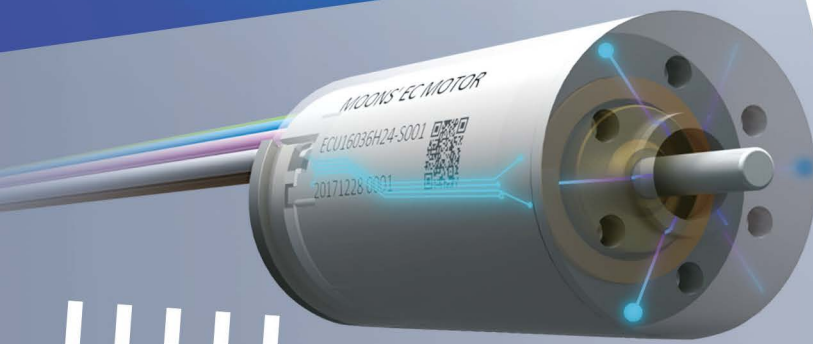


Micro Motion Systems

| with ironless winding



presented by



ELEKTRONIK SERVICE GMBH

MOONS'
moving in better ways

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Company Profile

MOONS' is one of the largest integrated manufacturers of motion control products within China, using internationally proven scientific management tools along with the pursuit for professional applied technologies.

MOONS' continuously develops products that conserve energy, are more convenient and efficient in utilization and application, bringing assurance to the customers and creating values for them.

MOONS' products range from factory automation components to the intelligent LED drivers, from the intelligent management system of large industrial equipment to the control actuator in automotive and telecommunication devices.

- MOONS' was established in February 1994.
- Headquartered in Shanghai, China.
- Overseas companies located in North America, Europe, East Asia and Southeast Asia.



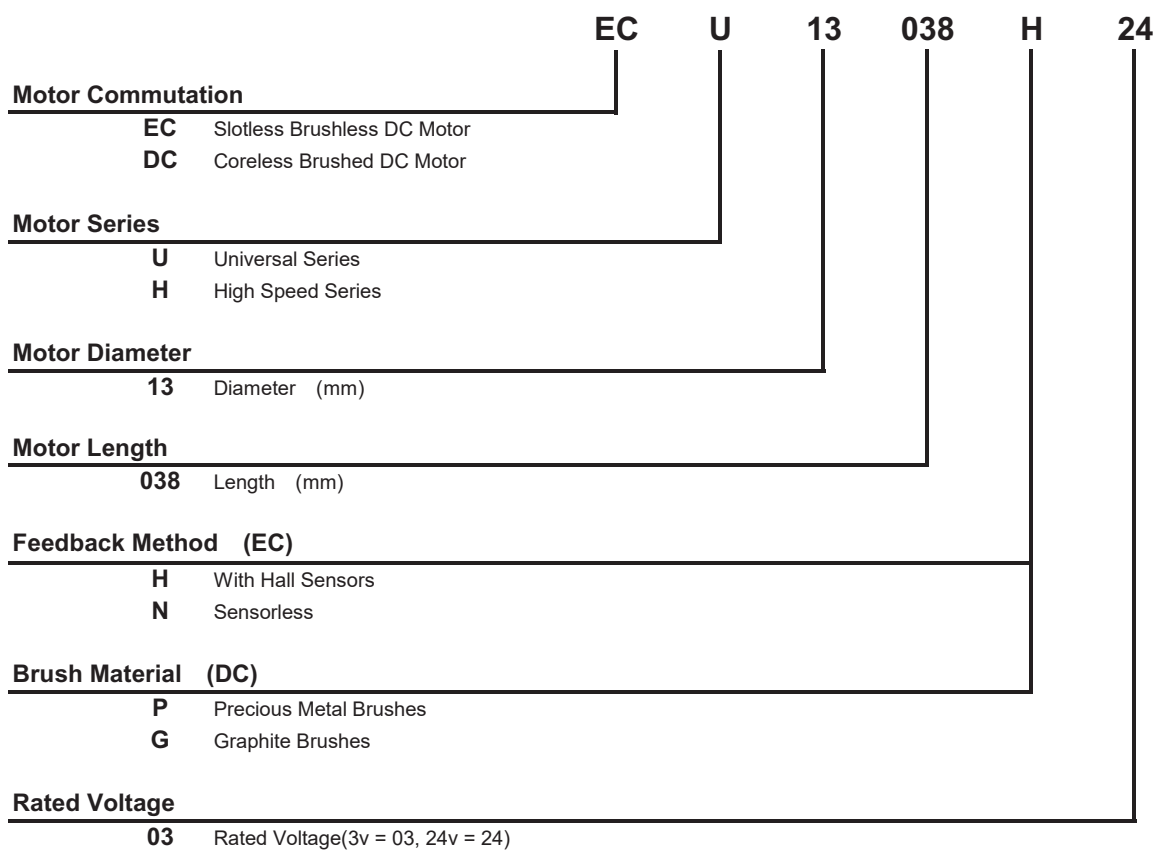
MOONS'
moving in better ways

Product Feature

MOONS' EC motor and DC motor use independent patented ironless winding. this special design can bring high speed, high torque and low noise. Because of no cogging and compact structure, we can get smoother running at high or low speed, more accurate control, higher efficiency and higher power density.

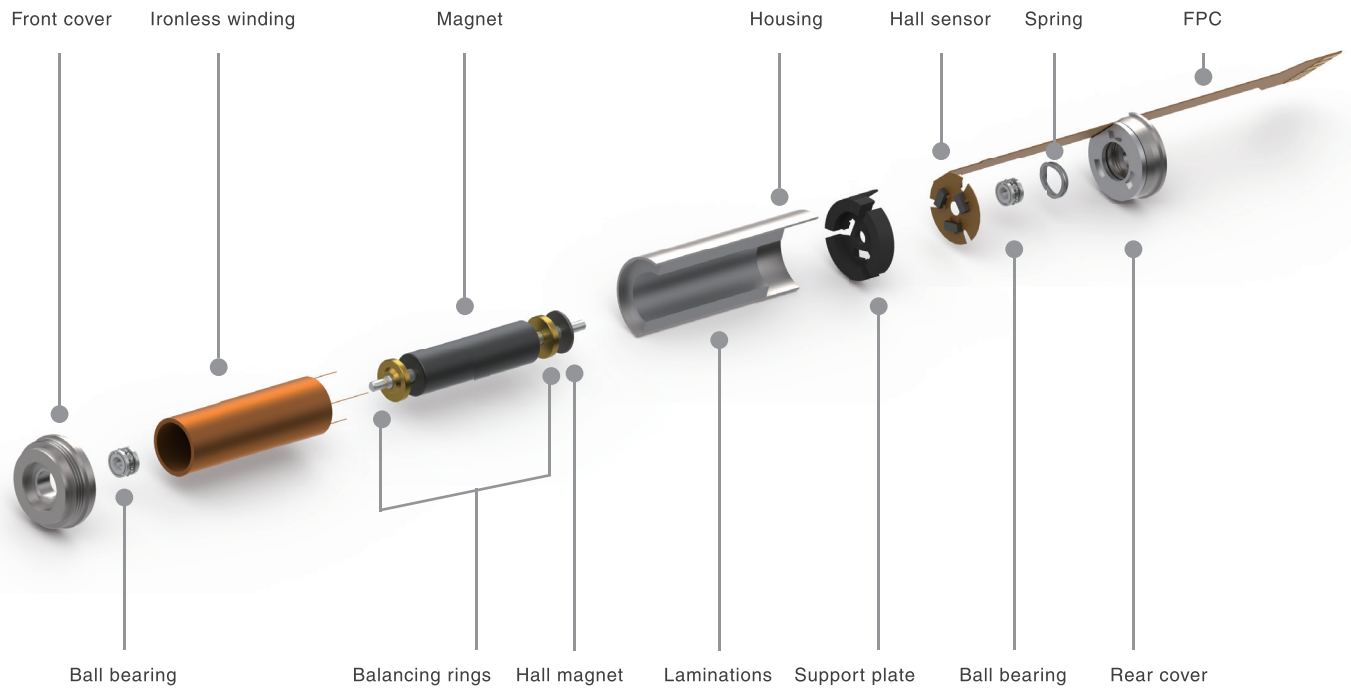
- Ironless Winding
- Small Size
- High Torque
- High Speed

Product Code

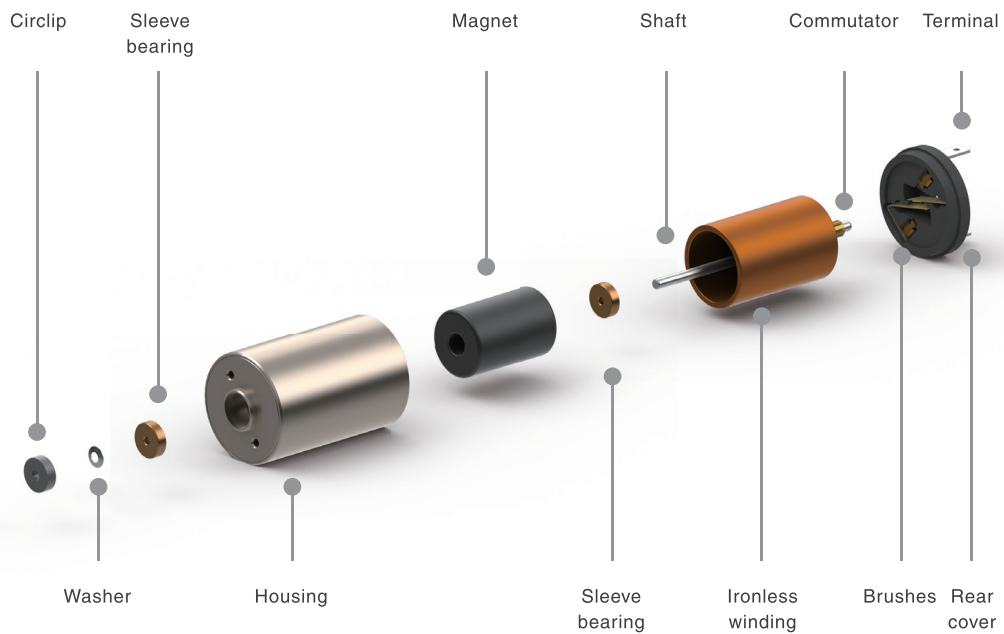


Structure

EC Series Motor Structure



DC Series Motor Structure



Product Overview

Slotless Brushless DC Motor

Coreless Brushed DC Motor

Planetary Gearbox

Encoder

Drive

Technical

Slotless

BLDC Motor

ECU13026

ECU13038

ECU16036

ECU22048

ECH16056 High speed



ECH22045 High speed



ECH22060 High speed



ECU13026 \varnothing 13mm 5/7.5W

Motor Data	Part Numbers					
		ECU13026H06	ECU13026H09	ECU13026H12	ECU13026H18	ECU13026H24
Nominal voltage	V	6	9	12	18	24
No load speed	rpm	24900	27600	24600	25100	26100
No load current	mA	130	115	76	54	49
Nominal speed	rpm	17000	20100	16900	17200	18600
Max. continuous torque	mNm	2.58	2.81	2.69	2.62	2.53
Max. continuous current	A	1.27	1.02	0.65	0.44	0.34
Stall torque	mNm	8.9	11.8	9.7	9.6	9.9
Stall current	A	3.92	3.78	2.09	1.41	1.14
Max efficiency	%	65	69	66	66	67
Resistance (phase-phase)	Ohm	1.53	2.38	5.74	12.8	21.0
Inductance (phase-phase)	mH	0.019	0.036	0.081	0.174	0.285
Torque constant	mNm / A	2.27	3.13	4.66	6.85	8.64
Speed constant	rpm / V	4200	3055	2050	1395	1105
Speed/torque gradient	rpm / mNm	2826	2326	2526	2608	2685
Mechanical time constant	ms	5.74	4.73	5.13	5.30	5.46
Rotor inertia	gcm ²	0.194	0.194	0.194	0.194	0.194

Specification

Bearing		Ball bearing
Max speed	rpm	40000
Axial play	mm	0..0.05
Radial play		Preloaded
Max axial load (dynamic)	N	1
Max. force for press fits (static)	N	10
Max radial load (5mm from flange)	N	4
Ambient temperature	° C	-40~+100
Max winding temperature	° C	155
Thermal resistance		
Housing - Ambient	° C / W	32.0
Winding - Housing	° C / W	3.69
Thermal time constant		
Motor	s	250
Winding	s	0.58
Number of pole pairs		1
Number of phases		3
Weight	g	19

Combination

Gearbox

PG13C
 \varnothing 13mm 0.3Nm 16:1-425:1
 Page 43

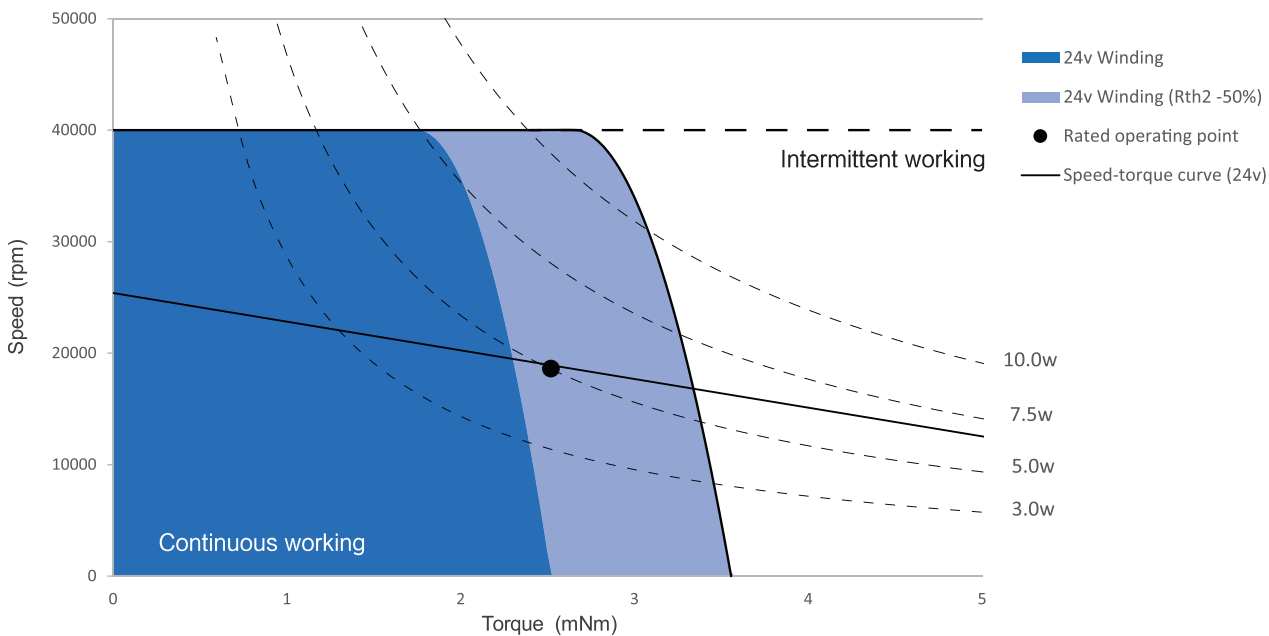
Encoder

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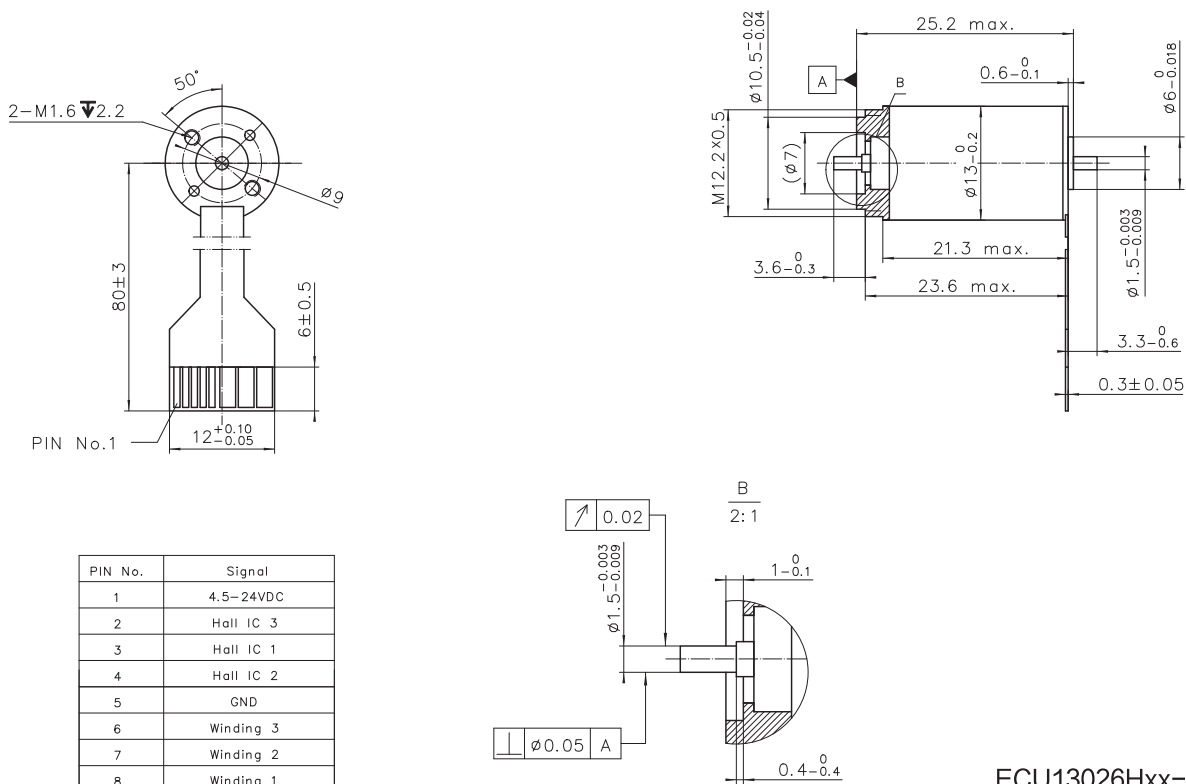
Option

