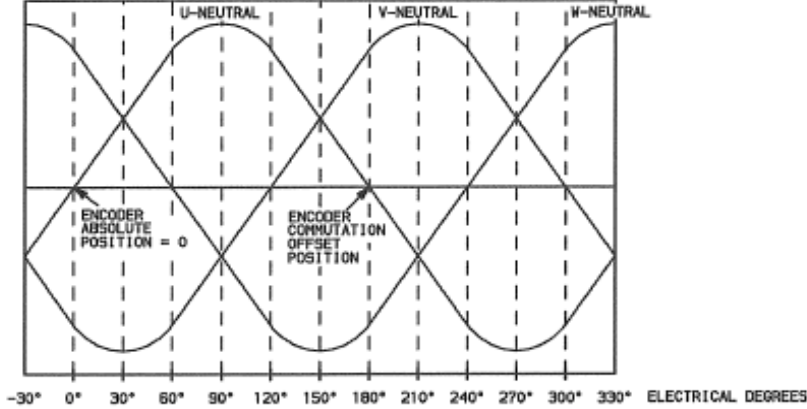
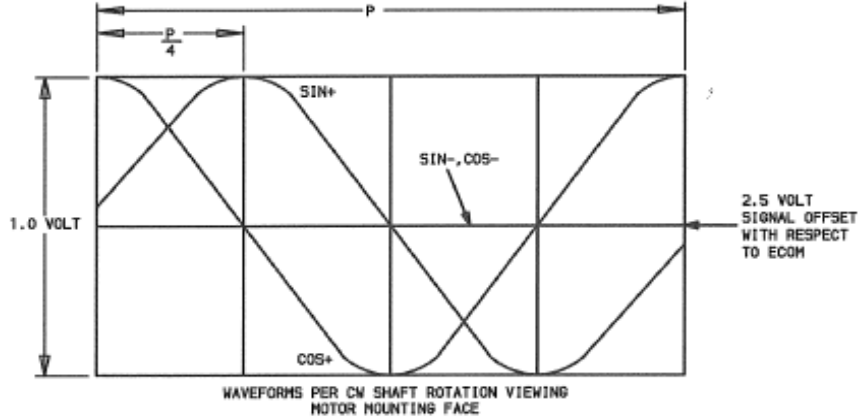


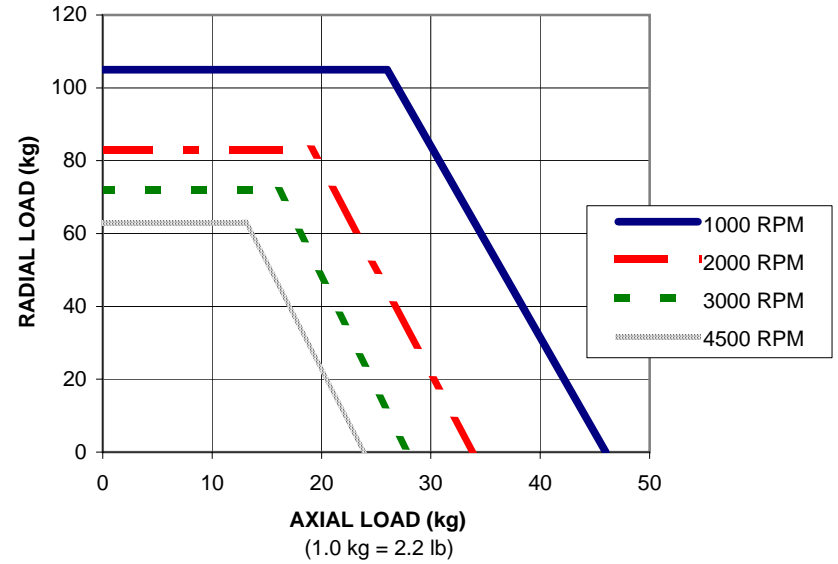
PHASE - NEUTRAL BACK EMF, ENCODER ABSOLUTE POSITION



SIN+, SIN-, COS+, COS- ENCODER OUTPUT WAVEFORMS



SHAFT LOAD RATING for 20,000 hour L10 bearing life and RADIAL LOAD applied mid-way along shaft extension




NOTES:

