

Brushless Torque Motors

HT Series High Torque Brushless Torque Motors

High Torque Density, Sinusoidal BEMF, Frameless

Allied Motion's HT (High Torque) series of frameless brushless torque motors are available in six diameters from 26.7 mm (1.05 in) to 127 mm (5 in) with three stack lengths each. Continuous torque ratings range from 0.021 Nm (2.9 oz-in) to 4.4 Nm (693 oz-in). Winding voltage is 24 VDC or 100 VDC, depending upon model. Hall effect commutation sensors are integral to the motor, and require no setup on the part of the user.

The standard HT series motors are especially well suited for direct integration into applications that demand high power density motors with minimum size, weight, and inertia. Non-standard models of the HT series are also available in stator diameters from 19.3 mm (0.76 in) to 239 mm (9.42 in).

Typical applications for the HT series are semiconductor processing equipment, medical systems including life support, robotic systems, laser

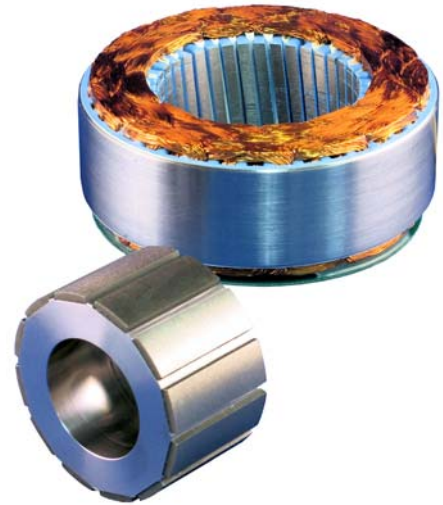
sighting and control, and cryogenic cooling pumps, to name a few.

Features & Benefits

- Frameless high torque-to-inertia motors with continuous torque rating up to 623 oz-in (4.4 Nm)
- Frame diameters from 26.7 mm (1.05 in) to 127mm (5 in).
- Continuous power ratings from 11 W to 464 W.
- High energy neodymium iron boron magnets as standard.
- Integral hall-effect commutation sensors

Options

- Samarium Cobalt magnets for very high temperature environments.
- Available non-standard designs with stator diameter from 19.3 mm (0.76 in) to 239 mm (9.42 in).
- Housed versions with feedback (encoder or resolver).
- Custom design versions



- High torque density frameless motors.
- Continuous torque from 0.021 Nm (2.9 oz-in) to 4.4 Nm (693 oz-in)
- Continuous power ratings from 11 W to 464 W.

SPECIFICATIONS SUMMARY

Model	Units	HT0100x	HT0150x	HT0200x	HT0230x	HT0380x	HT0500x
Cont. Stall Torque	oz-in	2.9 - 8.9	7 - 19	16 - 46	30 - 88	99 - 290	201 - 623
	Nm	0.021 - 0.063	0.048 - 0.133	0.114 - 0.326	0.215 - 0.620	0.70 - 2.05	1.41 - 4.40
Motor Constant	oz-in/√W	1.40 - 3.71	2.34 - 5.94	4.8 - 12.7	7.9 - 20.8	17.7 - 48.5	30.2 - 86.9
	Nm/√W	0.018 - 0.098	0.017 - 0.042	0.034 - 0.090	0.034 - 0.066	0.12 - 0.34	0.21 - 0.61
Design Voltage	VDC	24				100	
No Load Speed	RPM	5400 - 8580	3499 - 7301	989 - 2112	932 - 2027	778 - 1639	602 - 1477

