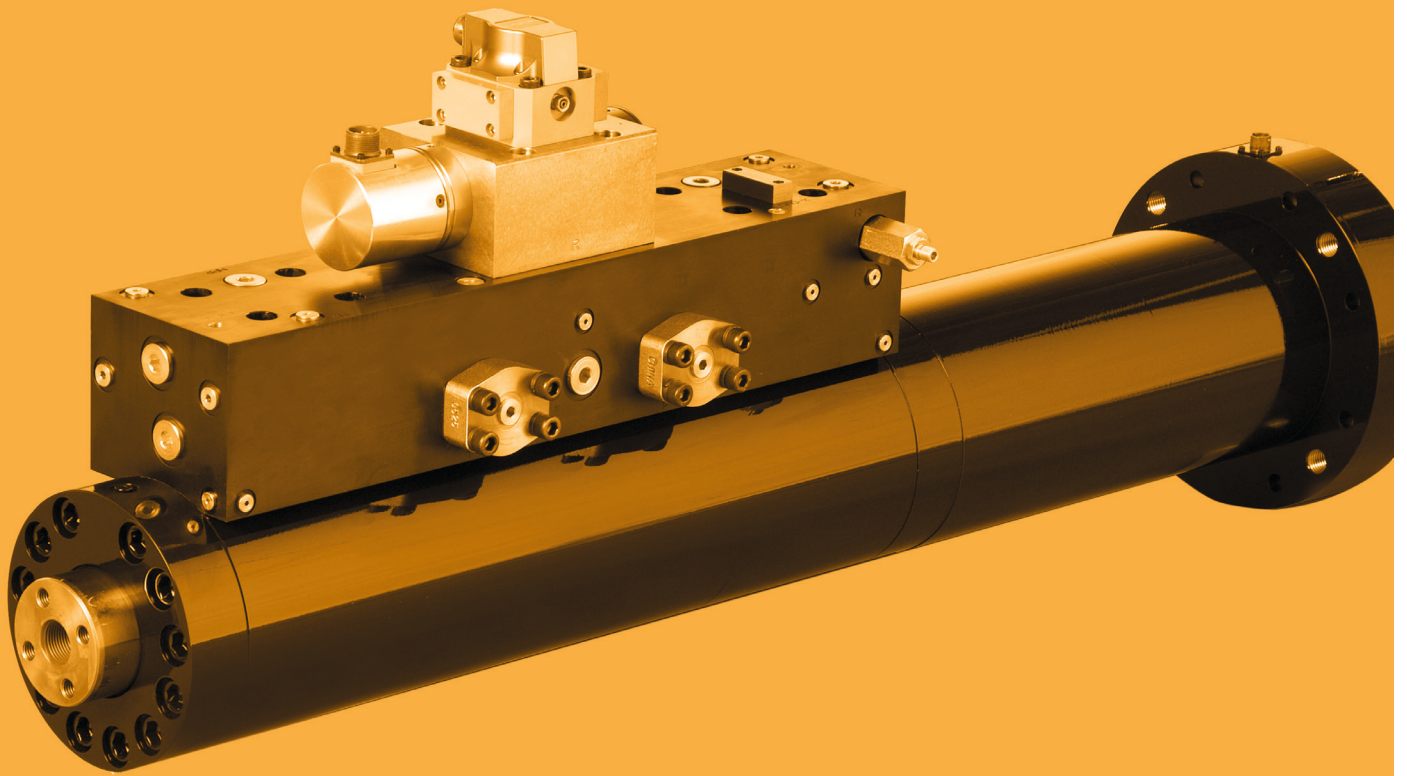


HYDRAULIC TEST ACTUATOR

HYDROSTATIC BEARING



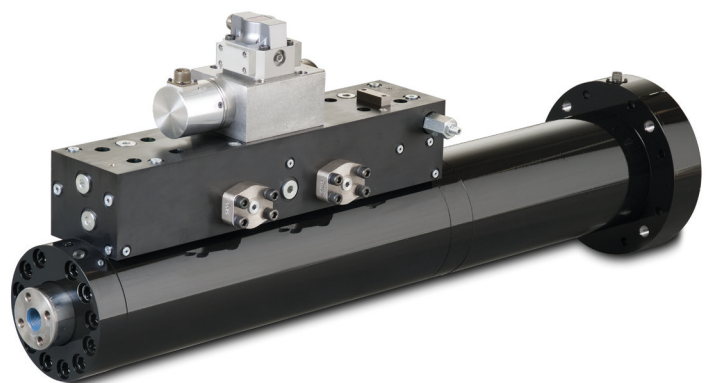
Rev. H, April, 2018

HIGHER LEVEL OF DYNAMIC PERFORMANCE,
RELIABILITY AND LONGEVITY

Whenever the highest levels of motion control performance and design flexibility are required, you'll find Moog expertise at work. Through collaboration, creativity and world-class technological solutions, we help you overcome your toughest engineering obstacles.

