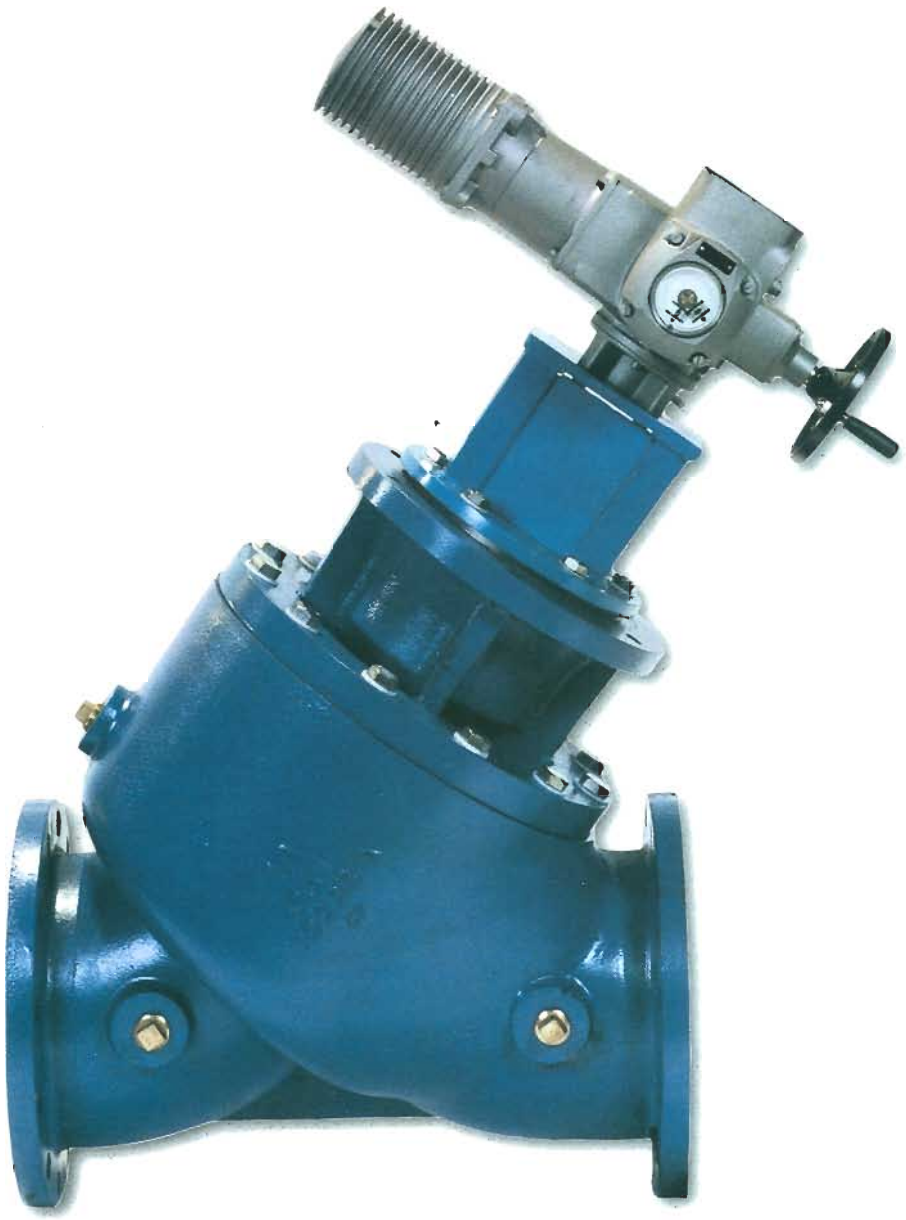
CHECKtronic®

PUMP CONTROL VALVE

GA INDUSTRIES



Electric motor actuated pump control valve with built-in check valve and handwheel manual override

BULLETIN #1625-M

CHECKtronic®
PUMP CONTROL VALVE

The GA Industries CHECKtronic® Pump Control Valve *is...*
...THREE VALVES IN ONE!

The CHECKtronic® Pump Control Valve is a "fail-safe" electric motor actuated pump control valve that provides an adjustable, controlled opening and closing speed for minimizing the pressure surges and waterhammer associated with normal pump operation PLUS it has a built-in check feature for reliable valve closure upon power or pump failure, independent of the actuator or its controls.

And, its integral handwheel manual actuator permits pump operation even if there is no power to the electric actuator.

The CHECKtronic® Pump Control Valve's electric motor actuator greatly simplifies installation and field wiring by eliminating complicated hydraulic power units and controls associated with oil, water or air cylinder actuated valves.

The valve is suitable for use with virtually any fluid, from clean water to raw sewage and, with alternate materials, a wide variety of industrial fluids. Its streamlined "wye" and "elbow" design handles solids very well, with 60% LESS headloss than a comparable globe or angle valve, thereby reducing pumping cost.

The GA Industries CHECKtronic® Pump Control Valve...a unique combination of value, simplicity, versatility and reliability, combined with more than a century of experience in surge control valves.

CHECKtronic®
PUMP CONTROL VALVE

Why use GA Industries CHECKtronic® Pump Control Valves?

