

Fire Engine Dump Valve

INSTRUCTIONS

Installation - Operation - Inspection - Maintenance

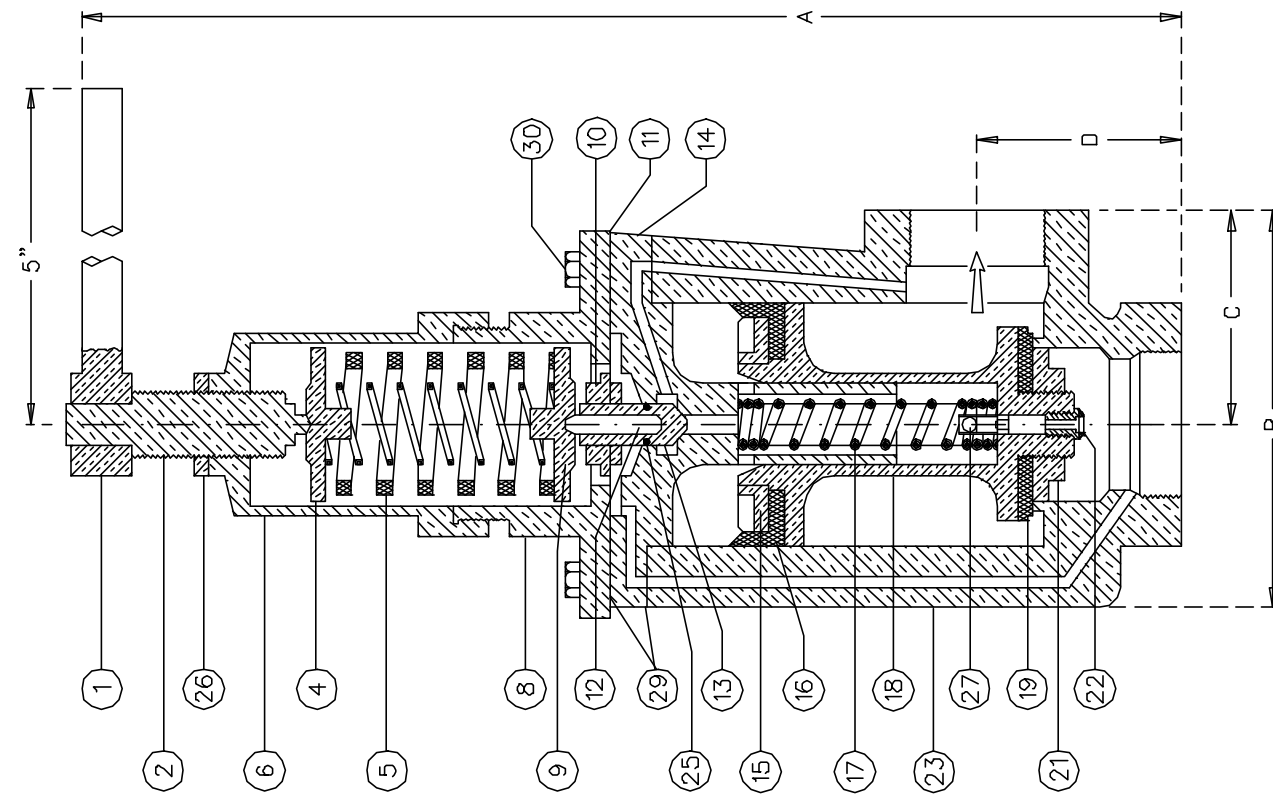


1" - 3" ROSS MODEL - 20WR-D
Fire Engine Dump Valve

Serial #S _____

ROSS VALVE Mfg. Co., Inc.

6 OAKWOOD AVENUE, TROY, NY 12180 - PHONE 518/274-0961 - FAX 518/274-0210



PART	DESCRIPTION	QTY	MATERIAL
1	ADJUSTING HANDLE	OPT.	BRONZE**
2	ADJUSTING SCREW	1	BRONZE**
4	TOP SPRING WASHER	1	BRONZE
5	ADJUSTING SPRING(S)	VARY	STEEL
6	SPRING CHAMBER	1	BRONZE**
8	DIAPHRAGM COVER	1	BRONZE**
9	BOTTOM SPRING WASHER	1	BRONZE
10	DIAPHRAGM NUT	1	BRONZE
11*	DIAPHRAGM	1	BRONZE
12	PILOT PIN	1	STAINLESS
13	PILOT STEM	1	BRONZE
14	DIAPHRAGM PLATE	1	BRONZE
15	CUP FOLLOWER	1	BRONZE
16*	CUP PACKING	1	LEATHER
17	GUIDE SPRING	1	STAINLESS
18	STEM	1	BRONZE
19*	SEAT PACKING	1	POLYURETHANE
21	SEAT FOLLOWER	1	BRONZE
22*	STRAINER/ORIFICE	1	STAINLESS
23	SHELL	1	BRONZE
25*	O-RING PACKING	1	BUNA-N
26	LOCK NUT	1	BRONZE**
27*	BALL CHECK VALVE	1	STAINLESS/BRONZE
29*	GASKETS - DIAPHRAGM PLATE	2	COMPOSITION
30	BOLTS - ASSEMBLY	10	BRONZE**

* INCLUDED IN STANDARD REPAIR KIT
 ** OPTION - CHROME PLATED

FNPT CONNECTIONS	WEIGHT (LBS.)	DIMENSIONS (INCHES)			
		A	B	C	D
1, 1-1/4, 1-1/2	S.B. 27	14	5-1/8	2-1/2	2-3/4
1-1/2, 2	L.B. 34	16	5-1/2	2-7/8	2-3/4
2-1/2, 3	L.B. 43	17	7-3/4	5-1/4	4-3/8

