RODNEY HUNT®

Rodney Hunt

A ZURN *Company*

Cone Valves

ROTOVALVES

RotoValve

Valves

RODNEY HUNT®

Rodney Hunt Rotovalves:™

Unparalleled Dependability
Proven Design

The Rodney Hunt Rotovalve has a worldwide reputation for service in a variety of water and wastewater control applications. The Rotovalve is a rugged and highly dependable liquid control valve which can accurately modulate flows under extreme velocities, pressures, and temperatures.

Long-life, low-maintenance
- Many original Rotovalves still operational after 50 years of dependable service.
- Tolerates severe service conditions.
- Lift and turn operation eliminates seat wear.

Reduces Costs
- Full-ported for low head loss.
- Eliminates down-time for seat adjustment or replacement.
- “Smaller than line size" applications enable the reduction of valve size.

Rugged Construction
- Integrally cast trunnions and mounting pads assure proper alignment between body, plug and mechanism.
- Electrically fused Monel metal-to-metal seats handle sludge and grit.
- Fully skirted plug with integrally cast trunnions.
- Moving parts totally enclosed in a lubricated, quickly removed, cast iron housing.

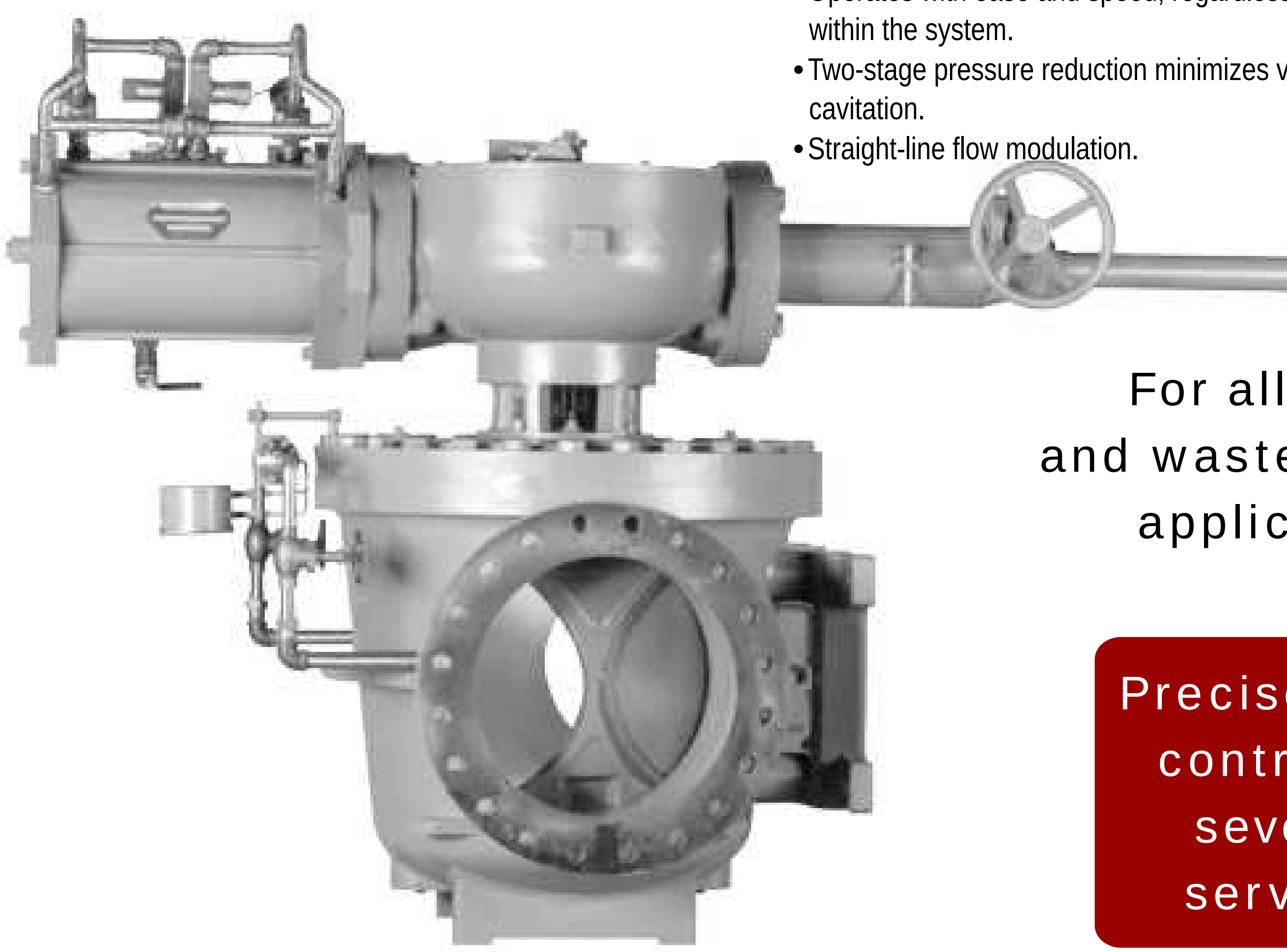
Unique Seating
- Lift and turn operation.

