FLOWSERVE

Limitorque MX and QX Valve Actuators

Next-generation electronic actuators

Experience In Motion

Flowserve Limitorque Actuation Systems

Limitorque is an operating unit of Flowserve, a $4 billion-plus company strongly focused on automation and support of the valve industry. Introduced in 1929, Limitorque has 80-plus years of experience in actuating every type of valve.

- Proven history as an industry leader and innovator
- 240,000-square-foot manufacturing and assembly facility in Lynchburg, VA, USA
- Global quick response centers in Houston, TX; Suzhou, China; Bangalore, India; and Newbury, UK
- Global service network of factory-trained technicians provides excellent after-sales support
- Complete range of products:
  - Multi-turn products up to 18,000 ft-lb of torque and 500,000 lb of thrust
  - Quarter-turn products up to 614,000 ft-lb of torque
- Low maintenance, high reliability, durability and long-life actuators that translate into low cost of ownership
- Complete and competitive valve control solutions for all industries

State-of-the-art Actuation

The Flowserve Limitorque QX quarter-turn and MX multi-turn electronic valve actuators lead the industry in quality, safety and ease of use.

The MX included innovations that were market firsts when introduced, and the latest MX and QX models have improved on these while adding to the list:

- Non-intrusive design employs selection knobs with solid-state Hall-effect devices instead of reed switches that can fail with age and vibration
- Non-contacting absolute encoders for accurate position sensing.
- Batteries are not required for the absolute encoder to retain position data in the event of loss of main power thus eliminating the need for costly battery maintenance programs or the potential loss of equipment availability due to battery failure
- The absolute encoder includes redundant position sensors and comparator logic for increased reliability and safety
- Limigard technology uses internal logic to compare with external commands to prevent actuator malfunctions using a Fail/No Action philosophy
- Graphical display for access to operational data in 10 languages
- Optional Bluetooth® wireless connectivity

The QX and MX provide the user with predictable, reliable and safe operation for years to come, in the most rigorous applications and extreme environments.

