

# DYNATORQUE

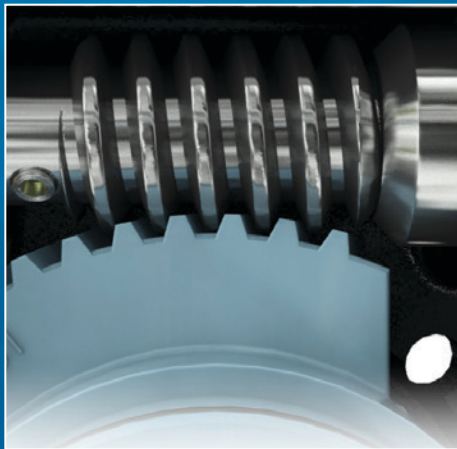
Valve accessories

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## **DYNATORQUE Valve Accessories**

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For years, Cameron DYNATORQUE\* valve accessories have been recognized as an innovator in manufacturing technology, with commitments to quality and design that result in a trustworthy and solid product portfolio.



The DYNATORQUE accessories product line is a single-source solution for both standard and customized gears and automated valve accessories, including declutchable and nondeclutchable manual overrides; the DYNATORQUE D-Stop\* partial-stroke test device; the DYNATORQUE D-Lock\* valve-locking device; spur and miter gears; handwheels; and ground position indicators.

To us, customer focus means our products are backed by our commitment to customer needs:

- Customized products are no problem—access many different frame and spur combinations, a wide variety of material options, and one-off capabilities with rapid turnaround
- Onsite static and dynamic-load test benches create DYNATORQUE accessories that will perform in the most challenging real-world applications
- Attention to quality at every level of the manufacturing process—rigorous approval standards for material sourcing, preproduction and postproduction inspections, ISO certifications, and randomly selected, measured, and tested operators.

# Worm Gear Operators

Cameron DYNATORQUE DT\* quarter-turn severe-service gear operators are designed for use with valves and dampers as well as with most other quarter-turn applications requiring a self-locking mechanism. Our flexible manufacturing process allows us to offer both standard construction and custom configurations for customer-specific applications.

Standard operators are available with various mounting interface dimensions. Custom-machined gears come with bores and bolt holes for direct mounting to the valve. Standard materials are cast gray or ductile iron, but the line also offers a varied selection of alternate materials to meet customer application requirements.

For extremely corrosive applications, operators with external components constructed of cast CF-8M stainless steel are available. These operators are completely sealed and are ideal for applications such as brewing, food processing, leaching operations, offshore platforms, and pulp and paper plants. Gear operators with stainless-steel internal parts also are available.

## Features

- 16 different frame and spur combinations provide an output torque range from 375 to 25,000 ft.lbf [500 to 33,900 N.m]
- Standard mounting dimensions or configured to customer requirements
- Chainwheel operation available on select frame sizes
- Variable handwheel shaft lengths
- Optional models with 180° and 360° multiturn capabilities
- Marine, submerged, and high- and low-temperature applications
- Available with American Water Works Association (AWWA) C-504 material and design criteria



# Bevel Gear Operators

The DYNATORQUE BG\* multiturn bevel-gear operator provide smooth, even torque transmission for thrust and nonthrust applications, such as gate, knife gate, pinch, sluice gate, or globe valves. This line of operators can also be used in almost any multiturn, right-angle application requiring mechanical advantage.

## Features

- 20 different frame and spur combinations provide an output thrust of 22,000–150,000 lbf [98,000–667,000 N] and a torque output range up to 3,500 ft.lbf [4,745 N.m]
- DYNATORQUE BG3 and BG6 operators have standard ISO 5211 mounting patterns (optional patterns on request)
- Gearbox housing of ductile iron
- Investment-cast ductile iron bevel and pinion gears for smooth, continuous transmission of torque
- Optional bronze stem nuts for direct threaded interfacing and lug drivers for existing valve yoke nuts
- Motor mounts available for electric motor

