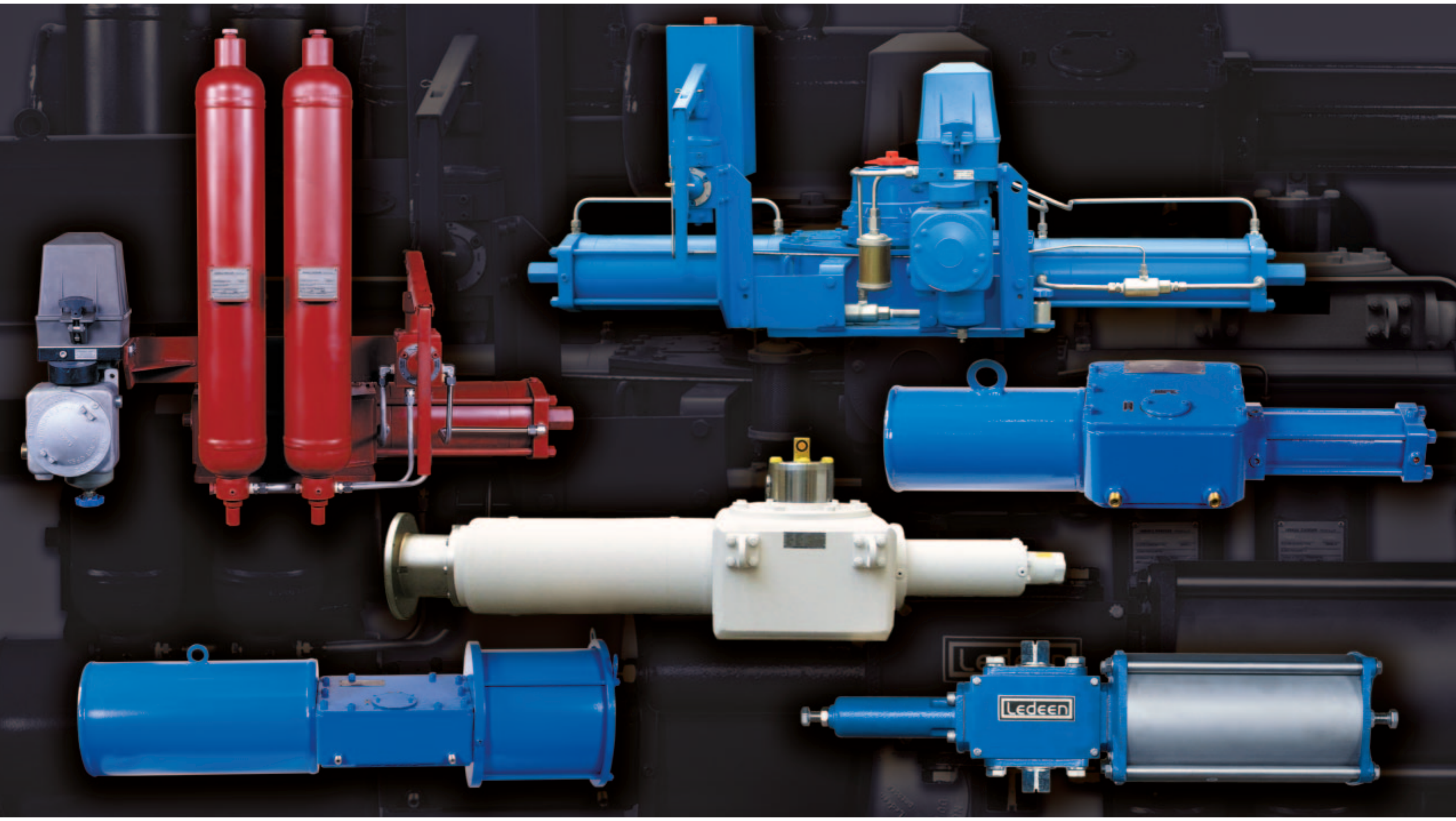
# Ledeen™ Valve Actuators



**Providing dependable performance for over 50 years, Ledeen valve actuators have created a presence in the market. Now a part of the Cameron product line, Ledeen will continue its exposure to a wide variation of application**

