20 Synchronous servo motors for screw drives

EZS

20.1 Overview

Synchronous servo motors for screw drives (direct drive for threaded spindle)

Features

Backlash-free connection with the threaded spindle using a clamping unit	✓
Axial angular contact ball bearing acting on two sides for direct absorption of the threaded spindle forces	✓
Super compact due to tooth-coil winding method with the highest possible copper fill factor	✓
Backlash-free holding brake (optional)	✓
Convection cooling or forced ventilation (optional)	✓
Optical, inductive EnDat absolute encoders or resolvers	✓
Elimination of referencing with multi-turn absolute encoders (optional)	✓
One Cable Solution (OCS) with EnDat 3 encoder (optional)	✓
Electronic nameplate for fast and reliable commissioning	✓
Rotatable plug connectors with quick lock	✓

Axial forces

F_{ax}	760 – 31271 N

20.2   Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from −15 °C to +40 °C
- Operation on a STOBER drive controller
- DC link voltage U_{ZK} = DC 540 V
- Coating: RAL 9005 Jet black, matte

In addition, the technical data applies to an uninsulated design with the following thermal mounting conditions:

Type	Dimensions of steel mounting flange (thickness x width x height)	Convection surface area Steel mounting flange
EZS5	23 x 210 x 275 mm	0.16 m²
EZS7	28 x 300 x 400 mm	0.3 m²

Formula symbols

An explanation of the formula symbols can be found in Chapter [▶ 23.1].

Observe the additional information on the following formula symbols:

- I_0 = RMS value of the line-to-line current when stall torque M_0 is generated (tolerance ±5%).
- I_{max} = RMS value of the short-term maximum permitted line-to-line current when maximum torque M_{max} is generated (tolerance ±5%). Exceeding I_{max} may lead to irreversible damage (demagnetization) of the rotor.
- I_N = RMS value of the line-to-line current when nominal torque M_N is generated at the nominal point (tolerance ±5%).
- M_0 = Torque that a motor is continuously able to deliver at a speed of 10 rpm (tolerance ±5%). At a speed of 0 rpm, a minor continuous torque has to be taken into account. Contact your STOBER customer advisor for such an application.

20.2.1   EZS motors with convection cooling

Type	K_{EM} [V/1000 rpm]	n_N [rpm]	M_N [Nm]	I_N [A]	$K_{M,N}$ [Nm/A]	P_N [kW]	M_0 [Nm]	I_0 [A]	K_{M0} [Nm/A]	M_R [Nm]	M_{max} [Nm]	I_{max} [A]	R_{U-V} [Ω]	L_{U-V} [mH]	T_{el} [ms]	J [kcgm²]	m [kg]
EZS501U	97	3000	3.85	3.65	1.05	1.2	4.30	3.95	1.19	0.40	16.0	22.0	3.80	23.50	6.18	6.50	7.10
EZS502U	121	3000	6.90	5.30	1.30	2.2	7.55	5.70	1.40	0.40	31.0	33.0	2.32	16.80	7.24	8.80	8.50
EZS503U	119	3000	9.10	6.70	1.36	2.9	10.7	7.60	1.46	0.40	43.0	41.0	1.25	10.00	8.00	11.1	10.0
EZS701U	95	3000	6.65	6.80	0.98	2.1	7.65	7.70	1.07	0.59	20.0	25.0	1.30	12.83	9.87	20.3	12.6
EZS702U	133	3000	11.0	7.75	1.42	3.5	13.5	9.25	1.53	0.59	41.0	36.0	1.00	11.73	11.73	25.6	14.9
EZS703U	122	3000	15.3	10.8	1.42	4.8	19.7	13.5	1.50	0.59	65.0	62.0	0.52	6.80	13.08	30.8	17.2

