



Brush Commutated DC Servo Motors

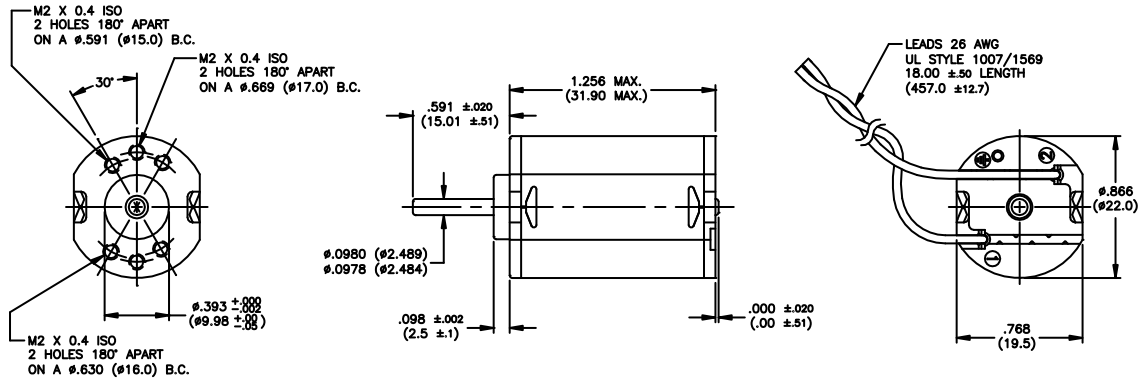
AMETEK brush commutated DC motors are instrument grade and are IP42 rated construction including a wide range of rated torque and speeds in a compact design. These motors offer smooth, quiet operation and long life. Armatures are skewed to minimize magnetic cogging, even at low speeds, and some windings are resin impregnated for greater reliability in incremental motion applications. Different optical incremental encoder resolutions are available on all models for reliable position, velocity, and direction feedback (most encoders feature rugged metal housings).

Extensive options are available including: different encoder resolutions, custom cables, optional brush materials, EMI/RFI suppression networks, shaft modifications, shaftmounted pulleys and gears, ball bearings, special windings, electromechanical brakes, and an integrated spur gearhead or planetary bolt on option is available too.

X - Available Option		C - Consult Factory for Availability																							
G Brush Commutated DC Servo Motors				Available Motor Options																					
				Encoders							Gears						Brakes		Tach						
Series	Diameter	Torque	RPM Max.	E22A	E30	E35A	E60	U	H	Q	G22A	G22B	G30A	G35A	G40A	G42A	G42B	G51A	G3000	B30A	B49A	B3	B5	14 V	
6210	0.866-in. (22mm)	0.8 - 2 oz-in. (0.005 - 0.014 Nm)	8,500	X							X	X													
8690	1.02-in. (26mm)	1.9 - 3.2 oz-in. (0.013 - 0.022 Nm)	9,000	X	X	X							X	X							X				
8220	1.18-in. (29.9mm)	1.6 - 2.6 oz-in. (0.011 - 0.018 Nm)	10,500	X	X	X							X	X							X				
8540	1.18-in. (30mm)	2.5 - 7.6 oz-in. (0.017 - 0.053 Nm)	7,500	X		X		X					X	X							X				
9230	1.58-in. (40.1mm)	2.4 - 11.5 oz-in. (0.016 - 0.081 Nm)	8,200	X	X	X							X		X	X	X				X	X			
14200	2.125-in. (54mm)	10 - 50 oz-in. (0.070 - 0.353 Nm)	4,000		X	X	X	X		C					X	X	X	X	C			C			
ID23000	2.25-in. (57mm)	30 - 57 oz-in. (0.211 - 0.402 Nm)	6,000					X	X	X									X		X			X	
ID33000	3.25-in. (83mm)	75 - 225 oz-in. (0.529 - 1.588 Nm)	6,000					X	X	X									X		X			X	



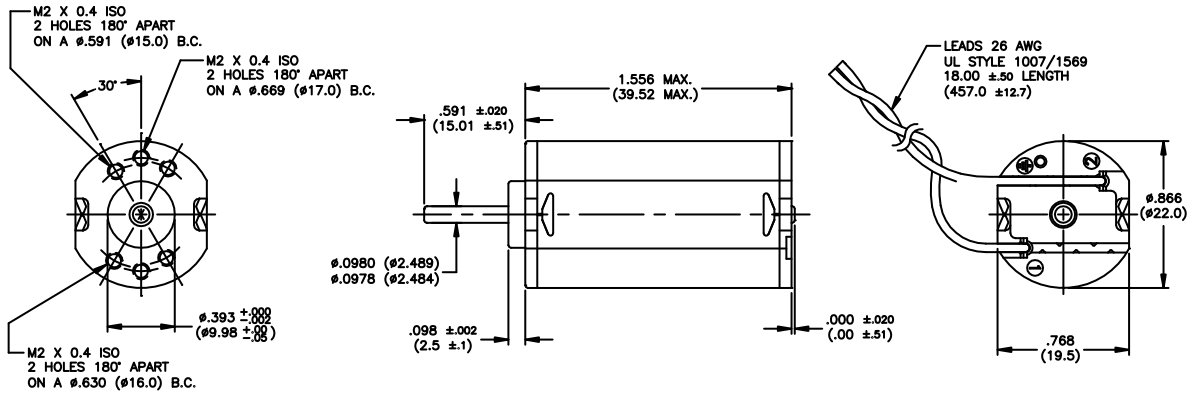
PITTMAN®



Specification	Units	Part/Model Number								
		6212 6.0 V	6212 7.58 V	6212 9.55 V	6212 12.0 V	6212 15.2 V	6212 19.1 V	6212 24.0 V	6212 30.3 V	
Supply Voltage	VDC	6.0	7.58	9.55	12.0	15.2	19.1	24.0	30.3	
Continuous Torque	oz-in	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	
	Nm	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	
Speed @ Cont. Torque	RPM	4650	4630	4590	4560	4620	4690	4660	4480	
Current @ Cont. Torque	Amps (A)	1.11	0.88	0.70	0.56	0.44	0.35	0.28	0.22	
Continuous Output Power	Watts (W)	2.8	2.7	2.7	2.7	2.7	2.8	2.8	2.7	
Motor Constant	oz-in/sqrt W	0.67	0.67	0.67	0.66	0.67	0.67	0.67	0.66	
	Nm/sqrt W	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Torque Constant	oz-in/A	0.93	1.17	1.47	1.85	2.34	2.95	3.70	4.68	
	Nm/A	0.007	0.008	0.01	0.013	0.017	0.021	0.026	0.033	
Voltage Constant	V/krpm	0.69	0.87	1.09	1.37	1.73	2.18	2.74	3.46	
	V/rad/s	0.007	0.008	0.01	0.013	0.017	0.021	0.026	0.033	
Terminal Resistance	Ohms	1.90	3.05	4.88	7.75	123	19.1	30.4	50.2	
Inductance	mH	1.01	1.62	2.57	4.05	6.49	10.3	16.2	26.0	
No-Load Current	Amps (A)	0.18	0.14	0.11	0.090	0.071	0.056	0.045	0.036	
No-Load Speed	RPM	8060	8100	8110	8100	8110	8100	8110	8070	
Peak Current	Amps (A)	3.16	2.49	1.96	1.55	1.24	1.00	0.79	0.60	
Peak Torque	oz-in	2.77	7.27	2.71	2.70	2.73	2.78	2.76	2.66	
	Nm	0.0196	0.0513	0.0191	0.0191	0.0193	0.0196	0.0195	0.0188	
Coulomb Friction Torque	oz-in	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	
	Nm	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Viscous Damping Factor	oz-in/krpm	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	
	Nm s/rad	4.83E-7	4.83E-7	4.83E-7	4.83E-7	4.83E-7	4.83E-7	4.83E-7	4.83E-7	
Electrical Time Constant	ms	0.53	0.53	0.53	0.52	0.53	0.54	0.53	0.52	
Mechanical Time Constant	ms	23	23	23	23	23	23	23	24	
Thermal Time Constant	min	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	
Thermal Resistance	Celsius/W	38	38	38	38	38	38	38	38	
Max. Winding Temperature	Celsius	130	130	130	130	130	130	130	130	
Rotor Inertia	oz-in-sec ²	7.30E-5	7.30E-5	7.30E-5	7.30E-5	7.30E-5	7.30E-5	7.30E-5	7.30E-5	
	kg-m ²	5.15E-7	5.15E-7	5.15E-7	5.15E-7	5.15E-7	5.15E-7	5.15E-7	5.15E-7	
Weight (Mass)	oz	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
	g	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Neodymium Magnets 5-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	Complementary Products <ul style="list-style-type: none"> Encoders Gearboxes
	Notes <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only.

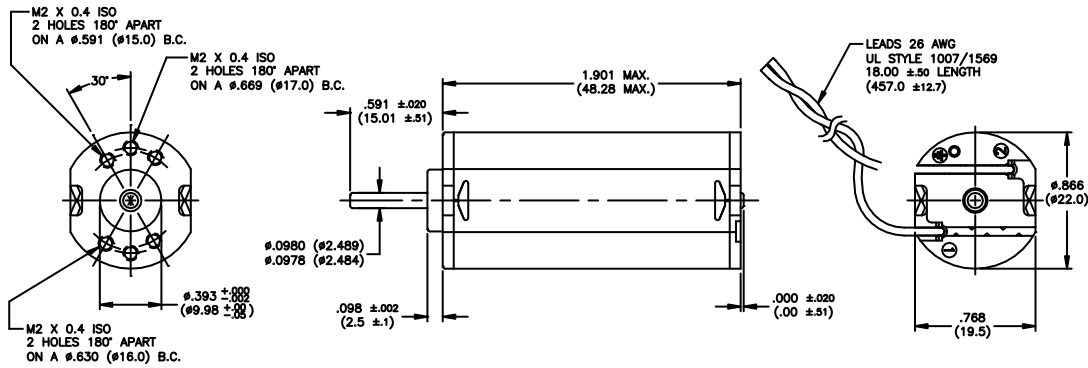
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		6213 6.0 V	6213 7.58 V	6213 9.55 V	6213 12.0 V	6213 15.2 V	6213 19.1 V	6213 24.0 V	6213 30.3 V
Supply Voltage	VDC	6.0	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Continuous Torque	oz-in	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	Nm	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092
Speed @ Cont. Torque	RPM	5200	5120	5160	5160	5130	5100	5130	5180
Current @ Cont. Torque	Amps (A)	1.60	1.25	0.99	0.79	0.62	0.50	0.40	0.31
Continuous Output Power	Watts (W)	5.1	5.0	5.0	5.0	5.0	5.0	5.0	5.1
Motor Constant	oz-in/sqrt W	0.98	0.98	1.00	0.99	0.99	0.98	0.98	1.00
	Nm/sqrt W	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Torque Constant	oz-in/A	1.00	1.28	1.62	2.02	2.57	3.23	4.04	5.13
	Nm/A	0.007	0.009	0.011	0.014	0.018	0.023	0.029	0.036
Voltage Constant	V/krpm	0.74	0.95	1.20	1.49	1.90	2.39	2.99	3.79
	V/rad/s	0.007	0.009	0.011	0.014	0.018	0.023	0.029	0.036
Terminal Resistance	Ohms	1.04	1.69	2.64	4.19	6.76	10.8	16.9	26.5
Inductance	mH	0.67	1.11	1.77	2.76	4.46	7.07	11.0	17.8
No-Load Current	Amps (A)	0.18	0.14	0.11	0.090	0.071	0.056	0.045	0.035
No-Load Speed	RPM	7700	7600	7570	7630	7590	7590	7620	7590
Peak Current	Amps (A)	5.77	4.49	3.62	2.86	2.25	1.77	1.42	1.14
Peak Torque	oz-in	5.59	5.56	5.68	5.60	5.60	5.54	5.56	5.68
	Nm	0.0395	0.0393	0.0401	0.0395	0.0395	0.0391	0.0393	0.0401
Coulomb Friction Torque	oz-in	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
	Nm	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
Viscous Damping Factor	oz-in/krpm	0.0089	0.0089	0.0089	0.0089	0.0089	0.0089	0.0089	0.0089
	Nm s/rad	5.98E-7	5.98E-7	5.98E-7	5.98E-7	5.98E-7	5.98E-7	5.98E-7	5.98E-7
Electrical Time Constant	ms	0.64	0.66	0.67	0.66	0.66	0.66	0.65	0.67
Mechanical Time Constant	ms	14	14	14	14	14	14	14	14
Thermal Time Constant	min	11	11	11	11	11	11	11	11
Thermal Resistance	Celsius/W	29	29	29	29	29	29	29	29
Max. Winding Temperature	Celsius	130	130	130	130	130	130	130	130
Rotor Inertia	oz-in-sec ²	9.60E-5	9.60E-5	9.60E-5	9.60E-5	9.60E-5	9.60E-5	9.60E-5	9.60E-5
	kg-m ²	6.78E-7	6.78E-7	6.78E-7	6.78E-7	6.78E-7	6.78E-7	6.78E-7	6.78E-7
Weight (Mass)	oz	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	g	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Neodymium Magnets 5-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

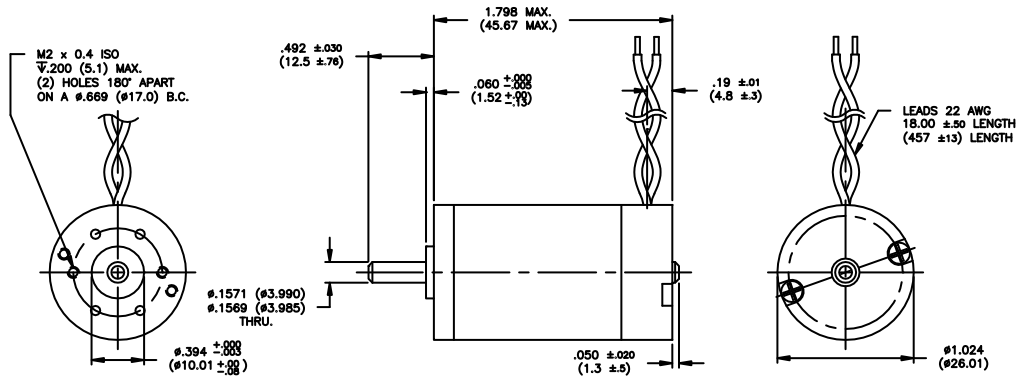
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		6214 6.0 V	6214 7.58 V	6214 9.55 V	6214 12.0 V	6214 15.2 V	6214 19.1 V	6214 24.0 V	6214 30.3 V
Supply Voltage	VDC	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Continuous Torque	oz-in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Nm	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141
Speed @ Cont. Torque	RPM	6450	6570	6490	6270	6370	6370	6427	6280
Current @ Cont. Torque	Amps (A)	2.55	2.08	1.61	1.26	1.00	0.80	0.63	0.50
Continuous Output Power	Watts (W)	9.5	9.70	9.6	9.3	9.4	9.4	9.3	9.3
Motor Constant	oz-in/sqrt W	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	Nm/sqrt W	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Torque Constant	oz-in/A	0.93	1.13	1.44	1.86	2.34	2.93	3.72	4.68
	Nm/A	0.007	0.008	0.01	0.013	0.017	0.021	0.026	0.033
Voltage Constant	V/krpm	0.69	0.84	1.06	1.38	1.73	2.17	2.75	3.46
	V/rad/s	0.007	0.008	0.01	0.013	0.017	0.021	0.026	0.033
Terminal Resistance	Ohms	0.50	0.81	1.32	2.15	3.36	5.33	8.60	13.7
Inductance	mH	0.29	0.44	0.71	1.18	1.87	2.92	4.72	7.48
No-Load Current	Amps (A)	0.24	0.18	0.11	0.10	0.083	0.066	0.052	0.041
No-Load Speed	RPM	8380	8720	8650	8390	8450	8480	8390	8420
Peak Current	Amps (A)	12.00	9.36	7.23	5.58	4.52	3.58	2.79	2.21
Peak Torque	oz-in	10.9	10.4	10.3	10.2	10.4	10.3	10.2	10.2
	Nm	0.077	0.0734	0.0727	0.072	0.0734	0.0727	0.072	0.072
Coulomb Friction Torque	oz-in	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	Nm	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Viscous Damping Factor	oz-in/krpm	0.0114	0.0114	0.0114	0.0114	0.0114	0.0114	0.0114	0.0114
	Nm s/rad	7.65E-7	7.65E-7	7.65E-7	7.65E-7	7.65E-7	7.65E-7	7.65E-7	7.65E-7
Electrical Time Constant	ms	0.58	0.54	0.54	0.55	0.56	0.55	0.55	0.55
Mechanical Time Constant	ms	9	10	10	10	10	10	10	10
Thermal Time Constant	min	13	13	13	13	13	13	13	13
Thermal Resistance	Celsius/W	22	22	22	22	22	22	22	22
Max. Winding Temperature	Celsius	130	130	130	130	130	130	130	130
Rotor Inertia	oz-in-sec ²	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011
	kg-m ²	7.77E-7	7.77E-7	7.77E-7	7.77E-7	7.77E-7	7.77E-7	7.77E-7	7.77E-7
Weight (Mass)	oz	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	g	76.5	76.5	76.5	76.5	76.5	76.5	76.5	76.5

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Neodymium Magnets 5-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes
<p>Notes</p> <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only. 	

