



Red Valve Company, Inc.®

GS-700 Diaphragm Actuator

Installation, Operation, and Maintenance Manual



Series 700 actuators are pneumatic diaphragm operators that have spring return in both direct and reverse acting styles, offering fail open and fail closed modes respectively. The pressed steel diaphragm case construction along with the nylon reinforced Buna-N rubber diaphragm permits a maximum allowable air supply pressure of 80 psig (550 kPag).

This pre-formed diaphragm provides a constant effective area throughout the full extent of travel.

With effective diaphragm areas ranging from 60–160 in² (385–1030cm²), Series 700 actuators can provide the necessary stem force to meet virtually any operating requirement.

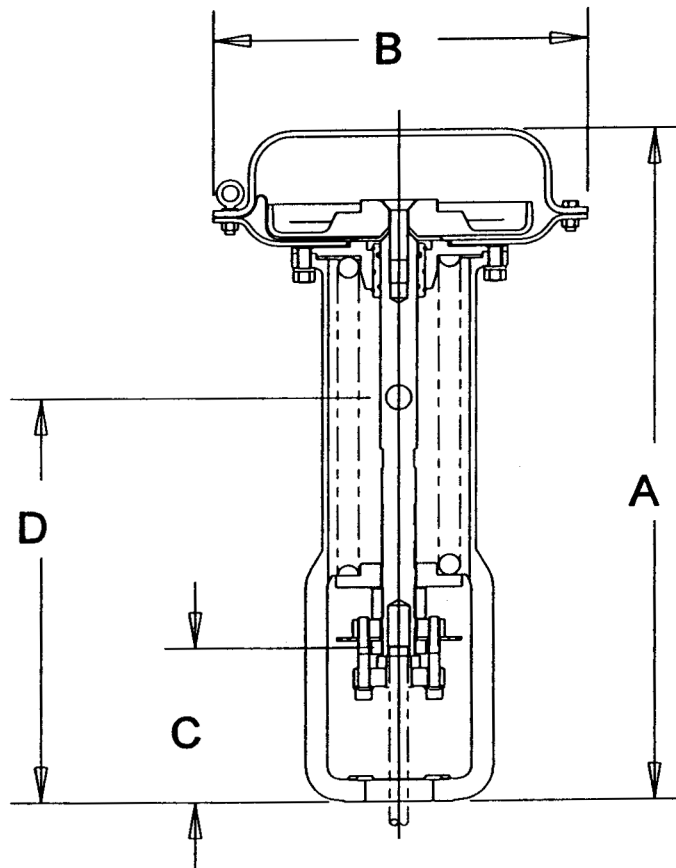
IMPORTANT

Please take a moment to **review this manual. Before performing any maintenance on the valve be sure that the pipeline has been depressurized.** The improper installation or use of this product may result in personal injury, product failure, or reduced product life. Red Valve Co., Inc. can accept NO liability resulting from the improper use or installation of this product. If you have any questions or problems, please call the customer service hotline at (412) 279-0044. We appreciate your comments. And thank you for choosing Red Valve.

PRODUCT SPECIFICATION SHEET

SUBJECT: MODEL 700 ACTUATOR

11.2 DIMENSIONS & WEIGHTS - REVERSE ACTING, NO HANDWHEEL



ACTUATOR SIZE	60	100	160	160-L
'A', in.	21.09	28.06	32.38	40.81
'B', in.	11.50	15.12	18.00	18.00
'C", in.	6.50	6.50	6.25	6.38
'D', in. (Center of Gravity)	13.66	17.41	20.92	22.58
WEIGHT WITH HEAVIEST SPRING, lb.	78.1	136.7	204.2	239.1

RED VALVE INSTRUCTION MANUAL

MODEL GS700 REVERSE-ACTING ACTUATOR

3.0 MAINTENANCE

3.1 GENERAL

Actuator parts are subject to normal wear and must be inspected and replaced when necessary. The frequency of inspection and part replacement depends on the severity of the service conditions. Normally, only the rubber parts such as the diaphragm, stem seal, gasket, and rings will require replacement.

