

Kollmorgen Servo Systems Catalog



Micron™ Gearheads



AKM™ Servomotors



Kollmorgen Cartridge DDR™ Motors



Housed Direct Drive Rotary Motors



Direct Drive Linear Motors



Linear Positioners



Multi-Axis Precision Tables



AKD™ Servo Drive

Kollmorgen.

Every solution comes from a real understanding of the challenges facing machine designers and users.

The ever-escalating demands of the marketplace mean increased pressure on machine designers and users at every turn. Time constraints. Demands for better performance. Having to think about the next-generation machine even before the current one is built. While expectations are enormous, budgets are not. Kollmorgen's innovative automation and motion solutions and broad range of quality products help engineers not only overcome these challenges but also build truly differentiated machines.

Because motion matters, it's our focus. Motion can distinctly differentiate a machine and deliver a marketplace advantage by improving its performance. This translates to overall increased efficiency on the factory floor. Perfectly deployed machine motion can make your customer's machine more reliable and efficient, enhance accuracy and improve operator safety. Motion also represents endless possibilities for innovation. We've always understood this potential, and thus, have kept motion at our core, relentlessly developing products that offer precision control of speed, accuracy and position in machines that rely on complex motion.

Removing the Barriers of Design, Sourcing, and Time

At Kollmorgen, we know that OEM engineers can achieve a lot more when obstacles aren't in the way. So, we knock them down in three important ways:

Integrating Standard and Custom Products

The optimal solution is often not clear-cut. Our application expertise allows us to modify standard products or develop totally custom solutions across our whole product portfolio so that designs can take flight.

Providing Solutions, Not Just Components

As companies reduce their supplier base and have less engineering manpower, they need a total system supplier with a wide range of integrated solutions. Kollmorgen is in full response mode with complete solutions that combine programming software, engineering services and best-in-class components.

Global Footprint

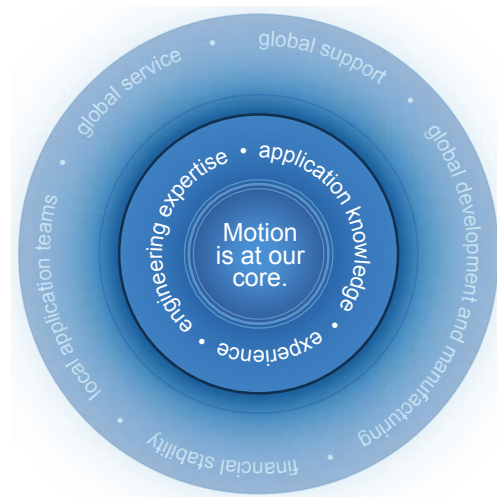
With direct sales, engineering support, manufacturing facilities, and distributors across North America, Europe, the Middle East, and Asia, we're close to OEMs worldwide. Our proximity helps speed delivery and lend support where and when they're needed.

Financial and Operational Stability

Kollmorgen is part of Danaher Corporation, our \$14B parent company. A key driver in the growth of all Danaher divisions is the Danaher Business System, which relies on the principle of "kaizen" – or continuous improvement. Using world-class tools, cross-disciplinary teams of exceptional people evaluate processes, and develop plans that result in superior performance.

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AKD™ Servo Drive

Our AKD series is a complete range of Ethernet-based servo drives that are fast, feature-rich, flexible and integrate quickly and easily into any application.* AKD ensures plug-and-play commissioning for instant, seamless access to everything in your machine. And, no matter what your application demands, AKD offers industry-leading servo performance, communication options, and power levels, all in a smaller footprint.

This robust, technologically advanced family of drives delivers optimized performance when paired with our best-in-class components, producing higher quality results at greater speeds and more uptime. With Kollmorgen servo components, we can help you increase your machine's overall effectiveness by 50%.

* Patents pending.

The Benefits of AKD Servo Drive

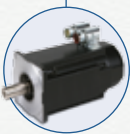
<ul style="list-style-type: none"> • Optimized Performance in Seconds 	<ul style="list-style-type: none"> • Auto-tuning is one of the best and fastest in the industry • Automatically adjusts all gains, including observers • Immediate and adaptive response to dynamic loads • Precise control of all motor types • Compensation for stiff and compliant transmission and couplings
<ul style="list-style-type: none"> • Greater Throughput and Accuracy 	<ul style="list-style-type: none"> • Up to 27-bit-resolution feedback yields unmatched precision and excellent repeatability • Very fast settling times result from a powerful dual processor system that executes industry-leading and patent pending servo algorithms with high resolution • Advanced servo techniques such as high-order observer and bi-quad filters yield industry-leading machine performance • Highest bandwidth torque-and-velocity loops. Fastest digital current loop in the market
<ul style="list-style-type: none"> • Easy-to-Use Graphical User Interface (GUI) for Faster Commissioning and Troubleshooting 	<ul style="list-style-type: none"> • Six-channel real-time software oscilloscope commissions and diagnoses quickly • Multi-function Bode Plot allows users to quickly evaluate performance • Auto-complete of programmable commands saves looking up parameter names • One-click capture and sharing of program plots and parameter settings allow you to send machine performance data instantly • Widest range of programming options in the industry
<ul style="list-style-type: none"> • Flexible and Scalable to Meet Any Application 	<ul style="list-style-type: none"> • 3 to 24 Arms continuous current; 9 to 48 Arms peak • Very high power density enables an extremely small package • True plug-and-play with all standard Kollmorgen servomotors and positioners • Supports a variety of single and multi-turn feedback devices—Smart Feedback Device (SFD), EnDat2.2, 01, BiSS, analog Sine/Cos encoder, incremental encoder, HIPERFACE®, and resolver • Tightly integrated Ethernet motion buses without the need to add large hardware: EtherCAT®, SynqNet®, Modbus/TCP, EtherNet/IP, PROFINET, and CANopen® • Scalable programmability from base torque-and-velocity through multi-axis master

AKD Servo Drive

The AKD servo drive delivers 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 indexing, to multi-axis programmable motion with embedded Kollmorgen Automation Suite. The versatile AKD sets the standard for power density and performance.



Micron™ Gearheads



AKM™ Servomotors



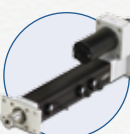
Kollmorgen Cartridge DDR™ Motors



Housed Direct Drive Rotary Motors



Direct Drive Linear Motors*



Linear Positioners



Multi-Axis Precision Tables

Best-in-Class Components

AKD works seamlessly with Kollmorgen motors and positioners—well-known for quality, reliability, and performance.



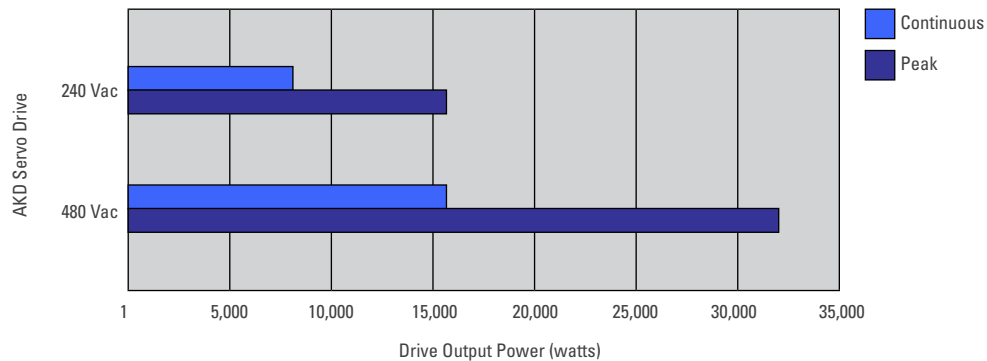
AKD™ Servo Drive

* For more information on our direct drive linear motors, visit www.kollmorgen.com/brushlessddl

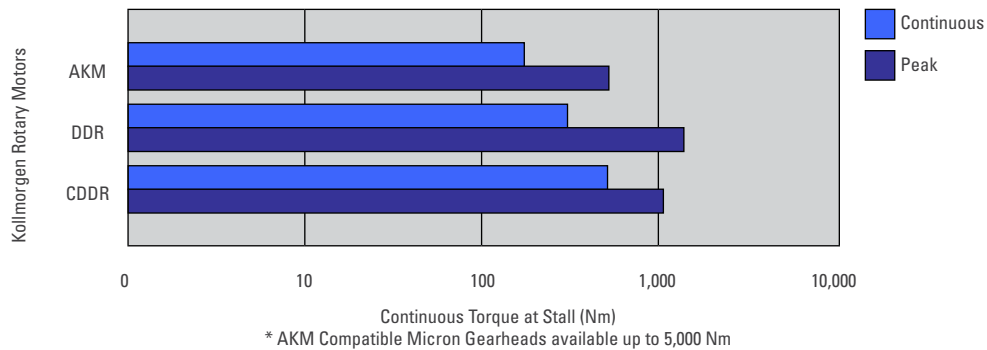
AKD Servo Drive Range of Coverage

When you pair the AKD servo drive with any of our Kollmorgen motors or linear positioners, you'll achieve optimized performance. From 3 to 24 Arms continuous current and 9 to 48 Arms peak current, the feature-rich AKD provides a solution for nearly any application.

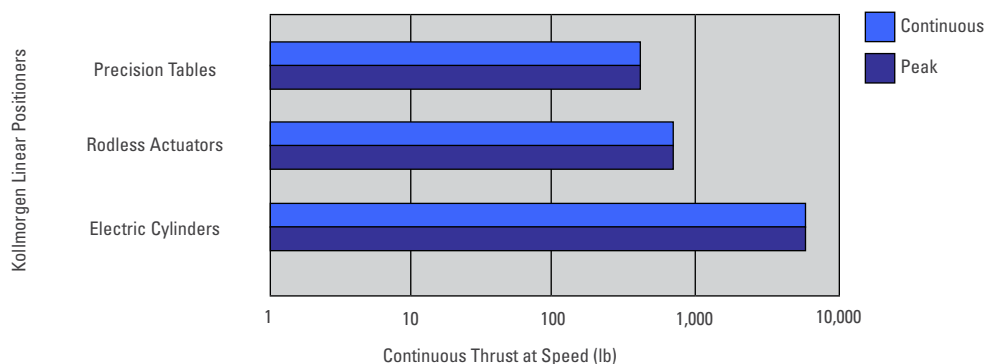
AKD Power Range (pp 2-15)



AKD's Kollmorgen Rotary Motor Coverage (pp 18-31)



AKD's Kollmorgen Linear Positioner Coverage (pp 32-49)



AKD Servo Drive

AKD servo drive is specifically designed with the versatility, communications, and power you need to expand machine performance and increase integration speeds. Motor set-up is plug-and-play and multiple Ethernet connectivity options provide both open and closed protocols. Online troubleshooting and data verification enable faster, bug-proof programming. And a broad power range in a smaller, compact design allows you to use these robust drives with a single interface while experiencing industry-leading, high-performance servo loops.

AKD Specifications		
Encoder Output or AUX Encoder Input	2.5 MHz Maximum line frequency	
Feedback	Smart Feedback Device (SFD), EnDat2.2, 01, BiSS, analog Sine/Cos encoder, incremental encoder, HIPERFACE®, and resolver	
Logic supply	24 Vdc	
	Base drive	With I/O expansion
Digital input (24 Vdc)	8 (1 dedicated to enable)	20 (1 dedicated to enable)
Digital output (24 Vdc)	3 (1 dedicated to fault relay)	13 (1 dedicated to fault relay)
Analog input (+/- 10 Vdc, 16-bit)	1	2
Analog output (+/- 10 Vdc, 16-bit)	1	2
Programmable inputs	7	19
Programmable outputs	2	12
Sink/Source inputs/outputs	Yes	Yes



Industry-leading power density

General Specifications

120 / 240 Vac 1 & 3 Phase (85 -265 V)	Continuous Current (Arms)	Peak Current (Arms)	Drive Continuous Output Power Capacity (Watts)	Internal Regen (Watts) (Ohms)		Height mm (in)	Width mm (in)	Depth mm (in)	Depth with Cable Bend Radius mm (in)
AKD-■00306	3	9	1100	0	0	168 (6.61)	57 (2.24)	153 (6.02)	184 (7.24)
AKD-■00606	6	18	2000	0	0	168 (6.61)	57 (2.24)	153 (6.02)	184 (7.24)
AKD-■01206	12	30	4000	100	15	195 (7.68)	76 (2.99)	186 (7.32)	215 (8.46)
AKD-■02406	24	48	8000	200	8	250 (9.84)	100 (3.94)	230 (9.06)	265 (10.43)

240/480 Vac 3 Phase (187-528 V)	Continuous Current (Arms)	Peak Current (Arms)	Drive Continuous Output Power Capacity (Watts)	Internal Regen (Watts) (Ohms)		Height mm (in)	Width mm (in)	Depth mm (in)	Depth with Cable Bend Radius mm (in)
AKD-■00307	3	9	2000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■00607	6	18	4000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■01207	12	30	8000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■02407	24	48	16,000	200	23	310 (12.20)	105 (4.13)	229 (9.02)	264 (10.39)
AKD-■04807	48	96	32,000	400	Coming in 2012				
AKD-■09607	96	192	64,000	800	Coming in 2012				

Note: For complete AKD model nomenclature, refer to page 67

Scalable Programmability

The AKD servo drive delivers cutting-edge technology and performance with one of the most compact footprints in the industry. The AKD is flexible enough for virtually any application. From one axis that is as simple as analog torque and velocity, to 128 axes of fully programmable synchronized motion, AKD is the answer.

Benefits

- Optimized performance in seconds
- Greater throughput and accuracy
- Easy-to-use Graphical User Interface (GUI) for faster commissioning and troubleshooting
- Flexible and scalable to meet any application



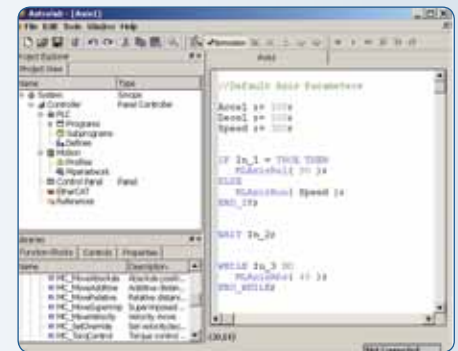
Base AKD ("B" Option)

- Controlled by analog torque-and-velocity commands
- Includes electronic gearing via X9 connector
- Includes access to 11 digital I/O and 2 analog I/O on base drive
- Includes 2 high-speed digital inputs
- Expandable to 31 digital I/O and 4 analog I/O



Motion Tasking ("P" Option)

- Adds simple point-and-click indexing to base drive
- Provides user with pre-programmed options
- Guides novice user through simplified steps to create indexing moves
- Includes access to 11 digital I/O and 2 analog I/O on base drive
- Includes 2 high-speed digital inputs
- Expandable to 31 digital I/O and 4 analog I/O
- Same package size as base drive



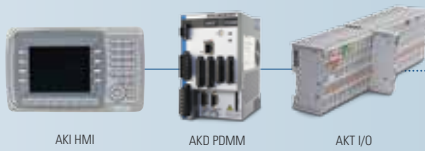
BASIC Programmable 1.5 Axis Drive ("T" Option)

- Adds BASIC programmability to base AKD
- 4KHz programmable interrupt service routines
- Conditional statements, built-in math functions, user functions and subroutines
- Includes access to 11 digital I/O and 2 analog I/O on base drive
- Includes 2 high-speed digital inputs
- Expandable to 31 digital I/O and 4 analog I/O
- Same package size as base drive

Basic Operation

Single-Axis

RANGE OF KOLLMORGEN AUTOMATION SUITE CAPABILITIES



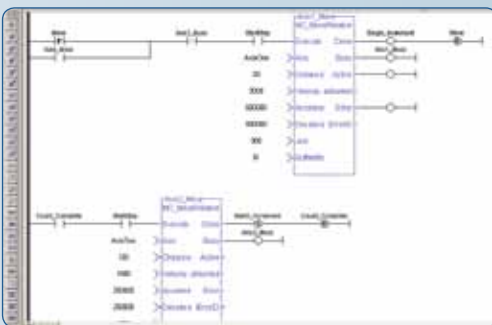
AKI HMI

AKD PDMM

AKT I/O

AKD PDMM used standalone as a single-axis drive with integrated controller and soft-PLC

- Includes all the capabilities of Kollmorgen Automation Suite™ – a fully integrated, truly scalable programming solution
- Choose from all five IEC 61131-3 languages (structured text, function block diagram, ladder diagram, instruction list, sequential function chart) for soft PLC process programming
- Program motion using your choice of PLCopen for motion or our innovative Pipe Network™
- Exclusive function blocks, such as “wait,” enable your program to act as a scanning or sequential language
- Onboard I/O includes 17 digital (with 2 high-speed inputs) and 2 analog
- Controls AKT™ remote I/O for nearly unlimited expandability
- AKD PDMM only adds 30mm width to AKD base drives



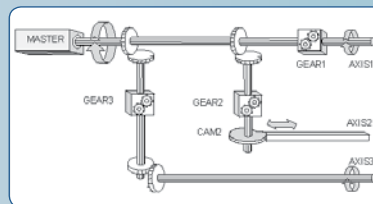
AKD Servo Drive

AKD Servo Drive

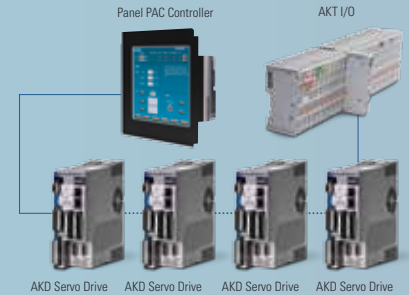
AKT I/O

Seamlessly add additional axes and AKD PDMM serves as a high-performance multi-axis machine controller

- Provide true synchronized-path control of up to 8 or more axes
- Reduce cabinet size and wiring requirements with onboard motion and machine control in a single, compact package
- Easily manage remote I/O and the I/O of all attached drives via EtherCAT
- Use PLCopen for motion or Pipe Network™ to program sophisticated camming and gearing applications in a matter of minutes
- Add 11 digital and 2 analog I/O to the system with each additional AKD Servo axis incorporated
- Includes 2 high-speed digital inputs for each additional AKD servo axis



Using the exclusive Pipe Network provides a one-to-one translation of a mechanical system into a logical world.



AKD Servo Drive

AKD Servo Drive

AKD Servo Drive

AKD Servo Drive

Kollmorgen Automation Suite Programmable Automation Controller (PAC)

- Build EtherCAT-based systems up to 128 axes of high-performance motion using a PAC controller
- This scalable solution provides a full integrated development environment for any application, whether programming a single axis of motion, a multi-axis AKD PDMM™ system, or a PAC-based system up to 128 axes
- Panel PACs include the choice of a 10”, 15” or 17” touchscreen user interface
- PAC controllers include choice of Celeron or Core2Duo processor for scalable performance
- Program camming, gearing and other motion applications using a choice of PLC open for motion or the graphical Pipe Network™
- Add 11 digital and 2 analog I/O to the system with each additional AKD Servo axis incorporated
- Includes 2 high-speed digital inputs for each additional AKD servo axis

IEC 61131-3 with five languages for process programming (soft PLC)

Choice of PLCopen for motion or Kollmorgen exclusive Pipe Network for motion programming



Programming

Multi-Axis Programming

AKD BASIC Drives

High Performance Capabilities in an Integrated Drive/Control Solution

Add co-engineering to your toolbox. Save money, simplify your machine and customize performance to meet the specific needs of each customer or application – as needed, today or tomorrow.

Our new Kollmorgen AKD™ BASIC drives add BASIC-programmable machine and motion control to the superior performance of our AKD drive platform. So engineers can quickly customize performance at the drive level without touching the PLC. In fact, for many applications you can avoid the expense, wiring and cabinet space of a PLC altogether.

Whether you rely on your own engineering expertise or Kollmorgen's, the base and Expanded I/O versions of our AKD BASIC drive give you the unprecedented machine and motion control flexibility in a compact, fully integrated drive package. It's one more example of our co-engineering mission to help you deliver exactly what your customers want – when they want it – in solutions that are more cost-effective to build, simpler in design and faster to market.

AKD BASIC Language Programmable Drive

In addition to the wide selection and key features of our proven AKD, the standard version of our AKD BASIC drive offers:

- **Programmable machine control built into the drive**, so you can engineer perfect axis-level performance without touching the machine controller. In fact, AKD BASIC can eliminate the need for a PLC in single and 1.5 axis applications – reducing wiring requirements, panel space, design complexity and cost.
- **High performance motion control built into the drive**, enabling increased speed for more complex moves in a simpler design with reduced wiring.
- **BASIC Language programming**, providing simple program flow control in a solution that's easy to learn, quick to master and universally accepted.
- **An integrated development environment**, allowing single-point programming, de-bugging, commissioning, tuning and management of your AKD BASIC drive from within AKD WorkBench. Our BASIC editor provides innovative features that speed development time and reduce coding errors.
- **Source code lockout with password protection**, freeing you to differentiate your product with drive-level control while safeguarding your intellectual property.

Expanded I/O AKD BASIC Programmable Drive

Building on the features of the AKD BASIC drive, we also offer an expanded I/O version that adds:

- **A total of 20 digital inputs, 13 digital outputs, 2 analog inputs and 2 analog outputs**, reducing or eliminating the need for remote I/O and its associated installation and wiring costs.
- **An SD memory card slot** for loading, and restoring programs and parameters, without the need for a PC.

I/O Capabilities	Base Version	Expanded I/O Version
Digital Inputs	8	20
Digital Outputs	3	13
Analog Inputs	1	2
Analog Outputs	1	2



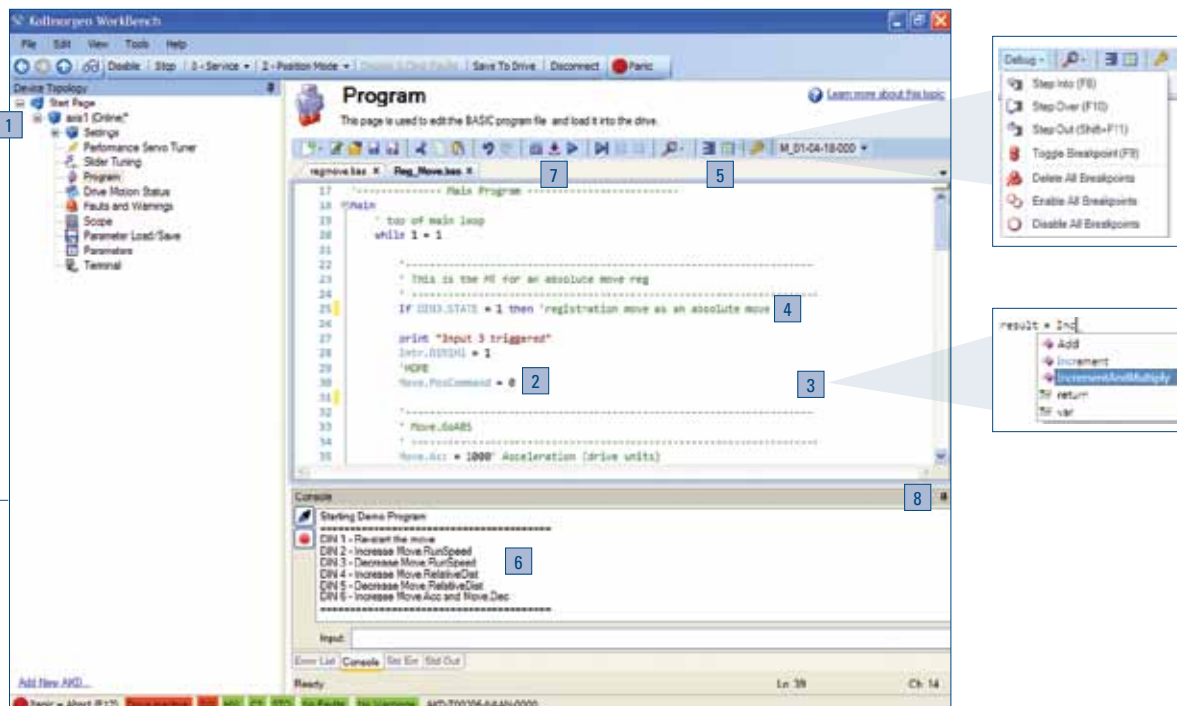
Development Tools that Speed Programming and Improve Quality

Co-engineering is a powerful tool. To make it easy for you to provide better solutions for your customers, we provide an innovative BASIC programming environment within Kollmorgen WorkBench. So there's only one software package to use for all of your drive setup, configuration, tuning and management tasks in addition to motion and machine control programming.

Pre-built code templates give your application a head-start, while automatic formatting, highlighting and other ease-of-use features increase programming speed and accuracy. Complete access to all programming capabilities and drive features within a single environment helps speed your development of complete, optimally engineered solutions.

Novice users will enjoy a short ramp-up time to productive coding, while experienced users will discover well-designed tools that take their programming skills to new levels of speed and quality.

- 1 Integrated axis setup
- 2 Code snippets simplify formatting
- 3 Auto-complete helps speed coding and reduce errors
- 4 Automatic color coding makes it easy to distinguish comments, parameters, print statements and other types of code
- 5 Full debugger accelerates development
- 6 Packaged program console provides instant program status
- 7 Menu-driven navigation provides intuitive look and feel
- 8 Window pinning maximizes workspace



AKD PDMM™ Integrated Servo Drive and Automation Controller

Build Simpler and Better with Drive-Resident Machine and Motion Control

Extend your design options. Control as many as eight axes or more without the need for a PLC or PAC. Reduce cabinet space and wiring requirements. Program perfect machine and motion control for any project using a single, fully integrated programming environment. Build a better machine at a lower cost.

Our new addition to the AKD™ drive family combines one servo axis, a master controller that supports multiple additional axes, and the full automation capability of Kollmorgen Automation Suite™ (refer to page K4 for more information on Kollmorgen Automation Suite).—all in a single, compact package.

Welcome to the AKD PDMM™ programmable drive, multi-axis master.

Performance Specifications

120/240 VAC 1- and 3-Phase	Continuous Current (Arms)	Peak Current (Arms)	H (mm/inches)	W (mm/inches)	D (mm/inches)
AKD-M00306-MCEC-0000	3	9	168 / 6.61	89 / 3.50	156 / 6.14
AKD-M00606-MCEC-0000	6	18	168 / 6.61	89 / 3.50	156 / 6.14
AKD-M01206-MCEC-0000	12	30	196 / 7.72	107 / 4.22	187 / 7.36
240/400/480 VAC 3-Phase	Continuous Current (Arms)	Peak Current (Arms)	H (mm/inches)	W (mm/inches)	D (mm/inches)
AKD-M00307-MCEC-0000	3	9	256 / 10.08	99 / 3.90	185 / 7.28
AKD-M00607-MCEC-0000	6	18	256 / 10.08	99 / 3.90	185 / 7.28
AKD-M01207-MCEC-0000	12	30	256 / 10.08	99 / 3.90	185 / 7.28

Features

- Kollmorgen Automation Suite™ provides fully integrated programming, testing, setup and commissioning
- Embedded web server utility simplifies service
- Control 8 axes or more* while reducing machine footprint
 - EtherCAT multi-axis master motion controller integrated with a standard AKD™ drive axis
 - Full IEC61131-3 soft PLC for machine control, with support for all 5 programming languages
 - Choice of PLCopen for motion or Pipe Network™ for programming motion control
 - 32 kB non-volatile memory stores machine data to eliminate scrap upon restart after power failure
 - SD Card slot simplifies backup and commissioning, with no PC required
 - Onboard I/O includes 13 digital inputs, 4 digital outputs, 1 analog input, 1 analog output (expandable with AKT series of remote I/O) (refer to page K19 for information on AKT I/O)
- Works with Kollmorgen Visualization Builder for programming AKI human-machine interface panels (refer to page K10 for more information on Kollmorgen Visualization Builder)



A Single, Scalable Development Suite

Kollmorgen Automation Suite™ simplifies and accelerates development through a unified system of software, hardware, and collaborative co-engineering. This scalable solution provides a fully integrated development environment for any application, whether you're programming a single axis of motion, a multi-axis AKD PDMM™ system, or a PAC-based system up to 128 axes. Kollmorgen Automation Suite has been proven to:

(refer to page K11 for information on AKC PAC products)

- Improve product throughput by up to 25% with industry-leading motion bandwidth
- Reduce scrap by up to 50% with world-class servo accuracy, seamless power-failure recovery and highly dynamic changeovers
- Increase precision for better quality, reduced waste and less downtime using EtherCAT—the field bus with motion bus performance
- Enable more adaptable, sustainable and innovative machines that measurably improve marketability and profitability

A Single Family of Servo Drives

Kollmorgen AKD™ servo drives deliver cutting-edge performance in a compact footprint. From basic torque-and-velocity applications, to indexing, to multi-axis programmable motion, these feature-rich drives offer:

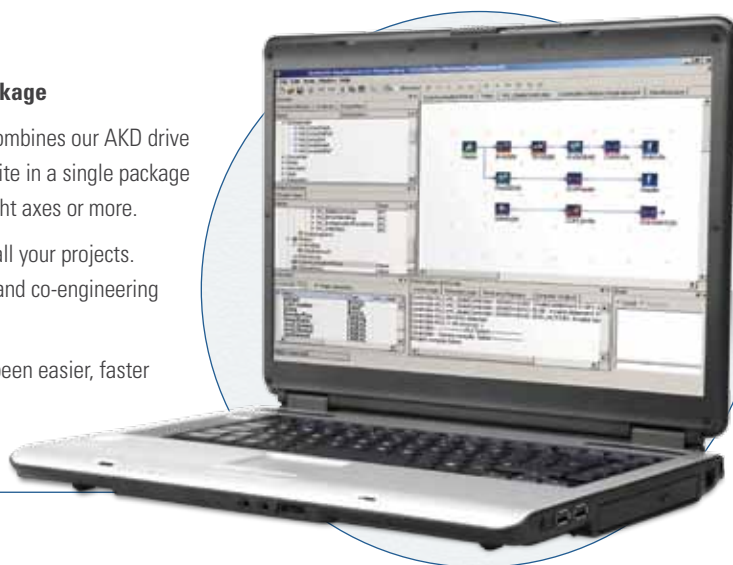
- Plug-and-play compatibility with your servomotor
- All the advantages of Kollmorgen's breadth of motor platforms including AKM™, CDDR™, and other direct-drive technologies
- The fastest velocity and position loop updates
- Full-frequency autotuning for perfect motion across the performance spectrum
- Real-time feedback from a wide variety of devices

Our Best Drive and Automation Solution in a Single Package

The new AKD PDMM programmable drive, multi-axis master combines our AKD drive platform with the full feature set of Kollmorgen Automation Suite in a single package—providing complete machine and motion control for up to eight axes or more.

You need only one development suite and one drive family for all your projects. And you can rely on one source for all the motion components and co-engineering expertise you need to build a better machine.

With AKD PDMM, the best in machine engineering has never been easier, faster or more cost-effective.

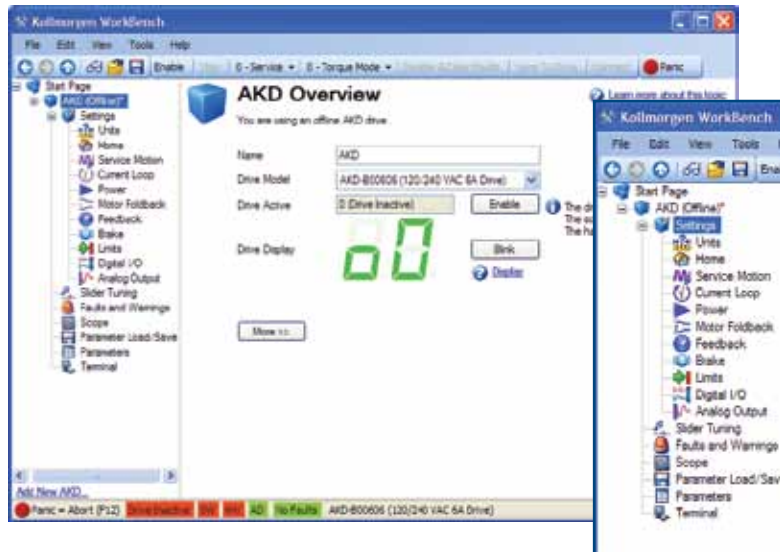


Kollmorgen WorkBench

Our simple Graphical User Interface (GUI), Kollmorgen WorkBench, is designed to expedite and streamline the user's experience with the AKD servo drive. From easy application selection and reduced math, to a sleek six-channel scope; the user interface is extremely easy to use. Kollmorgen WorkBench supports intuitive access to the exclusive Performance Servo Tuner (PST) available inside AKD. The patent pending PST makes auto-tuning the AKD high-performance servo drive with world-class Kollmorgen motors very simple.

