

AKD™ Servo Drive

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

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

* Patents pending.

The advantages for you

- Higher machine speed/throughput

- Less rejects, better quality

- Quicker exchange, increased availability

- Reduced time-to-market

Key features

- Feedback with maximum resolution (up to 27 bit)
- Torque and speed control with high bandwidth – The quickest digital torque control on the market: 0.67 μ s
- Multi function Bode plot simplifies the evaluation and optimization of drive and machine performance
- Patented, powerful autotuning algorithms
- Enhanced servo technology enables excellent machine performance
- High-resolution analog input (digital --> analog)

- Two powerful processors enable quick settling time

- "Real time" software oscilloscope with six channels for quick startup and diagnostics
- Automatic completion of programmable commands saves searching for parameter names
- The recording and transmission of program plots and parameter settings with a mouse click enables the immediate transfer of machine performance data
- Powerful and user-friendly user interface
- Robust and reliable quality

- Supports a great number of single-turn and multi-turn feedback systems – Digital resolvers (SFD), EnDat2.2, EnDat2.1, BiSS, analog sin/cos encoders, incremental encoders, HIPERFACE® and resolvers
- Integrated motion bus systems EtherCAT®, SynqNet®, PROFINET®, Ethernet/IP® and CANopen®
- For operating rotary and linear motors
- Wide range of programming options
- Compatible with many front end controllers
- Exceptional power density

AKD Servo Drive

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



Direct drive linear motors



KBM™ Frameless Direct Drive Motors

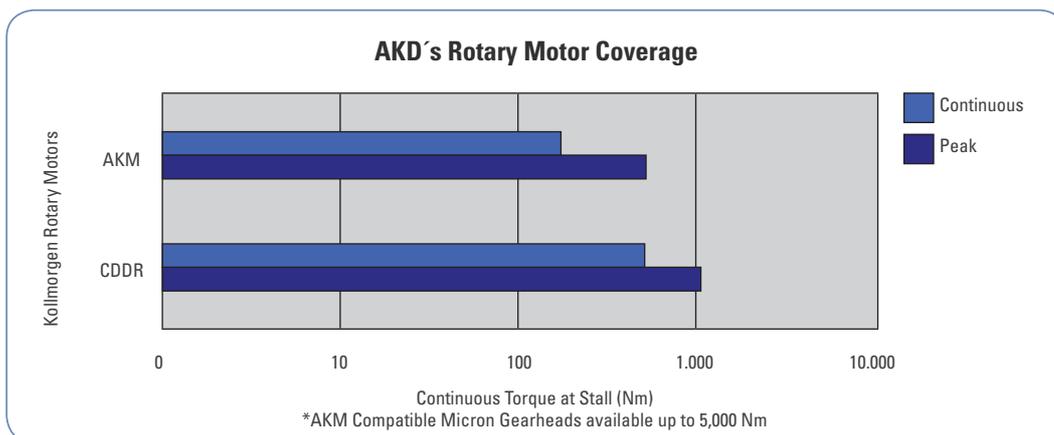
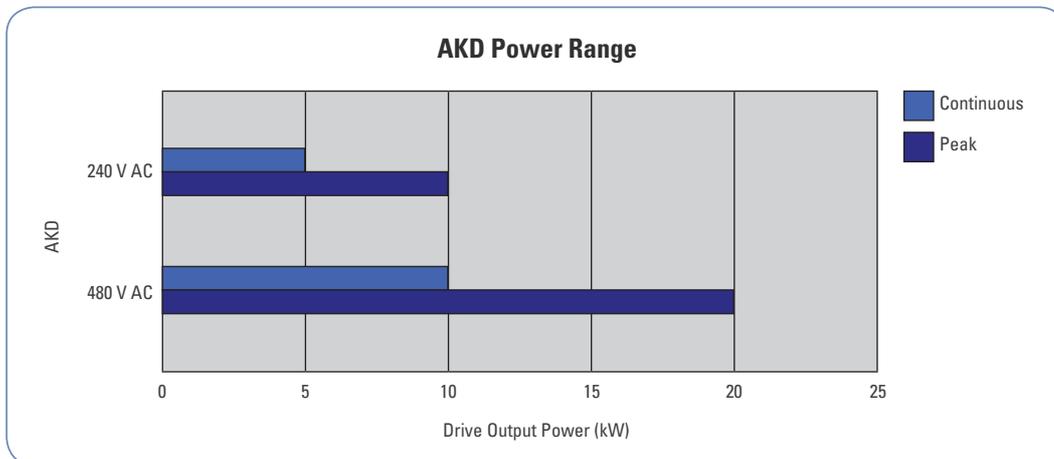
Best-in-Class Components

