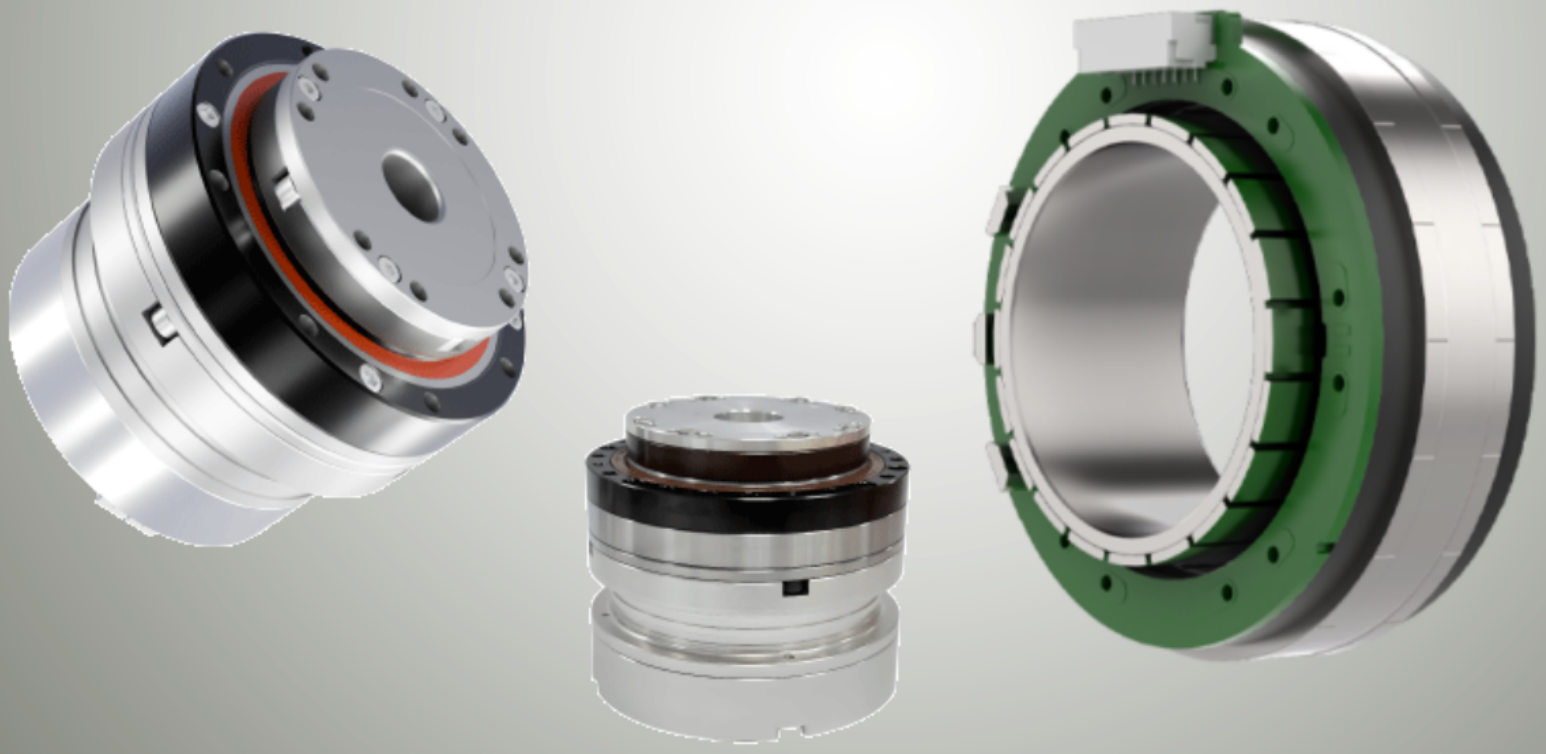
KOCO MOTION

Intelligence in motion



Control. Freedom. Movement.

Frameless Motors and Robotic Joints

www.kocomotion.de

Frameless Motors and Robotic Joints

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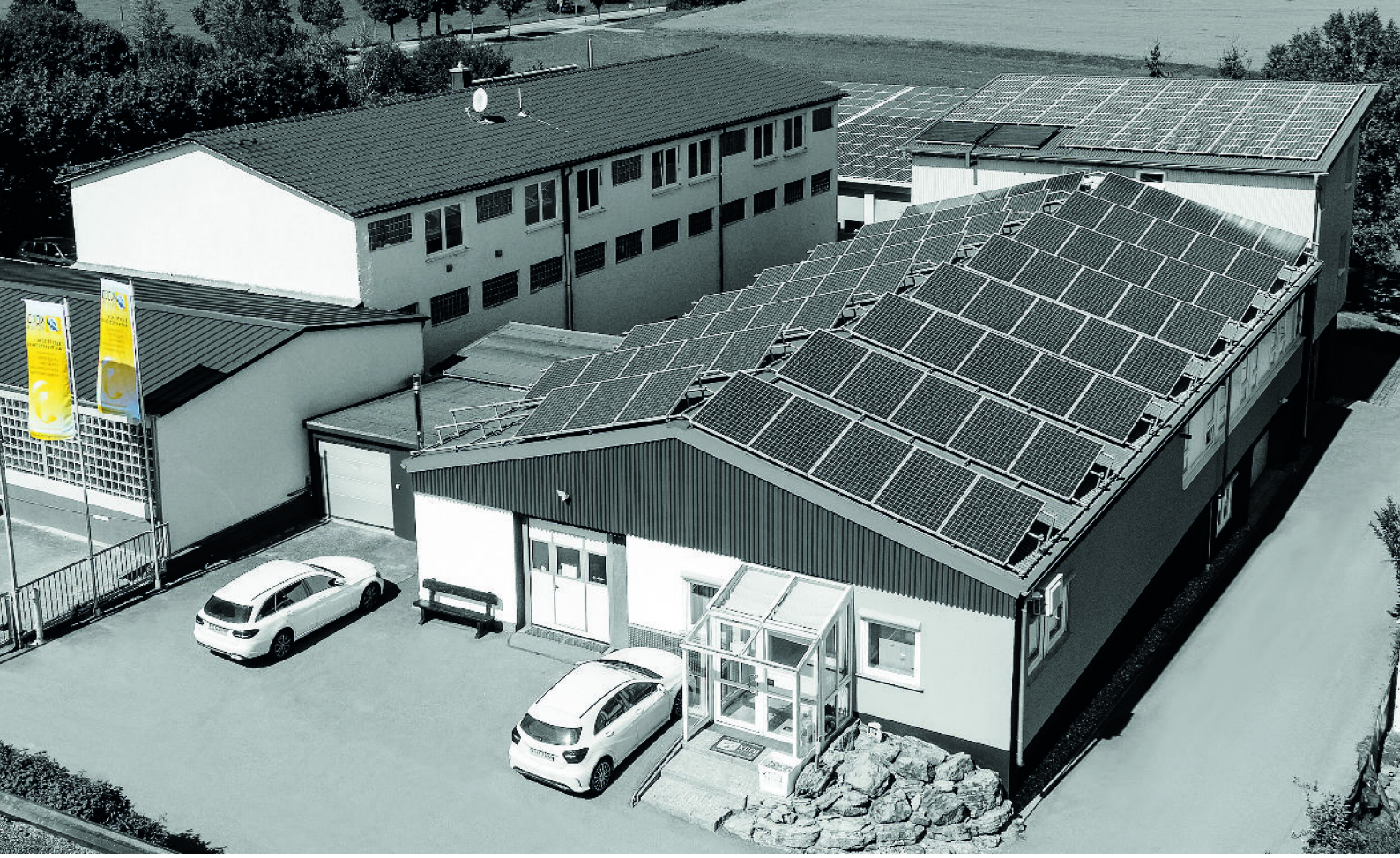
Harmonic Drive Integrated Joints



HIGH CUSTOMER SATISFACTION IS OUR MOTIVATION

From tailor-made drive solutions in small series to complex projects with large quantities - our KOCO MOTION team is ready to provide our customers with advice and support.

We collaborate with our customers to coordinate requirements and specifications and ensure compliance with those through close inspections. On-time delivery and tested quality are always our claim and are also proven by certifications according to DIN EN ISO 9001 and DIN EN ISO 14001.

PERSONAL. ENVIRONMENTALLY FRIENDLY. AND WITH DRIVE.

Our employees are our greatest asset. Their motivation is not only based on good relationships with each other and with KOCO MOTION, but also lies in the opportunity to fully contribute their skills and achieve our company goals in an individual way.

We see ourselves as part of the environment and therefore treat the scarce natural resources we are given carefully. We actively look for ways to keep and improve our actions and behavior in an environmentally friendly manner.

We are KOCO MOTION

...Intelligence in motion

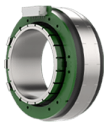
We are only satisfied when the optimal solution has been found for our customers.

As a system house, we always offer our customers the best drive solution and can rely on a global network of motor and control technologies. We implement our customers‘ projects in a highly professional and extremely flexible manner in partnership with our customers. Our aim is always to achieve the highest quality within the agreed budget.

We draw on years of experience in the development and production of electric motors and respond individually to the wishes and ideas of our customers in project consulting. For us, the focus is on the personal relationship with customers, employees and suppliers. We understand our customers‘ needs exactly, achieve a high level of customer satisfaction and are THE partner for our customers when it comes to drives.

