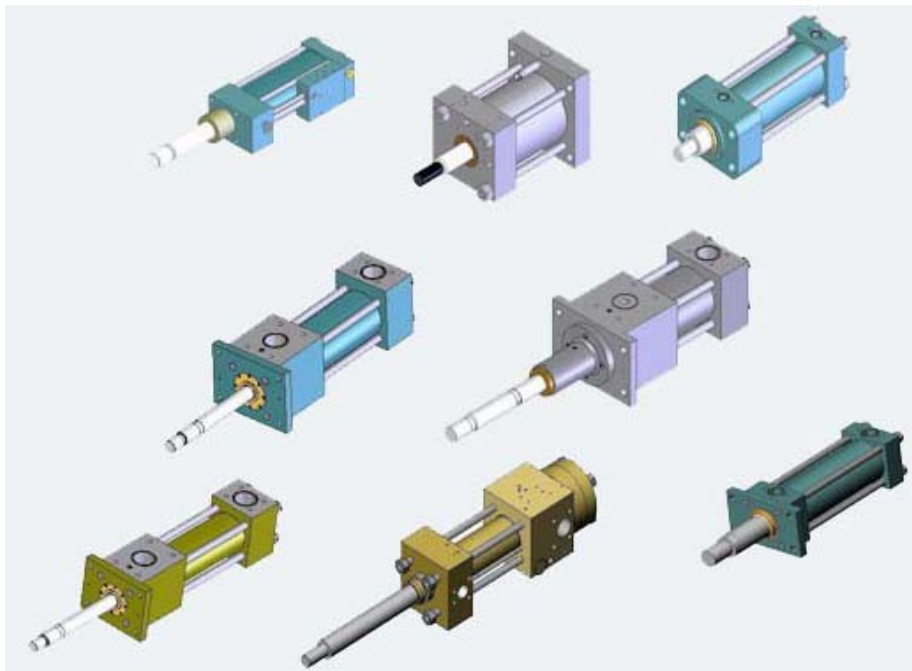




Serving the Fluid Power Industry with Cylinders



Hydraulic Products

- Supply
- Manufacture
- Service
- Repair



A Virginia Corporation since 1979, ServoCon's modern laboratory facilities are located in the heart of the beautiful Shenandoah Valley. A Virginia Corporation since 1989, ALPHA engineering design, production and new parts distribution facilities have teamed up with ServoCon to provide all of your fluid power controls, sales new from ALPHA and service from ServoCon.

For two decades ServoCon and ALPHA engineers, technicians, sales and support staff have been providing the industry's highest quality sales and service in fluid power components. ServoCon ALPHA is an ISO 9001-2000 compliant global leader selling and repairing electrohydraulic servocontrols for power generation facilities. We have qualified engineers and technicians, calibrated test equipment, static and dynamic testing at the component and assembly level, large replacement parts inventory, competitive pricing and quick turn around. Our engineers and technicians have been trained by major OEMs. With over 30 years of experience, our staff can best provide for your repair or new servoactuator and servovalve needs.

WE OFFER NEW

COMPONENTS FOR ANY APPLICATION

ALL REPAIR WORK COMES WITH "AS NEW WARRANTY"

LET OUR PROFESSIONAL TECHNICAL STAFF PROVIDE YOU WITH OVER 30 YEARS OF EXPERIENCE "WE KNOW THE DESIGNS OF THE QUALITY COMPONENTS BECAUSE WE HAVE BEEN REPAIRING THEM ALL FOR YEARS"

QUICK TURNAROUND

To Order Call: 1-800-447-7747

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Note:

Cylinders should be removed from systems and sent to ServoCon ALPHA for cleaning and calibration once a year. Cylinders actuate in the same loop as servovalves and solenoid valves and have cavities where contamination and varnish resides. Cylinders should be cleaned and calibrated at the very least every 2 years to keep the system lubricated and to minimize any deterioration of the gland seals and O-rings. At this time the wipers, shaft , barrels and rings can be inspected and replaced if they are worn beyond their specifications and are causing any external or excessive internal leakage.

