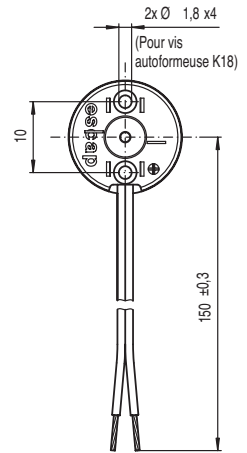
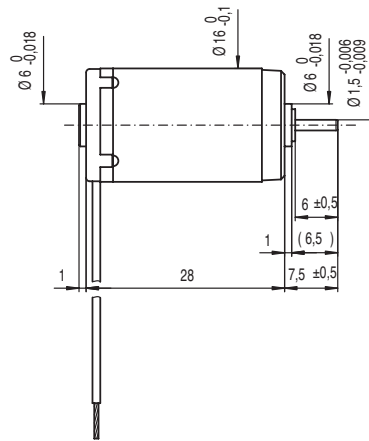
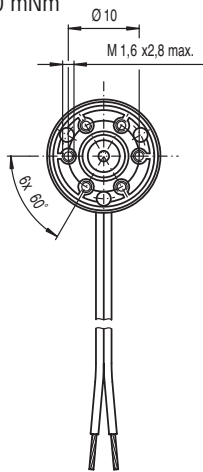


Max screw torque 40 mNm
Max traction 230 N



dimensions in mm
mass: 24 g

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Winding Type



-220P

-220E

-213E

-211E

-210E

-208E

Measured Values

Measured Values	Unit	-220P	-220E	-213E	-211E	-210E	-208E
Measuring voltage	V	3	6	9	12	15	24
No-load speed	rpm	10600	10900	8000	8700	9000	10400
Stall torque	mNm (oz-in)	16 (2.3)	19.9 (2.8)	12.7 (1.80)	12.1 (1.71)	12.2 (1.73)	14.3 (2.0)
Average No-load current	mA	45	17	8	6.5	5.5	3.5
Typical starting voltage	V	0.02	0.05	0.12	0.18	0.20	0.30

Max. Recommended Values

Max. Recommended Values	Unit	-220P	-220E	-213E	-211E	-210E	-208E
Max. continuous current	A	2.0	1.21	0.55	0.42	0.35	0.25
Max. continuous torque	mNm (oz-in)	5.2 (0.74)	6.3 (0.89)	5.8 (0.82)	5.4 (0.76)	5.4 (0.76)	5.4 (0.76)
Max. angular acceleration	10 ³ rad/s ²	282	277	292	273	291	272

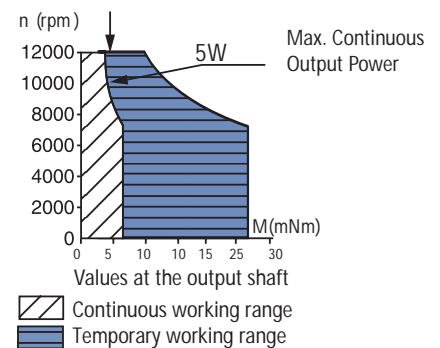
Intrinsic Parameters

Intrinsic Parameters	Unit	-220P	-220E	-213E	-211E	-210E	-208E
Back-EMF constant	V/1000 rpm	0.28	0.55	1.12	1.37	1.65	2.3
Torque constant	mNm/A (oz-in/A)	2.67 (0.38)	5.3 (0.74)	10.7 (1.51)	13.1 (1.85)	15.8 (2.23)	22 (3.11)
Terminal resistance	ohm	0.5	1.6	7.6	13	19.5	37
Motor regulation R/k ²	10 ³ /Nms	70	58	66	76	79	77
Rotor inductance	mH	0.01	0.045	0.15	0.26	0.40	0.72
Rotor inertia	kgm ² 10 ⁻⁷	0.8	0.91	0.8	0.8	0.74	0.8
Mechanical time constant	ms	5.6	5.3	5.3	6.1	5.8	6.1

Executions		
		Single Shaft
Gearbox	Page	16G88
B16	102	5
BA16	103	5
R16	104	1

- Thermal resistance: rotor-body 8°C/W, body-ambient 35°C/W
- Thermal time constant - rotor / stator: 6 s / 500 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: 0.05 x 10⁻⁶ Nms
- Max. axial static force for press-fit: 100 N
- 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
- Motor fitted with sleeve bearings

Max. Recommended Speed



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