User-Friendly Environment

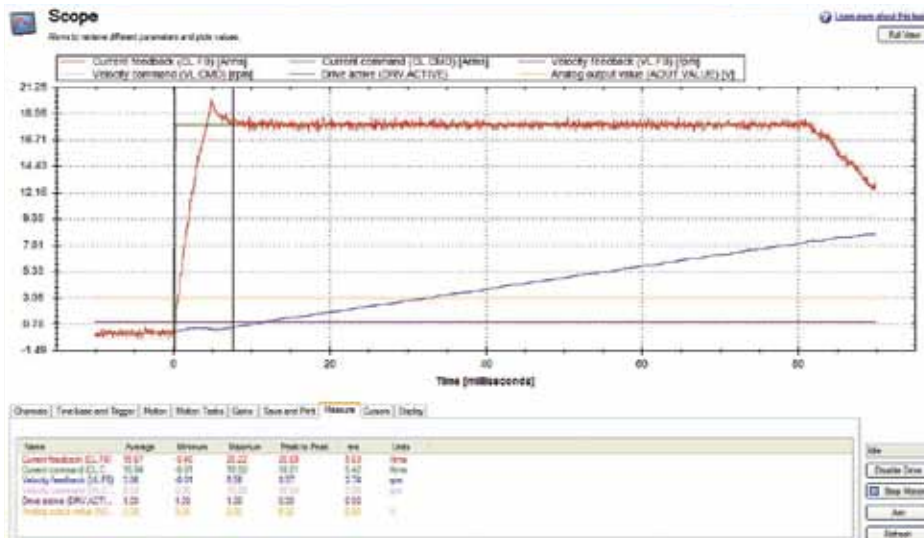
Logical flow, colorful icons and easy access simplify interactions with the AKD servo drive. The folder structure allows for instant identification and easy navigation.



Sleek Six-Channel "Real-Time" Software Oscilloscope

The easy-to-use AKD servo drive interface has a sleek digital oscilloscope that provides a comfortable environment for users to monitor performance. There are multiple options to share data in the format you prefer at the click of a button.

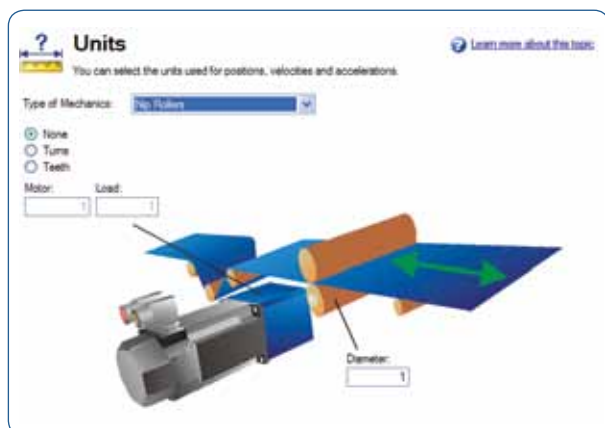
- Save as an image
- Load to an e-mail
- Print



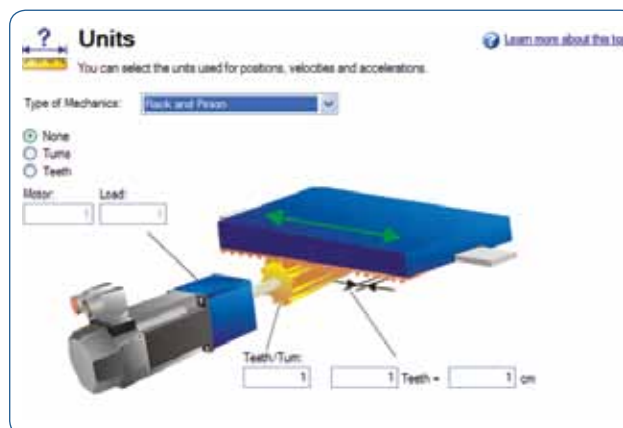
Application Selection

Simplifies set-up by allowing use of machine or application-based units. Nip roller and rack and pinion set-ups shown.

Nip Roller Application Selection



Rack and Pinion Application Selection



Data-Sharing

The ease-of-sharing continues in the parameters window. Kollmorgen WorkBench provides the user the easy options of printing or emailing the parameter values at the click of a button.

Parameters

Learn more about this topic

This page lists all the current values of all the drive parameters on the drive.

Full Name	Value	Units	Parameter	Read/Write
Active Disable				
Deceleration during active disable	3000.000	rpm/s	AD DEC	read-write
Time-out	1000	ms	AD DISTO	read-write
State	0	ms	AD STATE	read-only
Velocity window	120.000	rpm	AD VELTHRESH	read-write
Time delay after velocity window	5	ms	AD VELTHRESHTM	read-write
Analog Input				
Analog input low pass filter cutoff freq...	5.000.000	Hz	AIN CUTOFF	read-write
Analog input signal deadband	0.000	V	AIN DEADBAND	read-write
Analog input mode	0 - Inactive		AIN MODE	read-write
Analog input offset	0.000	V	AIN OFFSET	read-write
Analog input signal	0.000	V	AIN VALUE	read-only
Analog Input/Output				
Analog input torque scale	0.001	A/V	AIO ISCALE	read-write
Analog input velocity scale	0.060	rpm/V	AIO VSCALE	read-write
Analog Output				
Analog output mode	0 - User Variable		AOUT MODE	read-write
Analog output value	0.000	V	AOUT VALUE	read-write
Mode				
Current Loop				
Current command	0.000	A	CLCMD	read-only
Current command - user	0.000	A	CLCMDU	read-write
Current command - D component	0.000	A	CLDCMD	read-only
Current command - user D component	0.000	A	CLDCMDU	read-write

Find:

More >>

Group

Refresh

Port

E-Mail

Drive Parameter List - Message (Plain Text)

File Edit View Insert Format Tools Actions Help

Send

To...

Cc...

Bcc...

Subject: Drive Parameter List

Attach... DriveParameterList.csv (16 KB) Attachment Options...

Drive Parameter List is attached.

AKD Connector Layout and Functionality

Ethernet Connectivity

- Ethernet-based AKD servo drive provides the user with multiple bus choices
- EtherCAT® (DSP402 protocol), Modbus/TCP, SynqNet®, EtherNet/IP, PROFINET and CANopen®
- No option cards are required

Industrial Design

- Rugged circuit design and compact enclosure for space-saving, modern appearance – minimizes electrical noise emission and susceptibility
- Full fault protection
- UL, cUL listed, and CE
- No external line filters needed (480 Vac units) for CE & UL compliance
- Removable screw terminal connectors for easy connections
- DC Bus sharing

Safe-Torque-Off (STO)

(IEC 61800 SIL2)

- Switches off the power stage to ensure personnel safety and prevents an unintended restart of the drive, even in fault condition
- Allows logic and communication to remain on during power stage shut down

Internal Regenerative Braking Resistor

(All powers except 120/240 Vac 3 Arms and 6 Arms)

- Simplifies system components
- Saves overhead of managing external regeneration when internal regeneration is sufficient

Performance Servo Tuner (PST)

- Exclusive patent pending auto-tuner reaches optimized set-up in seconds
- Handles inertia mismatches up to 1000:1
- Industry leading bandwidth under compliant and stiff load conditions, no matter the mechanical bandwidth of the machine



Plug-and-Play with Kollmorgen Motors and Positioners

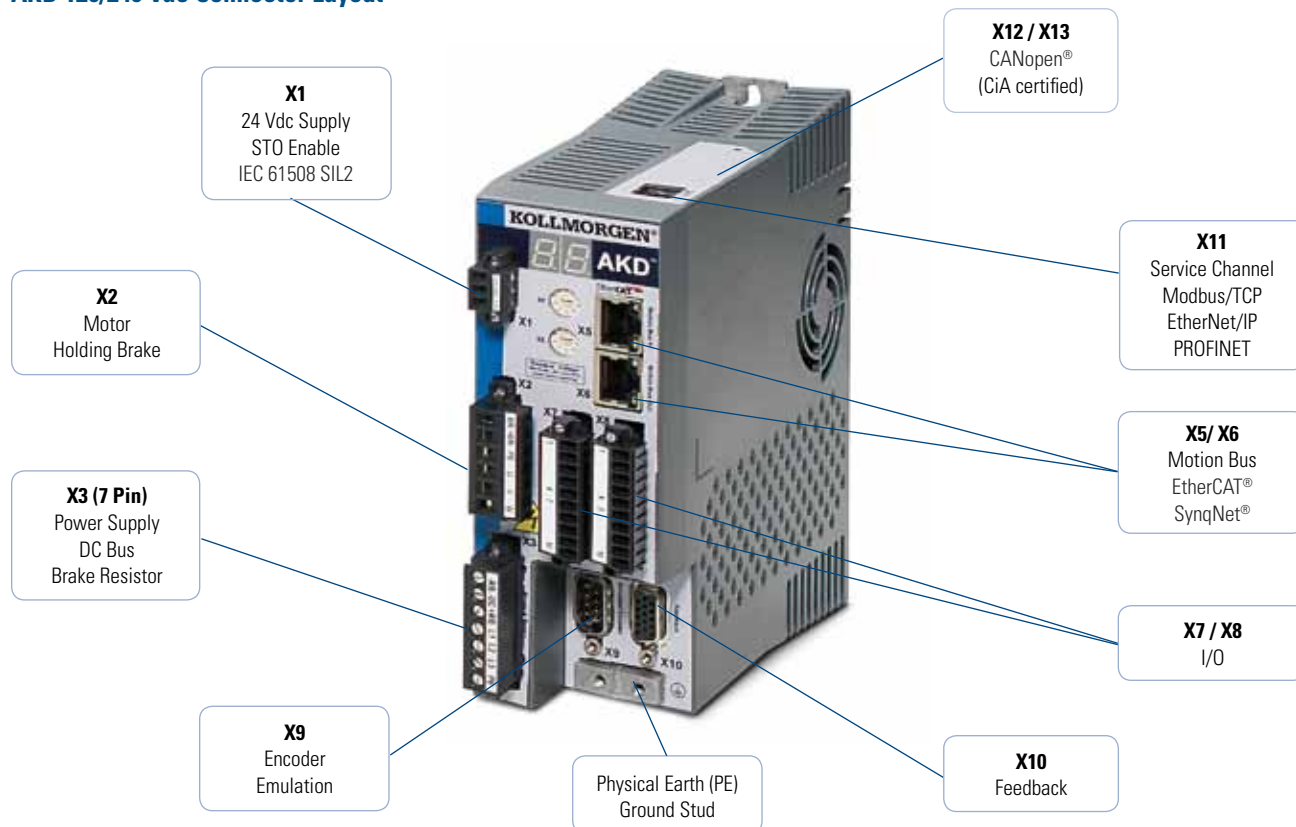
- Electronic motor nameplates allow parameters to automatically load for fast commissioning
- Motion in seconds
- Custom motor parameters easily entered

I/O (Base Drive)

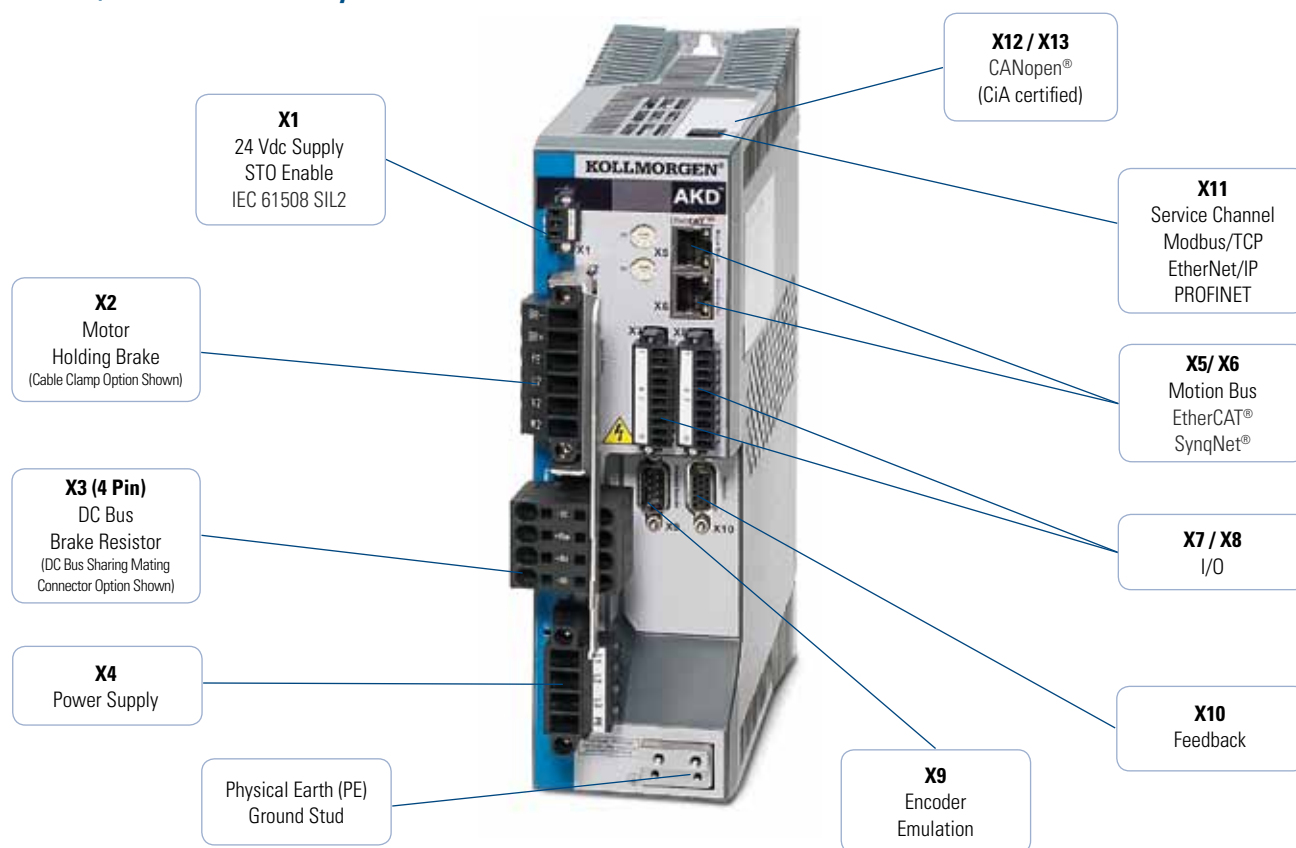
- 8 digital inputs (1 dedicated to enable)
- 2 high-speed digital inputs (maximum time delay of 1.0 µs)
- 3 digital outputs (1 dedicated to fault relay)
- 1 analog input - 16 bit
- 1 analog output - 16 bit



AKD 120/240 Vac Connector Layout



AKD 240/480 Vac Connector Layout



Accessories



CANopen Accessories

We offer cables, terminators and adaptors for simple integration with CANopen machine networks.



Brake Resistors

We offer a full line of brake resistors up to 6000 watts. Brake resistors are impedance matched with AKD and are available in many sizes and form factors.



Shielding Solutions

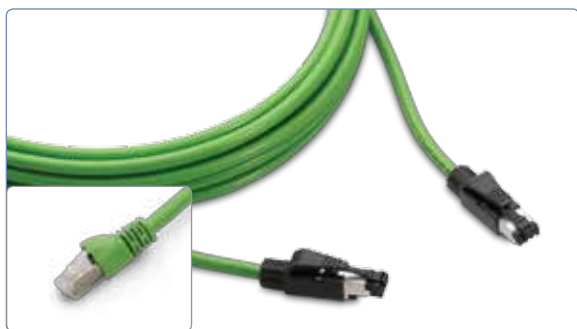
AKD servo drive can be equipped with shielding plates.



LEFT: Line filter
RIGHT: Motor choke

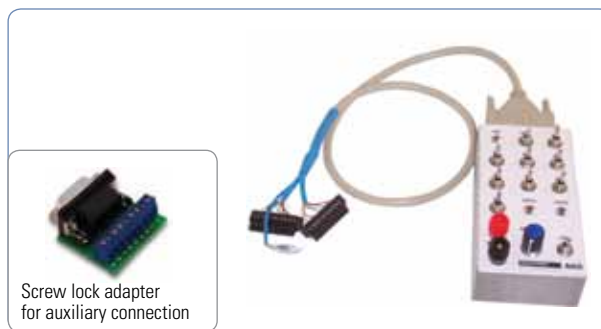
Chokes and Filters

Line filters are offered to improve reliability and to protect the life of the machine in less stable environments. Motor chokes reduce radiated emissions and are recommended for applications with cable lengths >25 meters.



Motion Bus and Service Port Cables

We offer industrial shielded PUR cables with RJ45 connections for demanding industrial environments. These cables outperform office cables in EMC resilience, durability, and life.



Screw lock adapter
for auxiliary connection

I/O Control Box and Breakout Adapter

Our I/O Control Box is pre-populated with I/O switches and a power connection for quicker prototyping.

Servo System Cables

Value Line power and feedback cables are suitable for most standard applications. High-performance Flex Line power and feedback cables are available for trailing and flexing applications or where longer lengths are required.



Mating Connectors

AKD servo drives include screw type mating connectors. Alternative connectors for DC Bus and mains sharing are also available. D-sub and RJ-type connectors are not included.

Specification Comparison

	Value Line	Flex Line
Lengths offered	1, 3, 6, 9, 12 m	1-50 m, 1/2 m increments
Max ampacity (continuous)	12 A	24 A
Static flex radius	10 x Cable outside dimension (OD)	10 x Cable outside dimension (OD)
Dynamic flex (1,000,000 cycles)	Not rated	15 x Cable outside dimension (OD)
Motor connectors available	Euro style	Euro style
Maximum motor connector IP rating	IP67	IP65
Cable agency approvals	RoHS, UL, CE	UL, CSA, CE, NEC, NFPA
Feedback supported	SFD, EnDat2.2, 01, BiSS, resolver, HIPERFACE®	SFD, Sine Encoder, EnDat2.2, 01, BiSS, resolver, HIPERFACE®, comcoder
Holding brake	Available	Available

Power Cables

AKD Servo Drive	Value Line	OD (mm)	Value Line with Brake	OD (mm)	Flex Line	OD (mm)	Flex Line with Brake	OD (mm)
3/6 Amp	VP-507BEAN-XX	9.4	VP-508CFAN-XX	10.9	CP-507CCAN-XX-X	12.7	CP-507CDAN-XX-X	14.5
12 Amp	VP-508CEAN-XX	10.3	VP-508CFAN-XX	10.9	CP-507CCAN-XX-X	12.7	CP-507CDAN-XX-X	14.5
20 Amp	VP-508DEAN-XX	11.7	VP-508DFAN-XX	12.9	CP-508DCAN-XX-X	14.5	CP-508DDAN-XX-X	16.6
24 Amp	Not available	Not available	Not available	Not available	CP-508EDBN-XX-X	18.3	CP-508EDBN-XX-X	18.3

Feedback Cables

Feedback Type	Value Line	OD (mm)	Flex Line	OD (mm)
SFD	VF-DA0474N-XX	6.7	CF-DA0374N-XX-X	7.5
EnDat 2.1 / BiSS, HIPERFACE®	VF-SB4474N-XX	9.7	CF-SB7374N-XX-X	11.2
Resolver	VF-RA2474N-XX	9.7	CF-RA2574N-XX-X	9.5
Incremental / comcoder	Not available	Not available	CF-CB7374N-XX-X	11.2

Note: Refer to page 66 for matching cables by motor type and drive.

AKD Servo Systems

When you need precise position control, choose from Kollmorgen's broad portfolio of AKD servo system components. Our unparalleled product line breadth provides great flexibility for any application. Whether it's any combination of motors and drives, cables, controller, electric cylinders or gearheads, all components are plug-and-play for easy, seamless integration. These best-in-class servo systems can be matched with single-axis or multi-axis motion controllers for a system solution that's precise, reliable and durable.

The Benefits of AKD Servo Systems

<ul style="list-style-type: none"> Optimized AKM and Direct Drive Motor Windings to AKD Servo Drive 	<ul style="list-style-type: none"> Same size AKM servomotor delivers up to 47% more shaft power than before Reduction in drive size and motor size Reduction in system cost
<ul style="list-style-type: none"> Plug-and-Play Motor-Recognition Drive Commissioning for AKM, Cartridge DDR, and DDR Motor Families Industry-Leading and Patent Pending Auto-Tuning Algorithms 	<ul style="list-style-type: none"> Reduction in set-up time for each servo system Immediate and adaptive response to dynamic loads optimizes performance in seconds Precise control of all motor types Compensation for stiff and compliant transmissions and couplings
<ul style="list-style-type: none"> New Lower Cost Multi-Turn Feedback Option 	<ul style="list-style-type: none"> Improve machine precision with high resolution and improved accuracy Reduce cycle time and sensor-and-wiring costs by eliminating traditional homing methods
<ul style="list-style-type: none"> Industry-Leading Motor Power Density 	<ul style="list-style-type: none"> Don't let motor size dictate the size of your machine Fit more motor into a smaller space than you thought possible
<ul style="list-style-type: none"> AKM Servomotor Offers 28 Frame-Stack Combinations and Nearly 120 Standard Windings in a Single Motor Line Cartridge DDR Motor Offers 17 Frame-Stack Combinations and 31 Windings Cartridge DDR Motor Offers 12 Frame-Stack Combinations and 12 Windings 	<ul style="list-style-type: none"> Over 50,000 standard motor variations including a wide range of mounting, connectivity, feedback and other options Flexibility provides choices to help you find an exact-fit solution Simplifies or eliminates mechanical modifications and engineering adaptation
<ul style="list-style-type: none"> New IP67 Protection Class Option for AKM 	<ul style="list-style-type: none"> Apply AKM servomotor into hostile industrial applications with confidence and long-term reliability

AKM Servomotor

The AKM brushless servomotor stands alone in the marketplace in terms of flexibility and performance advantages. Kollmorgen's culture of continuous improvement has paid dividends again. The AKM servomotor's innovative design has been polished and optimized. With the new AKD servo drive amplifier, the AKM servomotor sets a new standard of refined servo performance, designed to deliver precise motion and more power for your money. Nowhere else will you find a more versatile and complete servo family to meet your needs and exceed your expectations.

AKM Features

- 0.16 to 180 Nm continuous stall torque (1.4 to 1590 lb-in)
- 8 frame sizes (40 to 260 mm)
- 28 frame-stack length combinations
- 117 'standard' windings tailored for 75 Vdc and 120/240/400/480 Vac operation
- Flexible flange mount and shaft options
- Industry leading low-cogging contributing to extreme smoothness
- Numerous feedback options for high-performance and precision or rugged environment
- Unmatched customization – special windings, special shafts, and much more

AKD Servo Drive with AKM Servomotor Plug-and-Play Feedback

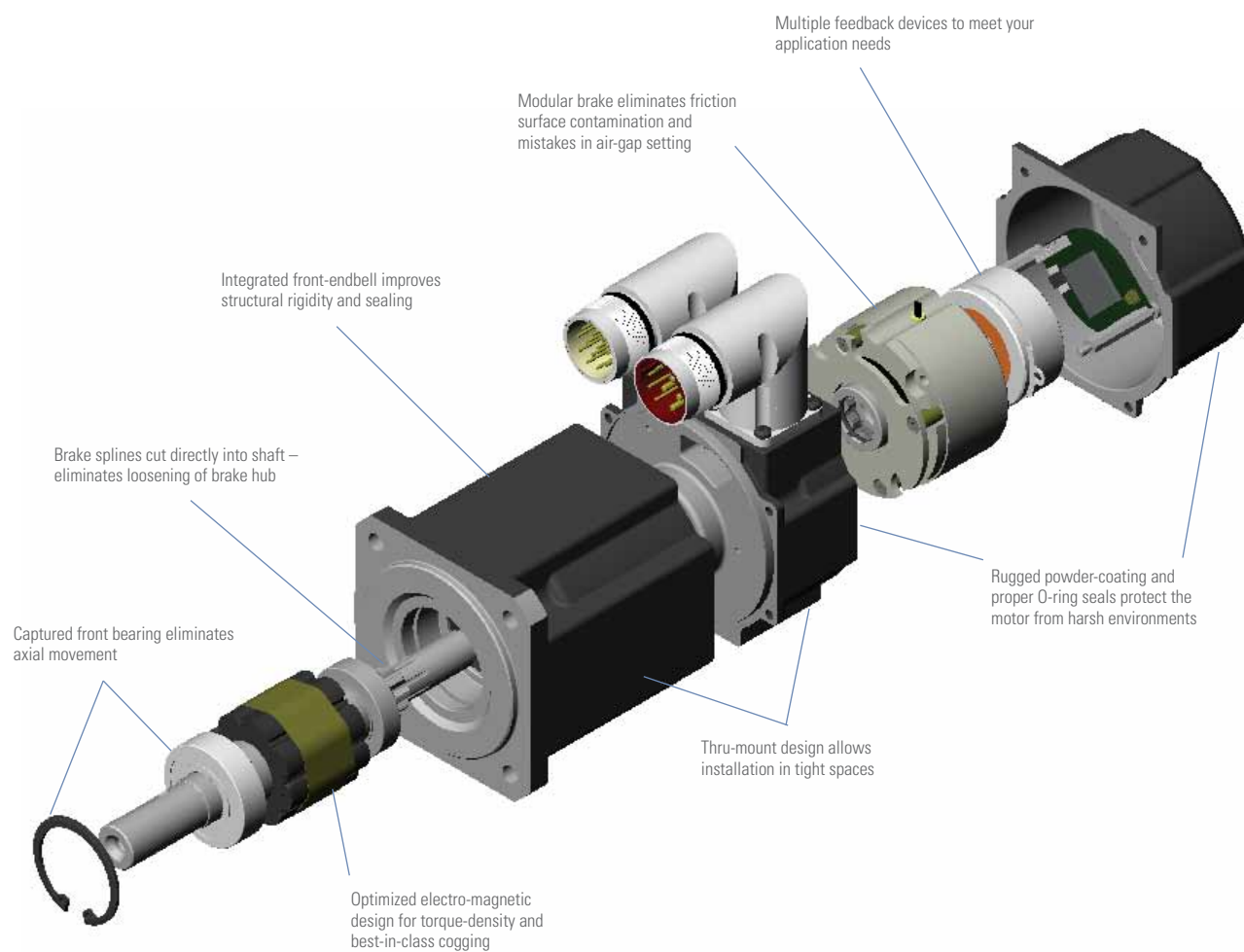
These feedback devices include electronic motor nameplates allowing plug-and-play commissioning, eliminating the need for drive parameter set-up and servo loop tuning in most applications.



Performance Data

AKM Servomotor	Single-turn Absolute			Multi-turn Absolute		
	Accuracy (arc-min)	Resolution (bits)	Motor Key	Accuracy (arc-min)	Resolution (bits)	Motor Key
AKM1	16	24	C	—	—	—
AKM2-3	9	24	C	8	20	LB
AKM4-8	9	24	C	4.66	21	LB
AKM2-4	1.0	27	DA	1.0	27	DB
AKM5-8	0.333	27	DA	0.333	27	DB

AKM (Exploded) 3D Model Shows Key Design Features



AKM Servomotor

Performance Data

AKM Servomotor		AKD Servo Drive	Frame Size NEMA/ mm	Cont.Torque at stall Tcs Nm (lb-in)	Peak Torque at stall Tps Nm (lb-in)	Rated Speed Nrtd RPM	Max System Speed RPM	Power Prtd Watts	Inertia (Jm) Kg-cm ² (lb-in-s ² x10 ⁻²)
120 Vac	AKM11B	AKD-X00306	17/ 40	0.18 (1.59)	0.61 (5.4)	4000	8000	80	0.017 (0.0015)
	AKM11C	AKD-X00306	17/ 40	0.19 (1.68)	0.62 (5.5)	6000	8000	110	0.017 (0.0015)
	AKM12C	AKD-X00306	17/ 40	0.31 (2.74)	1.08 (9.56)	4000	8000	130	0.031 (0.00274)
	AKM12E	AKD-X00306	17/ 40	0.31 (2.74)	0.91 (8.05)	8000	8000	230	0.031 (0.00274)
	AKM13C	AKD-X00306	17/ 40	0.41 (3.63)	1.46 (12.9)	3000	6150	130	0.045 (0.0040)
	AKM13D	AKD-X00306	17/ 40	0.40 (3.54)	1.36 (12.0)	7000	8000	270	0.045 (0.0040)
	AKM21C	AKD-X00306	23/ 60	0.48 (4.25)	1.48 (13.1)	2500	5620	120	0.107 (0.0095)
	AKM21E	AKD-X00306	23/ 60	0.47 (4.16)	1.21 (10.7)	7000	8000	300	0.107 (0.0095)
	AKM22C	AKD-X00306	23/ 60	0.84 (7.43)	2.39 (21.2)	1000	2820	90	0.161 (0.0142)
	AKM22E	AKD-X00306	23/ 60	0.87 (7.70)	2.42 (21.4)	3500	5410	290	0.161 (0.0142)
	AKM23D	AKD-X00306	23/ 60	1.15 (10.2)	3.89 (34.4)	1500	3270	180	0.216 (0.0191)
	AKM23F	AKD-X00606	23/ 60	1.18 (10.4)	3.88 (34.3)	4500	6290	500	0.216 (0.0191)
	AKM24D	AKD-X00306	23/ 60	1.40 (12.4)	4.84 (42.8)	1500	2700	210	0.270 (0.0239)
	AKM24F	AKD-X00606	23/ 60	1.41 (12.5)	4.82 (42.7)	3000	4720	420	0.270 (0.0239)
	AKM31E	AKD-X00306	na/ 80	1.20 (10.6)	3.23 (28.6)	2500	4240	310	0.330 (0.0292)
	AKM32E	AKD-X00306	na/ 80	2.04 (18.1)	5.97 (52.8)	1000	2350	210	0.590 (0.0522)
	AKM32H	AKD-X00606	na/ 80	2.10 (18.6)	6.22 (55.1)	3000	4460	620	0.590 (0.0522)
	AKM33H	AKD-X00606	na/ 80	2.87 (25.4)	8.55 (75.7)	2500	3310	690	0.850 (0.0752)
	AKM41E	AKD-X00306	34/ 90	2.01 (17.8)	5.33 (47.2)	1200	2420	240	0.810 (0.0717)
	AKM41H	AKD-X00606	34/ 90	2.05 (18.1)	5.49 (48.6)	3000	4460	580	0.810 (0.0717)
	AKM43H	AKD-X00606	34/ 90	4.82 (42.7)	14.0 (124)	1200	1920	560	2.09 (0.185)
	AKM43L	AKD-X01206	34/ 90	4.73 (41.9)	11.7 (104)	3000	4020	1190	2.09 (0.185)
	AKM44H	AKD-X00606	34/ 90	5.89 (43.3)	17.0 (150)	1000	1620	570	2.73 (0.242)
	AKM51H	AKD-X00606	42/ 115	4.79 (42.4)	11.7 (104)	1200	2150	560	3.42 (0.303)
	AKM51L	AKD-X01206	42/ 115	4.89 (43.3)	10.6 (93.8)	3000	4150	1240	3.42 (0.303)
	AKM52L	AKD-X01206	42/ 115	8.67 (76.7)	19.6 (173)	1500	2290	1240	6.22 (0.551)
	AKM53L	AKD-X01206	42/ 115	11.6 (103)	26.5 (235)	1200	1740	1350	9.12 (0.807)
	AKM54L	AKD-X01206	42/ 115	13.5 (119)	31.3 (277)	1200	1510	1630	11.9 (1.06)
240 Vac	AKM11B	AKD-X00306	17/ 40	0.18 (1.59)	0.61 (5.4)	8000	8000	140	0.017 (0.0015)
	AKM12C	AKD-X00306	17/ 40	0.31 (2.74)	1.08 (9.56)	8000	8000	230	0.031 (0.00274)
	AKM13C	AKD-X00306	17/ 40	0.41 (3.63)	1.46 (12.9)	8000	8000	300	0.045 (0.0040)
	AKM21C	AKD-X00306	23/ 60	0.48 (4.25)	1.48 (13.1)	8000	8000	320	0.107 (0.0095)
	AKM22C	AKD-X00306	23/ 60	0.84 (7.43)	2.73 (24.2)	3500	5650	290	0.161 (0.0142)
	AKM22E	AKD-X00306	23/ 60	0.87 (7.70)	2.42 (21.4)	8000	8000	580	0.161 (0.0142)
	AKM23D	AKD-X00306	23/ 60	1.15 (10.2)	3.89 (34.4)	5000	6540	530	0.216 (0.0191)
	AKM23F	AKD-X00606	23/ 60	1.18 (10.4)	3.88 (34.3)	8000	8000	780	0.216 (0.0191)
	AKM24D	AKD-X00306	23/ 60	1.40 (12.4)	4.84 (42.8)	4000	5410	540	0.270 (0.0239)
	AKM24F	AKD-X00606	23/ 60	1.41 (12.5)	4.82 (42.7)	8000	8000	930	0.270 (0.0239)
	AKM31C	AKD-X00306	na/ 80	1.15 (10.2)	3.87 (34.3)	2500	4050	290	0.330 (0.0292)
	AKM31E	AKD-X00306	na/ 80	1.20 (10.6)	3.23 (28.6)	6000	8000	600	0.330 (0.0292)
	AKM32E	AKD-X00306	na/ 80	2.04 (18.1)	5.97 (52.8)	3000	4710	600	0.590 (0.0522)
	AKM32H	AKD-X00606	na/ 80	2.10 (18.6)	6.22 (55.1)	7000	8000	1060	0.590 (0.0522)
	AKM33E	AKD-X00306	na/ 80	2.80 (24.8)	8.95 (79.2)	2000	3130	550	0.850 (0.0752)
	AKM33H	AKD-X00606	na/ 80	2.87 (25.4)	8.55 (75.7)	5500	6640	1300	0.850 (0.0752)
	AKM41E	AKD-X00306	34/ 90	2.01 (17.8)	5.33 (47.2)	3000	4850	570	0.810 (0.0717)
	AKM41H	AKD-X00606	34/ 90	2.05 (18.1)	5.49 (48.6)	6000	6000	1010	0.810 (0.0717)
	AKM42E	AKD-X00306	34/ 90	3.42 (30.3)	9.74 (86.2)	1800	2740	590	1.45 (0.128)
	AKM42G	AKD-X00606	34/ 90	3.51 (31.1)	11.0 (97.4)	3500	4660	1060	1.45 (0.128)
	AKM43H	AKD-X00606	34/ 90	4.82 (42.7)	14.0 (124)	3000	3850	1210	2.09 (0.185)
	AKM43L	AKD-X01206	34/ 90	4.73 (41.9)	11.7 (104)	6000	6000	1590	2.09 (0.185)
	AKM44E	AKD-X00306	34/ 90	5.79 (51.2)	16.5 (146)	1200	1680	660	2.73 (0.242)
	AKM44H	AKD-X00606	34/ 90	5.89 (43.3)	17.0 (150)	2500	3250	1220	2.73 (0.242)

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and AKM model nomenclature, refer to pages 67 and 68 respectively.

