增压泵控阀

主动控制的止回阀

■ 隔离系统，不受水泵启闭影响：

- 恒速泵
- 一组恒速泵
- 一组变频泵

液压动力，隔膜驱动的740型泵控阀根据接收到的电子信号完全开启或关闭。隔离系统不受水泵启闭影响，防止水锤等压力波动。

Features and Benefits

- 管线压力驱动
  - 独立工作
  - 无需马达动力
  - 长期密封紧闭
- 电磁头控制
  - 低成本电线
  - 各种压力等级，电压范围广
  - 常开或常闭
- 止回功能 （使用弹簧）
  - 取代管径大小的止回阀
  - 故障机械关闭
- 在线服务--维修简便
- 双腔式
  - 全力开启（选项"B"）和关闭
  - 静音开启和关闭特点
  - 受保护的隔膜
- 平衡式密封盘--高流量性能
- 设计灵活--增加附加水力功能

Major Additional Features

- 持压- 743
- 减压- 742
- 流量控制- 747-U
- 水泵循环控制- 748
- 深井泵电控- 745
- 全力开启和关闭- 740-B
- 电控- 740-18
- 持压和减压- 743-2Q

See relevant BERMAD publications.

工作顺序（常开型）

740型是一个由电磁控制，带限位开关，三路电磁导阀和止回阀

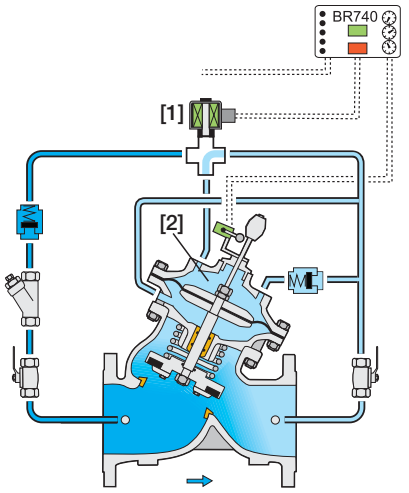
的水力控制阀。还有常闭型可供选择。
对于大口径阀门，增加一个加速器可以加快阀门反应速度。

水泵开启过程

泵控阀电磁头为通电开启，但水泵工作之前，主阀门处于关闭状态。
不通电的电磁阀（1）连接上控制腔[2]和阀前入水口，引入系统静压。

当水泵开始工作时，形成阀前压力上升，超过系统静压，使得阀门开启压力增大。

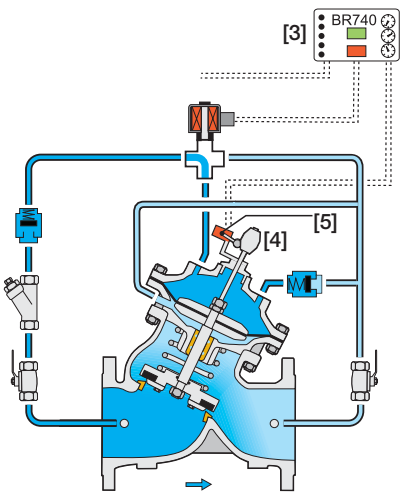
上控制腔压力通过开启的电磁阀释放，允许阀门逐渐开启。



开启

水泵停泵过程

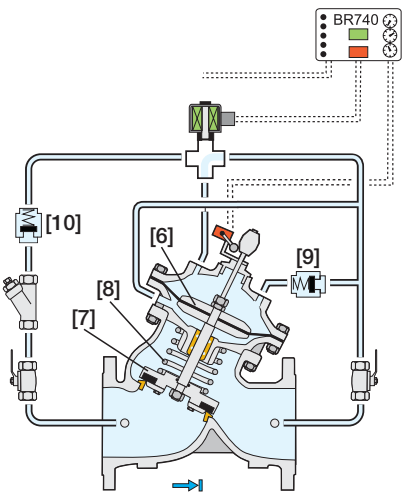
在带传统止回阀的水泵系统中，关闭指令直接下达到水泵，造成突然关闭。
在带"主动止回阀"的系统中，关闭指令下达到BR740-E电控器[3]，电控器给电磁阀电压。然后压力通过电磁阀进入上控制腔，缓慢关闭主阀，隔离运行中的水泵和系统。当阀位指示杆[4]降下时，它激活了阀门的限流开关[5]，传递信号到控制器，关闭水泵。在到达预设延时时间后，控制器给电磁阀断电，限位开关复位，回到初始状态，等待水泵下一次接受信号时正常开启。
阀门受液压压力保持关闭。



关闭

断电--弹簧装置，零流速，不逆止的阀门

当水泵工作突然断电时，阀前压力即刻降低，产生水力作用在隔膜驱动装置[6]和阀瓣[7]上，作用力平衡。但是弹簧[8]打破这种平衡，在水流改变方向之前关闭阀门。
一旦主阀已经关闭，阀后压力通过止回阀[9]进入上控制腔，止回阀[10]将压力锁定在上控制腔，主阀完全关闭复位。

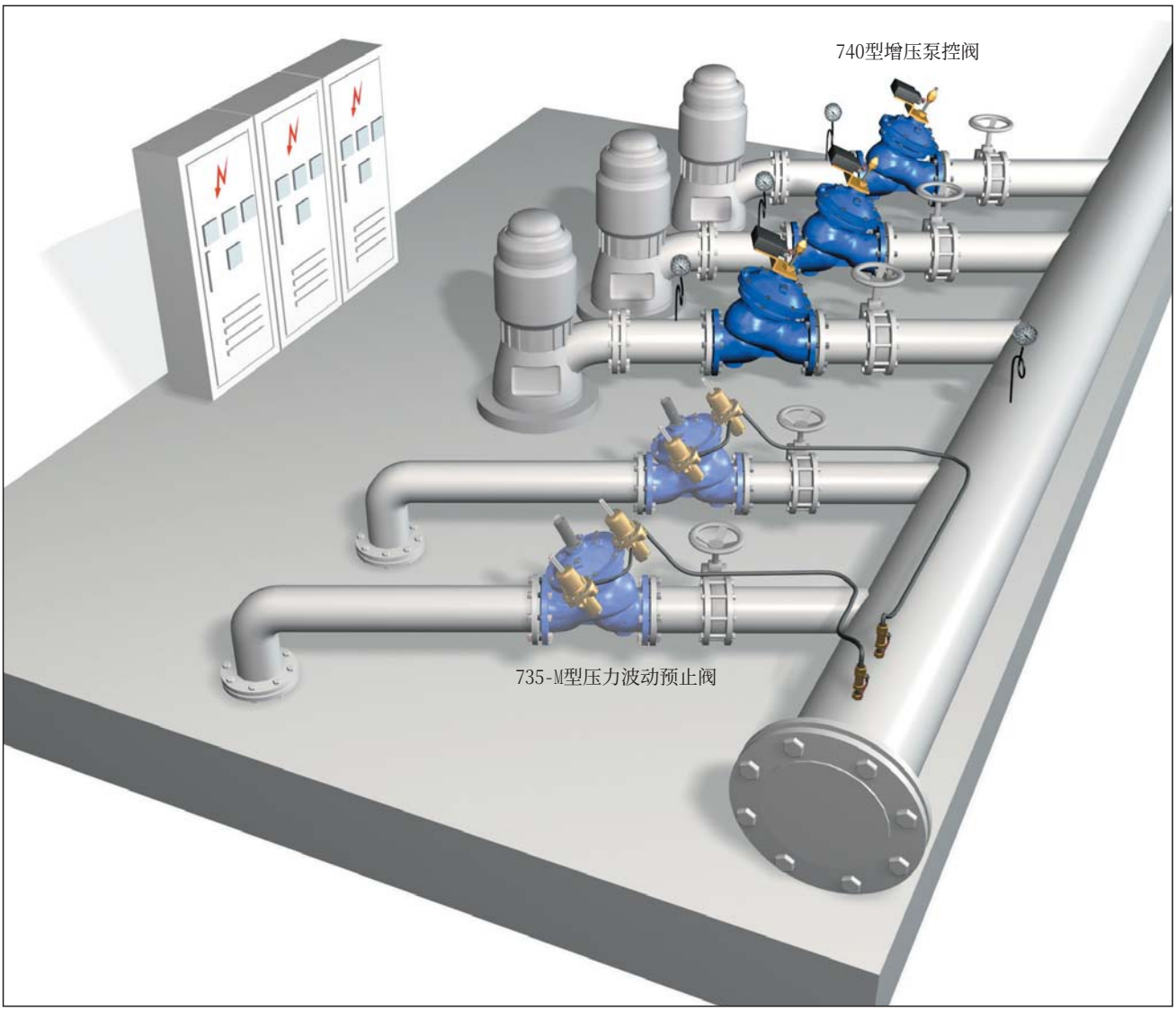


关闭（断电后）

Typical Installation

在此系统中，一组水泵通过支管向主管供水。
740型安装在每台水泵的出口：

- 防止水锤发生，而不是降低水锤影响
- 保证增压泵开启关闭平稳
- 保证工作泵和非工作泵之间互相切换时过程平稳
- 变频泵和恒速增压泵之间切换平稳



BR 740-E 电控器

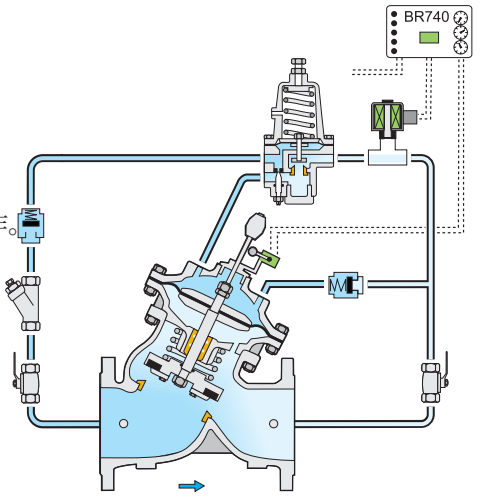
BR 740-E 协调各系统元件，消除水锤。这种控制器自带内置工作模式，可以在现场选择调节。这些模式基于积累的方法经验，防止现场程序可能出现的错误。