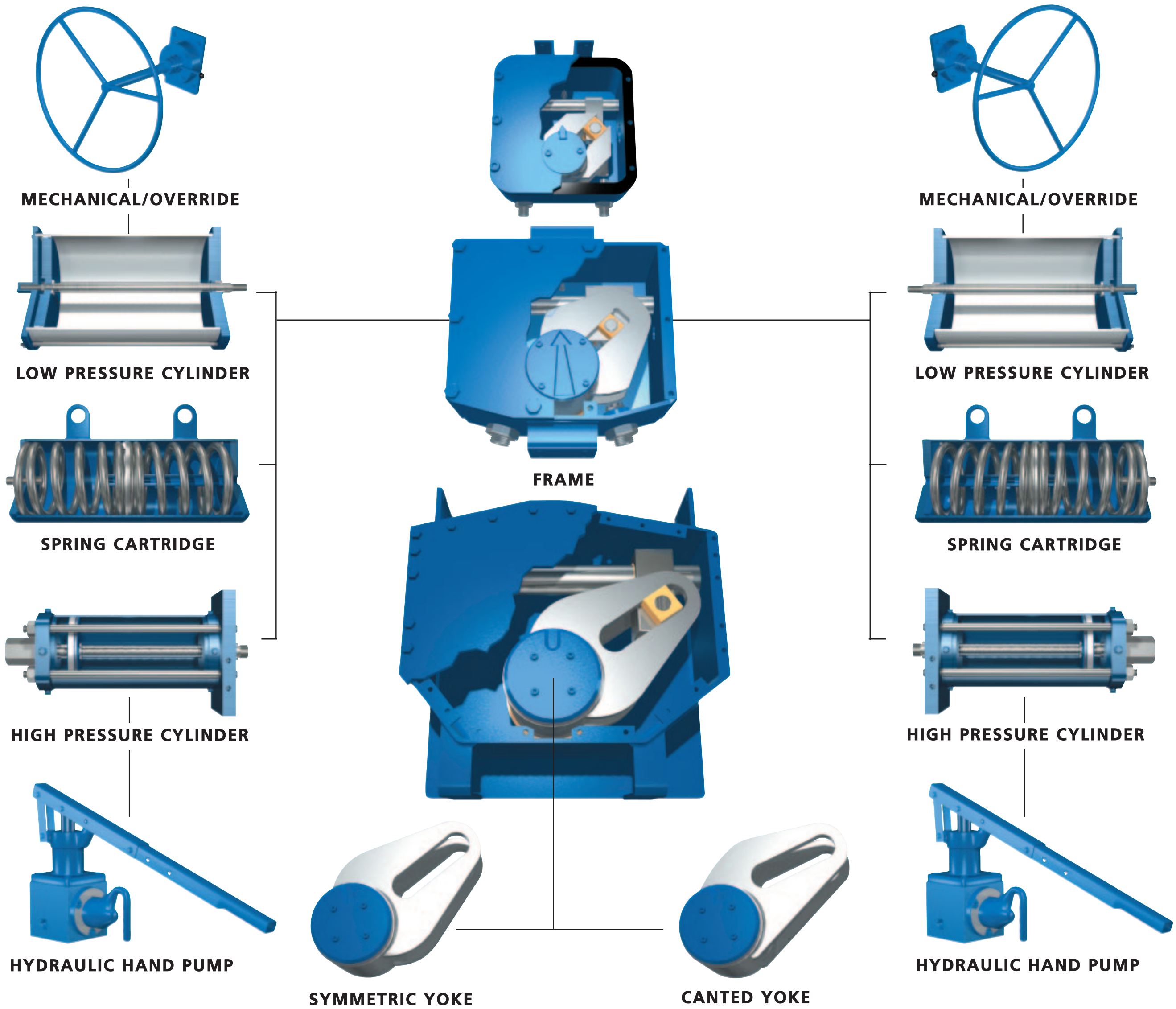
# Extensive Experience.

**requirements and environmental conditions, bringing a significant accumulation of valuable, field-proven experience. By applying the knowledge gained into actuator design enhancements, Cameron is able to provide equipment that has outstanding performance characteristics with minimal maintenance requirements. Ledeen offers multiple frame sizes, torque output and yoke options for modular assembly customization.**

# Modular Assembly

### CONSISTENT AND FLEXIBLE

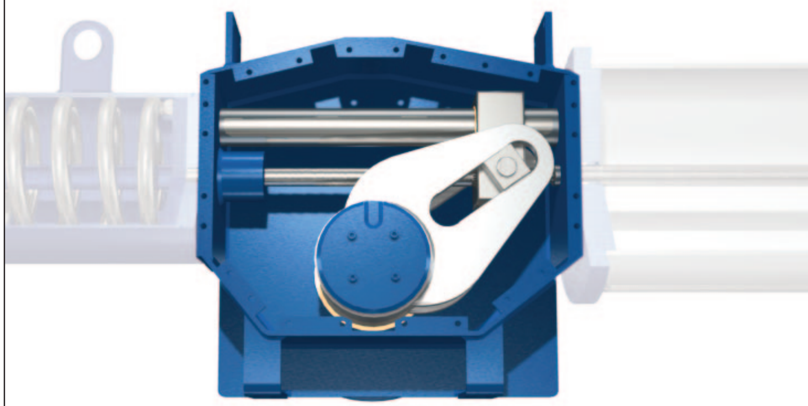
Consistent engineering design and efficient modular assembly allows maximum operational flexibility to be achieved. Double acting, spring fail close/open or manual override operations are combinations that are readily obtainable on the low pressure air, high pressure gas or hydraulic products. This maintains product consistency throughout any project requirement, regardless of valve size, class, actuator supply medium, pressure or actuator function (DA/SR) requirements. As a result, all products can be safely and confidently operated by personnel. In addition, the consistent design provides for a significant reduction in the quantity of recommended spare parts and seal kits, which minimizes costs within maintenance programs.

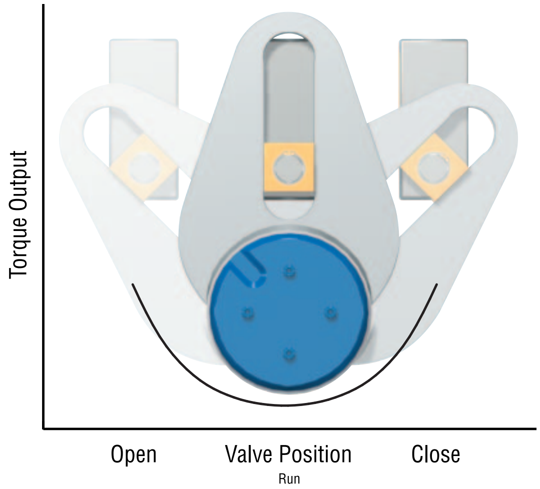


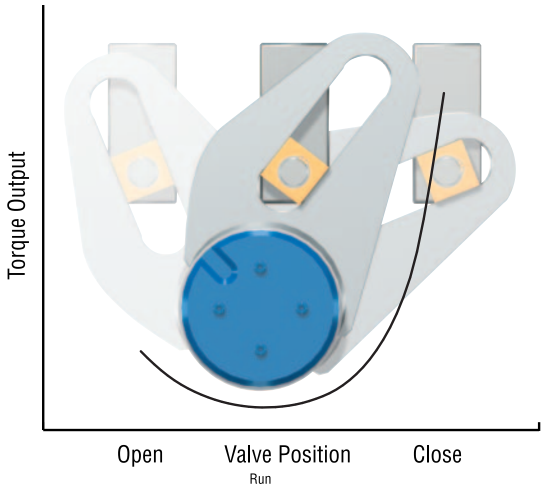
# Frame Design

### STANDARD FEATURES

- Scotch yoke mechanism generates powerful opening and closing torque outputs
- Steel fabricated frame provides rugged foundation of modular assemblies
- Chrome plated side load bar with guide block for effective elimination of piston rod deflection
- Bronze bushing interfaces provide low friction support of sliding and rotating components
- Aluminum bronze sliding blocks for a low friction, low stress pin connection






