

# Quantum Series

## Brushless DC Motors

For Further Information Contact ....

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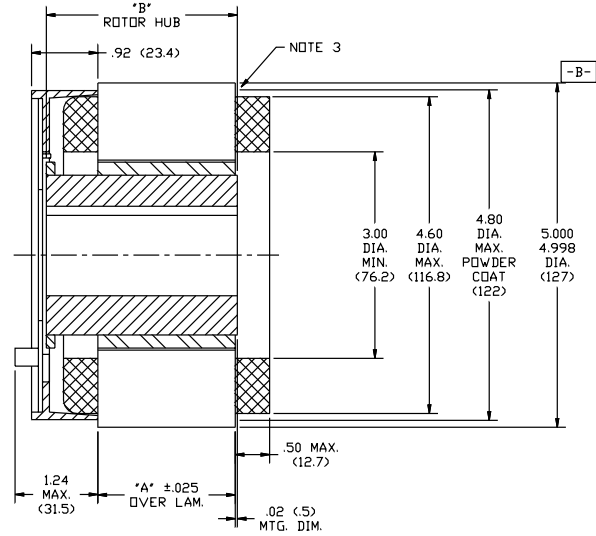
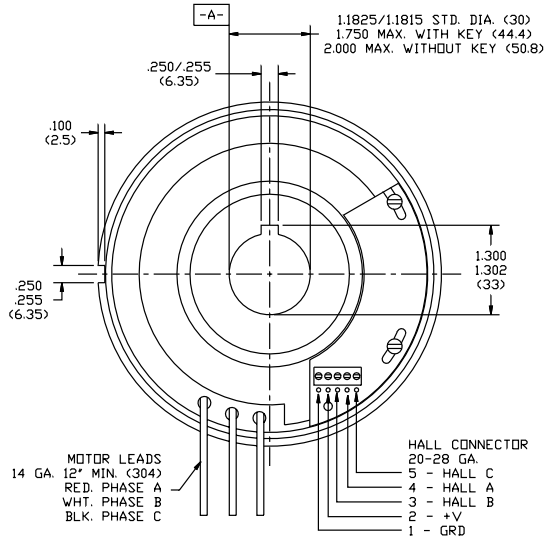
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**Heason**  
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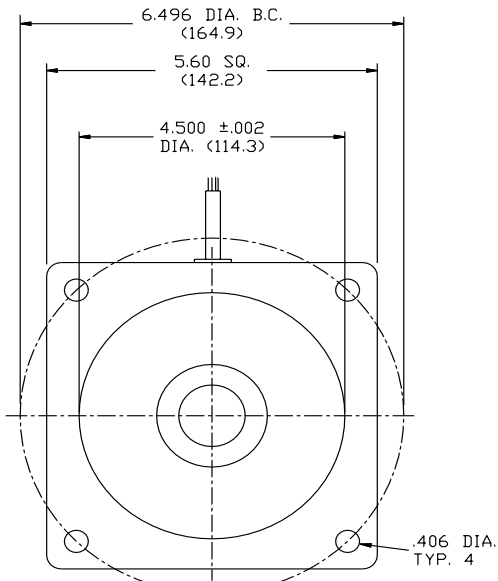
### Frameless Motor



- MOTOR SUPPLIED AS TWO SEPARATE COMPONENTS, ROTOR ASSEMBLY AND STATOR ASSEMBLY.
- DIAMETERS "A" AND "B" TO BE CONCENTRIC WITHIN .005 WHEN MOUNTED.
- BETWEEN STATOR O.D. AND POWDER COAT, LAMINATIONS ARE EXPOSED FOR MOUNTING SURFACE, BOTH ENDS.

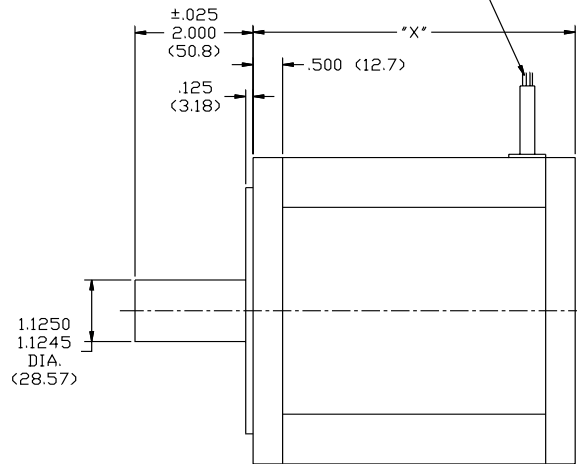
| MODEL | "A" STATOR  | "B" ROTOR    |
|-------|-------------|--------------|
| 5600  | 1.0 (25.4)  | 1.78 (45.2)  |
| 5601  | 2.0 (50.8)  | 2.81 (71.3)  |
| 5602  | 3.0 (76.2)  | 3.81 (96.7)  |
| 5603  | 4.0 (101.6) | 4.84 (122.9) |
| 5604  | 5.0 (127)   | 5.84 (148.3) |
| 5605  | 6.0 (152.4) | 6.87 (174.5) |