FPC / Cable
 With hall sensor / Sensorless

Operating Range



Dimension



PIN No.	Signal
1	4.5-24VDC
2	Hall IC 3
3	Hall IC 1
4	Hall IC 2
5	GND
6	Winding 3
7	Winding 2
8	Winding 1

ECU13026Hxx-S001

ECU13038 \varnothing 13mm 10/15W

Motor Data		Part Numbers					
		ECU13038H06	ECU13038H09	ECU13038H12	ECU13038H18	ECU13038H24	ECU13038H36
Nominal voltage	V	6	9	12	18	24	36
No load speed	rpm	23700	23400	23000	23400	24500	25600
No load current	mA	215	185	140	121	90	84
Nominal speed	rpm	17900	18000	17400	19000	18600	20200
Max. continuous torque	mNm	5.05	5.56	5.51	5.57	5.13	5.55
Max. continuous current	A	2.33	1.70	1.23	0.91	0.63	0.49
Stall torque	mNm	22.1	27.1	26.2	29.9	25.8	33.6
Stall current	A	9.23	7.38	5.19	4.23	2.73	2.46
Max efficiency	%	71	73	73	74	74	74
Resistance (phase-phase)	Ohm	0.65	1.22	2.31	4.26	8.80	14.6
Inductance (phase-phase)	mH	0.008	0.020	0.037	0.097	0.130	0.267
Torque constant	mNm / A	2.39	3.67	5.04	7.07	9.45	13.64
Speed constant	rpm / V	3990	2600	1895	1350	1010	700
Speed/torque gradient	rpm / mNm	1084	864	869	813	940	750
Mechanical time constant ms		3.69	2.94	2.96	2.77	3.20	2.55
Rotor inertia	gcm ²	0.325	0.325	0.325	0.325	0.325	0.325

Specification

Bearing		Ball bearing
Max speed	rpm	40000
Axial play	mm	0..0.05
Radial play		Preloaded
Max axial load (dynamic)	N	1
Max. force for press fits (static)	N	10
Max radial load (5mm from flange)	N	4
Ambient temperature	° C	-40~+100
Max winding temperature	° C	155
Thermal resistance		
Housing - Ambient	° C / W	23.0
Winding - Housing	° C / W	1.89
Thermal time constant		
Motor	s	350
Winding	s	0.48
Number of pole pairs		1
Number of phases		3
Weight	g	29

Combination

Gearbox

PG13C
 \varnothing 13mm 0.3Nm 16:1-425:1
 Page 43

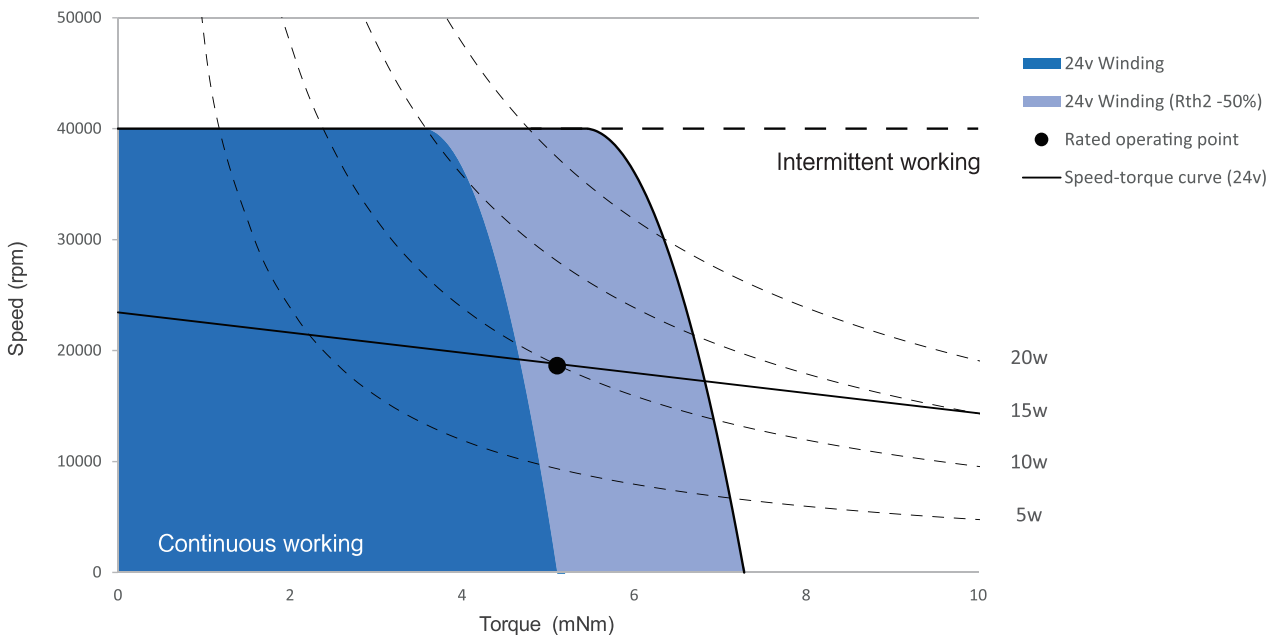
Encoder

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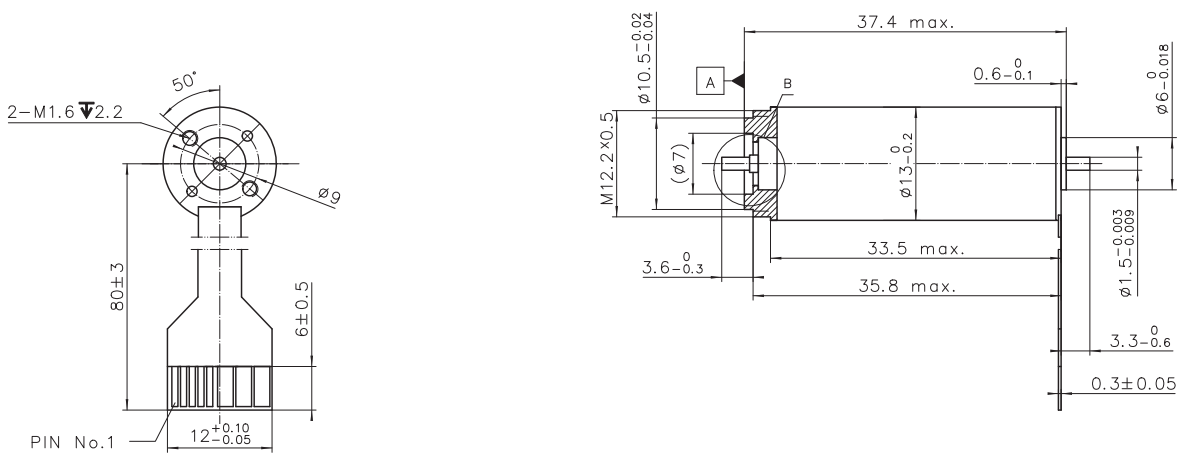
Option

FPC / Cable
 With hall sensor / Sensorless

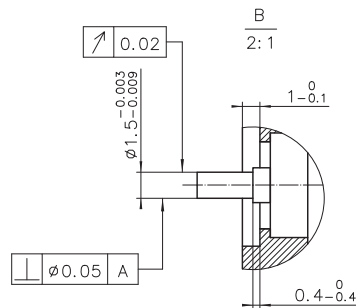
Operating Range



Dimension



PIN No.	Signal
1	4.5-24VDC
2	Hall IC 3
3	Hall IC 1
4	Hall IC 2
5	GND
6	Winding 3
7	Winding 2
8	Winding 1



ECU13038Hxx-S001

ECU16036

Ø16mm 14/23W

Motor Data		Part Numbers			
		ECU16036H12	ECU16036H18	ECU16036H24	ECU16036H36
Nominal voltage	V	12	18	24	36
No load speed	rpm	14800	17100	15000	17200
No load current	mA	165	160	115	100
Nominal speed	rpm	11800	13800	11900	14000
Max. continuous torque	mNm	10.2	9.7	9.9	9.4
Max. continuous current	A	1.49	1.11	0.76	0.57
Stall torque	mNm	56.0	61.5	57.8	63.5
Stall current	A	7.27	6.02	3.75	3.16
Max efficiency	%	81	81	80	80
Resistance (phase-phase)	Ohm	1.65	2.99	6.40	11.4
Inductance (phase-phase)	mH	0.102	0.180	0.409	0.707
Torque constant	mNm / A	7.70	10.21	15.40	20.10
Speed constant	rpm / V	1240	935	620	475
Speed/torque gradient	rpm / mNm	266	274	258	269
Mechanical time constant	ms	1.67	1.72	1.62	1.69
Rotor inertia	gcm ²	0.6	0.6	0.6	0.6

Specification

Bearing		Ball bearing
Max speed	rpm	30000
Axial play	mm	0..0.14
Radial play		Preloaded
Max axial load (dynamic)	N	1
Max. force for press fits (static)	N	18
Max radial load (5mm from flange)	N	6
Ambient temperature	° C	-40~+100
Max winding temperature	° C	155
Thermal resistance		
Housing - Ambient	° C / W	20.5
Winding - Housing	° C / W	3.30
Thermal time constant		
Motor	s	525
Winding	s	0.72
Number of pole pairs		1
Number of phases		3
Weight	g	44

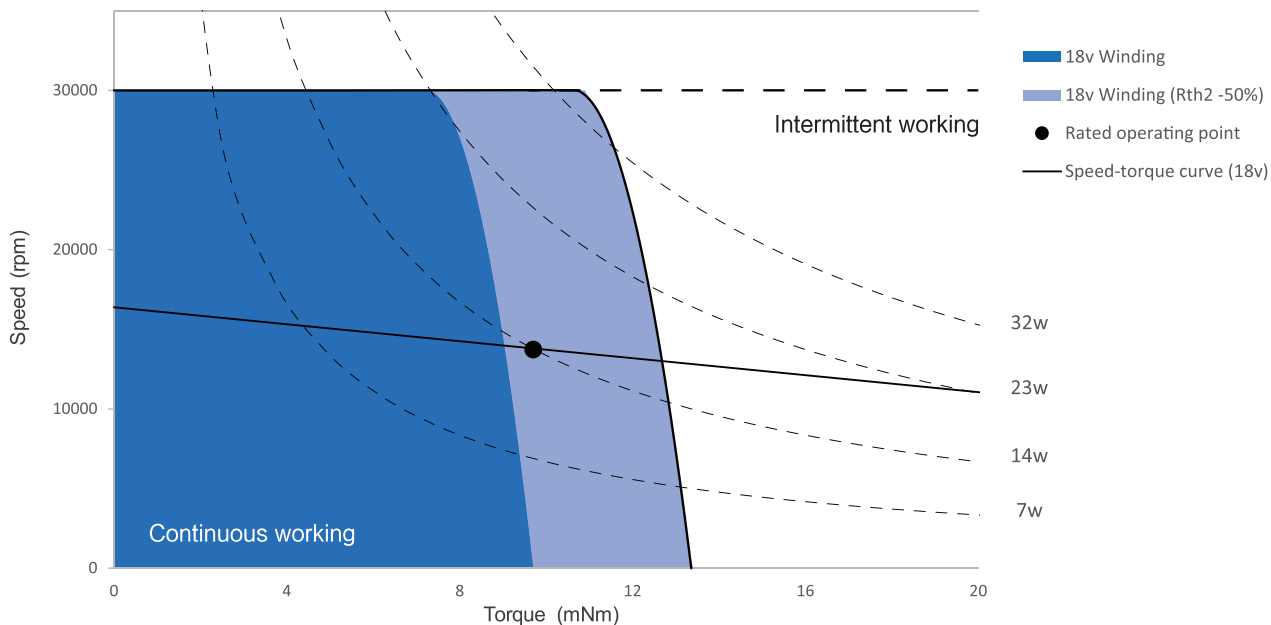
Combination

Gearbox
PG16C
Ø16mm 0.5Nm 4:1-850:1
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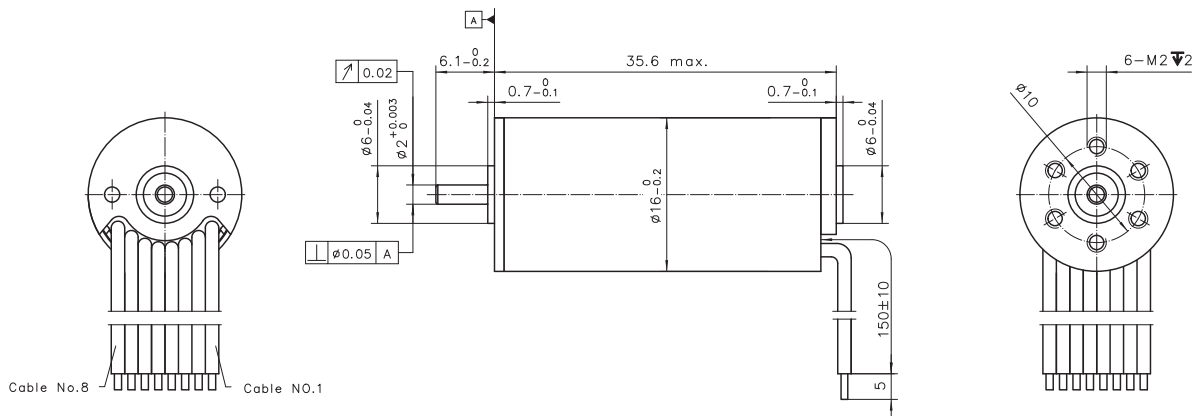
Encoder
Please contact local sales.

