

Frameless Servo Motor - NK Series

Overview

Description

NK Series Servo motors are an innovative direct drive solution designed for industrial applications. NK Series brushless servomotors combine exceptionally precise and quality motion, high dynamic performance with a compact footprint, allowing complete integration into a mechanical system.

NK motors are suitable to applications where constant speed is needed due to their low cogging characteristic. Support with customisation and integration are possible on request.



Advantages

- Low cogging solution
- Compact diameter
- Oil-proof on request
- Global cost reduction
- Increased reliability and reduced maintenance
- High dynamic performance and power density: increased productivity and reduced size when compared to induction motors
- Simple, light and compact machine design
- No coupling systems needed
- Greater stiffness and robustness of the system
- Low noise level
- Integration assistance

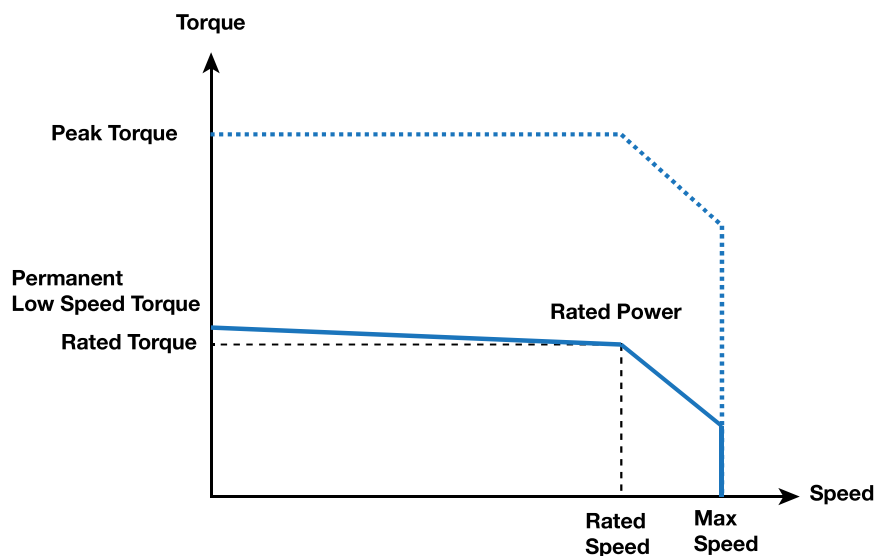
Application

- Medical
- Machine Tools
- Submarine
- Packaging Machinery
- Pump
- Compressor
- Winch
- Special Machine
- Electric Cylinder

Technical Characteristics - Overview

Cooling	Natural cooling	Water cooling
Power	0.2...7.5 kW	3.8...34 kW
Torque	0.45...41 Nm	3.1...90 Nm
Max Speed	8 900 min ⁻¹	15 000 min ⁻¹
Number of poles	10	10
Diameter	42 – 56 – 62 – 80 – 111 – 143 mm	62 – 80 – 111 – 143 mm
Power supply	24 – 48 – 230 – 400 VAC	24 – 48 – 230 – 400 VAC

Technical Data



Motor	Rated Power P _n	Rated Torque M _n	Rated Current I _n	Low speed torque M ₀	Low Speed Current I ₀	Peak Torque M _{peak}	Peak Current I _{peak}	Max. Speed N _{max}	Frequency at max speed	Moment of Inertia J
	[kW]	[Nm]	[Arms]	[Nm]	[Arms]	[Nm]	[Arms]	[min ⁻¹]	[Hz]	[kgmm ²]
230VAC power supply - single or three-phased										
NK110E_P	0.21	0.33	0.79	0.45	1.0	1.7	4.0	6000	500	13
NK210E_T	0.33	0.80	1.11	1	1.3	3.4	5.4	4000	333	38
NK210E_P	0.39	0.61	1.32	1	2.0	3.4	8.0	6000	500	38
NK310E_P	0.43	1.8	1.27	2	1.4	6.6	5.6	2300	192	79
NK310E_K	0.69	1.65	2.06	2	2.4	6.6	9.7	4000	333	79
NK420E_P	0.85	3.53	2.41	4	2.7	13.4	10.9	2300	192	290
NK420E_J	1.31	3.14	3.74	4	4.7	13.4	18.9	4000	333	290
NK430E_J	1.57	4.68	4.53	5,5	5.2	18.7	21.0	3200	267	426
NK430E_F	1.80	4.29	5.28	5,5	6.6	18.7	26.6	4000	333	426
NK620E_R	1.71	7.42	4.99	8	5.3	26.6	21.2	2200	183	980
NK620E_J	2.55	6.08	7.82	8	9.9	26.6	39.5	4000	333	980
NK630E_R	1.63	10.7	4.75	12	5.3	39.9	21.0	1450	121	1470
NK630E_K	2.70	9.21	7.8	12	9.9	39.9	39.4	2800	233	1470
NK630E_G	3.48	8.31	10.1	12	13.9	39.9	55.7	4000	333	1470
NK820E_L	4.99	13.2	14.8	16	17.6	49.9	69.2	3600	300	3200
NK840E_J	5.27	22.9	15.7	28	18.9	91.8	74.8	2200	183	6200
NK860E_F	6.53	32.8	21.8	41	27.0	136.0	107.6	1900	158	9200
NK860E_D	7.48	27.5	22.5	41	33.0	136.0	131.6	2600	217	9200