### Housed Motor



LEADWIRE - TEFLON COATED  
TYPE "E" PER MIL-W-16878/4  
12" MIN. LENGTH (305)

A) MOTOR: 14 AWG. RED(A), WHT(B), BLK(C)  
B) SENSOR: 24 AWG. BLU(+), BRN(A), ORG(B)  
YEL(C), GRN(GRD)



| MODEL   | "X"          |
|---------|--------------|
| QB05600 | 4.84 (123)   |
| QB05601 | 5.84 (148.3) |
| QB05602 | 6.84 (173.7) |
| QB05603 | 7.84 (199)   |
| QB05604 | 8.84 (224.5) |
| QB05605 | 9.84 (250)   |

**Hathaway**  
**Emoteq Corp**

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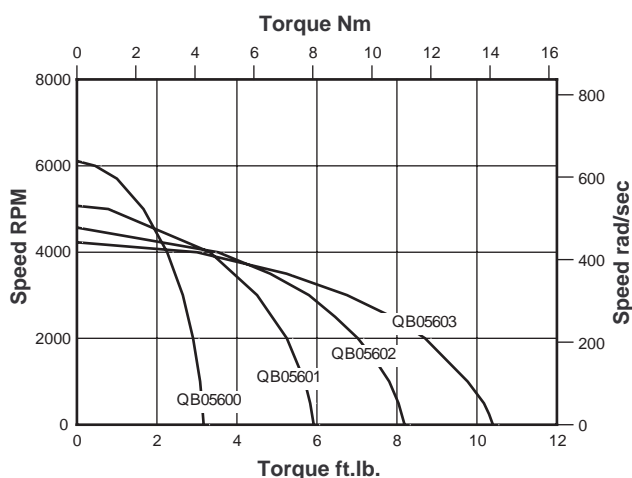
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# Quantum Series