Note 3: Max mechanical speeds: 8000 RPM for AKM1, 2, 3 and 6000 RPM for AKM4, 5, 6, 7.

Performance Data

AKM Servomotor		AKD Servo Drive	Frame Size NEMA/ mm	Cont.Torque at stall Tcs Nm (lb-in)	Peak Torque at stall Tps Nm (lb-in)	Rated Speed Nrt'd RPM	Max System Speed RPM	Power Prtd Watts	Inertia (Jm) Kg-cm ² (lb-in-s ² x10 ⁻²)
240 Vac	AKM51H	AKD-X00606	42/ 115	4.79 (42.4)	11.7 (104)	3000	4030	1220	3.42 (0.303)
	AKM51L	AKD-X01206	42/ 115	4.89 (43.3)	10.6 (93.8)	6000	6000	1260	3.42 (0.303)
	AKM52H	AKD-X00606	42/ 115	8.48 (75.1)	21.6 (191)	1800	2390	1420	6.22 (0.551)
	AKM52L	AKD-X01206	42/ 115	8.67 (76.7)	19.6 (173)	3500	4580	2350	6.22 (0.551)
	AKM53H	AKD-X00606	42/ 115	10.5 (92.9)	27.8 (246)	1500	1970	1650	9.12 (0.807)
	AKM53L	AKD-X01206	42/ 115	11.6 (103)	26.5 (235)	2500	3450	2510	9.12 (0.807)
	AKM54H	AKD-X00606	42/ 115	14.2 (126)	37.5 (332)	1000	1340	1400	11.9 (1.06)
	AKM54L	AKD-X01206	42/ 115	13.5 (119)	31.3 (277)	2500	3030	3010	11.9 (1.06)
	AKM62H	AKD-X00606	na/ 142	11.9 (105)	29.61 (262)	1000	1560	1170	16.9 (1.50)
	AKM62L	AKD-X01206	na/ 142	12.2 (108)	26.3 (233)	2500	3380	2620	16.9 (1.50)
	AKM63L	AKD-X01206	na/ 142	16.8 (149)	39.3 (348)	1500	2260	2330	24.2 (2.14)
	AKM63N	AKD-X02406	na/ 142	17.0 (150)	40.3 (357)	3000	3450	4080	24.2 (2.14)
	AKM64L	AKD-X01206	na/ 142	19.7 (174)	44.4 (393)	1500	2070	2890	31.6 (2.80)
	AKM64Q	AKD-X02406	na/ 142	19.5 (173)	43.1 (381)	3000	3440	4810	31.6 (2.80)
	AKM65L	AKD-X01206	na/ 142	24.6 (218)	55.4 (490)	1300	1660	3040	40.0 (3.54)
	AKM65P	AKD-X02406	na/ 142	24.5 (217)	53.9 (477)	2400	2750	4790	40.0 (3.54)
	AKM72P	AKD-X02406	na/ 180	29.5 (261)	65.8 (606)	1800	2170	4500	64.5 (5.71)
	AKM72Q	AKD-X02406	na/ 180	24.5 (217)	56.0 (496)	2000	2730	4860	64.5 (5.71)
400 Vac	AKM73P	AKD-X02406	na/ 180	41.4 (366)	95.3 (828)	1300	1610	4700	92.1 (8.15)
	AKM73Q	AKD-X02406	na/ 180	33.0 (292)	76.1 (674)	1500	2020	5250	92.1 (8.15)
	AKM74Q	AKD-X02406	na/ 180	46.8 (414)	90.7 (803)	1200	1710	5380	120 (10.6)
	AKM22C	AKD-X00307	23/ 60	0.84 (7.43)	2.73 (24.2)	8000	8000	570	0.161 (0.0142)
	AKM23D	AKD-X00307	23/ 60	1.15 (10.2)	3.89 (34.4)	8000	8000	760	0.216 (0.0191)
	AKM24D	AKD-X00307	23/ 60	1.40 (12.4)	4.84 (42.8)	8000	8000	920	0.270 (0.0239)
	AKM31C	AKD-X00307	na/ 80	1.15 (10.2)	3.87 (34.3)	5000	7100	520	0.330 (0.0292)
	AKM32E	AKD-X00307	na/ 80	2.04 (18.1)	5.97 (52.8)	6500	8000	1020	0.590 (0.0522)
	AKM33E	AKD-X00307	na/ 80	2.80 (24.8)	8.95 (79.2)	4500	5490	1100	0.850 (0.0752)
	AKM41E	AKD-X00307	34/ 90	2.01 (17.8)	5.33 (47.2)	6000	6000	990	0.810 (0.0717)
	AKM42E	AKD-X00307	34/ 90	3.42 (30.3)	9.74 (86.2)	3500	4790	1030	1.45 (0.128)
	AKM42G	AKD-X00607	34/ 90	3.51 (31.1)	11.0 (97.4)	6000	6000	1470	1.45 (0.128)
	AKM43H	AKD-X00607	34/ 90	4.82 (42.7)	14 (124)	5500	6000	1620	2.09 (0.185)
	AKM44E	AKD-X00307	34/ 90	5.79 (51.2)	16.5 (146)	2000	2940	1010	2.73 (0.242)
	AKM44H	AKD-X00607	34/ 90	5.89 (43.3)	17.0 (150)	4500	5710	1640	2.73 (0.242)
	AKM51H	AKD-X00607	42/ 115	4.79 (42.4)	11.7 (104)	6000	6000	1230	3.42 (0.303)
	AKM52H	AKD-X00607	42/ 115	8.48 (75.1)	21.6 (191)	3500	4180	2290	6.22 (0.551)
	AKM52L	AKD-X01207	42/ 115	8.67 (76.7)	19.6 (173)	6000	6000	2050	6.22 (0.551)
	AKM53H	AKD-X00607	42/ 115	10.5 (92.9)	27.8 (246)	3000	3450	2770	9.12 (0.807)
	AKM53L	AKD-X01207	42/ 115	11.6 (103)	26.5 (235)	5000	6000	3140	9.12 (0.807)
	AKM54H	AKD-X00607	42/ 115	14.2 (126)	37.5 (332)	1800	2340	2350	11.9 (1.06)
	AKM54L	AKD-X01207	42/ 115	13.5 (119)	31.3 (277)	4500	5310	3830	11.9 (1.06)
	AKM62H	AKD-X00607	na/ 142	11.9 (105)	29.6 (262)	2000	2730	2140	16.9 (1.50)
	AKM62L	AKD-X01207	na/ 142	12.2 (108)	26.3 (233)	5000	5920	3880	16.9 (1.50)
	AKM63L	AKD-X01207	na/ 142	16.8 (149)	39.3 (348)	3000	3950	4040	24.2 (2.14)
	AKM63N	AKD-X02407	na/ 142	17.0 (150)	40.3 (357)	5000	6000	4900	24.2 (2.14)
	AKM64L	AKD-X01207	na/ 142	19.7 (174)	44.4 (393)	3000	3640	4900	31.6 (2.80)
	AKM64Q	AKD-X02407	na/ 142	19.5 (173)	43.1 (381)	5000	6000	5600	31.6 (2.80)
	AKM65L	AKD-X01207	na/ 142	24.6 (218)	55.4 (490)	2500	2910	5030	40.0 (3.54)
	AKM65P	AKD-X02407	na/ 142	24.5 (217)	53.9 (477)	4000	4820	6240	40.0 (3.54)
	AKM72L	AKD-X01207	na/ 180	30.0 (266)	70.5 (624)	1500	2300	3970	64.5 (5.71)
	AKM72P	AKD-X02407	na/ 180	29.5 (261)	68.5 (606)	3000	3800	6280	64.5 (5.71)
	AKM72Q	AKD-X02407	na/ 180	24.5 (217)	56.0 (496)	4000	4780	6830	64.5 (5.71)
	AKM73L	AKD-X01207	na/ 180	41.7 (369)	95.4 (844)	1400	1720	5060	92.1 (8.15)
	AKM73P	AKD-X02407	na/ 180	41.4 (366)	93.5 (828)	2400	2820	7130	92.1 (8.15)
	AKM73Q	AKD-X02407	na/ 180	33.0 (292)	76.1 (674)	3000	3550	7920	92.1 (8.15)
	AKM74L	AKD-X01207	na/ 180	49.7 (440)	114 (1010)	1200	1450	5470	120 (10.6)
	AKM74P	AKD-X02407	na/ 180	52.3 (463)	125 (1110)	1800	2110	7050	120 (10.6)
	AKM74Q	AKD-X02407	na/ 180	46.8 (414)	90.7 (803)	2500	3000	8250	120 (10.6)

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and AKM model nomenclature, refer to pages 67 and 68 respectively.

Note 3: Max mechanical speeds: 8000 RPM for AKM1, 2, 3 and 6000 RPM for AKM4, 5, 6, 7.

AKM Servomotor

Performance Data

AKM Servomotor		AKD Servo Drive	Frame Size NEMA/ mm	Cont.Torque at stall Tcs Nm (lb-in)	Peak Torque at stall Tps Nm (lb-in)	Rated Speed Nrtd RPM	Max System Speed RPM	Power Prtd Watts	Inertia (Jm) Kg-cm ² (lb-in-s ² x10 ⁻²)
480 Vac	AKM22C	AKD-X00307	23/ 60	0.84 (7.43)	2.34 (20.7)	8000	8000	570	0.161 (0.0142)
	AKM23D	AKD-X00307	23/ 60	1.15 (10.2)	3.89 (34.4)	8000	8000	760	0.216 (0.0191)
	AKM24D	AKD-X00307	23/ 60	1.40 (12.4)	4.84 (42.8)	8000	8000	920	0.270 (0.0239)
	AKM31C	AKD-X00307	na/ 80	1.15 (10.2)	3.35 (29.7)	6000	8000	570	0.330 (0.0292)
	AKM32E	AKD-X00307	na/ 80	2.04 (18.1)	5.97 (52.8)	8000	8000	1020	0.590 (0.0522)
	AKM33E	AKD-X00307	na/ 80	2.80 (24.8)	8.95 (79.2)	5000	6280	1190	0.850 (0.0752)
	AKM41E	AKD-X00307	34/ 90	2.01 (17.8)	5.33 (47.2)	6000	6000	990	0.810 (0.0717)
	AKM42E	AKD-X00307	34/ 90	3.42 (30.3)	9.74 (86.2)	4000	5470	1140	1.45 (0.128)
	AKM42G	AKD-X00607	34/ 90	3.51 (31.1)	11.0 (97.4)	6000	6000	1470	1.45 (0.128)
	AKM43H	AKD-X00607	34/ 90	4.82 (42.7)	14.0 (124)	6000	6000	1620	2.09 (0.185)
	AKM44E	AKD-X00307	34/ 90	5.79 (51.2)	16.5 (146)	2500	3370	1200	2.73 (0.242)
	AKM44H	AKD-X00607	34/ 90	5.89 (43.3)	17.0 (150)	5500	6000	1690	2.73 (0.242)
	AKM51H	AKD-X00607	42/ 115	4.79 (42.4)	11.7 (104)	6000	6000	1230	3.42 (0.303)
	AKM52H	AKD-X00607	42/ 115	8.48 (75.1)	21.6 (191)	4000	4780	2420	6.22 (0.551)
	AKM52L	AKD-X01207	42/ 115	8.67 (76.7)	19.6 (173)	6000	6000	2050	6.22 (0.551)
	AKM53H	AKD-X00607	42/ 115	10.5 (92.9)	27.8 (246)	3000	3940	2770	9.12 (0.807)
	AKM53L	AKD-X01207	42/ 115	11.6 (103)	26.5 (235)	6000	6000	2540	9.12 (0.807)
	AKM54H	AKD-X00607	42/ 115	14.2 (126)	37.5 (332)	2000	2680	2560	11.9 (1.06)
	AKM54L	AKD-X01207	42/ 115	13.5 (119)	31.3 (277)	5000	6000	3690	11.9 (1.06)
	AKM62H	AKD-X00607	na/ 142	11.9 (105)	29.6 (262)	2400	3120	2480	16.9 (1.50)
	AKM62L	AKD-X01207	na/ 142	12.2 (108)	26.3 (233)	6000	6000	3610	16.9 (1.50)
	AKM63L	AKD-X01207	na/ 142	16.8 (149)	39.3 (348)	3500	5410	4400	24.2 (2.14)
	AKM63N	AKD-X02407	na/ 142	17.0 (150)	40.3 (357)	6000	6000	4400	24.2 (2.14)
	AKM64L	AKD-X01207	na/ 142	19.7 (174)	44.4 (393)	3500	4160	5280	31.6 (2.80)
	AKM64Q	AKD-X02407	na/ 142	19.5 (173)	43.1 (381)	6000	6000	4620	31.6 (2.80)
	AKM65L	AKD-X01207	na/ 142	24.6 (218)	55.4 (490)	2800	3320	5450	40.0 (3.54)
	AKM65P	AKD-X02407	na/ 142	24.5 (217)	53.9 (477)	4500	5500	6360	40.0 (3.54)
	AKM72L	AKD-X01207	na/ 180	30.0 (266)	70.5 (624)	1800	2630	4580	64.5 (5.71)
	AKM72P	AKD-X02407	na/ 180	29.5 (261)	68.5 (606)	3000	4340	6680	64.5 (5.71)
	AKM72Q	AKD-X02407	na/ 180	24.5 (217)	56.0 (496)	4500	5460	6640	64.5 (5.71)
	AKM73L	AKD-X01207	na/ 180	41.7 (369)	95.4 (844)	1500	1970	5620	92.1 (8.15)
	AKM73P	AKD-X02407	na/ 180	41.4 (366)	93.5 (828)	2400	3220	7130	92.1 (8.15)
	AKM73Q	AKD-X02407	na/ 180	33.0 (292)	76.1 (674)	3500	4050	8060	92.1 (8.15)
	AKM74L	AKD-X01207	na/ 180	49.7 (440)	114 (1010)	1400	1660	6080	120 (10.6)
	AKM74P	AKD-X02407	na/ 180	52.3 (463)	125 (1110)	1800	2420	7050	120 (10.6)
	AKM74Q	AKD-X02407	na/ 180	46.8 (414)	90.7 (803)	3000	3430	8580	120 (10.6)

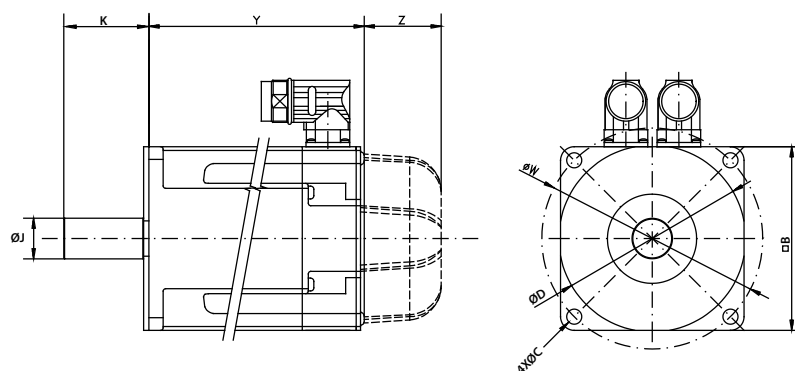
Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and AKM model nomenclature, refer to pages 67 and 68 respectively.

Note 3: Max mechanical speeds: 8000 RPM for AKM1, 2, 3 and 6000 RPM for AKM4, 5, 6, 7.

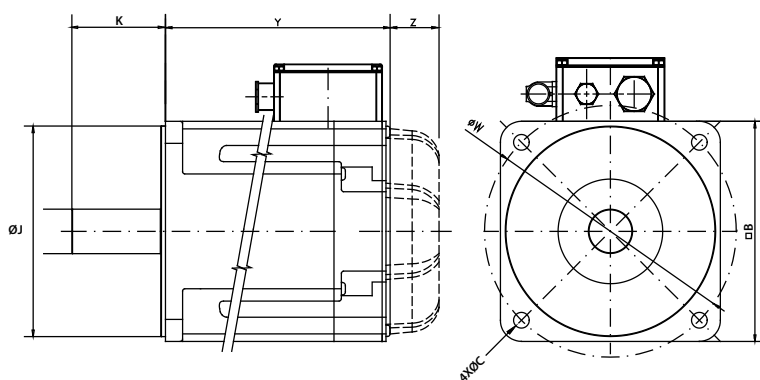
Model with Power Connector

Outline indicative of AKM11 - AKM74



Model with Terminal Box

Outline indicative of AKM82 - AKM84



Dimensions (mm)

Model	Shaft **	Shaft Length	Mount Hole **	Length 1 stack (AKMx1)	Length 2 stack (AKMx2)	Length 3 stack (AKMx3)	Length 4 stack (AKMx4)	Length 5 stack (AKMx5)	Brake Adder	Sine Enc. Adder *
	"J"	"K"	"C"	"Y"	"Y"	"Y"	"Y"	"Y"		
AKM1	8	25	4.3	79	98	117	n/a	n/a	n/a	n/a
AKM2	9	20	4.8	95.4	114.4	133.4	152.4	n/a	34.1	0
AKM3	14	30	5.8	109.8	140.8	171.8	n/a	n/a	30.5	0
AKM4	19	40	7	118.8	147.8	176.8	205.8	n/a	33.5	0
AKM5	24	50	9	127.5	158.5	189.5	220.5	n/a	45	18.5
AKM6	32	58	11	n/a	153.7	178.7	203.7	228.7	47	18.5
AKM7	38	80	13.5	n/a	192.5	226.5	260.5	n/a	42	9.5
AKM8	48	110	18.5	n/a	263.4	343.9	424.4	n/a	66	0

Model	Frame Square "B"	Mount Pilot **	Mount B.C. **
AKM1	40	30	36
AKM2	58	40	63
AKM3	70	60	75
AKM4	84	80	100

Model	Frame Square "B"	Mount Pilot **	Mount B.C. **
AKM5	108	110	130
AKM6	138	130	165
AKM7	188	180	215
AKM8	260	250	300

* AKM5x w/ Sine Enc. and brake, plus adders, -2.0 mm.

AKM6x w/ Sine Enc. and brake, plus adders, +0.5 mm.

AKM7x w/ Sine Enc. and brake, plus adders, +9.3 mm.

** Assumes the "A" international mount, other mounts available see AKM selection guide online.

Direct Drive Technology (DDT)

Conventional servo systems commonly have a mechanical transmission which can consist of gears, gearheads, belts/pulleys or cams connected between the motor and the load.

With direct drive technology, the mechanical transmission is eliminated and the motor is coupled directly to the load.

Why Use Direct Drive Technology?

Increased Accuracy and Repeatability

A “precision” planetary gearhead could have a backlash of 1 arc-minute. This can result in the load moving by 1 arc-minute with an absolutely stationary drive motor. Kollmorgen’s standard direct drive rotary (DDR) servomotors have repeatability better than 1 arc-second. Therefore, a direct drive motor can hold a position 60 times better than a conventional motor/gearhead.

The increased accuracy of direct drive technology results in a higher quality product out of the machine:

- Print registration is more accurate
- Cut or feed lengths can be held more precisely
- Coordination with other machine axes is more accurate
- Indexing location is more exact
- Tuning issues due to backlash are eliminated

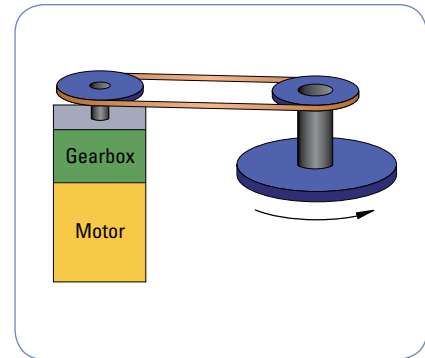
Higher Bandwidth

Mechanical transmission components impose a limit on how fast a machine can start and stop and also extend the required settling time. These factors limit the possible throughput of a machine.

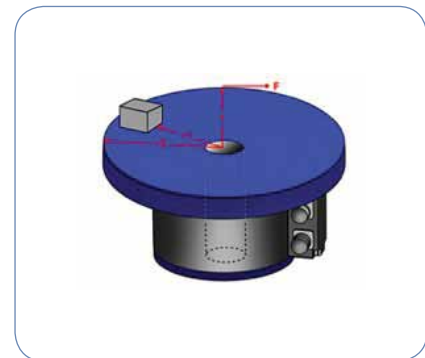
Direct drive technology removes these limitations and allows for much faster start/stop cycles and also provides greatly reduced settling time. This will allow a greater throughput from the machine. Users of direct drive systems have reported up to a 2X increase in throughput.

Improved Reliability and Zero Maintenance

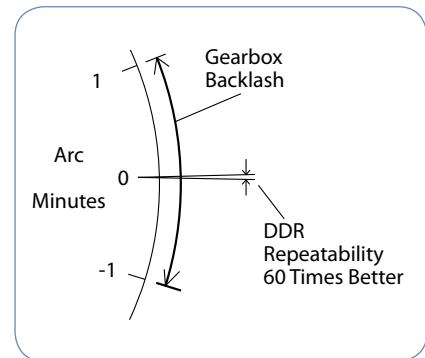
Gears, belts, and other mechanical transmission parts break. By eliminating these parts and using DDR motors, the reliability of the machine is improved. Gearheads require periodic lubrication and/or replacement in aggressive start/stop applications. Belts require periodic tightening. There are no time-wear components in a direct drive motor and consequently they require zero maintenance.



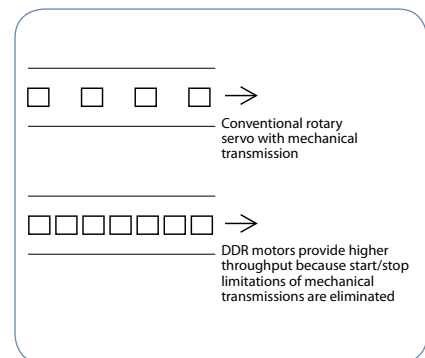
Servomotor and gearhead



Direct drive motor



Improved repeatability



Increased throughput

Fewer Parts

With direct drive motors, all you need is the motor and the mounting bolts. This often replaces many parts including brackets, guards, belts, pulleys, tensioners, couplings, and bolts, resulting in:

- Fewer parts on the BOM. Fewer parts to purchase, schedule, inventory and control, and fewer parts to assemble.
- Assembly time of the servo drops from several hours with the mechanical transmission to several minutes with the DDR.
- Reduced cost. Although a direct drive motor may carry a small price-premium compared to a motor/gearhead with the same torque, consider that there is an overall cost reduction when eliminating the parts and labor of all the extra components required in a servo system with mechanical transmission.

No Inertia Matching

Servo systems with mechanical transmissions require inertia matching that limits the reflected load inertia at 5 to 10 times the motor inertia. If this limitation is not met, the system becomes difficult to control due to instability issues. Inertia matching limitations of mechanical transmission systems often force machine designers to use a larger motor than would otherwise be required just to satisfy the inertia matching requirement.

Such sizing conventions are not required with direct drive technology. Since the motor is directly connected to the load, the inertia of the motor and the load become a common inertia. Therefore, no inertia matching is required when using DDR. DDR applications have run with inertia ratios greater than 11,000:1.

Reduced Audible Noise

Machines with DDR motors have audible noise levels as low as 20 dB less than the same machine with a mechanical transmission.

Three DDR Product Categories to Choose From

Kollmorgen's 50 years of electromagnetic and electromechanical design experience combined with our quality and service, allowed us to refine and expand DDR technology into three product categories for easy installation, use, and short lead times: [Frameless DDR](#), [Housed DDR](#), and the [Cartridge DDR](#). This allows you to select the right DDR solution for your application.

F Series Frameless DDR

Frameless motors include a rotor and stator as separate components which are integrated into, ride on the bearings of, and become a part of the driven load. Frameless motors offer the most compact and lightweight DDR solution available. The "F" series is Kollmorgen's latest frameless DDR product. It provides excellent torque/volume with the use of a proprietary neodymium-iron magnet rotor structure and skewed armature assembly. The F series is the first UL recognized parts set available on the market. This provides OEMs with the benefits of UL component ratings for easier agency approval on their machines.

Housed DDR

The Housed DDR is a housed motor assembly featuring a factory aligned high-resolution feedback device and precision bearings, allowing it to function as the core of rotary indexing and rate table applications. The system can also be used as a flexible indexer, providing programmable, rapid indexing far exceeding the throughput and accuracy of conventional mechanical or variable reluctance technology indexers.

Cartridge DDR

This motor is the first in the industry to combine the space-saving and performance advantages of frameless DDR technology with the ease of installation of a full-frame motor. Consisting of a rotor, stator, and factory-aligned high-resolution feedback device, the motor uses the machine's bearings to support the rotor. An innovative compression coupling engages the rotor to the load and the frame of the motor mounts to the machine with a bolt circle and pilot diameter just like a conventional servomotor, saving space and design time and simplifying the overall system.

DDR Applications

Format	Where Used
Frameless DDR	Application where size and weight must be absolutely minimized
Housed DDR	Applications where the load rides on the motor's bearings such as indexing or rate tables
Cartridge DDR	Any application with existing bearings

Cartridge Direct Drive Rotary (DDR) Motor

The Cartridge Direct Drive Rotary (DDR) motor is the first in the industry to combine the space-saving and performance advantages of frameless DDR technology with the ease of installation of a full-frame motor. Cartridge DDR motors also feature an advanced electromagnetic design that provides up to 50% more torque density than comparably sized conventional servomotors.

Consisting of a rotor, stator and factory-aligned high-resolution feedback device, the Cartridge DDR motor uses the machine's bearings to support the rotor.

An innovative compression coupling secures the Cartridge DDR's rotor to the machine shaft, and the Cartridge DDR's housing is bolted to the machine frame with a bolt circle and pilot – just like a conventional servomotor – saving space and design time and simplifying the overall system.

Conventional servo systems typically include a number of mechanical transmission components that limit the performance and reliability, and drive up cost of operation. Cartridge DDR motors eliminate all mechanical transmission parts, resulting in the following features:

Cartridge DDR Features

- Assembles as quickly as 5 minutes
- 5 frame sizes, multiple lengths
- Continuous torque range: 4.57 Nm (3.37 lb-ft) to 510 Nm (373 lb-ft), accommodates a wide range of high-power application requirements
- Optimized torque output with high-pole count efficient electromagnetic design
- Integrated high resolution sine encoder
- 134,217,728 counts/rev
- Speeds up to 2,500 RPM meets most medium speed and high-torque application requirements
- Direct load connection eliminates gearheads, belts and pulleys
- Low cogging for smooth low-speed rotation
- Zero backlash and compliance provides more responsive system performance



The Cartridge DDR Advantage – Press Feed Machine

Consider how Cartridge DDR technology improves a press feed machine:

Reduced Assembly Time

The assembly time for the original mechanical transmission system was 4 hours. In contrast, the Cartridge DDR motor is installed in less than 5 minutes, resulting in a significant cost savings in labor.

Reduced Parts Count

The original mechanical transmission system comprises 2 bracket pieces, 12 bolts, 2 pulleys, 2 set screws, 2 keys, a timing belt, a housing to protect operators from the timing belt, a tension system for the timing belt, and motor/gearhead. With the Cartridge DDR system, this is all replaced by the motor and 4 mounting bolts, resulting in fewer parts to maintain and cost savings.

Improved Accuracy

The best planetary gearheads have a backlash between 1 and 2 arc-minutes. Over the life of the gearhead, the backlash will increase. The Cartridge DDR system has an absolute accuracy of 26 arc-seconds and a repeatability of 0.7 arc-seconds. The press feed machine with the Cartridge DDR has a feed accuracy of ± 0.0005 inch where the press feed machine with the mechanical transmission has a feed accuracy of 0.002 inch. Therefore, there was an overall four times improvement in machine accuracy with the Cartridge DDR system.

Increased Throughput

The cycle rate of the Cartridge DDR system is two times better than the mechanical transmission. This results in an increase in throughput of 100 percent.

Improved Reliability and Simplified Maintenance

The Cartridge DDR system eliminates parts that wear, change over time, or fail. Gearheads are prone to wear, and backlash increases over time. Belts and pulleys stretch and require maintenance to maintain proper belt tension. By eliminating these components, the Cartridge DDR system delivers greater system reliability.

Press Feed Example

Gearheads have a finite life span, especially in a demanding cyclic application such as a press feed. On this machine, the gearhead must be replaced every 10,000 hours and the belt must be tensioned every 2,000 hours. By contrast, the Cartridge DDR motor has no wear components and requires no maintenance thus simplifying the maintenance schedule for the machine, including operating costs.

Reduced Audible Noise

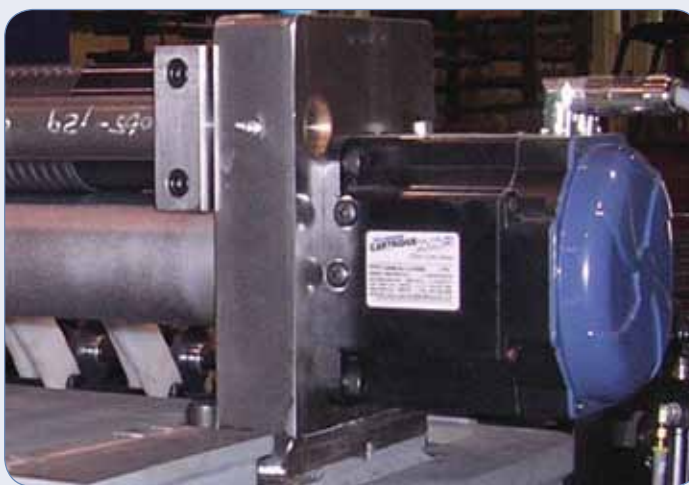
The Cartridge DDR system has as much as a 20 dB reduction in noise compared to a mechanical transmission servo system. This can dramatically reduce the overall noise level of the machine. A quieter machine gives the perception of quality. This is rightfully so as the noise emitted by gears and belts is caused by the wearing of the parts.

Total Reduced Cost

A Cartridge DDR motor typically costs 20 percent more than a comparable motor/gearhead combination. However, the elimination of parts and assembly time typically results in a lower total cost for the Cartridge DDR solution.



Press feed machine built with a conventional servomotor, gearhead, belt and pulleys.



Same machine with a Cartridge DDR motor installed. Here, the shaft of the driven roll is extended into the Cartridge DDR motor and the motor applies torque directly to the driven roll.

