

## Differential Piston Control Valves

Accurate and Reliable Pressure, Level, and Flow Control





A  VAG-Group Brand

## **A Century of Experience**

GA Industries valves are known for long term reliability in the most demanding water and wastewater applications. Whether a simple check valve or a complex automatic control valve, each GA Industries valve is built on over 100 years of design, manufacturing and application experience to ensure its dependability and superior performance.

## **Outstanding Technical Support**

From the factory to the field, every GA Industries valve comes with responsive and knowledgeable technical assistance and support. Factory application engineers and our team of trained and experienced sales representatives work closely with designers to select the right valve from our broad product range to ensure that it meets the system requirements. We are committed to serving our customers in all phases of the project.

## **Superior Quality**

GA Industries valves are produced under a certified ISO-9001 quality system. They are designed in accordance with AWWA and other industry standards and are precision manufactured from the highest grade materials. Every valve is tested to ensure it meets our high standards and the latest industry requirements, so you can be sure it will operate as expected from the minute it is put in service.

## **Comprehensive Product Range**

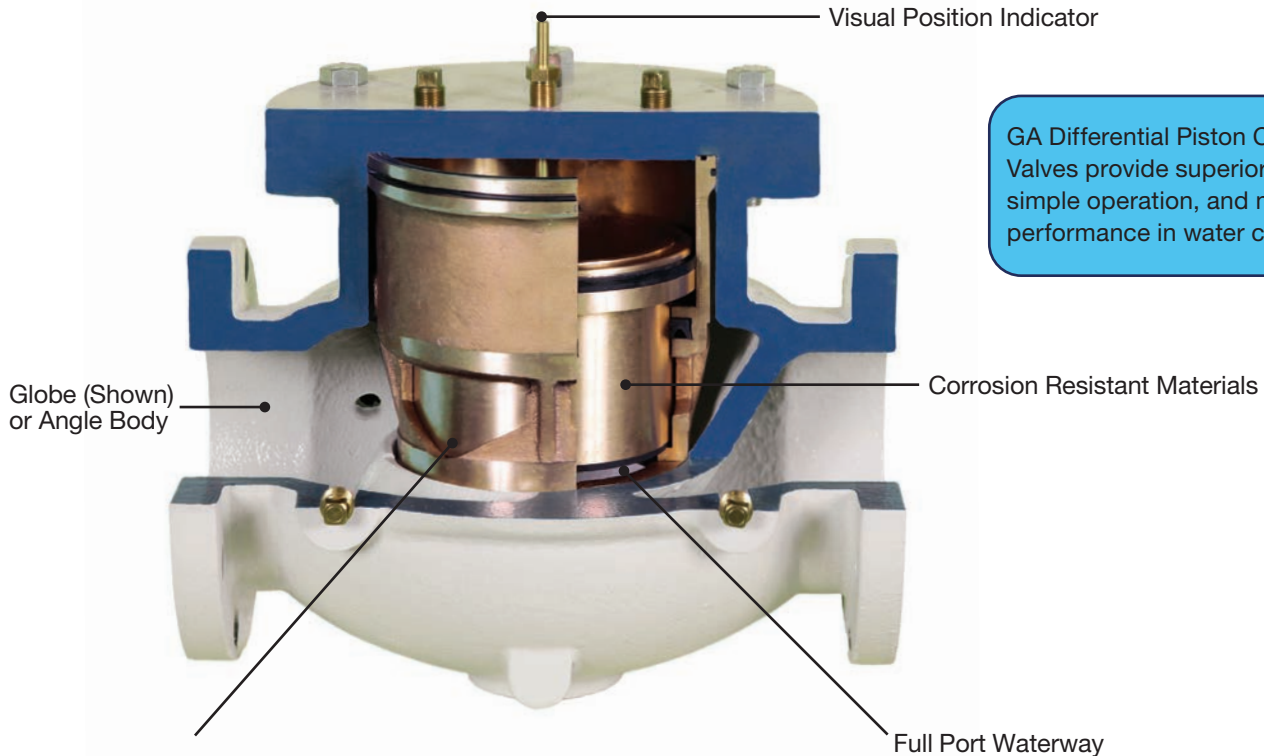
We are continuously expanding and improving our product line to meet the ever-changing needs of the waterworks industry. From standard butterfly and plug valves to sophisticated, highly engineered pump control, check and surge control valves, we offer one of the broadest ranges of valves in the industry. Please see the back cover for a complete listing of our product offering.