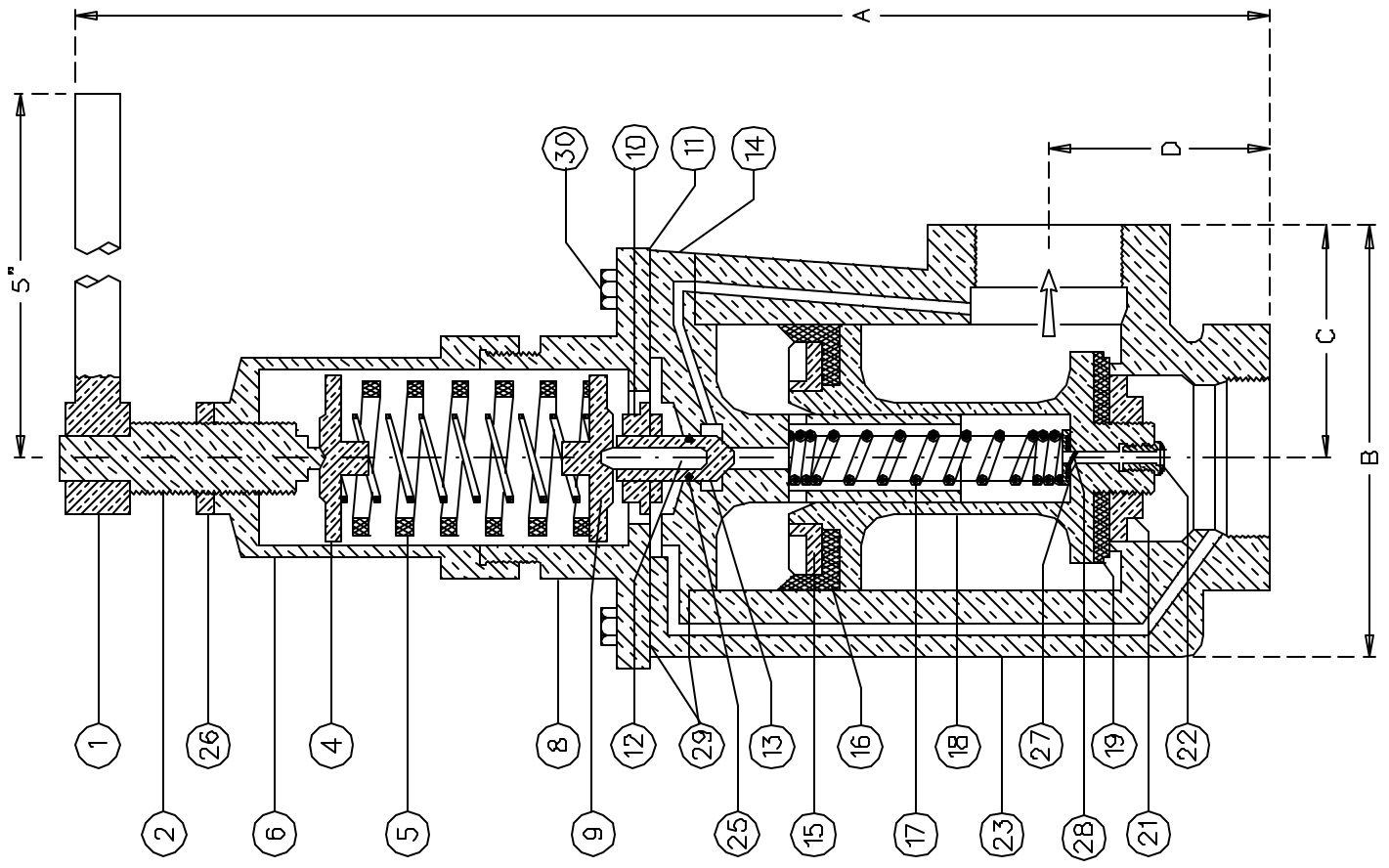
L.B. - LARGE BODY
 S.B. - SMALL BODY

ROSS VALVE Mfg. Co., Inc.
 6 OAKWOOD AVENUE - P.O. BOX 895 - TROY, NEW YORK, 12181 - TEL. (518) 274-0961

NO SCALE DRAWING 20WR-D
 DATE 4-6-81 3401-AD REVISED 1-14-00 R.C.
 MODEL 20WR-D

FIRE ENGINE DUMP (RELIEF) VALVE
 WITH INTERNAL PILOT & BALL CHECK

DIAPHRAGM PLATE #14 ALIGN THROUGH HOLE IN PLATE WITH INTERNAL WASTE PORT ON OUTLET SIDE OF SHELL.
 GASKET PLACEMENT
 - PLACE (1) #29 GASKET ON TOP OF #14 DIAPHRAGM PLATE (BELOW #11 DIAPHRAGM) - ALL BOLT HOLES SHOULD BE OPEN, WHILE THE PORT HOLE SHOULD BE COVERED.
 - PLACE (1) #29 GASKET BELOW #14 DIAPHRAGM PLATE - ALL BOLT HOLES AND PORT HOLES SHOULD BE OPEN.



