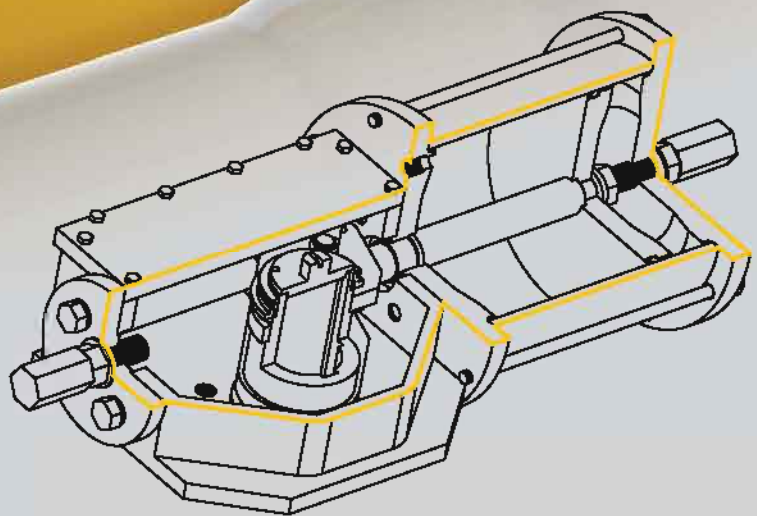


Heavy Duty Pneumatic and Hydraulic actuators

Sy-Pa



Modular Design

Symmetric or Canted Yoke Design

Scotch Yoke Mechanism

Emergency Manual Override Design



INTRODUCTION

Sy-Pa heavy duty scotch yoke actuators offer a broad range of torques to 100,000 N-m (885,000 lb. in.)

The APHD and APHS series is designed for on-off or modulating control of any quarter-turn ball, butterfly, rotary plug or damper style valve application.

Our standard offering is the symmetrical design yoke that delivers maximum torque at both ends of the 90° cycle.

FEATURE

Modular construction allowing for complete interchangeability.

Scotch yoke design generates high break torque needed for the actuation of many quarter-turn valves.

Weatherproof housing fabricated from carbon steel ensures light weight and high strength.

Graphite-impregnated PTFE piston bearing reduces friction between the piston and cylinder bore and allows the cylinder to be operated without lubrication.

Hard chromium plated on guide bar provides corrosion resistance and minimal friction loads.

Fully encapsulated factory welded spring cartridge to ensure personnel safety and simplified assembly.

ISO 5211 mounting pattern promotes easier valve adaptation by utilizing internationally recognized standards.

External travel stops allow precise adjustments of $\pm 7^\circ$ rotation at each end of travel.

Symmetric steel scotch yoke mechanism to suit most valve torque requirements.

Emergency manual override hand wheel or hydraulic override, jack-screw overrides available on request.

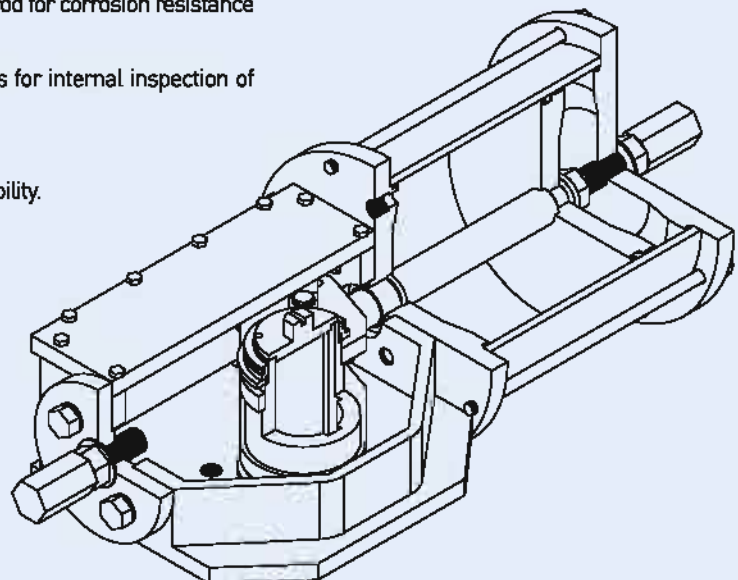
Carbon steel piston supported by high strength alloy steel chromium plated piston rod ensure corrosion resistant durability.