—Low torque for easy operation.

—No seat wear.

- Self-purging, Monel-to-Monel seats assure tight closure.

Excellent Hydraulic Characteristics
- Drip-tight shutoff against pressure or vacuum.
- Easily controlled operating speed minimizes water hammer.
- Operates with ease and speed, regardless of pressure within the system.
- Two-stage pressure reduction minimizes vibration and cavitation.
- Straight-line flow modulation.

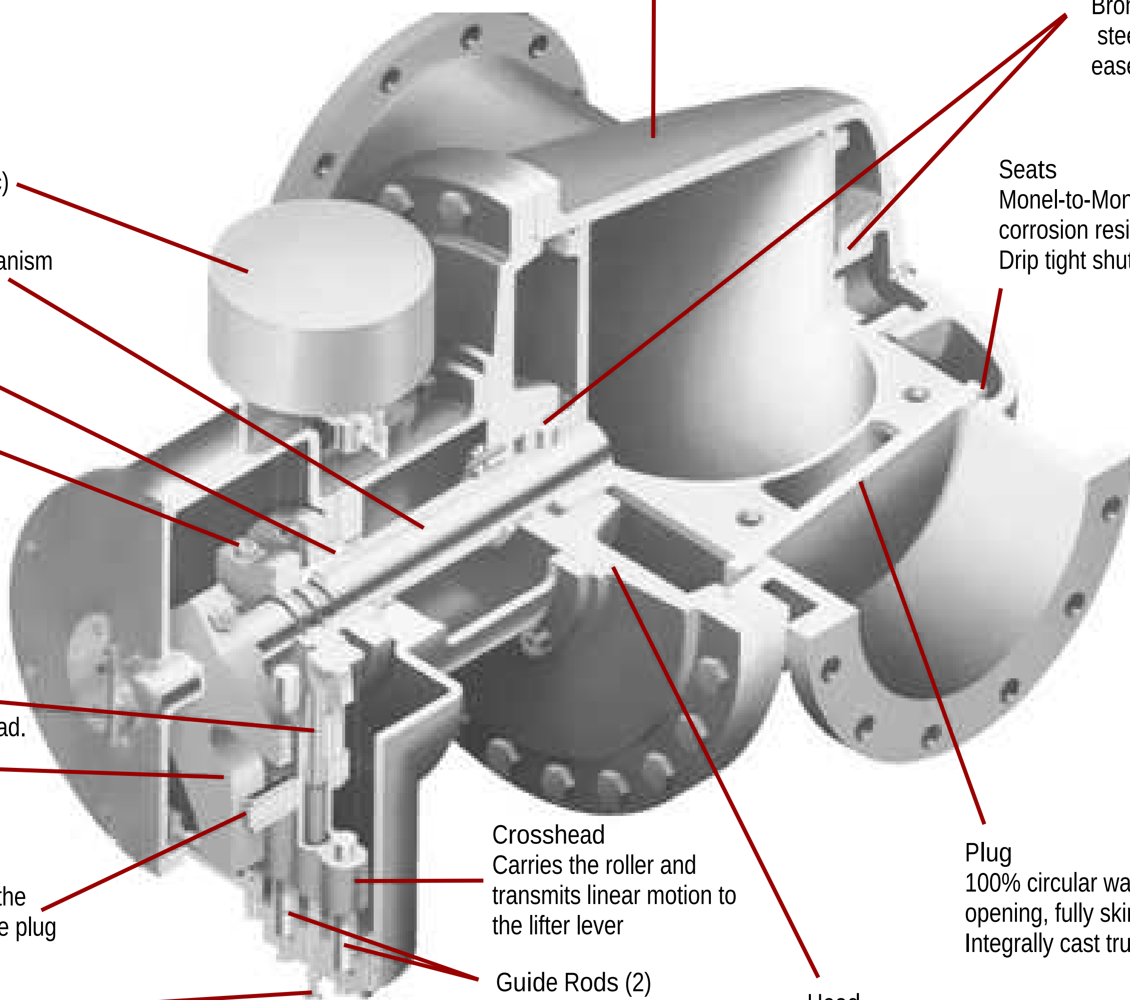


For all water and wastewater applications

Precise flow control in severe service

Rodney Hunt Rotovalves™:

Cut Out View



Rodney Hunt Rotovalves™:

Water Hammer Control

The smooth and linear operating cycle of the Rotovalve is highly effective in controlling surge and water hammer while providing precise flow regulation.

