ACTUATION & INSTRUMENTATION

While pumps, seals and valves seem to get most of the attention, it's often the actuators and positioning solutions that are running the show. Fail-safe isolation. On-off modulation. Precision process control. These are the must-haves of fluid motion and control, no matter how difficult or remote the application.

Our actuator and positioning products are equal parts durability and sophistication, an ideal balance that delivers reliable valve control in tough, hazardous environments. From small-footprint, compact electric actuators to high-torque, high-speed, fluid-powered products, every solution is built to withstand its environment and deliver industry-leading service life. Embedded technologies make them easy to use and set up. More importantly, operators can readily identify and expedite solutions to process and equipment issues through advanced prognostics, diagnostics and communications protocols.


DIAGNOSTICS PORT
BLUETOOTH - OK?
REMOTE
STOP
LOCAL
OPEN
(YES)
(NO)
CLOSE
Limitorque

MX

ELECTRIC

Delivering unmatched positioning accuracy for control and modulating functions, Flowserve electric actuators are the world's first choice for some of the most challenging applications. Compact, lightweight designs keep footprints small. Cost-effective capital investment is matched by reduced costs for operation, control functions, maintenance, environmental compliance and safety. Superior process monitoring, data logging and information feedback options maximize efficiency and minimize downtime.

Electric – Quick Reference*

Product	Sub-Type	Torque	Thrust	Output Speed	Temperatures
L120	Intrusive Multi-Turn	136 to 81 600 Nm (100 to 60 000 ft-lb)	4500 to 225 000 kN (10 000 to 500 000 lbf)	750 to 3000 rpm	-50°C to 65°C (-56°F to 150°F)
SMB	Intrusive Multi-Turn	20 to 81 349 Nm (15 to 60 000 ft-lb)	36 to 2224 kN (8000 to 500 000 lbf)	1800 to 3600 rpm	-20°F to 150°F (-29°C to 66°C)
SB and SBD	Intrusive Multi-Turn	353 to 11 253 Nm (260 to 8300 ft-lb)	62 to 1112 kN (14 000 to 250 000 lbf)	1800 to 3600 rpm	-20°F to 150°F (-29°C to 66°C)
QX	Non-Intrusive, Quarter-Turn	54 to 2033 Nm (40 to 1500 ft-lb)	—	5 to 120 s	-55°C to 70°C (-67°F to 156°F)
QXM	Non-Intrusive, Multi-Turn	24 to 337 Nm (18 to 250 ft-lb)	3 to 40 kN (593 to 9065 lbf)	3 to 24 rpm	-30°C to 70°C (-22°F to 156°F)
MX	Non-Intrusive, Multi-Turn	27 to 2307 Nm (20 to 1700 ft-lb)	35 to 333 kN (8000 to 75 000 lbf)	15 to 200 rpm	-60°C to 70°C (-76°F to 158°F)

** Additional products shown on next page*

Electric – Quick Reference, cont'd.

Product	Sub-Type	Topology	Comm. Meth.	Max. Tran.	Max. Devc.	Max. Dist.
Modbus DDC	Network Controls	Multi-drop (single ended/redundant loop for MX)	Master-Slave	19.2 Kbps	250	1200 m (without repeaters)
Modbus Ethernet TCP/IP	Network Controls	Redundant bi-directional loop or daisy chain	Modbus protocol over RS-485 or Ethernet	38.4 Kbps	250	1.52 km (without repeaters)
Foundation Fieldbus H1 with DTM	Network Controls	Multi-drop, Point-to-Point, Tree	Publisher/ Subscriber	31.25 Kbps	240/network — 32/segment (with repeater)	1900 m/segment
PROFIBUS DP V1 with Redundancy and DTM	Network Controls	Multi-drop, Point-to-Point Daisy Chain	Master-Slave	1.5 Mbps	127	1200 m (without repeaters)
PROFIBUS PA	Network Controls	Multi-drop, Point-to-Point, Tree	Master-Slave	31.25 Kbps	127 (31 per repeater)	1200 m (without repeaters)
DeviceNet	Network Controls	Multi-drop, Linear Trunkline/Dropline	Master-Slave	500 Kbps	64	500 m
Hart with DTM	Network Controls	Multi-drop, Point-to-Point	Master-Slave	1.2 Kbps	15	1800 m/network

All network PCBs meet EMC requirements to European Directive 2004/108/EC and vibration/seismic requirements to Machinery Directive 2006/42/EC.

INTRUSIVE MULTI-TURN

L120

Limitorque®

From commercial power feedwater and steam systems, to oil and gas refining and coking, to water filtration and treatment, the L120 has a solid record in the most demanding applications.

- Proven safety with explosion-proof certification, torque overload protection, plus resistance to lightning, EMI, fire, vibration and high-pressure steam
- Longer service life from aluminum and ductile iron housings, plus anti-friction bearing-supported alloy steel worm shafts with bronze worm gears
- Broad application flexibility via integration with most network protocols through UEX electronic controls package
- Extreme environment performance available from weatherproof, submersible and explosion-proof construction options

SPECIFICATIONS

Torque: 136 to 81 600 Nm
(100 to 60 000 ft-lb)
Thrust: 4500 to 225 000 kN
(10 000 to 500 000 lbf)
Output Speed: 750 to 3000 rpm
Temp: -50°C to 65°C (-56°F to 150°F)

Refer to literature LMENBR1200 at flowserve.com/library.

INTRUSIVE MULTI-TURN

SMB

Limitorque

Introduced in the 1960s, SMB actuators are used by the U.S. Navy, every nuclear power facility in the U.S., and virtually every other industrial environment.

- Long service life with rugged with cast iron housing and precision-machined gearing
- Extreme environment performance enabled by nuclear, weatherproof, submersible or explosion-proof construction
- Lower maintenance and downtime owing to torque-limiting feature, which de-energizes the motor to prevent valve damage in the event of an obstruction
- Fully qualified for nuclear applications to IEEE 384, 323 and 344

SPECIFICATIONS

Torque: 20 to 81 349 Nm
(15 to 60 000 ft-lb)
Thrust: 36 to 2224 kN
(8000 to 500 000 lbf)
Output Speed: 1800 to 3600 rpm
Temp: -29°C to 66°C (-20°F to 150°F)

Refer to literature LMENBR1400 at flowserve.com/library.

INTRUSIVE MULTI-TURN

SB and SBD

Limitorque

These spring-compensated extensions of the SMB product line are available for applications where thermal expansion may pose a jammed-valve risk, or where valve discs are subject to extremely high-speed closure.

- High-temperature capability enabled by design that allows for thermal expansion and contraction of the valve stem and actuator stem nut
- High-speed performance made possible by spring-loaded stem nut, which absorbs the seating shock caused by rapid closing
- Longer service life via impact-dampening capability, which enables actuators to function at speeds as high as three times normal rates
- Optimized performance for stem contraction and torque back-seating applications available with double-compensating SBD configuration

SPECIFICATIONS

Torque: 353 to 11 253 Nm
(260 to 8300 ft-lb)
Thrust: 62 to 1112 kN
(14 000 to 250 000 lbf)
Output Speed: 1800 to 3600 rpm
Temp: -29°C to 66°C (-20°F to 150°F)

Refer to literature LMENBR1400 at flowserve.com/library.

ELECTRIC

NON-INTRUSIVE, QUARTER-TURN

QX

Limitorque

The QX design builds on more than 20 years of proven MX technology to provide all the user-preferred features in a quarter-turn smart actuator package.

- Greater process control with non-contacting absolute encoders that provide accurate position sensing
- B.I.S.T., built-in self-test which never needs batteries to retain position data, even in the event of main power loss
- Extreme environment performance made possible by non-intrusive design, 100% solid-state controls, and reliable digital communication control system
- Flexible control configurations, setup and diagnostics in 11 languages, and advanced brushless DC motor that supports most global voltages, AC or DC

SPECIFICATIONS

Torque: 54 to 2033 Nm (40 to 1500 ft-lb)
Output Speed: 5 to 120 s
Temp: -55°C to 70°C (-67°F to 156°F)

Refer to literature LMENBR3302 at flowserve.com/library.

NON-INTRUSIVE, MULTI-TURN

QXM

Limitorque

A smart, non-intrusive electronic valve actuator with a maximum of 20 drive sleeve turns. Designed for limited, short stroke, light torque rising stem valve applications such as choke or control valves.

- Lower operating costs compared to pneumatic actuators, with the added advantages of electrical operation
- Greater process control from accuracy that meets and exceeds EN 15714 (Class D) and IEC 60034 standards for modulating service
- Increased reliability via electro-magnetic noise protection of analog process control signals

SPECIFICATIONS

Torque: 24 to 337 Nm; (18 to 250 ft-lb)
Thrust: 3 to 40 kN; (593 to 9065 lbf)
Output Speed: 3 to 24 rpm
Temp: -30°C to 70°C (-22°F to 156°F)

Refer to literature LMENBR3302 at flowserve.com/library.

NON-INTRUSIVE, MULTI-TURN

MX

Limitorque

Introduced in 1997 and into its third generation, the MX is built upon a wealth of experience and performance in valve actuation. Thousands are installed in all major market segments.

- Broad versatility owing to a wide variety of configurations, including torque-only, thrust-based, linear thrust base and rising stem applications
- Increased uptime from patented absolute positioning encoder that never needs batteries and B.I.S.T. built-in self-test
- Instant actuator status and valve position in 11 languages provided by graphical display with local control switches with solid-state Hall effect devices
- Low-temperature capability to -60°C (-76°F) with arctic temperature and solid-state starter options for modulation to 1200 starts per hour

SPECIFICATIONS

Torque: 27 to 2307 Nm (20 to 1700 ft-lb)
Thrust: 35 to 333 kN; (8000 to 75 000 lbf)
Output Speed: 15 to 200 rpm
Temp: -60°C to 70°C (-76°F to 158°F)

Refer to literature LMENBR2302 at flowserve.com/library.