25mm Inner Rotor Frameless Torque Motor

DS25mm Series FL

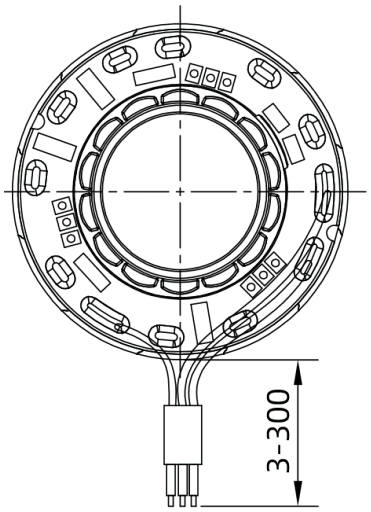


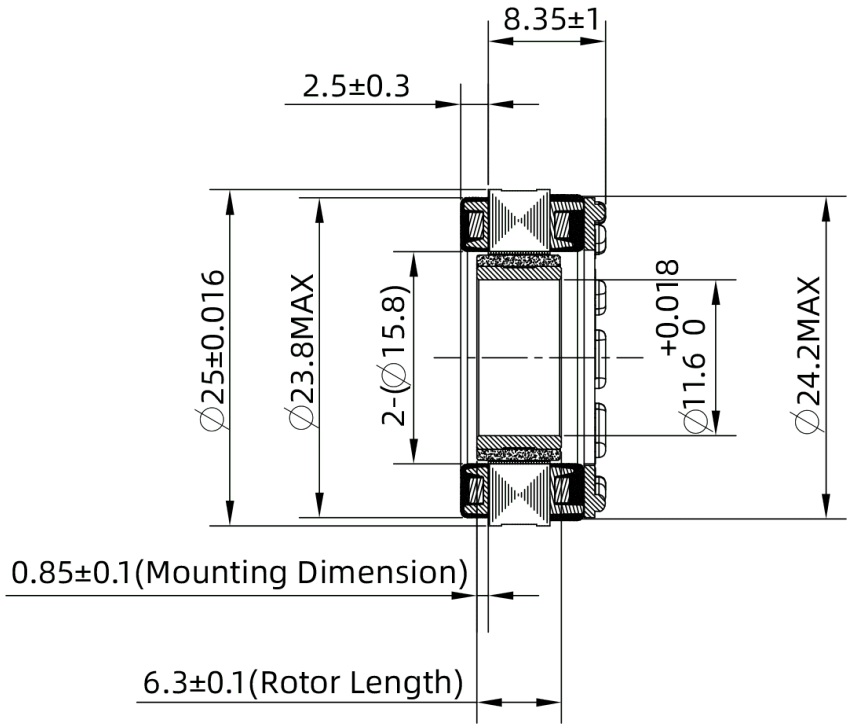
DS25mm Series FL is a 25 mm frameless BLDC motor family for compact direct-drive integration where low mass, small diameter, and high speed are critical. It operates at 24 VDC and delivers 70 W rated power, 0.032 N·m rated torque, and speeds up to 26,000 rpm.

https://www.kocomotion.de/produkt/ds25mm-series/

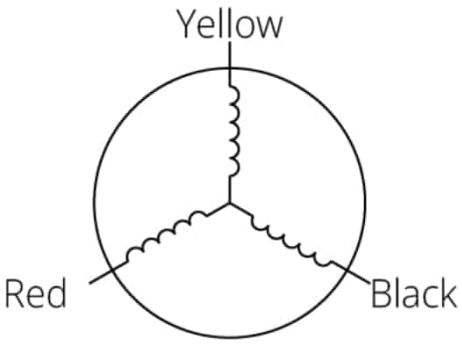
Motor Characteristics	Unit	25ZWC10X-1
Stator outer diameter	mm	25 +/- 0.016
Feedback method		none
Commutation angle		120°
Insulation strength (Withstand voltage)	VAC/3mA/1s	600
Insulation resistance	MΩ/500VDC	50
Stator weight	g	22
Rotor weight	g	3.2
No-load speed	RPM	26000
No-load current	A	0.65(REF)
Rated voltage	VDC	24
Rated power	W	70
Rotor inner diameter	mm	11.6 + 0.018
Rated torque	N·m	0.032
Rated speed	RPM	22650
Rated current	A	8.6
Torque constant	Nm/A	0.009
Back-EMF constant (effective value)	Vrms/Krpm	0.65
Peak torque	N·m	0.105
Peak current	A	13
Rotor inertia	g·cm²	1.47
Motor length	mm	8.35 +/- 1
Number of slots		12
Pole pairs		7
Phase-to-phase resistance	Ω	0.42
Phase-to-phase inductance	mH	0.123
Winding connection method		Star connection
Insulation class		F
Duty type		S2

Drawings

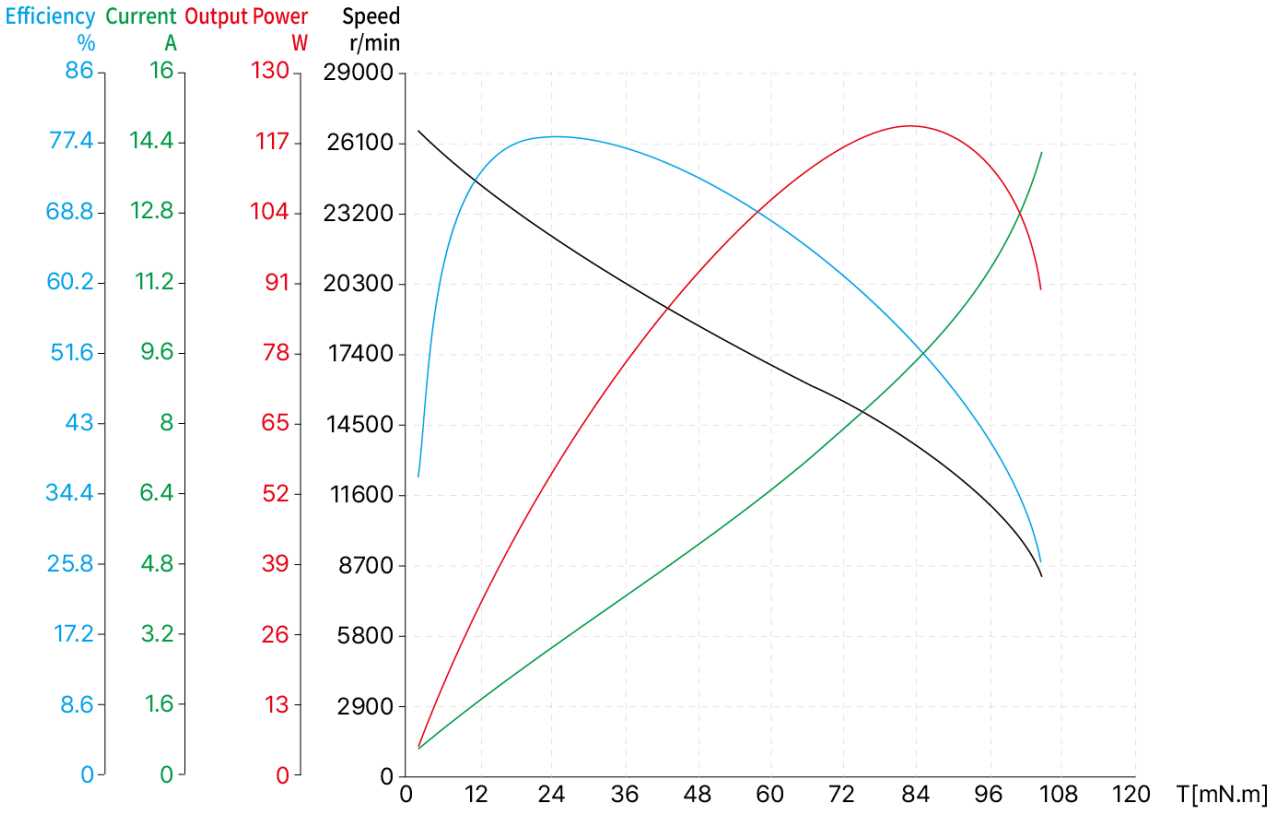




Lead-out type	Lead-out color	Function
UL1332 AWG20	Yellow	U phase
	Red	V phase
	Black	W phase

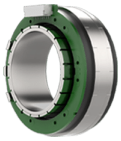


Speed/Thrust Curves



38mm Inner Rotor Frameless Torque Motor

DS38mm Series FL



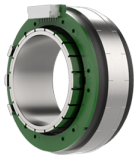
Frameless 38 mm BLDC motor family for compact direct-drive integration in embedded motion assemblies where low mass, space efficiency, and installation flexibility matter. These 48 VDC motors use a 12-slot, 7-pole-pair design and deliver 110 to 245 W rated power with speeds up to 13,000 RPM.

https://www.kocomotion.de/produkt/ds38mm-series/

Motor Characteristics	Unit	38ZWC15X-1	38ZWC22X-7
Stator outer diameter	mm	38 +/- 0.019	38 +/- 0.019
Feedback method		none	none
Commutation angle		120°	120°
Insulation strength (Withstand voltage)	VAC/3mA/1s	1200	1200
Insulation resistance	MΩ/500VDC	50	50
Stator weight	g	50	87
Rotor weight	g	10	20
No-load speed	RPM	13000	13000
No-load current	A	0.6(REF)	0.6(REF)
Rated voltage	VDC	48	48
Rated power	W	110	245
Rotor inner diameter	mm	18 + 0.018	18 + 0.018
Rated torque	N·m	0.1	0.23
Rated speed	RPM	10470	10190
Rated current	A	2.75	6.10
Torque constant	Nm/A	0.035	0.039
Back-EMF constant (effective value)	Vrms/Krpm	2.6	2.88
Peak torque	N·m	0.32	0.76
Peak current	A	11	24.2
Rotor inertia	g·cm²	10	20
Motor length	mm	12.3 +/- 1	12.3 +/- 1
Number of slots		12	12
Pole pairs		7	7
Phase-to-phase resistance	Ω	0.8	0.14
Phase-to-phase inductance	mH	0.9	0.185
Winding connection method		Star connection	Star connection
Insulation class		F	F
Duty type		S2	S2

43mm Inner Rotor Frameless Torque Motor

DS43mm Series FL



Frameless 43 mm BLDC motor family for compact direct-drive integration in embedded systems such as humanoid robotics. The 48 VDC design supports flexible custom installation and external feedback architecture, delivering 31.5 W rated power, 0.1 N·m rated torque at 3000 rpm, and 0.3 N·m peak torque.

https://www.kocomotion.de/produkt/ds43mm-series/

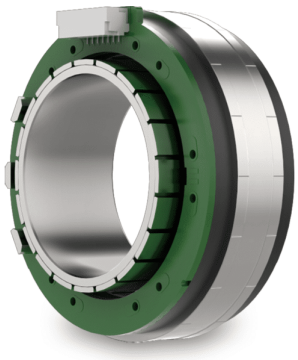
Motor Characteristics	Unit	43ZWC15X-2
Stator outer diameter	mm	43 +/- 0.31
Feedback method		none
Commutation angle		120°
Insulation strength (Withstand voltage)	VAC/3mA/1s	1200
Insulation resistance	MΩ/500VDC	50
Stator weight	g	50
Rotor weight	g	10
No-load speed	RPM	4200
No-load current	A	0.15(REF)
Rated voltage	VDC	48
Rated power	W	31.5
Rotor inner diameter	mm	25 + 0.052
Rated torque	N·m	0.1
Rated speed	RPM	3000
Rated current	A	1
Torque constant	Nm/A	0.1113
Back-EMF constant (effective value)	Vrms/Krpm	8.4
Peak torque	N·m	0.3
Peak current	A	3.3
Rotor inertia	g·cm²	20
Motor length	mm	15.0 +/- 0.5
Number of slots		18
Pole pairs		10
Phase-to-phase resistance	Ω	3.4
Phase-to-phase inductance	mH	2.17
Winding connection method		Star connection
Insulation class		F
Duty type		S2

50mm Inner Rotor Frameless Torque Motor

DS50mm Series FL

Frameless 50 mm BLDC motor family for compact automation and robotics drives. The DS50mm Series FL uses Hall sensor feedback, star winding, and an 18-slot/10-pole-pair design. At 48 VDC, the family delivers up to 219 W rated power and 1.5 N·m peak torque.