**General Specifications:**

|   |  |
|---|--|
| 1. Motor type: 3 phase, wye winding, permanent magnet rotor, totally enclosed, non-ventilated.            |  |
| 2. Motor poles: .....   | 8  |
| 3. Operating Speed, max .....   | 4500 RPM   |
| 4. Base speed (max speed at peak torque), Ref: .....  | 3100 RPM   |
| 5. Operating voltage at base speed: .....   | 220 VAC RMS  |
| 6. Continuous stall torque, max, at max winding temperature in a 40C ambient: .....                       | 5.99 Nm (53 lb-in)   |
| 7. Winding temperature, max, in a 40C ambient: .....  | 140 degrees C  |
| 8. Continuous stall current, max: .....   | 17.28 Amps 0 to peak   |
| 9. Heatsink size, aluminum, attached to front mounting flange for continuous torque specifications: ..... | 305 x 305 x 12.7mm (12 x 12 x 0.5 inch)                      |
| 10. Peak stall torque, max: .....   | 13.5 Nm (119 lb-in)  |
| 11. Peak stall current, max: .....  | 50.28 Amps 0 to peak   |
| 12. Rated Speed (Speed at max continuous power) .....   | 4000   |
| 13. Continuous output rating, max at rated speed: .....   | 1.65 kW (2.21 hp)  |
| 14. Continuous torque, max, at rated speed: .....   | 3.9 Nm (35 lb-in)  |
| 15. Continuous current, Ref, at rated speed: .....  | 10.5 Amps 0 to peak  |
| 16. Operating voltage, Ref (Not for direct connection to AC line): .....                                  | 240 VAC RMS  |
| 17. Insulation class: .....   | 155C (Class F)   |
| 18. Housing temperature, max: .....   | 125C (257F)  |
| 19. Ke, +/-10%, phase to phase at 25C +/- 5C: .....   | 50 V/kRPM 0 to peak  |
| 20. Kt (sine), Ref, at 25C +/- 5C: .....  | 0.41 Nm/Amp (3.66 lb-in/Amp) 0 to peak                       |
| 21. Winding resistance, +/- 10%, phase to phase at 25C +/- 5C: .....                                      | 0.591 ohms   |
| 22. Winding inductance, Ref, phase to phase: .....  | 5.09 mH  |
| 23. Dielectric rating of motor power connections (U,V,W), to ground for 1 second: .....                   | 1800 VAC RMS 50/60 Hz  |
| 24. Audible noise, Ref, at 1 meter distance: .....  | XX dBA   |
| 25. Rotor inertia, +/- 10%: .....   | 0.000983 kg-m <sup>2</sup> (0.00870 lb-in-sec <sup>2</sup> ) |
| 26. Rotor balancing quality grade: .....  | G-6.3  |
| 27. Friction torque, Ref: .....   | 0.114 Nm (1.01 lb-in)  |
| 28. Friction torque, Ref, with shaft seal option installed: .....   | 0.14 Nm (1.2 lb-in)  |
| 29. Cogging torque, Ref: .....  | 0.037 Nm (0.33 lb-in) peak to peak                           |
| 30. Thermal resistance, Ref, winding to ambient: .....  | 0.57 degrees C/watt  |
| 31. Thermal time constant, Ref, winding to ambient: .....   | 26.5 minutes   |
| 32. Product weight, Ref: .....  | 6.8 kg (15 lb)   |
| 33. Shipping weight, Ref: .....   | 8.1 kg (17.84 lb)  |
| 34. Operating ambient temperature: .....  | 0C to 40C (32F to 104F)                                      |

**Notes:**

- "Ref" denotes untoleranced specifications, provided for reference only.
- Speed, torque and current specifications are for operation with Allen Bradley drives.

|   |   |                                      |      |          |          |                    |          |
|---|---|--------------------------------------|------|----------|----------|--------------------|----------|
|  | CONFIDENTIAL AND PROPRIETARY INFORMATION  | Engineering Specification Electrical |      | Sheet    | <b>2</b> | of                 | <b>4</b> |
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|   |   | Dr. Scott Johnson                    | Date | 08-26-09 | <b>A</b> | <b>10000073869</b> | Ver      |

**General Specifications, continued:**


- 35. Storage ambient temperature: ..... -30C to 70C (-22F to 158F)
- 36. Relative humidity, non-condensing: ..... 5% to 95%
- 37. Liquid / dust protection: ..... IP66
- 38. Shock, max, 6 msec duration: ..... 20 g peak
- 39. Vibration, max, 30 to 2000 Hz: ..... 2.5 g peak
- 40. Shaft material: ..... Steel, 1144
- 41. Paint, color: ..... Black
- 42. Shaft, key (if provided), front mounting surface, and connector mating surfaces are not painted.

