# AKD®-N Decentralized Servo Drive

The new 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 Drives

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.
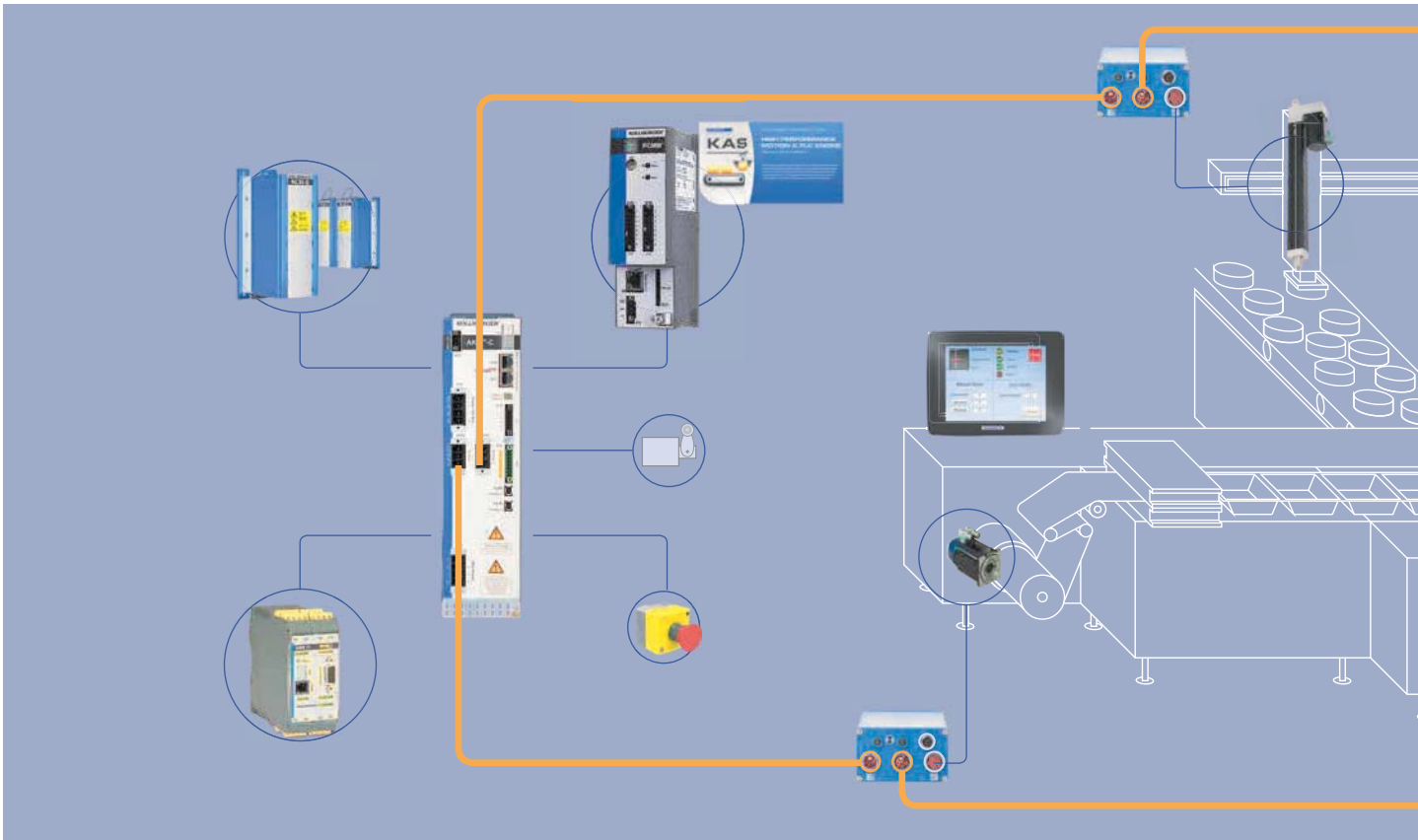


**Kollmorgen Automation Suite™**
- Scalable automation solution for drive-dominant applications
- Graphic motion programming
- Compatible with IEC 61131-3 and PLCopen Motion Control