Enhance your products' performance, achieve greater efficiencies, and help take your thinking further than you ever thought possible.

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This catalog is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described herein. The products described herein are subject to change without notice. In case of doubt, please contact Moog.

For the most current information, visit www.moog.com/industrial.

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INNOVATIVE 8 POCKET HYDROSTATIC BEARING FOR IMPROVED SIDE LOAD TEST CAPABILITIES AND LESS ENERGY NEEDS

While other actuators have the traditional 4 pocket bearing design we have an innovative 8 pocket hydrostatic bearing design which yields much improved side load test capabilities. Traditional 4 pocket actuators can withstand side loads up to 40% of stall while Moog's new 8 pocket design withstands side loads up to 60% of stall increasing your test capabilities significantly. And these higher forces can be reached with less leakage flow, thus causing you to use less oil with lower maintenance. In addition our new hydrostatic bearing actuator requires a smaller HPU making this essentially a cleaner hydraulic application over the traditional design.

HIGHER LEVEL OF DYNAMIC PERFORMANCE, RELIABILITY AND LONGEVITY

Moog has vast experience developing actuators for some of the world's most demanding applications and building high performance motion control components is one of our strengths. Actuators are key to high performance test solutions and our customers have expressed a need for more reliable, high performance components than they can find in the marketplace. We have put some of our top engineers on this product development project that combines test application knowledge with a long history of actuation experience. The result is the O86-6 series actuator that is the benchmark for strength and durability test applications. Improving the performance of today's test systems, while meeting stricter environmental concerns requires a new kind of building block component. The Moog actuator represents a new breed of component design and robust performance. This new building block can be used in many applications including single and multiple actuator test systems.

Advanced cushion design for higher reliability and safety

We took a traditional design and made significant improvements developing a truly better cushioning system. The actuator incorporates this advanced design to ensure safety and prevent equipment damage. The O86-6 series actuator has a cushion at each end to ensure that the actuator will be decelerated before reaching end of stroke in both directions.

- Dampens force for test reliability
- Each cushion design is physically tested to ensure proper functioning
- Provides true active cushioning in a properly sealed system

Improved seal wear for longer life and less maintenance

The actuator's advanced coating used on the rod significantly improves seal wear for long life and less maintenance. A stainless steel rod utilizes proprietary seals and this unique rod coating to provide several performance advantages. This design also provides for a cleaner hydraulic operation creating a more environmentally friendly lab.

- Rod surface 80 HRC
- Extends the seal life
- Clean operation allows for less maintenance time and costs
- Proprietary surface finishing requirements to enhance seal life and minimize oil leakage
- Stainless steel rod to prevent corrosion

Innovative design for less maintenance

Moog engineers designed the manifold to house all of the piping in the actuator, thereby removing the need for most of the exterior piping. The result is significantly less maintenance requirements and downtime.

- Minimal failure points due to less piping
- Few potential oil leaks over time because of self containment in manifold

Moog Servovalves - World leader in servo-control test systems

Moog Servovalves have a worldwide reputation for long-life, high performance and excellent after market support. This advanced servo control provides precision movement in these test actuators.

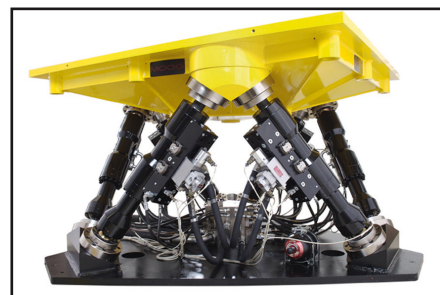
Custom servovalves can also be tailored to meet your unique requirements by developing special configurations that offer ever more optimized performance. Benefits include:

- Improved step response
- Reduced hysteresis and increased small signal response with use of high response valves

Solutions built around you

The Moog hydrostatic bearing actuator delivers higher reliability, less maintenance and increased dynamic performance for test labs looking for the competitive edge. High-quality materials combined with superior engineering such as advanced cushion design and innovative manifold design make these actuators the right choice for a range of system challenges.

To ensure high performance from design to delivery, Moog engineers use the latest tools such as Matlab® and Simulink® system modeling. A rigorous physical testing program ensures that our customers receive components that they can rely on for a trouble-free test process. The combination of innovative design, world-class manufacturing and responsive worldwide customer support, make Moog components the ideal answer for test labs that offer more reliability and the highest performance.



