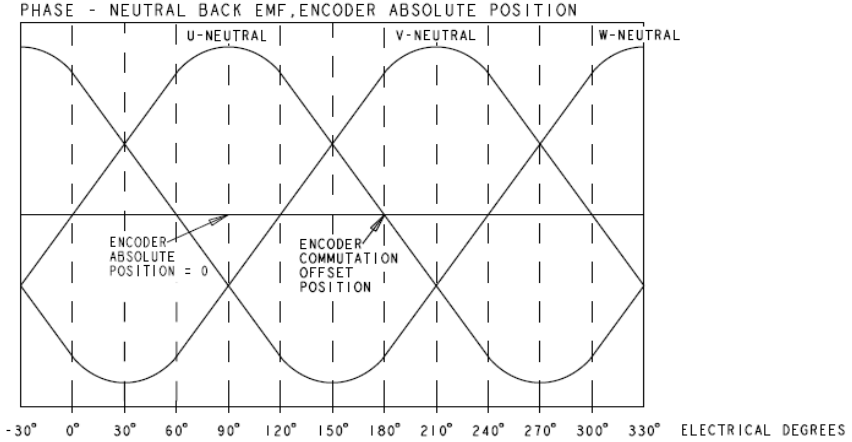
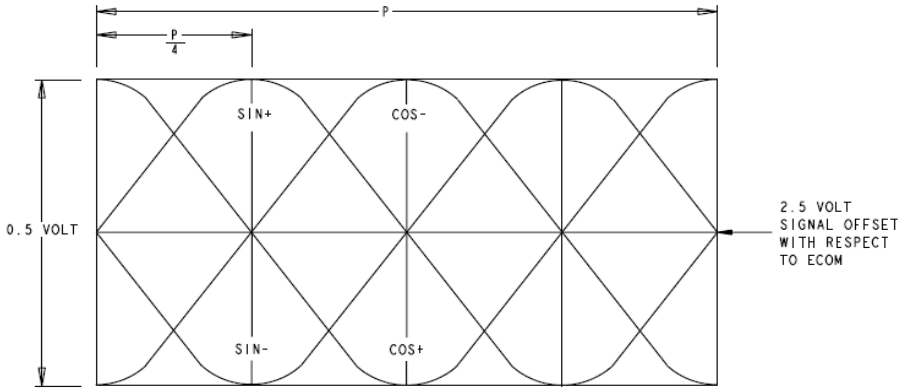
PHASE - NEUTRAL BACK EMF, ENCODER ABSOLUTE POSITION




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




WAVEFORMS PER CW SHAFT ROTATION VIEWING MOTOR MOUNTING FACE

**NOTES:**

| | | | | | |
|---|---|---|---|---|---|
| Rockwell Automation | CONFIDENTIAL AND PROPRIETARY INFORMATION<br>THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF ROCKWELL AUTOMATION, INC. AND MAY NOT BE USED, COPIED OR DISCLOSED TO OTHERS, EXCEPT WITH THE AUTHORIZED WRITTEN PERMISSION OF ROCKWELL AUTOMATION, INC. | Engineering Specification Electrical<br>**RDB-B29016-3B72AA**<br>Dr. S. Johnson Date 10-13-09 | Sheet 1 of 4<br>Size **A** | **10000065579** | Ver **00** |

## General Specifications:

1. Motor type: 3 phase, wye winding, permanent magnet rotor, totally enclosed, non-ventilated.
2. Motor poles: 38
3. Operating Speed, max: 785 RPM
4. Base speed (max speed at peak torque), Ref, at 440 VAC RMS operating voltage: 347 RPM
5. Continuous stall torque, max, at max winding temperature in a 40C ambient: 49.2 Nm (435 lb-in)
6. Winding temperature, max, in a 40C ambient: 150 degrees C
7. Continuous stall current, max: 10.0 Amps 0 to peak
8. Heatsink size, aluminum, attached to front mounting flange for continuous torque specifications: 407 x 407 x 19.1mm (16 x 16 x 0.75 inch)
9. Peak stall torque, max: 110 Nm (974 lb-in)
10. Peak stall current, max: 31.0 Amps 0 to peak
11. Rated Speed (UL file and motor nameplate Rated RPM): 750 RPM
12. Continuous power rating, max: 3.18 kW (4.26 hp)
13. Speed at continuous power rating: 729 RPM
14. Continuous torque, max, at continuous power rating: 41.7 Nm (369 lb-in)
15. Continuous current, Ref, at continuous power rating: 8.5 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: 683 V/kRPM 0 to peak
20. Kt (sine), Ref, at 25C +/- 5C: 5.65 Nm/Amp (50.01 lb-in/Amp) 0 to peak
21. Winding resistance, +/- 10%, phase to phase at 25C +/- 5C: 3.11 ohms
22. Winding inductance, Ref, phase to phase: 25.4 mH
23. Dielectric rating of motor power connections (U,V,W), to ground for 1 second: 2352 VAC RMS 50/60 Hz
24. Audible noise, Ref, at 1 meter distance: 65 dbA
25. Rotor inertia, +/- 10%: 0.028 kg-m² (0.25 lb-in-sec²)
26. Friction torque, Ref: 1.4 Nm (12.4 lb-in)
27. Cogging torque, Ref: 0.79 Nm (7.0 lb-in) peak to peak
28. Thermal resistance, Ref, winding to ambient: 0.302 degrees C/watt
29. Thermal time constant, Ref, winding to ambient: 76 minutes
30. Product weight, Ref: 28.6 kg (63 lb)
31. Shipping weight, Ref: 36.8 kg (81 lb)
32. Operating ambient temperature: 0C to 40C (32F to 104F)
33. Storage ambient temperature: -30C to 70C (-22F to 158F)