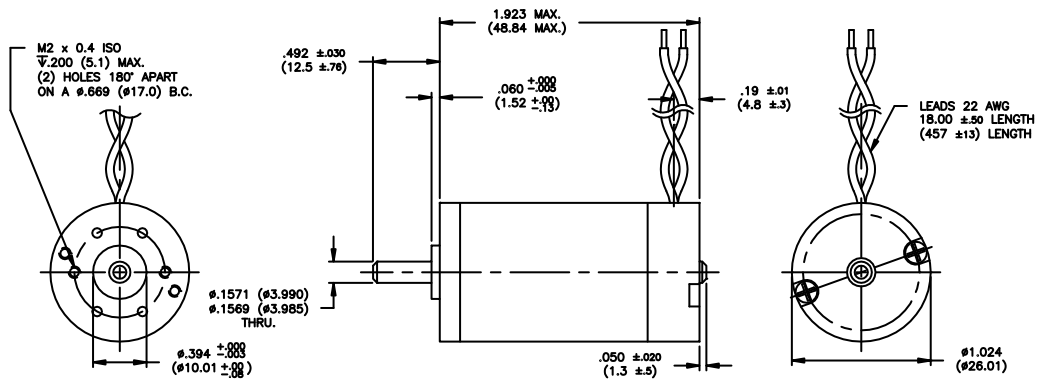
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		8691 6.0 V	8691 7.58 V	8691 9.55 V	8691 12.0 V	8691 15.2 V	8691 19.1 V	8691 24.0 V	8691 30.3 V
Supply Voltage	VDC	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Continuous Torque	oz-in	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
	Nm	0.0134	0.0134	0.0134	0.0134	0.0134	0.0134	0.0134	0.0134
Speed @ Cont. Torque	RPM	4470	4620	4700	4780	4920	4880	4890	4890
Current @ Cont. Torque	Amps (A)	2.32	1.83	1.45	1.16	0.93	0.73	0.57	0.46
Continuous Output Power	Watts (W)	6.4	6.6	6.7	6.8	7.0	7.0	7.0	7.0
Motor Constant	oz-in/sqrt W	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3
	Nm/sqrt W	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.009
Torque Constant	oz-in/A	1.08	1.37	1.74	2.17	2.71	3.44	4.35	5.47
	Nm/A	0.008	0.01	0.012	0.015	0.019	0.024	0.031	0.039
Voltage Constant	V/krpm	0.80	1.01	1.29	1.60	2.00	2.54	3.22	4.04
	V/rad/s	0.008	0.01	0.012	0.015	0.019	0.024	0.031	0.039
Terminal Resistance	Ohms	0.80	1.22	1.87	2.89	4.47	7.08	11.3	17.8
Inductance	mH	0.41	0.66	1.05	1.63	2.55	4.10	6.55	10.2
No-Load Current	Amps (A)	0.39	0.31	0.25	0.20	0.16	0.13	0.095	0.080
No-Load Speed	RPM	6980	6970	6920	6980	7080	7000	6990	7000
Peak Current	Amps (A)	7.50	6.21	5.11	4.15	3.40	2.70	2.13	1.71
Peak Torque	oz-in	7.68	8.09	8.45	8.58	8.78	8.83	8.86	8.89
	Nm	0.0542	0.0571	0.0597	0.0606	0.062	0.0623	0.0626	0.0628
Coulomb Friction Torque	oz-in	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	Nm	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
Viscous Damping Factor	oz-in/krpm	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
	Nm s/rad	5.84E-7	5.84E-7	5.84E-7	5.84E-7	5.84E-7	5.84E-7	5.84E-7	5.84E-7
Electrical Time Constant	ms	0.51	0.54	0.56	0.56	0.57	0.58	0.58	0.58
Mechanical Time Constant	ms	14	13	12	12	12	12	12	12
Thermal Time Constant	min	13	13	13	13	13	13	13	13
Thermal Resistance	Celsius/W	19	19	19	19	19	19	19	19
Max. Winding Temperature	Celsius	130	130	130	130	130	130	130	130
Rotor Inertia	oz-in-sec ²	0.00014	0.00014	0.00014	0.00014	0.00014	0.00014	0.00014	0.00014
	kg-m ²	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7
Weight (Mass)	oz	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	g	76.5	76.5	76.5	76.5	76.5	76.5	76.5	76.5

<p>Performance (24 V Winding)</p>	<p>Standard Features</p> <ul style="list-style-type: none"> • Ball Bearings • 2-Pole Stator • Neodymium Magnets • 7-Slot Armature • Heavy-Gage Steel Housing • Silicon Steel Laminations • Copper-Graphite Brushes • Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> • Encoders • Gearboxes • Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

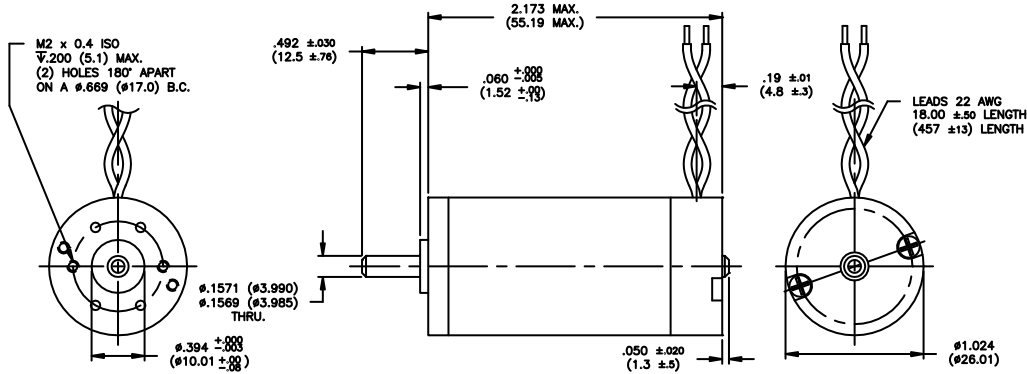
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number								
		8692 7.58 V	8692 9.55 V	8692 12.0 V	8692 15.2 V	8692 19.1 V	8692 24.0 V	8692 30.3 V	8692 38.2 V	
Supply Voltage	VDC	7.58	9.55	12.0	15.2	19.1	24.0	30.3	38.2	
Continuous Torque	oz-in	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	
	Nm	0.0169	0.0169	0.0169	0.0169	0.0169	0.0169	0.0169	0.0169	
Speed @ Cont. Torque	RPM	5140	5270	5300	5470	5510	5490	5470	5540	
Current @ Cont. Torque	Amps (A)	2.33	1.84	1.46	1.16	0.93	0.73	0.58	0.46	
Continuous Output Power	Watts (W)	9.3	9.5	9.6	9.9	9.9	9.9	9.9	10.0	
Motor Constant	oz-in/sqrt W	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
	Nm/sqrt W	0.01	0.011	0.011	0.011	0.011	0.011	0.011	0.011	
Torque Constant	oz-in/A	1.32	1.67	2.11	2.64	3.30	4.18	5.28	6.64	
	Nm/A	0.009	0.012	0.015	0.019	0.023	0.03	0.037	0.047	
Voltage Constant	V/krpm	0.98	1.23	1.56	1.95	2.44	3.09	3.90	4.91	
	V/rad/s	0.009	0.012	0.015	0.019	0.023	0.03	0.037	0.047	
Terminal Resistance	Ohms	0.86	1.30	2.02	3.10	4.84	7.67	12.2	19.2	
Inductance	mH	0.47	0.76	1.21	1.90	2.97	4.77	7.61	12.1	
No-Load Current	Amps (A)	0.34	0.27	0.21	0.17	0.13	0.10	0.087	0.063	
No-Load Speed	RPM	7320	7300	7270	7370	7410	7360	7340	7380	
Peak Current	Amps (A)	8.81	7.35	5.94	4.90	3.95	3.13	2.49	1.99	
Peak Torque	oz-in	11.2	11.8	12.1	12.5	12.6	12.6	12.7	12.8	
	Nm	0.0791	0.0833	0.0854	0.0883	0.089	0.089	0.0897	0.0904	
Coulomb Friction Torque	oz-in	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	
	Nm	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	
Viscous Damping Factor	oz-in/krpm	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	
	Nm s/rad	6.71E-7	6.71E-7	6.71E-7	6.71E-7	6.71E-7	6.71E-7	6.71E-7	6.71E-7	
Electrical Time Constant	ms	0.55	0.58	0.60	0.61	0.61	0.62	0.62	0.63	
Mechanical Time Constant	ms	12	11	11	11	11	11	11	10	
Thermal Time Constant	min	13	13	13	13	13	13	13	13	
Thermal Resistance	Celsius/W	18	18	18	18	18	18	18	18	
Max. Winding Temperature	Celsius	130	130	130	130	130	130	130	130	
Rotor Inertia	oz-in-sec ²	0.00017	0.00017	0.00017	0.00017	0.00017	0.00017	0.00017	0.00017	
	kg-m ²	1.2E-6	1.2E-6	1.2E-6	1.2E-6	1.2E-6	1.2E-6	1.2E-6	1.2E-6	
Weight (Mass)	oz	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	
	g	87.9	87.9	87.9	87.9	87.9	87.9	87.9	87.9	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> • Ball Bearings • 2-Pole Stator • Neodymium Magnets • 7-Slot Armature • Heavy-Gage Steel Housing • Silicon Steel Laminations • Copper-Graphite Brushes • Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> • Encoders • Gearboxes • Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

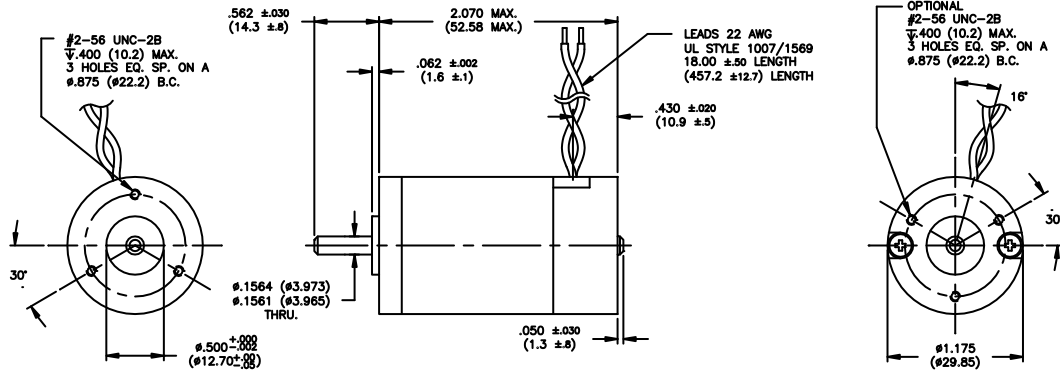
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		8693 9.55 V	8693 12.0 V	8693 15.2 V	8693 19.1 V	8693 24.0 V	8693 30.3 V	8693 38.2 V	8693 48.0 V
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0
Continuous Torque	oz-in	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Nm	0.0226	0.0226	0.0226	0.0226	0.0226	0.0226	0.0226	0.0226
Speed @ Cont. Torque	RPM	6870	7070	7170	7180	7260	7370	7350	7310
Current @ Cont. Torque	Amps (A)	2.83	2.25	1.78	1.41	1.13	0.90	0.71	0.56
Continuous Output Power	Watts (W)	16	17	17	17	17	17	17	17
Motor Constant	oz-in/sqrt W	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	Nm/sqrt W	0.011	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Torque Constant	oz-in/A	1.38	1.73	2.19	2.77	3.46	4.313	5.47	6.92
	Nm/A	0.01	0.012	0.015	0.02	0.024	0.03	0.039	0.049
Voltage Constant	V/krpm	1.02	1.28	1.62	2.05	2.56	3.19	4.04	5.12
	V/rad/s	0.01	0.012	0.015	0.02	0.024	0.03	0.039	0.049
Terminal Resistance	Ohms	0.73	1.08	1.67	2.59	4.02	6.28	9.96	15.8
Inductance	mH	0.39	0.61	0.98	1.56	2.44	3.81	6.12	9.77
No-Load Current	Amps (A)	0.35	0.28	0.22	0.18	0.14	0.11	0.090	0.070
No-Load Speed	RPM	8930	8960	8980	8910	8980	9080	9040	8980
Peak Current	Amps (A)	13.08	11.11	9.10	7.37	5.97	4.82	3.84	3.03
Peak Torque	oz-in	17.6	18.7	19.5	19.9	20.2	20.4	20.5	20.5
	Nm	0.1243	0.132	0.1377	0.1405	0.1426	0.144	0.1447	0.1447
Coulomb Friction Torque	oz-in	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	Nm	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
Viscous Damping Factor	oz-in/krpm	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
	Nm s/rad	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6
Electrical Time Constant	ms	0.53	0.56	0.59	0.60	0.61	0.61	0.61	0.62
Mechanical Time Constant	ms	12	12	11	11	11	11	11	11
Thermal Time Constant	min	12	12	12	12	12	12	12	12
Thermal Resistance	Celsius/W	16	16	16	16	16	16	16	16
Max. Winding Temperature	Celsius	130	130	130	130	130	130	130	130
Rotor Inertia	oz-in-sec ²	0.00023	0.00023	0.00023	0.00023	0.00023	0.00023	0.00023	0.00023
	kg-m ²	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6
Weight (Mass)	oz	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74
	g	106	106	106	106	106	106	106	106

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 7-Slot Armature Copper-Graphite Brushes 2-Pole Stator Heavy-Gage Steel Housing Diamond-Turned Commutator Ceramic Magnets Silicon Steel Laminations
	Complementary Products <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	Notes <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only.

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

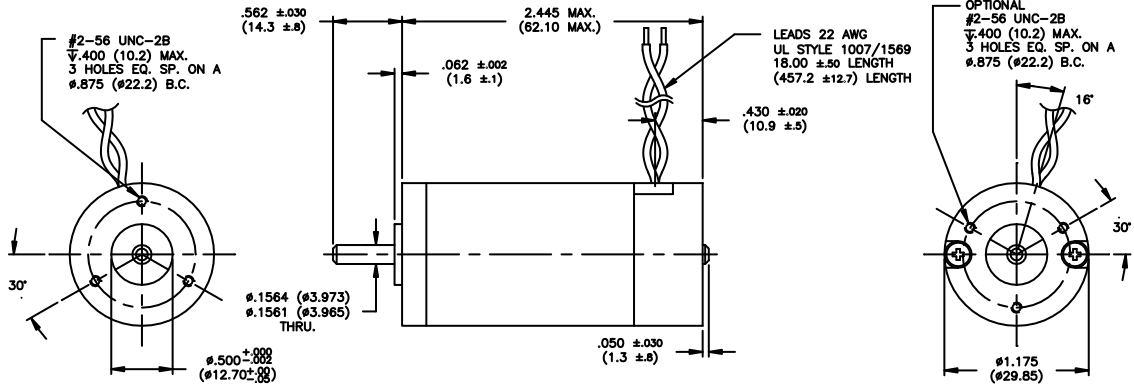


Specification	Units	Part/Model Number								
		8222 9.55 V	8222 12.0 V	8222 15.2 V	8222 19.1 V	8222 24.0 V	8222 30.3 V	8222 38.2 V	8222 48.0 V	
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0	
Continuous Torque	oz-in	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	
	Nm	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	
Speed @ Cont. Torque	RPM	4950	5040	5200	5170	5180	5180	5290	5210	
Current @ Cont. Torque	Amps (A)	1.47	1.18	0.94	0.74	0.58	0.47	0.36	0.29	
Continuous Output Power	Watts (W)	5.8	5.9	6.1	6.0	6.1	6.1	6.2	6.1	
Motor Constant	oz-in/sqrt W	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
	Nm/sqrt W	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	
Torque Constant	oz-in/A	1.555	1.94	2.42	3.07	3.88	4.88	6.18	7.76	
	Nm/A	0.011	0.014	0.017	0.022	0.027	0.034	0.044	0.055	
Voltage Constant	V/krpm	1.15	1.43	1.79	2.27	2.87	3.61	4.57	5.74	
	V/rad/s	0.011	0.014	0.017	0.022	0.027	0.034	0.044	0.055	
Terminal Resistance	Ohms	2.01	3.10	4.81	7.61	12.1	19.1	30.3	48.0	
Inductance	mH	1.00	1.57	2.45	3.93	6.27	9.92	15.9	25.1	
No-Load Current	Amps (A)	0.31	0.25	0.20	0.16	0.012	0.10	0.070	0.060	
No-Load Speed	RPM	7630	7670	7800	7720	7700	7710	7740	7710	
Peak Current	Amps (A)	75	3.87	3.16	2.51	1.98	1.59	1.26	1.00	
Peak Torque	oz-in	6.88	7.02	7.16	7.21	7.23	7.25	7.36	7.29	
	Nm	0.0486	0.0496	0.0505	0.0509	0.051	0.0512	0.052	0.0515	
Coulomb Friction Torque	oz-in	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	
	Nm	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	
Viscous Damping Factor	oz-in/krpm	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	
	Nm s/rad	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6	1.01E-6	
Electrical Time Constant	ms	0.50	0.51	0.51	0.52	0.52	0.52	0.52	0.52	
Mechanical Time Constant	ms	17	16	16	16	16	16	16	16	
Thermal Time Constant	min	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	
Thermal Resistance	Celsius/W	24	24	24	24	24	24	24	24	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.00014	0.00014	0.00014	0.00014	0.00014	0.00014	0.00014	0.00014	
	kg-m ²	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7	9.89E-7	
Weight (Mass)	oz	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	
	g	133	133	133	133	133	133	133	133	

<p>Performance (24 V Winding)</p>	<p>Standard Features</p> <ul style="list-style-type: none"> • Ball Bearings • 2-Pole Stator • Neodymium Magnets • 7-Slot Armature • Heavy-Gage Steel Housing • Silicon Steel Laminations • Copper-Graphite Brushes • Diamond-Turned Commutator <p>Complementary Products</p> <ul style="list-style-type: none"> • Encoders • Gearboxes • Brakes <p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>
--	--

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

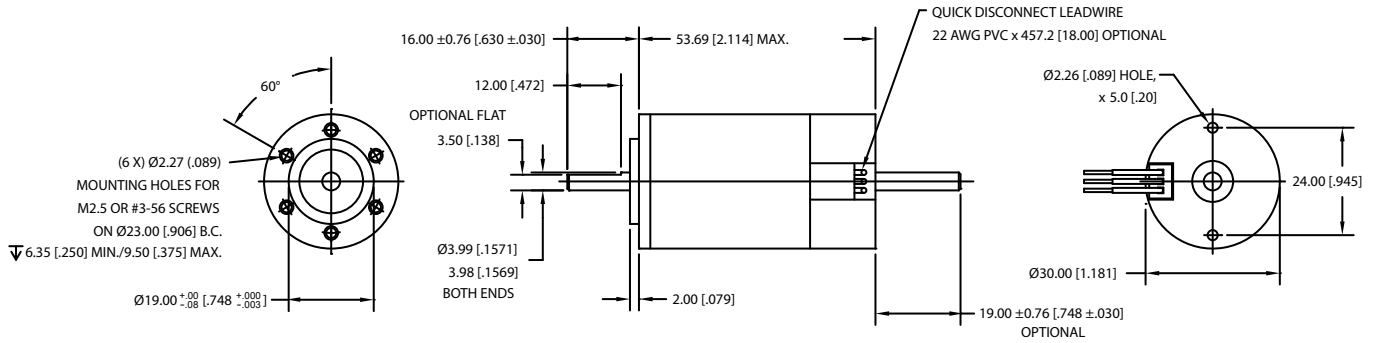
8540 Series Recommended for New Designs



Specification	Units	Part/Model Number								
		8224 9.55 V	8224 12.0 V	8224 15.2 V	8224 19.1 V	8224 24.0 V	8224 30.3 V	8224 38.2 V	8224 48.0 V	
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0	
Continuous Torque	oz-in	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	
	Nm	0.0184	0.0184	0.0184	0.0184	0.0184	0.0184	0.0184	0.0184	
Speed @ Cont. Torque	RPM	7490	7800	7920	7980	8070	8180	8150	8140	
Current @ Cont. Torque	Amps (A)	2.83	2.28	1.80	1.43	1.14	0.92	0.72	0.57	
Continuous Output Power	Watts (W)	14.4	15.0	15.2	15.3	15.5	15.7	15.7	15.7	
Motor Constant	oz-in/sqrt W	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	
	Nm/sqrt W	0.01	0.01	0.011	0.011	0.011	0.011	0.011	0.011	
Torque Constant	oz-in/A	1.24	1.54	1.96	2.47	3.09	3.86	4.89	6.18	
	Nm/A	0.009	0.011	0.014	0.017	0.022	0.027	0.035	0.044	
Voltage Constant	V/krpm	0.92	1.14	1.45	1.83	2.29	2.85	3.62	4.57	
	V/rad/s	0.009	0.011	0.014	0.017	0.022	0.027	0.035	0.044	
Terminal Resistance	Ohms	0.79	1.17	1.80	2.79	4.33	6.75	10.7	17.0	
Inductance	mH	0.37	0.58	0.94	1.50	2.34	3.65	5.86	9.35	
No-Load Current	Amps (A)	0.45	0.36	0.29	0.23	0.18	0.15	0.12	0.090	
No-Load Speed	RPM	9830	9960	9920	9900	9960	10060	10000	9970	
Peak Current	Amps (A)	12.1	10.3	8.44	6.85	5.54	4.49	3.56	2.82	
Peak Torque	oz-in	14.4	15.2	16.0	16.3	16.6	16.7	16.8	16.9	
	Nm	0.1017	0.1073	0.113	0.1151	0.1172	0.1179	0.1186	0.1193	
Coulomb Friction Torque	oz-in	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	
	Nm	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	
Viscous Damping Factor	oz-in/krpm	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	
	Nm s/rad	1.34E-6	1.34E-6	1.34E-6	1.34E-6	1.34E-6	1.34E-6	1.34E-6	1.34E-6	
Electrical Time Constant	ms	0.47	0.50	0.52	0.54	0.54	0.54	0.55	0.55	
Mechanical Time Constant	ms	17	16	15	15	15	15	15	14	
Thermal Time Constant	min	11	11	11	11	11	11	11	11	
Thermal Resistance	Celsius/W	21	21	21	21	21	21	21	21	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.00023	0.00023	0.00023	0.00023	0.00023	0.00023	0.00023	0.00023	
	kg-m ²	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6	1.62E-6	
Weight (Mass)	oz	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	
	g	164.7	164.7	164.7	164.7	164.7	164.7	164.7	164.7	

Performance (24 V Winding)	Standard Features
<p>Speed (rpm) vs Torque (oz-in) and Current (A) vs Torque (oz-in) graph. The speed curve (solid line) starts at 10000 rpm at 0 oz-in and drops to 0 rpm at 16 oz-in. The current curve (dashed line) starts at 0 A at 0 oz-in and rises to 6 A at 16 oz-in.</p>	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 7-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

