

RBE(H) Series Motors



Data
Publication

The RBE series brushless motors provide a wide range of flexible motor solutions for frameless DDR (Direct Drive Rotary) motor applications.

- 10 frame sizes from 21.3mm to 239mm outside diameter
- Continuous Torque range from .01Nm to 38Nm
- Peak Torque range from .03Nm to 200Nm
- Speeds up to 35,000rpm
- Standard and custom windings to match speed/torque performance

These motors come in either housed (RBEH) or frameless (RBE) mechanical configurations. The Housed models come with stainless steel shafts and can include any combination of Hall sensors, encoder, or resolver as rotor position feedback devices.

The frameless configuration is supplied as two separate components (rotor and stator) and does not include a shaft, bearings, or endbells. Frameless motors are integrated directly with the load where the same bearings which support the load also support the motor. This configuration eliminates shaft, bearings, endbells, and couplings offering reduced volume, weight, complexity and also results in improved servo stiffness and quicker response. Frameless motors can include integral Hall sensors and additional position feedback devices such as encoders or resolvers would be added as separate components.

RBE(H) Motor Series

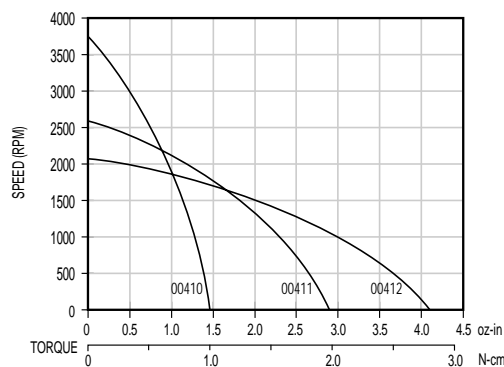
RBE(H) 00410 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	00410	00411	00412
Max Cont. Output Power	HP Rated	HP	0.019	0.027	0.032
at 25°C amb.	P Rated	Watts	14	20	24
Speed at Rated Power	N Rated	RPM	22400	15200	12550
Max Mechanical Speed	N Max	RPM	35000	35000	35000
Continuous Stall Torque	Tc	oz-in	1.54	2.93	4.13
at 25°C amb.		N-m	0.0109	0.0207	0.0292
Peak Torque	Tp	oz-in	3.49	7.13	11.0
		N-m	0.025	0.050	0.08
Max Torque	Tsl	oz-in	3.49	7.13	11.0
for Linear KT		N-m	0.025	0.050	0.078
Motor Constant	Tm	oz-in/ \sqrt{W}	0.65	1.09	1.46
		N-m/ \sqrt{W}	0.005	0.008	0.010
Thermal Resistance*	Rth	°C/Watt	8.00	7.11	6.64
Viscous Damping	Fi	oz-in/RPM	1.80E-05	3.40E-05	5.00E-05
		N-m/RPM	1.27E-07	2.40E-07	3.53E-07
Max Static Friction	Tf	oz-in	0.60	0.88	1.15
		N-m	0.0042	0.0062	0.0081
Max Cogging Torque	Tcog	oz-in	0.37	0.58	0.80
Peak to Peak		N-m	0.0026	0.0041	0.0060
Inertia	Jmf	oz-in-sec ²	1.70E-05	2.70E-05	3.80E-05
Frameless Motor		Kg-m ²	1.20E-07	1.91E-07	2.68E-07
Weight	Wtf	oz	1.1	1.6	2.0
		Kg	3.1E-02	4.4E-02	5.7E-02
Inertia	Jmh	oz-in-sec ²	1.70E-05	2.70E-05	3.80E-05
Housed Motor		Kg-m ²	1.20E-07	1.91E-07	2.68E-07
Weight	Wth	oz	1.7	2.2	2.7
		Kg	4.8E-02	6.2E-02	7.7E-02
No. of poles	P		6	6	6

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	2.27	1.79	3.09	2.31	1.80	3.24	2.99	2.72	1.99
Current at Peak Torque	Ip	Amps	4.33	3.43	6.13	4.86	3.86	6.88	6.88	6.13	4.33
Torque Sensitivity	Kt	oz-in/Amp	0.945	1.20	0.693	1.65	2.12	1.18	1.76	1.94	2.65
		N-m/Amp	0.00667	0.00845	0.00489	0.0116	0.0150	0.0083	0.0125	0.0137	0.0187
Back EMF constant	Kb	V/KRPM	0.699	0.885	0.513	1.22	1.57	0.870	1.30	1.44	1.96
Motor Resistance	Rm	Ohms	2.11	3.37	1.08	2.28	3.72	1.17	1.46	1.78	3.48
Motor Inductance	Lm	mH	0.18	0.29	0.096	0.26	0.43	0.13	0.20	0.24	0.45

*Rth assumes a housed motor mounted to a 3.25" x 3.25" x 0.25" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 00410 Series



