"Installation & Specification Guide"

Backflow Irrigation Control Station

BIC-1000

Table of Contents

WATTS®

Description

The primary purpose of this valve station is to provide pressure control over a large range of flow rates at a fixed point in the irrigation system. The station shall be designed such that -

A. System pipe breaks and leakage are minimized, based on best practice design principles.

B. Ease of System Maintenance is of primary importance.

C. System Performance is reliable and consistent and matches certified design criteria.

A secondary purpose of this valve station may be to provide on-off flow control to the system.

Features

A. System pipe breaks and leakage are minimized based on best practice design principles

The valve station shall be designed such that the following capabilities may be achieved -

1. Maintain system pressure at a constant pressure that will provide adequate discharge from the worst case Station or Head from 20% to 100% of design flow.
   - No more than 10psi variation at steady state flow over entire operating range from 20% to 100% of continuous flow range.
2. Reduce or eliminate pressure spike or "Water Hammer" events by minimizing operating pressure during operation.
   - Field adjustable closing speed on pressure or flow control valves.
   - Field adjustable set point with minimal "drop off" as flow rate increases.
   - Ability to set the stable pressure as low as possible while maintaining "A1" (see above). Range: 40 – 120psi set point.
3. Provide a means to drastically reduce system pressure when the system is idle.
   - Provides a small pre-load valve to maintain a constant low pressure to the system during idle times.
   - A low flow rate valve is ideal in order to conserve water should pipe leaks be prevalent.
4. Minimize the amount of piping that is subjected to high purveyor supply pressure.
   - Provide a valve station as near to the purveyor connection as possible.

B. Ease of System Maintenance is of primary importance.

1. Provide for ease of access.
   - Valve Station shall be designed to be installed so that all equipment that may require scheduled maintenance or repair is above ground.
2. Provide for means to determine functionality.
   - All equipment subject to inspection for maintenance / repair / or performance evaluations shall be designed such that proper operation can be determined through external test methods rather than solely by disassembly and inspection.
3. Provide for means of in-line repair or ease of replacement.
   - All equipment shall be flanged, or installed with unions or grooved couplers.
   - Adequate Spacer Flanges shall be used to ensure that compensation for manufacturing variations in equipment lay length may be made.

C. System Performance is reliable and consistent and matches certified design criteria.

1. Provide fully matched and certified components in a pre-assembled and certified valve station.
   - Wherever possible, a single manufacturer's components shall be used in the Valve Station Assembly.
   - Valve Station vendor shall provide a certified submittal with bill of materials which will detail the primary customer connection dimensions, the installed equipment, and the materials of construction for approval prior to fabrication.
   - Vendor shall provide a pre-assembled Valve Station that has received at a minimum full hydro-test to 1.5 times the design supply pressure for 5 minutes.
   - Vendor shall provide performance data submittals for comparison of proposed Valve Station performance to system design criteria.

Automatic Control Valve Data

BIC 1000 Specification Drawing

Configuration Data -
Typical BOM and Drawing
Valve Station Component Requirements

JOB NAME _____

CUSTOMER _____

ENGINEER _____

RFQ# _____

ACV ONLY

ITEM	QTY	DESCRIPTION	MATERIAL	SIZE	CONNECT
1	1	SHUT-OFF VALVE	Contact Factory		FLANGE
2	OPTIONAL	FLOW METER	Contact Factory		FLANGE
3	1	FLANGE X THREAD ADAPTOR	304 SS / ZN PLATE STEEL		FLANGE
4	1	DIAPHRAGM ACTUATED CONTROL VALVE	FBE / DI / SST		FLANGE
5	1	FLANGE X GROOVE ADAPTOR	304 SST		FLG X GRV
6	1	GROOVE COUPLER	EPOXY COATED DI		GROOVE
7	1	RELIEF VALVE	BRASS / BRONZE		FLANGE
8	1	OUTLET HEADER	304 SST		FLANGE
9	1	SHUT-OFF VALVE	Contact Factory		FLANGE
10	3	SPACER FLANGE - SLOTTED - NOT SHOWN	304 SST		FLANGE

NOTE: See specific component specifications or literature for detailed component material descriptions