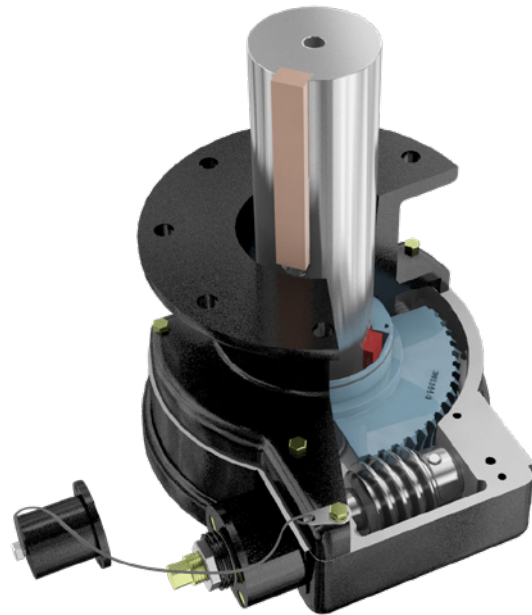


# Valve Locking Devices

The DYNATORQUE D-Lock device is used with automated valves (pneumatic, hydraulic, or electric) that require lock-out capability to prevent valve rotation. This feature is ideal for applications such as maintenance shutdowns when the valve must remain in a locked position, even if an actuator is unintentionally engaged.

## Features

- Valve held in either open or closed position while compensating for hysteresis and machining tolerances (select models provide both open and closed locking)
- Ideal for torque-seated valves such as triple-offset butterfly valves
- Applicable for almost any rotating device



# Manual Overrides

Cameron DYNATORQUE automated valve manual overrides are used with pneumatic, hydraulic, and back-drivable electric actuators. These products are sandwich mounted as part of an automated valve package to provide manual operation of the automated valve if a loss of plant air supply, power gas, hydraulic fluid power, or electricity occurs.

## Features

- Standard ISO 5211 mounting dimensions on top and bottom flanges, or custom machined for mounting to actuator and valve
- Transparent to valve operation when disengaged

### DYNATORQUE SD\* declutchable manual override features

- Suitable for either double-acting or spring-return actuators
- Nine different frame and spur combinations provide an output torque range from 250 to 11,666 ft.lbf [340 to 15,815 N.m]
- One-hand declutch mechanism
- Declutchable override sandwich mounted between valve and actuator

### DYNATORQUE SRD\* nondeclutchable manual override features

- Alternative to the DYNATORQUE SD override for spring-return applications only
- 11 different frame and spur combinations provide output torque ranges from 3,000 to 140,000 ft.lbf [340 to 29,375 N.m]
- Select frame sizes available with chainwheel option for spring-return actuators in overhead locations
- Nondeclutchable override sandwich mounted between valve and actuator



*DYNATORQUE SD override.*

*DYNATORQUE SRD override.*

# D-Stop Partial-Stroke Test Device

The DYNATORQUE D-Stop device is one of the world's premier mechanical devices for partial-stroke testing of installed critical service valves, such as emergency shutdown valves (ESDVs) while the valves are flowing process fluids and full-stroke valve testing is not practical.

## How it works

The DYNATORQUE D-Stop device has two internal cams. During normal valve operation, the DYNATORQUE D-Stop device is disengaged and the actuator is free to stroke the valve on demand. When the partial-stroke test is to be performed, the stainless steel engagement key is inserted into the DYNATORQUE D-Stop key socket.

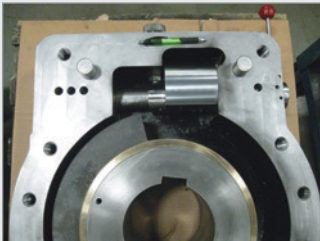
A safety feature designed into the device forces an intentional, two-handed operation in order to engage the DYNATORQUE D-Stop device. When the safety release mechanism is pulled, the engagement cam is free to rotate 90° counterclockwise. Once the key is turned, it is locked into the device and the engagement cam rotates. The device is now engaged (see illustration below).