Option
With hall sensor / Sensorless

Operating Range



Dimension



Connection (Cable AWG 24)

Cable No.	Signal	Color
1	Motor winding 1	brown
2	Motor winding 2	red
3	Motor winding 3	orange
4	V _{Hall} 3...24VDC	yellow
5	GND	green
6	Hall IC 1	blue
7	Hall IC 2	violet
8	Hall IC 3	grey

ECU16036Hxx-S101

ECU22048

Ø22mm 55/75W

Motor Data		Part Numbers			
		ECU22048H18	ECU22048H24	ECU22048H36	ECU22048H48
Nominal voltage	V	18	24	36	48
No load speed	rpm	19500	19200	19400	19900
No load current	mA	342	326	295	253
Nominal speed	rpm	17000	16400	16600	17100
Max. continuous torque	mNm	33.1	32.5	31.6	31.1
Max. continuous current	A	4.04	2.94	2.01	1.56
Stall torque	mNm	322.8	316.6	328.9	341.0
Stall current	A	36.00	25.53	17.91	14.29
Max efficiency	%	86	86	86	85
Resistance (phase-phase)	Ohm	0.50	0.94	2.01	3.36
Inductance (phase-phase)	mH	0.052	0.104	0.230	0.391
Torque constant	mNm / A	8.97	12.40	18.36	23.87
Speed constant	rpm / V	1065	770	520	400
Speed/torque gradient	rpm / mNm	59	58	57	56
Mechanical time constant	ms	2.40	2.36	2.30	2.28
Rotor inertia	gcm ²	3.86	3.86	3.86	3.86

Specification

Bearing		Ball bearing
Max speed	rpm	30000
Axial play	mm	0..0.14
Radial play		Preloaded
Max axial load (dynamic)	N	3.5
Max. force for press fits (static)	N	60
Max radial load (5mm from flange)	N	15
Ambient temperature	° C	-40~+100
Max winding temperature	° C	155
Thermal resistance		
Housing - Ambient	° C / W	9.0
Winding - Housing	° C / W	1.75
Thermal time constant		
Motor	s	510
Winding	s	1.59
Number of pole pairs		1
Number of phases		3
Weight	g	110

Combination

Gearbox

PG22C
Ø22mm 0.8Nm 4:1-509:1
Page 45

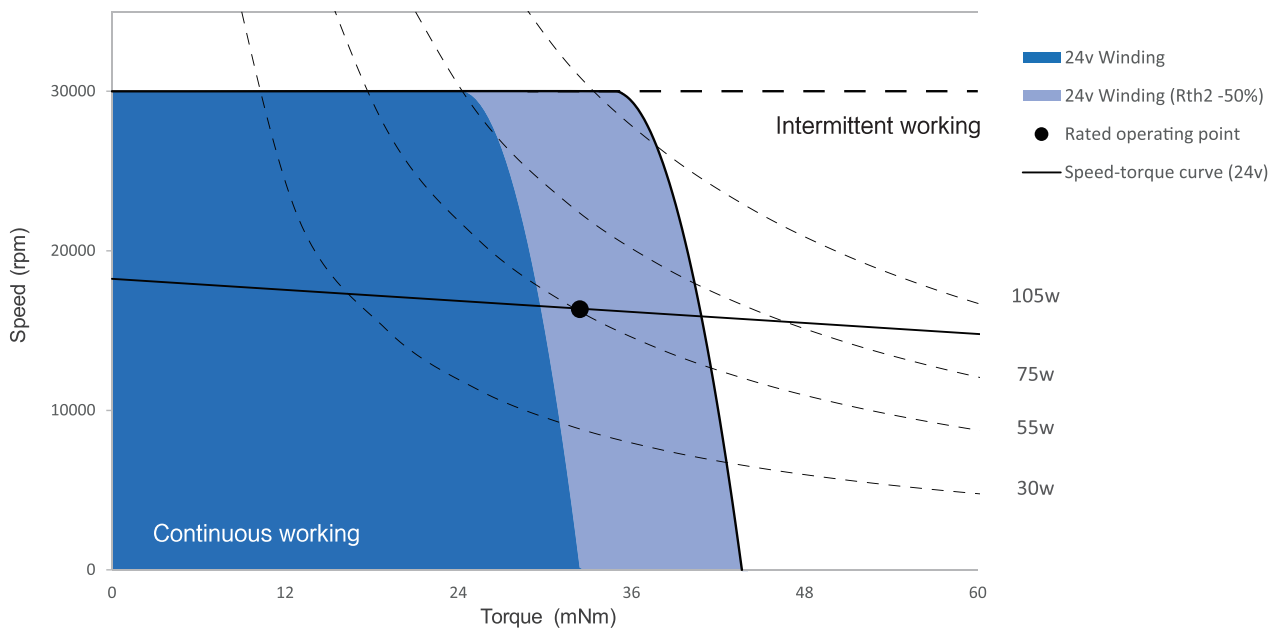
Encoder

U22
Ø22mm 256 Lines 2 Channels
Page 51

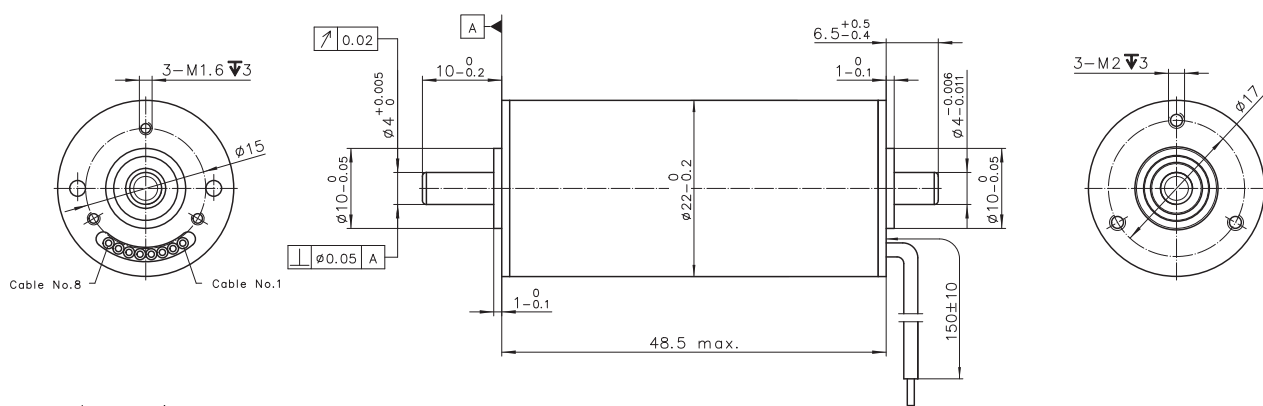
Option

With hall sensor / Sensorless

Operating Range



Dimension



Connection (Cable AWG 24)

Cable No.	Signal	Color
1	Motor winding 1	brown
2	Motor winding 2	red
3	Motor winding 3	orange
4	V _{Hall} 3...24VDC	yellow
5	GND	green
6	Hall IC 1	blue
7	Hall IC 2	violet
8	Hall IC 3	grey

ECU22048Hxx-S101

ECH16056

Ø16mm 75/90W

Motor Data		Part Numbers			
		ECH16056H18	ECH16056H24	ECH16056H36	ECH16056H48
Nominal voltage	V	18	24	36	48
No load speed	rpm	47600	40800	49600	44800
No load current	mA	560	510	680	530
Nominal speed	rpm	44700	38200	46600	42200
Max. continuous torque	mNm	15.8	16.3	13.2	13.1
Max. continuous current	A	4.93	3.41	2.57	1.82
Stall torque	mNm	302.8	299.6	317.6	310.3
Stall current	A	83.72	53.33	45.57	30.38
Max efficiency	%	90	89	89	87
Resistance (phase-phase)	Ohm	0.22	0.45	0.79	1.58
Inductance (phase-phase)	mH	0.019	0.045	0.081	0.151
Torque constant	mNm / A	3.62	5.62	6.97	10.21
Speed constant	rpm / V	2640	1700	1370	935
Speed/torque gradient	rpm / mNm	157	136	155	145
Mechanical time constant	ms	1.17	1.01	1.15	1.08
Rotor inertia	gcm ²	0.71	0.71	0.71	0.71

Specification

Bearing		Ball bearing
Max speed	rpm	60000
Axial play	mm	0..0.29
Radial play		Preloaded
Max axial load (dynamic)	N	1.5
Max. force for press fits (static)	N	60
Max radial load (5mm from flange)	N	10
Ambient temperature	° C	-40~+100
Max winding temperature	° C	155
Thermal resistance		
Housing - Ambient	° C/ W	9.0
Winding - Housing	° C/ W	1.75
Thermal time constant		
Motor	s	588
Winding	s	1.10
Number of pole pairs		1
Number of phases		3
Weight	g	73

Combination

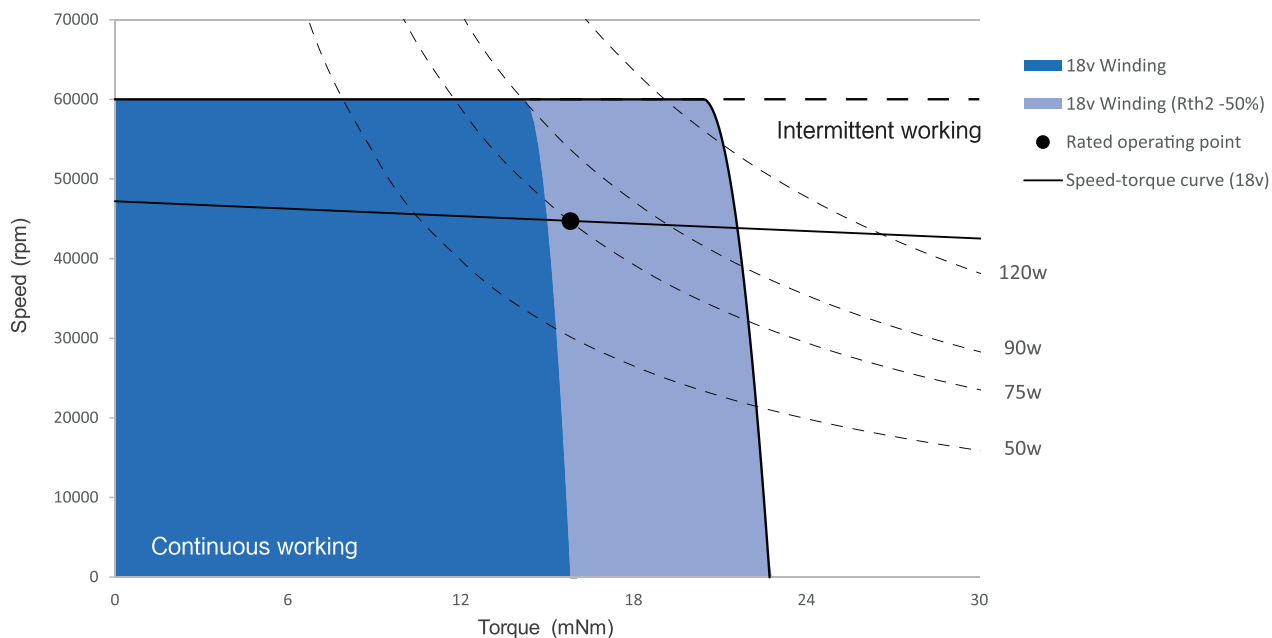
Gearbox Encoder

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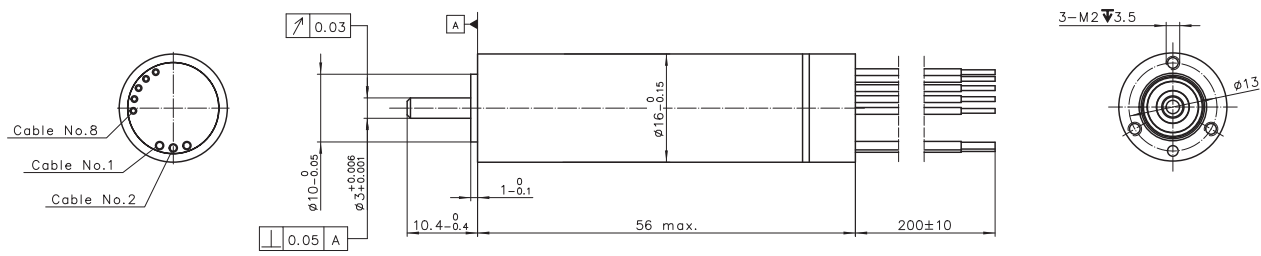
Option

With hall sensor / Sensorless

Operating Range



Dimension



Connection

Cable No.	Signal	Color	Wire gage
1	Motor winding 1	red	AWG 22
2	Motor winding 2	black	
3	Motor winding 3	white	
4	V _{hall} 3...24VDC	orange	AWG 26
5	GND	blue	
6	Hall IC 1	yellow	
7	Hall IC 2	brown	
8	Hall IC 3	grey	

ECH16056Hxx-S001

ECH22045

Ø22mm 80/100W

Motor Data		Part Numbers			
		ECH22045H18	ECH22045H24	ECH22045H36	ECH22045H48
Nominal voltage	V	18	24	36	48
No load speed	rpm	38900	40500	39000	39700
No load current	mA	450	540	520	480
Nominal speed	rpm	35400	37200	35100	36300
Max. continuous torque	mNm	19.0	21.2	18.5	19.4
Max. continuous current	A	4.65	4.19	2.54	2.10
Stall torque	mNm	314.1	436.7	379.9	451.1
Stall current	A	69.23	75.00	41.38	37.80
Max efficiency	%	89	90	89	89
Resistance (phase-phase)	Ohm	0.26	0.32	0.87	1.27
Inductance (phase-phase)	mH	0.024	0.038	0.097	0.162
Torque constant	mNm / A	4.54	5.82	9.18	11.94
Speed constant	rpm / V	2105	1640	1040	800
Speed/torque gradient	rpm / mNm	121	90	99	85
Mechanical time constant	ms	2.38	1.77	1.94	1.68
Rotor inertia	gcm ²	1.88	1.88	1.88	1.88

Specification

Bearing		Ball bearing
Max speed	rpm	50000
Axial play	mm	0..0.24
Radial play		Preloaded
Max axial load (dynamic)	N	4
Max. force for press fits (static)	N	110
Max radial load (5mm from flange)	N	16
Ambient temperature	° C	-40~+100
Max winding temperature	° C	155
Thermal resistance		
Housing - Ambient	° C/ W	15.0
Winding - Housing	° C/ W	0.60
Thermal time constant		
Motor	s	450
Winding	s	0.98
Number of pole pairs		1
Number of phases		3
Weight	g	98

Combination

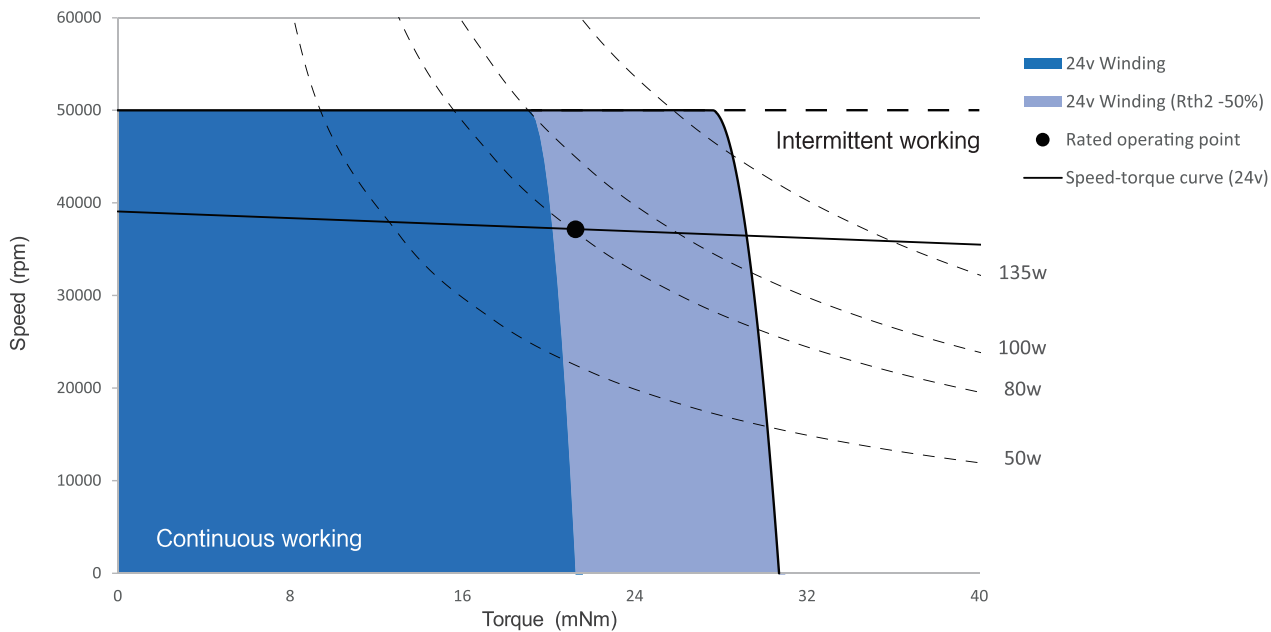
Gearbox Encoder

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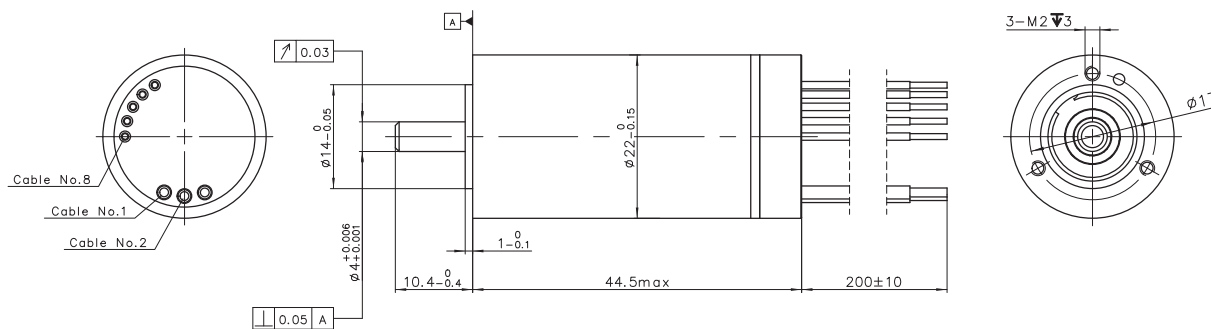
Option