Pressure Surges
Pressure surges occur in liquid systems whenever the fluid velocity is changed. Sudden changes, such as the starting and especially the stopping of pumps, can produce damaging pressure surges and severe water hammer. These pressure surges propagate through the entire system in a "wave-like" fashion, producing both abnormally high and low pressure transients that can result in burst pipe and valves, fluid column separation, pipeline collapse, customer complaints, personal injury and potential liability. Engineers have employed many methods to eliminate or at least control such surges, some more complicated than others.

Pump Control Valves
One proven way to prevent undesirable pressure surges associated with pump operation is to install pump control valves on each pump discharge. In addition to functioning as a check valve to prevent back flow when the pump is off-line, pump control valves operate in concert with the pump motor to impart a controlled, gradual change of fluid velocity during normal pump start-up and shutdown so that damaging surge pressures are prevented.

The typical hydraulically operated globe or angle, ball, cone, plug or butterfly valve used as a pump control valve requires hydraulic or pneumatic pressure to open and close the valve. Valve operation is sequenced with the pump motor operation through a series of electro-hydraulic controls. In all cases, the pump control valve must be "fail-safe" so that it closes upon power outage or pump failure to prevent flow reversal. "Fail-safe" operation requires a complex system of controls and a reliable source of pressure to close the valve upon power outage or failure of the pump. If the pumped fluid is clean and the pressure reliable, line pressure can be used to operate the valve. If the fluid is sewage, dirty or debris-laden, inadequate, unreliable or otherwise unsuitable for use by the controls, a separate source of hydraulic (water or oil) or pneumatic pressure is needed to operate the valve. This often involves sophisticated oil or water accumulators or compressed air systems to ensure sufficient pressure is available to close the valve under all operating scenarios, including power or pump failure.

Electric Motor Actuated Pump Control Valves
Electric motor actuated pump control valves are sometimes considered because they don't need complex electro-hydraulic controls, accumulators or compressed air systems. Electric motor actuators are simple, dependable and easy to install and operate. However, typical AC electric motor actuated pump control valves are not "fail-safe." Upon power failure they normally "hold position" and if open, allow backflow unless a separate mechanical check valve is installed in addition to the pump control valve. Although they require AC/DC converters, DC motor actuators can be made relatively "fail-safe" through expensive and cumbersome battery packs. Overall, electric motor actuated pump control valves are not common because their disadvantages usually outweigh their advantages.

The CHECKtronic© Pump Control Valve
The GA Industries CHECKtronic© Pump Control Valve is three valves in one! Its innovative design incorporates a fail-safe check valve into an automatic electric motor actuated, slow opening and slow closing pump control valve, plus provides for emergency manual valve operation. Installation is simplified, complicated controls are eliminated and reliable "fail-safe" operation is ensured without the need for accumulators, compressed air systems, battery packs or separate check valves.

The CHECKtronic© Pump Control Valve's AC electric motor actuator slowly opens and closes the valve in sequence with the pump motor to control surges associated with normal pump operation. The speed of valve operation is *field adjustable* to suit the system – an important feature not found in many electric motor actuated pump control valves. A simple local or remote "pump start" dry contact closure initiates a pump start/valve opening sequence and a "pump stop" turns off the pump only after the valve has closed.

If the CHECKtronic© Pump Control Valve is open when the power fails, the electric motor actuator holds position, but the spring-assisted "StopCheck" automatically separates from the actuator and quickly closes to prevent back flow. When power is restored, electrical interlocks prevent pump restart until the actuator resets and is holding the valve closed.

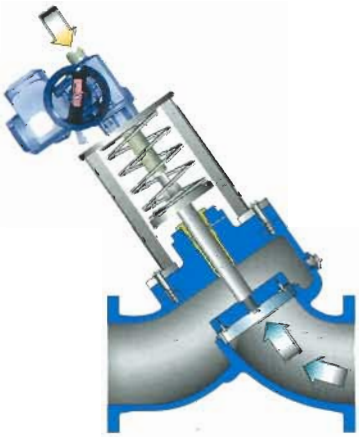
The GA Industries CHECKtronic© Pump Control Valve is the ultimate in value, simplicity, versatility and reliability and is well suited for a wide range of services from water to raw sewage and many industrial fluids.

CHECKtronic®
PUMP CONTROL VALVE

How does the GA Industries CHECKtronic® Pump Control Valve Work?

Pump Start
A "pump start" energizes the pump motor but the CHECKtronic© Pump Control Valve's electric motor actuator continues to hold the valve tightly closed against the running pump. After the pump is up to speed and pressure, the electric motor actuator energizes and slowly opens the CHECKtronic© Pump Control Valve. The slow opening speed controls how fast the fluid column accelerates to flowing velocity in order to minimize pump start-up surges.

Pump Running – Valve Open
The valve continues to the open position. The CHECKtronic© Pump Control Valve's streamlined body produces very low headloss and handles fluids such as sewage or debris-laden water without clogging. The valve's electric motor actuator has both a visual position indicator and provisions for electrical indication of open and closed.



Normal Pump Shutdown
Upon a normal shutdown command, the CHECKtronic© Pump Control Valve's electric motor actuator begins closing the valve but the pump motor continues to run. The valve's slow closing speed controls how fast the fluid column decelerates in order to minimize column separations and pressure surges. The pump motor deenergizes only after the valve is fully seated and the fluid has been brought to rest.