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



AKD Range of Coverage

When you pair the AKD Servo Drive with any of our Kollmorgen motors, you'll achieve optimized performance. From 3 to 24 A_{rms} continuous current and 9 to 48 A_{rms} peak current, the feature-rich AKD provides a solution for nearly any application.



AKD Servo Drive

AKD 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 trouble-shooting 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.

Performance Specifications

Servo Loop	Update Rate	Bandwidth (Max)
Current Loop	1.5 MHz (0.67 μ s)	5.0 kHz
Velocity Loop	16 kHz (62.5 μ s)	1.6 kHz
Position Loop	4 kHz (250 μ s)	0.8 kHz

Inputs/Outputs		
Digital Input Events	16 kHz (62.5 μ s) Update Rate	
Encoder Output or AUX Encoder Input	2.5 MHz Maximum Frequency	
Feedback	Digital Resolver (SFD), EnDat2.2, EnDat2.1, BiSS, analog sin/cos encoder, incremental encoder, HIPERFACE [®] , and resolver	
Logic Supply	24 V DC	
	Base Drive	With I/O Expansion*
Digital Input (24 V DC)	8 (1 dedicated to enable)	20 (1 dedicated to enable)
Digital Output (24 V DC)	3 (1 dedicated to fault relay)	13 (1 dedicated to fault relay)
Analog Input (\pm 10 V DC, 16-bit)	1	2
Analog Output (\pm 10 V DC, 16-bit)	1	2
Programmable Inputs	7	19
Programmable Outputs	2	12
Sink/Source Inputs/Outputs	Yes	Yes

* AKD-T only

AKD Servo Drive



General Specifications

120 / 240 V AC 1-ph / 3-ph (85 -265 V)	Continuous Current (A _{rms})	Peak Current (A _{rms})	Drive Continuous Output Power (kW)	Internal Regen (watts) (ohms)		Height (mm)	Width (mm)	Depth (mm)	Depth with Cable Bend Radius (mm)
AKD-■00306	3	9	1.1	–	–	168	59	153	185
AKD-■00606	6	18	2.0	–	–	168	59	153	185
AKD-■01206	12	30	4.0	100	15	196	78	187	max. 215
AKD-■02406	24	48	8.0	200	8	238	100	228	max. 265
480 V AC 3-ph (187 -528 V)	Continuous Current (A _{rms})	Peak Current (A _{rms})	Drive Continuous Output Power (kW)	Internal Regen (kW) (ohms)		Height (mm)	Width (mm)	Depth (mm)	Depth with Cable Bend Radius (mm)
AKD-■00307	3	9	2.0	0.1	33	256	70	185	max. 225
AKD-■00607	6	18	4.0	0.1	33	256	70	185	max. 225
AKD-■01207	12	30	8.0	0.1	33	256	70	185	max. 225
AKD-■02407	24	48	16.0	0.2	23	306	105	228	max. 265

AKD Functionality

Ethernet Connectivity

- The Ethernet-based AKD range offers the user a choice of several bus systems:
- EtherCAT® (DSP402 protocol), Modbus/TCP, SynqNet®, PROFINET RT® and EtherNet/IP®
- No option cards necessary

Standard Bus System

- EtherCat®
- CANopen®

Industrial Design

- Robustly wired circuits and a compact housing for a modern, space-saving design – Increased immunity against electrical interference and minimized emission of electrical disturbances.
- Full fault protection
- UL, cUL and CE approval
- No external mains filters required for CE and UL conformance (480 V AC units)
- Simple connections through screwable plug terminals
- Common use of the DC bus possible

Safe Torque Off (STO)

(IEC 61508 SIL2 certified)

- Switches the power stage off to ensure the safety of personnel and to prevent an unwanted restart of the amplifier – Even during faults.
- Allows for the maintenance of logic functions and communication during power stage deactivation.

