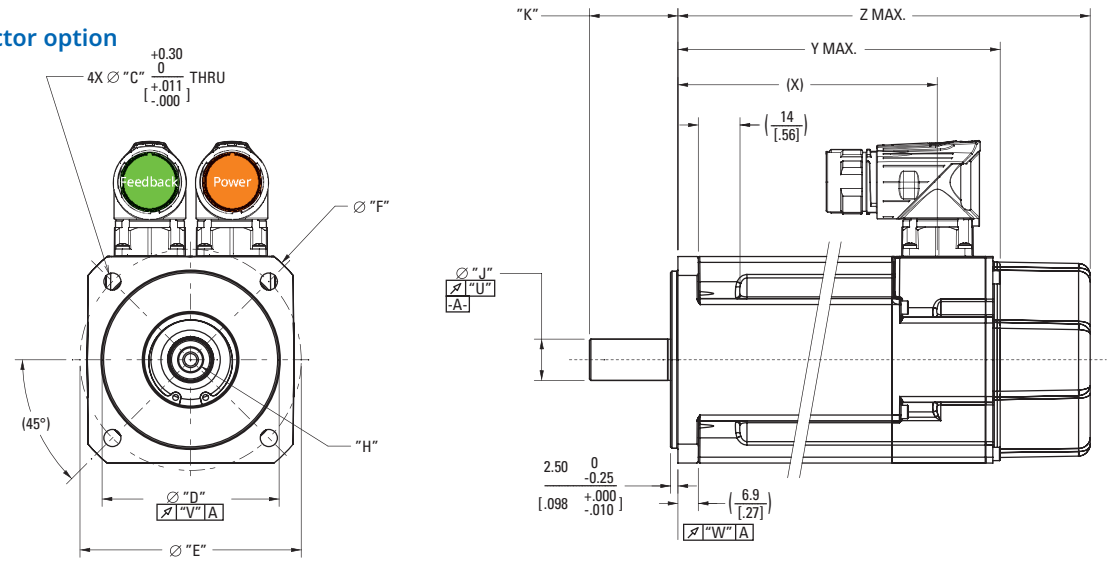
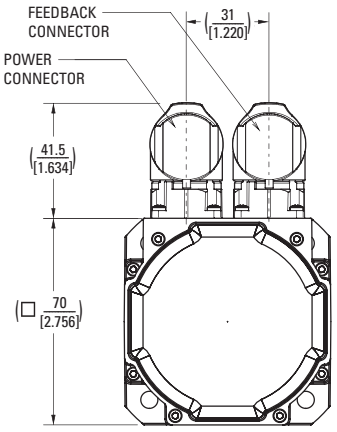
# 8.1 AKM3 - Dimensional Drawing

**IMPORTANT**

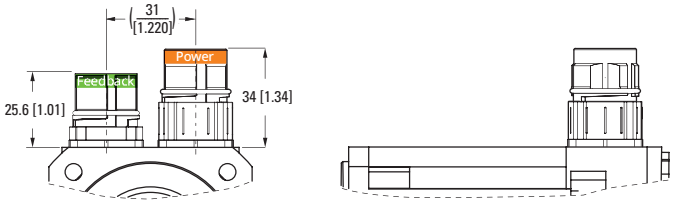
- All drawings are in principle (not scaled).
- 3D Models are available at Kollmorgen Design Tools - 3D Models.

