

Rotork Actuators – Quality Controlled

Rotork is a global leader in valve actuation technology. We provide a comprehensive range of valve actuators, controls and associated equipment, as well as a variety of valve actuator services including commissioning, preventive maintenance and retrofit solutions.

Rotork Fluid Systems specialises in the production and support of fluid power actuators and control systems. We are dedicated to providing the marketplace with the latest technology, consistently high quality, innovative design, excellent reliability and superior performance.

Rotork Fluid Systems maintains dedicated engineering groups for Applications, Product Improvement and New Product Development so that our customers can gain all the benefits that ever advancing technologies have to offer and to ensure our efforts are in step with the continually evolving needs of our customers.

Most importantly, we have a long-standing commitment to meeting the special needs of a wide range of applications including: oil and gas exploration and transportation; municipal water and wastewater treatment; power generation; and the chemical and process industries.

With over fifty years of engineering and manufacturing expertise, we have tens of thousands of successful valve actuator installations throughout the world.

HPG Range – Direct High-Pressure Gas Actuators

Every Rotork Fluid Systems actuator is built to provide long and efficient service with a minimum of maintenance. The design, engineering and materials used in the construction ensure optimum performance even in the harshest of environments. Our modular construction design facilitates stocking by allowing a minimal amount of components to meet a wide range of valve torque requirements.

Rotork's HPG range of pipeline actuators are designed to use pipeline gas as the motive power source. Using our industry recognised and proven hydraulic scotch-yoke quarter-turn actuator as the valve prime mover, we have experience designing and supplying direct gas actuators to many end-user specifications. Our actuators are complemented with a variety of Rotork Fluid Systems designed and manufactured high-pressure gas controls.

Manual override is a standard feature of the range. The design incorporates a separate cylinder for hydraulic override to ensure complete separation of high-pressure pipeline gas from the hydraulic fluid. The use of an independent override cylinder allows replacement of power cylinder seals without removal of the actuator from the valve and will even allow for manual operation while the power cylinder is disassembled.

The gas control manifold employs poppet style control valves – a reliable design trusted throughout the industry. They are pilot operated for remote control. Operation is both simple and intuitive.



HPG Range – Quarter-turn Actuators



Output

Quarter-turn maximum torque 600,000 Nm / 5,300,000 lbf.in (higher upon request)

Temperature Range

Standard: -29 to 60 °C (-20 to 140 °F)

Low: -40 to 60 °C (-40 to 140 °F)

Super Low: -46 to 40 °C (-50 to 104 °F)

Hazardous Area Approvals

Standard: ATEX - II 2G EEx de IIB T4

Options: IEC - Ex de IIB T4; Explosionproof Class 1, Division 1, Groups C&D

Other approvals available upon request



Standard Features and Benefits

- Scotch yoke quarter-turn actuators with either symmetric or canted yoke designs for optimum sizing of actuator to valve
- Actuators are IP66M/67M third-party certified and approved for environmental protection
- Actuators are CE and ATEX 94/9/CE third-party certified and approved
- Chromium-plated piston rod and electroless nickel-plated cylinder to provide enhanced durability of critical sealing surfaces
- Working pressure 10 to 105 barg (145 to 1,500 psig) – higher on application
- Controls designed to operate at full pipeline pressure eliminating possible pressure regulator failure
- Manual hand pump for emergency or local operation
- Options with either low-pressure or high-pressure control logic design
- Modular and compact integrated manifold design reduces fittings and potential leakage
- Local control via lever-operated poppet valves on the multi-function manifold
- Stainless steel pressure gauge to measure gas supply pressure with psi/bar scale
- Particulate filter with a stainless steel element is included as standard. The element is easily removable and cleanable
- Stroke time is adjusted via two hydraulic flow control valves providing smooth and precise speed control

Optional Features

- Pressure sensing valves with optional manual reset to monitor pipeline pressure
- Pressure differential valves with optional manual reset to monitor the differential across the valve
- Line break detection safety systems sensing pipeline pressure drop over time
- ESD (emergency shutdown) control configurations to suit specific customer shutdown logic requirements
- Actuator torque limiting device for the protection of the valve drive train
- Custom gas filtration
- Lockable control cabinet in stainless steel
- Power gas storage tanks to provide power upon loss of main pipeline pressure
- Pressure vessel certification including ASME U-Stamp, PED 97/23/EC – other approvals on application

High-Pressure Gas Control Systems

A comprehensive range of control systems and schematics have been developed to meet the requirements of end-user direct high-pressure gas applications.

A variety of standard Rotork direct high-pressure gas schematics are listed below. Please contact our international sales departments for further options.

