

Distributed Servo Technology

The drive for the machine design of tomorrow



KOLLMORGEN

Because Motion Matters™

AKD[®]-N Distributed Servo Amplifier

Distributed around the machine with highly integrated functionality and unrivaled connection technology, the new AKD-N servo drives from KOLLMORGEN can be installed in the vicinity of the motor thanks to robust construction and IP67 protection rating. AKD-N offers a complete solution for the next generation of machine design – helping simplify design and reducing the machine footprint.

Lower machine complexity

Secure plug-in connectors, unlimited range of motor options, mounting where there is already space, a high degree of integrated functions: These are only four of the benefits of the distributed AKD-N servo drives. Connect many AKD-N drives to a common power supply (“AKD-C”) via EtherCAT to reduce complexity even further, and use the optional network port to connect remote I/O devices without additional network hubs and long cable runs. Likewise, assembly and installation is a breeze - No industrial electrical training is needed.

More freedom in design

“Less is more” holds true for machine design when considering size, power, or complexity. Free up your design with a thin single cable between motors, drives, and power supply. The space achieved can be used for smaller cable ducts, lighter trailing chains, and tighter pass-throughs – or simply for more design freedom in the development of new machines.

OEE: Overall Equipment Effectiveness

KOLLMORGEN’s distributed servo drive system increases the efficiency over the entire life cycle of a machine (overall equipment effectiveness, OEE). First, the design configuration and the simple connection technology decrease the time for assembly, installation and startup in machine construction. 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 via high environmental protection level as well as space-saving electrical cabinet superstructures for an increase in production space. Moreover, the installation and connection technology increases the machine uptime – and thereby the productivity – because maintenance and service tasks are completed faster.

The advantages of distributed drive technology

- Reduced costs
 - Reduced cabling because DC and network, power, I/O and safety (STO) run in one cable
 - Fast and simple assembly requires no special training through ready-made, keyed, screw lock cables
 - Pick the optimum motor for the machine. No derating of oversized motors as required by most integrated solutions
- Compact machines
 - Smaller electrical cabinets
 - Servo amplifiers mounted in the immediate vicinity of the motor
 - Robust drive-enclosure construction to IP67 protection class which eliminates the requirement for additional environmental shielding
- Faster startup
 - IP67 rated plug connectors for connection without tools
 - At only eleven millimeters, the thin hybrid cable has a small bend radius and pass through diameter to help save space – even in cramped machine corners
 - Connect remote I/O modules and network devices directly to the drive via the optional 3rd EtherCAT port
 - Parameterization and data analysis with the graphical-based Kollmorgen Workbench®
- Higher machine effectiveness (OEE)
 - Fast and effective cleaning
 - High operating safety through robust construction
 - Lower connection count and elimination of manual wiring increases uptime
- More flexibility in machine design
 - Compatible with any Kollmorgen servo motor technology whether standard rotary, direct drive rotary or linear
 - Simple combination of central and distributed drives within the comprehensive AKD family
 - Faster modification and upgrade options through linear topology as well as I/O and network interfaces at the drive

AKD-N Distributed Servo Technology: Our way to make machines simpler

An overview of the advantages:

- Lower machine complexity
- More design freedom
- Higher OEE (overall equipment effectiveness)

■ Connection of external energy management
■

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



■ MotionBus (EtherCAT) for connection to automation systems
■

■ Startup with the Kollmorgen WorkBench
■

■ Simple connection of local I/O
■

■ 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
■
■



and more effective

■ Distributed solution reduces effort and costs for switch cabinet
■



■ Complete integration in the AKD family
■

■ Status LED for simple diagnosis

■ Options like an auxiliary network port and local STO offer maximal flexibility
■

