

Scotch-Yoke LEDEEN Actuators

Gas-over-oil and direct-gas actuators

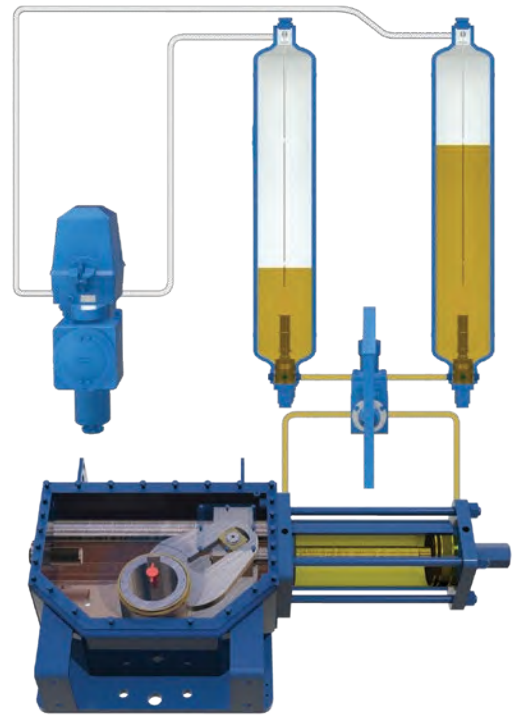
Scotch-Yoke Gas-Over-Oil LEDEEN Actuators

Typical application

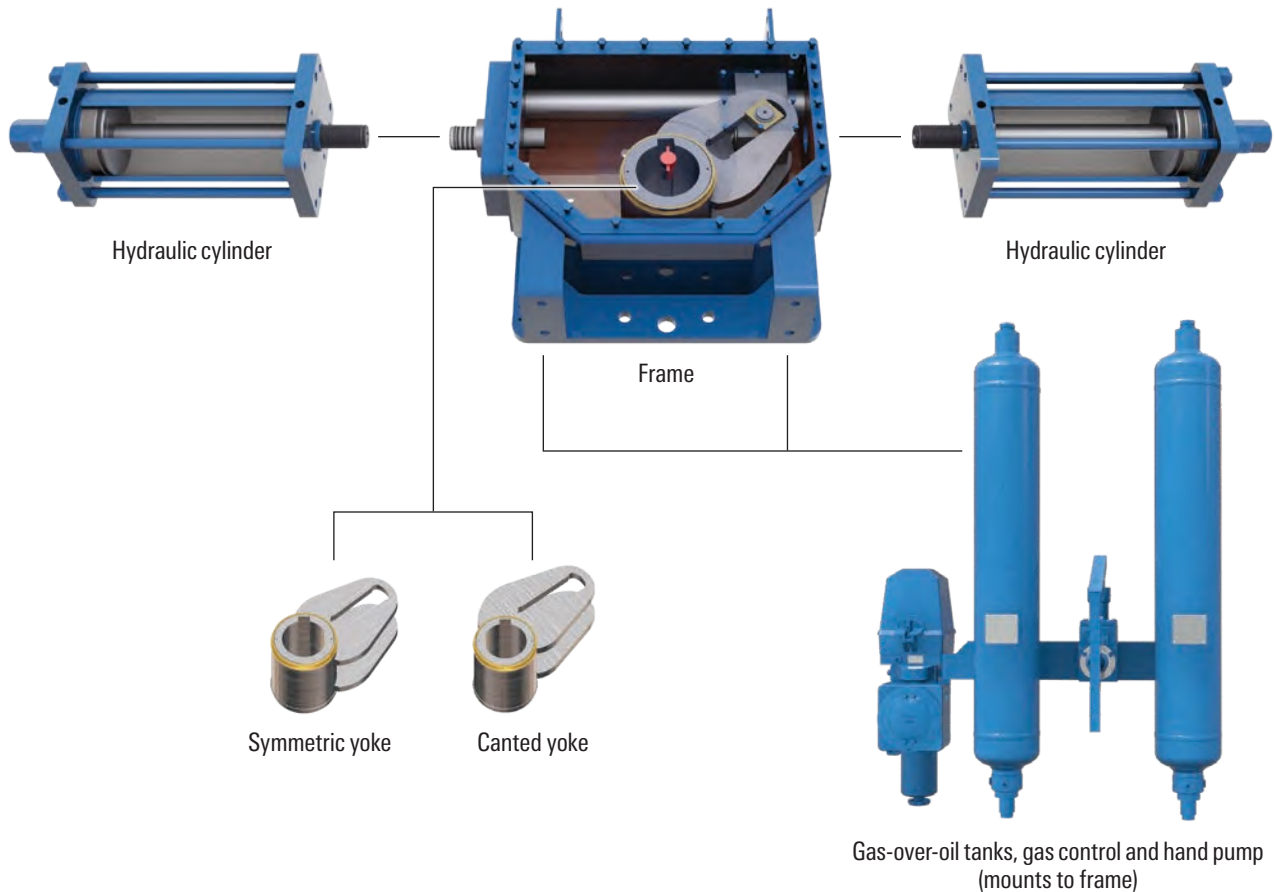
For on-off control of any natural gas transmission ball or plug valve utilizing the high-pressure natural gas from the pipeline with a gas-over-oil configuration