Hard chromium plated and polished guide bar and piston rod for corrosion resistance and minimal friction.

Easily removable housing cover provides effortless access for internal inspection of yoke mechanism.

Special coatings for offshore or corrosive environments.

Modular construction allowing for complete interchangeability.





HEAVY DUTY PNEUMATIC QUARTER-TURN ACTUATORS

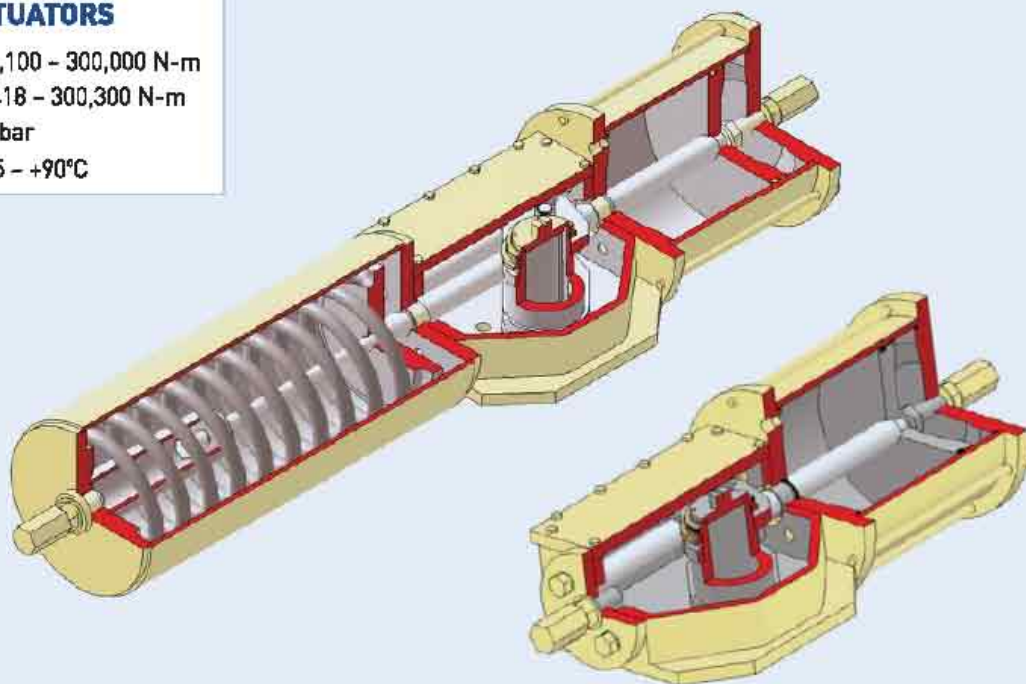
PNEUMATIC ACTUATORS

DOUBLE ACTING : 1,100 - 300,000 N-m

SPRING RETURN : 418 - 300,300 N-m

PRESSURE : 3.6 - 9 bar

TEMPERATURE : -25 - +90°C



HEAVY DUTY HYDRAULIC QUARTER-TURN ACTUATORS