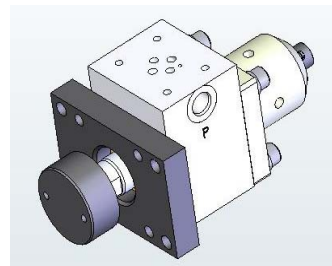
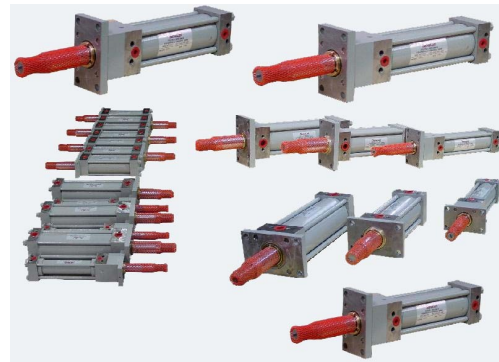
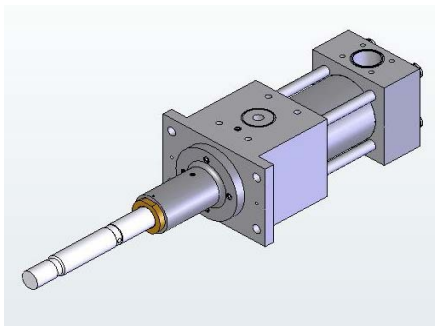
Cylinders

Manufacturers

Aidro, Air Royal, Allenair, Alpha, American, Benton, Bimba, Bosch, Cinn Milacron, Cincinnati, Coburn, El-O-Matic, Festo, ETSI, Flight Safety, GE, GEMU, Hanna, Hennels, His, Hydroline, Hysco, HR -Textron, Milwaukee, Miller, Moog, MTS, Oilgear, Ortman Miller, Parker, Prince, Protech, Rotac, Rexroth, Schrader, Siemens Westinghouse, Sundstrand, ServoCon, Sheffer, Springville, TJ, Young and Franklin, Vickers, Wabco, Westinghouse.

Who We Are

ServoCon® ALPHA is a leader worldwide selling and repairing electrohydraulic servocontrols for industry using hydraulic control systems. We have certified engineers and technicians, calibrated test equipment, static and dynamic testing at the component and assembly level, large replacement parts inventory, competitive pricing and quick turn around. Our engineers and technicians have been trained by major OEMs. With over 30 years of experience, our staff can best provide for your repair or new servocontrol needs.



Specialty Cylinders

Cylinders

What They Are

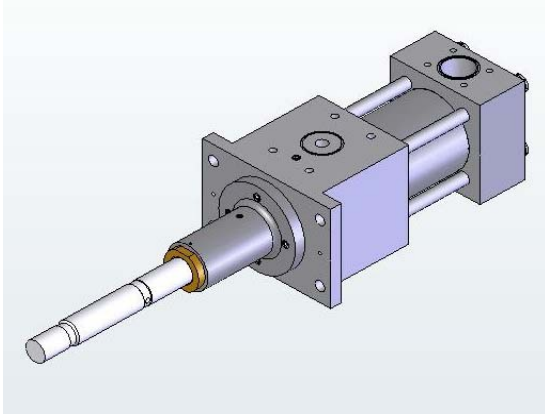
This document describes hydraulic and electrohydraulic cylinders. Cylinders are composed of a control block, head, cap, tube, tie rods, piston, piston rod or shaft, piston head and rings, rod bearings, and seals. . Cylinders are a part of the hydraulic circuit in many hydraulic and servo systems. They are usually a part or a larger assembly which may also be called control pacs, actuators or servoactuators. Cylinders are used in the majority of applications to convert fluid energy into straight line motion. They are manufactured in a variety of diameters, stroke lengths, and mounting styles. They may be classified according to construction, into four types: tie-rod, threaded, welded, and flanged. Cylinders are also made using retaining rings. They are classified as follows:

- Standard Double-Acting
- Single Acting
- Double-Rod
- Spring Return, Single Acting
- Ram Type, Single Acting
- Telescoping Tandem Duplex