PART	DESCRIPTION	QTY	MATERIAL
1	ADJUSTING HANDLE	OPT.	BRONZE**
2	ADJUSTING SCREW	1	BRONZE**
4	TOP SPRING WASHER	1	BRONZE
5	ADJUSTING SPRING(S)	VARY	STEEL
6	SPRING CHAMBER	1	BRONZE**
8	DIAPHRAGM COVER	1	BRONZE**
9	BOTTOM SPRING WASHER	1	BRONZE
10	DIAPHRAGM NUT	1	BRONZE
11*	DIAPHRAGM	1	BRONZE
12	PILOT PIN	1	STAINLESS
13	PILOT VALVE	1	BRONZE
14	DIAPHRAGM PLATE	1	BRONZE
15	CUP FOLLOWER	1	BRONZE
16*	CUP PACKING	1	LEATHER
17	GUIDE SPRING	1	STAINLESS
18	STEM	1	BRONZE
19*	SEAT PACKING	1	POLYURETHANE
21	SEAT FOLLOWER	1	BRONZE
22*	STRAINER/DRIFICE	1	STAINLESS
23	SHELL	1	BRONZE
25*	O-RING PACKING	1	BUNA-N
26	LOCK NUT	1	BRONZE**
27	RETAINER RING	1	BRONZE
28*	FLAPPER CHECK	1	NEOPRENE
29*	GASKETS - DIAPHRAGM PLATE	2	COMPOSITION
30	BOLTS - ASSEMBLY	10	BRONZE**

* INCLUDED IN STANDARD REPAIR KIT
 ** OPTION - CHROME PLATED

SIZE	WEIGHT (LBS.)	DIMENSIONS (INCHES)		
		A	B	C
1, 1-1/4, 1-1/2	S.B. 27	14	5-1/8	2-1/2
1-1/2, 2	L.B. 34	16	5-1/2	2-7/8
2-1/2, 3	L.B. 43	17	7-3/4	5-1/4

L.B. - LARGE BODY
 S.B. - SMALL BODY

ROSS VALVE Mfg. Co., Inc.
 6 OAKWOOD AVENUE - P.O. BOX 585 - TROY, NEW YORK, 12181 - TEL. (518) 274-0961

NO SCALE DRAWING 20WR-D
 DATE 4-6-81 3401-AD REVISED 9-24-99 S.M.
 MODEL 20WR-D
 FIRE ENGINE DUMP (RELIEF) VALVE
 WITH FLAPPER CHECK

