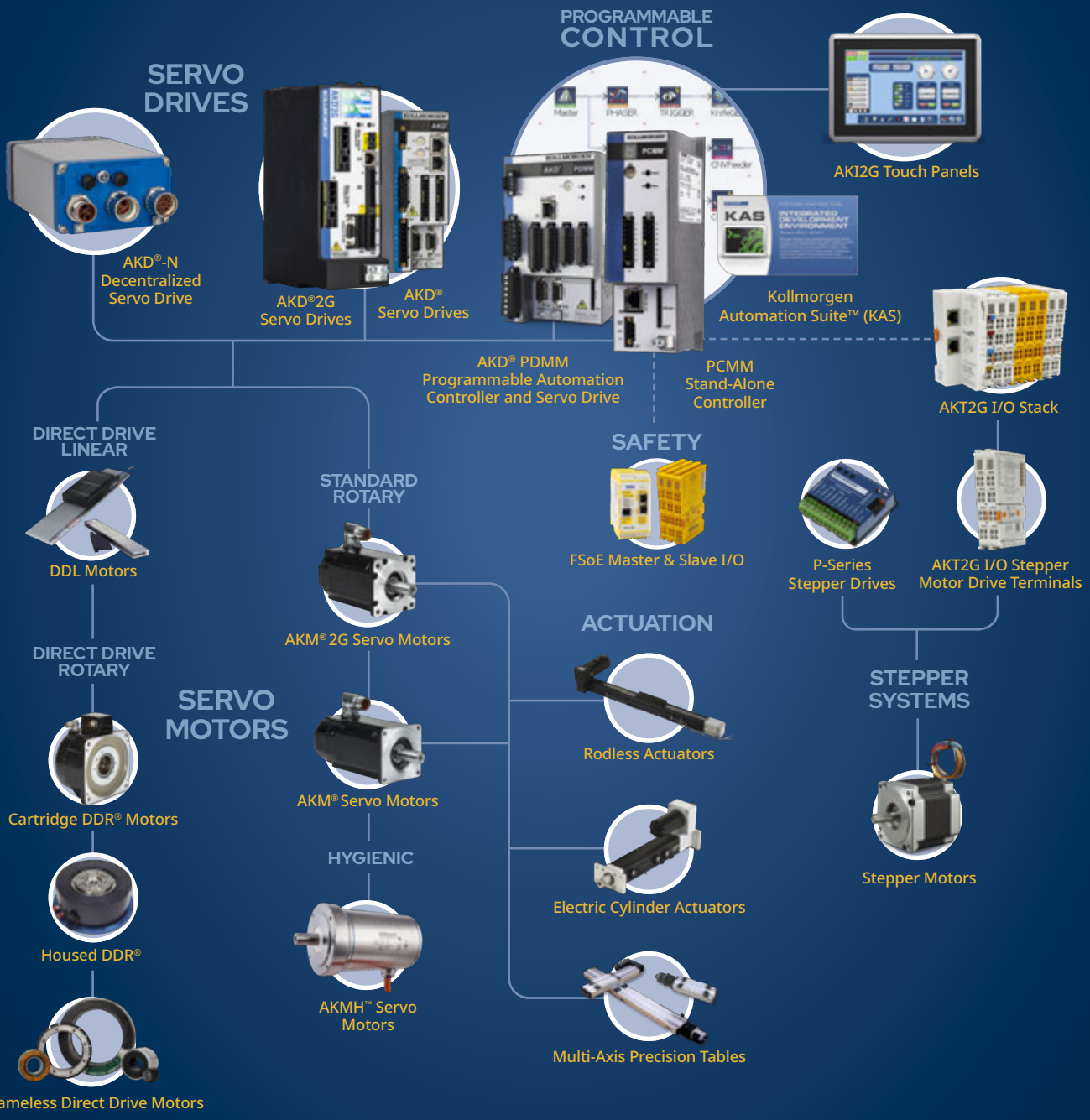
Automation and Motion Control

Programmable Automation Solutions



KOLLMORGEN

Kollmorgen: Your Partner, In Motion.

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

Innovators consistently rate Kollmorgen as one of their best motion systems manufacturing partners. Whether you are looking for classic servo motors, direct-drive servo motors, stepper motors, drives & amplifiers, gearing, actuation, or multi-axis motion controllers, Kollmorgen is one of the few companies in the world that actually designs and manufactures all of these products.

Our customers are leaders in many industries such as Aerospace & Defense, Printing, Packaging & Converting, Food & Beverage Processing, Medical Imaging, In Vitro Diagnostics & Laboratory Automation, Pharmaceutical Manufacturing, Material Forming and Cutting, Oil & Gas, and Robotics. Kollmorgen is also a leader in Warehouse Automation, including complete AGV systems, software, awareness and autonomy.

Our Automation Solutions can be found on Mars and in space, ships and submarines, O&G drilling and metrology, surgical robots and laser eye surgery, even inside artificial hearts. These are just a few applications that demand high-performance and high-quality while satisfying their specific needs.

Because motion matters, it's our focus: Motion can distinctly differentiate a specific machine and deliver a marketplace advantage by increasing its performance and dramatically improving Overall Equipment Effectiveness (OEE).

High-performance motion can make your customer's machine more reliable and energy-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 and in our Vision, Mission & Values, relentlessly developing products that offer precise control of torque, velocity and position accuracy in machines that rely on complex motion.

KOLLMORGEN

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 clear obstacles 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 Motion Solutions, Not Just Components

As companies reduce their supplier base and focus their engineering manpower on the product design, they need a total system supplier with a wide range of integrated solutions. Kollmorgen offers complete solutions as well as motion subsystems that combine programming software, engineering services and best-in-class motion components.

Global Footprint

With direct sales, engineering support, manufacturing facilities, and distributors spanning the Americas, 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 Altra Industrial Motion. A key driver in the growth of all Altra divisions is the Altra 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.

Kollmorgen: Your partner. In Motion.

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Continued on the following page.

Capture, or click, any QR code throughout this catalog to access detailed product-specific selection guides, installation manuals, information, self-help tools, and support.

Automation and Motion Control

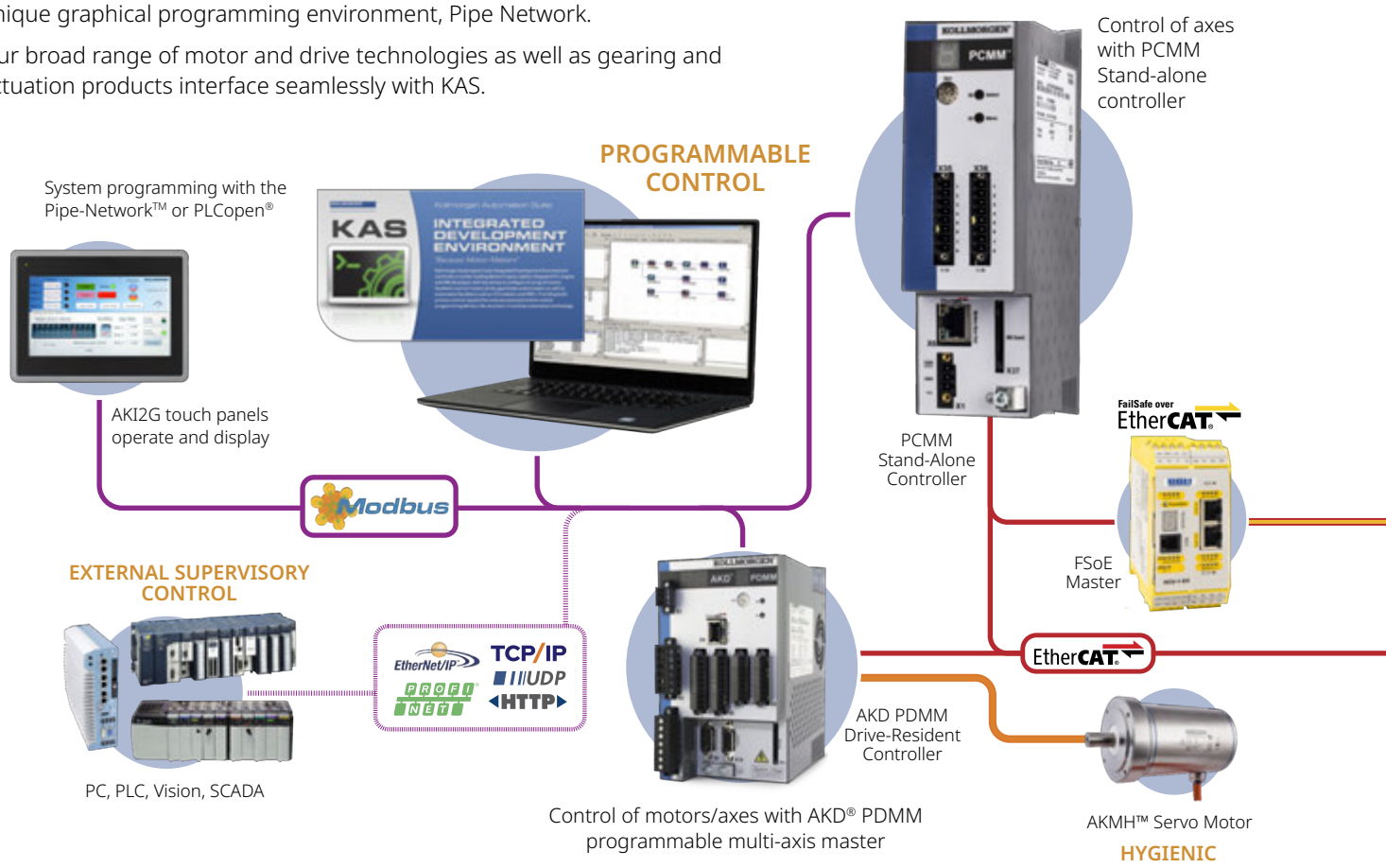
Comprehensive Line of Products Offering Complete System Solutions

Kollmorgen's comprehensive line of control software and hardware, drives and motors enables you to complete your solutions with one supplier:

Whether you want a stand-alone controller or drive-resident, Kollmorgen's Automation Suite can coordinate up to 64 or more axes, and synchronize the path of up to 32 or more axes per control engine. We offer the industry standard IEC61131-3 programming language, as well as our unique graphical programming environment, Pipe Network.

Our broad range of motor and drive technologies as well as gearing and actuation products interface seamlessly with KAS.

Flexible single or multi-axis drive solutions in decentralized and central architectures with PCMM, AKD-PDMM and the Kollmorgen Automation Suite™



The PCMM multi-axis controller can coordinate up to 64 or more axes, and synchronize the path of 32 or more axes per control engine on AKD family drives via the EtherCAT protocol*, with extremely precise cycle times of 250 µs. Optionally, an AKI2G control panel using standard Modbus communication protocol can be connected for operating the machine. The PCMM works with leading bus systems, opening up a wide array of control system options. The PDMM motion controller is equipped with an AKD servo drive for direct connection to a motor. The PDMM is ideal for machine builders who prefer an simplified, integrated solution.

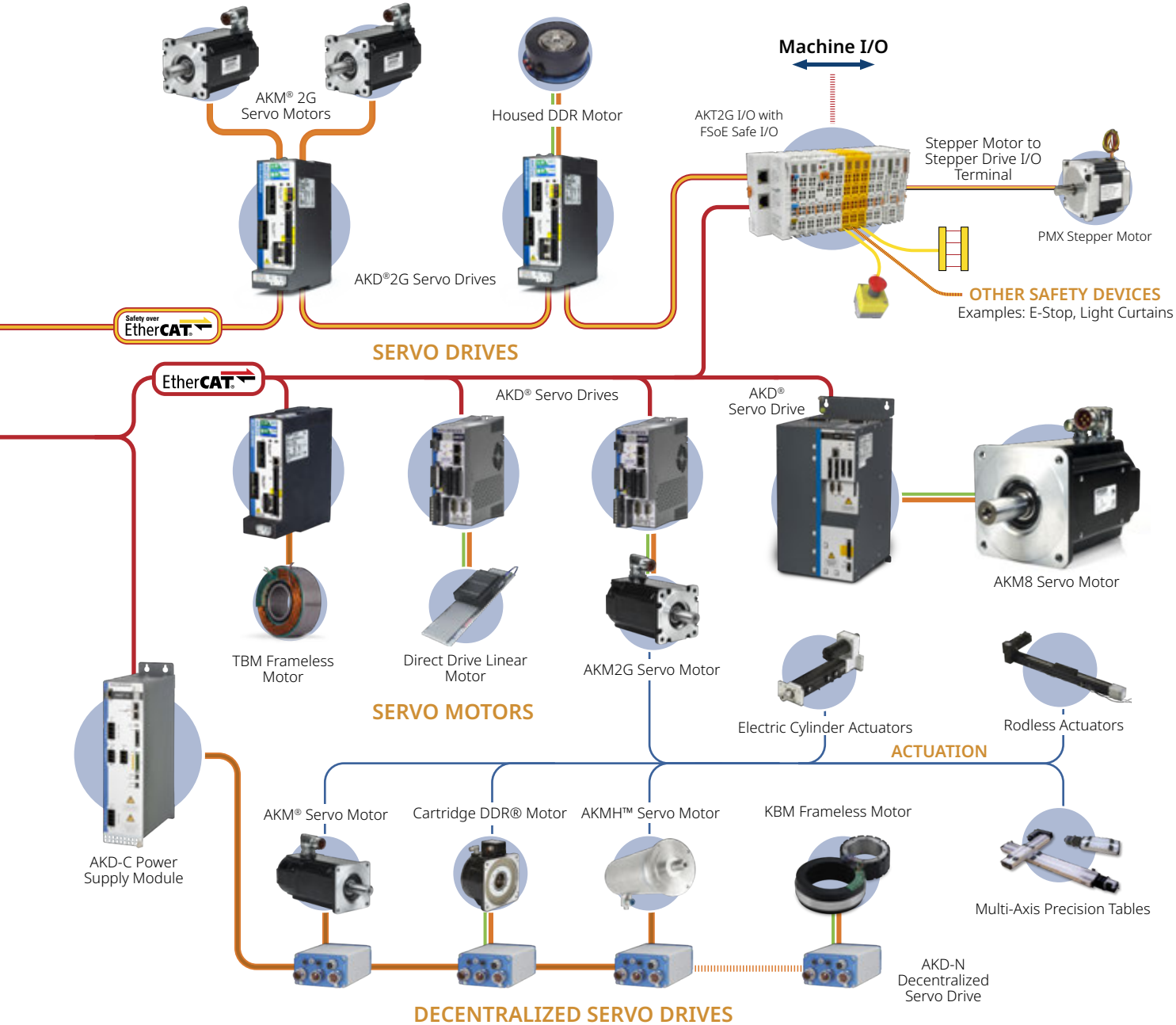
* Maximum axis count depends on motion/automation complexity and performance (20 or more axis possible for low complexity machine at 1 kHz network update rate, 8 axes based on medium complexity machine at 4 kHz network update rate.)

Diverse and Scalable Drive Solutions

Need more axes? Different motor types? Linear direct drives here, direct drives with no housing there? No problem! With the EtherCAT® system bus you can connect more AKD family servo drives and add motors of all performance classes from the Kollmorgen product range.

Interfaces are frequently the bottleneck in system design, but not so with Kollmorgen Automation Suite (KAS). With Advanced Kollmorgen Terminals (AKT2G) I/O and the EtherCAT® bus coupler, you can build a flexible interface system which meets all of your requirements.

Control and monitor the processes on the machine with the AKI2G series touch panels. With the Kollmorgen Visualization Builder (KVB), you can program ergonomic user interfaces and display machine data clearly.



Kollmorgen Automation Suite™

Kollmorgen's machine automation platform dramatically simplifies how you approach the many complex automation challenges of today's machines. We have created an integrated development environment (IDE) that greatly simplifies programming and system configuration and combines multiple tools into one intuitive platform, we have global support and experienced engineering services to solve your biggest challenges, and our best-in-class automation and motion components deliver unparalleled motion performance; all of which combine to help you create a differentiated machine, get to market faster, and have the comfort and ease of collaborating with just one vendor.

Integrated Development Environment – Quickly and easily design, refine and troubleshoot all of a machine's automated solutions in this highly intuitive application featuring a single programming environment that provides great flexibility and control.

Engineering Services – A Kollmorgen representative establishes a collaborative, consultative relationship from the beginning by assessing needs and objectives. Field engineers and application engineers constantly support the design and build phase as well as the factory installation phase to ensure that your needs are met from concept to production. Additional services are available that include development, on-site deployment, and training.

Best-in-Class Automation and Motion Components – With Kollmorgen, there's security in knowing the necessary components that form the building blocks of a machine are always available. No one offers a wider range of standard, modified standard and custom products. Motion is at the core of our Automation Suite, where others in the industry consider it an add-on.

Kollmorgen Co-engineering – More than a solutions provider, we co-engineer a better fit with your company using both products and services. From a wide breadth of product modifications, over 500,000 standard options on our AKM family motor line, to aftermarket revenue protection and training programs, Kollmorgen co-engineering helps you differentiate your machine and business.

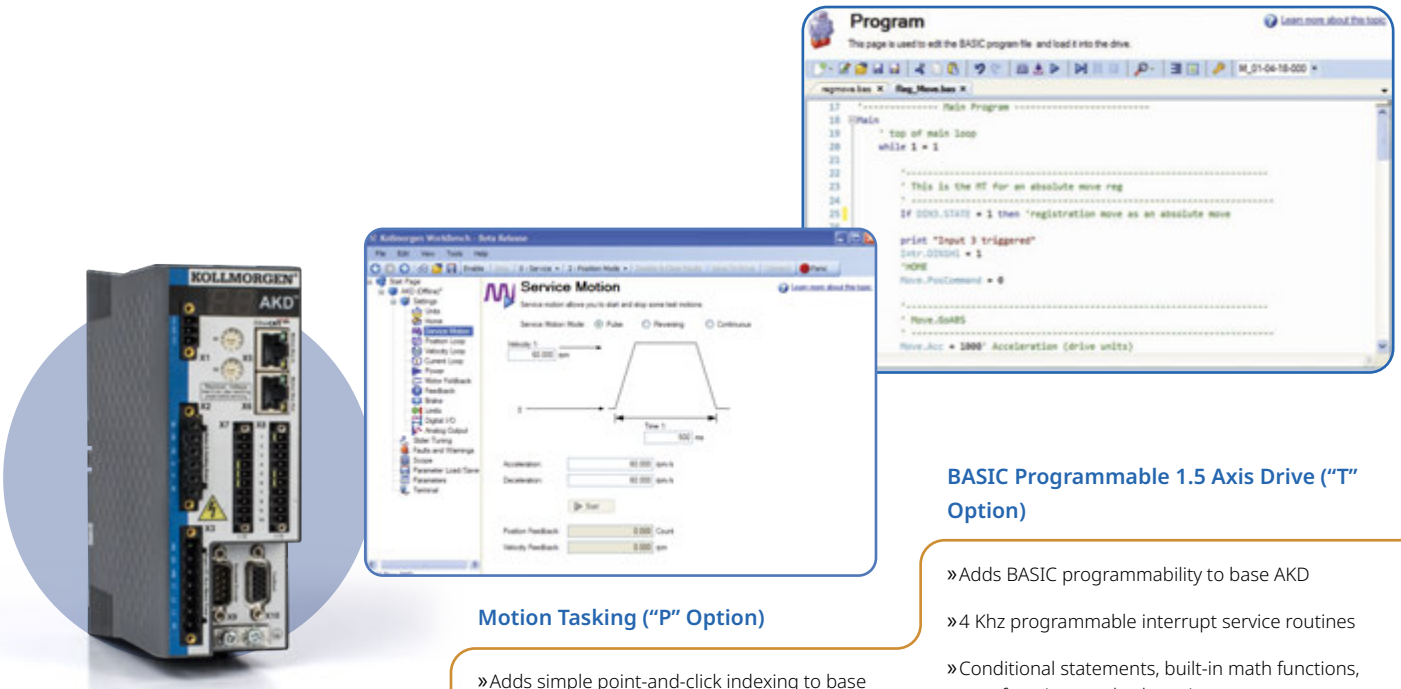
We accept your challenges as our own. That's the Kollmorgen co-engineering difference.

The Advantages of Kollmorgen Automation Suite™	
High machine performance	»Up to 25% greater throughput »Up to 50% scrap reduction »Improved accuracy »Advanced drive technology for machines with outstanding performance
Fast to market	»Up to 30% reduction in development time – Motion in Minutes »Services available for program development, training, start-up, and support »Industry standard programming environment and industrial networks
Enhanced ease-of-use and integration	»Single integrated programming environment for automation, drive technology, and all hardware »Drag-and-drop motion programming »Certified components that are tested to work together »Seamless integration and configuration of drives for optimal set-up
A demonstrated solution	»The result of over 25 years of optimizing, programming and implementing automation and drive solutions »Integrates the diverse experience of the suppliers and platforms that form today's Kollmorgen »Used successfully for more than 15 years

Scalable Programmability

Kollmorgen delivers cutting-edge technology and performance with the AKD® family servo drives and KAS controls platform. Whether your application requires a single axis or over 100 synchronized axes, Kollmorgen's intuitive software and tools scale to meet your needs. From simple analog torque control to the latest high-performance automation network, AKD servo drives pack power and flexibility for virtually any application into one of the most compact footprints of any digital servo drive in the industry.

- »Patented auto-tuning delivers optimized performance in seconds.
- »1.5 MHz current loop and 16 KHz velocity loops offers greater bandwidth and performance 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



Analog Control

- »Controlled by analog torque-and-velocity commands
- »Includes electronic gearing via X9 connector

Motion Tasking ("P" Option)

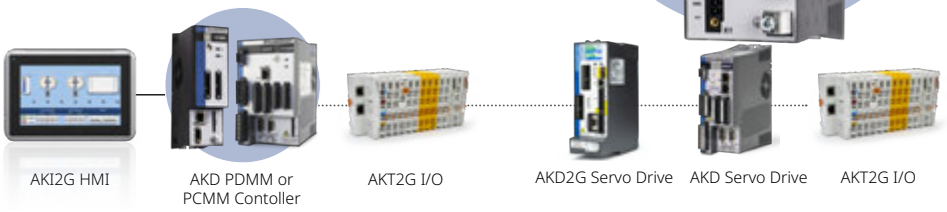
- »Adds simple point-and-click indexing to base drive
- »Provides user with pre-programmed options
- »Guides novice user through simplified steps to create indexing moves
- »Network connectivity to EtherCAT®, CANopen®, Profinet® RT, Ethernet/IP™, TCP/IP, SynqNet® and others
- »MODBUS port for communication with HMI

BASIC Programmable 1.5 Axis Drive ("T" Option)

- »Adds BASIC programmability to base AKD
- »4 Khz programmable interrupt service routines
- »Conditional statements, built-in math functions, user functions and subroutines
- »Same package size as base drive
- »Optional integrated SD card for easy backup and drive cloning
- »Includes electronic camming functionality

Basic Operation → Single-Axis Programming →

RANGE OF KOLLMORGEN AUTOMATION SUITE CAPABILITIES



AKD2G Multi-Axis Drive

- Adds dual axis capability with analog, electronic gearing, step-and-direction, motion tasking and motionbus operation modes
- Adds dual channel STO for each axis
- Option to add 4 Safe Inputs and integrated SafeMotion including FSoE, SS1, SDB, SBC/SBT, etc.
- Optimized for single cable technology
- Modular design offers quicker customization capability
- Improved graphical display (160x128-pixel)
- Single axis variant is available

Programmable Drive Multi-Axis Master PDMM ("M" Option)

- Scalable solution for use as a single axis drive or multi-axis drive controller with integrated programmable automation capability
- Choose from all five IEC 61131-3 languages for soft PLC process programming
- Program motion using your choice of PLCopen for motion or our innovative Pipe Network™
- 4 KHz PLC scan rate and EtherCAT® updates
- Complete line of HMI panels with integrated software to simplify GUI development
- Exclusive function blocks, such as "wait," enable your program to act as a scanning or sequential language
- Connects to AKT™2G network I/O for nearly unlimited expandability

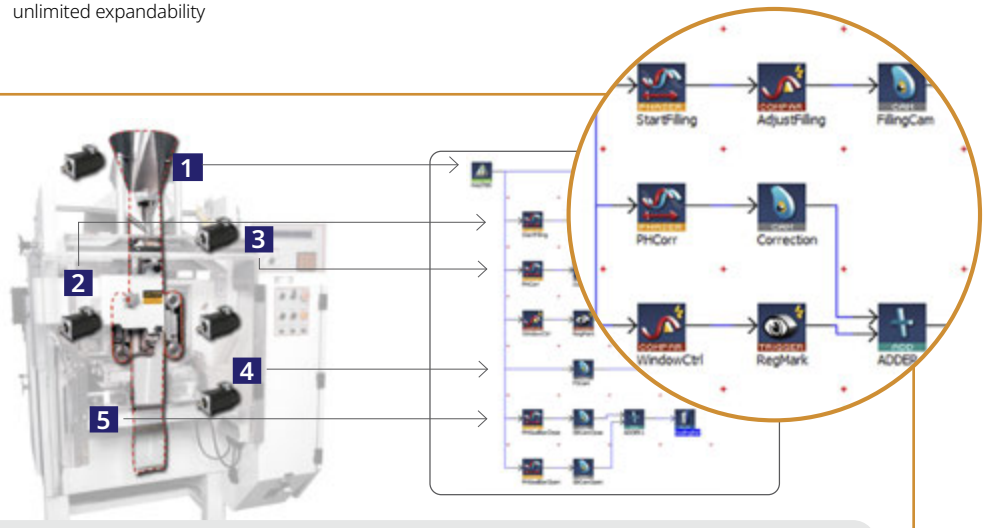
Seamlessly add additional axes. PCMM serves as a high-performance multi-axis machine controller.

- SD card for easy backup and system updates
- IoT-enabled integrated webserver for diagnostics and troubleshooting from any computer or mobile device
- Provide true synchronized-path control of up to 32 axes
- Reduce cabinet size and wiring requirements with a single, compact package
- Easily manage remote I/O and the I/O of all attached drives via EtherCAT®
- Use industry standard PLCopen for motion, or choose Kollmorgen's Pipe Network™ to program sophisticated camming and gearing applications in a matter of minutes

Pipe Network™

Kollmorgen Visual Motion Programming

- Accelerate development by programming tasks in hours that would otherwise take weeks
- Improved coding quality through visual programming and by using pre-built modules that have been extensively tested and optimized
- Easy knowledge transfer, replacing pages of complex code with easily understood graphical representations
- Available on PCMM and AKD PDMM controllers



Pipe Network provides a one-to-one translation of a mechanical system into a logical world as shown in the Vertical Form Fill and Seal machine above. Click and build your motion program in minutes, or contact Kollmorgen for examples of common machine architectures to further accelerate your development.

→ Dual-Axis Programming → Multi-Axis Programming

Development

A fully integrated development environment (IDE) provides the tools you need to develop everything from PLC and motion programs to HMI and device setup – all in one place. It's easier to learn and use, eliminates the need for multiple programs and data stores, and helps you bring a higher-quality machine to market faster.

Integrated Development Environment (IDE)

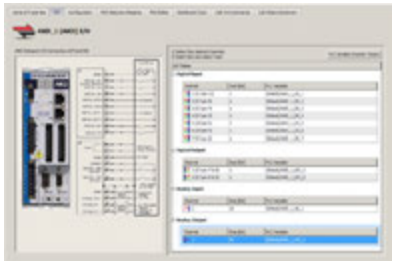
» Fully integrated programming environment incorporates standard IEC61131-3 compliant tools.

» Use the network configurator and predefined user blocks to streamline development and ensure programming quality.

Our IDE offers two powerful programming methods and a complete set of tools for simulating, testing and optimizing motion.

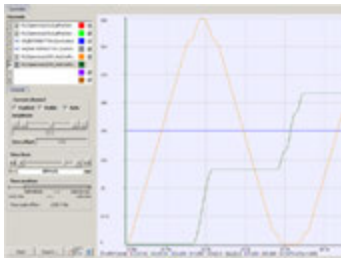
Embedded Motion

Choose PLCopen for motion if you already use this industry standard in your existing products, and want to continue using it within the Kollmorgen Automation Suite programming environment.

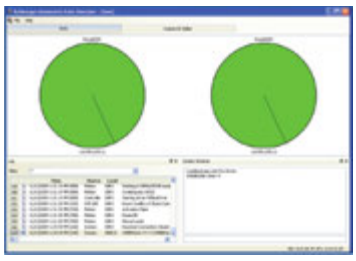


Embedded wiring diagrams and one-click I/O variable mapping makes drive integration easy.

Integrated Tools



Scope motion parameters to fine-tune performance and synchronization, portrayed with up to eight channels and flexible mapping of variables.



One-click motion simulation using virtual axes alongside real axes for quick development and implementation.

Pipe Network™
Kollmorgen Visual Motion Programming

Choose Kollmorgen's exclusive Pipe Network™ for the quickest, easiest way to represent mechanical systems in software – using drag-and-drop tools to create an intuitive visual representation.

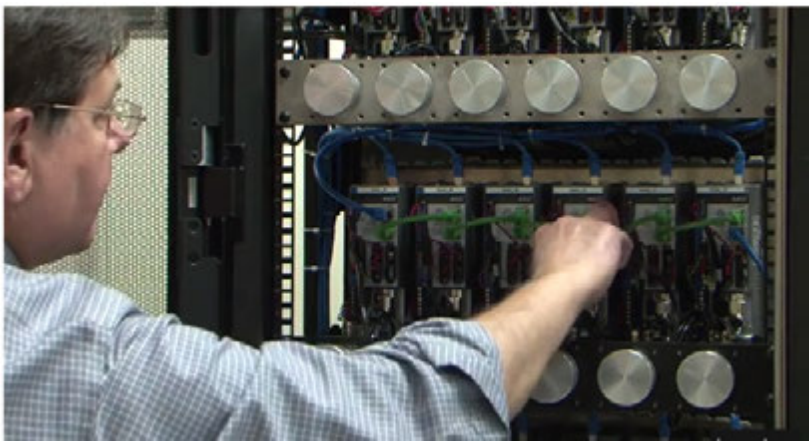
Complete motion system configuration from one location with embedded AKD Workbench allows configuration of all servo drives over EtherCat®.

Lifecycle

Kollmorgen is committed to helping you maximize the productivity and profitability of your machine across an extended lifecycle. Design and build today, with confidence for a full return on investment for years to come.

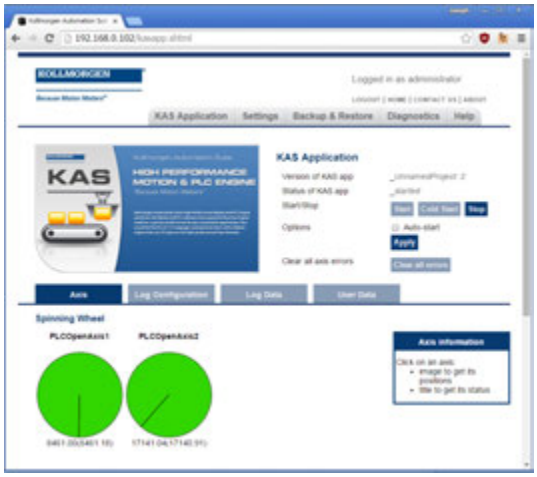
Continual Development Testing

Kollmorgen develops, tests, and continually validates all new products to ensure compatibility and performance in the Kollmorgen ecosystem.



Maintenance Support Tools

Our tools give end-users the ability to remotely verify continuous operation and communicate issues effectively.



Built-in, mobile-ready webserver provides performance information with no software required

Software and Hardware Security

Password protection for source code and hardware connectivity provides security for both OEMs and end-users.

✓ **Protect source code**
✓ **Protect network access**

Software PLC

Easy-to-Use, Auto-Discover, Auto-Recognize, Auto-Configure, Scope, CAM, IEC 61131-3 PLC

» Kollmorgen Automation Suite™ offers a set of tools that is familiar to automation programmers, but has enhancements like predefined motion blocks and visual diagnostics tools.

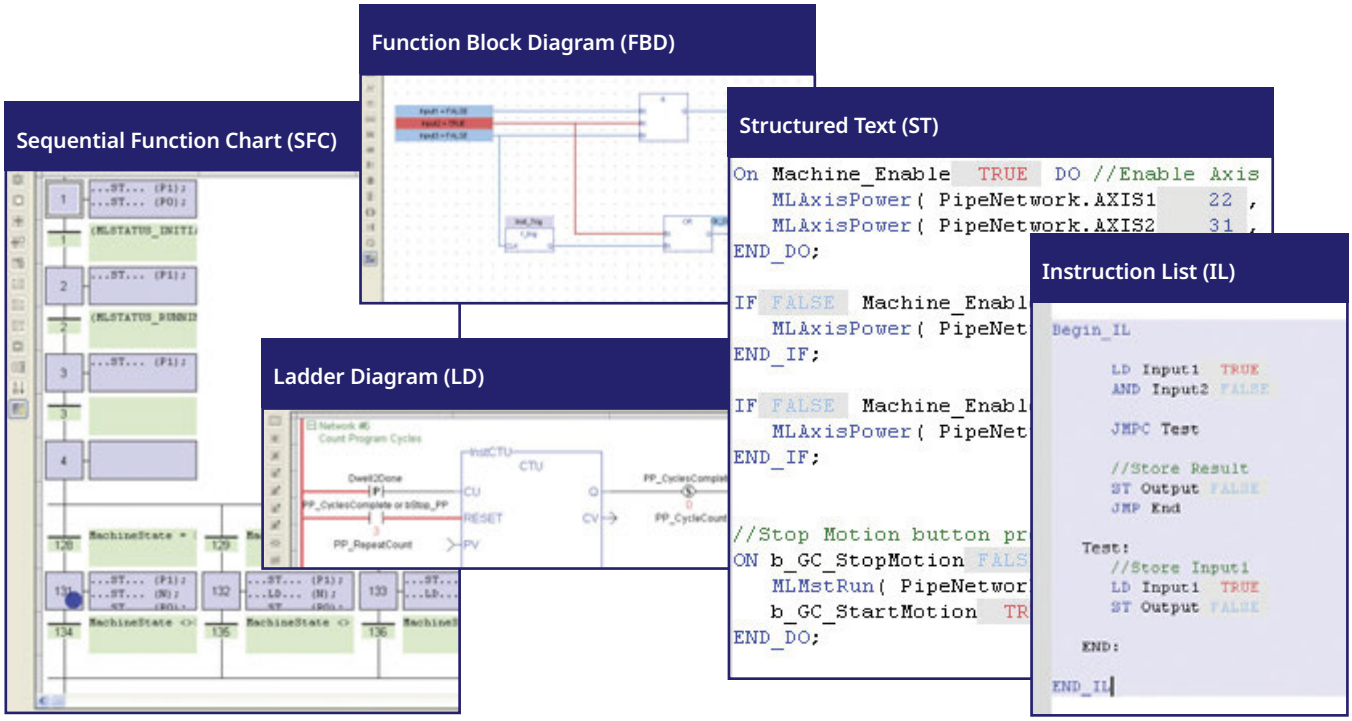
IEC 61131-3 Toolkit Features

- » IEC-61131-3 engine
- » Re-compile while running animated variables
- » Industry and application Specific Function Blocks
- » PID temperature control block
- » Debugger Tools with Watch window
- » 8-channel Real-Time Oscilliscope

» The environment for developing PLC programs has been created with an emphasis on speed. Recognize and configure motion control components to accelerate systems development. With auto-recognize and auto configure features, testing efforts are reduced.

» Once an application or a function block has been created for a given application, the user can store this as a "user-defined function block" to promote reuse of tested software in subsequent projects to save time.

» Maintain your standards in corporate programming languages by using any of the IEC 61131-3 languages. In fact, enhance it further by mixing and matching languages to deliver the best solution for the application.

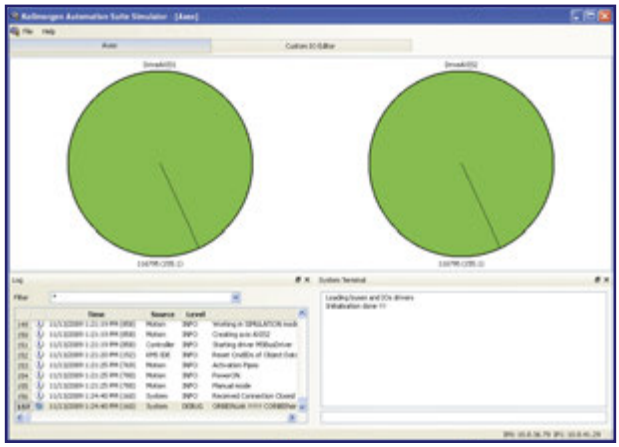


All five IEC 61131-3 PLC languages are supported

» Kollmorgen Automation Suite's integrated development environment (IDE) allows the developer to create solutions without having to connect a single device by using the offline simulator. Start creating systems before the first hardware component is delivered. Simply configure your system network in "offline development" mode and change the status of the devices one-by-one when you actually connect them.

Automatic I/O variable creation with scope definitions

Adding bus couplers with I/Os onto a motion network topology

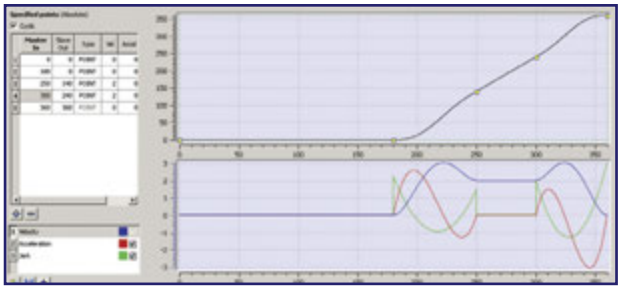


Simulator with PLC simulation and motion

» Standard debugging features like "step into", "step over", etc. are available to troubleshoot programs. In addition, debug your code using the soft oscilloscope and continuously plot up to 8 variables at network update rates – the display can also be configured to suit the scale that the developer desires.

» Our CAM editor lets you create complex CAM profiles using a graphical interface. When converting, it is also possible to import existing CAM profile points into the CAM editor to allow you to seamlessly reuse your existing profiles.

» CAM-on-the-Fly lets you change CAM profiles based on network inputs or changes in machine conditions.



Graphical environment for creating CAMs

Motion Programming

Our motion control solutions are backed by Kollmorgen's vast experience solving application-specific problems for the many industries we serve. Kollmorgen Automation Suite™ offers advantages that have helped our customers accelerate the development of more precise, high-performance motion.

For example:

Superior machine synchronization, with motion-optimized runtime engine and deterministic EtherCAT® network:

- IEEE1588 distributed clock correction
- Hardware-based synchronization
- PLC code execution at EtherCAT® update rate, eliminating process delay
- Low hardware latency

Flexible profile generation, allowing problem-solving through multiple methods branching out of standard pre-packaged tools:

- Pre-loaded and user-defined motion blocks optimized for specific industries and applications
- Configurable through Pipe Network™ and PLCopen for motion

Motion Capabilities

- Absolute and incremental moves
- Jerk-limited moves (S-curve)
- CAM profiles (static or with "on-the-fly" profile changes)
- Gearing (EtherCAT® synchronized)
- Multiple high-speed registration methods (FPGA-based capture engine)
- Homing
- Tension control based motion
- Motion-based functional safety
- Superimposed moves
- Phase adjust
- Multi-axis interpolated motion

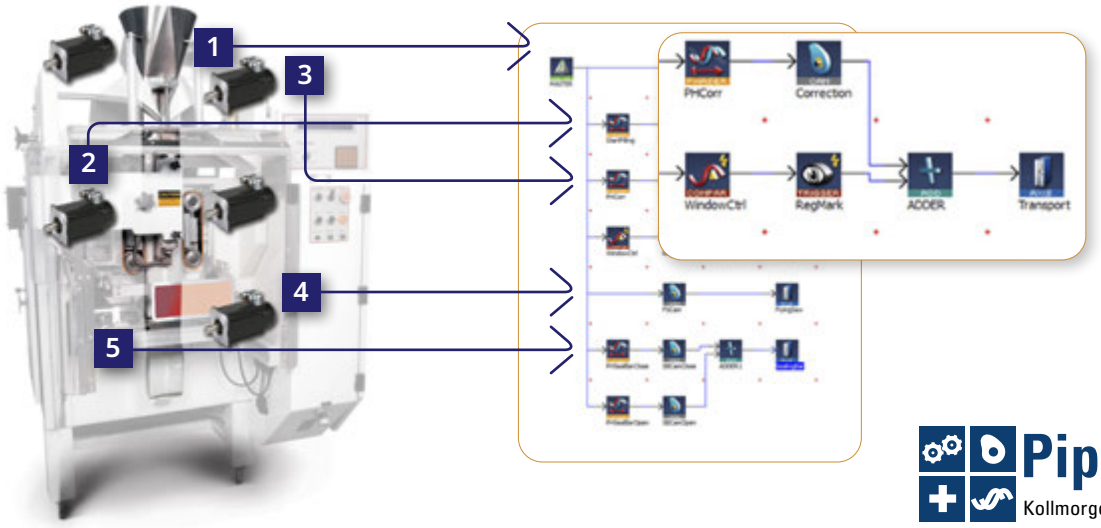
Program motion quickly and intuitively with our Pipe Network™ graphical programming language. Or choose the industry-standard PLCopen for motion to easily reuse your existing programming resources.

Pipe Network™ Visual Programming Environment

Our innovative Pipe Network™ programming environment provides a visual, drag-and-drop model of your machine's motion, including complex axis and cam relationships.

Program Tasks in Hours Instead of Weeks:

» Intuitive visual programming with a library of prebuilt modules.
» Easy knowledge transfer, replacing pages of complex code with easily understood graphical representations



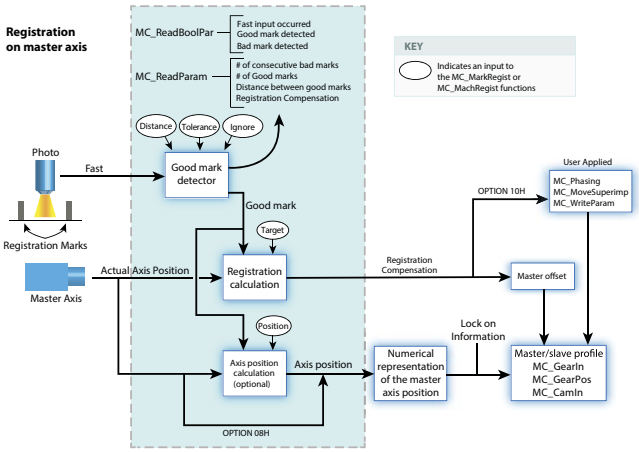
Pipe Network™ provides a one-to-one translation of mechanical systems into a logical world, so you can click and build your motion program in minutes – as shown in this example of a vertical form-fill-seal machine.

Pipe Network™
Kollmorgen Visual Motion Programming

PLCopen for Motion

The Kollmorgen Automation Suite™ IDE incorporates PLCopen for motion, a widely accepted open industry standard.

In the example shown here, PLCopen for motion is used within the Kollmorgen Automation Suite IDE to precisely control axis position based on registration marks:



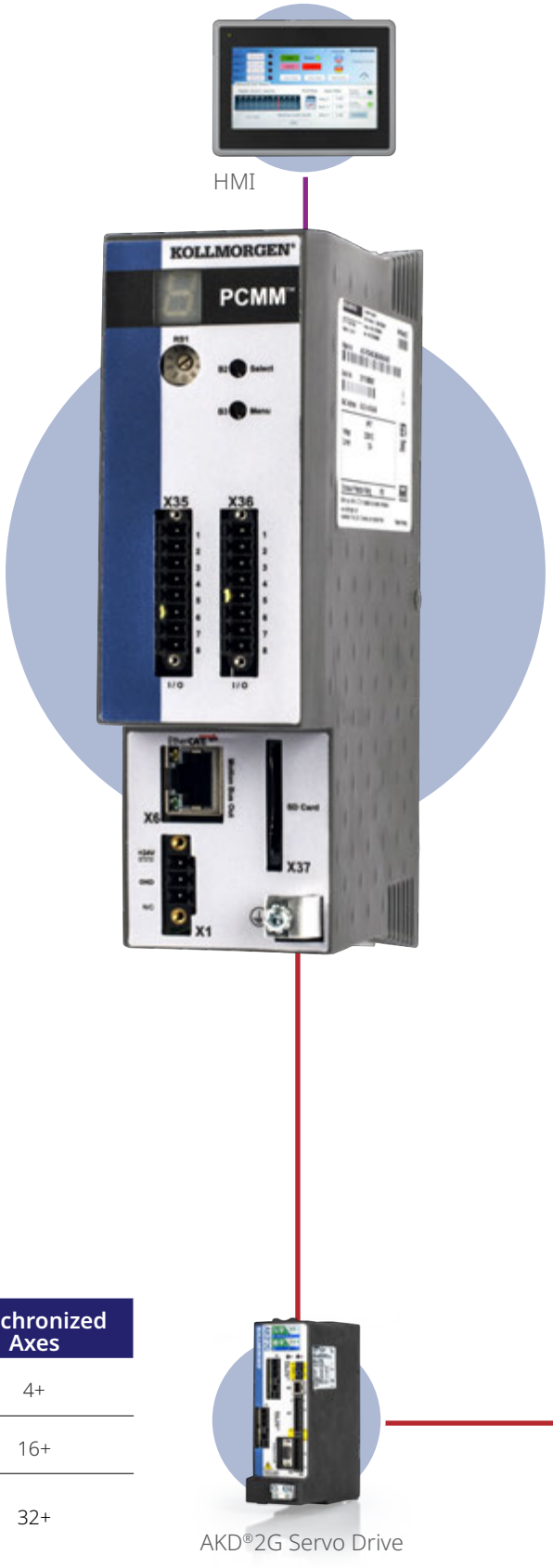
PCMM™ Stand-Alone Controller

Powerful Motion Controller in a Small and Simple Package

The PCMM programmable motion controller delivers the same features as the drive-integrated AKD®-PDMM controller, but in a stand-alone package that offers flexibility when used with AKD®-N/C decentralized drives and for machines where the benefits of an integrated drive and controller are not required.

Ideal for OEM's that want to reduce cabinet space and machine complexity without sacrificing performance. The PCMM delivers full PLC functionality, a high-performance motion control and EtherCAT® master in one small package that easily installs in any electrical panel.

Programming is simplified using the KAS IDE which includes PipeNetwork™ visual programming, one-click simulation, as well as integrated configuration and diagnostic tools. The PCMM with KAS IDE simplifies machine development and helps you get to market faster.



General Features and Specifications

Processor	Available with 1.2GHz (single or dual core option) or 800MHz CPU
Internal Memory	64 MB Flash memory for program storage
External Memory	Removable SD card (not included)
Input Power	24 Vdc @ 1.25 A
Operating Temperature	0 °C - 40 °C
Sealing	IP20
Local I/O	6 digital inputs, 2 digital outputs
Motion Network	EtherCAT®, max 4kHz update rate
PLC Programming	IEC-61131-3, support for all 5 languages
Motion Programming	PLCopen or PipeNetwork®
HMI Programming	KVB programming for AKI2G panels
Dimensions	174mm (H) x 46.6mm (W) x 111.5mm (D)
Certifications	CE / UL

Part Number	Processor	Code	Axes Capacity	Synchronized Axes
AKC-PCM-MC-080-00N-00-000	800 MHz Standard Multi-axis Controller	MC	8+	4+
AKC-PCM-M1-120-00N-00-000	1.2 GHz High Performance Multi-axis Controller	M1	32+	16+
AKC-PCM-M2-120-00N-00-000	1.2 GHz Dual-core High Performance Multi-axis Controller	M2	64+	32+

Note: these are axis count estimates which are impacted by cycle update rate and motion complexity.

PCMM™ Hardware Features

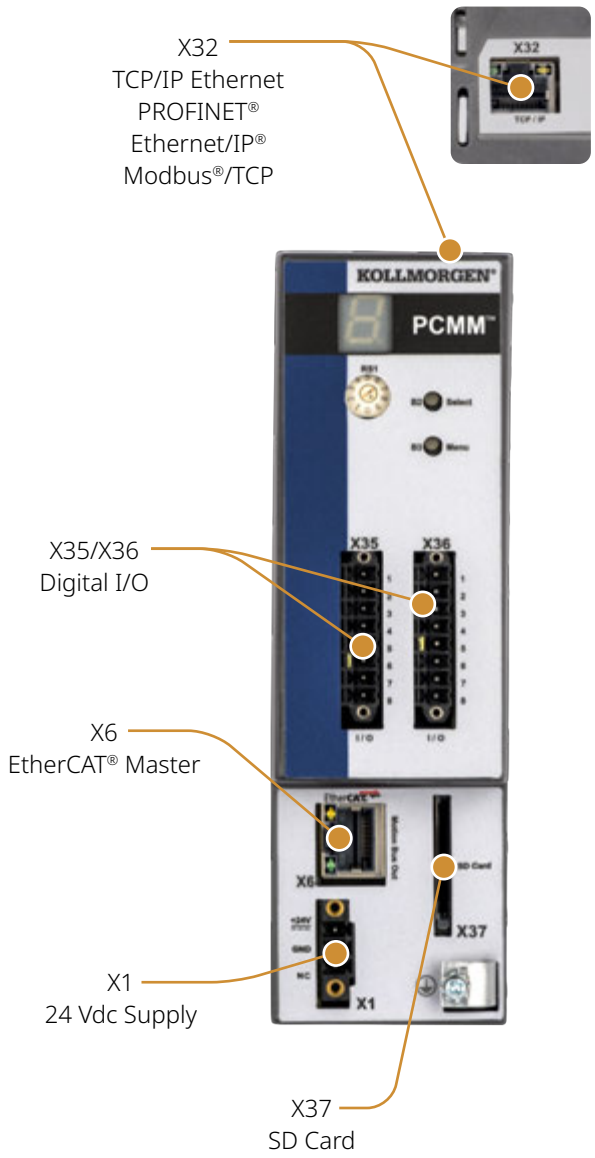
» Up to 1.2GHz CPU meets the performance requirements for a broad range of machines
» Control 1 to 30 or more axes with a single controller
» 100BaseT connection supporting TCP/IP, MODBUS®, EthernetIP®, Profinet® to host PLC, computer, or network to easily interface with most manufacturing systems
» Cycle times as low as 250 µs
» Alphanumeric display for fast diagnostics and system troubleshooting
» Removable SD memory card for simple backup/restore and file storage
» On-board digital I/O with support for expansion I/O via EtherCAT®
» Compact size reduces cabinet space and cost

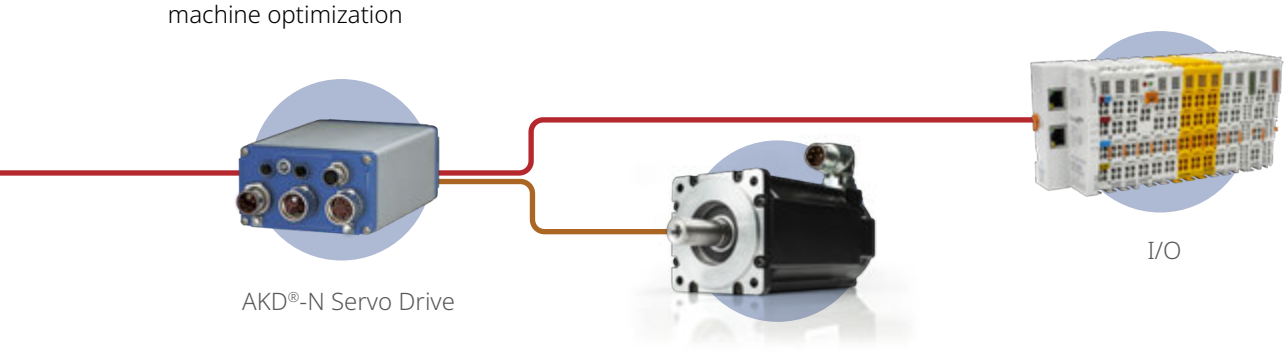
PCMM™ Software Features

» IEC 61131-3 programmable automation and motion controller
» EtherCAT® master for high-performance motion and device synchronization
» PipeNetwork™ motion engine for visual programming
» Embedded RTOS for guaranteed performance and stability
» Integrated webserver for remote diagnostics and status checking
» Ideal design for modular machines and flexible manufacturing systems

PCMM™ System Integration

» Seamless integration with Kollmorgen's AKD® family servo drives, AKM® family rotary servo motors , AKI2G HMIs, and AKT2G fieldbus I/O terminals for a complete automation solution
» Network communication via OPC, MODBUS®, TCP/IP, UDP, and common fieldbuses for fast integration into your machine or factory
» Intuitive EtherCAT® configuration tools built into KAS IDE simplifies network configuration
» Integrated Kollmorgen Workbench for rapid servo tuning and machine optimization





AKD®-N Servo Drive

AKM® 2G Servo Motor

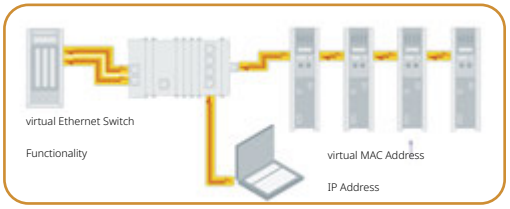
I/O

Real-time Motion Bus

EtherCAT®

EtherCAT® Real-time Bus for Motion and I/O Connectivity

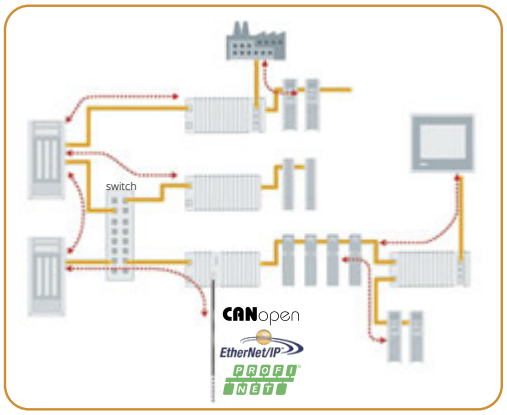
- Auto-recognition of Kollmorgen Automation Suite-compatible components
- Guaranteed real-time update cycle down to 250 microseconds.
- Supported by 2000+ member companies
- Standard Ethernet cabling = lower implementation cost
- Interoperability with other buses
- Wide availability of devices



Transparent for all Ethernet protocols

EtherCAT® Performance Overview

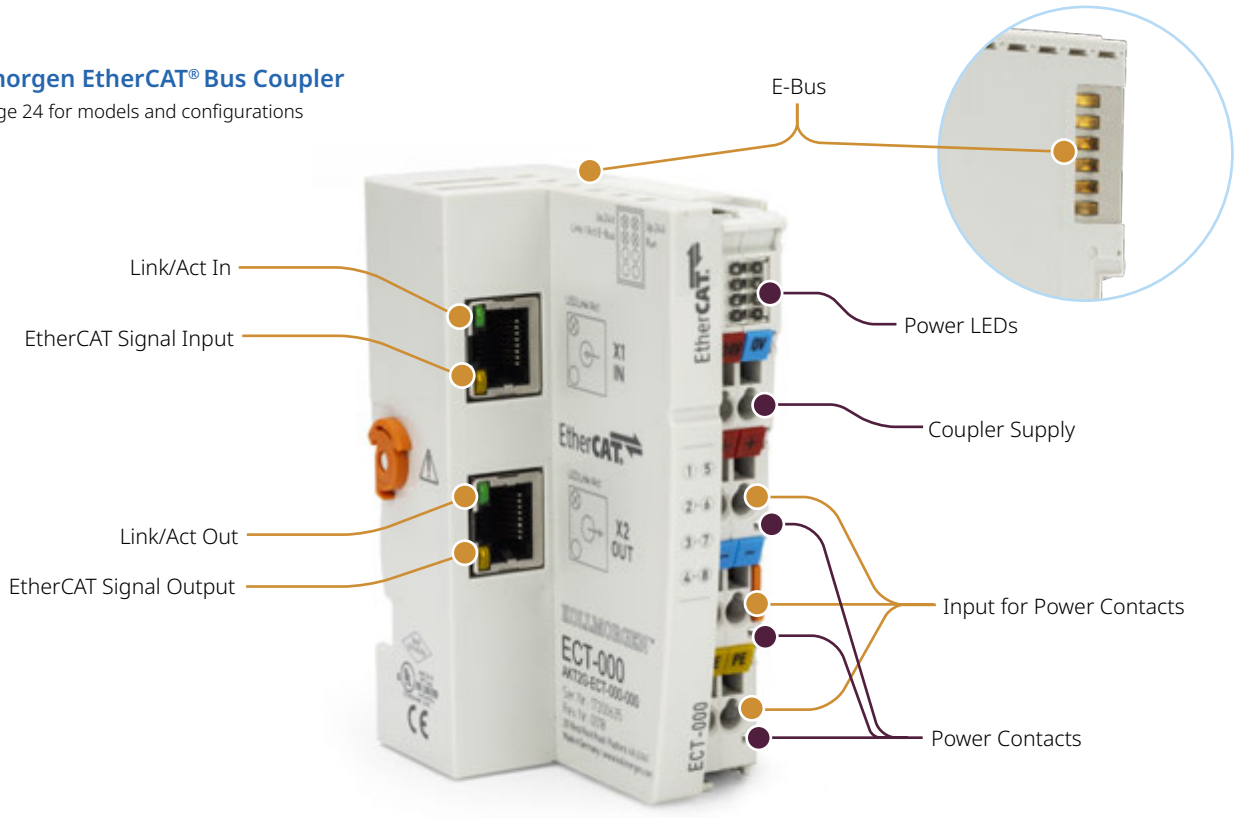
Process Data	Update Time
256 distributed digital I/O	11 µs = 0.01 ms
1000 distributed digital I/O	30 µs
200 analog I/O (16 bit)	50 µs – 20 kHz
100 Servo Axis, with 8 Bytes input and output data each	100 µs
1 Fieldbus Master-Gateway (1486 Bytes Input and 1486 Bytes Output Data)	150 µs



Versatile network architecture

Kollmorgen EtherCAT® Bus Coupler

See page 24 for models and configurations



Human Machine Interface (HMI)

Kollmorgen HMI Panels

With Kollmorgen HMI's visualization projects can be scaled for different size screens and performance demands without having to re-write code or learn different tools.

» Choose from 5", 7", and 12" displays
» IP65 protection class screen for easy cleaning
» Rugged Plastic or Aluminum Housing

AKI2G-CDA 5" and 7" *AKI2G-CDB 7" and 12"*

AKI2G-CDA Series

5", 7" Touchscreen HMI

Our basic industrial HMI offers a high resolution touch-screen and modern design. The panel combines IP65 corrosion resistant plastic housing with the full version of Kollmorgen Visualization Builder, providing a cost-effective yet advanced HMI solution for small to medium applications. The basic AKI2G model is the choice for a cost-efficient, high value, reliable HMI panel.

AKI2G-CDB Series

7", 12" Touchscreen HMI

Our advanced AKI2G series HMIs offers a choice of high performance industrial panels designed for demanding applications. All come with high-performance processors, the latest screen technology and a wide range of connectivity options to cover all your automation needs. We recommend our advanced high-performance HMI for all applications.

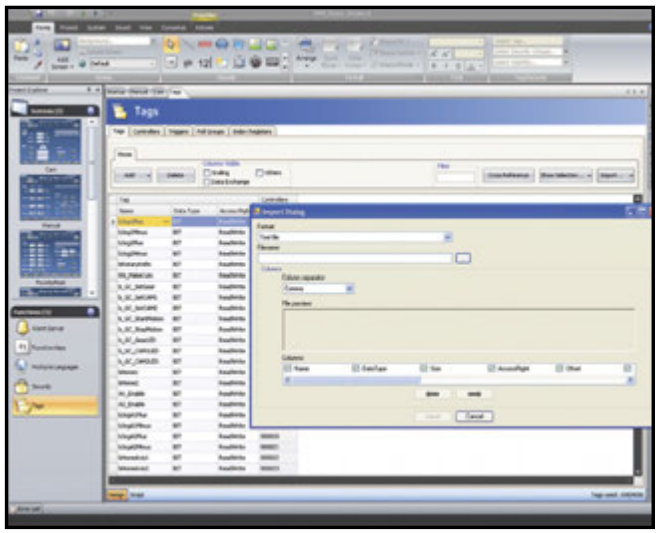
HMI Software Tools

Kollmorgen Automation Suite Visualization Builder™ HMI Software

Kollmorgen Automation Suite Visualization Builder operates from within the Kollmorgen Automation Suite integrated development environment making it quick and easy to create your HMI program and transfer it to the panel.

Features include

» Automatic mapping transfers PLC variables to HMI tags avoiding mistakes and saving time.
» Multi-screen navigation
» Trending/Data Logging
» Recipes
» Alarm management
» Drag and Drop programming
» Password Protection



HMI developer environment

Human Machine Interface (HMI)

AKI2G-CDA Series

Specifications	5 inch AKI2G-CDA-MOD-05T-000	7 inch AKI2G-CDA-MOD-07T-000
General Description		
Part number	AKI2G-CDA-MOD-05T-000	AKI2G-CDA-MOD-07T-000
Certifications		
General	CE, FCC, KCC	
Marine	–	
UL	UL 61010-2-201	
Mechanical		
Mechanical size	170 × 107 × 49 mm	196 × 146 × 52 mm
Touch type	Resistive	
Cut-out size	161 × 93 mm	186 × 136 mm
Weight	0.5 kg	0.7 kg
Housing material	Plastic (PC+ABS), Gray	
Power		
Input voltage	24 V DC (18 to 32 VDC) CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.	
Power consumption	6W	9.6W
Input fuse	Internal DC fuse	
System		
CPU	ARM9 400 MHz	
RAM	128 MB	
FLASH	256 MB, 200 MB free for application storage	
Display		
Size diagonal	5" diagonal	7" diagonal
Resolution	800 × 480 pixels	
Backlight	LED Backlight	
Backlight life time	20 000 hours	
Backlight brightness	300 cd/m²	400 cd/m²
Backlight dimming	Industrial Dimming	
Display type	TFT-LCD with LED backlight	
Display pixel error	Class I (ISO9241-307)	
Communication Serial		
Number of serial ports	2 Port 9pin DSUB	
Serial port 1	RS 232 (RTS/CTS)	
Serial port 2	RS422/485	
Serial port 3	RS 232	
Serial port 4	RS 485	
Ethernet Communication		
Number of ethernet ports	1	
Ethernet port 1	1 × 10/100 Base-T (shielded RJ45)	
Ethernet port 2	–	
Expansion interface		
Expansion port	No	
SD card	No	
USB	1 × USB 2.0 500mA	
Environmental		
Operating temperature	-10°C to +50°C	
Storage temperature	-20° to +60°C	
Shock	15g, half-sine, 11ms according to IEC60068-2-27	
Vibration	1g, according to IEC 60068-2-6, Test Fc	
Sealing front	IP65	
Sealing back	IP20	
Humidity	5% – 85% non-condensed	

Human Machine Interface (HMI)

AKI2G-CDB Series

Specifications	7 inch AKI2G-CDB-MOD-07T-000	12 inch AKI2G-CDB-MOD-12T-000
General Description		
Part number	AKI2G-CDB-MOD-07T-000	AKI2G-CDB-MOD-12T-000
Certifications		
General	CE, FCC, KCC	
Marine	DNV, KR, GL, LR, ABS, CCS	
UL	UL 61010-2-201	
Mechanical		
Mechanical size	204 × 143 × 50 mm	340 × 242 × 57 mm
Touch type	Resistive	
Cut-out size	189 × 128mm	324 × 226mm
Weight	0.8 kg	2.6 kg
Housing material	Powder-coated aluminum, Gray	
Power		
Input voltage	24 V DC (18 to 32 VDC) CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.	
Power consumption	14.4W	28.8W
Input fuse	Internal DC fuse	
System		
CPU	i.MX6Solo Single Cortex-A9 1.0GHz 512kBL2cache	i.MX6DualLite, Dual Cortex-A9 1.0GHz 512kBL2cache
RAM	512 MB	1 GB
FLASH	2GB SSD(eMMC), 1.5GB free for application storage	
Display		
Size diagonal	7" diagonal	12.1" diagonal
Resolution	800 × 480 pixels	1280 x 800 pixels
Backlight	LED Backlight	
Backlight life time	20 000 hours	50 000 hours
Backlight brightness	350 cd/m²	400 cd/m²
Backlight dimming	Industrial Dimming	
Display type	TFT-LCD with LED backlight	
Display pixel error	Class I (ISO9241-307)	
Communication Serial		
Number of serial ports	1 Port 9pin DSUB	
Serial port 1	RS 232 (RTS/CTS)	
Serial port 2	RS422/485	
Serial port 3	RS485 (only if COM 2 is RS485)	
Ethernet Communication		
Number of ethernet ports	1	2
Ethernet port 1	1 × 10/100 Base-T (shielded RJ45)	
Ethernet port 2	–	1 × 10/100 Base-T (shielded RJ45)
Expansion interface		
Expansion port	Yes, ciX expansion module	
SD card	SD and SDHC	
USB	1 × USB 2.0 500mA	2 × USB 2.0 500mA
Environmental		
Operating temperature	-10°C to +60°C	
Storage temperature	-20° to +70°C	
Shock	15g, half-sine, 11ms according to IEC60068-2-27	
Vibration	1g, according to IEC 60068-2-6, Test Fc	
Sealing front	IP65, NEMA 4X/12 and UL Type 4X/12	
Sealing back	IP20	
Humidity	5% – 85% non-condensed	

AKT2G I/O Terminals

Advanced Kollmorgen Terminal (AKT)

I/O

Kollmorgen Automation Suite™ includes an array of I/O options for applications that need more I/O than can be provided by the onboard I/O of the drives or for applications that need specialized functionality such as thermocouple management through I/O. The DIN rail mount IP20 terminals simply slide together and connect to the system's EtherCAT® bus where they are auto-recognized for easy configuration.

Typical Bus Coupler

EtherCAT® bus coupler

Typical I/O Terminal

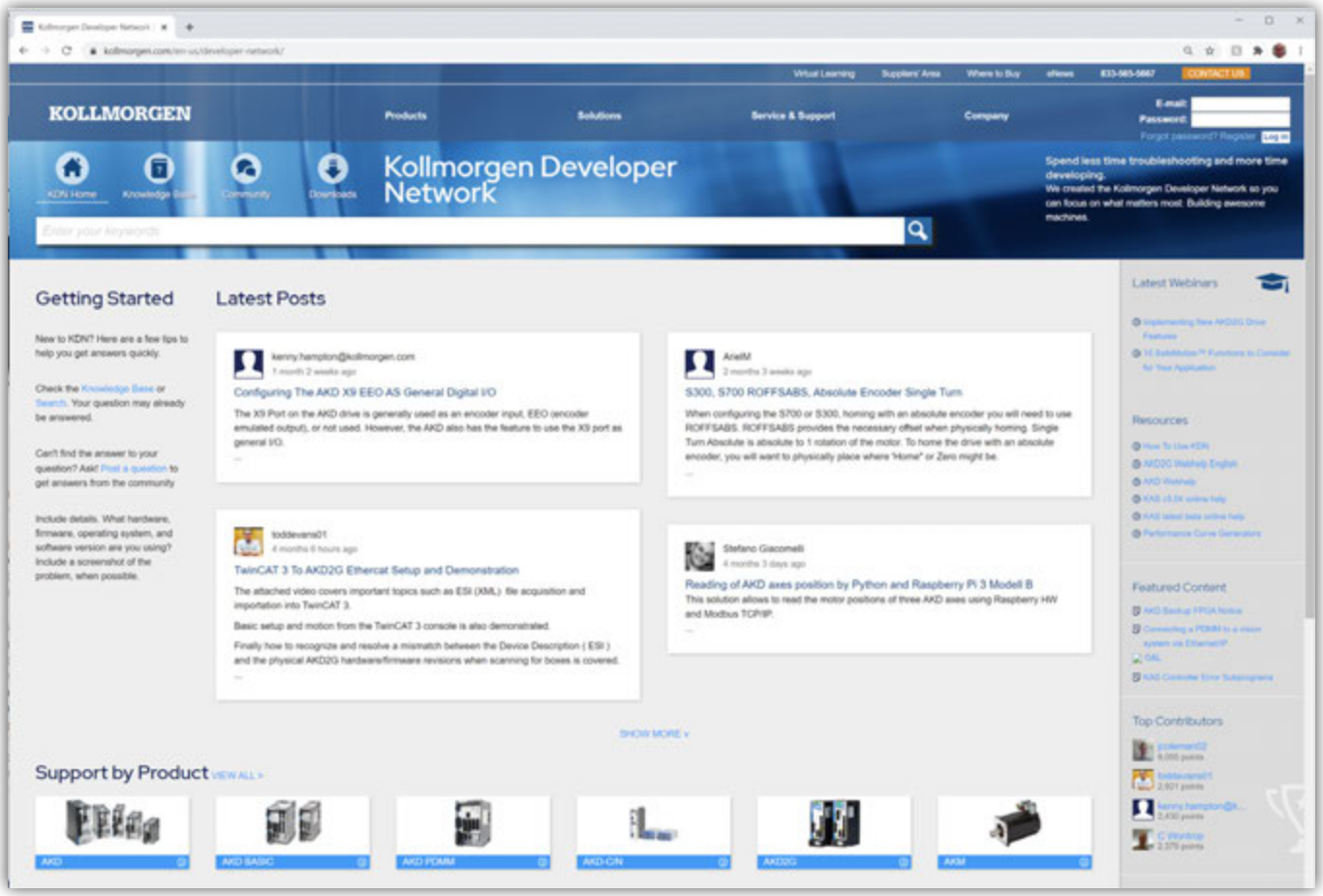
Side label view

Available Motion Bus Coupler Model	
AKT2G-ECT-000-000	EtherCAT® Bus Coupler
Available Analog Input Terminal Models	
AKT2G-AN-430-000	4 channel analog input terminal, 10/0...+10 V, -20/0/+4...+20 mA
AKT2G-AN-240-000	2 channel analog, RTD input, temperature input module
AKT2G-AN-400-000	4 channel thermocouple input terminal
Available Analog Output Terminal Models	
AKT2G-AT-410-000	4 channel analog output terminal, 0-10 Vdc
AKT2G-AT-425-000	4 channel analog output terminal, -10 V to +10 V
Available Digital Output Terminal Models	
AKT2G-DT-008-000	8 channel digital output terminal, 24 Vdc, 0.5 A
AKT2G-SDO-004-000	4 channel safe digital output terminal, 24 Vdc, 0.5 A

Available Digital Input Terminal Models	
AKT2G-DN-002-000	2 channel Up/down counter 24 Vdc, 100 kHz, 32 bit
AKT2G-DN-008-000	8 channel digital input terminal, 3 ms
AKT2G-DNH-008-000	8 channel digital input terminal, 10 µs
AKT2G-SDI-004-000	4 channel safe digital input terminal, 24 Vdc
Available Specialty Terminal Models	
AKT2G-EM-000-000	End terminal
AKT2G-PSF-024-000	Bus feed terminal, 24 Vdc, fused
Stepper Motor Drive Terminal	
AKT2G-SM-L15-000	Stepper Motor Drive Terminal, 24 Vdc, 1.5 A
AKT2G-SM-L50-000	Stepper Motor Drive Terminal, 50 Vdc, 5 A
AKT2G-BRC-000-000	Brake Chopper Terminal
Encoder Interface Terminals	
AKT2G-ENC-180-000	1-channel incremental encoder interface, 32 bit
AKT2G-ENC-190-000	Incremental encoder interface with differential input, 16/32 bit

Kollmorgen Developer Network

Kollmorgen Developer Network (KDN) is the central location for engineers to quickly get support on all Kollmorgen products, interact with and learn from the larger Kollmorgen user community, and receive expert instruction from Kollmorgen Applications Engineers and staff.



Ask a Question

Ask a question, or search and respond to existing questions. Provide an answer, or vote on the best answer. Leverage the global scope of Kollmorgen to get up to speed quickly.

Start a Discussion

Want to share a best practice, get feedback, or understand how others are solving similar problems? Start a new discussion, or join an active one, to share in the collabrative experience and knowledge of Kollmorgen product developers.

Propose a Feature

Have an idea for a new product, or feature? Submit it here. Customers speak and we listen. We know one size does not fit all. Our product is flexible, but sometimes differentiation requires a collaborative approach.