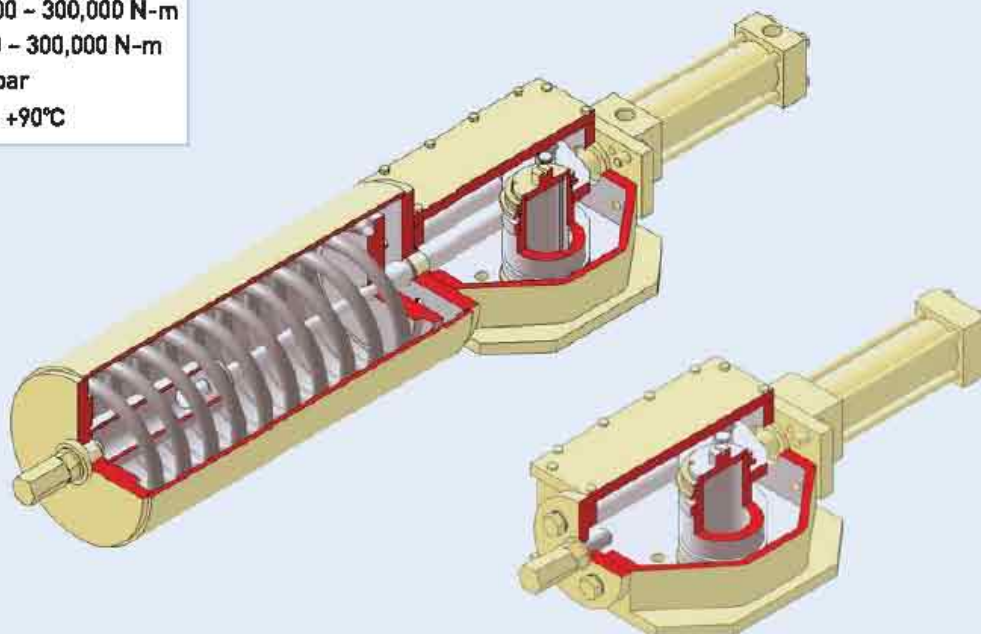
HYDRAULIC ACTUATORS

DOUBLE ACTING : 1,000 - 300,000 N-m

SPRING RETURN : 420 - 300,000 N-m

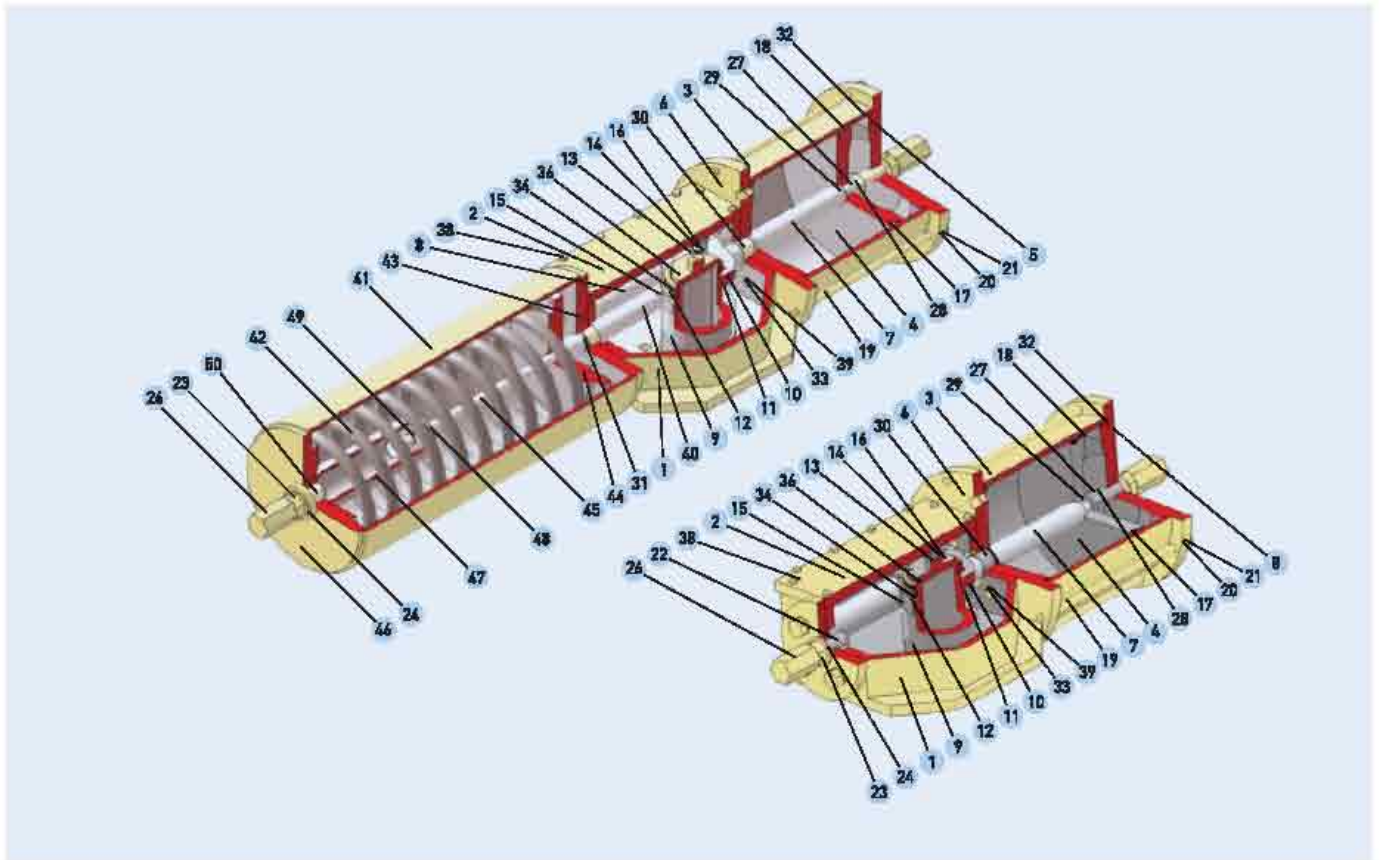
PRESSURE : 30 - 170 bar

TEMPERATURE : -25 - +90°C





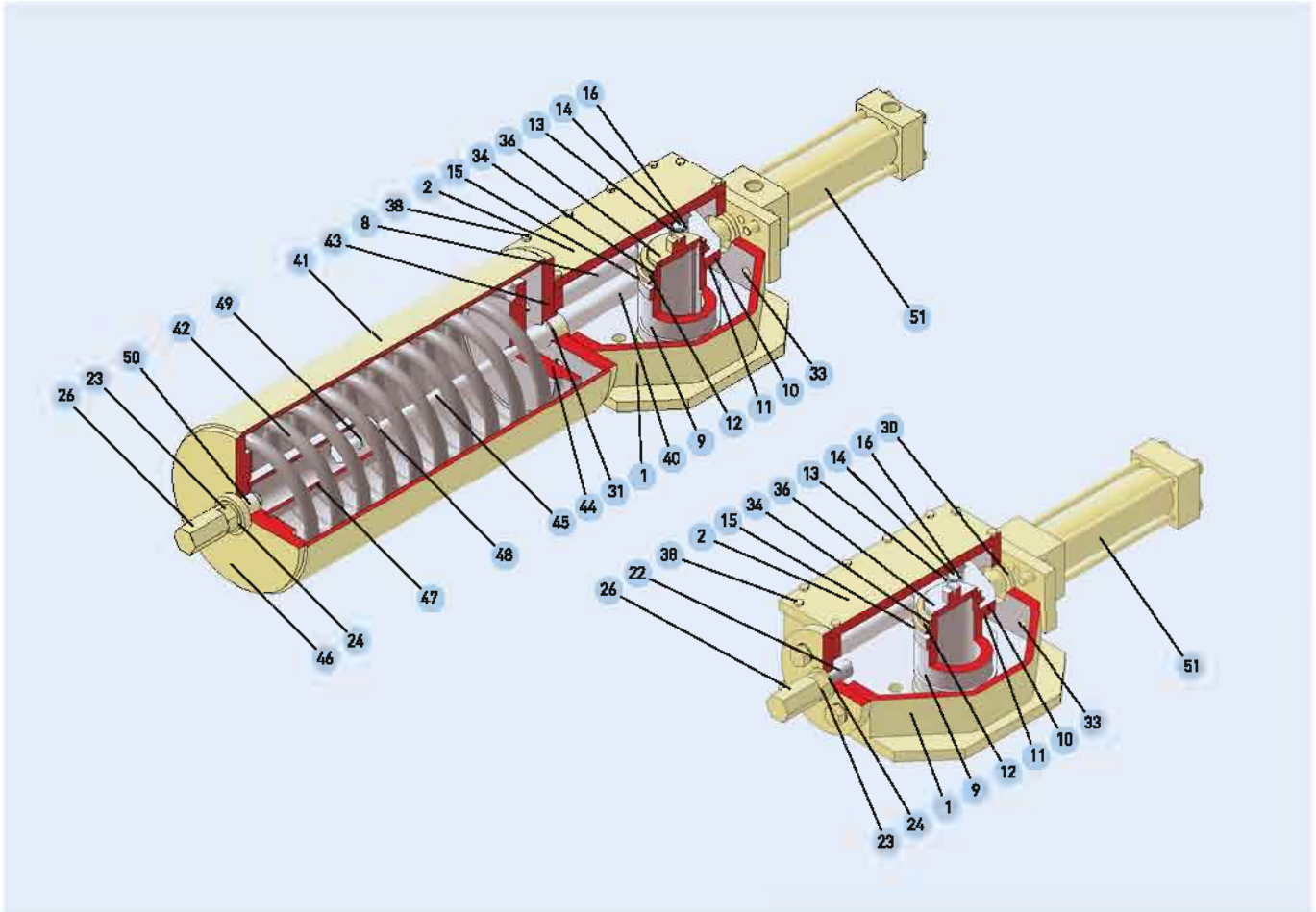
PNEUMATIC Double acting and spring return