## Notes:

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

## General Specifications, continued:

| | |
|---|---|
| 34. Relative humidity, non-condensing: | 5% to 95% |
| 35. Liquid / dust protection: | IP65 |
| 36. Shock, max, 6 msec duration: | 20 g peak |
| 37. Vibration, max, 30 to 2000 Hz: | 2.5 g peak |
| 38. Bearing arrangement: None internal to motor. Shaft is supported by customer's shaft / bearing system. | |
| 39. Shaft material: | Steel |
| 40. Paint color, gloss level, except rear cover: | Black, 20 to 35 gloss units |
| 41. Rear cover color (Pantone color code), painted or exposed material color: | Cool gray # 5, 0 to 20 gloss units |
| 42. Shaft, key (if provided), front mounting surface, and connectors are not painted. | |

## Feedback Specifications:

| | |
|---|---|
| 1. Feedback interface type (encoder supplier proprietary), order designation: | Endat, 2.2/01 |
| 2. SIN, COS waveform output signals/rev: | 2048 sinusoids/rev |
| 3. SIN, COS waveform amplitude, measured differentially from SIN+ to SIN-, or COS+ to COS-: | 0.75 to 1.2 VAC peak to peak |
| 4. SIN, COS voltage offset with respect to ECOM, +/- 0.5 VDC: | 2.5 VDC |
| 5. DATA+, DATA-, CLK+, CLK- signals applicable standard, signals type: | RS 485, Synchronous |
| 6. CLK+, CLK- clock frequency, Ref, when operating with Kinetix Endat adapter kit: | 468.75 kHz |
| 7. Communication hierarchy: Encoder is slave, communication is externally initiated. | |
| 8. Single turn absolute position value range: | 0 to 8191 (13 bit) |
| 9. Absolute position data: Binary, value increases with CW shaft rotation viewing motor mounting face. | |
| 10. Memory storage capacity available for Rockwell parameters, EEPROM, min: | 64 words, 16 bits/word |
| 11. EPWR 5V (encoder power) input voltage: | 3.6 to 14 VDC |
| 12. EPWR 5V continuous input current,max, at 5.0 VDC: | TBD mADC |
| 13. EPWR 5V inrush input current, max, when connected to Kinetix6000 drive: | TBD ADC |
| 14. TS+, TS- PTC Thermistor transition temperature, +/-5C: | 160 degrees C |
| 15. TS+, TS- PTC thermistor circuit resistance, Ref, at thermistor transition temperature: | 1100 ohms |
| 16. TS+, TS- PTC thermistor circuit resistance, Ref, at 25 C +/- 5C: | 160 ohms |
| 17. TS+, TS- PTC thermistor resistance vs temperature curves applicable standards: | DIN 44081 / 44082 |
| 18. TS+, TS- PTC thermistor circuit configuration (number of thermistors): | 2 in series |

