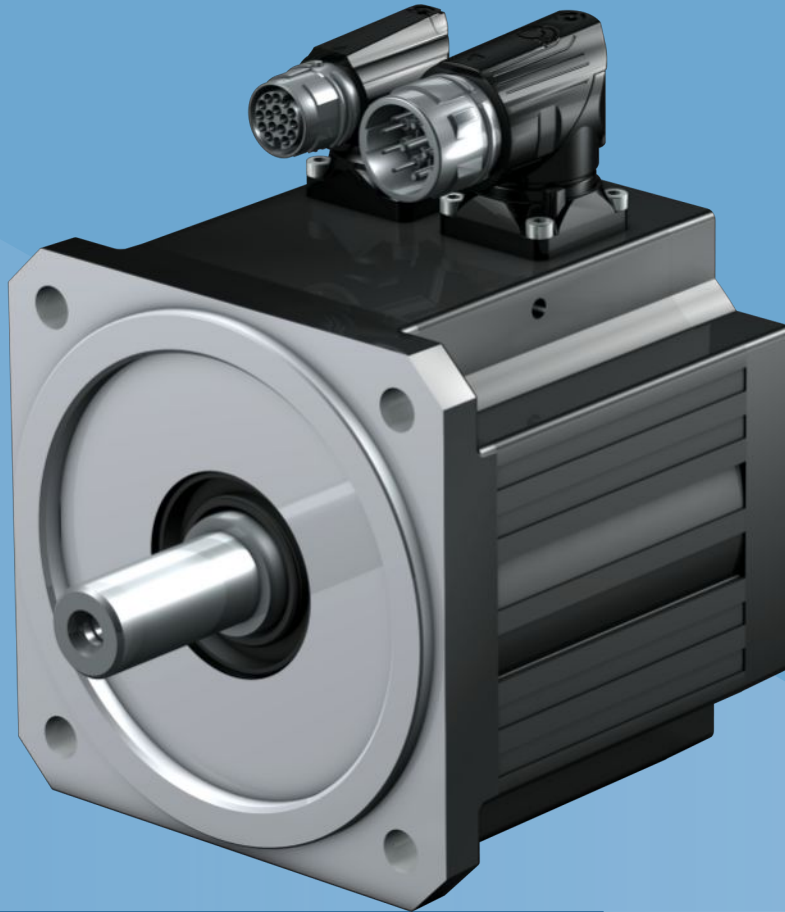




17 Synchronous servo motors

EZ

17.1 Overview

Synchronous servo motors with single tooth winding

Features

- High dynamics ✓
- Short length ✓
- Super compact due to tooth-coil winding method with the highest possible copper fill factor ✓
- Backlash-free holding brake (optional) ✓
- Electronic nameplate for fast and reliable commissioning ✓
- 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) ✓
- Rotatable plug connectors with quick lock ✓

Torques

M_N	0.4 – 77.2 Nm
M_0	0.44 – 94 Nm

17.2 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
EZ2 – EZ5	23 x 210 x 275 mm	0.16 m ²
EZ7 – EZ8	28 x 300 x 400 mm	0.3 m ²

Note the differing ambient conditions in Chapter Derating

Formula symbols

An explanation of the formula symbols can be found in Chapter [▶ 20.1](#).

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.

