Highlights

- Complete drive system with TwinCAT Motion Control
- For highly dynamic, single and multiple axis positioning tasks
- Modularity and scalable power in compact Drive Technology
- XTS – Linear motor on an endless path

Drive Technology

The drive system for highly dynamic positioning tasks

▸ **www.beckhoff.com/DriveTechnology**

Product overview Servo Drives

AX8000

AX8000 | Multi-axis servo system: power supply modules

	AX8620-0000 338	AX8640-0000 338
Rated output current	1 ~ 7 A DC 3 ~ 20 A DC	40 A DC
Supply voltage	1 x 100…240 V AC 3 x 200…480 V AC	3 x 200…480 V AC

Any number of axis modules can be added provided that the rated output current of the power supply modules is sufficient.

AX8000 | Multi-axis servo system: axis modules

	AX8108 339	AX8118 339	AX8206 339
Rated current	1 x 8 A	1 x 18 A	2 x 6 A
Number of axes	1	1	2
Motor feedback	OCT	OCT	OCT
TwinSAFE/safe drive technology	AX8108-0000 without TwinSAFE	AX8118-0000 without TwinSAFE	AX8206-0000 without TwinSAFE
	AX8108-0100 STO/SS1	AX8118-0100 STO/SS1	AX8206-0100 STO/SS1
	AX8108-0200 Safe Motion	AX8118-0200 Safe Motion	AX8206-0200 Safe Motion

AX8000 | Multi-axis servo system: option modules

	1-channel	2-channel
Coupling module for AMP8000	AX8831-0000-0000 360	AX8832-0000-0000 360
		For AX86xx-0000
Capacitor module		AX8810-0000-0000 340

AX5000

AX5000 | Digital Compact Servo Drives

	AX5101…AX5112 346	AX5201…AX5206 347	AX5118…AX5140 346	AX5160…AX5193 346
Number of axes	1	2	1	1
Rated current	1.5…12 A	2 x 1.5…6 A	18…40 A	60…170 A
Supply voltage	3 x 100…480 V AC (wide voltage range), 1 x 100…240 V AC	3 x 100…480 V AC (wide voltage range), 1 x 100…240 V AC	3 x 100…480 V AC (wide voltage range)	3 x 400…480 V AC
Motor feedback	OCT, multi-feedback	OCT, multi-feedback	OCT, multi-feedback	multi-feedback

AX5000 | Digital Compact Servo Drives: options

	1-channel		2-channel	
Coupling module for AMP8000	**AX5031-0000-0200** 360		**AX5032-0000-0200** 360	
Encoder option cards	**AX5701** 348 1 V_{PP}, BiSS B, Hiperface, EnDat	**AX5721** 348 EnDat 2.2, BiSS C	**AX5702** 348 1 V_{PP}, BiSS B, Hiperface, EnDat	**AX5722** 348 EnDat 2.2, BiSS C
	STO/SS1		**Safe Motion**	
TwinSAFE/safe drive technology	**AX5801-0200** 348 for AX5101…AX5140 and AX5201…AX5206		**AX5805-0000** 348 for AX5101…AX5140 and AX5201…AX5206	**AX5806-0000** 348 for AX5160…AX5193
	Power supply		**Power distribution**	
AX-Bridge	**AX5901** 349 for AX5101…AX5125 and AX5201…AX5206	**AX5902** 349 for AX5140	**AX5911** 349 for AX5101…AX5112 and AX5201…AX5206	**AX5912** 349 for AX5118 and AX5125
	Brake energy recovery			
Brake module	**AX5021** 353 connection of external brake resistors			

Product overview Distributed Servo Drive system

AMP804x | Distributed Servo Drive, flange code F4

Data for 560 V DC	AMP8041-wDyz 358	AMP8041-wEyz 358	AMP8042-wEyz 358	AMP8043-wEyz 358
Standstill torque	2.01 Nm	2.01 Nm	3.48 Nm	4.80 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	2500 min^{-1}	2500 min^{-1}
Rated power	0.61 kW	1.23 kW	0.87 kW	1.18 kW
Standstill current	1.65 A	3.00 A	2.15 A	2.90 A
Connection technology	ECP B23 plug	ECP B23 plug	ECP B23 plug	ECP B23 plug
One Cable Technology (OCT)	yes	yes	yes	yes

AMP805x | Distributed Servo Drive, flange code F5

Data for 560 V DC	AMP8051-wEyz 358	AMP8051-wGyz 358	AMP8052-wFyz 358	AMP8053-wGyz 358
Standstill torque	4.08 Nm	4.08 Nm	6.97 Nm	9.70 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	2000 min^{-1}	2000 min^{-1}
Rated power	1.02 kW	1.02 kW	1.34 kW	1.78 kW
Standstill current	2.70 A	4.75 A	3.30 A	4.70 A
Connection technology	ECP B23 plug	ECP B23 plug	ECP B23 plug	ECP B23 plug
One Cable Technology (OCT)	yes	yes	yes	yes

AX503x, AX883x | Coupling modules for AMP8000

	AX5031-0000-0200 360	AX5032-0000-0200 360	AX8831-0000-0000 360	AX8832-0000-0000 360
Function	coupling module with feed	coupling module with feed	coupling module	coupling module
Number of channels	1	2	1	2
Rated output current DC-Link	20 A DC	∑ 20 A DC	20 A DC	2 x 20 A DC
Rated output current 24 V	16 A DC	∑ 20 A DC	16 A DC	∑ 20 A DC
DC-Link voltage	565…680 V DC	565…680 V DC	565…680 V DC	565…680 V DC

AMP8805 | Distribution module for AMP8000

	AMP8805-0000-0000 361
Function	distribution module
Number of channels	1 x Power IN, 5 x Power OUT, 1 x EtherCAT P OUT
Rated input current 24 V	16 A DC
DC-Link voltage	565…680 V DC
DC-Link capacitance	1120 µF
Protection class	IP 65

Product overview Synchronous Servomotors

AM8000, AM8500

AM8000, AM8500 with fan

Synchronous Servomotors, OCT

	Flange code F1 (40 mm)	F2 (58 mm)	F3 (72 mm)	F4 (87 mm)	F5 (104 mm)	F6 (142 mm)	F7 (197 mm)	
Standard 400 V AC		**AM802x** M_0 = 0.50…1.20 Nm	**AM803x** M_0 = 1.37…3.22 Nm	**AM804x** M_0 = 2.37…5.65 Nm	**AM805x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM806x** M_0 = 12.8…35.0 Nm, up to 49.0 Nm with fan	**AM807x** M_0 = 29.0…92.0 Nm, up to 129 Nm with fan	366
Standard 230 V AC	**AM801x** M_0 = 0.20…0.52 Nm							366
Standard 48 V DC	**AM811x** M_0 = 0.20…0.52 Nm	**AM812x** M_0 = 0.50…0.80 Nm	**AM813x** M_0 = 1.35…2.37 Nm	**AM8141** M_0 = 2.40 Nm				414
Increased inertia 400 V AC			**AM853x** M_0 = 1.37…3.22 Nm	**AM854x** M_0 = 2.37…5.65 Nm	**AM855x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM856x** M_0 = 12.8…29.0 Nm, up to 41.4 Nm with fan		378
Stainless steel 400 V AC			**AM883x*** M_0 = 0.85…1.85 Nm	**AM884x*** M_0 = 1.60…3.50 Nm	**AM885x*** M_0 = 3.10…6.40 Nm	**AM886x*** M_0 = 7.75…16.7 Nm		392

*Please note the different flange size.

Synchronous Servomotors, 2-cable standard

	Flange code F1 (40 mm)	F2 (58 mm)	F3 (72 mm)	F4 (87 mm)	F5 (104 mm)	F6 (142 mm)	F7 (197 mm)	F8 (260 mm)	
Standard 400 V AC		**AM802x** M_0 = 0.50…1.20 Nm	**AM803x** M_0 = 1.37…3.22 Nm	**AM804x** M_0 = 2.37…5.65 Nm	**AM805x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM806x** M_0 = 12.8…35.0 Nm, up to 49.0 Nm with fan	**AM807x** M_0 = 29.0…92.0 Nm, up to 129 Nm with fan		366
		AM302x M_0 = 0.87…1.41 Nm	**AM303x*** M_0 = 1.15…2.79 Nm	**AM304x*** M_0 = 1.95…6.00 Nm	**AM305x*** M_0 = 4.70…14.9 Nm	**AM306x*** M_0 = 11.9…25.0 Nm	**AM307x*** M_0 = 29.7…53.0 Nm	**AM308x** M_0 = 75.0…180 Nm	396
Standard 230 V AC	**AM301x** M_0 = 0.18…0.41 Nm	**AM302x** M_0 = 0.48…0.87 Nm	**AM3031** M_0 = 1.20 Nm						396
	AM801x M_0 = 0.20…0.52 Nm								368
Standard 48 V DC	**AM811x** M_0 = 0.20…0.52 Nm	**AM812x** M_0 = 0.50…0.80 Nm	**AM813x** M_0 = 1.35…2.37 Nm	**AM8141** M_0 = 2.40 Nm					414
Increased inertia 400 V AC			**AM853x** M_0 = 1.37…3.22 Nm	**AM854x** M_0 = 2.37…5.65 Nm	**AM855x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM856x** M_0 = 12.8…29.0 Nm, up to 41.4 Nm with fan			378
				AM354x* M_0 = 1.90…4.20 Nm	**AM355x*** M_0 = 4.10…8.60 Nm	**AM356x*** M_0 = 11.6…14.9 Nm			
Stainless steel 400 V AC			**AM883x*** M_0 = 0.85…1.85 Nm	**AM884x*** M_0 = 1.60…3.50 Nm	**AM885x*** M_0 = 3.10…6.40 Nm	**AM886x*** M_0 = 7.75…16.7 Nm			392

*Please note the different flange size.

Product overview Linear Servomotors, stepper motors

Linear Servomotors

	AL2000 403	AL2400 404	AL2800 405
Especially suitable for	maximum power density	confined spaces	highest demands on force
Magnetic path width	80 mm	50 mm	130 mm
Cooling	air	air	air, partly water
Max. speed	7 m/s	12 m/s	6 m/s
Max. force	225…1800 N	120…720 N	1800…6750 N
Protection class	IP 64	IP 64	IP 64

Linear actuators

	AA1121 412
Rated force	150 N
Peak force	800 N
Max. movement	10 mm
Max. acceleration	7 m/s²
Protection class	IP 54

Stepper motors

	AS1000 424	AS2000 420
Sizes	N1 (NEMA17), N2 (NEMA23), N3 (NEMA34)	N2 (NEMA23), N3 (NEMA34)
Resolution	1.8°/200 full steps	1.8°/200 full steps
Encoder	incremental, 1024 lines	incremental, 1024 lines
Standstill torque < 3 A	0.38…0.60 Nm	0.80 Nm
Standstill torque > 3 A	1.20…5.00 Nm	1.50…8.00 Nm
Protection class	IP 43, AS1060: IP 20	IP 54

Product overview planetary gear units

AG3210 AG2300 AG3300 AG2400 AG3400 AG2800 AG2250 AG1000

Planetary gear units for AM8000/AM8500

	AG3210 389	AG2300 386	AG3300 388	AG2400 390	AG3400 391
Variant	standard (MF)	standard (MF), high-speed (MC)	standard (MF)	standard (MF)	standard (MF)
Output type	shaft	shaft	shaft	flange	flange
Gear ratios	1-stage i = 3…10, 2-stage i = 9…100	1-stage i = 3…10, 2-stage i = 16…100	1-stage i = 3…10, 2-stage i = 9…100	1-stage i = 4…10, 2-stage i = 16…100	1-stage i = 3…10, 2-stage i = 9…100
Protection class	IP 64	IP 65	IP 65	IP 65	IP 64

Planetary gear units for other motor series

	AG2800 395	AG2250 418	AG1000 427
Variant	stainless steel	straight and angled versions	standard
Motor series	AM8800	AM8100, AS2000	AS1000
Output type	shaft	shaft	shaft
Gear ratios	1-stage i = 3…10, 2-stage i = 9…100	1-stage i = 3…10, 2-stage i = 9…64	1-stage i = 3.7 or 6.75
Protection class	IP 69K	IP 54	IP 43, AS1060: IP 20

Product overview compact Drive Technology

EtherCAT Terminals

EtherCAT Plug-in Modules

Bus Terminals

EtherCAT Box modules

EtherCAT P Box modules

	Product group	BLDC motor	DC motor			Stepper motor
		4.5…8 A	< 3 A	3…5 A	> 5 A	< 3 A
I/O	EtherCAT Terminals IP 20	EL7411-9014 2 232 I_{rms} = 4.5 A, 50 V DC, STO	EL7332 2 231 I_{max} = 1.0 A, 24 V DC	EL7332 + ZB8610 2 231 I_{max} = 3.0 A, 24 V DC		EL7037 2 227 I_{max} = 1.5 A, 24 V DC, incremental encoder, vector control
		EL7411-9014 + ZB8610 2 232 I_{rms} = 7…8 A, 50 V DC, STO		EL7342 2 231 I_{max} = 3.5 A, 50 V DC, incremental encoder	EL7342 + ZB8610 2 231 I_{max} = 6.5 A, 50 V DC, incremental encoder	EL7031 2 226 I_{max} = 1.5 A, 24 V DC
	EtherCAT Plug-in Modules IP 20			EJ7342 I_{max} = 3.5 A, 2 393 50 V DC, incremental encoder		EJ7031 2 391 I_{max} = 1.5 A, 24 V DC
	Bus Terminals IP 20		KL2532 2 483 I_{max} = 1.0 A, 24 V DC	KL2552 I_{max} = 5.0 A, 2 483 50 V DC, incremental encoder		KL2531 2 481 I_{max} = 1.5 A, 24 V DC
	EtherCAT Box modules IP 67			EP/ER7342-0002 2 314 I_{max} = 3.5 A, 50 V DC		EP/ER7041-1002 2 312 I_{max} = 1.5 A, 50 V DC, incremental encoder
	EtherCAT P Box modules IP 67			EPP7342-0002 2 352 I_{max} = 3.5 A, 50 V DC		EPP7041-1002 2 351 I_{max} = 1.5 A, 50 V DC, incremental encoder
Motion	Flange code F1 (40 mm), N1 (NEMA17)					AS1010 424 1.0 A, 48 V DC, 0.38 Nm
						AS1020 424 1.0 A, 48 V DC, 0.50 Nm
	Flange code F2 (58 mm), N2 (NEMA23)					AS1030 424 1.5 A, 48 V DC, 0.60 Nm
						AS2021-0Dy0 420 2.0 A, 48 V DC, 0.80 Nm
	Flange code F3 (72 mm), N3 (NEMA34)					
	Flange code F4 (87 mm)					

Flange code F1 | Flange code N1 | Flange code F2 | Flange code N2 | Flange code F3 | Flange code N3 | Flange code F4

Servomotor

3…5 A	> 5 A	< 3 A	3…5 A	> 5 A
EL7037 + ZB8610 2 227 I_{max} = 3.0 A, 24 V DC, incremental encoder, vector control		**EL7201-9014** 2 229 I_{rms} = 2.8 A, 50 V DC, OCT, STO	**EL7201-9014 + ZB8610** 2 229 I_{rms} = 4.5 A, 50 V DC, OCT, STO	**EL7221-9014** 2 228 I_{rms} = 7…8 A with ZB8610, 50 V DC, OCT, STO
EL7047-9014 2 227 I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control, STO	**EL7047-9014 + ZB8610** 2 227 I_{max} = 6.5 A, 50 V DC, incremental encoder, vector control, STO	**EL7201-0010** 2 229 I_{rms} = 2.8 A, 50 V DC, OCT	**EL7201-0010 + ZB8610** 2 229 I_{rms} = 4.5 A, 50 V DC, OCT	
EL7047 2 227 I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control	**EL7047 + ZB8610** 2 227 I_{max} = 6.5 A, 50 V DC, incremental encoder, vector control	**EL7201** 2 229 I_{rms} = 2.8 A, 50 V DC, resolver	**EL7201 + ZB8610** 2 229 I_{rms} = 4.5 A, 50 V DC, resolver	
EL7041 2 227 I_{max} = 5.0 A, 50 V DC, incremental encoder			**EL7211-9014** 2 229 I_{rms} = 4.5 A, 50 V DC, OCT, STO	
			EL7211-0010 2 229 I_{rms} = 4.5 A, 50 V DC, OCT	
			EL7211 2 229 I_{rms} = 4.5 A, 50 V DC, resolver	
EJ7047 I_{max} = 5.0 A, 50 V DC, 2 391 incremental encoder, vector control			**EJ7211-9414** 2 392 I_{rms} = 4.5 A, 50 V DC, OCT, STO, TwinSAFE SC	
EJ7041-0052 2 391 I_{max} = 5.0 A, 50 V DC			**EJ7211-0010** 2 392 I_{rms} = 4.5 A, 50 V DC, OCT	
KL2541 2 481 I_{max} = 5.0 A, 50 V DC, incremental encoder				
EP/ER7041-3002 2 313 I_{max} = 5.0 A, 50 V DC, incremental encoder			**EP7211-9034** 2 311 I_{rms} = 4.5 A, 50 V DC, OCT, STO	
EPP7041-3002 2 351 I_{max} = 5.0 A, 50 V DC, incremental encoder				
		AM8111-wFyz 414 2.8 A, 48 V DC, 0.20 Nm, 4000 min^{-1}	**AM8112-wFyz** 414 4.7 A, 48 V DC, 0.38 Nm, 4500 min^{-1}	
			AM8113-wFyz 414 4.8 A, 48 V DC, 0.52 Nm, 3000 min^{-1}	
AS1050 424 5.0 A, 48 V DC, 1.20 Nm	**AS2022-0Hy0** 420 5.6 A, 48 V DC, 1.50 Nm		**AM8121-wFyz** 414 4.0 A, 48 V DC, 0.50 Nm, 3000 min^{-1}	
	AS2023-0Hy0 420 5.6 A, 48 V DC, 1.80 Nm		**AM8122-wFyz** 414 4.0 A, 48 V DC, 0.80 Nm, 2000 min^{-1}	**AM8122-wJyz** 414 8.0 A, 48 V DC, 0.80 Nm, 4500 min^{-1}
AS1060 424 5.0 A, 48 V DC, 5.00 Nm	**AS2041-1Hy0** 420 5.6 A, 48 V DC, 3.30 Nm		**AM8131-wFyz** 414 5.0 A, 48 V DC, 1.35 Nm, 1000 min^{-1}	**AM8131-wJyz** 414 8.0 A, 48 V DC, 1.35 Nm, 1800 min^{-1}
	AS2042-1Hy0 420 5.6 A, 48 V DC, 6.40 Nm			**AM8132-wJyz** 414 8.0 A, 48 V DC, 2.37 Nm, 1000 min^{-1}
	AS2043-1Jy0 420 6.5 A, 48 V DC, 8.00 Nm			
				AM8141-wJyz 414 8.0 A, 48 V DC, 2.40 Nm, 1000 min^{-1}

Product overview XTS

Standard
motor module

Black Line
motor module

Hygienic
motor module

Motor modules

	Standard 432	Black Line 441	Hygienic 444
Straight	**AT2000-0250**	**AT2000-0250-0002**	**ATH2000-0250**
	AT2001-0250 with feed	**AT2001-0250-0002** with feed	**ATH2001-0250** with feed
	AT2001-0250-0003 with feed, UL-listed	**AT2001-0250-0004** with feed, UL-listed	
Curved, 180° (clothoid)	**AT2050-0500**	**AT2050-0500-0002**	**ATH2050-0500**
Positive curve, 45°	**AT2040-0250**	**AT2040-0250-0002**	
	AT2041-0250 with feed	**AT2041-0250-0002** with feed	
	AT2041-0250-0003 with feed, UL-listed	**AT2041-0250-0004** with feed, UL-listed	
Positive curve, 22.5°	**AT2020-0250**	**AT2020-0250-0002**	
	AT2021-0250 with feed	**AT2021-0250-0002** with feed	
Negative curve, -22.5°	**AT2025-0250**	**AT2025-0250-0002**	
	AT2026-0250 with feed	**AT2026-0250-0002** with feed	

Movers

	Standard 434	Hygienic 445
6 rollers	**AT9011-0050-0550** mover standard, length 50 mm	**ATH9011-0075-0550** mover standard, length 75 mm
	AT9011-0050-1550 mover 1, length 50 mm	
	AT9011-0070-0550 mover standard, length 70 mm	
	AT9011-0070-1550 mover 1, length 70 mm	
12 rollers	**AT9012-0050-0550** mover standard, length 50 mm	
	AT9012-0050-1550 mover 1, length 50 mm	

Standard mover

Hygienic mover

Standard guide rail

Hygienic guide rail

Standard starter kit

Guide rails

	Standard 435	Hygienic 446
Straight	**AT9000-xxxx** without lock	**ATH9000-xxxx** without lock
	AT9100-xxxx with lock	**ATH9100-xxxx** with lock
		ATH9200-xxxx connector, without lock
Positive curve, 180°	**AT9020-2250** length 2250 mm, for 22.5° motor module [1]	
	AT9040-1250 length 1250 mm, for 45° motor module [1]	
	AT9050-0500 length 500 mm, for 180° motor module [2]	**ATH9050-0500-0075** length 500 mm, for 180° motor module
Positive curve, 90°	**AT9040-0750** length 750 mm, for 45° motor module [1]	
Positive curve, 45°	**AT9040-0500** length 500 mm, for 45° motor module [1]	
Positive curve, 22.5°	**AT9020-0500** length 500 mm, for 22.5° motor module [1]	
Negative curve, -22.5°	**AT9025-0500** length 500 mm, for -22.5° motor module [1]	
Positive curve, 360°	**AT9142-2000** length 2000 mm, for 45° motor module [1]	

[1] Suitable for mover type AT9011-0050-0550. For mover AT9011-0070-0550, add -0070 to the order specification.

[2] Suitable for mover types AT9011-0050-0550 and AT9012-0050-0550. For mover AT9011-0070-0550, add -0070 to the order specification.

Starter kits

	Standard 438
Small	**AT2000-0500**
Medium	**AT2000-1000**
Large	**AT2000-1500**

The Motion Company

AX8000 multi-axis EtherCAT drive

Servo Drives 334
- Available as multi-axis system or stand-alone version (1-/2-channel)
- High-speed EtherCAT communication
- Wide range of nominal current types, up to 170 A
- Flexible motor type selection
- Optimised for multi-axis applications

▶ **www.beckhoff.com/Servo-Drives**

Distributed Servo Drive system 354
- Servo drives directly integrated into the motor
- STO/SS1 safety function as standard; optionally Safe Motion
- Advanced power electronics ensure minimal derating
- No changes in machine design required

▶ **www.beckhoff.com/AMP8000**

Synchronous Servomotors 364
- For demanding positioning tasks
- Highly dynamic behaviour
- Brushless three-phase motors
- Permanent magnet in the rotor

▶ **www.beckhoff.com/Servomotors**

In combination with the motion control solutions offered by the company's TwinCAT automation software, Beckhoff Drive Technology provides an advanced, all-inclusive drive system. PC-based control technology from Beckhoff is ideally suited for single- and multi-axis positioning tasks with high dynamic requirements.

The AX5000 and AX8000 Servo Drive series with high-performance EtherCAT communication offer the best-possible performance and dynamics. Servomotors with One Cable Technology (OCT), combining power and feedback systems into one standard motor cable, reduce material and commissioning costs.

▶ **www.beckhoff.com/DriveTechnology**

Compact Drive Technology 410

- Solutions for up to 8 A in the space-saving I/O system
- Simple connection of stepper, servo, DC or AC motors
- IP 20 or IP 67 connection options
- Matching motors and gearboxes

▶ **www.beckhoff.com/compact-drive-technology**

eXtended Transport System XTS 428

- Linear motor on an endless path
- Replaces traditional mechanics with advanced mechatronic solutions
- Software-based functional changes
- Individual product transport with continuous material flow

▶ **www.beckhoff.com/XTS**

- **Scalable product range of servo drive technology**
- **Integrated safety technology in compliance with safety performance level PL e, integrated into compact Drive Technology up to safety performance level PL d**
- **As the pioneer of One Cable Technology and the eXtended Transport System, Beckhoff specialises in manufacturing efficient, space-saving motion solutions.**

AM8000, AM8500, AM8800, AM8100 | One Cable Technology (OCT)

The One Cable Technology (OCT) of the AM8xxx motor series reduces the motor cabling to the mandatory motor cable, which can then also be used directly for the feedback signals. As in sensorless control, the user no longer has to use an additional feedback cable. All the information required for control purposes is transferred reliably and interference-proof via a digital interface.

The symbiosis of power and feedback cable enables reliable implementation of high-precision positioning and lower velocity fluctuations. The encoder data, rotor position, multi-turn information and thermal conditions in motor are transferred via a purely digital interface. Costly analog evaluation function blocks in the drive amplifier can be avoided, while retaining extensive diagnostic options.

Since a cable and plug are omitted at both the motor and controller end, the component and commissioning costs are significantly reduced. The wiring is simplified significantly, possible error sources are eliminated. This also has positive effects on the peripheral devices, since drag-chains, cable bushings and areas reserved for cables in machines and control cabinets can now be made smaller. OCT can be used for line lengths of up to 100 m.

This results in greater degrees of freedom on the motor side: the omission of a plug connector allows the new technology to be used even in the smallest motor sizes. The AX5000 and AX8000 EtherCAT Servo Drives support OCT.

Features

- digital single-cable transmission via the existing motor cable
- digital transmission of sensor data
- no interference-susceptible analog signals
- support for the electronic identification plate
- Encoder cables, including expensive plugs, are dispensed with.
- reduction
  - in the costs for cable, plug and assembly
  - in warehouse costs by dispensing with a cable variant
  - in space requirements in cable carrier chains
  - in space requirements on the motor (important with small sizes)
  - in the sources of error and wear
- Remote diagnostics are possible up to the motor.
- Cable lengths of up to 100 m are possible.
- operating hours counter and error memory integrated in the motor

▶ **www.beckhoff.com/OCT**

The AX8000 and AX5000 EtherCAT Servo Drives support One Cable Technology.

AM8000, AM8500 | Fan hoods with improved connection technology

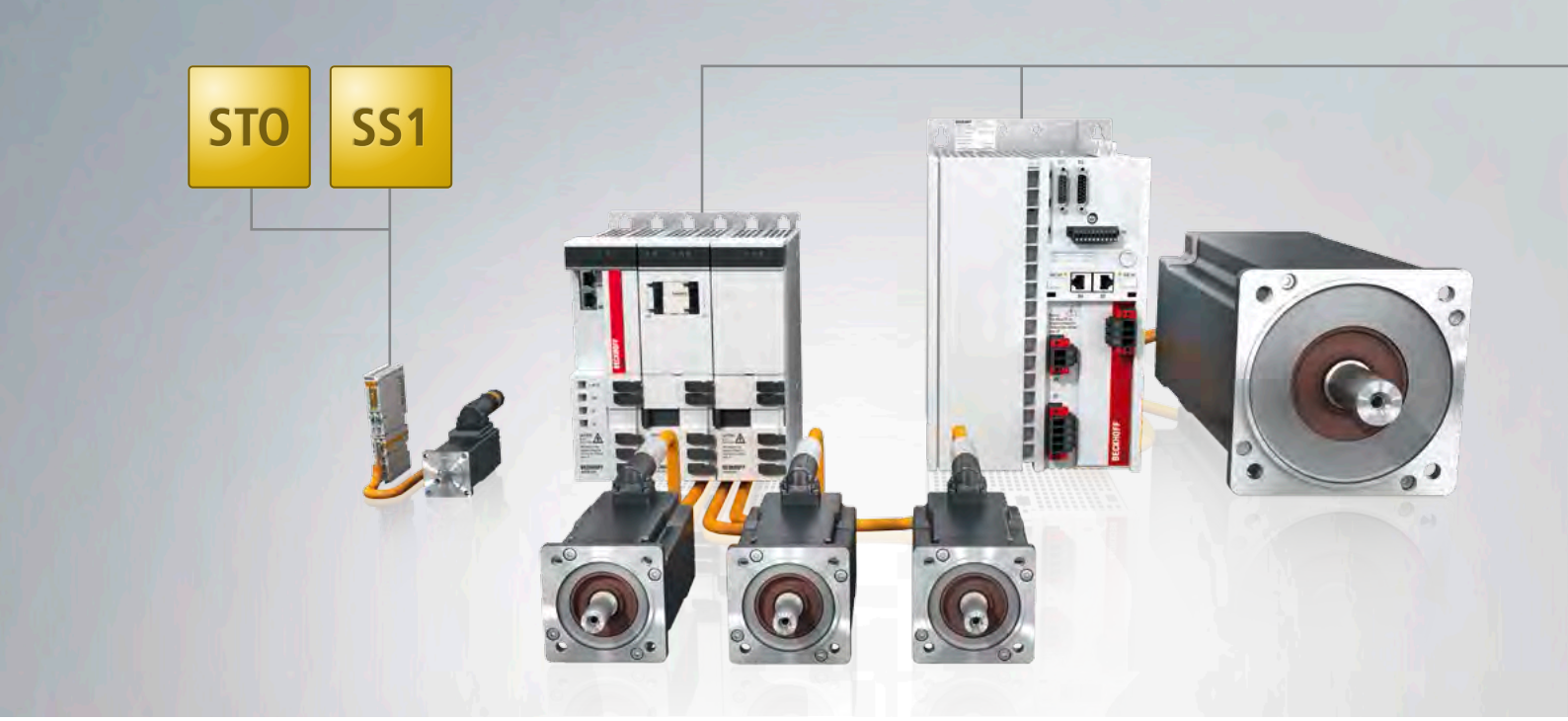
In the forced-cooling versions, the AM8000 and AM8500 servomotor series offer a high torque even at high speeds. The external axial ventilation by means of a 24 V DC fan, which is controlled independently of the motor, increases the power density of the servomotors: the standstill torque is about 35 % higher; the nominal torque at nominal speed is even 150 % higher compared with the standard variant.

The new design of the fan hoods, with an enhanced smooth surface, simplifies mounting and reduces the required mounting space by 5 %. Also new is the easy connection using the integrated robust M12 connector, which is a perfect match for the angled M12 plug connector of the preassembled, ready-to-install ZK4054-6400-0xxx control cable.

Ordering information	Available for following motors
AM805x-wxyA/B	servomotor 4.9…11.4 Nm (standstill torque)
AM806x-wxyA/B	servomotor 12.8…29 Nm (standstill torque)
AM807x-wxyA/B	servomotor 41.2…129 Nm (standstill torque)
AM855x-wxyA/B	servomotor with increased moment of inertia 4.9…11.4 Nm (standstill torque)
AM856x-wxyA/B	servomotor with increased moment of inertia 12.8…29 Nm (standstill torque)

Ordering information	Connection cable and matching digital output terminals
ZK4054-6400-0xxx	M12 control cable, PUR, 3 x 0.75 mm², drag-chain suitable, for connetion of the fan for the AM8000 and AM8500 motor series
KL2022	2-channel digital output terminal 24 V DC, 2.0 A, 4-wire system
EL2022	2-channel digital output terminal 24 V DC, 2.0 A, 4-wire system

ZK4054-6400-0xxx



TwinSAFE | Safe drive technology

TwinSAFE is a universal safety concept that integrates secure functionalities into the standard control platform: including the PLC, I/Os and drive technology. All safety functions such as emergency stop, safety door monitoring, two-hand operation, safety mat evaluation and muting, safe position, safely limited velocity, etc. can be programmed and configured with the integrated TwinCAT engineering platform.

Dynamic movements of electrical drive technology used in a machine can create considerable hazards to people and the environment. From a normative point of view, drive technology is therefore also considered in a safety-oriented way by coordinating and monitoring certain movements and processes.

TwinSAFE offers three levels for implementing safe drive technology:

– STO/SS1 according to IEC 61800-5-2
– Safe Motion according to IEC 61800-5-2
– programmable, safe drive technology through integrated logic

The safe drive components are able to switch the motor torque-free or to monitor velocity, position and direction of rotation (in compliance with EN ISO 13849-1:2008 (Cat. 4, PL e)). No further devices such as contactors or circuit breakers are necessary in the supply lines for this. This enables a very lean installation and helps to reduce costs and control cabinet space.

Even safe position monitoring or position range monitoring is simple to implement with the aid of the safe drive technology. It requires no additional wiring, since the EtherCAT communication in the servo drives is used to communicate directly with the TwinSAFE Logic components, based on the safe drive technology.

Like the programming or configuration of the safety application, the entire parameterisation of the safe drive technology is performed from the TwinCAT software. All system-specific settings are stored together with the application in the TwinSAFE Logic components. For that reason the safe drive components can be exchanged at any time without requiring software changes. The respective component receives all the parameters necessary for operation at the next power-on or boot-up.

Programmable, safe drive technology through integrated logic

The AX8000 multi-axis servo drive system encompasses new functions of safe drive technology with TwinSAFE: the AX8108, AX8118 and AX8206 axis modules include a programmable TwinSAFE Logic corresponding to an EL6910 and enable the direct implementation of a safety application in the servo drive. The user enjoys greater degrees of freedom in the implementation of safety applications in drive technology systems, and the flexibility in programming facilitates individual design of safe drive technology to suit the specific system. The safety functions STO and SS1 can be implemented with the TwinSAFE axis modules with the ordering option -0100 (STO/SS1). These functions can be initiated both via hard wiring and via FSoE. For TwinSAFE axis modules with the ordering option -0200 (Safe Motion), various internal and external drive signals are available for implementing an application-specific safety function. As usual, these can be interconnected with the typical EL6910 pre-certified function blocks to form complex, safe drive functions such as SLS, SLP, etc. Depending on the application, the safety-oriented information can be pre-processed directly in the drive so that the central TwinSAFE logic need only process the information that is aggregated there.

TwinSAFE safe drive technology see
▶ **www.beckhoff.com/TwinSAFE**
or page 542

Ordering information	TwinSAFE components for STO/SS1 according to IEC 61800-5-2
EL7047-9014	stepper motor terminal with incremental encoder, STO and vector control, 50 V DC, 5 A
EL7221-9014	EtherCAT servo terminal for OCT, with STO input, 50 V DC, I_{rms} = 7…8 A with ZB8610
EL7211-9014	EtherCAT servo terminal for OCT, with STO input, 50 V DC, I_{rms} = 4.5 A
EL7201-9014	EtherCAT servo terminal for OCT, with STO input, 50 V DC, I_{rms} = 2.8 A
EP7211-9034	EtherCAT Box, industrial housing, servo box module with OCT and STO, 50 V DC, I_{rms} = 4.5 A
EJ7211-9414	EtherCAT plug-in module, servomotor module for OCT, with STO input, 50 V DC, I_{rms} = 4.5 A, TwinSAFE SC
EL7411-9014	BLDC motor terminal with incremental encoder and STO, 50 V DC, I_{rms} = 4.5 A
AX5801-0200	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1 (1)
AX8108-0100	single-axis module 8 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8118-0100	single-axis module 18 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8206-0100	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated

(1) only compatible with drives of the HW version 2.0 (AX5xxx-0000-020x)

Ordering information	TwinSAFE components for Safe Motion according to IEC 61800-5-2
AX5805-0000	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (1)
AX5806-0000	TwinSAFE drive option card for AX5000 from 60 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (2)
AX8108-0200	single-axis module 8 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8118-0200	single-axis module 18 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8206-0200	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated

(1) AX5000 up to 40 A: AX5x01-0000-020x, AX5x03-0000-020x, AX5x06-0000-020x, AX5112-0000-020x, AX5118-0000-020x, AX5125-0000-020x, AX5140-0000-020x

(2) AX5000 from 60 A up to 170 A: AX5160-0000-020x, AX5172-0000-020x, AX519x-0000-020x

Ordering information	TwinSAFE axis modules with integrated Logic
AX8108-0100	single-axis module 8 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8108-0200	single-axis module 8 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8118-0100	single-axis module 18 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8118-0200	single-axis module 18 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8206-0100	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8206-0200	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated

XTS | eXtended Transport System

The linear transport system XTS (eXtended Transport System) unites the benefits of rotary and linear systems. XTS enables individual product transport with a continuous flow of material. Due to the low construction volume the energy efficiency can be improved and the size of a machine can be significantly reduced.

Only motor module, mover, software and Industrial PC

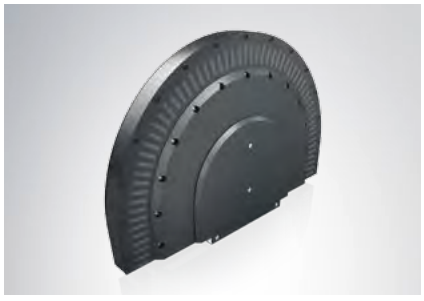
PC-based control from Beckhoff follows a principle that is equally simple and efficient: the maximum application of information technology for the simplification of mechanical processes. With XTS, Beckhoff has transferred this principle directly to the field of drive systems – and in this way has opened up new efficiency potentials in mechanical engineering, because XTS makes do with four simple components.

- Firstly: an arbitrary number of motor parts, which serve as path modules.
- Secondly: an arbitrary number of movers, which act individually or in groups.
- Thirdly: control software.
- And fourthly: an Industrial PC.

Flexible use, arbitrary functional options

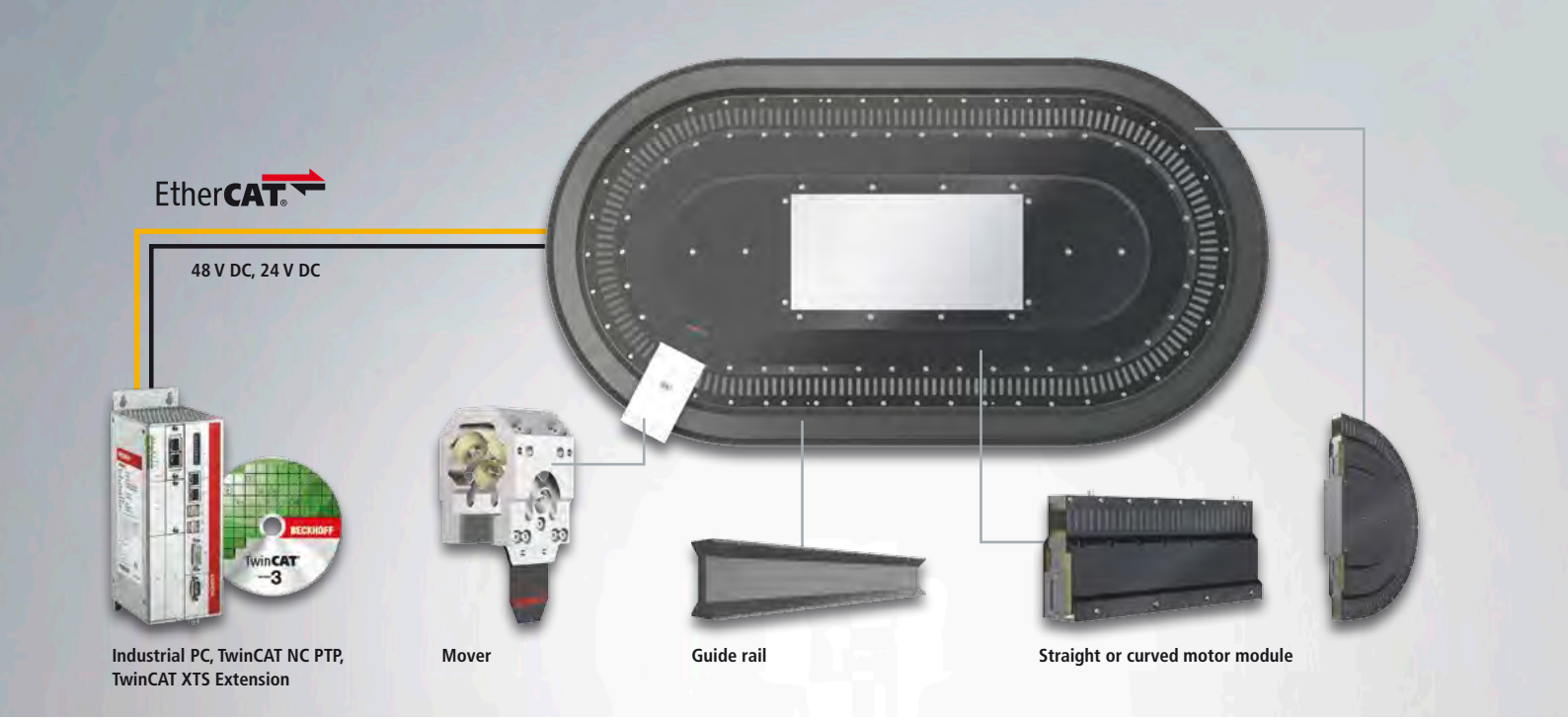
There are virtually no limits to the possibilities of use of XTS: the movers can accelerate, brake, position and synchronise; they can take up absolute and positions relative to each other; they can group themselves and accumulate; they can create clamping forces in motion; they can travel through curves as fast as along straights; they can recover energy through regenerative braking and utilise both travel directions for transport purposes. And all of that with precise position control, without backlash, without material fatigue, virtually without wear – and without cost-intensive maintenance.

XTS Standard



XTS Black Line

XTS Hygienic

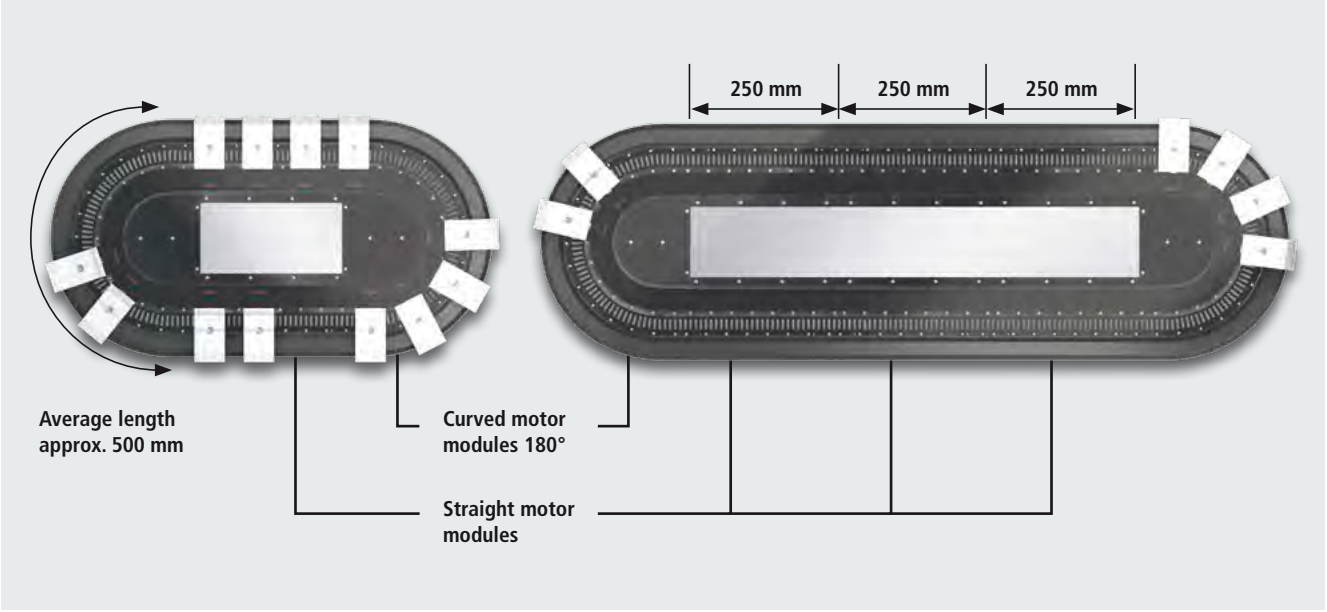


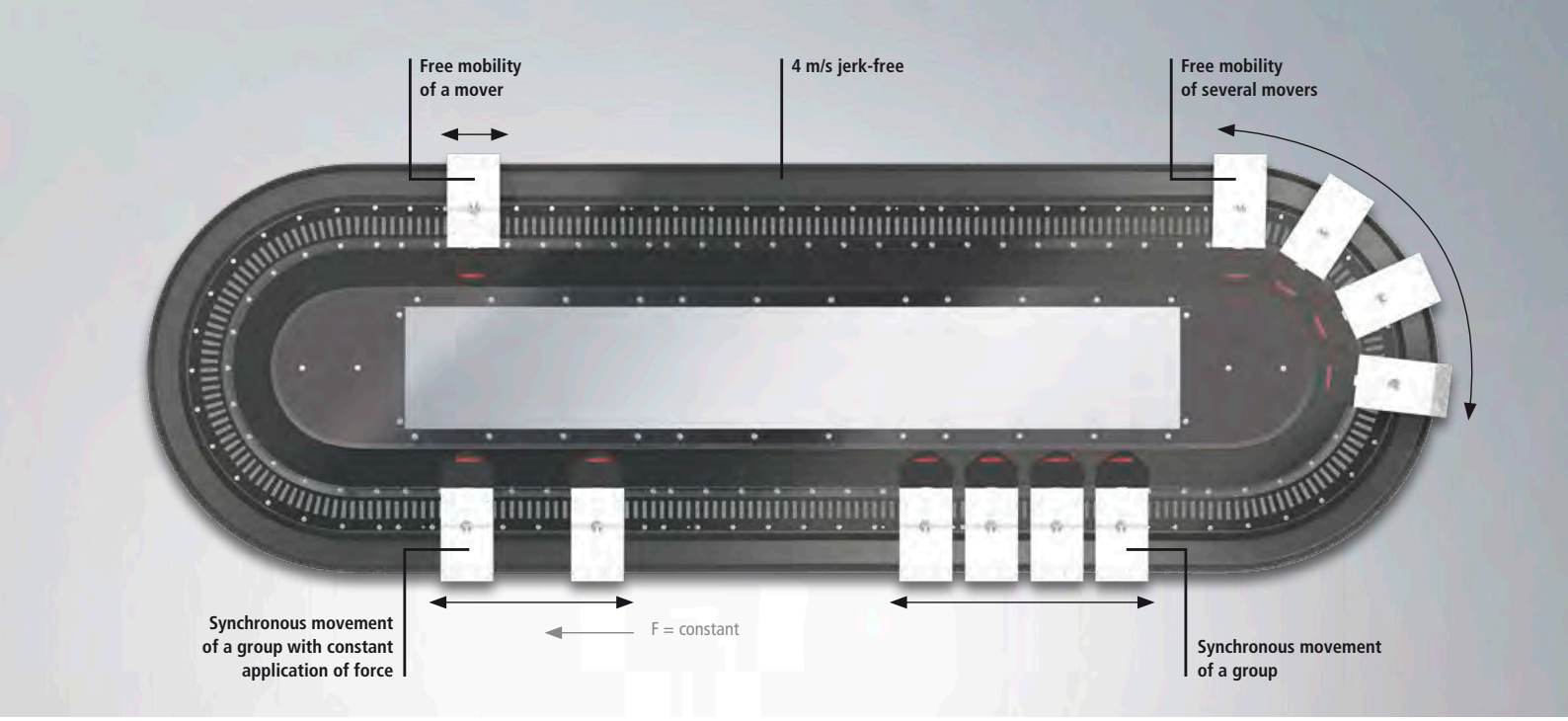
XTS | Modular and flexible

XTS is a mechatronic system containing all functions necessary for operation. A modular, fully integrated linear motor with power electronics and displacement measurement in one device. A mover as the moved part. A mechanical guide rail. The most diverse applications can be realised with these few coordinated components. The desired geometries, lengths and radii are formed by the number and choice of the components.

