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

<table>
<thead>
<tr>
<th>2224 U</th>
<th>003 SR</th>
<th>006 SR</th>
<th>012 SR</th>
<th>018 SR</th>
<th>024 SR</th>
<th>036 SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage $U_N$</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td>Terminal resistance $R$</td>
<td>0.56 ± 12%</td>
<td>1.94</td>
<td>8.71</td>
<td>17.50</td>
<td>36.30</td>
<td>91.40</td>
</tr>
<tr>
<td>Output power $P_{2 \max.}$</td>
<td>3.92</td>
<td>4.55</td>
<td>4.05</td>
<td>4.54</td>
<td>3.88</td>
<td>3.46</td>
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<tr>
<td>Efficiency $\eta_{\max.}$</td>
<td>80</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>81</td>
<td>80</td>
</tr>
<tr>
<td>No-load speed $n_0$</td>
<td>8,100</td>
<td>8,200</td>
<td>7,800</td>
<td>8,100</td>
<td>7,800</td>
<td>7,800</td>
</tr>
<tr>
<td>No-load current (with shaft ø 0.08 in) $I_0$</td>
<td>0.066</td>
<td>0.029</td>
<td>0.014</td>
<td>0.010</td>
<td>0.007</td>
<td>0.005</td>
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<tr>
<td>Stall torque $M_H$</td>
<td>2.62</td>
<td>3.00</td>
<td>2.80</td>
<td>3.03</td>
<td>2.69</td>
<td>2.39</td>
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<tr>
<td>Friction torque $k_F$</td>
<td>0.033</td>
<td>0.028</td>
<td>0.028</td>
<td>0.030</td>
<td>0.028</td>
<td>0.031</td>
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<tr>
<td>Speed constant $k_n$</td>
<td>2,730</td>
<td>1,380</td>
<td>657</td>
<td>454</td>
<td>328</td>
<td>219</td>
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<tr>
<td>Back-EMF constant $k_E$</td>
<td>0.366</td>
<td>0.725</td>
<td>1.520</td>
<td>2.200</td>
<td>3.040</td>
<td>4.560</td>
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<tr>
<td>Torque constant $k_M$</td>
<td>0.494</td>
<td>0.980</td>
<td>2.053</td>
<td>2.974</td>
<td>4.121</td>
<td>6.160</td>
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<tr>
<td>Current constant $k_I$</td>
<td>2.024</td>
<td>1.020</td>
<td>0.487</td>
<td>0.336</td>
<td>0.243</td>
<td>0.162</td>
</tr>
<tr>
<td>Slope of $n-M$ curve $\Delta n/\Delta M$</td>
<td>3.092</td>
<td>2,733</td>
<td>2,786</td>
<td>2,673</td>
<td>2,900</td>
<td>3,264</td>
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<tr>
<td>Rotor inductance $L$</td>
<td>11</td>
<td>45</td>
<td>200</td>
<td>450</td>
<td>800</td>
<td>1,800</td>
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<tr>
<td>Mechanical time constant $\tau_m$</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Rotor inertia $J$</td>
<td>3.399 · 10^1</td>
<td>3.824 · 10^1</td>
<td>3.824 · 10^1</td>
<td>3.965 · 10^1</td>
<td>3.682 · 10^1</td>
<td>3.257 · 10^1</td>
</tr>
<tr>
<td>Angular acceleration $\alpha_{\max.}$</td>
<td>77</td>
<td>78</td>
<td>74</td>
<td>77</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td>Thermal resistance $R_{th,1}/R_{th,2}$</td>
<td>5 / 20</td>
<td></td>
<td></td>
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<tr>
<td>Thermal time constant $\tau_{wl}/\tau_{w2}$</td>
<td>6.8 / 440</td>
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<td></td>
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<tr>
<td>Operating temperature range:</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– motor</td>
<td>–30 to +85</td>
<td>–22 to +185</td>
<td></td>
<td></td>
<td></td>
<td>+125 (+257)</td>
</tr>
<tr>
<td>– rotor, max. permissible</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Shaft bearings:</td>
<td>ball bearings (standard)</td>
<td>ball bearings (optional)</td>
<td>ball bearings, preloaded (optional)</td>
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<tr>
<td>– with shaft diameter</td>
<td>0.0787</td>
<td>0.0787</td>
<td>0.0787</td>
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<tr>
<td>– radial at 3,000 rpm (0.12 in from bearing)</td>
<td>5.40</td>
<td>28.80</td>
<td>28.80</td>
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<tr>
<td>– axial at 3,000 rpm</td>
<td>0.72</td>
<td>2.88</td>
<td>2.88</td>
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<tr>
<td>– axial at standstill</td>
<td>72</td>
<td>36</td>
<td>36</td>
<td></td>
<td></td>
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<tr>
<td>Shaft play:</td>
<td>radial</td>
<td>0.0012</td>
<td>0.0006</td>
<td>0.0006</td>
<td></td>
<td></td>
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<tr>
<td>– axial</td>
<td></td>
<td>0.0079</td>
<td>0.0079</td>
<td>0</td>
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<tr>
<td>Housing material</td>
<td>steel, black coated</td>
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<tr>
<td>Weight</td>
<td>1.62</td>
<td></td>
<td></td>
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<tr>
<td>Direction of rotation</td>
<td>clockwise, viewed from the front face</td>
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<tr>
<td>Recommended values</td>
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</tr>
<tr>
<td>Speed up to</td>
<td>$n_{e \max.}$</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Torque up to</td>
<td>$M_{e \max.}$</td>
<td>0.708</td>
<td>0.708</td>
<td>0.708</td>
<td>0.708</td>
<td>0.708</td>
</tr>
<tr>
<td>Current up to (thermal limits)</td>
<td>$I_{e \max.}$</td>
<td>2.200</td>
<td>1.200</td>
<td>0.570</td>
<td>0.400</td>
<td>0.280</td>
</tr>
</tbody>
</table>

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

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