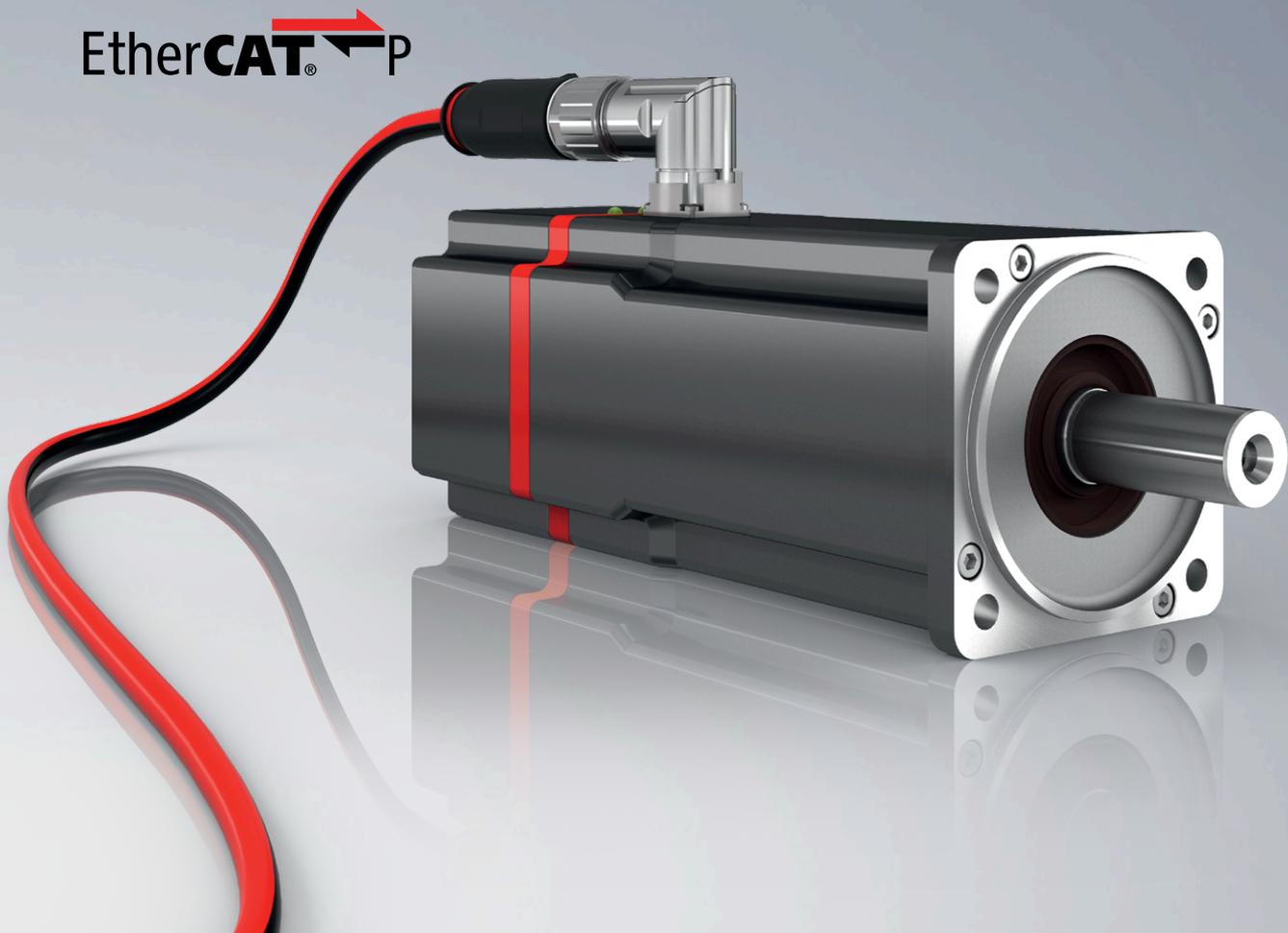


BECKHOFF New Automation Technology

Minimises the control cabinet:
AMP8000 Distributed Servo Drive system



Completes the highly scalable Beckhoff Drive Technology: the AMP8000



Compact Drive Technology



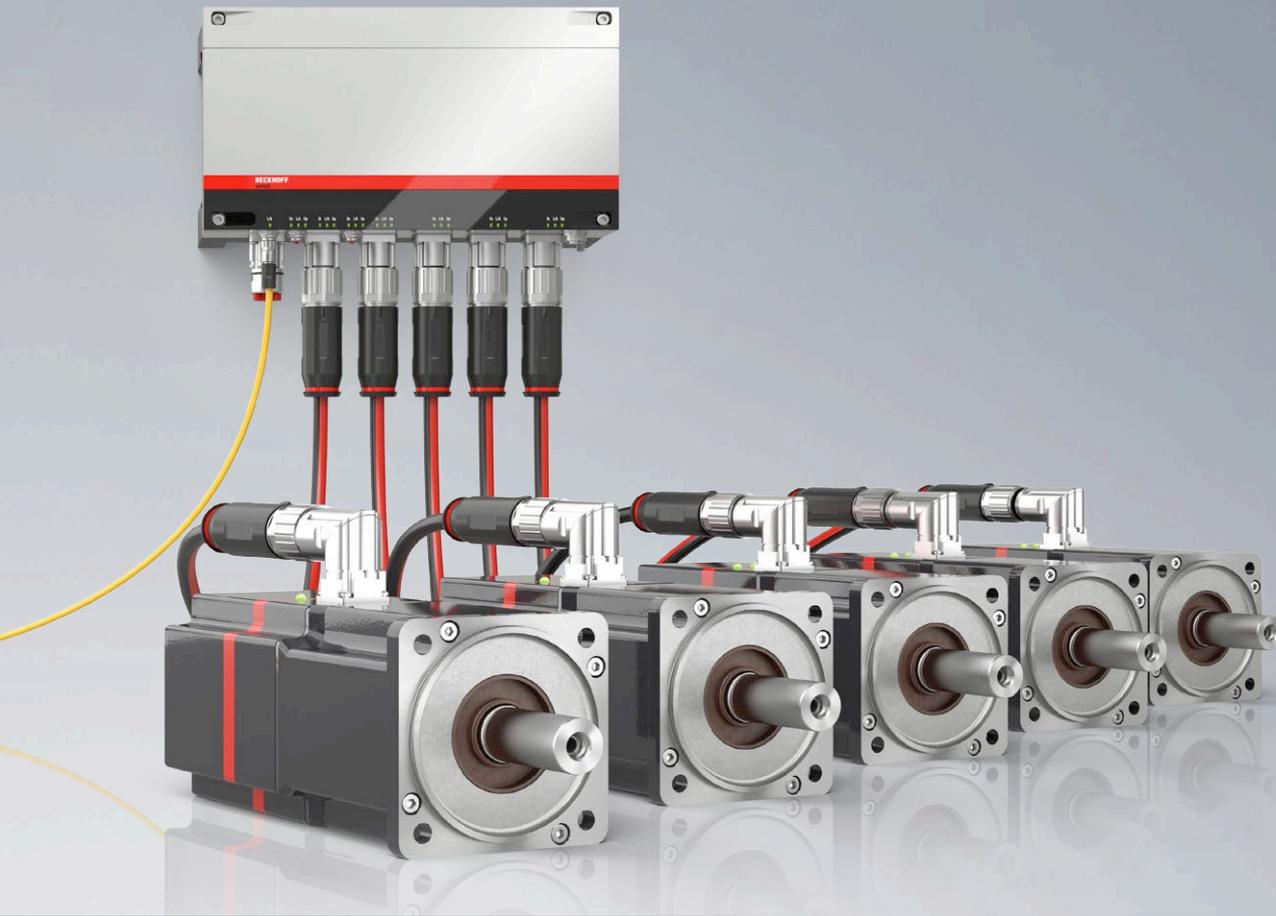
As a provider of scalable Drive Technology, Beckhoff offers a wide-ranging hardware and software portfolio for all requirements, price classes and areas of application: in addition to comprehensive motion control solutions from TwinCAT software and scalable motor series, a broad drive controller portfolio is also available, ranging from Compact Drive Technology directly at the I/O level

AX8000 | Compact multi-axis servo system



right on up to the flexible AX5000 Servo Drives. This range is supplemented by the highly compact AX8000 servo system: as a multi-axis servo system with modules that can be combined, the AX8000 puts high-performance drive technology with optimised space utilisation in any control cabinet to offer users a custom-fitted, individual solution for all motion tasks.