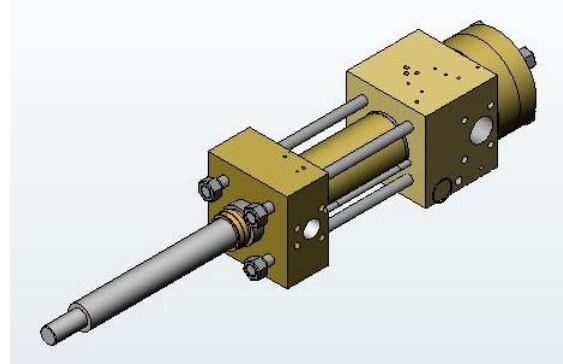
Where They Are Used

Cylinders are used to accomplish many tasks. Most commonly they are mounted on linear or rotary systems where they transform the electrical command signal into linear or rotary motion output of the actuator. Quite often this concept is used for position control of a machine platform or controlled load. Applications include industrial and mobile machinery applications the are almost unlimited. Typical machines are robots, machining, forming and molding equipment, compactors, fire trucks, turbine control, aircraft and simulators of all types to mention a few. They are used in the production of steel, lumber, aluminum, paper, electric power, oil and almost every other military and commercial product available.

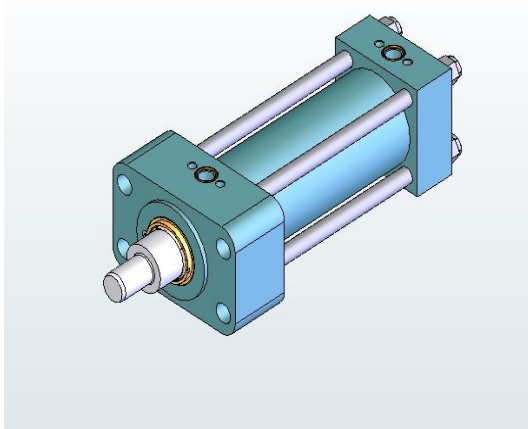
Cylinders



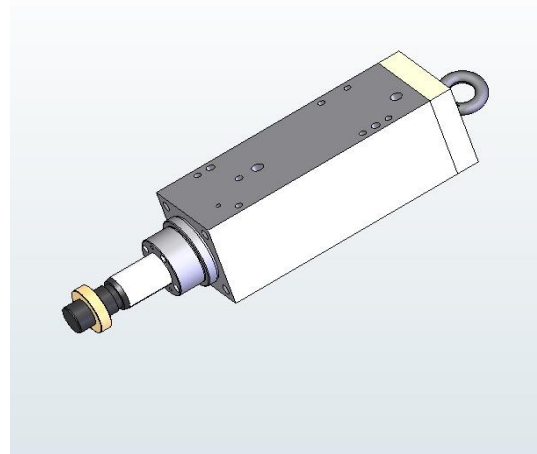
Siemens Westinghouse



GE



Heavy Duty



Special Applications

The System Cylinders Like

Like most hydraulic system components, cylinders like to be used with a fluid free of excessive particle contamination as well as reasonable chemical composition to avoid chemical erosion. It is difficult to generalize in describing how clean a system should be due to the great variance between requirements with different applications. One guide which may be helpful in terms of filtration is to maintain a filtration of 75 Beta ratio which is equivalent to 10 micron nominal and 25 micron absolute for servocontrols which has been found to be satisfactory in most applications. Fluid chemical composition should be monitored as well as the fluid and system manufacturer recommendations followed to maintain the proper chemical composition.

Cylinders

Two other areas should receive particular attention. On new system start-up or upon cylinder repair or replacement, flush the system thoroughly prior to installation, particularly if servovalves are in the system.

Cylinder Failures Due To Fluid Contamination

Leaking cylinders with very low operating time fail and are sent to us after having been installed in a new system or after a repair from some other facility because they were not pressure tested or stroked. We test all system components new or repaired to assure a zero external leakage. This is done using a flow test system that is monitored for a high cleanliness level. At the same time we are repairing the units the customer is flushing their system so there is minimal contamination between the filtration and any cylinder. When any filter element in the system fails which is suspected to have caused the generation of contamination, flush the system and service the filtration system.

