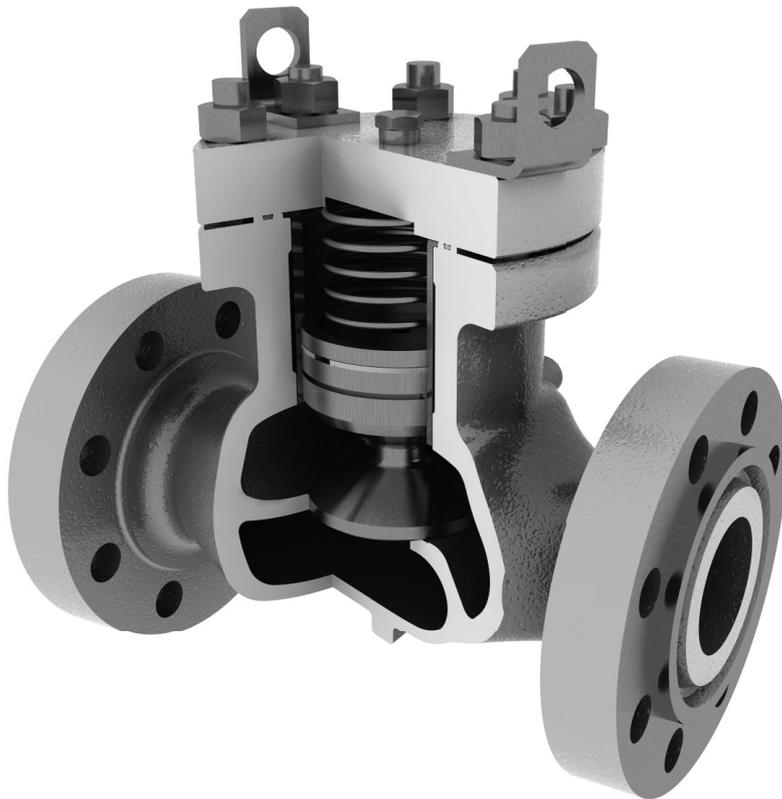


TOM WHEATLEY® Piston Check Valve

Installation, Operation, and Maintenance Manual



CONTENTS

BILL OF MATERIALS.....	3
SCOPE	4
INSTALLATION AND OPERATION INSTRUCTIONS	4
BEFORE INSTALLATION SAFETY INFORMATION.....	4
HORIZONTAL INSTALLATION.....	5
VERTICAL INSTALLATION	6
MAINTENANCE PROCEDURES.....	6
DISASSEMBLY.....	6
REASSEMBLY.....	7
CONTACT INFORMATION	8

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File copies of this manual are maintained. Revisions and/or additions will be made as deemed necessary by Cameron. The drawings in this book are not drawn to scale, but the dimensions shown are accurate.

