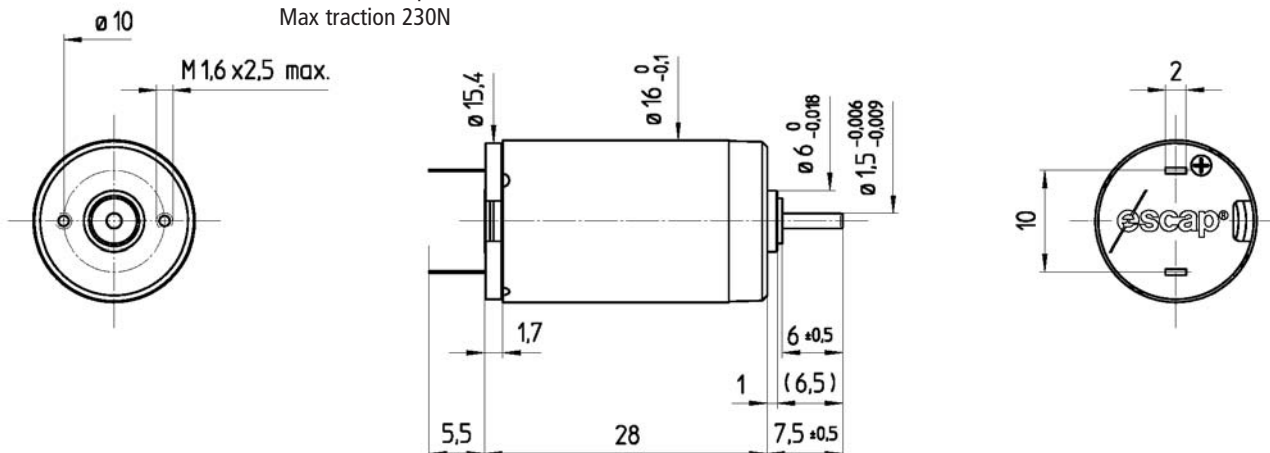


Max screw torque 40mNm
Max traction 230N



dimensions in mm
mass: 24 g

16N28 ☉☉ • 201

Winding Type

☉☉

-111P

-210E

-208E

-207E

-106

-205E

Measured Values

Measuring voltage	V	3	7.5	9.0	12.0	16.0	18.0
No-load speed	rpm	9500	9700	8900	10800	10200	9600
Stall torque	mNm (oz-in)	3.7 (0.52)	3.7 (0.52)	3.1 (0.45)	3.1 (0.45)	3.4 (0.48)	2.9 (0.41)
Average No-load current	mA	28	13.3	8.4	7.7	6.3	4.9
Typical starting voltage	V	0.10	0.15	0.2	0.3	0.4	0.45

Max. Recommended Values

Max. continuous current	A	1.01	0.42	0.29	0.24	0.19	0.15
Max. continuous torque	mNm (oz-in)	2.9 (0.44)	2.9 (0.41)	2.7 (0.38)	2.4 (0.34)	2.7 (0.38)	2.5 (0.35)
Max. angular acceleration	10 ³ rad/s ²	161	148	172	192	200	182

Intrinsic Parameters

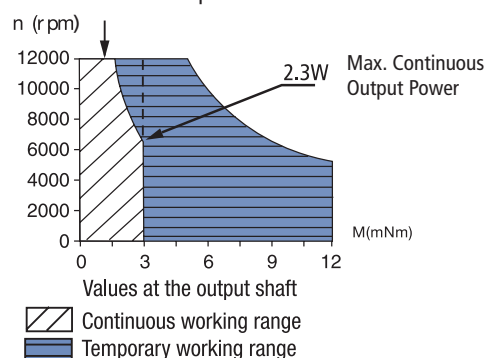
Back-EMF constant	V/1000 rpm	0.31	0.75	1.0	1.1	1.5	1.8
Torque constant	mNm/A (oz-in/A)	2.96 (0.42)	7.2 (1.0)	9.5 (1.35)	10.3 (1.45)	14.6 (2.07)	17.3 (2.45)
Terminal resistance	ohm	2.4	14.6	28	40.5	68.5	109
Motor regulation R/k ²	10 ³ /Nms	270	280	310	380	320	360
Rotor inductance	mH	0.08	0.5	0.8	0.9	2	3
Rotor inertia	kgm ² 10 ⁻⁷	0.72	0.77	0.63	0.51	0.53	0.55
Mechanical time constant	ms	20	22	20	19	17	20