Latest Downloads

Keep up with our continually improving product, with access to the latest downloads.

Kollmorgen Servo Drive Overview

AKD® Product Family

Kollmorgen offers an extensive range of servo drives, designed to provide precise control, optimum torque and a rich feature set to complement our wide range of rotary servo motors and linear positioning systems. The AKD product family of servo drives offer the broadest connectivity with the most advanced control technology, simplified commissioning and compact packaging available in the global marketplace.

Kollmorgen servo drives are commonly paired with our broad lineup of Kollmorgen servo motors offering plug-and-play compatibility. They are also well suited to run with most servo motors on the market due to flexible setup software and support for the most popular feedback devices (including resolvers, incremental encoders, BiSS, EnDat®, HIPERFACE®, and sine encoders).

The AKD product family offers a range of drive-resident safety functions increasing machine safety, while improving operator ergonomics and machine throughput.

The AKD product family offers several variants supporting centralized control panel architecture including single and dual axis drives, programmable and drive-resident controllers, minimizing panel space requirements and maximizing performance. For those applications that need IP67 drives outside a control panel, or have extensive cabling lengths from the machine to the control panel, the AKD-N is great decentralized option for machine builders to design the optimal cost effective machine.

Our premier KAS machine automation solution brings together a highly integrated and intuitive software programming environment, best-in-class motion components and exceptional co-engineering services to help you build highly differentiated machines. Kollmorgen Automation Suite™ (KAS) has proven to dramatically accelerate development time, increase machine throughput, reduce scrap and increase overall equipment effectiveness (OEE). AKD product family drives can connect to Kollmorgen's PCMM, an EtherCAT® master controller, which is programmed through KAS using industry-standard IEC 61131-3 PLC programming toolkit controlling 64 or more axes.

AKD® Product Family





Parameter	AKD2G	AKD	AKD BASIC	AKD PDMM	AKD-N/AKD-C
Base I/O	12 digital 2 analog	11 digital 2 analog	11 digital 2 analog	17 digital 2 analog	5 digital
Expansion I/O[1]	8 digital 2 analog *Drive size is the same	No	20 digital 2 analog *adds 30 mm to the drive width for drives up to 12A	Up to 1000+ remote I/O via EtherCAT	No
Safe I/O	2 digital inputs for Safey option 1 4 digital inputs for SafeMotion options	No	No	No	No
SafeMotion[2]	Yes	STO only	STO only	STO only	STO only
Optimized for single cable[3]	Yes	No	No	No	Yes
Continuous current limit[4]	12A	48A	48A	48A	12A
Connectivity[5]	Analog, EtherCAT, CANopen, Profinet IRT, Ethernet/IP, TCP/IP, Modbus/TCP	Analog, EtherCAT, CANopen, Profinet RT, Ethernet/IP, TCP/IP, Modbus/TCP	Analog	EtherCAT, CANopen, Profinet RT, Ethernet/IP, TCP/IP, Modbus/TCP	EtherCAT
Axis Configuration	single or dual	single	single	single	single
Drive-resident controller	No	No	No	Yes	No
Programmability	parameterized, 2 axes control loops, actlon table	parameterized	parameterized, BASIC programmable	parameterized, IEC 61131-3 via PLCopen or Pipe Network	parameterized
Graphical Display	160x128-pixel display	2 digit LED	2 digit LED	3 digit LED	Status LED
Removeable Memory[6]	Yes	No	Yes	Yes	No
System Architecture	Centralized	Centralized	Centralized	Centralized	Decentralized
IP Rating	IP20	IP20	IP20	IP20	IP67

Notes:
1: Add EtherCAT multi-axis master, PCMM, to the AKD drive family to enable remote I/O expansion via EtherCAT. PCMM controller functionality is built into the PDMM
2: SafeMotion includes FSoE, STO, SS1, SS2, SOS, SDB, SBC/SBT, SLS, SSR, SSM, SDI, SAR, SLA, SLI, SLP, SCA up to SIL3 / PLe
3: Single cable optimized means one single cable for power & motor feedback with 1 connector at motor end and 1 connector at drive end
4: Higher power variants under development in some models. Consult factory for availability.
5: Consult factory on connectivity options for AKD2G. Profinet and Ethernet/IP will be added in 2021
6: Optional integrated SD card for easy backup and drive cloning

AKD® 2G Servo Drive

The newest member of the AKD family is our most powerful yet.

Along with increased power, the AKD2G is simplified and includes integrated SafeMotion™ that increases Ease-of-Use.

The new AKD2G servo drive introduces the Kollmorgen Servo on a Chip™: A powerful compute engine that can control two axes simultaneously and up to 28 I/O. While we were at it, we streamlined the design by optimizing the AKD2G for single-cable motors.

The Benefits of AKD®2G Servo Drives

Flexible

- One and two axis variants available
- Modular design allows the user to specify only the features needed
- Supports a variety of feedback devices. SFD3 & HIPERFACE® DSL standard; optional feedbacks include EnDat, BiSS, Analog Sine/Cos encoder, incremental encoder, resolver and more
- Multiple bus choices for system optimization, including EtherCAT® & FSoE, CANopen®, PROFINET® IRT and Ethernet/IP™
- Over-voltage, current, and temperature detection provided for added dependability
- Optional SafeMotion Monitor™ (SMM™), up to SIL3/PLe
- Dual-channel STO for each axis (up to SIL3/PLe)
- Optionally available with coated PCBA
- Industry-leading power density for greater flexibility in mounting
  - Fits into a 10 inch [25.4 cm] deep control panel

Easy to Use

- Plug-and-play compatibility with Kollmorgen controls and motors
- WorkBench GUI, acclaimed for customer experience and usability
- Hybrid motor-power connector is optimized for single-cable motors; No adaptors, no D-subs, no splitters
- Cage-clamp spring terminal connectors on I/O allow for fast and easy installation
- Optically isolated I/O reduces noise and eliminates need for additional hardware

Fast

- Accommodates changing load conditions immediately:
  - Current loop updates in 1.28 µs, nearly 50x the speed of our nearest competitors
  - Velocity and position loops lead the market at 62.5 µs and 125 µs, respectively
- Servo on a Chip™ includes dual-core ARM™ A9, 800 MHz µP, 1.5 M gates
- AI-based auto-tuning with a click of a button gets you started quickly
- Wizard-based tuning uses advanced Bode plot tool to help you efficiently manual-tune when desired
- Fast data acquisition with TCP/IP Ethernet service channel

AKD® 2G Servo Drive

AKD2G Means Unparalleled Connectivity

Base Model

The base model of Kollmorgen's AKD2G includes all of the performance described previously, and is optimized to interface to a single-connector motor with Kollmorgen's Smart Feedback or HIPERFACE® DSL. It also offers 16 I/O, 160x128-pixel graphical display, removable SD card, and your choice of motionbusses.

Extended I/O Variant

The extended I/O variant offers everything on the base model, plus I/O expansion. It adds additional 12 I/O for a total of 28 I/O. The option fit in the same package as the base model.

Two-cable feedback option

Needing support for non-single-cable feedback like EnDat, BiSS or incremental encoders? The two-cable feedback option adds a 15-pin SUB-D connector for dual cable feedback or dual-loop operation.

SafeMotion™ Monitor (SMM™)

The Extended I/O model is offered with the optional SMM. The SMM converts some of the I/O into "Safe" I/O, and allows the drive to interface safely to an FSoE master. Again, these options fit in the same package as the base model.

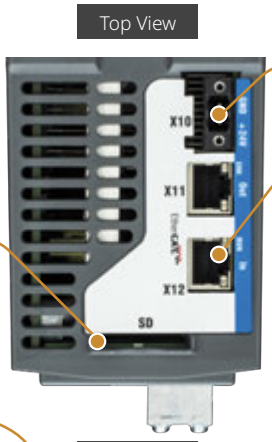
Dual-Axis AKD2G 480 Vac
(shown with optional feedback and I/O expansion)

Dual-Axis AKD2G 240 Vac
(shown with optional SMM, feedback and I/O expansion)

120/240 Vac	Continuous Current	Peak Current	Typical Shaft Power	Internal Regen		Height	Width	Depth	Depth w/ cable bend radius
	(Arms)	(Arms)	(kW)	(W)	(Ω)	mm (in)	mm (in)	mm (in)	mm (in)
AKD2G-SPx-6V03S	3	9	1	100	15	233 (9.15)	75 (2.95)	180 (7.09)	225 (8.86)
AKD2G-SPx-6V06S	6	18	2						
AKD2G-SPx-6V12S	12	30	4						
AKD2G-SPx-6V03D	3 & 3	9 & 9	1 & 1						
AKD2G-SPx-6V06D	6 & 6	18 & 18	2 & 2						

240/480 Vac	Continuous Current	Peak Current	Typical Shaft Power	Internal Regen		Height	Width	Depth	Depth w/ cable bend radius
	(Arms)	(Arms)	(kW)	(W)	(Ω)	mm (in)	mm (in)	mm (in)	mm (in)
AKD2G-SPx-7V03S	3	9	2	100	33	270 (10.6)	75 (2.95)	180 (7.09)	225 (8.86)
AKD2G-SPx-7V06S	6	18	4						
AKD2G-SPx-7V12S	12	30	8						
AKD2G-SPx-7V03D	3 & 3	9 & 9	2 & 2						
AKD2G-SPx-7V06D	6 & 6	18 & 18	4 & 4						

AKD2G Drive Connector Layout



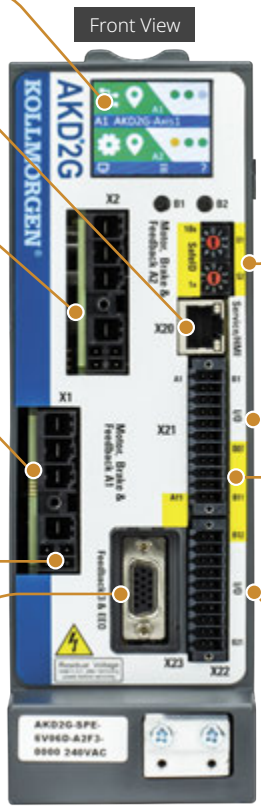
24Vdc logic supply input

Optional Motionbus:
- EtherCAT®
- FSoE
- CANopen®
- Profinet® IRT
- Ethernet/IP™

Removable memory
(Standard SD card)

Safe Address Setting
(included with SMM option)

Full color (RGB) backlit LCD display, 160 x 128 pixels



Service Port:
- Workbench connection
- TCP/IP
- Modbus TCP

Second motor
(with dual-axis option)
- Motor power
- Brake
- Feedback

Optimized for single hybrid cable interface:
- Motor power
- Brake
- Feedback

Up to SIL3 Safe Options
- Safe Brake
- Safe Feedback

Optional feedback port
(15-pin "D-sub"):
- Dual-loop Feedback
- Legacy Feedbacks
  - Resolver
  - A-QUAD-B
  - EnDAT
  - BiSS
  - sin/cos, etc.
- EEO (encoder emulation)

AC Mains (in and out):
120/240 Vac, 240/480 Vac

Inputs and Outputs (I/O):

Base drive offers:
1 x Analog Input
1 x Analog Output
8 x Digital Inputs (sinking), of which two (2) are high-speed
4 x Digital Outputs (sourcing)
1 x Relay Output, 24V @ 2A
1 x Two-channel STO

Optional I/O Expansion:

Drive with I/O expansion offers:
2 x Analog Inputs
2 x Analog Outputs
12 x Digital Inputs (sinking), of which two (2) are high-speed
2 x "Open" Digital Outputs as volt-free pairs (sink/source 5V-24V), high speed
6 x Digital Outputs (sourcing)
2 x RS485-style Selectable Inputs or Outputs, 5V
1 x Relay Output, 24V @ 2A
1 x One-channel or Two-channel STO

Drive with SMM* & I/O expansion offers:**
2 x Analog Inputs
2 x Analog Outputs
8 x Digital Inputs (sinking), of which two (2) are high-speed
4 x "Safe" Digital Inputs (sinking), can be configured instead as "normal" inputs or STO
2 x "Open" Digital Outputs (sink/source 5V-24V), high speed
2 x Digital Outputs (sourcing)
4 x "Safe" Outputs (sourcing)
2 x RS485-style Selectable Inputs or Outputs, 5V high-speed
1 x Relay Output, 24V @ 2A
1 x One-channel or Two-channel STO

Physical Earth (PE)
Also where shield/screens are mounted

*SMM = Optional SafeMotion Monitor
**I/O count shows the net sum of standard I/O + the expansion I/O

SafeMotion™

Second Generation SafeMotion Improves Productivity

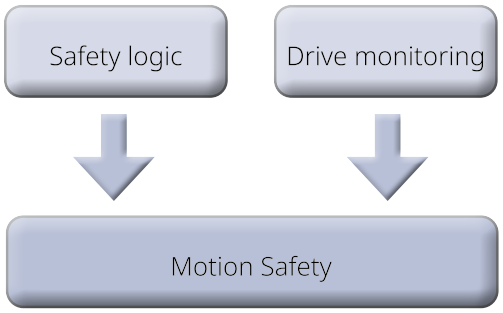
Why should a whole production line be brought to a standstill during user interventions when only one part of it is affected? Kollmorgen has put the idea of building drives with SafeMotion that integrates the safety logic and monitoring within the drive. Without compromising on safety, SafeMotion can achieve considerably higher productivity and offer more flexibility when adjusting to new requirements.

Make the Most of the Advantages of the Kollmorgen Motion Safety Strategy

Higher productivity	Motion Safety enables user interventions in running processes Safe motion instead of safe deactivation Risk-dependent triggering of safety functions
Low system costs	Optimal adjustment to requirements due to modular structure Wide range of standard products Safety control and drive monitoring in one device
Flexible	Modular concept and simple upgrade of existing drives Seamless transition from hardwired to configurable safety logic
Simple and fast implementation	Important motion-related safety functions are integrated Predefined safety function blocks Intuitive tools for programming and parameterization in the field by the customer

Safety Logic and Drive Monitoring Integrated within the Drive

Quickly Integrate AKD2G Into Your Automation System



Easy to Use

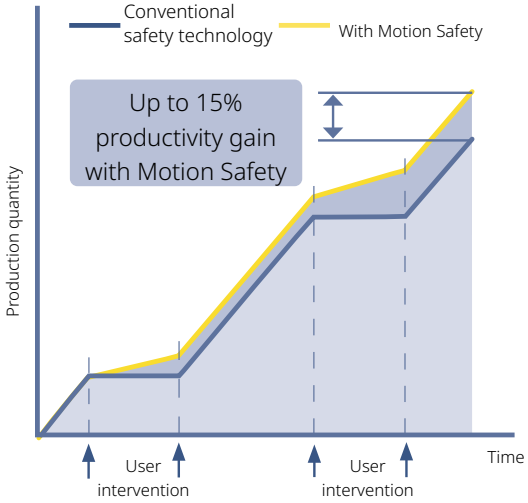
- Workbench or FSoE master tool:
  - Easy configuration and troubleshooting
  - Simplified commissioning & troubleshooting
  - Simple field drive replacement

Flexible & Seamless Integration

- Easy connectivity to simple safety relays or to FSoE master
- Standalone safety without additional safety control
- Central SafeMotion parameter storage in the PLC

Innovative SafeMotion

- Single cable technology with optional safe encoder
- Optional Safe EnDAT® high-accuracy e.g. with linear feedback
- Quick (~ms) response to critical events
- Extended safety funtions like Safe Dynamic Brake (SDB) and Safe Brake Test (SBT)



Productivity Gains with Motion Safety

Safety functions for areas with dangerous motion are activated when intervening in a running process. With intelligent safety functions, motion sequences are controlled so that each motion is safe. For example, this is performed through position monitoring and restricting the range of motion or by increasing the cycle times. Parts of the machine that do not constitute a risk to the user are not affected. The graph clearly shows the productivity gains when using Kollmorgen's Motion Safety technology.

Kollmorgen – your Competent Partner for Safe Drive Solutions

As the leading manufacturer of electrical drive technology, Kollmorgen boasts extensive expertise gained from thousands of drive projects around the world. Safety logic, servo drives, motors, through to complete automation solutions – Kollmorgen supplies coordinated components for safe drive solutions, all from one source. Whether it is a standard implementation or a new development as part of a co-engineering project, make use of Kollmorgen's innovative capacity and experience for developing your safe drive.

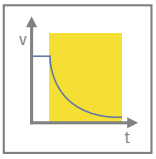
FailSafe over EtherCAT®

SafeMotion™

Extensive Safety Functions for SafeMotion, tailored to your needs.

Option 1 – STO hard-wired

STO (Safe Torque Off)

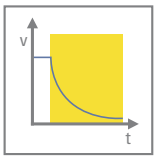


STO - Safe Torque Off

STO safely interrupts the power supply to the motor in the servo drive. The motor becomes torque-free.

Option 2 – Safe Stopping Functions

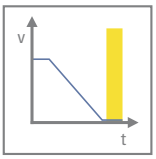
STO (Safe Torque Off)



STO - Safe Torque Off

STO safely interrupts the power supply to the motor in the servo drive. The motor becomes torque-free.

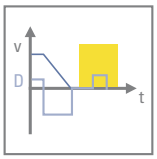
SS1[1] (Safe Stop 1 – Time Monitored)



SS1 - Safe Stop 1 -t

The axis is brought to a standstill by controlled braking. Then the power supply to the motor is safely interrupted and the motor becomes torque-free.

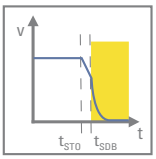
SBC (Safe Brake Control), SBT



SBC, SBT - Brake Control

SBC (Safe Brake Control)
SBC provides safe signals for controlling external and internal holding brakes.
SBT (Safe Brake Test) (non-standardized)
Test function for external brakes and the internal motor holding brake.

SDB (Safe Dynamic Brake)



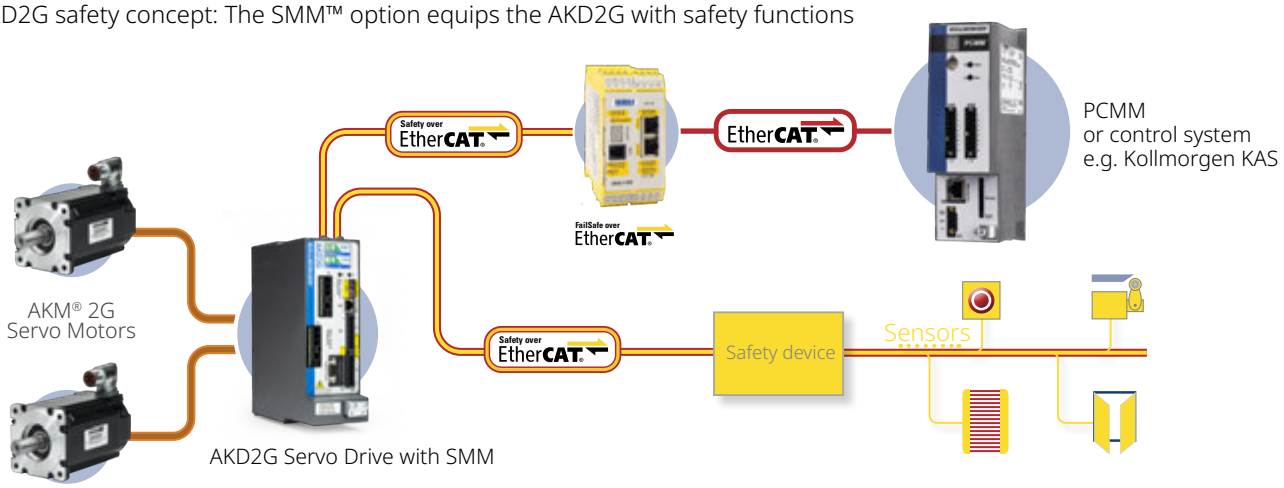
SDB - Safe Dynamic Brk.

When SDB is triggered, the energy stored in the moment of inertia of the rotating mass is converted into heat energy via a braking resistor in or at the drive. The delay time to standstill is shorter than during normal coasting (STO).[2]

1. SS1 if faulted is the default setting. Users can easily configure this or other actions in WorkBench.
2. The deceleration is not controlled. External forces such as vertical loads can keep the motor spinning longer.

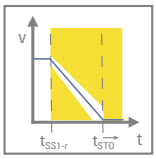
Possible Example System: Safe Dual-axis Drive with....

AKD2G safety concept: The SMM™ option equips the AKD2G with safety functions



Option 3 – Safe Speed and Positioning

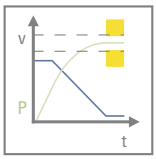
SS1-r (Deceleration Monitored SS1)



SS1 - Safe Stop 1 -r

SS1-r, when activated, monitors the controlled stop of the axis until the STO function can be activated.

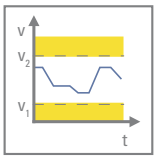
SOS (Safe Operating Stop)



SOS - Safe Operating Stp

Monitors the stop position reached and triggers SS1 in the event of deviations beyond the specified limits. The control functions of the drive remain active.

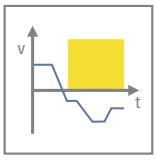
SSR* (Safe Speed Range)



SSR - Safe Speed Range

Monitors that the drive observes a defined speed limit. In the event of an error, STO is triggered.

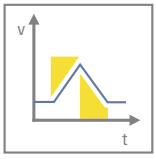
SDI* (Safe Direction)



SDI - Safe Direction

The SDI function ensures that the drive can only move in a defined direction. In the event of an error, SS1 is triggered.

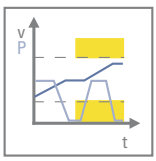
SLA (Safe Limited Acceleration)



SLA - Safe Limited Accel

This function prevents the motor from accelerating or decelerating too rapidly. If the rate of acceleration exceeds the limits, STO is triggered.

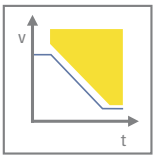
SLP* (Safe Limited Position)



SLP - Safe Limited Pos.

Monitors the absolute position of the drive. If the limit value is reached or the brake torque is too low to keep the drive within the limit value, SS1 is triggered.

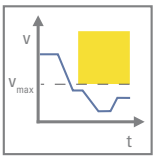
SS2* (Safe Stop 2)



SS2 - Safe Stop 2

The drive is brought to a standstill by controlled braking and subsequently remains in controlled standstill. The control functions of the drive are maintained.

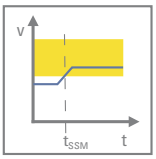
SLS* (Safe Limited Speed)



SLS - Safe Limited Speed

Monitors that the drive observes a defined speed limit. In the event of an error, SS1 is triggered.

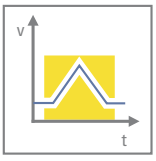
SSM (Safe Speed Monitor)



SSM - Safe Spd. Monitor

This function monitors the speed.If a selected speed range is left, a safe output signal is generated.
An additional “standstill monitor” can be replaced by the function.

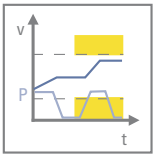
SAR (Safe Acceleration Range)



SAR - Safe Accel Range

This function keeps the motor acceleration and/or deceleration within defined limits. If the acceleration limits are exceeded, STO is triggered.

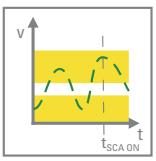
SLI* (Safe Limited Increments)



SLI - Safe Limited Incr.

Monitors the relative position of the drive with respect to the current position when activating the SLI function. SS1 is triggered when the prescribed limit value is reached.

SCA (Safe Cam)



SCA - Safe Cam

This function monitors the position. If a defined position range is left, a safe output signal is generated. Used to implement safe electronic cam sequencers without requiring any hardware cams.

*SS1, if faulted, is the default setting. Users can easily configure this or other actions in WorkBench.

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 equipment effectiveness (OEE) by 50%.

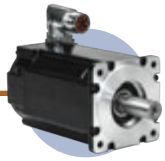
The Benefits of AKD® Servo Drives

Optimized Performance in Seconds	» 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
Greater Throughput and Accuracy	» 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
Easy-to-use Graphical User Interface (GUI) for Faster Commissioning and Troubleshooting	» 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
Flexible and Scalable to Meet any Application	» 3 to 48 Arms continuous current; 9 to 96 Arms peak » Very high power density enables an extremely small package » True plug-and-play with all standard Kollmorgen servo motors and actuators » Supports a variety of single and multi-turn feedback devices – Smart Feedback Device (SFD/SFD3), EnDat 2.2, EnDat 2.1, 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® RT, SERCOS® III, 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.

AKMH™ Hygienic Stainless Steel Motors

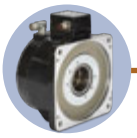


AKM & AKM® 2G Servo Motors

Frameless Brushless Direct Drive Motors

AKD®-N Decentralized Servo Drive

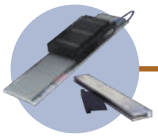
Control of axes with PCMM programmable multi-axis EtherCAT® master



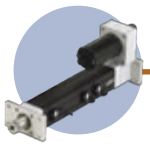
Cartridge DDR® Motors

AKD® Servo Drive

Housed DDR® Motors



Direct Drive Linear Motors



Linear Actuators

Multi-Axis Precision Tables

Best-in-Class Components
AKD works seamlessly with Kollmorgen motors and actuators–well-known for quality, reliability, and performance.

Industry-leading power density

48A @ 480V

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-x00306	3	9	1100	0	0	168 (6.61)	59 (2.32)	156 (6.14)	184 (7.24)
AKD-x00606	6	18	2000	0	0	168 (6.61)	59 (2.32)	156 (6.14)	184 (7.24)
AKD-x01206	12	30	4000	100	15	196 (7.72)	78 (3.07)	187 (7.36)	215 (8.46)
AKD-x02406	24	48	8000	200	8	247 (9.72)	100 (3.94)	228 (8.98)	265 (10.43)

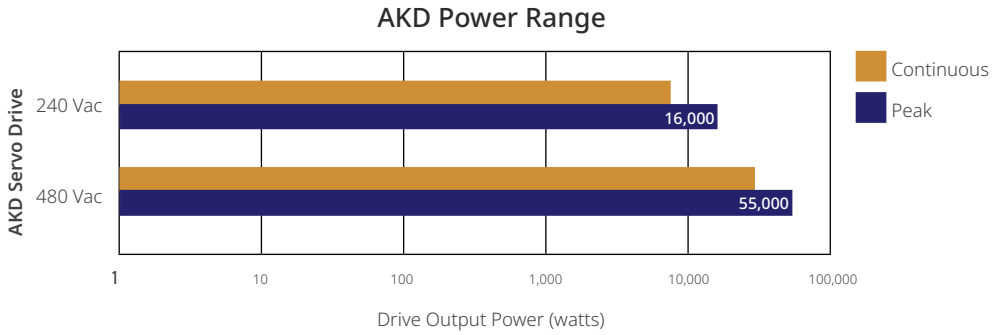
240/480 Vac 3 Phase (187-528 V)	Continuous Current (Arms)	Peak Current (Arms)	Drive Continuous Output Power Capacity (Watts)	Internal Regen (Watts)	(Ohms)	Height mm (in)	Width mm (in)	Depth mm (in)	Depth with Cable Bend Radius mm (in)
AKD-x00307	3	9	2000	100	33	256 (10.08)	70 (2.76)	185 (7.28)	221 (8.70)
AKD-x00607	6	18	4000	100	33	256 (10.08)	70 (2.76)	185 (7.28)	221 (8.70)
AKD-x01207	12	30	8000	100	33	256 (10.08)	70 (2.76)	185 (7.28)	221 (8.70)
AKD-x02407	24	48	16,000	200	23	306 (12.01)	105 (4.13)	228 (8.98)	264 (10.39)
AKD-x04807	48	96	35,000	–	–	385 (15.16)	185 (7.28)	225 (8.86)	260 (10.23)

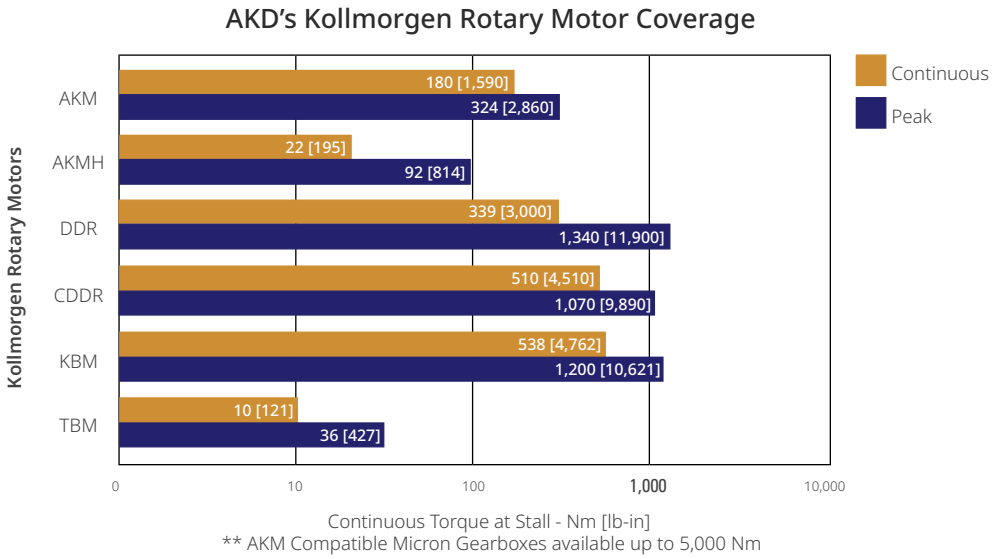
EtherCAT PROFINET EtherNet/IP SERCOS interface SynqNet CANopen Modbus/TCP HTTP UDP UL LISTED CE ISO RoHS EAC

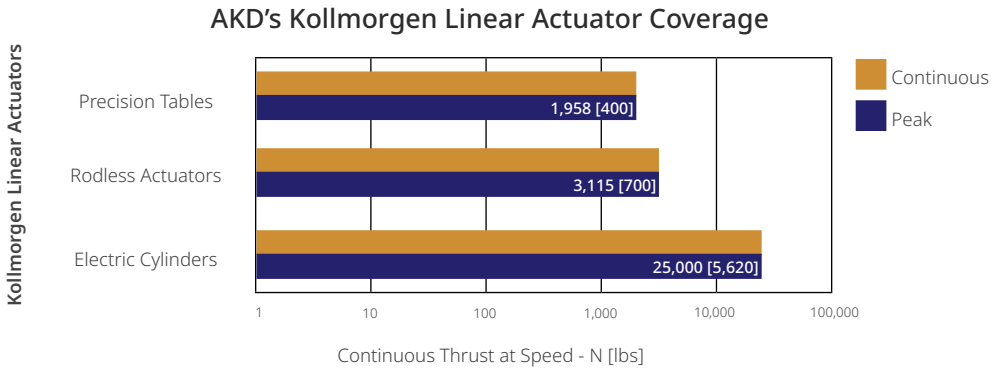
AKD® Servo Drive

Range of Coverage

When you pair the AKD servo drive with any of our Kollmorgen motors or linear actuators, you'll achieve optimized performance. From 3 to 48 Arms continuous current and 9 to 96 Arms peak current, the feature-rich AKD provides a solution for nearly any application.







Feedback & I/O

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

	Standard Drive	With I/O expansion - AKD-T only
Encoder Output or AUX Encoder Input	2.5 MHz Maximum line frequency	
Feedback	Smart Feedback Device (SFD3) and HIPERFACE DSL single cable feedback SFD, EnDat 2.1, EnDat 2.2, BiSS, analog Sine/Cos encoder, incremental encoder, HIPERFACE and resolver dual cable feedback	
Logic supply	24 Vdc	
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

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 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.

I/0 Capabilities	Base Version	Expanded I/O Version
Digital Inputs	8	20
Digital Outputs	3	13
Analog Inputs	1	2
Analog Outputs	1	2

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.

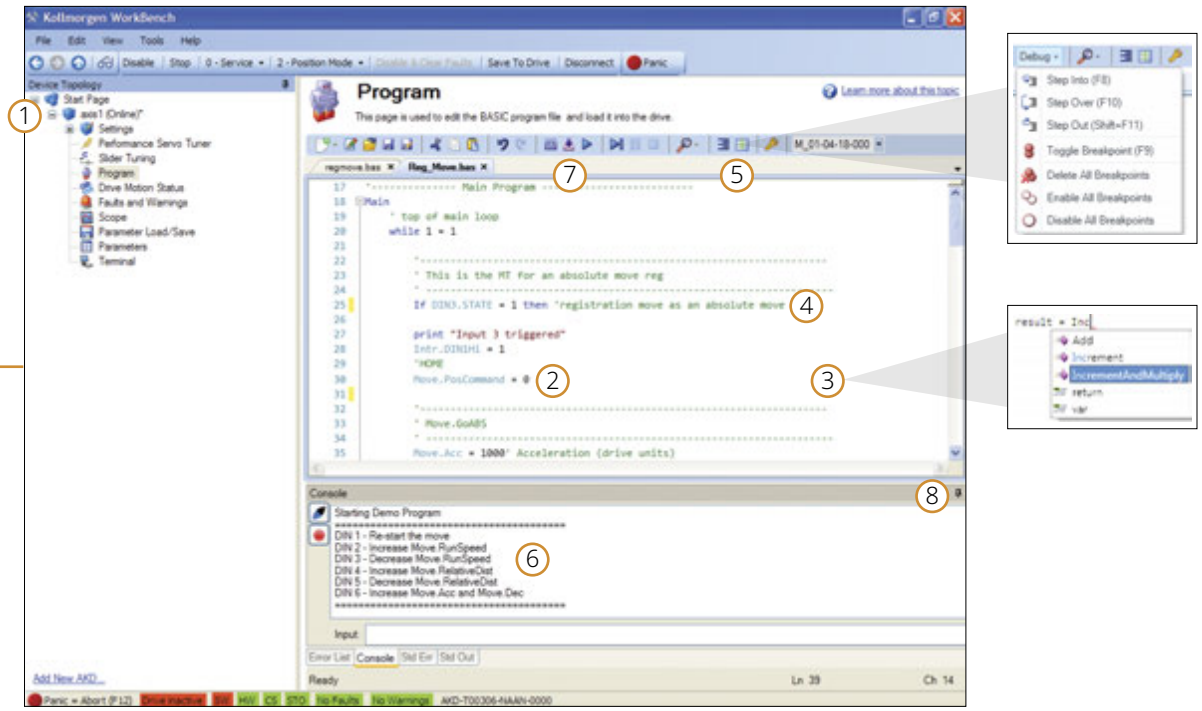
Development Tools that Speed Programming and Improve Quality

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 Drive-Resident 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 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™ —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-MxEC-0000	3	9	168 / 6.61	89 / 3.50	156 / 6.14
AKD-M00606-MxEC-0000	6	18	168 / 6.61	89 / 3.50	156 / 6.14
AKD-M01206-MxEC-0000	12	30	196 / 7.72	107 / 4.21	187 / 7.36
AKD-MO2406-MxEC-0000	24	48	248 / 9.76	96 / 3.78	228 / 8.98

240/400/480 Vac 3-Phase*	Continuous Current (Arms)	Peak Current (Arms)	H (mm/inches)	W (mm/inches)	D (mm/inches)
AKD-M00307-MxEC-0000	3	9	256 / 10.08	99 / 3.90	185 / 7.28
AKD-M00607-MxEC-0000	6	18	256 / 10.08	99 / 3.90	185 / 7.28
AKD-M01207-MxEC-0000	12	30	256 / 10.08	99 / 3.90	185 / 7.28
AKD-M02407-MxEC-0000	24	48	306 / 12.05	99 / 3.90	228 / 8.98
AKD-M04807-MxEC-0000	48	96	385 / 15.16	185 / 7.28	225 / 8.85

*Where"x" = C is for the standard 800 MHz CPU and "x" = 1 is for the high performance v1.2 GHz CPU.

Features

- Kollmorgen Automation Suite™ provides fully integrated programming, testing, setup and commissioning
- Embedded web server utility simplifies service
- Control 32 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
  - On-board I/O includes 13 digital inputs, 4 digital outputs, 1 analog input, 1 analog output (expandable with AKT series of remote I/O)
- Works with Kollmorgen Visualization Builder for programming AKI2G human-machine interface panels

*Maximum axis count depends on motion/automation complexity and performance (8 axes nominal based on medium complexity at 4 kHz network update rate)

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 PCMM-based system up to 64 axes or more. Kollmorgen Automation Suite has been proven to:

- 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:

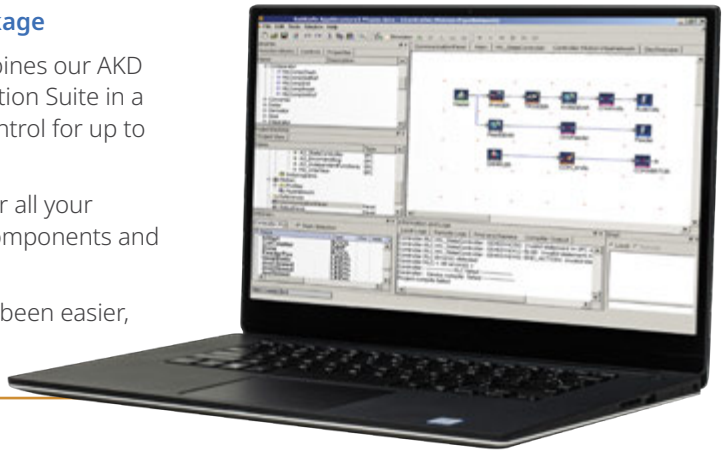
- Plug-and-play compatibility with your servo motor
- All the advantages of Kollmorgen´s breadth of motor platforms including AKM®, CDDR®, and other direct-drive technologies
- The fastest velocity and position loop updates
- Full-frequency auto-tuning for perfect motion across the performance spectrum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

Our Best Drive and Automation Solution in a Single Package

The 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.



AKD® Servo Drive Accessories

Ethernet Connectivity

- Ethernet-based AKD servo drive provides the user with multiple bus choices
- EtherCAT® (DSP402 protocol), Modbus® TCP, SynqNet®, EtherNet/IP™, PROFINET® RT, SERCOS III, 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, CE, and EAC
- 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)

- 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
- AKD-x003 – AKD-x024: SIL2 / PL d
- AKD-x048: SIL3 / PL e

Internal Regenerative Braking Resistor

(all models except 120/240 Vac 3 A_{eff} and 6 A_{eff} , as well as 480 Vac, 48 A_{eff})

- 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 Actuators

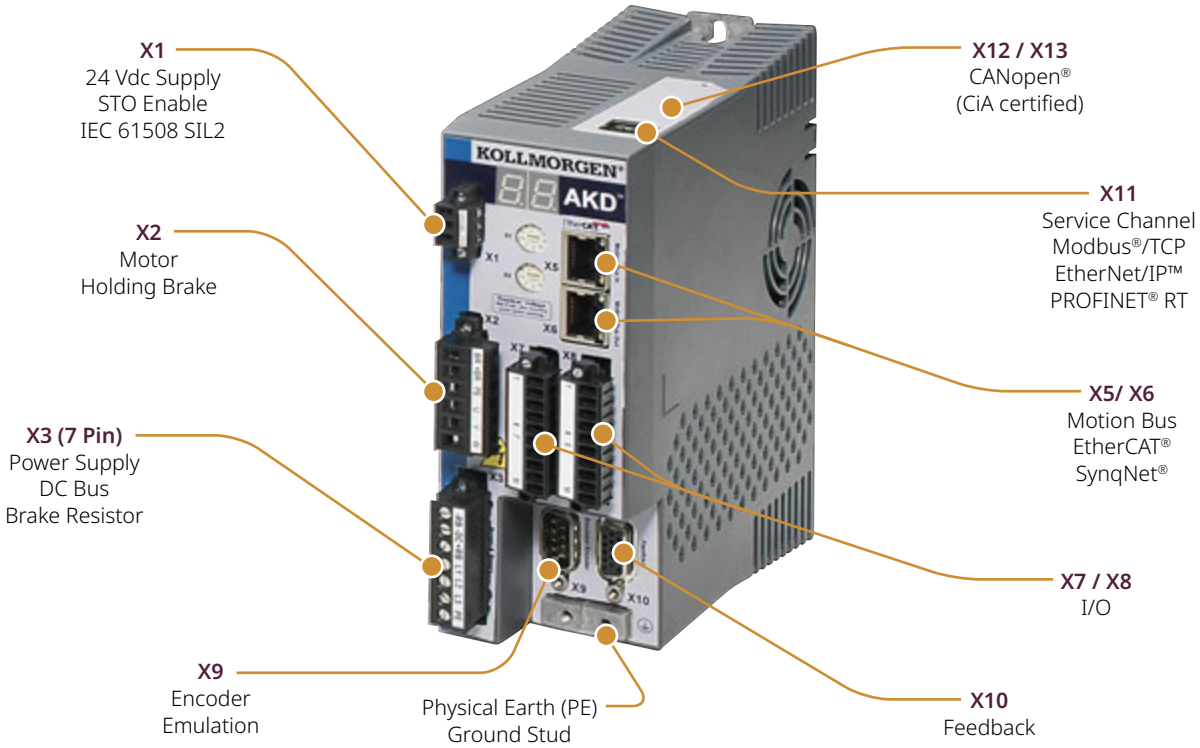
- Electronic motor nameplates allow parameters to automatically load for fast commissioning
- Motion in seconds
- Custom motor parameters easily entered

I/O (Base Drive)

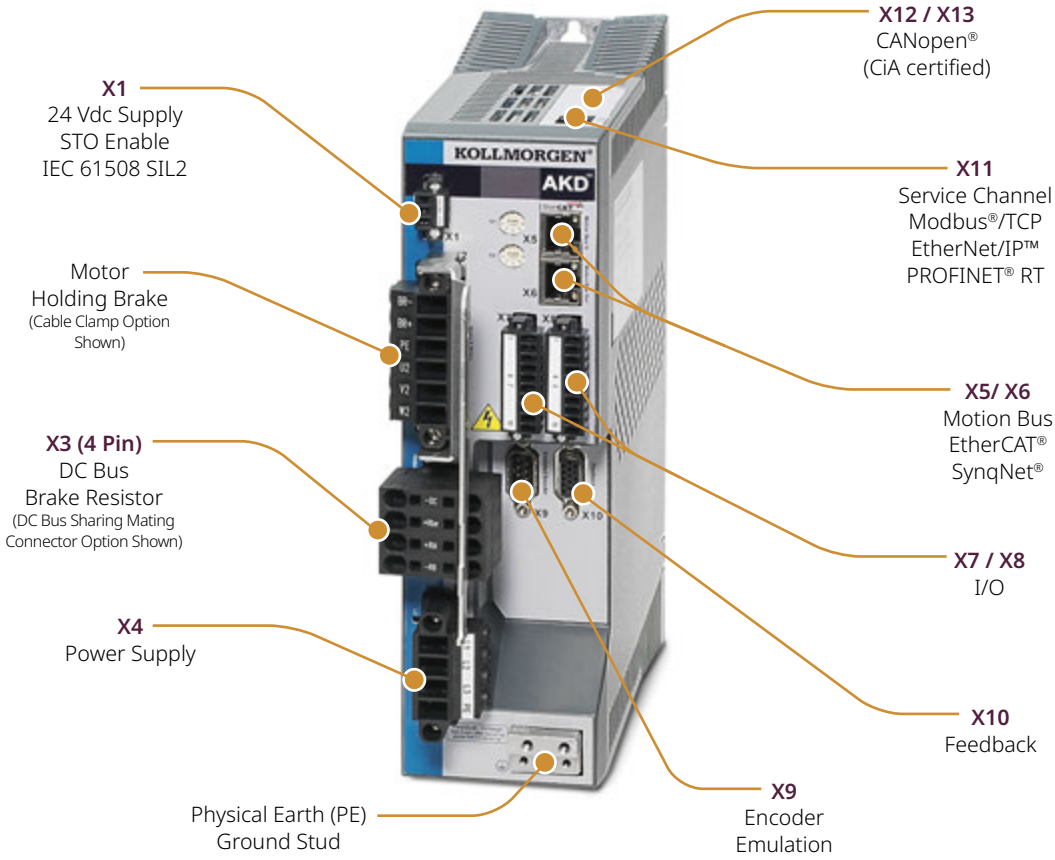
- 8 digital inputs (1 dedicated to enable)
- 2 high-speed digital inputs (maximum time delay of 1.0 µs)
- 3 digital outputs (1 dedicated to fault relay)
- 1 analog input - 16 bit
- 1 analog output - 16 bit

EtherCAT® PROFINET EtherNet/IP Modbus TCP/IP UDP HTTP CANopen SERCOS interface SynqNet

AKD 120/240 Vac Connector Layout



AKD 240/480 Vac Connector Layout

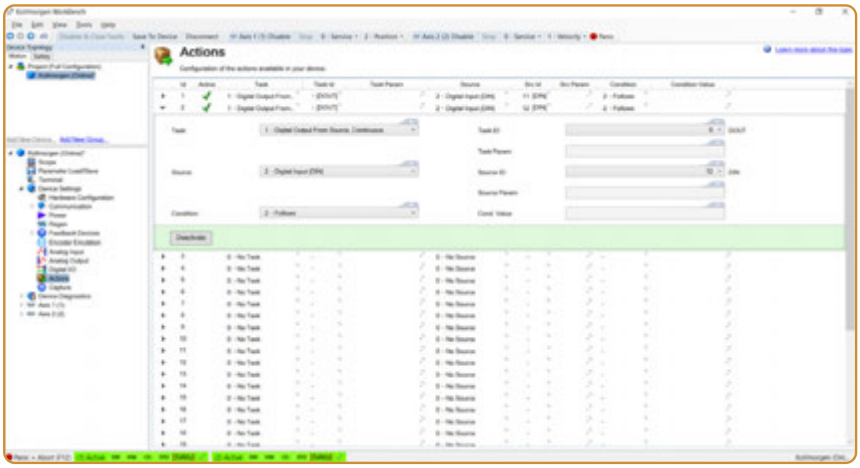


Kollmorgen Workbench

Our simple Graphical User Interface (GUI), Kollmorgen WorkBench, is designed to expedite and streamline the user's experience with the AKD® family of servo drives. 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

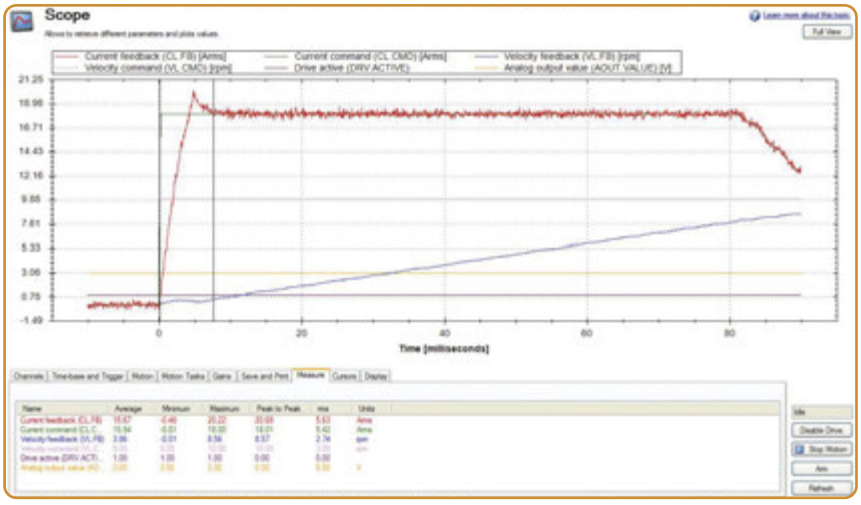
Logical flow, colorful icons and easy access simplify interactions with the AKD servo drive. The folder structure allows for instant identification and easy navigation.



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.

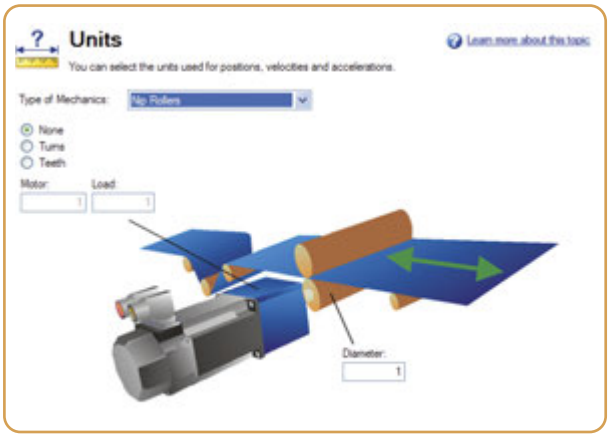
- Save as an image
- Load to an e-mail
- Print



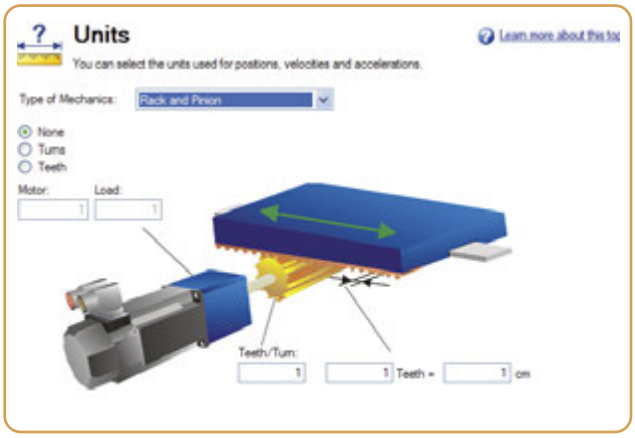
Application Selection

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

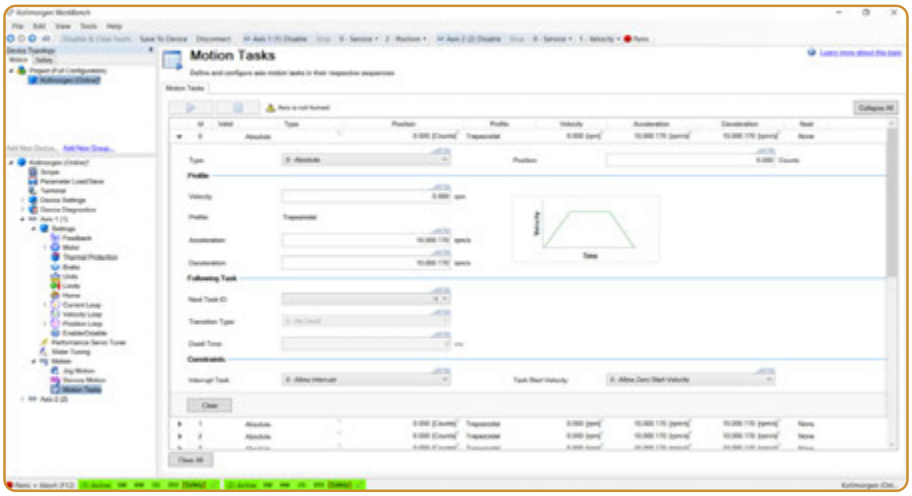


Rack and Pinion Application Selection



Motion Simplified

Quickly and effortlessly, build motion into your application through Workbench's menus. Workbench provides users easy options and visual representation to integrate both simple and complex motion profiles.



AKD®-N Decentralized Servo Drive

The decentralized AKD-N servo drives from Kollmorgen can be placed in the immediate vicinity of the motor thanks to its robust, compact construction and protection class IP67, plug-in connections, excellent motor compatibility and high degree of integrated functionality.

With the decentralized AKD-N servo drives, you can develop drive and automation architectures that are easily comprehensible, and integrate with the central AKD servo drives. Using EtherCAT® as a system bus, we reduce complexity further since the AKD-N can collect I/O signals on the axis and pass them on in bundled form.

Improved Overall Equipment Effectiveness (OEE)

With AKD-N you increase the effectiveness beyond the entire life cycle of your machine (OEE, Overall Equipment Effectiveness). The design configuration and simple connection technology decrease the time for assembly, installation, and start-up. During the operating phase, the AKD-N plays a valuable part in energy savings due to the integrated DC connection. Further advantages in production are faster cleaning cycles, thanks to a higher protection class, as well as fewer cables in combination with a space-saving switch cabinet superstructure. Moreover, the assembly and connection technology increases the availability – and thereby productivity – because maintenance and service tasks are completed faster.

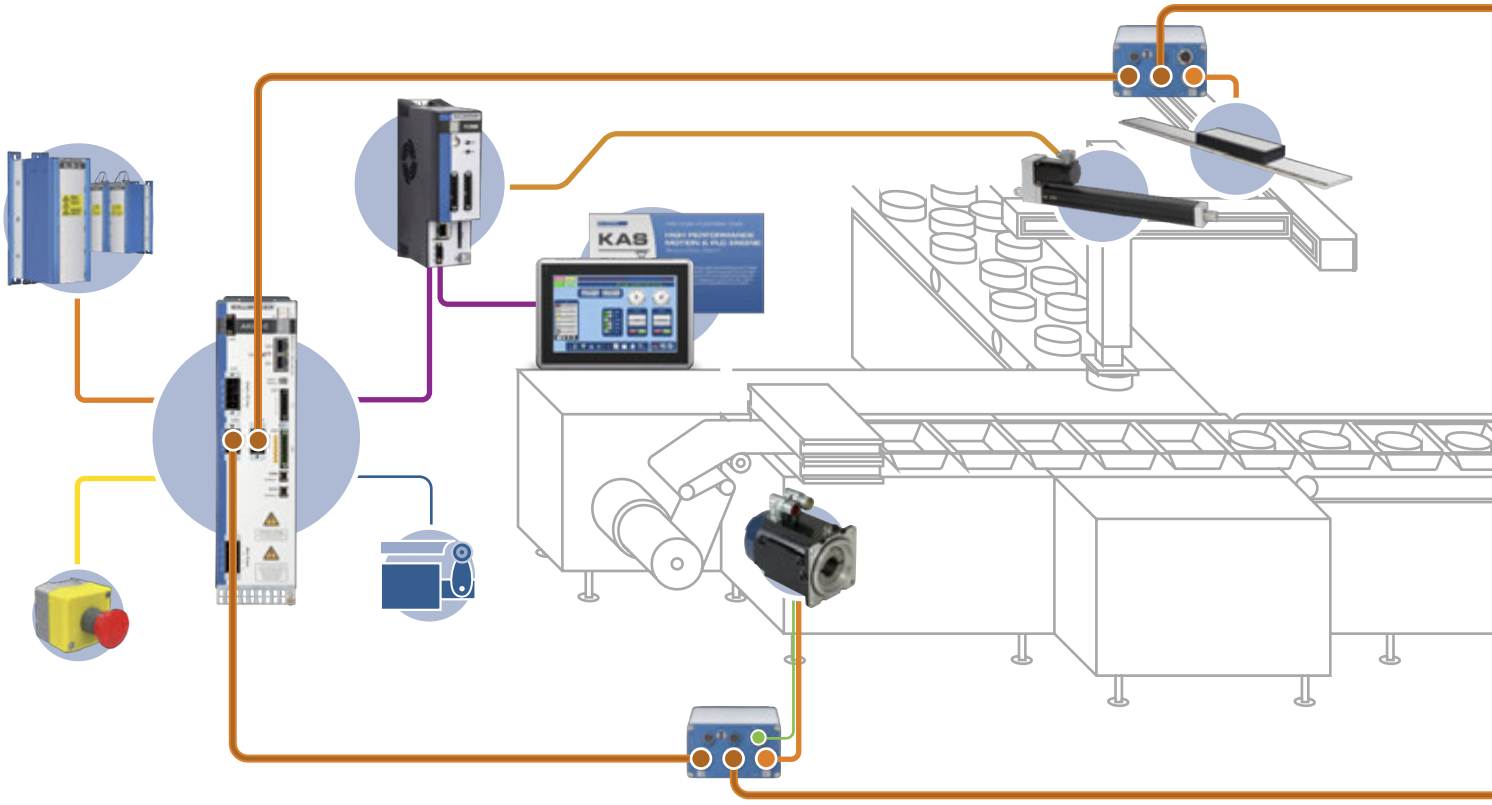
The Advantages of Decentralized Servo Drives

Reduced costs	Reduced cabling because DC and network, power supply, I/O level as well as safety (STO) run in one cable Faster and simple assembly, even without special knowledge, through ready-made and tested cables Lack of derating enables smaller motor and servo drive combinations compared to integrated system with the same output power
Compacter machines	Smaller and therefore more easily integrated switch cabinets Servo drives in the immediate vicinity of the motor Robust construction in Protection class IP67 makes protective enclosures superfluous
Faster startup	Plug connectors in IP67 for connection without tools At only eleven millimeters, the thin hybrid cable can be laid in a space-saving manner – even in tight machine corners, thanks to a small bending radius Simple connection of I/O systems or networks directly to the drive Parameterization with the tools of the Kollmorgen WorkBench
Higher machine effectiveness (OEE)	Design supports fast and effective cleaning High operating safety through robust construction Precision through digital feedback Everything at a glance: Status display on servo drive
More flexibility in machine design	Compatible with all motors from Kollmorgen with single-cable, or dual-cable, connection Simple combination of central and decentralized controllers within the comprehensive AKD family Faster modification and upgrade options through linear topology as well as I/O and network interfaces at the axis

AKD®-N Decentralized Servo Drive

Next Gen Machine Design Now

Next gen design requires the perfect interplay of standardized drive and automation components. Selection of a functional, freely scalable solution ultimately ensures the highest degree of design freedom in building machines that operate efficiently without complexity.



Kollmorgen Automation Suite™

» Scalable automation solution for drive-dominant applications
» Graphic motion programming
» Compatible with IEC 61131-3 and PLCopen Motion Control

AKD-C Central Power Supply Module

» Power supply for up to 16 AKD-N
» Complete integration in the AKD family
» EtherCAT® Network
» 2 STO inputs SIL 2 / PLd
» 1 each digital input and output, 1 relay output

AKD-N Distributed Servo Amplifier

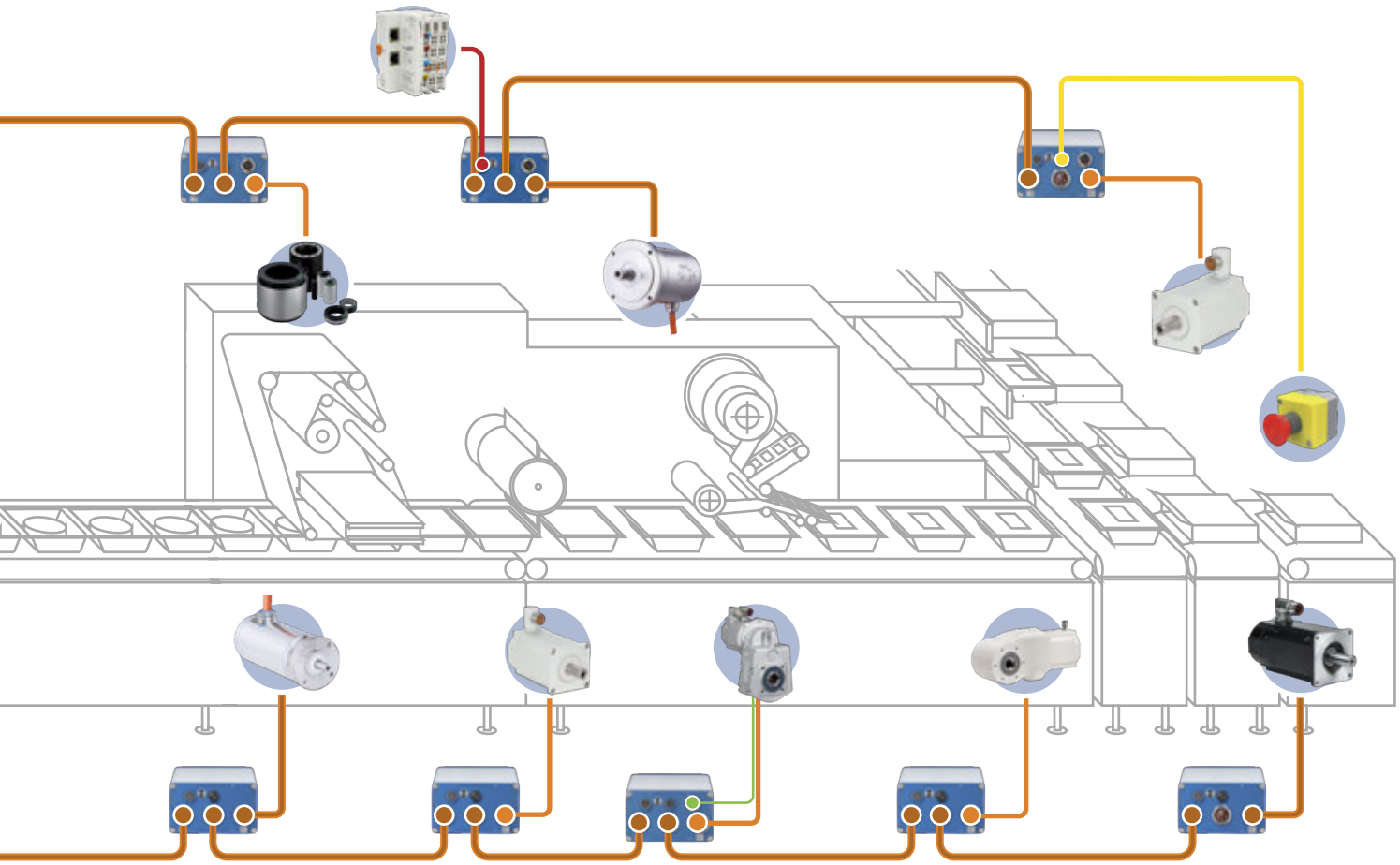
» Less cabling through single-cable solution
» Fast installation, simple assembly and connection
» IP65/IP67, UL design 4x
» Options: local EtherCAT® interface or local STO (SIL2 / PLd), connection for feedback systems

PCMM™ Stand-Alone Controller

» Up to 128 axes of coordinated motion with a single controller
» Up to 1.2GHz CPU for both motion and machine control
» PipeNetwork™ motion engine for visual programming or PLCOpen Motion engine
» High performance control with flexible cycle time as low as 250 µs
» 100BaseT connection supporting MODBUS TCP/IP, EthernetIP®, Profinet®, HTTP, and UDP

KCM Capacitor Modules

» Reduces the energy costs and prevents downtime
» Simple implementation
» No harmonics in the power cables
» Scalable capacity



AKM® 2G Servo Motors

» Average continuous torque increases of 30% or greater
» The same performance in 20% less space.

AKM® Servo Motors

» High torque density
» High precision and dynamics
» Produced in Europe, US and Asia regions

AKMH™ Stainless Steel Motors

» For the highest hygienic requirements
» Protection class IP69K
» Fulfills EHEDG directive

AKM Washdown Servo Motors

» Applications with regular cleaning
» Housing coating is Ecolab®-certified

AKM Washdown Food Servo Motors

» For use in the food and beverage industry
» Protection class IP67, FDA compliant

AKM Food-Grade Gearmotor

» The highest hygienic requirements
» High efficiency
» Single-cable connection

Cartridge Direct Drive Rotary® DDR

» Direct load coupling without gears or belts
» High precision, low noise generation

KBM Direct Drives with No Housing

» Low weight, exceptionally compact
» Modular system

DDL Ironcore ICH Motor

» High power density
» Large dynamics (>10g)
» Patented anti-cogging design

Linear Actuators

» Positioning an externally guided and supported load.
» Moving a load that pivots.

AKD®-N Decentralized Servo Drive

Our Way of Making Machines Simpler and More Efficient

- Advantage: Lower machine complexity
- Advantage: Greater freedom of design
- Advantage: Higher OEE (Overall Equipment Effectiveness)

- Complete integration in the AKD family

- Decentralized solution reduces effort and costs for switch cabinet

- MotionBus (EtherCAT®) for connection to automation systems

- Startup with the Kollmorgen Workbench

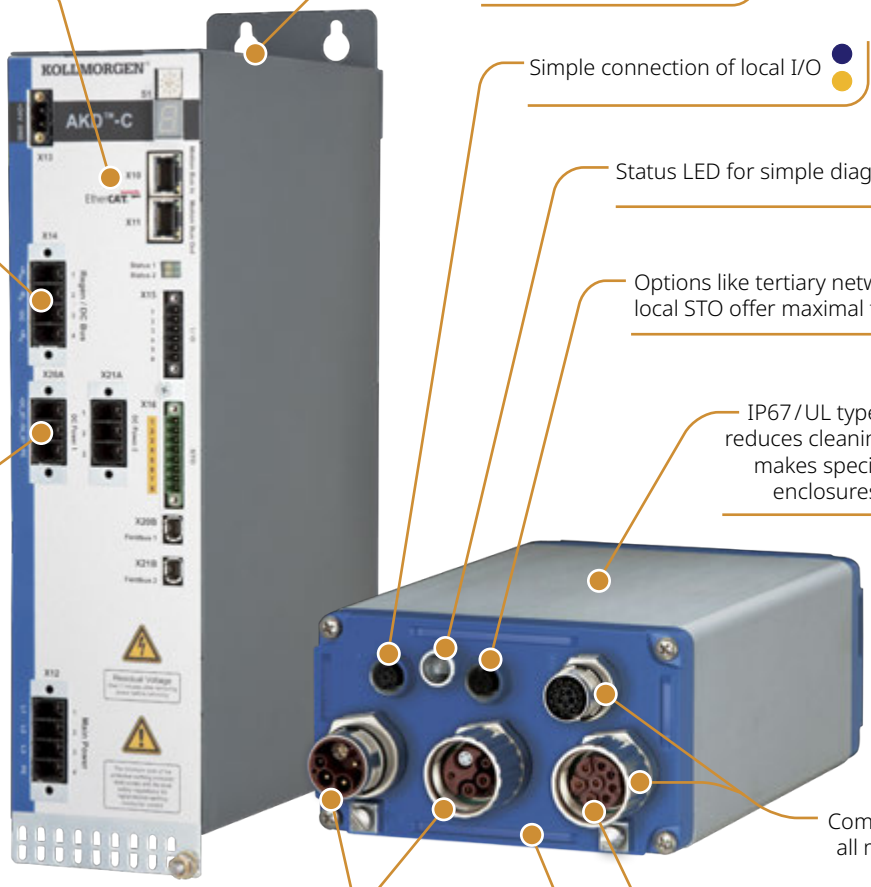
- Simple connection of local I/O

- Status LED for simple diagnosis

- Connection of external additional components

- Options like tertiary network and local STO offer maximal flexibility

- IP67 / UL type 4x housing reduces cleaning times and makes special protective enclosures redundant.



- A single AKD-C supplies up to 16 AKD-N

- Compatible with all motors from Kollmorgen

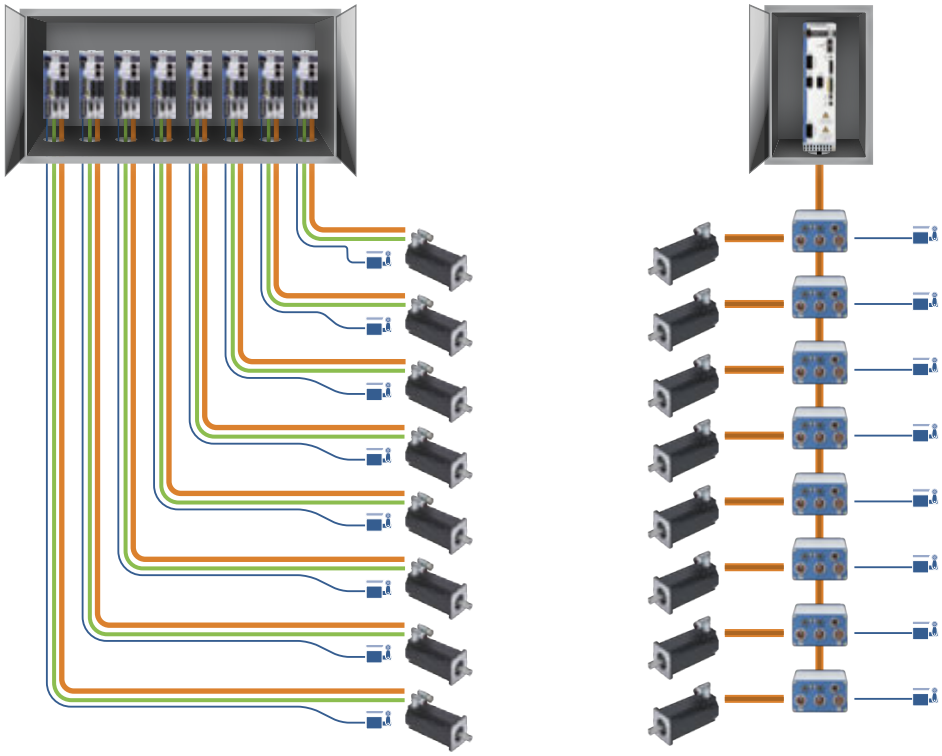
- A single cable with 11 mm diameter for DC bus, electrical supply, EtherCAT® network and STO reduces cabling outlay, increases the reliability and enables flexible machine design

- Simple and fast attachment

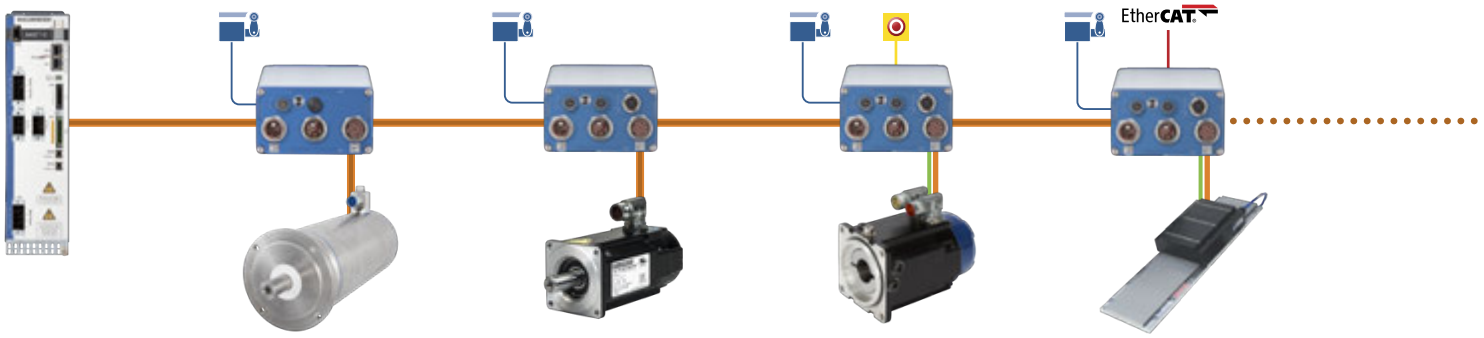
- Hybrid motor cable for simplified cabling, faster installation and higher reliability

Why Lay 372 m. of Cable When 42 m. Will Suffice?

Imagine your machine includes eight axes each with a distance of three meters. The switch cabinet is 5 meters away and on each axis there is also a switch. With this thoroughly realistic example, that equates to a total of 372 meters of cable – with our AKD-N it would have been 42 meters. The decentralized servo technology of the AKD-N saves 330 meters here! That is cable that does not have to be purchased or laid and which does not require any space in the machine construction. We find that these are very good grounds for starting the comparison. We combine the AKD-N servo controllers and their power supply modules with pre-assembled and tested system cables – it doesn't get much simpler than this.

