

G Slotless Brushless DC Motor

Modar's Slotless Brushless DC Motors can avoid the pulsation of air gap magnetic induction caused by uneven magnetic resistance in the teeth.

It can eliminate the pulse loss in the armature core and the surface loss on the main pole surface.

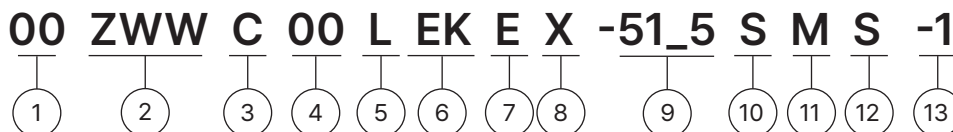
Slotless Brushless DC Motor has high durability, low electrical noise and high efficiency. Maximum efficiency of motor reaches 91% and this motor is suitable for the servo system which needs quick movement and high power.



Part number construction	G-2
6mm	G-3
8mm	G-5
10mm	G-7
12mm	G-9
13mm	G-11
14mm	G-13
16 mm	G-15
22 mm	G-17
28 mm	G-19
30 mm	G-21
36 mm	G-23
42 mm	G-25
Accessories and options	G-27



Part Number Construction



① Motor Size

Motor Size(mm)	6	8	10	12	13	14	16	22	28	30	36	42
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② Product Name

ZWW = Slotless Brushless DC Motor

③ Motor Shape

C = Circular Type

S = Square Type

④ Motor Length

Unit : mm

when the length involves decimal points, use "_" instead

⑤ Motor Casing

L = Aluminum

T = Stainless steel / Iron

X = No housing

⑥ Option

EKX = Encoder (X = Encoder Resolution)

B = Brake

GX= Gearbox (X = Gear Ratio)

Note: When Options are not single,

please use in alphabetical order for example, "BEG"

⑦ Structure

E = External type

N = Non-Captive type

C = Electric Cylinder (Captive) type

K = Kaptive type

⑧ Lead Screw Code

Please refer to lead screw code selection table

⑨ Screw Length / Stroke

Kaptive = stroke distance

Non-captive = total length of screw

External = screw extension length from the mounting flange

⑩ Screw Surface Treatment

T = Teflon coating

S = Standard (No teflon coating)

⑪ End Machining

M = Metric

U = UNC

S = Smooth

C = Customize

N = None

⑫ Nut Style

S = Standard flange nut

A = Anti-backlash nut

C = Customized nut

⑬ Customer Sequence Number

Example

Part Number	16ZWWC40EK-001
Description	Motor diameter 16mm Slotless BLDC circular type Body length 40mm Encoder Customization No.001



6mm Series

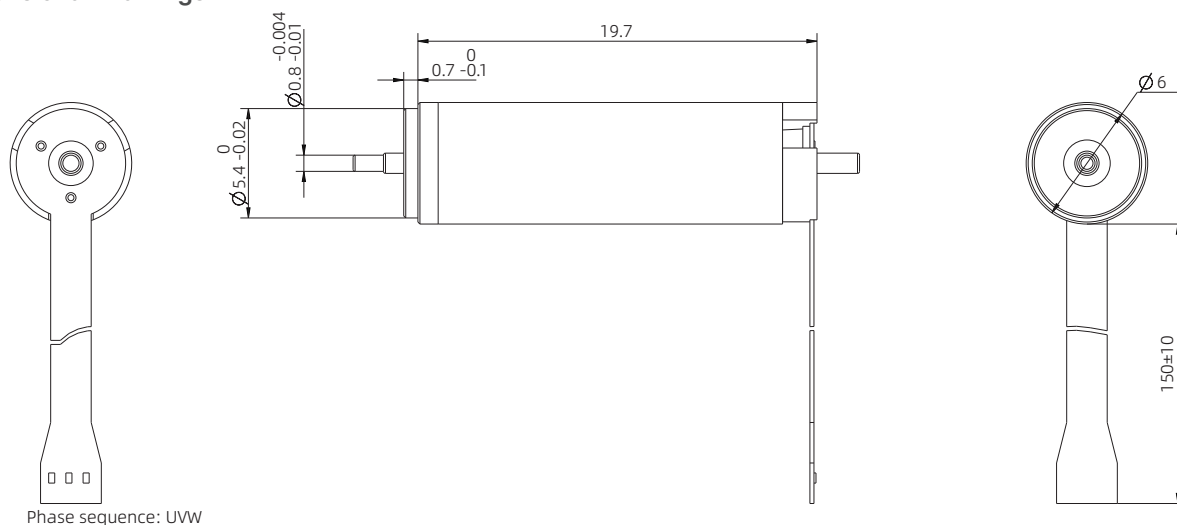
Motor Characteristics

Motor part number	6ZWWC20	
Pole pairs	-	1
Terminal resistance, Phase-Phase	Ω	5.9
Terminal inductance, Phase-Phase	mH	0.04
Winding connection method	-	Delta connection
Insulation class	-	B
Duty type	-	S2
Insulation strength (Withstand voltage)	-	300VAC/1KHz/1mA/1s
Insulation resistance	-	100M Ω /300VDC
Weight	g	3
Rated voltage	V	6
Rated power	W	1
Rated torque	mN·m	0.3
Rated speed	RPM	32000
Rated current	A	0.46
No load speed	RPM	48500
No load current	A	0.09
Motor efficiency	%	37
Noise (Ambient noise 20dB, test distance 1m)	dB	<50
Thermal Resistance (No-load)	K/W	39.9
Ambient temperature	°C	22.3
Max winding temperature	°C	63
Torque constant	mN·m/A	0.65
Back-EMF constant - peak value	V/Krpm	0.1
Back-EMF constant - effective value	V/Krpm	0.07
Peak torque	mN·m	0.66
Peak current	A	1
Rotor inertia	g·cm ²	0.005
Mechanical time constant	ms	6.92
End bell	-	Stainless steel
Bearing	-	Deep groove ball bearing
Magnet	-	Sinter NdFeB
Rotation shaft	-	Carbon steel

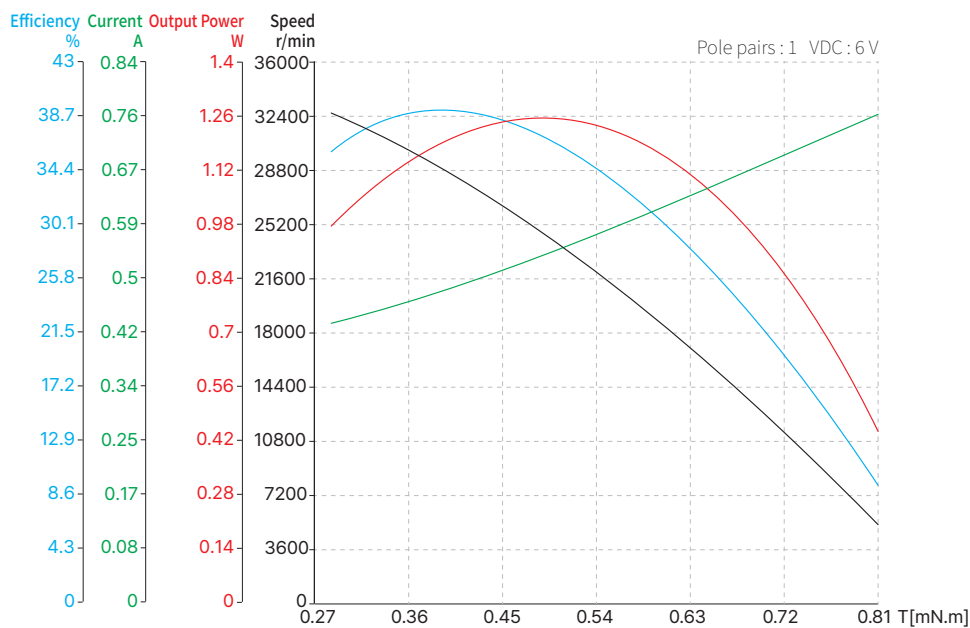


6mm Series

Dimensional Drawings



Torque Performance Curves



8mm Series

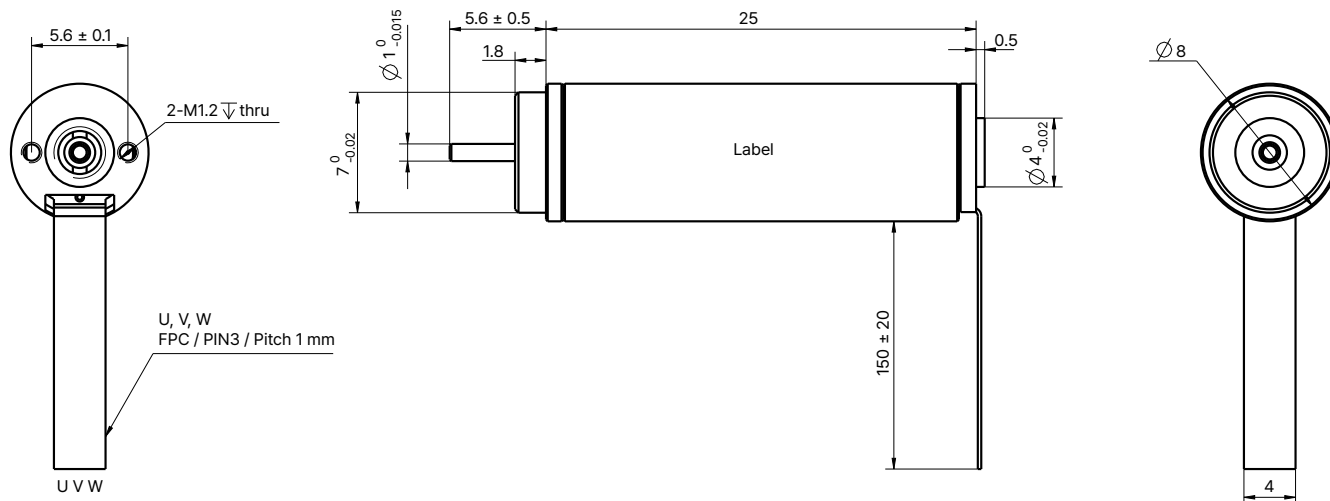
Motor Characteristics

Motor part number	8ZWWC25	
Pole pairs	-	1
Terminal resistance, Phase-Phase	Ω	6.1
Terminal inductance, Phase-Phase	mH	0.085
Winding connection method	-	Delta connection
Insulation class	-	B
Duty type	-	S2
Insulation strength (Withstand voltage)	-	300VAC/1KHz/1mA/1s
Insulation resistance	-	100M Ω /300VDC
Weight	g	7.3
Rated voltage	V	12
Rated power	W	3.25
Rated torque	mN·m	0.8
Rated speed	RPM	38200
Rated current	A	0.45
No load speed	RPM	48000
No load current	A	0.056
Motor efficiency	%	60
Noise (Ambient noise 20dB, test distance 1m)	dB	<50
Thermal Resistance (No-load)	K/W	12.52
Ambient temperature	°C	22.3
Max winding temperature	°C	63
Torque constant	mN·m/A	1.77
Back-EMF constant - peak value	V/Krpm	0.26
Back-EMF constant - effective value	V/Krpm	0.19
Peak torque	mN·m	3.49
Peak current	A	2
Rotor inertia	g·cm ²	0.016
Mechanical time constant	ms	3.11
End bell	-	Stainless steel
Bearing	-	Deep groove ball bearing
Magnet	-	Sinter NdFeB
Rotation shaft	-	Carbon steel

