5	19.0	25.3	3.80	15.2		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	4.20	2.10	1.58	10.5	2.63		
Back EMF Constant - K_B	V per RAD/S	±10%	5.70	2.85	2.14	14.2	3.57		
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.67	1.42	0.85	35.7	2.25		
Inductance - L_M	mH	±30%	36	9.0	5.1	225	14		

T-9908

70 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SHIPPED AS (2) SEPARATE COMPONENTS: STATOR WITH ROTOR SECURED IN PLACE BY SHIPPING CLAMP AND MYLAR IN AIR GAP AND BRUSH RING ASSEMBLY. REMOVE MYLAR AFTER ROTOR AND STATOR ARE SECURELY MOUNTED. **CAUTION:** ROTOR MUST REMAIN INSIDE STATOR AT ALL TIMES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO CONCENTRIC WITHIN .003 (.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "E" TEFLON COATED
12" MIN. LG.

SIZE CONSTANTS

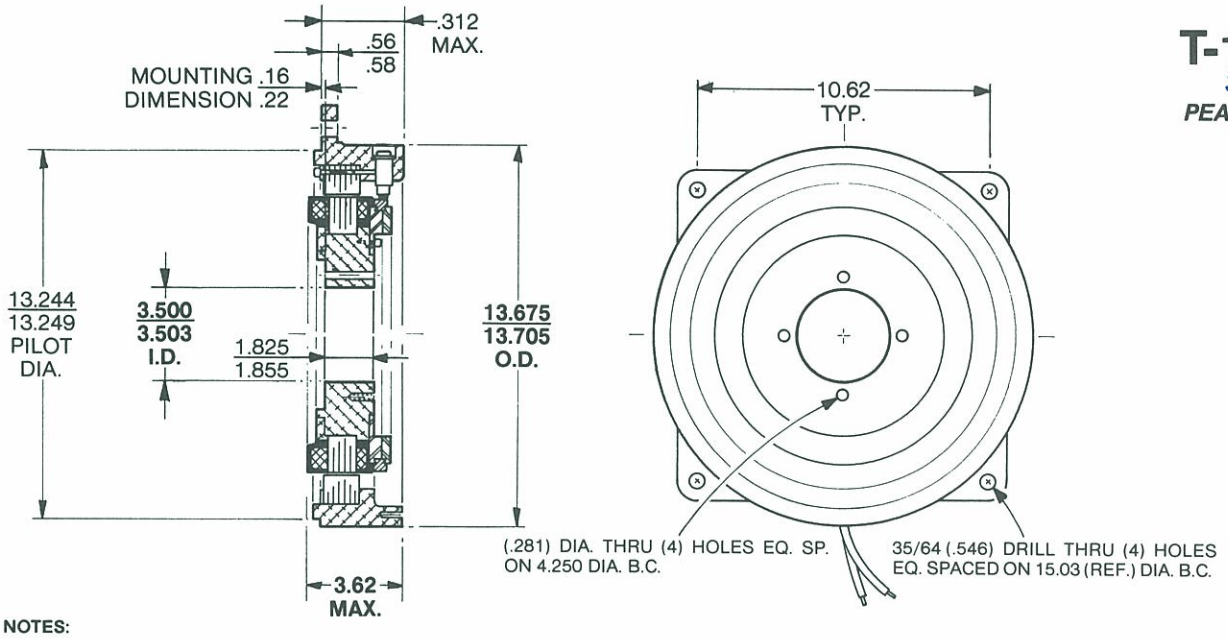
		Value	Units
Peak Torque Rating - T_P		70	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		720	WATTS
Motor Constant - K_M		2.61	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		7.8	RAD/S
Electrical Time Constant - τ_E		6.4	MS
Static Friction (Max.) - T_F		0.6	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	9.1	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.3	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		143	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		0.11	LB.FT.S^2
Motor Weight		50	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.		142.5	44.8	36.0	72.0		
Peak Current - I_P	AMPERES	Rated		5.0	16.0	20.0	10.0		
Torque Sensitivity - K_T	LB.FT./AMP.	±10%		14.1	4.40	3.52	7.04		
Back EMF Constant - K_B	V per RAD/S	±10%		19.1	5.97	4.77	9.54		
DC Resistance (25°C) - R_M	OHMS	±12.5%		28.5	2.80	1.80	7.20		
Inductance - L_M	mH	±30%		180	18	11	44		

T-10036

35 lb. ft.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SHIPPED AS COMPLETE ASSEMBLY WITH ROTOR SECURED IN PLACE BY SHIPPING CLAMP. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .010 T.I.R. WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W WHEN VIEWED FROM END OPPOSITE FLANGE MOUNTING.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — SPECIAL BRUSH MATERIAL FOR IMPROVED COMMUTATION AT HIGH POWER INPUT LEVELS.

LEADS:
#18 AWG TYPE "EE" TEFLON COATED
18" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		35	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		740	WATTS
Motor Constant - K_M		1.28	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		16	RAD/S
Electrical Time Constant - τ_E		3.5	MS
Static Friction (Max.) - T_F		0.5	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	2.3	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.025	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.42	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		190	CYCLES/REV.
Number of Poles		14	
Rotor Inertia - J_M		0.060	LB.FT.S^2
Motor Weight		52.5	LB.

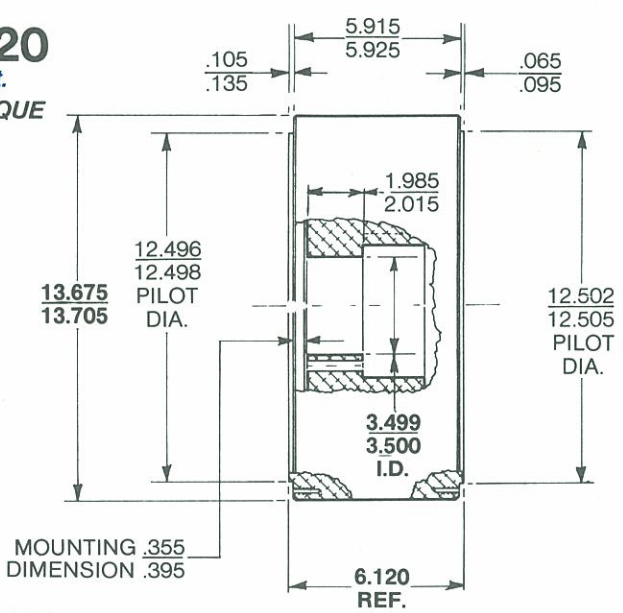
WINDING CONSTANTS — Winding Designation

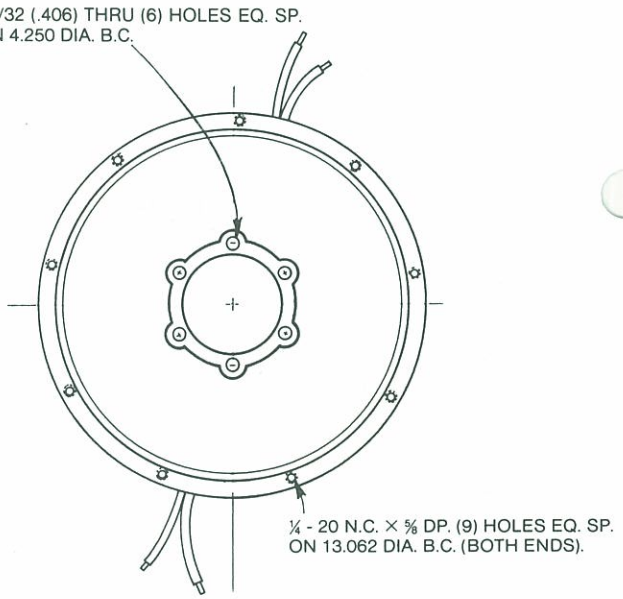
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.			38.2	59	90	154	240
Peak Current - I_P	AMPERES	Rated			19.1	12.8	7.65	4.8	3.0
Torque Sensitivity - K_T	LB.FT./AMP	±10%			1.83	2.75	4.58	7.33	11.6
Back EMF Constant - K_B	V per RAD/S	±10%			2.48	3.73	6.20	9.90	15.7
DC Resistance (25°C) - R_M	OHMS	±12.5%			2.0	4.6	11.7	32	80
Inductance - L_M	mH	±30%			7.0	15.7	44	112	281

T-10020

100 lb. ft.

PEAK TORQUE





NOTES:

1. — MOTOR TO BE SUPPLIED AS COMPLETE ASSEMBLY, WITH ROTOR SECURED INSIDE STATOR. **CAUTION: DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.**
2. — MOUNTING REQUIREMENTS: ROTOR AND STATOR TO BE CONCENTRIC WITHIN .007 (.014 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEADS, WITH RESPECT TO WHITE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH END. CONNECT (2)BLACK LEADS TOGETHER AND (2) WHITE LEADS TOGETHER FOR PROPER OPERATION.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — SPECIAL BRUSH MATERIAL FOR IMPROVED COMMUTATION AT HIGH POWER INPUT LEVELS.

LEADS:
#18 TEFLON TYPE "E" WIRE, 3' LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		930	WATTS
Motor Constant - K_M		3.3	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		7	RAD/S
Electrical Time Constant - τ_E		7.5	MS
Static Friction (Max.) - T_F		2	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	14.5	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.05	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		190	CYCLES/REV.
Number of Poles		14	
Rotor Inertia - J_M		0.18	LB.FT.S^2
Motor Weight		110	LB.

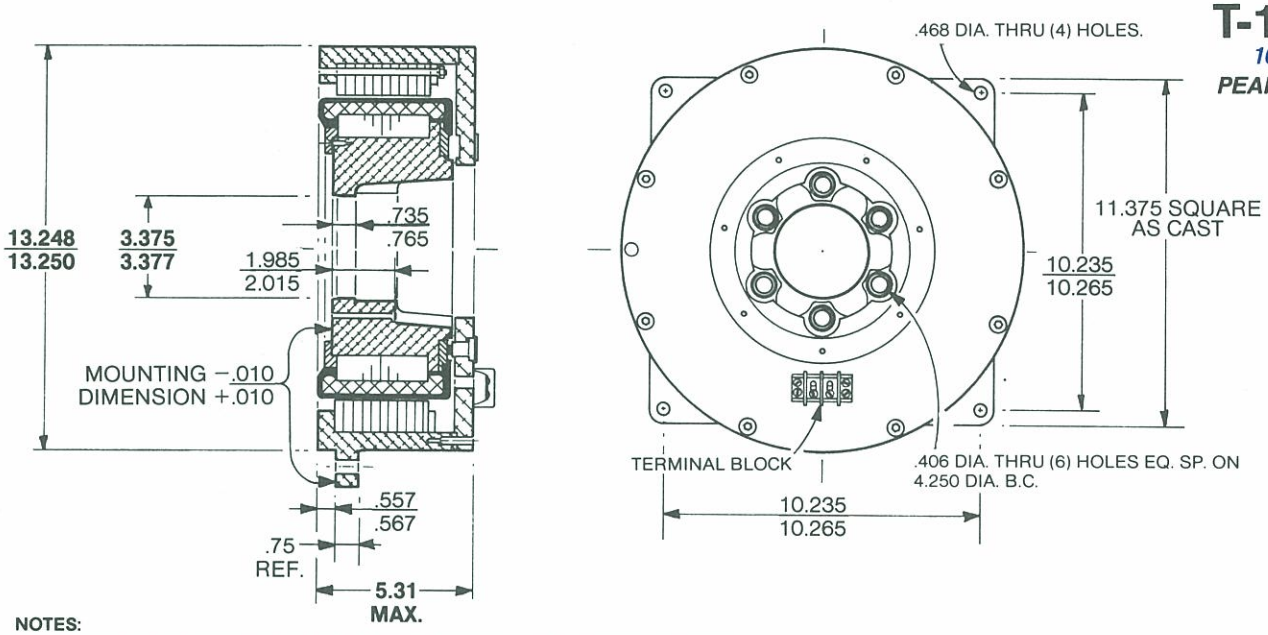
WINDING CONSTANTS — Winding Designations

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	134.9	53.3	84.7	70.2	67.0	33.0	
Peak Current - I_P	AMPERES	Rated	7.1	17.2	11.0	18.0	13.4	30.0	
Torque Sensitivity - K_T	LB.FT/AMP.	±10%	14.2	5.8	9.1	5.7	7.46	3.33	
Back EMF Constant - K_B	V per RAD/S	±10%	19.2	7.9	12.3	7.7	10.1	4.50	
DC Resistance (25°C) - R_M	OHMS	±12.5%	19.0	3.1	7.7	3.9	5.00	1.10	
Inductance - L_M	mH	±30%	143	24	60	20	40	7.0	

T-10035

100 lb. ft.

PEAK TORQUE



NOTES:

1. — MOTOR TO BE SHIPPED AS COMPLETE ASSEMBLY WITH ROTOR SECURED IN PLACE BY SHIPPING CLAMP. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR.
2. — MOUNTING REQUIREMENTS: ROTOR AND STATOR ARE TO BE CONCENTRIC WITH-IN 0.009" (0.018 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINAL "A" WITH RESPECT TO TERMINAL "B", ROTATION SHALL BE C.C.W. FACING BRUSH PLATE SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — FULL COMPLEMENT OF SPECIAL BRUSHES FOR IMPROVED COMMUTATION AT HIGH POWER INPUT LEVELS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		1040	WATTS
Motor Constant - K_M		3.10	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		7.67	RAD/S
Electrical Time Constant - τ_E		5.77	MS
Static Friction (Max.) - T_F		1.0	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	13.0	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.05	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		190	CYCLES/REV.
Number of Poles		14	
Rotor Inertia - J_M		0.178	LB.FT.S^2
Motor Weight		95.5	LB.

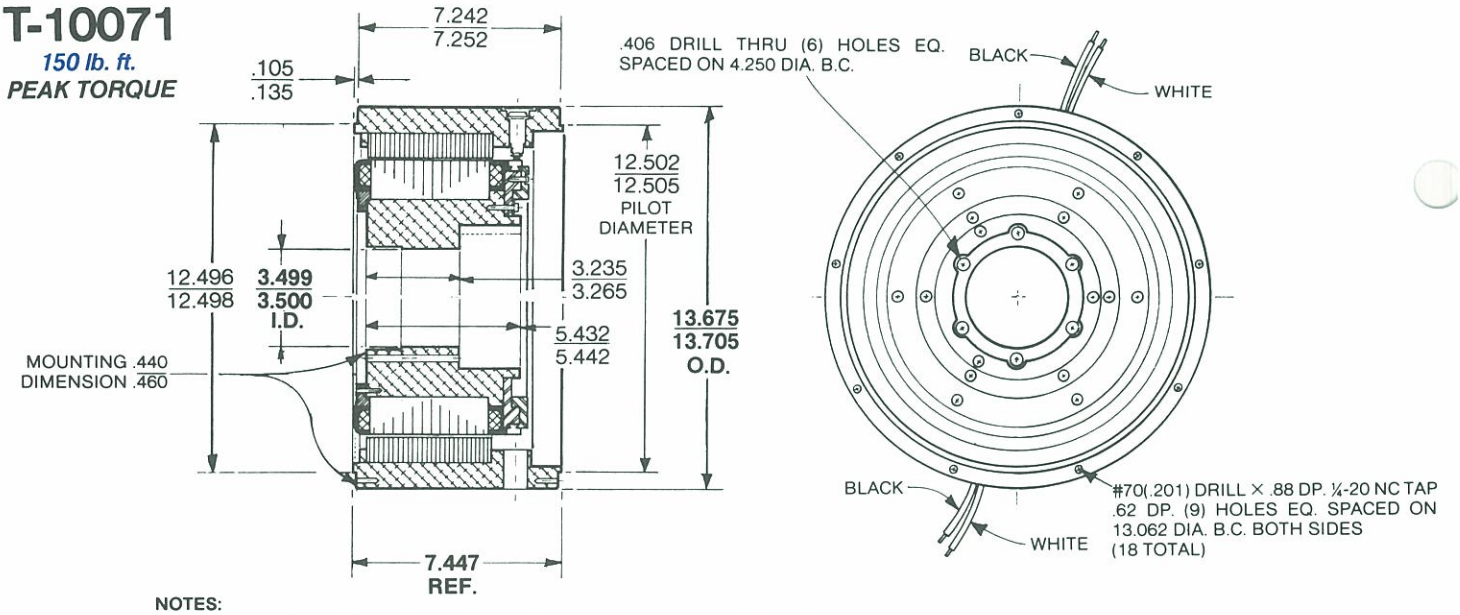
WINDING CONSTANTS

Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	52.0	208	26.2	33.0	66.5	103	165
Peak Current - I_P	AMPERES	Rated	20.0	5.00	40.0	30.0	17.1	10.0	6.33
Torque Sensitivity - K_T	LB.FT./AMP	±10%	5.00	20.0	2.50	3.33	5.80	10.0	15.8
Back EMF Constant - K_B	V per RAD/S	±10%	6.78	27.1	3.40	4.50	7.90	13.6	21.4
DC Resistance (25°C) - R_M	OHMS	± 12.5%	2.60	41.6	0.660	1.10	3.90	10.3	26.0
Inductance - L_M	mH	±30%	15	260	4.0	7.0	20	60	150

T-10071

150 lb. ft.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SUPPLIED AS COMPLETE ASSEMBLY WITH ROTOR SECURED INSIDE STATOR. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .005(.010 T.I.R) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO BLACK LEADS, ROTATION SHALL BE C.C.W. FACING COMMUTATOR.
4. — CONNECT (2) BLACK LEADS TOGETHER AND (2) WHITE LEADS TOGETHER FOR PROPER OPERATION.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.
6. — SPECIAL BRUSH MATERIAL FOR HIGH VOLTAGE OPERATION.

BRUSH LEADS:
#18 AWG TYPE "E" TEFLON COATED, 3' LG.

SIZE CONSTANTS

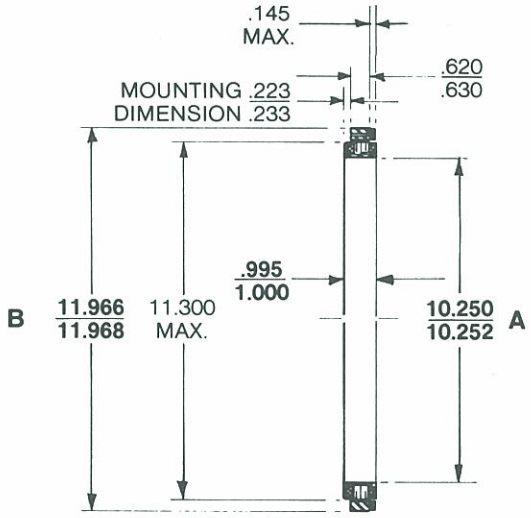
		Value	Units
Peak Torque Rating - T_P		150	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		1470	WATTS
Motor Constant - K_M		3.9	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		7.2	RAD/S
Electrical Time Constant - τ_E		6.6	MS
Static Friction (Max.) - T_F		1.8	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	20.8	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.06	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.27	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		190	CYCLES/REV.
Number of Poles		14	
Rotor Inertia - J_M		0.22	LB.FT.S^2
Motor Weight		145	LB.

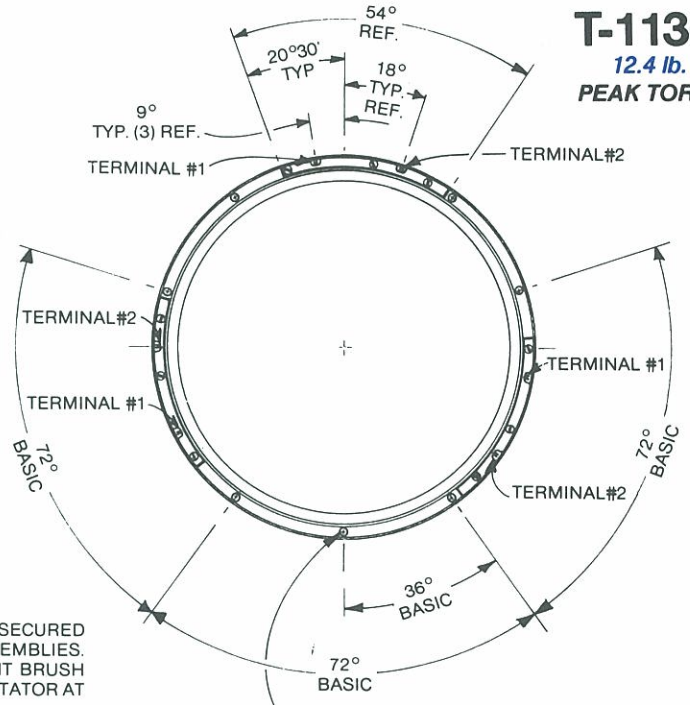
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	68.8	56.8	109	218	173	34.4	
Peak Current - I_P	AMPERES	Rated	21.5	25.8	14.3	6.76	8.60	43.0	
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	7.0	5.8	10.5	22.2	17.5	3.5	
Back EMF Constant - K_B	V per RAD/S	±10%	9.5	7.9	14.2	30.1	23.8	4.75	
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.2	2.2	7.63	32.2	20.2	0.80	
Inductance - L_M	mH	±30%	21.0	14.6	47	210	131	5.2	

T-11306

12.4 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SUPPLIED AS FOUR SEPARATE COMPONENTS: ROTOR SECURED INSIDE STATOR WITH MYLAR SHIMS IN AIR GAP & (3) BRUSH SEGMENT ASSEMBLIES. SECURELY MOUNT ROTOR AND STATOR: REMOVE MYLAR SHIMS & MOUNT BRUSH SEGMENT ASSEMBLIES. **CAUTION**: ROTOR MUST NOT BE REMOVED FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO TERMINALS #2, WITH RESPECT TO TERMINALS #1, ROTATION SHALL BE C.W. FACING BRUSH END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		12.4	LB.FT.
Power Input, Stalled at T_P(25°C) - P_P		260	WATTS
Motor Constant - K_M		0.77	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		16	RAD/S
Electrical Time Constant - τ_E		1.0	MS
Static Friction (Max.) - T_F		0.37	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.8	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.006	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.30	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		241	CYCLES/REV.
Number of Poles		40	
Rotor Inertia - J_M		0.02	LB.FT.S^2
Motor Weight		7.2	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D*	E*	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	16.0	26.9	63.6	127	160	19.5	40.5
Peak Current - I_P	AMPERES	Rated	16.3	8.16	4.08	2.04	1.63	13.0	6.53
Torque Sensitivity - K_T	LB.FT/AMP.	±10%	0.76	1.52	3.04	6.08	7.6	0.95	1.9
Back EMF Constant - K_B	V per RAD/S	±10%	1.03	2.06	4.12	8.24	10.3	1.29	2.57
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.98	3.30	14.0	62.4	98.3	1.5	6.2
Inductance - L_M	mH	±30%	1.0	2.4	16	64	100	1.6	6.3

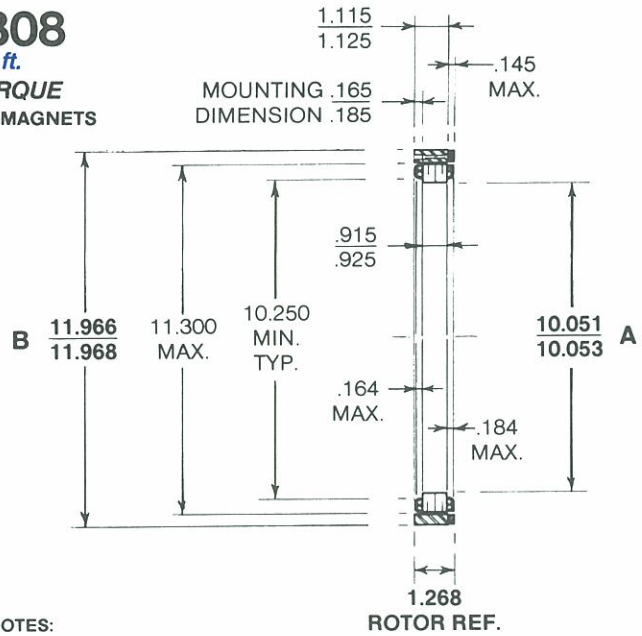
*SPECIAL WINDING

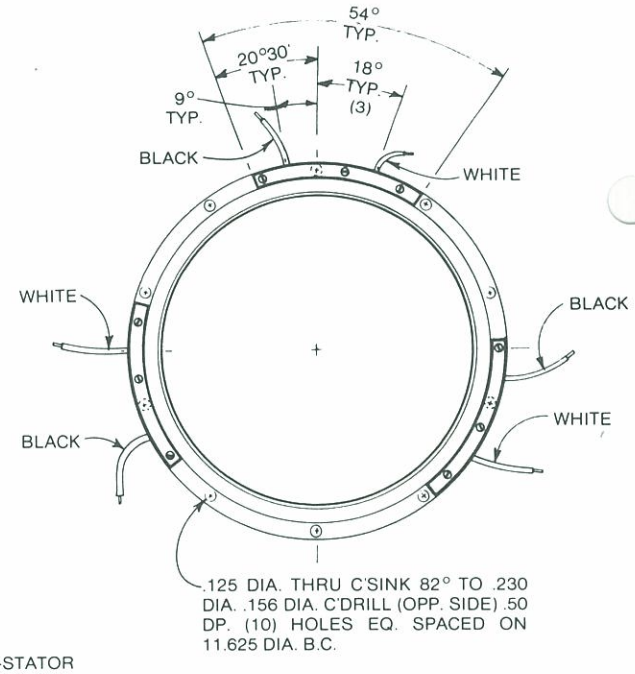
T-11308

20 lb. ft.

PEAK TORQUE

HIGH ENERGY MAGNETS





NOTES:

1. — MOTOR TO BE SUPPLIED AS **FOUR** SEPARATE COMPONENTS: ROTOR-STATOR (WITH MYLAR STRIPS IN AIR GAP) AND (3) BRUSH RING SEGMENT ASSEMBLIES. **CAUTION:** DO NOT REMOVE MYLAR UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO WHITE LEADS, WITH RESPECT TO BLACK LEADS, ROTATION SHALL BE C.W. FACING BRUSH RING END.
4. — CONNECT (3) BLACK LEADS TOGETHER AND (3) WHITE LEADS TOGETHER FOR PROPER OPERATION.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:

#22 AWG TYPE "E" TEFLON COATED PER MIL W-16878 36" MIN. LG.

SIZE CONSTANTS

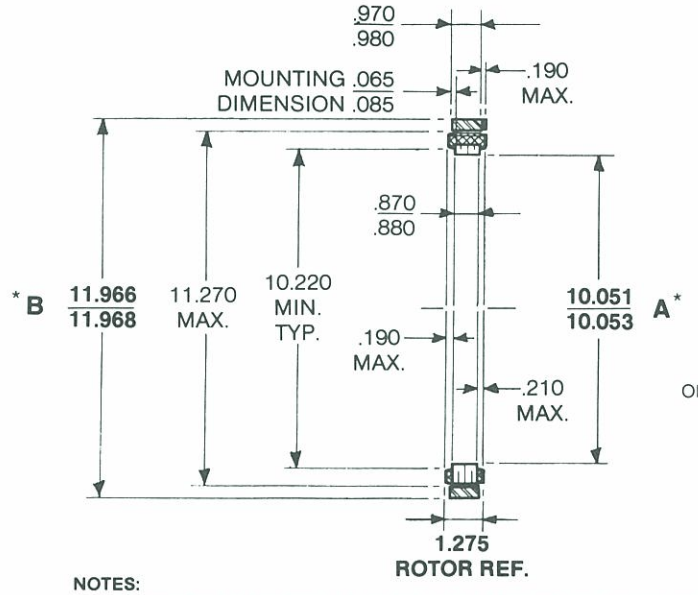
		Value	Units
Peak Torque Rating - T_P		20	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		218	WATTS
Motor Constant - K_M		1.35	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		8	RAD/S
Electrical Time Constant - τ_E		1.4	MS
Static Friction (Max.) - T_F		0.71	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	2.5	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.02	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.30	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		181	CYCLES/REV.
Number of Poles		40	
Rotor Inertia - J_M		0.03	LB.FT.S^2
Motor Weight		9	LB.

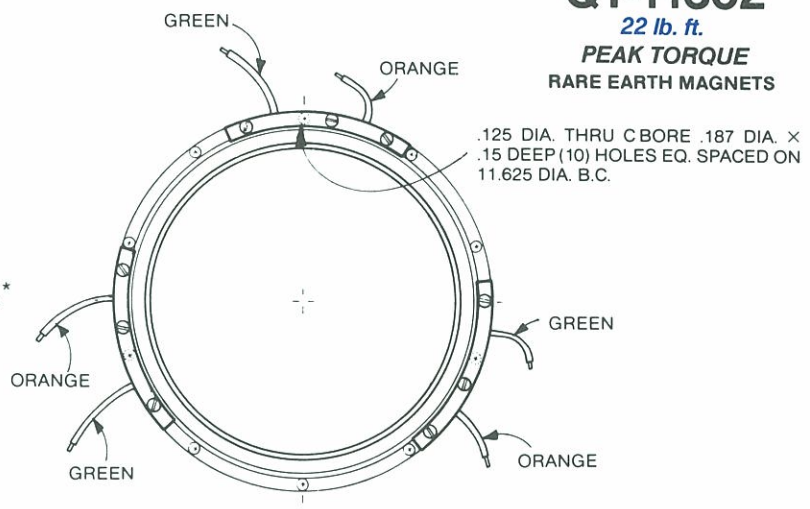
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	64.1	32.1	40.4	80.6			
Peak Current - I_P	AMPERES	Rated	3.39	6.78	5.51	2.75			
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	5.90	2.95	3.63	7.26			
Back EMF Constant - K_B	V per RAD/S	±10%	8.00	4.00	4.92	9.84			
DC Resistance (25°C) - R_M	OHMS	±12.5%	18.9	4.73	7.33	29.3			
Inductance - L_M	mH	±30%	26	6.5	9.8	39			

QT-11302

22 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:
1. — MOTOR TO BE SHIPPED AS FIVE (5) SEPARATE COMPONENTS: STATOR ASSEMBLY, ROTOR ASSEMBLY, AND (3) THREE BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — CONNCET (3) GREEN LEADS TOGETHER AND (3) ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. — DIAMETERS MARKED "*" ARE AVERAGE OF FREE STATE.
6. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TEFLON COATED PER MIL W-16878, 36" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		22	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		232	WATTS
Motor Constant - K_M		1.44	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		7.8	RAD/S
Electrical Time Constant - τ_E		0.93	MS
Static Friction (Max.) - T_F		1.0	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	2.83	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.02	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency (Fundamental)		181	CYCLES/REV.
Number of Poles		40	
Rotor Inertia - J_M		0.03	LB.FT.S^2
Motor Weight		8.7	LB.

WINDING CONSTANTS — Winding Designation

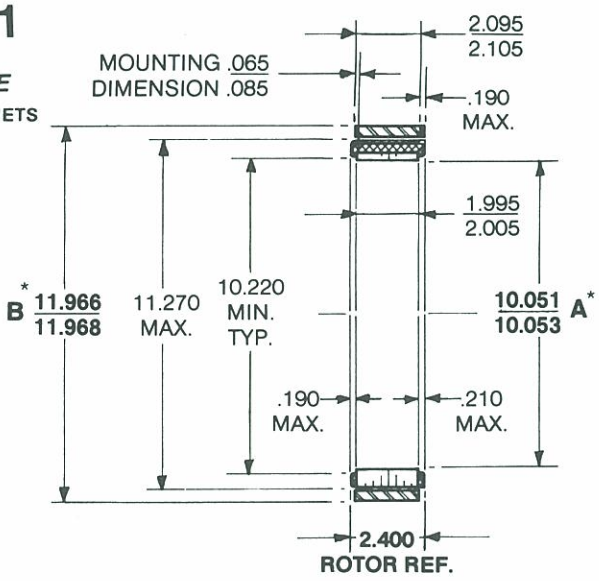
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	26.4	41.9					
Peak Current - I_P	AMPERES	Rated	8.80	5.38					
Torque Sensitivity - K_T	LB.FT./AMPS	±10%	2.50	4.09					
Back EMF Constant - K_B	V per RAD/S	±10%	3.39	5.55					
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.00	7.79					
Inductance - L_M	mH	±30%	2.8	7.5					

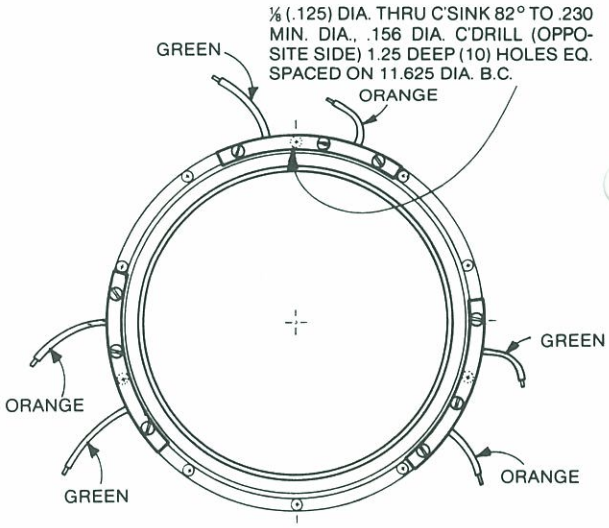
QT-11301

50 lb. ft.

PEAK TORQUE

RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SUPPLIED AS FIVE SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND (3) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W FACING BRUSH RING END.
4. — CONNECT (3) GREEN LEADS TOGETHER AND (3) ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. — DIAMETERS MARKED "*" ARE AVERAGE OF FREE STATE.
6. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TEFLON COATED PER MIL W-16878, 36" MIN. LENGTH.

SIZE CONSTANTS

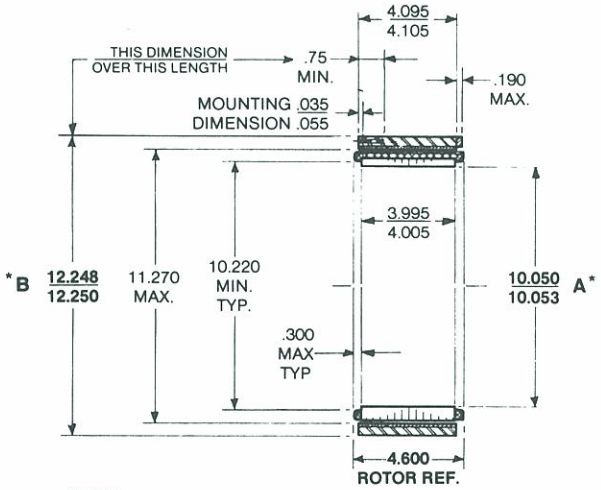
		Value	Units
Peak Torque Rating - T_P		50	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		331	WATTS
Motor Constant - K_M		2.75	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		4.87	RAD/S
Electrical Time Constant - τ_E		1.20	MS
Static Friction (Max.) - T_F		1.6	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	10.3	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.30	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.30	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency (Fundamental)		181	CYCLES/REV.
Number of Poles		40	
Rotor Inertia - J_M		0.060	LB.FT.S^2
Motor Weight		17.5	LB.