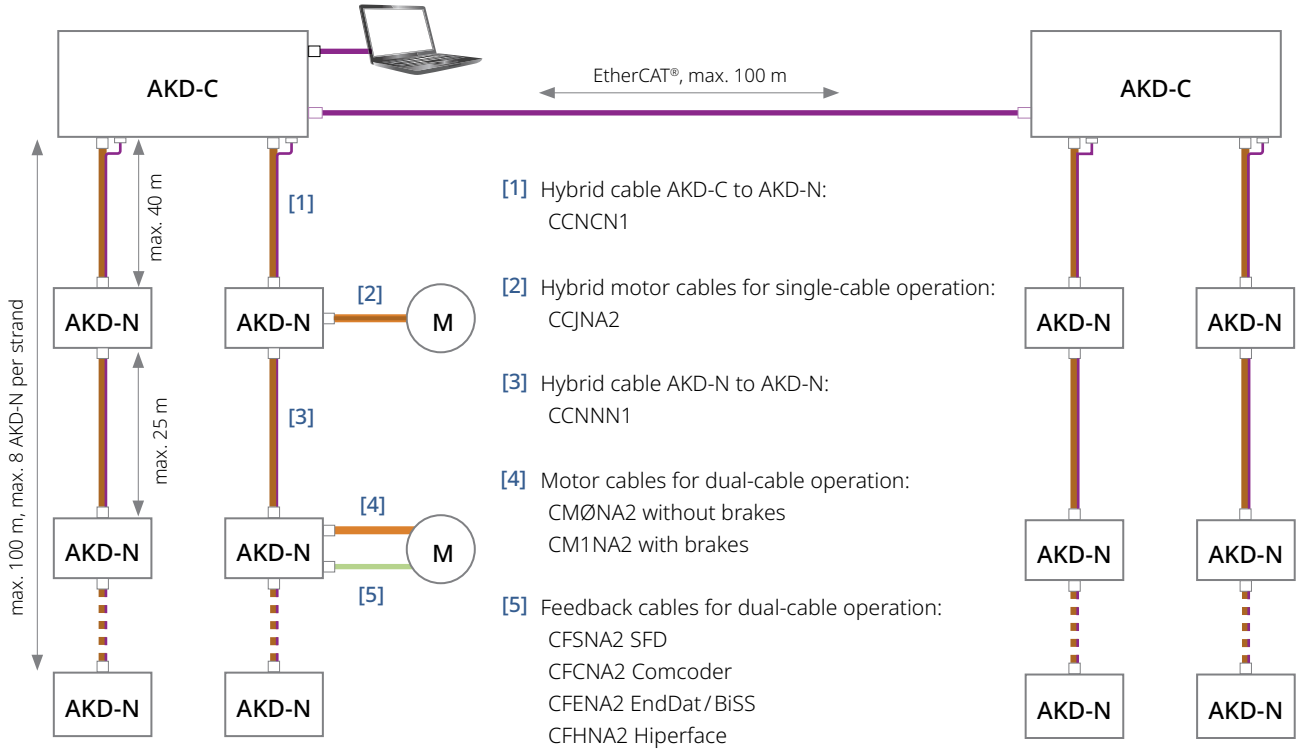


Regardless of which Motor: Plug and Play
Our AKD-N decentralized servo controllers work optimally with every motor. Within our Kollmorgen system, you can also thoroughly use all advantages of the single-cable connection technology individually.



AKD®-N Decentralized Servo Drive

Technical Data and Topology



AKD-N Decentralized Servo Drives

Continuous current	3 A, 6 A, 12 A
Peak current	9 A, 18 A, 36 A
Continuous input power	1.5 kVA, 3 kVA, 6 kVA
Protection class	IP67
Digital inputs/outputs	3 digital inputs / 1 digital output
Safety function	STO SIL 2 (only AKD-N-DS)
Feedback systems Dual-cable (not with -DB)	SFD (digital resolver), BISS-C, Comcorder, hall sensor, Endat 2.1 and 2.2, Hiperface
Feedback systems Single-cable	SFD3 (digital resolver)
Communication	EtherCAT
Dimensions (W x H x D)	Housing: 3 A, 6 A: 130 x 75 x 201 (mm) 12 A: 130 x 75 x 301 (mm) With plugs 3A, 6 A: 130 x 75 x 228 (mm) 12 A: 130 x 75 x 328 (mm)

AKD-C Power Supply Module

Line voltage	400/480 V
Overall performance	10 kW
Intermediate circuit voltage	560/680 V DC
Output current	17 A (peak 34 A)
Protection class	IP20
Output strands	2, for up to 8 AKD-N apiece
Safety function	one STO Enable and STO Status apiece for each strand, SIL 2
Digital inputs/outputs	1 input, 1 output, 1 relay output
Communication	EtherCAT®, TCP/IP service interface
Dimensions (W x H x D)	Housing (Front) 80 x 260 x 198 (mm) Installation dimension with plugs 80 x 329 x 231 (mm)

Connections and Controls

[1] Network connection for service PC (TCP/IP) (on the top)

[2] Setting the IP address

[3] 24 V DC power supply

[4] Error and status displays

[5] Motion Bus I/O connections (EtherCAT®)

[6] Status display of the local network

[7] Connection for external brake resistor and KCM buffer module

[8] I/O (1 each digital input and output, 1 relay output)

[9] DC outputs for connection of up to eight decentralized AKD-N servo drives apiece

[10] STO input, STO status output (one each per strand),

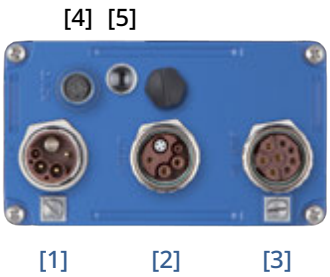
[11] Local network for communication with AKD-N

[12] Power connection 400 V / 480 V AC

Connection Options for AKD-N

AKD-N-	Single-cable technology	Separate feedback	Digital I/O	Tertiary fieldbus	Local STO
DB	✓	—	✓	—	—
DF	—	✓	✓	✓	—
DG	✓	—	✓	✓	—
DS	—	✓	✓	—	✓
DT	✓	—	✓	—	✓

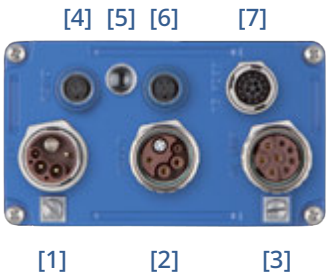
AKD-N-DB



[1] [2] Connections for hybrid cable

[3] Motor connection

AKD-N-DF, -DS



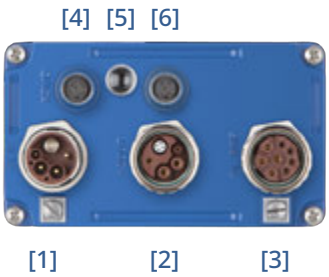
[4] 3 digital inputs, 1 digital outputs

[5] Status/error display with LED

[6] STO connection (-DS) / Tertiary fieldbus (-DF)

[7] Connection for feedback with dual-cable technology

AKD-N-DG, -DT



Servo Motors

When you need precise position control, choose from Kollmorgen's broad portfolio of 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 gearboxes, 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 Advantages of Kollmorgen Servo Motors

» **Optimized AKM family and direct drive motor windings for the AKD® family of servo drives** » **Amplifier and motor dimensions reduced** » **Lower system costs**	» With the same size, the AKM offers up to 47% more power on the motor shaft » For a given frame size the AKM2G provides an average continuous torque increase of 30% compared to most competitive motors of equivalent size
» **Quicker start-up of all servo systems** » **Immediate and adaptive reaction to dynamic loads optimizes performance within seconds** » **Precise regulation of all motor types** » **Compensation for stiff and compatible gearboxes and clutches**	» Start-up of amplifiers with plug-and-play detection for AKM family and Cartridge DDR series motors
» **More precise machines due to higher resolution and improved accuracy** » **With multi-turn absolute encoders: reduced cycle times and lower costs for sensors and cabling through the omission of conventional reference run methods**	» New, cost-efficient multi-turn feedback options
» **Machine design independent of motor size** » **Installation of motors in the tightest space**	» Motors with the highest power densities in the whole industry
» **Millions of standard motor versions available in various mounting, connection, and feedback variants, as well as further options** » **Available with single cable technology with digital feedback (Kollmorgen exclusive SFD3, HIPERFACE® DSL or EnDat 2.2)** » **Our flexible products deliver a perfectly suited solution to your application** » **Simplifies mechanical modifications and design adjustments or renders them totally superfluous**	» AKM offers 28 housing and design length combinations, as well as 120 different standard windings for a single motor series » AKM2G is available in 6 frame sizes, 23 frame-stack length combinations, and 70 standard windings » The AKM2G design has the potential for greater Co-Engineering (modification) thanks to the new housing design. With a more flexible design for Co-Engineering addressing applications not covered by catalog standards is increased
» **AKM Washdown and AKM Washdown Food offer maximum reliability and a long service life for the most demanding industrial applications** » **AKM2G is available with the choice of optional Mineral filled PTFE shaft seal (Teflon®) for dry running environments or Viton® shaft seal for wet running environments**	» AKM and AKM2G are available in standard IP54 rating (AKM1 standard IP40) or optional IP65 with shaft seal. AKM is also available with IP67 rating

Kollmorgen Servo Motor Overview

Kollmorgen offers a comprehensive range of servo motors including electric cylinders, rodless actuators, and precision tables to meet a wide range of application requirements. For actuator products not included in this catalog go to www.kollmorgen.com for information about other Kollmorgen linear positioning products.

	Model	Product Family	Applications
	AKM®2G and AKM® Servo Motors	AKM	Designed with industry leading torque density and configurability. The medium-inertia AKM line includes over 4.8 million standard options to fit applications from general automation to applications that require IP67 sealing. The low-inertia AKM2G expands the AKM family to offer smaller footprint, higher torque versions for applications requiring the maximum torque density and the highest dynamic performance.
	AKMH IP69K Hygienic Motors	AKMH	The AKMH meets the food industry's strictest hygienic design criteria while being rugged enough to withstand the toughest of daily washdown regimens. Perfect for Food Processing, Primary Food Packaging, Pharmaceutical and Medical applications.
	Cartridge Direct Drive Servo Motors	CDDR	The CDDR is designed to provide the benefit of embedded frameless motor technology in an easy-to-integrate package. Perfect for applications in Printing, Packaging and Converting.
	Housed Direct Drive Servo Motors	HDDR	Housed DDR motors are designed for precise positioning of larger loads without the use of a mechanical transmission. Increasing OEE through the removal of belts and gearboxes that fail unexpectedly or require frequent maintenance.
	KBM Frameless Direct Drive Motors	KBM	With a wide variety of sizes and an extensive range of torque and speed options the KBM frameless direct drive motors are engineered to provide the high-performance, long life and simple installation that today's design engineers demand.
	TBM Frameless Direct Drive Motors	TBM	The Kollmorgen TBM frameless direct direct drive motors are designed for applications that require high power in a small, compact form factor with minimized weight and inertia. These motors provide the highest performance in applications such as robotic joints, medical robotics, sensor gimbals, guidance systems and other motion-critical applications.
	Direct Drive Linear Servo Motors	IC IL	Ideal for applications requiring very low bearing friction, high acceleration of lighter loads, and for maximizing constant velocity, even at ultra low speeds.

Model	Product Family	Features
AKM®2G and AKM® Servo Motors	AKM	Designed to deliver precise motion and more power for your money. More than 500,000 standard configurations that include various feedback, connector, paint and sealing options.
AKMH IP69K Hygienic Motor	AKMH	The AKMH is designed to withstand the toughest of daily washdown regimens without the need for covers. The AKMH's hygienic design makes it easy to clean, keeping your machine running and protecting your brand. Designed with a single cable that combines power, feedback and an innovative venting feature that extends the life of the motor.
Cartridge Direct Drive Servo Motors	CDDR	The CDDR is a patented design that allows for this torque dense frameless motor to be installed on your machine in 5 minutes. The CDDR lowers your machines maintenance, increases your machines uptime and increase your machines peformance.
Housed Direct Drive Servo Motors	HDDR	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.
KBM Frameless Direct Drive Motors	KBM	KBM motors cover a range of frameless motor solutions across a variety of applications. KBM is engineered to provide the high-performance, long life and simple installation that today's design engineers demand.
TBM Frameless Direct Drive Motors	TBM	Typical applications include robotic joints, weapon stations, sensor gimbals, sight systems, UAV propulsion and guidance, as well as many others.
Direct Drive Linear Servo Motors	IC IL	Kollmorgen linear motors provide precise placement of product by directly coupling to your load and eliminating the backlash associated with high maintenance linear transmission components.

AKM® Servo Motor Family

Kollmorgen's AKM family of servo motors gives you unprecedented choice and flexibility from a wide range of standard products so you can select the best servo motor for your application.

With the broad range of AKM and AKM2G motors that support voltages up to 480 Vac, washdown, food grade, and the AKMH stainless steel hygienic motor for the toughest environments- Kollmorgen has a standard motor solution that can meet your needs right from the catalog.

Still need more? For your truly unique motion control applications, work with our engineering team to customize a solution for your machine design. Either way, standard product or customized, we can help you choose the motion control solution that meets your exact requirements.

The Benefits of AKM® Servo Motors

Best-in-Class Performance	» Industry-leading motor power density » Same size AKM/AKD system delivers up to 47% more shaft power » Compensation for stiff and compliant transmissions and couplings » Exceptionally low cogging
Flexibility to Find an Exact-fit Solution in a Standard Product	» AKM offers 28 frame-stack combinations and 120 standard windings in a single motor line » 4.8 million possible AKM part number combinations and growing » Simplifies or eliminates mechanical modifications and engineering adaptation » Available with single cable technology with digital feedback (Digital Resolver SFD3 or HIPERFACE® DSL) » Washdown and Food Grade options for AKM » Higher torque models up to 180 Nm of continuous torque
Ease-of-Use and Faster Commissioning	» Plug-and-play motor recognition drive commissioning » Reduce cycle time and sensor-and-wiring costs by eliminating traditional homing methods » Reduction in set-up time for each servo system

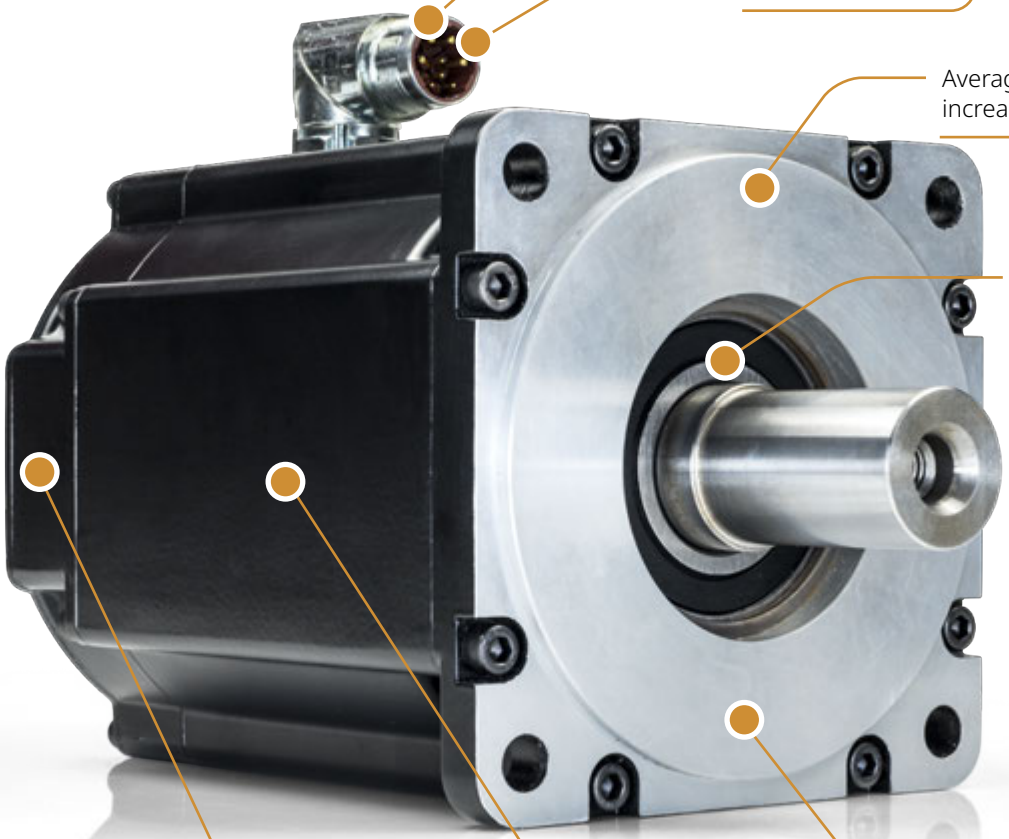
AKM®2G Brushless Servo Motor

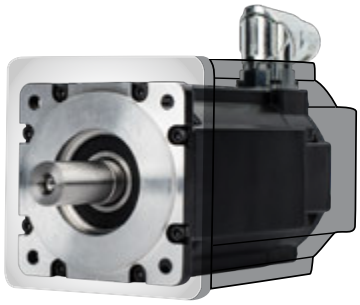
AKM®2G represents the latest evolution of the industry leading AKM motor product family.

With average continuous torque increases of 30%, OEMs and users can achieve substantial machine performance increases without increasing the size of the motor.

The improved torque density allows a smaller motor to be used which reduces the machine footprint without sacrificing performance.

- Extensive Selection of Feedback options to match application and performance requirements
- Shaft, mounting and connector options for optimal flexibility
- Holding Brake option





Get the same performance in 20% less space.

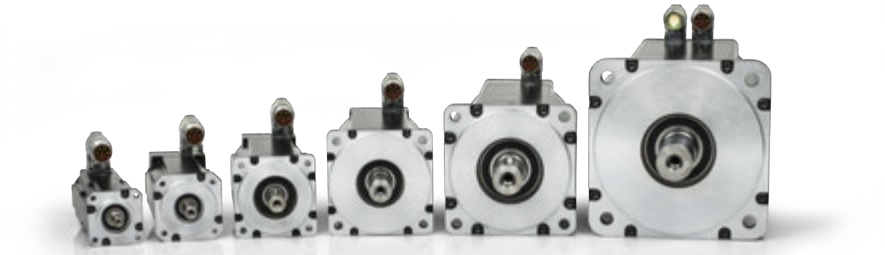
For new machine designs, the AKM2G allows customers to decrease the size, footprint, and complexity of the machine, while still getting the power and performance they need.

The AKM2G drops right into existing machine designs to increase performance, when compared to competing motors, without increasing the size of the motor.

The AKM2G features six sizes with performance levels between 0.3 and 10kW. It offers selectable options such as feedbacks, mounting configurations, and performance capabilities. Due to the modular structure of the motor, Kollmorgen is better equipped than competitors to adapt motors to the requirements of a specific application in parallel with standard production needs. Machine builders are then able to choose from a wider range of standard models that leverage Kollmorgen's extensive product and application knowledge.

The Benefits of AKM2G Servo Motor

Smaller Footprint	**Reduce machine space** » For equivalent torque it is possible to use a smaller size motor than most competitive motors. » The range of AKM2G sizes provides for optimizing for length or flange square depending on which dimension is most critical. » Use of the smaller motor saves space achieving equivalent performance in a smaller footprint machine or saving space for other machine elements.
Increased Torque	**Higher performance** » For a given frame size the AKM2G provides an average continuous torque increase of 30% compared to most competitive motors of equivalent size. » Higher torque in the same package size increases machine performance (greater throughput, move heavier loads, etc.).
Wider Speed Range	**Faster operation** » For many AKM2G sizes the maximum speeds are higher than competitive motors. » Higher speeds ⇨ operate machines faster ⇨ greater throughput.
Greater Flexibility	**More options to match needs** » AKM2G is designed to support a wider array of feedback, brake, thermal sensor and shaft seal options – this greater flexibility means a higher probability of meeting application requirements with a standard product. » The AKM2G design has the potential for greater Co-Engineering (modification) thanks to the new three-piece housing. With a more flexible design for Co-Engineering, addressing applications not covered by catalog standards is increased. » Standard voltage selections of 24, 36, 48, 72, 96 and 108 Vdc meet most available power sources for low voltage motors. 120, 240, 400 and 480 Vac for higher voltage systems. » Kollmorgen can work with you to meet your specific requirements for the exact solution you need.
Higher Efficiency	**Reduce energy consumption** » AKM2G has lower equivalent resistance than many competitive solutions. For equivalent motor frame sizes AKM2G will typically be more energy efficient (2-5%). » Energy consumption is reduced with AKM2G compared to many competitors. » When weight and space are critical such as on portable, mobile or battery power applications higher efficiency translates to a smaller motor with lower energy demand.



AKM2G Series Servo Motor Family

AKM® Brushless Servo Motor

AKM Motors Offer Extremely High Torque Density and High Acceleration

The AKM high-performance motor series offers a wide range of mounting, connectivity, feedback and other options. These motors offer superb flexibility to meet application needs with:

- 8 frame sizes (40 to 260 mm)
- 28 frame-stack length combinations
- More than 120 standard windings

Features

Torque
0.16 to 180 Nm continuous stall torque (1.4 to 1590 lb-in) in 28 frame/stack combinations. Specific torques are often available from multiple frame sizes to optimize mounting and inertia matching capabilities.

Speed
Speeds up to 8000 rpm meet high speed application requirements. Windings tailored to lower speeds are also available.

Voltage
AKM motors can be applied to all standard global voltages. Windings are specifically tailored to work with drives powered by 75 Vdc, 120, 240, 400 or 480 Vac.

Mounting
Multiple mounting standards are available to meet common European, North American, and Japanese standards.

Feedback
AKM motors include resolver, encoder (commutating), Sine-Absolute encoder or SFD (Smart Feedback Device) feedback options to meet specific application requirements.

Smoothness
Smooth performance results from low-cog, low-harmonic distortion magnetic designs.

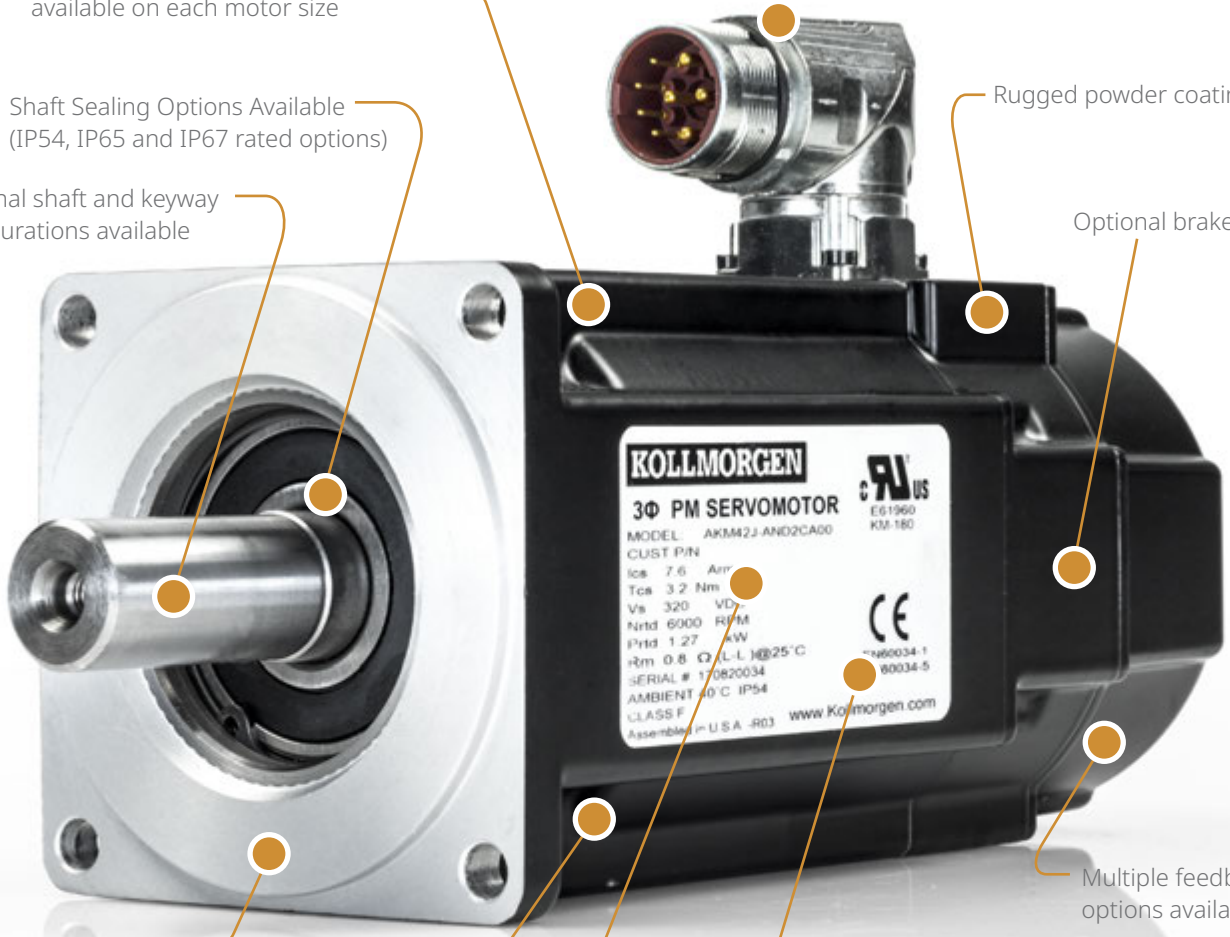
Connectivity
Rotatable IP65 connectors, straight IP67 connectors or low cost IP20 Molex plugs are both available to provide flexibility. Single connectors/plugs (combined power and feedback) are also available to minimize motor and cable cost (SFD and DSL only).

Thermal
Windings are rated conservatively at 100°C rise over a 40°C ambient while using 155°C (class F) insulation materials. Motors meet applicable UL, CSA, and CE requirements and include thermistors.

Additional Options:

- » Holding Brakes
- » Shaft sealing options available
- » Feedback devices
- » Shaft and mounting variations
- » Custom windings
- » Connectivity

Kollmorgen AKM Configurable Servo Motor Features



Standard connector options available (i.e. IP67 straight, IP65 rotatable and cable)

Multiple stack lengths and windings available on each motor size

Shaft Sealing Options Available (IP54, IP65 and IP67 rated options)

Optional shaft and keyway configurations available

Rugged powder coating

Optional brake

Multiple feedback options available

Multiple standard mounts and customized options available

Insulation Class F, high torque density windings with thermal protection and linear thermal device options

Potted for increased thermal dissipation which yields higher performance in a small package

Low cogging design

EN60034-1
EN60034-5

E61960
E103510
PS155-1
KM-180

AKM® Washdown and Food Grade

AKM® Washdown and Food Grade

These motor variants are used in applications that are subject to strict hygiene regulations in which it is essential that the formation of nuclei and corrosion are avoided and in which machines must be cleaned cyclically. These motors are based on the standard types AKM2 – AKM6 with special modifications for use in the food-processing industry, in the packaging industry, or even outdoors. An option for AKM Washdown and Food Grade motors is to coat the flange.

AKM® Washdown

Performance Data

Part Numbers:
AKMxxx-xxxxx-0W: Washdown with unpainted flange
AKMxxx-Wxxxx-0W: Washdown with painted flange

Note: The AKM Washdown motors must not come into contact with any unpacked food.

Application Area:	Harsh Environments, Outdoors
Application Examples:	Transport in the food and packaging area without contact with food, radar stations, and wind turbines
Standards:	UL, CE, RoHS
Surface:	Gray 2K paint
Immunity:	Against tested industrial cleaning agents*, corrosion-resistant
Degree of Protection:	IP67
Shaft:	303 Stainless steel (CSN417029)
Rotary Shaft Seal:	PTFE
Lubricant:	Industrial bearing grease, non-food-grade
Connector:	Stainless steel, smooth surface
Screws:	Stainless steel
Name Plate:	Engraved, additional name plate in the package

AKM® Food Grade

Part Numbers:
AKMxxx-xxxxx-0F: Food Grade with unpainted flange
AKMxxx-Wxxxx-0F: Food Grade with painted flange

Note: The surface of the AKM Food Grade food motor has passed all tests as per FDA Global Migration for indirect contact with food. Any direct contact with unpacked food is not permitted.

Application Examples:	Food and beverages industries; cutting, packing, and filling without direct contact with food; motor positioned laterally or below the food.
Standards:	UL, CE, RoHS, FDA
Surface:	White 2K FDA compliant paint**
Immunity:	Against tested industrial cleaning agents*, corrosion-resistant
Degree of Protection:	IP67
Shaft:	303 Stainless steel (CSN417029)
Rotary Shaft Seal:	PTFE as per FDA
Lubricant:	Food grade as per FDA
Connector:	Stainless steel, smooth surface
Screws:	Stainless steel
Name Plate:	Engraved, additional name plate in the package

* Resistance of the AKM Washdown and AKM Food Grade surfaces to the following industrial cleaning agents has been tested: P3-topactive DES, P3-topactive LA, P3-topax 56, P3-topax 66, P3-topax 91
**Meets FDA global migration standards

AKM® Servo Motor Quick Guide

AKM2G

Performance Data (continued)

AKM2G Servo Motor	Frame Size	Max Cont. Torque for ΔT wdg. = 100°C	Max Cont. Current for ΔT wdg. = 100°C	Max Cont. Torque for ΔT wdg. = 60°C	Max mechanical speed	Peak Torque	Peak Current	120 Vac (160 Vdc)			240 Vac (320 Vdc)			400 Vac (560 Vdc)			480 Vac (640 Vdc)			Inertia (incl. Resolver feedback)	Optional Brake Inertia (additional)	Weight
								Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)			
21D	58	0.636	2.17	0.494	8000	1.78	8.66	0.583	4800	0.293	0.534	8000	0.448	0.525	8000	0.439	0.52	8000	0.435	0.093	0.04	1.1
21E	58	0.642	2.73	0.498	8000	1.79	10.9	0.568	6200	0.369	0.534	8000	0.448	-	-	-	-	-	-	0.093	0.04	1.1
21G	58	0.649	4.18	0.503	8000	1.79	16.7	0.545	8000	0.456	-	-	-	-	-	-	-	-	-	0.093	0.04	1.1
22C	58	1.11	1.65	0.859	8000	3.33	6.62	1.09	1800	0.206	1.04	4400	0.48	0.956	7800	0.781	0.944	8000	0.791	0.155	0.04	1.4
22D	58	1.11	2.37	0.861	8000	3.33	9.49	1.07	2900	0.326	0.991	6600	0.685	0.938	8000	0.786	0.928	8000	0.777	0.155	0.04	1.4
22E	58	1.11	2.93	0.863	8000	3.34	11.7	1.06	3800	0.422	0.955	8000	0.8	-	-	-	-	-	-	0.155	0.04	1.4
23D	58	1.48	2.11	1.15	8000	4.69	8.44	1.45	1800	0.273	1.37	4300	0.615	1.23	7600	0.977	1.2	8000	1	0.217	0.04	1.7
23E	58	1.48	2.92	1.151	8000	4.69	11.7	1.42	2800	0.416	1.29	6200	0.839	1.19	8000	0.993	1.17	8000	0.978	0.217	0.04	1.7
23F	58	1.5	4.07	1.168	8000	4.74	16.3	1.39	4100	0.599	1.22	8000	1.02	-	-	-	-	-	-	0.217	0.04	1.7
24D	58	1.82	2.11	1.41	8000	7.11	8.45	1.76	1500	0.277	1.66	3500	0.607	1.48	6100	0.948	1.39	7400	1.07	0.279	0.04	2
24E	58	1.82	2.92	1.42	8000	7.14	11.7	1.73	2300	0.417	1.58	4900	0.808	1.34	8000	1.12	1.31	8000	1.1	0.279	0.04	2
24F	58	1.85	4.11	1.44	8000	7.22	16.4	1.69	3400	0.603	1.43	7200	1.08	1.31	8000	1.09	1.27	8000	1.06	0.279	0.04	2
31C	72	1.68	1.48	1.3	8000	5.99	5.9	1.67	1000	0.175	1.64	2400	0.412	1.58	4300	0.713	1.55	5200	0.844	0.426	0.12	1.8
31D	72	1.68	2.06	1.31	8000	6	8.23	1.67	1500	0.263	1.62	3500	0.594	1.52	6100	0.972	1.46	7300	1.12	0.426	0.12	1.8
31E	72	1.7	2.9	1.33	8000	6.06	11.6	1.68	2300	0.404	1.59	5000	0.832	1.43	8000	1.2	1.39	8000	1.16	0.426	0.12	1.8
32D	72	2.81	2.17	2.18	8000	10.4	8.66	-	-	-	2.72	2200	0.628	2.58	3900	1.06	2.5	4700	1.23	0.813	0.12	2.5
32E	72	2.8	2.75	2.18	8000	10.3	11	2.78	1300	0.378	2.67	2900	0.811	2.46	5000	1.29	2.33	6100	1.49	0.813	0.12	2.5
32G	72	2.9	4.24	2.26	8000	10.6	17	2.82	2300	0.68	2.6	4700	1.28	2.17	7600	1.72	-	-	-	0.813	0.12	2.5
33E	72	3.86	2.99	3	8000	14.6	12	-	-	-	3.64	2300	0.878	3.33	4000	1.39	3.14	4800	1.58	1.2	0.12	3.3
33G	72	3.81	4.24	2.97	8000	14.4	16.9	3.71	1600	0.622	3.44	3350	1.21	2.83	5800	1.72	2.42	7000	1.77	1.2	0.12	3.3
33H	72	3.85	5.8	3.01	8000	14.6	23.2	3.68	2250	0.866	3.2	4600	1.54	1.88	8000	1.57	-	-	-	1.2	0.12	3.3
41D	88	2.85	2.32	2.22	6000	7.25	9.27	2.84	900	0.267	2.76	2100	0.607	2.62	3800	1.04	2.53	4600	1.22	0.774	0.36	2.9
41E	88	2.87	2.92	2.24	6000	7.26	11.7	2.84	1200	0.357	2.73	2700	0.773	2.52	4800	1.27	2.38	5900	1.47	0.774	0.36	2.9
41G	88	2.86	4.53	2.24	6000	7.26	18.1	2.79	2100	0.613	2.57	4500	1.21	2.28	6000	1.43	2.19	6000	1.37	0.774	0.36	2.9
42D	88	5.04	2.27	3.93	6000	14.35	9.07	-	-	-	4.94	1200	0.62	4.79	2100	1.05	4.69	2600	1.28	1.36	0.36	3.86
42E	88	5.08	2.88	3.97	6000	14.4	11.5	-	-	-	4.93	1600	0.83	4.71	2700	1.33	4.56	3300	1.58	1.36	0.36	3.86
42H	88	5.12	5.64	4.02	6000	14.44	22.6	5	1500	0.79	4.65	3200	1.56	3.87	5600	2.27	3.56	6000	2.23	1.36	0.36	3.86
43D	88	6.97	2.33	5.44	6000	21.1	9.31	-	-	-	-	-	-	6.67	1600	1.12	6.58	1900	1.31	1.95	0.36	4.81
43G	88	6.97	4.52	5.46	6000	21.1	18.1	-	-	-	6.61	1900	1.32	6.1	3200	2.05	5.76	3900	2.35	1.95	0.36	4.81
43I	88	6.98	7.14	5.51	6000	21.1	28.6	6.81	1400	1	6.21	3000	1.95	4.83	5300	2.68	4.02	6000	2.53	1.95	0.36	4.81
44E	88	8.48	2.99	6.63	6000	26.9	11.97	-	-	-	8.31	900	0.783	7.99	1700	1.42	7.8	2100	1.72	2.53	0.36	5.76
44H	88	8.51	5.87	6.69	6000	27	23.5	8.39	900	0.79	7.92	2000	1.66	6.98	3500	2.56	6.32	4300	2.85	2.53	0.36	5.76
44J	88	8.47	7.3	6.7	6000	26.9	29.2	8.28	1200	1.04	7.58	2600	2.06	6.04	4500	2.84	4.92	5400	2.78	2.53	0.36	5.76

Continued on following page.

AKM® Servo Motor Quick Guide

AKM2G

Performance Data (continued)

AKM2G Servo Motor	Frame Size	Max Cont. Torque for ΔT wdg. = 100°C	Max Cont. Current for ΔT wdg. = 100°C	Max Cont. Torque for ΔT wdg. = 60°C	Max mechanical speed	Peak Torque	Peak Current	120 Vac (160 Vdc)			240 Vac (320 Vdc)			400 Vac (560 Vdc)			480 Vac (640 Vdc)			Inertia (incl. Resolver feedback)	Optional Brake Inertia (additional)	Weight
								Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)			
51H	114	6.82	5.78	5.33	6000	15.7	17.3	6.73	1100	0.78	6.44	2400	1.62	5.89	4200	2.59	5.53	5100	2.96	2.52	1.2	5.13
51I	114	6.83	6.35	5.35	6000	15.7	19	6.72	1200	0.85	6.38	2700	1.8	5.74	4600	2.77	5.29	5700	3.16	2.52	1.2	5.13
51K	114	6.81	10.2	5.36	6000	15.7	30.5	6.54	2100	1.44	5.77	4500	2.72	4.67	6000	2.93	-	-	-	2.52	1.2	5.13
52H	114	12	6.3	9.4	6000	29	18.9	-	-	-	11.5	1500	1.8	10.7	2700	3.02	10.3	3200	3.44	4.58	1.2	7.03
52K	114	11.9	10	9.43	6000	29	30.1	11.7	1200	1.47	10.8	2500	2.83	9	4400	4.14	7.81	5300	4.34	4.58	1.2	7.03
52L	114	11.93	12.5	9.42	6000	28.9	37.6	11.5	1500	1.8	10.2	3200	3.42	7.42	5600	4.35	-	-	-	4.58	1.2	7.03
53H	114	16.2	5.69	12.7	6000	41.8	17.1	-	-	-	15.7	1000	1.65	14.9	1800	2.81	14.4	2200	3.32	6.64	1.2	8.89
53L	114	16	12.5	12.7	6000	41.4	37.6	15.6	1100	1.8	14.1	2400	3.53	10.9	4200	4.77	8.64	5100	4.61	6.64	1.2	8.89
53M	114	16.1	14.2	12.7	6000	41.4	42.5	15.4	1300	2.09	13.5	2800	3.97	9.74	4800	4.9	-	-	-	6.64	1.2	8.89
54L	114	20.1	10.6	15.9	6000	54.8	31.7	-	-	-	18.4	1600	3.09	15.9	2800	4.66	14.3	3400	5.08	8.7	1.2	10.8
54M	114	20	14.5	15.9	6000	54.7	43.9	19.3	1100	2.22	17.2	2300	4.13	12.9	3900	5.28	9.8	4800	4.92	8.7	1.2	10.8
54N	114	20	16.3	15.9	6000	54.7	48.8	19.1	1200	2.4	16.5	2600	4.49	11	4500	5.2	-	-	-	8.7	1.2	10.8
62K	142	15.3	9.32	12	6000	37.6	28	-	-	-	14.4	1700	2.56	12.9	3000	4.05	11.9	3700	4.59	9.1	3.6	10
62L	142	15.2	11.6	12	6000	37.4	34.9	14.9	1000	1.56	13.8	2200	3.19	11.5	3900	4.7	9.84	4800	4.95	9.1	3.6	10
62M	142	15.1	14.6	11.9	6000	37.4	43.7	14.6	1300	1.99	13.1	2800	3.85	9.6	5000	5.03	-	-	-	9.1	3.6	10
63H	142	21.7	6.11	17	6000	55.1	18.3	-	-	-	21.5	750	1.69	20.6	1300	2.8	20.1	1600	3.37	13	3.6	12.3
63K	142	21.5	9.79	16.9	6000	54.7	29.4	-	-	-	20.5	1300	2.79	18.9	2200	4.35	17.8	2700	5.03	13	3.6	12.3
63M	142	21.4	15.2	16.9	6000	54.5	45.5	20.9	1000	2.19	19.2	2100	4.21	15.6	3600	5.88	12.84	4500	6.05	13	3.6	12.3
63N	142	21.4	16.8	16.9	6000	54.5	50.5	20.7	1100	2.39	18.7	2300	4.51	14.1	4100	6.07	-	-	-	13	3.6	12.3
64L	142	27	11.4	21.3	6000	70.7	34.1	-	-	-	25.7	1200	3.23	23.4	2100	5.15	21.9	2600	5.95	16.9	3.6	14.5
64M	142	26.9	15.8	21.3	6000	70.5	47.5	-	-	-	24.6	1700	4.37	20.5	3000	6.45	17.7	3700	6.84	16.9	3.6	14.5
64N	142	26.8	17.8	21.2	6000	70.3	53.3	26.2	900	2.47	23.8	2000	4.98	18.9	3400	6.72	15.2	4200	6.67	16.9	3.6	14.5
65L	142	32.6	12.4	25.8	6000	86.8	37.1	-	-	-	31.1	1100	3.58	28.5	1900	5.67	26.8	2300	6.46	20.8	3.6	16.8
65M	142	32.6	15.3	25.8	6000	86.8	45.9	-	-	-	30.3	1400	4.44	26.7	2400	6.71	24.3	2900	7.38	20.8	3.6	16.8
65N	142	32.7	19	25.9	6000	87	56.9	-	-	-	29.5	1700	5.25	23.6	3100	7.67	19.6	3800	7.79	20.8	3.6	16.8
71L	192	22.9	12.1	18	6000	49.5	30.2	-	-	-	21.2	1500	3.34	19	2600	5.17	17.5	3200	5.87	25.9	12.3	16.8
71N	192	22.8	17.3	18	6000	49.3	43.3	22	1050	2.42	19.9	2200	4.58	15.2	4000	6.38	12	4900	6.14	25.9	12.3	16.8
71P	192	23.0	21.1	18.2	6000	49.8	52.8	21.9	1300	2.97	19	2700	5.36	12.1	4900	6.18	-	-	-	25.9	12.3	16.8
72L	192	40.5	12.3	32	6000	89.3	30.8	-	-	-	38.7	900	3.64	36.1	1550	5.86	34.2	1900	6.81	46.8	12.3	22.9
72N	192	41.1	18.7	32.7	6000	90.4	46.9	-	-	-	37.4	1400	5.48	31.9	2400	8.03	28.4	2900	8.63	46.8	12.3	22.9
72P	192	40.7	21.2	32.4	6000	89.6	53	-	-	-	36.1	1600	6.05	29	2800	8.51	24.2	3400	8.6	46.8	12.3	22.9
72R	192	40.5	37	32.2	6000	89.4	92.4	-	-	-	28.6	2800	8.38	-	-	-	-	-	-	46.8	12.3	22.9
73L	192	56.6	11.6	44.7	6000	127.3	29	-	-	-	-	-	-	52.5	1050	5.77	50.6	1300	6.89	67.7	12.3	29
73N	192	57.9	17.6	45.9	6000	129.6	43.9	-	-	-	54.6	900	5.15	49.5	1600	8.29	46.6	1900	9.3	67.7	12.3	29
73Q	192	57.1	27.4	45.6	6000	128.1	68.5	-	-	-	50	1500	7.85	38.9	2600	10.6	30.8	3200	10.3	67.7	12.3	29
74P	192	72.2	23.1	57.7	6000	164.6	57.8	-	-	-	66.5	1000	6.96	58.1	1700	10.3	52.4	2100	11.5	88.6	12.3	35.2
74Q	192	71.7	28.8	57.7	6000	163.8	72.1	-	-	-	64	1250	8.37	50.7	2200	11.7	41.7	2700	11.8	88.6	12.3	35.2
74R	192	71.3	32.5	57.5	6000	162.9	81.1	-	-	-	61.5	1450	9.34	45.1	2500	11.8	34	3000	10.7	88.6	12.3	35.2
74R	192	71.3	32.4	57.5	6000	162.7	81				61.5	1450	9.34	44.9	2500	11.8	33.5	3000	10.5	88.6	12.3	35.2

Continued on following page.

AKM2G Low Voltage

Performance Data

AKM2G Servo Motor	Frame Size	Max Cont. Torque for ΔT wdg. = 100°C	Max Cont. Current for ΔT wdg. = 100°C	Max Cont. Torque for ΔT wdg. = 60°C	Max mechanical speed	Peak Torque	Peak Current	24 Vdc			48 Vdc			72 Vdc			96 Vdc			Inertia (incl. Resolver feedback)	Optional Brake Inertia (additional)	Weight
								Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)			
21KL	58	0.640	9.87	0.497	8000	1.78	39.5	–	–	–	0.574	5600	0.337	0.537	8000	0.450	0.533	8000	0.446	0.093	0.040	1.1
21ML	58	0.642	14.2	0.498	8000	1.79	56.8	0.605	3400	0.215	0.539	8000	0.452	-	-	-	-	-	-	0.093	0.040	1.1
21PL	58	0.642	19.7	0.498	8000	1.79	78.6	0.587	4700	0.289	0.534	8000	0.45	-	-	-	-	-	-	0.093	0.040	1.1
22KL	58	1.10	9.83	0.855	8000	3.32	39.3	-	-	-	1.05	3300	0.363	1.01	5300	0.559	0.956	7300	0.731	0.155	0.040	1.4
22NL	58	1.11	15.2	0.863	8000	3.34	60.8	1.08	2200	0.250	1.02	5200	0.555	0.944	8000	0.791	-	-	-	0.155	0.040	1.4
22PL	58	1.12	18.9	0.871	8000	3.35	75.6	1.08	2900	0.328	0.997	6400	0.67	0.942	8000	0.789	-	-	-	0.155	0.040	1.4
23KL	58	1.48	9.82	1.15	8000	4.69	39.3	-	-	-	1.42	2400	0.358	1.37	4000	0.574	1.30	5500	0.751	0.217	0.040	1.7
23ML	58	1.49	13.5	1.15	8000	4.70	54.0	-	-	-	1.40	3400	0.498	1.31	5500	0.755	1.19	7600	0.951	0.217	0.040	1.7
23PL	58	1.50	19.2	1.17	8000	4.73	76.9	1.46	1900	0.291	1.35	4900	0.694	1.18	8000	0.989	-	-	-	0.217	0.040	1.7
24KL	58	1.79	9.92	1.39	8000	5.92	39.7	-	-	-	1.73	2000	0.363	1.67	3300	0.578	1.59	4600	0.766	0.279	0.040	2.0
24ML	58	1.79	13.7	1.39	8000	5.92	54.9	-	-	-	1.69	2900	0.514	1.58	4700	0.779	1.44	6500	0.982	0.279	0.040	2.0
24PL	58	1.82	19.1	1.41	8000	5.97	76.4	1.77	1600	0.297	1.65	4000	0.692	1.46	6500	0.994	1.30	8000	1.085	0.279	0.040	2.0
31ML	72	1.73	14.2	1.34	8000	6.14	56.8	-	-	-	1.65	3300	0.570	1.57	5200	0.853	1.46	7200	1.10	0.426	0.12	1.8
31PL	72	1.69	20.0	1.33	8000	6.09	80.7	1.67	2200	0.385	1.57	4900	0.804	1.41	7800	1.15	-	-	-	0.426	0.12	1.8
32ML	72	2.89	14.8	2.25	8000	10.7	59.1	-	-	-	2.81	2000	0.589	2.70	3200	0.906	2.57	4400	1.18	0.813	0.12	2.5
32PL	72	2.77	20.0	2.23	8000	10.6	82.4	2.79	1300	0.379	2.70	3000	0.849	2.51	4700	1.23	2.26	6400	1.51	0.813	0.12	2.5
33ML	72	3.82	14.8	2.97	8000	14.5	59.0	-	-	-	3.69	1500	0.579	3.54	2400	0.890	3.34	3400	1.19	1.2	0.12	3.3
33PL	72	3.85	5.8	3.01	8000	14.6	23.2	3.68	2250	0.866	3.2	4600	1.54	1.88	8000	1.57	-	-	-	1.2	0.12	3.3
41ML	88	2.85	2.32	2.22	6000	7.25	9.27													0.774	0.36	2.9
41PL	88	2.87	2.92	2.24	6000	7.26	11.7													0.774	0.36	2.9
42ML	88	2.86	4.53	2.24	6000	7.26	18.1													1.36	0.36	3.86
42NL	88	5.04	2.27	3.93	6000	14.35	9.07													1.36	0.36	3.86
42PL	88	5.08	2.88	3.97	6000	14.4	11.5													1.36	0.36	3.86
43LL	88	5.12	5.64	4.02	6000	14.44	22.6													1.95	0.36	4.81
43ML	88	6.97	2.33	5.44	6000	21.1	9.31													1.95	0.36	4.81
43NL	88	6.97	4.52	5.46	6000	21.1	18.1													1.95	0.36	4.81
44LL	88	6.98	7.14	5.51	6000	21.1	28.6													2.53	0.36	5.76
44ML	88	8.48	2.99	6.63	6000	26.9	11.97													2.53	0.36	5.76
44NL	88	8.51	5.87	6.69	6000	27	23.5													2.53	0.36	5.76

	24 Vdc			36 Vdc			48 Vdc			72 Vdc			96 Vdc			108 Vdc		
	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)	Rated Torque (speed)	Rated Speed	Rated Power (speed)
41ML	-	-	-	-	-	-	2.85	1600	0.477	2.78	2500	0.727	2.69	3400	0.96	-	-	-
41PL	2.89	1000	0.303	-	-	-	2.80	2300	0.674	2.68	3600	1.01	2.51	5000	1.31	-	-	-
42ML	-	-	-	-	-	-	5.10	900	0.481	5.02	1400	0.736	4.93	1900	0.98	-	-	-
42NL	-	-	-	5.12	800	0.429	5.08	1100	0.585	4.96	1800	0.93	4.81	2500	1.26	-	-	-
42PL	-	-	-	5.10	900	0.480	5.04	1300	0.686	4.89	2100	1.08	4.73	2800	1.39	-	-	-
43LL	-	-	-	-	-	-	-	-	-	6.94	900	0.654	6.86	1200	0.86	-	-	-
43ML	-	-	-	-	-	-	7.00	600	0.440	6.91	1000	0.724	6.80	1400	1.00	-	-	-
43NL	-	-	-	7.01	600	0.440	6.96	800	0.58	6.83	1300	0.93	6.65	1900	1.32	-	-	-
44LL	-	-	-	-	-	-	-	-	-	8.46	700	0.620	8.35	1000	0.874	8.28	1200	1.040
44ML	-	-	-	-	-	-	8.54	500	0.447	8.41	900	0.793	8.29	1200	1.04	8.21	1400	1.20
44NL	-	-	-	-	-	-	8.50	600	0.534	8.36	1000	0.875	8.20	1400	1.20	8.11	1600	0.00

AKM® Servo Motor Quick Guide

AKM, AKM Washdown, and AKM Food Grade

Performance Data

AKM Servo Motor	Flange size [mm]	Cont. Torque at Stall Tcs [Nm]	Continuous Current I_0 [A]	Peak Torque at stall Tps [Nm]	75 Vdc			120 Vac (160 Vdc)			240 Vac (320 Vdc)			400 Vac (560 Vdc)			480 Vac (640 Vdc)			Inertia (Jm) [kg•cm²]	Weight [kg]
					Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]		
11B	40	0.18	1.16	0.61	–	–	–	4000	0.18	0.08	8000	0.17	0.14	–	–	–	–	–	–	0.017	0.35
11C	40	0.18	1.45	0.61	–	–	–	6000	0.18	0.11	–	–	–	–	–	–	–	–	–	0.017	0.35
11E	40	0.18	2.91	0.61	6000	0.18	0.11	–	–	–	–	–	–	–	–	–	–	–	–	0.017	0.35
12C	40	0.31	1.51	1.08	–	–	–	4000	0.30	0.13	8000	0.28	0.23	–	–	–	–	–	–	0.031	0.49
12E	40	0.31	2.72	1.08	3000	0.31	0.10	8000	0.28	0.23	–	–	–	–	–	–	–	–	–	0.031	0.49
13C	40	0.41	1.48	1.46	–	–	–	3000	0.41	0.13	8000	0.36	0.30	–	–	–	–	–	–	0.045	0.63
13D	40	0.40	2.40	1.44	2000	0.40	0.08	7000	0.36	0.27	–	–	–	–	–	–	–	–	–	0.045	0.63
21C	60	0.48	1.58	1.47	–	–	–	2500	0.46	0.12	8000	0.39	0.32	–	–	–	–	–	–	0.11	0.82
21E	60	0.50	3.11	1.49	2000	0.48	0.10	7000	0.41	0.30	–	–	–	–	–	–	–	–	–	0.11	0.82
21G	60	0.50	4.87	1.51	4000	0.46	0.19	–	–	–	–	–	–	–	–	–	–	–	–	0.11	0.82
22C	60	0.84	1.39	2.73	–	–	–	1000	0.83	0.09	3500	0.78	0.29	8000	0.68	0.57	8000	0.68	0.57	0.16	1.10
22E	60	0.87	2.73	2.76	1000	0.85	0.09	3500	0.81	0.30	8000	0.70	0.59	–	–	–	–	–	–	0.16	1.10
22G	60	0.88	4.82	2.79	2500	0.83	0.22	7000	0.74	0.54	–	–	–	–	–	–	–	–	–	0.16	1.10
23C	60	1.13	1.41	3.77	–	–	–	1000	1.11	0.12	2500	1.08	0.28	5500	0.99	0.57	7000	0.95	0.70	0.22	1.38
23D	60	1.16	2.19	3.84	–	–	–	1500	1.12	0.18	5000	1.03	0.54	8000	0.92	0.77	8000	0.92	0.77	0.22	1.38
23E	60	1.16	2.78	3.86	–	–	–	2500	1.1	0.29	6500	0.98	0.67	–	–	–	–	–	–	0.22	1.38
23F	60	1.18	4.31	3.88	1500	1.15	0.18	4500	1.07	0.50	8000	0.94	0.79	–	–	–	–	–	–	0.22	1.38
24C	60	1.38	1.42	4.67	–	–	–	–	–	–	2000	1.32	0.28	4500	1.25	0.59	5500	1.22	0.70	0.27	1.66
24D	60	1.41	2.21	4.76	–	–	–	1500	1.36	0.21	4000	1.29	0.54	8000	1.11	0.93	8000	1.11	0.93	0.27	1.66
24E	60	1.40	2.79	4.79	–	–	–	2000	1.34	0.28	5500	1.24	0.71	–	–	–	–	–	–	0.27	1.66
24F	60	1.42	3.89	4.82	1000	1.39	0.15	3000	1.33	0.42	8000	1.12	0.94	–	–	–	–	–	–	0.27	1.66
31C	80	1.15	1.37	3.88	–	–	–	–	–	–	2500	1.12	0.29	5000	1.00	0.52	6000	0.91	0.57	0.33	1.55
31E	80	1.20	2.99	4.00	750	1.19	0.09	2500	1.17	0.31	6000	0.95	0.60	–	–	–	–	–	–	0.33	1.55
31H	80	1.23	5.85	4.06	2000	1.20	0.25	6000	0.97	0.61	–	–	–	–	–	–	–	–	–	0.33	1.55
32C	80	2.00	1.44	6.92	–	–	–	–	–	–	1500	1.95	0.31	3000	1.86	0.58	3500	1.83	0.67	0.59	2.23
32D	80	2.04	2.23	7.10	–	–	–	1000	2.00	0.21	2500	1.93	0.51	5500	1.65	0.95	6000	1.58	0.99	0.59	2.23
32E	80	2.04	2.82	7.11	–	–	–	–	–	–	3500	1.87	0.69	7000	1.41	1.03	7000	1.22	1.02	0.59	2.23
32H	80	2.10	5.50	7.26	1200	2.06	0.26	3000	1.96	0.62	7000	1.45	1.06	–	–	–	–	–	–	0.59	2.23
33C	80	2.71	1.47	9.76	–	–	–	–	–	–	1000	2.64	0.28	2000	2.54	0.53	2500	2.50	0.65	0.85	2.9
33E	80	2.79	2.58	9.96	–	–	–	–	–	–	2000	2.62	0.55	4500	2.34	1.10	5000	2.27	1.19	0.85	2.9
33H	80	2.88	5.62	10.22	800	2.82	0.24	2500	2.66	0.70	5500	2.27	1.31	–	–	–	–	–	–	0.85	2.9
41C	90	1.95	1.46	6.12	–	–	–	–	–	–	1200	1.88	0.24	3000	1.77	0.56	3500	1.74	0.64	0.81	2.44
41E	90	2.02	2.85	6.28	–	–	–	1200	1.94	0.24	3000	1.82	0.57	6000	1.58	0.99	6000	1.58	0.99	0.81	2.44
41H	90	2.06	5.6	6.36	1000	1.99	0.21	3000	1.86	0.58	6000	1.62	1.02	–	–	–	–	–	–	0.81	2.44
42C	90	3.35	1.40	11.3	–	–	–	–	–	–	–	–	–	1500	3.10	0.49	2000	3.02	0.63	1.5	3.39
42E	90	3.42	2.74	11.3	–	–	–	–	–	–	1800	3.12	0.59	3500	2.81	2.35	4000	2.72	1.14	1.5	3.39
42G	90	3.53	4.80	11.5	–	–	–	–	–	–	3500	2.90	1.06	6000	2.35	1.48	6000	2.35	1.48	1.5	3.39
42H	90	3.54	6	13.34	–	–	–	2000	3.2	0.67	–	–	–	–	–	–	–	–	–	1.5	3.39
42J	90	3.56	8.4	11.6	–	–	–	3000	3.03	0.95	6000	2.36	1.50	–	–	–	–	–	–	1.5	3.39
43E	90	4.70	2.76	15.9	–	–	–	–	–	–	1500	4.24	0.67	2500	3.92	1.03	3000	3.76	1.18	2.1	4.35
43G	90	4.80	4.87	16.1	–	–	–	–	–	–	2500	4.00	1.05	5000	3.01	1.58	6000	2.57	1.61	2.1	4.35
43H	90	4.82	3.86	16.1	–	–	–	1200	4.46	0.56	3000	3.86	1.21	5500	2.81	1.62	6000	2.58	1.62	2.1	4.35
43K	90	4.90	9.60	16.4	–	–	–	2500	4.08	1.07	6000	2.62	1.65	–	–	–	–	–	–	2.1	4.35
43L	90	4.73	3.78	16.0	–	–	–	3000	3.78	1.19	6000	2.53	1.59	–	–	–	–	–	–	2.1	4.35
44E	90	5.76	2.90	19.9	–	–	–	–	–	–	1200	5.22	0.66	2000	4.80	1.01	2500	4.56	1.19	2.7	5.3
44G	90	5.88	5.00	20.2	–	–	–	–	–	–	2000	4.90	1.03	4000	3.76	1.57	5000	3.19	1.67	2.7	5.3
44H	90	5.89	5.6	20.0	–	–	–	1000	5.44	0.57	2500	4.66	1.22	4500	3.48	1.64	5500	2.93	1.69	2.7	5.3
44J	90	6.00	8.80	20.4	–	–	–	–	–	–	4000	3.84	1.61	6000	2.75	1.73	6000	2.75	1.73	2.7	5.3
44K	90	5.88	10.1	23.7	–	–	–	2500	4.08	1.38	5000	3.18	1.67	–	–	–	–	–	–	2.7	6.3
51E	115	4.70	2.75	11.6	–	–	–	–	–	–	1200	4.41	0.55	2500	3.98	1.04	3000	3.80	1.19	3.4	4.2
51G	115	4.75	4.84	11.7	–	–	–	–	–	–	2500	4.02	1.05	5000	2.62	1.37	6000	1.94	1.22	3.4	4.2
51H	115	4.79	6.00	11.7	–	–	–	–	–	–	3000	3.87	1.22	6000	1.95	1.23	6000	1.95	1.23	3.4	4.2
51K	115	4.90	9.40	11.9	–	–	–	2500	4.15	1.09	5500	2.35	1.35	–	–	–	–	–	–	3.4	4.2
51L	115	4.89	11.9	12	–	–	–	3000	3.95	1.24	6000	2.00	1.26	–	–	–	–	–	–	3.4	4.2

Performance curves can be generated using our online Performance Curve Generator Tool: https://pcgh.kollmorgen.com/

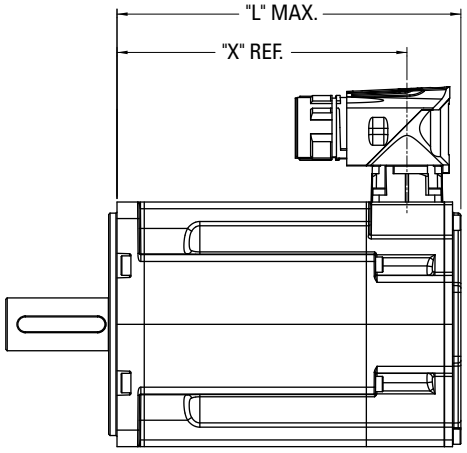
Performance Data (continued)

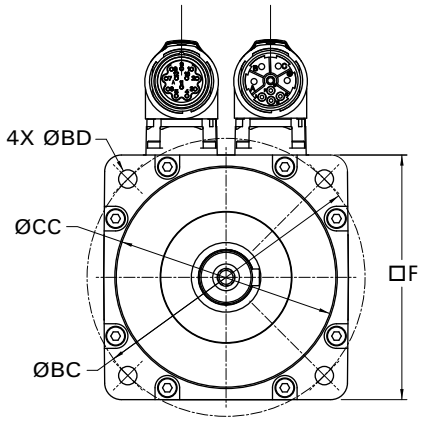
AKM Servo Motor	Frame size [mm]	Cont. Torque at Stall Tcs [Nm]	Continuous Current I_0 [A]	Peak Torque at stall Tps [Nm]	120 Vac (160 Vdc)			240 Vac (320 Vdc)			400 Vac (560 Vdc)			480 Vac (640 Vdc)			Inertia (Jm) [kg•cm²]	Weight [kg]
					Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm]	Rated Power Prtd [kW]		
52E	115	8.34	2.99	21.3	–	–	–	–	–	–	1500	7.61	1.20	2000	7.28	1.52	6.2	5.8
52G	115	8.43	4.72	21.5	–	–	–	1200	7.69	1.21	2500	7.06	1.85	3000	6.66	2.09	6.2	5.8
52H	115	8.48	5.90	21.6	–	–	–	1800	7.53	1.42	3500	6.26	2.30	4000	5.77	2.42	6.2	5.8
52K	115	8.60	9.30	21.9	–	–	–	3000	6.80	2.14	5500	3.90	2.25	6000	3.25	2.04	6.2	5.8
52L	115	8.67	11.6	22.0	1500	7.89	1.24	3500	6.40	23.5	6000	3.27	2.06	6000	3.27	2.03	6.2	5.8
52M	115	8.60	13.1	21.9	–	–	–	4500	5.20	2.45	–	–	–	–	–	–	6.2	5.8
53G	115	11.4	4.77	29.7	–	–	–	1000	10.7	1.12	2000	9.85	2.06	2400	9.50	2.39	9.1	7.4
53H	115	11.5	6.60	30.0	–	–	–	–	–	–	3000	8.63	2.77	3500	8.23	3.02	9.1	7.4
53K	115	11.6	9.40	30.3	–	–	–	2000	10.1	2.12	4000	7.65	3.20	4500	6.85	3.23	9.1	7.4
53L	115	11.6	11.8	30.3	1200	13.0	1.63	2500	9.59	2.51	5000	6.00	3.14	6000	4.05	2.55	9.1	7.4
53M	115	11.4	13.4	29.7	–	–	–	3000	8.72	2.74	–	–	–	–	–	–	9.1	7.4
53P	115	11.4	19.1	29.8	–	–	–	5000	5.88	3.08	–	–	–	–	–	–	9.1	7.4
53Q	115	11.57	21.1	42.6	2500	9.58	2.51	5500	4.99	2.87	–	–	–	–	–	–	9.1	7.4
54G	115	14.3	5.00	38.0	–	–	–	–	–	–	1500	12.9	2.03	2000	12.3	2.57	12	9
54H	115	14.2	5.50	37.5	–	–	–	–	–	–	1500	12.6	2.38	2000	12.2	2.56	12	9
54K	115	14.4	9.7	38.4	–	–	–	1800	12.7	2.39	3500	10.0	3.68	4000	9.25	3.87	12	9
54L	115	14.1	12.5	37.5	–	–	–	2500	11.5	3.00	4500	8.13	3.83	–	–	–	12	9
54N	115	14.1	17.8	37.6	–	–	–	3500	9.85	3.61	–	–	–	–	–	–	12	9
54P	115	14.36	19.6	54.5	–	–	–	4000	9.23	3.87	–	–	–	–	–	–	12	9
62G	142	11.9	4.9	29.7	–	–	–	–	–	–	1800	10.4	1.96	2000	10.2	2.14	17	8.9
62H	142	11.9	5.4	29.6	–	–	–	1000	10.8	1.17	2000	10.2	2.14	2400	9.9	2.49	17	8.9
62K	142	12.2	9.6	30.2	–	–	–	2000	10.4	2.18	3500	9.00	3.30	4500	8.00	3.77	17	8.9
62L	142	12.2	12.0	30.1	–	–	–	2500	10.0	2.62	5000	7.42	3.89	6000	5.74	3.61	17	9.8
62M	142	12.2	13.4	30.2	–	–	–	3000	9.50	2.98	6000	5.70	3.58	6000	5.70	3.58	17	8.9
62P	142	12.3	18.8	30.3	–	–	–	4500	8.10	3.82	–	–	–	–	–	–	17	8.9
62Q	142	12.0	21.8	29.8	–	–	–	5500	6.5	3.74	–	–	–	–	–	–	17	8.9
63G	142	16.5	4.5	42.1	–	–	–	–	–	–	1200	14.9	1.87	1500	14.6	2.29	24	11.1
63H	142	16.6	5.6	42.1	–	–	–	–	–	–	1500	14.6	2.29	1800	14.2	2.68	24	11.1
63K	142	16.8	9.9	42.6	–	–	–	1500	14.9	2.34	3000	12.9	4.05	3500	12.0	4.40	24	11.1
63L	142	16.8	11.1	42.6	–	–	–	1500	14.2	2.23	3000	12.9	4.05	3500	12	4.4	24	11.1
63M	142	17.0	13.8	43.0	–	–	–	2000	14.3	2.99	4000	11.3	4.73	4500	10.5	4.95	24	11.1
63N	142	17.0	17.4	43.0	–	–	–	3000	13.0	4.08	5000	9.60	5.03	6000	7.00	4.40	24	11.1
63Q	142	16.7	22.4	42.4	–	–	–	3500	11.9	4.36	–	–	–	–	–	–	24	11.1
64K	142	20.8	9.2	53.5	–	–	–	1200	18.8	2.36	2000	17.2	3.60	2500	16.3	4.27	32	13.3
64L	142	21.0	12.8	54.1	–	–	–	1500	18.4	2.89	3000	15.6	4.90	3500	14.4	5.28	32	13.3
64P	142	20.4	18.6	52.9	–	–	–	2500	16.0	4.19	4500	11.9	5.62	5500	9.00	5.18	32	13.3
64Q	142	20.0	20.7	53.2	–	–	–	3000	15.3	4.81	5000	10.7	6.45	6000	7.40	4.65	32	13.3
65K	142	24.8	9.8	64.5	–	–	–	1000	22.8	2.39	2000	20.2	4.23	2200	19.7	4.54	40	15.4
65L	142	25.0	12.2	65.2	–	–	–	1300	22.4	3.05	2500	19.2	5.03	2800	18.6	5.37	40	15.4
65M	142	25.0	13.6	65.2	–	–	–	1500	21.9	3.44	2500	19.2	5.03	3000	18.1	5.69	40	15.4
65N	142	24.3	17.8	63.7	–	–	–	2000	19.8	4.15	3500	16.0	5.86	4000	14.7	6.16	40	15.4
65P	142	24.5	19.8	64.1	–	–	–	2400	19.1	4.8	4000	14.9	6.24	5000	11.6	6.08	40	15.4
72K	180	29.7	9.3	79.4	–	–	–	–	–	–	1500	25.1	3.94	1800	24.0	4.52	65	19.7
72L	180	30	11.5	79.5	–	–	–	–	–	–	1500	25.3	3.97	1800	24.3	4.58	65	19.7
72M	180	30.0	13.0	79.8	–	–	–	–	–	–	2000	23.6	4.94	2500	22.1	5.79	65	19.7
72P	180	29.4	18.7	78.5	–	–	–	1800	23.8	4.49	3000	20.1	6.31	3500	18.2	6.67	65	19.7
72Q	180	29.5	23.5	78.4	–	–	–	2000	23.2	4.89	4000	16.3	6.83	4500	14.1	6.65	65	19.7
73L	180	42.0	12.1	113	–	–	–	–	–	–	1400	34.4	5.04	1500	33.8	5.31	92	26.7
73M	180	42.0	13.6	112	–	–	–	–	–	–	1500	33.8	5.31	1800	32.1	6.05	92	26.7
73P	180	41.6	19.5	111	–	–	–	1300	34.7	4.72	2400	28.5	7.16	2800	26.3	7.71	92	26.7
73Q	180	41.5	24.5	111	–	–	–	1500	33.4	5.25	3000	25.2	7.92	3500	22	8.07	92	26.7
74L	180	53.0	12.9	143	–	–	–	–	–	–	1200	43.5	5.47	1400	41.5	6.08	120	33.6
74P	180	52.5	18.5	142	–	–	–	–	–	–	1800	39.6	7.46	2000	35.9	7.52	120	33.6
74Q	180	52.2	26.1	141	–	–	–	1300	41.9	5.71	2500	31.5	8.25	3000	27.3	8.58	120	33.6
82T	260	75	48	210	–	–	–	–	–	–	2500	47.5	12.4	3000	38.0	11.9	172	49
83T	260	130	62	456	–	–	–	–	–	–	2200	70.0	16.1	2500	60.0	15.7	334	73
84T	260	180	67	668	–	–	–	–	–	–	1800	105	19.8	2000	93.0	19.5	495	97

Performance curves can be generated using our online Performance Curve Generator Tool: https://pcgh.kollmorgen.com/

AKM® Servo Motor Family Dimensions

AKM2G-xx General Dimensions for Brake and Non-Brake Models





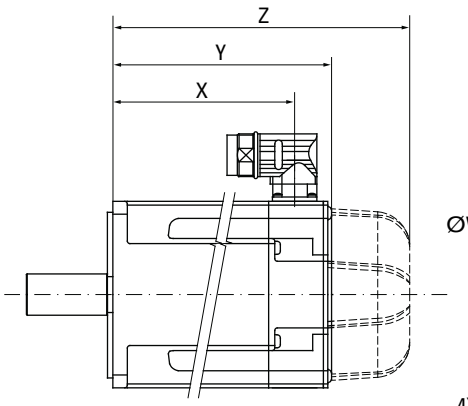
All measurement specifications in mm

	Model	No Brake				Brake				Flange	Bolt Circle	Bore Dia.	Pilot Dia.
			Resolver / SFD3 / Comcoder	DSL / EnDat 2.2/22	EnDat 2.2/01 / BiSS		Resolver / SFD3 / Comcoder	DSL / EnDat 2.2/22	EnDat 2.2/01 / BiSS				
		X	L	L	L	X	L	L	L	□F	ØBC	ØBD	ØCC
	AKM2G-21	90.75	111.15	118.15	111.15	129.75	150.15	157.15	150.15	58	63	5.5	40
	AKM2G-22	110.00	130.40	137.40	130.40	149.00	169.40	176.40	169.40	58	63	5.5	40
	AKM2G-23	129.25	149.65	156.65	149.65	168.25	188.65	195.65	188.65	58	63	5.5	40
	AKM2G-24	148.50	168.90	175.90	168.90	187.50	207.90	214.90	207.90	58	63	5.5	40
	AKM2G-31	101.10	121.40	129.40	121.40	142.30	162.60	170.60	162.60	72	75	5.5	60
	AKM2G-32	132.25	152.55	160.55	152.55	173.45	193.75	201.75	193.75	72	75	5.5	60
	AKM2G-33	163.40	183.70	191.70	183.70	204.60	224.90	232.90	224.90	72	75	5.5	60
	AKM2G-41	104.30	124.60	132.60	124.60	152.10	172.40	180.40	172.40	88	100	6.6	80
	AKM2G-42	130.55	150.85	158.85	150.85	178.35	198.65	206.65	198.65	88	100	6.6	80
	AKM2G-43	156.80	177.10	185.10	177.10	204.60	224.90	232.90	224.90	88	100	6.6	80
	AKM2G-44	183.05	203.35	211.35	203.35	230.85	251.15	259.15	251.15	88	100	6.6	80
	AKM2G-51	120.10	142.80	148.40	163.90	177.10	199.80	205.40	220.90	114	130	9.0	110
	AKM2G-52	149.50	172.20	177.80	193.30	206.50	229.20	234.80	250.30	114	130	9.0	110
	AKM2G-53	178.90	201.60	207.20	222.70	235.90	258.60	264.20	279.70	114	130	9.0	110
	AKM2G-54	208.30	231.00	236.60	252.10	265.30	288.00	293.60	309.10	114	130	9.0	110
	AKM2G-62	144.40	168.10	178.40	189.20	210.10	233.80	244.10	254.90	142	165	10.9	130
	AKM2G-63	166.45	190.15	200.45	211.25	232.15	255.85	266.15	276.95	142	165	10.9	130
	AKM2G-64	188.50	212.20	222.50	233.30	254.20	277.90	288.20	299.00	142	165	10.9	130
	AKM2G-65	210.55	234.25	244.55	255.35	276.25	299.95	310.25	321.05	142	165	10.9	130
Small Connector	AKM2G-71	143.90	169.10	181.10	189.20	221.35	246.55	258.55	266.65	192	215	13.4	180
Small Connector	AKM2G-72	177.85	203.05	215.05	223.15	255.35	280.55	292.55	300.65	192	215	13.4	180
Small Connector	AKM2G-73	211.80	237.00	249.00	257.10	289.30	314.50	326.50	334.60	192	215	13.4	180
Small Connector	AKM2G-74	245.75	270.95	282.95	291.05	323.25	348.45	360.45	368.55	192	215	13.4	180
Large Connector	AKM2G-71	149.60	181.10	181.10	189.20	227.05	258.55	258.55	266.65	192	215	13.4	180
Large Connector	AKM2G-72	183.55	215.05	215.05	223.15	261.05	292.55	292.55	300.65	192	215	13.4	180
Large Connector	AKM2G-73	217.50	249.00	249.00	257.10	295.00	326.50	326.50	334.60	192	215	13.4	180
Large Connector	AKM2G-74	251.45	282.95	282.95	291.05	328.95	360.45	360.45	368.55	192	215	13.4	180

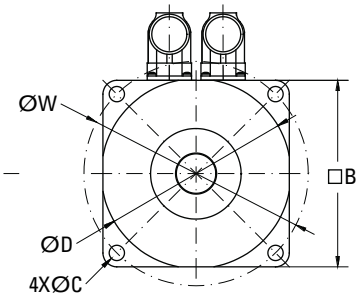
AKM, AKM Washdown, and AKM Washdown Food

Model with Power and Signal Connector

Dimensional drawing for AKM11 - AKM84



Measure Y: Without holding brake
Measure Z: With holding brake



All measurement specifications in mm – Measure Y: Measurement without holding brake, Measure Z: Measurement with holding brake

Model	X	Resolvers		Comcoder		Biss/Endat		Hiperface		Drive Cliq		Flange	Bolt circle	Bore diameter	Centering collar
		Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	□B	ØW	ØC	ØD
AKM11	56.1	69.6	106.6	79.0	–	–	–	79	116	–	–	40	46	4.3	30
AKM12	75.1	88.6	125.6	98.0	–	–	–	98	135	–	–	40	46	4.3	30
AKM13	94.1	107.6	144.6	117.0	–	–	–	117	154	–	–	40	46	4.3	30
AKM21	76.1	95.4	129.5	95.4	129.5	95.4	129.5	113.4	147.1	–	–	58	63	4.8	40
AKM22	95.1	114.4	148.5	114.4	148.5	114.4	148.5	132.4	166.1	–	–	58	63/65 (1)	4.8	40
AKM23	114.1	133.4	167.5	133.4	167.5	133.4	167.5	151.4	185.1	–	–	58	63/65 (1)	4.8	40
AKM24	135.1	152.4	186.5	152.4	186.5	152.4	186.5	170.4	204.1	–	–	58	63/65 (1)	4.8	40
AKM31	87.9	109.8	141.3	109.8	141.3	109.8	141.3	125.3	159.3	–	–	70	75/85 (2)	5.8	60
AKM32	118.9	140.8	172.3	140.8	172.3	140.8	172.3	156.3	190.3	–	–	70	75/85 (2)	5.8	60
AKM33	149.9	171.8	203.3	171.8	203.3	171.8	203.3	187.3	221.3	–	–	70	75/85 (2)	5.8	60
AKM41	96.4	118.8	152.3	118.8	152.3	118.8	152.3	136.8	170.3	152.3	170.3	84	90/100 (3)	7	60/80 (3)
AKM42	125.5	147.8	181.3	147.8	181.3	147.8	181.3	165.8	199.3	181.3	199.3	84	90/100 (3)	7	60/80 (3)
AKM43	154.4	176.8	210.3	176.8	210.3	176.8	210.3	194.8	228.3	210.3	228.3	84	90/100 (3)	7	60/80 (3)
AKM44	183.4	205.8	239.3	205.8	239.3	205.8	239.3	223.8	257.3	239.3	257.3	84	90/100 (3)	7	60/80 (3)
AKM51	105.3	127.5	172.5	127.5	172.5	145.0	189.0	145.0	189.0	146.0	189.0	108	115/130 (4)	7	95/110 (4)
AKM52	136.3	158.5	203.5	158.5	203.5	177.0	220.0	177.0	220.0	177.0	220.0	108	115/130 (4)	7	95/110 (4)
AKM53	167.3	189.5	234.5	189.5	234.5	208.0	251.0	208.0	251.0	208.0	251.0	108	115/130 (4)	7	95/110 (4)
AKM54	198.3	220.5	265.5	220.5	265.5	239.0	282.0	239.0	282.0	239.0	282.0	108	115/130 (4)	7	95/110 (4)
AKM62	130.5	153.7	200.7	153.7	200.7	172.2	219.7	172.2	219.7	172.2	219.7	138	165	11	130
AKM63	155.5	178.7	225.7	178.7	225.7	197.2	244.7	197.2	244.7	197.2	244.7	138	165	11	130
AKM64	180.5	203.7	250.7	203.7	250.7	222.2	269.7	222.2	269.7	222.2	269.7	138	165	11	130
AKM65	205.5	228.7	275.7	228.7	275.7	247.2	294.7	247.2	294.7	247.2	294.7	138	165	11	130
AKM72	164.5	192.5	234.5	192.5	234.5	192.5	234.5	192.5	234.5	201.7	253.3	188	215	13,5	180
AKM73	198.5	226.5	268.5	226.5	268.5	235.7	287.3	235.7	287.3	235.7	287.3	188	215	13,5	180
AKM74	232.5	260.5	302.5	260.5	302.5	269.7	321.3	269.7	321.3	269.7	321.3	188	215	13,5	180
AKM82	170	267	333	267	333	267	333	267	333	–	–	260	300	18.5	250
AKM83	250.5	347.5	413.5	347.5	413.5	347.5	413.5	347.5	413.5	–	–	260	300	18.5	250
AKM84	331	428	494	428	494	428	494	428	494	–	–	260	300	18.5	250

(1) ØW = 63 mm AKM2xx-Ax
ØW = 65 mm AKM2xx-Dx

(2) ØW = 75 mm AKM3xx-Ax
ØW = 85 mm AKM3xx-Cx

(3) ØW = 100 mm, ØV = 80 mm AKM4xx-Ax
ØW = 90 mm, ØV = 60 mm AKM4xx-Cx

(4) ØW = 130 mm ØV = 110 mm AKM5xx-Ax
ØW = 115 mm ØV = 95 mm AKM5xx-Ax

AKMH™ Stainless Steel Washdown Motors

Designed for Fast Cleaning and Increased Uptime. The AKMH stainless steel motor is designed to meet the standards for IP69K and EHEDG and is built with FDA approved, food-grade materials. The careful elimination of flat surfaces, cracks, and crevices prevents the build-up of foreign material and bacteria. The AKMH housing and cable can endure daily wash-downs with high pressure, high temperature, and caustic chemicals. The robust design means that guards and covers are not required to protect the motor from harsh cleaning regimens. These AKMH features constitute quicker cleaning, more reliable machine performance and the increase of OEE for the entire manufacturing line.