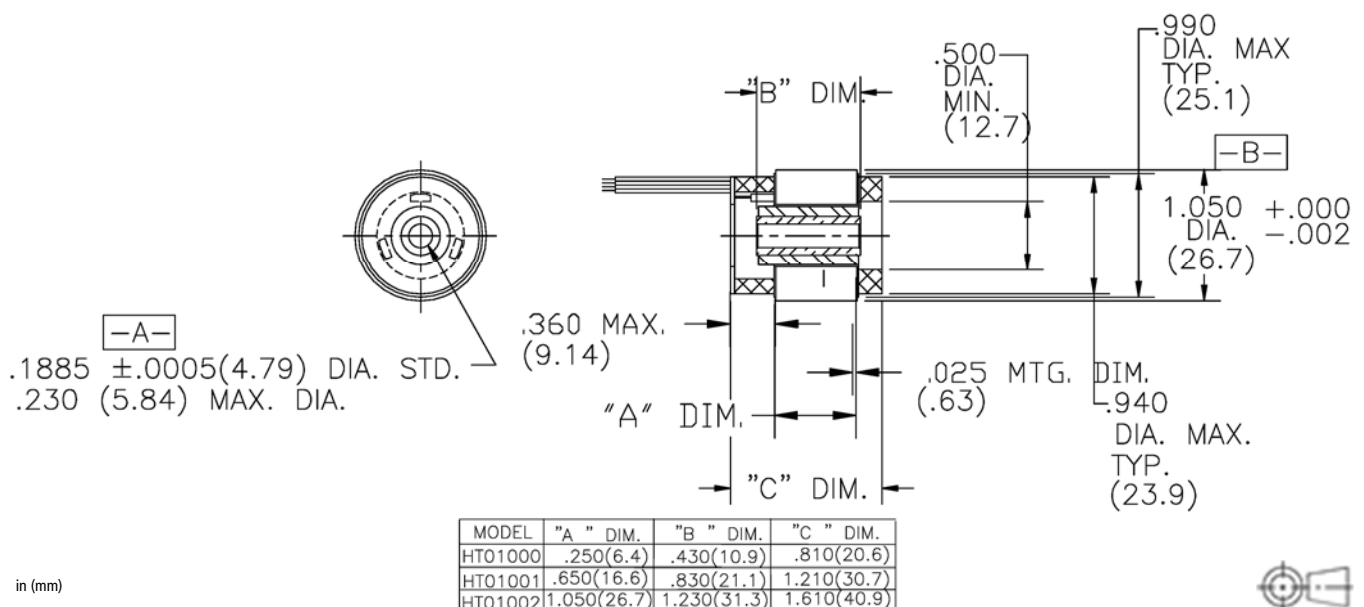
Brushless Torque Motors

High Torque Series Brushless Torque Motors

SPECIFICATIONS

Model No.		HT01000	HT01001	HT01002
Stall Torque	oz-in	2.9	5.9	8.9
	Nm	0.021	0.042	0.063
Peak Torque (±25%)	oz-in	35	75	117
	Nm	0.24	0.53	0.83
Motor Constant	oz-in/W ^{1/2}	1.40	2.62	3.71
	Nm/W ^{1/2}	0.098	0.018	0.026
Elect. Time Constant	ms	0.18	0.30	0.39
Mech. Time Constant	ms	1.8	0.9	0.7
Thermal Resistance	°C/W	10.8	9.3	8.2
Viscous Damping	oz-in/RPM	4.3E-5	8.8E-5	1.3E-4
	Nm/RPM	3.0E-7	6.3E-7	9.0E-7
Cogging Torque (max.)	oz-in	0.4	0.6	0.7
	Nm	0.003	0.004	0.005
Rotor Inertia	oz-in-s ²	2.2E-5	4.4E-5	6.6E-5
	kg-m ²	1.6E-7	3.1E-7	4.7E-7
Motor Weight	oz	1.2	2.3	3.3
	kg	0.04	0.06	0.09
Poles	-	-	6	-
Winding	-	-	A	-
Design Voltage	V	-	24	-
Peak Torque	oz-in	13	33	56
	Nm	0.09	0.23	0.39
Peak Current	A	3.5	6.5	9.5
Torque Constant	oz-in/A	3.6	5.0	5.9
	Nm/A	0.03	0.04	0.04
No-Load Speed	RPM	8580	6280	5400
	rad/s	898	658	565
Back EMF Constant	V/kRPM	2.7	3.7	4.4
	V/rad/s	0.03	0.04	0.04
Resistance (ph-ph, ±12%)	Ohms	6.76	3.70	2.52
Inductance (ph-ph, ±30%)	mH	1.24	1.12	0.99

DIMENSIONS

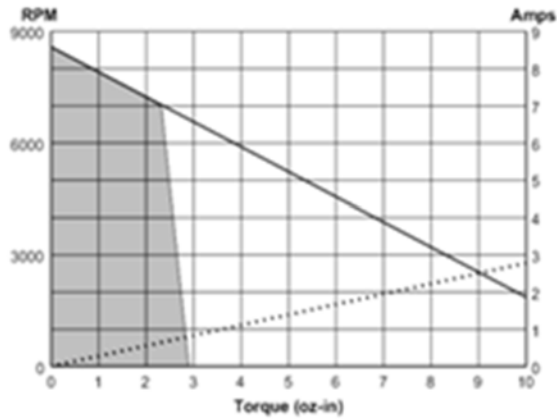


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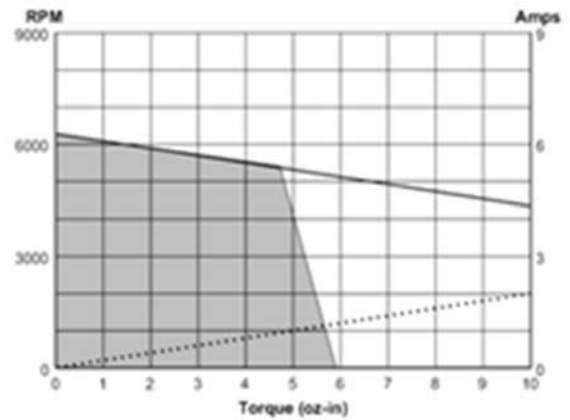
High Torque Series Brushless Torque Motors

PERFORMANCE

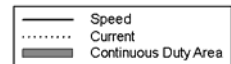
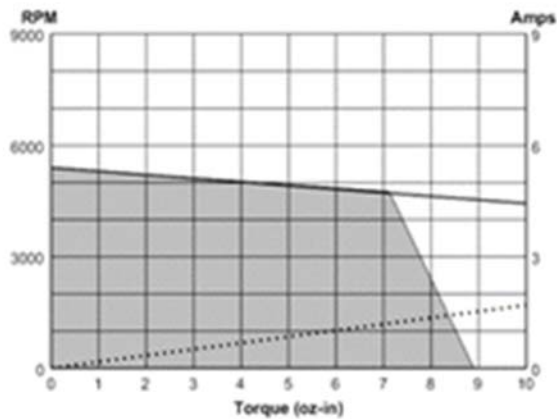
HT01000-A00



