

# SMALL MOTION SYSTEMS

VALUE, RELIABILITY,  
PERFORMANCE.



Rev. C, August 2024

DELIVERING VALUE WITH OPTIMIZED  
PERFORMANCE AND SIZE, FROM THE GLOBAL  
LEADER IN HIGH-PERFORMANCE MOTION BASES.

**MOOG** | Shaping the way our world moves™

# RELIABILITY. PERFORMANCE. SUPPORT.

Around the world, our forward-thinking engineers help customers design and implement motion platform solutions that set new standards in performance, fidelity and versatility. Through close collaboration and a willingness to tailor our approach to meet your unique needs, Moog gives you the leadership edge. Our small motion systems give you best-in-class performance with the reliability you expect from Moog. These systems are used in many applications including:

- Driving simulation for cars, trains, trams, other rail vehicles, trucks, rough terrain vehicles
- Flight simulation for small aircraft and light helicopters
- Motion for entertainment rides
- Automotive testing on interior systems or others

Features	Benefits
<b>6 Degree of Freedom motion- Small size/High payload</b> Translations: vertical (heave), longitudinal (surge), lateral (sway) Rotations: pitch, roll, and yaw	<b>Minimal Facility requirements</b> The compact footprint makes it an integrated solution that is easy to position, run and control anywhere in your facility
<b>Motion Control Software</b> Moog provides open architecture control software developed specifically for your unique needs with motion cueing or ride-file play/replay capability	<b>User Friendly</b> The design makes it simple to operate efficiently through integrated control hardware and an optional user friendly test software GUI
<b>High Quality Components</b> The industry's most innovative engineering design incorporates advanced friction compensation control software, Moog ball screws, servo drives and servo motors	<b>System Confidence</b> Best-in-class system smoothness comes from Moog's vertically integrated manufacturing which controls all major components
<b>Optimized Design</b> Fold back-mounted servo motors enable a high performance, optimized motion envelope with an ideal transmission ratio and shared energy bus	<b>Cost Effective</b> Small motion systems feature low power consumption, low noise, and low maintenance cost and fit well into a clean working environment
<b>Integrated Safety Features</b> The small motion system includes an integrated cushioning system, built-in dynamic brakes, safety electronics and software	<b>Safe Operation</b> Users can test or train with assurance that the human-rated system will operate safely with any profile and in any failure condition

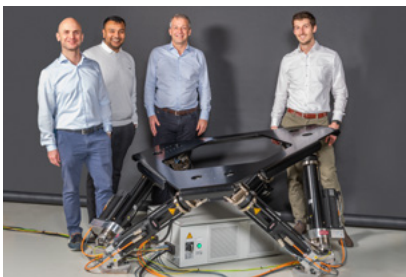


# WHY CHOOSE MOOG SMALL MOTION SYSTEMS?

THE MOOG SMALL MOTION SYSTEMS PROVIDE UNPRECEDENTED PERFORMANCE, UNRIVALED RELIABILITY, AND INCREDIBLE INTELLIGENCE.

## OPTIONS

- Installation, commissioning and operator training on site
- Tailor made motion cueing tuning
- Creation of a motion ride file
- Envelope study of customer's specific payload geometry
- Service/Maintenance contract
- Moving plate frame (simplifies upgrading a previous generation of the MB-E-6DOF/12/1500KG motion base)
- Moving beams frame (provides more flexibility for payload mounting)
- Additional mechanical brakes
- Additional I/O
- Remote cabinet
- Advanced Testing capabilities
- Backup Energy Storage
- Automated test tool software