Leading the Charge in Electric Innovation

Flowserve was one of the first companies to introduce electric actuators back in the 1980s. Since then, we've significantly increased their efficiency while dramatically reducing their cost. In recent years, these advances have reached a tipping point that makes electric actuators the first choice for a wide variety of applications. Today's electric actuators can provide superior positioning accuracy for control or modulating functions, plus invaluable diagnostic and process data.

NETWORK CONTROLS

Modbus DDC

Limitorque ensures complete integration with Modbus DDC. Connect up to 250 actuators with a single twisted-pair cable on an RS-485 network to a PLC/SCADA system or Limitorque Master Station.

- Greater process control in even the largest networks made possible by support for up to 250 actuators
- Increased efficiency, security and safety via Master Station option, enabling complete single-source control and diagnostics for MX, QX, L120 and LY units
- Complies with EMC requirements to European Directive 2004/108/EC and vibration/seismic requirements to Machinery Directive 2006/42/EC

SPECIFICATIONS

Topology: Multi-drop (single ended/ redundant loop for MX)
Comm. Meth: Master-Slave
Max. Trans. Rate: 19.2 Kbps
Max. Devices: 250
Max. Dist: 1200 m (without repeaters)

Refer to LMENIM2329 and LMENFL5100 at flowserve.com/library.

NETWORK CONTROLS

Modbus Ethernet TCP/IP

Combining the simplicity of the Modbus protocol with the widespread Ethernet standard, Limitorque products with Modbus Ethernet TCP/IP connect to any Modbus network that supports TCP/IP and RS485 systems.

- Greater process control enabled by support for up to 250 devices
- Increased flexibility and reduced costs via off-the-shelf Ethernet tools, permitting control from a DCS, PLC or PC
- Easy installation with simple module that connects directly to Modbus terminals
- Optimized communication performance supported by baud rate options from 1.2K up to 38.4K
- Complies with ODVA CIP specifications for internet protocols, Industrial Ethernet (IE) regulations IEC 61158 (Fieldbus) and IEEE 802

SPECIFICATIONS

Topology: Redundant bi-directional loop or daisy chain
Comm. Meth: Modbus protocol over RS-485 or Ethernet
Max. Trans. Rate: 38.4 Kbps
Max. Devices: 250
Max. Dist: 1.52 km (without repeaters)

Refer to literature LLMENIM2329 at flowserve.com/library.

NETWORK CONTROLS

Foundation Fieldbus H1 with DTM

Limitorque actuators with Foundation Fieldbus can act as a link active scheduler and time master for regulating communication on a fieldbus segment.

- Broad network versatility from support for multiple topologies, including point-to-point, bus with spurs, daisy chain, tree or combinations of these
- Ease of installation and setup with direct connection to PLC or DCS systems from major manufacturers, including Emerson, Honeywell, ABB, GE and Yokogawa
- Increased performance, safety and environmental compliance from Flowserve ValveSight™ support
- Complies with EMC requirements to European Directive 2004/108/EC and vibration/seismic requirements to Machinery Directive 2006/42/EC

SPECIFICATIONS

Topology: Multi-drop, Tree, Point-to-Point
Comm. Meth: Publisher/Subscriber
Max. Trans. Rate: 31.25 Kbps
Max. Devices: 240/network; 32/segment (with repeater)
Max. Dist: 1900 m/segment

Refer to literature LMENIM2330 at flowserve.com/library.

NETWORK CONTROLS

PROFIBUS DP V1 with Redundancy and DTM

Limitorque actuators with PROFIBUS DP are designed to operate sensors and actuators via a centralized controller in production (factory) automation applications.

- Reduced maintenance and related operating costs via intuitive software that proactively identifies maintenance needs, preventing unscheduled shutdowns
- Increased efficiency enabled by network that allows users to communicate in real time with every device and monitor diagnostics information, including alarms
- Complies with EMC requirements to European Directive 2004/108/EC
- Complies with Profibus specification, Slave-Redundancy_2.212_v12 and transfers communication for both flying and system redundancy in ≤ 500 ms per specification
- Supports NAMUR NE-107

SPECIFICATIONS

Topology: Multi-drop, Point-to-Point, Daisy Chain
Comm. Meth: Master-Slave
Max. Trans. Rate: 1.5 Mbps
Max. Devices: 127
Max. Dist: 1200 m (without repeaters)

Refer to LMENIM2339 and LMENFL2336 at flowserve.com/library.

NETWORK CONTROLS

PROFIBUS PA

Limitorque actuators with PROFIBUS PA are used to monitor and control process automation applications.

- Broad application flexibility via analog and digital input/output function blocks
- Ease of installation and setup made possible by direct connection to PLC or DCS systems from major manufacturers, including Emerson, Honeywell, ABB and Yokogawa
- Increased performance, safety and environmental compliance from Flowserve ValveSight support
- Complies with EMC requirements to European Directive 2004/108/EC and vibration/seismic requirements to Machinery Directive 2006/42/EC

SPECIFICATIONS

Topology: Multi-drop, Tree, Point-to-Point
Comm. Meth: Master-Slave
Max. Trans. Rate: 31.25 Kbps
Max. Devices: 127 (31 per repeater)
Max. Dist: 1200 m (without repeaters)

Refer to literature LMENIM2336 at flowserve.com/library.

NETWORK CONTROLS

DeviceNet

Limitorque actuators integrate seamlessly with DeviceNet. DeviceNet is a digital, multi-drop network that connects and serves as a communication network between industrial controllers and field devices.

- Broad application flexibility via support for multiple communication hierarchies and message prioritization
- Greater reliability and reduced downtime assured by cyclic redundancy checking (CRC), auto retries, and bus-powered network interface that allows alarm information to be communicated when actuator loses main power
- Complies with EMC requirements to European Directive 2004/108/EC and vibration/seismic requirements to Machinery Directive 2006/42/EC

SPECIFICATIONS

Topology: Multi-drop, Linear Trunkline/Dropline
Comm. Meth: Master-Slave
Max. Trans. Rate: 500 Kbps
Max. Devices: 64
Max. Dist: 500 m

Refer to literature LMENIM2328 at flowserve.com/library.

NETWORK CONTROLS

Hart with DTM

Limitorque actuators with HART (Highway Addressable Remote Transducer) allow secondary masters, such as handheld communicators, to be connected without interfering with the plant control system.

- Greater process control, asset management efficiency and safety made possible by enabling the use of both centralized control/monitoring and smart field devices
- Faster diagnostic feedback and summaries due to burst mode that enables response of up to three commands continuously
- Complies with EMC requirements to European Directive 2004/108/EC and vibration/seismic requirements to Machinery Directive 2006/42/EC

SPECIFICATIONS

Topology: Multi-drop, Point-to-Point
Comm. Meth: Master-Slave
Max. Trans. Rate: 1.2 Kbps
Max. Devices: 15
Max. Dist: 1800 m/Network

Refer to LMENFL2340 or LMENIM2340 at flowserve.com/library.

V Series Bevel

GEARBOXES

Whether for manual or motorized operation, Flowserve quarter- and multi-turn gearboxes stand up to the toughest performance requirements and environmental challenges. Trouble-free operation, high uptime and rugged dependability are engineered into every unit through high-strength gearing, robust housings and roller bearing-supported shafts. Broad application versatility is achieved via weatherproof and submersible constructions and a wide range of output speeds and torques.

Gearboxes – Quick Reference

Product	Sub-Type	Torque to	Thrust to	Temperatures
V Series Bevel	Multi-Turn	52 000 Nm (38 350 ft-lb)	7650 kN (1.7 million lbf)	-35°C to 90°C (-31°F to 194°F)
SR Series Spur	Multi-Turn	23 000 N (16 984 ft-lb)	3500 kN (787 000 lbf)	-35°C to 90°C (-31°F to 194°F)
WG Series Worm	Quarter-Turn	442 000 Nm (326 000 ft-lb)	—	-35°C to 90°C (-31°F to 194°F)
HBC Series Worm	Quarter-Turn	126 204 Nm (93 000 ft-lb)	—	-29°C to 66°C (-20°F to 150°F)

GEARBOXES

MULTI-TURN

V Series Bevel

V Series bevel gearboxes are designed for manual and motorized operation for industrial gate and globe valves as well as slide gates.

Limitorque

- Broad application versatility provided by excellent sealing of mating surfaces, which allows for weatherproof or temporary submersion applications
- Increased uptime facilitated by roller bearing-supported shaft and high-strength bevel gearing, which are rated for extremely high thrust and torque requirements
- Longer service life via ductile iron housing and roller bearing-supported shafts and drive sleeve that provide durability

SPECIFICATIONS

Torque to: 52 000 Nm (38 350 ft-lb)
Thrust to: 7650 kN (1.7 million lbf)
Temp: -35°C to 90°C (-31°F to 194°F)

Refer to literature LMENFL3602 at flowserve.com/library.

MULTI-TURN

SR Series Spur

The SR Series is a solid-performing, multi-turn, spur gearbox designed for manual or motorized operation of gate and globe valves as well as slide gates.

Limitorque

- Well suited for high vibration or tight space requirements owing to parallel input shaft and output drive sleeve
- Application versatility provided by available weatherproof and submersible constructions as well as a wide range of output speeds and torques
- Increased uptime facilitated by roller bearing-supported shaft and high-strength gearing, which are rated for extremely high thrust and torque requirements
- High strength and durability provided by ductile iron housing and roller bearing-supported shafts and drive sleeve

SPECIFICATIONS

Torque to: 23 000 Nm (16 984 ft-lb)
Thrust to: 3500 kN (787 000 lbf)
Temp: -35°C to 90°C (-31°F to 194°F)

Refer to literature LMENIM3701 at flowserve.com/library.