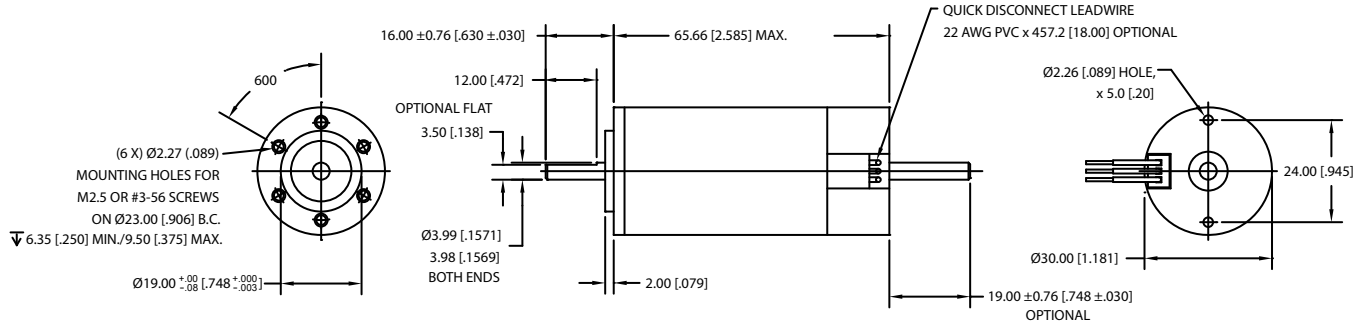
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		8541 9.55 V	8541 12.0 V	8541 15.2 V	8541 19.1 V	8541 24.0 V	8541 30.3 V	8541 38.2 V	8541 48.0 V
Supply Voltage	VDC	9.55	12.00	15.15	19.10	24.00	30.30	38.20	48.00
Continuous Torque	oz-in	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	Nm	0.0177	0.0177	0.0177	0.0177	0.0177	0.0177	0.0177	0.0177
Speed @ Cont. Torque	RPM	4187	4187	4161	4138	4205	4198	4153	4126
Current @ Cont. Torque	Amps (A)	2.02	1.59	1.26	1.00	0.79	0.63	0.50	0.40
Continuous Output Power	Watts (W)	7.7	7.7	7.7	7.7	7.8	7.8	7.7	7.6
Motor Constant	oz-in/sqrt W	1.4	1.5	1.4	1.4	1.5	1.4	1.4	1.4
	Nm/sqrt W	0.01	0.011	0.01	0.01	0.011	0.01	0.01	0.01
Torque Constant	oz-in/A	1.76	2.24	2.82	3.56	4.48	5.63	7.13	8.96
	Nm/A	0.012	0.016	0.02	0.025	0.032	0.04	0.05	0.063
Voltage Constant	V/krpm	1.30	1.66	2.08	2.63	3.31	4.16	5.27	6.62
	V/rad/s	0.012	0.016	0.02	0.025	0.032	0.04	0.05	0.063
Terminal Resistance	Ohms	1.50	2.37	3.81	6.08	9.5	15.1	24.3	38.6
Inductance	mH	1.13	1.83	2.94	4.63	7.3	11.6	18.5	29.2
No-Load Current	Amps (A)	0.46	0.36	0.29	0.23	0.18	0.14	0.11	0.09
No-Load Speed	RPM	6790	6728	6754	6722	6733	6754	6724	6717
Peak Current	Amps (A)	6.36	5.06	3.98	3.14	2.54	2.01	1.57	1.24
Peak Torque	oz-in	10.40	10.53	10.40	10.38	10.56	10.49	10.41	10.33
	Nm	0.0734	0.0743	0.0734	0.0733	0.0746	0.0741	0.0735	0.0729
Coulomb Friction Torque	oz-in	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Nm	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
Viscous Damping Factor	oz-in/krpm	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
	Nm s/rad	1.68E-6	1.68E-6	1.68E-6	1.68E-6	1.68E-6	1.68E-6	1.68E-6	1.68E-6
Electrical Time Constant	ms	.76	.77	.77	.76	.77	.77	0.76	0.76
Mechanical Time Constant	ms	19	19	19	19	19	19	19	19
Thermal Time Constant	min	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
Thermal Resistance	Celsius/W	17	17	17	17	17	17	17	17
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	.00029	.00029	.00029	.00029	.00029	.00029	.00029	.00029
	kg-m ²	2.05E-6	2.05E-6	2.05E-6	2.05E-6	2.05E-6	2.05E-6	2.05E-6	2.05E-6
Weight (Mass)	oz	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66
	g	132.1	132.1	132.1	132.1	132.1	132.1	132.1	132.1

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> • Heavy Duty Ball Bearings • 2-Pole Stator • Bonded Neo Magnets • 7-Slot Armature • Heavy-gauge Steel Housing • Silicon Steel Laminations • Graphite Brushes • Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> • Encoders • Gearboxes • Brakes
<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>	

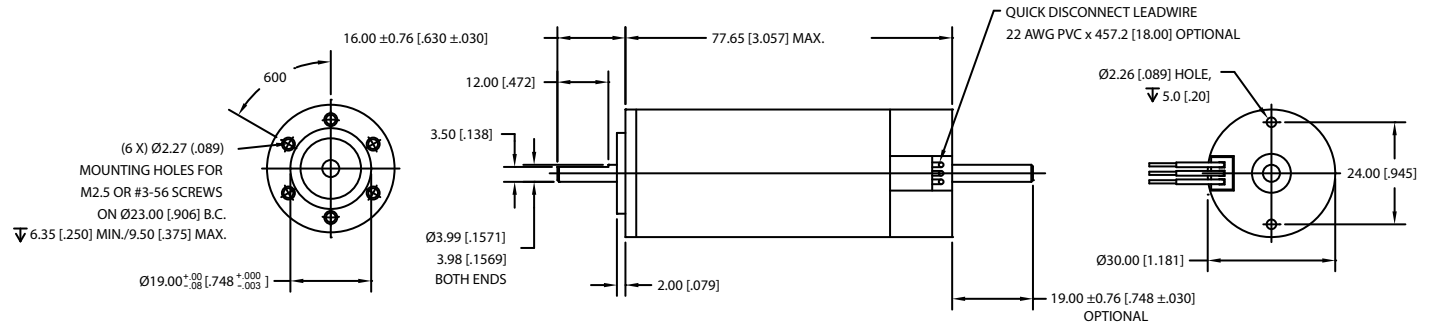
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		8542 9.55 V	8542 12.0 V	8542 15.2 V	8542 19.1 V	8542 24.0 V	8542 30.3 V	8542 38.2 V	8542 48.0 V
Supply Voltage	VDC	9.55	12.0	15.15	19.10	24.00	30.30	38.20	48.00
Continuous Torque	oz-in	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	Nm	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395
Speed @ Cont. Torque	RPM	3187	3917	4583	5155	5340	5623	5591	5635
Current @ Cont. Torque	Amps (A)	3.97	3.15	2.56	2.02	1.59	1.25	1.00	0.79
Continuous Output Power	Watts (W)	13.1	16.1	18.8	21.2	21.9	23.1	23.0	23.1
Motor Constant	oz-in/sqrt W	1.8	2.0	2.1	2.3	2.4	2.5	2.5	2.5
	Nm/sqrt W	0.013	0.014	0.015	0.016	0.017	0.018	0.018	0.018
Torque Constant	oz-in/A	1.76	2.23	2.77	3.51	4.46	5.55	7.02	8.83
	Nm/A	0.012	0.016	0.02	0.025	0.031	0.039	0.05	0.062
Voltage Constant	V/krpm	1.30	1.65	2.05	2.60	3.29	4.10	5.19	6.53
	V/rad/s	0.012	0.016	0.02	0.025	0.031	0.039	0.05	0.062
Terminal Resistance	Ohms	0.96	1.29	1.71	2.27	3.33	4.90	7.83	12.2
Inductance	mH	0.49	.79	1.22	1.96	3.16	5.0	8.0	12.7
No-Load Current	Amps (A)	0.50	0.42	0.36	0.28	0.22	0.16	0.13	0.10
No-Load Speed	RPM	6966	6958	7102	7110	7058	7196	7168	7162
Peak Current	Amps (A)	9.9	9.3	8.8	8.4	7.20	6.18	4.88	3.94
Peak Torque	oz-in	16.6	19.8	23.5	28.6	31.1	33.4	33.3	33.9
	Nm	0.1172	0.1398	0.1659	0.2019	0.2196	0.2358	0.2351	0.2393
Coulomb Friction Torque	oz-in	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	Nm	0.0042	0.0042	0.0042	0.0042	0.0042	0.0042	0.0042	0.0042
Viscous Damping Factor	oz-in/krpm	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036
	Nm s/rad	2.42E-6	2.42E-6	2.42E-6	2.42E-6	2.42E-6	2.42E-6	2.42E-6	2.42E-6
Electrical Time Constant	ms	0.51	0.61	0.71	0.86	0.95	1.02	1.02	1.04
Mechanical Time Constant	ms	22	18	16	13	12	11	11	11
Thermal Time Constant	min	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2
Thermal Resistance	Celsius/W	14	14	14	14	14	14	14	14
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	.00052	.00052	.00052	.00052	.00052	.00052	.00052	.00052
	kg-m ²	3.67E-6	3.67E-6	3.67E-6	3.67E-6	3.67E-6	3.67E-6	3.67E-6	3.67E-6
Weight (Mass)	oz	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10
	g	172.9	172.9	172.9	172.9	172.9	172.9	172.9	172.9

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> • Heavy Duty Ball Bearings • 2-Pole Stator • Bonded Neo Magnets • 7-Slot Armature • Heavy-gauge Steel Housing • Silicon Steel Laminations • Graphite Brushes • Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> • Encoders • Gearboxes • Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

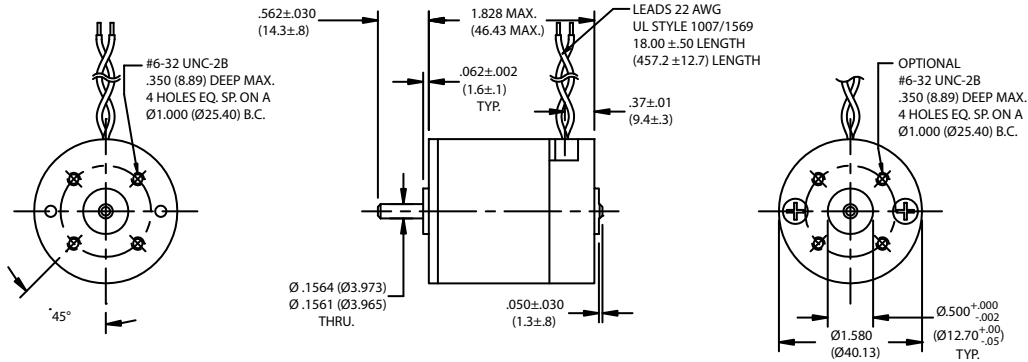
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		8543 9.55 V	8543 12.0 V	8543 15.2 V	8543 19.1 V	8543 24.0 V	8543 30.3 V	8543 38.2 V	8543 48.0 V
Supply Voltage	VDC	9.55	12.00	15.15	19.10	24.00	30.30	38.20	48.00
Continuous Torque	oz-in	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	Nm	0.0586	0.0586	0.0586	0.0586	0.0586	0.0586	0.0586	0.0586
Speed @ Cont. Torque	RPM	3129	3815	4363	4635	4515	4668	4855	4895
Current @ Cont. Torque	Amps (A)	4.96	3.91	3.04	2.44	1.92	1.51	1.20	0.95
Continuous Output Power	Watts (W)	19.2	23.4	26.8	28.5	27.7	28.7	29.8	30.1
Motor Constant	oz-in/sqrt W	2.5	2.7	3.1	3.2	3.2	3.3	3.5	3.6
	Nm/sqrt W	0.018	0.019	0.022	0.023	0.023	0.023	0.025	0.025
Torque Constant	oz-in/A	2.055	2.60	3.34	4.17	5.29	6.71	8.423	10.66
	Nm/A	0.015	0.018	0.024	0.029	0.037	0.047	0.059	0.075
Voltage Constant	V/krpm	1.52	1.92	2.47	3.08	3.91	4.96	6.23	7.88
	V/rad/s	0.015	0.018	0.024	0.029	0.037	0.047	0.059	0.075
Terminal Resistance	Ohms	0.70	0.90	1.17	1.66	2.74	4.04	5.87	8.98
Inductance	mH	0.42	0.64	1.04	1.62	2.57	4.10	6.55	10.48
No-Load Current	Amps (A)	0.51	0.40	0.31	0.25	0.20	0.15	0.12	0.10
No-Load Speed	RPM	6062	6055	5990	6062	6003	5984	6012	5981
Peak Current	Amps (A)	13.6	13.3	13.0	11.5	8.8	7.5	6.5	5.35
Peak Torque	oz-in	26.9	33.5	42.4	46.9	45.3	49.2	53.8	55.9
	Nm	0.1899	0.2365	0.2993	0.3311	0.3198	0.3474	0.3798	0.3947
Coulomb Friction Torque	oz-in	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	Nm	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049
Viscous Damping Factor	oz-in/krpm	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
	Nm s/rad	3.36E-6	3.36E-6	3.36E-6	3.36E-6	3.36E-6	3.36E-6	3.36E-6	3.36E-6
Electrical Time Constant	ms	0.60	.71	.89	0.97	0.94	1.01	1.12	1.17
Mechanical Time Constant	ms	18	15	12	11	11	10	9	9
Thermal Time Constant	min	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Thermal Resistance	Celsius/W	11	11	11	11	11	11	11	11
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	.00082	.00082	.00082	.00082	.00082	.00082	.00082	.00082
	kg-m ²	5.79E-6	5.79E-6	5.79E-6	5.79E-6	5.79E-6	5.79E-6	5.79E-6	5.79E-6
Weight (Mass)	oz	7.55	7.55	7.55	7.55	7.55	7.55	7.55	7.55
	g	214	214	214	214	214	214	214	214

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> • Heavy Duty Ball Bearings • 2-Pole Stator • Bonded Neo Magnets • 7-Slot Armature • Heavy-gauge Steel Housing • Silicon Steel Laminations • Graphite Brushes • Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> • Encoders • Gearboxes • Brakes
<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>	

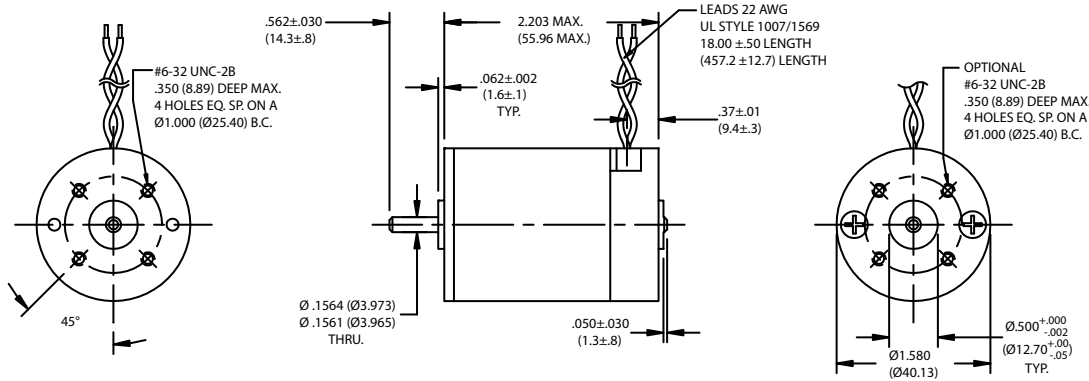
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number								
		9232 9.55 V	9232 12.0 V	9232 15.2 V	9232 19.1 V	9232 24.0 V	9232 30.3 V	9232 38.2 V	9232 48.0 V	
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0	
Continuous Torque	oz-in	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	
	Nm	0.0169	0.0169	0.0169	0.0169	0.0169	0.0169	0.0169	0.0169	
Speed @ Cont. Torque	RPM	5100	5150	5280	5280	5290	5330	5320	5320	
Current @ Cont. Torque	Amps (A)	1.95	1.53	1.21	0.96	0.77	0.61	0.48	0.38	
Continuous Output Power	Watts (W)	9	9	9	9	9	9	9	9	
Motor Constant	oz-in/sqrt W	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	
	Nm/sqrt W	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	
Torque Constant	oz-in/A	1.73	2.20	2.77	3.50	4.40	5.53	7.00	8.80	
	Nm/A	0.012	0.016	0.02	0.025	0.031	0.039	0.049	0.062	
Voltage Constant	V/krpm	1.28	1.63	2.05	2.59	3.25	4.09	5.18	6.51	
	V/rad/s	0.012	0.016	0.02	0.025	0.031	0.039	0.049	0.062	
Terminal Resistance	Ohms	1.25	1.93	2.99	4.70	7.38	11.6	18.5	29.2	
Inductance	mH	0.72	1.16	1.83	2.94	4.64	7.34	11.7	18.6	
No-Load Current	Amps (A)	0.41	0.32	0.25	0.20	0.16	0.13	0.10	0.080	
No-Load Speed	RPM	6920	6860	6910	6880	6870	6900	6880	6880	
Peak Current	Amps (A)	7.64	6.22	5.08	4.06	3.25	2.61	2.07	1.64	
Peak Torque	oz-in	12.5	13.0	13.4	13.5	13.6	13.7	13.8	13.7	
	Nm	0.0883	0.0918	0.0946	0.0953	0.096	0.0967	0.0974	0.0967	
Coulomb Friction Torque	oz-in	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
	Nm	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	
Viscous Damping Factor	oz-in/krpm	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	
	Nm s/rad	1.81E-6	1.81E-6	1.81E-6	1.81E-6	1.81E-6	1.81E-6	1.81E-6	1.81E-6	
Electrical Time Constant	ms	0.58	0.60	0.61	0.63	0.63	0.63	0.63	0.63	
Mechanical Time Constant	ms	16	15	15	15	15	15	14	14	
Thermal Time Constant	min	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	
Thermal Resistance	Celsius/W	23	23	23	23	23	23	23	23	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.00027	0.00027	0.00027	0.00027	0.00027	0.00027	0.00027	0.00027	
	kg-m ²	1.91E-6	1.91E-6	1.91E-6	1.91E-6	1.91E-6	1.91E-6	1.91E-6	1.91E-6	
Weight (Mass)	oz	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	
	g	197.9	197.9	197.9	197.9	197.9	197.9	197.9	197.9	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 7-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		9233 9.55 V	9233 12.0 V	9233 15.2 V	9233 19.1 V	9233 24.0 V	9233 30.3 V	9233 38.2 V	9233 48.0 V
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0
Continuous Torque	oz-in	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	Nm	0.0332	0.0332	0.0332	0.0332	0.0332	0.0332	0.0332	0.0332
Speed @ Cont. Torque	RPM	4570	4650	4840	4850	4870	4890	4900	4900
Current @ Cont. Torque	Amps (A)	2.92	2.30	1.85	1.46	1.16	0.92	0.74	0.59
Continuous Output Power	Watts (W)	16	16	17	17	17	17	17	17
Motor Constant	oz-in/sqrt W	2.5	2.6	2.6	2.6	2.7	2.7	2.7	2.7
	Nm/sqrt W	0.018	0.018	0.018	0.018	0.019	0.019	0.019	0.019
Torque Constant	oz-in/A	2.10	2.67	3.31	4.20	5.28	6.68	8.40	10.6
	Nm/A	0.015	0.019	0.023	0.03	0.037	0.047	0.059	0.075
Voltage Constant	V/krpm	1.55	1.97	2.45	3.11	3.90	4.94	6.21	7.81
	V/rad/s	0.015	0.019	0.023	0.03	0.037	0.047	0.059	0.075
Terminal Resistance	Ohms	0.72	1.08	1.63	2.53	3.94	6.21	9.	15.4
Inductance	mH	0.52	0.84	1.29	2.08	3.29	5.27	8.32	13.2
No-Load Current	Amps (A)	0.38	0.30	0.24	0.19	0.15	0.12	0.10	0.080
No-Load Speed	RPM	5850	5800	5930	5880	5880	5860	5870	5870
Peak Current	Amps (A)	13.3	11.1	9.33	7.55	6.09	4.88	3.91	3.11
Peak Torque	oz-in	27.1	28.9	30.1	30.9	31.4	31.8	32.0	32.0
	Nm	0.1913	0.204	0.2125	0.2182	0.2217	0.2245	0.2259	0.2259
Coulomb Friction Torque	oz-in	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	Nm	0.0042	0.0042	0.0042	0.0042	0.0042	0.0042	0.0042	0.0042
Viscous Damping Factor	oz-in/krpm	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
	Nm s/rad	2.28E-6	2.28E-6	2.28E-6	2.28E-6	2.28E-6	2.28E-6	2.28E-6	2.28E-6
Electrical Time Constant	ms	0.72	0.78	0.79	0.82	0.84	0.85	0.85	0.85
Mechanical Time Constant	ms	11	10	10	9.3	9.2	9.1	9.0	9.0
Thermal Time Constant	min	11	11	11	11	11	11	11	11
Thermal Resistance	Celsius/W	19	19	19	19	19	19	19	19
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	0.00046	0.00046	0.00046	0.00046	0.00046	0.00046	0.00046	0.00046
	kg-m ²	3.25E-6	3.25E-6	3.25E-6	3.25E-6	3.25E-6	3.25E-6	3.25E-6	3.25E-6
Weight (Mass)	oz	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90
	g	252.3	252.3	252.3	252.3	252.3	252.3	252.3	252.3