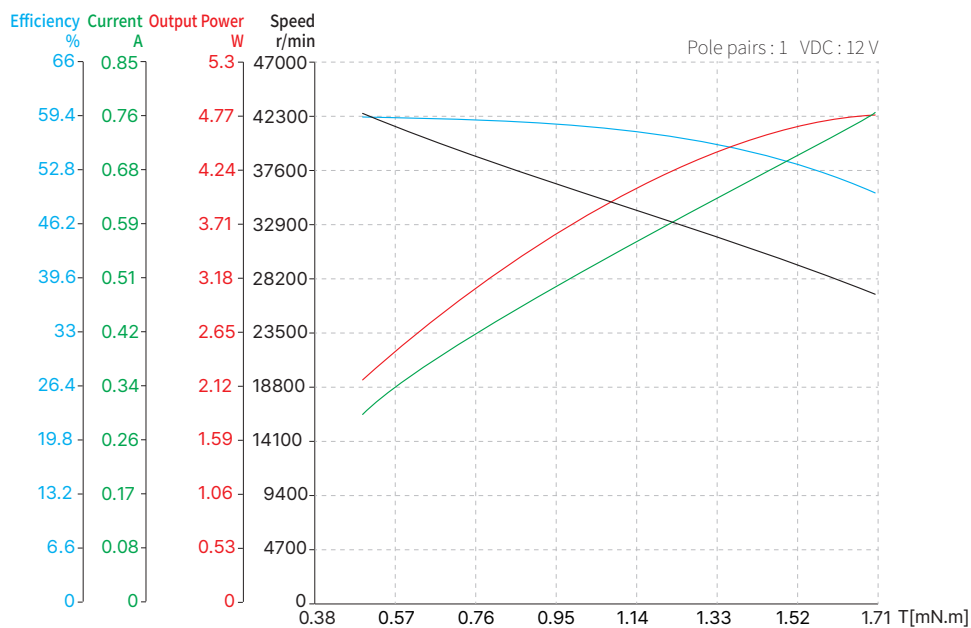


8mm Series

Dimensional Drawings



Torque Performance Curves



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

G-6



10mm Series

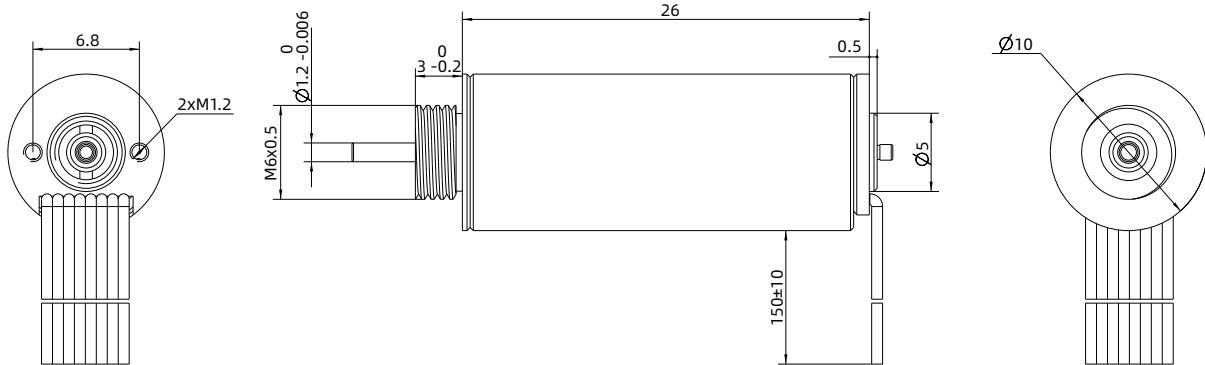
Motor Characteristics

Motor part number	10ZWWC26	
Pole pairs	-	1
Terminal resistance, Phase-Phase	Ω	4.5
Terminal inductance, Phase-Phase	mH	0.15
Winding connection method	-	Delta connection
Insulation class	-	B
Duty type	-	S2
Feedback method	-	Hall sensor
Commutation angle	-	120°
Insulation strength (Withstand voltage)	-	300VAC/1KHz/1mA/1s
Insulation resistance	-	100M Ω /300VDC
Weight	g	14.3
Rated voltage	V	12
Rated power	W	5
Rated torque	mN·m	1.5
Rated speed	RPM	28500
Rated current	A	0.56
No load speed	RPM	35000
No load current	A	0.065
Motor efficiency	%	67
Noise (Ambient noise 20dB, test distance 1m)	dB	<50
Thermal Resistance (No-load)	K/W	10.6
Ambient temperature	°C	22.3
Max winding temperature	°C	70
Torque constant	mN·m/A	2.68
Back-EMF constant - peak value	V/Krpm	0.4
Back-EMF constant - effective value	V/Krpm	0.28
Peak torque	mN·m	7.15
Peak current	A	3
Rotor inertia	g·cm ²	0.026
Mechanical time constant	ms	1.63
End bell	-	Stainless steel
Bearing	-	Deep groove ball bearing
Magnet	-	Sinter NdFeB
Rotation shaft	-	Carbon steel

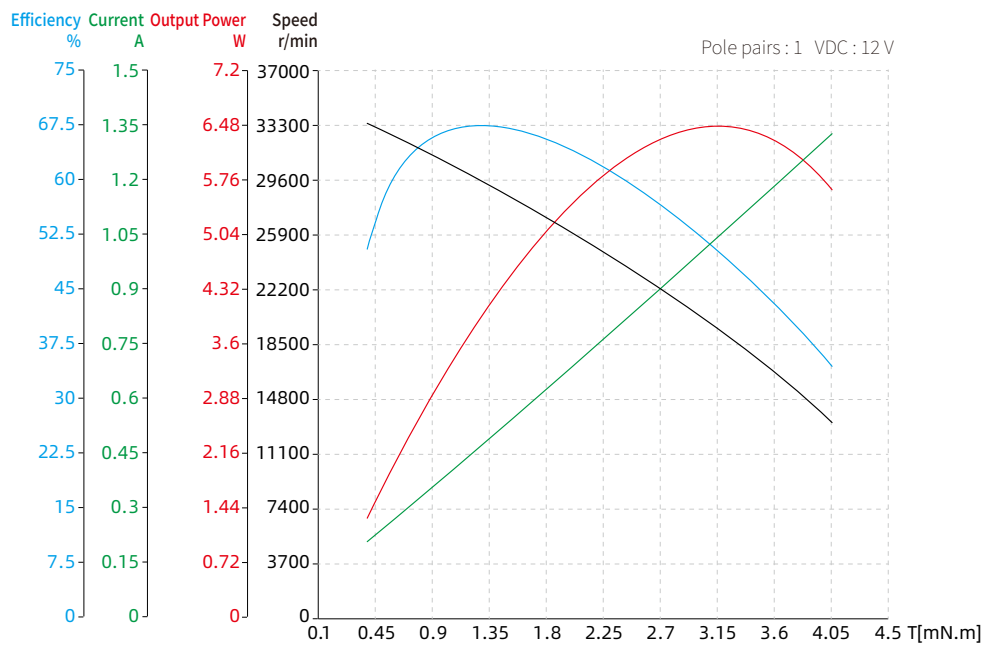


10mm Series

Dimensional Drawings



Torque Performance Curves



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

G-8



12mm Series

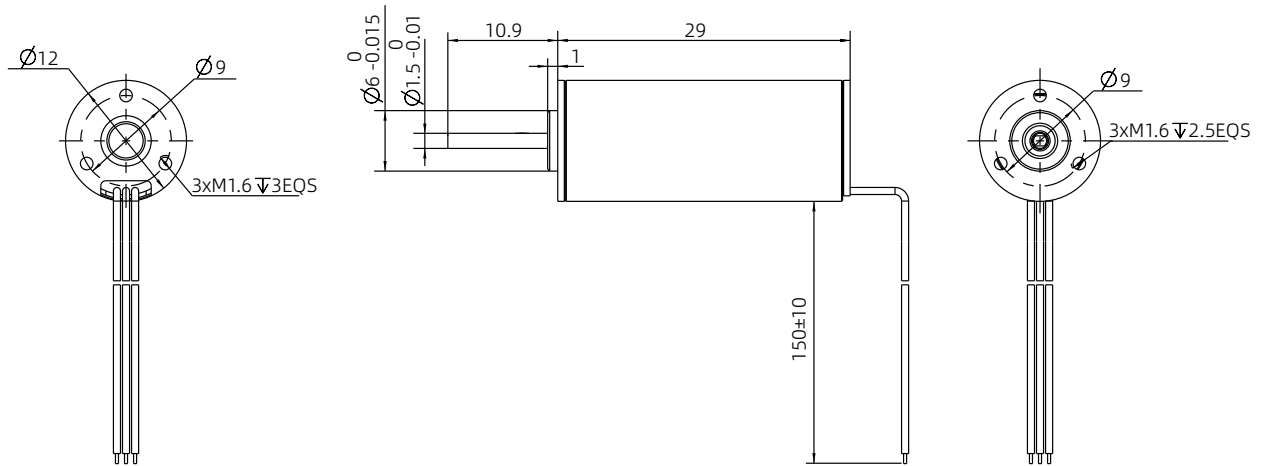
Motor Characteristics

Motor part number	12ZWWC29	
Pole pairs	-	2
Terminal resistance, Phase-Phase	Ω	1
Terminal inductance, Phase-Phase	mH	0.033
Winding connection method	-	Star connection
Insulation class	-	B
Duty type	-	S2
Insulation strength (Withstand voltage)	-	660VAC/1KHz/1mA/1s
Insulation resistance	-	100M Ω /500VDC
Weight	g	16.5
Rated voltage	V	6
Rated power	W	5
Rated torque	mN·m	4
Rated speed	RPM	12000
Rated current	A	1.21
No load speed	RPM	15000
No load current	A	0.16
Motor efficiency	%	70
Noise (Ambient noise 20dB, test distance 1m)	dB	<50
Thermal Resistance (No-load)	K/W	12.49
Ambient temperature	°C	22.3
Max winding temperature	°C	86
Torque constant	mN·m/A	3.29
Back-EMF constant - peak value	V/Krpm	0.49
Back-EMF constant - effective value	V/Krpm	0.34
Peak torque	mN·m	19.76
Peak current	A	6
Rotor inertia	g·cm ²	0.3
Mechanical time constant	ms	2.76
End bell	-	Aluminum alloy
Bearing	-	Deep groove ball bearing
Magnet	-	Sinter NdFeB
Rotation shaft	-	Carbon steel