ITEM	DESCRIPTION	Q'TY	MATERIAL
1	HOUSING	1	CARBON STEEL
2	HOUSING COVER	1	CARBON STEEL
3	CYLINDER TUBE	1	CARBON STEEL (Ni PLATED)
4	PISTON	1	CARBON STEEL
5	END FLANGE	1	CARBON STEEL
6	FRONT FLANGE	1	CARBON STEEL
7	PISTON ROD	1	ALLOY STEEL (Cr PLATED)
8	GUIDE ROD	1	ALLOY STEEL (Cr PLATED)
9	YOKE	1	CARBON STEEL
10	YOKE PLATE	2	CARBON STEEL
11	GUIDE BLOCK	1	CARBON STEEL
12	YOKE BUSHING	2	BRONZE
13	SLIDING BLOCK	2	CARBON STEEL
14	GUIDE BLOCK PIN	1	ALLOY STEEL
15	GUIDE BLOCK BUSHING	2	BRONZE
16	SNAP RING	2	ALLOY STEEL
17	PISTON O-RING	1	FKM
18	PISTON WAER RING	1	PTFE+GRAPHITE
19	CYLINDER BOLT	-	CARBON STEEL
20	CYLINDER WASHER	-	CARBON STEEL
21	CYLINDER NUT	-	CARBON STEEL
22	ADJUST BOLT	2	CARBON STEEL
23	ADJUST NUT	2	CARBON STEEL
24	ADJUST WASHER	2	CARBON STEEL
25	ADJUST O-RING	2	FKM
26	ADJUST BOLT COVER	2	CARBON STEEL

ITEM	DESCRIPTION	Q'TY	MATERIALS
27	PISTON ROD WASHER	1	CARBON STEEL
28	PISTON ROD NUT	1	CARBON STEEL
29	PISTON ROD O-RING	1	FKM
30	FLANGE BUSHING	1	BRONZE
31	FLANGE O-RING #1	1	FKM
32	FLANGE O-RING #2	2	FKM
33	FLANGE BOLT	-	CARBON STEEL
34	YOKE BUSHING O-RING #1	2	FKM
35	YOKE BUSHING O-RING #2	2	FKM
36	TOP PAD	1	CARBON STEEL
37	FLANGE BOLT	-	CARBON STEEL
38	HOUSING COVER BOLT	-	CARBON STEEL
39	FLANGE BOLT O-RING	-	FKM
40	SPRING ROD	1	CARBON STEEL
41	SPRING TUBE	1	CARBON STEEL
42	SPRING	1	SPRING STEEL
43	SPRING FRONT FLANGE	1	CARBON STEEL
44	SPRING THRUST FLANGE	1	CARBON STEEL
45	SPRING GUIDE ROD	1	CARBON STEEL
46	SPRING END FLANGE	1	CARBON STEEL
47	SPRING POCKET TUBE	1	CARBON STEEL
48	SPRING POCKET RING	1	CARBON STEEL
49	SPRING POCKET BUSHING	1	BRONZE
50	SPRING ADJUST ADAPTOR	1	CARBON STEEL
49	SPRING POCKET BUSHING	1	BRONZE
50	SPRING ADJUST ADAPTOR	1	CARBON STEEL

HYDRAULIC Double acting and spring return



ITEM	DESCRIPTION	QTY	MATERIAL
1	HOUSING	1	CARBON STEEL
2	HOUSING COVER	1	CARBON STEEL
8	GUIDE ROD	1	ALLOY STEEL [C ₇ PLATED]
9	YOKE	1	CARBON STEEL
10	YOKE PLATE	2	CARBON STEEL
11	GUIDE BLOCK	1	CARBON STEEL
12	YOKE BUSHING	2	BRONZE
13	SLIDING BLOCK	2	CARBON STEEL
14	GUIDE BLOCK PIN	1	ALLOY STEEL
15	GUIDE BLOCK BUSHING	2	BRONZE
16	SNAP RING	2	ALLOY STEEL
22	ADJUST BOLT	2	CARBON STEEL
23	ADJUST NUT	2	CARBON STEEL
24	ADJUST WASHER	2	CARBON STEEL
25	ADJUST O-RING	2	FKM
26	ADJUST BOLT COVER	2	CARBON STEEL
31	FLANGE O-RING #1	1	FKM
33	FLANGE BOLT	-	CARBON STEEL
34	YOKE BUSHING O-RING #1	2	FKM
35	YOKE BUSHING O-RING #2	2	FKM