## Differential Piston Control Valves

### Pressure, Level and Flow Control

The GA Industries Differential Piston Control Valve is a heavy duty automatic water control valve. The rugged and versatile main valve construction is the heart of a countless number of pilot-operated control valve configurations designed to meet virtually any type of water pressure, flow, and level control requirement.



### Versatile Body Style

3" – 36" Heavy Duty Cast Iron Globe and Angle body, ANSI B16.1 Class 125 or 250 flanged.

### Flow Efficient Full Port

The GA Differential Piston Control Valve's full port flow area provides low head loss in on/off applications, such as pump control, and the capacity to handle high flow in pressure reducing and other regulating applications.

### Exclusive V-Port Design

Only the GA Differential Piston Valve provides the ideal combination of full port capacity and excellent low flow control. The long V-ports provide an ideal "throttling characteristic" by extending the controlling range over a large portion of the valve stroke for stable low flow control.

### Cavitation Resistance

All throttling occurs through the long stationary V-ports that are located downstream of the seat, protecting critical seating surfaces from cavitation and wear.

### Corrosion Resistant Materials

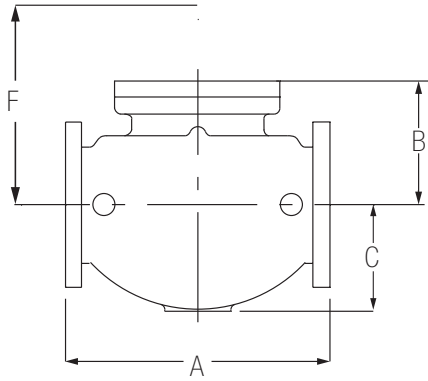
All critical internal components are made from corrosion resistant bronze for long term service.

### Visual Position Indicator

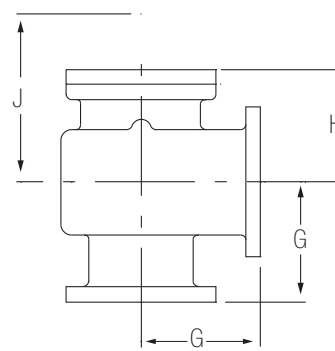
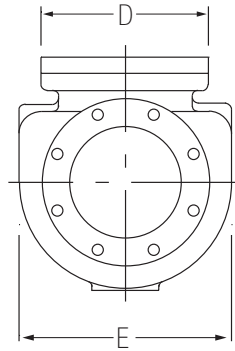
The standard visual position shows at a glance whether the valve is open or closed and can actuate electrical position switches for remote indication.

### Long Term Service and Easy Maintenance

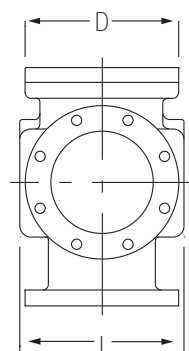
All parts are interchangeable between globe and angle body and removable through the top flange so the body stays in the line for all service. Many GA Differential Piston Valves have been in continuous service for 60+ years.



