

Permanent Magnet DC Motors

TYPICAL APPLICATIONS

Robotics and factory automation

- Pick-and-place robots
- Positioning tables
- Welding wire feeders
- Automatic guided vehicles
- Barcoding equipment

Computer and office equipment

- Copier and microfilm machines
- Printers / plotters
- Tape drives

Industrial equipment

- Automatic door actuators
- Material handling equipment
- Packaging, marking and sorting equipment
- Machine tools
- Web drives
- Gimbal controlled cameras for security systems
- Antenna drives

Medical equipment

- Electric wheelchairs and scooters
- Bio-analytical equipment
- Medical pumps
- Centrifuges

FEATURES

- Long-life, externally replaceable brushes; various grade materials available for high / low voltage applications
- Superior protection provided by totally enclosed, high strength, zinc-plated steel housing
- Shaft configuration optional
- Machined aluminum end-cap for precise locating; round or square. Precision-tapped mounting holes provided to your specifications
- Silicon steel laminations
- Diamond turned commutator for quiet operation and long brush life
- Skewed rotors available for minimal cogging torque
- Rotors are dynamically balanced to ISO G2.5
- Available with standard NEMA mountings
- Polyester resin impregnated insulated windings
- Double-shielded, permanently lubricated ball bearings, ABEC 5 standard; others optional

BENEFITS

- Optional pre-aligned encoders provide accurate positioning
- Tachometers are available – 7, 10, 14 V / KRPM
- These motors offer continuous torques from 16.5 to 560 oz-in, peak torques from 125 to 3500 oz-in
- Motor lengths – 3.33 to 9.0 inches
- Diameter – 2.25 to 4.0 inches
- Permanently lubricated bearings
- Available with carbon steel or stainless steel shafts; single or double ended extensions
- Custom shaft and end cap configurations are also available

C23, 34, 42 Series



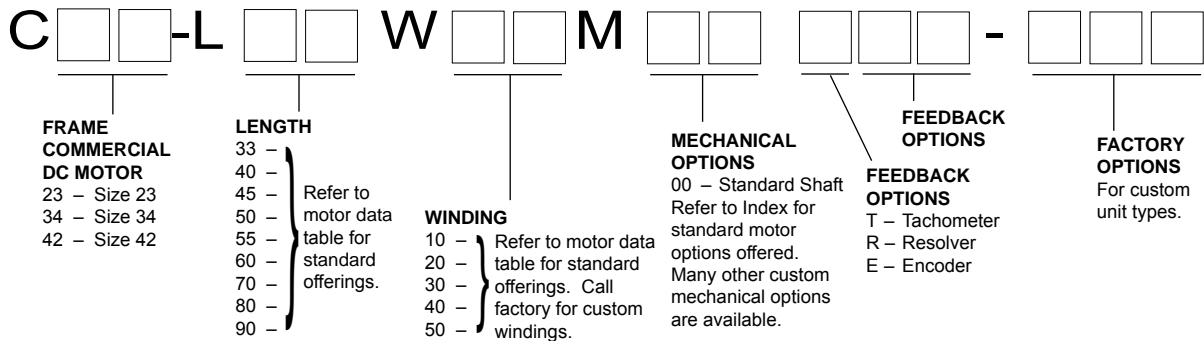
Available with integrated tachometers, resolvers and encoders for closed-loop control

Moog Components Group offers a complete line of 2.25 to 4 inches diameter permanent magnet motors. Integrated feedback devices (tachometers and encoders) are available for closed-loop control.

We offer a variety of standard sizes. If mechanical modifications are needed custom options are available for your specific application. Our engineering department is prepared to discuss your application to help tailor a permanent magnet motor to fit your needs.

