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***SH68-C68-S***

## Detailed Specifications

For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

Last Revised: 2014-11-06 07:14:00.0

# AKD Servo Drives and Brushless Servo Motors With Smart Feedback Devices



- 12 A peak, 6 A continuous current output, up to 1.25 kW output power
- Plug-and-play compatibility with AKM servo motors through Smart Feedback Device (SFD) technology
- Fast control-loop update rates guarantee reliable control, accommodate for changing load condition
- 120 or 240 VAC powered (1 or 3 phases)
- Screw-terminal connectors on I/O allow for fast and easy installation
- Optically isolated I/O and encoder emulation
- AKM sizes: 40, 58, 70, 84, 108, and 165 mm
- Continuous rated torque: 0.18 N • m (1.59 lb in.) to 11.9 N • m (105 lb in.)
- Max speed: 8000 rpm
- Operating temperature ambient: -20 to 120 °C
- Industrial standards: UR, cUR, CE
- Sealing standard: IP40

## Application and Technology

### AKD Servo Drives

National Instruments AKD servo motor drives deliver cutting-edge technology and performance with one of the most compact footprints in the industry. These feature-rich drives provide a solution for nearly any application, from basic torque-and-velocity applications to synchronized multi-axis motion using the NI LabVIEW graphical development environment.

AKD servo motor drives are available with step-direction, analog, or EtherCAT connectivity to the motion controller. This flexibility enables a scalable motion system architecture and allows customers to combine AKD drives with the following:

- NI plug-in motion control devices for PCI or PXI
- NI C Series drive interface modules for NI CompactRIO
- Any real-time controller capable of running NI EtherCAT master software such as CompactRIO, NI PXI real-time controllers, NI industrial controllers, or NI Embedded Vision Systems

The versatile AKD servo drives set the standard for power density and performance. High-speed loop rates guarantee reliable control and accommodate changing load conditions immediately. Integrated optically isolated I/O reduces noise and enables safe operation. Graphical configuration software and features such as autotuning and wizard-based configuration allow for simplified system setup. If used with National Instruments AKM servo motors, these drives provide plug-and-play configuration through Smart Feedback Device (SFD) technology and direct cabling.

### Brushless Servo Motors

National Instruments AKM brushless servo motors, available in a wide variety of frame sizes, speed, and torque ranges, provide superior dynamic performance. Perfectly matched with National Instruments AKD servo drives, these motors enable plug-and-play configuration due to integrated SFD technology and simplified cabling.

AKM rotary brushless servo motors incorporate low-inertia rotors and stand out due to their low-cog, low-harmonic distortion magnetic design. Because of their superior dynamic performance and availability in different frame sizes, speed ranges, and torque ranges, brushless servos are an effective solution for applications such as machine control, manufacturing test, semiconductor positioning, biomedical machines, and lab automation.

### Smart Feedback Device (SFD) Technology

- Resolution  $2^{24}$  counts per revolution
- Accuracy  $\pm 16$  arc-min net (0.26 deg)
- Plug-and-play configuration SFD technology and direct cabling

### Accessories

- Direct connect cables for connection to NI 73xx motion controllers and NI 951x drive interface modules

## Hardware

- Unlike brushed DC motors, brushless motors contain no commutator assembly, making them less susceptible to mechanical wear and more practical for extended rugged use with reduced maintenance.
- Brushless motors feature higher efficiency because there are no brushes to cause electrical or friction losses.
- The elimination of ionizing sparks from the commutator makes brushless motors better for oxygen-rich environments.
- Brushless motors run windings along the housing of the motor with the stator mounted on the rotor. This allows for greater heat dissipation through the casing of the motor.
- Brushless motors are entirely encased, protecting the system against particles and debris in dusty environments.

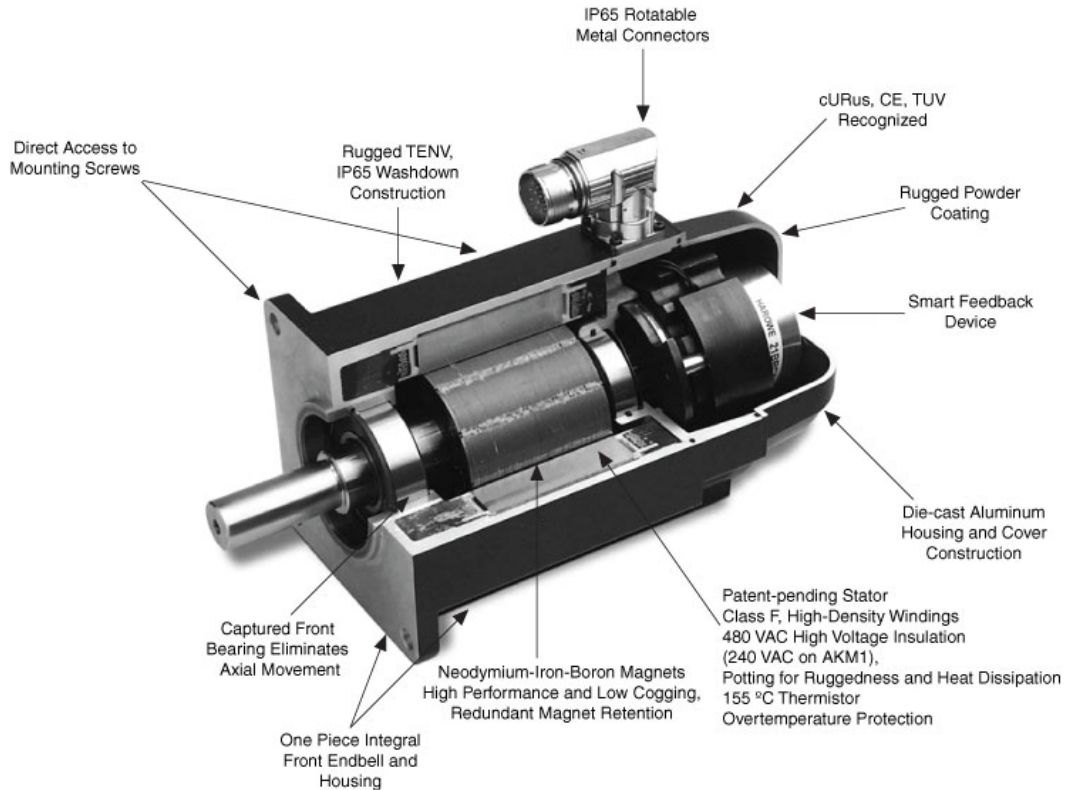


Figure 1. AKM Brushless Servo Motors

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## Support and Services

### System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at [ni.com/advisor](http://ni.com/advisor) to find a system assurance program to meet your needs.

### Calibration

NI measurement hardware is calibrated to ensure measurement accuracy and verify that the device meets its published specifications. To ensure the ongoing accuracy of your measurement hardware, NI offers basic or detailed recalibration service that provides ongoing ISO 9001 audit compliance and confidence in your measurements. To learn more about NI calibration services or to locate a qualified service center near you, contact your local sales office or visit [ni.com/calibration](http://ni.com/calibration).

### Technical Support

Get answers to your technical questions using the following National Instruments resources.

- **Support** - Visit [ni.com/support](http://ni.com/support) to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
- **Discussion Forums** - Visit [forums.ni.com](http://forums.ni.com) for a diverse set of discussion boards on topics you care about.

## Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit [ni.com/repair](http://ni.com/repair).

## Training and Certifications

The NI training and certification program delivers the fastest, most certain route to increased proficiency and productivity using NI software and hardware. Training builds the skills to more efficiently develop robust, maintainable applications, while certification validates your knowledge and ability.

- **Classroom training in cities worldwide** - the most comprehensive hands-on training taught by engineers.
- **On-site training at your facility** - an excellent option to train multiple employees at the same time.
- **Online instructor-led training** - lower-cost, remote training if classroom or on-site courses are not possible.
- **Course kits** - lowest-cost, self-paced training that you can use as reference guides.
- **Training memberships** and training credits - to buy now and schedule training later.

Visit [ni.com/training](http://ni.com/training) for more information.

## Extended Warranty

NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit [ni.com/warranty](http://ni.com/warranty).

## OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit [ni.com/oem](http://ni.com/oem).

## Alliance

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 700 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit [ni.com/alliance](http://ni.com/alliance).