Technical Data

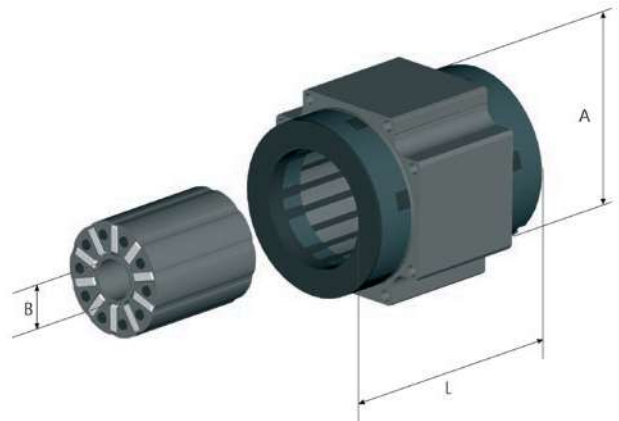
Motor	Rated Power P _n	Rated Torque M _n	Rated Current I _n	Low speed torque M _o	Low speed Current I _o	Peak Torque M _{peak}	Peak Current I _{peak}	Max. Speed N _{max}	Frequency at max speed	Moment of Inertia J
	[kW]	[Nm]	[Arms]	[Nm]	[Arms]	[Nm]	[Arms]	[min ⁻¹]	[Hz]	[kgmm ²]
400VAC power supply - three-phased										
NK210E_T	0.385	0.613	0.9	1	1.3	3.4	5.4	6000	500	38
NK310E_P	0.689	1.65	1.2	2	1.4	6.6	5.6	4000	333	79
NK420E_V	0.753	3.6	1.2	4	1.4	13.4	5.5	2000	167	290
NK420E_P	1.31	3.14	2.2	4	2.7	13.4	10.9	4000	333	290
NK430E_V	0.563	5.38	1.4	5.5	1.4	18.7	5.6	1000	83	426
NK430E_P	1.5	4.77	2.5	5.5	2.8	18.7	11.3	3000	250	426
NK430E_L	1.8	4.29	3.0	5.5	3.8	18.7	15.1	4000	333	426
NK620E_V	1.57	7.52	2.7	8	2.8	26.6	11.3	2000	167	980
NK620E_R	2.52	6.17	4.3	8	5.3	26.6	21.2	3900	325	980
NK620E_J	2.45	4.1	5.6	8	9.9	26.6	39.5	5700	475	980
NK630E_V	1.53	10.8	2.4	12	2.6	39.9	10.5	1350	113	1470
NK630E_R	2.64	9.34	4.2	12	5.3	39.9	21.0	2700	225	1470
NK630E_N	3.18	7.6	5.3	12	7.9	39.9	31.7	4000	333	1470
NK820E_X	2.93	14.7	4.8	16	5.2	49.9	20.3	1900	158	3200
NK820E_R	5.29	12.9	9.1	16	11.0	49.9	43.2	3900	325	3200
NK840E_Q	5.09	23.2	8.5	28	10.1	91.8	39.9	2100	175	6200
NK840E_K	6.8	18.6	11.5	28	16.8	91.8	66.5	3500	292	6200
NK860E_J	7.48	27.5	12.7	41	18.5	136.0	74.0	2600	217	9200
400 VAC power supply - three-phased - water cooled										
NK310W_F	3.8	2.5	7.4	3.1	8.9	5.89	18.0	15000	1250	79
NK420W_D	4.9	4.64	12.6	6.1	16.3	12.6	36.4	12000	1000	290
NK430W_D	7.4	7.26	14.1	9.6	18.3	18.9	38.9	10000	833	420
NK620W_C	7.7	10.7	20.7	15	29	23.5	48.0	10000	833	980
NK630W_D	11.8	17.8	31.2	23	40.1	38.7	72.8	8000	667	1470
NK820W_G	12.6	19	35.2	24	44.1	37.9	75.0	8000	667	3200
NK840W_D	26.4	42.7	52.7	53	65.3	75.8	100.0	6500	542	6200
NK860W_D	34.8	83.2	64.6	90	70.2	140	123.2	4000	333	9200