**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**
- High-performance motion controller
- Functional scope of the Kollmorgen Automation Suite™
- EtherCAT®, 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
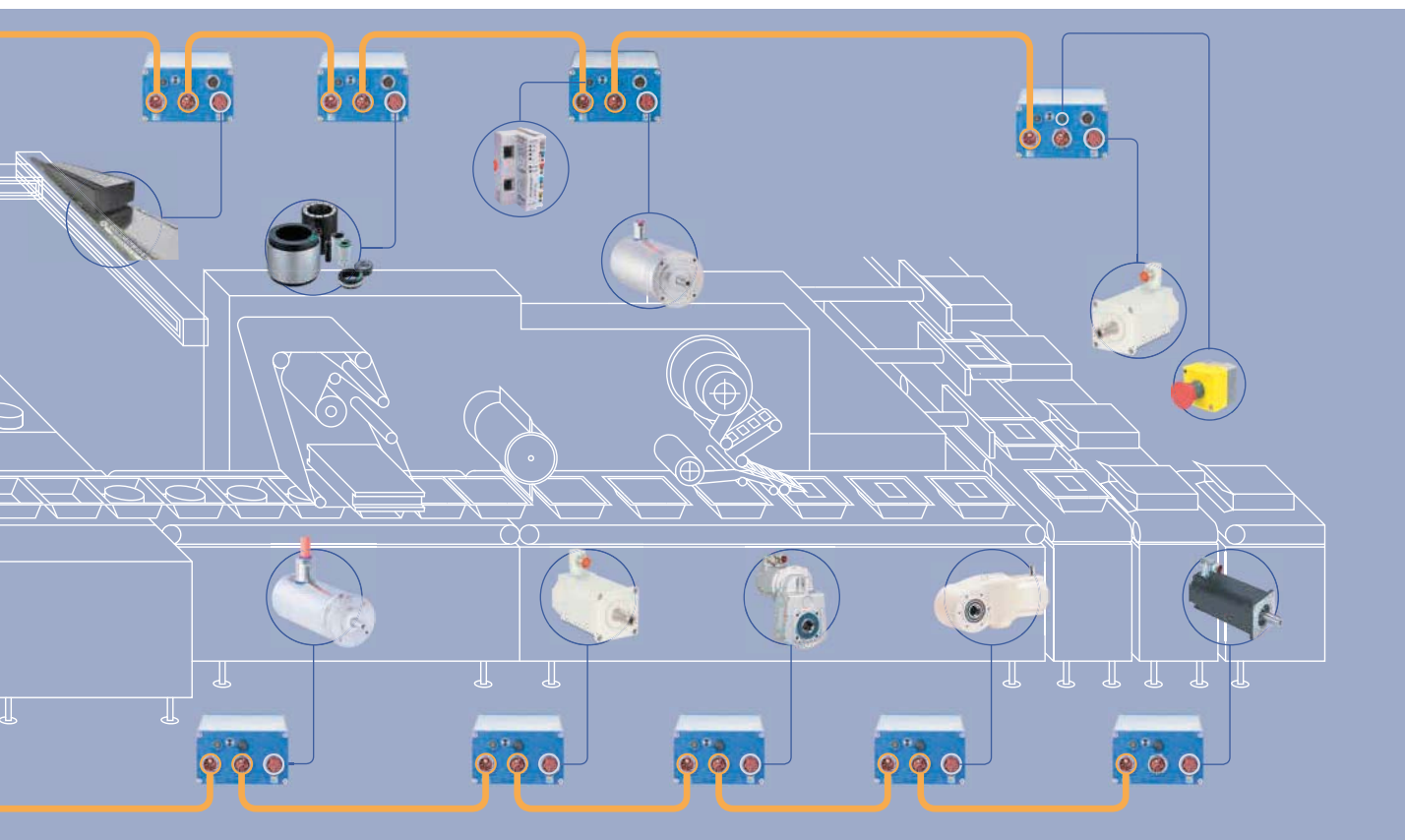
### AKM® Servo Motors

- 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™ Hygienic Stainless Steel Servo Motors

