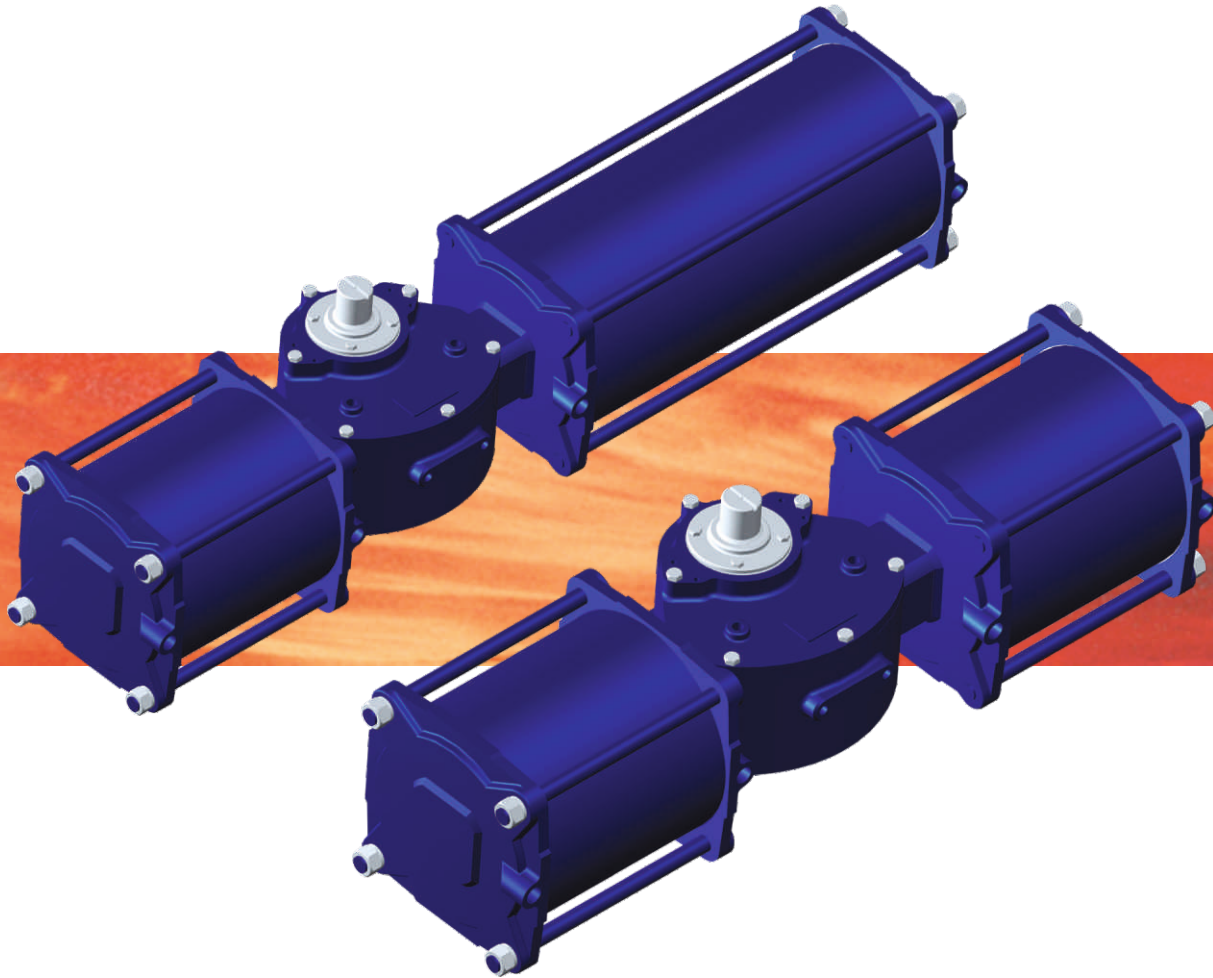




Series 25

Pneumatic Scotch Yoke Actuator
Double Acting and Spring Return

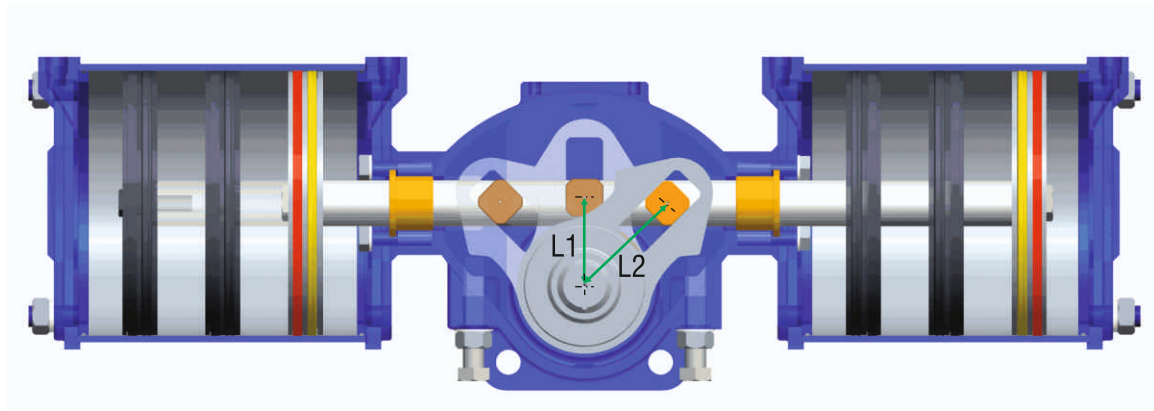


Leading the Industry with Innovation by Design

	
<h1>DNV BUSINESS ASSURANCE</h1> <h2>MANAGEMENT SYSTEM CERTIFICATE</h2>	
Certificate No. 7962/2010-AQ-IND-ROA Rev. 01	
<i>This is to certify that</i>	
<h3>DELVAL FLOW CONTROLS PVT. LTD.</h3>	
<i>at</i>	
Gat No. 25, 37, 43/1A, Village: Kavanthe, Tahsila: Khambhala, District: Satara - 412 801, Maharashtra, INDIA	
<i>has been found to conform to the Quality Management System Standard:</i>	
<h3>ISO 9001:2008</h3>	
<i>This certificate is valid for the following scope:</i>	
<h4>DESIGN, MANUFACTURE AND AFTER SALES SERVICE OF BUTTERFLY VALVES, BALL VALVES, ACTUATORS, LIMIT SWITCH BOX AND VALVE AUTOMATION SYSTEMS</h4>	
<i>Initial Certification date:</i> 29 July 2010	<i>Place and date of issue:</i> Chennai, 20 May 2015
<i>This Certificate is valid until:</i> 28 July 2016	<i>For the Accredited Body:</i> THE NATIONAL AGENCY FOR CERTIFICATION, PVT. LTD. HYDERABAD
	
<i>The audit has been performed under the supervision of</i>	
Shradh Lakshminide <i>Lead Auditor</i>	
Bhupalram Ajit <i>Management Representative</i>	

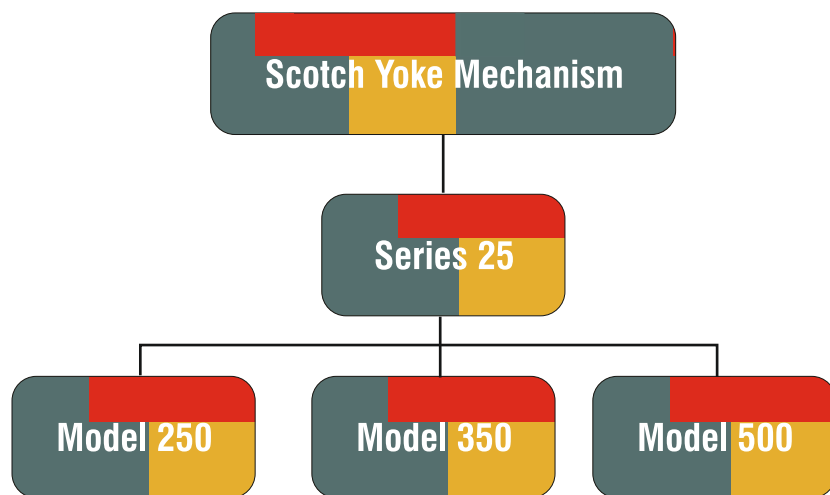
Scotch Yoke Mechanism

The scotch-yoke mechanism produces torque that closely matches the required torque characteristic of most quarter-turn valves. As per the characteristic of the valve, the scotch-yoke produces its highest torque at the start and the end of each stroke, providing maximum torque at opening & closing of the valve.



As the piston moves, the length of the moment arm is changing constantly. Because the effective moment arm is longest at the start and the end of the stroke (L2), the starting torque (torque output at the start and the end of a stroke) approaches nearly twice the magnitude of the minimum torque (L1) (torque output at the shortest moment arm length). Thus, scotch yoke mechanism torque output allows the use of a smaller piston, shorter moment arm and lower operating pressures than many other mechanisms.

Classification:



Design and Construction Series 25 - Model 250/350/500

Design Features

1. Ductile Iron Housing provides better strength with water ingress protection meeting IP 67 grade.

2. Hard Chrome Plated, Honed Finished Cylinder Bore increases seal life.

3. Hard Chrome Plated Steel Piston Rod provides strength and corrosion resistance for enduring high cycle applications.

4. Heat Treated Stainless Steel Thrust Pin transfers piston force to the steel yoke for efficient transmission of torque.

5. Guide Bands And Piston Quad Seals ensure low-friction piston guidance during operation to protect cylinder walls from potential scoring and provide continuous cylinder wiping action.

6. Spring Return Actuators pre-piped with stainless steel tubing to provide air to both pistons with one single connection.