HT01001-A00

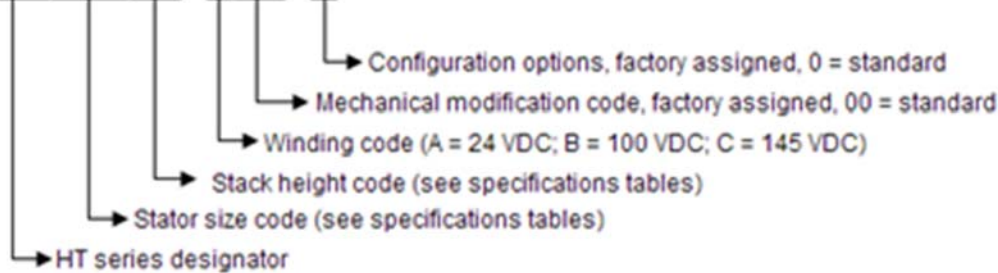


HT01002-A00



MODEL NUMBERING

HT01000 - A00 - 0



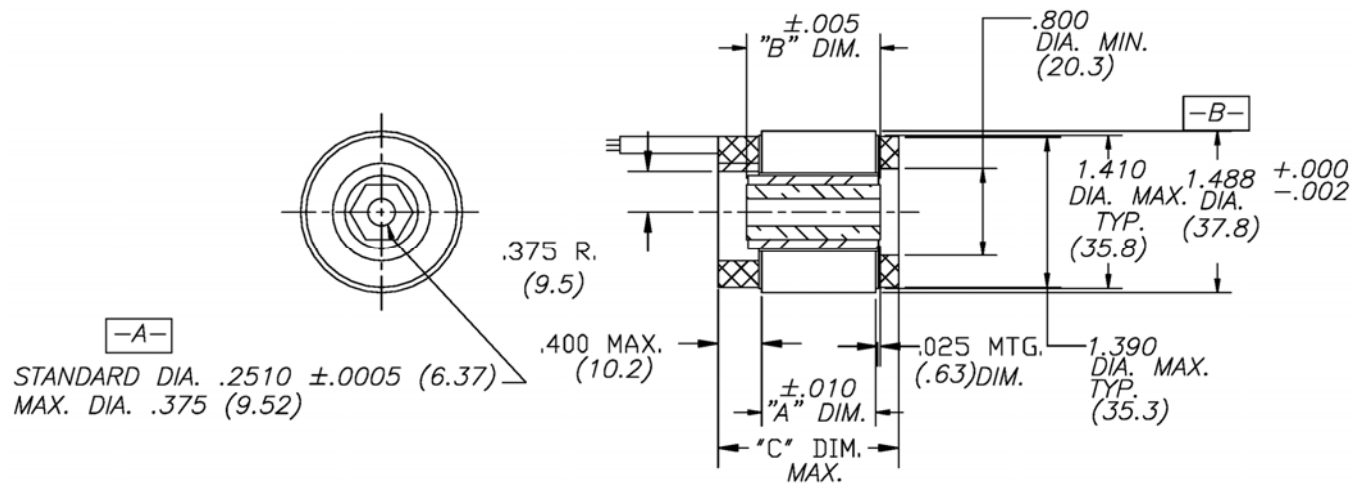
Brushless Torque Motors

High Torque Series Brushless Torque Motors

SPECIFICATIONS

Model No.		HT01500	HT01501	HT01502
Stall Torque	oz-in	7	13	19
	Nm	0.048	0.092	0.133
Peak Torque ($\pm 25\%$)	oz-in	83	166	254
	Nm	0.58	1.17	1.79
Motor Constant	oz-in/W ^{1/2}	2.34	4.33	5.94
	Nm/W ^{1/2}	0.017	0.031	0.042
Elect. Time Constant	ms	0.28	0.49	0.66
Mech. Time Constant	ms	3.0	1.7	1.3
Thermal Resistance	$^{\circ}\text{C}/\text{W}$	6.6	6.0	5.4
Viscous Damping	oz-in/RPM	6.6E-5	1.3E-4	1.8E-4
	Nm/RPM	4.7E-7	9.1E-7	1.3E-6
Cogging Torque (max.)	oz-in	0.7	1.2	1.8
	Nm	0.005	0.009	0.013
Rotor Inertia	oz-in-s ²	1.0E-4	2.0E-4	3.1E-4
	kg-m ²	7.3E-7	1.4E-6	2.1E-6
Motor Weight	oz	2.5	4.6	6.8
	kg	0.07	0.13	0.19
Poles	-	-	6	-
Winding	-	-	A	-
Design Voltage	V	-	24	-
Peak Torque	oz-in	30	60	92
	Nm	0.21	0.43	0.65
Peak Current	A	6.9	8.1	10.1
Torque Constant	oz-in/A	4.3	7.4	9.1
	Nm/A	0.03	0.05	0.06
No-Load Speed	RPM	7301	4290	3499
	rad/s	765	202	366
Back EMF Constant	V/kRPM	3.2	5.5	6.8
	V/rad/s	0.03	0.05	0.06
Resistance (ph-ph, $\pm 12\%$)	Ohms	3.46	2.96	2.38
Inductance (ph-ph, $\pm 30\%$)	mH	0.96	1.44	1.57

DIMENSIONS



MODEL	"A" DIM.	"B" DIM.	"C" DIM.
HT01500	.250 (6.4)	.430 (10.9)	.860 (21.9)
HT01501	.650 (16.6)	.830 (21.1)	1.260 (32.0)
HT01502	1.050 (26.7)	1.230 (31.3)	1.660 (42.2)

in (mm)

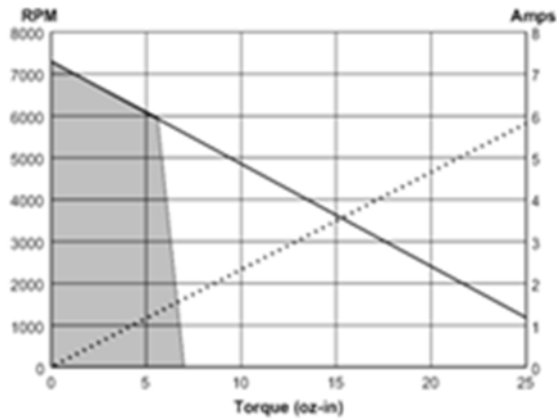


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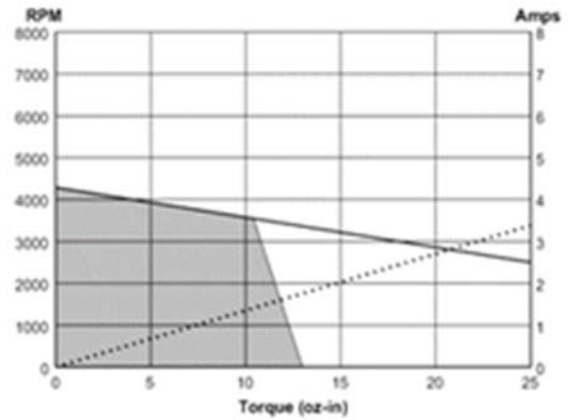
High Torque Series Brushless Torque Motors

PERFORMANCE

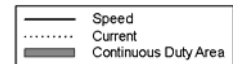
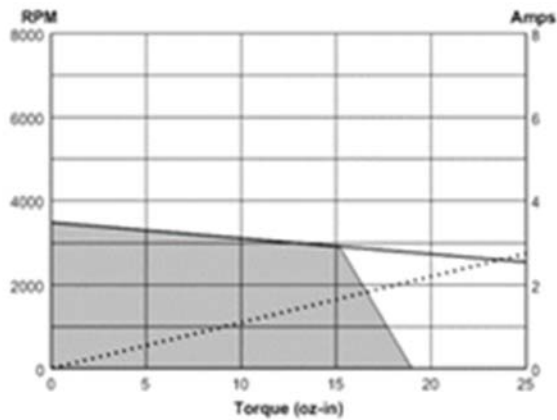
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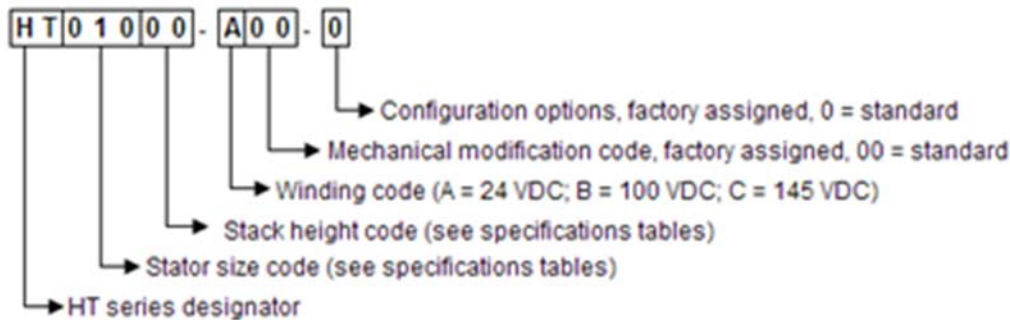
HT01501-A00



