

DC-Micromotors

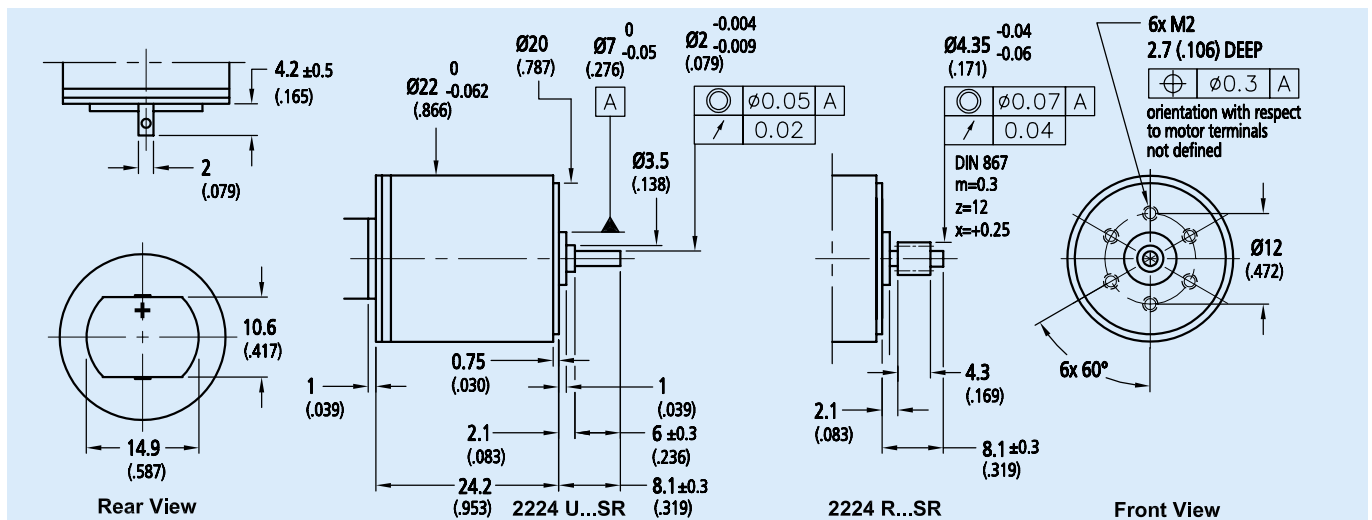
Precious Metal Commutation

0.708 oz-in

For combination with:
 Gearheads: 20/1, 22E, 22/2, 22/5, 22/6, 23/1, 38/3
 Encoders: IE2