Power Failure or Pump Failure
If the valve is open and there is a loss of power to the pump motor or failure of the pump, the integral spring-assisted "stop-check" automatically separates from the electric motor actuator and quickly closes to prevent backflow through the pump.

CHECKtronic®
PUMP CONTROL VALVE

Electric Motor Actuator

Standard Electric Motor Actuator

The standard GA Industries CHECKtronic® Pump Control Valve is equipped with a heavy duty, open-close, multi-turn, self-locking electric motor actuator. The standard actuator is NEMA 4 rated, 230/460VAC/3Ph/60Hz, thermally protected with 120VAC control circuit, reversing contactors, limit switches, torque switches and manual hand wheel. An integral local control station is provided with a lockable local-off-remote selector switch, push buttons and indicating lights. ***NOTE:*** Other voltages, NEMA ratings and options are available, consult factory.

Standard Two-Speed Operation

For proper control of pressure surges, pump control valves must not only have precise valve operating speeds but also the ability to adjust these speeds to suit field conditions. The GA Industries CHECKtronic® Pump Control Valve's standard electric motor actuator is equipped with an integral, electronic "stepping mode" to extend the operating time of any portion of the valve's stroke. The start and end of the stepping mode and its on/off time can be independently set to provide the flow cutoff characteristic necessary to control the surges associated with normal pump operation. ***NOTE:*** The GA Industries CHECKtronic® Pump Control Valve can be actuated by virtually any commercially available electric motor actuator, but the features of our STANDARD actuator may not be available from all manufacturers.

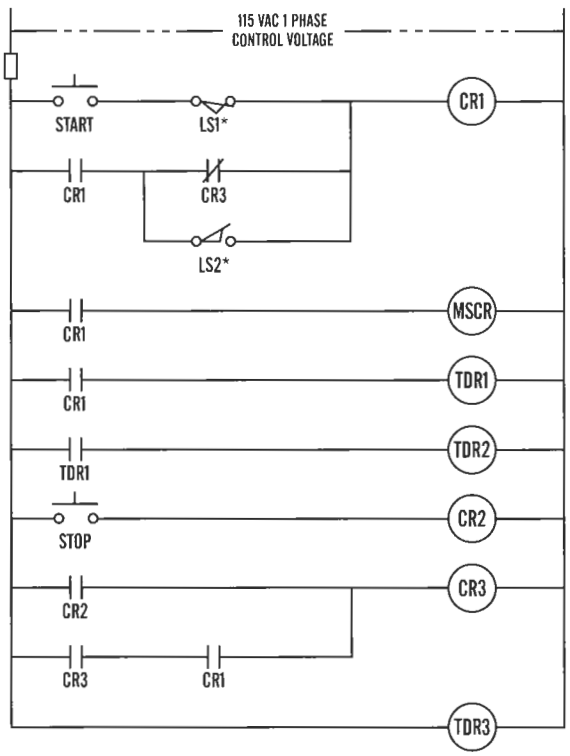
Typical Sequence of Operation

PUMP START

1. Pump start button depressed (if manual pump start) or dry contacts close (if remote pump start).
2. Pump motor starter energizes.
3. CHECKtronic® Pump Control Valve opens as pump reaches full speed.
   NOTE: On some installations a time delay or pressure switch relay may be needed to delay valve opening until pump has come up to speed and pressure.
4. Limit switch contacts close within CHECKtronic® Pump Control Valve actuator as valve opens to interlock pump motor starter circuit.
5. Valve open - pump running.

NORMAL PUMP SHUTDOWN

1. Pump stop button depressed (if manual pump stop or dry contacts disengage (if remote pump start).
2. CHECKtronic® Pump Control Valve begins to close while pump motor continues to run.
3. At a point very near the closed position, limit switch contacts open within CHECKtronic® Pump Control Valve actuator, deenergizing the pump motor starter.
4. CHECKtronic® Pump Control Valve continues to the fully seated position as pump coasts to a stop.
5. Valve closed - pump stopped.



COMPONENTS NOT FURNISHED BY GA INDUSTRIES:

START - MOMENTARY PUSHBUTTON OR MOMENTARY CONTACT CLOSURE TO INITIATE START SEQUENCE

STOP - MOMENTARY PUSHBUTTON OR MOMENTARY CONTACT CLOSURE TO INITIATE STOP SEQUENCE

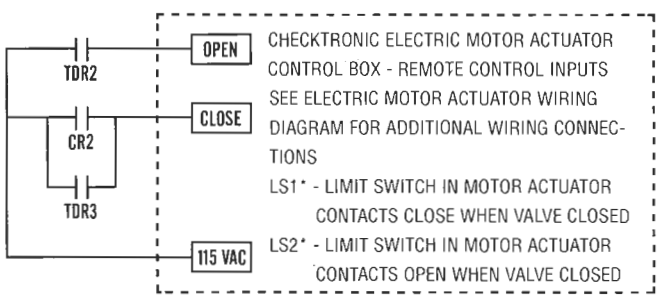
MSCR - MOTOR STARTER CONTROL RELAY

CR1, CR2, CR3 - CONTACT RELAYS

TDR1 - TIME DELAY RELAY (ON-DELAY TYPE: DELAY TIMER STARTS WHEN ENERGIZED, CONTACTS TRANSFER AFTER DELAY PERIOD, DE-ENERGIZE TO RESET)