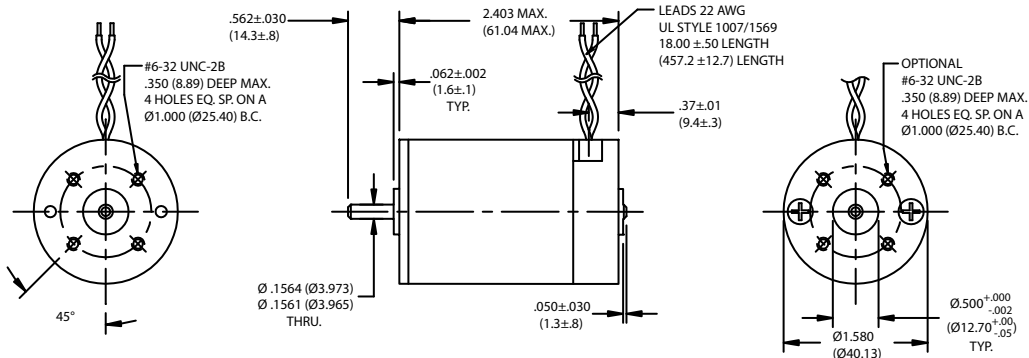
Performance (24 V Winding)	Standard Features
<p>Speed (rpm) vs Torque (oz-in) and Current (A) vs Torque (oz-in) graph. The speed curve (solid line) starts at 6000 rpm at 0 oz-in and decreases to 0 rpm at 30 oz-in. The current curve (dashed line) starts at 0 A at 0 oz-in and increases to 6 A at 30 oz-in.</p>	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 7-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

Brush Commutated DC Servo Motors

9234 Series

8540 Series Recommended for New Designs

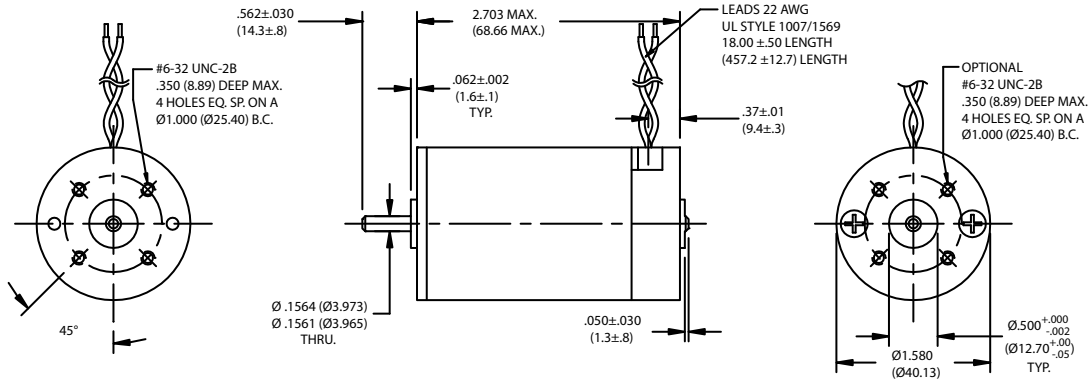


Specification	Units	Part/Model Number							
		9234 9.55 V	9234 12.0 V	9234 15.2 V	9234 19.1 V	9234 24.0 V	9234 30.3 V	9234 38.2 V	9234 48.0 V
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0
Continuous Torque	oz-in Nm	6.1 0.0431	6.1 0.0431	6.1 0.0431	6.1 0.0431	6.1 0.0431	6.1 0.0431	6.1 0.0431	6.1 0.0431
Speed @ Cont. Torque	RPM	4670	4800	4900	5050	5040	5090	5090	5090
Current @ Cont. Torque	Amps (A)	3.82	3.02	2.37	1.91	1.50	1.20	0.94	0.75
Continuous Output Power	Watts (W)	21	22	22	23	23	23	23	23.0
Motor Constant	oz-in/sqrt W Nm/sqrt W	2.7 0.019	2.8 0.02	2.9 0.02	3.0 0.021	3.0 0.021	3.0 0.021	3.0 0.021	3.0 0.021
Torque Constant	oz-in/A Nm/A	2.04 0.014	2.58 0.018	3.29 0.023	4.07 0.029	5.165 0.036	6.50 0.046	8.22 0.058	10.3 0.073
Voltage Constant	V/krpm V/rad/s	1.51 0.014	1.91 0.018	2.43 0.023	3.01 0.029	3.82 0.036	4.81 0.046	6.08 0.058	7.65 0.073
Terminal Resistance	Ohms	0.56	0.83	1.26	1.89	2.96	4.62	7.30	11.5
Inductance	mH	0.39	0.63	1.02	1.56	2.51	3.97	6.35	10.0
No-Load Current	Amps (A)	0.42	0.33	0.26	0.21	0.16	0.13	0.10	0.080
No-Load Speed	RPM	6050	6020	5990	6090	6030	6060	6040	6030
Peak Current	Amps (A)	17.1	14.5	12.1	10.1	8.1	6.56	5.23	4.17
Peak Torque	oz-in Nm	33.9 0.2393	36.4 0.257	38.8 0.2739	40.3 0.2845	41.1 0.2902	41.8 0.2951	42.2 0.2979	42.3 0.2986
Coulomb Friction Torque	oz-in Nm	0.60 0.0042	0.60 0.0042	0.60 0.0042	0.60 0.0042	0.60 0.0042	0.60 0.0042	0.60 0.0042	0.60 0.0042
Viscous Damping Factor	oz-in/krpm Nm s/rad	0.039 2.62E-6	0.039 2.62E-6	0.039 2.62E-6	0.039 2.62E-6	0.039 2.62E-6	0.039 2.62E-6	0.039 2.62E-6	0.039 2.62E-6
Electrical Time Constant	ms	0.70	0.76	0.81	0.83	0.85	0.86	0.87	0.87
Mechanical Time Constant	ms	11	10	10	10	9.3	9.1	9.0	9.0
Thermal Time Constant	min	12	12	12	12	12	12	12	12
Thermal Resistance	Celsius/W	17	17	17	17	17	17	17	17
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ² kg-m ²	0.00059 4.17E-6	.00059 4.17E-6	.00059 4.17E-6	.00059 4.17E-6	.00059 4.17E-6	.00059 4.17E-6	.00059 4.17E-6	.00059 4.17E-6
Weight (Mass)	oz g	10.1 286.3	10.1 286.3	10.1 286.3	10.1 286.3	10.1 286.3	10.1 286.3	10.1 286.3	10.1 286.3

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 7-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	Complementary Products <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	Notes <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only.

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

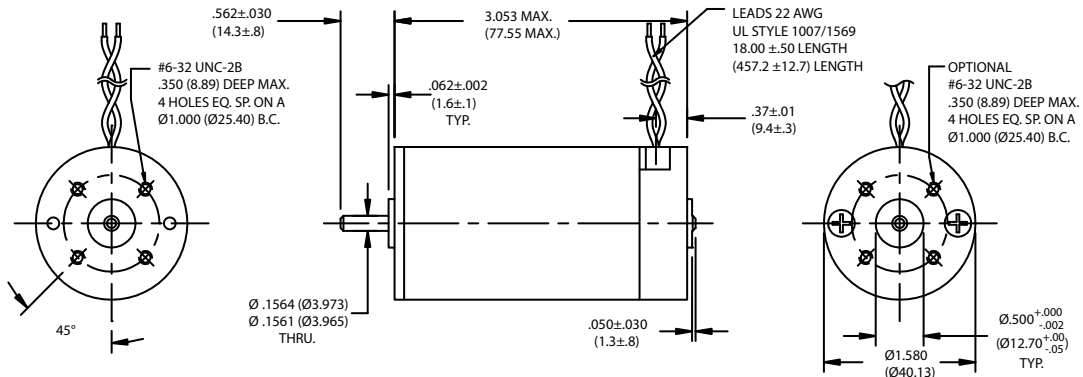
PITTMAN PRODUCTS
 343 Godshall Drive, Harleysville, PA 19438
 USA: +1 267 933 2105 - Europe: +33 240928751 - Asia: +86 21 5763 1258
www.pittman-motors.com



Specification	Units	Part/Model Number								
		9235 9.55 V	9235 12.0 V	9235 15.2 V	9235 19.1 V	9235 24.0 V	9235 30.3 V	9235 38.2 V	9235 48.0 V	
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0	
Continuous Torque	oz-in	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	
	Nm	0.0487	0.0487	0.0487	0.0487	0.0487	0.0487	0.0487	0.0487	
Speed @ Cont. Torque	RPM	4790	5090	5220	5250	5380	5390	5420	5400	
Current @ Cont. Torque	Amps (A)	4.39	3.55	2.80	2.21	1.78	1.40	1.11	0.88	
Continuous Output Power	Watts (W)	24	26	27	27	27	28	28	28	
Motor Constant	oz-in/sqrt W	2.9	3.0	3.1	3.2	3.2	3.3	3.3	3.3	
	Nm/sqrt W	0.02	0.021	0.022	0.023	0.023	0.023	0.023	0.023	
Torque Constant	oz-in/A	2.00	2.47	3.14	3.99	4.94	6.27	7.89	9.98	
	Nm/A	0.014	0.017	0.022	0.028	0.035	0.044	0.056	0.07	
Voltage Constant	V/krpm	1.48	1.83	2.32	2.95	3.65	4.64	5.83	7.38	
	V/rad/s	0.014	0.017	0.022	0.028	0.035	0.044	0.056	0.07	
Terminal Resistance	Ohms	0.48	0.68	1.02	1.56	2.37	3.72	5.83	9.23	
Inductance	mH	0.33	0.51	0.82	1.33	2.05	3.30	5.21	8.35	
No-Load Current	Amps (A)	0.47	0.38	0.30	0.24	0.19	0.15	0.12	0.090	
No-Load Speed	RPM	6180	6300	6290	6220	6320	6290	6300	6260	
Peak Current	Amps (A)	19.9	17.6	14.9	12.2	10.1	8.15	6.55	5.20	
Peak Torque	oz-in	38.9	42.6	45.9	47.9	49.1	50.1	50.8	51.0	
	Nm	0.2746	0.3008	0.3241	0.3382	0.3466	0.3537	0.3586	0.3601	
Coulomb Friction Torque	oz-in	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	
	Nm	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	
Viscous Damping Factor	oz-in/krpm	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	
	Nm s/rad	3.02E-6	3.02E-6	3.02E-6	3.02E-6	3.02E-6	3.02E-6	3.02E-6	3.02E-6	
Electrical Time Constant	ms	0.69	0.75	0.80	0.85	0.86	0.89	0.89	0.90	
Mechanical Time Constant	ms	13	12	12	11	11	11	10	10	
Thermal Time Constant	min	13	13	13	13	13	13	13	13	
Thermal Resistance	Celsius/W	15	15	15	15	15	15	15	15	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.00079	0.00079	0.00079	0.00079	0.00079	0.00079	0.00079	0.00079	
	kg-m ²	5.58E-6	5.58E-6	5.58E-6	5.58E-6	5.58E-6	5.58E-6	5.58E-6	5.58E-6	
Weight (Mass)	oz	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
	g	340.2	340.2	340.2	340.2	340.2	340.2	340.2	340.2	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 7-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

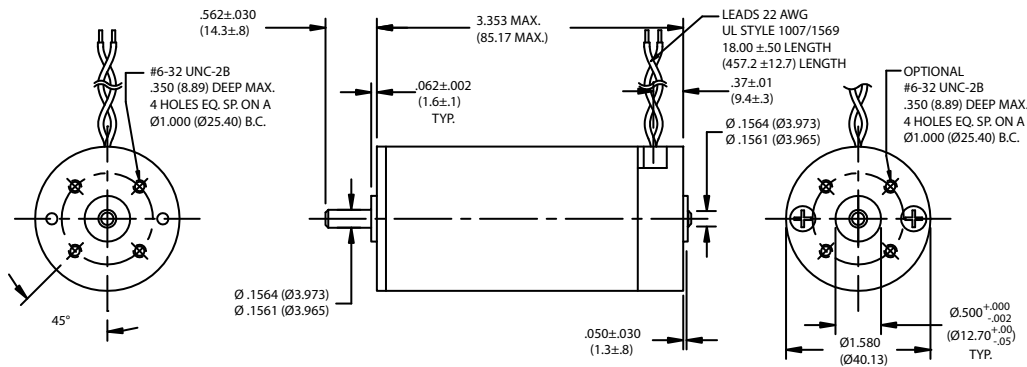
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		9236 9.55 V	9236 12.0 V	9236 15.2 V	9236 19.1 V	9236 24.0 V	9236 30.3 V	9236 38.2 V	9236 48.0 V
Supply Voltage	VDC	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0
Continuous Torque	oz-in	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50
	Nm	0.0671	0.0671	0.0671	0.0671	0.0671	0.0671	0.0671	0.0671
Speed @ Cont. Torque	RPM	3530	3750	3850	3880	3980	3980	4010	3990
Current @ Cont. Torque	Amps (A)	4.52	3.65	2.88	2.26	1.82	1.44	1.14	0.90
Continuous Output Power	Watts (W)	25	26	27	27	28	28	28	28
Motor Constant	oz-in/sqrt W	3.7	3.9	4.0	4.1	4.1	4.2	4.2	4.2
	Nm/sqrt W	0.026	0.028	0.028	0.029	0.029	0.03	0.03	0.03
Torque Constant	oz-in/A	2.62	3.25	4.12	5.24	6.49	8.24	10.4	13.1
	Nm/A	0.019	0.023	0.029	0.037	0.046	0.058	0.073	0.093
Voltage Constant	V/krpm	1.94	2.40	3.05	3.87	4.80	6.09	7.66	9.69
	V/rad/s	0.019	0.023	0.029	0.037	0.046	0.058	0.073	0.093
Terminal Resistance	Ohms	0.50	0.71	1.07	1.64	2.49	3.91	6.14	9.72
Inductance	mH	0.43	0.66	1.06	1.72	2.63	4.24	6.70	10.7
No-Load Current	Amps (A)	0.40	0.33	0.26	0.20	0.16	0.13	0.10	0.080
No-Load Speed	RPM	4730	4800	4800	4750	4820	4790	4810	4770
Peak Current	Amps (A)	19.1	16.9	14.2	11.6	9.64	7.75	6.22	4.94
Peak Torque	oz-in	49.0	53.9	57.5	60.0	61.5	62.8	63.4	63.7
	Nm	0.3459	0.3805	0.406	0.4236	0.4342	0.4434	0.4476	0.4497
Coulomb Friction Torque	oz-in	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Nm	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056
Viscous Damping Factor	oz-in/krpm	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	Nm s/rad	3.56E-6	3.56E-6	3.56E-6	3.56E-6	3.56E-6	3.56E-6	3.56E-6	3.56E-6
Electrical Time Constant	ms	0.86	0.93	0.99	1.0	1.1	1.1	1.1	1.1
Mechanical Time Constant	ms	10	10	8.9	8.5	8.4	8.2	8.1	8.0
Thermal Time Constant	min	14	14	14	14	14	14	14	14
Thermal Resistance	Celsius/W	14	14	14	14	14	14	14	14
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
	kg-m ²	7.06E-6	7.06E-6	7.06E-6	7.06E-6	7.06E-6	7.06E-6	7.06E-6	7.06E-6
Weight (Mass)	oz	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
	g	391.2	391.2	391.2	391.2	391.2	391.2	391.2	391.2

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 7-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	Complementary Products <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	Notes <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only.

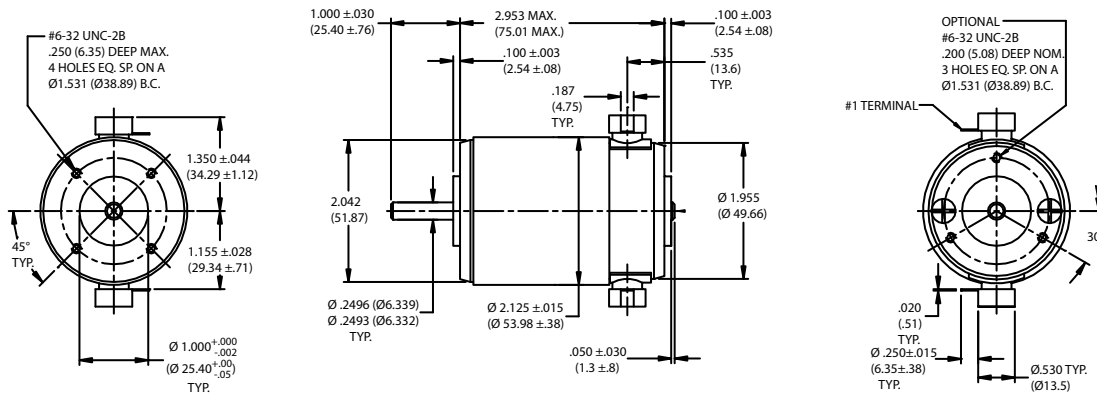
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number								
		9237 12.0 V	9237 15.2 V	9237 19.1 V	9237 24.0 V	9237 30.3 V	9237 38.2 V	9237 48.0 V	9237 60.0 V	
Supply Voltage	VDC	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.0	
Continuous Torque	oz-in	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	
	Nm	0.0812	0.0812	0.0812	0.0812	0.0812	0.0812	0.0812	0.0812	
Speed @ Cont. Torque	RPM	4050	4310	4360	4370	4490	4490	4490	4490	
Current @ Cont. Torque	Amps (A)	4.73	3.81	3.00	2.36	1.91	1.51	1.19	0.95	
Continuous Output Power	Watts (W)	34	37	37	37	38	38	38	38	
Motor Constant	oz-in/sqrt W	4.0	4.2	4.3	4.4	4.4	4.5	4.5	4.5	
	Nm/sqrt W	0.028	0.03	0.03	0.031	0.031	0.032	0.032	0.032	
Torque Constant	oz-in/A	3.00	3.72	4.72	6.00	7.43	9.40	11.9	15.0	
	Nm/A	0.021	0.026	0.033	0.042	0.052	0.066	0.084	0.106	
Voltage Constant	V/krpm	2.22	2.75	3.49	4.44	5.49	6.95	8.80	11.1	
	V/rad/s	0.021	0.026	0.033	0.042	0.052	0.066	0.084	0.106	
Terminal Resistance	Ohms	0.55	0.79	1.20	1.85	2.82	4.45	6.98	11.1	
Inductance	mH	0.49	0.75	1.21	1.97	3.01	4.85	7.67	12.3	
No-Load Current	Amps (A)	0.37	0.30	0.23	0.18	0.15	0.12	0.090	0.080	
No-Load Speed	RPM	5210	5330	5290	5230	5330	5310	5280	5280	
Peak Current	Amps (A)	21.8	19.2	15.9	13.0	10.7	8.58	6.88	5.47	
Peak Torque	oz-in	64.3	70.5	74.0	76.8	78.7	79.6	80.8	80.9	
	Nm	0.454	0.4977	0.5224	0.5422	0.5556	0.562	0.5704	0.5712	
Coulomb Friction Torque	oz-in	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	
	Nm	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	
Viscous Damping Factor	oz-in/krpm	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	
	Nm s/rad	3.69E-6	3.69E-6	3.69E-6	3.69E-6	3.69E-6	3.69E-6	3.69E-6	3.69E-6	
Electrical Time Constant	ms	0.89	0.95	1.0	1.1	1.1	1.1	1.1	1.1	
Mechanical Time Constant	ms	10	10	9.2	8.7	8.7	8.6	8.4	8.4	
Thermal Time Constant	min	14	14	14	14	14	14	14	14	
Thermal Resistance	Celsius/W	11	11	11	11	11	11	11	11	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	
	kg-m ²	8.47E-6	8.47E-6	8.47E-6	8.47E-6	8.47E-6	8.47E-6	8.47E-6	8.47E-6	
Weight (Mass)	oz	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	
	g	439.4	439.4	439.4	439.4	439.4	439.4	439.4	439.4	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 7-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>	