Water hammer, a phenomenon occurring in pipelines carrying incompressible fluids, is the result of a sudden change in fluid velocity. Such a change in velocity could be caused by a sudden closing or opening of a valve, which creates a series of pressure pulsations in the line. The intensity of the initial pressure pulsation can sometimes break the pipe. Water hammer must be a consideration in any system design.

The magnitude of the increase in pressure from water hammer is a function of time and liquid velocity. It is generally accepted that the maximum pressure rise will occur in the first wave whenever the valve is closed completely within one period. One period is defined as the time it takes the shock wave to travel from the valve to the end of the pipe and return. Succeeding waves are progressively less in magnitude.

The complete closure of a valve in a time longer than one period limits the degree of pressure rise in the first wave. The longer the elapsed closing time, the lesser the magnitude of the first and succeeding waves. Controlled closing time is tile key to reducing the intensity of water hammer.

A fully skirted Rotovalve is ideal for water hammer control because of its design and the ease by which the stroke time can be adjusted. The two orifices (influent and effluent) drop the unbalanced pressure in two stages, greatly reducing the potential for cavitation and vibration.

How does the cone valve operate?

The Rotovalve cone valve is different from other through-ported valves (like the ball valve) in its unique seating / unseating operation.

The plug is raised along the axis of the shaft to initiate opening of the valve, and lowered to complete closing of the valve (See Figure 1). This action permits the plug to rotate freely on journal bearings during the entire opening/closing sequence which reduces torque and eliminates seat wear.

Step 1: The closed position. The Rotovalve seats drip tight with the machined monel faces on both sides of the plug seating against the machined monel surfaces on each side of the body.

Step 2: Lift actuation: The first movement of the actuator (manual, electric, or cylinder) moves the crosshead laterally toward the rotator lever. This initial lateral movement of the crosshead moves the lifter lever, which turns the lift nut and raises the plug away from the body seat. The plug has not turned.

Step 3: Opening: Once the crosshead contacts the rotator lever, further lateral movement of the crosshead then turns the plug.

Step 4: Opening: Close-to-open, and open-to-close sequence can be adjusted for water hammer control. The two orifices of the valve (influent and effluent) drop the unbalanced pressure in two stages, reducing the potential for cavitation and vibration.

Step 5: Fully open: Once the plug is fully rotated, continued movement of the crosshead turns the lift nut, reseating the plug.