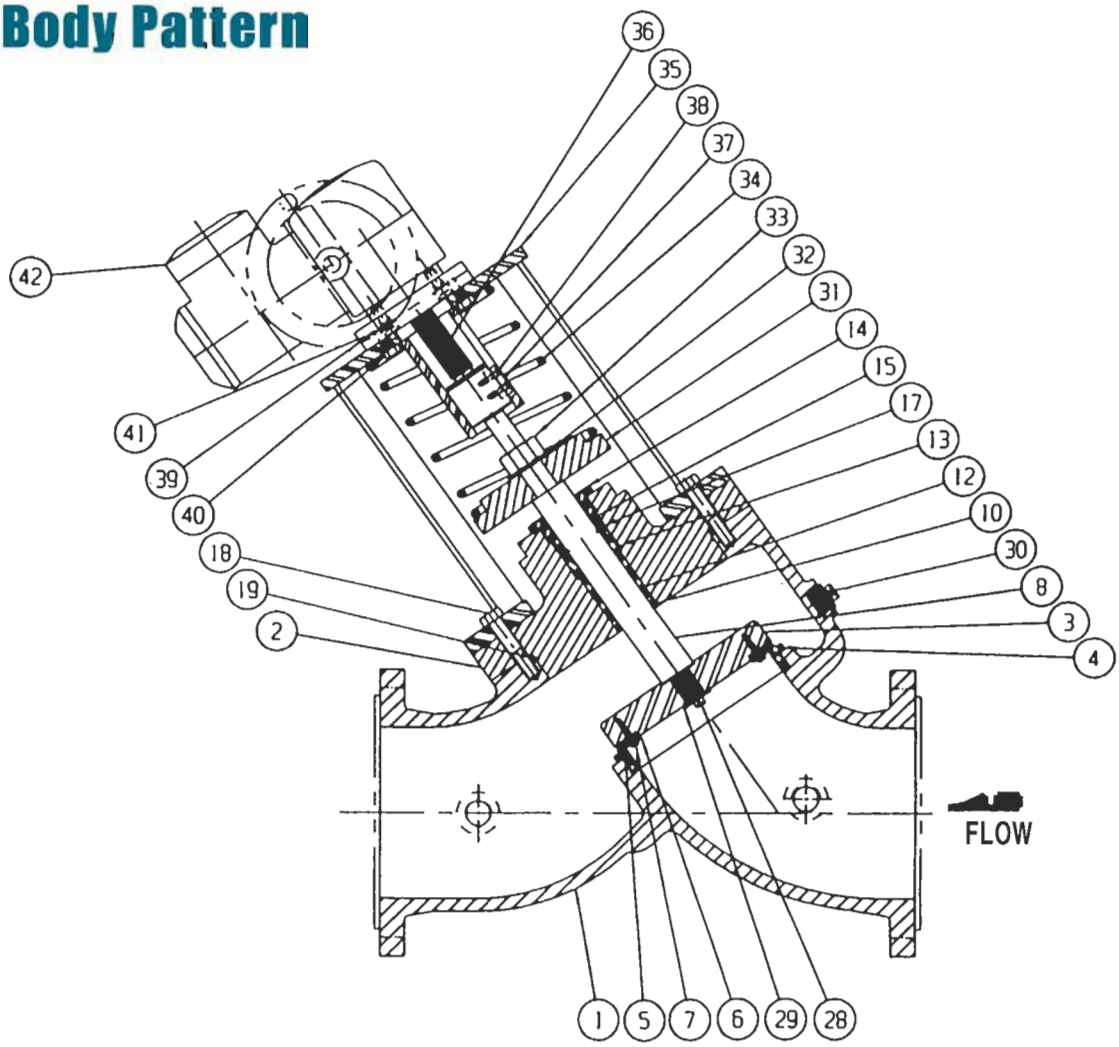
TDR2, TDR3 - TIME DELAY RELAY (INTERVAL-DELAY TYPE: CONTACTS TRANSFER WHEN ENERGIZED, DELAY TIMER STARTS WHEN ENERGIZED, CONTACTS RETURN AFTER DELAY PERIOD, DE-ENERGIZE TO RESET)

NOTE: BASIC CONTROL SCHEMATIC SHOWN PROVIDES FOR NORMAL PUMP START AND NORMAL PUMP STOP SEQUENCE ONLY.
STATUS INDICATION, EMERGENCY LOCK-OUTS, EMERGENCY INDICATION, AND/OR PUMP ALTERNATING CONTROL(S) ARE NOT INCLUDED IN THE BASIC CONTROL SCHEMATIC. THESE ITEMS MAY BE ADDED TO THE CONTROL SCHEMATIC AS REQUIRED BY THE DESIGN ENGINEER.



