

MOOG

The most recognized name in
Servo and Proportional Valves



UNMATCHED SERVO AND PROPORTIONAL VALVE EXPERIENCE

A



B



C





Moog Inc. was founded in 1951 by William C. Moog, inventor of the electrohydraulic servovalve. This technology heralded a new era of precision control. Position, velocity and force were now precisely controlled by a compact, high-performance device. The advent of this

established Moog Inc. as the world leader in servovalves, a position we hold to this day.

The electrohydraulic servovalve converts electrical command impulses to directional power. When it is attached to a piston or actuator, it is capable of effecting movements so exact that its accuracy is measured in the millionths of an inch. Moog servovalves easily direct up to 2.5 million pounds of rocket engine thrust, as well as controlling the delicate articulation of a robot arm. Servovalves often repeat such movements through millions of cycles and react to commands in milliseconds. Whether a servovalve takes one trip into space or operates on a machine tool for decades, it must be highly dependable.

Unequaled Servo and Proportional Valve Application Experience

Originally Moog servovalves were used in aerospace flight controls for missiles, rockets and aircraft. In 1959 Moog Inc. adapted the aerospace servovalve for use in high performance industrial processes, including metal cutting, fatigue testing, plastic molding, steam and gas turbine operation, and steel making. In the mid 80's, Moog created a second line of electrohydraulic valves called servo-proportional valves, offering consumers a more cost effective solution to less demanding motion control applications. Today our servo-proportional valves are mainstays in injection molding, machine tool and sawmill applications.

- A.) *Modern, highly automated steel mills such as this Schloemann Siemens Rolling Mill use over eighty Moog Inc. servovalves to control steels final form.*
- B.) *Moog Inc.'s forty year involvement in the Titan family of launch vehicles has evolved from supplying thrust vector control (TVC) actuators on the core vehicle, to additionally supplying the complete TVC system on the solid-rocket-motor booster.*
- C.) *The Boeing 777's fly-by-wire flight control systems depend on Moog Inc. servovalves.*

We continue to extend our expertise in the design and manufacture of electrohydraulic control products and systems. This range of advanced technology enables you to optimize production output and take tighter control of automation for increased profitability.

Moog Inc. offers advanced engineering capability in the design and development of innovative new products, incorporating the latest technology in materials and manufacturing processes. A strong emphasis on quality control and production efficiency assures you of receiving cost effective and highly reliable products. In addition, Moog offers exceptional skill and experience in the application and support of its products.



Extensive Worldwide Presence

Moog Inc. has a long established presence worldwide with 21 manufacturing, sales and customer support locations literally spanning the globe!

Steadfast Focus on Solutions

Moog Inc. is more than a hardware manufacturer; it is a company of ideas. It is also a resource for original and creative solutions to precision motion control problems. The essential goal of Moog is clearly defined...to offer our customers the highest quality and most cost effective solutions to their control problems.



THE INDUSTRIAL SERVO AND PROPORTIONAL VALVE LEADER

A



B



C



A.) Moog Inc.'s high performance servovalves are used extensively in material testing applications such as vehicle simulation, fatigue testing and vibration evaluation. Here Moog valves create the motion that put this automobile through a high speed maneuver.

B.) This blow molding machine uses Moog servovalves to rapidly and smoothly open and close the mold, thereby improving production rates.

C.) A hot strip mill has control requirements involving coil handling, strip steering and material thickness which involve Moog Inc.'s proportional valves and electronics.

D.) Moog servovalves have been a standard on GE's and their manufacturing associates gas turbines for over 15 years. Today a majority of gas and steam turbine manufacturers use Moog valves for fuel, steam and geometry control applications.

E.) With mechanical feedback, electrical feedback and direct drive valves, Moog has the broadest line of servo and proportional valves on the market.