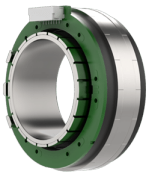
https://www.kocomotion.de/produkt/ds50mm-series/



Motor Characteristics	Unit	50ZWC15X-1	50ZWC25X-1
Stator outer diameter	mm	50 +/- 0.031	50 +/- 0.031
Feedback Method		Hall sensor	Hall sensor
Commutation Angle		120°	120°
Insulation Strength (Dielectric Strength)	VAC/1mA/1s	500	500
Insulation resistance	MΩ/500VDC	100	100
Stator weight	g	77.5	124
Rotor weight	g	38	50
No-load speed	RPM	6400	5000
No-load current	A	0.4(REF)	1.1(REF)
Rated voltage	VDC	48	48
Rated power	W	168	219
Rotor Inner Bore	mm	30 + 0.033	30 + 0.033
Rated torque	N·m	0.3	0.51
Rated speed	RPM	5350	4100
Rated current	A	4.4	5.65
Torque Constant	Nm/A	0.074	0.092
Back-EMF constant (RMS)	Vrms/Krpm	5.5	6.8
Peak Torque	N·m	0.96	1.5
Peak current	A	10.7	16.1
Rotor inertia	g·cm²	100	135
Motor length	mm	13.2 +/- 1	13.2 +/- 1
Number of Slots		18	18
Number of Pole Pairs		10	10
Phase resistance	Ω	0.62	0.6
Phase inductance	mH	0.44	0.45
Winding Connection Type		Star shape	Star shape
Insulation Class		F	F
Duty Cycle		S2	S2

60mm Inner Rotor Frameless Torque Motor

DS60mm Series FL



Frameless 60 mm BLDC motor family for compact direct-drive integration in embedded and space-constrained equipment. The 48 VDC design with Hall sensor feedback delivers 205 W rated power, 0.6 N·m rated torque at 3250 rpm, and up to 1.8 N·m peak torque with flexible mechanical installation.

https://www.kocomotion.de/produkt/ds60mm-series/

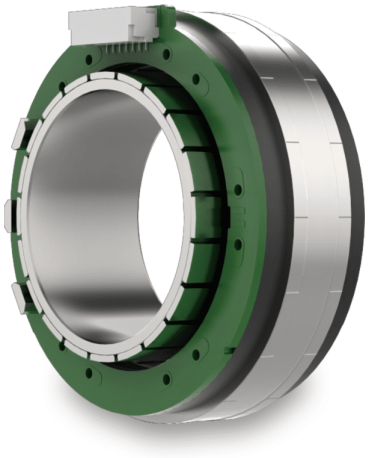
Motor Characteristics	Unit	60ZWC25X-1
Stator outer diameter	mm	60 0 / - 0.08
Feedback method		Hall sensor
Commutation angle		120°
Insulation strength (Withstand voltage)	VAC/3mA/1s	1200
Insulation resistance	MΩ/500VDC	100
Stator weight	g	167
Rotor weight	g	48
No-load speed	RPM	4000
No-load current	A	1.1(REF)
Rated voltage	VDC	48
Rated power	W	205
Rotor inner diameter	mm	36 + 0.039
Rated torque	N·m	0.6
Rated speed	RPM	3250
Rated current	A	5.1
Torque constant	Nm/A	0.12
Back-EMF constant (effective value)	Vrms/Krpm	8.85
Peak torque	N·m	1.8
Peak current	A	14.5
Rotor inertia	g·cm²	122
Motor length	mm	25.2 +/- 0.5
Number of slots		18
Pole pairs		10
Phase-to-phase resistance	Ω	0.24
Phase-to-phase inductance	mH	0.42
Winding connection method		Star connection
Insulation class		F
Duty type		S2

70mm Inner Rotor Frameless Torque Motor

DS70mm Series FL

Frameless 70 mm BLDC motor family for precision automation and motion control. The DS70mm Series FL uses Hall sensor feedback with 120° commutation and delivers up to 456 W rated power, 1.3 N·m rated torque, and speeds up to 3750 RPM at 48 VDC in a compact frameless design.

https://www.kocomotion.de/produkt/ds70mm-series/



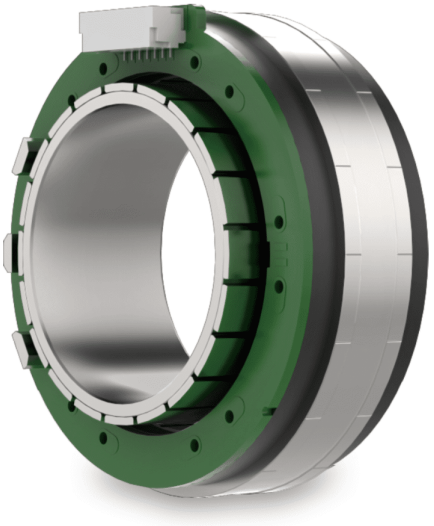
Motor Characteristics	Unit	70ZWC20X-1	70ZWC25X-1
Stator outer diameter	mm	69 + / - 0.037	69 + / - 0.037
Feedback Method		Hall sensor	Hall sensor
Commutation Angle		120°	120°
Insulation Strength (Dielectric Strength)	VAC/1mA/1s	500	500
Insulation resistance	MΩ/500VDC	100	100
Stator weight	g	167.5	224
Rotor weight	g	72	90
No-load speed	RPM	4350	4400
No-load current	A	0.5(REF)	1.3(REF)
Rated voltage	VDC	48	48
Rated power	W	216	456
Rotor Inner Bore	mm	42 + 0.039	42 + 0.039
Rated torque	N·m	0.55	1.3
Rated speed	RPM	3750	3350
Rated current	A	5.4	11.4
Torque Constant	Nm/A	0.109	0.13
Back-EMF constant (RMS)	Vrms/Krpm	8.1	9.6
Peak Torque	N·m	1.65	2.6
Peak current	A	14.2	21
Rotor inertia	g·cm²	358	455
Motor length	mm	15.9 +/- 1	15.9 +/- 1
Number of Slots		18	18
Number of Pole Pairs		10	10
Phase resistance	Ω	0.32	0.22
Phase inductance	mH	0.52	0.35
Winding Connection Type		Star shape	Star shape
Insulation Class		F	F
Duty Cycle		S2	S2

85mm Inner Rotor Frameless Torque Motor

DS85mm Series FL

Frameless 85 mm BLDC motors for industrial automation, robotics, and motion control. The DS85mm Series combines compact integration with Hall sensor feedback for precise commutation, 48 VDC operation, star winding, and robust performance, with models offering up to 827 W rated power and 6 N·m peak torque.

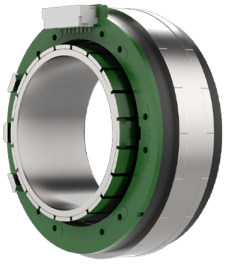
https://www.kocomotion.de/produkt/ds85mm-series/



Motor Characteristics	Unit	85ZWC25X	85ZWC35X-1
Stator outer diameter	mm	85 +/- 0.043	85 +/- 0.043
Feedback Method		Hall sensor	Hall sensor
Commutation Angle		120°	120°
Insulation Strength (Dielectric Strength)	VAC/1mA/1s	500	500
Insulation resistance	MΩ/500VDC	100	100
Stator weight	g	315	460
Rotor weight	g	135	189
No-load speed	RPM	3650	4700
No-load current	A	0.6(REF)	2.4(REF)
Rated voltage	VDC	48	48
Rated power	W	422	827
Rotor Inner Bore	mm	52 + 0.046	52 + 0.046
Rated torque	N·m	1.3	2
Rated speed	RPM	3100	3950
Rated torque	N·m	1.3	2
Rated current	A	10.3	20.6
Torque Constant	Nm/A	0.16	0.117
Back-EMF constant (RMS)	Vrms/Krpm	9.7	8.66
Peak Torque	N·m	3.9	6
Peak current	A	27	62
Rotor inertia	g·cm²	1086	1520
Motor length	mm	20.3 +/- 1	20.3 +/- 1
Number of Slots		18	18
Number of Pole Pairs		10	10
Phase resistance	Ω	0.14	0.06
Phase inductance	mH	0.34	0.12
Winding Connection Type		Star shape	Star shape
Insulation Class		F	F
Duty Cycle		S2	S2

115mm Inner Rotor Frameless Torque Motor

DS115mm Series FL



Frameless 115 mm BLDC motor series for compact integrated drive designs requiring high torque density and direct machine integration. The DS115mm Series uses Hall sensor feedback and 48 VDC operation, delivering 570 W rated power, 3.9 N·m rated torque at 1400 rpm, and up to 12.7 N·m peak torque.

https://www.kocomotion.de/produkt/ds115mm-series/

Motor Characteristics	Unit	115ZWC37X-1
Stator outer diameter	mm	115 +/- 0.025
Feedback method		Hall sensor
Commutation angle		120°
Insulation strength (Withstand voltage)	VAC/3mA/1s	1200
Insulation resistance	MΩ/500VDC	50
Stator weight	g	815
Rotor weight	g	245
No-load speed	RPM	1750
No-load current	A	1.8(REF)
Rated voltage	VDC	48
Rated power	W	570
Rotor inner diameter	mm	74 +0.03
Rated torque	N·m	3.9
Rated speed	RPM	1400
Rated current	A	14.1
Torque constant	Nm/A	0.281
Back-EMF constant (effective value)	Vrms/Krpm	20.8
Peak torque	N·m	12.7
Peak current	A	47
Rotor inertia	g·cm²	3930
Motor length	mm	33.2 +/- 1
Number of slots		27
Pole pairs		15
Phase-to-phase resistance	Ω	0.122
Phase-to-phase inductance	mH	0.477
Winding connection method		Star connection
Insulation class		F
Duty type		S2

50mm Inner Rotor Frameless Torque Motor

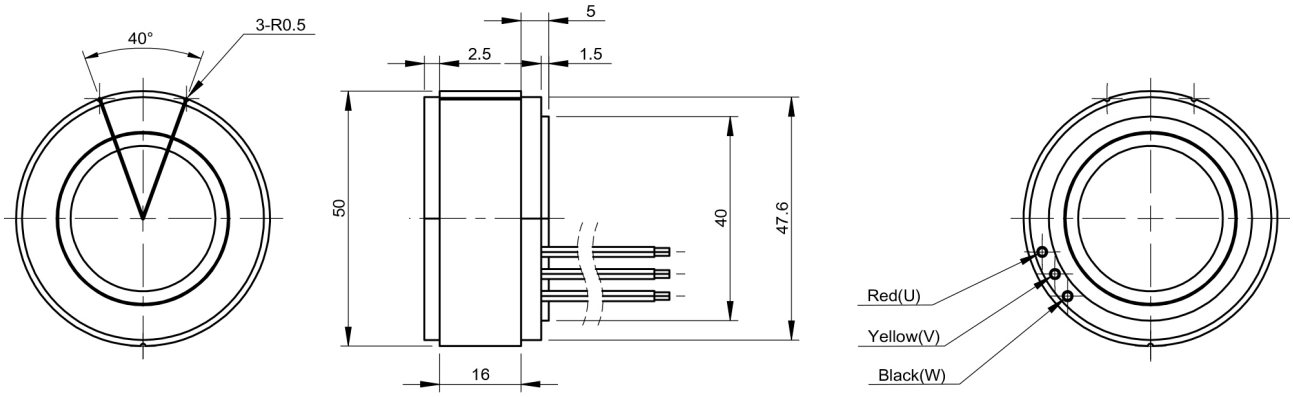
BS5016NFL

The BS5016NFL series features 50mm inner rotor BLDC motors with a slotted, sensorless design for precise control and high efficiency. These motors deliver up to 914 W output power and 6.1 Nm stall torque at 48 V, making them ideal for robotics, industrial automation, and motion control applications. Custom options include shaft length, gear heads, encoders, and specialized winding configurations.

