

STEPPING MOTORS

2-Phase Hybrid Type

1.8°, 0.9° and 0.45° Full Step Angle

SCHRITTMOTOREN

2-Phasen Hybrid-Schrittmotoren

1,8°, 0,9° und 0,45° Vollschrittwinkel

STEPPING MOTORS

SPECIFICATIONS

Full Step Series	Model A = Single Shaft B = Double Shaft	Bipolar				Unipolar				Length [mm]	Page
		Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]		
1.8° HECM □ 20 mm	HECM213-F0.5 (A/B)	0.017	0.50	4.2	1.8					33.5	4
	HECM213-F0.4 (A/B)	0.017	0.35	8.5	3.4	only bipolar drive available				33.5	
	HECM215-F0.5 (A/B)	0.034	0.47	9.8	4.3	nur in bipolarer Ausführung erhältlich				46.5	
	HECM215-F0.4 (A/B)	0.034	0.35	16.0	7.0					46.5	
1.8° HECM □ 28 mm	HECM223-F1.2 (A/B)	0.078	1.2	1.6	1.6					33.5	5
	HECM223-F0.7 (A/B)	0.078	0.7	4.2	3.9	only bipolar drive available				33.5	
	HECM225-F1.2 (A/B)	0.140	1.2	2.2	2.0	nur in bipolarer Ausführung erhältlich				47.5	
	HECM225-F0.7 (A/B)	0.140	0.7	6.2	5.7					47.5	
1.8° SECM □ 28 mm	SECM223-S1.5 (A/B)	0.075	1.0	1.4	1.2	0.050	1.5	0.7	0.3	33.5	
	SECM223-S1.0 (A/B)	0.080	0.67	5.4	4.8	0.060	0.95	2.7	1.2	33.5	
	SECM225-S1.4 (A/B)	0.130	1.0	2.0	2.2	0.090	1.4	1.0	0.55	47.5	
1.8° HECM □ 42 mm	HECM244-F1.3 (A/B)	0.50	1.3	3.6	6.0					41	6 / 7
	HECM244-F0.9 (A/B)	0.50	0.85	8.0	14.0					41	
	HECM245-F1.3 (A/B)	0.62	1.3	3.8	6	only bipolar drive available				49	
	HECM245-F0.9 (A/B)	0.62	0.85	9.8	15.0	nur in bipolarer Ausführung erhältlich				49	
	HECM246-F1.3 (A/B)	0.93	1.3	5.2	10.0					61	
	HECM246-F0.9 (A/B)	0.93	0.85	12.0	24.0					61	
1.8° SECM □ 42 mm	SECM243-S1.0 (A/B)	0.21	0.67	8.4	11.2	0.16	0.95	4.2	2.8	33	8 / 9
	SECM243-S0.4 (A/B)	0.21	0.28	48.0	60.0	0.16	0.40	24.0	15.0	33	
	SECM243-S0.3 (A/B)	0.21	0.22	80	88.0	0.16	0.30	40.0	22.0	33	
	SECM243-F1.3 (A/B)	0.22	1.30	2.2	3.3	only bipolar drive available				33	
	SECM244-S1.2 (A/B)	0.33	0.85	6.6	14.4	0.26	1.20	3.3	3.6	39	
	SECM244-S0.8 (A/B)	0.33	0.57	16.0	30.4	0.26	0.80	8.0	7.6	39	
	SECM244-S0.4 (A/B)	0.33	0.28	60.0	120.0	0.26	0.40	30.0	30.0	39	
	SECM244-S0.2 (A/B)	0.33	0.14	240.0	424.0	0.26	0.20	120.0	106.0	39	
	SECM244-F1.1 (A/B)	0.37	1.13	3.7	7.8	nur in bipolarer Ausführung erhältlich				39	
	SECM245-S1.2 (A/B)	0.41	0.85	6.6	12.0	0.32	1.20	3.3	3.0	47	
	SECM245-S0.8 (A/B)	0.41	0.57	18.0	38.0	0.32	0.80	9.0	9.5	47	
	SECM245-S0.4 (A/B)	0.41	0.28	60.0	116.0	0.32	0.40	30.0	29.0	47	
0.9°ECM □ 42 mm	ECM243M-S0.9 (A/B)	0.10	0.64	8.8	10.0	0.08	0.90	4.4	2.5	33	10 / 11
	ECM243M-S0.3 (A/B)	0.10	0.21	80.0	84.0	0.08	0.30	40.0	21.0	33	
0.9°-0.45° □ 39 mm	ECM232M-F0.3 (A/B)	0.050	0.32	38.0	19.0	only bipolar drive available				22	
	ECM232N-F0.3 (A/B)	0.046	0.30	40.0	25.0	nur in bipolarer Ausführung erhältlich				22	
Stepping Motor with Encoder											
1.8° SECM □ 42 mm	SECM243-S1.0H2200	0.21	0.67	8.4	11.2	0.16	0.95	4.2	2.8	50	12
	SECM243-S1.0P2200	0.21	0.67	8.4	11.2	0.16	0.95	4.2	2.8	52	
	SECM244-S1.2H2200	0.33	0.85	6.6	14.4	0.26	1.20	3.3	3.6	56	
	SECM244-S1.2P2200	0.33	0.85	6.6	14.4	0.26	1.20	3.3	3.6	58	
	SECM245-S1.2H2200	0.41	0.85	6.6	12.0	0.32	1.20	3.3	3.0	64	
	SECM245-S1.2P2200	0.41	0.85	6.6	12.0	0.32	1.20	3.3	3.0	66	

Planetary Gear see Page 13 -15

Planetengetriebe siehe Seite 13 - 15

Driver Electronics see Page 16

Treiberelektronik siehe Seite 16

Our quality system for motion control components has been examined and officially certified by TÜV Germany according to DIN EN ISO 9001:2000

Unser Qualitätssystem wurde hinsichtlich des Bereiches Vertrieb von Antriebskomponenten hin überprüft und offiziell mit dem TÜV Zertifikat DIN EN ISO 9001:2000 ausgezeichnet.



Our stepping motors are certified according to EN 61000-6-2:2001 and EN 61000-6-3:2001. EMC standards.

Unsere Schrittmotoren wurden zertifiziert nach EMV-Standard EN61000-6-2:2001 und EN61000-6-3:2001.

PRODUCT NUMBER CODE

S E C M 2 4 3 M - S 1.0 A

Shaft Type: A = Single Shaft Welle: A = Einzelwelle
 B = Double Shaft B = Doppelwelle
 P = Encoder P = Encoder

Current per phase
 Strom pro Phase

S = 6 Leadwires / Anschlußdrähte
 F = 4 Leadwires / Anschlußdrähte

Full Step Angle: No Letter = 1.8°, M = 0.9°, N = 0.45°
 Vollschrtrittwinkel: Ohne Buchstabe = 1,8°, M = 0,9°, N = 0,45°

Length of Motor: ex. 2 = approx. 22 mm
 Motorlänge: z. B. 2 = ca. 22 mm

Mounting Size: 1 = 20x20 mm, 2 = 28x28 mm, 3 = 39x39 mm, 4 = 42x42 mm
 Flanschmaß: 1 = 20x20 mm, 2 = 28x28 mm, 3 = 39x39 mm, 4 = 42x42 mm

Number of phase: 2 = 2 phase motor
 Anzahl der Phasen: 2 = 2 Phasenmotor

EC Motion Stepping Motor

S or H = High Torque Series
 S oder H = Drehmomentverstärkte Serie
 No Letter = Standard Series
 Ohne Buchstabe = Standardserie

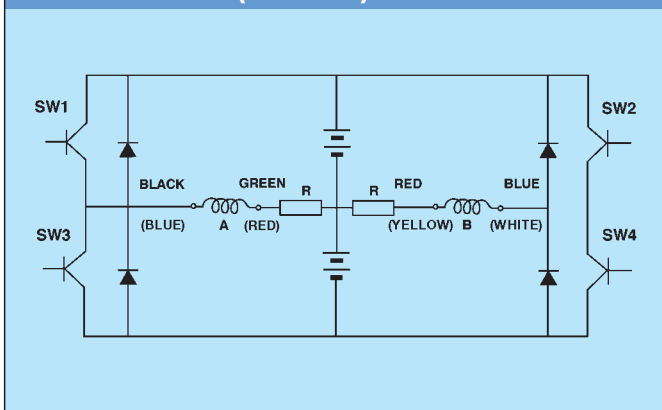
Operation of 2 phase Stepping Motor

Stepping Motors operate on Phase-Switched DC Power. The motor shaft advances 200 (400, 800) steps per revolution with 1.8° (0.9°, 0.45°) motor when a Full-Step mode is used. When a Half-Step mode is used, 400 (800, 1600) steps per revolution with 1.8° (0.9°, 0.45°) motor.