SPECIFICATION AND NUMBERING SYSTEM

Part Numbering System



C23 SERIES SPECIFICATIONS – Continuous Stall Torque 16.5 - 27 oz-in (0.117 - 0.191 Nm) Peak Torque 125 - 250 oz-in (0.883 - 1.765 Nm)

Part Number*	C23-L33					C23-L40					
	10	20	30	40	50	10	20	30	40	50	
Winding Code**											
L = Length	inches	3.33					4				
	millimeters	84.6					101.6				
Peak Torque	oz-in	125.0	125.0	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	Nm	0.883	0.883	0.883	0.883	0.883	1.765	1.765	1.765	1.765	1.765
Continuous Stall Torque	oz-in	16.5	16.5	16.5	16.5	16.5	27.0	27.0	27.0	27.0	27.0
	Nm	0.117	0.117	0.117	0.117	0.117	0.191	0.191	0.191	0.191	0.191
Rated Terminal Voltage	volts DC	12-24	12-24	12-36	12-60	12-60	12-24	12-48	12-60	12-60	12-60
Terminal Voltage	volts DC	12	12	24	36	48	12	24	36	48	60
Rated Speed	RPM	4700	2150	4200	3750	3000	2300	3600	3500	2850	2250
	rad/sec	492	225	440	393	314	241	377	367	298	236
Rated Torque	oz-in	7.5	12.6	12.7	14.4	15.8	17.3	25.5	25.3	25.6	24.2
	Nm	0.05	0.09	0.09	0.10	0.11	0.12	0.18	0.18	0.18	0.17
Rated Current	Amps	4.75	4.3	3	2	1.4	4.9	4.3	2.75	1.8	1.1
Rated Power	Watts	26.1	20.0	39.5	40.0	35.1	29.4	67.9	65.5	54.0	40.3
	Horsepower	0.03	0.03	0.05	0.05	0.05	0.04	0.09	0.09	0.07	0.05
Torque Sensivity	oz-in/amp	2.65	4.25	6.2	10.25	15.75	4.84	7.74	12	18.5	28.75
	Nm/amp	0.0187	0.0300	0.0438	0.0724	0.1112	0.0342	0.0547	0.0847	0.1306	0.2030
Back EMF	volts/KRPM	2	3.15	4.6	7.6	11.5	3.58	5.72	8.82	13.82	21.22
	volts/rad/sec	0.0191	0.0301	0.0439	0.0726	0.1098	0.0342	0.0546	0.0842	0.1320	0.2026
Terminal Resistance	ohms	0.60	1.00	1.70	4.00	9.00	0.70	0.96	2.30	5.50	12.00
Terminal Inductance	mH	0.35	0.94	2.00	5.50	13.00	0.50	1.30	3.10	7.36	18.00
Motor Constant	oz-in/watt ^{1/2}	3.4	4.3	4.8	5.1	5.3	5.8	7.9	7.9	7.9	8.3
	Nm/watt	0.024	0.030	0.034	0.036	0.037	0.041	0.056	0.056	0.056	0.059
Rotor Inertia	oz-in-sec ²	0.0022	0.0022	0.0022	0.0022	0.0022	0.004	0.004	0.004	0.004	0.004
	g-cm ²	155.4	155.4	155.4	155.4	155.4	282.5	282.5	282.5	282.5	282.5
Friction Torque	oz-in	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	Nm	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Thermal Resistance	°C/watt	6.2	6.2	6.2	6.2	6.2	5.4	5.4	5.4	5.4	5.4
Damping Factor	oz-in/KRPM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Nm/KRPM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Weight	oz	27	27	27	27	27	38	38	38	38	38
	g	765	765	765	765	765	1077	1077	1077	1077	1077
Electrical Time Constant	millisecond	0.5833	0.9400	1.1765	1.3750	1.4444	0.7143	1.3584	1.3478	1.3382	1.5000
Mech. Time Constant	millisecond	26.07623	17.2056	13.72994	11.82747	11.44547	16.91906	9.052773	9.100907	9.00927	8.237676
Speed/Torque Gradient	rpm/oz-in	-113.2075	-74.69655	-59.60729	-51.34788	-49.68944	-40.39891	-21.61598	-21.73091	-21.51211	-19.66971

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.