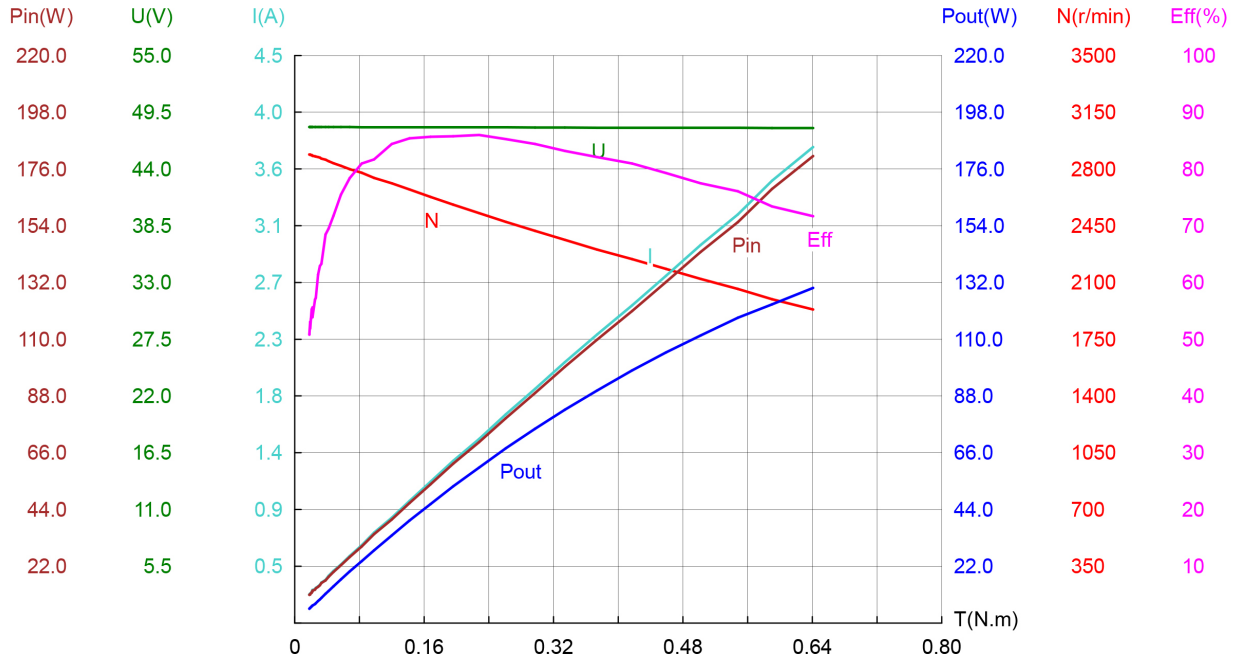
https://www.kocomotion.de/produkt/bs5016nfl/

Motor Specifications	Unit	BS5016NFL-14-48.0	BS5016NFL-29-48.0	BS5016NFL-58-48.0
Rated voltage	V	48.0	48.0	48.0
Rated current	A	1.8	3.1	5.1
Max.output power	W	56	227	914
Max.efficiency	%	85	85	85
Back-EMF constant	mV/rpm	32.8	1.65	8.3
Torque constant	Nm/A	0.31	0.16	0.08
KV Value	rpm/V	30	60	120
Speed/torque gradient	rpm/Nm	973	957	950
Rotor inertia	gcm²	61	61	61
Weight	g	138	138	138
Thermal resistance winding-ambient	K/W	3.3	3.3	3.3
Line resistance	Ω	10	2.5	0.63
Thermal time constant winding	s	120	120	120
Insulation class		B	B	B
Operating temperature	°C	-40~+100	-40~+100	-40~+100
Thermal class of winding	°C	180	180	180
Circuit type		Y	Y	Y
Puncture		500VAC / 5mA /1s	500VAC / 5mA /1s	500VAC / 5mA /1s
Insulation resistance	MΩ/500VDC	100	100	100
No. of pole pairs		10	10	10
No. of slots		18	18	18
Commutation structure		sensorless	sensorless	sensorless
Line inductance	mH	5.2	1.3	0.33
Outer diameter	mm	50	50	50
Motor length	mm	16	16	16
No-load speed	rpm	1440	2880	5760
No-load current	A	0.1	0.2	0.3
Stall torque	N.m	1.5	3	6.1
Stall current	A	4.8	19.2	76.8
Rated torque	N.m	0.53	0.46	0.38
Rated speed	rpm	835	2194	4857

Drawings



Speed/Thrust Curves



60mm Inner Rotor Frameless Torque Motor

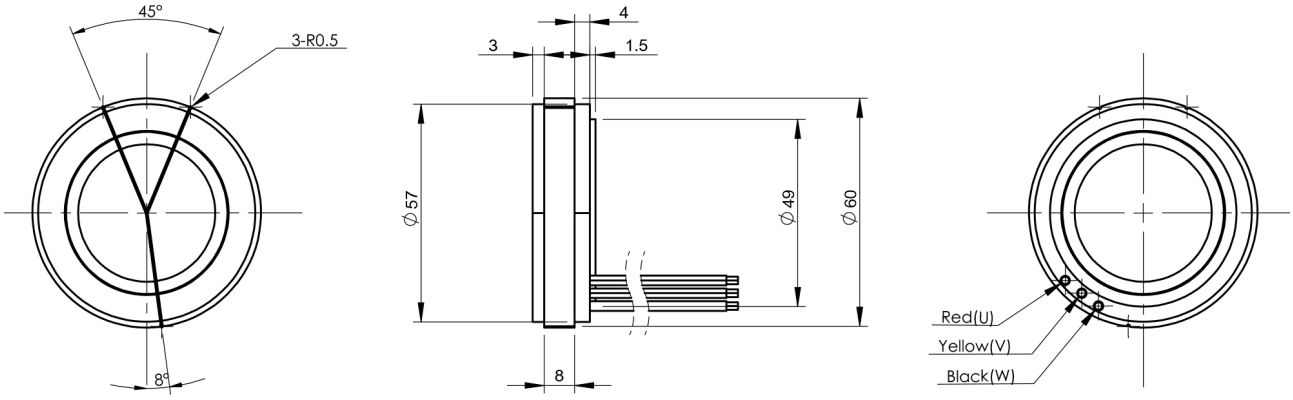
BS6008NFL

The BS6008NFL series features 60mm diameter, slotted, sensorless BLDC inner rotor motors engineered for high-efficiency, maintenance-free operation. Key benefits include compact size, robust torque range, high-speed capability, and advanced thermal management. Ideal for demanding tasks in collaborative robotics, robotic joints, and industrial automation, these motors support custom options such as gearheads, encoders, and various shaft or winding configurations.

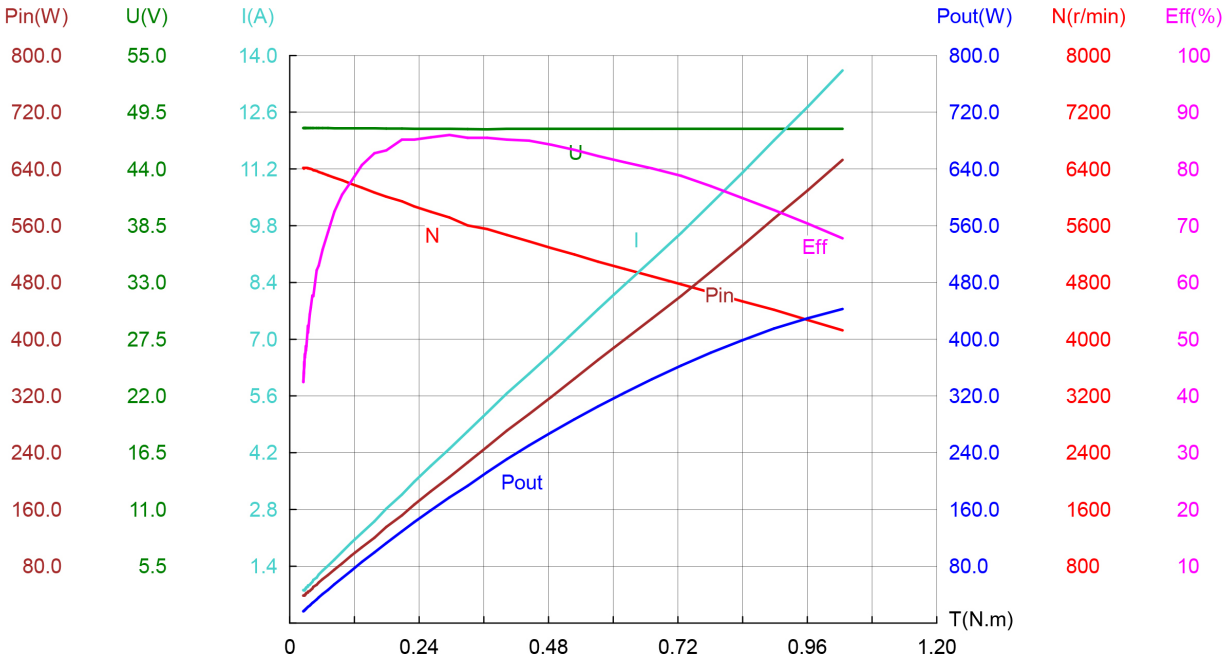
https://www.kocomotion.de/produkt/bs6008nfl/