HT01502-A00



MODEL NUMBERING



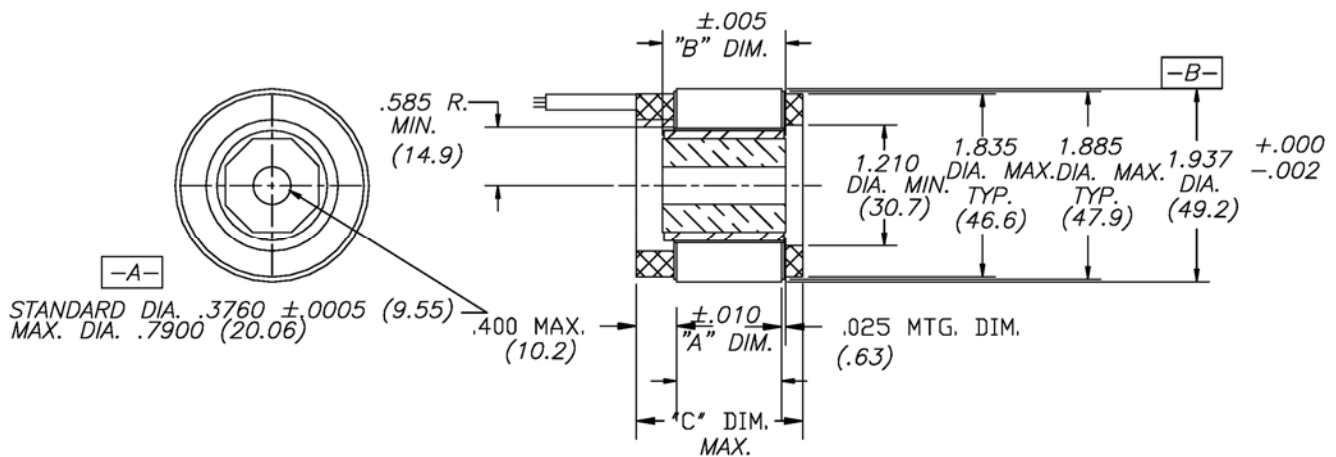
Brushless Torque Motors

High Torque Series Brushless Torque Motors

SPECIFICATIONS

Model No.		HT02000	HT02001	HT02002
Stall Torque	oz-in	16	32	46
	Nm	0.114	0.229	0.326
Peak Torque ($\pm 25\%$)	oz-in	188	448	702
	Nm	1.33	3.16	4.95
Motor Constant	oz-in/W ^{1/2}	4.8	9.3	12.7
	Nm/W ^{1/2}	0.034	0.066	0.090
Elect. Time Constant	ms	0.25	0.47	0.63
Mech. Time Constant	ms	5.0	2.5	2.0
Thermal Resistance	$^{\circ}\text{C}/\text{W}$	4.8	4.4	4.1
Viscous Damping	oz-in/RPM	2.7E-4	5.5E-4	8.2E-4
	Nm/RPM	1.9E-6	3.9E-6	5.8E-6
Cogging Torque (max.)	oz-in	1.1	2.2	2.4
	Nm	0.008	0.016	0.017
Rotor Inertia	oz-in-s ²	7.3E-4	1.4E-3	2.1E-3
	kg-m ²	5.2E-6	1.0E-5	1.5E-5
Motor Weight	oz	4.2	7.8	11.4
	kg	0.12	0.22	0.32
Poles	-	-	8	-
Winding	-	-	A	-
Design Voltage	V	-	24	-
Peak Torque	oz-in	68	163	255
	Nm	0.48	1.15	1.80
Peak Current	A	8.6	12.8	16.8
Torque Constant	oz-in/A	8.0	12.7	15.2
	Nm/A	0.06	0.09	0.11
No-Load Speed	RPM	3986	2521	2112
	rad/s	417	264	221
Back EMF Constant	V/kRPM	5.9	9.4	11.2
	V/rad/s	0.06	0.09	0.11
Resistance (ph-ph, $\pm 12\%$)	Ohms	2.81	1.87	1.43
Inductance (ph-ph, $\pm 30\%$)	mH	0.71	0.88	0.90

DIMENSIONS



MODEL	"A" DIM.	"B" DIM.	"C" DIM.
HT02000	.250 (6.4)	.430 (10.9)	.862 (21.9)
HT02001	.650 (16.6)	.830 (21.1)	1.262 (32.1)
HT02002	1.050 (26.7)	1.230 (31.3)	1.662 (42.2)

in (mm)

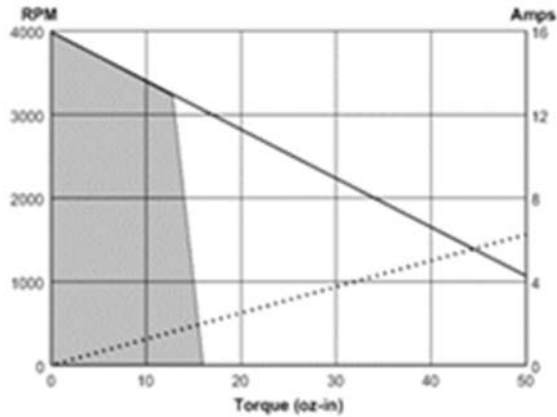


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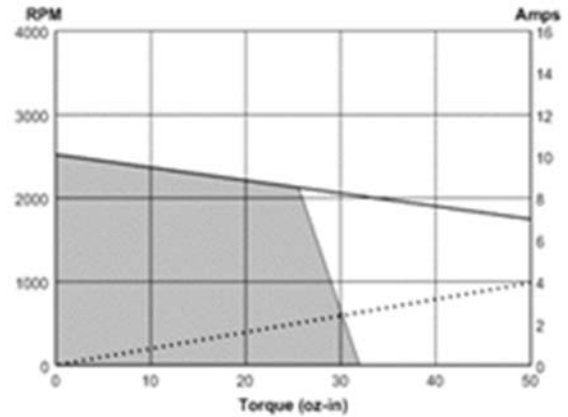
High Torque Series Brushless Torque Motors

