

9 Watt

**Precious Metal Commutation System - 9 Segments**

Max traction force: 300 N  
Max screw torque: 130 mNm

dimensions in mm  
mass: 53 g

**22N78** ☉☉ • 1001

**22N98** ☉☉ • 1005

Winding Type	☉☉	324P	319P	313P	311P	216E	215E	208E
<b>Measured Values</b>								
Measuring voltage	V	3	6	9	12	18	24	48
No-load speed	rpm	6400	8700	6800	7300	8200	9100	6400
Stall torque	mNm	52.0	66.0	45.0	48.0	49.0	58.0	32.0
Average No-load current	mA	15	10	10	7	6	5	1
Typical starting voltage	V	0.05	0.1	0.1	0.15	0.2	0.3	0.5
<b>Max. Recommended Values</b>								
Max. continuous current	A	3.7	2.4	1.18	0.98	0.67	0.58	0.18
Max. continuous torque	mNm	16.5	15.7	14.6	14.8	13.8	14.5	12.9
Max. angular acceleration	10 <sup>3</sup> rad/s <sup>2</sup>	120	130	133	141	117	128	157
<b>Intrinsic Parameters</b>								
Back-EMF constant	V/1000 rpm	0.47	0.69	1.31	1.64	2.18	2.64	7.50
Torque constant	mNm/A	4.5	6.6	12.5	15.8	20.8	25.2	72.0
Terminal resistance	Ohms	0.3	0.6	2.5	3.9	7.7	10.5	107.0
Motor regulation R/k <sup>2</sup>	10 <sup>3</sup> /Nms	13	14	16	16	18	17	21
Rotor inductance	mH	0.02	0.04	0.16	0.25	0.50	0.70	7.00
Rotor inertia	kgm <sup>2</sup> 10 <sup>-7</sup>	5.45	4.90	4.39	4.20	4.74	4.50	3.32
Mechanical time constant	ms	7.0	6.8	7.0	6.7	8.4	7.4	6.9

Executions				
		Single Shaft	With MR2	With E9
Gearbox	Page	22N78	22N98	22N98
R22	239	1001	1008	1005
M22	240	1001	1008	1005
K24	241	1001	1008	1005
K27	242	1001	1008	1005
RG1/8	245	1007	1009	1006
RG1/9	246	1007	1009	1006
K38	244	1007	1009	1006

- Thermal resistance : rotor-body 6°C/W  
body-ambient 22°C/W
- Thermal time constant – rotor/stator: 9s / 550s
- 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: 150N (with sleeve bearing only)
- End play: ≤ 150 µm  
Radial play: ≤ 30 µm  
Shaft runout: ≤ 10 µm
- Max. side load at 5mm from mounting face – sleeve bearings 3 N  
– ball bearings 6 N
- Motor fitted with sleeve bearings (ball bearings optional)