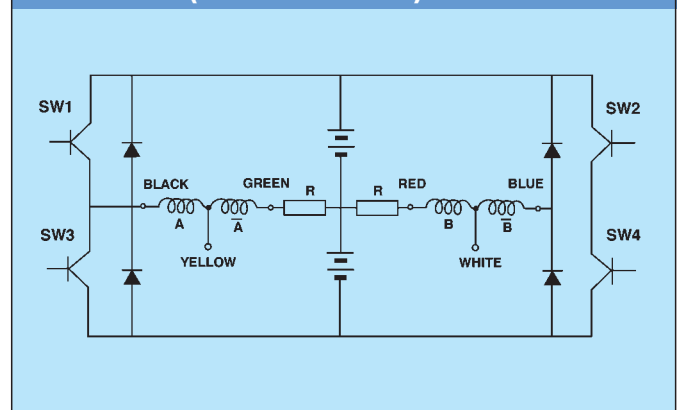
Arbeitsweise der 2-Phasen Schrittmotoren

Schrittmotoren benötigen zum Betrieb eine geschaltete Gleichspannung. Die Motorwelle eines 1,8° (0,9°, 0,45°) Schrittmotors führt beim Vollschrtrittbetrieb 200 (400, 800) Schritte pro Umdrehung aus. Bei Halbschrtrittbetrieb verdoppeln sich die oben angegebenen Schritte auf 400 (800, 1600) Schritte bei einem 1,8° (0,9°, 0,45°) Schrittmotor.

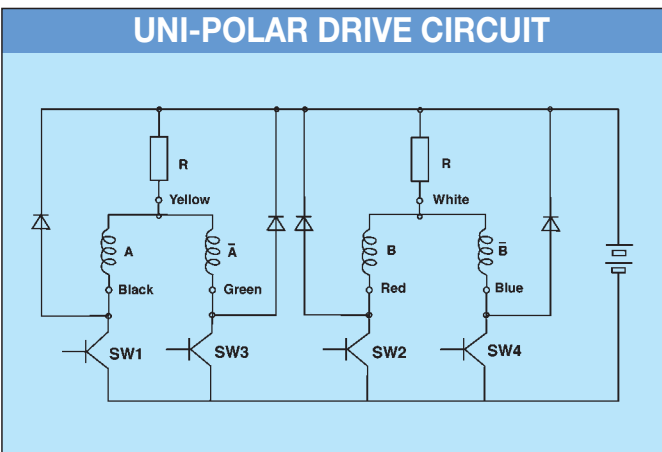
Bi-POLAR (4 Leads) DRIVE CIRCUIT



Bi-POLAR (6 Leads Series) DRIVE CIRCUIT



UNI-POLAR DRIVE CIRCUIT



Bipolar (4 Leads/6 Leads Series)

Drive Circuit for:

Stepping Motor with 4 or 6 Leadwires

Bipolarer (4 Leiter/6 Leiter Seriell)

Treiberanschluß für:

Schrittmotoren mit 4 oder 6 Anschlußdrähten

Unipolar Drive Circuit for:

Stepping Motor with 6 Leadwires

Unipolarer Treiberanschluß für:

Schrittmotoren mit 6 Anschlußdrähten

STEPPING MOTORS

□ 20 and 28 mm HECM-/SECM-SPECIFICATIONS

1.8° HIGH-TORQUE 2 PHASE STEPPING MOTOR

Model A = Single Shaft B = Double Shaft	● Bipolar (4 Leads)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
HECM213-F0.5 (A/B)	0.017	0.50	4.2	1.8	-	-	-	-	(A1)
HECM213-F0.4 (A/B)	0.017	0.35	8.5	3.4	-	-	-	-	(A2)
HECM215-F0.5 (A/B)	0.034	0.47	9.8	4.3	-	-	-	-	(A3)
HECM215-F0.4 (A/B)	0.034	0.35	16.0	7.0	-	-	-	-	(A4)

Number of Leads	Weight of Motor		Size Length		Rotor Inertia	
	HECM213	HECM215	HECM213	HECM215	HECM213	HECM215
4	0.05 kg	0.08 kg	30 mm	46.5 mm	$1.9 \times 10^{-7} \text{ kgm}^2$	$4 \times 10^{-7} \text{ kgm}^2$

Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

Model A = Single Shaft B = Double Shaft	● Bipolar (4 Leads)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
HECM223-F1.2 (A/B)	0.078	1.2	1.6	1.6	-	-	-	-	(B1)
HECM223-F0.7 (A/B)	0.078	0.7	4.2	3.9	-	-	-	-	(B2)
HECM225-F1.2 (A/B)	0.140	1.2	2.2	2.0	-	-	-	-	(B3)
HECM225-F0.7 (A/B)	0.140	0.7	6.2	5.7	-	-	-	-	(B4)

Number of Leads	Weight of Motor		Size Length		Rotor Inertia	
	HECM223	HECM225	HECM223	HECM225	HECM223	HECM225
4	0.12 kg	0.17 kg	33.5 mm	47.5 mm	$8 \times 10^{-7} \text{ kgm}^2$	$18 \times 10^{-7} \text{ kgm}^2$

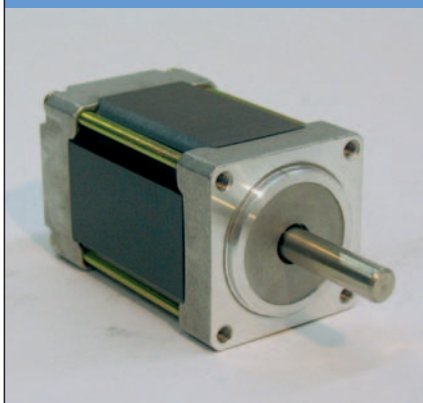
Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

Model A = Single Shaft B = Double Shaft	● Bipolar (Series)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
SECM223-S1.5 (A/B)	0.075	1.0	1.4	1.2	0.050	1.5	0.7	0.3	(C1)
SECM223-S1.0 (A/B)	0.080	0.67	5.4	4.8	0.060	0.95	2.7	1.2	(C2)
SECM225-S1.4 (A/B)	0.130	1.0	2.0	2.2	0.090	1.4	1.0	0.55	(C3)

Number of Leads	Weight of Motor		Size Length		Rotor Inertia	
	SECM223	SECM225	SECM223	SECM225	SECM223	SECM225
6	0.12 kg	0.17 kg	33.5 mm	47.5 mm	$8 \times 10^{-7} \text{ kgm}^2$	$18 \times 10^{-7} \text{ kgm}^2$

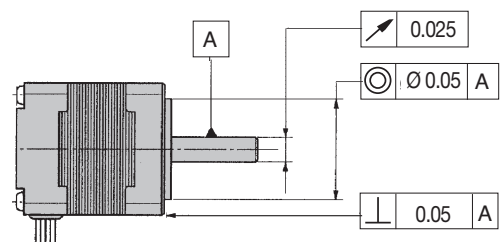
Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