FILE: 20WRDPL

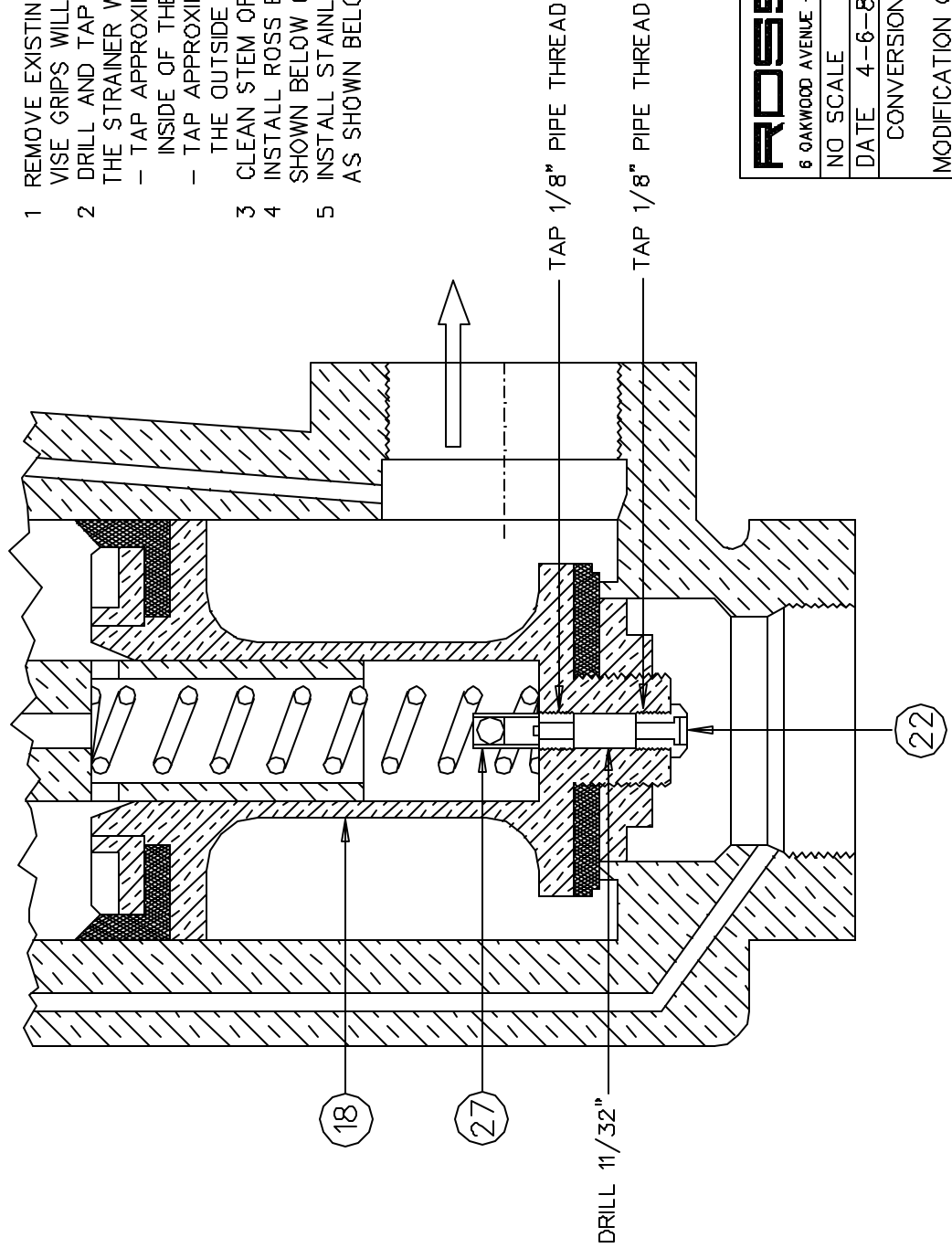
INSTRUCTIONS

CONVERSION OF MODEL 20WR (OR 19WR) RELIEF VALVE
TO
MODEL 20WR-D (OR 19WR-D) DUMP VALVE

OR

MODIFICATION OF MODEL 20WR-D (OR 19WR-D) DUMP VALVE
TO REPLACE NEOPRENE FLAPPER CHECK WITH ROSS BALL CHECK

- 1 REMOVE EXISTING STRAINER (PART 22); VISE GRIPS WILL BE HANDY.
- 2 DRILL AND TAP THE HOLE FROM WHICH THE STRAINER WAS REMOVED.
 - TAP APPROXIMATELY 1/4" STARTING FROM INSIDE OF THE STEM USING 1/8" PIPE TAP.
 - TAP APPROXIMATELY 1/4" STARTING FROM THE OUTSIDE OF THE STEM USING 1/8" PIPE TAP.
- 3 CLEAN STEM OF ALL CHIPS AND DEBRIS.
- 4 INSTALL ROSS BALL CHECK (PART 27) AS SHOWN BELOW (ON THE INSIDE OF THE STEM).
- 5 INSTALL STAINLESS STRAINER-ORIFICE (NEW PART 22) AS SHOWN BELOW (ON THE OUTSIDE OF THE STEM).



ROSS VALVE Mfg. Co., Inc.	
6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274-0961	
NO. SCALE	DRAWING 20WRCONV
DATE 4-6-81 3401-AD2	REVISED 9-15-95
CONVERSION OF MODEL 20WR (19WR) RELIEF VALVE OR MODIFICATION OF MODEL 20WR-D (19WR-D) DUMP VALVE	

MODEL 20WR-D ANGLE DUMP (RELIEF) VALVE INSTRUCTIONS

General: The Model 20WR-D is an all bronze, internal Pilot-Operated Angle Body Relief Valve capable of handling large quantities of water while maintaining close pressure tolerance. The valve is self-contained and easily adjusted through various pressure ranges which cover from 30 psi to 450 PSI. The valve is installed on the suction side of a pump and wastes to atmosphere to protect the pump against excessive pressures in a relay operation.

Design: The "controlled" pressure is piped into the bottom connection. This pressure enters the bottom of the movable piston through a strainer-orifice and passes into the power chamber area above the main piston. Assuming the pilot seat is closed, the pressure in the power chamber becomes equal to the incoming pressure and a hydraulic seating force is developed due to area differentials on the piston. The incoming pressure is also communicated to the small reservoir under the diaphragm through the port on the side of the valve opposite the outlet branch. As long as the springload above the diaphragm exceeds the upward force of the inlet pressure acting under the diaphragm, the pilot seat will remain closed. This in turn keeps the main piston closed.

When the pressure under the diaphragm exceeds the spring loading, the diaphragms lift the pilot stem off its seat. Since the flow into the power chamber is restricted by the strainer-orifice at the bottom of the main stem, opening of the pilot seat results in a decrease in pressure above the piston. This allows the incoming pressure to lift the valve piston and relieve itself through the side outlet.

A small ball check valve is installed above the orifice in the bottom of the piston. This seals the operating chamber and prevents the vacuum from lifting the piston when draughting. As insurance, we recommend installing either a main line check valve or a hand operated isolation valve to close this line during draughting.

Adjustment: Adjustment is made by turning the adjusting screw on the top of the valve. Turning the screw *clockwise* increases the compression on the springs and requires a higher pressure to open the valve; *counter-clockwise* decreases the setting.

Maintenance: The best possible maintenance the valve can experience is occasional operation. This keeps the packings soft and pliable and keeps the valve flushed out. If the valve has been idle for a long period of time (or if an extended period of disuse is anticipated), the valve piston should be removed and a light coat of grease applied to the cup leather after it has been "worked" in the hand.

Repairs: When repairs are required the following parts (11 diaphragm, 16 cup packing, 19 seat packing, 22 strainer/orifice, 25 o-ring pilot packing, 27 ball check valve and 29 diaphragm plate gaskets), should be replaced, and may be ordered as a "Repair Kit" for valve Serial Number _____. In addition, other parts (especially the pilot seat, main seat, cylinder wall, etc.) should be inspected for damage, wear or mineral deposits. The seat on the pilot stem may require lapping with fine valve grinding compound to restore a tight seal.

REPAIR INSTRUCTIONS

Relief Valve - Ross Valve Model 20WR Dump (Relief) Valve - Ross Valve Model 20WR-D

The repair of the Model 20WR or 20WR-D relief valve is made easy by installing a standard repair kit for the appropriate valve size, as follows:

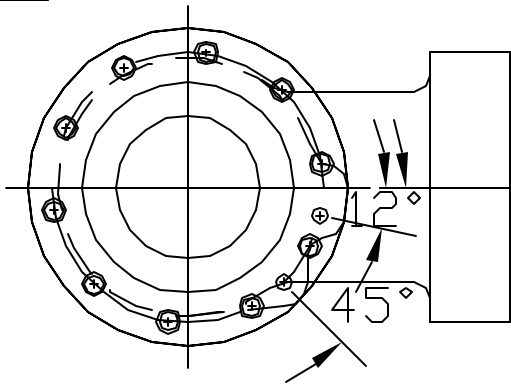
Note: Prior to starting a repair, it is recommended that the position of the adjusting screw #2 be marked. This will ensure that the same pressure setting is obtained upon re-assembly of the valve. The position of the diaphragm plate #14 with respect to the valve shell should also be marked. This will ensure that the valve's internal ports will be correctly aligned upon re-assembly.