17.2.1 EZ 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 _{dyn} [kgcm ²]	m _{dyn} [kg]
EZ202U	40	6000	0.40	0.99	0.41	0.25	0.44	1.03	0.45	0.03	1.48	3.48	26.00	15.80	0.61	0.13	1.43
EZ203U	40	6000	0.61	1.54	0.40	0.38	0.69	1.64	0.44	0.03	2.70	5.80	13.20	10.30	0.76	0.17	1.67
EZ301U	40	6000	0.89	1.93	0.46	0.56	0.95	2.02	0.49	0.04	2.80	12.7	11.70	39.80	3.40	0.19	1.50
EZ301U	40	3000	0.93	1.99	0.47	0.29	0.95	2.02	0.49	0.04	2.80	12.7	11.70	39.80	3.40	0.19	1.50
EZ302U	42	6000	1.50	3.18	0.47	0.94	1.68	3.48	0.49	0.04	5.00	17.8	4.50	18.70	4.16	0.29	2.10
EZ302U	86	3000	1.59	1.60	0.99	0.50	1.68	1.67	1.03	0.04	5.00	8.55	17.80	75.00	4.21	0.29	2.10
EZ303U	55	6000	1.96	3.17	0.62	1.2	2.25	3.55	0.65	0.04	7.00	16.9	4.90	21.10	4.31	0.40	2.60
EZ303U	109	3000	2.07	1.63	1.27	0.65	2.19	1.71	1.30	0.04	7.00	8.25	20.30	68.70	5.24	0.40	2.60
EZ401U	47	6000	2.30	4.56	0.50	1.4	2.80	5.36	0.53	0.04	8.50	33.0	1.94	11.52	5.94	0.93	4.00
EZ401U	96	3000	2.80	2.74	1.02	0.88	3.00	2.88	1.06	0.04	8.50	16.5	6.70	37.70	5.63	0.93	4.00
EZ402U	60	6000	3.50	5.65	0.62	2.2	4.90	7.43	0.66	0.04	16.0	43.5	1.20	8.88	7.40	1.63	5.10
EZ402U	94	3000	4.70	4.40	1.07	1.5	5.20	4.80	1.09	0.04	16.0	26.5	3.00	21.80	7.26	1.63	5.10
EZ404U	78	6000	5.80	7.18	0.81	3.6	8.40	9.78	0.86	0.04	29.0	51.0	0.89	7.07	7.94	2.98	7.20
EZ404U	116	3000	6.90	5.80	1.19	2.2	8.60	6.60	1.31	0.04	29.0	35.0	1.85	15.00	8.11	2.98	7.20
EZ501U	68	6000	3.40	4.77	0.71	2.1	4.40	5.80	0.77	0.06	16.0	31.0	2.10	12.10	5.76	2.90	5.00
EZ501U	97	3000	4.30	3.74	1.15	1.4	4.70	4.00	1.19	0.06	16.0	22.0	3.80	23.50	6.18	2.90	5.00
EZ502U	72	6000	5.20	7.35	0.71	3.3	7.80	9.80	0.80	0.06	31.0	59.0	0.76	5.60	7.37	5.20	6.50
EZ502U	121	3000	7.40	5.46	1.36	2.3	8.00	5.76	1.40	0.06	31.0	33.0	2.32	16.80	7.24	5.20	6.50
EZ503U	84	6000	6.20	7.64	0.81	3.9	10.6	11.6	0.92	0.06	43.0	63.5	0.62	5.00	8.06	7.58	8.00
EZ503U	119	3000	9.70	6.90	1.41	3.1	11.1	7.67	1.46	0.06	43.0	41.0	1.25	10.00	8.00	7.58	8.00
EZ505U	103	4500	9.50	8.94	1.06	4.5	15.3	13.4	1.15	0.06	67.0	73.0	0.50	4.47	8.94	12.2	10.9
EZ505U	141	3000	13.5	8.80	1.53	4.2	16.0	10.0	1.61	0.06	67.0	52.0	0.93	8.33	8.96	12.2	10.9
EZ701U	76	6000	5.20	6.68	0.78	3.3	7.90	9.38	0.87	0.24	20.0	31.0	0.87	8.13	9.34	8.50	8.30
EZ701U	95	3000	7.40	7.20	1.03	2.3	8.30	8.00	1.07	0.24	20.0	25.0	1.30	12.83	9.87	8.50	8.30
EZ702U	82	6000	7.20	8.96	0.80	4.5	14.3	16.5	0.88	0.24	41.0	60.5	0.34	3.90	11.47	13.7	10.8
EZ702U	133	3000	12.0	8.20	1.46	3.8	14.4	9.60	1.53	0.24	41.0	36.0	1.00	11.73	11.73	13.7	10.8
EZ703U	99	4500	12.1	11.5	1.05	5.7	20.0	17.8	1.14	0.24	65.0	78.0	0.36	4.42	12.28	21.6	12.8
EZ703U	122	3000	16.5	11.4	1.45	5.2	20.8	14.0	1.50	0.24	65.0	62.0	0.52	6.80	13.08	21.6	12.8
EZ705U	106	4500	16.4	14.8	1.11	7.7	30.0	25.2	1.20	0.24	104	114	0.22	2.76	12.55	34.0	18.3
EZ705U	140	3000	21.3	14.2	1.50	6.7	30.2	19.5	1.56	0.24	104	87.0	0.33	4.80	14.55	34.0	18.3
EZ802U	90	4500	10.5	11.2	0.94	5.0	34.5	33.3	1.05	0.30	100	135	0.13	1.90	14.60	58.0	26.6
EZ802U	136	3000	22.3	13.9	1.60	7.0	37.1	22.3	1.68	0.30	100	84.0	0.30	5.00	16.66	58.0	26.6
EZ803U	131	3000	26.6	17.7	1.50	8.4	48.2	31.1	1.56	0.30	145	124	0.18	2.79	15.50	83.5	32.7
EZ805U	142	2000	43.7	25.9	1.69	9.2	66.1	37.9	1.75	0.30	205	155	0.13	2.22	17.08	133	45.8