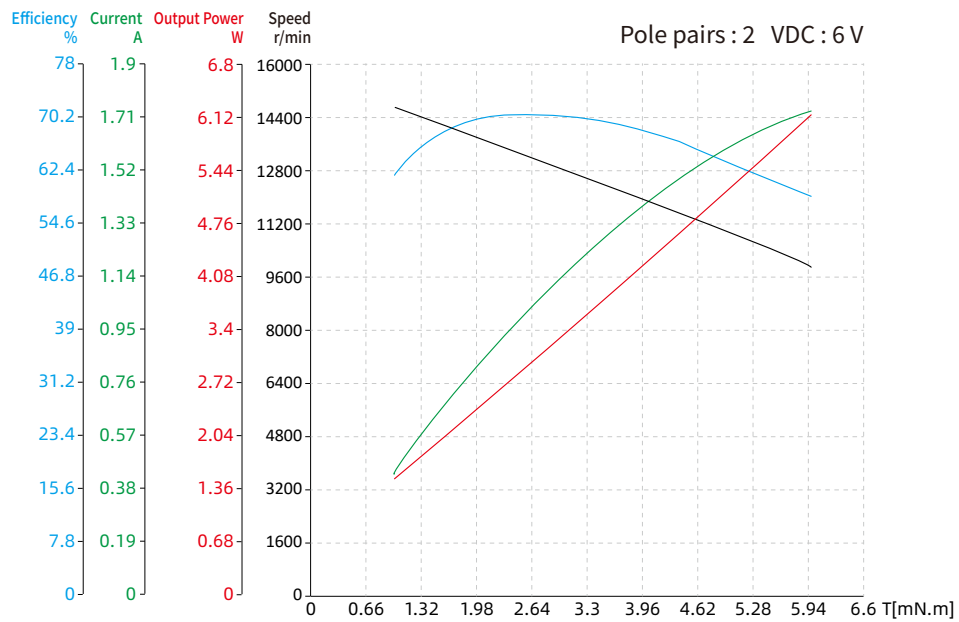


12mm Series

Dimensional Drawings



Torque Performance Curves



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

G-10



13mm Series

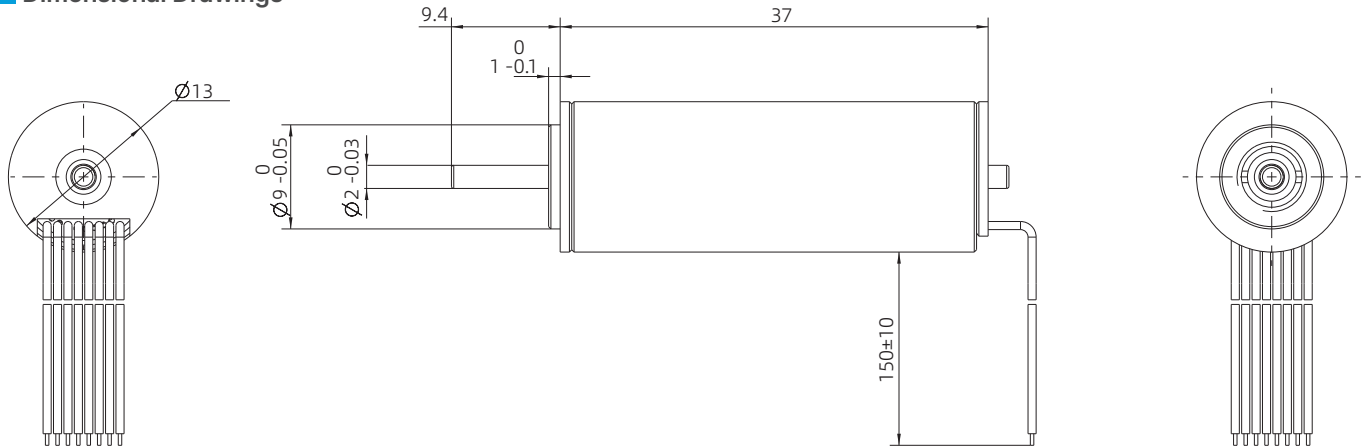
Motor Characteristics

Motor part number	13ZWWC37	
Pole pairs	-	1
Terminal resistance, Phase-Phase	Ω	3.65
Terminal inductance, Phase-Phase	mH	0.113
Winding connection method	-	Delta connection
Insulation class	-	B
Duty type	-	S2
Feedback method	-	Hall sensor
Commutation angle	-	120°
Insulation strength (Withstand voltage)	-	300VAC/1KHz/1mA/1s
Insulation resistance	-	100M Ω /300VDC
Weight	g	28.6
Rated voltage	V	24
Rated power	W	11
Rated torque	mN·m	2.7
Rated speed	RPM	43500
Rated current	A	0.66
No load speed	RPM	46800
No load current	A	0.086
Motor efficiency	%	69
Noise (Ambient noise 20dB, test distance 1m)	dB	<50
Thermal Resistance (No-load)	K/W	3.70
Ambient temperature	°C	22.3
Max winding temperature	°C	63
Torque constant	mN·m/A	4.06
Back-EMF constant - peak value	V/Krpm	0.6
Back-EMF constant - effective value	V/Krpm	0.43
Peak torque	mN·m	26.73
Peak current	A	7
Rotor inertia	g·cm ²	0.14
Mechanical time constant	ms	3.09
End bell	-	Stainless steel
Bearing	-	Deep groove ball bearing
Magnet	-	Sinter NdFeB
Rotation shaft	-	Carbon steel

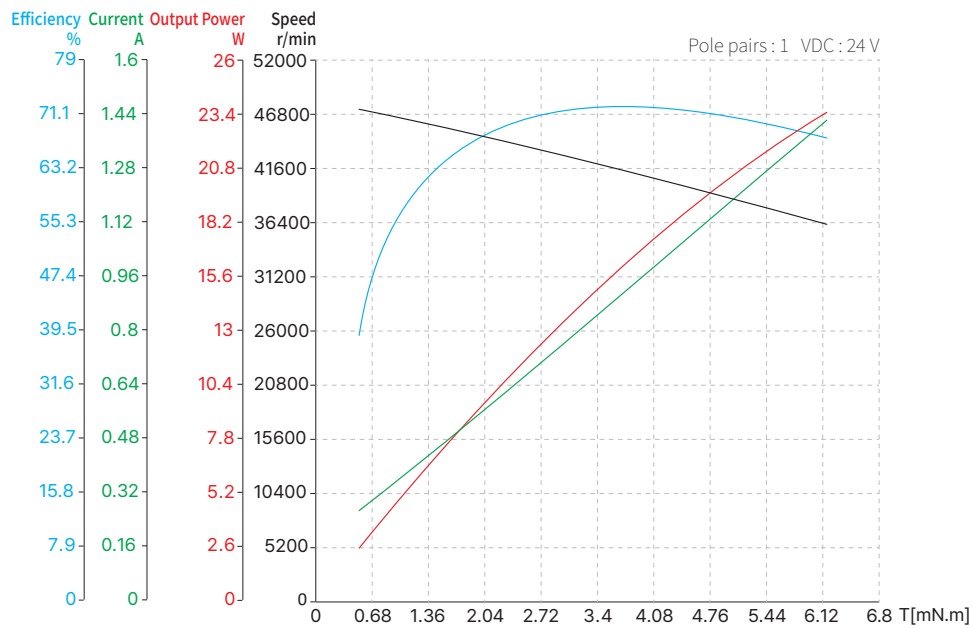


13mm Series

■ Dimensional Drawings



■ Torque Performance Curves



14mm Series

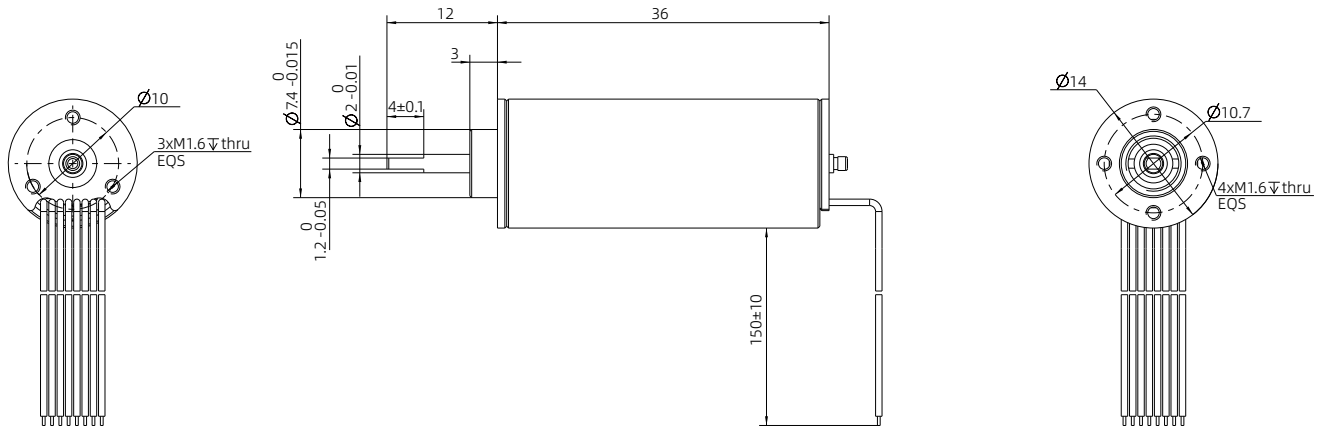
Motor Characteristics

Motor part number	14ZWWC36	
Pole pairs	-	1
Terminal resistance, Phase-Phase	Ω	0.87
Terminal inductance, Phase-Phase	mH	0.04
Winding connection method	-	Delta connection
Insulation class	-	B
Duty type	-	S1
Feedback method	-	Hall sensor
Commutation angle	-	120°
Insulation strength (Withstand voltage)	-	500VAC/1KHz/1mA/1s
Insulation resistance	-	100M Ω /500VDC
Weight	g	34.2
Rated voltage	V	6
Rated power	W	5.1
Rated torque	mN·m	4
Rated speed	RPM	12152
Rated current	A	1.3
No load speed	RPM	15000
No load current	A	0.18
Motor efficiency	%	66
Noise (Ambient noise 20dB, test distance 1m)	dB	<50
Thermal Resistance (No-load)	K/W	9.35
Ambient temperature	°C	22.3
Max winding temperature	°C	70
Torque constant	mN·m/A	3.08
Back-EMF constant - peak value	V/Krpm	0.46
Back-EMF constant - effective value	V/Krpm	0.32
Peak torque	mN·m	20
Peak current	A	6
Rotor inertia	g·cm ²	0.15
Mechanical time constant	ms	1.38
End bell	-	Stainless steel
Bearing	-	Deep groove ball bearing
Magnet	-	Sinter NdFeB
Rotation shaft	-	Carbon steel