Installation

Cylinder fluid connections are usually made through the use of face seals or fittings. The O-rings provided with the cylinders when shipped are suitable for installation. Prior to mating the cylinders to the manifold or other component, inspect the O-rings to be sure they are not cut and are clean. Be sure the O-rings are in place. Old seals should not be used a second time as they usually have taken a set unique to their first installation and are susceptible to leaking upon reinstallation. The mating surface must be flat within 0.001 inch and the surface finish which mate with the O-ring seals should be 32 micro inch finish maximum. Be sure the manifold surface is clean and free of loose chips or dirt which could enter any of the fluid passages or prevent the cylinder from being properly mated to the manifold surface. Be sure the cylinder is oriented on the manifold so that the ports are stroking the cylinder in the expected direction. The screws furnished with the cylinders are to retain the shipping plate and are not designed for use in cylinder installation. Therefore, they must not be used to mount the cylinder. Bolts in accordance with or similar in strength and design to NAS-1352 should be used. Bolts should be tightened in an alternating pattern evenly to the appropriate torque to accommodate the bolt size. Should there be a face seal failure, it is always useless to apply additional torque to attempt to stop leakage from the failed seal and could result in a needless stripping of the cylinder mounting threads.

Maintenance

Wear In Barrels

To the right you can see normal wear in cylinder barrels after three to five years of service. This kind of wear may cause system internal leakage and erratic movement in system components. The wear residue remains in the system as silt and raises system contamination. ServoCon ALPHA manufactures barrels of all sizes for new and remanufactured assemblies. We keep an inventory of raw material to make various barrel sizes for quick delivery.



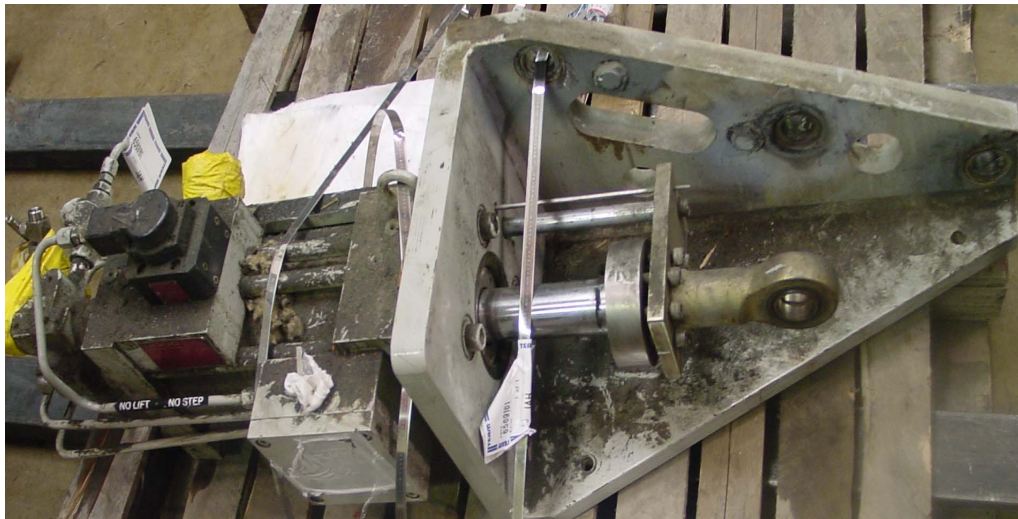
Glands And Seal Wear

To the right you can see what normal wear looks like in cylinder gland and seal areas. Varnishing is usually visible when cylinders operate in high heat environments and particularly where there is condensation promoting oxidation and rust internally and externally. Mixed in the lubrication systems all of these residues remain in the system raising system contamination levels above a safe operating level for control valves. ServoCon ALPHA is a leader offering services that are superior when it is time to perform maintenance on cylinders. The picture lower right is a classic example of varnish rings baked into the barrel of a cylinder. Flushing a system will not remove this kind of varnishing. We have developed methods to remove the varnishing which will not change the dimensional characteristics of the internal fluid passages.