Reduced Recall Risk. The Food Modernization Safety Act (FMSA) gives the US federal government the ability to shut down facilities, recall food products, and levy stiff fines to ensure public safety in regards to food manufacturing. The AKMH is designed to meet the toughest hygienic requirements in the industry in order to reduce the possibility of food borne illnesses and costly recalls.

Bottom Line. With 19 standard motor sizes, multiple standard windings, feedback options and vast Co-Engineering possibilities, the AKMH motor can be a great fit for diverse applications in industries such as food & beverage and pharmaceutical. Kollmorgen's AKMH environmental solutions help maintain the highest standard of machine cleanliness and increase OEE by reducing the risk of potentially devastating supplier/government recalls.

The Benefits of AKMH™ Motors

- Increase your machine's Overall Equipment Effectiveness (OEE) with water and chemical resistant designs that maximize motor **reliability**
- Reduce your machine's total cost of ownership with shortened cleaning times and improved **durability**
- Enhance the value of your machine by **lowering** your customer's **risk of recall** through the superior hygienic design of AKMH

- IP69K certification of motor and cable inside the washdown environment
- Unique design technique to eliminate condensation
- FDA Approved, food-grade O-ring seals
- All exposed surfaces are 316L or DIN 1.4404 Stainless Steel; superior to 303/304 for corrosion resistance
- Round design with no nooks or crannies
- Sloped rear cover and connector mounting surface to eliminate puddling, even in vertical mounting
- No external hardware (no bolts, washers, or screws) to trap soil or pathogens or fall into food
- Smooth surface meeting EHEDG criteria, promotes rapid cleaning and no harboring of pathogens
- FDA Approved, food-grade bearing lube
- FDA Approved, food-grade shaft seal
- Cable designed to eliminate the need for conduit
- Hygienic, IP69K shaft seal includes special shaft treatment for long life
- No protective covers needed for washdown; no secondary cleaning disassembly required
- FDA approved, food-grade tubing option for applications where the cable is in a food zone
- Washdown cable(s) for increased reliability, faster cleaning, and fewer places to harbor pathogens
- Hygienic marking method eliminates harboring of pathogens
- Unique vented tube or connector design that equalizes pressure when temperature drops; e.g., during wash-down

- **Highly configurable** motor selection means an optimal fit for your machine and less time needed to find the right mechanical components
- Innovative design features **reduce** associated **cost and time** of installation.
- Industry leading configurability for **optimized performance**

- 19 frame/stack length options
- Windings designed for optimized machine performance
- Cables designed for direct connection to AKD2G and AKD servo drives (plug & play)
- Cables designed to meet NFPA 79 without the need for additional thermal overload protection
- Standard configurable cable lengths to 15 meters; no intermediate junction boxes needed
- Face and flange mounts available in both IEC and NEMA standards
- Brake option
- Multi-turn absolute feedback option; single-turn absolute feedback standard
- Additional feedback options available for retrofitting fielded motors with non-Kollmorgen drives
- Single and dual cable options for use with non-Kollmorgen drives
- UL/CE/RoHS/IP69K/BISSC/NSF/USDA/EAC certifications
- Designed to EHEDG guidelines

Specify only Kollmorgen AKMH systems to ensure:

- Reduced risk of food recall
- Reduced cleaning time, higher OEE
- Highest reliability and durability

AKMH™ Design Features

The key benefits of AKMH hygienic design features:

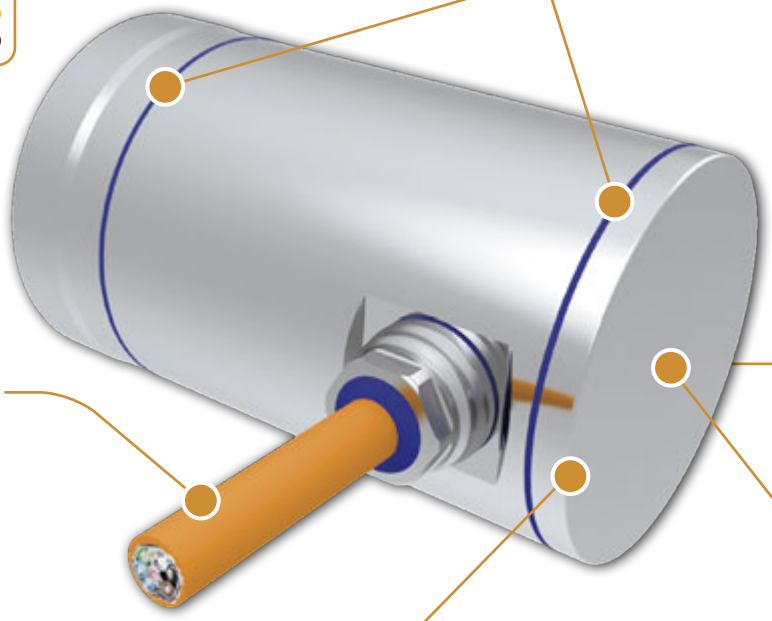
- Reduces risk of food recall
- Increases reliability in wash-down applications
- Reduces cleaning time: higher OEE

Smooth surface meeting EHEDG criteria, promotes rapid cleaning and no harboring of pathogens

No protective covers required for washdown... no secondary cleaning disassembly required

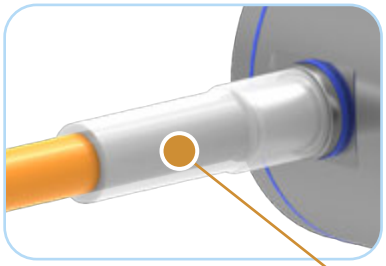
External O-ring and gasket sealing with FDA approved materials

All exposed surfaces are 316L stainless; superior to 304/303 for hygiene & corrosion resistance



Chemical resistant cable for pH of 2-12, meeting IEC60364-5-52, UL, CSA, CE, RoHS

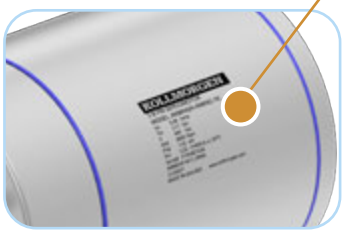
Conical end cover to eliminate water puddling, even in vertical mounting



No external hardware (no bolts, washers, or screws) to trap soil & pathogens or fall into food

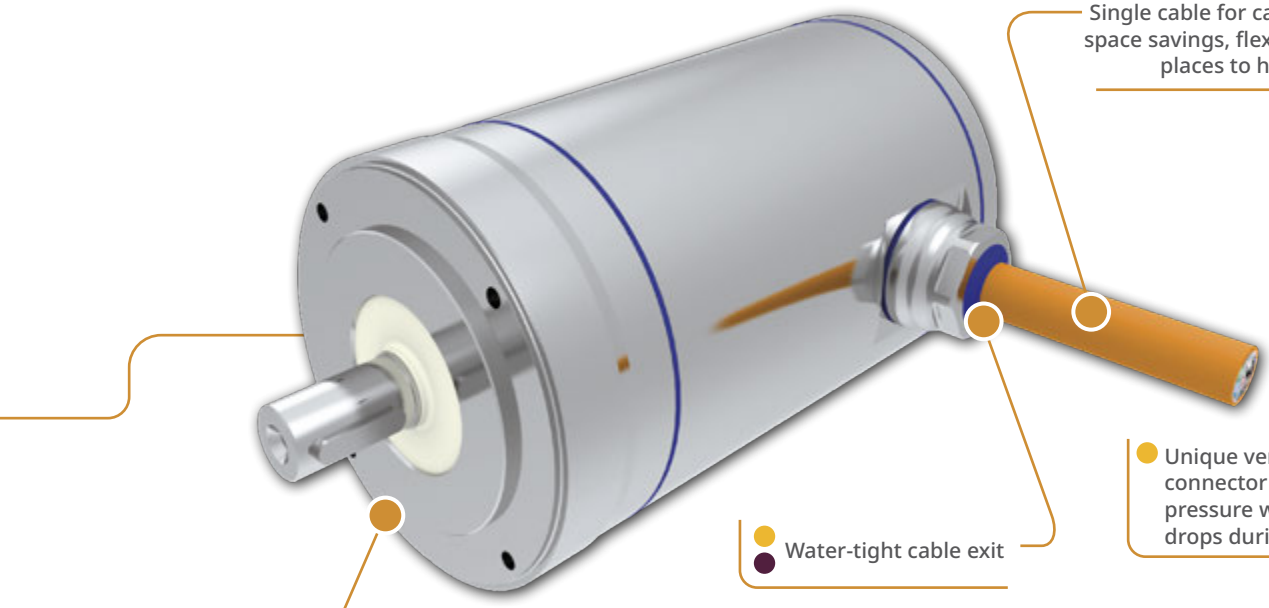
FDA food-grade approved tubing over cable for food zone applications

Hygienic marking method eliminates harboring of pathogens



Unique vented tube or connector design equalizes pressure in and outside the motor to prevent condensation inside the housing during changes of temperature

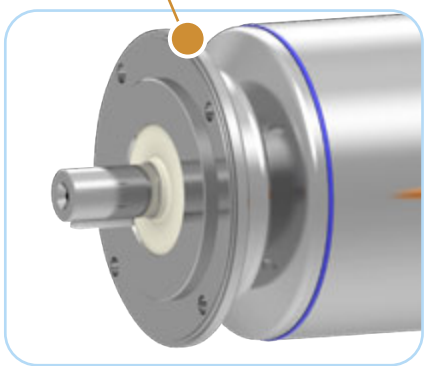
Single cable for cable cost savings, space savings, flexibility, and fewer places to harbor pathogens



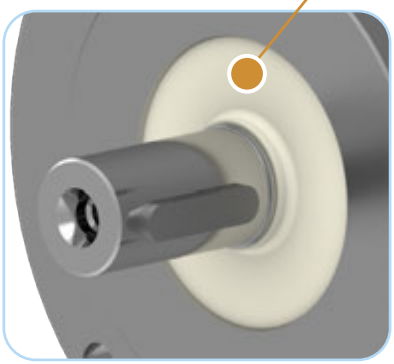
Unique vented tube or connector design that equalizes pressure when temperature drops during wash-down

Water-tight cable exit

Face Mount for most hygienic design, Flange Mount option for easy mounting



Hygienic, IP69K shaft seal, special shaft treatment for long life



AKMH Servo Motor Quick Guide

Performance Data

AKMH Servo Motor	Cont. Torque at Stall Tcs [Nm] ①②③	Continuous Current I_0 [A] ①②③	Peak Torque at stall Tps [Nm] ①②③	120 Vac (160 Vdc)			240 Vac (320 Vdc)			400 Vac (560 Vdc)			480 Vac (640 Vdc)			Inertia (Jm) [kg·cm²]	Weight [kg]
				Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③		
21C	0.31	1.37	1.76	2500	0.33	0.09	8000	0.22	0.18	8000	0.21	0.18	8000	0.21	0.18	0.11	3.6
21E	0.36	2.67	1.81	7000	0.26	0.19	-	-	-	-	-	-	–	-	-	0.11	3.6
21G	0.37	4.10	1.83	-	-	-	-	-	-	-	-	-	–	-	-	0.11	3.6
22C	0.61	1.19	3.16	1000	0.63	0.07	3500	0.58	0.21	8000	0.41	0.34	8000	0.40	0.34	0.16	4.1
22E	0.65	2.32	3.23	3500	0.61	0.22	3500	0.60	0.22	-	-	-	–	-	-	0.16	4.1
22G	0.64	3.98	3.27	7000	0.47	0.34	-	-	-	-	-	-	–	-	-	0.16	4.1
23D	0.85	1.88	4.37	1500	0.87	0.14	5000	0.73	0.38	8000	0.49	0.41	8000	0.46	0.39	0.22	4.6
23E	0.90	2.39	4.43	2500	0.86	0.23	6500	0.66	0.45	-	-	-	–	-	-	0.22	4.6
23F	0.88	3.63	4.46	4500	0.78	0.37	8000	0.48	0.40	-	-	-	–	-	-	0.22	4.6
24D	1.10	1.96	5.35	1500	1.10	0.17	4000	0.97	0.41	8000	0.52	0.44	8000	0.47	0.39	0.27	5.1
24E	1.15	2.52	5.36	2000	1.10	0.23	5500	0.88	0.51	-	-	-	–	-	-	0.27	5.1
24F	1.12	3.42	5.39	3000	1.04	0.33	8000	0.53	0.44	-	-	-	–	-	-	0.27	5.1
31C	0.91	1.24	3.76	-	-	-	2500	0.86	0.23	5000	0.72	0.38	6000	0.65	0.41	0.33	4.1
31E	0.96	2.64	3.88	2500	0.91	0.24	6000	0.68	0.43	-	-	-	-	-	-	0.33	4.1
31H	0.99	5.04	3.95	6000	0.71	0.45	-	-	-	-	-	-	-	-	-	0.33	4.1
32C	1.68	1.3	6.92	-	-	-	1500	1.62	0.25	3000	1.47	0.46	3500	1.41	0.52	0.59	5.0
32E	1.69	2.49	7.06	-	-	-	3500	1.53	0.56	7000	0.71	0.52	8000	0.22	0.18	0.59	5.0
32H	1.77	4.81	7.21	3000	1.61	0.51	7000	0.71	0.52	-	-	-	-	-	-	0.59	5.0
33C	2.46	1.37	9.94	-	-	-	1000	2.42	0.25	2000	2.29	0.48	2500	2.22	0.58	0.85	5.9
33E	2.51	2.34	10.19	-	-	-	2000	2.38	0.50	4500	1.85	0.87	5000	1.68	0.88	0.85	5.9
33H	2.6	5.00	10.43	2500	2.41	0.63	5500	1.56	0.90	-	-	-	-	-	-	0.85	5.9
41C	1.77	1.46	5.75	-	-	-	1500	1.73	0.27	3000	1.61	0.51	3500	1.56	0.57	0.81	6.1
41E	1.75	2.73	5.84	1500	1.77	0.28	3000	1.64	0.52	6000	1.26	0.79	6000	1.22	0.77	0.81	6.1
41H	1.83	5.34	5.92	3000	1.71	0.54	6000	1.29	0.81	-	-	-	-	-	-	0.81	6.1
42C	3.15	1.41	10.62	-	-	-	-	-	-	1500	3.02	0.47	2000	2.94	0.62	1.45	7.4
42E	3.12	2.64	10.79	-	-	-	2000	2.97	0.62	3500	2.60	0.95	4000	2.43	1.02	1.45	7.4
42H	3.15	5.64	11.04	2000	3.15	0.66	4500	2.40	1.13	6000	0.82	0.52	6000	0.46	0.29	1.45	7.4
42J	3.37	8.11	11.08	3000	3.02	0.95	6000	1.27	0.80	-	-	-	-	-	-	1.45	7.4
43E	4.38	2.61	15.50	-	-	-	1500	4.25	0.67	2500	3.89	1.02	3000	3.65	1.15	2.09	8.8
43H	4.55	5.22	15.65	-	-	-	3000	3.94	1.24	6000	0.12	0.08	5500	0.82	0.47	2.09	8.8
43L	4.02	9.92	15.58	3000	3.48	1.09	5500	0.45	0.26	-	-	-	-	-	-	2.09	8.8
44E	5.41	2.70	19.77	-	-	-	1000	5.29	0.55	2000	4.83	1.01	2500	4.56	1.19	2.73	10.2
44H	5.4	5.23	19.73	-	-	-	2500	4.72	1.24	5000	1.96	1.03	5000	1.27	0.66	2.73	10.2
44K	5.42	9.41	19.75	2000	4.96	1.04	5000	1.83	0.96	-	-	-	-	-	-	2.73	10.2
51E	3.92	2.61	10.09	-	-	-	1500	3.83	0.60	2500	3.58	0.94	3000	3.44	1.08	3.42	8.9
51H	3.8	5.45	10.17	-	-	-	3000	3.44	1.08	5500	2.20	1.27	5500	2.05	1.18	3.42	8.9
51L	3.89	10.58	10.33	3000	3.54	1.11	5500	2.16	1.24	-	-	-	-	-	-	3.42	8.9

① Motor winding excess temperature, ΔT = 100 K with ambient temperature = 40°C

② All specifications refer to sinusoidal supply

③ Rated data with reference flange (aluminum, dims (mm): AKMH2, AKMH3, AKMH4: 254 x 254 x 6.35 AKMH5: 305 x 305 x 12.7 AKMH6: 457 x 457 x 12.7)

Performance Data (Continued)

AKMH Servo Motor	Cont. Torque at Stall Tcs [Nm] ①②③	Continuous Current I_0 [A] ①②③	Peak Torque at stall Tps [Nm] ①②③	120 Vac (160 Vdc)			240 Vac (320 Vdc)			400 Vac (560 Vdc)			480 Vac (640 Vdc)			Inertia (Jm) [kg·cm²]	Weight [kg]
				Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③	Rated Speed Nrtd [RPM]	Rated Torque Trtd [Nm] ①②③	Rated Power Prtd [kW] ①②③		
52E	6.69	2.68	18.79	-	-	-	-	-	-	1500	6.41	6.22	2000	6.10	1.30	6.22	11.1
52H	6.72	5.17	19.01	-	-	-	1500	6.54	1.03	3500	5.22	4.54	4000	4.70	1.90	6.22	11.1
52L	6.66	9.87	19.30	-	-	-	3500	5.30	1.94	4500	2.46	1.27	4500	1.26	0.60	6.22	11.1
52M	6.7	11.15	19.20	-	-	-	4500	3.76	1.77	-	-	-	-	–	-	6.22	11.1
53H	9.45	5.92	26.74	-	-	-	-	-	-	3000	6.95	5.99	3500	5.88	2.20	9.12	13.4
53L	8.99	10.09	26.95	-	-	-	3000	6.83	2.15	3500	3.62	2.29	3500	2.82	0.84	9.12	13.4
53P	8.3	15.66	26.56	-	-	-	3500	3.66	1.34	-	-	-	-	–	-	9.12	13.4
54H	13.21	5.30	35.62	-	-	-	1000	12.88	1.35	2000	11.45	11.26	2000	11.27	2.36	11.90	15.7
54L	12.1	11.29	35.65	-	-	-	2500	9.74	2.55	3000	6.76	-	-	–	-	11.90	15.7
54P	11.83	16.58	36.08	-	-	-	3000	7.19	2.26	-	-	-	-	–	-	11.90	15.7
62H	10.6	5.32	32.24	-	-	-	1000	10.14	1.06	2000	9.15	1.92	2000	9.07	1.90	16.90	19.6
62L	10.1	11.05	33.03	-	-	-	2500	8.33	2.18	4000	3.77	1.58	4000	2.94	1.23	16.90	19.6
62M	10.3	12.53	33.13	-	-	-	3000	7.82	2.46	4000	3.22	1.35	4000	2.07	0.87	16.90	19.6
63H	14.6	5.42	44.73	-	-	-	-	-	-	1500	13.30	2.09	2000	12.61	2.64	24.20	23.1
63L	14.1	10.23	45.29	-	-	-	2000	12.47	2.61	3000	9.81	3.08	3500	7.64	2.80	24.20	23.1
63M	14.2	12.59	46.02	-	-	-	2000	12.47	2.61	4000	4.76	1.99	4000	3.04	1.27	24.20	23.1
64K	18.0	8.74	55.79	-	-	-	1000	17.34	1.82	2000	15.40	3.23	2500	14.19	3.71	31.60	26.7
64L	17.9	11.87	56.46	-	-	-	1500	16.57	2.60	3000	12.19	3.83	3500	9.29	3.40	31.60	26.7
65K	21.4	9.33	65.87	-	-	-	1000	20.65	2.16	2000	18.40	3.85	2500	17.00	4.45	40.00	30.2
65L	21.5	11.44	66.72	-	-	-	1500	20.01	3.14	2500	16.97	4.44	3000	14.68	4.61	40.00	30.2
65M	21.1	12.57	66.63	-	-	-	1500	19.64	3.09	3000	14.63	4.60	3000	13.78	4.33	40.00	30.2

① Motor winding excess temperature, ΔT = 100 K with ambient temperature = 40°C

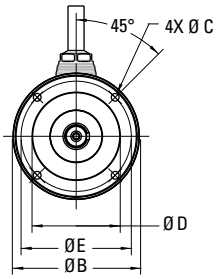
② All specifications refer to sinusoidal supply

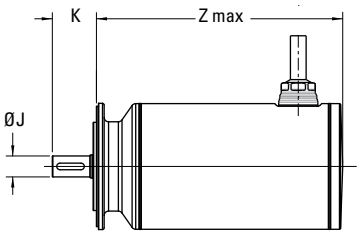
③ Rated data with reference flange (aluminum, dims (mm): AKMH2, AKMH3, AKMH4: 254 x 254 x 6.35 AKMH5: 305 x 305 x 12.7 AKMH6: 457 x 457 x 12.7)

Flange / Shaft Combinations

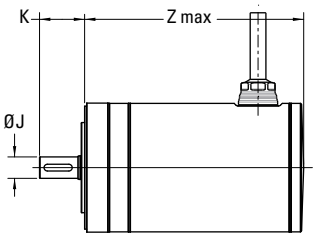
Type	AC	AN	BK	BN	CC	CN	DK	DN	EK	EN	GC	GN	HC	HN	LK
Mounting	Flange	Flange	Flange	Flange	Front	Front	Front	Front	Front	Front	Flange	Flange	Front	Front	Flange
Standard	IEC	IEC	NEMA	NEMA	IEC	IEC	NEMA	NEMA	NEMA	NEMA	IEC	IEC	IEC	IEC	NEMA
Shaft	Closed Keyway	Smooth	Open Keyway	Smooth	Closed Keyway	Smooth	Open Keyway	Smooth	Open Keyway	Smooth	Closed Keyway	Smooth	Closed Keyway	Smooth	Open Keyway
AKMH 2x	●	●	–	●	●	●	–	●	–	–	–	–	–	–	–
AKMH 3x	●	●	–	●	●	–	–	–	–	–	–	–	–	–	–
AKMH 4x	●	●	●	●	●	●	●	●	●	●	–	–	–	–	●
AKMH 5x	●	●	●	●	●	●	●	●	●	●	●	●	●	●	–
AKMH 6x	●	●	–	–	●	●	●	●	●	●	–	–	–	–	–

AKMH Dimensions

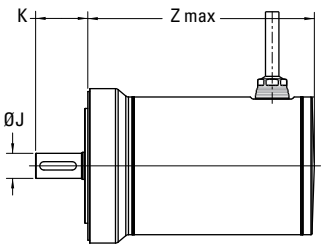




AKMH flange mounting

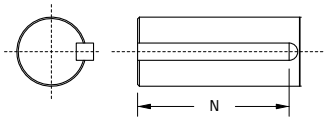


AKMH front mounting

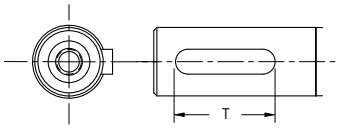


Only AKMH5x front mounting

Open keyway (BK, CN, DK versions)



Closed keyway (AC, BN, GC, HC versions)



Dimensions (mm)

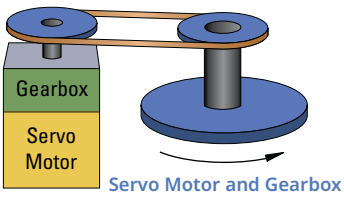
Model	Z max. SFD3 digital resolver		Z max. Hiperface DSL		Flange
	without brake	with brake	without brake	with brake	ØB
AKMH21	167.2	201.2	180.2	214.2	79
AKMH22	186.2	220.2	199.2	233.2	79
AKMH23	205.2	239.2	218.2	252.2	79
AKMH24	224.2	258.2	237.2	271.2	79
AKMH31	166.5	198.0	182.5	214.0	89
AKMH32	197.5	229.0	213.5	245.0	89
AKMH33	228.5	260.0	244.5	276.0	89
AKMH41	166.7	201.0	182.7	217.0	113
AKMH42	195.7	230.0	211.7	246.0	113
AKMH43	224.7	259.0	240.7	275.0	113
AKMH44	253.7	288.0	269.7	304.0	113
AKMH51	187.4	229.4	198.4	240.4	148
AKMH52	218.4	260.4	229.4	271.4	148
AKMH53	249.4	291.4	260.4	302.4	148
AKMH54	280.4	322.4	291.4	333.4	148
AKMH61	209.9	256.5	220.9	267.5	186
AKMH62	234.9	281.5	245.9	292.5	186
AKMH63	259.9	306.5	270.9	317.5	186
AKMH64	284.9	331.5	295.9	342.5	186

Dimensions (mm)

AKMH XX-		AC		AN		BK		BN		CC		CN		DK		DN		EK		EN		GC		GN		HC		HN		LK
Mounting		Flange				Flange				Front				Front				Front				Flange				Front				Flange
Standard		IEC				NEMA				IEC				NEMA				NEMA				IEC				IEC				NEMA
Shaft		Closed Keyway		Smooth		Open Keyway		Smooth		Closed Keyway		Smooth		Open Keyway		Smooth		Open Keyway		Smooth		Closed Keyway		Smooth		Closed Keyway		Smooth		Open Keyway
AKMH 2x	Ø C	4.80				–		5.10		M4 x 0.7 x 8.0				–		UNF10-32		–				–				–				–
	Ø D	40				–		38.10		40				–		38.1		–				–				–				–
	Ø E	63				–		66.68		63				–		66.68		–				–				–				–
	Ø J	11				–		9.524		11				–		9.524		–				–				–				–
	K	30				–		31.8		30.0				–		31.8		–				–				–				–
	N/T	T = 16		NA		–		NA		T = 16		NA		–		NA		–				–				–				–
AKMH 3x	Ø C	5.80				–				M5 x 0.8 x 10.0				–				–				–				–				–
	Ø D	60				–				60				–				–				–				–				–
	Ø E	75				–				75				–				–				–				–				–
	Ø J	14				–				14				–				–				–				–				–
	K	30				–				30.0				–				–				–				–				–
	N/T	T = 16		NA		–				T = 16		NA		–				–				–				–				–
AKMH 4x	Ø C	7.0				6.91				M6 x 1 x 12				UNC 1/4 - 20 x 12.3				M6 x 1 x 12				–				–				UNC 3/8 - 16 x 19.1
	Ø D	80				73.025				80				73.025		73		80				–				–				114.30
	Ø E	100				98.43				100				98.43				100				–				–				149.23
	Ø J	19				15.875				19				15.875				16				–				–				15.862
	K	40.0				52.40				40.0				52.40				52.40				–				–				50.8
	N/T	T = 25		NA		N = 34.93		NA		T = 25		NA		N = 34.93		NA		N = 30.00		NA		–				–				T = 25
AKMH 5x	Ø C	9				8.33				M8 x 1.25 x 16.0				UNC 3/8 - 16 x 19.05				M8 x 1.25 x 16.0				9				M8 x 1.25 x 16.0				–
	Ø D	110				55.560				110				55.563				110				95				95				–
	Ø E	130				125.73				130				125.73				130				115				115				–
	Ø J	24				19.05				24				19.05				24				24				24				–
	K	50.0				57.15				50.0				57.15				50.0				50.0				50.0				–
	D	T = 36		NA		N = 38.1		NA		T = 36		NA		N = 38.1		NA		N = 36.00		NA		T = 36		NA		T = 36		N = 38.1		–
AKMH 6x	Ø C	11.00				–				M10 x 1.5 x 20.0				UNC 3/8 - 16 x 19.05				M10 x 1.5 x 20.0				–				–				–
	Ø D	130				–				130				114.3				130				–				–				–
	Ø E	165.0				–				165.0				149.23				165.0				–				–				–
	Ø J	32				–				32				28.580				28				–				–				–
	K	58				–				58				69.9				60.0				–				–				–
	D	40		NA		–				T = 40		NA		N = 38.10		NA		N = 45.00		NA		–				–				–

Direct Drive Motor Overview

Conventional servo systems commonly have a mechanical transmission which can consist of gears, gearboxes, belts/pulleys or cams connected between the motor and the load. With Direct Drive Motors, the mechanical transmission is eliminated and the motor is coupled directly to the load.



Servo Motor and Gearbox

Why Use Direct Drive Motors?

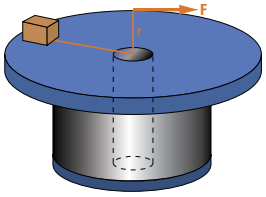
Increased Accuracy and Repeatability

A "precision" planetary gearbox 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) and direct drive linear (DDL) servo motors have repeatability better than 1 arc-second. Therefore, a direct drive motor can hold a position 60 times better than a conventional motor/gearbox.

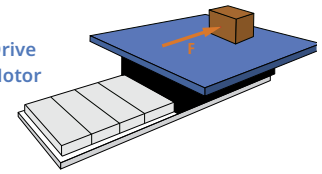
The increased accuracy of direct drive rotary motors results in a higher quality product out of the machine:

- 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

Direct Drive Rotary Motor



Direct Drive Linear Motor

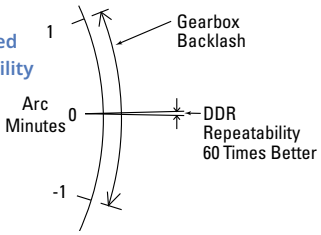


Higher Bandwidth

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 rotary motors remove these limitations and allows for much faster start/stop cycles and also provide greatly reduced settling time. Users of direct drive systems have reported up to a 2X increase in throughput.

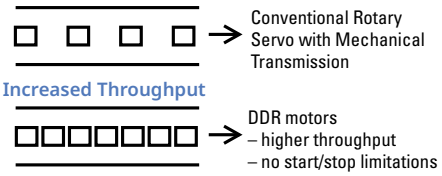
Improved Repeatability



Improved Reliability and Zero Maintenance

Gears, belts, and other mechanical transmission parts break. By eliminating these parts and using DDR and DDL motors, the reliability of the machine is improved. Gearboxes 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.

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. Less parts to purchase, schedule, inventory and control, and less 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/gearbox 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 rotary motors. 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 and DDL. DDR and DDL applications have run with inertia ratios greater than 1,000:1.

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.

Which Direct Drive Motor is Right for Your Application?

Kollmorgen's 70 years of electromagnetic and electromechanical design experience combined with our quality and service, allowed us to refine and expand DDR motors 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.

Applications where the load rides on the motor's bearings such as indexing or rate tables

Cartridge DDR Motor

This motor is the first in the industry to combine the space-saving and performance advantages of Frameless DDR motors 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 servo motor, saving space and design time and simplifying the overall system.

Any application with existing bearings

Housed DDR Motor

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 indexers.

Applications where size and weight must be absolutely minimized

Frameless DDR Motors

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 KBM™ and TBM series are Kollmorgen's Frameless DDR products. The KBM provides excellent torque/volume with the use of a proprietary neodymium-iron magnet rotor structure and skewed armature assembly. The KBM 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. The TBM frameless motor is a series of direct drive torque motors designed for applications that require high power in a small, compact form factor with minimized weight and inertia.

Applications where linear motion is required

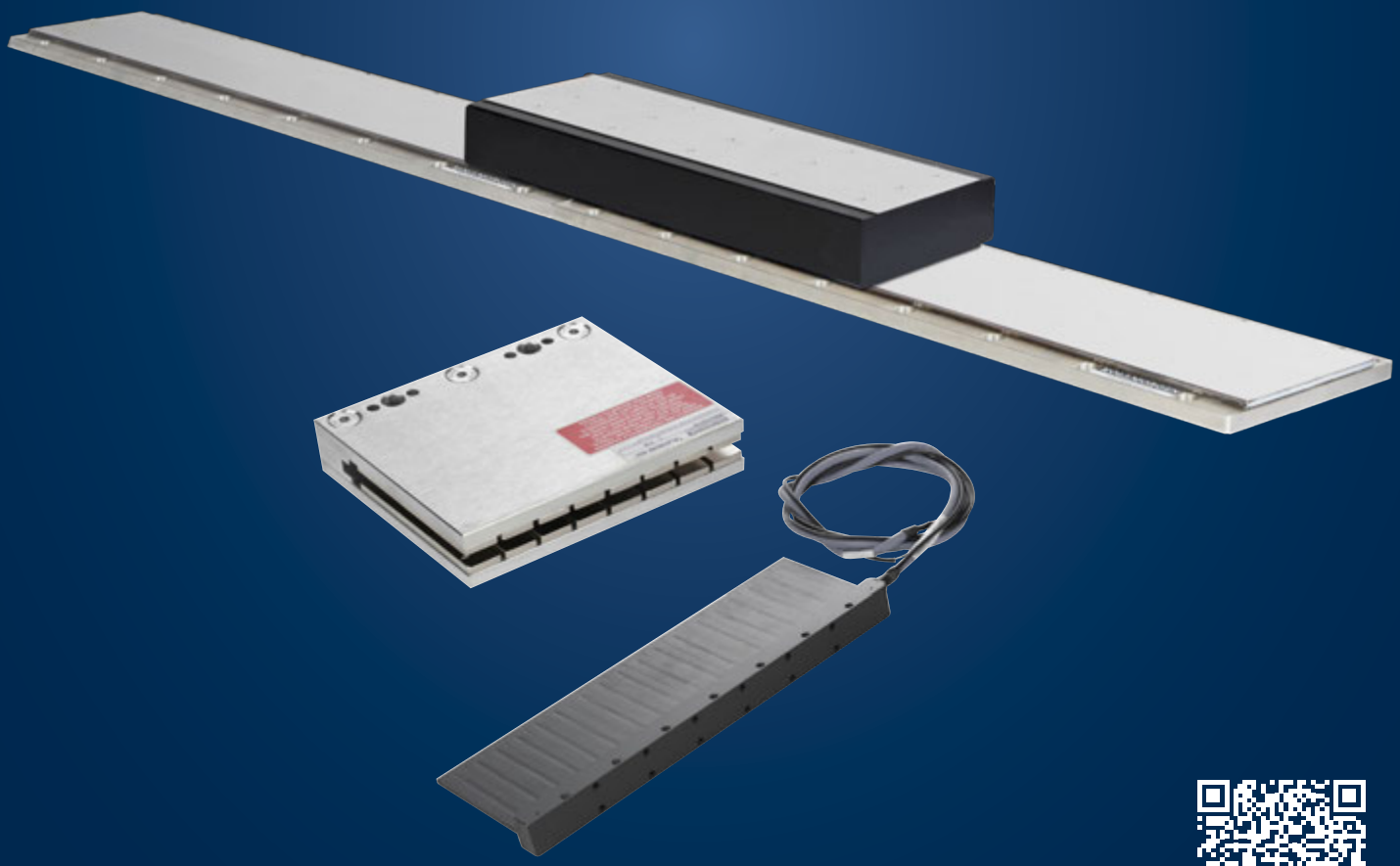
Direct Drive Linear (DDL) Motor

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.

Direct Drive Linear (DDL) Motor

Our direct drive linear motor series provide new dimension in performance with high throughput, accuracy, and zero maintenance.

The product line are frameless, permanent magnet, three phase, brushless servo motors. The DDL product line consists of two fundamental constructions, Ironless (slotless) and Ironcore. Ironless motors have no attractive force between the framless components and zero cogging for the ultra smooth motion. Ironcore motors provide the highest force per frame size. They feature a patented anti-cogging design which yields extremely smooth operation.



The Benefits of Direct Drive Linear Motor

» **Zero Maintenance with Greater Accuracy and Higher Bandwidth**	» Smoother velocity and reduced audible noise » Power transmission without backlash » Transmission elements such as couplings, toothed belts, ball/lead screws, rack & pinions, and other fitted components can be eliminated » No gears or screws, no lubrication required » Improved machine reliability
» **Wide Range of Sizes and Force to Cover any Linear Application**	» Increased performance for the entire system » Flat, compact drive solution » Easily mix / match motors and drives » Real-life acceleration up to 10 G
» **Simplified, High Force Permanent Magnet Design**	» Higher bandwidth and faster response than ball/lead screws or rack & pinion solutions » Rapid indexing of heavy loads with peak force up to 12,500 N (2,800 lb) » Reduced audible noise, fewer parts and lower cost of ownership » More compact machine design

Direct Drive Linear (DDL) Motor

Direct Drive Linear Motor Options

Two types of linear motors are available, **Ironcore** and **Ironless**. Each one provides characteristics and features that are optimal depending upon the application. Ironcore motors have coils wound on silicon steel laminations, to maximize the generated force, with a single sided magnet way.

Ironcore Motor

Using a patented electromagnetic design, DDL linear motors have the highest rated force per size, a high Km motor constant (equals low thermal losses), and low cogging forces without the need for skewing of the magnets. The high thrust forces possible with these motors make them ideal for accelerating and moving high masses, and maintaining stiffness during machining or process forces. Ironless motors have no iron, or slots for the coils to be wound on.

Therefore, these motors have zero cogging, a very light mass, and absolutely no attractive forces between the coil assembly and the magnet way. These characteristics are ideal for applications requiring very low bearing friction, high acceleration of lighter loads, and for maximizing constant velocity, even at ultra low speeds. The modular magnet ways consists of a double row of magnets to maximize the generated thrust force and to provide a flux return path for the magnetic circuit.

Ironless Motor

Feedback Types

All brushless motors require feedback for commutation. The conventional rotary motor typically utilizes a resolver mounted on the rear of the motor or Hall effect devices mounted integrally in the coil windings. For a linear motor, commutation feedback can also be accomplished with a variety of methods. Digital or linear Hall effect devices are available from Kollmorgen for the DDL motor series which allow the drive electronics to commutate the linear motors in a manner identical to rotary motors.

For exceptionally smooth motion requirements, sinusoidal drive electronics such as the Kollmorgen's AKD® series, using digital Hall effects, provide sinusoidal drive currents to the motor for the best constant force and velocity performance. As an alternative, it is typical for linear motor applications to have a linear encoder present in the system for position feedback. It is increasingly common today for drive amplifiers, such as the AKD digital amplifier, to derive the necessary commutation information directly from this linear encoder, either with or without supplemental digital Hall effect devices on startup. Other types of feedback used on linear motor applications include linear Inductosyns, laser interferometers, and LVDT.

Advantages

Wide Speed Range

Since the frameless parts of the linear motor are non-contact, and no limitations of a mechanical transmission are present, both very high speeds and very low speeds are easily obtainable. Speeds are truly not limited by the motor. Instead, by eliminating the mechanical transmission, speed becomes limited by other elements in the system such as the linear bearings, and the achievable bandwidth from any feedback devices. Application speeds of greater than 5 meters per second (200 in./sec.) or less than 1 micron per second (.00004 in./sec.) are typically achievable. In comparison, mechanical transmissions such as ball screws are commonly limited to linear speeds of 0.5 to 0.7 meters per second (20-30 in./sec.) because of resonances and wear. In addition to a wide speed range, linear motors, both ironcore and ironless, have excellent constant velocity characteristics, typically better than ± 0.01% speed variation.

High System Dynamics

In addition to high speed capability, direct drive linear motors are capable of very high accelerations. Limited only by the system bearings, accelerations of 3 to 5 G are quite typical for the larger motors and accelerations exceeding 10 G are easily achievable for smaller motors.

Easy Selection Process:

1. Determine peak and continuous force required for your applications by using the Application Sizing worksheets in the DDL Motor Selection Guide or the Motioneering tool
2. Refer to the DDL Motor Summary section of the DDL Motor Selection Guide to choose your motor
3. Build model number for ordering by referring to the Model Nomenclature section of the DDL Motor Selection Guide*

Smooth Operation and Positional Accuracy

Both ironless and ironcore motors exhibit very smooth motion profiles due to the inherent motor design of Kollmorgen's DDL series. Cogging, which is a component of force, is greatly reduced in the ironcore designs and is zero in the ironless designs. As a result, these direct drive linear motors provide very low force and velocity ripple for ultra smooth motion. Positioning accuracies are limited only by the feedback resolution, and sub-micron resolutions are commonly achievable.

Unlimited Travel

With the DDL motor series, magnet ways are made in 5 modular sections: 64 mm, 128 mm, 256 mm, 512 mm and 1024 mm long. Each module can be added in unlimited numbers to any other module to allow for unlimited travel. Whether the travel required is 1mm (0.04 inches) or 100 meters (330 feet), the DDL series can accommodate the need.

No Wear or Maintenance

Linear motors have few components, therefore the need for ball screw components such as nuts, bearing blocks, couplings, motor mounts and the need to maintain these components have been eliminated. Very long life and clean operation, with no lubrication or maintenance of these parts are the result.

Integration of Components is Much Simpler

Frameless linear motors require much fewer components than rotary motors with mechanical transmissions. A 0.8 mm airgap (0.031 inches) for the ironcore design and 0.5 mm airgap (0.020 inches) for the ironless design is the only alignment of the frameless linear motor components that is necessary. No critical alignments are required as with ball screws. Straightness of travel as provided by the system linear bearings is more than sufficient for the Kollmorgen linear motors.

Typical Applications for Linear Motors Include:

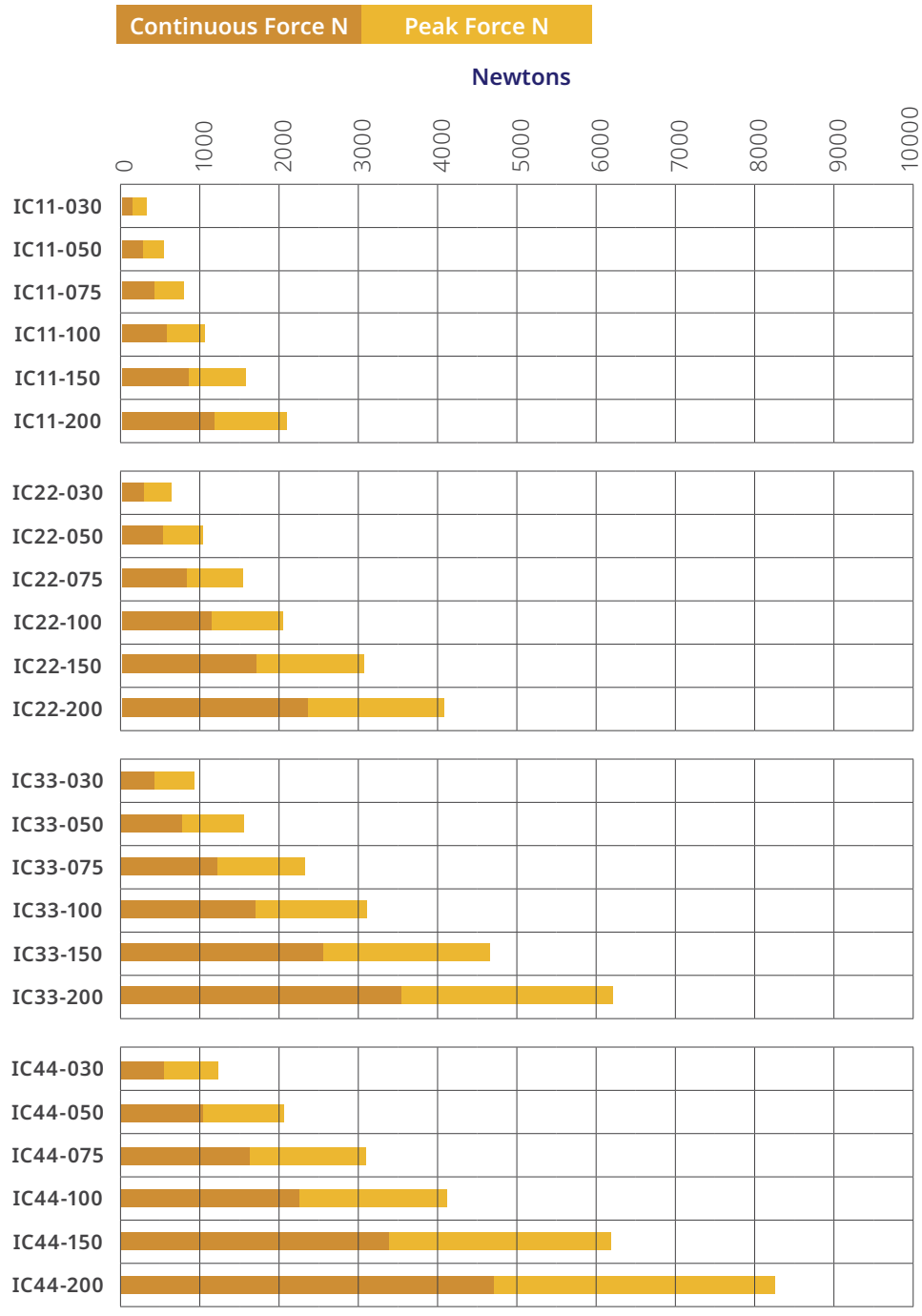
Machine Tool
Drilling
Milling
Grinding
Laser cutting
Cam grinding
Semiconductor
Wafer handling process
Wafer-inspection
Wafer slicing
Tab bonding
Wire bonding
Ion implantation
Lithography
Textile
Carpet tufting
Measurement/inspection
Coordinate measurement machines
Electronic assembly
Pick-and-place machines
Component insertion
Screen printers
Adhesive dispensers
PC board inspection, drilling

Other applications include:
Flight simulators
Acceleration sleds
Catapult
G-Force measurement

* The DDL model nomenclature can also be found on pages 184 to 185.

Direct Drive Linear (DDL) Motor

Ironcore Linear Motors – 230 Vac (Non-Cooled)

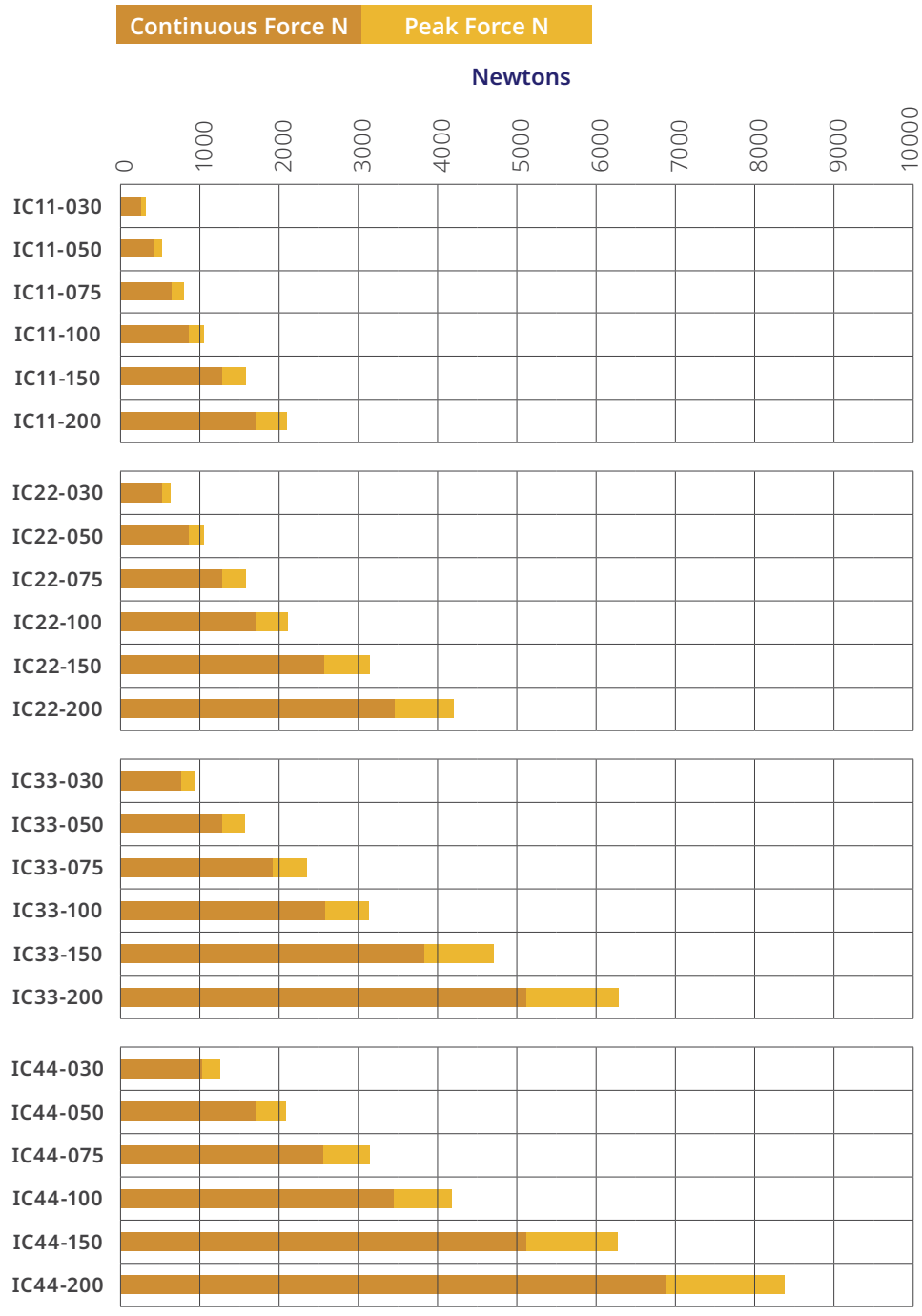


Motor Type	Max. Force (N) Continuous N	Continuous (lbf)	Peak N	Peak (lbf)
IC11-030	144	32.4	320	71.9
IC11-050	263	59.1	533	120
IC11-075	413	92.8	800	180
IC11-100	574	129	1067	240
IC11-150	861	194	1600	360
IC11-200	1197	269	2135	480
IC22-030	280	62.9	624	140
IC22-050	526	118	1039	234
IC22-075	825	185	1558	350
IC22-100	1148	258	2077	467
IC22-150	1723	387	3117	701
IC22-200	2393	538	4156	934
IC33-030	431	96.9	944	212
IC33-050	789	177	1572	353
IC33-075	1238	278	2358	530
IC33-100	1722	387	3144	707
IC33-150	2583	581	4716	1060
IC33-200	3590	807	6291	1414
IC44-030	560	126	1259	283
IC44-050	1053	237	2096	471
IC44-075	1651	371	3144	707
IC44-100	2296	516	4192	942
IC44-150	3445	774	6289	1414
IC44-200	4786	1076	8388	1885

Note: Performance data summarized here represents motor data only. For system performance data with Kollmorgen drives use the Motioneering Application Engine sizing software found here: https://motioneering.kollmorgen.com

Note: See the DDL Selection Guide for more detailed motor data and dimension drawings.

Ironcore Linear Motors – 230 Vac (Water-Cooled)



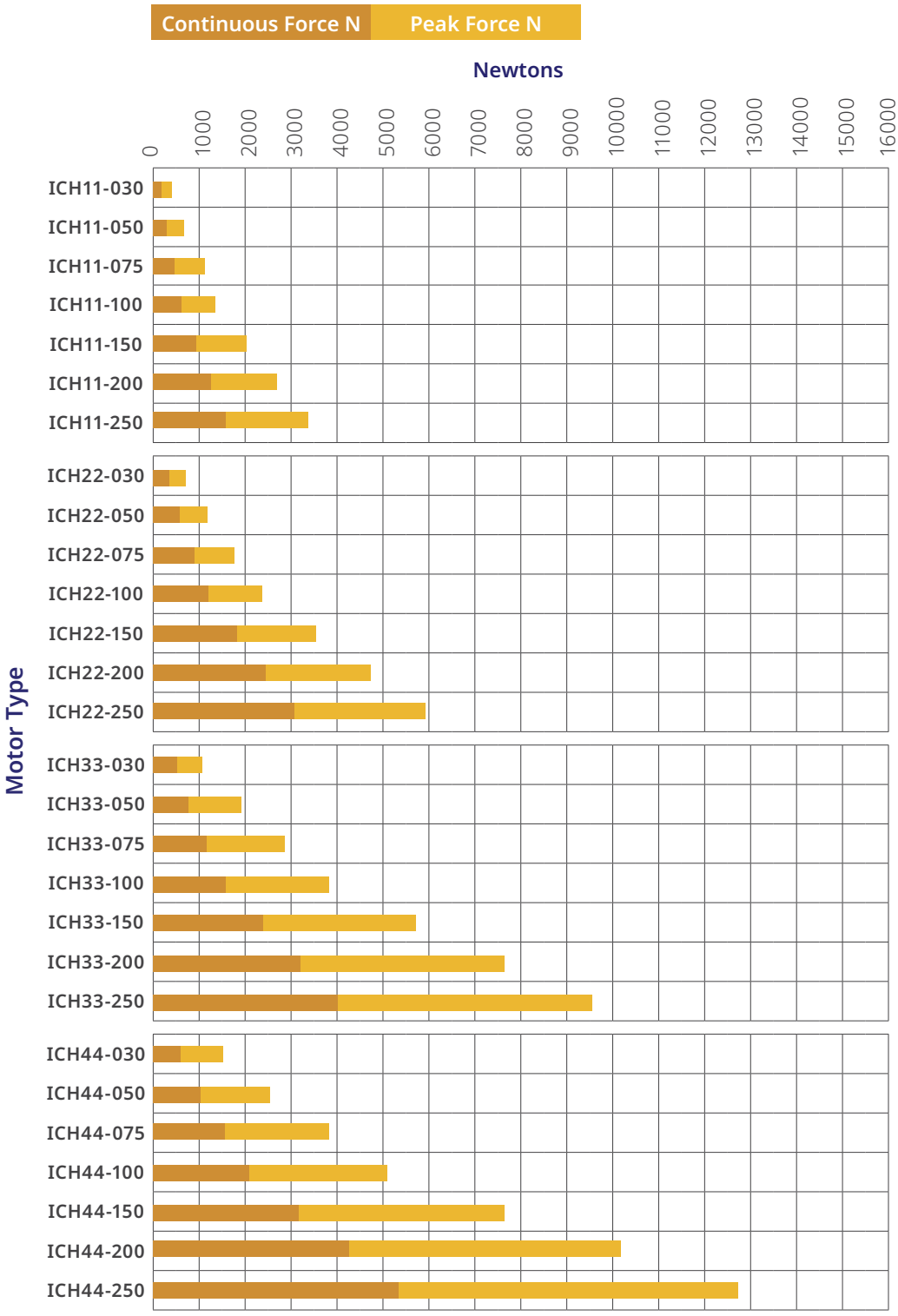
Motor Type	Max. Force (N) Continuous N	Continuous (lbf)	Peak N	Peak (lbf)
IC11-030	254	57.1	315	70.8
IC11-050	432	97.1	525	118
IC11-075	649	146	798	179
IC11-100	864	194	1051	236
IC11-150	1285	289	1576	354
IC11-200	1712	385	2102	473
IC22-030	519	117	630	142
IC22-050	864	194	1051	236
IC22-075	1284	287	1576	354
IC22-100	1715	386	2106	473
IC22-150	2566	577	3152	709
IC22-200	3458	777	4204	945
IC33-030	769	173	945	212
IC33-050	1283	288	1575	354
IC33-075	1926	433	2365	532
IC33-100	2593	583	3152	709
IC33-150	3849	865	4724	1063
IC33-200	5135	1154	6306	1418
IC44-030	1036	233	1260	283
IC44-050	1711	385	2101	472
IC44-075	2568	577	3154	709
IC44-100	3457	777	4202	945
IC44-150	5133	1154	6303	1417
IC44-200	6916	1555	8407	1890

Note: Performance data summarized here represents motor data only. For system performance data with Kollmorgen drives use the Motioneering Application Engine sizing software found here: https://motioneering.kollmorgen.com

Note: See the DDL Selection Guide for more detailed motor data and dimension drawings.

Direct Drive Linear (DDL) Motor

Ironcore Linear Motors – 480 Vac

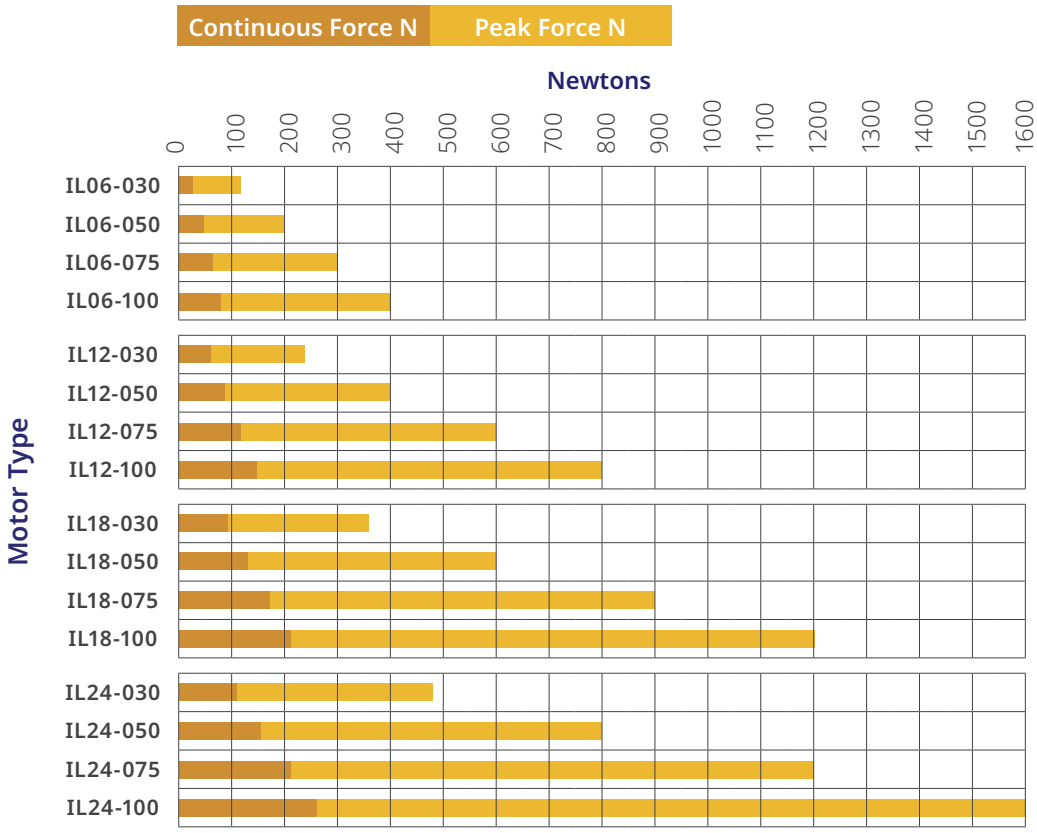


	Max. Force (N)			
	Continuous		Peak	
	N	(lbf)	N	(lbf)
ICH11-030	175	39.3	405	91.0
ICH11-050	299	67.2	674	151.5
ICH11-075	455	102.3	1012	227.5
ICH11-100	612	137.6	1349	303.3
ICH11-150	927	208.4	2023	454.8
ICH11-200	1251	281.2	2698	606.5
ICH11-250	1569	352.7	3372	758.1
ICH22-030	342	76.9	710	159.6
ICH22-050	584	131.3	1184	266.2
ICH22-075	889	199.9	1775	399
ICH22-100	1203	270.4	2367	532.1
ICH22-150	1823	409.8	3551	798.3
ICH22-200	2445	549.7	4734	1064.2
ICH22-250	3067	689.5	5918	1330.4
ICH33-030	511	114.9	1065	239.4
ICH33-050	769	172.9	1909	429.2
ICH33-075	1171	263.3	2863	643.6
ICH33-100	1575	354	3818	858.3
ICH33-150	2387	536.6	5727	1287.5
ICH33-200	3201	719.6	7636	1716.6
ICH33-250	4016	902.8	9545	2145.8
ICH44-030	600	134.9	1527	343.3
ICH44-050	1023	230	2545	572.1
ICH44-075	1557	350	3818	858.3
ICH44-100	2095	471	5090	1144.3
ICH44-150	3175	713.8	7636	1716.6
ICH44-200	4258	957.2	10181	2288.8
ICH44-250	5341	1200.7	12726	2860.9

Note: Performance data summarized here represents motor data only. For system performance data with Kollmorgen drives use the Motioneering Application Engine sizing software found here: https://motioneering.kollmorgen.com

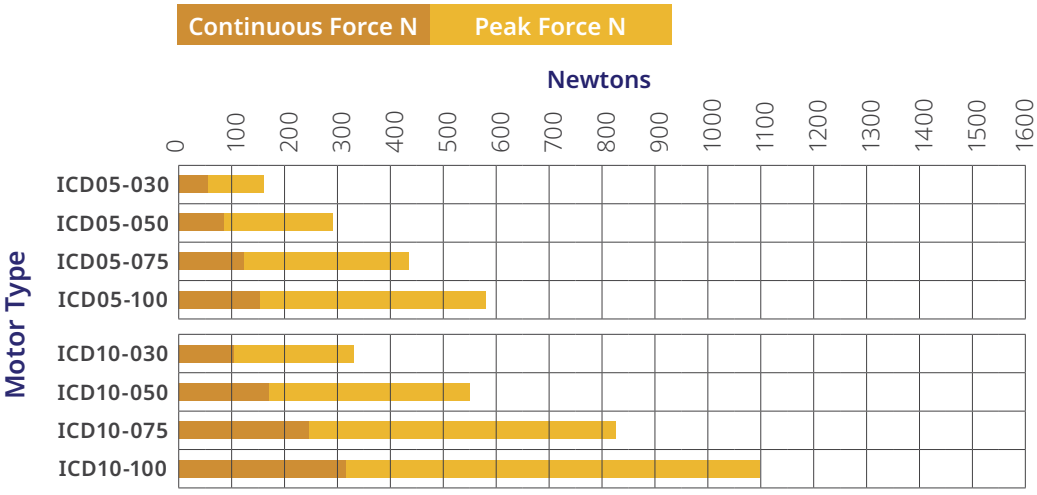
Note: See the DDL Selection Guide for more detailed motor data and dimension drawings.

Ironless Linear Motors



	Max. Force (N)			
	Continuous		Peak	
	N	(lbf)	N	(lbf)
IL06-030	30.3	6.81	120	27.0
IL06-050	49.7	11.2	200	45.0
IL06-075	67.6	15.2	300	67.4
IL06-100	82.8	18.6	400	89.9
IL12-030	62.1	14.0	240	54.0
IL12-050	88.4	19.9	400	89.9
IL12-075	119	26.8	600	135
IL12-100	148	33.3	800	180
IL18-030	92.1	20.7	360	80.9
IL18-050	131	29.4	600	135
IL18-075	173	38.9	900	202
IL18-100	211	47.4	1200	270
IL24-030	109	24.5	480	108
IL24-050	155	34.8	800	180
IL24-075	211	47.4	1200	270
IL24-100	262	58.9	1600	360

ICD Linear Motors



	Max. Force (N)			
	Continuous		Peak	
	N	(lbf)	N	(lbf)
ICD05-030	57.0	12.8	165	37.1
ICD05-050	87.0	19.6	295	66.3
ICD05-075	125	28.1	441	99.1
ICD05-100	157	35.3	588	132
ICD10-030	104	23.4	330	74.2
ICD10-050	171	38.4	550	124
ICD10-075	246	55.3	824	185
ICD10-100	315	70.8	1099	247

Note: Performance data summarized here represents motor data only. For system performance data with Kollmorgen drives use the Motioneering Application Engine sizing software found here: https://motioneering.kollmorgen.com

Note: See the DDL Selection Guide for more detailed motor data and dimension drawings.

Direct Drive Rotary (DDR™) Motor

Kollmorgen offers a comprehensive selection of direct drive motors in different sizes and performance ranges. Direct drive motors are characterized by their high precision, reliability, and above all being maintenance-free. Mechanical components for power transmission such as belts or gearheads are not necessary – you just need the motor and bolts for mounting.

The Cartridge and Housed DDR motors combine the performance advantages of direct drives with the simple installation and the handling advantages of conventionally housed motors. By contrast the KBM™ and TBM series direct drive motors, with no housing, can be perfectly tailored to the application thanks to a unique construction kit principle.

All drives can be combined with AKD® or AKD® PDMM series servo drives, and the powerful Kollmorgen Automation Suite™ development environment is available for application programming.

Regardless which drive technology you decide on, Kollmorgen provides right solution and optimum support during the development phase.

The Advantages of Rotary Direct Drives

Superb performance data	» Maximum torque density thanks to innovative, electromagnetic design minimizes the motor's spatial requirements. » Extremely quiet running with low cogging values and low harmonic distortion (THD) » Wide speed range and high acceleration values
Reliable and safe operation through careful construction	» Doubly secured magnet mounting on the rotor of the high-speed models through bonding and additional Kevlar® tape overlay » 155°C-approved internal winding temperature and thermistor overtemperature protection guarantee safe continuous operation in demanding applications » Insulation materials with UL approval facilitate the certification of higher-level assemblies » All materials are RoHS-compliant
Configurable design reduces the time-to-solution to a minimum	» KBM series offers 14 frame sizes with several design lengths » TBM series offers 3 frames sizes with 3 stack lengths per frame » Cartridge DDR series offers 5 frame sizes with several design lengths » Housed DDR series offers 4 frame sizes » Standard sensor feedback with hall effect sensors » Insulation types for high and low voltage » Several winding options with customer-specific windings upon request » Changes to the mechanical connection are easy to perform

Cartridge Direct Drive Rotary (DDR®) Motor

The Cartridge 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 servo motors.

Consisting of a rotor, stator, 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 servo motor. Also, mechnical transmission components are eliminated, saving space and design time while simplifying the overall system.