Additional Applications

743型带稳压功能的增压泵控阀

在以下工况时管网需求会大于水泵的设计需求：
- 在空管注水时
- 在用户用水需求过量时
- 当水泵设计扬程压力大于系统阻力时

任何上述因素都会导致水泵过载和气蚀危害。
743型在增压泵控阀上加入一个持压功能，确保水泵在系统设计范围内工作。
这样既保护水泵，又保护了系统，同时还保持标准740的工作顺序。

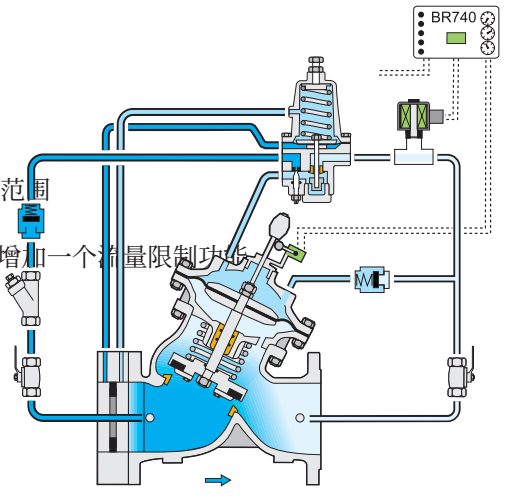


747-U型带流量控制功能的增压泵控制阀

当管网需求大于水泵设计规格，水泵曲线（流量比压力）相对陡峭，
743型在增压泵控和持压阀最适合保护水泵过载和气蚀。

但是，当水泵曲线相对平缓时，通过控制水泵出口压力来控制水泵工作范围

是不够的。这时建议采用流量控制。747-U型在标准740型的工作顺序上增加一个流量限制功能。



742型带减压功能的增压泵控阀

标准水泵受一个持续的压差作用而增加压力。

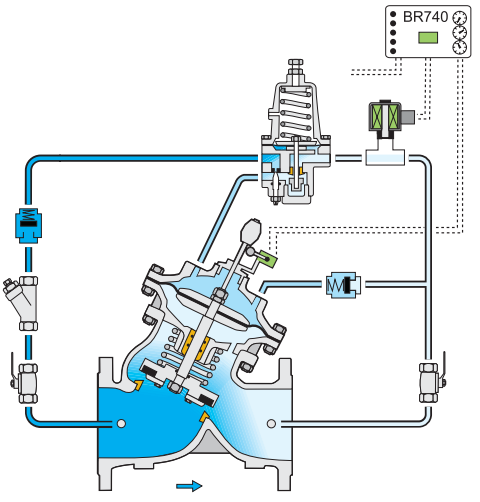
增加的抽水压力可以引起过量泄压，如：
- 不断变化的供给管网压力或多源供压
- 从高位压差的水塔抽水
- 深井抽水

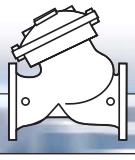
当水泵曲线（流量比压力）相对陡峭时，730型泄压阀（循环）最适合。

但是，当水泵曲线相对平缓时，循环不够，多余的流量不能影响泄压。

最适合的解决方法是减少泄放压力，保护用户。

742型在保持标准740型工作顺序时，增加一个减压功能。





Engineer Specifications

泵控阀根据接收到的电子信号开启或关闭。隔离系统，不受水泵启闭影响，防止水锤等压力波动。

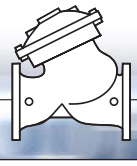
主阀：隔膜驱动，中央导向的主阀，球形阀体采用Y型或角型设计。阀体内有一个可更换可上下移动的不锈钢底座。阀门有一个无阻隔流通口，无导向杆，无轴承，无支撑肋。阀体阀盖材质为球墨铸铁。所有外部锣帽螺栓都双层涂层。
阀门所有零部件都可在线维修更换，无需将阀门从管线拆除。

驱动装置：双腔式驱动装置带有一个下腔隔离体，隔离下控制腔与下游流体。驱动装置可作为一个整体（从密封盘到顶端阀盖）从阀体拆卸。不锈钢阀轴由隔离体上的轴承中心导向。可更换得密封盘包括一个弹性密封橡胶，可选择安装螺栓调节的V型截流塞。

控制系统：控制系统由一个三路电磁导阀（8"和口径更大的阀门，电磁头还要带一个加速器），两个止回阀（12"口径更大的阀门，附加一个止回阀），一个限流开关，两个独立球阀和一个过滤器。所有接头都是铸造黄铜或不锈钢材质。
装配完成的阀门需根据客户要求经过水力测试后方可出厂。

质量保证：阀门制造厂通过ISO 9001质量认证标准认证。
主阀通过NSF,WRAS,和其他认可标准认证，可作为饮用水阀门使用。

BERMAD Waterworks



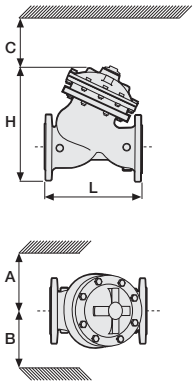
700 Series

Model 740

Technical Data

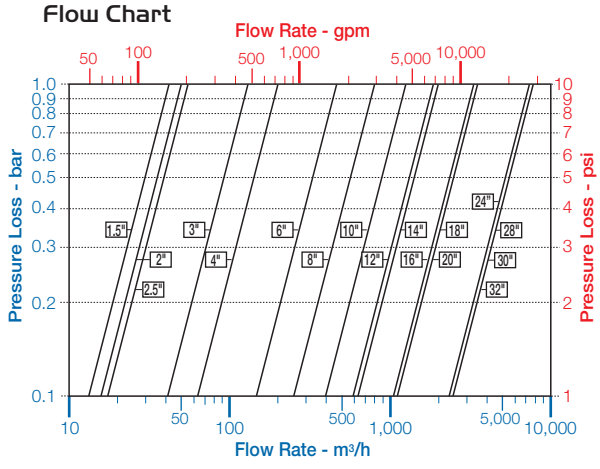
Dimensions and Weights

Size		A, B		C		L		H		Weight	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
40	1½"	350	14	180	7	205	8.1	239	9.4	9.1	20
50	2	350	14	180	7	210	8.3	244	9.6	10.6	23
65	2½"	350	14	180	7	222	8.7	257	10.1	13	29
80	3"	370	15	230	9	250	9.8	305	12.0	22	49
100	4"	395	16	275	11	320	12.6	366	14.4	37	82
150	6"	430	17	385	15	415	16.3	492	19.4	75	165
200	8"	475	19	460	18	500	19.7	584	23.0	125	276
250	10"	520	21	580	23	605	23.8	724	28.5	217	478
300	12"	545	22	685	27	725	28.5	840	33.1	370	816
350	14"	545	22	685	27	733	28.9	866	34.1	381	840
400	16"	645	26	965	38	990	39.0	1108	43.6	846	1865
450	18"	645	26	965	38	1000	39.4	1127	44.4	945	2083
500	20"	645	26	965	38	1100	43.3	1167	45.9	962	2121



Data is for Y-pattern, flanged, PN16 valves
Weight is for PN16 basic valves
"C" enables removing the actuator in one unit
"L", ISO standard lengths available
For more dimensions and weights tables, refer to Engineering Section

Flow Chart



Data is for Y-pattern, flat disk valves
For more flow charts, refer to Engineering Section

主阀

阀体形状: "Y" (球型) & 角型
口径: 11/2-32" (40-800 mm)
连接标准(压力等级):
法兰: ISO PN16, PN25
(ANSI Class 150, 300)
线圈: BSP or NPT
其他: 请询问厂商
工作温度:
水温最高80°C (180°F)
标准材质:
阀体和执行机构: 球墨铸铁
内部部件:
不锈钢, 青铜& 钢涂层
隔膜:
NBR 尼龙加强纤维
密封件: NBR
涂层:
环氧涂层, RAL 5005 (蓝色)
NSF & WRAS 认证静电聚酯粉末喷涂
RAL 6017 (绿色)

控制系统

标准材质:
配件:
青铜, 黄铜, 不锈钢& NBR
配管: 铜或不锈钢
接头: 锻造黄铜或不锈钢
电磁阀标准材质:
阀体: 黄铜, 不锈钢
密封件: NBR或FPM
封套: 环氧浇铸
电磁头电压参数:
电压:
(ac): 24, 110-120, 220-240, (50-60 Hz)
(dc): 12, 24, 110, 220
水泵电耗:
(ac): 30 VA, inrush; 15 VA (8W), holding or 70 VA, inrush; 40 VA (17.1W), holding
(dc): 8-11.6W
数据可能随电磁头型号不同而变化