The AMP8000 distributed Servo Drive system opens up new avenues for modular machine concepts. It integrates a servo drive in a very compact design directly into the servomotor. Because the power electronics have been moved directly to the machine, the space required in the control cabinet is reduced to the size of a single coupling module, which supplies several servo drives with just a single cable via a distribution module. The result:

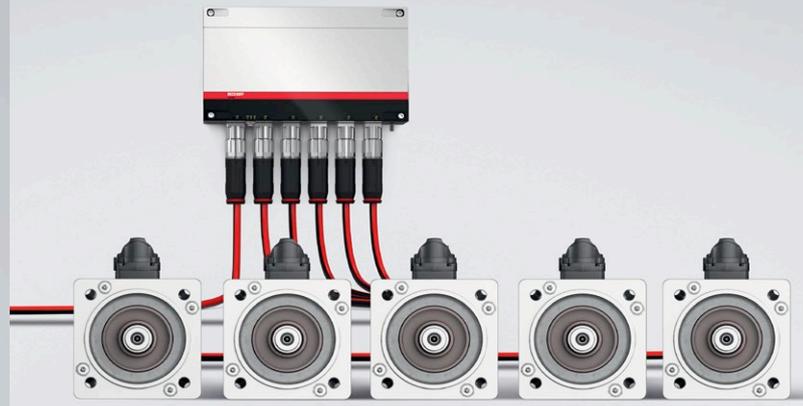


AX5000 | Servo Drives



AMP8000 | Distributed Servo Drive system

NEW



significant savings in terms of material, space requirements, costs and installation effort. A supply module with a high protection level even relocates the entire system directly to the machine. With just a few components, the AMP8000 system is very easy to configure because only a single type of cable is required to connect power supply modules, distribution modules and drives to one another. Such other com-

ponents as motor chokes, protection devices or filters are not required to operate the system. All connection and supply modules are also equipped with an EtherCAT P connection for the Beckhoff I/O portfolio. This simplifies the connection to further inputs, encoders or latch units significantly.

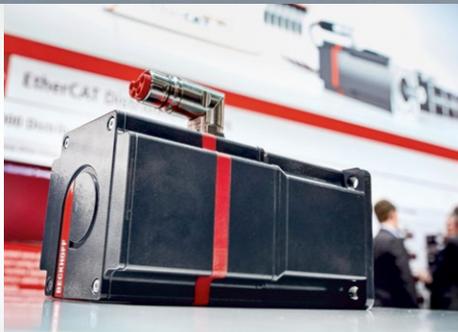
Highly scalable Beckhoff Drive Technology

- the optimal drive concept for every application
- Compact Drive Technology at the I/O level
- modular multi-axis servo system
- distributed Servo Drive system with high protection rating
- scalable motor series
- comprehensive motion control functionalities

The AMP8000 idea: integrated servo drive, minimised footprint



The AMP8000 consists of a combination of the tried-and-trusted AM8000 servomotors with a highly efficient servo amplifier. A new type of power electronics using coldswitch technology limits power loss to an unprecedented low level – and the installation space required for the electronics is reduced to an absolute minimum. The motor, however, retains its original form



factor; it remains mounting-compatible and achieves very nearly the same performance data as a comparable motor without built-in power electronics. This helps users with the design; they retain full flexibility to use either IP 20 or IP 65 solutions according to their requirements. The integrated secure single-turn or multi-turn encoders enable the AMP8000 to be used in applications where functional safety



Status LEDs

Rotatable connector

Single-tooth winding for highest torques

Identical attachment dimensions as proven standard motor series AM8000 and AM8500

Backlash-free permanent magnet holding brake

Powder-coated
– scratchproof
– durable

– Modular design
– Greatest possible variability

High-quality radial bearing
– service life 30,000 hrs
– maximum axial and radial loadability

is required. In most cases, there is no longer any need for a mechanical limit switch. The AMP8000 is connected using an EtherCAT P cable; further connections are not required for operation.

It is an important benefit in machine design, that the AMP8000 system enables full integration of the drive technology into the most individual machine concepts. Even different

servo systems can be interconnected to enable efficient energy management.

- highly efficient power output stage equipped with coldswitch technology
- safe encoder integrated
- same high performance as proven AM8000 servomotors
- exceptionally high efficiency
- Made in Germany quality product

Flexible configuration for individual machine concepts

Power supply module

AMP8620 power supply module with integrated safe 24 V power supply unit

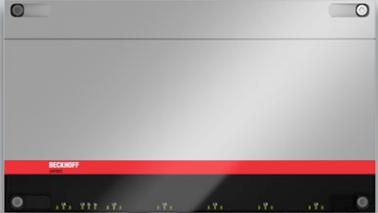
AMP8620 power supply module



Distribution module

The AMP8805 distribution module is equipped with five outputs for the connection of further servo drives or distribution modules and an integrated EtherCAT P output for additional EtherCAT P box modules.