PERFORMANCE

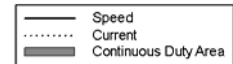
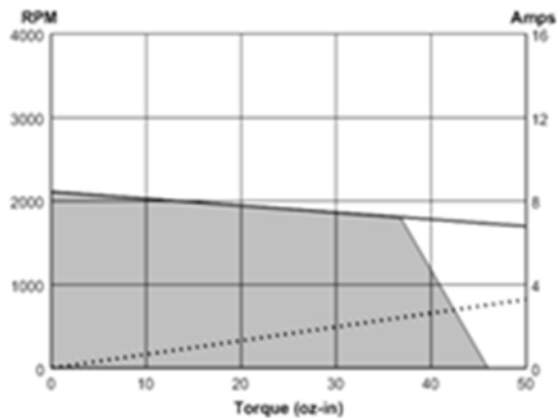
HT02000-A00



HT02001-A00

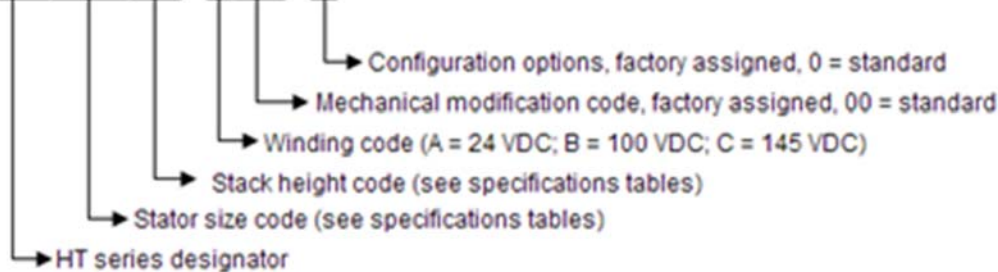


HT02002-A00



MODEL NUMBERING

HT01000 - A00 - 0



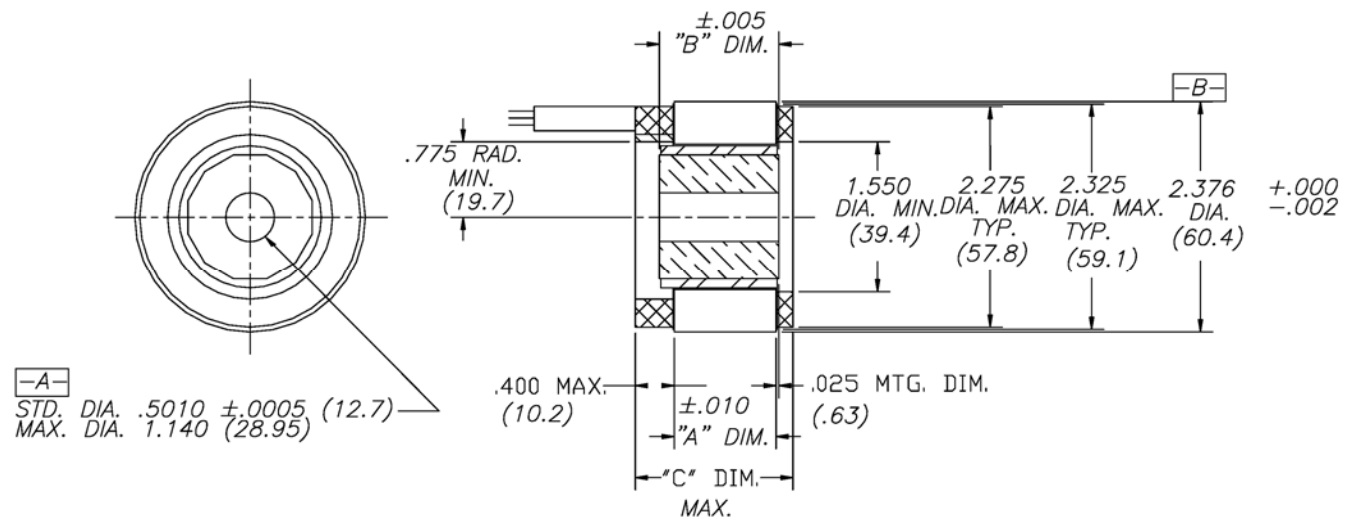
Brushless Torque Motors

High Torque Series Brushless Torque Motors

SPECIFICATIONS

Model No.		HT02300	HT02301	HT02302
Stall Torque	oz-in	30	61	88
	Nm	0.215	0.413	0.620
Peak Torque ($\pm 25\%$)	oz-in	329	675	1035
	Nm	2.32	4.76	7.31
Motor Constant	oz-in/W ^{1/2}	7.9	15.0	20.8
	Nm/W ^{1/2}	0.056	0.106	0.147
Elect. Time Constant	ms	0.34	0.61	0.83
Mech. Time Constant	ms	5.3	2.8	2.2
Thermal Resistance	$^{\circ}\text{C}/\text{W}$	3.7	3.3	3.1
Viscous Damping	oz-in/RPM	8.2E-4	1.6E-3	2.4E-3
	Nm/RPM	5.8E-6	1.1E-5	1.7E-5
Cogging Torque (max.)	oz-in	1.9	2.8	3.8
	Nm	0.014	0.020	0.027
Rotor Inertia	oz-in-s ²	2.1E-3	4.2E-3	6.3E-3
	kg-m ²	1.4E-5	2.9E-5	4.5E-5
Motor Weight	oz	6.0	11.5	17.0
	kg	0.17	0.33	0.48
Poles	-	-	12	-
Winding	-	-	A	-
Design Voltage	V	-	24	-
Peak Torque	oz-in	97	199	305
	Nm	0.68	1.40	2.15
Peak Current	A	6.2	7.2	8.9
Torque Constant	oz-in/A	15.6	27.5	34.3
	Nm/A	0.11	0.19	0.24
No-Load Speed	RPM	2027	1161	932
	rad/s	212	122	98
Back EMF Constant	V/kRPM	11.6	20.3	25.4
	V/rad/s	0.11	0.19	.24
Resistance (ph-ph, $\pm 12\%$)	Ohms	3.89	3.32	2.70
Inductance (ph-ph, $\pm 30\%$)	mH	1.32	2.02	2.24