ITEM	DESCRIPTION	QTY	MATERIALS
36	TOP PAD	1	CARBON STEEL
37	FLANGE BOLT	-	CARBON STEEL
38	HOUSING COVER BOLT	-	CARBON STEEL
40	SPRING ROD	1	CARBON STEEL
41	SPRING TUBE	1	CARBON STEEL
42	SPRING	1	SPRING STEEL
43	SPRING FRONT FLANGE	1	CARBON STEEL
44	SPRING THRUST FLANGE	1	CARBON STEEL
45	SPRING GUIDE ROD	1	CARBON STEEL
46	SPRING END FLANGE	1	CARBON STEEL
47	SPRING POCKET TUBE	1	CARBON STEEL
48	SPRING POCKET RING	1	CARBON STEEL
49	SPRING POCKET BUSHING	1	BRONZE
50	SPRING ADJUST ADAPTOR	1	CARBON STEEL
49	SPRING POCKET BUSHING	1	BRONZE
50	SPRING ADJUST ADAPTOR	1	CARBON STEEL
51	HYDRAULIC CYLINDER ASM	1	



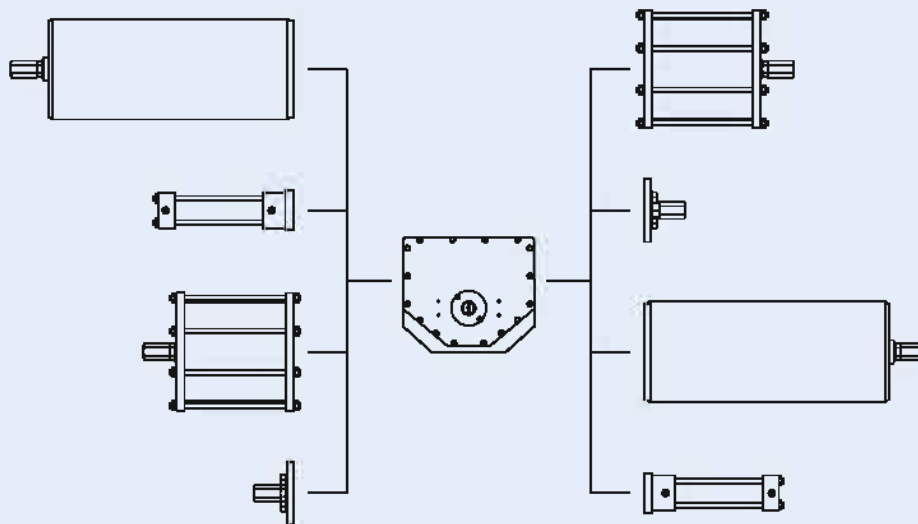
MODULAR VERSATILITY

Sy-Pa series actuators share a modular construction design.

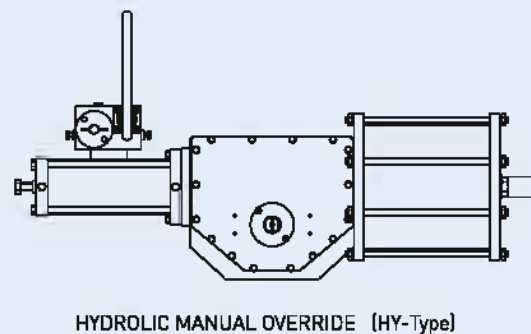
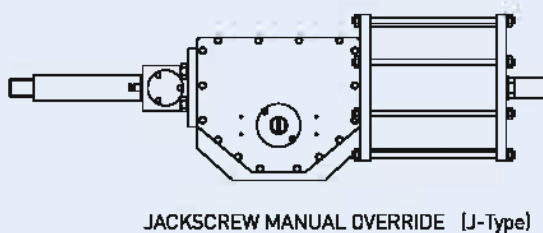
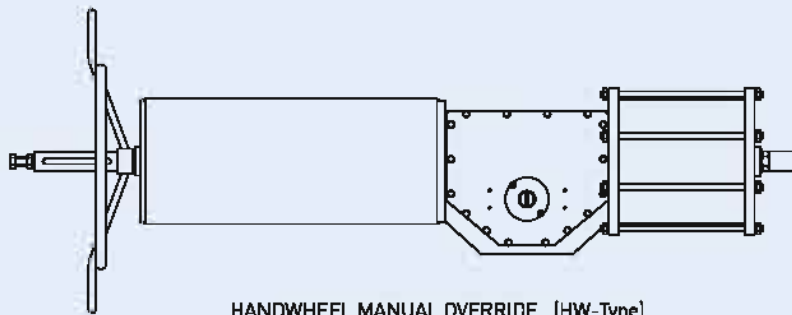
The center body is available in 6 sizes.