The XTS components for a continuous system

- curve sections
- 2 or more straight sections
- 1 or more movers
- Beckhoff Industrial PC
- TwinCAT NC PTP
- TwinCAT XTS extension
- power supply units





XTS | **Basic functions**

The XTS system enables a new class of functions that can be used at the same time in several places.
Completely new, particularly flexible: transport and positioning tasks are economically solvable with little effort.

The linear motor with NC and more degrees of freedom

Free mobility of an individual wireless mover
The individual mover can be moved like a linear motor along the entire path, since it makes do without cables. It can arbitrarily start, stop, brake, accelerate and drive to positions. Like a linear motor with NC, an individual mover can be synchronised to external motion profiles, thereby achieving maximum flexibility.

Production speed of up to 4 m/s over the entire path
An individual mover can be addressed sensitively – without jerking and with maximum positioning accuracy. The jerk-free acceleration profiles even allow the transport of open liquids.

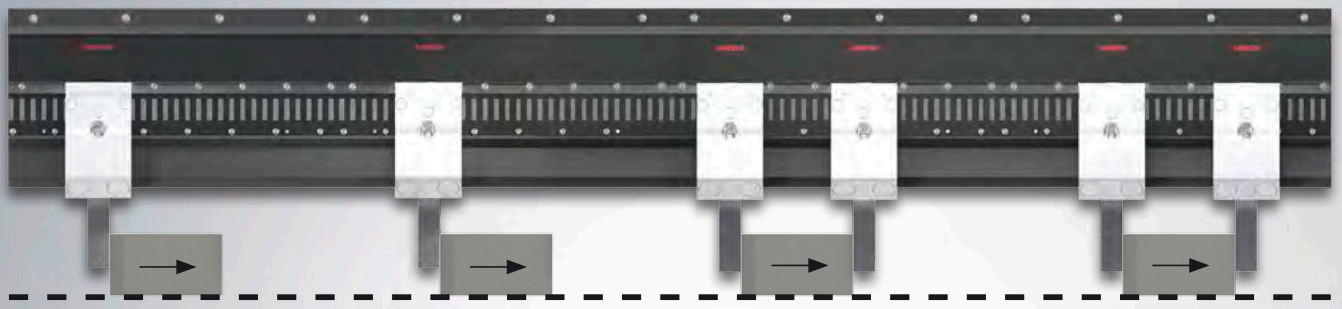
Less wear, less maintenance
The use of XTS leads to less mechanical wear, since only the mover needs mechanical bearings. Gears, belts, guide rollers and clamps are no longer necessary. Due to the high positioning accuracy, the compensation of inaccuracies as required in common transport solutions is unnecessary: there is no stretching of chains due to load and wear, re-tensioning of toothed belts or mechanical backlash during load changes. Apart from the payload, only the small mass of the mover is moved.

Synchronous movement in the group

Movements with constant force
A mover follows another with a defined force. It can apply a "clamping force" while at the same time following a movement, for example in order to hold a product. For other applications the force can be limited so as not to place an unnecessary load on a product under any conditions.

Synchronous movement of a group
At any place on the path during movement, groups can be formed that stop together or drive past processing stations with a specified speed profile. The size of the group (number and spacing) can be changed dynamically.

Free mobility of several movers
The movers can all be moved independently of one another. They can take up absolute positions along the entire travel distance. In addition, they can be moved relatively to each other and always avoid a collision with their neighbour.



Push product, adapt product spacing, reduce or increase product speed

Clamp and move product

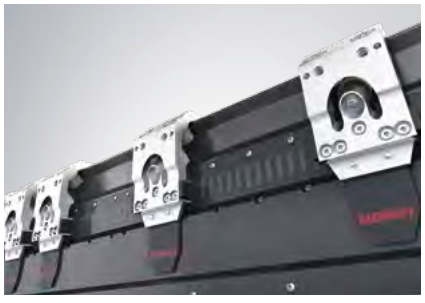
Use of the basic functions

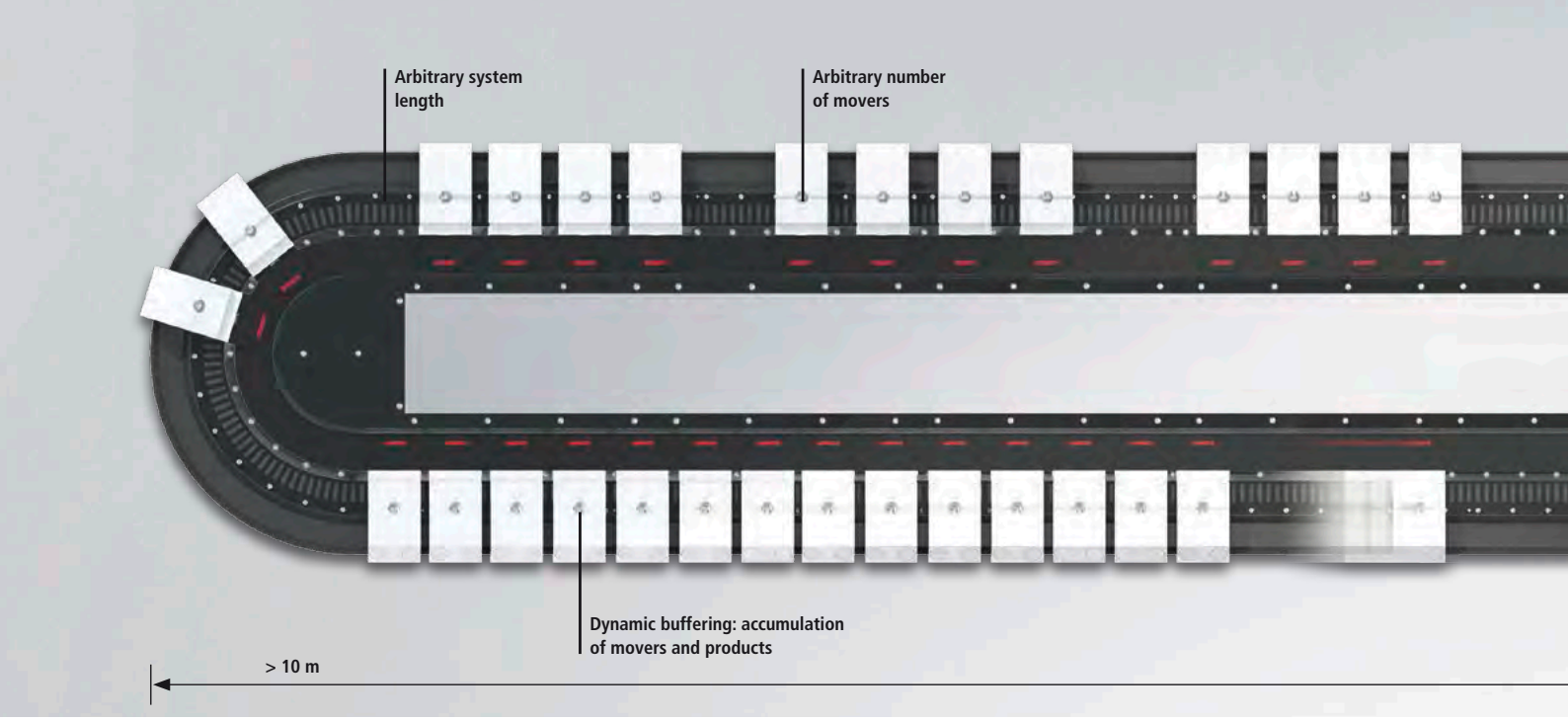
Interruption-free production flow

From the combination of the basic functions, product flows can be kept constantly in motion with XTS. Since the movers in the XTS operate independently of each other, it is possible to stop and process individual objects without having to interrupt the entire process. Viewed from the outside the production flow is maintained.

Push product, adapt product spacing, reduce or increase product speed
The movers of the XTS system can always run with the flow of product. No return trip or return stroke is necessary. The transported material can be accumulated and grouped during the movement via the dynamic buffering.

Clamp and move product
Through the combination of the synchronous movement of a group and the application of a constant force, a product can be clamped and moved in a clamped condition. Movement is controlled at all times and at all places on the transport path.





XTS | **Complex functions**

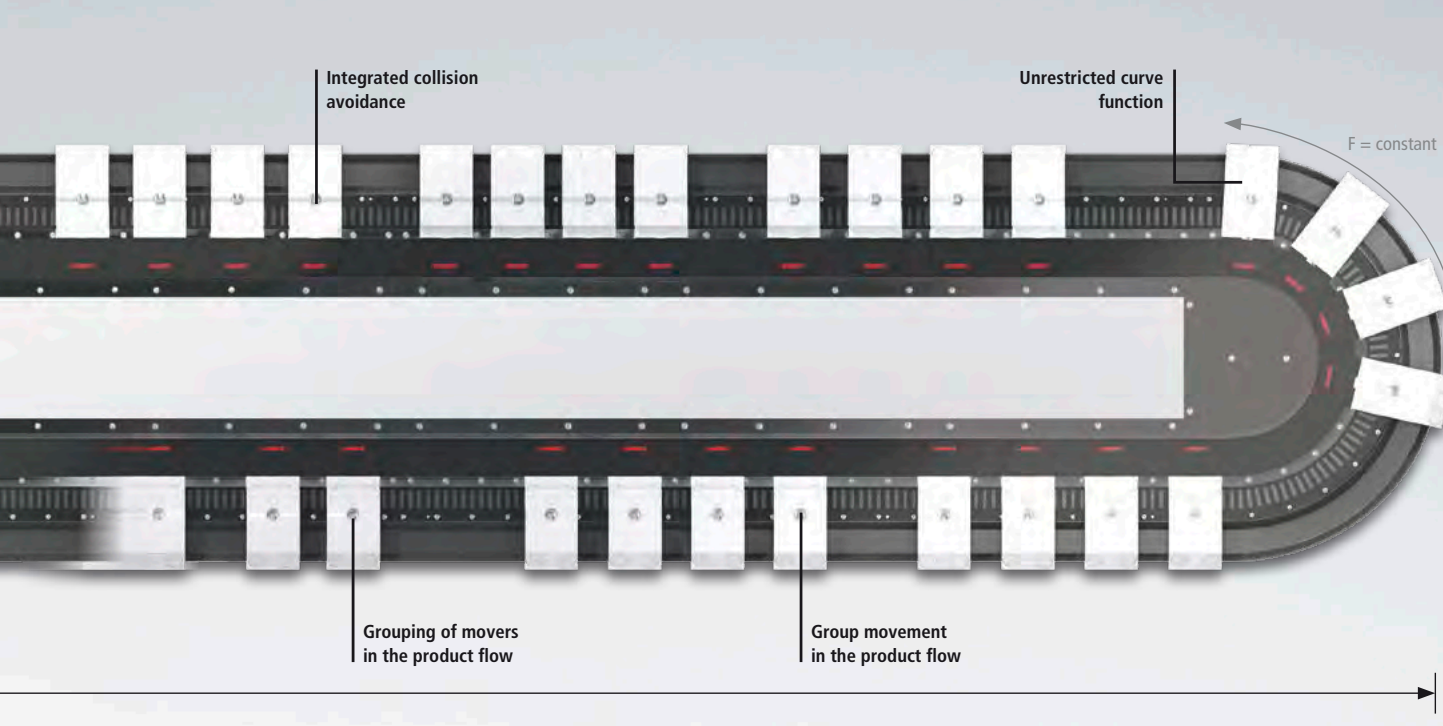
Due to the mechatronic concept, XTS combines functions and characteristics that are required for the dynamic transport of goods of all kinds. Apart from the basic functions of the movers, the complex functions of XTS enable the gentle control of an endless product flow.

Arbitrary number of movers
There are no system limits for the number of movers; consequently the number can be optimally adapted to the application. In practice the number is limited only by the available computing power of the PC.

Unrestricted curve function
The entire travel path becomes the utilisable path, since the outward and return path and also the curve segments are available for the transport and processing of materials. This maximum utilisation of the machine volume results in very compact application solutions, which enable completely new machine concepts.

Arbitrary system length
There are no restrictions on the total length of the path, so that 10 m and much more are technically possible. The system consists of individual modules, which when combined with one another create both small, compact solutions and metre-long transport paths. Straight sections are made up of 250 mm modules which can be made endless by the use of curved segments. A motor cable has to be attached at least every three metres. The electrical connection between the modules is automatically made when assembling. The guide rail system offers lengths of up to 2.5 m.

Lower mass, increased safety
Small masses lead to a lower hazard potential, because unlike XTS, a conveyor chain is kept in motion by a central drive unit. The total acting force corresponds to the sum of all necessary individual forces over the entire length. In the case of an error, a mechanical malfunction or a manual intervention in the process, this force acts on one place. With XTS this risk can be significantly minimised and safety can be increased, since in most cases only the parameterised force of a mover acts. Hence, even in the case of a collision with an obstacle, only the mass of a mover with its payload acts.

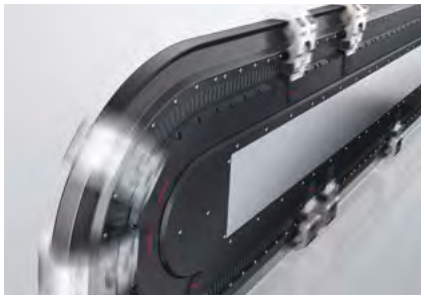


Control of a continuous product flow

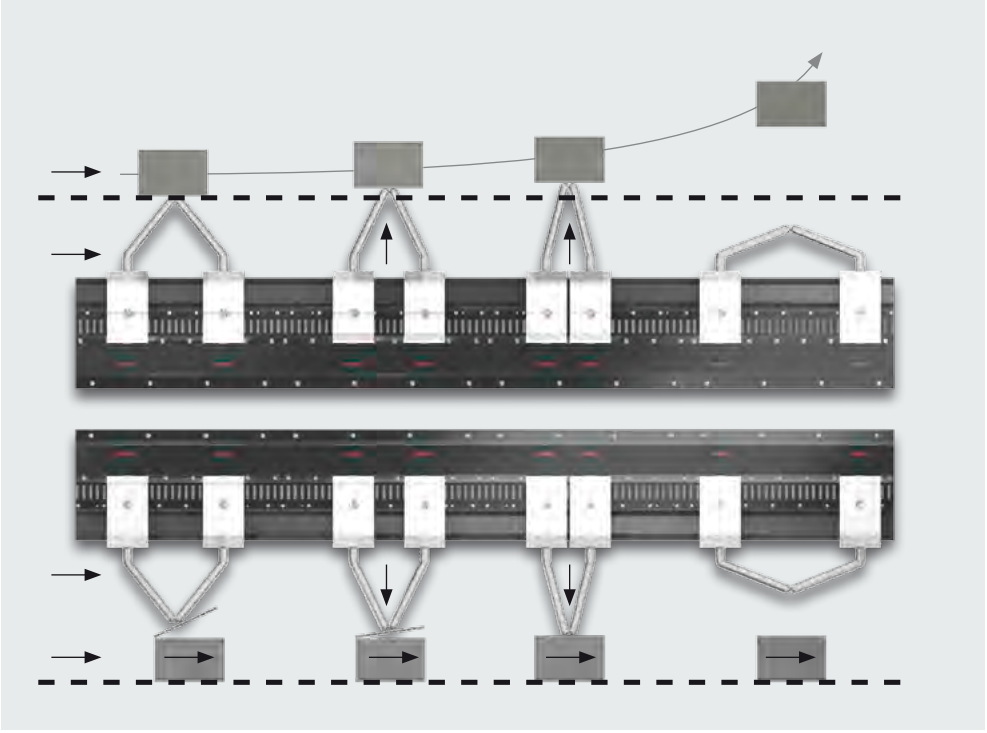
High-power dynamics, but no unrestrained force
The fast signal processing and the large bandwidth of EtherCAT enable the best dynamic characteristics. Together with large peak forces, high acceleration is available to the application. Position lag monitoring avoids damage to the product in case of mechanical malfunctions. In addition, force limitation and jerk reduction allow the optimal handling of the product at all times at different points in the production. For example, the parameters can be adapted according to the filling level while moving.

Absolutely precise configuration
The arbitrary number of movers, the modular path guidance, the individual controllability of each individual mover and the simple integrability into existing machines and plants ensure a precisely matching solution with which the production efficiency of a machine can be further optimised.

Fast, flexible format adaptation
A change of format when changing products or, for example, when the filling quantity changes can be carried out without stopping production: the modifications can be realised by changing the software parameters and empirical values can also be retrieved at any time in the form of a stored parameter set. The parameters can be exchanged between applications of the same type.

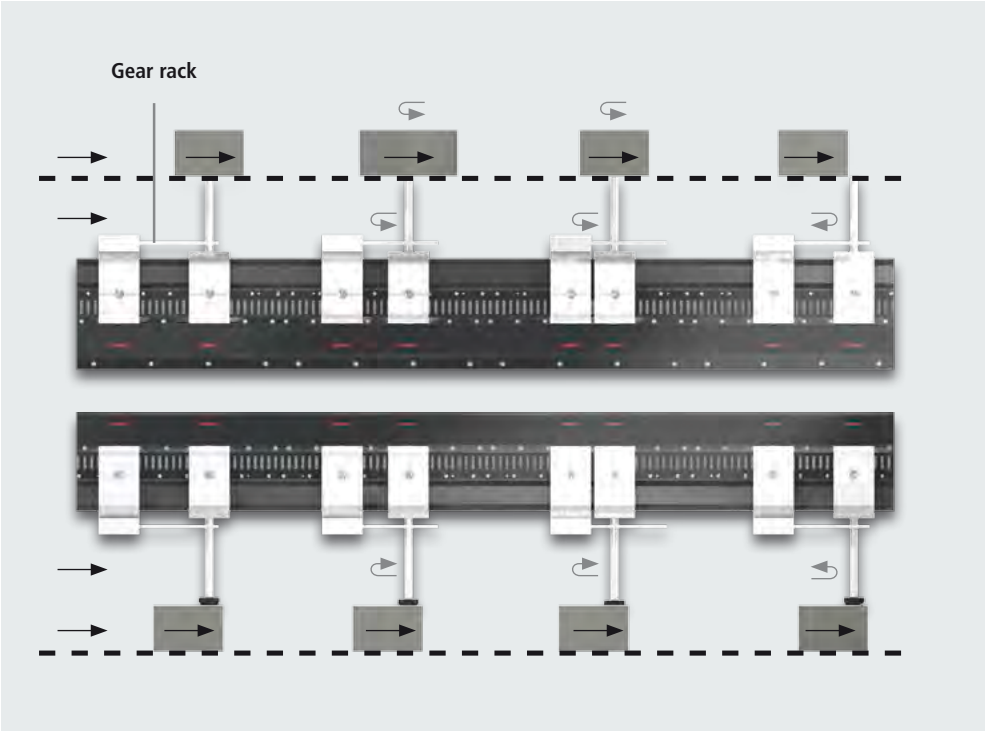


XTS | **Application examples**

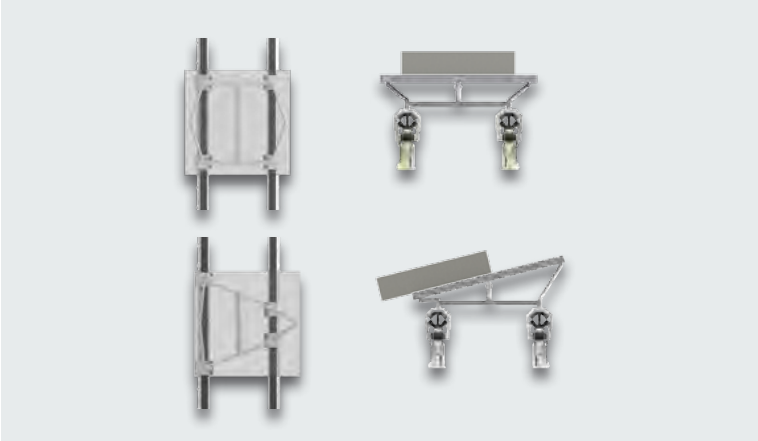


Movement kinematics in one system

Kinematics in linear motion for handling a product: lifting, sealing, etc.
A mechanical action generated by the relative movement between two movers creates an additional movement that can manipulate a product. Transported materials can be pushed upwards or to the side. A product can be closed or processed in some other way while moving.

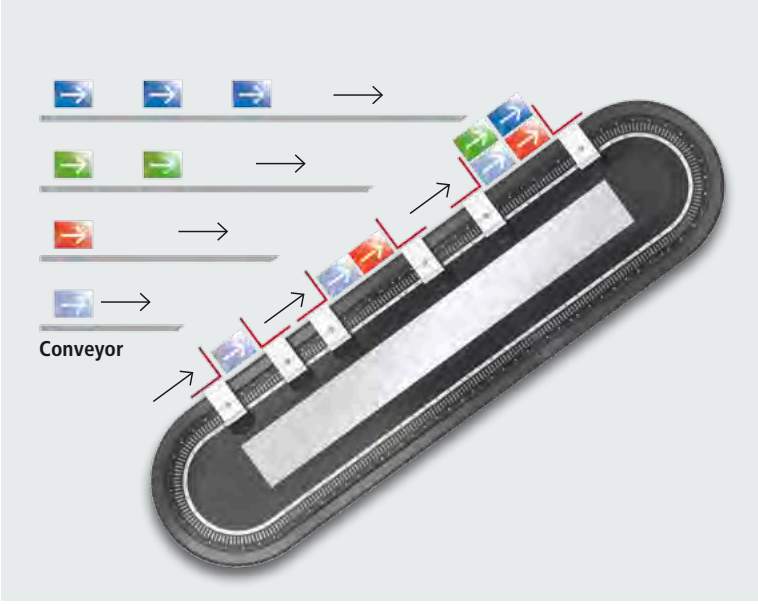


Kinematics in linear motion for handling a product: rotate, screw cap on, etc.
A rotary movement can be generated between two movers by a suitable mechanical action. This can, for example, screw a cap on or rotate the product.



Movement kinematics in two systems

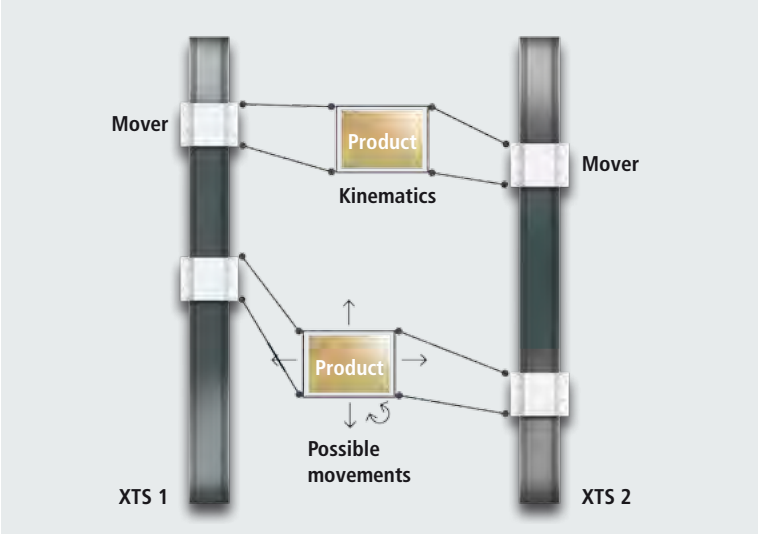
Transport and discharge product
A package or a case is transported on a surface. The package is to be deposited at a station. The surface is tilted to the side and the package slides off. Four movers on two paths move the tilting surface with the transported material. A change in the spacing of the movers with respect to each other generates a mechanical action that tilts the surface. The transported material can be prevented from sliding off when driving through curves by an inclined position and can be specifically deposited at another place while driving or after stopping.



Grouping system

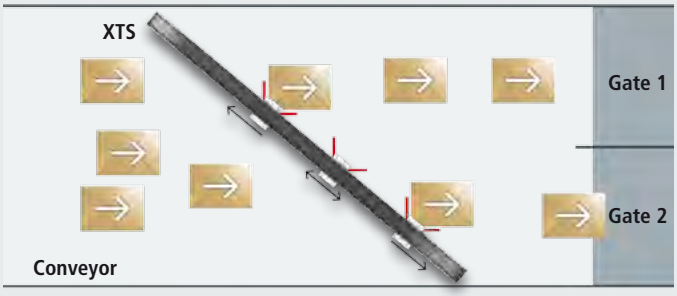
Used as a grouping system, the XTS can easily combine products arriving on multiple conveyor belts into predefined and easily changed groups and move them to the next station.

The plant can adapt to the product width, stack height and number of stacks without any manual intervention. The distance between the movers and also the motion profile are changed by parameters in the software. This can even be done during operation without a standstill.



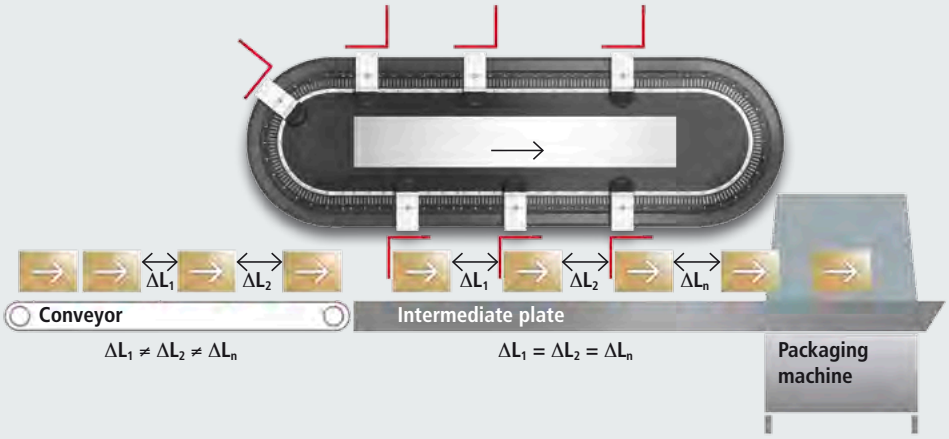
Travelling manipulator

With circulating kinematics the transported product can be influenced in X and Y directions. With two XTS systems arranged in parallel, the manipulator is synchronised to the product and shifts it on the belt at full speed. The product can even be slightly rotated by using appropriate kinematics.



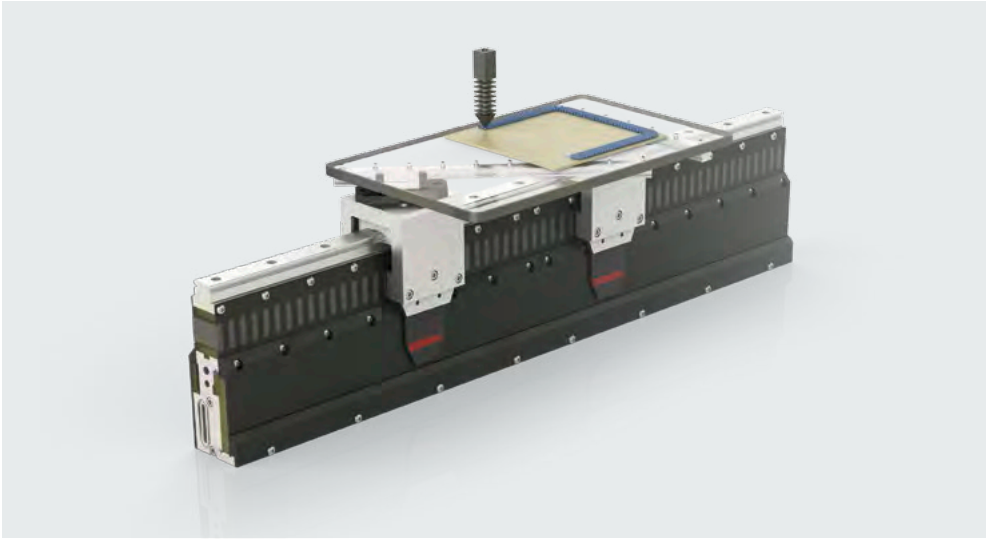
Distribution system

Functioning as a distribution system, the XTS splits an incoming product stream into multiple streams (two in this case) inexpensively and with great flexibility.



Feeder with distance adjustment

The XTS makes it easy to implement a feeder with distance adjustment that synchronises products arriving at different intervals with the downstream process.



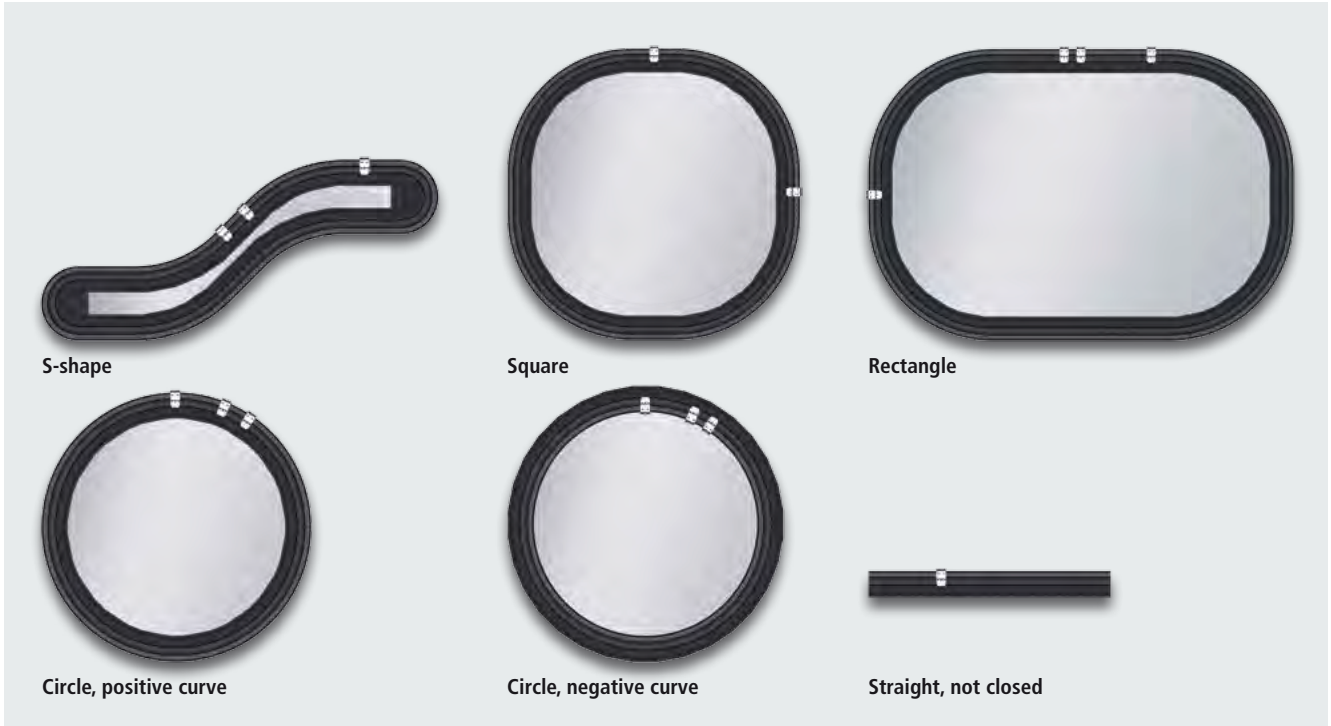
XY axis

Two movers, defined as a virtual XY axis, and can be controlled with G-code. For example, the XTS can move the product along in a targeted manner under a fixed adhesive nozzle, in order to apply adhesive evenly along the outer contour.

Parallel filling of liquids

The particularly time-consuming liquid filling process shown here is implemented as a 15-fold parallel configuration. All inherently fast operations, such as bottle inspection, sealing, labeling and grouping are implemented just once. This considerably reduces the costs and space requirements of the entire system. With a filling time of three seconds, the plant achieves an output of five units per second. Dwell times, accelerations and product distances are realised as software functions. As a result, no mechanical adjustments are necessary, and product changeovers can be carried out during ongoing operation.

XTS | **Trajectories**



Servo Drives

▶ **www.beckhoff.com/Servo-Drives**

AX5101–AX5112, AX52xx | **Digital Compact Servo Drives: 1-/2-channel up to 8.3 kW**

- 1- or 2-channel Servo Drives
- high-speed EtherCAT communication
- rated current up to 12 A or 2 x 6 A
- optimised for multi-axis applications
- variable motor output current for 2-channel Servo Drives
- TwinSAFE drive option card

See page 344

AX8000 | **Multi-axis EtherCAT drive: Compact control power with 1 µs current control update time**

- optimised, compact dimensions for control cabinet installation
- OCT integrated
- new, integrated AX-Bridge: toolless mounting
- powerful FPGA technology combined with multi-core ARM processors
- multi-channel current control technology
- TwinSAFE axis modules

See page 336

EL72x1-9014 | **Compact servo drive in EtherCAT Terminals**

- seamless integration within EtherCAT I/O system
- various performance classes between 2.8 and 8 A
- direct motor connection with OCT
- enables implementation of the STO (Safe Torque Off) safety function
- vector control for highly dynamic positioning tasks
- designed for use with AM8100

See page 2 228

EP7211-9034 | **Servomotor box with OCT and STO, 4.5 A**

- seamless integration within EtherCAT I/O system
- direct motor connection with OCT
- enables implementation of the STO (Safe Torque Off) safety function
- vector control for highly dynamic positioning tasks
- designed for use with AM8100

See page 2 311

EJ7211-xxxx | **Servomotor modules with OCT, 4.5 A**

- seamless integration within EtherCAT I/O system
- direct motor connection with OCT
- EJ7211-9414 enables implementation of the STO (Safe Torque Off) safety function
- vector control for highly dynamic positioning tasks
- designed for use with AM8100

See page 2 392

AX5118–AX5140 | **Digital Compact Servo Drives: 1-channel up to 28 kW**

- high-speed EtherCAT communication
- rated current: 18/25/40 A
- flexible motor type selection
- TwinSAFE drive option card

See page 344

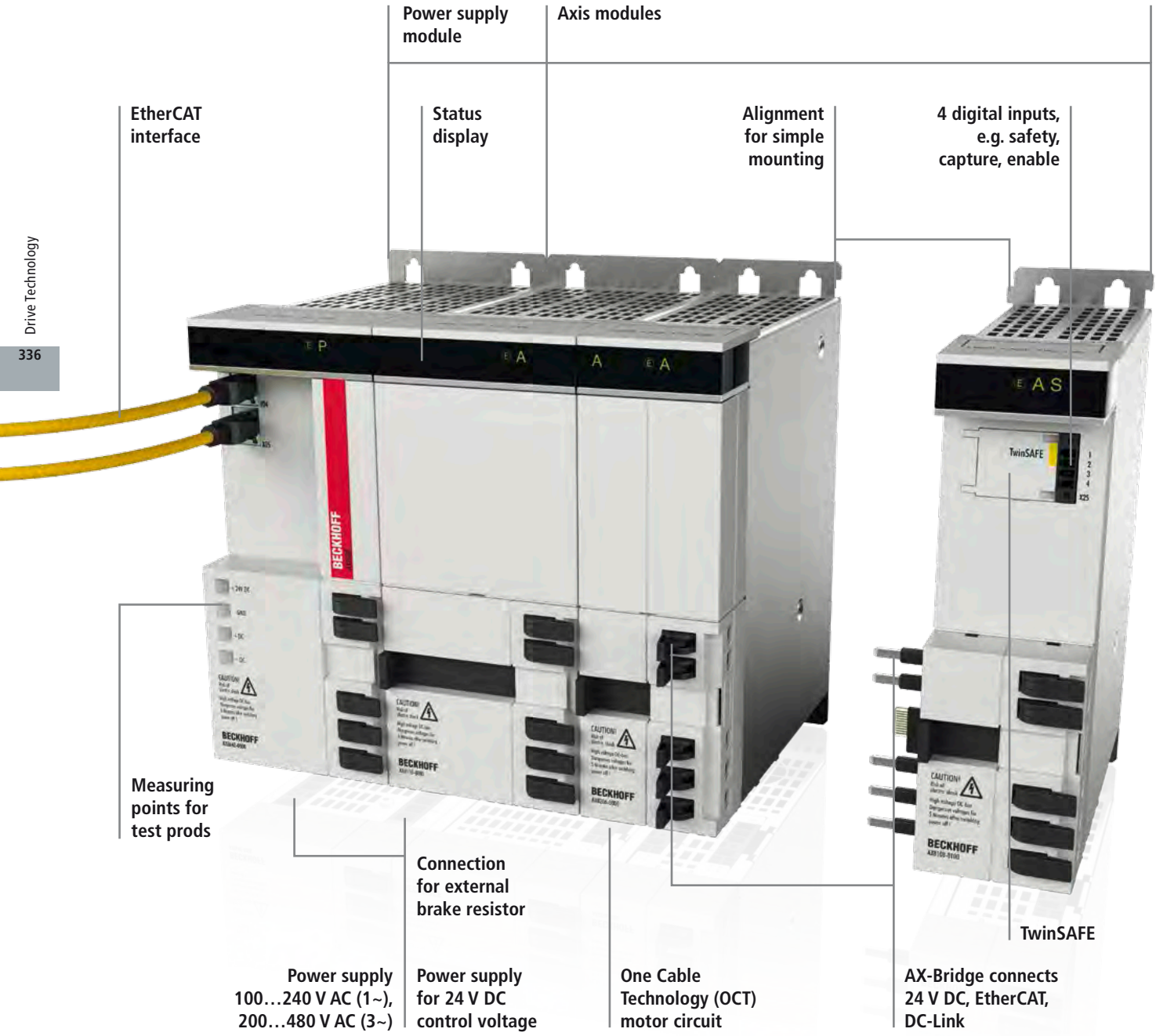
AX5160–AX5193 | **Digital Compact Servo Drives: 1-channel up to 118 kW**

- high-speed EtherCAT communication
- rated current: 60/72/90/110/143/170 A
- high performance with small dimensions
- flexible motor type selection
- TwinSAFE drive option card

See page 344

AX8000 | Multi-axis servo system

▶ www.beckhoff.com/AX8000



AX8620 | Power supply module, 20 A

AX8640 | Power supply module, 40 A

AX8108 | Axis module, 8 A

AX8118 | Axis module, 18 A

AX8206 | Double-axis module, 2 x 6 A

The AX8000 multi-axis servo system greatly simplifies the implementation of multi-channel drive solutions. The required number of 1-channel or 2-channel axis modules are attached to the central supply module. The modules are connected without screws or tools using the built-in AX-Bridge quick connection system, which is based on spring-loaded terminals. The 1-axis and 2-axis modules can optionally be equipped with STO or TwinSAFE (drive-integrated safety functions).

eXtreme Fast Control in the drive

The EtherCAT-based AX8000 multi-axis servo system combines powerful FPGA technology with multi-core ARM processors. The new multi-channel current control technology enables extremely short sampling and response times. The entirely hardware-implemented current controller combines the advantages of analog and digital control technology: reaction to a current deviation from the setpoint value is possible within 1 µs; the velocity controller cycle time is around 16 µs at a switching frequency of 32 kHz. The processing of EtherCAT process data (actual and setpoint values) is carried out without a processor almost without delay in the hardware, so that the minimum EtherCAT cycle time is only 62.5 µs.

One Cable Technology (OCT)

The AX8000 multi-axis servo system supports OCT, the One Cable Technology for power and feedback. In connection with the servomotors from the AM8000 (standard), AM8500 (increased inertia) and AM8800 (stainless steel) series, the wiring is reduced to the standard motor cable, via which the feedback signals are also transmitted. As in sensorless control, the user no longer has to use an additional feedback cable. All information required for control purposes is transmitted reliably and interference-proof via a digital interface.

Drive-integrated safety functions

The AX8000 with TwinSAFE supports the typical drive-integrated safety functions and fulfills the requirements of DIN EN ISO 13849-1:2008 (PL c/Cat. 3 up to PL e/Cat. 4).

- stop functions (STO, SOS, SS1, SS2)
- speed functions (SLS, SSM, SSR, SMS) with up to 8 speeds
- position functions (SLP, SCA, SLI) with reference cams
- acceleration functions (SAR, SMA)
- rotating direction functions (SDIp, SDIn)
- brake function (SBC)
- safely limited torque (SLT)

Technical data	AX8000
Bus system	EtherCAT
Drive profile	CiA402 according to IEC 61800-7-201 (CoE)
Rated supply voltage	100…480 V AC, 50/60 Hz
DC-Link voltage	140…875 V DC
Current control	1 µs update time, 16 µs cycle time
Design form	modular system with 60 or 90 mm wide elements
Protection class	IP 20
Operating temperature	0…+55 °C (see documentation)
Approvals	CE, cULus

AX8620, AX8640 | **Power supply modules**

A power supply module generates the DC-Link voltage (DC) for the supply of the axis modules and the option modules from the mains voltage. It already contains a mains filter, for which the drive is tested and certified in accordance with EN 61800-3 for Category C3 use.

Any regenerative energy produced, e.g. through strong braking of the motors, can be converted into heat either via the internal brake resistor or via the combination of built-in brake chopper and external brake resistor. Alternatively, the energy can be buffered in the AX8810 capacitor module.

AX8000 supply modules can be used on 1- and 3-phase low-voltage mains supplies.

- 1-phase mains supplies 100…240 V AC, 50/60 Hz
- 3-phase mains supplies 200…480 V AC, 50/60 Hz

A separate 24 V DC power supply is required in each case.

Technical data	AX8620-0000-0000	AX8640-0000-0000
Rated supply voltage	1 x 100…240 V AC 3 x 200…480 V AC	
Rated input current at 40 °C	1~: 10.0 A AC 3~: 17.5 A AC	3~: 35 A AC
Rated output current	1~: 5 A DC without mains choke/7 A DC with mains choke 3~: 20 A DC	3~: 40.0 A DC
Rated output	1~: 2.0 kW 3~: 10.7 kW	3~: 21.4 kW
DC-Link voltage	max. 875 V DC	
DC-Link capacitance	405 µF	625 µF
Max. braking power (internal/external)	21.8 kW/21.8 kW	43.6 kW/40.1 kW
Further information	www.beckhoff.com/AX8620	www.beckhoff.com/AX8640

AX81xx, AX8206 | **Axis modules**

An axis module contains the DC-Link and the inverter for supplying the motor. Depending on the required number of axes, the axis modules are attached to the supply module to form the multi-axis servo system. Axis modules with different ratings can be combined in order to enable an optimised design of the individual axes.

Supporting a wide supply voltage range from 100 to 480 V AC, the axis modules can be operated without limitation with any of the supply modules. This flexibility simplifies the implementation of machine configurations for any type of mains supply. The electrical connection is established without tools via the already integrated AX-Bridge: it automatically connects DC-Link, 24 V DC control voltage and communication via EtherCAT between the linked modules. The DC-Link connection enables the exchange of energy during acceleration and braking procedures, where the regenerative brake energy is primarily stored in the common DC-Link. If the energy exceeds the DC-Link capacitance, utilize the brake resistor of the AX881x capacitor modul to suppress the DC-Link voltage. The AX8000 multi-axis servo drive system encompasses new functions of safe drive technology with TwinSAFE: the AX8108, AX8118 and AX8206 axis modules include a programmable TwinSAFE Logic corresponding to an EL6910 and enable the direct implementation of a safety application in the servo drive. The user enjoys greater degrees of freedom in the implementation of safety applications in drive technology systems, and the flexibility in programming facilitates individual design of safe drive technology to suit the specific system. The safety functions STO and SS1 can be implemented with the TwinSAFE axis modules with the ordering option -0100 (STO/SS1). These functions can be initiated both via hard wiring and via FSoE. For TwinSAFE axis modules with the ordering option -0200 (Safe Motion), various internal and external drive signals are available for implementing an application-specific safety function.

Technical data	AX8108	AX8118	AX8206
Rated current	1 x 8 A	1 x 18 A	2 x 6 A
DC-Link voltage	max. 875 V DC		
DC-Link capacitance	135 µF	405 µF	135 µF
Number of channels	1	1	2
Min. rated channel current at full current resolution	1 A	5 A	1 A
Peak output current*	20 A	40 A	14 A | 20 A
Further information	www.beckhoff.com/AX81xx	www.beckhoff.com/AX81xx	www.beckhoff.com/AX82xx

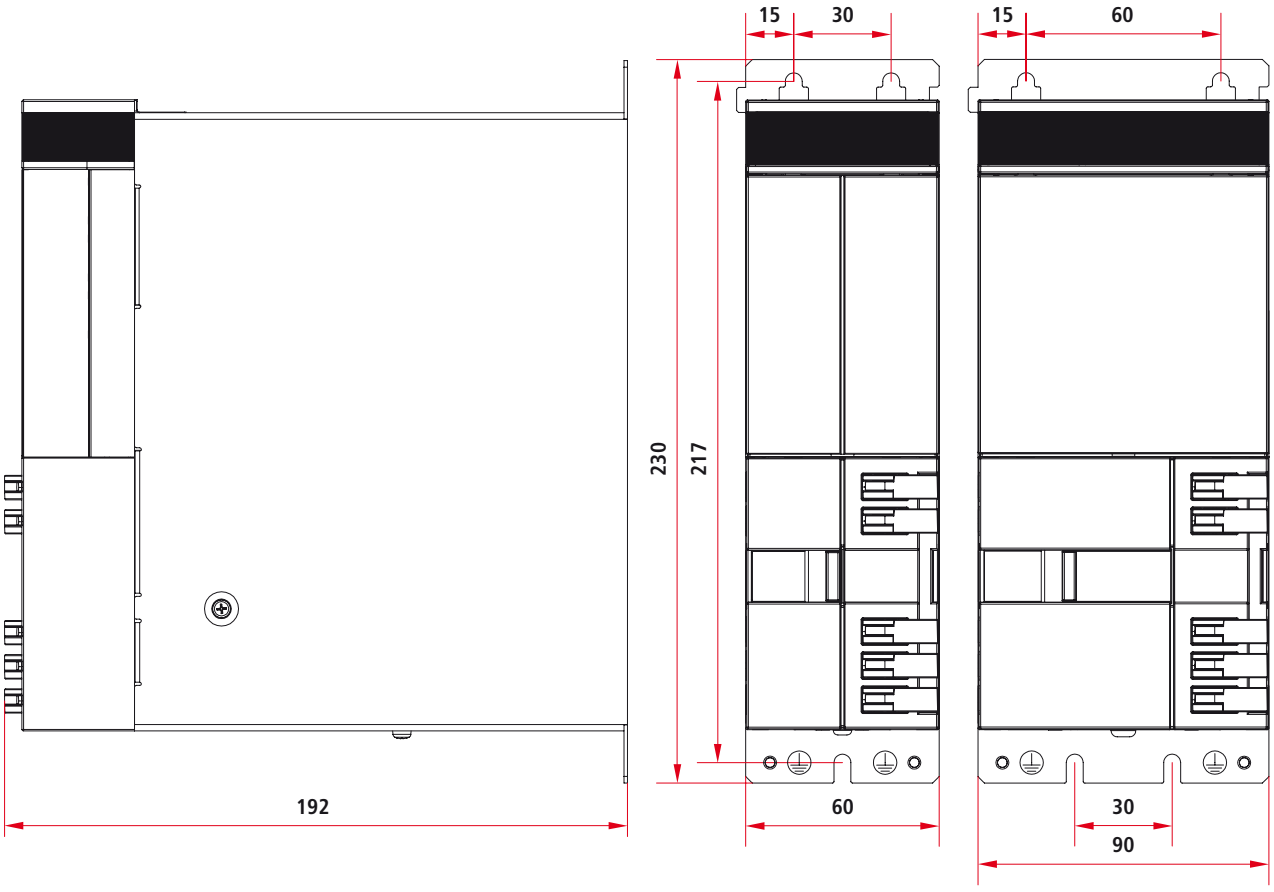
*rating for 560 V DC

Ordering information	Axis module 1 x 8 A	Axis module 1 x 18 A	Axis module 2 x 6 A
Without TwinSAFE	AX8108-0000-0000	AX8118-0000-0000	AX8206-0000-0000
STO/SS1	AX8108-0100-0000	AX8118-0100-0000	AX8206-0100-0000
Safe Motion	AX8108-0200-0000	AX8118-0200-0000	AX8206-0200-0000

AX8810 | **Capacitor module**

An AX8810 capacitor module extends the DC-Link capacitance and is suitable for the support of the DC-Link. It enables energy savings: voltage peaks generated by braking motors are taken up and stored. This makes the activation of the brake resistor mostly unnecessary and helps to reduce power losses. Overall, the use of the capacitor module makes a reduction in the total connected load possible and also a smaller dimensioning of the fuse.