Modular assembly

Scotch-yoke gas-over-oil LEDEEN* actuators provide increased flexibility through consistent engineering design and efficient modularity. Double-acting, single-cylinder, and dual-cylinder options are available to meet specific pipeline application requirements.



Quarter-turn gas-over-oil actuator.



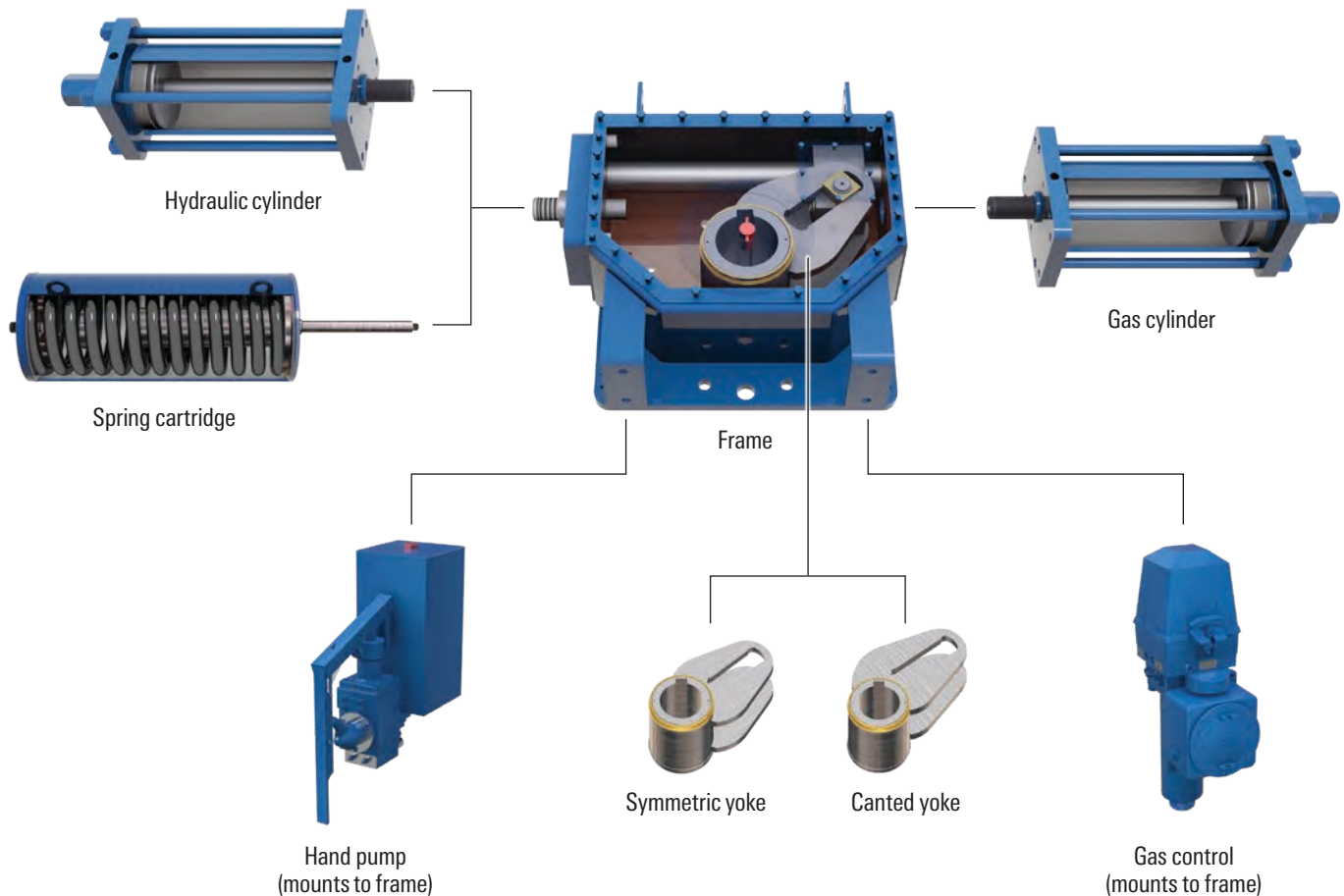
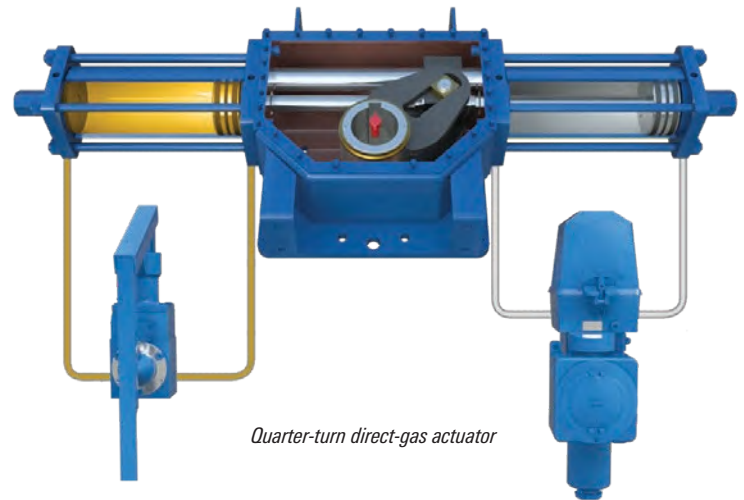
Scotch-Yoke Direct-Gas LEDEEN Actuators