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

### AKM Food-Grade Gearmotors

- 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

### ICH Direct Drive Linear Motors

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

# AKD®-N Decentralized Servo Drives

## 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

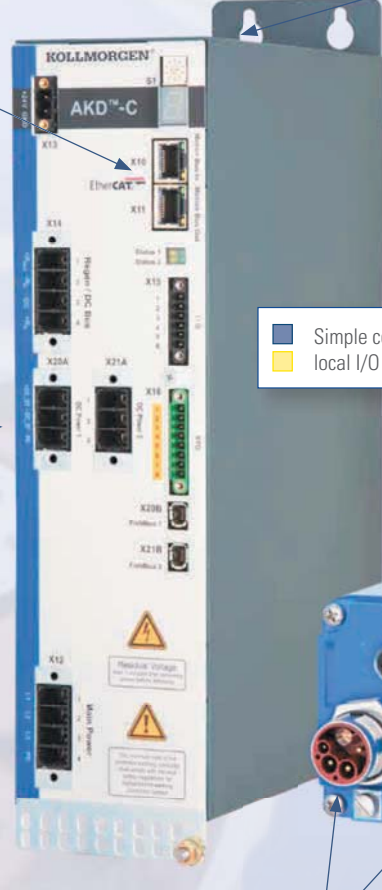■ ■ Decentralized solution reduces effort and costs for switch cabinet

■ ■ Startup with the Kollmorgen WorkBench

■ ■ MotionBus (EtherCAT®) for connection to automation systems

■ ■ Connection of external additional components

■ ■ Status LED for simple diagnosis

■ ■ Simple connection of local I/O

■ ■ Options like tertiary network and local STO offer maximal flexibility

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

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

■ ■ Simple and fast attachment

■ ■ 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

■ ■ ■ Hybrid motor cable for simplified cabling, faster installation and higher reliability
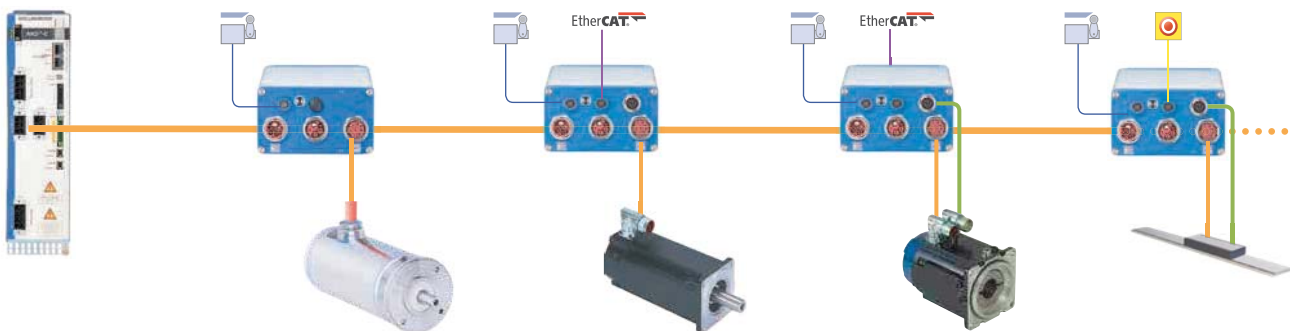
# Why Lay 372 m of Cable when 42 m Will Suffice?

