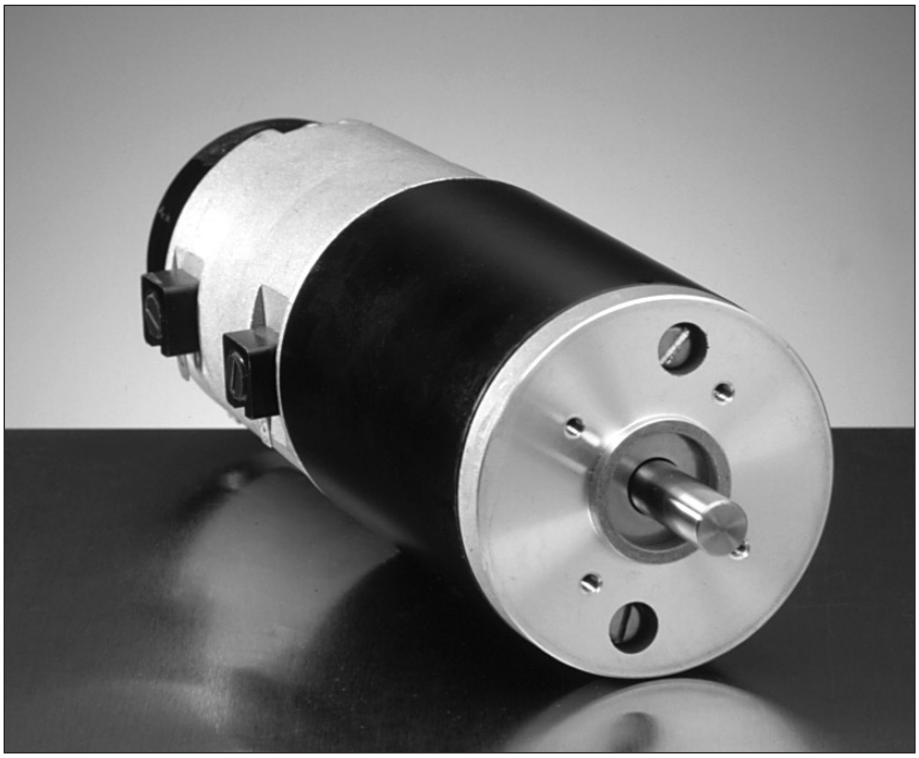
TORQUEMASTER®

BRUSH SERVO MOTORS

2600 SERIES

Series 2600, is a high performance, permanent magnet brush servo motor for use in various industrial direct drive or geared servo systems



- Rugged industrial construction
- Continuous torque ratings up to 90 oz.-in. —with speeds up to 6500 RPM (no load)
- Peak torque ratings up to 450 oz.-in.
- High torque-to-inertia ratio delivers maximum torque per frame size
- Superior low speed performance
- Numerous custom options available
- CE / UL

CE

Performance Benefits

CMC Torque Systems specializes in the design of high performance brush servo motors that provide efficiency, flexibility of application, and a long and trouble-free service life. Our TORQUEMASTER® 2600 series is no exception.

With fast response, accurate control and high torque-to-inertia ratios, you can count on the TORQUEMASTER 2600 Series of brush servo motors to provide smooth operation throughout a full speed range. The 2600 Series delivers smooth and superior low speed performance, and maximum power ratings with low thermal resistance for high speed performance. In addition, with maximum torque in a smaller package, you can count on better pricing for a better overall value.

When integrated with high performance brush amplifiers, TORQUEMASTER 2600 Series brush servo motors provide effective and highly efficient motion control solutions for a wide range of applications—including factory automation, packaging, robotics, machine tools, medical instrumentation and more.

Design Features

TORQUEMASTER 2600 Series brush servo motors are rated from 17 oz.-in. to 90 oz.-in. with speeds and torque stability up to 6500 RPM. They utilize the latest in high performance permanent magnet technology, and are available in eight standard windings to meet your most demanding applications.

