

## TYPICAL APPLICATIONS

- Robotics
- Factory automation
- Medical equipment
- Computer peripherals and office equipment
- Portable, battery-operated equipment
- Textile machinery
- Packaging machinery
- Actuators

## FEATURES

- Long-life, replaceable metal graphite brushes
- Stainless steel shafts, 0.125 and 0.187 inch diameters, single and double extensions
- Permanently lubricated ball bearings, ABEC 5 standard
- Polyester resin impregnated insulated windings for reliable high speed and high voltage operation
- Rare earth magnets for high power density
- Diamond turned commutator for quiet operation and long brush life
- 13 bar commutator for superior servo performance
- High torque in a “small package” size
- Low noise and backlash

## BENEFITS

- High torque-to-inertia ratio
- Up to 1274 oz-in peak starting torque
- Highly resistant to demagnetization
- Weighs only 6.8 oz
- High energy / high power in small packages

## OPTIONS AVAILABLE

- Custom endcaps and mounting configurations are available
- Skewed rotors available for minimum cogging torque
- Encoder and tachometer packages
- Custom shaft and end cap configurations

\* Previously the AS-780D Series

Note: This catalog contains basic marketing information and general part descriptions of Moog Components Group product lines. With respect to the U.S. export regulations, the products described herein are controlled by the U.S. Commerce Department or the U.S. State Department. Contact Moog Components Group for additional detail on the export controls that are applicable to your part.

# Miniature High-Torque, DC Servomotors and DC Gearmotors

## Series C13 Samarium Cobalt\*



### **Available with integrated tachometers or encoders for closed-loop control**

The series C13 high energy rare earth servomotors provide fast response and high starting torque, but are priced significantly less than comparable rare earth motors. They offer high coercivity and high flux density for greater mechanical output.

Permanent magnet DC rare earth motors are lightweight, yet are highly reliable. They will not demagnetize under severe conditions.

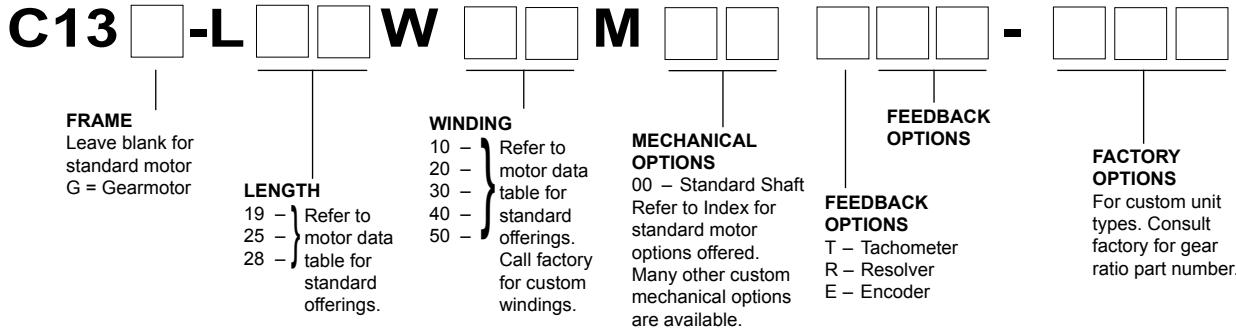
A series of high precision gearmotors is obtained by matching high precision planetary gearheads with the C13 rare earth motors. We offers a wide range of output torque and speed options with standard and custom gear ratios.

Custom modified shaft designs, mounting configurations, speed variations, and various DC input voltages are available. Consult our engineering department to help you develop a motor that is tailored to your application.