7. Compact Design utilizing a unique two piston design.

8. Unique "Safe Spring Cartridge" Design allows the actuator to be safely assembled and disassembled in the field without the need for special tools. A double acting actuator can be converted to spring return unit by simply changing the cylinder and installing corresponding size of spring cartridge assembly. A spring return can be converted to a double acting actuator by removing the spring cartridge.

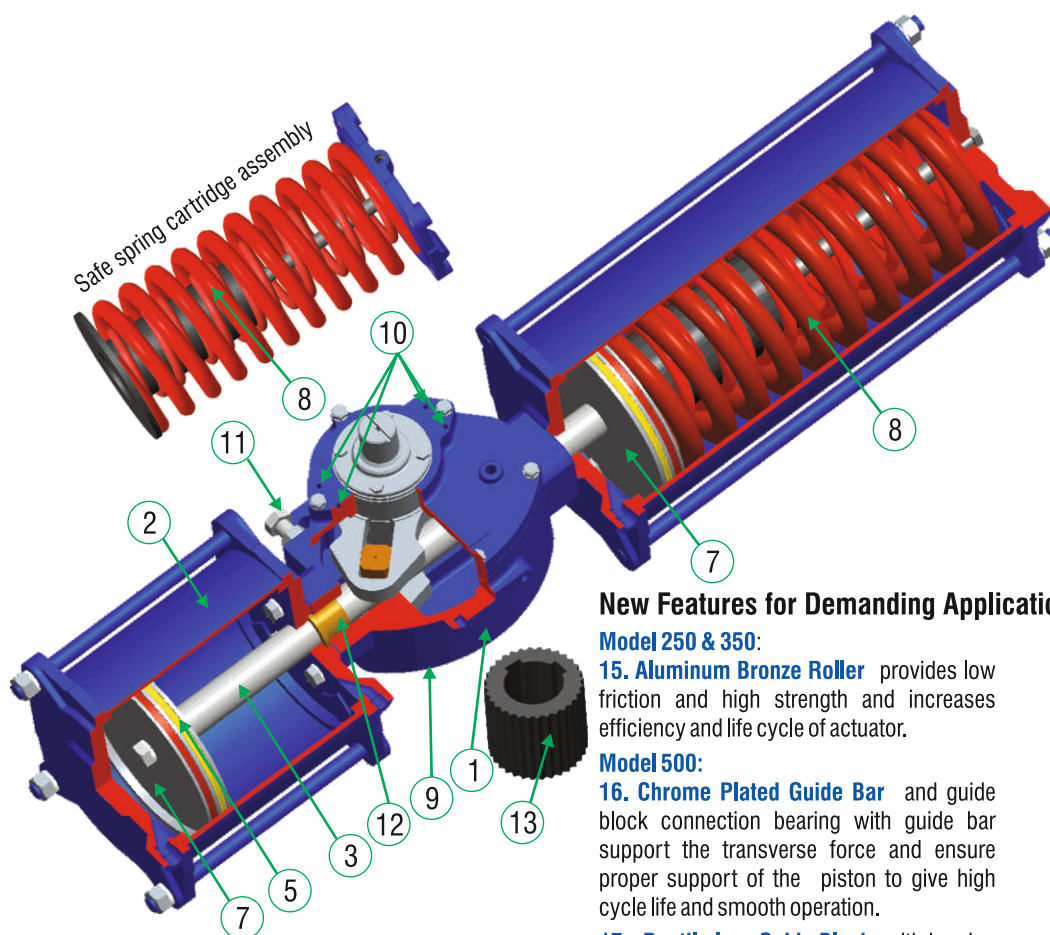
9. ISO 5211 Mounting Pattern provides easy valve / actuator mounting using international standards.

10. Top Cover Drilled To Namur Standards Namur drive slot in shaft on top of yoke enables accessory driven components to maintain a compact assembly.

11. Bi-directional Travel Stop located in the main housing to provide adjustment in open and closed direction $\pm 5^\circ$.

12. Phosphor Bronze Piston Rod Bushing provides low-friction support. Precise alignment of the piston rod increases efficiency and provides extended actuator life and efficient torque transmission.

13 & 14. High Strength Yoke The yoke is a very critical part of the scotch yoke actuator. This part is most often where the life of the actuator is controlled. The yoke converts the linear force to torque. On 250 yoke arm DelTorq® uses 17-4 Ph stainless steel as standard for this critical part. Unique hollow yoke design permits the use of a universal adapter for direct mounting to quarter turn valves.