### C- connector option

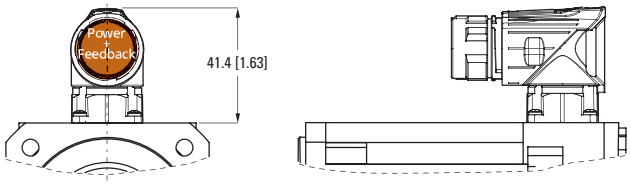


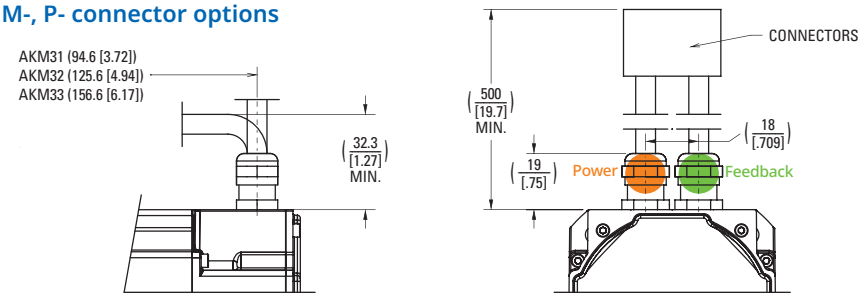

### G- connector option



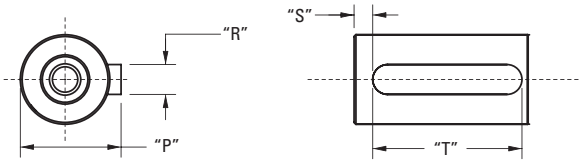

### 9- connector option




### M-, P- connector options




### Shaft-keyway dimensions



# 8.2 AKM3 - Dimension Data

## AKM3x Mounting Flange-Shaft Dimensional Data

| Mounting Flange-Shaft | Hole Diameter "C" | Pilot Diameter "D" | Bolt Circle Dia. "E" | "F" | "H" | Shaft Diameter "J" | Shaft Length "K" | Shaft Dia. w/ Key "P" |
|---|---|---|---|---|---|---|---|---|
| AC | 5.80 [0.228] | 60 [2.3622] | 75 [2.953] | 90 [3.543] | D M5 DIN 332 | 14 [0.5512] | 30.0 [1.181] | 16 [0.630] |
| AN | 5.80 [0.228] | 60 [2.3622] | 75 [2.953] | 90 [3.543] | D M5 DIN 332 | 14 [0.5512] | 30.0 [1.181] | – |
| CC | 5.80 [0.228] | 60 [2.3622] | 85 [3.346] | – | D M5 DIN 332 | 14 [0.5512] | 30.0 [1.181] | 16 [0.630] |
| CN | 5.80 [0.228] | 60 [2.3622] | 85 [3.346] | – | D M5 DIN 332 | 14 [0.5512] | 30.0 [1.181] | – |
| GC | 5.80 [0.228] | 60 [2.3622] | 75 [2.953] | 90 [3.543] | D M5 DIN 332 | 11[0.4331] | 23 [0.906] | 12.5 [0.492] |
| GN | 5.80 [0.228] | 60 [2.3622] | 75 [2.953] | 90 [3.543] | D M5 DIN 332 | 11 [0.4331] | 23 [0.906] | – |

| Mounting Flange-Shaft | Key Width "R" | "S" | Key Length "T" | "U" | "V" | "W" |
|---|---|---|---|---|---|---|
| AC | 5 [0.197] | 5.00 [1.97] | 20 [0.787] | 0.035 [0.0013] | 0.080 [0.0031] | 0.080 [0.0031] |
| AN | – | – | – | 0.035 [0.0013] | 0.080 [0.0031] | 0.080 [0.0031] |
| CC | 5 [0.197] | 5.00 [1.97] | 20 [0.787] | 0.035 [0.0013] | 0.080 [0.0031] | 0.080 [0.0031] |
| CN | – | – | – | 0.035 [0.0013] | 0.080 [0.0031] | 0.080 [0.0031] |
| GC | 4 [0.157] | 3.5 [0.138] | 16 [0.630] | 0.035 [0.0013] | 0.080 [0.0031] | 0.080 [0.0031] |
| GN | – | – | – | 0.035 [0.0013] | 0.080 [0.0031] | 0.080 [0.0031] |

## AKM3x Motor Length Dimensional Data

| | No Brake (N) | | |
|---|---|---|---|
| | X* | Y MAX | Z MAX |
| Connector | C-, 9-, G-, M-, P- | C-, 9-, G-, M-, P- | C-, 9-, G- |
| Feedback Option | R-, C-, 1-, 2-, Cx, Ex, Ax, Dx, Lx, Gx | R-, C-, 1-, 2-, Cx, Ex, Ax, Dx, Lx | Gx |
| AKM31 | 87.9 [3.46] | 109.8 [4.32] | 125.3 [4.93] |
| AKM32 | 118.9 [4.68] | 140.8 [5.54] | 156.3 [6.15] |
| AKM33 | 149.9 [5.9] | 171.8 [6.76] | 187.3 [7.37] |

| | Brake (2) | | |
|---|---|---|---|
| | X* | Z MAX | |
| Connector | C-, 9-, G-, M-, P- | C-, 9-, G-, M-, P- | C-, 9-, G- |
| Feedback Option | R-, C-, 1-, 2-, Cx, Ex, Ax, Dx, Lx, Gx | R-, C-, 1-, 2-, Cx, Ex, Ax, Dx, Lx | Gx |
| AKM31 | 87.9 [3.46] | 141.3 [5.56] | 159.3 [6.27] |
| AKM32 | 118.9 [4.68] | 172.3 [6.78] | 190.3 [7.49] |
| AKM33 | 149.9 [5.9] | 203.3 [8] | 221.3 [8.71] |