CHECKtronic®
PUMP CONTROL VALVE

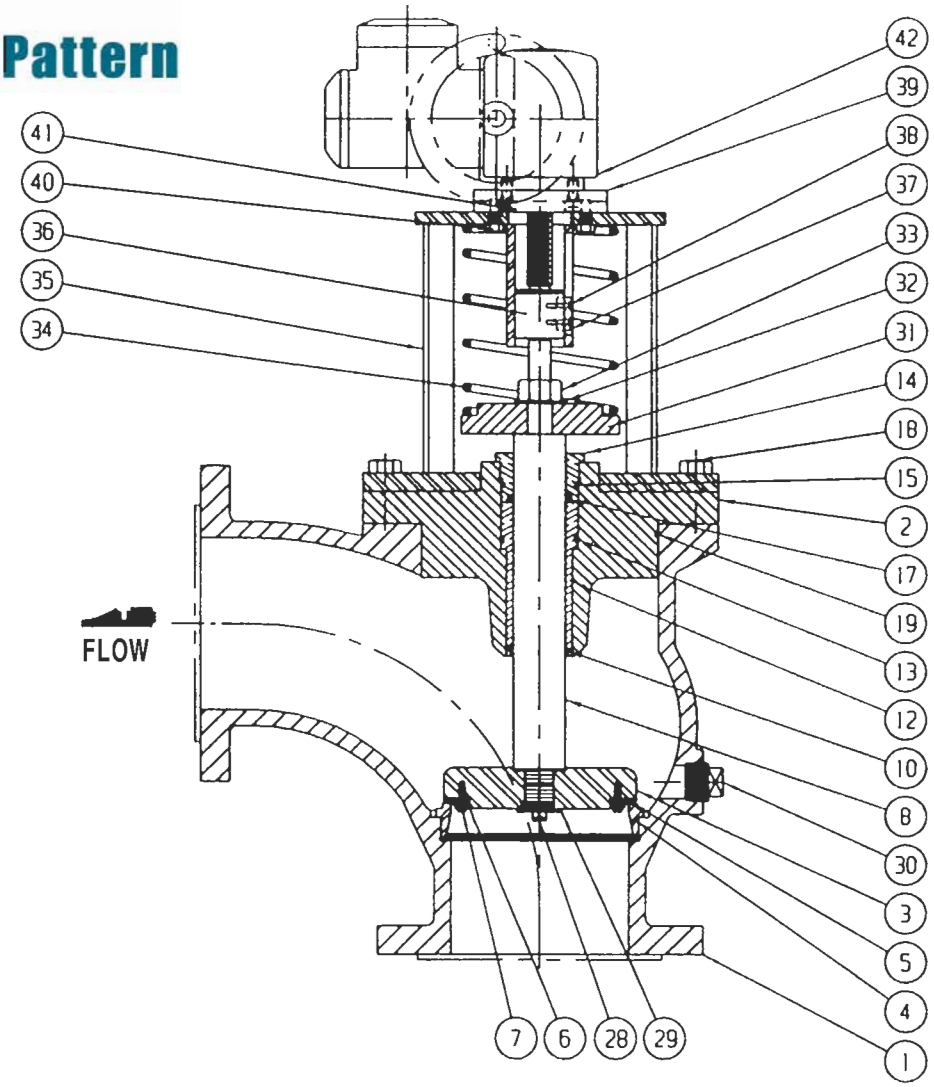
Parts List
Wye Body Pattern



ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Body	13	Bushing Seal	32	Spring Seat Washer
2	Cover	14	Gland	33	Spring Seat Nut
3	Disc	15	Gland Seal	34	Spring
4	Body Seat	17	Stem Seal	35	Actuator Mounting Bracket
5	Disc Seat Ring	18	Cover Bolts	36	Actuator Threaded Stem
6	Seat Follower	19	Cover Seal	37	Actuator Threaded Stem Key
7	Seat Follower Screws	28	Stem Lock Screw	38	Actuator Threaded Stem Key Bolts
8	Stem	29	Stem Lock Washer	39	Actuator Adaptor
10	Rod Wiper	30	Body Plug	40	Adaptor Bolts
12	Bushing	31	Spring Seat	41	Actuator Bolts
				42	Electric Motor Actuator

CHECKtronic®
PUMP CONTROL VALVE

Parts List
Elbow Body Pattern



ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	**Body**	13	**Bushing Seal**	32	**Spring Seat Washer**
2	**Cover**	14	Gland	33	**Spring Seat Nut**
3	**Disc**	15	Gland Seal	34	Spring
4	Body Seat	17	Stem Seal	35	Actuator Mounting Bracket
5	Disc Seat Ring	18	Cover Bolts	36	Actuator Threaded Stem
6	Seat Follower	19	Cover Seal	37	Actuator Threaded Stem Key
7	**Seat Follower** Screws	28	**Stem Lock Screw**	38	Actuator Threaded Stem Key Bolts
8	Stem	29	Stem Lock Washer	39	Actuator Adaptor
10	**Rod Wiper**	30	**Body Plug**	40	**Adaptor Bolts**
12	Bushing	31	Spring Seat	41	**Actuator Bolts**
				42	**Electric Motor Actuator**