High-Pressure Gas Control Schematics

Schematic	Hydraulic manual override	Local manual control	Low pressure Close	Line break	2-way electric remote
HPG7000-001	✓	✓			
HPG7010-001	✓	✓	✓		
HPG7020-001	✓	✓		✓	
HPG8000-001	✓	✓			✓
HPG8010-001	✓	✓	✓		✓
HPG8020-001	✓	✓		✓	✓

Remote Operation

- Place the remote/local selector switch 1Z50B in remote position (R)
- For valve actuator open stroke: energise solenoid valve 1V50A (Z)
- For valve actuator close stroke: energise solenoid valve 1V50B (Z1)

Local Operation

- Place the remote/local selector switch 1Z50B in local position (L)
- For valve actuator open stroke: press hand lever valve 1V50A
- For valve actuator close stroke: press hand lever valve 1V50B

Manual Operation

- Place the remote/local selector switch 1Z50B in local position (L)
- For valve actuator open stroke, shift the hand operated valve 1V1 to the open position and operate the hydraulic pump 1P1
- For valve actuator close stroke, shift the hand operated valve 1V1 to the close position and operate the hydraulic pump 1P1

Pneumatic Line Break

- The systems sense the pressure in the main line. In the event of a line break a pressure drop will be detected by the system and the actuator will move to the close position. The low pressure close set point of the system is adjustable
- A pressure signal from the shifted 1S80 differential pressure switch pilots valve 1V45 and poppet valve 1V11B
- Valve 1V45 vents pilot signal of poppet valve 1V11A
- Valve 1V11B closes the valve actuator

Pneumatic Line Break Reset



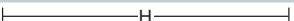
- Discharge the pilot gas line by opening flow regulator 1V85
- Reset pilot hand operated valve 1V45
- Close flow regulator 1V85

Parts List for HPG8000-001 & HPG8020-001 Schematics

Item	Description
1A1	Rotork double-acting actuator
1P1	Hand pump
1S1	Limit switch box
1S80	3/2 N.C. Adjustable differential pressure switch
1V1	4/3 Hand operated valve
1V2	Stop valve
1V3, 1V4, 1V5	Check valve
1V7, 1V8	Relief valve
1V9, 1V10	Unidirectional flow regulator
1V11	Gas block
1V11A	3/2 N.C. Pilot valve spring return (open)
1V11B	3/2 N.C. Pilot valve spring return (close)
1V15	Shuttle valve
1V40	Close limit valve
1V45	3/2 Pilot hand operated valve
1V50A	3/2 N.C. Solenoid valve spring return with manual override (open)
1V50B	3/2 N.C. Solenoid valve spring return with manual override (close)
1V80	Drain valve
1V81	Isolation valve
1V82	Check valve
1V83	Calibrate orifice
1V84	Check valve
1V85	Flow regulator valve
1Z1	Pressure gauge
1Z2	Gas vent
1Z3	Pump reservoir
1Z7	Pump group
1Z12, 1Z13, 1Z14	Gas vent
1Z20	Inlet manifold
1Z20A	Mechanical filter
1Z50A	Junction box
1Z50B	Remote/local selector switch (r/l)
1Z80	Line break block
1Z81	Tank (line break)
1Z82A, 1Z82B	Mechanical filter
1Z83	Pressure gauge