17.2.2 EZ 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_{dyn} [kgcm ²]	m_{dyn} [kg]
EZ401B	47	6000	2.90	5.62	0.52	1.8	3.50	6.83	0.52	0.04	8.50	33.0	1.94	11.52	5.94	0.93	5.40
EZ401B	96	3000	3.40	3.40	1.00	1.1	3.70	3.60	1.04	0.04	8.50	16.5	6.70	37.70	5.63	0.93	5.40
EZ402B	60	6000	5.10	7.88	0.65	3.2	6.40	9.34	0.69	0.04	16.0	43.5	1.20	8.88	7.40	1.63	6.50
EZ402B	94	3000	5.90	5.50	1.07	1.9	6.30	5.80	1.09	0.04	16.0	26.5	3.00	21.80	7.26	1.63	6.50
EZ404B	78	6000	8.00	9.98	0.80	5.0	10.5	12.0	0.88	0.04	29.0	51.0	0.89	7.07	7.94	2.98	8.60
EZ404B	116	3000	10.2	8.20	1.24	3.2	11.2	8.70	1.29	0.04	29.0	35.0	1.85	15.00	8.11	2.98	8.60
EZ501B	68	6000	4.50	6.70	0.67	2.8	5.70	7.50	0.77	0.06	16.0	31.0	2.10	12.10	5.76	2.90	7.00
EZ501B	97	3000	5.40	4.70	1.15	1.7	5.80	5.00	1.17	0.06	16.0	22.0	3.80	23.50	6.18	2.90	7.00
EZ502B	72	6000	8.20	11.4	0.72	5.2	10.5	13.4	0.79	0.06	31.0	59.0	0.76	5.60	7.37	5.20	8.50
EZ502B	121	3000	10.3	7.80	1.32	3.2	11.2	8.16	1.38	0.06	31.0	33.0	2.32	16.80	7.24	5.20	8.50
EZ503B	84	6000	10.4	13.5	0.77	6.5	14.8	15.9	1.07	0.06	43.0	63.5	0.62	5.00	8.06	7.58	10.0
EZ503B	119	3000	14.4	10.9	1.32	4.5	15.9	11.8	1.35	0.06	43.0	41.0	1.25	10.00	8.00	7.58	10.0
EZ505B	103	4500	16.4	16.4	1.00	7.7	22.0	19.4	1.14	0.06	67.0	73.0	0.50	4.47	8.94	12.2	12.9
EZ505B	141	3000	20.2	13.7	1.47	6.4	23.4	14.7	1.60	0.06	67.0	52.0	0.93	8.33	8.96	12.2	12.9
EZ701B	76	6000	7.50	10.6	0.71	4.7	10.2	12.4	0.84	0.24	20.0	31.0	0.87	8.13	9.34	8.50	11.2
EZ701B	95	3000	9.70	9.50	1.02	3.1	10.5	10.0	1.07	0.24	20.0	25.0	1.30	12.83	9.87	8.50	11.2
EZ702B	82	6000	12.5	16.7	0.75	7.9	19.3	22.1	0.89	0.24	41.0	60.5	0.34	3.90	11.47	13.7	13.7
EZ702B	133	3000	16.6	11.8	1.41	5.2	19.3	12.9	1.51	0.24	41.0	36.0	1.00	11.73	11.73	13.7	13.7
EZ703B	99	4500	19.8	20.3	0.98	9.3	27.2	24.2	1.13	0.24	65.0	78.0	0.36	4.42	12.28	21.6	15.7
EZ703B	122	3000	24.0	18.2	1.32	7.5	28.0	20.0	1.41	0.24	65.0	62.0	0.52	6.80	13.08	21.6	15.7
EZ705B	106	4500	27.7	25.4	1.09	13	39.4	32.8	1.21	0.24	104	114	0.22	2.76	12.55	34.0	21.2
EZ705B	140	3000	33.8	22.9	1.48	11	41.8	26.5	1.59	0.24	104	87.0	0.33	4.80	14.55	34.0	21.2
EZ802B	90	4500	30.6	30.5	1.00	14	47.4	45.1	1.06	0.30	100	135	0.13	1.90	14.60	58.0	31.6
EZ802B	136	3000	34.3	26.5	1.29	11	47.9	28.9	1.67	0.30	100	84.0	0.30	5.00	16.66	58.0	31.6
EZ803B	131	3000	49.0	35.9	1.37	15	66.7	42.3	1.58	0.30	145	124	0.18	2.79	15.50	83.5	37.7
EZ805B	142	2000	77.2	45.2	1.71	16	94.0	53.9	1.75	0.30	205	155	0.13	2.22	17.08	133	51.8

