

installation, operating, and maintenance instructions

tank safety valve

model 66TS

GENERAL DESCRIPTION

In most refinery applications, product storage tanks are located at a remote distance from the loading facilities. This practice is, of course, very wise from a safety standpoint. In order to maximize the safety of such a system, the tank should also be isolated from the loading facilities at all times that a loading operation is not taking place. In this way the tank can be protected in case of a fire or in case of rupture of the delivery piping.

Such an arrangement requires a valve. The simplest approach would be to provide a manual on-off valve at the tank. However, this would require a second person, in addition to the loading man, to insure that the valve was open at the start of the loading operation and closed when loading was completed. This system would be inconvenient and, if mistakes were made, extremely costly. Forgetting to open the valve to start loading could result in damage to the delivery pump. Forgetting to close the valve after loading would compromise the safety of the entire system.

A far better approach is an automatic valve located at the tank. This valve would open quickly and fully when the delivery pump was started and close immediately and tightly on pump shutdown. It would remain closed at all times the pump was not running. For the utmost in safety and reliability it should be completely hydraulic in operation—i.e., no electrical power required, yet it should be completely operable even when it is at a remote distance from the delivery pump.

The OCV Model 66TS Tank Safety Valve is specifically designed to meet all of the requirements outlined above. Physically, the 66TS is a single-seated, hydraulically-operated, diaphragm-actuated globe valve designed to operate from the pressure differential created by the delivery pump. It is a power-actuated type valve with isolated upper and lower diaphragm chambers. Thus the actuating pressure differential is completely independent of the flow loss through the valve, enabling the total pressure drop in the pump suction line to be kept to a minimum.

The 66TS will start to open when the pump differential reaches 5 psi. Specially designed valve internals allow sufficient flow to the pump after only a small degree of opening. The valve will be fully open when the pump differential reaches 15 psi. With a properly sized sense line and a minimum of 30 psid available from the pump, the total opening cycle will take no more than 10 seconds. On pump shutdown, the valve will immediately start closed. With a properly-sized sense line the closing cycle will take no more than 15 seconds.

Once closed, the 66TS will remain closed until the pump is once again started. The valve is fail-safe—i.e., if its diaphragm should fail, the valve will close whether or not the pump is running. The valve also contains a built-in thermal relief feature: if the downstream pressure should building to approximately 6-10 psi above tank head, the valve will open slightly to relieve excess pressure back to the tank.

MANUAL OPENING (OPTIONAL)

The 66TS can be fitted with a manual opening feature which enables the valve to be pumped open with a hand pump to gravity-feed the system in case of delivery pump malfunction.

INSTALLATION

Proper installation of the 66TS is essential to its correct operation in the system. The recommended installation is shown schematically on drawing 66TS-XXX.

The tank safety valve itself should be installed as close as possible to the tank in order to maximize its objective of tank isolation.

The manual isolation valves shown are not essential to system operation but are extremely desirable should internal maintenance have to be performed on the tank safety valve.

The pump must be capable of developing a pressure differential of at least 15 psi above tank head at full flow in order to fully open the tank safety valve.

Proper sizing of the sense line between the pump discharge and tank safety valve is extremely important, especially when the valve and pump are an appreciable distance apart. Undersizing of this line will result in slower opening and closing of the valve. Notice that the recommendations shown are based on a 10-second opening with a 30-psi pump and a 15-second closing. If faster operation is desired, or a weaker pump is employed, the sense line should be increased proportionately.

In many systems, the line downstream of the pump is essentially "open" when the pump is started. Starting the pump under such low head conditions will result in insufficient differential to open the tank safety valve. The combination of low head and no suction supply can bring about immediate and extreme cavitation of the pump. In order to prevent this occurrence, it is highly recommended that a **slow-opening** check valve be installed on the pump discharge. In this way the pump starts against a closed valve, the discharge head is immediately high, the tank safety valve opens readily, and, as the check valve slowly opens, there is a smooth transition from no flow to full flow, with no risk of pump cavitation.

The check valve also serves to prevent backflow of product into the storage tank when the pump is off. Note that the tank safety valve itself provides limited backflow

protection, but only to 6-10 psi back pressure. If the backflow potential is greater than this, the check valve is a necessity.

In short, the slow-opening check valve can safely be omitted only if both the following conditions exist: (1) the discharge piping is "closed" on pump start-up and is full of fluid at all times, and (2) backflow protection above 6-10 psi is not necessary.

Three other features, not shown on the installation diagram, are desirable:

1. The sense line between the valve and pump discharge should be kept clear and free of buildup of particulate matter. To insure this, install a strainer in the sense line at the pump discharge. The strainer should, of course, be of at least the same nominal size as the sense line.
2. If the slow-opening check valve is used, and thermal pressure buildup in the piping downstream of the check valve is a possibility, a thermal relief valve should be installed on the check valve to relieve this pressure back to the pump side. It will then be led back to the tank by the built-in thermal relief feature of the tank safety valve.
3. If the tank safety valve is equipped with the manual feature, a manual on-off valve should be a low-loss type such as a gate or ball valve.

THEORY OF OPERATION

The 66TS is actuated by a differential pressure acting across its diaphragm. The lower diaphragm chamber receives pressure from the pump discharge. This pressure acts in the direction to open the valve. The upper diaphragm chamber senses pump suction pressure and also contains the valve spring. These forces act in the direction to close the valve.

There is also a net closing force across the valve seat caused by the differential of tank head acting over the seat and pump suction pressure acting under the seat.

OPENING CYCLE: When the pump is started, its discharge pressure starts to rise. When this pressure rises to 5 psi over tank head, the closing forces acting on the valve are overcome and the valve starts open. The discharge pressure continues to increase. When it reaches 15 psi over tank head, the valve will be fully open.

CLOSING PRESSURE: When the pump is stopped, the discharge and suction pressures become equal to tank

head. There are now no differential pressures acting on the valve, only the closing force created by the spring. Therefore the valve closes readily.

THERMAL RELIEF: With the valve closed and the pump off, there are normally no differential forces on the valve except for the spring. However, if there is a thermal pressure buildup in the downstream piping, an opening force will be applied under the valve seat. When this pressure is sufficient to overcome the spring (6-10 psi over tank head), the valve will open a small amount and relieve the excess pressure back to the tank.

MAINTENANCE

Visual inspection at periodic internals is required to determine the general physical condition of the equipment. This inspection should be conducted at no more than 30 day intervals. The following is a list of "check points" to assist maintenance personnel in this task.

- a. Check for chipped or peeling paint.
- b. Check that all tube fittings on the valve are secure.
- c. Check for damaged tubing.
- d. Check for leaks at fittings and around bonnets and flanges.
- e. Check for loose bolts on bonnets and flanges.

TROUBLESHOOTING

The 66TS, due to its rather simple construction and positive action, should provide virtually trouble-free operation. If problems should occur, the following outline should enable maintenance personnel to isolate the specific malfunction and take the appropriate remedial action.

A. VALVE FAILS TO OPEN OR OPENS TOO SLOWLY

1. Sense line too small—See chart on drawing 66TS-XXX.
2. Sense line clogged—Clean strainer if one is installed. If not, clean sense line as required and install strainer in sense line where it joins the pump discharge line.

3. Main valve diaphragm ruptured—replace diaphragm.

NOTE: Any time maintenance is required inside the valve, close the manual isolation valves located on either side of the valve. Due to the heavy spring employed in the 66TS, use extreme caution in removing the bonnet. Remove all bonnet nuts except two located at opposite sides of the bonnet. Loosen these two nuts slowly and evenly until the spring tension is relieved. When reassembling the valve, "jack" the bonnet down against the spring with two nuts at 180°, tightened evenly.

4. Valve stem binding—Disassemble valve as noted above and check the stem and upper and lower bearing areas for burrs, deep scratches, or buildup of foreign material. Clean and polish as required.