Each brush servo motor in the TORQUEMASTER 2600 Series is ruggedly designed and manufactured for reliable performance.

Motors can be customized to fit your exact application with tachometers, encoders, brakes and other options.

TORQUE SYSTEMS

Improving Productivity Worldwide

Cleveland Motion Controls
An IMC Company

2600 SERIES

TORQUEMASTER®

BRUSH SERVO MOTOR CHARACTERISTICS

	SYMBOL		UNITS	2605	2610	2615	2620	2630	2640
	T_C	Cont. Torque	Oz-In	17	29	42	52	70	90
	T_P	Peak Torque	Oz-In	75	150	200	300	350	450
	T_F	Static Friction	Oz-In	4.5	4.5	4.5	4.5	4.5	4.5
	F_i	Viscous Friction	Oz-In/KRPM	0.2	0.2	0.3	0.4	0.5	0.6
	T_R	Cogging Torque	Oz-In	0.2	0.3	0.5	0.7	1	1.5
	J_M	Inertia	Oz-In-sec^2	0.0018	0.0031	0.0044	0.0057	0.0083	0.0115
	R_{TH}	Thermal Res	Deg C/watt	5.9	5	4.5	4	3.5	3
	T_{TH}	Thermal Time	Minute	10	15	15	20	20	25
	t_m	Mech Time	Millisec	8.6	5.9	4.9	4.8	4.6	4.6
	t_e	Elect Time	Millisec	1.6	1.9	2.1	2.1	2.2	2.2
	F_C	Commutation	Factor	890	1300	1750	2100	2870	3780
	Wt	Weight	Lbs	2	2.6	3.1	3.6	4.7	5.7

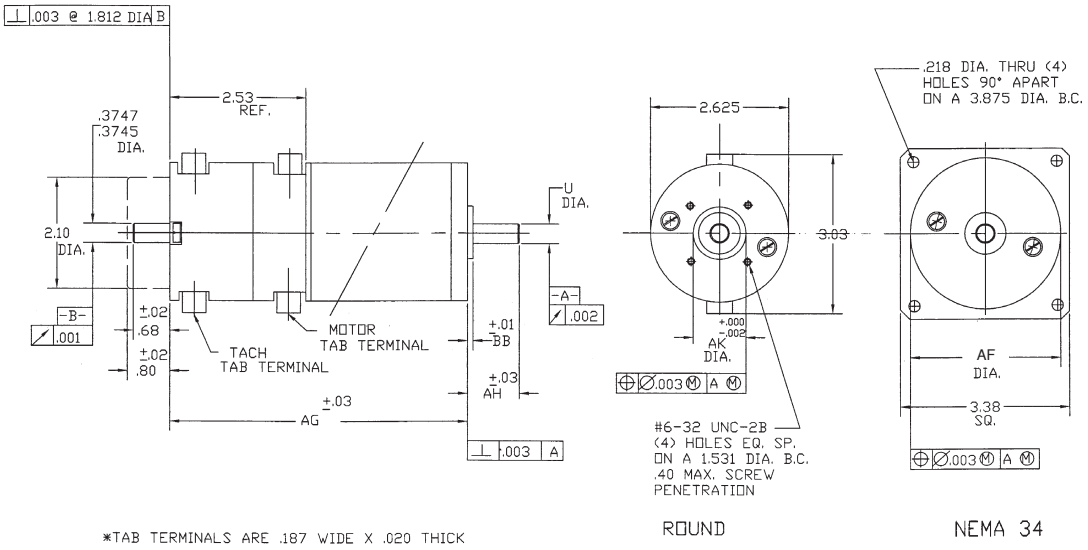
Note: All values at 25°C Ambient.

