Kollmorgen Servo Systems Catalog

KOLLMORGEN ®

Because Motion Matters™

Micron™ Gearheads

AKM™ Servomotors

Cartridge Direct Drive Rotary™ Motors

Housed Direct Drive Rotary Motors
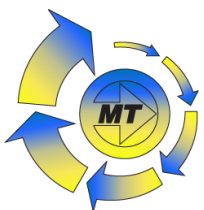
Direct Drive Linear Motors

Linear Positioners

Multi-Axis Precision Tables

AKD™ Servo Drive

www.motiontech.com.au

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 our selection of Kollmorgen motors and drives that are known to integrate seamlessly together, we can now help you increase your machine's overall effectiveness by up to 50% over other leading motor and drive combinations.

* Patents pending.

The Benefits of AKD Servo Drive

- Optimized Performance in Seconds

  - 20-30% gain in power density due to optimization of AKD and DDR motor windings to precisely match AKD
  - 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 96 Arms continuous current; 9 to 192 Arms peak
  - Very high power density enables an extremely small package
  - True plug-and-play with all standard Kollmorgen servomotors and positioners
  - Supports a variety of single and multi-turn feedback devices—Smart Feedback Device (SFD), EnDat2.2, 01, BiSS, analog Sine/Cos encoder, incremental encoder, HIPERFACE®, and resolver
  - Tightly integrated Ethernet motion buses without the need to add large hardware: EtherCAT®, SynqNet®, Modbus/TCP, and CANopen®
  - Scalable programmability from base torque-and-velocity through multi-axis master

AKD Servo Drive

The AKD servo drive delivers cutting-edge technology and performance with one of the most compact footprints in the industry. These feature-rich drives provide a solution for nearly any application, from basic torque-and-velocity applications, to indexing, to multi-axis programmable motion with embedded Kollmorgen Automation Suite. The versatile AKD sets the standard for power density and performance.