### SYMMETRIC YOKE DESIGN (GS, SY, ST)

- Provides conventional torque output
- Equivalent break and end torque values

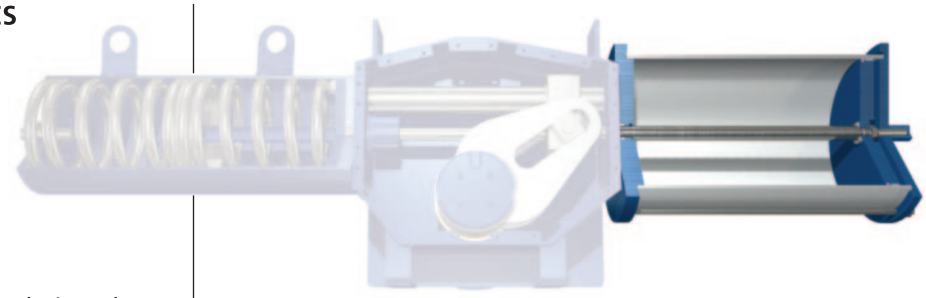
### CANTED YOKE DESIGN (MT, HT)

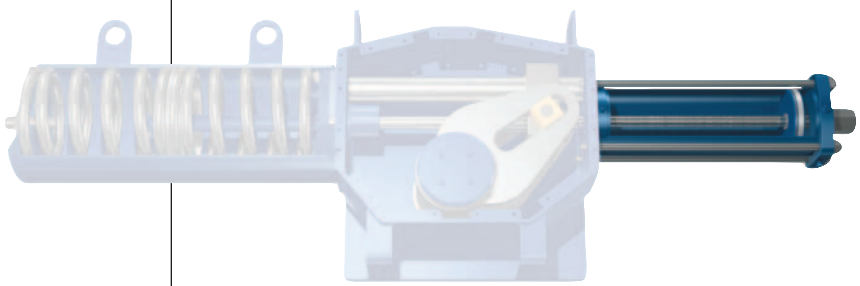
- Provides unique torque output
- Maximizes break and reseat torque values

# Power Cylinder and Spring Cartridge Design

### POWER CYLINDER STANDARD FEATURES

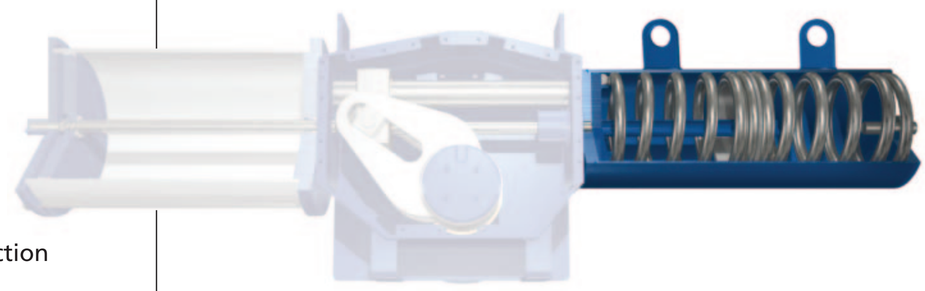
- Steel cylinder assembly provides robust pressure containment for all conditions
- Nickel plated cylinder I.D. ensures excellent sealing surface with superior corrosion resistance
- Buna piston seal configurations specifically designed for pneumatic, hydraulic and high pressure gas applications
- Composite guide band on piston provides low friction guidance and support





### SPRING CARTRIDGE STANDARD FEATURES

- Steel spring cartridge is fully enclosed from environmental conditions
- Epoxy coated prestressed springs provide consistent performance with corrosion protection
- Seal welded design construction provides maximum personnel safety



### STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODELS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| GS, SY, ST, MT & HT | -22˚ F to 212˚ F<br>-30˚ C to 100˚ C | 40 to 3000 psig<br>3 to 207 barg |

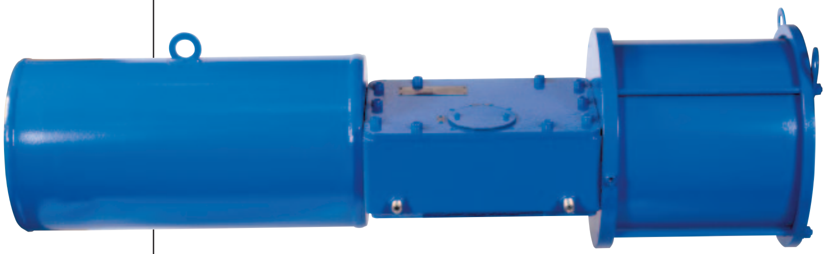
# Quarter-Turn Pneumatic

## TYPICAL APPLICATION

For on/off or modulating control of any ball, plug or butterfly valve utilizing compressed air, natural gas or nitrogen actuator supply.

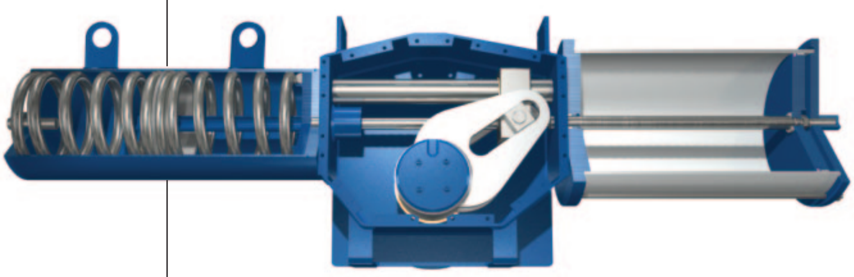
## STANDARD FEATURES

- All models available as double acting or spring return
- Torque outputs to 3,600,000 in-lbs (400,000 Nm)
- Open and close travel stops, ±3˚ min.
- Local position indication
- Refer to pages 4 and 5 for frame, power cylinder and spring cartridge features



