



HIGH PRESSURE ACTUATORS

HIGH PRESSURE | HYDRAULIC & GAS POWERED ACTUATORS

A WORLD OF EXPERIENCE

Biffi is a leading manufacturer of valve automation solutions with 60 years' experience and a global presence, offering a comprehensive selection of standard as well as specially designed actuation systems. The range includes electric, pneumatic, hydraulic, direct gas, gas-hydraulic, electro-hydraulic, compact and control systems with a full complement of accessories suitable for a wide range of applications.

The highest standards of product reliability and quality are guaranteed by advanced manufacturing facilities combining lean principles with continuous quality auditing and a zero harm work ethic. Local presence and after sales support teams worldwide ensure meeting the day-to-day flow control requirements of every plant or process.

Biffi's commitment to the highest ethical standards in our daily business practices is recognized by the achievement of the following certifications:

ISO 9001 - Quality management system

SA 8000 - Social accountability standard

ISO 1400 - Environmental management system

BS OHSAS 18001 - Occupational health and safety assessment



RELIABLE PROVEN HIGH PRESSURE ACTUATORS

Biffi has been a major supplier of gas and hydraulically-operated actuators for use in high pressure applications for over five decades, with many thousands of units providing reliable, effective service worldwide in the remotest of locations from the Siberian steppes to the deserts of Arabia.

MODULAR ROBUST AND COMPACT

Robust in their construction and yet compact in their design, Biffi high pressure actuators have been engineered to provide the optimum balance of simplicity, reliability and economy. A modular design concept provides maximum flexibility while their robust construction ensures long service life with minimal maintenance.

Available in a wide range of models to suit specific applications, their highly-efficient and very compact design is a result of specific output thrust / torque mechanisms (linear, canted or symmetric scotch yoke, rack and pinion) that enable required valve torques to be achieved effectively. They feature a lightweight assembly and a nitride-coated mechanism to minimize friction, ensuring a long life.

This is housed within an immensely strong and totally-enclosed high grade ductile iron, carbon steel with a high performance painting available with Norsok approval, which ensures maximum resistance to corrosion even in the most hostile of environments and

at very low temperatures.

MHP, Hand wheel, lever or jackscrew manual overrides are available.

VERSATILE IN DESIGN

The valve/actuator coupling area enables actuators to be mounted on the valves in any of four positions, at 90° intervals.

Single-acting spring modules are available in fully-encapsulated or tie-rods versions, to ensure personnel safety and easy replacement.

SPECIAL DESIGNS / CONFIGURATIONS

Actuator models are available to provide quick acting service (ESD/BDV action less than 0.3s) with specific, integral Biffi manufactured components and there are compact single and multi-spring versions that can provide a footprint space reduction.

EXCEPTIONAL ENGINEERING EXPERTISE

For applications outside those covered by the standard range, the company has the facilities, unrivalled experience and engineering expertise that enable it to create custom-made solutions to meet specific needs. Working closely with customers and end-users, tailor made solutions can be engineered to cover the most stringent applications and operating conditions.

TECHNICAL SPECIFICATIONS

DESIGN PRESSURE

up to 100 bar /1,450 psi (direct gas)
special version available

up to 352 bar /5,105 psi (hydraulic)

TORQUE OUTPUT

Double acting up to
800,000 Nm (7,080,000 lbf in)

Spring ending torque up to
235,000 Nm (2,080,000 lbf in)

THRUST OUTPUT

Double acting thrust
up to 8,000,000 N

Spring ending thrust
up to 555,058 N

single or multispring versions
available

AMBIENT TEMPERATURE

Standard range:
20°C to +100°C (-4°F to +210°F)

Extended range:
-60°C to +135°C (-70°F to +275°F)



Gas over oil



Direct gas



Rack and pinion

DESIGNS TO SUIT EVERY HIGH PRESSURE APPLICATION

All high pressure actuators are available in double-acting and spring return versions for any quarter-turn and linear valve such as ball, plug, butterfly, damper-style, check, gate and globe valves.

The product range includes:

GPO, GIG/GIGS

Actuators with a gas powered scotch yoke mechanism that offer the major benefit of using the gas flowing in the pipeline for their operation, with no need for any other power source. Models include gas and oil combinations (GPO) and direct gas types (GIG/GIGS).