RBE(H) Motor Series

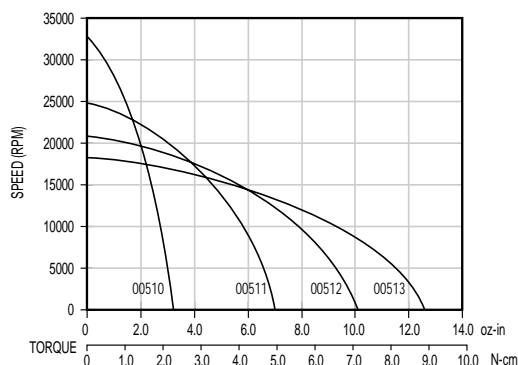
RBE(H) 00510 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	00510	00511	00512	00513
Max Cont. Output Power at 25°C amb.	HP Rated	HP	0.040	0.070	0.086	0.095
	P Rated	Watts	29	52	64	71
Speed at Rated Power	N Rated	RPM	20900	15700	13300	11700
Max Mechanical Speed	N Max	RPM	28000	28000	28000	28000
Continuous Stall Torque at 25°C amb.	Tc	oz-in	3.11	7.00	9.80	12.1
		N-m	0.0219	0.0494	0.0692	0.0854
Peak Torque	Tp	oz-in	7.05	15.8	24.4	32.1
		N-m	0.050	0.111	0.17	0.23
Max Torque for Linear KT	Tsl	oz-in	7.05	15.8	24.4	32.1
		N-m	0.050	0.111	0.172	0.227
Motor Constant	Tm	oz-in/ \sqrt{W}	1.00	1.91	2.53	3.03
		N-m/ \sqrt{W}	0.00704	0.0135	0.0179	0.0214
Thermal Resistance*	Rth	°C/Watt	6.23	5.20	4.75	4.51
Viscous Damping	Fi	oz-in/RPM	4.00E-05	6.63E-05	9.32E-05	1.20E-04
		N-m/RPM	2.83E-07	4.68E-07	6.58E-07	8.48E-07
Max Static Friction	Tf	oz-in	0.61	0.80	1.00	1.20
		N-m	0.0043	0.006	0.007	0.008
Max Cogging Torque Peak to Peak	Tcog	oz-in	0.38	0.55	0.73	0.90
		N-m	0.0027	0.0039	0.0051	0.0064
Frameless Motor	Inertia	oz-in-sec ²	4.50E-05	5.00E-05	5.60E-05	6.10E-05
		Kg-m ²	3.18E-07	3.53E-07	3.95E-07	4.31E-07
Weight	Wtf	oz	1.3	2.0	2.6	3.3
		Kg	3.69E-02	5.55E-02	7.45E-02	9.36E-02
Housed Motor	Inertia	oz-in-sec ²	4.50E-05	5.00E-05	5.60E-05	6.10E-05
		Kg-m ²	3.18E-07	3.53E-07	3.95E-07	4.31E-07
Weight	Wth	oz	3.8	4.5	5.1	5.8
		Kg	1.08E-01	1.26E-01	1.45E-01	1.64E-01
No. of poles	P		6	6	6	6

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	3.18	2.52	3.85	3.09	2.45	3.74	4.43	3.50	2.89	4.16	3.28	2.71
Current at Peak Torque	Ip	Amps	6.55	5.19	8.26	6.55	5.19	8.26	10.4	8.26	6.55	10.4	8.26	6.55
Torque Sensitivity	Kt	oz-in/Amp	1.17	1.47	0.966	2.53	3.19	2.09	2.44	3.09	3.74	3.20	4.05	4.90
		N-m/Amp	0.0083	0.0104	0.0068	0.0179	0.0225	0.0147	0.0172	0.0218	0.0264	0.0226	0.0286	0.0346
Back EMF constant	Kb	V/KRPM	0.865	1.09	0.715	1.87	2.36	1.54	1.81	2.29	2.77	2.36	2.99	3.62
Motor Resistance	Rm	Ohms	1.38	2.19	0.891	1.75	2.78	1.13	0.931	1.466	2.27	1.11	1.75	2.71
Motor Inductance	Lm	mH	0.22	0.34	0.15	0.38	0.60	0.26	0.25	0.40	0.59	0.34	0.55	0.80

*Rth assumes a housed motor mounted to a 3.25" x 3.25" x 0.25" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 00510 Series



RBE(H) Motor Series

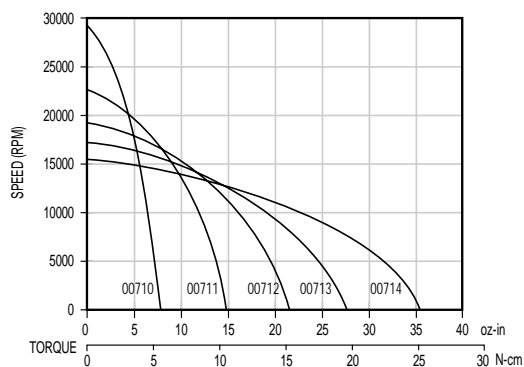
RBE(H) 00710 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	00710	00711	00712	00713	00714
Max Cont. Output Power at 25°C amb.	HP Rated	HP	0.0858	0.133	0.166	0.189	0.225
	P Rated	Watts	64	99	124	141	168
Speed at Rated Power	N Rated	RPM	17700	14110	12000	10800	9750
Max Mechanical Speed	N Max	RPM	20000	20000	20000	20000	20000
Continuous Stall Torque at 25°C amb.	Tc	oz-in	8.14	15.5	21.5	27.6	35.3
		N-m	0.057	0.109	0.152	0.195	0.249
Peak Torque	Tp	oz-in	22.7	43.8	63.3	84.5	114
		N-m	0.160	0.310	0.447	0.597	0.802
Max Torque for Linear KT	Tsl	oz-in	22.7	43.8	63.3	84.5	114
		N-m	0.160	0.310	0.447	0.597	0.802
Motor Constant	Km	oz-in/ \sqrt{W}	2.36	4.05	5.38	6.67	8.25
		N-m/ \sqrt{W}	0.0166	0.029	0.038	0.047	0.058
Thermal Resistance*	Rth	°C/Watt	5.90	4.91	4.47	4.19	3.94
Viscous Damping	Fi	oz-in/RPM	4.40E-05	8.39E-05	1.20E-04	1.56E-04	2.00E-04
		N-m/RPM	3.11E-07	5.93E-07	8.49E-07	1.11E-06	1.41E-06
Max Static Friction	Tf	oz-in	0.90	1.54	2.12	2.70	3.40
		N-m	0.0064	0.011	0.015	0.019	0.024
Max Cogging Torque Peak to Peak	Tcog	oz-in	0.75	1.38	1.95	2.52	3.20
		N-m	0.0053	0.0097	0.0137	0.0178	0.023
Frameless Motor Inertia	Jmf	oz-in-sec ²	1.30E-04	2.00E-04	2.80E-04	3.50E-04	4.40E-04
		Kg-m ²	9.18E-07	1.41E-06	1.98E-06	2.47E-06	3.11E-06
Housed Motor Weight	Wtf	oz	2.8	4.4	5.8	7.2	8.9
		Kg	7.94E-02	1.24E-01	1.64E-01	2.04E-01	2.52E-01
Housed Motor Inertia	Jmh	oz-in-sec ²	1.30E-04	2.00E-04	2.80E-04	3.60E-04	4.50E-04
		Kg-m ²	9.18E-07	1.41E-06	1.98E-06	2.54E-06	3.18E-06
Housed Motor Weight	Wth	oz	7.8	9.3	11	12	14
		Kg	2.21E-01	2.65E-01	3.04E-01	3.44E-01	3.91E-01
No. of poles	P		6	6	6	6	6