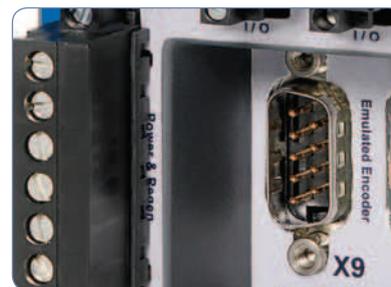
Internal Dynamic Brake Resistor

(all models except 120/240 V AC 3 A_{eff} and 6 A_{eff})

- Simple system components
- No costs for external brake resistors if the internal brakes suffice

Autotuning

- Optimized performance through automatic, guided or manual optimization
- Balances moment of inertia mismatches of up to 1,000:1
- Exceptional bandwidth under normal and heavy-load conditions – Irrespective of the mechanical bandwidth of the machine



Plug-and-Play Compatible with the Kollmorgen Motor

- Electronic rating plates enable the automatic loading of parameters for quick startup
- Programming of movement profiles within seconds
- Simple input of customer-specific parameters

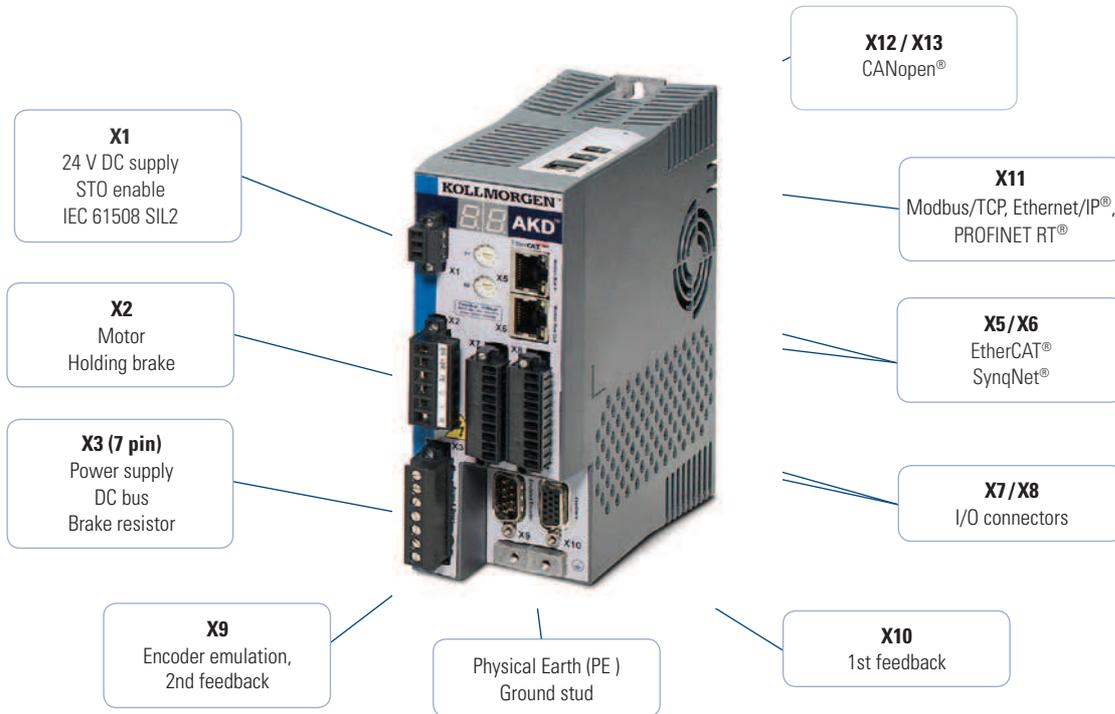
I/O (base amplifier)