Associated Drives

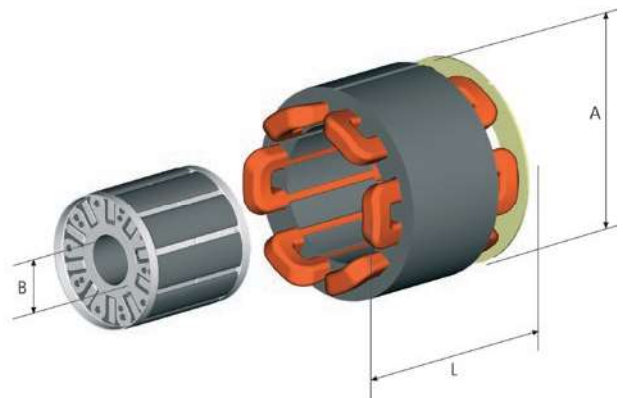
Motor	Compax3	PSD1	SLVD-N	AC890	AC30
230 VAC power supply - single or three-phased					
NK110E_P..	C3S025V2..	PSD1SW1200	SLVD1N	890SD-231300B...	-
NK210E_T..	C3S025V2..	PSD1SW1200	SLVD2N	890SD-231300B...	-
NK210E_P..	C3S025V2..	PSD1SW1200	SLVD2N	890SD-231300B...	-
NK310E_P..	C3S025V2..	PSD1SW1200	SLVD2N	890SD-231300B...	-
NK310E_K..	C3S025V2..	PSD1SW1200	SLVD2N	890SD-231550B...	-
NK420E_P..	C3S063V2..	PSD1SW1300	SLVD5N	890SD-231550B...	-
NK420E_J..	C3S063V2..	-	SLVD5N	890SD-231700B...	-
NK430E_J..	C3S063V2..	PSD1SW1300	SLVD7N	890SD-231700B...	-
NK430E_F..	C3S100V2..	-	SLVD7N	890SD-232165B...	-
NK620E_R..	C3S063V2..	PSD1SW1300	SLVD7N	890SD-231700B...	-
NK620E_J..	C3S100V2..	-	SLVD10N	890SD-232165B...	-
NK630E_R..	C3S063V2..	-	SLVD7N	890SD-231700B...	-
NK630E_K..	C3S100V2..	-	SLVD10N	890SD-232165B...	-
NK630E_G..	C3S150V2..	-	SLVD15N	890SD-232240C...	-
NK820E_L..	-	-	-	890SD-232240C...	-
NK840E_J..	-	-	-	890SD-232240C...	-
NK860E_F..	-	-	-	890SD-232300C...	-
NK860E_D..	-	-	-	-	-
400 VAC power supply - three-phased					
NK210E_T..	C3S015V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK310E_P..	C3S015V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK420E_V..	C3S015V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK420E_P..	C3S038V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK430E_V..	C3S015V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK430E_P..	C3S038V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK430E_L..	C3S038V4..	PSD1MW1300	-	890SD-532100B...	31V4-D0005-B...
NK620E_V..	C3S038V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK620E_R..	C3S075V4..	PSD1MW1400	-	890SD-532100B...	31V4-D0006-B...
NK620E_J..	C3S150V4..	PSD1MW1600	-	890SD-532160B...	31V4-D0006-B...
NK630E_V..	C3S038V4..	PSD1MW1300	-	890SD-531450B...	31V4-D0004-B...
NK630E_R..	C3S075V4..	PSD1MW1400	-	890SD-532100B...	31V4-D0006-B...
NK630E_N..	C3S150V4..	PSD1MW1600	-	890SD-532160B...	31V4-D0010-B...
NK820E_X..	C3S075V4..	PSD1MW1400	-	890SD-532100B...	31V4-D0006-B...
NK820E_R..	C3S150V4..	PSD1MW1600	-	890SD-532160B...	31V4-D0012-B...
NK840E_Q..	C3S150V4..	PSD1MW1600	-	890SD-532160B...	31V4-D0012-B...
NK840E_K..	C3S300V4..	PSD1MW1800	-	890SD-532240C...	31V4-E0023-B...
NK860E_J..	C3S300V4..	PSD1MW1800	-	890SD-532240C...	31V4-E0023-B...
400 VAC power supply - three-phased - water cooled					
NK310W_F..	C3S150V4..	PSD1MW1600	-	890SD-532160B...	31V4-E0016-B...
NK420W_D..	C3S300V4..	PSD1MW1800	-	890SD-532240C...	31V4-E0023-B...
NK430W_D..	C3S300V4..	PSD1MW1800	-	890SD-532240C...	31V4-F0032-B...
NK620W_C..	C3S300V4..	PSD1MW1800	-	890SD-53230SC...	31V4-G0045-B...
NK630W_D..	C3H050V4..	-	-	890SD-532590D...	31V4-G0060-B...
NK820W_G..	C3H050V4..	-	-	890SD-532590D...	31V4-G0060-B...
NK840W_D..	C3H090V4..	-	-	890SD-432730E...	31V4-H0105-B...
NK860W_D..	C3H090V4..	-	-	890SD-432730E...	31V4-G0073-B...