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 meter of cable – with our AKD-N it would have been 42 meter. The decentralized servo technology of the AKD-N saves 330 meter 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.
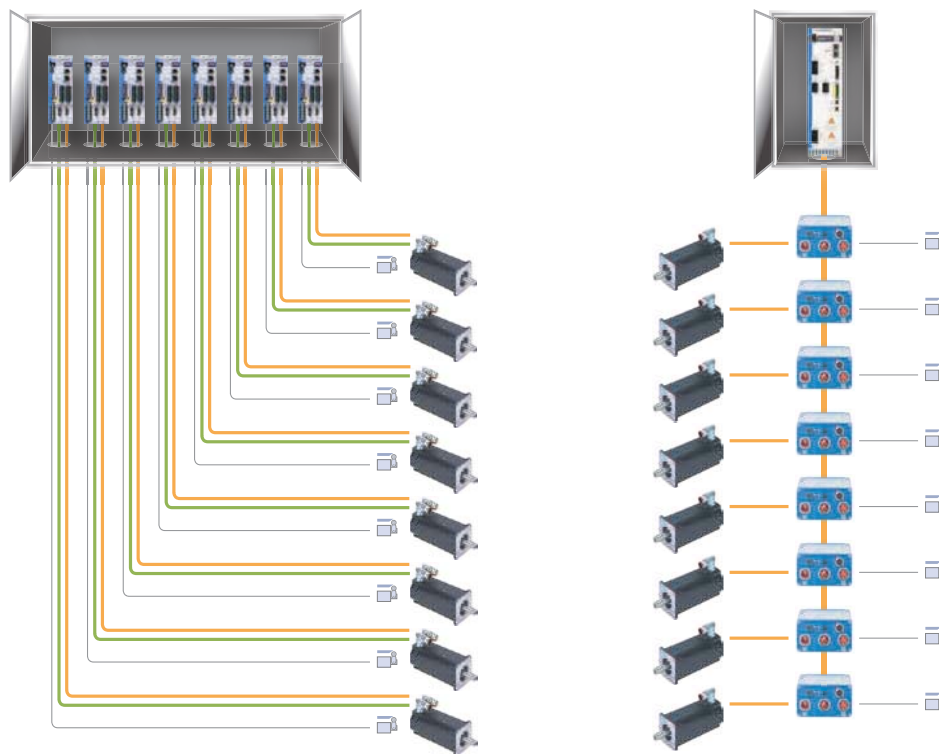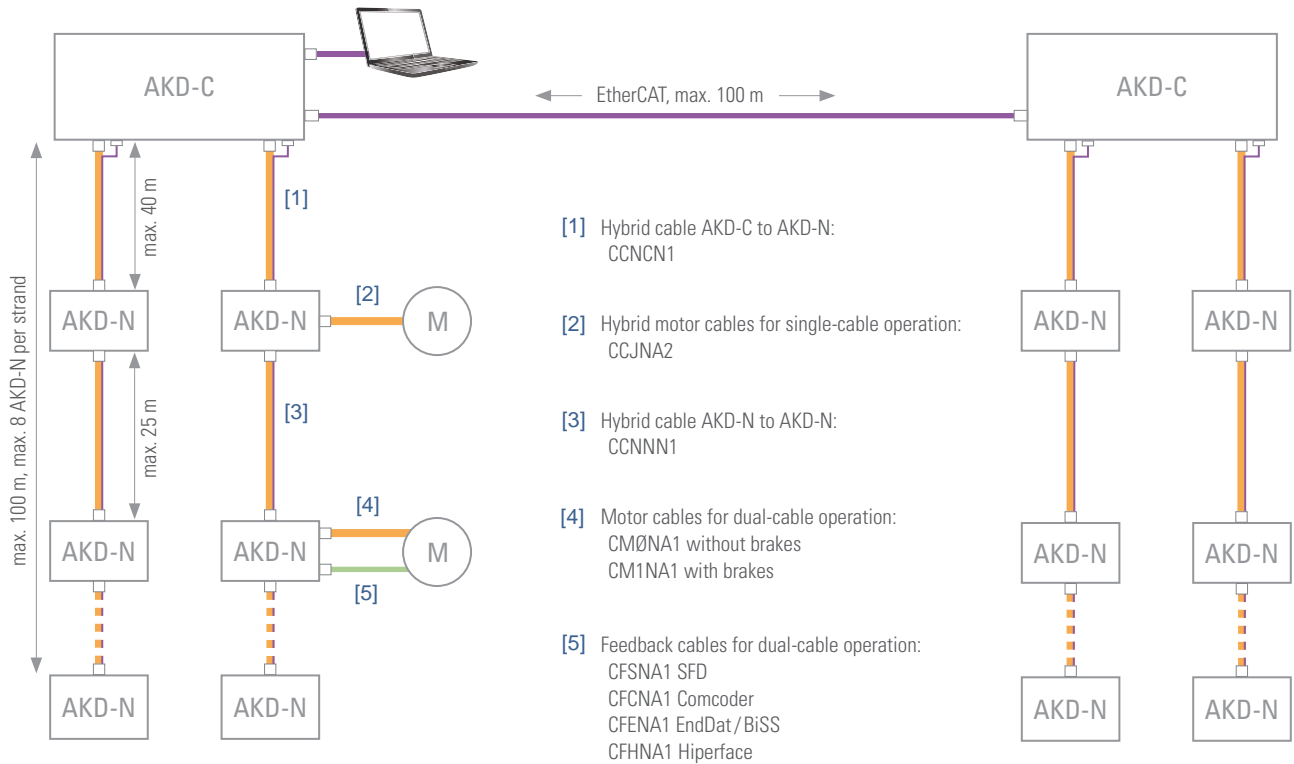