3.2 PRECAUTIONS

Be aware that large pressure and spring forces are required to actuate a valve. Sudden release of these forces or of valve or actuator pressure has the potential to cause personal injury or damage to property.

Before starting to disassemble the actuator, proceed as follows:

- A. Isolate the valve from the line pressure.
- B. Release fluid pressure from the valve.
- C. Release air pressure from the diaphragm chamber of the actuator.
- D. Remove all actuator spring preload. Note that if the actuator travel has been set up to be less than nominal, it may not be possible to remove all preload with the spring adjuster nut alone. In this case, it will be necessary to disassemble the stem connector to remove remaining spring preload.

3.3 REVERSE-ACTING ACTUATOR (Refer to Figure I and the Actuator Assembly Drawing)

3.3.1 Disassembly

- A. Bypass or isolate the valve and reduce the diaphragm pressure to atmospheric.
- B. Rotate the spring adjuster nut (Item 29) downward on the actuator stem until all spring preload is removed.
- C. If necessary, remove the stem connector by removing the four cap screws (Item 23). Loosen the setscrew in the stem clamp (Item 26) and remove the stem clamp from the actuator stem.
- D. If necessary, remove the actuator from the valve by unthreading the hold-down nut or studs and nuts, as applicable.
- E. Remove the spring adjuster nut (Item 29) from the actuator stem.
- F. Remove the cap screws (Item 4) and hex nuts (Item 5) and remove the base (Item 3).
- G. If the diaphragm is not being replaced, remove the stem and diaphragm plate assembly (items 11, 12, 13, 14, and 16). If the diaphragm is being replaced, block the lower end of the actuator stem, then unscrew the flat head screw (item 11) and remove the diaphragm plate (item 13), the diaphragm (item 14) and the diaphragm stop (item 12).
- H. If necessary, remove the actuator stem (Item 16) from the bushing (Item 30).
 - 1. If necessary, remove the cover (Item 2) and the yoke plate and bushing assembly (Items 31 and 30) by removing the hex nuts and lockwashers (Items 9 and 10).
- J. Remove the bushing from the yoke plate by removing one of the retaining rings (Item 34).