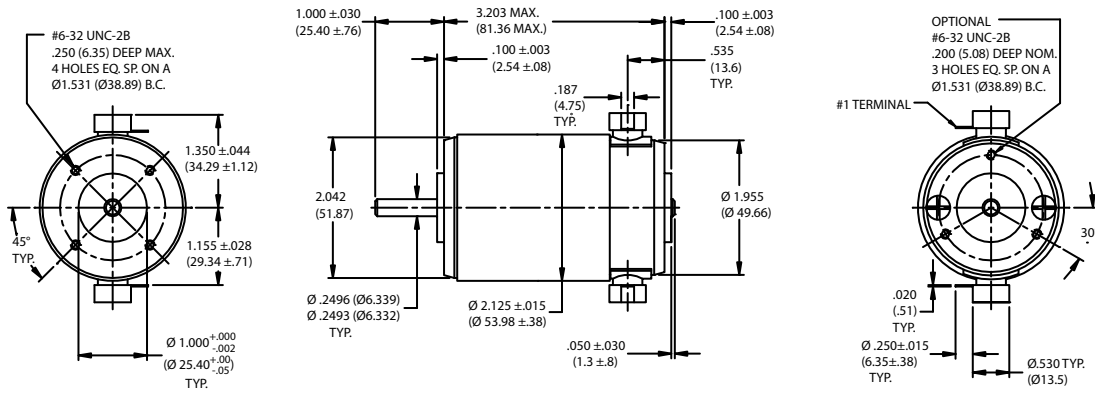
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number								
		14201 12.0 V	14201 15.2 V	14201 19.1 V	14201 24.0 V	14201 30.3 V	14201 38.2 V	14201 48.0 V	14201 60.0 V	
Supply Voltage	VDC	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6	
Continuous Torque	oz-in	10	10	10	10	10	10	10	10	
	Nm	0.0706	0.0706	0.0706	0.0706	0.0706	0.0706	0.0706	0.0706	
Speed @ Cont. Torque	RPM	3280	3370	3350	3330	3320	3350	3340	3330	
Current @ Cont. Torque	Amps (A)	3.57	2.86	2.26	1.79	1.40	1.13	.89	0.70	
Continuous Output Power	Watts (W)	24	25	25	25	25	25	25	25	
Motor Constant	oz-in/sqrt W	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5	
	Nm/sqrt W	0.031	0.031	0.031	0.032	0.032	0.032	0.032	0.032	
Torque Constant	oz-in/A	3.72	4.65	5.89	7.44	9.46	11.8	14.9	18.930	
	Nm/A	0.026	0.033	0.042	0.053	0.067	0.083	0.105	0.134	
Voltage Constant	V/krpm	2.75	3.44	4.36	5.50	7.00	8.71	11.0	14.0	
	V/rad/s	0.026	0.033	0.042	0.053	0.067	0.083	0.105	0.134	
Terminal Resistance	Ohms	0.72	1.11	1.76	2.79	4.45	6.98	11.1	17.8	
Inductance	mH	0.63	0.99	1.59	2.54	4.10	6.37	10.2	16.4	
No-Load Current	Amps (A)	0.52	0.42	0.33	0.26	0.20	0.17	0.13	0.10	
No-Load Speed	RPM	4140	4200	4170	4150	4120	4160	4150	4120	
Peak Current	Amps (A)	16.7	13.7	10.9	8.60	6.81	5.47	4.32	3.41	
Peak Torque	oz-in	60.1	61.7	62.0	62.1	62.5	62.5	62.4	62.6	
	Nm	0.4243	0.4356	0.4377	0.4384	0.4413	0.4413	0.4405	0.442	
Coulomb Friction Torque	oz-in	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
	Nm	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	
Viscous Damping Factor	oz-in/krpm	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	
	Nm s/rad	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5	
Electrical Time Constant	ms	0.88	0.89	0.90	0.91	0.92	0.91	0.92	0.92	
Mechanical Time Constant	ms	12	12	11	11	11	11	11	11	
Thermal Time Constant	min	22	22	22	22	22	22	22	22	
Thermal Resistance	Celsius/W	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	
	kg-m ²	1.13E-5	1.13E-5	1.13E-5	1.13E-5	1.13E-5	1.13E-5	1.13E-5	1.13E-5	
Weight (Mass)	oz	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	
	g	589.7	589.7	589.7	589.7	589.7	589.7	589.7	589.7	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 11-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>	

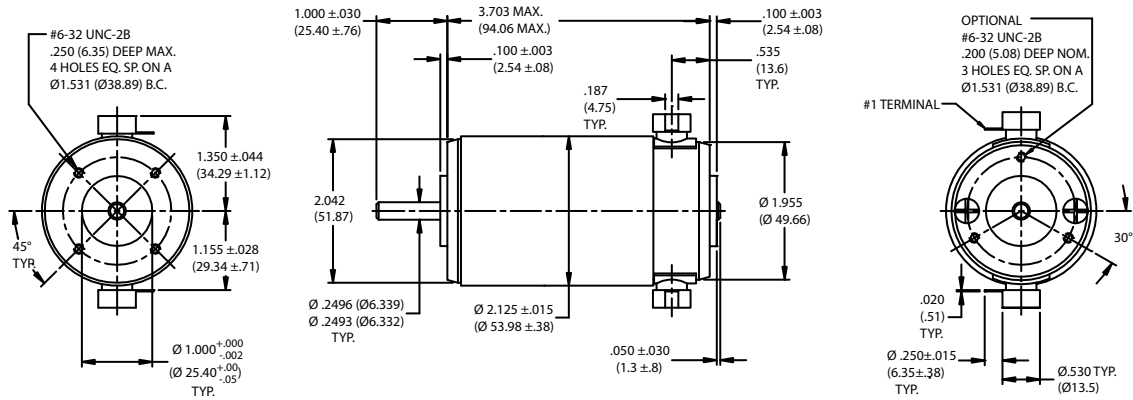
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		14202 12.0 V	14202 15.2 V	14202 19.1 V	14202 24.0 V	14202 30.3 V	14202 38.2 V	14202 48.0 V	14202 60.0 V
Supply Voltage	VDC	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6
Continuous Torque	oz-in	14	14	14	14	14	14	14	14
	Nm	0.0988	0.0988	0.0988	0.0988	0.0988	0.0988	0.0988	0.0988
Speed @ Cont. Torque	RPM	3430	3460	3500	3480	3490	3470	3490	3490
Current @ Cont. Torque	Amps (A)	4.57	3.62	2.89	2.28	1.81	1.42	1.14	0.91
Continuous Output Power	Watts (W)	36	36	36	36	36	36	36	36
Motor Constant	oz-in/sqrt W	5.8	5.9	5.9	5.9	6.0	6.0	6.0	6.0
	Nm/sqrt W	0.041	0.042	0.042	0.042	0.042	0.042	0.042	0.042
Torque Constant	oz-in/A	3.90	4.93	6.166	7.80	9.85	12.5	15.6	19.7
	Nm/A	0.028	0.035	0.044	0.055	0.07	0.088	0.11	0.139
Voltage Constant	V/krpm	2.88	3.65	4.56	5.77	7.28	9.26	11.5	14.6
	V/rad/s	0.028	0.035	0.044	0.055	0.07	0.088	0.11	0.139
Terminal Resistance	Ohms	0.45	0.71	1.09	1.73	2.74	4.37	6.85	10.9
Inductance	mH	0.63	1.01	1.58	2.54	4.05	6.55	10.2	16.2
No-Load Current	Amps (A)	0.49	0.39	0.31	0.24	0.19	0.15	0.12	0.10
No-Load Speed	RPM	4000	4010	4040	4010	4010	3970	4010	4000
Peak Current	Amps (A)	26.7	21.4	17.5	13.87	11.06	8.74	7.01	5.56
Peak Torque	oz-in	102	104	106	106	107	108	107	108
	Nm	0.7201	0.7342	0.7484	0.7484	0.7554	0.7625	0.7554	0.7625
Coulomb Friction Torque	oz-in	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Nm	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085
Viscous Damping Factor	oz-in/krpm	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
	Nm s/rad	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5	1.14E-5
Electrical Time Constant	ms	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5
Mechanical Time Constant	ms	10	10	9.4	9.3	9.2	9.1	9.2	9.1
Thermal Time Constant	min	24	24	24	24	24	24	24	24
Thermal Resistance	Celsius/W	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023
	kg-m ²	1.62E-5	1.62E-5	1.62E-5	1.62E-5	1.62E-5	1.62E-5	1.62E-5	1.62E-5
Weight (Mass)	oz	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
	g	737.1	737.1	737.1	737.1	737.1	737.1	737.1	737.1

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 11-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	Complementary Products <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	Notes <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only.

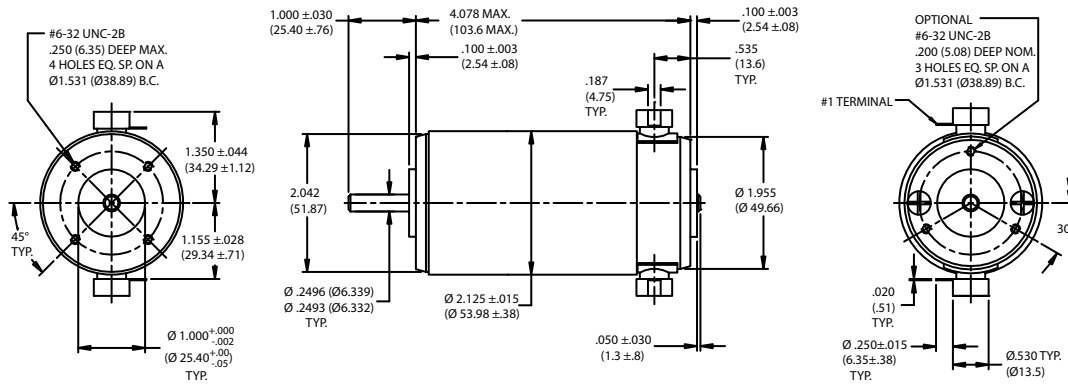
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number								
		14203 12.0 V	14203 15.2 V	14203 19.1 V	14203 24.0 V	14203 30.3 V	14203 38.2 V	14203 48.0 V	14203 60.0 V	
Supply Voltage	VDC	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6	
Continuous Torque	oz-in	21	21	21	21	21	21	21	21	
	Nm	0.1483	0.1483	0.1483	0.1483	0.1483	0.1483	0.1483	0.1483	
Speed @ Cont. Torque	RPM	2880	2920	2920	2950	2950	2950	2910	2960	
Current @ Cont. Torque	Amps (A)	5.63	4.45	3.52	2.82	2.22	1.76	1.39	1.11	
Continuous Output Power	Watts (W)	45	45	45	46	46	46	45	46	
Motor Constant	oz-in/sqrt W	7.6	7.8	7.9	7.9	7.9	8.0	8.0	8.0	
	Nm/sqrt W	0.054	0.055	0.056	0.056	0.056	0.056	0.056	0.056	
Torque Constant	oz-in/A	4.63	5.86	7.41	9.26	11.7	14.8	18.8	23.392	
	Nm/A	0.033	0.041	0.052	0.065	0.083	0.105	0.133	0.165	
Voltage Constant	V/krpm	3.42	4.33	5.48	6.85	8.67	11.0	13.9	17.3	
	V/rad/s	0.033	0.041	0.052	0.065	0.083	0.105	0.133	0.165	
Terminal Resistance	Ohms	0.37	0.57	0.89	1.38	2.19	3.46	5.53	8.68	
Inductance	mH	0.56	0.91	1.45	2.26	3.63	5.79	9.34	14.5	
No-Load Current	Amps (A)	0.48	0.38	0.30	0.24	0.19	0.15	0.12	0.090	
No-Load Speed	RPM	3380	3390	3370	3390	3380	3370	3330	3380	
Peak Current	Amps (A)	32.4	26.7	21.5	17.4	13.8	11.0	8.68	6.98	
Peak Torque	oz-in	148	154	157	159	160	161	161	162	
	Nm	1.0449	1.0872	1.1084	1.1225	1.1296	1.1367	1.1367	1.1437	
Coulomb Friction Torque	oz-in	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	
	Nm	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	
Viscous Damping Factor	oz-in/krpm	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	
	Nm s/rad	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5	
Electrical Time Constant	ms	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7	
Mechanical Time Constant	ms	7.3	7.1	6.9	6.8	6.8	6.7	6.6	6.7	
Thermal Time Constant	min	26	26	26	26	26	26	26	26	
Thermal Resistance	Celsius/W	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	
	kg-m ²	2.12E-5	2.12E-5	2.12E-5	2.12E-5	2.12E-5	2.12E-5	2.12E-5	2.12E-5	
Weight (Mass)	oz	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	
	g	884.5	884.5	884.5	884.5	884.5	884.5	884.5	884.5	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 11-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	Complementary Products <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	Notes <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only.

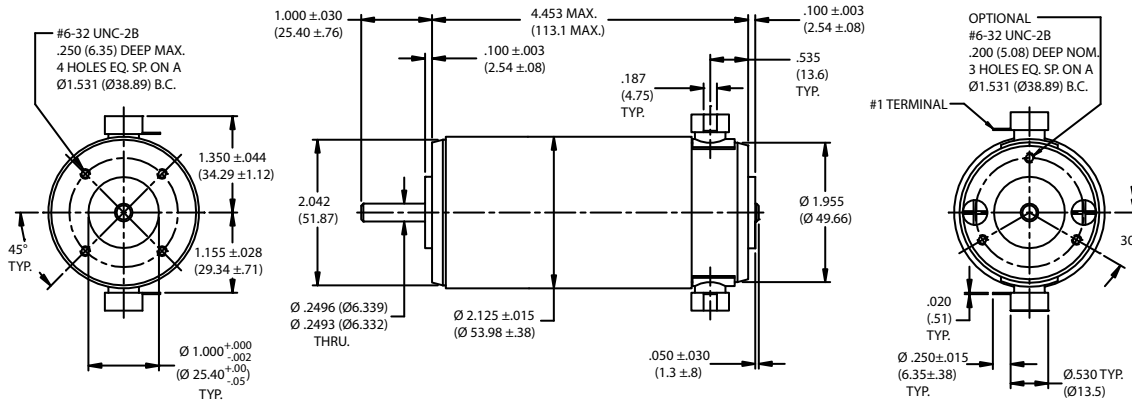
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		14204 12.0 V	14204 15.2 V	14204 19.1 V	14204 24.0 V	14204 30.3 V	14204 38.2 V	14204 48.0 V	14204 60.0 V
Supply Voltage	VDC	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6
Continuous Torque	oz-in	26	26	26	26	26	26	26	26
	Nm	0.1836	0.1836	0.1836	0.1836	0.1836	0.1836	0.1836	0.1836
Speed @ Cont. Torque	RPM	3130	3190	3190	3200	3240	3230	3220	3200
Current @ Cont. Torque	Amps (A)	7.34	5.87	4.64	3.67	2.94	2.32	1.83	1.44
Continuous Output Power	Watts (W)	60	61	61	62	62	62	62	62
Motor Constant	oz-in/sqrt W	8.3	8.4	8.5	8.6	8.7	8.7	8.7	8.8
	Nm/sqrt W	0.059	0.059	0.06	0.061	0.061	0.061	0.061	0.062
Torque Constant	oz-in/A	4.33	5.42	6.86	8.67	10.844	13.7	17.3	22.039
	Nm/A	0.031	0.038	0.048	0.061	0.077	0.097	0.122	0.156
Voltage Constant	V/krpm	3.20	4.01	5.07	6.41	8.02	10.2	12.8	16.3
	V/rad/s	0.031	0.038	0.048	0.061	0.077	0.097	0.122	0.156
Terminal Resistance	Ohms	0.27	0.42	0.65	1.01	1.57	2.50	3.96	6.33
Inductance	mH	0.40	0.62	1.00	1.60	2.50	4.01	6.40	10.3
No-Load Current	Amps (A)	0.52	0.42	0.33	0.26	0.21	0.17	0.13	0.10
No-Load Speed	RPM	3630	3670	3650	3630	3660	3650	3630	3610
Peak Current	Amps (A)	44.4	36.2	29.4	23.8	19.3	15.3	12.1	9.57
Peak Torque	oz-in	190	194	199	204	207	207	208	209
	Nm	1.3414	1.3696	1.4049	1.4402	1.4614	1.4614	1.4685	1.4755
Coulomb Friction Torque	oz-in	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Nm	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113
Viscous Damping Factor	oz-in/krpm	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
	Nm s/rad	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5	1.21E-5
Electrical Time Constant	ms	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6
Mechanical Time Constant	ms	7.5	7.5	7.2	7.0	7.0	6.9	6.9	6.8
Thermal Time Constant	min	29	29	29	29	29	29	29	29
Thermal Resistance	Celsius/W	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037
	kg-m ²	2.61E-5	2.61E-5	2.61E-5	2.61E-5	2.61E-5	2.61E-5	2.61E-5	2.61E-5
Weight (Mass)	oz	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.2
	g	997.9	997.9	997.9	997.9	997.9	997.9	997.9	997.9

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 11-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

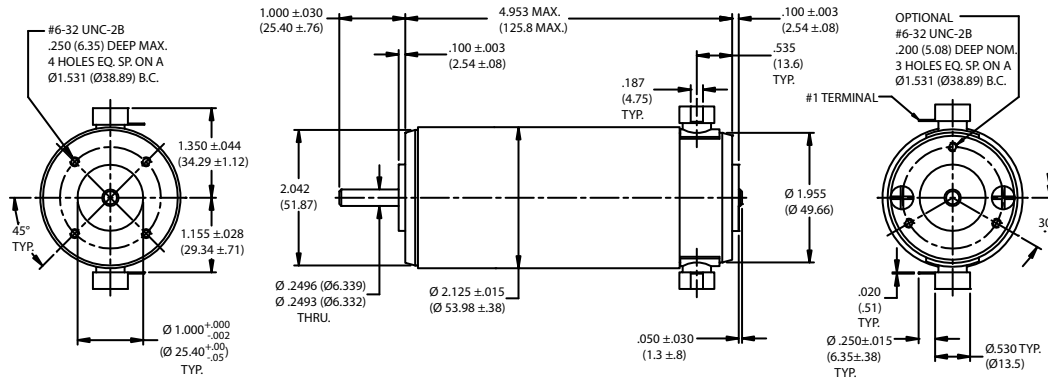
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number								
		14205 12.0 V	14205 15.2 V	14205 19.1 V	14205 24.0 V	14205 30.3 V	14205 38.2 V	14205 48.0 V	14205 60.0 V	
Supply Voltage	VDC	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6	
Continuous Torque	oz-in	31	31	31	31	31	31	31	31	
	Nm	0.2189	0.2189	0.2189	0.2189	0.2189	0.2189	0.2189	0.2189	
Speed @ Cont. Torque	RPM	2510	2590	2580	2580	2610	2600	2590	2580	
Current @ Cont. Torque	Amps (A)	7.2	5.77	4.55	3.60	2.88	2.28	1.80	1.42	
Continuous Output Power	Watts (W)	58	59	59	59	60	60	59	59	
Motor Constant	oz-in/sqrt W	9.6	9.8	9.9	10	10	10	10	10	
	Nm/sqrt W	0.068	0.069	0.07	0.071	0.071	0.071	0.071	0.071	
Torque Constant	oz-in/A	5.25	6.56	8.31	10.5	13.1	16.6	21.0	26.637	
	Nm/A	0.037	0.046	0.059	0.074	0.093	0.117	0.148	0.188	
Voltage Constant	V/krpm	3.88	4.85	6.15	7.76	9.71	12.3	15.5	19.7	
	V/rad/s	0.037	0.046	0.059	0.074	0.093	0.117	0.148	0.188	
Terminal Resistance	Ohms	0.30	0.45	0.71	1.11	1.73	2.75	4.36	6.97	
Inductance	mH	0.45	0.71	1.13	1.81	2.83	4.54	7.24	11.7	
No-Load Current	Amps (A)	0.49	0.40	0.31	0.25	0.20	0.16	0.12	0.10	
No-Load Speed	RPM	2990	3030	3010	2990	3020	3010	3000	2970	
Peak Current	Amps (A)	40.0	33.8	26.9	24.6	17.5	13.9	11.0	8.69	
Peak Torque	oz-in	207	219	221	224	227	228	229	229	
	Nm	1.4614	1.5461	1.5603	1.5814	1.6026	1.6097	1.6167	1.6167	
Coulomb Friction Torque	oz-in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
	Nm	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	
Viscous Damping Factor	oz-in/krpm	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
	Nm s/rad	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	
Electrical Time Constant	ms	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	
Mechanical Time Constant	ms	6.8	6.5	6.4	6.3	6.3	6.2	6.2	6.1	
Thermal Time Constant	min	29	29	29	29	29	29	29	29	
Thermal Resistance	Celsius/W	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	
	kg-m ²	3.11E-5	3.11E-5	3.11E-5	3.11E-5	3.11E-5	3.11E-5	3.11E-5	3.11E-5	
Weight (Mass)	oz	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	
	g	1119.8	1119.8	1119.8	1119.8	1119.8	1119.8	1119.8	1119.8	