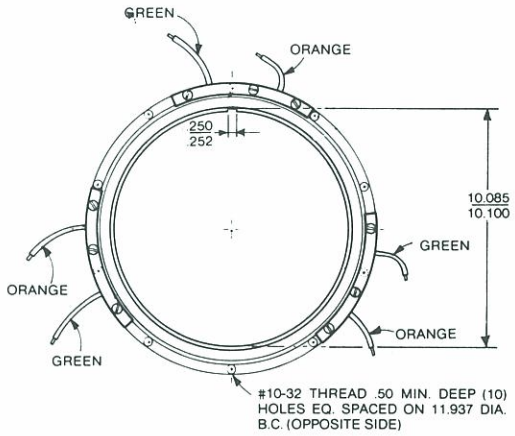
WINDING CONSTANTS — *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	57.5	28.7	36.2	45.6			
Peak Current - I_P	AMPERES	Rated	5.75	12.2	9.78	7.52			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	8.70	4.10	5.12	6.65			
Back EMF Constant - K_B	V per RAD/S	±10%	11.8	5.56	6.94	9.02			
DC Resistance (25°C) - R_M	OHMS	±12.5%	10.0	2.35	3.70	6.07			
Inductance - L_M	mH	±30%	12	2.7	4.2	7.0			

QT-11303

100 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS FOUR (4) SEPARATE COMPONENTS: (3) BRUSH RING SEGMENTS, AND STATOR ASSEMBLY WITH ROTOR ASSEMBLY INSIDE SECURED WITH SHIPPING CLAMP AND MYLAR IN AIR GAP - REMOVE MYLAR AFTER ROTOR AND STATOR ARE SECURELY MOUNTED.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE
4. — CONNECT (3) GREEN LEADS TOGETHER AND (3) ORANGE LEADS TOGETHER FOR PROPER OPERATION.
5. — DIAMETERS MARKED "*" ARE AVERAGE OF FREE STATE.
6. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 36" MIN. LENGTH.

SIZE CONSTANTS

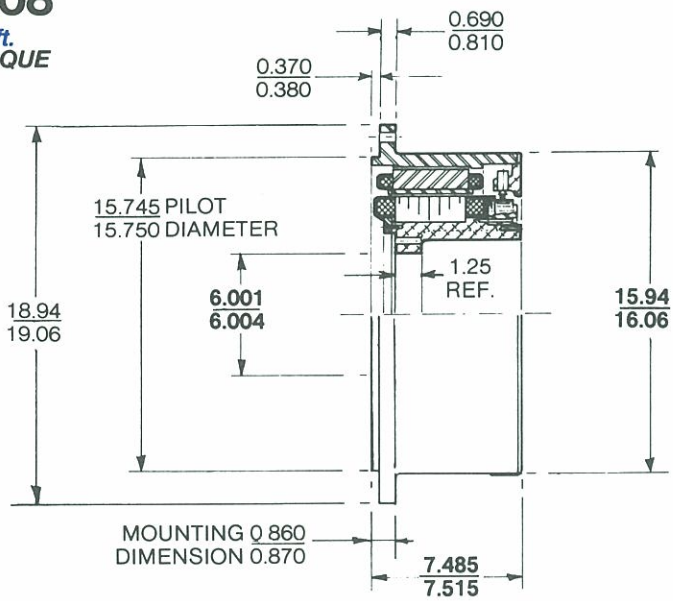
		Value	Units
Peak Torque Rating - T_P		100	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		499	WATTS
Motor Constant - K_M		4.5	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		3.6	RAD/S
Electrical Time Constant - τ_E		0.76	MS
Static Friction (Max.) - T_F		2.5	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	27	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.50	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.21	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		181	CYCLES/REV.
Number of Poles		40	
Rotor Inertia - J_M		0.11	LB.FT.S^2
Motor Weight		39	LB.

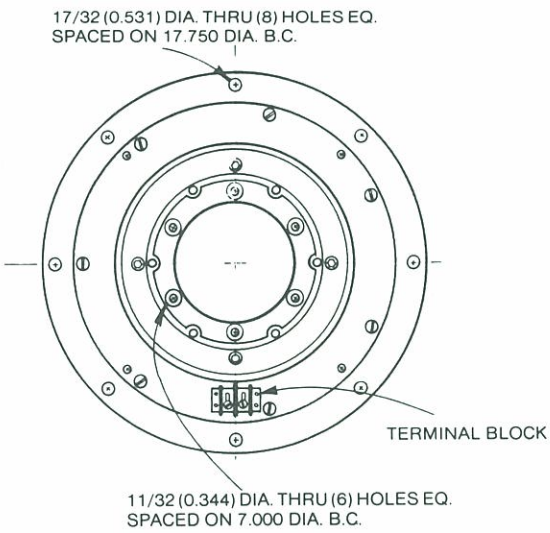
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	45.8	37.8					
Peak Current - I_P	AMPERES	Rated	10.9	14.0					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	9.20	7.15					
Back EMF Constant - K_B	V per RAD/S	±10%	12.5	9.70					
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.20	2.70					
Inductance - L_M	mH	±30%	3.2	1.9					

T-12008

201 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS COMPLETE ASSEMBLY WITH ROTOR SECURED INSIDE STATOR. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: STATOR AND ROTOR TO BE CONCENTRIC WITHIN .005 (.010 T.I.R.) WHEN MOUNTED.
3. — TYPICAL BRUSH LIFE > 10^7 REVS.
4. — SPECIAL BRUSH MATERIAL FOR IMPROVED COMMUTATION AT HIGH POWER INPUT LEVELS.

SIZE CONSTANTS

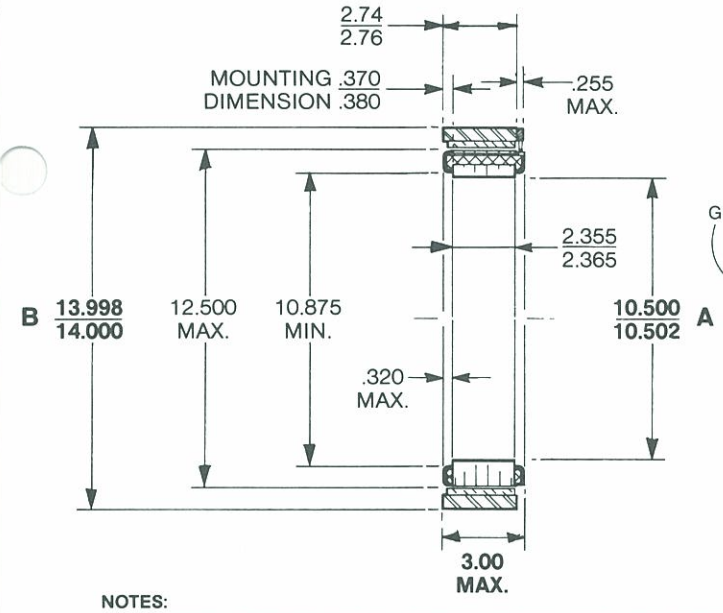
		Value	Units
Peak Torque Rating - T_P		201	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		2628	WATTS
Motor Constant - K_M		3.93	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		9.63	RAD/S
Electrical Time Constant - τ_E		8.33	MS
Static Friction (Max.) - T_F		1.0	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	20.9	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.09	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.2	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		197	CYCLES/REV.
Number of Poles		14	
Rotor Inertia - J_M		0.500	LB.FT.S^2
Motor Weight		194	LB.

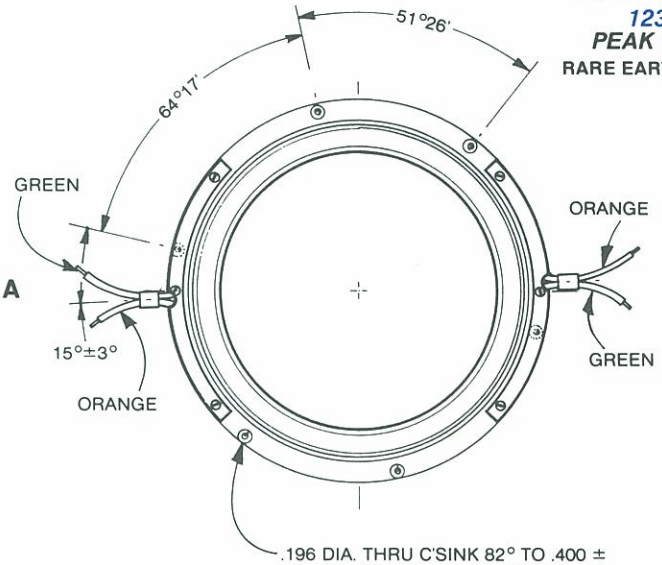
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	112	50.0	59.5	69.0	87.5	138	28.5
Peak Current - I_P	AMPERES	Rated	23.4	51.5	42.5	36.5	28.2	18.4	85.9
Torque Sensitivity - K_T	LB.FT./AMP	±10%	8.60	3.90	4.70	5.50	7.10	10.9	2.32
Back EMF Constant - K_B	V per RAD/S	±10%	11.7	5.30	6.40	7.50	9.70	15.0	3.14
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.80	0.970	1.40	1.90	3.10	7.50	0.330
Inductance - L_M	mH	±30%	40	8.0	12	16	26	64	3.0

QT-12506

123 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR SUPPLIED AS FOUR SEPARATE COMPONENTS: ROTOR ASSEMBLY, STATOR ASSEMBLY, AND (2) BRUSH SEGMENTS.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE VOLTAGE APPLIED TO ORANGE LEADS WITH RESPECT TO GREEN LEADS ROTATION SHALL BE C.W. FACING BRUSH END.
4. — FOR PROPER OPERATION CONNECT (2) GREEN LEADS TOGETHER AND (2) ORANGE LEADS TOGETHER.
5. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "E" TEFLON COATED PER MIL W-16878 12" MIN. LENGTH.

SIZE CONSTANTS

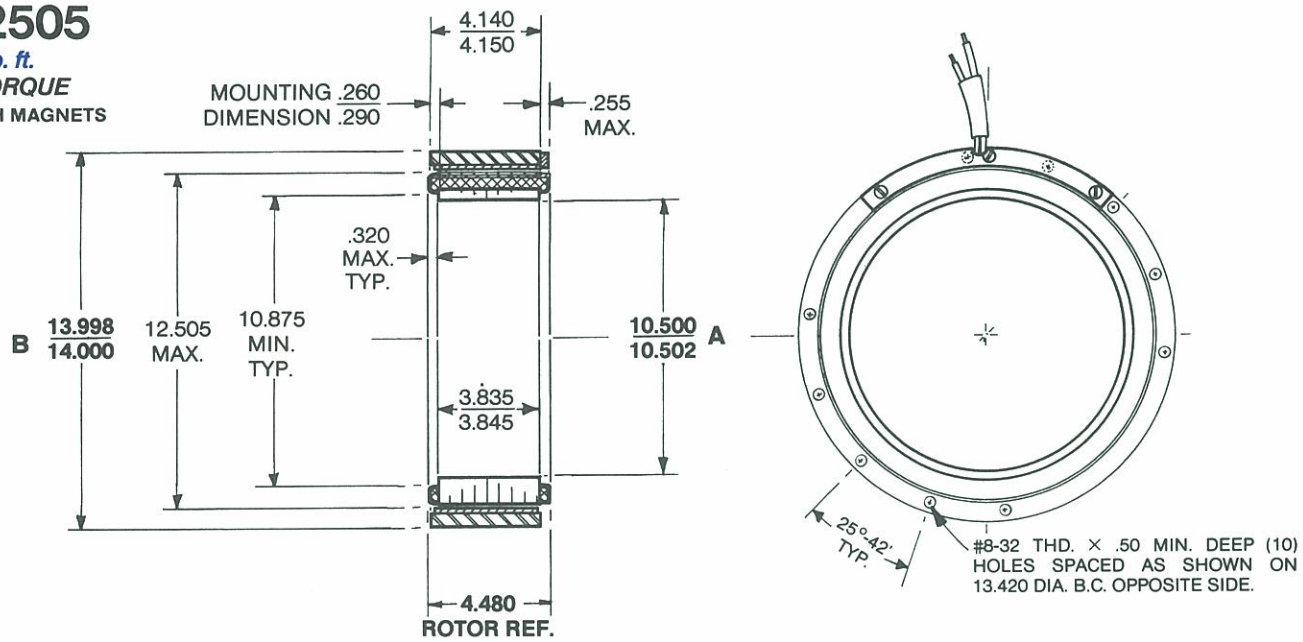
		Value	Units
Peak Torque Rating - T_P		123	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		794	WATTS
Motor Constant - K_M		4.36	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P-ω_{NL}		4.76	RAD/S
Electrical Time Constant - τ_E		3.24	MS
Static Friction (Max.) - T_F		1.2	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	25.8	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.2	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		139	CYCLES/REV.
Number of Poles		28	
Rotor Inertia - J_M		0.170	LB.FT.S^2
Motor Weight		42	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	64.6	32.2	41.0				
Peak Current - I_P	AMPERES	Rated	12.3	23.4	19.5				
Torque Sensitivity - K_T	LB.FT./AMP	±10%	10.0	5.26	6.32				
Back EMF Constant - K_B	V per RAD/S	±10%	13.6	7.13	8.57				
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.25	1.38	2.10				
Inductance - L_M	mH	±30%	17	4.7	6.8				

QT-12505

200 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SHIPPED AS THREE SEPARATE COMPONENTS: BRUSH SEGMENT ASSEMBLY, ROTOR ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .003 (.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 12" MIN. LENGTH.

SIZE CONSTANTS

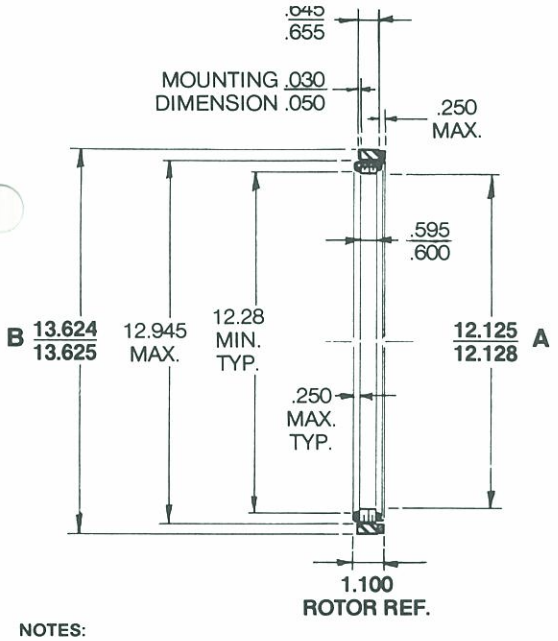
		Value	Units
Peak Torque Rating - T_P		200	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		1095	WATTS
Motor Constant - K_M		6.04	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		4	RAD/S
Electrical Time Constant - τ_E		3.78	MS
Static Friction (Max.) - T_F		1.6	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	49.5	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.30	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency (Fundamental)		139	CYCLES/REV.
Number of Poles		28	
Rotor Inertia - J_M		0.27	LB.FT.S^2
Motor Weight		67	LB.

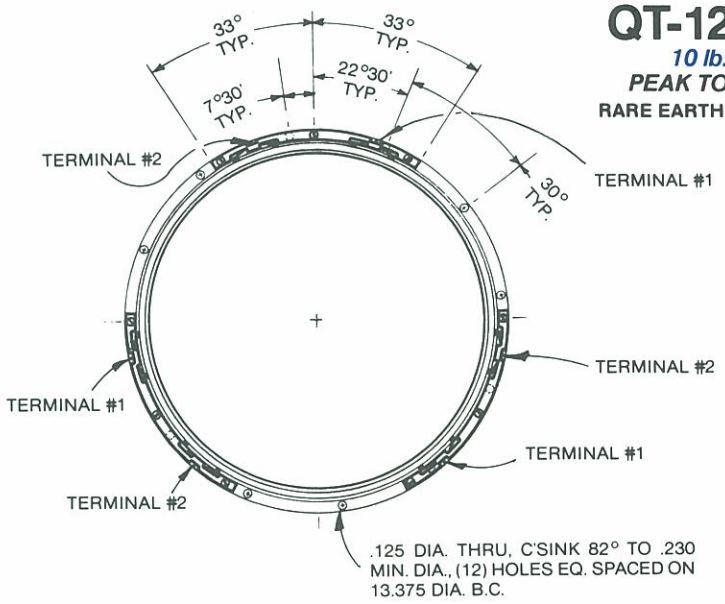
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	70.2						
Peak Current - I_P	AMPERES	Rated	15.6						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	12.8						
Back EMF Constant - K_B	V per RAD/S	±10%	17.4						
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.50						
Inductance - L_M	mH	±30%	17						

QT-12901

10 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR TO BE SHIPPED AS FOUR (4) SEPARATE COMPONENTS: (3) BRUSH RING SEGMENTS, AND STATOR ASSEMBLY WITH ROTOR ASSEMBLY INSIDE, SECURED BY SHIPPING CLAMP WITH MYLAR IN AIR GAP. REMOVE MYLAR AFTER ROTOR AND STATOR ARE SECURELY MOUNTED. **CAUTION:** STATOR TO BE MOUNTED WITH MAGNETIC STEEL SCREWS.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINALS MARKED #1, ROTATION OF ROTOR SHALL BE C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		10	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		135	WATTS
Motor Constant - K_M		0.86	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		10	RAD/S
Electrical Time Constant - τ_E		0.37	MS
Static Friction (Max.) - T_F		0.4	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.0	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.03	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.30	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		287	CYCLES/REV.
Number of Poles		48	
Rotor Inertia - J_M		0.024	LB.FT.S^2
Motor Weight		5	LB.

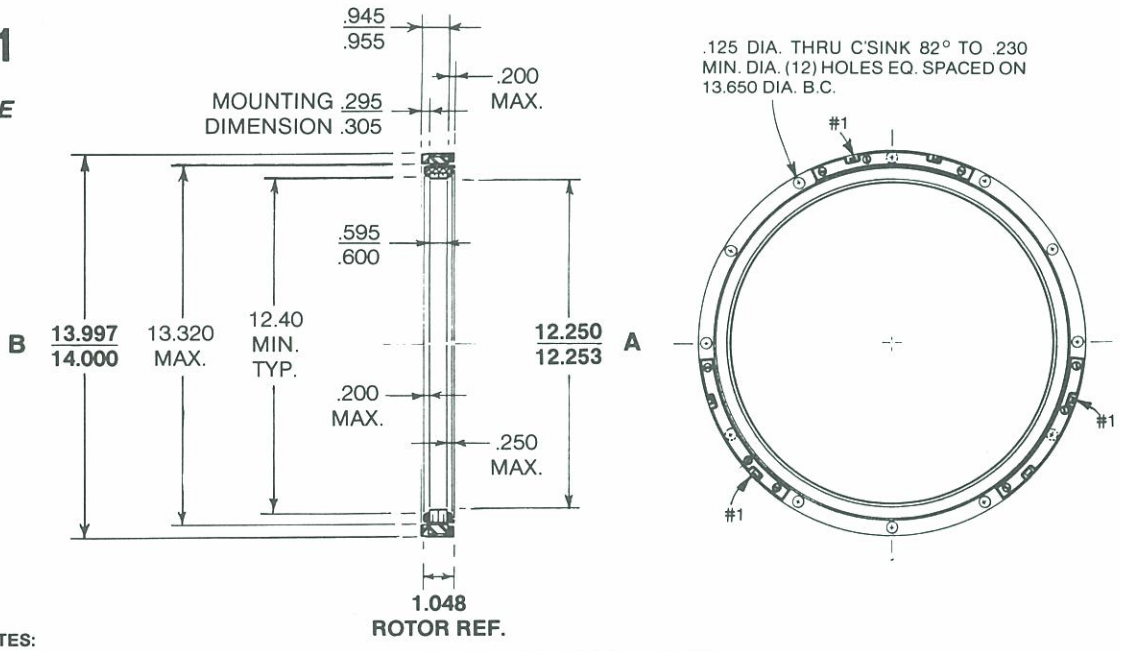
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	27.0	15.2					
Peak Current - I_P	AMPERES	Rated	5.00	9.01					
Torque Sensitivity -K_T	LB. FT./AMP	±10%	2.00	1.11					
Back EMF Constant - K_B	V per RAD/S	±10%	2.71	1.51					
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.40	1.68					
Inductance - L_M	mH	±30%	2.0	0.62					

T-13301

14.4 lb. ft.

PEAK TORQUE



NOTES:

1. — MOTOR TO BE SUPPLIED AS **FIVE** SEPARATE COMPONENTS: ROTOR, (3) BRUSH RING SEGMENT ASSEMBLIES, AND STATOR WITH (4) KEEPERS. **CAUTION:** DO NOT REMOVE KEEPERS UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO TERMINALS #1, ROTATION SHALL BE C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

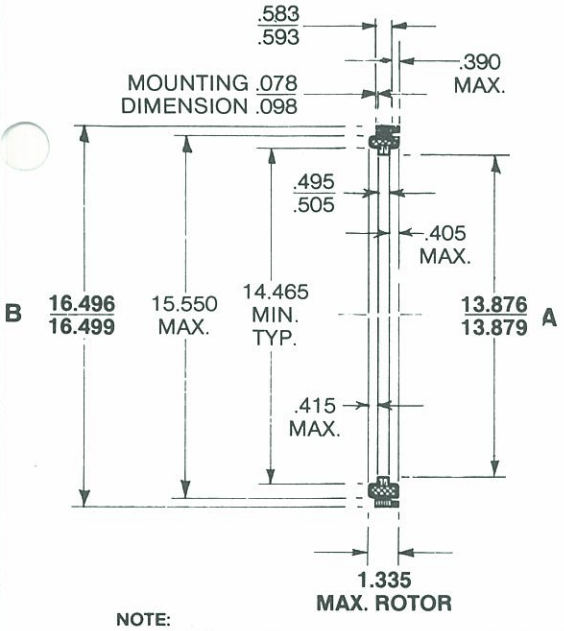
		Value	Units
Peak Torque Rating - T_P		14.4	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		256	WATTS
Motor Constant - K_M		0.9	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		13	RAD/S
Electrical Time Constant - τ_E		1.0	MS
Static Friction (Max.) - T_F		0.4	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.1	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.03	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.30	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		215	CYCLES/REV.
Number of Poles		48	
Rotor Inertia - J_M		0.032	LB.FT.S^2
Motor Weight		8.5	LB.

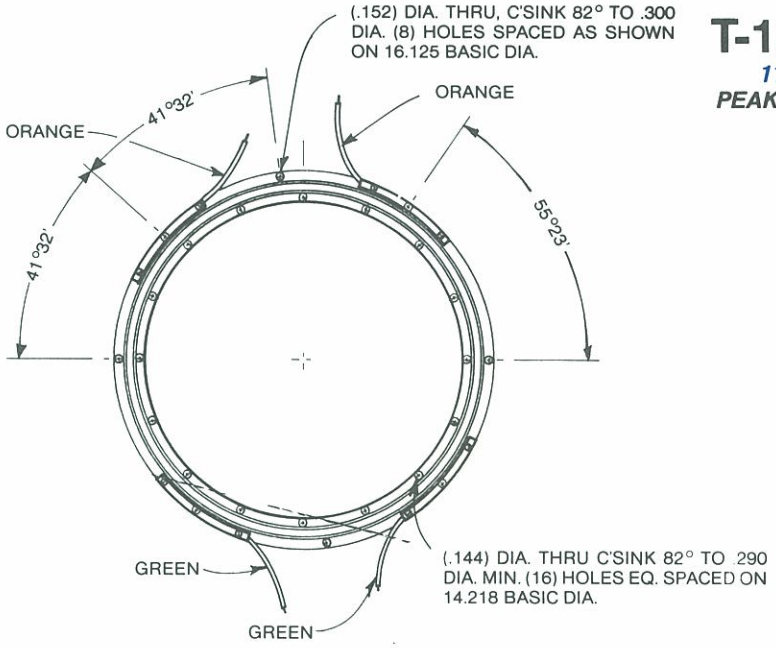
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	32.4	16.2	64.9	131			
Peak Current - I_P	AMPERES	Rated	7.91	17.4	3.96	1.98			
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	1.82	0.827	3.64	7.28			
Back EMF Constant - K_B	V per RAD/S	±10%	2.47	1.12	4.94	9.87			
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.1	0.930	16.4	65.6			
Inductance - L_M	mH	±30%	4.0	0.82	16	64			

T-15602

11 lb. ft.
PEAK TORQUE





NOTE:

1. — MOTOR SUPPLIED AS FIVE SEPARATE COMPONENTS: STATOR WITH ROTOR IN PLACE WITH MYLAR IN AIR GAP & (4) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEADS WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG TYPE "EE" TEFLON COATED PER MIL W-16878 48" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		11	LB FT.
Power Input, Stalled at T_P(25°C) - P_P		198	WATTS
Motor Constant - K_M		0.78	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		13.3	RAD/S
Electrical Time Constant - τ_E		2.2	MS
Static Friction (Max.) - T_F		0.25	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.83	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.01	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.25	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		235	CYCLES/REV.
Number of Poles		26	
Rotor Inertia - J_M		0.08	LB.FT.S^2
Motor Weight		13	LB.

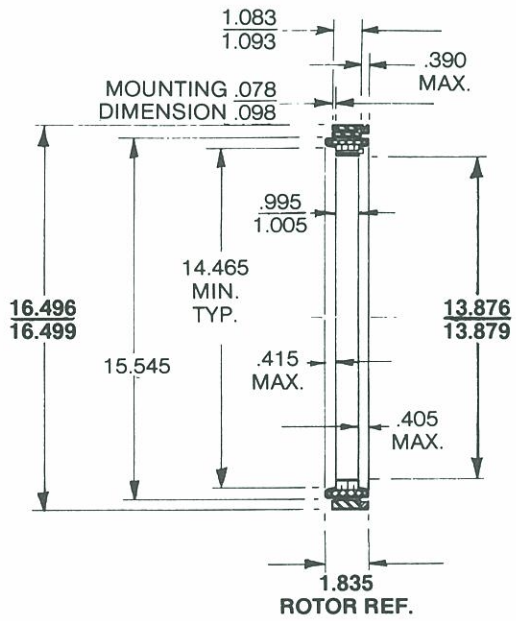
WINDING CONSTANTS — Winding Designation

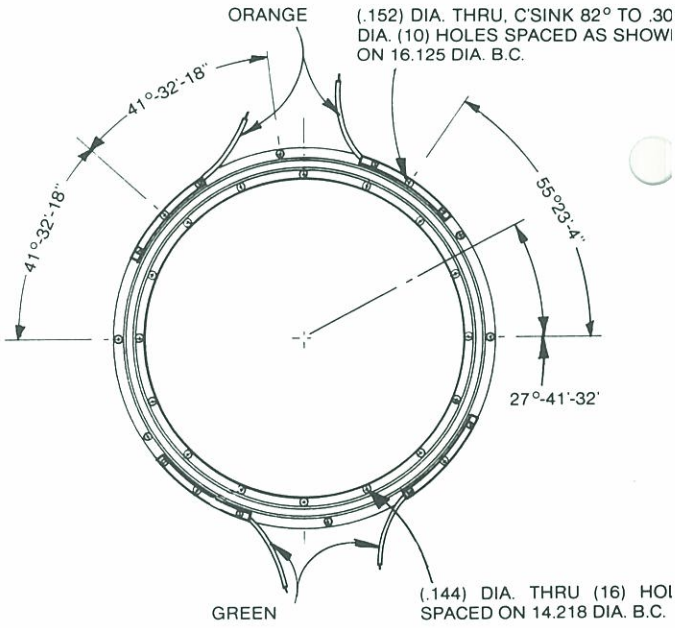
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	18.9	37.7	75.5	151			
Peak Current - I_P	AMPERES	Rated	10.5	5.24	2.62	1.31			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.05	2.10	4.20	8.40			
Back EMF Constant - K_B	V per RAD/S	±10%	1.42	2.85	5.69	11.4			
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.80	7.20	28.8	115			
Inductance - L_M	mH	±30%	4.0	16	64	260			

T-15603

30 lb. ft.

PEAK TORQUE





NOTE:

1. — MOTOR SUPPLIED AS FIVE SEPARATE COMPONENTS: STATOR WITH ROTOR IN PLACE WITH MYLAR IN AIR GAP & (4) BRUSH SEGMENT ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEADS WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#20 AWG TYPE "EE" TEFLON COATED
PER MIL W-16878, 48" MIN. LG.

SIZE CONSTANTS

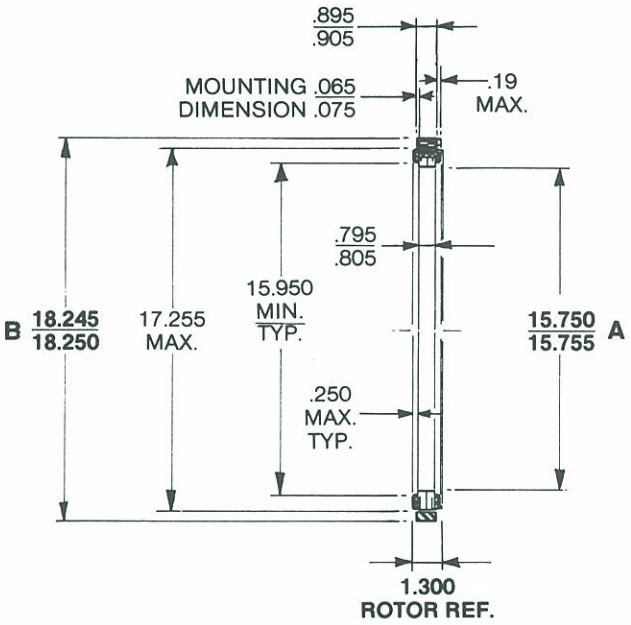
		Value	Units
Peak Torque Rating - T_P		30	LB FT.
Power Input, Stalled at T_P(25°C) - P_P		450	WATTS
Motor Constant - K_M		1.41	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		11	RAD/S
Electrical Time Constant - τ_E		3.6	MS
Static Friction (Max.) - T_F		0.35	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	2.72	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.02	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.22	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		235	CYCLES/REV.
Number of Poles		26	
Rotor Inertia - J_M		0.14	LB.FT.S^2
Motor Weight		22	LB.

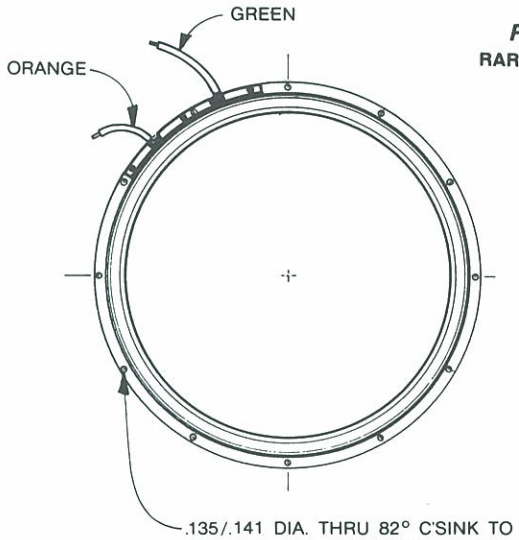
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	31.5	62.8	126	158	39.5		
Peak Current - I_P	AMPERES	Rated	14.3	7.14	3.57	2.86	11.1		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	2.1	4.20	8.40	10.5	2.70		
Back EMF Constant - K_B	V per RAD/S	±10%	2.85	5.69	11.4	14.2	3.66		
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.2	8.80	35.2	55.4	3.56		
Inductance - L_M	mH	±30%	8.0	32	130	200	13		

QT-17301

54.0 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





.135/.141 DIA. THRU 82° C'SINK TO .230 MIN. DIA. .156 C'DRILL (OPPOSITE SIDE) .50 DP. (12) HOLES EQ. SPACED ON 17.915 DIA. B.C.

NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH SEGMENT ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED PER MIL W-16878 36" MIN. LENGTH.

SIZE CONSTANTS

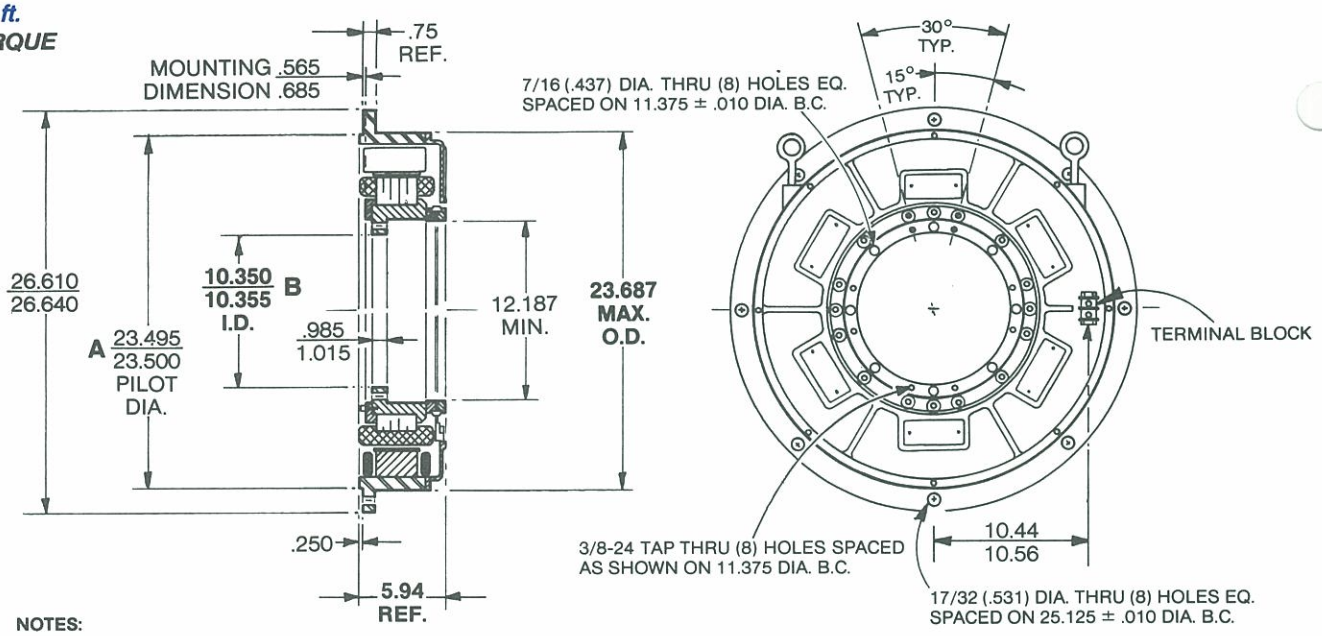
		Value	Units
Peak Torque Rating - T_P		54.0	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		386	WATTS
Motor Constant - K_M		2.75	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		5.27	RAD/S
Electrical Time Constant - τ_E		1.56	MS
Static Friction (Max.) - T_F		1.2	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	10.2	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.040	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.20	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		241	CYCLES/REV.
Number of Poles		48	
Rotor Inertia - J_M		0.130	LB.FT.S^2
Motor Weight		18	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	78.6	24.6					
Peak Current - I_P	AMPERES	Rated	4.91	15.4					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	11.0	3.52					
Back EMF Constant - K_B	V per RAD/S	±10%	14.9	4.77					
DC Resistance (25°C) - R_M	OHMS	±12.5%	16.0	1.60					
Inductance - L_M	mH	±30%	25	2.6					

T-18002

300 lb. ft.
PEAK TORQUE



NOTES:

1. — MOTOR TO BE SUPPLIED AS COMPLETE ASSEMBLY. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .010 (.020 T.I.R.) WHEN MOUNTED.
3. — TYPICAL BRUSH LIFE > 10^7 REVS.