■ Simple and fast attachment
■

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

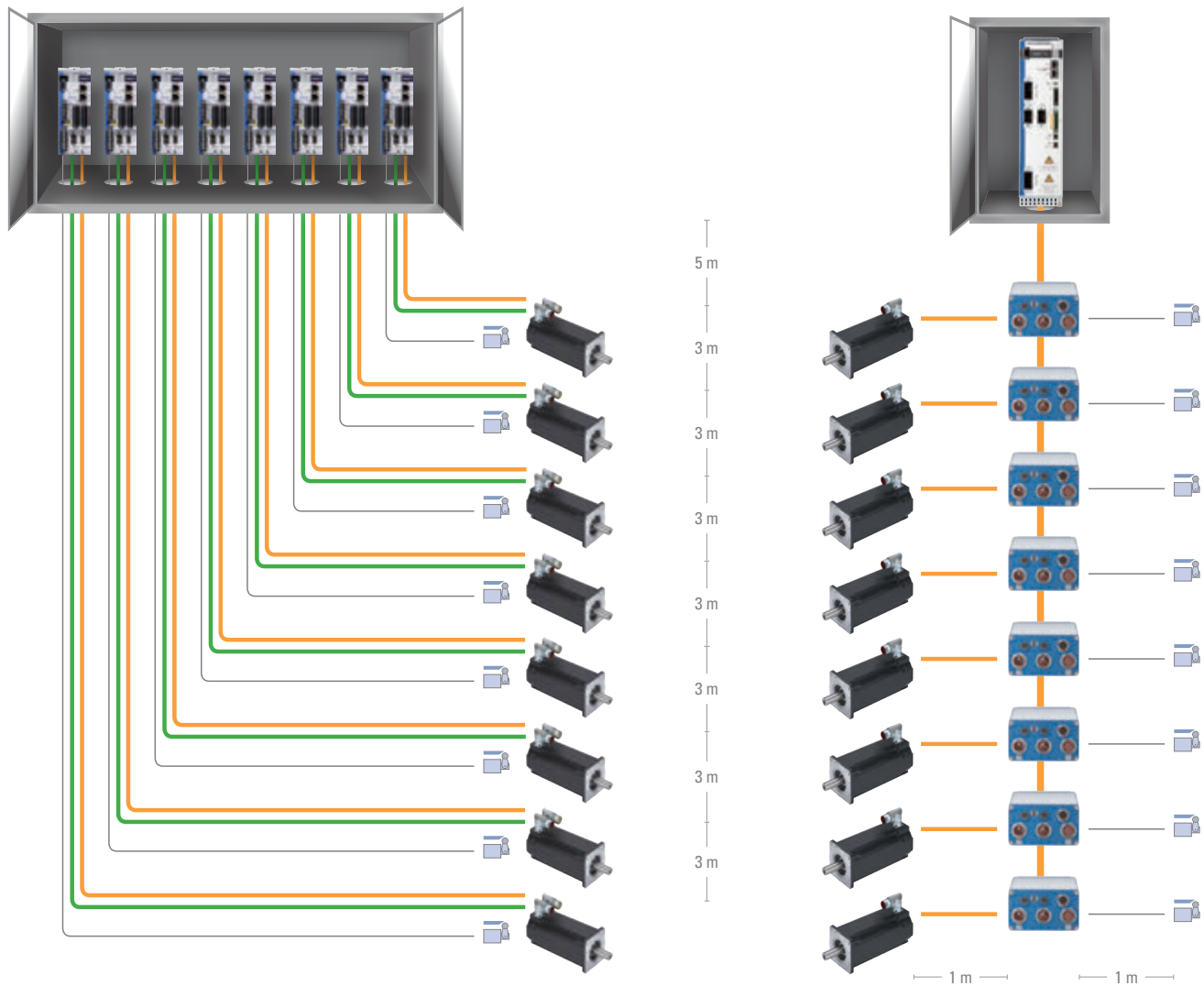
■ Compatible with all motors from Kollmorgen
■