(continued on next page)

Brush Motors

C23 SERIES SPECIFICATIONS –

Continuous Stall Torque 34 - 50 oz-in (0.240 - 0.353 Nm)
Peak Torque 310 - 430 oz-in (2.189 - 3.037 Nm)

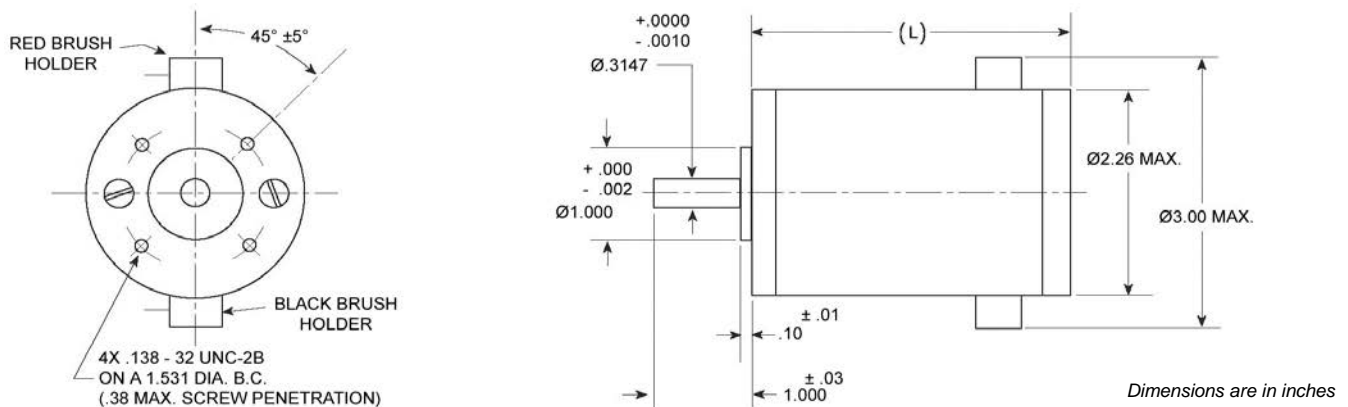
Part Number*		C23-L45					C23-L50					C23-L55				
Winding Code**		10	20	30	40	50	10	20	30	40	50	10	20	30	40	50
L = Length	inches	4.5					5					5.45				
	millimeters	114.3					127.0					138.4				
Peak Torque	oz-in	310.0	310.0	310.0	310.0	310.0	360.0	360.0	360.0	360.0	360.0	430.0	430.0	430.0	430.0	430.0
	Nm	2.189	2.189	2.189	2.189	2.189	2.542	2.542	2.542	2.542	2.542	3.037	3.037	3.037	3.037	3.037
Continuous Stall Torque	oz-in	34.0	34.0	34.0	34.0	34.0	42.0	42.0	42.0	42.0	42.0	50.0	50.0	50.0	50.0	50.0
	Nm	0.240	0.240	0.240	0.240	0.240	0.297	0.297	0.297	0.297	0.297	0.353	0.353	0.353	0.353	0.353
Rated Terminal Voltage	volts DC	12 - 24	12 - 48	12 - 60	12 - 60	12 - 60	12 - 24	12 - 60	12 - 60	18 - 60	24 - 60	12 - 24	12 - 60	12 - 60	18 - 60	24 - 60
Terminal Voltage	volts DC	12	24	36	48	60	12	24	36	48	60	12	24	36	48	60
Rated Speed	RPM	1950	2600	2600	2100	1555	1600	2150	2150	1800	1283	1350	1800	1700	1300	887
	rad/sec	204	272	272	220	163	168	225	225	188	134	141	188	178	136	93
Rated Torque	oz-in	25.3	26.5	25.8	23.3	23	27.1	30.1	32	31.5	34.3	36.4	39.3	40.5	40.9	43.5
	Nm	0.18	0.19	0.18	0.16	0.16	0.19	0.21	0.23	0.22	0.24	0.26	0.28	0.29	0.29	0.31
Rated Current	Amps	5.8	3.75	2.4	1.4	0.95	5.1	3.5	2.4	1.5	1.05	5.6	3.75	2.5	1.6	1.1
Rated Power	Watts	36.5	51.0	49.6	36.2	26.5	32.1	47.9	50.9	42.0	32.6	36.4	52.3	50.9	39.3	28.6
	Horsepower	0.05	0.07	0.07	0.05	0.04	0.04	0.06	0.07	0.06	0.04	0.05	0.07	0.07	0.05	0.04
Torque Sensitivity	oz-in/amp	6.06	9.75	14.9	23.5	36	7.32	11.7	18	28.3	43.4	8.78	14.04	21.6	34	52.1
	Nm/amp	0.0428	0.0689	0.1052	0.1659	0.2542	0.0517	0.0826	0.1271	0.1998	0.3065	0.0620	0.0991	0.1525	0.2401	0.3679
