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6D-1848





SAF-T-MATIC

Manufactured by Kings Energy Services Ltd.

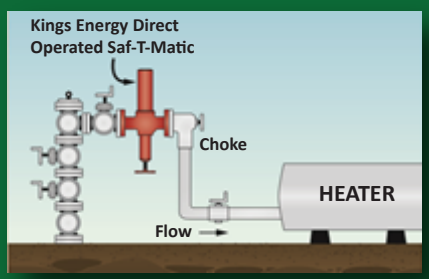
PROVIDING SOLUTIONS FOR FLOW CONTROL

The Saf-T-Matic is an essential component for all flow line applications. This is a safety valve, which automatically controls the shutdown of flow lines when pressures exceed or fall below pre-determined limits. The Saf-T-Matic Valve can be used on various applications including oil well flow lines, gas lines, hydraulic lines, or wherever there is a need for high and low pressure overloads and/or loss of fluids in case of line bursts. The working pressure range of the Saf-T-Matic Valve is from 0 to 15,000 Psi.

VALVE OPERATION

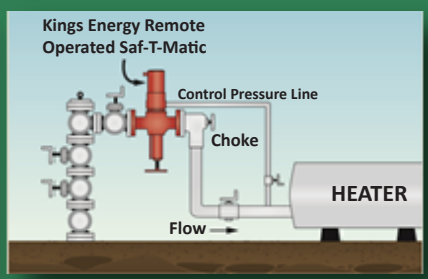
Once the Saf-T-Matic has been assembled and installed on the flow line, and prior to the establishment of flow, the valve must be placed in the manual lockout position until the normal flowing conditions have been met. Once normal operation conditions have been obtained, and the line pressure is between the high and low pressure-settings of the Saf-T-Matic, the valve can be turned counter clockwise until it encounters the low "STOP" position. It is advisable to do a inline test of the valve using regular operating pressures to check that the valve is functioning properly on the high and low pressure settings. If the pressure settings are not satisfactory, adjustments may be made inline until the proper range is obtained.

TYPICAL DIRECT OPERATED SYSTEM



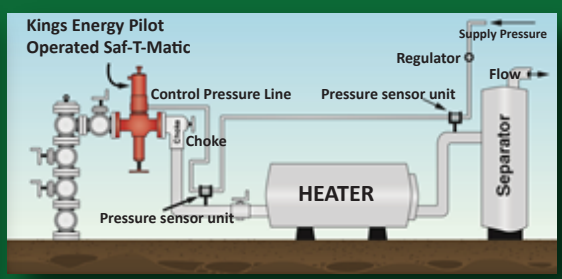
The Direct Operated "Saf-T-Matic" Valve takes its control pressure directly from the line on which it is installed. No external control lines or control pressure sources are required. The Direct Control Head of this valve has a self-contained High-Low pressure sensor unit that closes the valve on predetermined pressure settings.

TYPICAL REMOTE OPERATED SYSTEM



The Remote Operated "Saf-T-Matic" Valve takes its control pressure from a point remote from the actual location of the valve. This control pressure may be flow line pressure downstream from the valve or it may be from a source independent of the flow line, depending on the requirements of the user. The control pressure is fed externally to the Remote Control Pressure Inlet on the Remote Adapter portion of the Remote Control Head.

TYPICAL REMOTE OPERATED SYSTEM

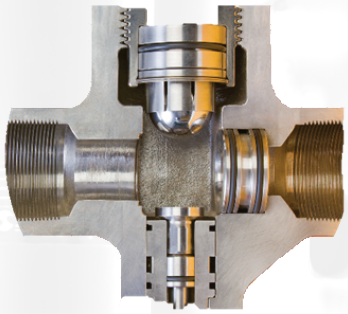


The Pilot Operated "Saf-T-Matic" Valve takes its control pressure from a point, or points, remote from the actual location of the valve. The Pilot Control Head of this valve does not have a built-in High-Low pressure sensor and must rely on an outside signal, such as that from an High-Low Sensor Unit, for its operation. The Pilot Operated "Saf-T-Matic" Valve is usually operated by one or more pressure sensor units located at different locations throughout the system.