- @ Loosen the adjusting screw #2 in order to release the compression on springs #5. (Note: There is no need to remove the adjusting screw completely.)
- @ Remove the spring chamber #6, top spring washer #4, springs #5, and bottom spring washer #9.
- @ Loosen the assembly bolts #30 and remove the diaphragm cover #8.
- @ Remove the pilot assembly (including the diaphragm nut #10, diaphragms #11, pilot pin #12, pilot valve #13, and o-ring #25) and re-pack as follows:
 - @ Remove the diaphragm nut #10 and replace the diaphragms #11 (all 4 sheets).
 - @ Replace the o-ring #25.
 - @ Inspect the pilot valve #13 to ensure that there is a good seating surface.
- @ Remove the diaphragm plate #14 and inspect as follows:
 - @ Check the internal seating surface to ensure that it will create a good seal with the pilot valve. (Note: The pilot valve may be "ground-in" to the diaphragm plate seat, using a light grinding compound, in order to restore a good seal.)
 - @ Check all internal ports to make sure they are clear.
- @ Remove the guide spring #17 and stem assembly (including the cup follower #15, cup packing #16, stem #18, seat packing #19, seat follower #21, strainer/orifice #22, and check valve #27 - if supplied), and re-pack as follows:
 - @ Remove the cup follower #15 and seat follower #21 and replace the corresponding packings. (Note: Care should be taken so that the cup follower #15 is not over-tightened, as it may extrude the cup packing #16 and cause the valve stem #18 to stick.)
 - @ Replace the strainer/orifice #22.
 - @ For dump valves (Model 20WR-D), replace the check valve #27. (Note: If the old neoprene style check valve was used, replace with the new ball style check valve according to separate instructions).
- @ Inspect the valve shell #23 as follows:
 - @ Check the "barrel" and seat areas for nicks or score marks. (Note: A fine sandpaper may be used to restore a smooth finish, when required.)
 - @ Check all internal ports to make sure they are clear.
- @ Re-install the stem assembly and guide spring #17.
- @ Place the first diaphragm gasket #29 on the valve shell #23. (Note: The sensing ports must not be blocked.)
- @ Re-install the diaphragm plate #14, making sure that the port holes underneath line up with the corresponding port holes on the valve shell #23. (Note: The guide spring #17 will cause the diaphragm plate #14 to remain off of the valve shell #23.)
- @ Place the second diaphragm gasket #29 on top of the diaphragm plate #14. (Note: The sensing ports should be blocked by this gasket.)
- @ Re-install the pilot assembly.
- @ Re-install the diaphragm cover #8. (Note: At this time the diaphragm plate #14 and diaphragm cover #8 can be pushed down against the force of the guide spring #17 and held in place by the assembly bolts #30.)
- @ Replace the bottom spring washer #9, springs #5, and top spring washer #4.
- @ Replace the spring chamber #6.
- @ Restore the adjusting screw #2 to its original position and tighten the lock nut #26.

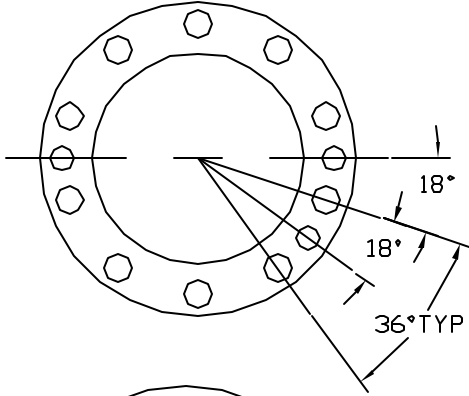
Note: All replaceable packings and gaskets are stock items and may be ordered as a "Main Valve Repair Kit" for valve serial number _____. They are available for regular delivery or next day service. All spare parts are available from:

Ross Valve Mfg. Co., Inc. - 6 Oakwood Avenue, Troy, New York 12181 - Phone (518) 274-0961 - Fax (518) 274-0210

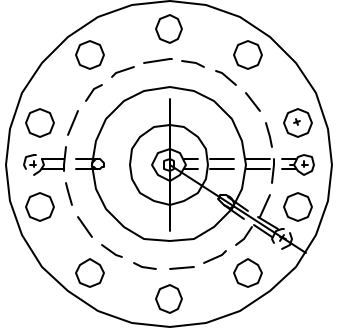
REV.	REVISION	DRAWN	APPROVED	CHK'D
A	CREATE AUTOCAD DRAWING	TJS		



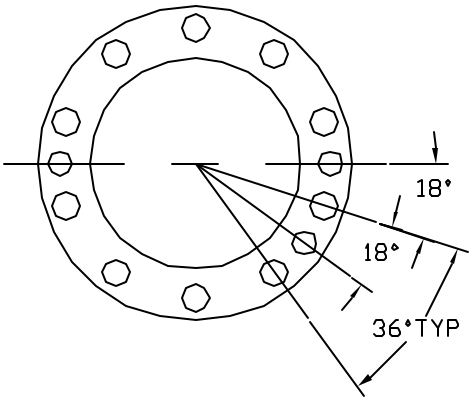
Shell



Paper Gasket



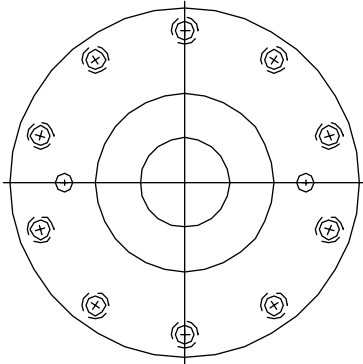
Diaphragm Plate



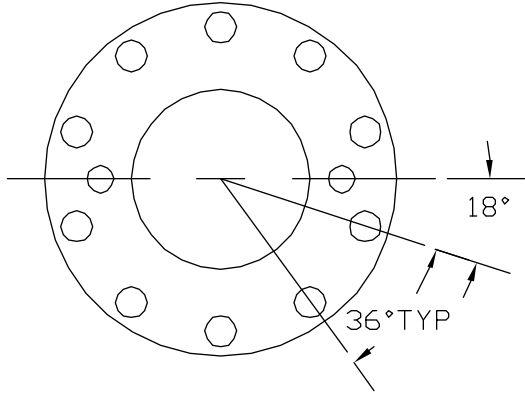
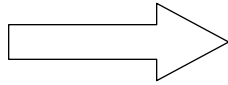
Paper Gasket

