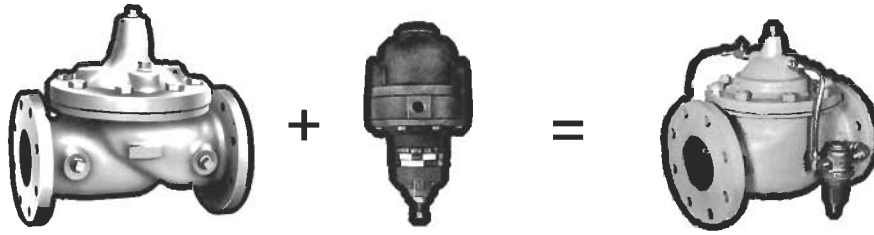# *Understanding Automatic Control Valves*

Most Automatic Control Valves (ACVs) consist of a basic valve and some kind of pilot control system.

When there is no pressure on the assembly, the spring and the weight of the assembly hold the valve closed. When placed in-line and pressure is applied, the valve opens. If inlet pressure is piped into the cover chamber the valve closes tightly.

no pressure

in-line, pressure applied

chamber closing tightly
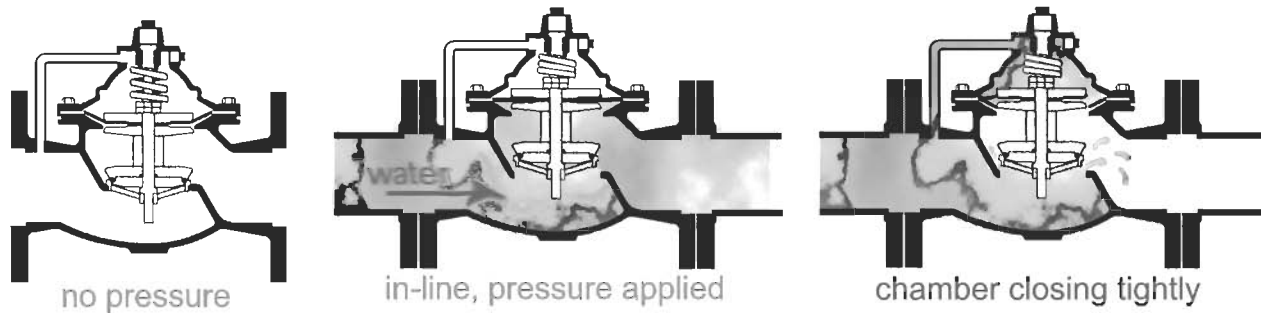
A control that simply opens the valve and closes it (three way valve) is called "non-throttling" because it cannot vary the size of its opening. The valve is either open, or when fluid flows into the cover chamber, closed. To open: control is turned to exhaust cover chamber pressure. To close: control is turned to apply pressure. Non-throttling valves are usually hard to operate because they require high presures. **Modulating valves** use different mechanisms, making operation easier: by hand, pressure, solenoid, by a difference in two pressures, or by a float.

Restriction

Modulating Control

chamber closing tightly
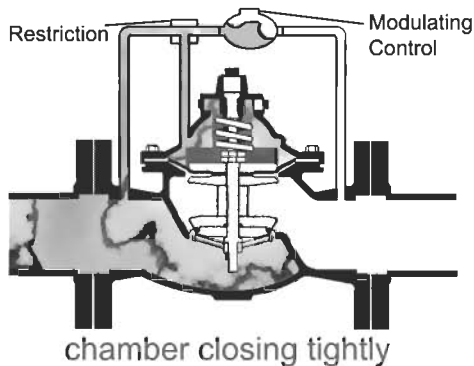
Modulating valves open and close based on pressure, like non-throttling valves. Modulating valves provide the following operations:

• **Pressure Reduction:** Outlet pressure on control diaphragm makes main valve counteract to hold inlet pressure constant.

• **Pressure Relief:** Inlet pressure on control diaphragm makes main valve counteract to hold constant inlet pressure.

• **Rate of Flow Controller:** Keeps flows constant by making main valve counteract any slight changes in differential pressure across an orifice plate located in the main line.

• **Liquid Level Controller:** Slight changes in flow through a float control cause main valve to counteract changes in reservoir level so liquid level remains constant.

• **Check Valve:** The simplest control ... uses a tube running from the cover to the outlet of the valve. Direction of flow is reverse of all other valves described. Greater inlet pressure pushes the valve open. Greater outlet pressure is directed to cover chamber to close the valve. The End.

Questions? Call 1-800-66-BKFLO and we can help!   *American Backflow Specialties*
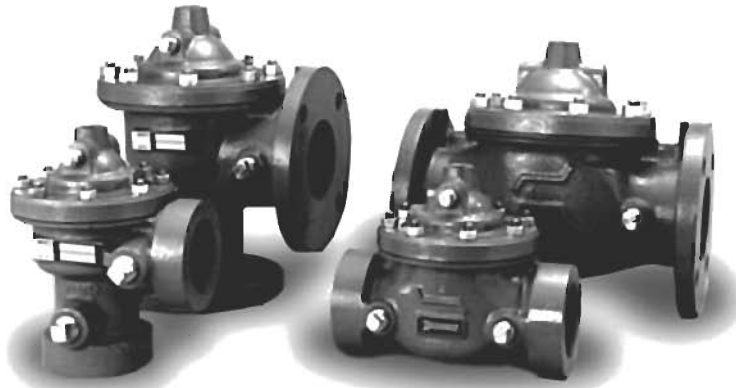
WATTS ACV

4 Valves

A Ball Valves

B Regulators

C Automatic Control Valves

Performance is standard: Design and features incorporated into every Watts ACV means consistent, dependable, high performance, positive control and long life.

Efficient design: The main valve, globe or angle pattern, is diaphragm actuated, hydraulically operated. Its four major components are the body, cover, interior seat and diaphragm/stem assembly.

Variable volume cover chamber: A synthetic rubber/nylon diaphragm is between the valve body and cover creating a sealed chamber into which line fluid and pressure is introduced. Varying the amount of pressure positions the stem assembly to open, close or modulate the valve as required.

Precise alignment and stable throttling: A cover bearing and integral seat bearing guide the stem assembly for precise alignment with the seat. With the quad seal retainer plate, progressive opening/closing flows, stable throttling, low friction operation and positive closure is ensured.

Drip tight seal: Watts ACV leads the automatic valve industry by being the first to incorporate the dynamic quad seal. The seat, retained on 3 1/2+ sides, provides positive closure while eliminating the need to "bite" into the seal, adding years to the valve's life. Each quad seal has two usable sides.

Fused epoxy prolongs life: Applied under rigorous preparation and application standards, it is non-porous, improving the flow coefficiency of the valve and effectively sealing the casting from interaction with the controlled liquid. The coating also protects the valve from the environment, preventing mineral buildup and rust, simplifies maintenance, and prolongs the life of the valve.

Multiple function performance: By varying the control/piping arrangement, the Watts ACV is able to perform a diversity of functions and applications. A multi-functioning valve results in more system protection at lower cost.

Simplified Maintenance: The main valve and pilot system can be serviced without removing the valve from the line.

STEM ASSEMBLY

STEM
STEM NUT/WASHER
DIAPHRAGM
QUAD SEAL RETAINER
QUAD SEAL
DIAPHRAGM WASHER
SPACER
QUAD SEAL RETAINER PLATE

Cover
Cover bearing
Cover chamber
Spring
Stem
Spacer
Retainer
"Quad seal" retainer plate
Seat
Seat "o-ring"
Body
Stem nut
Stud
Nut
Diaphragm washer