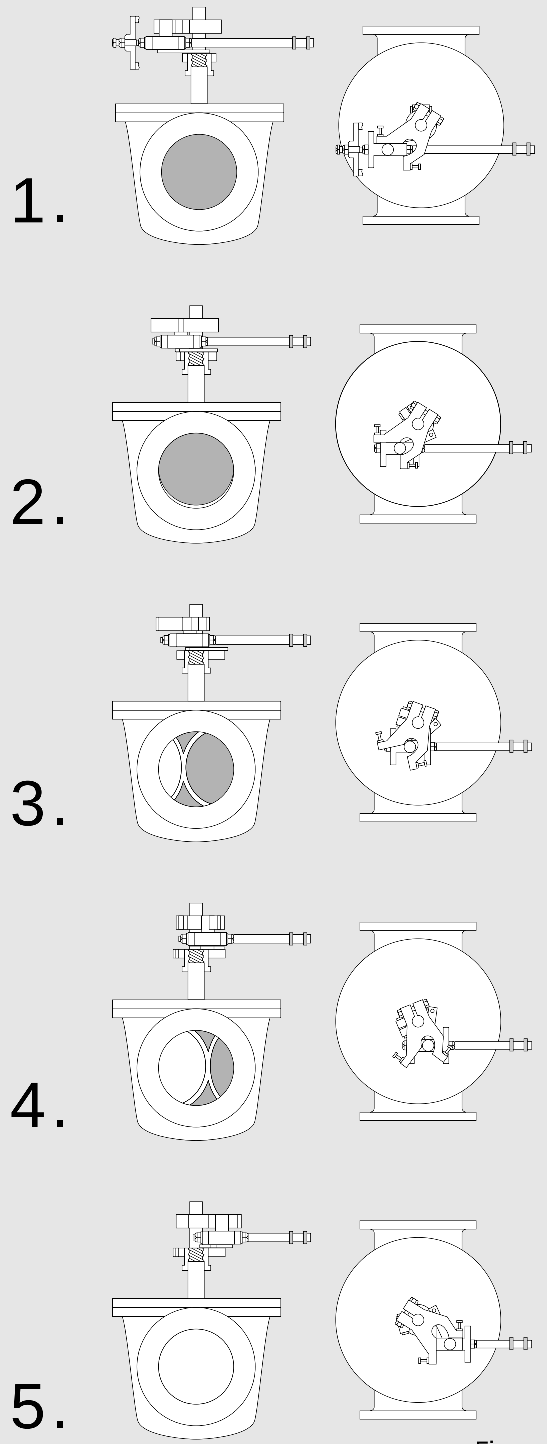


Figure 1

Actuator Mechanism Cross Section

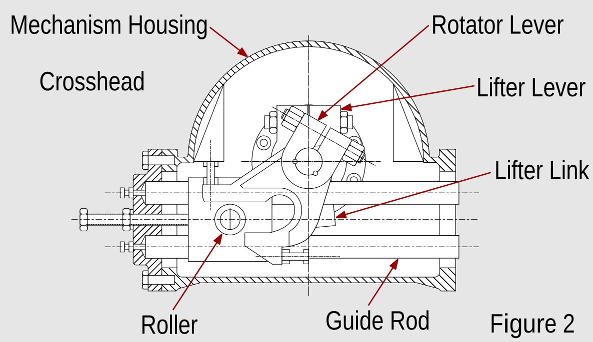
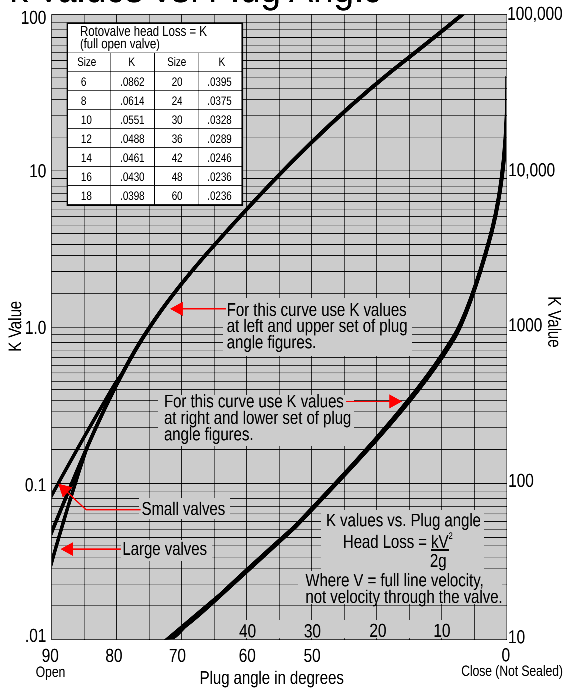


Figure 2

Characteristics

k Values vs. Plug Angle



Rotovalve C_V Values for Closed Systems

VALVE SIZE	PLUG ANGLE IN DEGREES FROM CLOSED								
	90	80	70	60	50	40	30	20	10
RESISTANCE FACTOR "K"		.46	1.9	5.2	13	31	74	180	580
6	3596	1566	826	472	300	193	123	78	44
8	7423	2784	1468	839	534	343	219	139	78
10	12165	4350	2294	1311	834	536	342	217	122
12	18466	6265	3304	1888	1201	772	493	313	176
14	25613	8527	4497	2567	1635	1051	671	426	239
16	34820	11138	5874	3356	2136	1373	877	556	312
18	45515	14096	7434	4248	2703	1738	1110	704	395
20	56191	17403	9178	5244	3337	2145	1370	870	488
24	80915	25060	13216	7552	4806	3089	1974	1253	703
30	134100	39157	20651	11880	7509	4827	3084	1957	1100
36	200780	56386	29738	16993	10813	6951	4441	2819	1583
42	277053	76748	40476	23129	14718	9462	6045	3837	2155
48	372356	100242	52867	30210	19224	12358	7895	5012	2815