MX Multi-turn Actuator*

Electric Motor available for 3 phase

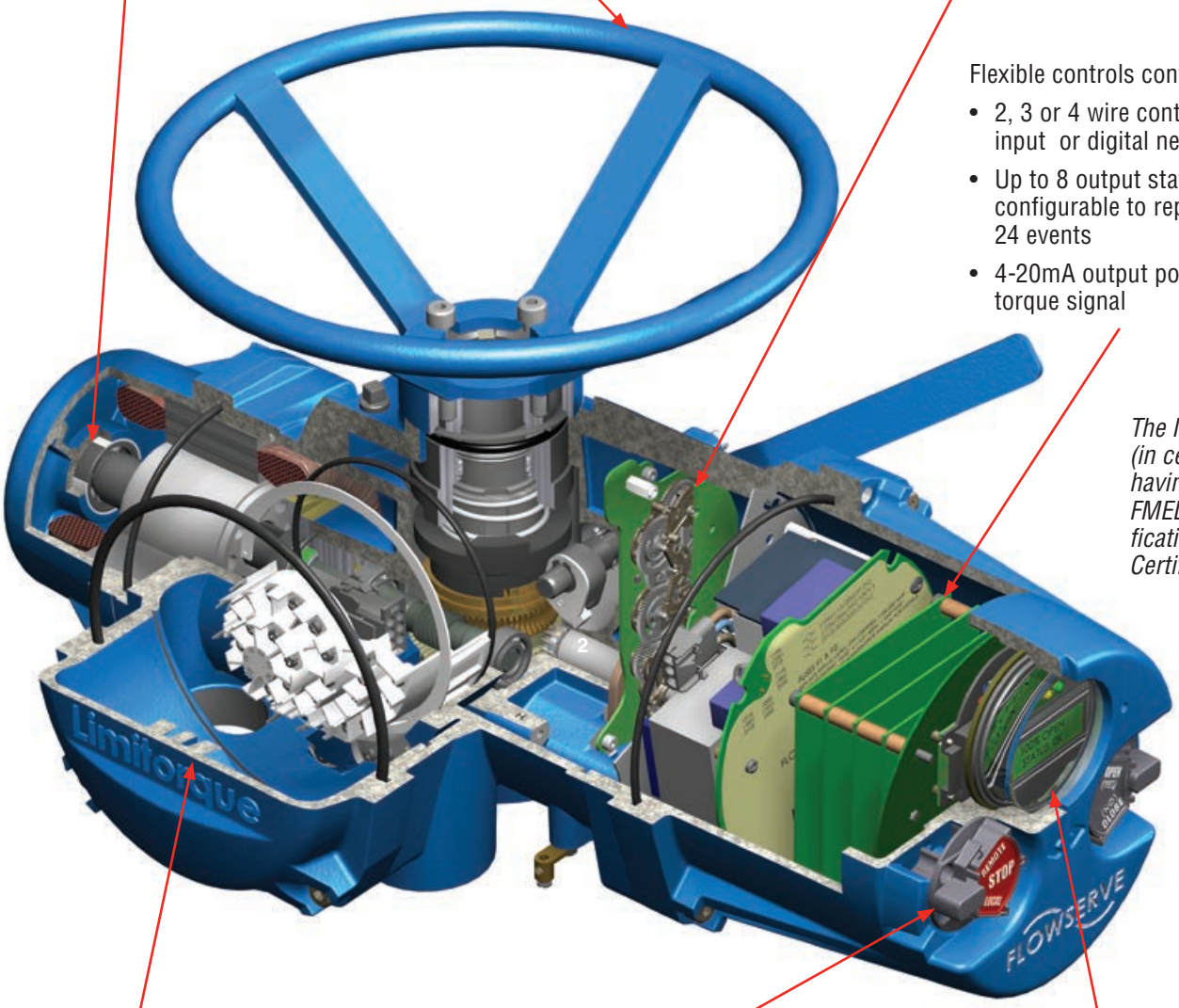
Handwheel for operation when electric power is not available, automatically returns to motor operation when the motor is energized

Unique redundant non-contacting absolute encoder that doesn't require batteries to maintain position on loss of power

Flexible controls configurations

- 2, 3 or 4 wire control, 4-20mA input or digital network control
- Up to 8 output status contacts configurable to report any of 24 events
- 4-20mA output position and/or torque signal

The MXa is SIL 3 capable (in certain configurations) having passed a rigorous FMEDA analysis and certification process by exida Certification Services.



Double-sealed terminal compartment to protect the electrical controls when the terminal cover is removed

Configuration is performed using knobs equipped with rare earth magnets that excite the solid state Hall effect devices that make actuator set-up choices without the need for any additional tools or devices