With hall sensor / Sensorless

Operating Range



Dimension



Connection

Cable No.	Signal	Color	Wire gage
1	Motor winding 1	red	AWG 22
2	Motor winding 2	black	
3	Motor winding 3	white	
4	V _{motor} 3...24VDC	orange	AWG 26
5	GND	blue	
6	Hall IC 1	yellow	
7	Hall IC 2	brown	
8	Hall IC 3	grey	

ECH22045Hxx-S001

ECH22060

Ø22mm 120/150W

Motor Data

		ECH22060H24	ECH22060H36	ECH22060H48
Nominal voltage	V	24	36	48
No load speed	rpm	37000	38200	38200
No load current	mA	650	590	520
Nominal speed	rpm	35300	36600	36500
Max. continuous torque	mNm	32.8	33.8	30.6
Max. continuous current	A	5.93	4.34	3.07
Stall torque	mNm	795.8	926.6	823.7
Stall current	A	128.34	102.86	68.57
Max efficiency	%	91	91	91
Resistance (phase-phase)	Ohm	0.19	0.35	0.70
Inductance (phase-phase)	mH	0.024	0.053	0.097
Torque constant	mNm / A	6.20	9.01	12.01
Speed constant	rpm / V	1540	1060	795
Speed/torque gradient	rpm / mNm	46	41	46
Mechanical time constant	ms	1.57	1.39	1.57
Rotor inertia	gcm ²	3.23	3.23	3.23

Specification

Bearing		Ball bearing
Max speed	rpm	50000
Axial play	mm	0..0.24
Radial play		Preloaded
Max axial load (dynamic)	N	4
Max. force for press fits (static)	N	110
Max radial load (5mm from flange)	N	16
Ambient temperature	° C	-40~+100
Max winding temperature	° C	155
Thermal resistance		
Housing - Ambient	° C/ W	12.7
Winding - Housing	° C/ W	0.60
Thermal time constant		
Motor	s	400
Winding	s	1.56
Number of pole pairs		1
Number of phases		3
Weight	g	140

Combination

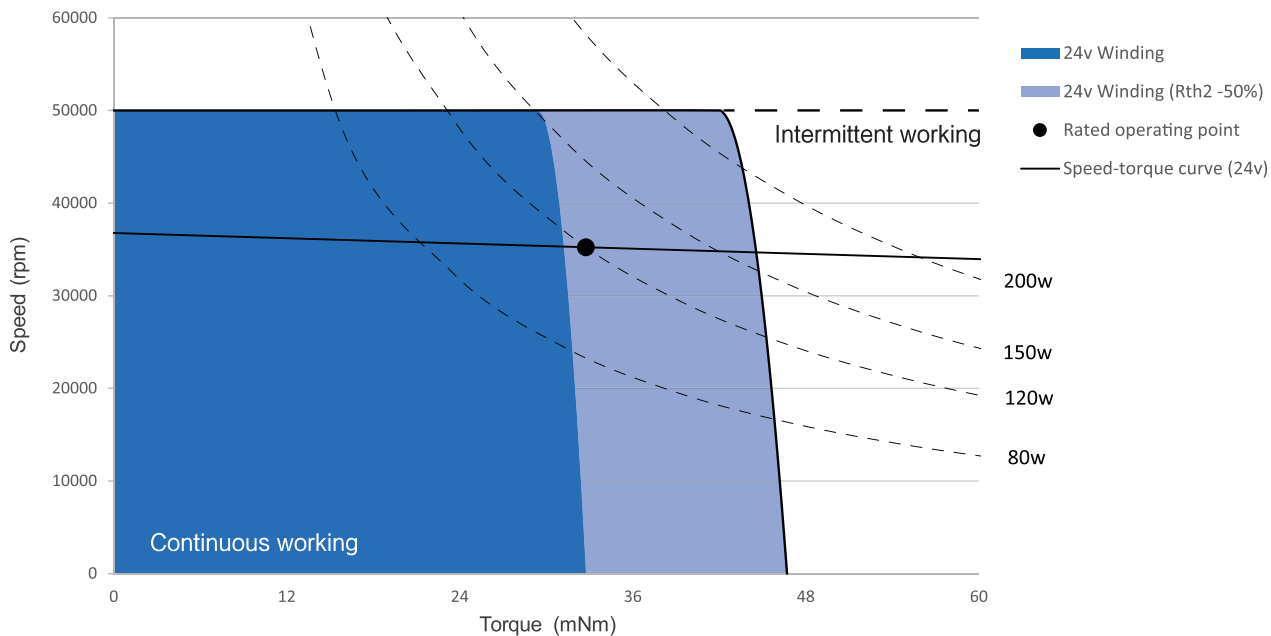
Gearbox Encoder

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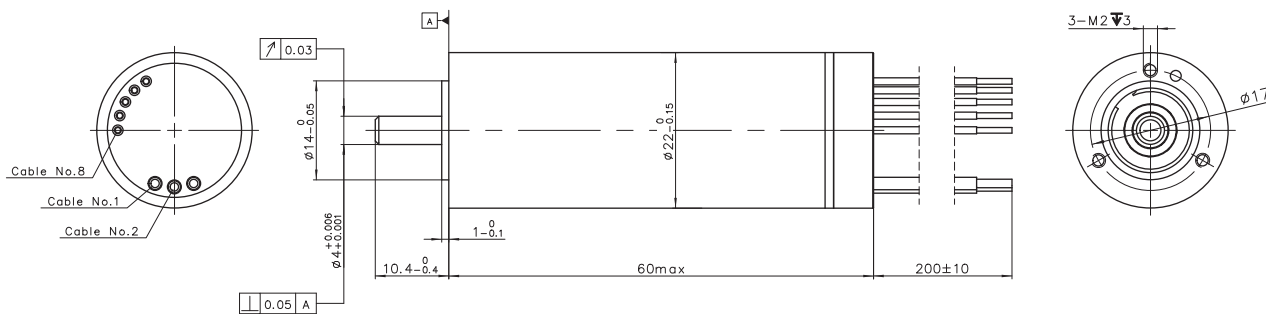
Option

With hall sensor / Sensorless

Operating Range



Dimension



Connection

Cable No.	Signal	Color	Wire gage
1	Motor winding 1	red	AWG 18
2	Motor winding 2	black	
3	Motor winding 3	white	
4	V _{bat} 3...32VDC	orange	AWG 26
5	GND	blue	
6	Hall IC 1	yellow	
7	Hall IC 2	brown	
8	Hall IC 3	grey	

ECH22060Hxx-S001

Notes

Coreless Brushed

DC Motor

DCU08017

DCU10017

DCU10025

DCU13020

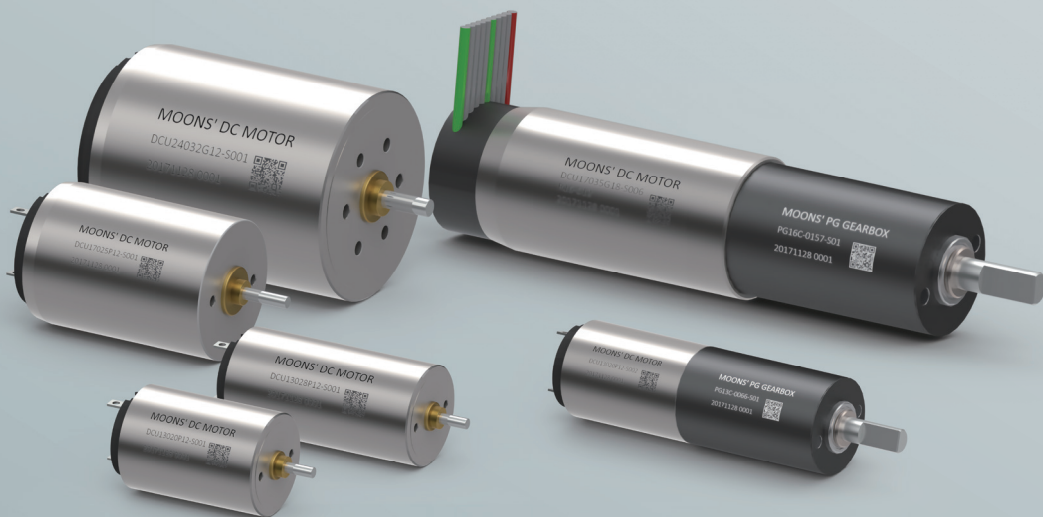
DCU13028

DCU16025

DCU17025

DCU17035

DCU24032



DCU08017

Ø8mm Precious Metal Brushes 0.3/1W

Motor Data	Part Numbers		
		DCU08017P06	DCU08017P12
Nominal voltage	V	6	12
No load speed	rpm	13500	16000
No load current	mA	14	6
Nominal speed	rpm	3360	5460
Max. continuous torque	mNm	0.60	0.60
Max. continuous current	A	0.164	0.093
Stall torque	mNm	0.85	0.95
Stall current	A	0.21	0.14
Max efficiency	%	55	63
Terminal Resistance	Ohm	28.0	87.0
Terminal Inductance	mH	0.206	0.606
Torque constant	mNm / A	3.96	6.87
Speed constant	rpm / V	2410	1390
Speed/torque gradient	rpm / mNm	17030	17603
Mechanical time constant	ms	6.60	6.82
Rotor inertia	gcm ²	0.037	0.037

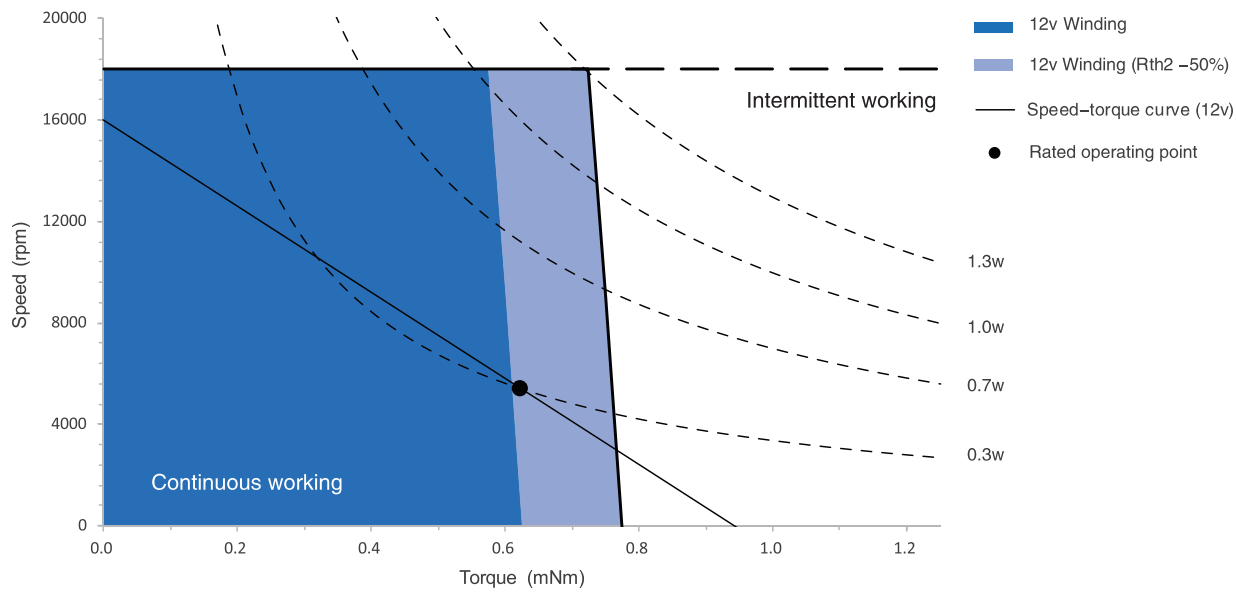
Specification		
Bearing	Sleeve bearing	
Max speed	rpm	18000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+65
Max winding temperature	° C	100
Thermal resistance		
Housing - Ambient	° C / W	52.8
Winding - Housing	° C / W	26.4
Thermal time constant		
Motor	s	21
Winding	s	2.37
Number of pole pairs	1	
Weight	g	4.5

Combination

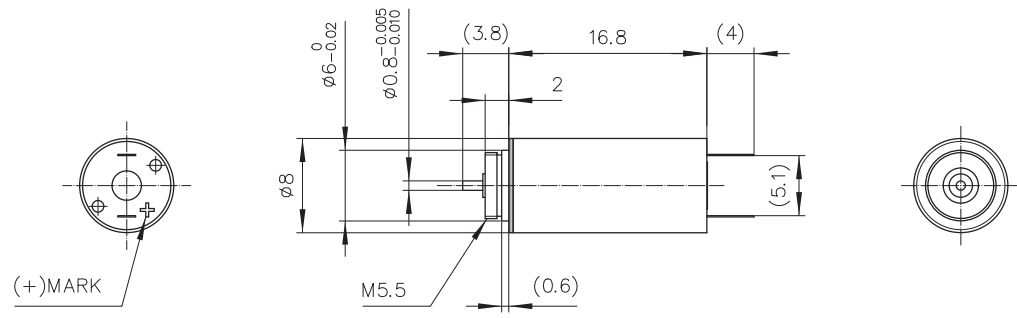
Gearbox

PG08C
 Ø8mm 0.1 Nm 16:1-1024:1
 Page 41

Operating Range



Dimension



DCU08017Pxx-S001

DCU10017

Ø10mm Precious Metal Brushes 0.4/1.1W

Motor Data	Part Numbers		
		DCU10017P03	DCU10017P06
Nominal voltage	V	3	6
No load speed	rpm	13300	13800
No load current	mA	18.6	11.2
Nominal speed	rpm	4990	5010
Max. continuous torque	mNm	0.80	0.71
Max. continuous current	A	0.403	0.197
Stall torque	mNm	1.33	1.21
Stall current	A	0.63	0.30
Max efficiency	%	69	65
Terminal Resistance	Ohm	4.7	19.8
Terminal Inductance	mH	0.042	0.197
Torque constant	mNm / A	2.09	4.00
Speed constant	rpm / V	4570	2390
Speed/torque gradient	rpm / mNm	10345	11844
Mechanical time constant	ms	7.37	7.57
Rotor inertia	gcm ²	0.068	0.061

Specification		
Bearing	Sleeve bearing	
Max speed	rpm	15000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+65
Max winding temperature	° C	100
Thermal resistance		
Housing - Ambient	° C / W	54.5
Winding - Housing	° C / W	23.4
Thermal time constant		
Motor	s	108
Winding	s	2.53
Number of pole pairs	1	
Weight	g	7.4