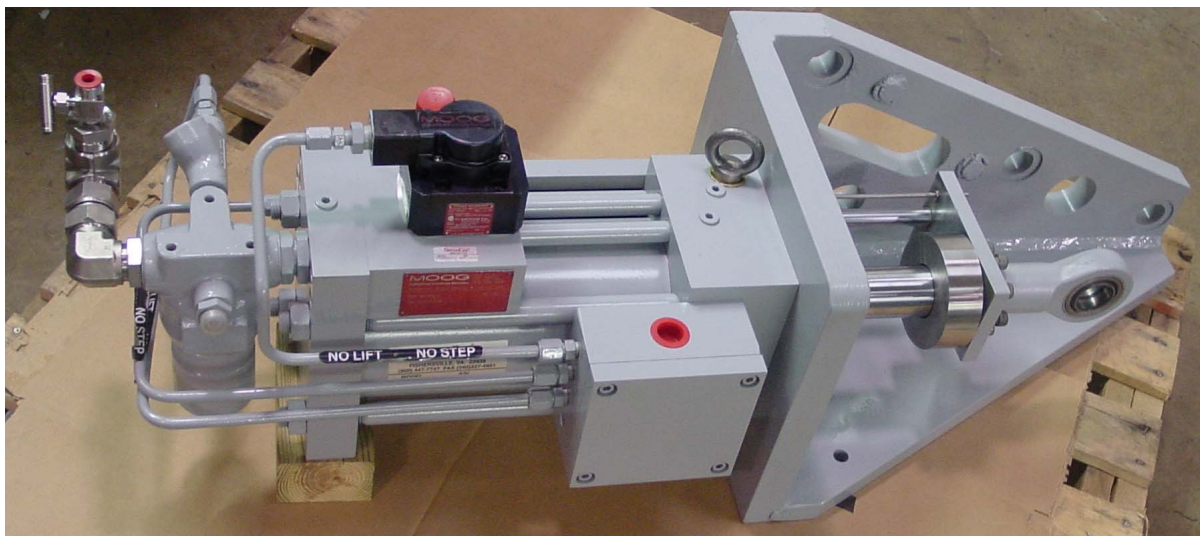


Cylinder Assembly Before and After

Shown below is an example of a cylinder coming into our facility for service. All parts and pieces were disassembled, inspected, worn parts, seals and rings were replaced. The cylinder and other parts were cosmetically coated with epoxy resins and tested to meet original specifications. We shipped the assembly complete with an as new warranty at a fraction of the cost of a totally new purchase. This unit was serviced under our extreme expedite plan in 3 days.



It is typical for us to service large quantities of cylinders during forced or scheduled maintenance periods for our customers. Our normal deliveries are 1-2 weeks depending on customer need.



To Order Call: 1-800-447-7747

Cylinder Assembly After

Take these steps to a smooth operating system: Call 800-447-7747 and schedule your cylinder maintenance with the ServoCon ALPHA Account Specialist for your area. Be sure to discuss quantities for discounts, the manufacturer, bore and stroke of the cylinders, delivery needed, please provide drawings and manuals for you equipment if possible. Your Account Specialist will work with you to employ a carrier service. They are trained to assure your service is hassle free.



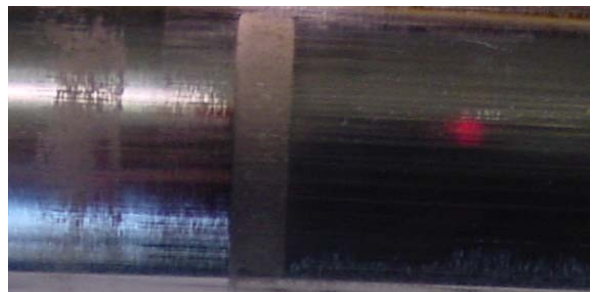
Large or Small

To the left and below are large spring housings attached to a heavy duty large cylinder remanufactured at ServoCon ALPHA.



Glands, Rod And Seal Wear

Below you can see a close up of excessive wear on a rod that was stroked through a worn cylinder gland and varnished seal area. This can be prevented with the proper maintenance intervals. As mentioned varnishing is readily visible when cylinders operate in high heat environments and particularly where there is condensation promoting oxidation and rust. The glands and rods can become severely galled and must be replaced to prevent forced outages.