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	4.83	3.87	6.91	4.73	3.78	6.75	4.56	3.65	6.51	4.38	3.51	6.26	4.68	3.37	6.02
Current at Peak Torque	Ip	Amps	12.6	9.99	17.8	12.6	10.0	17.8	12.6	10.0	17.8	12.6	10.0	17.8	14.2	10.0	17.8
Torque Sensitivity	Kt	oz-in/Amp	1.87	2.34	1.31	3.60	4.50	2.52	5.19	6.49	3.63	6.92	8.65	4.85	8.26	11.5	6.43
		N-m/Amp	0.0132	0.0165	0.0092	0.0254	0.0318	0.0178	0.0367	0.0458	0.0257	0.0489	0.0611	0.0342	0.0584	0.0810	0.0454
Back EMF constant	Kb	V/KRPM	1.38	1.73	0.968	2.66	3.33	1.86	3.84	4.80	2.69	5.12	6.40	3.58	6.11	8.49	4.75
Motor Resistance	Rm	Ohms	0.629	0.991	0.311	0.790	1.24	0.390	0.933	1.47	0.461	1.08	1.70	0.533	1.00	1.97	0.618
Motor Inductance	Lm	mH	0.19	0.30	0.095	0.37	0.57	0.18	0.54	0.84	0.26	0.72	1.1	0.35	0.76	1.5	0.46

*Rth assumes a housed motor mounted to a 3.25" x 3.25" x 0.25" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 00710 Series



RBE(H) Motor Series

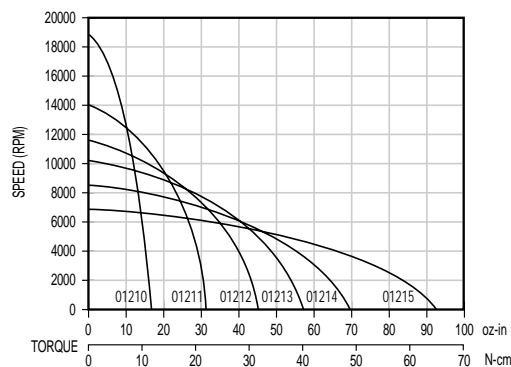
RBE(H) 01210 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	01210	01211	01212	01213	01214	01215
Max Cont. Output Power at 25°C amb.	HP Rated	HP	0.142	0.204	0.243	0.272	0.290	0.310
	P Rated	Watts	106	152	181	203	216	231
Speed at Rated Power	N Rated	RPM	13800	9680	8100	7152	6230	5100
Max Mechanical Speed	N Max	RPM	18000	18000	18000	18000	18000	18000
Continuous Stall Torque at 25°C amb.	Tc	oz-in	16.4	31.6	43.5	54.8	66.2	90.4
		N-m	0.115	0.223	0.307	0.387	0.467	0.639
Peak Torque	Tp	oz-in	48.4	114	168	222	282	435
		N-m	0.342	0.806	1.18	1.57	1.99	3.07
Max Torque for Linear KT	Tsl	oz-in	48.4	114	168	222	282	435
		N-m	0.342	0.806	1.18	1.57	1.99	3.07
Motor Constant	Tm	oz-in/ \sqrt{W}	4.00	7.12	9.50	11.7	13.9	18.4
		N-m/ \sqrt{W}	0.028	0.050	0.067	0.083	0.098	0.130
Thermal Resistance*	Rth	°C/Watt	4.25	3.86	3.68	3.55	3.44	3.27
Viscous Damping	Fi	oz-in/RPM	1.30E-04	2.96E-04	4.46E-04	5.97E-04	7.78E-04	1.20E-03
		N-m/RPM	9.18E-07	2.09E-06	3.15E-06	4.22E-06	5.49E-06	8.48E-06
Max Static Friction	Tf	oz-in	1.70	2.13	2.53	2.92	3.40	4.50
		N-m	0.0120	0.015	0.018	0.021	0.024	0.032
Max Cogging Torque Peak to Peak	Tcog	oz-in	0.41	0.66	0.88	1.10	1.37	2.00
		N-m	0.0029	0.0046	0.0062	0.0078	0.0097	0.014
Frameless Motor	Inertia Jmf	oz-in-sec ²	7.30E-04	1.20E-03	1.70E-03	2.10E-03	2.70E-03	4.00E-03
		Kg-m ²	5.15E-06	8.47E-06	1.20E-05	1.48E-05	1.91E-05	2.82E-05
Housed Motor	Weight Wtf	oz	4.5	7.2	9.6	12.1	15.1	22.0
		Kg	1.26E-01	2.03E-01	2.74E-01	3.44E-01	4.28E-01	6.24E-01
Housed Motor	Inertia Jmh	oz-in-sec ²	7.60E-04	1.30E-03	1.80E-03	2.20E-03	2.80E-03	4.20E-03
		Kg-m ²	5.37E-06	9.18E-06	1.27E-05	1.55E-05	1.98E-05	2.97E-05
Housed Motor	Weight Wth	oz	11.3	14.2	16.8	19.5	22.6	30.0
		Kg	3.20E-01	4.02E-01	4.77E-01	5.52E-01	6.41E-01	8.50E-01
No. of poles	P		8	8	8	8	8	8