BILL OF MATERIALS

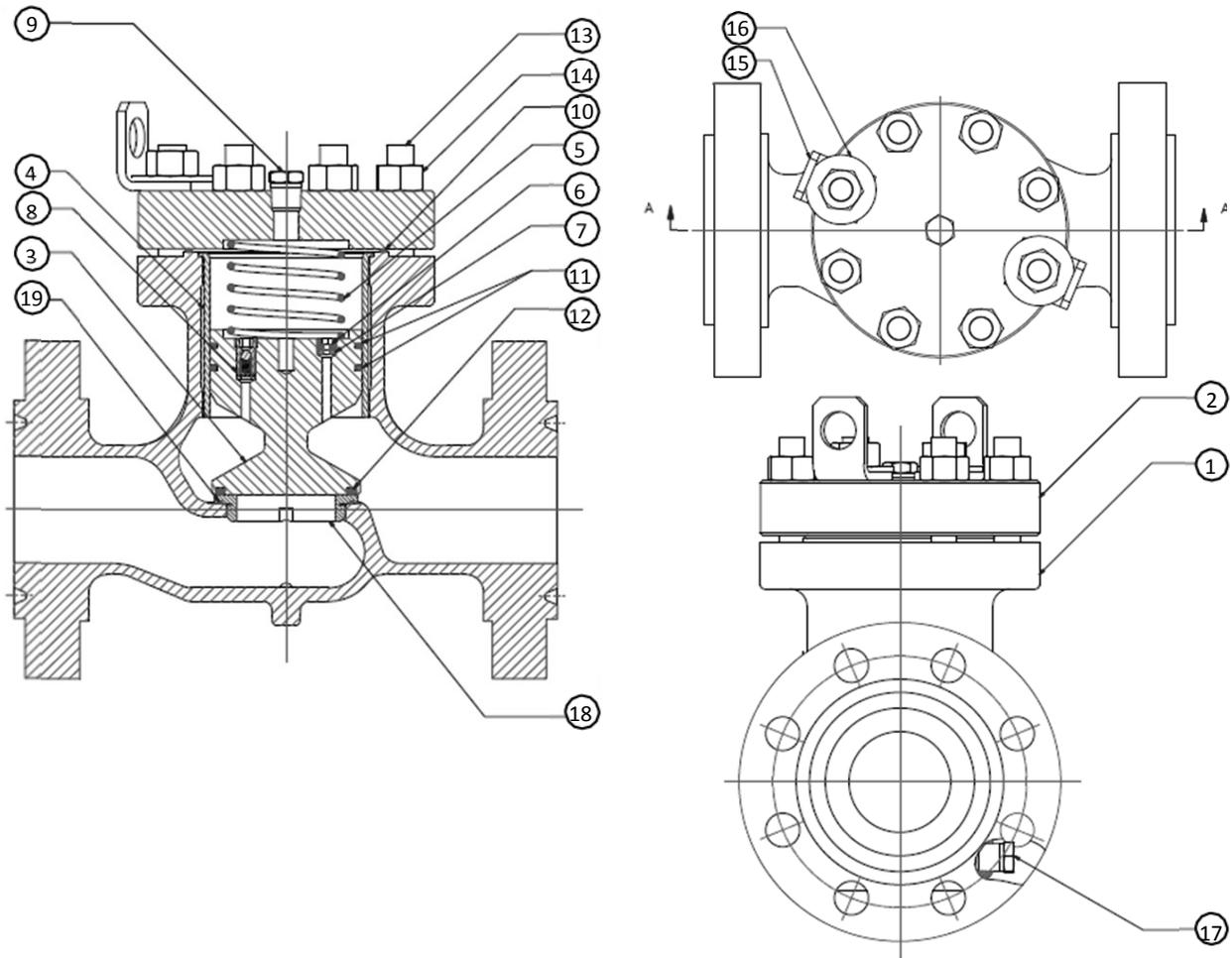


Figure 1 - Tom Wheatley Piston Check Valve

Table 1- Tom Wheatley Piston Check Valve Parts List

Item	Qty.	Description	Item	Qty.	Description
1	1	Body	12	1	O-ring, Piston
2	1	Cover	13	Note-*	Stud
3	1	Piston	14	Note-*	Hex Nut
4	1	Liner	15	2	Lifting Bracket
5	1	Spring	16	2	Flat Washer
6	1	Looking Set Screw	17	1	Pipe Plug, Body (if required)
7	1	Orifice	18	1	Seat
8	1	Check Valve	19	1	Seat Seal
9	1	Pipe Plug, Cover			
10	1	Seal O-Ring			
11	2	Piston Ring			

* Quantity as required.

SCOPE

The Tom Wheatley piston check valve features a floating piston with an O-Ring seal. The cover is bolted to the body and sealed with an O-Ring. The cover includes a cover plug (NPT threads). The valve is supplied with an integral seat or a removable seat with an O-Ring.

INSTALLATION AND OPERATION INSTRUCTIONS

BEFORE INSTALLATION SAFETY INFORMATION

In the absence of differential pressure, gravity and spring force cause the piston to rest in the closed position. Pressure applied at the upstream end of the valve lifts the piston off the seat and allows flow. As flow varies, the piston floats within a cylinder. During upper travel of the piston in the liner, the fluid in the chamber on top of the piston begins to compress. This compressed fluid prohibits the piston to travel. This pressure is relieved by actuation of spring-loaded ball check valve installed in the piston. As pressure above the piston is relieved, the piston continues its upward travel. Should the flow cease, the piston lowers under spring and gravity force. This downward travel causes a vacuum to develop above the piston which inhibits further downward movement. An orifice installed at the top of the piston permits pressure equalization above and below the piston. The piston can then lower until it contacts the seat and affects a bubble-tight seal preventing back-flow in the line. The ball check valve and orifice also serve to dampen any piston "slam" that may occur due to rapid flow fluctuations.