Cartridge Direct Drive Rotary Motor (DDR)

240 Vac Performance Data

Cartridge DDR Motor	AKD Servo Drive	Frame Size	Continuous Torque	Peak Torque	Maximum Speed	Weight	Inertia (Jm)
		mm (in)	Nm (lb-in)	Nm (lb-in)	RPM	kg (lb)	kg-cm ² (lb-in-s ² x10 ⁻³)
C041A	AKD-X00306	108 (4.25)	4.57 (40.4)	12.3 (109)	1750	4.08 (9.00)	5.86 (5.19)
C041B	AKD-X00606	108 (4.25)	4.52 (40.0)	12.2 (108)	2500	4.08 (9.00)	5.86 (5.19)
C042A	AKD-X00606	108 (4.25)	8.25 (73.0)	22.2 (196)	1700	5.67 (12.5)	8.87 (7.85)
C042B	AKD-X01206	108 (4.25)	8.45 (74.8)	22.8 (202)	2500	5.67 (12.5)	8.87 (7.85)
C043A	AKD-X00606	108 (4.25)	11.1 (98.2)	30.0 (265)	1250	7.26 (16.0)	11.9 (10.5)
C043B	AKD-X01206	108 (4.25)	11.2 (99.1)	30.2 (267)	2500	7.26 (16.0)	11.9 (10.5)
C044A	AKD-X00606	108 (4.25)	13.9 (123)	37.4 (331)	1050	8.84 (19.5)	14.9 (13.2)
C044B	AKD-X01206	108 (4.25)	14.1 (125)	37.9 (335)	2150	8.84 (19.5)	14.9 (13.2)
C051A	AKD-X00606	138 (5.43)	11.7 (104)	30.2 (267)	1200	8.39 (18.5)	27.4 (24.2)
C051B	AKD-X01206	138 (5.43)	11.9 (105)	30.6 (271)	2450	8.39 (18.5)	27.4 (24.2)
C052C	AKD-X00606	138 (5.43)	16.9 (150)	43.1 (381)	950	10.7 (23.5)	35.9 (31.8)
C052D	AKD-X01206	138 (5.43)	16.5 (146)	42.3 (374)	2050	10.7 (23.5)	35.9 (31.8)
C053A	AKD-X01206	138 (5.43)	21.0 (186)	54.1 (479)	1350	13.2 (29.0)	44.3 (39.2)
C053B	AKD-X02406	138 (5.43)	20.2 (179)	50.1 (443)	2500	13.2 (29.0)	44.3 (39.2)
C054A	AKD-X01206	138 (5.43)	24.9 (220)	63.8 (565)	1200	15.4 (34.0)	52.8 (46.7)
C054B	AKD-X02406	138 (5.43)	23.8 (211)	61.2 (542)	2500	15.4 (34.0)	52.8 (46.7)
C061A	AKD-X01206	188 (7.40)	33.8 (299)	86.8 (768)	900	18.6 (41.0)	94.1 (83.2)
C061B	AKD-X02406	188 (7.40)	32.6 (288)	75.6 (669)	1950	18.6 (41.0)	94.1 (83.2)
C062C	AKD-X01206	188 (7.40)	48.4 (428)	117 (1040)	700	23.6 (52.0)	126 (112)
C062B	AKD-X02406	188 (7.40)	44.6 (395)	102 (900)	1400	23.6 (52.0)	126 (112)
C063C	AKD-X01206	188 (7.40)	61.8 (547)	157 (1380)	550	29.0 (63.0)	157 (139)
C063B	AKD-X02406	188 (7.40)	59.0 (522)	136 (1200)	1050	29.0 (63.0)	157 (139)
C091A	AKD-X02406	246 (9.68)	50.2 (444)	120 (1060)	600	27.7 (61.0)	280 (248)
C092C	AKD-X02406	246 (9.68)	102 (900)	231 (2050)	450	41.3 (91.0)	470 (416)
C093C	AKD-X02406	246 (9.68)	139 (1230)	317 (2800)	350	54.4 (120)	660 (584)
C131C	AKD-X02406	350 (13.8)	189 (1670)	395 (3500)	250	63.5 (140)	1240 (1100)
C132C	AKD-X02406	350 (13.8)	362 (3200)	818 (7240)	120	101 (223)	2250 (1990)
C133C	AKD-X02406	350 (13.8)	499 (4410)	1070 (9890)	100	132 (292)	3020 (2670)

400/480 Vac Systems Performance Data

Cartridge DDR Motor	AKD Servo Drive	Frame Size	Continuous Torque	Peak Torque	Maximum Speed		Weight	Inertia (Jm)
		mm (in)	Nm (lb-in)	Nm (lb-in)	RPM		kg (lb)	kg-cm ² (lb-in-s ² x10 ⁻³)
					400 Vac	480 Vac		
CH041A	AKD-X00307	108 (4.25)	4.56 (40.4)	11.3 (100)	2500	2500	4.08 (9.00)	5.86 (5.19)
CH042A	AKD-X00607	108 (4.25)	8.26 (73.1)	19.0 (168)	2500	2500	5.67 (12.5)	8.87 (7.85)
CH043A	AKD-X00607	108 (4.25)	11.1 (98.2)	25.3 (224)	2250	2500	7.26 (16.0)	11.9 (10.5)
CH044A	AKD-X00607	108 (4.25)	13.9 (123)	31.6 (280)	1850	2250	8.84 (19.5)	14.9 (13.2)
CH051A	AKD-X00607	138 (5.43)	11.7 (104)	28.0 (248)	2100	2500	8.39 (18.5)	27.4 (24.2)
CH052C	AKD-X00607	138 (5.43)	16.9 (150)	43.1 (381)	1750	2100	10.7 (23.5)	35.9 (31.8)
CH053A	AKD-X01207	138 (5.43)	21.0 (186)	54.1 (479)	2350	2500	13.2 (29.0)	44.3 (39.2)
CH054A	AKD-X01207	138 (5.43)	24.9 (220)	63.8 (565)	2100	2500	15.4 (34.0)	52.8 (46.7)
CH061A	AKD-X01207	188 (7.40)	33.8 (299)	86.8 (768)	1600	1900	18.6 (41.0)	94.1 (83.2)
CH062C	AKD-X01207	188 (7.40)	48.4 (428)	117 (1040)	1250	1550	23.6 (52.0)	126 (112)
CH063C	AKD-X01207	188 (7.40)	61.8 (547)	157 (1380)	950	1150	29.0 (63.0)	157 (139)
CH063B	AKD-X02407	188 (7.40)	59.0 (522)	136 (1200)	1850	2200	29.0 (63.0)	157 (139)
CH091A	AKD-X02407	246 (9.68)	50.2 (444)	120 (1060)	1200	1500	27.7 (61.0)	280 (248)
CH092C	AKD-X02407	246 (9.68)	102 (900)	231 (2050)	800	1000	41.3 (91.0)	470 (416)
CH093C	AKD-X02407	246 (9.68)	139 (1230)	317 (2800)	700	800	54.4 (120)	660 (584)
CH131C	AKD-X02407	350 (13.8)	189 (1670)	395 (3500)	500	600	63.5 (140)	1240 (1100)
CH131B	AKD-X04807*	350 (13.8)	190 (1680)	396 (3500)	800	1000	63.5 (140)	1240 (1100)
CH132C	AKD-X02407	350 (13.8)	362 (3200)	818 (7240)	250	300	101 (223)	2250 (1990)
CH132B	AKD-X04807*	350 (13.8)	361 (3190)	759 (6720)	400	500	101 (223)	2250 (1990)
CH133C	AKD-X02407	350 (13.8)	499 (4410)	1070 (9480)	200	250	132 (292)	3020 (2670)
CH133B	AKD-X04807*	350 (13.8)	510 (4510)	1090 (9700)	350	400	132 (292)	3020 (2670)

Cartridge DDR C09 and C13 Dimensions

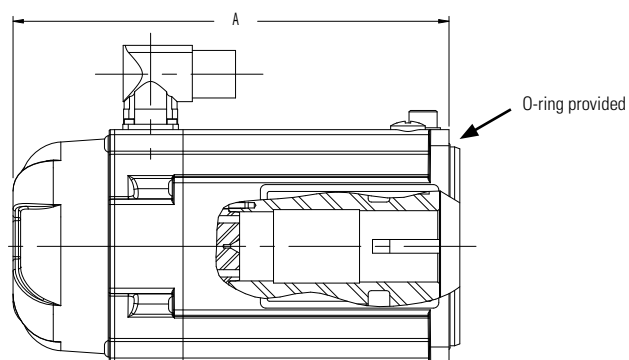
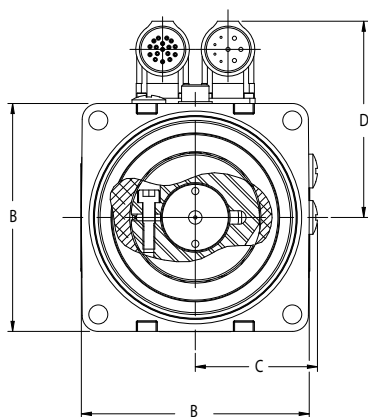
Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and Cartridge DDR motor model nomenclature, refer to pages 63 and 65 respectively.

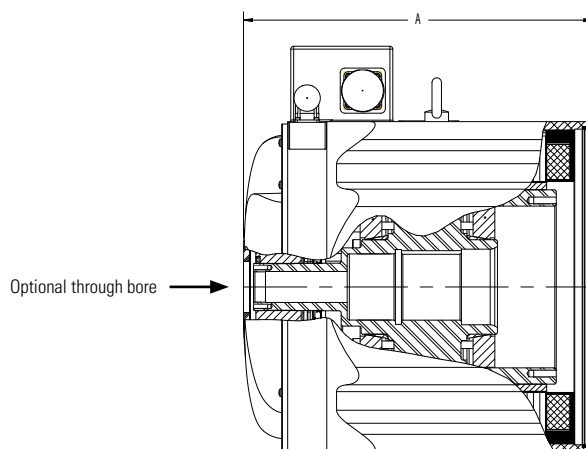
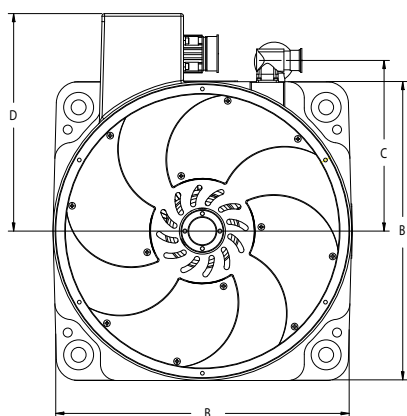
*Coming soon

Cartridge DDR C04, C05 and C06 Dimensions

Cartridge DDR Motor	A mm (in)	B mm (in)	C mm (in)	D mm (in)
C(H)041	171 (6.73)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)042	202 (7.95)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)043	233 (9.17)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)044	264 (10.4)	108 (4.25)	59 (2.31)	93 (3.67)
C(H)051	195 (7.68)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)052	220 (8.66)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)053	245 (9.65)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)054	270 (10.6)	138 (5.43)	76 (3.00)	108 (4.25)
C(H)061	226 (8.90)	188 (7.40)	99 (3.88)	133 (5.25)
C(H)062	260 (10.2)	188 (7.40)	99 (3.88)	133 (5.25)
C(H)063	294 (11.6)	188 (7.40)	99 (3.88)	133 (5.25)



Cartridge DDR Motor	A mm (in)	B mm (in)	C mm (in)	D mm (in)
C(H)091	204 (8.03)	246 (9.68)	149 (5.88)	182 (7.18)
C(H)092	253 (9.96)	246 (9.68)	149 (5.88)	182 (7.18)
C(H)093	302 (11.9)	246 (9.68)	149 (5.88)	182 (7.18)
C(H)131	231 (9.09)	350 (13.8)	200 (7.87)	256 (10.1)
C(H)132	301 (11.9)	350 (13.8)	200 (7.87)	256 (10.1)
C(H)133	370 (14.6)	350 (13.8)	200 (7.87)	256 (10.1)



Housed Direct Drive Rotary (DDR) Motor

Housed DDR motors are multi-pole (16 to 32) hollow shaft motors with their own bearings and high-resolution encoder system. They are coupled directly to the load and enable very precise and repeatable systems. Housed DDR motors are maintenance free and run more quietly and with better dynamics than systems that use gears, belts, cams or other mechanical transmission components.

Housed DDR Features

- 4 frame sizes
- Robust cross-roller bearing
- Dual bearing option
- IP67 option
- Continuous torque range: 5.8 Nm (4.3 lb-ft) to 339 Nm (250 lb-ft)
- Optimized torque output with high-pole count efficient electromagnetic design
- Integrated high-resolution sine-encoder
- 134,217,728 counts per rev resolution, 27 bits
- Feedback accuracy: +/- 26 arc-sec
- Repeatability better than 1 arc second

Housed DDR Benefits

- Transmission elements such as couplings, toothed belts, spindles, and other fitted components can be eliminated
- Mechanical design is made much simpler
- Power transmission without backlash
- More compact machinery assemblies
- Increased performance for the entire system

Housed DDR Motor Advantage

Consider how a Housed DDR motor improved a medical manufacturing machine.

Product is located at the steel pins on the outside of the machine's turret as shown. The 115 kg load wheel has an inertia of 20 kg-m². There are 96 steel pins for an index angle of 3.5 degrees to move.

The move is accomplished in less than 100 ms.

Realized Housed DDR Motor Benefits

The Direct Drive Advantage

The following improvements were observed compared to the previous design that used a mechanical indexer:

Improved Repeatability

The Housed DDR motor demonstrated a repeatability better than 1 arc-second which was substantially better than the mechanical indexer.

No Degradation

Direct drive system performance, accuracy and repeatability do not degrade over time as they do with a mechanical indexer. With a mechanical indexer, as parts wear over time, the accuracy and repeatability degrade.

Immediate Stop

The direct drive system can immediately stop if there is a process error. The mechanical indexer required several cycles to stop which could cause tooling and machine damage.



Greatly Reduced Audible Noise

With the mechanical indexer, the noise was at a level such that two people would have to yell to hear each other. By contrast, if you turned your back to the Housed DDR motor, you could barely detect that it was running.

Easy Profile Change

Motion parameters such as index angle, speed, acceleration, and dwell are very simple to change with the Housed DDR motor. The mechanical indexer does not support flexible motion profiles.

Better Value

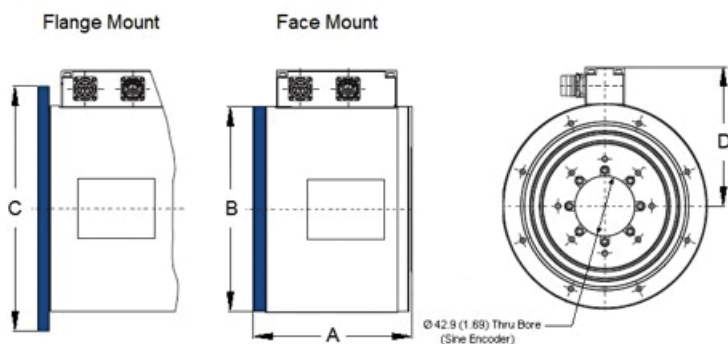
The Housed DDR motor is attractively priced compared to the mechanical indexer it replaced. When the other advantages listed above are also considered, the Housed DDR motor was the obvious choice.

240 Vac Performance Data

Housed DDR Motor	AKD Servo Drive	Frame Size mm (in)	Continuous Torque Nm (lb-in)	Peak Torque Nm (lb-in)	Maximum Speed (RPM)	Weight kg (lb)	Inertia (Jm) cm ² (lb-in-s ² x10 ⁻³)
D061	AKD-X00606	175 (6.90)	5.3 (46.9)	16.9 (150)	500	9.4 (20.7)	61 (54.0)
D062	AKD-X00606	175 (6.90)	9.8 (86.7)	33.5 (296)	500	11.3 (24.9)	71 (62.8)
D063	AKD-X00606	175 (6.90)	17.7 (157)	64.4 (570)	500	13.8 (30.4)	86 (76.1)
D081	AKD-X00606	217 (8.55)	15.9 (141)	45.0 (398)	500	17.9 (39.4)	144 (127)
D082	AKD-X00606	217 (8.55)	25.9 (229)	92.2 (816)	300	21.5 (47.3)	194 (172)
D083	AKD-X00606	217 (8.55)	50.4 (446)	160 (1420)	250	28.8 (63.4)	301 (266)
D101	AKD-X00606	280 (11.0)	34.6 (306)	129 (1140)	300	31.5 (69.3)	693 (613)
D102	AKD-X00606	280 (11.0)	63.4 (561)	227 (2010)	200	43.8 (96.4)	992 (878)
D103	AKD-X01206	280 (11.0)	115 (1020)	501 (4430)	120	60.8 (134)	1750 (1550)
D141	AKD-X01206	362 (14.2)	108 (956)	367 (3250)	200	59.4 (131)	1630 (1440)
D142	AKD-X01206	362 (14.2)	183 (1620)	519 (4590)	120	86.6 (191)	2740 (2430)
D143	AKD-X02406	362 (14.2)	339 (3000)	1340 (11,900)	60	146 (321)	5420 (4800)

400/480 Vac Performance Data

Housed DDR Motor	AKD Servo Drive	Frame Size mm (in)	Continuous Torque Nm (lb-in)	Peak Torque Nm (lb-in)	Maximum Speed RPM	Weight kg (lb)	Inertia (Jm) cm ² (lb-in-s ² x10 ⁻³)
DH061	AKD-X00607	175 (6.90)	5.3 (46.9)	16.9 (150)	800	9.4 (20.7)	61 (54.0)
DH062	AKD-X00607	175 (6.90)	9.8 (86.7)	33.5 (296)	800	11.3 (24.9)	71 (62.8)
DH063	AKD-X00607	175 (6.90)	17.7 (157)	64.4 (570)	800	13.8 (30.4)	86 (76.1)
DH081	AKD-X00607	217 (8.55)	15.9 (141)	45.0 (398)	500	17.9 (39.4)	144 (127)
DH082	AKD-X00607	217 (8.55)	25.9 (229)	92.2 (816)	500	21.5 (47.3)	194 (172)
DH083	AKD-X00607	217 (8.55)	50.4 (446)	160 (1420)	500	28.8 (63.4)	301 (266)
DH101	AKD-X00607	280 (11.0)	34.6 (306)	129 (1140)	300	31.5 (69.3)	693 (613)
DH102	AKD-X00607	280 (11.0)	63.4 (561)	227 (2010)	300	43.8 (96.4)	992 (878)
DH103	AKD-X01207	280 (11.0)	115 (1020)	501 (4430)	250	60.8 (134)	1750 (1550)
DH141	AKD-X01207	362 (14.2)	108 (956)	367 (3250)	300	59.4 (131)	1630 (1440)
DH142	AKD-X01207	362 (14.2)	183 (1620)	519 (4590)	300	86.6 (191)	2740 (2430)
DH143	AKD-X02407	362 (14.2)	339 (3000)	1340 (11,900)	120	146.0 (321)	5420 (4800)



Dimensions

DDR	A mm (in)	B mm (in)	C mm (in)	D mm (in)
D(H)061	130 (5.12)	175 (6.90)	220 (8.66)	126 (4.95)
D(H)062	140 (5.55)	175 (6.90)	220 (8.66)	126 (4.95)
D(H)063	164 (6.46)	175 (6.90)	220 (8.66)	126 (4.95)
D(H)081	145 (5.71)	217 (8.55)	260 (10.2)	147 (5.80)
D(H)082	165 (6.50)	217 (8.55)	260 (10.2)	147 (5.80)
D(H)083	206 (8.11)	217 (8.55)	260 (10.2)	147 (5.80)
D(H)101	153 (6.02)	280 (11.0)	330 (13.0)	181 (7.11)
D(H)102	185 (7.28)	280 (11.0)	330 (13.0)	181 (7.11)
D(H)103	248 (9.76)	280 (11.0)	330 (13.0)	181 (7.11)
D(H)141	153 (6.02)	362 (14.2)	406 (16.0)	218 (8.59)
D(H)142	217 (8.52)	362 (14.2)	406 (16.0)	218 (8.59)
D(H)143	344 (13.50)	362 (14.2)	406 (16.0)	218 (8.59)

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and Housed DDR motor model nomenclature, refer to pages 67 and 70 respectively.

Linear Positioning System

Kollmorgen is also the market leader in precise linear positioning, backed by 40 years of experience of providing innovative solutions customers can count on everyday. We offer linear positioners that range from 20 N (5 lb) of thrust and 100 mm (4 in) length, up to 25 kN (5600 lb) and 1.5 m length (unlimited length for linear motors) with precision better than a single thread of human hair (≤ 0.1 mm/0.004 in). Our linear positioner families leverage the breadth of our AKM servomotor product line, which provides a wide range of solutions for nearly any application.

Electric Cylinders (EC)

Primarily designed to apply a force through an extendable rod, electric cylinders are a clean and efficient replacement for hydraulic actuators and pneumatic cylinders, and an alternative to many types of linear transmissions. A wide variety of mounting and coupling alternatives significantly increases their problem solving potential.

Rodless Actuators

Long travel, quiet operation, and high moment loading differentiates rodless actuators from other mechanical transmissions.

Precision Tables

Positioning tables are used when accurate and repeatable motion is critical (1 part per 10,000 or better). These tables offer a wide variety of single and multi-axis configurations, open and closed frame tables, ball or lead screw driven, and overhung and constant support for Kollmorgen geometry configurations.

Direct Drive Linear (DDL) Motor

Directly coupling a linear motor to the driven load offers many advantages, including eliminating all mechanical transmissions, such as ball/lead screws, rack & pinions, belts/pulleys, and eliminating gearboxes. This in turn also eliminates backlash and compliance, and other problems associated with these mechanical transmissions.

DDL Benefits

- Zero maintenance
- No ball screws, gearboxes, rack and pinions, belts/pulleys
- Zero backlash and compliance
- High stiffness
- High positional accuracy
- Compact mechanical assembly
- Reduced parts count in machine
- Very smooth velocity
- Quiet operation



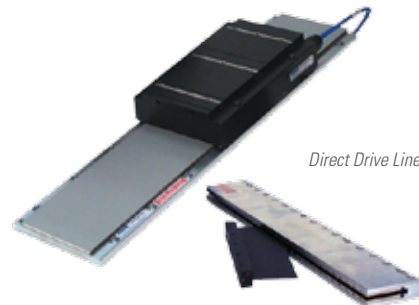
Electric Cylinders



Rodless Actuators



Precision Tables



Direct Drive Linear Motors

Performance Data

	Minimum Stroke mm (in)	Maximum Stroke mm (in)	Repeatability mm (in)	Maximum Thrust kN (lbf)	Maximum Payload kN (lbf)	Maximum Speed mm/s (in/s)
Electric cylinders	50 (2.0)	1500 (60)	0.013 (0.0005)	25 (5620)	Designed to push and pull	1300 (51)
Rodless actuators	150 (6.0)	2700 (106)	0.1 (0.004)	3.1 (700)	1.33 (300)	3000 (120)
Precision tables	50 (2.0)	1500 (60)	0.004 (0.00016)	2.0 (440)	6.2 (1400)	1300 (51)
Direct drive linear motors*	64 (2.5)	Unlimited	1×10^{-6} (3.9×10^{-6})	15.6 (3500)	Customer design limited	5000 (200)

* We offer hundreds of custom and semi-custom solutions for direct drive linear (DDL) applications.

Precision Tables DS4 / DS6 Series

Precision positioning tables are best suited for applications where the accuracy and repeatability requirements are more important than axial thrust of the drive train. Precision positioning tables can also be used in less precise applications where adequate moment load support is necessary, and are ideal building blocks for complete multi-axis positioning systems.

The DS4 and DS6 are Kollmorgen's most versatile and modular line of positioning tables.

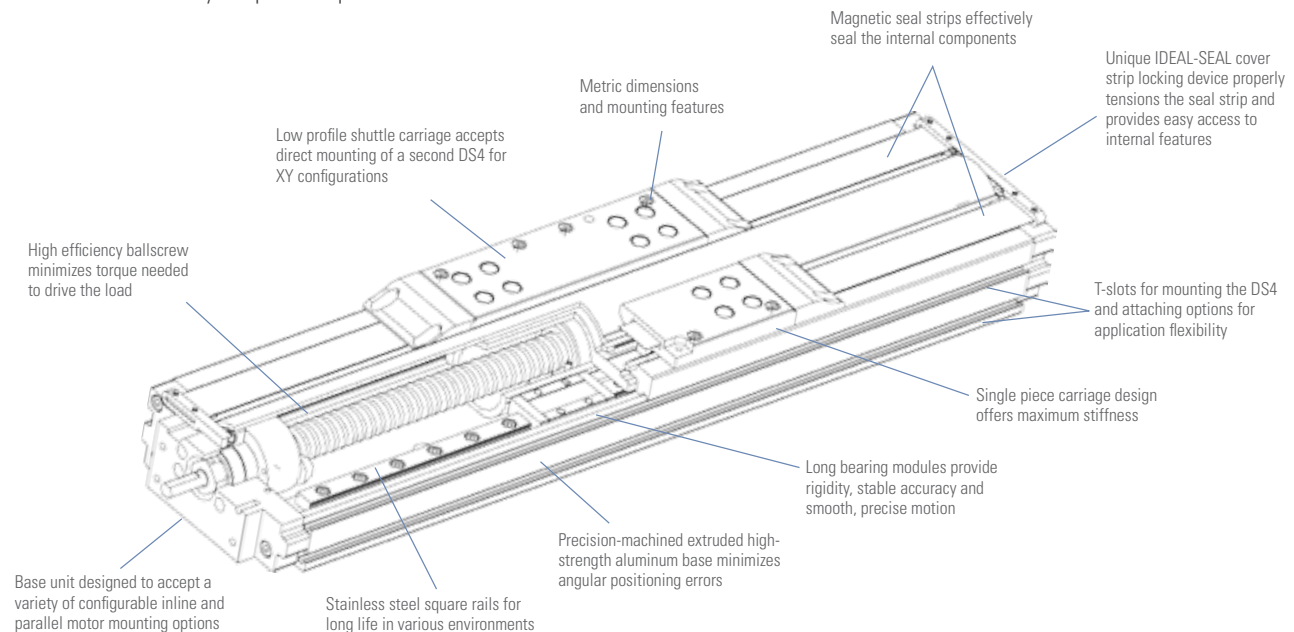
Combined with the AKD Servo Drive and AKM Servomotors, DS4 and DS6 Systems Offer

- An optimized electromechanical solution suitable for demanding high precision positioning
- Performance and versatility in a compact package
- Outstanding industrial durability
- Tremendous configuration flexibility
- Industry-leading price vs. performance value

DS Series Design Features

Following are several features that make the DS Series the positioning table of choice for the most demanding applications:

- Travel lengths from 50 mm to 2 m cover a wide range of applications.
- Precision ballscrew drive, with 5 mm, 10 mm and 25 mm leads, offers high speed and efficiency, excellent repeatability and accuracy, and mechanical advantage.
- Proven magnetic stainless steel seal strip technology effectively seals the internal components of the DS Series, protecting the ballscrew and ways from contaminants. This feature also contains ballscrew and way lubrication within the DS Series.
- Easily configurable modular design and option set, including a variety of motor mounting orientations, motor sizes and type, ballscrew leads, coupling types and sizes, encoder feedback options, limit/home sensor types, and shaft brakes allow the DS Series to be customized to meet your specific requirements.



DS Series precision tables can be ordered in a variety of multi-axis configurations including XY, XZ, and XYZ or cartesian arrangements. Consult Kollmorgen applications engineering for standard and custom configurations.

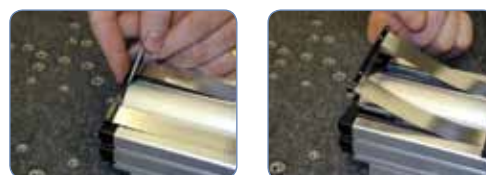
A second option is to order standard multi-axis brackets and assemble the axes yourself.

Unique IDEAL-SEAL Magnetic Cover Strip Locking Device

- Entire length of lead screw and linear bearing system are protected, providing both operator safety and protection from contaminants.
- Seal strips are always properly tensioned, drastically decreasing wear that requires regular field repair.
- Allows easy access to interior of DS4 for mounting and maintenance.
- No small hardware or springs to lose, and no exposure to the sharp ends of the strips, which are problems for similar seal end-cap designs.



All DS4 and DS6 tables will bolt directly together in a standard XY without modification.



Configurable Options

DS Series	
Servomotor options	AKM23D, AKM42G
Grades	Precision* (up to 600 mm), commercial
Motor orientations	In-line, parallel right/left/under
Couplings options** (inline configurations)	Bellows
Transmission ratio (parallel configurations)	1:1
Limit sensors	PNP (sinking) inductive proximity sensors, 5-30 Vdc
Home sensor	PNP (sinking) inductive proximity sensors, 5-30 Vdc
Shaft brake	Electromagnetic power of holding brake, 24 Vdc
Linear encoder options	1.0, 0.5 and 0.1 motion resolution, modular incremental type

* Additional lead time applies to precision grade. Contact customer support for details.

** Additional couplings available. Contact customer support for details.

Accessories

DS Series	
Toe clamps	Provide convenient external mounting to a base plate or to riser blocks
Narrow riser blocks	Raise unit for clearance of larger motor options, utilizing internal base mounting features on the side
Wide riser blocks	Allow rising of the unit, independent of base mounting features
Brackets and mounting plates	Facilitate multi-axis configurations
Cable sets	For connection to AKD and other drives



Limit Sensor



Linear Encoder



Toe Clamp

Precision Tables DS4 / DS6 Series

DS4 General Specifications

Travel (mm)	50	100	150	200	250	300	350	400	450	500	550	600
Overall height, less motor (mm)	47											
Width (mm)	95											
System length, Inline less motor (mm)	317	367	417	467	517	567	617	667	717	767	817	867
System length, parallel motor mounts (mm)	300	350	400	450	500	550	600	650	700	750	800	850
Positional accuracy (microns)												
Commercial grade	12	12	14	20	22	24	26	26	28	34	36	40
Precision grade	8	8	10	12	12	14	14	16	19	21	23	25
Straightness & flatness (microns)	6	6	9	12	12	14	18	21	23	23	25	25
Bi-directional repeatability, open loop												
Commercial grade (microns)	+/- 3											
Precision grade (microns)	+/- 1.3											
Load capacity, normal (kg) (max)	170											
Axial load capacity (kg)	90											
Acceleration (max) (m/sec ²)	20											
Moving mass (kg)	0.75											
Total mass (kg)	2.7	3	3.3	3.6	3.9	4.1	4.4	4.7	5	5.3	5.6	5.9
Ballscrew diameter (mm)	16											
Duty cycle (%)	100											
Ballscrew efficiency	90											
Max. breakaway torque (oz-in)	18											
Max. running torque (oz-in)	16											
Ballscrew lead available (mm)	5, 10											
Input inertia (10 ⁻⁵ kg-m ²)	1.17	1.24	1.67	1.93	2.18	2.43	2.68	2.93	3.19	3.44	3.69	3.94
Max. ballscrew speed (rev/sec)	80						60		55	50		

DS6 General Specifications

Travel (mm)	100	200	300	400	500	600	700	800	900	1000	1250	1500	1750	2000
Overall height (mm)	70													
Width (mm)	150													
System length, inline less motor (mm)	465	565	665	765	865	965	1065	1165	1265	1365	1615	1865	2115	2365
System length, parallel motor mounts (mm)	470	570	670	770	870	970	1070	1170	1270	1370	1620	1870	2120	2370
Positional accuracy (microns)														
Commercial grade	14	22	28	39	45	48	92	94	103	105	118	134	154	159
Precision grade	12	14	15	20	25	50	-	-	-	-	-	-	-	-
Straightness & flatness (microns)	10	14	17	23	30	33	40	46	50	55	76	95	115	135
Bi-directional repeatability, open loop														
Commercial grade (microns)	+/- 3						+/-5							
Precision grade (microns)	+/- 1.3						N/A							
Load capacity, normal (kg) (max)	630													
Axial load capacity (kg)														
Commercial grade	90						200							
Precision grade	90						N/A							
Acceleration (max) (m/sec ²)	20													
Moving mass (kg)	2.8													
Total mass (kg)	8.9	10.2	11.5	12.8	14.0	15.4	19.4	20.9	22.4	23.9	27.8	31.6	35.4	40.1
Ballscrew diameter (mm)	16						25							
Duty cycle (%)	100													
Ballscrew efficiency	90						80							
Max. breakaway torque (oz-in)	18						55							
Max. running torque (oz-in)	16						48							
Ballscrew lead available (mm)	5, 10						5, 10, 25							
Input inertia (10 ⁻⁵ kg-m ²)	3.8	4.4	5	5.5	6.1	6.7	37	40.4	43.9	47.3	56	64.5	73.2	81.9
Max. ballscrew speed (rev/sec)	80		60		50		60	50	40	35	24	16	13	11

*All performance specifications are based upon proper mounting procedures, with the DS table fully supported on a flat surface (flat within 0.008 mm/300 mm). Positional accuracy and repeatability specifications are for inline motor mount models only. Contact customer support for specifications of parallel mount configurations. Above specifications are measured 37.5 mm directly above the center of the carriage. Specifications are based upon operation at 20° C.

120 Vac Performance Data

	Sys #	Precision Table - AKM Servomotor	AKD Servo Drive	Stroke Length Type	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (mm)
DS4	1	DS4-XXX-10G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	104	17.6	210	10.8	210	17.6	600
	2	DS4-XXX- 5G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	195	8.8	210	8.4	210	8.8	600
DS6	3	DS6-XXX-25G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	37	44.0	138	8.2	138	44.0	600
	4	DS6-XXX-10G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	104	17.6	210	12.4	210	17.6	600
	5	DS6-XXX- 5G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	195	8.8	210	8.6	210	8.8	600
DS6	6	DS6-XXX-25G-AKM23D-■ ■ ■ ■	AKD-X00306	≥ 700 mm	41	44.0	138	8.2	154	44.0	800
	7	DS6-XXX-10G-AKM23D-■ ■ ■ ■	AKD-X00306	≥ 700 mm	91	17.6	331	3.1	376	17.6	800
	8	DS6-XXX- 5G-AKM23D-■ ■ ■ ■	AKD-X00306	≥ 700 mm	143	8.8	440	5.0	440	8.8	800

240 Vac Performance Data

	Sys #	Precision Table - AKM Servomotor	AKD Servo Drive	Stroke Length Type	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (mm)
DS4	1	DS4-XXX-10G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	98	31.5	210	31.5	210	31.5	300
	2	DS4-XXX- 5G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	184	15.7	210	15.7	210	15.7	300
DS6	3	DS6-XXX-10G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	98	31.5	210	31.5	210	31.5	300
	4	DS6-XXX- 5G-AKM23D-■ ■ ■ ■	AKD-X00306	≤ 600 mm	184	15.7	210	15.7	210	15.7	300
	5	DS6-XXX-25G-AKM23D-■ ■ ■ ■	AKD-X00306	≥ 700 mm	40	59	154	47	154	59	700
	6	DS6-XXX-10G-AKM23D-■ ■ ■ ■	AKD-X00306	≥ 700 mm	88	23.6	374	18	374	23.6	700
	7	DS6-XXX- 5G-AKM23D-■ ■ ■ ■	AKD-X00306	≥ 700 mm	138	11.8	440	11.8	440	11.8	700
	8	DS6-XXX-10G-AKM42G-■ ■ ■ ■	AKD-X00306	≤ 600 mm	210	28.4	210	28.4	210	28.4	300
	9	DS6-XXX- 5G-AKM42G-■ ■ ■ ■	AKD-X00306	≤ 600 mm	210	14.5	210	14.5	210	14.5	300
	10	DS6-XXX-25G-AKM42G-■ ■ ■ ■	AKD-X00306	≥ 700 mm	114	59	438	35.8	438	59	700
	11	DS6-XXX-10G-AKM42G-■ ■ ■ ■	AKD-X00306	≥ 700 mm	272	23.6	440	23.6	440	23.6	700
	12	DS6-XXX- 5G-AKM42G-■ ■ ■ ■	AKD-X00306	≥ 700 mm	440	11.8	440	11.8	440	11.8	700

Note 1: Performance based on inline motor configuration.