Micron™ Gearheads

AKM™ Servomotors

Cartridge Direct Drive Rotary™ Motors

Housed Direct Drive Rotary Motors

Best-in-Class Components
AKD works seamlessly with Kollmorgen motors and positioners–well-known for quality, reliability, and performance.
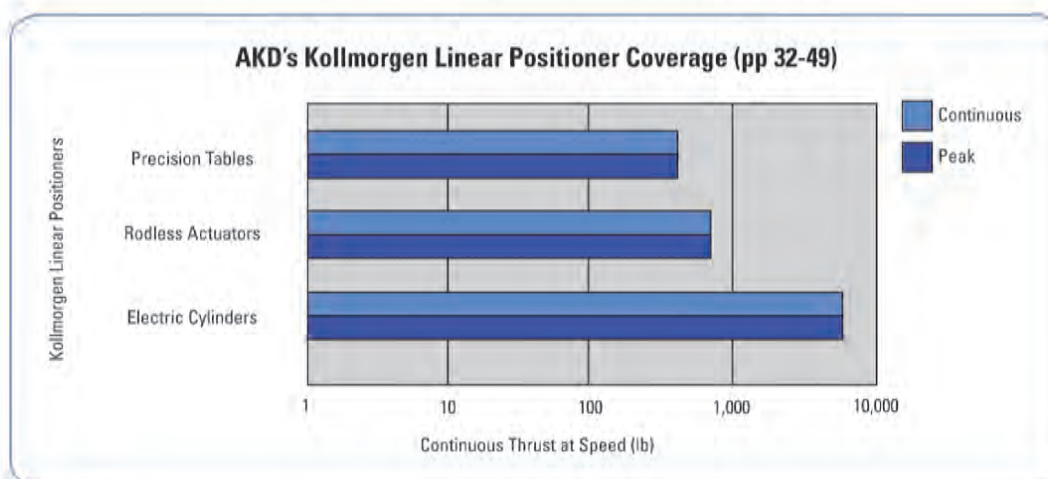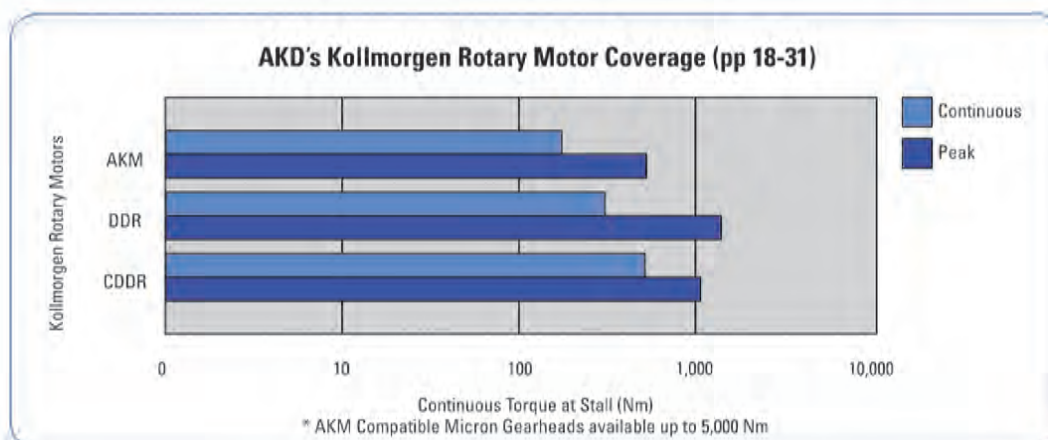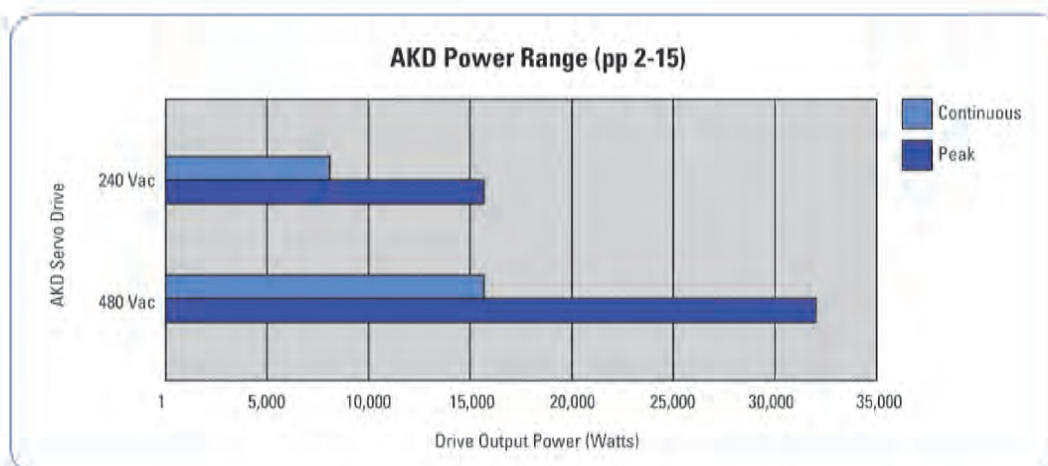
Direct Drive Linear Motors*

Linear Positioners

Multi-Axis Precision Tables

AKD™ Servo Drive

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

AKD Servo Drive Range of Coverage

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

AKD Power Range (pp 2-15)

- Continuous
- Peak

AKD Servo Drive

240 Vac

480 Vac

1   5,000   10,000   15,000   20,000   25,000   30,000   35,000

Drive Output Power (Watts)

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

- Continuous
- Peak

Kollmorgen Rotary Motors

AKM

DDR

CDDR

0   10   100   1,000   10,000

Continuous Torque at Stall (Nm)
* AKM Compatible Micron Gearheads available up to 5,000 Nm

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

- Continuous
- Peak

Kollmorgen Linear Positioners

Precision Tables

Rodless Actuators

Electric Cylinders

1   10   100   1,000   10,000

Continuous Thrust at Speed (lb)