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

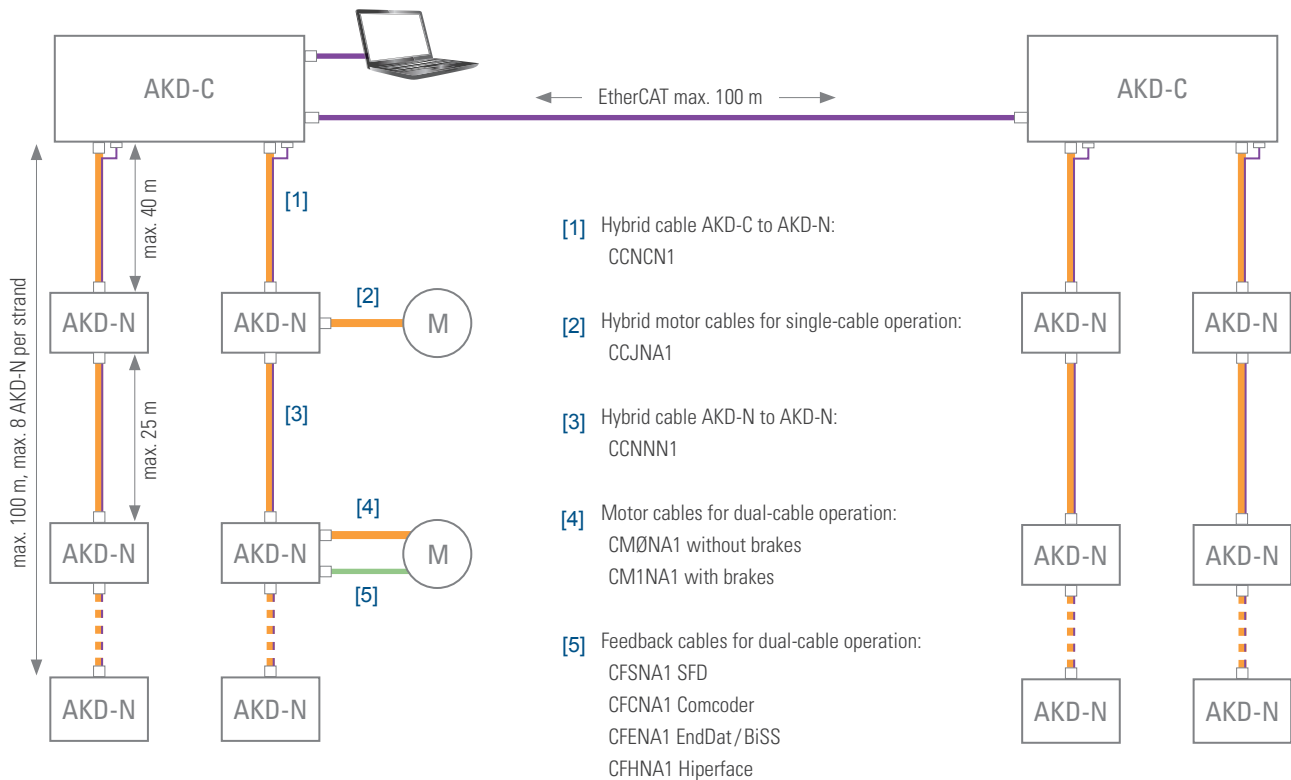


Why lay 372 meters of cable when 42 meters will suffice?

Consider an eight axis machine, with three meters between each motor and five meters distance to the drive cabinet. This system would have a total of 372 meters of cable with standard drives - with the AKD-N, it would have 42 meters. The distributed servo technology saves 330 meters in this example. Those are cables that don't have to be purchased; don't need to be laid; and don't require any space in the machine. This highlights just one of the many reasons to evaluate a distributed design for your machine. Additionally, you can connect the AKD-N servo drive and power supply module via ready-made and tested system cables and plugs - it couldn't be simpler.