Simulation Table System



4-Post Hydrostatic Test Systems

HYDRAULIC INTERFACES

Hydraulic Distribution System	
Oil Requirements System Fluid System Fluid	Mobil DTE-25, Shell Tellus 46, or equivalent Mobil DTE-24, Shell Tellus 32, or equivalent
Filtration Requirements	To prolong the operational life of active hydraulic components, the hydraulic fluid should be maintained at a cleanliness level of ISO 4406 (SAE J1165) 15/14/11.
Pressure Operating Pressure Maximum Return Pressure Maximum Drain Pressure	3000 psi (210 bar) 200 psi (14 bar) 50 psi (3.5 bar)
Operating Temperature	Hydraulic oil temperature should be maintained between 24°C (75°F) and 57°C (135°F)
Hydraulic Manifolds	
Manifold Ports	Pressure & Tank: SAE 4-bolt metric flange connection per ISO 6162 TYPE 1 G761/D765 Manifold: SAE 1.00 (-16) 79-100/72 Series Manifold: SAE 1.50 (-24) 79-200 Series Manifold: SAE 2.00 (-32) Pilot Pressure: SAE 6 straight threaded o-ring port - ISO 11926-1 Drain: SAE 6 straight threaded o-ring port - ISO 11926-1 Moog Recommends the use of SAE O-Ring Face Seal (ORFS) 'Seal-Lok' ISO 8434-3 or BSPP O-Ring 24° Cone Flareless "E02" ISO8434-4 for the best leak free connection
Servovalves* Standard Response High Response	G761, 72, 79-100, 79-200 G761, D765, 79-100, 79-200

*Moog Application Engineering can help you select the ideal size and type of servovalve to optimize performance.

ELECTRICAL INTERFACE

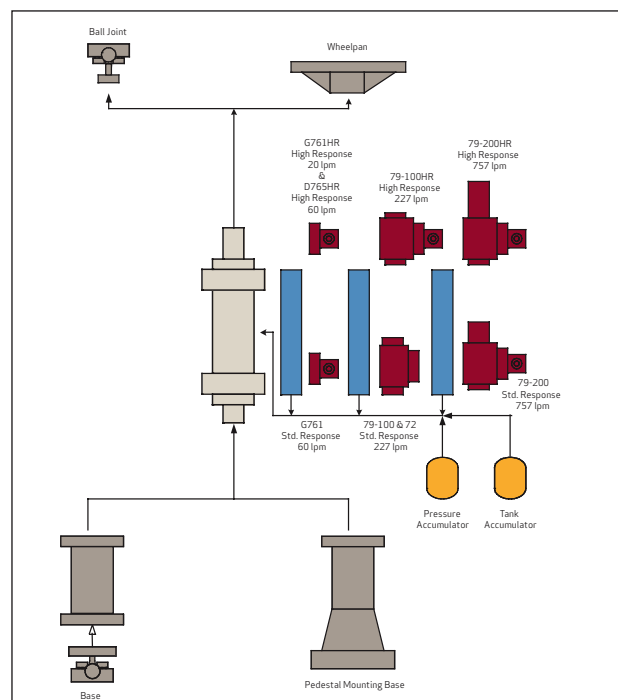
Transducer Specifications	
LVDT Transducer	LVDT excitation (5V peak to peak @ 3kHz)