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	5.41	3.89	6.95	5.81	3.63	9.06	5.42	3.38	8.45	5.77	4.00	8.88	6.15	3.73	8.61	5.46	3.31	7.64
Current at Peak Torque	Ip	Amps	15.0	10.6	18.9	20.0	10.6	26.8	20.0	10.6	26.8	22.5	13.4	30.1	25.3	13.4	35.8	25.3	13.4	35.8
Torque Sensitivity	Kt	oz-in/Amp	3.34	4.64	2.60	5.80	9.30	3.72	8.49	13.6	5.45	10.0	14.5	6.50	11.3	18.7	8.08	17.4	28.7	12.4
		N-m/Amp	0.0236	0.0328	0.0183	0.0410	0.0657	0.0263	0.0600	0.0962	0.0385	0.0707	0.102	0.0459	0.0799	0.132	0.0571	0.123	0.203	0.0878
Back EMF constant	Kb	V/KRPM	2.47	3.43	1.92	4.29	6.88	2.75	6.28	10.1	4.03	7.41	10.7	4.81	8.36	13.8	5.97	12.9	21.2	9.19
Motor Resistance	Rm	Ohms	0.698	1.38	0.431	0.664	1.75	0.276	0.803	2.11	0.334	0.733	1.55	0.307	0.666	1.82	0.336	0.890	2.43	0.450
Motor Inductance	Lm	mH	0.280	0.54	0.17	0.32	0.83	0.13	0.44	1.1	0.18	0.47	0.97	0.20	0.48	1.3	0.25	0.71	1.9	0.36

*Rth assumes a housed motor mounted to a 4.0" x 3.75" x 0.25" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 01210 Series



RBE(H) Motor Series

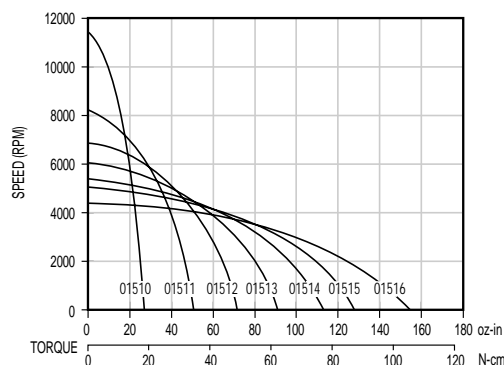
RBE(H) 01510 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	01510	01511	01512	01513	01514	01515	01516
Max Cont. Output Power at 25°C amb.	HP Rated	HP	0.127	0.176	0.210	0.240	0.264	0.284	0.307
	P Rated	Watts	95	131	157	179	197	212	229
Speed at Rated Power	N Rated	RPM	7450	5400	4550	4050	3570	3400	2970
Max Mechanical Speed	N Max	RPM	16500	16500	16500	16500	16500	16500	16500
Continuous Stall Torque at 25°C amb.	Tc	oz-in	27.4	54.3	71.9	91.3	114	127	154
		N-m	0.193	0.384	0.508	0.645	0.808	0.897	1.085
Peak Torque	Tp	oz-in	78.6	162	234	313	403	540	610
		N-m	0.555	1.15	1.66	2.21	2.85	3.81	4.31
Max Torque for Linear KT	Tsl	oz-in	78.6	162	234	313	403	540	610
		N-m	0.555	1.16	1.66	2.21	2.85	3.81	4.31
Motor Constant	Km	oz-in/ \sqrt{W}	6.38	11.6	14.8	18.2	22.1	24.1	28.6
		N-m/ \sqrt{W}	0.0451	0.0819	0.105	0.128	0.156	0.170	0.202
Thermal Resistance*	Rth	°C/Watt	4.10	3.55	3.30	3.13	2.95	2.85	2.72
Viscous Damping	Fi	oz-in/RPM	2.74E-04	1.05E-03	1.76E-03	2.47E-03	3.32E-03	3.88E-03	5.30E-03
		N-m/RPM	1.94E-06	7.43E-06	1.24E-05	1.74E-05	2.34E-05	2.74E-05	3.74E-05
Max Static Friction	Tf	oz-in	2.00	2.93	3.77	4.62	5.63	6.31	8.00
		N-m	0.0141	0.021	0.027	0.033	0.040	0.045	0.057
Max Cogging Torque Peak to Peak	Tcog	oz-in	0.950	1.22	1.47	1.71	2.01	2.21	2.70
		N-m	0.00671	0.00862	0.0104	0.0121	0.0142	0.0156	0.019
Frameless Motor	Inertia Jmf	oz-in-sec ²	2.10E-03	3.60E-03	4.90E-03	6.20E-03	7.70E-03	8.80E-03	1.14E-02
		Kg-m ²	1.48E-05	2.54E-05	3.46E-05	4.38E-05	5.44E-05	6.21E-05	8.05E-05
Weight	Wtf	oz	6.30	10.5	14.3	18.1	22.7	25.8	33.4
		Kg	1.79E-01	2.98E-01	4.06E-01	5.14E-01	6.44E-01	7.30E-01	9.47E-01
Housed Motor	Inertia Jmh	oz-in-sec ²	2.20E-03	3.70E-03	5.00E-03	6.30E-03	7.80E-03	8.90E-03	1.15E-02
		Kg-m ²	1.55E-05	2.61E-05	3.53E-05	4.45E-05	5.51E-05	6.28E-05	8.12E-05
Weight	Wth	oz	19.0	23.5	27.5	31.6	36.4	39.7	47.8
		Kg	5.39E-01	6.65E-01	7.80E-01	8.95E-01	1.03E+00	1.13E+00	1.38E+00
No. of poles	P		12	12	12	12	12	12	12