D

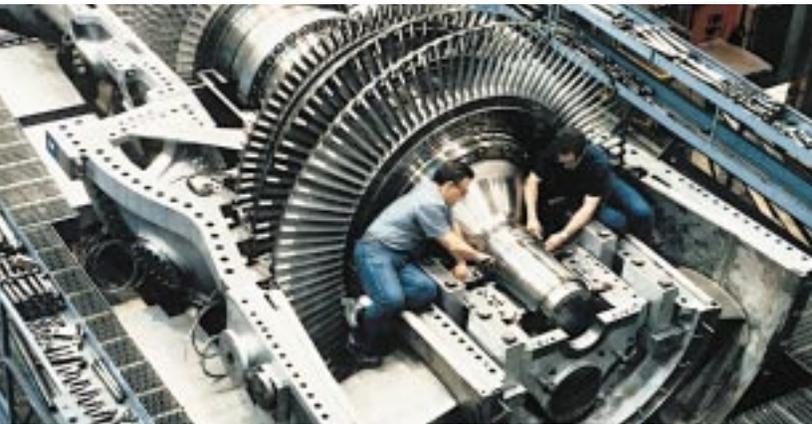


photo courtesy of Gas Turbine World

Moog has supplied industrial markets with servo and proportional valves for over 35 years. Today Moog, with five manufacturing sites and nineteen service centers around the world, supplies thousands of customers with over 60,000 valves yearly. With over forty years of product design and development experience to draw from, Moog's servo and proportional valve product range and application knowledge is second to none. Whether your system requires tried and true mechanical feedback servovalves, fast response electrical feedback servovalves, efficient direct drive servo-proportional valves or contamination resistant servo-proportional flow control valves, Moog has the solution.

Mechanical Feed Back (MFB) Servovalves

Moog MFB servovalves have been the heart of closed loop, electrohydraulic control systems for decades. Moog offers the broadest range of MFB's available.

- The G631 series is a standard performance servovalve with rated flows of 1 to 20 gpm.
- The G761 series is a high performance servovalve with rated flows of 1 to 16.5 gpm.
- The 72 series is a standard performance servovalve with rated flows of 25 to 60 gpm.

Electrical Feed Back (EFB) Servovalves

In the D765 and 79 series servovalves, conventional mechanical feedback has been replaced with electrical feedback using a spool position transducer. With integrated spool position loop closure, these valves offer increased stability and improved linearity over conventional MFB valves.

E



Direct Drive (DDV) Servo-Proportional Valves

The Moog D633 and D634 DDV's are closed loop servo-proportional valves with permanent magnet linear force motors and integral electronic spool position feedback. Elimination of the hydraulic pilot stage on traditional servovalves saves valuable energy when applications require multiple valves.

Servo-Proportional Flow Control (PFC) Valves

The D660 series is the latest line of servo-proportional valves offered by Moog. The D660 series incorporates Moog's new ServoJet® technology, the latest in pilot stage technology. The ServoJet® brings lower internal leakage, improved dynamics, greater contamination resistance, and improved frequency response to the reliable second stage of Moog proportional valves. With rated flows up to 1,000 gpm, there is a D660 suitable for virtually every flow control application.

Whether you are an OEM designing new motion control systems, or an end user looking for replacement and repair for existing servo and proportional valves, Moog has your solution.

Moog has your solution. "It's all about Solution Moog".

We back our products with the strong reputation and resources of the leading name in servotechnology...Moog Inc.!





G63I (MFB) SERIES

Standard performance, two-stage servovalve with a field replaceable pilot filter, external pilot supply capability and an ISO 4401 size 5 port pattern for 4 ports.

- Frequency Response: 70 Hz ($\pm 100\%$ signal)
- Step Response: 15 msec
- Flow Range: 1 to 20 gpm
- Maximum Operating Pressure: 4,500 psi

G76I (MFB) SERIES

High performance, two-stage servovalve with a field replaceable filter, external pilot supply capability and an ISO 10372 size 4 mounting pattern.

- Frequency Response: 90 to 180 Hz ($\pm 40\%$ signal)
- Step Response: 4 to 13 msec
- Flow Range: 1 to 16.5 gpm
- Maximum Operating Pressure: 4,500 psi



72 (MFB) SERIES

Standard performance, two-stage servovalve with a field replaceable filter, external pilot supply capability and an ISO 10372 size 6 mounting pattern.

- Frequency Response: 30 to 80 Hz ($\pm 100\%$ signal)
- Step Response: 12 to 32 msec
- Flow Range: 25 to 60 gpm
- Maximum Operating Pressure: 5,000 psi

79 (EFB) SERIES

High performance, three-stage servovalve in which the position of the third stage is monitored with a spool position transducer. Available with integrated electronics.