HECM / SECM-Series



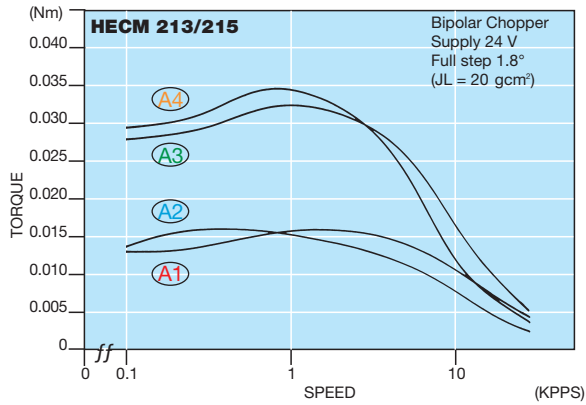
GENERAL SPECIFICATIONS

Items	Specifications
Shaft Runout	0.025 mm Max. T.I.R.
Shaft Radial Play	0.030 mm Max. (0.5 kgf)
Shaft Axial Play	0.075 mm Max. (0.5 kgf)
Insulation Resistance	100 M Ω (DC 500 V)
Dielectric Strength	500 V AC (1 Minute)
Insulation Class	CLASS B
Temperature Rise	80° C MAX. (2 PHASE ON)
Working Temperature	-20° C ~ +50° C



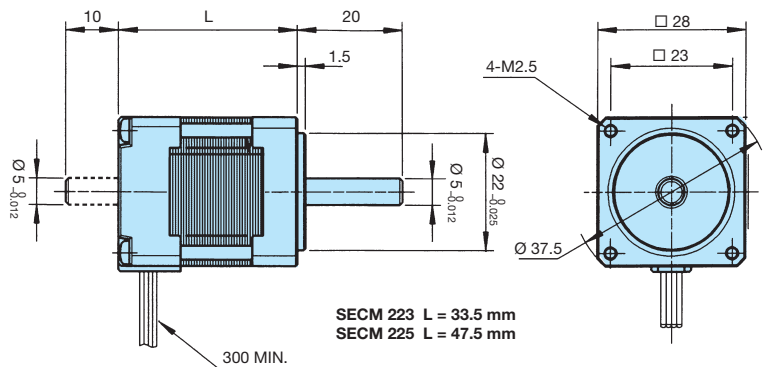
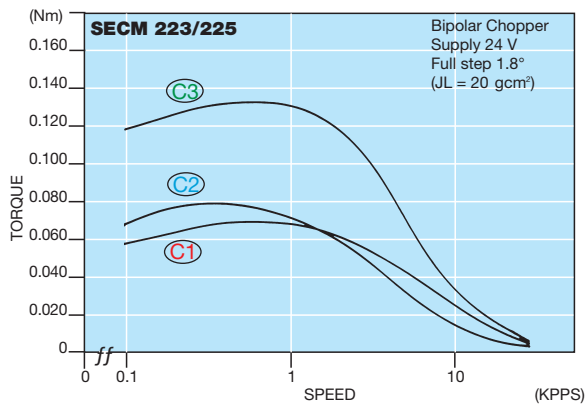
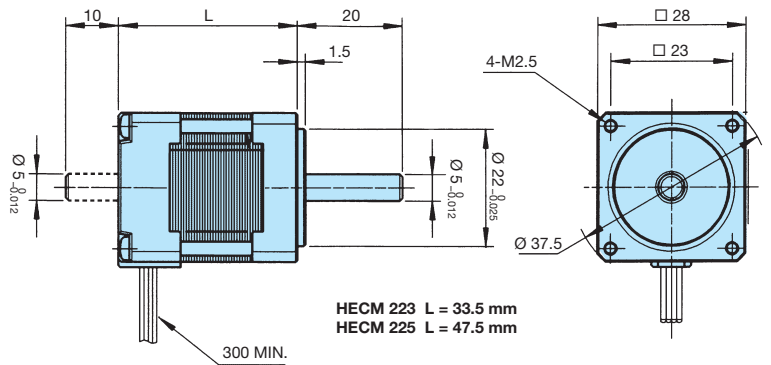
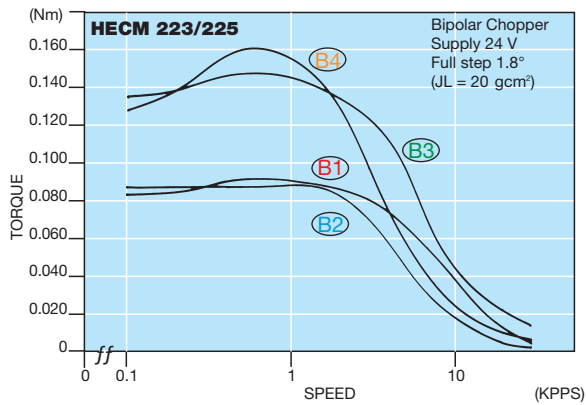
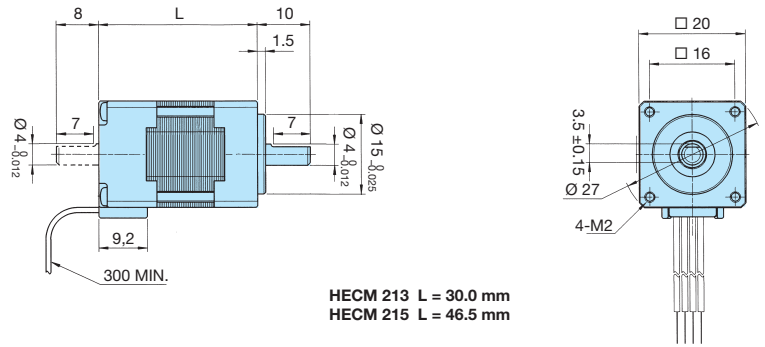
TORQUE VS. SPEED CHARACTERISTIC

Nm/KPPS (1000 PULSE/SECOND)

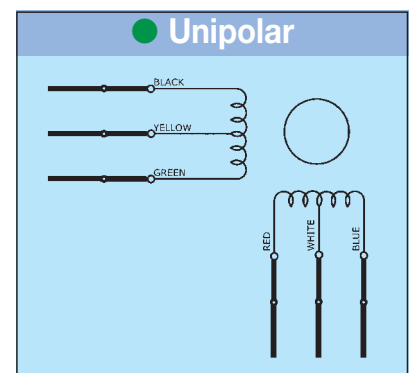
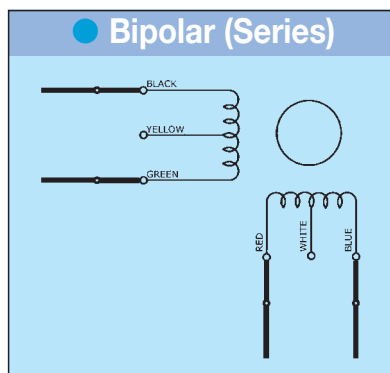
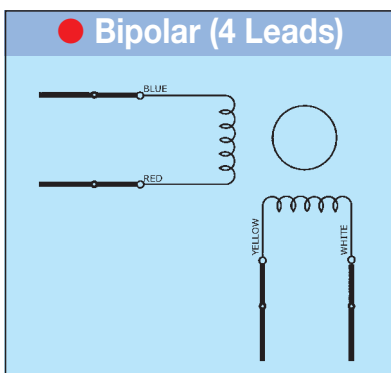


DIMENSIONS

UNIT = mm



COLOR OF LEAD WIRES



STEPPING MOTORS

□ 42 mm HECM-SPECIFICATIONS

1.8° HIGH-TORQUE 2 PHASE STEPPING MOTOR

Model A = Single Shaft B = Double Shaft	● Bipolar (4 Leads)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
HECM244-F1.3 (A/B)	0.50	1.3	3.6	6.0	–	–	–	–	(G1)
HECM244-F0.9 (A/B)	0.50	0.85	8.0	14.0	–	–	–	–	(G2)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
4	0.25 kg	41 mm	$57 \times 10^{-7} \text{ kgm}^2$

Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

Model A = Single Shaft B = Double Shaft	● Bipolar (4 Leads)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
HECM245-F1.3 (A/B)	0.62	1.3	3.8	6.0	–	–	–	–	(H1)
HECM245-F0.9 (A/B)	0.62	0.85	9.8	15.0	–	–	–	–	(H2)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
4	0.35 kg	49 mm	$76 \times 10^{-7} \text{ kgm}^2$

Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

Model A = Single Shaft B = Double Shaft	● Bipolar (4 Leads)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
HECM246-F1.3 (A/B)	0.93	1.3	5.2	10.0	–	–	–	–	(I1)
HECM246-F0.9 (A/B)	0.93	0.85	12.0	24.0	–	–	–	–	(I2)