加速器标准材质:
黄铜或不锈钢
内部部件: 不锈钢和黄铜
密封件: NBR或FPM

电磁头选择

Valve Size	Solenoid Model		Accelerator Model	
	330 (2.0 mm)	311 (1.0 mm)	54	58HC
1½-8"	■			
1½-6"		■		
10-20"	■		■	
8-20"		■	■	
24 -32"	■			■
24 -32"		■		■
PN 16			PN 25	

BR 740-E 控制器
供压电源: 110, 230 V(ac) 50/60 Hz
电耗: <8 VA
电磁头电路熔丝: 2A (Internal)
水泵控制回路熔丝: 1A (Internal)
尺寸 : 96 x 96 x 166 mm (DIN), 0.75 kg
壳体材质: NORYL (DIN 43700)
限流开关
开关类型: SPDT
电子等级: 10A, type gI or gG
工作温度: 高达85oC (185oF)
封套等级: IP66

How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide)

Sector	Size	Primary Feature	Additional Feature	Pattern	Body Material	End Connections	Coating	Voltage & Position	Tubing & Fittings	Additonal Attributes
WW	6"	740	00	Y	C	16	EB	4AO	CB	S

Sector
- WW — Waterworks

Size
- 6" — 1½ - 32"

Primary Feature
- 740 — Booster Pump Control

Additional Feature
- 00 — No Additional Feature
- 03 — Closing and Opening Speed Control
- 18 — Electronic Control

Multiple choices permitted

Pattern
- Y — Oblique (up to 20")
- A — Angle (up to 18")
- G — Globe (24-32" only)

Body Material
- C — Ductile Iron Standard
- S — Cast Steel
- N — St. Steel 316
- U — Nickel Alumin. Bronze

End Connections
- 16 — ISO-16
- 25 — ISO-25
- A5 — ANSI-150
- A3 — ANSI-300
- J6 — JIS-16
- J2 — JIS-20

Coating
- EB — Epoxy FB Blue
- PG — Polyester Green
- PB — Polyester Blue
- UC — Uncoated

Voltage & Position
- 4AC — 24VAC/50Hz - N.C.
- 4AO — 24VAC/50Hz - N.O.
- 4DC — 24VDC - N.C.
- 4DO — 24VDC - N.O.
- 4DP — 24VDC - L.P.
- 2AC — 220VAC/50-60Hz N.C.
- 2AO — 220VAC/50-60Hz N.O.

Tubing & Fittings
- CB — Copper Tubing & Brass Fittings
- PB — Plastic Tubing & Brass Fittings
- NN — St. St. 316 Tubing & Fittings

Additonal Attributes
- B — Double Chamber
- F — Large Control Filter
- S — Electric Limit Switch
- Q — Valve Position Transmitter
- O — Flow Over the Seat
- X — 3-Way Control Loop
- N — St. St. 316 Control Accessories
- T — St. St. 316 Internal Trim (Closure & Seat)
- D — St. St. 316 Actuator Internal Assembly
- R — Delrin Bearing
- E — Viton Elastomers for Seals & Diaphragm
- 6 — Pressure Gauge

Multiple choices permitted

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定压电磁式泵控阀

Active Check Valve

- 隔绝来自系统的泵开始和停止作用
  - 单一的速率泵
  - 单一的速率泵组
  - 易变的速率泵组
- 防止水泵过载和气蚀保护
- 受控管路满水流

743 型定压电磁式泵控阀是一种可保持阀门上游压力的水泵控制阀，以防止水泵过速。由电磁导阀与可编程控制泵的启动和阀门开闭次序，水泵直到泵后压力及流量稳定后，再启动阀门开启，防止开泵时压力波动。

Features and Benefits

- 管网压力驱动
  - 独立驱动
  - 无需发动机
  - 长期紧密封
- 螺线管控制
  - 低能量消耗
  - 低成本配线
  - 压力和电压的范围广
  - 常开或常闭
- 止回特性
  - 更换管线止回阀尺寸
  - 自动防故障装置机械关闭
- 在线维护—简单维护
- 双腔设计
  - 无冲击开关特性
  - 有效保护隔膜
- 密封盘平衡—大流量能力
- 设计灵活—便于附加功能

主要附加型号

- 入口定压式泵控阀—743-06
- 电子控制—743-18
- 持压减压—743-2Q

See relevant BERMAD publications

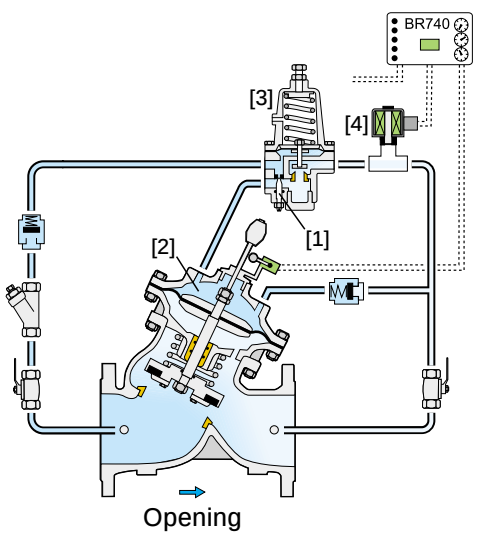
Sequence of Operation (Normally Open Type)

The Model 743 is a pilot-controlled valve equipped with an adjustable, 2-way, pressure-sustaining pilot (optional with sealed spring cell), a 2-way solenoid pilot (optional 3-way), a limit switch and two check valves. Two optional solenoid control circuits are available:

- 2-way solenoid (see explanations & drawings below)
- 3-way solenoid, controlling the pressure-sustaining pilot sealed spring-cell

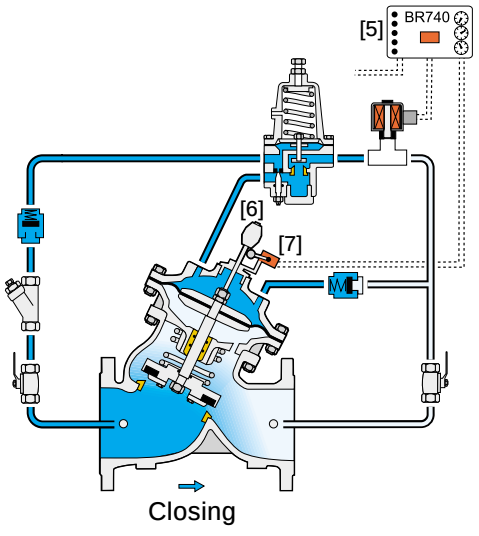
Pump Starting Procedure

The needle valve [1] continuously allows flow from the valve inlet into the upper control-chamber [2]. Prior to pump start, the valve is hydraulically closed although electrically open. As pump starts, valve upstream pressure builds and rises above the system static pressure, causing opening hydraulic forces to rise. The upper control-chamber pressure is released to valve outlet through the pressure-sustaining pilot [3] and the de-energized solenoid [4], allowing the valve to gradually open. If as a result of valve opening, the discharge pressure drops to pilot setting, the pressure sustaining pilot throttles causing the main valve to throttle sustaining upstream pressure at pilot setting.



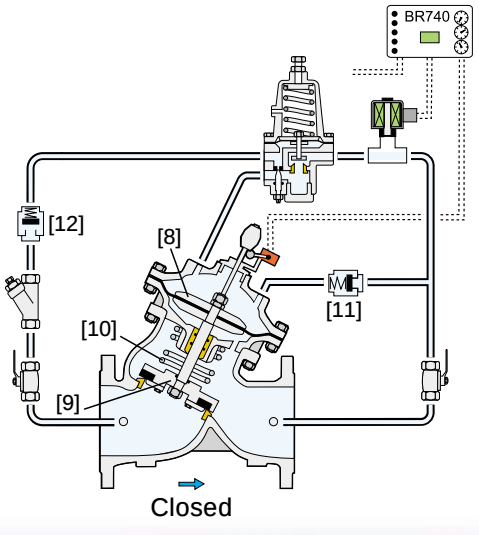
Pump Stopping Procedure

In pumping systems with standard check valves, the shut-down command is issued directly to the pump, abruptly shutting it down.
In systems with "active check valves", the shut-down command is issued to the BR740-E electronic controller [5] which energizes the solenoid. The solenoid then closes, stopping release of pressure from the upper control-chamber, gradually closing the main valve. As the indictor knob [6] moves down, it activates the limit switch [7], signaling the controller to shut down the pump.
After a preset time delay, the controller de-energizes the solenoid and resets the limit switch command, allowing the pump to start when next signaled.
The valve remains hydraulically closed and electrically open .



Power Failure - Spring-Loaded, Zero Velocity Non-Return Valve

If electric power fails during pumping, the upstream pressure immediately drops causing the hydraulic forces acting on the diaphragm assembly [8] and closure [9] to balance. The spring [10] then breaks this balance closing the valve before the flow can change direction. Once the main valve has closed, the check valve [11] allows downstream pressure into the upper control-chamber while the check valve [12] traps it, resetting the main valve for the next pump starting process.