# C13 Series Specifications

## SPECIFICATION AND NUMBERING SYSTEM

### Part Numbering System Guide



## C13 SERIES SPECIFICATIONS – Continuous Stall Torque 7.5 - 13.0 oz-in (0.053 - 0.092 Nm) Peak Torque 50 - 100 oz-in (0.353 - 0.706 Nm)

Part Number*		C13-L19-					C13-L25-	C13-L28-	
Winding Code**		10	20	30	40	50	10	10	20
L = Length	inches	1.902					2.45	2.802	
	millimeters	48.3					62.2	71.2	
Peak Torque	oz-in	50	50	50	50	50	75	100	100
	Nm	0.353	0.353	0.353	0.353	0.353	0.530	0.706	0.706
Continuous Stall Torque	oz-in	7.5	7.5	7.5	7.5	7.5	10.0	13.0	13.0
	Nm	0.053	0.053	0.053	0.053	0.053	0.071	0.092	0.092
Rated Terminal Voltage	volts DC	6 - 18	6 - 24	6 - 24	12 - 36	12 - 48	12 - 24	6 - 24	12 - 36
Terminal Voltage	volts DC	12	12	24	36	48	12	12	24
Rated Speed	RPM	3000	1880	2875	2225	2877	2400	1643	2439
	rad/sec	314	197	301	233	301	251	172	255
Rated Torque	oz-in	5.8	6.9	6.4	6.7	7.5	10.3	14	12.3
	Nm	0.04	0.05	0.05	0.05	0.05	0.07	0.10	0.09
Rated Current	Amps	2.05	1.8	1.4	0.95	1.4	1.95	3.5	2
Rated Power	Watts	12.9	9.6	13.6	11.0	16.0	18.0	17.0	22.2
	Horsepower	0.02	0.01	0.02	0.01	0.02	0.09	0.02	0.03
Torque Sensivity	oz-in/amp	3.42	4.35	5.45	8.1	10.25	6.04	4.6	7.85
	Nm/amp	0.0242	0.0307	0.0385	0.0572	0.0724	0.0427	0.0325	0.0554
Back EMF	volts/KRPM	2.53	3.21	4.03	5.99	7.57	4.47	3.4	5.81
	volts/rad/sec	0.0242	0.0307	0.0385	0.0572	0.0723	0.0427	0.0325	0.0555
Terminal Resistance	ohms	1.55	2.30	3.35	7.90	12.00	2.64	1.30	3.70
Terminal Inductance	mH	0.52	0.84	1.30	3.00	4.80	0.71	0.90	2.60
Motor Constant	oz-in/watt <sup>1/2</sup>	2.7	2.9	3.0	2.9	3.0	3.7	4.0	4.1
	Nm/watt	0.019	0.020	0.021	0.020	0.021	0.026	0.028	0.029
Rotor Inertia	oz-in-sec <sup>2</sup>	.00026	.00026	.00026	.00026	.00026	0.004	.00043	.00043
	g-cm <sup>2</sup>	18.4	18.4	18.4	18.4	18.4	282.5	30.4	30.4
Friction Torque	oz-in	0.75	0.75	0.75	0.75	0.75	1.00	1.00	1.00
	Nm	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Thermal Resistance	°C/watt	11.0	11.0	11.0	11.0	11.0	7.8	5.5	5.5
Damping Factor	oz-in/KRPM	0.1	0.1	0.1	0.1	0.1	0.1	0.57	0.57
	Nm/KRPM	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.004
Weight	oz	6.8	6.8	6.8	6.8	6.8	9	11.2	11.2
	g	193	193	193	193	193	255	318	318
Electrical Time Constant	millisecond	0.3355	0.3652	0.3881	0.3797	0.4000	0.2689	0.6923	0.7027
Mech. Time Constant	millisecond	4.8764649	4.483876	4.152057	4.432363	4.209995	40.95115	3.742155	3.652339
Speed/Torque Gradient	rpm/oz-in	-179.1369	-164.715	-152.526	-162.8228	-154.654	-97.7821	-83.1202	-81.1252

**IMPORTANT**

Typical performance characteristics at 25°C. The operational life of any motor is dependent upon individual operating parameters, environment, temperature and other factors. Your specific application results may vary. Please consult the factory to discuss your requirements.