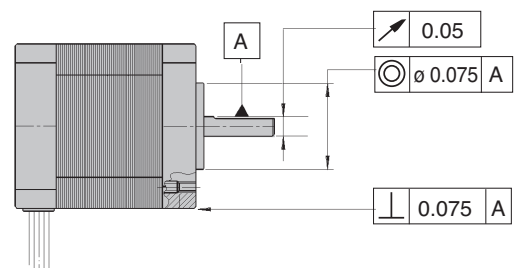
Number of Leads	Weight of Motor	Size Length	Rotor Inertia
4	0.45 kg	61 mm	$114 \times 10^{-7} \text{ kgm}^2$

Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$



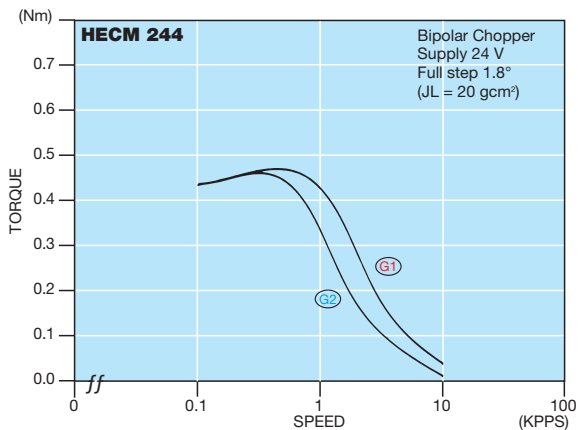
GENERAL SPECIFICATIONS

Items	Specifications
Shaft Runout	0.05 mm Max. T.I.R.
Shaft Radial Play	0.02 mm Max. (0.5 kgf)
Shaft Axial Play	0.075 mm Max. (1 kgf)
Insulation Resistance	100 M Ω (DC 500 V)
Dielectric Strength	500 V AC (1 Minute)
Insulation Class	CLASS B
Temperature Rise	80° C MAX. (2 PHASE ON)
Working Temperature	-20° C ~ + 50° C



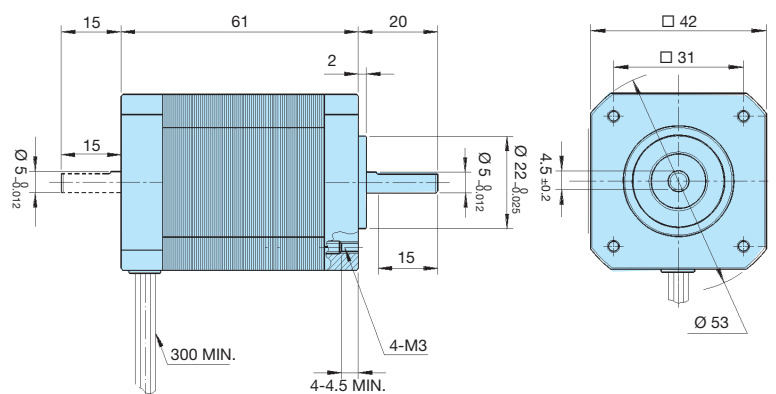
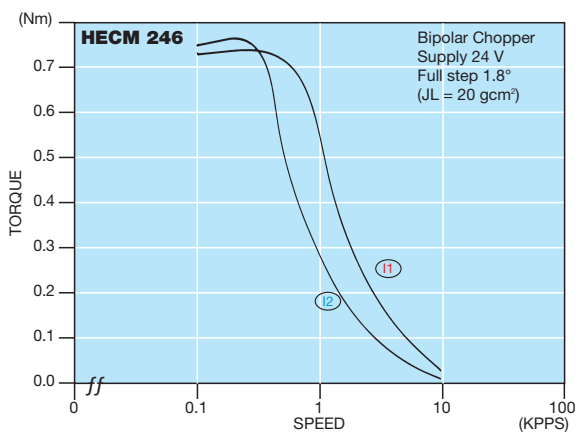
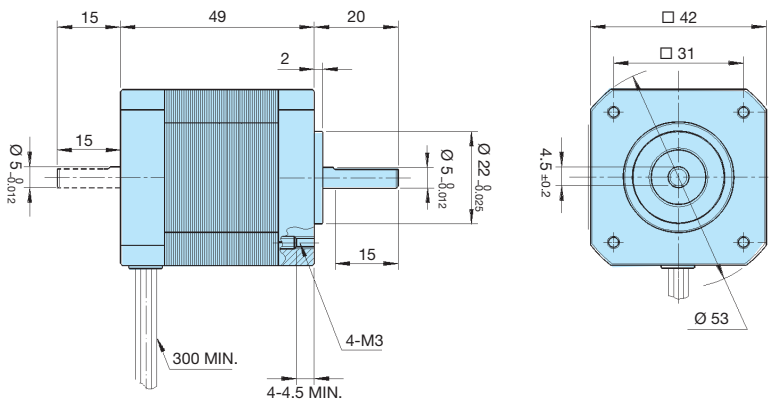
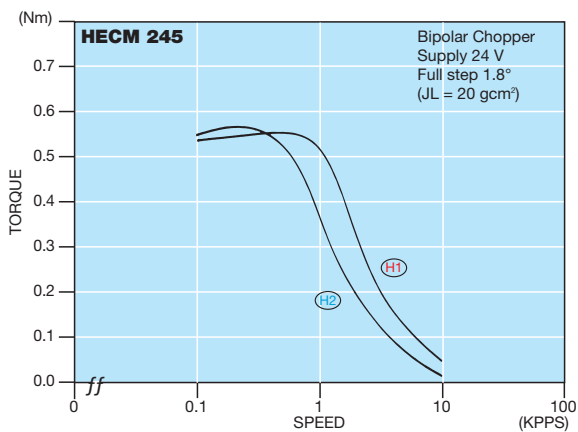
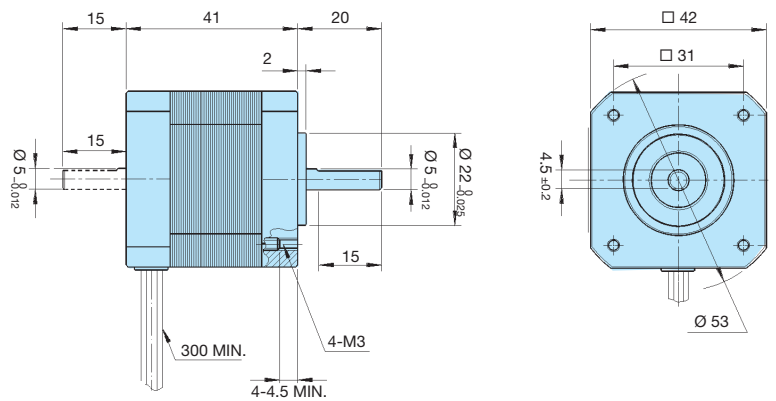
TORQUE VS. SPEED CHARACTERISTIC

Nm/KPPS (1000 PULSE/SECOND)

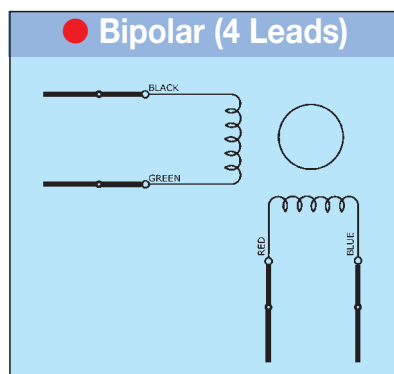


DIMENSIONS

UNIT = mm



COLOR OF LEAD WIRES



The HECM-Series are a new generation of high performance Stepping Motor up to 1 Nm holding torque in size $\square 42$ mm, full step angle 1.8° , half step angle 0.9° . This excellent torque characteristic is made up of new magnet technologies and precise manufacturing. Small in size, but big in performance.

Die Schrittmotoren der HECM-Serie sind eine neue Generation von leistungsstarken High-Torque-Schrittmotoren mit $1,8^\circ$ Vollschrittwinkel und bis zu 1 Nm Haltemoment. Erreicht wurde dies durch den konsequenten Einsatz neuester Magnet- und Produktionstechnologien. Zum Einsatz kommen diese Schrittmotoren überall dort, wo bei einer stetigen Verkleinerung der Anwendungen immer leistungsstärkere Schrittmotoren benötigt werden.