Typical Applications

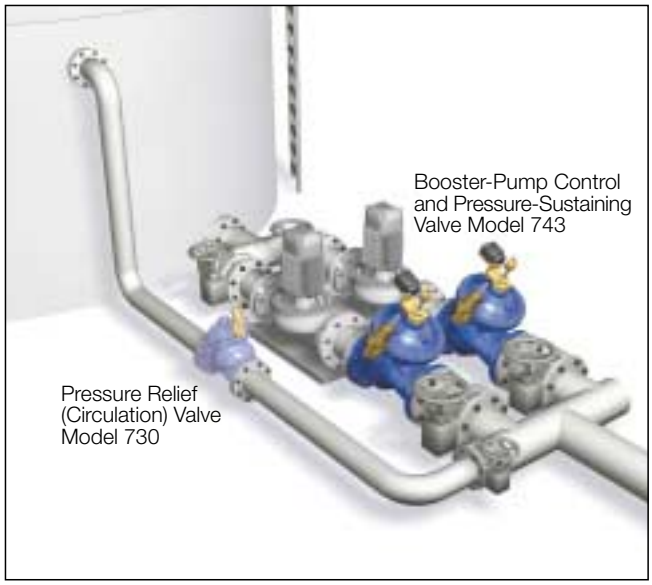
Network Over-Demand

Network demand is greater than pump design specifications:

- During empty pipeline filling
- During over-demand by consumers
- When the pump pressure specification is much higher than system resistance

Any of these factors might cause pump overload and cavitation damage.

The Model 743 by adding a pressure-sustaining feature to the Booster-Pump Control Valve ensures that the pump operates within design specifications protecting both the pump and the system.



BR 740-E Electronic Controller

The BR 740-E coordinates between all system components to eliminate surges from the system. This controller provides built-in operating modes that can be selected on-site. These modes are based on accumulated know-how to prevent errors that might occur during on-site programming.

Tender Specifications

The Pump Control & Pressure-Sustaining Valve shall open or shut-off in response to electric signals. It shall isolate the pump from the system during pump starting and stopping, to prevent pipeline surges. While open, it shall sustain minimum discharge pressure regardless of fluctuating flow.

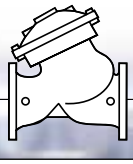
Main Valve: The main valve shall be a center-guided, diaphragm-actuated, globe valve of either oblique (Y) or angle pattern design. The body shall have a replaceable, raised, stainless steel seat ring. The valve shall have an unobstructed flow-path, with no stem guides, bearings, or supporting ribs. The body and cover shall be ductile iron. All external bolts, nuts, and studs shall be Duplex® coated. All valve components shall be accessible and serviceable without removing the valve from the pipeline.

Actuator: The actuator assembly shall be double-chambered with an inherent separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly (seal disk to top cover) shall be removable from the valve as an integral unit. The stainless steel valve-shaft shall be center-guided by a bearing in the separating partition. The replaceable radial seal disk shall include a resilient seal and shall be capable of accepting a V-Port Throttling Plug by bolting.

Control System: The control system shall consist of a solenoid pilot, an adjustable, direct-acting, 2-way pressure-sustaining pilot, two check valves (for 12” valves and larger, an additional check valve), a limit switch, two isolating cock valves, and a filter. All fittings shall be forged brass or stainless steel. The assembled valve shall be hydraulically tested.

Quality Assurance: The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The valve shall be certified as a complete drinking water valve according to NSF, WRAS, and other recognized standards.

BERMAD Waterworks



700 Series

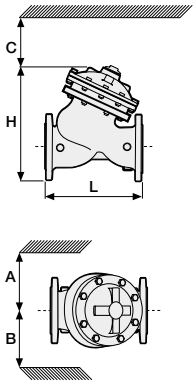
Model 743

Technical Data

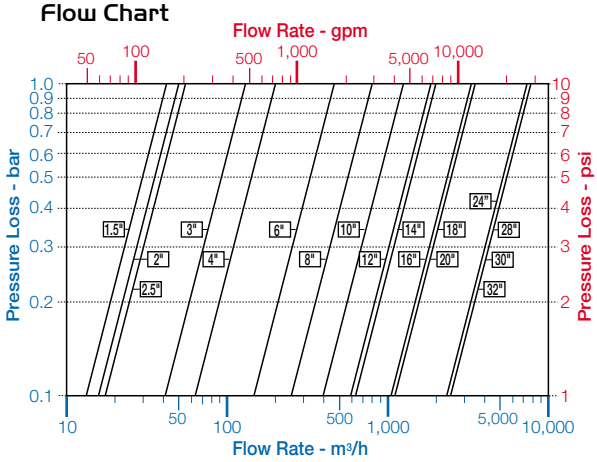
Dimensions and Weights

Size		A, B		C		L		H		Weight	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
40	1½"	350	14	180	7	205	8.1	239	9.4	9.1	20
50	2	350	14	180	7	210	8.3	244	9.6	10.6	23
65	2½"	350	14	180	7	222	8.7	257	10.1	13	29
80	3"	370	15	230	9	250	9.8	305	12.0	22	49
100	4"	395	16	275	11	320	12.6	366	14.4	37	82
150	6"	430	17	385	15	415	16.3	492	19.4	75	165
200	8"	475	19	460	18	500	19.7	584	23.0	125	276
250	10"	520	21	580	23	605	23.8	724	28.5	217	478
300	12"	545	22	685	27	725	28.5	840	33.1	370	816
350	14"	545	22	685	27	733	28.9	866	34.1	381	840
400	16"	645	26	965	38	990	39.0	1108	43.6	846	1865
450	18"	645	26	965	38	1000	39.4	1127	44.4	945	2083
500	20"	645	26	965	38	1100	43.3	1167	45.9	962	2121

Data is for Y-pattern, flanged, PN16 valves
Weight is for PN16 basic valves
"C" enables removing the actuator in one unit
"L", ISO standard lengths available
For more dimensions and weights tables, refer to Engineering section



Flow Chart



Data is for Y-pattern, flat disc valves
For more flow charts, refer to Engineering section

Main Valve

Valve Patterns: "Y" (globe) & angle
Size Range: 1½–32" (40-800 mm)
End Connections (Pressure Ratings):
Flanged: ISO PN16, PN25 (ANSI Class 150, 300)
Threaded: BSP or NPT
Others: Available on request
Working Temperature:
Water up to 80°C (180°F)
Standard Materials:
Body & Actuator: Ductile iron
Internals:
Stainless steel, bronze & coated steel
Diaphragm:
NBR (Buna N) Nylon fabric-reinforced
Seals: NBR (Buna N)
Coating:
Fusion Bonded Epoxy, RAL 5005 (Blue)
NSF & WRAS approved or Electrostatic Polyester Powder, RAL 6017 (Green)

Control System

Standard Materials:
Accessories: Bronze, brass, St.Steel & NBR
Tubing: Copper or stainless steel
Fittings: Forged brass or stainless steel
Pilot Standard Materials:
Body: Brass, bronze or stainless steel
Elastomers: NBR (Buna N)
Internals: Stainless steel
Solenoid Standard Materials:
Body: Brass or stainless steel
Elastomers: NBR (Buna N) or FPM
Solenoid Electrical Data:
Voltages:
(ac): 24, 110-120, 220-240, (50-60 Hz)
(dc): 12, 24, 110, 220
Power Consumption:
(ac): 30 VA, inrush; 15 VA (8W), holding or 70 VA, inrush; 40 VA (17.1W), holding
(dc): 8-11.6W

Values might vary according to specific solenoid model
For pressure-sustaining pilot valve selection table, refer to Model 730.

Solenoid Selection

Valve Pressure Rating	Solenoid Control Circuit			
	2-Way		3-Way	
	281	404	330	311
PN 16	■		■	
PN 25		■		■

BR 740-E Controller
Supply voltage: 110, 230 V(ac) 50/60 Hz
Power consumption: <8 VA
Solenoid circuit fuse: 2A (Internal)
Pump control circuit fuse: 1A (Internal)
Dimensions (DIN): 96 x 96 x 166 mm, 0.75 kg
Housing material: NORYL (DIN 43700)
Limit Switch
Switch type: SPDT
Electrical rating: 10A, type gI or gG
Enclosure rating: IP66

How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide)

Sector	Size	Primary Feature	Additional Feature	Pattern	Body Material	End Connections	Coating	Voltage & Position	Tubing & Fittings	Additonal Attributes
WW	6"	743	00	Y	C	16	EB	4AO	CB	S

Sector: WW — Waterworks

Size: 6" — 1½ - 32"

Primary Feature: 743 — Booster-Pump Control & Pressure-Sustaining

Additional Feature: 00 — Multiple choices permitted

No Additional Feature	00
Closing and Opening Speed-Control	03
Differential Pressure-Sustaining	06
Electronic Control	18
Pressure-reducing feature	2Q

Pattern: Y

Oblique (up to 20")	Y
Angle (up to 18")	A
Globe (24-32" only)	G

Body Material: C

Ductile Iron Standard	C
Cast Steel	S
St. Steel 316	N
Nickel Alumin. Bronze	U

End Connections: 16

ISO-16	16
ISO-25	25
ANSI-150	A5
ANSI-300	A3
JIS-16	J6
JIS-20	J2

Coating: EB

Polyester Green	PG
Polyester Blue	PB
Epoxy FB Blue	EB
Uncoated	UC

Voltage & Position: 4AO

24VAC/50Hz - N.C.	4AC
24VAC/50Hz - N.O.	4AO
24VDC - N.C.	4DC
24VDC - N.O.	4DO
24VDC - L.P.	4DP
220VAC/50-60Hz N.C.	2AC
220VAC/50-60Hz N.O.	2AO