Motor Specifications	Unit	BS6008NFL-16-48.0	BS6008NFL-33-48.0	BS6008NFL-29-48.0
Rated voltage	V	48.0	48.0	48.0
Rated current	A	2.1	3.9	6.1
Max.output power	W	56	229	922
Max.efficiency	%	86	86	86
Back-EMF constant	mV/rpm	28.8	14.5	7.3
Torque constant	Nm/A	0.28	0.14	0.07
KV Value	rpm/V	34.2	68.3	136.7
Speed/torque gradient	rpm/Nm	1251	1232	1222
Rotor inertia	gcm^2	81	81	81
Weight	g	119	119	119
Thermal resistance winding-ambient	K/W	1.6	1.6	1.6
Line resistance	Ω	9.92	2.48	0.6
Thermal time constant winding	s	120	120	120
Insulation class		B	B	B
Operating temperature	°C	-40~+100	-40~+100	-40~+100
Thermal class of winding	°C	180	180	180
Circuit type		Y	Y	Y
Puncture		500VAC / 5mA /1s	500VAC / 5mA /1s	500VAC / 5mA /1s
Insulation resistance	MΩ/500VDC	100	100	100
No. of pole pairs		10	10	10
No. of slots		24	24	24
Commutation structure		sensorless	sensorless	sensorless
Line inductance	mH	4.16	1.04	0.26
Protection class	IP	20	20	20
Outer diameter	mm	60	60	60
Motor length	mm	8	8	8
No-load speed	rpm	1640	3280	6560
No-load current	A	0.08	0.15	0.3
Stall torque	N.m	1.3	2.7	5.4
Stall current	A	4.8	19.4	77.4
Rated torque	N.m	0.56	0.52	0.4
Rated speed	rpm	841	2377	5459

Drawings



Speed/Thrust Curves



84mm Inner Rotor Frameless Torque Motor

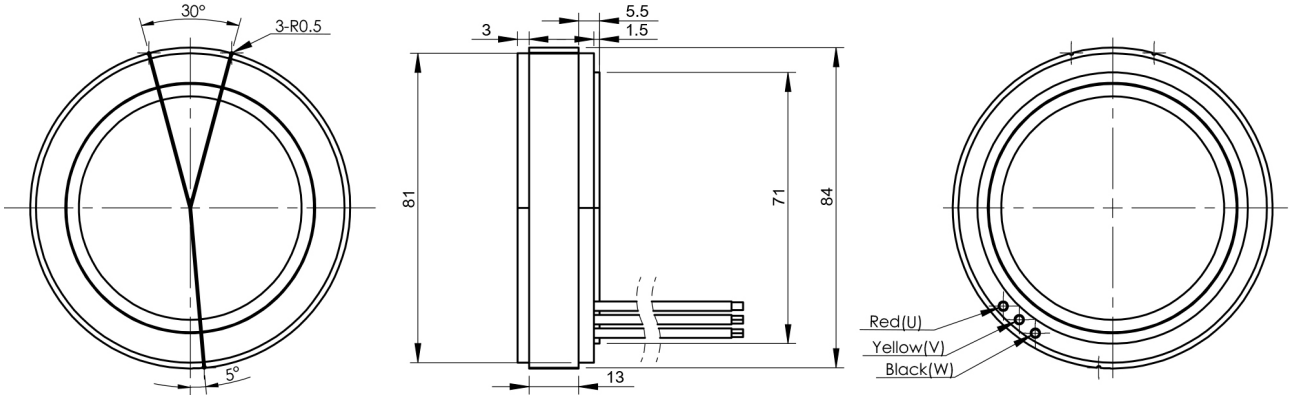
BS8413NFL

The BS8413NFL family features 84mm inner rotor, slotted, sensorless BLDC motors designed for high-efficiency, reliable operation in demanding industrial automation, robotics, and motion control. Offering multiple winding options for versatile performance, these motors deliver up to 2082 W power output, high torque density, and support robust customizations such as shaft modification, gear heads, and feedback devices.

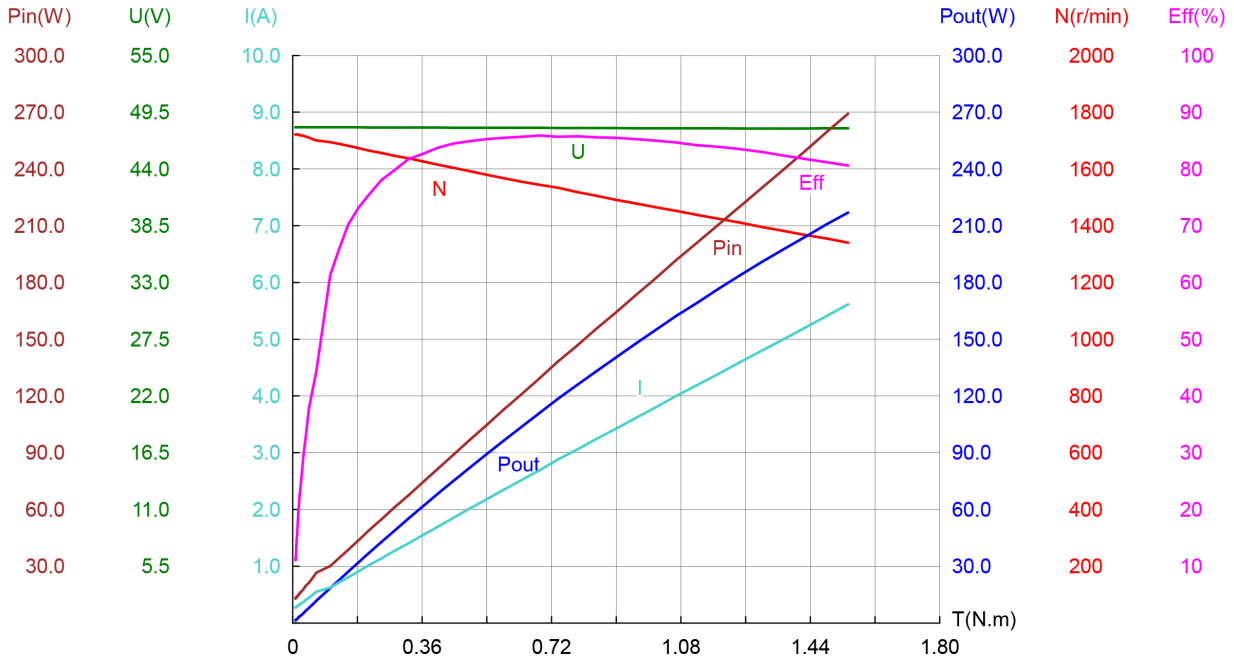
https://www.kocomotion.de/produkt/bs8413nfl/

Motor Specifications	Unit	BS8413NFL-9-48.0	BS8413NFL-17-48.0	BS8413NFL-35-48.0
Rated voltage	V	48.0	48.0	48.0
Rated current	A	3.1	5.2	8.0
Max.output power	W	128	518	2082
Max.efficiency	%	86	86	86
Back-EMF constant	mV/rpm	54.9	27.6	13.8
Torque constant	Nm/A	0.52	0.26	0.13
KV Value	rpm/V	18	36	72.1
Speed/torque gradient	rpm/Nm	153	151	150
Rotor inertia	gcm²	535	535	535
Weight	g	255	255	255
Thermal resistance winding-ambient	K/W	1.9	1.9	1.9
Line resistance	Ω	4.4	1.1	0.28
Thermal time constant winding	s	120	120	120
Insulation class		B	B	B
Operating temperature	°C	-40~+100	-40~+100	-40~+100
Thermal class of winding	°C	180	180	180
Circuit type		Y	Y	Y
Puncture		500VAC / 5mA /1s	500VAC / 5mA /1s	500VAC / 5mA /1s
Insulation resistance	MΩ/500VDC	100	100	100
No. of pole pairs		16	16	16
No. of slots		36	36	36
Commutation structure		sensorless	sensorless	sensorless
Line inductance	mH	2.36	0.59	0.15
Protection class	IP	20	20	20
Outer diameter	mm	84	84	84
Motor length	mm	13	13	13
No-load speed	rpm	865	1730	3460
No-load current	A	0.13	0.25	0.5
Stall torque	N.m	5.6	11.4	23
Stall current	A	10.9	43.6	174.5
Rated torque	N.m	1.5	1.3	1
Rated speed	rpm	565	1379	2979

Drawings



Speed/Thrust Curves



104mm Inner Rotor Frameless Torque Motor

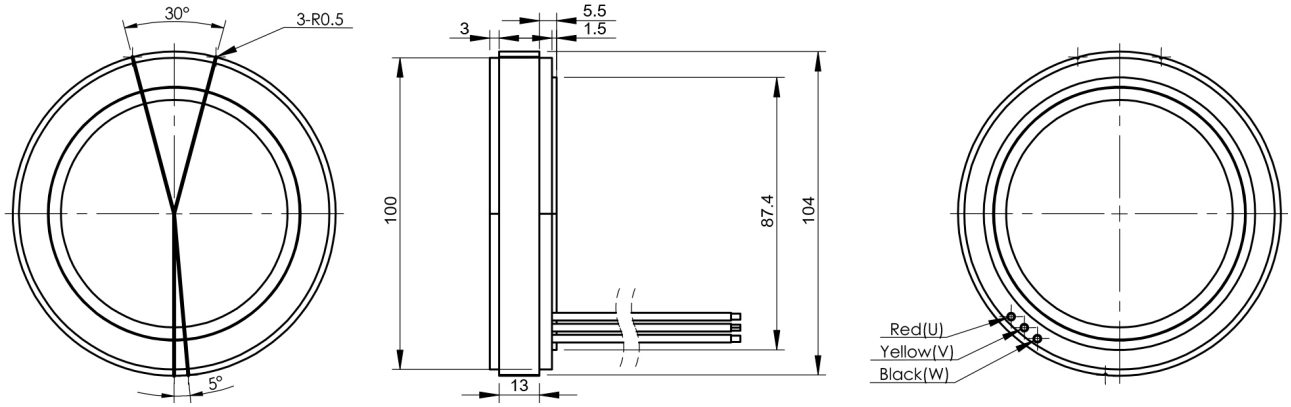
BS10413NFL

The BS10413NFL series features high-performance 104mm BLDC inner rotor motors with slotted, sensorless commutation. Designed for efficient and dynamic motion control, these motors offer high torque density, max output power up to 5.1 kW, and compact construction. Key applications include robotic joints, cooperative robotics, and industrial automation. Custom options such as encoder, special coils, or gear heads increase adaptability for demanding automation tasks.