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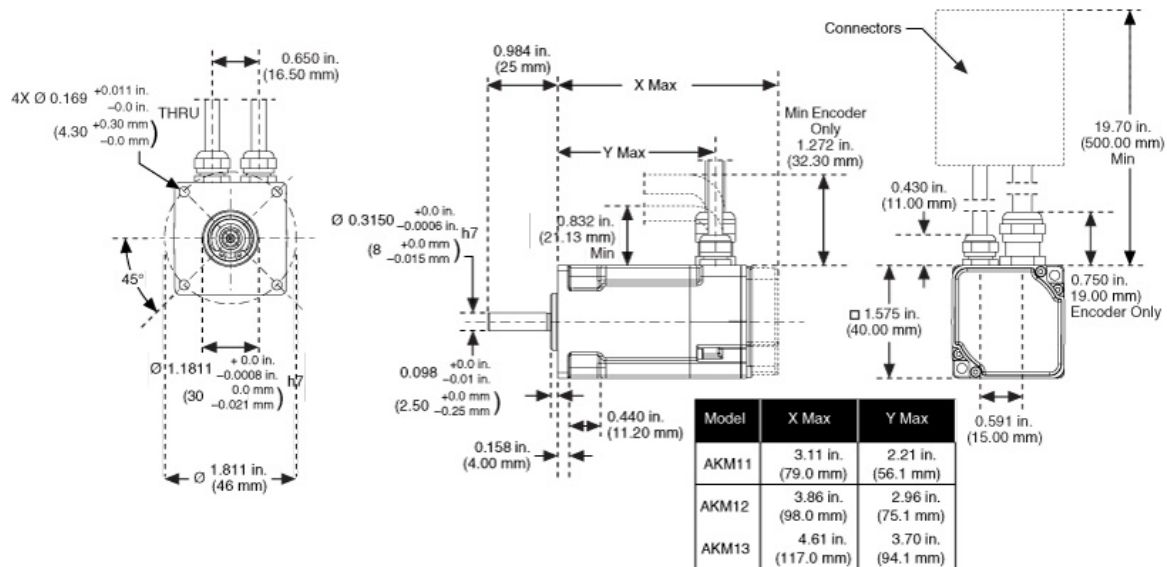
## Detailed Specifications

AKM 1x Motors					
	AKM11B	AKM11C	AKM12C	AKM12E	AKM13C
NI Part Number	781530-01	781531-01	781532-01	781533-01	781534-01
Manufacturer Part Number	AKM11B-ANCNC-00	AKM11C-ANCNC-00	AKM12C-ANCNC-00	AKM12E-ANCNC-00	AKM13C-ANCNC-00
Compatible AKD Drive	AKD-P00306				
Specifications					
	AKM11B	AKM11C	AKM12C	AKM12E	AKM13C
Continuous Current at Stall (A)	1.16	1.45	1.51	2.72	1.48
Peak Current at Stall (A)	4.65	5.79	6.06	10.90	5.93
Continuous Torque at Stall N • m (lb-in.) @ 100 °C	0.18 (1.62)	0.19 (1.64)	0.31 (2.74)	0.31 (2.74)	0.41(3.63)
Peak Torque at Stall N • m (lb-in.)	0.61 (5.4)	0.62 (5.43)	1.08 (9.56)	1.08 (9.56)	1.46 (12.9)
Max Rated DC Bus Voltage	320 (240)	160 (120)	320 (240)	160 (120)	320 (240)
Rated Speed RPM 160 VDC (120 VAC)	4000	6000	4000	8000	3000
Rated Speed RPM 320 VDC (240 VAC)	8000	n/a*	8000	n/a*	8000
Max Continuous Power kW(HP) @160 VDC (120VAC)	0.08 (0.10)	0.11 (0.15)	0.13 (0.17)	0.23 (0.31)	0.13 (0.17)
Max Continuous Power kW(HP) @320 VDC (240VAC)	0.14 (0.19)	n/a*	0.23 (0.31)	n/a*	0.30 (0.41)
Rotor Inertia (Jm) kg-cm <sup>2</sup> (lb*in.*s <sup>2</sup> )	0.017 (0.0000151)	0.017 (0.0000151)	0.031 (0.0000274)	0.031 (0.0000274)	0.045 (0.0000398)
DC Resistance Ohms @ 25 °C (line to line)	18.23	12.11	12.4	3.9	13.5
Winding Inductance mH	12.5	8.3	9.1	2.7	10.3
Back EMF Constant V/krpm	10.2	8.3	12.5	6.8	16.8
Max Winding Temperature °C	155				
Thermal Resistance °C/W	1.75	1.75	1.69	1.69	1.62
Weight kg (lbs)	0.35 (0.8)	0.35 (0.8)	0.49 (1.1)	0.49 (1.1)	0.63 (1.4)

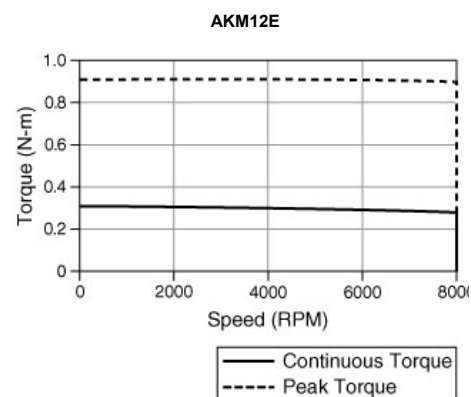
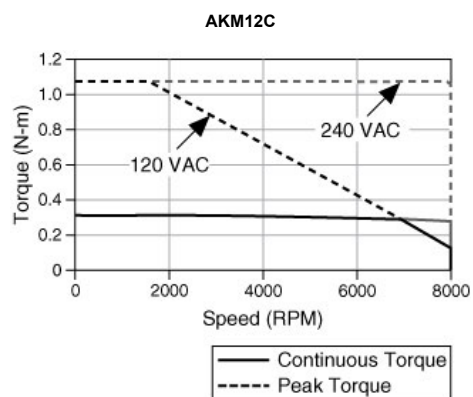
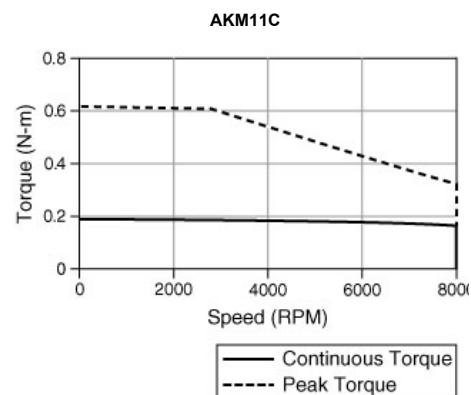
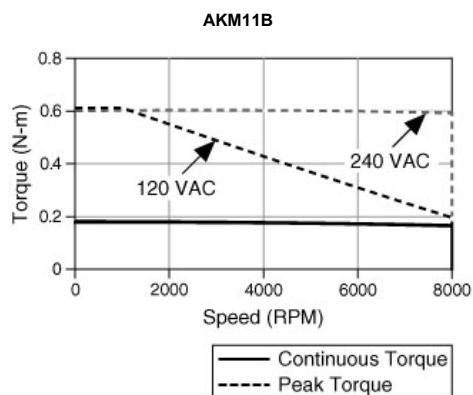
Maximum Mechanical Speed RPM	8000
Max Radial Force (N)	48
Max Axial Force (N)	200
Shaft	Closed Shaft
Cables	0.5 m Shielded Cables with IP65 Connectors
Recommended Heat Sink Size	10 by 10 by ¼ in. Aluminum Plate

\*n/a indicates windings – do not support voltage

## Dimensions

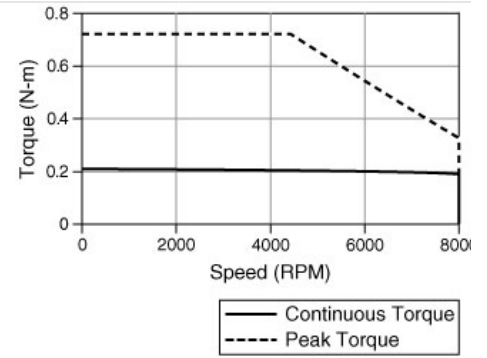
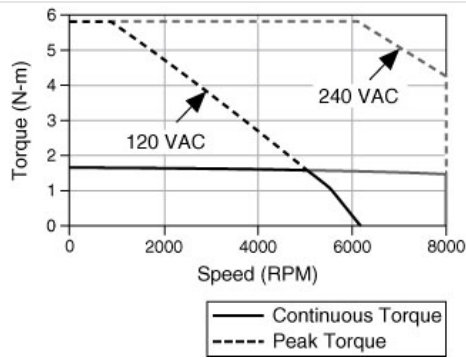