Combination

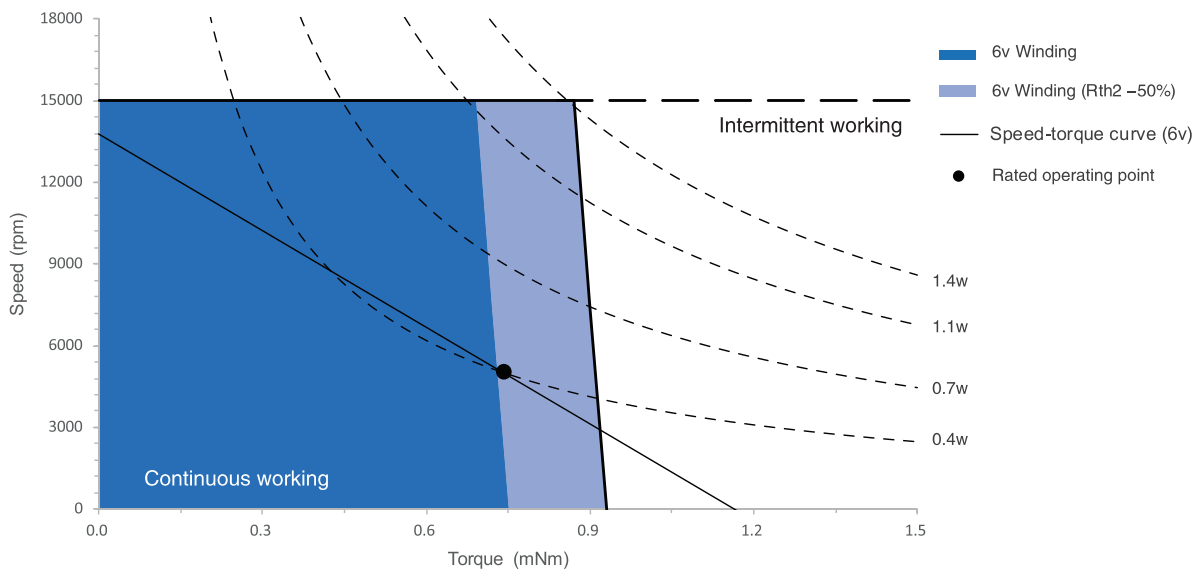
Gearbox

PG10C
 Ø10mm 0.15 Nm 16:1-1024:1
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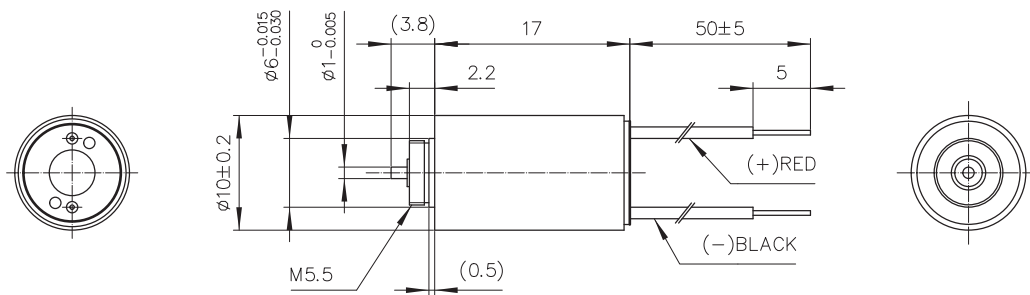
Encoder

RS10
 Ø10mm 12 Lines 2 Channels
 Page 47

Operating Range



Dimension



DCU10017Pxx-S001

DCU10025

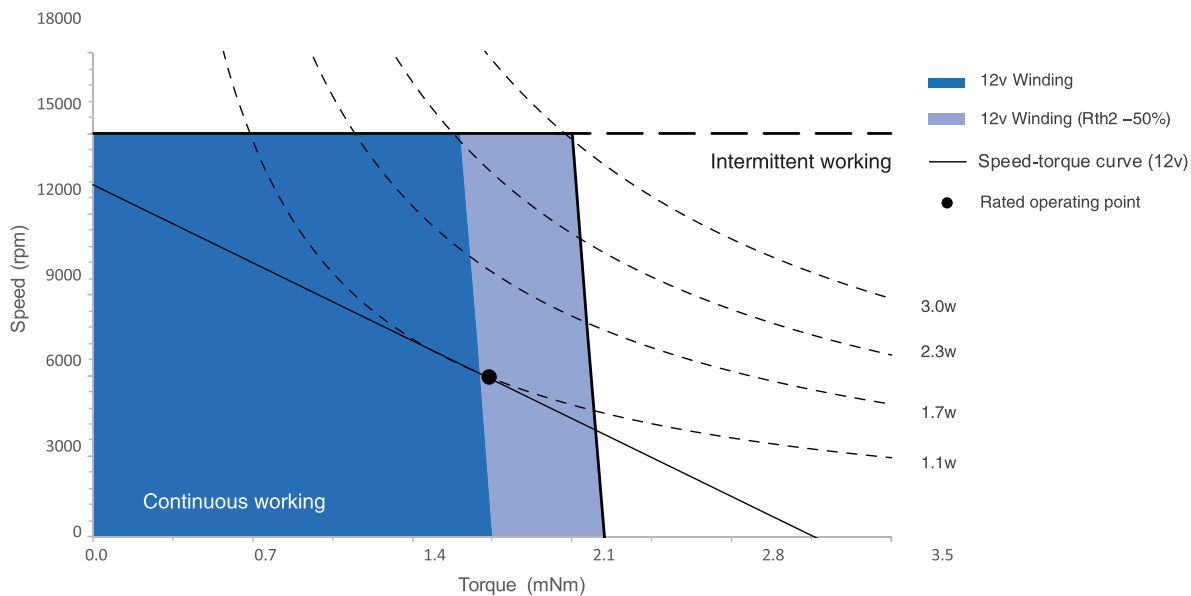
Ø10mm Precious Metal Brushes 1.1/2.5W

Motor Data	Part Numbers			
		DCU10025P03	DCU10025P06	DCU10025P12
Nominal voltage	V	3	6	12
No load speed	rpm	13200	11900	13100
No load current	mA	19.2	10.4	4.6
Nominal speed	rpm	6790	5900	6500
Max. continuous torque	mNm	1.63	1.73	1.58
Max. continuous current	A	0.777	0.374	0.188
Stall torque	mNm	3.39	3.48	3.19
Stall current	A	1.58	0.73	0.37
Max efficiency	%	79	78	79
Terminal Resistance	Ohm	1.9	8.2	32.4
Terminal Inductance	mH	0.026	0.128	0.432
Torque constant	mNm / A	2.15	4.75	8.60
Speed constant	rpm / V	4450	2010	1110
Speed/torque gradient	rpm / mNm	3940	3469	4180
Mechanical time constant	ms	4.46	4.07	4.25
Rotor inertia	gcm ²	0.108	0.112	0.097

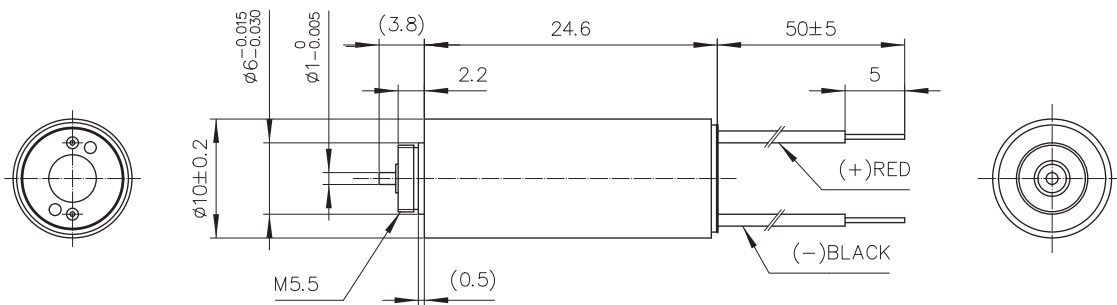
Specification		
Bearing	Sleeve bearing	
Max speed	rpm	15000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+65
Max winding temperature	° C	100
Thermal resistance		
Housing - Ambient	° C / W	41.3
Winding - Housing	° C / W	10.8
Thermal time constant		
Motor	s	135
Winding	s	1.78
Number of pole pairs	1	
Weight	g	10.7

Combination	
Gearbox	
PG10C	
Ø10mm 0.15 Nm 16:1-1024:1	
Page 42	
Encoder	
RS10	
Ø10mm 12 Lines 2 Channels	
Page 47	

Operating Range



Dimension



DCU10025Pxx-S001

DCU13020

Ø13mm Precious Metal Brushes 1.7/2.3W

Motor Data		Part Numbers				
		DCU13020P03	DCU13020P06	DCU13020P09	DCU13020P12	DCU13020P15
Nominal voltage	V	3	6	9	12	15
No load speed	rpm	9800	12100	12400	12900	12400
No load current	mA	23.3	23.0	11.7	8.0	7.1
Nominal speed	rpm	5030	8100	7940	8630	8110
Max. continuous torque	mNm	1.64	1.74	1.85	1.83	1.81
Max. continuous current	A	0.596	0.409	0.275	0.218	0.167
Stall torque	mNm	3.44	5.12	5.36	5.62	5.33
Stall current	A	1.20	1.13	0.77	0.65	0.47
Max efficiency	%	74	73	79	78	77
Terminal Resistance	Ohm	2.5	5.3	11.7	18.6	32.0
Terminal Inductance	mH	0.041	0.099	0.246	0.402	0.688
Torque constant	mNm / A	2.87	4.53	6.97	8.76	11.37
Speed constant	rpm / V	3330	2110	1370	1090	840
Speed/torque gradient	rpm / mNm	2903	2471	2300	2327	2364
Mechanical time constant	ms	8.33	9.19	7.68	7.77	7.82
Rotor inertia	gcm ²	0.274	0.355	0.319	0.319	0.316

Specification		
Bearing	Sleeve bearing	
Max speed	rpm	13000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+65
Max winding temperature	° C	100
Thermal resistance		
Housing - Ambient	° C / W	50.6
Winding - Housing	° C / W	16.8
Thermal time constant		
Motor	s	76
Winding	s	4.14
Number of pole pairs	1	
Weight	g	13.6

Combination

Gearbox

PG13C
 Ø13mm 0.3 Nm 16:1-425:1
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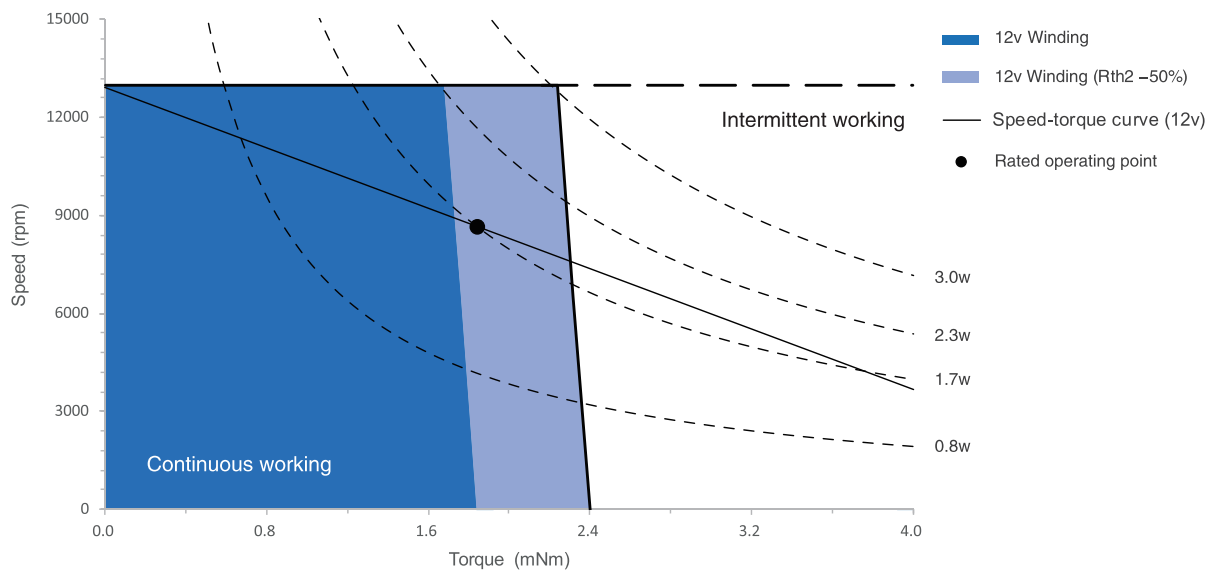
Encoder

R13
 Ø13mm 256 Lines 3 Channels
 Page 48

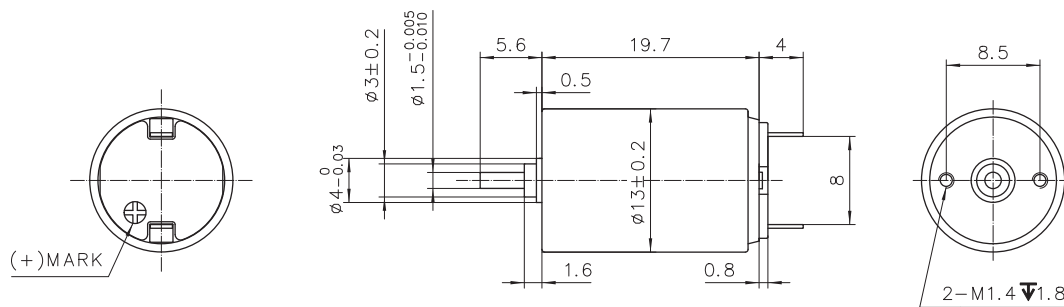
Option

Precious Metal Brushes / Graphite Brushes

Operating Range



Dimension



DCU13020Pxx-S001

DCU13028

Ø13mm Precious Metal Brushes 2.8/4.2W

Motor Data	Part Numbers					
		DCU13028P06	DCU13028P12	DCU13028P15	DCU13028P18	DCU13028P24
Nominal voltage	V	6	12	15	18	24
No load speed	rpm	9700	11800	12000	11400	11700
No load current	mA	16.7	16.8	10.0	10.5	7.5
Nominal speed	rpm	6110	7980	8430	7730	7980
Max. continuous torque	mNm	3.36	3.43	3.33	3.44	3.48
Max. continuous current	A	0.591	0.359	0.293	0.231	0.179
Stall torque	mNm	9.18	11.36	11.34	10.91	11.40
Stall current	A	1.57	1.15	0.96	0.72	0.57
Max efficiency	%	80	82	81	85	84
Terminal Resistance	Ohm	3.8	10.4	15.6	25.0	41.9
Terminal Inductance	mH	0.090	0.244	0.372	0.574	0.977
Torque constant	mNm / A	5.86	9.84	11.79	15.16	19.89
Speed constant	rpm / V	1630	970	810	630	480
Speed/torque gradient	rpm / mNm	1066	1025	1072	1039	1011
Mechanical time constant	ms	4.72	4.5	4.73	4.58	4.44
Rotor inertia	gcm ²	0.423	0.419	0.421	0.421	0.419

Specification		
Bearing	Sleeve bearing	
Max speed	rpm	13000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+65
Max winding temperature	° C	100
Thermal resistance		
Housing - Ambient	° C / W	36.3
Winding - Housing	° C / W	8.4
Thermal time constant		
Motor	s	229
Winding	s	3.90
Number of pole pairs	1	
Weight	g	20.4

