



## Products and Services for the Power Generation Industry



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## Excellence in Motion Control

For over 60 years, Moog has been a leader in the manufacture of precision control components and systems. Moog's products control machinery in a variety of high performance applications including plastics, metal forming, flight simulation, and power generation to name a few.

Moog has one of the most extensive range of products, customers, and markets in the power generation industry. We design and develop complete turbine control assemblies for fuel, steam and variable geometry control applications in many types and sizes. Moog has become the supplier of choice by many Power Generation Manufacturers.

Moog supports the global power generation business with a network of over 21 subsidiaries staffed with service support personnel in Europe, Asia, and the Americas. The combination of advanced design and manufacturing with global repair and field service support, ensures that Moog is the preferred supplier of original equipment providers and those responsible for keeping power generation facilities running.



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 For the most current information, visit [www.moog.com/industrialrepairs](http://www.moog.com/industrialrepairs).

Please see [www.moog.com/industrialrepairs](http://www.moog.com/industrialrepairs) for our Global Service and Repair contact brochure.



## Proven Experience in Power Generation Applications

Today's top producers of Steam and Gas Turbines have steadfastly used Moog for their position control needs for well over a decade. Moog's design features include:

- Explosion-proof and intrinsically safe models approved to FM, CSA, and ATEX standards
- Rugged design
- High dynamic response for improved position control

The proven reliability and performance of Moog's products make them the right choice for control of:

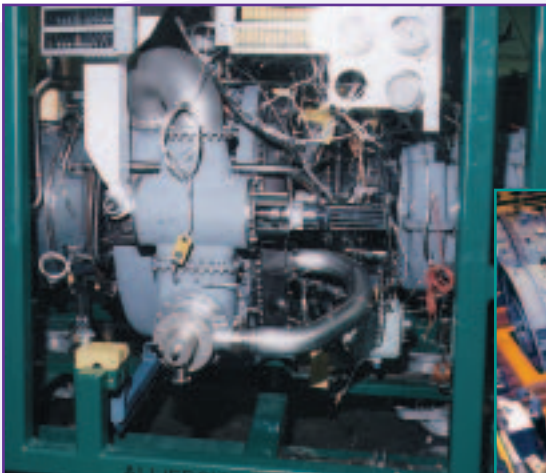
- *Gaseous fuel control*
- *Liquid fuel control*
- *Inlet guide vane control*
- *Combustor by-pass*
- *Bleed valve control*
- *Steam admission control*
- *Steam extraction control*
- *Steam by-pass control*
- *Active instability control (AIC)*
- *Wet NO<sub>x</sub> control (steam and water)*
- *Dry low NO<sub>x</sub> control*

Types of Turbine Applications:

- *Large Steam*
- *Medium Steam*
- *Large-Frame Industrial Gas*
- *Aeroderivative Engines*
- *Small-Frame Industrial Gas*
- *Synthetic Gas*
- *Dual Fuel*
- *Combined Cycle*

Partial List of Customers:

- *ABB (Alstom)*
- *Allied Signal*
- *Alstom*
- *European Gas Turbines (EGT)  
(GE Energy Product Europe)*
- *Fuji Electric*
- *General Electric (GE)*
- *Mitsubishi Heavy Industry*
- *Nuovo Pignone (GE Oil & Gas)*
- *Rolls-Royce*
- *Siemens*
- *Siemens Westinghouse*
- *Solar*
- *Toshiba*
- *Volvo*



## Hydraulic and Electric Solutions

Moog supplies replacement, repairs, and field service for all products for the Power Generation industry.

### Servovalues

- Moog has supplied over 10,000 servovalues to more than 1,000 power plants worldwide.
- Intrinsically-safe and explosion-proof models specially designed for power generation applications.
- Custom models available.
- Reliable design with built in fail-safe.
- Easy to retrofit for most steam turbine applications.



**Whitton**  
Pump  
Technologies



### Moog Liquid Fuel and Hydraulic Lube Pumps

- Repair and replacement support of packaged pump, motor, and drive system for high accuracy fuel metering.
- High efficiency gear pump technology utilized broadly on aeroderivative turbine applications
- Patented self-lubricating pressure balanced bushings, hardened steel drive shafts and proprietary process for gear sets ensure a long service life.

