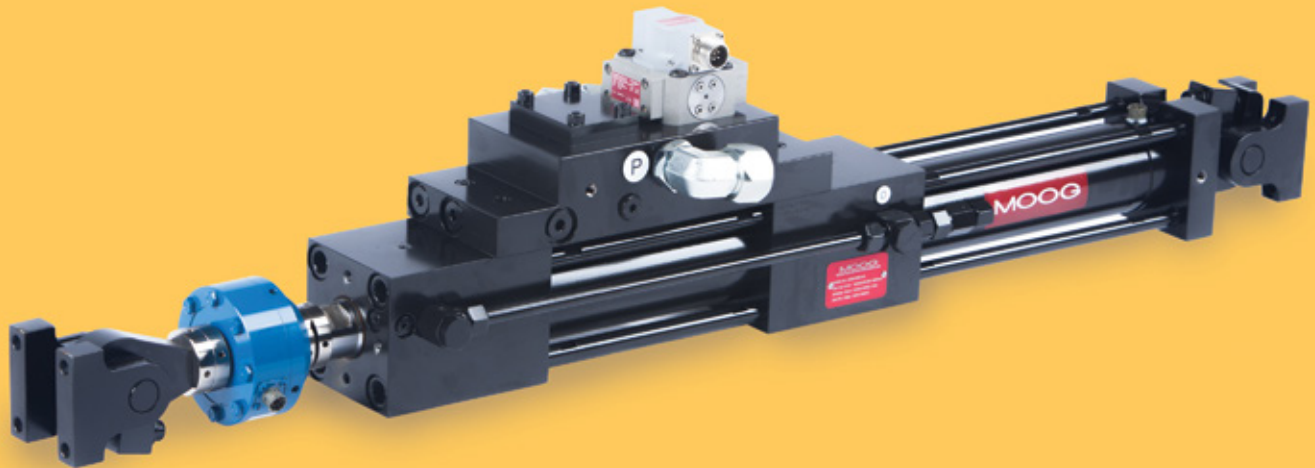


HYDRAULIC TEST ACTUATOR POLYMER BEARING



Rev.A, May 2018

DELIVERING FLEXIBILITY AND
RELIABILITY FOR A RANGE OF
SINGLE-AND MULTI-AXIS
TEST SYSTEMS

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 machine’s performance, achieve greater efficiencies and help take your thinking further than you ever thought possible.

INTRODUCTION

Product Overview3

TECHNICAL DATA

Specifications4

Critical Dimensions6

Technical Features7

ORDERING INFORMATION

Order Information.....8

BACKGROUND

Support and Spare Parts9

Moog Test Products10



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.

Moog is a registered trademark of Moog Inc. and its subsidiaries. All trademarks as indicated herein are the property of Moog Inc and its subsidiaries. For the full disclaimer refer to www.moog.com/literature/disclaimers.

For the most current information, visit www.moog.com/industrial or contact your local Moog office.

©Moog Inc. 2018. All rights reserved. All changes are reserved.

PRODUCT OVERVIEW

Fatigue rated actuators are the heart of high performance test systems. For years, test engineers have been looking for actuators that deliver dependability, less maintenance and high performance, yet are available at an affordable price. Their goal has been to expedite tests to obtain accurate test results more efficiently.

With deep roots in electro-hydraulic servo control expertise and global test experience, Moog has designed servo actuators for some of the world’s most demanding

applications—from Primary Flight Control System Actuators to Automatic Gap Control Actuators used in a steel mill product line.

Today, Moog has further developed a new series of Actuators, the C086A7 Polymer Bearing Hydraulic Test Actuator to meet the critical test needs of test engineers.