## Torque versus Speed

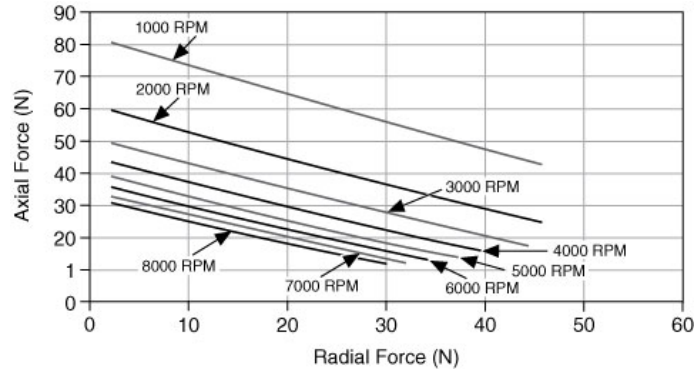


AKM13C

AKM13D



AKM1x 20,000 Hours  $L_{10}$  Bearing Life



## AKM 2x Motors

	AKM21C	AKM21E	AKM22C	AKM22E	AKM23D	AKM23F	AKM24D	AKM24F
NI Part Number	781536-01	781537-01	781538-01	781539-01	781540-01	781541-01	781542-01	781543-01
Manufacturer Part Number	AKM21C-ANCNC-00	AKM21E-ANCNC-00	AKM22C-ANCNC-00	AKM22E-ANCNC-00	AKM23D-ANCNC-00	AKM23F-ANCNC-00	AKM24D-ANCNC-00	AKM24F-ANCNC-00
AKD Drive	AKD-P00306	AKD-P00306	AKD-P00306	AKD-P00306	AKD-P00306	AKD-P00606	AKD-P00306	AKD-P00306

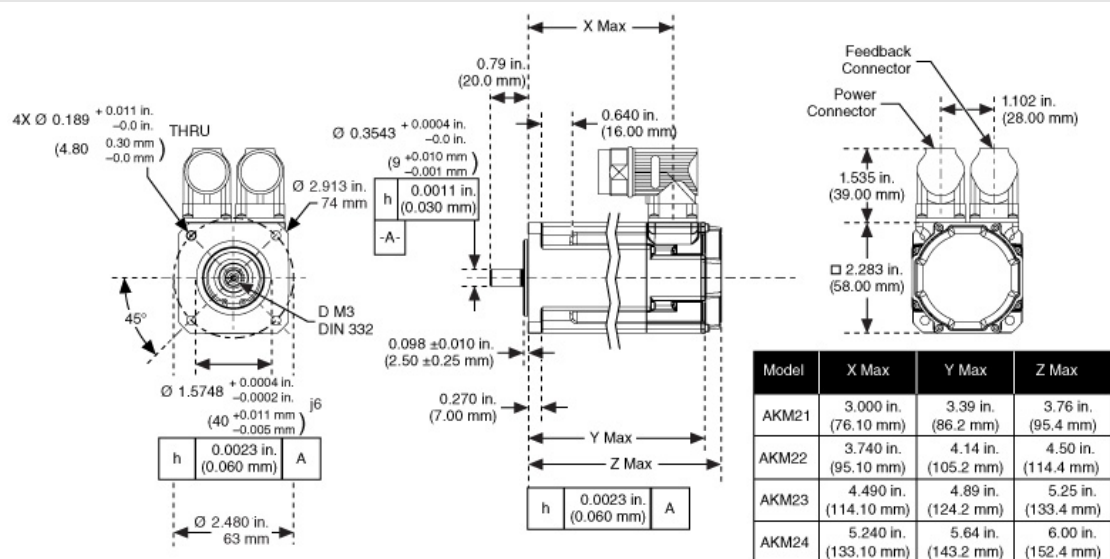
## Specifications

	AKM21C	AKM21E	AKM22C	AKM22E	AKM23D	AKM23F	AKM24D
Continuous Current at Stall (A)	1.58	3.11	1.39	2.73	2.19	4.31	2.21
Peak Current at Stall (A)	6.3	12.4	5.6	10.9	8.8	17.2	8.8
Continuous Torque at Stall N • m (lb-in.) @ 100 °C	0.48 (4.25)	0.50 (4.4)	0.84 (7.43)	0.87 (7.70)	1.15 (10.2)	1.18 (10.4)	1.41 (12.5)
Peak Torque at Stall N • m (lb-in.)	1.47 (13.0)	1.49 (13.2)	2.73 (24.2)	2.76 (24.4)	3.84 (34.0)	3.88 (34.3)	4.76 (42.2)
Max Rated DC Bus Voltage	320 (240)	160 (120)	640 (480)	320 (240)	640 (480)	320 (240)	640 (480)
Rated Speed RPM 160 VDC (120 VAC)	2500	7000	1000	3500	1500	4500	1500
Rated Speed RPM 320 VDC (240 VAC)	8000	n/a*	3500	8000	5000	8000	4000
Max Continuous Power kW(HP) @160 VDC (120VAC)	0.12 (0.16)	0.3 (0.41)	0.09 (0.12)	0.3 (0.4)	0.18 (0.24)	0.5 (0.68)	0.21 (0.29)
Max Continuous Power kW(HP) @320 VDC (240VAC)	0.32 (0.43)	n/a*	0.29 (0.38)	0.59 (0.79)	0.54 (0.72)	0.79 (1.06)	0.54 (0.72)
Rotor Inertia (Jm) kg-cm <sup>2</sup> (lb*in.*s <sup>2</sup> )	0.107 (0.0000947)	0.107 (0.0000947)	0.161 (0.000142)	0.161 (0.000142)	0.216 (0.000191)	0.216 (0.000191)	0.270 (0.000242)
DC Resistance Ohms @ 25 °C (line to line)	13	3.42	20.0	5.22	8.77	2.34	9.02
Winding Inductance mH	19	5.2	35.5	9.7	17.3	4.68	18.7

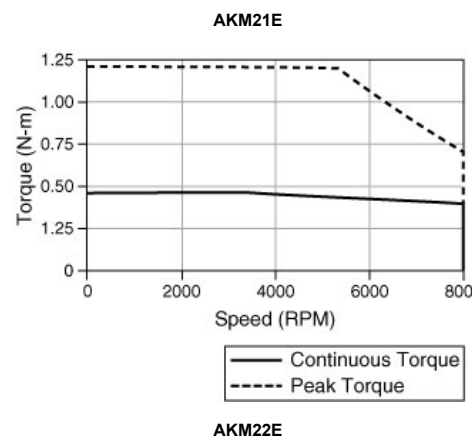
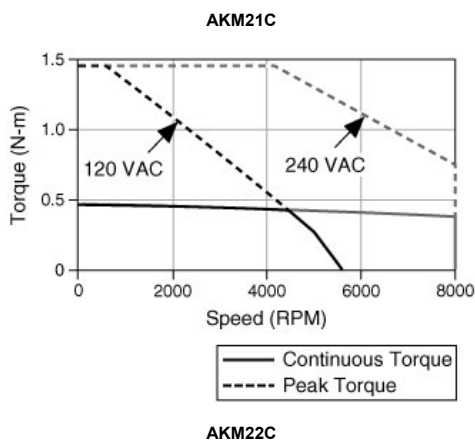
Back EMF Constant V/krpm	18.1	9.7	36.9	19.3	31.4	16.3	38.1
Max Winding Temperature °C	155						
Thermal Resistance °C/W	1.48	1.48	1.28	1.28	1.19	1.19	1.17
Weight kg (lbs)	0.82 (1.8)	0.80 (1.8)	1.1 (2.4)	1.1 (2.4)	1.38 (3.0)	1.38 (3.0)	1.66 (3.7)
Maximum Mechanical Speed RPM	8000						
Max Radial Force (N)	150						
Max Axial Force (N)	600						
Shaft	Smooth Shaft						
Cables	Dual Motor-Mounted Rotatable IP65 Connectors						
Recommended Heat Sink Size	10 by 10 by ¼ in. Aluminum Plate						

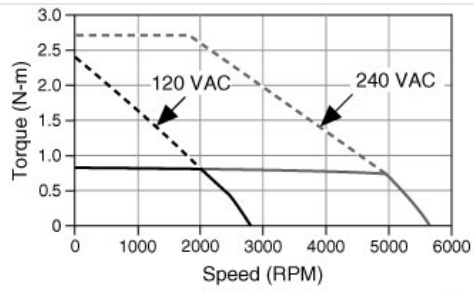
\*n/a indicates windings do not support voltage