**DS2000XP** Servodrives



Servomotors



### Servomotors and Servodrives

- Moog's extensive line of servomotors includes improvements on existing products, as well as new innovative products designed based on custom requirements.
- The DS2000XP is a customized servodrive for Electro-Mechanical Actuation Systems with a high performance motion control card based on the 555 microprocessor. With high resolution, 32 bit floating point control loops, Digital SERCOS, CANOpen, Firewire, and absolute encoder interfaces, it is flexible, fast, and powerful.
- Explosion-proof and ATEX approved models available

### 80 Series Hydraulic Actuators

- In production since 1990, Moog has over 3,000 Traditional 80 Series Hydraulic Actuators in the field.
- The New Generation 80 Series Hydraulic Actuators, in service since 2003, are a more compact, modular design.
- The choice of many of the largest machine builders in the industry for over 20 years.



**80 Series Traditional**  
*Hydraulic Actuator*



**80 Series New Generation**  
*Hydraulic Actuator*

### Explosion-proof Gas Turbine Actuator

- Both disc and coil spring fail-safe type actuators are available.

### 80 Series Electrohydraulic Steam Control Assembly

- Moog's standard offering for large-frame gas turbines.
- Models include a manifold for hydraulic fail-safe protection, position transducers, an on-board filter, a spring cage for mechanical fail-safe protection, and an integrated process control valve.



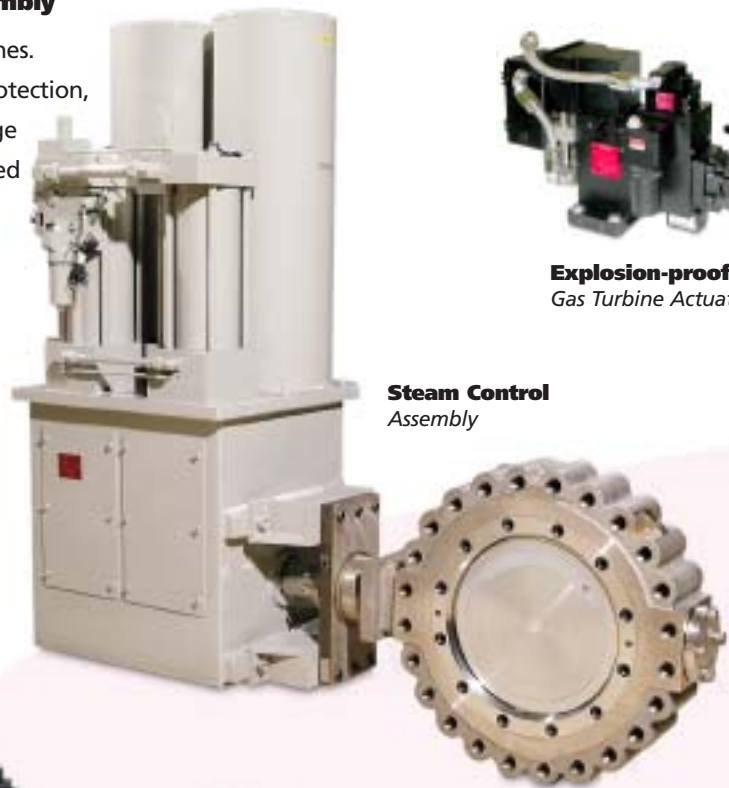
**Explosion-proof**  
*Gas Turbine Actuator*

### Electro-Mechanical Actuators

- Linear and rotary actuator types.
- Compact integrated approach designed for high temperature environment.
- Explosion-proof ratings.



**880 Series**  
*Electro-Mechanical Actuator*



**Steam Control**  
*Assembly*



**85 Series**  
*Inlet Guide Vane Actuator*

### Inlet Guide Vane Control Actuators

- Hydraulic and electric versions available.

## Moog Commitment

Keeping power generation facilities running and power flowing to the grid is a continual challenge. Moog in partnership with our network of Authorized Distributors and Subsidiaries, is prepared to help you succeed anywhere in the world.