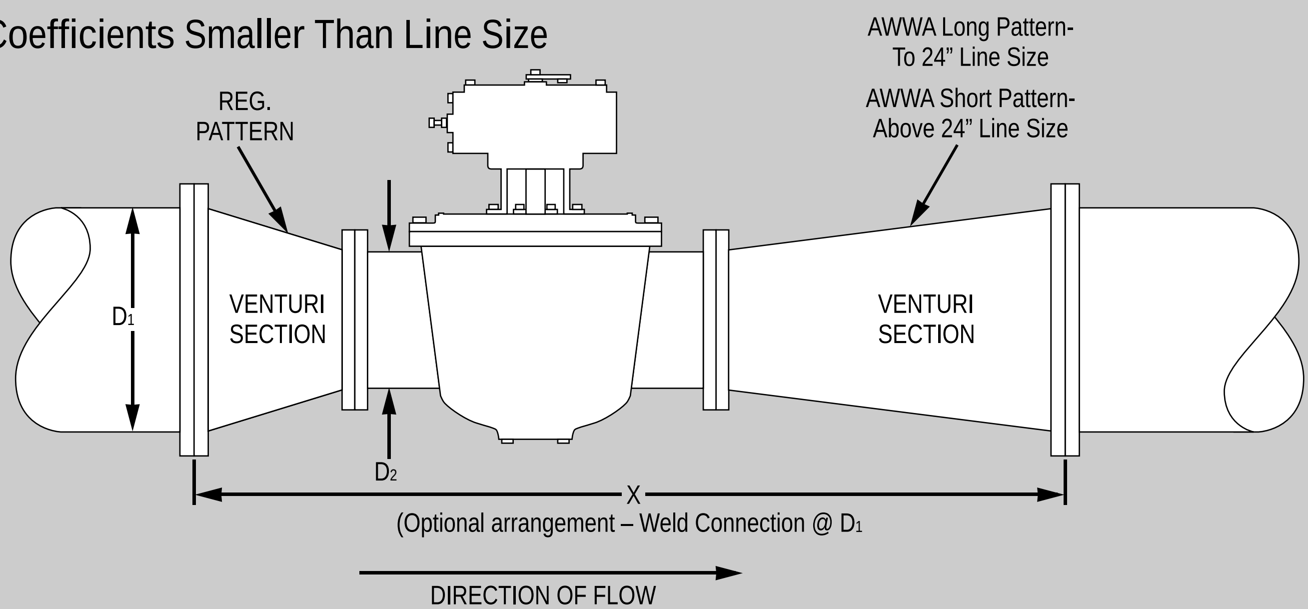
1. The maximum controllable valve position is determined by the dynamic characteristics (k) of the complete system, including the valve, the reducer and increaser sections.

2. Estimates for a regulating valve size, excluding the line, the reducer and the increaser losses, are based on maximum valve control at the 80 Deg. from closed position.

$$C_V = 29.8\ D_V^2 \sqrt{\frac{1}{K}}$$

D_V = Valve I.D. in inches

Flow Coefficients Smaller Than Line Size



Optional C_V Values

LINE D_1 IN.	VALVE D_2 IN.	X APPROX.	CV STATION
10	8	47.5	5170
	6	51.12	2070
12	10	56.12	8790
	8	53.5	4150
	6	60.12	1850
14	12	63	12710
	10	60.12	7120
	8	62.5	3700
16	14	71.5	17452
	12	67	10930
	10	69.12	6210
18	16	77	25720
	14	73.5	16520
	12	73	9620

LINE D_1 IN.	VALVE D_2 IN.	X APPROX.	CV STATION
20	18	80.75	34130
	16	79	22690
	14	78.5	13800
24	20	95	37690
	18	89.75	24760
	16	93	17140
30	24	116	51750
	20	115	26990
	18	117.75	19710
36	30	136	87000
	24	138	38870
	20	143	23150

LINE D_1 IN.	VALVE D_2 IN.	X APPROX.	CV STATION
42	36	154.5	130900
	30	148	66030
	24	166	33990
48	42		190600
	36	164.5	101700
	30	180	57840
54	48		261400
	42	183.25	159200
	36	193	89300
60	54		321600
	48	199	218200
	42	211.25	129800