Actuator Series Code: C086A7

Features	Benefits
<p>7 rated dynamic forces: 15 kN (3.3kip) to 500 kN (110kip)</p> <p>3 standard working strokes: 100mm (4 inch), 150mm (6 inch), 250mm (10 inch)</p> <p>Multiple combinations: Building-block design and other options to create different actuator configurations to suit your unique application needs</p>	<p>Many standard offerings for a wide variety of applications</p>
<p>High performance seal solution, long life bearings</p> <p>Robust and rigid servo valves, contact-less linear position sensors and fatigue-rated load cells</p>	<p>Long life and low friction</p>
<p>High side-load capacity hybrid polymer bearings</p>	<p>Higher side-load capacity and increased durability, longer service time for more demanding applications</p>
<p>Industrial leading Moog G761, 72 and 79 series Servo Valves are installed to provide high dynamic, accurate and robust actuator control</p>	<p>High performance servo control</p>

Solutions Built Around You

Moog Polymer Bearing Test Actuator delivers higher reliability, less maintenance for test labs that seek a cost-effective solution yet expect to maintain their competitive edge in the market.

Moog engineers combine the use of the latest tools and their vast experience in a variety of applications to ensure high performance from design to delivery. A rigorous physical testing program ensures that our customers receive components that they can rely on for years of trouble-free operation. The combination of innovative design, world-class manufacturing and responsive worldwide customer support makes Moog components the ideal solution for test labs that offer more reliability and the highest performance.

Typical Applications:

- Automotive durability testing
- Rolling stock structural testing
- Aerospace fatigue testing
- Civil engineering structural testing
- Package vibration testing