A pneumatic or hydraulic cylinder can be attached to either or both sides. A spring cartridge can also be fitted to either side for Failed Shut Down applications.

Modular construction and stocking of components by Sy-Pa and distributors facilitates quick delivery times.



MANUAL OVERRIDE





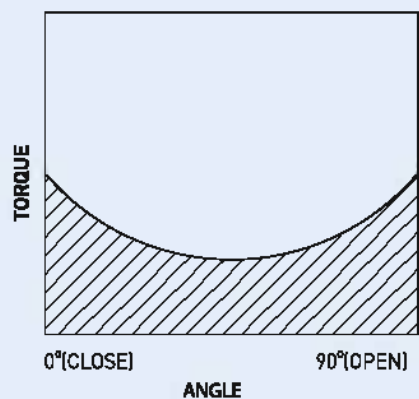
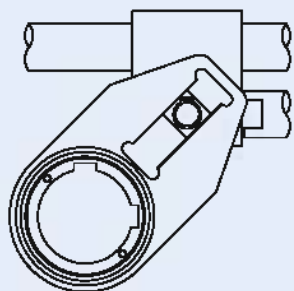
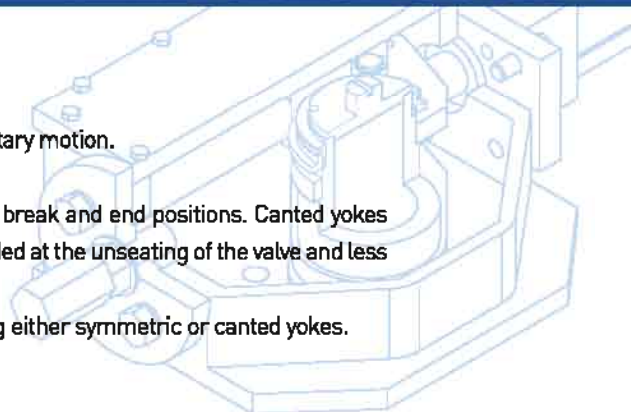
SYMMETRIC OR CANTED

The scotch yoke mechanism converts the actuator's linear piston movement into a rotary motion.

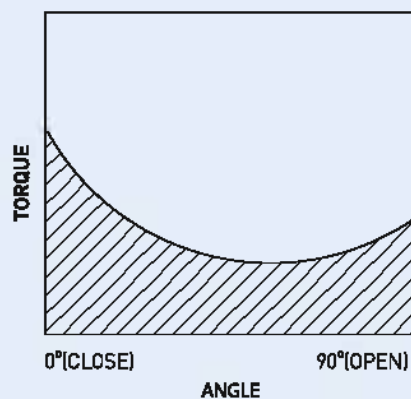
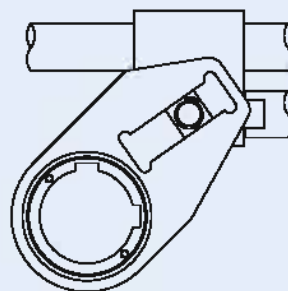
Sy-Pa actuators are available with symmetric or canted yokes.

Symmetric yokes are used when requirements call for efficient operation at both the break and end positions. Canted yokes have a torque advantage in applications where the break torque requirements are needed at the unseating of the valve and less critical at the run or full open positions.

The following graph illustrates the torque output curves for an identical actuator using either symmetric or canted yokes.



SYMMETRIC YOKE



CANTED YOKE





Heavy Duty Pneumatic and Hydraulic actuators



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