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

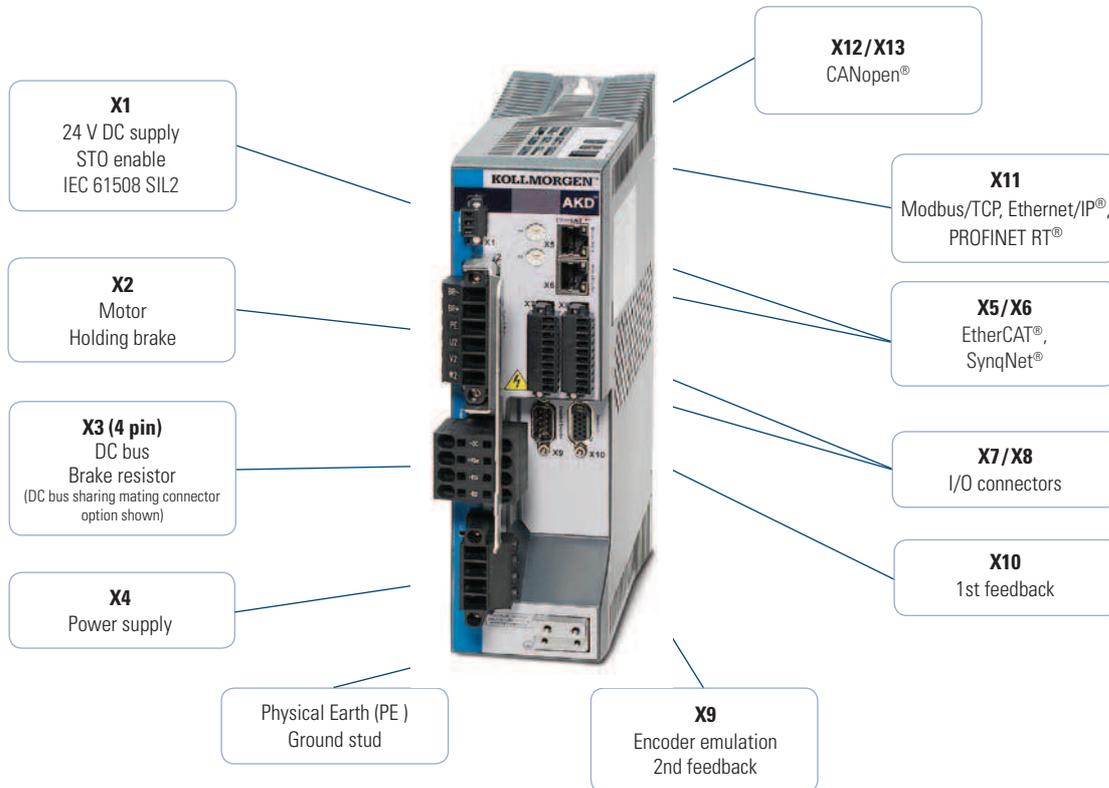


AKD Connector Layout

AKD 120/240 V AC – Connector Layout



AKD 480 V AC – Connector Layout

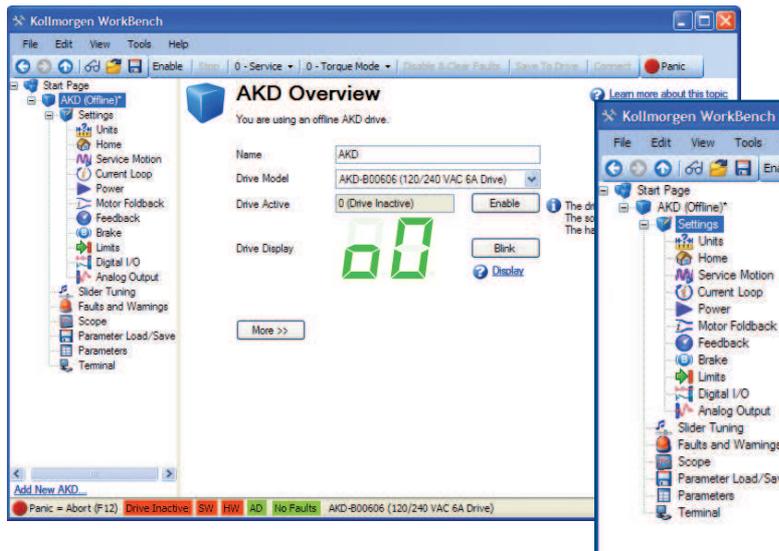


Kollmorgen WorkBench

Our simple Graphical User Interface (GUI), Kollmorgen WorkBench, is designed to expedite and streamline the user's experience with AKD. From easy application selection and reduced math, to a sleek six-channel scope; the user interface is extremely easy to use. Kollmorgen WorkBench also makes auto-tuning the AKD with Kollmorgen motors very easy.