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	5.10	3.71	9.06	4.85	3.53	4.98	4.44	3.23	7.90	4.22	3.07	7.50	4.62	2.94	7.18	5.13	2.83	6.91	5.18	2.59	6.34
Current at Peak Torque	Ip	Amps	14.0	9.89	25.0	14.0	9.89	16.7	14.0	9.89	25.0	14.0	9.89	25.0	15.7	9.89	25.0	21.0	9.89	25.0	19.8	9.89	25.0
Torque Sensitivity	Kt	oz-in/Amp	6.78	7.92	3.24	11.6	16.2	11.5	17.0	23.4	9.56	22.7	31.2	12.8	26.0	40.9	16.7	26.0	47.2	19.3	31.2	62.3	25.5
		N-m/Amp	0.0407	0.0559	0.0229	0.0833	0.115	0.0812	0.120	0.165	0.0675	0.160	0.220	0.0901	0.184	0.289	0.118	0.184	0.333	0.136	0.220	0.440	0.180
Back EMF constant	Kb	V/KRPM	4.26	5.86	2.40	8.73	12.0	8.50	12.6	17.3	7.07	16.8	23.1	9.43	19.2	30.2	12.4	19.2	34.9	14.3	23.1	46.1	18.9
Motor Resistance	Rm	Ohms	0.814	1.58	0.256	1.04	2.02	0.988	1.33	2.59	0.418	1.55	3.03	0.489	1.38	3.45	0.557	1.16	3.86	0.623	1.19	4.75	0.769
Motor Inductance	Lm	mH	0.32	0.61	0.101	0.58	1.1	0.55	0.87	1.6	0.27	1.2	2.3	0.38	1.1	2.6	0.47	0.99	3.3	0.55	1.1	4.4	7.4

*Rth assumes a housed motor mounted to a 4" x 3.25" x 0.25" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 01510 Series



RBE(H) Motor Series

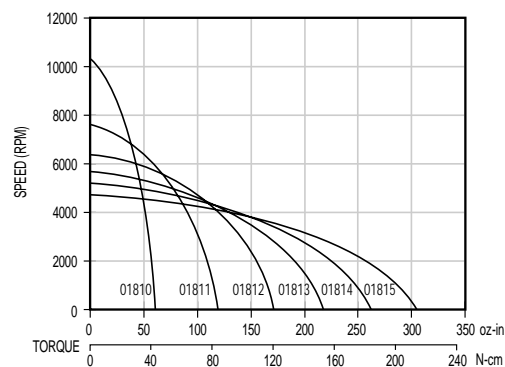
RBE(H) 01810 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	01810	01811	01812	01813	01814	01815
Max Cont. Output Power at 25°C amb.	HP Rated	HP	0.280	0.402	0.488	0.572	0.611	0.646
	P Rated	Watts	209	300	364	427	456	482
Speed at Rated Power	N Rated	RPM	7040	5250	4350	3850	3520	3230
Max Mechanical Speed	N Max	RPM	14000	14000	14000	14000	14000	14000
Continuous Stall Torque at 25°C amb.	Tc	oz-in	60.8	121	173	218	262	305
		N-m	0.429	0.856	1.22	1.54	1.85	2.16
Peak Torque	Tp	oz-in	216	430	654	871	1069	1297
		N-m	1.53	3.04	4.62	6.15	7.55	9.16
Max Torque for Linear KT	Tsl	oz-in	136	273	413	554	679	825
		N-m	0.96	1.93	2.92	3.91	4.80	5.83
Motor Constant	Km	oz-in/ \sqrt{W}	11.0	19.6	26.5	32.8	37.8	43.1
		N-m/ \sqrt{W}	0.077	0.139	0.187	0.231	0.267	0.304
Thermal Resistance*	Rth	°C/Watt	2.55	2.11	1.91	1.83	1.70	1.62
Viscous Damping	Fi	oz-in/RPM	9.00E-04	1.83E-03	2.71E-03	3.56E-03	4.39E-03	5.30E-03
		N-m/RPM	6.36E-06	1.29E-05	1.91E-05	2.52E-05	3.10E-05	3.74E-05
Max Static Friction	Tf	oz-in	3.10	4.49	5.81	7.09	8.33	9.70
		N-m	0.0219	0.032	0.041	0.050	0.059	0.069
Max Cogging Torque Peak to Peak	Tcog	oz-in	1.50	1.79	2.08	2.35	2.61	2.90
		N-m	0.0106	0.0127	0.0147	0.0166	0.0184	0.020
Frameless Motor Inertia	Jmf	oz-in-sec ²	5.10E-03	8.70E-03	1.22E-02	1.55E-02	1.88E-02	2.23E-02
		Kg-m ²	3.60E-05	6.14E-05	8.62E-05	1.09E-04	1.33E-04	1.57E-04
Housed Motor Weight	Wtf	oz	12.0	19.8	27.2	34.5	41.4	49.1
		Kg	3.40E-01	5.61E-01	7.72E-01	9.77E-01	1.17E+00	1.39E+00
Housed Motor Inertia	Jmh	oz-in-sec ²	5.30E-03	8.80E-03	1.24E-02	1.58E-02	1.91E-02	2.27E-02
		Kg-m ²	3.74E-05	6.21E-05	8.76E-05	1.12E-04	1.35E-04	1.60E-04
Housed Motor Weight	Wth	oz	30.0	38.2	46.0	53.6	60.9	69.0
		Kg	8.50E-01	1.08E+00	1.30E+00	1.52E+00	1.73E+00	1.96E+00
No. of poles	P		12	12	12	12	12	12

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	5.28	2.85	7.39	5.24	2.82	7.34	4.91	2.64	6.87	5.87	3.49	10.2	5.73	3.41	9.93	5.51	3.28	9.54
Current at Peak Torque	Ip	Amps	21.3	10.0	30.2	21.3	10.0	30.2	21.3	10.0	30.2	26.9	14.2	40.3	26.9	14.2	40.3	26.9	14.2	40.3
Torque Sensitivity	Kt	oz-in/Amp	12.1	22.5	8.64	24.0	44.5	17.1	36.4	67.5	26.0	38.4	64.5	22.2	47.1	79.2	27.2	57.2	96.1	33.0
		N-m/Amp	0.0855	0.159	0.0610	0.170	0.315	0.121	0.257	0.477	0.184	0.271	0.456	0.157	0.333	0.559	0.192	0.404	0.679	0.233
Back EMF constant	Kb	V/KRPM	8.95	16.6	6.39	17.8	32.9	12.7	26.9	50.0	19.2	28.4	47.7	16.4	34.9	58.6	20.1	42.3	71.1	24.4
Motor Resistance	Rm	Ohms	1.22	4.16	0.615	1.49	5.10	0.753	1.88	6.42	0.949	1.38	3.79	0.458	1.55	4.28	0.518	1.76	4.85	0.588
Motor Inductance	Lm	mH	0.90	3.1	0.46	1.8	6.2	0.92	2.5	8.5	1.3	1.9	5.5	0.65	2.2	6.2	0.73	2.7	7.6	0.90