Executions

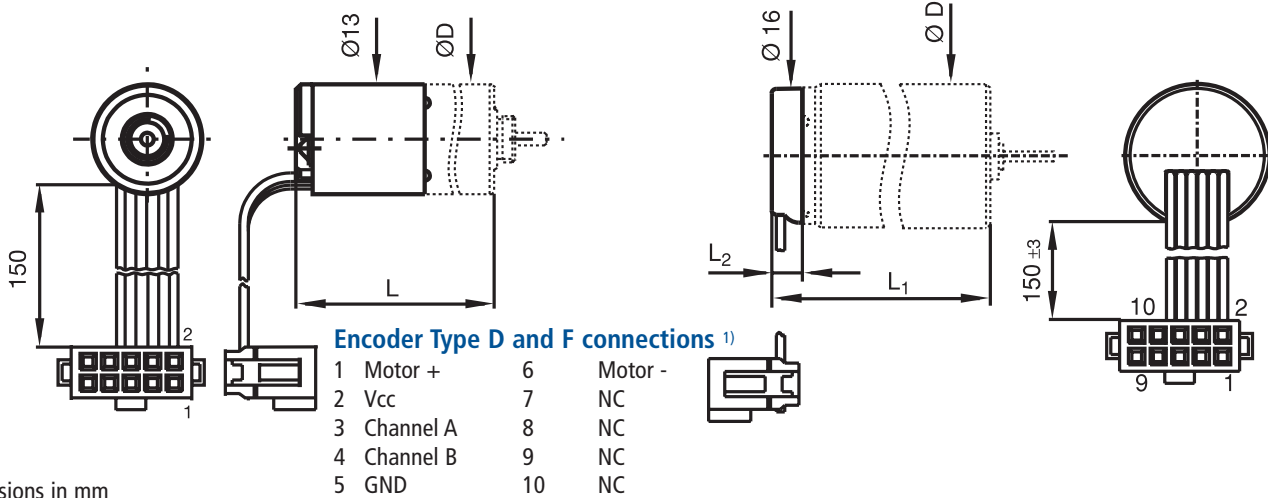
		Single Shaft	With F16
Gearbox	Page	16N28	16N28
B16 200	102	235	235
BA16 200	103	235	235
R16	104	201	201

- Thermal resistance: rotor-body 7°C/W, body-ambient 28°C/W
- Thermal time constant - rotor / stator: 7 s / 390 s
- Max. rated coil temperature: 100°C (210°F)
- Recom. ambient temperature range: -30°C to +85°C (-22°F to +185°F)
- Viscous damping constant: 0.04 x 10⁻⁶ Nms
- Max. axial static force for press-fit: 100 N (with sleeve bearing only)
- End play: ≤150 μm
- Radial play: ≤30 μm
- Shaft runout: ≤10 μm
- Max. side load at 5 mm from mounting face:
 - sleeve bearings 1.5 N
 - ball bearings 3 N
- Motor fitted with sleeve bearings (ball bearings optional)

Max. Recommended Speed



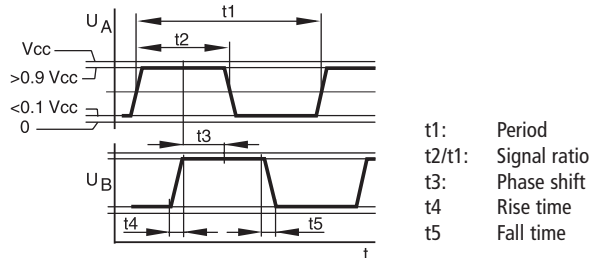
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Characteristics at 22°C

			D	F		
Number of pulses per rev			12	16		
Supply voltage	Vcc	V	5	3.5...15		
Supply current	typical at 5 V	mA	4	6		
Rise time	t4	µs	0.125	5		
Fall time	t5	µs	0.05	0.2		
Output signal ²⁾			Two channels / square wave in quadrature			
Electrical phase shift between U1 and U2	t3/t1 x 360	degree	90 ± 40			
Signal ratio ³⁾	t2/t1	%	50 ± 25			
Max. count frequency		kHz	10	15		
Operating temperature range		°C	-20...+85			
Inertia		10 ⁻⁷ x kgm ²	0.1			
Measuring conditions	Temperature	°C	22			
	Supply voltage	V	5			
	Load resistance	Mohm	1			
	Load capacity	pF	25			
Encoder F available on motor types	16C	16N	17S	17N	22N	22V
L1 = length (mm)	18.6	30	20	28.9	34	36.3
L2 = length (mm)	3,6	3.6	3.6	3.6	3.1	3.1
D = motor diameter (mm)	16	16	17	17	22	22
Encoder D available on motor types	13N	P110.19	P110.19	P110.19	P110.19	P110.19
L = length (mm)	40.4	31.2	31.2	31.2	31.2	31.2
D = motor diameter (mm)	13	16	16	16	16	16

Typical Encoder Output Signal



- 1) Connector Dupont type Quikie II or equivalent
- 2) Internal pull-up resistor: 10 kohm only available with the F type encoder
- 3) Over the entire frequency and temperature range

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