Notes:

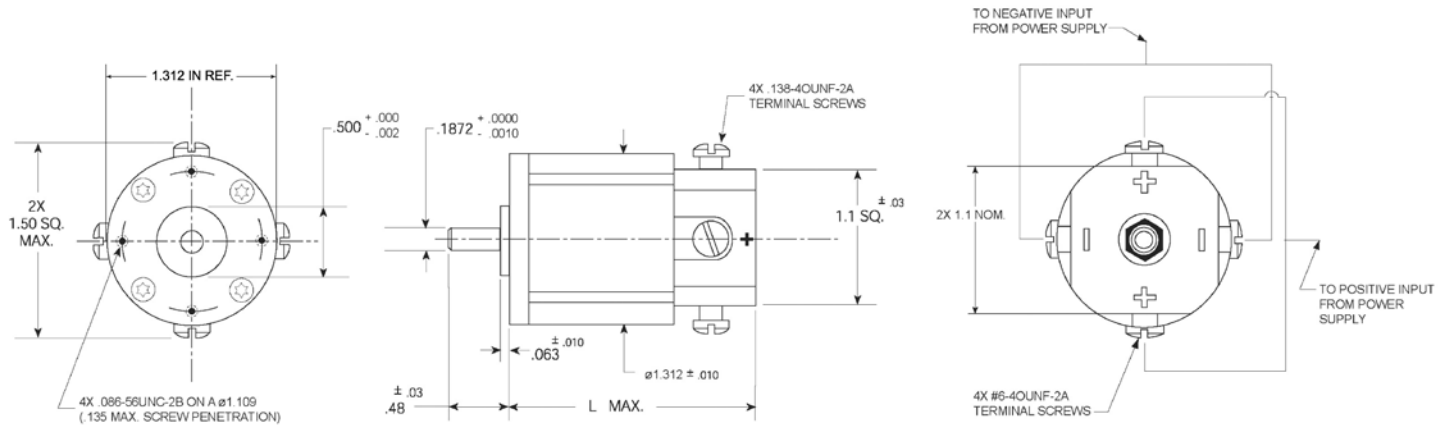
- For MS (military style) connector, please specify connector housing and terminal.
- Data for informational purposes only. Should not be considered a binding performance agreement. For specific applications, please contact the factory.

\*Many other custom mechanical options are available – consult factory.

\*\*Many other winding options are available – consult factory.

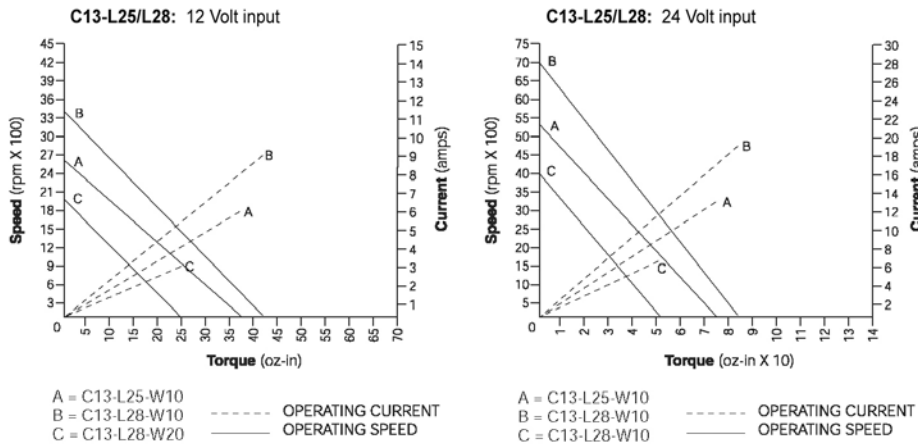
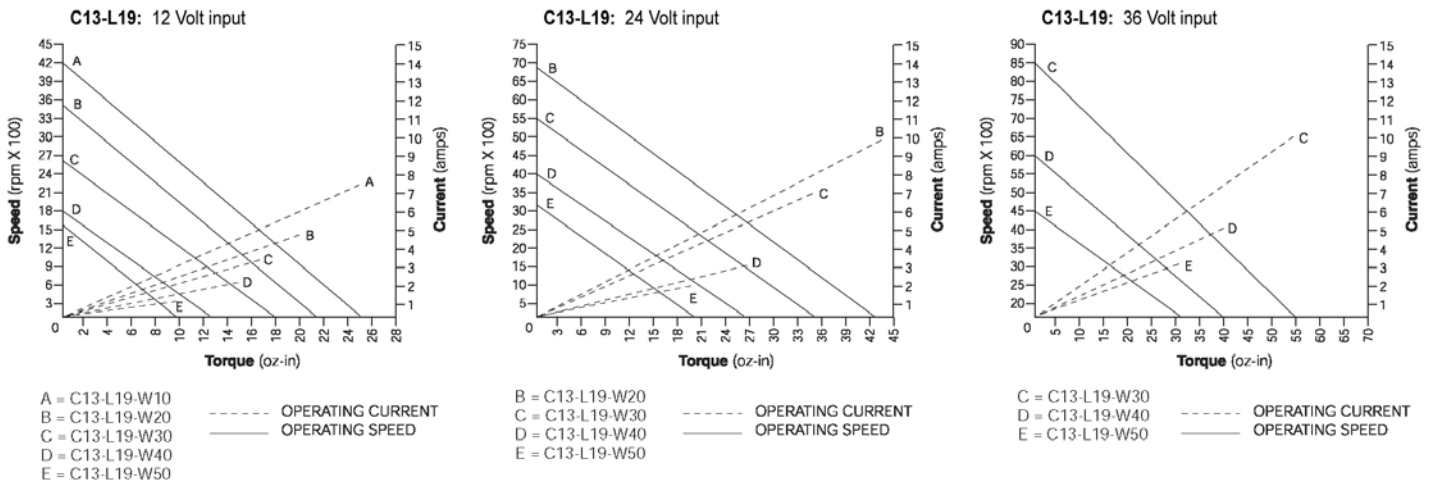
# C13 Series Performance Curves