Typical application

For on-off control of any natural gas transmission ball or plug valve utilizing the high-pressure natural gas from the pipeline with a direct-gas configuration

Modular assembly

Consistent engineering design and efficient modular assembly allows increased flexibility to be achieved. Double-acting, dual-cylinder, and spring-return options are available to meet specific pipeline application requirements.



Quarter-Turn Gas-Over-Oil Standard Features

- Single- or dual-cylinder models available
- Torque outputs to 5,700,000 in.lbf [644,000 N.m]
- Open and close travel stops provide $\pm 3^\circ$ minimum
- 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 and stem side loading
- Bronze bushing interfaces provide low-friction support of sliding and rotating components
- Aluminum bronze sliding blocks for a low-friction, low-stress pin connection
- Steel cylinder assembly provides robust pressure containment for all conditions
- Cylinder ID plated to ensure excellent sealing surface with enhanced corrosion resistance
- Nitrile rubber piston seal configurations specifically designed for gas-over-oil applications
- Composite guide band on piston provides low-friction guidance and support
- ASME and PED gas-over-oil pressure vessels complete with dipstick, hydraulic filter, and adjustable speed controls
- High-pressure-rated gas controls for local, remote, and automatic operations
- Hydraulic manual override with four-position selector valve, purging port, and breakdown-style pump lever



Single cylinder.



Dual cylinder.