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 11-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>

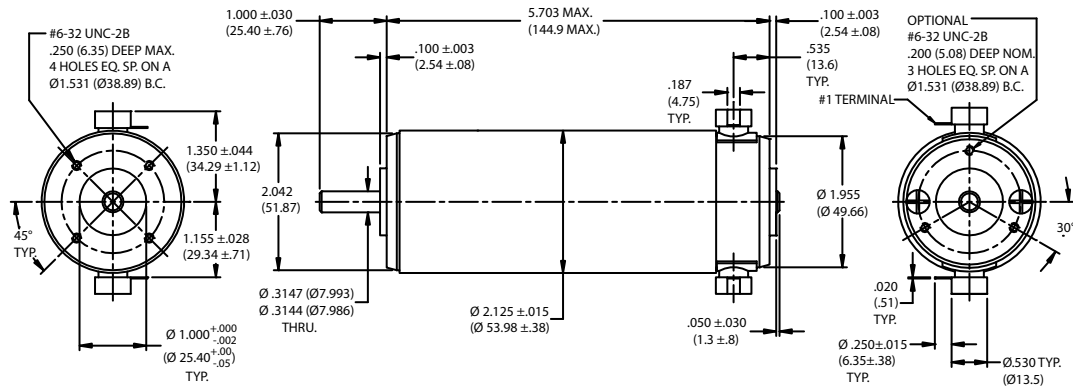
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number								
		14206 12.0 V	14206 15.2 V	14206 19.1 V	14206 24.0 V	14206 30.3 V	14206 38.2 V	14206 48.0 V	14206 60.0 V	
Supply Voltage	VDC	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6	
Continuous Torque	oz-in	37	37	37	37	37	37	37	37	
	Nm	0.2612	0.2612	0.2612	0.2612	0.2612	0.2612	0.2612	0.2612	
Speed @ Cont. Torque	RPM	2830	2740	2780	2770	2780	2810	2790	2800	
Current @ Cont. Torque	Amps (A)	9.31	6.97	5.59	4.41	3.49	2.80	2.2	1.74	
Continuous Output Power	Watts (W)	76	74	75	75	75	76	75	76	
Motor Constant	oz-in/sqrt W	10	11	11	11	11	11	11	11	
	Nm/sqrt W	0.071	0.078	0.078	0.078	0.078	0.078	0.078	0.078	
Torque Constant	oz-in/A	4.746	6.32	7.89	10.0	12.6	15.8	20.0	25.3	
	Nm/A	0.034	0.045	0.056	0.071	0.089	0.112	0.141	0.179	
Voltage Constant	V/krpm	3.51	4.67	5.83	7.39	9.34	11.7	14.8	18.7	
	V/rad/s	0.034	0.045	0.056	0.071	0.089	0.112	0.141	0.179	
Terminal Resistance	Ohms	0.22	0.35	0.54	0.84	1.32	2.06	3.28	5.20	
Inductance	mH	0.31	0.54	0.85	1.36	2.17	3.39	5.44	8.68	
No-Load Current	Amps (A)	0.56	0.41	0.33	0.26	0.21	0.17	0.13	0.10	
No-Load Speed	RPM	3320	3160	3180	3150	3150	3180	3150	3150	
Peak Current	Amps (A)	54.5	43.4	35.4	28.6	23.0	18.5	14.6	11.7	
Peak Torque	oz-in	256	272	276	283	287	290	290	292	
	Nm	1.8074	1.9203	1.9486	1.998	2.0262	2.0474	2.0474	2.0615	
Coulomb Friction Torque	oz-in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
	Nm	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141	
Viscous Damping Factor	oz-in/krpm	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
	Nm s/rad	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	1.28E-5	
Electrical Time Constant	ms	1.4	1.5	1.6	1.6	1.6	1.6	1.7	1.7	
Mechanical Time Constant	ms	7.2	6.5	6.4	6.2	6.1	6.1	6.0	6.0	
Thermal Time Constant	min	34	34	34	34	34	34	34	34	
Thermal Resistance	Celsius/W	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155	
Rotor Inertia	oz-in-sec ²	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	
	kg-m ²	3.67E-5	3.67E-5	3.67E-5	3.67E-5	3.67E-5	3.67E-5	3.67E-5	3.67E-5	
Weight (Mass)	oz	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	
	g	1287.1	1287.1	1287.1	1287.1	1287.1	1287.1	1287.1	1287.1	

Performance (24 V Winding)	Standard Features	
<p>Speed (rpm) vs Torque (oz-in) and Current (A) graph. The speed curve (solid black line) shows a linear decrease from approximately 3300 rpm at 0 oz-in to 0 rpm at 300 oz-in. The current curve (dashed blue line) shows a linear increase from 0 A at 0 oz-in to approximately 32 A at 300 oz-in.</p>	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 11-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator 	
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes 	
	<p>Notes</p> <p>1 All values specified at 25°C ambient temperature and without heat sink. 2 Peak values are theoretical and supplied for reference only.</p>	

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number							
		14207 15.2 V	14207 19.1 V	14207 24.0 V	14207 30.3 V	14207 38.2 V	14207 48.0 V	14207 60.0 V	14207 76.4 V
Supply Voltage	VDC	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Continuous Torque	oz-in	50	50	50	50	50	50	50	50
	Nm	0.353	0.353	0.353	0.353	0.353	0.353	0.353	0.353
Speed @ Cont. Torque	RPM	2910	2770	2810	2810	2820	2840	2830	2830
Current @ Cont. Torque	Amps (A)	9.98	7.48	5.98	4.71	3.74	2.99	2.37	1.87
Continuous Output Power	Watts (W)	108	102	104	104	104	105	105	105
Motor Constant	oz-in/sqrt W	12	13	13	13	13	13	13	13
	Nm/sqrt W	0.085	0.092	0.092	0.092	0.092	0.092	0.092	0.092
Torque Constant	oz-in/A	6.00	8.004	10.0	12.7	16.0	20.0	25.3	32.0
	Nm/A	0.042	0.057	0.071	0.09	0.113	0.141	0.179	0.226
Voltage Constant	V/krpm	4.44	5.92	7.39	9.39	11.8	14.8	18.7	23.7
	V/rad/s	0.042	0.057	0.071	0.09	0.113	0.141	0.179	0.226
Terminal Resistance	Ohms	0.24	0.39	0.59	0.93	1.46	2.29	3.64	5.78
Inductance	mH	0.31	0.56	0.87	1.40	2.23	3.48	5.58	8.93
No-Load Current	Amps (A)	0.51	0.38	0.30	0.24	0.19	0.15	0.12	0.090
No-Load Speed	RPM	3330	3140	3160	3140	3140	3160	3150	3140
Peak Current	Amps (A)	63.3	49.0	40.7	32.6	26.2	21.0	16.6	13.2
Peak Torque	oz-in	377	389	404	411	416	416	418	420
	Nm	2.6616	2.7463	2.8522	2.9017	2.937	2.937	2.9511	2.9652
Coulomb Friction Torque	oz-in	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Nm	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155
Viscous Damping Factor	oz-in/krpm	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	Nm s/rad	1.68E-5	1.68E-5	1.68E-5	1.68E-5	1.68E-5	1.68E-5	1.68E-5	1.68E-5
Electrical Time Constant	ms	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.5
Mechanical Time Constant	ms	6.3	5.8	5.6	5.5	5.4	5.4	5.4	5.4
Thermal Time Constant	min	32	32	32	32	32	32	32	32
Thermal Resistance	Celsius/W	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max. Winding Temperature	Celsius	155	155	155	155	155	155	155	155
Rotor Inertia	oz-in-sec ²	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067
	kg-m ²	4.73E-5	4.73E-5	4.73E-5	4.73E-5	4.73E-5	4.73E-5	4.73E-5	4.73E-5
Weight (Mass)	oz	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5
	g	1545	1545	1545	1545	1545	1545	1545	1545

Performance (24 V Winding)	Standard Features
	<ul style="list-style-type: none"> Sintered Bronze Bearings 2-Pole Stator Ceramic Magnets 11-Slot Armature Heavy-Gage Steel Housing Silicon Steel Laminations Copper-Graphite Brushes Diamond-Turned Commutator
	<p>Complementary Products</p> <ul style="list-style-type: none"> Encoders Gearboxes Brakes
	<p>Notes</p> <ol style="list-style-type: none"> All values specified at 25°C ambient temperature and without heat sink. Peak values are theoretical and supplied for reference only.

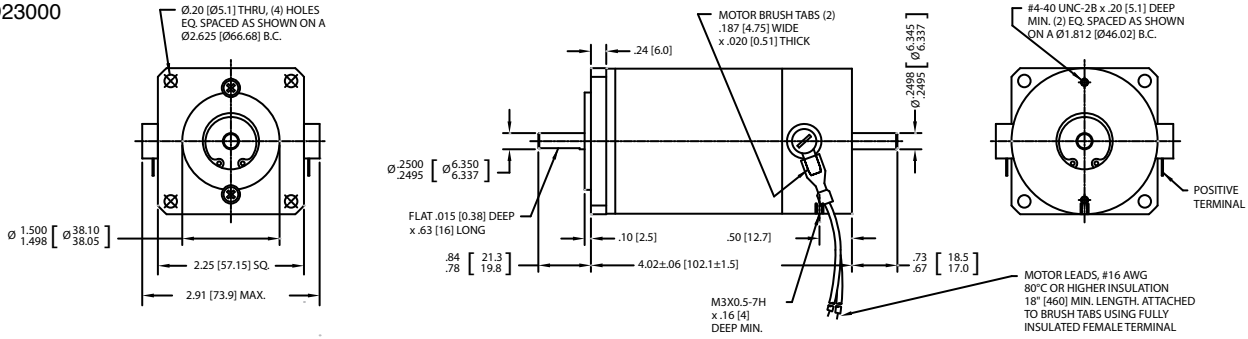
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

Brush Commutated DC Servo Motors

ID23000 Series



ID23000



Specification	Units	Part/Model Number	ID23000
Supply Voltage	VDC		60
Continuous Stall Torque	lb-in Nm		1.88 0.212
Speed @ Cont. Torque	RPM		6000
Current @ Cont. Torque	Amps (A)		4.98
Continuous Output Power	Watts (W)		101
Motor Constant	lb-in/sqrt W Nm/sqrt W		.49 0.06
Torque Constant	lb-in/A Nm/A		.49 0.055
Voltage Constant	V/krpm V/rad/s		5.80 0.055
Terminal Resistance	Ohms		1.16
Inductance	mH		1.40
Max. Speed	RPM		6000
Peak Current	Amps (A)		34.88
Peak Torque	lb-in Nm		15.00 1.695
Thermal Time Constant	min		15.00
Thermal Resistance	Celsius/W		2.98
Max. Winding Temperature	Celsius		155
Rotor Inertia	lb-in-sec ² kg-m ²		2.37E-4 2.68E-5
Weight	Lbs Kg		2.20 1

Motor Performance

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip=2 Ic)
- 4 = Tp motor

36 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip=2 Ic)
- 4 = Tp motor

Standard Features

- Designed with low Ke's to accommodate low bus voltage
- Voltage rating up to 60 VDC
- Dynamically balanced armatures
- 2 Pole Stator
- Ball Bearings

Complementary Products

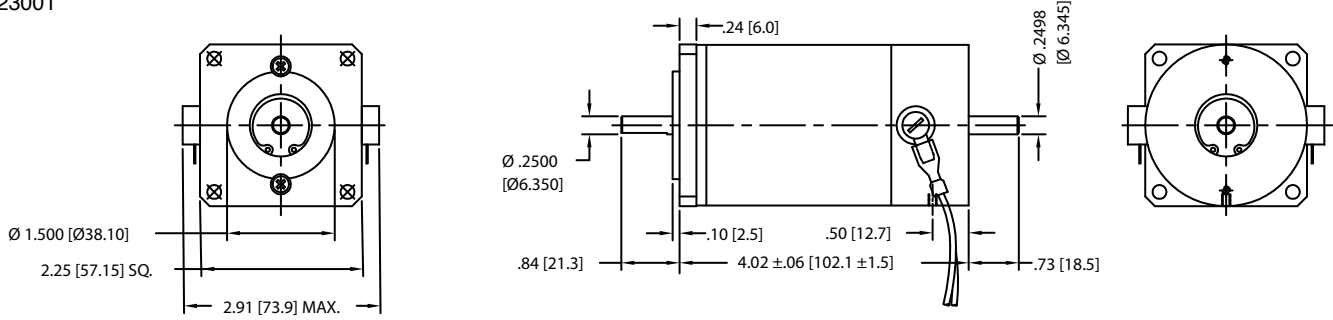
- Encoders
- Gearboxes
- Brakes
- Tachometers

Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25"

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

ID23001



		Part/Model Number
Specification	Units	ID23001
Supply Voltage	VDC	60
Continuous Stall Torque	lb-in Nm	1.88 0.212
Speed @ Cont. Torque	RPM	6000
Current @ Cont. Torque	Amps (A)	3.91
Continuous Output Power	Watts (W)	93
Motor Constant	lb-in/sqrt W Nm/sqrt W	.51 0.06
Torque Constant	lb-in/A Nm/A	.625 0.071
Voltage Constant	V/krpm V/rad/s	7.40 0.071
Terminal Resistance	Ohms	1.52
Inductance	mH	3.39
Max. Speed	RPM	6000
Peak Current	Amps (A)	27.34
Peak Torque	lb-in Nm	15.00 1.695
Thermal Time Constant	min	15.00
Thermal Resistance	Celsius/W	3.71
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ² kg-m ²	2.37E-4 2.68E-5
Weight	Lbs Kg	2.20 1

Motor Performance

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (lp=2 lc)
- 4 = Tp motor

36 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (lp=2 lc)
- 4 = Tp motor

Standard Features

- Designed with low Ke's to accommodate low bus voltage
- Voltage rating up to 60 VDC
- Dynamically balanced armatures
- 2 Pole Stator
- Ball Bearings

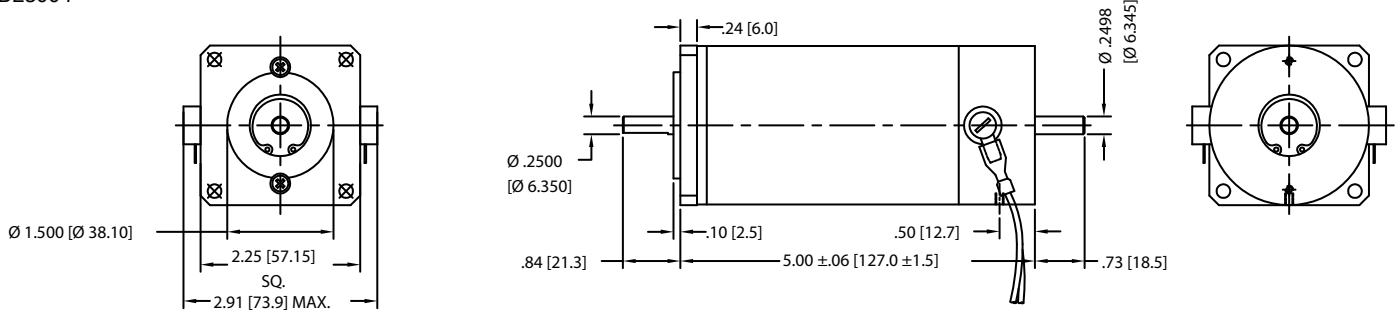
Complementary Products

- Encoders
- Gearboxes
- Brakes
- Tachometers

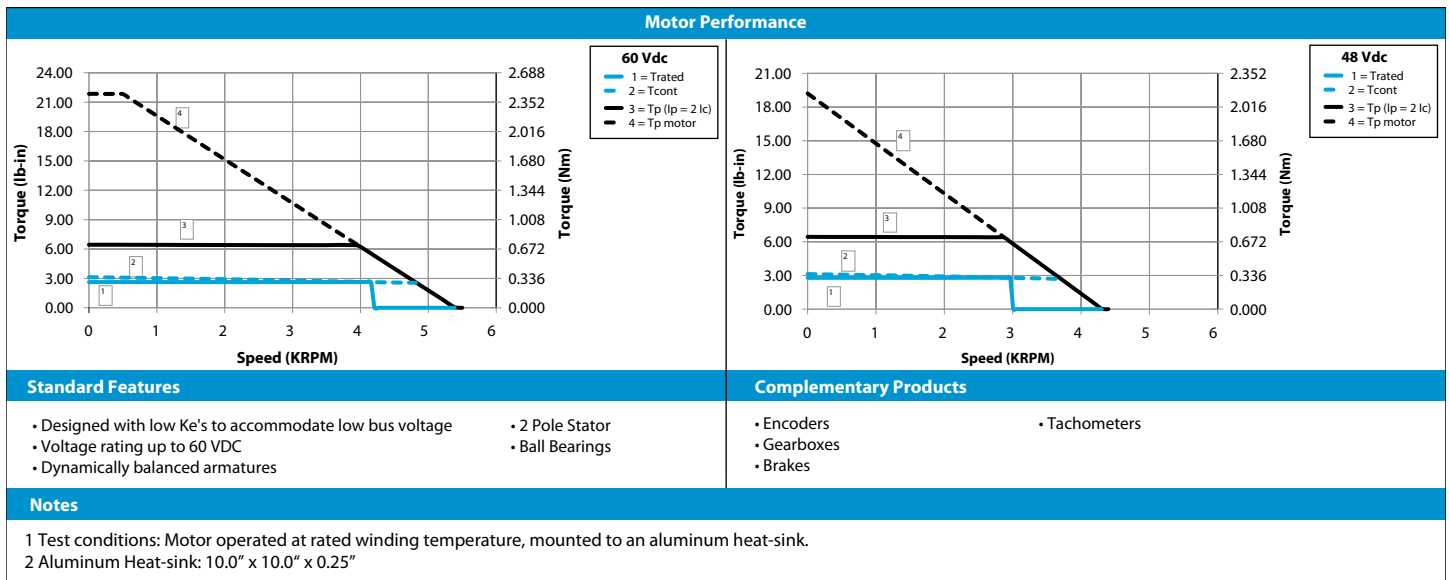
Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25"