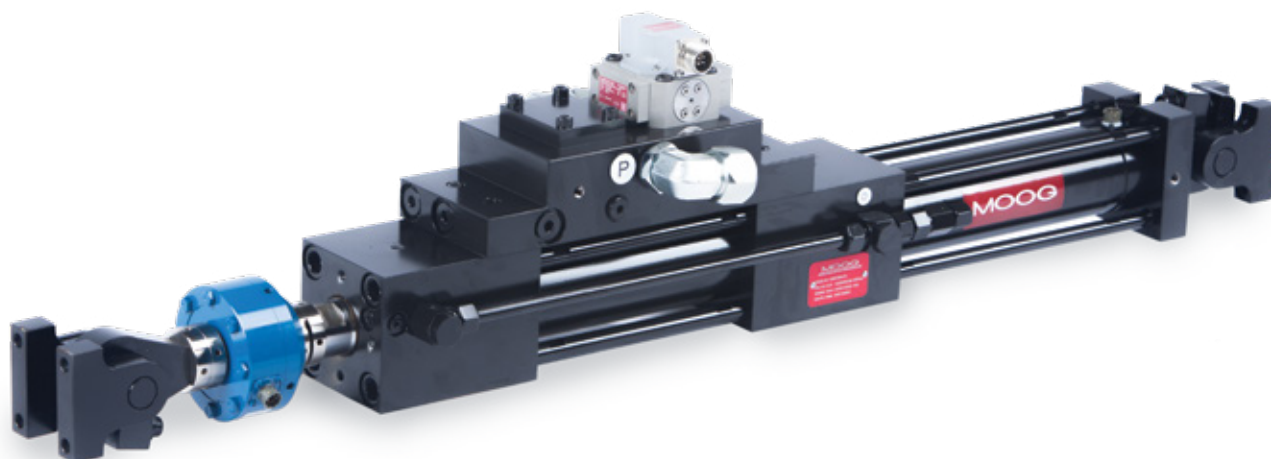
SPECIFICATIONS

Key Actuator Specifications

Model Number	Nominal Force	Static* Force	Full Stroke	Working Stroke	Rod Dia.	Bore Dia.	Piston Area
Units	kN (kip)	kN (kip)	mm (in)	mm (in)	mm (in)	mm (in)	cm ² (in ²)
C086A73	15 (3.3)	19.9 (4.5)	180,230,330 (7.1,9.1,13)	100,150,250 (4,6,10)	45 (1.8)	57 (2.2)	9.6 (1.5)
C086A74	25 (5.5)	31.6 (7.1)	180,230,330 (7.1,9.1,13)	100,150,250 (4,6,10)	45 (1.8)	63 (2.5)	15.3 (2.37)
C086A75	50 (11)	58.5 (13.2)	180,230,330 (7.1,9.1,13)	100,150,250 (4,6,10)	80 (3.1)	100 (3.9)	28.3 (4.39)
C086A76	100 (22)	130.1 (29.2)	140,190,290 (5.5,7.5,11.4)	100,150,250 (4,6,10)	80 (3.1)	120 (4.7)	62.8 (9.74)
C086A77	150 (33)	170.7 (38.4)	140,190,290 (5.5,7.5,11.4)	100,150,250 (4,6,10)	80 (3.1)	130 (5.1)	82.4 (12.8)
C086A79	250 (55)	280.0 (63.0)	140,190,290 (5.5,7.5,11.4)	100,150,250 (4,6,10)	100 (3.9)	165 (6.5)	135 (20.9)
C086A7A	500 (110)	617.8 (138.9)	124,174,274 (4.9,6.9,10.8)	100,150,250 (4,6,10)	140 (5.5)	240 (9.4)	298 (46.2)

Cushion length on each end is 20 mm (0.79 in). The C086A7A has a 12 mm (0.47 in) cushion.

*Calculated at 207Bar (3000 psi).