PROVIDING SOLUTIONS

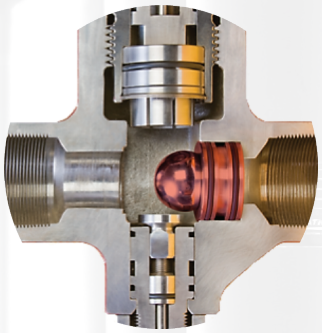
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HOW THE SAF-T-MATIC WORKS



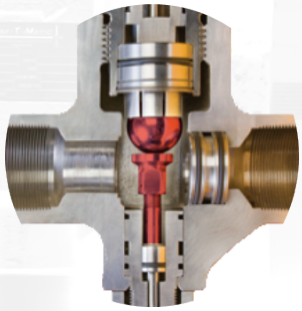
Neutral Position

Pressure from a remote location, or source enters the valve through the remote control pressure inlet on the remote adapter (see above). As long as this control pressure stays within the selected high-low pressure set points of the valve, the valve will remain open.



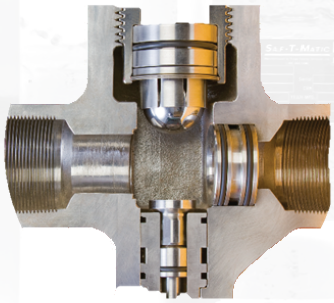
Valve Closed

If the control pressure exceeds or drops below the selected high-low pressure set-points, the control head ejects the ball into the flow path. The fluid flow automatically seats the ejected ball in the ball seat.



Opening of Valve

To open the valve, the ball must be placed back into the ball holder by means of the manual ball reset. As the reset handwheel is turned, the by-pass seal opens equalizing the line pressure on both sides of the ball. This causes the ball to drop from the ball seat. With the ball reset mechanism holding the ball off the seat, normal flow through the valve may be restored and flow line pressure is re-established. If the flow line pressure returns to normal and stays within the selected high-low range, the control pressure, being the same, will return the control head to normal condition, retracting the ejection piston.



Neutral Position Re-established

To complete the opening of the “Saf-T-Matic” Valve, the manual ball reset mechanism must be retracted from the flow line by backing down the reset handwheel until the bypass is again sealed. The valve is now returned to service.

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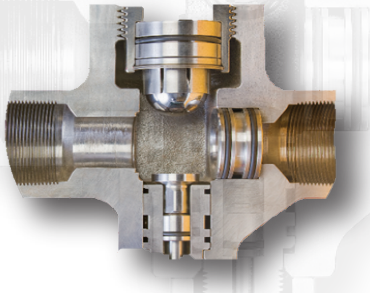
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THE CONTROL HEAD

The Control Head is the control processing unit of the valve as it contains the only moving parts for general operation. The high and low pressure pistons located inside the control head each have their own independent spring and adjusting nut, which release the stainless steel ball to block the flow. The line pressure operates against the two spring-loaded pistons to keep the ball in the open position, but once the line pressure rises above, or falls below, the set pressure limits, the ball is ejected and the flow line is blocked.

1. **Low Pressure Settings -** This spring continuously tries to force the low pressure piston downward agains the ball, which ejects from the holder. As long as th upward force produced by the conrol pressure is greater than the pre-set downward force of the spring, the low pressure piston is held up. Opposing this spring force is the normal operating pressures of the line, which keeps the ball in place. When the force of the control pressure becomes less than the force of the spring, the low pressure piston will move down and eject the ball.
2. **High Pressure Settings -** This spring continuously forces the high pressure piston upward , away from the ball. A port in the center of the piston allows pressure to act on the top of the piston driving it downward agains the force of the spring. The top of the high pressure pistong has a greater surface area acting downward that the other areas acting upward, so when the force of the control pressure becomes greater than the preset force of the spring, the high pressure piston moves downward and the ball is ejected.