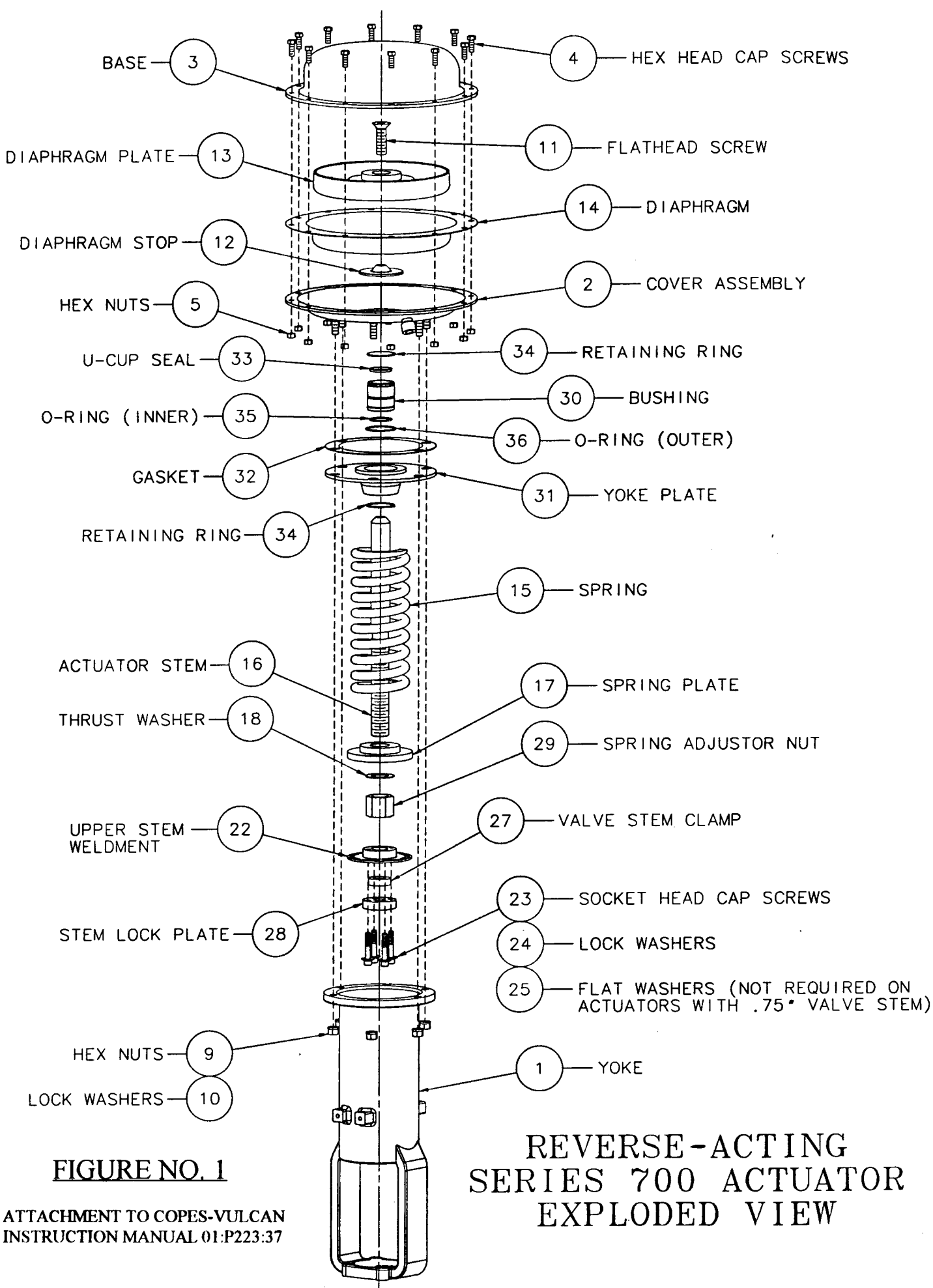
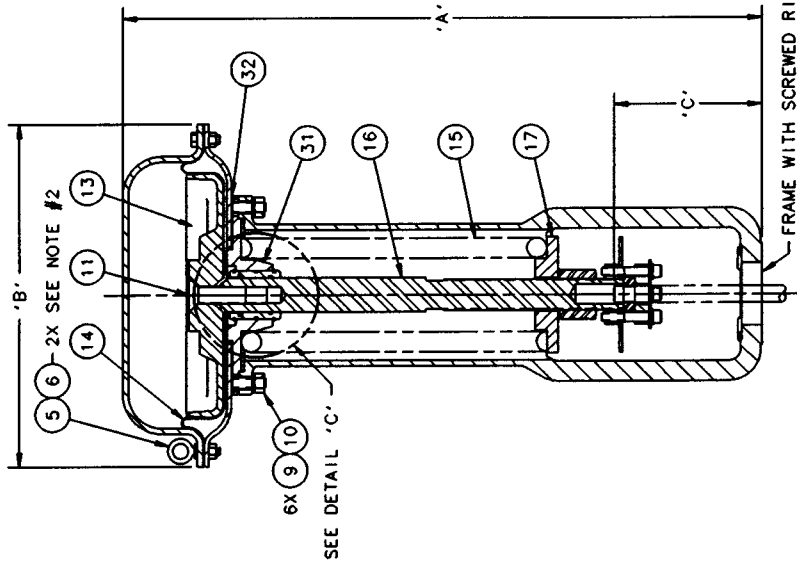