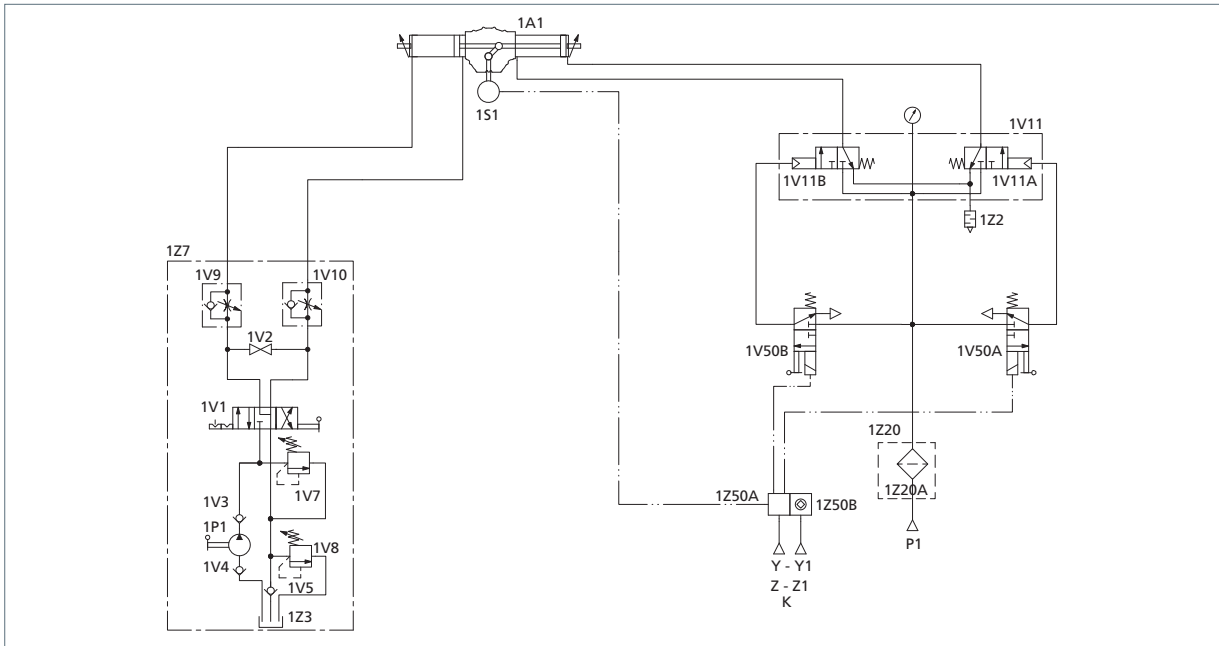
Connection	Description
P1	Gas connection (105 barg max.)
P4	Line break gas connection downstream (105 barg max.)
K	Electrical connection to remote/local selector switch status
Y	Limit switch box electric connection
Y1	Limit switch box electric connection
Y	Electric connection to solenoid valve open
Y1	Electric connection to solenoid valve close

Legend

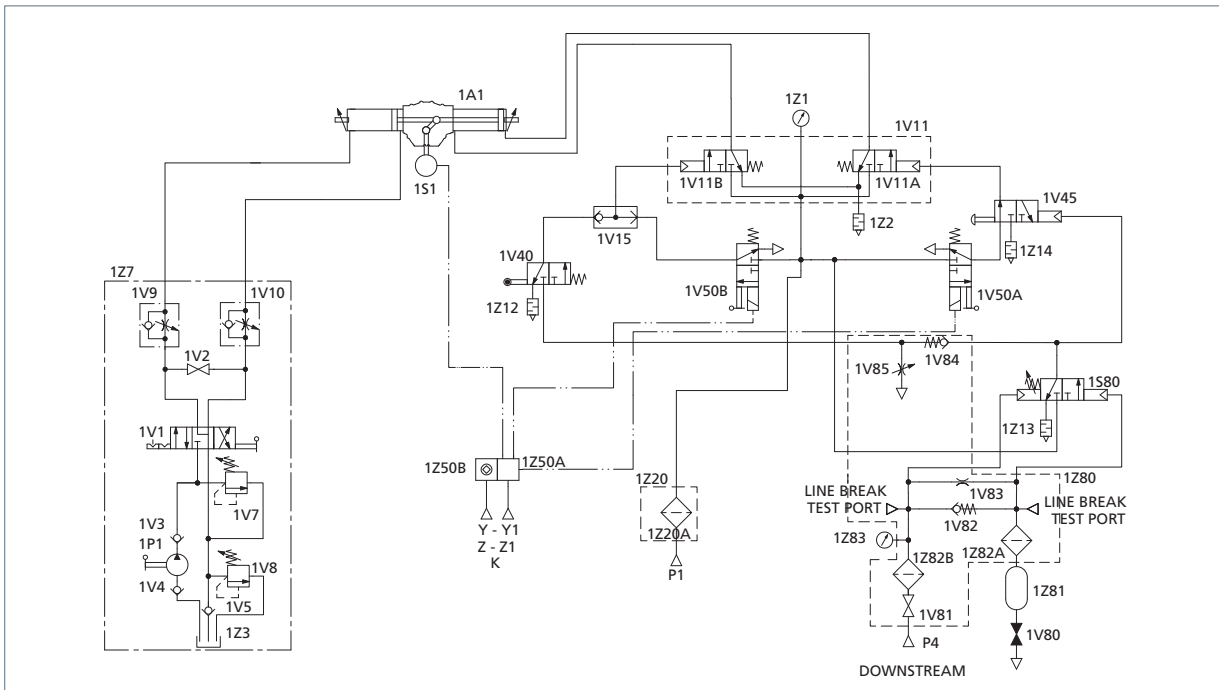
	Solenoid connection
	High pressure gas line
	Hydraulic fluid line

HPG Schematics

HPG8000-001 2-way Electric Remote Operation & Local Manual Control



HPG8020-001 2-way Electric Remote Operation with Line Break & Local Manual Control



Notes:

1. Travel limit switch are used to de-energise the solenoid when the actuator reaches the end of travel.
2. Schematics are shown without pneumatic and electric supply.
3. Actuators are shown in close position.