Note 2: Refer to page 66 for matching cables.

Note 3: For complete AKD and DS4 / DS6 Series model nomenclature, refer to pages 67 and 71 respectively.

Electric Cylinders N2 / EC Series

Electric cylinders are thrust-producing devices that are best suited for applications requiring high axial force with the moment and side loads already properly supported.

Kollmorgen has combined the broad product offering of the N2 and EC Series electric cylinders with the industry-leading AKM servomotors and AKD servo drives. The N2 and EC Series of electric cylinders offer a wide range of available thrusts in standard units from 600 lb (N2) to 5620 lb (EC5) across 5 electric cylinder frame sizes.

- Speeds up to 52 in/sec are available and integrated geared options provide the ability to increase thrust capacity for lower speed applications, leveraging the speed capacity of servo systems.
- Multiple servomotor options are available for the product line ranging from NEMA 23 size to NEMA 42 size servos. The combination with the AKM servomotor enables the use of various feedback devices including sine-encoder and the low-cost but high-performance Smart Feedback Device (SFD) when used with the AKD servo drive.
- Windings and voltage operation are not differentiated in MOTIONEERING®. All systems are offered at all voltages (240, 400, 480).
- The AKM servomotor comes mounted on the electric cylinder as specified by the electric cylinder part number. This eliminates time to match the motor to the electric cylinder and eliminates potential mechanical incompatibility.

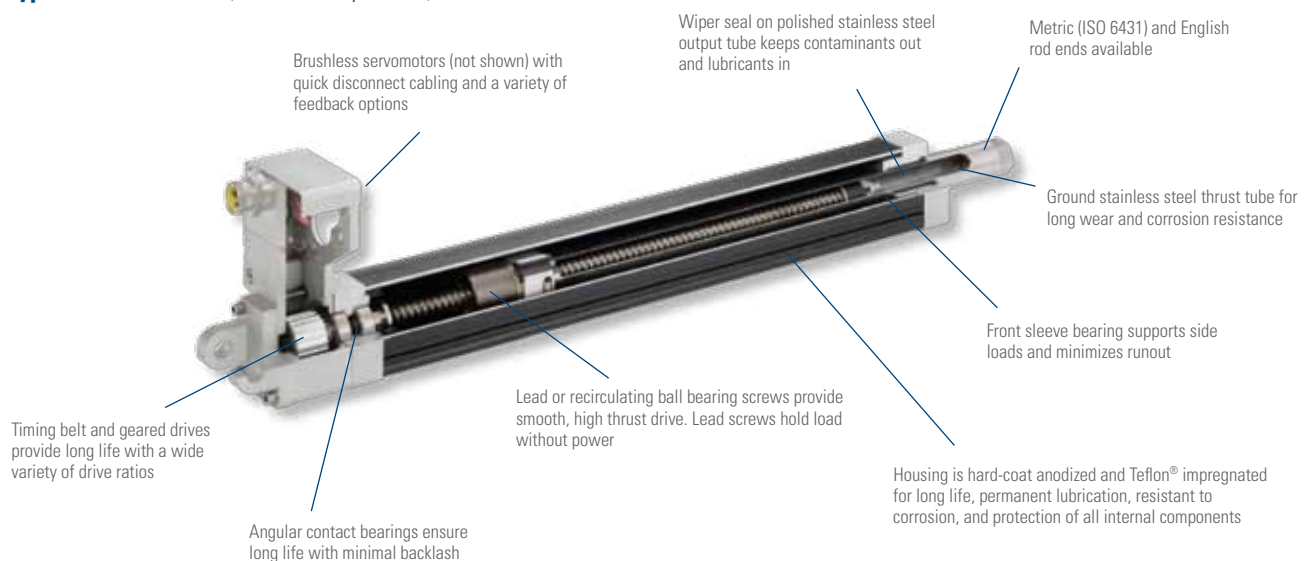
EC Servo Positioners

- Designed for performance
- Highest quality precision rolled ballscrews and Acme screws – for quiet, long-life operation
- Brushless servo with encoder, resolver or SFD feedback
- Sealed for IP54 protection. IP65 option available
- Thrust up to 25,000 N [5,620 lb]
- Speed up to 1.3 m/s [52.5 in/sec]
- Metric design (ISO 6431)
- Available in 5 power ranges – EC1, 2, 3, 4 & 5

N2 Servo Positioners

- Smallest package size
- Time-proven design
- Improved durability over previous designs
- Thrust up to 2,670 N [600 lb]
- Speed up to 0.76 m/s [30 in/sec]
- English dimensions (to NFPA standards)
- Brushless servo with encoder, resolver or SFD feedback

Typical Construction (EC2 cut-away shown)



Kollmorgen offers electric cylinder drive mechanisms designed around either lead or ballscrews. Ballscrews, being the more efficient of the two, utilize ball nuts riding on recirculating ball bearings, resulting in higher speeds, loads and cycle rates. However, the more efficient design of ballscrew technology lends it to being backdriven when power is removed if precautions are not taken (e.g., electric brakes or counter loading).

Lead screws are capable of holding the load in position when power is removed, but are less efficient in operation. Kollmorgen's guide system prevents rotation of the drive nut, thus eliminating any torque loading to machine linkage.

Electric Cylinders Are Preferred When:

- Positioning an externally guided and supported load
- Moving a load that pivots
- There is a high concentration of airborne contaminants (rodless actuators are inherently less well protected)
- Replacing a hydraulic or pneumatic cylinder with an electromechanical solution



General Specifications

Series	N2		EC1	EC2		EC3		EC4	EC5
Std. maximum stroke length inches (mm)	* 22.5 (571.5)		7.87 (200)	29.53 (750)		39.37 (1000)		59.06 (1500)	59.06 (1500)
Type of screw	Lead	Ball	Ball	Lead	Ball	Lead	Ball	Ball	Ball
Lead	0.2 in, 0.5 in	0.2 in, 0.5 in	1.025 in	4 mm	16, 5 mm	4 mm	16, 10, 5 mm	25, 10 mm	32, 10 mm
Nom. lead screw diameter	0.625 in	0.625 in	0.375 in	16 mm	16 mm	20 mm	20 mm	25 mm	32 mm
Backlash inches (mm)	0.016 (0.40)	0.015 (0.38)	0.015 (0.30)	0.016 (0.40)	0.010 (0.25)	0.016 (0.40)	0.010 (0.25)	0.12 (0.30)	0.12 (0.30)
Dimension Std.	English NFPA Std.		Metric ISO 6431 Std.	Metric ISO 6431 Std.		Metric ISO 6431 Std.		Metric ISO 6431 Std.	Metric ISO 6431 Std.
Bore size (mm)			0.875 in	50		63		80	100
Brushless servomotor	AKM23, NEMA 23		AKM1x, NEMA 17	AKM23, NEMA 23		AKM23, NEMA 23 AKM42, NEMA 34 AKM52, NEMA 42 **		AKM42, NEMA 34 AKM52, NEMA 42 **	AKM42, NEMA 34 AKM52, NEMA 42 **
Max. thrust lb. (N)	600 (2670)		150 (667)	810 (3600)		1620 (7200)		2700 (12,000)	5620 (25,000)
Max. velocity in/sec (m/s)	12 (0.3)	30 (0.76)	13 (0.33)	9.2 (0.23)	50 (1.27)	8.0 (0.20)	50 (1.28)	52.5 (1.33)	52.5 (1.33)
Max. rated duty cycle % (load, speed dependent)	50	100	100	50	100	50	100	100	100
Limit switches	optional		optional	optional		optional		optional	optional
Std. operating temperature range C (F)	32 to 140 (0 to 60)		-30 to +70 (-22 to 158)	-30 to +70 (-22 to 158)		-30 to +70 (-22 to 158)		-30 to +70 (-22 to 158)	-30 to +70 (-22 to 158)
Moisture/contaminants	Humid, but Not Direct Contact		IP54 Std. IP65 Opt.	IP54 Std. IP65 Opt.		IP54 Std. IP65 Opt.		IP54 Std. IP65 Opt.	IP54 Std. IP65 Opt.

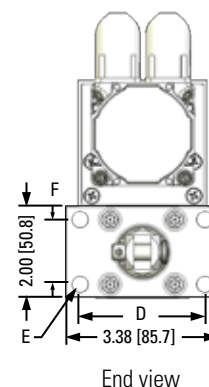
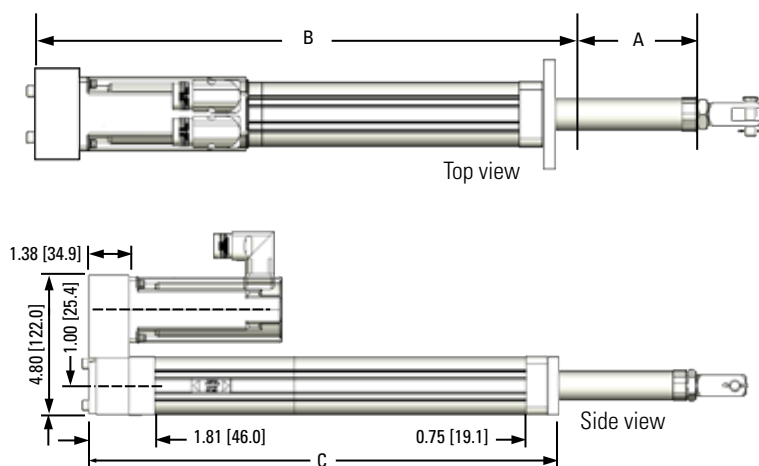
* Requires dual rod-end bearing option for length over 12".

** NEMA 42 mount, shaft does not follow a NEMA std.

Electric Cylinders N2 / EC Series

N2 MF1 Front Rectangular Flange Mount

Parallel



	English Option	Metric Option
	MF1 (inches)	MF1M (mm)
D	2.75	72*
E	0.34	9*
F	1.43	36*

* Meets ISO 40mm bore standard

N2 Series Dimensions

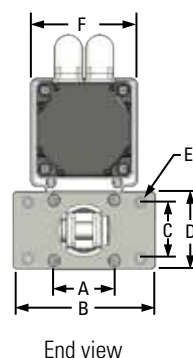
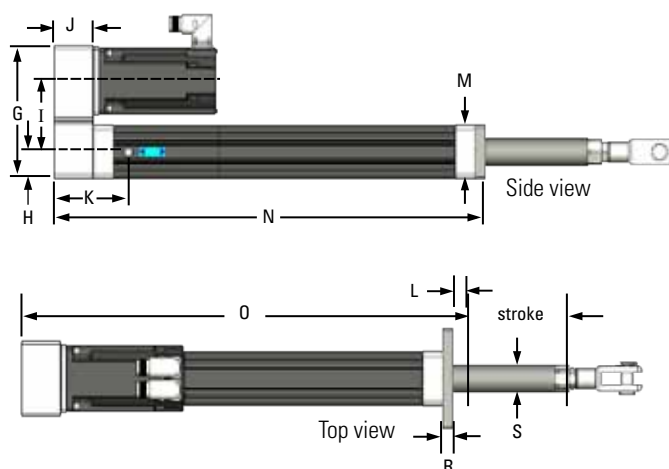
A	Standard Stroke Lengths Available						
inch	2.0	4.0	6.0	8.0	12.0	18.0	24.0
mm	50.8	101.6	152.4	203.2	304.8	457.2	609.6

B	Retract Length	C	Mounting length
inch	5.37 + S	inch	5.06 + S
mm	136.4 + S	mm	128.5 + S

S = stroke

EC MF1 Front Flange

Parallel



Flange Dimensions

In accordance with ISO 6431 for:	
Type	Bore Size
EC1	30 mm
EC2	50 mm
EC3	63 mm
EC4	80 mm
EC5	100 mm

EC Series Dimensions

	A	B	C	D	E	F	G	H
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
EC1	60.0 (2.36)	74.0 (2.91)	28.0 (1.10)	40.0 (1.57)	6.60 (0.26)	48.0 (1.89)	82.6 (3.25)	19.0 (0.75)
EC2	90.0 (3.54)	114.3 (4.50)	45.0 (1.77)	63.5 (2.50)	9.0 (0.35)	79.8 (3.14)	144.0 (5.7)	28.4 (1.12)
EC3	100.0 (3.94)	127.0 (5.00)	50.0 (1.97)	69.1 (2.72)	9.0 (0.35)	95.5 (3.76)	169.7 (6.7)	34.8 (1.37)
EC4	127.0 (5.00)	152.4 (6.00)	69.9 (2.75)	96.3 (3.79)	13.5 (0.53)	127.0 (5.00)	221.0 (8.7)	46.1 (1.81)
EC5	150.0 (5.91)	186.9 (7.36)	75.0 (2.95)	114.3 (4.50)	13.97/14.35 (.555/.565)	127.0 (5.00)	221.0 (8.7)	46.1 (1.81)

	I	J	K	L	M	N Cyl Length	O Retract length
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
EC1	41.8 (1.65)	31.3 (1.23)	—	10.2 (0.40)	38.1 (1.50)	106.8 + S (4.2 + S)	117.0 + S (4.60 + S)
EC2	74.7 (2.94)	41.7 (1.64)	88.6 (3.49)	25.0 (0.98)	56.9 (2.24)	218.5 + S (8.6 + S)	243.4 + S (9.58 + S)
EC3	*87.6/89.7 (*3.45/3.53)	49.3 (1.94)	94.2 (3.71)	25.0 (0.98)	69.6 (2.74)	246.3 + S (9.7 + S)	271.1 + S (10.67 + S)
EC4	111.1 (4.37)	71.9 (2.83)	150.9 (5.94)	41.4 (1.63)	92.2 (3.63)	365.8 + S (14.4 + S)	406.9 + S (16.02 + S)
EC5	111.1 (4.37)	71.9 (2.83)	150.9 (5.94)	35.0 (1.38)	92.2 (3.63)	365.8 + S (14.4 + S)	406.9 + S (16.02 + S)

	P Breather port Hex		Q	R	S
	type	mm (inch)	mm (inch)	mm (inch)	mm (inch)
EC1	—	—	—	10.0 (0.39)	22.2 (0.88)
EC2	1/8 NPT	11.1 (0.44)	34.8 (1.37)	9.5 (0.37)	28.0 (1.10)
EC3	1/8 NPT	11.1 (0.44)	41.1 (1.62)	12.7 (0.50)	35.0 (1.38)
EC4	1/4 NPT	14.0 (0.55)	52.8 (2.08)	12.7 (0.50)	50.0 (1.97)
EC5	1/4 NPT	14.0 (0.55)	52.8 (2.08)	19.1 (0.75)	50.0 (1.97)

* AKM23 / AKM24 dimension.

240 Vac Performance Data

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)
N2	1 N2-AKM23D-■■■■-10-5B *	AKD-X00306	190	12.0	600	11.5	600	12.0	18.0
	2 N2-AKM23D-■■■■-15-5B	AKD-X00306	287	8.0	600	8.0	600	8.0	18.0
	3 N2-AKM23D-■■■■-20-5B	AKD-X00306	382	6.0	600	6.0	600	6.0	18.0
	4 N2-AKM23D-■■■■-25-5B	AKD-X00306	370	4.8	600	4.8	600	4.8	18.0
	5 N2-AKM23D-■■■■-120-5B	AKD-X00306	600	1.0	600	1.0	600	1.0	18.0
	6 N2-AKM23D-■■■■-10-2B *	AKD-X00306	75	30.0	275	24.5	280	30.0	18.0
	7 N2-AKM23D-■■■■-15-2B	AKD-X00306	115	20.0	412	16.4	421	20.0	18.0
	8 N2-AKM23D-■■■■-20-2B	AKD-X00306	152	15.0	545	12.3	545	15.0	18.0
	9 N2-AKM23D-■■■■-25-2B	AKD-X00306	146	12.0	534	9.8	545	12.0	18.0
	10 N2-AKM23D-■■■■-120-2B	AKD-X00306	600	2.5	600	2.5	600	2.5	18.0
	11 N2-AKM23D-■■■■-10-5A	AKD-X00306	86	12.0	305	9.8	312	12.0	18.0
	12 N2-AKM23D-■■■■-15-5A	AKD-X00306	128	8.0	458	6.5	467	8.0	18.0
	13 N2-AKM23D-■■■■-20-5A	AKD-X00306	169	6.0	600	4.9	600	6.0	18.0
	14 N2-AKM23D-■■■■-25-5A	AKD-X00306	165	4.8	593	3.9	600	4.8	18.0
	15 N2-AKM23D-■■■■-120-5A	AKD-X00306	600	1.0	600	1.0	600	1.0	18.0

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)
EC	1 EC1-AKM11B-■■■■-10-03B *	AKD-X00306	50	13.0	75	13.0	75	13.0	200
	2 EC1-AKM11B-■■■■-20-03B	AKD-X00306	100	6.0	125	6.0	125	6.0	200
	3 EC1-AKM11B-■■■■-40-03B	AKD-X00306	150	3.0	150	3.0	150	3.0	200
	4 EC1-AKM13C-■■■■-10-03B*	AKD-X00306	75	11.5	75	13.0	75	13.0	200
	5 EC1-AKM13C-■■■■-20-03B	AKD-X00306	125	5.9	125	6.0	126	6.0	200

36 Vdc Stepper Performance Data

Sys #	Electric Cylinder - CT Step Motor	Cont. Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)
1	EC1-CTP12XLF10-10-03B	19.7	5.0	75	5.0	200
2	EC1-CTP12XLF10-20-03B	35.4	2.5	125	2.5	200
3	EC1-CTP12XLF10-40-03B	70.8	1.25	150	1.25	200

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD, EC, and N2 Series model nomenclature, refer to pages 67, 73 and 74, respectively.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust).

** Based on critical speed of screw specification.

Electric Cylinders N2 / EC Series

240 Vac Performance Data

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (mm)**	Cylinder Bore Size (EC)
EC2	16 EC2-AKM23D-■■■■-10-04A *	AKD-X00306	108	9.2	387	7.7	396	9.2	200	50
	17 EC2-AKM23D-■■■■-15-04A	AKD-X00306	160	6.2	521	5.8	582	6.2	300	50
	18 EC2-AKM23D-■■■■-20-04A	AKD-X00306	216	4.6	455	4.6	622	4.6	450	50
	19 EC2-AKM23D-■■■■-50-04A	AKD-X00306	517	1.8	809	1.8	809	1.8	600	50
	20 EC2-AKM23D-■■■■-100-04A	AKD-X00306	809	0.9	809	0.9	809	0.9	750	50
	21 EC2-AKM23D-■■■■-10-16B *	AKD-X00306	60	50.5	218	30.9	223	50.5	200	50
	22 EC2-AKM23D-■■■■-15-16B	AKD-X00306	85	40.1	293	23.4	237	45.0	200	50
	23 EC2-AKM23D-■■■■-20-16B	AKD-X00306	116	29.5	245	24.5	350	31.0	300	50
	24 EC2-AKM23D-■■■■-50-16B	AKD-X00306	292	7.3	809	7.3	809	7.3	750	50
	25 EC2-AKM23D-■■■■-100-16B	AKD-X00306	581	3.7	809	3.7	809	3.7	750	50
	21 EC2-AKM23D-■■■■-10-05B *	AKD-X00306	186	16.3	697	9.7	712	16.3	200	50
	22 EC2-AKM23D-■■■■-15-05B	AKD-X00306	272	12.5	809	8.3	809	13.5	300	50
	23 EC2-AKM23D-■■■■-20-05B	AKD-X00306	370	9.2	782	7.6	809	10.0	300	50
	24 EC2-AKM23D-■■■■-50-05B	AKD-X00306	809	2.3	809	2.3	809	2.3	750	50
EC3	25 EC3-AKM23D-■■■■-15-16B	AKD-X00306	86	39.3	327	20.6	334	42.0	200	63
	26 EC3-AKM23D-■■■■-20-16B	AKD-X00306	119	28.6	448	14.0	459	30.0	300	63
	27 EC3-AKM23D-■■■■-50-16B	AKD-X00306	251	6.3	891	6.1	909	6.3	750	63
	28 EC3-AKM23D-■■■■-70-16B	AKD-X00306	349	4.5	1240	4.4	1260	4.5	1000	63
	29 EC3-AKM23D-■■■■-10-10B *	AKD-X00306	98	21.0	349	19.3	356	21.0	300	63
	30 EC3-AKM23D-■■■■-15-10B	AKD-X00306	141	21.0	523	12.9	534	21.0	300	63
	31 EC3-AKM23D-■■■■-20-10B	AKD-X00306	191	17.9	716	8.9	734	20.0	300	63
	32 EC3-AKM23D-■■■■-50-10B	AKD-X00306	404	3.8	1420	3.8	1450	3.8	1000	63
	33 EC3-AKM23D-■■■■-70-10B	AKD-X00306	561	2.8	1620	2.8	1620	2.8	1000	63
	34 EC3-AKM23D-■■■■-10-05B *	AKD-X00306	196	10.3	695	9.7	712	10.3	300	63
	35 EC3-AKM23D-■■■■-15-05B	AKD-X00306	285	10.3	1040	6.4	1070	10.3	300	63
	36 EC3-AKM23D-■■■■-20-05B	AKD-X00306	381	8.9	1430	4.4	1470	10.0	300	63
	37 EC3-AKM23D-■■■■-50-05B	AKD-X00306	800	2.0	1620	2.0	1620	2.0	750	63
	38 EC3-AKM23D-■■■■-70-05B	AKD-X00306	1120	1.4	1620	1.4	1620	1.4	1000	63
	38 EC3-AKM42G-■■■■-10-16B *	AKD-X00606	149	45.0	601	24.4	628	45.0	200	63
	39 EC3-AKM42G-■■■■-15-16B	AKD-X00606	223	30.0	510	24.0	736	30.0	300	63
	40 EC3-AKM42G-■■■■-50-16B	AKD-X00606	690	6.3	1620	6.3	1620	6.3	750	63
	41 EC3-AKM42G-■■■■-70-16B	AKD-X00606	965	4.5	1620	4.5	1620	4.5	1000	63
	42 EC3-AKM42G-■■■■-10-10B *	AKD-X00606	238	28.4	961	15.3	1010	21.0	300	63
	43 EC3-AKM42G-■■■■-15-10B	AKD-X00606	357	18.9	823	14.5	1200	21.0	300	63
	44 EC3-AKM42G-■■■■-50-10B	AKD-X00606	1100	3.9	1620	3.9	1620	3.9	1000	63
	45 EC3-AKM42G-■■■■-70-10B	AKD-X00606	1530	2.8	1620	2.8	1620	2.8	1000	63
	46 EC3-AKM42G-■■■■-15-05B	AKD-X00606	710	10.3	1620	7.7	1620	10.3	300	63

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and EC Series model nomenclature, refer to pages 67 and 73 respectively.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust).

** Based on critical speed of screw specification.

240 Vac Performance Data

Sys #	Electric Cylinder - AKM Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	**Max Stroke for Max Speed (mm)	Cylinder Bore Size (EC)
EC4	48 EC4-AKM42G-■■■■-10-25B *	AKD-X00606	108	52.5	395	36.1	402	52.5	300	80
	49 EC4-AKM42G-■■■■-15-25B	AKD-X00606	143	47.3	593	24.1	603	50.0	300	80
	50 EC4-AKM42G-■■■■-20-25B	AKD-X00606	190	35.4	791	18.1	804	36.0	450	80
	51 EC4-AKM42G-■■■■-50-25B	AKD-X00606	580	5.1	1940	5.1	1960	5.1	1500	80
	52 EC4-AKM42G-■■■■-100-25B	AKD-X00606	1130	2.6	2700	2.6	2700	2.6	1500	80
	53 EC4-AKM42G-■■■■-10-10B *	AKD-X00606	270	21.0	989	14.4	1005	15.3	450	80
	54 EC4-AKM42G-■■■■-15-10B	AKD-X00606	357	18.9	1480	9.6	1500	15.3	450	80
	55 EC4-AKM42G-■■■■-20-10B	AKD-X00606	476	14.2	1980	7.2	2010	14.5	450	80
	56 EC4-AKM42G-■■■■-50-10B	AKD-X00606	1440	2.1	2700	2.1	2700	2.1	1500	80
	57 EC4-AKM42G-■■■■-100-10B	AKD-X00606	2700	1.0	2700	1.0	2700	1.0	1500	80
	58 EC4-AKM52H-■■■■-10-25B *	AKD-X00606	256	36.3	458	30.7	668	36.3	300	80
	59 EC4-AKM52H-■■■■-15-25B	AKD-X00606	384	24.2	844	18.6	1200	24.2	600	80
	60 EC4-AKM52H-■■■■-20-25B	AKD-X00606	512	18.1	874	16.7	1160	18.1	750	80
	61 EC4-AKM52H-■■■■-50-25B	AKD-X00606	1360	5.1	2700	5.1	2700	5.1	1500	80
	62 EC4-AKM52H-■■■■-100-25B	AKD-X00606	2700	2.6	2700	2.6	2700	2.6	1500	80
	63 EC4-AKM52H-■■■■-10-10B *	AKD-X00606	640	14.5	1120	13.1	1670	14.5	450	80
	64 EC4-AKM52H-■■■■-15-10B	AKD-X00606	961	9.7	2090	8.0	2700	9.7	600	80
	65 EC4-AKM52H-■■■■-20-10B	AKD-X00606	1280	7.2	2190	6.7	2700	7.2	750	80
	66 EC4-AKM52H-■■■■-50-10B	AKD-X00606	2700	2.1	2700	2.1	2700	2.1	1500	80
	67 EC4-AKM52L-■■■■-10-25B *	AKD-X01206	240	52.5	422	52.5	700	52.5	300	80
	68 EC4-AKM52L-■■■■-15-25B	AKD-X01206	287	48.3	741	42.9	1090	48.3	300	80
	69 EC4-AKM52L-■■■■-20-25B	AKD-X01206	368	36.3	789	32.2	1040	36.3	450	80
	70 EC4-AKM52L-■■■■-50-25B	AKD-X01206	1370	5.1	2370	5.1	2370	5.1	1500	80
	71 EC4-AKM52L-■■■■-100-25B	AKD-X01206	2700	2.6	2700	2.6	2700	2.6	1500	80
	72 EC4-AKM52L-■■■■-10-10B *	AKD-X01206	650	15.3	1110	15.3	1500	15.3	300	80
	73 EC4-AKM52L-■■■■-15-10B	AKD-X01206	860	15.3	1870	15.3	2700	15.3	300	80
	74 EC4-AKM52L-■■■■-20-10B	AKD-X01206	956	14.5	1970	13.0	2610	14.5	300	80
	75 EC4-AKM52L-■■■■-50-10B	AKD-X01206	2700	2.1	2700	2.1	2700	2.1	1500	80
EC5	76 EC5-AKM42G-■■■■-10-32B *	AKD-X00606	88	52.5	309	46.3	314	52.5	450	100
	77 EC5-AKM42G-■■■■-15-32B	AKD-X00606	121	52.5	463	30.8	471	52.5	450	100
	78 EC5-AKM42G-■■■■-20-32B	AKD-X00606	149	45.4	618	23.1	628	45.4	450	100
	79 EC5-AKM42G-■■■■-50-32B	AKD-X00606	438	6.6	1530	6.6	1530	6.6	1500	100
	80 EC5-AKM42G-■■■■-100-32B	AKD-X00606	880	3.4	3000	3.4	3000	3.4	1500	100
	81 EC5-AKM42G-■■■■-10-10B *	AKD-X00606	270	15.3	989	14.4	1005	15.3	450	100
	82 EC5-AKM42G-■■■■-15-10B	AKD-X00606	400	15.3	1480	9.6	1510	15.3	450	100
	83 EC5-AKM42G-■■■■-20-10B	AKD-X00606	476	14.2	1980	7.2	2010	14.2	600	100
	84 EC5-AKM42G-■■■■-50-10B	AKD-X00606	438	6.6	1530	6.6	1530	6.6	1000	100
	85 EC5-AKM42G-■■■■-100-10B	AKD-X00606	880	3.4	3000	3.4	3000	3.4	1500	100
	86 EC5-AKM52H-■■■■-10-32B *	AKD-X00606	200	46.4	353	42.9	522	46.4	450	100
	87 EC5-AKM52H-■■■■-15-32B	AKD-X00606	300	30.9	935	2.3	935	30.9	750	100
	88 EC5-AKM52H-■■■■-20-32B	AKD-X00606	400	23.2	683	21.0	1010	23.2	750	100
	89 EC5-AKM52H-■■■■-50-32B	AKD-X00606	1080	6.6	3000	5.9	3045	6.6	1500	100
	90 EC5-AKM52H-■■■■-100-32B	AKD-X00606	2070	3.4	3630	3.4	3630	3.4	1500	100
	91 EC5-AKM52H-■■■■-10-10B *	AKD-X00606	641	14.5	1130	13.1	1670	14.5	450	100
	92 EC5-AKM52H-■■■■-15-10B	AKD-X00606	961	9.7	2080	8.0	3000	9.7	750	100
	93 EC5-AKM52H-■■■■-20-10B	AKD-X00606	1281	7.3	2180	6.7	3000	7.3	750	100
	94 EC5-AKM52H-■■■■-50-10B	AKD-X00606	3400	2.1	5620	2.1	5620	2.1	1500	100
	95 EC5-AKM52H-■■■■-100-10B	AKD-X00606	5620	1.0	5620	1.0	5620	1.0	1500	100
	96 EC5-AKM52L-■■■■-15-32B	AKD-X01206	261	52.5	580	52.5	853	52.5	450	100
	97 EC5-AKM52L-■■■■-20-32B	AKD-X01206	299	46.4	616	41.0	911	46.4	450	100
	98 EC5-AKM52L-■■■■-15-10B	AKD-X01206	860	15.3	1890	15.3	2730	15.3	450	100
	99 EC5-AKM52L-■■■■-20-10B	AKD-X01206	956	14.5	1970	12.8	2610	14.5	450	100

Note 1: Refer to page 66 for matching cables.

Note 2: For complete AKD and EC Series model nomenclature, refer to pages 67 and 73 respectively.

Ratings are based on the AKM servomotor and the matching AKD servo drive. Specifications are based on 240 Vac, 3 phase voltage supply.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust) ** Based on critical speed of screw specification.

Rodless Actuators R-Series



The name rodless actuator comes from this technology's close relationship to electric cylinders, sharing many of the same components. Rather than having a rod, rodless actuators incorporate a carriage supported by linear bearings. Where electric cylinders are designed to extend in and out of the work area delivering force or thrust, rodless actuators are designed to be load carrying mechanisms (up to 300 lb) incorporating ballscrews, leadscrews, or belt drive transmissions with optional integrated gearheads.

Rodless actuators also share many of the fundamental design characteristics of precision positioning tables. Precision tables are designed to carry larger payloads and deliver superior repeatability and accuracy. Rodless actuators offer longer travels and higher speeds at a lower price. Screw driven rodless actuators are also thrust-producing devices that are best for axial force applications where the space is limited and a payload must also be supported or carried. As individual components, rodless actuators are not well suited for moment loading; however, they can be effectively combined into complete Cartesian systems for some multi-axis applications. For higher speed, lower thrust applications, rodless actuators can be repeatability-driven with a timing belt instead of a screw.

Kollmorgen has combined the broad product offering of the R-Series rodless actuators with the industry-leading AKM servomotors and AKD servo drives. The R-Series of rodless actuators offer a wide range of available thrusts in standard units with three basic frame sizes (R2A, R3, R4).

Rodless actuators offer longer travels (up to 108") and higher speeds (belt drives up to a maximum speed of 120 in/sec). Integrated geared options provide the ability to increase thrust capacity for lower speed applications leveraging the speed capacity of servo systems.

Multiple servomotor options are available for the product line, ranging from NEMA 23 size to NEMA 42 size servos. The combination with the AKM servomotor enables the use of various feedback devices including sine-encoder and the low-cost but high-performance Smart Feedback Device (SFD) when used with the AKD servo drive.

The AKM servomotor comes mounted on the rodless actuators as specified by the rodless actuator part number. This eliminates time to match the motor to the electric cylinder and eliminates potential mechanical incompatibility.