*For 0.5m shielded cable option (M or P), add 6.7 mm to "X"
Note 1: Dimensions are in mm [inches].
Note 2: Product designed in metric. English conversions provided for reference only.

## 8.3 AKM3 - Performance Data

| | | | | | AKM31 | | | AKM32 | | | | AKM33 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Parameters | Tol | Symbol | Units | C | E | H | C | D | E | H | C | E | H |
| | Max Rated Voltage ⑫ | Max | – | Vac | 480 | 240 | 120 | 480 | 480 | 480 | 240 | 480 | 480 | 240 |
| | | | | Vdc | 640 | 320 | 160 | 640 | 640 | 640 | 320 | 640 | 640 | 320 |
| | Continuous Torque for ΔT winding = 100°C ①②⑦⑧⑨ | Nom | $T_{cs}$ | Nm | 1.15 | 1.20 | 1.23 | 2.00 | 2.04 | 2.04 | 2.10 | 2.71 | 2.79 | 2.88 |
| | | | | lb-in | 10.2 | 10.6 | 10.8 | 17.7 | 18.1 | 18.1 | 18.6 | 24.0 | 24.7 | 25.5 |
| | Continuous Current for ΔT winding = 100°C ①②⑦⑧⑨ | Nom | $I_{cs}$ | $A_{rms}$ | 1.37 | 2.99 | 5.85 | 1.44 | 2.23 | 2.82 | 5.50 | 1.47 | 2.58 | 5.62 |
| | Continuous Torque for ΔT winding = 60°C ② | Nom | $T_{cs}$ | Nm | 0.92 | 0.96 | 0.98 | 1.60 | 1.63 | 1.63 | 1.68 | 2.17 | 2.23 | 2.30 |
| | | | | lb-in | 8.1 | 8.5 | 8.7 | 14.2 | 14.4 | 14.4 | 14.9 | 19.2 | 19.7 | 20.4 |
| | Max Mechanical Speed ⑤ | Nom | $N_{max}$ | rpm | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 |
| | Peak Torque ①② | Nom | $T_p$ | Nm | 3.88 | 4.00 | 4.06 | 6.92 | 7.10 | 7.11 | 7.26 | 9.76 | 10.0 | 10.2 |
| | | | | lb-in | 34.3 | 35.4 | 35.9 | 61.2 | 62.8 | 62.9 | 64.3 | 86.4 | 88.1 | 90.4 |
| | Peak Current | Nom | $I_p$ | $A_{rms}$ | 5.5 | 12.0 | 23.4 | 5.7 | 8.9 | 11.3 | 22.0 | 5.9 | 10.3 | 22.5 |
| 75 Vdc | Rated Torque (speed) ①②⑦⑧⑨⑩ | | $T_{rtd}$ | Nm | - | 1.19 | 1.20 | - | - | - | 2.06 | - | - | 2.82 |
| | | | | lb-in | - | 10.5 | 10.6 | - | - | - | 18.2 | - | - | 24.6 |
| | Rated Speed | | $N_{rtd}$ | rpm | - | 750 | 2000 | - | - | - | 1200 | - | - | 800 |
| | Rated Power (speed) ①②⑦⑧⑨ | | $P_{rtd}$ | kW | - | 0.09 | 0.25 | - | - | - | 0.26 | - | - | 0.24 |
| | | | | Hp | - | 0.13 | 0.34 | - | - | - | 0.35 | - | - | 0.32 |
