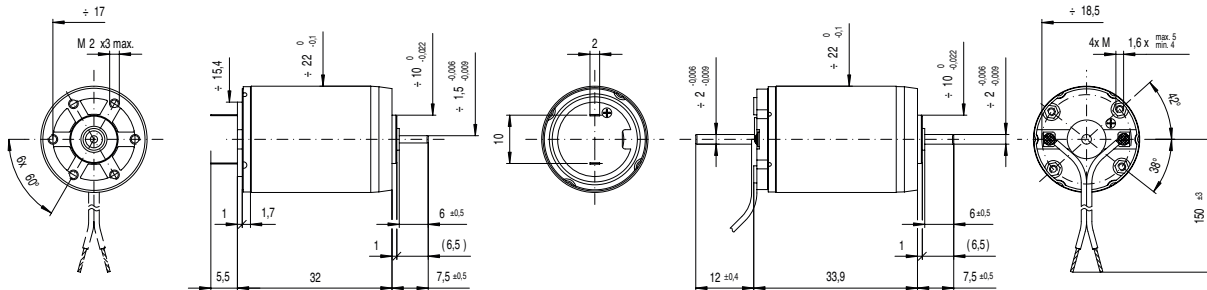


3.8 Watt

Precious Metal Commutation System - 9 Segments

Max screw torque 130 mNm  
Max traction 300N



dimensions in mm  
mass: 53 g

**22N28** ☉☉ • 286

**22N48** ☉☉ • 308

**Winding Type**

☉☉

-216P

-216E

-213E

-210E

-208E

-105

**Measured Values**

Measured Values		3.0	6.0	9.0	12.0	18.0	18.0
Measuring voltage	V	3.0	6.0	9.0	12.0	18.0	18.0
No-load speed	rpm	5200	5600	7000	5900	6300	3600
Stall torque	mNm (oz-in)	10.9 (1.54)	10.6 (1.50)	10.7 (1.51)	8.6 (1.21)	8.2 (1.16)	4.3 (0.61)
Average No-load current 1)	mA	12.6/27	7.0/14	6.0/11	4.5/9	3.5/7	1.4/3
Typical starting voltage 1)	V	0.03/0.25	0.05/0.35	0.06/0.45	0.08/0.5	0.12/0.7	0.24/0.90

**Max. Recommended Values**

Max. continuous current	A	1.50	0.83	0.62	0.38	0.26	0.14
Max. continuous torque	mNm (oz-in)	8.1 (1.15)	8.4 (1.19)	7.5 (1.06)	7.3 (1.04)	7.0 (0.98)	6.6 (0.93)
Max. angular acceleration	10 <sup>3</sup> rad/s <sup>2</sup>	100	96	107	98	96	132

**Intrinsic Parameters**

Back-EMF constant	V/1000 rpm	0.57	1.07	1.28	2.02	2.83	4.95
Torque constant	mNm/A (oz-in/A)	5.44 (0.77)	10.2 (1.45)	12.2 (1.73)	19.3 (2.73)	27.0 (3.83)	47.3 (6.69)
Terminal resistance	ohm	1.50	5.80	10.3	27.0	59.0	200
Motor regulation R/k <sup>2</sup>	10 <sup>3</sup> /Nms	51	56	69	73	81	90
Rotor inductance	mH	0.10	0.35	0.50	1.20	2.30	7.00
Rotor inertia	kgm <sup>2</sup> 10 <sup>-7</sup>	3.50	3.50	2.80	3.00	2.90	2.00
Mechanical time constant	ms	18	19	19	22	23	18

1) Single Shaft/double shaft

		Executions		
		Single Shaft	For F16	For E9
Gearbox	Page	22N28	22N28	22N48
R22	239	286	286	308
M22	240	286	286	308
K24	241	286	286	308
K27	242	286	286	308
RG1/8	245	204	204	310
RG1/9	246	204	204	310
K38	244	204	204	310

- Thermal resistance: rotor-body 6°C/W  
body-ambient 22°C/W
- Thermal time constant - rotor / stator: 9 s / 550 s
- Max. rated coil temperature: 100°C (210°F)
- Recom. ambient temperature range: -30°C to +65°C (-22°F to +150°F)
- Viscous damping constant: 0.1 x 10<sup>-6</sup> Nms
- Max. axial static force for press-fit: 150 N
- End play: ≤ 150 µm  
Radial play: ≤ 30 µm  
Shaft runout: ≤ 10 µm
- Max. side load at 5 mm from mounting face:  
- sleeve bearings 3 N  
- ball bearings 6 N
- Motor fitted with sleeve (ball bearings optional)

**Max. Recommended Speed**