Typical Performance Data

	FLOW RATE CAPACITIES - GPM			PRESSURES - PSI		
LINE SIZE	CONTINUOUS	INTERMITTENT*	MINIMUM	MAX INLET	MIN DP	SET POINT RANGE
2	210	260	1	170	20	40 - 120
3	460	570	30	170	20	40 - 120
4	800	1000	50	170	20	40 - 120
6	1800	2300	115	170	20	40 - 120

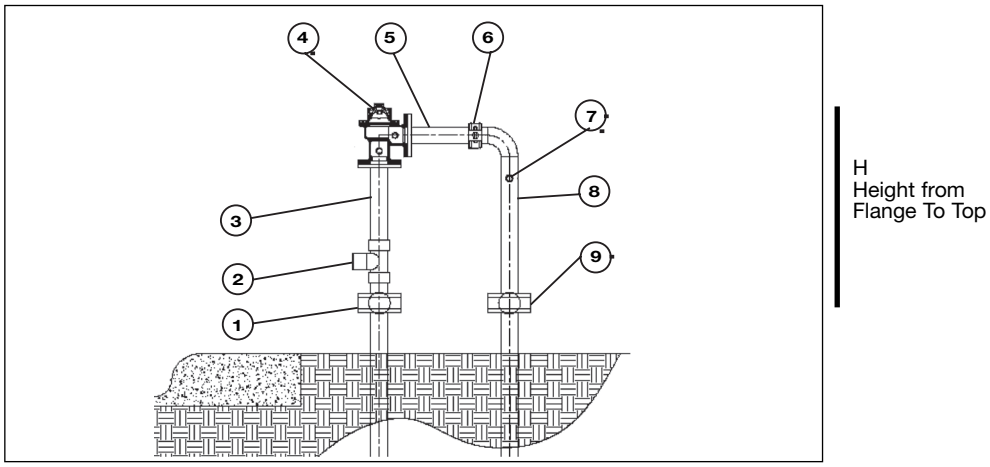
*Based on:

a - Max capacity through the ACV for a system with a 20psi or greater pressure reduction requirement

	FLOW RATES - GPM		FALL OFF FROM SET POINT @ - PSI			
LINE SIZE	20% CONT	20% INTERMIT	20% CONT	20% INTERMIT	100% CONT	100% INTERMIT
2	42	52	0	1	4	6
3	92	114	0	0	1	2
4	160	200	0	1	2	4
6	360	460	0	0	1	2

X	Hydro test the fully assembled Valve Station to 175psi for 5 minutes without leakage.

Typical Configuration Drawing - Above Ground Installation



CC - Center Line of Inlet / Outlet Pipes

Customer Inputs

Customer Connections — Input Header Size

Size	Check One
2	
3	
4	
6	

Component Customization

Strainer — Item 2

Style	Check One	
SS WYE		Standard
NONE		

ACV — Item 3

Style	Check One	
LAUSD		
MASTER		Standard
AUTO SHIFT		Standard
NONE		

Backflow Preventer — Item 4

Style	Check One	
909PCQT		
009M2PCQT		
NONE		Standard

Lug Type Butterfly Shutoff Valves — Item 1 & item 9

Style	Check One	
DBF		Standard
NONE		

Typical Dimensional Data

Certified Drawing Supplied with Order

Pipe Size – NPS		Typical Dims – Inch	
Inlet	Outlet	CC Dim	H
2	2		
3	3		
4	4		
6	6		

Station Specifications

Backflow - Irrigation Control Valve Station (BIC)

Description

Backflow Irrigation Control Valve Station
Pre-Engineered / Pre-Assembled / Certified

To meet the material list, Customer Connection Dimensions, Installed Equipment and Materials of Construction with individual components supplied and supported by Watts Regulator as shown featuring:

- Flanged or Grooved Connections between all components.
- Stable Field adjustable set point for outlet condition within 10psi over a range of flow from 20% - 100% of continuous design flow rate
- Water Hammer reduction is enhanced by field adjustable closing speeds on pressure or flow control valves … equipped with a small pre-load valve.