Key Control Components

Complementing the modular design of our high-pressure gas systems are the Rotork designed and manufactured control options ranging from simple local/remote pilot operated valves to pressure sensing and line break controls.

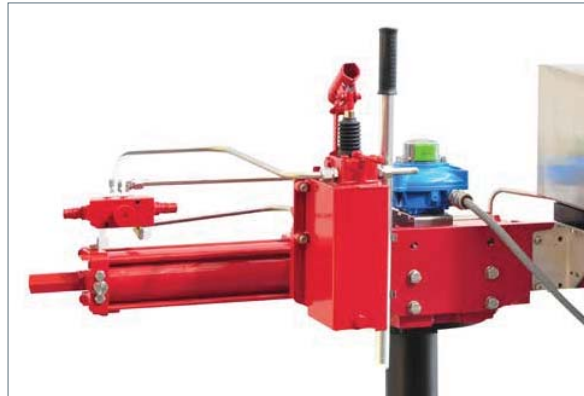
At the centre of our control systems is our multifunction manifold block. The high-pressure, high-flow manifold system allows us to configure a wide variety of control options.

Multi-function Manifold Block

- Integral gas filter
- Leak-free high-flow poppet valve design
- Anodised aluminium construction
- Tamper-proof cover (optional)

Hand Pump Override

- Selector valve to permit local operation
- Flow control valves to adjust stroke time in each direction



Available Options

Dehydrator / Filter

A coalescing filter assembly with purge valve to facilitate removal of water from incoming power gas.

High / Low Pressure Select

This option provides two gas connection ports, one for the upstream side of the valve, and the other for the downstream side. Both connections are fed to a set of valves that select the higher or lower of the two.

Auxiliary N2 Connection

A second inlet gas connection that allows the user to connect a nitrogen supply for test.

Torque Limiting Device (TLD)

A device that limits the actuator maximum torque output to protect the actuator and/or valve stem from damage in the event of overpressure.

High Differential Open Inhibit

Automatic inhibition of opening, when the difference of pressure between upstream and downstream sides of the valve exceeds a set point. This can be achieved pneumatically or electrically.

High or Low Pressure Open or Close

Automatic closure of the valve when the pressure in the pipeline drops below a set point.

Pneumatic or Electronic Line Break

Automatic closing of the valve when the rate of pressure drop in the pipeline is greater than an adjustable, user-defined set point.

Local / Remote Selector

A manual selector to allow the local user to place the actuator in local mode, thus taking priority over remote signals. This can be achieved pneumatically or electrically.

Electric ESD

A special ESD solenoid valve is added to the circuit, and when it is de-energised, the actuator moves to the fail-safe position.

Electrical Pressure Switch

A pressure switch is placed in the circuit to provide electrical indication when the pressure drops below a set point.

Manual Override Indication Switches

A switch is placed on the manual override selector to provide electrical indication when the actuator has been placed in local hand-pump mode.

High Pressure Ball Valve

Lockable valves are available to provide system isolation during maintenance.

Fire Protection Systems

Rotork Fluid Systems actuators and control systems can be customized to withstand exposure both to fire and very high environmental temperatures. A range of fire-proof systems is available that include flexible protective jackets, intumescent coatings and rigid enclosure systems.

For further information on Rotork's fire protection solutions, consult publication PUB000-004.



rotork® Site Services

Rotork Site Services provides a comprehensive range of service products, each specifically tailored to meet customers' requirements.

Emergency and Planned Service encompasses installation, commissioning, upgrading, installation of control systems, troubleshooting and repair of damaged or deteriorating assets. Actuator Overhauls are performed in Rotork workshops to bring long service units back to guaranteed 'as new' condition. Health Checks enable customers to prioritise maintenance and replacement planning whilst Preventative Maintenance enhances the integrity of actuators to maximise plant utilisation.

Rotork Site Services has a wealth of experience in Retrofitting new actuators to valves, penstocks and dampers installed on existing plant, as well as the factory assembly of new valves and actuators for plant upgrades and extensions. Capabilities for Extended Scope Projects include surveys, design, procurement, manufacturing and commissioning to cover the broad scope of activities surrounding actuation projects.

Visit www.rotork.com to identify your nearest Rotork Site Services centre.

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