User-Friendly Environment

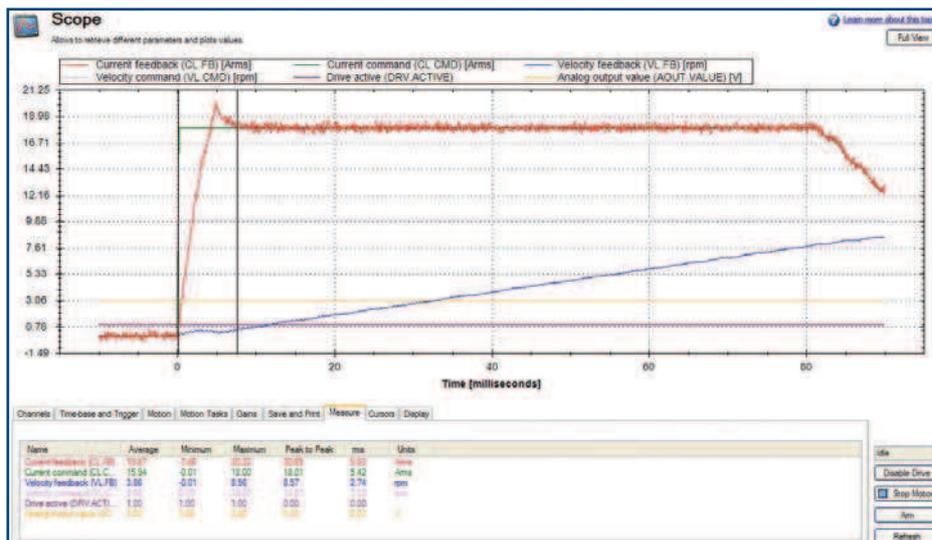
Logical flow, colorful icons and easy access simplify interactions with AKD. The folder structure allows for instant identification and easy navigation.



Six-Channel "Real-Time" Software Oscilloscope

The easy-to-use AKD interface has an 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.

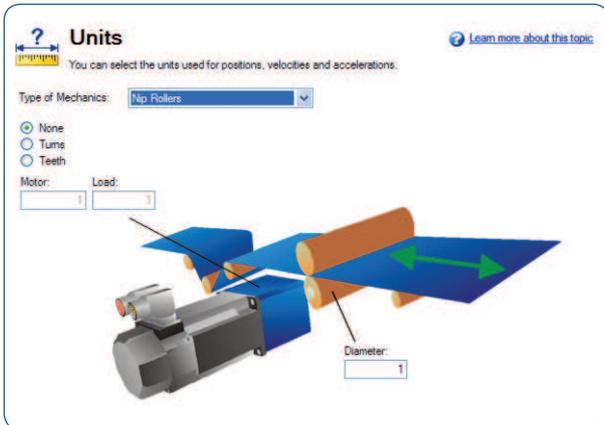
- Save as an image
- Send as an e-mail
- Print



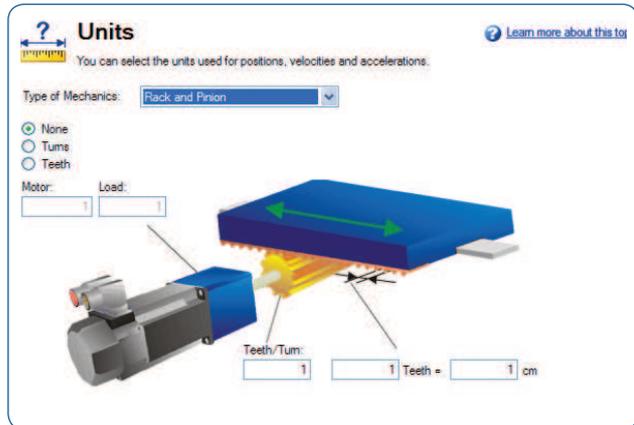
Application Selection

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.