Globe Body



Angle Body



### Dimensions (inches)

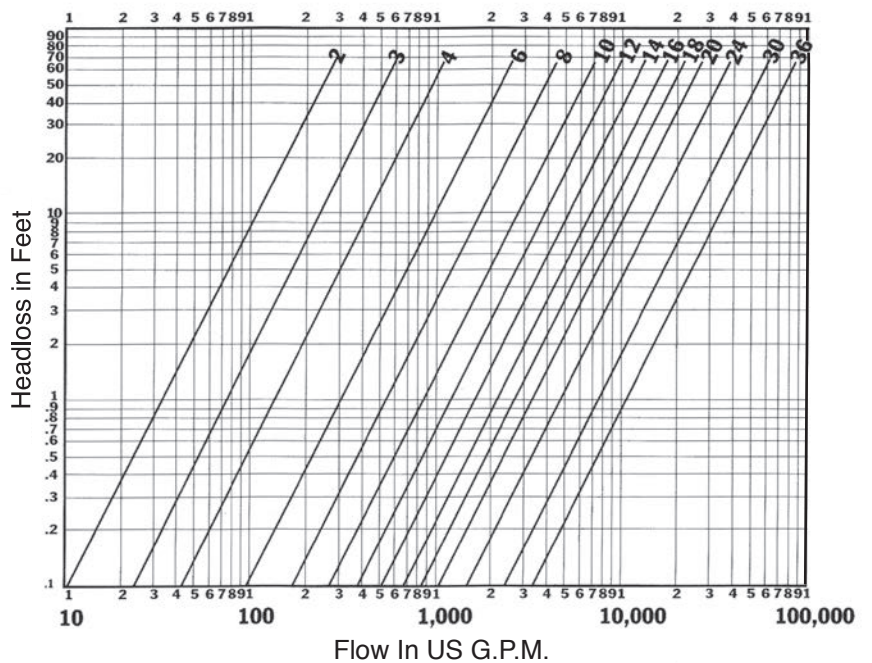
Size	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
A	9	12	12	13	18	24 1/2	26	31	33	36	40	40	48	60	63
B	6 5/8	6 3/4	6 3/4	7 11/16	9 1/8	11 5/8	13 5/16	16 5/8	18 3/8	22 1/4	25 1/4	25 1/4	31 1/2	40 1/2	47 5/8
C	3	4 1/4	4 1/4	5 1/4	6 1/2	8 1/4	9 3/4	13	12 1/4	13 1/2	17	17	20 3/4	26	29 3/4
D	8	8 5/8	8 5/8	10	14	17	21	24	28	30 1/2	35	35	33 1/2	42	48 1/2
E	6 3/8	9	9	10	14	18	24	28	30	32	40	40	47	56 1/4	66
F	10	10	10	12	14	18	21	25	28	33	38	38	47	60	79
G	4 1/2	6	6	6 1/2	8 3/4	11 1/4	14 1/4	15 1/2	16 1/2	18	20 1/2	20 1/2	24	30	33
H	5 9/16	6 3/8	6 3/8	7 1/4	9 1/8	11 11/16	13 5/16	15	17	21 1/8	24 5/8	24 5/8	30 3/4	38 1/2	43 3/4
I	5 3/4	9	9	11	16	20	24	26	30	36	40	40	44	50 1/2	59
J	10	10	10	11	14	18	21	23	27	32	37	37	45	57	75
Wgt. (lbs)	260	260	260	300	450	800	1300	1600	1800	2400	3700	3900	6000	11000	17000

Note: 1. Dimensions F and J are the distance required to remove the piston  
 2. Dimensions and weights are approximate, please consult factory for specific information

### Standard Materials

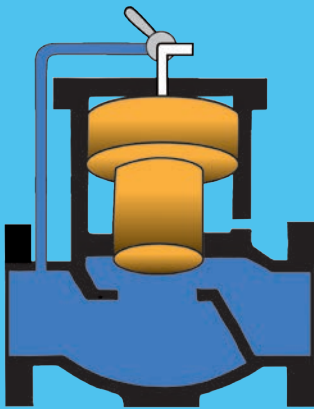
Body	Cast Iron, ASTM A126 Class B (NSF-61 Epoxy Coated)
Cover	Steel, ASTM A36 (NSF-61 Epoxy Coated)
Cover Fasteners	Steel, ASTM A307 (Optional 316 Stainless Steel)
Piston, Liner, Seat Ring	Lead Free Bronze
Seals	Buna-N or Composition
Renewable Seat	Buna-N
Internal Fasteners	Stainless Steel, Type 304

### Globe Body Headloss Chart



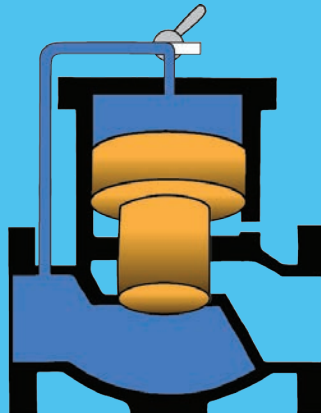
\*Angle body headloss is approximately half that of Globe body. Consult factory for more information.

## How it Works



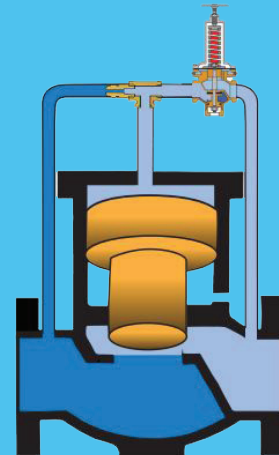
### Valve Fully Open

When the area above the piston is exhausted to atmosphere, the inlet pressure acting on the underside of the piston exerts an opening force which lifts the piston and opens the valve.