MODULAR CONFIGURATIONS

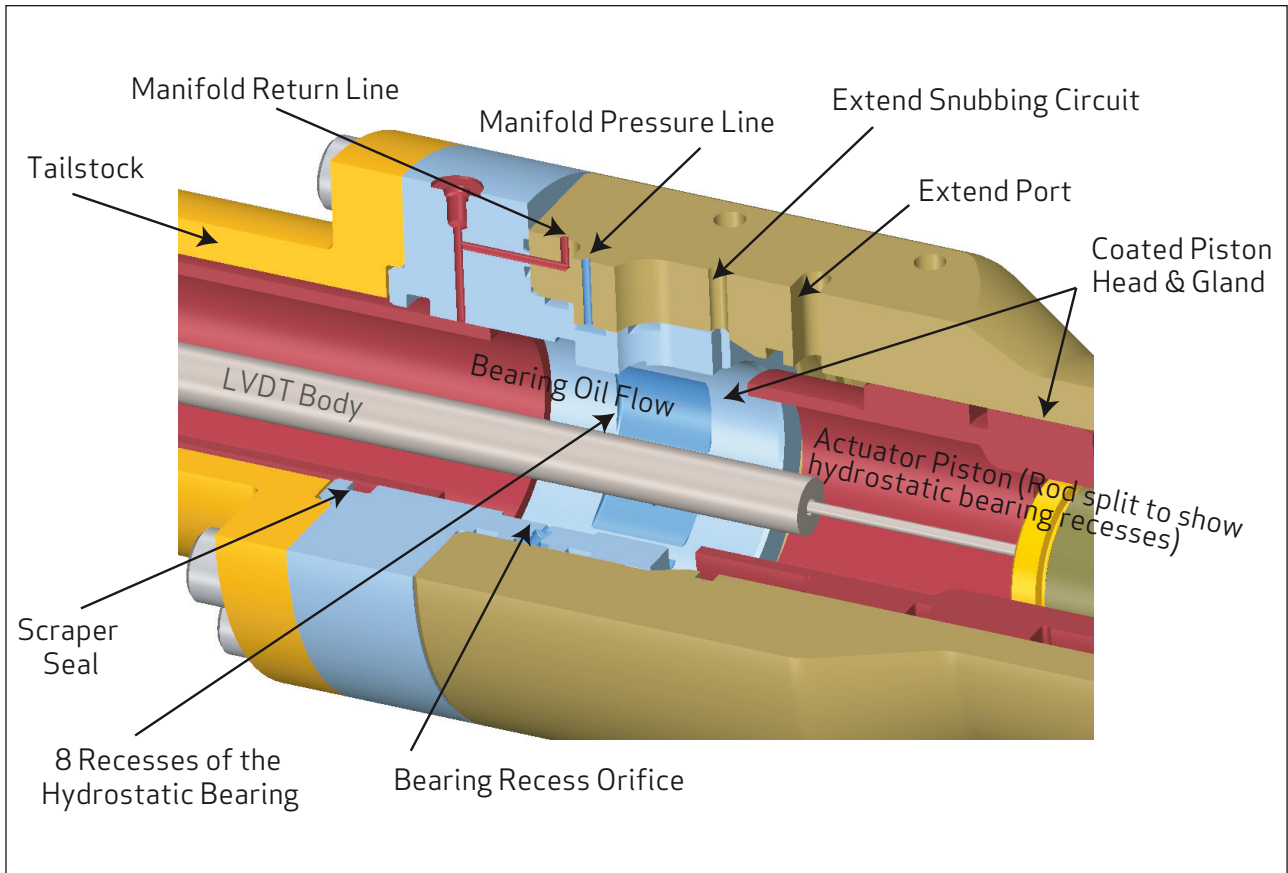
A variety of available configurations allows you to design the exact actuator that you need for your test system for increased modularity. Moog can provide a series of servovalves and accumulators to match your needs as well as offer a range of joints and bases for maximum efficiency.

Key for configurations:

- Joints and Bases
- Servovalves
- Accumulators
- Manifolds

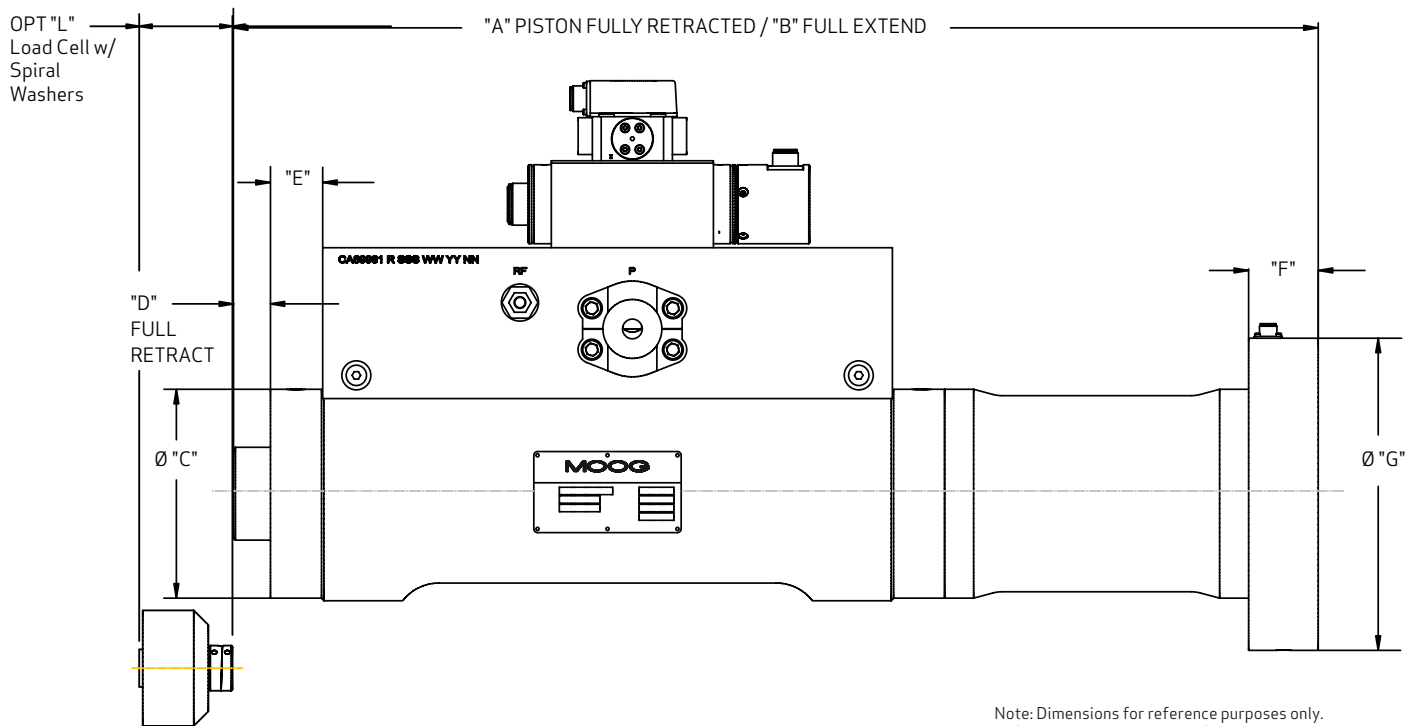


CRITICAL COMPONENTS



HYDROSTATIC BEARING ACTUATOR FORCE PRODUCT RANGE

Force Rating	Full Stroke Length	Working Stroke Length	Rod Diameter	Cylinder Bore Diameter	Piston Area
kN (kip)	mm (in)	mm (in)	mm (in)	mm (in)	sq cm (sq in)
30 (6.6)	241, 293, 343, 395 (9.5, 11.5, 13.5, 15.5)	152, 204, 254, 306 (6, 8, 10, 12)	80.0 (3.2)	92.0 (3.62)	16.2 (2.5)
38 (8.5)	253, 305, 355, 407 (10, 12, 14, 16)	152, 204, 254, 306 (6, 8, 10, 12)	80.0 (3.2)	95.0 (3.7)	20.6 (3.2)
50 (11)	253, 305, 355, 407 (10, 12, 14, 16)	152, 204, 254, 306 (6, 8, 10, 12)	80.0 (3.2)	99.0 (3.9)	26.7 (4.1)
100 (22)	253, 305, 355, 407 (10, 12, 14, 16)	152, 204, 254, 306 (6, 8, 10, 12)	100 (3.9)	130 (5.1)	54.2 (8.4)
160 (35)	253, 305, 355, 407 (10, 12, 14, 16)	152, 204, 254, 306 (6, 8, 10, 12)	100 (3.9)	145 (5.7)	86.6 (13.4)

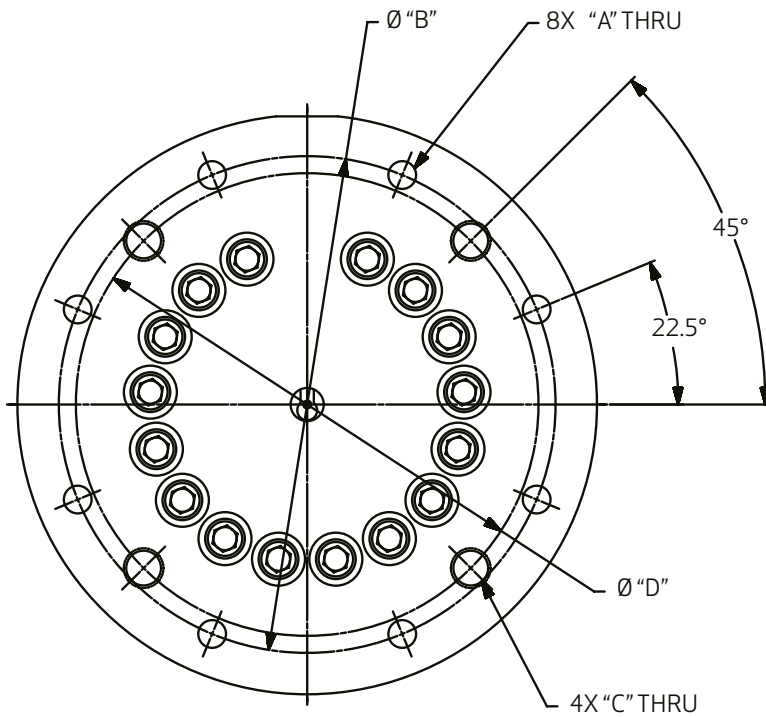


Actuator Force kN / KIP	ACTUATOR FULL RETRACT LENGTH "A" / FULL EXTEND "B"				"C" mm (in)	"D" mm (in)	"E" mm (in)	"F" mm (in)	"G" mm (in)	OPT "L" mm (in)
	ACTUATOR STROKE OPTION									
	152 mm (in)	204 mm (in)	254 mm (in)	306 mm (in)						
30 / 6.6	865 / 1106 (34.1/43.5)	969 / 1262 (38.1/49.7)	1069 / 1412 (42.1/55.6)	1173 / 1568 (46.2/61.7)	180 (7.1)	32.0 (1.3)	39.0 (1.5)	60.0 (2.4)	270 (10.6)	114 (4.5)
38 / 8.5	935 / 1188 (36.8/46.8)	1039 / 1344 (40.9/52.9)	1139 / 1494 (44.8/58.8)	1243 / 1650 (48.9/65.0)	180 (7.1)	32.0 (1.3)	45.0 (1.8)	60.0 (2.4)	270 (10.6)	114 (4.5)
50 / 11	935 / 1188 (36.8/46.8)	1039 / 1344 (40.9/52.9)	1139 / 1494 (44.8/58.8)	1243 / 1650 (48.9/65.0)	180 (7.1)	32.0 (1.3)	45.0 (1.8)	60.0 (2.4)	270 (10.6)	114 (4.5)
100 / 22	1035 / 1288 (40.7/50.7)	1139 / 1444 (44.8/56.9)	1239 / 1594 (48.8/62.8)	1343 / 1750 (52.9/68.9)	220 (8.7)	32.0 (1.3)	45.0 (1.8)	70.0 (2.8)	350 (13.8)	114 (4.5)
160 / 35	1105 / 1358 (43.5/53.5)	1209 / 1514 (47.6/59.6)	1309 / 1664 (51.5/65.5)	1413 / 1820 (55.6/71.7)	227 (8.9)	32.0 (1.3)	45.0 (1.8)	70.0 (2.8)	350 (13.8)	139 (5.5)