AMP8805 distribution module



AX8000 compact multi-axis servo system

up to 75 m

Control cabinet, large

Machine



5 OCT connections

Control cabinet, small

Machine



EtherCAT P

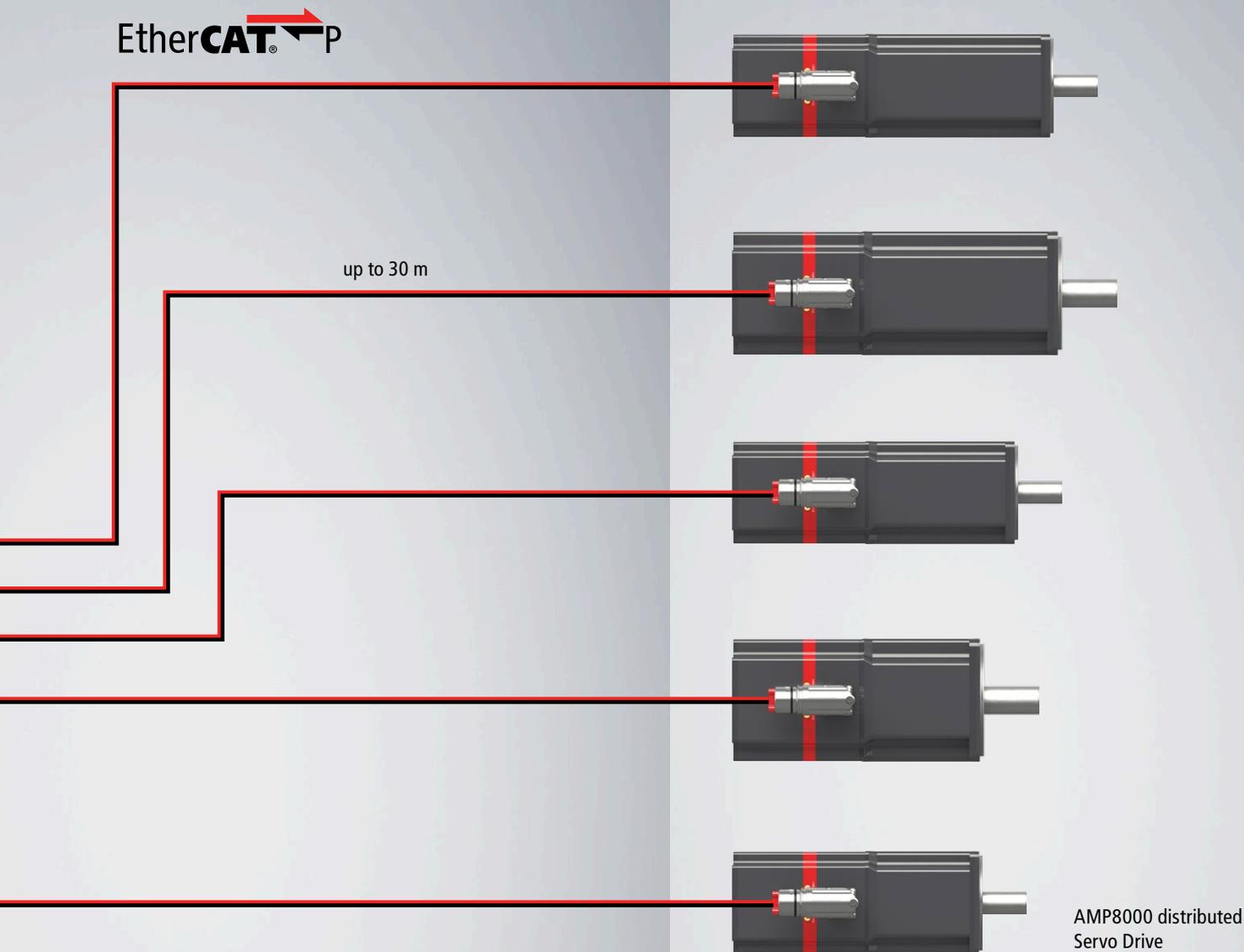
One Cable Automation

EtherCAT

EtherCAT P: One Cable Automation for the field level

The EtherCAT P one-cable solution combines communication and power supply between control cabinet and machine in a single cable.

EtherCAT[®] P



Distributed Servo Drives

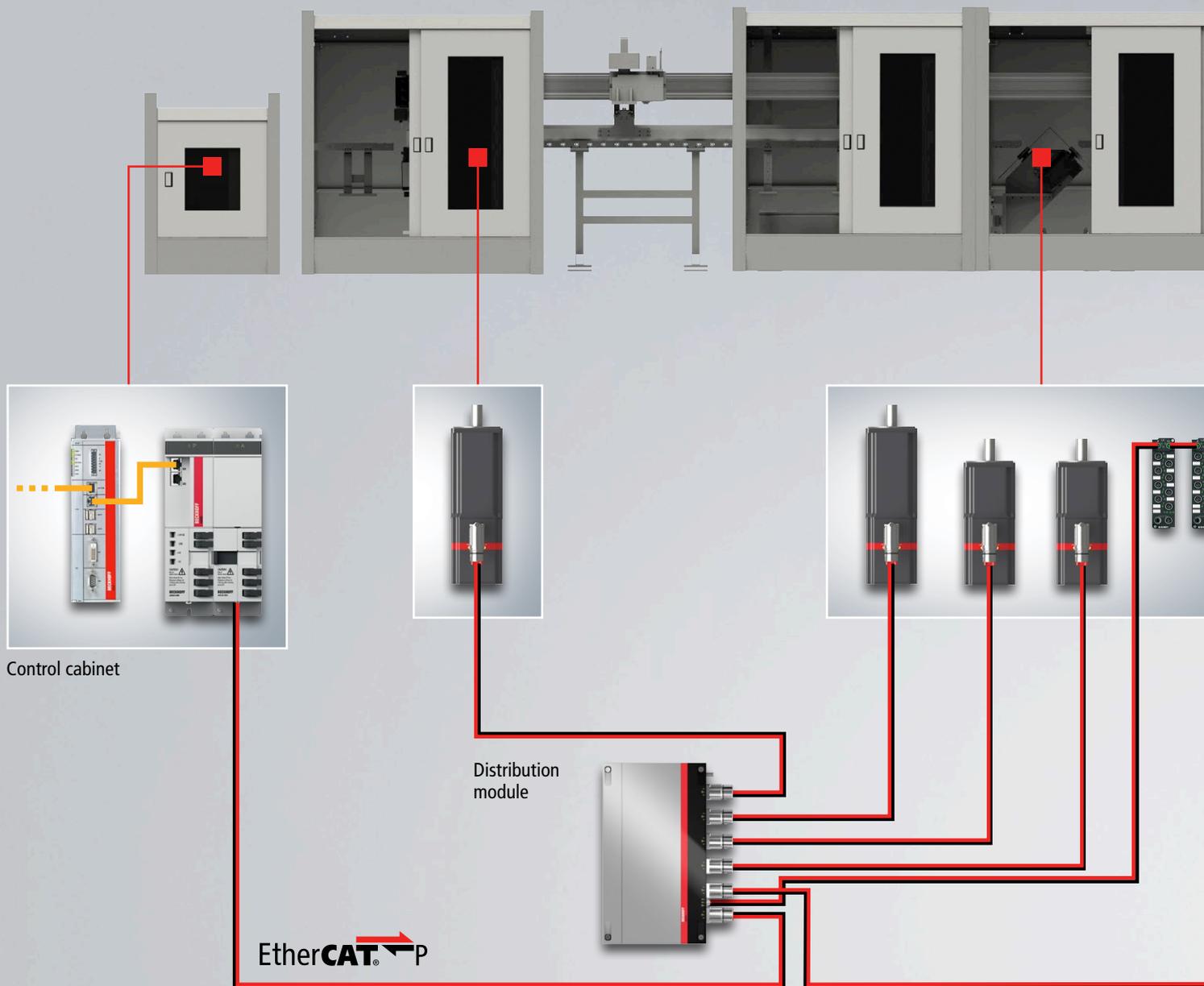
Permanent magnet-excited three-phase synchronous motors with integrated servo drive

All machine concepts can be implemented with the AMP8000 system. It can be flexibly adapted to individual requirements – this design flexibility can be used to minimise the space requirements in the control cabinet or to completely integrate the system into the machine as an IP 65 version. Only one cable type is required for the entire system cabling. The preassembled system cables

significantly reduce the time and cost required for logistics, cabling and commissioning and minimise the risk of error. Additional components such as motor chokes and protection devices are not required.

- flexible design supports all machine concepts
- high IP 65 protection rating for use at the machine
- simplified cabling
- low costs for installation and commissioning
- minimises or eliminates space requirements in the control cabinet