SPECIFICATIONS

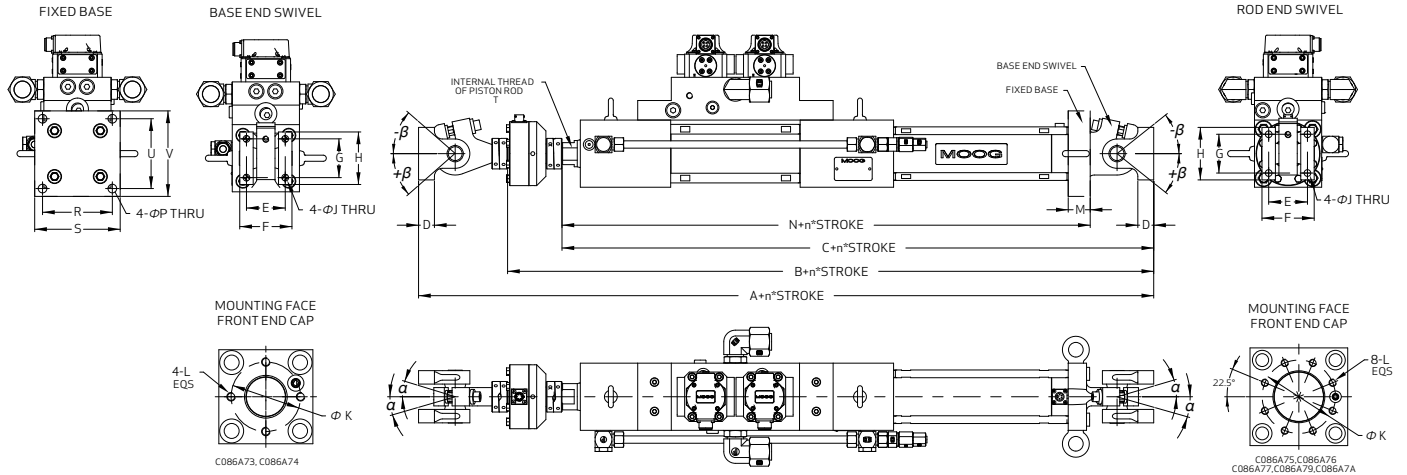
Additional Specifications

Pressure	
Operating Pressure	21 MPa (3000 psi)
Maximum Return Pressure	1.4 MPa (200 psi)
Maximum Drain Pressure	0.35 MPa (50 psi)
Seal	
Material	NBR as standard
Hydraulic Interface	
Pressure Line	SAE 37° FLARE (ISO8434-2) -16 (G761 Manifold) -24 (72/79-100 series Manifold)
Return Line	SAE 37° FLARE (ISO8434-2) -16 (G761 Manifold) -24 (72/79-100 series Manifold)
Drain Line	SAE 37° FLARE (ISO8434-2) -6
Operation Temperature Range	
Hydraulic Oil Temperature	24 °C (75 °F) to 57 °C (134 °F)
Oil Requirements	
System Fluid	Hydraulic oil as per DIN 51524 parts 1 to 3 and ISO VG 32, 46 or equivalent
Cleanliness Level	ISO 4406 (SAE J1165) 15/14/11 (NAS 5)
Electrical Interface	
Transducer Specification	
LVDT Position Transducer	LVDT excitation (3.5 Vrms @ 3kHz)
Standard electrical connector mates with the following, or equivalent (waterproof, IP65)	
G761 Servo Valve	MS3106F14S-2S
72 Servo Valve	MS3106F14S-2S
Position Transducer and Load cell	PT06A-10-6S
Delta-P Pressure Transducer	PT06A-8-4S



SPECIFICATIONS

Critical Dimensions



MODEL NUMBER	Nominal FORCE (kN/kip)	A		B		C		D mm(in)	E mm(in)
		FULLY RETRACTED n=2 mm(in)	FULLY EXTENDED n=3 mm(in)	FULLY RETRACTED n=2 mm(in)	FULLY EXTENDED n=3 mm(in)	FULLY RETRACTED n=2 mm(in)	FULLY EXTENDED n=3 mm(in)		
C086A73	15/3.3	904(35.6)	984(38.7)	758(29.8)	838(33.0)	669(26.3)	749(29.5)	26(1.0)	63.5(2.5)
C086A74	25/5.5	904(35.6)	984(38.7)	758(29.8)	838(33.0)	669(26.3)	749(29.5)	26(1.0)	63.5(2.5)
C086A75	50/11	1092(43.0)	1172(46.1)	861(33.9)	941(30.0)	735(28.9)	815(32.1)	36(1.4)	114.3(4.5)
C086A76	100/22	1198(47.2)	1238(48.7)	904(35.6)	944(37.2)	783(30.8)	823(32.4)	57(2.2)	146(5.7)
C086A77	150/33	1258(49.5)	1298(51.1)	969(38.1)	1009(39.7)	823(32.4)	863(34.0)	57(2.2)	146(5.7)
C086A79	250/55	1411(55.6)	1451(57.1)	1051(41.4)	1091(43.0)	905(35.6)	945(37.2)	60(2.4)	184(7.2)
C086A7A	500/110	1879(74.0)	1903(74.9)	1383(54.4)	1407(55.4)	1182(46.5)	1206(47.5)	80(3.1)	241.3(9.5)

MODEL NUMBER	Nominal FORCE (kN/kip)	F mm(in)	G mm(in)	H mm(in)	J mm(in)	K mm(in)	T	L	M mm(in)
C086A73	15/3.3	85.5(3.4)	63.5(2.5)	86(3.4)	11(0.43)	81.3(3.2)	M27X2 DEP.46	M10X1.5 DEP.16	36(1.4)
C086A74	25/5.5	85.5(3.4)	63.5(2.5)	86(3.4)	11(0.43)	81.3(3.2)	M27X2 DEP.46	M10X1.5 DEP.16	36(1.4)
C086A75	50/11	149.3(5.9)	114.3(4.5)	143(5.6)	17(0.67)	120(4.7)	M27X2 DEP.46	M12X1.75 DEP.20	47(1.9)
C086A76	100/22	186(7.3)	146(5.7)	188(7.4)	17(0.67)	120(4.7)	M33X2 DEP.46	M12X1.75 DEP.25	60(2.4)
C086A77	150/33	186(7.3)	146(5.7)	188(7.4)	17(0.67)	145(5.7)	M33X2 DEP.46	M16X2 DEP.25	60(2.4)
C086A79	250/55	234(9.2)	184(7.2)	230(9.1)	26(1.0)	172(6.8)	M42X2 DEP.53	M16X2 DEP.25	72(2.8)
C086A7A	500/110	314.5(12.4)	241.3(9.5)	317.5(12.5)	33.5(1.3)	200(7.9)	M72X2 DEP.90	M24X3 DEP.38	80(3.1)