RPHD/RPHS SERIES

Hydraulic rack and pinion actuators that provide the most economical on-off and modulating control for small to medium quarter-turn valves.

OLGA/OLGAS, MORIN HP SERIES

Hydraulic actuators with a scotch yoke mechanism which have an efficient design and deliver high break-out torques making them suitable for most quarter turn valves up to the largest sizes. They have been engineered

to provide the optimum balance of simplicity, reliability and economy.

THD/THS SERIES

Compact hydraulic actuators with a quarter turn helical slot mechanism which provide the most effective reduced footprint when space is an issue.

HLA/HLAS, HYGLA/HYGLAS, GIL/GILS

Hydraulic, gas-over-oil and gas operated actuators with a linear mechanism to provide high thrust values, available in compact type with single or multi-spring versions for all valve sizes.

TYPICAL APPLICATIONS

- Offshore platforms
- Onshore terminals
- Petrochemical plants
- Oil refineries
- Gas, water and oil pipelines
- Metering, compressor and pumping stations
- Conventional and geo-thermal power plants
- Advanced combined cycle plants
- Emergency shutdown applications

QUICK ACTING TYPICAL APPLICATIONS

- Power generation plants
- Turbine feeding valves (trip and control)
- Turbine by-pass valves
- Compressor blow-off valves
- Condensator water feeding valves
- Boiler combustion control valves
- High pressure relief valves

COMPACT TYPICAL APPLICATIONS

- FPSO and drilling ships
- CALM
(Catenary Anchor Leg Mooring)
- SALM
(Single Anchor Leg Mooring)
- PLEM
(Pipe Line End Manifold)
- Offshore platforms
- Tank farms



Quick acting



Scotch yoke



Linear

VERSATILITY BY DESIGN

The modular design concept of high pressure actuators creates the most efficient ranges available and the broadest flexibility, with a minimal number of totally coordinated components enabling fast deliveries. Any of a range of manual override options can be fitted simply to the cylinder or center body, which also incorporates integrated support brackets to allow the mounting of control accessories in a convenient and easily accessible position at the base of the actuator.

ROBUST CONSTRUCTION

Piston actuators are built to last in materials that have been selected specifically to provide optimum performance and an extended service life with minimal maintenance. All the totally enclosed housings are in fabricated nodular cast iron or carbon steel, to provide maximum strength. A guide bar resists transverse loads and supports the piston rod, when present.

MINIMAL FRICTION

Friction is minimized through the use of an electro-less nickel-plated and polished cylinder, PTFE-impregnated

bronze or sintered bronze bushings, hard chrome plated guide bar, spring container and piston rods. Friction is further reduced through floating type piston seals, which provide low hysteresis and high sensitivity, preventing sticking problems

MAXIMUM CORROSION RESISTANCE

The use of hard chrome plated alloy steels and electro-less nickel-plated carbon steels, critical part available in full stainless steel and specific high performance Norsok approved painting with additional Frosio and Nace on site inspector, provide maximum corrosion resistance and extending service life.

ACCURATE PERFORMANCE

External travel stops allow precise angular stroke adjustment between 82° and 98° as a minimum.

APPROVALS

Biffi high pressure actuators are available with the following approvals (depending on the product selected):

SAFETY INTEGRITY LEVEL

IEC 61508-1÷7:2010 – SIL2 or SIL3 capable

AREA CLASSIFICATION

ATEX - II 2GD 135°C (T4)

ENCLOSURE STANDARDS

IEC 60529 - IP65/IP66/IP66M/IP67M/IP68

ANSI/NEMA 250 - NEMA 4, 4X, and 6

PRESSURE EQUIPMENT DIRECTIVE

PED 2014/68/EU



Electronic Line Break System



Control Systems



Hydraulic Manual Override MHP

COMPLETE ACTUATION SOLUTIONS

High pressure actuators are available with a wide range of options and accessories, including manual overrides, control and monitoring devices and complete control systems, to ensure that your actuator is ideally suited for each application.

If you have a specific requirement please contact your local sales office.