Technical data	AX8810-0000-0000
Function	capacitor module
For power supply modules	AX86xx-0000
DC-Link voltage	max. 875 V DC
DC-Link capacitance	1755 µF
Further information	www.beckhoff.com/AX881x



Dimensions	Height without connectors	Depth without connectors	Width
AX8620	230 mm	192 mm	60 mm
AX8640	230 mm	192 mm	90 mm
AX8108	230 mm	192 mm	60 mm
AX8118	230 mm	192 mm	90 mm
AX8206	230 mm	192 mm	60 mm
AX8810	230 mm	192 mm	60 mm

Motor supply cables for AX8000 Servo Drives at AM8xxx

For maximum cable lengths and further specifications see current documentation under ▶ **www.beckhoff.com/documentation**.
Torsion-resistant variants for robotic applications are available in the following wire gauges: 1 mm², 1.5 mm², 2.5 mm².

Motor cables 1 mm² for motors with itec® plug at AX8108 and AX8206

Ordering information	Motor cable with 1 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8022-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 81 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1 mm² + (2 x 0.75 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8022-0050	example for 5 m length
ZK4501-8022-xxxx	extension cable

Motor cables 1.5 mm² for motors with M23 speedtec® at AX8108 and AX8206

Ordering information	Motor cable with 1.5 mm² wire gauge, fixed installation
ZK4800-8003-xxxx	Cables for fixed installation, min. bending radius = 61 mm (5 x OD), (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8003-0050	example for 5 m length
ZK4501-8003-xxxx	extension cable

Ordering information	Motor cable with 1.5 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8023-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 89 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8023-0050	example for 5 m length
ZK4501-8023-xxxx	extension cable

Motor cables 2.5 mm² for motors with M23 speedtec® plug at AX8118

Ordering information	Motor cable with 2.5 mm² wire gauge, fixed installation
ZK4800-8004-xxxx	Cables for fixed installation, min. bending radius = 69 mm (5 x OD), (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8004-0050	example for 5 m length
ZK4501-8004-xxxx	extension cable

Ordering information	Motor cable with 2.5 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8024-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 97 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8024-0050	example for 5 m length
ZK4501-8024-xxxx	extension cable

Motor cables 4 mm² for motors with M40 speedtec® plug at AX8118

Ordering information	Motor cable with 4 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8025-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 111 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 4 mm² + (2 x 1 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8025-0050	example for 5 m length
ZK4501-8025-xxxx	extension cable

Accessories for AX8000 Servo Drives at AM8xxx

Power supply | Mains chokes for AX8000

Ordering information	AX2090-ND80-00xx | Mains chokes
AX2090-ND80-0010	mains choke for AX8620-xxxx supply module, 1-phase, U_K 4 %
AX2090-ND80-0020	mains choke for AX8620-xxxx supply module, 3-phase, U_K 4 %
AX2090-ND80-0040	mains choke for AX8640-xxxx supply module, 3-phase, U_K 4 %

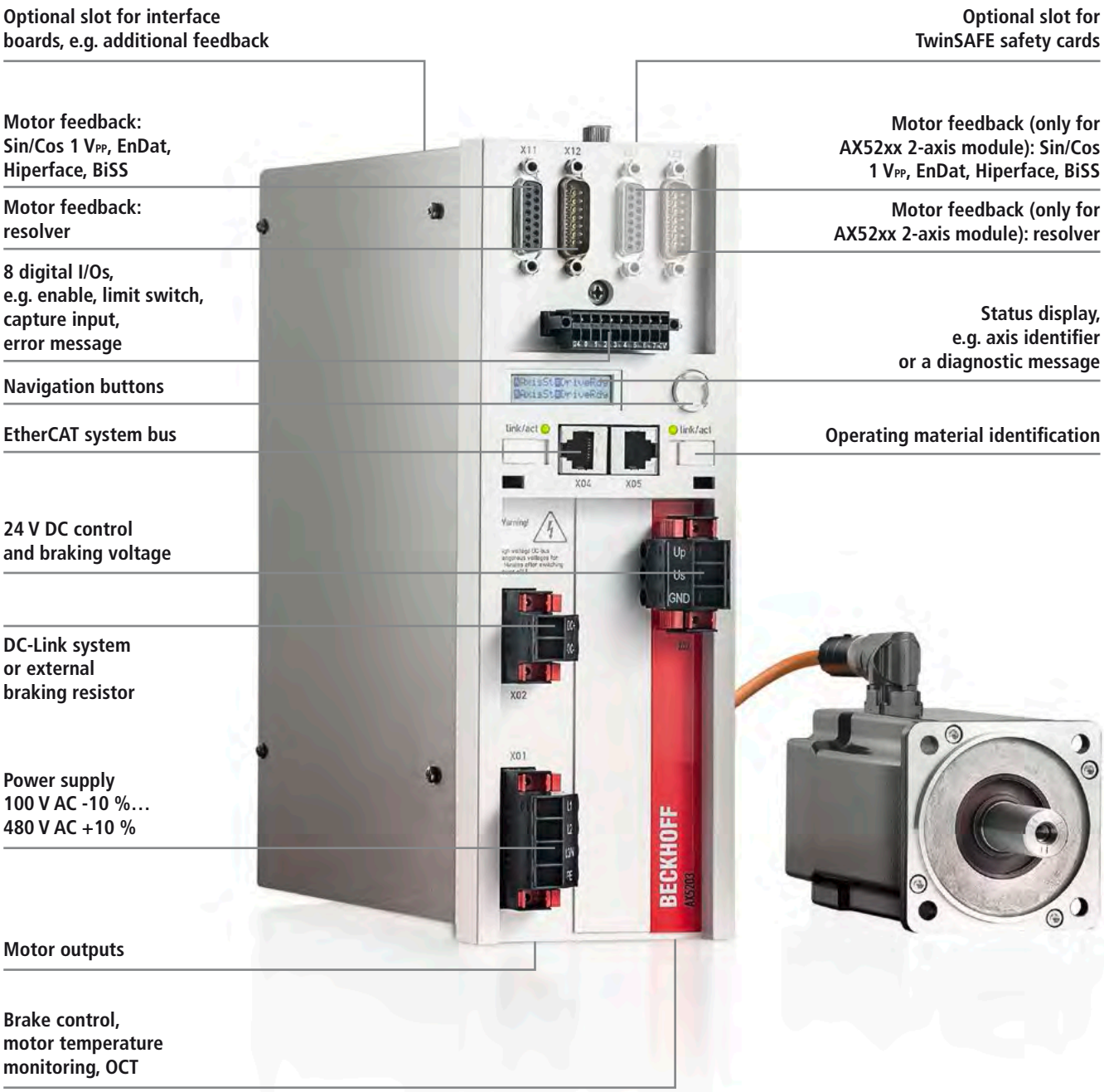
Brake energy management

Ordering information	AX2090-BW80-xxxx | Braking resistors
AX2090-BW80-1000	external braking resistor for AX8640-0000-0000 supply module, 1.0 kW, 18 Ω [1]
AX2090-BW80-1600	external braking resistor for AX8620-0000-0000 supply module, 1.6 kW, 33 Ω [1]
AX2090-BW80-3200	external braking resistor for AX8640-0000-0000 supply module, 3.2 kW, 18 Ω [2]

Recommended interface cables: [1] ZK4000-2101-2xxx (1.5 mm²), [2] ZK4000-2102-2xxx (2.5 mm²)

AX5000 | Digital Compact Servo Drives

▶ www.beckhoff.com/AX5000



AX5101–AX5112 | 1-channel, up to 12 A

AX52xx | 2-channel, up to 2 x 6 A

AX5118–AX5140 | 1-channel, 18/25/40 A

AX5160, AX5172 | 1-channel, 60/72 A

AX5190, AX5191 | 1-channel, 90/110 A

AX5192, AX5193 | 1-channel, 143/170 A

The EtherCAT drives

The AX5000 Servo Drive product line from Beckhoff sets new standards in drive performance. The AX5000 series is available in single- or multi-channel form and is optimised for exceptional functionality and cost-effectiveness. Featuring integrated, high-speed control technology with a current control cycle of down to 62.5 µs, the AX5000 drives support fast and highly dynamic positioning tasks. The drives utilise EtherCAT as a high-performance communication system, providing an ideal interface with PC-based control technology while supporting coupling with other fieldbus systems. The 2-channel Servo Drives with variable motor output current optimise the packaging density and the cost per drive channel. The compact design and simple and safe installation through the "AX-Bridge" quick connection system significantly simplify control cabinet assembly.

Technical highlights

- **fast control algorithms**
  - current control: min. 62.5 µs
  - speed control: min. 62.5 µs
  - position control: min. 62.5 µs
- **variably adjustable current and speed filters**
- **high-speed EtherCAT system communication**
- **1- or 2-channel Servo Drive**
  - optimised for multi-axis applications
  - variable motor output current in 2-channel drives
- **active DC-Link and brake energy management via AX-Bridge**
- **variable motor interface with**
  - multi-feedback interface
  - flexible motor type selection
  - scalable, wide range motor current measurement
  - OCT (One Cable Technology)
  - electronic identification plate
- **high-speed capture inputs**
  - eight programmable digital I/Os, two with timestamp
- **mains connection**
  - wide voltage range 100…480 V AC
  - integrated mains filter
- **integration of safety functions (optional)**
  - STO, SS1
  - TwinSAFE: intelligent safety functions for Motion Control with AX58xx
- **compact design for simple control cabinet installation (300 mm depth)**
- **AX-Bridge – the quick connection system for power supply, DC-Link and control voltage**
- **variable cooling concept (fanless, forced cooling)**

Technical data	AX5000
Bus system	EtherCAT
Drive profile	SERCOS™ profile for servo drives according to IEC 61800 7 204 (SoE)
Rated supply voltage	100…480 V AC, 50/60 Hz
DC-Link voltage	max. 875 V DC
Current control	62.5 µs
Design form	compact Servo Drive in 1- and 2-channel models, multi-axis systems with AX-Bridge
Protection class	IP 20
Operating temperature	AX5x01…AX5140: 0…50 °C, AX5160…AX5193: 0…40 °C
Approvals	CE, cULus

AX51xx | 1-channel Servo Drives up to 40 A

Technical data	AX5101-0000-020x	AX5103-0000-020x	AX5106-0000-020x	AX5112-0000-020x
Function	servo drive for one drive axis			
Rated supply voltage	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %	3 x 100…480 V AC ±10 %
Rated current	1~: 1.5 A 3~: 1.5 A	1~: 3 A 3~: 3 A	1~: 4.5 A 3~: 6 A	3~: 12 A
DC-Link voltage	max. 875 V DC			
Peak output current	4.5 A	7.5 A	13 A	26 A
Further information	www.beckhoff.com/AX51xx			

Technical data	AX5118-0000-020x	AX5125-0000-020x	AX5140-0000-020x
Function	servo drive for one drive axis		
Rated supply voltage	3 x 100…480 V AC ±10 %		
Rated current	3~: 18 A	3~: 25 A	3~: 40 A
DC-Link voltage	max. 875 V DC		
Minimum rated channel current at full current resolution	12 A	12 A	18 A
Peak output current	36 A	50 A	80 A
Further information	www.beckhoff.com/AX51xx		

AX51xx | 1-channel Servo Drives 60…170 A

Technical data	AX5160-0000-020x	AX5172-0000-020x	AX5190-0000-020x
Function	servo drive for one drive axis		
Rated supply voltage	3 x 400…480 V AC ±10 %		
Rated current	3~: 60 A	3~: 72 A	3~: 90 A
DC-Link voltage	max. 875 V DC		
Max. braking power (internal/external)	–/52 kW	–/52 kW	–/67 kW
Peak output current	120 A	144 A	180 A
Further information	www.beckhoff.com/AX5160		

Technical data	AX5191-0000-020x	AX5192-0000-020x	AX5193-0000-020x
Function	servo drive for one drive axis		
Rated supply voltage	3 x 400…480 V AC ±10 %		
Rated current	3~: 110 A	3~: 143 A	3~: 170 A
DC-Link voltage	max. 875 V DC		
Max. braking power (internal/external)	–/67 kW	–/103 kW	–/103 kW
Peak output current	180 A	215 A	221 A
Further information	www.beckhoff.com/AX5160		

AX52xx | 2-channel Servo Drives

Technical data	AX5201-0000-020x	AX5203-0000-020x	AX5206-0000-020x
Function	servo drive for two drive axes with flexible distribution of the total device current		
Rated supply voltage	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %		
Rated current	1~: 2 x 1.5 A 3~: 2 x 1.5 A	1~: 2 x 3 A 3~: 2 x 3 A	1~: 2 x 4.5 A 3~: 2 x 6 A
DC-Link voltage	max. 875 V DC		
Peak output current	2 x 5 A	2 x 10 A	2 x 13 A
Further information	www.beckhoff.com/AX52xx		

Dimensions	Height without connectors	Width	Depth without connectors
AX5101	274 mm	92 mm	232 mm
AX5103	274 mm	92 mm	232 mm
AX5106	274 mm	92 mm	232 mm
AX5112	274 mm	92 mm	232 mm
AX5118	274 mm	185 mm	232 mm
AX5125	274 mm	185 mm	232 mm
AX5140	274 mm	185 mm	232 mm
AX5201	274 mm	92 mm	232 mm
AX5203	274 mm	92 mm	232 mm
AX5206	274 mm	92 mm	232 mm
AX5160	345 mm	190 mm	259 mm
AX5172	345 mm	190 mm	259 mm
AX5190	540 mm	280 mm	253 mm
AX5191	540 mm	280 mm	253 mm
AX5192	540 mm	280 mm	332 mm
AX5193	540 mm	280 mm	332 mm

Typical combinations AX5000	Mains choke	Mains filter	Braking resistor (x = 3 or 6)
AX5160	AX2090-ND50-0060	integrated (C3 up to 25 m)	AX2090-BW52-x000
AX5172	AX2090-ND50-0072	integrated (C3 up to 25 m)	AX2090-BW52-x000
AX5190	AX2090-ND50-0090	AX2090-NF50-0100	AX2090-BW53-x000
AX5191	AX2090-ND50-0110	AX2090-NF50-0150	AX2090-BW53-x000
AX5192	AX2090-ND50-0143	AX2090-NF50-0150	AX2090-BW54-x000
AX5193	AX2090-ND50-0170	AX2090-NF50-0180	AX2090-BW54-x000

Braking resistor: x = power in kW

Options for AX5000 Servo Drives

AX57xx | Encoder option cards

The AX5000 Servo Drive series supports a large number of feedback interfaces via the multi-feedback interface:
- resolver (2-, 4-, 6- or 8-pole)
- SinCos encoder 1 V_{PP}
- single- and multi-turn encoder EnDat
- single- and multi-turn encoder EnDat 2.2
- single- and multi-turn encoder Hiperface 1 V_{PP}
- single- and multi-turn encoder BiSS 1 V_{PP}
- single- and multi-turn encoder 1 V_{PP}

From hardware revision 2 onwards, OCT (One Cable Technology) is also supported by the AX5000 and with it the "second encoder" function where the encoder inside the motor is used for commutation and a second high-resolution encoder is used for position control.

Encoder option cards
For the integration of further feedback systems the controllers can be equipped with encoder option cards from hardware revision 2 onwards. The option cards are inserted in the second option slot on top of the AX5000, offering the possibility to connect one or two further encoders, depending on the version.

Encoder option cards for AX51xx
- AX5701: one additional encoder input 1 V_{PP}, BiSS B, Hiperface, EnDat
- AX5721: one additional encoder input EnDat 2.2 or BiSS C

Encoder option cards for AX52xx
- AX5702: two additional encoder inputs 1 V_{PP}, BiSS B, Hiperface, EnDat
- AX5722: two additional encoder inputs EnDat 2.2 or BiSS C

Ordering information		Pict.
AX5701-0000	encoder option card for one additional encoder input 1 V_{PP}, BiSS B, Hiperface, EnDat	
AX5702-0000	encoder option card for two additional encoder inputs 1 V_{PP}, BiSS B, Hiperface, EnDat	A
AX5721-0000	encoder option card for one additional encoder input EnDat 2.2, BiSS C	
AX5722-0000	encoder option card for two additional encoder inputs EnDat 2.2, BiSS C	

AX58xx | TwinSAFE drive options cards

Significant hazards to persons arise from the dynamic movements of the electrical drive equipment of machines. With the AX58xx TwinSAFE drive option cards numerous safety functions can be easily implemented by the user. No further circuits are necessary for this, such as circuit breakers or contactors in the supply lines or special external encoder systems. Optional cards that are certified according to DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and IEC 61508:2010 (SIL 3) are available for different safety categories:

AX5801 | Personal protection against inadvertent restart of the drive axis (STO/SS1):
- Safe Torque Off (STO) according to IEC 61800-5-2
- control through safe 24 V DC outputs
- mains voltage and motor line remain connected

AX5805, AX5806 | Safe Motion according to IEC 61800-5-2. Control is performed via EtherCAT; no further wiring is required:
- stop functions (STO, SOS, SS1, SS2)
- speed functions (SLS, SSM, SSR, SMS) with up to 8 speeds
- position functions (SLP, SCA, SLI) with reference cams
- acceleration functions (SAR, SMA)
- rotating direction functions (SDIp, SDIn)

For further information on TwinSAFE and the TwinSAFE products see page 542

Ordering information		Pict.
AX5801-0200	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1 (1)	B
AX5805-0000	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (1)	C
AX5806-0000	TwinSAFE drive option card for AX5000 from 60 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (2)	

(1) AX5000 up to 40 A: AX5x01-0000-020x, AX5x03-0000-020x, AX5x06-0000-020x, AX5112-0000-020x, AX5118-0000-020x, AX5125-0000-020x, AX5140-0000-020x

(2) AX5000 from 60 A up to 170 A: AX5160-0000-020x, AX5172-0000-020x, AX519x-0000-020x

AX59xx | **AX-Bridge quick connection system**

For Servo Drives up to a rated current of 40 A, the AX59xx AX bridge enables the simple and fast connection of several AX5000 units to form a multi-axis system by means of plug-in supply and connection modules.

The AX590x supply module is simply snapped onto the Servo Drive. The AX591x connection module with integrated busbars is suitable for multi-axis systems and combines mains input, intermediate circuit, 24 V DC control voltage and brake voltage. In combination, the AX590x and AX591x modules enable fast installation and commissioning.

– integration of power supply, DC-Link, 24 V DC control and braking voltage
– connection module with power rail system, current carrying capacity up to 85 A
– straightforward installation and disassembly without additional wiring
– visible and safe contacting

Active DC-Link and brake energy management

With the AX-Bridge the DC-Links are automatically through-connected: This enables an economic energy balancing between axes.

– short-circuit-proof
– intelligent utilisation of all available system braking resistors
– elimination power loss

Ordering information		Pict.
AX5901-0000	AX-Bridge power supply module for connection of supply voltage and 24 V DC for control and brake energy (pluggable), for AX5x01…AX5125, 85 A	D
AX5902-0000	AX-Bridge power supply module for connection of supply voltage and 24 V DC for control and brake energy (pluggable), for AX5140, 85 A	D
AX5911-0000	AX-Bridge power distribution module, quick connection system for power supply, DC-Link and control voltage (pluggable), for AX5x01…AX5112, 85 A	E
AX5912-0000	AX-Bridge power distribution module, quick connection system for power supply, DC-Link and control voltage (pluggable), for AX5118 and AX5125, 85 A	F

A

B

C

D

E

F

Motor cables for AX5000 Servo Drives at AM8xxx

For maximum cable lengths and further specifications see current documentation under ▶ **www.beckhoff.com/documentation**.
Torsion-resistant variants for robotic applications are available in the following wire gauges: 1 mm², 1.5 mm², 2.5 mm².

Motor cables 1 mm² for motors with itec® plug at AX5000 (1.5…6 A)

Ordering information	Motor cable with 1 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8022-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 81 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1 mm² + (2 x 0.75 mm²) + (2 x AWG22))
ZK4500-8022-0050	example for 5 m length
ZK4501-8022-xxxx	extension cable

Motor cables 1.5 mm² for motors with M23 speedtec® plug at AX5000 (1.5…12 A)

Ordering information	Motor cable with 1.5 mm² wire gauge, fixed installation
ZK4500-8003-xxxx	cables for fixed installation, min. bending radius = 61 mm (5 x OD), (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22))
ZK4500-8003-0050	example for 5 m length
ZK4501-8003-xxxx	extension cable

Ordering information	Motor cable with 1.5 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8023-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 89 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22))
ZK4500-8023-0050	example for 5 m length
ZK4501-8023-xxxx	extension cable

Motor cables 2.5 mm² for motors with M23 speedtec® plug at AX5000 (18…25 A)

Ordering information	Motor cable with 2.5 mm² wire gauge, fixed installation
ZK4500-8004-xxxx	cables for fixed installation, min. bending radius = 69 mm (5 x OD), (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22))
ZK4500-8004-0050	example for 5 m length
ZK4501-8004-xxxx	extension cable

Ordering information	Motor cable with 2.5 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8024-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 97 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22))
ZK4500-8024-0050	example for 5 m length
ZK4501-8024-xxxx	extension cable

Motor cables 4 mm² for motors with M40 speedtec® plug at AX5000 (12…25 A)

Ordering information	Motor cable with 4 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8025-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 111 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 4 mm² + (2 x 1 mm²) + (2 x AWG22))
ZK4500-8025-0050	example for 5 m length
ZK4501-8025-xxxx	extension cable

Motor cables 10 mm² for motors with M40 speedtec® plug at AX5000 (40 A)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8027-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 225 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x AWG22))
ZK4500-8027-0050	example for 5 m length
ZK4501-8027-xxxx	extension cable

Motor cables 10 mm² for motors with M40 speedtec® plug at AX5000 (60 A) (1)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use
ZK4504-8027-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 255 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x AWG22))
ZK4504-8027-0050	example for 5 m length
ZK4501-8027-xxxx	extension cable

(1) According to DIN EN 60204-1 only permitted for a continuous current of 52 A! With AX5000 Servo Drives (60 A) only permitted for utilising the peak current capacity! AX5000 (60 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Motor cables 10 mm² for motors with connector box at AX5000 (60 A) (1)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use
ZK4506-8027-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 255 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x AWG22))
ZK4506-8027-0050	example for 5 m length

(1) According to DIN EN 60204-1 only permitted for a continuous current of 52 A! With AX5000 Servo Drives (60 A) only permitted for utilising the peak current capacity! AX5000 (60 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Motor cables 16 mm² for motors with M40 speedtec® plug at AX5000 (72 A) (1)

Ordering information	Motor cable with 16 mm² wire gauge, flexible for drag-chain use
ZK4504-8018-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 180 m/min, max. 5 m/s², min. bending radius = 250 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x 1.5 mm²))
ZK4504-8018-0050	example for 5 m length

(1) According to DIN EN 60204-1 only permitted for a continuous current of 70 A! With AX5000 Servo Drives (72 A) only permitted for utilising the peak current capacity! AX5000 (72 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Motor cables 16 mm² for motors with connector box at AX5000 (72 A) (1)

Ordering information	Motor cable with 16 mm² wire gauge, flexible for drag-chain use
ZK4506-8018-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 180 m/min, max. 5 m/s², min. bending radius = 250 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x 1.5 mm²))
ZK4506-8018-0050	example for 5 m length

(1) According to DIN EN 60204-1 only permitted for a continuous current of 70 A! With AX5000 Servo Drives (72 A) only permitted for utilising the peak current capacity! AX5000 (72 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Feedback cables for AX5000 Servo Drives at AM8xxx

Resolver cables for motors with itec® plug at AX5000

Ordering information	Resolver cable with 0.25 mm² wire gauge, flexible, for drag-chain use
ZK4530-8110-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 120 m/min, max. 4 m/s², min. bending radius = 75 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, 4 x 2 x 0.25 mm²
ZK4530-8110-0050	example for 5 m length
ZK4531-8110-xxxx	extension cable

Resolver cables for motors with M23 speedtec® plug at AX5000

Ordering information	Resolver cable with 0.25 mm² wire gauge, flexible, for drag-chain use
ZK4530-8010-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 120 m/min, max. 4 m/s², min. bending radius = 75 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, 4 x 2 x 0.25 mm²
ZK4530-8010-0050	example for 5 m length
ZK4531-8010-xxxx	extension cable

Encoder cables for motors with M23 speedtec® plug at AX5000

Ordering information	Encoder cable with 0.5 mm² wire gauge, highly flexible, suitable as trailing cable
ZK4510-8020-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 53 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (7 x 2 x 0.14 mm² + 2 x 0.5 mm²). The cable is UL and CSA listed.
ZK4510-8020-0050	example for 5 m length
ZK4511-8020-xxxx	extension cable

Accessories for AX5000 Servo Drives at AM8xxx

EtherCAT patch cables

Ordering information	ZK1090-9191-0xxx | EtherCAT patch cables
ZK1090-9191-0001	EtherCAT bridge AX5x01 to AX5112, length 0.17 m
ZK1090-9191-0002	EtherCAT bridge AX5118 to AX5140, length 0.26 m
ZK1090-9191-0xxx	EtherCAT patch cable, 0xxx = length in decimetres (-0020 = 2 m)

Not assembled motor cables for higher performance, for AX5000 (from 25 A)

Ordering information	Motor cable, flexible, drag-chain suitable with 5 million bending cycles, for Servo Drives AX5000 from 25 A
ZK4509-0016-0zzz	6 mm², for AX5125, (4 x 6 mm² + (2 x 1 mm² + 2 x 1.5 mm²)) (1)
ZK4509-0017-0zzz	10 mm², for AX5140, (4 x 10 mm² + (2 x 1 mm² + 2 x 1.5 mm²)) (1)
ZK4509-0018-0zzz	16 mm², for AX5160, (4 x 16 mm² + 2 x (2 x 1.5 mm²)) (1)
ZK4509-0019-0zzz	25 mm², for AX5172, (4 x 25 mm² + 2 x (2 x 1.5 mm²)) (1)
ZK4509-0019-1zzz	35 mm², for AX5190, (4 x 35 mm² + 2 x (2 x 1.5 mm²)) (1)
ZK4509-0019-2zzz	50 mm², for AX5191, (4 x 50 mm² + 2 x (2 x 2.5 mm²)) (1)

zzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0016-0100 = 10 metres, (1) not suitable for OCT

EMC accessories | Shroud for AX5000 (from 60 A)

Ordering information	Shroud for connecting cable screens
AX2090-SB50-0001	shroud for AX5160/AX5172
AX2090-SB50-0002	shroud for AX5190/AX5191
AX2090-SB50-0003	shroud for AX5192/AX5193

Power supply | Mains filters for AX5000 (from 1.5 A)

Ordering information	AX2090-NF50-0xxx | Mains filters
AX2090-NF50-0014	mains filter C2 up to AX5112 Servo Drives, 46.4 x 231 x 70 mm (W x H x D), 0.9 kg
AX2090-NF50-0032	mains filter C2 up to AX5125 Servo Drives, 58 x 265 x 90 mm (W x H x D), 1.75 kg
AX2090-NF50-0063	mains filter C3 for AX5160* Servo Drives up to 63 A, 62 x 305 x 180 mm (W x H x D), 5 kg
AX2090-NF50-0100	mains filter C3 for AX5172*/AX5190 Servo Drives up to 100 A, 75 x 336 x 200 mm (W x H x D), 6 kg
AX2090-NF50-0150	mains filter C3 for AX5191/AX5192 Servo Drives up to 150 A, 90 x 380 x 220 mm (W x H x D), 6.8 kg
AX2090-NF50-0180	mains filter C3 for AX5193 Servo Drives up to 180 A, 200 x 410 x 120 mm (W x H x D), 7 kg

* AX5160, AX5172: mains filter already integrated. Additional mains filter for C3 only necessary if the cable lengths exceed 25 m.

Power supply | Mains chokes for AX5000 (from 60 A)

Ordering information	AX2090-ND50-0xxx | Mains chokes
AX2090-ND50-0060	mains choke for AX5160 Servo Drive, 60 A, 0.25 mH, U_K 2 %, 190 x 200 x 120 mm (W x H x D), 7 kg
AX2090-ND50-0072	mains choke for AX5172 Servo Drive, 72 A, 0.20 mH, U_K 2 %, 190 x 240 x 110 mm (W x H x D), 10 kg
AX2090-ND50-0090	mains choke for AX5190 Servo Drive, 90 A, 0.16 mH, U_K 2 %, 230 x 300 x 160 mm (W x H x D), 13 kg
AX2090-ND50-0110	mains choke for AX5191 Servo Drive, 110 A, 0.13 mH, U_K 2 %, 230 x 300 x 180 mm (W x H x D), 15 kg
AX2090-ND50-0143	mains choke for AX5192 Servo Drive, 143 A, 0.10 mH, U_K 2 %, 240 x 330 x 200 mm (W x H x D), 25 kg
AX2090-ND50-0170	mains choke for AX5193 Servo Drive, 170 A, 0.09 mH, U_K 2 %, 240 x 330 x 200 mm (W x H x D), 25 kg

Power supply | Transient voltage suppressor for AX5000 (1.5…25 A)

Ordering information	Transient voltage suppressor for AX5000 Servo Drives
AX2090-TS50-3000	transient voltage suppressor for AX5000, required if CSA certification necessary

Braking energy management

Ordering information	Components for brake energy management for AX5000
AX5021-0000-0000	brake module unit with internal braking resistor (250 W) and option for connecting an external braking resistor (up to 6 kW) as well as an additional DC-Link expansion capacity for storing brake energy efficiently
AX2090-BW50-0300	external braking resistor for AX5x01 to AX5112 (stand-alone), 0.3 kW/47 Ω, 92 x 120 x 349 mm (W x H x D), 2 kg (1)
AX2090-BW50-0600	external braking resistor for AX5x01 to AX5112 (stand-alone), 0.6 kW/47 Ω, 92 x 120 x 549 mm (W x H x D), 3 kg (1)
AX2090-BW50-1600	external braking resistor for AX5x01 to AX5112 (stand-alone), 1.6 kW/47 Ω, 185 x 120 x 649 mm (W x H x D), 5.8 kg (1)
AX2090-BW51-1000	external braking resistor for AX5118 to AX5140 (stand-alone) and in combination with braking unit AX5021, 1 kW/23 Ω, 92 x 120 x 749 mm (W x H x D), 4 kg (2)
AX2090-BW51-3000	external braking resistor for AX5118 to AX5140 (stand-alone) and in combination with braking unit AX5021, 3 kW/23.4 Ω, 355 x 255 x 490 mm (W x H x D), 8 kg (2)
AX2090-BW51-6000	external braking resistor for AX5118 to AX5140 (stand-alone) and in combination with braking unit AX5021, 6 kW/23.2 Ω, 455 x 255 x 490 mm (W x H x D), 12 kg (2)
AX2090-BW52-3000	external braking resistor for AX5160 and AX5172 (stand-alone), 3 kW/13.2 Ω, 355 x 260 x 490 mm (W x H x D), 9.5 kg (3)
AX2090-BW52-6000	external braking resistor for AX5160 and AX5172 (stand-alone), 6 kW/13 Ω, 455 x 260 x 490 mm (W x H x D), 13 kg (3)
AX2090-BW53-3000	external braking resistor for AX5190 and AX5191 (stand-alone), 3 kW/10.2 Ω, 355 x 255 x 490 mm (W x H x D), 9.5 kg (4)
AX2090-BW53-6000	external braking resistor for AX5190 and AX5191 (stand-alone), 6 kW/10 Ω, 455 x 260 x 490 mm (W x H x D), 13 kg (4)
AX2090-BW54-3000	external braking resistor for AX5192 and AX5193 (stand-alone), 3 kW/6.6 Ω, 355 x 255 x 490 mm (W x H x D), 9.5 kg (4)
AX2090-BW54-6000	external braking resistor for AX5192 and AX5193 (stand-alone), 6 kW/6.5 Ω, 455 x 260 x 490 mm (W x H x D), 13 kg (4)

Recommended interface cables: (1) ZK4000-2101-2xxx (1.5 mm²), (2) ZK4000-2102-2xxx (2.5 mm²), (3) ZK4509-8025-xxxx (4 mm²), (4) ZK4000-2104-2xxx (6 mm²)

AX5000 motor chokes

Ordering information	AX2090-MD50-00xx | Motor chokes
AX2090-MD50-0012	motor choke for AX5000 (1.5…12 A) up to 12 A rated current, necessary for motor cable ≥ 25 m with a max. cable length of 100 m, with integrated supply cable (150 mm)
AX2090-MD50-0025	motor choke for AX5000 (18…25 A), up to 25 A rated current, necessary for motor cable ≥ 25 m with a max. cable length of 50 m, with integrated supply cable (150 mm)

Distributed Servo Drive system

▶ www.beckhoff.com/AMP8000

AX503x, AX883x | **Coupling modules for AMP8000**

- 1- or 2-channel coupling modules
- AX503x with feed
- only component in the control cabinet
- IP 20 protection class

See page 360

AMP8805 | **Distribution module for AMP8000**

- five outputs
- EtherCAT P output
- high protection class IP 65: direct machine layout integration
- overall cable length reduction

See page 361

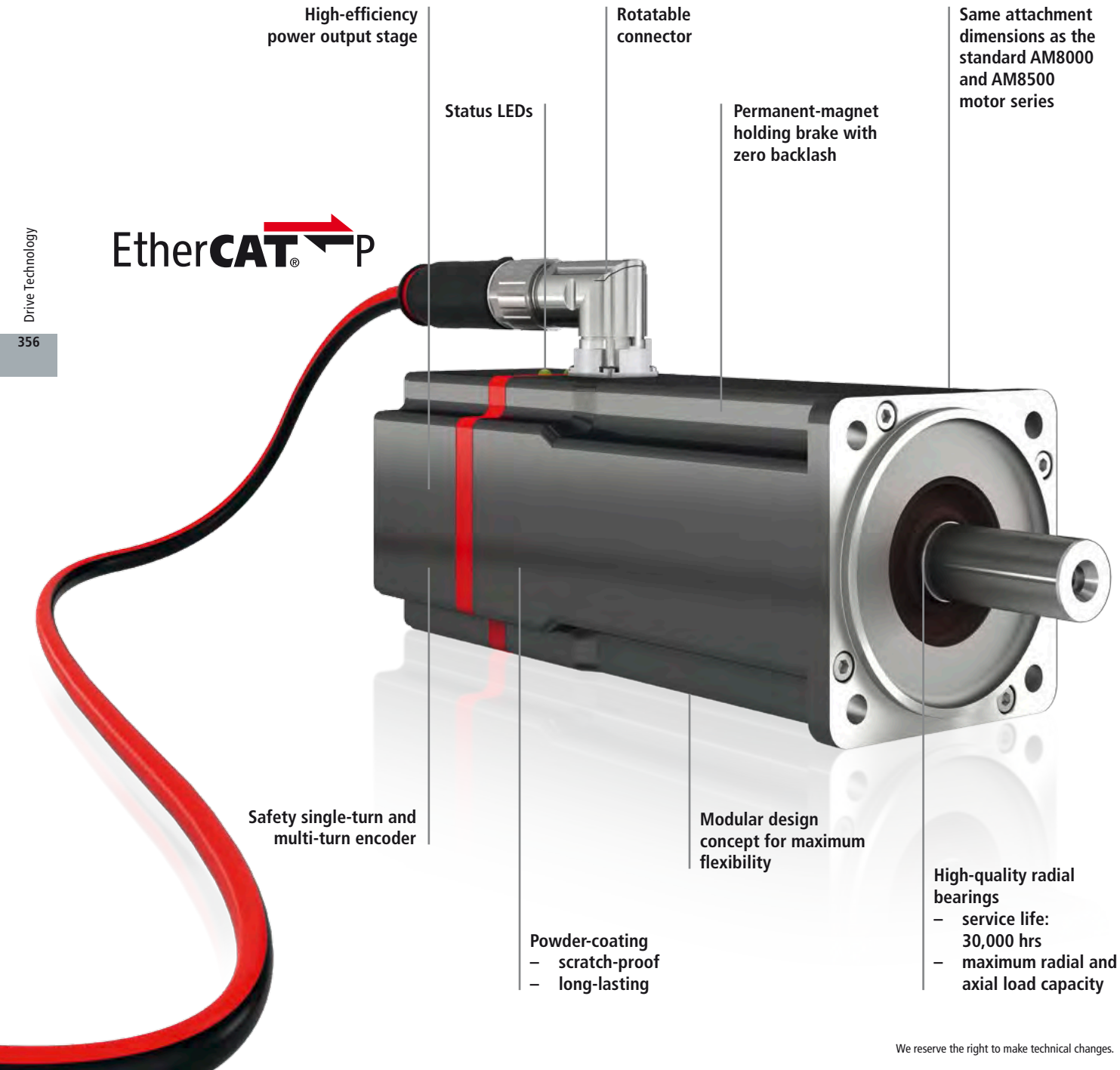
AMP80xx | **Distributed Servo Drive**

- permanent magnet-excited three-phase synchronous motor with integrated servo drive
- safe single-turn and multi-turn encoder
- 2.01 to 9.70 Nm standstill torque
- integrated TwinSAFE Logic

See page 356

AMP8000 | Distributed Servo Drive system

▶ **www.beckhoff.com/AMP8000**



AX5031

AX8831

AMP8805

AMP8000

Distributed Servo Drives for modular machines

The AMP8000 distributed Servo Drive system opens up new possibilities for modular machine concepts, because it integrates the drive directly into the motor in a very compact design. By relocating the power electronics to the machine, the control cabinet needs to house only a single coupling module that supplies multiple distributed Servo Drives with a single cable via a distribution module. This produces significant savings in terms of material, space, cost, and installation effort.

More compact motors, fewer cables

The one cable solution EtherCAT P can be used for consistently cabling entire distributed Servo Drive systems. EtherCAT P combines communication and power supply in one cable. Instead of having to use multiple connection cables between a control cabinet and a machine, a single cable to the AMP8805 distribution module is all it takes, because each of the AMP8805 distribution Servo Drives is in turn connected to the distribution module with just a short cable. Since the entire system can be cascaded, even complex machines or lines can be implemented in simple topologies. The one cable solution EtherCAT P simplifies the logistics in installation considerably and minimises wiring errors. The cable routes to the motor can be laid out much more clearly, and space requirements in the control cabinet are reduced to a minimum.

Safe drive technology with TwinSAFE

TwinSAFE is a universal safety concept that seamlessly integrates safety functionalities – from the PLC to I/Os through to the drive technology – into the standard control platform. All safety functions such as emergency stop, safety door monitoring, two-hand operation, safety mat monitoring, and muting, safe position, safely limited speed, a.o., can be programmed and/or configured with the universal TwinCAT engineering platform. The distributed AMP8000 Servo Drives support drive-integrated STO/SS1 safety functions with TwinSAFE as per IEC 61800-2 by default. The system will soon be available with TwinSAFE Safe Motion as well, so that more complex and more limiting safety functions can be implemented.

Highlights

- reduced space requirements in control cabinets through direct integration of the servo drive in the motor
- modularity and flexibility through coupling and distribution modules
- Existing machine designs can remain unchanged: flange and shaft are mechanically compatible with the AM8000.
- no reduction in motor performance because of highly efficient and thermally insulated power electronics
- cost-effectiveness through one cable solution: only one cable type needed in the entire drive system
- reduced cabling effort and minimised cable lengths through AMP8805 distribution module
- Efficient through DC-Link group: regenerative energy can be used by other drives.
- STO/SS1 safety functions as standard; extensive Safe Motion functions as an option

AMP80xx | **Distributed Servo Drive**

The AMP8000 can be installed in place of a standard AM8000 or AM8500 servomotor. There is no need to modify existing machine design, since only the overall length has been changed, i.e. the other dimensions remain unchanged. Through the use of the latest output stage technologies, there is minimal derating, i.e. the performance data is almost on a par with the comparable standard motor type.

The AMP8000 is available with flange sizes F4 (2.01…4.80 Nm) and F5 (4.08…9.70 Nm). It can be equipped with either multi-turn or single-turn encoders. TwinSAFE (STO/SS1) is integrated as standard; Safe Motion will be available as an option.

Technical data	AMP80xx
Motor type	permanent magnet-excited three-phase synchronous motor with integrated servo drive
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal)
Cooling	convection, permissible ambient temperature 40 °C
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled
Approvals	CE, UL in preparation
Feedback system	absolute encoder single-turn and multi-turn (OCT)

Options	AMP80xx
Feather key groove	according to DIN 6885 P1
Holding brake backlash-free	permanent magnet single-surface brake, suitable only as holding brake
Shaft seal	radial shaft seal made of FPM
Feedback system option	safe absolute encoder single- and multi-turn
TwinSAFE safe drive technology	integrated TwinSAFE Logic, STO, SS1, SS2, SOS, SLS, SDIp, SDIn, SSM, SSR, SMS, SLP, SCA, SLI, SAR, SMA (in preparation)

Ordering options

You will find the possible ordering options for the distributed Servo Drives listed in this table. Please note: The options cannot be retrofitted. All electrical variables are RMS values.

Order reference	AMP80uv-wxyz
u	flange code F
v	motor length
w = 0	smooth shaft
w = 1	shaft with groove and feather key according to DIN 6885
w = 2	smooth shaft with IP 65 sealing ring
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key
x	winding code A…Z
y = 1	safe absolute encoder single-turn, absolute position within one revolution, 24 bit resolution
y = 2	safe absolute encoder multi-turn, absolute position within 4096 revolutions, 24 bit resolution
z = 0	without holding brake
z = 1	with holding brake
Information	AMP804x = F4, ECP B23 plug AMP805x = F5, ECP B23 plug

AMP804x | **Flange code F4, motor length 1 – 3**

Data for 560 V DC	AMP8041-wDyz	AMP8041-wEyz	AMP8042-wEyz	AMP8043-wEyz
Standstill torque	2.01 Nm	2.01 Nm	3.48 Nm	4.80 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	2500 min^{-1}	2500 min^{-1}
Rated power	0.61 kW	1.23 kW	0.87 kW	1.18 kW
Standstill current	1.65 A	3.00 A	2.15 A	2.90 A
Connection technology	ECP B23 plug			
One Cable Technology (OCT)	yes			

AMP805x | **Flange code F5, motor length 1 – 3**

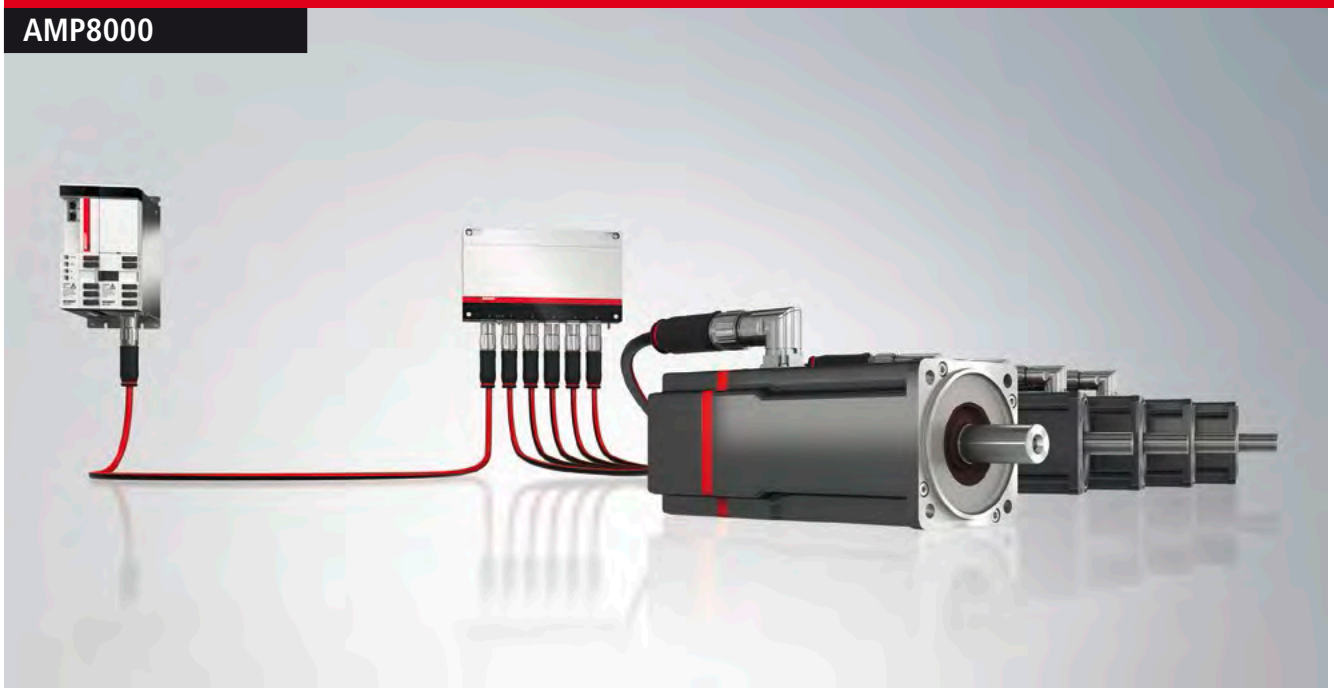
Data for 560 V DC	AMP8051-wEyz	AMP8051-wGyz	AMP8052-wFyz	AMP8053-wGyz
Standstill torque	4.08 Nm	4.08 Nm	6.97 Nm	9.70 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	2000 min^{-1}	2000 min^{-1}
Rated power	1.02 kW	1.02 kW	1.34 kW	1.78 kW
Standstill current	2.70 A	4.75 A	3.30 A	4.70 A
Connection technology	ECP B23 plug			
One Cable Technology (OCT)	yes			

▶ **www.beckhoff.com/AMP8000**

Accessories

Ordering information	Motor cable with 2.5 mm² wire gauge, flexible for drag-chain use
ZK7A26-3031-0xxx	flexible, drag-chain suitable EtherCAT P cable, mechanical coding 3, (3 G 2.5 mm² + 2 x 1.5 mm² + (1 x 4 x AWG22)), ECP B23, plug, straight, female+female, 5+4 pin, EtherCAT-P-coded – ECP B23, plug, straight, male+male, 5+4 pin, EtherCAT-P-coded, xxxx = ordering indication of the length of the motor cable in decimetres

For availability status see Beckhoff website at: www.beckhoff.com/AMP8000



AX503x, AX883x | Coupling modules for AMP8000

For connecting AMP8000 distributed Servo Drives to the PC-based control technology, and more specifically to the EtherCAT-based Servo Drive systems AX5000 and AX8000 there are two coupling modules available in single-channel and dual-channel versions each.

The coupling modules provide a connection for the DC-Link intermediate circuit, 24 V DC power supply and EtherCAT communication. Distributed Servo Drives can be coupled to the AX8000 multi-axis servo system via an AX883x coupling module and to the AX5000 EtherCAT Drives via an AX503x coupling module. By means of the 1- or 2-channel coupling modules and the AMP8805 distribution module, the implementation of simple as well as complex distributed drive solutions is easy and straightforward.