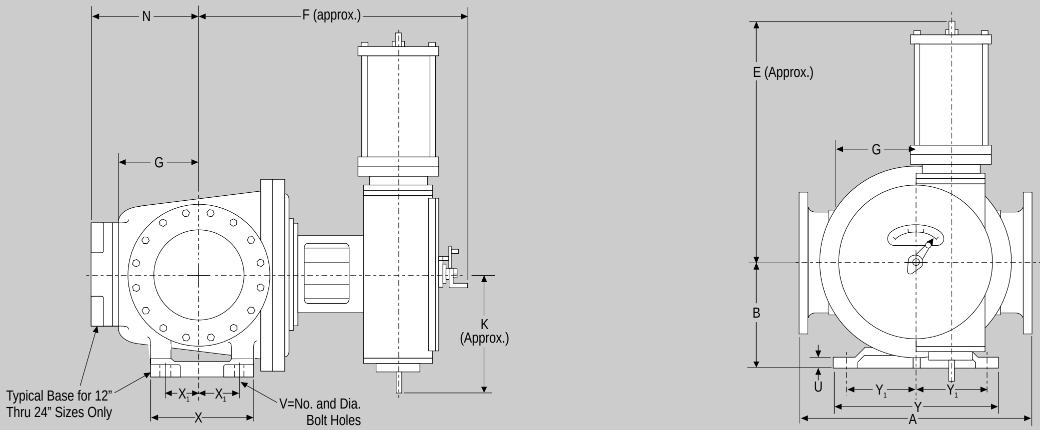
Other size variations available upon request.

Materials and Dimensions

Body, Plug and Head Castings .... ASTM A126 Class C cast iron (for 150 psi service) or ASTM A536 Grade 65-45-12 ductile iron or A216 Grade WCB cast steel (for 250 psi service)
Head and Body Bushing ....Bronze
Mechanism Housing .... Cast iron
Cover...Cast iron
Lift Nut ....Bronze
Crosshead ....Bronze
Thrust Ring .... Steel
Roller... Steel
Guide Rods... Stainless Steel
Seat Rings..Monel
Trunnion Bearings ....Bronze or Stainless Steel
Flanges .... ANSI Class 125, 250, 300 or metric
Valve Shaft .... Stainless Steel ASTM Type 630
O-Ring ....Buna-N
Packing...Fiber and Graphite
Packing Gland..Bronze

Sizes...................6”-84”

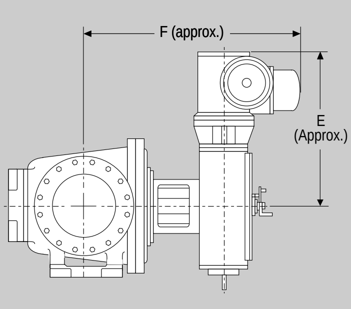
Cylinder Operator



SIZE	A 125 Lb	A 250 Lb	B	E	F	G	K	N*	U*	V*	X*	X_1*	Y*	Y_1*	APPROX. Wts. (Lbs.)
6	23 ⅛	24	—	27	26 ½	6 ¾	10	9 ⅜	1 ⅜	(4)-1	10	3 ¾	15 ¼	6 ⅝	730
8	23 ½	24 ½	—	27	27 ½	8 ¼	10	10 ¾	1 ⅜	(4)-1	10	3 ¾	15 ¼	6 ⅝	890
10	28 ⅛	29 ½	—	27	28 ½	9 ¾	10	12 ⅜	1 ⅜	(4)-1	10	3 ¾	15 ¼	6 ⅝	1,235
12	31	32 ½	14	37	34 ½	13 ¼	15 ½	15 ¾	1 ½	(4)-1⅜	14	5	22	9 ½	2,260
14	35 ½	37	15 ½	37	35 ½	14 ¼	15 ½	16 ¾	1 ½	(4)-1⅜	14	5	22	9 ½	2,520
16	39	40 ⅝	17 ⅛	37	36 ½	16 ½	15 ½	19	1 ½	(4)-1⅜	14	5	22	9 ½	3,170
18	41 ¾	43 ⅜	19 ¼	37	37 ½	18 ⅜	15 ½	20 ⅞	1 ½	(4)-1⅜	14	5	22	9 ½	3,515
20	47	48 ⅝	22 ¼	49	47 ¾	20 ¾	21	24 ¾	1 ¾	(4)-1¾	20	8	31 ½	14	5,840
24	56	57 ¾	26 ¼	49	50 ½	22 ⅞	21	26 ⅞	1 ¾	(4)-1¾	20	8	31 ½	14	8,320
30	64	65 ¾	31 ½	56 ½	58 ¾	29 ½	29 ¾	34	1 ¾	(4)-2¼	28	11 ½	40 ½	18	13,520
36	70 ½	74	36 ½	56 ½	61 ¾	31	29 ¾	35 ½	1 ¾	(4)-2¼	28	11 ½	40 ½	18	19,400
42	83 ¼	85 ⅜	47	67 ¼	70	38	40 ½	42	2 ¼	(4)-2⅝	42	15 ½	42	18	34,700
48	88	90 ½	47 ½	67 ¼	92	42	40 ½	46	2 ½	(4)-3	48	21	46	21	43,900
54	101	—	54	—	95	51 ¼	45	54	2 ¾	(4)-3	48	21	46	21	63,200
60	119 ½	—	61	—	102	56	45	58 ¾	2 ¾	(4)-3	48	21	46	21	80,600