## Dimensions

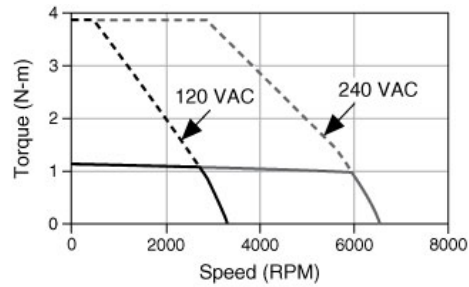


## Torque versus Speed

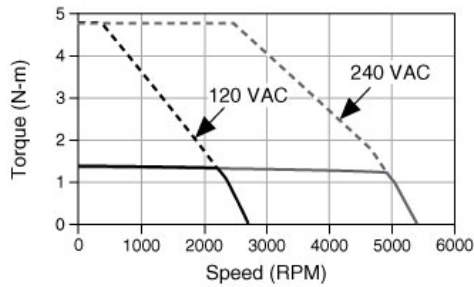




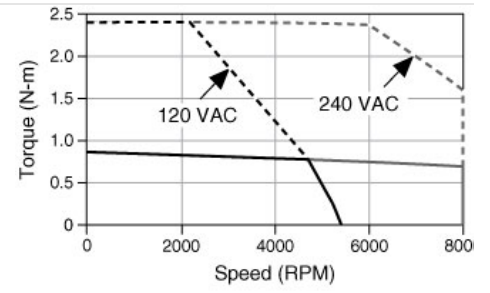
AKM23D



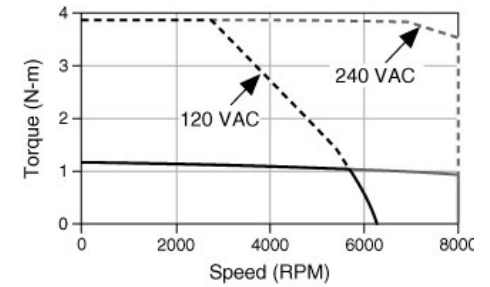
AKM24D



— Continuous Torque  
- - - Peak Torque

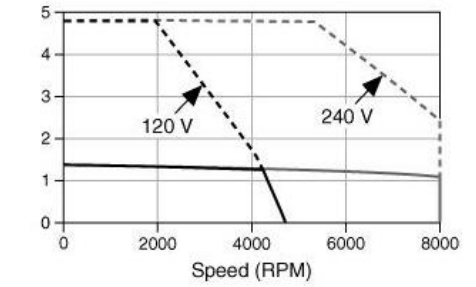


AKM23F



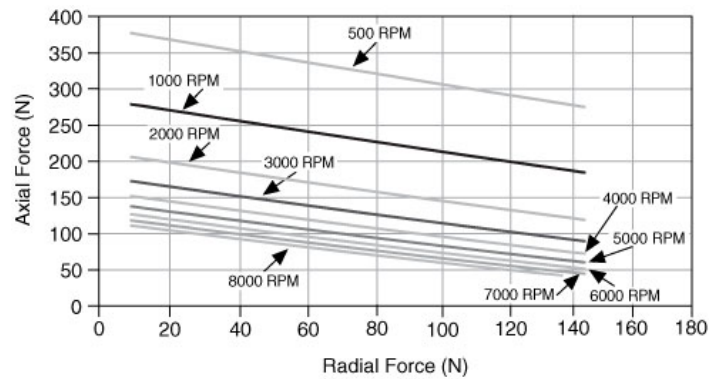
— Continuous Torque  
- - - Peak Torque

AKM24F



— Continuous Torque  
- - - Peak Torque

AKM2x 20,000 Hours  $L_{10}$  Bearing Life



#### AKM 3x Motors

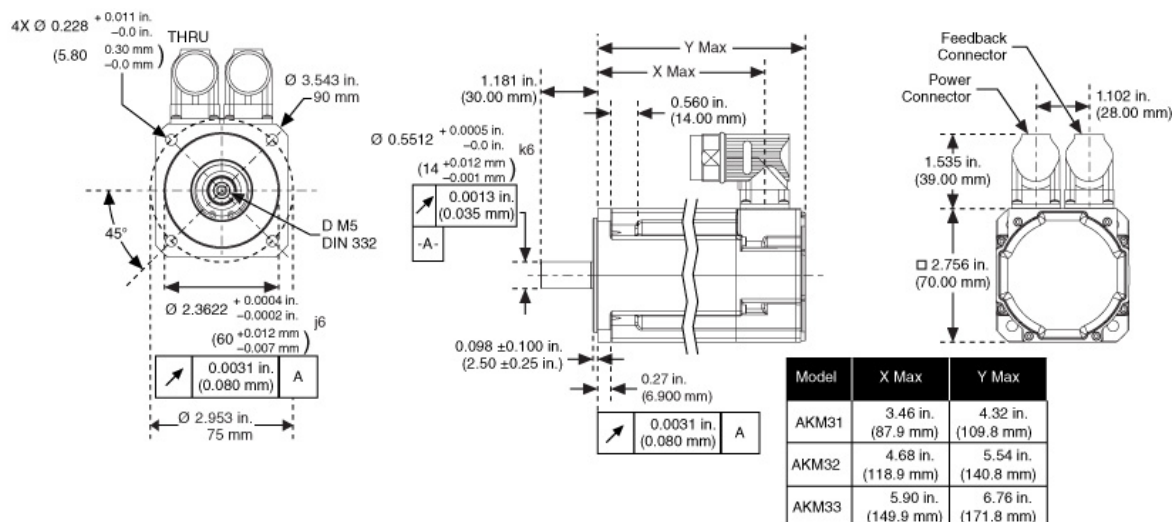
	AKM31C	AKM31E	AKM32E	AKM32H	AKM33E
NI Part Number	781544-01	781545-01	781546-01	781547-01	781548-01
Manufacturer Part Number	AKM31C-ANCNC-00	AKM31E-ANCNC-00	AKM32E-ANCNC-00	AKM32H-ANCNC-00	AKM33E-ANCNC-00
Compatible AKD Drive	AKD-P00306	AKD-P00306	AKD-P00306	AKD-P00606	AKD-P00306

## Specifications

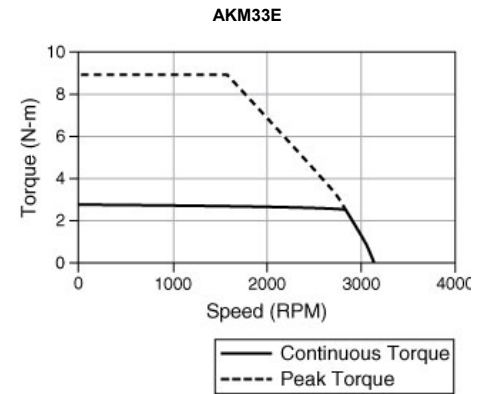
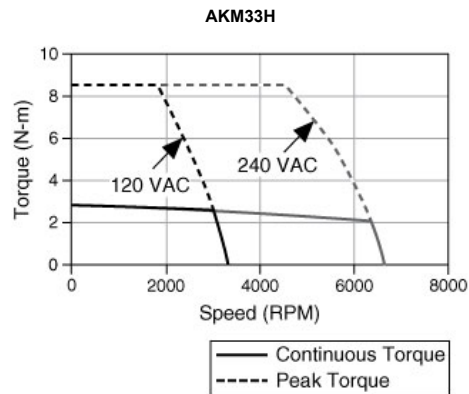
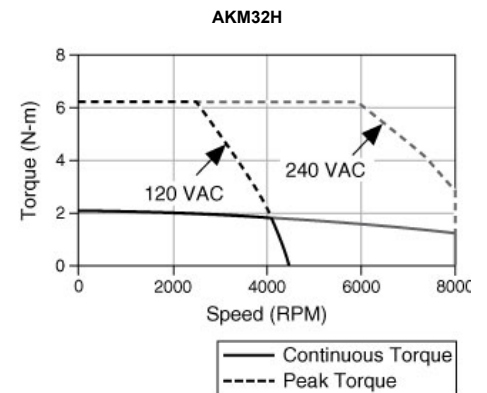
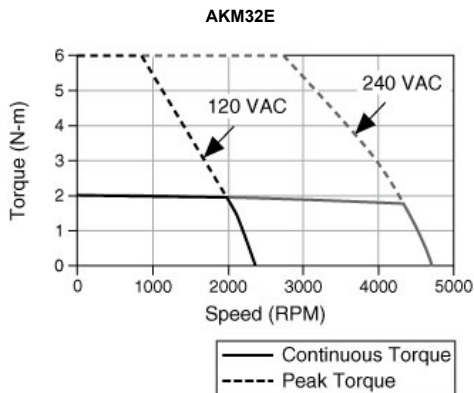
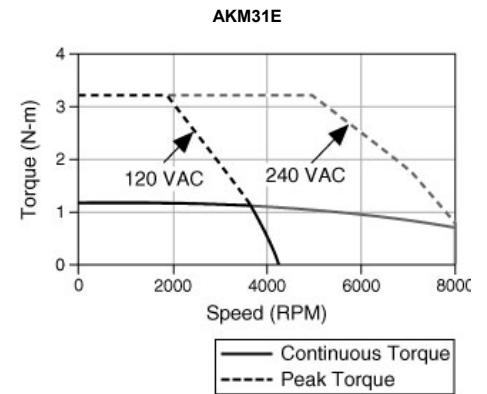
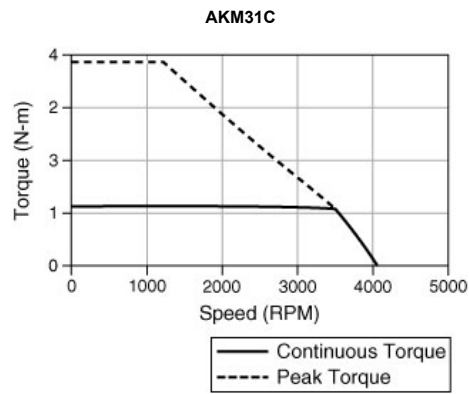
	AKM31C	AKM31E	AKM32E	AKM32H	AKM33E
Continuous Current at Stall (A)	1.37	2.99	2.82	5.5	2.58
Peak Current at Stall (A)	5.5	12	11.3	22	10.3
Continuous Torque at Stall N • m (lb-in.) @ 100 °C	1.15 (10.2)	1.20 (10.6)	2.04 (18.1)	2.10 (18.6)	2.79 (24.7)
Peak Torque at Stall N • m (lb-in.)	3.88 (34.3)	4.00 (35.4)	7.11 (62.9)	7.26 (64.3)	9.96 (88.1)
Max Rated DC Bus Voltage	640 (480)	320 (240)	320 (240)	320 (240)	640 (480)
Rated Speed RPM 160 VDC (120 VAC)	n/a*	2500	2350	3000	n/a*
Rated Speed RPM 320 VDC (240 VAC)	2500	6000	4710	7000	2000
Max Continuous Power kW(HP) @160 VDC (120VAC)	n/a*	0.31 (0.41)	0.210 (282)	0.62 (0.83)	n/a*
Max Continuous Power kW(HP) @320 VDC (240VAC)	0.29 (0.30)	0.60 (0.80)	0.6 (0.805)	1.06 (1.42)	0.55 (0.74)
Rotor Inertia (Jm) kg-cm <sup>2</sup> (lb*in.*s <sup>2</sup> )	0.33 (0.000292)	0.33 (0.000292)	0. (0.0000274)	0.031 (0.0000274)	0.045 (0.0000398)
DC Resistance Ohms @ 25 °C (line to line)	21.4	4.74	6.32	1.69	9.01
Winding Inductance mH	37.5	8.6	12.8	3.55	18.5
Back EMF Constant V/krpm	51.4	24.8	47.1	23.6	66.5
Max Winding Temperature °C	155				
Thermal Resistance °C/W	1.99	1.19	1.01	1.01	0.88
Weight kg (lbs)	1.5 (3.4)	1.5 (3.4)	2.23 (4.9)	2.23 (4.9)	2.9 (6.4)
Maximum Mechanical Speed RPM	8000				
Max Radial Force (N)	340				
Max Axial Force (N)	600				
Shaft	Smooth Shaft				
Cables	Motor-Mounted Rotatable IP65 Connectors				
Recommended Heat Sink Size	10 by 10 by ¼ in. Aluminum Plate				