CHECKtronic®
PUMP CONTROL VALVE

MATERIALS OF CONSTRUCTION

PART	MATERIAL	SPECIFICATION
Body, Cover	Cast Iron (Standard)	ASTM A126 Class B
	Ductile Iron (Optional)	ASTM A536
	Cast Steel (Optional)	ASTM A216 Gr. WCB
	Cast Stainless Steel (Optional)	ASTM A351
Disc	Ductile Iron (Standard)	ASTM A536
	Cast Stainless Steel (Optional)	Type 18-8
	Cast Steel	ASTM A216 Gr. WCB
Body Seat, Seat Follower	Stainless Steel	Type 316
Stem	Stainless Steel	Type 303
Disc Seat Ring	Synthetic Polymer	Ultra High Molecular Weight Polyethylene (UHMWPE)
O-Rings & Gaskets	Rubber/Composition	Buna-N/Fiber (Other Materials Available)
Gland, Bushing	Brass	C36000
Internal Wetted Fasteners	Stainless Steel	Type 18-8
Actuator Bracket & Adaptor	Steel	ASTM A36
Spring	Steel	ASTM A229
External Fasteners	Steel	ASTM A307
Threaded Stem	Stainless Steel	Type 18-8

Note: We reserve the right to substitute materials which in our opinion are of equal or superior quality.

PRESSURE RATINGS

Cast Iron Body, Class 125 Flanges	200 PSI (3" to 12" Size) 150 PSI (14" to 24" Size)
Cast Iron Body, Class 250 Flanges	400 PSI (3" to 12" Size) 300 PSI (14" to 24" Size)
Ductile Iron Body, Class 150 Flanges	250 PSI (3" to 24" Size)
Ductile Iron Body, Class 300 Flanges	500 PSI (3" to 24" Size)

NOTE:

1. Standard flanges conform to ANSI standards. BS, DIN, ISO and other flanges are available, consult factory for availability and pressure ratings.
2. Higher pressure ratings available with steel or stainless steel body.
3. Valve maximum working pressure (MWP) may be less than pressure rating due to actuator.

WARRANTY

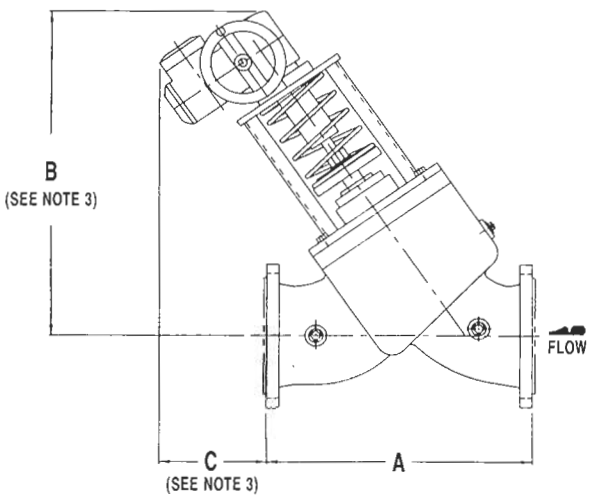
This GA Industries product is made of the finest available materials and every possible precaution has been taken to assure premium workmanship consistent with established quality procedures. Valves or parts proven faulty due to defective materials or poor workmanship will be replaced free of charge, FOB our factory, upon presentation of such proof. This warranty shall not cover the cost of installation and is valid for one year from date of shipment. Dimensions and specifications are subject to change without notice.

APPROXIMATE SHIPPING WEIGHTS

SIZE	(IN)	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
	(MM)	75	100	150	200	250	300	350	400	450	500	600
WEIGHT												
	(LBS)	275	300	525	675	870	1400	2400	2750	3150	3450	6800
	(KG)	125	136	238	306	394	635	1088	1247	1428	1564	3082

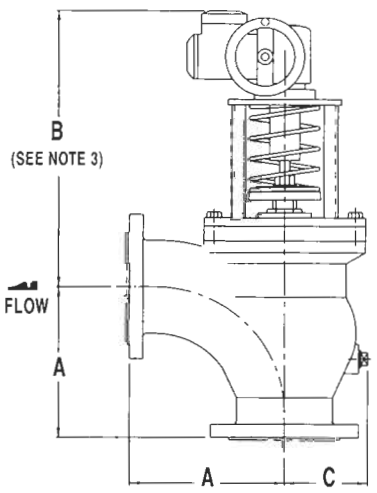
CHECKtronic®
PUMP CONTROL VALVE

Dimensional Data
Wye Body



	A	B	C	VALVE BODY WIDTH
	inches	inches	inches	inches
3"	12	29	15 1/2	6 3/4
4"	13	30 1/2	14 1/2	8
6"	18	33 1/2	13	11 1/2
8"	24 1/2	37	10 1/2	15
10"	26	40 1/2	13	18
12"	31	45	12 1/2	19 5/8
14"	33	46	11 1/2	21
16"	36	52 1/2	13 1/2	25
18"	40	60	15 1/2	28
20"	40	61	15 1/2	28
24"	48	64	17	33
30"	60	85	22	45

Elbow Body



	A	B	C	VALVE BODY WIDTH
	inches	inches	inches	inches
3"	7 3/4	32	5	2 1/2
4"	9	33	6	3
6"	11 1/2	34	7	3 1/2
8"	14	35	8	4
10"	16 1/2	36	11	5 1/2
12"	19	37 1/2	13	6 1/2
14"	21 1/2	41	16	8
16"	24	50	17	8 1/2
18"	26 1/2	52	21	11 1/2
20"	29	54	23	13
24"	34	58	24	12
30"	41 1/2	70	28	14