B. VALVE FAILS TO CLOSE OR CLOSES TOO SLOWLY

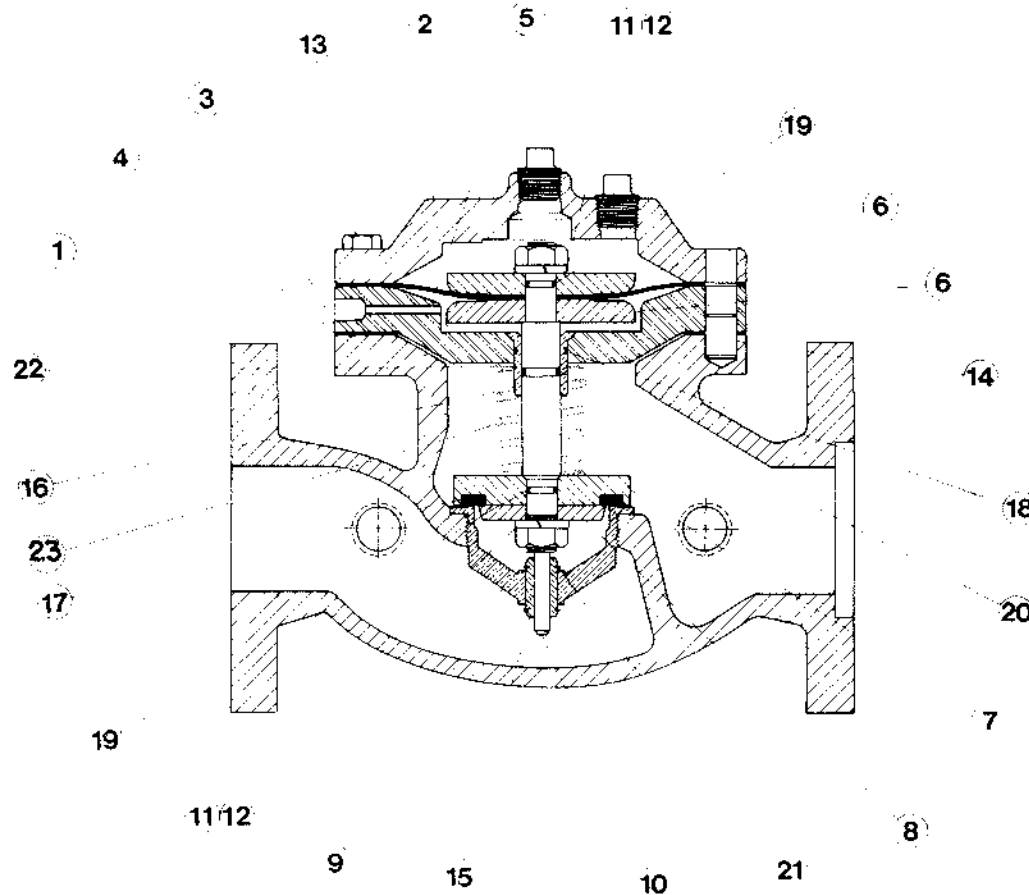
1. Sense line too small—See A1 above.
2. Sense line clogged—See A2 above.
3. Valve stem binding—See A4 above.

MANUAL OPENING OPTION

The manual opening feature is provided by means of a Schrader valve which is installed at the inlet port of the 66TS intermediate plate. To complete the requirements for this option, a manual on-off valve must be installed in the sense line leading from the pump discharge. For convenience, the valve should be installed near the point where the sense line connects to the body. The on-off valve should be of a low-loss type such as a ball valve or gate valve.

To manually open the 66TS, first close the on-off valve. Connect the pressure source (hand pump, low pressure air bottle, etc.) to the Schrader valve. The 66TS can then be opened fully by applying pressure equal to 15 psi over tank head.

To return the 66TS to the closed position, simply remove the pressure source and open the on-off valve.



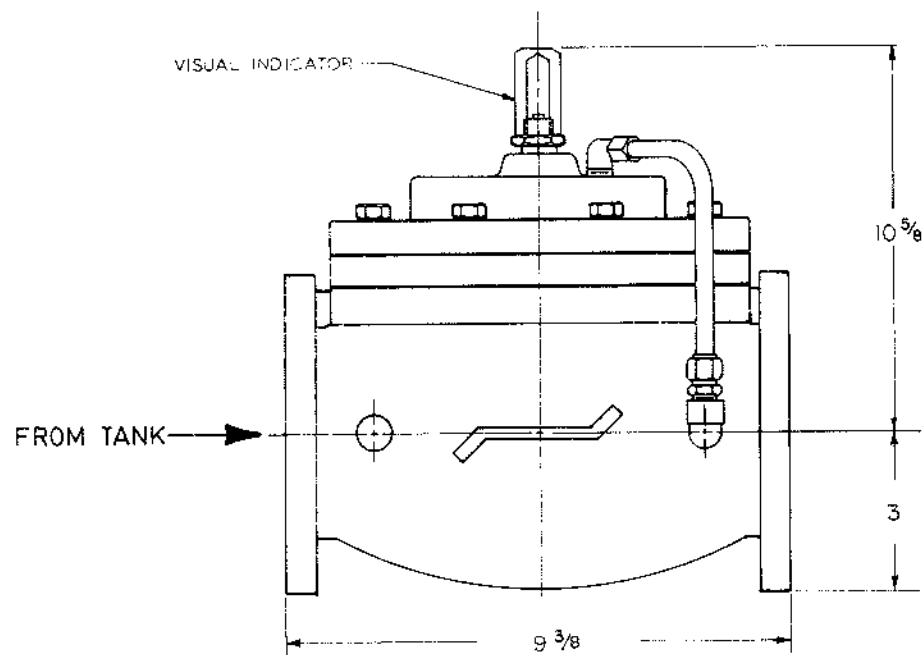
NOTE
1 WHEN ORDERING PARTS PLEASE
SPECIFY DESCRIPTION PART
NUMBER AND MATERIAL
2 Δ - RECOMMENDED SPARE PARTS
3 O - PARTS USED WHEN STAINLESS
STEEL SEAT RING IS FURNISHED

23	650721	1	SPRING	STN STEEL
22	630711	1	RETAINING RING	STN STEEL
O	630705	2	RETAINING RING	STN STEEL
Δ	611111	1	O-RING	VITON
Δ	611012	2	O-RING	VITON
Δ	610018	1	O-RING	BUNA-N
Δ	691500	1	SEAT DISC	VITON
O	690500	1	SEAT DISC	BUNA-N
O	300165	1	GUIDE BUSHING	BRASS
O	300037	1	SEAT RING BUSHING	DEL-RIN
14	620701	2	DOWEL PIN	STN STEEL
13	531012	8	CAPSCREW	CAD. PL. STL
12	685703	2	LOCKWASHER	STN STEEL
11	580709	2	STEM NUT	STN STEEL
10	313719	1	STEM	STN STEEL
O	311700	1	SEAT RING	STN STEEL
O	311100	1	SEAT RING	BRONZE
8	309000	1	SEAT RETAINER	CAST IRON
7	306440	1	SEAT PLATE	STEEL
6	307430	2	DIAPHRAGM PLATE	STEEL
Δ	690111	1	DIAPHRAGM	VITON
Δ	690011	1	DIAPHRAGM	BUNA-N
Δ	693108	1	GASKET	VITON
Δ	693008	1	GASKET	BUNA-N
3	306430	1	INTERMEDIATE PLATE	CAST STEEL
2	303330	1	BONNET	CAST IRON
1	301300	1	BODY ANSI 150 LB	CAST STEEL
1	301300	1	BODY ANSI 125 LB	CAST IRON

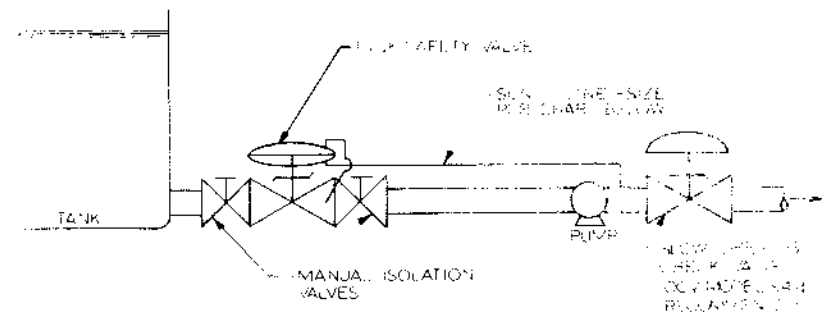
ITEM	QTY	NO.	DESCRIPTION	MATERIAL
1	1	301300	BODY ANSI 150 LB	CAST STEEL
1	1	301300	BODY ANSI 125 LB	CAST IRON