| 120 Vac (160 Vdc) | Rated Torque (speed) ①②⑦⑧⑨⑩ | | $T_{rtd}$ | Nm | - | 1.17 | 0.97 | - | 2.00 | 2.01 | 1.96 | - | - | 2.66 |
| | | | | lb-in | - | 10.3 | 8.6 | - | 17.7 | 17.7 | 17.4 | - | - | 23.5 |
| | Rated Speed | | $N_{rtd}$ | rpm | - | 2500 | 6000 | - | 1000 | 1000 | 3000 | - | - | 2500 |
| | Rated Power (speed) ①②⑦⑧⑨ | | $P_{rtd}$ | kW | - | 0.31 | 0.61 | - | 0.21 | 0.21 | 0.62 | - | - | 0.70 |
| | | | | Hp | - | 0.41 | 0.82 | - | 0.28 | 0.28 | 0.83 | - | - | 0.93 |
| 240 Vac (320 Vdc) | Rated Torque (speed) ①②⑦⑧⑨⑩ | | $T_{rtd}$ | Nm | 1.12 | 0.95 | - | 1.95 | 1.93 | 1.87 | 1.45 | 2.64 | 2.62 | 2.27 |
| | | | | lb-in | 9.9 | 8.4 | - | 17.3 | 17.1 | 16.5 | 12.8 | 23.4 | 23.2 | 20.1 |
| | Rated Speed | | $N_{rtd}$ | rpm | 2500 | 6000 | - | 1500 | 2500 | 3500 | 7000 | 1000 | 2000 | 5500 |
| | Rated Power (speed) ①②⑦⑧⑨ | | $P_{rtd}$ | kW | 0.29 | 0.60 | - | 0.31 | 0.51 | 0.69 | 1.06 | 0.28 | 0.55 | 1.31 |
| | | | | Hp | 0.39 | 0.80 | - | 0.41 | 0.68 | 0.93 | 1.42 | 0.37 | 0.74 | 1.75 |
| 400 Vac (560 Vdc) | Rated Torque (speed) ①②⑦⑧⑨⑩ | | $T_{rtd}$ | Nm | 1.00 | - | - | 1.86 | 1.65 | 1.41 | - | 2.54 | 2.34 | - |
| | | | | lb-in | 8.9 | - | - | 16.5 | 14.6 | 12.5 | - | 22.5 | 20.7 | - |
| | Rated Speed | | $N_{rtd}$ | rpm | 5000 | - | - | 3000 | 5500 | 7000 | - | 2000 | 4500 | - |
| | Rated Power (speed) ①②⑦⑧⑨ | | $P_{rtd}$ | kW | 0.52 | - | - | 0.58 | 0.95 | 1.03 | - | 0.53 | 1.10 | - |
| | | | | Hp | 0.70 | - | - | 0.78 | 1.27 | 1.38 | - | 0.71 | 1.48 | - |
| 480 Vac (640 Vdc) | Rated Torque (speed) ①②⑦⑧⑨⑩ | | $T_{rtd}$ | Nm | 0.91 | - | - | 1.83 | 1.58 | 1.22 | - | 2.50 | 2.27 | - |
| | | | | lb-in | 8.1 | - | - | 16.2 | 14.0 | 10.8 | - | 22.1 | 20.1 | - |
| | Rated Speed | | $N_{rtd}$ | rpm | 6000 | - | - | 3500 | 6000 | 8000 | - | 2500 | 5000 | - |
| | Rated Power (speed) ①②⑦⑧⑨ | | $P_{rtd}$ | kW | 0.57 | - | - | 0.67 | 0.99 | 1.02 | - | 0.65 | 1.19 | - |
| | | | | Hp | 0.77 | - | - | 0.90 | 1.33 | 1.37 | - | 0.88 | 1.59 | - |