FIGURE NO. 1

ATTACHMENT TO COPES-VULCAN
INSTRUCTION MANUAL 01:P223:37

**REVERSE-ACTING
SERIES 700 ACTUATOR
EXPLODED VIEW**

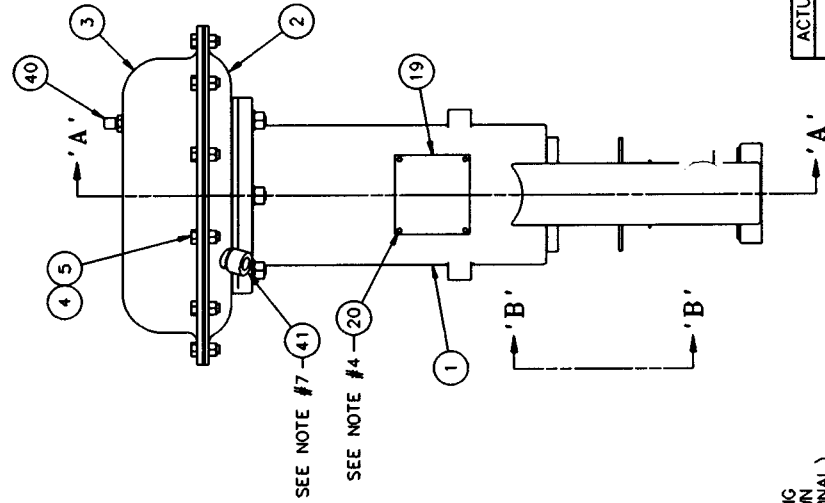


SECTION 'A-A'

FRAME WITH SCREWED RING BONNET CONNECTION SHOWN (STUDDED ARR'G'T. OPTIONAL)

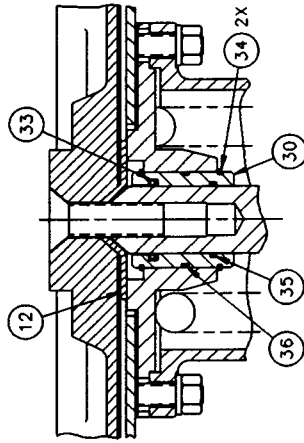
NOTES:

1. REFER TO COMPUTER FILE FOR PART INFORMATION.
2. EYE BOLTS TO BE 180° APART.
3. REMOVE EYE BOLTS (ITEM #6) AND REPLACE WITH CAP SCREWS (ITEM #4) ON ALL ACTUATOR ASSEMBLIES WHEN USED ON VALVES LARGER THAN 5" PRIOR TO SHIPPING.
4. 4X ϕ .104, ∇ .19", AT ASSEMBLY.
5. SEE DRAWING C-357187 FOR REQUIRED OPTIONS.
6. SEE DRAWING D-357643 FOR ITEM MATERIALS AND SPECIFICATIONS.
7. ITEM #41 (BUSHING). NOT REQUIRED ON 60 SQ. INCH ACTUATORS.
8. 2X ϕ .136, ∇ .38", AT ASSEMBLY.
9. FLAT WASHERS (ITEM #25) NOT REQUIRED ON ACTUATORS WITH .75" VALVE STEMS.



VIEW 'B-B'

2X SEE NOTE #8-46
.06" APPROX.
4X SEE NOTE #9-25



DETAIL 'C'

ACTUATOR SIZE	'A'	'B'	'C'
60	21.09	11.50	6.50
100	28.06	15.12	6.50
160	32.38	18.00	6.25
160 LONG STROKE	40.81	18.00	6.38

ITEM NO.	ACTUATOR SIZE	ASSEMBLY TORQUES (FT-LB \pm 10%)
6	100, 160 & 160 LONG STROKE	
5	6	12
9	15	36
11	44	80
23	24	24

THE FOLLOWING IS AN EXPLANATION OF HOW TO INTERPRET A PART NUMBER. THIS IS AN EXAMPLE OF A SERIES 700-100R ACTUATOR WITH A ϕ .75" STEM, SPRING PART NO. 357569, W/O HANDWHEEL OR TRAVEL STOPS AND SCREWED RING BONNET CONNECTION.

SERIES	STATUS	ACT. SERIES	ACT. SIZE	SPRING	HANDWHEEL/ TRAVEL STOPS	FRAME MAT'L.
*	*	11	04	04	1	1
ACT	4	11	04	04	1	1

PART NO. ACT411040411
* - DENOTES CONSTANT ENTRIES FOR THIS ASSEMBLY

PROJECT: cv6-actuator
LIBRARY: cv6-100r
DRAWING: C-357185
THIS DRAWING WAS PRODUCED BY ELECTRONIC METHODS
DO NOT REVISE MANUALLY.