Combination

Gearbox

PG13C
 Ø13mm 0.3 Nm 16:1-425:1
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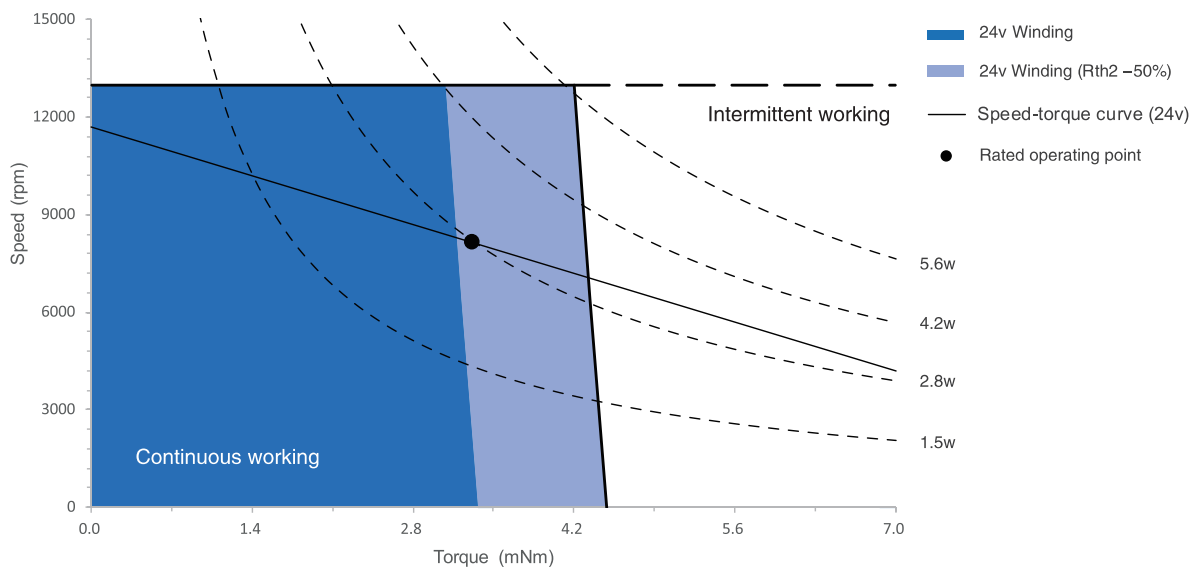
Encoder

R13
 Ø13mm 256 Lines 3 Channels
 Page 48

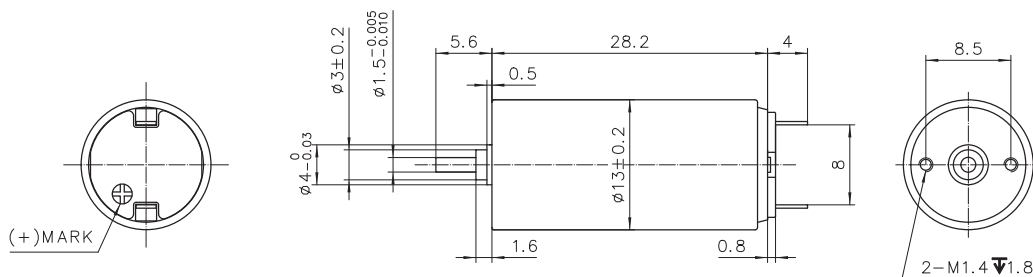
Option

Precious Metal Brushes / Graphite Brushes

Operating Range



Dimension



DCU13028Pxx-S001

DCU16025

Ø16mm Precious Metal Brushes 2/3W

Motor Data		Part Numbers		
		DCU16025P06	DCU16025P12	DCU16025P24
Nominal voltage	V	6	12	24
No load speed	rpm	10800	10600	12700
No load current	mA	22.3	7.7	6.8
Nominal speed	rpm	5490	5680	8180
Max. continuous torque	mNm	1.87	2.11	2.23
Max. continuous current	A	0.384	0.206	0.133
Stall torque	mNm	3.90	4.63	6.39
Stall current	A	0.76	0.44	0.36
Max efficiency	%	69	75	74
Terminal Resistance	Ohm	7.9	27.5	66.4
Terminal Inductance	mH	0.027	0.144	0.419
Torque constant	mNm / A	5.16	10.61	17.68
Speed constant	rpm / V	1850	900	540
Speed/torque gradient	rpm / mNm	2846	2333	2028
Mechanical time constant	ms	6.65	6.06	5.71
Rotor inertia	gcm ²	0.223	0.248	0.269

Specification		
Bearing	Sleeve bearing	
Max speed	rpm	13000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+65
Max winding temperature	° C	100
Thermal resistance		
Housing - Ambient	° C / W	40.6
Winding - Housing	° C / W	10.5
Thermal time constant		
Motor	s	281
Winding	s	4.26
Number of pole pairs	1	
Weight	g	24.3

Combination

Gearbox

PG16C
 Ø16mm 0.5 Nm 19:1-850:1
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Encoder

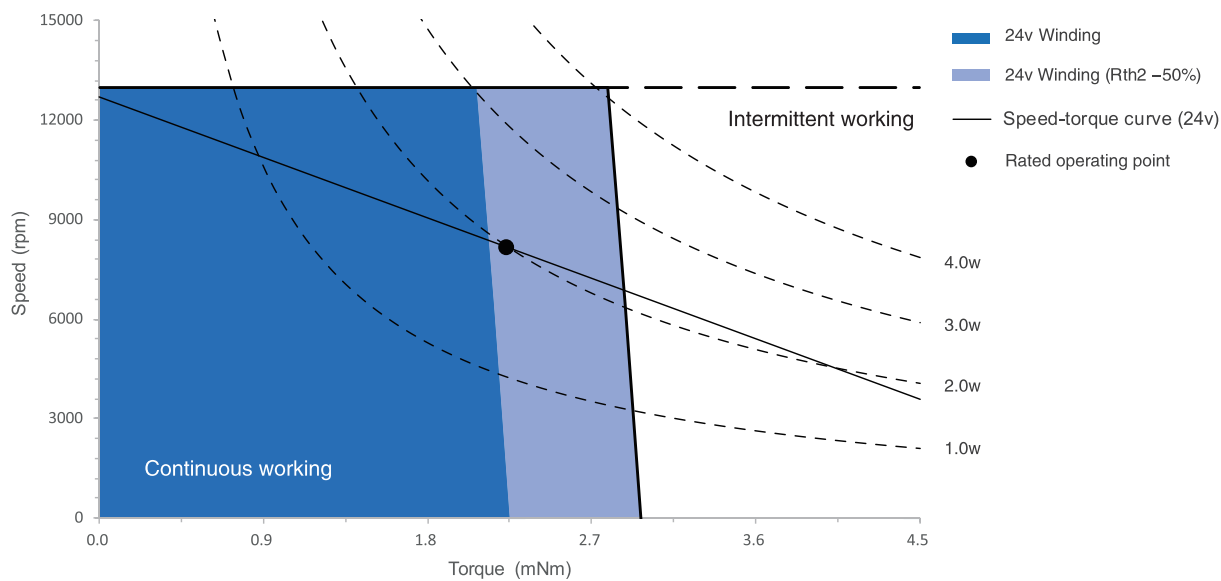
R16
 Ø16mm 512 Lines 3 Channels
 Page 49

K16
 Ø16mm 200 Lines 2 Channels
 Page 50

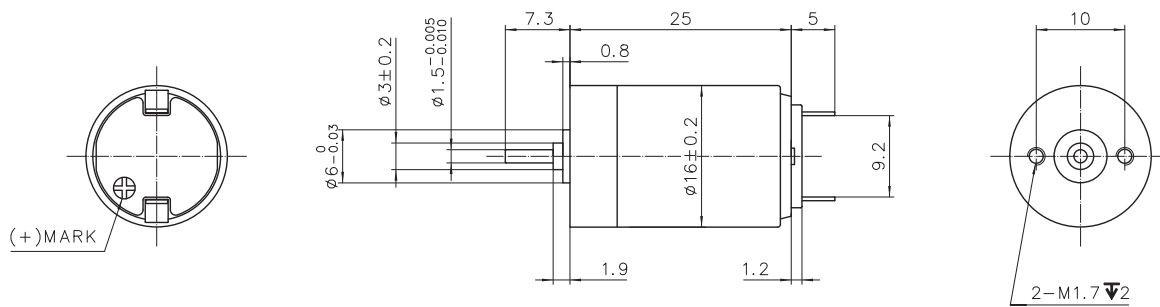
Option

Precious Metal Brushes / Graphite Brushes
 Sleeve Bearing / Ball Bearing

Operating Range



Dimension



DCU16025Pxx-S001

DCU17025 Ø17mm Precious Metal Brushes 3.5/4.5W

Motor Data		Part Numbers			
		DCU17025P06	DCU17025P12	DCU17025P18	DCU17025P24
Nominal voltage	V	6	12	18	24
No load speed	rpm	10400	10400	10700	11400
No load current	mA	12.3	8.2	6.3	3.5
Nominal speed	rpm	7310	7520	7800	8260
Max. continuous torque	mNm	3.69	3.90	3.88	3.89
Max. continuous current	A	0.686	0.365	0.250	0.195
Stall torque	mNm	12.47	14.16	14.47	14.91
Stall current	A	2.27	1.29	0.91	0.73
Max efficiency	%	86	83	84	87
Terminal Resistance	Ohm	2.6	9.3	19.8	32.7
Terminal Inductance	mH	0.068	0.272	0.600	0.900
Torque constant	mNm / A	5.49	10.98	15.92	20.32
Speed constant	rpm / V	1740	870	600	470
Speed/torque gradient	rpm / mNm	837	737	746	756
Mechanical time constant	ms	5.96	5.80	5.79	5.91
Rotor inertia	gcm ²	0.680	0.752	0.741	0.746

Specification		
Bearing	Sleeve bearing	
Max speed	rpm	12000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+65
Max winding temperature	° C	100
Thermal resistance		
Housing - Ambient	° C / W	35.0
Winding - Housing	° C / W	13.2
Thermal time constant		
Motor	s	360
Winding	s	6.20
Number of pole pairs	1	
Weight	g	30

Combination

Gearbox

PG16C
 Ø16mm 0.5 Nm 19:1-850:1
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Encoder

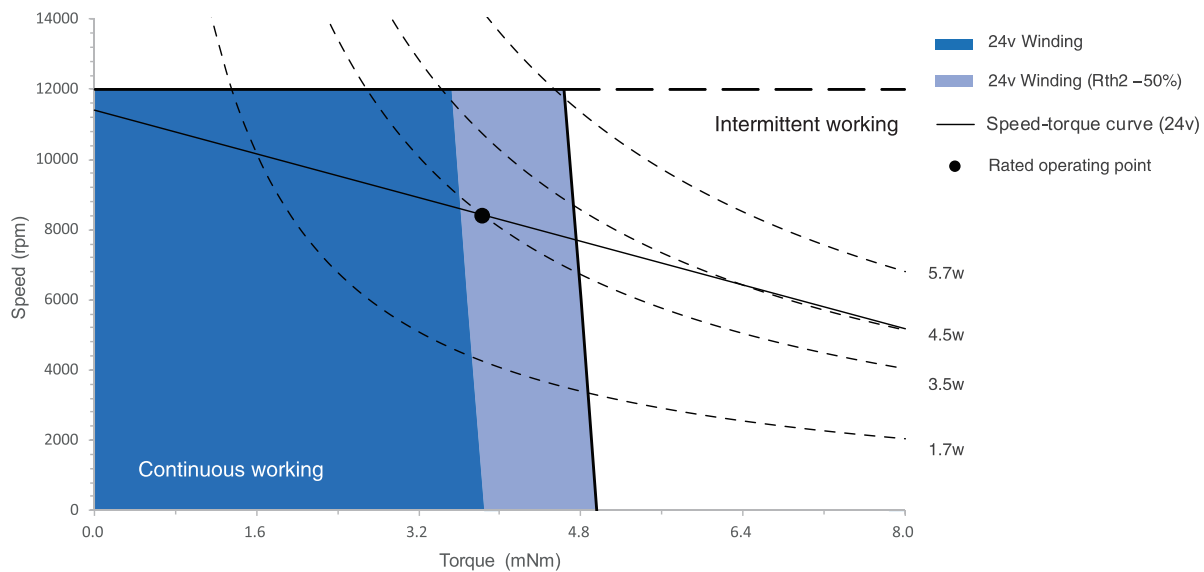
R16
 Ø16mm 512 Lines 3 Channels
 Page 49

K16
 Ø16mm 200 Lines 2 Channels
 Page 50

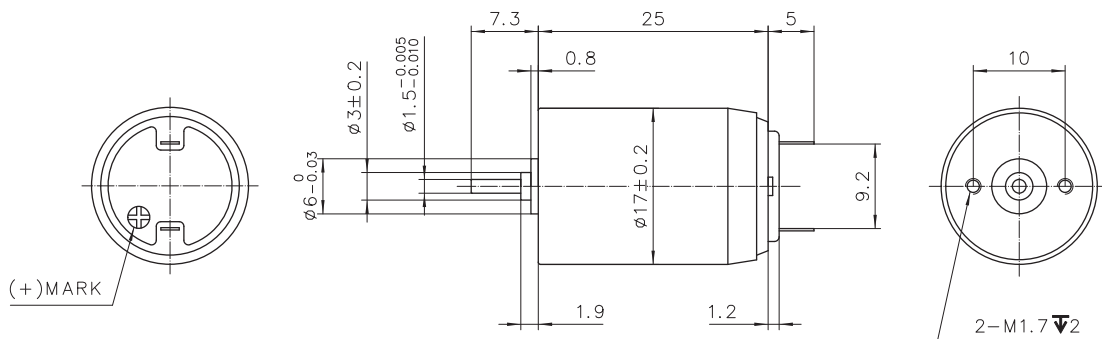
Option

Precious Metal Brushes / Graphite Brushes
 Sleeve Bearing / Ball Bearing

Operating Range



Dimension



DCU17025Pxx-S001

DCU17035

Ø17mm Graphite Brushes 7.5/9W

Motor Data		Part Numbers			
		DCU17035G12	DCU17035G18	DCU17035G24	DCU17035G36
Nominal voltage	V	12	18	24	36
No load speed	rpm	9900	11000	11500	10500
No load current	mA	19.7	24.6	24.7	12.8
Nominal speed	rpm	7130	8320	9050	7990
Max. continuous torque	mNm	7.25	7.18	7.72	7.66
Max. continuous current	A	0.650	0.491	0.421	0.253
Stall torque	mNm	26.10	29.91	37.12	32.93
Stall current	A	2.27	1.94	1.90	1.03
Max efficiency	%	83	79	79	79
Terminal Resistance	Ohm	5.3	9.3	12.6	34.8
Terminal Inductance	mH	0.166	0.285	0.453	1.340
Torque constant	mNm / A	11.51	15.40	19.49	31.83
Speed constant	rpm / V	830	620	490	300
Speed/torque gradient	rpm / mNm	382	373	317	328
Mechanical time constant	ms	4.36	4.34	3.78	3.92
Rotor inertia	gcm ²	1.09	1.11	1.14	1.14

Specification		
Bearing	Sleeve bearing	
Max speed	rpm	12000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+85
Max winding temperature	° C	125
Thermal resistance		
Housing - Ambient	° C / W	21.3
Winding - Housing	° C / W	11.6
Thermal time constant		
Motor	s	504
Winding	s	10.96
Number of pole pairs	1	
Weight	g	41.4

Combination

Gearbox

PG16C
 Ø16mm 0.5 Nm 4:1-850:1
 Page 44

Encoder

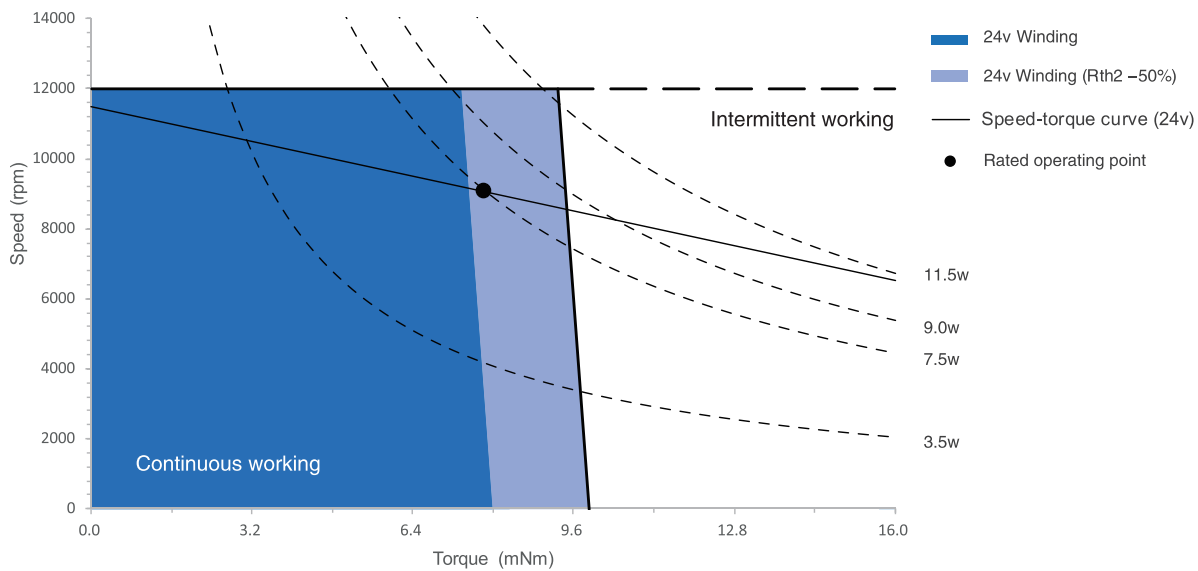
R16
 Ø16mm 512 Lines 3 Channels
 Page 49