Technical Data and Topology



AKD-N Distributed Servo Drive

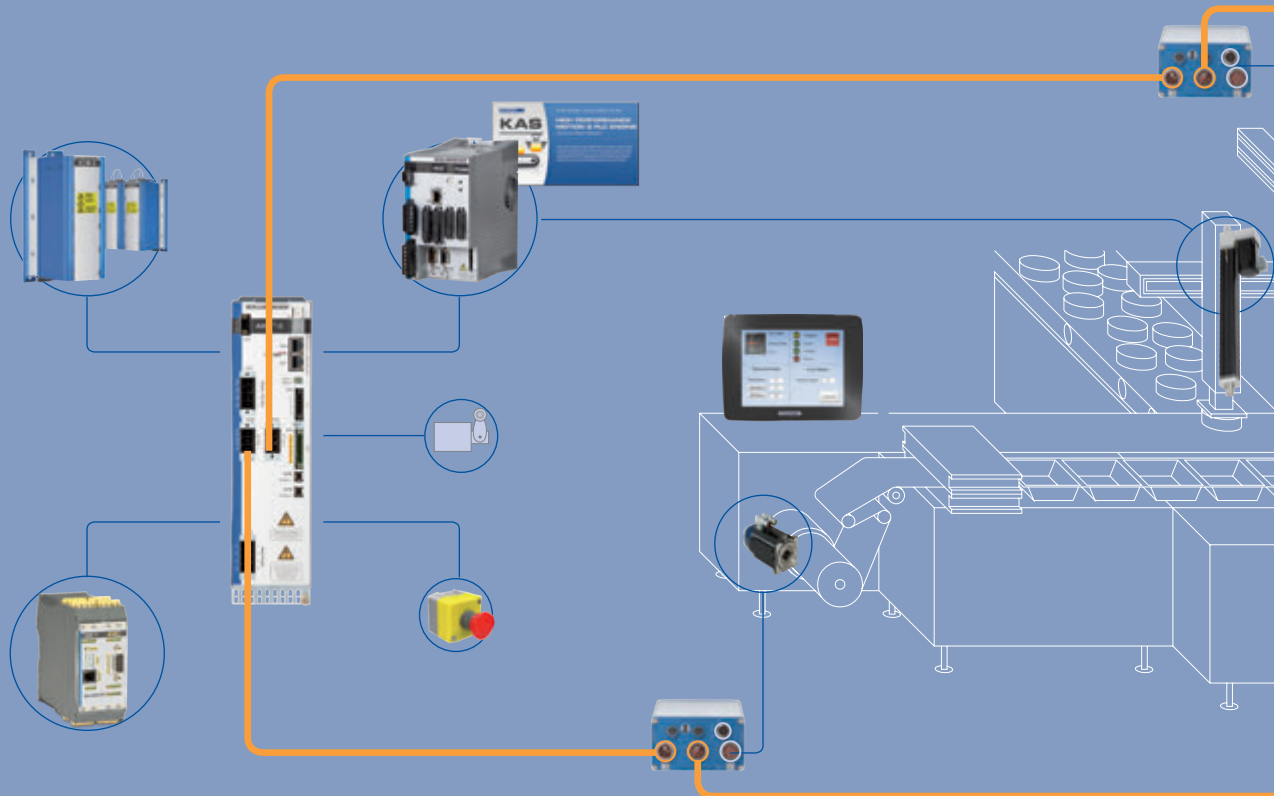
Continuous current	3 A, 6 A
Peak current	9 A, 18 A
Continuous input power	1.5 kVA, 3 kVA
Protection type	IP67
Digital inputs/outputs	3 digital inputs/ 1 digital output
Safety function	STO SIL 2/ PL d (only AKD-N-DS)
Feedback systems Dual-cable (not with -DB)	SFD (digital resolver), BiSS-C, Comcorder, hall sensor, Endat 2.1 and 2.2, Hiperface
Feedback systems Single-cable	SFD3 (digital resolver) and Hiperface DSL
Communication	EtherCAT
Dimensions (W x H x D)	Housing: 130 x 75 x 201 (mm) With plugs 130 x 75 x 247 (mm)

AKD-C Power Supply Module

Line voltage	400/480 Vac 3Ø
Overall performance	10 kW
Intermediate circuit voltage	560/680 Vdc
Output current	17 A (peak 34 A)
Protection type	IP20
Output strands	2, for up to 16 AKD-N drives total on a single power supply
Safety function	one STO Enable and STO Status for each strand, SIL 2/ PL d
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)