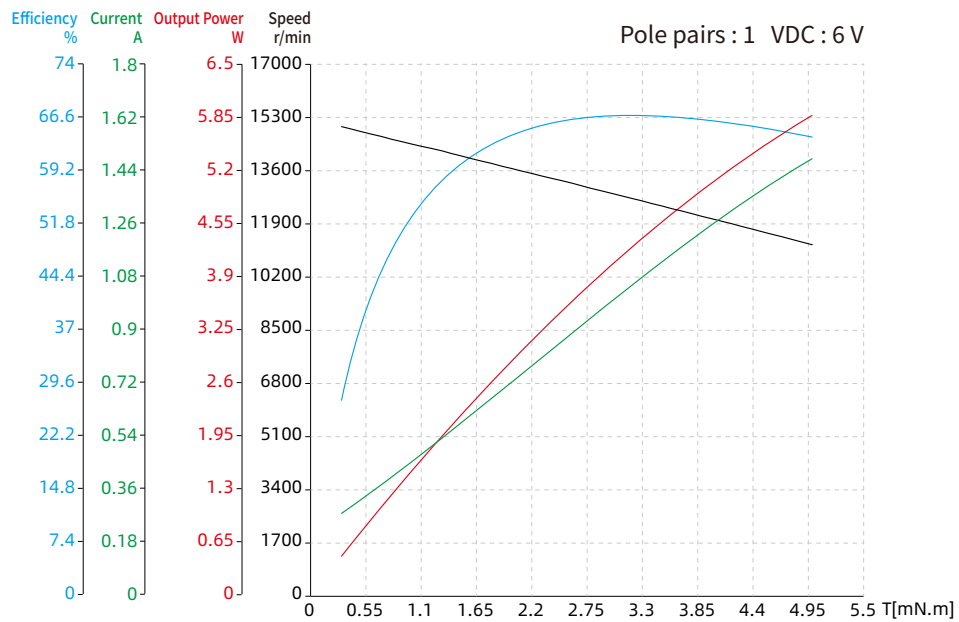


14mm Series

Dimensional Drawings



Torque Performance Curves



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

G-14



16mm Series

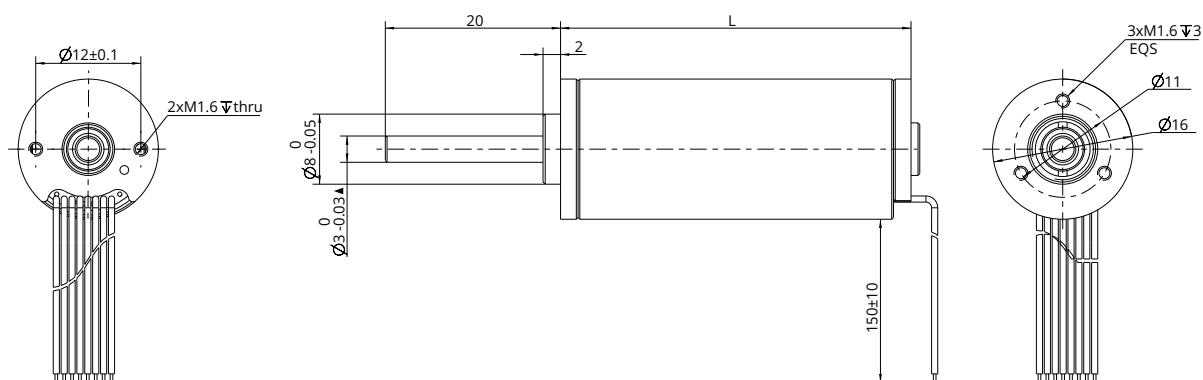
Motor Characteristics

Motor part number		16ZWWC24-1SZ	16ZWWC40					16ZWWC56-5SZ
Pole pairs	-	1	1	1	1	1	1	1
Terminal resistance, Phase-Phase	Ω	2.408	0.63	1.31	1.85	3.15	0.3196	0.4971
Terminal inductance, Phase-Phase	mH	0.067	0.033	0.045	0.096	0.2	0.014	0.033
Winding connection method	-	Delta connection	Star connection	Star connection	Star connection	Star connection	Delta connection	Star connection
Insulation class	-	B	B	B	B	B	B	B
Duty type	-	S2	S2	S2	S2	S2	S2	S2
Feedback method	-	Hall sensor	Hall sensor	Hall sensor	Hall sensor	Hall sensor	Hall sensor	Hall sensor
Commutation angle	-	120°	120°	120°	120°	120°	120°	120°
Insulation strength (Withstand voltage)	-	500VAC/1KHz/1mA/1s						
Insulation resistance	-	100M Ω /500VDC						
Weight	g	26.5	47	47	47	47	47	63
Rated voltage	V	12	18	24	36	48	12	24
Rated power	W	10.8	33	39	39	39	27.26	73.5
Rated torque	mN·m	3.2	7.4	7.4	7.5	7.4	7.5	14.6
Rated speed	RPM	32300	44000	51300	50000	50000	34700	48100
Rated current	A	1.21	2.19	1.96	1.32	0.95	3	3.81
No load speed	RPM	44000	50000	58000	56000	56000	40000	54000
No load current	A	0.35	0.31	0.22	0.15	0.12	0.4	0.5
Motor efficiency	%	75.5	85	84	82.4	84.92	81.4	87.1
Noise (Ambient noise 20dB, test distance 1m)	dB	<50	<50	<50	<50	<50	<50	<50
Thermal Resistance (No-load)	K/W	-	1.22	1.33	1.47	1.07	-	-
Thermal Time Constant (No-load)	S	-	420	450	480	390	-	-
Ambient temperature	°C	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Max winding temperature (No-load)	°C	-	63	75	80	63.8	-	-
Torque constant	mN·m/A	2.6	3.38	3.78	5.66	7.75	2.86	4.24
Back-EMF constant - peak value	V/Krpm	0.38	0.50	0.56	0.84	1.15	0.42	0.62
Back-EMF constant - effective value	V/Krpm	0.27	0.35	0.40	0.59	0.81	0.3	0.44
Peak torque	mN·m	9	96.65	69.21	110.19	118.13	53	140
Peak current	A	4.9	29	18	19	15	19	39
Rotor inertia	g·cm ²	0.3	0.583	0.583	0.583	0.583	0.58	0.8
Mechanical time constant	ms	10.69	3.21	5.35	3.36	3.06	2.28	2.21
End bell	-	Stainless steel						
Bearing	-	Deep groove ball bearing						
Magnet	-	Sinter NdFeB						
Rotation shaft	-	Carbon steel						



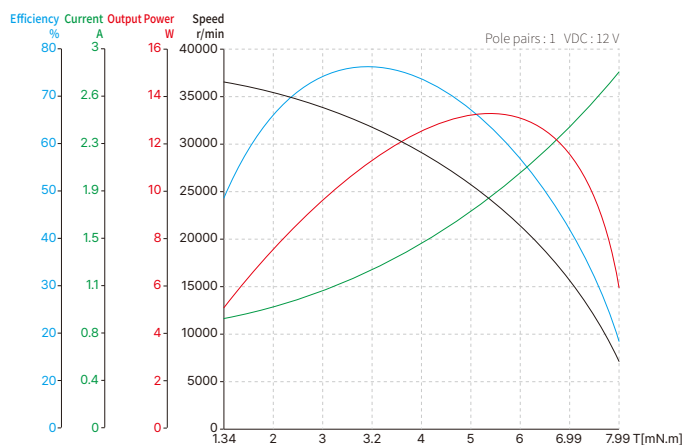
16mm Series

Dimensional Drawings

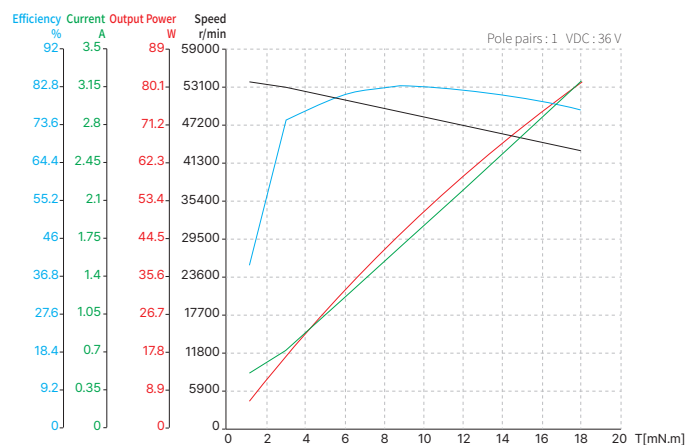


Torque Performance Curves

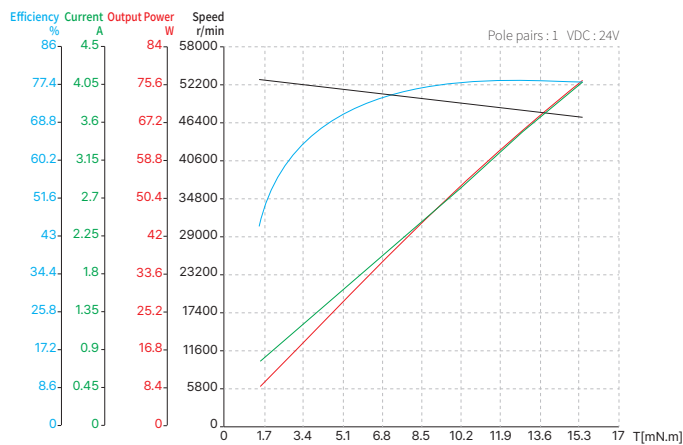
16ZWWC24



16ZWWC40



16ZWWC56



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)



22mm Series

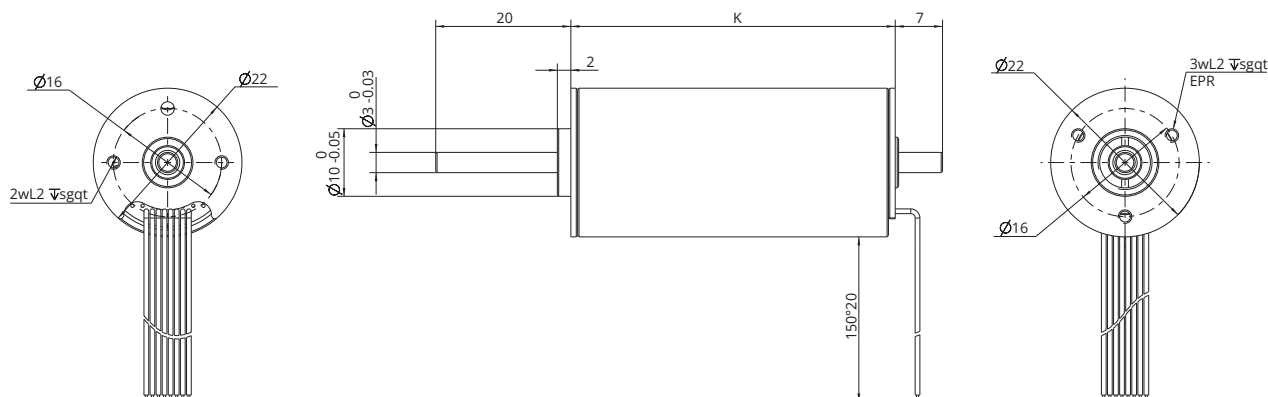
Motor Characteristics

Motor part number		22ZWWC48					22ZWWC64-1SZ
Pole pairs	-	1	1	1	1	2	1
Terminal resistance, Phase-Phase	Ω	0.26	0.3	0.57	1	0.94	0.63
Terminal inductance, Phase-Phase	mH	0.018	0.027	0.06	0.11	0.057	0.061
Winding connection method	-	Star connection	Star connection	Star connection	Star connection	Star connection	Star connection
Insulation class	-	B	B	B	B	B	B
Duty type	-	S2	S2	S2	S2	S1	S2
Feedback method	-	Hall sensor	Hall sensor	Hall sensor	Hall sensor	Hall sensor	Hall sensor
Commutation angle	-	120°	120°	120°	120°	120°	120°
Insulation strength (Withstand voltage)	-	500VAC/1KHz/1mA/1s					
Insulation resistance	-	100M Ω / 500VDC					
Weight	g	110	110	110	110	110	140
Rated voltage	V	18	24	36	48	24	24
Rated power	W	83	100	100	100	53	38.24
Rated torque	mN·m	20	20	20	20	25	20
Rated speed	RPM	40000	49000	47400	49600	20100	18200
Rated current	A	7.95	4.68	3.12	2.29	3	1.86
No load speed	RPM	50000	55000	53000	54000	25700	19300
No load current	A	0.3	0.4	0.32	0.14	0.18	0.126
Motor efficiency	%	87	89	89	91	81	89.7
Noise (Ambient noise 20dB, test distance 1m)	dB	<50	<50	<50	<50	<50	< 50
Thermal Resistance (No-load)	K/W	0.38	0.58	0.51	0.42	1.12	-
Thermal Time Constant (No-load)	S	840	600	900	1200	620	-
Ambient temperature	°C	21.4	22	24.7	21.1	23.3	22.3
Max winding temperature (No-load)	°C	52.7	80	75.5	70.5	82	-
Torque constant	mN·m/A	2.52	4.27	6.41	8.74	8.33	11.87
Back-EMF constant - peak value	V/Krpm	0.37	0.63	0.95	1.29	1.23	1.758
Back-EMF constant - effective value	V/Krpm	0.26	0.45	0.67	0.91	0.87	1.24
Peak torque	mN·m	116.11	341.76	404.72	419.33	212.77	320
Peak current	A	46	80	63	48	26	33.5
Rotor inertia	g·cm ²	1.15	1.15	1.15	1.15	1.15	3
Mechanical time constant	ms	4.72	1.89	1.60	1.51	1.56	1.34
End bell	-	Stainless steel					
Bearing	-	Deep groove ball bearing					
Magnet	-	Sinter NdFeB					
Rotation shaft	-	Carbon steel					



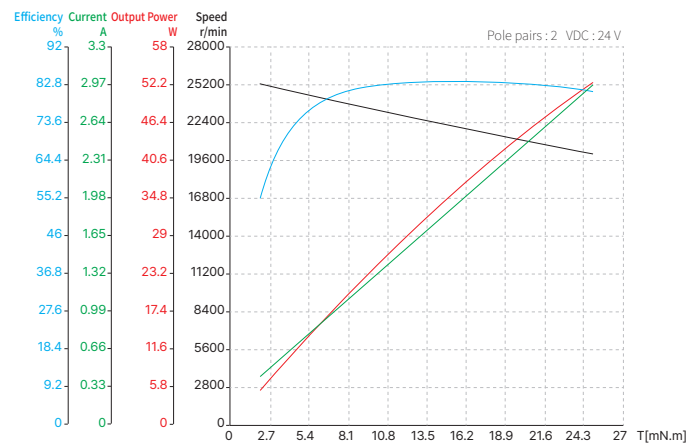
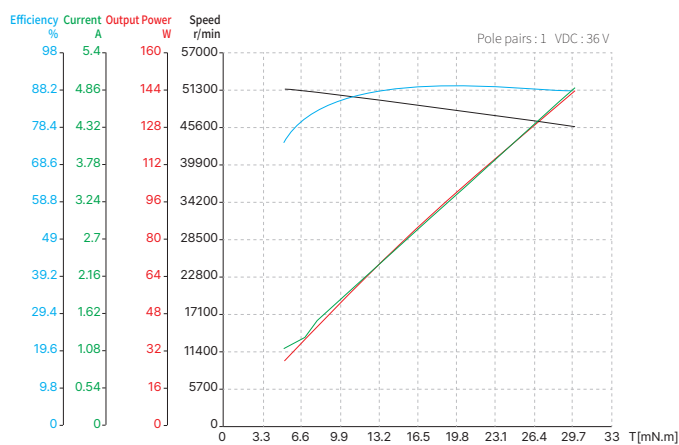
22mm Series