READ CAREFULLY BEFORE INSTALLING OR OPERATING THE VALVE.

Due to the critical nature of pressurized piping systems, it is recommended that the compatibility to the service of metallic and non-metallic components be confirmed prior to installation. This valve is not recommended for slurry service. Hazards are inherent with the construction, operation, and maintenance of high pressure piping systems. The following information and precautions are provided to minimize these hazards:

1. The valve's nameplate indicates maximum operating pressure as well as minimum and maximum operating temperatures. The valve may be safely operated within these limits.
2. The valve's end connections are available in a flanged configuration.
3. The valve has been factory pressure tested based on the nameplate maximum operating pressure.
4. All Tom Wheatley piston check valves are equipped with lifting brackets or eyes. Fittings and other devices, which may be attached to the valve, are not intended to be used as lifting points. Always follow local safety regulations when lifting heavy valves.
5. Tom Wheatley piston check valves are designed, manufactured, and tested under a certified quality system. Only quality parts and materials are used in the assembly of Tom Wheatley valves. Pressure containing components are suitable for the minimum temperature marked on the nameplate. Factory certification is available.

6. If the valve, in service, is exposed to hazards such as traffic, winds, or earthquake loading, contact the factory, if necessary, to confirm that the valve design is suitable for the application. The factory requires a complete description of the hazard before making any recommendations.
7. If the valve, in service, is exposed to hazards such as excessive piping system reaction forces and moments, contact the factory, if necessary, to confirm that the valve design is suitable for the application. The factory requires a complete description of the hazard before making any recommendations.
8. If the valve in service is exposed to hazards such as corrosive or abrasive fluids or atmospheric conditions, contact the factory, if necessary, to confirm that the valve design is suitable for the application. The factory requires a complete description of the hazard before making any recommendations.
9. The valve has been designed and manufactured so that under normal operating conditions hazards such as material fatigue, brittle fracture, creep rupture or buckling will not occur. Do not operate the valve beyond the pressures and temperatures marked on the nameplate. The factory requires a complete description of the hazard before making any recommendations.
10. The user is responsible for minimizing other hazards associated with the construction, operation and maintenance of high pressure piping systems, such as:
 - a. Provisions for the release or blow off of pressure
 - b. Prevention of physical access to system under pressure
 - c. Prevention of physical access to surfaces of extreme temperature
 - d. Provisions for inspection
 - e. Provisions for draining and venting
 - f. Provisions for filling
 - g. Provision for equipment access
 - h. Prevention of over-pressurization, over-heating, and over-filling
 - i. Provision for fault indication
11. The user is responsible for meeting applicable local safety regulations.

NOTE: If system hydrostatic tests are to be performed at pressures exceeding the rated working pressure, the valve should be pressurized from the upstream side. This prevents exposure of the piston to these pressures while the body cavity can accept up to 150% rated working pressure. Care must be taken not to damage the seal faces, and that they are clean for assembly. After pressure tests, with all test pressure relieved, the body cavity should be completely drained via the attached piping system to prevent corrosion. The valve may then be placed in the required operating position.

HORIZONTAL INSTALLATION

When installing the piston check valve in the horizontal position, install the valve with the arrow mark on the body pointing in the direction of flow and the cover side up.

Flow through the valve (in the direction of the arrow mark) forces the piston to lift fully. The piston seals the valve when the flow is reversed. Gravity and spring force cause the piston to close when no flow is present.

VERTICAL INSTALLATION

When installing the piston check valve in vertical piping, install the valve with the arrow mark on the body pointed in the direction of flow. Upward flow through the valve will cause the piston to float to the open position.

If there is no flow through the piping, spring force will keep the piston in the closed position. Flow through the piping in the upward direction will cause the piston to travel open. When flow is reversed, spring force assisted by fluid flow will move the piston to the closed position.