Advantages of the Cartridge DDR Motors

- Quick assembly within 5 minutes
- Direct power transmission without mechanical components reduces operating and maintenance costs
- Low cogging and thus smooth running at low speeds
- The backlash-free design improves the system's response characteristics

Performance Overview

- 5 frame sizes from 108 to 350 mm
- 17 different lengths and 52 standard windings
- Continuous torques of 4.57 Nm to 510 Nm
- Speeds up to 2500 rpm
- Integrated, high-resolution sinus encoder (optional)

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/gearbox. 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 gearboxes have a backlash between 1 and 2 arc-minutes. Over the life of the gearbox, 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. Gearboxes 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

Gearboxes have a finite life span, especially in a demanding cyclic application such as a Press Feed. On this machine, the gearbox 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 and reducing operating costs.

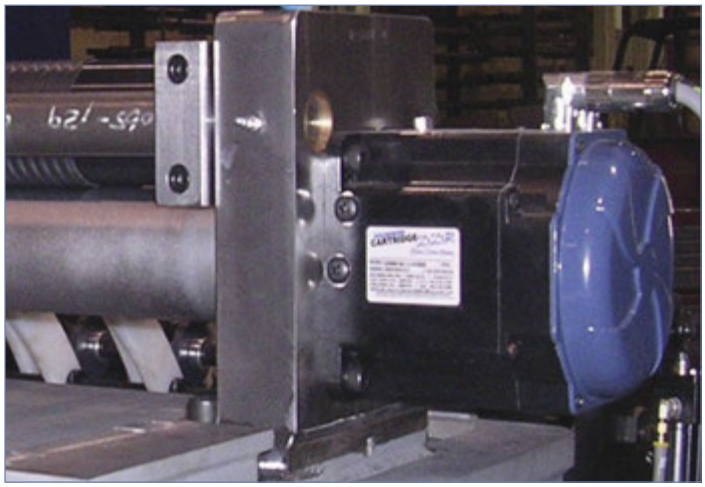
Reduced Audible Noise

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/gearbox combination. However, the elimination of parts and assembly time typically results in a lower total cost for the Cartridge DDR solution.v

Press feed machine built with a conventional servo motor, gearbox, 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 DDR® Motor Quick Guide

240 Vac Performance Data

Cartridge DDR Motor	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-cm² (lb-in-s² 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)

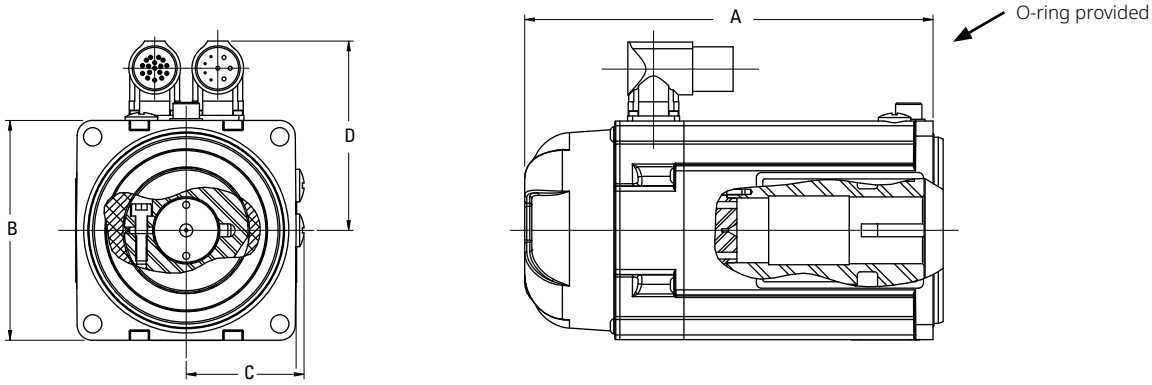
400/480 Vac Systems Performance Data

Cartridge DDR Motor	Servo Drive	Frame Size	Continuous Torque	Peak Torque	Maximum Speed		Weight	Inertia (Jm)
					RPM			
		mm (in)	Nm (lb-in)	Nm (lb-in)	400 Vac	480 Vac	kg (lb)	kg-cm² (lb-in-s² x10⁻³)
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)	1016 (9042)	350	400	132 (292)	3020 (2670)

Cartridge DDR® Motor Dimensional Data

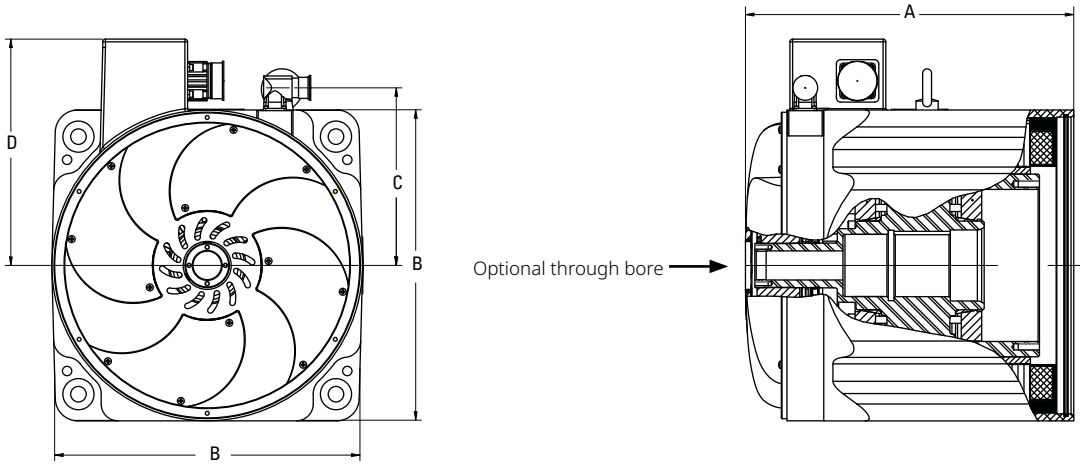
Cartridge DDR C04, C05 and C06 Dimensions

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 C09 and C13 Dimensions

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.

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.

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 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-m^2. There are 96 steel pins for an index angle of 3.5 degrees to move.
The move is accomplished in less than 100 ms.

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

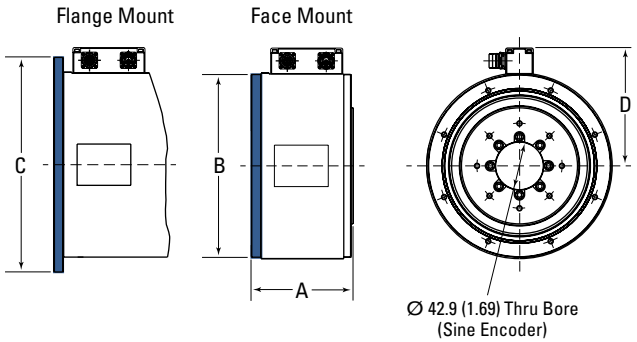
Housed DDR Performance Data and Dimensions

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) kg-cm² [lb-in-s² 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) kg-cm² [lb-in-s² 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 pages 169-170 for matching cables.
Note 2: For complete AKD and Housed DDR motor model nomenclature, refer to pages 175 and 183 respectively.

KBM Series Frameless Brushless Motor

The KBM frameless motor series direct drive technology

KBM frameless brushless motor models are engineered to provide the high-performance, long life and simple installation that today's design engineers demand. Optional latching digital Hall effect sensors are pre-aligned and factory installed with added axial rotor length to achieve proper triggering. Choice of insulation allows operation over a wide range of line input voltage. Our detailed selection guide provides a variety of pre-engineered options and configurations that are currently available.

Custom Application Solutions

For customized features, contact Kollmorgen to help us understand exactly what you need and how we can further optimize any KBM or engineer a new custom motor solution for the unique requirements of your application. We are experts in providing optimized solutions such as special winding configurations, tailored mounting features, diameter and stack length dimensional adjustments, or material variations.

The Benefits of KBM Frameless Motors

» Industry-Leading Frameless Motor Performance	» Advanced electromagnetic designs deliver maximum torque density which minimizes required motor space envelope » Extremely smooth rotation with minimal cogging and low total harmonic distortion (THD) » Broad operating speed range and rapid acceleration
» Quality Construction Ensures Reliability and Safe Operation	» Redundant magnet attachment to rotor on high-speed models – adhesive bonding and high-strength banding » 155°C motor winding temperature rating with integral thermistor allows continuous safe operation for demanding applications » Designed with UL-recommended insulation systems to simplify system regulatory approval » RoHS compliant material selection » Compliant with Harmonized Type C Standards EN60034-1:2004 - Rotating Electrical Machines and where appropriate in accordance to the Low Voltage Directive 2006-95-EC
» Highly Configurable Design Minimizes Time to Solution	» 14 frame sizes with multiple stack lengths » Standard sensor feedback using Hall effect sensors » Standard high and low voltage insulation » Multiple standard windings with custom windings available upon request » Mechanical interface changes easily accommodated

KBM Series Overview

Kollmorgen, the global leader in direct drive motor technology, is pleased to offer KBM series frameless brushless motors. With a wide variety of sizes and torque ranges available, KBM models are engineered to provide the high-performance, long life and simple installation that today's design engineers demand.

Quality Construction

- Fully encapsulated stator windings
- 155°C internal winding temperature continuous capability
- PTC thermistor (avalanche-type) overload protection
- High performance magnets
- Fail-safe bands over rotor magnets*
- RoHS compliant

Available Options (No engineering fees apply)

Sensor Feedback (KBMS models)

Latching digital hall effect sensors are pre-aligned and factory installed on the lead end of the stator. Wiring instructions and electrical timing diagrams are included in this selection guide. KBMS models include added axial rotor length to achieve proper sensor triggering.

Choice of Insulation System

S (standard) – acceptable for applications up to 240 Vac drive amplifier supply.
H (high voltage) – required for applications >240 Vac and up to 480 Vac drive amplifier supply.

Allowed Modifications (Engineering fees apply. Consult Kollmorgen Customer Support for guidance or to obtain a quotation. Unit price increase may apply, depending upon extent of modification.)

Special Windings

Motor windings may be optimized to provide desired speed and torque performance according to the unique voltage and current requirements of a customer's application. Kollmorgen engineers must confirm electrical feasibility and manufacturability of each special winding arrangement prior to quotation.

Special Rotor Hub Dimensions

Rotor hubs may be provided with special customer-designated hole patterns, mounting features or smaller inner bore diameters. Standard KBM(S) models shown within this selection guide include the largest available inner rotor bore diameter.

Rotor Hub Material

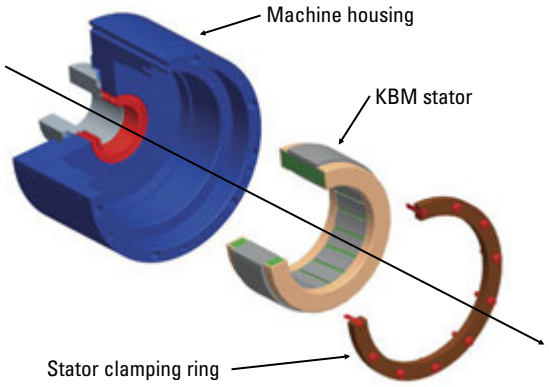
Standard configuration KBM(S) rotor hubs are constructed from non-plated cold rolled steel. If special plating, coating, cleaning or alternate material is desired, Kollmorgen engineers must confirm feasibility and pricing adjustment prior to quotation.

Stator Sleeve Material

Standard configuration KBM(S)-10, 14, 17, 25, 35, 45, 163 and 260 size stators are designed with uncoated aluminum sleeves around the stator lamination stack. If special coating or plating is desired for the aluminum stator sleeve, Kollmorgen engineers must confirm feasibility and pricing adjustment prior to quotation. Stator sleeves are only utilized for the sizes listed above.

Agency UL Information

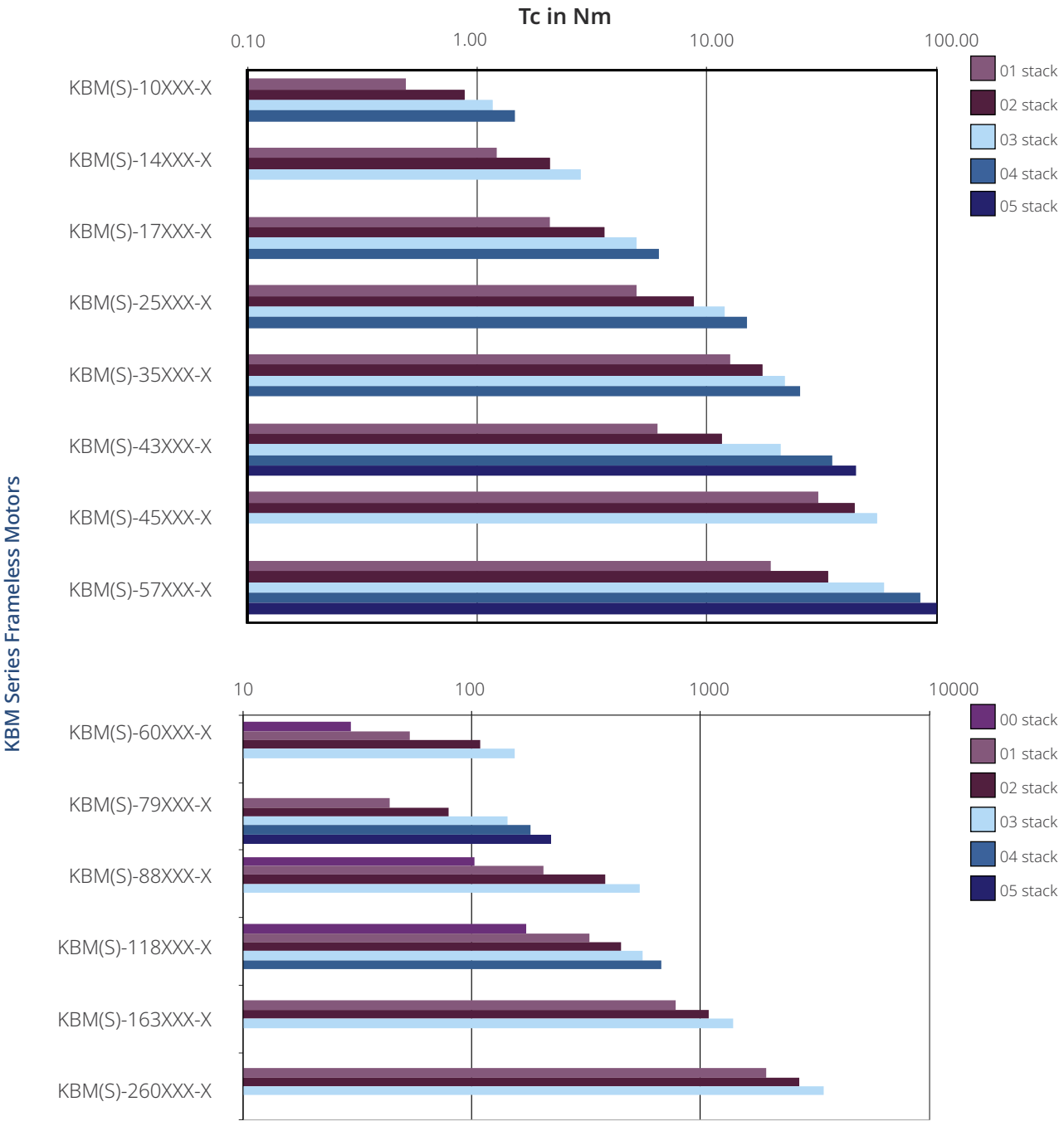
KBM(S) motors are designed to facilitate UL certification in the customer's higher-level assembly. Stator insulation systems are constructed entirely from agency-approved materials and are designed in full compliance with agency creepage and clearance dimensional guidelines. Dielectric strength between winding circuit and grounded metal stator surface is tested at agency-specified voltage level. Because a frameless motor's compliance with agency requirements is dependent upon correct installation and proper design of the surrounding enclosure by the user, KBM(S) series products are not formally labeled or agency-approved at the frameless motor level.



* Does not apply to KBM 163 and KBM 260.

KBM(S) Continuous Torque Overview

Select from our wide variety of sizes and torque ranges to suit your application needs.



For more detailed information please visit: http://www.kollmorgen.com/en-us/products/motors/direct-drive/kbm-series-frameless/

TBM Series Frameless Motors

The TBM frameless motor is a series of direct drive torque motors designed for applications that require high power in a small, compact form factor with minimized weight and inertia.

Typical applications include robotic joints, weapon stations, sensor gimbals, sight systems, UAV propulsion and guidance, as well as many others.

TBM(S) Product Features

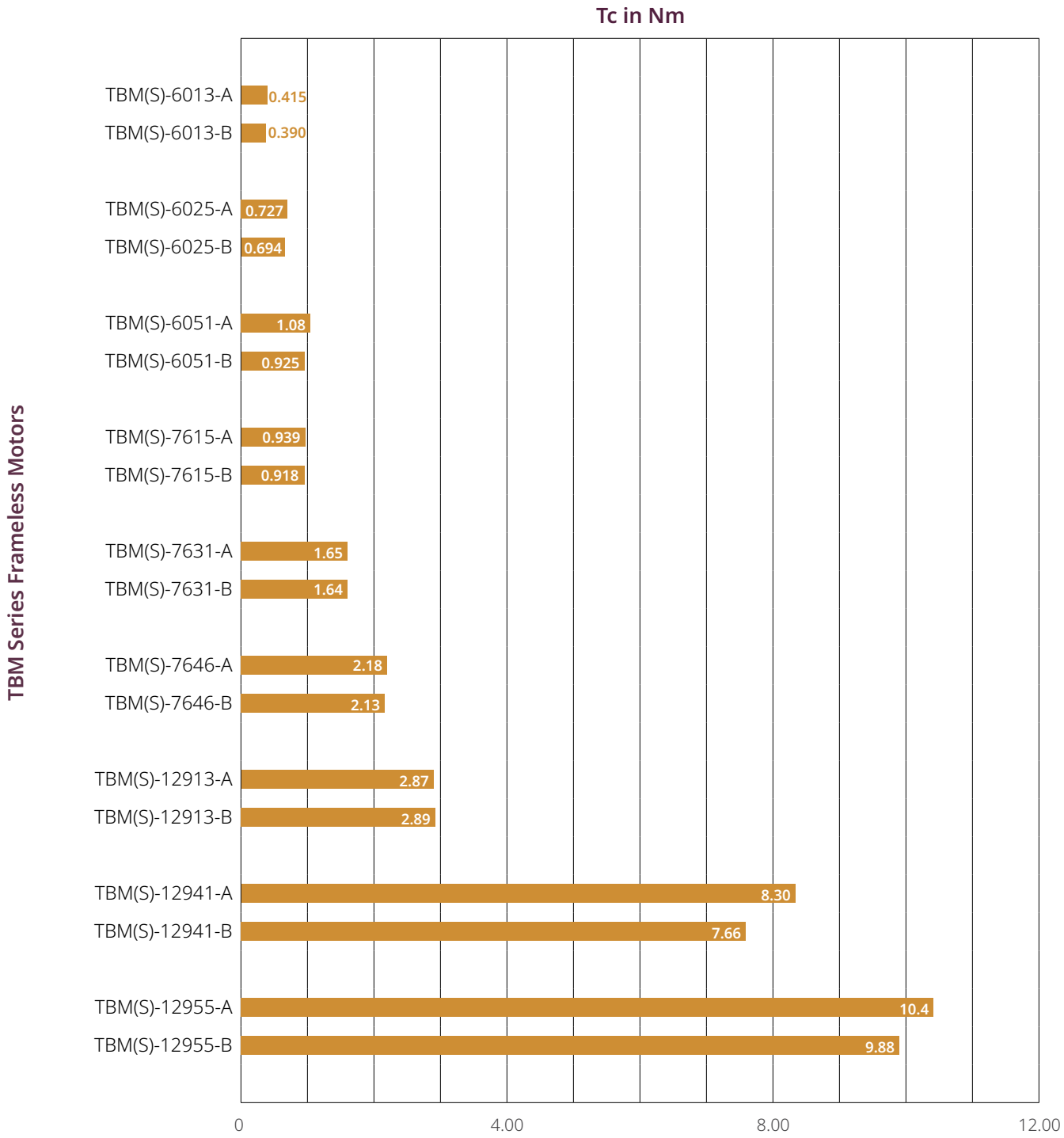
- 3 frame sizes ranging from 60mm (2.36 inches) up to 129mm (5.08 inches)
- 3 stacks lengths per frame
- 2 standard winding options per frame
- Latching Hall Effects (pre-aligned / factory installed)
- Low Cogging designs
- Stainless Steel Yokes for maximum corrosion protection
- RoHS Compliant
- Banded Rotors
- Laser Marked Armatures

For non-standard requests Kollmorgen provides a variety of standard options and configurations.

If higher levels of customization are required, contact Kollmorgen to help us understand exactly what you need.

TBM(S) Continuous Torque Overview

Select from our wide variety of sizes and torque ranges to suit your application needs.



For more detailed information please visit: http://www.kollmorgen.com/en-us/products/motors/direct-drive/tbm-series/

Stepper Drives and Motors

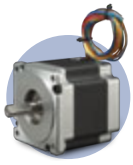
Our stepper motors, drives and controllers, which accommodate a wide range of power requirements, provide a high-performance, yet very cost-effective solution when you need precise motion control.

Our hybrid stepper motors are some of the highest torque-density motors in the industry. Available in several NEMA frame sizes, these 2 phase stepper motors inherently move in small, precise 0.9 or 1.8 degree increments (400 or 200 steps/revolution). This stepping action is simple to control and does not require complicated, expensive feedback devices. Our stepper motors are excellent alternatives to pneumatic, hydraulic and servo motor systems.

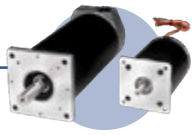
Kollmorgen's stepper drives are designed with versatility, ease-of-use, and cost-effectiveness in mind. Choose from a broad range of advanced drives and controls including full, half, and microstepping models in both modular and packaged designs.

Kollmorgen's stepper drives and motors are designed with versatility, ease–of–use, and cost-effectiveness in mind. The motors provide high torque in a small package and come in a wide range of standard sizes, constructions, windings and options. They are available with custom leads, shafts and connectors are routinely provided to effectively solve your application needs. Several models feature the addition of our innovative SIGMAX® technology for higher torque and acceleration rates.

P-Series Stepper Drives

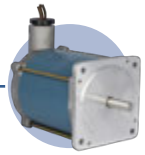


PMX Series Stepper

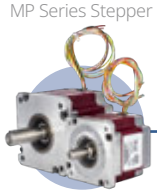


EH Series Stepper

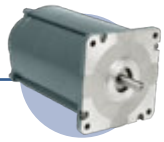
MP Series Stepper



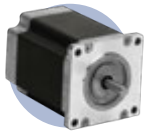
MX Explosion-Proof Series



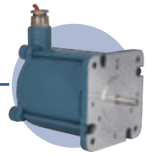
KN Series Stepper



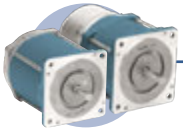
MH172 Stepper



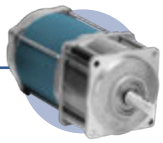
KS06 Synchronous



X Series Synchronous



SS Series Synchronous



SS Gearbox Synchronous

Best-in-Class Components
P-Series Stepper Drives work seamlessly with Kollmorgen stepper and synchronous motors for quality, reliability, and performance.

P-Series Drive Features and Benefits

P5000

Value DC Input Stepper Drive

- Wave matching for Kollmorgen motors to provide optimal performance
- All inputs and outputs are optically isolated
- Step and direction inputs or internal velocity controlled oscillator (VCO) dip switch selectable
- DIP switch selectable micro-stepping resolution settings
- Idle current reduction, DIP switch selectable
- Compensation for mid-range instability
- RoHS & CE certified
- UL pending

P6000

Full Featured AC Input Stepper Drive

- No programming required
- Covers full power range of Kollmorgen steppers
- Switch selectable current from 0.2-5.7 Arms, 8.0 A peak
- Switch selectable for many Kollmorgen motor parings
- All inputs and outputs are optically isolated
- Single-ended and differential step and direction
- Enable input
- Switch selectable micro-stepping resolution
- Anti-resonance based on load inertia
- RoHS & CE certified

P7000

Full Featured AC or DC Input Stepper Drives with Intelligent Indexing Option (-PN)

- AC and DC input versions
- Covers full power range of Kollmorgen steppers
- Drives can be configured by either dip switches or P7000 software
- Intelligent indexing option (-PN) provides ability to link motion tasks.
- All inputs and outputs are optically isolated
- Single-ended and differential step and direction
- Enable input
- Switch selectable micro-stepping resolution
- Anti-resonance based on load inertia
- RoHS, CE and UL certified

Budget/Value → Full-Featured

STEPPER DRIVE PRODUCT OVERVIEW

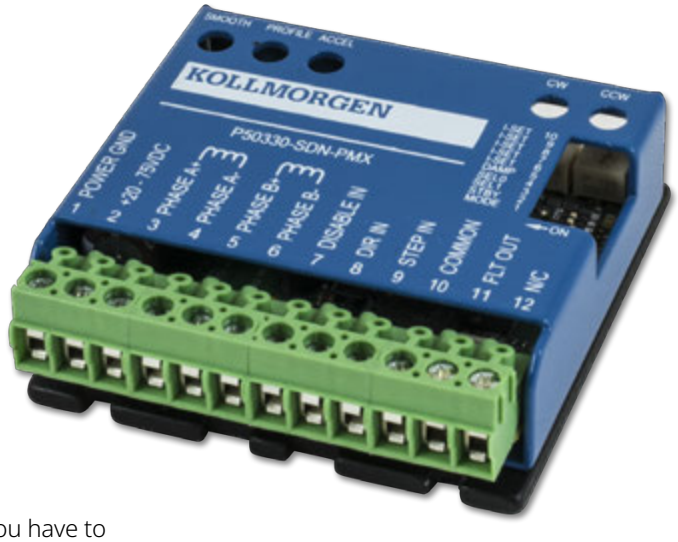
Stepper Drive Model	Modes of Operation*	Input voltage (Vdc)	Input Voltage (Vac)	Output current (Adc) Continuous (Peak)
P5000	S, V	20 - 75	n/a	0.7 - 2.0 (3.5)
P6000	S	n/a	120/240	0.3 - 5.7 (8.0)
P70530	S, M	20 - 75	n/a	0 - 5.0 (7.1)
P70360	S, M	n/a	120/240	0 - 2.5 (3.5)

Modes of Operation: S - Step and Direction; V - Velocity Controlled Oscillator (VCO); M - Motion Node Indexing

P5000 Stepper Drive Controller

Big Performance, Micro Package.

The P5000 is a compact micro-stepping stepper drive optimized for high system performance with Kollmorgen's industry leading POWERMAX II stepper motors. It is an impressive yet simple addition to the Kollmorgen stepper drive family.



P5000 Stepper Drive
(Shown Actual Size)

Optimized. Smooth. Compact.

Pairing a stepper system doesn't get any easier! The P5000 and Kollmorgen stepper motors are meant to be together. With Kollmorgen motor windings optimized for the P5000, all you have to do is set the dip switches for the motor you are paired with and you have a smooth operating system that fully utilizes the potential of your Kollmorgen motor and drive combination!

Features

- Current output from 0.7-3.5 Arms peak; DIP switch selectable in 0.2 Amp increments
- Bus Voltage 20-75 Vdc
- Wave matching for Kollmorgen motors to provide optimal performance for the Kollmorgen Stepper Motor Families.
- All Inputs and Outputs are Optically Isolated
- Command Source from External Step and Direction Inputs or Internal Velocity Controlled Oscillator (VCO); DIP switch selectable
- External Single-Ended Step and Direction Command
- Disable or Fault Reset Input
- Fault or Enable Output
- Pulse Multiplier smooths micro-stepping*
- Idle Current Reduction; DIP switch selectable
- Compensation for mid-range instability*
- VCO Mode
- CW Limit Input
- CCW Limit Input
- Run/Stop Input
- Run/Stop Output
- CW Speed trimpot
- CCW Speed trimpot
- Accel/Decel trimpot
- DIP switch selectable micro-stepping-resolution settings
- RoHS & CE certified
- UL pending

*Patents Pending

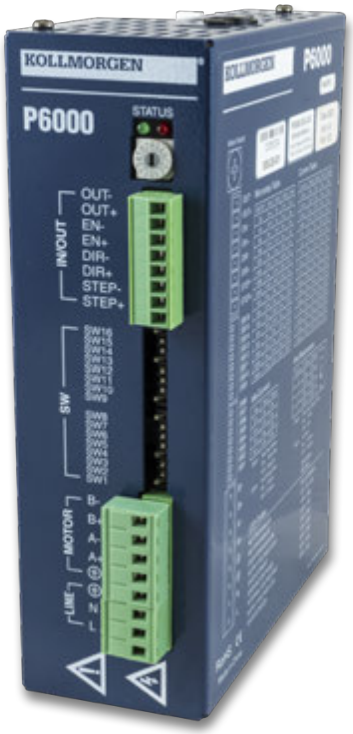
P6000 Stepper Drive Controller

Powerful, Yet Simple.

The P6000 is an AC input micro-stepping drive optimized for pairing with POWERPAC and POWERMAX stepper motors. With the simplicity of dip switches and the optimized performance from the complete system, this stepper solution brings increased machine performance without the associated complexity.

Powerful. Simple. Optimized.

The P6000 and Kollmorgen POWERPAC and POWERMAX stepper motors are designed to provide the best system solution when paired with one another. The easy dip switch selection matches the P6000 settings with the optimal Kollmorgen stepper motor requirements to provide the best performance and most efficient solution for nearly any application.



P6000 Stepper Drive

Features

No programming required!

Covers full power range of Kollmorgen Stepper Motors

Switch Selectable Current Output from 0.2-5.7 Arms, 8.0 A peak

120/240 VAC Input (160/320 Vdc Bus)

Kollmorgen Stepper Motor Pairing; Switch Selectable

All Inputs and Outputs are Optically Isolated

Single-Ended and Differential Step and Direction or CW/CCW Command; Switch Selectable

Enable Input

Fault Output (Sinking or Sourcing)

Status LEDs for easy troubleshooting

Switch Selectable Micro-Stepping-Resolution Settings

Step Smoothing Filter; Switch Selectable

Idle Current Reduction; Switch Selectable

Anti-Resonance Based On Load Inertia; Switch Selectable

Self-Test Conducts Spin Test to Confirm Proper Connection; Switch Selectable

RoHS & CE Certified

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 42. 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.

Multistepping™

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

Kollmorgen Stepper Motor Overview

Kollmorgen offers a comprehensive range of stepper motor products including continuous torque, high torque and hybrid options to meet a wide range of application requirements. For other Kollmorgen stepper products or information not included in this catalog go to www.kollmorgen.com.

	Product Family	NEMA	Step	Stacks	Holding Torque (oz-in)
Economy, Push	PMX08	08	1.8°	2	4.0
	PMX11	11	1.8°	3	16.8
	PMX14	14	1.8°	3	26.4
	PMX17	17	0.9° 1.8°	5	107.0
	PMX23	23	0.9° 1.8°	4	378.0
	PMX34	34	1.8°	4	1739
Economy	CTP1	17	1.8°	3	80
	CTP2 CTM2	23	1.8°	3	360 / 470
Flagship Products	P2 M2	23	1.8°	3	214 / 253
	T2	23	1.8°	4	380
	N3 K3	34	1.8°	4	2180 / 2790
	N4 K4	42	1.8°	3	4370 / 5660
Conventional	H2 E2	23	1.8°	3	158 / 225
	H3 E3	34	1.8°	3	916 / 1300
	H4 E4	42	1.8°	3	2650 / 3960
	MH172	66	1.8°	1	6139
Special Purpose	MX9	34	1.8°	3	550
	MX11	42	1.8°	2	1390

Holding Torque (oz-in): 400, 1200, 2000, 2800, 3600, 4400, 5200, 6000

Standard Stepper Motor Construction

Step motor utilizing SIGMAX® Technology

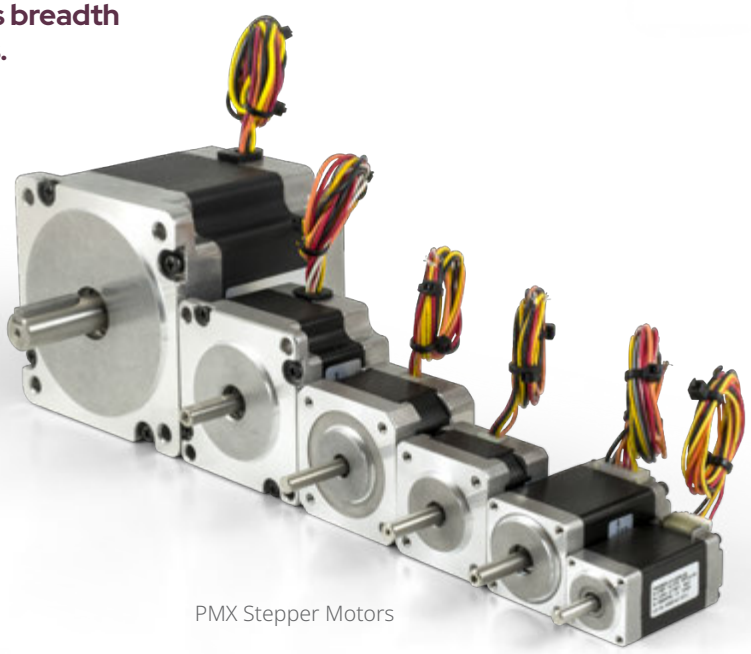
Product Family	NEMA	Features				Standard Options ∘ = available option														Family Features
		UL Recognized	CE Mark	RoHS	SIGMAX® Technology	Integral Connectoin	Leadwire	4-Lead Bipolar	6-Lead Unipolar	8-Lead	Terminal Box	MS Connector	IP Sealing	Encoders	Front Shaft: Normal	Front Shaft: Flat	Front Shaft: Keyway	Rear Shaft	Low Inertia	
PMX08	08		•	•			•	•					30		∘	•		•		» NEMA Sizes 8, 11, 14, 17, 23, 34 » CE, RoHS, and REACH Compliant » Unipolar or Bipolar windings » Options: shaft flats, rear shaft with encoder mounting holes, IP Sealing » Special Options readily available: spur and planetary gearboxes, encoders, special shafts
PMX11	11		•	•			•	•					30		∘	•		•		
PMX14	14		•	•			•	•					30		∘	•		•		
PMX17	17		•	•		•	•	•	∘				30		∘	•		•		
PMX23	23		•	•		•	•	•	∘				30		∘	•		•		
PMX34	34		•	•			•	•					30		∘	•	∘	•		
CTP1	17		•	•			•	•	•				40		•			•		» High torque standard CTP models » Enhanced CTM SIGMAX models produce up to 25% more torque in same package » Large bearings provide high thrust and radial loads
CTP2 CTM2	23		• •	• •	•		• •	• •	• •				40		•	∘		• •		
P2 M2	23	• •	• •	• •	•	• •	• •			•			40 40	• •	• •	∘ ∘		• •	• •	» High torque standard hybrid stepper motor » Enhanced M and K SIGMAX models provide up to 25% more torque in same package » Low detent torque for smoother microstepping » Bipolar and unipolar winding » Large array of options
T2	23		•				•	•	•		•	•	40	•	•	∘		•		
K3 N3	34	• •	• •		•		• •	• •	• •	• •	• •	• •	65[1] 65[1]	• •			• •	• •		
K4 N4	42	• •	• •		•		• •	• •	• •	• •	• •	• •	65[1] 65[1]	• •			• •	• •		
H2 E2	23		• •		•		• •	• •	• •	• •		• •	40 40	• •	• •	∘ ∘		• •	• •	» High efficiency, low loss hybrid designs in a conventional round frame » Enhanced E SIGMAX models provide up to 25% more torque in the same package » Torque produced over a wide speed range » Large array of options » E2, H2 offer high axial loading
H3 E3	34	• •	• •		•		• •	• •	• •	• •		• •	65[1] 65[1]	• •	• •	∘ ∘		• •		
H4 E4	42	• •	• •		•		• •	• •	• •	• •		• •	65[2] 65[2]	• •			• •	• •		
MH172	66										•		40	•			•	•		
MX9	34	•											40		•			•		» Standard hybrid stepper motor » Meets Explosion proof UL Class 1, Division 1 Group D requirements » Up to 150% rated torque reserve capacity (MX9) and 200% for (MX11)
MX11	42	•											40			•		•		

Notes: 1. Requires shaft seal and connection option other than leaded (Meets IP40 otherwise)
2. Requires shaft seal option (Meets IP40 otherwise)

Hybrid PMX Step Motor

Kollmorgen's PMX™ stepper motor line delivers breadth and design flexibility at competitive lead times.

Kollmorgen is excited to continue its winning heritage in hybrid stepper motors with the PMX family. Leveraging the best practices from customer preferred products in the POWERMAX and POWERPAC families, the PMX lines will deliver breadth and design flexibility at a very competitive lead time. Look no further for that hybrid stepper motor family with local support that gives you the flexibility you need to succeed.



PMX Stepper Motors

PMX Series motors include smaller Nema 08, 11, and 14 frame sizes in addition to the traditional Nema 17, 23, and 34 frame sizes. Each frame size is built with high quality construction in an affordable, market competitive solution. Numerous co-engineering options are also available including: customizing shafts, encoders, and mounted spur and planetary gearboxes.

- **Increased Design Flexibility** – six frame sizes (08, 11, 14, 17, 23, 34) each with several stack length and winding options available
- **Minimal Drive Adjustments** – options for 1.8 and 0.9 degree step angles
- **Lower Unit Cost** – PMX motors are priced competitively in today's current stepper market and are the lowest of all Kollmorgen stepper products
- **Quality Construction** translates to reliability in the field and a long service life
- **Localized Support** gives you the delivery terms and immediate technical support you need, meaning quicker time to market and less downtime
- **Flexible Manufacturing** enables Kollmorgen to immediately evaluate modifications and co-engineered solutions for rapid prototyping
- **Easy to Apply Worldwide** – CE, RoHS, REACH

Many Applications

PMX motors allow Kollmorgen customers to fulfill their automation needs at an affordable cost, enabling higher throughput in a wide variety of equipment. In addition, leveraging Kollmorgen's technical expertise and flexible engineering, the PMX is ready for seamless special and co-engineering options, allowing for swifter and easier integration into both new and existing applications.

PMX Stepper Motor General Specifications

Series	Stacks	Holding Torque (Motor Mounted) Bipolar oz-in	Holding Torque (Motor Mounted) Bipolar Nm	Length in	Length mm	Features
Size 08 PMX Series						
2 Phase, 1.8° Step Motors. Frame size: 0.8 inch, 20 mm						
PMX081	1	2.50	0.018	1.18	30.0	• Front shaft flat option • Rear shaft option
PMX082	2	4.00	0.028	1.65	42.0	
Size 11 PMX Series						
2 Phase, 1.8° Step Motors. Frame size: 1.1 inch, 28 mm						
PMX111	1	10.1	0.071	1.26	32.0	• Front shaft flat option • Rear shaft option • Integral connector option
PMX112	2	16.1	0.114	1.77	45.0	
PMX113	3	16.8	0.119	2.01	51.0	
Size 14 PMX Series						
2 Phase, 1.8° Step Motors. Frame size: 1.4 inch, 35 mm						
PMX141	**1**	**14.7**	**0.104**	**1.02**	**26.0**	• **Front shaft flat option** • **Rear shaft option** • **Rear encoder mounting holes**
PMX142	**2**	**20.1**	**0.142**	**1.10**	**28.0**	
PMX143	**3**	**26.4**	**0.186**	**1.42**	**36.0**	
Size 17 PMX Series						
2 Phase, 0.9° or 1.8° Step Motors. Frame size: 1.7 inch, 42 mm						
PMX171 (1.8)	1	28.4	0.201	1.02	26.0	• Front shaft flat option • Rear shaft option • Integral connector option • Bipolar or Unipolar winding available • Rear encoder mounting holes
PMX172 (1.8)	2	40	0.281	1.32	33.5	
PMX173 (1.8)	3	61	0.427	1.56	39.5	
PMX174 (1.8)	4	78	0.551	1.87	47.5	
PMX171 (1.8)	5	107	0.756	2.36	60.0	
Size 23 PMX Series						
2 Phase, 0.9° or 1.8° Step Motors. Frame size: 2.2 inch, 57 mm						
PMX231 (1.8)	1	102	0.722	1.61	41.0	• Front shaft flat option • Bipolar or Unipolar winding available • Rear shaft option • Integral connector option • Rear encoder mounting holes
PMX232 (1.8)	2	208	1.47	2.20	56.0	
PMX233 (1.8)	3	337	2.38	2.99	76.0	
PMX234 (1.8)	4	378	2.67	3.35	85.0	
Size 34 PMX Series						
2 Phase, 1.8° Step Motors. Frame size: 3.4 inch, 86 mm						
PMX341	1	490	3.46	2.56	65.0	• Front shaft flat option • Rear shaft option
PMX342	2	704	4.97	3.15	80.0	
PMX343	3	1285	9.07	4.65	118.0	
PM344	4	1739	12.28	6.14	156.0	

Note: For complete PMX series model nomenclature, refer to page 187.

CT Series Step Motor

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	
	Style	Stacks	Bipolar oz-in	Bipolar Nm	in	mm
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

» Inch or metric mounting
» Rear shaft option

Size 22 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	
	Style	Stacks	Bipolar oz-in	Bipolar Nm	in	mm
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

» Captured heavy duty bearings
» High voltage insulation system
» Rear shaft option

Note: For complete CT Series model nomenclature, refer to page 188.

POWERPAC N/K Series Step Motor

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: IP65, 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	
	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

» Captured heavy duty bearings
» High voltage insulation system
» Options:
- Terminal box
- MS connectors
- Rear shaft
- Encoder
- Front shaft seal

Size 42 N/K

2 Phase, 1.8° Step Motors. Frame size: 4.3 inch, 110 mm

Series	Construction		Holding Torque (Motor Mounted)		Length	
	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

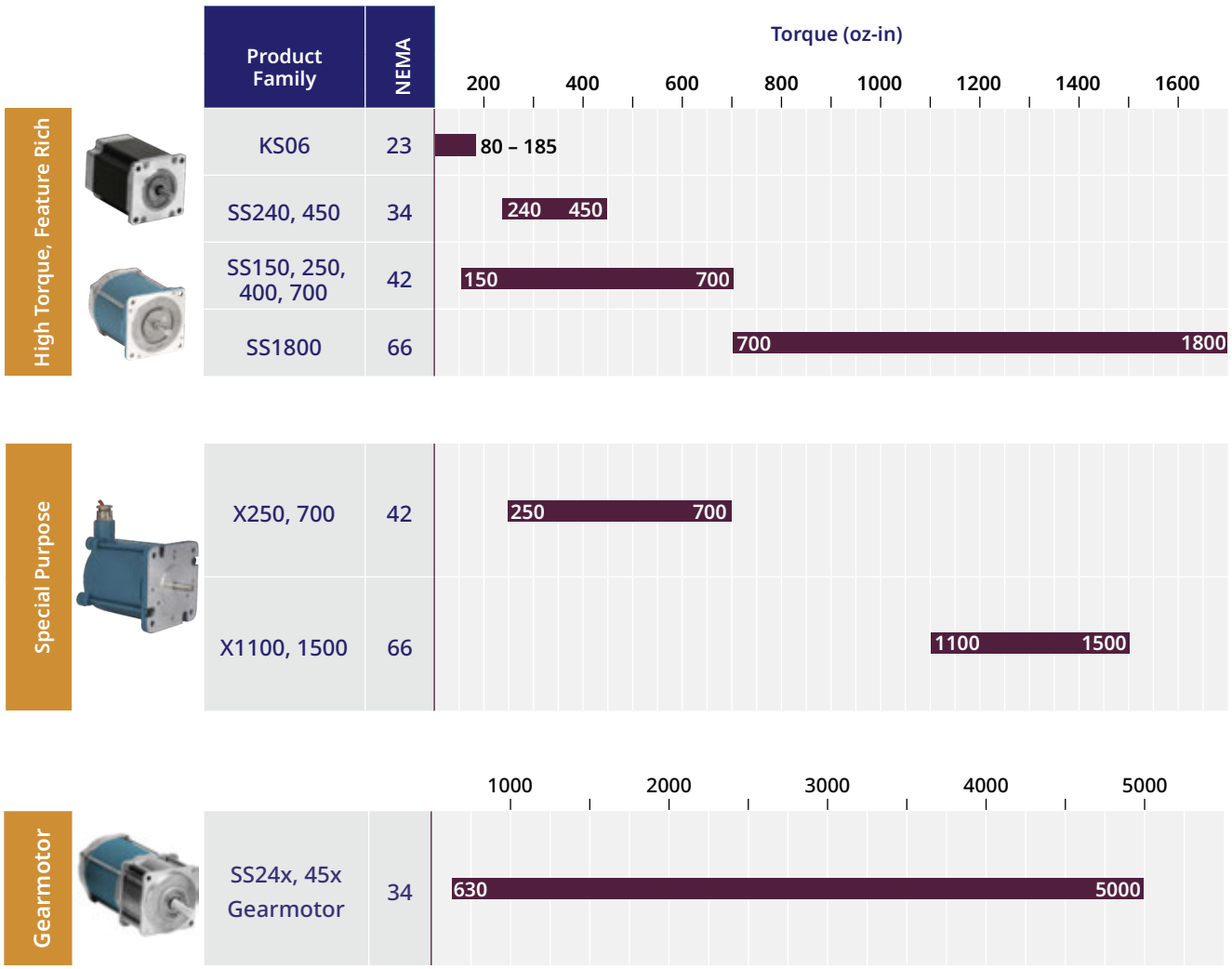
» Captured heavy duty bearings
» High voltage insulation system
» Options:
- Terminal box
- MS connectors
- Rear shaft
- Encoder
- Front shaft seal

Note: For complete Size 34 and 42 N/K model nomenclature, refer to pages 190 and 191 respectively.

AC Synchronous Motor Overview

Kollmorgen offers a comprehensive range of AC synchronous motor products including continous torque, high torque and hybrid options to meet a wide range of application requirements. For products not included in this catalog go to www.kollmorgen.com for information about other Kollmorgen synchronous motor products.

Flagship Products



Product Family	NEMA	Phases	Options			Family Features
			Leaded	Terminal Box	Rear Shaft	
KS06	23	1Ø	·	·	·	» 1Ø and 3Ø (SS240, 450 models only) » 72 rpm motor speed (with 60 Hz voltage) » 60 rpm motor speed (with 50 Hz voltage) » 120 volt or 240 volt AC models » Torques: 80 – 1800 oz-in (0.56 – 12.7 Nm) » Fast starting, stopping, or reversing » Can be stalled indefinitely without overheating
SS240, 450	34	3Ø	·	·	·	
SS150, 250,400, 700	42	1Ø	·	·	·	
SS1800	66	1Ø	·	·	·	
X250, 700	42	1Ø	·		·	» 1Ø models » X models meet UL Class 1, Group D requirements » X models meet ATEX, Exd IIC T5 Gb rqmt. » 60 and 50 Hz models (72 and 60 rpm respectively) » 120 volt or 240 volt AC models » Torques: 250 – 1500 oz-in (1.77 – 10.6 Nm) » Fast starting, stopping, or reversing » Can be stalled indefinitely without overheating
X1100, 1500	66	1Ø	·		·	
SS240, 450 Gearmotor	34	3Ø	·	·	·	» All the features of the SS240, 450 series » Gear reducers with ratios up to 125:1 » Torques: 634 - 5000 oz-in (4.48 – 35.3 Nm)

Linear Actuation & Positioning Systems

Kollmorgen offers a comprehensive range of linear actuator products including electric cylinders, rodless actuators, and precision tables to meet a wide range of application requirements. For actuator products not included in this catalog go to www.kollmorgen.com for information about other Kollmorgen linear positioning products.

Model	Product Family	General Information
Electric Cylinders[1]	EC1 EC2 EC3 EC4 EC5 N2	» Highest Force (Thrust) » Clean, Hydraulic Replacement » Compact Cross Section » Extends into Work Area
Rodless Actuators (screw drive)	R2A R3 R4	» High Force (Thrust) » High Repeatability » Long Travel » Load Carrying Capability
Rodless Actuators (belt drive)	R2A R3 R4	» Very High Speed » Quiet Operation » Long Travel » Load Carrying Capability
Precision Tables	DS4 DS6	» High Accuracy & Repeatability » Low Maintenance, Long Life » High Moment Loads

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.

Model	Max Speed [3] In/s (mm/s)	Max Thrust [2, 3] Lb (N)	Repeatability [4, 5] In (mm)	Max Payload Lb (kg)	Max Travel In (mm)
Electric Cylinders[1]	52.5 (1330)	5620 (25,000)	to ± 0.0005 (0013)	Note 1	59.1 (1500)
Rodless Actuators (screw drive)	39 (1000)	700 (3110)	to ± 0.0005 (0013)	300 (136)	108 (2743)
Rodless Actuators (belt drive)	118 (3000)	300 (1330)	to ± 0.004 (0.10)	300 (136)	108 (2743)
Precision Tables	32.5 (825)	440 (1960)	to ± 3 microns (commercial grade) / ± 1.3 microns (precision grade)	794 (360)	79 (2000)

Notes:
1. Electric cylinders are designed primarily for thrust application where loads are supported externally.
2. Thrust ratings are based on mechanical limits rather than motor limits unless indicated otherwise.
3. Max speed and max thrust ratings are not necessarily available simultaneously
4. Repeatability is dependent on feedback resolution, load, friction, and drive gain settings.
5. Repeatability is unidirectional unless otherwise specified

EC / N2 Series Electric Cylinders

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 servo motors 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 servo motor options are available for the product line ranging from NEMA 23 size to NEMA 42 size servos. The combination with the AKM servo motor 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 servo motor 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.

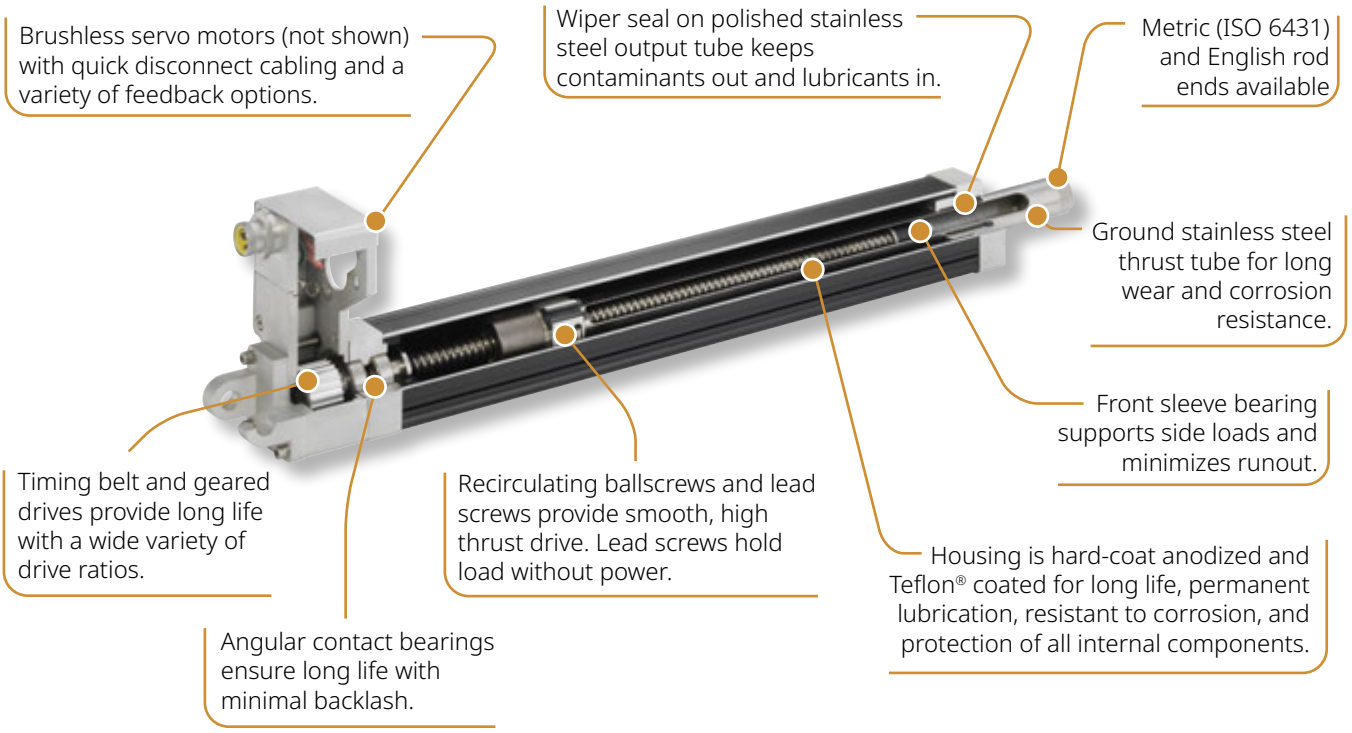
EC Servo Linear Actuators

- Designed for performance
- Highest quality precision rolled ballscrews and lead screws – for quiet, long-life operation
- Brushless Servo motor and Stepper motor options available
- Sealed for IP54 protection. IP65 option available.
- Thrust up to 25000 N [5620 lb]
- Speed up to 1.3 m/s [52.5 in/s]
- Metric design (ISO 6431)
- Available in 5 power ranges – EC1, 2, 3, 4 & 5

N2 Servo Linear Actuators

- Smallest Package Size
- Time-Proven Design
- Improved Durability Over Previous Designs
- Thrust up to 2670 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
- Stepper motors also available

Typical Construction (EC2 cut-away shown)



Kollmorgen offers electric cylinder drive mechanisms designed around either lead screws or ballscrews. Ballscrews, being the more efficient of the two, utilize ballnuts 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 ball / lead 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 electro-mechanical solution.

Specification Overview

Series	N2		EC1	EC2		EC3		EC4	EC5
Std. Maximum Stroke Length [in (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	3 mm	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	10 mm	16 mm	16 mm	20 mm	20 mm	25 mm	32 mm
Backlash [in (mm)]	0.016 (0.40)	0.015 (0.38)	0.015 (0.38)	0.016 (0.40)	0.010 (0.25)	0.016 (0.40)	0.010 (0.25)	0.012 (0.30)	0.012 (0.30)
Dimension Std.	English NFPA Std.		Metric ISO6431 Std.						
Bore size	–		30 mm	50 mm		63 mm		80 mm	100 mm
Brushless Servo Motor	AKM23		AKM1x	AKM23		AKM23, AKM42, AKM52		AKM42, AKM52	AKM42, AKM52
Stepper Motor	T22		CTP12	T22, T31		T22, T31		T31, T32, T41	T31, T32, T41
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								
Std. Operating Temperature Range [C (F)]	0 to 60 (32 to 140)		-30 to 70 (-22 to 158)						
Moisture/ Contaminants	Humid, but Not Direct Contact		IP54 Std. IP65 Opt.						

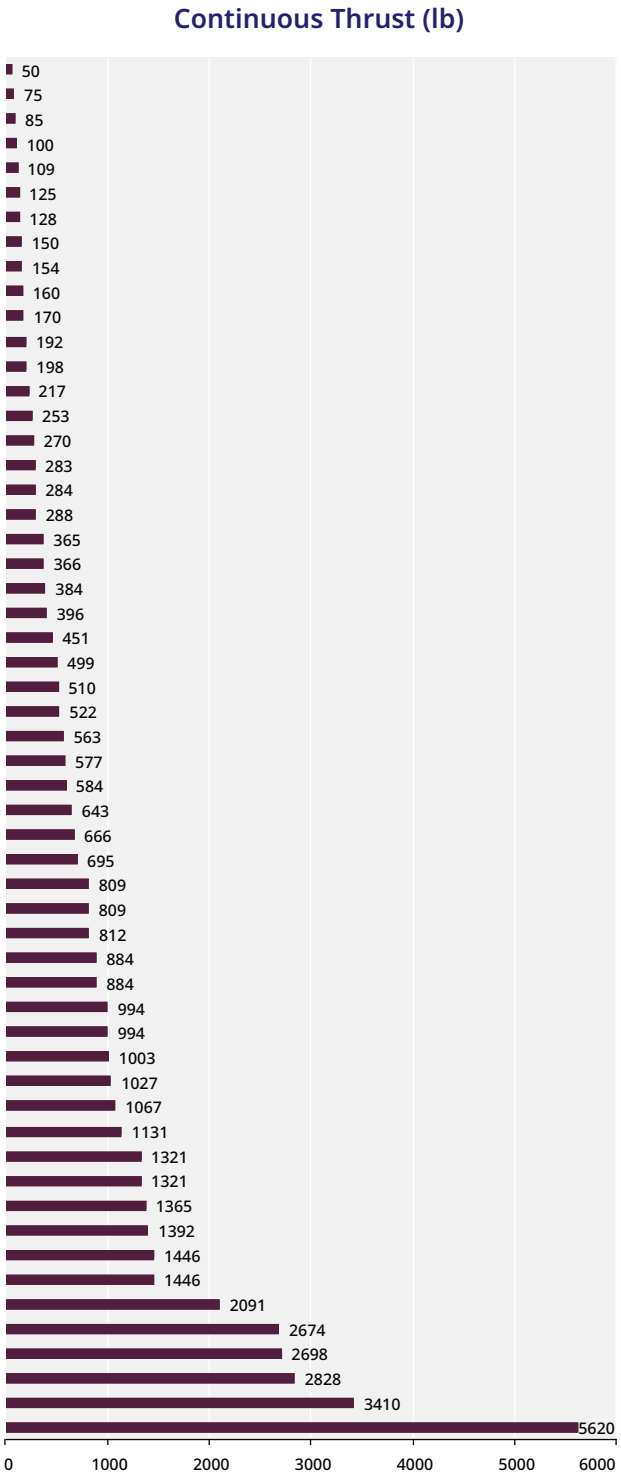
*Note: Requires dual rod-end bearing option for length over 12"

EC / N2 Series Electric Cylinders

Low Speed Servo Performance

System	AKD Cont Amps	Cont Thrust @ Speed		Peak Thrust @ Speed		Max Thru-st
		lb	in/s	lb	in/s	lb
EC1-AKM11B-xxx-10-03M	3 A	50	13.0	75	13.0	75
EC1-AKM13C-xxx-10-03M	3 A	75	13.0	75	13.0	75
N2-AKM23D-xxx-10-5A	3 A	85	12.0	260	12.0	312
EC1-AKM11B-xxx-20-03M	3 A	100	6.0	125	6.0	125
EC2-AKM23D-xxx-10-04A	3 A	109	9.2	337	9.2	396
EC1-AKM13C-xxx-20-03M	3 A	125	6.0	125	6.0	125
N2-AKM23D-xxx-15-5A	3 A	128	8.0	392	8.0	467
EC1-AKM11B-xxx-40-03M	3 A	150	3.0	150	3.0	150
N2-AKM23D-xxx-20-2B	3 A	154	15.0	468	15.0	561
EC2-AKM23D-xxx-15-04A	3 A	160	6.2	499	6.2	582
N2-AKM23D-xxx-20-5A	3 A	170	6.0	517	6.0	600
N2-AKM23D-xxx-10-5B	3 A	192	12.0	585	12.0	600
EC3-AKM23D-xxx-10-05B	3 A	198	10.2	708	9.4	712
EC2-AKM23D-xxx-20-04A	3 A	217	4.6	455	4.6	790
EC3-AKM23D-xxx-50-16B	3 A	253	6.2	885	6.2	909
EC2-AKM23D-xxx-15-05B	3 A	270	13.2	809	8.0	809
EC3-AKM23D-xxx-15-05B	3 A	283	10.2	1060	6.3	1070
EC5-AKM42G-xxx-10-10B	6 A	284	15.2	1503	15.2	1005
N2-AKM23D-xxx-15-5B	3 A	288	8.0	600	8.0	600
EC3-AKM23D-xxx-20-05B	3 A	365	9.5	1372	5.0	1469
EC2-AKM23D-xxx-20-05B	3 A	366	9.7	770	8.0	809
N2-AKM23D-xxx-20-5B	3 A	384	6.0	600	6.0	600
EC5-AKM42G-xxx-15-10B	6 A	396	15.2	1503	9.4	1508
EC5-AKM42G-xxx-50-32B	6 A	451	6.6	1530	6.6	1530
EC4-AKM42G-xxx-20-10B	6 A	499	14.0	2005	7.1	2005
EC5-AKM42G-xxx-20-10B	6 A	510	13.2	2005	7.1	2010
EC2-AKM23D-xxx-50-04A	3 A	522	1.8	809	1.8	809
EC3-AKM23D-xxx-70-10B	3 A	563	2.81	1620	2.81	1620
EC4-AKM42G-xxx-50-25B	6 A	577	5.1	1959	5.1	1959
EC2-AKM23D-xxx-100-16B	3 A	584	3.67	809	3.67	809
EC5-AKM52H-xxx-10-10B	6 A	643	14.5	1137	13.0	1974
EC4-AKM52H-xxx-10-10B	6 A	666	14.0	1137	13.0	1974
EC3-AKM42G-xxx-50-16B	6 A	695	6.25	1620	6.25	1620
EC2-AKM23D-xxx-100-04A	3 A	809	0.91	809	0.91	809
EC2-AKM23D-xxx-50-05B	3 A	809	2.3	809	2.3	809
EC3-AKM23D-xxx-50-05B	3 A	812	1.9	1619	1.9	1619
EC5-AKM42G-xxx-100-32B	6 A	884	3.3	2997	3.3	3000
EC5-AKM52L-xxx-15-10B	12 A	884	15.0	1891	15.0	2695
EC4-AKM52H-xxx-15-10B	6 A	994	9.5	2067	8.0	2698
EC5-AKM52H-xxx-15-10B	6 A	994	9.5	2067	8.0	2962
EC4-AKM52L-xxx-20-10B	12 A	1003	14.4	1907	13.5	2698
EC5-AKM52L-xxx-20-10B	12 A	1027	14.0	1966	13.0	3501
EC5-AKM52H-xxx-50-32B	6 A	1067	6.5	1851	6.5	1851
EC4-AKM42G-xxx-100-25B	6 A	1131	2.6	2698	2.6	2698
EC4-AKM52H-xxx-20-10B	6 A	1321	7.2	2187	6.6	2698
EC5-AKM52H-xxx-20-10B	6 A	1321	7.2	2193	6.5	3501
EC4-AKM52H-xxx-50-25B	6 A	1365	5.1	2365	5.1	2365
EC4-AKM52L-xxx-50-25B	12 A	1392	5.1	2369	5.1	2369
EC4-AKM42G-xxx-50-10B	6 A	1446	2.0	2698	2.0	2698
EC5-AKM42G-xxx-50-10B	6 A	1446	2.0	4898	2.0	4898
EC5-AKM52H-xxx-100-32B	6 A	2091	3.3	3624	3.3	3624
EC4-AKM52H-xxx-100-25B	6 A	2674	2.6	2698	2.6	2698
EC4-AKM42G-xxx-100-10B	6 A	2698	1.04	2698	1.04	2698
EC5-AKM42G-xxx-100-10B	6 A	2828	1.04	5620	1.04	5620
EC5-AKM52H-xxx-50-10B	6 A	3410	2.05	5620	2.05	5620
EC5-AKM52H-xxx-100-10B	6 A	5620	1.04	5620	1.04	5620

Ratings are based on the AKM servo motor and the matching AKD Drive. Specifications are based on 230 Vac, 3 phase voltage supply.

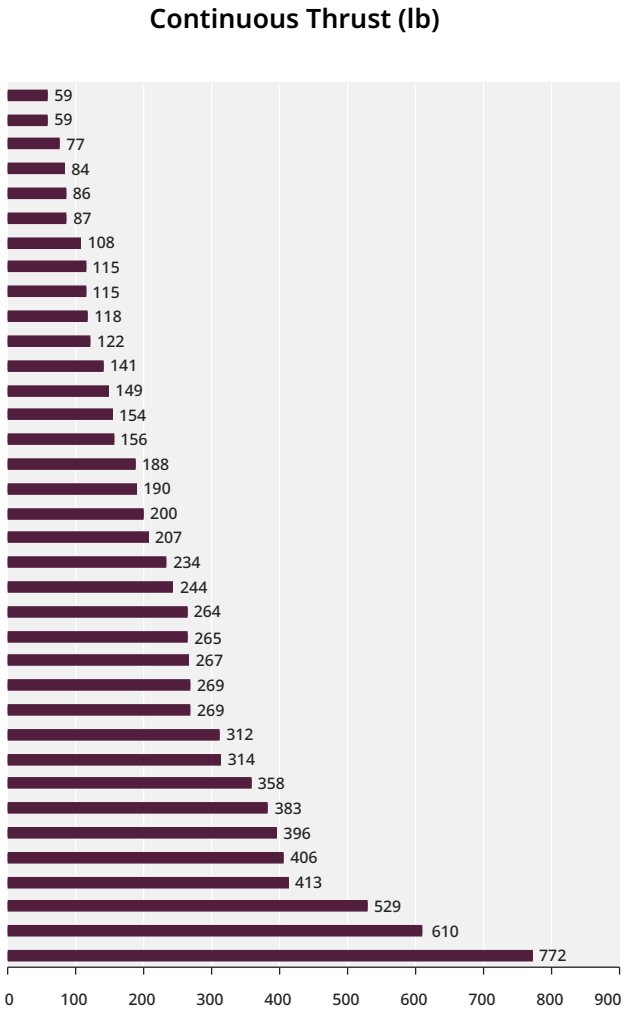


Plotted value is continuous thrust (lb), refer to chart for the associated rated speed value.

High Speed Servo Performance

System	AKD Cont	Cont Thrust @ Speed		Peak Thrust @ Speed		Max Thru-st
		lb	in/s	lb	in/s	lb
EC2-AKM23D-xxx-10-16B	3 A	59	50.0	221	30.0	222
EC3-AKM23D-xxx-10-16B	3 A	59	50.0	221	30.0	222
N2-AKM23D-xxx-10-2B	3 A	77	30.0	233	30.0	280
EC2-AKM23D-xxx-15-16B	3 A	84	42.0	293	23.0	327
EC3-AKM23D-xxx-15-16B	3 A	86	41.0	332	20.0	334
EC5-AKM42G-xxx-10-32B	6 A	87	52.5	313	45.0	313
EC4-AKM42G-xxx-10-25B	6 A	108	52.0	400	35.0	402
EC2-AKM23D-xxx-20-16B	3 A	115	31.0	223	26.0	445
N2-AKM23D-xxx-15-2B	3 A	115	20.0	350	20.0	420
EC3-AKM23D-xxx-20-16B	3 A	118	30.0	457	12.5	459
EC5-AKM42G-xxx-15-32B	6 A	122	52.5	470	30.0	470
EC3-AKM23D-xxx-15-10B	3 A	141	21.0	520	13.0	534
EC4-AKM42G-xxx-15-25B	6 A	149	47.0	595	24.0	603
EC3-AKM42G-xxx-10-16B	6 A	154	45.2	598	24.0	628
EC5-AKM42G-xxx-20-32B	6 A	156	45.0	626	22.5	628
EC2-AKM23D-xxx-10-05B	3 A	188	16.0	385	16.0	712
EC3-AKM23D-xxx-20-10B	3 A	190	18.0	686	10.0	735
EC4-AKM42G-xxx-20-25B	6 A	200	35.0	802	17.5	804
EC5-AKM52H-xxx-10-32B	6 A	207	46.0	351	42.0	617
EC3-AKM42G-xxx-15-16B	6 A	234	30.0	495	25.0	888
EC4-AKM52L-xxx-10-25B	12 A	244	52.5	422	52.5	719
EC4-AKM52H-xxx-10-25B	6 A	264	36.0	441	33.0	790
EC5-AKM52L-xxx-15-32B	12 A	265	52.0	584	52.0	842
EC4-AKM52L-xxx-15-25B	12 A	267	48.5	699	43.0	1078
EC3-AKM42G-xxx-10-10B	6 A	269	20.9	958	15.0	1010
EC4-AKM42G-xxx-10-10B	6 A	269	21.0	1002	14.2	1005
EC5-AKM52H-xxx-15-32B	6 A	312	30.0	626	26.0	925
EC5-AKM52L-xxx-20-32B	12 A	314	46.0	614	42.0	1094
EC3-AKM42G-xxx-15-10B	6 A	358	18.9	820	15.0	1420
EC4-AKM42G-xxx-15-10B	6 A	383	17.5	1501	9.5	1508
EC4-AKM52H-xxx-15-25B	6 A	396	24.0	827	20.0	1185
EC4-AKM52L-xxx-20-25B	12 A	406	35.5	785	33.0	1400
EC5-AKM52H-xxx-20-32B	6 A	413	23.0	684	21.0	1094
EC4-AKM52H-xxx-20-25B	6 A	529	18.0	879	16.0	1400
EC4-AKM52L-xxx-10-10B	12 A	610	21.0	1055	21.0	1797
EC4-AKM52L-xxx-15-10B	12 A	772	18.6	1825	17.0	2695

Ratings are based on the AKM servo motor and the matching AKD Drive. Specifications are based on 230 Vac, 3 phase voltage supply.



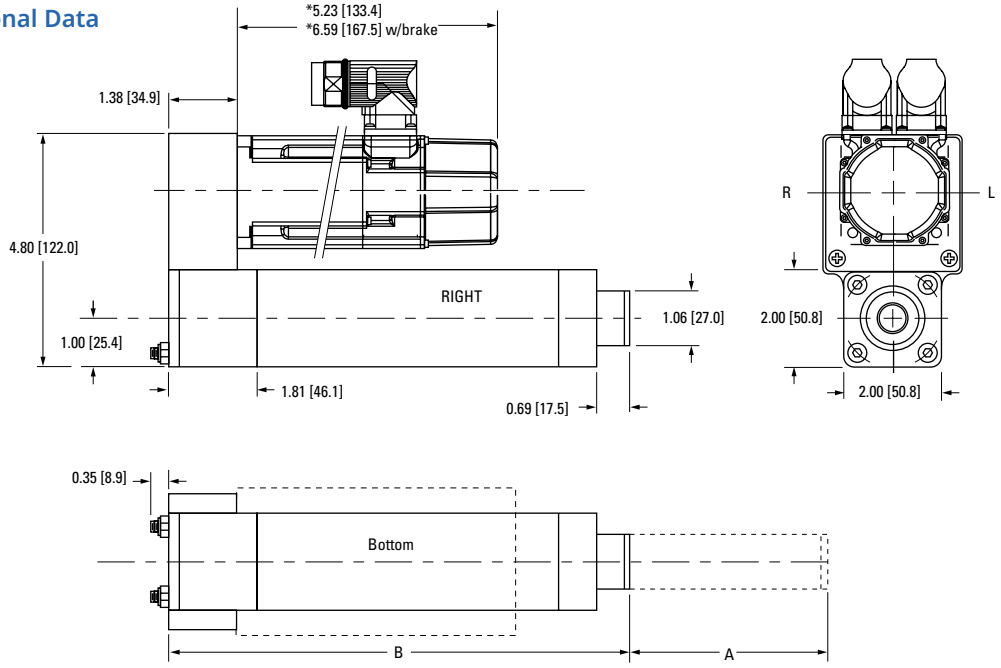
Plotted value is continuous thrust (lb), refer to chart for the associated rated speed value.