Tubing & Fittings: CB

Copper Tubing & Brass Fittings	CB
Plastic Tubings & Brass Fittings	PB
St. St. 316 Tubing & Fittings	NN

Additonal Attributes: S — Multiple choices permitted

V-Port Throttling Plug	V
Large Control Filter	F
Electric Limit-Switch	S
3-way Control Loop	X
Valve Position Transmitter	Q
St. St. 316 Control Accessories	N
St. St. 316 Internal Trim (Closure & Seat)	T
St. St. 316 Actuator Internal Assembly	D
Delrin Bearing	R
Viton Elastomers for Seals & Diaphragm	E
Pressure Gauge	6

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伯尔梅特

循环式泵控阀　　748-BFSU

748型循环式泵控阀是一种自动控制阀，用于水泵开启和关闭时系统不受波动冲击波影响。它防止泵因为电机高转速低流量运转而引起的过载，阀门同样附带快速泄压功能。这种阀被设计成便于安装在泵水泵的止回阀之间，可直通向大气，当水泵开启及关闭的同时主阀体打开。

旁通式水泵控制阀:

伯尔梅特 748 - BFSU 循环泵控阀（CiV）为伯尔梅特公司专业设计的新概念水泵保护系统。 将阀门安装于 “旁通” 水泵出口，止回阀的入口。开启 748 - BFSU 循环泵控阀可将水泵出口的水引回水源处或吸水管路。

开启和关闭过程如下:

- 初始状态:水泵关闭，748 - BFSU 循环泵控阀开启，止回阀关闭。
- 开启信号: 水泵开启，748 - BFSU 循环泵控阀限制循环水并通过液压驱动开始关闭，同时止回阀开始同步开启（由于止回阀入口压力上升）
- 开启过程结束: 水泵继续工作，748 - BFSU 循环泵控阀关闭，止回阀开启
- 关闭信号: 水泵处于工作状态，748 - BFSU 循环泵控阀收到信号开始打开，止回阀开始同步关闭（由于止回阀入口压力下降）
- 关闭过程结束: 748 - BFSU 循环泵控阀完全开启，向控制器发出信号关闭水泵，止回阀完全关闭，所有的水流入水库，水泵水流通过 CiV 保持平稳，水泵收到关闭信号，停泵。
- 系统回到初始状态。

748 - BFSU 循环泵控阀的特点:

- 双腔液压驱动阀门.
- 低压，电控（电磁阀控制）
- 在停电或误操作情况下起到快速泄压作用
- 带有稳定流量功能，防止水泵过载和气蚀

748 - BFSU 循环泵控阀解决方案的优点:

- 水泵开启关闭时管道中压力不会上升
- 调节水泵时管道压力不会上升或下降
- 无须特殊的止回阀（单瓣式足够）
- 无水头损失（控制阀为旁通式）
- 断电（关闭闸阀）时保护水泵
- 工作时间短=工作寿命长
- 最少的维修需要:
  - 每年 3-4 次清洗控制回路中的过滤器
  - 定期保养： 两年一次
  - 技术人员所需的技能：液压阀技术知识- 安全工作条件
  - 工作压力：16 kg/cm^2

    测试压力： 25kg/cm^2

压力波动预止阀
——水锤消除阀

- 为所有水泵系统中消除水锤：
  增压泵和深井泵，恒速泵和变频泵
- 为所有供水网络消除水锤：
  市政供水，楼宇供水，污水和灌溉系统
  维修困难，偏远位置和陈旧水系统改造

液压动力，隔膜驱动的735-M型压力波动预止阀安装在旁通上，能够感应到水锤发生前，伴随水泵突然停工而产生的压力下降。预开启的阀门消除随之而来的弥合水锤高压，消除水锤危害。

另外，一旦系统超压，735-M型能够起到泄压阀的作用，立即开启主阀泄放系统超压，避免系统处于超压状态。

Features and Benefits

- 取代排气锤装置
  - 泄放水锤，自动防故障开启
  - 维护最小化
  - 节省空间
  - 降低投资和维修成本
  - 对较高压力等级，特别经济有效
- 管线压力驱动
  - 独立工作
  - 无需马达其他动力
  - 长期密封紧闭
  - 可调节力作用
- 双腔式设计
  - 关闭速度平缓(无水锤)
  - 有效保护隔膜
- 在线维护简便-简便维护
- 无阻隔阀口-性能可靠
- 密封盘平衡- 流量大

Major Additional Features

- 电磁头控制 – 735-55-M
- 感应式隔膜（污水） – 735-Md
- 消防用电动复位功能 – FP-730-59
- 快速泄压阀 – 73Q

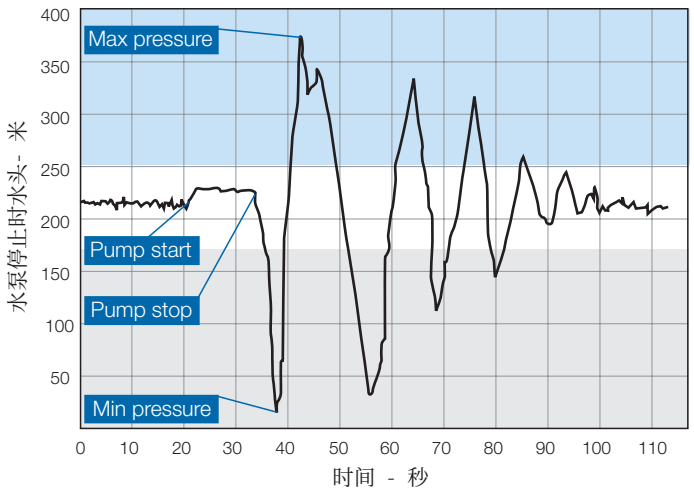
See relevant BERMAD publications.

Operation

水泵突然停止工作会产生巨大压力落差，水柱在内在动能驱使下不断沿着管道前进，管道产生极端低压。

当动能渐渐消失耗尽时，水柱朝水泵方向折返。一旦回流撞击止回阀，将形成高压水锤，贯穿系统流动流速高达4马赫。即便是快速泄压阀的反应速度也不够消除水锤。

无保护的泵站压力

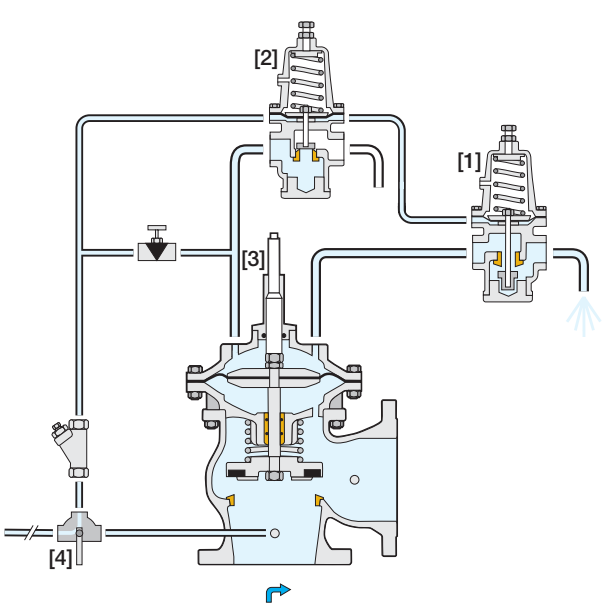


消除水锤要求预知波动和提前采取措施。735-M型十分适合完成这个任务。
低压导阀(LP) [1] 感应到最初压力降低并开启。迅速动作到允许剩余管线压力开速开启主阀。

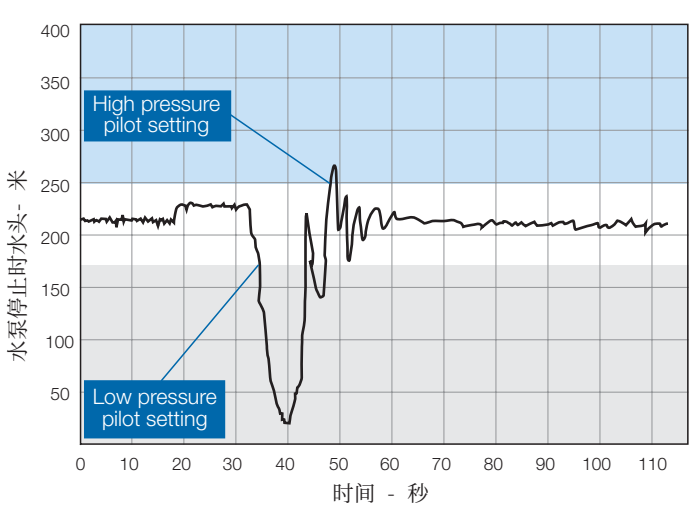
预开启的735-M型泄放水柱回流，限制管线压力升高。如果泄放率不够，压力超过高压导阀(HP) [2]的设定值，高压导阀迅速打开，进一步打开主阀开启度。