AKD Servo Drive

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

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

Modbus/TCP

Industry-leading power density

General Specifications

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

480 Vac 3Ø (342 -528 V)	Continuous Current (Arms)	Peak Current (Arms)	Drive Continuous Output Power Capacity (Watts)	Internal Regen (Watts)	(Ohms)	Height mm (in)	Width mm (in)	Depth mm (in)	Depth with Cable Bend Radius mm (in)
AKD-■00307	3	9	2000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■00607	6	18	4000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■01207	12	30	8000	100	33	256 (10.08)	70 (2.76)	186 (7.32)	221 (8.70)
AKD-■02407	24	48	16,000	200	23	310 (12.20)	105 (4.13)	229 (9.02)	264 (10.39)
AKD-■04807	48	96	32,000	400		*Coming Soon*			
AKD-■09607	96	192	64,000	800		*Coming Soon*			

Note: For complete AKD model nomenclature, refer to page 63.

Scalable Programmability

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

Benefits

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

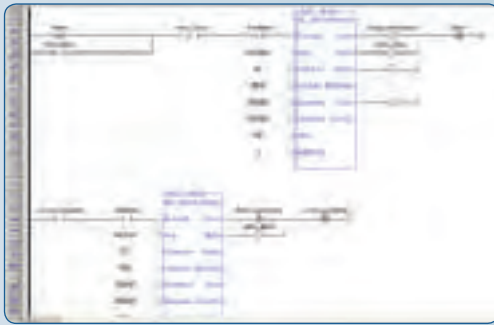### BASIC Programmable 1.5 Axis Drive ("T" Option)

- Adds BASIC programmability to base AKD
- Greater functionality than simple indexing
- Includes access to 11 digital I/O and 2 analog I/O on base drive
- Includes 2 high-speed digital inputs
- Expandable to 31 digital I/O and 4 analog I/O
- Same package size as base drive

Motion Tasking ("P" Option)

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

Base AKD ("B" Option)

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

Basic Operation

Single-Axis

PC-Based Control

AKD Slaves

Kollmorgen Automation Suite
Programmable Automation Controller (PAC)

- Capable of controlling up to 128 axes using a PAC and EtherCAT-enabled base AKD
- Easily manages remote I/O via EtherCAT in addition to all drives' I/O
- Sets new standards for precision and optimizes nearly any application
- Pipe Network – program sophisticated camming and gearing applications in a matter of minutes
- Adds only 30 millimeters to width of drives below 12 Amps; same size as larger base drives
- Includes 11 digital I/O and 2 analog I/O per axis
- Includes 2 high-speed digital inputs per axis

Optional HMI

AKD Master   AKD Slaves

Kollmorgen Automation Suite
Programmable Multi-Axis Master

- True synchronized-path control of up to 4 axes
- Sets new standards for precision and optimizes nearly any application
- Easily manages remote I/O via EtherCAT in addition to all drives' I/O
- Pipe Network – program sophisticated camming and gearing applications in a matter of minutes
- Adds only 30 millimeters to width of drives below 12 Amps; same size as larger base drives
- Includes 11 digital I/O and 2 analog I/O per axis
- Includes 2 high-speed digital inputs per axis

Kollmorgen Automation Suite Programmable Drive

- Powerful 1.5 axis controller: new standard for performance!
- All five IEC 61131-3 languages (structured text, function block diagram, ladder diagram, instruction list, sequential function chart) for process programming (soft PLC)
- PLCopen for motion programming
- Exclusive function blocks such as "wait" and "interrupt" so your program can act as a scanning language or sequential language
- Includes access to 11 digital I/O and 2 analog I/O on base drive
- Includes 2 high-speed digital inputs
- Expandable to 31 digital I/O and 4 analog I/O
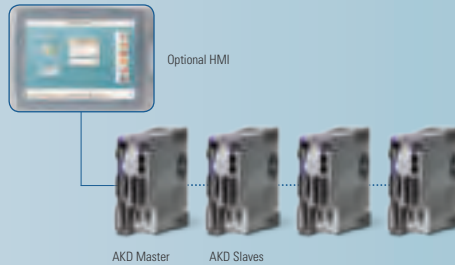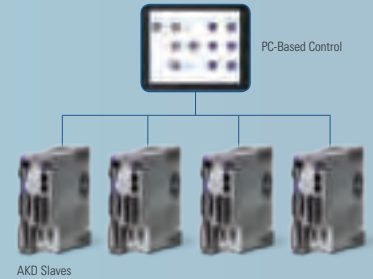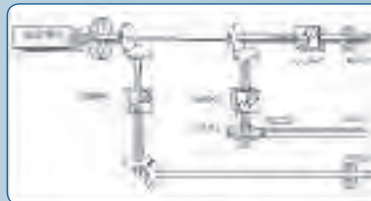- Same package size as base drive