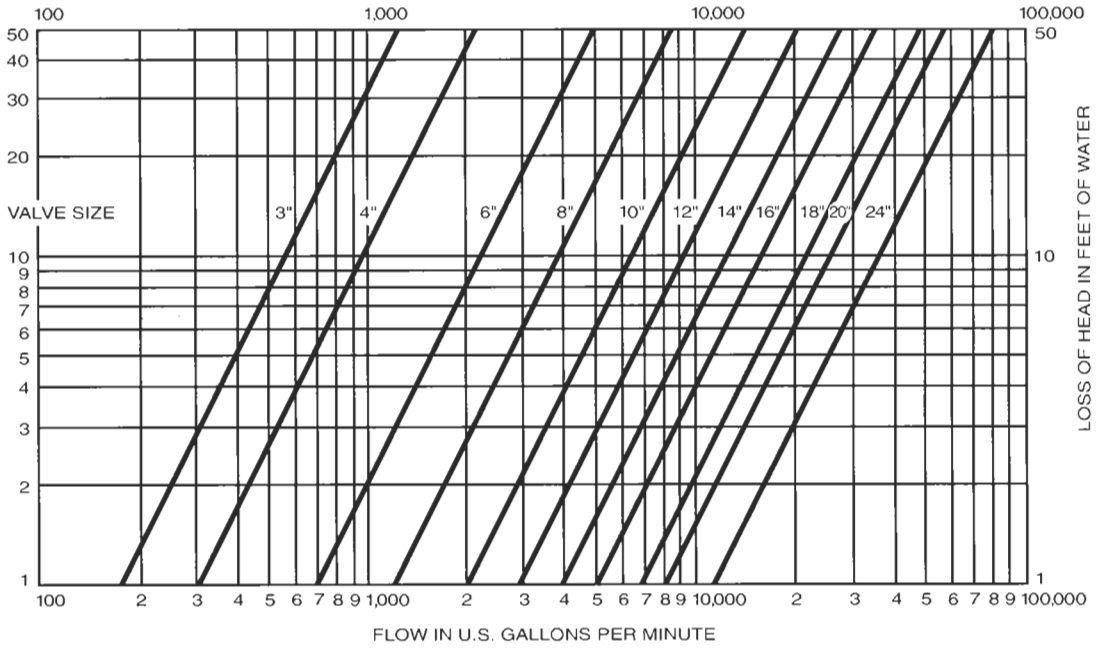
NOTE:
1. Standard flanges per ANSI B16.1. BS, DIN, ISO and other flanges are available.
2. "A" dimension on valves with raised face flanges does not include the length of the raised face.
3. Dimension may vary per operator selection. For accurate dimension, consult factory.
4. Actuator may extend beyond valve body width and can be rotated in 90° increments.
5. Dimensions shown are for estimating purposes and are not guaranteed. Certified drawings are available when requested with order.
6. Divide inches by 0.039 to obtain millimeters.

CHECKtronic®
PUMP CONTROL VALVE

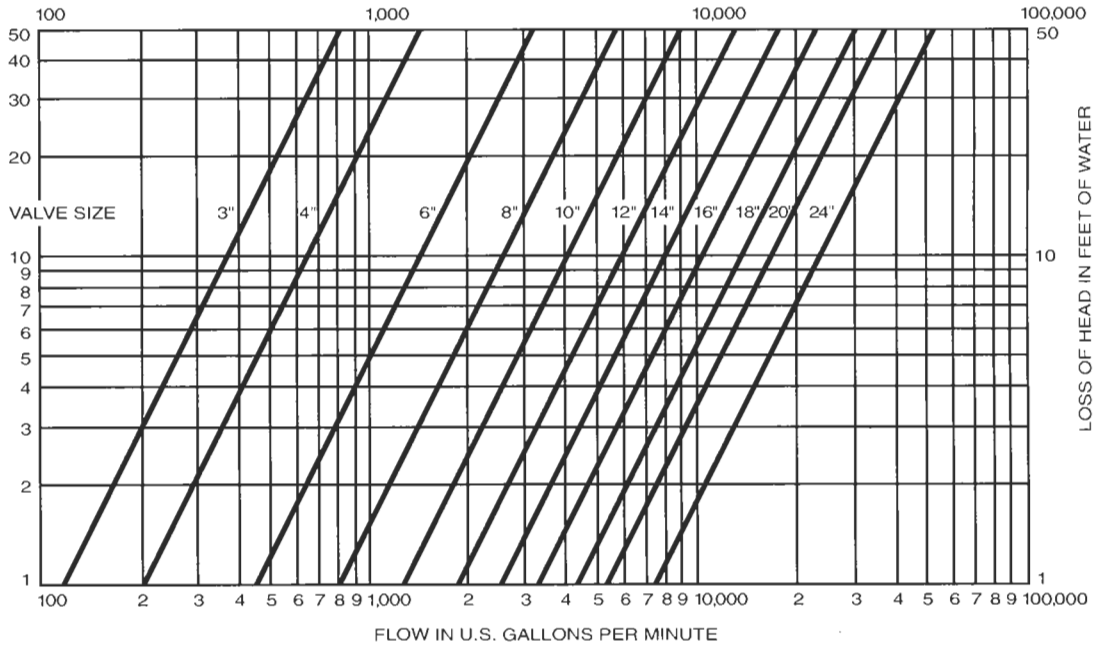
Reduce Headloss and Save Pumping Costs

The GA Industries CHECKtronic® Pump Control Valve's full-ported, streamlined long radius elbow pattern and wye body style have 60% LESS headloss than traditional angle and globe body valves.

