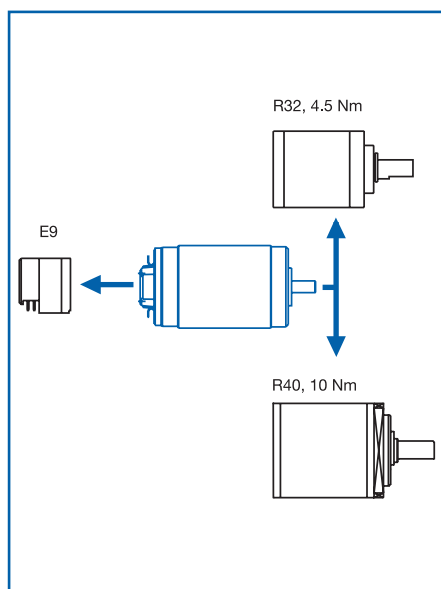


Winding types	[ ]	-228P	-228E	-416SP
<b>Measured values</b>				
1 Measuring voltage	V	9.0	15.0	24.0
2 No-load speed	rpm	4990	4320	4470
3 Stall torque	mNm (oz-in)	121 (17.12)	148 (20.89)	149 (21.11)
4 Average no-load current	mA	180	90.0	50.0
5 Typical starting voltage	V	--	--	--
<b>Max. recommended values</b>				
6 Max. continuous current	A	3.04	1.87	1.18
7 Max. continuous torque	mNm (oz-in)	48.1 (6.8)	57.9 (8.2)	58.3 (8.3)
8 Max. angular acceleration	10 <sup>3</sup> rad/s <sup>2</sup>	40	48	45
<b>Intrinsic parameters</b>				
9 Back-EMF constant	V/1000 rpm	1.76	3.40	5.40
10 Torque constant	mNm/A (oz-in/A)	16.8 (2.38)	32.5 (4.60)	51.6 (7.30)
11 Terminal resistance	ohm	1.25	3.30	8.30
12 Motor regulation R/k <sup>2</sup>	10 <sup>3</sup> /Nms	4.43	3.13	3.12
13 Rotor inductance	mH	0.13	0.52	1.30
14 Rotor inertia	kgm <sup>2</sup> · 10 <sup>-7</sup>	48.00	48.00	52.00
15 Mechanical time constant	ms	21	15	16

Availability: see enclosed document at the end of the catalogue



- Thermal resistance :  
rotor-body 4 °C/W  
body-ambient 8 °C/W
- Thermal time constant - rotor / stator :  
50 s / 920 s
- Max. rated coil temperature : 155°C
- Recom. ambient temperature range :  
-10 °C to +80 °C (-14 °F to +176 °F)
- Max. axial static force for press-fit : 100 N  
- shaft supported: 1000 N
- End play : negligible  
Radial play : negligible  
Shaft runout : ≤ 10 µm
- Max. side load at 10mm from mounting face:  
- ball bearings 35 N
- Motor fitted with ball bearings