QUARTER-TURN

WG Series Worm

The WG Series of worm gearboxes offers unsurpassed quality and longevity in a wide variety of weatherproof, submersible and buried-service applications.

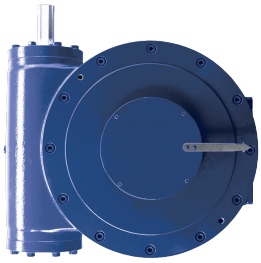
Limitorque

- Extraordinary range of output speeds and torques made possible by compatibility with a wide array of numerous electric actuators
- Reduced downtime provided by the removable, top-entry, splined valve shaft adapter, which ensures proper engagement of the valve stem
- Increased uptime due to rugged ductile iron housing, roller bearing-supported shaft and well-designed sealing, which stands up to tough conditions

SPECIFICATIONS

Torque to: 442 000 Nm (326 000 ft-lb)
Temp: -35°C to 90°C (-31°F to 194°F)

Refer to literature LMENFL2102 at flowserve.com/library.



Limitorque

QUARTER-TURN

HBC Series Worm

The HBC is the strongest worm gearbox on the market. It delivers consistent, trouble-free performance in demanding applications, ranging from nuclear power plants to critical service flow control in hydroelectric plants.

- Broad application versatility provided by ability to actuate a wide range of devices, both manually or motorized, at a considerable range of output speeds and torques
- Increased uptime due to bronze worm gear paired with alloy steel worm shaft
- Lower maintenance costs due to heavy-duty construction; proven in use for more than 50 years to be rugged and dependable
- Ease of operation made possible by valve position pointer, which makes at-a-glance position checking easier than ever

SPECIFICATIONS

Torque to: 126 204 Nm (93 000 ft-lb)
Temp: -29°C to 66°C (-20°F to 150°F)

Refer to literature LMENBR3500 at flowserve.com/library.

Smart Solutions for the World's Toughest Applications

No matter how extreme the environment or strict the regulations, customers the world over trust Flowserve actuation and positioning products to provide reliable, intelligent control. Whether your devices need to endure polar ice or desert heat, provide fail-safe protection in explosive atmospheres or nuclear power stations, or control complicated modulating processes with pinpoint accuracy, Flowserve has an actuation solution that's right for your application.

40R

FLUID POWER

Whether you need fail-safe action, high-torque power or high-speed functionality, Flowserve fluid power actuators are built for the world's toughest jobs. Reliable operation, reduced maintenance and longer service life are made possible by the simplicity, efficiency and flexibility built into every design. From nuclear power plants to offshore drilling platforms, the world's most critical infrastructures rely on Flowserve for rugged, efficient actuators with service lifespans of a quarter-century or more.

Fluid Power – Quick Reference*

Product	Sub-Type	Torque	Thrust	MAWP	Temperatures
LPS	Pneumatic — Scotch Yoke	550 kNm (405 659 ft-lb)	—	12 barg (174 psig)	-60°C to 160°C (-76°F to 320°F)
LPC	Pneumatic — Scotch Yoke	5500 Nm (4057 ft-lb)	—	12 barg (174 psig)	-60°C to 160°C (-76°F to 320°F)
RG, ARG and WRG	Pneumatic — Scotch Yoke	248 kNm (2.2M in-lb)	—	10.3 barg (150 psig)	-55°C to 149°C (-67°F to 300°F)
Turnex™	Pneumatic — Linkage	60 to 20 000 Nm (44 to 1475 ft-lb)	—	8 barg (116 psig)	-30°C to 80°C (-22°F to 176°F); to -40°C (-40°F) on request
LRP	Pneumatic — Scotch Yoke	10 to 1700 Nm (88 to 15 046 in-lb)	—	8.3 barg (120 psig)	-40°C to 150°C (-40°F to 302°F)
F39	Pneumatic — Rack & Pinion	7100 Nm (62 835 in-lb)	—	8.3 barg (120 psig)	-40°C to 150°C (-40°F to 302°F)
40R	Pneumatic — Rack & Pinion	7100 Nm (62 835 in-lb)	—	8.3 barg (120 psig)	-40°C to 150°C (-40°F to 302°F)
33R	Pneumatic — Rack & Pinion	2309 Nm (20 436 in-lb)	—	5.5 barg (80 psig)	-40°C to 150°C (-40°F to 302°F)

** Additional products shown on next page*

Fluid Power – Quick Reference, cont'd.

Product	Sub-Type	Torque	Thrust	MAWP	Temperatures
P61	Pneumatic — Rack & Pinion	1063 Nm (9408 in-lb)	—	8.3 barg (120 psig)	-40°C to 150°C (-40°F to 302°F)
Supernova™	Pneumatic — Rack & Pinion	5005 Nm (44 294 in-lb)	—	8 barg (120 psig)	-50°C to 150°C (-55°F to 302°F)
SXL	Pneumatic — Rack & Pinion	765 Nm (6770 in-lb)	—	8.3 barg (120 psig)	-50°C to 150°C (-55°F to 302°F)
NR	Pneumatic — Rotary	5 to 1285 Nm (43 to 11 381 in-lb)	—	6 barg (80 psig)	-60°C to 70°C (-76°F to 158°F)
VR	Pneumatic — Rotary	8 to 4160 Nm (72 to 36 820 in-lb)	—	10.3 barg (150 psig)	-60°C to 177°C (-76°F to 350°F)
FlowAct™	Pneumatic — Linear	—	0.25 to 60 kN (56.2 to 13 488.5 lbf)	6 barg (87 psig)	-40°C to 80°C (-40°F to 176°F)
VL	Pneumatic — Linear	—	15.85 to 262.53 kN (3564 to 59 020 lbf)	10.3 barg (150 psig)	-40°C to 177°C (-40°F to 350°F)
VL-C	Pneumatic — Linear	—	15.85 to 134.11 kN (3564 to 30 150 lbf)	10.3 barg (150 psig)	-40°C to 177°C (-40°F to 350°F)
VL-ES	Pneumatic — Linear	—	72.73 to 166.45 kN (16 350 to 37 420 lbf)	10.3 barg (150 psig)	-40°C to 177°C (-40°F to 350°F)
VL-UHC	Pneumatic — Linear	—	15.85 to 125.88 kN (3564 to 28 300 lbf)	10.3 barg (150 psig)	-40°C to 80°C (-40°F to 176°F)
Series 2 Type KP	Pneumatic — Linear	—	to 35.0 kN (7868 lbf)	6 barg (87 psig)	-40°C to 80°C (-40°F to 176°F)
Series 4 Type KA	Pneumatic — Linear	—	to 25.5 kN (5735 lbf)	1.4 to 4.2 barg (20 to 60 psig)	-30°C to 80°C (-22°F to 176°F)
LHS and LHH	Hydraulic	550 kNm (405 659 ft-lb)		345 barg (5000 psig)	-60°C to 160°C (-76°F to 320°F)
LDG	Direct Gas	550 kNm (405 659 ft-lb)		105 barg (1500 psig)	-40°C to 160°C (-40°F to 320°F)

PNEUMATIC — SCOTCH YOKE

LPS

Ideal for medium or large valve actuation and any application requiring robust design, long service life and high-speed operation. Meets the most stringent safety and performance standards for oil and gas applications.

Limitorque

- Low total cost of ownership provided by 25-year design life and maintenance intervals up to six years
- High-speed performance with reduced size, weight and consumption made possible by highly efficient design
- Modular construction allows easy on site maintenance without special tools and without removal from the valve
- Regulatory compliance with the highest industry standards, including EN 15714 and IEC 61508 (SIL 3 capable)

SPECIFICATIONS

Torque: 550 kNm (405 659 ft-lb)
MAWP: 12 barg (174 psig)
Temp: -60°C to 160°C (-76°F to 320°F)

Refer to LFENBR0001 or LFENFL0001 at flowserve.com/library.

PNEUMATIC — SCOTCH YOKE

LPC

Suitable for pneumatic on-off, light modulating and control applications of small or medium quarter-turn valves in general and protective services. Also useable in safety services up to SIL 3 in accordance with IEC 61508.

Limitorque

- Low total cost of ownership provided by proven design with 25-year lifecycle and maintenance intervals up to five years (or per EN 15714 endurance testing)
- Application versatility enabled by flexible field conversion from Fail Close CW to Fail Open CCW and easy retrofitting via specially designed coupling interface
- Superior reliability and durability above typical industry standards, thanks to heavy-duty design and excellent corrosion resistance
- Regulatory compliance with the toughest industry standards, including EN 15714 and ISO 9001

SPECIFICATIONS

Torque: 5500 Nm (4057 ft-lb)
MAWP: 12 barg (174 psig)
Temp: -60°C to 160°C (-76°F to 320°F)

Refer to LFENBR0002 or LFENTB0002 at flowserve.com/library.

PNEUMATIC — SCOTCH YOKE

RG, ARG and WRG

A ductile cast iron actuator series, ideal for general process and chemical applications where highly standardized pneumatic actuators are required. It offers more than 250 torque profiles and significantly reduces transverse loads.

Automax Accord™ Worcester

- Easier installation in tight spaces via pull-to-compress design and concentric nested spring configuration plus easy on-site field reconfiguration
- Increased efficiency from canted yoke and support system, which delivers approximately 20% higher break torque
- Greater process control via bidirectional travel stops that allow precise adjustment of open and closed positions
- Environmental protection assured by IP67M (temporary submersion) rating and marine-grade epoxy surface treatment

SPECIFICATIONS

Torque: 248 kNm (2.2M in-lb)
MAWP: 10.3 barg (150 psig)
Temp: -55°C to 149°C (-67°F to 300°F)

Refer to literature AXEBR1002 at flowserve.com/library.

