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Hydraulic Test Actuator - Single-Ended
Mobium/PDF/Rev. A, March 2013, Id. CDL33164-en

HYDRAULIC TEST ACTUATOR SINGLE-ENDED C086-3 SERIES



Rev.A, March 2013

DELIVERING FLEXIBILITY AND
RELIABILITY FOR A RANGE OF SINGLE-
AND MULTIPLE-CHANNEL 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.

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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.

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OVERVIEW

Actuators are at the heart of high performance test systems such as those used for aerospace structural testing. 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 expectation has been to expedite tests to obtain accurate test results more efficiently. Test safety and protection have been the primary criteria when selecting Actuators for large scale tests.

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 AGC Control Actuators used in a steel mill product line.

Today, Moog engineers have further developed a new series of Actuators, the C086-3 Single-Ended Hydraulic Test Actuator to meet the critical test needs of aerospace test engineers around the world.

Features	Benefits
8 force sizes: Tension force rated from 15kN (3.4 kip) to 1154kN (259.3 kip) 7 stroke lengths: Stroke from 250mm (10 in) to 4000mm (160 in) Multiple combinations: Building-block design and a variety of options	Wide array of sizes and flexibility
Safety-Abort Manifold as an option for large scale, multiple channel and synchronized aerospace testing Aborting mechanism can be customized to suit different safety concepts and customers	Ultimate safety and protection for specimen and test
"Building Block" concept and Commercial-Off-The-Shelf (COTS) components	Economical solution to customers
High performance seals and bearings Robust and rigid servovalves, contact-less linear position sensors and loadcells	Longer life and low friction, High Performance
High-load-capacity wear rings are selected to increase side load rating	Higher side load rating
Rod bearings and seals can be easily replaced without dismantling the whole actuator	Simple maintenance
Industry-leading Moog G761 and 72 servo valves are selected to provide high dynamic, accurate and robust actuator control	High performance servo control

Solutions Built Around You

Moog Single-Ended Hydraulic Test Actuator delivers higher reliability, less maintenance and cost-effective performance for test labs seeking the competitive edge.

Typical Applications:

- Aerospace structural static and fatigue testing
- Civil engineering testing
- General industrial servo control applications

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 makes Moog components the ideal solution for test labs that offer more reliability and the highest performance.



Iron Bird Test

Landing Gear Structural Test

SPECIFICATIONS

Basic Actuator Specifications

Model Number	Construction Style	Rated Force @21 Mpa		Rod Diameter	Bore Diameter	Stroke	Buckling Force Capacity (*)
		Tension	Compression				
		kN (kip)	kN (kip)				
C086-31	Tie Rod Type (Figure 1)	15 (3.4)	41 (9.2)	40 (1.6)	50 (2.0)	250 (10) 300 (12) 500 (20) 750 (30) 1000 (40) 2000 (80) 4000 (160)	>41 (9.2) >41 (9.2) >41 (9.2) 32.7 (7.3) 18.4 (4.1) 4.6 (1.0) 1.1 (0.3)
C086-32		32 (7.2)	65 (14.6)	45 (1.8)	63 (2.5)	250 (10) 300 (12) 500 (20) 750 (30) 1000 (40) 2000 (80) 4000 (160)	>65 (14.6) >65 (14.6) >65 (14.6) 52.5 (11.8) 29.5 (6.6) 7.4 (1.7) 1.8 (0.4)
C086-33		64 (14.4)	105 (23.6)	50 (2.0)	80 (3.1)	250 (10) 300 (12) 500 (20) 750 (30) 1000 (40) 2000 (80) 4000 (160)	>105 (23.6) >105 (23.6) >105 (23.6) 80.3 (18.0) 45.1 (10.1) 11.3 (2.5) 2.8 (0.6)
C086-34		99 (22.2)	165 (37.1)	63 (2.5)	100 (4.0)	250 (10) 300 (12) 500 (20) 750 (30) 1000 (40) 2000 (80) 4000 (160)	>165 (37.1) >165 (37.1) >165 (37.1) >165 (37.1) 114.1 (25.6) 28.5 (6.4) 7.1 (1.6)
C086-35		152 (34.2)	258 (58.0)	80 (3.1)	125 (4.9)	250 (10) 300 (12) 500 (20) 750 (30) 1000 (40) 2000 (80) 4000 (160)	>258 (58.0) >258 (58.0) >258 (58.0) >258 (58.0) >258 (58.0) 74.3 (16.7) 18.6 (4.2)
C086-36	Flange Type (Figure 2)	288 (64.7)	422 (94.8)	90 (3.5)	160 (6.3)	250 (10) 300 (12) 500 (20) 750 (30) 1000 (40) 2000 (80)	>422 (94.8) >422 (94.8) >422 (94.8) >422 (94.8) >422 (94.8) 119.0 (26.7)
C086-37		460 (103.3)	660 (148.3)	110 (4.3)	200 (7.9)	250 (10) 300 (12) 500 (20) 750 (30) 1000 (40) 2000 (80)	>660 (148.3) >660 (148.3) >660 (148.3) >660 (148.3) >660 (148.3) 265.5 (59.7)
C086-38		1154 (259.3)	1688 (379.3)	180 (7.1)	320 (12.6)	250 (12) 300 (12) 500 (20) 750 (30)	>1688 (379.3) >1688 (379.3) >1688 (379.3) >1688 (379.3)