2" Tank Safety Valve

REV	DATE	BY	CHKD	APP'D
1	10/1/83	10/1/83	10/1/83	10/1/83
2	10/1/83	10/1/83	10/1/83	10/1/83
3	10/1/83	10/1/83	10/1/83	10/1/83
4	10/1/83	10/1/83	10/1/83	10/1/83
5	10/1/83	10/1/83	10/1/83	10/1/83
6	10/1/83	10/1/83	10/1/83	10/1/83
7	10/1/83	10/1/83	10/1/83	10/1/83
8	10/1/83	10/1/83	10/1/83	10/1/83
9	10/1/83	10/1/83	10/1/83	10/1/83
10	10/1/83	10/1/83	10/1/83	10/1/83
11	10/1/83	10/1/83	10/1/83	10/1/83
12	10/1/83	10/1/83	10/1/83	10/1/83
13	10/1/83	10/1/83	10/1/83	10/1/83
14	10/1/83	10/1/83	10/1/83	10/1/83
15	10/1/83	10/1/83	10/1/83	10/1/83
16	10/1/83	10/1/83	10/1/83	10/1/83
17	10/1/83	10/1/83	10/1/83	10/1/83
18	10/1/83	10/1/83	10/1/83	10/1/83
19	10/1/83	10/1/83	10/1/83	10/1/83
20	10/1/83	10/1/83	10/1/83	10/1/83
21	10/1/83	10/1/83	10/1/83	10/1/83
22	10/1/83	10/1/83	10/1/83	10/1/83
23	10/1/83	10/1/83	10/1/83	10/1/83



RECOMMENDED INSTALLATION



SPECIFICATIONS

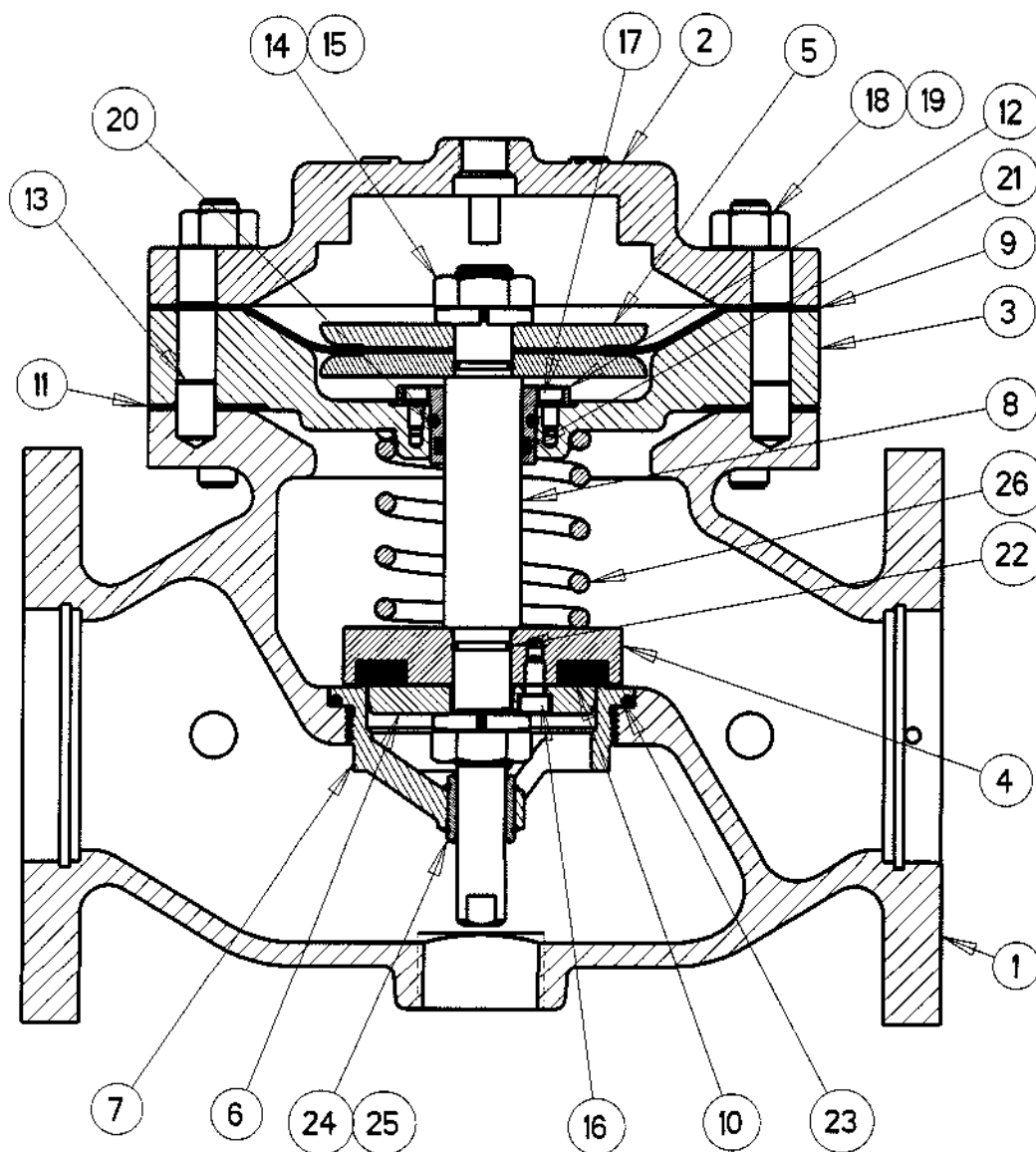
FAULT WILL AUTOMATICALLY CLOSE IF DIAGNOSIS FAILS

* PUMP DISCHARGE HEAD (M) IS 1.67 m.