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

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

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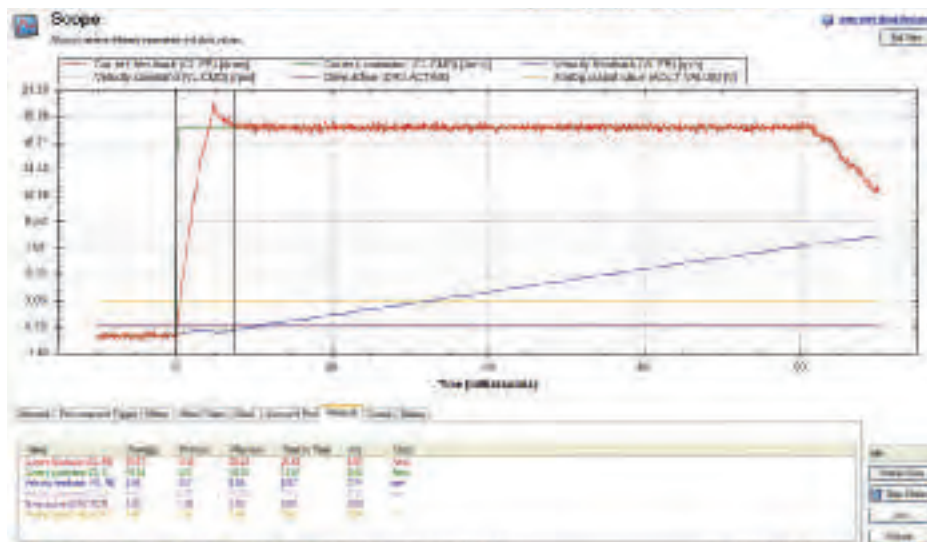
Programming

Multi-Axis Programming

Kollmorgen WorkBench

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

User-Friendly Environment

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

Sleek Six-Channel "Real-Time" Software Oscilloscope

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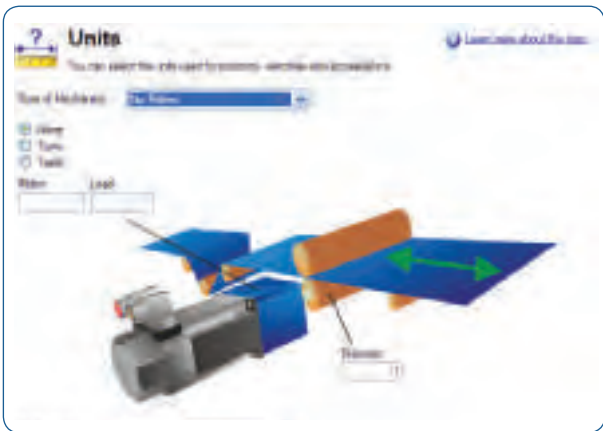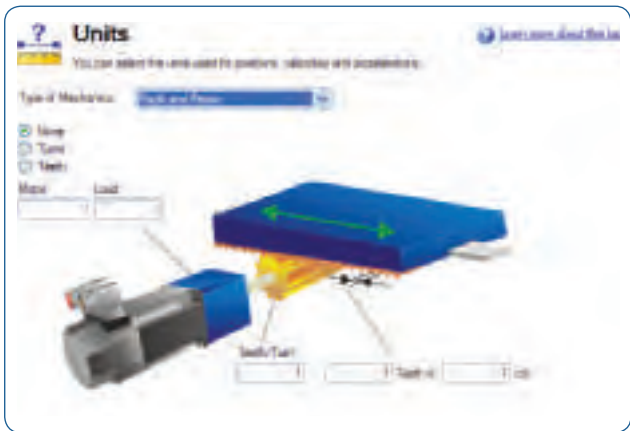
- Save as an image
- Load to an e-mail
- Print