New Features for Demanding Applications:

Model 250 & 350:

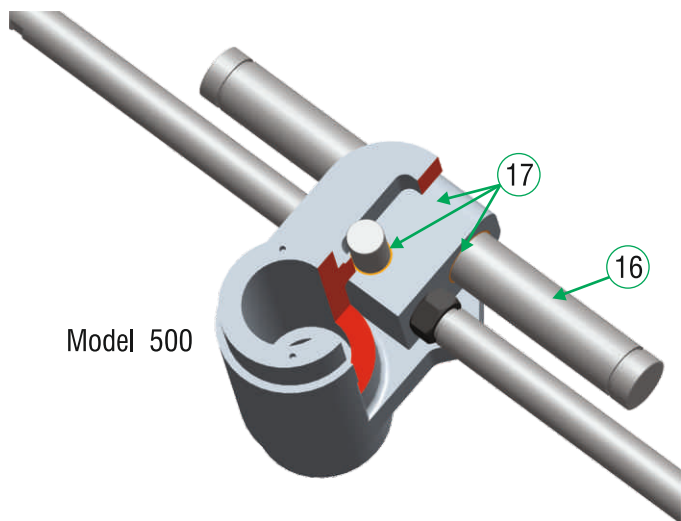
15. Aluminum Bronze Roller provides low friction and high strength and increases efficiency and life cycle of actuator.

Model 500:

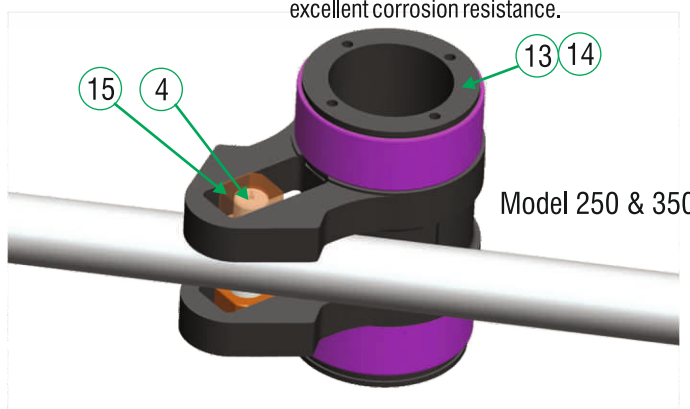
16. Chrome Plated Guide Bar and guide block connection bearing with guide bar support the transverse force and ensure proper support of the piston to give high cycle life and smooth operation.

17. Ductile Iron Guide Block with bearing ensures proper lubrication to pin & guide bar, provides low friction and increases efficiency of the actuator.

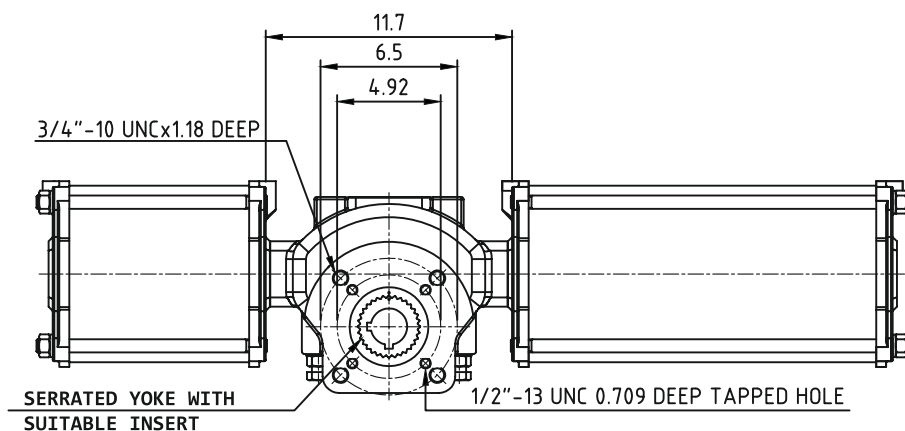
18. Corrosion Protection All casting components are coated on all surfaces through a process of liquid passivation based on trivalent chromium to achieve excellent corrosion resistance.



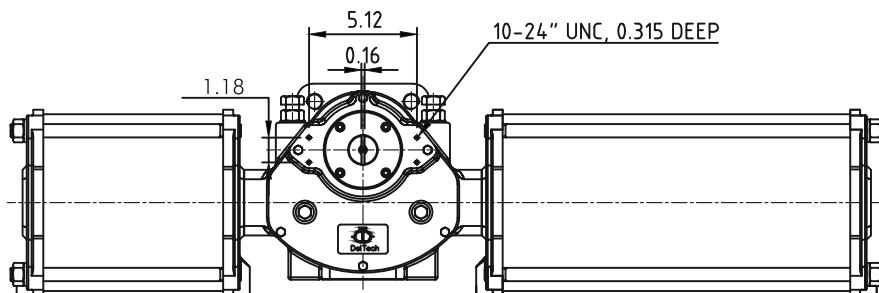
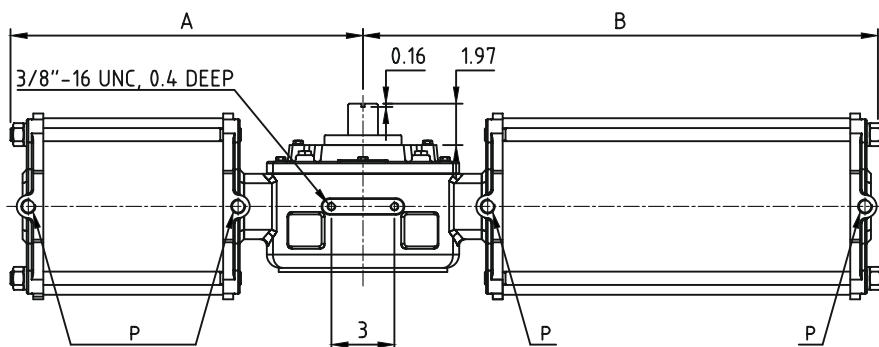
Model 500