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

AKD PDMM



- High-performance servo amplifier with integrated multi-axis master controller
- Functional scope of the Kollmorgen Automation Suite
- 3 in 1: Servo amplifier, PLC and motion controller
- Profinet, Ethernet/IP and Modbus TCP standard

KCM Condenser Modules

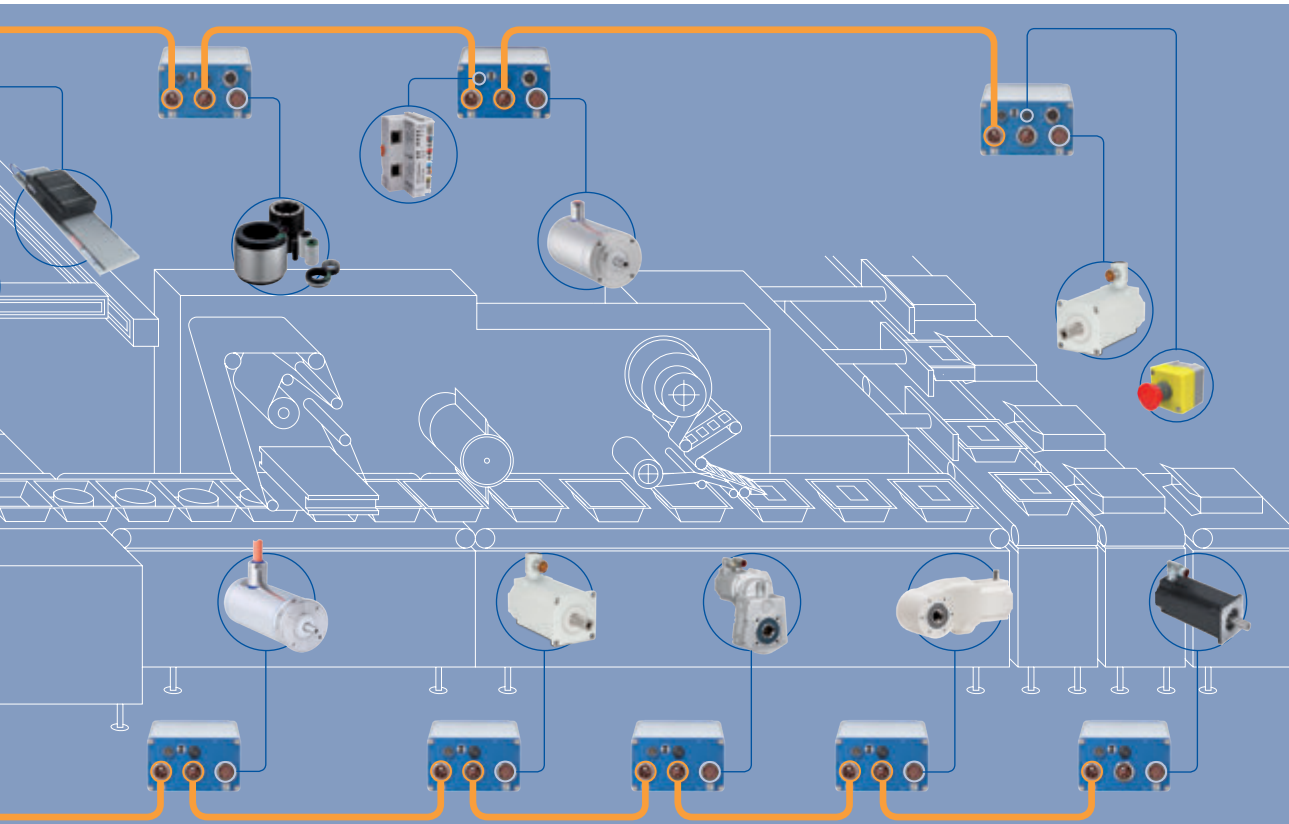


- Reduces the energy costs and prevents downtime
- Simple Implementation
- No harmonics in the power cables
- Scalable capacity