STEPPING MOTORS

□ 42 mm SECM-SPECIFICATIONS

1.8° HIGH-TORQUE 2 PHASE STEPPING MOTOR

Model A = Single Shaft B = Double Shaft	● Bipolar (Series)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
SECM243-S1.0 (A/B)	0.21	0.67	8.4	11.2	0.16	0.95	4.2	2.8	(D1)
SECM243-S0.4 (A/B)	0.21	0.28	48.0	60.0	0.16	0.40	24.0	15.0	(D2)
SECM243-S0.3 (A/B)	0.21	0.22	80.0	88.0	0.16	0.30	40.0	22.0	(D3)
SECM243-F1.3 (A/B) ●	0.24	1.30	2.2	3.3	-	-	-	-	(D4)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
S = 6 F = 4	0.2 kg	33 mm	35 x 10 ⁻⁷ kgm ²

Resistance / Phase (Ω) = ± 10%, Inductance / Phase (mH) = ± 20%. ● Bipolar (4 Leads)

Model A = Single Shaft B = Double Shaft	● Bipolar (Series)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
SECM244-S1.2 (A/B)	0.33	0.85	6.6	14.4	0.26	1.20	3.3	3.6	(E1)
SECM244-S0.8 (A/B)	0.33	0.57	16.0	30.4	0.26	0.80	8.0	7.6	(E2)
SECM244-S0.4 (A/B)	0.33	0.28	60.0	120.0	0.26	0.40	30.0	30.0	(E3)
SECM244-S0.2 (A/B)	0.33	0.14	240.0	424.0	0.26	0.20	120.0	106.0	(E4)
SECM244-F1.1 (A/B) ●	0.37	1.13	3.7	7.8	-	-	-	-	(E5)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
S = 6 F = 4	0.25 kg	39 mm	54 x 10 ⁻⁷ kgm ²

Resistance / Phase (Ω) = ± 10%, Inductance / Phase (mH) = ± 20%. ● Bipolar (4 Leads)

Model A = Single Shaft B = Double Shaft	● Bipolar (Series)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
SECM245-S1.2 (A/B)	0.41	0.85	6.6	12.0	0.32	1.20	3.3	3.0	(F1)
SECM245-S0.8 (A/B)	0.41	0.57	18.0	38.0	0.32	0.80	9.0	9.5	(F2)
SECM245-S0.4 (A/B)	0.41	0.28	60.0	116.0	0.32	0.40	30.0	29.0	(F3)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
6	0.3 kg	47 mm	68 x 10 ⁻⁷ kgm ²

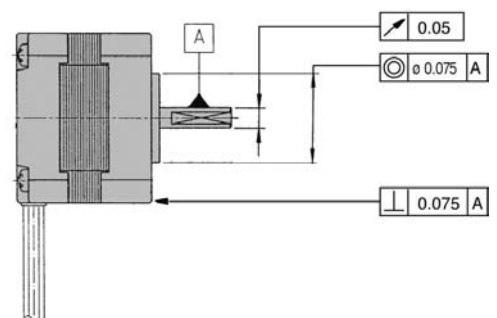
Resistance / Phase (Ω) = ± 10%, Inductance / Phase (mH) = ± 20%

SECM-Series



GENERAL SPECIFICATIONS

Items	Specifications
Shaft Runout	0.05 mm Max. T.I.R.
Shaft Radial Play	0.025 mm Max. (0.5 kgf)
Shaft Axial Play	0.075 mm Max. (1 kgf)
Insulation Resistance	100 M Ω (DC 500 V)
Dielectric Strength	500 V AC (1 Minute)
Insulation Class	CLASS B
Temperature Rise	80° C MAX. (2 PHASE ON)
Working Temperature	-20° C ~ + 50° C



STEPPING MOTORS

□ 42 and 39 mm ECM-SPECIFICATIONS

0.9° and 0.45° 2 PHASE STEPPING MOTOR

Model A = Single Shaft B = Double Shaft	● Bipolar (Series)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
ECM243M-S0.9 (A/B)	0.10	0.64	8.8	10.0	0.08	0.90	4.4	2.5	(J1)
ECM243M-S0.3 (A/B)	0.10	0.21	80.0	84.0	0.08	0.30	40.0	21.0	(J2)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
6	0.2 kg	33 mm	$19 \times 10^{-7} \text{ kgm}^2$

Full Step Angle = 0.9°, Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

General Specifications see page 8

Model A = Single Shaft B = Double Shaft	● Bipolar (4 Leads)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
ECM232M-F0.3 (A/B)	0.050	0.32	38.0	19.0	-	-	-	-	(K1)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
4	0.12 kg	22 mm	$10 \times 10^{-7} \text{ kgm}^2$

Full Step Angle = 0.9°, Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

Model A = Single Shaft B = Double Shaft	● Bipolar (4 Leads)				● Unipolar				Speed-Torque
	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	Holding Torque [Nm]	Current/Phase [A]	Resistance/Phase [Ohm]	Inductance/Phase [mH]	
ECM232N-F0.3 (A/B)	0.046	0.30	40.0	25.0	-	-	-	-	(L1)

Number of Leads	Weight of Motor	Size Length	Rotor Inertia
4	0.12 kg	22 mm	$10 \times 10^{-7} \text{ kgm}^2$

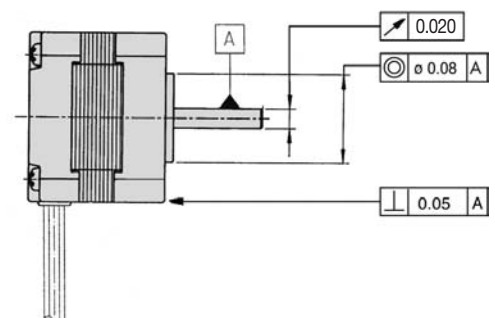
Full Step Angle = 0.45°, Resistance / Phase (Ω) = $\pm 10\%$, Inductance / Phase (mH) = $\pm 20\%$

ECM-Serie



GENERAL SPECIFICATIONS

Items	Specifications
Shaft Runout	0.020 mm Max. T.I.R.
Shaft Radial Play	0.020 mm Max. (0.5 kgf)
Shaft Axial Play	0.020 mm Max. (1 kgf)
Insulation Resistance	100 M Ω (DC 500 V)
Dielectric Strength	500 V AC (1 Minute)
Insulation Class	CLASS B
Temperature Rise	80° C MAX. (2 PHASE ON)
Working Temperature	-20° C ~ + 50° C