SIZE CONSTANTS

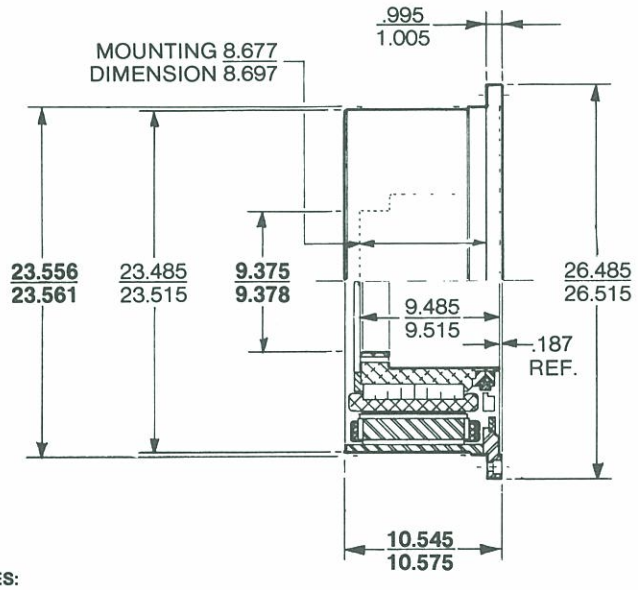
		Value	Units
Peak Torque Rating - T_P		300	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		1452	WATTS
Motor Constant - K_M		7.85	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		3.6	RAD/S
Electrical Time Constant - τ_E		20.0	MS
Static Friction (Max.) - T_F		3.0	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	83.6	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.5	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.13	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		235	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		1.40	LB.FT.S^2
Motor Weight		300	LB.

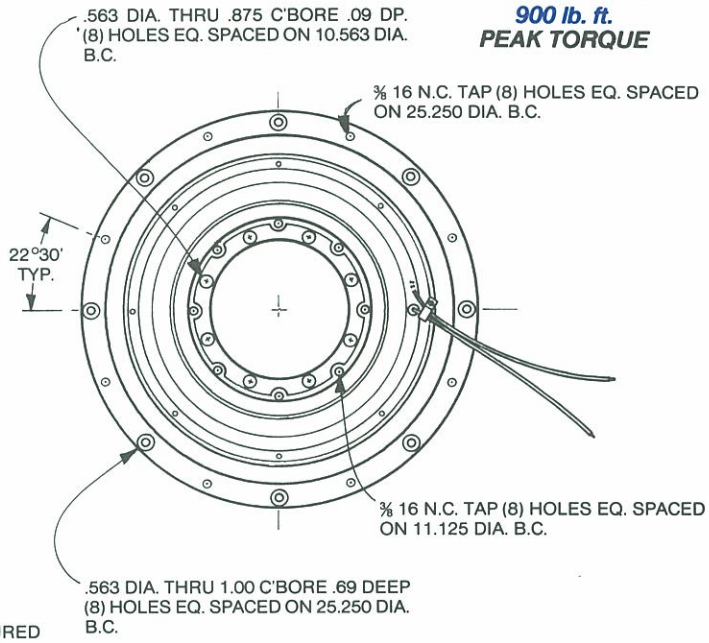
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	66.0		33.0	41.4	84.5	132	168
Peak Current - I_P	AMPERES	Rated	22.0		44.2	36.6	18.4	11.0	8.80
Torque Sensitivity - K_T	LB.FT./AMP	±10%	13.6		6.80	8.20	16.3	27.2	34.0
Back EMF Constant - K_B	V per RAD/S	±10%	18.4		9.20	11.0	22.1	36.9	46.1
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.00		0.750	1.13	4.60	12.0	19.0
Inductance - L_M	mH	±30%	60		15	22	88	240	380

T-18004

900 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SUPPLIED AS COMPLETE ASSEMBLY WITH ROTOR SECURED INSIDE STATOR. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENT: ROTOR AND STATOR TO BE CONCENTRIC WITHIN .005 (.010 T.I.R.) WHEN MOUNTED.
3. — TYPICAL BRUSH LIFE > 10^7 REVS.
4. — SPECIAL BRUSH MATERIAL FOR HIGH CURRENT OPERATION.

SIZE CONSTANTS

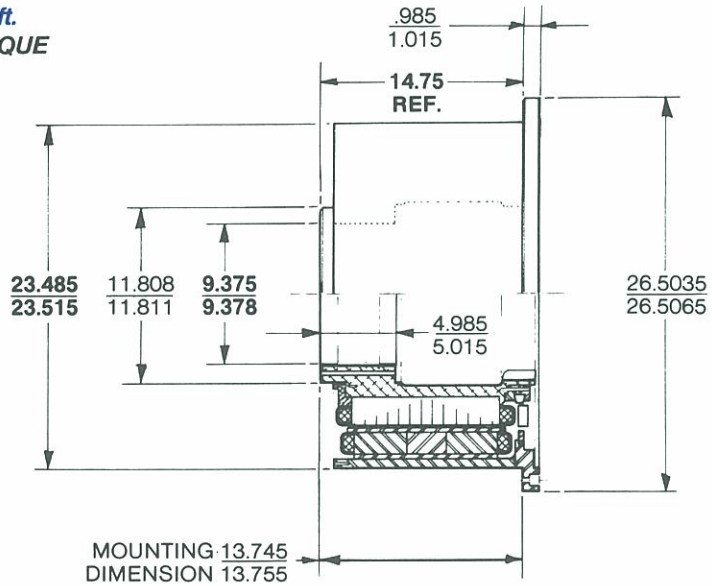
		Value	Units
Peak Torque Rating - T_P		900	LB.FT.
Power Input, Stalled at T_P (25°C) - P_P		3435	WATTS
Motor Constant - K_M		15.3	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		2.8	RAD/S
Electrical Time Constant - τ_E		25.0	MS
Static Friction (Max.) - T_F		4.0	LB.FT.
Viscous Damping Coefficients	Zero Impedance - F_0	319	LB.FT. PER RAD/S
	Infinite Impedance - F_I	0.20	LB.FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.12	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		235	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		3.10	LB.FT.S^2
Motor Weight		650	LB.

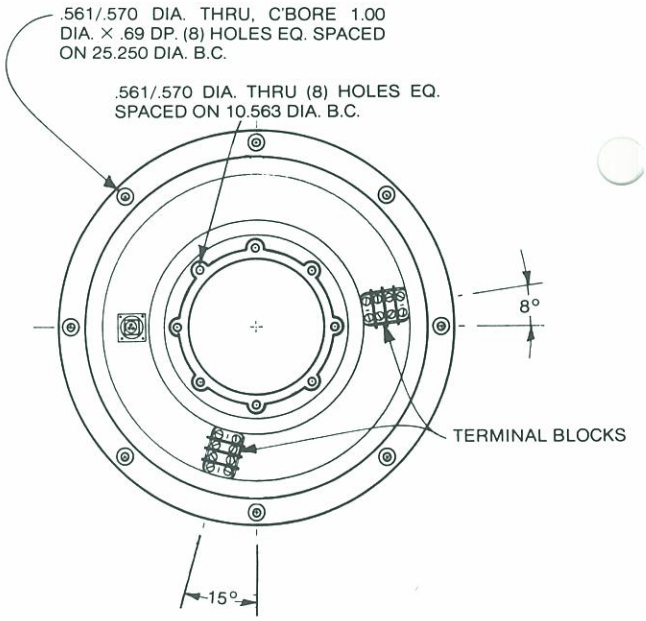
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	133	212	110	168	268	333	69.0
Peak Current - I_P	AMPERES	Rated	25.7	16.0	33.4	21.4	12.9	10.3	53.0
Torque Sensitivity - K_T	LB.FT./AMP	±10%	35.0	56.0	27.0	42.0	70.0	87.5	17.0
Back EMF Constant - K_B	V per RAD/S	±10%	47.5	76.1	36.7	57.1	95.1	119	23.0
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.20	13.2	3.30	7.85	20.6	32.8	1.3
Inductance - L_M	mH	±30%	130	330	83	190	520	810	33

T-18031

1600 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR TO BE SUPPLIED AS COMPLETE ASSEMBLY WITH ROTOR SECURED INSIDE STATOR. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENT: ROTOR AND STATOR TO BE CONCENTRIC WITHIN .005 (.010 T.I.R.) WHEN MOUNTED.
3. — TYPICAL BRUSH LIFE > 10^7 REVS.
4. — SPECIAL BRUSH MATERIAL FOR IMPROVED COMMUTATION AT HIGH POWER INPUT LEVELS.

SIZE CONSTANTS

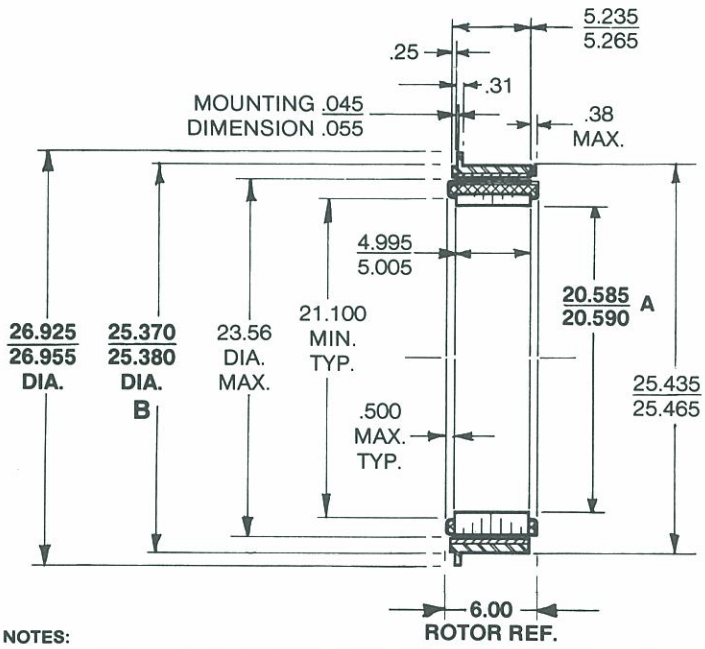
		Value	Units
Peak Torque Rating - T_P		1600	LB FT.
Power Input, Stalled at T_P(25°C) - P_P		5600	WATTS
Motor Constant - K_M		21.4	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		2.55	RAD/S
Electrical Time Constant - τ_E		23	MS
Static Friction (Max.) - T_F		6	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	630	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1.00	LB. FT. PER RAD/S
Maximum Winding Temperature		130	°C
Temperature Rise per Watt - TPR		0.08	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		235	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		4.2	LB.FT.S^2
Motor Weight		850	LB.

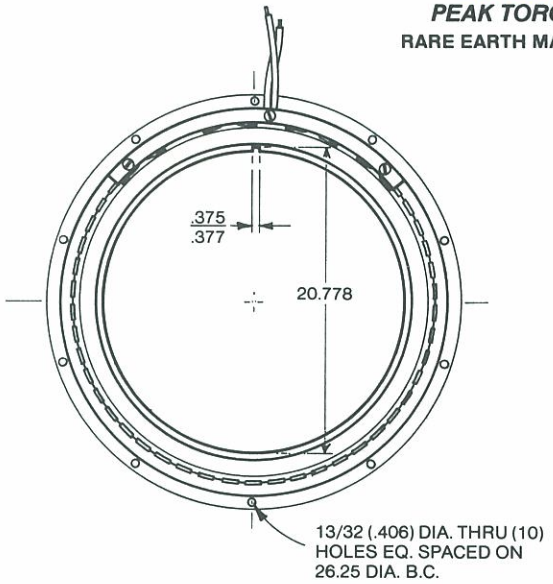
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	85	89.3	166	179			
Peak Current - I_P	AMPERES	Rated	65	81.2	40.6	36.1			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	24.6	19.7	39.4	44.3			
Back EMF Constant - K_B	V per RAD/S	±10%	33.4	26.7	53.4	60.1			
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.3	1.10	4.10	4.95			
Inductance - L_M	mH	±30%	30	19	76	97			

QT-23502

700 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR SHIPPED AS (2) SEPARATE COMPONENTS: ROTOR-STATOR ASSEMBLY WITH SHIPPING CLAMP, MYLAR IN AIR GAP AND BRUSH SEGMENT ASSEMBLY.
2. — MOUNTING REQUIREMENT: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .005(.010 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#18 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 12" MIN. LG.

SIZE CONSTANTS

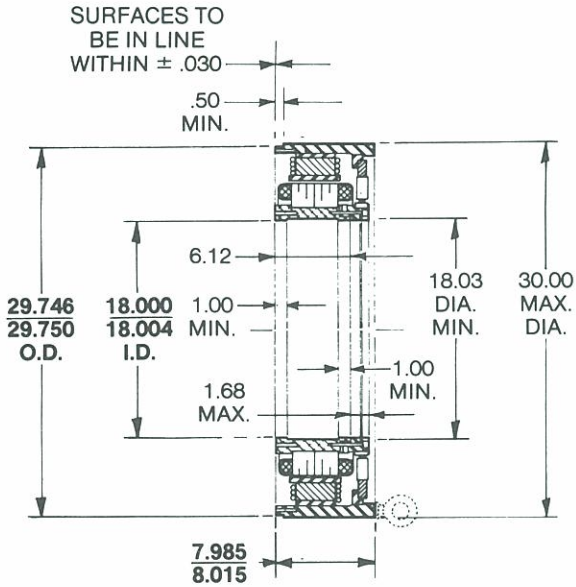
		Value	Units
Peak Torque Rating - T_P		700	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		1310	WATTS
Motor Constant - K_M		19	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		1.4	RAD/S
Electrical Time Constant - τ_E		4.8	MS
Static Friction (Max.) - T_F		7.0	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	510	LB. FT. PER RAD/S
	Infinite Impedance - F_I	2.0	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		.13	°C/WATT
Ripple Torque (Average to Peak) - T_R		4.0	PERCENT
Ripple Frequency - (Fundamental)		326	CYCLES/REV.
Number of Poles		50	
Rotor Inertia - J_M		2.9	LB.FT.S^2
Motor Weight		230	LB.

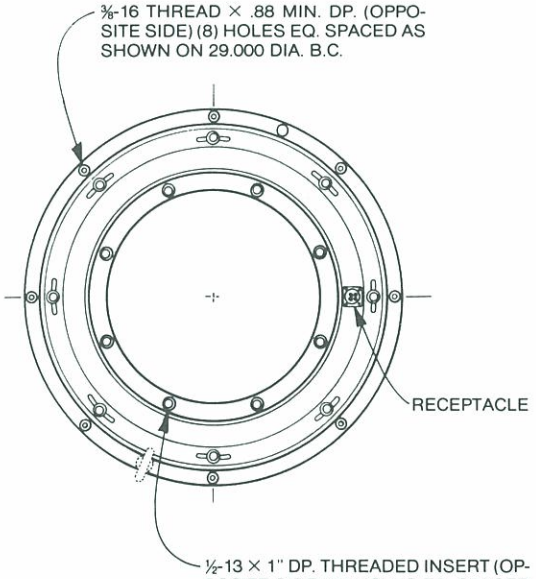
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	52.5						
Peak Current - I_P	AMPERES	Rated	25.0						
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	28.0						
Back EMF Constant - K_B	V per RAD/S	±10%	38.0						
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.10						
Inductance - L_M	mH	±30%	10						

T-24005

1000 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS COMPLETE ASSEMBLY WITH ROTOR SECURED INSIDE STATOR BY SHIPPING CLAMPS. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: ROTOR AND STATOR TO BE CONCENTRIC WITHIN .020 (.040 T.I.R.) WHEN MOUNTED.
3. — TYPICAL BRUSH LIFE > 10^7 REVS.
4. — SPECIAL BRUSH MATERIAL FOR IMPROVED COMMUTATION.

SIZE CONSTANTS

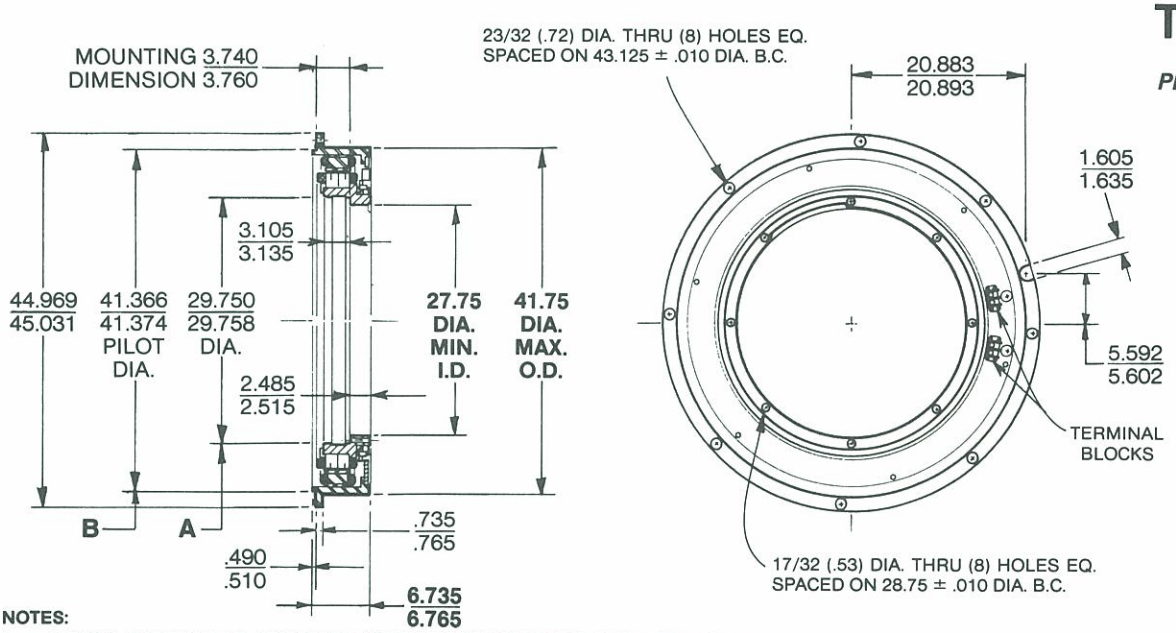
		Value	Units
Peak Torque Rating - T_P		1000	LB FT.
Power Input, Stalled at T_P(25°C) - P_P		7000	WATTS
Motor Constant - K_M		12	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		5	RAD/S
Electrical Time Constant - τ_E		12.5	MS
Static Friction (Max.) - T_F		5	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	194	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.5	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.08	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		320	CYCLES/REV.
Number of Poles		22	
Rotor Inertia - J_M		8	LB.FT.S^2
Motor Weight		730	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	158	123	200	224			
Peak Current - I_P	AMPERES	Rated	44	58.7	35.2	32.0			
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	22.7	17.0	28.4	31.2			
Back EMF Constant - K_B	V per RAD/S	±10%	30.8	23.0	38.5	42.3			
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.60	2.10	5.70	7.00			
Inductance - L_M	mH	±30%	45	25	70	85			

T-36010

1500 lb. ft.
PEAK TORQUE



NOTES:

1. — MOTOR SUPPLIED AS COMPLETE ASSEMBLY WITH ROTOR SECURED INSIDE STATOR BY SHIPPING STRAPS. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITH-.005 (.010 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO (2) TERMINALS "A" WITH RESPECT TO (2) TERMINALS "B", ROTATION SHALL BE C.C.W. FACING BRUSH RING END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — SPECIAL BRUSH MATERIAL TO ALLOW FOR HIGH VOLTAGE OPERATION.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		1500	LB FT.
Power Input, Stalled at T_P(25°C) - P_P		4900	WATTS
Motor Constant - K_M		21	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		2.4	RAD/S
Electrical Time Constant - τ_E		14	MS
Static Friction (Max.) - T_F		10	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	617	LB. FT. PER RAD/S
	Infinite Impedance - F_I	5	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.07	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		469	CYCLES/REV.
Number of Poles		36	
Rotor Inertia - J_M		15	LB.FT.S^2
Motor Weight		820	LB.

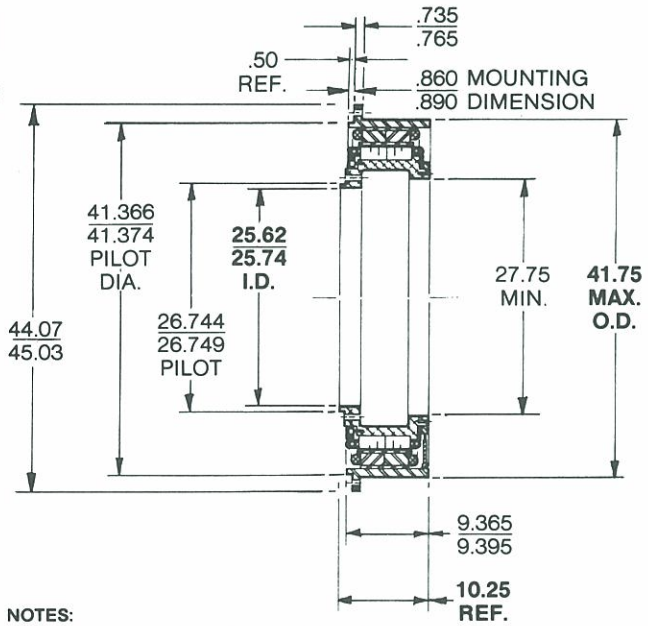
WINDING CONSTANTS

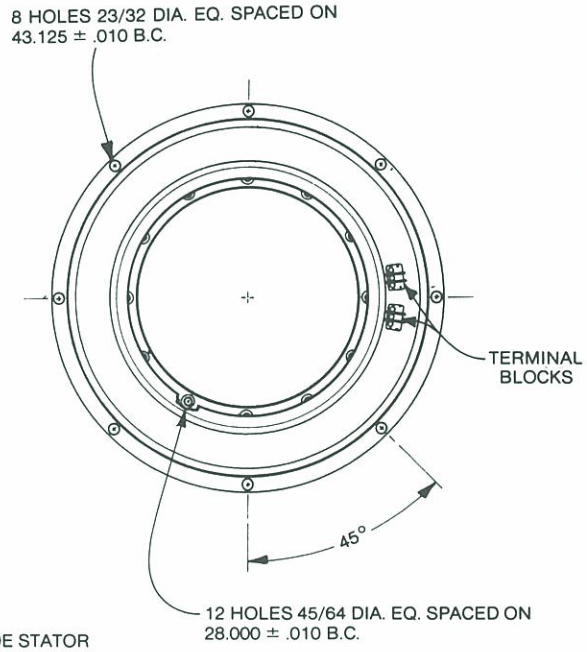
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	56.7						
Peak Current - I_P	AMPERES	Rated	87.2						
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	17.2						
Back EMF Constant - K_B	V per RAD/S	±10%	23.3						
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.65						
Inductance - L_M	mH	±30%	9.0						

T-36001

3000 lb. ft.
PEAK TORQUE





NOTES:

1. — UNIT SHIPPED AS COMPLETE ASSEMBLY WITH ROTOR SECURED INSIDE STATOR BY SHIPPING CLAMP. **CAUTION:** DO NOT REMOVE ROTOR FROM STATOR AT ANY TIME.
2. — MOUNTING REQUIREMENT: ROTOR AND STATOR TO BE CONCENTRIC WITHIN .025(.050 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE VOLTAGE APPLIED TO TERMINAL "A" WITH RESPECT TO TERMINAL "B" THE ROTATION OF THE ARMATURE SHALL BE C.C.W. FACING THE BRUSH END.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.
5. — SPECIAL BRUSH MATERIAL FOR HIGH VOLTAGE OPERATION.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		3000	LB.FT.
Power Input, Stalled at T_P(25°C) - P_P		6300	WATTS
Motor Constant - K_M		37.8	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		1.6	RAD/S
Electrical Time Constant - τ_E		22	MS
Static Friction (Max.) - T_F		12	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1932	LB. FT. PER RAD/S
	Infinite Impedance - F_I	10	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.04	°C/WATT
Ripple Torque (Average to Peak) - T_R		2	PERCENT
Ripple Frequency - (Fundamental)		469	CYCLES/REV.
Number of Poles		36	
Rotor Inertia - J_M		26	LB.FT.S^2
Motor Weight		1360	LB.

WINDING CONSTANTS — Winding Designation

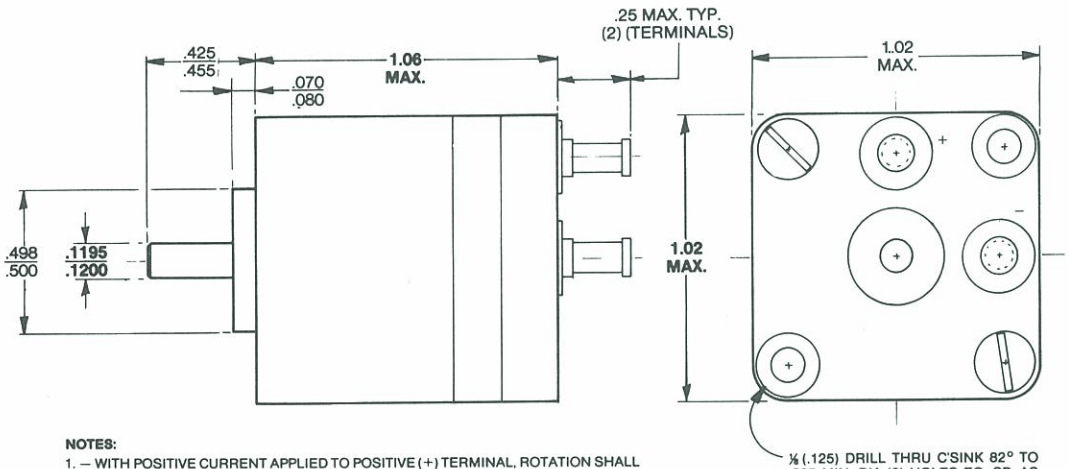
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	229.6	144.4	183.2	288.6	120.1	123.9	78.3
Peak Current - I_P	AMPERES	Rated	27.5	43.5	34.9	21.7	52.2	65.2	87.0
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	109	69.0	86.0	138	57.5	46.0	34.5
Back EMF Constant - K_B	V per RAD/S	±10%	148	93.6	116.6	187	78.0	62.4	46.8
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.35	3.32	5.25	13.3	2.3	1.9	0.90
Inductance - L_M	mH	±30%	180	72	110	290	50	32	18

Housed Torquer Selection Guide (oz. in. & lb. ft.)

MODEL NUMBER	Peak Torque @ Stall		Motor Constant	No Load Speed	Electrical Time Constant	Friction	Rotor Inertia	Physical Dimensions		Weight
	T_P oz. in.	P_P watts	K_M oz. in./$\sqrt{watt}$	ω_{NL} rad/sec	τ_e msec.	T_f oz. in.	J_M oz. in. sec.^{2}	OD in.	Length in.	oz.
T-0716	7	40	1.1	814	0.36	0.35	1.3×10^{-4}	1.02	1.06	2.9
QT-0701	11	60	1.4	770	0.28	0.35	1.3×10^{-4}	1.02	1.06	2.9
QT-0714	20	132	1.74	933	0.31	0.35	1.6×10^{-4}	1.02	1.19	3.1
T-1397	20	60	2.58	400	0.34	1.0	9.5×10^{-4}	2.10	1.09	8.8
NT-2116	35	41	5.45	160	0.60	1.1	6.4×10^{-3}	3.02	1.32	19
T-1341	40	98	4.05	340	0.34	1.0	1.6×10^{-3}	2.22	1.22	7.6
NT-2117	60	34	10.3	80	1.0	2.3	1.2×10^{-2}	3.02	1.48	25
NT-1387	90	256	5.65	400	0.41	4.0	3.5×10^{-3}	2.09	2.50	16.1
NT-2158	120	50	17.0	57	1.5	3.5	1.95×10^{-2}	3.02	1.98	32
QT-1413	157	346	8.45	312	0.28	4.42	4.4×10^{-3}	2.22	2.48	32
T-2998	163	77	18.6	67	1.6	3.26	4.6×10^{-2}	3.95	1.75	40
	lb. ft.	watts	lb. ft./$\sqrt{watt}$	rad/sec	msec.	lb. ft.	lb. ft. sec^2	in.	in.	lbs.
QT-2606	1.5	25	0.30	12.2	2.2	0.12	5.0×10^{-4}	3.25	3.50	5
NT-2171	1.77	440	0.08	183	2.0	0.05	1.3×10^{-4}	4.02	4.50	10
T-4055	1.8	91	0.19	37	1.9	0.04	8.7×10^{-4}	5.39	1.97	4
T-4054	2.7	147	0.22	40	2.0	0.05	1.1×10^{-3}	5.52	2.70	4
T-5144	2.7	85	0.29	22	2.6	0.05	2.0×10^{-3}	6.44	1.84	7
T-5721	7	260	0.4	27	3.0	0.1	5.4×10^{-3}	8.31	2.78	10.5
T-7208	11	335	0.60	22.5	3.2	0.15	1.0×10^{-2}	9.65	3.00	10.3
T-7215	22	530	0.96	15	5.7	0.25	1.9×10^{-2}	9.65	3.75	35
T-8005	64	720	2.38	8	13.3	0.65	6.2×10^{-2}	10.75	7.00	100
T-10081	100	1070	3.06	7.5	6.7	1.2	0.29	13.00	7.97	130

T-0716

7.0 oz. in.
PEAK TORQUE



NOTES:

1. — WITH POSITIVE CURRENT APPLIED TO POSITIVE (+) TERMINAL, ROTATION SHALL BE C.W. WHEN VIEWED FROM SHAFT END.
2. — MAXIMUM SOLDERING TEMPERATURE FOR ATTACHING LEADS TO TERMINALS 400°F.
3. — GOLD PLATED COMMUTATOR.
4. — UNIT HAS METAL END BELLS.

SIZE CONSTANTS

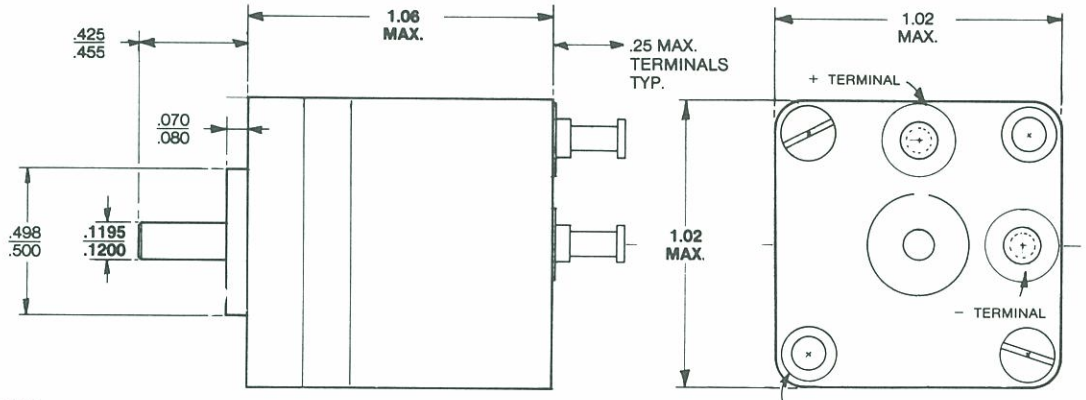
		Value	Units
Peak Torque Rating - T_P		7.0	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		40.1	WATTS
Motor Constant - K_M		1.10	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		814	RAD/S
Electrical Time Constant - τ_E		0.359	MS
Static Friction (Max.) - T_F		0.35	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	8.56×10^{-3}	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	3.90×10^{-4}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		12	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.30×10^{-4}	OZ.IN.S^2
Motor Weight		2.93	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	25.9	20.5	13.0	38.9	30.0		
Peak Current - I_P	AMPERES	Rated	1.55	1.95	3.12	1.06	1.25		
Torque Sensitivity - K_T	OZ. IN./AMP.	±10%	4.50	3.57	2.24	6.60	5.60		
Back EMF Constant - K_B	V per RAD/S	±10%	0.031	0.025	0.016	0.047	0.040		
DC Resistance (25°C) - R_M	OHMS	±12.5%	16.7	10.5	4.18	36.7	24.0		
Inductance - L_M	mH	±30%	6.0	4.0	1.6	13	9.5		

QT-0701

11 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:
1. – WITH POSITIVE CURRENT APPLIED TO POSITIVE (+) TERMINAL ROTATION SHALL BE C.W. WHEN VIEWED FROM THE SHAFT END.
2. – MAXIMUM SOLDERING TEMPERATURE FOR ATTACHING LEADS TO TERMINALS = 400°F.
3. – GOLD PLATED COMMUTATOR.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		11	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		60	WATTS
Motor Constant - K_M		1.4	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		770	RAD/S
Electrical Time Constant - τ_E		0.28	MS
Static Friction (Max.) - T_F		0.35	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.014	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	4.6×10^{-4}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		12	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.3×10^{-4}	OZ.IN.S^2
Motor Weight		2.9	OZ.