KSM safety controller



- Machine and motion safety in one device
- More than 200 verified safety functions
- Flexible – scalable from 1 to 12 secure axes
- High safety standard – Safety Level SIL 3 / PLe



AKM Servo Motors

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



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



AKMH Stainless Steel Motors

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



AKM Food-Grade Gearmotor

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



Cartridge DDR Rotary Direct Drives

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



KBM Direct Drives with No Housing

- Low weight, exceptionally compact
- Modular system

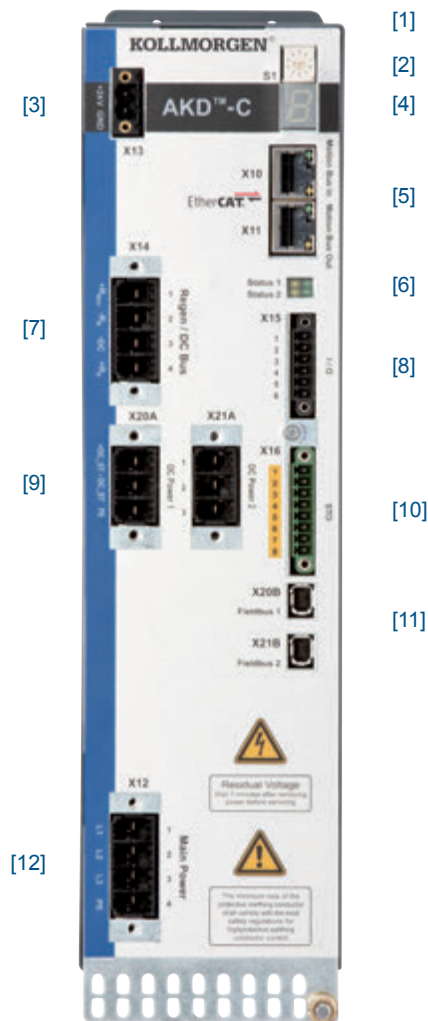


DDL Linear Motor

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

Connections and Controls

Power supply module AKD-C

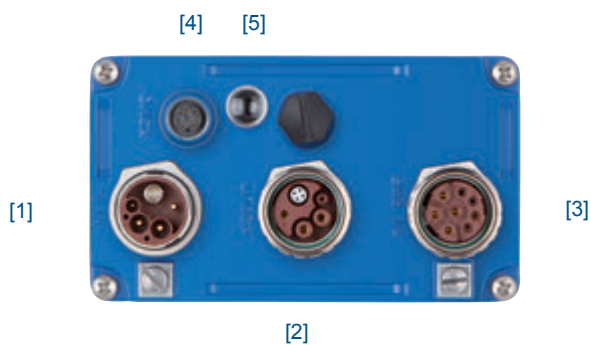


- [1] Network connection for service PC (TCP/IP) (on the top)
- [2] Rotary dial for setting the IP address
- [3] 24 V DC power supply
- [4] Error and status displays
- [5] Motion Bus connections (EtherCAT)
- [6] Status display of the local network
- [7] Connection for external brake resistor or KCM buffer module
- [8] I/O (1 each digital input and output, 1 relay output)
- [9] DC outputs for connection of up to eight distributed AKD-N servo amplifiers on each connection
- [10] STO input, STO status output (one each per strand),
- [11] Local network for communication with AKD-N
- [12] Power connection 400/480 Vac 3Ø

Connection options for AKD-N

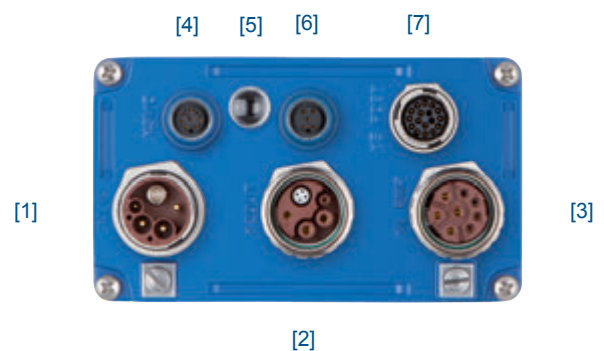
AKD-N-	Single-cable technology	Separates Feedback	Digital E/A	Tertiary Network	Local STO
DB	✓	—	✓	—	—
DF	✓	✓	✓	✓	—
DS	✓	✓	✓	—	✓