Dimensions

Motor	Dimensions [mm]		
	A	B	L
NK110	42	9	62
NK210	56	12	65



Motor	Dimensions [mm]		
	A	B	L
NK310	62	14	77
NK420	80	20	94
NK430			119
NK620	111	26	106
NK630			135
NK820	143	40	119
NK840			179
NK860			242
NK310W	82	14	85
NK420W	100	20	102
NK430W			127
NK620W	131	26	114
NK630W			143
NK820W	163	40	120
NK840W			180
NK860W			243



Option

Several types of sensor are available for use with servo motor kits depending upon the needs of the application, such as environment, resolution and accuracy: resolver, high resolution sensor, optical encoder...

Order Code

NK Series

	1	2	3	4	5	6	7
Order example	NK110	E	A	K	R1	0	00

1 Motor type	NK110 NK210 NK310	see table "Technical Data"	4 Motor type	P T J	see table "Technical Data"
2 Cooling	E	Natural cooling	5 Fix code	R1	
	W	Water cooling	6 Thermal protection + Brake/Motors	0	Without (standard)
3 Feedback sensors/Motors	A	2 pole resolver		1	PTC (NK3-8 only)
	K	Without sensor (standard)		2	Thermo switch (NK3-8 only)
	P	Absolute single-turn encoder HIPERFACE DSL SIL2 - EKS36		6	KTY (NK3-8 only)
	Q	Absolute multi-turn encoder HIPERFACE DSL SIL2 - EKM36	7 Mechanical characteristics/Motors	00	Standard
	R	Absolute single-turn HIPERFACE encoder 128 ppt SKS36		XX	Customization (on request)
	S	Absolute multi-turn HIPERFACE encoder 128 ppt SKM36			

Feedback Sensors

2 poles resolver - option A

- Accuracy: $\pm 10'$ max
- Transformation ratio: $0.5 \pm 5\%$
- Max. operating speed: $17\,000\text{ min}^{-1}$
- Working temperature range: $-55\dots+155\text{ }^\circ\text{C}$
- Compatibility: NK1 to NK8

Single turn / Multiturn absolute encoder HIPERFACE SKS/SKM36 - option R/S

- Number of sine/cosine periods per revolution: 128
- Absolute position per revolution: 4096 (12 bits)
- Number of absolutely encodable revolutions: 4096 (SKM36)
- Max. operating speed SKS36: $12\,000\text{ min}^{-1}$
- Max. operating speed SKM36: $9\,000\text{ min}^{-1}$
- Working temperature range: $-20\dots+110\text{ }^\circ\text{C}$
- Compatibility: NK2 to NK8

Single turn / Multiturn absolute encoder HIPERFACE EKS/EKM36 - option P/Q

- Up to 20 bit resolution per revolution
- Number of absolutely encodable revolutions: 4096 (EKM)
- SIL2 certified
- Max. operating speed: $12\,000\text{ min}^{-1}$ (EKS), $9\,000\text{ min}^{-1}$ (EKM)
- Working temperature range: $-20\dots+115\text{ }^\circ\text{C}$
- Compatibility: NK1 to NK8