\*n/a indicates windings do not support voltage

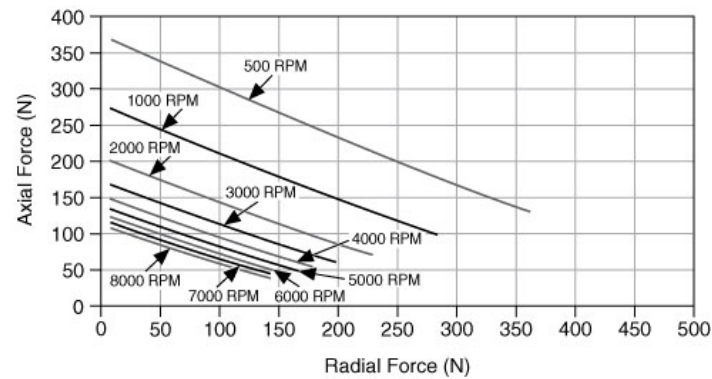
## Dimensions



## Torque versus Speed



**AKM3x 20,000 Hours  $L_{10}$  Bearing Life**



#### AKM 4x Motors

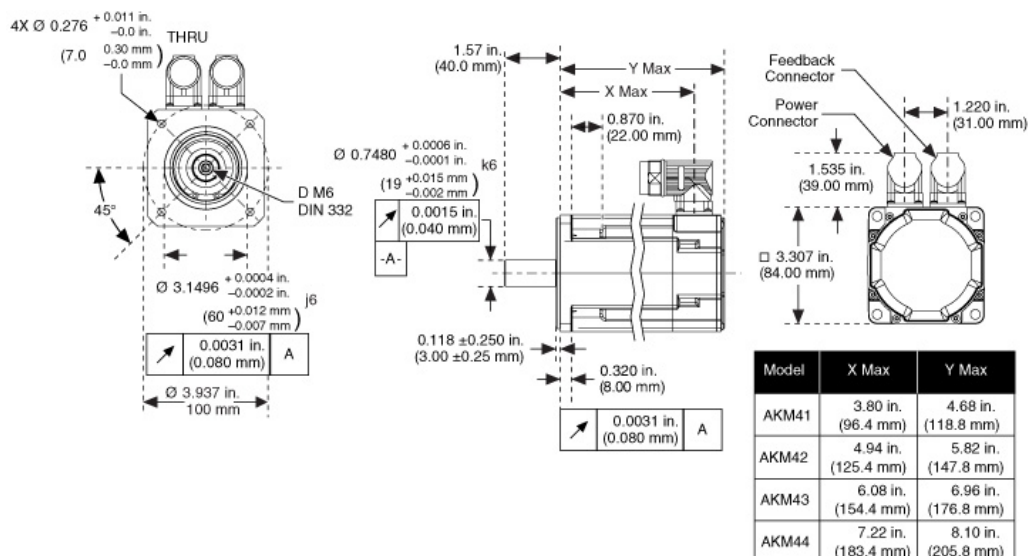
	AKM41E	AKM41H	AKM42E	AKM42G	AKM43H	AKM44E
NI Part Number	781550-01	781551-01	781552-01	781553-01	781554-01	781555-01
Manufacturer Part Number	AKM41E-ANCNC-00	AKM41H-ANCNC-00	AKM42E-ANCNC-00	AKM42G-ANCNC-00	AKM43H-ANCNC-00	AKM44E-ANCNC-00
Compatible AKD Drive	AKD-P00306	AKD-P00606	AKD-P00306	AKD-P00606	AKD-P00606	AKD-P00306

## Specifications

	AKM41E	AKM41H	AKM42E	AKM42G	AKM43H	AKM44E
Continuous Current at Stall (A)	2.85	5.6	2.74	4.8	5.4	2.9
Peak Current at Stall (A)	11.4	22.4	11	19.2	21.6	11.4
Continuous Torque at Stall N • m (lb-in.) @ 100 °C	2.02 (17.9)	2.06 (18.2)	3.42 (30.3)	3.53 (31.2)	4.82 (42.7)	5.76 (51.0)
Peak Torque at Stall N • m (lb-in.)	6.28 (55.6)	6.36 (56.3)	11.3 (99.7)	11.5 (102)	16.1 (102)	19.9 (179)
Max Rated DC Bus Voltage	640 (480)	320 (240)	640 (480)	640 (480)	640 (480)	640 (480)
Rated Speed RPM 160 VDC (120 VAC)	1200	3000	n/a*	n/a*	1930	n/a*
Rated Speed RPM 320 VDC (240 VAC)	3000	6000	1800	3500	3860	1200
Max Continuous Power kW(HP) @160 VDC (120VAC)	0.24 (0.33)	0.58 (0.78)	n/a*	n/a*	0.56 (0.751)	n/a*
Max Continuous Power kW(HP) @320 VDC (240VAC)	0.57 (0.77)	1.02 (1.36)	0.59 (0.79)	1.06 (1.42)	1.21 (1.62)	0.66 (0.88)
Rotor Inertia (Jm) kg-cm <sup>2</sup> (lb*in.*s <sup>2</sup> )	0.81 (000719)	0.81 (000719)	1.45 (0.00128)	1.45 (0.00128)	2.09 (0.00185)	2.73 (0.00242)
DC Resistance Ohms @ 25 °C (line to line)	6.02	1.56	7.78	2.51	2.1	8.64
Winding Inductance mH	18.4	5.0	26.8	9.2	8.75	33.9
Back EMF Constant V/krpm	42.9	22.4	76.2	44.7	57.4	123.0
Max Winding Temperature °C	155					
Thermal Resistance °C/W	1.04	1.04	0.89	0.89	0.7	0.71
Weight kg (lbs)	2.44 (5.4)	2.44 (5.4)	3.39 (7.5)	3.39 (7.5)	4.35 (9.59)	5.3 (11.7)
Maximum Mechanical Speed RPM	8000					
Max Radial Force (N)	500					
Max Axial Force (N)	1400					
Shaft	Smooth Shaft					
Cables	Motor-Mounted Rotatable IP65 Connectors					
Recommended Heat Sink Size	10 by 10 by ¼ in. Aluminum Plate					

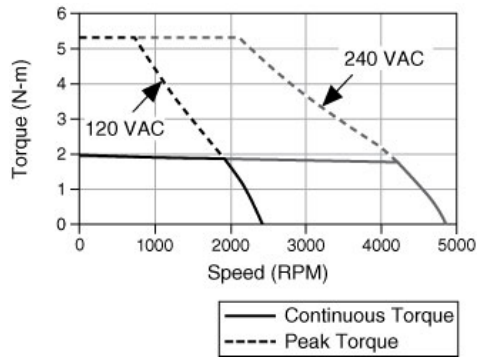
\*n/a indicates windings do not support voltage