PNEUMATIC — LINKAGE

Turnex

The Turnex is a heavy-duty actuator for high-performance modulating control. It is also used for on-off service.

NAF

- Maintenance-free operation enabled by robust linkage system with bushing, providing optimum torque curve for quarter-turn valves and eliminating play
- Seamless integration with NAF control valve package provided by unique direct mounting concept
- Installation ease enhanced by internal air passages, eliminating external pipes
- Minimizes spare parts with unique system of sleeves for different stem diameters, plus more than three decades of parts consistency

SPECIFICATIONS

Torque: 60 to 20 000 Nm (44 to 1475 ft-lb)
MAWP: 8 barg (116 psig)
Temp: -30°C to 80°C (-22°F to 176°F); to -40°C (-40°F) on request

Refer to literature Fk 74.59 at flowserve.com/library.

PNEUMATIC — RACK & PINION

LRP

The Limitorque LRP actuator is robust and reliable. It is designed for high-performance automation of quarter-turn valves in a wide range of applications.

Limitorque

- Improved reliability, performance stability and service life enabled by unique piston support rods that ensure side loads are transmitted through the bearings, not the body
- Efficient torque matching ensured by the linear torque curve of the balanced double rack and pinion design plus a large range of sizes
- Installation ease and application flexibility with ISO 5211 mounting with star drive output as well as Namur VDI/VDE 3845 top mounting and solenoid mounting patterns

SPECIFICATIONS

Torque: 1700 Nm (1250 ft-lb)
MAWP: 8 barg (116 psig)
Temp: -40°C to 150°C (-40°F to 302°F)

Refer to literature LFENBR0009 at flowserve.com/library.

PNEUMATIC — RACK & PINION

F39

High-cycle pneumatic power for on-off or throttling control of rotary valves and dampers. Available in double-acting or spring-return configurations.

Worcester

- Longer service life enabled by piston support rods that eliminate the need for the body to be used as a bearing surface
- Increased efficiency from balanced double rack-and-pinion, eliminating side loads
- Faster operation speed is a standard feature, thanks to unique design enabling unrestricted air flow through guide rods
- Increased plant and personnel safety via long screws, allowing complete release of spring energy during disassembly

SPECIFICATIONS

Torque: 7100 Nm (62 835 in-lb)
MAWP: 8.3 barg (120 psig)
Temp: -40°C to 150°C (-40°F to 302°F)

Refer to literature WCENBR1003 at flowserve.com/library.

PNEUMATIC — RACK & PINION

40R

Recognized as the leading name in the quarter-turn pneumatic actuator market for half a century. With 11 sizes available, torque output can be closely matched to the required valve torque.

Norbro®

- Longer service life enabled by piston support rods that eliminate the need for the body to be used as a bearing surface
- Increased safety plus ease of maintenance from anti-blowout pinion, airflow through support rods, and long end cap screws to release spring energy
- Application flexibility made possible by large size range and Namur VDE/VDI 3845 top-mounting pattern for easy fitting and interchangeability of ancillary equipment
- Minimizes space requirements with compact fail-safe option, available in same body size as double-acting configuration

SPECIFICATIONS

Torque: 7100 Nm (62 835 in-lb)
MAWP: 8.3 barg (120 psig)
Temp: -40°C to 150°C (-40°F to 302°F)

Refer to literature NBEBR0003 at flowserve.com/library.

PNEUMATIC — RACK & PINION

33R

A 180-degree actuator derived from the world-renowned Norbro 40R, designed to compliment the Worcester Series 18/19 multi-way ball valve.

Norbro

- Longer service life enabled by piston support rods that eliminate the need for the body to be used as a bearing surface
- Increased safety plus ease of maintenance from anti-blowout pinion, airflow through support rods, and long end cap screws to release spring energy
- Application flexibility made possible by large size range and Namur VDE/VDI 3845 top-mounting pattern for easy fitting and interchangeability of ancillary equipment
- Easy installation in tight spaces via spring-return version, available in same body size as double-acting configuration, creating a compact fail-safe option

SPECIFICATIONS

Torque: 2309 Nm (20 436 in-lb)
MAWP: 5.5 barg (80 psig)
Temp: -40°C to 150°C (-40°F to 302°F)

Refer to NBEBR0002 or NBEBR0003 at flowserve.com/library.

PNEUMATIC — RACK & PINION

P61

The P61 brings new levels of control to batch filling operations. Based on the 40R, it is designed specifically to provide rapid, repeatable and highly accurate filling control for weigh/measuring processes.

Norbro

- Greater process control assured by two-stage operation which allows high flow followed by repeatable trickle flow before closing
- Longer service life enabled by piston support rods that eliminate the need for the body to be used as a bearing surface
- Increased safety from bolted-on cover sleeve, anti-blowout pinion, airflow through support rods, and long end cap screws to release spring energy

SPECIFICATIONS

Torque: 1063 Nm (9408 in-lb)
MAWP: 8.3 barg (120 psig)
Temp: -40°C to 150°C (-40°F to 302°F)

Refer to NBEBR0004 or NBEBR0003 at flowserve.com/library.

PNEUMATIC — RACK & PINION

Supernova

Accord

Supernova ASAP series rack and pinion actuators are designed for butterfly, plug or ball valves, and offer one compact design for double acting and spring return.

- Increased efficiency and cycle life from precision die-cast pistons with large cylinder bearings
- Greater precision and reliability assured by integral travel stops in both directions, plus 10 degrees of overtravel for precise adjustment
- Longer, trouble-free service life enabled by precision-extruded hard anodized aluminum body and a one-piece, factory-lubricated, nitride-protected pinion gear
- Ease and flexibility of installation via dual ISO 5211 mounting pattern

SPECIFICATIONS

Torque: 5005 Nm (44 294 in-lb)
MAWP: 8 barg (120 psig)
Temp: -50°C to 150°C (-55°F to 302°F)

Refer to ACENBR0004 or ACENBR0001 at flowserve.com/library.

PNEUMATIC — RACK & PINION

SXL

Automax

Ideal for corrosive environments, the SXL Series utilizes a 316 stainless steel body with stainless steel or aluminum pistons and springs. Optional polished finishes for sanitary applications also available.

- Longer service life and lower maintenance cost from corrosion-resistant materials
- Greater process control enabled by bi-directional travel stops, with 5° overtravel and 10° undertravel adjustment in each direction
- Installation ease via ISO 5211 mounting with Namur VDE/VDI 3845 top-mounting pattern for easy fitting and interchangeability of ancillary equipment

SPECIFICATIONS

Torque: 765 Nm (6770 in-lb)
MAWP: 8.3 barg (120 psig)
Temp: -50°C to 150°C (-55°F to 302°F)

Refer to literature LPR0006 at flowserve.com/library.

PNEUMATIC — ROTARY

NR

Valtek

The Flowserve Valtek NR diaphragm rotary actuator features excellent sensitivity that provides quick, accurate movements for precise control.

- Long operating life enabled by rolling diaphragm that creates minimal wear
- Lower maintenance and parts cost assured by simple design
- Increased efficiency from ISO 9001-compliant design, allowing direct mounting of positioners for minimal lost motion

SPECIFICATIONS

Torque: 5 to 1285 Nm
(43 to 11 381 in-lb)
MAWP: 6 barg (80 psig)
Temp: -60°C to 70°C (-76°F to 158°F)

Refer to literature VLENIM0064 at flowserve.com/library.

PNEUMATIC — ROTARY

VR

Valtek

The Flowserve Valtek VR cylinder actuator is a high-pressure, compact actuator with high torque and pneumatic stiffness for excellent throttling capabilities.

- Greater process control enabled by standard splined shaft connection that eliminates backlash
- Lower maintenance costs, greater ease of installation, and compliance with seismic requirements assured by compact, lightweight and rugged design
- Long service life via low-friction bearings that provide millions of cycles with minimal wear while minimizing hysteresis
- Increased plant and personnel safety made possible by air-purged, fully enclosed transfer case

SPECIFICATIONS

Torque: 8 to 4160 Nm (72 to 36 820 in-lb)
MAWP: 10.3 barg (150 psig)
Temp: -60°C to 177°C (-76°F to 350°F)

Refer to literature VLATB031 at flowserve.com/library.

PNEUMATIC — LINEAR

FlowAct

Valtek

The FlowAct pneumatic diaphragm actuator is a high-thrust, multi-spring actuator for direct or reverse action — easy installation and field reversible without additional parts.

- High-speed performance enabled by low volume between diaphragm and case
- Greater efficiency from fabric-reinforced, roll-type diaphragm that maintains linear stem positioning
- Lower maintenance cost made possible by maintenance-free stem bushing

SPECIFICATIONS

Thrust: 0.25 to 60 kN (56.2 to 13 488.5 lbf)
MAWP: 6 barg (87 psig)
Temp: -40°C to 80°C (-40°F to 176°F)

Refer to literature SAENTBFACT at flowserve.com/library.

PNEUMATIC — LINEAR

VL

Valtek

The VL Series is the standard set of actuators for Valtek control valves, providing precise control and reliable performance for more than 30 years.

- Increased efficiency provided by substantially higher thrust capabilities compared to diaphragm actuators, allowing tighter valve shutoff
- Installation and maintenance ease made possible by exceptionally compact and lightweight aluminum cylinder
- Ease of maintenance further enabled by durable construction and cylinder design, which provides easy access to all internal components
- Lower installation and replacement costs with standard O-rings for static and dynamic seals

SPECIFICATIONS

Thrust: 15.85 to 262.53 kN (3564 to 59 020 lbf)
MAWP: 10.3 barg (150 psig)
Temp: -40°C to 177°C (-40°F to 350°F)

Refer to literature VLENBR0002 at flowserve.com/library.