Standard Product Characteristics

Actuator Type	Temperature Range, degF [degC]	Gauge Pressure Range, psi [bar]
Gas over oil	-22 to 212 [-30 to 100]	145 to 1,500 [10 to 104]

Quarter-Turn Direct-Gas Standard Features

- All double-acting models are dual cylinder
- Gas cylinder dedicated to generating torque, and hydraulic cylinder dedicated to smooth speed control and manual override with hand pump
- Torque outputs to 5,700,000 in.lbf [644,000 N.m]
- Open and close travel stops provide $\pm 3^\circ$ minimum
- 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 and stem side loading
- Bronze bushing interfaces provide low-friction support of sliding and rotating components
- Aluminum bronze sliding blocks for a low-friction, low-stress pin connection
- Steel cylinder assembly provides robust pressure containment for all conditions
- Cylinder ID plated to ensure excellent sealing surface with excellent corrosion resistance
- Nitrile rubber piston seal configurations specifically designed for direct-gas applications
- Composite guide band on piston provides low-friction guidance and support
- Seal-welded, steel-spring cartridge provides maximum personnel safety and resistance to environmental conditions
- Epoxy coated, prestressed springs provide consistent performance with corrosion protection
- High-pressure rated gas controls for local, remote, and automatic operations
- Hydraulic manual override with three-position selector valve, dual-speed controls, purging port, and breakdown-style pump lever



Double acting.

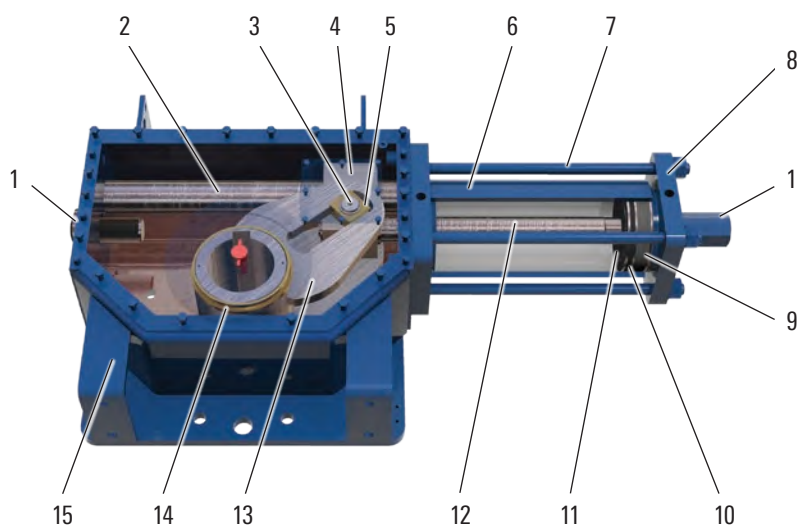


Spring return.

Standard Product Characteristics

Actuator Type	Temperature Range, degF [degC]	Gauge Pressure Range, psi [bar]
Direct gas	-22 to 212 [-30 to 100]	145 to 1,500 [10 to 104]

Gas-Over-Oil Standard Construction



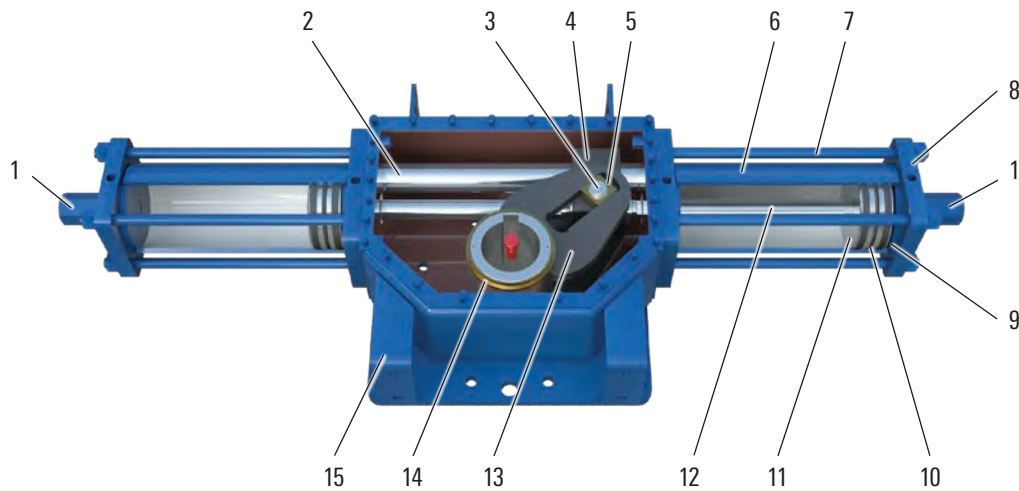
Single-cylinder assembly.