Moog provides easy access to genuine replacement products and rapid factory repairs through a network of 21 international repair and sales facilities that service over 150 countries. Field service from knowledgeable technicians and engineers provide extra confidence when on-site assistance is needed. The extensive network of Authorized Distributors in North America are additional local support to help with serving on-site needs.



## Moog Authentic Repairs

We know that our motion control products are the heart of your system. Moog takes the same care providing its repair services that it uses when manufacturing products for the most precise industrial applications.

Moog's repair seal is your guarantee of a Moog Authentic Repair and renewal of your manufacturer's warranty protection.\* Moog's products are known for exceptionally long service life, and when you need repair or maintenance services, you can trust us to restore your original performance while minimizing downtime. Moog Parts. Moog Specs. Moog Specialists. No other repair service provider can offer you this confidence.

*\*Ask your local representative for details.*

## Moog Parts

Moog's heritage as the leader in developing and manufacturing precision products ensures all components used in a repair are the same high quality as the original. Specialized advanced testing and diagnostics determines what is needed to repair a product to match original performance. In critical operations in power generation facilities that must remain running, customers can be confident that they have original equipment parts from the manufacturer who knows how to build the product.

## Moog Specs

*With over 60 years of experience designing and producing servovalve products, Moog maintains detailed product specifications that are frequently updated to ensure the highest performance of repairs. Sophisticated IT systems provide global access to model-specific design parameters, drawings of components, and performance dynamics for all of our thousands of valves, no matter when or where the original part was manufactured. Only Moog's repair facilities have the current specifications needed to ensure accurate performance, warranty protection, and reliability for continued long service life.*

## Moog Specialists

As a premier designer and manufacturer of products for the Power Generation Industry, Moog's professionals understand the products and applications of our customers like no other repair providers. Our technicians have vast knowledge of hydraulic and electric products, and the specialized equipment to test and repair them so they perform like new. Application and design engineers provide technical support for our repair activities to ensure that the installation, operation, and maintenance of repaired products is trouble-free for users. Field service from experienced technicians is also available for customers that need convenient, on-site assistance. Our distribution network acts as your resource for technical assistance, training, and order processing for all repairs.

## Parts, Repair, and Field Service Programs

Moog has designated customized support programs to help meet the challenging needs of power generation facilities and to ensure the safety of all personnel.

➤ **Field Replaceable Component Parts.** *Moog has identified parts that can easily be replaced on-site and provides technical documentation and service manuals to support your maintenance staff. On-site assistance from Moog Technicians and Engineers is also available.*

➤ **On-Site Field Service.** *Due to safety and quality concerns, performing some parts replacement and service will require Moog's authorized technicians and engineers. Designated services can not be performed by non-authorized personnel.*

➤ **Factory Repair.** *Refurbishment, repair, or recalibration services requiring factory personnel and equipment to ensure "as-new" performance.*



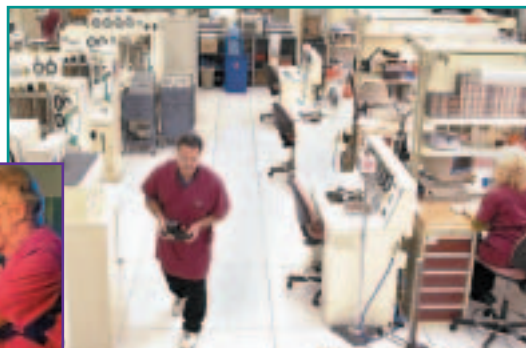
## Minimize Downtime. Maximize Savings.

Moog knows that repairs can mean expensive downtime for your company. Our network of Authorized Distributors and network of Subsidiaries are sensitive to the needs of Power Generation facilities and are available 24 hours a day, 7 days a week, to help you arrange for any service necessary. Contact the local Moog Authorized Distributor near you to arrange for a site visit, ensure a quality factory repair or to obtain replacement parts. Rely on Moog Authentic Repairs.

## Ask for Moog.

For the location nearest you, visit our website at [www.moog.com/worldwide](http://www.moog.com/worldwide). For Authorized Distributors in the North American region, visit [www.moog.com/distributorlocator](http://www.moog.com/distributorlocator) or call 800-624-8585 or 716-687-4949.

# MOOG





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