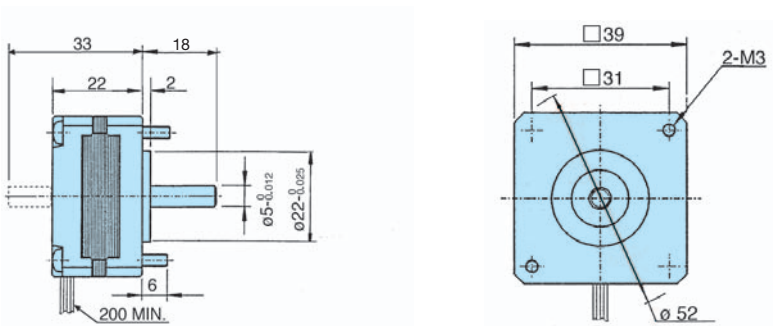
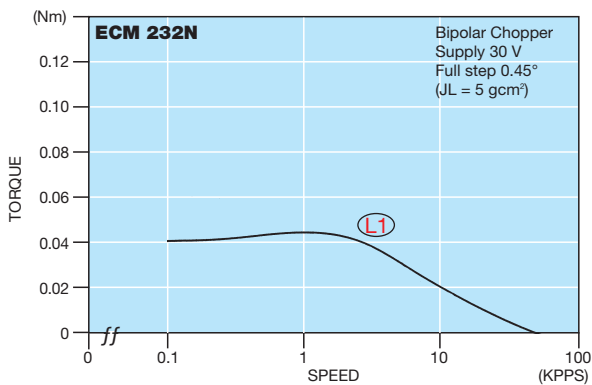
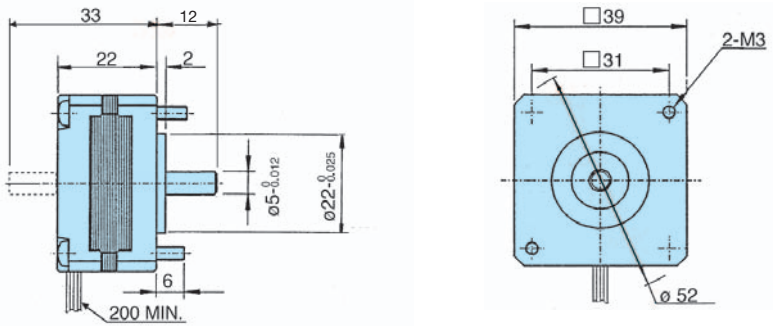
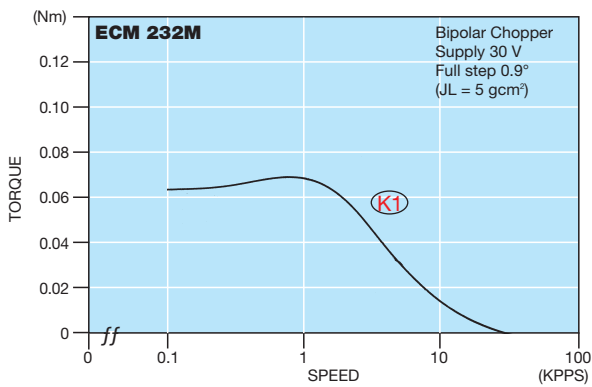
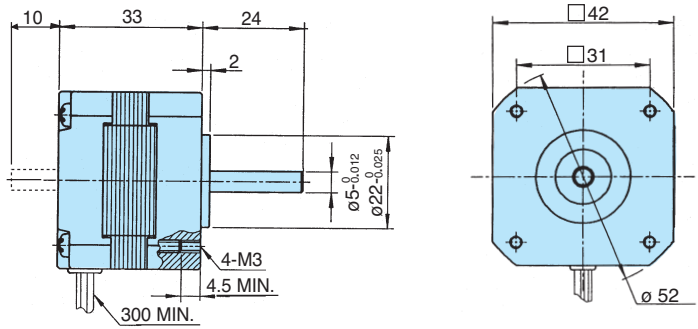
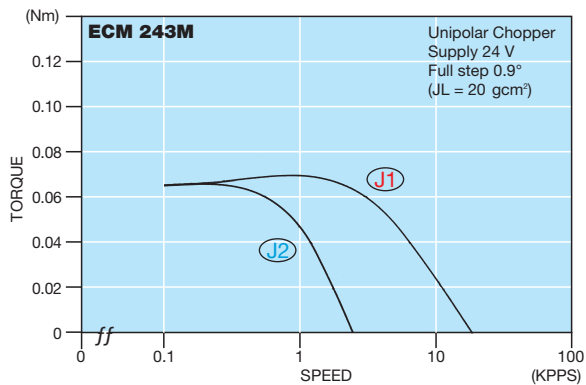


TORQUE VS. SPEED CHARACTERISTIC

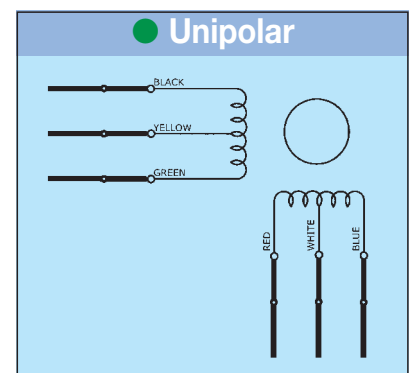
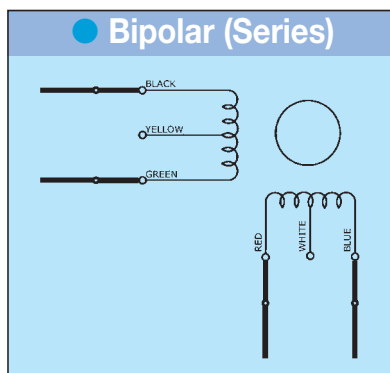
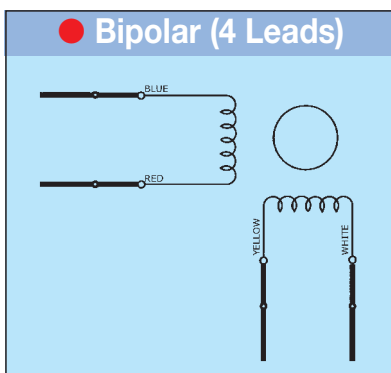
Nm/KPPS (1000 PULSE/SECOND)

DIMENSIONS

UNIT = mm



COLOR OF LEAD WIRES

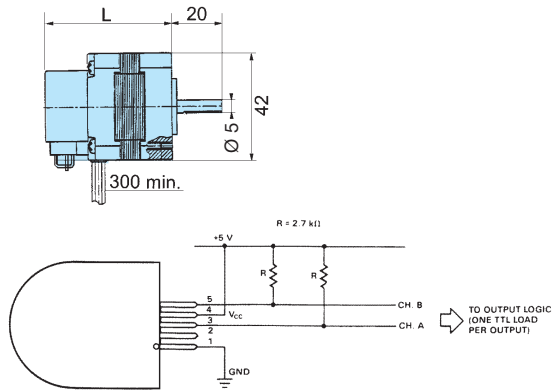


STEPPING MOTORS

□ 42 mm ENCODER-SPECIFICATIONS

1.8° 2 PHASE STEPPING MOTOR

H-Type: 2-Phase-Step Motor with Encoder TTL Output 200 CPR



Article Name	Motor Length	Output
SECM243-S1.0H2200	L = 50 mm	TTL Output 200 CPR
SECM244-S1.2H2200	L = 56 mm	TTL Output 200 CPR
SECM245-S1.2H2200	L = 64 mm	TTL Output 200 CPR

Motor Specification and Torque-Curve see Pages:

SECM243-S1.0H2200 → SECM243-S1.0A → Page 8 and Page 9

SECM244-S1.2H2200 → SECM244-S1.2A → Page 8 and Page 9

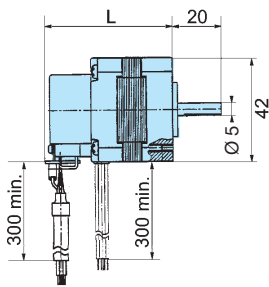
SECM245-S1.2H2200 → SECM245-S1.2A → Page 8 and Page 9

Required Connector for Encoder:

Hewlett Packard: HEDS-8902, Molex: 2695 series with 2759 series term.

AMP: 103686-4, 640442-5, Dupont/Berg: 65039-032 with 4825X-000 term.

P-Type: 2-Phase-Step Motor with Encoder Line Driver Output 200 CPR



Article Name	Motor Length	Output
SECM243-S1.0P2200	L = 53 mm	Line Driver Output 200 CPR
SECM244-S1.2P2200	L = 59 mm	Line Driver Output 200 CPR
SECM245-S1.2P2200	L = 67 mm	Line Driver Output 200 CPR

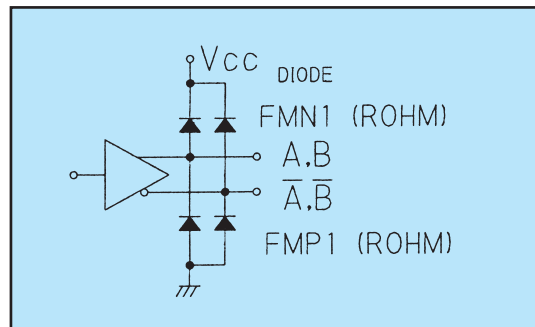
Motor Specification and Torque-Curve see Pages:

SECM243-S1.0P2200 → SECM243-S1.0A → Page 8 and Page 9

SECM244-S1.2P2200 → SECM244-S1.2A → Page 8 and Page 9

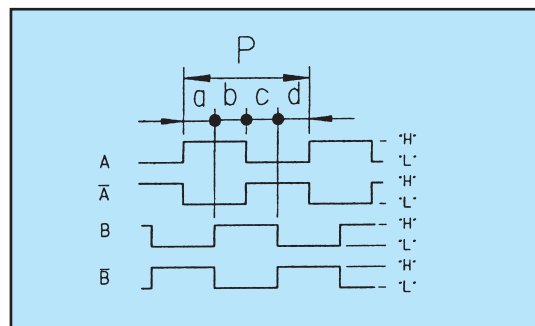
SECM245-S1.2P2200 → SECM245-S1.2A → Page 8 and Page 9