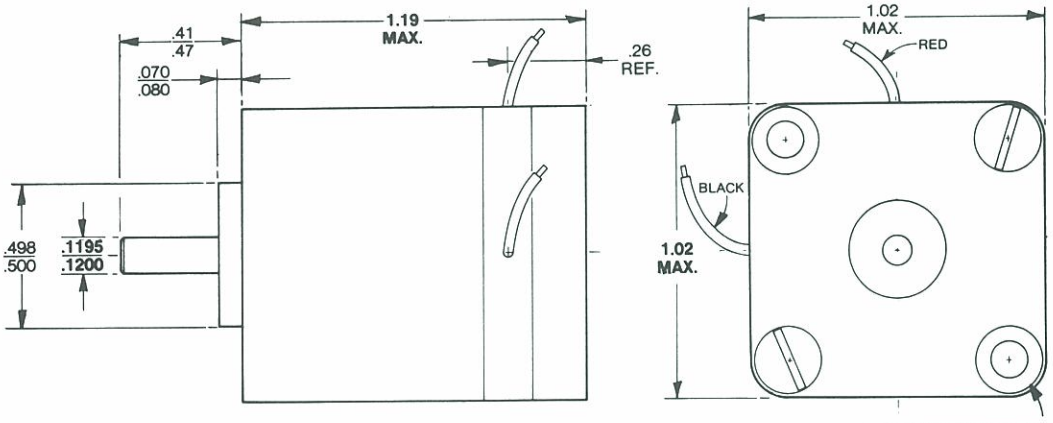
WINDING CONSTANTS

Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	41.2	32.6	25.9	20.5	16.2	51.6	12.9
Peak Current - I_P	AMPERES	Rated	1.45	1.82	2.31	2.89	3.67	1.15	4.68
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	7.60	6.06	4.77	3.80	3.00	9.54	2.35
Back EMF Constant - K_B	V per RAD/S	±10%	.054	.043	.034	.027	.021	.067	.017
DC Resistance (25°C) - R_M	OHMS	±12.5%	28.4	17.9	11.2	7.10	4.42	44.9	2.75
Inductance - L_M	mH	±30%	8.0	5.1	3.2	2.0	1.2	13	0.74

QT-0714

20.0 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



⅛ (.125) DIA. THRU C'SINK 82° TO .235 MIN. DIA. (2) HOLES EQ. SPACED ON 1.062 DIA. B.C.

NOTE:
WITH POSITIVE CURRENT APPLIED TO BLACK LEAD ROTATION SHALL BE C.W. WHEN VIEWED FROM SHAFT END.

LEADS:
#26 AWG TYPE "E" TEFLON COATED LEAD WIRE 12" MIN LENGTH.

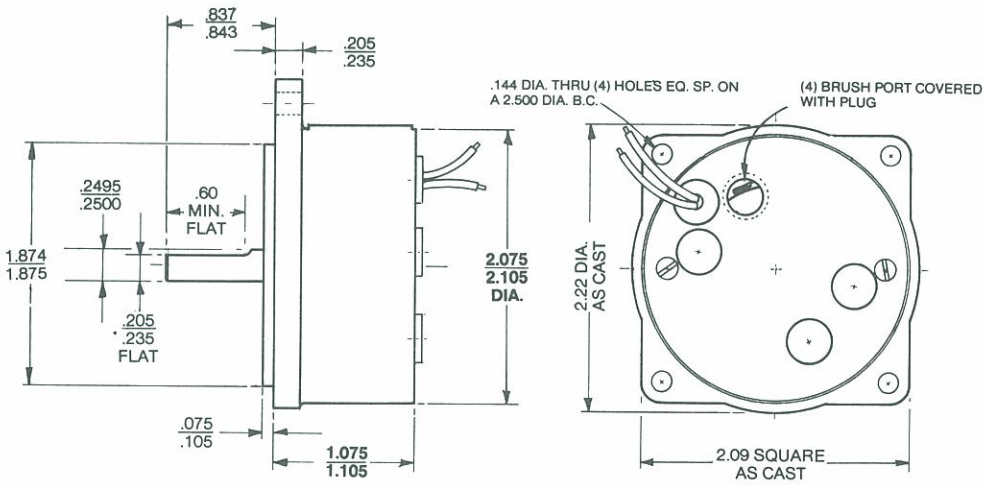
SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		20.0	OZ. IN.
Power Input; Stalled at T_P(25°C) - P_P		132	WATTS
Motor Constant - K_M		1.74	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		933	RAD/S
Electrical Time Constant - τ_E		0.312	MS
Static Friction (Max.) - T_F		0.35	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.021	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	6.0×10^{-4}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		12	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.6×10^{-4}	OZ.IN.S^2
Motor Weight		3.1	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	20.8	26.2	65.8	41.6	52.4		
Peak Current - I_P	AMPERES	Rated	6.35	4.98	2.00	3.17	2.52		
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	3.15	4.02	10.0	6.30	7.93		
Back EMF Constant - K_B	V per RAD/S	±10%	0.022	0.028	0.071	0.045	0.056		
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.27	5.26	32.9	13.1	20.8		
Inductance - L_M	mH	±30%	1.02	1.66	10	4.1	6.5		

T-1397
20 oz. in.
PEAK TORQUE



NOTE:
1. – WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.

LEADS:
(2) LEADS #28 AWG TYPE "E" TEFLON COATED 12" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		20	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		60	WATTS
Motor Constant - K_M		2.58	OZ IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		400	RAD/S
Electrical Time Constant - τ_E		0.34	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.049	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	4.6×10^{-3}	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		15	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		9.5×10^{-4}	OZ.IN.S^2
Motor Weight		8.8	OZ.

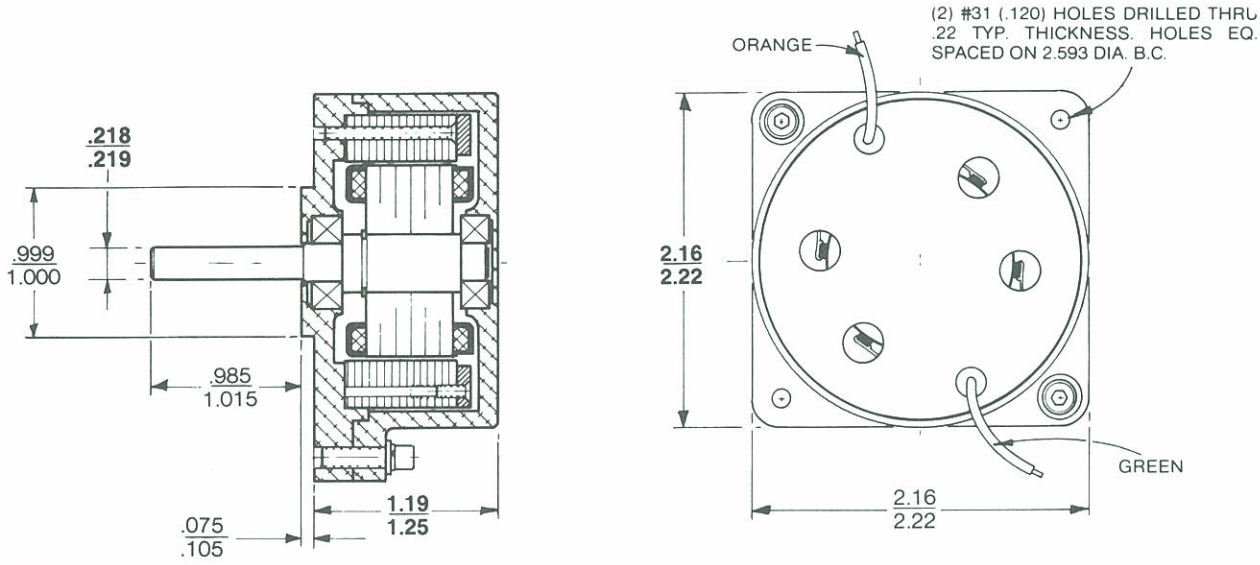
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	31.0	49.4	26.0	40.6	13.0		
Peak Current - I_P	AMPERES	Rated	1.8	1.2	2.3	1.5	4.8		
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	11.0	16.5	8.7	13.7	4.2		
Back EMF Constant - K_B	V per RAD/S	±10%	0.078	0.116	0.061	0.097	0.0296		
DC Resistance (25°C) - R_M	OHMS	±12.5%	17.2	41.2	11.3	27.1	2.7		
Inductance - L_M	mH	±30%	6.0	13.0	4.0	10.0	0.90		

T-1341

40 oz. in.

PEAK TORQUE



NOTES:

1. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, ROTATION SHALL BE C.C.W. FACING LEAD END.

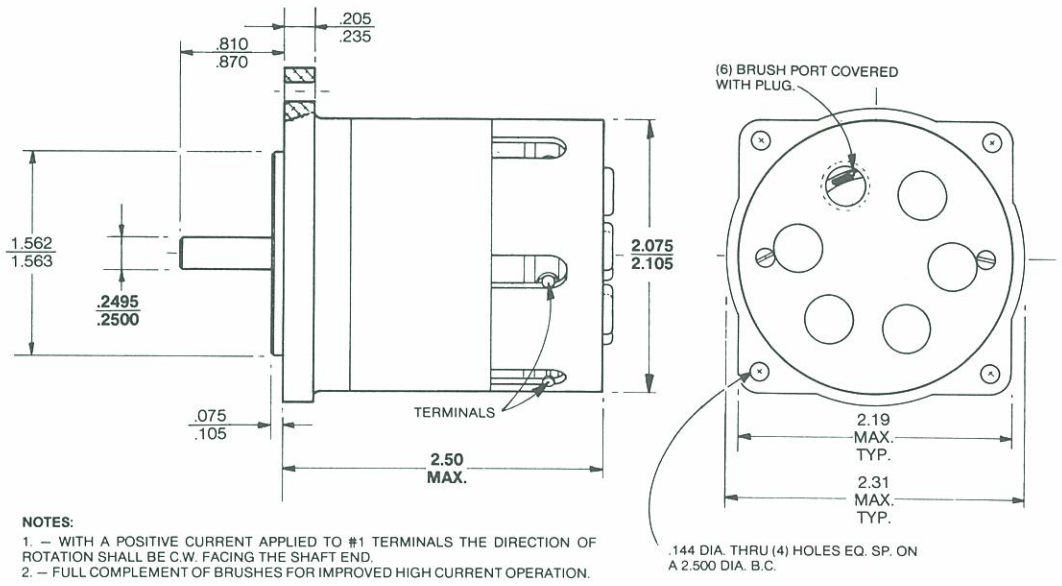
LEADS:
#28 FLEXIBLE WIRE TYPE "E" TEFLON COATED. (2) REQ'D, 10" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		40	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		98	WATTS
Motor Constant - K_M		4.05	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		340	RAD/S
Electrical Time Constant - τ_E		0.34	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.12	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.007	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		13.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		1.6×10^{-3}	OZ.IN.S^2
Motor Weight		7.6	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	12.8	28.5	23.4				
Peak Current - I_P	AMPERES	Rated	7.6	3.31	4.04				
Torque Sensitivity - K_T	OZ. IN./AMP	±10%	5.24	12.1	9.9				
Back EMF Constant - K_B	V per RAD/S	±10%	0.037	0.086	0.07				
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.67	8.9	5.8				
Inductance - L_M	mH	±30%	0.5	3.0	2.0				



NOTES:
1. — WITH A POSITIVE CURRENT APPLIED TO #1 TERMINALS THE DIRECTION OF ROTATION SHALL BE C.W. FACING THE SHAFT END.
2. — FULL COMPLEMENT OF BRUSHES FOR IMPROVED HIGH CURRENT OPERATION.

SIZE CONSTANTS

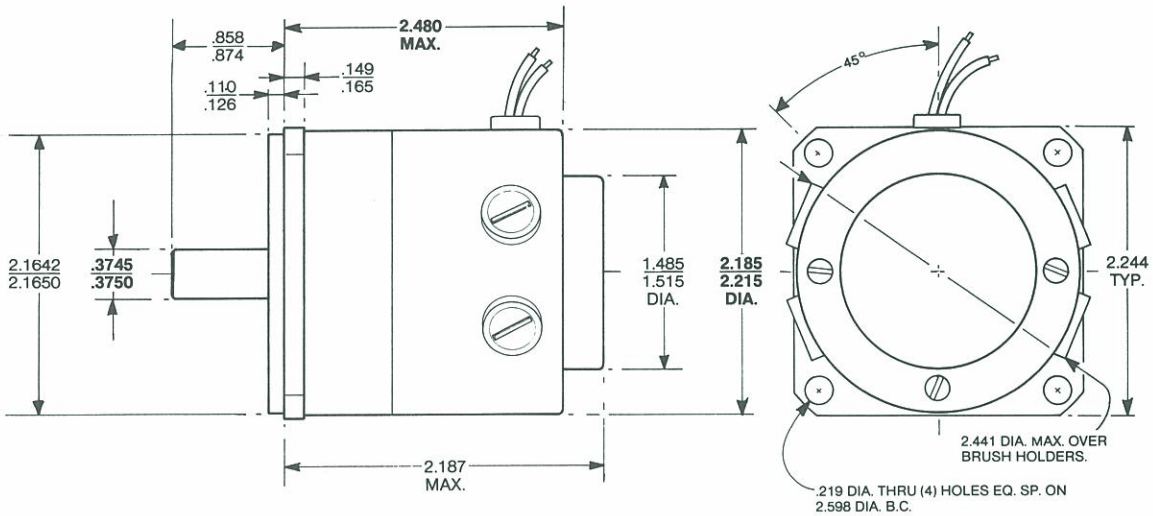
		Value	Units
Peak Torque Rating - T_P		90	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		256	WATTS
Motor Constant - K_M		5.65	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		400	RAD/S
Electrical Time Constant - τ_E		0.411	MS
Static Friction (Max.) - T_F		4.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.226	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.019	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		9	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		6	
Rotor Inertia - J_M		3.50×10^{-3}	OZ.IN.S^2
Motor Weight		16.1	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	22.0						
Peak Current - I_P	AMPERES	Rated	11.6						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	7.80						
Back EMF Constant - K_B	V PER RAD/S	±10%	0.0551						
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.90						
Inductance - L_M	mH	±30%	0.78						

QT-1413

0.817 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS



NOTE:
WITH A POSITIVE CURRENT APPLIED TO RED LEAD WITH RESPECT TO BLUE LEAD, A C.W. ROTATION SHALL BE VIEWED FROM SHAFT END.

LEADS:
#26 AWG TYPE "E" TEFLON COATED, 12" MIN. LENGTH.

SIZE CONSTANTS

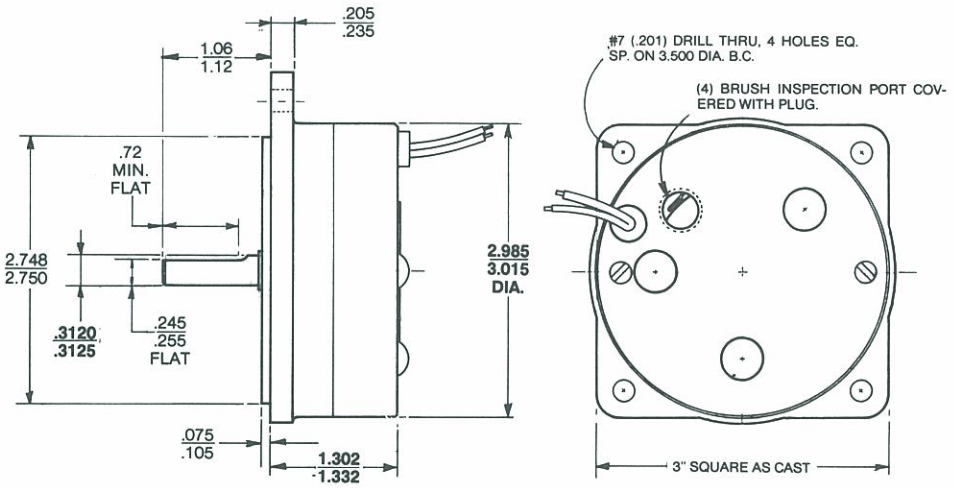
		Value	Units
Peak Torque Rating - T_P		0.817	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		346	WATTS
Motor Constant - K_M		0.044	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		312	RAD/S
Electrical Time Constant - τ_E		0.278	MS
Static Friction (Max.) - T_F		0.023	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	2.62×10^{-3}	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1.00×10^{-4}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		8	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		2.30×10^{-5}	LB.FT.S^2
Motor Weight		2	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	70.6						
Peak Current - I_P	AMPERES	Rated	4.90						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.167						
Back EMF Constant - K_B	V PER RAD/S	±10%	0.226						
DC Resistance (25°C) - R_M	OHMS	±12.5%	14.4						
Inductance - L_M	mH	±30%	4.0						

NT-2116

35 oz. in.
PEAK TORQUE



NOTE:
1. – WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, ROTATION SHALL BE C.C.W. FACING THE BRUSH END.

LEADS:
#22 AWG TYPE "E" TEFLON COATED 12" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		35	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		41	WATTS
Motor Constant - K_M		5.45	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		160	RAD/S
Electrical Time Constant - τ_E		0.60	MS
Static Friction (Max.) - T_F		1.1	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.22	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	3.6×10^{-4}	OZ.IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		7.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		6.4×10^{-3}	OZ.IN.S^2
Motor Weight		19	OZ.

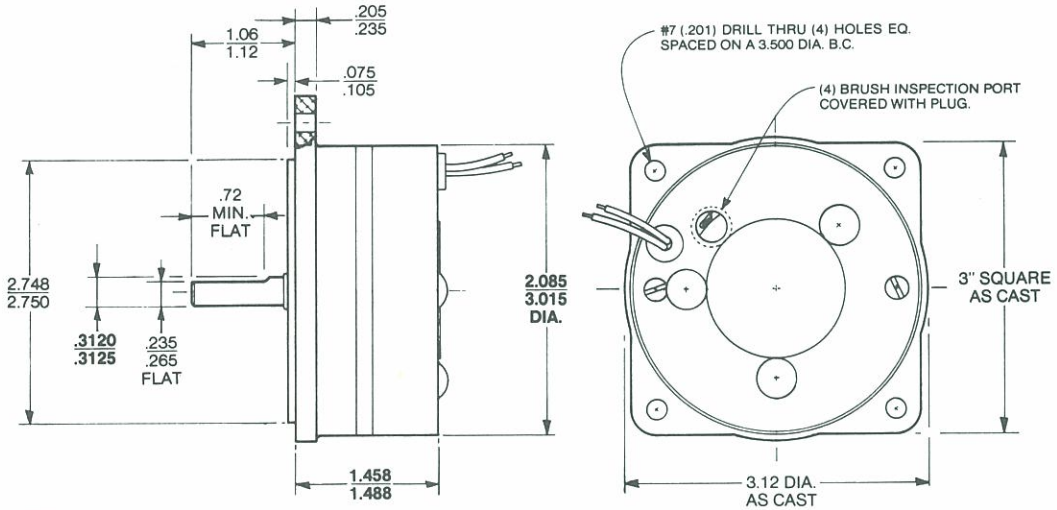
WINDING CONSTANTS

Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	18.9						
Peak Current - I_P	AMPERES	Rated	2.0						
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	17.5						
Back EMF Constant - K_B	V per RAD/S	±10%	0.12						
DC Resistance (25°C) - R_M	OHMS	±12.5%	9.5						
Inductance - L_M	mH	±30%	6.0						

NT-2117

60 oz. in.
PEAK TORQUE



NOTES:
1. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING THE BRUSH END.
2. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED, 12" MIN. LENGTH.

SIZE CONSTANTS

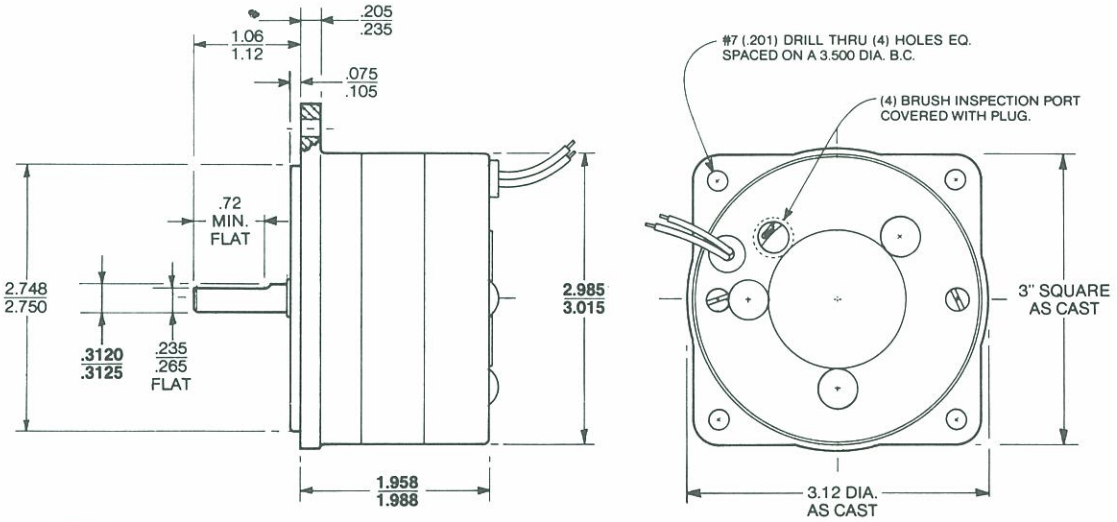
		Value	Units
Peak Torque Rating - T_P		60	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		34	WATTS
Motor Constant - K_M		10.3	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		80	RAD/S
Electrical Time Constant - τ_E		1.0	MS
Static Friction (Max.) - T_F		2.3	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.75	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.04	OZ.IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		7.8	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		0.012	OZ.IN.S^2
Motor Weight		25	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	10.6	25.0	49.9	16.8			
Peak Current - I_P	AMPERES	Rated	3.2	1.25	0.61	2.0			
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	18.7	46.8	98	30.5			
Back EMF Constant - K_B	V per RAD/S	±10%	0.13	0.33	0.69	0.22			
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.3	20.0	81.5	8.4			
Inductance - L_M	mH	±30%	3.2	20	85	8.0			

NT-2158

120 oz. in.
PEAK TORQUE



NOTES:
1. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING THE BRUSH END.
2. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED, 12" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		120	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		50	WATTS
Motor Constant - K_M		17.0	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		57	RAD/S
Electrical Time Constant - τ_E		1.5	MS
Static Friction (Max.) - T_F		3.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	2.2	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.08	OZ. IN. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		5.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		0.0195	OZ.IN.S^2
Motor Weight		32	OZ.

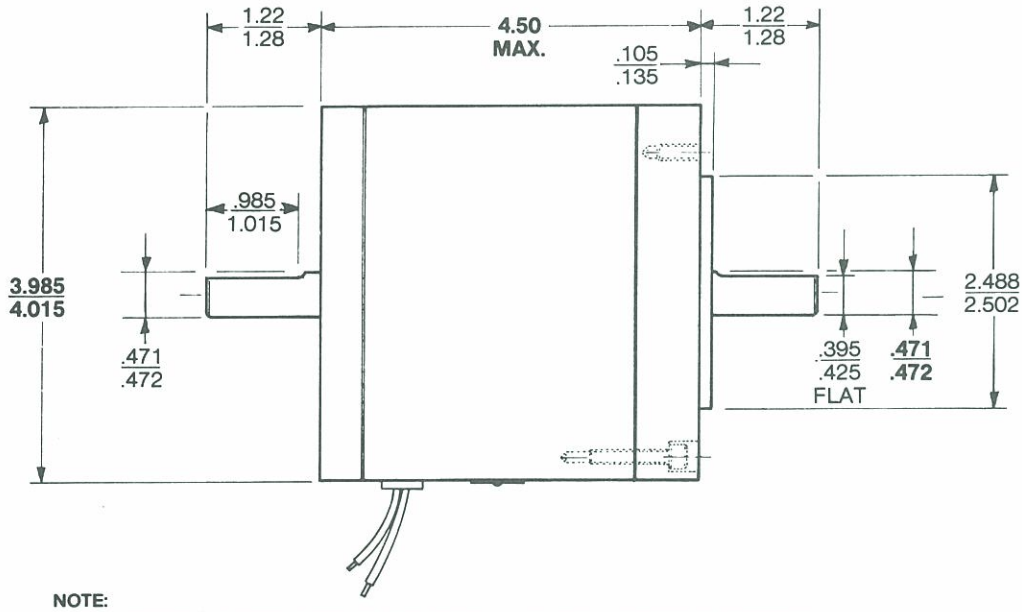
WINDING CONSTANTS — Winding Designation

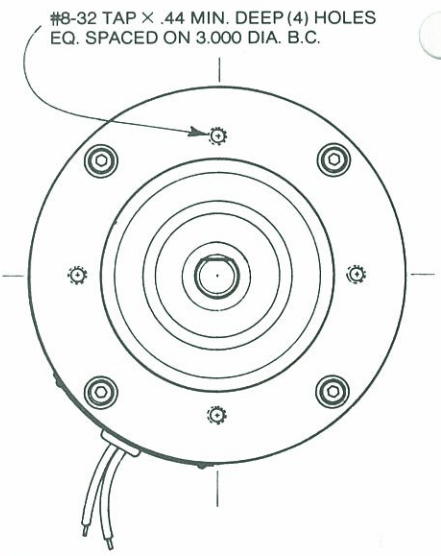
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	22.9	28.9	18.2				
Peak Current - I_P	AMPERES	Rated	2.1	1.7	2.67				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	57.2	70.8	44.9				
Back EMF Constant - K_B	V per RAD/S	±10%	0.404	0.50	0.317				
DC Resistance (25°C) - R_M	OHMS	±12.5%	10.9	17.0	6.80				
Inductance - L_M	mH	±30%	17.0	26.0	10				

NT-2171

340 oz. in.
PEAK TORQUE

SPECIAL MAGNET FOR RESISTANCE TO TORQUE SENSITIVITY DEGRADATION AT HIGH POWER INPUT LEVELS.





NOTE:
WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.

LEADS:
#20 AWG TYPE "EE" TEFLON COATED 12" MIN. LENGTH.

Peak Torque Rating - T_P		340	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		440	WATTS
Motor Constant - K_M		16.2	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		183	RAD/S
Electrical Time Constant - τ_E		2.0	MS
Static Friction (Max.) - T_F		9.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.85	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.033	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.025	OZ.IN.S^2
Motor Weight		160	OZ.

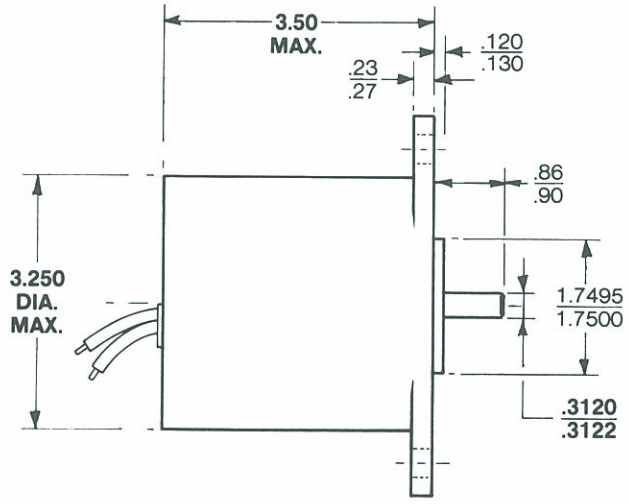
WINDING CONSTANTS

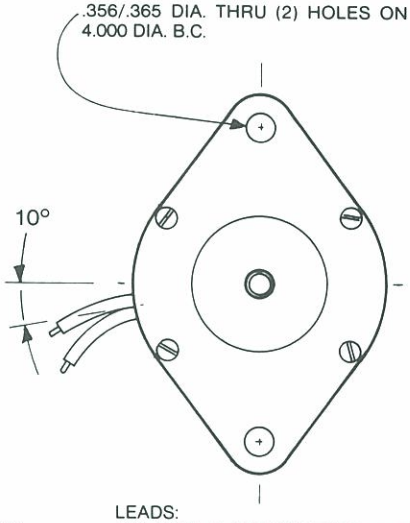
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	22.0						
Peak Current - I_P	AMPERES	Rated	20.0						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	17.0						
Back EMF Constant - K_B	V per RAD/S	±10%	0.12						
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.1						
Inductance - L_M	mH	±30%	2.25						

QT-2606

1.50 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTE:
1. —WITH A POSITIVE CURRENT APPLIED TO RED LEAD, ROTATION SHALL BE C.C.W. FACING SHAFT END.
2. — GOLD PLATED COMMUTATOR.

LEADS:
#24 AWG 19-STRAND TYPE "E" TEFLON COATED PER MIL W-16878 12" MIN. LG.

SIZE CONSTANTS

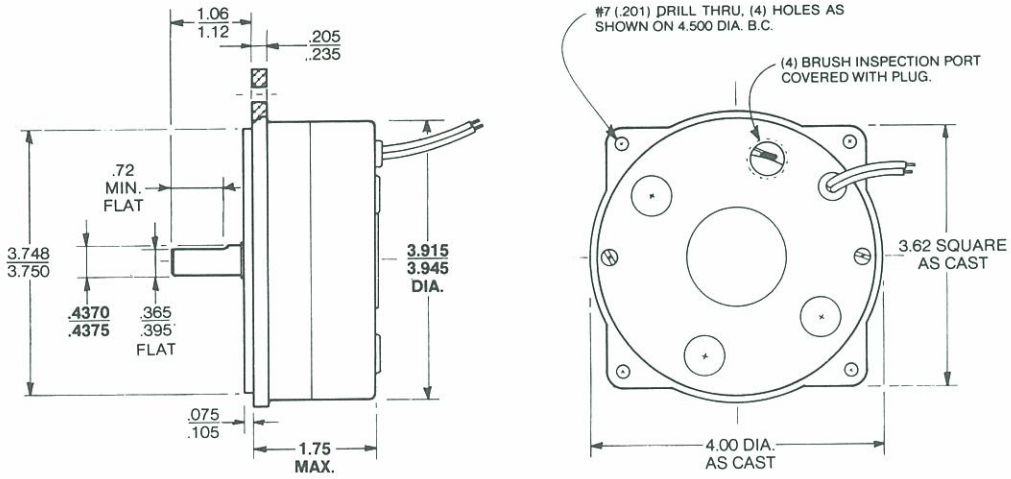
		Value	Units
Peak Torque Rating - T_P		1.50	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		25	WATTS
Motor Constant - K_M		0.301	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		12.2	RAD/S
Electrical Time Constant - τ_E		2.25	MS
Static Friction (Max.) - T_F		0.12	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	0.123	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1.4×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		39	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		5.00×10^{-4}	LB.FT.S^2
Motor Weight		5.0	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	5.46	17.3					
Peak Current - I_P	AMPERES	Rated	4.55	1.44					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.330	1.04					
Back EMF Constant - K_B	V per RAD/S	±10%	0.447	1.41					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.20	12.0					
Inductance - L_M	mH	±30%	2.7	27					

T-2998

0.85 lb. ft.
PEAK TORQUE



NOTES:
1. – WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING THE BRUSH END.
2. – TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#22 AWG TYPE "E" TEFLON COATED
12" MIN. LENGTH.

SIZE CONSTANTS

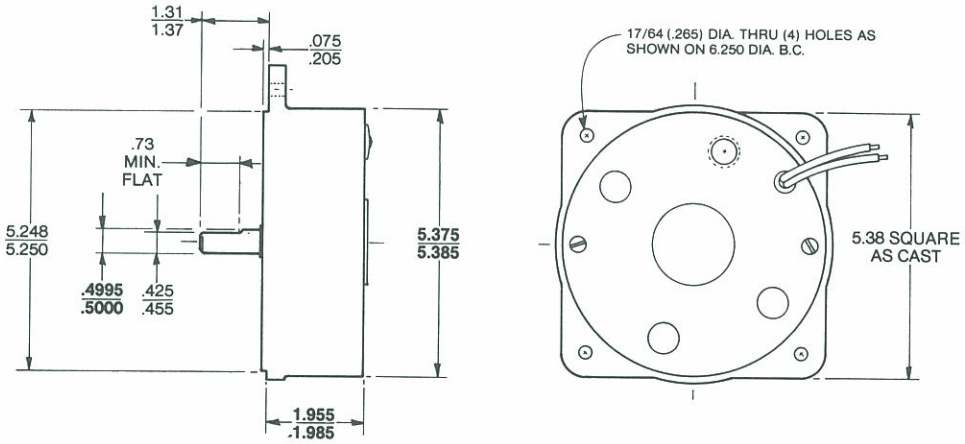
Peak Torque Rating - T_P		0.85	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		77	WATTS
Motor Constant - K_M		0.097	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		67	RAD/S
Electrical Time Constant - τ_E		1.6	MS
Static Friction (Max.) - T_F		0.017	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.013	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.5×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		3.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		2.4×10^{-4}	LB.FT.S^2
Motor Weight		2.5	LB.

WINDING CONSTANTS *Winding Designation*

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	28.2	14.9	22.8	89.2	34.5	56.7	12.2
Peak Current - I_P	AMPERES	Rated	2.74	5.5	3.4	0.85	2.13	1.36	6.8
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.31	0.155	0.25	1.0	0.40	0.63	0.125
Back EMF Constant - K_B	V per RAD/S	±10%	0.42	0.21	0.34	1.36	0.54	0.85	0.17
DC Resistance (25°C) - R_M	OHMS	±12.5%	10.3	2.7	6.7	105	16.2	41.7	1.8
Inductance - L_M	mH	±30%	17	4.1	11	175	27	68	2.7

T-4055

1.8 lb. ft.
PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.W. FACING THE SHAFT END.

LEADS:
#24 AWG TYPE "E" TEFLON COATED, 12" MIN. LENGTH.