EC / N2 Series Electric Cylinders

NOTE: For Cylinder Mounting option and Rod End option dimensional information, please reference the Kollmorgen Electric Cylinder Selection Guide: https://www.kollmorgen.com/en-us/products/literature/electric-cylinder-selection-guide/

Electric Cylinder Dimensional Drawings and Data

N2 Dimensional Data Parallel

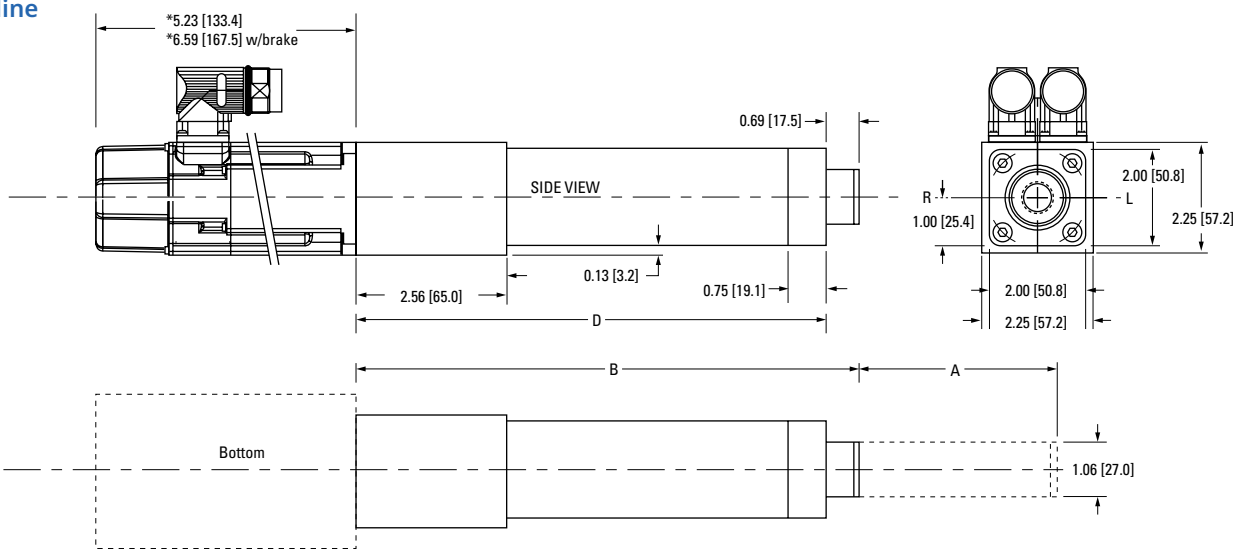


A	Standard Stroke Lengths Available						
inch	2.0	4.0	6.0	8.0	12.0	18.0	24.0
mm	50.8	101.6	152.4	203.2	304.8	457.2	609.6

B	Retract Length
inch	5.37 + S
mm	136.4 + S

S = stroke

N2 Dimensional Data Inline



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

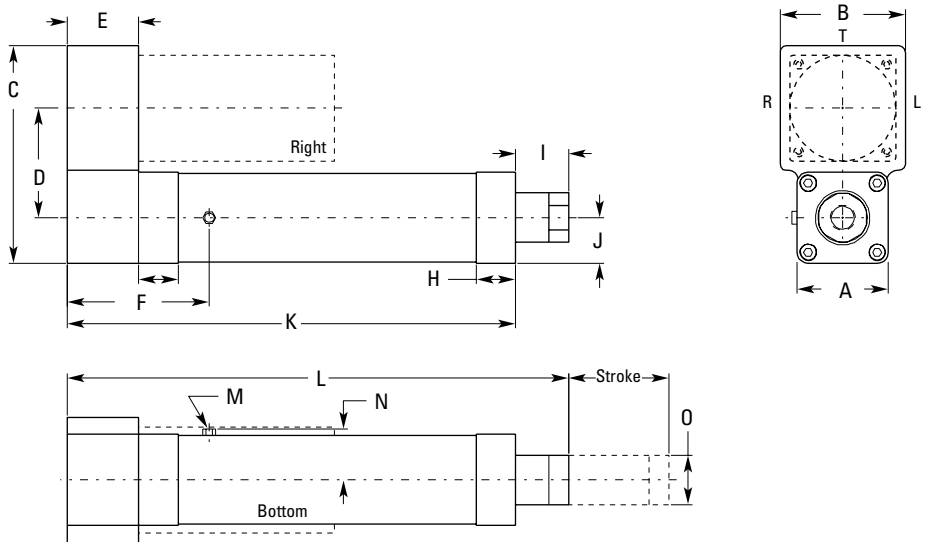
* AKM23 with motor mounted connectors.

B	Retract Length	D	Mounting length
inch	6.12 + S	inch	5.43 + S
mm	155.4 + S	mm	137.8 + S

S = stroke

EC Dimensional Data 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



	A mm (in)	B mm (in)	C mm (in)	D mm (in)	E mm (in)	F mm (in)	H mm (in)	I mm (in)	J mm (in)	K Cyl Length mm (in)
EC1	43.7 (1.72)	48.0 (1.89)	82.6 (3.25)	41.8 (1.65)	31.3 (1.23)	-	19.2 (0.76)	20.2 (0.80)	19.1 (0.75)	103.5 + S (4.07 + S)
EC2	56.9 (2.24)	79.8 (3.14)	144.0 (5.67)	74.7 (2.94)	41.7 (1.64)	88.6 (3.49)	22.1 (0.87)	34.5 (1.36)	28.5 (1.12)	208.8 + S (8.22 + S)
EC3	69.6 (2.74)	95.5 (3.76)	169.7 (6.68)	87.6/89.7 * (3.45/3.53 *)	49.3 (1.94)	94.2 (3.71)	25.1 (0.99)	37.7 (1.48)	34.8 (1.37)	233.4 + S (9.19 + S)
EC4	92.2 (3.63)	127.0 (5.00)	221.0 (8.70)	111.1 (4.37)	71.9 (2.83)	150.9 (5.94)	40.0 (1.57)	54.0 (2.13)	46.1 (1.81)	353.1 + S (13.9 + S)
EC5	92.2 (3.63)	127.0 (5.00)	221.0 (8.70)	111.1 (4.37)	71.9 (2.83)	150.9 (5.94)	40.0 (1.57)	54.0 (2.13)	46.1 (1.81)	353.1 + S (13.9 + S)

* AKM23/AKM42 dimension

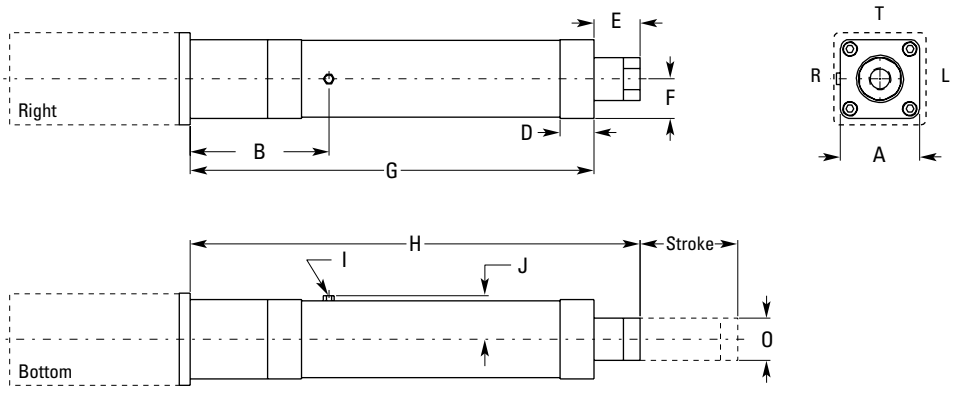
S = Stroke

	L Retract length mm (in)	M Breather port Hex		N mm (in)	O mm (in)
		type	mm (in)		
EC1	124.0 + S (4.88 + S)	-	-	-	22.2 (0.88)
EC2	243.4 + S (9.58 + S)	1/8 NPT	11.1 (0.44)	34.8 (1.37)	28.0 (1.10)
EC3	271.1 + S (10.67 + S)	1/8 NPT	11.1 (0.44)	41.1 (1.62)	35.0 (1.38)
EC4	406.9 + S (16.02 + S)	1/4 NPT	14.0 (0.55)	52.8 (2.08)	50.0 (1.97)
EC5	406.9 + S (16.02 + S)	1/4 NPT	14.0 (0.55)	52.8 (2.08)	50.0 (1.97)

S = Stroke

EC Dimensional Data Inline

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



	A mm (in)	B mm (in)	D mm (in)	E mm (in)	F mm (in)	G Cyl Length mm (in)	H Retract length mm (in)	I Breather port Hex		J mm (in)	O mm (in)
								type	mm (in)		
EC1	43.7 (1.72)	-	19.2 (0.76)	20.5 (0.81)	19.1 (0.75)	101.7 + S (4.00 + S)	122.1 + S (4.81 + S)	-	-	-	22.2 (0.88)
EC2	56.9 (2.24)	100.7 (3.96)	22.1 (0.87)	34.5 (1.36)	28.5 (1.12)	220.9 + S (8.70 + S)	255.5 + S (10.06 + S)	1/8 NPT	11.1 (0.44)	34.8 (1.37)	28.0 (1.10)
EC3	69.6 (2.74)	121.3 (4.78)	25.1 (0.99)	37.7 (1.48)	34.8 (1.37)	260.5 + S (10.25 + S)	298.1 + S (11.74 + S)	1/8 NPT	11.1 (0.44)	41.1 (1.62)	35.0 (1.38)
EC4	92.2 (3.63)	169.2 (5.94)	40.0 (1.57)	54.0 (2.13)	46.1 (1.81)	371.3 + S (14.62 + S)	425.3 + S (16.74 + S)	1/4 NPT	14.0 (0.55)	52.8 (2.08)	50.0 (1.97)
EC5	92.2 (3.63)	169.2 (6.66)	40.0 (1.57)	54.0 (2.13)	46.1 (1.81)	371.3 + S (14.62 + S)	425.3 + S (16.74 + S)	1/4 NPT	14.0 (0.55)	52.8 (2.08)	50.0 (1.97)

S = Stroke

R-Series Rodless Actuators

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 gearboxes.

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 servo motors 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 servo motor options are available for the product line, ranging from NEMA 23 size to NEMA 42 size servos. The combination with the AKM servo motor 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 servo motor 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

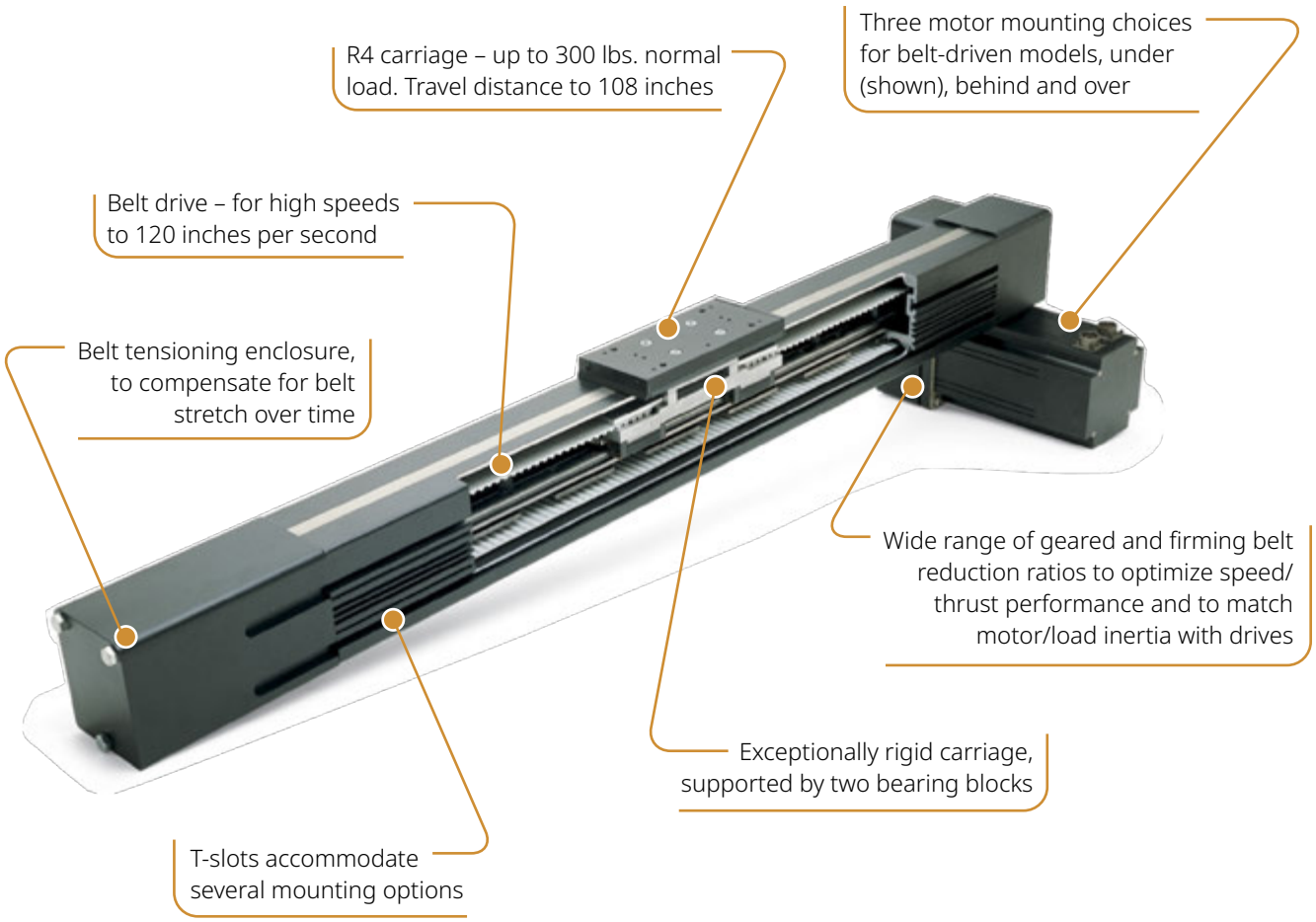
» The shortest overall work envelope (extended length equals retracted length) is required

» Multiple units will be combined into Cartesian systems

» There is a need for a compact cross-sectional linear positioning system

Typical Construction

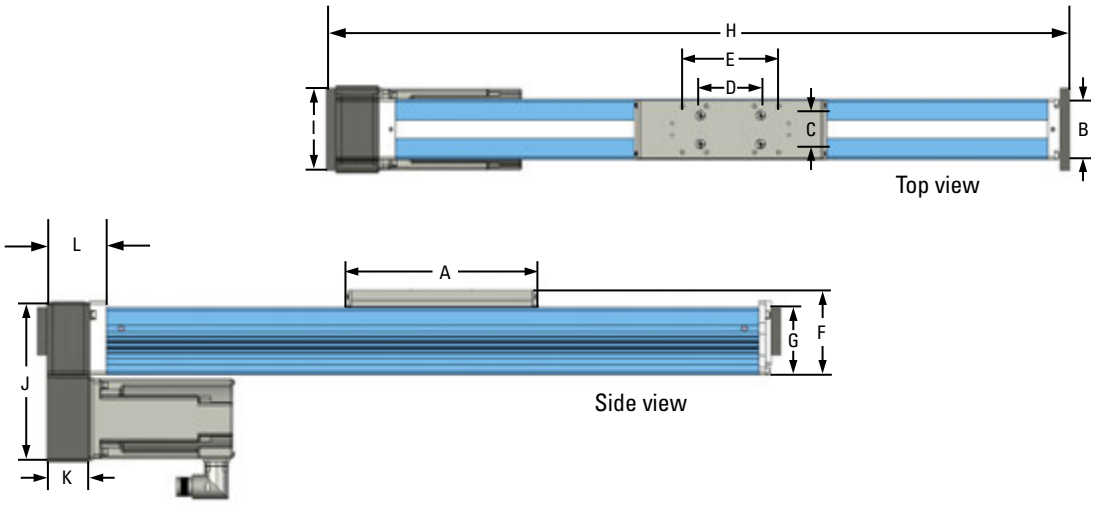
(R4 belt-driven cutaway shown)



R-Series Rodless Actuators

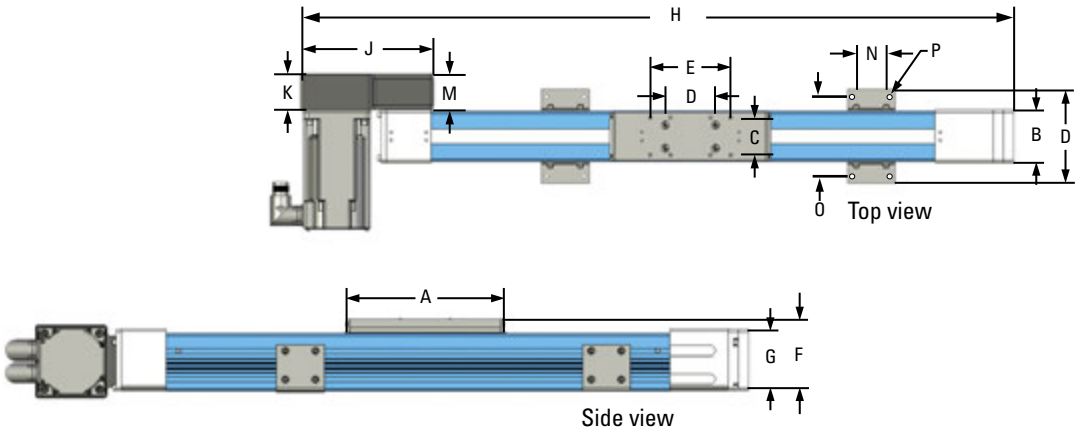
R3 Screw Drive

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

R-series Actuator	Metric Version (mm)	English Version (inch)
R2A	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

R-series Actuator	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
R2A	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)

R-series Actuator	F	G	H (Screw)	H (Belt)
	mm (in)	mm (in)	mm (in)	mm (in)
R2A	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

R-series Actuator	I	J	K	L
	mm (in)	mm (in)	mm (in)	mm (in)
R2A	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)

R-series Actuator	M	N	O	P
	mm (in)	mm (in)	mm (in)	mm (in)
R2A	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

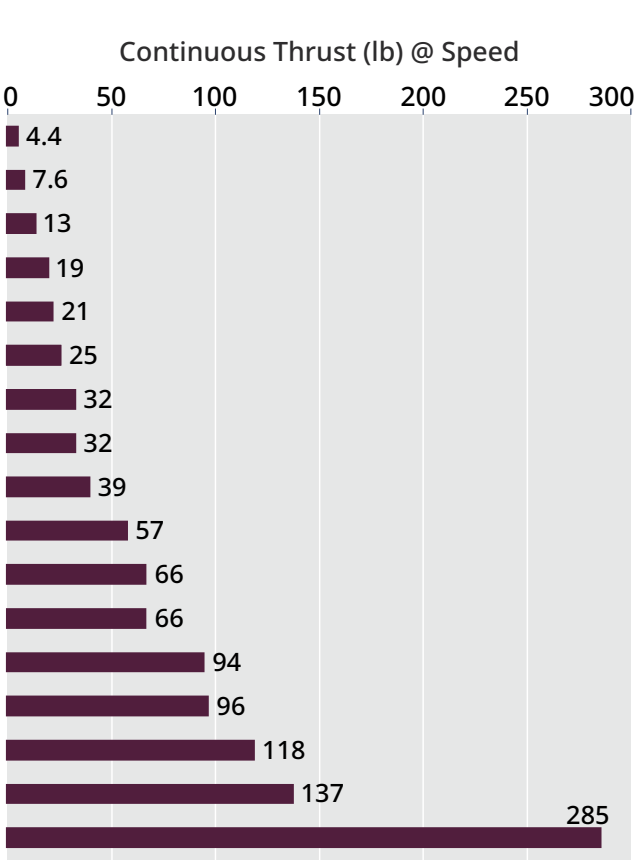
R-Series Rodless Actuators

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	Ballscrew	Lead Screw	Belt	Ballscrew	Lead Screw	Belt	Ballscrew	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 servo motor	AKM23			AKM23, AKM42			AKM42, AKM52	
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.*							

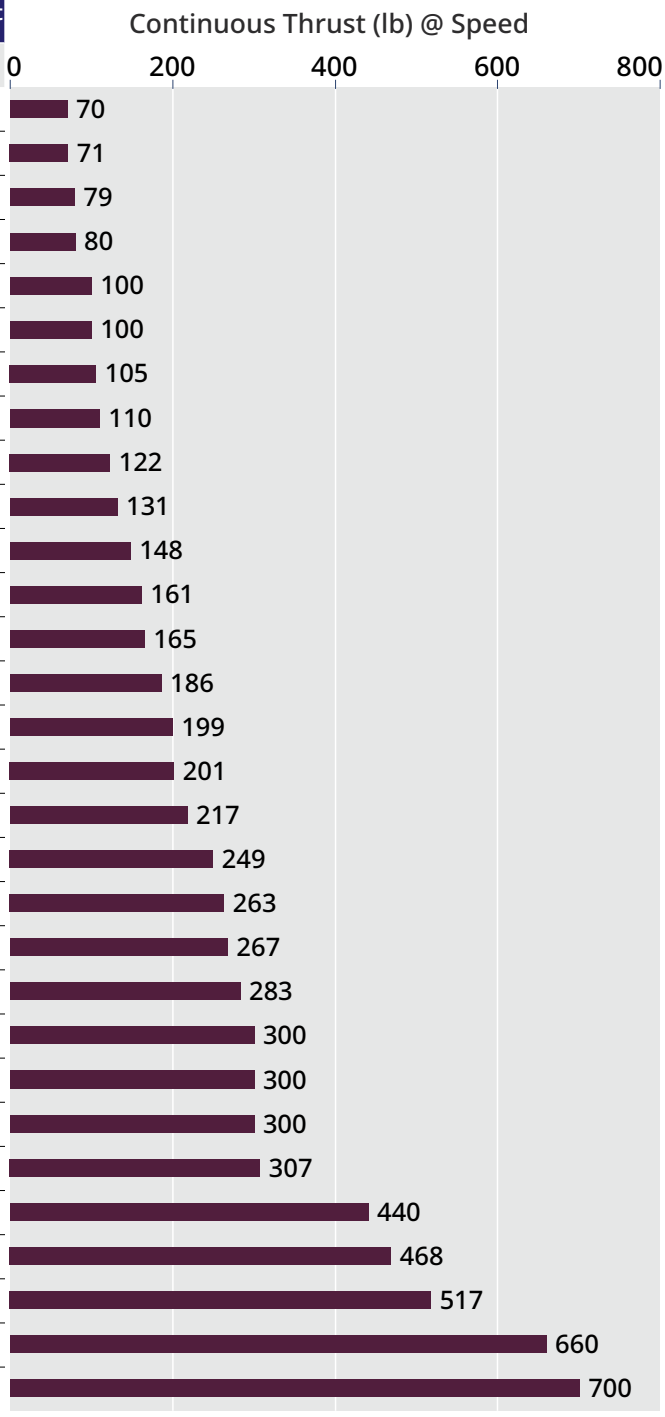
Belt Based Systems

Belt Based System	AKD® Cont. Amps	Cont. Thrust @ speed		Peak Thrust @ speed		Max Thrust
		lb	in/s	lb	in/s	lb
R3-AKM23D-xxx-15T	3 A	4.4	118	29	118	29
R3-AKM23D-xxx-20T	3 A	7.6	118	41	118	41
R2A-AKM23D-xxx-15T	3 A	13	80	64	80	64
R2A-AKM23D-xxx-20T	3 A	19	80	78	80	87
R3-AKM23D-xxx-50T	3 A	21	71	76	71	92
R4-AKM42G-xxx-20T	6 A	25	118	100	118	100
R3-AKM23D-xxx-70T	3 A	32	51	108	51	131
R3-AKM42G-xxx-20T	6 A	32	118	117	118	126
R4-AKM42G-xxx-30T	6 A	39	100	139	100	153
R4-AKM42G-xxx-50T	6 A	57	59	200	59	219
R3-AKM42G-xxx-50T	6 A	66	72	138	72	200
R4-AKM52H-xxx-20T	6 A	66	118	200	90	202
R3-AKM42G-xxx-70T	6 A	94	51	197	51	200
R4-AKM52H-xxx-30T	6 A	96	92	300	60	300
R4-AKM42G-xxx-100T	6 A	118	30	300	30	300
R4-AKM52H-xxx-50T	6 A	137	54	300	44	300
R4-AKM52H-xxx-100T	6 A	285	27	300	27	300



Screw Based Systems

Screw Based System	AKD® Cont. Amps	Cont. Thrust @ speed		Peak Thrust @ speed		Max Thrust
		lb	in/s	lb	in/s	lb
R2A-AKM23D-xxx-102B-yy-P	3 A	70	30	100	30	100
R3-AKM23D-xxx-102B-yy-P	3 A	71	30	269	25	275
R2A-AKM23D-xxx-105A-yy-P	3 A	79	12	100	12	100
R3-AKM23D-xxx-105A-yy-P	3 A	80	12	255	12	300
R2A-AKM23D-xxx-152B-yy-P	3 A	100	20	100	20	100
R2A-AKM23D-xxx-155A-yy-P	3 A	100	8.0	100	8	100
R4-AKM42G-xxx-101B-yy-P	6 A	105	40	356	40	390
R3-AKM23D-xxx-152B-yy-P	3 A	110	20	300	20	300
R3-AKM23D-xxx-155A-yy-P	3 A	122	8.0	300	8.0	300
R3-AKM23D-xxx-108A-yy-P	3 A	131	7.5	300	7.5	300
R3-AKM23D-xxx-202B-yy-P	3 A	148	15	300	15	300
R4-AKM42G-xxx-151B-yy-P	6 A	161	27	540	27	588
R3-AKM23D-xxx-205A-yy-P	3 A	165	6.0	300	6.0	300
R3-AKM23D-xxx-105B-yy-P	3 A	186	12	300	12	300
R3-AKM23D-xxx-158A-yy-P	3 A	199	5.0	300	5.0	300
R3-AKM42G-xxx-102B-yy-P	6 A	201	30	300	30	300
R4-AKM42G-xxx-201B-yy-P	6 A	217	20	700	20	700
R3-AKM42G-xxx-105A-yy-P	6 A	249	12	300	12	300
R4-AKM52H-xxx-101B-yy-P	6 A	263	37	263	37	700
R3-AKM23D-xxx-208A-yy-P	3 A	267	3.8	300	3.8	300
R3-AKM23D-xxx-155B-yy-P	3 A	283	8.0	300	8.0	300
R3-AKM23D-xxx-505A-yy-P	3 A	300	2.4	300	2.4	300
R3-AKM42G-xxx-152B-yy-P	6 A	300	20	300	20	300
R3-AKM42G-xxx-155A-yy-P	6 A	300	8.0	300	8.0	300
R4-AKM52H-xxx-151B-yy-P	6 A	307	25	307	25	700
R4-AKM42G-xxx-104B-yy-P	6 A	440	10	700	10	700
R4-AKM42G-xxx-501B-yy-P	6 A	468	7.8	700	7.8	700
R4-AKM52H-xxx-201B-yy-P	6 A	517	18	600	18	700
R4-AKM42G-xxx-154B-yy-P	6 A	660	6.7	700	6.7	700
R4-AKM52H-xxx-104B-yy-P	6 A	700	9.4	700	9.4	700



DS4 / DS6 Series Precision Tables

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® Servo Motors, 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

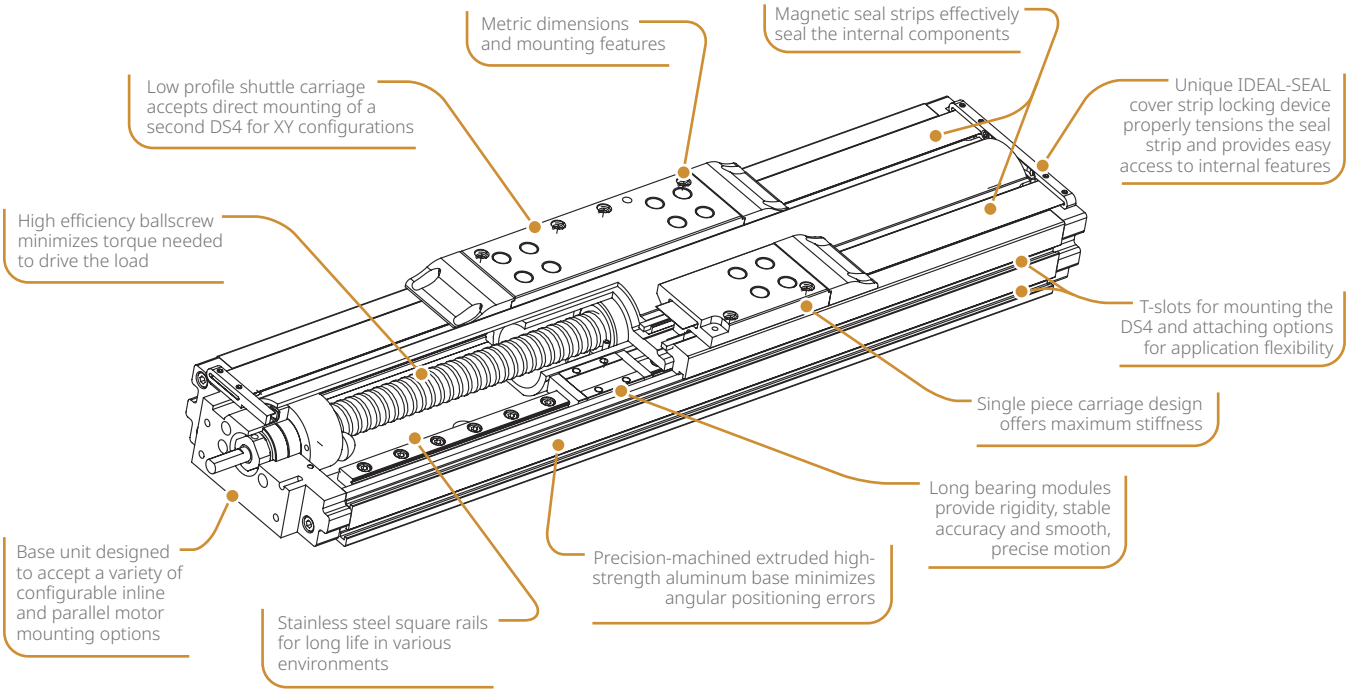
Following are several features that make the DS Series the positioning table of choice for the most demanding applications:

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.

Configurable Options

DS Series	
Servo motor 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

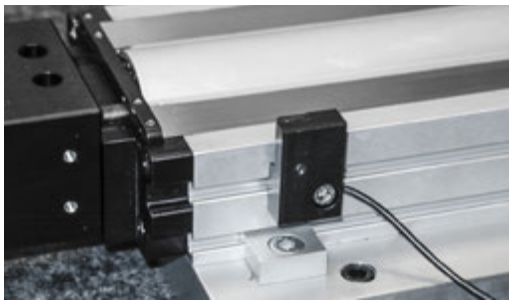
* Additional lead time applies to precision grade. Contact customer support for details.
** Additional couplings available. Contact customer support for details.

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

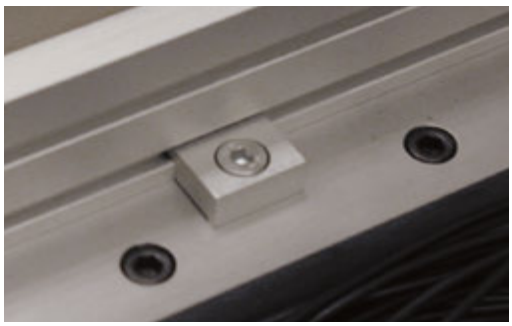
All DS4 and DS6 tables will bolt directly together in a standard XY without modification.

Seal Strips



Limit Sensor

Linear Encoder



Toe Clamp

DS4 / DS6 Series Precision Tables

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 Servo Motor	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

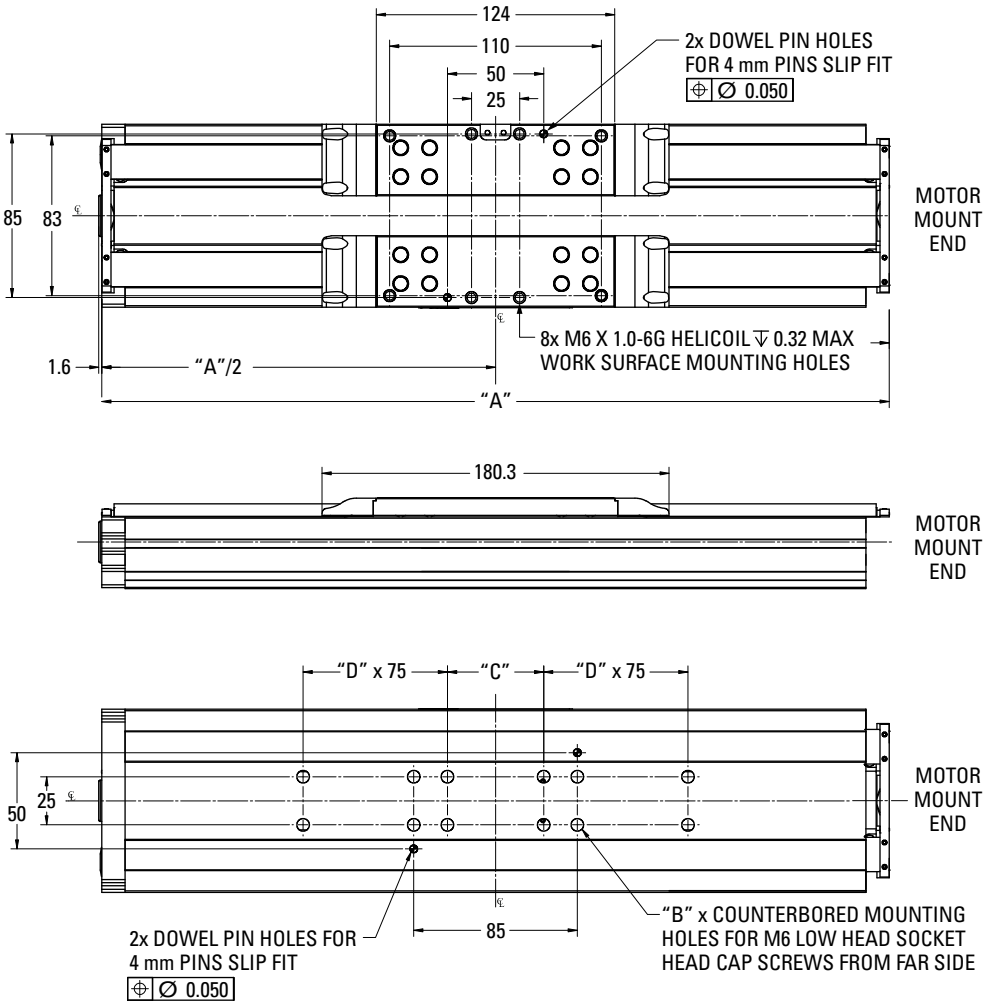
240 Vac Performance Data

	Sys #	Precision Table - AKM Servo Motor	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 in-line motor configuration.
Note 2: Contact customer support for matching cables.
Note 3: For complete AKD and DS4 / DS6 Series model nomenclature, refer to pages 175 and 201 respectively.

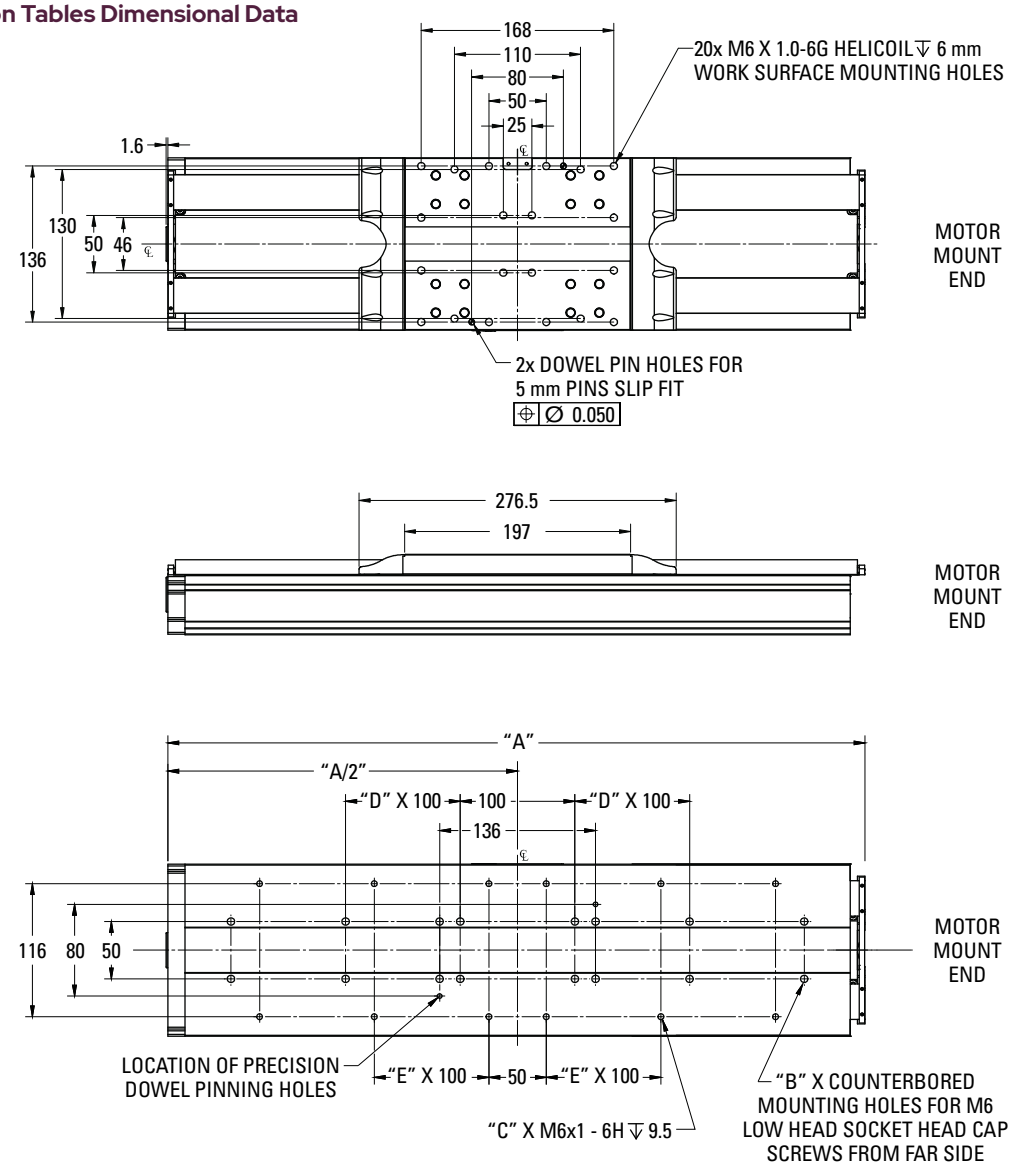
DS4 / DS6 Series Precision Tables

DS4 Precision Tables Dimensional Data



Model	Travel	"A"	"B"	"C"	"D"
DS4-50	50 mm	259.1	8	150	0
DS4-100	100 mm	309.1	12	50	1
DS4-150	150 mm	359.1	12	50	1
DS4-200	200 mm	409.1	12	50	1
DS4-250	150 mm	459.1	16	50	2
DS4-300	300 mm	509.1	16	50	2
DS4-350	350 mm	559.1	16	50	2
DS4-400	400 mm	609.1	20	50	3
DS4-450	450 mm	659.1	20	50	3
DS4-500	500 mm	709.1	20	50	3
DS4-550	550 mm	759.1	24	50	4
DS4-600	600 mm	809.1	24	50	4

DS6 Precision Tables Dimensional Data



Model	Travel	"A"	"B"	"C"	"D"	"E"
DS6-100	100 mm	408	12	8	1	1
DS6-200	200 mm	508	12	8	1	1
DS6-300	300 mm	608	16	12	2	2
DS6-400	400 mm	708	16	12	2	2
DS6-500	500 mm	808	20	16	3	3
DS6-600	600 mm	908	20	16	3	3
DS6-700	700 mm	1008	24	20	4	4
DS6-800	800 mm	1108	24	20	4	4
DS6-900	900 mm	1208	28	24	5	5
DS6-1000	1000 mm	1308	28	24	5	5
DS6-1250	1250 mm	1558	32	32	6	7
DS6-1500	1500 mm	1808	40	36	8	8
DS6-1750	1750 mm	2058	44	40	9	9
DS6-2000	2000 mm	2308	48	44	10	10

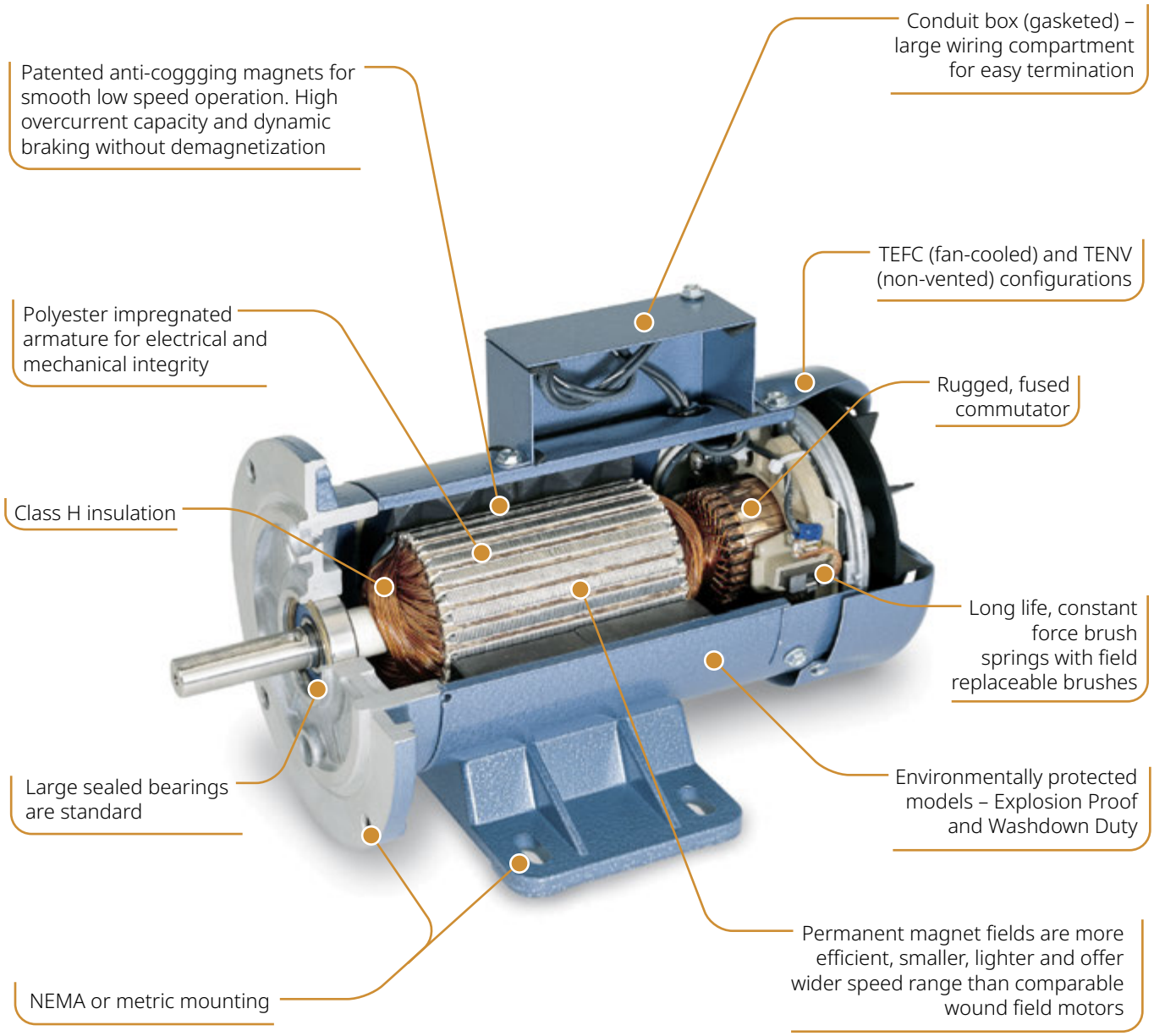
PMDC Permanent Magnet DC Motors

Why have design engineers depended on Kollmorgen permanent magnet DC motors for nearly 50 years? Value and Performance. Rugged, quality construction, backed by a 2 year warranty.

Plus, when you need something special, you know we've built thousands of custom-designed motors. Many more than we could ever show with these pages.

And if we don't have just what you need, we'll design a new one, even for a modest volume requirement.

Standard PMDC Motor Features



SR/SRF Series Continuous Duty Motors

General Specifications

SCR Rated NEMA Standards

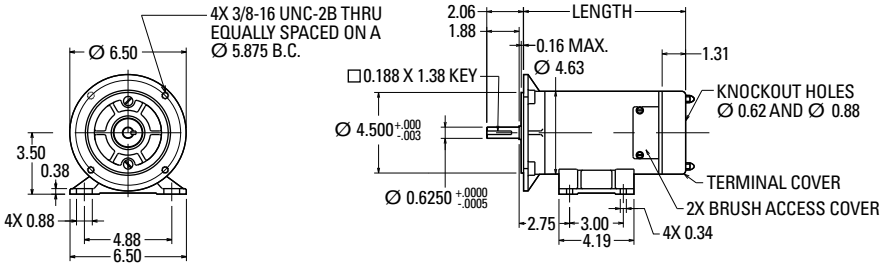
- NEMA C face with removable base – except the 180 V / 1.5 HP has a welded base
- Class H insulation
- UL Recognized (UL 1004, File E61960)
- CSA Certified (CSA Standard C22.2 No. 100, Class 421101, File LR43477)
- CE marked. Conforms to EN60034-1 and EN60034-5
- 1750 RPM

							Parameters										
	HP	Model Number	Product Code	NEMA	Enclosure	Continuous Current (A)	Continuous Torque (lb_f-in)	Peak Current (A)	Torque Constant (lb_f-in/A)	Resistance (Ω)	Inertia (lb_f-in)	Inductance (mH)	Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
90 V	1/8	SR3616-8290-7-56BC-CU	FGS2430	56C	TENV	1.5	4.5	34.0	4.0	5.3	2.9	19.4	1	8.13	14	YP00565
	1/4	SR3624-8291-7-56BC-CU	FGS2431	56C	TENV	2.7	9.0	54.0	3.9	2.5	4.0	9.6	1	9.13	18	YP00565
	1/3	SR3632-8292-7-56BC-CU	FGS2432	56C	TENV	3.5	12.0	71.0	3.9	1.8	5.0	6.6	1	10.13	21	YP00565
	1/2	SR3642-4822-7-56BC-CU	FGS2434	56C	TENV	4.7	18.0	74.0	4.2	0.9	6.5	3.8	1	12.10	27	YP00565
	1/2	SRF3632-5227-84-5-56BC-CU	FGS2748	56C	TEFC	5.1	18.0	54.0	4.0	1.3	5.2	5.8	2	10.10	22	YP00565
	3/4	SRF3650-4823-84-5-56BC-CU	FGS2749	56C	TEFC	6.9	27.0	81.0	4.2	0.7	7.8	3.7	2	13.25	30	YP00565
	1.0	SRF3756-4996-84-5-56BC-CU	FGS2751	56C	TEFC	9.5	36.0	81.0	4.4	0.5	12.8	3.4	2	13.25	30	YP00565
180 V	1/4	SR3624-1032-7-56BC-CU	FGS2658	56C	TENV	1.4	9.0	28.0	7.4	9.6	4.0	42.8	1	9.13	18	YP00566
	1/2	SR3642-4982-7-56BC-CU	FGS2438	56C	TENV	2.6	18.0	40.0	7.6	3.3	6.3	16.2	1	12.13	27	YP00566
	1/2	SRF3632-5265-84-5-56BC-CU	FGS2735	56C	TEFC	2.4	18.0	27.0	8.1	5.3	5.2	29.5	2	10.10	21	YP00566
	3/4	SRF3736-4983-84-5-56BC-CU	FGS2750	56C	TEFC	3.2	27.0	26.0	8.8	3.6	8.9	28.8	2	11.25	23	YP00566
	1.0	SRF3752-4984-84-5-56BC-CU	FGS2752	56C	TEFC	4.6	36.0	41.0	8.2	1.8	12.0	15.6	2	13.25	29	YP00566
	1.5	SRF5348-4485-84-5-45BC-CU	FGS2753	145TC*	TEFC	7.8	54.0	62.0	7.9	1.2	26.2	13.5	3	16.00	64	YP00574
	2.0	SRF5360-4985-84-5-82BC-CU	FGS2754	145TC/182	TEFC	9.5	72.0	78.0	8.2	0.6	35.9	7.0	4	16.50	75	YP00559
	3.0	SRF5570-4986-84-5-82BC-CU	FGS2755	145TC/182	TEFC	14.0	108.0	78.0	9.3	0.6	40.1	7.2	5	19.75	87	YP00585

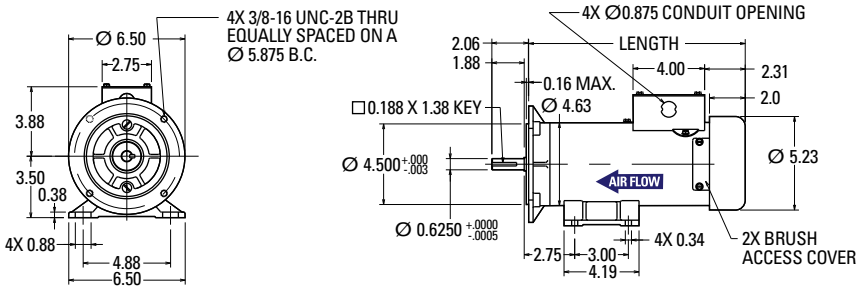
* Stamped steel, welded base, not removable

Configurations and Dimensions (inches)

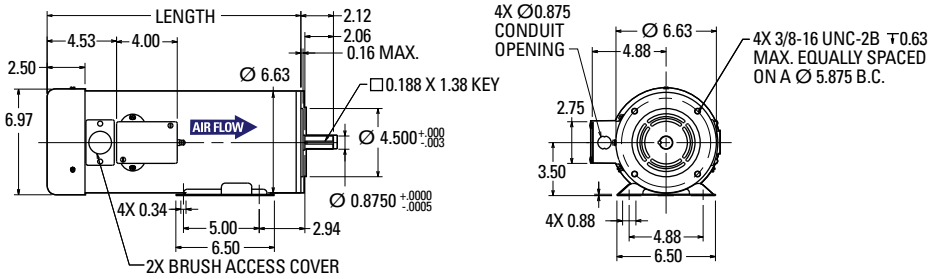
1 – TENV



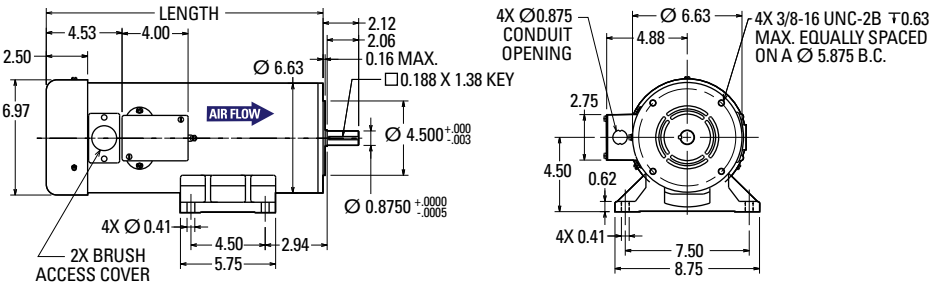
2 – TEFC



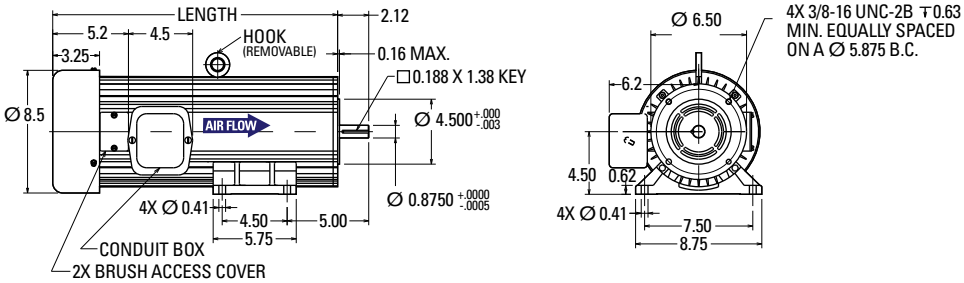
3 – TEFC



4 – TEFC



5 – TEFC



STF Series Washdown Motors

General Specifications

SCR Rated NEMA Standards – Washdown Duty

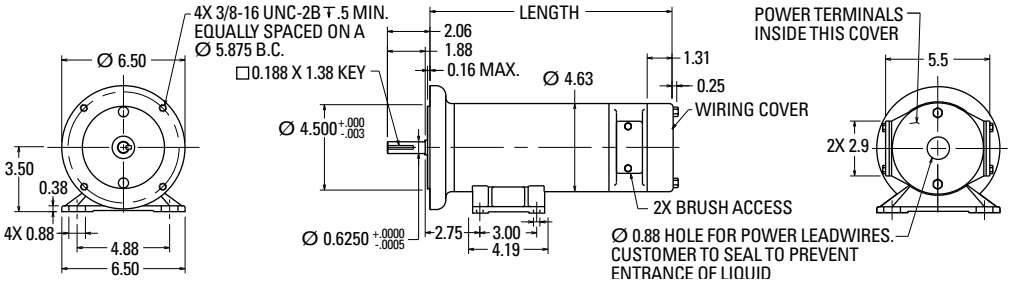
- NEMA C face with removable base – except the 1 and 1.5 HP motors have welded bases
- Class H insulation
- UL Recognized (UL 1004, File E61960)
- Complies with NEMA MG1-1.26.5 Waterproof designation and IP65
- Bakery Industry Sanitation Standards Committee (BISSC) certified per BISSC Standard 29 (Authorization No. 301)
- 1750 RPM

							Parameters									
		Model Number	Product Code	NEMA	Enclosure	Continuous Current	Continuous Torque	Peak Current (A)	Torque Constant	Resistance (Ω)	Inertia (lb_f-in)	Inductance (mH)	Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
90 V	1/4	STF3624-4976-61-56BC	FGS2419	56C	TENV	2.9	9.0	54.0	3.89	2.51	4.0	9.61	1	11.20	22	YP00572
	1/2	STF3640-4977-61-56BC	FGS2420	56C	TENV	5.1	18.0	67.0	4.05	0.95	6.3	4.38	1	12.20	26	YP00572
	3/4	STF3758-5150-61-56BC	FGS2757	56C	TENV	7.3	27.0	126.0	4.05	0.72	8.7	3.50	2	15.20	41	YP00572
180 V	1/2	STF3648-5268-61-56BC	FGS2738	56C	TENV	2.4	18.0	37.0	8.30	3.59	6.4	19.60	1	11.80	27	YP00571
	1.0	STF5332-3748-61-56BC-CU	FGS2389	56C*	TENV	4.6	36.0	36.0	8.00	2.40	22.4	32.00	3	13.30	41	YP00574
	1.5	STF5356-3749-61-45BC-CU	FGS2390	145TC*	TENV	7.1	54.0	70.0	7.90	1.11	29.8	11.20	4	16.30	65	YP00574
	2.0	STF5372-3750-61-82BC-CU	FGS2342	145TC/182	TENV	9.3	72.0	93.0	7.90	0.77	39.3	6.80	5	18.30	84	YP00574

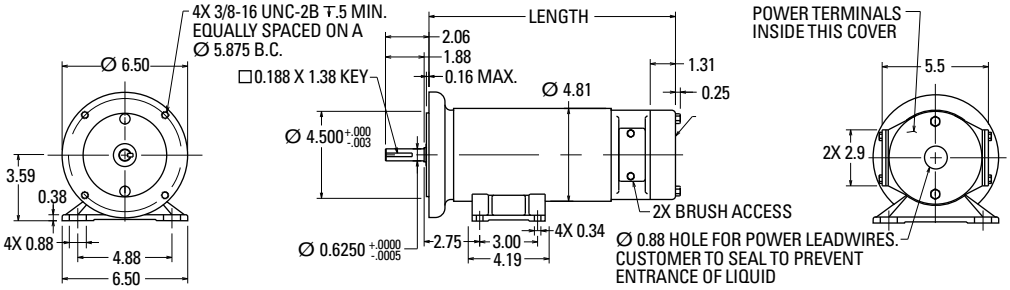
* Stamped steel, welded base, not removable

Configurations and Dimensions (inches)

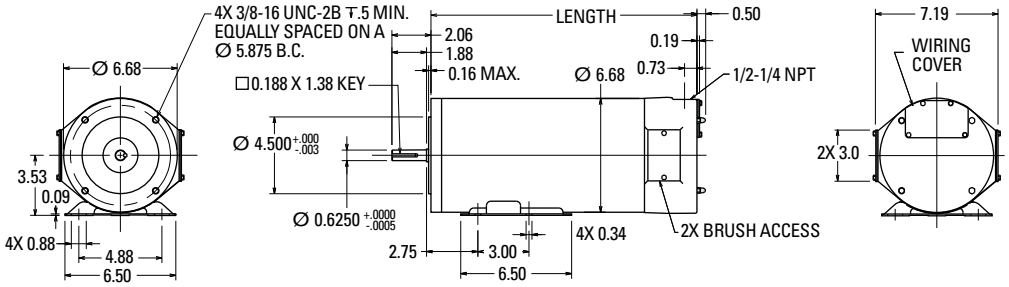
1 – TENV



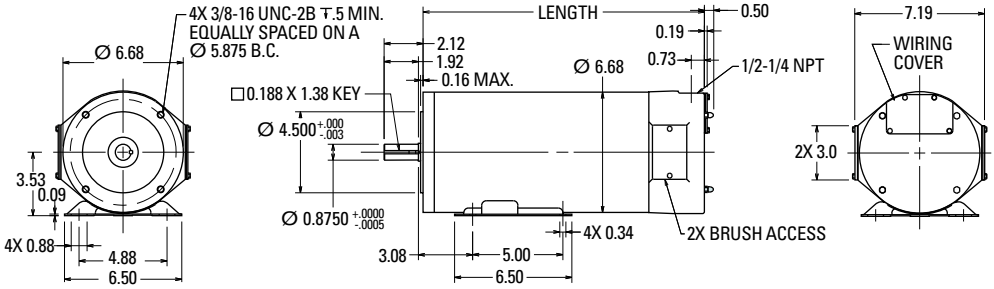
2 – TENV



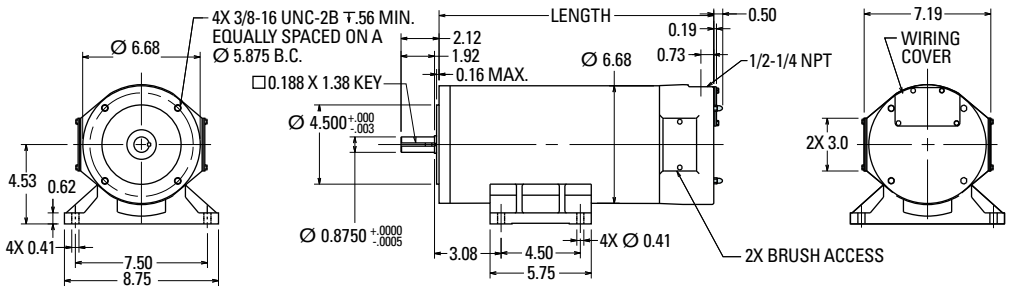
3 – TENV



4 – TENV



5 – TENV



EP Series Explosion Proof Motors

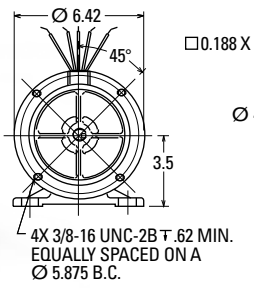
General Specifications

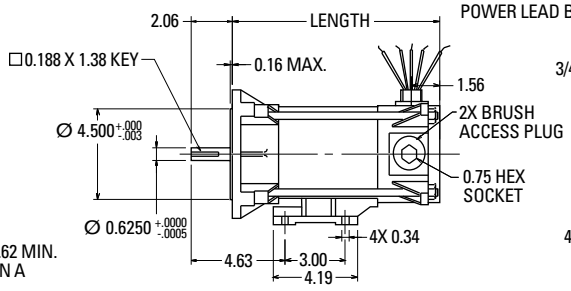
SCR Rated NEMA Standards – Explosion Proof

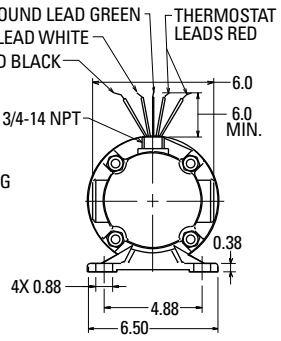
- NEMA C face with removable base
- Class H insulation
- UL Recognized (UL 674, File E56538), meets Division 1 & 2, Class 1 (Groups C & D), Class II (Groups F & G) and Class III
- CSA Listed Components per CSA Standard C22.2 No. 145, Class 428801 (File 213464).
- 1750 RPM

							Parameters									
		Model Number	Product Code	NEMA	Enclosure	Continuous Current	Continuous Torque	Peak Current (A)	Torque Constant	Resistance (Ω)	Inertia (lb_f-in)	Inductance (mH)	Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
90 V	1/4	EP3624-1434-7-56BC-CU	FGE0212	56C	TENV	2.6	9.0	52.0	4.07	2.63	4.0	10.5	1	10.38	23	YP00565
	1/3	EP3632-1435-7-56BC-CU	FGE0242	56C	TENV	3.5	12.0	71.0	3.94	1.76	5.0	6.6	1	11.38	27	YP00565
	1/2	EP3640-1436-7-56BC-CU	FGE0213	56C	TENV	4.7	18.0	87.0	4.24	1.03	6.4	5.1	1	12.38	30	YP00565
	3/4	EP3758-5151-7-56BC-CU	FGE0248	56C	TENV	7.0	27.0	113.0	4.15	0.74	8.0	3.8	1	14.0	36	YP00565
180 V	1/4	EP3624-5269-7-56BC-CU	FGE0261	56C	TENV	1.3	9.0	26.0	8.10	10.50	4.0	51.80	1	10.38	23	YP00566
	1/2	EP3644-5214-7-56BC-CU	FGE0262	56C	TENV	2.3	18.0	34.0	8.10	4.00	6.7	24.20	1	12.38	30	YP00566
	3/4	EP3752-5215-7-56BC-CU	FGE0263	56C	TENV	3.3	27.0	38.0	8.10	3.10	11.4	17.40	1	14.38	34	YP00566
12 V	1/3	EP3620-1954-7-56BC-CU	FGE0243	56C	TENV	28.0	12.0	n/a	0.52	0.04	3.5	0.18	1	10.38	19	YP00583
24 V	1/3	EP3624-2757-7-56BC-CU	FGE0245	56C	TENV	13.4	12.0	n/a	1.02	0.16	4.0	0.66	1	10.38	24	YP00593
	3/4	EP3648-4952-7-56BC-CU	FGE0244	56C	TENV	28.2	27.0	n/a	1.02	0.06	7.1	0.22	1	13.38	33	YP00593

Configuration and Dimensions (inches)







BA/BAF Series Low Voltage Motors

General Specifications

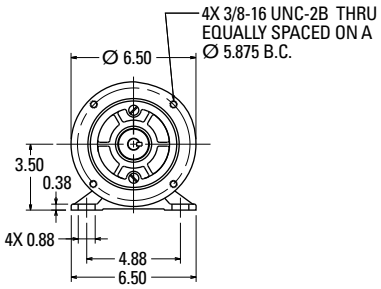
Low Voltage Rated NEMA Standards

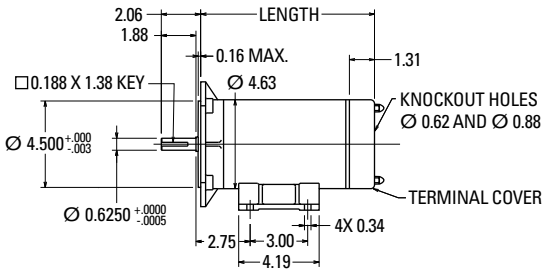
- NEMA C face with removable base
- Class H insulation
- UL Recognized (UL1004, File E61960)
- Designed for use with low voltage supplies (batteries).
- Highly efficient
- For constant speed, motors are operated directly from a battery with no motor control interface.
- For adjustable speeds, low voltage motor controls are readily available
- 1750 RPM

		Model Number	Product Code	NEMA	Enclosure	Parameters: Continuous Current	Continuous Torque	Peak Current (A)	Torque Constant	Resistance (Ω)	Inertia (lb_f-in)	Inductance (mH)	Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
12 V	1/4	BA3614-4648-9-56BC	FGB2010	56C	TENV	21.1	9.0	n/a	0.51	0.07	2.9	0.27	1	8.13	15	YP00593
	1/3	BA3624-7005-9-56BC	FGB2002	56C	TENV	27.0	12.0	n/a	0.51	0.04	4.0	0.14	1	9.13	19	YP00602
	1/2	BA3638-4588-9-56BC	FGB2005	56C	TENV	39.8	18.0	n/a	0.49	0.02	5.5	0.07	1	11.13	25	YP00592
24 V	1/4	BA3618-7009-9-56BC	FGB1592	56C	TENV	10.3	9.0	n/a	1.04	0.14	3.2	0.57	1	9.13	18	YP00593
	1/3	BA3624-7024-9-56BC	FGB2285	56C	TENV	13.4	12.0	n/a	1.02	0.16	4.0	0.66	1	9.13	19	YP00593
	1/2	BA3628-7012-9-56BC	FGB1441	56C	TENV	19.5	18.0	n/a	1.01	0.10	4.4	0.38	1	10.13	21	YP00593
	3/4	BA3648-4650-9-56BC	FGB2006	56C	TENV	28.2	27.0	n/a	1.02	0.06	7.1	0.22	1	12.10	29	YP00592
	1.0	BAF3644-5081-56BC	FGB2335	56C	TEFC	38.4	36.0	n/a	1.00	0.05	6.6	0.21	2	12.25	28	YP00583

Configuration and Dimensions (inches)

1 – TENV





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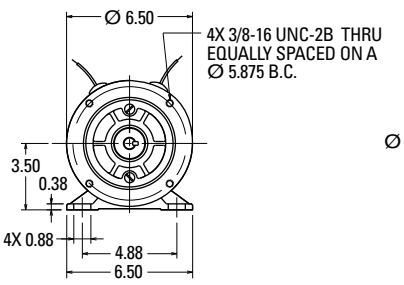
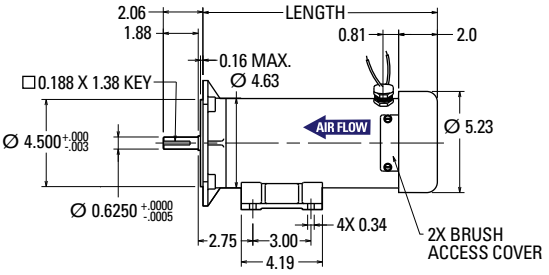




Optimized Solutions

Applying Our Knowledge to Meet Your Motion Needs

Optimize the Package, Performance and Features

- We provide solutions that meet your needs, including the ability to get optimum performance for the smallest package size.
- Our products deliver superior quality, through-put, efficiency, and performance.

Reduce Waste and Costs

- We have thousands of proven designs upon which to build new solutions. Our application experience expedites the design cycle, which enables you to be fully operational sooner.
- Great value is delivered in the final product.

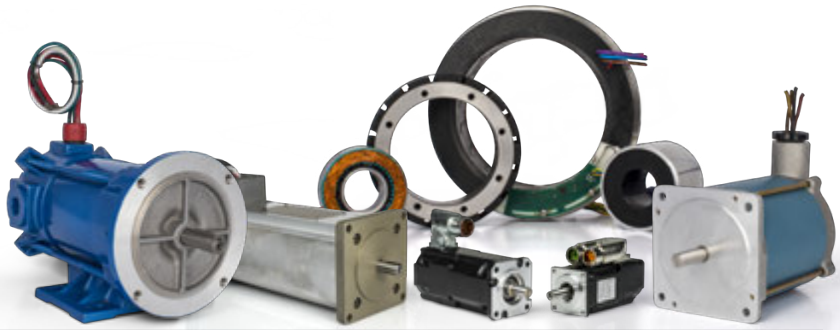
Meet the Most Challenging Requirements

- Designs are developed for manufacturability.
- Designing and manufacturing unique products are our core competencies.
- We have the broadest capabilities in the industry.

Compete and Win

Kollmorgen can translate your needs, from design to installation, into a custom motion solution that makes your end product more competitive – driving market share and profitability for your company.

For flexible production runs, from high volume to one piece, Kollmorgen provides on optimized solution that fits your needs – perfectly.



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 motor modifications include shaft, housing, winding and through-bore alterations; feedback type; mounting and connectors; ruggedization (high-shock-and-vibration), vacuum-duty, radiation-hardened, explosion-proof. Typical drive modifications include housing, mounting and heat-sinking; connector type; I/O type- and count; field buses and motion buses; special cabling; ruggedization (high-shock-and-vibration).

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.

Project Management

We follow a structured development process from initial concept to volume production. This enables us to provide a complete solution from design to implementation.

Our skilled engineering team is assigned to each project and ensures a high quality product, designed and delivered on time, successfully taking the prototype to full production.

- **Dedicated Resources & Equipment**
- **Real Time Customer Collaboration**
- **Validation of Performance, Cost & Manufacturability Before Volume Production**

Customer Visibility Throughout the Entire Process

A communicative and proactive approach keeps you updated and aware of what is required throughout, what it will cost, and what to expect for design testing.

This not only puts you in charge of approving any modifications before installation, but ensures the product is up and running quickly, with minimal development time and maximum value.

Engineering Excellence

What really sets us apart is our engineering expertise. With over 50 years of successfully designing custom motors, we are able to quickly assess, design and implement a solution that meets your needs.

Our engineers have extensive knowledge and experience, which means they have designed solutions for almost every unique and challenging situation. Their insightfulness and expertise will guide you through the development and implementation of an optimized motor solution.

We rely on the most advanced simulation tools to deliver the best products, designed to withstand the most unique and challenging environments:

- **3-D Modeling –ProE**
- Finite Element Analysis
  - Electromagnetics
  - Structural (stress, vibration, fatigue)
  - Thermal
- **Speed**
- **Infolytica**
- **Ansys**
- **Magneto**

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**

Capabilities to Meet Your Needs

Kollmorgen offers competitive lead times on nearly 1,000,000 commercial off-the-shelf (COTS) products, all with best-in-class performance and quality.

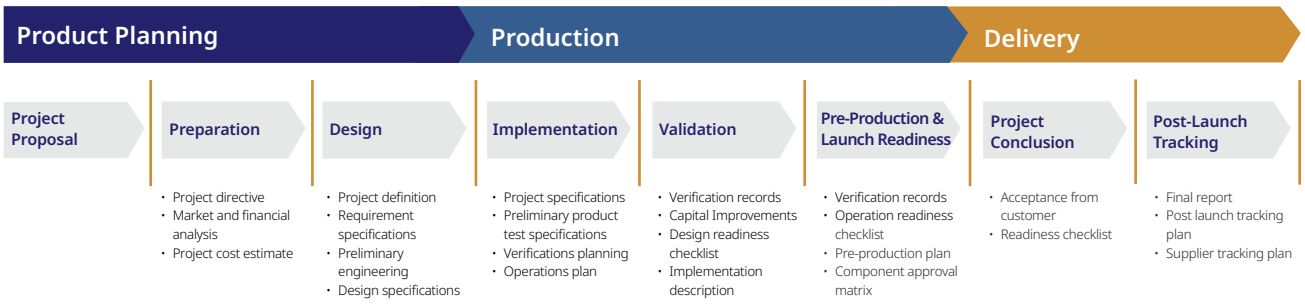
When COTS is not quite the best way to realize a totally optimized system, Kollmorgen can offer co-engineered solutions to meet your most difficult challenges and advance your competitive position. Drawing on a wealth of knowledge and expertise, our engineering support team will work alongside you to build a solution that differentiates your machine and improves your bottom line.

Here are just few examples of how Kollmorgen delivers real value to companies likes yours:

What You Need	Why Motion Matters	Kollmorgen Co-Engineering Results
30% Increase in Throughput	» Low inertia servo motors » High bandwidth servo loops » Simple, accurate, graphical programming tools	Using the Kollmorgen Automation Suite™ graphical camming design tool, Pipe Network™ and low-inertia AKM® servo motors, a major supplier of diabetic test labs **increased throughput by more than 30%** while improving accuracy and reducing scrap.
50% Increase in Accuracy and Quality	» Low cogging frameless servo motor » Advanced observers and bi-quad filters » Fast control loop update rates (.67µs)	Using our AKD® servo drive, a next-generation CT scanning manufacturer achieved **more than 50% improvement in velocity ripple** to produce the most accurate and detailed medical images possible while overcoming an extremely high moment of inertia.
25% Increase in Reliability **(Overall Equipment Effectiveness)**	» Innovative Cartridge Direct Drive Rotary® DDR motor » Eliminating parts on the machine » No additional wearing components	Using Kollmorgen's award-winning Cartridge DDR® servo motor technology, we eliminated more than 60 parts in a die-cutting machine and **increased the OEE by 25%** and throughput by 20%.
50% Reduction in Waste	» Superior motor/drive system bandwidth » DDR technology: • eliminates gearbox • 20X more accurate than geared solution	We helped a manufacturer of pharmaceutical packaging machines incorporate Housed DDR motors to increase the throughput by 35% and **reduce scrap by more than 50%** through more accurate alignment of the capsules.