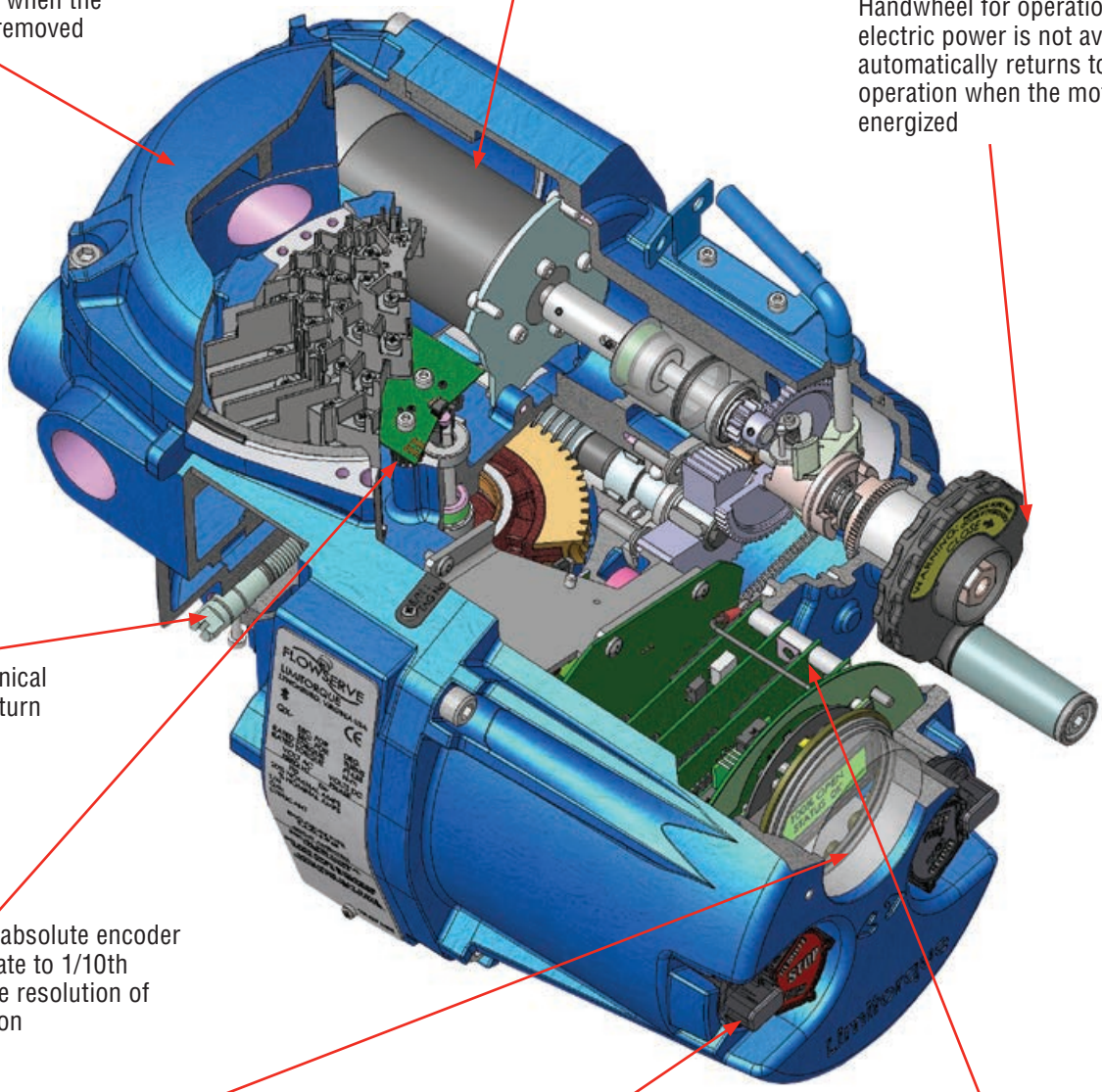
Graphical display improves visibility, allows for 180° rotation of the text and displays diagnostic graphs, actuator set-up & diagnostics in 10 languages

Limitorque QX Quarter-turn and QXM Multi-turn Actuator**

Double-sealed terminal compartment to protect the electrical controls when the terminal cover is removed

Advanced brushless DC motor that supports most global voltages - single phase and three phase AC and 24-250 VDC

Handwheel for operation when electric power is not available, automatically returns to motor operation when the motor is energized



Adjustable Mechanical Stops for quarter turn applications

A redundant absolute encoder that is accurate to 1/10th of one degree resolution of output rotation

Graphical display improves visibility, allows for 180° rotation of the text and displays diagnostic graphs, actuator set-up & diagnostics in 10 languages

Configuration is performed using knobs equipped with rare earth magnets that excite the solid state Hall Effect devices that make actuator set-up choices without the need for any additional tools or devices

Flexible controls configurations

- 2, 3 or 4 wire control, 4-20mA input or digital network control
- Up to 8 output status contacts configurable to report any of 24 events
- 4-20mA output position and/or torque signal

* For more information, refer to the MX sales brochure, LMENBR2302.
** For more information, refer to the QX sales brochure, LMENBR3302.