当系统逐渐稳定，趋于静压时，导阀双双关闭，主阀也随之关闭。若在主阀关闭过程压力升高，高压导阀则停止阀门关闭过程，防止压力持续升高。
限流器[3] 限制泄放的水流，防止水柱分离，保持关闭压力。
球阀[4]选择压力感应源：

- 直接从主出水管线--推荐(参见"典型应用")
- 从735-M形进水口



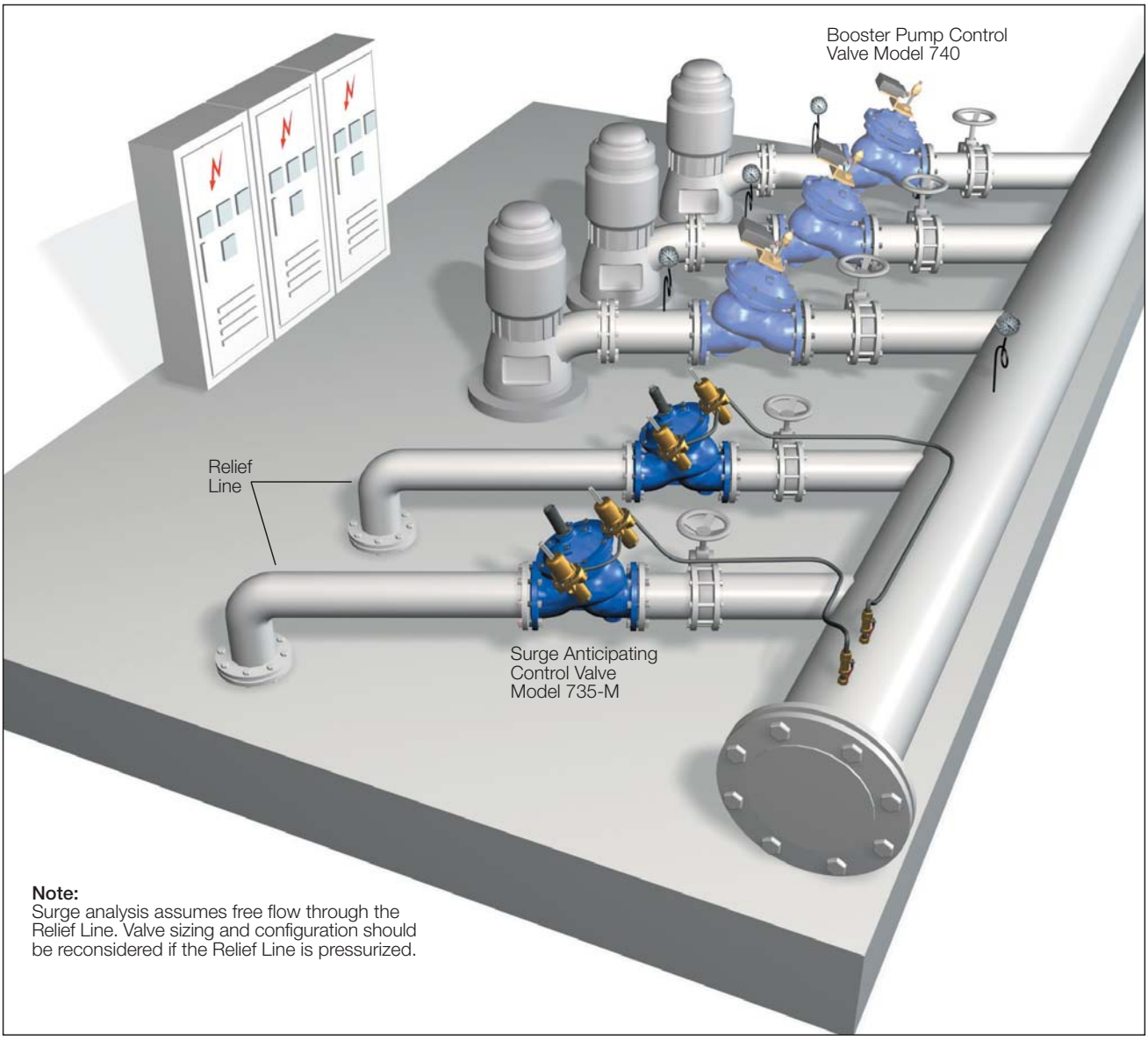
有735-M型保护的泵站压力



Typical Applications

在下图系统中， 水泵电池通过电箱供电给主管线。735-M型：

- 消除断电带来的水锤危害
- 切换“ 值班 ”水泵，无水锤。
- 根据导阀设定值，阀门平稳关闭。



Note:
Surge analysis assumes free flow through the Relief Line. Valve sizing and configuration should be reconsidered if the Relief Line is pressurized.

Bermad Surge Analysis Program – "BERSAP II"

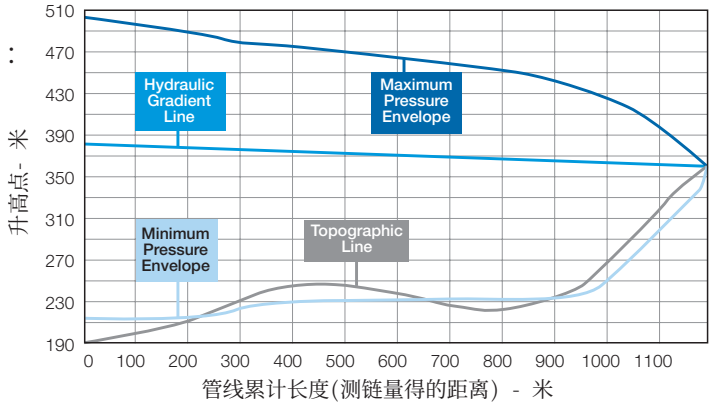
压力波动是很多因素共同作用的结果：设计流量，水泵系统，主管特点，等等。通过使用先进的数学和计算机软件，伯尔梅特经验丰富的工程师们可以分析实际工况。
为了得到最好最准确的分析结果，需要提供下面所有数据：

- 主管道
  - 管道剖面图（以测链量得的距离）
    管道高点处
  - 内径
  - 长度
  - 材质
  - 厚度
- 水泵
  - 水泵曲线(s)
  - 同时工作的水泵数量
  - Type of non-return valve
- 系统
  - 最高设计流量
  - 抽水泵和送水水库的最高和最低水位

对于有多个泵站和/或供水管线有多个用户的系统，还需要以下数据：

- 系统布局包括泵站，用户位置和特点。
- Head Gradient Line (HGL) for each and every node based on "Network-Solver" analysis

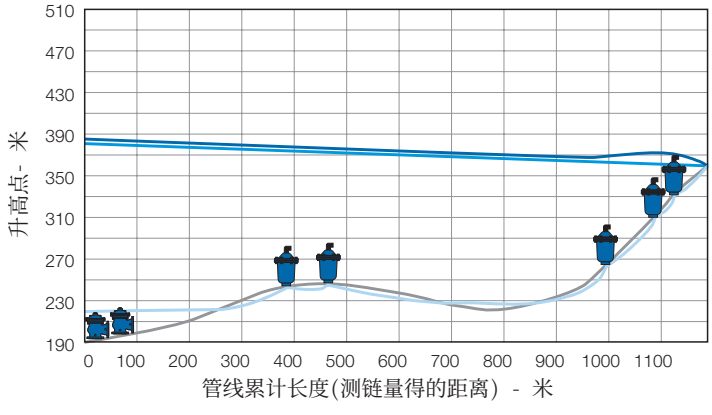
无压力保护的管网水力曲线



水锤分析的结果表明，若无保护措施，系统将面临：

- 压力32公斤
  (最大压力包迹线)
- 真空现象
  (最小压力包迹线)

压力受到全面保护的管网水力曲线



模拟水锤保护建议：

- 两种型号的735-M 阀门在泵站平行安装
- 在管线安装五台静音排气阀。

在水锤全面受到预知保护时，模拟发现无波动无最小真空现象。

- 压力最高达19 公斤
  (最大压力包迹线)
- 无可感知的真空现象
  (最小压力包迹线)

任何管道设计，都需要排气阀在真空环境时进气，在受高压时排气。排气阀安装位置，口径和型号需要考虑到水锤保护的要求。

Additional Application

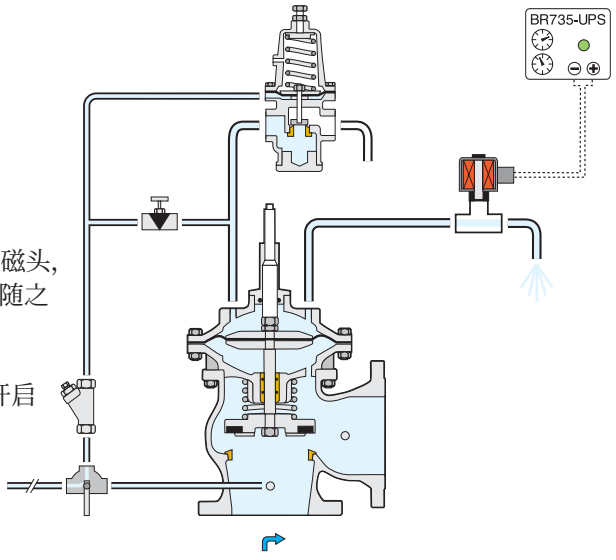
带电磁控制的压力波动预止阀735-55-M 型

带电磁控制的压力波动预止阀735-55-M 在下列情况时提供适当解决方案：

- 静压低于3公斤(45 psi)时
- 放电线短和波动临界时间少于3秒
- 考虑到维护维修，需要使用电控时

断电时，BR 735-UPS 控制器立即给电735-55-M型的常闭直流电磁头，领先于水泵突然停工伴随产生的压力骤降。阀门预开启，消除随之而来的弥合水锤高压，消除水锤危害。