Technical data	i AX5031-0000-0200	i AX5032-0000-0200	i AX8831-0000-0000	i AX8832-0000-0000
Function	coupling module with feed	coupling module with feed	coupling module	coupling module
Number of channels	1	2	1	2
Rated output current DC-Link	20 A DC	∑ 20 A DC	20 A DC	2 x 20 A DC
Rated output current 24 V	16 A DC	∑ 20 A DC	16 A DC	∑ 20 A DC
DC-Link voltage	565…680 V DC			
EtherCAT connection	directly via RJ45 socket	directly via RJ45 socket	integrated via AX-Bridge	integrated via AX-Bridge
Protection class	IP 20			
Further information	www.beckhoff.com/AX5031	www.beckhoff.com/AX5032	www.beckhoff.com/AX8831	www.beckhoff.com/AX8832

i For availability status see Beckhoff website at: www.beckhoff.com

AMP8805 | Distribution module for AMP8000

Via the AMP8805 distribution module, the AMP8000 system can be cascaded using just one short cable in such a way that even complex machines and lines can be implemented in simple topologies. Up to five outputs are available to connect further distributed Servo Drives or distribution modules. Because of their high protection rating, the AMP8805 distribution modules can be directly integrated into the machine layout. This reduces the overall cable lengths and wiring effort considerably, because only a single cable needs to be routed from the control cabinet to the machine. To store energy efficiently, the coupling modules are equipped with capacitors. Additional EtherCAT P Box modules can be installed easily and quickly via the integrated EtherCAT P output in order to integrate further I/Os or data acquisition applications.

Technical data	AMP8805-0000-0000
Function	distribution module
Number of channels	1 x Power IN, 5 x Power OUT, 1 x EtherCAT P OUT
Rated input current 24 V	16 A DC
DC-Link voltage	565…680 V DC
DC-Link capacitance	1120 µF
Protection class	IP 65
Further information	www.beckhoff.com/AMP8805

For availability status see Beckhoff website at: www.beckhoff.com/AMP8805

Servo and Linear Motors

▶ www.beckhoff.com/Servomotors

Servomotors
- AM8000 for applications with highest demands on dynamics and performance, One Cable Technology (OCT) for power and feedback
- AM8500 with increased internal inertia ratio, One Cable Technology (OCT) for power and feedback

For dynamic applications in the lower power range Beckhoff offers the compact Drive Technology series.

See page 364,
compact Drive Technology see page 410

Servomotors with forced cooling
- higher performance AM8000 and AM8500 motor series due to additional forced cooling
- independent 24 V DC fan
- standstill torques increased by about 30 %
- rated torque at rated speed increased by up to 150 %

See page 364

Stainless steel servomotors

– AM8800 for use in the food, chemical and pharmaceutical industries, One Cable Technology (OCT) for power and feedback
– AG2800: stainless steel gear unit turns the AM8800 into a perfectly matched and certified Hygienic Design servo axis by dead-space-free design, smooth surfaces, a round motor adapter and high resistance to corrosion

See page 392

Planetary gear units

– AG2300: high-end planetary gear units with output shaft
– AG2400: high-end planetary gear units with output flange
– AG3210, AG3300: Economy planetary gear units with output shaft
– AG3400: Economy planetary gear units with output flange

See page 386

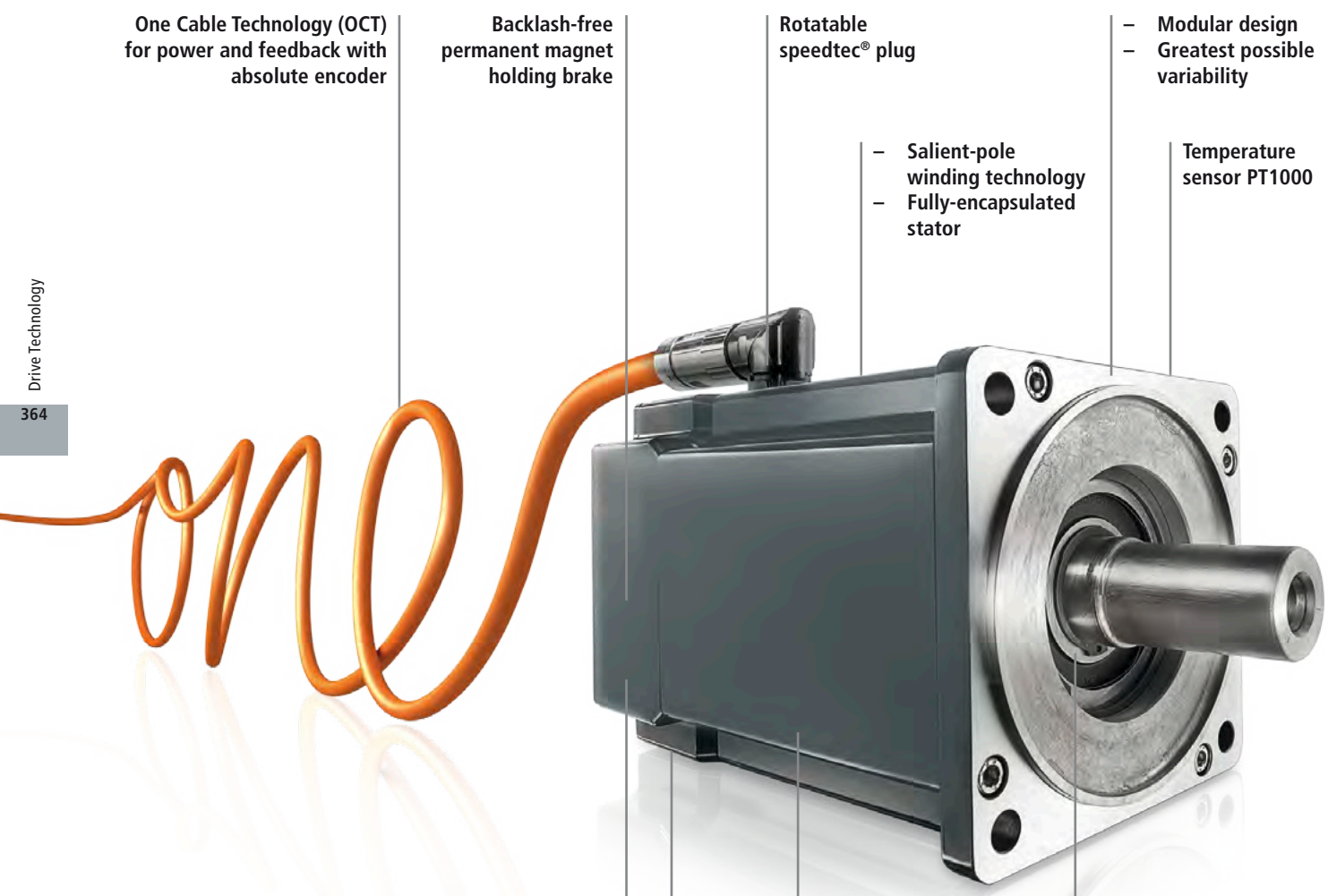
Linear Servomotors

– AL2xxx: iron core motor for high forces with different magnetic path widths (50/80/130 mm)

See page 400

AMxxxx | Synchronous Servomotors

▶ www.beckhoff.com/Servomotors



AM80xx high performance type with forced cooling

AM85xx

AM88xx

AM8000 – Dynamic power packages made in Germany

The AM8000 servomotors are durable and powerful synchronous servomotors in seven sizes, each with up to four overall lengths and provide seamless coverage for all areas of application from 0.2 up to 12 Nm. The high-performance servomotor series is characterised by an exceptional power density. Small end turns and the fully potted stator enable an optimised thermal transition from winding to motor housing.

As a result of low rotor moment of inertia coupled with an overload capability of up to 5 times, the AM8000 series is highly dynamic. The motors can be optionally equipped with OCT (One Cable Technology) or resolver (2-cable standard). With OCT, no encoder cable is required, since the feedback signals are digitally transmitted over the existing standard motor cable. Thus, the wiring costs can be reduced by up to 50 %.

Typical for all seven sizes of this motor series is the modular design. Therefore, mechanical adjustments to suit customer requirements can be made quickly and easily. With a guaranteed service life of 30,000 h for wearing parts such as ball bearings, this motor series offers high durability and robustness. Matching accessories such as gears and pre-assembled motor and encoder cables are available.

AM8500 – Synchronous servomotors with increased rotor moment of inertia

The AM8500 series extends the servomotor range by a complete series with increased rotor moment of inertia. This series covers a wide performance range with four sizes and three lengths with standstill torques ranging from 1.37 to 41 Nm. Due to the high rotor moment of inertia, the control of AM8500 servomotors is simplified in applications where a high external inertia has to be moved, because these motor types tend to vibrate less and are much easier to adjust via the servo controller.

AM8000/AM8500 – Forced Cooling

High torques even at high speeds: This is the benefit of the AM8000 and AM8500 motor series with additional forced cooling for increased performance. Equipped with a fan for axial ventilation, the standstill torques of these servomotors can be increased by about 35 %, and the rated torques at the rated speed by even up to 150 %. The external 24 V DC fan can be actuated independently of the motor.

AM8800 – Attractive hygienic design, EHEDG certified

The AM8800 stainless steel motor range is based on the AM8000 range and especially designed for use in the food, chemical and pharmaceutical industries. The motor design complies with the EHEDG requirements and the materials used with the FDA guidelines. The motors are made from AISI-316L stainless steel, making them resistant to aggressive cleaning materials. All AM8800 motors comply with protection class IP 69K and are provided with a hygienic-design cable gland. Four sizes, each with three different lengths, are available. The AM8800 range supports the One Cable Technology (OCT) as standard. The available options include a resolver, a sealing-air connection, or an AG2280 stainless steel gear unit for the implementation of a perfectly matched and standards-compliant servo axis in hygienic design.

AM3000 – High-dynamic, brushless servomotors

The low-inertia servomotors of the AM3000 series are equipped with rotors containing high-grade neodymium. The high-quality permanent magnet material highly contributes to the exceptionally dynamic behaviour of the motor series. Consequently, the AM3000 synchronous servomotors are mainly used in motion applications with highly dynamic requirements.

The AM3000 series incorporate resolvers as standard feedback unit; however, they can also be fitted with single-turn or multi-turn absolute encoders. The connection plugs can be rotated continuously. The IP 65/64 protection class of the motors can be increased to IP 65/65 by adding a sealing ring. Available accessories for these series include matching gears an pre-assembled motor and encoder cables.

AM8000 | **Synchronous Servomotors**

The AM8000 series represents robust, durable and high-performance synchronous servomotors "Made in Germany". The seven flange codes, with up to four overall lengths, cover a wide torque range from 0.2 up to 129 Nm.

The AM8000 motors feature a low rotor moment of inertia and a very high overload capacity. Based on these technical characteristics, the most highly dynamic applications can be realised.

The windings of the AM8000 motors are implemented using salient pole-wound technology, resulting in a high copper space factor. Due to the high slot space factor, high continuous torques can be achieved. The fully potted stator provides for an ideal thermal transition from winding to housing. Another advantage is mechanical protection of the winding wires against vibrations.

Amply sized, sealed grooved ball bearings in conjunction with a sophisticated mechanical design ensure a bearing service life of 30,000 hours. All motors feature an integrated PT1000 temperature sensor for exact temperature evaluation.

In the forced-cooling version, the power density of the AM8000 motor series can be further increased by means of external axial ventilation. This option is available for the AM806x to AM807x sizes.

The modular design of the AM8000 motors enables rapid implementation of mechanical adjustments. Customer-specific variants are available. The motors offer an electronic identification plate for simple commissioning.

The housing is fully powder-coated so that cutting edges are covered. The acrylic powder coating also offers high resistance against scratching and corrosion. In the basic version, AM8000 motors feature IP 54 protected housings. For harsh environmental conditions, the shaft feedthrough can optionally be equipped with an FPM sealing ring (fluoropolymer rubber), so that the whole motor is IP 65 protected.

Planetary gear units
see page 386

Pre-assembled cables
see page 350

Technical data	AM80xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal)
Cooling	convection, permissible ambient temperature 40 °C, optionally: external axial ventilation
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled; terminal box according to winding type
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL
Feedback system	absolute encoder single-turn and multi-turn, OCT, resolver, multi-turn 2-cable standard

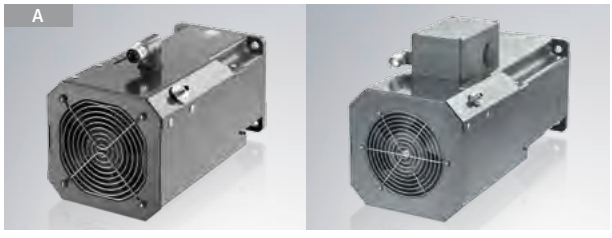
Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted. All specified electrical values are RMS values. The specifications for the connection technology (size of the connector) apply to motors with OCT. For motors with standard 2-cable configuration, "connection technology" refers to the size of the power connector. The size of the feedback connector for a standard 2-cable configuration is different, as follows: flange sizes F1…F3 = ytec® plug, F4…F7 = M23 speedtec® plug.

Order reference	AM80uv-wxyz	Pict.
u	flange code F	
v	motor length	
w = 0	smooth shaft	
w = 1	shaft with groove and feather key according to DIN 6885	
w = 2	smooth shaft with IP 65 sealing ring (not for AM801x)	
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key	
x	winding code A…Z	
y = 0	2-cable standard: feedback resolver (not for AM801x)	
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution	
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution	
y = 4	2-cable standard: feedback multi-turn, absoulte encoder SKM36, 128 SinCos periods (only for AM806x, AM807x and AM856x)	
y = A	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, resolution 23 bit (only for AM803x to AM807x and AM853x to AM856x)	
y = B	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, resolution 23 bit (only for AM803x to AM807x and AM853x to AM856x)	
y = N	without feedback (sensorless)	
z = 0	without holding brake	
z = 1	with permanent magnet-excited holding brake	
z = A	forced cooling, without holding brake, for AM805x, AM806x, AM807x [1]	A
z = B	forced cooling, with permanent magnet-excited holding brake, for AM805x, AM806x, AM807x [1]	A

[1] The EL2022 2 130 or KL2022 2 461 digital output terminal with matching ZK4054-6400-xxxx 321 supply cable is recommended for controlling the external 24 V DC ventilation.

A



AM801x | Flange code F1, motor length 1 – 3

Data for 230 V AC	AM8011-wByz	AM8012-wCyz	AM8013-wDyz
Standstill torque	0.20 Nm	0.38 Nm	0.52 Nm
Rated torque	0.18 Nm	0.33 Nm	0.45 Nm
Rated speed	8000 min^{-1}		
Rated power	0.15 kW	0.28 kW	0.38 kW
Standstill current	0.76 A	1.30 A	1.65 A
Rotor moment of inertia	0.034 $kgcm^2$	0.053 $kgcm^2$	0.072 $kgcm^2$
Rotor moment of inertia (with brake)	0.057 $kgcm^2$	0.075 $kgcm^2$	0.094 $kgcm^2$
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8021 | Flange code F2, motor length 1

Data for 400 V AC	AM8021-wByz	AM8021-wDyz
Standstill torque	0.50 Nm	
Rated torque	0.50 Nm	
Rated speed	8000 min^{-1}	9000 min^{-1}
Rated power	0.42 kW	0.47 kW
Standstill current	0.85 A	1.60 A
Rotor moment of inertia	0.139 $kgcm^2$	
Rotor moment of inertia (with brake)	0.208 $kgcm^2$	
Connection technology	itec® plug	
One Cable Technology (OCT)	yes	

AM8022 | Flange code F2, motor length 2

Data for 400 V AC	AM8022-wDyz	AM8022-wEyz
Standstill torque	0.80 Nm	
Rated torque	0.70 Nm	0.65 Nm
Rated speed	8000 min^{-1}	9000 min^{-1}
Rated power	0.59 kW	0.61 kW
Standstill current	1.50 A	2.44 A
Rotor moment of inertia	0.258 $kgcm^2$	
Rotor moment of inertia (with brake)	0.328 $kgcm^2$	
Connection technology	itec® plug	
One Cable Technology (OCT)	yes	

AM8023 | Flange code F2, motor length 3

Data for 400 V AC	AM8023-wEyz	AM8023-wFyz
Standstill torque	1.20 Nm	
Rated torque	1.00 Nm	0.90 Nm
Rated speed	8000 min^{-1}	9000 min^{-1}
Rated power	0.84 kW	0.85 kW
Standstill current	2.20 A	3.40 A
Rotor moment of inertia	0.378 $kgcm^2$	
Rotor moment of inertia (with brake)	0.448 $kgcm^2$	
Connection technology	itec® plug	
One Cable Technology (OCT)	yes	

AM8031 | Flange code F3, motor length 1

Data for 400 V AC	AM8031-wCyz	AM8031-wDyz	AM8031-wFyz
Standstill torque	1.37 Nm	1.38 Nm	1.40 Nm
Rated torque	1.34 Nm	1.33 Nm	1.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.42 kW	0.84 kW	1.23 kW
Standstill current	1.00 A	1.95 A	3.20 A
Rotor moment of inertia	0.467 $kgcm^2$		
Rotor moment of inertia (with brake)	0.546 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8032 | Flange code F3, motor length 2

Data for 400 V AC	AM8032-wDyz	AM8032-wEyz	AM8032-wHyz
Standstill torque	2.38 Nm	2.37 Nm	2.37 Nm
Rated torque	2.30 Nm	2.20 Nm	1.85 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.72 kW	1.38 kW	1.74 kW
Standstill current	1.70 A	2.95 A	5.10 A
Rotor moment of inertia	0.847 $kgcm^2$		
Rotor moment of inertia (with brake)	0.926 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8033 | Flange code F3, motor length 3

Data for 400 V AC	AM8033-wEyz	AM8033-wFyz	AM8033-wJyz
Standstill torque	3.20 Nm	3.22 Nm	3.22 Nm
Rated torque	2.98 Nm	2.70 Nm	2.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.94 kW	1.70 kW	2.17 kW
Standstill current	2.10 A	4.10 A	6.80 A
Rotor moment of inertia	1.23 $kgcm^2$		
Rotor moment of inertia (with brake)	1.46 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8041 | Flange code F4, motor length 1

Data for 400 V AC	AM8041-wDyz	AM8041-wEyz	AM8041-wHyz
Standstill torque	2.37 Nm	2.45 Nm	2.40 Nm
Rated torque	2.30 Nm	2.31 Nm	2.10 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	8000 min^{-1}
Rated power	0.72 kW	1.45 kW	1.76 kW
Standstill current	1.65 A	3.00 A	5.25 A
Rotor moment of inertia	1.09 $kgcm^2$		
Rotor moment of inertia (with brake)	1.73 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8042 | Flange code F4, motor length 2

Data for 400 V AC	AM8042-wEyz	AM8042-wFyz	AM8042-wJyz
Standstill torque	4.10 Nm		
Rated torque	3.90 Nm	3.70 Nm	3.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.02 kW	1.94 kW	2.60 kW
Standstill current	2.15 A	4.10 A	6.90 A
Rotor moment of inertia	1.98 $kgcm^2$		
Rotor moment of inertia (with brake)	2.63 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8043 | Flange code F4, motor length 3

Data for 400 V AC	AM8043-wEyz	AM8043-wHyz	AM8043-wKyz
Standstill torque	5.65 Nm	5.65 Nm	5.60 Nm
Rated torque	5.30 Nm	4.90 Nm	4.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.39 kW	2.57 kW	3.43 kW
Standstill current	2.90 A	5.40 A	9.30 A
Rotor moment of inertia	2.87 $kgcm^2$		
Rotor moment of inertia (with brake)	3.52 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8051 | Flange code F5, motor length 1

Data for 400 V AC	AM8051-wEyz	AM8051-wGyz	AM8051-wKyz
Standstill torque	4.80 Nm	4.90 Nm	4.90 Nm
Rated torque	4.60 Nm	4.40 Nm	3.90 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.20 kW	2.30 kW	3.27 kW
Standstill current	2.70 A	4.75 A	8.50 A
Rotor moment of inertia	2.25 $kgcm^2$		
Rotor moment of inertia (with brake)	2.91 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8051 | Flange code F5, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8051-wFyz	AM8051-wJyz	AM8051-wLyz
Standstill torque	6.20 Nm	6.30 Nm	6.30 Nm
Rated torque	5.8 Nm	5.5 Nm	3.6 Nm
Rated speed	2500 min^{-1}	4750 min^{-1}	8000 min^{-1}
Rated power	1.52 kW	2.74 kW	3.02 kW
Standstill current	3.50 A	5.80 A	11.1 A
Rotor moment of inertia	2.24 $kgcm^2$		
Rotor moment of inertia (with brake)	2.90 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8052 | Flange code F5, motor length 2

Data for 400 V AC	AM8052-wFyz	AM8052-wJyz	AM8052-wLyz
Standstill torque	8.20 Nm		
Rated torque	7.50 Nm	6.90 Nm	5.40 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7300 min^{-1}
Rated power	1.57 kW	2.89 kW	4.13 kW
Standstill current	3.30 A	6.30 A	11.3 A
Rotor moment of inertia	4.09 $kgcm^2$		
Rotor moment of inertia (with brake)	4.75 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8052 | Flange code F5, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8052-wGyz	AM8052-wKyz	AM8052-wNyz
Standstill torque	10.7 Nm	10.7 Nm	9.6 Nm
Rated torque	9.7 Nm	9.1 Nm	5.4 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	6000 min^{-1}
Rated power	2.03 kW	3.77 kW	4.08 kW
Standstill current	4.30 A	8.50 A	13.6 A
Rotor moment of inertia	4.08 $kgcm^2$		
Rotor moment of inertia (with brake)	4.74 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8053 | Flange code F5, motor length 3

Data for 400 V AC	AM8053-wGyz	AM8053-wKyz	AM8053-wNyz
Standstill torque	11.4 Nm		
Rated torque	10.0 Nm	8.35 Nm	4.50 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7000 min^{-1}
Rated power	2.09 kW	3.50 kW	3.30 kW
Standstill current	4.70 A	8.80 A	15.6 A
Rotor moment of inertia	5.93 $kgcm^2$		
Rotor moment of inertia (with brake)	7.04 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8053 | Flange code F5, motor length 3, high-performance type with forced cooling

Data for 400 V AC	AM8053-wJyz	AM8053-wLyz	AM8053-wPyz
Standstill torque	15.4 Nm	15.4 Nm	13.3 Nm
Rated torque	14.9 Nm	12.9 Nm	7.1 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	5000 min^{-1}
Rated power	3.12 kW	5.41 kW	3.72 kW
Standstill current	6.40 A	11.9 A	18.6 A
Rotor moment of inertia	5.92 $kgcm^2$		
Rotor moment of inertia (with brake)	7.04 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8061 | Flange code F6, motor length 1

Data for 400 V AC	AM8061-wGyz	AM8061-wJyz	AM8061-wMyz
Standstill torque	12.8 Nm		
Rated torque	12.1 Nm	11.0 Nm	9.00 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	1.90 kW	3.46 kW	4.71 kW
Standstill current	4.00 A	7.80 A	13.1 A
Rotor moment of inertia	11.1 $kgcm^2$		
Rotor moment of inertia (with brake)	13.4 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8061 | Flange code F6, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8061-wHyz	AM8061-wLyz	AM8061-wNyz
Standstill torque	17.1 Nm	17.1 Nm	15.5 Nm
Rated torque	16.1 Nm	14.7 Nm	10.7 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.36 kW	4.60 kW	5.60 kW
Standstill current	5.20 A	10.1 A	15.8 A
Rotor moment of inertia	11.1 $kgcm^2$		
Rotor moment of inertia (with brake)	13.4 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8062 | Flange code F6, motor length 2

Data for 400 V AC	AM8062-wJyz	AM8062-wLyz	AM8062-wPyz
Standstill torque	21.1 Nm		
Rated torque	18.50 Nm	15.2 Nm	6.50 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.91 kW	4.78 kW	3.40 kW
Standstill current	6.20 A	12.4 A	20.3 A
Rotor moment of inertia	20.0 $kgcm^2$		
Rotor moment of inertia (with brake)	22.3 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8062 | Flange code F6, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8062-wKyz	AM8062-wNyz	AM8062-wRyz
Standstill torque	29.9 Nm	29.9 Nm	28.1 Nm
Rated torque	26.4 Nm	22.2 Nm	13.4 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	3.87 kW	7.00 kW	7.00 kW
Standstill current	8.70 A	17.4 A	28.7 A
Rotor moment of inertia	20.0 $kgcm^2$		
Rotor moment of inertia (with brake)	22.3 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8063 | **Flange code F6, motor length 3**

Data for 400 V AC	AM8063-wKyz	AM8063-wNyz	AM8063-wRyz
Standstill torque	29.0 Nm		
Rated torque	22.3 Nm	13.2 Nm	6.10 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	3.50 kW	4.15 kW	2.56 kW
Standstill current	8.70 A	17.2 A	29.5 A
Rotor moment of inertia	29.0 $kgcm^2$		
Rotor moment of inertia (with brake)	34.9 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8063 | **Flange code F6, motor length 3, high-performance type with forced cooling**

Data for 400 V AC	AM8063-wLyz	AM8063-wQyz	AM8063-wTyz
Standstill torque	41.4 Nm	41.4 Nm	40.1 Nm
Rated torque	33.9 Nm	25.5 Nm	15.1 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	4.97 kW	8.00 kW	6.30 kW
Standstill current	11.6 A	24.0 A	39.8 A
Rotor moment of inertia	29.0 $kgcm^2$		
Rotor moment of inertia (with brake)	34.9 $kgcm^2$		
Connection technology	M23 speedtec® plug	M40 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8064 | **Flange code F6, motor length 4**

Data for 400 V AC	AM8064-wLy0	AM8064-wQy0	AM8064-wTy0
Standstill torque	35.0 Nm		
Rated torque	24.0 Nm	19.0 Nm	6.50 Nm
Rated speed	1500 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	2.51 kW	3.98 kW	2.00 kW
Standstill current	10.4 A	21.0 A	35.0 A
Rotor moment of inertia	38.6 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8064 | **Flange code F6, motor length 4, high-performance type with forced cooling**

Data for 400 V AC	AM8064-wNyA	AM8064-wRyA	AM8064-wTyA
Standstill torque	49.0 Nm		
Rated torque	33.0 Nm	26.0 Nm	10.0 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	3.45 kW	5.44 kW	3.10 kW
Standstill current	14.6 A	29.4 A	49.0 A
Rotor moment of inertia	38.6 $kgcm^2$		
Connection technology	M23 speedtec® plug	M40 speedtec® plug	terminal box
One Cable Technology (OCT)	yes	yes	–

AM8071 | Flange code F7, motor length 1

Data for 400 V AC	AM8071-wKyz	AM8071-wNyz	AM8071-wRyz
Standstill torque	31.8 Nm	31.8 Nm	29.0 Nm
Rated torque	26.5 Nm	19.5 Nm	8.00 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	4.16 kW	6.13 kW	3.35 kW
Standstill current	9.60 A	17.8 A	28.2 A
Rotor moment of inertia	49.6 $kgcm^2$		
Rotor moment of inertia (with brake)	68.3 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8071 | Flange code F7, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8071-wMyz	AM8071-wPyz	AM8071-wTyz
Standstill torque	42.8 Nm	42.8 Nm	41.2 Nm
Rated torque	36.2 Nm	29.2 Nm	18.1 Nm
Rated speed	1500 min^{-1}	2900 min^{-1}	4000 min^{-1}
Rated power	5.70 kW	8.90 kW	7.60 kW
Standstill current	12.6 A	23.8 A	41.1 A
Rotor moment of inertia	49.6 $kgcm^2$		
Rotor moment of inertia (with brake)	68.3 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8072 | Flange code F7, motor length 2

Data for 400 V AC	AM8072-wLyz	AM8072-wPyz	AM8072-wTyz
Standstill torque	54.6 Nm	54.6 Nm	50.0 Nm
Rated torque	48.9 Nm	38.2 Nm	13.0 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	5.12 kW	8.00 kW	4.08 kW
Standstill current	11.1 A	20.6 A	39.0 A
Rotor moment of inertia	92.2 $kgcm^2$		
Rotor moment of inertia (with brake)	110.9 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8072 | Flange code F7, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8072-wNyz	AM8072-wRyz	AM8072-wUyz
Standstill torque	80.7 Nm	80.7 Nm	74.0 Nm
Rated torque	72.6 Nm	60.1 Nm	33.8 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	7.6 kW	12.6 kW	10.6 kW
Standstill current	16.1 A	29.2 A	53.0 A
Rotor moment of inertia	92.2 $kgcm^2$		
Rotor moment of inertia (with brake)	111 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8073 | Flange code F7, motor length 3

Data for 400 V AC	AM8073-wNyz	AM8073-wQyz	AM8073-wTyz
Standstill torque	72.6 Nm	72.6 Nm	70.0 Nm
Rated torque	58.5 Nm	38.8 Nm	10.8 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	6.13 kW	8.13 kW	3.39 kW
Standstill current	14.7 A	27.9 A	45.6 A
Rotor moment of inertia	135 $kgcm^2$		
Rotor moment of inertia (with brake)	154 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8073 | Flange code F7, motor length 3, high-performance type with forced cooling

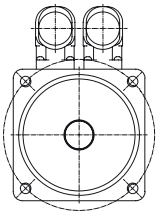
Data for 400 V AC	AM8073-wPyz	AM8073-wRyz	AM8073-wUyz
Standstill torque	104 Nm	104 Nm	95.0 Nm
Rated torque	83.7 Nm	63.3 Nm	17.8 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	8.8 kW	13.3 kW	5.60 kW
Standstill current	19.8 A	37.4 A	66.5 A
Rotor moment of inertia	135 $kgcm^2$		
Rotor moment of inertia (with brake)	154 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8074 | Flange code F7, motor length 4

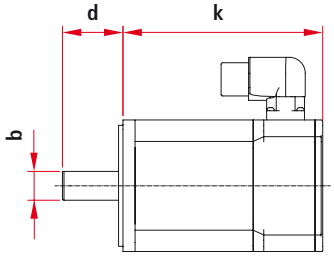
Data for 400 V AC	AM8074-wNy0	AM8074-wRy0	AM8074-wTy0
Standstill torque	92 Nm		
Rated torque	67 Nm	34 Nm	19.1 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	2500 min^{-1}
Rated power	7.02 kW	7.12 kW	5.0 kW
Standstill current	17.4 A	34.9 A	49.8 A
Rotor moment of inertia	180 $kgcm^2$		
Connection technology	M40 speedtec® plug	M40 speedtec® plug	terminal box
One Cable Technology (OCT)	yes	yes	–

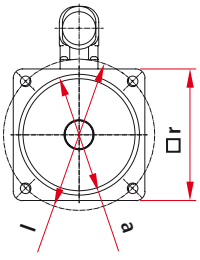
AM8074 | Flange code F7, motor length 4, high-performance type with forced cooling

Data for 400 V AC	AM8074-wRyA	AM8074-wTyA	AM8074-wUyA
Standstill torque	129 Nm		
Rated torque	93.3 Nm	51.7 Nm	24.5 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	9.77 kW	10.83 kW	7.7 kW
Standstill current	25.8 A	49.4 A	69.2 A
Rotor moment of inertia	180 $kgcm^2$		
Connection technology	M40 speedtec® plug	terminal box	terminal box
One Cable Technology (OCT)	yes	–	–

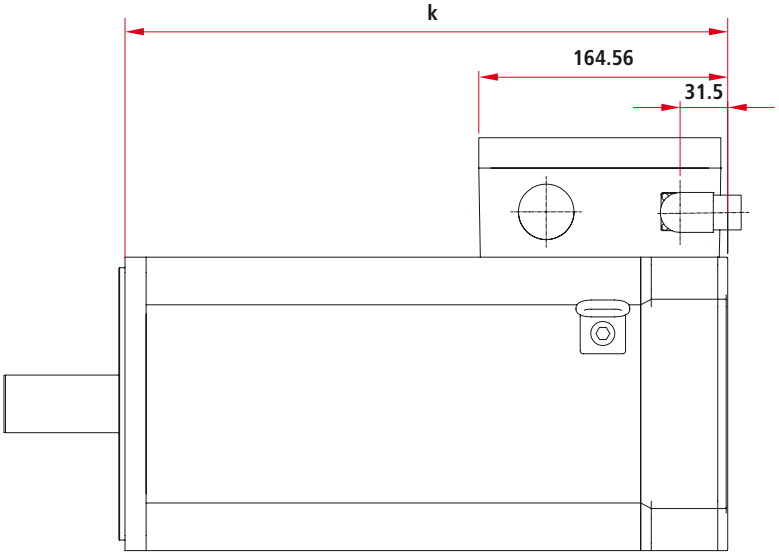


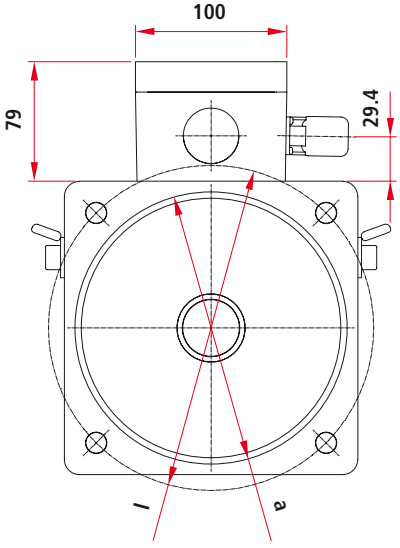
Resolver version





One Cable Technology





Motor connection with terminal box

Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8011	30 h7	8 h7	25 mm	46 mm	40 mm	97 mm	129 mm
AM8012	30 h7	8 h7	25 mm	46 mm	40 mm	117 mm	149 mm
AM8013	30 h7	8 h7	25 mm	46 mm	40 mm	137 mm	169 mm
AM8021	40 j6	9 k6	20 mm	63 mm	58 mm	111.5 mm	146 mm
AM8022	40 j6	9 k6	20 mm	63 mm	58 mm	133.5 mm	168 mm
AM8023	40 j6	9 k6	20 mm	63 mm	58 mm	155.5 mm	190 mm
AM8031	60 j6	14 k6	30 mm	75 mm	72 mm	129 mm	168 mm
AM8032	60 j6	14 k6	30 mm	75 mm	72 mm	154 mm	194 mm
AM8033	60 j6	14 k6	30 mm	75 mm	72 mm	180 mm	229 mm
AM8041	80 j6	19 k6	40 mm	100 mm	87 mm	132 mm	179.5 mm
AM8042	80 j6	19 k6	40 mm	100 mm	87 mm	162 mm	209.5 mm
AM8043	80 j6	19 k6	40 mm	100 mm	87 mm	192 mm	239.5 mm
AM8051	95 j6	24 k6	50 mm	115 mm	104 mm	136.5 mm	183.5 mm
AM8051*	95 j6	24 k6	50 mm	115 mm	104 mm	209 mm	256 mm
AM8052	95 j6	24 k6	50 mm	115 mm	104 mm	169.5 mm	216.5 mm
AM8052*	95 j6	24 k6	50 mm	115 mm	104 mm	242 mm	289 mm
AM8053	95 j6	24 k6	50 mm	115 mm	104 mm	202.5 mm	251.5 mm
AM8053*	95 j6	24 k6	50 mm	115 mm	104 mm	275 mm	324 mm
AM8061	130 j6	32 k6	58 mm	165 mm	142 mm	176 mm	228 mm
AM8061*	130 j6	32 k6	58 mm	165 mm	142 mm	259 mm	311 mm
AM8062	130 j6	32 k6	58 mm	165 mm	142 mm	216 mm	268 mm
AM8062*	130 j6	32 k6	58 mm	165 mm	142 mm	299 mm	351 mm
AM8063	130 j6	32 k6	58 mm	165 mm	142 mm	256 mm	315 mm
AM8063*	130 j6	32 k6	58 mm	165 mm	142 mm	339 mm	398 mm
AM8064	130 j6	32 k6	58 mm	165 mm	142 mm	296 mm	–
AM8071	180 j6	38 k6	80 mm	215 mm	194 mm	212 mm	284.5 mm
AM8071*	180 j6	38 k6	80 mm	215 mm	194 mm	322.5 mm	395 mm
AM8072	180 j6	38 k6	80 mm	215 mm	194 mm	269 mm	341.5 mm
AM8072*	180 j6	38 k6	80 mm	215 mm	194 mm	379.5 mm	452 mm
AM8073	180 j6	38 k6	80 mm	215 mm	194 mm	326 mm	398.5 mm
AM8073*	180 j6	38 k6	80 mm	215 mm	194 mm	436.5 mm	509 mm
AM8074	180 j6	38 k6	80 mm	215 mm	194 mm	398.5 mm	–
AM8074*	180 j6	38 k6	80 mm	215 mm	194 mm	517 mm	–

* high-performance type: oversize caused by fan, see dimension "k"

▶ **www.beckhoff.com/AM80xx**

AM8500 | Synchronous Servomotors with higher moment of inertia

The AM8500 series extends the servomotor range by a complete series with increased rotor moment of inertia. Due to the modified rotor geometry it is increased, depending on the length, by 100 to 300 % compared to the AM8000 servomotors. The AM8500 series covers a wide performance range with four sizes and three lengths with standstill torques from 1.37 to 41 Nm. A particular highlight, as with all servomotors from the AM8000 series, is the One Cable Technology (OCT) that combines power and feedback system in the standard motor cable.

Due to the high rotor inertia, control of the AM8500 is simplified in areas in which a high external inertia has to be moved, e.g. CNC applications in machine tools and woodworking machines. The servomotors tend to vibrate less and are much easier to adjust to the application on the servo controller. Where the ratio of external to inherent inertia has previously required a gearbox, this can now be dispensed with in some cases. Typical areas of application for the AM8500 servomotors are in woodworking machines, printing machines and machine tools as well as in film winders and feeding drive units.

In the forced cooling version the power density of the AM8500 motor series is thus increased further thanks to the external axial ventilation of the servomotors: the standstill torques can be increased by about 35 %; the rated torques at the rated speed even by up to 150 %. In this version the servomotor series offers high torques even at high speeds. Cooling takes place with a 24 V DC fan, which is actuated independently of the motor. In the forced cooling version all further options are available in accordance with the order data such as OCT or backlash-free permanent magnet holding brake. The forced cooling option is available for AM855x and AM856x.

Planetary gear units
see page 386

Pre-assembled cables
see page 350

Technical data	AM85xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal)
Cooling	convection, permissible ambient temperature 40 °C, optionally: external axial ventilation
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL
Feedback system	absolute encoder single-turn and multi-turn, OCT, resolver, multi-turn 2-cable standard

Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted. All specified electrical values are RMS values. The specifications for the connection technology (size of the connector) apply to motors with OCT. For motors with standard 2-cable configuration, "connection technology" refers to the size of the power connector. The size of the feedback connector for a standard 2-cable configuration is different, as follows: flange size F3: ytec® plug, flange sizes F4…F6 = M23 speedtec® plug.

Order reference	AM85uv-wxyz	Pict.
u	flange code F	
v	motor length	
w = 0	smooth shaft	
w = 1	shaft with groove and feather key according to DIN 6885	
w = 2	smooth shaft with IP 65 sealing ring	
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key	
x	winding code A…Z	
y = 0	2-cable standard: feedback resolver	
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution	
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution	
y = 4	2-cable standard: feedback multi-turn, absoulte encoder SKM36, 128 sincos periods (only for AM856x)	
y = A	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, resolution 23 bit	
y = B	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, resolution 23 bit	
y = N	without feedback (sensorless)	
z = 0	without holding brake	
z = 1	with holding brake (not available for AM8533, AM8543, AM8553 and AM8563)	
z = A	forced cooling, without holding brake, for AM855x, AM856x [1]	A
z = B	forced cooling, with holding brake, for AM855x, AM856x (not available for AM8553 and AM8563) [1]	A

[1] The EL2022 2 130 or KL2022 2 461 digital output terminal with matching ZK4054-6400-xxxx 321 supply cable is recommended for controlling the external 24 V DC ventilation.

A

AM8531 | Flange code F3, motor length 1

Data for 400 V AC	AM8531-wCyz	AM8531-wDyz	AM8531-wFyz
Standstill torque	1.37 Nm	1.38 Nm	1.40 Nm
Rated torque	1.34 Nm	1.33 Nm	1.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.42 kW	0.84 kW	1.23 kW
Standstill current	1.00 A	1.95 A	3.20 A
Rotor moment of inertia	1.67 $kgcm^2$		
Rotor moment of inertia (with brake)	1.76 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8532 | Flange code F3, motor length 2

Data for 400 V AC	AM8532-wDyz	AM8532-wEyz	AM8532-wHyz
Standstill torque	2.38 Nm	2.37 Nm	2.37 Nm
Rated torque	2.30 Nm	2.20 Nm	1.85 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.72 kW	1.38 kW	1.74 kW
Standstill current	1.70 A	2.95 A	5.10 A
Rotor moment of inertia	2.05 $kgcm^2$		
Rotor moment of inertia (with brake)	2.15 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8533 | Flange code F3, motor length 3

Data for 400 V AC	AM8533-wEy0	AM8533-wFy0	AM8533-wJy0
Standstill torque	3.20 Nm	3.22 Nm	3.22 Nm
Rated torque	2.98 Nm	2.70 Nm	2.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.94 kW	1.70 kW	2.17 kW
Standstill current	2.10 A	4.10 A	6.80 A
Rotor moment of inertia	2.44 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8541 | Flange code F4, motor length 1

Data for 400 V AC	AM8541-wDyz	AM8541-wEyz	AM8541-wHyz
Standstill torque	2.37 Nm	2.45 Nm	2.40 Nm
Rated torque	2.30 Nm	2.31 Nm	2.10 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	8000 min^{-1}
Rated power	0.72 kW	1.45 kW	1.76 kW
Standstill current	1.65 A	3.00 A	5.25 A
Rotor moment of inertia	4.62 $kgcm^2$		
Rotor moment of inertia (with brake)	5.27 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8542 | Flange code F4, motor length 2

Data for 400 V AC	AM8542-wEyz	AM8542-wFyz	AM8542-wJyz
Standstill torque	4.10 Nm		
Rated torque	3.90 Nm	3.70 Nm	3.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.02 kW	1.94 kW	2.60 kW
Standstill current	2.15 A	4.10 A	6.90 A
Rotor moment of inertia	5.51 $kgcm^2$		
Rotor moment of inertia (with brake)	6.17 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8543 | Flange code F4, motor length 3

Data for 400 V AC	AM8543-wEy0	AM8543-wHy0	AM8543-wKy0
Standstill torque	5.65 Nm	5.65 Nm	5.60 Nm
Rated torque	5.30 Nm	4.90 Nm	4.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.39 kW	2.57 kW	3.43 kW
Standstill current	2.90 A	5.40 A	9.30 A
Rotor moment of inertia	6.41 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8551 | Flange code F5, motor length 1

Data for 400 V AC	AM8551-wEyz	AM8551-wGyz	AM8551-wKyz
Standstill torque	4.80 Nm	4.90 Nm	4.90 Nm
Rated torque	4.60 Nm	4.40 Nm	3.90 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.20 kW	2.30 kW	3.27 kW
Standstill current	2.70 A	4.75 A	8.50 A
Rotor moment of inertia	8.75 $kgcm^2$		
Rotor moment of inertia (with brake)	9.41 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8551 | Flange code F5, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8551-wFyz	AM8551-wJyz	AM8551-wLyz
Standstill torque	6.20 Nm	6.30 Nm	6.30 Nm
Rated torque	5.8 Nm	5.5 Nm	3.6 Nm
Rated speed	2500 min^{-1}	4750 min^{-1}	8000 min^{-1}
Rated power	1.52 kW	2.74 kW	3.02 kW
Standstill current	3.50 A	5.80 A	11.1 A
Rotor moment of inertia	8.75 $kgcm^2$		
Rotor moment of inertia (with brake)	9.41 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8552 | Flange code F5, motor length 2

Data for 400 V AC	AM8552-wFyz	AM8552-wJyz	AM8552-wLyz
Standstill torque	8.20 Nm		
Rated torque	7.50 Nm	6.90 Nm	5.40 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7300 min^{-1}
Rated power	1.57 kW	2.89 kW	4.13 kW
Standstill current	3.30 A	6.30 A	11.3 A
Rotor moment of inertia	10.6 $kgcm^2$		
Rotor moment of inertia (with brake)	11.3 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8552 | Flange code F5, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8552-wGyz	AM8552-wKyz	AM8552-wNyz
Standstill torque	10.7 Nm	10.7 Nm	9.6 Nm
Rated torque	9.7 Nm	9.1 Nm	5.4 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	6000 min^{-1}
Rated power	2.03 kW	3.77 kW	4.08 kW
Standstill current	4.30 A	8.50 A	13.6 A
Rotor moment of inertia	10.6 $kgcm^2$		
Rotor moment of inertia (with brake)	11.2 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8553 | Flange code F5, motor length 3

Data for 400 V AC	AM8553-wGy0	AM8553-wKy0	AM8553-wNy0
Standstill torque	11.4 Nm		
Rated torque	10.0 Nm	8.35 Nm	4.50 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7000 min^{-1}
Rated power	2.09 kW	3.50 kW	3.30 kW
Standstill current	4.70 A	8.80 A	15.6 A
Rotor moment of inertia	12.4 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8553 | Flange code F5, motor length 3, high-performance type with forced cooling

Data for 400 V AC	AM8553-wJyA	AM8553-wLyA	AM8553-wPyA
Standstill torque	15.4 Nm	15.4 Nm	13.3 Nm
Rated torque	14.9 Nm	12.9 Nm	7.1 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	5000 min^{-1}
Rated power	3.12 kW	5.41 kW	3.72 kW
Standstill current	6.40 A	11.9 A	18.6 A
Rotor moment of inertia	12.5 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8561 | Flange code F6, motor length 1

Data for 400 V AC	AM8561-wGyz	AM8561-wJyz	AM8561-wMyz
Standstill torque	12.8 Nm		
Rated torque	12.1 Nm	11.0 Nm	9.00 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	1.90 kW	3.46 kW	4.71 kW
Standstill current	4.00 A	7.80 A	13.1 A
Rotor moment of inertia	48.2 $kgcm^2$		
Rotor moment of inertia (with brake)	50.6 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8561 | Flange code F6, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8561-wHyz	AM8561-wLyz	AM8561-wNyz
Standstill torque	17.1 Nm	17.1 Nm	15.5 Nm
Rated torque	16.1 Nm	14.7 Nm	10.7 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.36 kW	4.60 kW	5.60 kW
Standstill current	5.20 A	10.1 A	15.8 A
Rotor moment of inertia	48.2 $kgcm^2$		
Rotor moment of inertia (with brake)	50.6 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8562 | Flange code F6, motor length 2

Data for 400 V AC	AM8562-wJyz	AM8562-wLyz	AM8562-wPyz
Standstill torque	21.1 Nm		
Rated torque	18.5 Nm	15.2 Nm	6.50 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.91 kW	4.78 kW	3.40 kW
Standstill current	6.20 A	12.4 A	20.3 A
Rotor moment of inertia	57.1 $kgcm^2$		
Rotor moment of inertia (with brake)	59.6 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8562 | Flange code F6, motor length 2, high-performance type with forced cooling

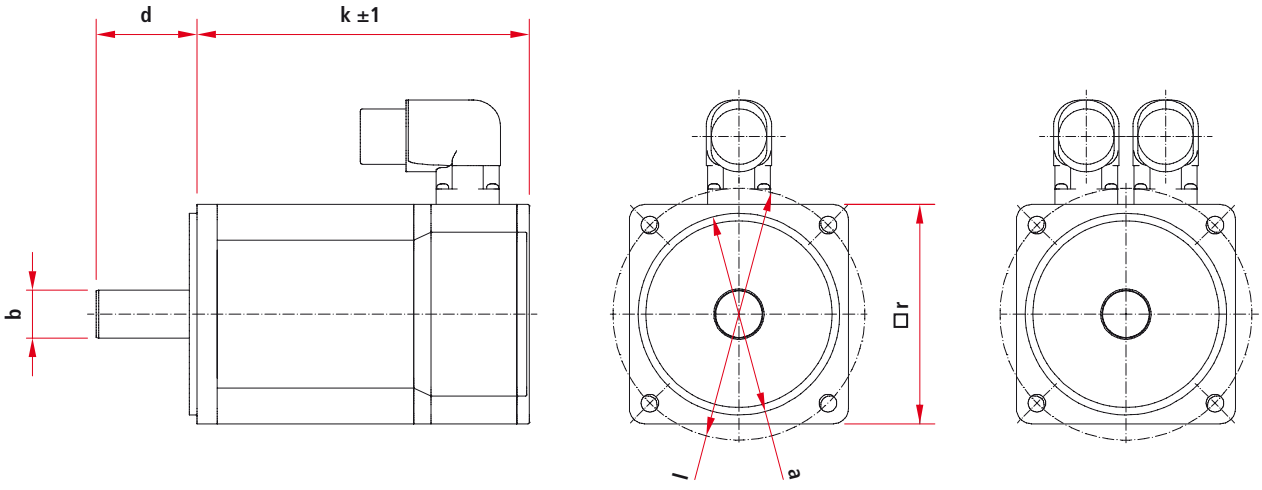
Data for 400 V AC	AM8562-wKyz	AM8562-wNyz	AM8562-wRyz
Standstill torque	29.9 Nm	29.9 Nm	28.1 Nm
Rated torque	26.4 Nm	22.2 Nm	13.4 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	3.87 kW	7.00 kW	7.00 kW
Standstill current	8.70 A	17.4 A	28.7 A
Rotor moment of inertia	57.1 $kgcm^2$		
Rotor moment of inertia (with brake)	59.6 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8563 | **Flange code F6, motor length 3**

Data for 400 V AC	AM8563-wKy0	AM8563-wNy0	AM8563-wRy0
Standstill torque	29.0 Nm		
Rated torque	22.3 Nm	13.2 Nm	6.10 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	3.50 kW	4.15 kW	2.56 kW
Standstill current	8.70 A	17.2 A	29.5 A
Rotor moment of inertia	66.1 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8563 | **Flange code F6, motor length 3, high-performance type with forced cooling**

Data for 400 V AC	AM8563-wLyA	AM8563-wQyA	AM8563-wTyA
Standstill torque	41.4 Nm	41.4 Nm	40.1 Nm
Rated torque	33.9 Nm	25.5 Nm	15.1 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	4.97 kW	8.00 kW	6.30 kW
Standstill current	11.6 A	24.0 A	39.8 A
Rotor moment of inertia	66.1 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug	M40 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		



One Cable Technology

Resolver version

Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8531	60 j6	14 k6	30 mm	75 mm	72 mm	168 mm	194 mm
AM8532	60 j6	14 k6	30 mm	75 mm	72 mm	194 mm	229 mm
AM8533	60 j6	14 k6	30 mm	75 mm	72 mm	229 mm	–
AM8541	80 j6	19 k6	40 mm	100 mm	87 mm	179.5 mm	209.5 mm
AM8542	80 j6	19 k6	40 mm	100 mm	87 mm	209.5 mm	239.5 mm
AM8543	80 j6	19 k6	40 mm	100 mm	87 mm	239.5 mm	–
AM8551	95 j6	24 k6	50 mm	115 mm	104 mm	183.5 mm	216.5 mm
AM8551*	95 j6	24 k6	50 mm	115 mm	104 mm	256 mm	289 mm
AM8552	95 j6	24 k6	50 mm	115 mm	104 mm	216.5 mm	251.5 mm
AM8552*	95 j6	24 k6	50 mm	115 mm	104 mm	289 mm	324 mm
AM8553	95 j6	24 k6	50 mm	115 mm	104 mm	251.5 mm	–
AM8553*	95 j6	24 k6	50 mm	115 mm	104 mm	324 mm	–
AM8561	130 j6	32 k6	58 mm	165 mm	142 mm	228 mm	268 mm
AM8561*	130 j6	32 k6	58 mm	165 mm	142 mm	311 mm	351 mm
AM8562	130 j6	32 k6	58 mm	165 mm	142 mm	268 mm	315 mm
AM8562*	130 j6	32 k6	58 mm	165 mm	142 mm	351 mm	398 mm
AM8563	130 j6	32 k6	58 mm	165 mm	142 mm	315 mm	–
AM8563*	130 j6	32 k6	58 mm	165 mm	142 mm	398 mm	–

* high-performance type: oversize caused by fan, see dimension "k"

▶ **www.beckhoff.com/AM85xx**

AG2300 | High-end gear series for AM8000 and AM8500 servomotors

The low-backlash, high-performance planetary gear units of the AG2300 series offer high torque, low torsional backlash and a very low noise level in all 14 gear ratios. The high-end gear units for the AM8000 and AM8500 servomotors have a high power density and are able to absorb high radial and axial forces. The high quality and running smoothness of this helical gear unit series meet the highest control quality demands.