Model 250 & 350



MODEL	App. Weight in (Lb)				
	DA	SR 40	SR 60	SR 80	SR 100
250-06	121	136.5	143	154	171.6
250-07	143	169.5	176	187	198
250-08	165	202.5	209	220	255.2
250-10	253	312.5	319	330	334.5



MODEL	VOLUME (Inch ³)
	Open / Close
250-06	380
250-07	432
250-08	682
250-10	1053

Spring Return Torques (Lb-Inch)

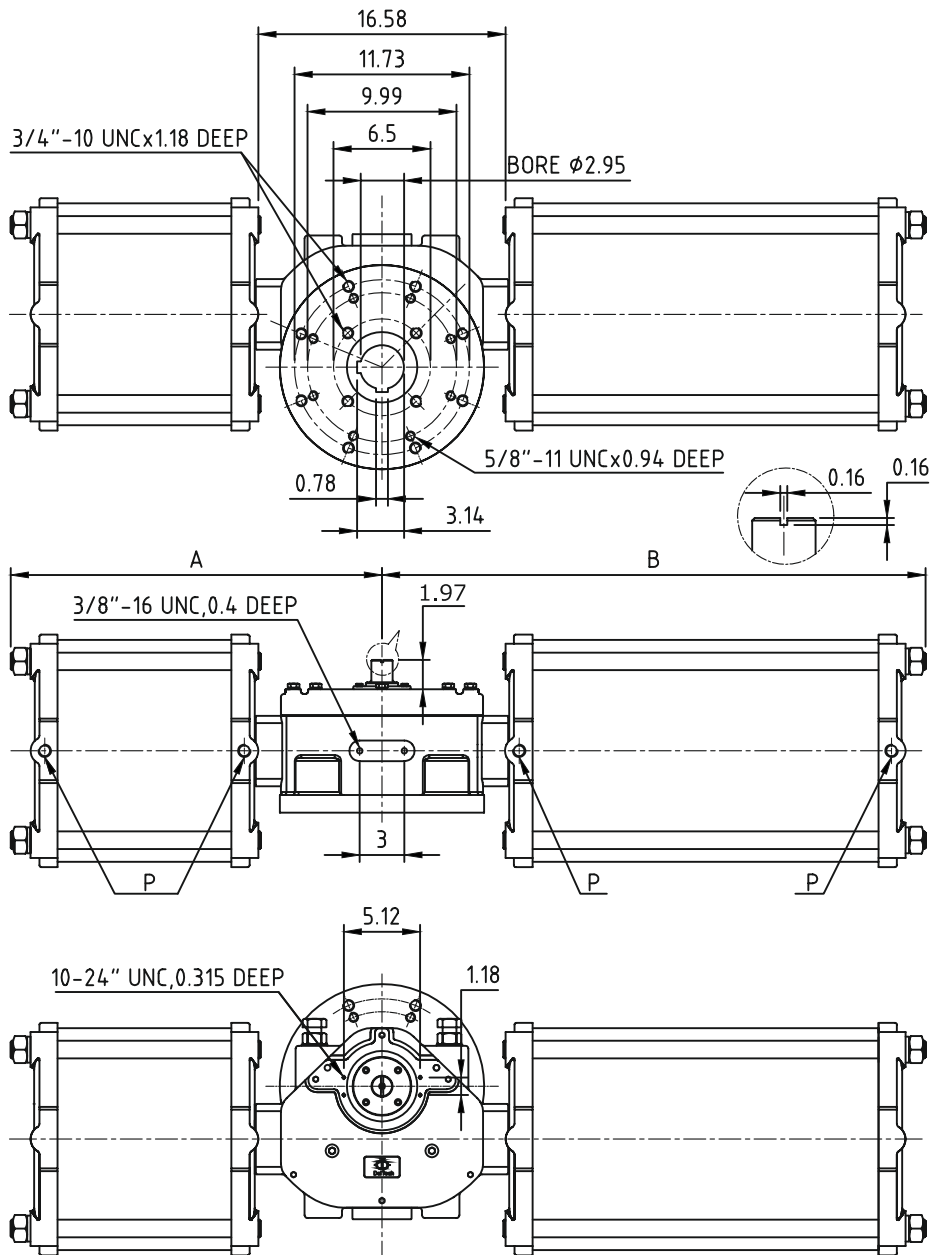
MODEL	TORQUE (Lb-Inch)	AIR SUPPLY PRESSURE (Psi)			
		40	60	80	100
250-06	PB	4921	7381	10709	13390
	PE	2735	4098	4593	5735
	SB	4699	7053	10239	12797
	SE	2611	3912	4390	5487
	RUN	1965	2956	3938	4921
250-07	PB	6744	10116	14691	18355
	PE	3744	5620	6292	7868
	SB	6452	9673	14036	17550
	SE	3584	5372	6018	7523
	RUN	2699	4053	5399	6753
250-08	PB	8770	13160	17550	23877
	PE	4868	7310	9744	10231
	SB	8390	12576	16771	22824
	SE	4655	6983	9310	9779
	RUN	3513	5266	7027	8779
250-10	PB	13735	20603	29904	37382
	PE	7629	11443	12815	16019
	SB	13133	19691	28586	35736
	SE	7292	10939	12248	15311
	RUN	5496	8248	10992	13744