Valtek

PNEUMATIC — LINEAR

VL-C

Offering identical springs and all the advantages of Flowserve standard aluminum actuators, the VL-C replaces all aluminum parts with carbon steel.

- High performance enabled by replacing all aluminum parts with carbon steel
- Lower maintenance costs and time from simple design
- Broad nuclear application flexibility provided by a variety of options and accessories, allowing the VL cylinder to fit into almost any application requiring high thrust and low maintenance
- Low inventory carrying costs enabled by lower-cost VL soft goods that are easier to find

SPECIFICATIONS

Thrust: 15.85 to 134.11 kN (3564 to 30 150 lbf)
MAWP: 10.3 barg (150 psig)
Temp: -40°C to 177°C (-40°F to 350°F)

Refer to literature VLENBR0002 at flowserve.com/library.

Valtek

PNEUMATIC — LINEAR

VL-ES

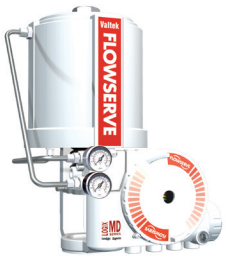
Using many of the same design concepts as the VL-C, the VL-ES offers external spring cans for applications where longer strokes or unusually high spring thrust are required.

- Longer service life — up to 2 million cycles — from dynamic quad seal design, stronger springs, plug stem jam nut, and thrust bearings that prevent windup
- Installation and maintenance ease made possible by exceptionally compact and lightweight aluminum cylinder
- Ease of maintenance via spring cylinder actuator design requiring the removal of just two parts to access all internal components
- Lower installation and replacement costs thanks to standard O-rings for static and dynamic seals

SPECIFICATIONS

Thrust: 72.73 to 166.45 kN (16 350 to 37 420 lbf)
MAWP: 10.3 barg (150 psig)
Temp: -40°C to 177°C (-40°F to 350°F)

Refer to literature VLENBR0002 at flowserve.com/library.



Valtek

PNEUMATIC — LINEAR

VL-UHC

For applications where ultra high cycle (UHC) life is needed, VL-UHC Series actuators offer up to 2 million full stroke cycles with periodic soft goods replacement.

- Significantly longer service life provided by dynamic quad seals, plug stem jam nut, recessed O-ring adjusting screw seal, and stronger springs with stress-reducing thrust bearings
- Lower maintenance costs and time from simple design that requires removal of just two parts to access all internal components
- Broad nuclear application flexibility provided by a variety of options and accessories, allowing the VL cylinder to fit into almost any application requiring high thrust and low maintenance

SPECIFICATIONS

Thrust: 15.85 to 125.88 kN (3564 to 28 300 lbf)
MAWP: 10.3 barg (150 psig)
Temp: -40°C to 80°C (-40°F to 176°F)

Refer to literature VLENBR0002 at flowserve.com/library.

PNEUMATIC — LINEAR

Series 2 Type KP

Kämmer®

Stainless steel actuators for standard use. Multi-spring design, fail-open or fail-close position, and various accessories such as handwheels or limit stops make the KP actuator a frequent choice among operators.

- Broad application versatility offered by a wide range of sizes, integrated options and accessories
- Increased durability from stainless steel material, which provides superior corrosion resistance, even without a protective coating
- Installation ease and flexibility enabled by compact variations with enclosed accessories

SPECIFICATIONS

Thrust: to 35.0 kN (7868 lbf)
MAWP: 6 barg (87 psig)
Temp: -40°C to 80°C (-40°F to 176°F)

Refer to literature KMEEBR0021 at flowserve.com/library.

PNEUMATIC — LINEAR

Series 4 Type KA

Kämmer

Compared to other manufacturers' diaphragm actuator designs, Series 4 offers much higher thrust, compact design and lighter weight. Field-reversible design may require no additional parts.

- Lower maintenance costs made possible by rugged positioner and internal design that protects all moving parts against damage and dirt
- Increased plant and personnel safety enabled by multiple-spring design, improving safety of fail-safe mode
- Broad application versatility enabled by a wide variety of top-mounted options, including handwheels, proximity switches and electric switches

SPECIFICATIONS

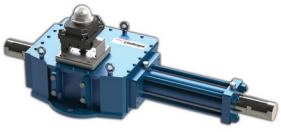
Thrust: to 25.5 kN (5735 lbf)
MAWP: 1.4 to 4.2 barg (20 to 60 psig)
Temp: -30°C to 80°C (-22°F to 176°F)

Refer to literature KMEEBR003 at flowserve.com/library.

HYDRAULIC

LHS and LHH

Suitable for on-off, modulating and control applications of quarter-turn valves in general and protective services. Also useable in safety services up to SIL 3 in accordance with IEC 61508.



Limitorque

- Longer service life and lower maintenance provided by proven design with 25-year life cycle and maintenance intervals up to six years
- Broad application versatility enabled by true modular design for flexible and easy field conversion
- Regulatory compliance assured by reliable design that meets a wide range of general service, protective service and safety application standards, including ESD / HIPPS and SIL Level 3 in accordance with IEC 61508
- Extreme environment performance available with polar or offshore variants

SPECIFICATIONS

Torque: to 550 kNm (405 659 ft-lb)
MAWP: 345 barg (5000 psig)
Temp: -60°C to 160°C (-76°F to 320°F)

Refer to LFENBR0003 and LFENFL0003 at flowserve.com/library.

DIRECT GAS

LDG

A high-pressure pneumatic, piston-type, Scotch yoke actuator designed to operate on high-pressure pneumatic supply fluids, including pipeline gases and nitrogen. Certified for SIL 3.

Limitorque

- Reduced equipment footprint due to compact dimensions and design
- Improved lifespan with 25-year design life and maintenance interval up to six years, or as prescribed in EN 15714 for high-cycle applications
- Simplified on-site maintenance for standard activities such as replacement of Scotch yoke sliding block without removing the actuator from the valve
- Reduced environmental impact through Limitorque's high-pressure rated MHPC control group that minimizes gas consumption and exhaust

SPECIFICATIONS

Torque: to 550 kNm (405 659 ft-lb)
MAWP: 105 barg (1500 psig)
Temp: -40°C to 160°C (-40°F to 320°F)

Refer to literature LFENTB0005 at flowserve.com/library.

Logix 3200MD

POSITIONERS

Dramatic improvements in process uptime, reliability and yield are facilitated at lower costs with the Flowserve portfolio of ultra-high precision positioners. Return-to-operation times are significantly reduced by advanced prognostic and diagnostic solutions that not only identify field problems, but expedite corrective actions. All models offer industry-leading embedded measurement, data reduction and diagnostic functionality, while control system-independent user interfaces facilitate performance configuration, operation and diagnosis with a single view.

Positioners – Quick Reference*

Product	Sub-Type	Air Capacity	Air Consumption	Repeatability	Temperatures
StarPac® 3	Digital	20.4 Nm^3/h @ 4 bar (12 SCFM @ 60 psi)	0.5 Nm^3/h @ 4 bar (<0.3 SCFM @ 60 psi)	0.25%	-40°C to 76°C (-40°F to 170°F)
D3	Digital	21 Nm^3/h @ 6 bar (12.5 SCFM @ 87 psi)	<0.018 Nm^3/h @ 6 bar (0.01 SCFM @ 87 psi) — zero bleed	<0.5%	-40°C to 80°C (-40°F to 176°F)
D20	Digital	7.2 Nm^3/h @ 6 bar (4.2 SCFM @ 87 psi)	0.12 Nm^3/h @ 6 bar (0.071 SCFM @ 87 psi)	<0.2%	-40°C to 85°C (-4°F to 185°F)
D30	Digital	45.6 Nm^3/h @ 6 bar (29 SCFM @ 87 psi)	0.5 Nm^3/h @ 6 bar (0.3 SCFM @ 87 psi)	<0.5%	-40°C to 80°C (-40°F to 176°F)
Apex 9000	Digital	7.2 Nm^3/h @ 6 bar (4.2 SCFM @ 87 psi)	0.12 Nm^3/h @ 6 bar (0.071 SCFM @ 87 psi)	<0.2%	-40°C to 85°C (-4°F to 185°F)
Logix 3800	Digital	30.6 Nm^3/h @ 4.1 bar (18 SCFM @ 60 psi)	0.082 to 0.637 Nm^3/h @ 4.1 bar (0.048 to 0.375 SCFM @ 60 psi)	≤0.25%	-52°C to 85°C (-61.6°F to 185°F)
Logix MD+	Digital	20.8 to 30.6 Nm^3/h @ 4.1 bar (12.2 to 18 SCFM @ 60 psi)	0.082 to 0.637 Nm^3/h @ 4.1 bar (0.048 to 0.375 SCFM @ 60 psi)	≤0.25%	-52°C to 85°C (-61.6°F to 185°F)
Logix 420	Digital	20.8 Nm^3/h @ 4.1 bar (12.2 SCFM @ 60 psi)	0.082 Nm^3/h @ 4.1 bar (0.048 SCFM @ 60 psi)	≤0.25%	-52°C to 85°C (-61.6°F to 185°F)

** Additional products shown on next page*

Positioners – Quick Reference, cont'd.