Dimensional Drawings

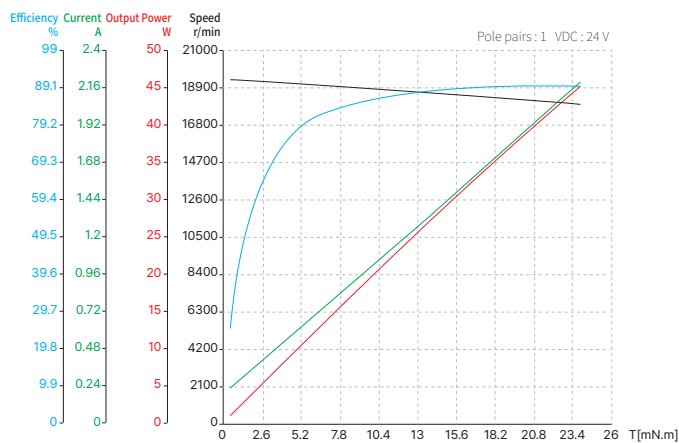


Torque Performance Curves

22ZWWC48



22ZWWC64



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)



28mm Series

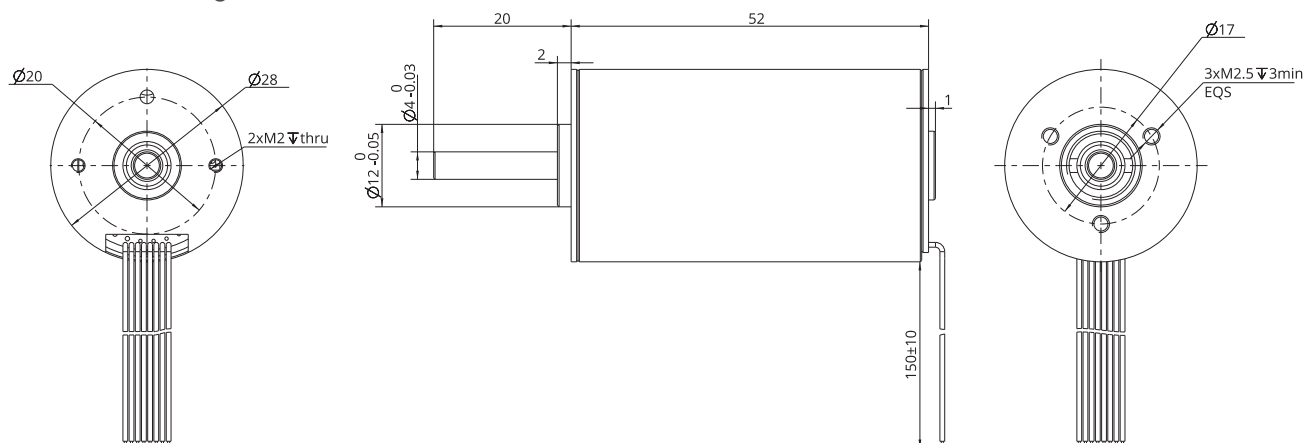
Motor Characteristics

Motor part number	28ZWWC52					
Pole pairs	-	1	1	1	1	2
Terminal resistance, Phase-Phase	Ω	0.52	1.7	4.3	6.6	1.6
Terminal inductance, Phase-Phase	mH	0.0495	0.178	0.42	0.77	0.13
Winding connection method	-	Star connection	Star connection	Star connection	Star connection	Star connection
Insulation class	-	B	B	B	B	B
Duty type	-	S2	S2	S2	S2	S1
Feedback method	-	Hall sensors	Hall sensors	Hall sensors	Hall sensors	Hall sensors
Commutation angle	-	120°	120°	120°	120°	120°
Insulation strength (Withstand voltage)	-	500VAC/1KHz/1mA/1s				
Insulation resistance	-	100M Ω /500VDC				
Weight	g	170	170	170	170	170
Rated voltage	V	12	24	36	48	24
Rated power	W	30	34	35	35	37
Rated torque	mN·m	32	32	32	34	50
Rated speed	RPM	6970	8430	8370	8340	7000
Rated current	A	3.13	1.69	1.17	0.86	2.00
No load speed	RPM	9270	9680	9500	9400	8500
No load current	A	0.2	0.11	0.084	0.061	0.12
Motor efficiency	%	80	84	83	85	81.5
Noise (Ambient noise 20dB, test distance 1m)	dB	<50	<50	<50	<50	<50
Thermal Resistance (No-load)	K/W	0.67	0.69	0.73	0.64	0.70
Thermal Time Constant (No-load)	S	1200	1200	1080	1100	880
Ambient temperature	°C	23	24	27	25	21.2
Max winding temperature (No-load)	°C	43.2	47.3	52.5	47.4	46.7
Torque constant	mN·m/A	10.24	18.97	27.32	39.63	25
Back-EMF constant - peak value	V/Krpm	1.52	2.81	4.04	5.87	3.70
Back-EMF constant - effective value	V/Krpm	1.07	1.99	2.86	4.15	2.62
Peak torque	mN·m	236.31	267.87	228.72	288.25	375
Peak current	A	23	14	8	7	15
Rotor inertia	g·cm ²	10.2	10.2	10.2	10.2	10.2
Mechanical time constant	ms	5.06	4.82	5.88	4.29	2.61
End bell	-	Stainless steel				
Bearing	-	Deep groove ball bearing				
Magnet	-	Sinter NdFeB				
Rotation shaft	-	Carbon steel				

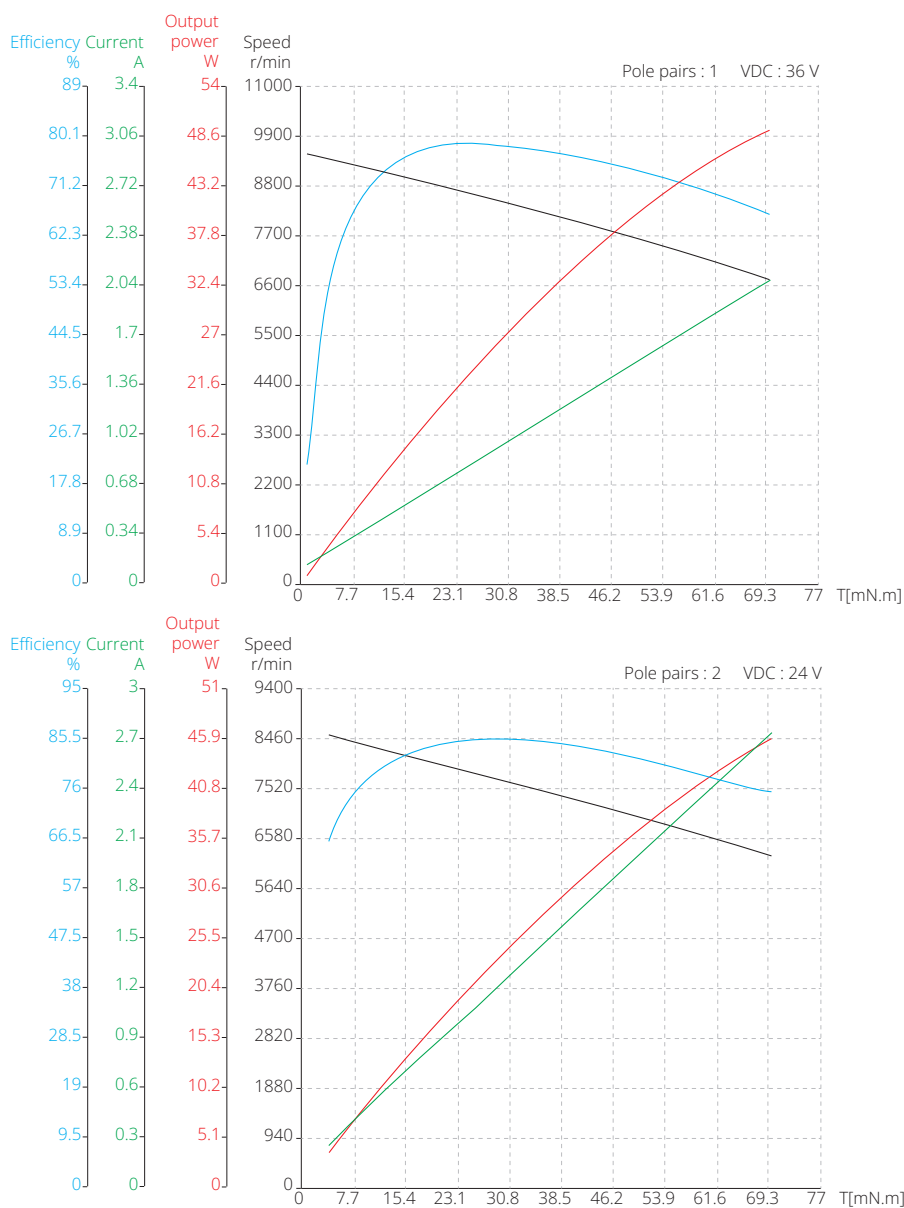


28mm Series

Dimensional Drawings



Torque Performance Curves



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)



30mm Series

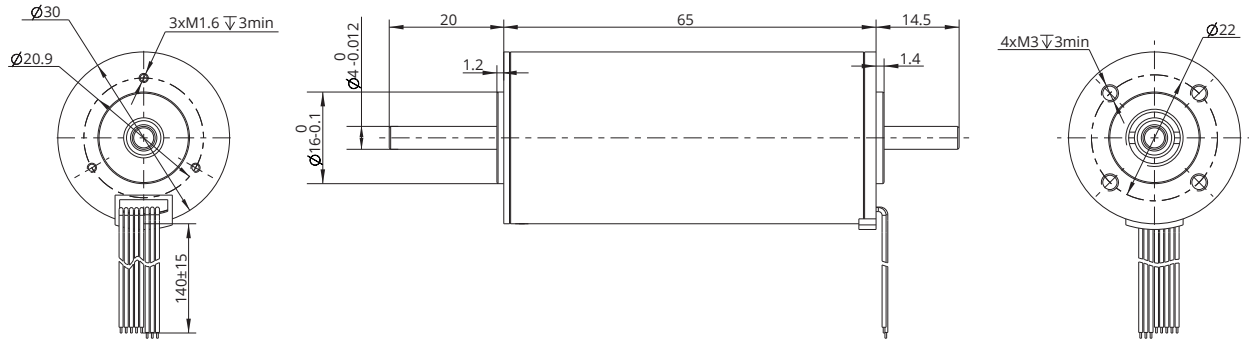
Motor Characteristics

Motor part number	30ZWWC65	
Pole pairs	-	2
Terminal resistance, Phase-Phase	Ω	0.5
Terminal inductance, Phase-Phase	mH	0.05
Winding connection method	-	Star connection
Insulation class	-	B
Duty type	-	S1
Feedback method	-	Hall sensors
Commutation angle	-	120°
Insulation strength (Withstand voltage)	-	500VAC/1KHz/1mA/1s
Insulation resistance	-	100M Ω /500VDC
Weight	g	230
Rated voltage	V	24
Rated power	W	65
Rated torque	mN·m	90
Rated speed	RPM	6900
Rated current	A	3.85
No load speed	RPM	9200
No load current	A	0.3
Motor efficiency	%	86
Noise (Ambient noise 20dB, test distance 1m)	dB	<50
Thermal Resistance (No-load)	K/W	0.31
Thermal Time Constant (No-load)	S	1200
Ambient temperature	°C	23
Max winding temperature (No-load)	°C	43.2
Torque constant	mN·m/A	23.38
Back-EMF constant - peak value	V/Krpm	3.46
Back-EMF constant - effective value	V/Krpm	2.45
Peak torque	mN·m	1122.08
Peak current	A	48
Rotor inertia	g·cm ²	28
Mechanical time constant	ms	2.56
End bell	-	Stainless steel
Bearing	-	Deep groove ball bearing
Magnet	-	Sinter NdFeB
Rotation shaft	-	Carbon steel