Cylinder Wear Due to Contamination

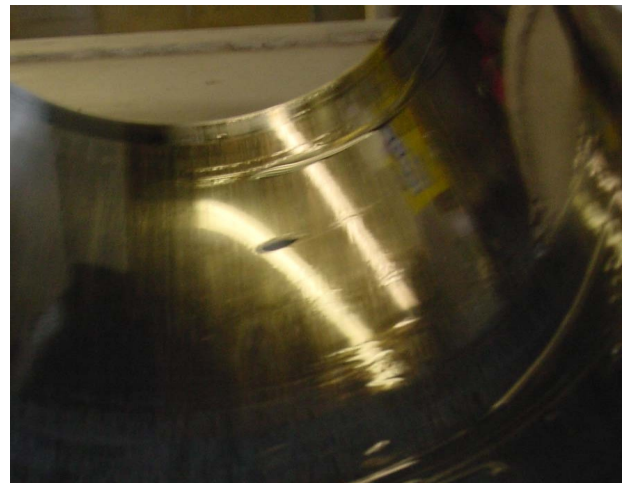
Wear In Rod Glands

To the right you can see normal wear in cylinder rod glands after a few years in continuous service. This kind of wear causes excessive rod wear, external leakage and erratic movement. The wear residue remains in the system as silt and raises the system contamination level. ServoCon ALPHA manufactures glands of all sizes for new and remanufactured cylinders.



Embedded Varnish

To the right you can see more wear in cylinder barrels. Varnishing is readily visible when cylinders operate in high heat environments and particularly where there is condensation promoting oxidation and rust internally and externally. ServoCon ALPHA leads in providing services that are superior when it is time to perform the necessary cylinder maintenance. The picture lower right is a classic example of varnish embedded into the inside barrel wall of a cylinder. Flushing a system will not remove this kind of varnishing. We have developed methods to remove the varnishing which will not change the dimensional characteristics of the internal fluid passages in most cases. Honing and other machining is necessary to repair these units.



Filters

Servo Valve Strainers and Tools

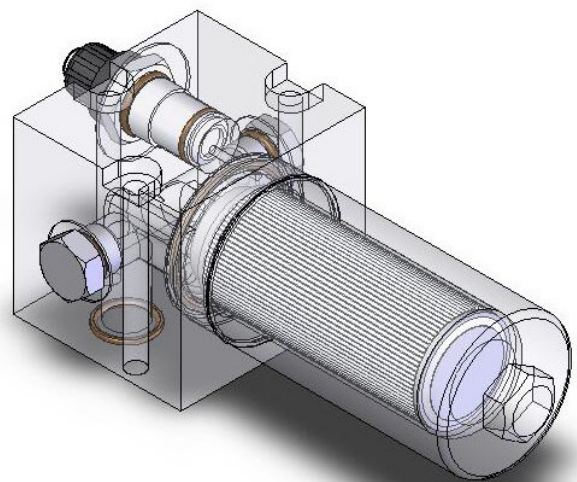
All high-pressure fluid passes through the filter elements in the servo valve and the control block. This insures clean fluid at all times for the operation of the servo valve. The filter elements are metal mesh design and should be replaced and cleaned quarterly. They may be cleaned and re-used at ServoCon ALPHA using the bubble point cleaning procedure. We stock all servo valve types to serve you when needed.



System Elements and Housings

There are many types of system filters used to keep your system clean. We stock for immediate delivery elements and housings and offer special designs to meet your needs. We have a complete cross reference system for elements to fit most filter housings at prices that will save you time and money. We will stock any filter for you in our warehouse and provide it as you have need.