SENSE LINE REQUIREMENTS

<u>DISTANCE, FT</u> <u>FROM PUMP</u>	<u>MIN. SCHED.</u> <u>PIPE SIZE</u>
0-200	1/4
201-900	3/8
901-3000	1/2

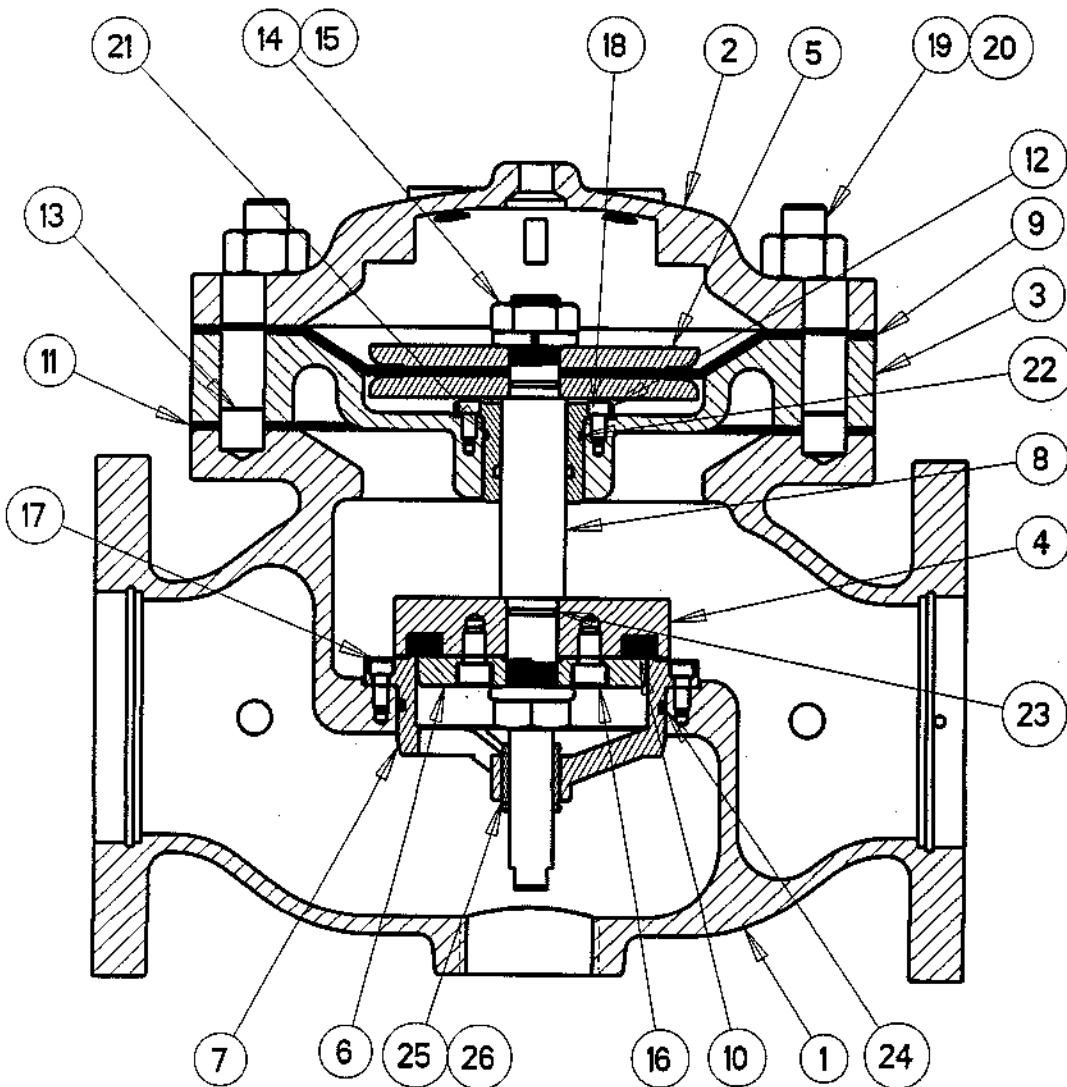
E					MATERIAL	TOLERANCES	 MOCV Control Valves MADE IN INDIA
D						UNLESS NOTED FRACTIONAL $\pm 1/64$	
C						DECIMAL $\pm .005$ MACH FINISH 125μ ANGULAR $\pm 1/2^\circ$	
B							
A					NO REQ'D	DRAWN BY DATE	
CHG	E. C. N. D.	DATE			SCALE	CHKD BY DATE	2" TANK SAFETY VALVE WORK NUMBER 6603-02A
REVISIONS				REF DWG NO'S			



ITEM	PART NO	QTY	DESCRIPTION	MAT'L
1	301091	1	BODY	DUCT. IRON
2	303092	1	BONNET	DUCT. IRON
3	306091	1	INTERMEDIATE PLATE	DUCT. IRON
4	306491	1	SEAT PLATE	STN. STL.
5	307092	2	DIAPHRAGM PLATE	STN. STL.
6	309092	1	SEAT RETAINER	STN. STL.
7	311791	1	SEAT RING	STN. STL.
8	313792	1	STEM	STN. STL.
9	690093	1	DIAPHRAGM	BUNA-N
10	690591	1	SEAT DISC	BUNA-N
11	693091	1	GASKET	BUNA-N
12	320076	1	GUIDE BUSHING	DELFIN
13	620701	2	DOWEL PIN	STN. STL.
14	590747	2	HEX NUT	STN. STL.
15	685712	2	LOCK WASHER	STN. STL.
16	530700	3	SKT. HD. CAPSCREW	STN. STL.
17	530702	2	SKT. HD. CAPSCREW	STN. STL.
18	300681	8	STUD	ZN PL STL
19	590011	8	HEX NUT	ZN PL STL
20	610123	1	O-RING	BUNA-N
21	610214	1	O-RING	BUNA-N
22	610016	2	O-RING	BUNA-N
23	610154	1	O-RING	BUNA-N
24	300071	1	LOWER BUSHING	TEFLON
25	630711	2	SNAP RING	STN. STL.
26	650772	1	SPRING	STN. STL.

* : RECOMMENDED SPARE PARTS

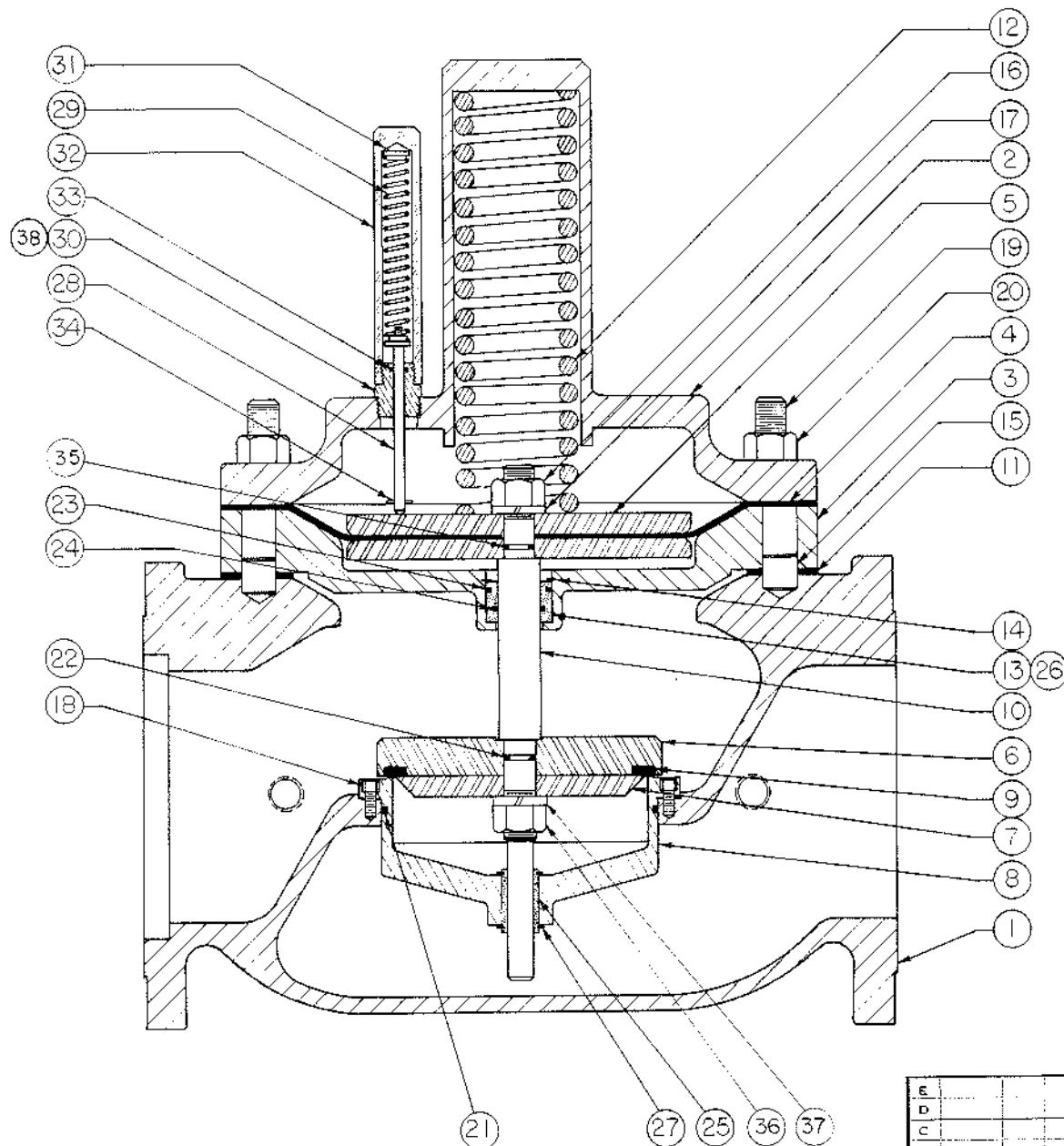
E					MATERIAL	TOLERANCES		OCV Control Valves		
D					150# DIST	UNLESS NOTED .XX ±.015 .XXX ±.005 ANGULAR ±0.5° MACH. FINISH 125		TULSA OKLAHOMA USA		
C				3" 3100 TANK SAFETY VALVE						
B										
A										
CHG	ECN	DATE	BY		NO. REQ'D	DRAWN BY	DATE	SIZE	DRAWING NUMBER	REV
						SDJ	03-06-06	A	3150TS	
					SCALE	CHKD BY	DATE			
REVISIONS				REF DWG NO'S	40%					