## Dimensions

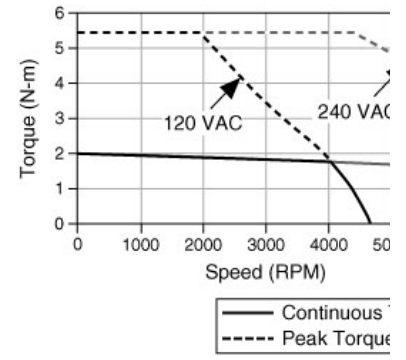


## Torque versus Speed

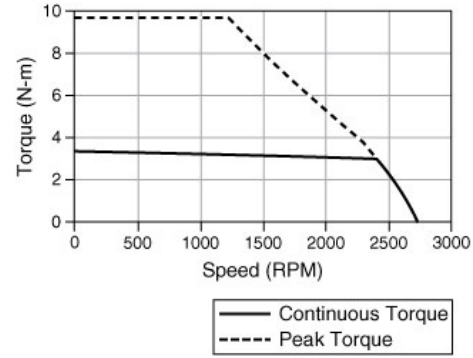
AKM41E



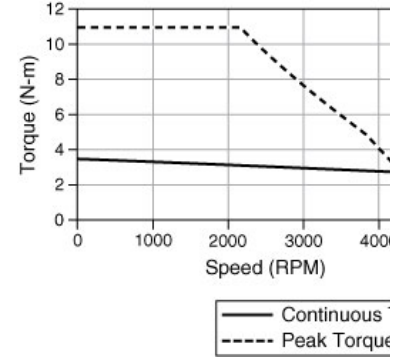
AKM41H



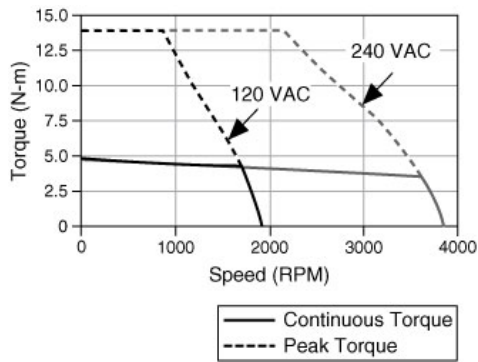
AKM42E



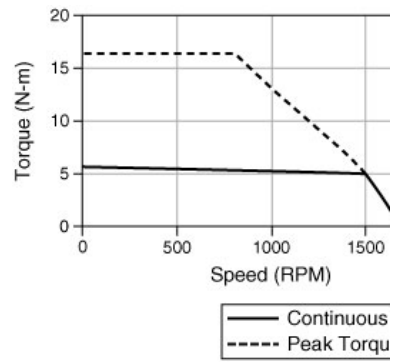
AKM42G



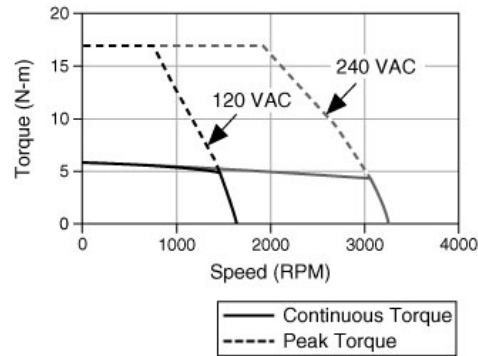
AKM43H

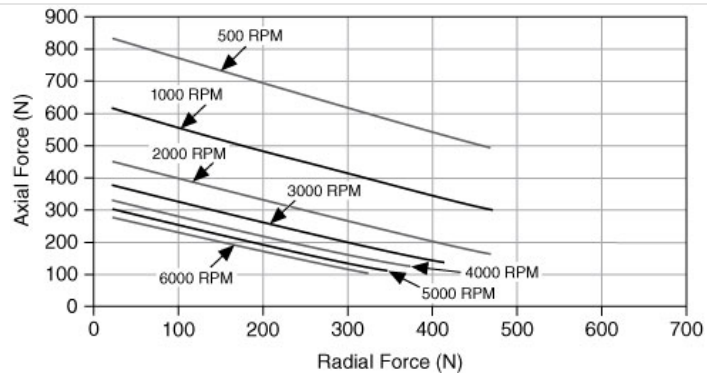


AKM44E



AKM44H

AKM4x 20,000 Hours  $L_{10}$  Bearing Life



## AKM 5x Motors

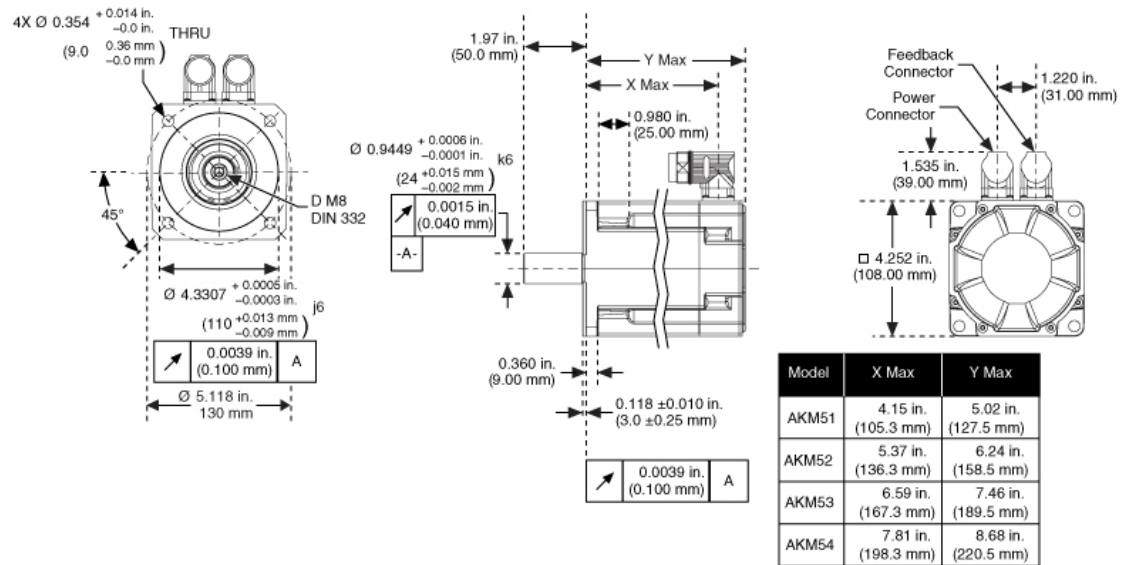
	AKM51H	AKM52H	AKM53H	AKM54H
NI Part Number	781557-01	781558-01	781559-01	781560-01
Manufacturer Part Number	AKM51H-ANCNC-00	AKM52H-ANCNC-00	AKM53H-ANCNC-00	AKM54H-ANCNC-00
Compatible AKD Drive	AKD-P00606			