At this point, when the valve actuator is sent to the test position, the drive cam that is attached to the actuator through the drive coupling rotates until it comes into contact with the engagement cam, normally 20° (this is a specifiable value). Metal-to-metal safety prevents the actuator from rotating past the set point.



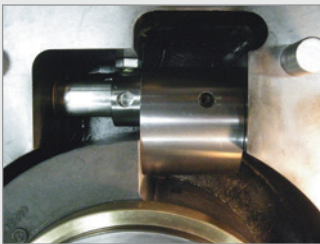
*DYNATORQUE D-Stop devices are built for both large and small valves. This DYNATORQUE DT4000 D-Stop device will fit between a large pneumatic actuator and a 36-in, 600-lbm ball valve installed on an offshore platform.*

## A Look Inside

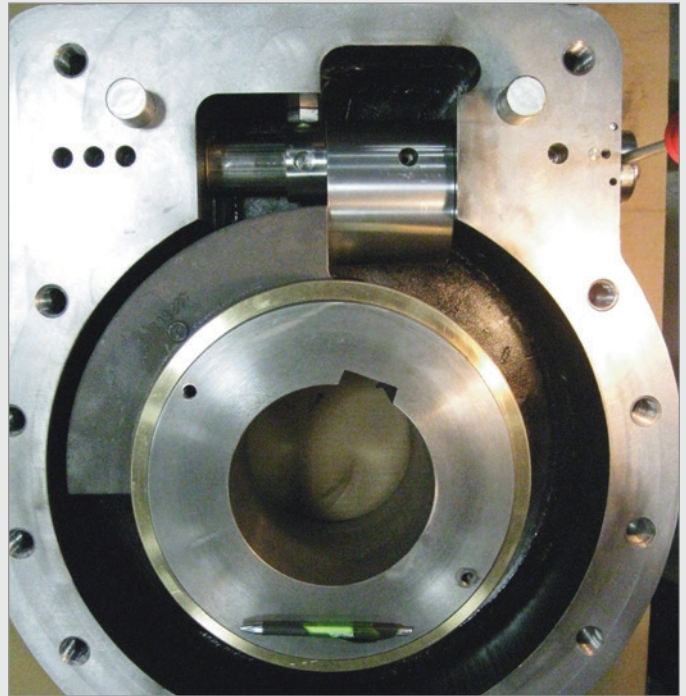


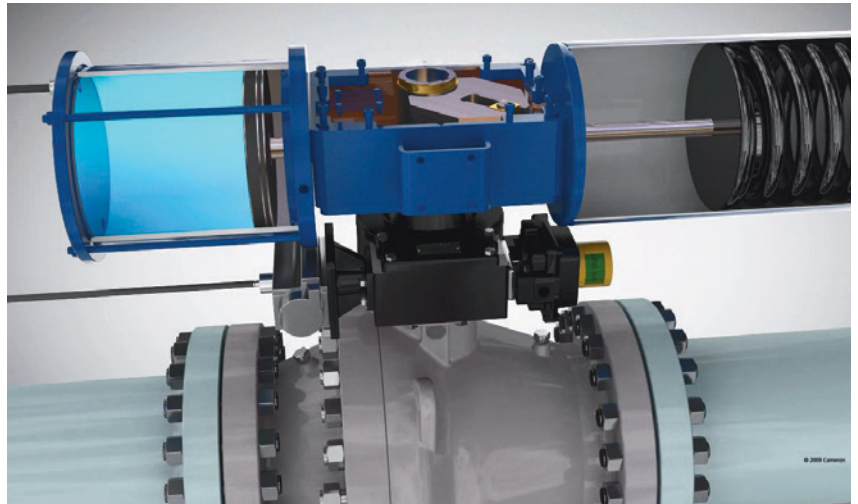
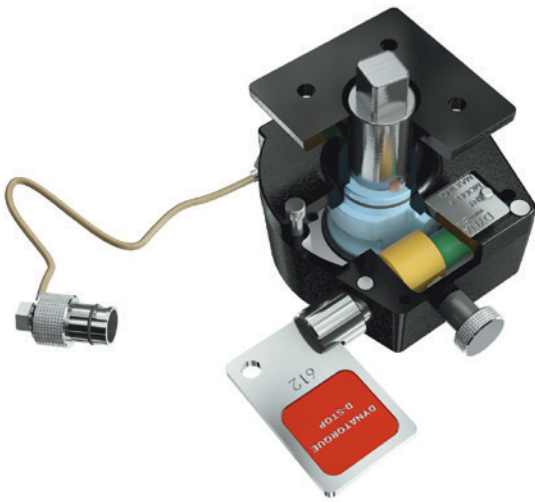
The photo to the left is a DYNATORQUE DT1000 D-Stop device in factory assembly with the cover removed. The DYNATORQUE D-Stop device is not in the engaged position. Cameron manufactures DYNATORQUE D-Stop devices up to 333,333-ft.lbf [451,939-N.m] capability.