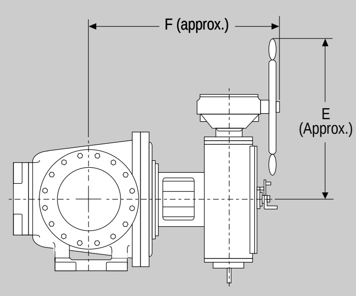
All dimensions are in inches. Dimensions for larger sizes or higher pressure ratings available upon request.
125 Lb & 250 Lb FLANGES CONFORM FULLY TO ANSI B6.1 LATEST EDITION BOTH DIMENSIONALLY & FOR BOLTING PATTERN AND ALL FLANGES ARE FULLY FACED.

Motor Operator



SIZE	E	F	APPROX. Wts. (Lbs.)
6	24⅛	34	680
8	24⅛	35	820
10	24⅛	36	1,100
12	27⅞	41	2,050
14	27⅞	42	2,550
16	27⅞	43	2,910
18	27⅞	44	3,430
20	32	49	5,300
24	32	52	7,700
30	36	70	13,000
36	36	73	17,750
42	48	80	31,570
48	48	96	40,100
54	63	95	57,500
60	63	102	73,500

Manual Operator



SIZE	E	F	APPROX. Wts. (Lbs.)
6	25 ½	28 ½	610
8	25 ½	29 ½	750
10	25 ½	30 ½	1,030
12	30 ⅛	36 ³⁄₁₆	1,830
14	30 ⅛	37 ³⁄₁₆	2,330
16	30 ⅛	38 ³⁄₁₆	2,690
18	30 ⅛	39 ³⁄₁₆	3,200
20	34 ⅝	49 ³⁄₁₆	5,080
24	34 ⅝	51 ¹⁵⁄₁₆	7,480
30	41 ⅛	68 ⅝	12,600
36	41 ⅛	71 ⅝	17,350
42	48	74 ½	31,100
48	48	77 ½	39,600
54	63	85	57,000
60	63	93	72,800

Dimensions for all three methods of operation are identical, except for E and F, as shown in the drawings above.
*Valve can be mounted in a horizontal or vertical line. Shaft can be horizontal or vertical. Actuator can be oriented in any direction relative to the shaft.

Rodney Hunt Rotovalves:™

Actuation and Control

Manual or Power Actuation

Manual: Self -locking, threaded stem attached to a geared unit with handwheel, chain-wheel or operating nut input.

Hydraulic: Cylinder using line pressure or separate external power source.

Electric Motor: Available for open-close or throttling service, complete with limit switches and torque switches as required. Manual override is standard. Also available for modulating service with position feedback for continuously adjustable automatic controls. Complete accessories are available and include indicator lights, integral reversing starters, push buttons, potentiometers, space heaters, sensors, transmitters, transducers and other control features.

Depending upon the application, Rodney Hunt hydraulic systems for valve control offer specific advantages and economies over manual and electric actuation. Where several valves are operated by a single hydraulic operating system, for example, considerable cost savings can result.

Rodney Hunt has the capability to design, manufacture, and test hydraulic systems complete with associated electrical control panels. Start-up assistance is also available. These capabilities offer the consulting engineer, contractor, and end-user single-source responsibility for both the valve equipment and hydraulic actuation.

Advantages of Hydraulic Actuation

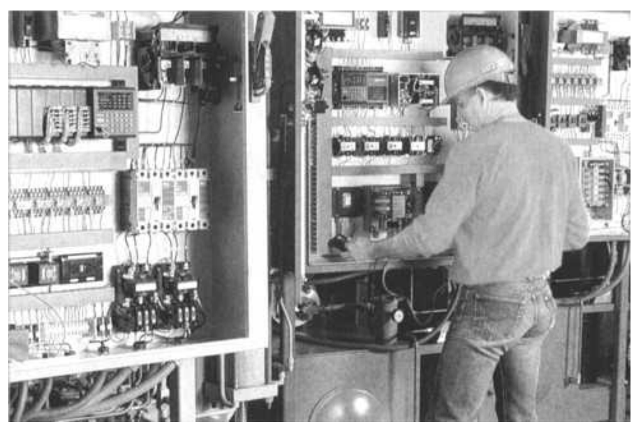
Economical. Hydraulic actuation is the most cost-effective type of power actuation currently available.