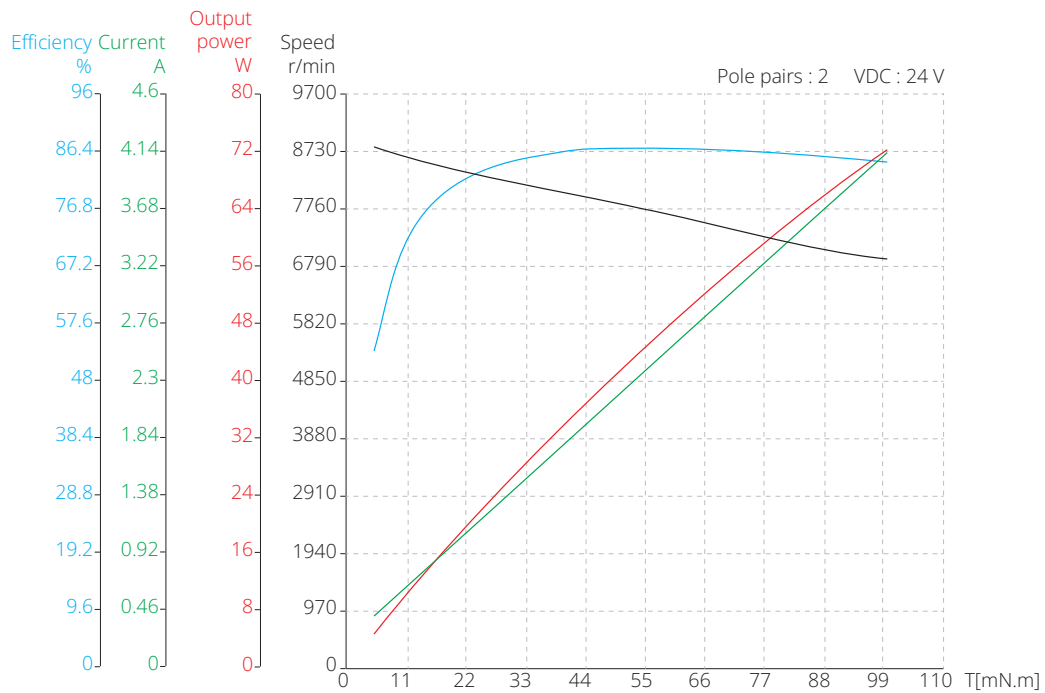


30mm Series

Dimensional Drawings



Torque Performance Curves



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

G-22



36mm Series

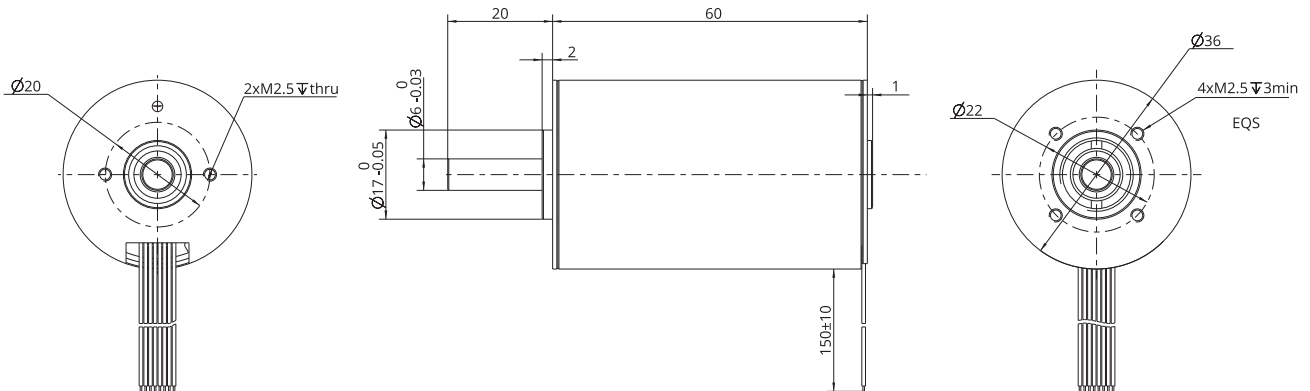
Motor Characteristics

Motor part number	36ZWWC60					
Pole pairs	-	1	1	1	1	2
Terminal resistance, Phase-Phase	Ω	0.6	0.68	1.45	2.1	0.41
Terminal inductance, Phase-Phase	mH	0.08	0.1	0.19	0.27	0.042
Winding connection method	-	Star connection	Star connection	Star connection	Star connection	Star connection
Insulation class	-	B	B	B	B	B
Duty type	-	S2	S2	S2	S2	S1
Feedback method	-	Hall sensors	Hall sensors	Hall sensors	Hall sensors	Hall sensors
Commutation angle	-	120°	120°	120°	120°	120°
Insulation strength (Withstand voltage)	-	500VAC/1KHz/1mA/1s				
Insulation resistance	-	100M Ω /500VDC				
Weight	g	270	270	270	270	270
Rated voltage	V	18	24	36	48	24
Rated power	W	68	69	74	85	85
Rated torque	mN·m	70	70	70	70	100
Rated speed	RPM	7340	9345	10000	11700	8100
Rated current	A	4.97	3.78	2.59	2.21	4.80
No load speed	RPM	10000	11000	11500	13000	10300
No load current	A	0.37	0.37	0.22	0.2	0.36
Motor efficiency	%	76	76	79.5	80	84.4
Noise (Ambient noise 20dB, test distance 1m)	dB	<50	<50	<50	<50	<50
Thermal Resistance (No-load)	K/W	0.42	0.43	0.44	0.36	0.58
Thermal Time Constant (No-load)	S	1350	1350	2700	1080	1330
Ambient temperature	°C	21.1	23.1	20.1	20.4	19.5
Max winding temperature (No-load)	°C	49.4	52.9	52.8	50.8	69.3
Torque constant	mN·m/A	14.08	18.50	27.07	31.62	20.83
Back-EMF constant - peak value	V/Krpm	2.09	2.74	4.01	4.68	3.08
Back-EMF constant - effective value	V/Krpm	1.47	1.94	2.83	3.31	2.18
Peak torque	mN·m	422.47	653.09	672.16	722.82	1219.51
Peak current	A	30	35	25	23	59
Rotor inertia	g·cm ²	39	39	39	39	39
Mechanical time constant	ms	11.80	7.75	7.72	8.19	3.68
End bell	-	Stainless steel				
Bearing	-	Deep groove ball bearing				
Magnet	-	Sinter NdFeB				
Rotation shaft	-	Carbon steel				

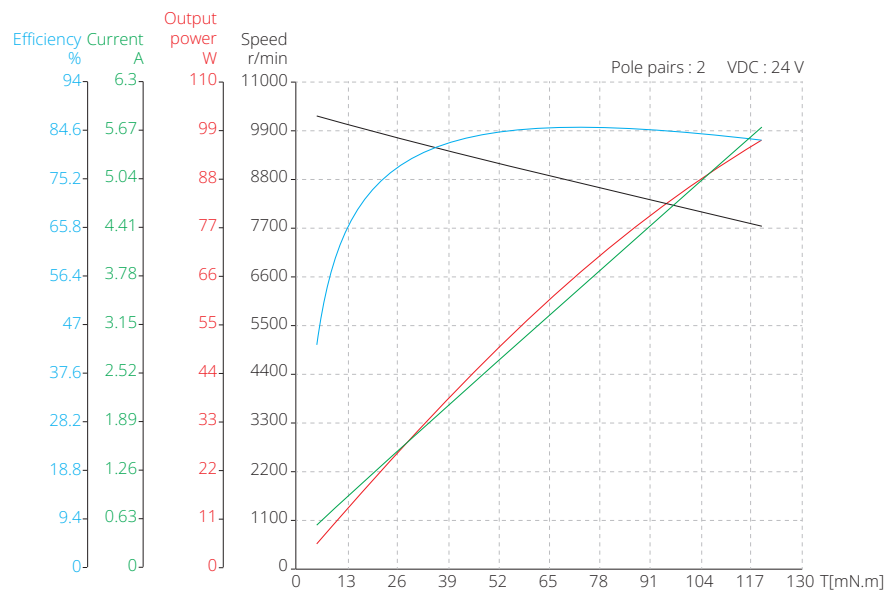
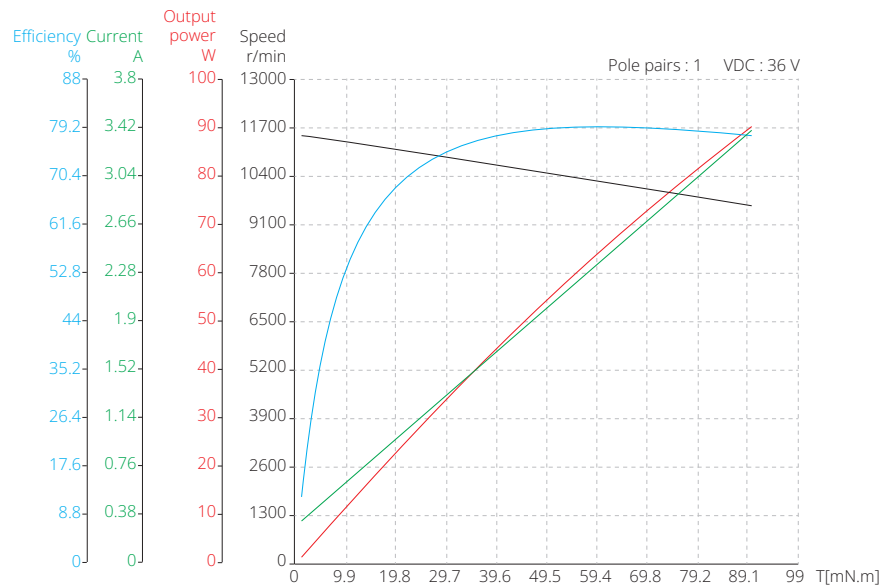


36mm Series

Dimensional Drawings



Torque Performance Curves



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)