Double Acting Torques (Lb-Inch)

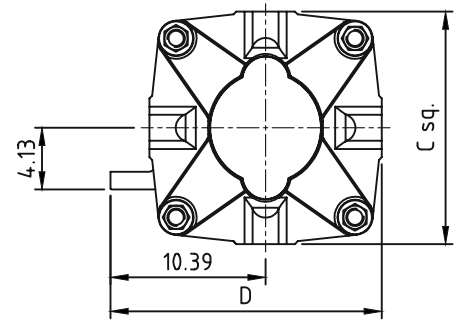
MODEL	TORQUE (Lb-Inch)	AIR SUPPLY PRESSURE (Psi)			
		40	60	80	100
250-06	BREAK	7310	10965	14620	18284
	RUN	4779	7169	9558	11956
250-07	BREAK	10027	15045	20054	25072
	RUN	6558	9832	13116	16390
250-08	BREAK	13045	19567	26081	32603
	RUN	8531	12788	17054	21320
250-10	BREAK	20417	30630	40834	N.A.
	RUN	13355	20028	26700	

Dimension (Inch)

MODEL	A	B					C	D	P
		DA	SR 40	SR 60	SR 80	SR 100			
250-06	16.34	16.34	24.24	24.24	24.91	26.56	6.81	9.05	3/8" NPT
250-07	16.53	16.53	24.59	24.59	25.62	27.03	7.87	9.61	3/8" NPT
250-08	16.73	16.73	24.48	24.48	26.72	27.78	8.82	10.06	1/2" NPT
250-10	17.44	17.44	25.7	25.7	26.4	28.53	10.83	11.06	1/2" NPT



MODEL	App. Weight in (Lb)				
	DA	SR 40	SR 60	SR 80	SR 100
350-10	429.9	545	559.9	610.6	652.5
350-12	588.6	798	811.3	881.8	930.3
350-14	734.1	1022	1036	1135	1201



MODEL	VOLUME (Inch ³)
	Open / Close
350-10	1113
350-12	1668
350-14	2261

Spring Return Torques (Lb-Inch)

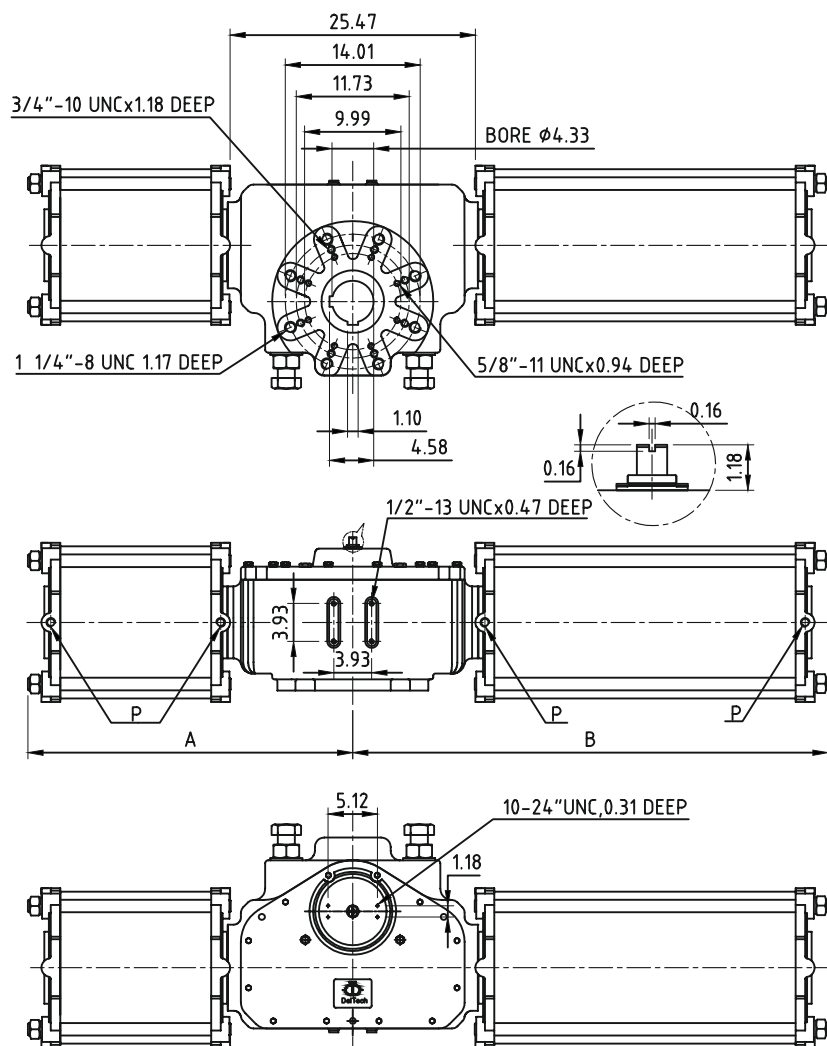
MODEL	TORQUE (Lb-Inch)	AIR SUPPLY PRESSURE (Psi)			
		40	60	80	100
350-10	PB	19470	29205	38931	48666
	PE	10806	16213	21621	27019
	SB	18612	27913	37214	46524
	SE	10328	15496	20665	25833
	RUN	7788	11691	15585	19479
350-12	PB	29187	43781	58366	72959
	PE	16204	24302	32409	40506
	SB	27895	41843	55790	69747
	SE	15488	23231	30975	38719
	RUN	11682	17523	23364	29205
350-14	PB	39542	59313	79084	98855
	PE	21957	32931	43905	54888
	SB	37798	56693	75597	94491
	SE	20983	31479	41967	52463
	RUN	15824	23736	31648	39568