The picture at the right shows the same DYNATORQUE DT1000 D-Stop device, but with the device now engaged. Standard travel is 20°, but this value can be specified to your unique requirements.



The photo to the left shows the DYNATORQUE D-Stop device fully engaged with metal-to-metal safety, preventing the valve from closing during the test procedure.





*DYNATORQUE D-Stop devices are modular. Specify local key- or remote-operated, with or without optional limit switches, to indicate on-test or off-test.*

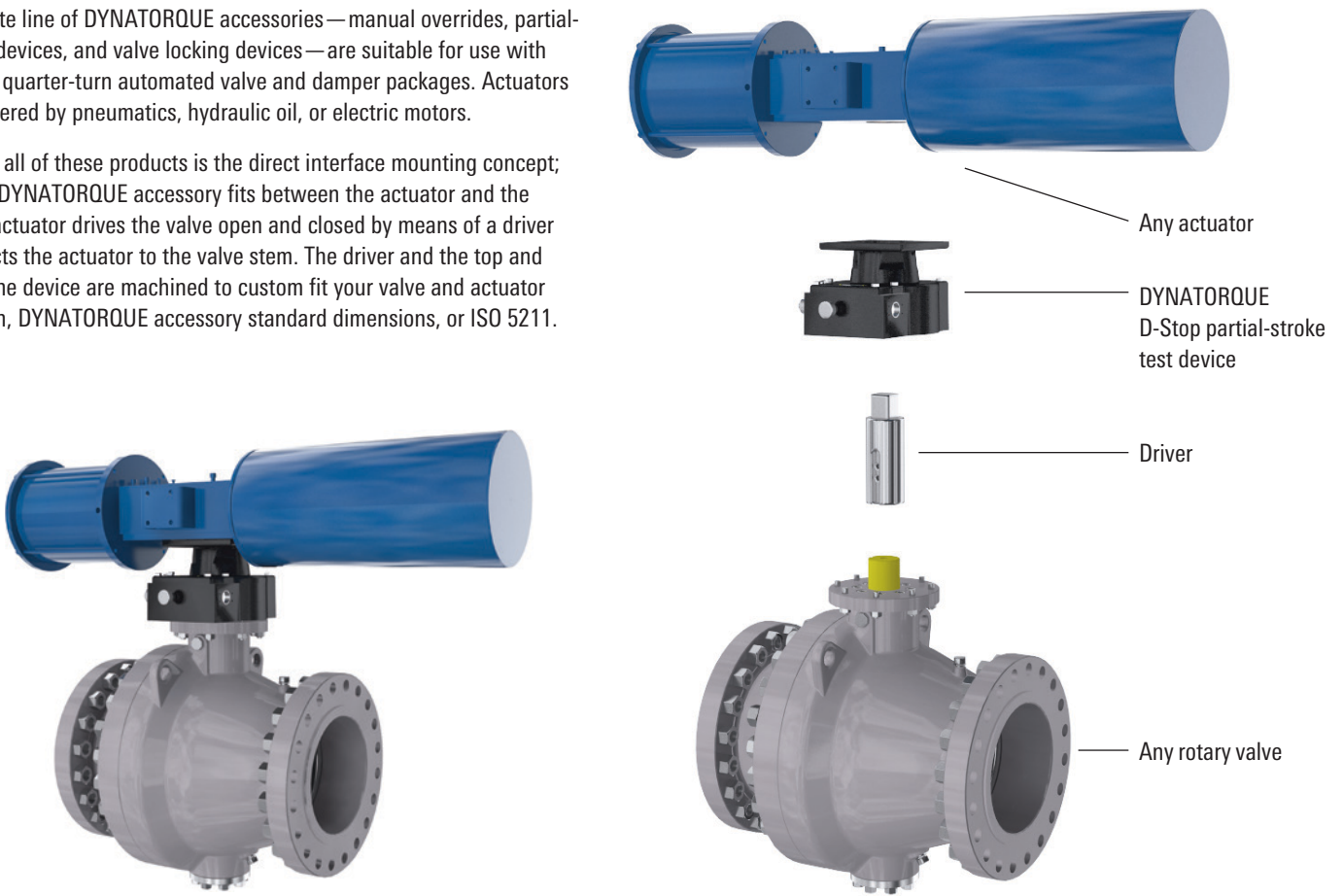
### Benefits of the Cameron DYNATORQUE D-Stop device