The operation of rodless actuators is similar to the electric cylinders described earlier. However, instead of an extending rod, a rodless unit features a moving carriage supported by linear bearings within an extruded aluminum chassis. This gives the rodless actuator the ability to guide and support a load, as well as position it.

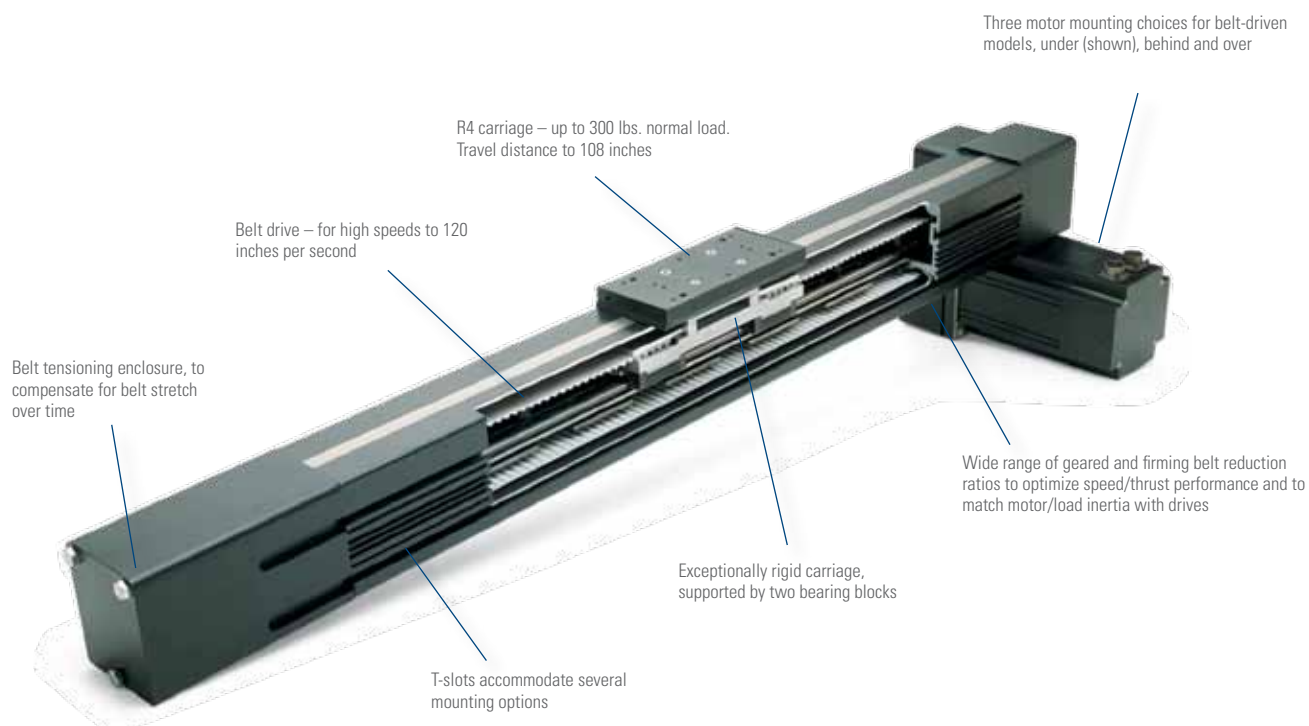
Kollmorgen rodless actuators are designed for outstanding overall performance, value, flexibility and reliability in industrial applications.

Rodless Actuators Are Preferred When:

- A low cost system is needed to both position and guide a load
- It is desired to eliminate external guides and ways
- The shortest overall work envelope (extended length equals retracted length) is required
- Multiple units will be combined into Cartesian systems
- There is a need for a compact cross-sectional linear positioning system

Typical Construction

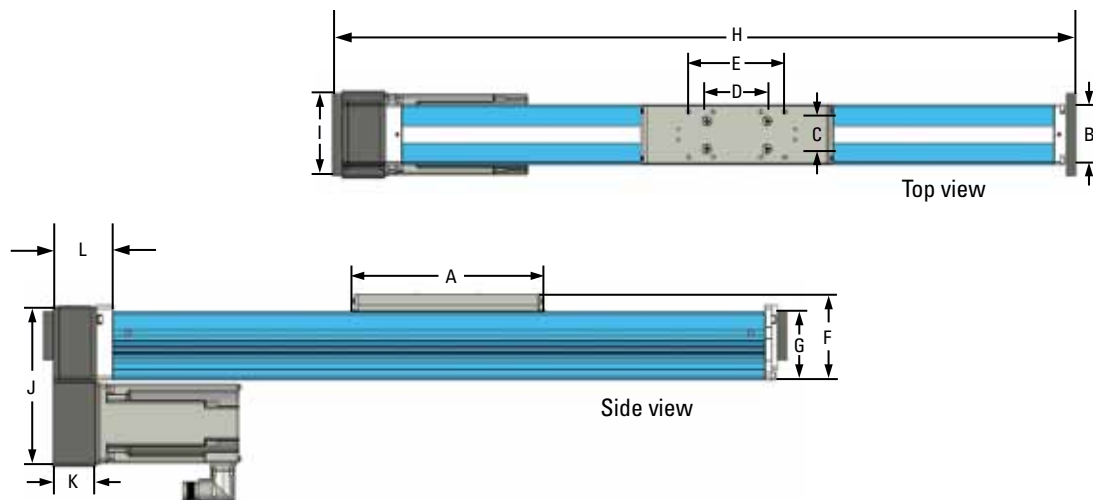
(R4 belt-driven cutaway shown)



Rodless Actuators R-Series

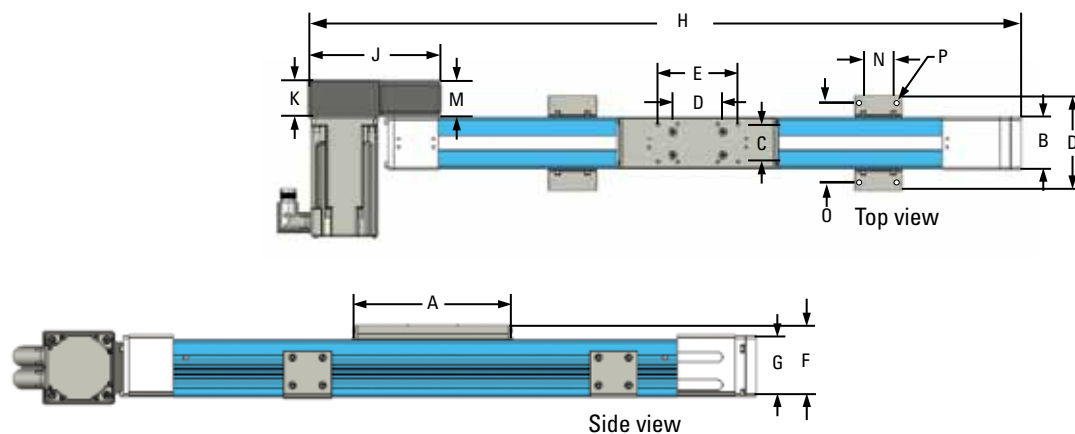
R3 Screw Drive

R3 screw drive with AKM42, parallel below motor orientation and flange mounting shown.



R3 Belt Drive

R3 belt drive with AKM42, behind left motor orientation and angle bracket feet shown.



Carriage Mounting Features

	Metric Version (mm)	English Version (inch)
RA2	8 x M5 x 0.8 x 8.0 deep	8 x 10-32 UNF x 0.31 deep
R3	8 x M5 x 0.8 x 9.6 deep	8 x 10-32 UNF x 0.38 deep
R4	4 x M6 x 1 x 12 deep	4 x 1/4-20 x 0.50 deep

Dimension Data

	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
RA2	210 (8.25)	50.8 (2.00)	31.8 (1.25)	50.8 (2.00)	101.6 (4.00)
R3	197 (7.76)	63.5 (2.50)	47.6 (1.88)	50.8 (2.00)	101.6 (4.00)
R4	197 (7.76)	92.2 (3.63)	63.5 (2.50)	NA	127.0 (5.00)

	F	G	H (Screw)	H (Belt)
	mm (in)	mm (in)	mm (in)	mm (in)
RA2	71.9 (2.83)	50.8 (2.00)	"S" + 345.3 (13.59)	"S" + 378.3 (14.89)
R3	88.8 (3.50)	71.5 (2.82)	"S" + 326.4 (12.85)	"S" + 522.0 (20.55)
R4	71.9 (2.83)	108.0 (4.25)	"S" + 411.8 (16.21)	"S" + 578.6 (22.78)

S = stroke

	I	J	K	L
	mm (in)	mm (in)	mm (in)	mm (in)
RA2	72.1 (2.84)	123.2 (4.85)	43.0 (1.69)	90.7 (3.57)
R3	91.4 (3.60)	168.9 (6.65)	45.5 (1.79)	88.1 (3.47)
R4	127.0 (5.00)	220.7 (8.69)	71.9 (2.83)	147.8 (5.82)

	M	N	O	P
	mm (in)	mm (in)	mm (in)	mm (in)
RA2	50.1 (1.97)	NA	88.8 (3.50)	8.7 (0.34) thru
R3	45.5 (1.79)	47.6 (1.88)	101.6 (4.00)	5.5 (0.22) thru
R4	71.9 (2.83)	63.5 (2.50)	127.0 (5.00)	7.0 (0.28) thru

Rodless Actuators R-Series

General Specifications

Series	R2A			R3			R4	
Std max stroke length (in)	72			108			108	
Cross section (in)	2 x 2			2.5 x 2.8			3.6 x 4.25	
Guide type	Roller Guides			Profile Rail			Profile Rail	
Drive type	Ball screw	Lead Screw	Belt	Ball screw	Lead Screw	Belt	Ball screw	Belt
Screw leads (in/rev)	0.5, 0.2	0.2, 0.125	n/a	0.5, 0.2	0.2, 0.125	n/a	1, 0.25	n/a
Nominal screw diameter (in)	0.625	0.625	n/a	0.625	0.625	n/a	1	n/a
Brushless servomotor	AKM23, NEMA 23			AKM23, NEMA 23, AKM42, NEMA 34			n/a	
Max thrust (lb)	100		72	300		200	700	300
Max velocity (in/sec)	30		80	30		120	40	120
Max carriage load								
Normal (lb)	50			100			300	
Roll moment (lb-in)	50			300			600	
Pitch moment (lb-in)	100			500			1000	
Repeatability (in)	+/-0.001		+/-0.010	+/-0.001		+/-0.010	+/-0.001	+/-0.010
Max duty cycle (speed, load dependent)	100%	60%	100%	100%	60%	100%	100%	100%
Limit sensors	Optional							
Std operating temperature range	-20 deg F to 140 deg F (-28 deg C to 60 deg C)							
Moisture/contamination	IP 44 rated: Splash-proof, protected against ingress of solid particles greater than 0.040 [1 mm] diameter.*							

240 Vac Performance Data

Sys #	Rodless Actuator-Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (in)
R2A	1 R2A-AKM23D-■■■■-10-2B*	AKD-X00306	70	30	100	30	100	30	18
	2 R2A-AKM23D-■■■■-15-2B	AKD-X00306	100	20	100	20	100	20	24
	3 R2A-AKM23D-■■■■-20-2B	AKD-X00306	100	15	100	15	100	15	30
	4 R2A-AKM23D-■■■■-10-5B	AKD-X00306	100	12	100	12	100	12	18
	5 R2A-AKM23D-■■■■-15-5B	AKD-X00306	100	8.0	100	8.0	100	8.0	24
	6 R2A-AKM23D-■■■■-20-5B	AKD-X00306	100	6.0	100	6.0	100	6.0	30
	7 R2A-AKM23D-■■■■-10-5A*	AKD-X00306	79	12	100	12	100	12	12
	8 R2A-AKM23D-■■■■-15-5A	AKD-X00306	100	8.0	100	8.0	100	8.0	18
	9 R2A-AKM23D-■■■■-20-5A	AKD-X00306	100	6.0	100	6.0	100	6.0	24
	10 R2A-AKM23D-■■■■-10-T*	AKD-X00306	7.0	80	40	80	40	80	72
	11 R2A-AKM23D-■■■■-15-T	AKD-X00306	13	80	64	80	64	80	72
	12 R2A-AKM23D-■■■■-20-T	AKD-X00306	19	80	78	80	87	80	72
R3	13 R3-AKM23D-■■■■-10-2B*	AKD-X00306	71	30	269	25	275	30	18
	14 R3-AKM23D-■■■■-15-2B	AKD-X00306	110	20	300	20	300	20	24
	15 R3-AKM23D-■■■■-20-2B	AKD-X00306	148	15	300	15	300	15	30
	16 R3-AKM23D-■■■■-50-2B	AKD-X00306	300	6.0	300	6.0	300	6.0	48
	17 R3-AKM23D-■■■■-10-5B*	AKD-X00306	186	12	300	12	300	12.0	18
	18 R3-AKM23D-■■■■-15-5B	AKD-X00306	283	8.0	300	8.0	300	8.0	24
	19 R3-AKM23D-■■■■-20-5B	AKD-X00306	300	6.0	300	6.0	300	6.0	30
	20 R3-AKM23D-■■■■-50-5B	AKD-X00306	300	2.4	300	2.4	300	2.4	48
	21 R3-AKM23D-■■■■-10-5A*	AKD-X00306	80	12	250	12	300	12	12
	22 R3-AKM23D-■■■■-15-5A	AKD-X00306	122	8.0	300	8.0	300	8.0	18
	23 R3-AKM23D-■■■■-20-5A	AKD-X00306	165	6.0	300	6.0	300	6.0	24
	24 R3-AKM23D-■■■■-50-5A	AKD-X00306	300	2.4	300	2.4	300	2.4	42
	25 R3-AKM23D-■■■■-10-8A*	AKD-X00306	131	7.5	300	7.5	300	7.5	18
	26 R3-AKM23D-■■■■-15-8A	AKD-X00306	199	5.0	300	5.0	300	5.0	30
	27 R3-AKM23D-■■■■-20-8A*	AKD-X00306	267	3.8	300	3.8	300	3.7	30
	28 R3-AKM23D-■■■■-50-8A	AKD-X00306	300	1.5	300	1.5	300	1.5	48
	29 R3-AKM23D-■■■■-10-T*	AKD-X00306	1.2	110	18	110	18	110	108

Note 1: Refer to page 66 for matching cables. Note 2: For complete AKD and R-Series model nomenclature, refer to pages 67 and 75 respectively.

* Inline type with 1-to-1 gear ratio (-10L) provide 10% additional thrust (not to exceed the max thrust).

240 Vac Performance Data

Sys #	Rodless Actuators-Servomotor	AKD Servo Drive	Cont. Thrust @ Speed (lb @ in/sec)		Peak Thrust @ Speed (lb @ in/sec)		Max Thrust (lb)	Max System Speed (in/sec)	Max Stroke for Max Speed (in)
R3	30 R3-AKM23D-■■■■-15-T	AKD-X00306	4.4	110	29	110	29	110	108
	31 R3-AKM23D-■■■■-20-T	AKD-X00306	8.0	110	40	110	41	110	108
	32 R3-AKM23D-■■■■-50-T	AKD-X00306	20	72	90	72	92	72	108
	33 R3-AKM23D-■■■■-70-T	AKD-X00306	30	51	128	51	131	51	108
	34 R3-AKM42G-■■■■-10-2B	AKD-X00606	200	30	300	30	300	30	18
	35 R3-AKM42G-■■■■-15-2B	AKD-X00606	300	20	300	20	300	20	24
	36 R3-AKM42G-■■■■-20-2B	AKD-X00606	300	15	300	15	300	15	30
	37 R3-AKM42G-■■■■-50-2B	AKD-X00606	300	6.0	300	6.0	300	6.0	48
	38 R3-AKM42G-■■■■-10-5B	AKD-X00606	300	12	300	12	300	12	18
	39 R3-AKM42G-■■■■-15-5B	AKD-X00606	300	8.0	300	8.0	300	8.0	24
	40 R3-AKM42G-■■■■-20-5B	AKD-X00606	300	6.0	300	6.0	300	6.0	30
	41 R3-AKM42G-■■■■-50-5B	AKD-X00606	300	2.4	300	2.4	300	2.4	48
	42 R3-AKM42G-■■■■-10-5A	AKD-X00606	221	12	300	12	300	12	12
	43 R3-AKM42G-■■■■-15-5A	AKD-X00606	300	8.0	300	8.0	300	8.0	18
	44 R3-AKM42G-■■■■-20-5A	AKD-X00606	300	6.0	300	6.0	300	6.0	24
	45 R3-AKM42G-■■■■-50-5A	AKD-X00606	300	2.4	300	2.4	300	2.4	42
	46 R3-AKM42G-■■■■-10-8A	AKD-X00606	300	7.5	300	7.5	300	7.5	18
	47 R3-AKM42G-■■■■-15-8A	AKD-X00606	300	5.0	300	5.0	300	5.0	24
	48 R3-AKM42G-■■■■-20-8A	AKD-X00606	300	3.8	300	3.8	300	3.8	30
	49 R3-AKM42G-■■■■-50-8A	AKD-X00606	300	1.5	300	1.5	300	1.5	60
	50 R3-AKM42G-■■■■-10-T	AKD-X00606	15	110	59	110	60	110	108
	51 R3-AKM42G-■■■■-15-T	AKD-X00606	25	110	92	110	93	110	108
	52 R3-AKM42G-■■■■-20-T	AKD-X00606	32	110	124	110	126	110	108
	53 R3-AKM42G-■■■■-50-T	AKD-X00606	66	72	200	72	200	72	108
	54 R3-AKM42G-■■■■-70-T	AKD-X00606	94	51	200	51	200	51	108
R4	55 R4-AKM42G-■■■■-10-1B	AKD-X00606	103	40	384	37	390	40	36
	56 R4-AKM42G-■■■■-15-1B	AKD-X00606	160	27	578	25	588	27	48
	57 R4-AKM42G-■■■■-20-1B	AKD-X00606	210	20	700	20	700	20	60
	58 R4-AKM42G-■■■■-50-1B	AKD-X00606	460	7.8	700	7.8	700	7.8	96
	59 R4-AKM42G-■■■■-100-1B	AKD-X00606	700	4.0	700	4.0	700	4.0	108
	60 R4-AKM42G-■■■■-10-4B	AKD-X00606	440	10.0	700	10.0	700	10	36
	61 R4-AKM42G-■■■■-15-4B	AKD-X00606	630	6.7	700	6.7	700	6.7	48
	62 R4-AKM42G-■■■■-20-4B	AKD-X00606	700	6.7	700	6.7	700	6.7	48
	63 R4-AKM42G-■■■■-50-4B	AKD-X00606	700	6.7	700	6.7	700	6.7	48
	64 R4-AKM42G-■■■■-10-T	AKD-X00606	11	110	47	110	47	110	108
	65 R4-AKM42G-■■■■-15-T	AKD-X00606	18	110	73	110	74	110	108
	66 R4-AKM42G-■■■■-20-T	AKD-X00606	25	110	98	110	100	110	108
	67 R4-AKM42G-■■■■-30-T	AKD-X00606	38	100	150	92	153	100	108
	68 R4-AKM42G-■■■■-50-T	AKD-X00606	56	59	215	54	219	59	108
	69 R4-AKM42G-■■■■-100-T	AKD-X00606	118	30	300	30	300	30	108
	70 R4-AKM52H-■■■■-10-1B	AKD-X00606	246	37	700	37	700	37	36
	71 R4-AKM52H-■■■■-15-1B	AKD-X00606	372	25	700	25	700	25	48
	72 R4-AKM52H-■■■■-20-1B	AKD-X00606	498	18	700	18	700	18	60
	73 R4-AKM52H-■■■■-50-1B	AKD-X00606	700	7.8	700	7.8	700	7.8	96
	74 R4-AKM52H-■■■■-10-4B	AKD-X00606	700	9.2	700	9.2	700	9.2	36
	75 R4-AKM52H-■■■■-15-4B	AKD-X00606	700	6.7	700	6.7	700	6.7	48
	76 R4-AKM52H-■■■■-20-4B	AKD-X00606	700	4.9	700	4.9	700	4.9	60
	77 R4-AKM52H-■■■■-50-4B	AKD-X00606	700	1.9	700	1.9	700	1.9	96
	78 R4-AKM52H-■■■■-10-T	AKD-X00606	30	110	97	110	99	110	108
	79 R4-AKM52H-■■■■-15-T	AKD-X00606	51	110	149	110	152	110	108
	80 R4-AKM52H-■■■■-20-T	AKD-X00606	65	110	201	90	204	110	108
	81 R4-AKM52H-■■■■-30-T	AKD-X00606	95	92	300	60	300	95	108
	82 R4-AKM52H-■■■■-50-T	AKD-X00606	137	54	300	44	300	54	108
	83 R4-AKM52H-■■■■-100-T	AKD-X00606	275	27	300	27	300	27	108

Note 1: Refer to page 66 for matching cables. Note 2: For complete AKD and R-Series model nomenclature, refer to pages 67 and 75 respectively.

Micron™ TRUE Planetary™ Gearhead

Helical gears are known for their quiet and smooth operation along with their ability to transmit higher loads than spur gears. Both of these features of helical gearing result from the improved contact ratio (effective teeth in mesh) over spur gears.

A high torque, whisper quiet helical gearhead has been designed by combining the positive attributes of gear crowning and helical gearing with the planetary construction to create the smoothest operating gearhead on the market.

- Broadest product range of gearheads in the industry
- Innovative gear technology offers size and performance advantages
- RediMount™ system provides error-free and reliable installations

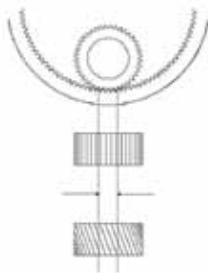
Helical Crowned TRUE Planetary™ Gearing

Features

- High torque capacity
- Low backlash
- Smooth operation
- Greater load sharing
- Whisper quiet

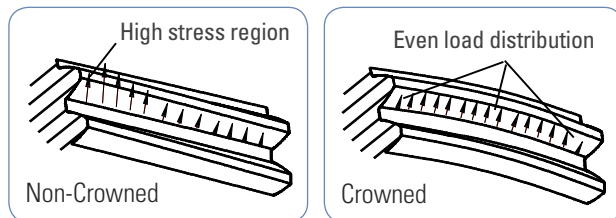
Spur vs. Helical Gearing

Typical contact ratio is 1.5 for spur gearing. Contact ratio for equivalent helical gear is 3.3 – more than double the contact ratio.



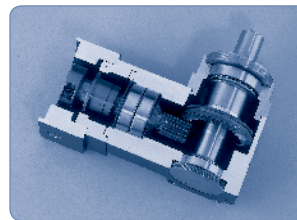
Crowned vs. Non-Crowned

Crowning optimizes the gear mesh alignment within a gear train to increase the torque capacity and reduce noise. It also enhances load distribution on the tooth flank to reduce high stress regions.

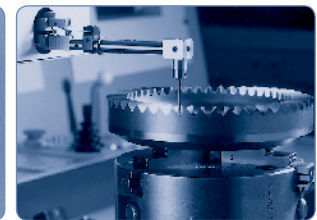


PowerTRUE™ Right Angle Gearheads

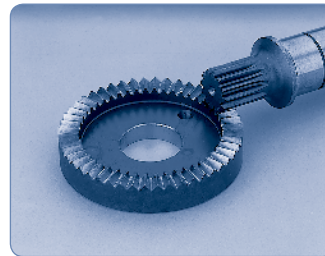
- Lower backlash from single axis mesh adjustment
- A compact design using face gear technology
- Whisper quiet operation due to high contact ratio
- Mesh ratios from 1:1 to 5:1
- Extremely efficient (98%)



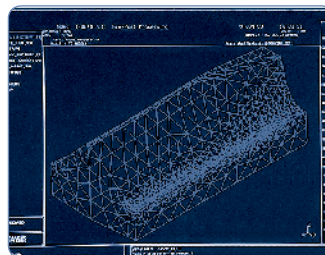
PowerTRUE™ gear technology



Computerized mapping of gear tooth profile




All Micron™ right angle gearheads use the PowerTRUE technology which increases the mesh ratio to 5:1 compared to a maximum of 3:1 typical in bevel gears.




Multiple teeth in the face gear simultaneously mesh with a standard involute pinion. The continuous tooth engagement yields a high contact ratio between the gear and the pinion, increasing torque and efficiency.

NEMA TRUE™		True planetary gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.						
Inline	Frame Size		Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
	English	Metric	1 Stage	2 Stage				
Size 17	NEMA 17	42 mm	170	170	1 Stage	3, 4, 5, 7, 10	93%	13 (8)*
Size 23 / 60	NEMA 23	60 mm	250	275				
Size 34 / 90	NEMA 34	90 mm	700	850	2 Stage	15, 20, 25, 30, 40, 50, 70, 100	88%	15 (9)*
Size 42 / 115	NEMA 42	115 mm	1000	1600				




NEMA TRUE™		True planetary gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.								
	Right Angle	Frame Size		Max T Peak (lb-in)			All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
		English	Metric	1 Stage	2 Stage	3 Stage				
	Size 23 / 60	NEMA 23	60 mm	360	366	366	1 Stage	1, 2, 3, 4, 5P	98%	13
	Size 34 / 90	NEMA 34	90 mm	1110	1110	1110	2 Stage	5T, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	15
	Size 42 / 115	NEMA 42	115 mm	2250	2250	2250	3 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	15



XTRUE™		The XTRUE Series is a new precision gearhead employing RediMount™ system that compliments our TRUE planetary gearhead line – already the largest selection of planetary gearheads in the world.						
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	XT040	40 mm	162	299	1 Stage	3, 4, 5, 7, 10	93%	13
	XT060	60 mm	483	483				
	XT080	80 mm	1460	1550				
	XT120	120 mm	2640	2640	2 Stage	15, 20, 25, 30, 40, 50, 70, 100	88%	15
XT160	160 mm	7750	7750					



EverTRUE™		EverTRUE, employing RediMount™ system, is specifically designed for 24/7 continuous running applications providing 3 times (30,000 hours) service life.						
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	ET010	101 mm	4090	4790	1 Stage	4, 5, 7, 10	95%	4
	ET014	141 mm	9430	11,250				
	ET018	182 mm	21,600	26,280	2 Stage	16, 20, 25, 28, 35, 40, 50, 70, 100	90%	5



* High Precision, low backlash versions available, low backlash value in parenthesis (Not available in size 17).

Note 1: Torque capacity is maximum of frame size stage design, not all ratios have the same rated torque capacity.

Note 2: Torque capacity is the maximum allowable momentary torque for emergency stopping or heavy shock loading.


Note 3: Ratio 5P is designed using the compact PowerTrue face gearing technology.


Note 4: Ratio 5T is designed using a True planetary gear stage for increased torque capacity.


Note 5: For complete gearhead model nomenclature, refer to page 76.




Micron™ TRUE Planetary™ Gearhead

DuraTRUE™	True planetary gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.							
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	DT60	60 mm	460	460	1 Stage	3, 4, 5, 7, 10	93%	9
	DT90	90 mm	1480	1480				
	DT115	115 mm	2510	2510	2 Stage	15, 20, 25, 30, 40, 50, 70, 100	88%	8
	DT142	142 mm	7380	7380				

DuraTRUE™	True planetary right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system.							
	Right Angle	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	DT60	60 mm	460	460	1 Stage	5, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	9
	DT90	90 mm	1480	1480				
	DT115	115 mm	2510	2510	2 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	8
	DT142	142 mm	7380	7380				


	Slimline right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Face gear technology for compact right angle construction. Dual shaft output version also available.								
	Right Angle	Frame Size Metric	Max T Peak (lb-in)			All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage	3 Stage				
	DT60S	60 mm	460	400	400	1 Stage	1, 2, 3, 4, 5P	98%	8
	DT90S	90 mm	1240	1240	1240	2 Stage	5T, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	9
DT115S	115 mm	2260	2500	2500	3 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	9	
DT142S	142 mm	5500	6920	7450					

	Hollow shaft right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Large diameter/ bolt circle for direct mechanical interface. Face gear technology for compact right angle construction.								
	Right Angle	Frame Size Metric	Max T Peak (lb-in)			All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage	3 Stage				
	DT90H	90 mm	1240	1240	1240	1 Stage	1, 2, 3, 4, 5P	98%	8
	DT115H	115 mm	2500	2500	2500	2 Stage	5T, 6, 9, 10, 12, 15, 20, 25, 30, 40, 50	93%	9
DT142H	142 mm	7660	7660	7660	3 Stage	60, 75, 90, 100, 120, 125, 150, 200, 250, 300, 400, 500	88%	9	


Note 1: Torque Capacity is maximum of frame size stage design, not all ratios have the same rated torque capacity.
 Note 2: Torque Capacity is the maximum allowable momentary torque for emergency stopping or heavy shock loading.
 Note 3: Ratio 5P is designed using the compact PowerTrue face gearing technology.
 Note 4: Ratio 5T is designed using a True planetary gear stage for increased torque capacity.
 Note 5: For complete gearhead model nomenclature, refer to page 76.




ValueTRUE™	Helical True planetary gearhead, flange mount design with stainless steel housing employing RediMount™ system.							
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	VT006	61 mm	800	910	1 Stage	4, 5, 7, 10	95%	4
	VT075	75 mm	1420	1630				
	VT090	90 mm	1420	1630				
	VT010	101 mm	4090	4790				
	VT115	115 mm	4090	4790	2 Stage	16, 20, 25, 28, 35, 40, 50, 70, 100	93%	5
	VT014	141 mm	9430	11,250				
	VT018	182 mm	21,600	26,280				
VT022	220 mm	36,980	44,000					

ValueTRUE™	Helical True planetary gearhead, flange mount design with stainless steel housing employing RediMount™ system.						
	Right Angle	Frame Size Metric	Max T Peak (lb-in)	All Sizes*	Gear Ratios Available	Efficiency	Backlash (arc-min)
			2 Stage				
	VTR006	61 mm	870	2 Stage	4, 5, 8, 10, 12, 14, 15, 16, 20, 25, 28, 30, 35, 40, 50	93%	5
	VTR075	75 mm	1570				
	VTR090	90 mm	1570				
	VTR010	101 mm	4580				
	VTR115	115 mm	4580				
	VTR014	141 mm	10,670				
VTR018	182 mm	24,780					

* 4 and 5:1 ratios not available with VTR006-VTR090.

UltraTRUE™		Helical True planetary inline gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Stainless steel housing, gear-path hobbled into stainless steel housing.						
	Inline	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	UT006	61 mm	890	1010	1 Stage	4, 5, 7, 10	95%	4
	UT075	75 mm	1580	1810				
	UT090	90 mm	1580	1810				
	UT010	101 mm	4540	5330				
	UT115	115 mm	4540	5330	2 Stage	16, 20, 25, 28, 35, 40, 50, 70, 100	90%	5
	UT014	141 mm	10,480	12,500				
	UT018	182 mm	24,101	29,200				
UT022	220 mm	41,090	48,890					

UltraTRUE™		Helical True planetary right angle gearhead, flange mount design with anodized aluminum housing employing RediMount™ system. Stainless steel housing, gear-path hobbled into stainless steel housing.						
	Right Angle	Frame Size Metric	Max T Peak (lb-in)		All Sizes	Gear Ratios Available	Efficiency	Backlash (arc-min)
			1 Stage	2 Stage				
	UTR006	61 mm	450	970	1 Stage	1, 2, 3, 4, 5	98%	4
	UTR075	75 mm	1410	1740				
	UTR090	90 mm	1410	1740				
	UTR010	101 mm	2850	5080	2 Stage	8, 10, 12, 14, 15, 16, 20, 25, 28, 30, 35, 40, 50	93%	5
	UTR115	115 mm	2850	5080				
	UTR014	141 mm	6270	11,860				
	UTR018	182 mm	16,910	27,530				

Note 1: Torque capacity is maximum of frame size stage design, not all ratios have the same rated torque capacity.

Note 2: Torque capacity is the maximum allowable momentary torque for emergency stopping or heavy shock loading.

Note 3: Ratio 5P is designed using the compact PowerTrue face gearing technology.

Note 4: Ratio 5T is designed using a True planetary gear stage for increased torque capacity.

Note 5: For complete gearhead model nomenclature, refer to page 76.



Stepper Products

Our stepper motors, drives and controllers, which accommodate a wide range of power requirements, provide a high-performance, yet very cost-effective solution when you need precise motion control. In addition, our stepper motors are the highest torque-density motors in the industry, simple to control and don't require complicated, expensive feedback devices. They're available in a wide range of lengths, windings and shafts.

We also offer hybrid stepper motors that deliver more power in a smaller package. These rugged NEMA 34 and 42 (90 and 110 mm) frame motors provide among the highest torques per frame size in the industry.

Due to their ease of use, simplified control needs and freedom from expensive feedback requirements, our step motors are excellent alternatives to pneumatic, hydraulic and servomotor systems.

P7000 Stepper Drive-Controller

P7000 stepper drives offer a unique level of system functionality, smoothness, high-speed performance and innovation unmatched in the industry.

The compact P7000 is designed to power Kollmorgen step motors ranging from NEMA size 17 up to NEMA size 34. Two power configurations are available for operation directly from AC power, or from a DC power supply.