20.2.2   EZS motors with forced ventilation

Type	K_{EM} [V/1000 rpm]	n_N [rpm]	M_N [Nm]	I_N [A]	$K_{M,N}$ [Nm/A]	P_N [kW]	M_0 [Nm]	I_0 [A]	K_{M0} [Nm/A]	M_R [Nm]	M_{max} [Nm]	I_{max} [A]	R_{U-V} [Ω]	L_{U-V} [mH]	T_{el} [ms]	J [kcgm²]	m [kg]
EZS501B	97	3000	5.10	4.70	1.09	1.6	5.45	5.00	1.17	0.40	16.0	22.0	3.80	23.50	6.18	6.50	9.00
EZS502B	121	3000	10.0	7.80	1.28	3.1	10.9	8.16	1.38	0.40	31.0	33.0	2.32	16.80	7.24	8.80	10.4
EZS503B	119	3000	14.1	10.9	1.29	4.4	15.6	11.8	1.35	0.40	43.0	41.0	1.25	10.00	8.00	11.1	11.9
EZS701B	95	3000	9.35	9.50	0.98	2.9	10.2	10.0	1.07	0.59	20.0	25.0	1.30	12.83	9.87	20.3	15.5
EZS702B	133	3000	16.3	11.8	1.38	5.1	19.0	12.9	1.51	0.59	41.0	36.0	1.00	11.73	11.73	25.6	17.8
EZS703B	122	3000	23.7	18.2	1.30	7.4	27.7	20.0	1.41	0.59	65.0	62.0	0.52	6.80	13.08	30.8	20.1

20.3   Torque/speed curves

Torque/speed curves depend on the nominal speed and/or winding design of the motor and the DC link voltage of the drive controller that is used. The following torque/speed curves apply to the DC link voltage DC 540 V.
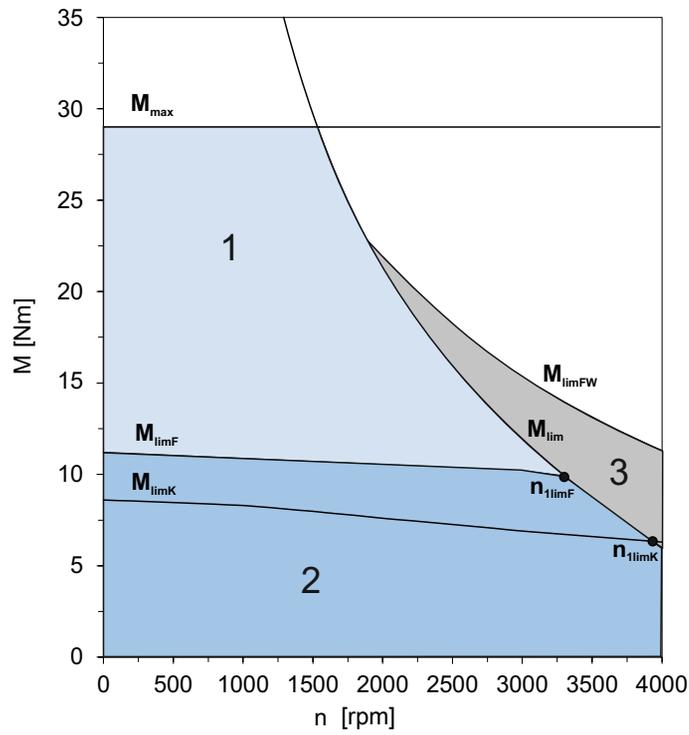

Fig. 1: Explanation of a torque/speed curve

1	Torque range for brief operation ($ED_{10} <$ 100%) with $\Delta\vartheta$ = 100 K	2	Torque range for continuous operation with constant load (S1 mode, ED_{10} = 100%) with $\Delta\vartheta$ = 100 K
3	Field weakening range (can be used only with operation on STOBER drive controllers)		

EZS501 (n_N=3000 rpm)

EZS502 (n_N=3000 rpm)

EZS503 (n_N=3000 rpm)

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EZS701 (n_N=3000 rpm)

EZS702 (n_N=3000 rpm)

EZS703 (n_N=3000 rpm)