## Typical Outline Drawing



Dimensions are in inches

## Torque/Speed Curves



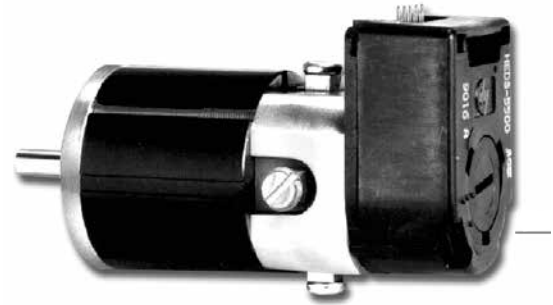
## INTEGRAL FEEDBACK DEVICES FOR CLOSED-LOOP CONTROL

All feedback devices are pre-assembled, aligned and fully tested, with output requirements matched (even custom designed) to your application. They are ideal for sensing rotary speed and angular position where space is a premium and low inertia is required.

### Encoders

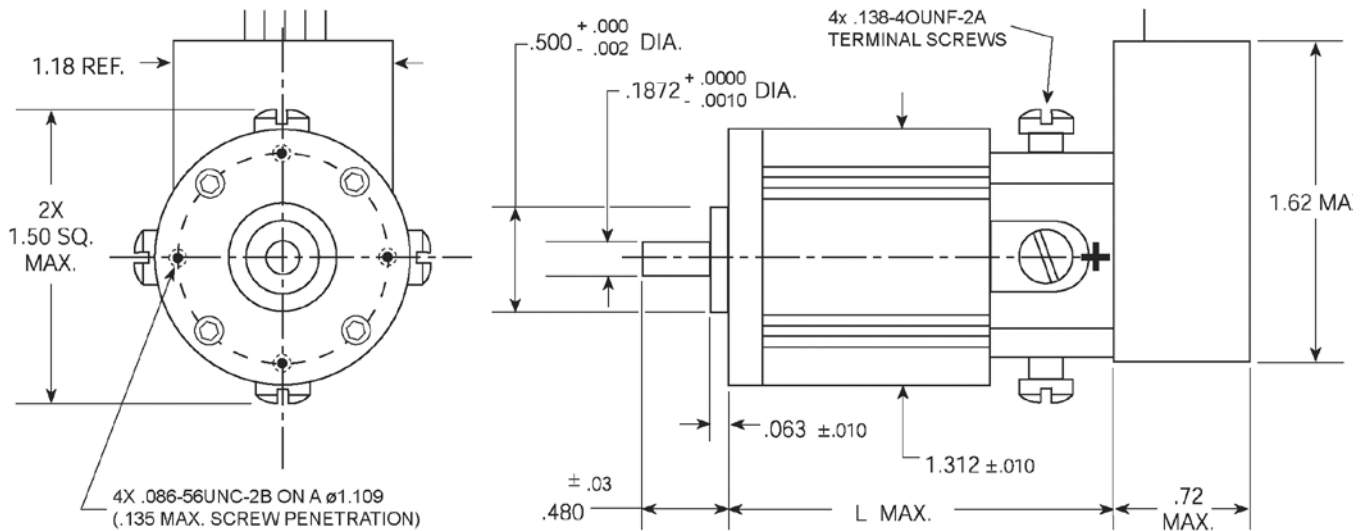
High resolution, high reliability, and state-of-the-art technology in a small package.