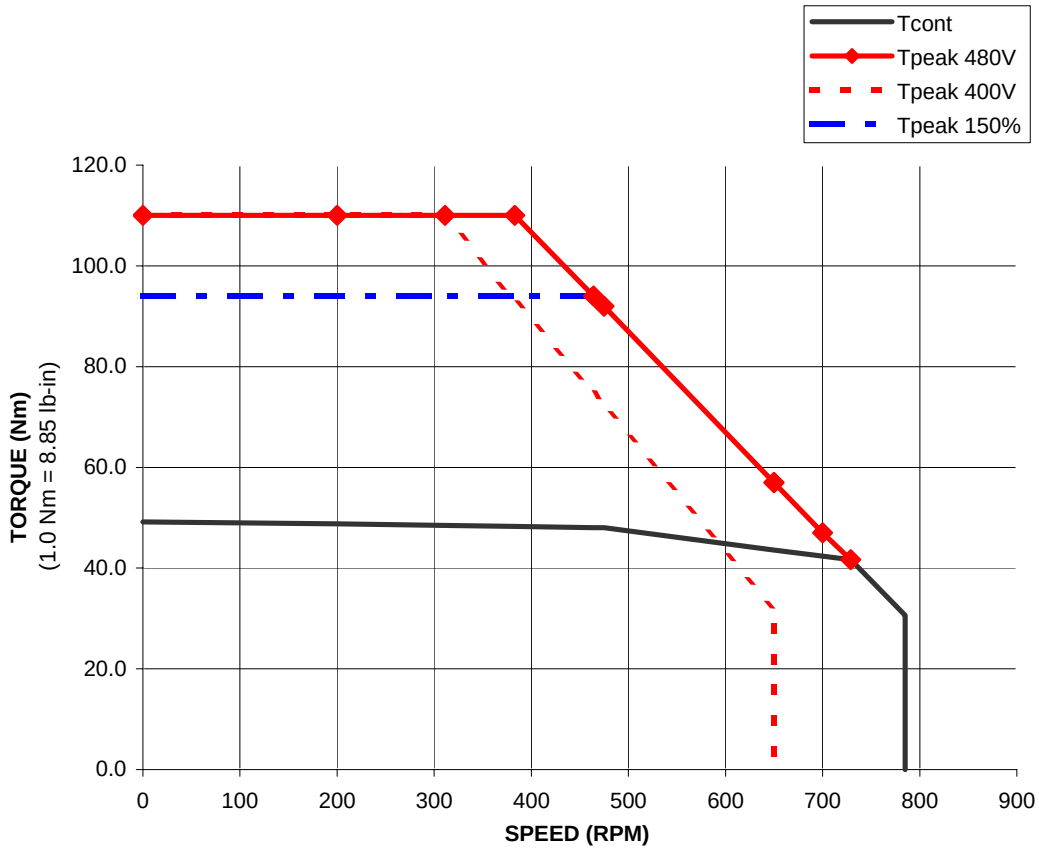
## Notes:

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

## RDB-B29016-3B72AA Performance with 2094-BC02-M02S
## at 480 and 400 VAC 3 phase Converter Input, 40C Motor Ambient

| SPEED RPM | TORQUE | | | |
|---|---|---|---|---|
| | Tcont | Tpeak 480V | Tpeak 400V | Tpeak 150% |
| | Nm | Nm | Nm | Nm |
| 0 | 49.2 | 110 | 110 | 94 |
| 200 | 48.8 | 110 | 110 | 94 |
| 311 | 48.5 | 110 | 110 | 94 |
| 383 | 48.3 | 110 | 93 | 94 |
| 464 | 48 | 94 | 75 | 94 |
| 475 | 48 | 92 | 72 | #N/A |
| 650 | 43.6 | 57 | 32.2 | #N/A |
| 650 | 43.6 | 57 | 0 | #N/A |
| 700 | 42.4 | 47 | #N/A | #N/A |
| 729 | 41.7 | 41.7 | #N/A | #N/A |
| 785 | 30.6 | #N/A | #N/A | #N/A |
| 785 | 0 | #N/A | #N/A | #N/A |

| SPEED RPM | TORQUE | | | |
|---|---|---|---|---|
| | Tcont | Tpeak 480V | Tpeak 400V | Tpeak 150% |
| | lb-in | lb-in | lb-in | lb-in |
| 0 | 435 | 974 | 974 | 832 |
| 200 | 432 | 974 | 974 | 832 |
| 311 | 429 | 974 | 974 | 832 |
| 383 | 427 | 974 | 823 | 832 |
| 464 | 425 | 832 | 664 | 832 |
| 475 | 425 | 814 | 637 | #N/A |
| 650 | 386 | 504 | 285 | #N/A |
| 650 | 386 | 504 | 0 | #N/A |
| 700 | 375 | 416 | #N/A | #N/A |
| 729 | 369 | 369 | #N/A | #N/A |
| 785 | 271 | #N/A | #N/A | #N/A |
| 785 | 0 | #N/A | #N/A | #N/A |




**Notes:**

1. Nm torque values shown are converted from tested lb-in data.
2. "Tpeak 150%" line shown applies when the drive peak current limit is set to 150% of the drive continuous current rating.



Engineering Specification Electrical

**RDB-B29016-3B72AA**

Dr. S. Johnson | Date 10-13-09



Size **A** | **10000065579** | Ver **00**