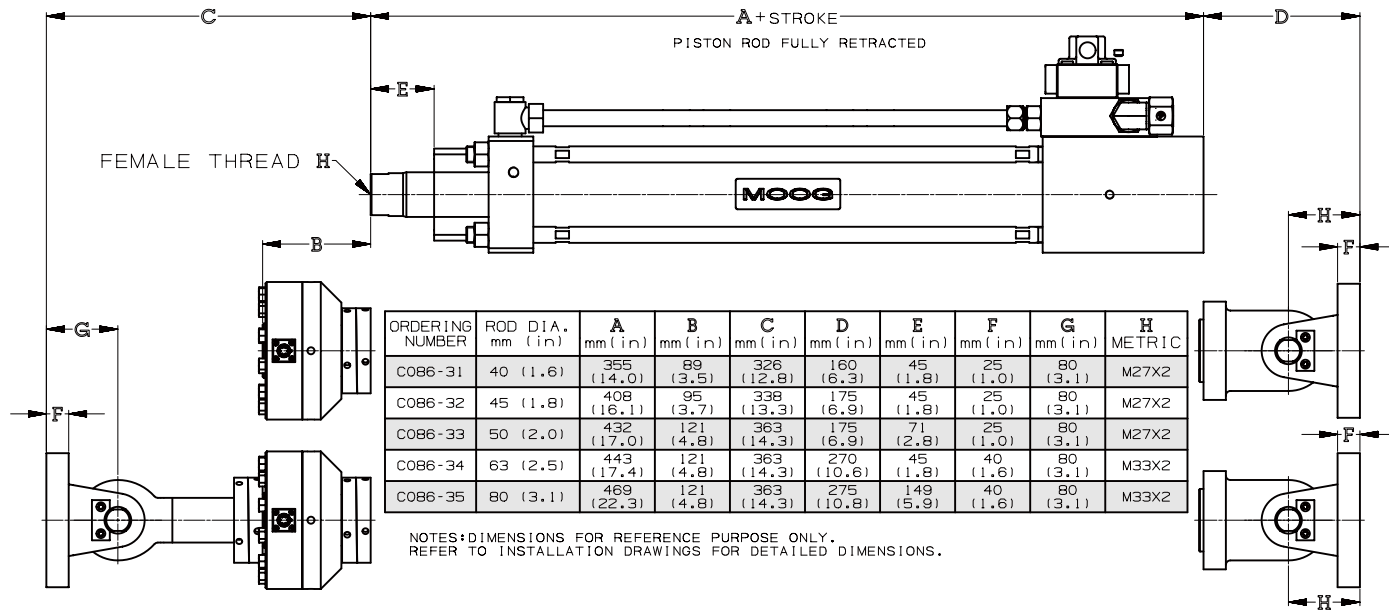
- (*) Notes:
 1. Clevis or swivel installation
 2. Without extension tube
 3. Safety factor =3.5
 4. If select fixed base installation, buckling force capability will be twice.