The MF standard variant allows high positioning accuracy and highly dynamic operating cycles (duty cycle < 60 %). The high-speed MC variant is suited for positioning with high nominal speeds in continuous operation (duty cycle > 60 %).

The gear units of the AG2300 series are perfectly matched to the AM8000 and AM8500 motor series. The inertia ratios, the required torques and the suitable motors can be conveniently calculated directly in TwinCAT with the TC Motion Designer. In addition, the tool checks in a single step whether the selected motor can be adapted to the gear unit. The planetary gear units are fitted to the respective motor in the factory and delivered as a complete motor/gear unit.

Features

- standard version MF for high positioning quality in highly dynamic operating cycles
- high-speed version MC for high speeds in continuous operation
- low-backlash planetary gear unit with output shaft
- absolutely maintenance-free, thanks to unique lubrication concept
- high axial and radial forces
- long service life (MF > 20,000 h, MC > 30,000 h)
- maximum efficiency
- maximum power density
- low running noise and smooth running thanks to helical gearing
- flexible installation position
- output shaft with feather key or smooth shaft
- available in 7 or 6 sizes
  - MF: SP060 to SP240
  - MC: SP075 to SP240
- 14 gear ratios, i = 3, 4, 5, 7, 8, 10 (1-stage), i = 16, 20, 25, 28, 32, 35, 40, 50, 64, 70, 100 (2-stage)
- acceleration torques between 36 and 5400 Nm
- low torsional backlash (1…8 arcmin)

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG2300-+SP060S-MF1-i	3/4/5/7/8/10	36…50 Nm	≤ 4/2 arcmin	F2, F3
AG2300-+SP060S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	38…50 Nm	≤ 6/4 arcmin	F2, F3
AG2300-+SP075S-MF1-i	3/4/5/7/8/10	102…132 Nm	≤ 4/2 arcmin	F3, F4, F5
AG2300-+SP075S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	105…132 Nm	≤ 6/4 arcmin	F3, F4
AG2300-+SP075S-MC1-i	3/4/5/7/8/10	68…90 Nm	≤ 6/4 arcmin	F3, F4, F5
AG2300-+SP075S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	70…90 Nm	≤ 8/6 arcmin	F3, F4
AG2300-+SP100S-MF1-i	3/4/5/7/8/10	282…378 Nm	≤ 3/1 arcmin	F4, F5, F6
AG2300-+SP100S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	259…347 Nm	≤ 5/3 arcmin	F3, F4, F5
AG2300-+SP100S-MC1-i	3/4/5/7/8/10	180…240 Nm	≤ 4/2 arcmin	F4, F5, F6
AG2300-+SP100S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	180…240 Nm	≤ 6/4 arcmin	F3, F4, F5
AG2300-+SP140S-MF1-i	3/4/5/7/8/10	468…792 Nm	≤ 3/1 arcmin	F5, F6, F7
AG2300-+SP140S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	583…726 Nm	≤ 5/3 arcmin	F4, F5, F6
AG2300-+SP140S-MC1-i	3/4/5/7/8/10	310…480 Nm	≤ 4/2 arcmin	F5, F6, F7
AG2300-+SP140S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	380…480 Nm	≤ 6/4 arcmin	F4, F5, F6
AG2300-+SP180S-MF1-i	3/4/5/7/8/10	1164…1452 Nm	≤ 3/1 arcmin	F6, F7
AG2300-+SP180S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	1164…1452 Nm	≤ 5/3 arcmin	F5, F6
AG2300-+SP180S-MC1-i	3/4/5/7/8/10	700…880 Nm	≤ 4/2 arcmin	F6, F7
AG2300-+SP180S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	700…880 Nm	≤ 6/4 arcmin	F5, F6, F7
AG2300-+SP210S-MF1-i	3/4/5/7/8/10	1920…3000 Nm	≤ 3/1 arcmin	F7
AG2300-+SP210S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	2043…3000 Nm	≤ 5/3 arcmin	F7
AG2300-+SP210S-MC1-i	3/4/5/7/8/10	1200…2000 Nm	≤ 4/2 arcmin	F7
AG2300-+SP210S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	1040…2000 Nm	≤ 5/4 arcmin	F7
AG2300-+SP240S-MF1-i	3/4/5/7/8/10	3300…5400 Nm	≤ 3/1 arcmin	F7, AM308x
AG2300-+SP240S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	3642…5400 Nm	≤ 5/3 arcmin	F7, AM308x
AG2300-+SP240S-MC1-i	3/4/5/7/8/10	1750…3600 Nm	≤ 4/2 arcmin	F7, AM308x
AG2300-+SP240S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	1680…3600 Nm	≤ 5/4 arcmin	F7, AM308x

▶ **www.beckhoff.com/AG2300**

AG3300 | **Economy planetary gear units**

The planetary gear units with output shaft in the AG3300 economy series are a cost-efficient alternative to the high-end AG2300 gears. The gears, which are available in 1-stage and 2-stage versions, are compatible in their mating dimensions with those of the high-end AG2300 series and enable the user to implement applications with lower demands on dynamics, torque and accuracy in a very cost-effective manner. The AG3300 series is available in standard and high-torque versions for AM8000 and AM8500 servomotors. The transmission ratios are finely scalable and range from 3 to 100.

Features

- equipped with output shaft
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 4 sizes with up to 21 gear ratios
- acceleration torques from 51 to 800 Nm
- high efficiency and high power density
- high radial and axial forces with low torsional backlash
- lubricated for life
- IP 65 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG3300-+NPS015S-MF1-i	3/4/5/7/8/10	51…64 Nm	≤ 8 arcmin	F2, F3, F4
AG3300-+NPS015S-MF2-i	12/15/16/20/25/28/30/32/35/40/50/64/70/100	51…64 Nm	≤ 10 arcmin	F1, F2, F3
AG3300-+NPS025S-MF1-i	3/4/5/7/8/10	128…160 Nm	≤ 8 arcmin	F3, F4, F5
AG3300-+NPS025S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	128…160 Nm	≤ 10 arcmin	F2, F3, F4
AG3300-+NPS035S-MF1-i	3/4/5/7/8/10	320…408 Nm	≤ 8 arcmin	F4, F5, F6
AG3300-+NPS035S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	320…408 Nm	≤ 10 arcmin	F3, F4, F5
AG3300-+NPS045S-MF1-i	5/8/10	640…800 Nm	≤ 8 arcmin	F6, F7
AG3300-+NPS045S-MF2-i	25/50/64/100	640…800 Nm	≤ 10 arcmin	F5, F6, F7

▶ **www.beckhoff.com/AG3300**

AG3210 | Economy planetary gear units

The planetary gear units of the AG3210 economy series with output shaft are a cost-efficient alternative to the high-end AG2210 gears. The gears, which are available in 1-stage and 2-stage versions, are compatible in their mating dimensions with those of the high-end AG2210 series, offering added value with regard to the transmittable torque as well as radial and axial force, and significantly reduced torsional backlash. The AG3210 series is available in standard and high-torque versions for AM8000 and AM8500 servomotors. The gear ratios are finely scalable and range from 3 to 100.

Features

- equipped with output shaft
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 5 sizes with up to 21 gear ratios
- acceleration torques from 18 to 800 Nm
- high efficiency and high power density
- high radial and axial forces with low torsional backlash
- lubricated for life
- IP 64 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG3210-+NP005S-MF1-i	4/5/7/8/10	18…22 Nm	≤ 10 arcmin	F1, F2, F3
AG3210-+NP005S-MF2-i	16/20/25/28/35/40/50/64/70/100	18…22 Nm	≤ 13 arcmin	F1, F2, F3
AG3210-+NP015S-MF1-i	3/4/5/7/8/10	51…64 Nm	≤ 8 arcmin	F2, F3, F4
AG3210-+NP015S-MF2-i	12/15/16/20/25/28/30/32/35/40/50/64/70/100	51…64 Nm	≤ 10 arcmin	F1, F2, F3
AG3210-+NP025S-MF1-i	3/4/5/7/8/10	128…160 Nm	≤ 8 arcmin	F3, F4, F5
AG3210-+NP025S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	128…160 Nm	≤ 10 arcmin	F2, F3, F4
AG3210-+NP035S-MF1-i	3/4/5/7/8/10	320…408 Nm	≤ 8 arcmin	F4, F5, F6
AG3210-+NP035S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	320…408 Nm	≤ 10 arcmin	F3, F4, F5
AG3210-+NP045S-MF1-i	5/8/10	640…800 Nm	≤ 8 arcmin	F6, F7
AG3210-+NP045S-MF2-i	25/50/64/100	640…700 Nm	≤ 10 arcmin	F5, F6, F7

▶ **www.beckhoff.com/AG3210**

AG2400 | High-end planetary gear units with output flange

The planetary gear units with output flange in the high-end AG2400 series absorb maximum radial and axial forces and transmit highest torques. High-quality gear tooth systems result in very low torsional backlash, making this gear series the ideal solution for dynamic and highly accurate positioning applications. The low-noise gears of the AG2400 series are optimised for the AM8xxx high-performance servomotors and meet the highest requirements regarding precision, dynamics and power density.

Features

- equipped with output flange
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 7 sizes with up to 20 gear ratios
- acceleration torques from 38 to 7200 Nm
- maximum efficiency
- maximum radial and axial forces with very low torsional backlash
- lubricated for life
- IP 65 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG2400-+TP004S-MF1-i	4/5/7/8/10	42…66 Nm	≤ 4/2 arcmin	F2, F3, F4
AG2400-+TP004S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	38…66 Nm	≤ 4/2 arcmin	F1, F2, F3
AG2400-+TP010S-MF1-i	4/5/7/8/10	126…172 Nm	≤ 4/2 arcmin	F3, F4, F5
AG2400-+TP010S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	96…158 Nm	≤ 3/1 arcmin	F2, F3, F4
AG2400-+TP025S-MF1-i	4/5/7/8/10	318…380 Nm	≤ 3/1 arcmin	F4, F5, F6
AG2400-+TP025S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	275…380 Nm	≤ 3/1 arcmin	F3, F4, F5
AG2400-+TP050S-MF1-i	4/5/7/8/10	648…840 Nm	≤ 3/1 arcmin	F5, F6, F7
AG2400-+TP050S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	550…825 Nm	≤ 3/1 arcmin	F4, F5, F6
AG2400-+TP110S-MF1-i	4/5/7/8/10	1680…1920 Nm	≤ 3/1 arcmin	F6, F7
AG2400-+TP110S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	1430…1760 Nm	≤ 3/1 arcmin	F5, F6, F7
AG2400-+TP300S-MF1-i	5/7/8/10	2280…4200 Nm	≤ 3/1 arcmin	F6, F7
AG2400-+TP300S-MF2-i	20/21/25/31/32/35/50/61/64/70/91/100	2800…3949 Nm	≤ 3/2 arcmin	F6, F7
AG2400-+TP500S-MF1-i	5/7/8/10	4000…7200 Nm	≤ 3/1 arcmin	F6, F7
AG2400-+TP500S-MF2-i	20/21/25/31/32/35/50/61/64/70/91/100	4800…6808 Nm	≤ 3/2 arcmin	F6, F7

▶ **www.beckhoff.com/AG2400**

AG3400 | Economy planetary gear units with output flange

The planetary gear units with output flange in the AG3400 economy series are a cost-efficient alternative to the high-end AG2400 gears.
The gears, which are available in 1-stage and 2-stage versions, are compatible in their mating dimensions with those of the high-end AG2400 series and enable the user to implement applications with lower demands on dynamics, torque and accuracy in a very cost-effective manner. The AG3400 series is available in standard and high-torque versions for AM8000 and AM8500 servomotors. The gear ratios are finely scalable and range from 3 to 100.

Features

- equipped with output flange
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 5 sizes with up to 21 gear ratios
- acceleration torques from 18 to 700 Nm
- high efficiency and high power density
- high radial and axial forces with low torsional backlash
- lubricated for life
- IP 64 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG3400-+NPT005S-MF1-i	4/5/7/8/10	18…22 Nm	≤ 10 arcmin	F1, F2, F3
AG3400-+NPT005S-MF2-i	16/20/25/28/35/40/50/64/70/100	18…22 Nm	≤ 13 arcmin	F1, F2, F3
AG3400-+NPT015S-MF1-i	3/4/5/7/8/10	51…60 Nm	≤ 8 arcmin	F2, F3, F4
AG3400-+NPT015S-MF2-i	12/15/16/20/25/28/30/32/35/40/50/64/70/100	51…60 Nm	≤ 10 arcmin	F1, F2, F3
AG3400-+NPT025S-MF1-i	3/4/5/7/8/10	128…160 Nm	≤ 8 arcmin	F3, F4, F5
AG3400-+NPT025S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	128…160 Nm	≤ 10 arcmin	F2, F3, F4
AG3400-+NPT035S-MF1-i	3/4/5/7/8/10	320…365 Nm	≤ 8 arcmin	F4, F5, F6
AG3400-+NPT035S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	320…365 Nm	≤ 10 arcmin	F3, F4, F5
AG3400-+NPT045S-MF1-i	5/8/10	640…700 Nm	≤ 8 arcmin	F6, F7
AG3400-+NPT045S-MF2-i	25/50/64/100	640…700 Nm	≤ 10 arcmin	F5, F6, F7

▶ www.beckhoff.com/AG3400

AM8800 | Stainless steel servomotors

Based on the AM8000 technology, the AM8800 series has a stainless steel housing that is designed according to the EHEDG guidelines in Hygienic Design. The AM8800 is ideally suited for use in the food, pharmaceutical and chemical industries.

The windings of the AM8800 motors are implemented using salient pole-wound technology. This gives rise to a high copper space factor. Due to the high slot space factor, high continuous torques can be attained. The fully potted stator provides for a thermally ideal transition of the winding to the housing. A further positive consequence of this is the mechanical protection of the winding wires against vibrations.

Since the housing and motor shaft are manufactured from scratch-proof stainless steel AISI 316L, no corrosion creep or damage to the paint finish is possible. The motors are manufactured as standard with IP 69K protection, allowing the use of steam pressure cleaners. An optional sealing air connection to prevent the formation of condensation is also available. The cable gland also has a hygienic design. The lubricants used are certified food-safe (FDA).

One Cable Technology (OCT)
With the servomotors of the AM8000 series the feedback signals are sent directly along the conductor to the power supply so that the power and feedback systems are combined in a single motor supply cable. With the use of OCT, the information is sent reliably and without interference through a digital interface. Since a cable and plug are omitted at both the motor and controller end, the component and commissioning costs are significantly reduced.

For further information on OCT see page 320

Stainless steel gear units AG2800 see page 395

Pre-assembled cables see page 350

Technical data	AM88xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3, optionally IM B14, IM V18, IM V19
Protection class	IP 69K, PTFE double-lip shaft seal with FDA approval
Cooling	convection, permissible ambient temperature 40 °C
Materials	AISI 316L
Temperature sensor	integrated in stator winding
Connection method	direct cable outlet via cable gland with connected M23 speedtec® coupling plug or direct connection for AX5000 or AX8000
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL, EHEDG
Feedback system	absolute encoder single-turn and multi-turn (OCT), resolver

Ordering options

You will find the possible ordering options for the motors listed in this table. Please note: The options cannot be retrofitted.
All electrical variables are RMS values.

Order reference	AM88uv-wxyz-caaa
u	flange code
v	motor length
w = 0	smooth shaft with sealing ring IP 69K
w = 1	shaft with groove and feather key according to DIN 6885 and sealing ring IP 69K
x	winding code A…Z
y = 0	2-cable standard: feedback resolver
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution
z = 0	without holding brake
z = 2	without holding brake, with sealing air connection
z = 1	with holding brake
z = 3	with holding brake, with sealing air connection
c = 0	motor connection via M23 speedtec® plug, cable length definable via aaa [1]
c = 2	direct connection for AX5000 up to 25 A (X13+X14), cable length definable via aaa
c = 3	direct connection for AX8000 (X13), cable length definable via aaa
aaa	length of the motor cable in decimetres

[1] For motor connection via an M23 speedtec® plug, a ZK4x00-80x3-xxxx motor supply cable must also be ordered in the required length.

Motor connections see page 350

AM883x | **Flange code 3**

Data for 400 V AC	AM8831-wByz	AM8832-wCyz	AM8833-wDyz
Standstill torque	0.85 Nm	1.40 Nm	1.85 Nm
Rated torque	0.70 Nm	1.00 Nm	1.35 Nm
Rated speed	3000 min^{-1}		
Rated power	0.22 kW	0.31 kW	0.42 kW
Standstill current	0.65 A	1.00 A	1.25 A
Rotor moment of inertia	0.469 $kgcm^2$	0.850 $kgcm^2$	1.231 $kgcm^2$
Rotor moment of inertia (with brake)	0.548 $kgcm^2$	0.929 $kgcm^2$	1.471 $kgcm^2$
One Cable Technology (OCT)	yes		

AM884x | **Flange code 4**

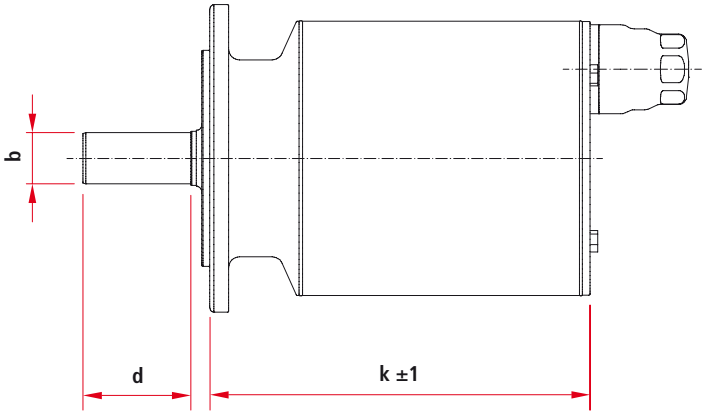
Data for 400 V AC	AM8841-wCyz	AM8842-wDyz	AM8843-wEyz
Standstill torque	1.60 Nm	2.60 Nm	3.50 Nm
Rated torque	1.30 Nm	1.90 Nm	2.75 Nm
Rated speed	3000 min^{-1}	2500 min^{-1}	2500 min^{-1}
Rated power	0.41 kW	0.50 kW	0.72 kW
Standstill current	1.10 A	1.60 A	1.90 A
Rotor moment of inertia	1.115 $kgcm^2$	2.006 $kgcm^2$	2.898 $kgcm^2$
Rotor moment of inertia (with brake)	1.765 $kgcm^2$	2.656 $kgcm^2$	3.548 $kgcm^2$
One Cable Technology (OCT)	yes		

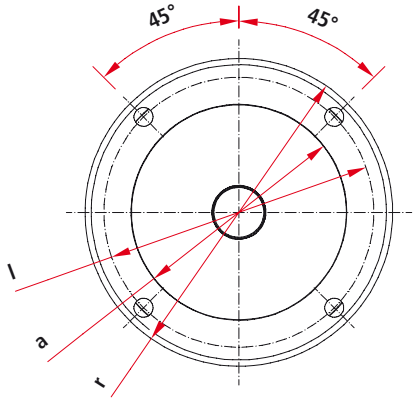
AM885x | **Flange code 5**

Data for 400 V AC	AM8851-wDyz	AM8852-wEyz	AM8853-wFyz
Standstill torque	3.10 Nm	4.80 Nm	6.40 Nm
Rated torque	2.70 Nm	3.70 Nm	4.30 Nm
Rated speed	2500 min^{-1}	2000 min^{-1}	2000 min^{-1}
Rated power	0.71 kW	0.77 kW	0.90 kW
Standstill current	1.80 A	2.10 A	2.80 A
Rotor moment of inertia	2.315 $kgcm^2$	4.142 $kgcm^2$	5.970 $kgcm^2$
Rotor moment of inertia (with brake)	2.975 $kgcm^2$	4.802 $kgcm^2$	7.090 $kgcm^2$
One Cable Technology (OCT)	yes		

AM886x | **Flange code 6**

Data for 400 V AC	AM8861-wEyz	AM8862-wFyz	AM8863-wGyz
Standstill torque	7.75 Nm	13.1 Nm	16.7 Nm
Rated torque	6.20 Nm	6.00 Nm	8.00 Nm
Rated speed	1500 min^{-1}		
Rated power	0.97 kW	0.94 kW	1.26 kW
Standstill current	2.53 A	4.10 A	4.90 A
Rotor moment of inertia	11.69 $kgcm^2$	20.93 $kgcm^2$	30.16 $kgcm^2$
Rotor moment of inertia (with brake)	13.94 $kgcm^2$	23.17 $kgcm^2$	32.40 $kgcm^2$
One Cable Technology (OCT)	yes		





Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8831	60 j6	14 k6	30 mm	75 mm	89 mm	134 mm	172 mm
AM8832	60 j6	14 k6	30 mm	75 mm	89 mm	159.5 mm	197.5 mm
AM8833	60 j6	14 k6	30 mm	75 mm	89 mm	185 mm	223 mm
AM8841	80 j6	19 k6	40 mm	100 mm	114 mm	141 mm	188 mm
AM8842	80 j6	19 k6	40 mm	100 mm	114 mm	171 mm	218 mm
AM8843	80 j6	19 k6	40 mm	100 mm	114 mm	201 mm	248 mm
AM8851	95 j6	24 k6	50 mm	115 mm	134 mm	146 mm	192 mm
AM8852	95 j6	24 k6	50 mm	115 mm	134 mm	179 mm	225 mm
AM8853	95 j6	24 k6	50 mm	115 mm	134 mm	212 mm	258 mm
AM8861	130 j6	32 k6	58 mm	165 mm	189 mm	171.5 mm	221.5 mm
AM8862	130 j6	32 k6	58 mm	165 mm	189 mm	211.5 mm	261.5 mm
AM8863	130 j6	32 k6	58 mm	165 mm	189 mm	251.5 mm	301.5 mm

▶ **www.beckhoff.com/AM88xx**

AG2800 | Planetary gear units for AM8800 stainless steel servomotors

The AM8800 stainless steel servomotors are fully compatible with the high requirements in the food, beverage and pharmaceutical industries with respect to optimum cleaning, resistance to aggressive cleaning agents, heavy mechanical loads and adverse environmental conditions. With their absolutely edge-free design these motors reduce the costs for machine manufacturers and users to a minimum.

A Hygienic Design drive axis does not always end at the stainless steel shaft of the motor; the use of a gearbox is often absolutely necessary. The same requirements apply here as to the stainless steel servomotors. All gearbox materials that come into contact with the environment exhibit high resistance to a large number of aggressive CIP (Cleaning in Place) cleaning media. The dead-space-free design, the smooth surface, the round motor adapter and the high resistance to corrosion of the gearboxes make the AM8800 a perfectly matched and certified Hygienic Design servo axis. The planetary gear units are fitted to the respective motor in the factory and delivered as a complete motor/gear unit.

Features

- corrosion-resistant implementation
- resistant to aggressive cleaning agents
- stainless steel screw plug
- food-compatible NSF-H1 lubrication
- high protection class IP 69K (at 30 bar, refering to DIN 40050-9)
- laser-etched name plate
- dead-space-free design and smooth, electro-polished surfaces

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced
AG2800-+HDV015Z-MF1-i	4/5/7/10	29…32 Nm	≤ 10/– arcmin
AG2800-+HDV015Z-MF2-i	16/20/25/35/50/70/100	29…32 Nm	≤ 15/– arcmin
AG2800-+HDV025Z-MF1-i	4/5/7/10	72…80 Nm	≤ 10/– arcmin
AG2800-+HDV025Z-MF2-i	16/20/25/35/50/70/100	72…80 Nm	≤ 15/– arcmin
AG2800-+HDV035Z-MF1-i	4/5/7/10	180…200 Nm	≤ 10/– arcmin
AG2800-+HDV035Z-MF2-i	16/20/25/35/50/70/100	180…200 Nm	≤ 15/– arcmin

▶ **www.beckhoff.com/AG2800**

AM3000 | **Synchronous Servomotors**

Pole-wound motor series
For the AM3000 servomotors, the stator is not wound outside the housing but inside through a needle winder.

With pole winding, the copper wire is in close contact with the iron core. The wire insulation can be much thinner, since no pressing of the winding head is required. These measures lead to a significant increase in the proportion of "active" copper, which determines the torque value, so that the performance of the AM3000 series is approx. 25…35 % higher. An additional benefit is that the motors are significantly shorter than conventional models.

Sealed winding
The AM3000 servomotors are characterised by an extremely low moment of inertia, robust design and high overload capacity. The winding is sealed in order to eliminate air between the individual wires, since the thermal resistance of air is higher than that of epoxy resin. This further increases mechanical resilience, e.g. in case of vibrations.

The AM3000 Synchronous Servomotors are available with eight different flange codes. For each size, once the flange code has been defined, there is scope for variation in the length. The motors are offered with torques between 0.18 and 180 Nm and with a wide range of nominal speeds, so that for each application and gear ratio the motor with the optimum dimensions can be selected.

Features
- rotable plug connectors
- terminal box for AM308x
- tight tolerances: resulting in a highly symmetric structure inside the motor reducing cogging to an absolute minimum
- feedback option: resolver, single-turn and multi-turn absolute encoders
- The motors are available with smooth shaft or with groove and feather key.
- protection class IP 65, shaft feedthrough IP 54, optional IP 65/IP 65
- UL/CSA

Option
- planetary gear units in different variants

Pre-assembled cables and more accessories
▶ **www.beckhoff.com/AM30xx**

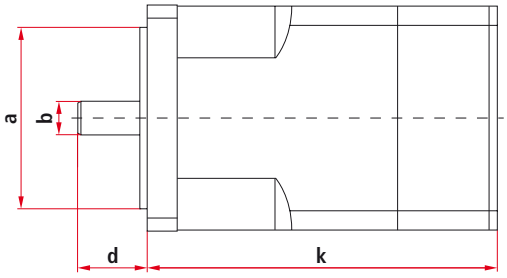
AM30uv-wxyz-000a	Stand-still torque	Stand-still current	Rated speed at rated supply voltage 230 V AC	400 V AC	480 V AC	Rotor moment of inertia (without brake)	(with brake)	Weight (without brake)	Weight (with brake)
AM3011-wByz-000a	0.18 Nm	1.16 A	8000 min^{-1}	–	–	0.017 kg cm^2	0.020 kg cm^2	0.35 kg	0.55 kg
AM3012-wCyz-000a	0.31 Nm	1.51 A	8000 min^{-1}	–	–	0.031 kg cm^2	0.034 kg cm^2	0.49 kg	0.69 kg
AM3013-wCyz-000a	0.41 Nm	1.48 A	8000 min^{-1}	–	–	0.045 kg cm^2	0.048 kg cm^2	0.63 kg	0.83 kg
AM3013-wDyz-000a	0.40 Nm	2.40 A	–	–	–	0.045 kg cm^2	0.048 kg cm^2	0.63 kg	0.83 kg
AM3021-wCyz-000a	0.48 Nm	1.58 A	8000 min^{-1}	–	–	0.107 kg cm^2	0.118 kg cm^2	0.82 kg	1.09 kg
AM3022-wCyz-000a	0.84 Nm	1.39 A	3500 min^{-1}	8000 min^{-1}	8000 min^{-1}	0.161 kg cm^2	0.172 kg cm^2	1.10 kg	1.37 kg
AM3022-wEyz-000a	0.87 Nm	2.73 A	8000 min^{-1}	–	–	0.161 kg cm^2	0.172 kg cm^2	1.10 kg	1.37 kg
AM3023-wCyz-000a	1.13 Nm	1.41 A	2500 min^{-1}	5500 min^{-1}	7000 min^{-1}	0.216 kg cm^2	0.227 kg cm^2	1.38 kg	1.65 kg
AM3023-wDyz-000a	1.16 Nm	2.19 A	5000 min^{-1}	8000 min^{-1}	8000 min^{-1}	0.216 kg cm^2	0.227 kg cm^2	1.38 kg	1.65 kg
AM3024-wCyz-000a	1.38 Nm	1.42 A	2000 min^{-1}	4500 min^{-1}	5500 min^{-1}	0.270 kg cm^2	0.281 kg cm^2	1.66 kg	1.93 kg
AM3024-wDyz-000a	1.41 Nm	2.21 A	4000 min^{-1}	8000 min^{-1}	8000 min^{-1}	0.270 kg cm^2	0.281 kg cm^2	1.66 kg	1.93 kg
AM3031-wCyz-0000	1.15 Nm	1.37 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	0.330 kg cm^2	0.341 kg cm^2	1.55 kg	1.90 kg
AM3031-wEyz-0000	1.20 Nm	2.99 A	6000 min^{-1}	–	–	0.330 kg cm^2	0.341 kg cm^2	1.55 kg	1.90 kg
AM3032-wCyz-0000	2.00 Nm	1.44 A	1500 min^{-1}	3000 min^{-1}	3500 min^{-1}	0.590 kg cm^2	0.601 kg cm^2	2.23 kg	2.58 kg
AM3032-wDyz-0000	2.04 Nm	2.23 A	2500 min^{-1}	5500 min^{-1}	6000 min^{-1}	0.590 kg cm^2	0.601 kg cm^2	2.23 kg	2.58 kg
AM3032-wHyz-0000	2.10 Nm	5.50 A	7000 min^{-1}	–	–	0.590 kg cm^2	0.601 kg cm^2	2.23 kg	2.58 kg
AM3033-wCyz-0000	2.71 Nm	1.47 A	1000 min^{-1}	2000 min^{-1}	2500 min^{-1}	0.850 kg cm^2	0.861 kg cm^2	2.90 kg	3.25 kg
AM3033-wEyz-0000	2.79 Nm	2.58 A	2000 min^{-1}	4500 min^{-1}	5000 min^{-1}	0.850 kg cm^2	0.861 kg cm^2	2.90 kg	3.25 kg
AM3041-wCyz-0000	1.95 Nm	1.46 A	1200 min^{-1}	3000 min^{-1}	3500 min^{-1}	0.810 kg cm^2	0.878 kg cm^2	2.44 kg	3.07 kg
AM3041-wEyz-0000	2.02 Nm	2.85 A	3000 min^{-1}	6000 min^{-1}	6000 min^{-1}	0.810 kg cm^2	0.878 kg cm^2	2.44 kg	3.07 kg
AM3041-wHyz-0000	2.06 Nm	5.60 A	6000 min^{-1}	6000 min^{-1}	6000 min^{-1}	0.810 kg cm^2	0.878 kg cm^2	2.44 kg	3.07 kg
AM3042-wCyz-0000	3.35 Nm	1.40 A	–	1500 min^{-1}	2000 min^{-1}	1.450 kg cm^2	1.518 kg cm^2	3.39 kg	4.02 kg
AM3042-wEyz-0000	3.42 Nm	2.74 A	1800 min^{-1}	3500 min^{-1}	4000 min^{-1}	1.450 kg cm^2	1.518 kg cm^2	3.39 kg	4.02 kg
AM3042-wGyz-0000	3.53 Nm	4.80 A	3500 min^{-1}	6000 min^{-1}	6000 min^{-1}	1.450 kg cm^2	1.518 kg cm^2	3.39 kg	4.02 kg
AM3043-wEyz-0000	4.70 Nm	2.76 A	1500 min^{-1}	2500 min^{-1}	3000 min^{-1}	2.090 kg cm^2	2.158 kg cm^2	4.35 kg	4.98 kg
AM3043-wGyz-0000	4.80 Nm	4.87 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	2.090 kg cm^2	2.158 kg cm^2	4.35 kg	4.98 kg
AM3043-wHyz-0000	4.82 Nm	5.40 A	3000 min^{-1}	6000 min^{-1}	–	2.090 kg cm^2	2.158 kg cm^2	4.35 kg	4.98 kg
AM3044-wEyz-0000	5.76 Nm	2.90 A	1200 min^{-1}	2000 min^{-1}	2500 min^{-1}	2.730 kg cm^2	2.798 kg cm^2	5.30 kg	5.93 kg
AM3044-wGyz-0000	5.88 Nm	5.00 A	2000 min^{-1}	4000 min^{-1}	5000 min^{-1}	2.730 kg cm^2	2.798 kg cm^2	5.30 kg	5.93 kg
AM3044-wHyz-0000	5.89 Nm	5.60 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	2.730 kg cm^2	2.798 kg cm^2	5.30 kg	5.93 kg
AM3044-wJyz-0000	6.00 Nm	8.80 A	4000 min^{-1}	6000 min^{-1}	6000 min^{-1}	2.730 kg cm^2	2.798 kg cm^2	5.30 kg	5.93 kg
AM3051-wEyz-0000	4.70 Nm	2.75 A	1200 min^{-1}	2500 min^{-1}	3000 min^{-1}	3.420 kg cm^2	3.593 kg cm^2	4.20 kg	5.30 kg
AM3051-wGyz-0000	4.75 Nm	4.84 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	3.420 kg cm^2	3.593 kg cm^2	4.20 kg	5.30 kg
AM3051-wHyz-0000	4.79 Nm	6.00 A	3000 min^{-1}	6000 min^{-1}	6000 min^{-1}	3.420 kg cm^2	3.593 kg cm^2	4.20 kg	5.30 kg
AM3052-wGyz-0000	8.43 Nm	4.72 A	1500 min^{-1}	2500 min^{-1}	3000 min^{-1}	6.220 kg cm^2	6.393 kg cm^2	5.80 kg	6.90 kg
AM3052-wHyz-0000	8.48 Nm	5.90 A	1800 min^{-1}	3500 min^{-1}	4000 min^{-1}	6.220 kg cm^2	6.393 kg cm^2	5.80 kg	6.90 kg
AM3052-wKyz-0000	8.60 Nm	9.30 A	3000 min^{-1}	5500 min^{-1}	6000 min^{-1}	6.220 kg cm^2	6.393 kg cm^2	5.80 kg	6.90 kg
AM3053-wGyz-0000	11.37 Nm	4.77 A	1000 min^{-1}	2000 min^{-1}	2400 min^{-1}	9.120 kg cm^2	9.293 kg cm^2	7.40 kg	8.50 kg
AM3053-wHyz-0000	11.51 Nm	6.60 A	–	3000 min^{-1}	3500 min^{-1}	9.120 kg cm^2	9.293 kg cm^2	7.40 kg	8.50 kg
AM3053-wKyz-0000	11.60 Nm	9.40 A	2000 min^{-1}	4000 min^{-1}	4500 min^{-1}	9.120 kg cm^2	9.293 kg cm^2	7.40 kg	8.50 kg
AM3054-wGyz-0000	14.30 Nm	5.00 A	–	1500 min^{-1}	2000 min^{-1}	11.92 kg cm^2	12.093 kg cm^2	9.00 kg	10.1 kg
AM3054-wHyz-0000	14.90 Nm	5.50 A	1000 min^{-1}	1800 min^{-1}	2000 min^{-1}	11.92 kg cm^2	12.093 kg cm^2	9.00 kg	10.1 kg
AM3054-wKyz-0000	14.40 Nm	9.70 A	1800 min^{-1}	3500 min^{-1}	4000 min^{-1}	11.92 kg cm^2	12.093 kg cm^2	9.00 kg	10.1 kg
AM3054-wLyz-0000	14.10 Nm	12.50 A	2500 min^{-1}	4500 min^{-1}	–	11.92 kg cm^2	12.093 kg cm^2	9.00 kg	10.1 kg
AM3062-wGyz-0000	11.90 Nm	4.90 A	–	1800 min^{-1}	2000 min^{-1}	16.90 kg cm^2	17.51 kg cm^2	8.90 kg	10.9 kg
AM3062-wHyz-0000	11.90 Nm	5.40 A	1000 min^{-1}	2000 min^{-1}	2400 min^{-1}	16.90 kg cm^2	17.51 kg cm^2	8.90 kg	10.9 kg
AM3062-wKyz-0000	12.20 Nm	9.60 A	2000 min^{-1}	3500 min^{-1}	4500 min^{-1}	16.90 kg cm^2	17.51 kg cm^2	8.90 kg	10.9 kg
AM3062-wMyz-0000	12.20 Nm	13.40 A	3000 min^{-1}	6000 min^{-1}	6000 min^{-1}	16.90 kg cm^2	17.51 kg cm^2	8.90 kg	10.9 kg
AM3063-wKyz-0000	16.80 Nm	9.90 A	1500 min^{-1}	3000 min^{-1}	3500 min^{-1}	24.20 kg cm^2	24.81 kg cm^2	11.1 kg	13.1 kg
AM3063-wMyz-0000	17.00 Nm	13.80 A	2000 min^{-1}	4000 min^{-1}	4500 min^{-1}	24.20 kg cm^2	24.81 kg cm^2	11.1 kg	13.1 kg
AM3063-wNyz-0000	17.00 Nm	17.40 A	3000 min^{-1}	5000 min^{-1}	6000 min^{-1}	24.20 kg cm^2	24.81 kg cm^2	11.1 kg	13.1 kg

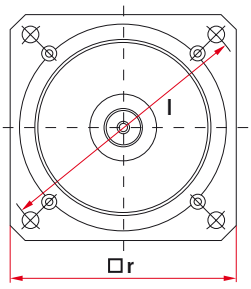
The table is continued on the next page.

AM30uv-wxyz-000a	Stand-still torque	Stand-still current	Rated speed at rated supply voltage 230 V AC	400 V AC	480 V AC	Rotor moment of inertia (without brake)	(with brake)	Weight (without brake)	Weight (with brake)
AM3063-wHyz-0000	16.60 Nm	5.60 A	–	1500 min^{-1}	1800 min^{-1}	31.60 kg cm²	32.21 kg cm²	13.3 kg	15.3 kg
AM3064-wKyz-0000	20.80 Nm	9.20 A	1200 min^{-1}	2000 min^{-1}	2500 min^{-1}	31.60 kg cm²	32.21 kg cm²	13.3 kg	15.3 kg
AM3064-wLyz-0000	21.00 Nm	12.80 A	1500 min^{-1}	3000 min^{-1}	3500 min^{-1}	31.60 kg cm²	32.21 kg cm²	13.3 kg	15.3 kg
AM3064-wPyz-0000	20.40 Nm	18.60 A	2500 min^{-1}	4500 min^{-1}	5500 min^{-1}	31.60 kg cm²	32.21 kg cm²	13.3 kg	15.3 kg
AM3065-wKyz-0000	24.80 Nm	9.80 A	1000 min^{-1}	2000 min^{-1}	2200 min^{-1}	40.00 kg cm²	40.61 kg cm²	15.4 kg	17.4 kg
AM3065-wMyz-0000	25.00 Nm	13.60 A	1500 min^{-1}	2500 min^{-1}	3000 min^{-1}	40.00 kg cm²	40.61 kg cm²	15.4 kg	17.4 kg
AM3065-wNyz-0000	24.30 Nm	17.80 A	2000 min^{-1}	3500 min^{-1}	4000 min^{-1}	40.00 kg cm²	40.61 kg cm²	15.4 kg	17.4 kg
AM3065-wPyz-0000	24.50 Nm	19.80 A	2400 min^{-1}	4000 min^{-1}	5000 min^{-1}	40.00 kg cm²	40.61 kg cm²	15.4 kg	17.4 kg
AM3072-wKyz-0000	29.70 Nm	9.30 A	–	1500 min^{-1}	1800 min^{-1}	64.50 kg cm²	66.14 kg cm²	19.7 kg	21.8 kg
AM3072-wMyz-0000	30.00 Nm	13.00 A	–	2000 min^{-1}	2500 min^{-1}	64.50 kg cm²	66.14 kg cm²	19.7 kg	21.8 kg
AM3072-wPyz-0000	29.40 Nm	18.70 A	1800 min^{-1}	3000 min^{-1}	3500 min^{-1}	64.50 kg cm²	66.14 kg cm²	19.7 kg	21.8 kg
AM3072-wQyz-0000	29.70 Nm	20.90 A	–	3500 min^{-1}	4000 min^{-1}	64.50 kg cm²	66.14 kg cm²	19.7 kg	21.8 kg
AM3073-wMyz-0000	42.00 Nm	13.60 A	–	1500 min^{-1}	1800 min^{-1}	92.10 kg cm²	93.74 kg cm²	26.7 kg	28.8 kg
AM3073-wPyz-0000	41.60 Nm	19.50 A	1300 min^{-1}	2400 min^{-1}	2800 min^{-1}	92.10 kg cm²	93.74 kg cm²	26.7 kg	28.8 kg
AM3073-wQyz-0000	41.60 Nm	24.60 A	–	3000 min^{-1}	3500 min^{-1}	92.10 kg cm²	93.74 kg cm²	26.7 kg	28.8 kg
AM3074-wLyz-0000	53.00 Nm	12.90 A	–	1200 min^{-1}	1400 min^{-1}	119.7 kg cm²	121.34 kg cm²	33.6 kg	35.7 kg
AM3074-wPyz-0000	52.50 Nm	18.50 A	–	1800 min^{-1}	2000 min^{-1}	119.7 kg cm²	121.34 kg cm²	33.6 kg	35.7 kg
AM3074-wQyz-0000	51.90 Nm	26.20 A	–	2500 min^{-1}	3000 min^{-1}	119.7 kg cm²	121.34 kg cm²	33.0 kg	35.7 kg
AM3082-wTyz-0006	75.00 Nm	48.00 A	–	2500 min^{-1}	3000 min^{-1}	172.0 kg cm²	177.00 kg cm²	65.0 kg	73.0 kg
AM3083-wTyz-0006	130.0 Nm	62.00 A	–	2200 min^{-1}	2500 min^{-1}	334.0 kg cm²	339.00 kg cm²	85.0 kg	93.0 kg
AM3084-wTyz-0006	180.0 Nm	67.00 A	–	1800 min^{-1}	2000 min^{-1}	495.0 kg cm²	500.00 kg cm²	105 kg	113 kg

u: flange code
v: motor length

Option w = 0: smooth shaft (preferred type)
w = 1: shaft with groove and feather key according to DIN 6885
w = 2: shaft with IP 65 sealing ring and smooth shaft
w = 3: shaft with IP 65 sealing ring and shaft with groove and feather key
Option x = winding code A…T
Option y = 0: resolver, 2-pole
y = 1: single-turn absolute encoder, EnDat 2.1
absolute position within one revolution, electronic identification plate
AM302x…AM304x: 512 sine periods per revolution
AM305x…AM308x: 2048 sine periods per revolution
y = 2: multi-turn absolute encoder, EnDat 2.1
absolute position within 4096 revolutions, electronic identification plate
AM302x…AM304x: 512 sine periods per revolution
AM305x…AM308x: 2048 sine periods per revolution
y = 3: single-turn absolute encoder, BiSS
absolute position within one revolution, electronic identification plate
AM302x…AM308x: 2048 sine periods per revolution
y = 4: multi-turn absolute encoder, BiSS
absolute position within 4096 revolutions, electronic identification plate
AM302x…AM308x: 2048 sine periods per revolution
Option z = 0: without holding brake
z = 1: with holding brake
Option a = 0: rotatable angular connectors for motor and feedback cable (only for AM302x up to AM307x)
a = 1: supply cable 0.5 m with non-detachable plugs (only for AM301x/AM302x), only for resolver
a = 3: vertical connectors for motor and feedback cables (only for AM302x up to AM307x)
a = 5: yTec plug (only for AM301x)
a = 6: motor connection via terminal box (only for AM308x)
With the exception of the shaft seal, the options cannot be installed in the field.
Options such as shaft seal, holding brake, absolute encoder can lead to a reduction of the nominal rating.