Distributed AKD-N-DB servo amplifiers



- [1] [2] Connections for hybrid cable
- [3] Motor connection
- [4] 3 digital inputs, 1 digital outputs
- [5] Status/error display with LED

Distributed AKD-N-DS, -DF servo amplifiers



- [1] [2] Connections for hybrid cable
- [3] Motor connection
- [4] 3 digital inputs, 1 digital outputs
- [5] Status/error display with LED
- [6] STO connection (-DS) / Auxiliary network port (-DF)
- [7] Connection for feedback with dual-cable technology

Plug and Play – regardless of the motor

It's good to know that our distributed AKD-N servo drives will work with every motor, whether standard rotary, linear, Direct Drive, or customized. The Kollmorgen solution allows to you realize the advantages of the distributed single-cable connection technology for any machine.

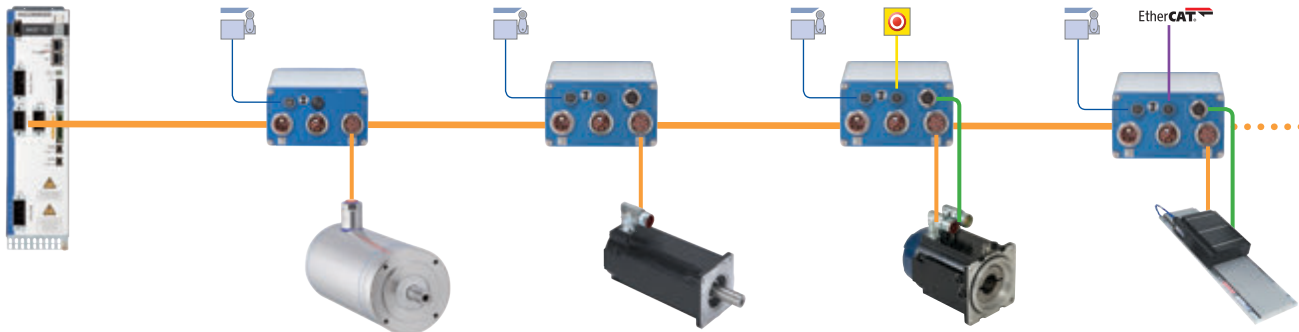
AKD-C
Central power supply module for up to 16 distributed AKD-N servo amplifiers

AKD-N-DB
For motors with single-cable connection

AKD-N-DS/-DF
For motors with single cable connection. Local STO (-DS) or network (-DF). The feedback input is not wired.

AKD-N-DS
For motors with separate feedback, with local STO safety function.

AKD-N-DF
For motors with separate feedback, with local network interface.



Model Nomenclature

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 Extension)
- M = Multi-axis Master Drive (Requires MC Extension option, and EC Connectivity option)

Current Rating

- 003 = 3 Amp
- 006 = 6 Amp
- 010 = 10kW (With Version C, this field refers to power.)
- 012 = 12 Amp
- 024 = 24 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*

AN = Analog command

- CC = CANopen OR EtherCAT
- CN = CANopen
- EC = EtherCAT
- EI = EtherNet/IP
- PN = PROFINET
- SQ = SynqNet

Drive Version Availability

- B, P, T
- P
- P
- C, M, N, P
- P
- P
- B

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

Extension

- CB = without extension
 - DB = hybrid motor cable
 - DF = additional EtherCAT port + feedback connector
 - DS = local STO + feedback connector
 - IC = Expanded I/O version and SD card slot ("T" version drive only)
- NB = Without extensions**

About Kollmorgen

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

For assistance with your application needs in North America, contact us at: 540-633-3545, support@kollmorgen.com or visit www.kollmorgen.com for a global contact list.

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- Global Design & Manufacturing
- Global Manufacturing



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