Additional Actuator Specifications

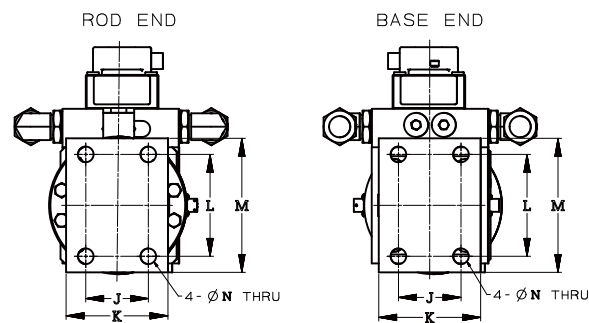
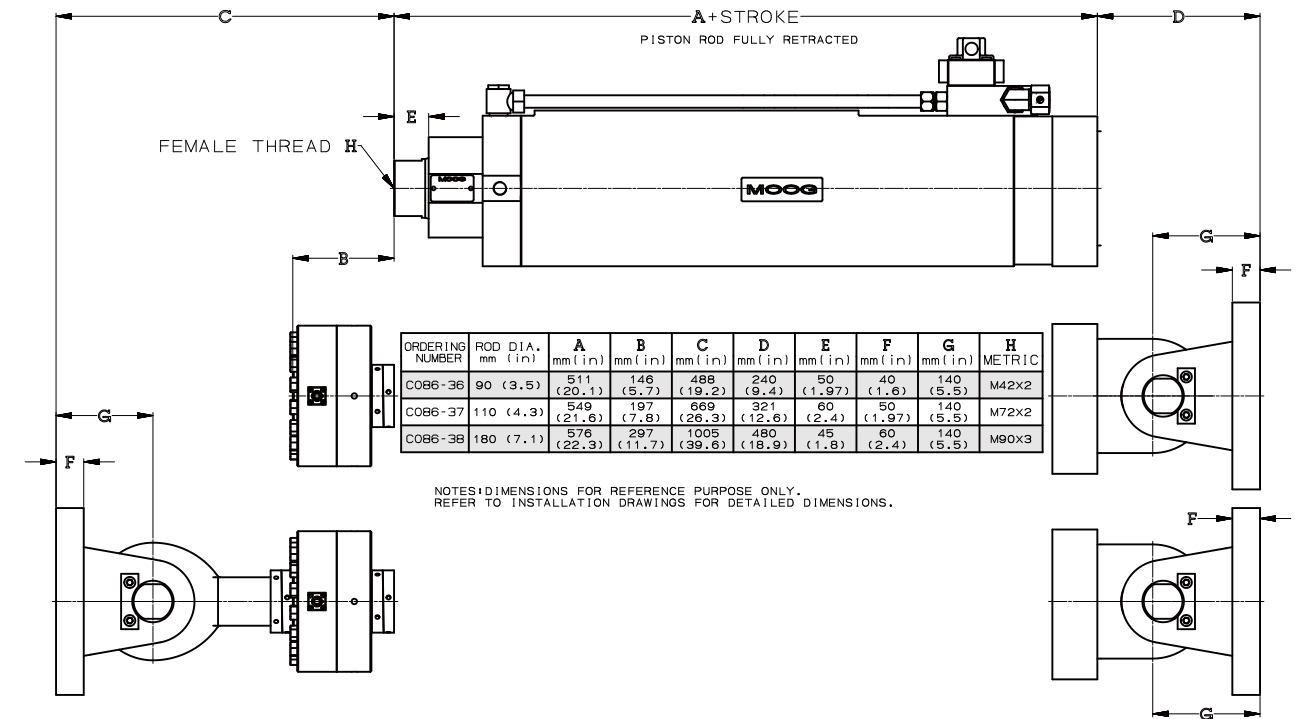
Pressure	
Operating Pressure	21 MPa
Maximum Return Pressure	1.4 MPa
Maximum Drain Pressure	0.35 MPa
Seal	
Material	NBR as standard
Hydraulic interface	
Pressure Line	SAE O-Ring Face Seal 'Seal-Lok' (ISO 8434-3)-12
Return Line	SAE O-Ring Face Seal 'Seal-Lok' (ISO 8434-3)-12
Drain Line	SAE O-Ring Face Seal 'Seal-Lok' (ISO 8434-3)-6
Operation Temperature Range	
Hydraulic Oil Temperature	24° C (75° F) to 57° C (134° F)
Oil Requirements	
System Fluid	Mobil DTE-24, 25, Shell Tellus 32, 46, or equivalent
Cleanliness level	ISO 4406 (SAE J1165) 15/14/11 (NAS 5)
Standard electrical connector mates with following, or equivalent (waterproof, IP65)	
G761 Servovalve	MS3106F14S-2S
72 Servovalve	MS3106F14S-2S
Position transducer & load cell	PT06A- 10-6S (MOOG # CA64645-001)