DATE XXXXXX	ROSS VALVE Mfg. Co., Inc.			
TOLERANCES UNLESS OTHERWISE SPECIFIED	6 DAKWOOD AVENUE - P.O. BOX 585 - TROY, NEW YORK, 12181 - TEL. (518) 274 0981			
FRACTIONAL ±1/64	TITLE: 20WR L.B. PORT ALIGNMENT			
DECIMAL ±.015	SCALE NONE	MATERIAL VARIOUS	DWG. NO. 500-XXX-XXX-XXX	REV. A
ANGULAR ±2°				

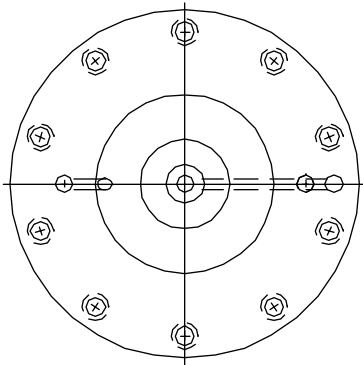
REV.	REVISION	DRAWN	APPROVED	CHK'D
A	CREATE AUTOCAD DRAWING	TJS		



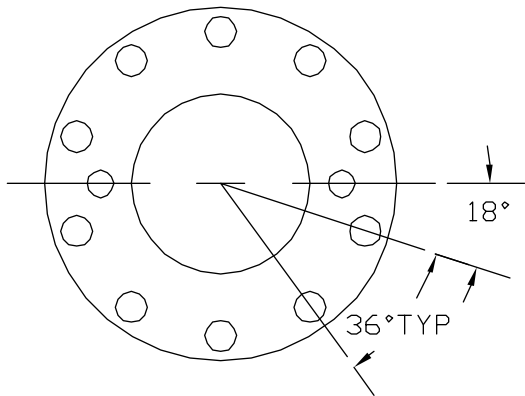
Shell - Inlet up from page & Outlet point in this direction



Paper Gasket - Alignment (not critical)



Diaphragm Plate



Paper Gasket - Alignment (Just make sure ports align)

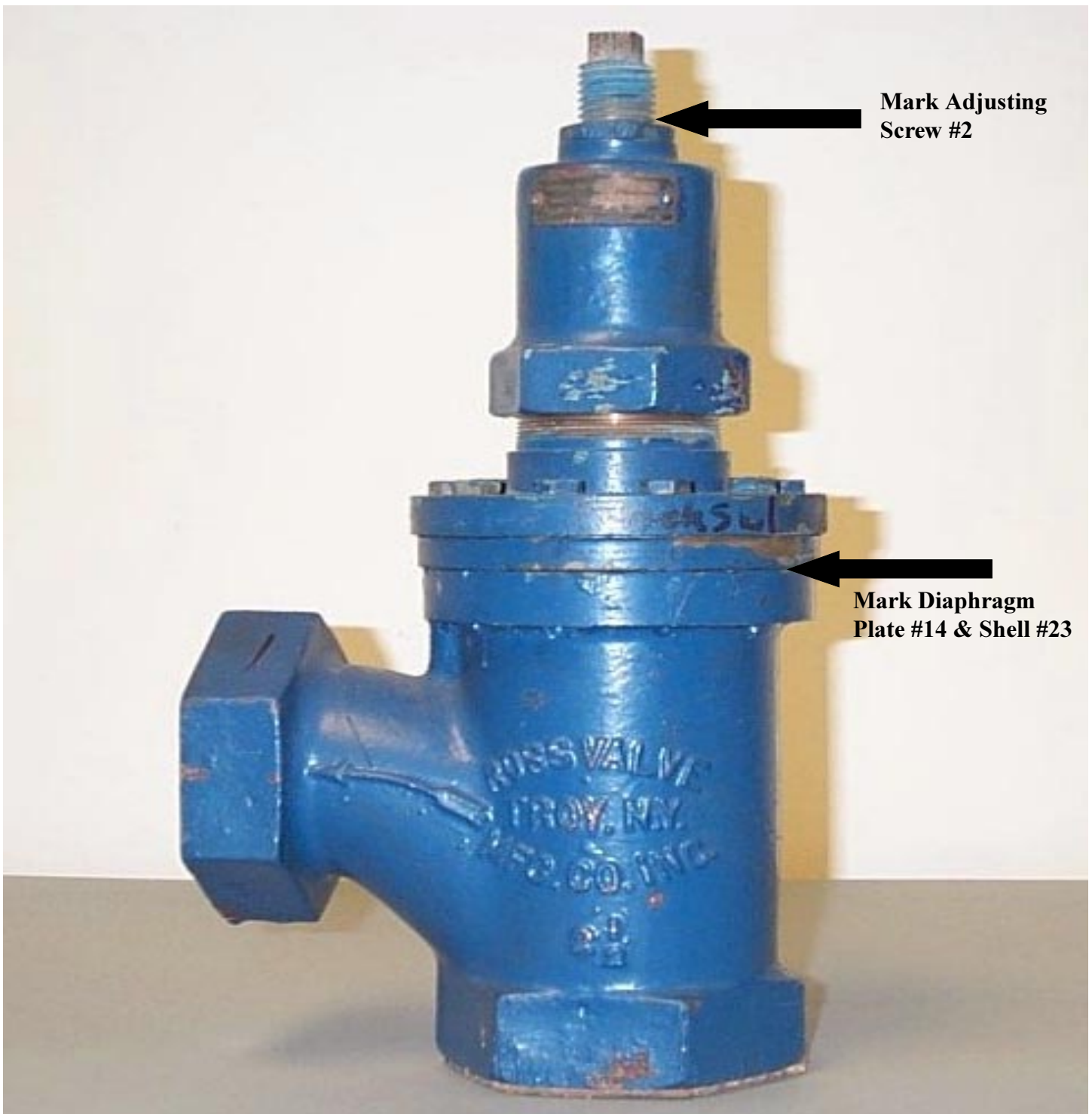
DATE XXXXXX	ROSS VALVE Mfg. Co., Inc.		
TOLERANCES UNLESS OTHERWISE SPECIFIED	6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0961		
FRACTIONAL $\pm 1/64$	TITLE: 20WR S.B. PORT ALIGNMENT		
DECIMAL $\pm .015$	SCALE NONE	MATERIAL VARIOUS	DWG. NO. 500-XXX-XXX-XXX
ANGULAR $\pm 2^\circ$			REV. A