Product	Sub-Type	Air Capacity	Air Consumption	Repeatability	Temperatures
Logix 3200MD	Digital	20.4 Nm^3/h @ 4 bar (12 SCFM @ 60 psi)	0.5 Nm^3/h @ 4 bar (<0.3 SCFM @ 60 psi)	<0.05%	-40°C to 80°C (-40°F to 176°F)
Logix 3400MD	Digital	20.4 Nm^3/h @ 4 bar (12 SCFM @ 60 psi)	0.5 Nm^3/h @ 4 bar (<0.3 SCFM @ 60 psi)	<0.05%	-40°C to 80°C (-40°F to 176°F)
P5 and EP5	Analog	25.3 to 32.4 Nm^3/h @ 6 bar (14.8 to 18.8 SCFM @ 87 psi)	0.59 to 1.32 Nm^3/h @ 6 bar (0.35 to 0.78 SCFM @ 87 psi)	≤0.5%	-40°C to 85°C (-40°F to 185°F)
Apex 4000	Analog	23.7 to 44.4 Nm^3/h @ 6 bar (13.9 to 26.1 SCFM @ 87 psi)	0.53 Nm^3/h @ 6 bar (0.31 SCFM @ 87 psi)	0.5%	-20°C to 85°C (-4°F to 185°F)
Apex 7000	Analog	25.3 to 32.4 Nm^3/h @ 6 bar (14.8 to 18.8 SCFM @ 87 psi)	0.59 to 1.32 Nm^3/h @ 6 bar (0.35 to 0.78 SCFM @ 87 psi)	≤0.5%	-40°C to 85°C (-40°F to 185°F)

DIGITAL

StarPac 3

Valtek Kammer

The StarPac 3 digital positioner offers repeatability, accuracy and quick system response time with a small footprint and simple installation.

- Greater process control with built-in diagnostics compared to traditional control loop technology
- Significantly higher response time via built-in process sensors with a sample rate of 16 times per second and typical loop time of 3 milliseconds
- Greater accuracy from control valve with digital positioner, including valve position sensor and actuator pressure sensors
- Lower installation and operating costs enabled by compact design that eliminates separate line taps and long runs of straight piping

SPECIFICATIONS

Air Cap: 20.4 Nm^3/h @ 4 bar (12 SCFM @ 60 psi)
Air Con: 0.5 Nm^3/h @ 4 bar (<0.3 SCFM @ 60 psi)
Repeatability: 0.25%
Temp: -40°C to 76°C (-40°F to 170°F)

Refer to literature VLENBR0066 at flowserve.com/library.

DIGITAL

D3

The D3 is suitable for linear or rotary valves, single- or double-acting actuators, and special applications. Available with general purpose, intrinsically safe and explosion-proof housings, with plug-in modules for limit switches and feedback.

PMV™

- Lower operational cost made possible by zero-bleed pneumatic relay that enables very low air consumption to minimize electricity costs and meet EPA bleed limits for natural gas applications
- Installation and configuration ease enabled by friction clutch, five simple keys and large graphic LCD display
- Broad application versatility with Hart, PROFIBUS PA, PROFIBUS DP, Foundation Fieldbus and industry-leading IEC ISA100 wireless communication technology
- ATEX, IECEx, CSA, FM and SIL 2 approvals available with some configurations

SPECIFICATIONS

Air Cap: 21 Nm^3/h @ 6 bar (12.5 SCFM @ 87 psi)
Air Con: <0.018 Nm^3/h @ 6 bar (0.01 SCFM @ 87 psi) – zero bleed
Repeatability: <0.5%
Temp: -40°C to 80°C (-40°F to 176°F)

Refer to PMENBR0001 or PMENBR0021 at flowserve.com/library.

DIGITAL

D20

This compact digital positioner suits both linear and rotary actuators in single-acting applications. Very high control precision on even the smallest valves. IS, NI and explosion-proof versions.

PMV

- Greater process control with very high precision, even on the smallest valves, plus add-in switches and 4-20 mA position feedback options
- Installation and operation ease from friction clutch, compact design, and single-button quick auto-calibration feature that tunes the D20 in seconds
- Broad application versatility made possible by flexible design that allows mounting to VDI/VDE 3845 (rotary) and VDI/VDE 3847 (linear with integrated tubing) standards
- ATEX, IECEx, CSA and FM approvals available with some configurations

SPECIFICATIONS

Air Cap: 7.2 Nm^3/h @ 6 bar (4.2 SCFM @ 87 psi
Air Con: 0.12 Nm^3/h @ 6 ba (0.071 SCFM @ 87 psi)
Repeatability: <0.2%
Temp: -40°C to 85°C (-4°F to 185°F)

Refer to PMENBR0015 or PMENBR0021 at flowserve.com/library.

POSITIONERS

DIGITAL

D30

PMV

The D30 is a robust, intelligent positioner with very high air capacity. Based on proven digital technology, it features a large, high-performance spool valve controlled by a unique intelligent control algorithm.

- High-volume performance enabled by robust, high-capacity design that eliminates the need for boosters
- Installation and operation ease from quick calibration and friction clutch to simplify commissioning plus a preloaded spring to eliminate play in the feedback mechanism
- Broad application versatility via modular design that suits almost any control valve — small or large, rotary or linear; options also include remote mounting of positioner
- Lower maintenance costs and downtime with ValveSight DTM predictive diagnostics

SPECIFICATIONS

Air Cap: 45.6 Nm^3/h @ 6 bar (29 SCFM @ 87 psi)
Air Con: 0.5 Nm^3/h @ 6 bar (0.3 SCFM @ 87 psi)
Repeatability: <0.5%
Temp: -40°C to 80°C (-40°F to 176°F)

Refer to PMENBR0030 or PMENBR0021 at flowserve.com/library.

DIGITAL

Apex 9000

Accord

The Apex 9000 is a compact digital positioner designed specifically for VDI/VDE 3845 rotary actuators. It offers excellent control at an affordable price.

- Installation and operation ease from friction clutch, compact design plus quick calibration and commissioning
- Greater process control with add-in switches and 4-20 mA position feedback options
- Increased plant and personnel safety with intrinsically safe, non-incendive, or explosion-proof FM, CSA, IECEx and ATEX options

SPECIFICATIONS

Air Cap: 7.2 Nm^3/h @ 6 bar (4.2 SCFM @ 87 psi)
Air Con: 0.12 Nm^3/h @ 6 bar (0.071 SCFM @ 87 psi)
Repeatability: <0.2%
Temp: -40°C to 85°C (-4°F to 185°F)

Refer to literature ACENBR0007 at flowserve.com/library.

DIGITAL

Logix 3800

Valtek
Automax
Kammer

Latest generation Digital HART and Foundation Fieldbus positioners designed for superior performance and reliability. The Logix 3800 Series can be easily configured using local buttons, handhelds or ValveSight software.

- SIL 3 capable, robust construction works in the harshest conditions for temperature, vibration, dirt, moisture, etc.
- High performance and precision control are provided by sensitive non-contact feedback sensor coupled with poppet-style relay. Predictive algorithms continuously monitor the health of the valve and actuator.
- Simple to use, one-button setup automatically configures the zero, span and gain of the positioner for most valves in less than 60 seconds
- Adaptable design is configurable to interface with valve, process and control system needs using HART, Foundation Fieldbus, 4-20 or discrete I/O signals

SPECIFICATIONS

Air Cap: 30.6 Nm^3/h @ 4.1 bar (18 SCFM @ 60 psi)
Air Con: 0.082 to 0.637 Nm^3/h @ 4.1 bar (0.048 to 0.375 SCFM @ 60 psi)
Repeatability: ≤0.25%
Temp: -52°C to 85°C (-61.6°F to 185°F)

Refer to literature LGENBR3100-00 at flowserve.com/library.

DIGITAL

Logix MD+

Digital HART positioners with state-of-the-art piezo technology for superior performance and reliability. The Logix MD+ Series can be easily configured using local buttons, HART handheld and ValveSight software.

Valtek Automax Kammer

- Greater process control enabled by fast CPU, precision components, inner loop control and advanced control algorithms
- Increased reliability via temperature and humidity sensors, which detect developing issues and prevent failures
- Greater durability from heavy-duty housing, providing tough protection from dust, liquids and impact in the most demanding environments
- Hazardous area performance assured by intrinsically safe electronics that meet ATEX, IECEx and North America (cFMus)

SPECIFICATIONS

Air Cap: 20.8 to 30.6 Nm^3/h @ 4.1 bar (12.2 to 18 SCFM @ 60 psi)
Air Con: 0.082 to 0.637 Nm^3/h @ 4.1 bar (0.048 to 0.375 SCFM @ 60 psi)
Repeatability: ≤0.25%
Temp: -52°C to 85°C (-61.6°F to 185°F)

Refer to literature LGENBR0109 at flowserve.com/library.

DIGITAL

Logix 420

The Logix 420 is a compact, cost-competitive solution for the single-acting, explosion-proof, intrinsically safe and non-incendive markets. Supports HART 6 and 7 protocols.

Valtek Automax Kammer

- Installation and operation ease assured by one-button calibration, easy user interface, LCD screen and ValveSight DTM software
- Greater accuracy and reliability made possible by precision components, inner loop control and advanced control algorithms
- Comprehensive online diagnostics and intuitive health display
- Explosion-proof compliance with Class I Division 1 and ATEX Ex d installations, intrinsically safe design certified for Class I Division 1 and Ex ia applications, plus non-incendive approvals

SPECIFICATIONS

Air Cap: 20.8 Nm^3/h @ 4.1 bar (12.2 SCFM @ 60 psi)
Air Con: 0.082 Nm^3/h @ 4.1 bar (0.048 SCFM @ 60 psi)
Repeatability: ≤ 0.25%
Temp: -52°C to 85°C (-61.6°F to 185°F)

Refer to literature LGENBR0106 at flowserve.com/library.

DIGITAL

Logix 3200MD

A digital HART positioner with state-of-the-art piezo technology to provide superior performance and reliability. Easily configured using local buttons, HART handheld or ValveSight software.