DIMENSIONS

Tie-Rod Style Actuators (Figure.1)

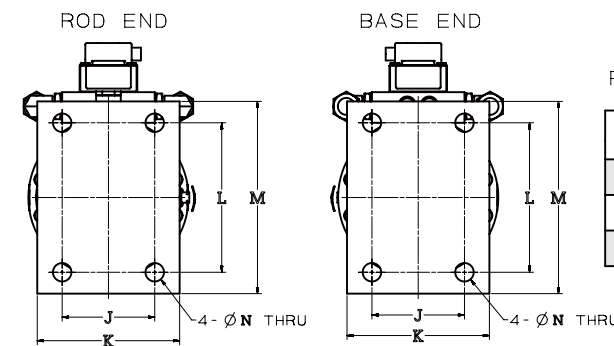


Flange Style Actuators (Figure.2)



ROD END & BASE END DIMENSIONS

ORDERING NUMBER	J mm (in)	K mm (in)	L mm (in)	M mm (in)	N mm (in)
COB6-31	70 (2.8)	114 (4.5)	114 (4.5)	150 (5.9)	17.5 (0.7)
COB6-32	70 (2.8)	114 (4.5)	114 (4.5)	150 (5.9)	17.5 (0.7)
COB6-33	70 (2.8)	114 (4.5)	114 (4.5)	150 (5.9)	17.5 (0.7)
COB6-34	130 (5.1)	200 (7.9)	210 (8.3)	270 (10.6)	26 (1.0)
COB6-35	130 (5.1)	200 (7.9)	210 (8.3)	270 (10.6)	26 (1.0)



ROD END & BASE END DIMENSIONS

ORDERING NUMBER	J mm (in)	K mm (in)	L mm (in)	M mm (in)	N mm (in)
COB6-36	130 (5.1)	200 (7.9)	210 (8.3)	270 (10.6)	26 (1.0)
COB6-37	145 (5.7)	250 (9.8)	260 (10.2)	320 (12.6)	33 (1.3)
COB6-38	200 (7.9)	350 (13.8)	400 (15.7)	490 (19.3)	52 (2.0)

CONFIGURATION ACTUATOR TO MEET YOUR NEEDS

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

Various Moog high performance servo valves and loadcells are provided to help application engineer to pick up the right one for a specific actuator to avoid over-sizing or undersizing. Mounting joints and bases are also provided to adapt to the installation requirements.