THE BODY ASSEMBLY

The Body sub assembly is the main frame of the valve. It consists of a strong LCC steel, designed to handle various pressures in any application.



THE RESET ASSEMBLY

The reset consists of a stainless steel plunger and stem, which is activated by a handwheel assembly and is hydraulically balanced against line pressure forces. The reset is a vital component of the Saf-T-Matic for two reasons. First, to equalize the line pressure on the upstream/downstream sides of the ball driving initial equalization of the line. Second, the reset is used as a safety mechanism so that an individual has to manually reset the valve at the location, this prevents unexpected or uncontrolled activation of the ESD from a remote site.

Equalizing the line pressure on both sides of the seated ball can be done by using the built-in bypass that is manufactured into the Saf-T-Matic valve. To utilize this bypass, the reset mechanism will be raised until it encounters the ball. When the stem has met the ball it will automatically open the bypass passage and begin the equalization process. Once the pressure has equalized, the ball will fall from its seat adn teh resent handle can be turned clockwise to raise the ball into the ball holder. The flow line valves can now be opened and normal operating pressure can be obtained.

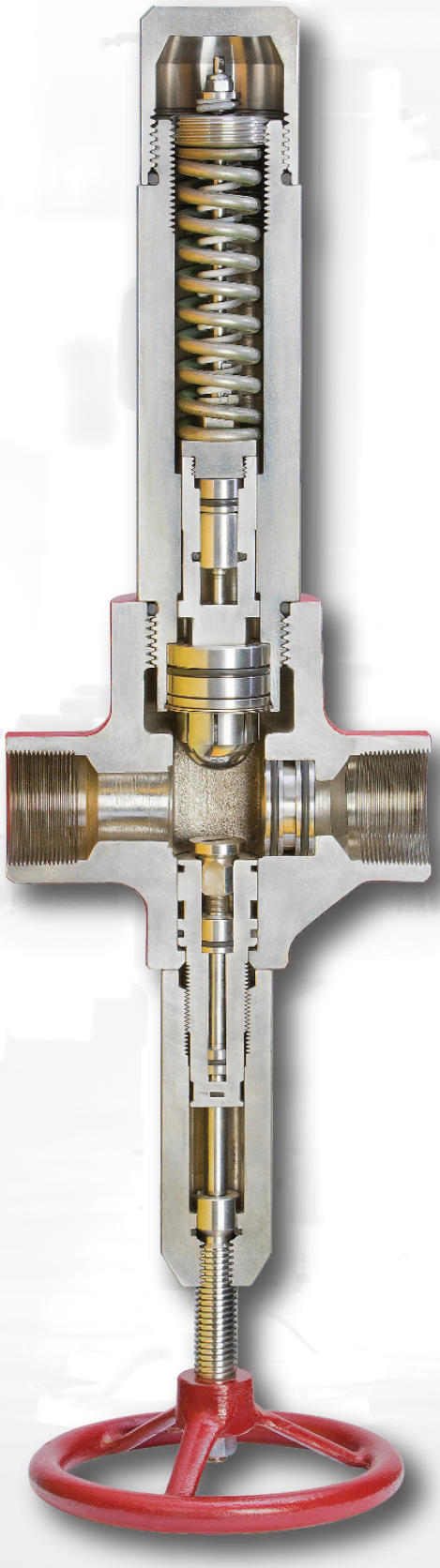
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DESIGN ADVANTAGES

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1. FAIL-SAFE

The Saf-T-Matic surface shut-down valve is held open by control pressure in the Direct Control, Remote Control, or Pilot Head. A loss of this control pressure, or a mechanical failure within the unit, will close the valve without the assistance from another power source.

2. MANUAL OPENING

Once the Saf-T-Matic closes, it must be opened manually to return to service. This safety feature prevents accidental automatic opening before it is desired or required. The balanced system of the valve allows ease of reopening against high body pressures.