Consistently distributed: with simple cascadability

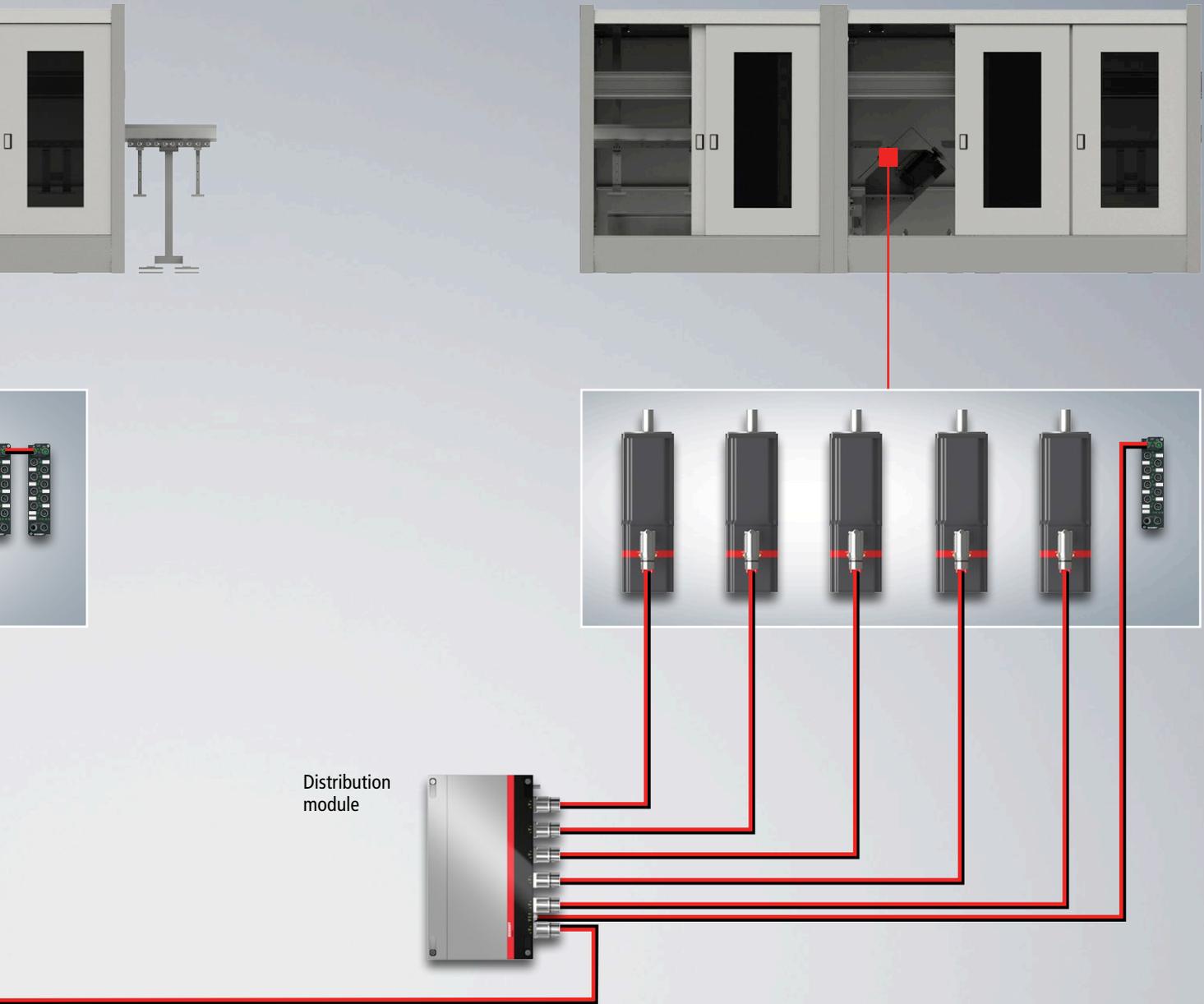


The AMP8000 distributed Servo Drive system is the ideal solution for modular machine concepts because it can be flexibly adapted to accommodate every need.

With the help of the AX883x coupling module, the AMP8000 system can be very easily integrated into the AX8000 servo system in terms of power supply. This provides for automatic energy

exchange in the common intermediate circuit of the overall system. The system can be cascaded virtually in any way desired. For this purpose, any output on the distribution module can be used.

Modular machines require modular drive solutions. Optional machine modules can be very easily integrated into a basic machine module using only one supply line. All the designer has to



Distribution module

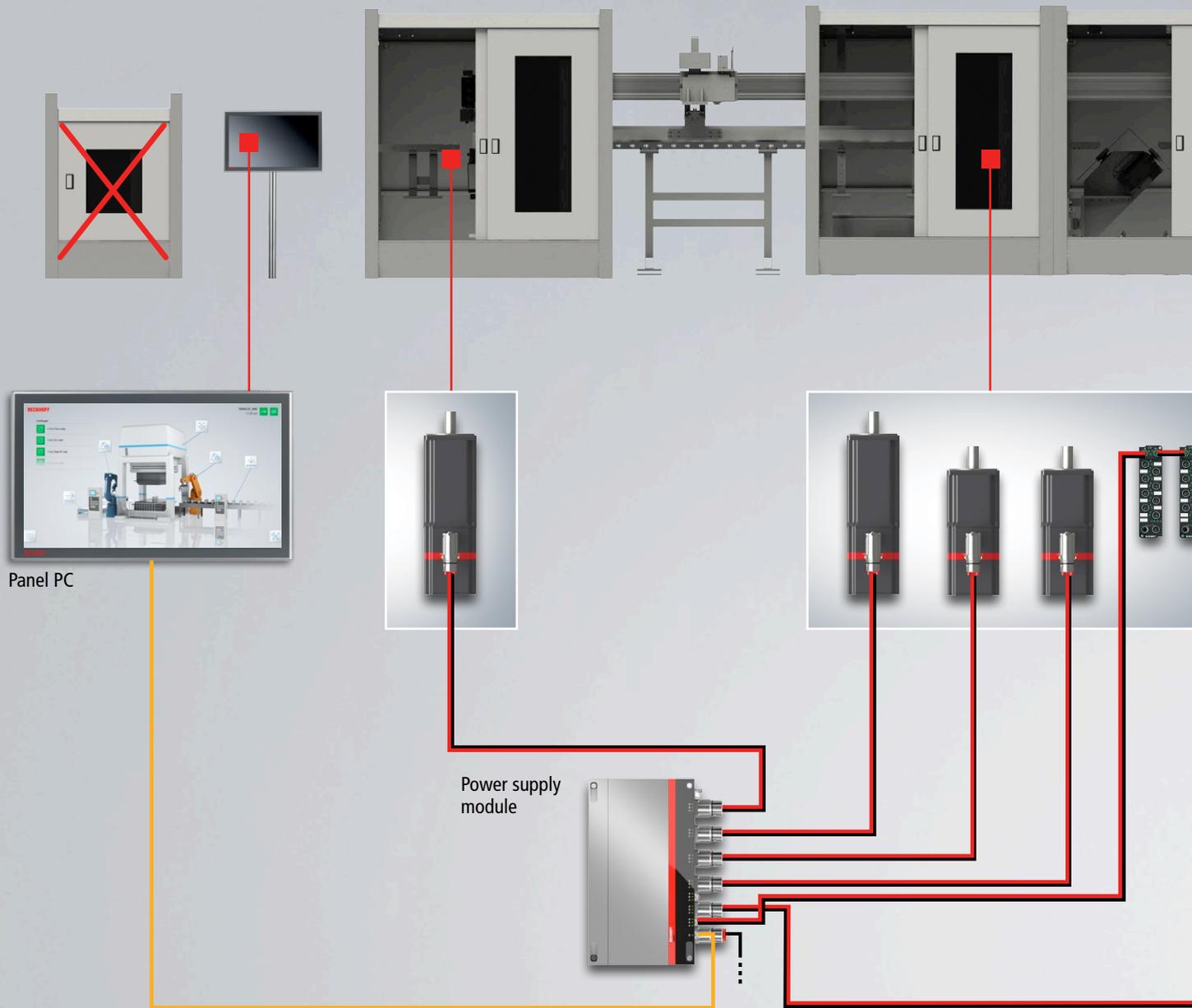
take into consideration is the power consumption required. Cascading can also be used to accommodate very long cable lengths for large machine designs and extensive installations.

The EtherCAT P connection integrated into the distribution modules serves as the interface to the EtherCAT P modules. This is where the components for the collection of the required

I/O signals can be connected. An additional power supply unit is not required as the components are supplied with safe 24 V voltage via the distribution module.