There are two levels of control offered. The basic drive accepts step and direction inputs. P7000 drives are also available with an integrated position controller (-PN option). The drives are configured by either on-board dip switches, or with the P7000 tools software.



Advanced P7000 Features Make it the Best Choice to Meet Your Application Requirements

Multistep™

Also known as auto-smoothing. The P7000 drive accepts full step pulse commands from the indexer and inserts fine micro-steps to smooth coarse low speed motion. This allows you to significantly upgrade machine performance without having to redesign machine control architecture.

Auto-Tuning

Advanced current auto-tuning techniques provide outstanding low-speed smoothness. The P7000 senses the motor's characteristics and automatically fine tunes itself to meet your high-performance needs. This reduces installation and set-up time.

Mid-Band Anti-Resonance Control

Reduces negative effects of mechanical resonance, allowing you to get more out of a smaller motor and virtually eliminating nuisance stalls and machine downtime.

Idle Current Reduction

If you do not require the motor's full torque to hold a load at rest, you can select the right amount of current (torque) to reduce motor heating and power consumption. This increases the life of the system.

Dynamic Smoothing

Quasi-S-curve algorithm reduces jerk, especially upon acceleration. Increases mechanical life of the machine and reduces energy consumption.

Intelligent Indexing Option (-PN)

Wizard-like P7000 helps you to develop and link motion tasks such as homing and conditional and unconditional indexing. You can be up-and-running quickly.

Modbus RTU Compatible

The intelligent indexing option (-PN) supports Modbus RTU to control motion with an external interface device. External interfaces make controlling motion simple for machine operators.

P7000 Tools

The position node option allows you to configure up to 63 absolute or relative moves. You can specify the moves' distance, acceleration, velocity, and deceleration rates, or simply specify the distance and total time for the move — P7000 will perform the calculations automatically.

Specifications	Units	P70530	P70360
Input voltage range	Volts	20 - 75 Vdc	120 or 240 Vac
Continuous current	Amps rms	5	2.5
Microstep peak current	Amps peak	7.1	3.5

Note: For complete P7000 Series model nomenclature, refer to page 77.



Hybrid Step Motor

Our step motors have higher performance and support larger shaft loads than any other step motors. Custom motors are available to meet specific application needs including: modified shafts, connectors, lead-screws, and shaft-mounted components.

CT Series

CT Series motors include the most popular sizes, options and value suitable for most commercial and industrial applications. Enhanced motors provide the maximum performance available. This patented technology boosts torque an additional 25% to 40% across the entire speed range, and allows machines to be designed that are smaller and move faster.

CT Series Benefits

- Smaller drives result in a lower system cost
- More torque allows for smaller, faster machines
- Higher efficiency enables lower operating costs

Size 17 CT Series

2 Phase, 1.8° Step Motors. Frame size: 1.7 inch, 43 mm
(CTP High Torque Performance Series)



Series	Construction		Holding Torque (Motor Mounted)		Length		• Inch or metric mounting • Rear shaft option
	Style	Stacks	Bipolar		in	mm	
			oz-in	Nm			
CTP10	Un-Enhanced	Short	43	0.30	1.37	34.7	
CTP11		1	62	0.44	1.61	40.9	
CTP12		2	80	0.56	1.92	48.8	

Size 23 CT Series

2 Phase, 1.8° Step Motors. Frame size: 2.2 inch, 57 mm
(CTM Enhanced-Max Torque and Efficiency, CTP High Torque Performance Series)



Series	Construction		Holding Torque (Motor Mounted)		Length		<ul style="list-style-type: none">• Captured heavy duty bearings• High voltage insulation system• Rear shaft option
	Style	Stacks	Bipolar		in	mm	
			oz-in	Nm			
CTM21	Enhanced	1	260	1.84	2.13	54.1	
CTM22		2	470	3.32	3.32	84.3	
CTP20	Un-Enhanced	Short	100	0.71	1.62	41.2	
CTP21		1	200	1.41	2.13	54.1	
CTP22		2	360	2.54	3.32	84.3	

Size 34 CT Series

2 Phase, 1.8° Step Motors. Frame size: 3.4 inch, 87 mm
(CTM Enhanced-Max Torque & Efficiency, CTP High Torque Performance Series)



Series	Construction		Holding Torque (Motor Mounted)		Length		<ul style="list-style-type: none">• Captured heavy duty bearings• High voltage insulation system• Standard keyway front shaft• Rear shaft option
	Style	Stacks	Bipolar		in	mm	
			oz-in	Nm			
CTM31	Enhanced	1	690	4.9	2.54	64.5	
CTM32		2	1350	9.5	3.80	96.5	
CTM33		3	1930	13.6	5.06	129	
CTP31	Un-Enhanced	1	565	4.0	2.54	64.5	
CTP32		2	1100	7.8	3.80	96.5	
CTP33		3	1580	11.2	5.06	129	

Note: For complete CT Series model nomenclature, refer to page 78.




N/K Series


The N/K Series are larger step motors with the power, rugged construction, and options that make these motors ideal for heavy industrial applications. Options include: IP56, terminal boxes and MS connectors. Enhanced versions provide the maximum performance torque available. This patented technology boosts torque an additional 25% to 40%. Custom motors are available to meet specific application needs including: modified shafts, connectors, lead-screws, and components mounted to the shaft.

N/K Series Benefits

- More torque to drive heavy loads
- Smaller drives result in a lower system cost
- Higher efficiency enables lower operating costs



Size 34 N/K		2 Phase, 1.8° Step Motors. Frame size: 3.4 inch, 87 mm					
Series	Construction		Holding Torque (Motor Mounted)		Length		<ul style="list-style-type: none"> • Captured heavy duty bearings • High voltage insulation system • Options: Terminal box MS connectors Rear shaft Encoder Front shaft seal
	Style	Stacks	Bipolar		in	mm	
			oz-in	Nm			
K31	Enhanced	1	830	5.9	3.7	94	
K32		2	1530	10.8	5.22	133	
K33		3	2200	15.6	6.74	171	
K34		4	2770	19.6	8.25	210	
N31	Un-Enhanced	1	650	4.6	3.7	94	
N32		2	1220	8.6	5.22	133	
N33		3	1760	12.4	6.74	171	
N34		4	2170	15.3	8.25	210	



Size 42 N/K		2 Phase, 1.8° Step Motors. Frame size: 3.4 inch, 87 mm					
Series	Construction		Holding Torque (Motor Mounted)		Length		<ul style="list-style-type: none"> • Captured heavy duty bearings • High voltage insulation system • Options: Terminal box MS connectors Rear shaft Encoder Front shaft seal
	Style	Stacks	Bipolar		in	mm	
			oz-in	Nm			
K41	Enhanced	1	2090	14.8	3.89	99	
K42		2	4000	28.2	5.91	150	
K43		3	5650	39.9	7.92	201	
N41	Un-Enhanced	1	1630	11.5	3.89	99	
N42		2	3140	22.2	5.91	150	
N43		3	4340	30.6	7.92	201	

Note: For complete Size 34 and 42 N/K model nomenclature, refer to pages 79 and 80 respectively.



Optimized Solutions

With Kollmorgen, there's always a way. Because we have decades of experience in developing optimized solutions for motion applications, you can be confident that we can provide the answer to your motion challenges. We have a huge breadth of standard products that can be modified in varying degrees, or we can develop custom motor and electronic products for true optimization.

Working with our proven portfolio of products, we can deliver solutions quickly, often with recognized cost efficiencies and reduced lead times. That means rapid prototyping, a shorter design cycle and getting to market faster. We do it all, because motion matters.

Optimized Solutions

Whether it's modifying a product from our standard catalog or a white sheet design for a custom solution, you can rely on decades of Kollmorgen expertise to solve your motion challenges and help your machine stand out from the crowd.

Modified Standard

Because our application expertise runs deep and our product portfolio is so broad, we can take any standard product and modify it a lot or a little to suit many needs – in a very rapid time frame. This approach ensures quality, performance and reliability by leveraging our proven track record.

Kollmorgen application engineers have a great deal of experience helping OEM engineers achieve their objectives. Typical modifications include shaft alterations, feedback type, mounting dimensions, connectors, and making components more rugged, vacuum-rated, radiation- and explosion-proof.

Custom Products

With motion as our core capability, we bring a significant history of innovation to today's engineering challenges. We leverage our design and engineering excellence and technical knowledge to deliver creative new solutions for virtually any need. Our vast experience also helps us deliver a custom product in a surprisingly short time. If you can conceive it, we can make it happen.

Structured Development Process

Working from our broad standard product portfolio, we create fully optimized solutions through the combination of off-the-shelf products, modified standard products and completely custom components. Our proven components and technology are the foundation for all of our solutions, expediting the design cycle and ensuring optimum performance for any application.

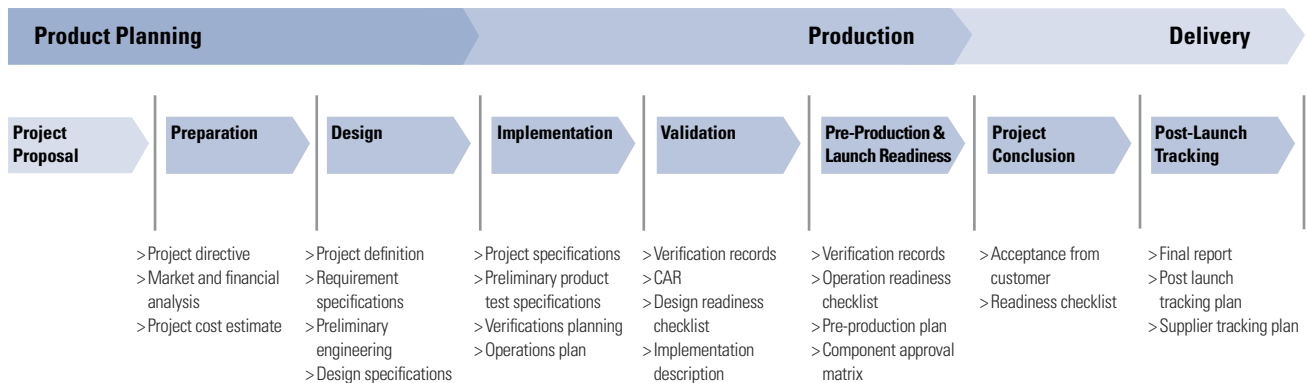
We follow a strict and efficient development process from initial concept to volume production. This ensures that products we develop meet customer needs, are cost effective to manufacture and move quickly from prototype to production. Customer involvement is key to our process, with ongoing collaboration throughout the initiative and multiple approval points to ensure a smooth, successful design cycle from beginning to end.

Why You Should Partner with Kollmorgen

- Experienced application engineers help define a customer's needs and identify the optimal Kollmorgen products and technologies
- Products optimized or developed by cross-functional teams to meet customer needs
- Rapid prototyping
- Smooth transition from prototype designs to sustainable and cost effective manufacturing
- Industry-proven quality, performance, and delivery
- Proven technology building blocks mitigate risks of customization

Optimized Solutions Process

Comprehensive design, manufacture and test capabilities ensure the end product meets the customer performance specifications and quality requirements. Our skilled engineering team works directly with each customer throughout the process, quickly taking the prototype to full production.



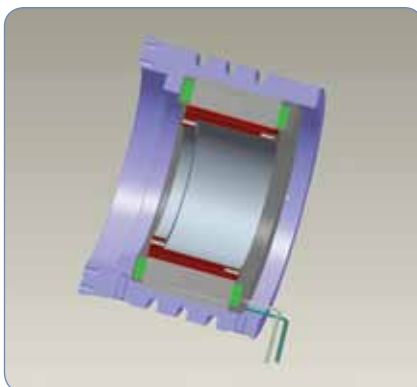
Proven Design Capabilities

Motor Solutions

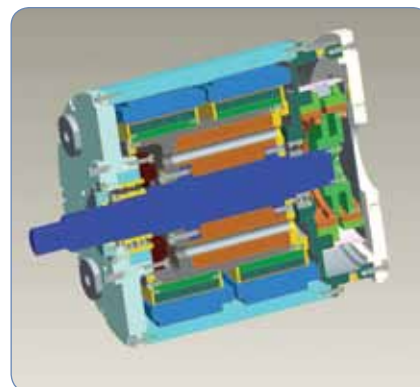
- Brushed, brushless and stepper motor building blocks used in frameless or housed configurations
- Designed for agency compliance (UL, CE)
- Voltage ratings from 48 Vdc – 600 Vdc, with capabilities in 800 Vdc and up
- Continuous torques from 0.5 Nm – 29,000 Nm
- Proven performance and reliability in a customizable package



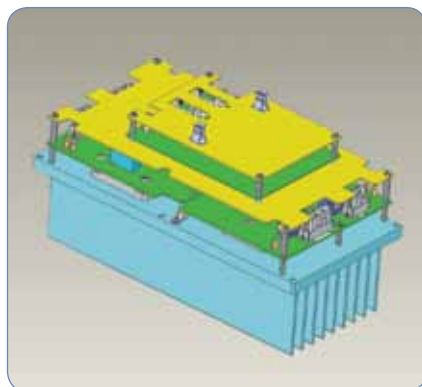
Medical diagnostics drive optimized for form-factor, I/O and EMC



Frameless direct drive rotary motor with water cooling features



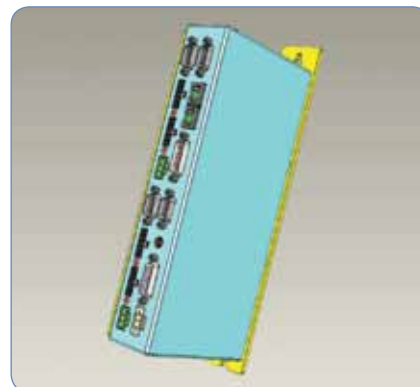
Custom submersible motor



2-axis drive for high-power robotics, optimized for form-factor and communications interface



200 kW electric starter/generator



4-axis stepper drive using SynqNet

Drive Solutions

- Board-level or packaged solutions supporting single to multi-axis configurations
- Brushed or brushless servo drives, stepper, AC induction control
- Integrated controller and communications options
- Designed for agency approvals (UL 508C, EN 50178, EN 61000-6-6, EN 61800-3, CISPR 14-1, and others available)
- Proprietary technology and software can be embedded into the drive

Motors and Electronics

Optimized for	Application
Reliability	Implantable heart pumps, military, remote equipment
Precision	Pick and place, satellite tracking, film processing
Package size	Medical imaging, ground based telescopes, aircraft instrumentation
Weight	Land vehicles, portable equipment, aircraft
Smooth operation	Medical respirators, high precision robotics, printing and textile machines
Harsh environments	Deep sea, outer space, high shock and vibration, extreme temperatures

Cables by Motor Type

Value Line Cables by Motor Type

Model	Power Cable	Power Cable with Brake Leads	SFD	EnDat2.2, 01 & BiSS
AKM to 6 Amps	VP-507BEAN-XX	VP-508CFAN-XX	VF-DA0474N-XX	VF-SB4474N-XX
AKM to 12 Amps	VP-508CEAN-XX	VP-508CFAN-XX	VF-DA0474N-XX	VF-SB4474N-XX
AKM to 20 Amps	VP-508DEAN-XX	VP-508DFAN-XX	VF-DA0474N-XX	VF-SB4474N-XX
CDDR to 6 Amps	VP-507BEAN-XX	n/a	n/a	VF-SB4474N-XX
CDDR to 12 Amps	VP-508CEAN-XX	n/a	n/a	VF-SB4474N-XX
CDDR to 20 Amps	VP-508DEAN-XX	n/a	n/a	VF-SB4474N-XX
DDR to 6 Amps	VP-507BEAN-XX	n/a	n/a	VF-SB4474N-XX
DDR to 12 Amps	VP-508CEAN-XX	n/a	n/a	VF-SB4474N-XX
DDR to 20 Amps	VP-508DEAN-XX	n/a	n/a	VF-SB4474N-XX

XX = length in meters (1, 3, 6, 9, 12) Example: VP-507BEAN-09 (9 meter cable).
Other feedback choices are available. Contact customer support for details.

Flex Line Cables by Motor Type

Model	Power Cable	Power Cable with Brake Leads	SFD	EnDat2.2, 01 & BiSS
AKM to 12 Amps	CP-507CCAN-XX-X	CP-507CDAN-XX-X	CF-DA0374N-XX-X	CF-SB7374N-XX-X
AKM to 20 Amps	CP-508DCAN-XX-X	CP-508DDAN-XX-X	CF-DA0374N-XX-X	CF-SB7374N-XX-X
AKM to 24 Amps	CP-508EDBN-XX-X	CP-508EDBN-XX-X	CF-DA0374N-XX-X	CF-SB7374N-XX-X
CDDR to 12 Amps	CP-507CCAN-XX-X	n/a	n/a	CF-SB7374N-XX-X
CDDR to 20 Amps	CP-508DCAN-XX-X	n/a	n/a	CF-SB7374N-XX-X
DDR to 12 Amps	CP-507CCAN-XX-X	n/a	n/a	CF-SB7374N-XX-X
DDR to 20 Amps	CP-508DCAN-XX-X	n/a	n/a	CF-SB7374N-XX-X

Note 1: XX-X = length in half-meters up to 50 meters (1, 3, 6, 9, 12 standard) Example: CP-507CCAN-03-5 (3.5 meter cable).

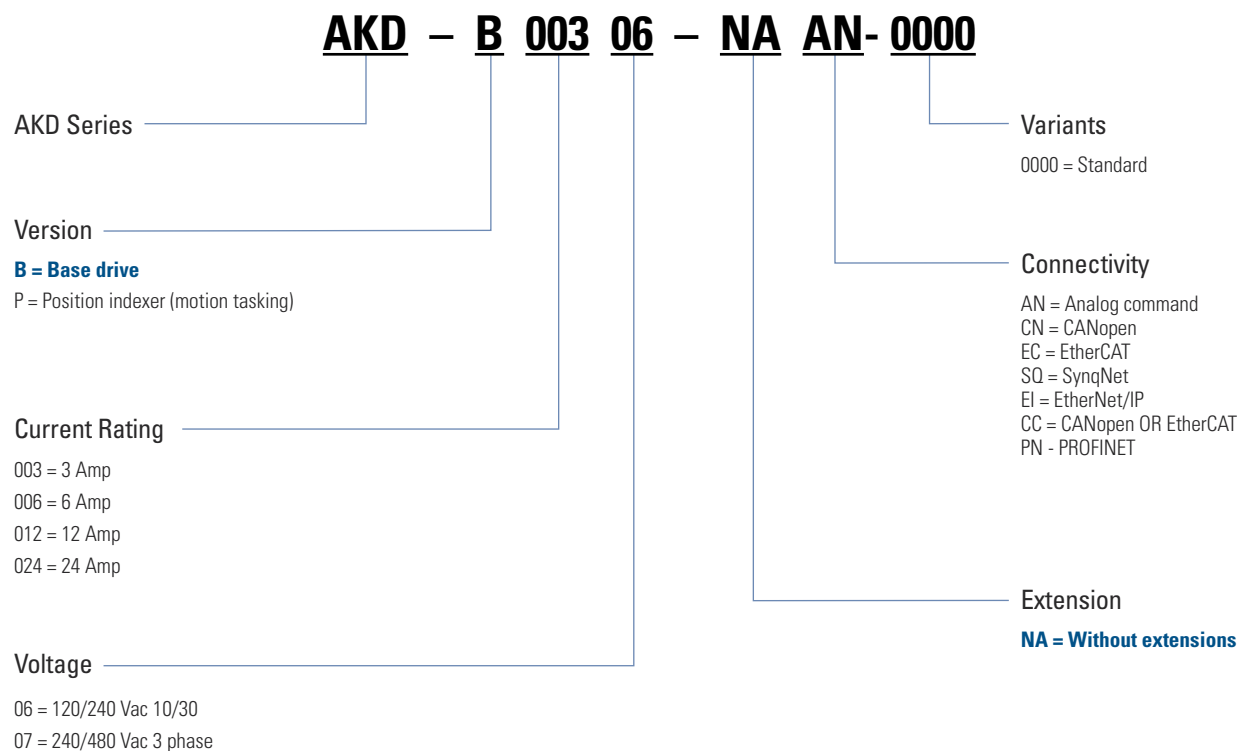
Note 2: Other feedback choices are available. Contact customer support for details.

Note 3: Other lengths are available. Contact customer support for details.

Note 4: Refer to page 19 for cable specifications.

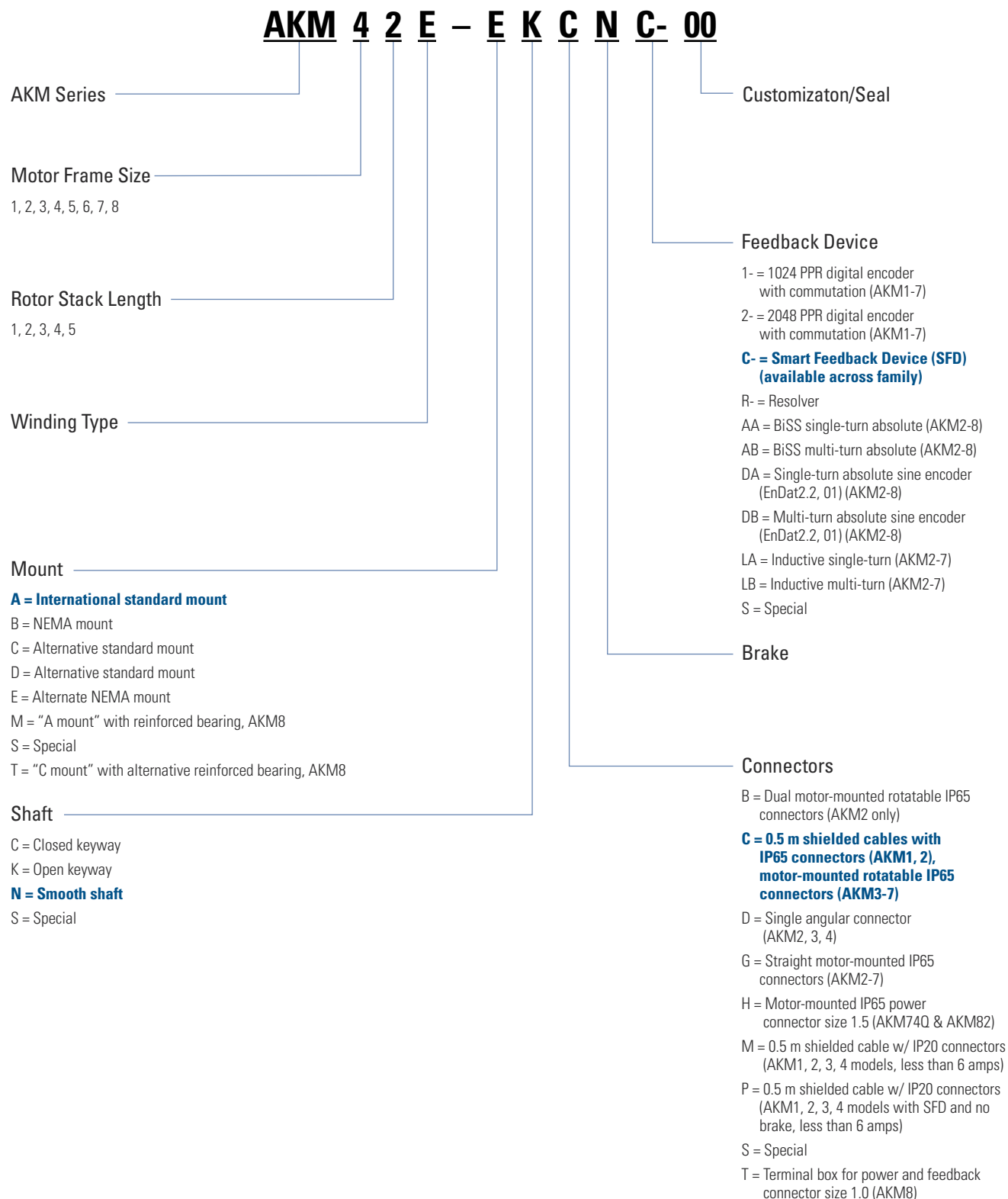
MODEL NOMENCLATURE

AKD Servo Drive

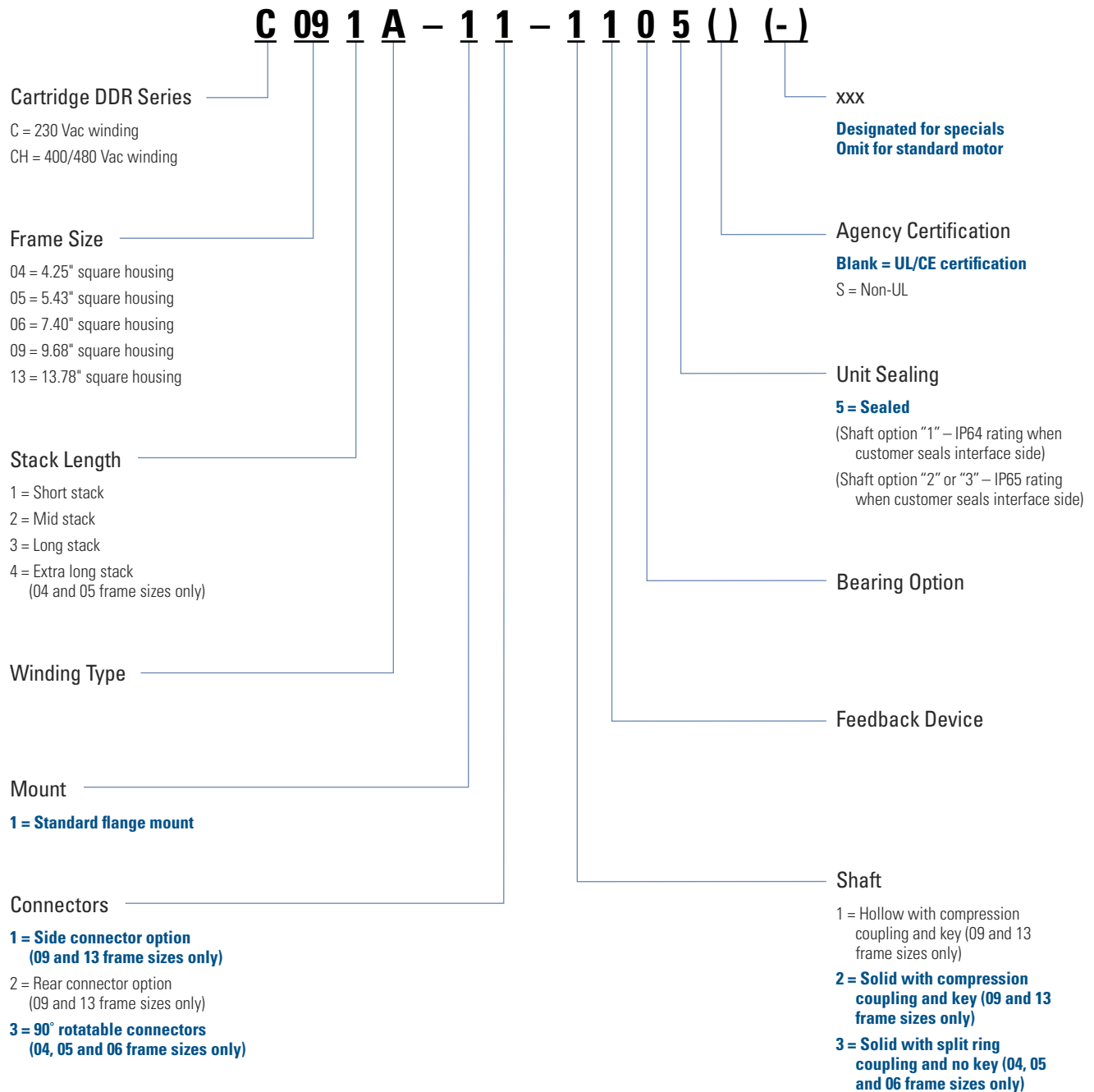


Note: Options shown in bold blue text are considered standard.

AKM Brushless Servomotor

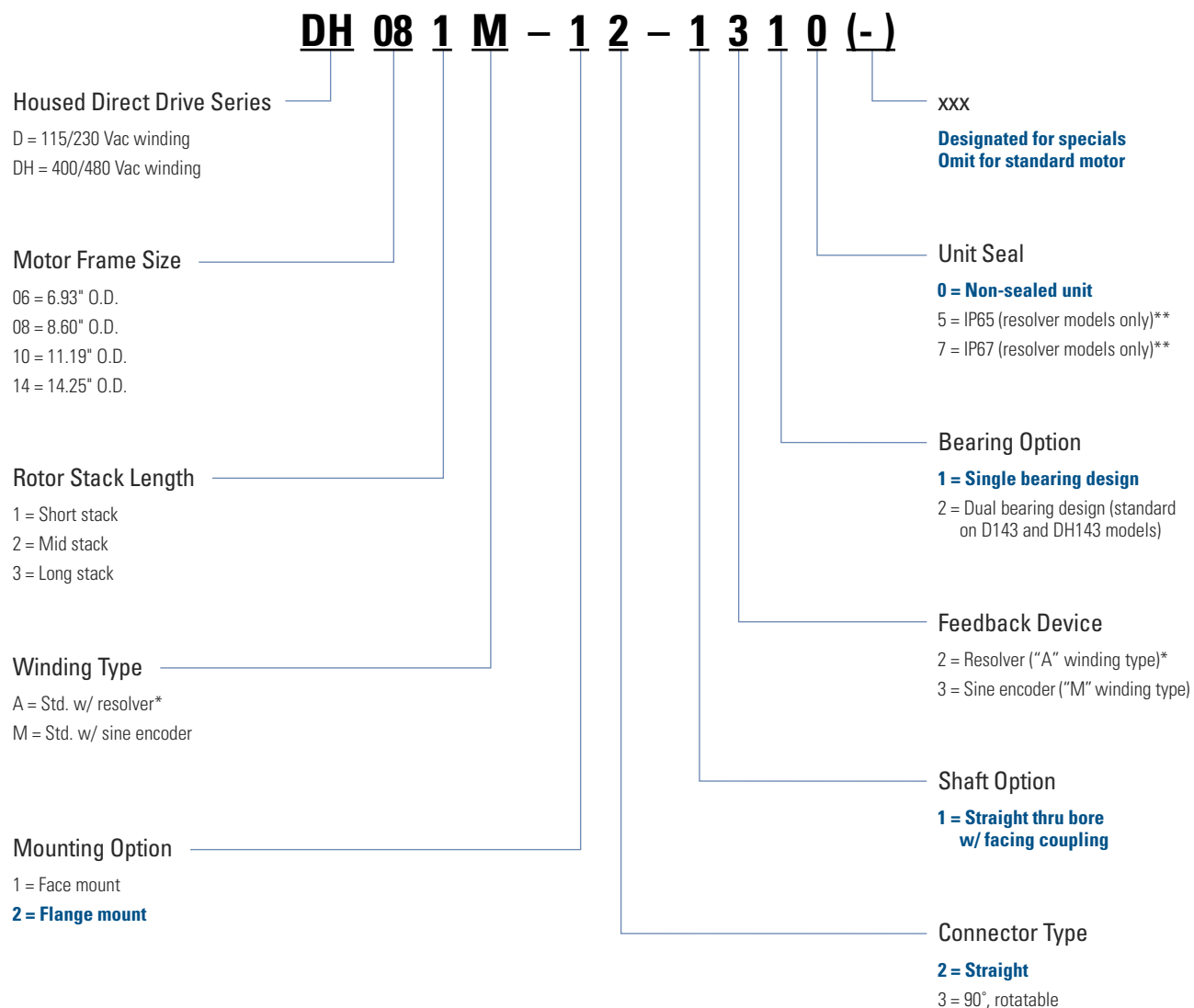


Cartridge Direct Drive Rotary (DDR) Motor



Note: Options shown in bold blue text are considered standard.

Housed Direct Drive Motors D(H) Series



* All models except D14x and DH14x.

** Sealed motors with encoder feedback have longer axial length.

Note: Options shown in bold blue text are considered standard.