ITEM	PART NO	QTY	DESCRIPTION	MAT'L
1	301044	1	BODY	DUCT. IRON
2	303045	1	BONNET	DUCT. IRON
3	303044	1	INTERMEDIATE PLATE	DUCT. IRON
4	306404	1	SEAT PLATE	STN. STL.
5	307746	2	DIAPHRAGM PLATE	STN. STL.
6	309045	1	SEAT RETAINER	STN. STL.
7	311744	1	SEAT RING	STN. STL.
8	313742	1	STEM	STN. STL.
9	690387	1	DIAPHRAGM	NYLON/BUNA-N
10	690544	1	SEAT DISC	BUNA-N
11	693044	1	GASKET	BUNA-N
12	320046	1	GUIDE BUSHING	DELRI
13	300708	2	DOWEL PIN	STN. STL.
14	590733	2	HEX NUT	STN. STL.
15	685708	2	LOCK WASHER	STN. STL.
16	530719	4	SKT. HD. CAPSCREW	STN. STL.
17	530701	6	SKT. HD. CAPSCREW	STN. STL.
18	530707	4	SKT. HD. CAPSCREW	STN. STL.
19	300094	8	STUD	ZN PL STL
20	590005	8	HEX NUT	ZN PL STL
21	610129	1	O-RING	BUNA-N
22	610216	1	O-RING	BUNA-N
23	610018	2	O-RING	BUNA-N
24	610245	1	O-RING	BUNA-N
25	300645	1	LOWER BUSHING	TEFLON
26	630707	2	SNAP RING	STN. STL.

RECOMMENDED SPARE PARTS
SPARE PARTS KIT P/N 906044

E					MATERIAL	TOLERANCES		OCV Control Valves		
D					150# DIST	UNLESS NOTED XX ±.015 XXX ±.005 ANGULAR ±0.5° MACH. FINISH 125		TULSA OKLAHOMA USA		
C				4" 4400 POWER-ACTUATED VALVE						
B										
A										
CHG	ECN	DATE	BY		NO. REQ'D	DRAWN BY	DATE	SIZE	DRAWING NUMBER	REV
						SDJ	10-04-04	A	4450	
					SCALE	CHKD BY	DATE			
REVISIONS					REF DWG NO'S	30%				

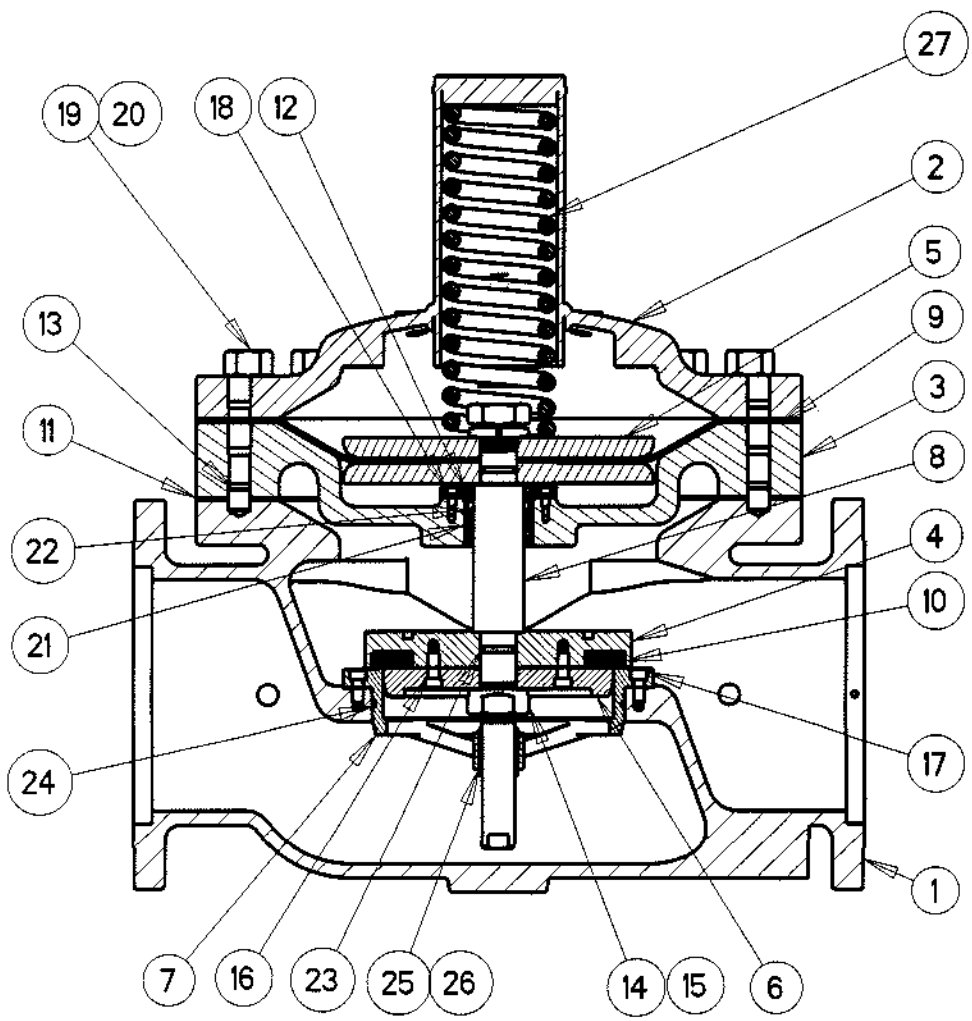


NOTES:

1. WHEN ORDERING PARTS, PLEASE SPECIFY SERIES NUMBER, PART NUMBER AND MATERIAL.
2. Δ = RECOMMENDED SPARE PARTS.
3. $\bigcirc$ = PARTS USED WHEN STAINLESS STEEL SEAT RING IS FURNISHED.

38	300155	1	INDICATOR BUSHING	BRASS
37	685726	1	LOCKWASHER	STN. STEEL
36	590735	1	HEX NUT	STN. STEEL
Δ 35	611016	1	O-RING	VITON
	610016			BUNA-N
Δ 34	620700	1	ROLL PIN	STN. STEEL
Δ 33	611010	1	O-RING	VITON
32	316001	1	INDICATOR HOUSING	ACRYLIC
31	300182	2	SPRING RETAINER	BRASS
30	300753	1	INDICATOR ADAPTER	STN. STEEL
	300153			BRASS
29	650435	1	INDICATOR SPRING	STEEL
28	316006	1	INDICATOR STEM	STN. STEEL
$\bigcirc$ 27	630723	2	RETAINING RING	STN. STEEL
$\bigcirc$ 26	300086	1	GUIDE BUSHING	DEL-RIN
$\bigcirc$ 25	300059	1	LOWER BUSHING	TEFLON
Δ 24	611218	1	O-RING	VITON
	610218			BUNA-N
Δ 23	611220	1	O-RING	VITON
	610220			BUNA-N
Δ 22	611020	1	O-RING	VITON
	610020			BUNA-N
Δ 21	611259	1	O-RING	VITON
	610259			BUNA-N
20	590005	12	HEX NUT	CAD PL. STEEL
19	300094	12	STUD	CAD PL. STEEL
18	530701	6	SOCKET HEAD CAPSCREW	STN. STEEL
17	685712	1	LOCKWASHER	STN. STEEL
16	590721	1	HEX NUT	STN. STEEL
15	300708	2	DOWEL PIN	STN. STEEL
14	630724	1	RETAINING RING	STN. STEEL
13	300186	1	GUIDE BUSHING	BRONZE
12	650002	1	SPRING	U. S. PL. STEEL
Δ 11	693014	1	GASKET	BUNA-N
10	313743	1	STEM	STN. STEEL
Δ 9	691503	1	SEAT DISC	VITON
	690503			BUNA-N
8	311714	1	SEAT RING	STN. STEEL
	311114			BRONZE
7	309417	1	SEAT RETAINER	STEEL
6	308450	1	SEAT PLATE	STEEL
5	307433	1	DIAPHRAGM PLATE	STEEL
Δ 4	690143	1	DIAPHRAGM	VITON
	690043			BUNA-N
3	306339	1	INTERMEDIATE PLATE	CAST STEEL
2	303455	1	BONNET ASSEMBLY	CAST STEEL
1	301703	1	BODY - ANS. 300 LB.	CAST STEEL
	301303		BODY - ANS. 150 LB.	CAST STEEL
ITEM	QTY	NO.	DESCRIPTION	MATERIAL