OPTIONS

Safety-Abort Manifold

Safety-Abort Manifold can be selected rather than a simple valve block. Controlled by a solenoid (and other signals), the Safety-Abort Manifold provides a mechanism to unload the hydraulic pressure in the actuator thus to remove loading force onto the specimen with a controlled speed. This provides an ultimate protection to specimen in case of an emergency especially for large scale, multiple-axis and synchronized testing such as aerospace structural testing.



Valve blocks

Standard valve block is designed for 1x MOOG G761 servo valve, flow rated from 4LPM (1GPM) to 63 LPM (16GPM). Other valve blocks are also available to adapt to 2x G761 servo valves or 1x 72 servo valve.

Position Sensor

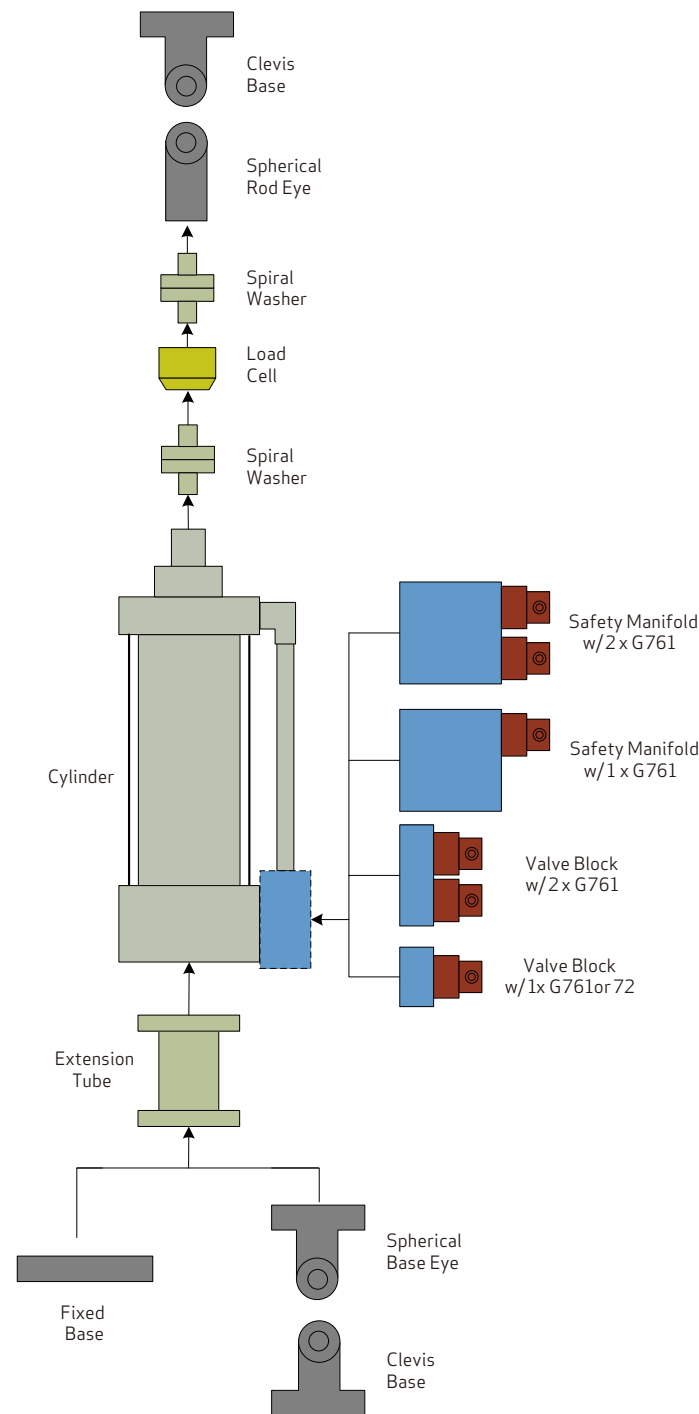
- Internal, co-axial installed position sensor as standard configuration.
- Signal type: Analog signal output as standard. SSI signal output is also available.
- Accuracy: $\leq 0.5\%$ F.S.