Filter Strainers and Tools



Filters Elements and Housings

Flushing Valves, Manifolds, Flushing Blocks and

Flushing Valves

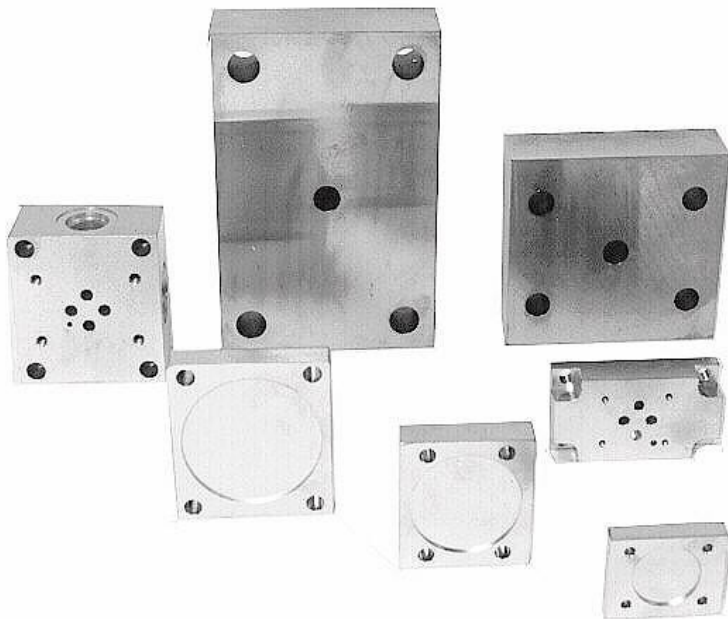
We offer Flushing Valves to assist in cleaning up your hydraulic power system before and after servovalves are installed new or after they have been cleaned and calibrated. They are available for all flow sizes and valve types. If you have a special valve pattern we will design and manufacture one to fit your application.

Flushing Valves, Manifolds, Adapters and Plates

We offer manifolds for all valve types for systems and control pacs, blanking plates and adapters for flushing valves and retrofit servovalve applications. A clean system helps keep servovalves in operation for longer periods. Please ask about a complete flush once your system has been cleaned.



Flushing Valves



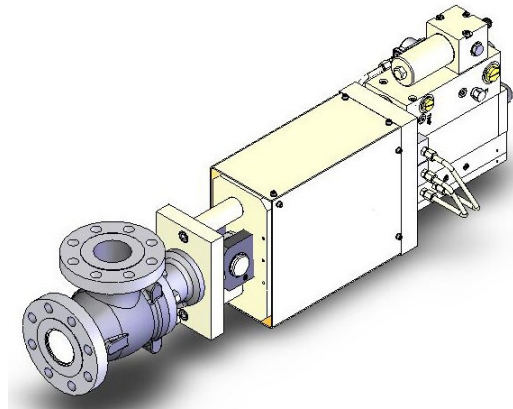
Manifolds, Flushing Blocks and Cover Plates

Other Products

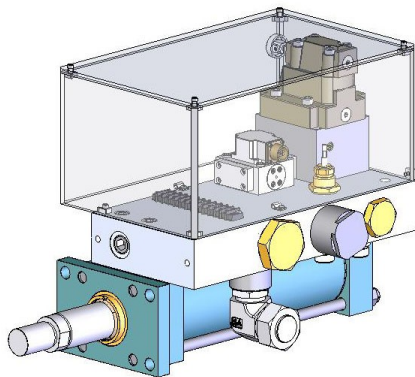
Control Pacs

Control Pac is short for Position-Controlled Power Actuator. The position-controlled power actuator provides the power to open and close the inlet steam valves and the extraction steam valves to maintain required turbine speed and extraction steam pressure.

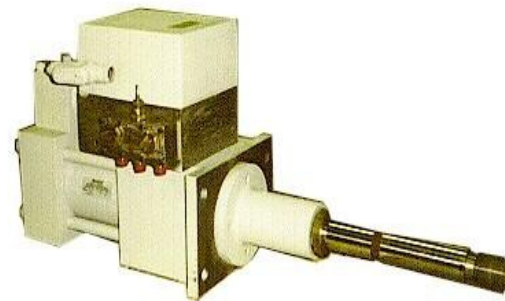
It is well known that operating efficiency of precision parts can be severely reduced and failure can occur by dirt and fluid deterioration. Periodically during turbine operation, or during routine inspection of the valve chest, inspect the wipers in the top of the actuator for oil leakage. A wet wiper surface is normal. However, if the oil actually drips from the cylinder, the actuator wipers and seals must be replaced at the first opportunity. Check the EHC fluid for varnishing and contamination. The best way to check your EHC fluid for contamination is visual inspection of the servovalve strainer, which should be done by ServoCon ALPHA. Your fluid should be checked on a continuing basis for contamination to insure a cleanliness level conducive to servovalve control.