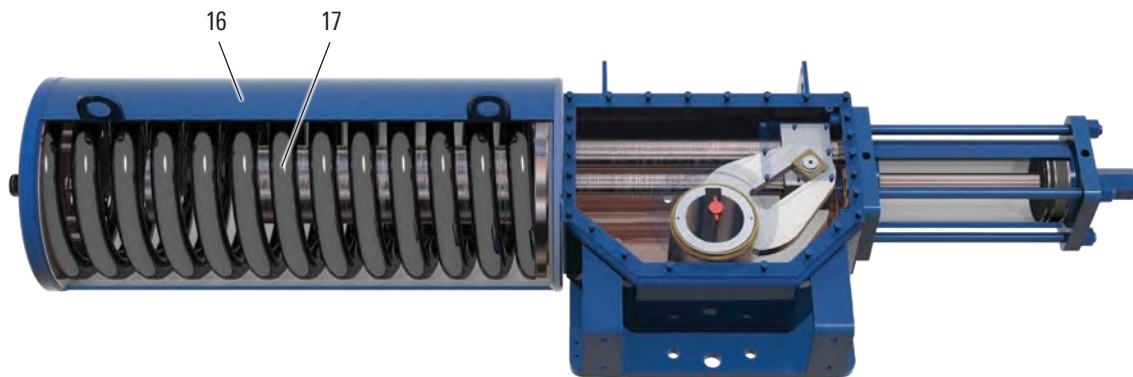
Dual-cylinder assembly.

Item	Description	Material
1	Travel stop	Alloy steel
2	Guide bar	Alloy steel
3	Pin	Alloy steel
4	Guide block	Carbon steel
5	Sliding block	Aluminum bronze
6	Cylinder	Carbon steel
7	Tie rod	Alloy steel
8	Flange	Carbon steel
9	Guide band	PTFE and graphite
10	Seal	Nitrile rubber quad ring
11	Piston	Carbon steel
12	Piston rod	Alloy steel
13	Scotch yoke	Alloy steel
14	Bushing	Bronze
15	Frame	Carbon steel

Direct-Gas Standard Construction



Double-acting assembly.



Spring-return assembly.

Item	Description	Material
1	Travel stop	Alloy steel
2	Guide bar	Alloy steel
3	Pin	Alloy steel
4	Guide block	Carbon steel
5	Sliding block	Aluminum bronze
6	Cylinder	Carbon steel
7	Tie rod	Alloy steel
8	Flange	Carbon steel
9	Guide band	PTFE and graphite
10	Seal	Nitrile rubber quad ring
11	Piston	Carbon steel
12	Piston rod	Alloy steel
13	Scotch yoke	Alloy steel
14	Bushing	Bronze
15	Frame	Carbon steel
16	Spring cartridge	Carbon steel
17	Spring	Alloy steel

Standard Accessories

High-pressure gas control assembly

- Compact design with weather-resistant enclosure
- Controls of hard anodized marine-grade aluminum material
- Stainless steel filter with molecular sieve to condition supply gas
- All control configurations are high-pressure rated
- Compact, easy-to-operate thumb levers for local operation
- Conversion from local to remote with integrated explosion-proof solenoids
- Extensive combination of automatic features available for meeting specific requirements of emergency shutdown

Hand pump assembly

- Easily generates a high-pressure hydraulic output to the actuator
- Multiposition selector valve for open, close, and remote functions (bypass position included on gas-over-oil model)
- Integrated pilot feature assures selector valve position does not inhibit power operation of actuator during remote or automatic functions
- Lockable, breakdown-style pump lever secures selector valve in remote position
- Purging feature that allows hydraulic circuit to expel trapped air



Control assembly.