NO	DATE	REVISIONS	BY	CHK	NO	DATE	REVISIONS	BY	CHK		
1	5-30	ITEM #20 QTY. WAS 6, ITEM #46 WAS #20 & ADDED NOTE #8.	RMG	10164	DCR	3	4-28-98	REV'D. ITEM #22 ORIENTATION.	RMG	10277	WES
2	3-18	REV'D. STEM CONNECTION PARTS IN VIEW 'B-B', ADDED NOTE #9 & 80 FT-LB TORQUE WAS 120.	RMG	10254	WES						

FOR: REVERSE ACTING SERIES 700 ACTUATORS WITHOUT HANDWHEEL

ACTUATOR ASSEMBLY

REF. LAYOUTS:
E-357635
E-357636
E-357637
E-357641

DFTSMAN RMG DATE 6-7-98 JOB NO. 96-00325-10
CHECKED DATE DATE SCALE
APP'D DCR DATE 6-21-98

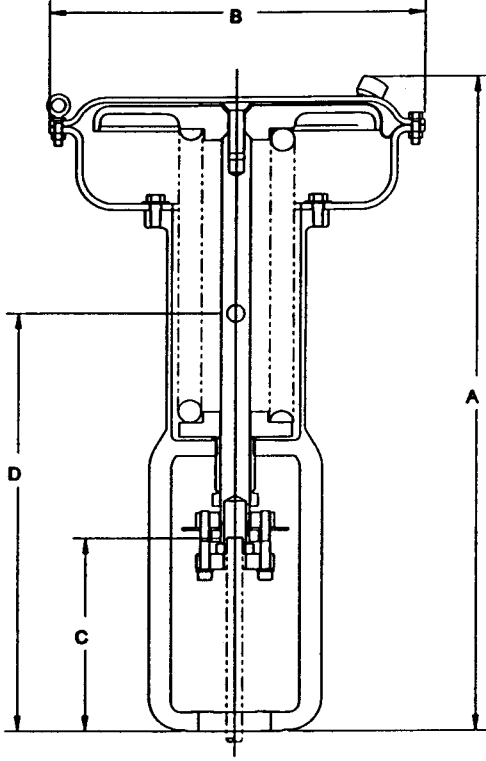
REPRO FROM PART CODE 3

DWG. NO. C-357185 REV 3

PRODUCT SPECIFICATION SHEET

SUBJECT: MODEL 700 ACTUATOR

11.0 DIMENSIONS & WEIGHTS - DIRECT ACTING, NO HANDWHEEL



ACTUATOR SIZE	60	100	160	160-L
'A', in.	20.50	28.12	32.31	39.75
'B', in.	11.50	15.12	18.00	18.00
'C', in.	7.56	9.38	9.31	11.81
'D', in. (Center of Gravity)	13.87	18.18	21.72	26.62
WEIGHT WITH HEAVIEST SPRING, lb.	74.2	129.7	191.2	231.3

RED VALVE INSTRUCTION MANUAL

MODEL GS700 DIRECT-ACTING ACTUATOR

3.0 MAINTENANCE

3.1 GENERAL

Actuator parts are subject to normal wear and must be inspected and replaced when necessary. The frequency of inspection and part replacement depends on the severity of the service conditions. Normally, only the diaphragm will require replacement.

3.2 PRECAUTIONS

Be aware that large pressure and spring forces are required to actuate a valve. Sudden release of these forces or of valve or actuator pressure has the potential to cause personal injury or damage to property.