SIZE CONSTANTS

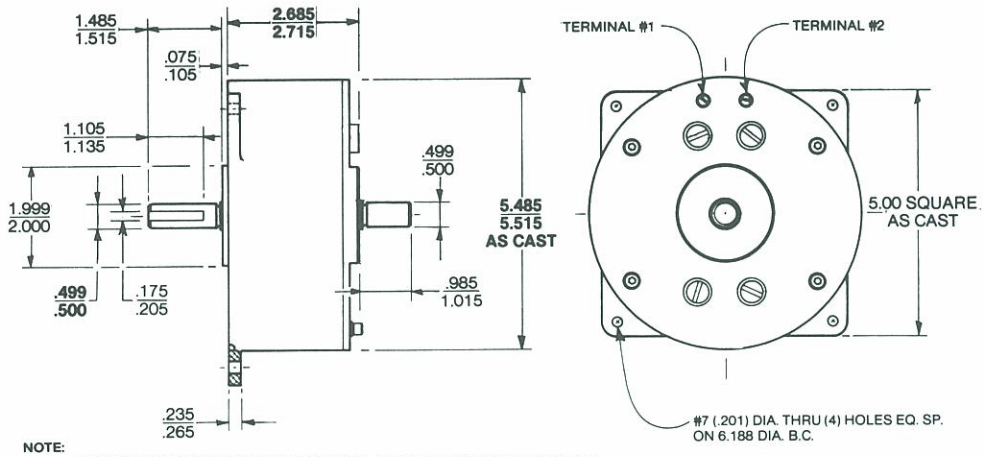
		Value	Units
Peak Torque Rating - T_P		1.8	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		91	WATTS
Motor Constant - K_M		0.19	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		37	RAD/S
Electrical Time Constant - τ_E		1.9	MS
Static Friction (Max.) - T_F		0.04	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.048	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.001	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		3.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		56	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		8.72×10^{-4}	LB.FT.S^2
Motor Weight		4	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	15.7	19.8	25.5	39.8			
Peak Current - I_P	AMPERES	Rated	5.60	4.60	3.70	2.30			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.32	0.39	0.49	0.79			
Back EMF Constant - K_B	V per RAD/S	±10%	0.43	0.53	0.66	1.07			
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.80	4.30	6.90	17.3			
Inductance - L_M	mH	±30%	5.0	8.0	13	33			

T-4054

2.7 lb. ft.
PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO TERMINAL #1 WITH RESPECT TO TERMINAL #2, ROTATION SHALL BE C.C.W. FACING BRUSH END.

SIZE CONSTANTS

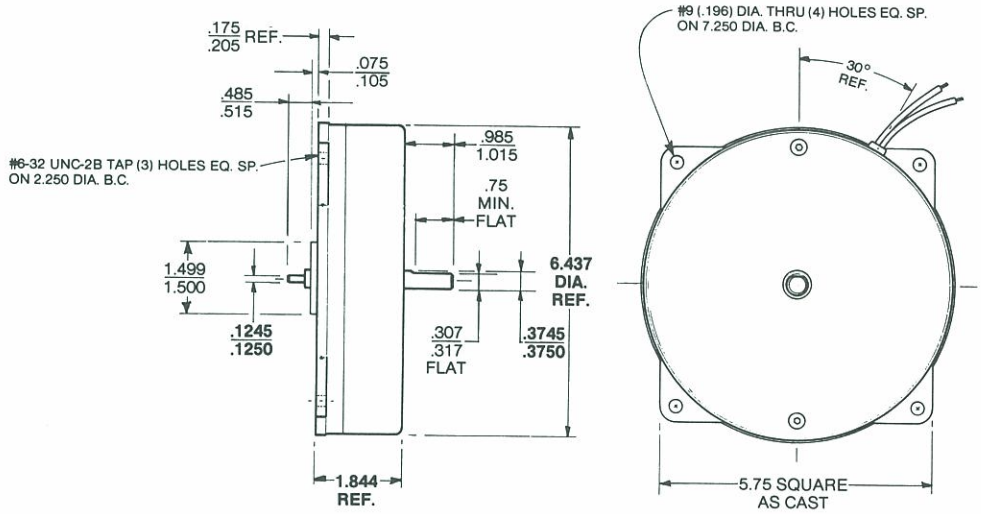
		Value	Units
Peak Torque Rating - T_P		2.7	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		147	WATTS
Motor Constant - K_M		0.22	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		40	RAD/S
Electrical Time Constant - τ_E		2.0	MS
Static Friction (Max.) - T_F		0.052	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.067	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.0015	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		56	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.0011	LB.FT.S^2
Motor Weight		4	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	30.0	14.6					
Peak Current - I_P	AMPERES	Rated	4.92	10.0					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.55	0.27					
Back EMF Constant - K_B	V per RAD/S	±10%	0.75	0.37					
DC Resistance (25°C) - R_M	OHMS	±12.5%	6.1	1.46					
Inductance - L_M	mH	±30%	12.0	2.8					

T-5144

2.7 lb. ft.
PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.W. WHEN VIEWED FROM MOUNTING FLANGE END.

LEADS:
#20 AWG TYPE "EE" TEFLON COATED 18" MIN LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		2.7	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		85	WATTS
Motor Constant - K_M		0.29	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		22	RAD/S
Electrical Time Constant - τ_E		2.6	MS
Static Friction (Max.) - T_F		0.05	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.12	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.0015	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		71	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.002	LB.FT.S^2
Motor Weight		7	LB.

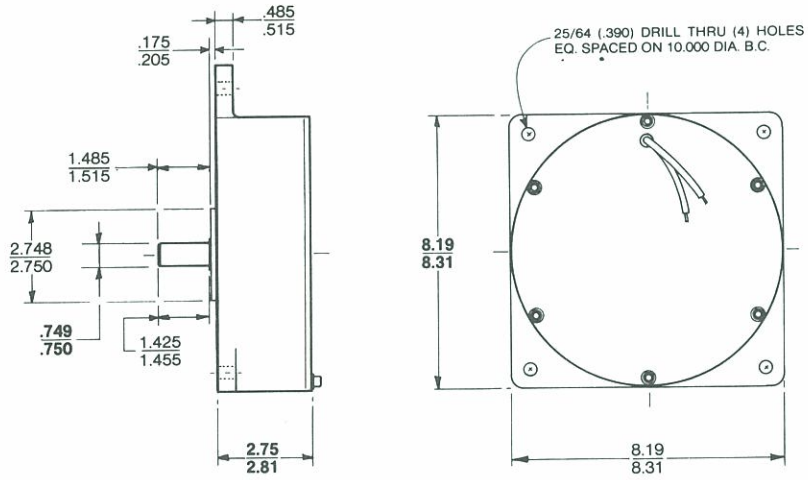
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	28.7	22.9	18.1	45.0			
Peak Current - I_P	AMPERES	Rated	2.84	3.75	4.53	1.80			
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.95	0.72	0.595	1.50			
Back EMF Constant - K_B	V per RAD/S	±10%	1.29	0.98	0.81	2.03			
DC Resistance (25°C) - R_M	OHMS	±12.5%	10.1	6.10	4.00	25.0			
Inductance - L_M	mH	±30%	26	16	10	64			

T-5721

7.0 lb. ft.

PEAK TORQUE



NOTES:

1. – WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM SHAFT END.
2. – TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#18 AWG TYPE "E" TEFLON COATED
24" MIN. LENGTH.

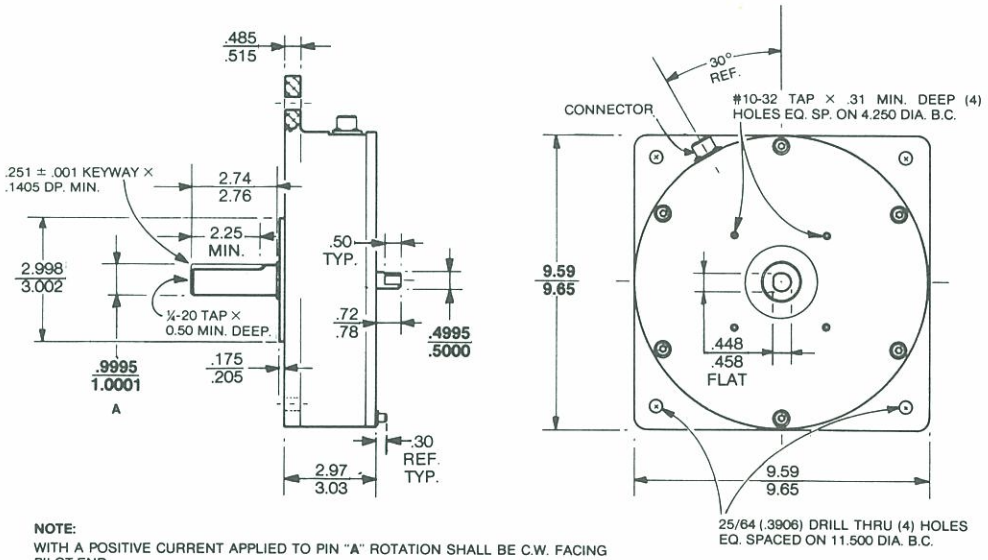
SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		7.0	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		260	WATTS
Motor Constant - K_M		0.43	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		27	RAD/S
Electrical Time Constant - τ_E		3.0	MS
Static Friction (Max.) - T_F		0.1	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.26	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.003	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		5.4×10^{-3}	LB.FT.S^2
Motor Weight		10.5	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	37.8	19.8	57.4	113.4	45.7		
Peak Current - I_P	AMPERES	Rated	7.00	13.2	4.38	2.12	5.38		
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.00	0.53	1.60	3.30	1.30		
Back EMF Constant - K_B	V per RAD/S	±10%	1.36	0.72	2.17	4.47	1.76		
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.40	1.50	13.1	53.5	8.50		
Inductance - L_M	mH	±30%	17	5.0	40	174	27		

T-7208
11 lb. ft.
PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO PIN "A" ROTATION SHALL BE C.W. FACING PILOT END.

SIZE CONSTANTS

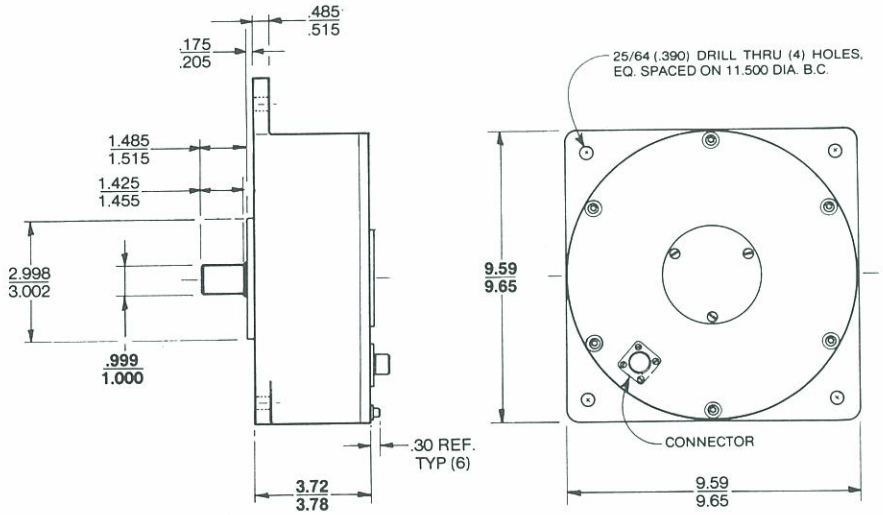
		Value	Units
Peak Torque Rating - T_P		11	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		335	WATTS
Motor Constant - K_M		0.601	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		22.5	RAD/S
Electrical Time Constant - τ_E		3.18	MS
Static Friction (Max.) - T_F		0.15	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.489	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.005	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.2	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		97	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.010	LB.FT.S^2
Motor Weight		10.3	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	38.4	30.5					
Peak Current - I_P	AMPERES	Rated	8.73	11					
Torque Sensitivity - K_T	LB. FT./AMP	±10%	1.26	1					
Back EMF Constant - K_B	V PER RAD/S	±10%	1.71	1.36					
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.40	2.77					
Inductance - L_M	mH	±30%	14	8.81					

T-7215

22 lb. ft.
PEAK TORQUE



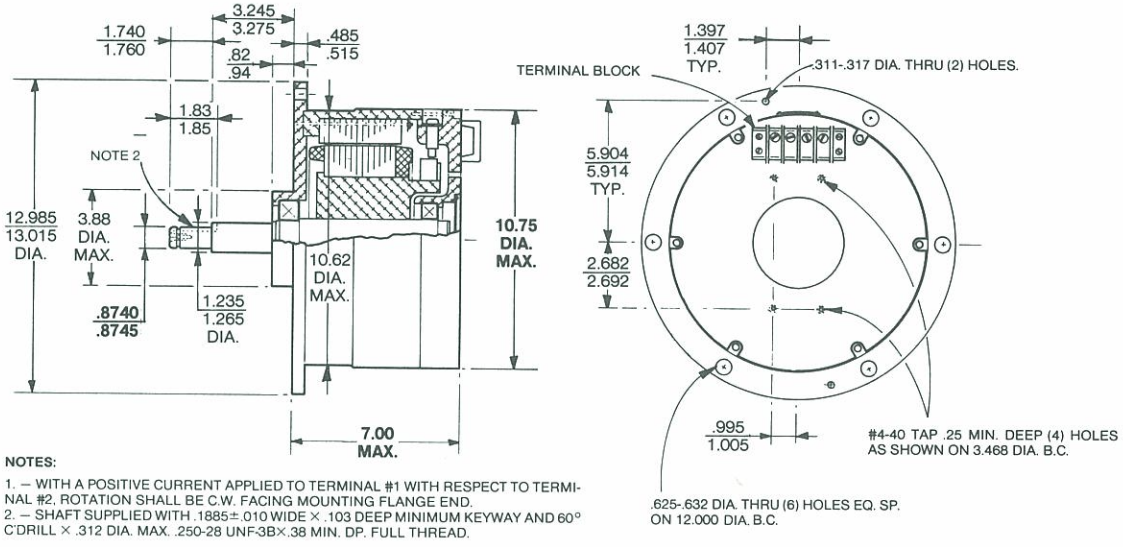
SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		22	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		530	WATTS
Motor Constant - K_M		0.96	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		15	RAD/S
Electrical Time Constant - τ_E		5.7	MS
Static Friction (Max.) - T_F		0.25	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.25	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.013	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		1.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		97	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.019	LB.FT.S^2
Motor Weight		35	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	66.7	50.1	23.8				
Peak Current - I_P	AMPERES	Rated	7.75	8.50	19.0				
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	2.84	2.60	1.16				
Back EMF Constant - K_B	V per RAD/S	±10%	3.85	3.53	1.57				
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.60	5.90	1.25				
Inductance - L_M	mH	±30%	48.0	40.0	8.0				

T-8005
64 lb. ft.
PEAK TORQUE



NOTES:

1. — WITH A POSITIVE CURRENT APPLIED TO TERMINAL #1 WITH RESPECT TO TERMINAL #2, ROTATION SHALL BE C.W. FACING MOUNTING FLANGE END.
2. — SHAFT SUPPLIED WITH .1885±.010 WIDE × .103 DEEP MINIMUM KEYWAY AND 60° C'DRILL × .312 DIA. MAX. .250-28 UNF-3B×.38 MIN. DP. FULL THREAD.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		64	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		720	WATTS
Motor Constant - K_M		2.38	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		8	RAD/S
Electrical Time Constant - τ_E		13.3	MS
Static Friction (Max.) - T_F		0.65	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	7.72	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.03	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		77	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.062	LB.FT.S^2
Motor Weight		100	LB.

WINDING CONSTANTS

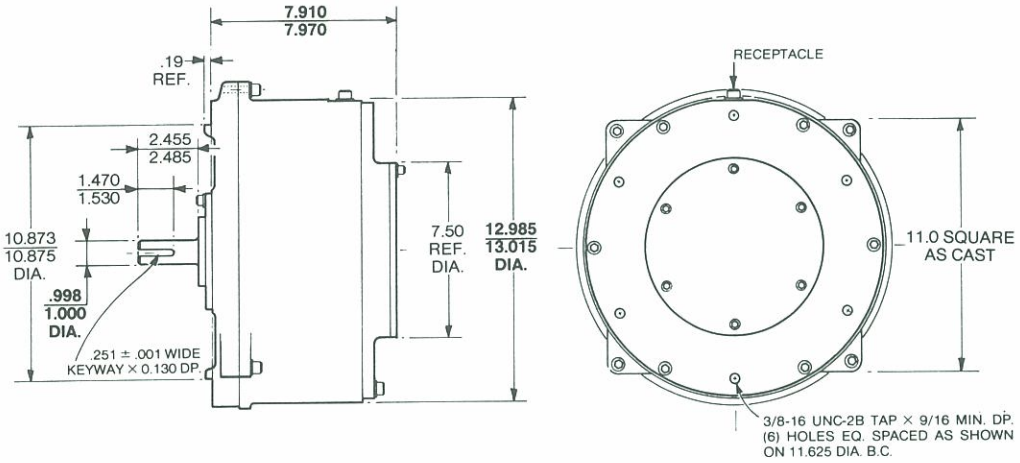
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	18.0						
Peak Current - I_P	AMPERES	Rated	40.0						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.60						
Back EMF Constant - K_B	V per RAD/S	±10%	2.17						
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.45						
Inductance - L_M	mH	±30%	6.0						

T-10081

100 lb. ft.

PEAK TORQUE



SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		1070	WATTS
Motor Constant - K_M		3.06	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		7.5	RAD/S
Electrical Time Constant - τ_E		6.7	MS
Static Friction (Max.) - T_F		1.2	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	13	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.05	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		190	CYCLES/REV.
Number of Poles		14	
Rotor Inertia - J_M		0.29	LB.FT.S^2
Motor Weight		130	LB.

WINDING CONSTANTS

Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	44						
Peak Current - I_P	AMPERES	Rated	24.4						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	4.1						
Back EMF Constant - K_B	V per RAD/S	±10%	5.55						
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.8						
Inductance - L_M	mH	±30%	12						

SERVO MOTORS

Servo motors are typically used in "running" applications where motor response time is critical. Because of the small diameter, long width configuration the torque is high, but the rotor inertia is minimized. Servo motors also typically have cartridge brushes for extended long life.

This section contains both frameless and housed versions of the basic servo motor.

Frameless Servo Selection Guide (oz. in. & lb. ft.)

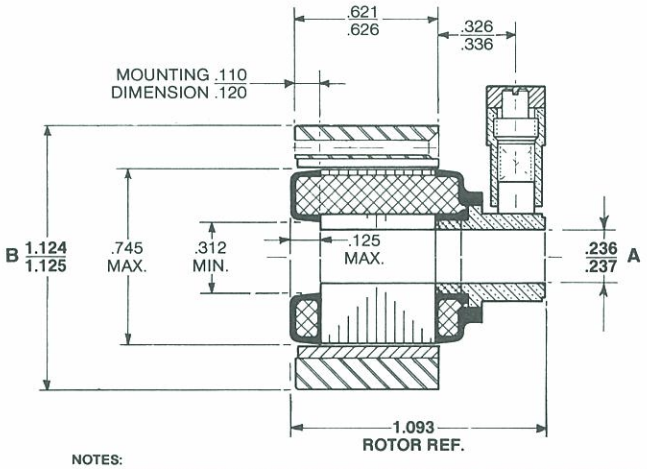
MODEL NUMBER	Peak Torque @ Stall		Motor Constant	No Load Speed	Electrical Time Constant	Friction	Rotor Inertia	Physical Dimensions			Weight
	T_P oz. in.	P_P watts	K_M oz. in./$\sqrt{watt}$	ω_{NL} rad/sec	τ_e msec.	T_f oz. in.	J_M oz. in. sec.^{2}	OD in.	ID in.	Length in.	oz.
QT-0718	12.3	63	1.5	725	0.32	0.8	1.6×10^{-4}	1.13	0.24	1.09	2.5
QT-0807	24	110	2.29	658	0.58	1.0	2.8×10^{-4}	1.25	shaft	1.55	7.3
T-1264	25	46	3.68	260	0.54	2.5	1.5×10^{-3}	2.25	shaft	1.53	22
T-1263	50	62	6.35	177	0.80	3.0	2.2×10^{-3}	2.25	shaft	1.97	16
QT-1809	54	140	4.56	368	0.60	5.5	8.0×10^{-3}	2.50	0.63	1.81	17
NT-2196	80	292	4.7	520	1.2	4.0	1.0×10^{-2}	3.07	0.79	1.93	24
NT-2191	90	56.5	11.9	89.3	1.64	7.5	1.9×10^{-2}	2.81	1.00	1.78	27
T-1265	100	102	9.9	143	1.06	6.0	3.2×10^{-3}	2.25	shaft	2.88	30
T-1806	100	95	10.3	130	1.3	3	1.0×10^{-2}	3.07	0.47	1.75	25
QT-2106	100	55	13.5	78	0.68	7	1.1×10^{-2}	2.81	shaft	1.75	25
T-1846	140	64	17.5	65	1.80	6	1.5×10^{-2}	3.07	0.47	2.37	45
QT-1403	157	347	8.42	313	0.28	3.5	3.73×10^{-3}	1.94	0.62	1.25	12
QT-1811	200	133	17.4	94.1	1.45	8.0	1.5×10^{-2}	2.90	0.43	2.31	48
T-1817	200	120	18.3	85	2.2	5	1.5×10^{-2}	3.07	0.47	2.37	45
	lb. ft.	watts	lb. ft./$\sqrt{watt}$	rad/sec	msec.	lb. ft.	lb. ft. sec.^{2}	in.	in.	in.	lbs.
NT-2952	1.2	79	0.13	48	2.1	0.05	3.9×10^{-4}	3.73	0.63	2.29	3.1
QT-2003	1.7	108	0.17	46.4	2.73	0.08	2.3×10^{-4}	2.90	0.50	4.00	3.1
T-1834	2.1	180	0.16	62	3.2	0.04	1.5×10^{-4}	3.07	shaft	3.81	5
T-7276	23	600	0.94	19.2	3.7	0.6	2.2×10^{-2}	9.00	4.25	3.57	22.5
QT-6404	26	560	1.1	15.9	3.9	0.5	1.3×10^{-2}	7.75	4.25	2.65	13.5
QT-6501	37	960	1.19	19	3.3	0.75	4.3×10^{-2}	8.50	1.00	6.33	42
QT-6405	40	819	1.4	15	4.3	0.75	1.85×10^{-2}	7.75	4.25	3.35	19
QT-7808	69	852	2.36	9.1	7.31	0.80	6.0×10^{-2}	9.00	2.15	5.00	47
T-9905	70	850	2.4	8.5	6.7	1.2	0.21	12.00	7.50	4.40	52

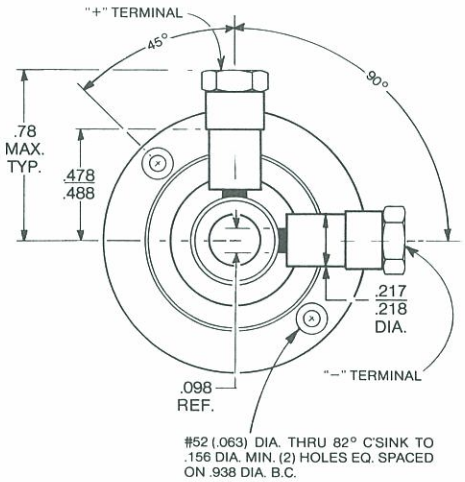
QT-0718

12.3 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS





#52 (.063) DIA. THRU 82° C'SINK TO .156 DIA. MIN. (2) HOLES EQ. SPACED ON .938 DIA. B.C.

NOTES:

1. — MOTOR SUPPLIED AS **SIX** SEPARATE COMPONENTS: ROTOR ASSEMBLY, (4) BRUSH ASSEMBLIES, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO "+" TERMINAL WITH RESPECT TO "−" TERMINAL ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH END.
4. — BRUSH HOLDERS TO BE MOUNTED BY CUSTOMER.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		12.3	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		63	WATTS
Motor Constant - K_M		1.55	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		725	RAD/S
Electrical Time Constant - τ_E		0.315	MS
Static Friction (Max.) - T_F		0.80	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.017	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.0002	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		25	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV
Number of Poles		4	
Rotor Inertia - J_M		1.6×10^{-4}	OZ.IN.S^2
Motor Weight		2.5	OZ.

WINDING CONSTANTS

Winding Designation

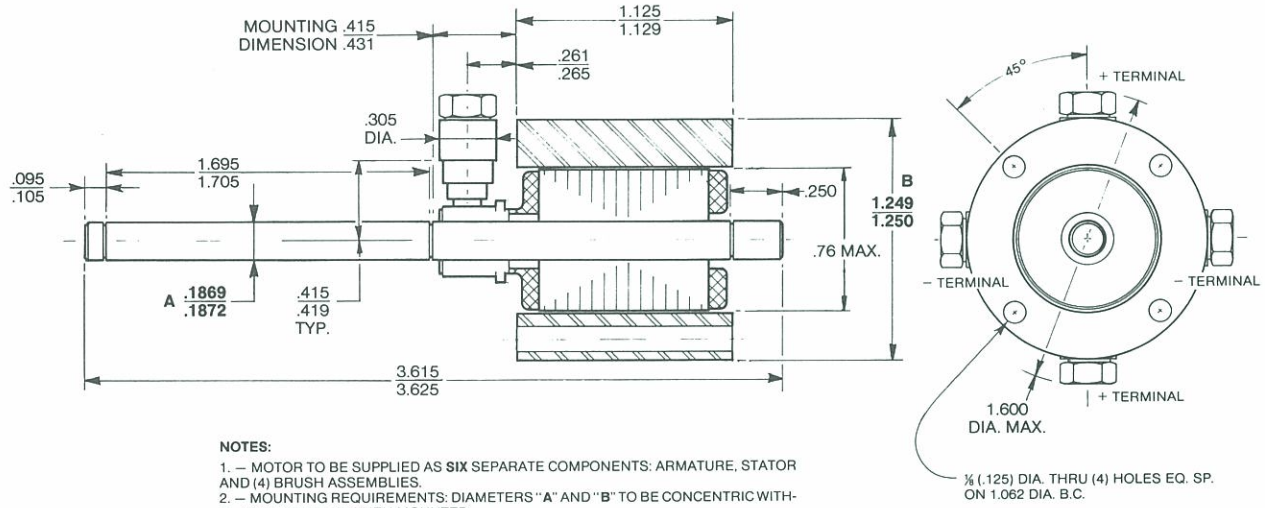
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	21.0	16.7					
Peak Current - I_P	AMPERES	Rated	3.00	3.79					
Torque Sensitivity - K_T	OZ. IN./AMP	±10%	4.10	3.25					
Back EMF Constant - K_B	V per RAD/S	±10%	0.029	0.023					
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.00	4.40					
Inductance - L_M	mH	±30%	2.2	1.4					

QT-0807

24 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS



NOTES:

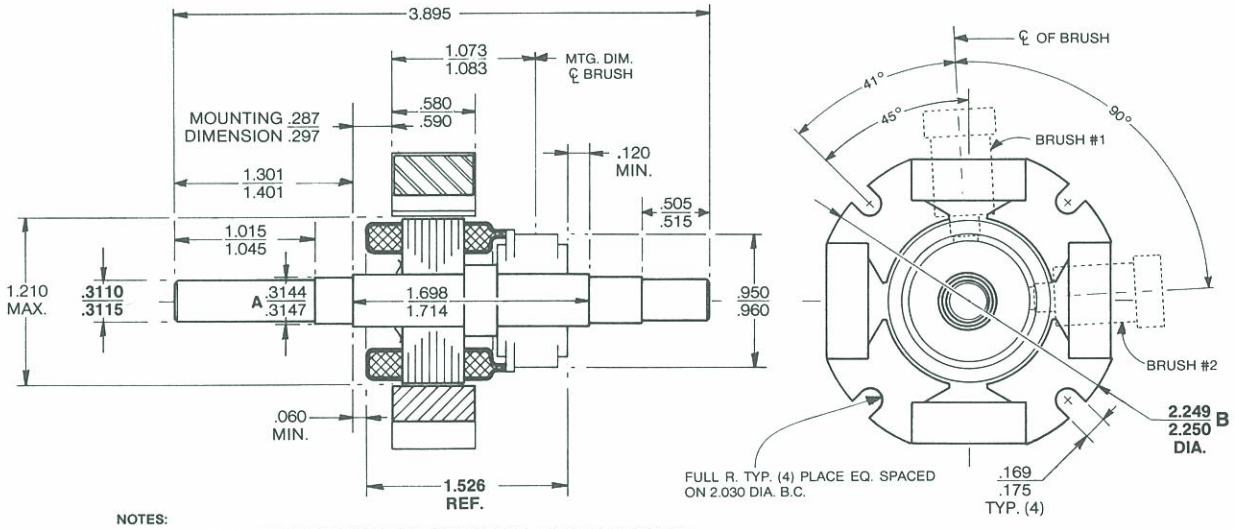
1. – MOTOR TO BE SUPPLIED AS **SIX** SEPARATE COMPONENTS: ARMATURE, STATOR AND (4) BRUSH ASSEMBLIES.
2. – MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .0035 (.007 T.I.R) WHEN MOUNTED.
3. – WITH A POSITIVE VOLTAGE APPLIED TO "+" TERMINALS WITH RESPECT TO "–" TERMINALS, ROTATION SHALL BE C.W. FACING BRUSH END.
4. – BRUSH HOLDERS TO BE MOUNTED BY CUSTOMER.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		24	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		110	WATTS
Motor Constant - K_M		2.29	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		658	RAD/S
Electrical Time Constant - τ_E		0.58	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.036	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.0011	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		9	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		2.8×10^{-4}	OZ.IN.S^2
Motor Weight		7.3	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	21.7						
Peak Current - I_P	AMPERES	Rated	5.05						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	4.75						
Back EMF Constant - K_B	V per RAD/S	±10%	0.033						
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.30						
Inductance - L_M	mH	±30%	2.5						



NOTES:

1. — MOTOR SUPPLIED AS TWO SEPARATE COMPONENTS: ROTOR, STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNLESS ROTOR IS FULLY IN PLACE.
2. — BRUSHES AND HOLDERS ARE CUSTOMER SUPPLIED.
3. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
4. — WITH POSITIVE CURENT APPLIED TO BRUSH #1, WITH RESPECT TO BRUSH #2, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH SIDE.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		25	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		46	WATTS
Motor Constant - K_M		3.68	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		260	RAD/S
Electrical Time Constant - τ_E		0.542	MS
Static Friction (Max.) - T_F		2.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.096	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.0015	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		8.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		21	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.0015	OZ.IN.S^2
Motor Weight		22	OZ.

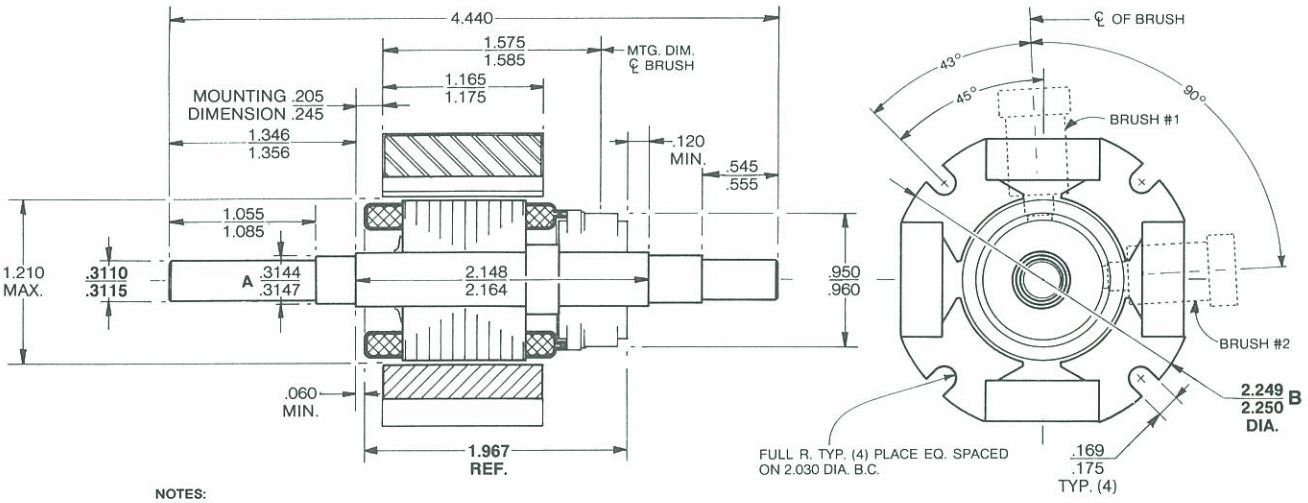
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	10.5	21.0					
Peak Current - I_P	AMPERES	Rated	4.39	2.19					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	5.70	11.4					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.040	0.080					
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.40	9.60					
Inductance - L_M	mH	±30%	1.3	5.2					

T-1263

50 oz. in.

PEAK TORQUE



NOTES:

1. — MOTOR SHIPPED WITH ARMATURE INSIDE STATOR AND MYLAR IN AIR GAP. **CAUTION:** DO NOT REMOVE ARMATURE FROM STATOR. REMOVE MYLAR AFTER ARMATURE & STATOR ARE SECURELY IN PLACE.
2. — BRUSHES AND HOLDERS ARE CUSTOMER SUPPLIED.
3. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
4. — WITH POSITIVE CURRENT APPLIED TO BRUSH #1, WITH RESPECT TO BRUSH #2, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH SIDE.

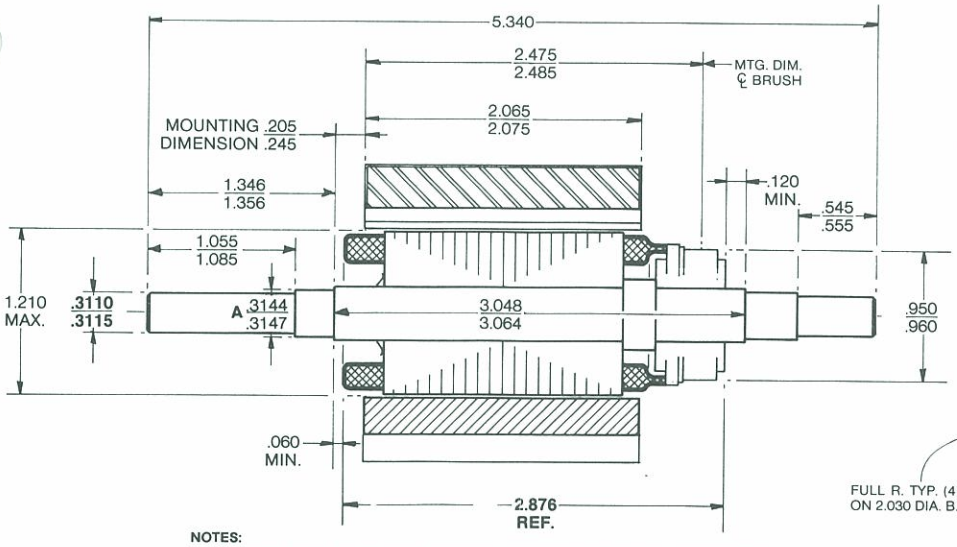
SIZE CONSTANTS

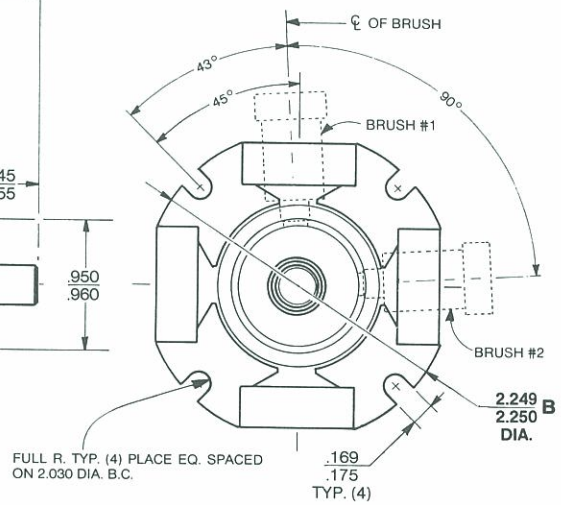
		Value	Units
Peak Torque Rating - T_P		50	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		62	WATTS
Motor Constant - K_M		6.35	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		177	RAD/S
Electrical Time Constant - τ_E		0.80	MS
Static Friction (Max.) - T_F		3.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.28	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.003	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		21	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.0022	OZ.IN.S^2
Motor Weight		16	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	14.2	23.0					
Peak Current - I_P	AMPERES	Rated	4.38	2.74					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	11.4	18.2					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.080	0.129					
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.25	8.40					
Inductance - L_M	mH	±30%	2.6	6.8					

T-1265
100 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS TWO SEPARATE COMPONENTS: ROTOR, AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNLESS ROTOR IS FULLY IN PLACE.
2. — BRUSHES AND HOLDERS ARE CUSTOMER SUPPLIED.
3. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
4. — WITH POSITIVE CURRENT APPLIED TO BRUSH #1, WITH RESPECT TO BRUSH #2, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH SIDE.