42mm Series

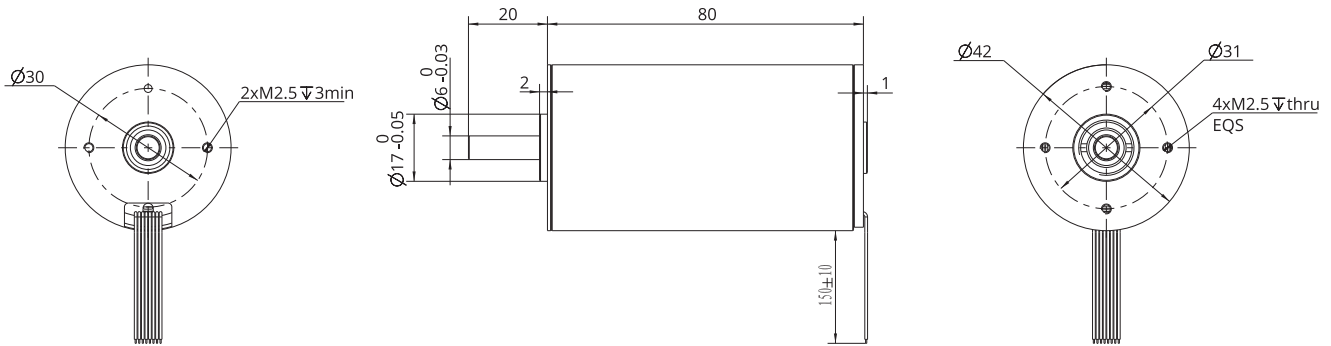
Motor Characteristics

Motor part number	42ZWWC80					
Pole pairs	-	1	1	1	1	2
Terminal resistance, Phase-Phase	Ω	0.4	0.45	0.6	0.95	0.22
Terminal inductance, Phase-Phase	mH	0.085	0.14	0.14	0.23	0.035
Winding connection method	-	Star connection	Star connection	Star connection	Star connection	Star connection
Insulation class	-	B	B	B	B	B
Duty type	-	S2	S2	S2	S2	S1
Feedback method	-	Hall sensors	Hall sensors	Hall sensors	Hall sensors	Hall sensors
Commutation angle	-	120°	120°	120°	120°	120°
Insulation strength (Withstand voltage)	-	500VAC/1KHz/1mA/1s				
Insulation resistance	-	100M Ω /500VDC				
Weight	g	500	500	500	500	500
Rated voltage	V	18	24	36	48	24
Rated power	W	66	80	100	160	102
Rated torque	mN·m	90	90	90	120	180
Rated speed	RPM	6678	8346	11619	12200	5400
Rated current	A	4.89	4.17	3.47	4.17	5.70
No load speed	RPM	9000	11000	13000	13800	6800
No load current	A	0.6	0.69	0.6	0.58	0.42
Motor efficiency	%	75	80	80	80	87.9
Noise (Ambient noise 20dB, test distance 1m)	dB	<50	<50	<50	<50	<50
Thermal Resistance (No-load)	K/W	0.43	0.50	0.67	0.26	0.41
Thermal Time Constant (No-load)	S	900	1620	2040	2040	1340
Ambient temperature	°C	23.1	23.5	23	23	22.6
Max winding temperature (No-load)	°C	51.5	63.7	90	90	72.1
Torque constant	mN·m/A	18.41	21.60	25.92	28.80	31.58
Back-EMF constant - peak value	V/Krpm	2.73	3.20	3.84	4.26	4.68
Back-EMF constant - effective value	V/Krpm	1.93	2.26	2.71	3.02	3.31
Peak torque	mN·m	828.41	1152.00	1555.20	1455.16	3444.98
Peak current	A	45	53	60	51	109
Rotor inertia	g·cm ²	96.3	96.3	96.3	96.3	96.3
Mechanical time constant	ms	11.37	9.29	8.60	11.03	2.12
End bell	-	Stainless steel				
Bearing	-	Deep groove ball bearing				
Magnet	-	Sinter NdFeB				
Rotation shaft	-	Carbon steel				

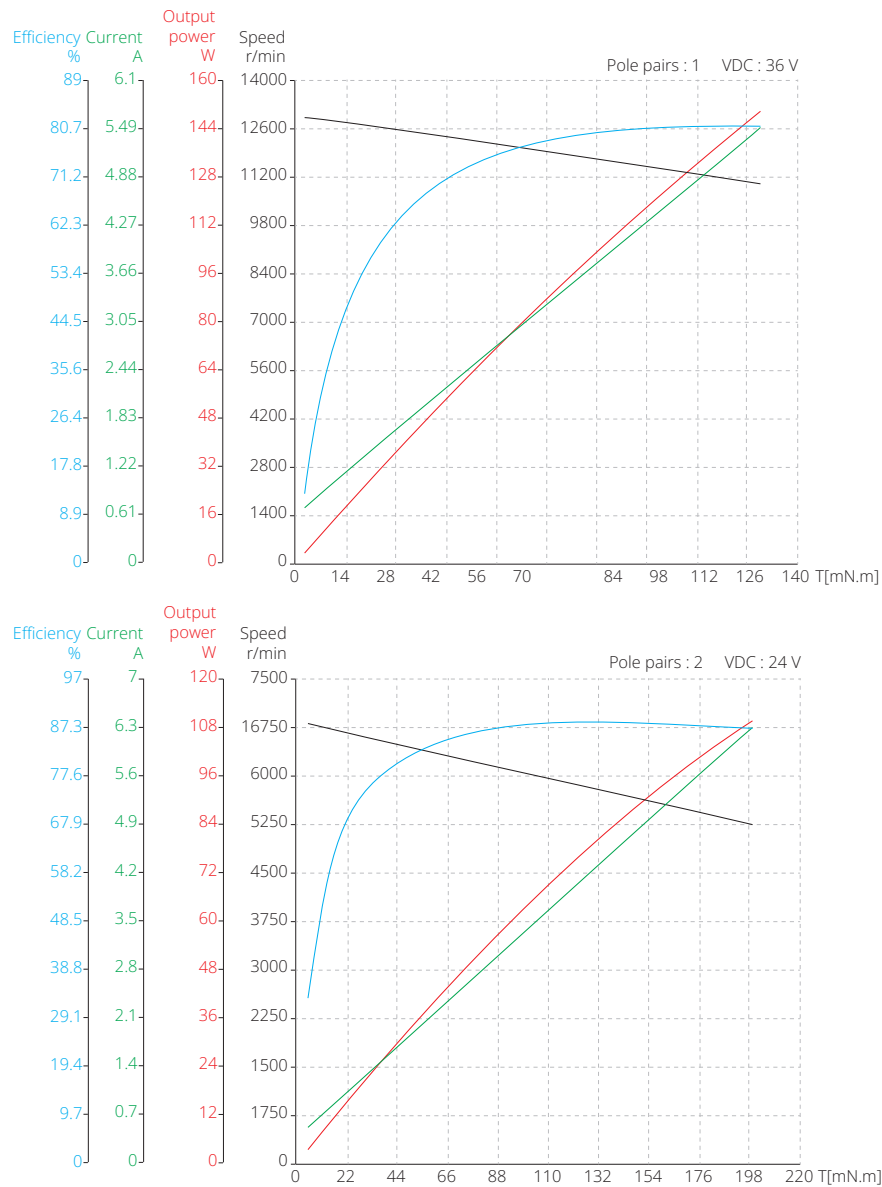


42mm Series

Dimensional Drawings



Torque Performance Curves



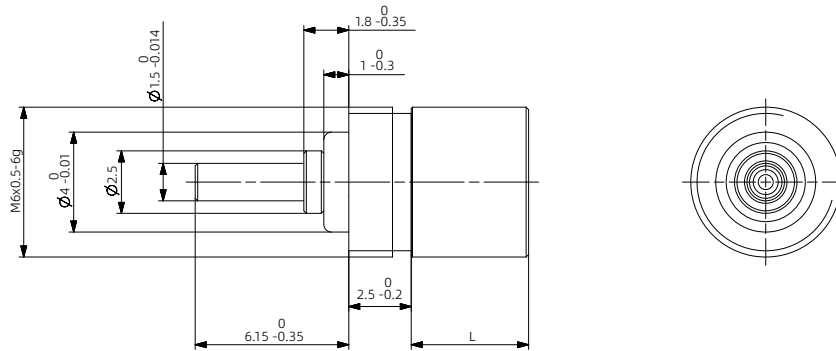
Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)



Accerosies and Options

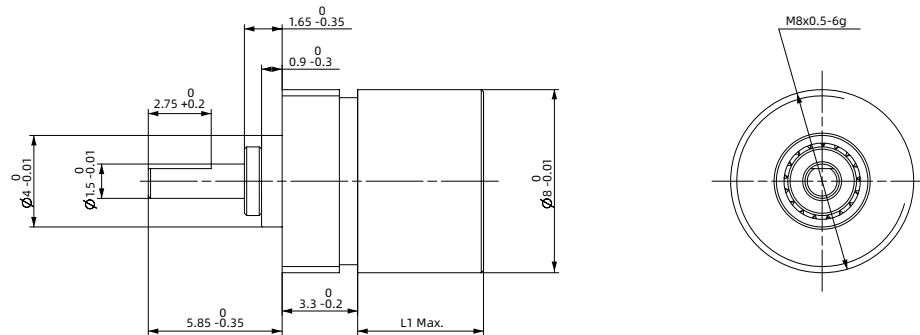
Precision planetary gearbox

6PGX



Stage	-	Stage 1	Stage 2	Stage 3
Gear ratio	X : 1	3.9	15	57
Max. backlash	°	1.8	2.0	2.2
Max. continuous output power	W	0.65	0.4	0.2
Max. peak output power	W	0.8	0.5	0.25
Max. continuous input speed	rpm	20000	20000	20000
Max. peak input speed	rpm	25000	25000	25000
Max. continuous torque	N·m	0.002	0.005	0.01
Max. peak torque	N·m	0.005	0.01	0.02
Max. efficiency	%	88	77	68
Weight	g	1.6	2	2.4
Gearbox length L	mm	4.7	7.2	9.7

8PGX

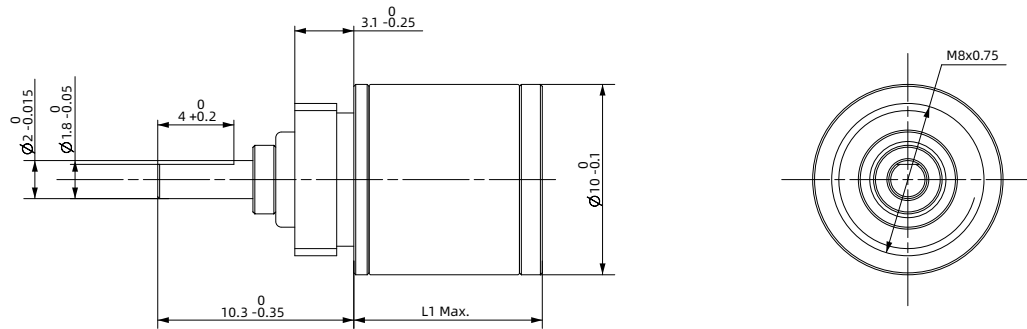


Stage	-	Stage 1	Stage 2	Stage 3
Gear ratio	X : 1	4	16	64
Max. backlash	°	1.8	2.0	2.2
Max. continuous output power	W	0.84	0.52	0.4
Max. peak output power	W	1.05	0.65	0.5
Max. continuous input speed	rpm	14000	14000	14000
Max. peak input speed	rpm	20000	20000	20000
Max. continuous torque	N·m	0.01	0.02	0.06
Max. peak torque	N·m	0.015	0.03	0.09
Max. efficiency	%	90	81	72
Weight	g	2.6	3.2	3.8
Gearbox length L	mm	5.5	8.1	10.7



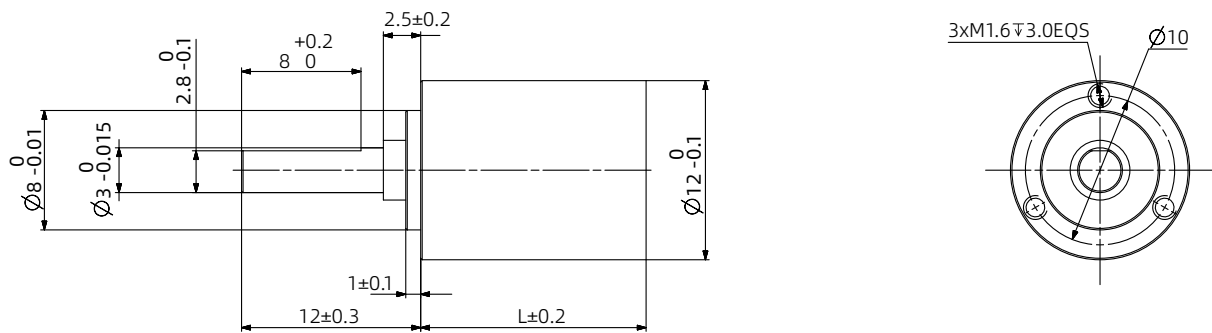
Accerrosies and Options

10PGX



Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	4.25	18	77	326
Max. backlash	°	1.5	1.8	2.0	2.2
Max. continuous output power	W	1.6	1.2	1.0	0.4
Max. peak output power	W	2	1.5	1.3	0.5
Max. continuous input speed	rpm	14000	14000	14000	14000
Max. peak input speed	rpm	18000	18000	18000	18000
Max. continuous torque	N·m	0.01	0.03	0.10	0.15
Max. peak torque	N·m	0.02	0.05	0.15	0.2
Max. efficiency	%	90	81	73	65
Weight	g	6.8	7.3	7.8	8.3
Gearbox length L	mm	10.1	13.6	17.1	20.6