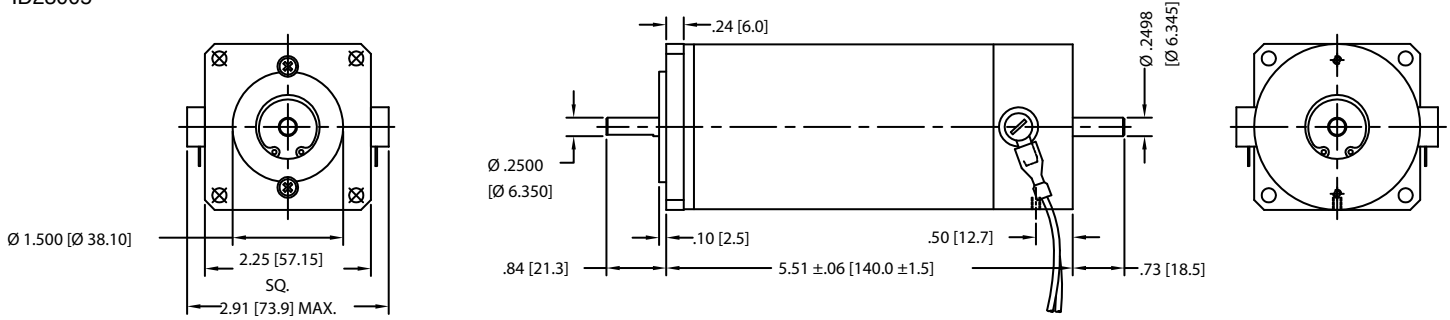
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



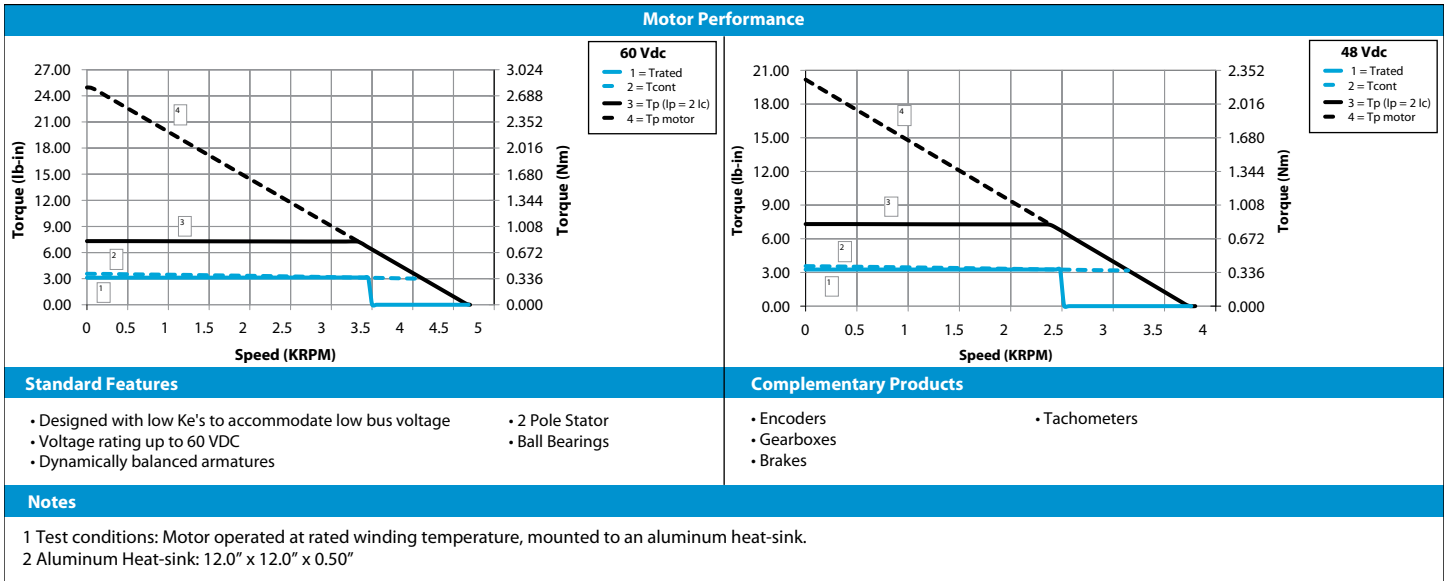
		Part/Model Number
Specification	Units	ID23004
Supply Voltage	VDC	60
Continuous Stall Torque	lb-in	3.13
	Nm	0.354
Speed @ Cont. Torque	RPM	4100
Current @ Cont. Torque	Amps (A)	4.22
Continuous Output Power	Watts (W)	131
Motor Constant	lb-in/sqrt W	.65
	Nm/sqrt W	0.07
Torque Constant	lb-in/A	.93
	Nm/A	0.105
Voltage Constant	V/krpm	11.00
	V/rad/s	0.105
Terminal Resistance	Ohms	2.03
Inductance	mH	5.20
Max. Speed	RPM	6000
Peak Current	Amps (A)	26.10
Peak Torque	lb-in	21.88
	Nm	2.472
Thermal Time Constant	min	17.00
Thermal Resistance	Celsius/W	2.39
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ²	3.87E-4
	kg-m ²	4.37E-5
Weight	Lbs	3.10
	Kg	1.4



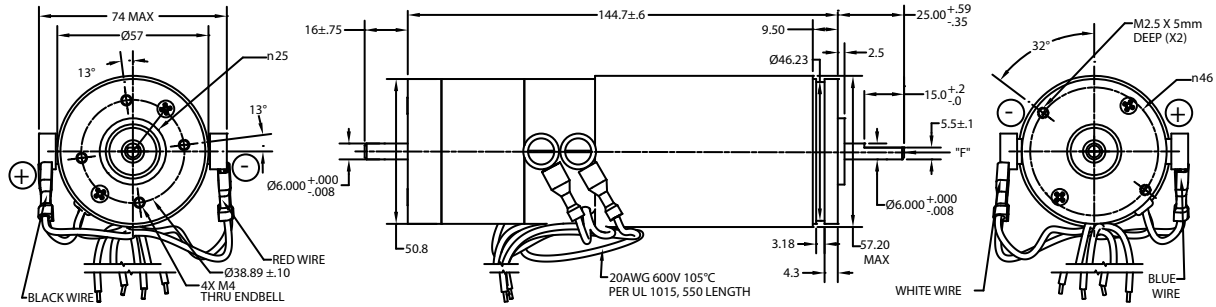
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



Specification	Units	Part/Model Number	ID23005
Supply Voltage	VDC		60
Continuous Stall Torque	lb-in Nm		3.56 0.402
Speed @ Cont. Torque	RPM		3400
Current @ Cont. Torque	Amps (A)		4.14
Continuous Output Power	Watts (W)		128
Motor Constant	lb-in/sqrt W Nm/sqrt W		.71 0.08
Torque Constant	lb-in/A Nm/A		1.07 0.121
Voltage Constant	V/krpm V/rad/s		12.70 0.121
Terminal Resistance	Ohms		2.23
Inductance	mH		6.40
Max. Speed	RPM		6000
Peak Current	Amps (A)		25.90
Peak Torque	lb-in Nm		25.00 2.825
Thermal Time Constant	min		20.00
Thermal Resistance	Celsius/W		2.26
Max. Winding Temperature	Celsius		155
Rotor Inertia	lb-in-sec ² kg-m ²		5.56E-4 6.28E-5
Weight	Lbs Kg		3.50 1.6



This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



		Part/Model Number
Specification	Units	ID23205
Supply Voltage	VDC	60
Continuous Stall Torque	lb-in	1.88
	Nm	0.212
Speed @ Cont. Torque	RPM	6000
Current @ Cont. Torque	Amps (A)	4.98
Continuous Output Power	Watts (W)	101
Motor Constant	lb-in/sqrt W	.46
	Nm/sqrt W	0.05
Torque Constant	lb-in/A	.490
	Nm/A	0.055
Voltage Constant	V/krpm	5.80
	V/rad/s	0.055
Terminal Resistance	Ohms	1.16
Inductance	mH	1.40
Max. Speed	RPM	6000
Peak Current	Amps (A)	34.88
Peak Torque	lb-in	15.00
	Nm	1.695
Thermal Time Constant	min	15.00
Thermal Resistance	Celsius/W	2.98
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ²	2.37E-4
	kg-m ²	2.68E-5
Weight	Lbs	2.20
	Kg	1

Motor Performance

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip=2 Ic)
- 4 = Tp motor

36 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip=2 Ic)
- 4 = Tp motor

Standard Features

- Tachometer Properties
- Voltage Sensitivity: 14 V/KRPM
- Voltage Ripple (Max. peak to peak) 5%
- Linearity: 0.2% Max
- Temp Coef: -0.05% / °C

Complementary Products

- Encoders
- Gearboxes
- Brakes
- Tachometers

Notes

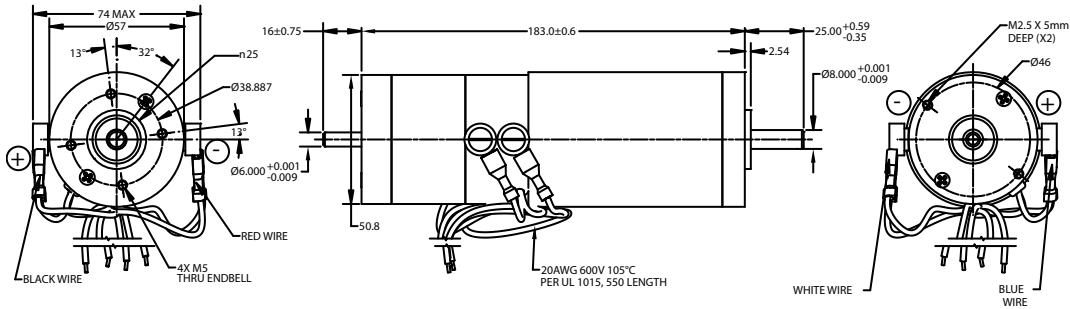
1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25"

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

Brush Commutated DC Servo Motors

ID23000 Series

ID23206 (A28531)



		Part/Model Number
Specification	Units	ID23206
Supply Voltage	VDC	60
Continuous Stall Torque	lb-in	3.00
	Nm	0.339
Speed @ Cont. Torque	RPM	3400
Current @ Cont. Torque	Amps (A)	4.14
Continuous Output Power	Watts (W)	128
Motor Constant	lb-in/sqrt W	.72
	Nm/sqrt W	0.08
Torque Constant	lb-in/A	1.07
	Nm/A	0.121
Voltage Constant	V/krpm	12.70
	V/rad/s	0.121
Terminal Resistance	Ohms	2.23
Inductance	mH	6.40
Max. Speed	RPM	4700
Peak Current	Amps (A)	25.90
Peak Torque	lb-in	25.00
	Nm	2.825
Thermal Time Constant	min	20.00
Thermal Resistance	Celsius/W	2.26
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ²	5.56E-4
	kg-m ²	6.28E-5
Weight	Lbs	3.50
	Kg	1.6

Motor Performance

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

48 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

Standard Features

- Tachometer Properties
 - Voltage Sensitivity: 14 V/KRPM
 - Voltage Ripple 5%
- Metric Mounting
- 2 Pole Stator

Complementary Products

- Gearboxes
- Brakes
- Tachometers

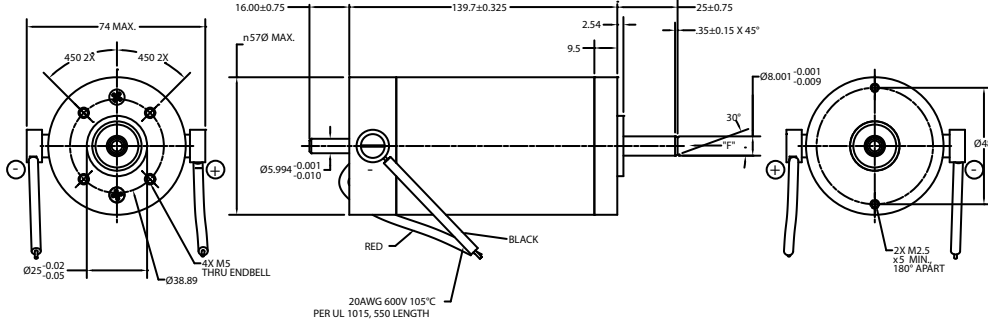
Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25"

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

PITTMAN PRODUCTS
 343 Godshall Drive, Harleysville, PA 19438
 USA: +1 267 933 2105 - Europe: +33 240928751 - Asia: +86 21 5763 1258
www.pittman-motors.com

ID23204 (A28521)



		Part/Model Number
Specification	Units	ID23204
Supply Voltage	VDC	60
Continuous Stall Torque	lb-in	3.00
	Nm	0.339
Speed @ Cont. Torque	RPM	3400
Current @ Cont. Torque	Amps (A)	4.14
Continuous Output Power	Watts (W)	128
Motor Constant	lb-in/sqrt W	.72
	Nm/sqrt W	0.08
Torque Constant	lb-in/A	1.07
	Nm/A	0.121
Voltage Constant	V/krpm	12.70
	V/rad/s	0.121
Terminal Resistance	Ohms	2.23
Inductance	mH	6.40
Max. Speed	RPM	4700
Peak Current	Amps (A)	25.90
Peak Torque	lb-in	25.00
	Nm	2.825
Thermal Time Constant	min	20.00
Thermal Resistance	Celsius/W	2.26
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ²	5.56E-4
	kg-m ²	6.28E-5
Weight	Lbs	3.50
	Kg	1.6

Motor Performance

60 Vdc

Graph showing Torque (lb-in) vs Speed (KRPM) for 60 Vdc. The y-axis ranges from 0.00 to 27.00 lb-in. The x-axis ranges from 0 to 5 KRPM. Four curves are shown: 1 = Trated (solid blue), 2 = Tcont (dashed blue), 3 = Tp (Ip=2 Ic) (solid black), and 4 = Tp motor (dashed black). The Tp motor curve shows the highest torque, reaching approximately 24.5 lb-in at 0 KRPM and dropping to 0 at 4.5 KRPM.

48 Vdc

Graph showing Torque (lb-in) vs Speed (KRPM) for 48 Vdc. The y-axis ranges from 0.00 to 21.00 lb-in. The x-axis ranges from 0 to 4 KRPM. Four curves are shown: 1 = Trated (solid blue), 2 = Tcont (dashed blue), 3 = Tp (Ip=2 Ic) (solid black), and 4 = Tp motor (dashed black). The Tp motor curve shows the highest torque, reaching approximately 19.5 lb-in at 0 KRPM and dropping to 0 at 3.5 KRPM.

Standard Features

- Metric Mounting
- 2 Pole Stator
- Dynamically Balanced Armature
- Ball Bearings

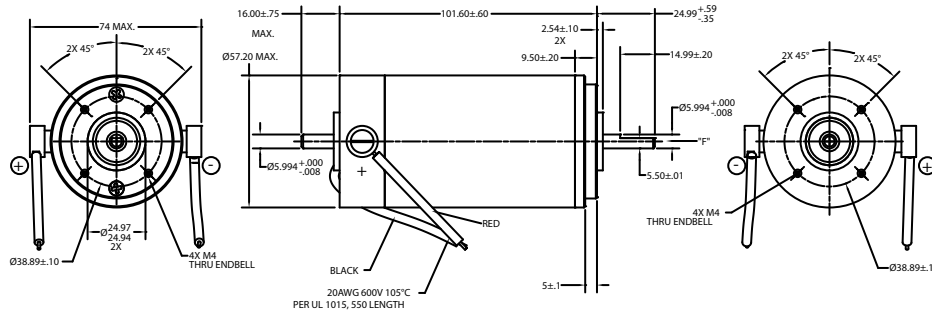
Complementary Products

- Encoders
- Gearboxes
- Brakes
- Tachometers

Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25"

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.



		Part/Model Number
Specification	Units	ID23201
Supply Voltage	VDC	60
Continuous Stall Torque	lb-in	1.88
	Nm	0.212
Speed @ Cont. Torque	RPM	6000
Current @ Cont. Torque	Amps (A)	3.91
Continuous Output Power	Watts (W)	93
Motor Constant	lb-in/sqrt W	.51
	Nm/sqrt W	0.06
Torque Constant	lb-in/A	0.625
	Nm/A	0.071
Voltage Constant	V/krpm	7.40
	V/rad/s	0.071
Terminal Resistance	Ohms	1.52
Inductance	mH	3.39
Max. Speed	RPM	6000
Peak Current	Amps (A)	27.34
Peak Torque	lb-in	15.00
	Nm	1.695
Thermal Time Constant	min	15.00
Thermal Resistance	Celsius/W	3.71
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ²	2.37E-4
	kg-m ²	2.68E-5
Weight	Lbs	2.20
	Kg	1

Motor Performance

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

36 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

Standard Features

- Metric Mounting
- 2 Pole Stator
- Dynamically Balanced Armature
- Ball Bearings

Complementary Products

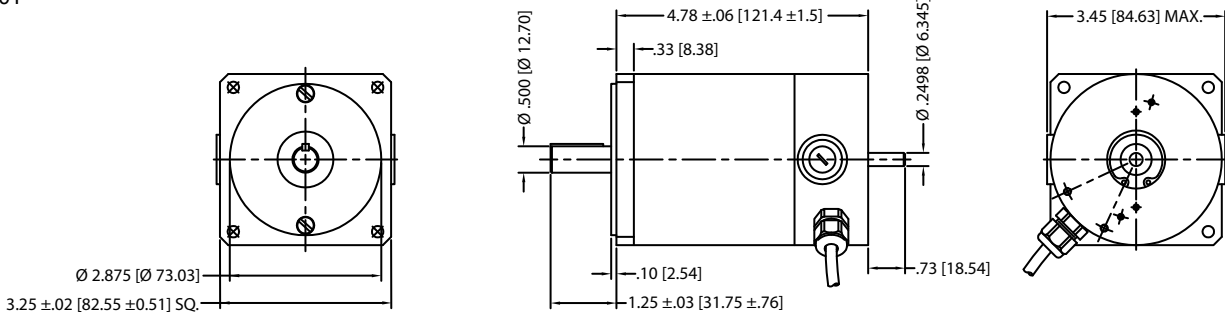
- Encoders
- Gearboxes
- Brakes
- Tachometers

Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25"

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

ID33001



Specification	Units	Part/Model Number	ID33001
Supply Voltage	VDC		90
Continuous Stall Torque	lb-in Nm		4.69 0.53
Speed @ Cont. Torque	RPM		4900
Current @ Cont. Torque	Amps (A)		5.75
Continuous Output Power	Watts (W)		165
Motor Constant	lb-in/sqrt W Nm/sqrt W		.92 0.1
Torque Constant	lb-in/A Nm/A		1.05 0.119
Voltage Constant	V/krpm V/rad/s		12.50 0.119
Terminal Resistance	Ohms		1.33
Inductance	mH		4.08
Max. Speed	RPM		6000
Peak Current	Amps (A)		5.75
Peak Torque	lb-in Nm		23.45 2.649
Thermal Time Constant	min		16.00
Thermal Resistance	Celsius/W		1.96
Max. Winding Temperature	Celsius		155
Rotor Inertia	lb-in-sec ² kg-m ²		.00119 1.34E-4
Weight	Lbs Kg		5.60 2.5

Motor Performance

90 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

Standard Features

- low and medium Ke's to accommodate low and medium bus voltage
- Voltage rating up to 90 VDC
- Dynamically Balanced Armatures
- 2 Pole Stator
- Ball Bearings

Complementary Products

- Encoders
- Gearboxes (consult factory)
- Brakes
- Tachometers

Notes

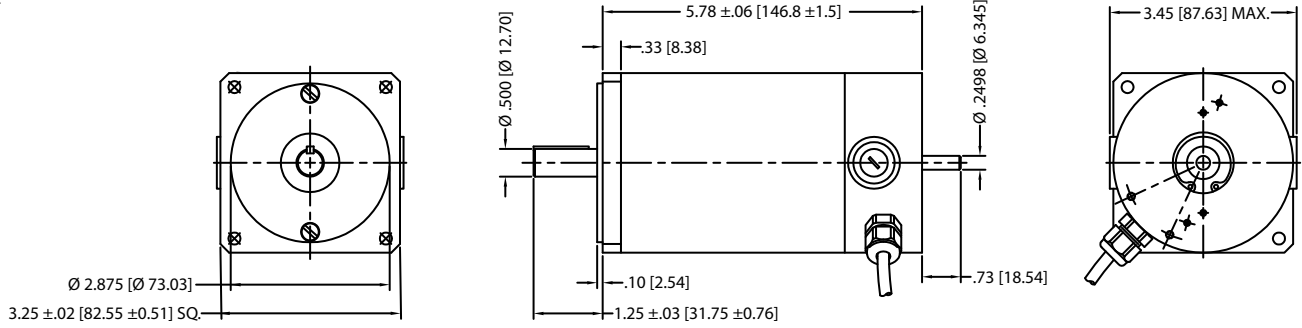
1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 12.0" x 12.0" x 0.50".