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

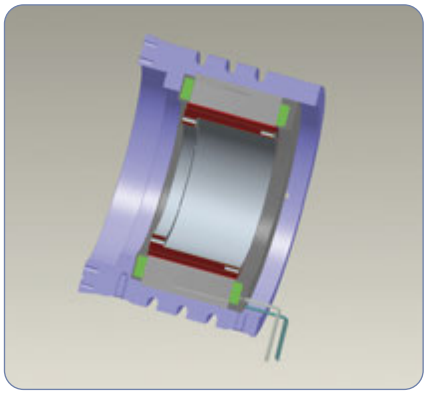
Motor Solutions

- Brushed, brushless and stepper motor building blocks used in frameless or housed configurations
- Designed for agency compliance (UL, CE, RoHS)
- 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

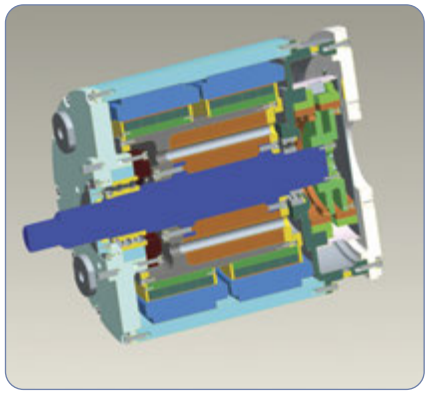
Drive Solutions

- 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

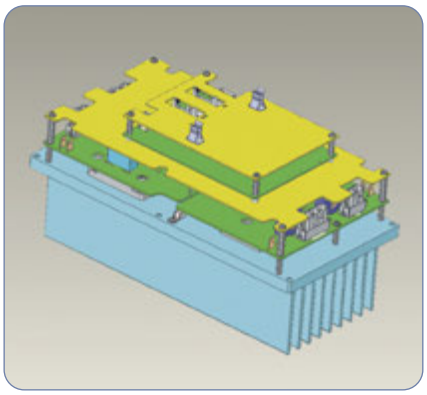
Medical diagnostics drive optimized for form-factor, I/O and EMC



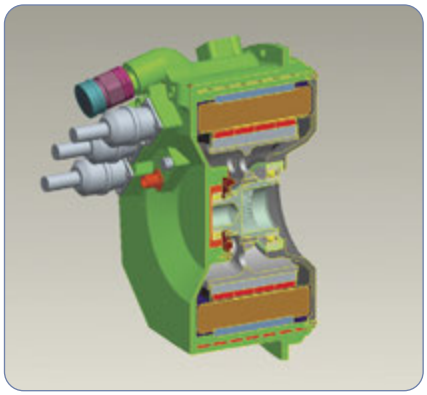
Frameless direct drive rotary motor with water cooling features



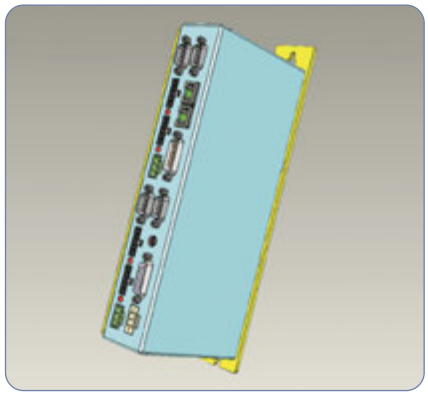
Custom submersible motor



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

Motors and Electronics

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

Kollmorgen Motors for Special Duty

Every day Kollmorgen pushes the boundaries of motion to deliver optimized solutions that satisfy even the most demanding application requirements in the harshest of environments.

We've been working with the biggest names in harsh and hazardous environments in Industry, Automation, Aerospace & Defense, Exploration, Nuclear, Medical and Robotics for nearly 60 years.

We are on Mars and the Moon and at the bottom of the oceans: In fact, Kollmorgen motors powered the legendary ROV Jason Jr. at a depth of 3,784 meters (12,415 feet) to explore the interior of Titanic for the first time since it sank in 1912.

Kollmorgen continues to collaborate with leading innovators with the same enthusiasm and acumen: Kollmorgen knows that motion matters and represents endless possibilities for innovation. Our engineering expertise and engineering capabilities enable us to deliver superior performing solutions for these demanding environments.

Goldline® S Series Submersible Servo Motors

These brushless servo motors incorporate pressure compensation technology to allow underwater operation up to 20,000 ft while withstanding extreme environments. They feature stainless steel and aluminum nickel bronze housings. All shafts are stainless steel and sealed with an externally serviceable O-ring seal.

- Choice of stainless steel and aluminum nickel bronze housings
- Stainless steel shaft with externally serviceable seal
- NEMA mounts
- Resolver feedback
- SEACON connectors
- Pressure compensated: 5,000 psi (Co-Engineered option for 10,000 psi possible)
- Designed to withstand severe shock and extreme environments

EKM Series Brushless AC Servo Motors

These enhanced, high-performance motors are Mil-Spec 810E rated and IP67 sealed, and comes standard with a stainless steel and chemical-agent-resistant paint, for duty in harsh environmental conditions.

- 0.43 to 53 Nm continuous stall torque (3.8 to 467 lb-in)
- Speeds up to 8000 RPM meet high speed requirements
- Custom windings, shaft variations, and fail-safe brakes available
- 480 Vac high voltage insulation
- Rugged resolver feedback for extreme environments
- Operating temperature range of -51˚ C to 54˚ C
- Shock and vibration tested per MIL-STD-810E, Methods 516.4 & 514.4, Procedure 1
- International standard mount available

QT Series Direct Drive DC Torque Servo Motors

The Direct Drive DC Torque motor is a servo actuator which can be directly attached to the load it drives. It has a permanent magnet (PM) field and a wound armature which act together to convert electrical power to torque. This torque can then be utilized in positioning or speed control systems.

In general, torque motors are deigned for three different types of operation:

- High stall torque ("stand-still" operation) for positioning systems
- High torque at low speeds for speed control systems
- Optimum torque at high speed for positioning, rate, or tensioning systems

MX Series Hazardous Duty Motors

The explosion-proof MX Series provides hazardous-duty stepper motors suitable for use in Class 1, Division 1, Group D locations. They are available in NEMA 34 and 42 frame sizes (90 and 110 mm), and provide minimum holding torques from 1.27 to 9.82 N-m (180 to 1390 oz-in).

- MX09 models: NEMA 34 (90 mm) motors available in three stack lengths with minimum torque ratings from 1.27 to 3.88 N-m (180 to 550 oz-in)
- MX11 models: NEMA 42 (110 mm) motors available in 2 stack lengths with minimum torque ratings from 6.0 to 9.82 N-m (850 to 1390 oz-in)
- Speeds up to 3,000 rpm provide for velocity demands of most high torque applications

Hazardous Duty Synchronous Motors

These synchronous motors are available in UL Listed versions suitable for use in Class I, Division 1, Group D hazardous locations. They provide torque up to 1,500 oz-in (1059 N-cm) and are available in NEMA 42 and 66 frame sizes (110 mm and 170 mm).

- Motor torque up to 1,500 oz-in (1059 N-cm)
- 72 rpm at 60 Hz, 60 rpm at 50 Hz
- 120 and 240 volt AC versions
- UL Listed versions meet Class I, Division 1, Group D requirements
- Conduit-style connection

EP Series Explosion-Proof Motors

These permanent magnet DC (PMDC) motors are SCR rated and adhere to NEMA standards. They are available in a variety of DC voltages, from 1/4 to 3/4 HP.

- Patented anti-cog magnets for smooth low speed operation
- Polyester-impregnated armature for electrical and mechanical integrity
- High overcurrent capacity and dynamic braking
- Rugged, fused commutator
- TEFC and TENV configurations
- Long life, constant force brush springs with field-replaceable brushes
- Gasketed conduit box with large wiring compartment
- Large sealed bearings, standard
- Class H insulation

EB Series High-Performance Explosion-Proof Servo Motors

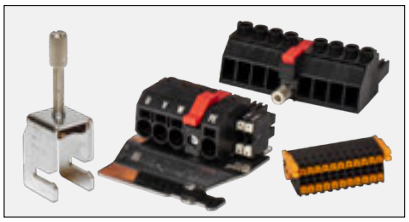
Based on our 230 VAC B and M Series, the Kollmorgen EB Series provides a high-performance explosion-proof servo motor suitable for applications where flammable vapors or gases create a potentially hazardous environment. These motors have been tested and proven capable of withstanding an internal explosion without bursting or allowing ignition to reach outside the motor frame.

- 230 VAC explosion-proof (Class I, Division 1, Groups C and D)
- Tested and proven capable of withstanding an internal explosion without bursting or allowing ignition to reach outside the motor frame

AKD® Servo Drive Accessories

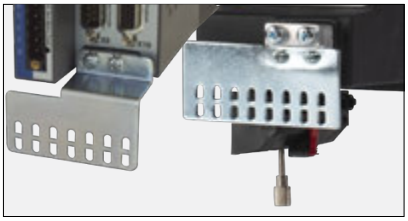
Mating Connectors and Shielding Kit

Kollmorgen's servo drives are equipped with screwable mating connectors. Alternative connectors for common DC, bus, and main ports are also available. We offer shielding kits for our flexible cables for use in environments with strong interference.



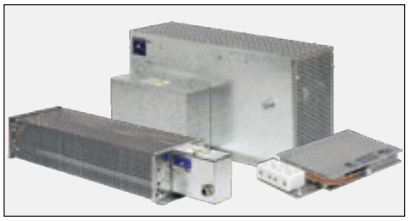
Shielding Solutions

AKD servo drives can be equipped with shielding plates.



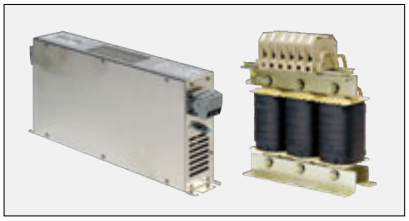
Brake Resistors

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.



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.

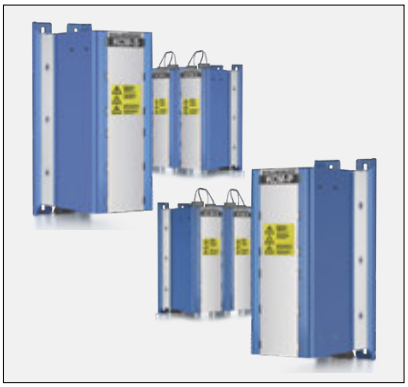


Static Energy Storage

Our Static Energy Storage supplies the drive with power in the event of power outages until the machine reaches a defined state. It generates a power outage signal for evaluation by the machine control system. Simple connection to the DC intermediate circuit with two cables; immediately ready for use; no adjustment; no controls. Cascade for nearly unlimited power range.

Braking Energy Storage

Our Braking Energy Storage saves Energy through Intelligent Energy Feedback. Substantial saving, especially in applications with short cycle times. Simple connection to DC intermediate circuit. Simple start-up – immediately ready for use; no adjustment; no controls. Nearly unlimited power range with expansion modules.

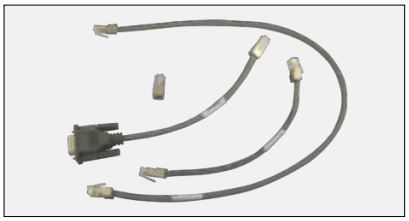


Motion Bus and Service Port Cables

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

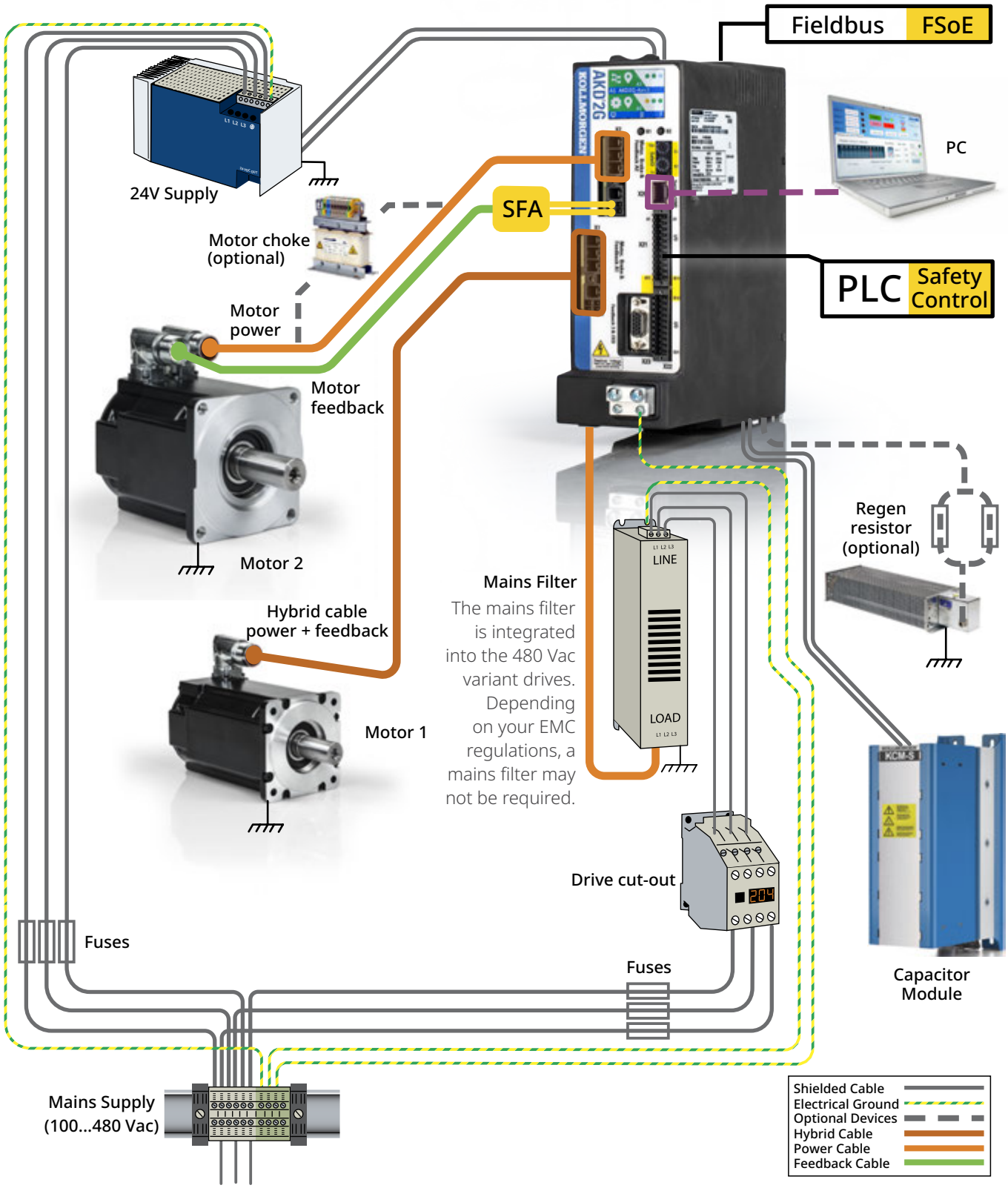
CANopen® Accessories

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



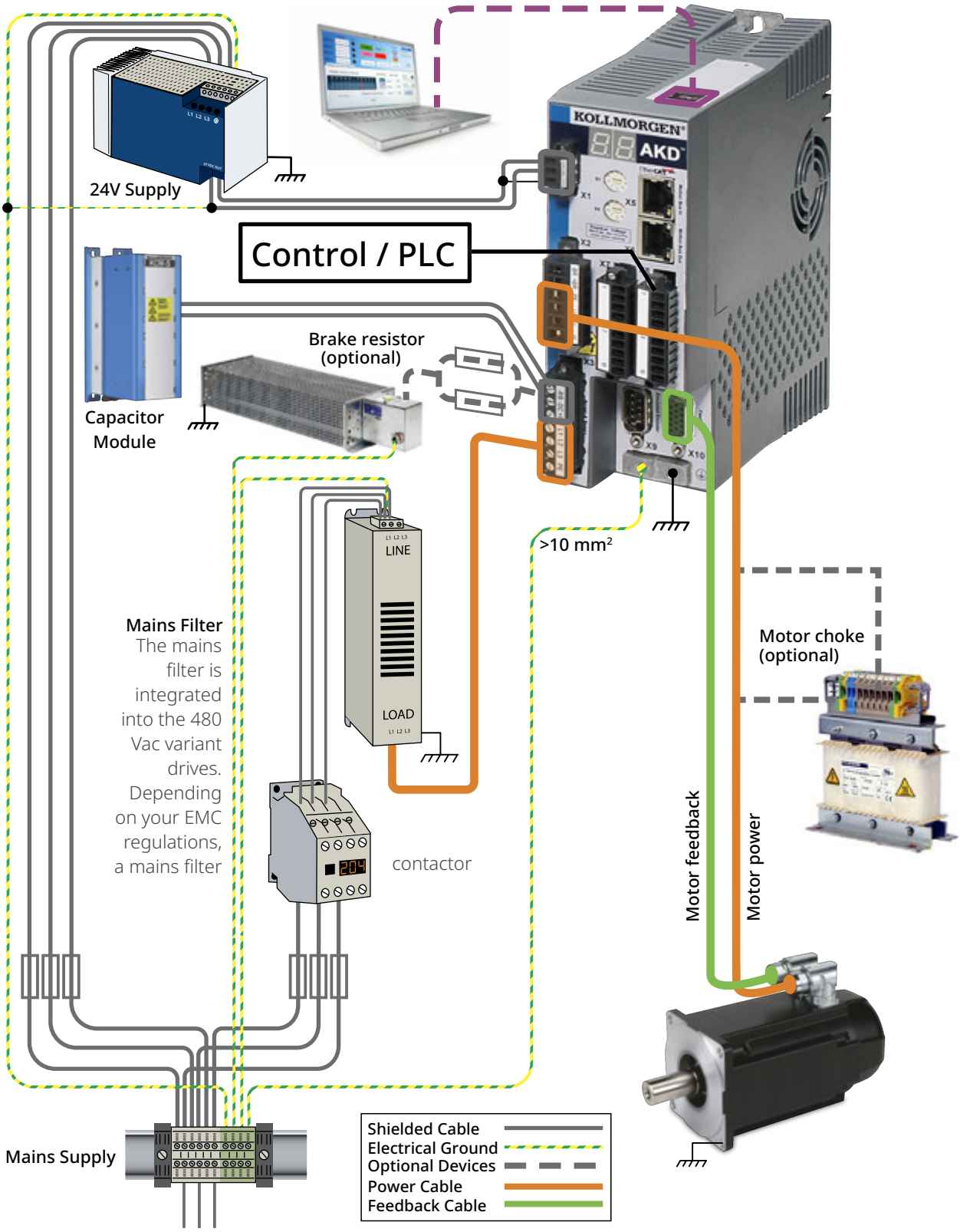
Drive System with AKD2G-Sxx-6VxxD

Example with single and dual cable motor connection on a dual axes drive.

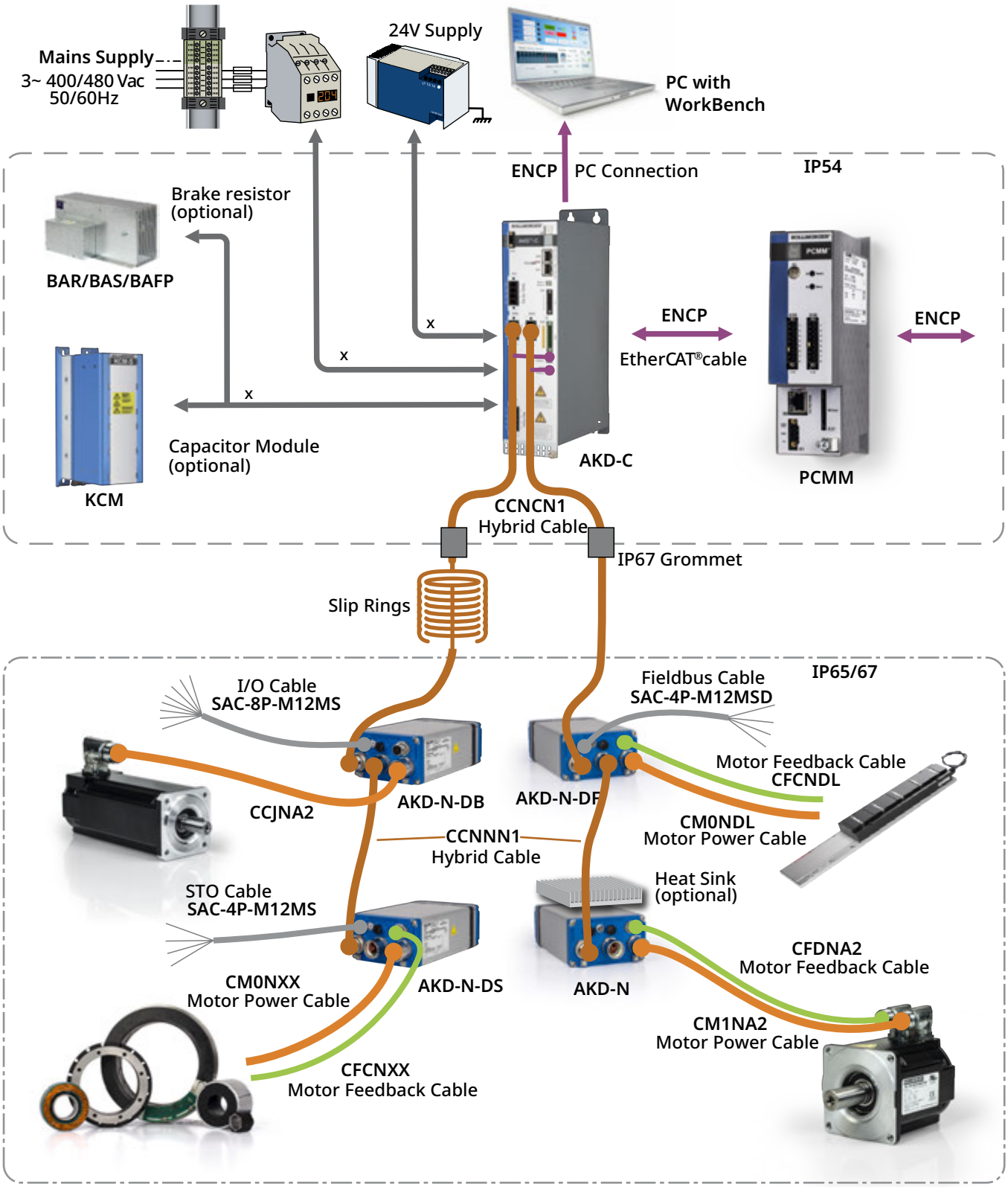


AKD® Servo Drive Accessories

Drive System with AKD-x00306...02406



System Featuring AKD®-N



Kollmorgen 2G Cables

High-performance servo systems require high signal integrity. Electrical noise in the system can cause degraded performance or even instability. Therefore, well-designed connectors and cables are as critical to the system as are motors, drives and controls. A system is only as good as its weakest link.

Kollmorgen guarantees the performance and quality of its servo systems only when you use Kollmorgen-supplied motors, drives and cables. Not all cables are created equal.

Kollmorgen has done the hard work for you: The cables in this Selection Guide have been tested with our motors, guaranteeing the highest level of performance. This guide will also provide the detail behind industry standards to assist selecting the right cable for specific application needs.

Kollmorgen Cable Features	Benefits
100% shielded end-to-end with prewired Kollmorgen connectors	Mitigate radiated noise from cable and noise immunity from external sources
Large-diameter power conductors	Able to handle peak currents needed for servo control Minimal impedance in the cables maximizes efficiency and noise immunity
Cable Flex rating	Flexible cables, suitable for trailing, last longer when connected to a moving motor.
Cable bend radius	Tight-bend-radius cables are useful when you have to jam the cables into a tight fit such as a sharp corner or smaller cable track
High-voltage rated	Meets approvals such as UL and CE

Kollmorgen 2G Cable Overview

Kollmorgen offers high performance servo cables to ensure the drive and motor operate at peak performance.
Every cable in this Selection Guide has passed Kollmorgen's rigorous tests. Our support team can provide you the optimal cable configuration for any given combination of drive, motor, and environment.

Dual Cables

Dual cable solutions separate power from feedback and typically allow for longer distances between the drive and motor. Dual cables are available for Resolver feedback on AKM®2G motors.

Hybrid Cables

Hybrid cables combine power conductors and feedback-signal conductors in one cable. Less cable means lower cost, reduced weight, and fewer connectors on the motor. Hybrid Cables are available for SFD3, HIPERFACE DSL® and EnDat® feedback on AKM2G motors.

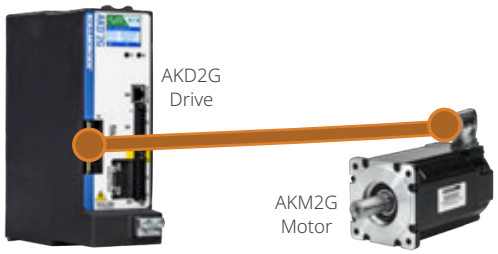
Additional Dual Cable Feedback Options on AKM® motors:

- SFD (Smart Feedback Device)
- Single & Multi-turn EnDat® sine encoders
- Single & Multi-turn BiSS sine encoders
- Single & Multi-turn HIPERFACE® sine encoders
- Up to 5000 lines/rev commutating encoders

Kollmorgen 2G Cable Lookup Tables

AKD®2G Servo Drive Section

Hybrid Single Cable Options



Smart Feedback Device (SFD3) – AKM®2G motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid Cable (PUR)[2]	Hybrid Cable (PVC)[3]
SFD3 (CA)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	SpeedTec® (D)	Rms < 15	H2-21-015-A1-00-XXXX00	H6-21-015-A1-00-XXXX00

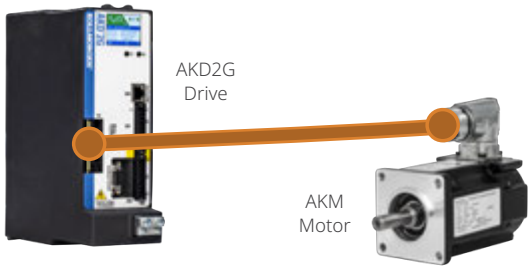
HIPERFACE DSL® – AKM®2G motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid Cable (PUR)[2]	Hybrid Cable (PVC)[3]
HIPERFACE DSL (GU)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	htec® (D)	Rms < 15	H2-21-015-B1-00-XXXX00	H6-21-015-B1-00-XXXX00

EnDat® 2.2 – AKM®2G motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid Cable (PUR)[2]	Hybrid Cable (PVC)[3]
EnDat 2.2 (LD)[4]	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	htec® (D)	Rms < 15	H2-21-015-B2-00-XXXX00	NA

Notes:
1. Current ratings used on a IEC 60364-5-52 standard
2. PUR cables have a Polyurethane cable jacket material typically used in Europe
3. PVC cables have a Polyvinyl Chloride cable jacket material typically used in North America
4. Hybrid EnDat 2.2 - 22 cable requires X23 connector on AKD2G drive and can only be used on one of the axes on a dual axis drive.



Smart Feedback Device (SFD3) – AKM® motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid Cable (PUR)[2]	Hybrid Cable (PVC)[3]
SFD3 (CA)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	itec® AKM1 only	Rms<11	H2-21-010-C4-00-XXXX00	H6-21-010-C4-00-XXXX00
		SpeedTec® (D)	Rms < 15	H2-21-015-A5-00-XXXX00	H6-21-015-A5-00-XXXX00

HIPERFACE DSL® – AKM® motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid Cable (PUR)[2]	Hybrid Cable (PVC)[3]
HIPERFACE DSL (GE, GF)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	SpeedTec® (D)	Rms < 15	H2-21-015-A5-00-XXXX00	H6-21-015-A5-00-XXXX00

Notes:
1. Current ratings used on a IEC 60364-5-52 standard
2. PUR cables have a Polyurethane cable jacket material typically used in Europe
3. PVC cables have a Polyvinyl Chloride cable jacket material typically used in North America

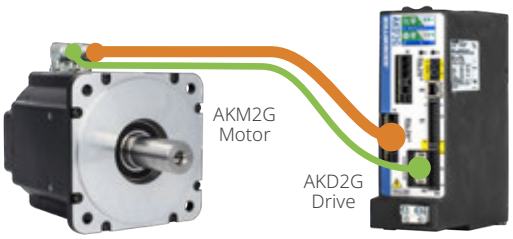
AKM1 itec Power + SFD3 Mating Connector

AKD2G Drive Connector

Kollmorgen 2G Cable Lookup Tables

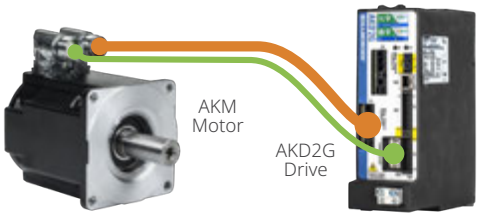
AKD®2G Servo Drive Section

Dual Cable Options – Power and Feedback



Resolver – AKM®2G motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Brake Option	Power Cable (PUR)[2] + 00-XXXX00	Power Cable (PVC)[3] + 00-XXXX00	Feedback Cable (PUR)[2] + 00-XXXX00	Feedback Cable (PVC)[3] + 00-XXXX00
Resolver (R-)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	ytec® (Y)	Rms < 15	No Brake	P1-21-015-C1-	P5-21-015-C1-	F1-10-FB2-C2-	F5-10-FB2-C2-
				Brake	P2-21-015-C1-	P6-21-015-C1-		
		SpeedTec® (C or G)	Rms < 15	No Brake	P1-21-015-A1-	P5-21-015-A1-	F1-10-FB2-A2-	F5-10-FB2-A2-
				Brake	P2-21-015-A1-	P6-21-015-A1-		



Resolver – AKM® motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Brake Option	Power Cable (PUR)[2] + 00-XXXX00	Power Cable (PVC)[3] + 00-XXXX00	Feedback Cable (PUR)[2] + 00-XXXX00	Feedback Cable (PVC)[3] + 00-XXXX00
Resolver (R-)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	ytec (Y)	Rms < 15	No Brake	P1-21-015-C1-	P5-21-015-C1-	F1-10-FB2-C2-	F5-10-FB2-C2-
				Brake	P2-21-015-C1-	P6-21-015-C1-		
		SpeedTec (C or G)	Rms < 15	No Brake	P1-21-015-A5-	P5-21-015-A5-	F1-10-FB2-A2-	F5-10-FB2-A2-
				Brake	P2-21-015-A5-	P6-21-015-A5-		

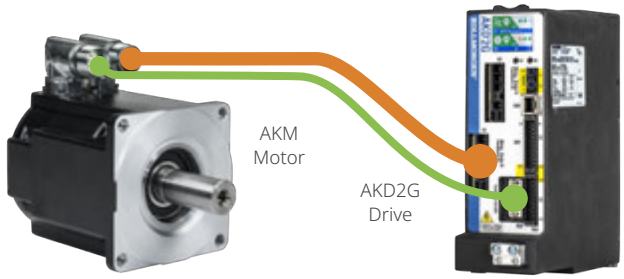
Smart Feedback Device – AKM® motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Brake Option	Power Cable (PUR)[2] + 00-XXXX00	Power Cable (PVC)[3] + 00-XXXX00	Feedback Cable (PUR)[2] + 00-XXXX00	Feedback Cable (PVC)[3] + 00-XXXX00
Smart Feedback Device (C-)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	ytec (Y)	Rms < 15	No Brake	P1-21-015-C1-	P5-21-015-C1-	F1-18-FB3-C2-	F5-18-FB3-C2-
				Brake	P2-21-015-C1-	P6-21-015-C1-		
		SpeedTec (C or G)	Rms < 15	No Brake	P1-21-015-A5-	P5-21-015-A5-	F1-18-FB3-A2-	F5-18-FB3-A2-
				Brake	P2-21-015-A5-	P6-21-015-A5-		

Notes:
1. Current ratings used on a IEC 60364-5-52 standard
2. PUR cables have a Polyurethane cable jacket material typically used in Europe
3. PVC cables have a Polyvinyl Chloride cable jacket material typically used in North America
4. Hybrid EnDat 2.2 - 22 cable requires X23 connector on AKD2G drive and only can be used with the X1 connector.

AKD®2G Servo Drive Section

Dual Cable Options – Power and Feedback



Commutating Encoder – AKM® motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Brake Option	Power Cable (PUR)[2] + 00-XXXX00	Power Cable (PVC)[3] + 00-XXXX00	Feedback Cable (PUR)[2] + 00-XXXX00	Feedback Cable (PVC)[3] + 00-XXXX00
Sine/Incr. Encoder w/ Halls (Ex, 1-,2-)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	ytec® (Y)	Rms < 15	No Brake	P1-21-015-C1-	P5-21-015-C1-	F1-20-FB4-C3-	F5-20-FB4-C3-
				Brake	P2-21-015-C1-	P6-21-015-C1-		
		SpeedTec® (C or G)	Rms < 15	No Brake	P1-21-015-A5-	P5-21-015-A5-	F1-20-FB4-A3-	F5-20-FB4-A3-
				Brake	P2-21-015-A5-	P6-21-015-A5-		

EnDat®/BiSS Encoder – AKM® motor to AKD®2G drive

Motor Feedback	Drive	Motor Connector	Current Rating[1]	Brake Option	Power Cable (PUR)[2] + 00-XXXX00	Power Cable (PVC)[3] + 00-XXXX00	Feedback Cable (PUR)[2] + 00-XXXX00	Feedback Cable (PVC)[3] + 00-XXXX00
EnDat/BiSS (Ax, Dx, Lx)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	SpeedTec (C or G)	Rms < 15	No Brake	P1-21-015-A5-	P5-21-015-A5-	F1-12-FB4-A3-	F5-12-FB4-A3-
				Brake	P2-21-015-A5-	P6-21-015-A5-		

HIPERFACE® Optical Sine Encoder – AKM® motor to AKD®2G drive

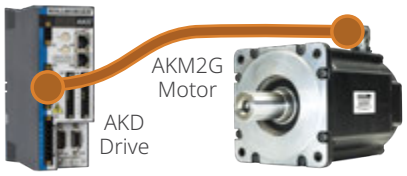
Motor Feedback	Drive	Motor Connector	Current Rating[1]	Brake Option	Power Cable (PUR)[2] + 00-XXXX00	Power Cable (PVC)[3] + 00-XXXX00	Feedback Cable (PUR)[2] + 00-XXXX00	Feedback Cable (PVC)[3] + 00-XXXX00
HIPERFACE (Gx)	AKD2G-SPx-6V03x AKD2G-SPx-6V06x AKD2G-SPx-6V12x AKD2G-SPx-7V03x AKD2G-SPx-7V06x AKD2G-SPx-7V12x	ytec (Y)	Rms < 15	No Brake	P1-21-015-C1-	P5-21-015-C1-	F1-14-FB6-C2-	F5-14-FB6-C2-
				Brake	P2-21-015-C1-	P6-21-015-C1-		
		SpeedTec (C or G)	Rms < 15	No Brake	P1-21-015-A5-	P5-21-015-A5-	F1-14-FB6-A3-	F5-14-FB6-A3-
				Brake	P2-21-015-A5-	P6-21-015-A5-		

Notes:
1. Current ratings used on a IEC 60364-5-52 standard
2. PUR cables have a Polyurethane cable jacket material typically used in Europe
3. PVC cables have a Polyvinyl Chloride cable jacket material typically used in North America

Kollmorgen 2G Cable Lookup Tables

AKD® Servo Drive Section

Hybrid Single Cable Options



Smart Feedback Device (SFD3) – AKM®2G motor to AKD® drive

Voltage	Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid (PUR)[3]	Hybrid Cable (PVC)[4]
120-240	SFD3 (CA)	AKD-x00306 AKD-x00606	SpeedTec® (D)	Rms < 15	H2-11-015-A1-00-XXXX00	H6-11-015-A1-00-XXXX00
		AKD-x01206 AKD-x02406	SpeedTec (D)	Rms < 20[2]	H2-12-025-A1-00-XXXX00	H6-12-025-A1-00-XXXX00
			SpeedTec (J)	Rms<27	H2-12-040-A4-00-XXXX00	–
				Rms<34	H2-12-060-A4-00-XXXX00	–
240-480	SFD3 (CA)	AKD-x00307 AKD-x00607 AKD-x01207	SpeedTec (D)	Rms < 15	H2-12-015-A1-00-XXXX00	H6-12-015-A1-00-XXXX00
		AKD-x02407	SpeedTec (D)	Rms < 20[2]	H2-12-025-A1-00-XXXX00	H6-12-025-A1-00-XXXX00
			SpeedTec (J)	Rms<27	H2-12-040-A4-00-XXXX00	–
				Rms<34	H2-12-060-A4-00-XXXX00	–
		AKD-X04807	SpeedTec (J)	Rms<34	H2-13-060-A4-00-XXXX00	–

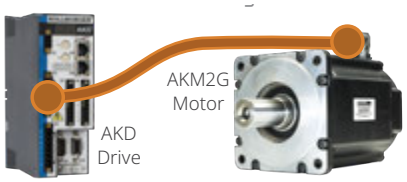
HIPERFACE DSL® – AKM®2G motor to AKD® drive

Voltage	Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid (PUR)[3]	Hybrid Cable (PVC)[4]
120-240	HIPERFACE DSL (GU)	AKD-x00306 AKD-x00606	htec® (D)	Rms < 15	H2-11-015-B1-00-XXXX00	H6-11-015-B1-00-XXXX00
		AKD-x01206 AKD-x02406	htec (D)	Rms < 20[2]	H2-12-025-B1-00-XXXX00	H6-12-025-B1-00-XXXX00
			htec (J)	Rms<27	H2-12-040-B3-00-XXXX00	–
				Rms<34	H2-12-060-B3-00-XXXX00	–
240-480	HIPERFACE DSL (GU)	AKD-x00307 AKD-x00607 AKD-x01207	htec (D)	Rms < 15	H2-12-015-B1-00-XXXX00	H6-12-015-B1-00-XXXX00
		AKD-x02407	htec (D)	Rms < 20[2]	H2-12-025-B1-00-XXXX00	H6-12-025-B1-00-XXXX00
			htec (J)	Rms<27	H2-12-040-B3-00-XXXX00	–
				Rms<34	H2-12-060-B3-00-XXXX00	–
		AKD-X04807	htec (J)	Rms<34	H2-13-060-B3-00-XXXX00	–

Notes:
1. Current ratings used on a IEC 60364-5-52 standard
2. To utilize full current rating of AKD-x0240x please use the htec M40 motor connector (J)
3. PUR cables have a Polyurethane cable jacket material typically used in Europe
4. PVC cables have a Polyvinyl Chloride cable jacket material typically used in North America

AKD® Servo Drive Section

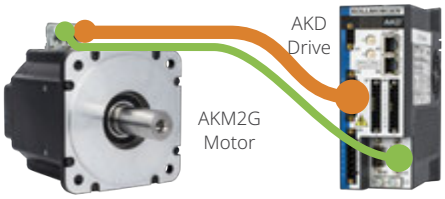
Hybrid Single Cable Options



EnDat® – AKM®2G motor to AKD® drive

Voltage	Motor Feedback	Drive	Motor Connector	Current Rating[1]	Hybrid (PUR)[3]	Hybrid Cable (PVC)[4]
120-240	EnDat 2.2 (LD)	AKD-x00306 AKD-x00606	htec® (D)	Rms < 15	H2-14-015-B2-00-XXXX00	–
		AKD-x01206 AKD-x02406	htec (D)	Rms < 15[2]	H2-15-015-B2-00-XXXX00	–
				Rms<27	H2-15-040-B2-00-XXXX00	–
240-480	EnDat 2.2 (LD)	AKD-x00307 AKD-x00607 AKD-x01207	htec (D)	Rms < 15	H2-15-015-B2-00-XXXX00	–
		AKD-x02407	htec (D)	Rms < 15	H2-15-015-B2-00-XXXX00	–
				Rms<27	H2-15-040-B2-00-XXXX00	–

Dual Cable Options – Power and Feedback



Resolver – AKM®2G motor to AKD® drive

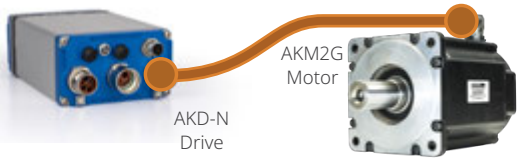
Voltage	Motor Feedback	Drive	Motor Connector	Current Rating[1]	Brake Option	Power Cable (PUR)[3] + 00-XXXX00	Power Cable (PVC)[4] + 00-XXXX00	Feedback Cable (PUR)[3] + 00-XXXX00	Feedback Cable (PVC)[4] + 00-XXXX00
120-240	Resolver (R-)	AKD-x00306 AKD-x00606	ytec® (Y)	Rms < 15	No Brake	P1-11-015-C1-	P5-11-015-C1-	F1-10-FB2-C2-	F5-10-FB2-C2-
					Brake	P2-11-015-C1-	P6-11-015-C1-		
			SpeedTec® (C or G)		No Brake	P1-11-015-A1-	P5-11-015-A1-	F1-10-FB2-A2-	F5-10-FB2-A2-
					Brake	P2-11-015-A1-	P6-11-015-A1-		
240-480	Resolver (R-)	AKD-x00307 AKD-x00607 AKD-x01207 AKD-x02407	ytec (Y)	Rms < 15	No Brake	P1-12-015-C1-	P6-12-015-C1-	F1-10-FB2-C2-	F5-10-FB2-C2-
					Brake	P2-12-015-C1-	P1-12-015-C1-		
			SpeedTec (C or G)	Rms < 15	No Brake	P1-12-015-A1-	P5-12-015-A1-	F1-10-FB2-A2-	F5-10-FB2-A2-
					Brake	P2-12-015-A1-	P6-12-015-A1-		
				Rms < 20[2]	No Brake	P1-12-025-A1-	P5-12-025-A1-		
					Brake	P2-12-025-A1-	P6-12-025-A1-		
				Rms<27[2]	No Brake	P1-12-040-A1-	P5-12-040-A1-		
					Brake	P2-12-040-A1-	P6-12-040-A1-		
			htec® (H)	Rms<27	No Brake	P1-12-040-A4-	P5-12-040-A4-		
					Brake	P2-12-040-A4-	P6-12-040-A4-		
		AKD-X04807	htec (H)	Rms<34	No Brake	P1-13-060-A4-	P5-13-060-A4-		
					Brake	P2-13-060-A4-	P6-13-060-A4-		

Notes:
1. Current ratings used on a IEC 60364-5-52 standard
2. To utilize full current rating of AKD-x0240x please use the htec M40 motor connector (J)
3. PUR cables have a Polyurethane cable jacket material typically used in Europe
4. PVC cables have a Polyvinyl Chloride cable jacket material typically used in North America

Kollmorgen 2G Cable Lookup Tables

AKD®-N Decentralized Servo Drive Section

Hybrid Single Cable Options



Smart Feedback Device (SFD3) – AKM®2G motor to AKD®-N drive

Drive	Motor Connector	Current Rating[1]	Hybrid (PUR)[3]	Hybrid Cable (PVC)[4]
AKD-N003	SpeedTec® (D)	Rms < 15	H2-33-015-A1-00-XXXX00	H6-33-015-A1-00-XXXX00
AKD-N006 AKD-N012		Rms < 20	H2-33-025-A1-00-XXXX00	H6-33-025-A1-00-XXXX00

HIPERFACE DSL® – AKM®2G motor to AKD®-N drive

Drive	Motor Connector	Current Rating[1]	Hybrid (PUR)[3]	Hybrid Cable (PVC)[4]
AKD-N003	SpeedTec (D)	Rms < 15	H2-33-015-B1-00-XXXX00	H6-33-015-B1-00-XXXX00
AKD-N006 AKD-N012		Rms < 20	H2-33-025-B1-00-XXXX00	H6-33-025-B1-00-XXXX00

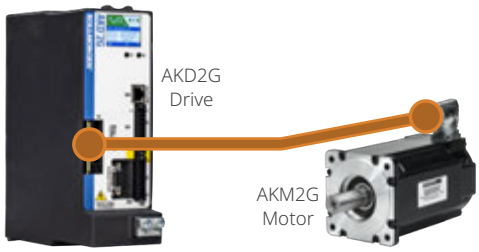
Notes:
1. Current ratings used on a IEC 60364-5-52 standard
2. To utilize full current rating of AKD-x0240x please use the htec M40 motor connector (J)
3. PUR cables have a Polyurethane cable jacket material typically used in Europe
4. PVC cables have a Polyvinyl Chloride cable jacket material typically used in North America

AKD-N – AKM2G Power + HIPERFACE DSL Cable

2G Value Line Cable Options for AKD2G Drives

Hybrid Single Cable Options

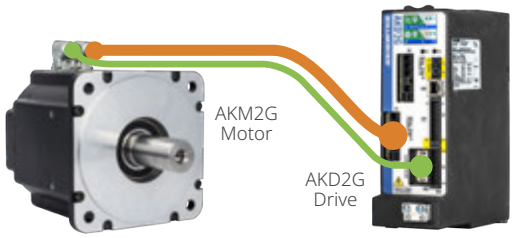
Kollmorgen is also excited to offer a new line of 2G Value Line Cables. These cables will pair with all of our AKM2G & AKD2G offerings and will be available in both dual cable and hybrid cable options. Similar to the current Value line cables the 2G Value Line cables will excel in static applications where cost is key.



AKD®2G drive to AKM®2G and AKM motors

Motor Feedback	Motor Connector	Current Rating[1]	AKM2G Hybrid Cable	AKM Hybrid Cable
SFD3	SpeedTec® (D)	Rms < 15	H6-21-015-A1-VL-XXXX00	H6-21-015-A5-VL-XXXX00
		Rms < 20	H6-21-025-A1-VL-XXXX00	H6-21-025-A5-VL-XXXX00
EnDAT/BiSS		Rms < 15	H6-21-015-B2-VL-XXXX00	–
HIPERFACE DSL		Rms < 15	H6-21-015-B1-VL-XXXX00	H6-21-015-A5-VL-XXXX00
		Rms < 20	H6-21-025-B1-VL-XXXX00	H6-21-025-A5-VL-XXXX00

Dual Cable Options



AKD®2G drive to AKM®2G and AKM motors

Motor Feedback	Motor Connector	Current Rating[1]	Brake Option	AKM2G Power Cable	AKM Power Cable	Feedback Cable
Comcoder	SpeedTec® (C or G)	Rms < 15	No Brake	P5-21-015-A1-VL-XXXX00	P5-21-015-A5-VL-XXXX00	F5-20-FB4-A3-VL-XXXX00
			Brake	P6-21-015-A1-VL-XXXX00	P6-21-015-A5-VL-XXXX00	
		Rms < 20	No Brake	P5-21-025-A1-VL-XXXX00	P5-21-025-A5-VL-XXXX00	
			Brake	P6-21-025-A1-VL-XXXX00	P6-21-025-A5-VL-XXXX00	
Resolver		Rms < 15	No Brake	P5-21-015-A1-VL-XXXX00	P5-21-015-A5-VL-XXXX00	F5-10-FB2-A3-VL-XXXX00
			Brake	P6-21-015-A1-VL-XXXX00	P6-21-015-A5-VL-XXXX00	
		Rms < 20	No Brake	P5-21-025-A1-VL-XXXX00	P5-21-025-A5-VL-XXXX00	
			Brake	P6-21-025-A1-VL-XXXX00	P6-21-025-A5-VL-XXXX00	
EnDAT/BiSS		Rms < 15	No Brake	P5-21-015-A1-VL-XXXX00	P5-21-015-A5-VL-XXXX00	F5-12-FB4-A3-VL-XXXX00
			Brake	P6-21-015-A1-VL-XXXX00	P6-21-015-A5-VL-XXXX00	
		Rms < 20	No Brake	P5-21-025-A1-VL-XXXX00	P5-21-025-A5-VL-XXXX00	
			Brake	P6-21-025-A1-VL-XXXX00	P6-21-025-A5-VL-XXXX00	
HIPERFACE DSL		Rms < 15	No Brake	–	P5-21-015-A5-VL-XXXX00	F5-14-FB6-A3-VL-XXXX00
			Brake	–	P6-21-015-A5-VL-XXXX00	
		Rms < 20	No Brake	–	P5-21-025-A5-VL-XXXX00	
			Brake	–	P6-21-025-A5-VL-XXXX00	

AKD® Servo Drive Cable Lookup Tables

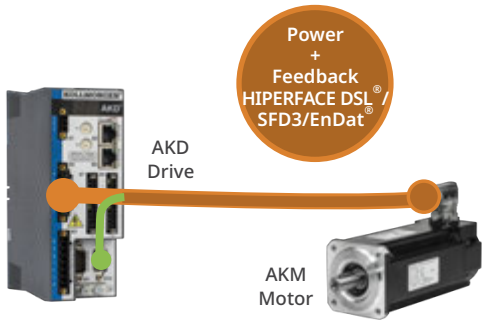
AKD® Performance Cables

Hybrid Single Cable Options

Hybrid cables offer a single connection point on the motor for both feedback and power. Feedback options for this connection type are:

- SFD3 (Single-turn absolute, CA option)
- HIPERFACE® DSL (Single-turn absolute, GE option)
- HIPERFACE DSL (Multi-turn option, GF option)

Washdown versions of this cable are also available.



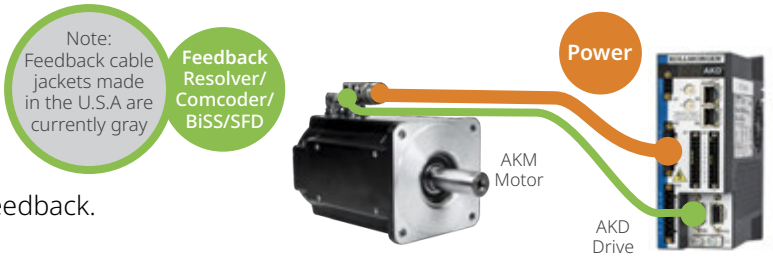
AKD Performance Hybrid Cables by Motor Type

Motor	Hybrid Cable[1] option for 240V drives (AKD-xxxx06xxxx)	Hybrid Cable[1] option for 480V drives (AKD-xxxx07xxxx)
AKM < 12 A	CCJ1A2-015	CCJ2A2-015
12 A ≤ AKM < 20 A	CCJ2A2-025	CCJ2A2-025
Washdown AKM < 12 A	WCJ1A1-015	WCJ2A1-015
12 A ≤ Washdown AKM < 20 A	WCJ2A1-025	WCJ2A1-025

[1] Hybrid cables support SFD GEN 3, Single-turn and Multi-turn HiPerFace DSL

Dual Cables Options

Dual cables are used to separate power and feedback. Options included in this catalog support:



- HIPERFACE (Single-turn absolute, GJ option)
- HIPERFACE (Multi-turn absolute, GK option)
- EnDat (Single-turn, LA option)
- EnDat (Multi-turn, LB option)
- BiSS (Single-turn absolute, AA option)
- BiSS (Multi-turn absolute, AB option)

AKD Performance Dual Cables by Motor Type

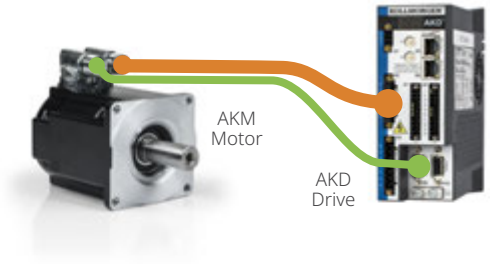
AKM Motor	Power Cable	Power Cable with Brake	SFD	EnDat 2.2, 01& BiSS
AKM < 12 A	CP-507CCAN	CP-507CDAN	CF-DA0374N	CF-SB7374N
12 A ≤ AKM < 20 A	CP-507DCAN	CP-507DDAN	CF-DA0374N	CF-SB7374N
20 A ≤ AKM < 24 A	CP-508EDBN	CP-508EDBN	CF-DA0374N	CF-SB7374N

CDDR Motor	Power Cable	Power Cable with Brake	SFD	EnDat 2.2, 01& BiSS
CDDR < 12 A	CP-507CCAN	N/A	N/A	CF-SB7374N
12 A ≤ CDDR < 20 A	CP-508DCAN	N/A	N/A	CF-SB7374N
20 A ≤ CDDR < 48 A	CM-13A4-010	N/A	N/A	CF-SB7374N
DDR < 12 A	CP-507CCAN	N/A	N/A	CF-SB7374N
12 A ≤ DDR < 20 A	CP-508DCAN	N/A	N/A	CF-SB7374N

AKD® Value Line Cables

Dual Cable Options

Value Line Cables are alternative cable options suitable for most applications. These cables separate power and feedback. Options included in this catalog support Single-turn (GJ) and Multi-turn (GK) for AKD.



AKD Value Line Dual Cables by Motor Type

AKM Motor	Power Cable	Power Cable with Brake	Comcoder	SFD2	Relsolver	EnDat 2.2, 01& BiSS
AKM < 6 A MOLEX	VP-H-507BECN	VP-H-507BFDN	VF-H-CD4474N	VF-H-DC0474N	–	–
AKM < 6 A	VP-H-507BEAN	VP-H-508CFAN	–	VF-H-DA0474N	VF-H-RA2474N	VF-H-SB7374N
6 A ≤ AKM < 12 A	VP-H-508CEAN	VP-H-508CFAN	–	VF-H-DA0474N	VF-H-RA2474N	VF-H-SB7374N
12 A ≤ AKM < 20 A	VP-H-508DEAN	VP-H-508DFAN	–	VF-H-DA0474N	VF-H-RA2474N	VF-H-SB7374N

CDDR Motor	Power Cable	Power Cable with Brake	SFD	EnDat 2.2, 01& BiSS
CDDR < 12 A	VP-H-507BEAN	N/A	N/A	VF-H-SB7374N
12 A ≤ CDDR < 20 A	VP-H-508CEAN	N/A	N/A	VF-H-SB7374N
20 A ≤ CDDR < 48 A	VP-H-508DEAN	N/A	N/A	VF-H-SB7374N
DDR < 12 A	VP-H-507BEAN	N/A	N/A	VF-H-SB7374N
12 A ≤ DDR < 20 A	VP-H-508CEAN	N/A	N/A	VF-H-SB7374N
12 A ≤ DDR < 20 A	VP-H-508DEAN	N/A	N/A	VF-H-SB7374N

AKD® Servo Drive Cable Lookup Tables

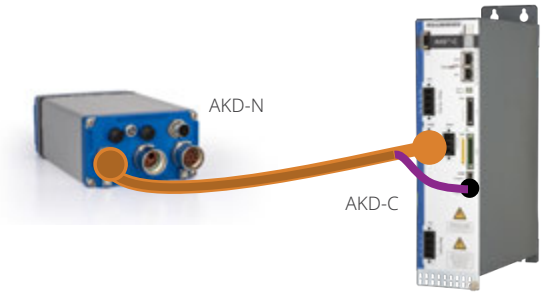
AKD®-N Performance Cables

Hybrid Single Cable Options

Hybrid Cable Connecting AKD-C Power Supply to AKD-N Axis Module

Part Number	Description
CCNCN1-025-xxmyy-00	Hybrid cable connecting AKD-C to AKD-N

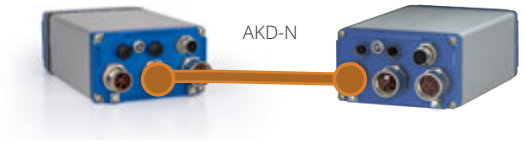
Length definition: xx=meters, yy=centimeters



Hybrid Cable Connecting AKD-N Axis Module to AKD-N Axis Module

Part Number	Description
CCNNN1-025-xxmyy-00	Hybrid cable connecting AKD-N to AKD-N

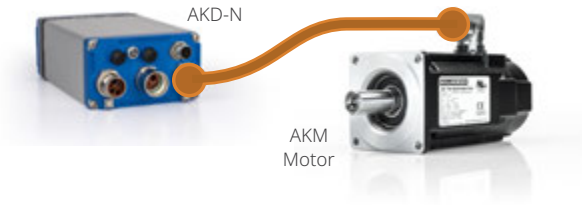
Length definition: xx=meters, yy=centimeters



Hybrid Cable Connecting AKD-N Axis Module to AKM® Motor

Part Number	Description
CCJNA3-015-xxmyy-00	Hybrid cable connecting AKD-N to AKM1 (SFD GEN3, Single-turn/Multi-turn HiPerFace DSL)
CCJNA2-015-xxmyy-00	Hybrid cable connecting AKD-N to AKM2-8 (SFD GEN3, Single-turn/Multi-turn HiPerFace DSL)

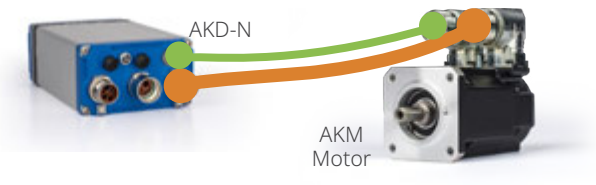
Length definition: xx=meters, yy=centimeters



Dual Cable Options

Performance Cables for AKD-N-DF/DS to AKM Motor

Motor	Connector	Power Cable	Power Cable with Brake	SFD
AKM < 6 A	y-tec	CM0NA3	CM1NA3	CFSNA3
	Dual Interconnect	CM0NA2	CM1NA2	CFSNA2



AKD®-N Performance Cables

Digital I/O and Fieldbus/Ethernet Cables

Digital I/O cable for AKD-N

All AKD-N drives have one 8 poles M12 connector to connect digital control signals.

Drive	Part Number	Description
AKD-N (all)	SAC-8P-M12MS	5 m, M12 mating connector, unconfigured wires

STO Cable for AKD-N-DS

AKD-N-DS drives (devices with local STO input) have an additional 4 poles M12 connectors to connect the local STO signals.

Drive	Part Number	Description
AKD-N-S	SAC-4P-M12MS	5 m, M12 mating connector, unconfigured wires, A- coded

Fieldbus cable for AKD-N-DF

AKD-N-DF drives (devices with local fieldbus input) have an additional 4 poles M12 connectors to connect the local fieldbus signals.

Drive	Part Number	Description
AKD-N-DF	SAC-4P-M12MSD/5.0	5 m, M12 mating connector, unconfigured wires, D- coded

CAN Bus Cables for AKD® Drives

Configured CAN bus Cables for AKD-xyyyzz-xxCN and AKD-xyyyzz-xxCC

Part Number	Description
CBP000-002-m15-00	CAN bus cable 0.15 m
CBP000-002-m30-00	CAN bus cable 0.30 m
CBP000-002-001-00	CAN bus cable 1.00 m
CBP000-002-003-00	CAN bus cable 3.00 m

CAN bus Termination Connector

Part Number	Description
AKD-CAN-Termination	CAN Termination connector
AKD-CAN-RJ12-SubD9	CAN RJ12->SubD9 adapter

The CAN Termination connector is required for bus termination of the last AKD connected to the CAN bus. For connecting an AKD to a CAN device with SubD9 connector the CAN RJ12-SubD9 adapter can be used.

Model Nomenclature

AKD®2G Servo Drive

AKD2G - S P E - 7V 06 S - A 1 F3 - 0000 - A

AKD2G Series

Format
S Servo IP20

Drive Version
P Position Indexer with motion tasks

Connectivity Option
N Analog
E EtherCAT®
C CANopen®
P PROFINET® IRT
I Ethernet/IP™

Voltage
06 120/240 Vac 1Ø/3Ø
07 240/480 Vac 3Ø

Current Rating
003 3 Amp
006 6 Amp
012 12 Amp*

Options
S Single Axis
D Dual Axis*

Platform Revision
A MAP Revision A

Functional Safety
1 STO, dual channel (SIL2, PLd)
2 STO, SS1, SDB, SBC/SBT, FSoE (up to SIL3/PLe)
3 STO, SS1, SS2, SOS, SDB, SBC/SBT, SLS, SSR, SSM, SDI, SAR, SLA, SLI, SLP, SCA (up to SIL 3 / PLe)

Options
00 Standard
F3 X23 (Feedback 3)
IO X22 (I/O)
DX X22 + X23

Customization
0000 Standard
A000 Coated PCBA

Connectors
A with connectors (except X1/X2 and X23)

* 12 amp dual axis drives are not currently available.

Note: Options shown in blue text are considered standard.

AKD® Servo Drive

AKD - B 003 06 - NB AN - 0000

AKD Series

Version

- B Base drive
- C Central power supply for AKD-N (requires CB extension)
- N Decentralized drive (requires DB, DF, or DS extension)
- P Position indexer (motion tasking)
- T AKD BASIC Language Programmable drive (requires IC or NB extesion)
- M Multi-axis Master Drive (requires M1 or MC extension option and EC connectivity option)

Current Rating

- 003 3 Amp
- 006 6 Amp
- 010 10 kW (for AKD-C, this field refers to power)
- 012 12 Amp
- 024 24 Amp
- 048 48 Amp

Voltage

- 06 120/240 Vac 1Ø/3Ø (24 Amp drive: 240 Vac 3Ø only)
- 07 240/480 Vac 3Ø (Version C: 07 = 400/480 Vac 3Ø | Version N: 07 = 560/680 Vdc)

Variants

- 0000 Standard

Connectivity*

		Drive Version Availability
AN	Analog command	B, P, T
CN	CANopen®	P
EC	EtherCAT®	C, M, N, P
EI	EtherNet/IP™	P
PN	PROFINET®	P
SQ	SynqNet®	B

*Motion Tasking is included as a free upgrade with CN, EC, EI and PN

Extension

- CB Without extention (AKD-C version only)
- DB Hybrid motor cable (AKD-N version only)
- DF Additional EtherCAT® port + feedback connector (AKD-N version only)
- DS Local STO + feedback connector (AKD-N version only)
- IC Expanded I/O version and SD card slot (AKD-T version only)
- M1 High performance multi-axis controller with industry-standard IEC 61131-3 PLC programming built-in
- MC Standard multi-axis controller
- NB Without extentions

Note: Options shown in blue text are considered standard.

Model Nomenclature

AKM®2G Brushless Servo Motor

AKM2G – 6 2 K – A N C N DA 0 0

AKM2G Series

Flange Size

2	58mm
3	72 mm
4	88 mm
5	114 mm
6	142 mm
7	192 mm

Rotor Length

1
2
3
4
5

Winding Type

A to Z

ML, PL	Low-voltage options
S	Special

Mount

A	IEC with accuracy N

Shaft

C	Keyway
N	Smooth shaft
S	Special

Connections

For all options see following page

S	Special

Brake

2	24 V holding brake
N	Without brake
S	Special

Feedback Device

For all options see following page

S	Special

Thermal Sensor

0	PT-1000 + PTC
1	PT-1000
2	PTC
3	KTY84-130 Equivalent
S	Special

Customization

0	Standard
T	Mineral filled PTFE seal (Teflon®)
V	Viton® shaft seal
x	Special

Feedback Unit Options

Code	Description	Connector Type	Compatible AKM2Gx	Size	Motor ID Support[3]	Accuracy[1,2] (arc-sec)	RMS Noise[1] (arc-sec)	Resolution	Absolute revs.	Compatible Drives
2-	Commutating Encoder	C,G	AKM2G3 LV	15	No	±218.2"	N/A	12 bits	None	AKD/AKD2G
CA	SFD3	D	AKM2G2-4	15	Yes	±585"	±9.9"	24 bits	1	AKD/AKD2G
		D	AKM2G5-7 > 20A	21						
		J	AKM2G7 > 20A	21						
GU	HIPERFACE DSL®	C,G	AKM2G3 LV	EEM37	Yes	±240"	±20"	17 bits	4096	AKD/AKD2G
		D	AKM2G2-7 ≤ 20A							
		J	AKM2G7 > 20A							
LD	EnDat® 2.2	C,G	AKM2G3 LV	EQI 1131	Yes	±120"	See Note 4	19 bits	4096	AKD/AKD2G
		D	AKM2G2-4							
		H	AKM2G7 ≤ 20A			±65"				
R-	Resolver	Y	AKM2G2	15	No	±540"	N/A	24 bits for AKD/AKD2G	1	All
		C/G	AKM2G3-4							
		C/G	AKM2G5-7 ≤ 20A	21						
		H	AKM2G7 > 20A							

Note 1: AKD/AKD2G drives have a resolver measurement accuracy of ±45", for a drive w/ motor accuracy of ±585" and RMS Noise of ±9.9".
Note 2: Accuracy refers to overall system accuracy once installed in the motor. Noise refers to the RMS position noise when at stand-still.
Note 3: Motor ID support means electronic motor nameplate data is included, allowing for plug-and-play commissioning.
Note 4: At the time of printing, this information was not available. Please contact Kollmorgen Customer Support for the latest update.
With AKD and AKD2G drives, all received positions are interpolated to a 32-bit resolution per revolution.

Connector Options

Model Designation	Connection	Compatible AKM2Gx	Position of connection
C	2 SpeedTec® M23	AKM2G3 - AKM2G7 ≤ 20 Amps	Angular, rotatable, motor mounted
D*	1 htec® M23	AKM2G2 - AKM2G7 ≤ 20 Amps	Angular, rotatable, motor mounted
G	2 SpeedTec® M23	AKM2G3 - AKM2G7 ≤ 20 Amps	Straight, motor mounted
H	1 M40 Power, 1 M23 Feedback	AKM2G7 > 20 Amps	Angular, rotatable, motor mounted
J*	1 htec® Connector M40	AKM2G7 > 20 Amps	Angular, rotatable, motor mounted
Y	1 ytec® Connector	AKM2G2	Rotatable, motor mounted

* Hybrid connectors valid for SFD3, DSL, and EnDat Feedback only.

Connector Description

Connector	Usage	Contacts - Pins Power/Signal	Max. Current [A] Power/Signal	Max. Cross Section [mm²] Power/Signal	Protection Class
M23 SpeedTec® right angle connectors (Size 1)	Power & Brake	4 / 5	20 / 10	4 / 1.5	IP65
	Resolver	- / 12	- / 10	- / 0.5	IP65
	DSL	5 / 2 / 2	20 / 10	4 / 1.5	IP65
	SFD3	4 / 5	20 / 10	4 / 1.5	IP65
	EnDat	5 / 4 / 6	20 / 10	4 / 1.5	IP65
M40 (Size 1.5)	Power & Brake	4 / 5	75 / 30	16 / 4	IP65
	SFD3	4 / 5	75 / 30	16 / 4	IP65
	DSL	5 / 4 / 2	75 / 30	16 / 4	IP65
ytec®	Power & Brake	4 / 5	14 / 3.6	1.5 / 0.75	IP65
	Resolver	- / 12	- / 5	- / 0.75	IP65

Model Nomenclature

AKM® Brushless Servo Motor

AKM 6 2 P – A N C N DA 00

AKM Series

Flange Size

1	40 mm
2	58 mm
3	70 mm
4	84 mm
5	108 mm
6	138 mm
7	188 mm
8	260 mm

Rotor Stack Length

		AKMx Availability							
		1	2	3	4	5	6	7	8
1	1 stack	•	•	•	•	•			
2	2 stacks	•	•	•	•	•	•	•	•
3	3 stacks	•	•	•	•	•	•	•	•
4	4 stacks		•		•	•	•	•	•
5	5 stacks						•		

Winding Type

A to Z

S Special

Mount

A	IEC with tolerance N
B	NEMA
C	Alternative IEC standard
D	Other standard
G	Alternative IEC standard
H	Alternative IEC standard
R	IEC with tolerance R
M, T	Reinforced bearing AKM8
W	Flange coating for Washdown, IEC
S	Special

Shaft

C	Keyway
K	Open keyway
N	Smooth shaft
S	Special

Customization/Seal

00	Standard motor without shaft seal (IP54 rating)
01	With shaft seal (IP65 rating)
0F	Food Grade (IP67 rating)
0W	Washdown (IP67 rating)
XX	Customization

Feedback Device

For all options see following page

S Special

Brake

2	24 V holding brake
N	Without brake
S	Special

Connectors

For all option details see following page

B	Dual 90° M23 Intercontec connectors, motor-mounted (AKM2 only)
C	Dual straight M23 Intercontec connectors, on 0.5 m shielded leads (AKM1-AKM2)
C	Dual 90° M23 Intercontec connectors, motor-mounted (AKM3-AKM7)
D	Single 90° M23 Intercontec connector, motor mounted (AKM2-AKM4)
9	Single 90° itec connector, motor-mounted (AKM1 only)
9	Single 90° M23 Intercontec connector, motor-mounted (AKM2-AKM6)
G	Dual straight M23 Intercontec connector, motor-mounted (AKM2-AKM7)
H	Dual 90° M40 Intercontec connector and M23 Intercontec feedback connector, motor-mounted (AKM74QT & AKM82T)
M	Dual molex connectors, on 0.5 m shielded leads (AKM1-AKM4)
P	Single Molex connector, on 0.5 m shielded leads (AKM1-AKM4)
T	Dual terminal box for power and M23 Intercontec feedback connector, motor-mounted (AKM8)
Y	Single ytec connector, motor-mounted (AKM1 only)

Note: These connector options are only valid for the "00" and "01" customization/seal option variants. Stainless Steel Hummel connectors are used for AKM Washdown (0W) and AKM Food Grade (OF) variants.

Base Model	Mount-Shaft Availability																									
	AC	AK	AN	BK	BN	CC	CK	CN	DC	DK	DN	EF	EK	EN	GC	GN	HC	HN	KK	LK	MC	MN	TC	TN	WC	WN
AKM1		•	•		•		•	•																		
AKM2	•		•		•		•		•		•	•		•											•	•
AKM3	•		•			•		•							•	•									•	•
AKM4	•		•	•		•		•					•		•	•			•						•	•
AKM5	•		•	•		•		•		•			•		•	•									•	•
AKM6	•		•												•	•			•	•					•	•
AKM7	•		•												•	•			•							
AKM8	•		•			•		•							•	•	•	•			•	•	•	•		

Note: Options shown in blue text are considered standard.

Feedback Unit Options

Code	AKM Frame Size	Designation	Single-Turn or Multi-Turn	Feedback Resolution: Device Resolution (Sin/Cos per Rev., Bits or Lines/Rev.)	Feedback Resolution: Max. Resolution after AKD Interpolation	Feedback Resolution: Max. Resolution after AKD2G Interpolation	Accuracy (± arc-mins)	Data Channel Resolution: Position Values/Rev.	Data Channel Resolution: # of Absolute Revs.
R-	1	Resolver	Single-Turn	1 pole pair (16-Bits)	16-Bits	16-Bits	15	16-Bits	1
	2-4						10		
	5-8						9		
1-	1-8	Comcoder	Single-Turn	1024 Lines	4,096	4,096	1	Not Absolute	Not Absolute
2-				2048 Lines	8,192	8,192			
ED	2-8			500 Lines	2,000	2,000			
EE				1000 Lines	4,000	4,000			
EF				2000 Lines	8,000	8,000			
EG				2500 Lines	10,000	10,000			
EH				5000 Lines	20,000	20,000			
EJ				10000 Lines	40,000	40,000			
EM				4096 Lines	16,384	16,384			
EN				8192 Lines	32,768	32,768			
AA	2-4	BiSS B Optical Sine Encoder	Single-turn	2048 Sin/Cos	27-Bits	32-Bits	0.6	19-Bits (Max.)	1
	5-8							22-Bits (Max.)	
AB	2-4		Multi-turn					19-Bits (Max.)	4,096
	5-8							22-Bits (Max.)	
C-	1	Smart Feedback Device (SFD)	Single-turn	24-Bits	24-Bits	24-Bits	15	24-Bits	1
	2-4						8		
	5-8						9		
CA	1	Smart Feedback Device, Gen. 3 (SFD3)	Single-turn	24-Bits			15		
	2-4						8		
	5-6						9		
DA	2-4	EnDat 2.2/01 Optical Sine Encoder	Single-turn	512 Sin/Cos	25-Bits	32-Bits	1	13-Bits	1
	5-8			2048 Sin/Cos	27-Bits		0.333		
DB	2-4		Multi-turn	512 Sin/Cos	25-Bits		1		4,096
	5-8			2048 Sin/Cos	27-Bits		0.333		
LA	2-3	EnDat Inductive Encoder	Single-turn	16 Sin/Cos	20-Bits	28-Bits	4.67	18-Bits	1
	4-8			32 Sin/Cos	21-Bits	29-Bits	3	19-Bits	
LB	2-3		Multi-turn	16 Sin/Cos	20-Bits	28-Bits	4.67	18-Bits	4,096
	4-8			32 Sin/Cos	21-Bits	29-Bits	3	19-Bits	
GA/GJ*	2-8	HIPERFACE Optical Sin/Cos Encoder	Single-turn	128 Sin/Cos	23-Bits	31-Bits	1.33	12-Bits	1
GB/GK*			Multi-turn						4,096
GE	2-6	HIPERFACE DSL Optical Encoder	Single-turn	18-Bits	18-Bits	18-Bits	1.33	18-Bits	1
GF			Multi-turn						4,096
GP**	1	HIPERFACE Capacitive Encoder	Single-turn	16 Sin/Cos	20-Bits	28-Bits	4.8	9-Bits	1
GR**			Multi-turn						4,096

*ServoStar (Sxxx)/AKD mapped respectively
**AKD mapped ONLY

Note: Please reference pages 60 to 65 of the AKM Selection Guide for additional feedback specific information not found in this table.