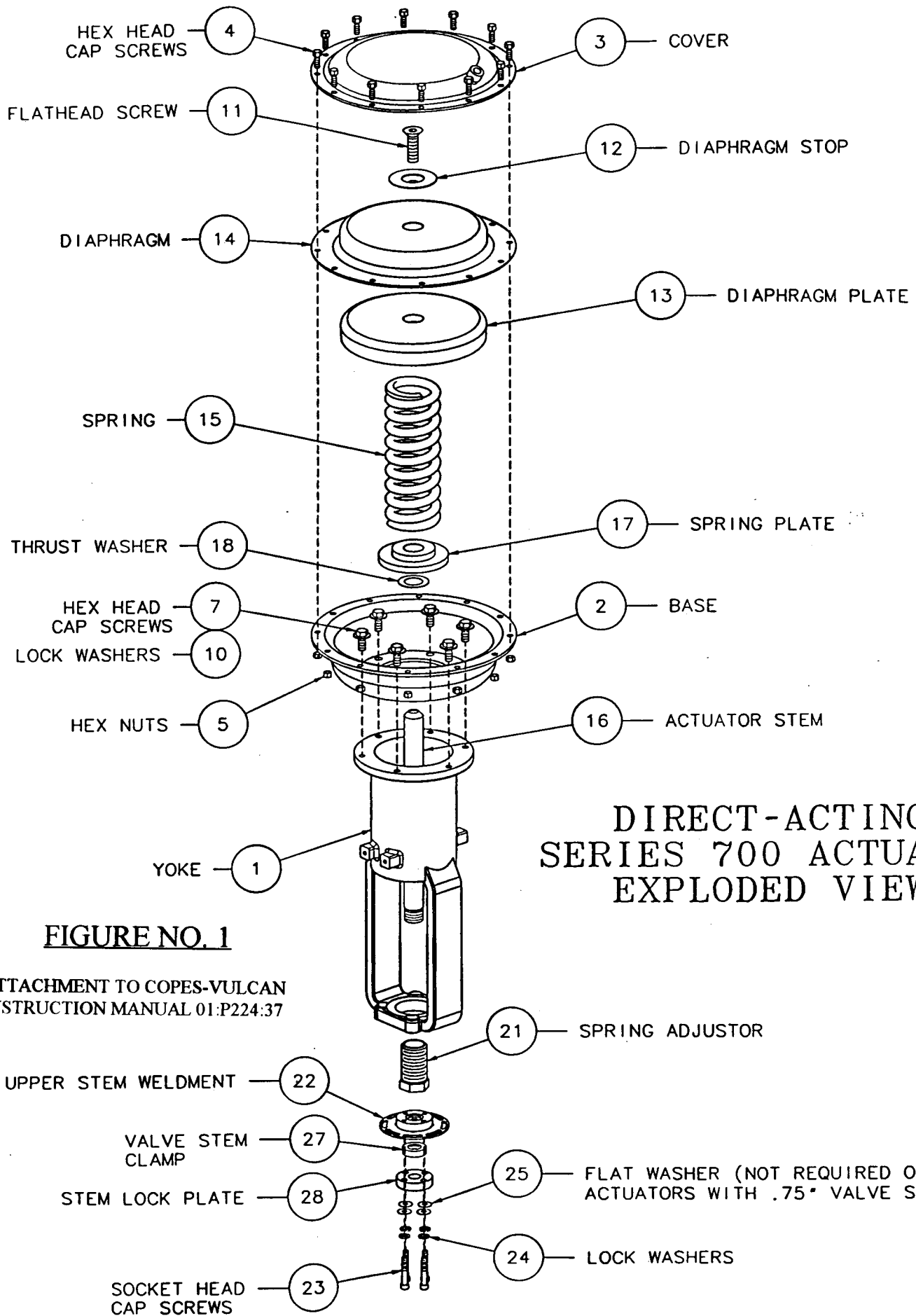
Before starting to disassemble the actuator, proceed as follows:

- A. Isolate the valve from the line pressure.
- B. Release fluid pressure from the valve.
- C. Release air pressure from the diaphragm chamber of the actuator.
- D. Remove all actuator spring preload. Note that, if the actuator travel has been set up to be less than nominal, it may not be possible to remove all preload with the spring adjuster alone. In this case, it will be necessary to disassemble the stem connector to remove the remaining spring preload.