Application Selection

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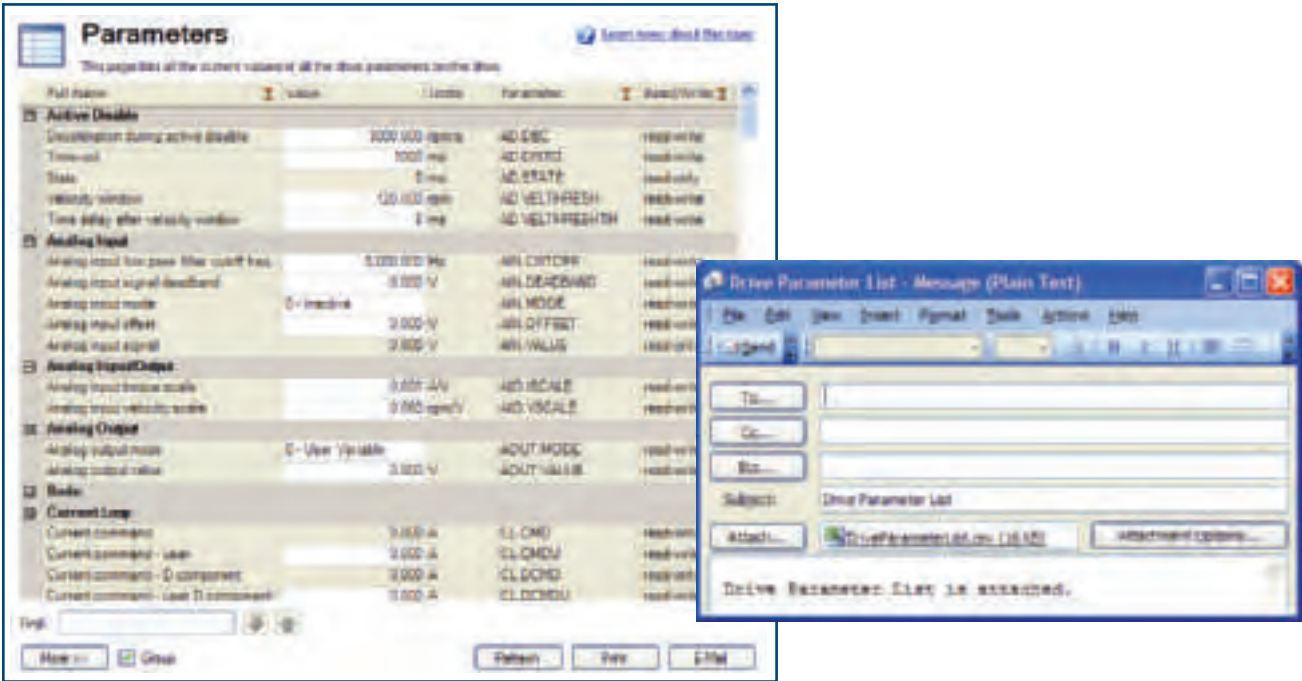
Nip Roller Application Selection

Rack and Pinion Application Selection

Data-Sharing

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

AKD Connector Layout and Functionality

Ethernet Connectivity

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

Industrial Design

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

Safe-Torque-Off (STO)

(IEC 61800 SIL2)

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

Internal Regenerative Braking Resistor

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

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

Performance Servo Tuner (PST)

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

Plug-and-Play with Kollmorgen Motors and Positioners

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

I/O (Base Drive)