Automatic Shift Valve Data

BIC 1000 Specification Drawing

Configuration Data -
Typical BOM and Drawing
Valve Station Component Requirements

JOB NAME _____

CUSTOMER _____

ENGINEER _____

RFQ# _____

AUTO SHIFT VALVE

ITEM	QTY	DESCRIPTION	MATERIAL	SIZE	CONNECT
1	1	SHUT-OFF VALVE	Consult Factory		FLANGE
2	1	STRAINER - WYE	304 SS / ZN PLATED FLG		FLANGE
3	1	DIAPHRAGM ACTUATED CONTROL VALVE	FBE / DI / SST		FLANGE
4	1	FLANGE X THREAD ADAPTOR	304 SS / ZN PLATE STEEL		FLANGE
5	1	BACKFLOW PREVENTER - WATTS 009M2PCQT	TEFLON COATED BRONZE		FLG X GRV
6	1	GROOVE COUPLER	EPOXY COATED DI		GROOVE
7	1	OUTLET HEADER	304 SST		FLANGE
8	1	RELIEF VALVE	BRASS / BRONZE		FLANGE
9	1	SHUT-OFF VALVE	Consult Factory		FLANGE
10	3	SPACER FLANGE - SLOTTED - NOT SHOWN	304 SST		FLANGE

NOTE: See specific component specifications or literature for detailed component material descriptions

Typical Performance Data

	FLOW RATE CAPACITIES - GPM			PRESSURES - PSI		
LINE SIZE	CONTINUOUS	INTERMITTENT*	MINIMUM	MAX INLET	MIN DP	SET POINT RANGE
2	160	220	1	170	20	40 - 120
3	320	480	30	170	20	40 - 120
4	500	750	50	170	20	40 - 120
6	1000	1500	115	170	20	40 - 120

*Based on:

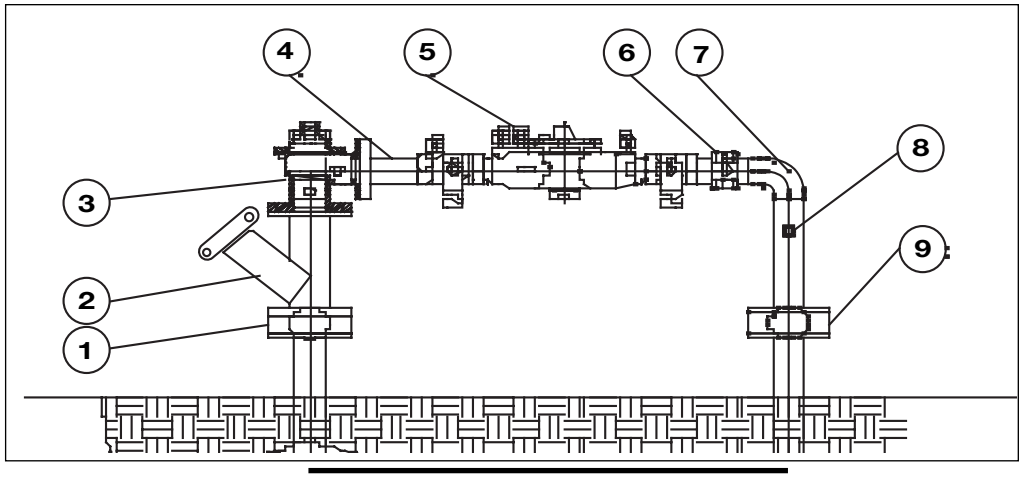
a - 150% Emergency Flow rate through Backflow Preventer (90 Minute UL/FM Test)

b - Max Capacity through the ACV for a system with a 20psi or greater pressure reduction requirement

	FLOW RATES - GPM		FALL OFF FROM SET POINT @ - PSI			
LINE SIZE	20% CONT	20% INTERMIT	20% CONT	20% INTERMIT	100% CONT	100% INTERMIT
2	32	44	4	5	8	18
3	64	96	3	3	4	11
4	100	150	5	6	7	9
6	200	300	4	4	5	6

X	Hydro test the fully assembled Valve Station to 175psi for 5 minutes without leakage.