17.3 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.

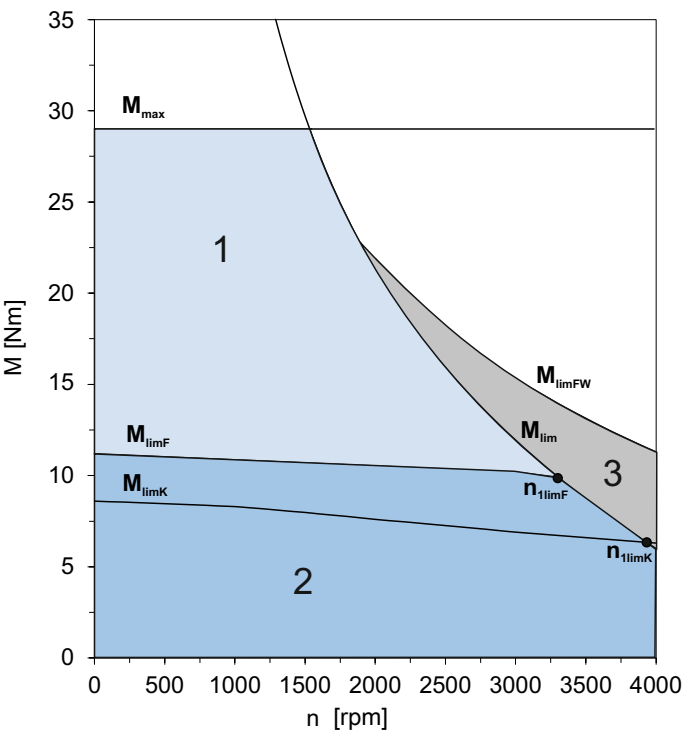


Fig. 1: Explanation of a torque/speed curve

- | | | | |
|---|---|---|---|
| 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 STOBBER drive controllers) | | |