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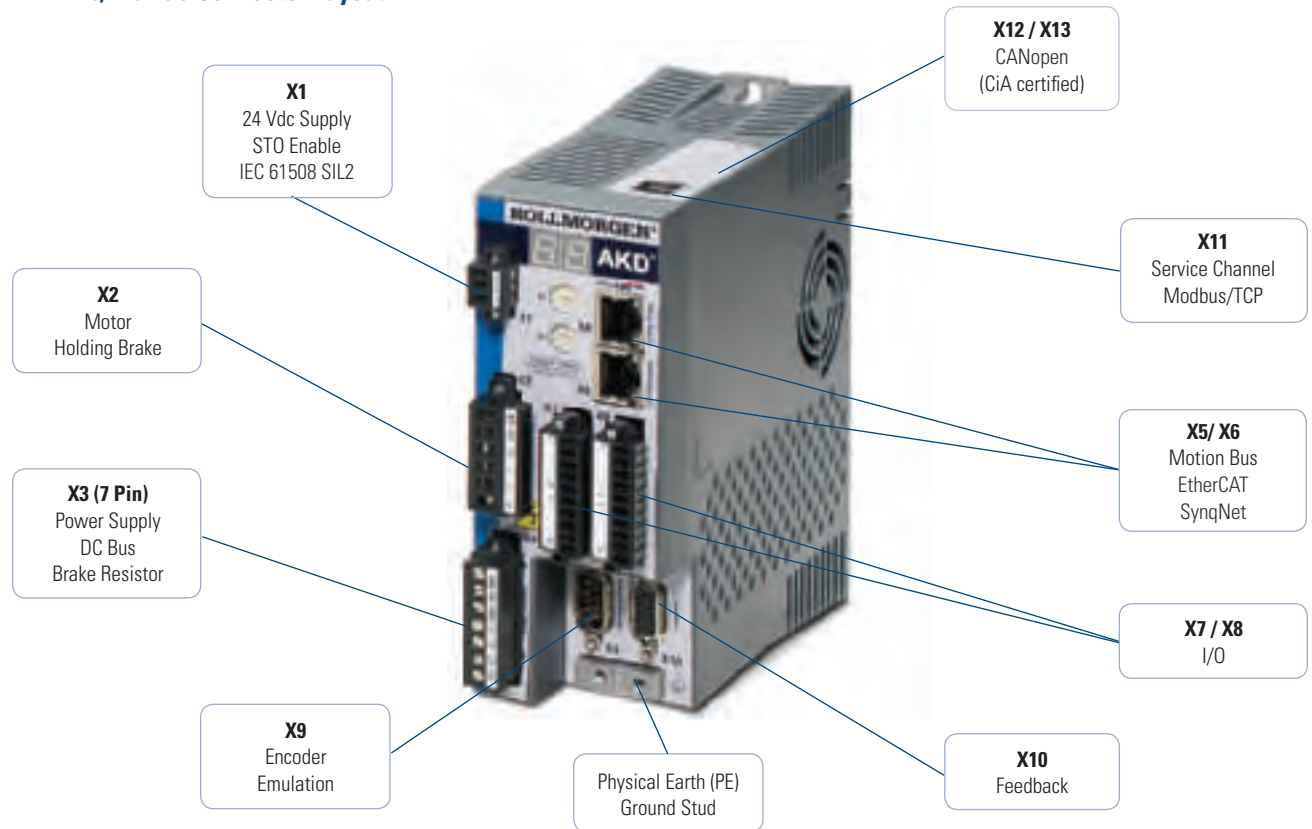- 1 analog input - 16 bit
- 1 analog output - 16 bit