REPAIR INSTRUCTIONS

Relief Valve - Ross Valve Model 20WR Dump (Relief) Valve - Ross Valve Model 20WR-D

The repair of the Model 20WR or 20WR-D relief valve is made easy by installing a standard repair kit for the appropriate valve size, as follows:

Note: Prior to starting a repair, it is recommended that the position of the adjusting screw #2 be marked. This will ensure that the same pressure setting is obtained upon re-assembly of the valve. The position of the diaphragm plate #14 with respect to the valve shell should also be marked. This will ensure that the valve's internal ports will be correctly aligned upon re-assembly.



**Mark Adjusting
Screw #2**

**Mark Diaphragm
Plate #14 & Shell #23**

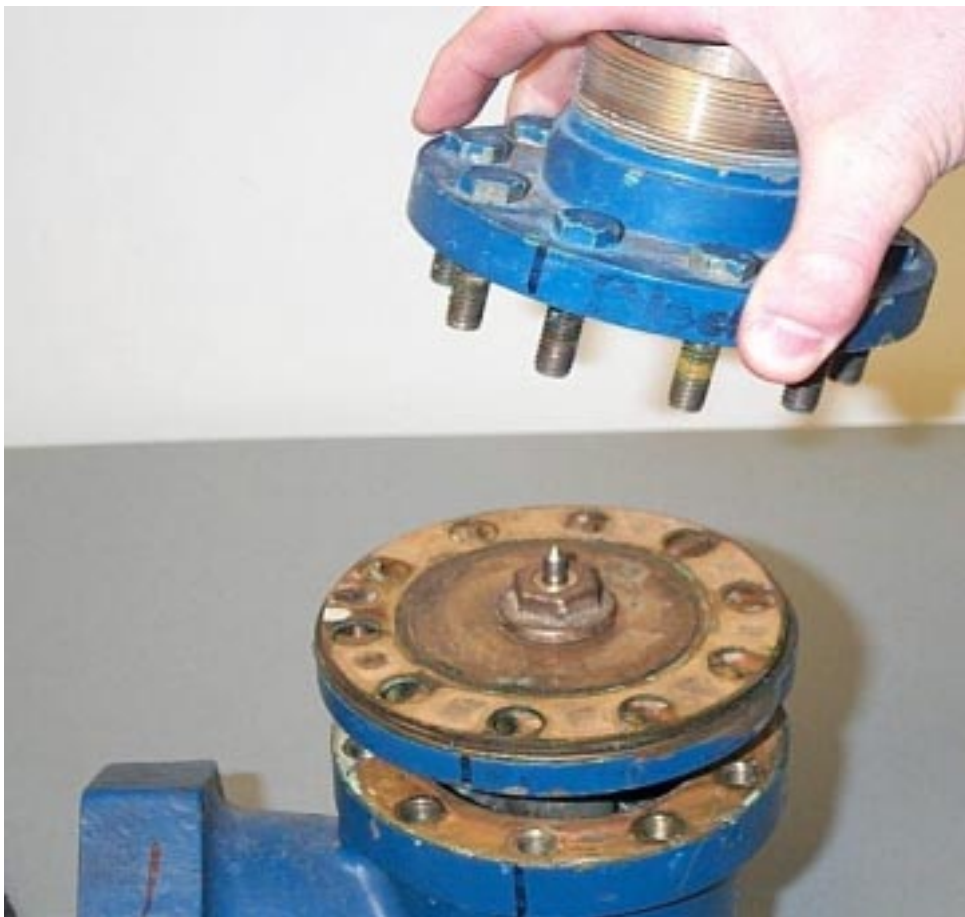
Loosen the adjusting screw #2 in order to release the compression on springs #5. (Note: There is no need to remove the adjusting screw completely.)



Remove the spring chamber #6, top spring washer #4, springs #5, and bottom spring washer #9.



Loosen the assembly bolts #30 and remove the diaphragm cover #8.



