

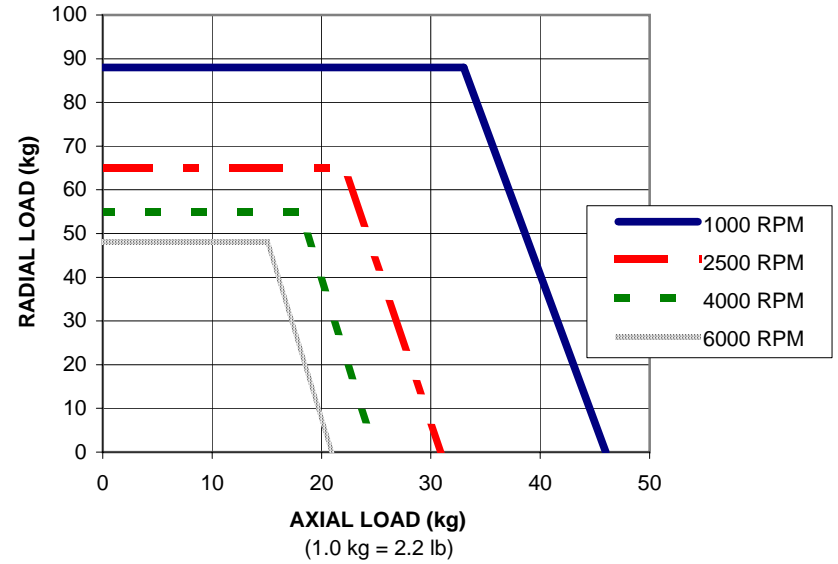
PHASE - NEUTRAL BACK EMF, ENCODER ABSOLUTE POSITION



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 | 5500 RPM |
| 4. Base speed (max speed at peak torque), Ref: | 3400 RPM |
| 5. Operating voltage at base speed: | 440 VAC RMS |
| 6. Continuous stall torque, max, at max winding temperature in a 40C ambient: | 6.55 Nm (58 lb-in) |
| 7. Winding temperature, max, in a 40C ambient: | 140 degrees C |
| 8. Continuous stall current, max: | 9.20 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: | 19.8 Nm (175 lb-in) |
| 11. Peak stall current, max: | 32.00 Amps 0 to peak |
| 12. Rated Speed (Speed at max continuous power) | 4000 |
| 13. Continuous output rating, max at rated speed: | 1.45 kW (1.94 hp) |
| 14. Continuous torque, max, at rated speed: | 3.5 Nm (31 lb-in) |
| 15. Continuous current, Ref, at rated speed: | 4.5 Amps 0 to peak |
| 16. Operating voltage, Ref (Not for direct connection to AC line): | 480 VAC RMS |
| 17. Insulation class: | 155C (Class F) |
| 18. Housing temperature, max: | 125C (257F) |
| 19. Ke, +/-10%, phase to phase at 25C +/- 5C: | 104 V/kRPM 0 to peak |
| 20. Kt (sine), Ref, at 25C +/- 5C: | 0.86 Nm/Amp (7.61 lb-in/Amp) 0 to peak |
| 21. Winding resistance, +/- 10%, phase to phase at 25C +/- 5C: | 2.20 ohms |
| 22. Winding inductance, Ref, phase to phase: | 13 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%: | 0.00089 kg-m ² (0.00788 lb-in-sec ²) |
| 26. Rotor balancing quality grade: | G-6.3 |
| 27. Friction torque, Ref: | 0.118 Nm (1.04 lb-in) |
| 28. Friction torque, Ref, with shaft seal option installed: | 0.38 Nm (3.4 lb-in) |
| 29. Cogging torque, Ref: | 0.045 Nm (0.40 lb-in) peak to peak |
| 30. Thermal resistance, Ref, winding to ambient: | 0.60 degrees C/watt |
| 31. Thermal time constant, Ref, winding to ambient: | 28 minutes |
| 32. Product weight, Ref: | 8.1 kg (17.8 lb) |
| 33. Shipping weight, Ref: | 9.35 kg (20.6 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.