Gas-over-oil hand pump assembly.



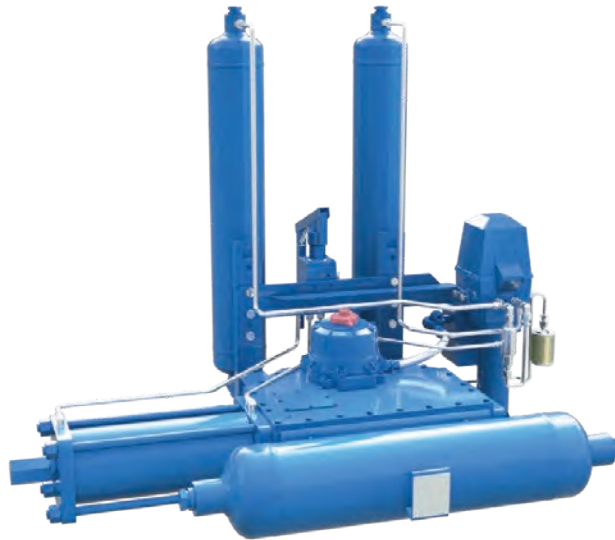
Direct-gas hand pump assembly.

Standard Options

- ASME and PED emergency storage vessels
- Materials of constructions for service conditions down to -50 degF [-45 degC]
- Special seals for low-temperature applications to -76 degF [-60 degC] and for high-temperature applications to 392 degF [200 degC]
- Spring-return direct-gas configurations with hydraulic dampening



Direct-gas assembly with emergency storage vessel.



Single-cylinder gas-over-oil assembly with emergency storage vessel.

Certifications

Our scotch-yoke LEDEEN actuators comply with many industry standards.

- ISO 9001:2000
- PED 97/23/EC
- SI 825
- IEC 61508:2000 (TUV SIL-3)
- Technical Regulations Customs Union (TR CU)



ISO 9001:2008

ISO 9001:2008 quality management system.



PED 97/23/EC

European PED—pressure equipment directive.



IEC 61508-1÷7:2010

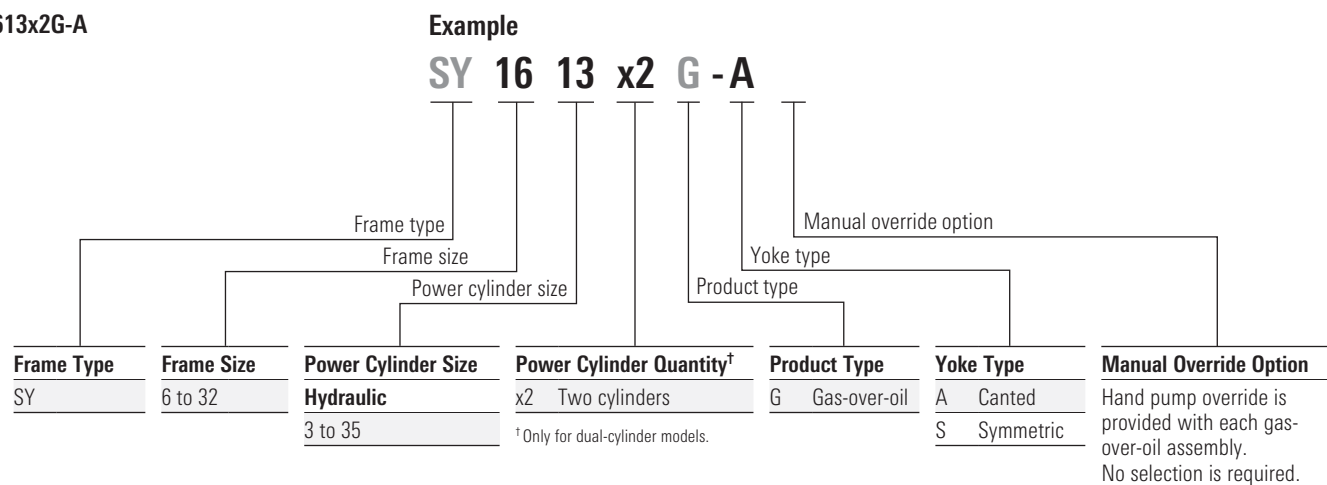
SIL 3 capability.