MB-E-6DOF/12/1500KG shown with optional moving plate frame

## SPECIFICATIONS

Model	MB-E-6DOF/12/500KG	MB-E-6DOF/12/1500KG
<b>DOF max. excursion</b>		
Surge (single) (max.)	-0.235 m / +0.275 m    -9.3 in / +10.8 in	-0.235 m / +0.275 m    -9.3 in / +10.8 in
Sway (single) (max.)	± 0.230 m    ± 9.1 in	± 0.230 m    ± 9.1 in
Heave (single) (max.)	± 0.310 m    ± 12.2 in	± 0.310 m    ± 12.2 in
Roll (single) (max.)	± 0.190 m    ± 7.5 in	± 0.190 m    ± 7.5 in
Pitch (single) (max.)	± 0.190 m    ± 7.5 in	± 0.190 m    ± 7.5 in
Yaw (single) (max.)	± 19.0°	± 19.0°
	± 22.5°	± 22.5°
	-19.0° / +23.0°	-19.0° / +23.0°
	-23.0° / +25.5°	-23.0° / +25.5°
	± 19.0°	± 19.0°
	± 23.0°	± 23.0°
<b>DOF max. velocity</b>		
Surge	± 0.60 m/s    ± 23.6 in/s	± 0.60 m/s    ± 23.6 in/s
Sway	± 0.60 m/s    ± 23.6 in/s	± 0.60 m/s    ± 23.6 in/s
Heave	± 0.50 m/s    ± 19.7 in/s	± 0.50 m/s    ± 19.7 in/s
Roll	± 40.0°/s	± 40.0°/s
Pitch	± 50.0°/s	± 50.0°/s
Yaw	± 50.0°/s	± 50.0°/s
<b>DOF max. acceleration</b>		
Surge	± 6.0 m/s <sup>2</sup>    ± 0.61 g	± 6.0 m/s <sup>2</sup>    ± 0.61 g
Sway	± 6.0 m/s <sup>2</sup>    ± 0.61 g	± 6.0 m/s <sup>2</sup>    ± 0.61 g
Heave	± 8.0 m/s <sup>2</sup>    ± 0.82 g	± 8.0 m/s <sup>2</sup>    ± 0.82 g
Roll	± 300.0°/s <sup>2</sup>	± 300.0°/s <sup>2</sup>
Pitch	± 300.0°/s <sup>2</sup>	± 300.0°/s <sup>2</sup>
Yaw	± 500.0°/s <sup>2</sup>	± 500.0°/s <sup>2</sup>
Gross Moving Load (GML) up to	500 kg    1,102 lb	1,500 kg    3,307 lb
GML moment of inertia about X-axis	250 kg.m <sup>2</sup>    184 slug.ft <sup>2</sup>	700 kg.m <sup>2</sup>    516 slug.ft <sup>2</sup>
GML moment of inertia about Y-axis	250 kg.m <sup>2</sup>    184 slug.ft <sup>2</sup>	700 kg.m <sup>2</sup>    516 slug.ft <sup>2</sup>
GML moment of inertia about Z-axis	250 kg.m <sup>2</sup>    184 slug.ft <sup>2</sup>	700 kg.m <sup>2</sup>    516 slug.ft <sup>2</sup>
GML CoG above moving platform centroid	≤ 0.50 m    ≤ 19.7 in	≤ 0.6 m    ≤ 23.6 in
Top of platform	0.714 m    28.1 in	0.714 m    28.1 in
Ground frame diameter	Approximately 2.0 m    78.7 in	Approximately 2.0 m    78.7 in
Actuator stroke	0.3 m    11.8 in	0.3 m    11.8 in
Power requirements	360 - 500 VAC, 3-phase, 50/60 Hz	360 - 500 VAC, 3-phase, 50/60 Hz
Peak current consumption	104 A @ 400 VAC	104 A @ 400 VAC
Max. continuous power consumption	14 kVA	14 kVA
Electronics and Software	Motion control cabinet, computer, software, maintenance and diagnostic web interface, Ethernet UDP API	Motion control cabinet, computer, software, maintenance and diagnostic web interface, Ethernet UDP API
Typical application	Low cost, single-user training platform for (e)VTOL, air, land and sea vehicle training, general R&D, VR (development) applications	Low cost air, land and sea vehicle training, general R&D and functional & structural component testing

System performance specifications are subject to change. Please consult with Moog for technical information.

# FLEXIBLE SERVICE WITH A GLOBAL REACH

It doesn't matter if you're in Buffalo, Berlin, or Beijing – if you need support, you need support. At Moog, our global network of service providers offers commercial support to customers in more than 20 countries across six continents. Phone. Email. Video conferencing. And yes, on-site support is available, too.

Keep in mind that this support comes from folks who are speaking your language – both literally and figuratively. With more than 1,500 motion systems installed around the world, Moog has the right people in the right place at the right time. They know you and they know your business, so your testing or training programs will run smoothly, efficiently, and profitably, no matter what.



If you're looking for support – or spare parts options such as exchange units, regional spares, or rotatable spares – you'll know where to find us.

Consider these Service/Support programs:

- Spare parts programs
- Global repair programs
- Service Level Agreements
- Software Maintenance Agreements
- On-site support

Moog has offices around the world. To get connected, follow us online or call the office nearest you.

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This technical data is based on current available information and is subject to change at any time by Moog. Specifications for specific systems or applications may vary.

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## Control Loading Systems:

Moog control loading solutions range from basic training to high fidelity full flight simulations in compact and standard packages that meet global certifications.

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## G-Seats:

Simulate realistic, sustained G-Force in helicopter and fighter G-Seats with high fidelity controllers and user-friendly interfaces.

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TALK TO US ABOUT HOW SMALL MOTION SYSTEMS CAN PROVIDE VALUE TO YOUR TESTING OR TRAINING PROGRAM

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