Back EMF	volts/KRPM	4.5	7.2	11	17.25	26.5	5.41	8.65	13.3	20.9	32	6.49	10.38	16	25.14	38.5
	volts/rad/sec	0.0430	0.0688	0.1050	0.1647	0.2531	0.0517	0.0826	0.1270	0.1996	0.3056	0.0620	0.0991	0.1528	0.2401	0.3676
Terminal Resistance	ohms	0.54	1.40	3.27	8.13	19.0	0.63	1.60	3.20	7.00	16.50	0.56	1.43	3.39	8.40	19.10
Terminal Inductance	mH	0.72	1.75	4.26	10.24	24.20	0.77	1.96	4.66	11.44	27.00	0.97	2.38	5.50	13.73	32.28
Motor Constant	oz-in/watt ^{1/2}	8.2	8.2	8.2	8.2	8.2	9.3	9.2	10.1	10.7	10.7	11.7	11.7	11.7	11.7	11.7
	Nm/watt	0.058	0.058	0.058	0.058	0.058	0.065	0.065	0.071	0.076	0.075	0.083	0.083	0.083	0.083	0.083
Rotor Inertia	oz-in-sec ²	0.0052	0.0052	0.0052	0.0052	0.0052	0.0065	0.0065	0.0065	0.0065	0.0065	0.0078	0.0078	0.0078	0.0078	0.0078
	g-cm ²	367.2	367.2	367.2	367.2	367.2	459.0	459.0	459.0	459.0	459.0	550.8	550.8	550.8	550.8	550.8
Friction Torque	oz-in	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6
	Nm	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Thermal Resistance	°C/watt	4.7	4.7	4.7	4.7	4.7	4.3	4.3	4.3	4.3	4.3	3.9	3.9	3.9	3.9	3.9
Damping Factor	oz-in/KRPM	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
	Nm/KRPM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002
Weight	oz	46	46	46	46	46	56	56	56	56	56	65	65	65	65	65
	g	1304	1304	1304	1304	1304	1588	1588	1588	1588	1588	1843	1843	1843	1843	1843
Electrical Time Constant	millisecond	1.3309	1.2500	1.3028	1.2595	1.2670	1.2300	1.2250	1.4563	1.6343	1.6364	1.7321	1.6643	1.6224	1.6345	1.6386
Mech. Time Constant	millisecond	10.80095	10.85778	10.86223	10.91902	10.90021	10.75786	10.75915	9.096742	8.054255	8.085451	8.025833	8.013327	8.010641	8.025579	8.020641
Speed/Torque Gradient	rpm/oz-in	-19.83865	-19.94302	-19.95119	-20.0555	-20.02096	-15.8076	-15.8095	-13.36675	-11.83492	-11.88076	-9.82763	-9.812617	-9.809028	-9.82732	-9.821273