HEADLOSS VS FLOW FOR LONG RADIUS ELBOW BODY VALVE



HEADLOSS VS FLOW FOR WYE BODY VALVE



CHECKtronic®
PUMP CONTROL VALVE

SPECIFICATION

CONSTRUCTION

The valve body shall be of the [in-line wye][long radius elbow] pattern of [cast iron conforming to ASTMA126 Class B][ductile iron conforming to ASTM A536 Grade 65-45-12] with integral flanges faced and drilled to ANSI B16.1 [Class 125][Class 250]. The valve shall be inherently self-cleaning with a net flow area of no less than the area of its nominal pipe size. The body shall have a replaceable 316 stainless steel seat and a seat inspection port.

The valve disc shall be ductile iron with a renewable resilient seat ring of ultra-high molecular weight polyethylene (UHMWPE) or other suitable resilient material, retained by a stainless steel follower ring with stainless steel screws. The valve stem shall be stainless steel and guided by a long bronze bearing in the valve cover and sealed where it passes through the cover by means of a replaceable pressure actuated seal.

The valve disc shall be designed to close quickly upon flow reversal, independent of the actuator, to prevent backflow. A spring shall be provided to assist valve closure.

The electric motor actuator shall be multi-turn, non-modulating [230/460VAC, 60 Hertz, 3 Phase NEMA 4] [_____VAC, _____Hertz, _____Phase, NEMA____] meeting AWWA C540 with integral limit switches, torque switches, visual position indicator and manual handwheel. Controls shall include reversing starter, control transformer, local-off-remote selector, indicating lights and open/close push buttons. The actuator shall provide a minimum valve operating time of [ ] seconds with an integral stepping mode to extend the operating time over any portion of the valve stroke. The start/end and the on/off pulse time shall be field adjustable.

FUNCTION

The Pump Control Valve with Electric Motor Actuator shall function to minimize surges associated with the normal starting and stopping of pumps. The valve shall slowly open after the pump has come up to speed and pressure at pump start. A normal pump shutdown shall be initiated by the valve slowly closing against the running pump, turning off the pump only after the valve has completely closed. The valve shall quickly close independently of the actuator upon flow reversal resulting from power outage, pump or pump motor failure or other sudden stoppages of pumping.

MANUFACTURER

The valve shall be the Series 1600-M "CHECKtronic®" Pump Control Valve as manufactured by GA Industries, Inc., Cranberry Township, PA USA

NOTE: Specifier to select [bracketed] options.

Product improvement is always evident at GA Industries, Inc. Specifications and design may change without notice.

INFORMATION NEEDED WHEN ORDERING

1. Size and Quantity
2. Body Style
3. Body Material and Flange Class
4. Installation Orientation
5. Type of Fluid
6. Pump Shut Off Head
7. Minimum Static Head at Valve Outlet
8. Pump Discharge Head
9. Actuator Electrical Characteristics
10. Operating Speed

CHECKtronic®

PUMP CONTROL VALVE

Design Features

- **PUMP CONTROL** – Field adjustable slow opening and closing controls normal pump start-up and shutdown surges
- **ELECTRIC ACTUATOR** – Simple, cost effective electric motor actuator eliminates complicated hydraulic power units, solenoid valves and cylinder actuators
- **CHECK** – Spring-assisted "StopCheck" reliably closes independent of actuator to prevent back-flow upon power or pump failure
- **MANUAL OVERDRIVE** – Permits emergency pump operation with inoperative actuator
- **VERSATILE** – 3" (80mm) to 24" (600mm) in "wye" or "long radius elbow" body
- **LOW HEADLOSS** – 60% LESS than typical globe or angle valve
- **TRIM** – Standard 316 stainless steel replaceable body seat and ultra-high molecular weight polyethylene (UHMWPE) renewable disc seat for drop tight shutoff

GA Industries Inc.

SINCE 1895

MANUFACTURERS OF GOLDEN ANDERSON® VALVES

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Pump Control Valve Fig. 2920

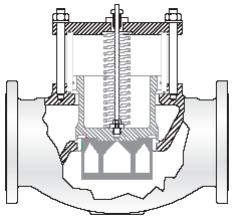

FIG. 2920 Globe type automatic valve solenoid operated. Its function will be to minimize the pressures related to startup and stop of pumps. The valve operation will be controlled by solenoids.

Valve configuration can be straight or angle pattern(in order to minimize headloss)

Sequence of functions:

Pump start up:

1. When the pump starts the valve will remain in closed position.
2. After a determined time lapse (to be programmed by an adjustable timer), the valve will open with a controlled speed.
3. Thus, the water inflow in the system will be produced in a progressive and controlled way once the downstream area has been pressurized.

Pump stop:

1. The pump stop process will start with the progressive closure of the control valve.
2. When the valve is about a 90% closed, the pump will stop.

In case of blackout, the solenoids will be de-energized and the main valve will start closing.

The valve shall be connected to a control panel where the timers will be housed.

For the check valve function, an alternative loop installed downstream will make a quick close of the valve by means of using the backflow pressure.