3.3 DIRECT-ACTING ACTUATOR (Refer to Figure I and the Actuator Assembly Drawing)

3.3.1 Disassembly

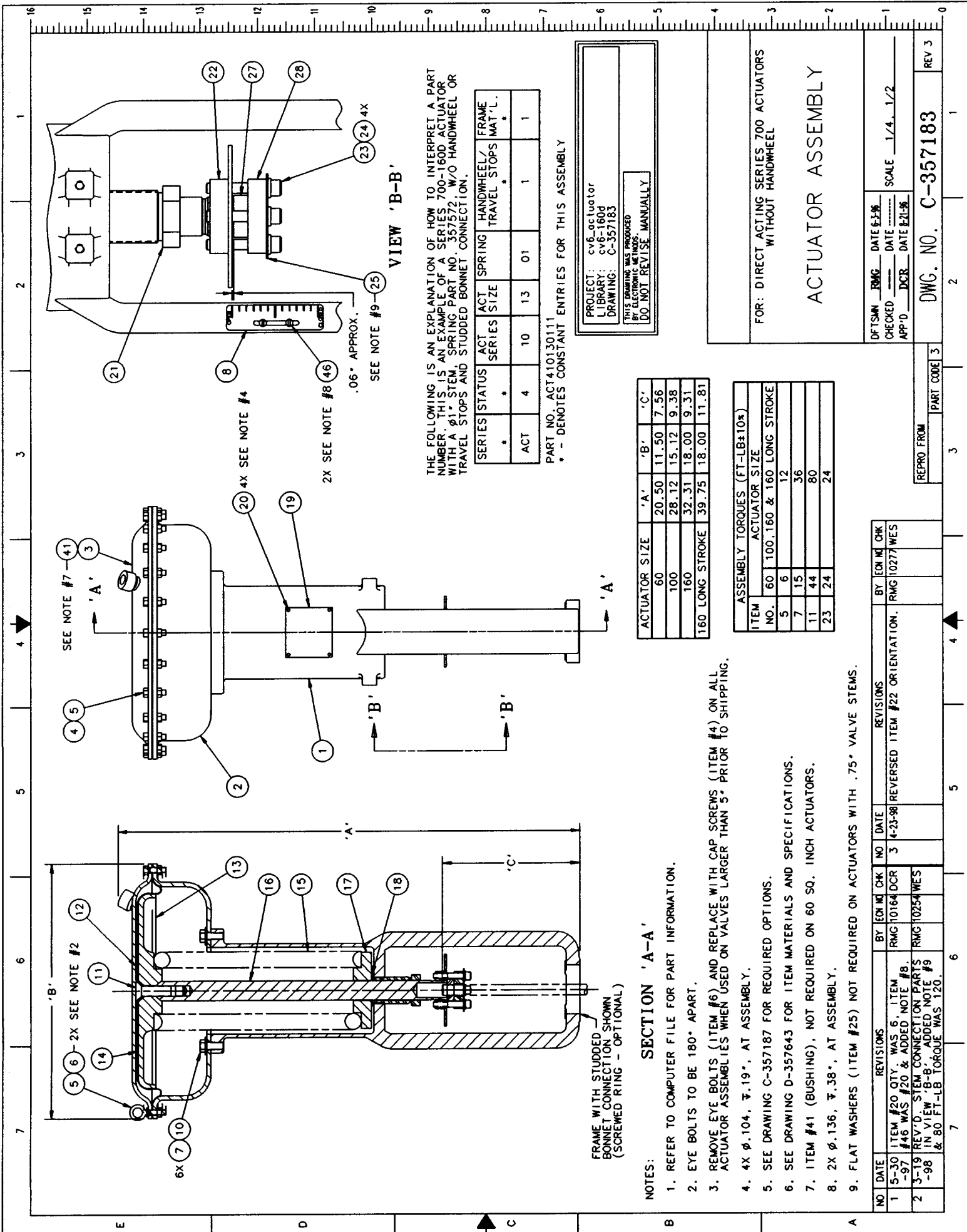
- A. Bypass or isolate the valve and reduce the diaphragm pressure to atmospheric.
- B. Rotate the spring adjuster (item 21) downward on the actuator stem until all spring preload is removed.
- C. If necessary, remove the stem connector by removing the four socket head cap screws (item 23). Loosen the setscrew in the stem clamp (Item 27) and remove the stem clamp from the actuator stem.
- D. If necessary, remove the actuator from the valve by unthreading the hold-down nut or studs and nuts, as applicable.
- E. Remove the hex head cap screws (Item 4) and hex nuts (Item 5) and remove the cover (Item 3).
- F. If the diaphragm is not being replaced, remove the stem and diaphragm plate assembly (Items 11, 12,13,14, and 16). If the diaphragm is being replaced, unscrew the flat head screw (Item 11), then remove the diaphragm stop (Item 12), the diaphragm (Item 14), and the diaphragm plate (Item 13).
- G. If necessary, remove the actuator stem (Item 16), the spring (Item 15), the spring plate (Item 17), and the thrust washer (Item 18).
- H. If necessary, remove the base (Item 2) by removing the hex head cap screws (Item 7) and lockwashers (Item 10).