- ideal solution for modular machine design
- automatic system-spanning energy management
- simple integration of optional machine modules
- integration of required I/O signals via EtherCAT P modules
- distribution module with safe 24 V power supply available

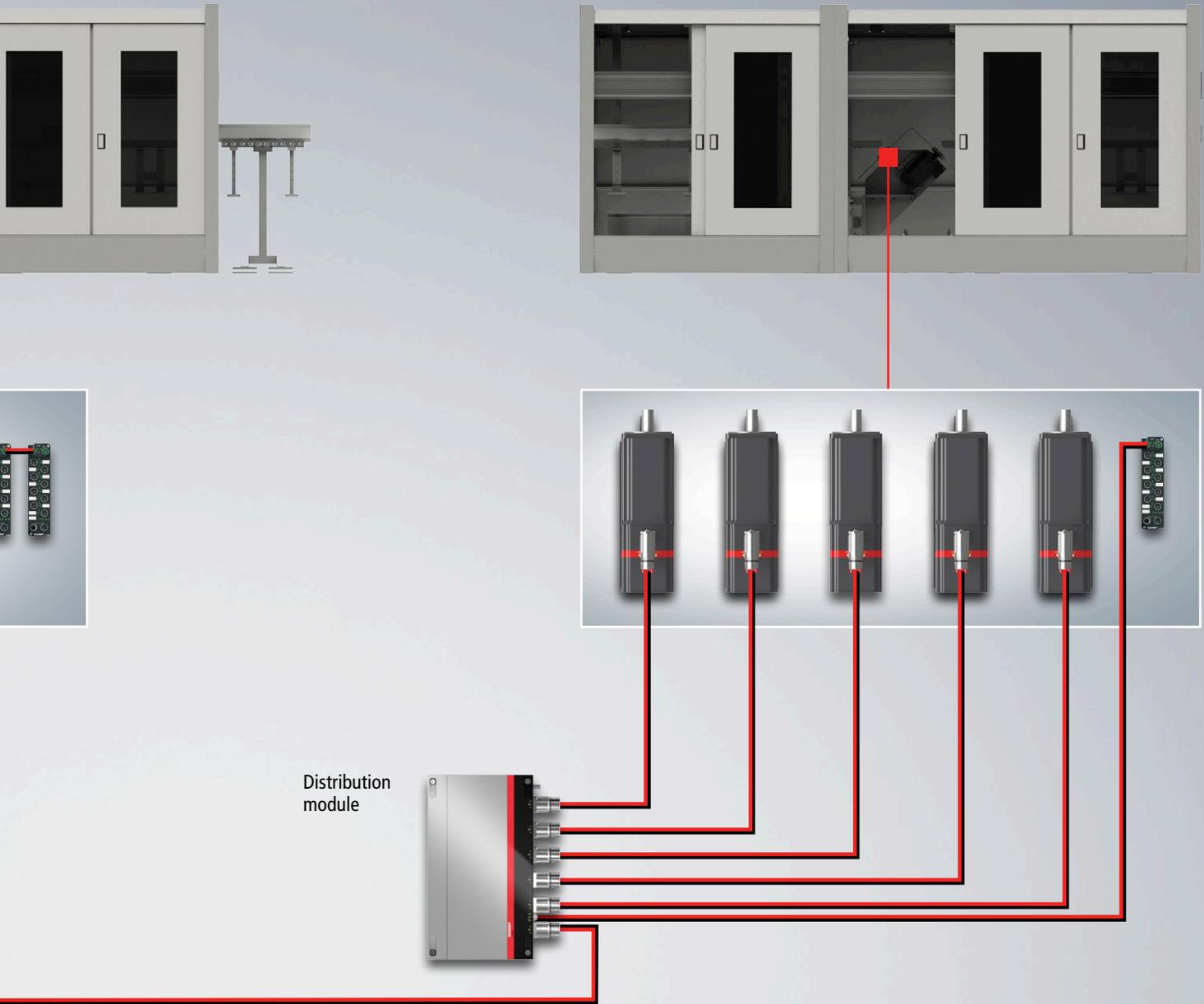
Consistently distributed: drive technology outside of control cabinets



In another expansion stage, the control cabinet space required for drive technology is completely eliminated. While previously the space requirements in the control cabinet for connecting the drives with the coupling modules was reduced to just one cable, it is now completely eliminated when the AMP8620 power supply module is used. This further reduces the floor space required and the

cabling effort for the entire machine. The air conditioning resources that would otherwise be necessary for the control cabinet are also eliminated.

The AMP8620 module is directly connected to the mains supply. It contains all required circuit components, such as mains filter, rectifier and charging circuit for the integrated DC link capacitors. Additional



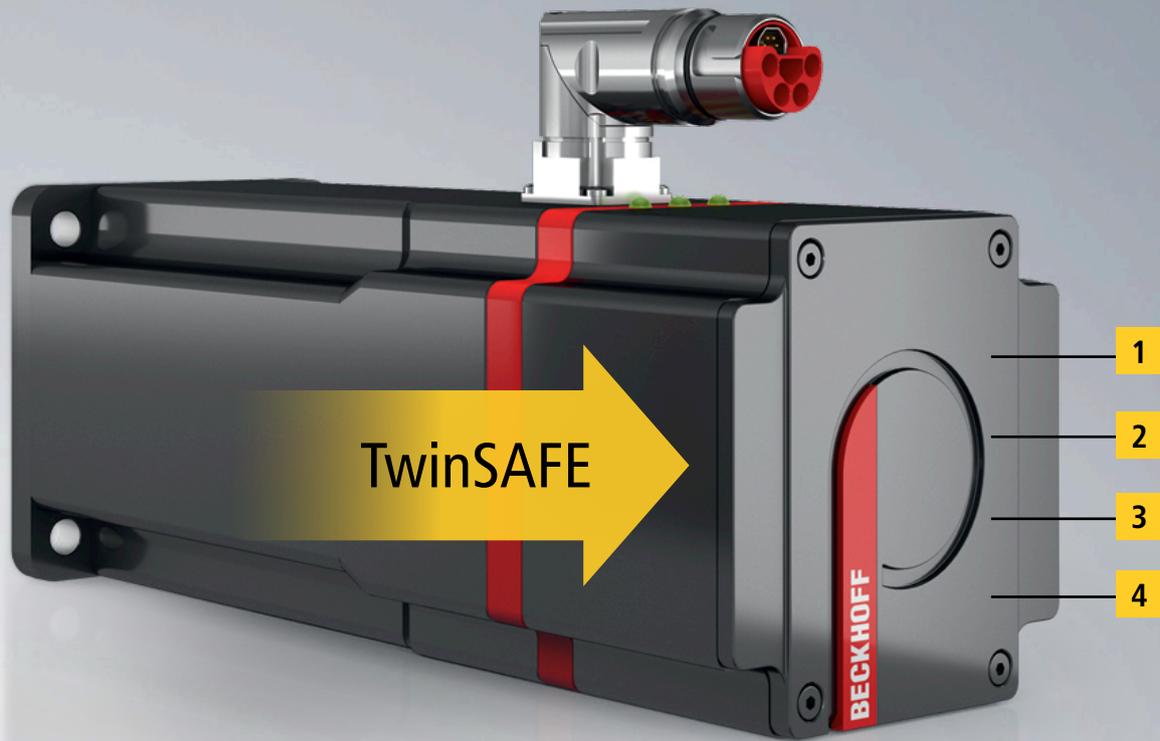
distribution modules or distributed AMP8000 Servo Drives can be optionally connected to the supply module. It is equipped with two EtherCAT P outputs, which can be used to either supply EtherCAT P modules or contact additional supply modules required for system expansion. The safe 24 V power supply unit integrated into the power supply module ensures that the logic power supply

does not exceed the permissible level.

The intermediate circuit capacitors integrated into the supply module store the regenerative energy of the entire system and then make it available again for acceleration processes. This ensures that the energy supplied is used in the best possible way.