SIZE CONSTANTS

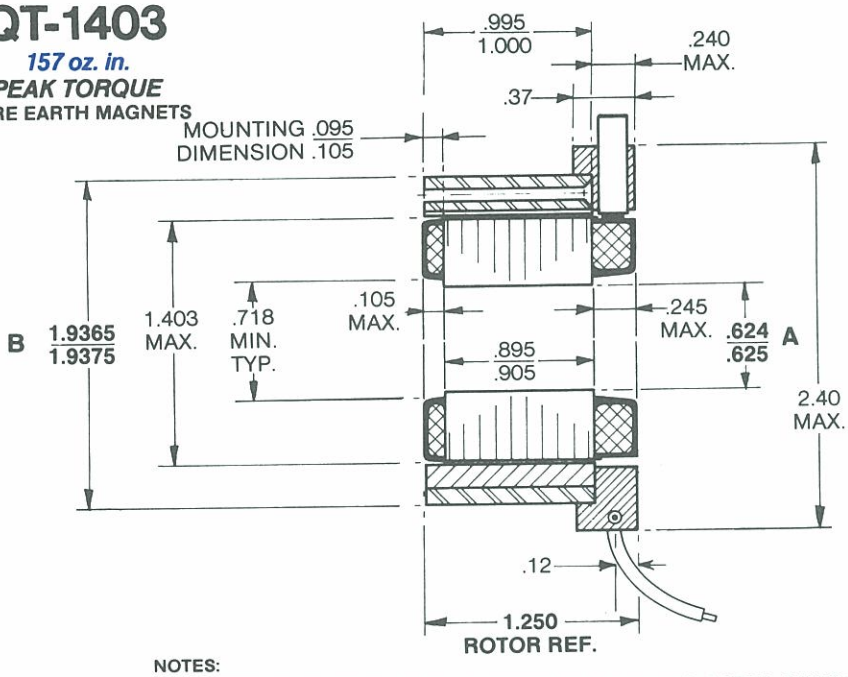
		Value	Units
Peak Torque Rating - T_P		100	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		102	WATTS
Motor Constant - K_M		9.9	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		143	RAD/S
Electrical Time Constant - τ_E		1.06	MS
Static Friction (Max.) - T_F		6.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.70	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.006	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		3.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		21	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.0032	OZ.IN.S^2
Motor Weight		30	OZ.

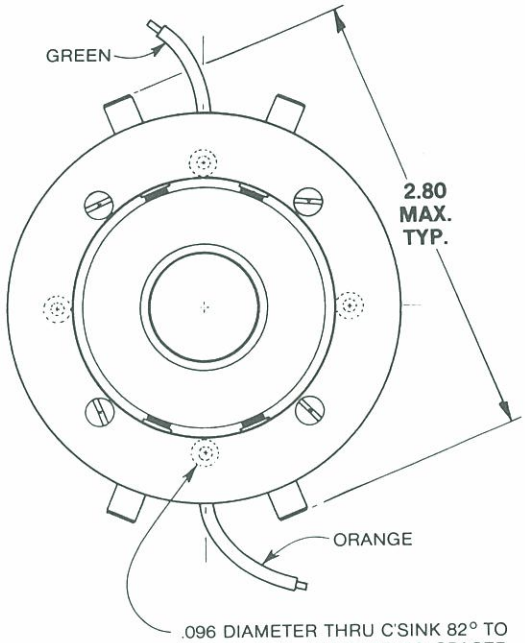
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	22.3	14.0					
Peak Current - I_P	AMPERES	Rated	4.55	7.00					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	22.0	14.3					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.155	0.101					
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.90	2.00					
Inductance - L_M	mH	±30%	5.2	2.2					

QT-1403

157 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS





.096 DIAMETER THRU C'SINK 82° TO .175 MIN. DIA. (4) HOLES EQ. SPACED AS SHOWN ON 1.727 DIA. B.C.

LEADS:
#24 AWG TYPE "E-E" TEFLON COATED PER-MIL-W-16878 12" MIN. LENGTH.

NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR, AND BRUSH RING.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.W. WHEN VIEWED FROM BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

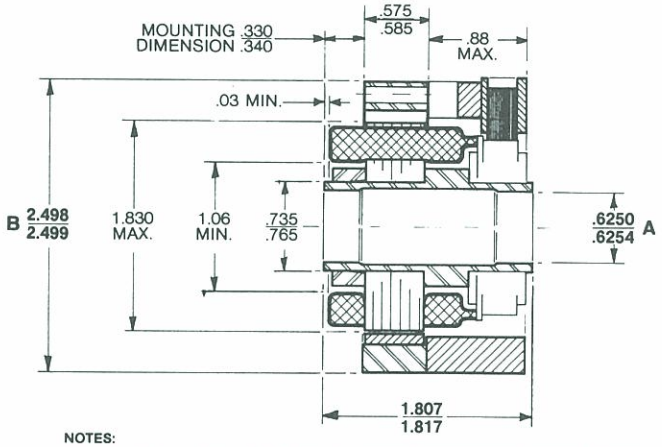
SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		157	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		347	WATTS
Motor Constant - K_M		8.42	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		313	RAD/S
Electrical Time Constant - τ_E		0.277	MS
Static Friction (Max.) - T_F		3.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.501	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.020	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		3.73×10^{-3}	OZ.IN.S^2
Motor Weight		12	OZ.

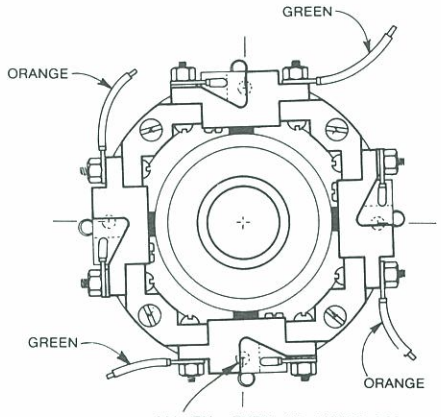
WINDING CONSTANTS

Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	35.4	28.1					
Peak Current - I_P	AMPERES	Rated	9.80	12.3					
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	16.0	12.8					
Back EMF Constant - K_B	V per RAD/S	±10%	0.113	0.090					
DC Resistance (25°C) - R_M	OHMS	±12.5%	3.61	2.29					
Inductance - L_M	mH	±30%	1.0	0.64					



NOTES:
1. — MOTOR TO BE SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR, BRUSH RING ASSEMBLY, AND STATOR.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEADS, WITH RESPECT TO ORANGE LEADS, ROTATION SHALL BE C.C.W. FACING BRUSH END. CONNECT (2) GREEN LEADS TOGETHER AND (2) ORANGE LEADS TOGETHER FOR PROPER OPERATION.



.144 DIA. THRU (4) HOLES EQ. SPACED AS SHOWN ON 2.250 DIA. B.C.

LEADS:
#18 AWG TEFLON COATED TYPE "E" PER MIL W-16878, 12" MIN. LG.

SIZE CONSTANTS

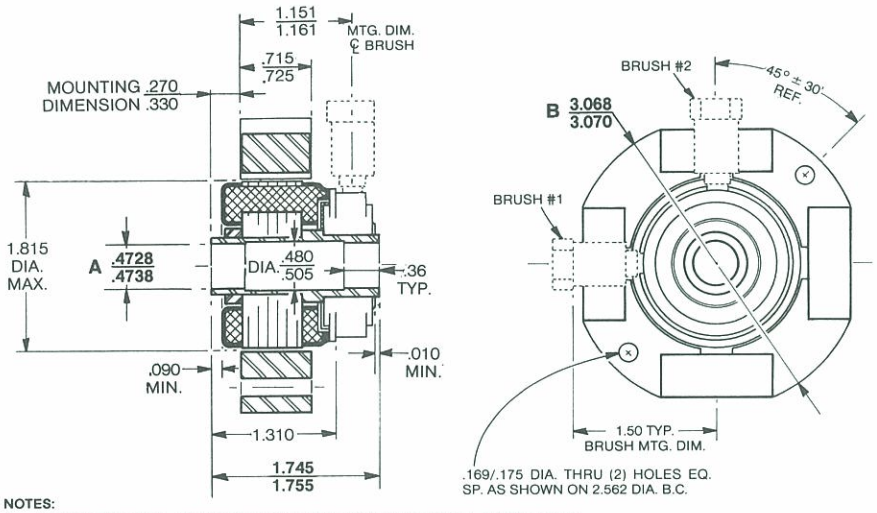
		Value	Units
Peak Torque Rating - T_P		54	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		140	WATTS
Motor Constant - K_M		4.56	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		368	RAD/S
Electrical Time Constant - τ_E		0.60	MS
Static Friction (Max.) - T_F		5.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.147	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.003	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		8	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.008	OZ.IN.S^2
Motor Weight		17	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	14.0	28.0					
Peak Current - I_P	AMPERES	Rated	10.0	5.0					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	5.40	10.8					
Back EMF Constant - K_B	V per RAD/S	±10%	0.038	0.076					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.40	5.60					
Inductance - L_M	mH	±30%	0.84	3.4					

T-1806

100 oz. in.
PEAK TORQUE



NOTES:

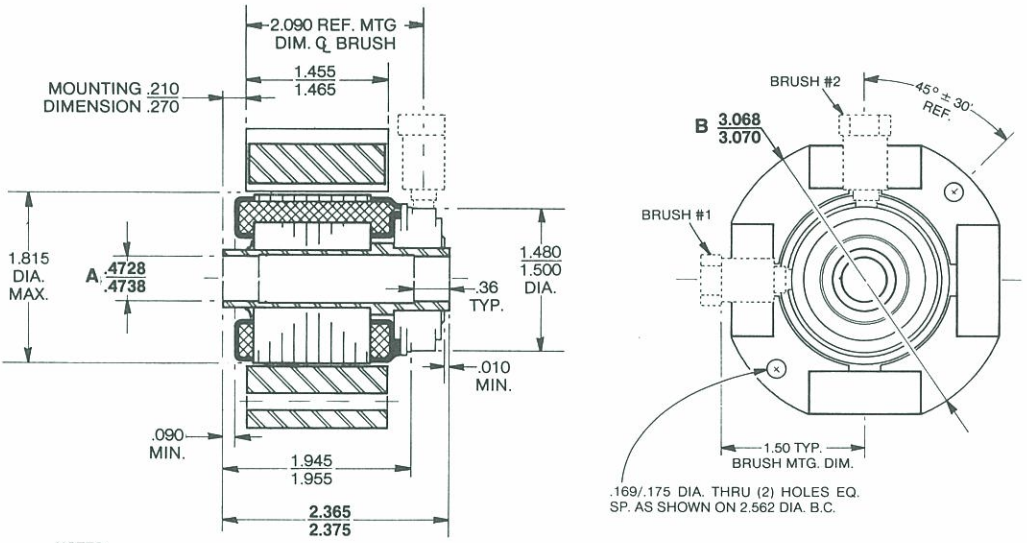
1. — MOTOR SUPPLIED AS TWO SEPARATE COMPONENTS: ROTOR, STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNLESS ROTOR IS IN PLACE.
2. — BRUSHES AND HOLDERS ARE CUSTOMER SUPPLIED.
3. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
4. — WITH POSITIVE CURRENT APPLIED TO BRUSH #1, WITH RESPECT TO BRUSH #2, ROTATION SHALL BE C.W. WHEN VIEWED FROM BRUSH SIDE.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		95	WATTS
Motor Constant - K_M		10.3	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		130	RAD/S
Electrical Time Constant - τ_E		1.3	MS
Static Friction (Max.) - T_F		3	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.75	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.012	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.010	OZ.IN.S^2
Motor Weight		25	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	9.6	100.0	14.7	46.6	16.8	24.3	37.0
Peak Current - I_P	AMPERES	Rated	10.7	0.85	6.7	2.1	6.0	3.37	2.66
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	9.3	118.0	14.9	47.2	16.7	29.7	37.2
Back EMF Constant - K_B	V PER RAD/S	±10%	0.066	0.83	0.105	0.333	0.127	0.210	0.263
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.90	118.0	2.2	22.2	3.0	7.2	13.9
Inductance - L_M	mH	±30%	1.1	176.0	2.8	28.0	3.6	11.2	17.5



NOTES:

1. — MOTOR SUPPLIED AS TWO SEPARATE COMPONENTS: ROTOR, STATOR WITH (2) KEEPERS. **CAUTION:** DO NOT REMOVE KEEPERS UNLESS ROTOR IS IN PLACE.
2. — BRUSHES AND HOLDERS ARE CUSTOMER SUPPLIED.
3. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
4. — WITH A POSITIVE CURRENT APPLIED TO BRUSH #1, ROTATION SHALL BE C.W. WHEN VIEWED FROM BRUSH SIDE.

SIZE CONSTANTS

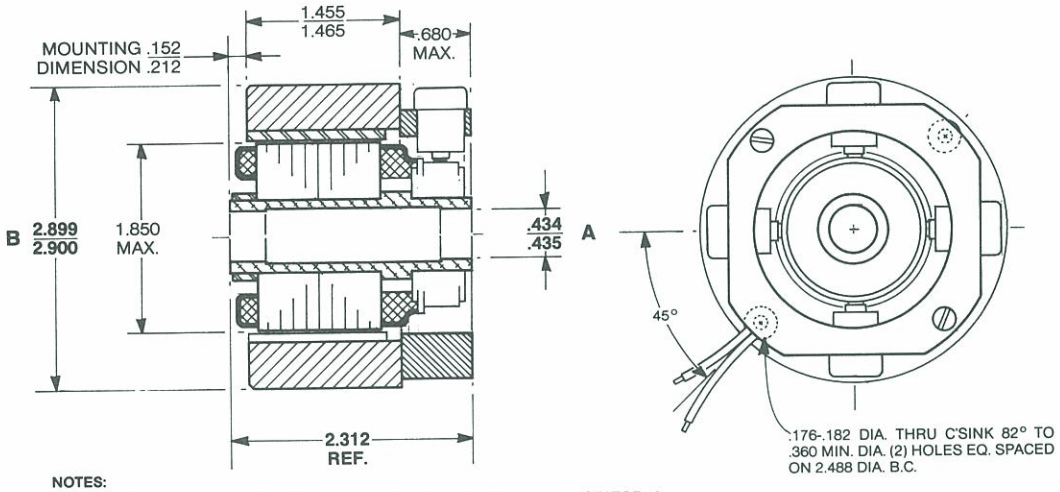
		Value	Units
Peak Torque Rating - T_P		140	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		64	WATTS
Motor Constant - K_M		17.5	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		65	RAD/S
Electrical Time Constant - τ_E		1.80	MS
Static Friction (Max.) - T_F		6	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	2.16	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.022	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.015	OZ.IN.S^2
Motor Weight		45	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	8.00	12.7	25.4				
Peak Current - I_P	AMPERES	Rated	8.00	5.09	2.55				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	17.5	27.5	55.0				
Back EMF Constant - K_B	V PER RAD/S	±10%	0.123	0.193	0.387				
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.00	2.49	9.98				
Inductance - L_M	mH	±30%	1.8	4.4	18				

QT-1811

200 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:
1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR, & BRUSH RING.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH RING SIDE.

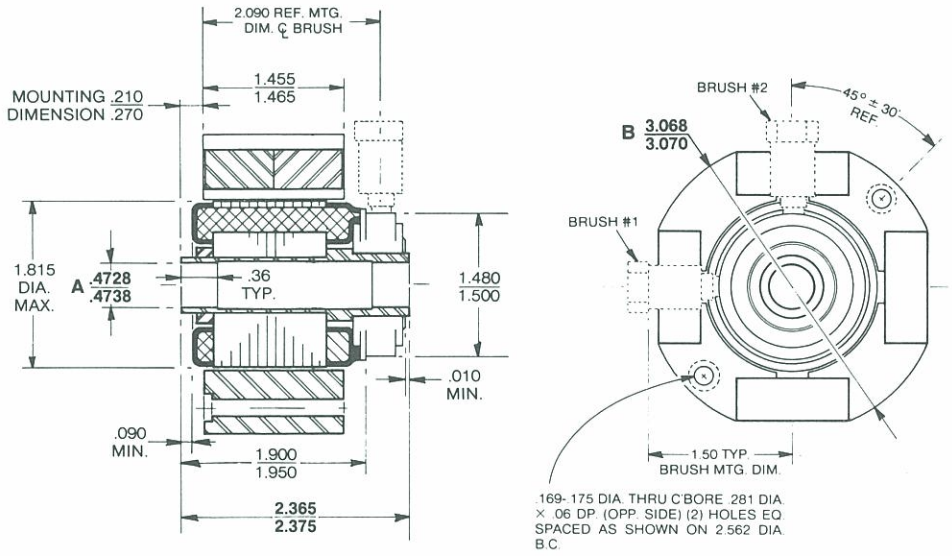
LEADS:
#22 AWG TYPE "E" TEFLON COATED PER MIL W-16878, 8" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		200	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		133	WATTS
Motor Constant - K_M		17.4	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		94.1	RAD/S
Electrical Time Constant - τ_E		1.45	MS
Static Friction (Max.) - T_F		8.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	2.13	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.020	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.015	OZ.IN.S^2
Motor Weight		48	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	12.1						
Peak Current - I_P	AMPERES	Rated	11.0						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	18.2						
Back EMF Constant - K_B	V PER RAD/S	±10%	0.129						
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.10						
Inductance - L_M	mH	±30%	1.6						



NOTES:

1. — MOTOR SUPPLIED AS TWO SEPARATE COMPONENTS: ROTOR AND STATOR WITH (2) KEEPERS. **CAUTION:** DO NOT REMOVE KEEPERS UNLESS ROTOR IS IN PLACE.
2. — BRUSHES AND HOLDERS ARE CUSTOMER SUPPLIED.
3. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
4. — WITH A POSITIVE CURRENT APPLIED TO BRUSH #1, ROTATION SHALL BE C.W. WHEN VIEWED FROM BRUSH SIDE.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		200	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		120	WATTS
Motor Constant - K_M		18.3	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		85	RAD/S
Electrical Time Constant - τ_E		2.2	MS
Static Friction (Max.) - T_F		5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	2.3	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.024	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.015	OZ.IN.S^2
Motor Weight		45	OZ.

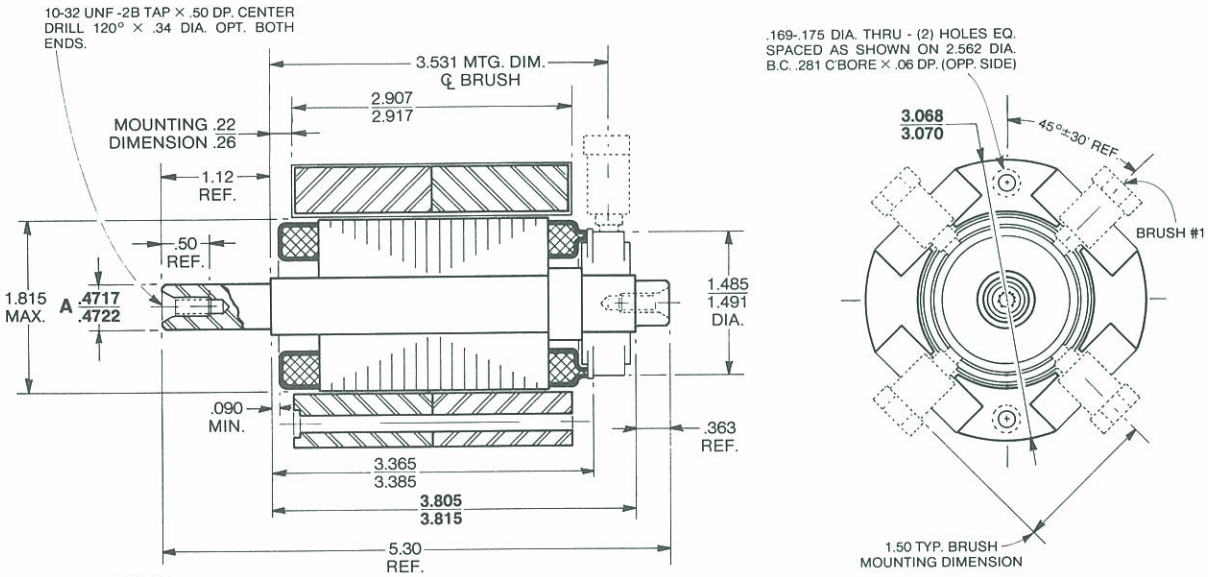
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	12.3	81.7	14.5	32.1	22.0	7.88	
Peak Current - I_P	AMPERES	Rated	10.7	1.34	8.5	3.38	5.40	17.9	
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	18.6	149.0	23.5	59.4	36.8	11.2	
Back EMF Constant - K_B	V PER RAD/S	±10%	0.131	1.05	0.166	0.42	0.262	0.079	
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.15	61.0	1.70	9.5	4.08	0.44	
Inductance - L_M	mH	±30%	2.2	141.0	3.6	22.4	8.8	0.79	

T-1834

400 oz. in.

PEAK TORQUE



NOTES:

1. — MOTOR SHIPPED WITH ARMATURE INSIDE STATOR AND MYLAR IN AIR GAP. **CAUTION:** DO NOT REMOVE ARMATURE FROM STATOR. REMOVE MYLAR AFTER ARMATURE AND STATOR ARE SECURELY IN PLACE.
2. — BRUSHES AND HOLDERS ARE CUSTOMER SUPPLIED.
3. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004 (.008 T.I.R.) WHEN MOUNTED.
4. — WITH A POSITIVE CURRENT APPLIED TO BRUSH #1, ROTATION SHALL BE C.W. WHEN VIEWED FROM BRUSH SIDE.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		400	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		180	WATTS
Motor Constant - K_M		29.7	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		62	RAD/S
Electrical Time Constant - τ_E		3.2	MS
Static Friction (Max.) - T_F		8	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	6.4	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.048	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.028	OZ.IN.S^2
Motor Weight		80	OZ.

WINDING CONSTANTS

Winding Designation

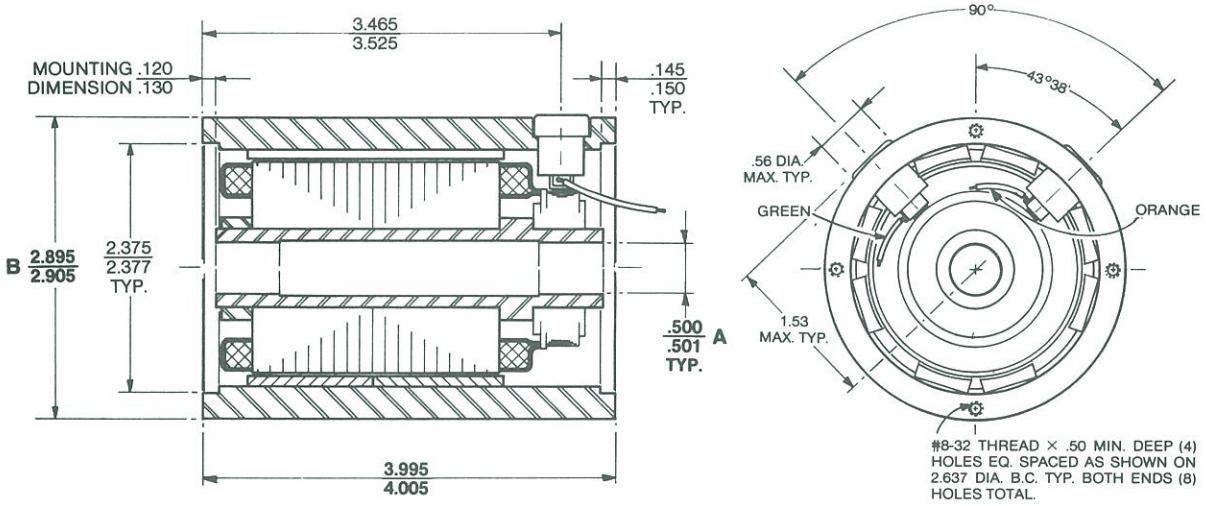
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	21	16.7					
Peak Current - I_P	AMPERES	Rated	8.4	11.2					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	47.6	35.7					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.336	0.252					
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.5	1.49					
Inductance - L_M	mH	±30%	8.0	4.5					

QT-2003

329 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS



NOTES:

1. — MOTOR TO BE SUPPLIED AS TWO SEPARATE COMPONENTS: ROTOR AND STATOR.
2. — MOUNTING REQUIREMENTS: DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD ROTATION SHALL BE C.C.W. WHEN VIEWED FROM LEAD SIDE.

LEADS:
#26 AWG TYPE "E" TEFLON COATED PER MIL-W-16878 12" MIN. LENGTH.

SIZE CONSTANTS

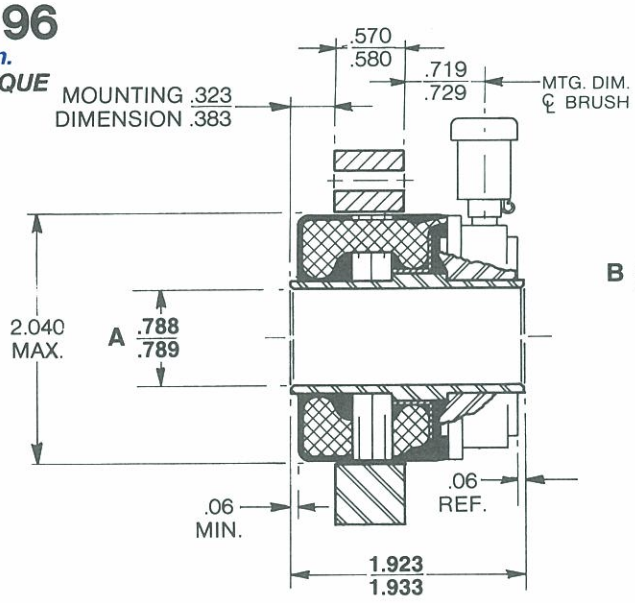
		Value	Units
Peak Torque Rating - T_P		329	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		108	WATTS
Motor Constant - K_M		31.7	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		46.4	RAD/S
Electrical Time Constant - τ_E		2.73	MS
Static Friction (Max.) - T_F		15	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	7.09	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.030	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.045	OZ.IN.S^2
Motor Weight		50	OZ.

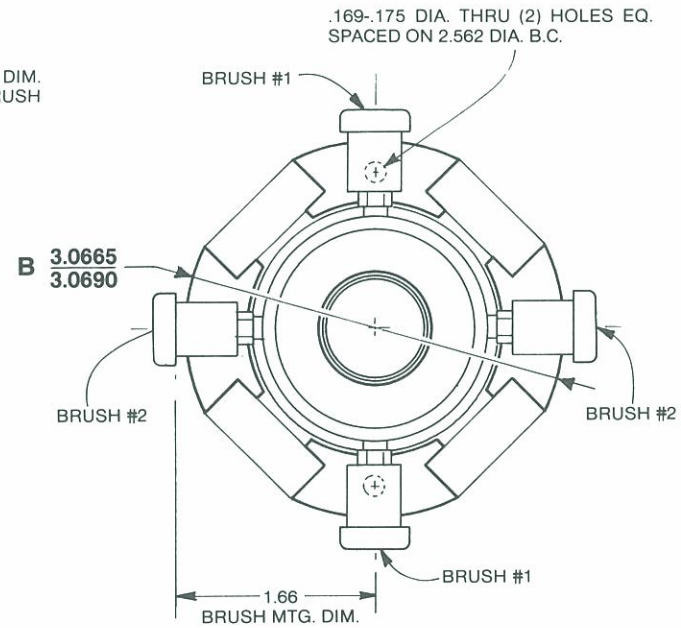
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	30.8						
Peak Current - I_P	AMPERES	Rated	3.50						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	94.0						
Back EMF Constant - K_B	V PER RAD/S	±10%	0.664						
DC Resistance (25°C) - R_M	OHMS	±12.5%	8.80						
Inductance - L_M	mH	±30%	24						

NT-2196

80 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS SIX SEPARATE COMPONENTS: ROTOR, STATOR WITH KEEPER AND (4) BRUSH HOLDER ASSEMBLIES. **CAUTION:** DO NOT REMOVE KEEPER UNLES ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .004(.008 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO BRUSH #1, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH SIDE.

SPECIAL MAGNET MATERIAL FOR RESISTANCE TO TORQUE SENSITIVITY DEGRADATION AT HIGH POWER INPUT LEVELS

SIZE CONSTANTS

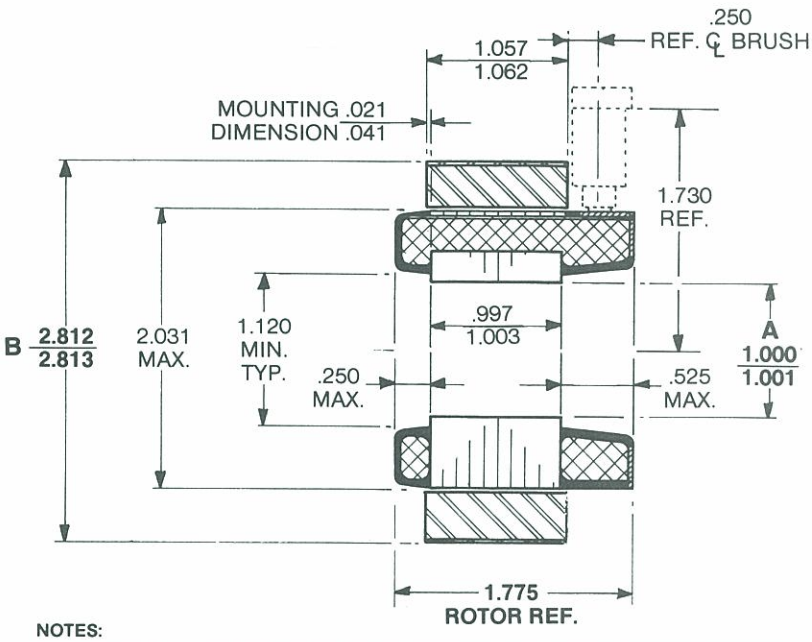
		Value	Units
Peak Torque Rating - T_P		80	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		292	WATTS
Motor Constant - K_M		4.7	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		520	RAD/S
Electrical Time Constant - τ_E		1.2	MS
Static Friction (Max.) - T_F		4.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.15	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.0024	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		3.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		31	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.01	OZ.IN.S^2
Motor Weight		24	OZ.

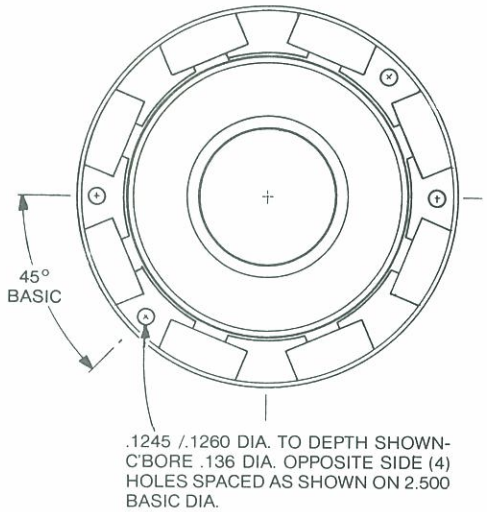
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	14.6						
Peak Current - I_P	AMPERES	Rated	20.0						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	4.0						
Back EMF Constant - K_B	V PER RAD/S	±10%	0.028						
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.73						
Inductance - L_M	mH	±30%	0.9						

NT-2191

90 oz. in.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS TWO SEPARATE COMPONENTS: ROTOR AND STATOR WITH KEEPER. **CAUTION:** DO NOT REMOVE KEEPER UNTIL ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO #1 BRUSHES WITH RESPECT TO #2 BRUSHES ROTATION SHALL BE C.C.W. FACING BRUSH END.
4. — BRUSHES ARE CUSTOMER SUPPLIED.