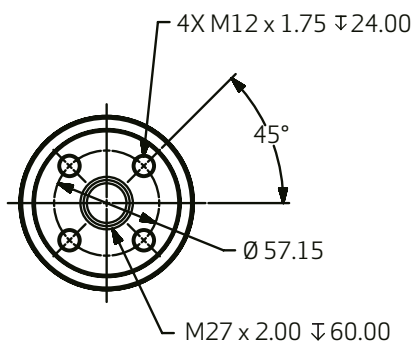
PEDESTAL BASE DIMENSIONS

Actuator Force kN / KIP	8 Thru Holes "A" mm (in)	Thru Hole BCD "B" mm (in)	4 Thread Holes "C" mm	Threaded BCD "D" mm (in)
30 / 6.6	13.5 (0.53)	229 (9.0)	M20 x 2.5	229 (9.0)
38 / 8.5	13.5 (0.53)	229 (9.0)	M20 x 2.5	229 (9.0)
50 / 11	13.5 (0.53)	229 (9.0)	M20 x 2.5	229 (9.0)
100 / 22	16.8 (0.66)	300 (11.8)	M24 x 3.0	279 (11.0)
160 / 35	16.8 (0.66)	300 (11.8)	M24 x 3.0	279 (11.0)

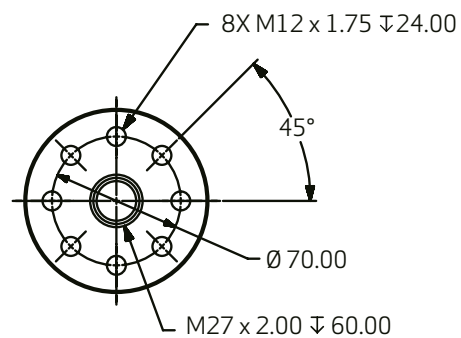
Note: Dimensions for reference purposes only. Refer to installation drawing for detailed dimensions.