Line Driver Specification



Encoder Performance (Line Driver Output):

Operating Temperature Range:	0°C up to 85°C
Supply:	DC 5V ± 5%, 100mA max.
Resolution:	200 Counts / Turn [CPR]
Frequency Response:	100KHz max.
A phase difference:	1/4 P ± 1/8 P
Code:	Incremental A. B. (2 CH.)
Output Signal when output is high:	DC 2.4V min.
Output Signal when output is low:	DC 0.4V max.
Sinking & Output Current:	Typical ± 20 mA max.
Rise & Fall Times:	1 µsec max.
Moment of Inertia:	5 g-cm ² max. Encoder only
Output Circuit:	Line Driver AM26C3IIB



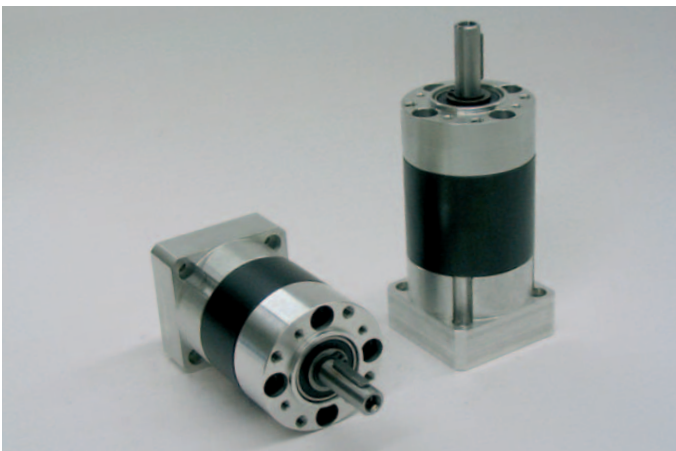
Encoder Connection Type A		Encoder Connection Type B	
Function	Color	Function	Color
DC 5 V	Red	DC 5 V	Red
GND	Blue	GND	Black
A Phase	Brown	A Phase	Brown
A-bar Phase	Orange	A-bar Phase	Orange
B Phase	Yellow	B Phase	Yellow
B-bar Phase	Gray	B Phase	White

PLANETARY GEAR PRODUCT

OVERVIEW:

Model	Stages	i		max. Torque	for Step Motor	Size Page
		from	to			
● PLI40	1-stage / 1-stufig	3	7	3 Nm	SECM243...245 HECM244...246	15
	2-stage / 2-stufig	14	46	7.5 Nm		
	3-stage / 3-stufig	51	308	15 Nm		

Model	Stages	i		max. Torque	for Step Motor	Size Page
		from	to			
● PLD40	1-stage / 1-stufig	4	9	8 Nm	SECM243...245 HECM244...246	15
	2-stage / 2-stufig	16	49	15 Nm		
	3-stage / 3-stufig	64	1000	15 Nm		



PLANETARY GEAR PRODUCT CODE:

PLI 40 3 24

Gear Flange:
Getriebeflansch:

= for SECM243-245 and HECM244-246
= for SECM243-245 und HECM244-246

Number of Gear Ratio:
Untersetzung:

= from $i = 3$ up to $i = 1000$
= von $i = 3$ bis $i = 1000$

Gear-Size:
Getriebedurchmesser:

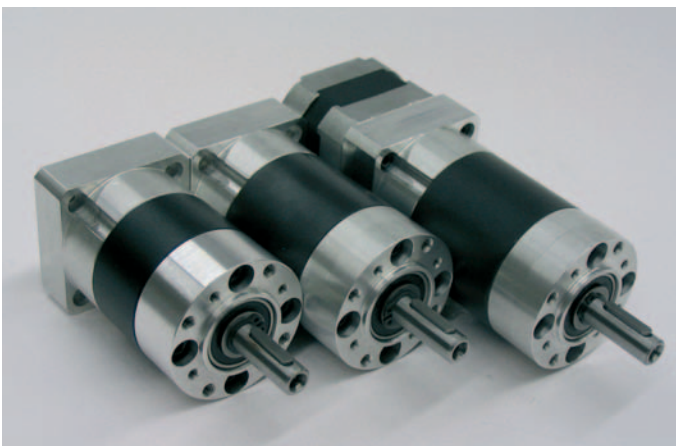
= PLI40 approx. $\varnothing 4\text{cm}$
= PLI40 ca. $\varnothing 4\text{cm}$

PLD40 approx. $\varnothing 4\text{cm}$
PLD40 ca. $\varnothing 4\text{cm}$

Planetary Gear Type:
Planetengetriebetyp:

= PLI = non integer Gear Ratio
= PLI = kein ganzzahliges
Untersetzungsverhältnis

PLD = integer Gear Ratio
PLD = ganzzahliges
Untersetzungsverhältnis



PLANETARY GEARS

SPECIFICATIONS

Size / Baugröße		● PLI40	i	i ⁽¹⁾	z ⁽²⁾	Size Page
<p>Nominal Output Torque T2N</p> <p>Abtriebs-Drehmoment T2N</p> <p>initial speed/ Eingangsdrehzahl = 3000 min⁻¹</p>	[Nm]	3.0	(3.70)	3	1	15
		3.0	(4.28)	4		
		3.0	(5.18)	5		
		3.0	(6.75)	7		
		7.5	(13.73)	14	2	
		7.5	(15.88)	16		
		7.5	(18.36)	18		
		7.5	(19.20)	19		
		7.5	(22.20)	22		
		7.5	(25.01)	25		
		7.5	(26.85)	27		
		7.5	(28.93)	29		
		7.5	(34.97)	35		
		7.5	(45.56)	46		
		15	(50.89)	51	3	
		15	(58.85)	59		
		15	(68.06)	68		
		15	(71.16)	71		
		15	(78.71)	79		
		15	(92.70)	93		
		15	(95.17)	95		
		15	(99.50)	100		
		15	(107.20)	107		
		15	(115.07)	115		
		15	(123.97)	124		
		15	(129.62)	130		
		15	(139.13)	139		
		15	(149.90)	150		
		15	(168.84)	169		
		15	(181.24)	181		
		15	(195.26)	195		
		15	(236.09)	236		
		15	(307.54)	308		

Size / Baugröße		● PLD40	i		z ⁽²⁾	Size Page
<p>Nominal Output Torque T2N</p> <p>Abtriebs-Drehmoment T2N</p> <p>initial speed/ Eingangsdrehzahl = 300 min⁻¹</p>	[Nm]	8	4	<p>Reduction ratios printed in bold → Standard Series Fett gedruckte Übersetzungen → Vorzugsreihe</p>	1	15
		8	5			
		8	7			
		8	9			
		15	16		2	
		15	20			
		15	25			
		15	28			
		15	35			
		15	49			
		15	64			
		15	80			
		15	100			
		15	140			
		15	175		3	
		15	245			
		15	343			
		15	729			
		15	1000			

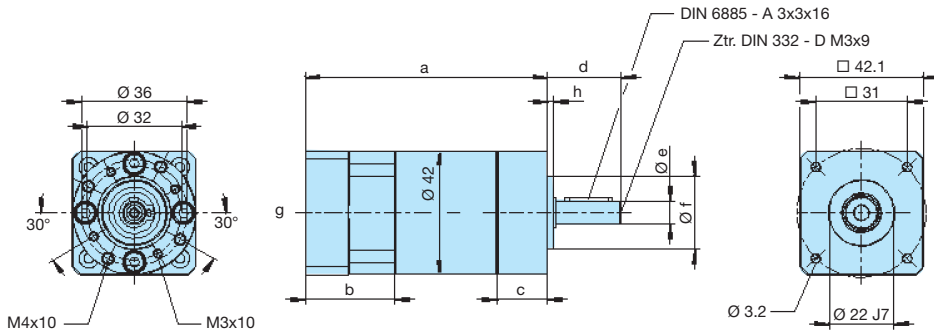
(1) = Ratios Rounded (1) = Übersetzungen gerundet