SIZE CONSTANTS

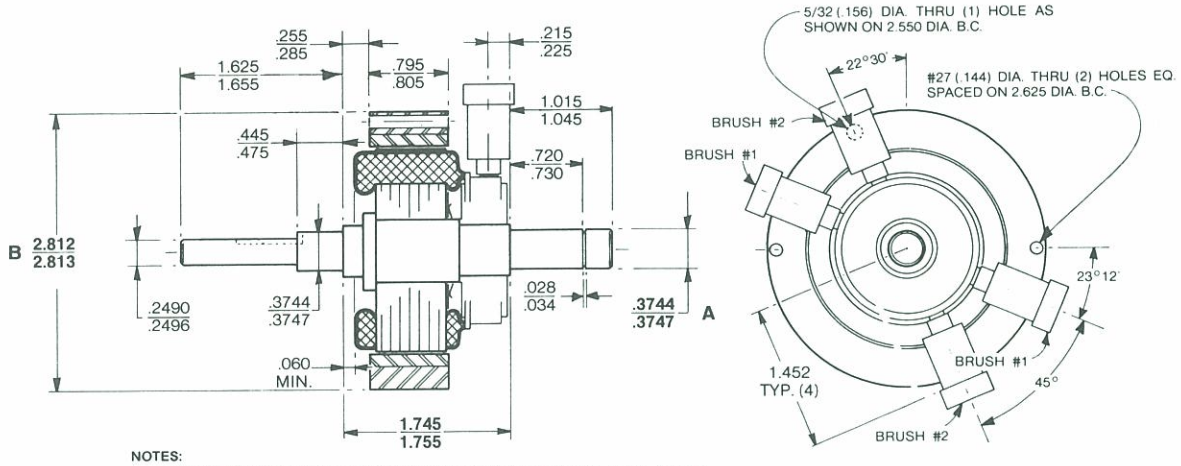
		Value	Units
Peak Torque Rating - T_P		90	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		56.5	WATTS
Motor Constant - K_M		11.9	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		89.3	RAD/S
Electrical Time Constant - τ_E		1.64	MS
Static Friction (Max.) - T_F		7.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.00	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.040	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		0.019	OZ.IN.S^2
Motor Weight		27	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	30.5						
Peak Current - I_P	AMPERES	Rated	1.85						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	48.4						
Back EMF Constant - K_B	V PER RAD/S	±10%	0.342						
DC Resistance (25°C) - R_M	OHMS	±12.5%	16.5						
Inductance - L_M	mH	±30%	27						

QT-2106

100 oz. in.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

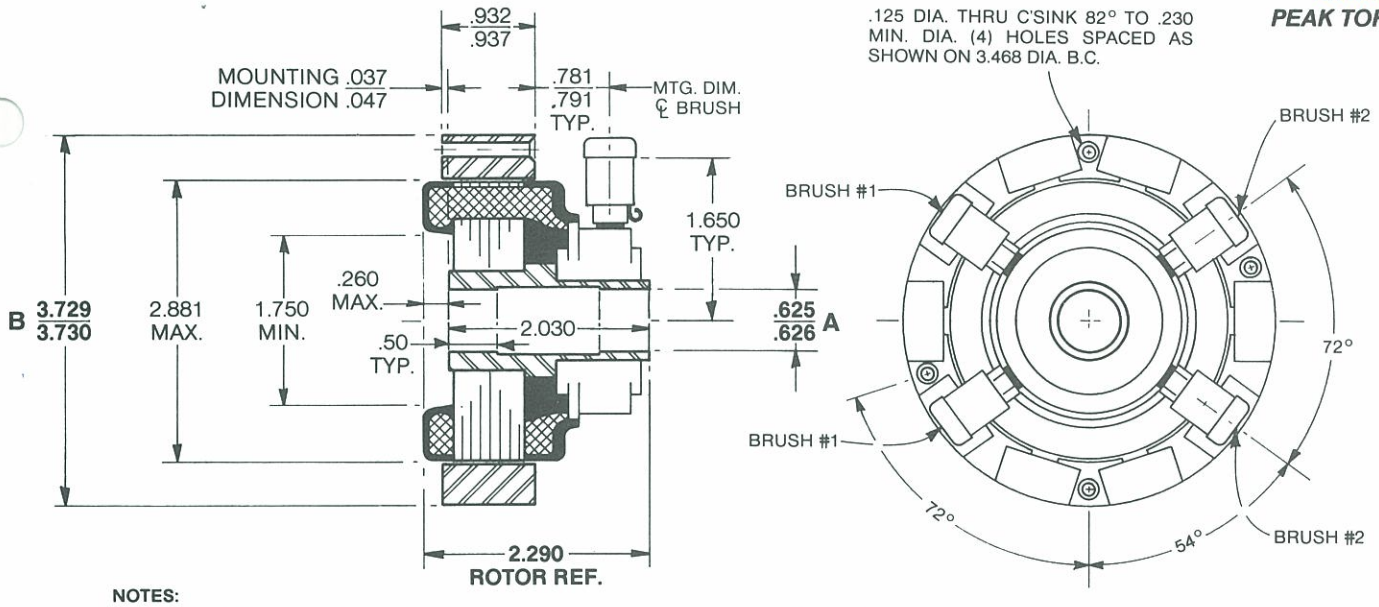
1. — MOTOR SUPPLIED AS **SIX** SEPARATE COMPONENTS: ROTOR, STATOR, & (4) BRUSH HOLDER ASSEMBLIES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003 (.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO #1 BRUSHES WITH RESPECT TO #2 BRUSHES, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM BRUSH SIDE.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		55	WATTS
Motor Constant - K_M		13.5	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		78	RAD/S
Electrical Time Constant - τ_E		0.68	MS
Static Friction (Max.) - T_F		7	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	1.28	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.058	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		8	
Rotor Inertia - J_M		0.011	OZ.IN.S^2
Motor Weight		25	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	19.7	9.84					
Peak Current - I_P	AMPERES	Rated	2.81	5.62					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	35.6	17.8					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.251	0.126					
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.00	1.75					
Inductance - L_M	mH	±30%	4.8	1.2					



NOTES:

1. — MOTOR TO BE SUPPLIED AS SIX SEPARATE COMPONENTS: STATOR WITH KEEPER, ROTOR ASSEMBLY, AND (4) BRUSH HOLDER ASSEMBLIES WITH BRUSHES. **CAUTION:** DO NOT REMOVE KEEPER UNLESS ROTOR IS FULLY IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002(.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO #1 BRUSHES, ROTATION SHALL BE C.C.W. WHEN FACING BRUSH END.

SIZE CONSTANTS

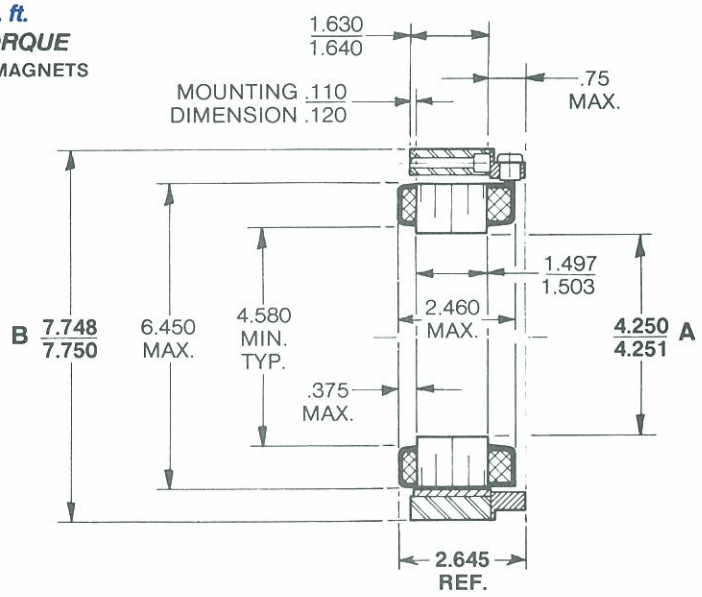
		Value	Units
Peak Torque Rating - T_P		1.2	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		79	WATTS
Motor Constant - K_M		0.135	LB.FT./ $\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		48	RAD/S
Electrical Time Constant - τ_E		2.1	MS
Static Friction (Max.) - T_F		0.052	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.025	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1.0×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		3.9×10^{-4}	LB.FT.S^2
Motor Weight		3.1	LB.

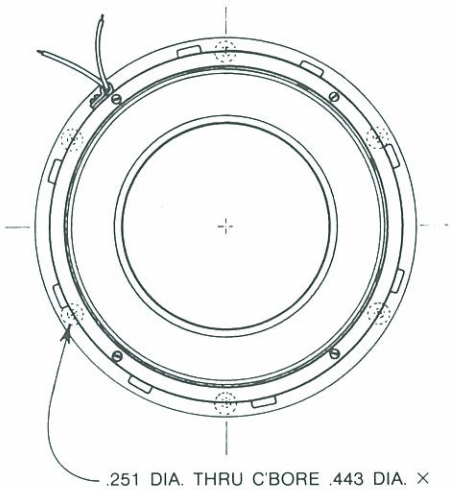
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	12.0	20					
Peak Current - I_P	AMPERES	Rated	6.3	4.0					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.19	0.30					
Back EMF Constant - K_B	V PER RAD/S	±10%	0.26	0.41					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.9	5.0					
Inductance - L_M	mH	±30%	4.1	10.4					

QT-6404

26 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD ROTATION WILL BE C.C.W. WHEN VIEWED FROM THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TEFLON COATED TYPE "E" PER MIL W-16878 12" MIN. LENGTH.

SIZE CONSTANTS

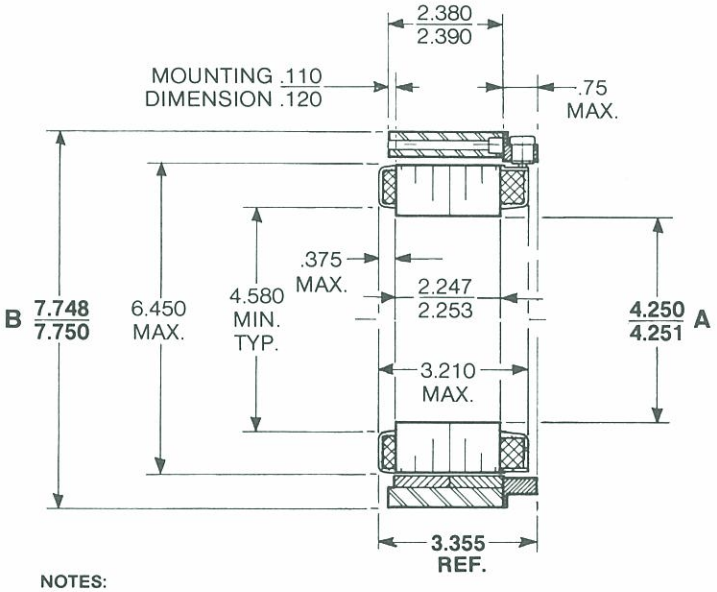
		Value	Units
Peak Torque Rating - T_P		26	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		560	WATTS
Motor Constant - K_M		1.1	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		15.9	RAD/S
Electrical Time Constant - τ_E		3.9	MS
Static Friction (Max.) - T_F		0.50	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	1.63	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.006	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		91	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		0.013	LB.FT.S^2
Motor Weight		13.5	LB.

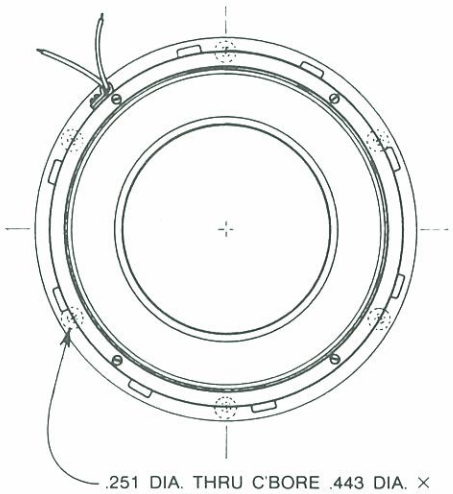
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	28.0						
Peak Current - I_P	AMPERES	Rated	20.0						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	1.30						
Back EMF Constant - K_B	V per RAD/S	±10%	1.76						
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.40						
Inductance - L_M	mH	±30%	5.4						

QT-6405

40 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR ASSEMBLY, BRUSH RING ASSEMBLY, AND STATOR ASSEMBLY.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD ROTATION WILL BE C.C.W. WHEN VIEWED FROM THE BRUSH RING SIDE.
4. — TYPICAL BRUSH LIFE > 10^7 REVS.

LEADS:
#16 AWG TEFLON COATED TYPE "E" PER MIL W-16878 12" MIN. LENGTH.

SIZE CONSTANTS

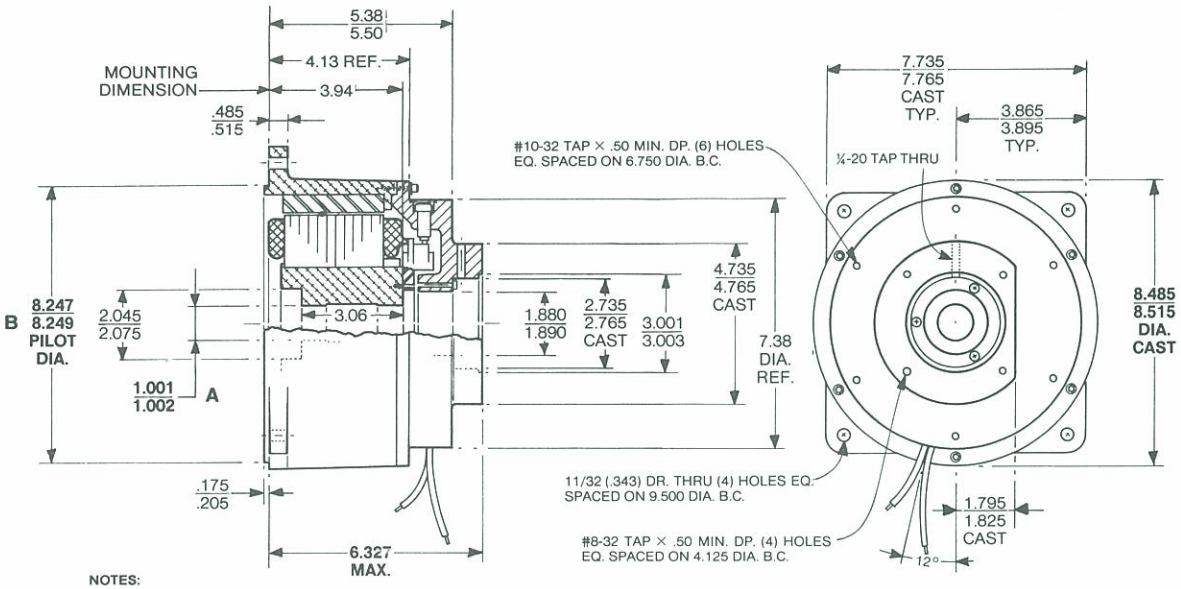
		Value	Units
Peak Torque Rating - T_P		40	LB. FT.
Power Input, Stalled at T_P(25°C) - P_P		819	WATTS
Motor Constant - K_M		1.4	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		15	RAD/S
Electrical Time Constant - τ_E		4.3	MS
Static Friction (Max.) - T_F		0.75	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_O	2.66	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.009	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.1	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		91	CYCLES/REV.
Number of Poles		18	
Rotor Inertia - J_M		0.0185	LB.FT.S^2
Motor Weight		19	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	25.6	39.1					
Peak Current - I_P	AMPERES	Rated	32.0	20.6					
Torque Sensitivity - K_T	LB.FT./AMP.	±10%	1.25	1.94					
Back EMF Constant - K_B	V per RAD/S	±10%	1.70	2.63					
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.800	1.90					
Inductance - L_M	mH	±30%	3.4	8.2					

QT-6501

37 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS



NOTES:

1. — TORQUE MOTOR SHIPPED AS (1) UNIT.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH END.

LEADS:
#14 AWG TYPE "EE" TEFLON COATED, 24" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		37	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		960	WATTS
Motor Constant - K_M		1.19	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		19	RAD/S
Electrical Time Constant - τ_E		3.3	MS
Static Friction (Max.) - T_F		0.75	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.94	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.015	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		79	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		0.043	LB.FT.S^2
Motor Weight		42	LB.

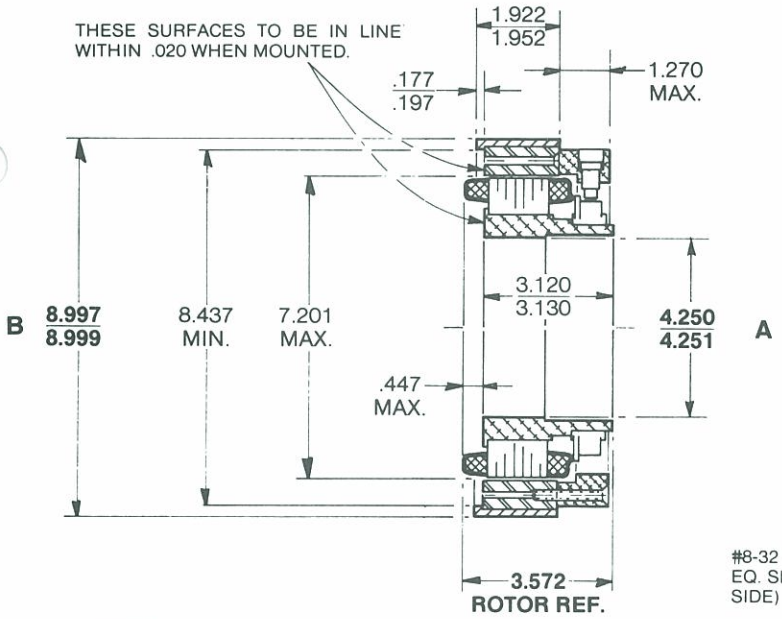
WINDING CONSTANTS

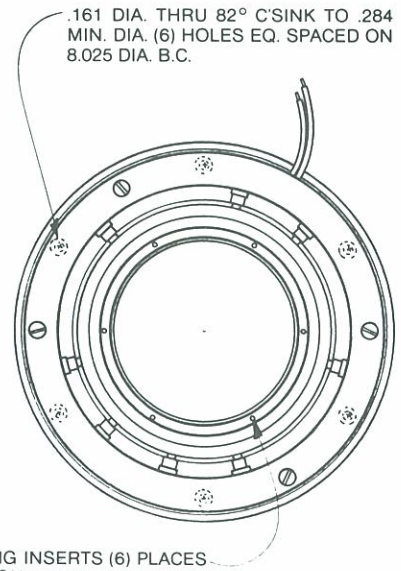
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	21.0						
Peak Current - I_P	AMPERES	Rated	45.7						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.81						
Back EMF Constant - K_B	V PER RAD/S	±10%	1.10						
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.46						
Inductance - L_M	mH	±30%	1.5						

T-7276

23.0 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR WITH (2) KEEPERS AND BRUSH RING ASSEMBLY. **CAUTION:** DO NOT REMOVE KEEPERS UNLESS ROTOR IS IN PLACE.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003(.006 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD, ROTATION SHALL BE C.C.W. WHEN VIEWED FROM THE BRUSH SIDE.

LEADS:
#16 AWG TEFLON INSULATED TYPE "EE" PER MIL-W 16878, 12" MIN. LG.

SIZE CONSTANTS

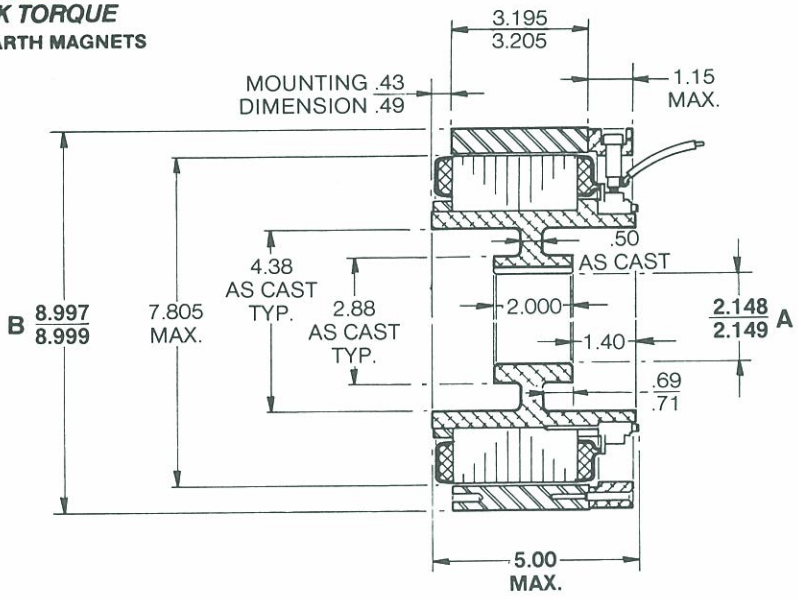
		Value	Units
Peak Torque Rating - T_P		23.0	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		600	WATTS
Motor Constant - K_M		0.94	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		19.2	RAD/S
Electrical Time Constant - τ_E		3.70	MS
Static Friction (Max.) - T_F		0.6	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	1.20	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.013	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		1.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		97	CYCLES/REV.
Number of Poles		12	
Rotor Inertia - J_M		0.022	LB.FT.S^2
Motor Weight		22.5	LB.

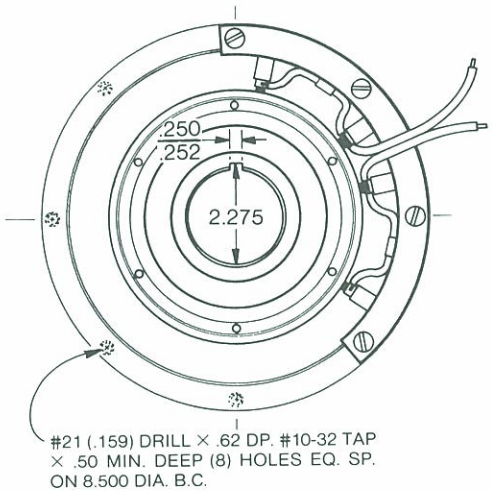
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	24.5	12.3					
Peak Current - I_P	AMPERES	Rated	24.5	57.2					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.94	0.40					
Back EMF Constant - K_B	V PER RAD/S	±10%	1.28	0.55					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.00	0.214					
Inductance - L_M	mH	±30%	3.7	0.68					

QT-7808

69 lb. ft.
PEAK TORQUE
RARE EARTH MAGNETS





NOTES:

1. — MOTOR SUPPLIED AS THREE SEPARATE COMPONENTS: ROTOR, STATOR, AND BRUSH RING SEGMENT.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .002 (.004 T.I.R.) WHEN MOUNTED.
3. — WITH POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD, ROTATION SHALL BE C.C.W. FACING BRUSH SIDE.

LEADS:
#16 AWG TYPE "EE" TEFLON INSULATED PER MIL W-16878, 12" MIN. LG.

SIZE CONSTANTS

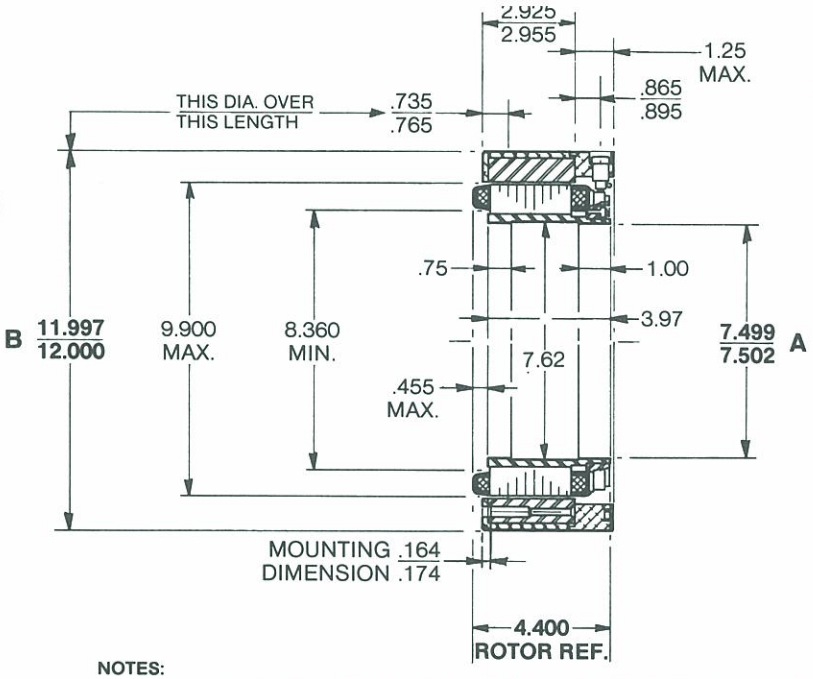
		Value	Units
Peak Torque Rating - T_P		69	LB.FT.
Power Input, Stalled at T_P (25°C) - P_P		852	WATTS
Motor Constant - K_M		2.36	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		9.12	RAD/S
Electrical Time Constant - τ_E		7.31	MS
Static Friction (Max.) - T_F		0.80	LB.FT.
Viscous Damping Coefficients	Zero Impedance - F_0	7.55	LB.FT. PER RAD/S
	Infinite Impedance - F_I	0.033	LB.FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		0.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		97	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		0.06	LB.FT.S^2
Motor Weight		47	LB.

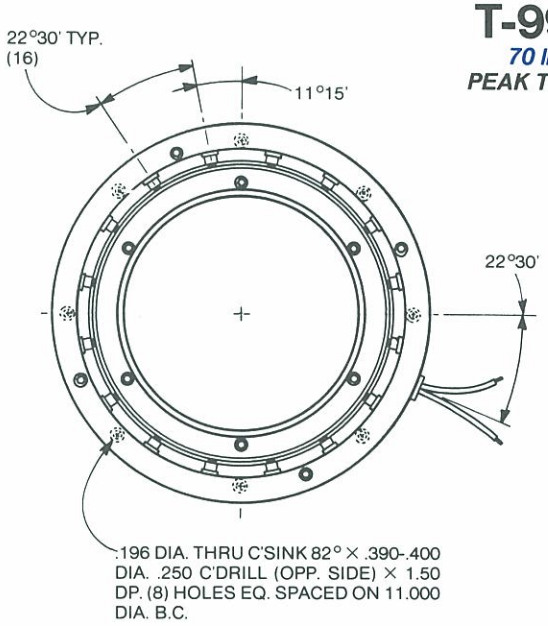
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	33.3						
Peak Current - I_P	AMPERES	Rated	25.6						
Torque Sensitivity - K_T	LB.FT./AMP	±10%	2.69						
Back EMF Constant - K_B	V PER RAD/S	±10%	3.65						
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.30						
Inductance - L_M	mH	±30%	9.5						

T-9905

70 lb. ft.
PEAK TORQUE





NOTES:

1. — MOTOR SUPPLIED AS (2) SEPARATE COMPONENTS: ROTOR AND STATOR MOUNTED ON SHIPPING CLAMP WITH MYLAR IN AIR GAP, AND BRUSH RING ASSEMBLY. **CAUTION:** ROTOR MUST REMAIN IN STATOR AT ALL TIMES.
2. — MOUNTING REQUIREMENTS: DIAMETERS "**A**" AND "**B**" TO BE CONCENTRIC WITHIN .003(.006 T.I.R.) WHEN MOUNTED.
3. — WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD ROTATION SHALL BE C.C.W. FACING BRUSH RING SIDE.
4. — FULL COMPLEMENT OF BRUSHES FOR IMPROVED HIGH CURRENT OPERATION.

LEADS:
14 AWG TEFLON COATED TYPE "EE"
12" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		70	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		850	WATTS
Motor Constant - K_M		2.40	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		8.5	RAD/S
Electrical Time Constant - τ_E		6.7	MS
Static Friction (Max.) - T_F		1.2	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	7.9	LB. FT. PER RAD/S
	Infinite Impedance - F_I	0.040	LB. FT. PER RAD/S
Maximum Winding Temperature		105	°C
Temperature Rise per Watt - TPR		0.4	°C/WATT
Ripple Torque (Average to Peak) - T_R		4	PERCENT
Ripple Frequency - (Fundamental)		143	CYCLES/REV.
Number of Poles		16	
Rotor Inertia - J_M		0.21	LB.FT.S^2
Motor Weight		52	LB.

WINDING CONSTANTS — Winding Designation

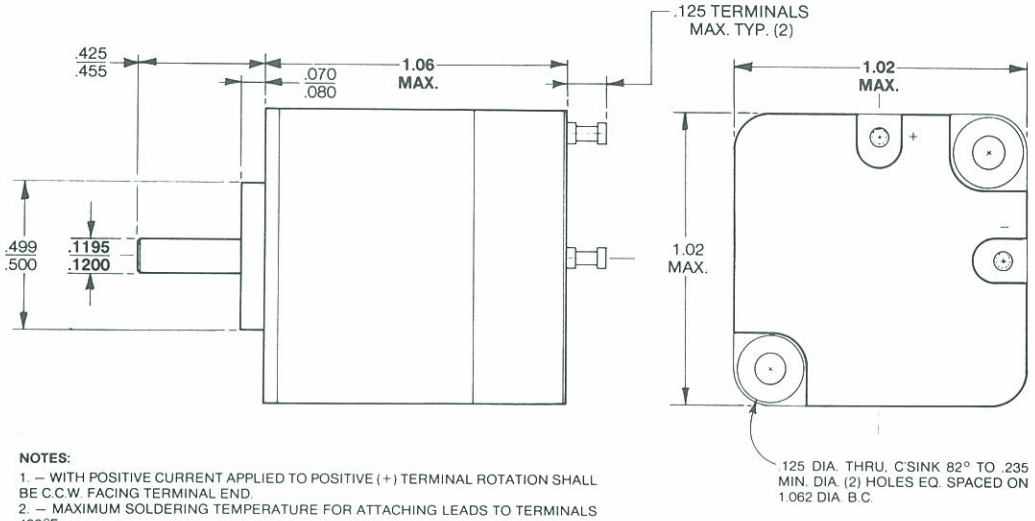
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	32	16					
Peak Current - I_P	AMPERES	Rated	26.5	53.0					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	2.64	1.32					
Back EMF Constant - K_B	V PER RAD/S	±10%	3.6	1.79					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.20	.300					
Inductance - L_M	mH	±30%	8	2.0					

Housed Servo Selection Guide (oz. in. & lb. ft.)

MODEL NUMBER	Peak Torque @ Stall		Motor Constant	No Load Speed	Electrical Time Constant	Friction	Rotor Inertia	Physical Dimensions		Weight
	T_P oz. in.	P_P watts	K_M oz. in./$\sqrt{watt}$	ω_{NL} rad/sec	τ_e msec.	T_f oz. in.	J_M oz. in. sec.^{2}	OD in.	Length in.	oz.
NT-0716	7.0	40	1.10	800	0.36	0.35	1.3×10^{-4}	1.02	1.06	2.9
OT-0706	15	70	1.79	667	0.57	0.80	2.5×10^{-4}	1.02	2.00	5.5
QT-0805	24	110	2.29	658	0.58	1.0	2.8×10^{-4}	1.32	2.13	7.3
T-1262	25	46	3.68	260	0.54	2.5	1.5×10^{-3}	2.53	2.56	22
T-1258	50	62	6.35	177	0.80	3.5	2.2×10^{-3}	2.52	2.85	30
NT-2173	54	57	7.1	150	0.96	3	9.0×10^{-3}	3.54	2.50	45
QT-1209	100	287	5.90	360	0.68	3	2.2×10^{-3}	2.52	2.85	30
QT-1226	100	74	11.7	104	0.55	7	5.0×10^{-3}	2.03	4.41	42
T-1266	100	102	9.9	143	1.06	6.0	3.2×10^{-3}	2.52	3.75	48
T-1281	100	102	9.9	143	1.05	6	3.2×10^{-3}	2.51	3.75	48
T-1816	100	95	10.3	130	1.3	4	1.0×10^{-2}	3.54	2.58	60
T-1856	110	125	9.8	162	0.64	4	1.0×10^{-2}	3.38	3.00	50
T-1814	200	120	18.3	85	2.2	5	1.7×10^{-2}	3.54	3.15	80
	lb. ft.	watts	lb. ft./$\sqrt{watt}$	rad/sec	msec.	lb. ft.	lb. ft. sec^2	in.	in.	lbs.
NT-2960	1.2	77	0.14	47	1.5	0.05	3.9×10^{-4}	4.02	3.12	3.1
T-1809	1.56	183	0.11	87	3	0.06	1.5×10^{-4}	3.50	4.39	6.5

NT-0716

7.0 oz. in.
PEAK TORQUE



NOTES:
1. — WITH POSITIVE CURRENT APPLIED TO POSITIVE (+) TERMINAL ROTATION SHALL BE C.C.W. FACING TERMINAL END.
2. — MAXIMUM SOLDERING TEMPERATURE FOR ATTACHING LEADS TO TERMINALS 400°F.
3. — UNIT HAS TRANSFER MOLDED END BELLS.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		7.0	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		40.2	WATTS
Motor Constant - K_M		1.10	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		800	RAD/S
Electrical Time Constant - τ_E		0.36	MS
Static Friction (Max.) - T_F		0.35	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.0086	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	3.9×10^{-4}	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		12	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		1.3×10^{-4}	OZ.IN.S^2
Motor Weight		2.93	OZ.

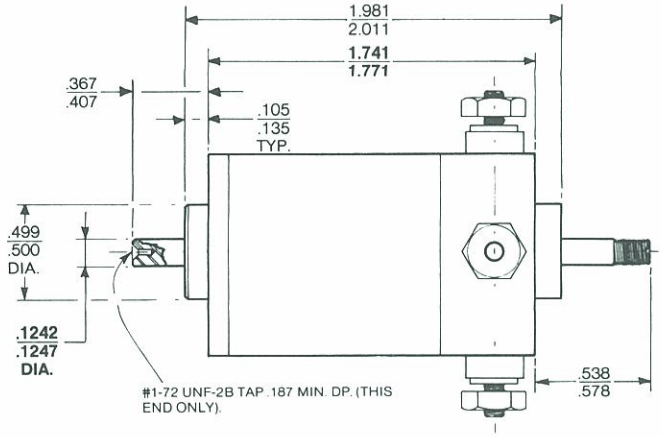
WINDING CONSTANTS

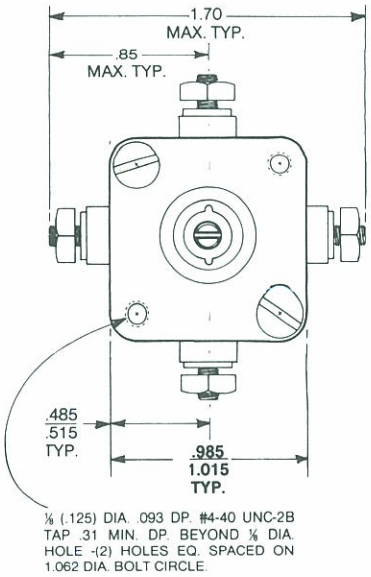
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P(25°C) - V_P	VOLTS	Nom.	25.9	20.5	13.0	38.9	30.0		
Peak Current - I_P	AMPERES	Rated	1.55	1.95	3.12	1.06	1.25		
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	4.5	3.57	2.24	6.6	5.6		
Back EMF Constant - K_B	V per RAD/S	±10%	.0318	.0252	.0158	.0466	.0395		
DC Resistance (25°C) - R_M	OHMS	±12.5%	16.7	10.5	4.18	36.7	24.0		
Inductance - L_M	mH	±30%	6.0	4.0	1.6	13.0	9.5		

QT-0706

15 oz. in.
PEAK TORQUE





NOTE:
WITH A POSITIVE CURRENT APPLIED TO "+" TERMINALS WITH RESPECT TO "−" TERMINALS ROTATION SHALL BE C.W. FACING BRUSH END.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		15	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		70	WATTS
Motor Constant - K_M		1.79	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @V_P - ω_{NL}		667	RAD/S
Electrical Time Constant - τ_E		0.57	MS
Static Friction (Max.) - T_F		0.80	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.0225	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.0009	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		10	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		2.5×10^{-4}	OZ.IN.S^2
Motor Weight		5.5	OZ.