Model Number Designation

Cameron offers customizable assemblies for LEDEEN SY series gas-over-oil and direct-gas actuators. An example model number for each actuator configuration is shown. By sequentially proceeding through each variable, the specific subassemblies of either actuator type can be clearly identified.

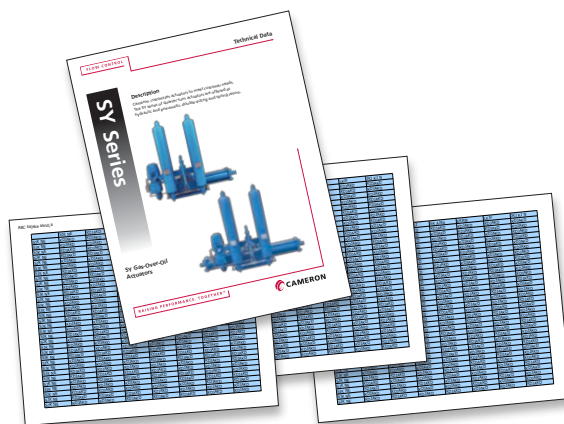
Gas over oil

SY1613x2G-A



Technical data

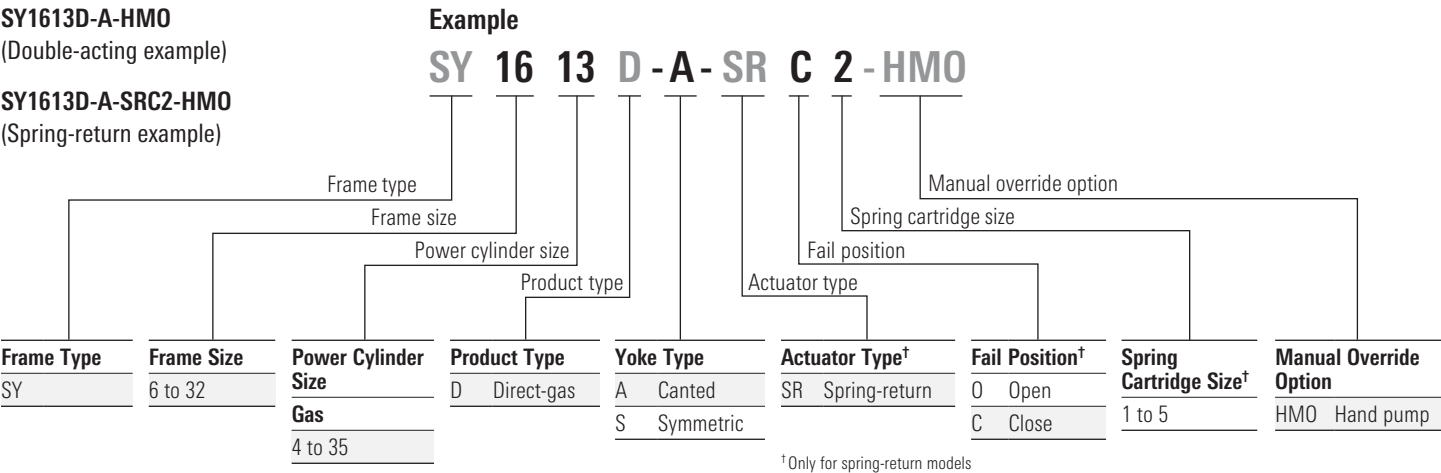
For additional technical data such as torque charts, dimensional drawings, etc., refer to the scotch-yoke gas-over-oil LEDEEN actuators technical data package or contact Cameron.