K16
 Ø16mm 200 Lines 2 Channels
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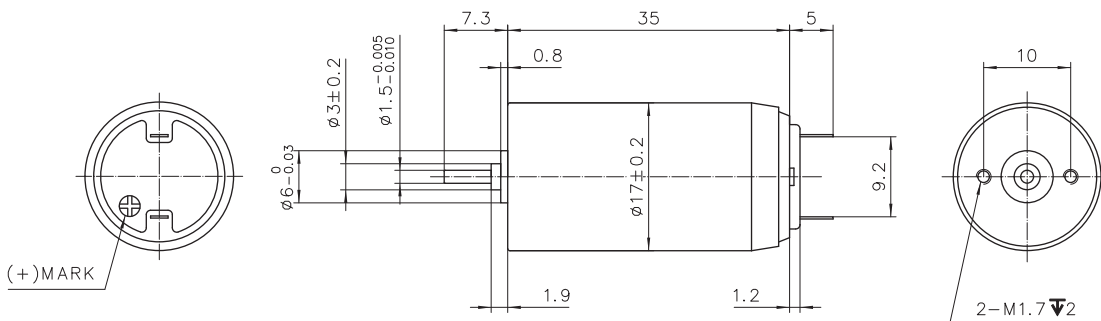
Option

Graphite Brushes / Precious Metal Brushes
 Sleeve Bearing / Ball Bearing

Operating Range



Dimension



DCU17035Gxx-S001

DCU24032

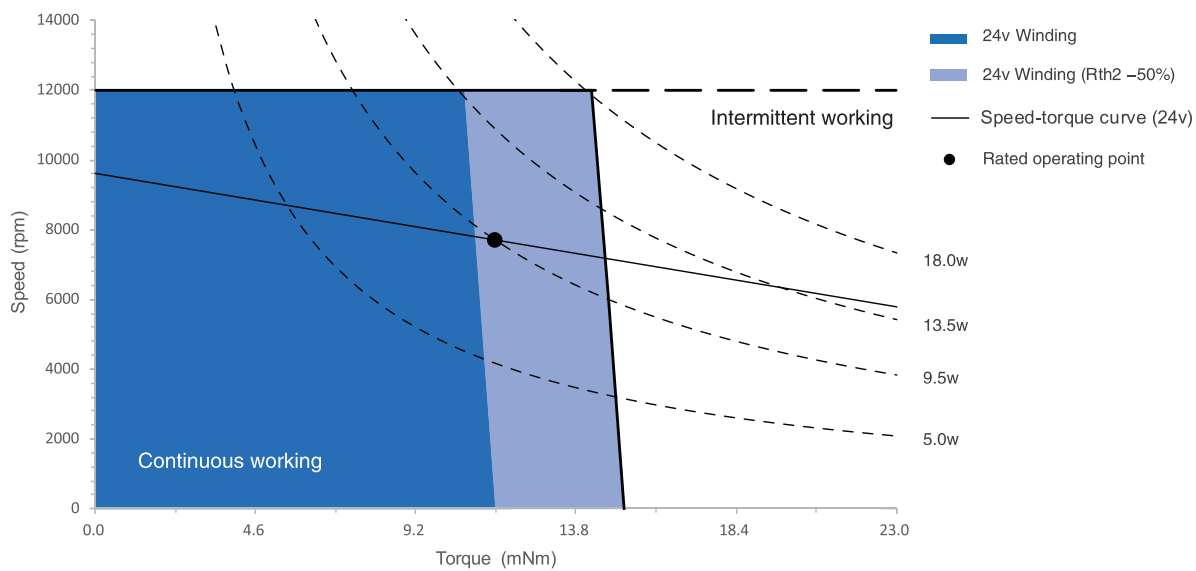
Ø24mm Graphite Brushes 9.5/13.5W

Motor Data		Part Numbers			
		DCU24032G09	DCU24032G12	DCU24032G18	DCU24032G24
Nominal voltage	V	9	12	18	24
No load speed	rpm	9700	9700	10100	9600
No load current	mA	40.0	25.6	18.3	21.0
Nominal speed	rpm	7450	7550	8050	7560
Max. continuous torque	mNm	9.83	10.65	10.92	11.89
Max. continuous current	A	1.162	0.942	0.659	0.506
Stall torque	mNm	42.85	50.53	53.66	60.58
Stall current	A	4.89	4.29	3.15	2.47
Max efficiency	%	83	82	85	83
Terminal Resistance	Ohm	1.8	2.8	5.7	9.7
Terminal Inductance	mH	0.386	0.068	0.143	0.284
Torque constant	mNm / A	8.76	11.79	17.05	24.49
Speed constant	rpm / V	1090	810	560	390
Speed/torque gradient	rpm / mNm	229	192	188	155
Mechanical time constant	ms	7.74	5.70	6.24	5.66
Rotor inertia	gcm ²	3.23	2.83	3.17	3.50

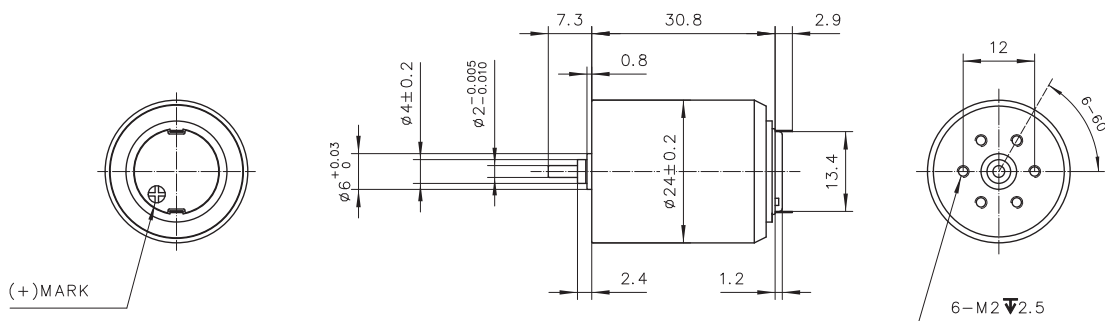
Specification		
Bearing	Sleeve bearing	
Max speed	rpm	11000
Axial play	mm	≤0.3
Number of commutator segments	5	
Ambient temperature	° C	-20~+85
Max winding temperature	° C	125
Thermal resistance		
Housing - Ambient	° C / W	24
Winding - Housing	° C / W	5.6
Thermal time constant		
Motor	s	669
Winding	s	6.66
Number of pole pairs	1	
Weight	g	78.8

Combination	
Gearbox	
PG22C	
Ø22mm	0.8 Nm 4:1-509:1
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Encoder	
K16	
Ø16mm	200 Lines 2 Channels
Page 50	
Option	
Sleeve Bearing / Ball Bearing	

Operating Range



Dimension



DCU24032Gxx-S001

Notes

Product Overview

Slotless Brushless DC Motor

Coreless Brushed DC Motor

Planetary Gearbox

Encoder

Drive

Technical

Planetary

Gearbox

PG08C

PG10C

PG13C

PG16C

PG22C



PG08C Planetary Gearhead Ø8mm 0.1Nm

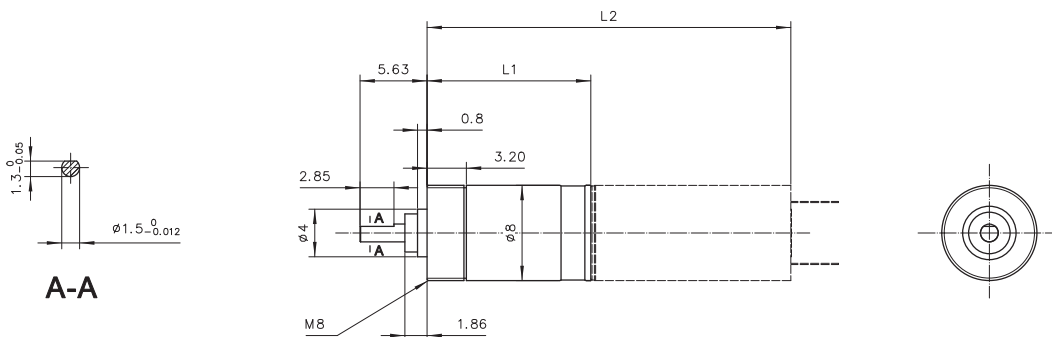
Gearhead Data

Reduction Ratio		4:1	16:1	64:1	256:1	1024:1
Number of stages		1	2	3	4	5
Max. continuous torque	Nm	0.01	0.02	0.06	0.08	0.10
Max. intermittent torque	Nm	0.02	0.03	0.09	0.12	0.15
Weight	g	2.6	3.2	3.9	4.6	5.3
Max. efficiency	%	90	81	66	58	42
Gearhead length L	mm	8.8	11.3	13.9	16.4	19.0
Gearmotor length L2						
└DCU08017	mm	25.6	28.1	30.7	33.2	35.8

Specification

Planetary gearhead		straight teeth
Output shaft		stainless steel, hardened
Bearing at output		sleeve bearing
Radial play	mm	≤ 0.07
Axial play	mm	≤ 0.15
Direction of rotation (drive to output)		=
Operating temperature	°C	-20~+65

Dimension



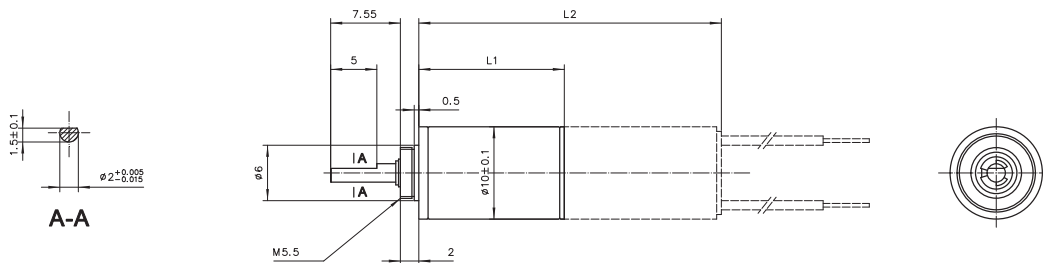
PG10C Planetary Gearhead Ø10mm 0.15Nm

Gearhead Data					
Reduction Ratio		16:1	64:1	256:1	1024:1
Number of stages		2	3	4	5
Max. continuous torque	Nm	0.03	0.10	0.15	0.15
Max. intermittent torque	Nm	0.05	0.15	0.23	0.23
Weight	g	6.9	8.3	9.7	11.1
Max. efficiency	%	81	73	66	59
Gearhead length L	mm	12.9	15.8	18.7	21.6
Gearmotor length L2	mm				
└ DCU10017		29.9	32.8	35.7	38.6
└ DCU10025		37.5	40.4	43.3	46.2

Specification

Planetary gearhead		straight teeth
Output shaft		stainless steel, hardened
Bearing at output		sleeve bearing
Radial play	mm	≤ 0.07
Axial play	mm	≤ 0.2
Direction of rotation (drive to output)		=
Operating temperature	°C	-20~+65

Dimension



PG13C Planetary Gearhead Ø13mm 0.3Nm

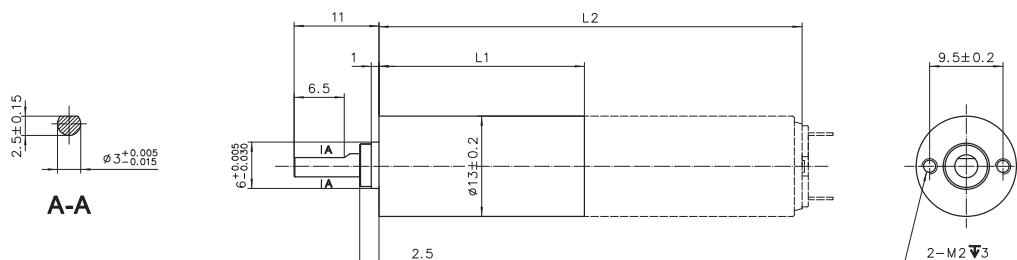
Gearhead Data

Reduction Ratio		16:1	66:1	271:1
			90:1	315:1
				425:1
Number of stages		2	3	4
Max. continuous torque	Nm	0.20	0.30	0.30
Max. intermittent torque	Nm	0.30	0.45	0.45
Weight	g	13.5	16.0	18.9
Max. efficiency	%	81	73	66
Gearhead length L1	mm	19.1	22.9	26.6
Gearmotor length L2				
└DCU13020	mm	39.0	42.8	46.5
└DCU13028	mm	47.5	51.3	55.0

Specification

Planetary gearhead		straight teeth
Output shaft		stainless steel, hardened
Bearing at output		sleeve bearing
Radial play	mm	≤ 0.1
Axial play	mm	≤ 0.25
Max. radial load	N	5 (5mm from flange)
Max. axial load	N	5
Max. force for press fits	N	15
Recommend input speed	rpm	≤ 10000
Direction of rotation (drive to output)		=
Ambient temperature	° C	-20~+65

Dimension



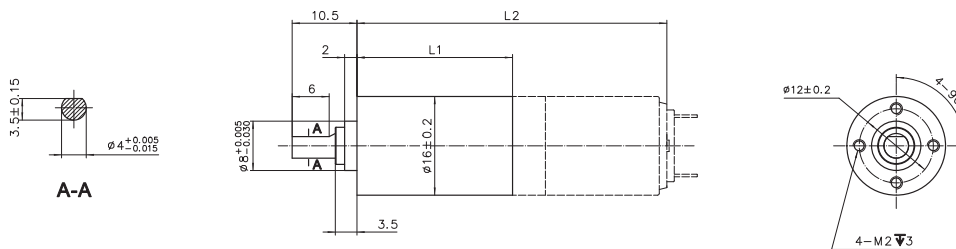
PG16C Planetary Gearhead Ø16mm 0.5Nm

Gearhead Data					
Reduction Ratio		4:1	19:1	84:1	369:1
			29:1	103:1	560:1
				157:1	850:1
Number of stages		1	2	3	4
Max. continuous torque	Nm	0.20	0.30	0.40	0.50
Max. intermittent torque	Nm	0.30	0.45	0.60	0.75
Weight	g	15.5	19.0	22.5	26.0
Max. efficiency	%	90	81	73	66
Gearhead length L1	mm	18.0	18.0	21.6	25.2
Gearmotor length L2					
└DCU16025	mm	43.2	43.2	46.8	50.4
└DCU16035	mm	53.2	53.2	56.8	60.4
└DCU17025	mm	43.2	43.2	46.8	50.4
└DCU17035	mm	53.2	53.2	56.8	60.4

Specification

Planetary gearhead	straight teeth	
Output shaft	stainless steel, hardened	
Bearing at output	sleeve bearing	
Radial play	mm	≤ 0.1
Axial play	mm	≤ 0.25
Max. radial load	N	8 (5mm from flange)
Max. axial load	N	10
Max. force for press fits	N	50
Recommend input speed	rpm	≤ 10000
Direction of rotation (drive to output)	=	
Ambient temperature	° C	-20~+65