MX and QX Network Communications

The MX/QX provide a comprehensive network option portfolio to the User. Network solutions are improved with the addition of HART to complement Modbus, Foundation Fieldbus H1, DeviceNet, Profibus DP_V1 and Profibus PA. MX/QX provide the User with predictable, reliable and safe operation for years to come, in applications that are subject to the most rigorous requirements and environmental extremes.

DDC (Distributed Digital Control) Modbus Communication

DDC is Flowserve Limitorque's digital communication control system that provides the ability to control and monitor up to 250 actuators over a single twisted-pair cable. The communication network employs Modbus protocol on an RS-485 network and is redundant. The field unit also communicates all actuator status and alarm diagnostic messages over the same communication network.

DDC Network

- Single-ended loop (consult factory)
- Modbus protocol
- High speed – up to 19.2 k baud

Foundation Fieldbus communication with Device Type Manager (DTM) technology

The MX and QX can be fitted with Foundation Fieldbus protocol that complies with the IEC 61158-2 Fieldbus H1 standard. The field unit device is able to support several topologies such as point-to-point, bus with spurs, daisy chain, tree or a combination of these.

Profibus DP V1 communication with DTM

The MX and QX can be fitted with Profibus DP_V1 protocol field units that comply with EN50170 Fieldbus Standard for RS-485 communications. The device supports several topologies such as point-to-point, bus with spurs, daisy chain, tree or a combination of these. The DTM supports Flowserve's ValveSight diagnostic engine.

Profibus PA communication with DTM

A Profibus PA protocol is available and complies with EN50170 Fieldbus Standard and Fieldbus physical layer per IEC 61158-2 for communications. The device supports several topologies such as point-to-point, bus with spurs, daisy chain, tree or a combination of these.

HART

HART (Highway Addressable Remote Transducer) is a digital communication protocol where field units may be connected by a standard instrumentation twisted-pair cable to form a HART communication system network. The HART network employs a bi-directional communication protocol, operating at 1200 bits/sec, that provides data access between intelligent actuators and host control/monitoring systems. In addition to a digital signal, the network simultaneously provides a 4-20 mA analog signal that is proportional to the field unit's primary measured value. The HART protocol is defined as an open network standard, and Limitorque's actuators are certified for use by the HCF, HART Communication Foundation.

DeviceNet

DeviceNet is a low-cost communications protocol which permits up to 64 nodes (devices) to be installed over a single network and is based upon CAN (Controller Area Network), a broadcast protocol developed for the automotive industry. DeviceNet™ protocol is defined as an open network standard, and Limitorque's device is certified for use by the ODVA, Open Device Standard Association.

Master Station III

MX and QX units equipped with DDC can be controlled via Flowserve Limitorque's Master Station III. It includes:

- Host interface – Industry-standard Modbus Rtu, ASCI, UDP, and TCP/IP protocols and control
- 5.6" TFT touch-screen display for network configuration status
- Configurable polling sequence priority
- Network time protocol for time synchronization of alarms/diagnostics data to host device
- Modular hot-swappable redundant design
- Email notifications of alarm conditions
- Data/event logging

Truly Global Designs

The QX and MX actuators have been tested to demonstrate compatibility with an extensive list of US, Canadian, EU and IEC regulations, allowing use in the harshest conditions found in applications anywhere in the world.

IEC
IP68
NEMA
FM
ATEX EExd and EExde
IECEx EExd and EExde
CENELEC
CE
MILSTD
IEEE
EN
ANSI/ISA
EMC
CSA
ASTM

For more information on the features, options and certifications of the Limitorque MX, consult Flowserve bulletin LMENBR2302 and for the QX, consult bulletin LMENBR3302.

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