- Bidirectional incremental code
- Up to 1024 cycles standard
- Up to 3 channels: A, B, and index
- TTL / CMOS compatible
- Other configurations and resolutions available



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### Typical Outline Drawing



Dimensions are in inches

### C13G Series – DC Gearmotors – 27 - 637 oz-in

Our gearboxes are assembled in a modular configuration from one, two or three planetary gear stages connected in series.

All planetary gearboxes conform to protection class IP 44. The output shaft ball bearings are protected by sealing washers, the input side is sealed from the motor as well.

### FEATURES

- Coaxial input and output
- Small size
- High tooth efficiency
- Small rotating mass
- Power distributed among several planet gears
- Low noise and backlash
- Reduction ratios from 4:1 to 308:1 in standard range (other ratios available, please consult factory)

# C13 Series Outline

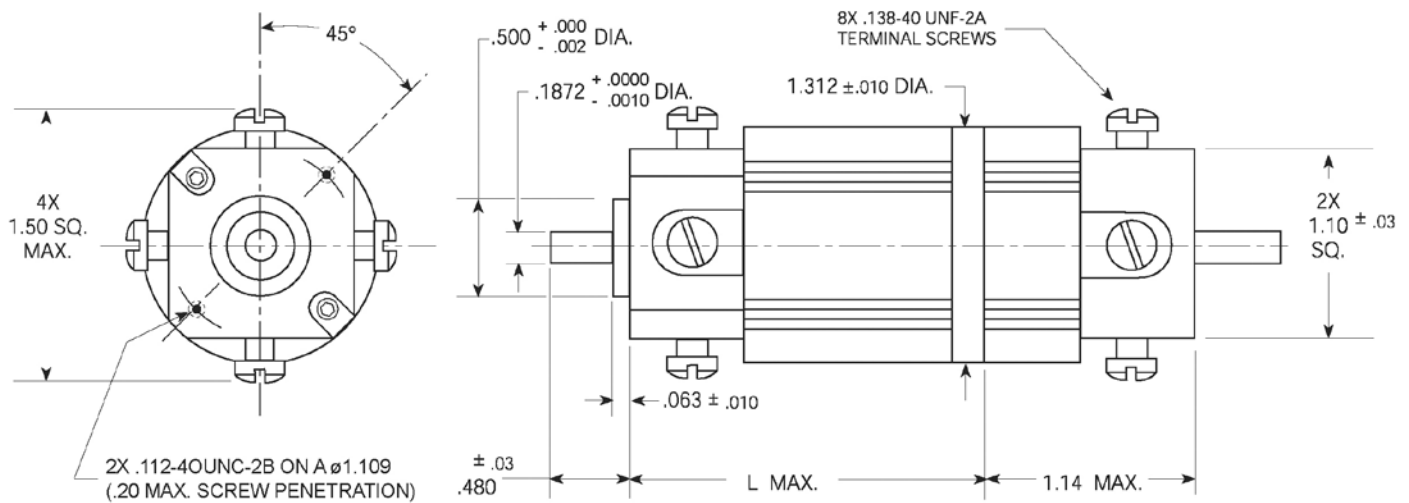
## Tachometers

Analog tachometers are an economical and efficient choice for applications requiring velocity feedback. These tachometers are integral to the motor on a common shaft, eliminating coupling or mounting irregularities.

- Voltage gradient: 2 V / Krpm
- Ripple voltage: 20% max peak to peak



## Typical Outline Drawing



Dimensions are in inches