MAINTENANCE PROCEDURES



CAUTION: Safety practices for pressurized equipment must be followed and address hazards inherent in pressurized systems. Extreme caution and safety procedures are to be exercised whenever valves, or fittings on a valve, are serviced or maintained.

The frequency of the maintenance depends on the service conditions. Please contact the factory regarding the maintenance schedule for particular service conditions.

DISASSEMBLY

With all pressure removed from the associated piping system, the valves can be serviced in-line or offline. During in-line maintenance, the piston check valve should be isolated from and relieved of all pressure on both the upstream and downstream sides. **Exercise extreme caution when removing the cover plug, as this will release any pressure in the valve.** Drain the valve fully via the cover drain plug or by piping system.

1. Remove the valve cover plate. Remove and inspect the cover seal. Replace the seal if damaged or shows excessive set.
2. Remove and inspect the spring. Replace if required.
3. Remove the piston by threading a lifting device into the tapped hole in the piston top and pulling the piston out of the valve.
4. Remove piston liner.
5. Remove seat (if applicable, Figure 1).
6. Clean and inspect the piston, piston rings, liner, and seat. Check piston and removable seat (if applicable) seating O-ring for damage and replace if necessary.
7. Ensure that ball check valves in piston function properly. The piston orifice must be free of debris.
8. For metal seating pistons, inspect seating surface for damage. Replace or repair damaged pistons.

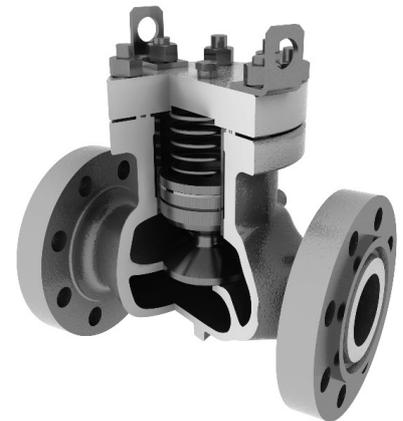


Figure 2 - Integral Seat Piston Check Valve

REASSEMBLY

Reassemble the valve in accordance with the following instructions. See Figure 2 (See Figure 1 for valves with replaceable seats).

1. Install seat O-Ring, 18, into O-Ring groove of seat, 19 (Figure 1). A small amount of thick grease may be applied to O-Ring to hold in place during assembly of seat into body.
2. If applicable, thread seat into body, 1 (Figure 1) ensuring that seat is in full contact with body seating surface.
3. Lower liner, 4, into body.
4. Install piston O-Ring, 12, into piston, 3. Ensure that O-Ring is not damaged during assembly.
5. Install orifice, 7, into piston. Secure orifice into place by threading lockscrew, 6, securely in place.
6. Thread check valve, 8, securely into piston. Inspect check valve to ensure that ball/spring function properly.
7. Assemble piston rings, 11, into piston grooves as shown.
8. Thread a lifting device into tapped hole located in top of piston. Apply TS-115 lubricant to piston outside. Lower piston assembly into the liner.
9. Lower spring, 5, into liner as shown.
10. Assemble cover O-Ring, 10, and cover 2 to valve body as shown.
11. Place lifting brackets, 15, over studs as shown (2"-6" valves). Thread nuts onto studs and tighten to torques listed in Table 2 below.
12. Apply Teflon tape or pipe sealant to threads of pipe plug, 9. Thread pipe plug into cover two turns beyond hand tight.
13. When required, prepare and assemble body pipe plug, 17, as described in Step 12.

Table 2 – Cover Bolting Torque

Stud Diameter (in.)	Threads (in.)	Torque (ft-lbf)
.375	16	16-18
.500	13	37-42
.625	11	72-81
.750	10	126-142
.875	9	200-225
1.000	8	297-334
1.125	8	429-483
1.25	8	595-669
1.375	8	798-898

Table 3 – Recommended Spare Parts List Guide

Qty. Of Valves	Minor Kit	Major Kit	Complete Valve
10	1	-	-
25	1	-	-
50	2	1	-
100	3	1	1

Table 4 – Repair Kit Contents

Minor	Major
Cover Seal	Standard Trim Subassembly With Piston Spring
Piston Seal	
Seat Seal (if applicable)	

CONTACT INFORMATION

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