DIMENSIONS



in (mm)



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Issued: February 11, 2009

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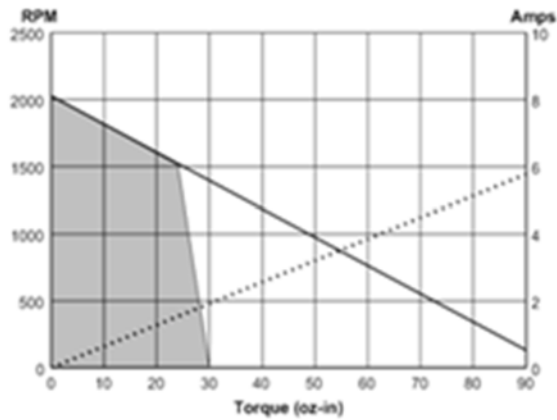
Specifications subject to change without notice

Brushless Torque Motors

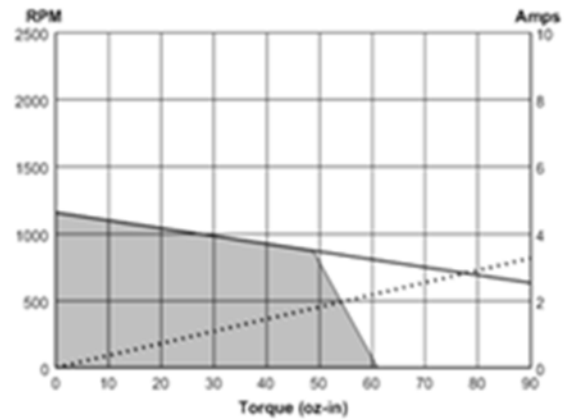
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PERFORMANCE

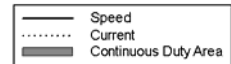
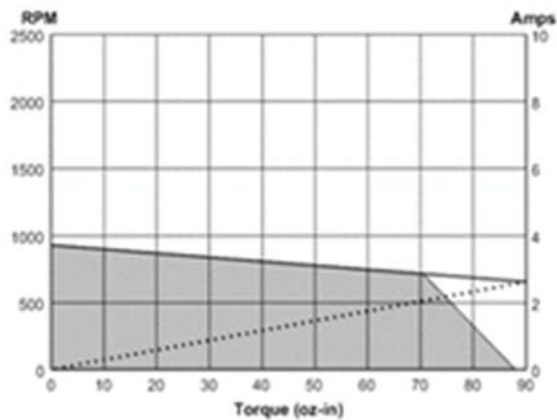
HT02300-A00