*Rth assumes a housed motor mounted to a 7" x 7.5" x 0.75" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 01810 Series



RBE(H) Motor Series

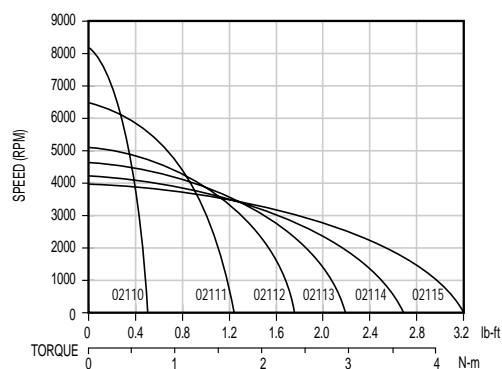
RBE(H) 02110 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	02110	02111	02112	02113	02114	02115
Max Cont. Output Power at 25°C amb.	HP Rated	HP	0.323	0.672	0.761	0.854	0.944	1.07
	P Rated	Watts	241	501	568	637	704	796
Speed at Rated Power	N Rated	RPM	5300	4242	3500	3050	2770	2650
Max Mechanical Speed	N Max	RPM	12000	12000	12000	12000	12000	12000
Continuous Stall Torque at 25°C amb.	Tc	lb-ft	0.703	1.23	1.77	2.20	2.69	3.20
		N-m	0.952	1.67	2.40	2.99	3.64	4.33
Peak Torque	Tp	lb-ft	1.87	3.37	5.10	6.80	8.27	10.2
		N-m	2.55	4.57	6.92	9.22	11.2	13.8
Max Torque for Linear KT	Tsl	lb-ft	1.26	2.56	3.75	5.00	6.37	7.49
		N-m	1.72	3.47	5.08	6.78	8.64	10.2
Motor Constant	Tm	lb-ft/√W	0.102	0.175	0.243	0.293	0.345	0.394
		N-m/√W	0.139	0.237	0.329	0.396	0.467	0.534
Thermal Resistance*	Rth	°C/Watt	1.70	1.60	1.50	1.40	1.30	1.20
Viscous Damping	Fi	lb-ft/RPM	1.04E-05	2.36E-05	3.59E-05	4.82E-05	6.06E-05	7.29E-05
		N-m/RPM	1.41E-05	3.19E-05	4.87E-05	6.54E-05	8.21E-05	9.88E-05
Max Static Friction	Tf	lb-ft	0.026	0.052	0.077	0.10	0.13	0.15
		N-m	0.035	0.071	0.104	0.136	0.171	0.203
Max Cogging Torque Peak to Peak	Tcog	lb-ft	0.016	0.039	0.061	0.082	0.104	0.125
		N-m	0.022	0.053	0.083	0.111	0.141	0.169
Frameless Motor	Inertia Jmf	lb-ft-sec ²	5.50E-05	9.70E-05	1.40E-04	1.74E-04	2.13E-04	2.66E-04
		Kg-m ²	7.46E-05	1.32E-04	1.90E-04	2.36E-04	2.89E-04	3.61E-04
Housed Motor	Weight Wtf	lb	1.29	2.21	3.07	3.94	4.80	5.66
		Kg	0.585	1.00	1.41	1.77	2.18	2.59
Housed Motor	Inertia Jmh	lb-ft-sec ²	5.60E-05	1.10E-04	1.41E-04	1.75E-03	2.14E-04	2.62E-04
		Kg-m ²	7.59E-05	1.49E-04	1.91E-04	2.37E-03	2.90E-04	3.55E-04
Housed Motor	Weight Wth	lb	2.00	3.22	4.37	5.51	6.66	7.80
		Kg	0.907	1.46	2.00	2.50	3.04	3.54
No. of poles	P		12	12	12	12	12	12

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	6.34	2.53	10.6	5.71	2.27	9.74	5.42	2.17	9.03	5.07	2.03	8.46	8.13	3.95	3.05	8.67	3.98	1.77
Current at Peak Torque	Ip	Amps	25.3	10.0	40.2	25.3	10.0	40.2	25.3	10.0	40.2	25.3	10.0	40.3	40.3	20.1	15.9	45.3	20.1	10.6
Torque Sensitivity	Kt	lb-ft/Amp	0.115	0.287	0.0690	0.225	0.566	0.132	0.341	0.851	0.204	0.454	1.14	0.272	0.347	0.714	0.925	0.386	0.840	1.89
		N-m/Amp	0.156	0.390	0.0935	0.305	0.768	0.179	0.462	1.15	0.277	0.62	1.54	0.37	0.471	0.968	1.24	0.523	1.14	2.56
Back EMF constant	Kb	V/KRPM	16.3	40.8	9.80	31.9	80.4	18.7	48.4	121	29.1	64.5	161	38.6	49.2	101	130	54.8	119	268
Motor Resistance	Rm	Ohms	1.27	8.05	0.479	1.66	10.6	0.611	1.97	12.5	0.743	2.40	15.2	0.904	1.01	4.17	6.83	0.961	4.74	23.2
Motor Inductance	Lm	mH	1.7	10	0.60	3.2	20	1.1	5.1	32	1.8	6.2	39	2.2	2.8	12	20	3.0	14	72

*Rth assumes a housed motor mounted to a 7" x 7.5" x 0.75" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 02110 Series