Notes:

1. For MS (military style) connector, please specify connector housing and terminal.
2. 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.

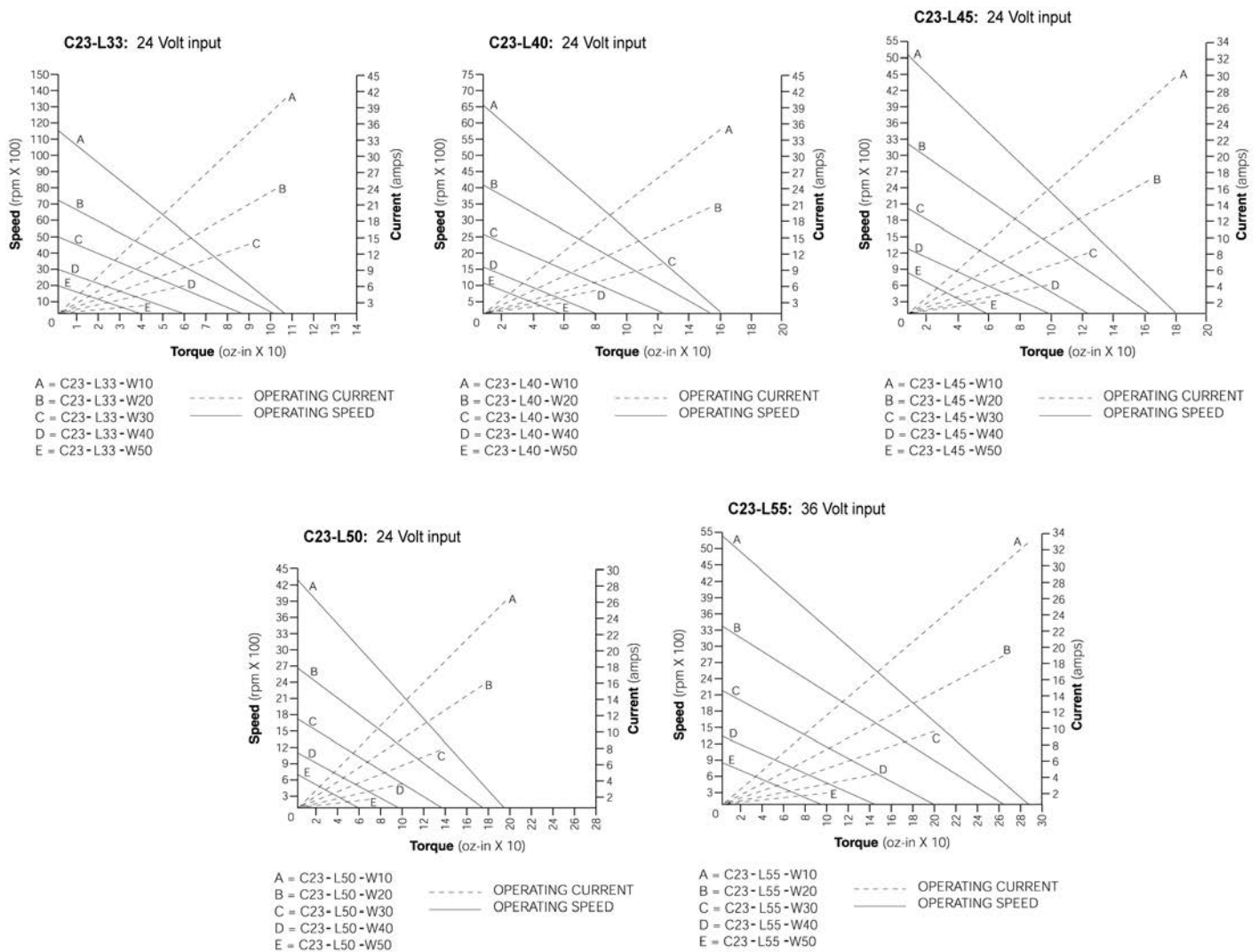
C23 Typical Outline Drawing



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.

C23 Torque / Speed Curves



• Skewed Armatures standard on C13 series - available on all other series upon request.

Note:

A skewed armature is one in which the laminations do not line up, but rather are on a skew for the length of the armature stack. There are some distinct advantages to a motor utilizing a skewed armature, the greatest being a REDUCTION OF COGGING.