## AVAILABLE OPTIONS

- Mechanical jackscrew override
- Hydraulic manual override
- Fluorosilicone seals for low temperature applications -76˚ F (-60˚ C)
- Viton® seals for high temperature applications 392˚ F (200˚ C)
- Low temperature materials



## STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODELS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| GS, SY, ST, MT & HT | -22˚ F to 212˚ F<br>-30˚ C to 100˚ C | 40 to 175 psig<br>3 to 12 barg |

# Quarter-Turn Hydraulic

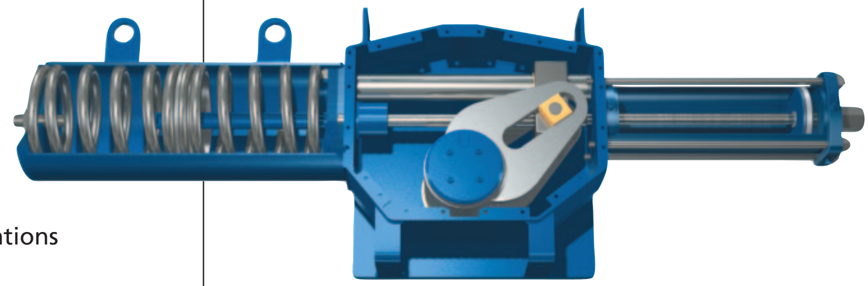
### TYPICAL APPLICATION

For on/off or modulating control of any ball, plug or butterfly valve utilizing hydraulic actuator supply.

### STANDARD FEATURES

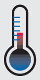
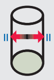
- All models available as double acting or spring return
- Torque outputs to 3,600,000 in-lbs (400,000 Nm)
- Open and close travel stops, ±3˚ min.
- Local position indication
- Refer to pages 4 and 5 for frame, power cylinder and spring cartridge features

### AVAILABLE OPTIONS



- Mechanical jackscrew override
- Hydraulic manual override
- Fluorosilicone seals for low temperature applications -76˚ F (-60˚ C)
- Viton® seals for high temperature applications 392˚ F (200˚ C)
- Low temperature materials

### STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODELS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| GS, SY, ST, MT & HT |  -22˚ F to 212˚ F<br>-30˚ C to 100˚ C |  145 to 3000 psig<br>10 to 207 barg |

# Quarter-Turn Gas-Over-Oil

## TYPICAL APPLICATION

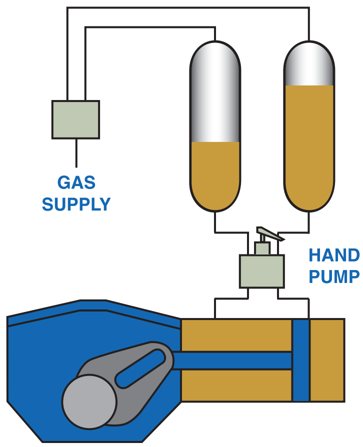
For on/off control of any natural gas transmission ball or plug valve utilizing a high pressure natural gas or nitrogen actuator supply.

## STANDARD FEATURES

- All models available as double acting
- Torque outputs to 3,600,000 in-lbs (400,000 Nm)
- Open and close travel stops, ±3˚ min.
- Local position indication
- ASME/PED Gas-Over-Oil pressure vessels with dip stick, filter and adjustable speed controls
- High pressure rated controls for local, remote and automatic operation (Refer to page 20)
- Hydraulic manual override
- Refer to pages 4 and 5 for frame and power cylinder features

## AVAILABLE OPTIONS

- Fluorosilicone seals for low temperature applications -76˚ F (-60˚ C)
- Viton® seals for high temperature applications 392˚ F (200˚ C)
- Low temperature materials
- ASME/PED emergency storage tank



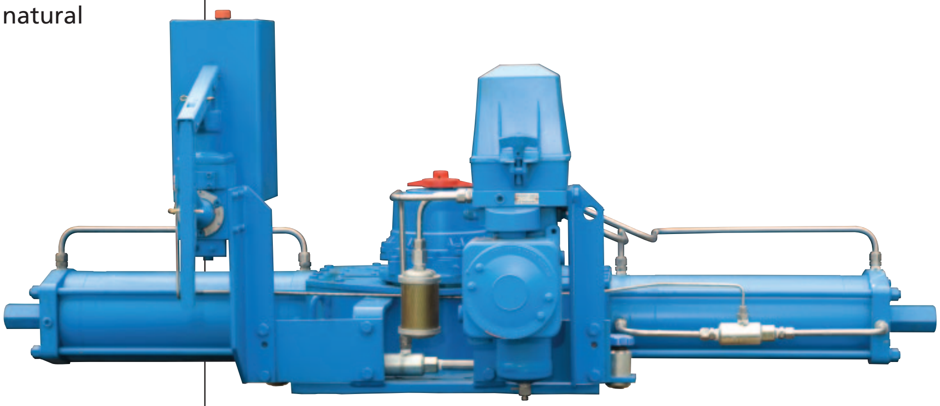

## STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODELS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| ST-GH, MT-GH & HT-GH | -22˚ F to 212˚ F<br>-30˚ C to 100˚ C | 145 to 1500 psig<br>10 to 104 barg |

# Quarter-Turn Direct Gas

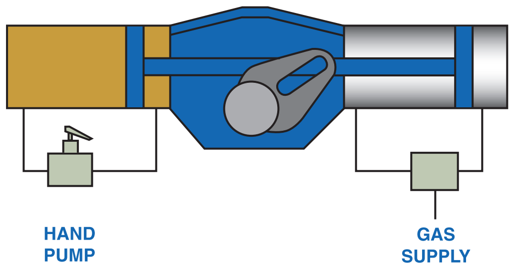
## TYPICAL APPLICATION

For on/off control of any natural gas transmission ball or plug valve utilizing a high pressure natural gas or nitrogen actuator supply.