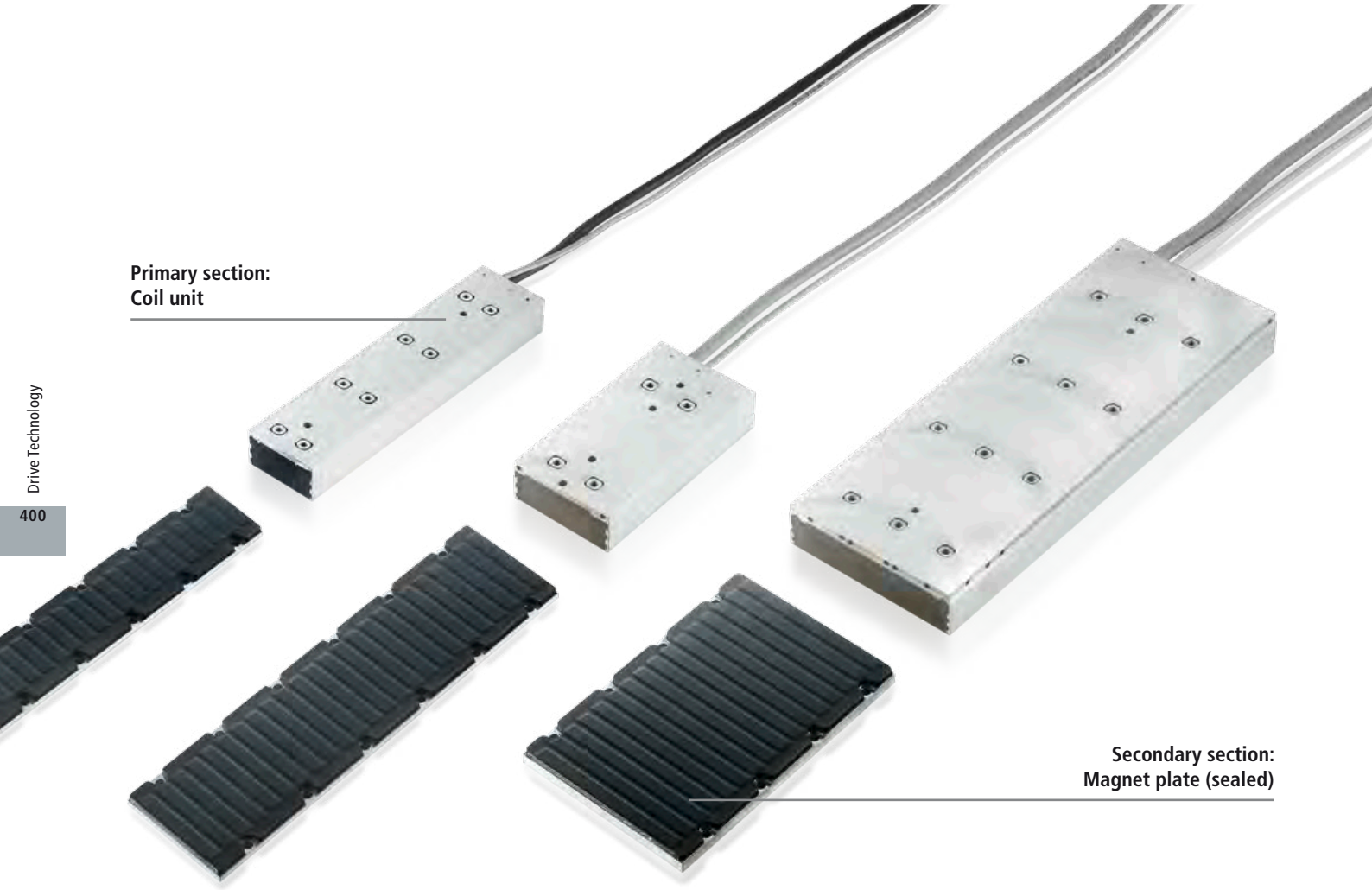


Dimensions	a	b	d	k (resolver) (without brake)	k (resolver) (with brake)	k (encoder) (without brake)	k (encoder) (with brake)	l	r
AM3011	30 mm	8 mm	25 mm	69.6 mm	106.6 mm	79.1 mm	116.1 mm	46 mm	40 mm
AM3012	30 mm	8 mm	25 mm	88.6 mm	125.6 mm	98.1 mm	135.1 mm	46 mm	40 mm
AM3013	30 mm	8 mm	25 mm	107.6 mm	144.6 mm	117.1 mm	154.1 mm	46 mm	40 mm
AM3021	40 mm	9 mm	20 mm	95.4 mm	129.5 mm	95.4 mm	129.5 mm	63 mm	58 mm
AM3022	40 mm	9 mm	20 mm	114.4 mm	148.5 mm	114.4 mm	148.5 mm	63 mm	58 mm
AM3023	40 mm	9 mm	20 mm	133.4 mm	167.5 mm	133.4 mm	167.5 mm	63 mm	58 mm
AM3024	40 mm	9 mm	20 mm	152.4 mm	186.5 mm	152.4 mm	186.5 mm	63 mm	58 mm
AM3031	60 mm	14 mm	30 mm	109.8 mm	141.3 mm	109.8 mm	141.3 mm	75 mm	70 mm
AM3032	60 mm	14 mm	30 mm	140.8 mm	172.3 mm	140.8 mm	172.3 mm	75 mm	70 mm
AM3033	60 mm	14 mm	30 mm	171.8 mm	203.3 mm	171.8 mm	203.3 mm	75 mm	70 mm
AM3041	80 mm	19 mm	40 mm	118.8 mm	152.3 mm	118.8 mm	152.3 mm	100 mm	84 mm
AM3042	80 mm	19 mm	40 mm	147.8 mm	181.3 mm	147.8 mm	181.3 mm	100 mm	84 mm
AM3043	80 mm	19 mm	40 mm	176.8 mm	210.3 mm	176.8 mm	210.3 mm	100 mm	84 mm
AM3044	80 mm	19 mm	40 mm	205.8 mm	239.3 mm	205.8 mm	239.3 mm	100 mm	84 mm
AM3051	110 mm	24 mm	50 mm	127.5 mm	172.5 mm	146.0 mm	189.0 mm	130 mm	108 mm
AM3052	110 mm	24 mm	50 mm	158.5 mm	203.5 mm	177.0 mm	220.0 mm	130 mm	108 mm
AM3053	110 mm	24 mm	50 mm	189.5 mm	234.5 mm	208.0 mm	251.0 mm	130 mm	108 mm
AM3054	110 mm	24 mm	50 mm	220.5 mm	265.5 mm	239.0 mm	282.0 mm	130 mm	108 mm
AM3062	130 mm	32 mm	58 mm	153.7 mm	200.7 mm	172.2 mm	219.7 mm	165 mm	138 mm
AM3063	130 mm	32 mm	58 mm	178.7 mm	225.7 mm	197.2 mm	244.7 mm	165 mm	138 mm
AM3064	130 mm	32 mm	58 mm	203.7 mm	250.7 mm	222.2 mm	269.7 mm	165 mm	138 mm
AM3065	130 mm	32 mm	58 mm	228.7 mm	275.7 mm	247.2 mm	294.7 mm	165 mm	138 mm
AM3072	180 mm	38 mm	80 mm	192.5 mm	234.5 mm	201.7 mm	253.7 mm	215 mm	188 mm
AM3073	180 mm	38 mm	80 mm	226.5 mm	268.5 mm	235.7 mm	287.3 mm	215 mm	188 mm
AM3074	180 mm	38 mm	80 mm	260.5 mm	302.5 mm	269.7 mm	321.3 mm	215 mm	188 mm
AM3082	250 mm	48 mm	110 mm	263.4 mm	329.4 mm	263.4 mm	329.4 mm	300 mm	260 mm
AM3083	250 mm	48 mm	110 mm	343.9 mm	410.0 mm	343.9 mm	410.0 mm	300 mm	260 mm
AM3084	250 mm	48 mm	110 mm	424.4 mm	490.4 mm	424.4 mm	490.4 mm	300 mm	260 mm

▶ **www.beckhoff.com/AM30xx**

ALxxxx | Linear Servomotors

▶ www.beckhoff.com/Linear-motors



AL20xx | Iron core motor,
magnetic path width 80 mm

AL24xx | Iron core motor,
magnetic path width 50 mm

AL28xx | Iron core motor,
magnetic path width 130 mm

Compact power packages: Linear Servomotors AL2xxx

The AL2xxx Linear Servomotors complement the servomotors series and can be used wherever rotary design reaches mechanical limits during installation, or where special drive characteristics, in terms of dynamics, synchronism or acceleration, are required.

Linear Servomotors are easy to set up and are not subject to mechanical wear. Moreover, there are virtually no limits on travel options. With their high acceleration characteristics, Linear Servomotors can achieve positioning velocities of up to 12 m/s – with a high force constant and a very good force/mass ratio.

The pole spacing is the same for all the motors of a motor series. This has the advantage that the procedure for adjusting the drive amplifiers and the adaptation to a linear encoder is always the same, which saves time during commissioning. In principle, it is possible to operate several primary sections on one magnetic track. This significantly reduces the installation and component costs and opens up application options that would not normally be considered for linear motors.

AL2200 magnetic encoder system (MES) for linear motors

The feedback system required by linear motors for commutation and detection of speed and position normally consists of a reading head and a graduated rule installed parallel to the travel path. The hardware requirements for the complete system increase with the length of the travel path. The AL2200 in contrast detects the magnetic field of a magnetic plate and supplies the servo drive with the incremental encoder signals for commutation and position control. The MES supplies one sine oscillation per logical motor revolution. A logical motor revolution is equivalent to the distance between two homopolar magnets, i.e. between two north poles, for example. The attainable accuracy of ±0.1 mm is sufficient for simple positioning tasks and depends to a large extent on the mechanical accuracy and position of the magnets along the travel path. Since no graduated rule has to be installed, the MES is a cost-efficient feedback solution for linear motors.

Ironless AL3800 Linear Servomotors
▶ **www.beckhoff.com/AL38xx**

AL2xxx | Linear Servomotors

The 3-phase Synchronous Linear Servomotors of the AL2xxx series consist of a primary section and a secondary section. The primary section contains a grooved, laminated core with inlaid copper windings. It is generally used as the moving part. The secondary section contains the steel plate with attached permanent magnets.

The motors of the individual series have the same width (including magnetic plate), i.e. all motors can be operated on the same magnetic plates, in any combination. The magnetic plates are fully sealed and therefore have an almost perfectly level and robust surface.

The primary sections have an IP 64 protection rating and are therefore suitable for application in harsh environments. They are equipped with a 0.5 m cable strand and optionally with pre-assembled connectors, so that they can be coupled with the servo drives either via the connector box or via plug connectors. This greatly reduces the difficulty of implementing the cabling, and makes a significant contribution to avoiding errors.

In conjunction with the AX5000 Servo Drives the linear motors of the AL2xxx series are very suitable for dynamic movements, which require high acceleration values over short distances.

Features
- accelerations up to 30 g
- no mechanical wear
- complete absence of backlash, giving stiff control response
- extremely precise positioning, high repeatability
- even, immediate force, little cogging
- very low thermal resistance, allowing high capacity utilisation
- protection from thermal overload through integrated temperature sensors
- Operation with the AX5000 simplified through default values.
- connection to the AX5000 through pre-assembled cables

AL20xx
- velocity: 2.5 m/s to 7 m/s
- peak forces: 225 N to 1800 N

AL24xx
- velocity: 4.5 m/s to 10 m/s
- peak forces: 120 N to 720 N

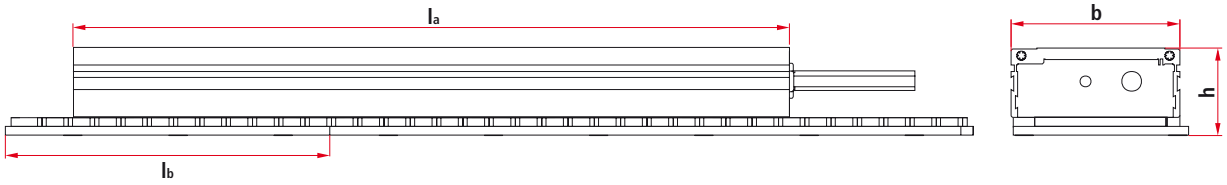
AL28xx
- velocity: 2.5 m/s or 6 m/s
- peak forces: 1800 N to 6750 N
- operation optionally with or without water cooling

AL2200 scaleless feedback system (MES) for Linear Servomotors
An MES system is available as an optional accessory for monitoring the magnetic field of the permanent magnets on the magnetic plate. With the aid of an integrated electronic unit, it provides incremental encoder signals for the Servo Drives of the AX5000 series for commutation, velocity and position control. The MES provides a sine wave per 24 mm pole pitch and a precision of 1/10 mm.

AL225x connector box
The AL225x connector boxes facilitate wiring between linear motor and servo drive. On one side, the motor, feedback and thermal protection cables are connected. The standard motor and encoder cables are connected on the other side of the boxes.

Options, pre-assembled cables and accessories see page 406

AL2000 | **Linear Servomotors**



Dimensions	b	l_a	h
AL2003	77 mm	98 mm	40 mm
AL2006	77 mm	146 mm	40 mm
AL2009	77 mm	195 mm	40 mm
AL2012	77 mm	244 mm	40 mm
AL2015	77 mm	290 mm	40 mm
AL2018	77 mm	336 mm	40 mm
AL2024	77 mm	468 mm	40 mm

Technical data	AL2003	AL2006	AL2009	AL2012	AL2015	AL2018	AL2024
Winding type	S	N | S	N | S	N | S	N | S	N | S	N | S
Max. speed	7 m/s	3.5 m/s (N), 7 m/s (S)	2.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)
Motor configuration	3-phase synchronous Linear Servomotors (400…480 V AC)						
Peak force (F_P)	225 N	450 N	675 N	900 N	1125 N	1350 N	1800 N
Peak current (I_{Pa})	6.5 A	6.5 A (N), 13.0 A (S)	6.5 A (N), 19.6 A (S)	13.1 A (N), 26.2 A (S)	13.5 A (N), 32.7 A (S)	19.6 A (N), 41 A (S)	26.2 A (N), 52 A (S)
Continuous force with air cooling (F_{ca})	75 N	200 N	300 N	400 N	500 N	600 N	800 N
Continuous current with air cooling (I_{ca})	2.28 A	2.15 A (N), 4.3 A (S)	2.14 A (N), 6.45 A (S)	4.3 A (N), 8.6 A (S)	4.46 A (N), 10.75 A (S)	6.45 A (N), 13.38 A (S)	8.6 A (N), 17.2 A (S)
Force constant (K_f)	46 N/A	93 N/A (N), 46 N/A (S)	140 N/A (N), 46 N/A (S)	93 N/A (N), 46 N/A (S)	112 N/A (N), 46 N/A (S)	93 N/A (N), 44.9 N/A (S)	93 N/A (N), 46 N/A (S)
Motor constant (K_m)	185 N²/W	380 N²/W	570 N²/W	760 N²/W	950 N²/W	1140 N²/W	1520 N²/W
Magnet pitch	24 mm						
Magnetic attraction force (F_a)	500 N	950 N	1325 N	1700 N	2075 N	2450 N	3400 N
Weight of the coil (M_P)	0.9 kg	1.5 kg	2.0 kg	2.6 kg	3.2 kg	3.8 kg	5.2 kg
Air gap	0.5 mm						
Temperature sensor	PTC 1 kΩ and KTY83-122						
Corresponding Servo Drive	AX5x03	AX5x03 (N), AX5x06 (S)	AX5x03 (N), AX5112 (S)	AX5x06 (N), AX5112 (S)	AX5x06 (N), AX5112 (S)	AX5112 (N), AX5118 (S)	AX5112 (N), AX5118 (S)

Ordering information	AL20xx-000x-000y coil unit
AL2003-0001-000y	Linear Servomotor, 400…480 V, F_p = 225 N, F_{ca} = 75 N
AL2006-000x-000y	Linear Servomotor, 400…480 V, F_p = 450 N, F_{ca} = 200 N
AL2009-000x-000y	Linear Servomotor, 400…480 V, F_p = 675 N, F_{ca} = 300 N
AL2012-000x-000y	Linear Servomotor, 400…480 V, F_p = 900 N, F_{ca} = 400 N
AL2015-000x-000y	Linear Servomotor, 400…480 V, F_p = 1125 N, F_{ca} = 500 N
AL2018-000x-000y	Linear Servomotor, 400…480 V, F_p = 1350 N, F_{ca} = 600 N
AL2024-000x-000y	Linear Servomotor, 400…480 V, F_p = 1800 N, F_{ca} = 800 N

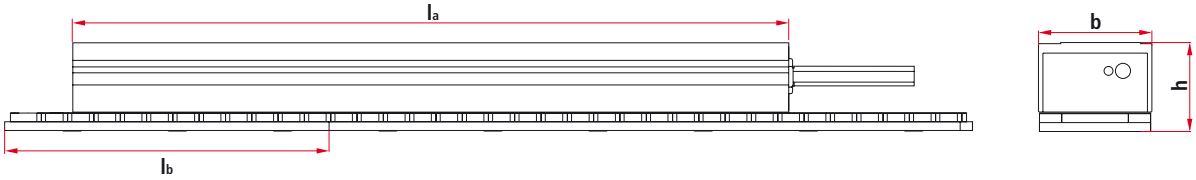
Option x = 0: N type, x = 1: S type

Option y = 0: without connector plug, y = 1: with connector plugs (motor and temperature)

Ordering information	AL21xx-0000 magnet plate
AL2110-0000	magnetic assembly (l_b = 192 mm, weight 3.8 kg/m), for AL20xx motors
AL2120-0000	magnetic assembly (l_b = 288 mm, weight 3.8 kg/m), for AL20xx motors

▶ **www.beckhoff.com/AL20xx**

AL2400 | **Linear Servomotors**



Dimensions	b	l_a	h
AL2403	51 mm	93 mm	40 mm
AL2406	51 mm	143 mm	40 mm
AL2412	51 mm	241 mm	40 mm
AL2418	51 mm	336 mm	40 mm

Technical data	AL2403	AL2406	AL2412	AL2418
Winding type	S	S	S	N | S
Max. speed	12 m/s	12 m/s	12 m/s	4.5 m/s (N), 10 m/s (S)
Motor configuration	3-phase synchronous Linear Servomotors (400…480 V AC)			
Peak force (F_P)	120 N	240 N	480 N	720 N
Peak current (I_{Pa})	4.1 A	8.2 A	16.4 A	12.3 A (N), 25.1 A (S)
Continuous force with air cooling (F_{ca})	60 N	120 N	240 N	360 N
Continuous current with air cooling (I_{ca})	1.54 A	3.08 A	6.15 A	4.50 A (N), 9.30 A (S)
Force constant (K_f)	39 N/A	39 N/A	39 N/A	79 N/A (N), 39 N/A (S)
Motor constant (K_m)	95 N²/W	190 N²/W	380 N²/W	570 N²/W
Magnet pitch	24 mm			
Magnetic attraction force (F_a)	300 N	500 N	900 N	1300 N
Weight of the coil (M_p)	0.6 kg	0.9 kg	1.6 kg	2.3 kg
Air gap	0.5 mm			
Temperature sensor	PTC 1 kΩ and KTY83-122			
Corresponding Servo Drive	AX5x03	AX5x03/AX5x06	AX5x06/AX5112	AX5x06/AX5112

Ordering information	AL240x-000x-000y coil unit
AL2403-0001-000y	Linear Servomotor, 400…480 V, F_p = 120 N, F_{ca} = 60 N
AL2406-0001-000y	Linear Servomotor, 400…480 V, F_p = 240 N, F_{ca} = 120 N
AL2412-0001-000y	Linear Servomotor, 400…480 V, F_p = 480 N, F_{ca} = 240 N
AL2418-0000-000y	Linear Servomotor, 400…480 V, F_p = 720 N, F_{ca} = 360 N, I_{Pa} = 12.3 A
AL2418-0001-000y	Linear Servomotor, 400…480 V, F_p = 720 N, F_{ca} = 360 N, I_{Pa} = 25.1 A

Option y = 0: without connector plug, y = 1: with connector plugs (motor and temperature)

Ordering information	AL25xx-0000 magnet plate
AL2510-0000	magnetic assembly (l_b = 96 mm, weight 2.1 kg/m), for AL24xx motors
AL2520-0000	magnetic assembly (l_b = 144 mm, weight 2.1 kg/m), for AL24xx motors
AL2530-0000	magnetic assembly (l_b = 384 mm, weight 2.1 kg/m), for AL24xx motors

▶ **www.beckhoff.com/AL24xx**

AL2800 | **Linear Servomotors**

Dimensions	b	l_a	h
AL2812	130 mm	244 mm	45 mm
AL2815	130 mm	290 mm	45 mm
AL2818	130 mm	344 mm	47 mm
AL2830	130 mm	562 mm	45 mm
AL2830-100x-0000	130 mm	580 mm	47 mm
AL2845	130 mm	852 mm	47 mm

Technical data	AL2812	AL2815	AL2818	AL2830	AL2845
Winding type	N | S	N | S	N | S	N | S	N | S
Max. speed	3 m/s (N), 6 m/s (S)	2.5 m/s (N), 6 m/s (S)	3 m/s (N), 6 m/s (S)	2.5 m/s (N), 6 m/s (S)	2.5 m/s (N), 6 m/s (S)
Motor configuration	3-phase synchronous Linear Servomotors (400…480 V AC)				
Peak force (F_P)	1800 N	2250 N	2700 N	4500 N	6750 N
Peak current (I_{Pa})	13 A (N), 26 A (S)	13.5 A (N), 33 A (S)	19.6 A (N), 41 A (S)	27 A (N), 66 A (S)	41 A (N), 98 A (S)
Continuous force with water cooling (F_{cw})	–	–	1200 N	2000 N	3000 N
Continuous force with air cooling (F_{ca})	760 N	950 N	1140 N	1900 N	2850 N
Continuous current with water cooling (I_{cw})	–	–	6.5 A (N), 13.4 A (S)	8.9 A (N), 21.5 A (S)	13.4 A (N), 32.3 A (S)
Continuous current with air cooling (I_{ca})	4.1 A (N), 8.2 A (S)	4.2 A (N), 10.2 A (S)	6.1 A (N), 12.7 A (S)	8.5 A (N), 20 A (S)	12.5 A (N), 31 A (S)
Force constant (K_f)	186 N/A (N), 93 N/A (S)	225 N/A (N), 93 N/A (S)	186 N/A (N), 90 N/A (S)	225 N/A (N), 93 N/A (S)	225 N/A (N), 93 N/A (S)
Motor constant (K_m)	1750 N²/W	2150 N²/W	2580 N²/W	4300 N²/W	6450 N²/W
Magnet pitch	24 mm				
Magnetic attraction force (F_a)	3400 N	4150 N	4900 N	8300 N	12450 N
Weight of the coil (M_p)	4.9 kg	5.9 kg	7.3 kg	11.6 kg, (12.3 kg*)	18.2 kg
Air gap	0.5 mm				
Temperature sensor	PTC 1 kΩ and KTY83-122				
Corresponding Servo Drive	AX5x06 (N), AX5112 (S)	AX5x06 (N), AX5118 (S)	AX5112 (N), AX5118 (S)	AX5112 (N), AX5125 (S)	AX5118 (N), AX5140 (S)

* increased weight with water-cooled primary section

Ordering information	AL28xx-000x-000y coil unit
AL2812-000x-000y	Linear Servomotor, 400…480 V, F_p = 1800 N, F_{ca} = 760 N
AL2815-000x-000y	Linear Servomotor, 400…480 V, F_p = 2250 N, F_{ca} = 950 N
AL2818-100x-000y	Linear Servomotor, 400…480 V, F_p = 2700 N, F_{cw} = 1200 N, water cooling
AL2830-000x-0000	Linear Servomotor, 400…480 V, F_p = 4500 N, F_{ca} = 1900 N
AL2830-100x-0000	Linear Servomotor, 400…480 V, F_p = 4500 N, F_{cw} = 2000 N, water cooling
AL2845-100x-0000	Linear Servomotor, 400…480 V, F_p = 6750 N, F_{cw} = 3000 N, water cooling

Option x = 0: N type, x = 1: S type, option y = 0: without connector plug, y = 1: with connector plugs (only possible with AL2812, AL2815 and AL2818!)

Ordering information	AL29xx-0000 magnet plate
AL2910-0000	magnetic assembly (l_b = 192 mm, weight 10.5 kg/m), for AL28xx motors
AL2920-0000	magnetic assembly (l_b = 288 mm, weight 10.5 kg/m), for AL28xx motors

▶ **www.beckhoff.com/AL28xx**

Accessories for ALxxxx Linear Motors

MES feedback system for Linear Servomotors

The MES supplies one sine oscillation per logical motor revolution. Since no graduated rule has to be installed, the MES is an inexpensive feedback solution for linear motors.

Ordering information	AL2200-000x | Feedback system	Pict.
AL2200-000x	magnetic encoder system (MES) for AL2000, AL2400 and AL2800 Linear Servomotors	A

Option x = 0: without connector plug, x = 1: with connector plug

Connector box for ALxxxx

The AL225x connector boxes facilitate wiring between linear motor and the Servo Drive. They are mounted on the linear slide and move with the motor. The motor cable, the thermal protection contact cable and the encoder cable are inserted into the box through cable glands and connected to the terminal strip. The temperature contact is linked to the motor and encoder cable, so that no thermal protection contact cable is required. The standard motor and encoder cables are connected on the other side of the boxes.

Ordering information	AL225x-0001 | Connector box	Pict.
AL2250-0001	connector box for linear motors, suitable for following types: AL20xx-000x-0000, AL24xx-000x-0000, AL2812-000x-0000, AL2815-000x-0000, AL2818-100x-0000, AL2830-0001-0000, AL2830-x000-0000	B
AL2255-0001	connector box for linear motors, suitable for following types: AL2830-1001-0000, AL2845-1000-0000	
AL2256-0001	connector box for linear motors, suitable for following types: AL2845-1001-0000	

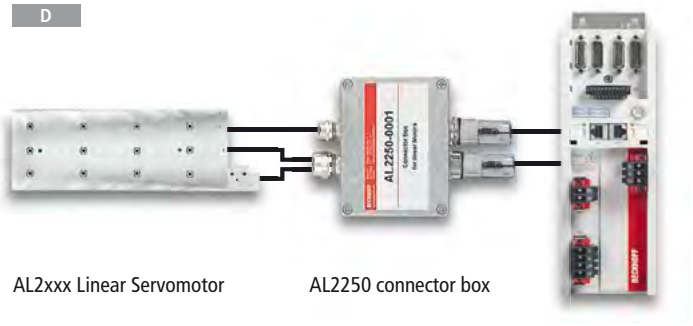
Installation options Linear Servomotors/connector box

Cable	AX5000	C	AX5000 + AL225x	D
Motor cable	ZK4500-0023/ZK4500-0024			
Thermal protection contact cable	ZK4540-0020		–	
Encoder cable for MES or absolute encoder	ZK4510-0020			
Encoder cable for encoder with zero pulse	ZK4520-0020			
Coil and feedback system	with connector plugs		without connector plugs	

C

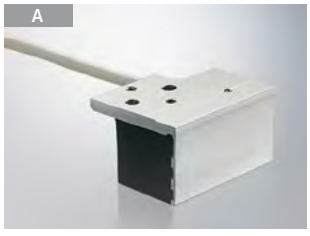
AL2xxx Linear Servomotor

D



AL2xxx Linear Servomotor AL2250 connector box

A



B

Supply cables for ALxxxx Linear Motors

Motor cable 1.5 mm² for ALxxxx at AX5000 (1.5…12 A)

Ordering information	Motor cable with 1.5 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4500-0023-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 87 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, length < 25 m, (4 x 1.5 mm² + 2 x (2 x 0.75 mm²))	A
ZK4500-0023-0050	example for 5 m length	
ZK4502-0023-xxxx	length ≥ 25 m	
ZK4509-0023-zzzz	not assembled	
ZK4501-0023-xxxx	extension cable	B

zzzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0023-0100 = 10 metres

Motor cable 2.5 mm² for ALxxxx at AX5000 (18…25 A)

Ordering information	Motor cable with 2.5 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4500-0024-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 95 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, length < 25 m, (4 x 2.5 mm² + 2 x (2 x 1 mm²))	A
ZK4500-0024-0050	example for 5 m length	
ZK4502-0024-xxxx	length ≥ 25 m	
ZK4509-0024-zzzz	not assembled	
ZK4501-0024-xxxx	extension cable	B

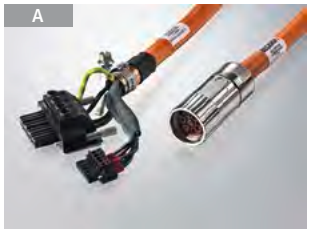
zzzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0024-0100 = 10 metres

Motor cable 10 mm² for ALxxxx at AX5000 (40 A)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4500-0017-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 180 m/min, max. 5 m/s², min. bending radius = 225 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1 mm²) + (2 x 1.5 mm²)), from 25 m motor choke required	A
ZK4500-0017-0050	example for 5 m length	
ZK4509-0017-zzzz	not assembled	
ZK4501-0017-xxxx	extension cable	B

zzzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0017-0100 = 10 metres

A



B

Encoder cable (MES) for ALxxxx and AL2250 at AX5000

Ordering information	Encoder cable with 0.14 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4510-0020-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 53 mm (7 x OD), max. drag-chain length horizontal = 20 m, vertical = 5 m, (7 x 2 x 0.14 mm² + 2 x 0.5 mm²)	C
ZK4510-0020-0050	example for 5 m length	
ZK4519-0020-zzzz	not assembled	
ZK4511-0020-xxxx	extension cable, highly flexible, drag-chain suitable	D

zzzz = ordering indication of the length of material in decimetres, e.g. ZK4519-0020-0100 = 10 metres

Encoder cable (SinCos encoder with zero pulse) for ALxxxx and AL2250 at AX5000

Ordering information	Encoder cable with 0.14 mm² wire gauge, highly flexible for drag-chain use
ZK4520-0020-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 53 mm (7 x OD), max. drag-chain length horizontal = 20 m, vertical = 5 m, (7 x 2 x 0.14 mm² + 2 x 0.5 mm²)

Thermal protection cable for ALxxxx at AX5000

Ordering information	Thermal protection cable with 0.14 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4540-0020-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 38 mm (7 x OD), max. drag-chain length horizontal = 20 m, vertical = 5 m, (2 x 2 x 0.14 mm²)	E

Note: Required if no connector box is used.

C

D

E

Connectors for AMxxxx and ALxxxx

Ordering information		Pict.
ZS4000-2030	EMC thermo-protective plug (female), D-sub, 9-pin, for AL2000, AL2400, AL2800 linear motors (counterpart to thermostat contact at AX5000 Servo Drive)	A
ZS4000-2040	EMC power coupling (male), M23, 8-pin, for motor cable extension ZK4501-00x3-xxxx and ZK4501-00x4-xxx (counterpart to motor cable ZK4500-00x3-xxxx and ZK4500-00x4-xxxx)	B
ZS4000-2100	metal flange for motor cable, itec®, M23 and feedback cable with itec®, to adjust the connector, including sealings	
ZS4000-2101	metal flange for feedback cable, M23, to adjust the connector, including sealings	C
ZS4000-2102	EMC power connector (female), itec®, 9-pin, for motor cable ZK4704-0411-xxxx for resolver feedback (counterpart to motor socket AM8100)	
ZS4000-2104	EMC power connector (female), M23, 9-pin, for motor cable ZK450x-80x3-xxxx and ZK450x-80x4-xxxx (counterpart to motor socket AM8000/AM8500)	
ZS4000-2105	EMC resolver connector (female), itec®, 12-pin, for resolver cable ZK453x-8110-xxxx (counterpart to motor socket AM801x, AM802x, AM803x, AM853x)	
ZS4000-2106	EMC resolver connector (female), M23, 12-pin, for resolver cable ZK453x-8010-xxxx (counterpart for motor socket AM8x4x up to AM8x7x)	
ZS4000-2107	EMC power connector (female), iTec, 9-pin, for motor cable ZK450x-8022-xxxx and ZK4704-0421-xxxx (counterpart for motor socket AM80xx/AM81xx/AM85xx with iTec)	
ZS4000-2108	EMC power coupling (male), M23, 9-pin, for AM8800 servomotor with cable tail (counterpart to motor cable ZK450x-80x3-xxxx and ZK450x-80x4-xxxx)	

A

B

C

Compact Drive Technology

▶ **www.beckhoff.com/compact-drive-technology**

Ultra-compact servo output stages
- seamless integration into the EtherCAT I/O system
- for highly dynamic positioning tasks
- EtherCAT Terminal (EL), EtherCAT Box (EP) and EtherCAT plug-in module (EJ)
- complete servo drive with STO input (Safe Torque Off)
- 2 feedback options: OCT, resolver
- adapted to AM8100

See page 314

AM8100 | **Compact Synchronous Servomotors with OCT**
- 0.2 to 2.4 Nm standstill torque
- integrated 18-bit absolute encoder (multi-turn or single-turn)
- dynamic servomotor from flange code 40 mm (F1)
- electronic type plate
- further ordering options for optimised axis matching
- suitable connecting cables for plug-and-play installation

See page 414

AA1121 | **Linear actuator up to 800 N peak force**
- integrated power electronics
- protective low voltage range
- absolute stroke measuring system (0.01 mm)

See page 412

Ultra-compact stepper motor output stages
- seamless integration into the I/O system
- EtherCAT Terminal (EL), Bus Terminal (KL), EtherCAT/EtherCAT P Box (EP/EPP) and EtherCAT plug-in module (EJ)
- 1 to 5 A output current
- vector control for highly dynamic positioning tasks (EL7037/EL7047/EJ7047)
- assembled connecting cables

See page 314

AG2250 | **Planetary gear units for servo and stepper motors**
- straight or angled design
- low torsional backlash
- suitable for AM8100, AS2000, AS1000

See page 418

AS2000 | **Stepper motors in industrial design up to 8 Nm**
- stepper motor with 1.8°/200 full steps
- flanges: NEMA23, NEMA34
- 0.8 to 8.0 Nm standstill torque
- industrial design and high protection class (IP 54)
- optionally with torsionally rigid integrated encoder (1024 inc/rev) for vector control

See page 420

AS1000 | **Stepper motors up to 5 Nm**
- stepper motor with 1.8°/200 full steps
- flanges: NEMA17, NEMA23, NEMA34
- 0.4 to 5.0 Nm standstill torque
- ready for connection, with cable outlet
- optionally with encoder

See page 424

AA1121 | Linear actuator with integrated power electronics

The linear actuator sets new standards for the electronic control of valves and linear adjusting units. With a lifting height of 10 mm and a peak force of 800 N, new standards are achieved with regard to the power density of linear actuators. The complete adjusting axis is defined with a size of only 49 x 49 x 92 mm (flange square x overall length).

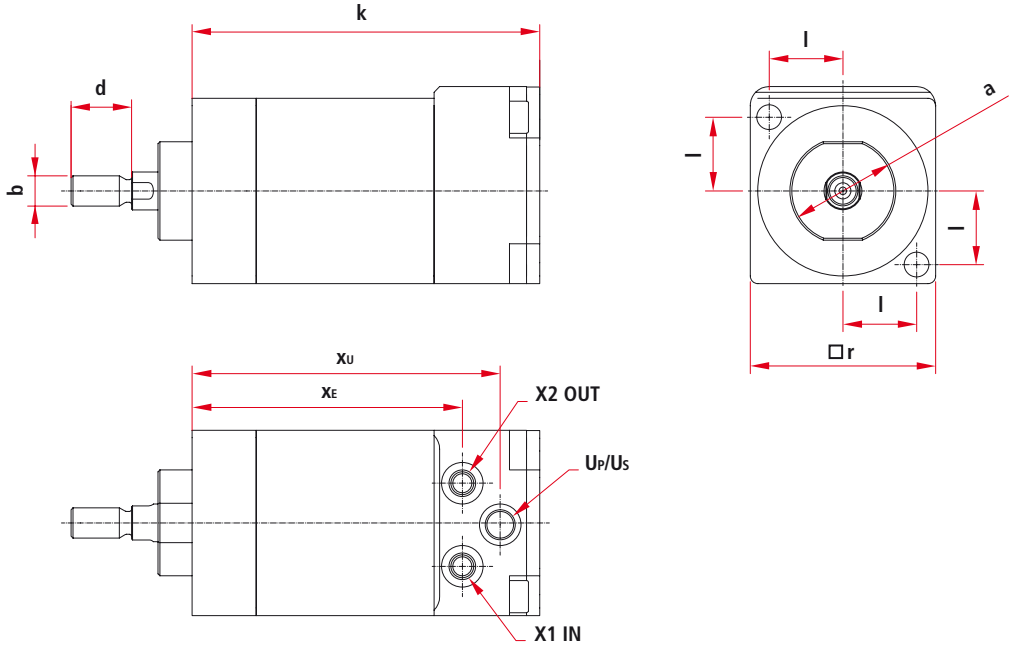
The linear actuator is equipped with integrated power electronics that is controlled simply and extremely fast via EtherCAT. For easy commissioning the well-known Drive Manager can be used. A continuous force of 150 N can be generated with the actuator. Accelerations of 7 m/s² and linear speeds of 100 mm/s allow exceptionally short control cycles. Mounting via a B5 flange is possible without special tools in the tightest of spaces. The shaft is provided as standard with an M8x1 external thread, on which commercially available adaptors such as ball heads or tensioning hooks common in pneumatic/hydraulic applications can be mounted. For connection in the protective low voltage range < 48 V DC a robust M12 plug can be used. The fieldbus connections for EtherCAT IN/OUT are realised with M8 plugs.

An absolute stroke measuring system is integrated, allowing an accuracy of 0.01 mm to be achieved so that previously necessary limit switches are not required. In comparison with conventional pneumatics, the linear actuator achieves a much higher positioning accuracy, resulting in higher process safety. This holds above all for distributed systems. Depending on the application, the use of an electronic actuator can save up to 75 % energy in comparison with pneumatic actuators, so that the linear actuator enables a rapid return on investment. Beckhoff supplies the necessary preassembled cables and the software to go with the actuators.

Technical data	AA1121
Motor type	axis actuator
Flange code	A2 (49 mm)
Rated supply voltage	24…48 V DC
Magnet material	neodymium-iron-boron
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54
Connection method	M12, screw type
Protocol	EtherCAT
Bus interface	2 x M8 socket, shielded, screw type
Feedback system	absolute encoder
Resolution	0.01 mm

AA1121 | **Flange code A2, motor length 1**

Data for 24…50 V DC	AA1121
Continuous stall force	200 N
Rated force	150 N
Peak force (F_P)	800 N
Standstill current	I_{rms} = 2.5 A
Peak current	I_{rms} = 10.0 A
Max. movement	10 mm
Max. acceleration	7 m/s²
Weight	840 g



Dimensions	a	b	d	x_E	x_U	l	r	k
AA1121	ø28	M8	16 mm	71.5 mm	81.5 mm	19.5 mm	49 mm	92 mm

▶ **www.beckhoff.com/AA1121**

Supply cables for linear actuator

Ordering information	Cable specification
ZK1090-3131-0xxx	M8, plug, straight, male, 4-pin, A-coded – M8, plug, straight, male, 4-pin, A-coded
ZK1090-3191-0xxx	M8, plug, straight, male, 4-pin, A-coded – RJ45, plug, straight, male, 8-pin
ZK2000-6100-0xxx	M12, plug, straight, male, 4-pin, A-coded – open end

For availability status see Beckhoff website at: www.beckhoff.com/AA1121

AM8100 | Servomotors for compact Drive Technology

The AM8100 servomotors from the AM8000 series are especially designed for operation with the Servo I/Os. The high dynamics of the servomotors open up a multitude of possible applications: for example in industrial robots for pick-and-place applications, or in general in mechanical engineering, where a compact design and high positioning accuracy are necessary. Like all motors of the AM8xxx family they are available in One Cable Technology (OCT) versions where power and feedback are combined in a single cable.

Homing is no longer necessary thanks to the absolute value encoder integrated in the motor: the position of the drive is saved in the EEPROM, which is ideal for adjustable axes. The encoder data are transmitted entirely digitally to the Servo I/Os via the motor cable. The encoder cable can be dispensed with. The full integration of the servo terminal in the Beckhoff control system facilitates the commissioning of the drive axis. All motors of the AM8xxx family use the electronic type plate, with which the engineering expenditure is additionally reduced by the simple reading of the motor parameters. The Beckhoff TwinCAT automation software enables the convenient parameterisation of the servomotors.

The AM81xx motors can optionally be equipped with a backlash-free permanent magnet holding brake, a sealing ring or a feather key groove. They are equipped with a sturdy rotary resolver encoder and for the purpose of long life have been developed with generously dimensioned bearings for general mechanical engineering. Matching gears and prefabricated connecting cables complete the ultra-compact drive axis.

Technical data	AM81xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal only for AM812x, AM813x, AM814x)
Cooling	convection, permissible ambient temperature 40 °C
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL (AM811x: UL in preparation)
Feedback system	resolver, OCT

Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted. All specified electrical values are RMS values. The specifications for the connection technology (size of the connector) apply to motors with OCT. For motors with standard 2-cable configuration, the size of the power and feedback connector is determined by the ytec® technology.

Order reference	AM81uv-wxyz	Pict.
u	flange code	
v	motor length	
w = 0	smooth shaft	
w = 1	shaft with groove and feather key according to DIN 6885	
w = 2	smooth shaft with IP 65 sealing ring (only for AM812x, AM813x, AM814x)	
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key (only for AM812x, AM813x, AM814x)	
x	winding code	
y = 0	2-cable standard: feedback resolver	A
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution	
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution	
z = 0	without holding brake	
z = 1	with holding brake	

A

Ultra-compact servo solutions with resolver feedback

AM811x | Flange code F1, motor length 1 – 3

Data for 50 V DC	AM8111-wFyz	AM8112-wFyz	AM8113-wFyz
Standstill torque	0.20 Nm	0.38 Nm	0.52 Nm
Rated torque	0.19 Nm	0.36 Nm	0.50 Nm
Rated speed	4000 min^{-1}	4500 min^{-1}	3000 min^{-1}
Rated power	0.08 kW	0.17 kW	0.16 kW
Standstill current	2.85 A	4.7 A	4.8 A
Rotor moment of inertia	0.029 $kgcm^2$	0.048 $kgcm^2$	0.067 $kgcm^2$
Rotor moment of inertia (with brake)	0.052 $kgcm^2$	0.071 $kgcm^2$	0.090 $kgcm^2$
EtherCAT Terminal	EL7201-0010	EL7211-0010	EL7211-0010
EtherCAT plug-in module	EJ7211-0010		
EtherCAT Box	EP7211-9034		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM812x | Flange code F2, motor length 1 – 2

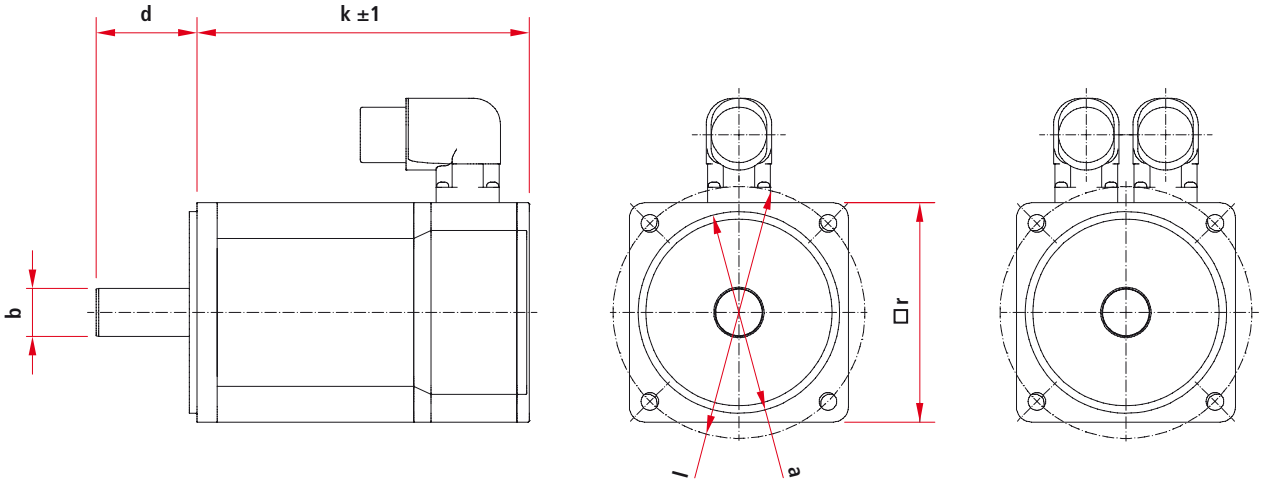
Data for 50 V DC	AM8121-wFyz	AM8122-wFyz	AM8122-wJyz
Standstill torque	0.50 Nm	0.80 Nm	0.80 Nm
Rated torque	0.50 Nm	0.80 Nm	0.75 Nm
Rated speed	3000 min^{-1}	2000 min^{-1}	4500 min^{-1}
Rated power	0.16 kW	0.17 KW	0.35 KW
Standstill current	4.0 A	4.0 A	8.0 A
Rotor moment of inertia	0.134 $kgcm^2$	0.253 $kgcm^2$	0.253 $kgcm^2$
Rotor moment of inertia (with brake)	0.204 $kgcm^2$	0.324 $kgcm^2$	0.324 $kgcm^2$
EtherCAT Terminal	EL7211-0010	EL7211-0010	EL7221-9014
EtherCAT plug-in module	EJ7211-0010	EJ7211-0010	–
EtherCAT Box	EP7211-9034		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM813x | Flange code F3, motor length 1 – 2

Data for 24…50 V DC	AM8131-wFyz	AM8131-wJyz	AM8132-wJyz
Standstill torque	1.35 Nm	1.35 Nm	2.37 Nm
Rated torque	1.35 Nm	1.34 Nm	2.35 Nm
Rated speed	1000 min^{-1}	1800 min^{-1}	1000 min^{-1}
Rated power	0.14 KW	0.25 kW	0.25 kW
Standstill current	5.0 A	8.0 A	8.0 A
Rotor moment of inertia	0.462 $kgcm^2$	0.462 $kgcm^2$	0.842 $kgcm^2$
Rotor moment of inertia (with brake)	0.541 $kgcm^2$	0.541 $kgcm^2$	0.921 $kgcm^2$
EtherCAT Terminal	EL7211-0010	EL7221-9014	EL7221-9014
EtherCAT plug-in module	EJ7211-0010	–	–
EtherCAT Box	EP7211-9034		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM814x | Flange code F4, motor length 1

Data for 24…50 V DC	AM8141-wJyz
Standstill torque	2.40 Nm
Rated torque	2.40 Nm
Rated speed	1000 min^{-1}
Rated power	0.25 kW
Standstill current	8.0 A
Rotor moment of inertia	1.08 $kgcm^2$
Rotor moment of inertia (with brake)	1.73 $kgcm^2$
EtherCAT Terminal	EL7221-9014
EtherCAT plug-in module	–
EtherCAT Box	EP7211-9034
Connection technology	itec® plug
One Cable Technology (OCT)	yes



Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8111	30 h7	8 h7	25 mm	46 mm	40 mm	97 mm	129 mm
AM8112	30 h7	8 h7	25 mm	46 mm	40 mm	117 mm	149 mm
AM8113	30 h7	8 h7	25 mm	46 mm	40 mm	137 mm	169 mm
AM8121	40 j6	9 k6	20 mm	63 mm	58 mm	111.5 mm	146 mm
AM8122	40 j6	9 k6	20 mm	63 mm	58 mm	133.5 mm	168 mm
AM8131	60 j6	14 k6	30 mm	75 mm	72 mm	129 mm	168 mm
AM8132	60 j6	14 k6	30 mm	75 mm	72 mm	154 mm	194 mm
AM8141	80 j6	19 k6	40 mm	100 mm	87 mm	132 mm	179.5 mm

▶ **www.beckhoff.com/AM81xx**

Accessories for AM8100 servomotors

Supply cables for servomotor terminals with OCT (and STO)

Ordering information	Suitable for EL72xx-0010, EL72xx-9014	Pict.
ZK4704-0421-2xxx	motor cable for OCT feedback, drag-chain suitable, (4 x 0.75 mm² + (2 x 0.34 mm²) + (2 x AWG22)), shielded [1]	A
ZK4704-0421-2050	example for 5 m length	
ZK4701-0421-2xxx	extension cable	

[1] Available in metres up to 20 m (2xxx = length in decimetres, e.g. -2010 = 1 m)

Supply cables for servomotor terminals with resolver

Ordering information	Suitable for EL72xx-0000	Pict.
ZK4704-0411-2xxx	motor cable for resolver feedback, drag-chain suitable, (4 x 0.75 mm² + (2 x 0.5 mm²)), shielded [1]	
ZK4724-0410-2xxx	resolver cable, drag-chain suitable, (3 x 2 x 0.25 mm²), shielded [1]	B

[1] Available in lengths of 1 m, 3 m, 5 m, 10 m and 20 m (2xxx = length in decimetres, e.g. -2010 = 1 m)

Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

A

B

AG2250 | Planetary gear units for compact Drive Technology

The AG2250 planetary gears are especially matched to the AM8100 motor series and have been expanded by a 2-stage version. For better design, planetary and angled planetary gears are available with the following transmission ratios: 12, 16, 20, 25, 32, 40 and 64.