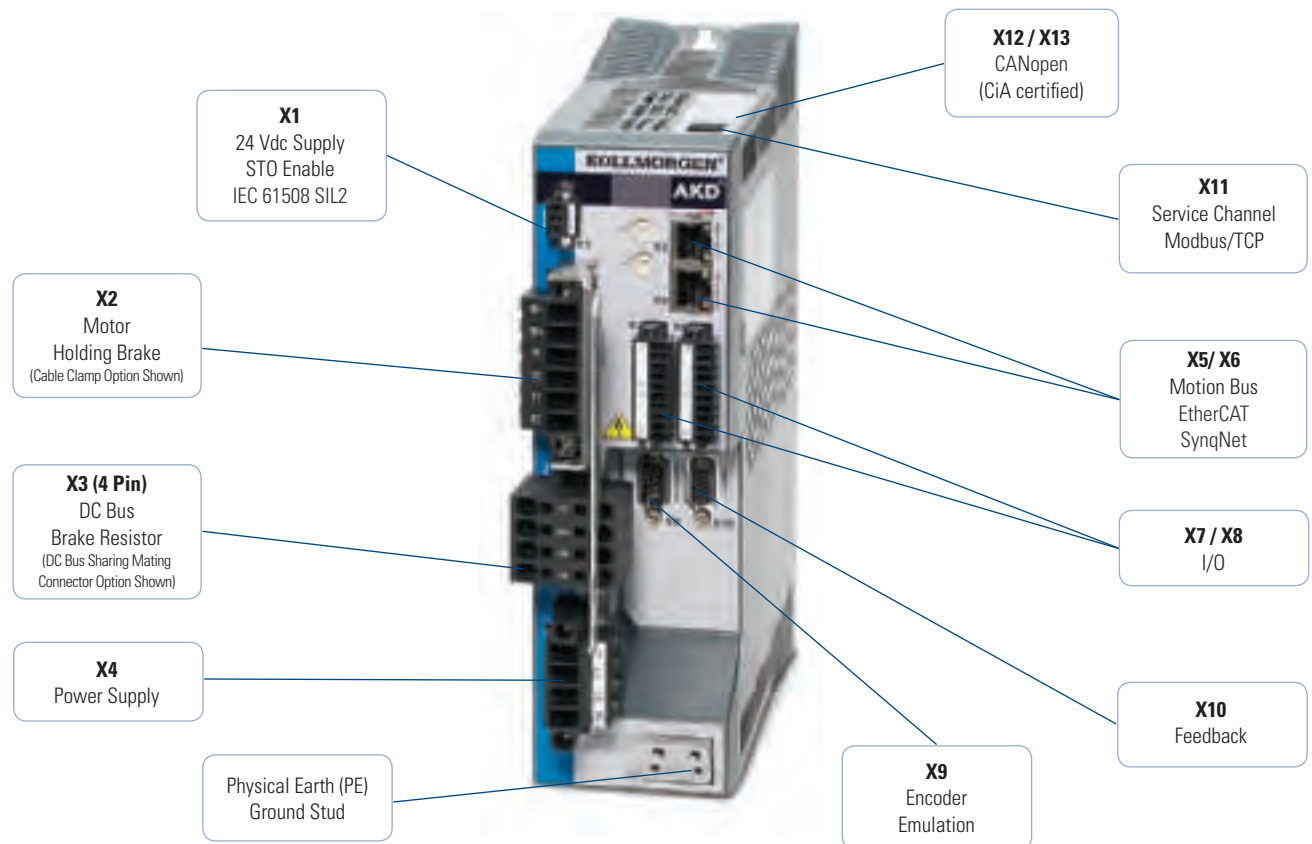## AKD 120/240 Vac Connector Layout

X1
24 Vdc Supply
STO Enable
IEC 61508 SIL2

X2
Motor
Holding Brake

X3 (7 Pin)
Power Supply
DC Bus
Brake Resistor

X9
Encoder
Emulation

Physical Earth (PE)
Ground Stud

X12 / X13
CANopen
(CiA certified)

X11
Service Channel
Modbus/TCP

X5/ X6
Motion Bus
EtherCAT
SynqNet

X7 / X8
I/O

X10
Feedback

AKD 480 Vac Connector Layout

X1
24 Vdc Supply
STO Enable
IEC 61508 SIL2

X2
Motor
Holding Brake
(Cable Clamp Option Shown)

X3 (4 Pin)
DC Bus
Brake Resistor
(DC Bus Sharing Mating
Connector Option Shown)