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

Brush Commutated DC Servo Motors

ID33000 Series

ID33002



Specification	Units	Part/Model Number
		ID33002
Supply Voltage	VDC	90
Continuous Stall Torque	lb-in Nm	7.50 0.847
Speed @ Cont. Torque	RPM	4000
Current @ Cont. Torque	Amps (A)	5.56
Continuous Output Power	Watts (W)	245
Motor Constant	lb-in/sqrt W Nm/sqrt W	1.47 0.17
Torque Constant	lb-in/A Nm/A	1.69 0.191
Voltage Constant	V/krpm V/rad/s	20.00 0.191
Terminal Resistance	Ohms	1.33
Inductance	mH	4.35
Max. Speed	RPM	6000
Peak Current	Amps (A)	38.93
Peak Torque	lb-in Nm	37.50 4.237
Thermal Time Constant	min	21.00
Thermal Resistance	Celsius/W	2.10
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ² kg-m ²	.0021 2.37E-4
Weight	Lbs Kg	7.20 3.3

Motor Performance

90 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

Standard Features

- low and medium Ke's to accommodate low and medium bus voltage
- Voltage rating up to 90 VDC
- Dynamically Balanced Armatures
- 2 Pole Stator
- Ball Bearings

Complementary Products

- Encoders
- Gearboxes (consult factory)
- Brakes
- Tachometers

Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 12.0" x 12.0" x 0.50".

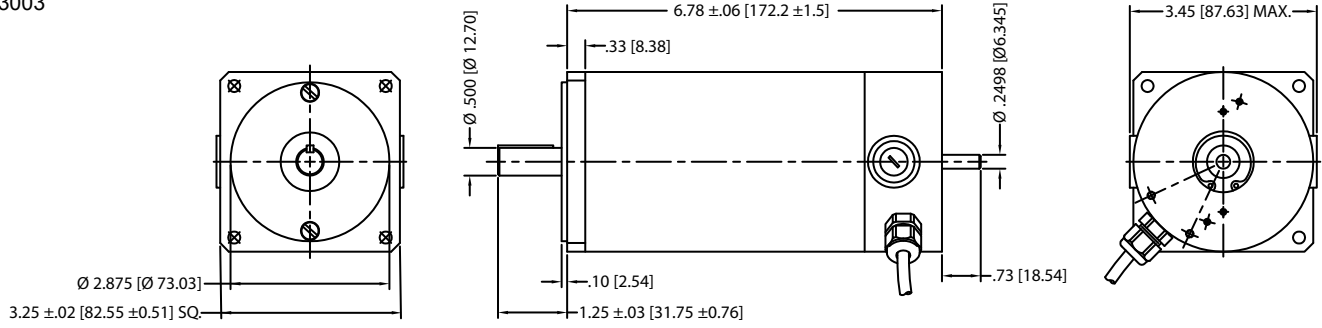
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

Brush Commutated DC Servo Motors

ID33000 Series



ID33003



Specification	Units	Part/Model Number
		ID33003
Supply Voltage	VDC	90
Continuous Stall Torque	lb-in Nm	10.60 1.198
Speed @ Cont. Torque	RPM	4400
Current @ Cont. Torque	Amps (A)	8.41
Continuous Output Power	Watts (W)	371
Motor Constant	lb-in/sqrt W Nm/sqrt W	1.87 0.21
Torque Constant	lb-in/A Nm/A	1.555 0.176
Voltage Constant	V/krpm V/rad/s	18.40 0.176
Terminal Resistance	Ohms	.69
Inductance	mH	2.35
Max. Speed	RPM	6000
Peak Current	Amps (A)	38.00
Peak Torque	lb-in Nm	53.1 6
Thermal Time Constant	min	25.00
Thermal Resistance	Celsius/W	1.77
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ² kg-m ²	.003 3.39E-4
Weight	Lbs Kg	8.80 4

Motor Performance

90 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip = 2 Ic)
- 4 = Tp motor

Standard Features

Complementary Products

- low and medium Ke's to accommodate low and medium bus voltage
- Voltage rating up to 90 VDC
- Dynamically Balanced Armatures
- 2 Pole Stator
- Ball Bearings

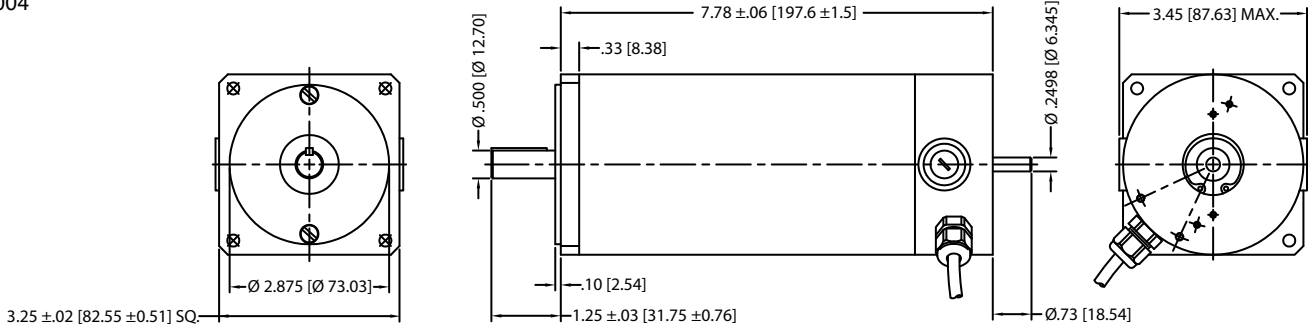
- Encoders
- Gearboxes (consult factory)
- Brakes
- Tachometers

Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 12.0" x 12.0" x 0.50".

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

ID33004



Specification	Units	Part/Model Number
		ID33004
Supply Voltage	VDC	90
Continuous Stall Torque	lb-in	14.10
	Nm	1.593
Speed @ Cont. Torque	RPM	3200
Current @ Cont. Torque	Amps (A)	8.56
Continuous Output Power	Watts (W)	447
Motor Constant	lb-in/sqrt W	2.16
	Nm/sqrt W	0.24
Torque Constant	lb-in/A	2.01
	Nm/A	0.227
Voltage Constant	V/krpm	23.80
	V/rad/s	0.227
Terminal Resistance	Ohms	.87
Inductance	mH	2.76
Max. Speed	RPM	6000
Peak Current	Amps (A)	38.80
Peak Torque	lb-in	70.30
	Nm	7.943
Thermal Time Constant	min	28.00
Thermal Resistance	Celsius/W	1.35
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ²	.00394
	kg-m ²	4.45E-4
Weight	Lbs	10.50
	Kg	4.8

Motor Performance

90 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip=2 Ic)
- 4 = Tp motor

60 Vdc

- 1 = Trated
- 2 = Tcont
- 3 = Tp (Ip=2 Ic)
- 4 = Tp motor

Standard Features

- low and medium Ke's to accommodate low and medium bus voltage
- Voltage rating up to 90 VDC
- Dynamically Balanced Armatures
- 2 Pole Stator
- Ball Bearings

Complementary Products

- Encoders
- Gearboxes (consult factory)
- Brakes
- Tachometers

Notes

1 Test conditions: Motor operated at rated winding temperature, mounted to an aluminum heat-sink.
 2 Aluminum Heat-sink: 12.0" x 12.0" x 0.50"

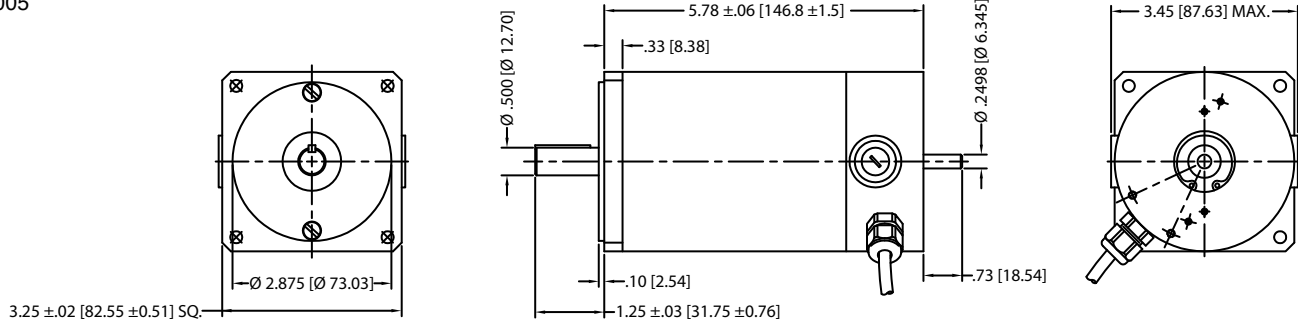
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

Brush Commutated DC Servo Motors

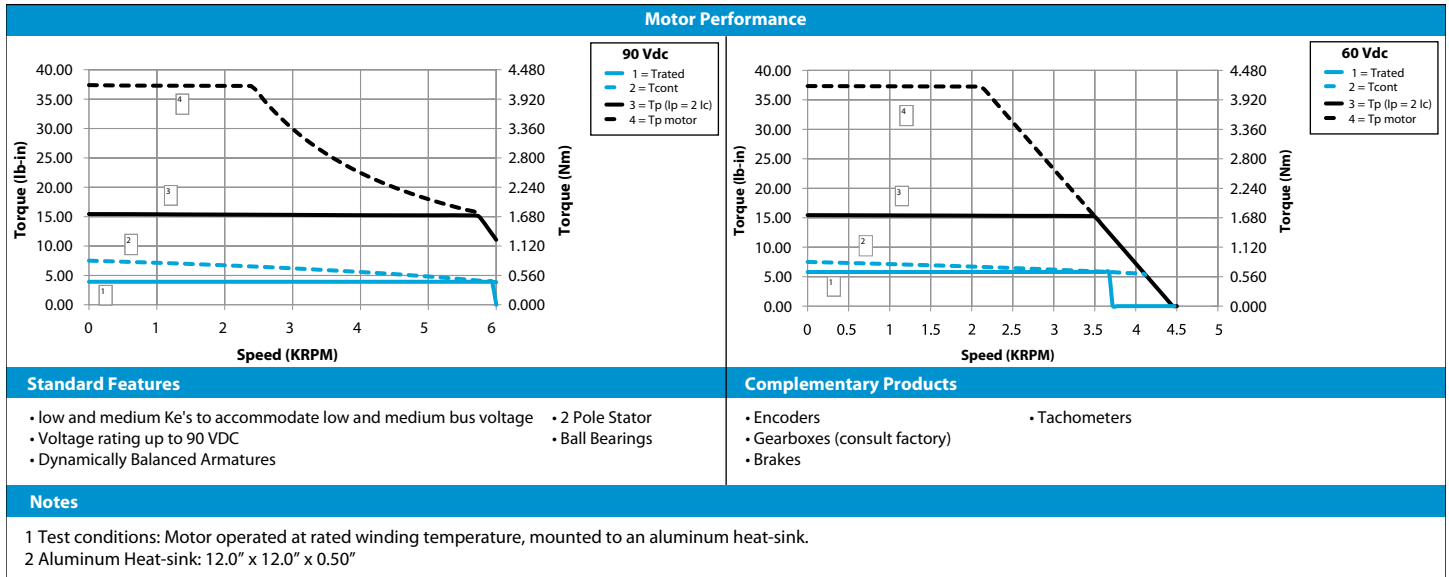
ID33000 Series

ID33005

PITTMAN®



Specification	Units	Part/Model Number
		ID33005
Supply Voltage	VDC	90
Continuous Stall Torque	lb-in	7.50
	Nm	0.847
Speed @ Cont. Torque	RPM	6000
Current @ Cont. Torque	Amps (A)	8.33
Continuous Output Power	Watts (W)	323
Motor Constant	lb-in/sqrt W	1.24
	Nm/sqrt W	0.14
Torque Constant	lb-in/A	1.13
	Nm/A	0.128
Voltage Constant	V/krpm	13.36
	V/rad/s	0.128
Terminal Resistance	Ohms	.83
Inductance	mH	2.31
Max. Speed	RPM	6000
Peak Current	Amps (A)	33.20
Peak Torque	lb-in	37.50
	Nm	4.237
Thermal Time Constant	min	21.00
Thermal Resistance	Celsius/W	1.49
Max. Winding Temperature	Celsius	155
Rotor Inertia	lb-in-sec ²	.0021
	kg-m ²	2.37E-4
Weight	Lbs	7.20
	Kg	3.3



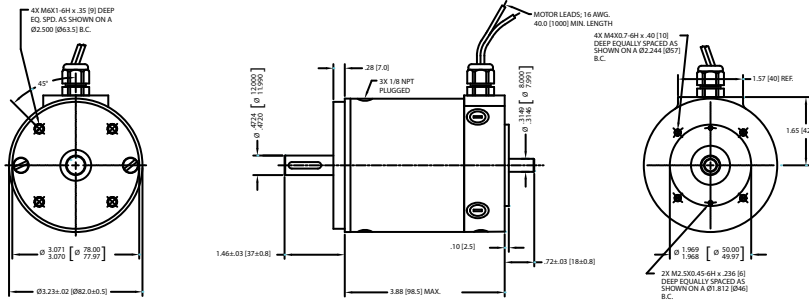
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

PITTMAN PRODUCTS
 343 Godshall Drive, Harleysville, PA 19438
 USA: +1 267 933 2105 - Europe: +33 240928751 - Asia: +86 21 5763 1258
www.pittman-motors.com

Brush Commutated DC Servo Motors

ID33000 Series

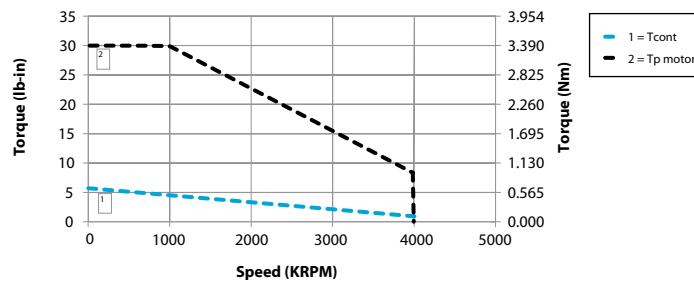
ID33901 / ID33902 (A27521 / A28311)



Part/Model Number

Specification	Units	ID33901	ID33902
Supply Voltage	VDC	60	60
Continuous Stall Torque	lb-in Nm	5.8 0.655	5.8 0.655
Current @ Cont. Stall Torq.	Amps (A)	8.0	5.2
Motor Constant	lb-in/sqrt W Nm/sqrt W	0.87 0.1	1.04 0.12
Torque Constant	lb-in/A Nm/A	0.73 0.082	1.13 0.128
Voltage Constant	V/krpm V/rad/s	8.6 0.082	13.4 0.128
Terminal Resistance	Ohms	0.70	1.18
Inductance	mH	0.42	0.86
Max. Speed	RPM	4000	4000
Peak Current	Amps (A)	40	26
Peak Torque	lb-in Nm	29.2 3.299	29.2 3.299
Thermal Time Constant	min	16.00	16.00
Thermal Resistance	Celsius/W	2.7	2.7
Max. Winding Temperature	Celsius	155	155
Rotor Inertia	lb-in-sec ² kg-m ²	0.02 0.00226	0.02 0.00226
Weight	Lbs Kg	4.4 2	4.4 2

Motor Performance



Standard Features

- ID33901 with 14V/KRPM Tachometer; ID33907
- ID33902 with 14V/KRPM Tachometer; ID33906
- Dynamically balanced armatures

- Metric Mounting
- 4 Pole Stator

Complementary Products

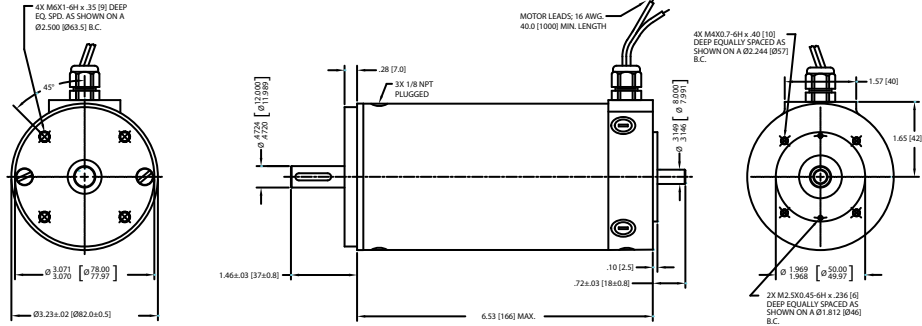
- Encoders
- Gearboxes (consult factory)
- Brakes
- Tachometer

Notes

- 1 Test conditions: 25°C
- 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25".

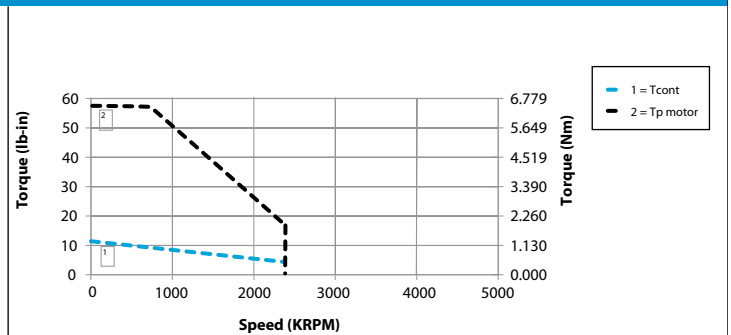
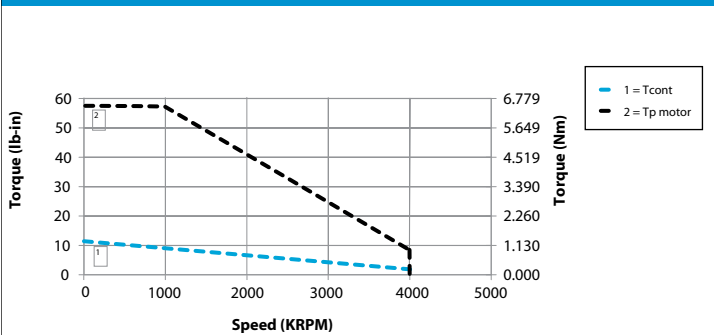
This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.

PITTMAN PRODUCTS
 343 Godshall Drive, Harleysville, PA 19438
 USA: +1 267 933 2105 - Europe: +33 240928751 - Asia: +86 21 5763 1258
www.pittman-motors.com



		Part/Model Number	
Specification	Units	ID33904	ID33905
Supply Voltage	VDC	60	60
Continuous Stall Torque	lb-in	12.5	12.5
	Nm	1.412	1.412
Current @ Cont. Stall Torq.	Amps (A)	5.8	10.7
Continuous Output Power	Watts (W)	212	280
Motor Constant	lb-in/sqrt W	1.32	1.86
	Nm/sqrt W	0.15	0.21
Torque Constant	lb-in/A	1.13	2.14
	Nm/A	0.128	0.242
Voltage Constant	V/krpm	13.4	25.3
	V/rad/s	0.128	0.242
Terminal Resistance	Ohms	0.74	1.32
Inductance	mH	0.64	1.9
Max. Speed	RPM	4000	2400
Peak Current	Amps (A)	49.0	26.3
Peak Torque	lb-in	56.3	56.3
	Nm	6.361	6.361
Thermal Time Constant	min	25	25
Thermal Resistance	Celsius/W	1.9	1.9
Max. Winding Temperature	Celsius	155	155
Rotor Inertia	lb-in-sec ²	0.0336	0.0336
	kg-m ²	3.80E-3	3.80E-3
Weight	Lbs	8.6	8.6
	Kg	3.9	3.9

Motor Performance



Standard Features

- ID33904 with 14V/KRPM Tachometer; ID33909
- Dynamically Balanced Armatures
- 4 Pole Stator
- Ball Bearings
- Metric Mounting

Complementary Products

- Encoders
- Gearboxes (consult factory)
- Brakes
- Tachometer

Notes

- 1 Test conditions: 25°C
- 2 Aluminum Heat-sink: 10.0" x 10.0" x 0.25".

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. Actual performance will vary depending on the operating environment and application. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For products designed to meet specific applications, contact PITTMAN Motor Sales Department.