The AG2250 series completes the range of small, affordable drive technology products. The gears are especially suited to applications where no particularly low torsional backlash is required. The inertia ratios, the required torques and the suitable motors can be conveniently calculated directly in TwinCAT with the TC Motion Designer. In addition, the tool checks in a single step whether the selected motor can be adapted to the gear unit. The planetary gear units are fitted to the respective motor in the factory and delivered as a complete motor/gear unit. The AG2250 series also contains angled planetary gears for space-saving installation of motors at a right-angle.

Features

- low torsional backlash
- high output torques
- high efficiency
- 1-stage planetary gear, transmission ratios 3, 4, 5, 7, 8, 10
- 2-stage planetary gear/ angled planetary gear, transmission ratios 12, 15, 16, 20, 25, 32, 40, 64
- 1-stage angled planetary gear, transmission ratios 3, 4, 5, 7, 8, 10
- 2-stage angled planetary gear, transmission ratios 12, 15, 16, 20, 25, 32, 40, 64
- flexible installation position
- lifetime lubrication
- suitable for motors of the AM8100 (48 V DC) and AS2000 (48 V DC) series

Technical data	AG2250
Type of gear	planetary gear/angled planetary gear
Life span	> 30,000 h/> 20,000 h
Lubrication	lubricated for life
Installation position	variable
Protection class	IP 54
Mechanically compatible with	flange code F, N (typical combination according to specifications)

Ordering options

You will find the possible ordering options for the gear units listed in this table. Please note: The options cannot be retrofitted.

Order reference	AG2250-+PLEaa-M0s-i-wXy-Motorsize
xPLEaa	series/size (PLE40, PLE60, PLE80, WPLE40, WPLE60, WPLE80)
s = 1	1-stage with i = 3/4/5/7/8/10
s = 2	2-stage with i = 12/16/20/25/32/40/64
i	gear ratio
w = 0	smooth shaft
w = 1	shaft with groove and feather key
X	identifying letter for clamping hub diameter; not available for selection, is selected automatically based on the respective motor
Motorsize	Specification of the size according to flange-compatible motors. The planetary gears are delivered as a unit with the assembled motor.
Motorsize = AM811x (F1)	flange code F1: AM801x, AM811x; compatible with AM301x, AM311x
Motorsize = AM812x (F2)	flange code F2: AM802x, AM812x; compatible with AM302x
Motorsize = AM312x	in combination with AM312x
Motorsize = AM813x (F3)	flange code F3: AM813x, AM803x, AM853x; compatible with AM303x
Motorsize = AM814x (F4)	flange code F4: AM814x, AM804x, AM854x; compatible with AM304x
Motorsize = AS202x (N2)	flange code N2 (NEMA23): AS202x
Motorsize = AS204x (N3)	flange code N3 (NEMA34): AS204x

AG2250 | **Size 40**

Technical data	AG2250-+PLE40-M01-i	AG2250-+PLE40-M02-i	AG2250-+WPLE40-M01-i	AG2250-+WPLE40-M02-i
Variant	planetary gear	planetary gear	angled planetary gear	angled planetary gear
Gear ratio	3/4/5/7/8/10	12/15/16/20/25/32/40/64	3/4/5/7/8/10	12/15/16/20/25/32/40/64
Nominal output torque	5…15 Nm	7.5…20 Nm	4.5…8.5 Nm	7.5…20 Nm
Max. acceleration torque	8…24 Nm	12…32 Nm	7…13.5 Nm	12…32 Nm
Max. torsion. backlash standard/reduced	≤ 15/– arcmin	≤ 19/– arcmin	≤ 21/– arcmin	≤ 25/– arcmin
Typ. flange code	F1	F1	F1	F1

AG2250 | **Size 60**

Technical data	AG2250-+PLE60-M01-i	AG2250-+PLE60-M02-i	AG2250-+WPLE60-M01-i	AG2250-+WPLE60-M02-i
Variant	planetary gear	planetary gear	angled planetary gear	angled planetary gear
Gear ratio	3/4/5/7/8/10	12/15/16/20/25/32/40/64	3/4/5/7/8/10	12/15/16/20/25/32/40/64
Nominal output torque	15…40 Nm	18…44 Nm	14…25 Nm	18…44 Nm
Max. acceleration torque	24…64 Nm	29…70 Nm	24…40 Nm	29…70 Nm
Max. torsion. backlash standard/reduced	≤ 10/– arcmin	≤ 12/– arcmin	≤ 16/– arcmin	≤ 18/– arcmin
Typ. flange code	F2, F3, AM312x, N2	F2, F3, AM312x	F2, F3, AM312x, N2	F2, F3, AM312x

AG2250 | **Size 80**

Technical data	AG2250-+PLE80-M01-i-wXy-AS204x	AG2250-+WPLE80-M01-i-wXy-AS204x
Variant	planetary gear	angled planetary gear
Gear ratio	3/4/5/7/8/10	3/4/5/7/8/10
Nominal output torque	38…115 Nm	38…67 Nm
Max. acceleration torque	61…184 Nm	61…107 Nm
Max. torsion. backlash standard/reduced	≤ 7/– arcmin	≤ 13/– arcmin
Typ. flange code	N3	N3

▶ **www.beckhoff.com/AG2250**

AS2000 | **Stepper motors**

The new AS2000 two-phase stepper motors with a stepper angle of 1.8 degrees shrink the gap to the AM8000 high-performance servomotor. With their flange codes N2 (NEMA23) and N3 (NEMA34), the stepper motors comply with international standards. Users can select from seven models ranging from 0.8 to 8 Nm.

The AS2023 with 2.3 Nm is a logical addition in the medium performance range, because the AS2000 series of stepper motors delivers significantly improved scalability.

The new design of the AS2000 series is more in line with industrial requirements. And with the higher IP 54 protection class, the motors can also be used under harsh environmental conditions. It also features easy cabling thanks to the standardised, integrated M12 high-power screwtype connector for power and the robust M12 connector for the encoder. With its torsion-proof, integrated encoder (1024 inc/rev), the motor is ideal for the Beckhoff-supported vector control of stepper motors. A non-encoder version is available as well. The vector control system minimises resonances and reduces the generation of heat and noise for servo-like operating characteristics.

All motors in the AS2000 series were designed to be used with EtherCAT stepper motor terminals EL7037 (1.5 A) and EL7047 (5 A). Commissioning them in TwinCAT is easy. To simplify the axis layout, the AS2000 stepper motors are integrated into the TC3 Motion Designer for easy dimensioning.

The motors are optionally available with a smooth shaft (flange code N2 only) or with a groove and feather key (flange code N3 only). Shielded motor and encoder cables are also available. They were designed for the stepper motor terminals and come preconfigured for the terminal points. With the low-backlash planetary gear of the AG2250 series in straight or angled versions, a wide range of applications can be accommodated. A new elastic coupling connector for easy machine mounting completes the portfolio.

Technical data	AS20xx
Motor type	stepper motor
Rated supply voltage	24…50 V DC
Resolution	1.8°/200 full steps
Insulation class	thermal class B (130 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54
Cooling	convection
Coating/surface	matt black coating RAL 9005
Connection method	M12 round plug connector
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE

Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted.
All specified electrical values are RMS values.

Order reference	AS20uv-wxyz
u	flange code
v	motor length
w = 0	smooth shaft (only for AS202x)
w = 1	shaft with groove and feather key according to DIN 6885 (only for AS204x)
x	winding code
y = 0	no encoder
y = 1	encoder 24 V DC, 1024 increments
z = 0	without holding brake

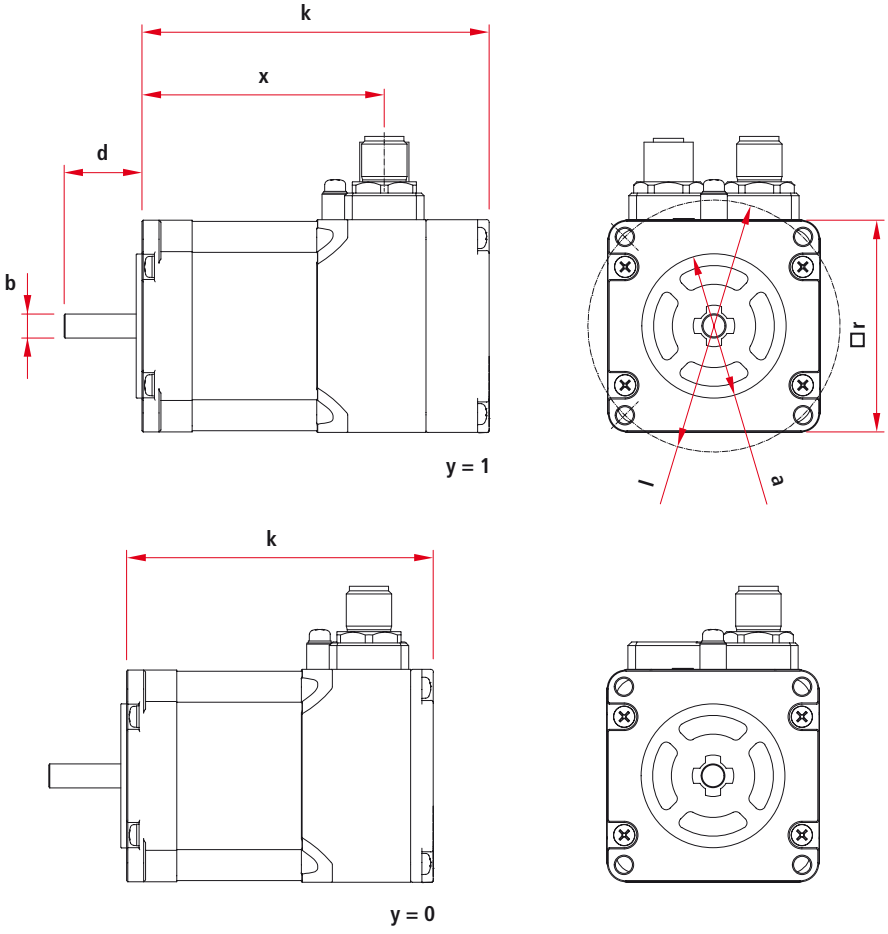
AS202x | Stepper motor 0.8…2.3 Nm (standstill torque), flange code N2

Data for 24…50 V DC	AS2021-0Dy0	AS2022-0Hy0	AS2023-0Hy0	i AS2023-0Jy0
Flange code	N2 (NEMA23/56 mm)			
Rated supply voltage	24…50 V DC			
Rated current (per phase)	2.00 A	5.60 A	5.60 A	6.40 A
Standstill torque	0.8 Nm	1.53 Nm	1.8 Nm	2.30 Nm
EtherCAT Terminal	EL7037/EL7031	EL7047	EL7047	EL7047
EtherCAT Box	EP7041-1002	EP7041-3002	EP7041-3002	EP7041-3002
EtherCAT plug-in module	EJ7047			
Bus Terminal	KL2531	KL2541	KL2541	KL2541
Gear unit	AG2250: PLE60, WPLE60			

AS204x | Stepper motor 3.3…8.0 Nm (standstill torque), flange code N3

Data for 24…50 V DC	AS2041-1Hy0	AS2042-1Hy0	AS2043-1Jy0
Flange code	N3 (NEMA34/86 mm)		
Rated supply voltage	24…50 V DC		
Rated current (per phase)	5.60 A	5.60 A	6.50 A
Standstill torque	3.3 Nm	6.4 Nm	8.0 Nm
EtherCAT Terminal	EL7047		
EtherCAT Box	EP7041-3002		
EtherCAT plug-in module	EJ7047		
Bus Terminal	KL2541		
Gear unit	AG2250: PLE80, WPLE80		

i For availability status see Beckhoff website at: www.beckhoff.com/AS2023



Dimensions	a	b	d	k	k (with encoder)	x	l	r
AS2021	38.1 mm	6.35 mm	20.6 mm	80 mm	93 mm	64.1 mm	47.14 mm	56 mm (NEMA23)
AS2022	38.1 mm	6.35 mm	20.6 mm	102 mm	115 mm	86.2 mm	47.14 mm	56 mm (NEMA23)
AS2023	38.1 mm	6.35 mm	20.6 mm	121 mm	134 mm	105.1 mm	47.14 mm	56 mm (NEMA23)
AS2041	73 mm	14 mm	30 mm	89.5 mm	100 mm	71.8 mm	69.6 mm	86 mm (NEMA34)
AS2042	73 mm	14 mm	30 mm	120 mm	130.5 mm	102.3 mm	69.6 mm	86 mm (NEMA34)
AS2043	73 mm	14 mm	30 mm	150 mm	161 mm	132.7 mm	69.6 mm	86 mm (NEMA34)

▶ **www.beckhoff.com/AS2000**

Accessories for AS2000 stepper motors

Pre-assembled cables for IP 20

Ordering information	Motor and encoder cables for IP 20 I/Os	Pict.
ZK4000-7700-xxxx	AS2000 motor cable, drag-chain suitable, (4 x 0.75 mm²), shielded, for EL703x/EL704x/KL253x/KL254x	A
ZK4000-5100-2xxx	AS2000 encoder cable, drag-chain suitable, (5 x 0.25 mm²), shielded, for EL703x/EL704x/KL253x/KL254x	B

Max. cable length 10 m, available in lengths of 1 m, 3 m, 5 m and 10 m (xxx = length in decimetres, e.g. -2010 = 1 m)
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

Pre-assembled cables for IP 67

Ordering information	Motor and encoder cables for IP 67 I/Os	Pict.
ZK4000-6877-xxxx	AS2000 motor cable, drag-chain suitable, (4 x 0.75 mm²), shielded, for EP704x/EJ704x	C
ZK4000-5151-xxxx	AS2000 encoder cable, drag-chain suitable, (5 x 0.25 mm²), shielded, for EP704x/EJ704x	D

Max. cable length 10 m, available in lengths of 1 m, 3 m, 5 m and 10 m (xxx = length in decimetres, e.g. -2010 = 1 m)
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

Coupling for AS2000

Ordering information	AG2090-+JCbb-c/d
AX2090-+JC05-c/d	jaw-type coupling for flange code N2 (AS202x), available in (drive/output) 6.35/6.00 mm, 6.35/6.35 mm, 6.35/8.00 mm
AX2090-+JC10-c/d	jaw-type coupling for flange code N3 (AS204x), available in (drive/output) 14.0/14.0 mm, 14.0/16.0 mm

AS1000 | **Stepper motors**

The AS1000 stepper motors with flange codes from 42 to 86 mm (NEMA17, NEMA23, NEMA34) and torques from 0.4 to 5 Nm are ideally suited for use as auxiliary axes and positioning drives. They are characterised by robustness and high holding torques. Due to the integrated micro-stepping the motors can position very well even without a feedback system and require only a motion terminal for power electronics. Stepper motors can also be operated with TwinCAT NC PTP for synchronisation functions such as cam plates or flying saws.

Technical data	AS10xx
Motor type	stepper motor
Rated supply voltage	24…50 V DC
Resolution	1.8°/200 full steps
Insulation class	thermal class B (130 °C)
Design form	AS1010/AS1020: flange-mounted according IM B14, IM V1, IM V3, AS1030/AS1050/AS1060: flange-mounted according IM B5, IM V1, IM V3
Protection class	IP 43, AS1060: IP 20
Cooling	Free ventilation of the motors must be ensured.
Connection method	direct cable outlet via cable gland with connected M12 coupling
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE

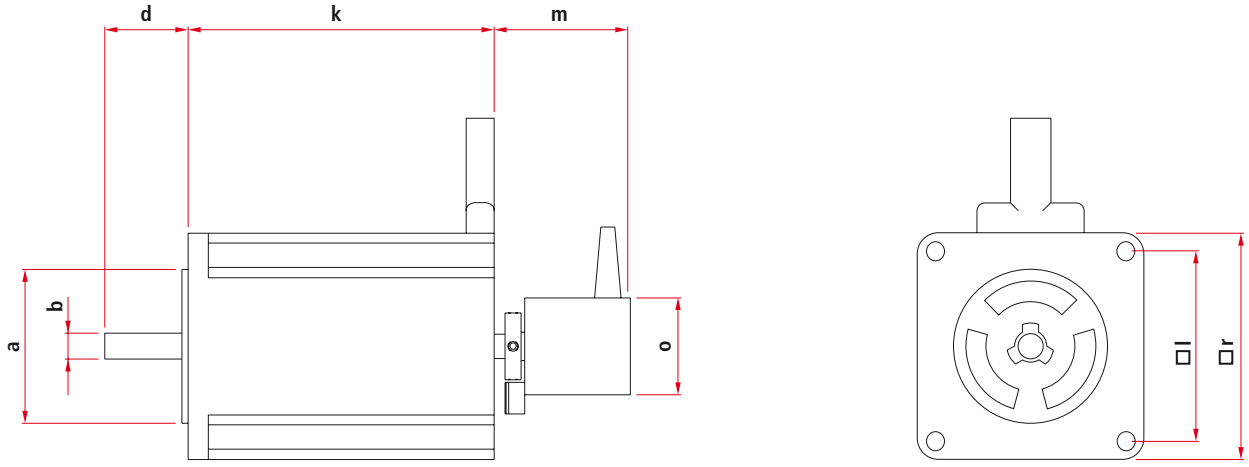
Order reference	AS10u0-wxyz
u	type
w = 0	AS1010, AS1020: smooth shaft with 1 flat, AS1030, AS1050: smooth shaft, AS1060: smooth shaft with 2 flats
w = 1	shaft with groove and feather key according to DIN 6885 (only available with AS1060)
x = 0	standard motor without second shaft
x = 1	second shaft (for AS1020/AS1050/AS1060 only), necessary for encoder
y = 0	no incremental encoder
y = 2	incremental encoder, 24 V DC, 1024 lines (only available for AS1020, AS1050, AS1060), requires x = 1

AS10xx | **Rated current 1.0…1.5 A**

Data for 24…50 V DC	AS1010-0000	AS1020-0xyz	AS1030-0000
Flange code	N1 (NEMA17/42 mm)	N1 (NEMA17/42 mm)	N2 (NEMA23/56 mm)
Rated current (per phase)	1.00 A	1.00 A	1.50 A
Standstill torque	0.38 Nm	0.50 Nm	0.60 Nm
Rotor moment of inertia	0.056 kgcm²	0.074 kgcm²	0.210 kgcm²
Bus Terminal	KL2531	KL2531/KL2541	KL2531
EtherCAT Terminal	EL7037/EL7031	EL7047/EL7037/EL7031/EL7041	EL7037/EL7031
EtherCAT Box	EP7041-1002	EP7041-1002	EP7041-1002
Gear unit	–	–	AG1000-+PM52.i

AS10xx | **Rated current 5 A**

Data for 24…50 V DC	AS1050-0xyz	AS1060-wxyz
Flange code	N2 (NEMA23/56 mm)	N3 (NEMA34/86 mm)
Rated current (per phase)	5.00 A	5.00 A
Standstill torque	1.20 Nm	5.00 Nm
Rotor moment of inertia	0.360 kgcm²	3.000 kgcm²
Bus Terminal	KL2541	KL2541
EtherCAT Terminal	EL7047/EL7041	EL7047/EL7041
EtherCAT Box	EP7041-3002	EP7041-3002
Gear unit	AG1000-+PM52.i	AG1000-+PM81.i



Dimensions	a	b	d	k	l	m	o	r
AS1010	22 mm	5 mm	24 mm	39 mm	31 mm	–	–	42 mm (NEMA17)
AS1020	22 mm	5 mm	24 mm	48 mm	31 mm	33 mm	24 mm	42 mm (NEMA17)
AS1030	38.1 mm	6.35 mm	20.6 mm	54 mm	47.14 mm	–	–	56 mm (NEMA23)
AS1050	38.1 mm	6.35 mm	20.6 mm	75.8 mm	47.14 mm	33 mm	24 mm	56 mm (NEMA23)
AS1060	73 mm	14 mm	30 mm	96.5 mm	69.6 mm	33 mm	24 mm	86 mm (NEMA34)

▶ **www.beckhoff.com/AS10xx**

Accessories for AS1000 stepper motors

Cables for AS1000 at Bus Terminal/EtherCAT Terminal up to 5 A

Ordering information	Cables for stepper terminals EL7031, EL7037, EL7041, EL7047 and KL2531, KL2541	Pict.
ZK4000-5100-2xxx	encoder cable for ASxxxx, IP 67, PUR, (5 x 0.25 mm²), shielded, flex, M12, plug, straight, male, 5-pin, A-coded – open end	A
ZK4000-6700-2xxx	motor cable for AS1000, assembled at both ends, (4 x 0.5 mm²), shielded, 4 million bending cycles, bending radius = 55 mm (10 x OD)	B

Available in lengths of 1 m, 3 m, 5 m and 10 m (2xxx = length in decimetres, e.g. -2010 = 1 m)
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

A

B

Cables for AS1000 at EtherCAT Box up to 5 A

Ordering infomation	Cables for stepper motor EtherCAT Box EP7041	Pict.
ZK4000-5151-xxxx	encoder cable for ASxxxx, IP 67, PUR, (5 x 0.25 mm²), shielded, flex, M12, plug, straight, male, 5-pin, A-coded – M12, plug, straight, male, 5-pin, A-coded	C
ZK4000-6768-xxxx	motor cable for AS1000, assembled at both ends, (4 x 0.5 mm²), shielded, 4 million bending cycles, bending radius = (10 x OD)	D

Available in lengths of 0.5 m, 1 m, 2 m and 10 m (xxxx = length in decimetres, e.g. -0005 = 0.5 m).
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

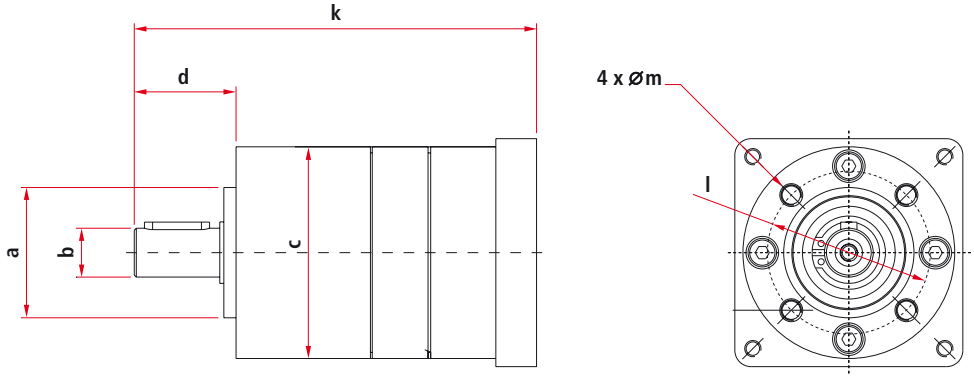
C

D

AG1000 | **Planetary gear units for AS1000**

Technical data	AG1000-+PM52.4	AG1000-+PM52.7	AG1000-+PM81.4	AG1000-+PM81.7
Nominal output torque	4 Nm	4 Nm	20 Nm	20 Nm
Max. acceleration torque	6 Nm	6 Nm	30 Nm	30 Nm
Gear ratio	3.7 or 63/17	6.75 or 27/4	3.7 or 63/17	6.75 or 27/4
Max. torsional backlash	≤ 0.7°	≤ 0.7°	≤ 0.5°	≤ 0.5°
Max. radial load	200 N	200 N	400 N	400 N
Efficiency	approx. 80 %			
Type of gear	planetary gear			
Weight	0.7 kg	0.7 kg	1.8 kg	1.8 kg
Available for stepper motors	AS1030, AS1050	AS1030, AS1050	AS1060	AS1060

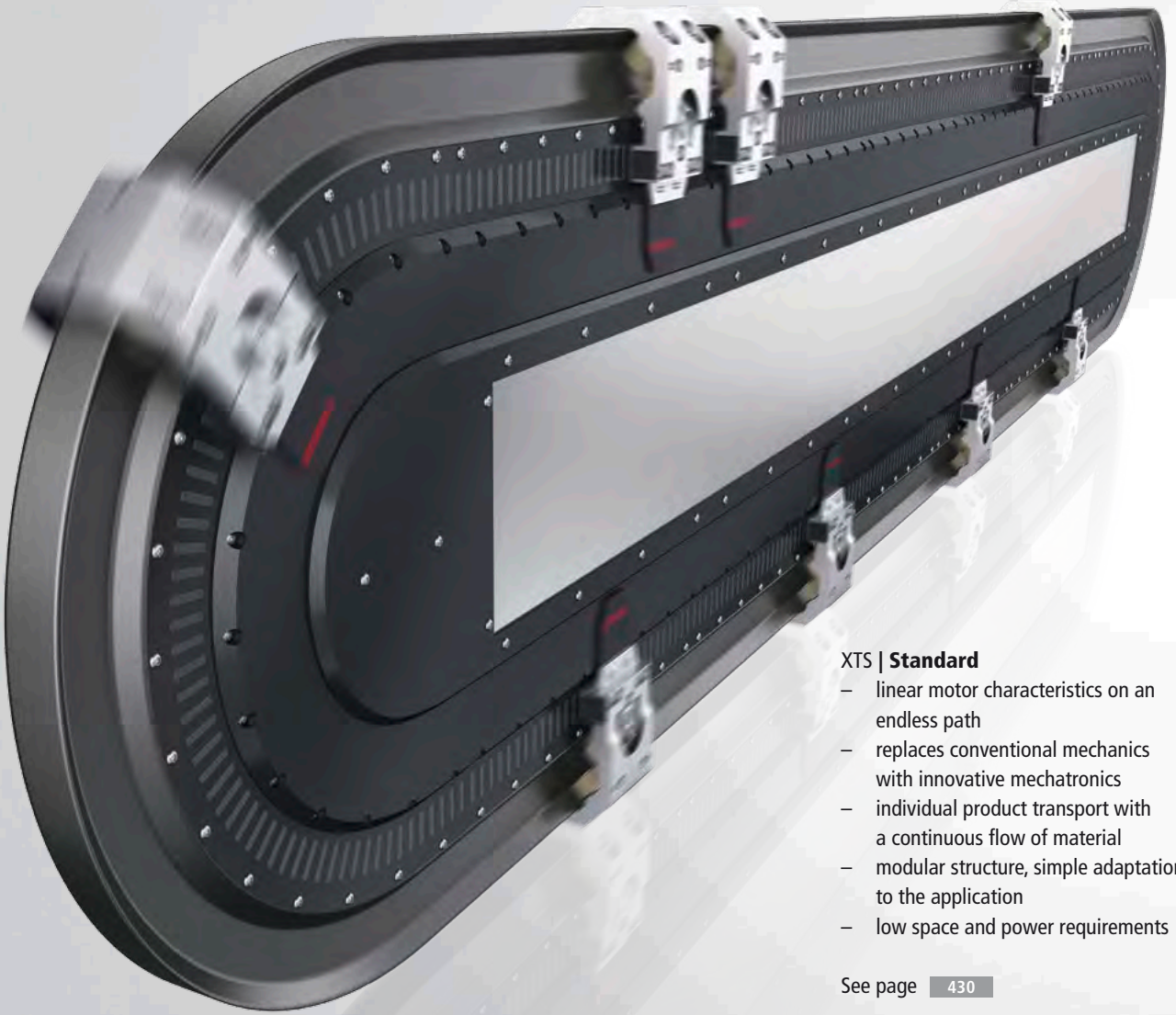
The planetary gears are delivered as a unit with the assembled stepper motor.



Dimensions	a	b	c	d	k	l	m
AG1000-+PM52.i	32 mm	12 mm	52 mm	25 mm	99.8 mm	40 mm	M5 x 10
AG1000-+PM81.i	50 mm	19 mm	81 mm	49 mm	151.2 mm	65 mm	M6 x 12

XTS | eXtended Transport System

▶ **www.beckhoff.com/XTS**



XTS | **Standard**
- linear motor characteristics on an endless path
- replaces conventional mechanics with innovative mechatronics
- individual product transport with a continuous flow of material
- modular structure, simple adaptation to the application
- low space and power requirements

See page 430

XTS | **Hygienic**
- easy to clean
- chemically resistant
- stainless steel
- IP 69K protection

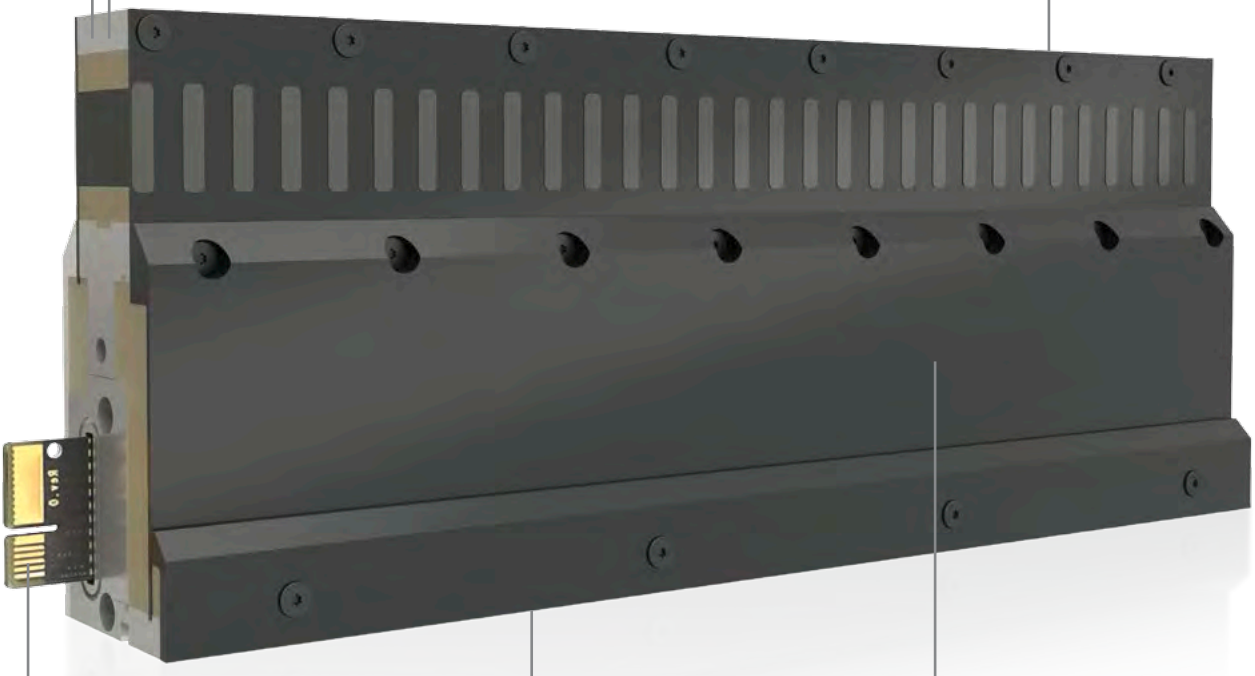
See page 442

XTS | **Black Line**
- without any holes in the upper profile of the motor module
- suitable for guide rails that are not screwed onto the motor modules (e.g. GFX Hepco guide system)

See page 440

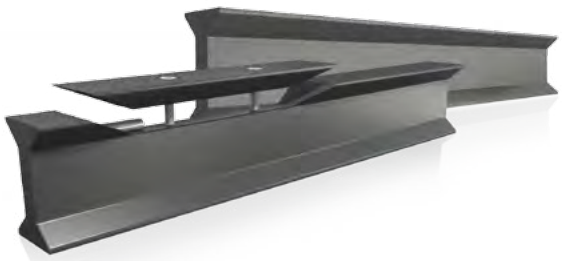
XTS Standard | The construction kit

▶ www.beckhoff.com/XTS-construction-kit



Straight motor module

Curved motor modules



Guide rail system

Mover

Motor module

The motor module contains the electromagnetic coils and all other active functions necessary for the operation of the system. Only a power supply and an EtherCAT connection are required. The motor module contains no moving parts and is not subject to any wear.

– fully integrated linear motor with power electronics and displacement measurement
– Coil arrangement and mechanical structure make up a ready-to-use unit.

Guide rail system

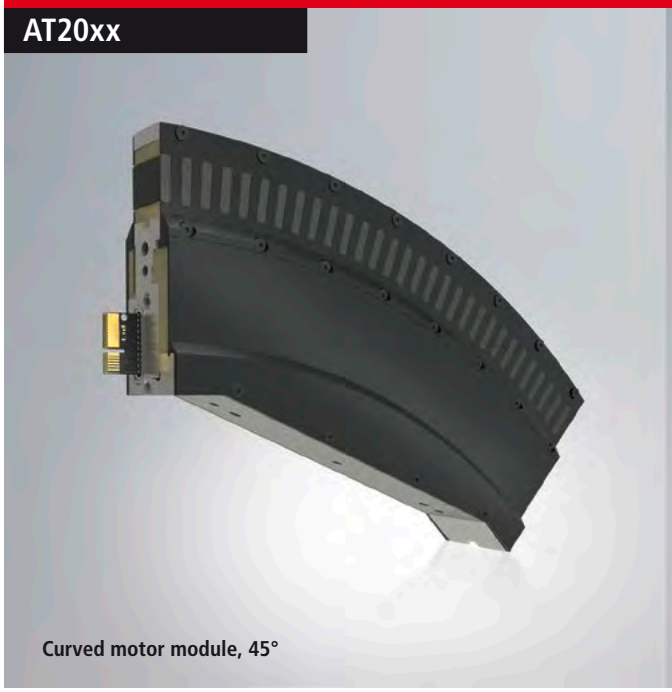
Movers and guide rails are optimally matched to each other. The geometry of the rail and the combination of hard anodised aluminium rail surface and running surface of the mover rollers allow good running characteristics and low wear. Lubrication of the system is not necessary.

Mover

The mover contains magnetic plates which, together with the coils in the motor modules, can generate propulsive forces. It absorbs the attractive forces of the magnets on both sides and compensates them as far as possible. This allows the rollers of the mover to run at high speed in the guide rail with low wear. The rollers are equipped with a particularly wear-resistant synthetic running surface. The tensioning of the rollers prevents backlash and is at the same time designed for low wear. Consequently, the lifetime of the rollers depends on the payload. A mechanically robust encoder flag conveys the mover position to the motor module.

System properties	XTS Standard
Max. force	100 N at standstill
Continuous force	30 N (at ~30 °C temperature increase in the motor compared to mounting frame)
Speed	4 m/s @ 48 V DC supply
Acceleration	> 100 m/s² (without payload)
Positioning accuracy	< ±0.15 mm @ 1.5 m/s possible within a straight module
Absolute accuracy	< ±0.25 mm possible within a straight module
Repeatability	< ±10 µm (standstill unidirectional)
Mover length	50 mm in direction of movement
Mover weight	approx. 410 g (complete mover without attachments)
Max. system length	> 100 m (dependent on computing power, no system limit)
Operating/storage temperature	-10…+40 °C/-25…+85 °C (for further information see documentation)
Protection class	motor modules: IP 65 (for further information see documentation)
Approvals	CE, UL
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4

Electrical data	XTS Standard
Supply voltage	control voltage 24 V DC, power supply 48 V DC
Current consumption	power supply: 16 A nominal current
Power consumption 24 V DC	motor modules: 30 W/m (communication, electronics, position determination)
Length per feed	max. 3 m (voltage supply, EtherCAT)
Power consumption per mover	approx. 12 W @ 4 m/s without payload



Curved motor module, 45°

Curved motor module, +22.5°

AT20xx-0xxx | **XTS motor modules**

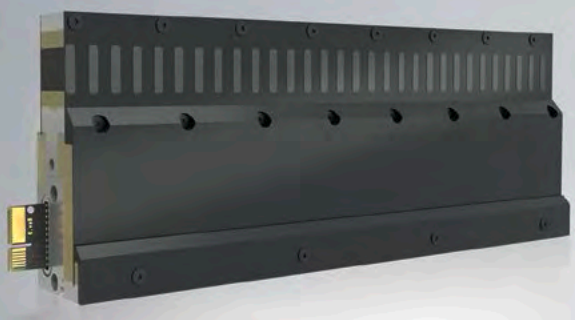
The motor module, the power electronics and the displacement measurement are built into the profile. The power electronics are optimised for the requirement and reduce assembly expenditure. There is an upper mechanical interface to the guide rail and a lower one to the support structure. Straight segments and curves can be combined arbitrarily. The geometry of the motor module without edges and openings allows easy cleaning.

Double-air-gap motor

- double-action linear motor, hence low resulting forces on the mechanical bearing and compact total solution
- displacement measurement integrated, no additional assembly, no calibration
- Tolerances are compensated automatically.
- Attractive forces neutralise each other.
- lower force effect (wear) on the guide
- Friction losses are greatly reduced.

Output stages and coil package integrated

- no cables between coil and output stage
  - no wiring expenditure
  - exclusion of errors
  - minimum mounting space
  - Output stage and coil are optimally matched to each other.
- supply voltage 48 V DC (low voltage, low safety expenditure)
- Independent supply of each individual coil with current is possible.
- arbitrary number of travelling fields/movers possible
- temperature monitoring of the output stage
- temperature model of the coils for optimum peak load use (I^2T model)
- low temperature rise due to good thermal coupling to the machine bed

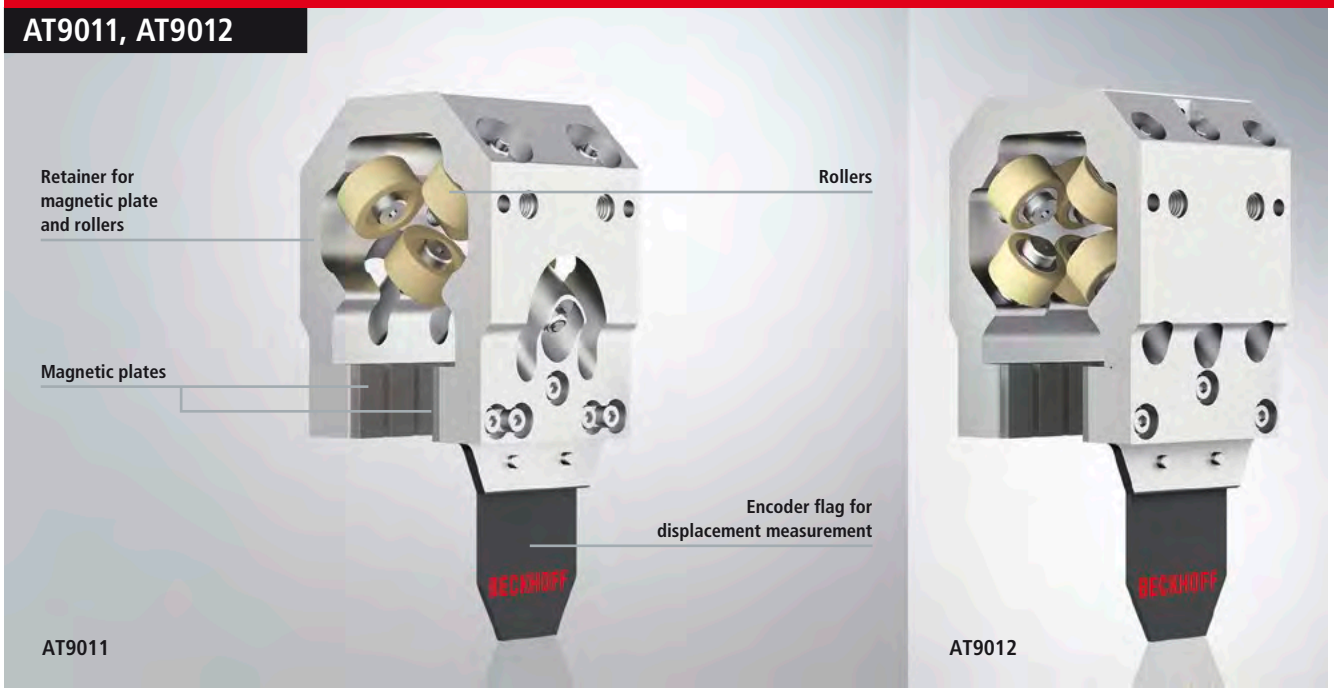


Straight motor module

Curved motor module, 180° (clothoid)

Ordering information	XTS motor modules
AT2000-0250	motor module, straight, 48 V DC/24 V DC, 250 mm x 39.1 mm x 96 mm (L x W x H), 2.0 kg
AT2001-0250	motor module with feed, straight, 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg
AT2001-0250-0003	motor module with feed, straight, 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg, UL-listed
AT2020-0250	motor module, 22.5° (positive curve, convex, radius constant), 48 V DC/24 V DC, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 2.2 kg
AT2021-0250	motor module with feed, 22.5° (positive curve, convex, radius constant), 48 V DC/24 V DC, cable length 5 m, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 3.3 kg
AT2025-0250	motor module, -22.5° (negative curve, concave, radius constant), 48 V DC/24 V DC, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 2.2 kg
AT2026-0250	motor module with feed, -22.5° (negative curve, concave, radius constant), 48 V DC/24 V DC, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 2.2 kg
AT2040-0250	motor module, 45° (positive curve, convex, radius constant), 48 V DC/24 V DC, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 1.9 kg
AT2041-0250	motor module with feed, 45° (positive curve, convex, radius constant), 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg
AT2041-0250-0003	motor module with feed, 45° (positive curve, convex, radius constant), 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg, UL-listed
AT2050-0500	motor module, 180° (clothoid, radius not constant), 48 V DC/24 V DC, 306.7 mm x 39.1 mm x 194.5 mm (L x W x H), 4.1 kg

▶ **www.beckhoff.com/AT2000**



AT9011, AT9012 | XTS movers

The movers are made of a light and solid aluminium alloy. Thanks to their arrangement the rollers allow backlash-free travel on the straights and in the curves. The coating of the rollers causes very little running noise and is particularly low-wear without lubrication of the guide rail. The attractive forces of the magnetic plates are largely balanced by the opposed arrangement, so that the rollers and the rail do not have to absorb the comparatively high attractive forces of the magnets.

The centre of the encoder flag supplies a position signal to the motor module. A Mover 1 can be detected by means of a special magnetic plate set. The encoder flag is made from a sturdy, lightweight glass-fibre reinforced material.

The AT9011-0070-0550 mover provides an increased payload due to its overall length of 70 mm and larger rollers. The standard rail can be used for traveling in straight lines, adapted rails are necessary for traveling around corners. Therefore, a mixed operation of movers of different sizes is only possible when traveling in straight lines.

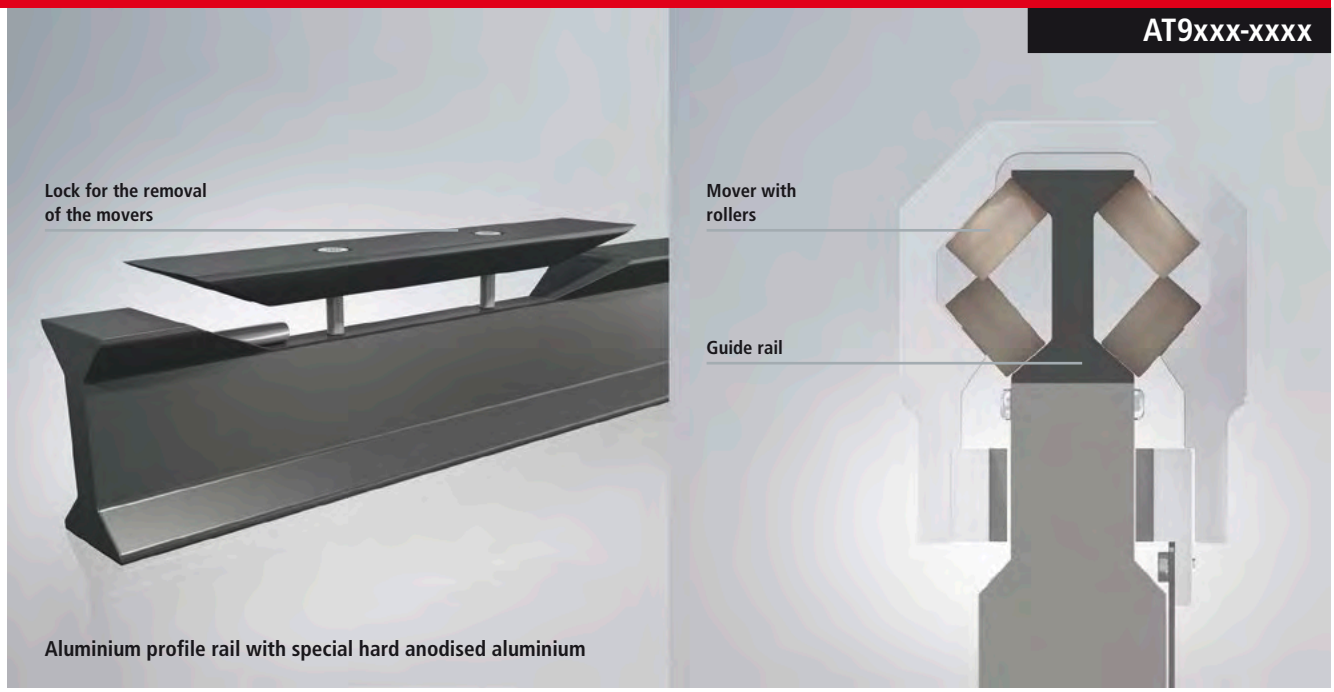
Features

- no sliding contacts or cables to the moved part, purely passive mover
- 2 magnetic plates generate the controlled propulsive force via the motor module.
- The attractive forces largely neutralise each other in relation to the guide mechanism.
- low friction losses
- An encoder flag generates the position signal.
- Short mover length allows small product spacings.
- Geometry allows driving through curves with full dynamics.
- no development of heat on and in the mover

Ordering information	XTS mover suitable for the guide rail system AT9000/AT9050
AT9011-0050-0550	mover, 6 rollers (plastic coated), length 50 mm, 410 g, mounted with magnetic plate set AT9001-0550 and set of rollers ZX9011-0050
AT9011-0050-1550	mover, 6 rollers (plastic coated), length 50 mm, 410 g, mounted with magnetic plate set AT9001-1550 and set of rollers ZX9011-0050
AT9011-0070-0550	mover, 6 rollers (plastic coated), length 70 mm, 595 g, mounted with magnetic plate set AT9001-0550 and set of rollers ZX9011-0070
AT9011-0070-1550	mover, 6 rollers (plastic coated), length 70 mm, 595 g, mounted with magnetic plate set AT9001-1550 and set of rollers ZX9011-0070
AT9012-0050-0550	mover, 12 rollers (plastic coated), length 50 mm, 460 g, mounted with magnetic plate set AT9001-0550 and set of rollers ZX9012-0050
AT9012-0050-1550	mover, 12 rollers (plastic coated), length 50 mm, 460 g, mounted with magnetic plate set AT9001-1550 and set of rollers ZX9012-0050

The magnetic plates can also be procured separately in order to be able to fit them to a self-developed mover.
Technical boundary conditions and support on enquiry.