X4
Power Supply

Physical Earth (PE)
Ground Stud

X12 / X13
CANopen
(CiA certified)

X11
Service Channel
Modbus/TCP

X5/ X6
Motion Bus
EtherCAT
SynqNet

X7 / X8
I/O

X10
Feedback

X9
Encoder
Emulation

Accessories

CANopen Accessories

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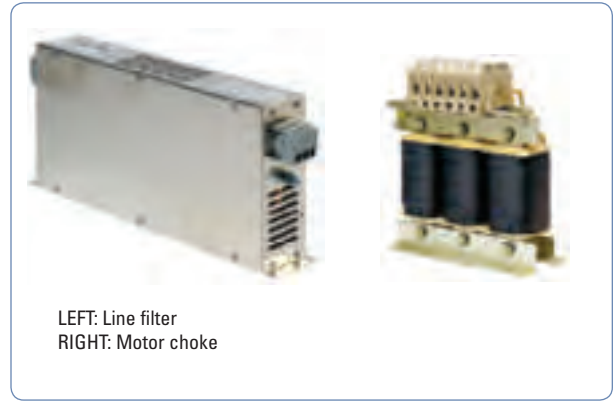

Brake Resistors

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

Shielding Solutions

AKD servo drive can be equipped with shielding plates.

LEFT: Line filter
RIGHT: Motor choke

Chokes and Filters

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

Motion Bus and Service Port Cables

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

Screw lock adapter for auxiliary connection

I/O Control Box and Breakout Adapter

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

AKD Servo Drive

AKD – **B 003 06** – **NA AN- 0000**

AKD Series

Version

B = Base drive
P = Position indexer (motion tasking)

Current Rating

003 = 3 Amp
006 = 6 Amp
012 = 12 Amp
024 = 24 Amp

Voltage

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

Variants

0000 = Standard

Connectivity

AN = Analog command
CN = CANopen
EC = EtherCAT
SQ = SynqNet

Extension

NA = Without extensions

Note: Options shown in bold blue text are considered standard
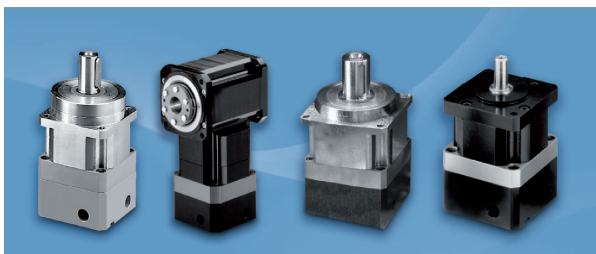
Other Kollmorgen Products

Precision Rotary Actuators

Precision Linear Actuators

AKD Servo Motors

Precision Planetary Reducers

MOTIONEERING® Application Engine

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

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

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

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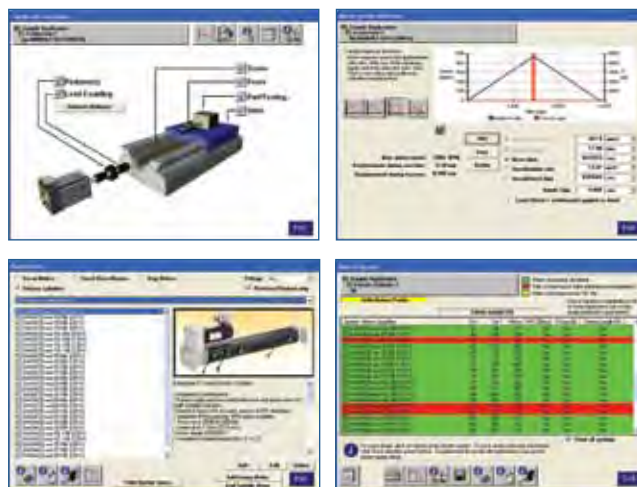
Features

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

Supported Operating Systems

- Microsoft® Windows 2000, XP, Vista

MOTIONEERING 6.0 includes

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

Distributors for Australia & New Zealand

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