MODEL NUMBER	Nominal FORCE (kN/kip)	N		P mm(in)	R mm(in)	S mm(in)	U mm(in)	V mm(in)	α	β
		FULLY RETRACTED n=2 mm(in)	FULLY EXTENDED n=3 mm(in)							
C086A73	15/3.3	565(22.2)	645(25.4)	14.2(0.56)	114.3(4.5)	140(5.5)	114.3(4.5)	140(5.5)	+7°	+90°
C086A74	25/5.5	565(22.2)	645(25.4)	14.2(0.56)	114.3(4.5)	140(5.5)	114.3(4.5)	140(5.5)	+7°	+90°
C086A75	50/11	576(22.7)	656(25.8)	17.3(0.68)	146(5.75)	188(7.40)	146(5.75)	188(7.40)	+17°	+90°
C086A76	100/22	566(22.3)	606(23.9)	17.3(0.68)	150(5.9)	188(7.40)	150(5.9)	188(7.40)	+17°	+90°
C086A77	150/33	606(23.9)	646(25.4)	17.3(0.68)	165(6.5)	200(7.9)	165(6.5)	200(7.9)	+17°	+90°
C086A79	250/55	629(24.8)	669(26.3)	26(1.0)	190(7.5)	240(9.4)	190(7.5)	240(9.4)	+14°	+90°
C086A7A	500/110	742(29.2)	766(30.1)	33.5(1.3)	280(11.0)	350(13.8)	280(11.0)	350(13.8)	+6°	-30°, +90°

NOTE: FACTOR n=2 (FULLY RETRACTED); n=3 (FULLY EXTENDED)
STROKE = 100mm, 150mm and 250mm

TECHNICAL FEATURES

Configurable Actuator To Meet Your Needs

Built-in Co-axial LVDT Position Sensor

Using just simple tools, the integrated co-axial LVDT can be null adjusted easily.

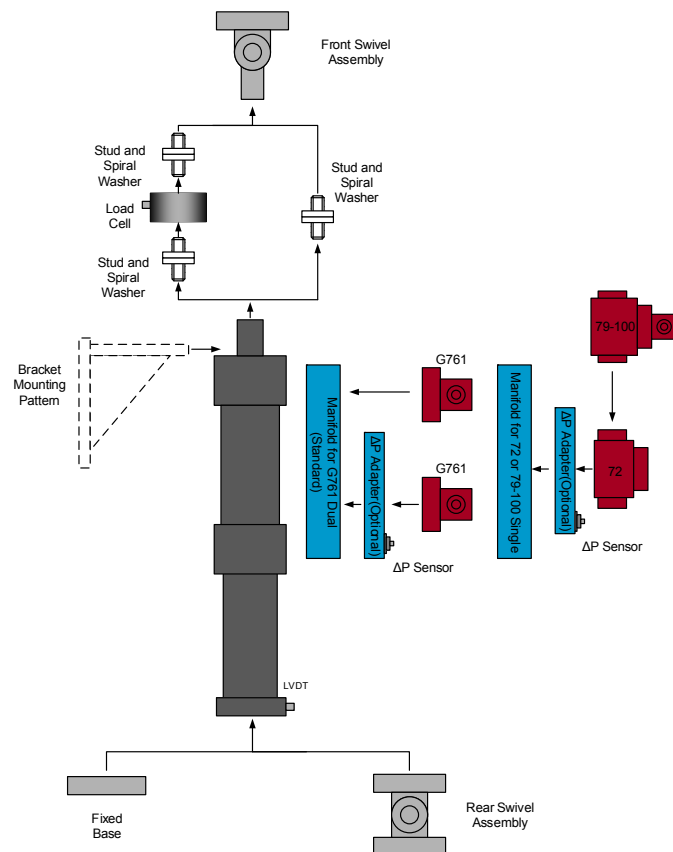
A variety of building blocks are available to configure the exact actuator per test rig design or application requirements (see illustrative drawing).