E						MATERIAL	TOLERANCES		 DCV Control Valves TULSA, OKLAHOMA U.S.A.		
D							UNLESS NOTED				
C							FRACTIONAL $\pm 1/64$				
B							DECIMAL $\pm .005$		6" TANK SAFETY VALVE		
A							MACH. FINISH 125				
							ANGULAR $\pm 1/2^\circ$				
CHG	E.C. NO.	DATE	BY			NO. REV'D	DRAWN BY	DATE	SIZE	DRAWING NUMBER	REV
							RON	10-83			
						SCALE	CHKD BY	DATE	C	6197	A
REVISIONS				REF. DWG. NO.'S							



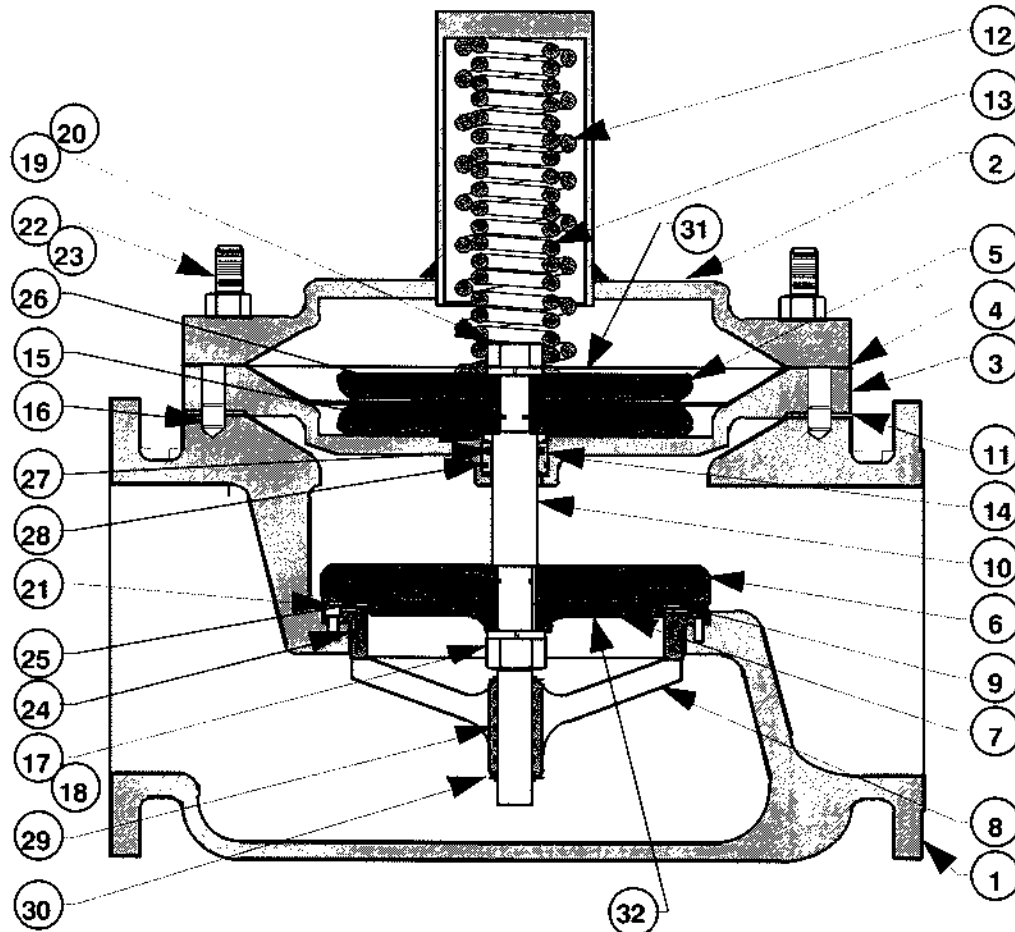
ITEM	PART NO	QTY	DESCRIPTION	MATERIAL
1	301084 301384	1	BODY	DUCT. IRON CAST STEEL
2	303484	1	BONNET	CAST STEEL
3	306084 306384	1	INTERMEDIATE PLATE	DUCT. IRON CAST STEEL
4	306484	1	SEAT PLATE	STEEL
5	307384	2	DIAPHRAGM PLATE	STEEL
6	309085	1	SEAT RETAINER	DUCT. IRON
7	311184 311784*	1	SEAT RING	BRONZE STN. STL.
8	313785	1	STEM	STN. STL.
9*	690085 690185	1	DIAPHRAGM	BUNA-N VITON
10*	690584 691584	1	SEAT DISC	BUNA-N VITON
11*	693084 693184	1	GASKET	BUNA-N VITON
12	300287 300288	1	GUIDE BUSHING	BRONZE STN. STL.
13	300708	2	DOWEL PIN	STN. STL.
14	590724	2	HEX NUT	STN. STL.
15	685717	2	LOCK WASHER	STN. STL.
16	530718	8	SKT. HD. CAPSCREW	STN. STL.
17	530711	8	SKT. HD. CAPSCREW	STN. STL.
18	530700	4	SKT. HD. CAPSCREW	STN. STL.
19	300684	12	STUD	ZN PL. STL.
20	590010	12	HEX NUT	ZN PL. STL.
21*	610227 611227	1	O-RING	BUNA-N VITON
22*	610327 611327	1	O-RING	BUNA-N VITON
23*	610214 611214	2	O-RING	BUNA-N VITON
24*	610268 611268	1	O-RING	BUNA-N VITON
25*	300074	1	LOWER BUSHING	TEFLON
26*	630713	2	SNAP RING	STN. STL.
27	650001	1	SPRING	STN. STL.

* : RECOMMENDED SPARE PARTS
 * : PARTS PROVIDED WITH STAINLESS STEEL SEAT RING

E					MATERIAL	TOLERANCES		OCV Control Valves		
D						UNLESS NOTED		TULSA OKLAHOMA USA		
C						.XX ±.015		8" 3200 TANK SAFETY VALVE		
B						.XXX ±.005				
						ANGULAR ±0.5°				
						MACH. FINISH 125				
A					NO. REQ'D	DRAWN BY	DATE	SIZE	DRAWING NUMBER	REV
CHG	ECN	DATE	BY			SDJ	03-20-06	A	3250TS	
				SCALE	CHKD BY	DATE				
REVISIONS				REF DWG NO'S	15%					

