

## SPECIFICATION CONTROL DRAWING

### 1.0 GENERAL

- 1.1 This document establishes the Mechanical, Electrical and Performance specifications for a D.C. Motor.
- 1.2 The supplier shall not change any parameter of this specification or the products purchased by XXX under this specification including but not limited to, change of material, methods of manufacture, or design, without the prior written consent of XXX.

### 2.0 Mechanical Specifications

- 2.1 Dimensions per Figure 1. All dimensions are in millimeters,  $\pm 0.3\text{mm}$  unless otherwise specified.

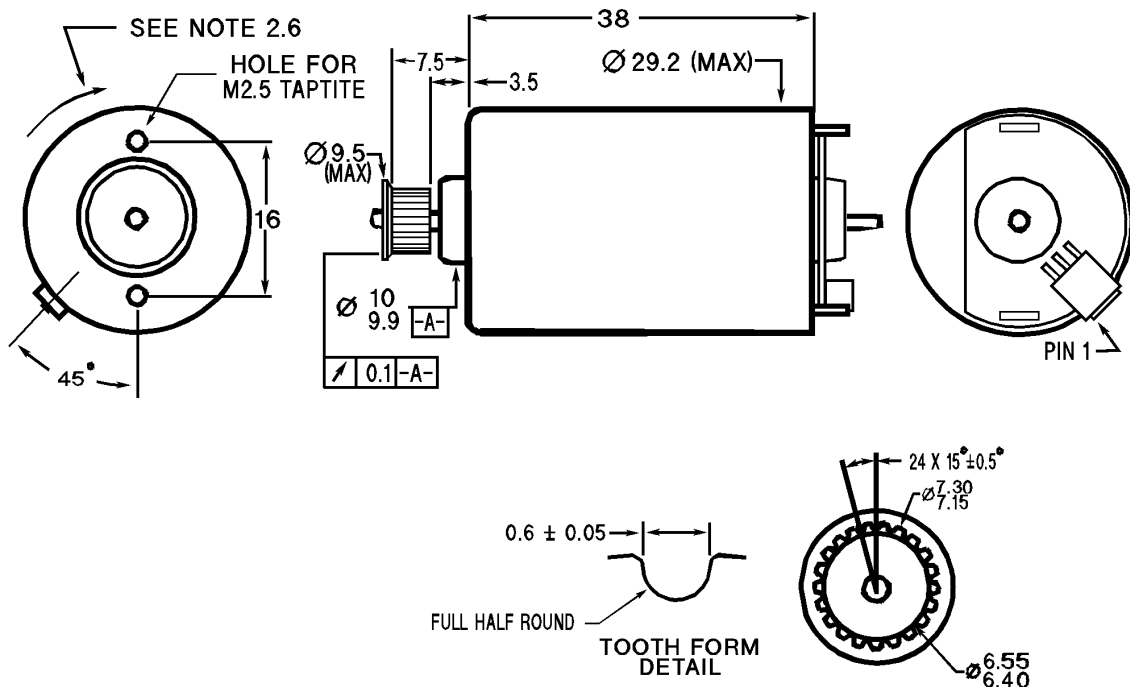


Figure 1 - Motor Assembly

- 2.2 Bearings; oil impregnated, sintered bronze alloy bushings as required to pass life testing with 0.05mm radial play.
- 2.3 Shaft extension, End Play and Preload
  - 2.3.1 Max shaft or pulley extension from the mounting surface
    - 2.3.1.1 Drive End; 11mm.
    - 2.3.1.2 Brush End; 45mm.
  - 2.3.2 Maximum End Play; 0.5mm.
  - 2.3.3 Pulley Position and Shaft Extension to be measured with the armature in it's natural preloaded position
- 2.4 Rotor inertia including gear;  $8\text{gm}\cdot\text{cm}^2$  (ref).

- 2.5 RFI suppression; as required to pass FCC minus 15db with motor operating as discribed in life test.
  - 2.6 Shaft rotation with pin 1 Positive to be clockwise as viewed from the Pulley end. All performance specs and EMI to be met in both directions.
  - 2.7 Connector; SMK part # CGP 4703-0101, with the center pin not used, or XXX approved equivalent.
  - 2.8 The pulley shall transmit 5 n-cm of torque without slipping on the armature shaft, between - 20degc and 85degc.
  - 2.9 Cogging Torque, peak to peak; 0.3 Ncm (max)
  - 2.10 The angular connector position is an XXX process critical dimension. It shall be held at 45° ±5° from the screw holes to the center of the connector.
  - 2.11 A M2.5 screw inserted 4mm into the motor shall not cause damage to the motor.
- 3.0 Electrical Specifications
- 3.1 All electrical measurements shall be performed at ambient temperatures between +20°C and +25°C, and shall be performed fast enough to prevent any heating effects.
  - 3.2 Test Voltage; 18.0 volts.
  - 3.3 Terminal Resistance; 6.3 ohms +/- 10% (-15% at end of life)
  - 3.4 Terminal Inductance measured at 1khz; 9.2 millihenries (ref)
- 4.0 Motor Performance Specifications
- 4.1 All motor performance measurements shall be performed fast enough to prevent any heating effects.at ambient temperatures between +20 and +25 degc
  - 4.2 Torque Constant; 1.9 Ncm/amp +/- 10%
  - 4.3 Voltage Constant; 2.0 V/krpm (ref)
  - 4.4 Motor Constant; 0.75 Ncm/sqrt(watt) (ref)
  - 4.5 Start-Up Voltage; 1.5 volts maximum with no side load
  - 4.6 No Load performance at test voltage
    - 4.6.1 No Load speed; 8500 rpm +/- 10%
    - 4.6.2 No load current; 0.18 amps maximum with no side load
  - 4.7 Stall performance at test voltage
    - 4.7.1 Stall torque; 5.0 Ncm (ref)
    - 4.7.2 Stall current; 2.77 amps (ref)

## 5.0 Life test

5.1 Life test duration; 500hours

5.2 Torsional load; 1.5 Ncm.

5.3 Side load; 10 N.

5.4 Applied voltage ; 12 v. CCW for 50ms. Then off for 300ms. Then repeat continuously.

5.5 At the end of the life test, the motor shall meet Sections 3 and 4.

## 6.0 Statistical Quality Control

6.1 Critical Parameters: The following parameters have been identified as critical for motor performance. Terminal Resistance (Rt), Torque Constant (Kt). Additional parameters may be included, either at this level or from the motor final assembly. These parameters are to be monitored on an audit basis, with random samples selected from each lot and tested. Data on these parameters is to be tabulated, archived by the supplier, and forwarded to XXX once per month using a format approved by XXX.

6.2 Frequency: Sampling will be performed on an ongoing basis during all manufacturing lots. The sample size to be approved by Hewlett Packard.

6.3 Lot Code: Each Lot Code shall contain motors built and tested during a specific period of time (one week max). All motors in a lot shall be built in the same location with similar parts and processes. The XXX part # and Lot Code shall be referenced on all QA data and permanently marked onto each motor in a location and format approved by XXX.

## 7.0 Packaging to be approved by XXX