- **Simplicity:** When it comes to testing systems, already-sophisticated automated valve system packages can become cumbersome if controls are added. As with electric systems, it is not necessary to integrate the Cameron DYNATORQUE D-Stop device into the control loop or add ancillary controls. It's simple.
- **Cost effectiveness:** The basic cost of a DYNATORQUE D-Stop device, depending on the torque requirement, is more economical than an electric or controls-driven system. Instrumentation personnel and software programmers are not required to install the DYNATORQUE D-Stop device, lowering installation costs. Further, the DYNATORQUE D-Stop device has no controls, eliminating the need for commissioning or routine control calibration. Most process plants have qualified in-house mechanics or valve automation centers nearby, and since there are no additional controls required, installation cost savings can be substantial.
- **True safety system tests:** Because the DYNATORQUE D-Stop device requires no extraneous controls when the valve is tested, all the actual SIS components, controls, and elements used in an ESDV or safety valve will be activated.
- **Integrity for demanding industrial environments:** The DYNATORQUE D-Stop device is vibration resistant. The outside is coated for corrosion protection and independently certified to IP 67 to prevent water ingress. Stainless-steel trim is used for keys, shafts, and sockets. The DYNATORQUE D-Stop device is permanently lubricated, factory sealed, and requires no routine maintenance.
- **SIL capability:** The DYNATORQUE D-Stop device has been found SIL capable by an independent third party. A copy of our failure modes, effects, and diagnostics analysis (FMEDA) is available on request with information such as probability of failure on demand (PDFavg) necessary to calculate SIL values for your application.

# Actuator-to-Valve Direct Interface

The complete line of DYNATORQUE accessories — manual overrides, partial-stroke test devices, and valve locking devices — are suitable for use with all styles of quarter-turn automated valve and damper packages. Actuators can be powered by pneumatics, hydraulic oil, or electric motors.

Common to all of these products is the direct interface mounting concept; that is, the DYNATORQUE accessory fits between the actuator and the valve. The actuator drives the valve open and closed by means of a driver that connects the actuator to the valve stem. The driver and the top and bottom of the device are machined to custom fit your valve and actuator combination, DYNATORQUE accessory standard dimensions, or ISO 5211.

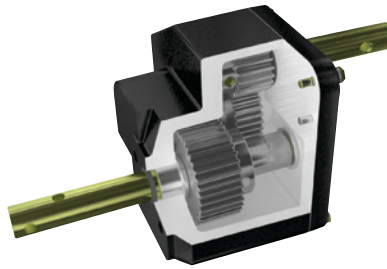


*The Cameron LEDEEN® actuator mounted on a DYNATORQUE D-Stop partial-stroke test device.*

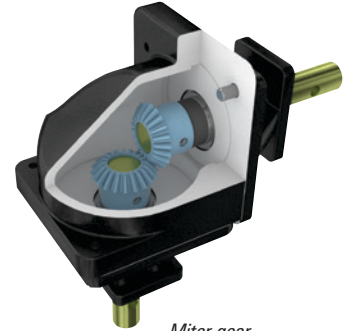


# Spur and Miter Gears

Spur and miter gears are used in applications requiring a nonself-locking mechanical advantage or where a change in input drive orientation is required. Both devices can be used as add-on features to our worm and bevel gears or can be purchased as standalone products.