Direct gas

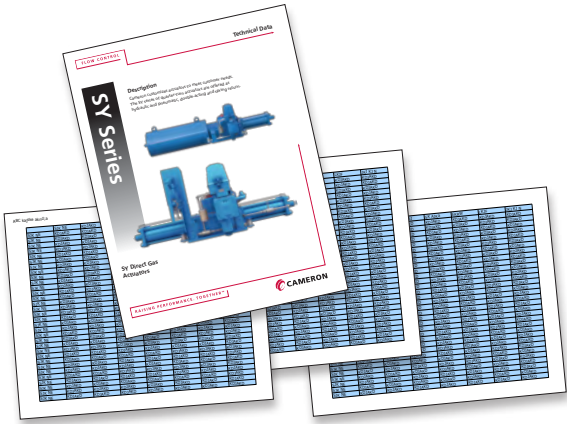
SY1613D-A-HMO
(Double-acting example)

SY1613D-A-SRC2-HMO
(Spring-return example)

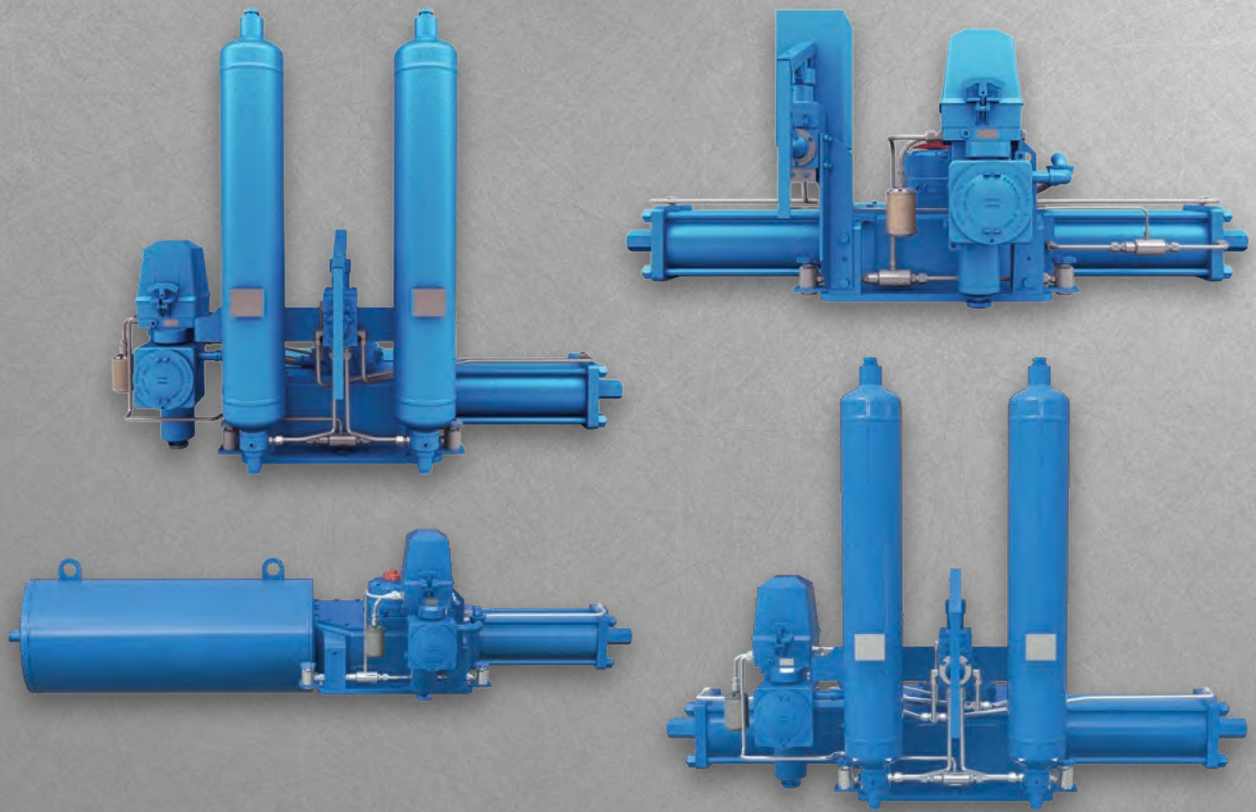


Technical data

For additional technical data such as torque charts, dimensional drawings, etc., refer to the scotch-yoke direct-gas LEDEEN actuators technical data package or contact Cameron.



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