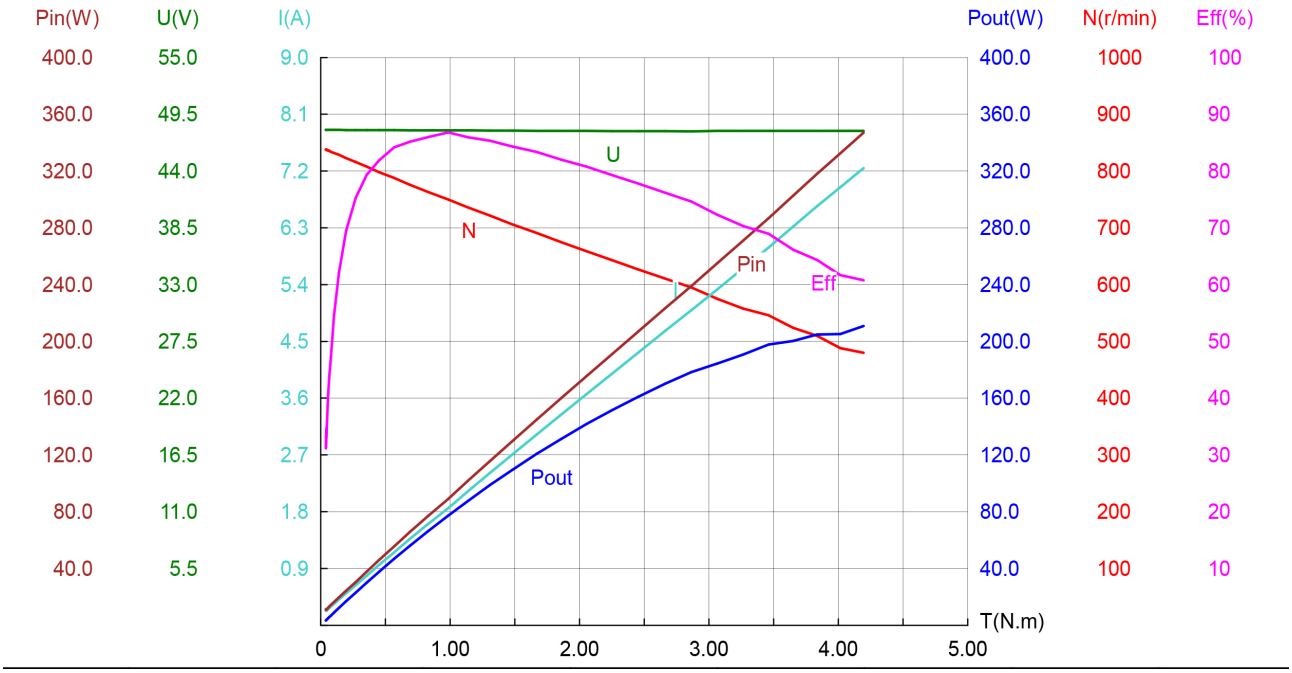
https://www.kocomotion.de/produkt/bs10413nfl/

Motor Specifications	Unit	BS10413NFL-9-48.0	BS10413NFL-17-48.0	BS10413NFL-34-48.0
Rated voltage	V	48.0	48.0	48.0
Rated current	A	4.3	7.3	11.2
Max.output power	W	315	1270	5100
Max.efficiency	%	86	86	86
Back-EMF constant	mV/rpm	56	28.1	14.1
Torque constant	Nm/A	0.54	0.27	0.13
KV Value	rpm/V	17.7	35.4	70.8
Speed/torque gradient	rpm/Nm	60	60	59
Rotor inertia	gcm²	1256	1256	1256
Weight	g	405	405	405
Thermal resistance winding-ambient	K/W	2.3	2.3	2.3
Line resistance	Ω	1.8	0.45	0.11
Thermal time constant winding	s	120	120	120
Insulation class		B	B	B
Operating temperature	°C	-40~+100	-40~+100	-40~+100
Thermal class of winding	°C	180	180	180
Circuit type		Y	Y	Y
Puncture		500VAC / 5mA /1s	500VAC / 5mA /1s	500VAC / 5mA /1s
Insulation resistance	MΩ/500VDC	100	100	100
No. of pole pairs		16	16	16
No. of slots		36	36	36
Commutation structure		sensorless	sensorless	sensorless
Line inductance	mH	1.7	0.43	0.11
Protection class	IP	20	20	20
Outer diameter	mm	104	104	104
Motor length	mm	13	13	13
No-load speed	rpm	850	1700	3400
No-load current	A	0.2	0.4	0.8
Stall torque	N.m	14.2	28.5	57.3
Stall current	A	27	107	427
Rated torque	N.m	2.2	1.8	1.4
Rated speed	rpm	646	1431	2985

Drawings



Speed/Thrust Curves



Inner Rotor Frameless Motor

FL-Series-Frameless motor FL38-FL50

FL-Series frameless 48 V servo motors in FL38 and FL50 sizes provide compact direct-drive integration for precise motion systems. The range covers rated outputs from 94 to 203 W, rated torque from 0.1 to 0.51 Nm, and peak torque up to 1.5 Nm, with efficiency above 80%.

https://www.kocomotion.de/produkt/fl-series-frameless-motor-fl38-fl50/

Characteristics	Unit	FL-38-08	FL-50-08	FL-50-15
Input voltage		48	48	48
Motor Back-EMF constant	Vdc/Krpm	2.54	5.37	8.12
Module torque constant	Nm/A	0.04	0.08	0.12
Motor phase resistance	Ohm	1.07	0.62	0.7
Motor phase inductance	mH	0.89	0.43	0.47
Pole pair		7	10	10
3 phase connection		Y	Y	Y
Encoder		Absolute	Hall+INC	Hall+INC
Weight	kg	0.05	0.12	0.16
Insulation grade		F	F	F
Stator Outer Diameter	mm	38	50	50
No load current	A	0.28	0.35	0.38
Motor length	mm	16.1	17.70 +/- 0.2	24 +/- 0.2
Rated speed		9000	5200	3800
Rated torque	Nm	0.1	0.3	0.51
Rated power	W	94	163	203
Rated current	A	2.75	3.9	4.3
Peak torque	Nm	0.32	0.96	1.5
Peak current	A	8.25	12.48	12.9
Efficiency		>80 %	>83 %	>81 %

Inner Rotor Frameless Motor

FL-Series-Frameless motor FL70-FL85

FL-Series frameless motors FL70 to FL85 are compact 48 V three-phase modules for integrated drive designs where low weight and direct installation are important. Across the range, rated output spans 201 to 733 W, rated torque 0.55 to 2 Nm, with peak torque up to 6 Nm.

https://www.kocomotion.de/produkt/fl-series-frameless-motor-fl70-fl85/

Characteristics	Unit	FL-70-10	FL-70-16	FL-85-13	FL-85-23
Input voltage		48	48	48	48
Motor Back-EMF constant	Vdc/Krpm	8.34	9.86	9.65	9.63
Module torque constant	Nm/A	0.12	0.14	0.14	0.14
Motor phase resistance	Ohm	0.36	0.25	0.16	0.08
Motor phase inductance	mH	0.51	0.38	0.33	0.18
Pole pair		10	10	10	10
3 phase connection		Y	Y	Y	Y
Encoder		Hall+INC	Hall+INC	Hall+INC	Absolute
Weight	kg	0.25	0.32	0.46	0.61
Insulation grade		F	F	F	F
Stator Outer Diameter	mm	70	70	85	85
No load current	A	0.42	0.41	0.37	0.38
Motor length	mm	20.5 +/- 0.2	26 +/- 0.2	25 +/- 0.2	35
Rated speed		3500	3000	2400	3500
Rated torque	Nm	0.55	1.3	1.3	2
Rated power	W	201	408	408	733
Rated current	A	4.4	9.2	9.4	14.5
Peak torque	Nm	1.65	2.6	3.9	6
Peak current	A	13.8	27.6	28.2	43.5
Efficiency		>82 %	>83 %	>82 %	>81 %

Outer Rotor Frameless Motor

FLO-Series-Frameless motor

FLO-Series frameless motors are compact 24 V three-phase motors for integrated motion systems requiring low weight and direct-drive performance. Across FLO-50-15 to FLO-90-15, the range delivers 0.35 to 1.5 Nm rated torque, 91.6 to 252 W rated power, and absolute multi-pole encoder feedback.

https://www.kocomotion.de/produkt/flo-series-frameless-motor/

Characteristics	Unit	FLO-50-15	FLO-70-15	FLO-90-15
Input voltage		24	24	24
Back-EMF constant	Vdc/Krpm	7.93	17	21.1
Torque constant	Nm/A	0.07	0.18	0.23
Phase to phase resistance	Ohm	0.4	0.5	0.35
Phase to phase induction	mH	0.19	0.55	0.28
Pole pair		13	13	17
Cogging torque	Nm	12	30.83	64
3 phase connection		Y	Y	Y
Encoder type		Absolute (Multi-pole)	Absolute (Multi-pole)	Absolute (Multi-pole)
Weight	kg	0.19	0.33	0.46
Insulation grade		F	F	F
No load current	V	0.32	0.21	0.35
Rotor Outer Diameter	mm	50	70	90
Motor length	mm	30.3 +/- 0.1	30.3 +/- 0.1	30.3 +/- 0.1
Rated speed	RPM	2500	2400	1600
Rated torque	Nm	0.35	0.8	1.5
Rated power	W	91.6	200	252
Rated current	A	4.9	4.4	6.6
Peak torque	Nm	0.87	2	3.75
Peak current	A	14.7	13.2	19.8
Efficiency		>83 %	>84 %	>83 %

Harmonic Drive Integrated Robotic Joint

H-Series-Direct drive module

H-Series direct drive modules provide compact, precise motion control for integrated machine axes and automation systems. Across H-50-15 to H-90-15, the range offers 24 or 48 V input, rated output from 91.6 to 252 W, ABS-17bit encoder feedback, CAN BUS communication, and repeat positioning accuracy below 0.01°.

https://www.kocomotion.de/produkt/h-series-direct-drive-module/

Characteristics	Unit	H-50-15	H-70-15	H-90-15
Input voltage	V	24	48	48
Efficiency	%	>83	>84	>83
Back-EMF Constant	Vdc/Krpm	7.93	17	21.1
Torque constant	Nm/A	0.07	0.18	0.23
Phase resistance	Ohm	0.4	0.5	0.35
Ohase inductance	mH	0.19	0.55	0.28
Pole pair		13	13	16
Cogging torque	mNm	12	31	64
3 phase connection		Y	Y	Y
Max axial payload	KN	0.489	1.87	2.35
Max radial payload	KN	0.1	0.44	0.77
No lead speed	RPM	3200	2800	2000
Inertia	kg cm²	0.57	1.80	4.20
Encoder type		ABS-17bit	ABS-17bit	ABS-17bit
Repeat position accuracy	degree	<0.01	<0.01	<0.01
Communication		CAN BUS	CAN BUS	CAN BUS
Weight	kg	0.24	0.47	0.71
Insulation grade		F	F	F
Outer Diameter	mm	50 +/- 0.1	70 +/- 0.1	90 +/- 0.1
Motor length	mm	46	49.5	48.5
No load input current	A	0.4	0.18	0.35
Rated speed	RPM	2500	2400	1600
Rated torque	Nm	0.35	0.8	1.5
Rated output power	W	91.6	200	252
Rated phase current	A	4.9	4.4	6.6
Peak torque	Nm	0.9	2	3.75
Peak phase current	A	12.4	13.2	19.8