Valtek Automax Kammer

- Installation ease assured by automatic calibration and tuning
- Faster diagnostic feedback and summaries made possible by burst mode
- Greater process control with 4-20 mA position feedback card option

SPECIFICATIONS

Air Cap: 20.4 Nm^3/h @ 4 bar (12 SCFM @ 60 psi)
Air Con: 0.5 Nm^3/h @ 4 bar (<0.3 SCFM @ 60 psi)
Repeatability: <0.05%
Temp: -40°C to 80°C (-40°F to 176°F)

Refer to LGENBR3000 or LGENIM0059 at flowserve.com/library.

POSITIONERS

DIGITAL

Logix 3400MD

A digital Foundation Fieldbus positioner with state-of-the-art piezo technology to provide superior performance and reliability. ITK 6.1 certified.

Valtek
Automax
Kammer

- Installation ease assured by automatic calibration and tuning
- Faster diagnostic feedback and summaries made possible by burst mode
- Easily configured using local buttons, FF handheld or ValveSight software
- Function blocks for AO, PID, DI, DO, input selector and output splitter

SPECIFICATIONS

Air Cap: 20.4 Nm^3/h @ 4 bar
(12 SCFM @ 60 psi)
Air Con: 0.5 Nm^3/h @ 4 bar
(<0.3 SCFM @ 60 psi)
Repeatability: <0.05%
Temp: -40°C to 80°C (-40°F to 176°F)

Refer to LGENBR3404 or LGENBR3405 at flowserve.com/library.

A Worldwide Network Keeps Your Business in Motion

Flowserve actuators are known for their dependability and ruggedness. But, when you need service, every member of the Flowserve team is committed to minimizing your downtime. Quick Response Centers and Blue Ribbon Service Centers are strategically located in the Americas, China, India, Middle East, and Europe to make sure you receive premium service and expertise whenever you need it — even with very short lead times.

ANALOG

P5 and EP5

Fast and accurate general purpose positioners available in pneumatic (P5) or electropneumatic (EP5) configurations. Choose from explosion-proof (EP5-EX), fail freeze (EP5-FS) and intrinsically safe (EP5-IS) options.

PMV

- Enhanced performance from high-gain, high-capacity spool valve assembly, providing very quick and accurate actuator and valve response plus simple commissioning with non-interactive, zero-span adjustment
- Longer service life assured by robust, simple design, delivering maximum reliability in all environments
- Versatility from compact, modular design, allowing for simple addition of I/P converters and F5 feedback unit; suitable for single- or double-acting applications

SPECIFICATIONS

Air Cap: 25.3 to 32.4 Nm^3/h @ 6 bar
(14.8 to 18.8 SCFM @ 87 psi)
Air Con: 0.59 to 1.32 Nm^3/h @ 6 bar
(0.35 to 0.78 SCFM @ 87 psi)
Repeatability: ≤0.5%
Temp: -40°C to 85°C (-40°F to 185°F)

Refer to PMENBR00008 or PMENBR0006 at flowserve.com/library.

ANALOG

Apex 4000

Accord
Automax
PMV

A compact, lightweight and cost-efficient positioner, the Apex 4000 is suitable for all rotary or linear valves, single- and double-acting.

- Corrosive environment capability assured by epoxy powder-coated aluminum construction of all exposed parts, plus gold-plated spool valve
- Greater reliability from compact, rugged design with few moving parts
- Broad application versatility provided by multiple cam options
- Quick and simple calibration uses thumbwheels and requires only a flat-head screwdriver; span adjustment performed internally with external zero adjustment
- Easy field upgradability to electro-pneumatic I/P options without removing cover

SPECIFICATIONS

Air Cap: 23.7 to 44.4 Nm^3/h @ 6 bar (13.9 to 26.1 SCFM @ 87 psi)
Air Con: 0.53 Nm^3/h @ 6 bar (0.31 SCFM @ 87 psi)
Repeatability: 0.5%
Temp: -20°C to 85°C (-4°F to 185°F)

Refer to literature AXAPS014 at flowserve.com/library.

ANALOG

Apex 7000

Accord
Automax
PMV

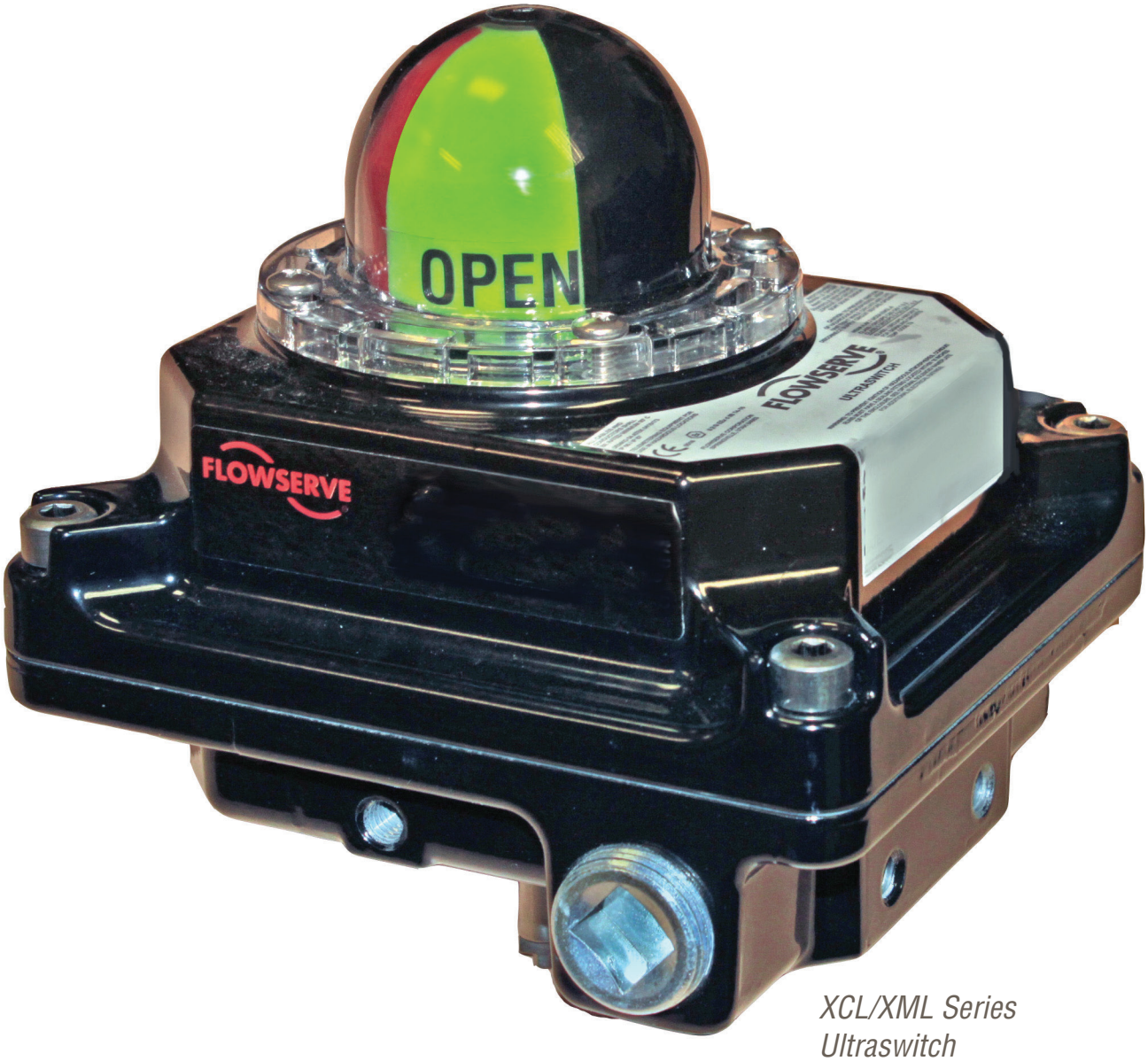
The Apex 7000 Series provides accurate valve positioning with advanced features. Usable with 3–15 psi pneumatic control signals, or optional current-to-pressure transducer for 4-20 mA signal input.

- Corrosive environment capability assured by epoxy powder-coated aluminum construction of all exposed parts, plus gold-plated spool valve
- Greater reliability from compact, rugged design with few moving parts
- Broad application versatility provided by multiple cam options
- Installation ease with quick and simple non-interacting, zero-span adjustment
- Easy field upgradability to electro-pneumatic I/P options without removing cover

SPECIFICATIONS

Air Cap: 25.3 to 32.4 Nm^3/h @ 6 bar (14.8 to 18.8 SCFM @ 87 psi)
Air Con: 0.59 to 1.32 Nm^3/h @ 6 bar (0.35 to 0.78 SCFM @ 87 psi)
Repeatability: ≤0.5%
Temp: -40°C to 85°C (-40°F to 185°F)

Refer to AXENPS0125 or AXENBR0006 at flowserve.com/library.



XCL/XML Series
Ultraswitch

SWITCH BOXES

Flowserve switch boxes have a proven track record for accurate and reliable position signaling in linear and rotary applications. Providing both visual and remote electrical position indications, these cost-effective, compact units offer unparalleled performance with ease of installation and calibration. Rugged, corrosion-resistant enclosures have multiple switch options and meet IP66/67 and NEMA Type 4X standards. Intrinsically safe, non-incendive and explosion-proof designs ensure safe, reliable operation in hazardous environments.