Increased control Valve can be designed to open and close at different speeds, and to permit easy field adjustment of speed.

Less wear. Hydraulic cylinders provide long, trouble-free service especially where valve cycles frequently, or is used for modulating service.

Flexible functions Systems can vary from a simple pushbutton station to sophisticated programmable positioning.

Emergency "fail-safe" operation. Can be easily configured to open or close valve in the event of power failure, line breakage, or other emergency.



Hydraulic actuation system engineering includes development of hydraulic power units that respond to computer instructions for exact valve positions, continuous monitoring, and emergency operation.

Rodney Hunt Rotovalves:™

Cone Valve Specifications

General: The cone valve shall be the Rotovalve™ as manufactured by Rodney Hunt Company. It shall be a full ported valve and shall be complete with actuator and accessories as specified herein.

Operation: Operation of the cone valve shall employ an axial motion to lift the valve plug from its seat, followed by a 90° rotary motion of the plug to open the valve and axial motion to reseat it in the open position. Closing movement of the valve plug shall be in reverse order. It shall be designed to operate satisfactorily at the flow conditions specified.

Valve Construction: The valve body shall be provided with seat rings of Monel metal electrically fused to the body waterway and sufficiently raised above the internal surface of the body to assure free operation. The valve shall be complete with ANSI Class flanges to mate with adjacent equipment.

The valve plug shall be fully skirted with integrally cast trunnions. It shall have a set of Monel seat rings electrically fused to the plug waterway and sufficiently raised above the extended surface of the plug to assure free operation. If sealing in the open position is required to prevent flow around the plug, a second set of seats shall be furnished. Trunnion bearings on the plug shall be bronze or stainless steel and shall mate with bronze or stainless steel bearings in the body and head.

The head shall make a registered connection with the valve body to assure proper bearing alignment. It shall be designed to support the cone valve mechanism and operating forces.

All valve castings shall be ASTM A126 Class C cast iron, ASTM A536 Grade 65-45-12 ductile iron, or ASTM A216 Grade WCB cast steel.

The valve shaft shall be stainless steel Type 630 with 125,000 psi minimum yield strength, and shall be pinned to the plug. The packing shall be fiber and graphite with a bronze adjustable packing gland.

Mechanism Construction: The operating mechanism shall be totally enclosed in a cast iron housing with an integrally cast mounting bracket to assure proper alignment. The housing shall be designed for either right of left hand actuator mounting.

The mechanism cover shall be cast iron and make a registered connection to tile mechanism housing. The cover shall be bronze bushed where the valve shaft extends through it. The bronze lift nut shall be contained completely within the mechanism housing with provision for external lubrication. The crosshead shall be of bronze B584 C86200 and shall travel on stainless steel guide rods. Two covered access holes shall be provided for access to the tube fittings on the crosshead. Ail indicator shall be mounted on the end of the valve shaft for local position indication.

Actuator: Actuator will be sized to operate the valve from full open to full closed at rated pressure with a maximum of` 80 ft./lb. of input torque on a manual actuator. The valve manufacturer shall be responsible for sizing electrical of cylinder actuators based on the flow conditions.

Testing: Cone valve body and head shall be hydrostatically tested for 10 minutes at a test pressure of one and one-half times maximum working pressure for which the valve is intended. Under test, parts shall show no evidence of distress and shall be free from any leaks.

When fully shop assembled, each cone valve shall be leak tested at the rated pressure. Leakage shall not exceed 0.4 oz /min /inch of diameter.

Pump Check Controls: The pump check controls shall be supplied, mounted and tested by the valve manufacturer. They shall consist of a 4-way solenoid valve with manual override, speed control valves, open /close limit switches, pump shutdown limit switch and a pressure switch positioned on the upstream side of the valve. When the pump reaches the designated pressure, the pressure switch is activated, energizing the solenoid control valve causing the cone valve to open at a predetermined rate. To shutdown pump operation, the solenoid control valve is de-energized causing the cone valve to close. When the cone valve is approximately 95% closed the pump shutdown limit switch shall be activated, shutting down the pump. The opening and closing speeds shall be independently adjusted from __ seconds to __ seconds.