RBE(H) Motor Series

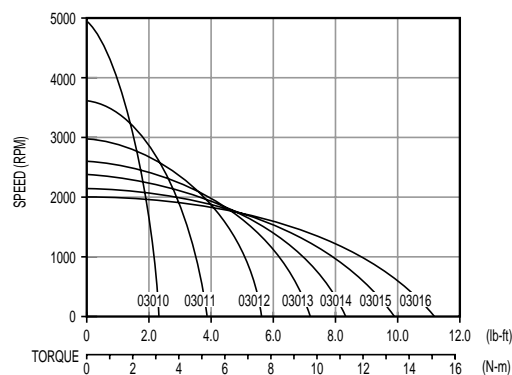
RBE(H) 03010 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	03010	03011	03012	03013	03014	03015	03016
Max Cont. Output Power at 25°C amb.	HP Rated	HP	0.863	1.12	1.32	1.48	1.49	1.60	1.61
	P Rated	Watts	644	832	981	1107	1110	1190	1200
Speed at Rated Power	N Rated	RPM	3000	2230	1830	1630	1460	1320	1200
Max Mechanical Speed	N Max	RPM	8300	8300	8300	8300	8300	8300	8300
Continuous Stall Torque at 25°C amb.	Tc	lb-ft	2.21	3.73	5.75	7.04	8.22	9.83	11.3
		N-m	3.00	5.06	7.81	9.55	11.1	13.3	15.3
Peak Torque	Tp	lb-ft	15.2	23.7	43.0	56.3	68.8	85.1	101
		N-m	20.6	32.2	58.3	76.3	93.2	115	137
Max Torque for Linear KT	Tsl	lb-ft	6.26	11.7	18.9	24.7	30.1	37.3	41.8
		N-m	8.49	15.9	25.6	33.5	40.9	50.6	56.7
Motor Constant	Km	lb-ft/ \sqrt{W}	0.308	0.482	0.707	0.846	0.958	1.13	1.27
		N-m/ \sqrt{W}	0.418	0.653	0.958	1.15	1.30	1.53	1.73
Thermal Resistance*	Rth	°C/Watt	1.55	1.32	1.20	1.14	1.07	1.03	1.00
Viscous Damping	Fi	lb-ft/RPM	5.06E-05	8.44E-05	1.21E-04	1.55E-04	1.86E-04	2.26E-04	2.58E-04
		N-m/RPM	6.86E-05	1.14E-04	1.64E-04	2.10E-04	2.52E-04	3.06E-04	3.50E-04
Max Static Friction	Tf	lb-ft	0.0938	0.171	0.255	0.332	0.401	0.493	0.566
		N-m	0.127	0.231	0.345	0.450	0.544	0.668	0.767
Max Cogging Torque Peak to Peak	Tcog	lb-ft	0.0521	0.103	0.159	0.210	0.257	0.317	0.366
		N-m	0.0706	0.140	0.216	0.285	0.348	0.430	0.496
Frameless Motor	Inertia Jmf	lb-ft-sec ²	2.03E-04	3.54E-04	5.16E-04	6.67E-04	8.02E-04	9.84E-04	1.13E-03
		Kg-m ²	2.75E-04	4.80E-04	7.00E-04	9.04E-04	1.09E-03	1.33E-03	1.53E-03
Weight	Wtf	lb	3.25	5.36	7.68	9.79	11.7	14.2	16.2
		Kg	1.41	2.43	3.48	4.44	5.31	6.45	7.37
Housed Motor	Inertia Jmh	lb-ft-sec ²	3.33E-04	5.78E-04	8.44E-04	1.09E-03	1.31E-03	1.61E-03	1.84E-03
		Kg-m ²	4.52E-04	7.84E-04	1.14E-03	1.48E-03	1.78E-03	2.18E-03	2.49E-03
Weight	Wth	lb	7.56	10.1	13.0	15.5	17.9	20.9	23.4
		Kg	3.43	4.60	5.90	7.05	8.10	9.50	10.6
No. of poles	P		12	12	12	12	12	12	12

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	7.58	5.87	3.60	7.30	5.62	3.49	6.98	5.38	3.34	6.54	5.03	3.12	6.26	4.82	2.99	6.05	4.66	2.89
Current at Peak Torque	Ip	Amps	60.5	40.3	24.3	53.9	35.9	22.6	60.5	40.3	25.4	60.5	40.3	25.4	60.5	40.3	25.4	60.5	40.3	25.3
Torque Sensitivity	Kt	lb-ft/Amp	0.304	0.392	0.640	0.535	0.695	1.12	0.862	1.12	1.80	1.13	1.47	2.37	1.38	1.79	2.88	1.72	2.23	3.60
		N-m/Amp	0.412	0.531	0.868	0.725	0.942	1.52	1.17	1.52	2.45	1.53	1.99	3.21	1.87	2.43	3.92	2.33	3.03	4.88
Back EMF constant	Kb	V/KRPM	43.1	55.6	90.9	75.9	99	159	122	159	256	160	208	336	196	255	410	244	317	511
Motor Resistance	Rm	Ohms	0.974	1.63	4.23	1.23	2.09	5.33	1.49	2.51	6.43	1.78	3.00	7.70	2.07	3.48	8.95	2.30	3.87	9.94
Motor Inductance	Lm	mH	1.9	3.2	8.4	3.3	5.6	14	4.8	8.1	21	6.2	10	27	7.6	13	33	8.9	15	39

*Rth assumes a housed motor mounted to a 7.5" x 7" x 0.375" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 03010 Series