## Regardless of which Motor: Plug and Play

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 Drives

## Technical Data and Topology



AKD-C

EtherCAT, max. 100 m

AKD-C

max. 40 m

max. 25 m

max. 100 m, max. 8 AKD-N per strand

[1]

AKD-N

AKD-N

[2]

M

AKD-N

AKD-N

[3]

AKD-N

AKD-N

AKD-N

AKD-N

[4]

M

AKD-N

AKD-N

[5]

AKD-N

AKD-N

AKD-N

AKD-N

[1]  Hybrid cable AKD-C to AKD-N:
     CCNCN1

[2]  Hybrid motor cables for single-cable operation:
     CCJNA2

[3]  Hybrid cable AKD-N to AKD-N:
     CCNNN1

[4]  Motor cables for dual-cable operation:
     CMØNA1 without brakes
     CM1NA1 with brakes

[5]  Feedback cables for dual-cable operation:
     CFSNA1 SFD
     CFCNA1 Comcoder
     CFENA1 EndDat / BiSS
     CFHNA1 Hiperface

## 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), Hiperface DSL |
| 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 252 (mm) With plugs 3A, 6 A: 130 x 75 x 247 (mm) 12 A: 130 x 75 x 297 (mm) |

## AKD-C Power Supply Module

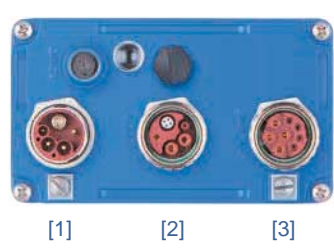| | |
|---|---|
| Line voltage | 400 / 480 V |
| Overall performance | 10 kW |
| Intermediate circuit voltage | 560 / 680 V DC |
| Output current | 17 A (peak 34 A) |
| Protection class | IP20 |
| Output strands | 2, for up to 8 AKD-N apiece |
| Safety function | One STO Enable and STO Status apiece 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 329 x 184 (mm) 80 x 329 x 231 (mm) |

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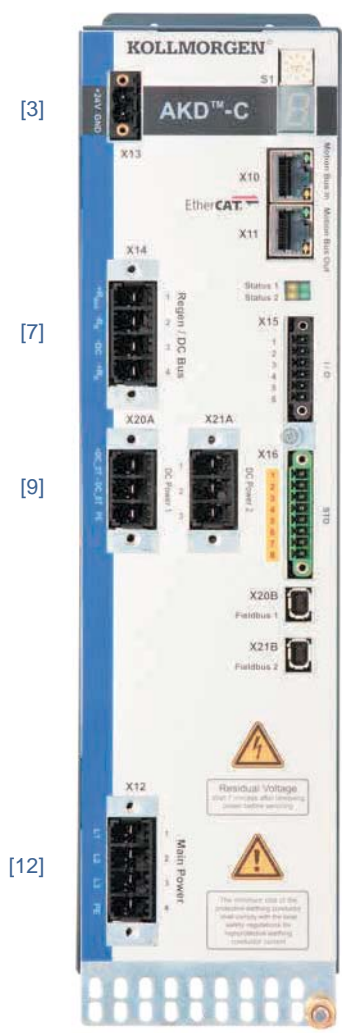
[1]   Network connection for service PC (TCP/IP) (on the top)

[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 fieldbus

[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 fieldbus 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

[4]   [5]

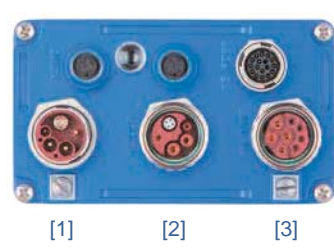[1]   [2]   [3]

[1] [2]   Connections for hybrid cable

[3]       Motor connection

## AKD-N-DF, -DS
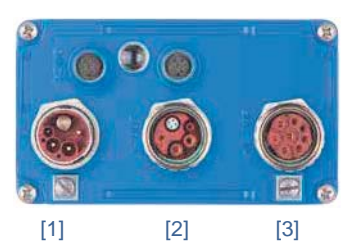
[4]   [5]   [6]      [7]

[1]   [2]   [3]

[4]   3 digital inputs, 1 digital outputs

[5]   Status/error display with LED

## AKD-N-DG, -DT

[4]   [5]   [6]

[1]   [2]   [3]

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

[7]   Connection for feedback with dual-cable technology