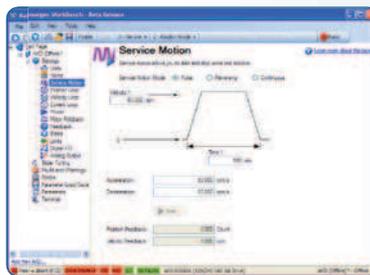
Full Name	Value	Units	Parameter	Read/Write
Active Disable				
Deceleration during active disable	3000.000	rpm/s	AD.DEC	read-write
Time-out	1000	ms	AD.DISTO	read-write
State	0	ms	AD.STATE	read-only
Velocity window	120.000	rpm	AD.VELTHRESH	read-write
Time delay after velocity window	6	ms	AD.VELTHRESHTM	read-write
Analog Input				
Analog input low pass filter cutoff freq...	5.000.000	Hz	AIN.CUTOFF	read-write
Analog input signal deadband	0.000	V	AIN.DEADBAND	read-write
Analog input mode	0 - Inactive		AIN.MODE	read-write
Analog input offset	0.000	V	AIN.OFFSET	read-write
Analog input signal	0.000	V	AIN.VALUE	read-only
Analog Input/Output				
Analog input torque scale	0.001	A/V	AIO.ISCALE	read-write
Analog input velocity scale	0.060	rpm/V	AIO.VSCALE	read-write
Analog Output				
Analog output mode	0 - User Variable		AOUT.MODE	read-write
Analog output value	0.000	V	AOUT.VALUE	read-write
Bode				
Current Loop				
Current command	0.000	A	CL.CMD	read-only
Current command - user	0.000	A	CL.CMDU	read-write
Current command - D component	0.000	A	CL.DCMD	read-only
Current command - user D component	0.000	A	CL.DCMDU	read-write

Scalable Programming

The AKD servo amplifier delivers innovative technology and performance in extremely compact sizes. The AKD is flexible enough for all areas of application. Whether it's just a single axis – such as an analog control for speed and torque – or 128 axes with a fully programmable, synchronized drive: AKD is the answer.

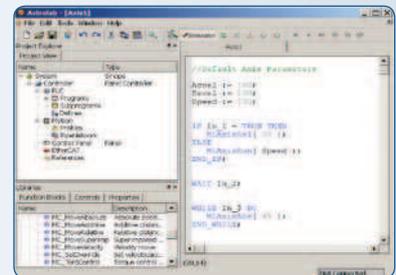
The Advantages For You

- Optimized performance
- Higher throughput and improved precision
- User-friendly graphical user interface for quicker startups and error searches
- Flexibility and scalability for every area of application



AKD with Drive Functions (AKD-P).

- Simple indexing using 'Point and Click'.
- Preprogrammed options.
- Guides inexperienced users through simplified steps to create indexing movements.
- 11 digital I/O and 2 analog I/O.
- 2 digital high-speed inputs.



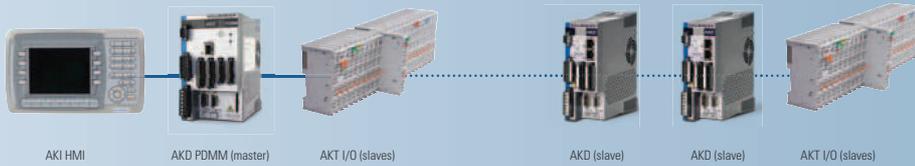
**AKD BASIC
Programmable 1.5-Axis Drive (AKD-T)**

- Expansion of the basis AKD to a simplified programming language similar to Basic.
- Conditional instructions, mathematical functions, user functions and subroutines.
- Access to 11 digital I/O and 2 analog I/O, can be expanded to 31 digital I/O and 4 analog I/O.
- 2 digital high-speed inputs

Basic operation

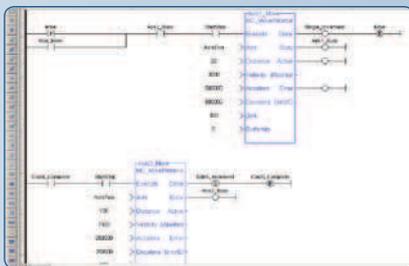
Programm

KOLLMORGEN AUTOMATION SUITE FUNCTION BANDWIDTHS



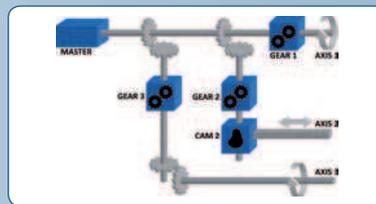
AKD PDMM as an independent single-axis drive with integrated motion control and soft PLC (AKD-M).