Double Acting Torques (Lb-Inch)

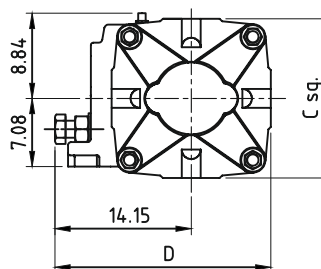
MODEL	TORQUE (Lb-Inch)	AIR SUPPLY PRESSURE (Psi)			
		40	60	80	100
350-10	BREAK	28940	43409	57879	72349
	RUN	18921	28382	37843	47303
350-12	BREAK	43383	65083	86774	108466
	RUN	28364	42551	56737	70915
350-14	BREAK	58782	88173	117563	N.A.
	RUN	38436	57649	76871	

Dimensions (Inch)

MODEL	A	B					C	D	p
		DA	SR 40	SR 60	SR 80	SR 100			
350-10	23.54	23.54	34.44	34.44	38.58	45.35	10.82	15.80	1/2" NPT
350-12	24.13	24.13	35.82	35.82	38.30	40.43	13.46	17.12	3/4" NPT
350-14	24.40	24.40	36.02	36.02	39.09	40.66	15.59	18.18	3/4" NPT



MODEL	App. Weight in (Lb)				
	DA	SR 40	SR 60	SR 80	SR 100
500-12	1278	1470	1488	1587	1697
500-14	1333	1640	1664	1774	1873
500-15	1380	1708	1730	1829	1962
500-16	1421	1802	1829	1962	2072



MODEL	VOLUME (Inch ³)
	Open / Close
500-12	1754
500-14	3593
500-15	4063
500-16	4670

Spring Return Torques (Lb-Inch)

MODEL	TORQUE (Lb-Inch)	AIR SUPPLY PRESSURE (Psi)			
		40	60	80	100
500-12	PB	42153	63233	84314	105386
	PE	23408	35108	46808	58516
	SB	40294	60446	80588	100740
	SE	22373	33559	44746	55932
	RUN	16868	25311	33745	42179
500-14	PB	57118	85677	107058	142786
	PE	31710	47569	63419	79278
	SB	54596	81889	109191	136485
	SE	30311	45471	60623	75783
	RUN	22860	34294	45719	57153
500-15	PB	64605	96908	129210	161513
	PE	35869	53799	71738	89668
	SB	61755	92633	123511	154388
	SE	34285	51427	68570	85712
	RUN	25680	38790	51711	64640
500-16	PB	74234	111351	148468	185585
	PE	41214	61826	82429	103041
	SB	70959	106439	141919	177398
	SE	39400	59100	78792	98492
	RUN	29709	44569	59419	74278

Double Acting Torques (Lb-Inch)

MODEL	TORQUE (Lb-Inch)	AIR SUPPLY PRESSURE (Psi)			
		40	60	80	100
500-12	BREAK	62667	94005	125334	156672
	RUN	40976	61463	81951	102439
500-14	BREAK	84907	127360	169814	212267
	RUN	55516	83279	111032	138795
500-15	BREAK	96040	144060	192080	240101
	RUN	62800	94191	125590	156990
500-16	BREAK	110360	165539	220710	NA
	RUN	72154	108236	144317	NA