See following page for notes.

## 8.4 AKM3 - Servo Motor Parameters

| | | | | AKM31 | | | AKM32 | | | | AKM33 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameters | Tol | Symbol | Units | C | E | H | C | D | E | H | C | E | H |
| Torque Constant ① | ±10% | $K_t$ | $Nm/A_{rms}$ | 0.85 | 0.41 | 0.21 | 1.40 | 0.92 | 0.73 | 0.39 | 1.86 | 1.10 | 0.52 |
| | | | $lb\text{-}in/A_{rms}$ | 7.5 | 3.6 | 1.9 | 12.4 | 8.1 | 6.5 | 3.5 | 16.5 | 9.7 | 4.6 |
| Back EMF Constant ⑥ | ±10% | $K_e$ | $V_{rms}/krpm$ | 54.5 | 26.1 | 13.7 | 89.8 | 59.0 | 47.1 | 24.8 | 120 | 70.6 | 33.4 |
| Motor Constant | Nom | $K_m$ | $N\text{-}m/\sqrt{W}$ | 0.150 | 0.154 | 0.151 | 0.235 | 0.232 | 0.237 | 0.245 | 0.295 | 0.299 | 0.303 |
| | | | $lb\text{-}in/\sqrt{W}$ | 1.33 | 1.36 | 1.34 | 2.08 | 2.05 | 2.10 | 2.17 | 2.61 | 2.65 | 2.68 |
| Resistance (line-line) ⑥ | ±10% | $R_m$ | ohm | 21.4 | 4.74 | 1.29 | 23.8 | 9.7 | 6.3 | 1.69 | 26.6 | 9.0 | 1.96 |
| Inductance (line-line) | | L | mH | 37.5 | 8.6 | 2.4 | 46.5 | 20.1 | 12.8 | 3.5 | 53.6 | 18.5 | 4.1 |
| Inertia (includes Resolver feedback) ③ | ±10% | $J_m$ | $kg\text{-}cm^2$ | 0.33 | | | 0.59 | | | | 0.85 | | |
| | | | $lb\text{-}in\text{-}s^2$ | 2.9E-04 | | | 5.2E-04 | | | | 7.5E-04 | | |
| Optional Brake Inertia (additional) | ±10% | $J_m$ | $kg\text{-}cm^2$ | 0.014 | | | 0.014 | | | | 0.014 | | |
| | | | $lb\text{-}in\text{-}s^2$ | 1.2E-05 | | | 1.2E-05 | | | | 1.2E-05 | | |
| Weight (w/o brake) ⑪ | | W | kg | 1.55 | | | 2.23 | | | | 2.9 | | |
| | | | lb | 3.4 | | | 4.9 | | | | 6.4 | | |
| Static Friction ①⑩ | | $T_f$ | Nm | 0.014 | | | 0.02 | | | | 0.026 | | |
| | | | lb-in | 0.12 | | | 0.18 | | | | 0.23 | | |
| Viscous Damping ① | | $K_{dv}$ | Nm/krpm | 0.002 | | | 0.003 | | | | 0.004 | | |
| | | | lb-in/krpm | 0.02 | | | 0.03 | | | | 0.04 | | |
| Thermal Time Constant | | TCT | minutes | 14 | | | 17 | | | | 20 | | |
| Thermal Resistance | | $R_{thw\text{-}a}$ | °C/W | 1.11 | | | 0.92 | | | | 0.78 | | |
| Operating Ambient Temperature Range ⑬ ⑭ ⑮ | | | °C | -20 to 40 | | | -20 to 40 | | | | -20 to 40 | | |
| Pole Pairs | | | | 4 | | | 4 | | | | 4 | | |
| Heat Sink Size | | | | 10"x10"x1/4" Aluminum Plate | | | 10"x10"x1/4" Aluminum Plate | | | | 10"x10"x1/4" Aluminum Plate | | |

Additional windings may exist. Please contact Kollmorgen Customer Support for further information or to request custom winding options for your application requirements.

Notes:

① Motor winding temperature rise, ΔT=100°C, at 40°C ambient.
② All data referenced to sinusoidal commutation.
③ Add parking brake if applicable for total inertia.
④ Motor with standard heat sink.
⑤ May be limited at some values of Vbus.
⑥ Measured at 25°C.
⑦ Brake option reduces continuous torque ratings by:
AKM31 = 0.0 Nm AKM32 = 0.05 Nm AKM33 = 0.1 Nm
⑧ For non-resolver feedback options: no continuous torque reduction.
⑨ Motors with non-resolver feedback and brake option, reduce continuous torque by:
AKM31 = 0.0 Nm AKM32 = 0.1 Nm AKM33 = 0.2 Nm
⑩ For motors with optional shaft seal, reduce torque shown by 0.047 Nm (0.41 lb-in), and increase $T_f$ by the same amount.
⑪ Brake option increases weight by 0.36 kg (0.79 lb).
⑫ Motors can be operated up to 480 Vac. For performances curves at voltages, listed or unlisted, please use our online Performance Curve Generator Tool.
⑬ Brake option will operate in this range in a non-condensing environment. See the Brake Option section for more information.
⑭ "AA" or "AB" BiSS feedback lower limit is -15°C; all other feedbacks meet or exceed this range.
⑮ Operation outside of this range may be possible. Please contact Kollmorgen Customer Support with your application requirements.