另外，一旦系统超压，735-M型能够起到泄压阀的作用，立即开启主阀泄放系统超压，避免系统处于超压状态。



BR-735-UPS 控制器

735-55-M型带电磁控制的压力波动预止阀除断电时开启，平时保持关闭状态，需要带一个常开(N.O.)电磁头，但常开的电磁头容易发生故障（线圈过热，粘度问题和钙内建等等）。推荐采用一个常闭无电电磁头和一个不间断电源的组合Un-Interruptible Power Source (UPS)。

BR-735-UPS 控制器包括两节可再充电式锂电池和一个时间设定器，决定阀门开启的时间段。控制器作为水泵控制面版的一部分，在预设时间立即给常闭电磁头电信号，开启主阀；预设时间完成后，控制器给电磁头断电，使得735-55-M型开启关闭。

Engineer Specifications

压力波动预止阀应该根据感应到的水泵突然停工而产生的压力骤降，消除回流的高压和水锤。
阀门的泄压功能使平稳紧闭，防止关闭水锤。阀门还应该泄放系统超压。

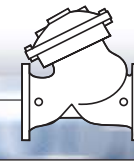
主阀：隔膜驱动，中央导向的主阀，球形阀体采用Y型或角型设计。阀体内有一个可更换可上下移动的不锈钢底座。阀门有一个无阻隔流通口，无导向杆，无轴承，无支撑肋。阀体阀盖材质为球墨铸铁。所有外部锣帽螺栓都双层涂层。阀门所有零部件都可在线维修更换，无需将阀门从管线拆除。

驱动装置：双腔式驱动装置带有一个下腔隔离体，隔离下控制腔与下游流体。驱动装置可作为一个整体（从密封盘到顶端阀盖）从阀体拆卸。不锈钢阀轴由隔离体上的轴承中心导向。可更换得密封盘包括一个弹性密封橡胶，可选择安装螺栓调节的V型截流塞。

控制系统：控制系统由一个两路直调式持压导阀，一个针阀，独立的球阀和一个过滤器。所有接头都是铸造黄铜或不锈钢材质。装配完成的阀门需根据客户要求经过水力测试和工厂调试后方可出厂。

质量保障：阀门制造厂通过ISO 9001质量认证标准认证。
主阀通过NSF,WRAS,和其他认可标准认证，可作为饮用水阀门使用。

BERMAD Waterworks



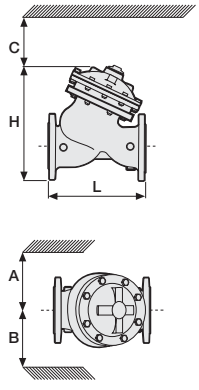
700 Series

Model 735-M

Technical Data

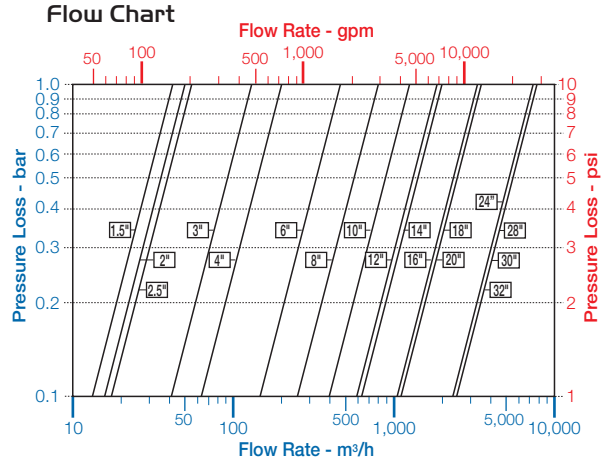
Dimensions and Weights

Size		A, B		C		L		H		Weight	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
40	1½"	350	14	180	7	205	8.1	239	9.4	9.1	20
50	2	350	14	180	7	210	8.3	244	9.6	10.6	23
65	2½"	350	14	180	7	222	8.7	257	10.1	13	29
80	3"	370	15	230	9	250	9.8	305	12.0	22	49
100	4"	395	16	275	11	320	12.6	366	14.4	37	82
150	6"	430	17	385	15	415	16.3	492	19.4	75	165
200	8"	475	19	460	18	500	19.7	584	23.0	125	276
250	10"	520	21	580	23	605	23.8	724	28.5	217	478
300	12"	545	22	685	27	725	28.5	840	33.1	370	816
350	14"	545	22	685	27	733	28.9	866	34.1	381	840
400	16"	645	26	965	38	990	39.0	1108	43.6	846	1865
450	18"	645	26	965	38	1000	39.4	1127	44.4	945	2083
500	20"	645	26	965	38	1100	43.3	1167	45.9	962	2121



Data is for Y-pattern, flanged, PN16 valves
Weight is for PN16 basic valves
"C" enables removing the actuator in one unit
"L", ISO standard lengths available
For more dimensions and weights tables, refer to Engineering Section

Flow Chart



Data is for Y-pattern, flat disk valves
For more flow charts, refer to Engineering Section

主阀

阀体形状："Y" (球型) & 角型
口径：11/2-32" (40-800 mm)
连接标准(压力等级)：
法兰：ISO PN16，PN25
(ANSI Class 150，300)
线圈：BSP or NPT
其他：请询问厂商
工作温度：
水温最高80 °C (180 °F)
标准材质：
阀体和执行机构：球墨铸铁
内部部件：
不锈钢，青铜& 钢涂层
隔膜：
NBR 尼龙加强纤维
密封件：NBR
涂层：
环氧涂层，RAL 5005 (蓝色)
NSF & WRAS 认证静电聚酯粉末喷涂
RAL 6017 (绿色)

控制系统

标准材质：
配件：
青铜，黄铜，不锈钢& NBR
配管：铜或不锈钢
接头：锻造黄铜或不锈钢
导阀标准材质：
阀体：青铜，黄铜，不锈钢
密封件：NBR
弹簧：钢镀锌或不锈钢
内部部件：不锈钢

Pilot Valve Selection

Valve Size	Pilot Setting (bar)	Pilot Type #2 #3	Pilot Type #2HC #3HC	Pilot Type #2+Ac #3+Ac
1½ - 4"	<15	■		
40 -100 mm	>15	●		
6 -14"	<15		■	
150 - 350 mm	>15		●	
16 - 32"	<15			■
400-800 mm	>15			●

■ Standard model ● with high pressure setting kit
Ac-Accelerated Opening valve

How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide)

Sector	Size	Primary Feature	Additional Feature	Pattern	Body Material	End Connections	Coating	Voltage & Position	Tubing & Fittings	Additonal Attributes
WW	6"	735	00	Y	C	16	EB	–	CB	FM

Sector
- WW — Waterworks

Size
- 6" — 1½ - 32"

Primary Feature
- 735 — Surge Anticipating Control

Additional Feature
- 00 — No Additional Feature
- 55 — Solenoid Controlled

Multiple choices permitted

Pattern
- Y — Oblique (up to 20") Angle
- A — (up to 18") Angle
- G — (24-32" only) Globe

Body Material
- C — Ductile Iron Standard
- S — Cast Steel
- N — St. Steel 316
- U — Nickel Alumin. Bronze

End Connections
- 16 — ISO-16
- 25 — ISO-25
- A5 — ANSI-150
- A3 — ANSI-300
- J6 — JIS-16
- J2 — JIS-20

Coating
- EB — Epoxy FB Blue
- PG — Polyester Green
- PB — Polyester Blue
- UC — Uncoated

Voltage & Position
- 4AC — 24VAC/50Hz - N.C.
- 4AO — 24VAC/50Hz - N.O.
- 4DC — 24VDC - N.C.
- 4DO — 24VDC - N.O.
- 4DP — 24VDC - L.P.
- 2AC — 220VAC/50-60Hz N.C.
- 2AO — 220VAC/50-60Hz N.O.