▶ **www.beckhoff.com/AT9011**



AT9xxx-xxxx | **XTS guide rails**

The guide rail with the matching movers makes the XTS system a ready-to-use solution. However, the motor modules can also be used together with the magnetic plate sets as a custom solution without the XTS guide rail.
The movers can be removed or inserted without tools through a lock by releasing two screws and removing part of the rail.

- optimised solution for immediate mounting on the motor module
- backlash-free due to low manufacturing tolerances and pre-tensioned rollers
- abrasion-resistant hard anodised aluminium
- free of abutting ends, lengths up to 2.5 m available
- high-precision mounting by means of fits
- easy maintenance through lock for the removal of the movers

Movers and guide rail are optimally matched to each other. The geometry of the aluminium rail and the hard anodised aluminium of the surface in combination with the running surface of the mover rollers allow good running characteristics and low wear.

Ordering information	XTS guide rails, suitable for straight motor modules
AT9000-0250	guide rail, 250 mm, straight, suitable for 1 x straight motor module AT200x-0250 with/without feed
AT9000-0500	guide rail, 500 mm, straight, suitable for 2 x straight motor module AT200x-0250 with/without feed
AT9000-0750	guide rail, 750 mm, straight, suitable for 3 x straight motor module AT200x-0250 with/without feed
AT9000-1000	guide rail, 1000 mm, straight, suitable for 4 x straight motor module AT200x-0250 with/without feed
AT9000-1250	guide rail, 1250 mm, straight, suitable for 5 x straight motor module AT200x-0250 with/without feed
AT9000-1500	guide rail, 1500 mm, straight, suitable for 6 x straight motor module AT200x-0250 with/without feed
AT9000-1750	guide rail, 1750 mm, straight, suitable for 7 x straight motor module AT200x-0250 with/without feed
AT9000-2000	guide rail, 2000 mm, straight, suitable for 8 x straight motor module AT200x-0250 with/without feed
AT9000-2250	guide rail, 2250 mm, straight, suitable for 9 x straight motor module AT200x-0250 with/without feed
AT9000-2500	guide rail, 2500 mm, straight, suitable for 10 x straight motor module AT200x-0250 with/without feed

Ordering information	XTS guide rails with gate, suitable for straigth motor modules
AT9100-0250	guide rail, 250 mm, straight with gate, suitable for 1 x straight motor module AT200x-0250 with/without feed
AT9100-0500	guide rail, 500 mm, straight with gate, suitable for 2 x straight motor module AT200x-0250 with/without feed
AT9100-0750	guide rail, 750 mm, straight with gate, suitable for 3 x straight motor module AT200x-0250 with/without feed
AT9100-1000	guide rail, 1000 mm, straight with gate, suitable for 4 x straight motor module AT200x-0250 with/without feed
AT9100-1250	guide rail, 1250 mm, straight with gate, suitable for 5 x straight motor module AT200x-0250 with/without feed
AT9100-1500	guide rail, 1500 mm, straight with gate, suitable for 6 x straight motor module AT200x-0250 with/without feed
AT9100-1750	guide rail, 1750 mm, straight with gate, suitable for 7 x straight motor module AT200x-0250 with/without feed
AT9100-2000	guide rail, 2000 mm, straight with gate, suitable for 8 x straight motor module AT200x-0250 with/without feed
AT9100-2250	guide rail, 2550 mm, straight with gate, suitable for 9 x straight motor module AT200x-0250 with/without feed
AT9100-2500	guide rail, 2500 mm, straight with gate, suitable for 10 x straight motor module AT200x-0250 with/without feed

Ordering information	XTS guide rails, suitable for 22.5° motor modules
AT9020-0500	guide rail, 500 mm, 22.5° curve (positive curve, convex, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 1 x 22.5° motor module AT202x-0250 with/without feed
AT9020-2250	guide rail set, 2250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0050-xxxx, consisting of 1 x AT9020-2250-1050 guide rail, 1250 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 4 x 22.5° motor module AT202x-0250 with/without feed 1 x AT9020-2250-2050 guide rail, 1000 mm, 90° curve, suitable for 4 x 22.5° motor module AT202x-0250 with/without feed
AT9020-2250-0070	guide rail set, 2250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0070-xxxx, consisting of 1 x AT9020-2250-1070 guide rail, 1250 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 4 x 22.5° motor module AT202x-0250 with/without feed 1 x AT9020-2250-2070 guide rail, 1000 mm, 90° curve, suitable for 4 x 22.5° motor module AT202x-0250 with/without feed

Ordering information	XTS guide rails, suitable for -22.5° motor modules
AT9025-0500	guide rail, 500 mm, -22.5° curve (negative curve, concave, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 1 x -22.5° motor module AT202x-0250 with/without feed

Ordering information	XTS guide rails, suitable for 45° motor modules
AT9040-0500	guide rail, 500 mm, 45° curve (positive curve, convex, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 1 x 45° motor module AT204x-0250 with/without feed
AT9040-0750	guide rail, 750 mm, 90° curve (positive curve, convex, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed
AT9040-0750-0070	guide rail, 750 mm, 90° curve (positive curve, convex, radius constant), for AT9011-0070-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed
AT9040-1250	guide rail set, 1250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0050-xxxx, consisting of 1 x AT9040-1250-1050 guide rail, 750 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed 1 x AT9040-1250-2050 guide rail, 500 mm, 90° curve, suitable for 2 x 45° motor module AT204x-0250 with/without feed
AT9040-1250-0070	guide rail set, 1250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0070-xxxx, consisting of 1 x AT9040-1250-1070 guide rail, 750 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed 1 x AT9040-1250-2070 guide rail, 500 mm, 90° curve, suitable for 2 x 45° motor module AT204x-0250 with/without feed
AT9142-2000	guide rail set, 2000 mm, 360° circle (positive curve, convex, radius constant, 4 parts), for AT9011-0050-xxxx, consisting of 1 x AT9142-2000-1050 guide rail, 500 mm, 90° curve with gate, suitable for 2 x 45° motor module AT204x-0250 with/without feed 3 x AT9142-2000-2050 guide rail, 500 mm, 90° curve, suitable for 2 x 45° motor module AT204x-0250 with/without feed

Ordering information	XTS guide rails, suitable for 180° motor modules (clothoid)
AT9050-0500	guide rail, 500 mm, 180° curve (clothoid, radius not constant), for AT9011-0050-xxxx or AT9012-0050-xxxx, suitable for 1 x 180° motor module AT2050-0500
AT9050-0500-0070	guide rail, 500 mm, 180° curve (clothoid, radius not constant), for AT9011-0070-xxxx, suitable for 1 x 180° motor module AT2050-0500

▶ **www.beckhoff.com/AT9000**

AT2000-xx00 | XTS starter kit

The XTS starter kit facilitates fast and effective entry to the new technology. Mechanical tests and the programming of your own motion profiles are simple to accomplish. Programming experience in IEC 61131-3 and knowledge of TwinCAT NC are required for this. The XTS starter kit contains all components required for the operation of an XTS system. Depending on the required path length, a choice of three starter kits is available. The construction is fully functional and completely pre-assembled.

Basic components

- stand and holder for all mechanical parts
- Industrial PC with all necessary interfaces and sufficient system performance
- TwinCAT NC PTP and XTS function package
- installed in a control cabinet, fully wired, ready for operation
- power supply units 24 V DC and 48 V DC
- 1 day instruction and programming support

Required user skills

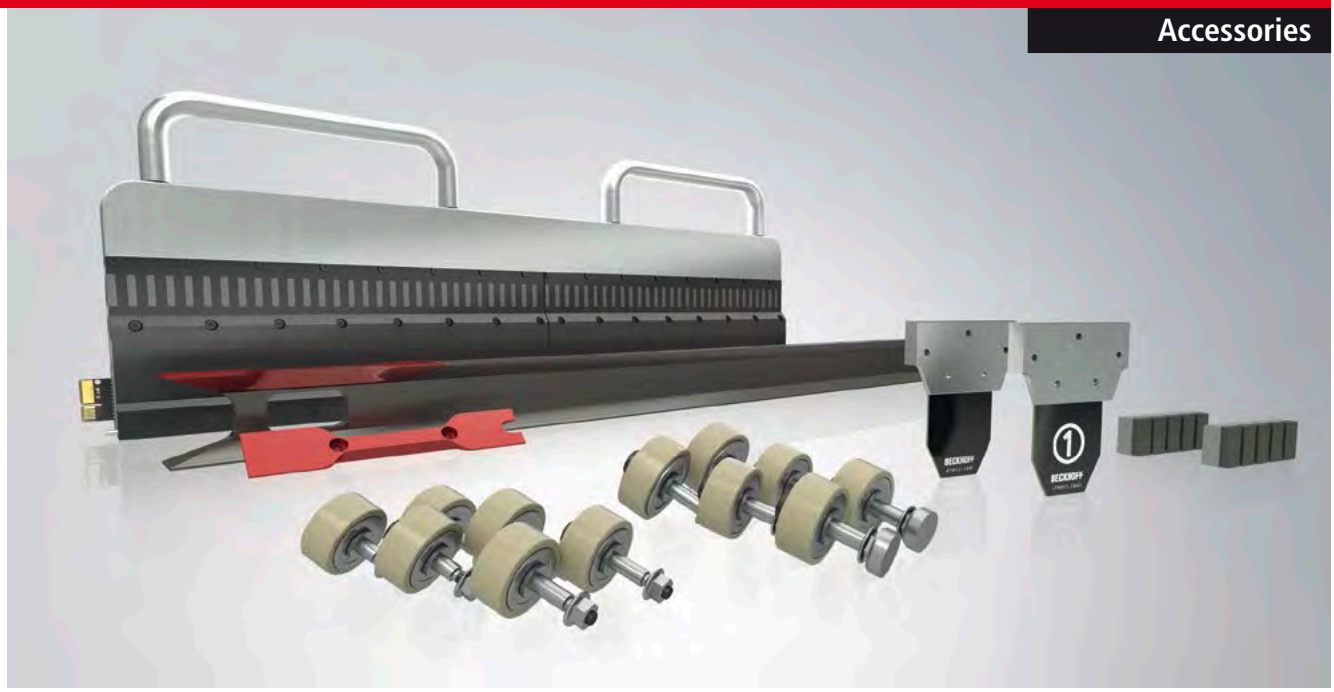
- practical experience with TwinCAT
- basic knowledge of Motion Control

For information on the Beckhoff training offers see page 572

Starter kit small	AT2000-0500
Motor module, straight	3 x AT2000-0250, 1 x AT2001-0250 (feed)
Motor module, 180°	2 x AT2050-0500
Guide rail, straight	1 x AT9000-0500, 1 x AT9100-0500 (gate)
Guide rail, 180°	2 x AT9050-0500
Mover	5 x AT9011-0050-0550

Starter kit medium	AT2000-1000
Motor module, straight	7 x AT2000-0250, 1 x AT2001-0250 (feed)
Motor module, 180°	2 x AT2050-0500
Guide rail, straight	1 x AT9000-1000, 1 x AT9100-1000 (gate)
Guide rail, 180°	2 x AT9050-0500
Mover	10 x AT9011-0050-0550

Starter kit large	AT2000-1500
Motor module, straight	10 x AT2000-0250, 2 x AT2001-0250 (feed)
Motor module, 180°	2 x AT2050-0500
Guide rail, straight	1 x AT9000-1500, 1 x AT9100-1500 (gate)
Guide rail, 180°	2 x AT9050-0500
Mover	10 x AT9011-0050-0550



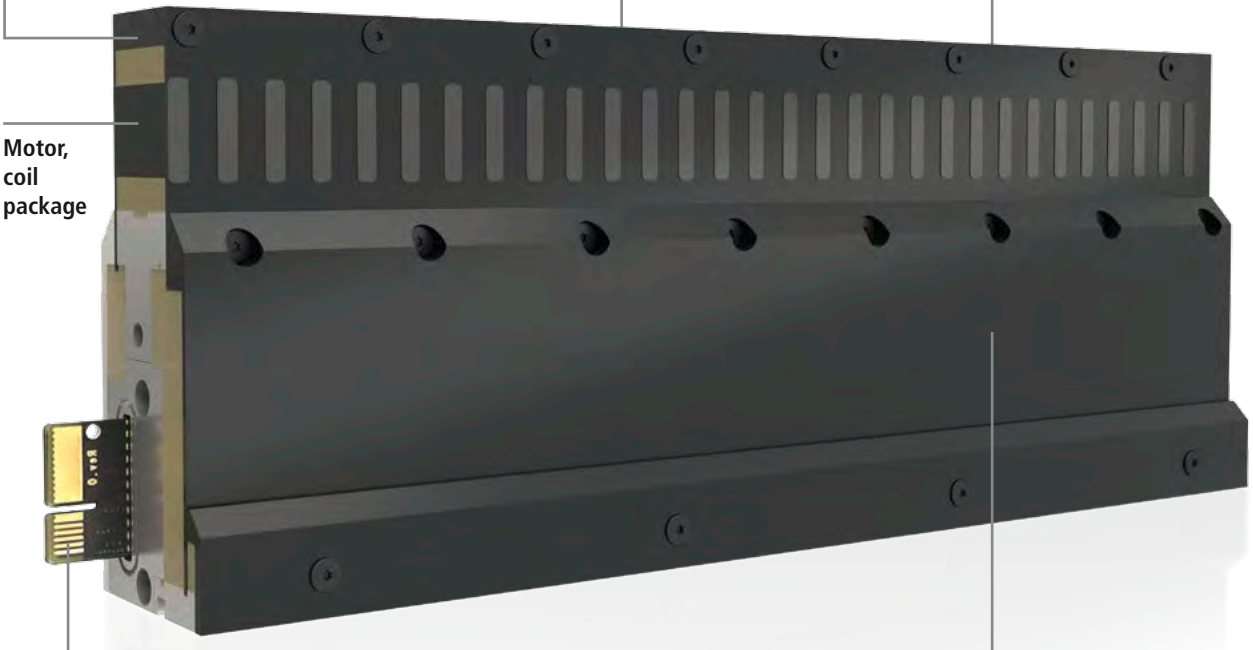
Accessories

The XTS accessories include ready-made roller sets for maintenance of XTS movers, magnetic plate sets for various applications and further auxiliaries for commissioning of an XTS linear transport system.

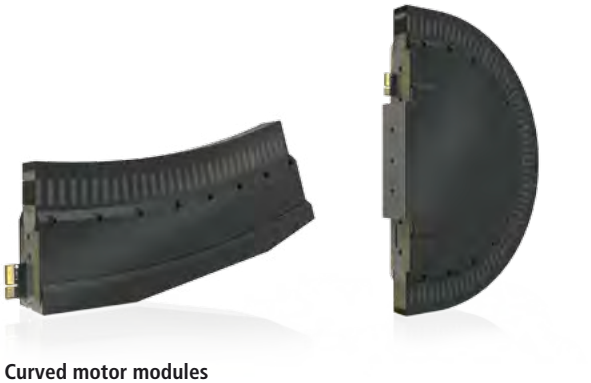
Ordering information	
ZX2000-0500	device for alignment of straight XTS standard motor modules
AT9001-0550	magnetic plate set mover standard, 5-pin, length 50 mm, preinstalled with 1.2 mm thick encoder flag, suitable for XTS standard movers
AT9001-0550-1840	magnetic plate set mover standard, 5-pin, length 50 mm, preinstalled with 1.8 mm thick encoder flag, suitable for external movers
AT9001-1550	magnetic plate set mover 1, 5-pin, length 50 mm, preinstalled with 1.2 mm thick encoder flag, suitable for XTS standard movers
AT9001-1550-1840	magnetic plate set mover 1, 5-pin, length 50 mm, preinstalled with 1.8 mm thick encoder flag, suitable for external movers
ZX9011-0050	set of rollers, 6 rollers (plastic coated), suitable for mover AT9011-0050-xxxx
ZX9011-0070	set of rollers, 6 rollers (plastic coated), suitable for mover AT9011-0070-xxxx
ZX9012-0050	set of rollers, 12 rollers (plastic coated), suitable for mover AT9012-0050-xxxx
ZX9001-0000	rail on support for XTS standard movers, suitable for XTS standard guide rails AT9100-xxxx

XTS Black Line | Motor modules

▶ www.beckhoff.com/XTS-Black-Line



Straight motor module



Curved motor modules

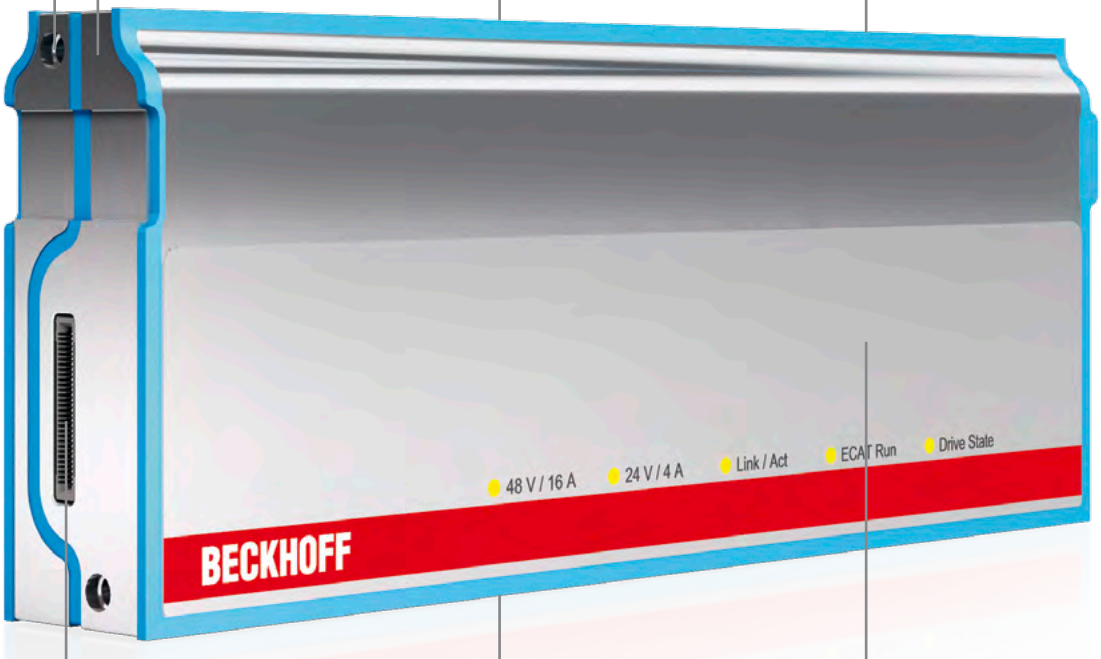
The motor modules of the new XTS Black Line supplement the existing product range by variants without holes in the upper profiles of the motor module. The motor modules in the XTS Black Line are intended for use with guide rails that are not screwed onto the modules.

Straight and curved motor modules can be combined with each other and also with standard modules as desired. The Black Line motor modules are easier to clean because there are no holes in the upper profile.

Ordering information	XTS Black Line: motor modules
AT2000-0250-0002	motor module, straight (top profile without drilling hole), 48 V DC/24 V DC, 250 mm x 39.1 mm x 96 mm (L x W x H), 2.0 kg
AT2001-0250-0002	motor module with feed, straight (top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg
AT2001-0250-0004	motor module with feed, straight (top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg, UL-listed
AT2020-0250-0002	motor module, 22.5° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 2.2 kg
AT2021-0250-0002	motor module, 22.5° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 3.3 kg
AT2025-0250-0002	motor module, -22.5° (negative curve, concave, radius constant, top profile without drilling hole), 48 V DC/24 V DC, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 2.2 kg
AT2026-0250-0002	motor module with feed, -22.5° (negative curve, concave, radius constant, top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 3.3 kg
AT2040-0250-0002	motor module, 45° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, 58.9 mm x 39.1 mm x 114.4 mm (L x W x H), 1.9 kg
AT2041-0250-0002	motor module with feed, 45° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg
AT2041-0250-0004	motor module with feed, 45° (positive curve, convex, radius constant, top profile without drilling hole), UL-listed, 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg
AT2050-0500-0002	motor module, 180° (clothoid, radius not constant, top profile without drilling hole), 48 V DC/24 V DC, 306.7 mm x 39.1 mm x 194.5 mm (L x W x H), 4.1 kg

XTS Hygienic | The construction kit

▶ www.beckhoff.com/XTS-Hygienic



To create a track the single parts with protection class IP 69K are mounted at the machine frame.

Centering hole

Installation area guide rail

Circumferential seals prevent the ingress of dirt particles.

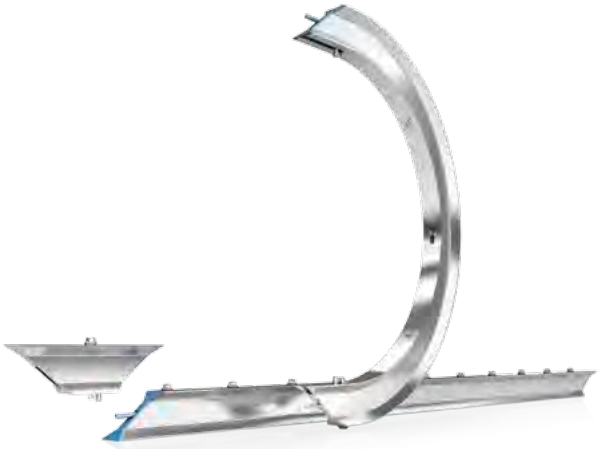
When mounting two modules, control voltage (24 V DC), power supply (48 V DC) and EtherCAT are automatically connected through.

Mounting area: This surface enables mounting at the machine base.

Position feedback integrated in motor module
- non-contact
- absolute positions of all movers
- multi-position measurement
- resistant to dirt

Straight motor module

Curved motor module



Guide rail system

Mover

The fully encapsulated mechatronic transport system, XTS Hygienic combines the advantages of rotary and linear drive systems for demanding environmental conditions.
The stainless steel version of the XTS linear transport system (with IP 69K protection rating) provides all functions required for system operation:

– modular, fully integrated linear motor combines power electronics and position feedback in a single component
– multiple movers used as moved parts for controlling the material flow
– mechanical guide rails for configuration of any desired geometry

With this matching set of only a few components, the most diverse applications in the food and pharmaceutical industries can be realised. All surfaces are chemically resistant and provide ease of cleaning. A system implementation with XTS Hygienic offers hygienic design without any hidden edges or undercuts. All components are sealed at the joints with a high-quality elastic material and enable high-pressure washdown. As a result, the XTS Hygienic meets all EHEDG requirements for system certification according to EL Class I AUX. Due to the reduced construction volume of the XTS components, users benefit from a smaller machine footprint in a clear layout providing ease of maintenance.

System properties	XTS Hygienic
Max. force	90 N at standstill
Continuous force	30 N (at ~30 °C temperature increase in the motor compared to mounting frame)
Speed	4 m/s @ 48 V DC supply
Acceleration	> 50 m/s² (without payload)
Mover length	80 mm in direction of movement
Mover weight	approx. 910 g (complete mover without attachments)
Max. system length	> 100 m (dependent on computing power, no system limit)
Surface	electropolished
Material	housing: stainless steel 1.4404 AISI 316L; sealing: FPM
Operating/storage temperature	-10…+40 °C/-25…+85 °C (for further information see documentation)
Protection class	IP 69K
Approvals	CE, EHEDG EL Class I AUX (standard-compliant when assembled)
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4

Electrical data	XTS Hygienic
Supply voltage	control voltage 24 V DC, power supply 48 V DC
Current consumption	power supply: 16 A nominal current
Power consumption 24 V DC	motor modules: 30 W/m (communication, electronics, position determination)
Length per feed	max. 3 m (voltage supply, EtherCAT)
Power consumption per mover	approx. 15 W @ 4 m/s without payload

ATH2000 | **XTS Hygienic motor modules**

The motor modules of the new XTS Hygienic series combine the advantages of the XTS and compliance with the high requirements of the food industry in relation to media resistance and easy cleaning.

Power electronics and position feedback are integrated in an electropolished stainless steel housing made of 1.4404 AISI 316L and are ready to connect.

When assembled, the motor modules seal to the machine bed and the guide rails without leaving any gaps or dead spaces. The required FPM seals are a fixed part of the housing, considerably simplifying system assembly. As usual, all motor modules can be combined with as desired. In the assembled state, compliance with protection class IP 69K is ensured.

The XTS components in hygienic design meet the requirements of the EHEDG recommendation with regard to cleanability and sealing. Certification of a system into which XTS Hygienic components are installed is possible according to the "Hygienic Design Weihenstephan Certified System".

The ATH2050-0500 curved modules can be connected to the straight modules ATH2000-0250 or ATH2001-0250. By adding two curved modules, a closed circuit track can be designed with the movers running on the circumference. To ensure the high IP 69K protection rating, the system is completely sealed.

Technical data	ATH2000-0250	ATH2001-0250	ATH2050-0500
Infeed	–	yes	–
Design form	straight	straight	curved
Dimensions (L x W x H)	250 mm x 34 mm x 96 mm	250 mm x 34 mm x 96 mm	315 mm x 34 mm x 200 mm
Weight	4.0 kg	5.4 kg	8.0 kg
Surface	electropolished		
Material	housing: stainless steel 1.4404 AISI 316L; sealing: FPM		
Protection class	IP 69K		
Approvals	CE		

Ordering information	XTS Hygienic: stainless steel motor modules
ATH2000-0250	stainless steel motor module, straight, 48 V DC/24 V DC, protection class IP 69K, 250 mm x 34 mm x 96 mm (L x W x H), 4.0 kg
ATH2001-0250	stainless steel motor module with feed, straight, 48 V DC/24 V DC, cable length 5 m, protection class IP 69K, 250 mm x 34 mm x 96 mm (L x W x H), 5.4 kg
ATH2050-0500	stainless steel motor module, 180° (clothoid, radius not constant), 48 V DC/24 V DC, protection class IP 69K, 315 mm x 34 mm x 200 mm (L x W x H), 8.0 kg

For availability status see Beckhoff website at: www.beckhoff.com/ATH2000

▶ **www.beckhoff.com/ATH2000**

ATH9011 | XTS Hygienic mover

The new ATH9011 mover is adapted to the new fields of application of the ATH2000 motor modules of the XTS Hygienic in order to guarantee good cleanability. The design and the materials of the movers allow cleaning in a washing machine. The feedback flag is an integrated component of the completely encapsulated magnetic plate set of the mover. Customer-specific attachments and tools can be mounted on the mover using a seal that is included in the delivery contents to ensure that the same hygienic requirements can also be met with customer connections.

Ordering information	XTS Hygienic: stainless steel mover suitable for the ATH900 guide rail system
ATH9011-0075-0550	stainless steel mover, 6 rollers (plastic coated), length 75 mm, 1.04 kg, mounted with magnetic plate set ATH9001-0550 and set of rollers ZXH9011-0075

▶ **www.beckhoff.com/ATH9011**

Accessories

Ordering information	XTS Hygienic accessories
ATH9001-0550	magnetic plate set, 5-pin, 50 mm, 3 mm thick encoder flags with electronic labeling mover standard, suitable for stainless steel mover ATH9011-00xx-0550
ZXH9011-0075	set of rollers, 6 rollers (plastic coated), suitable for stainless steel mover ATH9011-0075-xxxx

For availability status see Beckhoff website at: www.beckhoff.com

ATH9000 | **XTS Hygienic guide rails**

The guide rails of the new XTS Hygienic are entirely made of stainless steel. The interface between individuals rails has been revised for simple sealing. A lock allows fast exchange of the movers for cleaning and maintenance purposes after loosening just one screw. The curved rail is optimally matched to the ATH9011 mover of the XTS Hygienic. Small manufacturing tolerances and additional fits at the connection points to the motor modules allow both simple and precise mounting on the motor modules, ensuring a seal free of gaps and dead spaces at such junctions, too. The ATH9200 guide rails are designed in such a way that several straight guide rails can be combined.

Ordering information	XTS Hygienic guide rails, suitable for straight motor modules
ATH9000-0250	stainless steel guide rail, 250 mm, straight, suitable for 1 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-0500	stainless steel guide rail, 500 mm, straight, suitable for 2 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-0750	stainless steel guide rail, 750 mm, straight, suitable for 3 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1000	stainless steel guide rail, 1000 mm, straight, suitable for 4 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1250	stainless steel guide rail, 1250 mm, straight, suitable for 5 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1500	stainless steel guide rail, 1500 mm, straight, suitable for 6 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1750	stainless steel guide rail, 1750 mm, straight, suitable for 7 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-2000	stainless steel guide rail, 2000 mm, straight, suitable for 8 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-2250	stainless steel guide rail, 2250 mm, straight, suitable for 9 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-2500	stainless steel guide rail, 2500 mm, straight, suitable for 10 x straight stainless steel motor module ATH200x-0250 with/without feed

Ordering information	XTS Hygienic guide rails with gate, suitable for straight motor modules
ATH9100-0500	stainless steel guide rail, 500 mm, straight with gate, suitable for 2 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-0750	stainless steel guide rail, 750 mm, straight with gate, suitable for 3 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1000	stainless steel guide rail, 1000 mm, straight with gate, suitable for 4 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1250	stainless steel guide rail, 1250 mm, straight with gate, suitable for 5 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1500	stainless steel guide rail, 1500 mm, straight with gate, suitable for 6 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1750	stainless steel guide rail, 1750 mm, straight with gate, suitable for 7 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-2000	stainless steel guide rail, 2000 mm, straight with gate, suitable for 8 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-2250	stainless steel guide rail, 2250 mm, straight with gate, suitable for 9 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-2500	stainless steel guide rail, 2500 mm, straight with gate, suitable for 10 x straight stainless steel motor module ATH200x-0250 with/without feed

Ordering information	XTS Hygienic guide rails, suitable for 180° motor modules (clothoid)
ATH9050-0500-0075	stainless steel guide rail, 500 mm, 180° curve (clothoid, radius not constant), for ATH901x-0075-0550, suitable for 1 x stainless steel motor module ATH2050-0500

Ordering information	XTS Hygienic guide rails, connectors
ATH9200-0250	stainless steel guide rail, 250 mm, connector for straight stainless steel guide rails, suitable for 1 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-0500	stainless steel guide rail, 500 mm, connector for straight stainless steel guide rails, suitable for 2 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-0750	stainless steel guide rail, 750 mm, connector for straight stainless steel guide rails, suitable for 3 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1000	stainless steel guide rail, 1000 mm, connector for straight stainless steel guide rails, suitable for 4 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1250	stainless steel guide rail, 1250 mm, connector for straight stainless steel guide rails, suitable for 5 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1500	stainless steel guide rail, 1500 mm, connector for straight stainless steel guide rails, suitable for 6 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1750	stainless steel guide rail, 1750 mm, connector for straight stainless steel guide rails, suitable for 7 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-2000	stainless steel guide rail, 2000 mm, connector for straight stainless steel guide rails, suitable for 8 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-2250	stainless steel guide rail, 2250 mm, connector for straight stainless steel guide rails, suitable for 9 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-2500	stainless steel guide rail, 2500 mm, connector for straight stainless steel guide rails, suitable for 10 x straight stainless steel motor module ATH200x-0250 with/without feed

For availability status see Beckhoff website at: www.beckhoff.com/ATH9000

▶ **www.beckhoff.com/ATH9000**

Software

TwinCAT 3
- one engineering environment, based on Microsoft Visual Studio®
- IEC 61131, C/C++, MATLAB®/Simulink®
- integrated modules:
  - real-time
  - PLC, NC, CNC
  - HMI
  - robotics
  - measurement technology
  - Safety
- TwinCAT 3 modules: standardised programming framework for modular programming
- automatic code generation and project implementation with the TwinCAT Automation Interface

TE5910 | **TC3 Motion Designer**
- design tool for dimensioning a drive system, including detailed report function
- predefined load cases and motion profiles
- optimisation function and parts list generator

See page 450

TE5950 | **TC3 Drive Manager 2**
- intuitive commissioning of an AX8000 multi-axis servo system and the EL72xx servomotor terminals
- clear display of parameter and startup lists with integrated search function

See page 452

TF5850 | **TC3 XTS Extension**
- mapping of XTS movers as a servo axis
- All Motion Control functions can be used.
- automated system configuration
- intuitive 2D representation of the movers with XTS Viewer

See page 454

TE5910 | **TC3 Motion Designer**

The dimensioning of drive axes, in conjunction with the optimum selection of motor, gear unit, drive controllers and accessories, is the basis for an efficient machine design. The TC3 Motion Designer is optionally integrated in the TwinCAT automation platform, or it can be used as a stand-alone project engineering tool for mechanical design.

Mechanics
The TC3 Motion Designer supports the designer in the configuration of typical mechanical systems such as pinion rack, spindle nut, winder, crank drive, etc.

Motion profiles
Rough estimates for simple load cases with motion profiles, e.g. based on a $^1/_2$ or $^1/_3$ rule or a 7-segment profile, are easy to realise with a few mouse clicks. More complex tasks and kinematic systems, perhaps in conjunction with more sophisticated motion profiles, including cam gears according to VDI 2143, are also taken account of in the TC3 Motion Designer. Export functions enable the configuration to be transferred directly to the TwinCAT System Manager, without the need for repeated inputs.

Optimisation function
An optimisation algorithm makes the selection of gear units and motors straightforward. It suggests the optimum combination based on mechanical and cost considerations, taking into account adjustable filters. The connected database provides access to all available gear units, motors and servo drives offered by Beckhoff, including the compact Drive Technology range with servo terminals.

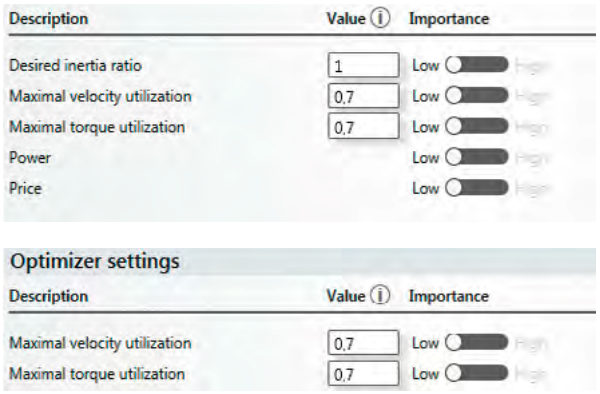
The automatic geometry matching feature checks the compatibility of motor and gear unit and prevents selection of unsuitable combinations.

Report functions
The axis configuration is documented in a report. A choice of short or detailed report is available.

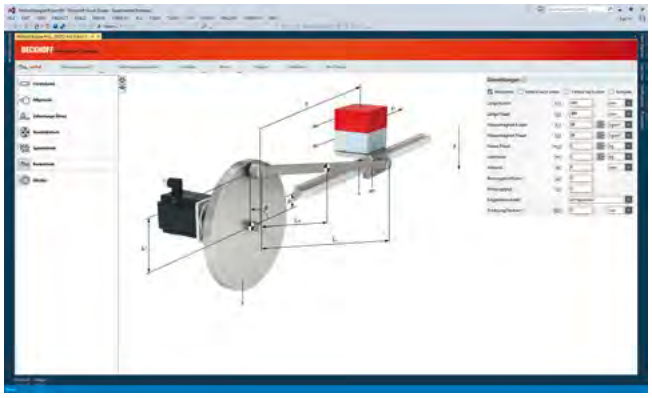
With a single click the designer can call up the technical data sheet for the motor and gear unit, and with a further click the corresponding 3D model of the drive components for integration in the design software.

Parts list generator
The integrated parts list generator can be used directly for preparing the purchase order. Accessories such as cables, chokes and installation material are also considered.

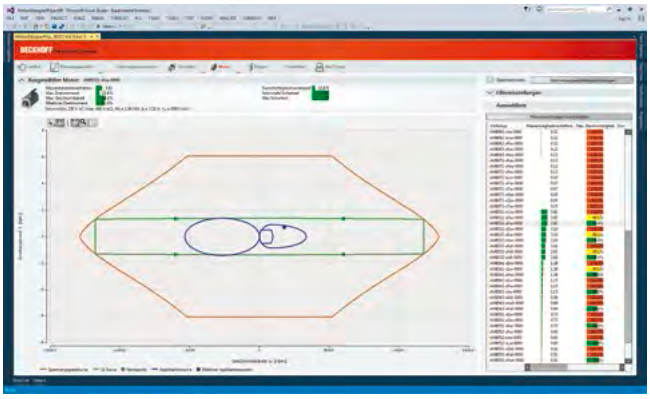
Multi-axis design
The TC3 Motion Designer regards the machine as a holistic unit, including all drive axes: All load cycles, including their temporal dependence and their influence on the common DC-Link, are taken into account. Selection of the optimum supply module or the common brake resistor is guaranteed.



The optimisation algorithm suggests the economically and mechanically optimal motor/gear unit combination according to the criteria that have been set.

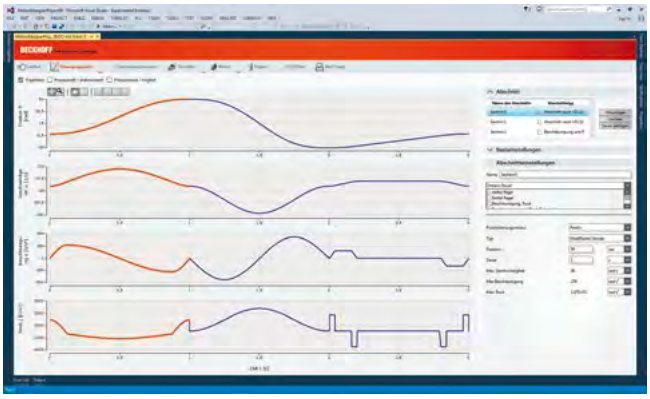


The selected mechanism is graphically displayed and can be adapted precisely to the real application through further settings.



The axis utilisation can be directly classified in the 4-quadrant view.

With the parts list editor all required components can be directly added. The complete parts list of all components can be exported in common formats, e.g. Excel.



The Motion Designer enables the direct observation of the curves of position, speed, torque and acceleration over time for each axis.

Ordering information	
TE5910	TC3 Motion Designer for drive dimensioning

▶ www.beckhoff.com/TE5910

TE5950 | TC3 Drive Manager 2

The TC3 Drive Manager 2 is used for commissioning the AX8000 or the EL72xx, EP72xx and EJ72xx I/O components. It is optionally available as an integrated version in the TwinCAT automation platform or an update version independently of TwinCAT. The TC3 Drive Manager 2 is integrated into a TwinCAT solution as a project and enables a separate assessment of supply modules, axis modules and axis channels.

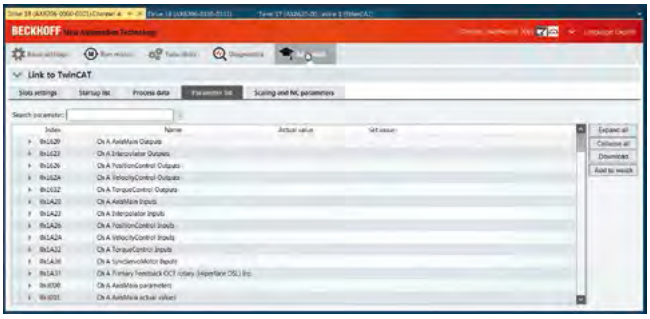
Automatic startup list
The menu structure enables intuitive axis commissioning. Via the electronic identification plate, TC3 Drive Manager 2 automatically identifies the motor and corresponding parameter data. As a result, a startup list is automatically generated for each axis.

Scope View is integrated
Using the Run Motor function, the motor is ready for operation with an NC control system.

The combination of NC control with the Scope View tool provides an optimal overview of the motor in operation. A fine-tuning of the axis and a minimisation of the tracking error is easy and straightforward.

Further adaptations are possible directly in the TC3 Drive Manager 2 via the Tune Drive function, such as the adjustment of parameter settings and the configuration of filters.

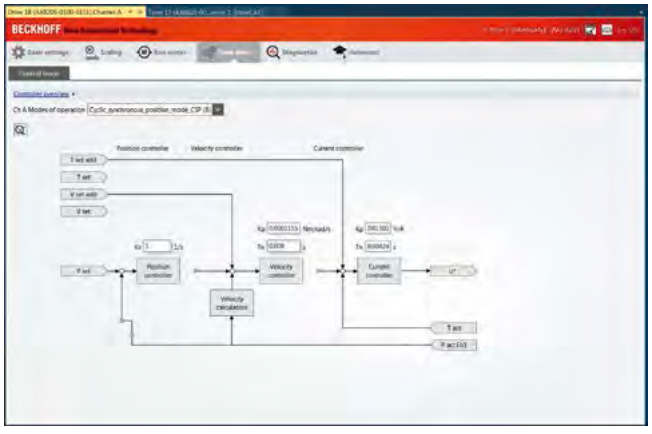
Detailed visualisation of the motor characteristic according to the electronic identification plate



Structured parameter list with integrated search function

Integrated scope in the NC control overview of the motor

All diagnostic messages at a glance and an additional watch window with individual user options



Direct fine-tuning of the drive during commissioning

Ordering information	
TE5950	TC3 Drive Manager 2

▶ **www.beckhoff.com/TE5950**

TF5850 | TC3 XTS Extension

The TC3 XTS Extension decouples servo algorithms from the hardware and calculates them centrally. TwinCAT maps each XTS mover as a normal servo axis, enabling simple movement handling. Each output stage/coil is supplied with a current setpoint via EtherCAT.

All Motion Control functions such as flying saw, electrical gears and cam plates are usable. Function extensions in TwinCAT take over typical XTS requirements:

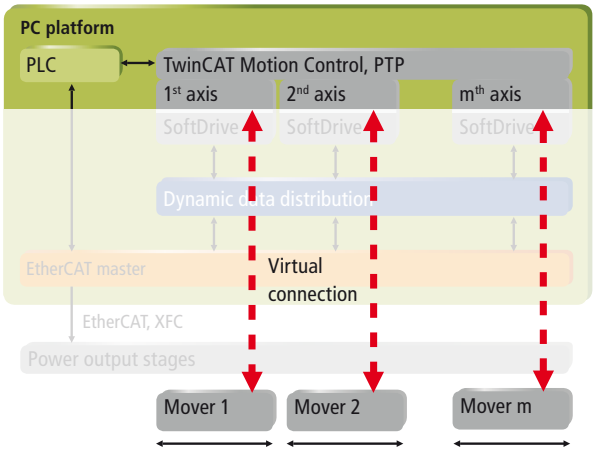
- automatic accumulation
- collision avoidance
- jerk avoidance
- centrifugal force limitation

The integration of the XTS system into a production plant is easily possible thanks to support of numerous fieldbuses. All TwinCAT interfaces and functions simplify development and maintenance:

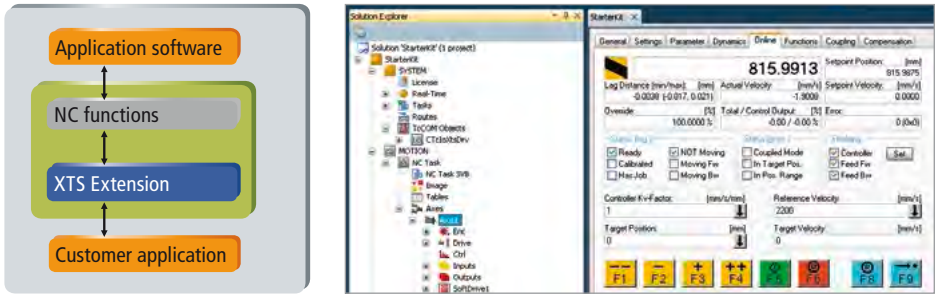
- application-specific programming in IEC 61131
- remote access over Ethernet
- synchronisation (with external application)
- setting of breakpoints
- visualisation of arbitrary variables

Distance monitoring | TF5400 TC3 Advanced Motion Pack integrated

The TF5850 contains the TwinCAT 3 function TF5400 TC3 Advanced Motion Pack with integrated distance monitoring (CA Collision Avoidance). This function is used by the mover axes for automatic monitoring of a pre-set safety distance between each other. If necessary, the axes will automatically brake the movers, taking into account the current dynamic parameters and velocity. Application programming is optimised and simplified significantly.



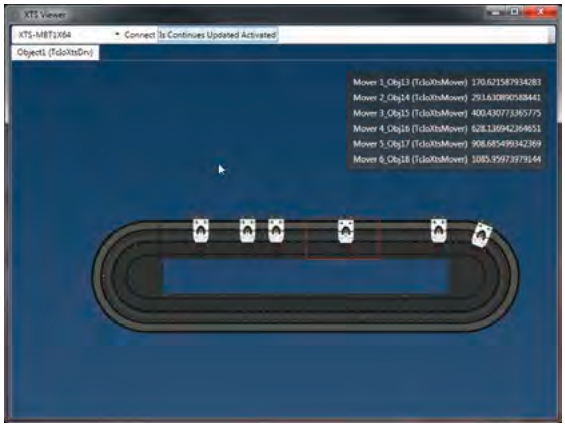
In IEC 61131 a mover can be programmed like a servo axis: simple movement commands are sufficient.



TC3 XTS Extension | In application programming, a mover is handled like a conventional servo axis.

The XTS configurator enables largely automated system configuration.

Axis and controller parameters of a mover can simply be copied within the XTS configurator.



The XTS viewer renders an intuitive online 2D represenation of the movers in motion and can be used as a diagnostics and simulation tool.

Ordering information	
TF5850-0050	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P50 (performance plus)
TF5850-0060	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P60 (mid performance)
TF5850-0070	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P70 (high performance)
TF5850-0080	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P80 (very high performance)
TF5850-0081	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P81 (Many Core, 5-8 Cores)
TF5850-0082	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P82 (Many Core, 9-16 Cores)
TF5850-0083	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P83 (Many Core, 17-32 Cores)
TF5850-0084	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P84 (Many Core, 33-64 Cores)

▶ **www.beckhoff.com/TwinCAT3**