Typical Configuration Drawing - Above Ground Installation



CC - Center Line of Inlet / Outlet Pipes

Customer Inputs

Customer Connections — Input Header Size

Size	Check One
2	
3	
4	
6	

Customer Customization

Strainer — Item 2

Style	Check One	
SS WYE		Standard
NONE		

ACV — Item 3

Style	Check One	
LAUSD		
MASTER		Standard
AUTO SHIFT		Standard
NONE		

Backflow Preventer — Item 4

Style	Check One	
909PCQT		
009M2PCQT		Standard
NONE		

Lug Type Butterfly Shutoff Valves — Item 1 & item 9

Style	Check One	
DBF		Standard
NONE		

Typical Dimensional Data

Certified Drawing Supplied with Order

Pipe Size – NPS		Typical Dims – Inch	
Inlet	Outlet	CC Dim	H
2	2		
3	3		
4	4		
6	6		

Station Specifications

Backflow - Irrigation Control Valve Station (BIC)

Description

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To meet the material list, Customer Connection Dimensions, Installed Equipment and Materials of Construction with individual components supplied and supported by Watts Regulator as shown featuring:

- Flanged or Grooved Connections between all components.
- Stable Field adjustable set point for outlet condition within 10psi over a range of flow from 20% - 100% of continuous design flow rate.
- Water Hammer reduction is enhanced by field adjustable closing speeds on pressure or flow control valves … equipped with a small pre-load valve.

BIC Station Operation

A. Turning on the system

1. Pressurize pressure system slowly from meter to inlet butterfly at closed position.
2. Open inlet butterfly 1/4" turn slowly about 2-3 notches.
3. Vent trapped air from top of Remote Control Valve cover and tubing at connection high point.
4. Open solenoid manual override. This will allow master valve and regulator to open and close.
5. Vent backflow at TC4-TC3-TC2 **when applicable**.
6. Open inlet butterfly to full capacity. The system is now ready to flow water.
7. Open outlet butterfly to slowly pressurize system.
8. With system flowing 5-10 GPM adjust pilot on Automatic Control Valve by adjusting screw clockwise to raise pressure. Adjust screw counterclockwise to lower pressure. Be sure Preload Pilot is closed at inlet ball valve.
9. Shut off downstream flow, observe psi as the holding set psi. Regulator is now set for system flowing pressure.

B. Placing the system into static condition

10. Close solenoid manual override. This will close Master Valve and Regulator. It will now not open to downstream pressure loss (placing the system into static condition), until the 24 volt solenoid is activated by controller.

C. Setting preload regulator to maintain LP static condition

11. Bleed off system's static pressure at any downstream outlet of the system or at TC4 on backflow to approximate 25psi close TC4 **when applicable**. System should be holding the 25-30psi tight (there is no supply of water to system because Master Valve is closed).
12. Open water supply ball valve to Preload Pilot, observe pressure, adjust pilot clockwise to raise system pressure above gauge, pressure holding at 25psi.
13. Adjust pilot counter clockwise to lower system pressure below 25psi. Observe gauge. Preload Regulator is set for the entire system static standby pressure. System Preload Regulator is now set.
14. Verify system static standby low pressure/shifting to system dynamic demands.
15. Turn on controller to station #1 and observe pressure setting, adjust as needed.

D. Setting system high pressure relief valve

16. Raise system operating to 20 pounds higher than set pressure.
17. Adjust Automatic Control Valve / Master Valve pilot clockwise to increase pressure reading to highest setting allowable over set pressure.
18. Adjust the Relief Valve until water starts to discharge. The Relief Valve should now be opening at the desired maximum pressure above system set point which should be approximately 20psi. Relief Valve is now set.

E. Setting the pressure control stat

19. With the system at static 20psi +/- above system set point, adjust the pressure control switch until it turns off the Master Valve 24 volt system. Pressure control stat is now adjusted.
20. Fine tune Remote Control Valve to minimize/eliminate water hammer to system.

Note

It is recommended that you fine tune each Remote Control Valve by closing down the throttle stem on each Remote Control Valve while flowing to help eliminate closing pressure spike.

This should have a large affect on water hammer on your system. Adjust throttle stem on Remote Control Valve until the system starts to show a decrease in coverage. This is where the throttle stem should stay for the Remote Control Valve to function correctly.

All rubber parts are standard across the valve line. All hard stainless steel wetted parts are above industry standards and are not found in the typical automatic control valve, master valves, pilot valves, etc.

The backflow is also above industry standards by encompassing the valve in fully polymer coated internals to the highest degree of corrosion resistance.

Always follow your local agency codes and procedures when installing, operating, and maintaining the BIC Station.

For additional information, visit our web site at: www.watts.com

WATTS®

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Water Safety & Flow Control Products

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Canada: 5435 North Service Rd., Burlington, ONT. L7L 5H7; www.wattscanada.ca

ES/IS-BIC-1000 0437