Series 2224 ... SR

| | 2224 U | 003 SR | 006 SR | 012 SR | 018 SR | 024 SR | 036 SR | | |
|--|-------------------------------------|---|-----------------------|-----------------------|--------------------------|-----------------------|-----------------------|------------------------------|---|
| 1 Nominal voltage | U_N | 3 | 6 | 12 | 18 | 24 | 36 | Volt | |
| 2 Terminal resistance | R ± 12% | 0.56 | 1.94 | 8.71 | 17.50 | 36.30 | 91.40 | Ω | |
| 3 Output power | $P_{2 \text{ max.}}$ | 3.92 | 4.55 | 4.05 | 4.54 | 3.88 | 3.46 | W | |
| 4 Efficiency | $\eta_{\text{ max.}}$ | 80 | 82 | 82 | 82 | 81 | 80 | % | |
| 5 No-load speed | n_o ± 12% | 8,100 | 8,200 | 7,800 | 8,100 | 7,800 | 7,800 | rpm | |
| 6 No-load current (with shaft \varnothing 0.08 in) | I_o ± 50% | 0.066 | 0.029 | 0.014 | 0.010 | 0.007 | 0.005 | A | |
| 7 Stall torque | M_H | 2.62 | 3.00 | 2.80 | 3.03 | 2.69 | 2.39 | oz-in | |
| 8 Friction torque | M_R | 0.033 | 0.028 | 0.028 | 0.030 | 0.028 | 0.031 | oz-in | |
| 9 Speed constant | k_n | 2,730 | 1,380 | 657 | 454 | 328 | 219 | rpm/V | |
| 10 Back-EMF constant | k_E | 0.366 | 0.725 | 1.520 | 2.200 | 3.040 | 4.560 | mV/rpm | |
| 11 Torque constant | k_M | 0.494 | 0.980 | 2.053 | 2.974 | 4.121 | 6.160 | oz-in/A | |
| 12 Current constant | k_I | 2.024 | 1.020 | 0.487 | 0.336 | 0.243 | 0.162 | A/oz-in | |
| 13 Slope of n-M curve | $\Delta n/\Delta M$ | 3,092 | 2,733 | 2,786 | 2,673 | 2,900 | 3,264 | rpm/oz-in | |
| 14 Rotor inductance | L | 11 | 45 | 200 | 450 | 800 | 1,800 | μH | |
| 15 Mechanical time constant | τ_m | 11 | 11 | 11 | 11 | 11 | 11 | ms | |
| 16 Rotor inertia | J | $3.399 \cdot 10^{-5}$ | $3.824 \cdot 10^{-5}$ | $3.824 \cdot 10^{-5}$ | $3.965 \cdot 10^{-5}$ | $3.682 \cdot 10^{-5}$ | $3.257 \cdot 10^{-5}$ | oz-in-sec ² | |
| 17 Angular acceleration | $\alpha_{\text{ max.}}$ | 77 | 78 | 74 | 77 | 74 | 74 | $\cdot 10^3 \text{ rad/s}^2$ | |
| 18 Thermal resistance | $R_{\text{th} 1} / R_{\text{th} 2}$ | 5 / 20 | | | | | | $^{\circ}\text{C/W}$ | |
| 19 Thermal time constant | τ_{w1} / τ_{w2} | 6.8 / 440 | | | | | | s | |
| 20 Operating temperature range: | | | | | | | | | |
| – motor | | – 30 to +85 (– 22 to +185) | | | | | | | $^{\circ}\text{C}$ ($^{\circ}\text{F}$) |
| – rotor, max. permissible | | +125 (+257) | | | | | | | $^{\circ}\text{C}$ ($^{\circ}\text{F}$) |
| Note: Special operating temperature models for | | –55 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$ (– 67 $^{\circ}\text{F}$ to +257 $^{\circ}\text{F}$) available on request. | | | | | | | |
| 21 Shaft bearings | | sintered bronze sleeves | ball bearings | ball bearings | ball bearings, preloaded | | | | |
| 22 Shaft load max.: | | (standard) | (optional) | (optional) | (optional) | | | | |
| – with shaft diameter | | 0.0787 | 0.0787 | 0.0787 | 0.0787 | | | in | |
| – radial at 3,000 rpm (0.12 in from bearing) | | 5.40 | 28.80 | 28.80 | 28.80 | | | oz | |
| – axial at 3,000 rpm | | 0.72 | 2.88 | 2.88 | 2.88 | | | oz | |
| – axial at standstill | | 72 | 36 | 36 | 36 | | | oz | |
| 23 Shaft play: | | | | | | | | | |
| – radial | \leq | 0.0012 | 0.0006 | 0.0006 | 0.0006 | | | in | |
| – axial | \leq | 0.0079 | 0.0079 | 0.0079 | 0 | | | in | |
| 24 Housing material | | steel, black coated | | | | | | | |
| 25 Weight | | 1.62 | | | | | | | oz |
| 26 Direction of rotation | | clockwise, viewed from the front face | | | | | | | |
| Recommended values | | | | | | | | | |
| 27 Speed up to | $n_{e \text{ max.}}$ | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 | rpm | |
| 28 Torque up to | $M_{e \text{ max.}}$ | 0.708 | 0.708 | 0.708 | 0.708 | 0.708 | 0.708 | oz-in | |
| 29 Current up to (thermal limits) | $I_{e \text{ max.}}$ | 2.200 | 1.200 | 0.570 | 0.400 | 0.280 | 0.180 | A | |



For notes on technical data refer to "Technical Information". Specifications subject to change without notice. MME0104