- concept without control cabinets
- minimised machine footprint
- integrated safe 24 V power supply unit
- energy efficiency through energy exchange via intermediate circuit
- high IP 65 protection rating for use at the machine

System-integrated as well: TwinSAFE with 15 safety functions



- 1 Integrated safety functions via FSoE
- 2 **Standard:** STO, SS1
- 3 **Optional*:** SS2, SOS, SLS, SSM, SSR, SMS, SLP, SCA, SLI, SAR, SMA, SDIp, SDIn
- 4 **TwinSAFE Logic**

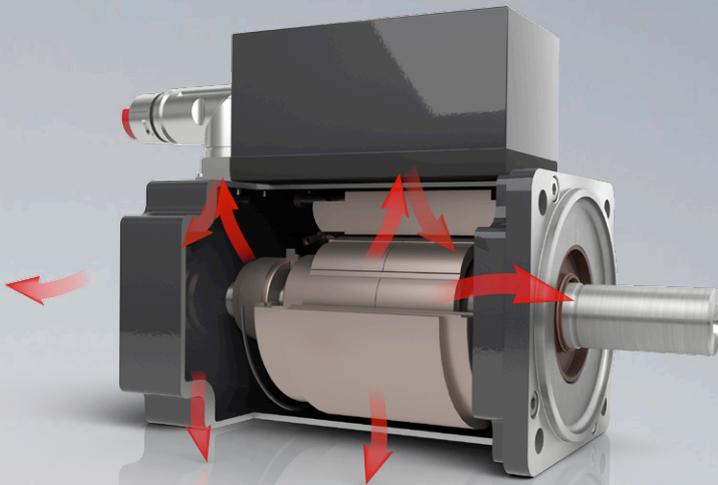
* in preparation

Even the standard version of the AMP8000 Servo Drive has the STO and SS1 safety functions on board. Like the optional Safe Motion functions, they are controlled via FSoE (Fail Safe over EtherCAT). The integrated TwinSAFE Logic also

enables a modular approach to be introduced into safety applications. The safety requirements of individual machine modules can be processed separately and then combined via the TwinSAFE Logic.

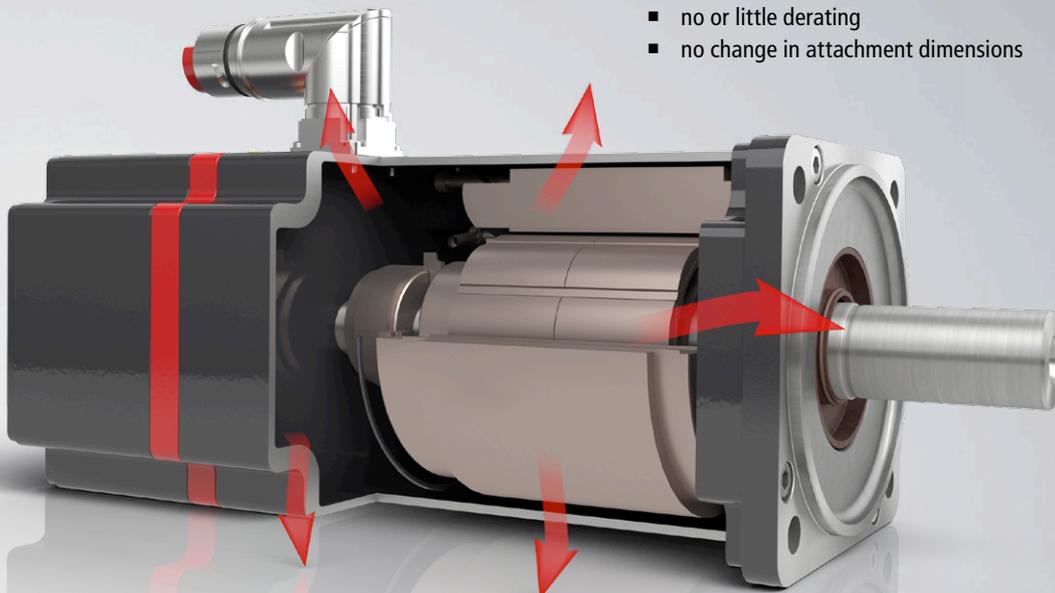
- 15 TwinSAFE motion functions
- STO and SS1 as standard functions
- controlled via FSoE
- no additional wiring requirements
- integrated TwinSAFE Logic

Minimised derating with highly efficient power output stage



Disadvantages of top mounting

- limited heat dissipation
- derating of approx. 25 – 30 %
- change in attachment dimensions



Advantages of rear mounting

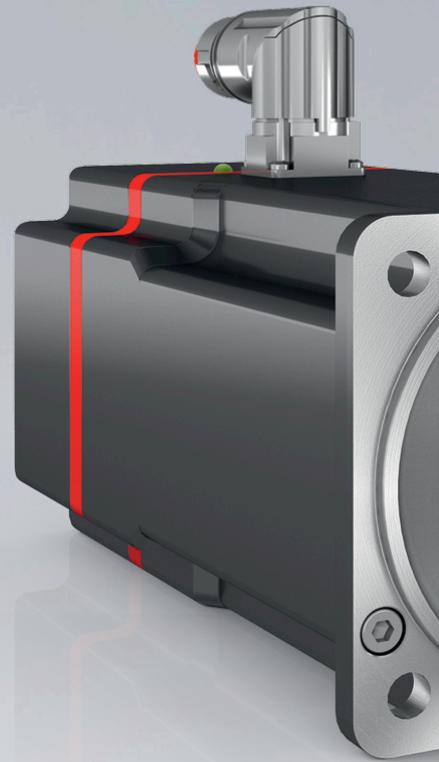
- virtually unobstructed heat dissipation
- no or little derating
- no change in attachment dimensions

The AMP8000 has been designed for maximum efficiency. A prerequisite for this was the development of a highly efficient power output stage based on coldswitch technology. It generates such low power dissipation that the required construction volume is extremely small. In addition, the electronics were not placed on top the windings as is usual, but at the rear shaft

end. Due to the optimised design with virtually unobstructed heat dissipation, an AMP8000 Servo Drive offers almost the same high performance as a comparable servomotor without attached power electronics.

- highly efficient power output stage in coldswitch technology
- thermally optimised placement of power electronics
- minimised derating compared to standard servomotors

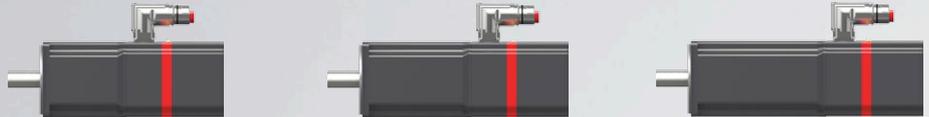
Scalable performance classes: the AMP8000 portfolio