## STANDARD FEATURES

- All models available as double acting
- Torque outputs to 3,600,000 in-lbs (400,000 Nm)
- Open and close travel stops, ±3˚ min.
- Local position indication
- Hydraulic manual override with reservoir filter, dipstick and adjustable speed controls
- High pressure rated controls for local, remote and automatic operation (Refer to page 20)
- Refer to pages 4 and 5 for frame and power cylinder features




## AVAILABLE OPTIONS

- Fluorosilicone seals for low temperature applications -76˚ F (-60˚ C)
- Viton® seals for high temperature applications 392˚ F (200˚ C)
- Low temperature materials
- ASME/PED emergency storage tank
- Spring return models

## STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODELS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| ST-DG, MT-DG & HT-DG | -22˚ F to 212˚ F<br>-30˚ C to 100˚ C | 145 to 1500 psig<br>10 to 104 barg |

# Linear Pneumatic

### TYPICAL APPLICATION

For on/off or modulating control of any gate valve or rising stem ball valve utilizing compressed air, natural gas or nitrogen actuator supply.

### PISTON ACTUATOR STANDARD FEATURES

- All models available as double acting or spring return
- Thrust outputs to 1,830,000 lbs (8,140,385 N)
- Local position indication
- Refer to page 5 for power cylinder and spring cartridge features

### AVAILABLE OPTIONS

- Mechanical jackscrew override
- Hydraulic manual override
- Fluorosilicone seals for low temperature applications -76° F (-60° C)
- Viton® seals for high temperature applications 392° F (200° C)
- Low temperature materials

### STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODEL | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| LP | -22° F to 212° F<br>-30° C to 100° C | 40 to 175 psig<br>3 to 12 barg |

# Linear Hydraulic

### TYPICAL APPLICATION

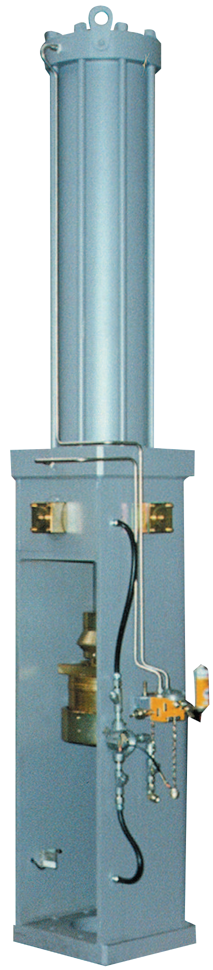
For on/off or modulating control of any gate valve or rising stem ball valve utilizing a hydraulic actuator supply.

### STANDARD FEATURES

- All models available as double acting or spring return
- Thrust outputs to 4,400,000 lbs (19,500,000 N)
- Local position indication
- Refer to page 5 for power cylinder and spring cartridge features

### AVAILABLE OPTIONS

- Mechanical jackscrew override
- Hydraulic manual override
- Fluorosilicone seals for low temperature applications -76° F (-60° C)
- Viton® seals for high temperature applications 392° F (200° C)
- Operating pressure to 5000 psig (345 barg)
- Low temperature materials



### STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODEL | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| LH | -22° F to 212° F<br>-30° C to 100° C | 145 to 3000 psig<br>10 to 207 barg |

# Linear Gas-Over-Oil

### TYPICAL APPLICATION

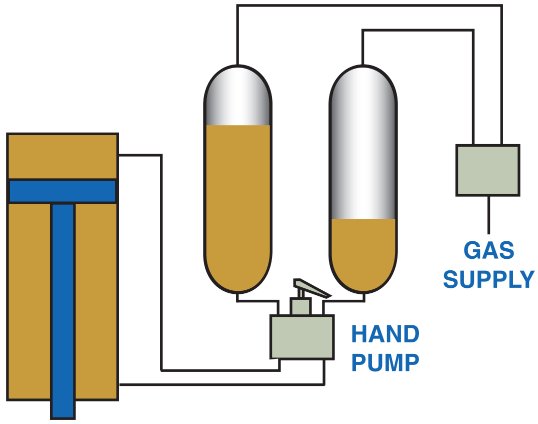
For on/off control of any natural gas transmission gate valve utilizing a high pressure natural gas or nitrogen actuator supply.

### PISTON ACTUATOR STANDARD FEATURES

- Available as double acting
- Thrust outputs to 4,400,000 lbs (19,572,177 N)
- Local position indication
- ASME/PED Gas-Over-Oil pressure vessels with dip stick, filter and adjustable speed controls
- High pressure rated controls for local, remote and automatic operation (Refer to page 20)
- Hydraulic manual override
- Refer to page 5 for power cylinder features

### AVAILABLE OPTIONS

- Fluorosilicone seals for low temperature applications -76˚ F (-60˚ C)
- Viton® seals for high temperature applications 392˚ F (200˚ C)
- Low temperature materials
- ASME/PED emergency storage tank




### STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODEL | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| LH-GH | -22˚ F to 212˚ F<br>-30˚ C to 100˚ C | 145 to 1500 psig<br>10 to 104 barg |

# Multi-Turn Electric

### TYPICAL APPLICATION

For on/off control of any ball, plug, butterfly or gate valve utilizing a 3-phase electric actuator supply.


### STANDARD FEATURES

- Available for continuous or intermittent service
- Torque outputs to 11,000 in-lbs (1245 Nm)
- Explosion-proof rated Exd IIB T4 IP68
- Approved to UL, FM, CSA and ATEX standards
- Two padlockable selector switches
- Hand wheel for manual operation

### AVAILABLE OPTIONS

- Quarter-turn and multi-turn reduction gearing for increased torque or thrust outputs
- Dial position indicator
- Position transmitter
- Fieldbus communication
- Low temperature materials
- Fluorosilicone seals for low temperature applications -76˚ F (-60˚ C)

## STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODEL | TEMPERATURE RANGE | VOLTAGE | OUTPUT SPEED |
|---|---|---|---|
| NP | -4˚ F to 176˚ F<br>-20˚ C to 80˚ C | 460VAC 60Hz 3Ph<br>380VAC 50Hz 3Ph | 12 to 173 rpm |

# Multi-Turn Manual Gearboxes

### TYPICAL APPLICATION

For manual on/off control of any ball, plug or butterfly valve.