## Specifications

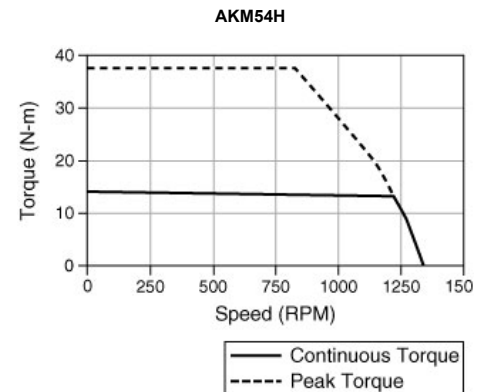
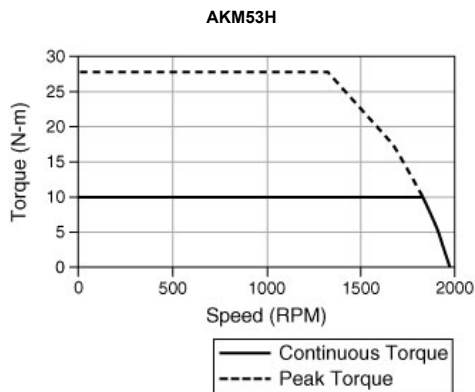
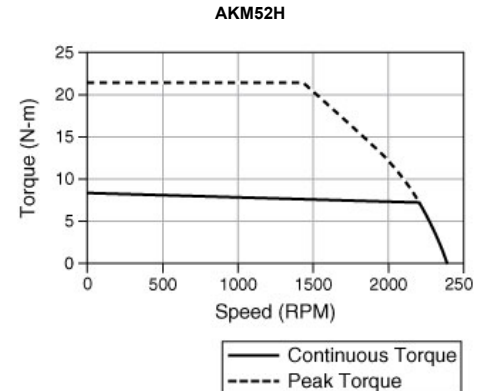
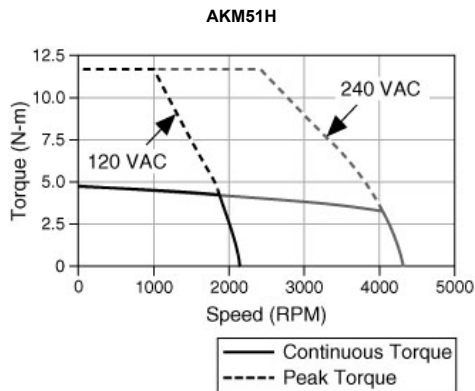
	AKM51H	AKM52H	AKM53H	AKM54H
Continuous Current at Stall (A)	6	5.9	6.6	5.5
Peak Current at Stall (A)	18	17.7	19.8	16.5
Continuous Torque at Stall N • m (lb-in.) @ 100 °C	4.79 (42.2)	8.48 (75.1)	10.5 (92.9)	14.2 (126)
Peak Torque at Stall N • m (lb-in.)	11.7 (104)	21.6 (191)	27.8 (246)	37.5 (332)
Max Rated DC Bus Voltage	640 (480)	640 (480)	640 (480)	640 (480)
Rated Speed RPM 160 VDC (120 VAC)	2160	n/a*	n/a*	n/a*
Rated Speed RPM 320 VDC (240 VAC)	4320	2390	1370	1340
Max Continuous Power kW(HP) @160 VDC (120VAC)	0.56 (0.751)	n/a*	n/a*	n/a*
Max Continuous Power kW(HP) @320 VDC (240VAC)	1.22 (1.65)	1.42 (1.9)	1.65 (2.21)	1.4 (1.88)
Rotor Inertia (Jm) kg-cm <sup>2</sup> (lb*in.*s <sup>2</sup> )	3.42 (0.00303)	6.22 (0.00551)	9.12 (0.00807)	11.9 (0.00105)
DC Resistance Ohms @ 25 °C (line to line)	1.97	2.35	2.07	3.19
Winding Inductance mH	11.9	11.4	18.3	2.7
Back EMF Constant V/krpm	51.3	92.7	112	165
Max Winding Temperature °C	155			
Thermal Resistance °C/W	0.68	0.56	0.5	0.45
Weight kg (lbs)	402 (9.26)	5.8 (12.8)	7.4 (16.3)	9.0 (19.8)
Maximum Mechanical Speed RPM	8000			
Max Radial Force (N)	830			
Max Axial Force (N)	200			
Shaft	Smooth Shaft			
Cables	Motor-Mounted Rotatable IP65 Connectors			
Recommended Heat Sink Size	10 by 10 by ¼ in. Aluminum Plate			

\*n/a indicates windings do not support voltage

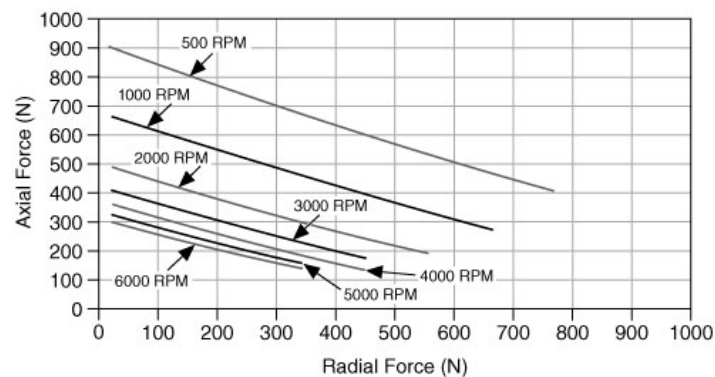
## Dimensions



## Torque versus Speed



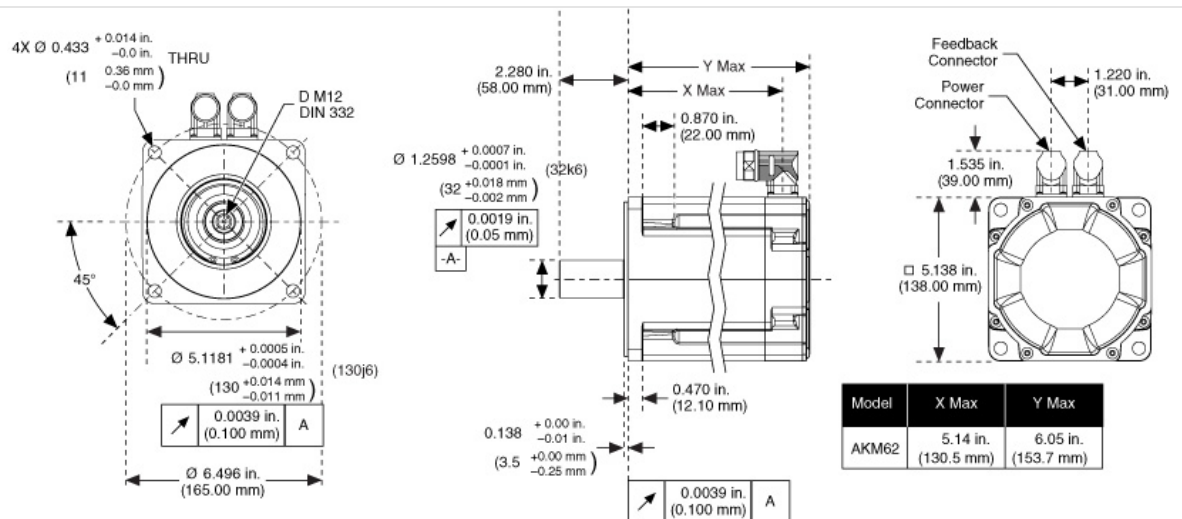
## AKM5x 20,000 Hours $L_{10}$ Bearing Life



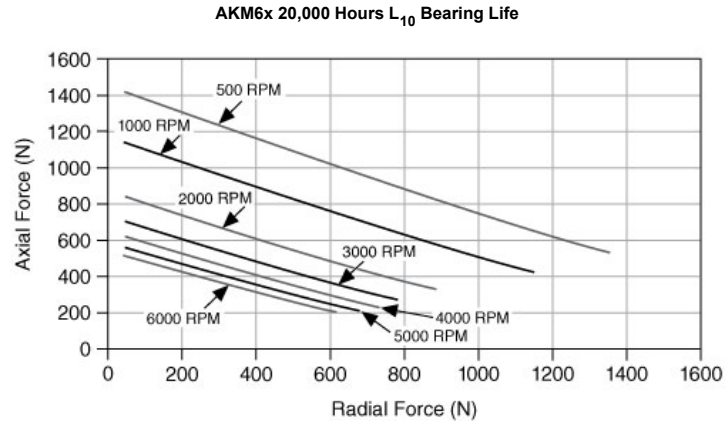
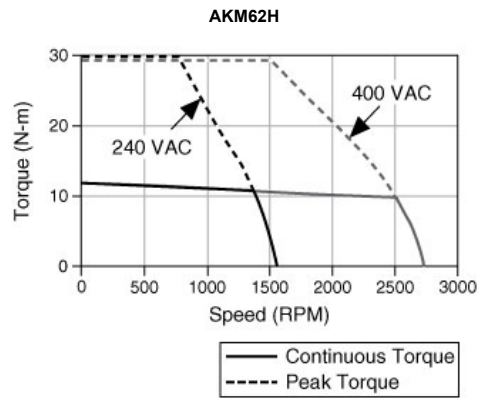
	<b>AKM62H</b>
<b>NI Part Number</b>	781561-01
<b>Manufacturer Part Number</b>	AKM62H-ANCNC-00
<b>Compatible AKD Drive</b>	AKD-P00606

## Specifications

	<b>AKM62H</b>
Continuous Current at Stall (A)	5.4
Peak Current at Stall (A)	16.2
Continuous Torque at Stall N • m (lb-in.) @ 100 °C	14.2 (126)
Peak Torque at Stall N • m (lb-in.)	37.5 (332)
Max Rated DC Bus Voltage	640 (480)
Rated Speed RPM 160 VDC (120 VAC)	n/a*
Rated Speed RPM 320 VDC (240 VAC)	1340
Max Continuous Power kW(HP) @160 VDC (120VAC)	n/a*
Max Continuous Power kW(HP) @320 VDC (240VAC)	1.4 (1.88)
Rotor Inertia (Jm) kg-cm <sup>2</sup> (lb*in.*s <sup>2</sup> )	11.9 (0.00105)
DC Resistance Ohms @ 25 °C (line to line)	3.19
Winding Inductance mH	2.7
Back EMF Constant V/krpm	165
Thermal Resistance °C/W	0.45
Weight kg (lbs)	9.0 (19.8)
Max Winding Temperature °C	155
Thermal Resistance °C/W	0.46
Weight kg(lbs)	8.9 (19.6)
Maximum Mechanical Speed RPM	8000
Max Radial Force (N)	1940
Max Axial Force (N)	2200
Shaft	Smooth Shaft
Cables	Motor-Mounted Rotatable IP65 Connectors
Recommended Heat Sink Size	12 by 12 by ¼ in. Aluminum Plate