AMP804x

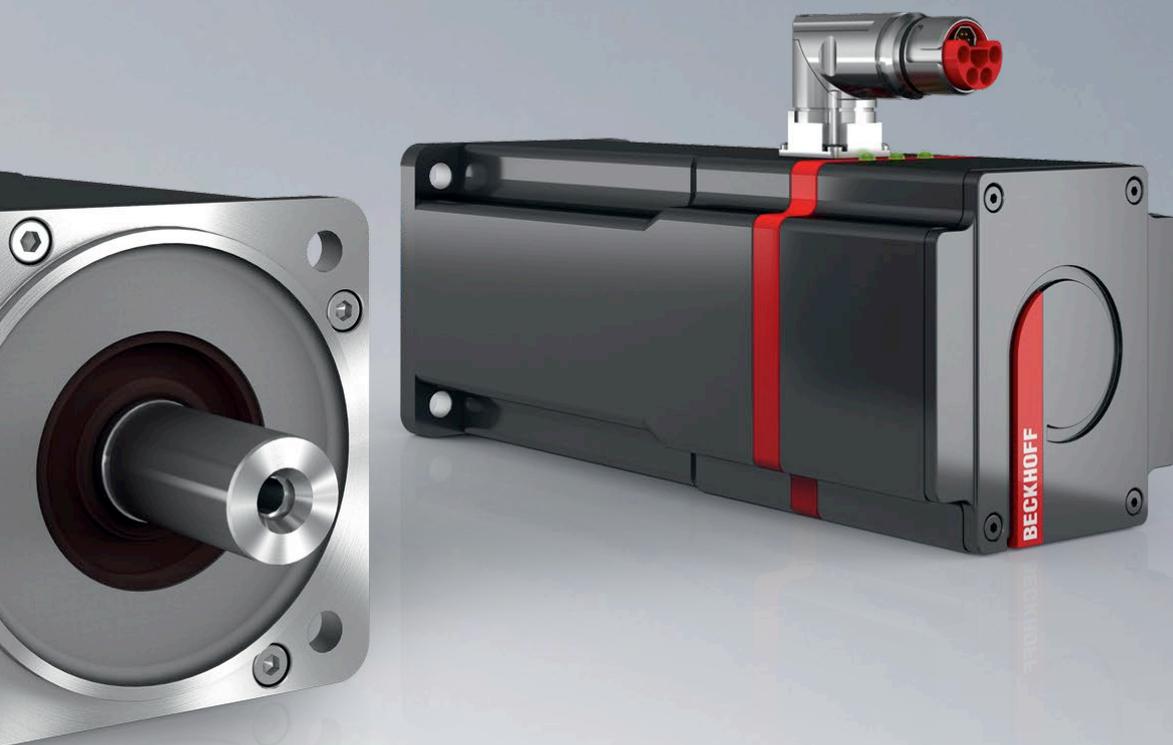
AMP804x Servo Drive with flange size F4:

► www.beckhoff.com/amp804x



Data for 400 V AC	AMP8041-wDyz/-wEyz	AMP8042-wEyz	AMP8043-wEyz
Standstill torque	2.24 Nm/2.41 Nm	3.88 Nm	5.32 Nm
Rated torque	2.19 Nm/2.29 Nm	3.71 Nm	5.01 Nm
Rated speed	3000 min ⁻¹ /6000 min ⁻¹	2500 min ⁻¹	2500 min ⁻¹
Rated power	0.69 kW/1.44 kW	0.97 kW	1.31 kW
Peak torque	11.87 Nm/11.02 Nm	22.42 Nm	29.10 Nm
Standstill current	1.57 A/2.97 A	2.04 A	2.74 A
Peak current	8.30 A/13.6 A	11.80 A	15.00 A
Rotor moment of inertia	1.09 kgcm ²	1.98 kgcm ²	2.87 kgcm ²
Weight	4.45 kg	5.45 kg	6.25 kg
Holding torque brake (Mbr)	9 Nm	9 Nm	9 Nm
Rotor moment of inertia with brake (J)	1.73 kgcm ²	2.63 kgcm ²	3.52 kgcm ²
Weight with brake (m)	5.25 kg	6.25 kg	7.45 kg
Connection technology	ECP B23 plug	ECP B23 plug	ECP B23 plug
One Cable Technology	yes	yes	yes

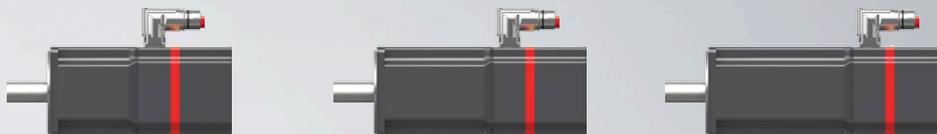
We reserve the right to make technical changes.



AMP805x

AMP805x Servo Drive with flange size F5:

► www.beckhoff.com/amp805x

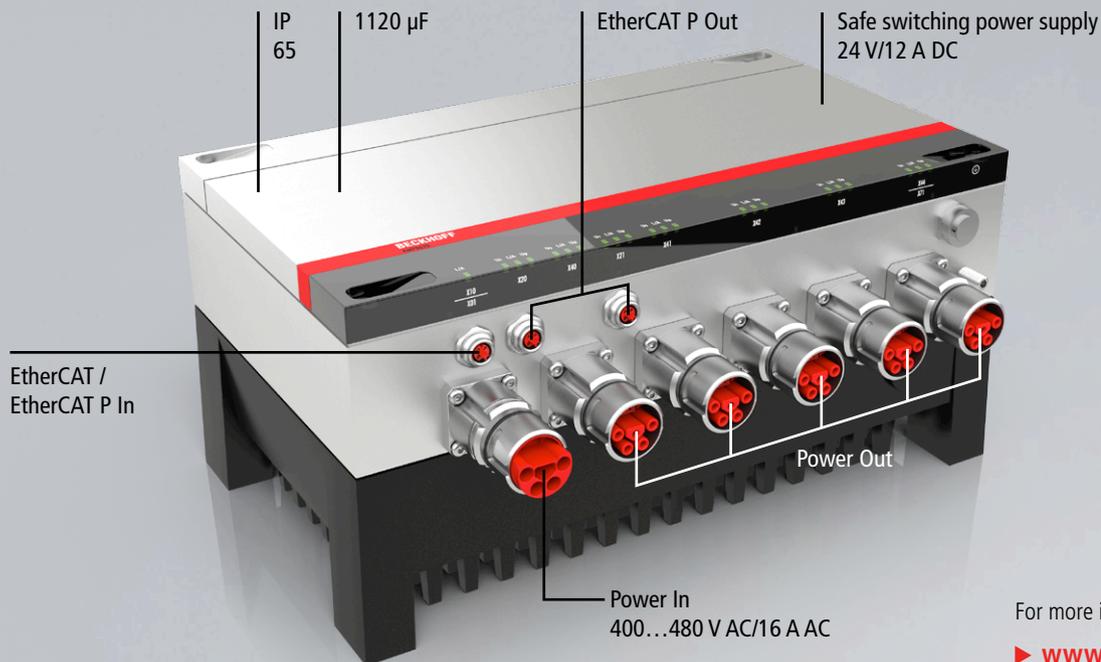


Data for 400 V AC	AMP8051-wEyz/-wGyz	AMP8052-wFyz	AMP8053-wGyz
Standstill torque	4.54 Nm/4.60 Nm	7.77 Nm	10.75 Nm
Rated torque	4.37 Nm/4.14 Nm	7.13 Nm	9.45 Nm
Rated speed	2500 min ⁻¹ /5000 min ⁻¹	2000 min ⁻¹	2000 min ⁻¹
Rated power	1.14 kW/2.17 kW	1.49 kW	1.98 kW
Peak torque	21.42 Nm/15.45 Nm	37.20 Nm	36.30 Nm
Standstill current	2.57 A/4.47 A	3.14 A	4.44 A
Peak current	12.10 A/15 A	15.00 A	15.00 A
Rotor moment of inertia	2.25 kgcm ²	4.09 kgcm ²	5.93 kgcm ²
Weight	5.65 kg	7.25 kg	8.95 kg
Holding torque brake (Mbr)	9 Nm	9 Nm	13 Nm
Rotor moment of inertia with brake (J)	2.91 kgcm ²	4.75 kgcm ²	7.04 kgcm ²
Weight with brake (m)	6.45 kg	8.15 kg	9.95 kg
Connection technology	ECP B23 plug	ECP B23 plug	ECP B23 plug
One Cable Technology	yes	yes	yes

We reserve the right to make technical changes.