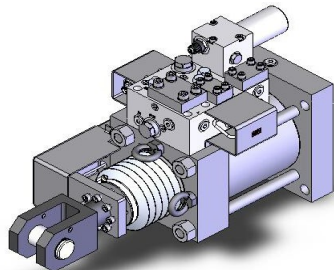
Fuel Gas (Moog, Young & Franklin)



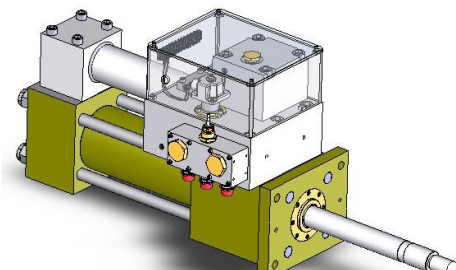
Siemens Governors



Siemens Governors



Inlet Guide Vane

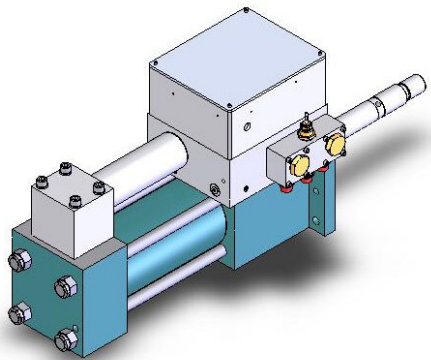


Intercepts

Other Products Continued

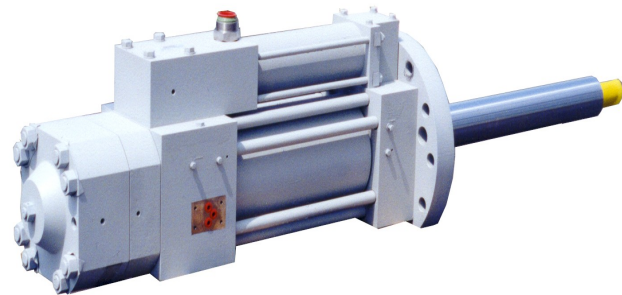
Control Pacs Continued

The other items to check are the total leakage of the control pac as a system, the contamination assessment for the varnishing and how that, along with other contamination on the low flow or blind side of the cylinder, is affecting system performance. If your servovalve strainers are plugged or varnished the cylinders they are controlling need to be disassembled, cleaned and tested with the servovalves as a unit to insure that proper control will be maintained when the unit is brought back on line.



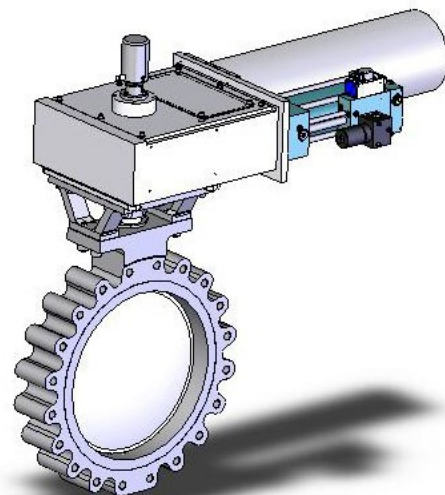
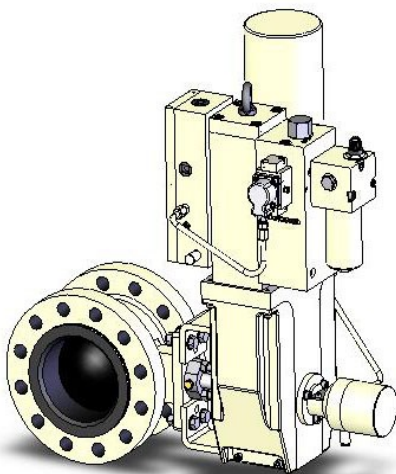
Siemens Governors and Intercepts

Fuel Gas Ratio



GE Governors, Intercepts

LP Admission



ServoCon[®] ALPHA



ServoCon ALPHA

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