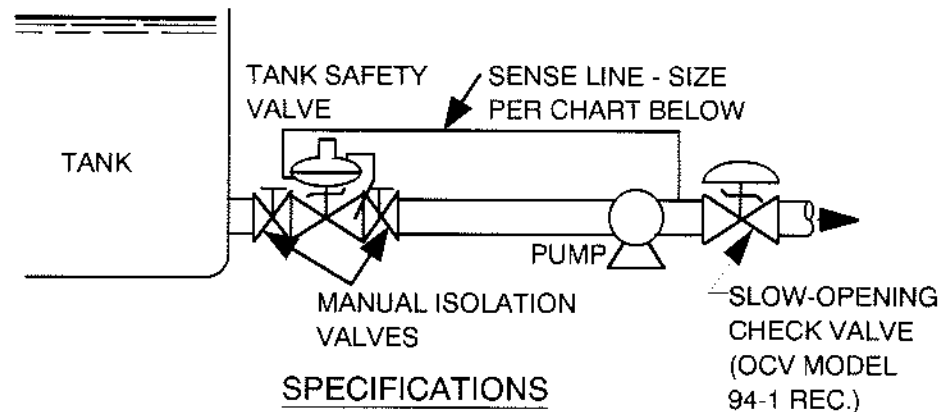
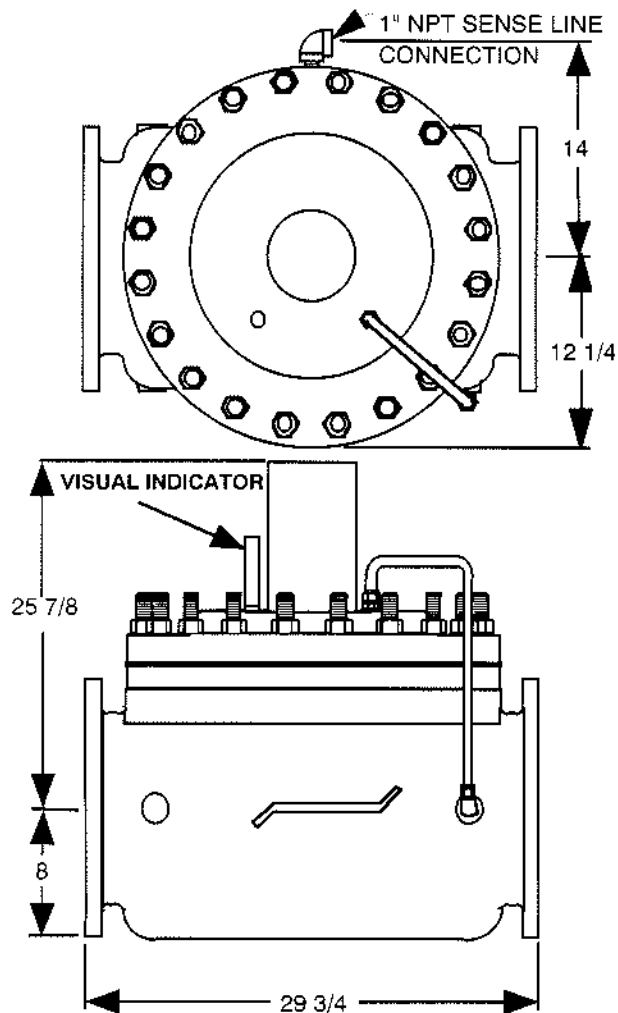
NOTES:

1. ▲ = RECOMMENDED SPARE PARTS
2. ● = PARTS STD. WITH S.S. SEAT RING
3. VITON ELASTOMERS ALSO AVAILABLE



32	531725	8	CAPSCREW (NOT SHN)	STN. STL.
31	300449	1	SPRING RET (NOT SHN)	STEEL
30	630714	2	RETAINING RING	STN. STL.
29	300007	1	LOWER BUSHING	TEFLON
28	610227	1	O-RING	BUNA-N
27	610327	1	O-RING	BUNA-N
26	610218	1	O-RING	BUNA-N
25	610218	1	O-RING	BUNA-N
24	610277	1	O-RING	BUNA-N
23	590010	16	HEX NUT	ZINC. PL. ST.
22	300488	16	STUD	ZINC. PL. ST.
21	530711	12	SKT. HD. CAPSCREW	STN. STL.
20	685713	1	LOCKWASHER	STN. STL.
19	590738	1	HEX NUT	STN. STL.
18	685713	1	LOCKWASHER	STN. STL.
17	590738	1	HEX NUT	STN. STL.
16	300708	2	DOWEL PIN	STN. STL.
15	530711	4	CAPSCREW (NOT SHN)	STN. STL.
14	300236	1	GUIDE BUSHING	DELTRIN
13	300232			BRASS
12	650746	1	INNER SPRING	STN. STL.
11	650000	1	OUTER SPRING	NKL. PL. STL.
10	693036	1	GASKET	BUNA-N
9	313754	1	STEM	STN. STL.
8	690505	1	SEAT DISC	BUNA-N
7	311705	1	SEAT RING	STN. STL.
6	311105			BRONZE
5	309035	1	SEAT RETAINER	DUCT. IRON
4	306470	1	SEAT PLATE	STEEL
3	307440	2	DIAPHRAGM PLATE	STEEL
2	690073	1	DIAPHRAGM	BUNA-N
1	306325	1	INTERMEDIATE PLATE	CAST STEEL
	303425	1	BONNET	CAST STEEL
	301325	1	BODY	CAST STEEL
ITEM	PART NO.	QTY	DESCRIPTION	MATERIAL

				MATERIAL		TOLERANCES		Control Valves TULSA, OKLAHOMA U.S.A.											
						N/A													
								NO. REQ'D		DRAWN BY RON		DATE 6-21-00		10" TANK SAFETY VALVE ASSEMBLY					
				CHG		E.C. NO.		DATE		BY		SCALE NONE		CHKD. BY		DATE		SIZE A	
REVISIONS				REF DWG NO'S															



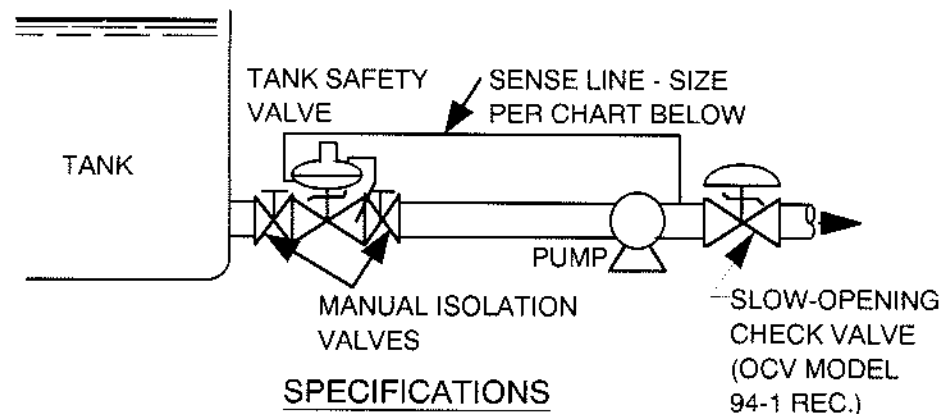
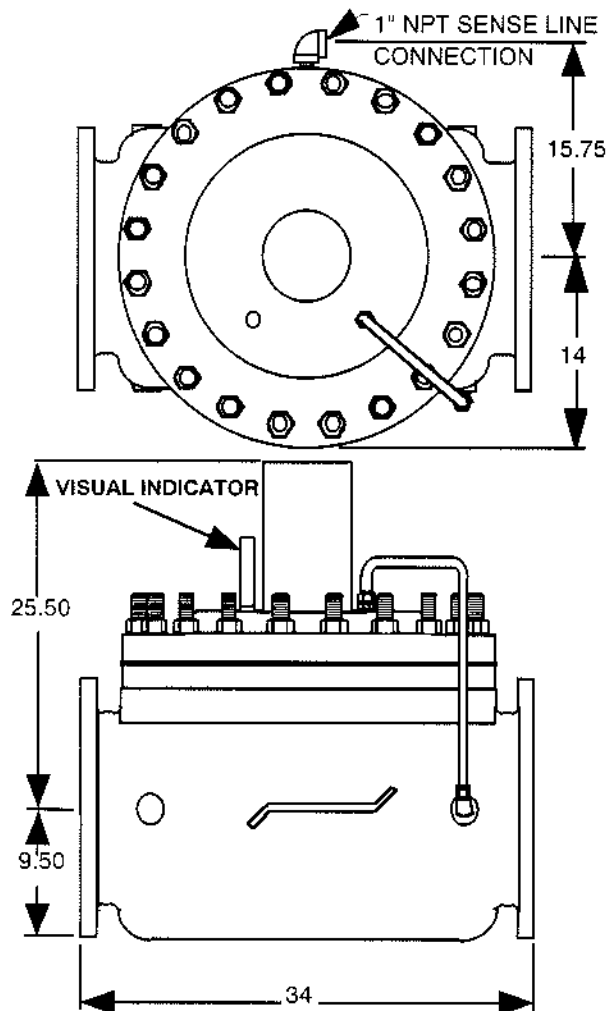
PRESSURE REQ'D TO START VALVE OPEN — 5 PSID*
 PRESSURE REQ'D TO FULL OPEN VALVE — 15 PSID*
 VALVE OPENING TIME — 10 SECONDS OR LESS WITH 30 PSID* MIN. PRESSURE AND SENSE LINE SIZED PER CHART BELOW.
 VALVE CLOSING TIME — 15 SECONDS OR LESS WITH SENSE LINE SIZED PER CHART BELOW.
 VALVE Cv (FULL OPEN) — 1250
 VALVE WILL AUTOMATICALLY CLOSE IF DIAPHRAGM FAILS.