*Spur gear.*



*Miter gear.*

## Spur gear features

- Heavy-duty iron and steel components
- Used with worm gear and bevel gear operators for reduced handwheel sizing and handwheel rim pull effort
- Can be used independent of worm and bevel gears with small nonrising stem gate and globe valves and other non-self locking applications that require torque multiplication. When used with small electric motor operators, it provides a low-ratio, nonself-locking torque multiplier

## Miter gear features

- Heavy-duty iron and steel components
- For use as a close-coupled gearbox that changes handwheel input shaft direction on worm and bevel gears
- Can be used to change shaft direction (90°) on any rotating device with compatible torque values and interface dimensions

# Handwheels

A comprehensive line of handwheels is offered in 6- to 48-in diameters. Standard handwheels are designed for use with our gear operators, and many are available in either recessed or flat versions.

## Features

- 6- to 10-in handwheels are recessed, cast duct iron
- 12- to 18-in handwheels are manufactured from tubing and are available in standard recessed and optional flat configurations, as well as in stainless steel
- Tubular handwheels are epoxy powder coated
- Cast handwheels are electrocoated
- Additional diameters and interface machining available



# Chainwheel Adapters

Chainwheels are available for applications where valve and operator combinations are in locations where direct handwheel operation is not possible.

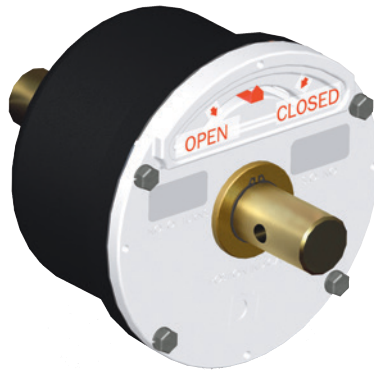
## Features

- Mounting of the chainwheel directly to the operator-input shaft rather than the rim of a handwheel
- Design that reduces the amount of cantilever load on the operator-input shaft and eliminates the need for a handwheel
- Standard chainwheel construction is cast iron with many optional materials available
- 1018 steel fabrication



# Ground Position Indicators

Remote ground position indicators are mechanical devices used to visually indicate the position of a buried or otherwise hidden valve. For example, when a valve and gear are installed in a buried service application, it may be difficult (or impossible) to know if the valve is open or closed.



## Features

- Capable of exceeding 30,000 turns
- Ground-level window provides clear indication of open or closed status
- Optional limit switches indicate valve position to operator in a remote location
- Sealed version available
- Optional 2-in square operating nuts, extension stems, and couplings



# Memory-Stop and Multiturn Worm Gears

A special traveling-nut module is added to the standard worm gear, providing a highly adjustable memory stop. It is ideal for use when the driven device is used for flow control and must always be opened or closed to the same exact position.

## Features

- Highly adjustable travel stops
- Memory-stop device suitable for valves and dampers
- Traveling nut module enables repeatable valve travel to the predestinated set point



# World-Class Manufacturing

## Core capabilities

The Cameron DYNATORQUE accessories manufacturing and service facility—Muskegon, Michigan, USA

- Manufacturing: 30,000 ft<sup>2</sup>
- Warehouse: 20,000 ft<sup>2</sup>
- Office: 6,000 ft<sup>2</sup>
- Computer numeric control machines: 17
- Testing:
  - Dynamic up to 400,000 lbm
  - Static up to 1,500,000 lbm
- Lifting capabilities: one crane with 2-tonUS lift capacity; five cranes with 0.5-tonUS lift capacity
- Quality certifications: ISO 9001:2008
- Operational since 1984



*Muskegon, Michigan, USA*



# DYNATORQUE



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