### STANDARD LRB FEATURES

- Torque outputs to 78,500 ft-lbs (106,500 Nm)
- All housings are rugged cast iron
- Worm screw and sector gear torque device
- Open and close travel stops
- Local position indication
- Waterproof construction

### STANDARD RG FEATURES

- Torque outputs to 180,800 ft-lbs (245,170 Nm)
- All housings are steel fabrication
- Threaded shaft and scotch yoke torque device
- Open and close travel stops
- Local position indication
- Waterproof construction

## STANDARD PRODUCT CHARACTERISTICS

| GEARBOX MODELS | TEMPERATURE RANGE |
|---|---|
| LRB, RG | -76˚ F to 212˚ F<br>-60˚ C to 100˚ C |

# Multi-Turn Subsea Gearboxes

### TYPICAL APPLICATION

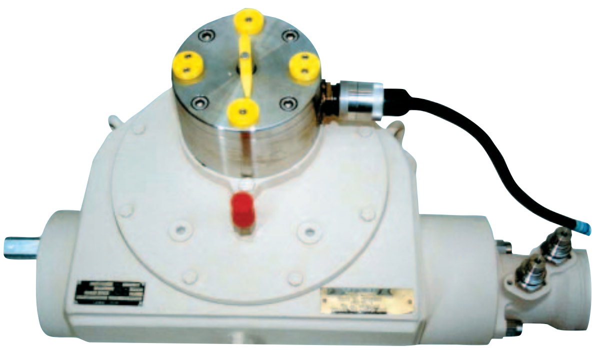
For on/off control of any subsea ball, plug or check valve.

### STANDARD LRBS FEATURES

- Submersible version of LRB gearbox
- Torque outputs to 78,500 ft-lbs (106,500 Nm)
- High input/output torque ratio
- Worm screw with sector gear torque mechanism
- Rugged cast iron housings
- Open and close travel stops
- Position indicator

### STANDARD RGS FEATURES

- Submersible version of RG gearbox
- Torque outputs to 180,800 ft-lbs (245,170 Nm)
- High input/output torque ratio
- Threaded shaft with scotch yoke torque mechanism
- Steel fabricated housings
- Open and close travel stops
- Position indicator

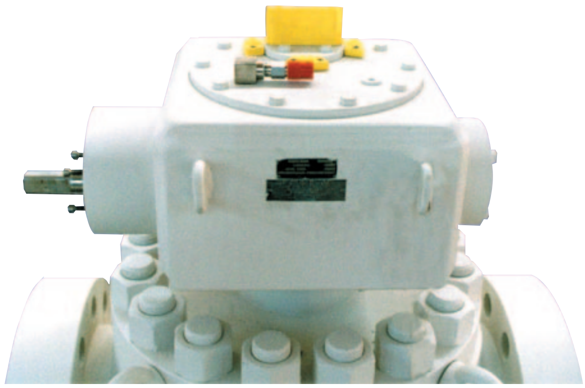


### STANDARD BGS FEATURES

- Specifically developed for subsea service
- Torque outputs to 92,500 ft-lbs (125,500 Nm)
- Reduced input/output torque ratio
- Bevel gear and sector gear torque mechanism
- Steel fabricated housings
- Open and close travel stops
- Position indicator

### AVAILABLE OPTIONS

- Pressure compensation for deepwater installations
- Tactile position indicator
- Microswitches
- ROV override



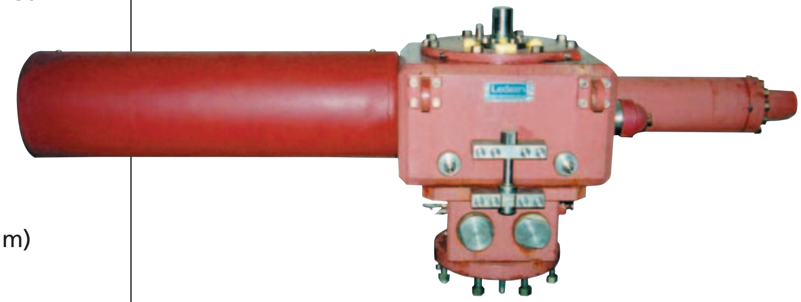
### STANDARD PRODUCT CHARACTERISTICS

| GEARBOX MODELS | DEPTH |
|---|---|
| LRBS, RGS & BGS | To 10,000+ ft (3000+ m) |

# Quarter-Turn Subsea

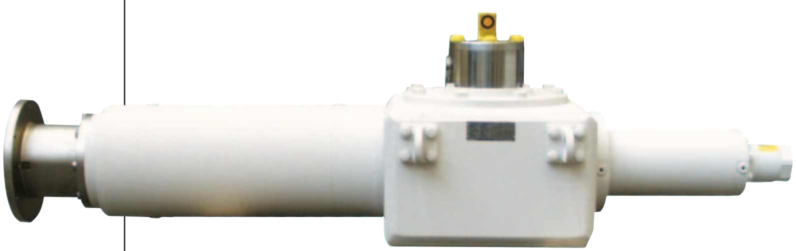
### TYPICAL APPLICATION

For on/off control of any subsea ball, plug or check valve utilizing a hydraulic actuator supply.