Dimensions (Inch)

MODEL	A	B					C	D	P
		DA	SR 40	SR 60	SR 80	SR 100			
500-12	32.67	32.67	48.30	48.30	53.22	56.57	13.77	21.06	3/4" NPT
500-14	32.99	32.99	49.05	49.05	52.59	55.94	15.59	21.96	3/4" NPT
500-15	33.74	33.74	49.01	49.01	52.95	58.07	16.53	22.44	3/4" NPT
500-16	33.46	33.46	49.01	49.01	53.54	56.69	17.71	23.03	3/4" NPT

Optional Features

Fail-Safe Operation:

Each DelTorq[®] actuator is capable of fail-safe operation using either stored compressed gas (air) or a mechanical spring.

Optional Accessories

Series 83 DelMonitor :

This valve position monitor mounts directly to the top of the actuator with a special compact bracket. The standard highly visible indicator shows valve position locally, and the internal switches indicate valve position to a remote location. Standard switches are two single poles double throws (SPDT). Micro switches are rated at 10 amps, 125 or 250 VAC, 220 VDC. The housing is rated to IP65/IP67.



Trims:

Trim options for these actuators include seals for high and low temperature applications. The actuator is designed to resist affects of environmental conditions.

Series 85 3-Way and 4-Way Solenoid Valve :

Series 85 solenoid valves are 3-way or 4-way, 5 ported 2 position piloted spool type single or dual solenoid valves designed for air or gas service. Valves are made of rugged anodized aluminum. A built-in manual operator allows manual operation when desired or during an electrical power outage. All valves are supplied with all necessary hardware for a direct mount installation.



Optional Three Coat Offshore Protective Coating System:

The basic three-coat offshore protective coating is a Zinc based coat applied to an actuator that has been sand blasted to specifications. A tie coat is then applied. The valve is then finished and protected with a light gray polyurethane topcoat. This offshore protective coating is applied at the factory using newly machined castings. 100% of the actuator surface including the area under the tag is coated leaving no area for corrosion to start.

Series 87 Positioner:

The Series 87 positioner offers a diverse mix of positioners and feedback for direct mounting to all DelTorq[®] actuators. Available in pneumatic and electropneumatic designs with low air consumption and high accuracy for use on single or double acting actuators. Quality design and product performance are coupled with competitive pricing and excellent service to provide a cost effective approach to accurate control and position feedback.



How to Order DelTorq Pneumatic Scotch Yoke Actuators

Series	Size		Operation	Trim / Other Variables / Specials				
Series	Housing	*Cylinder	Pressure Connection	Spring Pressure Rating	Manual Override	Shaft Rotation	**Insert Size	Special Options
25 = Scotch Yoke Actuator	250 = 2.5" Yoke Arm	06 = 6" Ø	SR = Spring Return	000 = For DA actuators	DJ = Double Jackscrew	C = Fail Clockwise Direction (Standard for SR)	Refer to the "available insert option" chart for the 2.5" yoke arm. For insert option of 3.5" and 5" yoke arm, please contact factory.	00 = No special requirements (Ductile iron housing, chrome plated steel cylinder and ductile iron end caps) SS = Stainless steel housing, cylinder and end caps OP = 3 coat offshore protective coating system
	350 = 3.5" Yoke Arm	07 = 7" Ø	DA = Double Acting	040 = Rated for 40 PSI	SJ = Single Jackscrew	F = Fail Counter Clockwise Direction		
	500 = 5.0" Yoke Arm	08 = 8" Ø		060 = Rated for 60 PSI	00 = None	S = Standard for Double Acting Models		
		10 = 10" Ø		080 = Rated for 80 PSI	DH = Double Acting Hydraulic	Y = Reverse Acting for Double Acting Models		
		12 = 12" Ø		100 = Rated for 100 PSI	SH = Single Acting Hydraulic			
		14 = 14" Ø						
		15 = 15" Ø						
		16 = 16" Ø						

**Available insert option only for 2.5" yoke arm

000 = Blank
55S = 0.866" Sq.
56S = 1.063" Sq.
58S = 1.417" Sq.
05D = 1.18" x 0.87" DD.
89D = 1.38" x 0.94" DD.
22R = 1.38" R / 0.394" Sq. Key
68R = 1.57" R / 0.47" x 0.31" Key
73R = 1.57" R / 0.393" Sq. Key
71R = 1.75" R / 0.375" Sq. Key
17R = 1.77" R / 0.5" x 0.35" Key
25R = 1.97" R / 0.47" x 0.39" Key
90R = 1.97" R / 0.55" x 0.35" Key

*Available cylinder sizes against corresponding yoke arm

Series	Yoke Arm	Cylinder Size
25	2.5"	6", 7", 8", 10"
25	3.5"	10", 12", 14"
25	5.0"	12", 14", 15", 16"

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