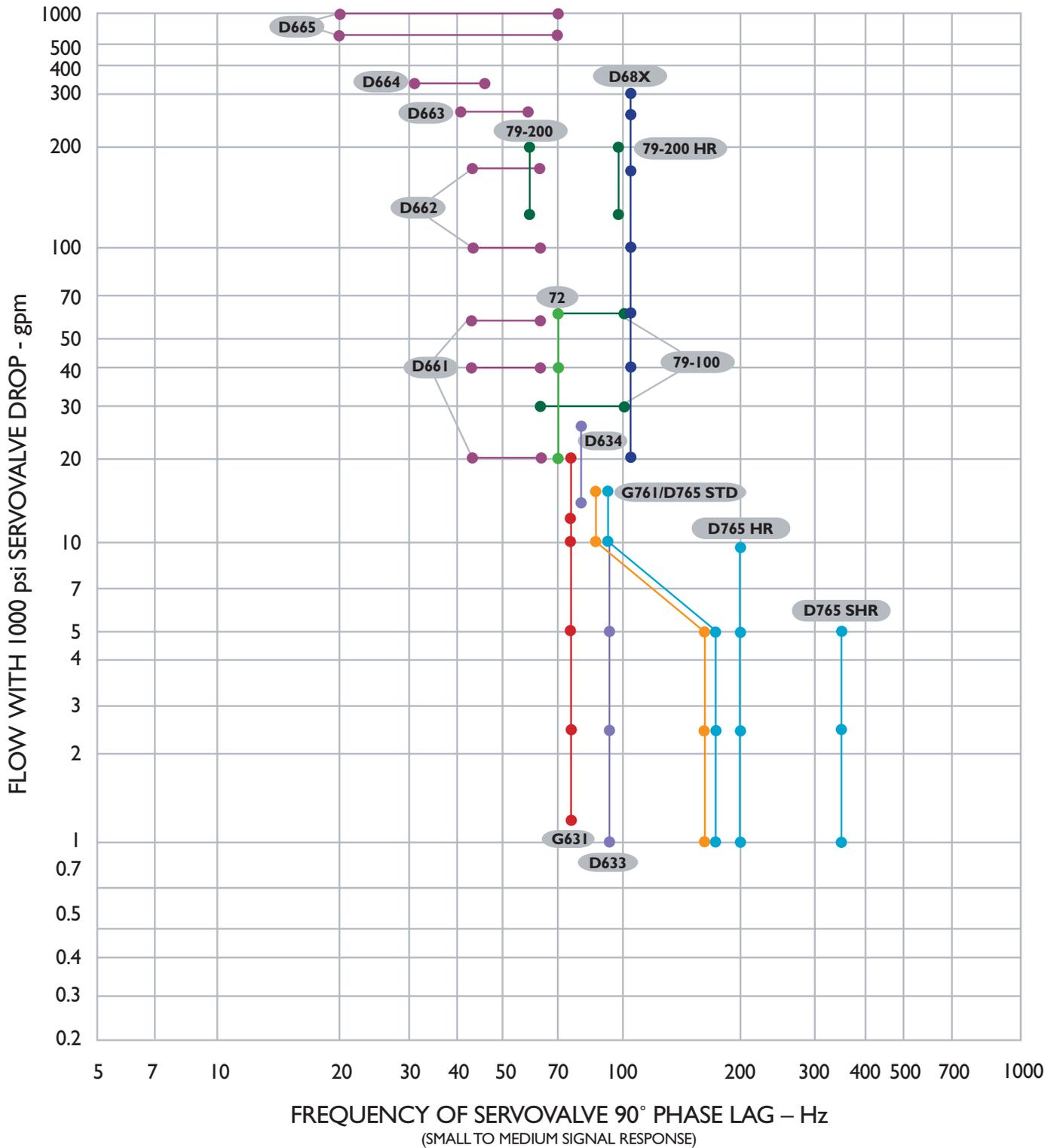
- Frequency Response: 60 to 90 Hz ($\pm 100\%$ signal)
- Step Response: 15 msec
- Flow Range: 30 to 200 gpm
- Maximum Operating Pressure: 5,000 psi



OVERVIEW OF VALVE PRODUCT OFFERING



The most recognized name in Servo and Proportional Valves





D765 (EFB) SERIES

High performance, two-stage servovalve with a field replaceable pilot filter, external pilot supply capability and integrated electronics for closed loop spool control. ISO 10372 size 04 mounting pattern.

- > Frequency Response: 90 to 250 Hz ($\pm 100\%$ signal)
- > Step Response: 2 to 4 msec
- > Flow Range: 1 to 16.5 gpm
- > Maximum Operating Pressure: 5,000 psi

D633/634 (DDV) SERIES

High performance, direct drive valve with electronic feedback and integrated electronics for closed loop spool control. The DDV utilizes a linear force motor to actuate a spring centered spool. Single stage design eliminates leakage associated with pilot stage. Dynamic performance is independent of system pressure. Mounting patterns per ISO 4401 size 3 and 5.