ROD END INTERFACE DIMENSIONS



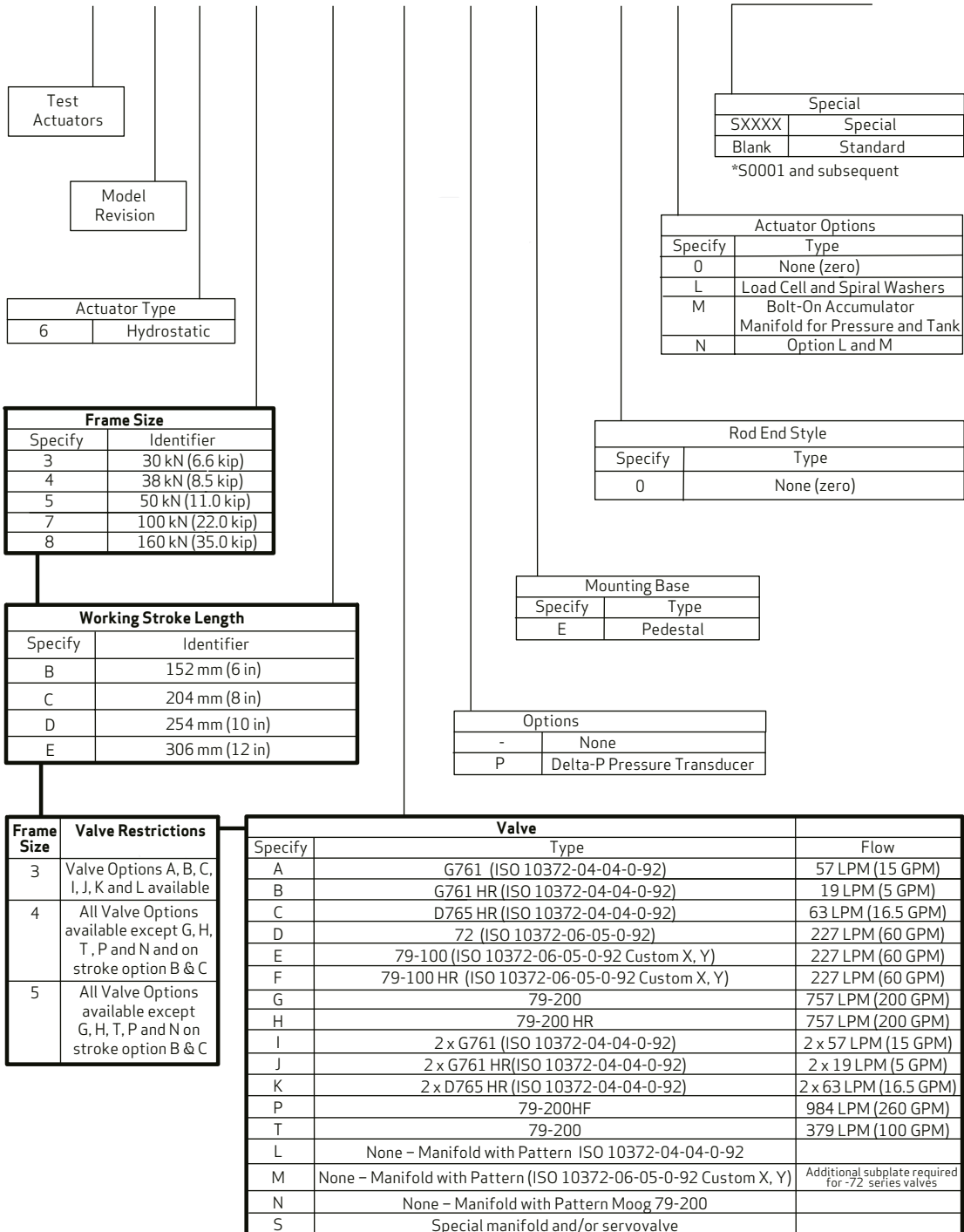
30 kN, 38 kN, and 50 kN Actuators



100 kN and 160 kN Actuators

MODEL NUMBER DEFINITION FOR HYDRAULIC TEST ACTUATOR - HYDROSTATIC BEARING

-086 - 6 X X X - X X X XXXXX



Other combinations are possible. Please consult with our Moog Applications Engineers for more information.

A HIGHER LEVEL OF SUPPORT

Five point inspection process

Our number one goal is to eliminate downtime and make repairs that will deliver reliability and cost savings for years to come. When you send in your repair, it must work like new when you get it back. This is the Moog Global Support™ promise.

- Incoming inspection will provide the customer details on the performance of the actuator assembly such as leakage and response. The inspection will also provide details to our technicians in regards to critical performance specs that need to be addressed.
- Technicians will then review engineering notes for any design improvements that may have been initiated since inception.
- Actuator assembly will get completely disassembled to piece parts. Aqueous Ultrasonic cleaners are used to thoroughly clean each component before inspection and dimensional checks. Any components found too worn will be replaced with OEM parts. Critical components such as fitted rod and bearings will be dimensionally checked to ensure the component meets the print criteria. A complete seal kit replacement will be installed to ensure integrity of the structure.
- The servovalve will be removed and sent through the same rigorous evaluation, disassembly and test.
- Finally, the assembly will be tested to original specs to ensure the overhaul unit meets all design and performance criteria as new.

Moog engineering on call for you

Delivering world-class motion control products and solutions means taking customer support far beyond the initial sale. It requires a dedicated approach to solving your problems, addressing your machine challenges and helping you achieve maximum productivity on a daily basis. In today's competitive manufacturing environment, machine performance plays a significant role in determining your bottom line. Moog Global Support™ is key to achieving cost-effective machine operation, day in and day out.

Actuator repair capabilities

Moog Global Support™ is designed to keep your critical machines up and running at peak performance with only 100% genuine Moog replacement parts. Only Moog replacement parts can deliver the reliability, versatility and long life that you would expect from a world leader in motion control solutions. Each Moog part delivers essential components with precise dimensions, close tolerances and specific materials specifications. Because we understand the key role our parts play in the overall operation of your machine, we carefully inspect and test each repair to identify only those components that need replacement.

Take the next step

Isn't it time you worked with a partner who can offer both the world-class products and collaborative expertise you need to reach the next level of performance? Contact us today and see for yourself the difference the right partner can make.