Switch Boxes – Quick Reference

Product	Sub-Type	No. of Switches	Temperatures
WS/WM Series Ultraswitch®	Switch Boxes	0 to 2	-40°C to 80°C (-40°F to 180°F)
PS/PM Series Ultraswitch	Switch Boxes	2 or 4	-40°C to 80°C (-40°F to 180°F)
DS/DM Series Ultraswitch	Switch Boxes	0 to 4	-55°C to 85°C (-67°F to 180°F)
XCL/XML Series Ultraswitch	Switch Boxes	0 to 4	-40°C to 85°C (-40°F to 180°F)
F5 Series	Switch Boxes	2	-40°C to 85°C (-40°F to 185°F)
Aviator II Ultraswitch	Switch Boxes	0 to 4	-20°C to 80°C (-4°F to 80°F)

SWITCH BOXES

SWITCH BOXES

WS/WM Series Ultraswitch

Intrinsically safe and non-incendive compact switch box for chemical, petrochemical, food and beverage, municipal, wastewater and pharmaceutical applications. Meets requirements for ATEX and cCSAus hazardous locations.

Automax
PMV

- Easy installation ensured by compact housing with multiple mounting possibilities and up to four conduit entries with pre-wired switches
- Configuration flexibility due to range of domed and flat indicators plus low profile units without indicators
- Ingress protection ensured by design that meets IP66/67 and NEMA Type 4X standards
- Choice of aluminum or corrosion-resistant resin enclosures

SPECIFICATIONS

No. of Switches: 0 to 2
Temp: -40°C to 80°C (-40°F to 180°F)

Refer to literature AXENBR0135 at flowserve.com/library.

SWITCH BOXES

PS/PM Series Ultraswitch

Intrinsically safe and non-incendive, the PS/PM features a lightweight, modular design with corrosion-resistant engineered resin enclosure. It is ideal for chemical, petrochemical, municipal, wastewater and pharmaceutical applications.

Automax
PMV

- Large range of global IS, NI and mb certificates enables use in all major applications worldwide
- Application flexibility due to the ability to be easily and directly mounted onto actuators for both rotary and linear applications with multiple switch options
- Optional continuous position feedback and bus communication
- Ingress protection ensured by design that meets IP66/67 and NEMA Type 4X standards

SPECIFICATIONS

No. of Switches: 2 or 4
Temp: -40°C to 80°C (-40°F to 180°F)

Refer to literature PMENBR0018 at flowserve.com/library.

SWITCH BOXES

DS/DM Series Ultraswitch

The DS/DM Ultraswitch provides reliable position signaling for the highest class Ex d IIC/Group A hazardous location areas. Available with aluminum or stainless steel enclosure for chemical, oil and gas, pharmaceutical and offshore applications.

Automax
PMV

- Meets IP66 and NEMA Type 4X standards and is offered for general purpose, weatherproof and IIC/Group A explosion-proof hazardous locations
- Highly configurable, with numerous options for switches, housing materials and terminals, among many others
- Easy installation owing to multiple mounting possibilities, up to three conduit entries and pre-wired switches

SPECIFICATIONS

No. of Switches: 0 to 4
Temp: -55°C to 85°C (-67°F to 180°F)

Refer to literature PMENBR0020 at flowserve.com/library.

SWITCH BOXES

XCL/XML Series Ultraswitch

Automax
PMV

The XCL/XML position indicator is globally certified explosion-proof and flame-proof for oil and gas, chemical, petrochemical, food and beverage, municipal, wastewater and pharmaceutical applications.

- Ease of use provided by UltraDome™ visual indicator, which provides a wide-angle view of the valve position, and Quick-Set™ cams, which offer easy, tool-free adjustment of sensing position
- Long service life provided by durable die cast aluminum housing with dichromate undercoat and electrostatic powder topcoat for corrosion resistance
- CSA/ATEX-approved for hazardous locations
- Application versatility owing to a watertight position indicator and multiple mounting options for any rack and pinion, Scotch yoke or other rotary actuator

SPECIFICATIONS

No. of Switches: 0 to 4
Temp: -40°C to 85°C (-40°F to 180°F)

Refer to literature AXENBR0006 at flowserve.com/library.

SWITCH BOXES

F5 Series

PMV

Feedback system offering the ability to add switches (mechanical or proximity), a potentiometer or a 4-20 mA transmitter to the P5/EP5 analog positioners. Intrinsically safe and explosion-proof enclosure versions available.

- Reliable operation provided by a compact and sturdy design with vibration resistance
- Optimal performance resulting from a cam and spindle that are not splined to achieve 100 percent resolution, which can be critical when used on control valves
- Application versatility owning to a wide range of limit switches and modular standard or explosion-proof housings that need no special mounting pieces

SPECIFICATIONS

No. of Switches: 2
Temp: -40°C to 85°C (-40°F to 185°F)

Refer to literature PMENBR0005 at flowserve.com/library.

SWITCH BOXES

Aviator II Ultraswitch

Automax
PMV

Integrated on-off valve controller with industry-leading capacity up to C_v 4.5. Meets the corrosive, hazardous and non-hazardous location valve control and positioning needs of chemical, oil and gas, and other industries.

- Secure operation in hazardous environments ensured by an internal pilot solenoid coil that contains and protects the coil
- Longer service life due to internally vented, tapered tee spool valve that prevents the ingress of corrosive atmospheres and permits bidirectional self-cleaning
- Lower total cost of ownership resulting from the internal pilot solenoid coil that also simplifies wiring, reduces installation time and eliminates expensive explosion-proof conduit and fittings

SPECIFICATIONS

No. of Switches: 0 to 4
Temp: -20°C to 80°C (-4°F to 80°F)

Refer to literature ACENPS0100 at flowserve.com/library.

ValveSight DTMs for HART or Fieldbus Communications

SOFTWARE

Make your operation more profitable and easier to manage with ValveSight software solutions, intelligent digital tools backed by more than two centuries of Flowserve fluid management expertise. Designed to be easy to use with minimal training, ValveSight enhances the entire equipment lifecycle. From easy installation and commissioning to superior operational control and maximum valve life, our software solutions help you get the most from every device while minimizing costly delays and downtime.

Software – Quick Reference

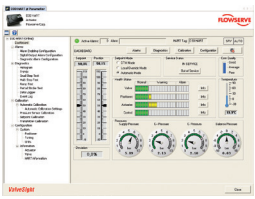
Product	Sub-Type	Specifications
ValveSight for Positioners and Switch Boxes	Software	• System Requirements: Windows XP, Windows 7, Windows 8, Windows 10 • Compatibility: HART, PROFIBUS, Foundation Fieldbus, FDT/DTM • Equipment: valves, actuators, positioners and control signals
ValveSight DTMs for HART or Fieldbus Communications	Software	• System Requirements: Windows XP, Windows 7, Windows 8, Windows 10 • Compatibility: Foundation Fieldbus; HART 6 and 7; FDT 1.2 and 2.0 • Equipment: valves, actuators, positioners
ValveSight DTM	Software	• System Requirements: Windows XP, Windows 7, Windows 8, Windows 10 • Compatibility: StarPac 3, FDT 2.0, Modbus • Major Systems: positioners, control systems

SOFTWARE

SOFTWARE

ValveSight for Positioners and Switch Boxes

A proactive diagnostic solution for on-off and control valves that can be seamlessly integrated into host control or plant asset management systems, improving plant efficiency without sacrificing safety and reliability.



PMV

- Reduced downtime enabled by early detection of emerging health issues and wear of valves, actuators and positioners, preventing costly unplanned shutdowns
- Reduced maintenance costs from proactive identification of components needing replacement
- Increased safety and efficiency via continuous online monitoring, equipment health tests, and prevention of on-off valves sticking in end positions
- Reduced startup costs from proven interoperability with numerous hosts and communication protocols; plus quick and easy local or remote commissioning

SPECIFICATIONS

- System Requirements: Windows XP, Windows 7, Windows 8, Windows 10
- Compatibility: HART, PROFIBUS, Foundation Fieldbus, FDT/DTM
- Equipment: valves, actuators, positioners and control signals

Refer to literature PMENBR0016 at flowserve.com/library.

SOFTWARE

ValveSight DTMs for HART or Fieldbus Communications

ValveSight software is designed to help engineers and maintenance personnel responsible for managing HART or Fieldbus positioners by simplifying setup, calibration, configuration and diagnostics.

Logix

- Decreased maintenance costs via predictive diagnostics able to identify and assess the severity of developing problems in valves, actuators, positioners or control loop configurations while the process is online and operating
- Reduced downtime made possible by real-time condition monitoring, including long-term trends, event capture, signatures, logs, hysteresis, deadband, repeatability and linearity (HDRL) testing
- Simple, accurate installation and operation enabled by integrated calibration and configuration tools and contextual help system

SPECIFICATIONS

- System Requirements: Windows XP, Windows 7, Windows 8, Windows 10
- Compatibility: Foundation Fieldbus; HART 6 and 7; FDT 1.2 and 2.0
- Equipment: valves, actuators, positioners

Refer to LGENSF0014 and VSENBR0004 at flowserve.com/library.

SOFTWARE

ValveSight DTM

StarPac ValveSight DTM is the software used by the revolutionary StarPac, enabling rapid flow measurement and intelligent control. Improves operations at a cost lower than conventional control systems.

Valtek

- Greater process control from system that gives users a unique, integrated view at a single point
- Greater efficiency with automatic PID control for fast integral adjustments to liquid flow, P1, P2, delta pressure, temperature, gas flow or auxiliary 4-20 mA signals
- Configuration and operation ease enabled by FDT/DTM 2.0 user interface with integrated help system

SPECIFICATIONS

- System Requirements: Windows XP, Windows 7, Windows 8, Windows 10
- Compatibility: StarPac 3, FDT 2.0, Modbus
- Major Systems: positioners, control systems

Refer to literature FLENMN0066-02I at flowserve.com/library.