### STANDARD FEATURES

- Available as double acting or spring return
- Torque outputs to 3,600,000 in-lbs (400,000 Nm)
- Pressure compensated for deep applications
- 100% RX and PT tested welds
- No external tie rods or tubing
- Open and close travel stops, ±5˚ min.
- Local tactile position indicator
- Spool piece with adjustable position locators



### AVAILABLE OPTIONS

- ROV override
- Manual override
- Microswitch
- Position transmitter
- Shallow submersion series (SGS & SSY models)
- In-house hyperbaric testing (Refer to page 18)

## STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODEL | PRESSURE RANGE |
|---|---|
| Mermaid | 150 to 3000 psig<br>10 to 207 barg |

# Linear Subsea

## TYPICAL APPLICATION

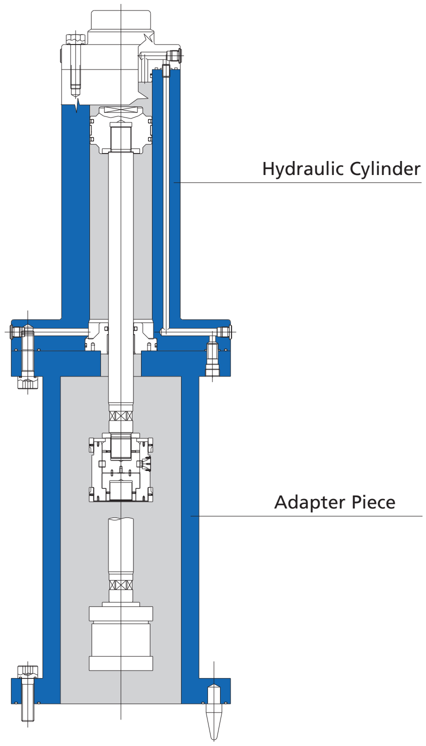
For on/off control of any subsea gate valve utilizing a hydraulic actuator supply.

## STANDARD FEATURES

- Available as double acting or spring return
- Thrust outputs to 4,400,000 lbs (19,500,000 N)
- Pressure compensated for deep applications
- 100% RX and PT tested welds
- No external tie rods or tubing

## AVAILABLE OPTIONS

- ROV override
- Diver intervention
- In-house hyperbaric testing (Refer to page 18)




## STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODEL | PRESSURE RANGE |
|---|---|
| Mytilus | 150 to 3000 psig<br>10 to 207 barg |

# Test Facility — Subsea

### TYPICAL APPLICATION

For verification of actuator performance in a subsea simulated environment under actual working conditions.

### HYPERBARIC CHAMBER STANDARD FEATURES

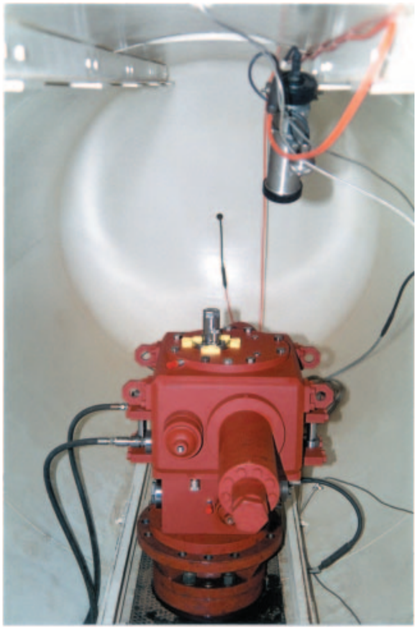
- Large capacity easily accepts manual gearboxes, double acting and spring return actuators
- Water environment is pressurized and temperature controlled to match actual subsea conditions
- Underwater video system provides capability to visually witness testing

### RECORDED TEST DATA

- Water environment pressure
- Water environment temperature
- Actuator supply pressure
- Actuator output torque
- Actuator frame and spool piece internal pressures
- Microswitch (if supplied) operation and integrity
- Video verification of actuator open/close operations

### AVAILABLE CHAMBER OPTION

- Testing depth to 9843 ft (3000 m)



### STANDARD CHAMBER CHARACTERISTICS

| SIMULATED DEPTH | DIMENSIONS |
|---|---|
| To 1500 ft (450 m) | Inside Diameter: 7.2 ft (2200 mm)<br>Maximum Length: 21.5 ft (6550 mm) |

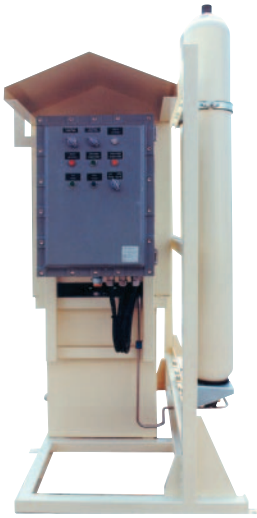
# Hydraulic Power Unit

### TYPICAL APPLICATION

Provides a reliable high pressure hydraulic output as a power source for hydraulic actuators.

### ELECTRIC MOTOR OPERATED

- Available for single or multi-actuator requirements
- 3 phase, VAC standard
- Emergency storage capability



### PORTABLE GASOLINE OR DIESEL OPERATED

- Mobile power source for individual actuator requirements
- Flexible hoses with quick disconnects

### SOLAR OPERATED

- Available for single or multi-actuator requirements
- Completely self-contained
- Emergency storage capability

### STANDARD PRODUCT CHARACTERISTICS

| POWER UNITS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| Electric, Gasoline, Diesel or Solar | -22˚ F to 212˚ F<br>-30˚ C to 100˚ C | 145 to 3000 psig<br>10 to 207 barg |

# Controls — High Pressure Gas

## TYPICAL APPLICATION

For local, remote or automatic control of any high pressure gas actuator utilizing a natural gas or nitrogen supply.