Connector Options

Code	Thermal Sensor*	Used with	IP Rating**	Connection type	Description
B	PTC	AKM2	IP65	2 SpeedTec Ready connectors, size 1.0 (M23)	Angled, rotatable, mounted on motor
C	PTC	AKM1-AKM2	IP65	2 SpeedTec Ready connectors, size 1.0 (M23)	On 0.5m cable
C	PTC	AKM3-AKM7	IP65	2 SpeedTec Ready connectors, size 1.0 (M23)	Angled, rotatable, mounted on motor
D	PTC	AKM2-AKM4	IP65	1 SpeedTec Ready connector, size 1.0 (M23)	Angled, rotatable, mounted on motor
9	PT1000	AKM1	IP65	1 hybrid itec connector	Rotatable, mounted on motor
9	PT1000	AKM2-AKM6	IP65	1 SpeedTec Ready connector, size 1.0 (M23)	Angled, rotatable, mounted on motor
G	PTC	AKM2-AKM7	IP67	2 SpeedTec Ready connectors, size 1.0 (M23)	Straight, mounted on motor
H	PTC	AKM74Q & AKM82T	IP65	1 feedback threaded connector, size 1.0 (M23) 1 power threaded connector, size 1.5 (M40)	Angled, rotatable, mounted on motor
M	PTC	AKM1-AKM4	IP20	2 Molex connectors, $I_C < 6$ A	On 0.5m cable
P	PTC	AKM1-AKM4	IP20	1 Molex connector, $I_C < 6$ A	On 0.5m cable
T	PTC	AKM8	IP65	1 terminal box for power 1 feedback threaded connector, size 1.0 (M23)	Mounted on motor
Y	PTC	AKM1	IP65	1 ytec connector	Rotatable, mounted on motor

*For Thermal Device Curves, please reference the AKM Selection Guide
**IP ratings shown apply ONLY to the connector and the connector base/bushing on motor.

NOTE: These connector options are only valid for the "00" or "01" Customization/Seal Option variants. Stainless Steel Hummel connectors are used for AKM Washdown (0W) and AKM Food Grade (0F) variants.

Model Nomenclature

AKMH™ Brushless Servo Motor

AKMH 4 2 E A N K N CA 1 K

AKMH Series

Motor Frame Size
2, 3, 4, 5, 6

Rotor Stack Length
1, 2, 3, 4, 5

Winding Type
A, B, C, D, etc.

S Special

Mount
- A Flange mounting IEC
- B Flange mounting NEMA
- C Face mounting IEC
- D Face mounting NEMA
- E EIC face mount (Third-party)
- G IEC Alternate flange mount (AKMH5 only)
- H IEC Alternate face mount (AKMH5 only)
- L NEMA 56 face mount (AKMH4 and 5 only)
- M IEC Flange (Third-party)
- P IEC Alternate flange mount (Third-party)
- S Special

Shaft
- C Closed keyway
- K Open keyway
- N Smooth shaft
- S Special

Brake[2]
- 2 24 V holding brake
- N Without brake
- S Special

Connector/Cable Options
See following page

Feedback Device
See following page

Cable Length
- 1 to F 1 to 15 meters (1m increments)
- 0 No cable, connectors

O-ring Material[1]
- K EPDM O-rings
- V Viton O-rings

Note: LK mount requires 2 weeks additional lead time for the first product order.
Note: Ex mounts are only available if Rx feedback devices are selected.

Mount-Shaft Availability

Base Model	Mount-Shaft										
	AC	AN	BK	BN	CC	CN	DK	DN	EK	EN	LK
AKMH2x	•	•		•	•	•		•			
AKMH3x	•	•		•	•						
AKMH4x	•	•	•	•	•	•	•	•	•	•	•
AKMH5x	•	•	•	•	•	•	•	•	•	•	
AKMH6x	•	•			•	•	•	•	•	•	

1. While both EPDM and Viton materials are resistant to most chemicals commonly found in food & beverage processing, Viton O-ring is recommended for applications with fluids and solids such as fish oil, animal fat, peanut butter and peanut oil.
2. C- feedback is not available with brake.

Connector/Cable Options

Single Cable

K[1]	Cable gland w/ drive end connectors for AKD (Power is ferruled flying leads and feedback terminated into D-Sub)
T[1]	Tubing over cable w/ drive end connectors for AKD
E	Cable gland w/ drive d\end connectors for AKD2G
F	Tubing over cable w/ drive end connectors for AKD2G
V[2]	Vented connector
N[3]	AKD-N connector
W[2]	Tubing to vented connector
B[4]	Cable to vented Speedtec ready connector
G[4]	Tubing to vented Speedtec ready connector
R[5]	Third-party mating connectors
C	Flying Leads (third-party drive ready, no d-sub)

Dual Cables

V[2]	Vented connector
W[2]	Tubing to vented connector
B[4]	Cable to vented Speedtec ready connector
G[4]	Tubing to vented Speedtec ready connector
R[5]	Mating connectors for third-party drives
L	Flying leads (2 cable only)
M	Tubing w/ flying leads (2 cable only)

Right-angle Connectors

D	Single connector (size 3-6)
A	Dual connectors (size 4-6)

Straight Connectors

H	Dual connectors (size 2-3)
P	Single connector (size 2 only)

Notes:

1. Single cable for power and feedback when SFD, SFD3 or DSL is chosen. Not available with other feedback options.
2. The single cable is terminated in a vented connector if SFD, SFD3, or DSL is chosen. If one of the other feedback devices is chosen then the power cable is terminated in a vented connector, while the feedback cable is terminated in a standard connector. Both options provide IP69K rated stainless steel connectors.
3. Single cable for power and feedback when SFD3 or DSL is chosen. Cable is terminated for direct connection to AKD-N with a nickel plated zinc connector. The connector is vented. Not available with other feedback options.
4. The single cable is terminated in a vented connector if SFD, SFD3, or DSL is chosen. If one of the other feedback devices is chosen then the power cable is terminated in a Vented connector, while the feedback cable is terminated in a standard connector. Both options provide IP67 rated nickel plated zinc connectors.
5. This connector option is available for only the RA, RB, RC, RD, RE, RF, RG, and RH feedback options. There will be a vented connector on the power cable and a standard connector on the feedback cable. Both connectors will be Nickel plated zinc and IP67 rated.

Feedback Device

C-	SFD2 (C- is not available with brake)
CA	Smart Feedback Device (SFD3)
GA	Hiperface SKS36 (ST) mapped for Servostar
GB	Hiperface SKM36 (MT) mapped for Servostar
GE	Hiperface DSL (ST)
GF	Hiperface DSL (MT)
GJ	Hiperface SKS36 (ST) mapped for AKD, mech. aligned to KM zero
GK	Hiperface SKM36 (MT) mapped for AKD, mech. aligned to KM zero
R-	Resolver
2-	2048 line encoder
LA	Inductive EnDat 2.1 Sine Encoder (ST)
LB	Inductive EnDat 2.1 Sine Encoder (MT)
DA	EnDat 2.1 Sine Encoder (ST)
DB	EnDat 2.1 Sine Encoder (MT)
RA*	Hiperface SRS50 (ST) 7-12V mapped for third-part drives (460V)
RB*	Hiperface SRM50 (MT) 7-12V mapped for third-part drives (460V)
RC*	Hiperface SRS50 (ST) 5V mapped for third-part drives (230V)
RD*	Hiperface SRM50 (MT) 5V mapped for third-part drives (230V)
RE	DSL (ST) mapped for third-part drives, 480V
RF	DSL (MT) mapped for third-part drives, 480V
RG	DSL (ST) mapped for third-part drives, 240V
RH	DSL (MT) mapped for third-part drives, 240V

Note: RA/RB/RC/RD are available as standard on AKMH size 4-6 only

Feedback and Connection Availability – AKMH(x) frame size (2-6)

Feedback Device	Cable Connection																
	E	F	K	T	L	M	V	W	D	P	A	H	R	C	B	G	N
C-, CA, GE, GF	2-6	2-6	2-6	2-6			2-6	2-6	3-6	2					2-6	2-6	2-6
2-, R-					2-6	2-6	2-6	2-6			4-6	2-3			2-6	2-6	
DA, DB					2-6	2-6	2-6	2-6			4-6	2-3			2-6	2-6	
GA, GB					2-6	2-6	2-6	2-6			4-6	2-3			2-6	2-6	
GJ, GK					2-6	2-6	2-6	2-6			4-6	2-3			2-6	2-6	
LA, LB					2-6	2-6	2-6	2-6			4-6	2-3			2-6	2-6	
RA, RB, RC, RD							4-6	4-6			4-6		4-6				
RE, RF, RG, RH							2-6	2-6	3-6	2			2-6	2-6			

Model Nomenclature

Cartridge DDR Motor

C 09 1 A - 1 1 - 1 1 0 5 - xxx

CDDR Series
- C 230 Vac
- CH 400/480 Vac

Frame Size
- 04 108 mm [4.25 in.] sq. housing
- 05 138 mm [5.43 in.] sq. housing
- 06 188 mm [7.40 in.] sq. housing
- 09 246 mm [9.68 in.] sq. housing
- 13 350 mm [13.78 in.] sq. housing

Stack Length
- 1 Short stack
- 2 Mid stack
- 3 Long stack
- 4 Extra long stack (04 and 05 frames only

Winding Type
- A Standard winding
- B High-speed winding (C04x, C05x, C06x, C13x)
- C Standard winding (C052, C062, C063, C092, C093, C13x)
- D High-speed winding (C052 only)

Mounting
- 1 Standard flange mount

Connector
- 1 Side connector (09 and 13 frames only)
- 2 Rear connector (09 and 13 frames only)
- 3 90° Rotatable connectors (04, 05, and 06 frames only)

Shaft
- 1 Hollow with compression coupling and key (09 and 13 frames only)
- 2 Solid with compression coupling and key (09 and 13 frames only)
- 3 Solid with split-ring coupling and no key (04, 05, and 06 frames only)

Feedback
- 1 EnDat single-turn absolute sine encoder (2048 line)
- 3 BiSS single-turn absolute sine encoder (2048 line)
- 4 BiSS multi-turn absolute sine encoder (2048 line)
- 5 EnDat multi-turn absolute sine encoder (2048 line)

Bearing
- 0 No bearing option

  (Standard - integral shipping clamp provided)

Seal
- 5 Sealed

  (Shaft option “1” - IP64 rating when customer seals interface side)

  (Shaft option “2” or “3” - IP65 when customer seals interface side)

Customization

Note: Options shown in blue text are considered standard.

Housed DDR Motor

DH 08 1 M - 1 2 - 1 3 1 0 - xxx

Direct Drive Series
D 115/230 VAC winding
DH 400/480 VAC winding

Motor Frame Size
06 6.93" O.D.
08 8.60" O.D
10 11.19" O.D.
14 14.25" O.D.

Rotor Stack Length
1 Short stack
2 Mid stack
3 Long stack

Winding Type
A Std. w/ resolver[1]
M Std. w/ sine encoder

Mounting Option
1 Face mount
2 Flange mount

Designated for Specials

Unit Seal
0 Non-sealed unit
5 IP652 - length increase
7 IP672 - length increase

Bearing Option
1 Single bearing design
2 Dual bearing design[3]

Feedback Device
2 Resolver ("A" Winding Type)[1]
3 Sine Encoder ("M" Winding Type)

Feedback Device
1 Straight thru bore w/ face coupling

Connector Type
2 Straight
3 90°, rotatable

Notes:
1. Not available on D14x & DH14x.
2. Encoder sealed motors have increased length. See outline drawing.
3. Standard on D143 & DH143 models.
4. Options shown in blue text are considered standard.

Model Nomenclature

Direct-Drive Linear Motor Coil Model Number Description

IL 06 030 A1 AC TR XX

Coil Type
- IL Ironless
- ICD Low Profile Ironcore
- IC Ironcore
- ICH Ironcore High Voltage

Coil Series
- 06 06 Series Ironless
- 12 12 Series Ironless
- 18 18 Series Ironless
- 24 24 Series Ironless
- 05 05 Series ICD
- 10 10 Series ICD
- 11 11 Series Ironcore
- 22 22 Series Ironcore
- 33 33 Series Ironcore
- 44 44 Series Ironcore

Magnetic Way Width
- 030 30 mm
- 050 50 mm
- 075 75 mm
- 100 100 mm
- 150 150 mm (IC/ICH only)
- 200 200 mm (IC/ICH only)
- 250 250 mm (ICH only)

Winding Code
- A1, A2, A3, A4 – "Y" Windings
- A4 – see performance specifications
- A5, A6, A7, A8 – "Δ" Windings

Termination Option Px or Cx
- Px – Shielded cable with connector:
  - P1 400 mm (16")
  - P2 200 mm (8")
  - P3 100 mm (4")
  - P4 1200 mm (48")
- Cx – Motor cable and thermal cable with flying leads:
  - C1 400 mm (16")
  - C2 200 mm (8")
  - C3 100 mm (4")
  - C4 1200 mm (48")

Thermal Protection Option
- TS Thermostat (IC only)
- TR Thermistor
- TY Standard (both PRT and KTY84-130 Equivalent) (ICH only)

Cooling Option (IC Only)
- AC Integral Cooling

If No Cooling, leave blank

Ironless 6 Series motor coil, 30 mm width, A1 winding designation terminated with 16" cable with connector.

Direct-Drive Linear Motor Magnetic Way Model Number Description

MW 030 L 0128 001

Magnetic Way Type
- MW Ironless
- MCD ICD
- MC Ironcore

Magnetic Way Width

030	30 mm	100	100 mm
050	50 mm	150	150 mm (IC only)
075	75 mm	200	200 mm (IC only)

L = Low Profile (30 & 50 mm Ironless only)

For standard Assemblies or Ironcore, leave blank.

Magnetic Assembly Way Length
- 0064 64 mm
- 0128 128 mm
- 0256 256 mm
- 0512 512 mm

Magnet Way Cover (Ironcore only)

(Leave blank for Ironless or no cover)

Example: MW0300128

Ironless magnet way, 30 mm magnet width, 128 mm assembly length.

Direct-Drive Linear Motor Hall Effect Assembly Model Number Description

HDIL 100 XX

Hall Effect
HD Digital for Ironcore High Voltage (NA)
HDIC Digital for Ironcore (Microswitch SS461A)
HDIL Digital for Ironless (Microswitch SS461A)

Winding Code
100 A1, A2, A3, A4
200 A5, A6, A7, A8
D Delta winding ICH in North America
Y Y winding ICH in North America

Termination Option Px or Cx
Px – Shielded cable with connector:
P1 400 mm (16″)
P2 200 mm (8″)
P3 100 mm (4″)
P4 1200 mm (48″)
Cx – Motor cable and thermal cable with flying leads:
C1 400 mm (16″)
C2 200 mm (8″)
C3 100 mm (4″)
C4 1200 mm (48″)

Example: HDIL-100-P1
Hall effect assembly with digital outputs for Ironless motor terminated with 16″ cable with connector.

Example: HD-Y-P1
Hall effect assembly with digital outputs for ironcore motor terminated with 16″ cable with connector.

Direct-Drive Linear Motor High Flex Cable Numbering System

M1C – 01

High Flex Motor Cable
M Motor

Wire Size
1C 18 AWG for AKD 3/6 Amp amplifiers
2C 14 AWG for AKD 12 Amp amplifiers*
3C 12 AWG for AKD 24 Amp amplifiers*

Example: M1C - 06
High flex motor cable, terminated with connectors at motor and amplifier ends, 18 AWG, for 3 or 6 Amp AKD.

Length in meters
01 1 m
03 3 m
06 6 m
09 9 m
12 12 m
15 15 m

H1C – 01

High Flex Hall Effect Cable
H1C Hall Effect

Example: H1C - 06
High flex Hall Effect cable, terminated with connectors at motor and amplifier ends.

Length in meters
01 1 m
03 3 m
06 6 m
09 9 m
12 12 m
15 15 m

T1C – 01

High Flex Thermal Cable
T1C Thermal
T2C Thermal (S300, S600)

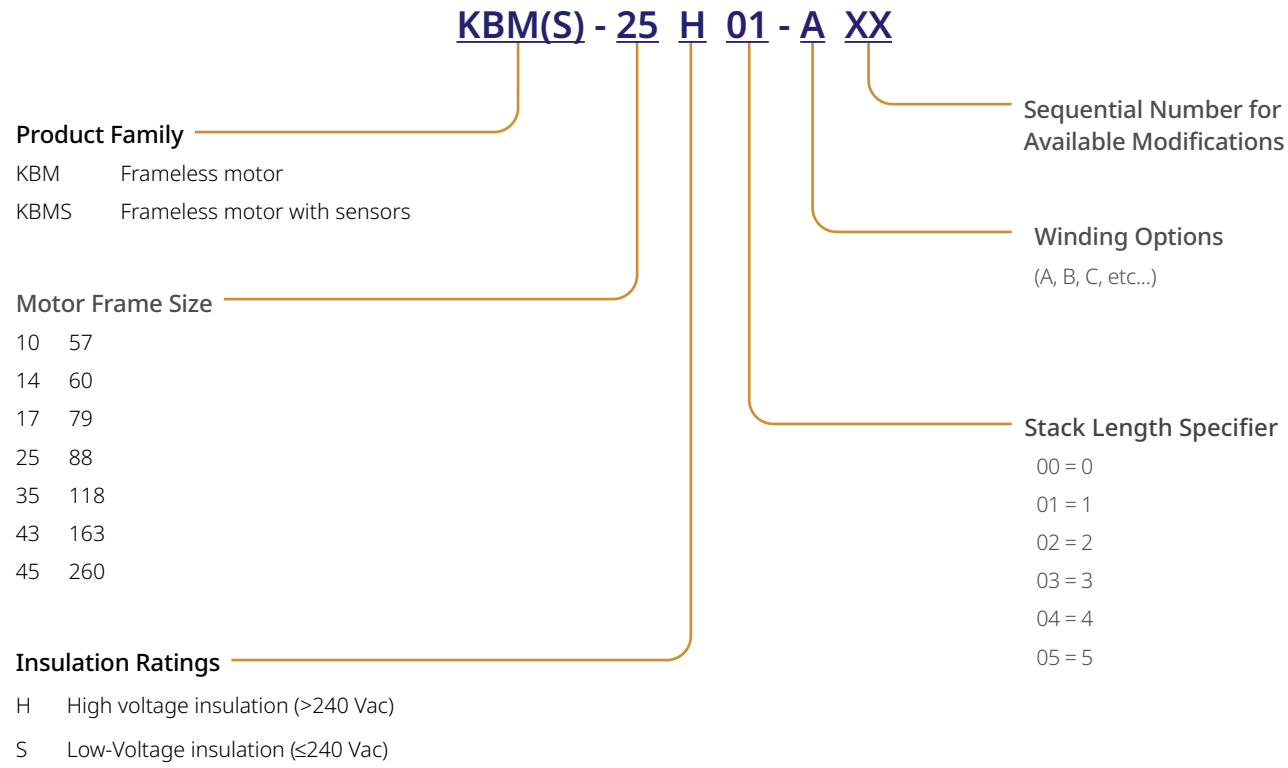
Example: T1C - 06
High flex Thermal cable, terminated with connectors at motor and amplifier ends.

Length in meters
01 1 m
03 3 m
06 6 m
09 9 m
12 12 m
15 15 m

* For application assistance regarding cable selection for these and other higher current rated amplifiers, contact a Kollmorgen Customer Support representative.

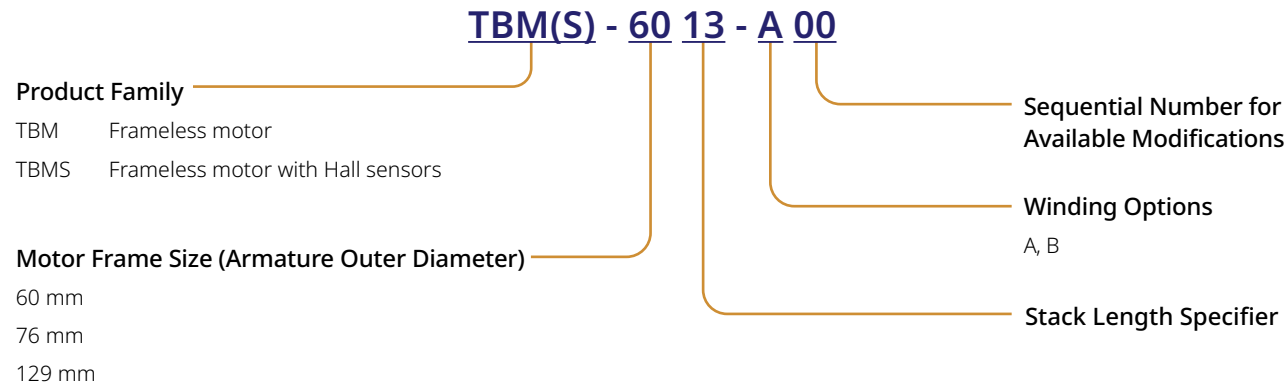
Model Nomenclature

KBM Frameless Motor



Note: H insulation is standard option for frame sizes 10, 14, 17, 25, 35 and 45.

TBM Frameless Motor



P-Series Stepper Drive

P7 03 6 0 – SD N __

P-Series
- P5 P5000 Series
- P6 P6000 Series
- P7 P7000 Series

Current Rating
- 03 2.5 Arms continuous, 3.5 Arms peak (AC models only)
- 05 5 Arms continuous, 7.2 Arms peak (DC models only)
- 06 5.7 Arms Continuous, 8.0 Amps peak*

Voltage Range
- 3 20 - 75 Vdc
- 6 120/240 Vac (160/320 Vdc)

Electrical Options
- 0 None

Functionality
- PN Motion node indexing
- SD Step/direction base drive, Internal VCO (P5000)
- R4 RS485 (P70360 only)

Feedback Device
- N No feedback, with mating connectors (P6000)
- O No feedback, no connectors

Customization
Omit field for standard configurations
- 000 Optimized for Standard POWERPAC
- 001 Optimized for Enhanced POWERPAC
- PMX Optimized Powermax Settings

PMX™ Series Stepper Motor

PMX 11 2 0 – A 1 O – B N 0 – 00

Motor Series

NEMA Motor Frame Size
08, 11, 14, 17, 23, 34

Rotor Stack Length

1	1 stack	All PMX series motors
2	2 stacks	All PMX series motors
3	3 stacks	PMX11, -17, -23, -34
4	4 stacks	PMX17, -23, -34
5	5 stacks	PMX17

Motor Winding

A, B, C, D	Bipolar windings
G, H, J	Unipolar or Bipolar windings

Step Angle

1	1.8˚	All PMX series motors
9	0.9˚	PMX17, PMX23

Connection/Hookup Option

B	4 lead Bipolar	All PMX series motors
U	6 lead Unipolar	PMX17, -23
X	Integrated Connector	PMX17, -23

Front Shaft Option

N	Normal/Smooth	All PMX series motors
F	Flat	All PMX series motors
K	Open Keyway	PMX34

Rear Shaft Option

O	No rear shaft	All PMX
R	Rear shaft	All PMX
H	Rear shaft + encoder mounting holes	PMX14, -17, -23

Model Nomenclature

CT Series Stepper 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

Winding Current
4 lead motors: Bipolar current x 10
6 lead motors: Unipolar current x 10

Examples:

05 0.5 Amps
10 1 Amp
50 5 Amps
00 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

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

Customization
00 Standard motor
Other numbers serially assigned for specail motors

Note: Options shown in blue text are considered standard.

E & H Series Stepper Motor

E 3 3 H C H P – L E K – M2 – 01

Basic Series
H Standard construction
E SIGMAX construction (n/a half stack)

Frame Size
2 NEMA 23 (2,25 in. dia.)
3 NEMA 34 (3.38 in. dia.)
4 NEMA 42 (4.28 in. dia.)

Number of Rotar Stacks
H Half stack (H series only)
1 1 stack
2 2 stacks
3 3 stacks
4 4 stacks

Mounting
N NEMA (n/a 4 stacks)
H Heavy duty NEMA (opt. on 3 stacks, std. on 4 stacks
S Special, contact customer support

Construction/Connection Style
R Regular/leadwire
C System MS connector
L Splashproof to terminal board via conduit connector: 1/2 in. NPS pipe thread (size 3,4 only)
M Splashproof to terminal board via conduit connector: metric PG11 pipe thread (size 3,4 only)
S Special, contact customer support

Number of Connections
F 8 lead
L 4 lead series
H 4 lead parallel
E 6 lead

Winding Type
T Max. torque at low speed
P Max. torque at high speed
A, B, C Additional standards
S Special, contact customer support

Special Sequence
00 Standard motor without shaft seal
01 Standard motor with shaft seal (size 3 and 4 only)
Other numbers will be assigned for special motors

Encoder Option
NS No feedback
All options below require construction R or C
M1 Encoder mounting provision (size 2 only). Requires shaft configuration E
HD 500 LPR encoder (size 2 only)
HJ 512 LPR encoder (size 2 only)
M2 HP encoder mounting provision (size 3,4 only). Requires shaft configuration E
M3 BEI endcoder mounting provision (size 3,4 only). Requires shaft configuration D
SS Special, contact customer support

Shaft Modifications
N Smooth (size 2,3 only) (mounting config. N only)
F Flat (size 2,3 only) (mounting config. N only)
K Straight key (size 3,4 only) (mounting config. H only)
W #303 Woodruff key (size 3 only) (mounting config. N only)
S Special

Shaft Configuration (Diameter & Length)
N Single
D Double (R or C construction only)
E Double ended for encoder (R or C construction only, size 3,4 only)
S Special, contact customer support

Rotor Type
L Laminated
J Low inertia (size 2 only, n/a with half stack motors)

Note: Options shown in blue text are considered standard.

Model Nomenclature

NEMA 34 K & N Series Stepper Motor

N 3 3 H C H J – L E K – M2 – 01

K and N Series
- N Standard construction
- K SIGMAX construction

Frame Size
- 3 NEMA 34 (3.38 in.) square frame

Stack Length
- 1 1 stack
- 2 2 stacks
- 3 3 stacks
- 4 4 stacks

Mounting
- H Heavy duty NEMA
- S Special, contact customer support

Construction/Connection Style
- R Regular/leadwire
- C System MS connector
- L Splashproof to terminal board via conduit connector: 1/2 in. NPSC pipe thread
- M Splashproof to terminal board via conduit connect: metric PG11 pipe thread
- S Special, contact customer support

Number of Connections
- F 8 lead (n/a C construction)
- L 4 lead
- H 4 lead parallel
- E 6 lead (n/a C construction)

Winding Type
- H Standard, 1 stack only
- D, E, G, J, K, L Standard
- M Standard, N/A on 1 stack
- S Special, contact customer support

Rotor Type
- L Laminated

Shaft Configuration (Diameter & Length)
- N Single
- D Double (R or C construction only)
- E Double ended for encoder (R or C construction only)

Shaft Modifications
- K Straight key
- S Special, contact customer support

Encoder Option
- NS No feedback
- M2 Encoder mounting provision (must use construction C or R and shaft configuration E)
- PD 500 LPR encoder
- PF 1000 LPR encoder
- SS Special, contact customer support

Special Sequence
- 00 Standard motor without shaft seal
- 01 Standard motor with shaft seal

Other numbers will be assigned for special motors

Note: Options shown in blue text are considered standard.

NEMA 42 K & N Series Stepper Motor

N 4 3 H C H J – L E K – M2 – 01

K and N Series
- N Standard construction
- K SIGMAX construction

Frame Size
- 4 NEMA 42 (4.325 in.) square frame

Stack Length
- 1 1 stack
- 2 2 stacks
- 3 3 stacks

Mounting
- H Heavy duty NEMA
- S Special, contact customer support

Construction/Connection Style
- R Regular/leadwire
- C System MS connector
- L Splashproof to terminal board via conduit connector: 1/2 in. NPSC pipe thread
- M Splashproof to terminal board via conduit connect: metric PG13.5 pipe thread
- S Special, contact customer support

Number of Connections
- F 8 lead (n/a C construction)
- L 4 lead
- H 4 lead parallel
- E 6 lead (n/a C construction)

Winding Type
- HJ Standard, 1 stack only
- K, N Standard, N/A on 1 stack
- L N/A on 1 stack
- F, M, G Standard
- S Special, contact customer support

Rotor Type
- L Laminated

Shaft Configuration (Diameter & Length)
- N Single
- D Double (R or C construction only)
- E Double ended for encoder (R or C construction only)

Shaft Modifications
- K Straight key
- S Special, contact customer support

Encoder Option
- NS No feedback
- M2 Encoder mounting provision (must use construction C or R and shaft configuration E)
- PD 500 LPR encoder
- PF 1000 LPR encoder
- SS Special, contact customer support

Special Sequence
- 00 Standard motor without shaft seal
- 01 Standard motor with shaft seal

Other numbers will be assigned for special motors

Note: Options shown in blue text are considered standard.

Model Nomenclature

M & P Series Stepper Motor

P 2 1 N R X A – L N N – N S – 00

Series
P Standard
M Enhanced (n/a half stack)

Frame Size
2 NEMA 23 (2.25 in. across flat)

Number of Stacks
H Half stack
1 1 stack
2 2 stacks

Mounting
N NEMA
S Special, contact customer support

Construction
R Regular
S Special, contact customer support

Termination
X Receptacle
F 8 flying leads
S Special, contact customer support

For X (receptacle) designation, Mating leaded connectors may be ordered seperately.
Optional GRN/YEL ground wire available.

Winding Type
A, B, C, D
S Special, contact customer support

Rotor Type
L Standard
J Low inertia (n/a half stack)

Shaft Configuration (Diameter & Length)
N Single
D Double
S Special, contact customer support

Shaft Modifications
N Smooth
F Flat
S Special, contact customer support

Encoder Option
NS No feedback

Use encoders below. You must specify shaft configuration D (double ended)

Caution: An encoder with line driver output my be required for use with some stepper motor controls.

M1 Encoder mounting provisions
HD Encoder 500 LPR
HJ Encoder 512 LPR
SS Special, contact customer support

Sequence Number
Insert 00 if all parts are standard.
Other numbers will be assigned for special motors.

Note: Options shown in blue text are considered standard.

MH172 Stepper Motor

MH 17 2 FD 8030 - _

MH Series

Frame Size
17 170 mm

Stack Length
2 Double stack

Options
Omit for no options
E Rear shaft extension
C2 200 line, six output encoder
C4 400 line, six output encoder
C5 500 line, six output encoder

Identification Suffix

Lead Configuration/Mount
FD 8 connections, round flange

MX Series Hazardous Duty Stepper Motor

MX 9 1 – F F – 206 U

MX Series
Meets UL Class 1, Division 1,
Group D requirements

Frame Size
9 90 mm
11 110 mm

Number of Stacks
1 1 stack
2 2 stacks
3 3 stacks

Rear Options
U No shaft extension
EU Shaft extension

Identification Suffix

Connection/Mount
FF

Note: Options shown in blue text are considered standard.

Model Nomenclature

T2 Series Stepper Motor

T 2 3 N R H J – L N N – N – 00

T Series

Motor Frame Size
2 NEMA 23 (2.25 in. square

Rotor Stack Length
H Half stack
1 1 stack
2 2 stacks
3 3 stacks

Mounting Configuration
N NEMA 23
S Special, contact factory

Construction / Hookup
C MS connector
L Terminal box via 1/2 in. NPT pipe thread
M Terminal box via PG11 pipe thread
R Regular leadwire
S Special, contact factory

Winding / Leads
E 6 leads (Unipolar)[1]
H 4 leads (Parellel connected)
L 4 leads (Series connected)
S Special, contact factory

Winding Type
D, E, F, G, H, J, K
S Special, contact factory

Rotor Type
L Laminated

Shaft Configuration
D Rear shaft extension[2]
N No rear shaft extension
S Special, contact factory

Shaft Modification
F Flat
N Smooth
S Special, contact factory

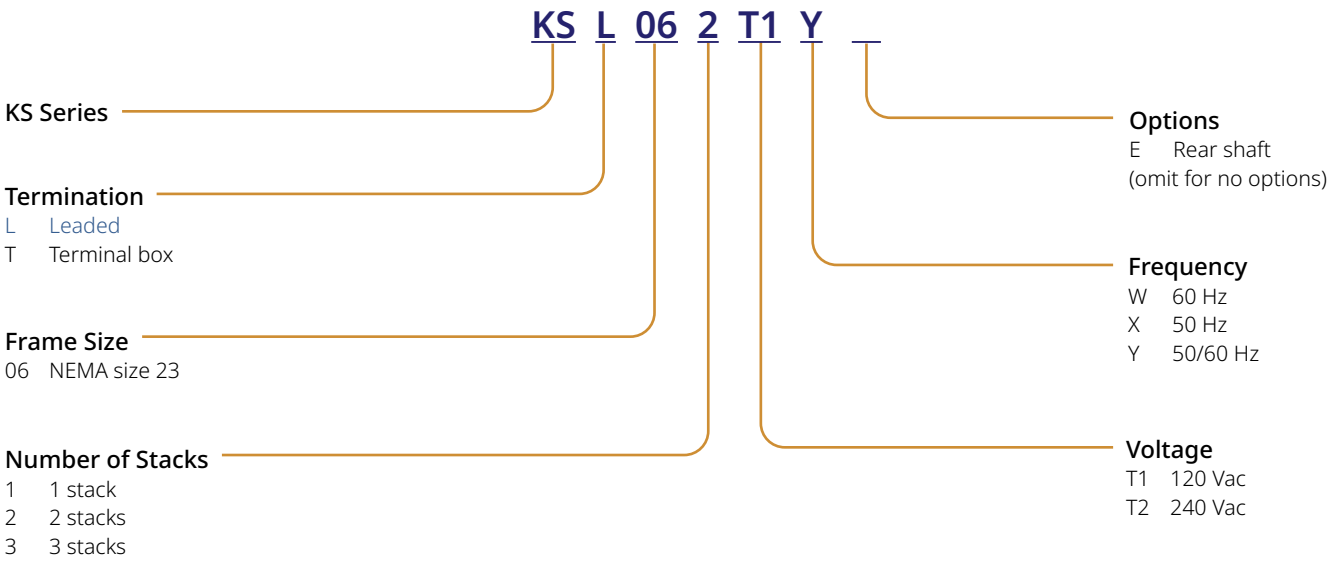
Encoder Option
C2 Encoder 200 LPR w/line driver[3]
C4 Encoder 400 LPR w/line driver[3]
C5 Encoder 500 LPR w/line driver[3]
M4 Encoder mtg. provisions[3]
SS Special, contact factory

Special Sequence
Insert 00 if all parts are standard
Any other numbers are factory assigned

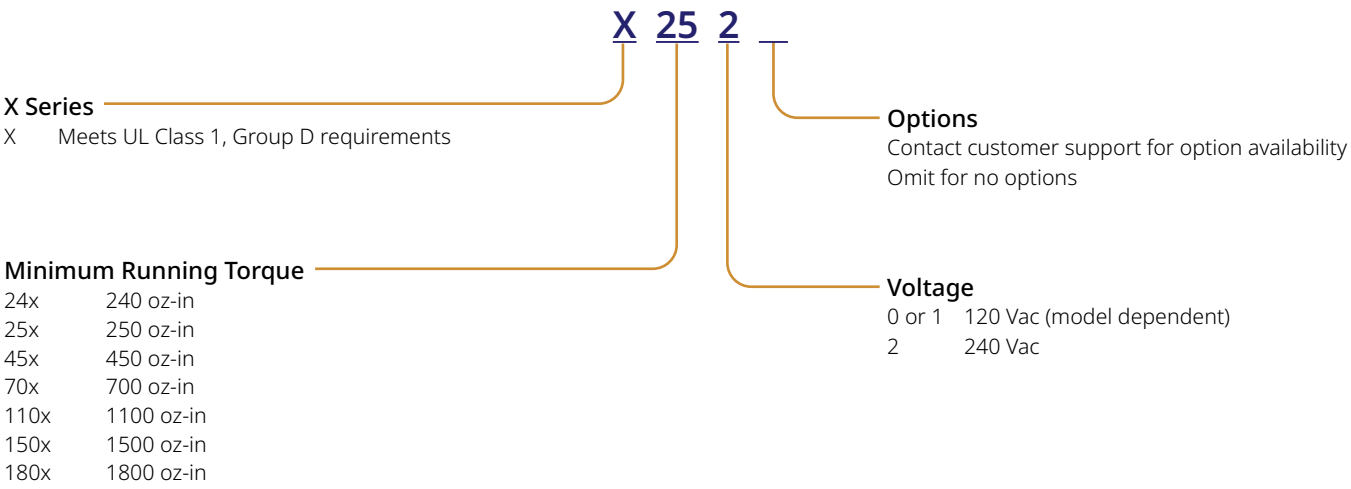
Notes:

1. N/A with "C" Construction / Hookup option
2. "R" Construction / Hookup only, required for motors with encoders
3. Requires "R" Construction / Hookup option and "D" Shaft Configuration option

KS Series AC Synchronous Motor



X Series AC Synchronous Motor



Note: Options shown in blue text are considered standard.

Model Nomenclature

SS Series AC Synchronous Motor

SS 24 1 L G60

SS Series

Minimum Running Torque

NEMA Size 23

25	25 oz-in
9x	90 oz-in
13x	130 oz-in

NEMA Size 24

5x	50 oz-in
8x	80 oz-in
24x	240 oz-in
45x	450 oz-in

NEMA Size 42

15xB	150 oz-in
25xB	250 oz-in
40xB	400 oz-in
70xB	700 oz-in

NEMA Size 66

180x	1800 oz-in

Gearbox

GXX	where XX = reducer ratio

Options

L	Leads
T	Terminal box
(blank)	Connector on leads
C	Covered capacitor
CT	Capacitor in terminal box
E	Rear shaft extension

Voltage

0 or 1	120 Vac (model dependent) Omit for 25 oz-in models (25 oz-in models are 120 Vac)
2	240 Vac

Note: Options shown in blue text are considered standard.

PMDC Permanent Magnet DC Motors

AAA nnnn – ... – 56BC – nn

Motor Type

SR	TENV SCR-Rated
SRF	TEFC SCR-Rated
STF	Washdown (TENV) SCR-Rated
EP	Explosion Proof (TENV)
BA	LVDC input (TENV), PWM or Battery Rated
BAF	LVDC input (TEFC), PWM or Battery Rated

Frame

56BC	56C Frame
45BC	145TC Frame
82BC	182TC Frame

Model Nomenclature

EC Series Electric Cylinder with AKM Servo Motors

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

EC Series

EC1
EC2
EC3
EC4
EC5

Motor Type

		Available
AKM11B	AKM11B-ANCNx-00 brushless servo	EC1
AKM13C	AKM13C-ANCNx-00 brushless servo	EC1
AKM23D	AKM23D-EFxxx-00 brushless servo	EC2, EC3
AKM23C	AKM23C-EFxxx-00 brushless servo	EC2, EC3
AKM42G	AKM42G-EKxxx-00 brushless servo	EC3, EC4, EC5
AKM42E	AKM42E-EKxxx-00 brushless servo	EC3, EC4, EC5
AKM52G	AKM52G-EKxxx-00 brushless servo	EC4, EC5
AKM52H	AKM52H-EKxxx-00 brushless servo	EC4, EC5
AKM52L	AKM52L-EKxxx-00 brushless servo	EC4, EC5

Motor Options

		Available
Bxx	Rotatable IP65 connectors	AKM2
Cxx	0.5 m shielded cables w/ IP65 connectors	AKM1, AKM2
Cxx	Rotatable IP65 connectors	AKM4, AKM5
xNx	No brake	AKM1, AKM2, AKM4, AKM5
x2x	24 Vdc power-off holding brake	AKM2, AKM4, AKM5
xxR	Resolver	AKM1, AKM2, AKM4, AKM5
xx2	2048 LPR incremental comm. encoder	AKM1, AKM2, AKM4, AKM5
xxC	Smart Feedback Device (SFD)	AKM1, AKM2, AKM4, AKM5

Drive Ratio

		Available
10	1.0:1 drive belt/pulley (EC1 – helical)	All
10L	1.0:1 inline coupling (direct 1:1 coupling is the only ratio available for inline models)	All
15	1.5:1 drive belt/pulley	EC2, EC3, EC4, EC5
20	2.0:1 drive belt/pulley (EC1 – helical)	Not valid for EC3-AKM42
40	4.0:1 helical gears	EC1 only
50	5.0:1 helical gears	EC2, EC3, EC4, EC5
70	7.1:1 helical gears	EC3 only
100	10.0:1 helical gears	EC2, EC4, EC5

Screw Lead

		Available
03M	3 mm/rev ballscrew	EC1
05B	5 mm/rev ballscrew	EC2, EC3
10B	10 mm/rev ballscrew	EC3, EC4, EC5
16B	16 mm/rev ballscrew	EC2, EC3
25B	25 mm/rev ballscrew	EC4
32B	32 mm/rev ballscrew	EC5
04A	4 mm/rev lead screw	EC2, EC3

Stroke Length

		Available
50	50 mm total stroke	All
100	100 mm total stroke	All
150	150 mm total stroke	All
200	200 mm total stroke	All
250	250 mm total stroke	EC2, EC3, EC4, EC5
300	300 mm total stroke	EC2, EC3, EC4, EC5
450	450 mm total stroke	EC2, EC3, EC4, EC5
600	600 mm total stroke	EC2, EC3, EC4, EC5
750	750 mm total stroke	EC2, EC3, EC4, EC5
1000	1000 mm total stroke	EC3, EC4, EC5
1250	1250 mm total stroke	EC4, EC5
1500	1500 mm total stroke	EC4, EC5
nnn	Custom stroke lengths available in 10 mm increments	

Cylinder Mounting

		Available
MF1	Front rectangular flange	EC1, EC2, EC3, EC5
MF1E	Front rectangular flange (English)	EC4 only
MF1M	Front rectangular flange (metric)	EC4 only
MF2	Rear rectangular flange	EC2, EC3, EC5
MF2E	Rear rectangular flange (English)	EC4 only
MF2M	Rear rectangular flange (metric)	EC4 only
MF3	Front & rear rectangular flange	EC2, EC3, EC5
MF3E	Front & rear rectangular flange	EC4 only
MF3M	Front & rear rectangular flange	EC4 only
MP2	Rear double clevis without pivot base	All
MP3	Rear double clevis with pivot base	All
MS1	Side end angle	EC2, EC3
MS2	Side lugs	All
MS6M	Side tapped holes (metric)	All
MS6E	Side tapped holes (English)	EC1, EC2, EC3, EC5
MT4	Trunnion	EC1, EC2, EC3, EC5

Rod Ends

		Available
FC2	Clevis (includes MT1M)	All
FS2	Spherical joint (includes FT1M)	All
FT1M	Female thread (metric)	All
FT1E	Female thread (English)	EC2, EC3, EC4, EC5
MT1M	Male thread (metric)	All
MT1E	Male thread (English)	EC2, EC3, EC4, EC5

Options

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

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 supplies, motor includes connectors. Default for all AKM Servo Motors; select cable as an accessory.

*Contact customer service for EC1

Note: Options shown in blue text are considered standard.

N2 Series Electric Cylinder with AKM Servo Motors

N2 – AKM23D – BNC – 15 – 5B – 8 – MP2 – FT1M – ( ) – CO

N2 Series

Motor Type*

AKM23D	AKM23D-EFxxx-00 brushless servo
AKM23C	AKM23C-EFxxx-00 brushless servo

Motor Options

Bxx	Rotatable IP65 connectors
Cxx	0.5 m shielded cables w/ IP65 connectors
xNx	No brake
x2x	24 Vdc power-off holding brake
xxR	Resolver
xx2	2048 LPR incremental comm. encoder
xxC	Smart Feedback Device (SFD

Drive Ratio

10	1.0:1 drive belt/pulley
10L	1.0:1 inline coupling (direct 1:1 coupling is the only ratio available for inline models)
15	1.5:1 drive belt/pulley
20	2.0:1 drive belt/pulley
25	2.5:1 helical gears

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")

Cable

CO	No cable supplied, motor includes connectors. Default for all AKM servo motors; select Kollmorgen cables based on motor/drive pairings.

Options***

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

BS24	24 Vdc brake on lead screw (not available with 10L ratio, or with MF2, MF3, MS2, MP2, MP3 mounting options)
DB	Dual rod end bearing
PB	Protective boot
W	Water resistant
F	Sub-freezing temperature
H	High temperature prep
L	Linear potentiometer (only for valid std. lengths)

Rod Ends

FC2	Clevis (includes MT1M)
FE2	Female eye rod end
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

* 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 blue text are considered standard.

Model Nomenclature

Rodless Actuators R-Series with AKM Servo Motors

R Series	Motor Type*	Motor Options	Drive Ratio	Linear Drive Type	Stroke Length	Motor Orientation	Carriage: Mounting Style	Carriage: English/ Metric	Cable Option
R3	– AKM42G	CNC	– 10	5B	– 12	– P	– A	S	E	– CO

R Series
R2A, R3, R4

Motor Type*

		Available
AKM23C	AKM23C-EFxxx-00 brushless servo	R2A, R3
AKM23D	AKM23D-EFxxx-00 brushless servo	R2A, R3
AKM42E	AKM42E-EKxxx-00 brushless servo	R3, R4
AKM42G	AKM42G-EKxxx-00 brushless servo	R3, R4
AKM52G	AKM52G-EKxxx-00 brushless servo	R4
AKM52H	AKM52H-EKxxx-00 brushless servo	R4

Motor Options

		Available
B■■	Rotatable IP65 connectors	AKM2
C■■	0.5 m shielded cables w/ IP65 connectors	AKM2
C■■	Rotatable IP65 connectors	AKM4, AKM5
■N■	No brake	AKM2, AKM4, AKM5
■2■	24 Vdc power-off holding brake	AKM2, AKM4, AKM5
■■R	Resolver	AKM2, AKM4, AKM5
■■2	2048 LPR incremental comm. encoder	AKM2, AKM4, AKM5
■■C	Smart Feedback Device (SFD)	AKM2, AKM4, AKM5

Drive Ratio

		Available
10	1.0:1 drive belt/pulley	R2A, R3, R4
15	1.5:1 drive belt/pulley	R2A, R3, R4
20	2.0:1 drive belt/pulley	R2A, R3, R4
30	3.0:1 drive belt/pulley	R4
50	5:1 helical gear	R3, R4
70	7:1 helical gear	R3
100	10:1 helical gear	R3

Linear Drive Type

		Available
5A	5 pitch (0.2″ lead) lead screw	R2A, R3
8A	8 pitch (0.125″ lead) lead screw	R2A, R3
1B	1 pitch (1″ lead) ball screw	R4
2B	2 pitch (0.5″ lead) ball screw	R2A, R3
4B	4 pitch (0.25″ lead) ball screw	R4
5B	5 pitch (0.2″ lead) ball screw	R2A, R3
T	Tangential drive belt	R2A, R3, R4

Stroke Length

		Available
6	6″ of total stroke	R2A, R3, R4
12	12″ of total stroke	R2A, R3, R4
18	18″ of total stroke	R2A, R3, R4
24	24″ of total stroke	R2A, R3, R4
30	30″ of total stroke	R2A, R3, R4
36	36″ of total stroke	R2A, R3, R4
42	42″ of total stroke	R2A, R3, R4
48	48″ of total stroke	R2A, R3, R4
54	54″ of total stroke	R2A, R3, R4
60	60″ of total stroke	R2A, R3, R4
72	72″ of total stroke	R2A, R3, R4
84	84″ of total stroke	R3, R4
96	96″ of total stroke	R3, R4
108	108″ of total stroke	R3, R4

Custom lengths available in the increment of 1″.

Options***

		Available
BS24	24 Vdc brake on lead screw (Screw option only, n/a with inline models, MF3 or “C” options)	R2A, R3, R4
BS115	115 Vdc brake on lead screw (Screw option only, n/a with inline models, MF3 or “C” options)	R2A, R3, R4
BS230	230 Vdc brake on lead screw (Screw option only, n/a with inline models, MF3 or “C” options)	R2A, R3, R4
WR	Water resistant seal option right	R2A
WL	Water resistant seal option left	R2A
GR	Lube port, right side	R3, R4
GL	Lube port, left side	R3, R4
DC1	Idler carriage between driven carriage and non-motor end	R2A
DC2	Idler carriage between driven carriage and motor end	R2A
VR	Breather vent, fitting, tubing, right side	R4
VL	Breather vent, fitting, tubing, left side	R4
C0	No motor cable	R2A, R3, R4
S	Stub shaft	R2A

English/Metric (carriage/mounting)

		Available
E	English carriage & mounting dimensions	R2A, R3, R4
M	Metric carriage & mounting dimensions	R2A, R3, R4

Carriage (omit this field for R2A models)

		Available
S	Single carriage	R3, R4
Dxx	Dual Carriage (xx = center distance between dual carriages in inches – contact customer support for lengths)	R3, R4

Mounting Style

		Available
MF3	Front & rear rectangular flanges	R2A
MS1	Side end angles	R2A
MS5	Adjustable feet	R2A
MS6	Side tapped mounting holes	R2A
A	Side angle brackets	R3, R4
B	Adjustable T-nuts	R3, R4
C	Front & rear rectangular flanges	R3, R4

Motor Orientation

		Available
Belt Options		
AR	Motor housing rotated above/right	R2A, R3, R4
BR	Motor housing rotated behind/right	R2A, R3, R4
CR	Motor housing rotated under/right	R2A, R3, R4
AL	Motor housing rotated above/left	R2A, R3, R4
BL	Motor housing rotated behind/left	R2A, R3, R4
CL	Motor housing rotated under/left	R2A, R3, R4
Screw Options		
I	Motor mounted inline	R2A, R3, R4
P	Motor mounted parallel	R2A, R3, R4
PR	Motor mounted parallel/right	R2A, R3, R4
PL	Motor mounted parallel/left	R2A, R3, R4

* 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 if C0 is not selected.
Note: Options shown in 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 Encoder	Options
DS4	– 250	– C	– 5G	– AKM23D	– BNC	(-)	– OE6	– PR6E	– LN1	– H0	(-)	– EO	– CLN

DS Series
DS4
DS6

Stroke Length
50	50 mm total stroke	DS4 only
100	100 mm total stroke	
150	150 mm total stroke	DS4 only
200	200 mm total stroke	
250	250 mm total stroke	DS4 only
300	300 mm total stroke	
350	350 mm total stroke	DS4 only
400	400 mm total stroke	
450	450 mm total stroke	DS4 only
500	500 mm total stroke	
550	550 mm total stroke	DS4 only
600	600 mm total stroke	
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 (≥ 700 mm)	DS6 only

Motor Type*
AKM23C	AKM23C-EFxxx-00 brushless servo	
AKM23D	AKM23D-EFxxx-00 brushless servo	
AKM42E	AKM42E-EKxxx-00 brushless servo	DS6 only
AKM42G	AKM42G-EKxxx-00 brushless servo	DS6 only

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 Encoder
E0	No linear encoder
E1	1.0 micron resolution
E2	0.5 micron resolution
E3	0.1 micron resolution

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 position
HN2 Home, PNP 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 preffered

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

* Contact customer support for AKM combinations outside of those listed.
** Extended lead time required.
Note 1: Options shown in blue text are considered standard.
Note 2: Contact customer support for price and lead time on all non-standard features.

Model Nomenclature

Kollmorgen 2G Cables

H2 – 12 – 015 – A1 – 00 – XXXX00

Cable Version

Cable Jacket Material – PUR

- F1 Mid-flex Feedback Cable PUR
- H2 Mid-flex Hybrid PUR with brake
- P1 Power Cable PUR
- P2 Power Cable PUR with brake

Cable Jacket Material – PVC

- F5 MId-flex Feedback Cable PVC
- H6 Mid-flex Hybrid PVC with brake
- P5 Mid-flex Power Cable PVC
- P6 Mid-flex Power Cable PVC with brake

Length (no less than 100 mm increments)

xxxx00 Length in mm

Standard lengths: 1 - 25 m

Example:
6 m cable = 006000
25 m cable = 025000

Options

- 00 Standard Option Set
- VL Value Line
- XX Specials (excluding standard option set)

Connector Type

If Feedback, connector type [connector type and pinout]

- 10 AKD, AKD2G, 15 Pin D-Sub, 45° angle, Resolver
- 12 AKD, AKD2G, 15 Pin D-Sub, 45 degree angle, EnDat® 2.1, BiSS B
- 14 AKD, AKD2G, 15 Pin D-sub, 45 degree angle, HIPERFACE®
- 18 AKD, AKD2G, 15 Pin D-sub, 45 degree angle, SFDG2
- 20 AKD, AKD2G, 15 Pin D-sub, 45 degree angle, Comcoder, Sine Enc. w/ Halls
- 41 S300/S700 Resolver 9 pin D-sub
- 42 S300/S700 Encoder 15 pin D-sub (EnDat® 2.2, Biss C)
- 43 S300/S700 Encoder 15 pin D-sub (Sine Encoder w Halls)
- 91 Flying leads, Resolver
- 92 Flying leads, EnDat, Biss
- 93 Flying leads, HIPERFACE
- 94 Flying leads, SFD2G
- 95 Flying leads, Comcoder

If Power or Hybrid drive connector type

- 11 AKD-x00306, -x00606 (Power and Hybrids with HDSL, SFD3)
- 12 AKD-x01206, -x02406 (Power and Hybrids with HDSL, SFD3)
  AKD-x00307, -x00607, -x01207, -x02407 (Power and Hybrids with HDSL, SFD3)
- 13 AKD-x04807 (Power and Hybrids with HDSL, SFD3)
- 14 AKD-x00306, -x00606 (Hybrids with EnDat 2.2)
- 15 AKD-x01206, -x02406 (Hybrids with EnDat 2.2)
  AKD-x00307, -x00607, -x01207, -x02407 (Hybrids with EnDat 2.2)
- 21 AKD2G-x00306, -x00606, -x01206
  AKD2G-x00307, -x00607, -x01207, -x02406, -x02407
- 33 AKD-N DB (Hybrid cable)
- 34 AKD-N DF/DS (Power cable)
- 41 S300 MV (Power or Hybrid w/ SFDG3, DSL)
- 42 S300 HV (Power or Hybrid w/ SFDG3, DSL)
- 43 S300 MV (Hybrid with EnDat 2.2-22)
- 44 S300 HV (Hybrid with EnDat 2.2-22)
- 46 S701-S724 connector (Power or Hybrid w/ SFDG3, HDSL)
- 47 S701-S724 connector (Hybrid with EnDat 2.2-22)
- 48 S748/S772 flying leads
- 01 Unterminated flying leads
- SP Special

Motor Mating Connector Type

Hybrid / Power Connectors

- A1 AKM2G, M23 SpeedTec® (9)
- A4 AKM2G, M40 SpeedTec (9)
- A5 AKM1G, M23 SpeedTec (8)
- A6 AKM1G, M23 Screw-type (8)
- A7 AKM1G, M40 SpeedTec (6)
- B1 AKM2G, M23 htec (9) standard keying, DSL)
- B2 AKM2G, M23 htec (13) (rotated keying, EnDat 2.2)
- B3 AKM2G, M40 htec (11) (standard keying, DSL)
- C1 AKM/AKM2G, M15 ytec® (9)
- C4 AKM, M15 itec (9) (SFD3)
- UB Unterminated (Blunt Cut)
- UF Unterminated (Flying leads)
- W5 AKM, M23 Hummel Washdown (8)

Feedback Connectors

- A2 AKM/AKM2G, M23 SpeedTec (12)
- A3 AKM/AKM2G, M23 SpeedTec (17)
- C2 AKM/AKM2G, M15 ytec (12)
- C3 AKM/AKM2G, M15 ytec (15)
- UB Unterminated (Blunt cut)
- UF Unterminated (flying leads)

Cable Type

If Feedback, type [cable construction, not pinout]

- FB1 4 Conductor
- FB2 8 Conductor
- FB3 6 Conductor
- FB4 16 Conductor
- FB5 14 Conductor
- FB6 10 Conductor
- FB7 12 Conductor

If Power or Hybrid drive connector type

- 010 1.0 mm^2
- 015 1.5 mm^2
- 025 2.5 mm^2
- 040 4.0 mm^2
- 060 6.0 mm^2
- 100 10.0 mm^2

Feedback Cables

CF – D A 03 74N – XXX

Cable Type
- CF Performance Line
- VF-H Value Line

Feedback Type
- D SFD
- H HIPERFACE®
- S Sine Encoder

Feedback Drive Connector
- A Size 1.0, 12-pin (SFD or Resolver)
- B Size 1.0, 17-pin (Encoder)

Feedback Motor Connector
- 03 4 conductor (SFD) (Performance Line)
- 04 4 conductor (SFD) (Value Line)

Cable Length

Length in meters

Power Cables

CP – 5 07 CD A N – XXX

Cable Type
- CP Performance Line
- VP-H Value Line Feedback

Drive Power Connector Type
- 07 AKD, 1-12A (230V)
- 08 AKD, 24A (230V) & 1-24A (480V)

Power Cable Material Type
- BE 16 AWG, 4 conductor, Value Line
- CD 14/18 AWG, 6 conductor, brake, Performance
- CE 14 AWG, 4 conductor, Value Line
- CF 14/18 AWG, 6 conductor, brake, Value Line
- DE 12 AWG, 4 conductor, Value Line
- DD 12/18 AWG, 6 conductor, brake, Performance
- DF 12/18 AWG, 6 conductor, brake, Value Line
- ED 10/18 AWG, 6 conductor, brake, Value Line

Motor Power Connector Type
- A Size 1.0, 8 pin
- B Size 1.5, 8 pin

Cable Length

Length in meters

Hybrid (Power + Feedback) Cables

Refer to the AKD Drive Cables (Centralized) nomenclature page

Model Nomenclature

AKD® Drive Cables (Centralized)

CC J 1 A2 – 015 – 003 – 00

Cable Version

Power

CM	Motor power
WM	Washdown motor power

Feedback

CF	Motor Feedback
WF	Washdown motor feedback

Hybrid (Power + Feedback)

CC	Motor hybrid
WC	Washdown motor hybrid

Fieldbus

CB	Motor hybrid
WB	Washdown motor hybrid

Cable Type

Power

0	No Brake
1	Brake

Feedback

C	Commutating Encoder
D	EnDat/BiSS digital
E	EnDat®/BiSS
H	HIPERFACE®
R	Resolver
S	SFD

Hybrid (Power + Feedback)

S	SDF + power
J	SDF3/DSL + power and brake

Fieldbus

P	CANopen®

Drive Connector Type

X	No connector (cut off)

Power / Hybrid (Power + Feedback)

1	AKD-x00306, -x00606
2	AKD-x01206, -x02406, -x00307, -x02407
3	AKD-x04807

Feedback

0	AKD X10
1	AKD X9

Fieldbus

0	AKD

Motor Connector Type

XX	No connector (cut off)
00	Special connector

Power

A1	AKM & C/CH connector 1.0
A2	AKM SpeedTec® 1.0
A3	AKM itec connector
A4	AKM molex, 10 pin
A5	AKM connector 1.5, 8 pin
A6	AKM molex, 5 pins
A7	AKM molex, 8 pins
AK	AKM terminal box
DL	Linear motors

Feedback

A1	AKM & C/CH connector 1.0
A2	AKM SpeedTec® 1.0
A3	AKM ytec® connector
A4	AKM molex, 10 pins
A5	AKM molex 18 pins
DL	Linear motors
E1	EnDat ext.
E2	HIPERFACE ext.

Hybrid (Power + Feedback)

A1	AKM & C/CH connector 1.0
A2	AKM SpeedTec® 1.0
A3	AKM itec connector
A4	AKM molex, 10 pin
A5	AKM connector 1.5, 8 pin

Fieldbus

00	Specific for fieldbus

Wire Cross Section

Power

010	1.0 mm²
015	1.5 mm²
025	2.5 mm²
040	4.0 mm²
060	6.0 mm²
100	10.0 mm²
160	16.0 mm²
250	25.0 mm²

Feedback

002	0.25 mm²

Fieldbus

002	0.25 mm²

Cable Length

Length in meters

Standard lengths:

m25	0.25 m
m50	0.50 m
001	1 m
003	3 m
006	6 m
012	12 m
024	24 m

Specials

00 = Cardboard packing

01 = Foil packing

AKD® -N Cables (Decentralized)

CC N C N1 – 025 – 05M00 – 00

Cable Version

Power

CM	Motor power
WM	Washdown motor power

Feedback

CF	Motor Feedback
WF	Washdown motor feedback

Hybrid (Power + Feedback)

CC	Motor hybrid
WC	Washdown motor hybrid

Cable Type

Power

0	No Brake
1	Brake

Feedback

C	Commutating Encoder
D	EnDat/BiSS digital
E	EnDat®/BiSS
H	HIPERFACE®
S	SFD

Hybrid (Power + Feedback)

S	SDF + power
J	SDF3/DSL + power and brake
N	EtherCAT® + power

Drive Connector Type

Power

N	AKD-N (DF/DS)

Feedback

N	AKD-N (DF/DS)

Hybrid (Power + Feedback)

C	AKD-C
N	AKD-N

Motor Connector Type

XX	No connector (cut off)
00	Special connector

Power

A1	AKM & C/CH connector 1.0
A2	AKM SpeedTec® 1.0
A3	AKM ytec® connector
DL	Linear motors

Feedback

A1	AKM & C/CH connector 1.0
D	AKM SpeedTec® 1.0
E	AKM ytec® connector
DL	Linear motors
E1	EnDat ext.
E2	HIPERFACE ext.

Hybrid (Power + Feedback)

A1	AKM & C/CH connector 1.0
A2	AKM SpeedTec® 1.0
A3	AKM itec connector
N1	AKD-N

Wire Cross Section

Power

010	1.0 mm²
015	1.5 mm²
025	2.5 mm²

Feedback

002	0.25 mm²

Hybrid (Power + Feedback)

010	1.0 mm²
015	1.5 mm²
025	2.5 mm²

Cable Length

XXMYY where:

XX	meters
YY	centimeters

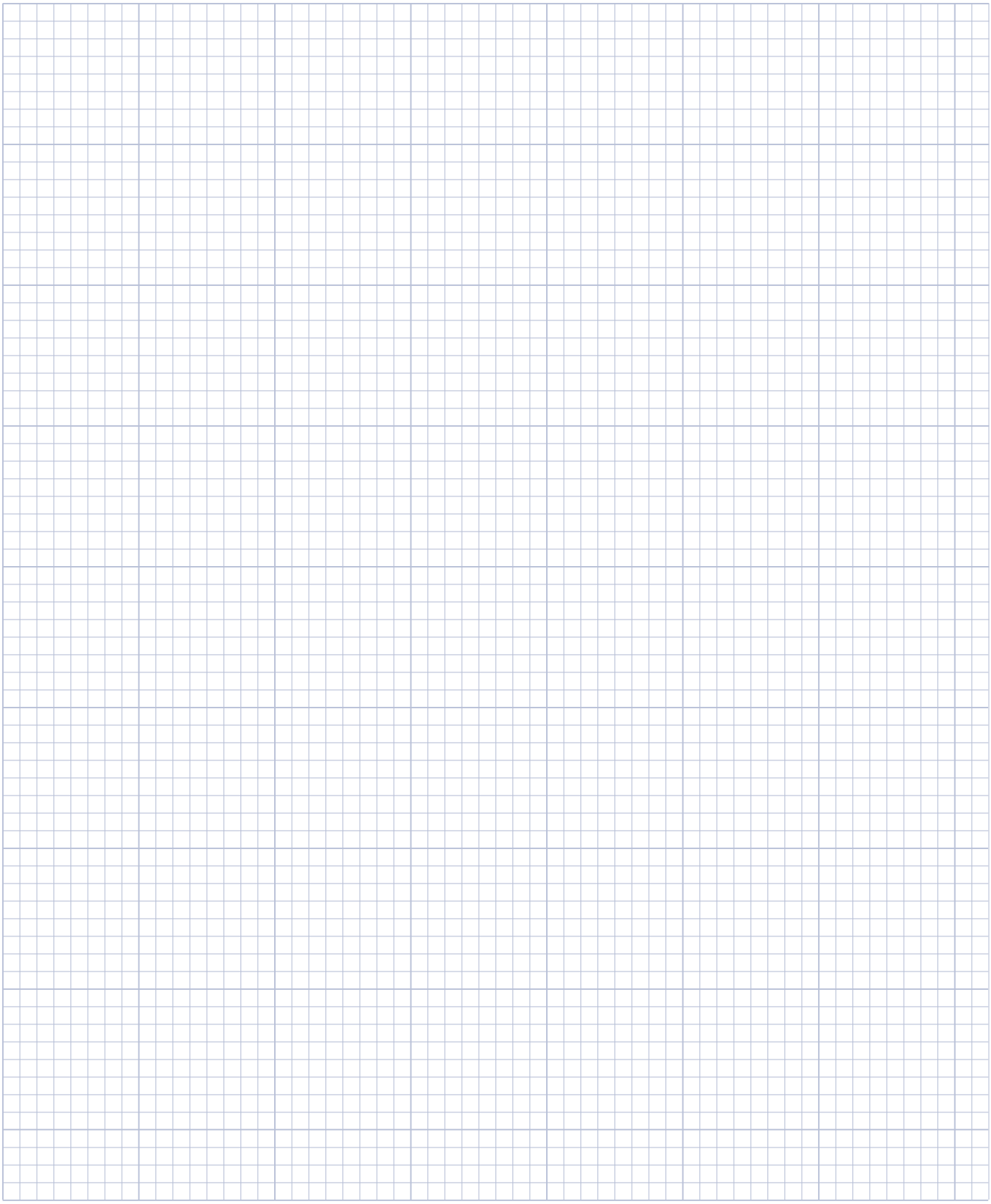
according to allowed steps (see accessories manual)

Specials

00 = Cardboard packing

01 = Foil packing

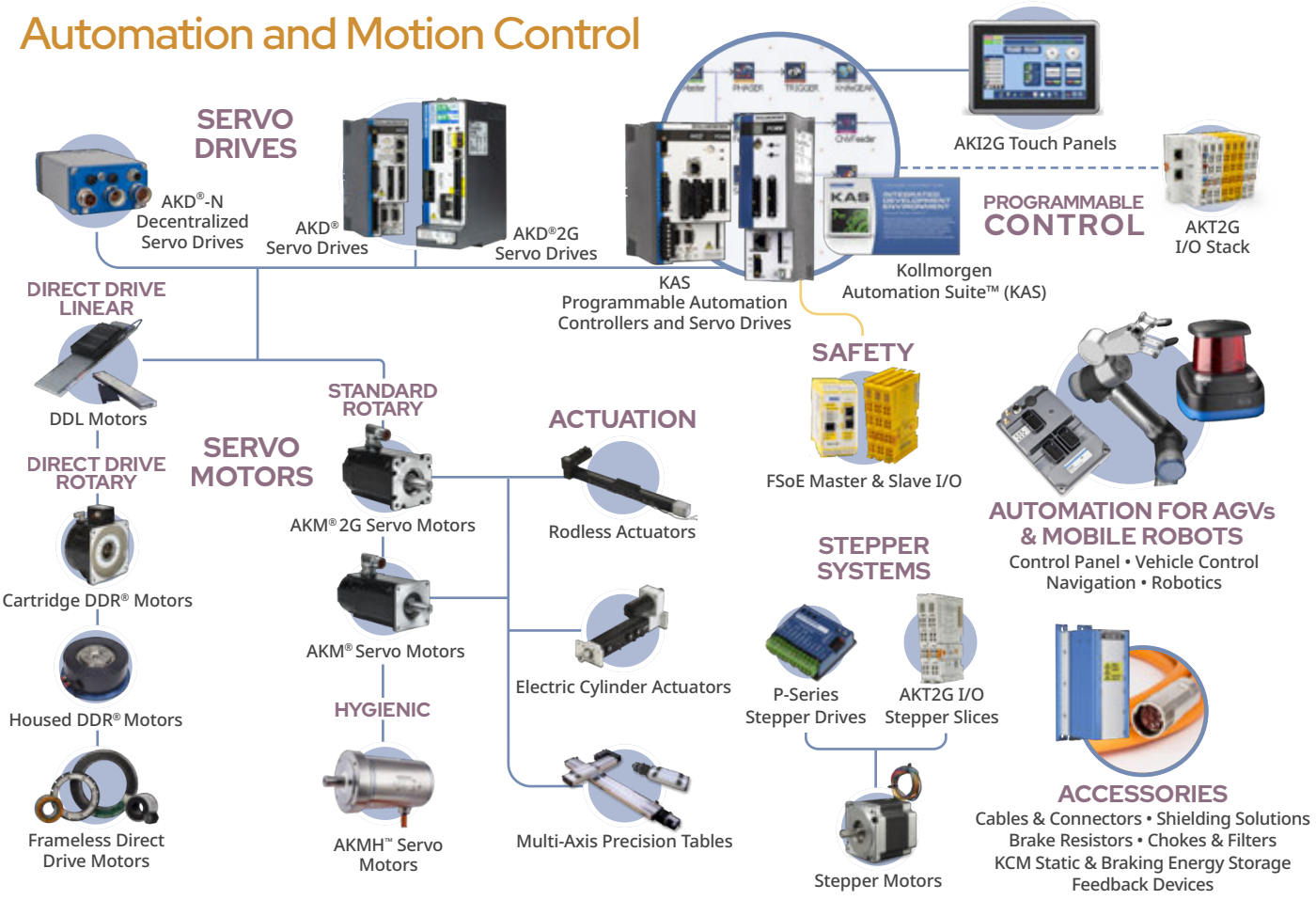
Notes



0.125 inch divisions

Kollmorgen Solutions

Automation and Motion Control



Self-Help Tools

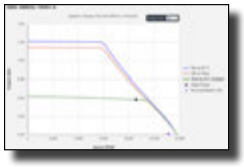
Motioneering® Online

Size and select the right product for your application needs

Drawing Generator

Provides TBM/KBM/AKM 2D and 3D drawings in many popular formats

Performance Curve Generator



Optimize TBM/KBM/AKM windings using customer supplied environmental and drive information

Product Selector

Choose the right product for your application needs

Kollmorgen Developer Network

Find answers to many key technical questions or start your own session

Stepper Optimizer

Select the most efficient stepper solution for your application

More Expertise for a More Successful Machine

Our global engineering, service and support network provides deep knowledge of all the major industries that rely on advanced motion control and automation technology. We offer world-class engineering expertise, self-service design tools, personalized field service, and easy access to our design, application and manufacturing centers in strategic locations across the globe.

About Kollmorgen

Kollmorgen has more than 70 years of motion experience, proven in the industry's highest-performing, most reliable motors, drives, linear actuators, gearheads, AGV control solutions and automation platforms. We deliver breakthrough solutions that are unmatched in performance, reliability and ease of use, giving machine builders an irrefutable marketplace advantage.

Kollmorgen is a brand of Altra Industrial Motion Corp. (NASDAQ: AIMC), a premier global designer and producer of a wide range of motion control and power transmission solutions. With engineered components and systems that provide the essential control of equipment speed, torque, positioning, and other functions, Altra products can be used in nearly any machine, process or application involving motion.

KOLLMORGEN

www.kollmorgen.com

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