WINDING									
A	K_T	Torq. Sens.	Oz-In/Amp	3.1	5.3	7.5	9.5	13.6	18
	R_A	Arm. Resis.	Ohms	0.29	0.38	0.47	0.56	0.74	0.92
	K_V	Back E.M.F	Volts/KRPM	2.3	3.9	5.5	7.0	10.1	13.3
	F_C/K_T	P_b	Watts	287	245	233	221	211	210
B	K_T	Torq. Sens.	Oz-In/Amp	3.7	6.4	9	11.5	16.4	21.7
	R_A	Arm. Resis.	Ohms	0.44	0.58	0.63	0.79	1.06	1.34
	K_V	Back E.M.F	Volts/KRPM	2.7	4.7	6.7	8.5	12.1	16.0
	F_C/K_T	P_b	Watts	241	203	194	183	175	174
C	K_T	Torq. Sens.	Oz-In/Amp	4.7	8	11.4	14.5	20.8	27.4
	R_A	Arm. Resis.	Ohms	0.7	0.87	1.02	1.4	1.7	2.14
	K_V	Back E.M.F	Volts/KRPM	3.5	5.9	8.4	10.7	15.4	20.2
	F_C/K_T	P_b	Watts	189	163	154	145	138	138
D	K_T	Torq. Sens.	Oz-In/Amp	6	10.2	14.5	18.5	26.5	35
	R_A	Arm. Resis.	Ohms	1.13	1.4	1.65	2.0	2.9	3.5
	K_V	Back E.M.F	Volts/KRPM	4.4	7.5	10.7	13.7	19.6	25.9
	F_C/K_T	P_b	Watts	148	127	121	114	108	108
E	K_T	Torq. Sens.	Oz-In/Amp	7.4	12.7	18	23	33	43.5
	R_A	Arm. Resis.	Ohms	1.8	2.2	2.5	3.15	4.3	5.4
	K_V	Back E.M.F	Volts/KRPM	5.5	9.4	13.3	17.0	24.4	32.1
	F_C/K_T	P_b	Watts	120	102	97	91	87	87
F	K_T	Torq. Sens.	Oz-In/Amp	9.2	15.8	22.3	28.5	41	53.9
	R_A	Arm. Resis.	Ohms	2.8	3.4	3.9	4.8	6.6	8.3
	K_V	Back E.M.F	Volts/RPM	6.8	11.7	16.5	21.1	30.3	39.8
	F_C/K_T	P_b	Watts	97	82	78	74	70	70
G	K_T	Torq. Sens.	Oz-In/Amp	11.5	19.6	27.8	35.5	51	67.1
	R_A	Arm. Resis.	Ohms	4.3	5.2	6.0	7.5	10.2	12.9
	K_V	Back E.M.F	Volts/KRPM	8.5	14.5	20.5	26.2	37.7	49.6
	F_C/K_T	P_b	Watts	77	66	63	59	56	56
H	K_T	Torq. Sens.	Oz-In/Amp	14.2	24.3	34.5	44	63	83.2
	R_A	Arm. Resis.	Ohms	6.84	8	9.3	11.5	15.6	19.8
	K_V	Back E.M.F	Volts/KRPM	10.5	18.0	25.5	32.5	46.6	61.5
	F_C/K_T	P_b	Watts	63	53	51	48	46	45

Note: Continuous torque specifications obtained with motor mounted to an 10" x 10" x 0.25" alum. plate at 25 C° ambient. Typical values are within ±10% of rating.

For custom designs please consult factory.
All specifications subject to change without notice.