Hollow Shaft Harmonic Drive Integrated Robotic Joint

RH-Hollow harmonic series

RH-Hollow harmonic series integrated servo actuators combine a hollow harmonic drive with 48 V operation, low backlash below 40 arcsec, dual 17-bit absolute encoders, and EtherCAT/CAN bus communication. Across RH-14 to RH-32, they provide precise positioning and compact high-torque motion control for demanding automation axes.

https://www.kocomotion.de/produkt/rh-hollow-harmonic-series/

Characteristics	Unit	RH-14	RH-17	RH-20	RH-32
Gear ratio		100	100	100	100
Peak current	A	5.7	7.4	10.6	32.1
Motor Back-EMF constant	Vdc/Krpm	19.2	19.2	19.2	26.7
Module torque constant	Nm/A	4	7.4	7.3	6.9
Motor phase resistance	Ohm	0.62	0.70	0.36	0.08
Motor phase inductance	mH	0.43	0.47	0.51	0.18
Pole pair		10	10	10	10
3 phase connection		Y	Y	Y	Y
Backlash	Arcsec	<40	<40	<40	<40
Radial load static load	KN	8.6	16.3	22	65.4
Radial load dynamic load	KN	5.8	10.4	14.6	38.2
Input voltage	V	48	48	48	48
Axial load static load	KN	58.7	78.2	132.7	342.6
Axial load dynamic load	KN	16.2	20.8	34	81.8
Inertia N	kg m^2	0.29	0.52	0.87	6.86
Inertia B		-	0.56	0.95	8.32
Encoder type		Dual Encoder ABS-17Bit (Input) | ABS-17BIT (Output)	Dual Encoder ABS-17Bit (Input) | ABS-17BIT (Output)	Dual Encoder ABS-17Bit (Input) | ABS-17BIT (Output)	Dual Encoder ABS-17Bit (Input) | ABS-17BIT (Output)
Repeat position accuracy		< 0.01	< 0.01	< 0.01	< 0.01
Communication		EtherCAT & CAN BUS	EtherCAT & CAN BUS	EtherCAT & CAN BUS	EtherCAT & CAN BUS
Weight N	kg	0.78	1.11	1.45	4.32
Weight B		-	1.28	1.75	4.74
Insulation grade		F	F	F	F
No load speed	RPM	30	30	30	30

Characteristics	Unit	RH-14	RH-17	RH-20	RH-32
Outer diameter END	mm	70	80	90	142
Motor length END	mm	81.7	90.2	82.9	108.4
Outer diameter EBD		-	80	90	142
Motor length EBD		-	104	97.4	125.3
No load current	A	0.4	0.6	1.2	2.8
Rated speed	RPM	25	25	25	18
Rated torque	Nm	11	35	50	150
Rated power	W	28	91	130	282
Rated current	A	2.8	4.7	6.8	21.8
Peak torque	Nm	28	54	80	229

Planetary Drive Integrated Robotic Joint

V2-Single encoder

48 V geared actuator family for compact motion systems requiring precise closed-loop control and geared torque output. V2-Single encoder models combine 18-bit feedback with CAN and RS485 communication, covering gear ratios from 6 to 36, rated torque from 3.5 to 18 Nm, and peak torque up to 40 Nm.

https://www.kocomotion.de/produkt/v2-single-encoder/

Characteristics	Unit	X6-7	X6-40	
Gear ratio		6	36	
Pole pair		14	14	
Anti-force torque	Nm	0.08	0.91	
Backlash	Arcmin	10	15	
Axial payload	N	775	775	985
Radial payload	N	1250	1250	1250
Inertia	kg cm²	4.8	28.8	30.6
Encoder type	bit	18	18	18
Communication		CAN:1M/RS485:115200/500K/1M/2.5M	CAN:1M/RS485:115200/500K/1M/2.5M	CAN:1M/RS485:115200/500K/1M/2.5M
Weight	kg	0.35	0.59	0.7
Outer diameter	mm	76	76	98
Input voltage	V	48	48	48
Motor length	mm	38	60.5	5
Rated speed	RPM	400	90	110
Rated torque	Nm	3.5	18	10
Rated power	W	150	170	125
Rated current	A	4	5.2	3.2
Peak torque	Nm	7	40	25
Peak current	A	9	10.5	8
Efficiency	%	70	70	80

Planetary Drive Integrated Robotic Joint

V3-Dual encoder

V3-Dual encoder is a 48 V geared servo actuator family for compact closed-loop motion control with controlled speed reduction, torque output, and dual position feedback. X6-8, X10-40, and X10-100 cover 4.5 to 50 Nm rated torque, 50 to 310 RPM, and CAN or RS485 communication.

https://www.kocomotion.de/produkt/v3-dual-encoder/

Characteristics	Unit	X6-8	X10-40	X10-100
Gear ratio		7	8	35
Pole pair		21	14	21
Anti-force torque	Nm	0.62	0.1	2.88
Backlash	arcmin	10	10	15
Axial payload	N	1625	775	1625
Radial payload	N	2250	1040	2250
Inertia	kg cm²	39.7	6.8	198.6
Encoder type		14 / 14	14 / 14	14 / 14
Communication		CAN:1M(RS485:115200/500K/1M/2.5M	CAN:1M(RS485:115200/500K/1M/2.5M	CAN:1M(RS485:115200/500K/1M/2.5M
Weight	kg	1.15	0.49	1.7
Outer diameter	mm	79	122	122
Input voltage	V	48	48	48
Motor length	mm	44.5	53	74
Rated speed	RPM	165	310	50
Rated torque	Nm	15	4.5	50
Rated power	W	265	135	265
Rated current	A	6.5	3.6	6.7
Peak torque	Nm	40	8	100
Peak current	A	15	7.2	13.5
Efficiency		82	78 %	82

Planetary Drive Integrated Robotic Joint

V4-Special series for robot X2-X6

Integrated geared servo actuators for robot joints, robotic axes, rotary axes, and compact servo mechanisms. The V4-Special X2-X6 family combines motor, gearbox, encoder feedback, and communication in one compact unit for precise motion control in limited installation space, with 24 to 48 V input, 2.5 to 20 Nm rated torque, and 0.01° control accuracy.

https://www.kocomotion.de/produkt/v4-special-series-for-robot-x2-x6/

Characteristics	Unit	X2-7	X4-10	X4-36	X6-60
Gear Ratio		28.17	12.6	36	19.612
Peak Phase Current	A	8.1	19.5	21.5	29.1
Efficiency	%	63	69.5	63.1	72.7
Motor Back-EMF Constant	Vdc/Krpm	4.3	6	6	16
Module Torque Constant	Nm/A	0.8	0.8	1.9	2.1
Motor Phase Resistance	Ohm	0.61	0.32	0.35	0.41
Motor Phase Inductance	mH	0.13	0.14	0.17	0.51
Pole Pair		13	13	13	10
3 Phase Connection		Y	Y	Y	Y
Back Drive Torque	Nm	0.4	0.8	1.14	1.6
Backlash	Arcmin	≤ 15	10	10	10
Input Voltage	V	24	24	24	48
Output Bearing Type		Deep Groove Ball Bearings	Deep Groove Ball Bearings	Crossed Roller Bearings	Crossed Roller Bearings
Axial Load Tensile Load	KN	0.25	1.2	1.3	1.8
Axial Load Compressive Load	KN	0.25	1.2	1.3	0.8
Radial Load	KN	1	1.2	1.5	2
Inertia	Kg cm²	0.17	0.25	0.3	0.66
Encoder Type and Interface		Dual Encoder ABS-17BIT(Input) / 18BIT(Output)	Dual Encoder ABS-17BIT(Input) / 18BIT(Output)	Dual Encoder ABS-17BIT(Input) / 18BIT(Output)	Dual Encoder ABS-17BIT(Input) / 17BIT(Output)
Control Accuracy	Degree	<0.01	<0.01	<0.01	<0.01
Communication		EtherCAT & CAN BUS	EtherCAT & CAN BUS	EtherCAT / CAN BUS	EtherCAT / CAN BUS
Weight	kg	0.26	0.33	0.36	0.82
Insulation Grade		F	F	F	F
No Load Speed	RPM	178	317	111	176
Outer diameter	mm	44 - 0.1	55 +/- 0.1	55 +/- 0.1	80 +/- 0.1
Motor length	mm	63.5 +/- 0.5	55.5 +/- 0.2	61 +/- 0.2	67.5 +/- 0.2

Characteristics	Unit	X2-7	X4-10	X4-36	X6-60
No Load Input Current	A	1	1	0.9	0.9
Rated Speed	RPM	142	238	83	153
Rated Torque	Nm	2.5	4	10.5	20
Rated Output Power	W	37	100	100	320
Rated Phase Current	A	3	7.8	6.1	9.5
Peak Torque	Nm	7	10	34	60

Planetary Drive Integrated Robotic Joint

V4-Special series for robot X8-X15

Special joint actuator series for robot axes X8 to X15, covering compact to high-torque requirements. The family includes 24 to 72 V models with rated torque from 8 to 145 Nm and peak torque from 32 to 450 Nm, supporting precise robotic motion with encoder feedback and industrial communication interfaces.

https://www.kocomotion.de/produkt/v4-special-series-for-robot-x8-x15/

Characteristics	Unit	X8-32	X8-120	X12-320	X15-450
Gear Ratio		9	19.612	20	20.25
Peak Phase Current	A	30	43.8	100	69.2
Efficiency	%	82	79	75	82.4
Motor Back-EMF Constant	Vdc/Krpm	10.9	19.2	17.9	29.9
Module Torque Constant	Nm/A	1.3	2.4	3.3	5.8
Motor Phase Resistance	Ohm	0.13	0.18	0.12	0.08
Motor Phase Inductance	mH	0.081	0.31	0.05	0.14
Pole Pair		21	10	20	20
3 Phase Connection			Y	Y	Y
Back Drive Torque	Nm	0.8	3.21	3.8	4
Backlash	Arcmin	8	10	10	10
Input Voltage	V	24	48	48	72
Output Bearing Type		Deep Groove Ball Bearings	Crossed Roller Bearings	Crossed Roller Bearings	Crossed Roller Bearings
Axial Load Tensile Load	KN	0.6	4	4.5	5.4
Axial Load Compressive Load	KN	0.6	1	4.5	5.4
Radial Load	KN	2	4.5	5	6
Inertia	Kg cm^2	1.43	1.5	12.9	31.6
Encoder Type and Interface		Single Encoder ABS-18BIT	Dual Encoder ABS-17BIT(Input) / 17BIT(Output)	Dual Encoder ABS-17BIT(Input) / 17BIT(Output)	Dual Encoder ABS-17BIT(Input) / 17BIT(Output)
Control Accuracy	Degree	<0.01	<0.01	<0.01	<0.01
Communication		RS485	EtherCAT / CAN BUS	EtherCAT / CAN BUS	485 / EtherCAT / CAN BUS
Weight	kg	0.55	1.40	2.4	3.50
Insulation Grade		F	F	F	F
No Load Speed	RPM	277	158	125	108
Outer diameter	mm	96 +/- 0.1	96 +/- 0.1	124 +/- 0.1	166 +/- 0.1
Motor length	mm	41.2 +/- 0.5	76 +/- 0.2	85 +/- 0.5	69 +/- 0.2