**Feedback Specifications:**

- 1. SIN, COS waveform output: ..... 1024 sinusoids/rev
- 2. SIN, COS waveform amplitude, ± 10%: ..... 1.0 VAC peak to peak
- 3. SIN -, COS - voltage offset with respect to ECOM ±0.3 VDC: ..... 2.5 VDC
- 4. EPWR 5V (encoder power) input voltage: ..... 4.5 to 12.0 VDC
- 5. EPWR 5V continuous input current,max, at 5.0 VDC: ..... 125 mADC
- 6. EPWR 5V inrush input current, max, when connected to Kinetix6000 drive: ..... 3.2 ADC
- 7. EPWR 9V (encoder power) input voltage: ..... N/A
- 8. EPWR 9V continuous input current,max, at 9.0 VDC: ..... N/A
- 9. EPWR 9V inrush input current, max, when connected to Kinetix6000 drive: ..... N/A
- 10. TS+, TS- thermostat operating voltage, max: ..... 250 Volts
- 11. TS+, TS- thermostat continuous current, max, at 0.6 power factor: ..... 1.6 Amps
- 12. TS+, TS- thermostat continuous current, max, at 1.0 power factor: ..... 2.5 Amps
- 13. DATA+, DATA- signal type, rate, asynchronous: ..... RS 485, 9600 baud
- 14. Communication hierarchy: Encoder is slave, communication is externally initiated.
- 15. Single turn absolute position value range: ..... 0 to 32,767 (15 bit)
- 16. Absolute position data: Binary, value increases with CW shaft rotation viewing motor mounting face.
- 17. Data (byte) format: Start bit, 8 data bits, parity bit, stop bit.
- 18. Memory storage capacity, EEPROM: ..... 128 bytes
- 19. Encoder temperature data: Binary value of encoder temperature in degrees C.

**Notes:**

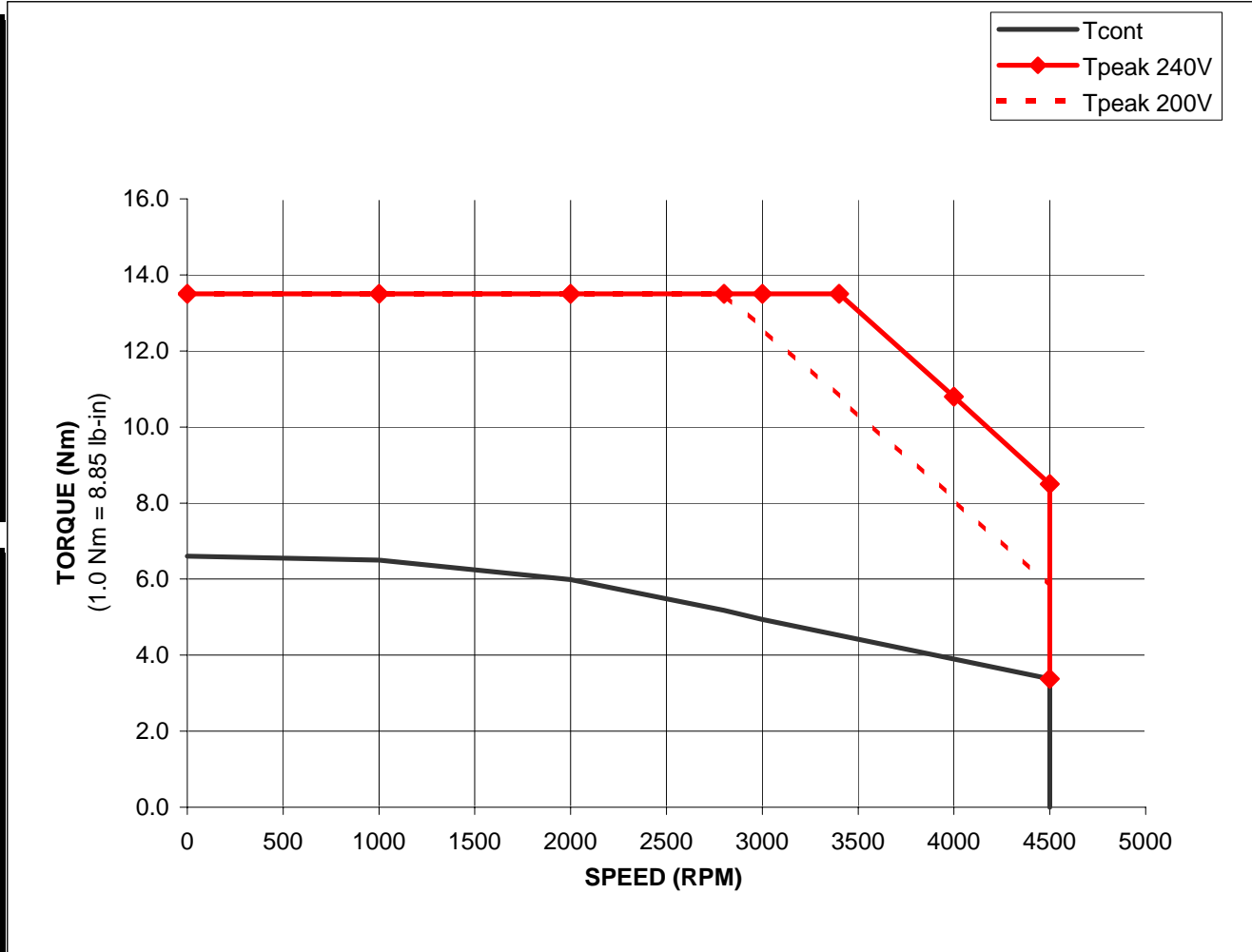
- 1. "Ref" denotes untoleranced specifications, provided for reference only.