MECHANICAL SPECIFICATIONS*



*TAB TERMINALS ARE .187 WIDE X .020 THICK

ROUND

NEMA 34

DIMENSION CHART*

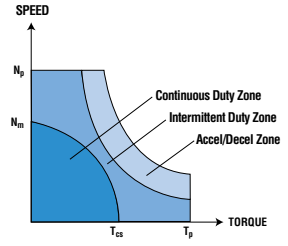
MOTOR	AG	AG	U DIA.		AH		AK	AF	BB	
	Motor Only Inches (Metric)	Motor Tach Inches (Metric)	STD	NEMA	STD	NEMA	STD	NEMA	STD	NEMA
2605	3.13 (79.50)	4.72 (119.8)	.3750/.3745	.3750/.3745	1.00	1.19	1.000	2.875	0.10	0.06
2610	3.63 (92.20)	5.22 (132.6)	.3750/.3745	.3750/.3745	1.00	1.19	1.000	2.875	0.10	0.06
2615	4.13 (104.90)	5.72 (145.3)	.3750/.3745	.3750/.3745	1.00	1.19	1.000	2.875	0.10	0.06
2620	4.63 (117.60)	6.22 (158.0)	.3750/.3745	.3750/.3745	1.00	1.19	1.000	2.875	0.10	0.06
2630	5.63 (143.01)	7.22 (183.4)	.3750/.3745	.3750/.3745	1.00	1.19	1.000	2.875	0.10	0.06
2640	6.63 (168.40)	8.22 (209.0)	.3750/.3745	.3750/.3745	1.00	1.19	1.000	2.875	0.10	0.06

METRIC (mm): DIMENSIONS ALL FRAME SIZES

SHAFT:	DIA	8j6	**MOUNTING:**	PILOT	25.0
	LENGTH	25.0		B.C.	38.89
				HOLE SIZE	M4

*All specifications are for reference only. Please consult the factory for certified dimension drawings. Standard Direction of Rotation: CCW rotation viewed from shaft end with red motor terminal positive with respect to black motor terminal.

TORQUE PERFORMANCE CURVES



NOTE: Continuous torque specifications obtained with motor mounted to an 10"x10"x.25" aluminum plate at 25 C° ambient. Typical values are within ±10% of rating.

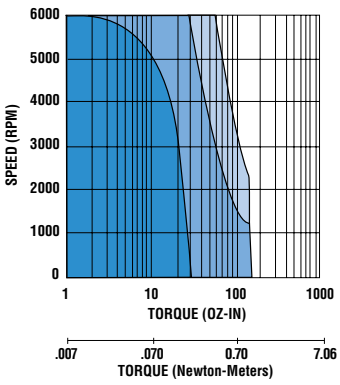
STANDARD WINDING SPEED/TORQUE CURVE DATA FOR SIZING A SERVO MOTOR

N_m = Maximum speed, continuous operation
N_p = Peak speed, acceleration/deceleration and intermittent duty
T_{cs} = Continuous stall torque
T_p = Peak torque

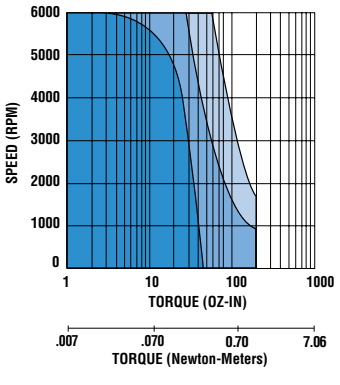
All specifications subject to change without notice.

TORQUE PERFORMANCE CURVES

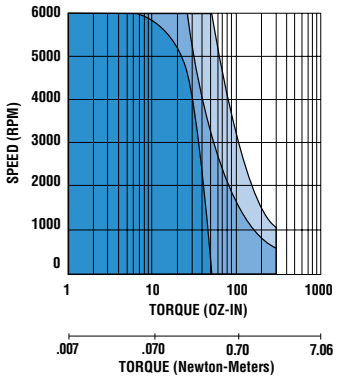
Motor MH2610 - WINDING: B



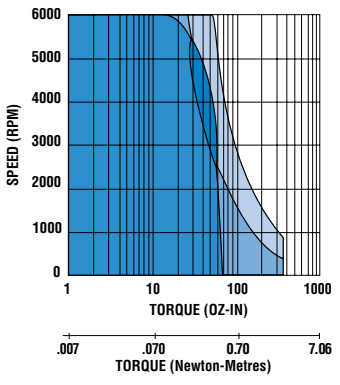
Motor MH2615 - WINDING: D



Motor MH2620 - WINDING: D



Motor MH2630 - WINDING: D



TORQUE SPEED CURVES OF OTHER WINDINGS AVAILABLE, CONSULT FACTORY.