3. VERSATILITY

The Saf-T-Matic offers several safety system shutdown options including Direct Operated, Remote Operated, Pilot Operated and in combination with other devices and equipment if required by the customer.

4. ADAPTABILITY

Saf-T-Matic valves can be matched to any standard connection and may be installed on wellheads, flow-lines, and at many other points requiring safety shutdown systems. Custom end connections available upon request.

5. BROAD OPERATING RANGES

The Saf-T-Matic valve can operate with control pressures raning from 0 -15,000psi.

6. STRAIGH-THROUGH FLOW

Bore alignment reduces flow turbulence, erosion and pressure drop. Pressure drop is taken at the outlet seat to reduce the possibility of formation of hydrates in the valve.

7. NON-FREEZING

The Saf-T-Matic does not vent to atmosphere. This reduces or eliminates the possibility of freezing of the control head mechanism.

8. FIELD SETTING

Pressure settings of the Control Heads may be changed in the field while the valve is in service.

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MATERIALS & CONSTRUCTION

With industry's high demand for performance valves, the Saf-T-Matic shutdown valve meets the world's most stringent requirements.

Saf-T-Matic valves are available in various body and trim materials from ASTM A216 WCB, A352LCC, A351 CF8M to Monell or Hastalloy for the most demanding of service.

A world class product, the Saf-T-Matic's outstanding proven performance comes from its outstanding quality.

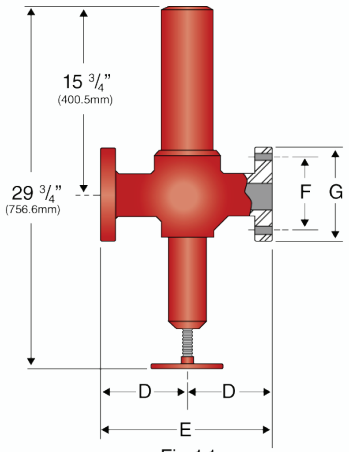


Fig 1.1

All Saf-T-Matic valves are manufactured and designed to meet the following industry standards:

API 6D	Pipeline Valves
ANSI B16.5	Steel Pipe Flanges and Flange Fittings
ANSI B16.34	Valves, Flanged and Butweld
ANSI B1.10	Face to Face Dimension for Ferrous Valves
MSS-SP-55	Quality Standard For Steel Castings
API 598	Valve Inspection and Testing
NACE MRO175	Standard Material Requirements 2002 Edition

VALVE DIMENSIONS

Connection		Valve Pressure (Psi)			Dimension (Inches)				No. Holes	Bolt Dia.
STYLE	RATING	RATING	WORKING	TEST	D	E	F	G		
FNPT	3600#	3,600	3,600	5,400	4-1/4 *107.9	8-1/2 *215.9	-	3-1/2 *88.9	-	-
RTJ Flange	2000# API	2,000	2,000	3,000	5-13/16 *147.6	11-5/8 *295.2	5 *127.0	6-1/2 *165.1	8	5/8 *15.87
RTJ Flange	3000# API	3,000	3,000	4,500	7-5/16 *185.7	14-5/8 *371.4	6-1/2 *165.1	8-1/2 *215.9	8	7/8 *22.2
RTJ Flange	5000# API	5,000	5,000	7,500	7-5/16 *185.7	14-5/8 *371.4	6-1/2 *165.1	8-1/2 *215.9	8	7/8 *22.2
RTJ Flange	API BX-152	10,000	10,000	15,000	10-1/4 *260.4	20-1/2 *520.7	6-1/4 *158.8	7-7/8 *200.2	8	3/4 *19.05
RTJ Flange	CL 600	1,480	1,480	2,220	5-3/4 *146.0	11-1/2 *292.1	5 *127.0	6-1/2 *165.1	8	5/8 *15.87
RTJ Flange	CL 900 CL 1500	3,750	3,750	5,625	7-5/16 *185.7	14-5/8 *371.4	6-1/2 *165.1	8-1/2 *215.9	8	7/8 *22.2

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