DIRECT-ACTING SERIES 700 ACTUATOR EXPLODED VIEW

FIGURE NO. 1

ATTACHMENT TO COPES-VULCAN
INSTRUCTION MANUAL 01:P224:37



VIEW 'B-B'

THE FOLLOWING IS AN EXPLANATION OF HOW TO INTERPRET A PART NUMBER. THIS IS AN EXAMPLE OF A SERIES 700-1600 ACTUATOR WITH A ϕ 1.00 STEM, SPRING PART NO. 357522, W/O HANDWHEEL OR TRAVEL STOPS AND STUDDED BONNET CONNECTION.

SERIES	STATUS	ACT SERIES	ACT SIZE	ACT SPRING	HANDWHEEL/ TRAVEL STOPS	FRAME MAT'L.
*	*	10	13	01	1	1
ACT	4					

PART NO. ACT410130111
 * - DENOTES CONSTANT ENTRIES FOR THIS ASSEMBLY

PROJECT: cv6 actuator
 LIBRARY: cv6-160d
 DRAWING: C-357183
 THIS DRAWING WAS PRODUCED BY ELECTRONIC METHODS. DO NOT REVISE MANUALLY.

ACTUATOR SIZE	'A'	'B'	'C'
60	20.50	11.50	7.56
100	28.12	15.12	9.38
160	32.31	18.00	9.31
160 LONG STROKE	39.75	18.00	11.81

ITEM NO.	ASSEMBLY TORQUES (FT-LB±10%)	
	ACTUATOR SIZE	LONG STROKE
5	60, 100, 160 & 160	12
7	15	36
11	44	80
23	24	24

SECTION 'A-A'

- NOTES:
- REFER TO COMPUTER FILE FOR PART INFORMATION.
 - EYE BOLTS TO BE 180° APART.
 - REMOVE EYE BOLTS (ITEM #6) AND REPLACE WITH CAP SCREWS (ITEM #4) ON ALL ACTUATOR ASSEMBLIES WHEN USED ON VALVES LARGER THAN 5" PRIOR TO SHIPPING.
 - 4X ϕ .104, ∇ .19", AT ASSEMBLY.
 - SEE DRAWING C-357187 FOR REQUIRED OPTIONS.
 - SEE DRAWING D-357643 FOR ITEM MATERIALS AND SPECIFICATIONS.
 - ITEM #41 (BUSHING), NOT REQUIRED ON 60 SQ. INCH ACTUATORS.
 - 2X ϕ .136, ∇ .38", AT ASSEMBLY.
 - FLAT WASHERS (ITEM #25) NOT REQUIRED ON ACTUATORS WITH .75" VALVE STEMS.

FOR: DIRECT ACTING SERIES 700 ACTUATORS WITHOUT HANDWHEEL

ACTUATOR ASSEMBLY

NO.	DATE	REVISIONS	BY	CHK	NO.	DATE	REVISIONS	BY	CHK	
1	5-30-97	ITEM #20 QTY. WAS 6, ITEM #46 WAS #20 & ADDED NOTE #8.	RMG	10164	DCR	3	4-23-98	REVERSED ITEM #22 ORIENTATION.	RMG	10277
2	3-19-98	REV'D. STEM CONNECTION PARTS IN VIEW 'B-B'. ADDED NOTE #9 & 80 FT-LB TORQUE WAS 120.	RMG	10254	WES					

DFTSMN	RMG	DATE	5-29-97	SCALE	1/4" = 1/2"
CHECKED		DATE			
APP'D	DCR	DATE	5-21-98		
REPRO FROM		PART CODE	3		
DWG. NO.	C-357183		REV	3	