# Size 56

## Brushless DC Motors

| PARAMETER                   | SYMBOL   | UNIT                 | QB05600 |       |       | QB05601 |       |       | QB05602 |       |       | QB05603 |       |       |
|-----------------------------|----------|----------------------|---------|-------|-------|---------|-------|-------|---------|-------|-------|---------|-------|-------|
| <b>Size Constants</b>       |          |                      |         |       |       |         |       |       |         |       |       |         |       |       |
| Max Cont. Stall Torque      | $T_C$    | ft.lb.               | 3.17    |       |       | 5.92    |       |       | 8.19    |       |       | 10.40   |       |       |
|                             |          | Nm                   | 4.29    |       |       | 8.03    |       |       | 11.10   |       |       | 14.10   |       |       |
| Max Rated Torque, 25%       | $T_R$    | ft.lb.               | 22.3    |       |       | 43.7    |       |       | 62.8    |       |       | 83.7    |       |       |
|                             |          | Nm                   | 30.3    |       |       | 57.2    |       |       | 85.1    |       |       | 113.5   |       |       |
| Motor Constant,             | $K_M$    | ft.lb./V             | 0.42    |       |       | 0.65    |       |       | 0.809   |       |       | 0.957   |       |       |
|                             |          | Nm/V                 | 0.56    |       |       | 0.88    |       |       | 1.09    |       |       | 1.29    |       |       |
| Electrical Time Constant    | $T_E$    | msec                 | 5.09    |       |       | 5.49    |       |       | 6.59    |       |       | 6.83    |       |       |
| Mechanical Time Constant    | $T_M$    | msec                 | 1.13    |       |       | 0.93    |       |       | 0.92    |       |       | 0.88    |       |       |
| Thermal Resistance          | TPR      | °C/Watt              | 1.09    |       |       | 0.75    |       |       | 1.15    |       |       | 0.52    |       |       |
| Viscous Damping             | $F_I$    | ft.lb./rpm           | 1.7E-5  |       |       | 3.6E-5  |       |       | 5.5E-5  |       |       | 7.4E-5  |       |       |
|                             |          | Nm/rpm               | 2.3E-5  |       |       | 4.9E-5  |       |       | 7.5E-5  |       |       | 1.0E-4  |       |       |
| Max Cogging Torque          | $T_F$    | ft.lb.               | 0.057   |       |       | 0.099   |       |       | 0.141   |       |       | 0.182   |       |       |
|                             |          | Nm                   | 0.078   |       |       | 0.134   |       |       | 0.191   |       |       | 0.247   |       |       |
| <b>Mechanical Constants</b> |          |                      |         |       |       |         |       |       |         |       |       |         |       |       |
| Frameless Motor Inertia     | $J_M$    | ft.lb.s <sup>2</sup> | 2.7E-4  |       |       | 5.4E-4  |       |       | 8.1E-4  |       |       | 1.1E-3  |       |       |
|                             |          | Kg.m <sup>2</sup>    | 3.6E-4  |       |       | 7.3E-4  |       |       | 1.1E-3  |       |       | 1.5E-3  |       |       |
| Frameless Motor Weight      | Wt       | lb.                  | 3.79    |       |       | 8.81    |       |       | 12.8    |       |       | 17.0    |       |       |
|                             |          | Kg                   | 1.72    |       |       | 3.99    |       |       | 5.84    |       |       | 7.76    |       |       |
| Housed Motor Inertia        | $J_M$    | ft.lb.s <sup>2</sup> | 4.6E-4  |       |       | 8.3E-4  |       |       | 1.2E-3  |       |       | 1.6E-3  |       |       |
|                             |          | Kg.m <sup>2</sup>    | 6.3E-4  |       |       | 1.1E-3  |       |       | 1.6E-3  |       |       | 2.1E-3  |       |       |
| Housed Motor Weight         | Wt       | lb.                  | 10.59   |       |       | 17.31   |       |       | 23.0    |       |       | 28.8    |       |       |
|                             |          | Kg                   | 4.80    |       |       | 7.84    |       |       | 10.4    |       |       | 13.0    |       |       |
| Number of Poles             | -        | -                    | 8       |       |       | 8       |       |       | 8       |       |       | 8       |       |       |
| <b>Winding Constants</b>    |          |                      |         |       |       |         |       |       |         |       |       |         |       |       |
| Design Voltage              | $V_p$    | Volts                | A       | B     | C     | A       | B     | C     | A       | B     | C     | A       | B     | C     |
| Peak Torque                 | $T_p$    | ft.lb.               | 40      | 130   | 300   | 40      | 130   | 300   | 40      | 130   | 300   | 40      | 130   | 300   |
|                             |          | Nm                   | 22.3    | 22.3  | 22.3  | 43.7    | 43.7  | 43.7  | 62.8    | 62.8  | 62.8  | 83.7    | 83.7  | 83.7  |
| Peak Current                | $I_p$    | Amperes              | 30.3    | 30.3  | 30.3  | 59.2    | 59.2  | 59.2  | 85.1    | 85.1  | 85.1  | 113.5   | 113.5 | 113.5 |
| Torque Constant, ±10%       | $K_T$    | ft.lb./A             | 224     | 121   | 62    | 409     | 204   | 93    | 498     | 263   | 124   | 640     | 299   | 154   |
|                             |          | Nm/A                 | 0.100   | 0.184 | 0.358 | 0.107   | 0.214 | 0.467 | 0.126   | 0.238 | 0.504 | 0.131   | 0.280 | 0.541 |
| No Load Speed               | $S_{NL}$ | RPM                  | 0.135   | 0.250 | 0.486 | 0.145   | 0.290 | 0.633 | 0.171   | 0.323 | 0.683 | 0.177   | 0.380 | 0.734 |
|                             |          | Rad/s                | 2830    | 4971  | 5896  | 2634    | 4281  | 4528  | 2235    | 3847  | 4192  | 2156    | 3270  | 3903  |
| BEMF Constant, ±10%         | $K_B$    | V/KRPM               | 296     | 520   | 617   | 275     | 448   | 474   | 234     | 402   | 439   | 225     | 342   | 408   |
|                             |          | V/rad/s              | 14.3    | 26.1  | 50.8  | 15.1    | 30.3  | 66.2  | 17.8    | 33.8  | 71.5  | 18.5    | 39.7  | 76.8  |
| Terminal Resistance, ±12%   | $R_M$    | Ohms                 | 0.135   | 0.250 | 0.486 | 0.145   | 0.290 | 0.633 | 0.171   | 0.323 | 0.683 | 0.177   | 0.380 | 0.734 |
| Terminal Inductance, ±30%   | $L_M$    | mH                   | 0.056   | 0.196 | 0.761 | 0.027   | 0.107 | 0.511 | 0.024   | 0.085 | 0.400 | 0.019   | 0.088 | 0.324 |
|                             |          |                      | 0.287   | 0.981 | 3.715 | 0.146   | 0.586 | 2.788 | 0.160   | 0.570 | 2.556 | 0.127   | 0.585 | 2.187 |



### Continuous Duty Speed/Torque Curves for 100°C Temperature rise.

The continuous duty speed/torque curves provide a guide to the operational capability of the motors. Continuous operation at a loadpoint on or under the curve limits the temperature rise of the motor to 100°C. Although the duration of acceleration or deceleration periods should be checked, the RMS speed and torque combination should also lie on or under the continuous duty curve. The curves assume housed motors mounted to a nominal size of aluminum heatsink in a 25°C ambient environment and still air cooling. Higher ambient temperatures will generally decrease the continuous duty capability of a motor. With increased heatsink areas or improved cooling such as forced air or water, the continuous duty capability of the motor may be increased. However, for most applications, the practical maximum motor temperature is 150°C with Hall effect sensors. Higher motor temperatures can easily be accommodated with different materials.



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