HT02301-A00

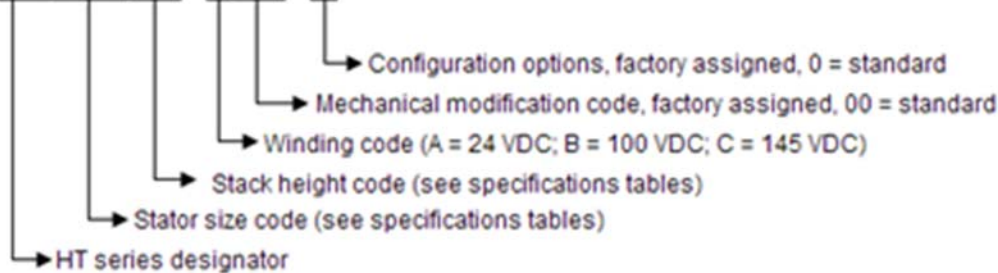


HT02302-A00



MODEL NUMBERING

HT01000 - A00 - 0



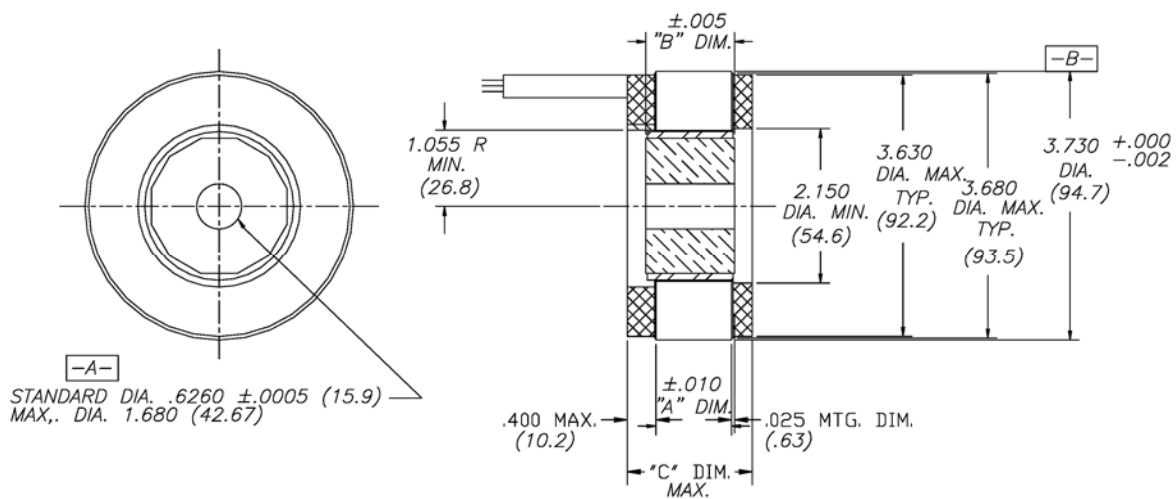
Brushless Torque Motors

High Torque Series Brushless Torque Motors

SPECIFICATIONS

Model No.		HT03800	HT03801	HT03802
Stall Torque	oz-in	99	204	290
	Nm	0.70	1.43	2.05
Peak Torque ($\pm 25\%$)	oz-in	674	1681	2392
	Nm	4.7	11.8	16.9
Motor Constant	oz-in/W ^{1/2}	17.7	34.9	48.5
	Nm/W ^{1/2}	0.12	0.25	0.34
Elect. Time Constant	ms	0.93	1.77	2.49
Mech. Time Constant	ms	4.1	2.0	1.6
Thermal Resistance	$^{\circ}\text{C}/\text{W}$	1.8	1.6	1.5
Viscous Damping	oz-in/RPM	2.0E-3	4.2E-3	6.3E-3
	Nm/RPM	1.4E-5	3.0E-5	4.4E-5
Cogging Torque (max.)	oz-in	2.9	6.1	8.1
	Nm	0.020	0.043	0.057
Rotor Inertia	oz-in-s ²	8.0E-3	1.7E-2	0.5E-2
	kg-m ²	0.6E-5	1.2E-4	1.8E-4
Motor Weight	oz	16.7	30.1	43.3
	kg	0.47	0.85	1.23
Poles	-	-	12	-
Winding	-	-	A	-
Design Voltage	V	-	100	-
Peak Torque	oz-in	385	961	1367
	Nm	2.72	6.78	9.65
Peak Current	A	4.73	7.54	7.93
Torque Constant	oz-in/A	81.4	127.4	172.3
	Nm/A	0.58	0.90	1.22
No-Load Speed	RPM	1639	1052	778
	rad/s	172	110	81
Back EMF Constant	V/kRPM	60.2	94.2	127.4
	V/rad/s	0.58	0.90	1.22
Resistance (ph-ph, $\pm 12\%$)	Ohms	21.12	13.26	12.61
Inductance (ph-ph, $\pm 30\%$)	mH	19.7	23.5	31.4

DIMENSIONS



MODEL	"A" DIM.	"B" DIM.	"C" DIM.
HT03800	.250(6.4)	.430(10.9)	.938(23.9)
HT03801	.650(16.6)	.830(21.1)	1.338(34.0)
HT03802	1.050(26.7)	1.230(31.3)	1.738(44.1)

in (mm)

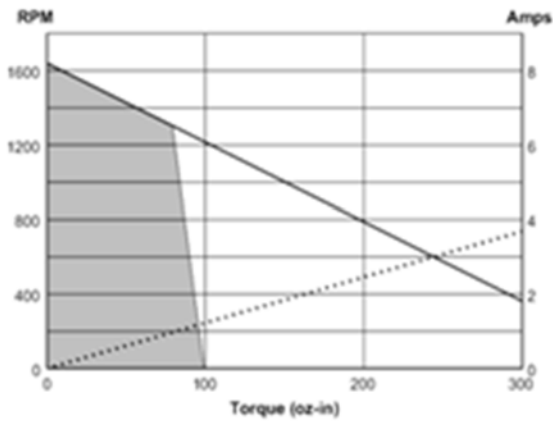


Brushless Torque Motors

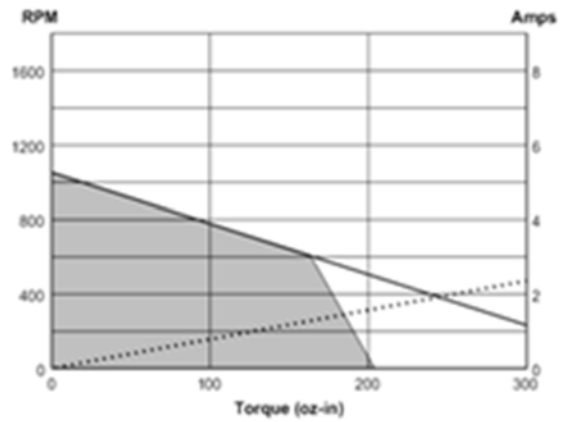
High Torque Series Brushless Torque Motors

PERFORMANCE

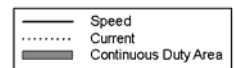
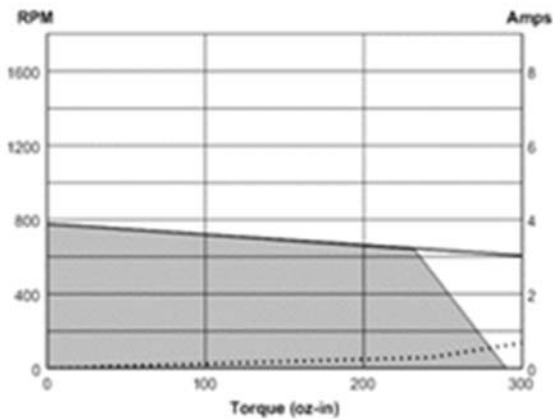
HT03800-A00