12PGX

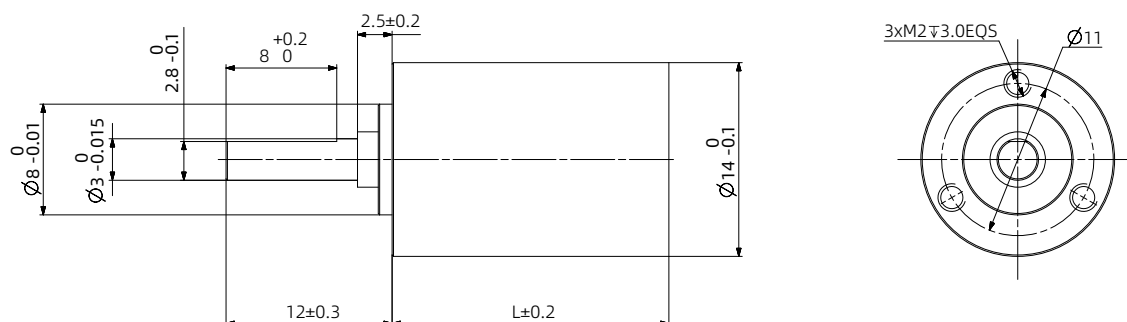


Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	4.3	18.4	79	337
Max. backlash	°	1.2	1.5	1.8	2.1
Max. continuous output power	W	2.0	1	0.5	0.25
Max. peak output power	W	2.5	1.25	0.65	0.3
Max. continuous input speed	rpm	16000	16000	16000	16000
Max. peak input speed	rpm	20000	20000	20000	20000
Max. continuous torque	N·m	0.08	0.11	0.14	0.17
Max. peak torque	N·m	0.1	0.14	0.18	0.21
Max. efficiency	%	90	80	75	65
Weight	g	9	12	15	18
Gearbox length L	mm	11.3	15.1	18.9	22.7



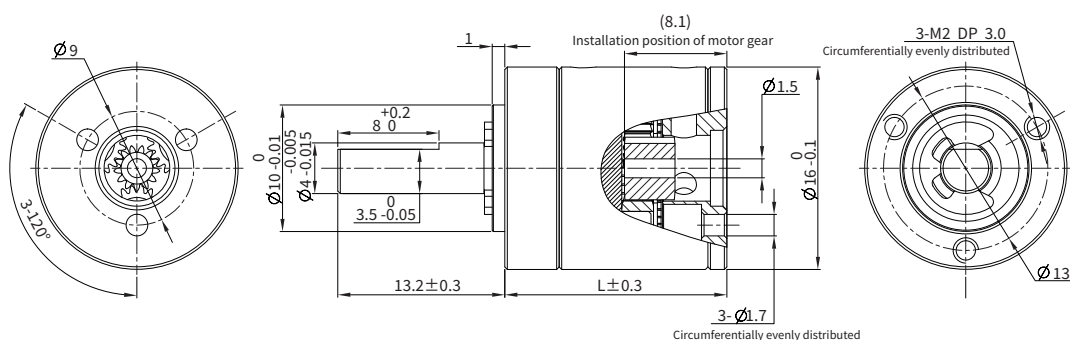
Accerrosies and Options

- 14PGX



Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	4.3	18.4	79	337
Max. backlash	°	1.1	1.3	1.45	1.7
Max. continuous output power	W	4.0	2.0	1.0	0.4
Max. peak output power	W	5.0	2.5	1.25	0.5
Max. continuous input speed	rpm	14000	16000	16000	16000
Max. peak input speed	rpm	18000	20000	20000	20000
Max. continuous torque	N·m	0.16	0.2	0.25	0.3
Max. peak torque	N·m	0.2	0.25	0.31	0.38
Max. efficiency	%	90	80	75	65
Weight	g	11	15	19	23
Gearbox length L	mm	11.8	16.1	20.4	24.7

- 16PGX

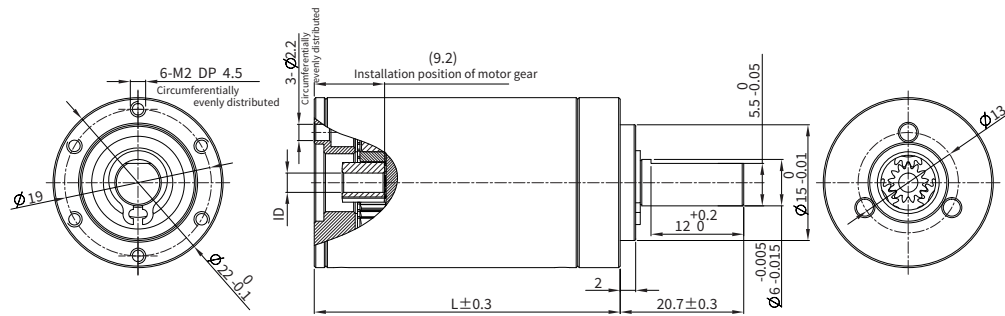


Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	3.9, 5.3	16, 21, 28	62, 83, 111, 150	243, 326, 439, 590, 794
Max. backlash	°	1.0	1.2	1.3	1.4
Max. continuous output power	W	6.5	3.2	1.6	0.6
Max. peak output power	W	8.0	4.0	2.0	0.75
Max. continuous input speed	rpm	12000	14000	14000	14000
Max. peak input speed	rpm	15000	18000	18000	18000
Max. continuous torque	N·m	0.2	0.25	0.35	0.45
Max. peak torque	N·m	0.25	0.35	0.45	0.55
Max. efficiency	%	90	80	75	65
Weight	g	25	31	37	42
Gearbox length L	mm	18.7	25.5	30.2	42



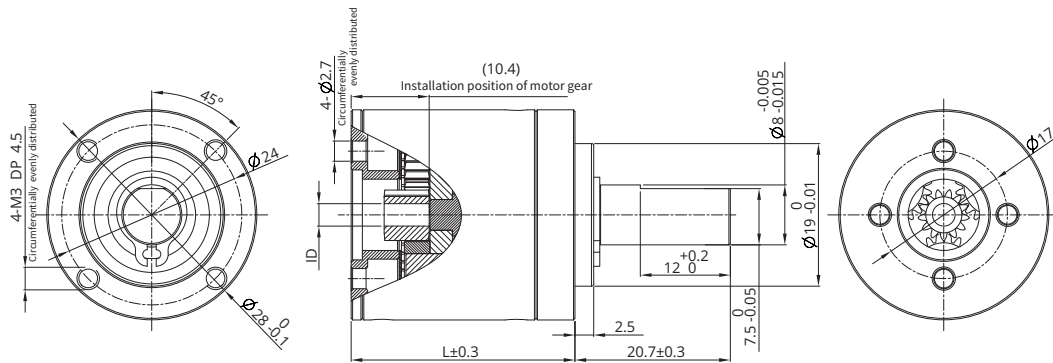
Accerrosies and Options

● 22PGX



Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	3.9, 5.3	16, 21, 28	62, 83, 111, 150	243, 326, 439, 590, 794
Max. backlash	°	0.85	1.05	1.2	1.35
Max. continuous output power	W	24	12	6.0	1.6
Max. peak output power	W	30	15	7.5	2.0
Max. continuous input speed	rpm	8000	10000	10000	10000
Max. peak input speed	rpm	10000	12500	12500	12500
Max. continuous torque	N·m	0.5	0.7	1.2	1.5
Max. peak torque	N·m	0.6	0.9	1.5	1.9
Max. efficiency	%	90	81	74	66
Weight	g	59	83	97	112
Gearbox length L	mm	22.3	33	39.6	46.3

● 28PGX

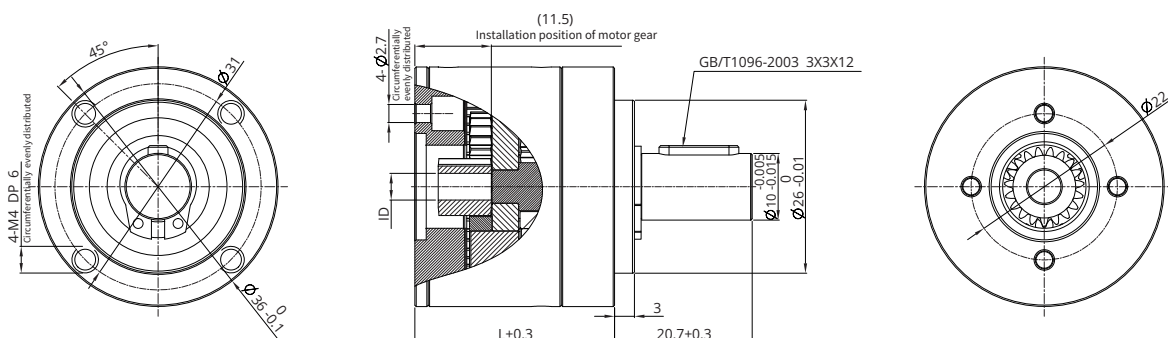


Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	3.9, 5.3	16, 21, 28	62, 83, 111, 150	243, 326, 439, 590, 794
Max. backlash	°	0.5	0.6	0.7	0.75
Max. continuous output power	W	100	50	25	8.0
Max. peak output power	W	125	62	31	10
Max. continuous input speed	rpm	6000	7000	7000	7000
Max. peak input speed	rpm	7500	8750	8750	8750
Max. continuous torque	N·m	1.25	2.9	5.0	5.0
Max. peak torque	N·m	1.6	3.6	6.3	6.3
Max. efficiency	%	90	81	72	65
Weight	g	103	150	174	198
Gearbox length L	mm	24.2	36.9	43.5	50.2



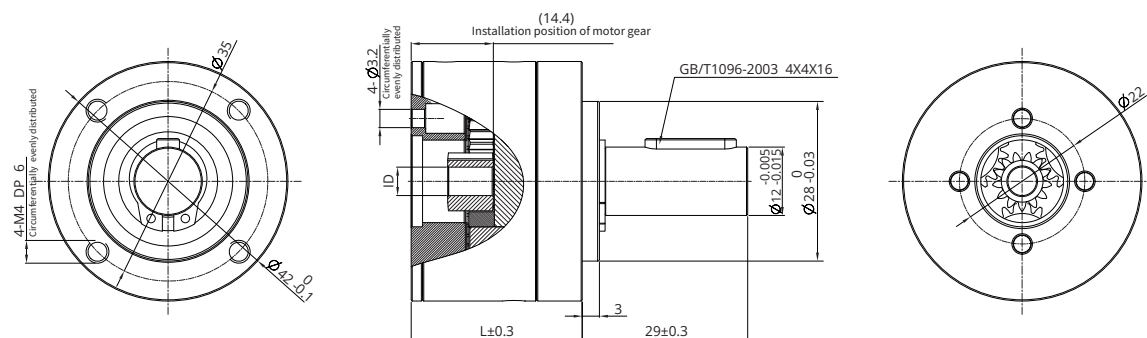
Accerrosies and Options

● 36PGX



Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	3.9, 5.3	16, 21, 28	62, 83, 111, 150	243, 326, 439, 590, 794
Max. backlash	°	0.5	0.6	0.7	0.8
Max. continuous output power	W	185	90	45	15
Max. peak output power	W	230	115	60	19
Max. continuous input speed	rpm	6000	6000	6000	6000
Max. peak input speed	rpm	7500	7500	7500	7500
Max. continuous torque	N·m	2.3	5.4	9.3	9.3
Max. peak torque	N·m	2.9	6.8	11.6	11.6
Max. efficiency	%	90	80	72	65
Weight	g	156	238	277	315
Gearbox length L	mm	30	44.7	51.3	58

● 42PGX



Stage	-	Stage 1	Stage 2	Stage 3	Stage 4
Gear ratio	X : 1	3.9, 5.3	16, 21, 28	62, 83, 111, 150	243, 326, 439, 590, 794
Max. backlash	°	0.3	0.4	0.5	0.6
Max. continuous output power	W	480	200	85	20
Max. peak output power	W	600	250	106	25
Max. continuous input speed	rpm	6000	6000	6000	6000
Max. peak input speed	rpm	7500	7500	7500	7500
Max. continuous torque	N·m	3.0	7.5	15	15
Max. peak torque	N·m	4.5	11.3	22.5	22.5
Max. efficiency	%	90	81	72	64
Weight	g	252	405	476	544
Gearbox length L	mm	36.1	54.9	63.6	72.4