(2) = Number of Stages (2) = Anzahl der Getriebestufen

DIMENSIONS

UNIT = mm

● PLI 40



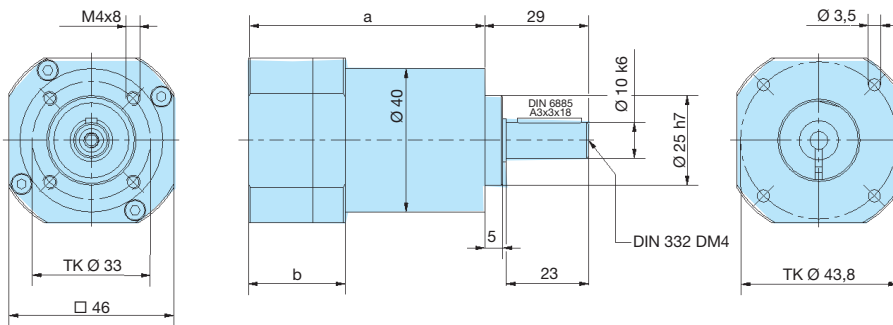
for SECM24... Stepping Motor

a = 69.5 mm (1 stage / 1 stufig)
 a = 82.5 mm (2 stage / 2 stufig)
 a = 95.5 mm (3 stage / 3 stufig)
 b = 30.5 mm e = 8 h 7
 c = 17.1 mm f = 25 h 9
 d = 25.0 mm h = 2 mm

for HECM24... Stepping Motor

a = 69.5 mm (1 stage / 1 stufig)
 a = 82.5 mm (2 stage / 2 stufig)
 a = 95.5 mm (3 stage / 3 stufig)
 b = 30.5 mm e = 8 h 7
 c = 17.1 mm f = 25 h 9
 d = 25.0 mm h = 2 mm

● PLD 40



for SECM24... Stepping Motor

a = 95 mm (1 stage / 1 stufig)
 a = 111 mm (2 stage / 2 stufig)
 a = 124 mm (3 stage / 3 stufig)
 b = 27 mm (1+2 stage / 1+2 stufig)
 b = 24 mm (3 stage / 3 stufig)

for HECM24... Stepping Motor

a = 95 mm (1 stage / 1 stufig)
 a = 111 mm (2 stage / 2 stufig)
 a = 124 mm (3 stage / 3 stufig)
 b = 27 mm (1+2 stage / 1+2 stufig)
 b = 24 mm (3 stage / 3 stufig)

Size / Baugröße		● PLI40	● PLD40	
efficiency / Wirkungsgrad		0.80	0.96	1-stage / 1-stufig
		0.75	0.94	2-stage / 2-stufig
		0.70	0.90	3-stage / 3-stufig
weight / Gewicht	[kg]	0.4	0.3	1-stage / 1-stufig
		0.5	0.4	2-stage / 2-stufig
		0.6	0.5	3-stage / 3-stufig
max. radial load / max. Radialkraft	[N]	160	220	1-stage / 1-stufig
max. axial load / max. Axialkraft	[N]	50	330	
max. radial load / max. Radialkraft	[N]	230	220	2-stage / 2-stufig
max. axial load / max. Axialkraft	[N]	80	330	
max. radial load / max. Radialkraft	[N]	300	220	3-stage / 3-stufig
max. axial load / max. Axialkraft	[N]	110	330	
backlash / Verdrehspiel	[deg]	0.80°	0.33°	1-stage / 1-stufig
		0.85°	0.42°	2-stage / 2-stufig
		0.90°	0.5°	3-stage / 3-stufig
initial speed / Eingangsdrehzahl		3000 min ⁻¹	300 min ⁻¹	
operating temp. / Betriebstemp.	[°C]	PLI40 = -30 up to +140 / -30 bis +140		
		PLD40 = -25 up to +90 shortly + 120 / -25 bis +90 kurzfristig + 120		
lubrication / Schmierung		Life time grease lubrication / Lebensdauer-Fettschmierung		



www.ec-motion.de

On our website, you will find our complete range of products. To access the technical specifications for your desired stepping motor, simply enter the product name in the „**Model-Code**“ search section. PDF files are also available for downloading. Give it a try!

Auf unserer Homepage finden Sie unser komplettes Produktprogramm. Über die „**Model Code**“ Eingabe gelangen Sie direkt zu den technischen Daten des gewünschten Schrittmotors. Geben Sie dazu nur den Artikelnamen ein. Zu allen Produkten stehen Dateien im PDF-Format zum Download bereit. Probieren Sie es doch einmal aus.

As an example, if you type in „**HECM24**“ in the search window, the following search results will be displayed:

Als Beispiel sehen Sie hier, was nach der Eingabe von „**HECM24**“ in das Model-Code Fenster, als Suchergebnis angezeigt wird.

2 Phasen Schrittmotoren

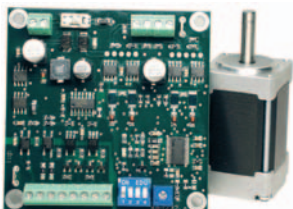
Model	Hubmoment [Nm]	Strom [A]	Vollstrom [A]	Induktivität [mH]	Gewicht [g]	Motor-Typ	Vollschrittwinkel [°]	Flanschmaß [mm]	Motorlänge [mm]	Position [mm]	Phasen [Anzahl]	Detail (PDF)
HECM24P14	0.5	0.8	0	18	25	SP	1.8	42	47	100	2	
HECM24P20	0.5	0.85	0	18	25	SP	1.8	42	47	100	2	
HECM24P25	0.5	1.2	0	18	25	SP	1.8	42	47	100	2	
HECM24P30	0.5	1.3	0	18	25	SP	1.8	42	47	100	2	

SMD231 – 2-Phase-Driver / 2-Phasentreiber



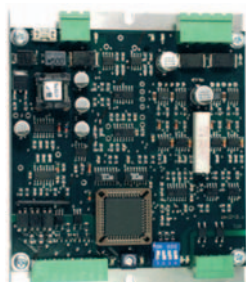
Step Revolution / Schrittauflösung	1/1, 1/2 Step
Supply Voltage / Eingangsspannung	from 21 V DC up to 37 V DC
Phase Current / Phasenstrom	from 0.2 A / up to 1.0 A
Input Signal / Eingangssignal	5 V DC or 24 V DC
Inputs / Eingänge	Puls, Direction, Gate, Off, Fast, Reset
Features e. g. / Eigenschaften z. B.	Protection against overcurrent and overtemp
Dimensions / Abmessung	L = 85 mm, B = 65 mm, H = 25 mm

ECMD241/242 – 2-Phase-Driver / 2-Phasentreiber



Step Revolution / Schrittauflösung	1/1, 1/2, 1/4, 1/16 Microstep
Supply Voltage / Eingangsspannung	from 24 V DC up to 40 V DC
Phase Current / Phasenstrom ECMD241 (ECMD242)	from 0.5 A / up to 1.25 A (from 1.0 A up to 2.5 A)
Input Signal / Eingangssignal	3.5 V DC or 24 V DC
Inputs / Eingänge	Puls, Direction, Off
Features e. g. / Eigenschaften z. B.	Protection against over voltage, automatic current down
Dimensions / Abmessung	L = 72 mm, B = 72 mm, H = 10 mm

ECMD243 – 2-Phase-Driver / 2-Phasentreiber



Step Revolution / Schrittauflösung	1/1, 1/2, 2/5, 1/4, 1/5, 1/8, 1/10 Microstep
Supply Voltage / Eingangsspannung	from 24 V DC up to 42 V DC
Phase Current / Phasenstrom	from 0.5 A / up to 3.5 A
Input Signal / Eingangssignal	3 V DC up to 24 V DC
Inputs / Eingänge	Puls, Direction, Gate, Reset
Features e. g. / Eigenschaften z. B.	Protection against miss polarity of power, over-temp, -voltage, -current, undervoltage, autom. current down function, active ballast circuit
Dimensions / Abmessung	L = 117 mm, B = 101 mm, H = 22 mm



EC Motion

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