Various Moog high performance servo valves and load cells are provided to achieve optimal performance and sizing efficiency. Contact Moog for further customized solutions.

Mounting joints and bases are also provided to adapt to the installation requirements.

Key for configurations

- Joints and Bases
- Servo Valves
- Manifolds/Valve Adapters
- Load Cells
- Accessories



EXTENSIVE OPTIONS

Servo Valve Manifolds

- The G761 servo valve manifold is designed for (2) G761 servo valves to provide up to 126 LPM (33 GPM) of rated flow
- A high flow manifold ported for one of the Moog 72 or 79-100 series servo valves can be selected to allow even higher velocities

Delta-P Sensor

- A Differential Pressure (Delta P) manifold block (including sensor) is an option that when connected to control electronics can enhance actuator dynamics and control

Mounting

- A front flange or bracket mounting bolt-circle is provided on the front end-bell
- Swivels can be selected for most common mounting configurations
- A fixed mounting base is also an option

Load Cell

- Fatigue-rated load cells are properly sized to provide reliable force feedback. Accessories such as Studs and Spiral Washers are typically provided together with the load cell

ORDER INFORMATION

C086 A 7 X X X - X X X XXXXX

Test Actuators

Model Revision

Actuator Type	
7	Hydraulic Test Polymer Bearing

Actuator Force Rating		
Specify	Frame Size	
	kN	kip
3	15	3.3
4	25	5.5
5	50	11.0
6	100	22.0
7	150	33.0
9	250	55.0
A	500	110.0

Working Stroke Length		
Specify	Identify	
A	100mm	4in
B	150mm	6in
D	250mm	10in

Servo Valve		
Specify	Type	Max Rated Flow
A	G761 (ISO 10372-04-04-0-92)	63 LPM (16.5 GPM)
B	G761 HR (ISO 10372-04-04-0-92)	19 LPM (5 GPM)
C*	72 (ISO 10372-06-05-0-92)	227LPM (60GPM)
D*	79-100 (ISO 10372-06-05-0-92)	227LPM (60GPM)
E	2 xG761 (ISO 10372-04-04-0-92)	2 x 63 LPM (16.5 GPM)
F	2x G761 HR (ISO 10372-04-04-0-92)	2 x 19 LPM (5 GPM)
G	None - Manifold with Pattern ISO 10372-04-04-0-92	2 x SV positions
H*	None - Manifold with Pattern ISO 10372-06-05-0-92	1 x SV position
I	Special Manifold and/or Servo valve	Consult Moog
J	G761 (ISO 10372-04-04-0-92)	38 LPM (10 GPM)
K	G761 (ISO 10372-04-04-0-92)	2 x 38 LPM (10 GPM)

*Valve option C, D and H are available only for 100kN to 500 kN frame sizes

Special	
SXXXX	Special
Blank	Standard

Force Sensor Coupling	
Specify	Type
N	None
W	Spiral Washers
L	Loadcell & Spiral Washers
S	Special

Rod End Style	
Specify	Type
0	None
1	Swivel
S	Special

Mounting Base	
Specify	Type
A	Swivel
B	Fixed Base
S	Special

Options	
Specify	Type
-	None
P	Delta-P Pressure Transducer

A HIGHER LEVEL OF SUPPORT

The actuator was designed to provide long life, and inexpensive, fast and easy repair when it is finally necessary. Moog can provide the typical wear items such as a replaceable bearing and the seals for your own repair. Or you can have Moog repair the actuator to a like-new condition.