HANDWHEEL MANUAL OVERRIDE (MHW/MRHW)

The conical spoked handwheel guarantees operator effort in line with ergonomic principles and regulations, with additional reduction gearing available on higher torque applications

HYDRAULIC MANUAL OVERRIDE (MHP)

Efficient manual operation through an hydraulic hand pump also allows accurate adjustment of actuator stroke time independently in the opening and closing directions. Hydraulic flow regulators guarantee smooth operation across the stroke.

TORQUE LIMITING DEVICE

On gas-powered actuators, when the gas supply pressure varies widely, a pressure reducer or patented 'torque

limiting device' can be supplied. The 'torque limiting device' consists of 2 pressure piloted valves which stop the gas flow and exhaust the gas enclosed in the gas-over-oil tanks of the GPO series when the output torque exceeds the pre-set value. On GIG and GIGS models, it stops the gas flow but does not vent.

PNEUMATIC AND ELECTRONIC (ELBS20) LINE BREAK SYSTEM FOR PIPELINE APPLICATIONS

The standard line break control operates autonomously and needs no external power source. Comprising a reference tank, calibrated orifice with check valve and a diaphragm valve, it signals the actuator to close the valve automatically when the pressure drop rate in the pipeline exceeds a pre-set value. The ELBS20 is an electronic device designed and built to monitor pipeline integrity and initiate failsafe action when necessary. It measures dynamic pressure trends in the pipeline continuously and sends a command to the actuator to stroke the line valve to the fail-safe position when critical anomalies are detected.

GPO GAS-OVER-OIL POWER TANKS

The GPO's tanks are engineered, manufactured and tested according to ASME VIII-DIV.1 and incorporate a hydraulic filter. They can also be supplied in accordance with PED European Directive 2014/68/UE, or other codes on request (U-STAMP, DOSH, AS1210).

PROXIMITY SENSORS AND LIMIT SWITCHES

TopWorx GO™ Switch products are engineered to meet tough applications while offering high reliability, installation flexibility and dependability in all environments. As the all in one proximity sensor and limit switch, GO Switches provide accurate final control to support quality and efficiency in a variety of industries. They are available with high pressure options up to 960 bar g.



Torque Limiting Device



TopWorx D-Series



IMVS2

DISCRETE VALVE CONTROLLERS

TopWorx™ discrete valve controllers enable automated on/off valves to communicate via FOUNDATION Fieldbus, DeviceNet, AS-Interface, Profibus, HART and Wireless HART protocols. They attach to all rotary and linear valves and actuators, operate in the most demanding environmental conditions, and carry a variety of hazardous area certifications.

They are available with spacious, rugged enclosures in aluminum, stainless steel, or resin.

INTEGRATED VALVE MONITORING SYSTEMS (IMVS2)

The IMVS2 is a fully automated partial stroking, smart valve and actuator diagnostic system capable of operating all actuator sizes without flow restriction or the need for costly additional equipment.

It is an electronic device that provides operational, safety and diagnostic functions through a single or double acting actuator mounted on a valve driven by an external single or redundant solenoid valve. It enables diagnostic functions, including partial stroke test and continuous monitoring of valve actuator pressure and position, to be carried out with the

valve on-line and in service with no disruption to the process.

Automated partial stroke tests (PST) minimize disruption to the process by extending the intervals between a plant's full closure tests while maintaining the required SIL level.

Valve position signal, functioning pressure signals and other optional external signals are monitored and processed by a microprocessor based logic mounted inside the device.

CONTROL SYSTEMS

Advanced engineering technology is used to design and manufacture controls and accessories, based on customer specifications and application requirements. The most stringent needs for control modes, operating conditions and customization can be met through the correct selection of schematics, components, materials and protection treatments.

The control system can include devices for automatic operation or 'stay put' in case of emergency - electric or pneumatic supply failure, high temperature, low or high pipeline pressure etc.

Specially designed control systems can be supplied for heavy duty service or specific working conditions – low working temperature, sour gas supply, special emergency operation, etc.

- On-off or modulating actuator service.
- Local or remote actuator control via electric or pneumatic signals.
- Panel mounted or enclosed in a weatherproof cabinet.
- Separate or assembled onto the actuator.
- Mounts to actuator housing via dedicated supports.



Biffi reserves the right to change product designs and specifications without notice.

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