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|  | CONFIDENTIAL AND PROPRIETARY INFORMATION | Engineering Specification Electrical | | Sheet 2 of 5 | |
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| | | Dr. Scott Johnson | Date 08-26-09 | | Ver 01 |

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: 2.2 to 2.8 VDC
- 4. EPWR 5V (encoder power) input voltage: N/A
- 5. EPWR 5V continuous input current,max, at 5.0 VDC: N/A
- 6. EPWR 5V inrush input current, max, when connected to Kinetix6000 drive: N/A
- 7. EPWR 9V (encoder power) input voltage: 7.0 to 12.0 VDC
- 8. EPWR 9V continuous input current,max, at 9.0 VDC: 80 mADC
- 9. EPWR 9V inrush input current, max, when connected to Kinetix6000 drive: 3.9 ADC
- 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.

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Brake Specifications:

1. Type: Spring-set holding brake, releases when voltage applied.
2. Holding torque, max: 4.18 Nm (37 lb-in)
3. Voltage input, +15/-10%, may be applied either polarity: 24 VDC
4. Current input, +/- 10%, at 24 VDC, at 25C +/- 5C: 0.50 ADC
5. Coil resistance, +/-10%, at 25C +/- 5C: 48 Ohms
6. Coil resistance, +/-10%, with motor operating at max continuous stall torque rating in a 40C ambient: 53 Ohms
7. Release time delay (when voltage applied), Ref: 50 msec
8. Engage time delay, (when voltage removed), Ref, with diode used as arc suppression device
in external control circuit: 110 msec
9. Engage time delay, (when voltage removed), Ref, with MOV used as arc suppression device
in external control circuit: 20 msec
10. Rotational backlash, Ref, with brake engaged: 45 arc minutes
11. Dielectric rating of brake connections (MBRK+, MBRK-) to ground for 1 second: 1200 VAC RMS 50/60 Hz

Notes:

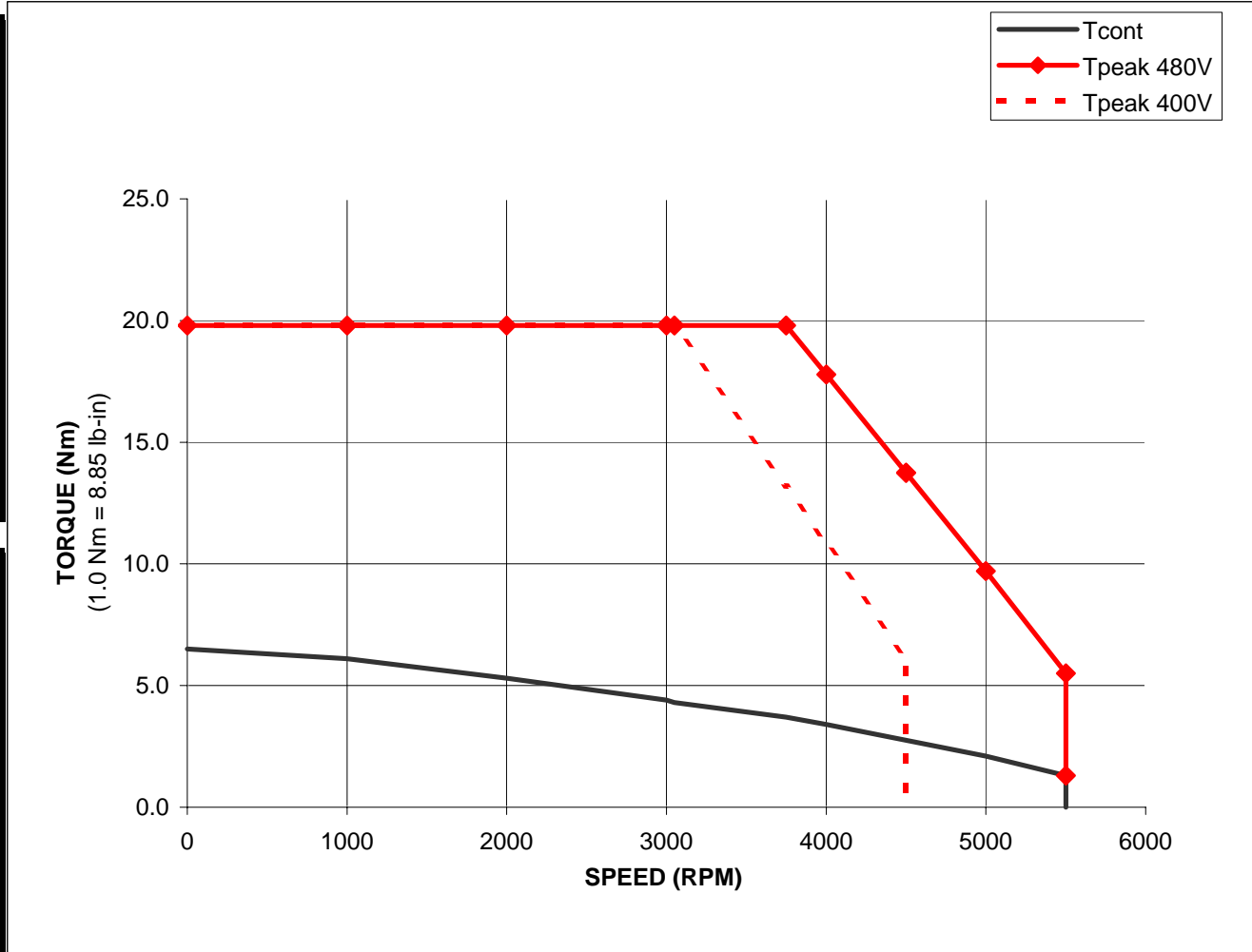
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**MPM-B1153F-Sxx4xx Performance with 2094-BC02-M02,
3 Phase at 480 VAC Drive Input, 40C Motor Ambient**

| SPEED RPM | TORQUE | | |
|--------------|--------|------------|------------|
| | Tcont | Tpeak 480V | Tpeak 400V |
| | Nm | Nm | Nm |
| 0 | 6.5 | 19.8 | 19.8 |
| 1000 | 6.1 | 19.8 | 19.8 |
| 2000 | 5.3 | 19.8 | 19.8 |
| 3000 | 4.4 | 19.8 | 19.8 |
| 3050 | 4.3 | 19.8 | 19.8 |
| 3750 | 3.7 | 19.8 | 13.2 |
| 4000 | 3.4 | 17.78 | 10.84 |
| 4500 | 2.75 | 13.74 | 6.12 |
| 4500 | 2.75 | 13.74 | 0 |
| 5000 | 2.1 | 9.7 | #N/A |
| 5500 | 1.3 | 5.5 | #N/A |
| 5500 | 0 | 1.3 | #N/A |

| SPEED RPM | TORQUE | | |
|--------------|--------|------------|------------|
| | Tcont | Tpeak 480V | Tpeak 400V |
| | lb-in | lb-in | lb-in |
| 0 | 57.5 | 175.2 | 175.2 |
| 1000 | 54.0 | 175.2 | 175.2 |
| 2000 | 46.9 | 175.2 | 175.2 |
| 3000 | 38.9 | 175.2 | 175.2 |
| 3050 | 38.1 | 175.2 | 175.2 |
| 3750 | 32.7 | 175.2 | 116.8 |
| 4000 | 30.1 | 157.4 | 95.9 |
| 4500 | 24.3 | 121.6 | 54.2 |
| 4500 | 24.3 | 121.6 | 0.0 |
| 5000 | 18.6 | 85.9 | #N/A |
| 5500 | 11.5 | 48.7 | #N/A |
| 5500 | 0.0 | 11.5 | #N/A |



Notes:

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



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