RBE(H) Motor Series

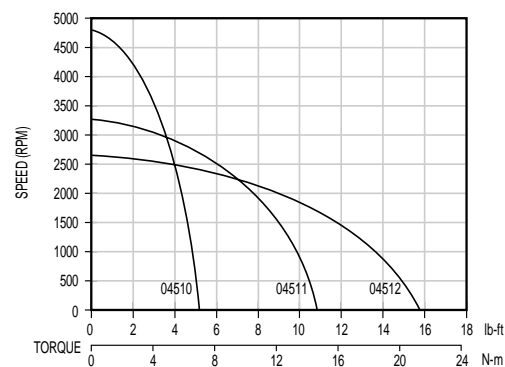
RBE(H) 04510 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	04510	04511	04512
Max Cont. Output Power	HP Rated	HP	2.10	3.03	3.54
at 25°C amb.	P Rated	Watts	1568	2262	2640
Speed at Rated Power	N Rated	RPM	3240	2210	2100
Max Mechanical Speed	N Max	RPM	6000	6000	6000
Continuous Stall Torque	Tc	lb-ft	4.83	10.6	15.9
at 25°C amb.		N-m	6.55	14.4	21.5
Peak Torque	Tp	lb-ft	20.5	46.8	72.5
		N-m	27.7	63.5	98.3
Max Torque	Tsl	oz-in	9.83	24.9	41.1
for Linear KT		N-m	0.069	0.176	0.290
Motor Constant	Km	lb-ft/ \sqrt{W}	0.489	0.99	1.42
		N-m/ \sqrt{W}	0.662	1.34	1.93
Thermal Resistance*	Rth	°C/Watt	0.83	0.71	0.65
Viscous Damping	Fi	lb-ft/RPM	1.60E-04	2.90E-04	4.20E-04
		N-m/RPM	2.17E-04	3.93E-04	5.69E-04
Max Static Friction	Tf	lb-ft	0.16	0.35	0.53
		N-m	0.217	0.468	0.719
Max Cogging Torque	Tcog	lb-ft	0.07	0.10	0.13
Peak to Peak		N-m	0.096	0.133	0.169
Inertia	Jmf	lb-ft-sec ²	1.20E-03	2.30E-03	3.40E-03
Frameless Motor		Kg-m ²	1.63E-03	3.12E-03	4.61E-03
Weight	Wtf	lb	6.0	10.5	15.0
		Kg	2.72	4.76	6.80
Inertia	Jmh	lb-ft-sec ²	1.60E-03	2.35E-03	3.40E-03
Housed Motor		Kg-m ²	2.17E-03	3.19E-03	4.61E-03
Weight	Wth	lb	14.0	18.5	23.0
		Kg	6.35	8.39	10.4
No. of poles	P		12	12	12

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	11.7	6.20	17.1	11.3	10.3	16.4	19.5	15.9	10.9
Current at Peak Torque	Ip	Amps	80.8	48.0	114	80.8	72.0	114	144	114	80.8
Torque Sensitivity	Kt	lb-ft/Amp	0.425	0.805	0.292	0.973	1.60	0.669	0.844	1.03	1.50
		N-m/Amp	0.576	1.09	0.396	1.32	1.44	0.907	1.14	1.40	2.03
Back EMF constant	Kb	V/KRPM	60.4	114	41.5	138	151	95.0	120	146	213
Motor Resistance	Rm	Ohms	0.757	2.78	0.366	0.964	1.18	0.465	0.352	0.542	1.12
Motor Inductance	Lm	mH	3.6	13	1.7	4.6	5.4	2.2	2.2	3.3	7.0

*Rth assumes a housed motor mounted to a 13" x 12.5" x 0.5" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 04510 Series



RBE(H) Motor Series

RBE(H) 06210 MOTOR SERIES PERFORMANCE DATA

Motor Parameters	Symbols	Units	06210	06211	06212
Max Cont. Output Power at 25°C amb.	HP Rated	HP	3.06	4.31	4.95
	P Rated	Watts	2286	3212	3690
Speed at Rated Power	N Rated	RPM	2650	1750	1390
Max Mechanical Speed	N Max	RPM	4500	4500	4500
Continuous Stall Torque at 25°C amb.	Tc	lb-ft	8.67	19.0	28.4
		N-m	11.8	25.8	38.4
Peak Torque	Tp	lb-ft	41.9	94.6	145
		N-m	56.8	128	197
Max Torque for Linear KT	Tsl	lb-ft	20.2	45.5	97
		N-m	27.4	61.7	131
Motor Constant	Km	lb-ft/ \sqrt{W}	0.80	1.64	2.37
		N-m/ \sqrt{W}	1.09	2.23	3.22
Thermal Resistance*	Rth	°C/Watt	0.70	0.62	0.58
Viscous Damping	Fi	lb-ft/RPM	1.50E-04	5.75E-04	1.00E-03
		N-m/RPM	2.03E-04	7.80E-04	1.36E-03
Max Static Friction	Tf	lb-ft	0.24	0.47	0.70
		N-m	0.325	0.637	0.949
Max Cogging Torque Peak to Peak	Tcog	lb-ft	0.13	0.18	0.23
		N-m	0.176	0.244	0.312
Frameless Motor	Inertia	lb-ft-sec ²	3.60E-03	7.30E-03	1.11E-02
		Kg-m ²	4.88E-03	9.90E-03	1.50E-02
Weight	Wtf	lb	10.8	18.2	25.6
		Kg	4.90	8.26	11.6
Housed Motor	Inertia	lb-ft-sec ²	3.70E-03	1.15E-02	1.20E-02
		Kg-m ²	5.02E-03	1.56E-02	1.63E-02
Weight	Wth	lb	22.3	29.8	37.3
		Kg	10.1	13.5	16.9
No. of poles	P		12	12	12

Winding Constants	Symbols	Units	A	B	C	A	B	C	A	B	C
Current at Cont. Torque	Ic	Amps	17.5	8.0	12.4	16.9	7.8	12.0	18.5	29.6	11.7
Current at Peak Torque	Ip	Amps	162	85.7	114	162	85.7	114	182	289	114
Torque Sensitivity	Kt	lb-ft/Amp	0.510	1.11	0.718	1.15	2.51	1.62	1.57	0.981	2.49
		N-m/Amp	0.691	1.51	0.973	1.56	3.40	2.19	2.13	1.33	3.37
Back EMF constant	Kb	V/KRPM	72.4	158	102	163	356	230	223	139	353
Motor Resistance	Rm	Ohms	0.405	1.93	0.804	0.489	2.33	0.970	0.438	0.172	1.10
Motor Inductance	Lm	mH	2.1	9.9	4.1	3.6	17	7.2	4.0	1.6	10

*Rth assumes a housed motor mounted to a 13" x 12.5" x 0.5" aluminum heatsink or equivalent

Continuous Duty Capability for 130°C Rise — RBE - 06210 Series