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VOLTAGE EQUATION FOR MOTORS

$$\text{Volts} = \frac{K_T \times RPM}{1{,}350} + \frac{T \times R_A}{K_T} + V_B$$

Where:

K_T = torque constant, oz.-in. per amp
T = load torque plus motor friction torque-oz.-in.
R_A = armature resistance + brush resistance
V_B = brush voltage drop = 2 volts

Note: For armature resistance at maximum temperature rating, multiply catalog value of R by 1.5

MOTOR TORQUE RATING VS. SPEED

$$T_R = .94K_T \left[\frac{130 - \frac{RPM \times T_F}{1{,}350} - \frac{RPM^2 \times F_i}{1{,}350{,}000}}{R_{TH} \quad 1.5\,R_A} \right]^{1/2} - T_F - \left[\frac{RPM \times F_i}{1000} \right]$$

Where:

T_R = rated torque (25°C ambient)-oz.-in.
K_T = torque sensitivity-oz.-in./amp
R_A = armature resistance
RPM = revolutions per minute
T_F = static friction torque-oz.-in.
F_i = viscous friction-oz.-in.
R_{TH} = thermal resistance

To Find: Higher Torque Rating for Intermittent Duty

$$\text{Let A} = \frac{\text{total cycle time in seconds}}{\text{thermal time constant of motors in seconds}}$$

$$\text{Let B} = \frac{\text{"on" time in seconds per cycle}}{\text{thermal time constant of motor in seconds}}$$

then with T_R = Rated torque for 100% duty
and T_{MAX} = Rated torque for intermittent duty

$$T_{MAX} = T_R \times \left[\frac{1 - e^{-A}}{1 - e^{-B}} \right]^{1/2}$$

ORDERING INFORMATION (For Standard Options)

26 — SERIES

XX — LAM STACK
05
10
15
20
30
40

X — TACH
0 = None
T = Tach

XX — COMMUTATION/MAGNET
00 = STD
01= 22 BAR

XX — ENCODER
00 = None
M0 = Mod. Enc Prep
M2 = Mod 500 line, 2 channel, marker, line driver
M3 = Mod 1000 line, 2 channel, marker, line driver

XX — BRAKE
00 = No Brake
B1 = 7 lb-in, 24 VDC

X — SEALING
0 = No sealing

X — TERMINATION
T = Tab terminals (std)
S = Screw terminals (optional)
W= 3 foot long leads attached to tab terminals (optional)
Y = 3 foot long leads w/cord grip (optional)

X — SHAFT
A = 3/8" dia. x 1" lg.
B = A plus .02" x .80" lg. flat
E = 3/8" dia. x .1.19" lg. (NEMA34)
F = E plus .02" x .80" long flat
S = Special

X — MTG PLATE
A = 2 5/8" Round
C = 3 1/4" Square (NEMA34)

X — WINDINGS MOTOR
A THRU H

X — WINDINGS TACH
(V/KRPM)
0 = None
E = 3
F = 7
G = 15

Customize The 2600 Series To Your Exact Requirements

To satisfy various applications with cost-effective solutions, 2600 Series motors are readily available with a wide range of standard capabilities. Final designs are often the result of cooperative efforts between the customer's engineering department and CMC. For assistance, call your local CMC distributor or CMC direct. We look forward to meeting your custom requirements.

Ask About Other Motion Control Solutions & Capabilities From Torque Systems

- Brushless TorqueMaster® Servo Motors
- PowerMaster® Amplifiers
- Shaft-mounted DataTorque™ Encoders
- Gearboxes/Brakes
- Expert application engineering
- Complete repair & refurbishing services

TORQUE SYSTEMS

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Fax: 888-295-5550 or 978-667-4989

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