### Valve Fully Closed

When the inlet pressure simultaneously acts on both the underside and on top of the piston, the larger area on top produces a net closing force which closes the valve. The differential piston valve uses line pressure to close the valve against line pressure, regardless of the line pressure or the pressure drop across the valve.



### Valve Modulating

Inlet pressure is applied to the underside of the piston while a regulating pilot controls the pressure applied to the top of the piston to “balance” the opening and closing forces and position the main valve in an intermediate position to control pressure, flow or level.



## Pump Control Valves

Electric Check Pump Control Valves are installed on the discharge of a water pump to control surges associated with the starting and stopping of the pump. Valve operation is sequenced with the pump motor through a system of electro-hydraulic controls to slowly open and close the valve during normal pump operation without excessive surge. In emergency situations, such as loss of power, pump, or motor failure, the valve will automatically close quickly, protecting the system.

### Common Variations:

- Electric Check with Pressure Sustaining
- Electric Check with Pump Discharge
- Electric Check with Integral Stop-Check Feature



## Surge Relief Valves

The GA Surge Relief Valve protects the system from an excessive rise in pressure subsequent to a stoppage of pumping or a sudden valve closure. The valve is normally closed, but opens quickly if the pressure at the inlet rises above the setting of the pilot. Once open, it will discharge water at a rate sufficient to prevent a further rise in pressure. The valve closes at an adjustable speed when the pressure subsides below its setting. This type of valve is typically installed on the side outlet of a tee, in the discharge header after the pump check valves, or just ahead of a fast closing valve.

### Common Variations:

- Surge Relief with Solenoid Override



## Pressure Reducing Valves

The GA Pressure Reducing Valve functions to reduce a higher upstream pressure to a lower, downstream pressure regardless of fluctuations in pressure or variations in flow. The pressure reducing pilot senses the downstream pressure and throttles the main valve as necessary to satisfy demand, without allowing the downstream pressure to rise above the pilot's setting. The main valve will close when the downstream pressure reaches the setting of the pressure reducing pilot.

Common Variations:

- Pressure Reducing and Sustaining
- Pressure Reducing and Solenoid Shutoff
- Pressure Reducing and Check



## Pressure Sustaining Valves

The GA Pressure Sustaining Valve protects the pressure integrity of the upstream system. The valve will remain fully open as long as the inlet pressure exceeds the minimum pressure setting on the pilot. Should the upstream pressure fall to the minimum pressure setting on the pilot, the valve will throttle to hold back (sustain) the pressure and will close if the inlet pressure falls below the pilot setting. The upstream system pressure is protected by reducing or cutting off the flow to the downstream system.

Common Variations:

- Pressure Sustaining and Solenoid shutoff
- Pressure Sustaining and Check



## Altitude Valves

The GA Altitude Valve is used on the inlet of water tanks, standpipes and reservoirs to prevent overflow when the supply head is greater than the maximum water level. A single acting altitude is a "one-way" flow valve, where water must be drawn from the tank through another pipe (tank supplies downstream system) or a check valve in parallel to the altitude valve (tank is filled through the altitude valve and supplies system through the check valve when system head falls below tank head). A double acting altitude valve is "two-way" flow and not only fills the tank, but also re-opens when system head falls below tank head to allow the tank to supply the system through the altitude valve.

Common Variations:

- Altitude with Check
- Altitude with Solenoid Shutoff
- Altitude with Sustaining
- Altitude with Relief



## Solenoid Valves

The GA Solenoid valve opens and closes by remotely energizing/de-energizing the solenoid pilot. A normally closed solenoid valve opens fully when the solenoid pilot is energized and closes tight when de-energized. A normally open solenoid valve opens fully when the solenoid pilot is de-energized and closes tight when it is energized.

Common Variations:

- Solenoid with Check
- Open and/or Closed Limit Switch

## Options & Accessories

- **Stop-Check Piston** - prevents reverse flow independent of the pilot controls.
- **Limit Switch** - electrically indicates if the valve is open or closed. A single switch indicates "closed/not closed" while dual switches indicate "full closed" and "full open." Various NEMA rating switches are available.
- **Pressure gauge** - indicates the pressure at the valve inlet and/or outlet.
- **Special Flanges** - faced and drilled per EN1092, BS4504 or AS4087 PN10, 16 or 25.