## Torque versus Speed



#### AKM Series Motors with Smart Feedback Device Angle Measurement

- Resolution:  $2^{24} = 16,777,216$  counts per rev = 0.0013 arc-min ( $2^{20}$  usable over EtherCAT)
- Accuracy:  $<\pm 0.75$  arc-min electrical + sensor error
- Size 10 sensor  $\pm 16$  arc-min net (AKM 1)
- Size 15 sensor  $\pm 9$  arc-min net (AKM 2, 3, 4)
- Size 21 sensor  $\pm 9$  arc-min net (AKM 5, 6)
- Electrical noise:  $<2$ -17 Rev rms at full bandwidth
- Bandwidth:  $>2000$  Hz at -3 dB and  $>1000$  Hz at  $-45^\circ$  phase lag
- Max tracking rate:  $>50,000$  RPM
- Velocity noise:  $<4$  RPM rms at full bandwidth
- Velocity ripple:  $<0.2\%$  pk-pk electronics only
  - Size 10 sensor  $<2.5\%$  pk-pk net (AKM 1)
  - Size 15 sensor  $<1.5\%$  pk-pk net (AKM 2,3,4)
  - Size 21 sensor  $<1.5\%$  pk-pk net (AKM 5,6)

#### Environmental

- Operating ambient temperature:  $-20$  to  $120^\circ\text{C}$
- Humidity: 10 to 90% noncondensing
- Storage temperature:  $-40$  to  $135^\circ\text{C}$

#### Cable Selection Guide

##### NI 73xx Motion Controller Solution

Motion Controller		Controller to Accessory Cable		Accessory	Access to Drive Cable		Brushless Servo Drive	Driver to Motor Cables		Motor Series
Bus	Family	Cable	Length		Cable	Length		Cable	Length	
PCI or PXI	NI 7330, NI 7340, or NI 7350	SHC68-C68-S	0.5 m	UMI-7772/7774	UMI-7772/7774 to AKD Drive Cable	2.5 m	AKD-P00306 (3 A, Analog or EtherCAT) or AKD-P00606 (6 A, Analog or EtherCAT)	Motor Power Cable, AKM Motor to AKD Drive	1 m	AKM Brushless Servo Motor
			2 m	(778556-01)	(781526-01)			3 m		
		SH68-C68-S	0.5 m	UMI-7764	UMI-7764 to AKD Drive Cable	2.5 m		SFD Feedback Cable, AKM Motor to AKD Drive	6 m	
			1 m	(777978-02)	(781527-01)			10 m		
			2 m							

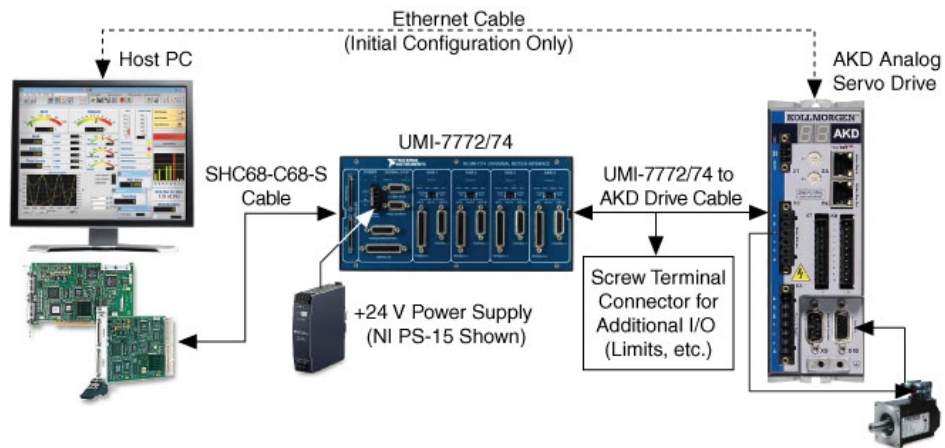


Figure 2. NI UMI-7772/74 to AKD Drive Connections

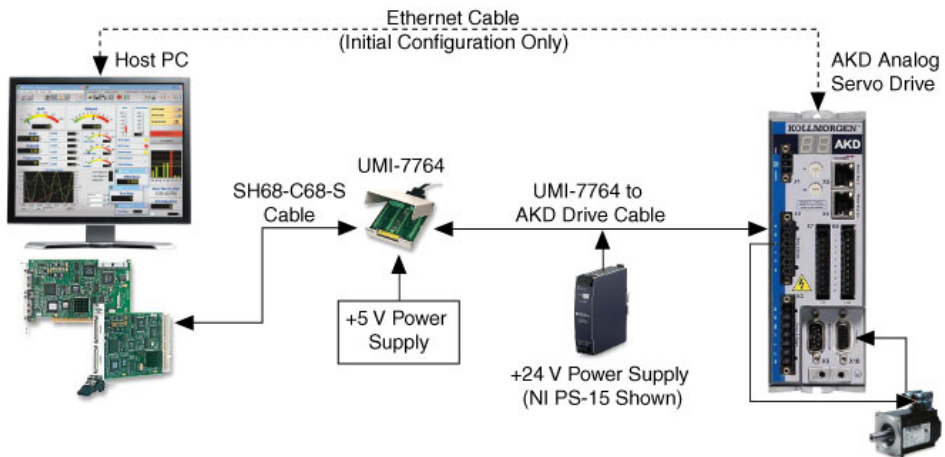


Figure 3. NI UMI-7764 to AKD Drive Connections

## NI 951x C Series Drive Interface Module Solution

Drive Interface Module		Module to Drive Cables		Brushless Servo Drive	Drive Motor Cable		Motor Series
Module	Interface Type	Cable	Length		Cable	Length	
NI 9514 or NI 9516	+/-10 V Analog	NI 9514/16 to AKD Drive Cable (781524-01)	2.5 m	AKD-P00306 (3 A, Analog or EtherCAT) or AKD-P00606 (6 A, Analog or EtherCAT)	Motor Power Cable, AKM Motor to AKD Drive	1 m 3 m	AKM Brushless Servo Motor
NI 9512	Step and Direction	NI 9512 to AKD Drive Cable (781525-01)	2.5 m		SFD Feedback Cable, AKM Motor to AKD Drive	6 m 10 m	

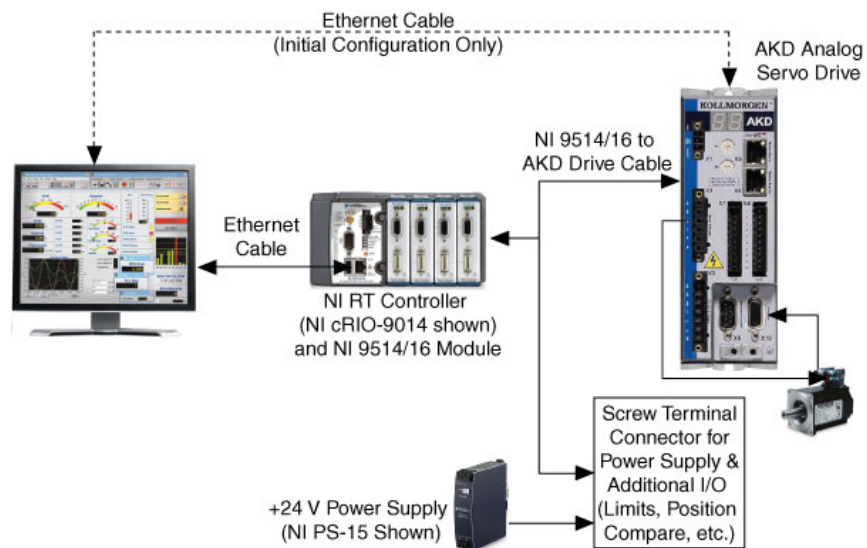


Figure 4. NI 9514/16 to AKD Drive Connections

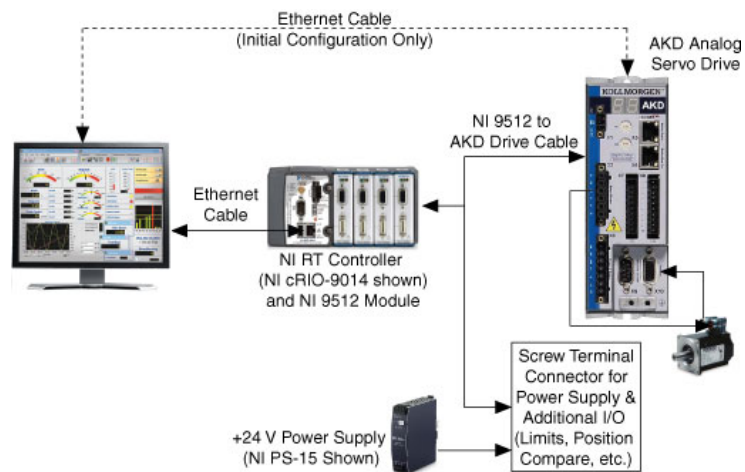


Figure 5. NI 9512 to AKD Drive Connections

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