WINDING CONSTANTS — Winding Designation

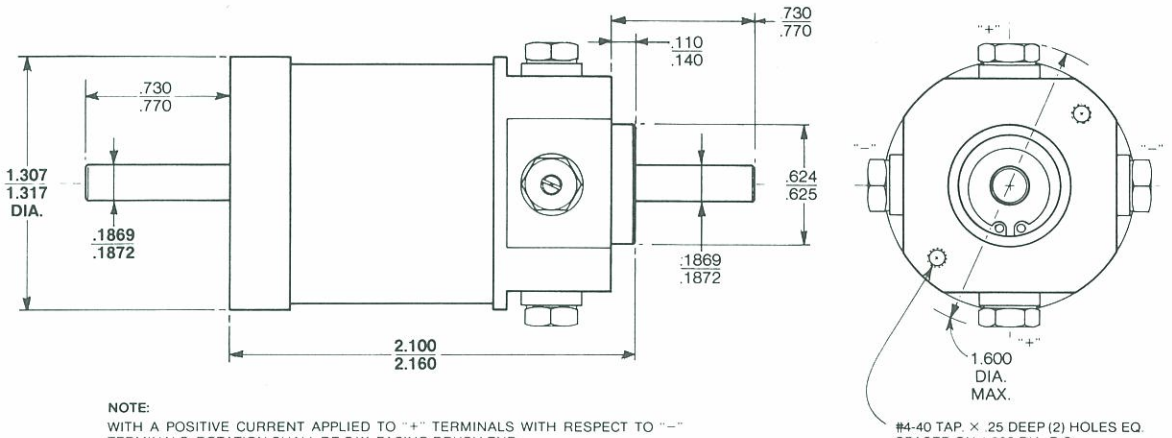
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	17.2	28.0					
Peak Current - I_P	AMPERES	Rated	4.00	2.50					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	3.75	6.00					
Back EMF Constant - K_B	V per RAD/S	±10%	0.026	0.042					
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.30	11.2					
Inductance - L_M	mH	±30%	2.5	6.4					

QT-0805

24 oz. in.

PEAK TORQUE

RARE EARTH MAGNETS



NOTE:
WITH A POSITIVE CURRENT APPLIED TO "+" TERMINALS WITH RESPECT TO "–" TERMINALS, ROTATION SHALL BE C.W. FACING BRUSH END.

#4-40 TAP. × .25 DEEP (2) HOLES EQ. SPACED ON 1.062 DIA. B.C.

SIZE CONSTANTS

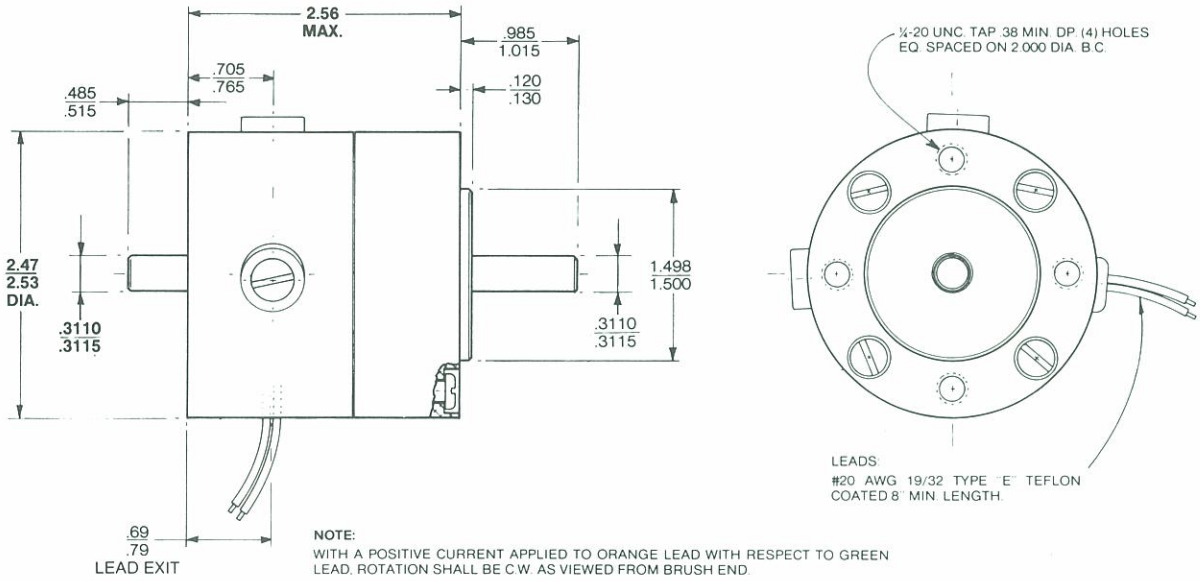
		Value	Units
Peak Torque Rating - T_P		24	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		110	WATTS
Motor Constant - K_M		2.29	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		658	RAD/S
Electrical Time Constant - τ_E		0.58	MS
Static Friction (Max.) - T_F		1.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.036	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.0011	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		9	°C/WATT
Ripple Torque (Average to Peak) - T_R		10	PERCENT
Ripple Frequency - (Fundamental)		13	CYCLES/REV
Number of Poles		4	
Rotor Inertia - J_M		2.8×10^{-4}	OZ.IN.S^2
Motor Weight		7.3	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	21.7						
Peak Current - I_P	AMPERES	Rated	5.05						
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	4.75						
Back EMF Constant - K_B	V per RAD/S	±10%	0.033						
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.30						
Inductance - L_M	mH	±30%	2.5						

T-1262

25 oz. in.
PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO ORANGE LEAD WITH RESPECT TO GREEN LEAD, ROTATION SHALL BE C.W. AS VIEWED FROM BRUSH END.

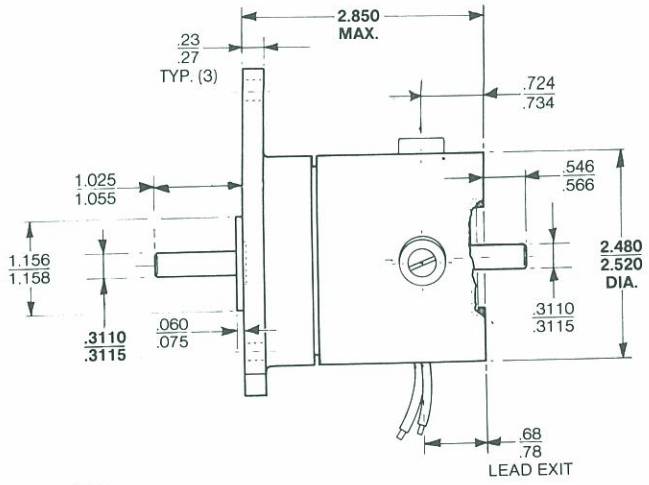
SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		25	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		46	WATTS
Motor Constant - K_M		3.68	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		260	RAD/S
Electrical Time Constant - τ_E		0.542	MS
Static Friction (Max.) - T_F		2.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.096	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.0015	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		8.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		21	CYCLES/REV
Number of Poles		4	
Rotor Inertia - J_M		0.0015	OZ.IN.S^2
Motor Weight		22	OZ.

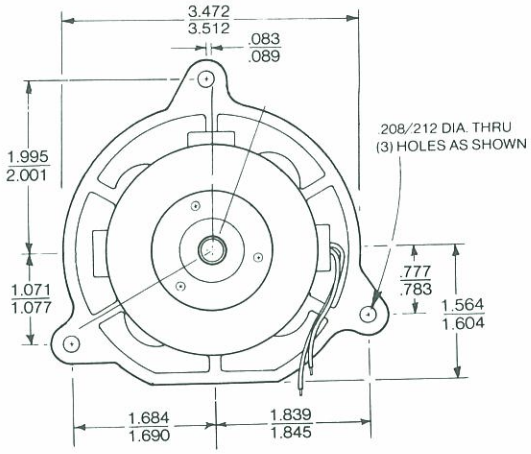
WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	10.5	21.0					
Peak Current - I_P	AMPERES	Rated	4.39	2.19					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	5.70	11.4					
Back EMF Constant - K_B	V per RAD/S	±10%	0.040	0.080					
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.40	9.60					
Inductance - L_M	mH	±30%	1.3	5.2					

T-1258
50 oz. in.
PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO ORANGE LEAD WITH RESPECT TO BLUE LEAD, ROTATION SHALL BE C.C.W. AS VIEWED FROM MOUNTING FLANGE END.



LEADS:
#20 AWG 19/32 TYPE "E" TEFLON COATED. LENGTH 16.00 MIN. FROM HOUSING.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		50	OZ. IN.
Power Input, Stalled at T_P(25°C) - P_P		62	WATTS
Motor Constant - K_M		6.35	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		177	RAD/S
Electrical Time Constant - τ_E		0.80	MS
Static Friction (Max.) - T_F		3.5	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_O	0.28	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.003	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		21	CYCLES/REV
Number of Poles		4	
Rotor Inertia - J_M		0.0022	OZ.IN.S^2
Motor Weight		30	OZ.

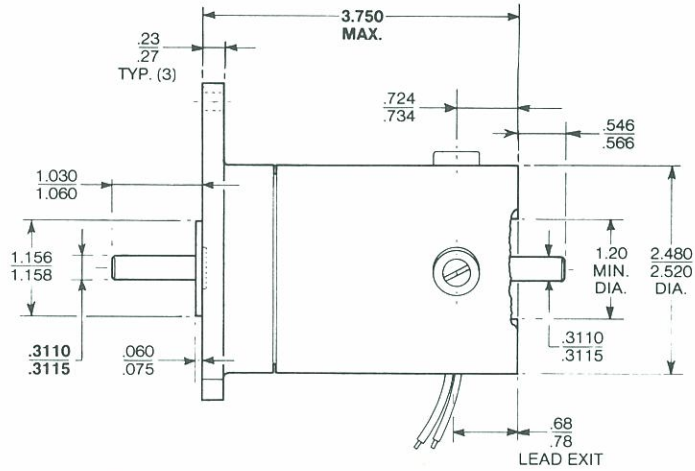
WINDING CONSTANTS

Winding Designation

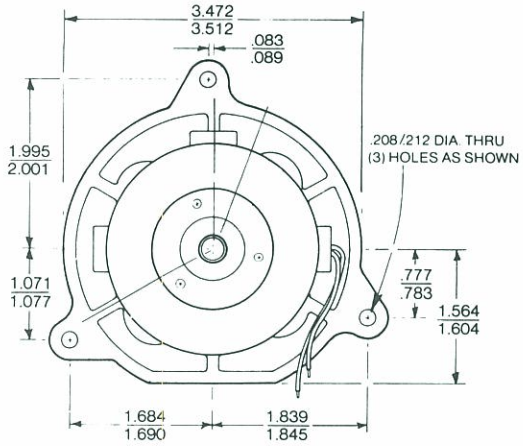
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	11.5	14.2	17.8	23.0	35.7		
Peak Current - I_P	AMPERES	Rated	5.48	4.38	3.50	2.74	1.75		
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	9.12	11.4	14.2	18.2	28.4		
Back EMF Constant - K_B	V per RAD/S	±10%	0.064	0.080	0.100	0.129	0.200		
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.10	3.25	5.10	8.40	20.4		
Inductance - L_M	mH	±30%	1.7	2.6	4.0	6.8	16		

T-1266

100 oz. in.
PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO ORANGE LEAD WITH RESPECT TO BLUE LEAD, ROTATION SHALL BE C.W. AS VIEWED FROM BRUSH END.



LEADS:
#20 AWG 19/32 TYPE "E" TEFLON COATED, LENGTH 16.000 MIN. FROM HOUSING.

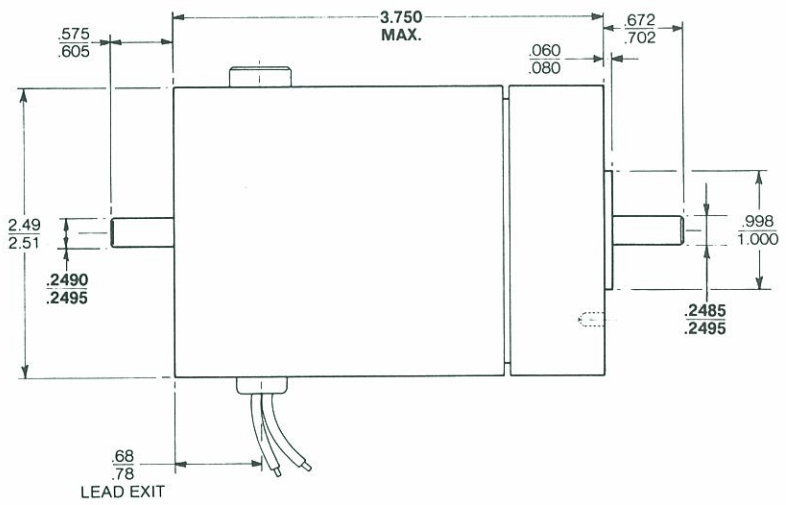
SIZE CONSTANTS

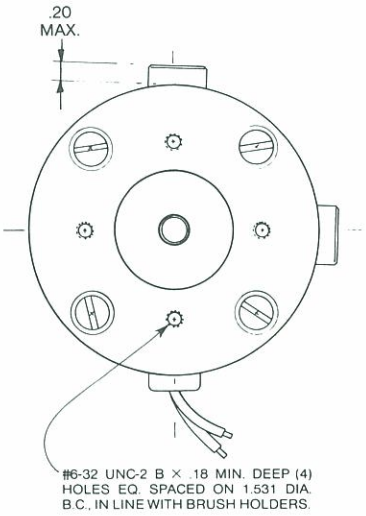
		Value	Units
Peak Torque Rating - T_P		100	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		102	WATTS
Motor Constant - K_M		9.9	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		143	RAD/S
Electrical Time Constant - τ_E		1.06	MS
Static Friction (Max.) - T_F		6.0	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.70	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.006	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		3.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		21	CYCLES/REV
Number of Poles		4	
Rotor Inertia - J_M		0.0032	OZ.IN.S^2
Motor Weight		48	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	22.3	17.7	28.1	35.2	14.0		
Peak Current - I_P	AMPERES	Rated	4.55	5.68	3.64	2.84	7.00		
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	22.0	17.6	27.5	35.2	14.3		
Back EMF Constant - K_B	V per RAD/S	±10%	0.155	0.124	0.194	0.248	0.101		
DC Resistance (25°C) - R_M	OHMS	±12.5%	4.90	3.11	7.72	12.4	2.00		
Inductance - L_M	mH	±30%	5.2	3.3	8.1	13	2.2		

T-1281
100 oz. in.
PEAK TORQUE





NOTES:
1. – WITH A POSITIVE CURRENT APPLIED TO ORANGE LEAD WITH RESPECT TO BLUE LEAD, ROTATION SHALL BE C.W. AS VIEWED FROM BRUSH END.
2. – UNIT SUPPLIED WITH ENCODER MOUNTING HOLES ON BRUSH END.

LEADS:
#20 AWG 19/32 TYPE "E" TEFLON COATED 36" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		100	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		102	WATTS
Motor Constant - K_M		9.9	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		143	RAD/S
Electrical Time Constant - τ_E		1.05	MS
Static Friction (Max.) - T_F		6	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.70	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.006	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		3.5	°C/WATT
Ripple Torque (Average to Peak) - T_R		7	PERCENT
Ripple Frequency - (Fundamental)		21	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.0032	OZ.IN.S^2
Motor Weight		48	OZ.

WINDING CONSTANTS

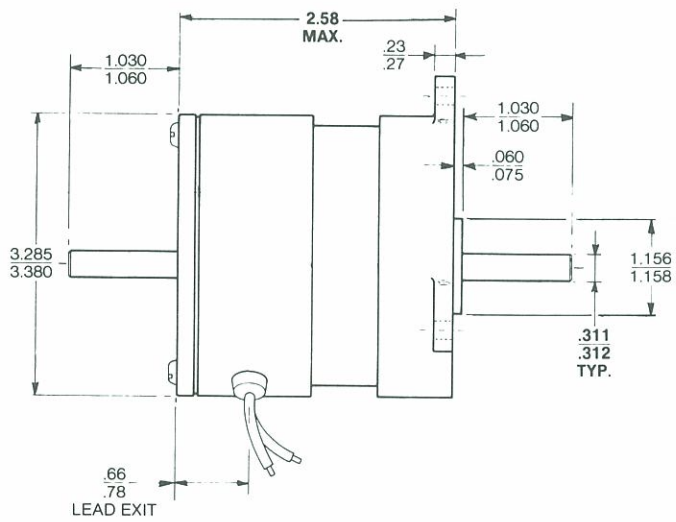
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	28.0	17.7					
Peak Current - I_P	AMPERES	Rated	3.64	5.70					
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	27.5	17.6					
Back EMF Constant - K_B	V per RAD/S	±10%	0.194	0.124					
DC Resistance (25°C) - R_M	OHMS	±12.5%	7.70	3.10					
Inductance - L_M	mH	±30%	8.1	3.3					

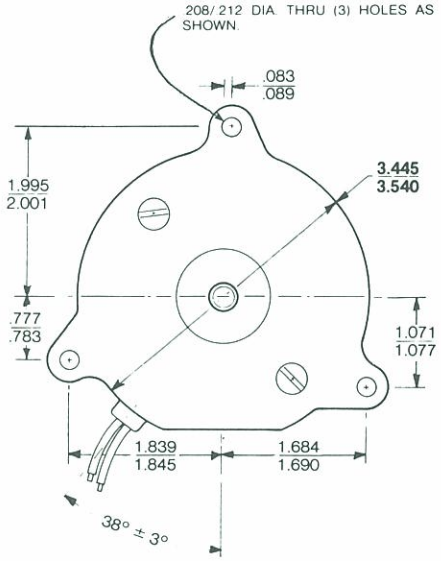
T-1816

100 oz. in.

PEAK TORQUE



NOTE:
WITH A POSITIVE CURRENT APPLIED TO ORANGE LEAD WITH RESPECT TO BLUE LEAD, ROTATION SHALL BE C.C.W FACING DRIVE END.



LEADS:
#20 AWG TYPE "E" TEFLON COATED
12" MIN. LENGTH PER MIL-W-16878.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		* 100	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		95	WATTS
Motor Constant - K_M		10.3	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		130	RAD/S
Electrical Time Constant - τ_E		1.3	MS
Static Friction (Max.) - T_F		4	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.75	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.012	OZ IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.010	OZ.IN.S^2
Motor Weight		60	OZ.

*Cont. stall torque = 42 oz.in.; 25°C ambient

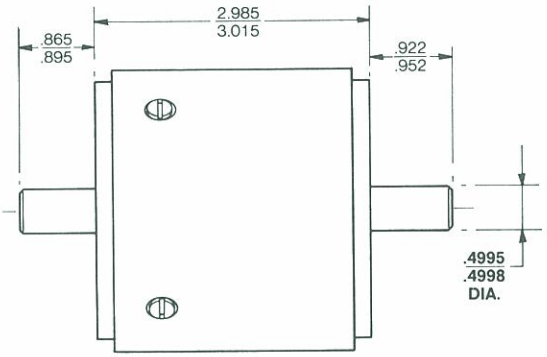
WINDING CONSTANTS

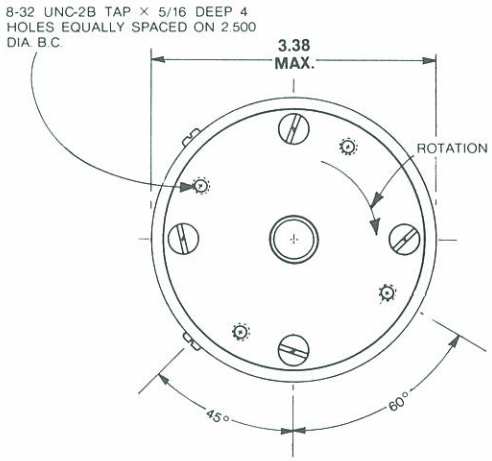
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	9.6	100.0	12.2	14.9	24.3		
Peak Current - I_P	AMPERES	Rated	10.7	0.85	8.45	6.76	3.37		
Torque Sensitivity - K_T	OZ.IN./AMP.	±10%	9.3	118.0	11.8	14.8	29.7		
Back EMF Constant - K_B	V per RAD/S	±10%	0.066	0.83	0.083	0.105	0.210		
DC Resistance (25°C) - R_M	OHMS	±12.5%	0.90	118.0	1.44	2.2	7.20		
Inductance - L_M	mH	±30%	1.1	176.0	1.76	2.8	11.2		

T-1856

110 oz. in.
PEAK TORQUE





NOTES:
1. – WITH POSITIVE CURRENT APPLIED TO "+" TERMINAL, ROTATION SHALL BE C.C.W. FACING BRUSH END.
2. – EPOXY ENCAPSULATED STATOR ASSEMBLY.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		110	OZ.IN.
Power Input, Stalled at T_P (25°C) - P_P		125	WATTS
Motor Constant - K_M		9.8	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		162	RAD/S
Electrical Time Constant - τ_E		.64	MS
Static Friction (Max.) - T_F		4	OZ.IN.
Viscous Damping Coefficients	Zero Impedance - F_0	.68	OZ.IN. PER RAD/S
	Infinite Impedance - F_I	.01	OZ.IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.0	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		.01	OZ.IN.S^2
Motor Weight		50	OZ.

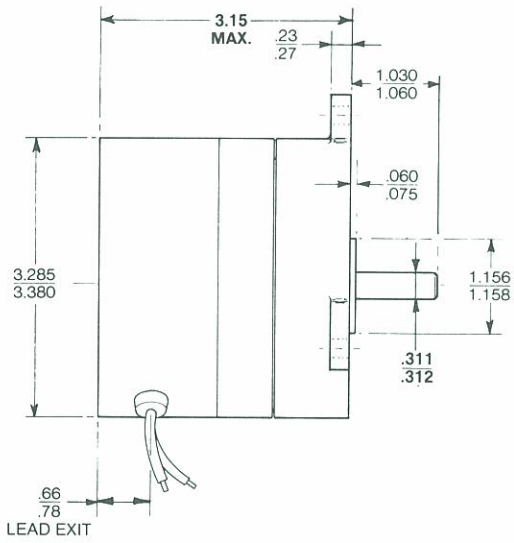
WINDING CONSTANTS

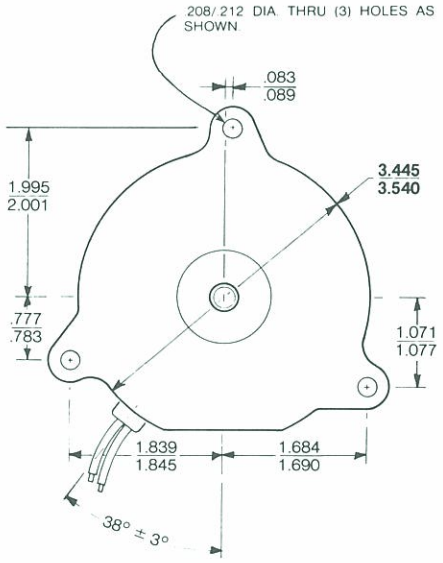
Winding Designation

	UNITS	TOLERANCES	
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	12.5
Peak Current - I_P	AMPERES	Rated	10
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	11
Back EMF Constant - K_B	V PER RAD/S	±10%	.077
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.25
Inductance - L_M	mH	±30%	.8

T-1814

200 oz. in.
PEAK TORQUE





NOTE:
WITH A POSITIVE CURRENT APPLIED TO ORANGE LEAD WITH RESPECT TO BLUE LEAD, ROTATION SHALL BE C.C.W. FACING DRIVE END.

LEADS:
#20 AWG TYPE "E" TEFLON COATED
12" MIN. LENGTH PER MIL-W-16878.

SIZE CONSTANTS

	Value	Units
Peak Torque Rating - T_P	200	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P	120	WATTS
Motor Constant - K_M	18.3	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}	85	RAD/S
Electrical Time Constant - τ_E	2.2	MS
Static Friction (Max.) - T_F	5	OZ. IN.
Viscous Damping Coefficients — Zero Impedance - F_0	2.3	OZ. IN. PER RAD/S
Viscous Damping Coefficients — Infinite Impedance - F_I	0.024	OZ. IN. PER RAD/S
Maximum Winding Temperature	155	°C
Temperature Rise per Watt - TPR	3.5	°C/WATT
Ripple Torque (Average to Peak) - T_R	5	PERCENT
Ripple Frequency - (Fundamental)	25	CYCLES/REV.
Number of Poles	4	
Rotor Inertia - J_M	0.017	OZ.IN.S^2
Motor Weight	80	OZ.

WINDING CONSTANTS

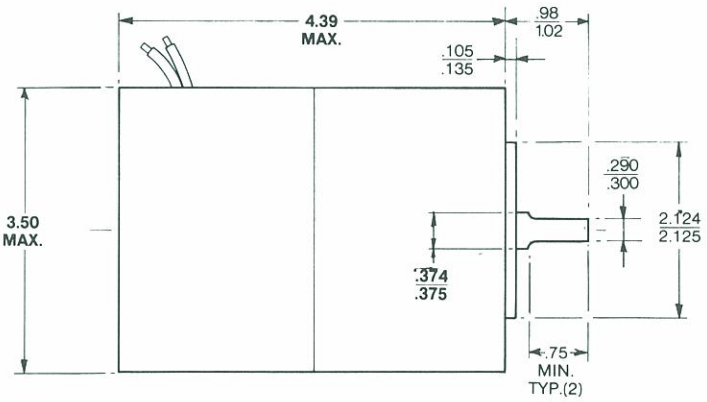
Winding Designation

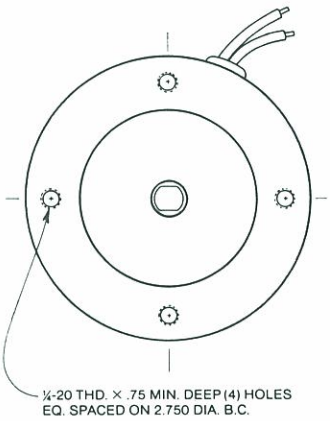
	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	12.3	81.7	22.0				
Peak Current - I_P	AMPERES	Rated	10.7	1.34	5.40				
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	18.6	149.0	36.8				
Back EMF Constant - K_B	V per RAD/S	±10%	0.131	1.052	0.262				
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.15	61.0	4.08				
Inductance - L_M	mH	±30%	2.2	141.0	8.8				

T-1809

300 oz. in.

PEAK TORQUE





NOTE:
WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD WITH RESPECT TO ORANGE LEAD ROTATION SHALL BE C.W. FACING SHAFT END.

LEADS:
#18 AWG TEFLON COATED TYPE "EE"
6" MIN. LG.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		300	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		183	WATTS
Motor Constant - K_M		22	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		87	RAD/S
Electrical Time Constant - τ_E		3	MS
Static Friction (Max.) - T_F		12	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	3.5	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.040	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		2.6	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		25	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.028	OZ.IN.S^2
Motor Weight		6.5	OZ.

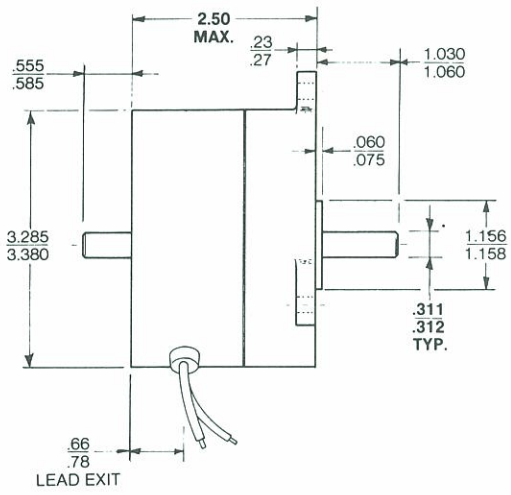
WINDING CONSTANTS

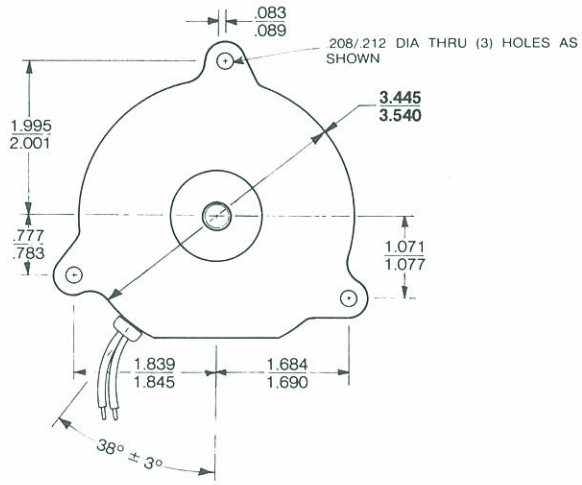
Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	30.6	9.9	85.6	16.2			
Peak Current - I_P	AMPERES	Rated	6	18.0	1.9	11.6			
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	50	16.7	159.0	26.0			
Back EMF Constant - K_B	V per RAD/S	±10%	0.35	0.12	1.12	0.18			
DC Resistance (25°C) - R_M	OHMS	±12.5%	5.1	0.55	45.0	1.4			
Inductance - L_M	mH	±30%	12	1.3	122	3.1			

NT-2173

54 oz. in.
PEAK TORQUE





NOTE:

WITH A POSITIVE CURRENT APPLIED TO ORANGE LEAD WITH RESPECT TO BLUE LEAD, ROTATION SHALL BE C.C.W. FACING MOUNTING FLANGE END.

LEADS:

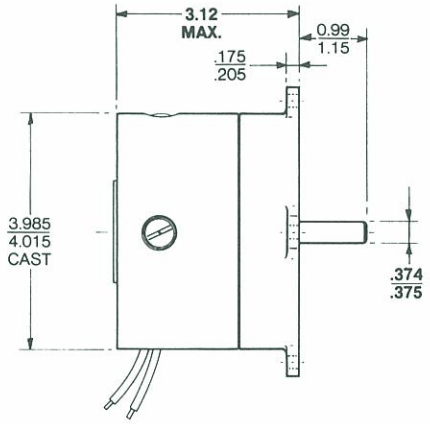
#20 AWG TYPE "E" TEFLON COATED 12" MIN. LENGTH PER MIL-W-16878.

SIZE CONSTANTS

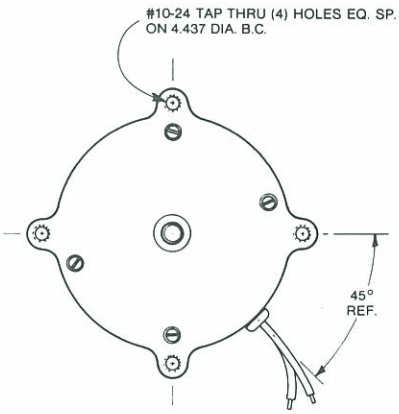
		Value	Units
Peak Torque Rating - T_P		54	OZ. IN.
Power Input, Stalled at T_P (25°C) - P_P		57	WATTS
Motor Constant - K_M		7.1	OZ.IN./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		150	RAD/S
Electrical Time Constant - τ_E		0.96	MS
Static Friction (Max.) - T_F		3	OZ. IN.
Viscous Damping Coefficients	Zero Impedance - F_0	0.36	OZ. IN. PER RAD/S
	Infinite Impedance - F_I	0.012	OZ. IN. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		5	°C/WATT
Ripple Torque (Average to Peak) - T_R		6	PERCENT
Ripple Frequency - (Fundamental)		33	CYCLES/REV.
Number of Poles		4	
Rotor Inertia - J_M		0.009	OZ.IN.S^2
Motor Weight		45	OZ.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	12.0	27.9	22.4	5.6	106.4	9.4	19.2
Peak Current - I_P	AMPERES	Rated	4.8	1.51	1.90	10.2	0.38	6.25	3.00
Torque Sensitivity - K_T	OZ.IN./AMP	±10%	11.3	36.0	28.6	5.3	144.0	8.65	18.0
Back EMF Constant - K_B	V per RAD/S	±10%	0.080	0.254	0.202	0.037	1.017	0.061	0.127
DC Resistance (25°C) - R_M	OHMS	±12.5%	2.5	18.5	11.8	0.55	280	1.50	6.40
Inductance - L_M	mH	±30%	2.4	24.2	15.4	0.53	387	1.4	6.0



NOTE:
WITH A POSITIVE CURRENT APPLIED TO GREEN LEAD ROTATION SHALL BE C.W. FACING SHAFT END.



LEADS:
#18 AWG TYPE "E" TEFLON COATED
8" MIN. LENGTH.

SIZE CONSTANTS

		Value	Units
Peak Torque Rating - T_P		1.2	LB. FT.
Power Input, Stalled at T_P (25°C) - P_P		77	WATTS
Motor Constant - K_M		0.137	LB.FT./$\sqrt{\text{WATT}}$
No Load Speed, Theoretical @ V_P - ω_{NL}		47	RAD/S
Electrical Time Constant - τ_E		1.5	MS
Static Friction (Max.) - T_F		0.052	LB. FT.
Viscous Damping Coefficients	Zero Impedance - F_0	0.025	LB. FT. PER RAD/S
	Infinite Impedance - F_I	1×10^{-3}	LB. FT. PER RAD/S
Maximum Winding Temperature		155	°C
Temperature Rise per Watt - TPR		4.3	°C/WATT
Ripple Torque (Average to Peak) - T_R		5	PERCENT
Ripple Frequency - (Fundamental)		41	CYCLES/REV.
Number of Poles		10	
Rotor Inertia - J_M		3.9×10^{-4}	LB.FT.S^2
Motor Weight		3.1	LB.

WINDING CONSTANTS — Winding Designation

	UNITS	TOLERANCES	A	B	C	D	E	F	G
Voltage, Stalled at T_P (25°C) - V_P	VOLTS	Nom.	12.0	24.0					
Peak Current - I_P	AMPERES	Rated	6.3	3.15					
Torque Sensitivity - K_T	LB.FT./AMP	±10%	0.19	0.38					
Back EMF Constant - K_B	V per RAD/S	±10%	0.26	0.52					
DC Resistance (25°C) - R_M	OHMS	±12.5%	1.9	7.6					
Inductance - L_M	mH	±30%	3.1	12.3					

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