## Specification

### GA Industries Differential Piston Control Valve

#### DESIGN

- A. Manufacturer shall have an ISO-9001 quality management system certified by an accredited body.
- B. The main valve shall be pilot-controlled, hydraulically operated, differential piston actuated and full ported.
- C. The control valve shall be “self-contained” and incorporate a system of pilot controls, factory assembled to and tested with the main valve. The valve shall be operated by line pressure and utilize the pilot system to open, close or throttle the differential piston main valve to perform the specified function(s).

#### CONSTRUCTION

- A. The main valve body shall be [globe][angle] style, constructed of high-strength cast iron conforming to ASTM A126 Class B with integral flanges, faced and drilled per ANSI B16.1 Class [125][250].
- B. The valve shall be “full-ported” so that when fully open the flow area through the valve is no less than the area of its nominal pipe size. Globe body valves shall have an integral bottom pad or feet to permit support directly beneath the body.
- C. The main valve shall operate on the differential piston principle such that the area on the underside of the piston is no less than the pipe area and the area on the upper surface is greater than that of the underside. There shall be no diaphragms or springs in the main valve.
- D. The valve piston shall be fully guided on its outside diameter and all guiding and sealing surfaces shall be lead-free bronze. To minimize the consequences of throttling, throttling shall be by long, stationary vee-ports located downstream of the seat and not by the seat itself. Sawtooth attachments or other add-on devices are not permitted.
- E. The valve shall be fully capable of operating in any position without the need of springs and shall not incorporate stems, stem guides or spokes in the waterway. A visual position indicator shall be provided.
- F. The main valve shall be serviceable in the line through a single flanged top cover that provides easy access to all internal components.
- G. The valve shall be shop coated with NSF-61 certified epoxy on internal surfaces in accordance with American Water Works Association Standard C550 (latest revision).

#### PILOT SYSTEM

- A. The valve shall be operated by a system of pilot controls necessary to perform the specified function(s).
- B. The pilot system shall be factory pre-piped, installed on the main valve and tested as an assembly.
- C. In addition to the necessary pressure regulating and/or electrically operated pilots, the system shall incorporate a wye-strainer and opening and/or closing speed control valves.
- D. Sufficient isolating valves and pipe unions shall be provided to facilitate removal and maintenance of the pilot system without disturbing the main valve.
- E. Pilots, controls, piping and fittings shall be stainless steel, lead-free bronze, brass, or copper.

#### MANUFACTURER

- A. Control valve shall be GA Industries differential piston design as manufactured by VAG USA, LLC, Mars, PA USA.

## GA Industries Valves for Water and Wastewater



- Butterfly Valves
  - Series 800 AWWA C504 Butterfly Valve
- Eccentric Plug Valves
  - 1/2" to 24" ECO-Centric® Round Port
  - 24" to 48" Rectangular Port
- Engineered Check Valves
  - Cushioned Swing Check
  - Oil Controlled Closing Swing Check
  - Tilting Disc Check
- Check Valves
  - Lever & Weight or Spring Swing Check
  - Heavy-Duty Swing Check
  - Rubber Flapper Check
- Pilot Operated Control Valves
  - Pressure Reducing
  - Pressure Sustaining
  - Emergency Cut-in
  - Altitude
  - Slow-Closing Check
  - Solenoid Control
  - Float
- Pump Control Valves
  - AWWA C507 Ball Valves
  - CHECKtronic® – Motor Actuated
  - Electric Check – Piston Actuated
  - Rotovalve® Cone Valve
- Surge Relief Valves
  - Diaphragm Actuated for Water
  - Differential Piston Actuated for Water
  - Spring Loaded for Wastewater or Sewage
- Air Valves
  - Air Release for Water & Sewage
  - Air and Vacuum for Water & Sewage
  - Combination for Water & Sewage
  - Vacuum Breaking Valves for Water & Sewage
  - Durovent™ All Stainless Steel Air Valves

GA Industries is a brand of the VAG Group, a renowned manufacturer of water control valves with headquarters in Mannheim, Germany, and an international organization of specialists that includes:

- Engineering & technical design
- Production
- Fabrication
- Sales & distribution
- Installation & start-up
- Aftermarket service



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