## STANDARD FEATURES

- Compact design with weatherproof enclosure
- All components have high pressure rating
- 3-stage gas filter/conditioner
- Easy operation of manual levers throughout pressure range
- Durable marine grade materials
- Easily converts from local to remote operation

## AVAILABLE OPTIONS

- Electric remote
- Electric failsafe
- Emergency shutdown
- High/low pressure shutdown
- Linebreak (diaphragm, digital or electronic)
- Station by-pass
- Various configurations or special requirements

## STANDARD PRODUCT CHARACTERISTICS

| CONTROL MODELS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| Local, Remote & Automatic | -76˚ F to 212˚ F<br>-60˚ C to 100˚ C | 145 to 1500 psig<br>10 to 104 barg |

# Controls — Low Pressure Pneumatic

### TYPICAL APPLICATION

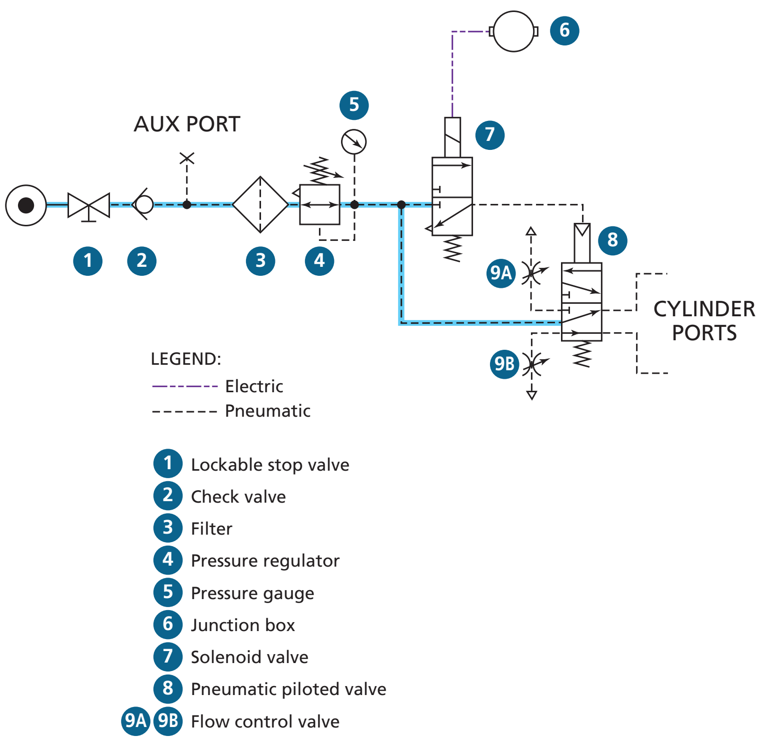
For local, remote or automatic control of any low pressure pneumatic actuator.

### STANDARD FEATURES

- Compact manifold design
- 316 stainless steel construction
- High flow capacity
- Accepts multiple solenoid brands
- Approved to NEMA and ATEX standards
- Control double-acting and spring return actuators
- Adaptable for custom applications
- FKM fluorocarbon Viton® seals
- SIL3 certification

### AVAILABLE OPTIONS

- Pilot or electrical control signal
- ASCO, Midland or Versa solenoid
- Lever or palm button manual operator
- Latching detent and manual reset devices
- Low power consumption
- EPDM seals for low temperature applications




### STANDARD PRODUCT CHARACTERISTICS

| CONTROL MODELS | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| Local, Remote & Automatic | -40° F to 200° F<br>-40° C to 93° C | 0 to 175 psig<br>0 to 12 barg |

# Position Monitoring Switches

## TYPICAL APPLICATION

For remote indication of any rotary requirement, primarily for quarter-turn valve actuators.

## STANDARD FEATURES

- Zytel®, aluminum or 316 SS enclosures
- Ingress protection rated IP67
- Explosion-proof rated Exd IIc T6 IP67
- Approved to ATEX and CENELEC standards
- 12 contact terminal strip
- High visibility dome indicator
- SPDT mechanical switches
- NPT or metric cable entries
- Namur mounting
- Easy to set colored cams

## AVAILABLE OPTIONS

- Ingress protection rated IP68
- DPDT mechanical switches
- Proximity switches
- Position transmitter


PMS 100


PMS 300


PMS 500

## STANDARD PRODUCT CHARACTERISTICS

| SWITCH MODEL | TEMPERATURE RANGE | INDICATOR COLORS |
|---|---|---|
| PMS | -67˚ F to 185˚ F<br>-55˚ C to 85˚ C | Red/Yellow<br>Red/Green |

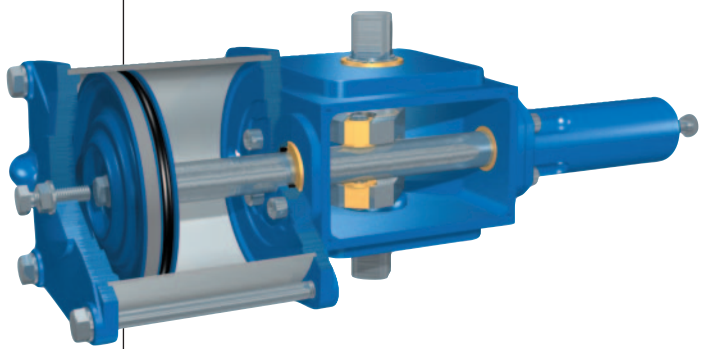
# Quarter-Turn Pneumatic

### TYPICAL APPLICATION

For on/off or modulating control of any ball, plug or butterfly valve utilizing compressed air, natural gas or nitrogen actuator supply.


### STANDARD FEATURES

- Available as double acting or spring return
- Torque outputs to 9700 in-lbs (1100 Nm)
- Ductile iron body, piston and end caps
- Stainless steel cylinders
- Symmetric yoke
- Aluminum bronze sliding blocks in yoke
- Composite guide sleeve on piston
- Open and close travel stops
- Local position indication



### AVAILABLE OPTIONS

- Mechanical jackscrew override
- Fluorosilicone seals for low temperature applications -76˚ F (-60˚ C)
- Viton® seals for high temperature applications 392˚ F (200˚ C)

### STANDARD PRODUCT CHARACTERISTICS

| ACTUATOR MODEL | TEMPERATURE RANGE | PRESSURE RANGE |
|---|---|---|
| VA | -22˚ F to 212˚ F<br>-30˚ C to 100˚ C | 40 to 174 psig<br>3 to 12 barg |

CAMERON

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HSE Policy Statement
At Cameron, we are committed ethically, financially and personally to a working environment where no one gets hurt, nothing gets harmed.