DS Series Precision Table

DS Series	Stroke Length	Grade	Ballscrew Lead	Motor Type*	Motor Options	Motor Mounts	Couplings	Motor Orient.	Limit Sensors	Home Switch	Shaft End Opt.	Linear Decoder	Options
DS4	250	C	5G	AKM23D	BNC	(-)	OE6	PR6E	LN1	H0	(-)	EO	CLN

DS Series

Stroke Length

50 = 50 mm total stroke	DS4 only
100 = 100 mm total stroke	DS4 only
150 = 150 mm total stroke	DS4 only
200 = 200 mm total stroke	DS4 only
250 = 250 mm total stroke	DS4 only
300 = 300 mm total stroke	DS4 only
350 = 350 mm total stroke	DS4 only
400 = 400 mm total stroke	DS4 only
450 = 450 mm total stroke	DS4 only
500 = 500 mm total stroke	DS4 only
550 = 550 mm total stroke	DS4 only
600 = 600 mm total stroke	DS4 only
700 = 700 mm total stroke	DS6 only
800 = 800 mm total stroke	DS6 only
900 = 900 mm total stroke	DS6 only
1000 = 1000 mm total stroke	DS6 only
1250 = 1250 mm total stroke	DS6 only
1500 = 1500 mm total stroke	DS6 only
1750 = 1750 mm total stroke	DS6 only
2000 = 2000 mm total stroke	DS6 only

Grade

C = Commercial grade
P = Precision grade**

Ballscrew Lead

5G = 5 mm/rev	
10G = 10 mm/rev	
25G = 25 mm/rev	DS6 only

Motor Type*

Motor Options*

B ■ ■ = Rotatable IP65 connectors	AKM2 only
C ■ ■ = 0.5 m shielded cables w/ IP65 connectors	AKM2 only
C ■ ■ = Rotatable IP65 connectors	AKM4, AKM5 only
■ N ■ = No brake	
■ 2 ■ = 24 Vdc power-off holding brake	
■ ■ R = Resolver	
■ ■ 2 = 2048 LPR incremental comm. encoder	
■ ■ C = Smart Feedback Device (SFD)	
■ ■ DA = Single-turn absolute sine encoder, EnDat2.2, 01	
■ ■ DB = Multi-turn absolute sine encoder, EnDat2.2, 01	

Additional Options

P1 = Standard pinning of x-axis carriage
CLN = Cleanroom prep – class 100
Omit for no additional options

Linear Decoder

Shaft End Options

BS = Brake on ballscrew,
24 Vdc power-off
ES = Rotary encoder on ballscrew,
1250 line
Omit for no additional options

Home Switch

H0 = No home sensor
HN1 = Home, NPN type normal open
HN2 = Home, NPN type normal closed
HP1 = Home, PNP type normal open
HP2 = Home, PNP type normal closed

Limit Sensors

L0 = No end-of-travel limits
LN1 = Limits, NPN type normal open
LN2 = Limits, NPN type normal closed
LP1 = Limits, PNP type normal open
LP2 = Limits, PNP type normal closed

Motor Orientation & Pulley Bore (Parallel Models)

PR6E = Parallel right
PL6E = Parallel left
PU6E = Parallel under
Omit if parallel model is not preferred

Couplings (Inline Models)

OE6 = Oldham style, 3/8" bore (AKM2X)
OE8 = Oldham style, 1/2" bore (AKM4X) DS6 only
BE6 = Bellows style, 3/8" bore (AKM2X)
BE8 = Bellows style, 1/2" bore (AKM4X) DS6 only
Omit for parallel models

Motor Mounts

X23 = NEMA 23 mount
X34 = NEMA 34 mount DS6 only
Omit if motor option is used

* Refer to Alternate AKM servomotor and electric cylinder systems table on page 72. Contact customer support for AKM combinations outside of those listed.

** Extended lead time required.

Note 1: Options shown in bold blue text are considered standard.

Note 2: Contact customer support for price and lead time on all non-standard features.

Alternate AKM Servomotor and Electric Cylinder Systems Table

For use when AKM servo motor is not included as part of electric cylinder model number.					
Electric Cylinder	AKM Frame	AKM Motor Model #	* Allowable AKM stack lengths	** Kollmorgen Motor Mount Code	Example Motor
N2	AKM2	AKM2XX-EFXXX	AKM21, 22, 23	IDR60 (C OR X)	AKM23D-EFCNC-00
EC1	AKM1	AKM1XX-ANXXX	AKM11, 13	IDR67 (C OR X)	AKM11B-ANCNC-00
EC2	AKM2	AKM2XX-EFXXX	AKM21, 22, 23	IDR60 (C OR X)	AKM23D-EFCNC-00
EC3	AKM2	AKM2XX-EFXXX	AKM21, 22, 23	IDR60 (C OR X)	AKM23D-EFCNC-00
EC3	AKM4	AKM4XX-EKXXX	AKM41, 42	IDR61 (C OR X)	AKM42G-EKCNr-00
EC4	AKM4	AKM4XX-EKXXX	AKM41, 42, 43, 44	IDR61 (C OR X)	AKM42G-EKCNr-00
EC4	AKM5	AKM5XX-EKXXX	AKM51, 52	IDR62 (C OR X)	AKM52G-EKCN2-00
EC5	AKM4	AKM4XX-EKXXX	AKM41, 42, 43, 44	IDR61 (C OR X)	AKM44G-EKCNr-00
EC5	AKM5	AKM5XX-EKXXX	AKM51, 52	IDR62 (C OR X)	AKM52G-EKCN2-00

* Based on maximum torque capacity, consult customer support for other combinations. Review application for inertia mismatch when considering motor options.

** We mount Kollmorgen motors without a fee. Must have "C" as motor mount code if you desire Kollmorgen to mount motor at factory. For non-Kollmorgen motors contact customer support for pricing.

NEMA Mounting Table		
Frame	Series	P/N Callout
NEMA 17	EC	17 (X or C)
NEMA 23	N, N2, EC2, EC3, R2A, R3	23 (X or C)
NEMA 34	N, N2, EC2, EC3, EC4, EC5, R2A, R3, R4, DS4, DS6	34 (X or C)
NEMA 42	EC4, EC5, R4, DS4, DS6	42 (X or C)

Example P/N: EC2-X-rest of pn-23X

Electric Cylinders EC Series

EC Series **Motor Type*** **Motor Options** **Drive Ratio** **Screw Lead** **Stroke Length** **Cylinder Mounting** **Rod Ends** **Options** **Cable Option**
EC2 – **AKM23D** – **BNR** – **10** – **05B** – **300** – **MP2** – **FT1M** (**-**) – **CO**

EC Series

EC1
EC2
EC3
EC4
EC5

Stroke Length**

Available

All
All
All
All
EC2, EC3, EC4, EC5
EC2, EC3, EC4, EC5
EC2, EC3, EC4, EC5
EC2, EC3, EC4, EC5
EC2, EC3, EC4, EC5
EC3, EC4, EC5
EC4, EC5
EC4, EC5

Motor Type*

CTP12 = CTP12xLF10MMA00 stepper motor
AKM11B = AKM11B-ANCxx-00 brushless servo
AKM13C = AKM13C-ANCxx-00 brushless servo
AKM23D = AKM23D-EFxxx-00 brushless servo
AKM23C = AKM23C-EFxxx-00 brushless servo
AKM42G = AKM42G-EKxxx-00 brushless servo
AKM42E = AKM42E-EKxxx-00 brushless servo
AKM52G = AKM52G-EKxxx-00 brushless servo
AKM52L = AKM52L-EKxxx-00 brushless servo

Available

EC1
EC1
EC1
EC2, EC3
EC2, EC3
EC3, EC4, EC5
EC3, EC4, EC5
EC4, EC5
EC4, EC5

Motor Options

B ■ ■ = Rotatable IP65 connectors
C ■ ■ = 0.5 m shielded cables w/ IP65 connectors
C ■ ■ = Rotatable IP65 connectors
■ N ■ = No brake
■ 2 ■ = 24 Vdc power-off holding brake
■ ■ R = Resolver
■ ■ 2 = 2048 LPR incremental comm. encoder
■ ■ C = Smart Feedback Device (SFD)
■ ■ ■ = Omit field for CTP12

Available

AKM2
AKM1, AKM2
AKM4, AKM5
AKM1, AKM2, AKM4, AKM5
AKM2, AKM4, AKM5
AKM1, AKM2, AKM4, AKM5
AKM1, AKM2, AKM4, AKM5
AKM1, AKM2, AKM4, AKM5
CTP12

Drive Ratio

10 = 1.0:1 drive belt/pulley (EC1 – helical)
15 = 1.5:1 drive belt/pulley
20 = 2.0:1 drive belt/pulley (EC1 – helical)
40 = 4.0:1 helical gears
50 = 5.0:1 helical gears
70 = 7.1:1 helical gears
100 = 10.0:1 helical gears
10L = 1.0:1 inline coupling (direct 1:1 coupling is the only ratio available for inline models)

Available

All
EC2, EC3, EC4, EC5
Not valid for EC3-AKM42
EC1 only
EC2, EC3, EC4, EC5
EC3 only
EC2, EC4, EC5
All

Screw Lead

03B = 0.125 in/rev ballscrew
05B = 5 mm/rev ballscrew
10B = 10 mm/rev ballscrew
16B = 16 mm/rev ballscrew
25B = 25 mm/rev ballscrew
32B = 32 mm/rev ballscrew
04A = 4 mm/rev lead screw

Available

EC1
EC2, EC3
EC3, EC4, EC5
EC2, EC3
EC4
EC5
EC2, EC3

Cylinder Mounting

MF1 = Front rectangular flange
MF1E = Front rectangular flange (English)
MF1M = Front rectangular flange (metric)
MF2 = Rear rectangular flange
MF2E = Rear rectangular flange (English)
MF2M = Rear rectangular flange (metric)
MF3 = Front & rear rectangular flange
MF3E = Front & rear rectangular flange
MF3M = Front & rear rectangular flange
MP2 = Rear double clevis without pivot base
MP3 = Rear double clevis with pivot base
MS1 = Side end angle
MS2 = Side lugs
MS6M = Side tapped holes (metric)
MS6E = Side tapped holes (English)
MT4 = Trunnion

Available

Rod Ends

FC2 = Clevis (includes MT1M)
FS2 = Spherical joint (includes FT1M)
FT1M = Female thread (metric)
FT1E = Female thread (English)
MT1M = Male thread (metric)
MT1E = Male thread (English)

Available

All
All
All
All
EC2, EC3, EC4, EC5
All
EC2, EC3, EC4, EC5

Options***

(add multiple in the following sequence, omit if no options required)

BA24 = 24 Vdc brake on actuator (EC1 only, not available with 10L ratio or MS1 mounting options)
BS24 = 24 Vdc brake on ballscrew (not available with EC1 or 10L ratio, or with MF2(x), MF3(x), MS1, MP2(x), MP3(x) mounting options)
BS115 = 115 Vac brake on ballscrew (not available with EC1 or 10L ratio, or with MF2(x), MF3(x), MS1, MP2(x), MP3(x) mounting options)
PB = Protective boot*
L = Linear potentiometer (only valid through 600 mm stroke, standard lengths)

Cable

CO = No cable supplied, motor includes connectors.
Default for all AKM servomotors; select Kollmorgen cables based on motor/drive pairing.

* Refer to Alternate AKM servomotor and electric cylinder systems table on page 72. Contact customer support for AKM combinations outside of those listed.

** For custom lengths round up to next standard incremental plus add standard cut fee.

*** Contact customer support for non-standard pricing and lead times.

Note: Options shown in bold blue text are considered standard.

Electric Cylinders N2 Series

N2 Series	Motor Type*	Stack Length	Drive Ratio	Screw Pitch	Stroke Length	Cylinder Mounting	Rod Ends	Options	Cable Option
N2	AKM23D	BNR	15	5B	8	MP2	FT1M	(-)	CO
N2 Series	Motor Type* AKM23D = AKM23D-EFxxx-00 brushless servo AKM23C = AKM23C-EFxxx-00 brushless servo						Cable CO = No cable supplied, motor includes connectors. Default for all AKM servomotors; select Kollmorgen cables based on motor/drive pairings.	Options*** (add multiple in the following sequence, omit if no option required) DB = Dual front braking BS24 = 24 Vdc brake on lead screw (not available with 10L ratio, or with MF2, MF3, MS2, MP2, MP3 mounting options) PB = Protective boot W = Water resistant F = Sub-freezing temperature H = High temperature prep L = Linear potentiometer (only for valid std. lengths)	
	B ■ ■ = Rotatable IP65 connectors C ■ ■ = 0.5 m shielded cables w/ IP65 connectors ■ N ■ = No brake ■ 2 ■ = 24 Vdc power-off holding brake ■ ■ R = Resolver ■ ■ 2 = 2048 LPR incremental comm. encoder ■ ■ C = Smart Feedback Device (SFD)		Drive Ratio 10 = 1.0:1 drive belt/pulley 15 = 1.5:1 drive belt/pulley 20 = 2.0:1 drive belt/pulley 25 = 2.5:1 helical gears 35 = 3.5:1 helical gears 120 = 12.0:1 helical gears 10L = 1.0:1 inline coupling (direct 1:1 coupling is the only ratio available for inline models)	Screw Pitch, Type 2B = 2 rev/inch ballscrew 5B = 5 rev/inch ballscrew 5A = 5 rev/inch lead screw 8A = 8 rev/inch lead screw	Stroke Length** 2 = 2 inch total stroke 4 = 4 inch total stroke 6 = 6 inch total stroke 8 = 8 inch total stroke 12 = 12 inch total stroke 18 = 18 inch total stroke (requires -DB option, effective stroke is 16.5") 24 = 24 inch total stroke (requires -DB option, effective stroke is 22.5") nn.n = Custom stroke lengths available in 0.1 inch increments		Rod Ends FC2 = Clevis (includes MT1M) FS2 = Spherical joint (includes FT1M) FT1M = Female thread (metric) FT1E = Female thread (English) MT1M = Male thread (metric) MT1E = Male thread (English)	Cylinder Mounting MF1 = Front rectangular flange MF2 = Rear rectangular flange MF3 = Front & rear rectangular flange MP2 = Rear double clevis without pivot base MP3 = Rear double clevis with pivot base MS1 = Side end angle MS2 = Side lugs MS6M = Side tapped holes (metric) MS6E = Side tapped holes (English) MT4 = Trunion	

* Refer to Alternate AKM servomotor and electric cylinder systems table on page 72. Contact customer support for AKM combinations outside of those listed.

** For custom lengths round up to next standard incremental plus add standard cut fee.

*** Contact customer support for non-standard pricing and lead times.

Note: Options shown in bold blue text are considered standard.

MODEL NOMENCLATURA

75

Micron™ TRUE Planetary™ Gearhead

DTR 115 – 005 – 0 – ()

Gearhead Series

NT = NemaTRUE™
 NTP = NemaTRUE PLUS™
 NTR = NemaTRUE 90™
 XT = XTRUE™
 ET = EverTRUE™
 DT = DuraTRUE™
 DTR = DuraTRUE 90™
 DTRS = DuraTRUE™ slimline
 DTRH = DuraTRUE™ hollow shaft
 DTRD = DuraTRUE™ dual shaft
 VT = ValueTRUE™
 VTR = ValueTRUE 90™
 UT = UltraTRUE™
 UTR = UltraTRUE 90™

Motor Model Number

RediMount number (if available)
 or motor manufacturer and model number

Customer Options

0 = None
 S = Special
 H = High precision
 (for NemaTRUE™ product line only)

Gearhead Ratio

See ratio availability in corresponding
 gearhead section (pp 51-53)

Gearhead Size

NemaTRUE™
NemaTRUE PLUS™
NemaTRUE 90™
 17 = Size 17
 23 = Size 23
 34 = Size 34
 42 = Size 42
 60 = Size 60
 90 = Size 90
 115 = Size 115

XTRUE™
 040 = Size 40
 060 = Size 60
 080 = Size 80
 120 = Size 120
 160 = Size 160

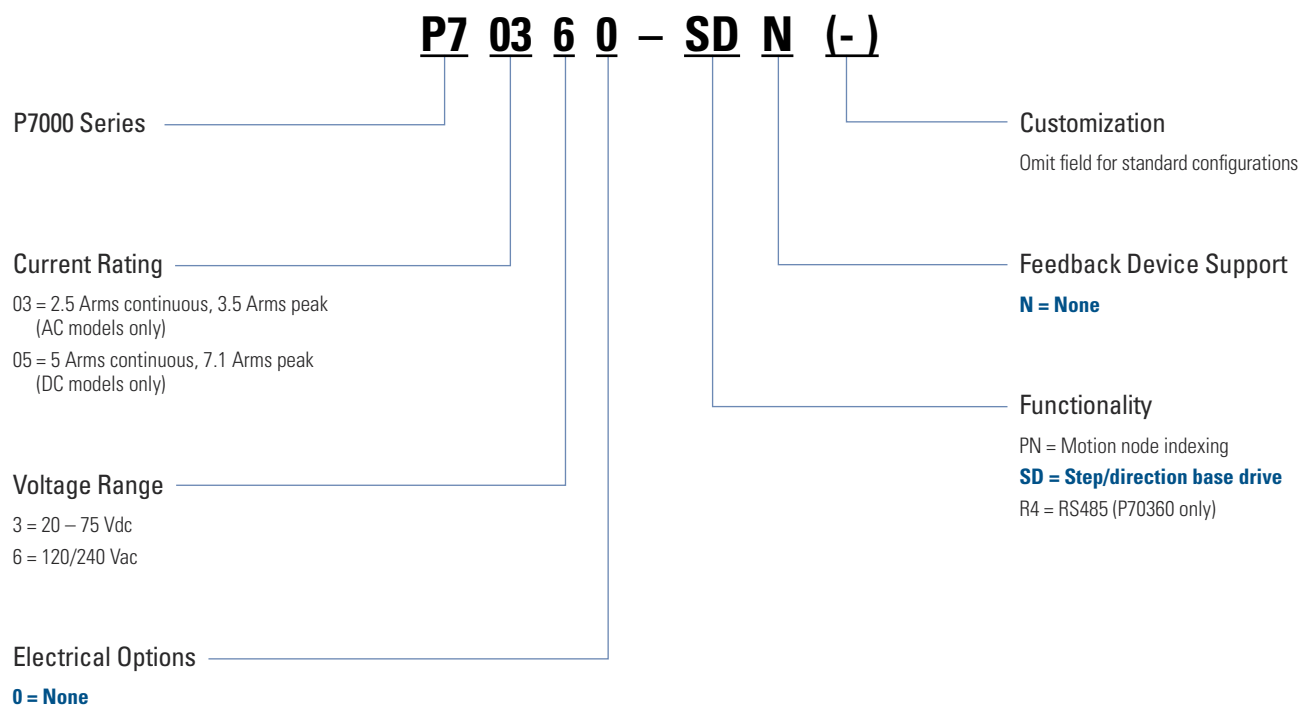
EverTRUE™
 10 = Size 10
 14 = Size 14
 18 = Size 18

DuraTRUE™
DuraTRUE 90™
DuraTRUE™ Slimline
DuraTRUE™ Hollow Shaft
DuraTRUE™ Dual Shaft
 60 = Size 60
 90 = Size 90
 115 = Size 115
 142 = Size 142

ValueTRUE™
ValueTRUE 90™
 006 = Size 60
 075 = Size 75
 090 = Size 90
 010 = Size 10
 115 = Size 115
 014 = Size 14
 018 = Size 18
 022 = Size 22

UltraTRUE™
UltraTRUE 90™
 006 = Size 60
 075 = Size 75
 090 = Size 90
 010 = Size 10
 115 = Size 115
 014 = Size 14
 018 = Size 18
 022 = Size 22 (UltraTRUE™ only)

P7000 Stepper Drive



CT Series Step Motor

CTM 2 1 N L F 10 N AA 00

CT Series

CTM = Cool torque maximum series
CTP = Cool torque performance series

Frame Size

1 = Size 17 / 4.2 cm (CTP only)
2 = Size 23 / 5.7 cm
3 = Size 34 / 8.5 cm

Length

0 = Short stack (CTP only)
1 = 1 stack
2 = 2 stacks
3 = 3 stacks

Mounting

N = NEMA through holes (size 23 & 34 only)
E = English tapped holes (size 17 only)
M = Metric tapped holes (size 17 only)

Construction/Connection Style

L = Leads
S = Special

Number of Connections

F = Four
S = Six

Customization

00 = Standard motor
Other numbers serially assigned for special motors

Rear Options

AA = None
EE = English rear shaft & encoder mounting holes (size 23 & 34 only)
MA = Metric rear shaft (size 17 only)
SS = Special

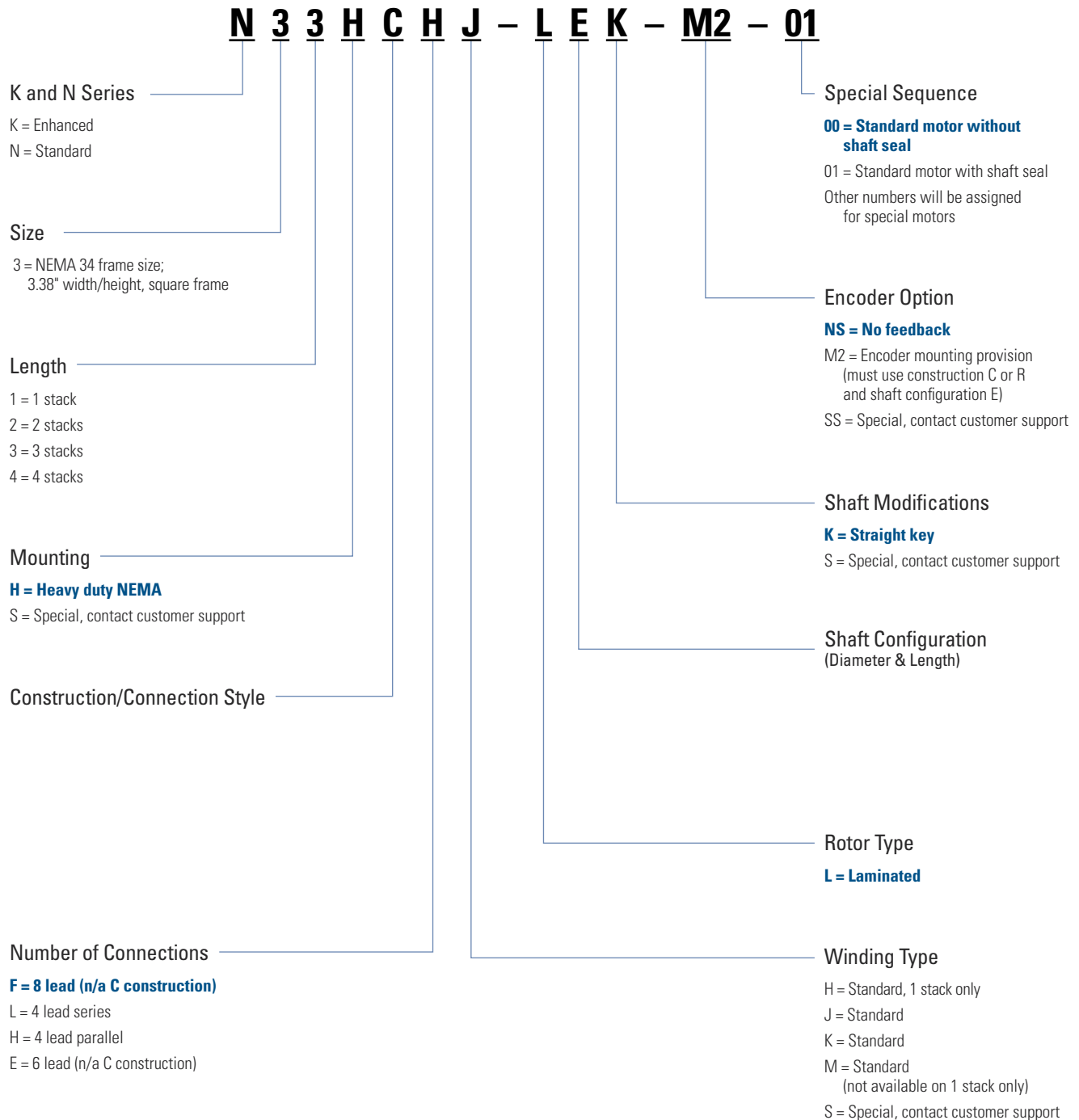
Front Shaft Options

N = Round smooth shaft (size 23 only)
F = Flat (size 23 only)
K = Straight keyway (size 34 only)
M = Metric (size 17 only)
S = Special

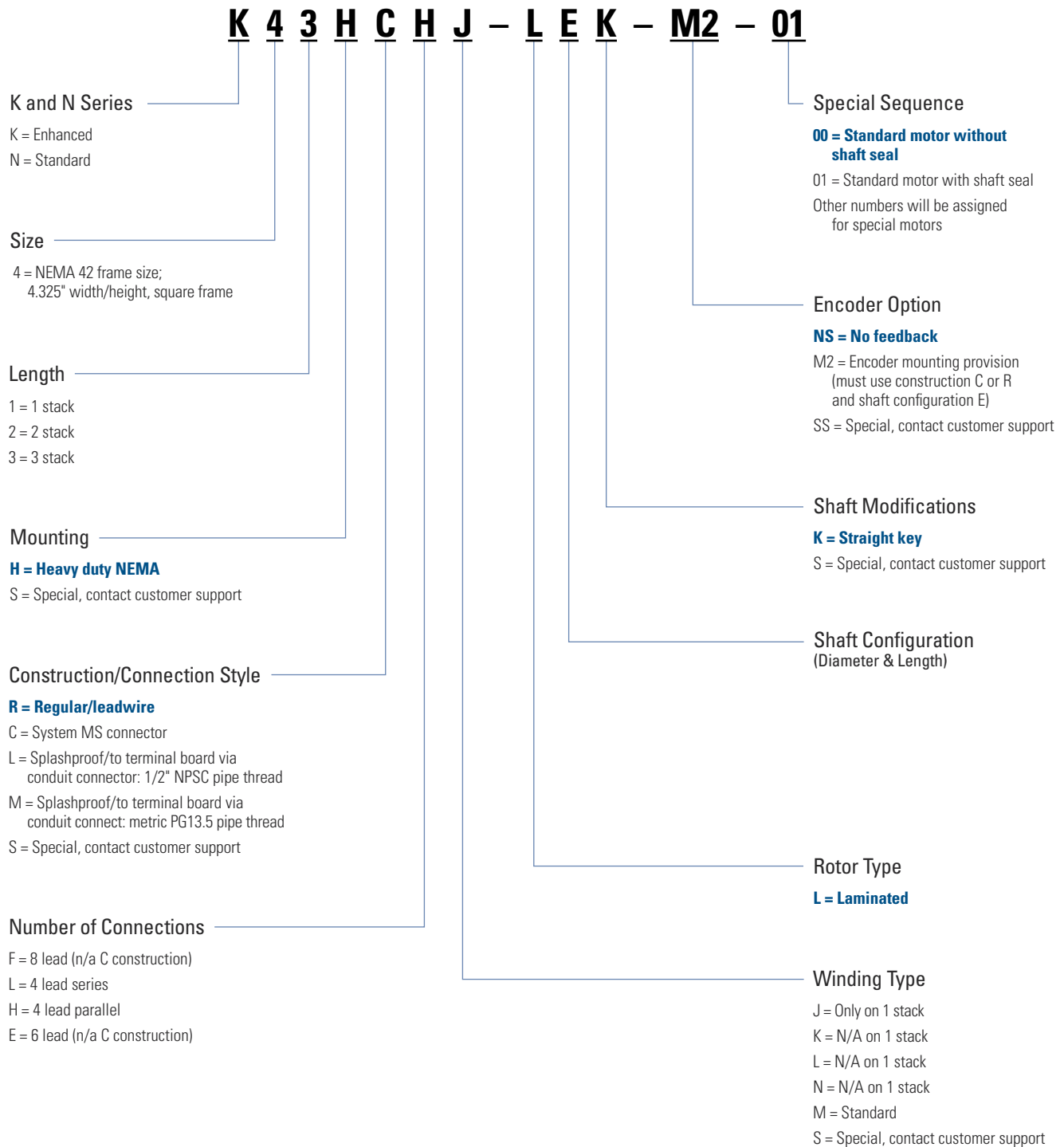
Winding Current

For 4 lead motors = bipolar current x 10
For 6 lead motors = unipolar current x 10
Examples:
05 = 0.5 Amps
10 = 1 Amp
50 = 5 Amps
00 = Special

NEMA 34 K and N Series Step Motor



NEMA 42 K and N Series Step Motor



NOTES:

NOTES:

MOTIONEERING® Application Engine

Introducing the Next Generation of Great Ideas To bring the Next Generation of Great Ideas to life, this Windows®-based motor-sizing program takes a systems approach to the selection of brushless, DC servomotors, stepper motors and drives. MOTIONEERING application engine, available at www.kollmorgen.com, uses a project concept for the collection and saving of rotary and linear multi-axis load information. This provides the user the flexibility to sum the effects of multiple axes of motion for power supply and shunt regeneration sizing.

A wide variety of linear and rotary mechanisms are provided including lead screw, rack and pinion, conveyor, nip rolls, cylinder, rotary, and direct data-entry using unique sizing algorithms and product databases criteria.

The searchable database consists of hundreds of systems on product combinations including rotary housed and frameless brushless servomotors, direct drive rotary and linear brushless servomotors, linear positioners (electric cylinders, rodless actuators, and precision tables) and stepper systems.

The MOTIONEERING application engine also provides versatile units-of-measure selection options for mechanism and motion profile data-entry, with the ability to convert data into other available units. Online Help explains program functions and the definition of terms and equations used in the program.

Features

- Group multiple mechanisms within a “project” – organize and combine data for power supply and regeneration sizing
- Types of mechanisms for analysis include lead screw, rack and pinion, conveyor, nip rolls, rotary and direct drive linear motor
- Motion profile options include simple triangle, 1/3-1/3-1/3 trapezoidal, variable traverse trapezoidal, and more
- Search results display shows color highlighted solution set of options for easy evaluation of system specifications and selection

Supported Operating Systems

- Microsoft® Windows 2000, XP, Vista

MOTIONEERING 6.0 includes

- Electric cylinder sizing and selection with AKM servomotor systems
- Rodless actuator with AKM servomotor systems (performance curves included)
- Precision table with AKM servomotor systems (performance curves included)
- PDF report functionality (includes application, drive, motor, positioner, and system specifications all in one easy-to-read report)

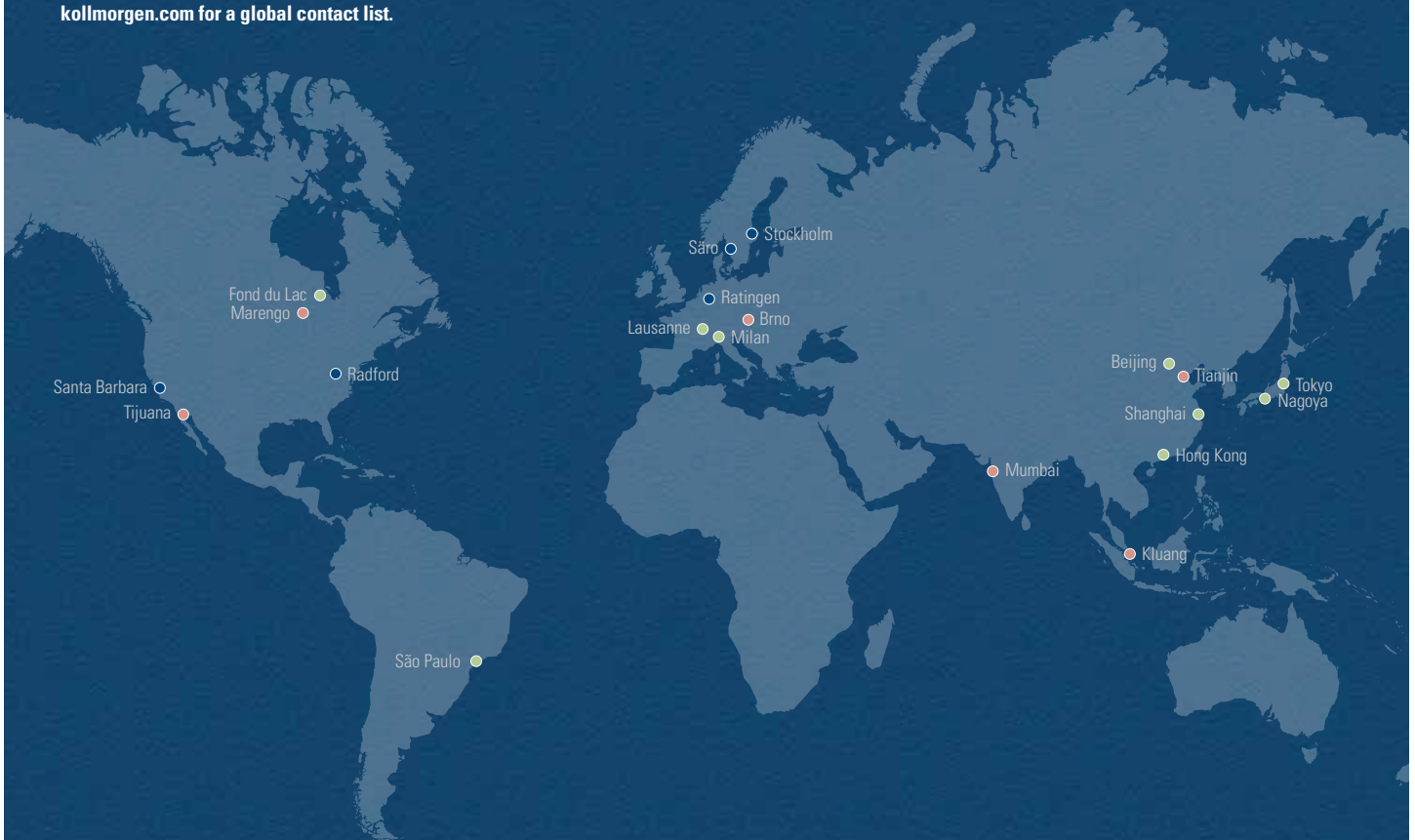


About Kollmorgen

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

**For assistance with your application needs,
contact us at: 540-633-3545,
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kollmorgen.com for a global contact list.**

- Application Centers
- Global Design & Manufacturing
- Global Manufacturing



KOLLMORGEN®

Because Motion Matters™

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