SPARE PARTS AND ACCESSORIES

Model Series	Replacement Seal Kit	Optional Seal Installation Tool Kit
-086-63** 30 kN (6.6 KIP)	CB01444-630	CB01446-630
-086-64** 38 kN (8.5 KIP) (79-100 Servovalve)	CB01444-641	CB01446-640
-086-64** 38 kN (8.5 KIP) (79-200 Servovalve)	CB01444-642	CB01446-640
-086-65** 50 kN (11 KIP) (79-100 Servovalve)	CB01444-651	CB01446-650
-086-65** 50 kN (11 KIP) (79-200 Servovalve)	CB01444-652	CB01446-650
-086-67** 100 kN (22 KIP)	CB01444-670	CB01446-670
-086-68** 160 kN (35 KIP)	CB01444-680	CB01446-680

* See CDS25985 Hydrostatic Actuator Operation & Maintenance Manual for additional details

	Standard Electrical Connector mates with the following, or equivalent (Waterproof, IP65)
G761 Servovalve	MS3106F14S-2S
D765HR Servovalve	EN175201-804 Type R
72 Series Servovalve	MS3106F14S-2S
79-100 Servovalve Pilot Valve LVDT	MS3106F14S-2S MS3106F14S-5S
79-200 Servovalve Pilot Valve LVDT	MS3106F14S-2S MS3106F14S-5S
Servoactuator LVDT	PT06A-10-6S (Moog # CA64645-001)
Delta P Transducer	PT06A-8-4S (Moog # CA64645-002)
Load Cell	PT06A-10-6S (Moog # CA64645-001)

MOOG TEST PRODUCTS - FOR EVERY TESTING NEED

Moog engineers are always ready to meet your unique application needs with building blocks or complete turnkey systems that include hydraulic or electric test actuators, Moog servovalves, hydraulic service manifolds, test controllers, software and more.

We are committed to providing world-class motion control products and solutions, taking customer support far

beyond the initial sale. Our dedicated approach solves your problems, addresses your machine challenges, and allows you to achieve maximum productivity on a daily basis.

It's time you worked with a partner who can offer both the world-class products you desire and collaborative expertise you need to reach the next level of performance. Contact us today to see the difference Moog can make.

TEST CONTROLLERS AND SOFTWARE



The Moog Test Controller is a real-time modular control system that can control or collect data from any hydraulic or electromechanical test system. The robust and compact modules have a wide range of transducer inputs and control outputs that can be easily configured for optimum use. The Moog test software allows the end user to control and record all of these signals in an easy to use format providing maximum value for many years of reliable usage.

The Moog Integrated Test Suite configures, calibrates and tunes equipment with easy-to-use setup. Replication will replicate time history files using state-of-the-art algorithms in an easy yet powerful way. Build complex, nested durability test through simple instructions. Run and monitor the progress of the durability test and specimen with the Moog Runner. Measure the resonant frequencies of your test specimen by running sinesweep durability tests. Run real-time closed loop control to defined random vibration frequency spectra (PSO's).



SERVO VALVES



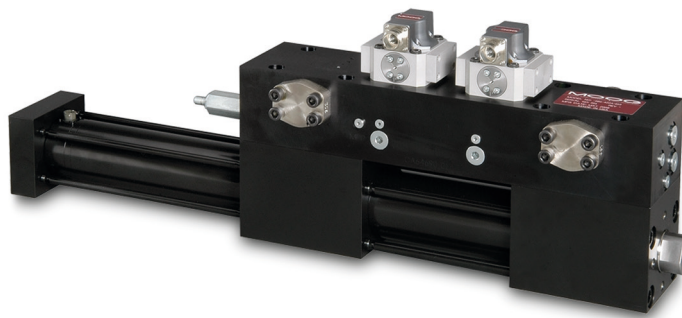
Because we design our renowned Moog Servo Valves - the world standard in performance and durability - you're assured of a system tailored to your exacting requirements.

HYDRAULIC SERVICE MANIFOLDS



The Moog Hydraulic Service Manifold (HSM) provides on/off hydraulic pressure with an adjustable transition from off to high pressure. Filters protect sensitive servo valves and accumulators provide instantaneous flow or pressure damping when needed. Several flow-rating sizes with 1 to 4 station options are available.

POLYMER BEARING ACTUATOR



The Moog Polymer Bearing Actuator was designed for higher reliability and safety. The 086-4 series actuator has a cushion at each end to ensure that the actuator will be decelerated before reaching end of stroke in both directions. The actuator's advanced coating used on the rod significantly improves seal wear for long life and less maintenance. A stainless steel rod utilizes proprietary seals and this unique rod coating to provide several performance advantages. This design also provides for a cleaner hydraulic operation creating a more environmentally friendly lab.

FOUR POSTER TEST SYSTEMS



Our Four Poster Test Systems include hydrostatic bearing test actuators for low friction, high velocity and high side load carrying capacity. Our systems are found in research labs where they are used for ride quality assessment and Noise, Vibration and Harshness (NVH) testing. They're used in durability test labs to validate selected body, chassis, and suspension designs. They are also used in production facilities to assess squeak and rattle concerns.

TAKE A CLOSER LOOK

Moog designs a range of products that complement the performance of those featured in this catalog. Visit our website for more information or contact the Moog facility nearest you.

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