Simplified cabling: the AMP8000 system components

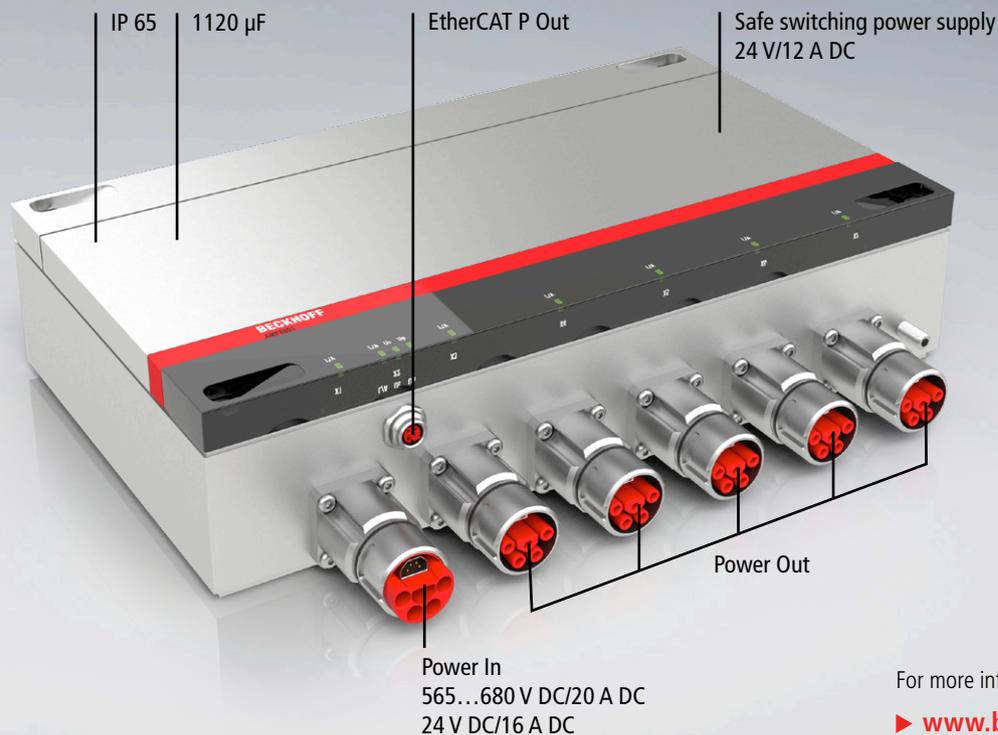
AMP8620 power supply module



For more information please see our webpage:

► www.beckhoff.com/amp8620

AMP8805 distribution module



For more information please see our webpage:

► www.beckhoff.com/amp8805

EtherCAT P cables and connectors

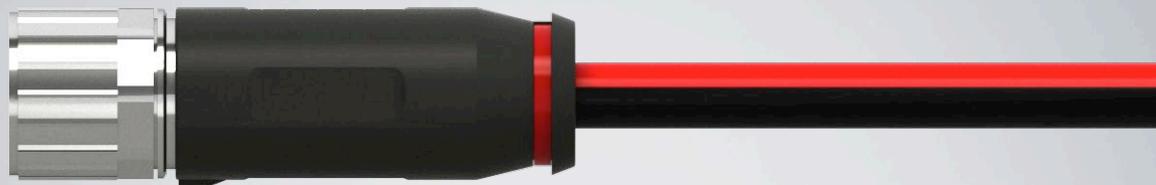
For more information please see our webpage:

► www.beckhoff.com/ethercat-p

M8, 24 V DC, 3 A



B23, 630 V AC/850 V DC, 30 A

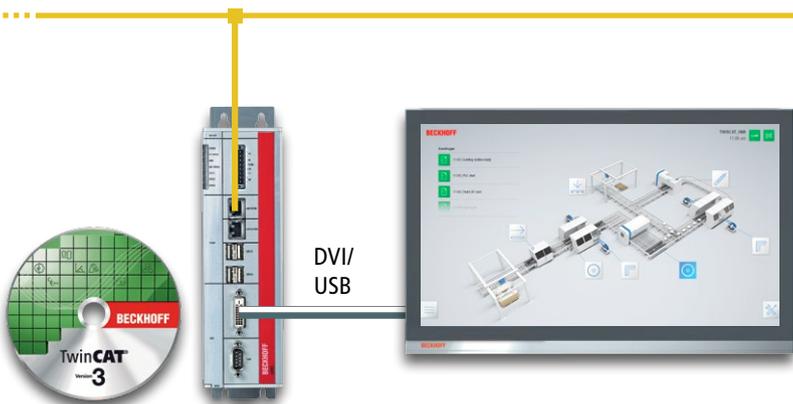


- just one cable type for the entire AMP8000 Servo Drive system
- no protection devices required in the AMP8000 system
- no additional components required for different cable lengths
- automatic exchange of regenerative energies within the system

For complete drive systems: Drive Technology and motion control from Beckhoff

Motion Control

EtherCAT



Drives 0.2...118 kW

Compact drives

EtherCAT/Bus Terminals
0.5...4 A



One Cable Technology



Synchronous Servomotors



Stepper motors



DC motors

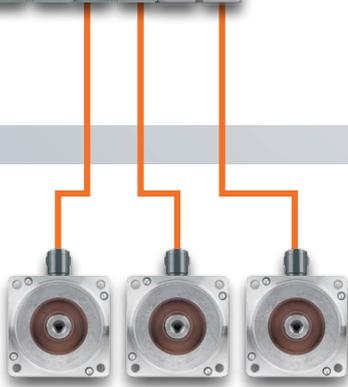
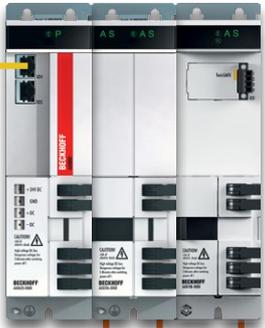


Planetary gear units

Motors from 0.2...180 Nm

Multi-axis Servo Drives

AX8000 Compact Servo Drive
1.0...18 A



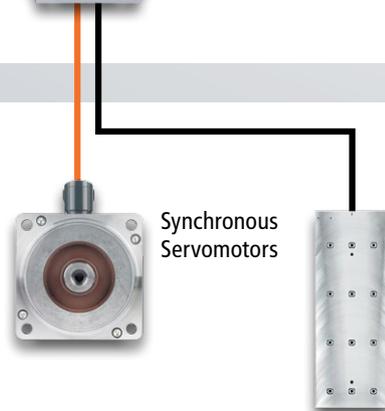
Synchronous Servomotors



Planetary gear units

Single-/Multi-axis Servo Drives

AX5000 Compact Servo Drives
1.5... 170 A



Synchronous Servomotors

Linear motors

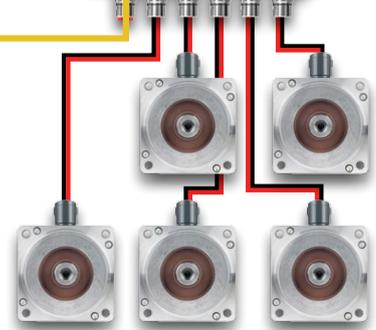


Planetary gear units

Distributed Servo Drive system

Power supply module for AMP8000

NEW



Synchronous Servomotors

In combination with the motion control solutions of the TwinCAT automation software, Beckhoff Drive Technology forms complete drive systems that cover all single- and multi-axis positioning tasks with highly dynamic requirements. This is guaranteed not only by the maximum scalability of the drive technology from the compact drive

amplifier in the I/O system via the AX8000 to the AX5000, but in particular by the wide range of TwinCAT functionalities. TwinCAT functions as a platform for engineering and as a runtime for all necessary functions: NC PTP, NC I, CNC, cam plates, "flying saw" or camshaft and robotics.

- maximally scalable motion-control systems
- integrated safety up to performance level PL e
- powerful EtherCAT system communication
- One Cable Technology for reduced material and commissioning costs

Minimise your machine footprint:
► www.beckhoff.com/amp8000

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