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 servo valve 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 overhauled unit meets all design and performance criteria as if it were 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

Model Number	Seal Kit	Polymer Bearing (need 2 pieces/actuator)
C086A73	CB91978-901	CB85110-001
C086A74	CB96699-901	CB85110-001
C086A75	CC01661-901	CB85110-002
C086A76	CC01663-901	CB85110-002
C086A77	CC01298-901	CB85110-002
C086A79	CC01317-901	CB85110-003
C086A7A	CC03145-901	CB85110-004

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, servo valves, hydraulic service manifolds, test controllers, software and more.

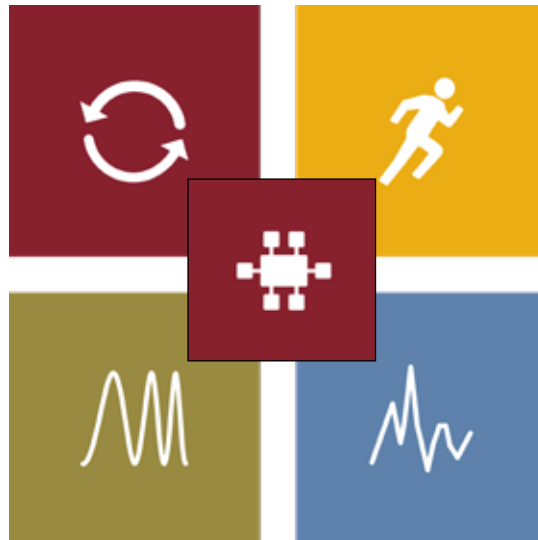
Test Controllers and Software

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.



MOOG REPLICATION

Replicate time history files using state-of-the-art algorithms in an easy yet powerful way



MOOG RUNNER

Build complex, nested durability tests through simple instructions. Run and monitor the progress of the durability test and specimen

MOOG SINESWEEP

Measure the resonant frequencies of your test specimen. Run sine sweep durability tests

MOOG VIBRATION

Run real-time closed loop control to defined random vibration frequency spectra (PSDs)

Hydrostatic Bearing Test Actuator

- Used in the Standard Hydraulic Simulation Table
- Innovative 8 pocket hydrostatic bearing increases side load capacity to 60% of stall output and reduces energy requirements
- Higher level of dynamic performance, reliability, and longevity
- Advanced coating used on the rod significantly improves seal wear for long life and less maintenance
- Fully integrated manifold eliminates the need for any external piping



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.



Moog 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.



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.

Australia
+61 3 9561 6044
info.australia@moog.com

Ireland
+353 21 451 9000
info.ireland@moog.com

South Africa
+27 12 653 6768
info.southafrica@moog.com

Brazil
+55 11 3572 0400
info.brazil@moog.com

Italy
+39 0332 421 111
info.italy@moog.com

Spain
+34 902 133 240
info.spain@moog.com

Canada
+1 716 652 2000
info.canada@moog.com

Japan
+81 46 355 3767
info.japan@moog.com

Sweden
+46 31 680 060
info.sweden@moog.com

China
+86 21 2893 1600
info.china@moog.com

Korea
+82 31 764 6711
info.korea@moog.com

Turkey
+90 216 663 6020
info.turkey@moog.com

France
+33 1 4560 7000
info.france@moog.com

Luxembourg
+352 40 46 401
info.luxembourg@moog.com

United Kingdom
+44 168 485 8000
info.uk@moog.com

Germany
+49 7031 622 0
info.germany@moog.com

The Netherlands
+31 252 462 000
test@moog.com

USA
+1 716 652 2000
info.usa@moog.com

Hong Kong
+852 2 635 3200
info.hongkong@moog.com

Russia
+7 8 31 713 1811
info.russia@moog.com

India
+91 80 4057 6666
info.india@moog.com

Singapore
+65 677 36238
info.singapore@moog.com

www.moog.com/industrial

Moog is a registered trademark of Moog Inc. and its subsidiaries. All trademarks as indicated herein are the property of Moog Inc. and its subsidiaries.

©2018 Moog Inc. All rights reserved. All changes are reserved.

Hydraulic Test Actuator - Polymer Bearing
MSH/PDF/Rev. A, May 2018, Id. CDL46689-en