Load Cell

High performance loadcell can be adapted to the actuators to provide a force feedback to a closed loop force control. Spiral washer can be provided as well.

Extension Tube

300mm (12in), 500mm (20in) & 800mm (32in) tube lengths for selection.



Key for configurations

- Joints and Bases
- Servovalves
- Manifolds/Valve Blocks
- Load Cells

ORDER INFORMATION

C086 - 3 X X X X X X X X X X XXX

Test Actuators

Model Revision

Actuator Type
3 Hydraulic Test Single Ended Actuator

Specify	Rated Force @ 21Mpa	
	kN	kip
1	15/41	3.3/9.2
2	32/65	7.1/14.6
3	64/105	14.3/23.6
4	99/165	22.2/37.0
5	152/258	34.1/57.9
6	288/422	64.7/94.8
7	460/660	103.4/148.3
8	1154/1688	259.4/379.4

Specify	Working Stroke Length	
	Identify	Identify
A	300 mm	12in
B	500 mm	20in
C	750 mm	30in
D*	1000 mm	40in
E*	2000 mm	80in
F*	4000 mm	160in
G	250 mm	10in

*Notes: Stroke Length 1000mm(40in) is only for Actuator size option 1-7; Stroke Length 2000mm(80in) is only for Actuator Force Rating option 1-7. Stroke Length 4000mm(160in) is only for Actuator Force Rating option 1-5.

Servo Valve		
Specify	Type	Flow
A	G761 (ISO 10372-04-04-0-92)	57 LPM (15 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	2 xG761 (ISO 10372-04-04-0-92)	2 x 57 LPM (15 GPM)
E	2x G761 HR (ISO 10372-04-04-0-92)	2 x 19 LPM (5 GPM)
F	None (Mounting Manifold with Pattern ISO 10372-04-04-0-92)	
G	None (Mounting Manifold with Pattern ISO 10372-06-05-0-92)	

Special	
SXX	Special
Blank	Standard

Extension Tube	
Specify	Type
0	without
1	300mm
2	500mm
3	800mm

Position Sensor	
Specify	Type
0	without
1	SSI signal
2	Analog signal (4-20mA)
3	Analog signal (0-10V)
S	Special

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

Rod End Style	
Specify	Type
0	None
1	Spherical Rod Eye
2	Spherical Rod Eye & Clevis Base
3	Swivel
S	Special

Mounting Base	
Specify	Type
0	None
1	Spherical Base Eye
2	Spherical Base Eye & Clevis Base
3	Swivel
4	Fixed Base
S	Special

Manifold	
Specify	Description
A	Valve Block w/ 1x SV
B*	Valve Block w/ 2x SV
C*	Safety Manifold with 1x Servo Valve
D*	Safety Manifold with 2x Servo Valves
S	Special

*Notes: Only can install one or two G761 series servo valves

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 to 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

Model No.	Seal Kit
C086-31	CB15108-901
C086-32	CB13136-901
C086-33	CB01307-901
C086-34	CB11272-901
C086-35	CB15219-901
C086-36	CB14276-901
C086-37	CB15514-901
C086-38	CB15546-901

PRODUCTS FOR EVERY NEED

Solutions designed around you

Moog engineers are always ready to meet your unique application needs with complete turnkey systems that include servoactuators, servovalves, software and more. Our Portable Test Controller, for example, is the only stand-alone unit on the market that can be extended up to four channels within the same housing.

Test Controllers

This servocontroller product incorporates Moog's unique force loop technology to handle general purpose tests. With or without a PC, our Test Controllers are flexible with high-performance capabilities to handle complex testing formulas. This makes it an indispensable tool for testing labs. The units offer plug-and-play with industry standard connectors for cost effective and easy integration. The larger Test Controller is ideal for complex systems up to 32 servo channels.



Moog Servovalves

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