Characteristics	Unit	X8-32	X8-120	X12-320	X15-450
No Load Input Current	A	0.9	1.6	2.7	3.5
Rated Speed	RPM	244	127	100	98
Rated Torque	Nm	8	43	85	145
Rated Output Power	W	204	574	900	1480
Rated Phase Current	A	6.2	17.6	30	25
Peak Torque	Nm	32	120	320	450

Planetary Drive Integrated Joint PJ3

Compact integrated planetary joint modules for robotic and motion-control axes. The PJ3 family combines planetary reduction with CAN / EtherCAT communication in a short 61.2 mm housing. Across the range, it offers 19.5 to 22 gear ratios, 9.5 to 44 Nm rated torque, 24-48 VDC supply, and IP54 protection.

https://www.kocomotion.de/produkt/planetary-drive-integrated-joint-pj3/

Characteristics	Unit	PJ3-60CAN29	PJ3-75CAN42	PJ3-97CAN140
Gear Ratio		19.5	20	22
Weight	g	530	800	1200
Communication Mode		CAN / EtherCAT	CAN / EtherCAT	CAN / EtherCAT
Outer diameter	mm	60	75	97
Rated Torque		9.5 Nm	14	44
Rated Speed	RPM	157.9	60	80
Instantaneous Maximum Torque	Nm	28.5	42	149
Maximum Speed	RPM	200	155	130
IP Level		IP54	IP54	IP54
Supply Voltage	VDC	24-48	24-48	24-28
Through Hole	mm	4.5	4.5	7.5
Length	mm	61.2 0.5	61.1 0.5	61.7 0.5

52mm Harmonic Drive Integrated Robotic Joint

52mm Harmonic Drive Integrated Joint HJ2-52

The HJ2-52 integrated joint module combines motor, harmonic reducer and 24-bit encoder in a compact 52 mm package for humanoid, collaborative and industrial robots. It delivers 5 N·m rated and 11 N·m peak torque, supports EtherCAT/CANFD, and enables closed-loop precision control with optional brake versions.

https://www.kocomotion.de/produkt/52mm-harmonic-drive-integrated-joint-hj2-52/

Characteristics	Unit	HJ2-52H101D24-NK-EC	HJ2-52H101D24-BK-EC
Reduction ratio		101	101
Rated current	A	0.6	2
Resistance	Ω	1.9	1.96
Inductance	mH	0.6	0.788
Pole pairs		10	10
Torque constant	Nm/A	8.6	5.0
Encoder resolution	bit	24	24
Field bus		EtherCAT, CAN, CANFD	EtherCAT, CAN, CANFD
Outer diameter	mm	52	52
Inner diameter	mm	10	10
Length	mm	56.6	74.1
Peak torque	Nm	11	11
Mass	g	326	380
Inertia	g·cm²	60	80
Outer diameter	mm	52	52
Max allowable torque	Nm	8.9	8.9
Rated torque	Nm	5 Speed: 20 RPM	6.5 Speed: 20 RPM
Peak speed	RPM	50	59
Speed	RPM	37 Torque: 2.5 Nm	40 Torque: 3.25 Nm
Backlash	arcsec	10	10
Supply voltage	VDC	48	48
Max current	A	1.3	3

Family Specification	
Available sizes	52/70/80/90/110 mm
Integrated components	Motor, reducer, and encoder

70mm Harmonic Drive Integrated Robotic Joint

70mm Harmonic Drive Integrated Joint HJ2-70

70 mm integrated robotic joint family for compact, high-precision motion axes in humanoid, collaborative, and industrial robots. It combines motor, harmonic reducer, and 24-bit encoder in one unit, with 101:1 reduction, 9.6 Nm rated torque, 34 Nm peak torque, 10 arcsec backlash, and EtherCAT/CAN/CANFD connectivity.

https://www.kocomotion.de/produkt/70mm-harmonic-drive-integrated-joint-hj2-70/

Characteristics	Unit	HJ2-70F101D24-NK-EC	HJ2-70F101D24-BK-EC
Reduction ratio		101	101
Rated current	A	2.3	3.6
Resistance	Ω	0.37	0.47
Inductance	mH	0.19	0.215
Pole pairs		10	10
Torque constant	Nm/A	5.6	8.9
Encoder resolution	bit	24	24
Field bus		EtherCAT, CAN, CANFD	EtherCAT, CAN, CANFD
Outer diameter	mm	70	70
Inner diameter	mm	12	12
Length	mm	61.3	82.3
Peak torque	Nm	34	34
Mass	g	598	800
Inertia	g·cm²	100	125
Outer diameter	mm	70	70
Max allowable torque	Nm	13.5	13.5
Rated torque	Nm	9.6 Speed: 20 RPM	9.6 Speed: 20 RPM
Peak speed	RPM	64	49
Speed	RPM	52 Torque: 4.8 Nm	37 Torque: 4.8 Nm
Backlash	arcsec	10	10
Supply voltage	VDC	48	48
Max current	A	8	5

80mm Harmonic Drive Integrated Robotic Joint

80mm Harmonic Drive Integrated Joint HJ2-80

80 mm integrated robotic joint modules for compact, high-precision motion axes in humanoid, collaborative, and industrial robots. The family combines motor, harmonic reducer, and 24-bit encoder in one unit, with 101:1 reduction, 30 Nm rated torque, 66 Nm peak torque, 48 VDC supply, and EtherCAT/CAN/CANFD connectivity.

https://www.kocomotion.de/produkt/80mm-harmonic-drive-integrated-joint-hj2-80/

Characteristics	Unit	HJ2-80F101D24-NK-EC	HJ2-80F101D24-BK-EC
Reduction ratio		101	101
Rated current	A	3.7	5
Resistance	Ω	0.26	0.33
Inductance	mH	0.19	0.074
Pole pairs		10	10
Torque constant	Nm/A	10.8	9.6
Encoder resolution	bit	24	24
Field bus		EtherCAT, CAN, CANFD	EtherCAT, CAN, CANFD
Outer diameter	mm	80	80
Inner diameter	mm	17	17
Length	mm	68.2	84.2
Peak torque	Nm	66	66
Mass	g	958.2	1170
Inertia	g·cm²	240	400
Outer diameter	mm	80	80
Max allowable torque	Nm	49	49
Rated torque	Nm	30 Speed: 20 RPM	30 Speed: 20 RPM
Peak speed	RPM	48	41
Speed	RPM	36 Torque: 15 Nm	34 Torque: 15 Nm
Backlash	arcsec	10	10
Supply voltage	VDC	48	48
Max current	A	8	6.7

Characteristics	
	-

90mm Harmonic Drive Integrated Robotic Joint

90mm Harmonic Drive Integrated Joint HJ2-90

Integrated robotic joint family for compact, high-precision motion axes in humanoid, collaborative, and industrial robots. These modules combine motor, harmonic reducer, and 24-bit encoder in one unit, delivering 50 Nm rated torque, 102 Nm peak torque, 101:1 reduction, 48 VDC operation, and EtherCAT/CAN/CANFD connectivity.

https://www.kocomotion.de/produkt/90mm-harmonic-drive-integrated-joint-hj2-90/

Characteristics	Unit	HJ2-90F101D24-NK-EC	HJ2-90F101D24-BK-EC
Reduction ratio		101	101
Rated current	A	6.1	6.1
Resistance	Ω	0.27	0.38
Inductance	mH	0.31	0.33
Pole pairs		10	10
Torque constant	Nm/A	10.8	11.8
Encoder resolution	bit	24	24
Field bus		EtherCAT, CAN, CANFD	EtherCAT, CAN, CANFD
Outer diameter	mm	80	90
Inner diameter	mm	18	18
Length	mm	71.2	88.3
Peak torque	Nm	102	102
Mass	g	1229.4	1600
Inertia	g·cm²	370	635
Outer diameter	mm	80	90
Max allowable torque	Nm	61	61
Rated torque	Nm	50 Speed: 20 RPM	50 Speed: 20 RPM
Peak speed	RPM	50	40
Speed	RPM	36 Torque: 25 Nm	30 Torque: 25 Nm
Backlash	arcsec	10	10
Supply voltage	VDC	48	48
Max current	A	12.4	8.4

110mm Harmonic Drive Integrated Joint HJ2-110

Integrated 110 mm robotic joint family for compact, high-precision motion axes in humanoid, collaborative, and industrial robots. These modules combine motor, harmonic reducer, and 24-bit encoder in one unit, with 101:1 reduction, 84 Nm rated torque, 194 Nm peak torque, 48 VDC supply, and EtherCAT/CAN/CANFD connectivity.

https://www.kocomotion.de/produkt/110mm-harmonic-drive-integrated-joint-hj2-110/

Characteristics	Unit	HJ2-110F101D24-NK-EC	HJ2-110F101D24-BK-EC
Reduction ratio		101	101
Rated current	A	8.6	9
Resistance	Ω	0.13	0.13
Inductance	mH	0.22	0.25
Pole pairs		10	10
Torque constant	Nm/A	12.8	14.3
Encoder resolution	bit	24	24
Field bus		EtherCAT, CAN, CANFD	EtherCAT, CAN, CANFD
Outer diameter	mm	110	110
Inner diameter	mm	25	25
Length	mm	80.2	97.6
Peak torque	Nm	194	194
Mass	g	1981.2	2600
Inertia	g·cm²	1010	1550
Outer diameter	mm	110	110
Max allowable torque	Nm	133	133
Rated torque	Nm	84 Speed: 20 RPM	84 Speed: 20 RPM
Peak speed	RPM	40	36
Speed	RPM	31 Torque: 42 Nm	27 Torque: 42 Nm
Backlash	arcsec	10	10
Supply voltage	VDC	48	48
Max current	A	19.9	10.4

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