HT03801-A00

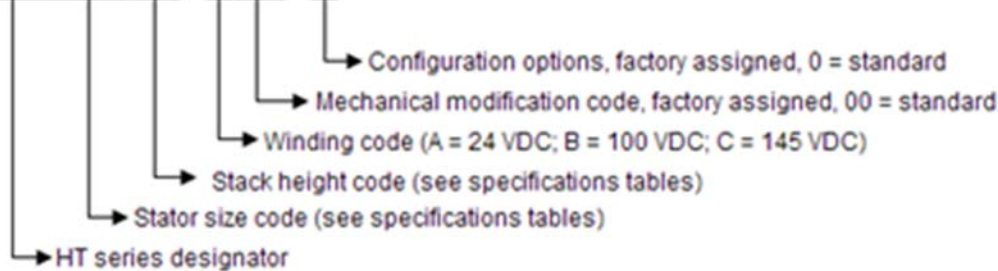


HT03802-A00



MODEL NUMBERING

HT01000-A00-0



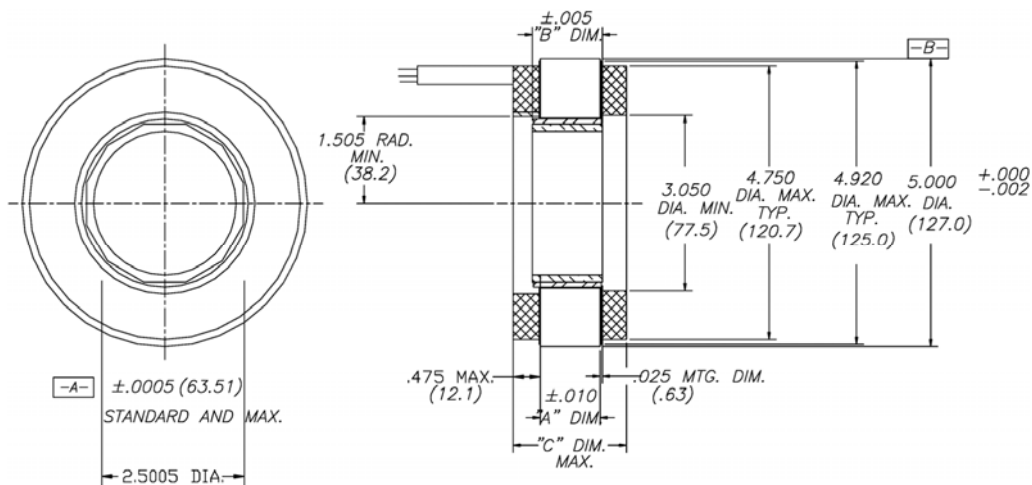
Brushless Torque Motors

High Torque Series Brushless Torque Motors

SPECIFICATIONS

Model No.		HT05000	HT05001	HT05002
Stall Torque	oz-in	201	419	623
	Nm	1.41	2.96	4.40
Peak Torque ($\pm 25\%$)	oz-in	1313	3019	4405
	Nm	9.2	21.3	31.1
Motor Constant	oz-in/W ^{1/2}	30.2	61.2	86.9
	Nm/W ^{1/2}	0.21	0.43	0.61
Elect. Time Constant	ms	1.56	3.00	4.14
Mech. Time Constant	ms	4.5	2.4	1.8
Thermal Resistance	$^{\circ}\text{C}/\text{W}$	1.3	1.2	1.1
Viscous Damping	oz-in/RPM	3.6E-3	7.5E-3	1.1E-2
	Nm/RPM	2.6E-5	5.3E-5	8.0E-5
Cogging Torque (max.)	oz-in	5.5	13.4	19.1
	Nm	0.039	0.095	0.135
Rotor Inertia	oz-in-s ²	2.0E-2	4.0E-2	6.0E-2
	kg-m ²	1.4E-4	2.8E-4	4.3E-4
Motor Weight	oz	27.1	45.9	64.9
	kg	0.77	1.30	1.84
Poles	-	-	12	-
Winding	-	-	A	-
Design Voltage	V	-	100	-
Peak Torque	oz-in	1010	2323	3389
	Nm	7.13	16.40	23.93
Peak Current	A	11.1	14.4	15.2
Torque Constant	oz-in/A	90.6	161.1	223.3
	Nm/A	0.64	1.14	1.58
No-Load Speed	RPM	1477	833	602
	rad/s	155	87	63
Back EMF Constant	V/kRPM	67.0	119.2	165.1
	V/rad/s	0.64	1.14	1.58
Resistance (ph-ph, $\pm 12\%$)	Ohms	8.97	6.94	6.59
Inductance (ph-ph, $\pm 30\%$)	mH	14.0	20.8	27.3

DIMENSIONS



MODEL	"A" DIM.	"B" DIM.	"C" DIM.
HT05000	.250(6.4)	.430(10.9)	1.187(30.2)
HT05001	.650(16.6)	.830(21.1)	1.587(40.3)
HT05002	1.050(26.7)	1.230(31.3)	1.987(50.5)

in (mm)

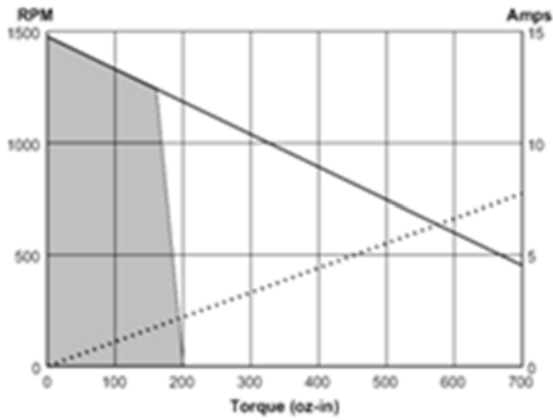


Brushless Torque Motors

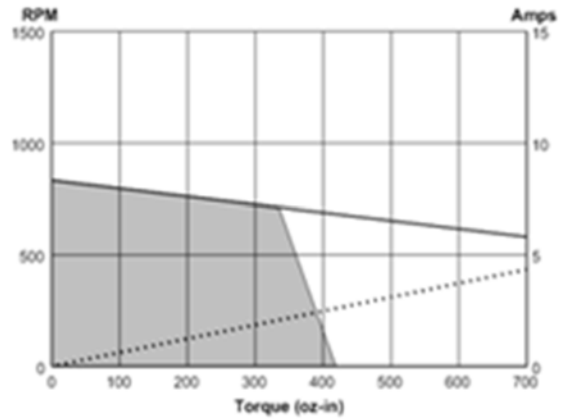
High Torque Series Brushless Torque Motors

PERFORMANCE

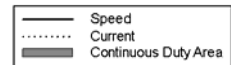
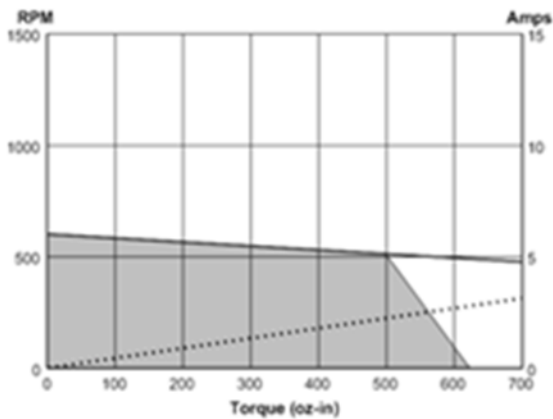
HT05000-A00



HT05001-A00

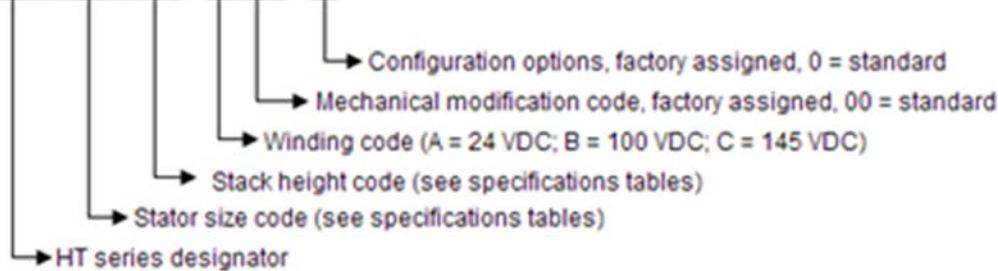


HT05002-A00



MODEL NUMBERING

HT01000-A00-0



Customer Assistance – Allied Motion “Speaks Your Language”



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- Application analysis assistance
- Standard product selection
- Product customization and options guidance
- Specification development for special-designed products
- Price quotations
- Ordering and order status information
- Logistics assistance

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