*PUMP DISCHARGE HEAD MINUS FULL TANK HEAD

SENSE LINE REQUIREMENTS

DISTANCE, FT. VALVE-TO-PUMP	MIN. SCHED 40 PIPE SIZE
0 - 30	3/4"
31 - 150	1"
151 - 600	1 1/4"
600 - 1 000	1 1/2"

					MATERIAL	TOLERANCES		 Control Valves TULSA, OKLAHOMA U.S.A.		
						FACE TO FACE FRACTIONAL ±3/32"		10" TANK SAFETY VALVE INSTALLATION		
						OTHERS GENERAL ENVELOPE				
					NO. REQ'D	DRAWN BY RON	DATE 6-21-00	SIZE	DRAWING NUMBER	REV.
CHG	E.C. NO.	DATE	BY		SCALE NONE	CHKD. BY	DATE	A	66TS-10A	
REVISIONS				REF DWG NO'S						



SPECIFICATIONS

PRESSURE REQ'D TO START VALVE OPEN — 5 PSID*
 PRESSURE REQ'D TO FULL OPEN VALVE — 15 PSID*
 VALVE OPENING TIME — 10 SECONDS OR LESS WITH 30
 PSID* MIN. PRESSURE AND
 SENSE LINE SIZED PER CHART
 BELOW.
 VALVE CLOSING TIME — 15 SECONDS OR LESS WITH
 SENSE LINE SIZED PER CHART
 BELOW.
 VALVE Cv (FULL OPEN) — 1700
 VALVE WILL AUTOMATICALLY CLOSE IF DIAPHRAGM FAILS.
 *PUMP DISCHARGE HEAD MINUS FULL TANK HEAD

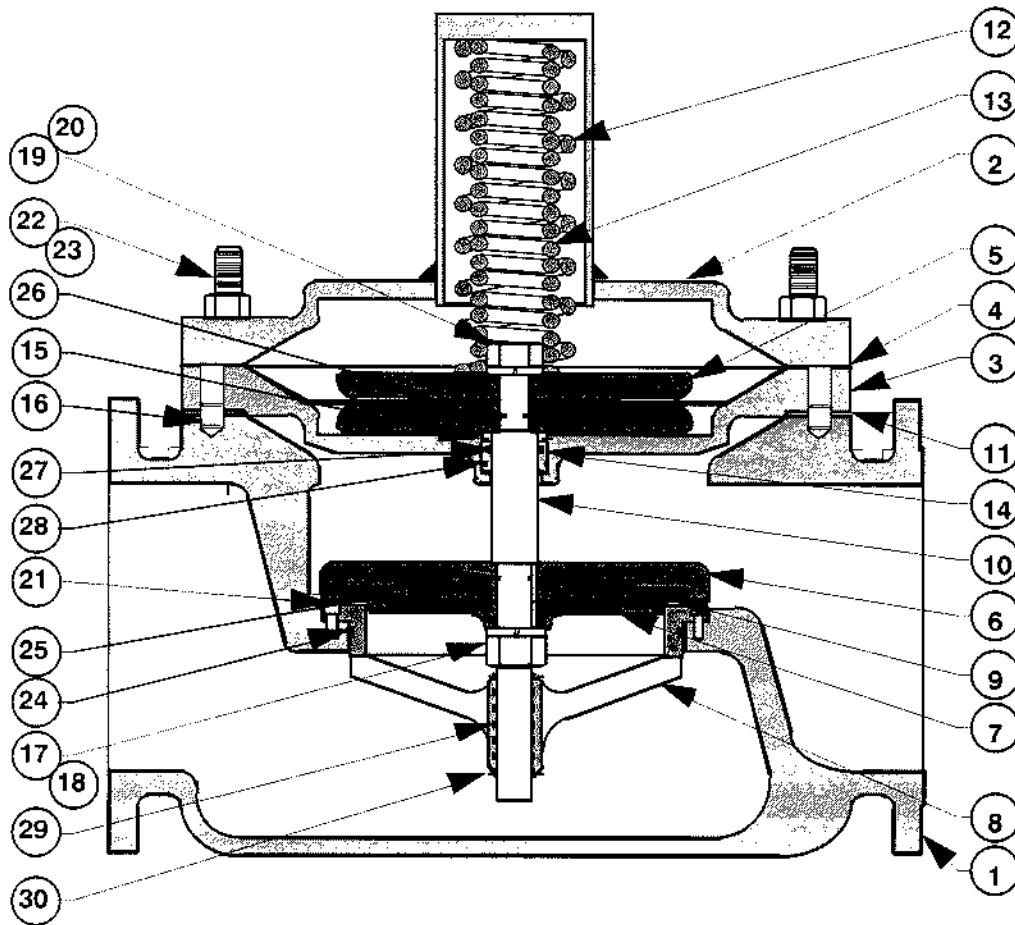
SENSE LINE REQUIREMENTS

<u>DISTANCE, FT.</u> <u>VALVE-TO-PUMP</u>	<u>MIN. SCHED 40</u> <u>PIPE SIZE</u>
0 - 30	3/4"
31 - 150	1"
151 - 600	1 1/4"
600 - 1 000	1 1/2"

					MATERIAL	TOLERANCES		 Control Valves TULSA, OKLAHOMA U.S.A.		
						FACE TO FACE FRACTIONAL ±1/8"				
						OTHERS GENERAL ENVELOPE		12" TANK SAFETY VALVE INSTALLATION		
CHG	E.C. NO.	DATE	BY		NO. REQ'D	DRAWN BY RON	DATE 4-8-99	SIZE	DRAWING NUMBER	REV.
REVISIONS				REF DWG NO'S	SCALE	CHKD. BY	DATE	A	66TS-12A	

NOTES:

1. ▲ = RECOMMENDED SPARE PARTS
2. ● = PARTS STD. WITH S.S. SEAT RING
3. VITON ELASTOMERS ALSO AVAILABLE



●	30	630714	2	RETAINING RING	STN. STL.
●	29	300097	1	LOWER BUSHING	TEFLON
▲	28	610145	1	O-RING	BUNA-N
▲	27	610328	1	O-RING	BUNA-N
▲	26	610121	1	O-RING	BUNA-N
▲	25	610125	1	O-RING	BUNA-N
▲	24	610456	1	O-RING	BUNA-N
	23	590028	20	HEX NUT	ZINC. PL. ST.
	22	300075	20	STUD	ZINC. PL. ST.
	21	530711	16	SKT. HD. CAPSCREW	STN. STL.
	20	685717	1	LOCKWASHER	STN. STL.
	19	590724	1	HEX NUT	STN. STL.
	18	685713	1	LOCKWASHER	STN. STL.
	17	590723	1	HEX NUT	STN. STL.
	16	620012	2	DOWEL PIN	STN. STL.
	15	630703	1	RETAINING RING	STN. STL.
		300602	1	GUIDE BUSHING	TEFLON
	14	300118			BRASS
	13	650761	1	INNER SPRING	STN. STL.
	12	650760	1	OUTER SPRING	STN. STL.
▲	11	693007	1	GASKET	BUNA-N
	10	313716	1	STEM	STN. STL.
▲	9	690506	1	SEAT DISC	BUNA-N
		311706	1	SEAT RING	STN. STL.
	8	311106			BRONZE
	7	309036	1	SEAT RETAINER	DUCT. IRON
	6	306446	1	SEAT PLATE	STEEL
	5	307436	2	DIAPHRAGM PLATE	STEEL
▲	4	690017	1	DIAPHRAGM	BUNA-N
	3	306436	1	INTERMEDIATE PLATE	CAST STEEL
	2	303436	1	BONNET	CAST STEEL
	1	301306	1	BODY	CAST STEEL
ITEM	PART NO.	QTY	DESCRIPTION	MATERIAL	

					MATERIAL	TOLERANCES		 Control Valves TULSA, OKLAHOMA U.S.A.		
						N/A		12" TANK SAFETY VALVE ASSEMBLY		
CHG	E.C. NO.	DATE	BY		NO. REQ'D	DRAWN BY RON	DATE 4-8-99	SIZE	DRAWING NUMBER	REV.
REVISIONS				REF DWG NO'S	SCALE	CHKD. BY	DATE	A	1500TS	