- Offers all the options of the Kollmorgen Automation Suite – A complete, scalable programming environment.
- Supports all five IEC 61131-3 languages (structured text, functional module language, ladder diagram, instruction list, sequential function chart) for the process programming (soft PLC).
- Drive programming with PLCopen or the innovative Kollmorgen Pipe Network™
- With function blocks such as "wait", the program behaves like a scanning or sequential language.
- 17 digital I/O (of which 2 are high-speed inputs) and 2 analog I/O.
- Control of the AKT™ additional I/O enables almost limitless expansion.



Seamless integration of additional axes enhances the AKD PDMM to become a powerful, multi-axis machine control system.

- Synchronized contour control of up to 8 axes.
- Reduced spatial requirements and simpler connection through motion and machine control in a single housing.
- Simple management of the remote I/O and the I/O of all connected drive controllers using EtherCAT.
- PLCopen for the programming of movements and Pipe Network™ – Programming of mature applications for cams and gearheads within minutes
- Each additional AKD expands the system by 11 digital I/O, 2 analog I/O and 2 digital high-speed inputs



The Pipe Network™ visualizes a mechanical system in the form of function blocks

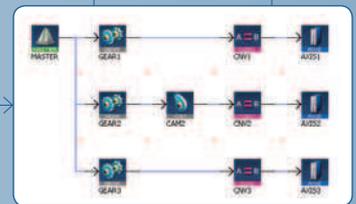


Programmable automation control (PAC) with the Kollmorgen Automation Suite

- Control of up to 128 axes with a PAC and an EtherCAT-capable AKD base.
- A full, scalable development environment for all programming tasks, from simple single-axis drives to multiple-axis PDMM systems through to 128-axis systems based on PAC.
- The programming of complex cam functions or electronic gearheads with the Pipe Network or PLCopen for general motion programming.
- 11 digital I/O, 2 digital high-speed inputs and 2 analog I/O per axis.

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

Select between PLCopen and the Pipe Network from Kollmorgen for the programming of drive tasks.



Programming for one axis

Programming for several axes

The AKD™ PDMM

Servo Amplifier With Integrated Motion Controller

Create more options for yourself during construction. Control eight or more axes without being dependent on a PLC or an additional motion controller. Save space in the switching cabinet and minimize wiring costs. Use a common development environment for your various applications and benefit from the compatibility and flexibility of the Kollmorgen Automation Suite. Increase machine performance and simultaneously cut costs.

We present the AKD™ PDMM (Programmable Drive Multi Master)

The AKD™ PDMM offers full PLC and motion functionality for one or more synchronized servo amplifiers using the powerful, integrated control system with the Kollmorgen Automation Suite™ automation software.

Technical data

120/240 V AC 1 and 3 phase	Continuous current (A _{ms})	Peak current (A _{ms})	H (mm)	B (mm)	T (mm)
AKD-M00306-MCEC-D000	3	9	168	89	156
AKD-M00606-MCEC-D000	6	18	168	89	156
AKD-M01206-MCEC-D000	12	30	196	107	187
240/400/480 V AC 3 phase					
AKM-M00307-MCEC-D000	3	9	256	99	185
AKM-M00607-MCEC-D000	6	18	256	99	185
AKM-M01207-MCEC-D000	12	30	256	99	185



Properties

- The Kollmorgen Automation Suite™ is a comprehensive piece of automation software which offers not only programming tools but also effective startup tools.
- Synchronization of eight or more axes without additional controls or additional motion controllers.
- Real time-capable control with EtherCAT Master integrated in an AKD servo amplifier.
- Programming interface as per IEC61131-3 with full support of the five programming languages.
- Reduced development times during drive programming with the Pipe Network™, the intuitive, graphical programming language, or alternatively with PLCopen.
- 128kB of non-volatile memory for the safe storage of important machine and process data.
- SD card plug slot for backing up and restoring application software, firmware and control parameters without a PC.
- Local digital and analog inputs and outputs: 13 digital inputs, four digital outputs, an analog input and an analog output (expandable using AKT series EtherCat bus terminals).
- Direct connection of the operating device through the integrated Kollmorgen Visualization Builder (KVB) HMI software and full support of the Kollmorgen AKI series operating devices.
- A central connection for the PLC, HMI, motion control, servo amplifier and CAM designer.
- Shorter startup times due to error detection using simulation during application development.
- Simple integration into available automation architectures with optional Ethernet/IP, ProfiNet or Modbus TCP interfaces.
- Web server integrated into the user interface, no additional software costs.