Use when additional electric control feature is selected

Tubing & Fittings
- CB — Copper Tubing & Brass Fittings
- PB — Plastic Tubing & Brass Fittings
- NN — St. St. 316 Tubing & Fittings

Additonal Attributes
- M — Flow Stem
- F — Large Control Filter
- d — Sensing Diaphragm
- V — V-Port Throttling Plug
- U — Orifice Assembly
- N — St. St. 316 Control Accessories
- T — St. St. 316 Internal Trim (Closure & Seat)
- D — St. St. 316 Actuator Internal Assembly
- R — Delrin Bearing
- E — Viton Elastomers for Seals & Diaphragm
- 6 — Pressure Gauge

Multiple choices permitted

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Typical Applications

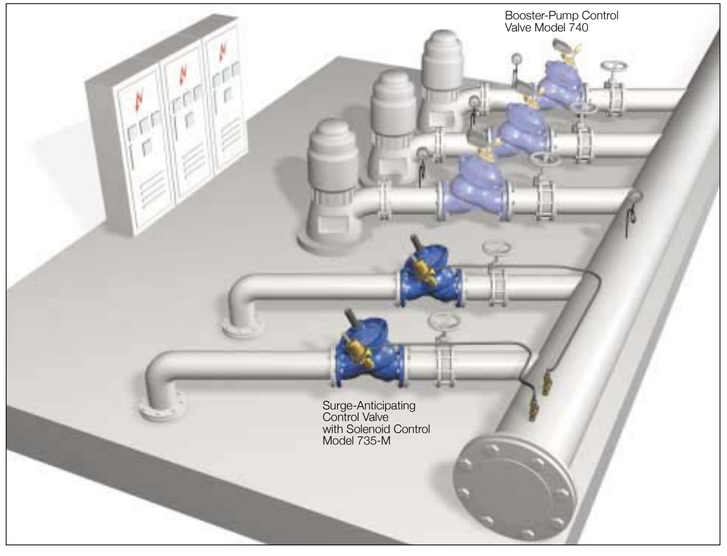
In this system, a pump battery supplies the main line through a manifold. The Model 735-55-M enables:

- Eliminating surge on power failure
- Surge-free switching between "on-duty" pumps
- Smooth closing according to pilot setting

The solenoid control is especially advantageous when:

- Static pressure is lower than 3 bar (45 psi)
- Discharge line is short & wave critical time is less than 3 seconds

Electric control is preferred due to maintenance considerations



BR 735-UPS Controller

As the Model 735-55-M Surge Anticipating Valve with Solenoid Control remains closed except in the event of power failure, it requires a normally open (N.O.) always energized solenoid, which is vulnerable to problems (coil heating, sticking problems, calcium build-up, etc.). The recommended alternative is using a combination of a normally closed (N.C.) de-energized solenoid, and an Un-interruptible Power Source (UPS).
The BR-735-UPS Controller, includes two re-chargeable lithium batteries and a settable timer for determining the period that the valve remains open. The Controller, as a part of the pump control panel, immediately energizes the N.C. solenoid to open the valve for a preset time after which it de-energizes the solenoid, allowing the Model 735-55-M to start closing.

BERMAD Waterworks
700 Series
Model 735-55-M

Technical Data

Dimensions and Weights

Size	A, B		C		L		H		Weight	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
40	1½"	350	14	180	7	205	8.1	239	9.4	9.1	20
50	2"	350	14	180	7	210	8.3	244	9.6	10.6	23
65	2½"	350	14	180	7	222	8.7	257	10.1	13	29
80	3"	370	15	230	9	250	9.8	305	12.0	22	49
100	4"	395	16	275	11	320	12.6	366	14.4	37	82
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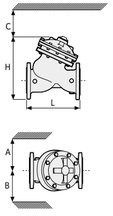
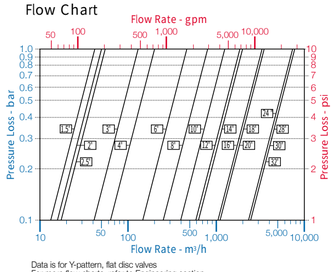
350	14"	545	22	685	27	733	28.9	866	34.1	381	840
400	16"	645	26	965	38	990	39.0	1108	43.6	846	1865
450	18"	645	26	965	38	1000	39.4	1127	44.4	945	2083
500	20"	645	26	965	38	1100	43.3	1167	45.9	962	2121



Data is for Y-pattern, flanged, PN16 valves
Weight is for PN16 basic valves
"C" enables removing the actuator in one unit
"L": ISO standard lengths available
For more dimensions and weights tables, refer to Engineering section

Flow Chart



Data is for Y-pattern, flat disc valves
For more flow charts, refer to Engineering section

Main Valve

Valve Patterns: "Y" (globe) & angle
Size Range: 1½"–32" (40-800 mm)
End Connections (Pressure Ratings):
Flanged: ISO PN16, PN25 (ANSI Class 150, 300)
Threaded: BSP or NPT
Others: Available on request
Working Temperature: Water up to 80°C (180°F)
Standard Materials:
Body & Actuator: Ductile iron
Internals: Stainless steel, bronze & coated steel
Diaphragm: NBR (Buna N) Nylon fabric-reinforced
Seals: NBR (Buna N)
Coating: Fusion Bonded Epoxy, RAL 5005 (Blue) NSF & WRAS approved or Electrostatic Polyester Powder, RAL 6017 (Green)

Control System

Standard Materials:
Accessories: Bronze, brass, stainless steel & NBR (Buna N)
Tubing: Copper or stainless steel
Fittings: Forged brass or stainless steel
Pilot Standard Materials:
Body: Brass, bronze or stainless steel
Elastomers: NBR (Buna N)
Springs: Galvanized steel or stainless steel
Internals: Stainless steel
Solenoid Standard Materials:
Body: Brass or stainless steel
Elastomers: NBR (Buna N) or FPM
Enclosure: Molded epoxy
Solenoid Electrical Data:
Voltages: (dc): 24
Power Consumption: (dc): 8-11.6W

Values might vary according to specific solenoid model

Pilot Valve Selection

Valve Size	Pilot Setting (bar)	Pilot Type #3	Pilot Type #3HC	Pilot Type #3+Ac
1½" - 4"	<15	■		
40 -100 mm	>15	●		
6 -14"	<15		■	
150 - 350 mm	>15		●	
16 - 32"	<15			■
400-800 mm	>15			●

■ Standard model ● with high pressure setting kit
Ac-Accelerated Openig valve

BR 735-UPS Controller
Supply voltage: 110, 230 V(ac) 50/60 Hz
Self power consumption: 6VA
Batteries: Two 12V, 4AH, rechargeable type
Protection class: IP54
Operating temperature: 0-50°C (50-125°F)
Dimensions (mm): H-211, W-240 & D-116
System is capable of energizing up to two 24V(dc) 12W solenoids

How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide)

Sector	Size	Primary Feature	Additional Feature	Pattern	Body Material	End Connections	Coating	Voltage & Position	Tubing & Fittings	Additonal Attributes
WW	6 "	735	55	Y	C	16	EB	4DC	CB	FM
Waterworks	1½ - 32"	Surge-Anticipaiting Control								

Pattern
- Oblique (up to 20") Y
- Angle (up to 18") A
- Globe (24-32" only) G

Body Material
- Ductile Iron Standard C
- Cast Steel S
- St. Steel 316 N
- Nickel Alumin. Bronze U

End Connections
- ISO-16 16
- ISO-25 25
- ANSI-150 A5
- ANSI-300 A3
- JIS-16 J6
- JIS-20 J2

Coating
- Polyester Green PG
- Polyester Blue PB
- Epoxy FB Blue EB
- Uncoated UC

Additional Feature
- No Additional Feature 00
- Eydraulic Override 09
- Multi-Setting Levels - Electrically Selected 45
- Solenoid-Controlled 55
- Electric Override 59

Multiple choices permitted

Voltage & Position
- 24VDC - N.C. 4DC

Tubing & Fittings
- Copper Tubing & Brass Fittings CB
- Plastic Tubings & Brass Fittings PB
- St. St. 316 Tubing & Fittings NN

Additonal Attributes
- Flow Stem M
- Large Control Filter F
- Sensing Diaphragm d
- V-Port Throttling Plug V
- Orifice Assembly U
- St. St. 316 Control Accessories N
- St. St. 316 Internal Trim (Closure & Seat) T
- St. St. 316 Actuator Internal Assembly D
- Delrin Bearing R
- Viton Elastomers for Seals & Diaphragm E
- Pressure Gauge 6

Multiple choices permitted

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BERMAD Waterworks
700 Series
Model 735-55-M

电磁式压力波动预止阀
with Solenoid Control

- 为所有水泵系统中消除水锤
  - 增压和深井泵，恒速泵和变频泵
- 为所有供水网络消除水锤
  - 市政供水，楼宇供水，污水和灌溉系统
  - 维修困难，偏远位置和陈旧水系统改造

735–55–M 电磁式压力波动预止阀是一种离线型，水力操作带薄膜执行机构的阀门。当任何作用都失败时阀门立即打开这就优先于压力降低和泵突然堵塞的情况之前打开的阀门驱散返回来的高压力波，消除振动。在预防关闭振动时，735–55–M阀门感知在线压力，可以平稳地关闭。阀门也可以解除过多的系统压力。

Features and Benefits

- 取代排气锤装置
  - 泄放水锤，自动防故障开启
  - 维护最小化
  - 节省空间
  - 降低投资和维修成本
  - 对较高压力等级，特别经济有效
- 螺线管控制
  - 低成本配线
  - 压力范围广
- 管线压力驱动
  - 无需马达其他动力
  - 可调节力作力
- 双腔设计
  - 关闭速度平缓 (无水锤)
  - 有效保护隔膜
- 在线维护简便—简单维护
- 无阻隔阀口—性能可靠
- 密封盘平衡—流量大

主要附加型号

- 感应膜片(污水使用)— 735–55–Md
- 水力超越型— 735–55–09–M
- 消防泵电子超越型—FP–730–59
- 电控多液位选择阀—735–45–M
- 快速泄压阀—73Q

See relevant BERMAD publications