Dimension



PG22C Planetary Gearhead Ø22mm 0.8Nm

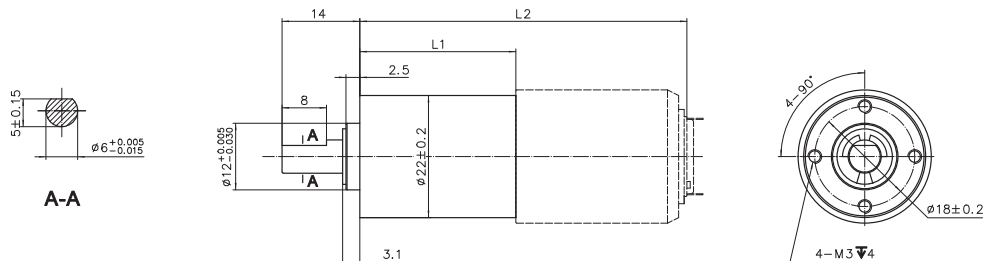
Gearhead Data

Reduction Ratio		4:1	16:1	64:1	256:1
			22:1	90:1	361:1
				107:1	509:1
Number of stages		1	2	3	4
Max. continuous torque	Nm	0.20	0.40	0.60	0.80
Max. intermittent torque	Nm	0.30	0.60	0.90	1.20
Weight	g	34.3	34.6	54.4	64.0
Max. efficiency	%	84	70	59	49
Gearhead length L1	mm	17.7	22.9	28.1	33.3
Gearmotor length L2					
└DCU24032	mm	48.7	53.9	59.1	64.3

Specification

Planetary gearhead		straight teeth
Output shaft		stainless steel, hardened
Bearing at output		sleeve bearing
Radial play	mm	≤ 0.1
Axial play	mm	≤ 0.35
Max. radial load	N	8 (5mm from flange)
Max. axial load	N	15
Max. force for press fits	N	100
Recommend input speed	rpm	≤ 10000
Direction of rotation (drive to output)		=
Ambient temperature	° C	-20~+65

Dimension



Encoder

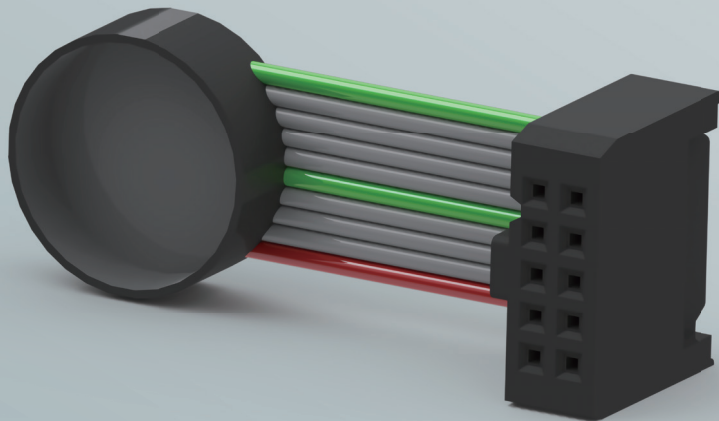
RS10

R13

R16

K16

U22



RS10 Magnetic Encoder Ø10mm 2 Channels

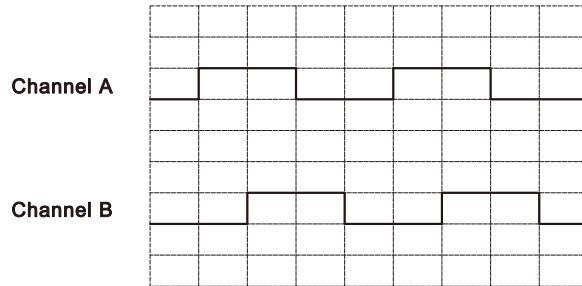
Encoder Data

Pulses per revolution		12
Number of channels		2 (A,B)
Supply voltage	V	3~24
Supply current	mA	≤10
Max. output current/chanel	mA	10
Max. frequency	kHz	20
Operating temperature	°C	-20~+65
Length L		
└ DCU10017	mm	23.5
└ DCU10025	mm	31.1

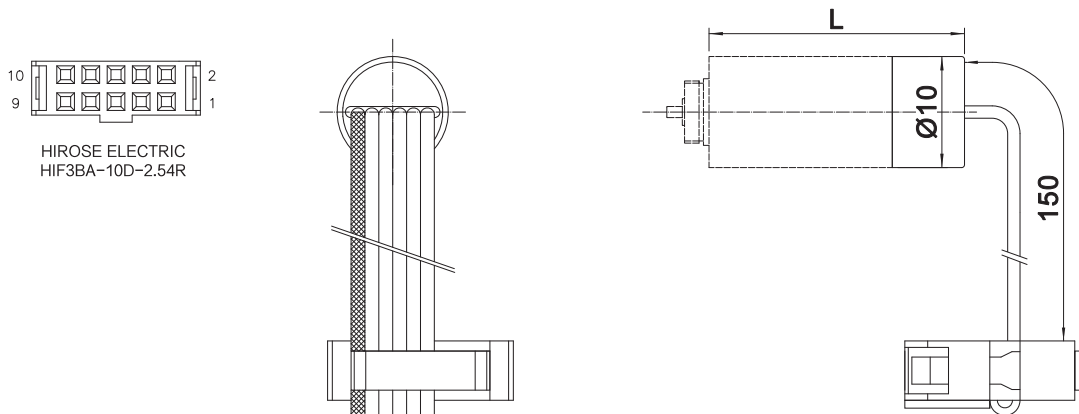
Connection

PIN No.	Function
1	Motor(+)
2	Vcc(5V)
3	Channel A
4	Channel B
5	GND
6	Motor (-)

Output Signal



Dimension



R13 Magnetic Encoder Ø13mm 3 Channels

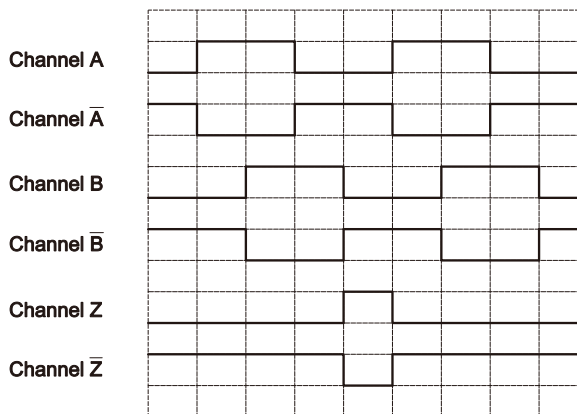
Encoder Data

Lines per revolution		256
Number of channels		3 (A,B,Z)
Supply voltage	V	5
Supply current	mA	≤40
Max. output current/chanel	mA	5
Max. frequency	kHz	80
Operating temperature	°C	-20~+65
Length L		
L-DCU13020	mm	25.4
L-DCU13028	mm	33.9

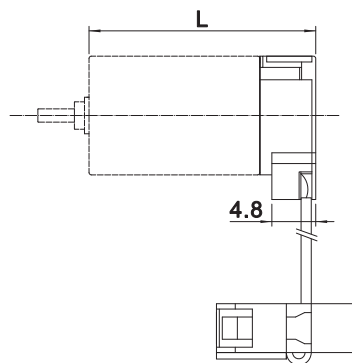
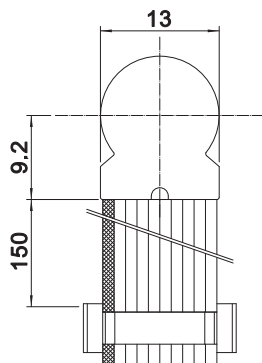
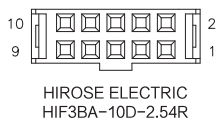
Connection

PIN No.	Function
1	Motor(+)
2	Vcc(5V)
3	GND
4	Motor(-)
5	Channel \bar{A}
6	Channel A
7	Channel \bar{B}
8	Channel B
9	Channel \bar{Z}
10	Channel Z

Output Signal



Dimension



R16 Magnetic Encoder Ø16mm 3 Channels

Encoder Data

Lines per revolution		512
Number of channels		3 (A,B,Z)
Supply voltage	V	5
Supply current	mA	≤40
Max. output current/channel	mA	5
Max. frequency	kHz	160
Operating temperature	°C	-20~+65

Length L

└DCU16025	mm	30.4
└DCU16035	mm	40.4
└DCU17025	mm	30.4
└DCU17035	mm	40.4

Connection

PIN No.	Function
1	Motor(+)
2	Vcc(5V)
3	GND
4	Motor(-)
5	Channel \bar{A}
6	Channel A
7	Channel \bar{B}
8	Channel B
9	Channel \bar{Z}
10	Channel Z

Output Signal

Channel A

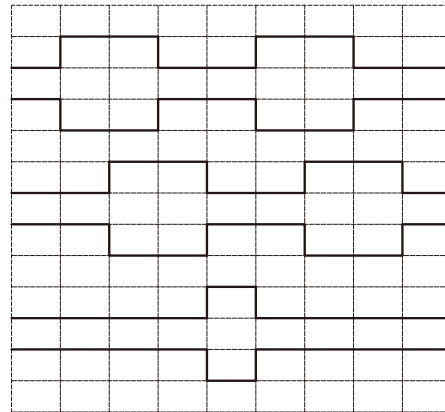
Channel \bar{A}

Channel B

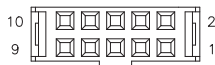
Channel \bar{B}

Channel Z

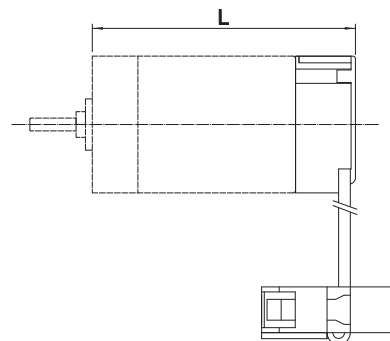
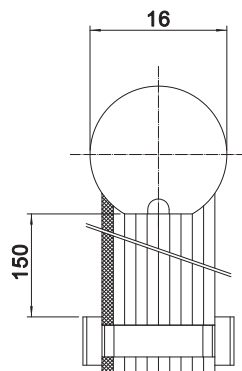
Channel \bar{Z}



Dimension



HIROSE ELECTRIC
HIF3BA-10D-2.54R



K16 Optical Encoder Ø16mm 2 Channels

Encoder Data

Lines per revolution		200
Number of channels		2 (A,B)
Supply voltage	V	5
Supply current	mA	≤20
Max. output current/channel	mA	3
Max. frequency	kHz	20
Operating temperature	°C	-20~+65

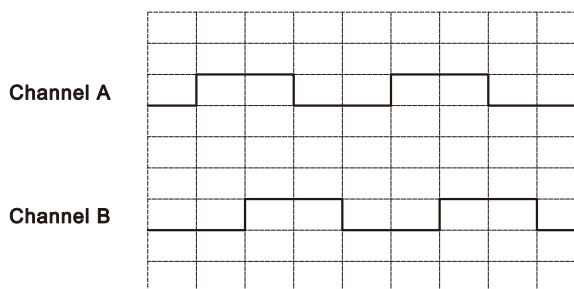
Length L

↳DCU16025	mm	37.5
↳DCU16035	mm	47.5
↳DCU17025	mm	37.5
↳DCU17035	mm	47.5
↳DCU24032	mm	43.3

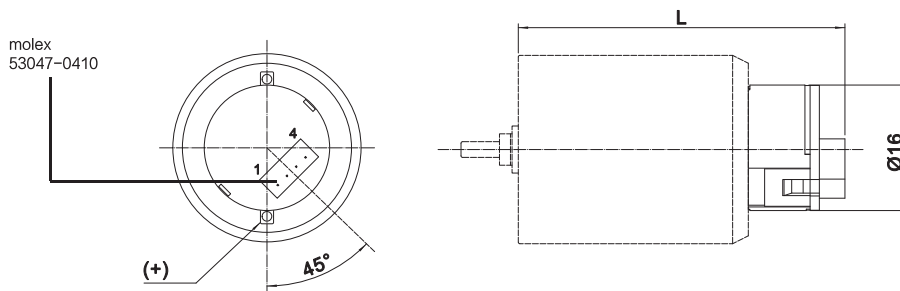
Connection

PIN No.	Function
1	Vcc
2	Channel B
3	GND
4	Channel A

Output Signal



Dimension



U22 Optical Encoder Ø22mm 2 Channels

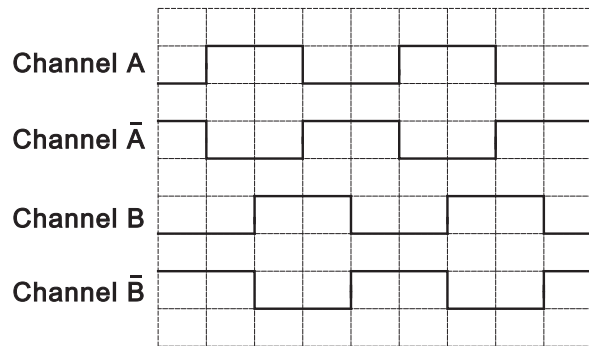
Encoder Data

Lines per revolution		256
Number of channels		2 (A,B)
Supply voltage	V	5
Supply current	mA	≤32
Max. frequency	kHz	100
Operating temperature	°C	-20~+100
Length L		
└ ECU22048	mm	62.0

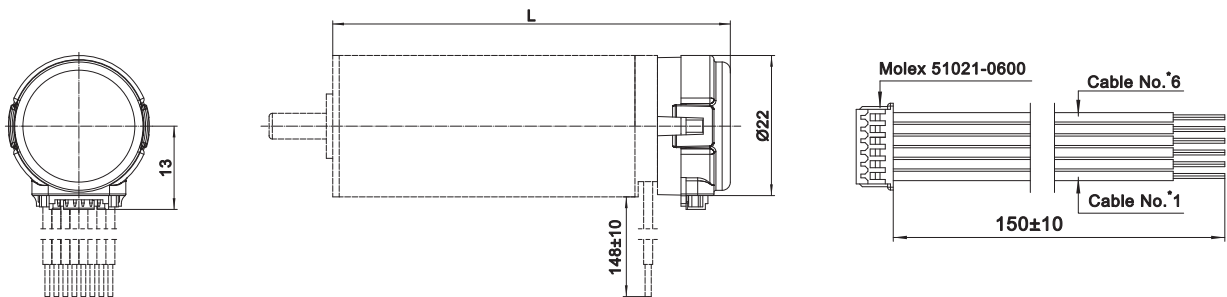
Connection

PIN No.	Function
1	GND
2	Channel A
3	Channel \bar{A}
4	Vcc(5V)
5	Channel B
6	Channel \bar{B}

Output Signal



Dimension



Product Overview

Slotless Brushless DC Motor

Coreless Brushed DC Motor

Planetary Gearbox

Encoder

Drive

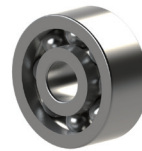
Technical

Technical

Customized Components



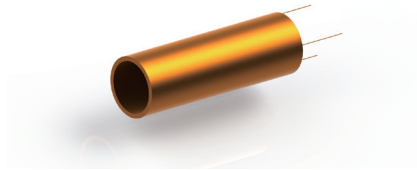
Pinion



Bearing



Flange



Winding

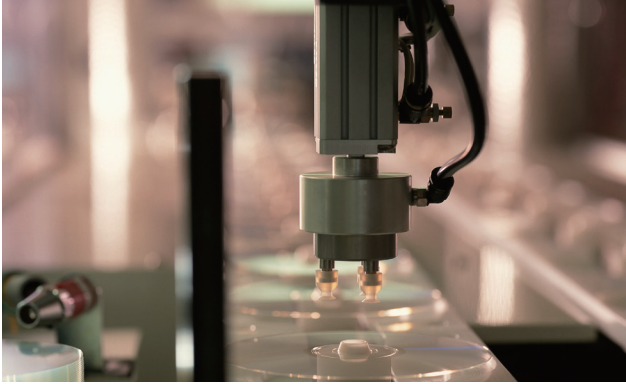


Shaft

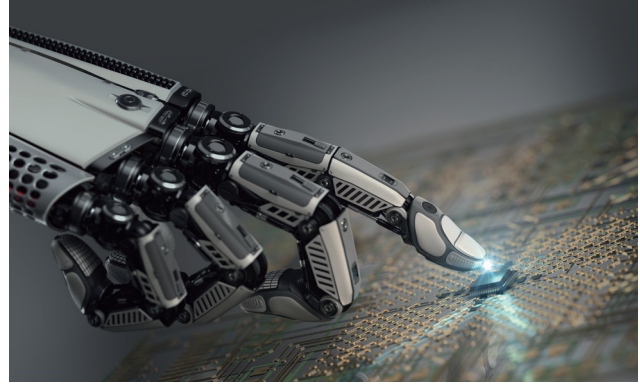


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