|   |   |                                      |          |                            |             |
|---|---|--------------------------------------|----------|----------------------------|-------------|
|  | CONFIDENTIAL AND PROPRIETARY INFORMATION  | Engineering Specification Electrical |          | Sheet <b>3</b> of <b>4</b> |             |
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|   | Dr. Scott Johnson   | Date                                 | 08-26-09 | A                          | Ver<br>01   |

**MPM-A1302F-Mxx2xx Performance with 2094-AC16-M03,  
3 Phase at 240 VAC Drive Input, 40C Motor Ambient**

| SPEED<br>RPM | TORQUE |            |            |
|--------------|--------|------------|------------|
|              | Tcont  | Tpeak 240V | Tpeak 200V |
|              | Nm     | Nm         | Nm         |
| 0            | 6.6    | 13.5       | 13.5       |
| 1000         | 6.5    | 13.5       | 13.5       |
| 2000         | 5.99   | 13.5       | 13.5       |
| 2800         | 5.18   | 13.5       | 13.5       |
| 3000         | 4.94   | 13.5       | 12.6       |
| 3400         | 4.52   | 13.5       | 10.8       |
| 4000         | 3.9    | 10.8       | 8.1        |
| 4500         | 3.38   | 8.5        | 5.8        |
| 4500         | 0      | 3.38       | #N/A       |
| #N/A         | #N/A   | #N/A       | #N/A       |
| #N/A         | #N/A   | #N/A       | #N/A       |
| #N/A         | #N/A   | #N/A       | #N/A       |

| SPEED<br>RPM | TORQUE |            |            |
|--------------|--------|------------|------------|
|              | Tcont  | Tpeak 240V | Tpeak 200V |
|              | lb-in  | lb-in      | lb-in      |
| 0            | 58.4   | 119.5      | 119.5      |
| 1000         | 57.5   | 119.5      | 119.5      |
| 2000         | 53.0   | 119.5      | 119.5      |
| 2800         | 45.8   | 119.5      | 119.5      |
| 3000         | 43.7   | 119.5      | 111.5      |
| 3400         | 40.0   | 119.5      | 95.6       |
| 4000         | 34.5   | 95.6       | 71.7       |
| 4500         | 29.9   | 75.2       | 51.3       |
| 4500         | 0.0    | 29.9       | #N/A       |
| #N/A         | #N/A   | #N/A       | #N/A       |
| #N/A         | #N/A   | #N/A       | #N/A       |
| #N/A         | #N/A   | #N/A       | #N/A       |



**Notes:**

1. Nm torque values shown are converted from tested lb-in data.



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Dr. Scott Johnson Date 08-26-09

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