Remove the pilot assembly (including the diaphragm nut #10, diaphragms #11, pilot pin #12, pilot valve #13, and o-ring #25) and re-pack as follows:

- ~ Remove the diaphragm nut #10 and replace the diaphragms #11 (all 4 sheets).
- ~ Replace the o-ring #25.
- ~ Inspect the pilot valve #13 to ensure that there is a good seating surface.



Remove the diaphragm plate #14 and inspect as follows:

- ~ Check the internal seating surface to ensure that it will create a good seal with the pilot valve. (Note: The pilot valve may be “ground-in” to the diaphragm plate seat, using a light grinding compound, in order to restore a good seal.)
- ~ Check all internal ports to make sure they are clear.



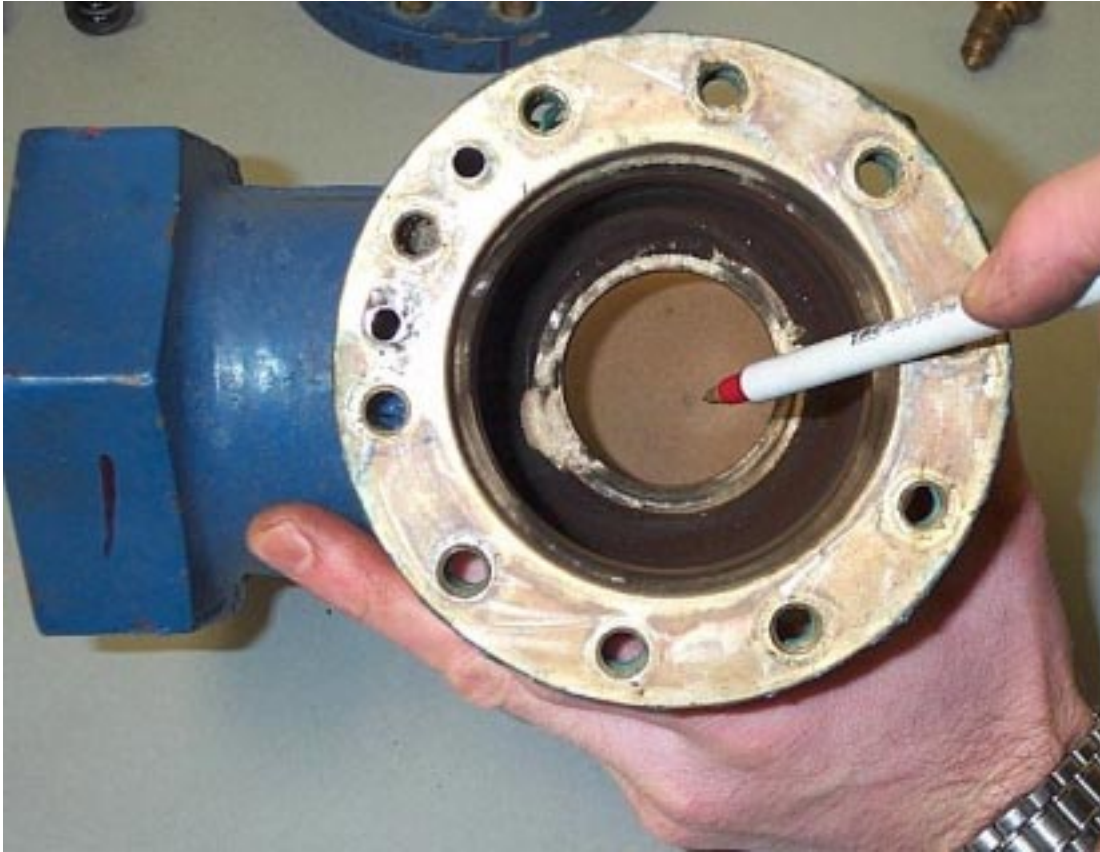
Remove the guide spring #17 and stem assembly (including the cup follower #15, cup packing #16, stem #18, seat packing #19, seat follower #21, strainer/orifice #22, and check valve #27 - if supplied), and re-pack as follows:

- ~ Remove the cup follower #15 and seat follower #21 and replace the corresponding packings. (Note: Care should be taken so that the cup follower #15 is not over-tightened, as it may extrude the cup packing #16 and cause the valve stem #18 to stick.)
- ~ Replace the strainer/orifice #22.
- ~ For dump valves (Model 20WR-D), replace the check valve #27. (Note: If the old neoprene style check valve was used, replace with the new ball style check valve according to separate instructions).



Inspect the valve shell #23 as follows:

- ~ Check the “barrel” and seat areas for nicks or score marks. (Note: A fine sandpaper may be used to restore a smooth finish, when required.)
- ~ Check all internal ports to make sure they are clear.



Re-install the stem assembly and guide spring #17.

Place the first diaphragm gasket #29 on the valve shell #23. (Note: The sensing ports must not be blocked.)

Re-install the diaphragm plate #14, making sure that the port holes underneath line up with the corresponding port holes on the valve shell #23. (Note: The guide spring #17 will cause the diaphragm plate #14 to remain off of the valve shell #23.)

Place the second diaphragm gasket #29 on top of the diaphragm plate #14. (Note: The sensing ports should be blocked by this gasket.)

Re-install the pilot assembly.

Re-install the diaphragm cover #8. (Note: At this time the diaphragm plate #14 and diaphragm cover #8 can be pushed down against the force of the guide spring #17 and held in place by the assembly bolts #30.)

Replace the bottom spring washer #9, springs #5, and top spring washer #4.

Replace the spring chamber #6.

Restore the adjusting screw #2 to its original position and tighten the lock nut #26.

Note: All replaceable packings and gaskets are stock items and may be ordered as a "Main Valve Repair Kit" for valve serial number _____. They are available for regular delivery or next day service. All spare parts are available from:

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