- > Frequency Response: 40 to 60 Hz ($\pm 100\%$ signal)
- > Step Response: 15 to 20 msec
- > Flow Range: 1 to 26 gpm
- > Maximum Operating Pressure: 5,000 psi



D660 (PFC) SERIES

Standard performance, two and three-stage servo-proportional flow control valves with electronic feedback and integrated electronics for closed loop spool control. Mounting patterns per ISO 4401 size 5, 7, 8 and 10.

- > Frequency Response: 10 to 30 Hz
- > Step Response: 2 to 45 msec
- > Flow Range: 20 to 1,000 gpm
- > Maximum Operating Pressure: 5,000 psi

CUSTOMER SUPPORT AND SERVO ACCESSORIES

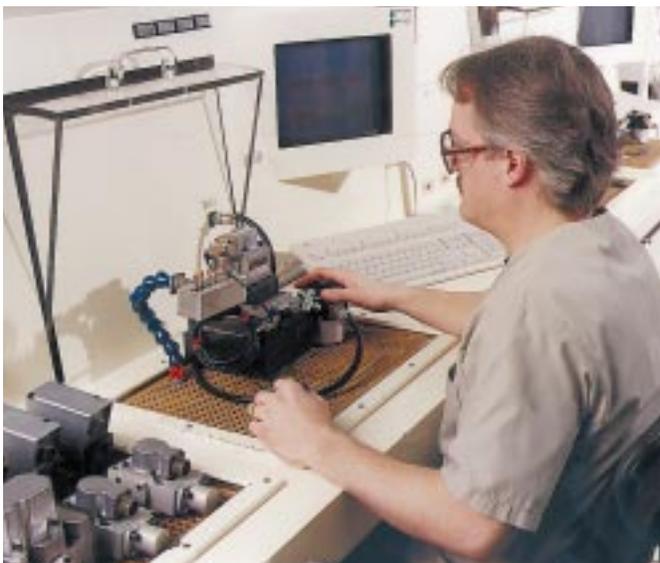
CUSTOMER SUPPORT

Application Engineering

Moog Inc.'s true expertise lies in helping you solve your motion control problems. Whether it is designing new servosystems, fine tuning existing equipment or trouble shooting performance problems, Moog has a staff of engineers waiting to assist. Often Moog's collaboration will result in customized solutions specifically suited to your needs. Moog's motion control expertise is unmatched. Call us and let us know how we can help...you will be glad you used Solution Moog!

Servovalve Repair and Remanufacturing Services

For Moog servo and proportional valves, there is only one authorized service facility in North America, that is the Moog Industrial Controls Division Service Center in East Aurora, New York. Every valve received by Moog is evaluated under a 10 point test procedure and repaired to meet the exact standards of a new valve. Only Moog original equipment parts are used for replacement. Critical need valves can be repaired and returned in as little as 24 hours. We know your valve because we built it. There is no one better qualified to return your valve to its original high performance, highly reliable state than Moog. We back that up with our a 2 year warranty on repaired or remanufactured valves, the same as our new valves.



SERVO ACCESSORIES

Servoelectronics

Moog Inc. offers a full line of servo electronics including servocontrollers, servoamplifiers and transducer signal conditioners to meet all your loop closure requirements. These electronics are specifically designed for closed loop electrohydraulic systems that control force, position or velocity. Optimize all your closed loop electrohydraulic designs by including high performance Moog servoelectronics with each Moog valve.

Servoactuators

Moog Inc.'s broad range of servoactuators combine high performance cylinders, linear feedback devices, and servo or proportional valves in one package. Moog servoactuators have been developed specifically to meet the needs of custom motion control solutions, without the costs and delays associated with custom design efforts. Our actuators are a completely assembled, self contained package. They are totally compatible with other Moog servocontrols and require minimum plumbing and fixturing. For high performance servoactuation solutions, Moog has the answer.

Valve and System Hydraulic Fluid Filters

Hydraulic fluid cleanliness is not only the key to long, reliable valve performance, but also to the integrity of the entire hydraulic system. Replaceable filter elements are available for all of the Moog valves. Moog also offers a complete line of system filters for high pressure and return lines. Using Moog filter solutions in your electrohydraulic circuits will ensure maximum performance and minimum downtime due to oil contamination.





Argentina
Australia
Austria
Brazil
China
England
Finland
France
Germany



India
Ireland
Italy
Japan
Korea
Luxembourg
Norway
Russia
Singapore
Spain
Sweden
USA

MOOG
Industrial Controls Division
Moog Inc., East Aurora, NY 14052-0018
Telephone: 716/655-3000
Fax: 716/655-1803
Toll Free: 1-800-272-MOOG
www.moog.com