Engineering Specification

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

LEAD FREE*

Series LFF113FP

Flood Protection Shutdown Control Valve with SentryPlus Alert® Technology

Series LFF113FP Flood Protection Shutdown Control Valve protects against property damage caused by continuous discharge from a Reduced Pressure Zone backflow prevention assembly. With SentryPlus Alert continuous monitoring technology in place, the flood sensor and sensor activation module attached to the assembly relief valve provides additional protection by signaling the relay box when discharge is continuous. (The activation module includes a time delay to prevent signaling based on intermittent or nuisance relief valve discharge.) The relay box then energizes the Solenoid device to close the valve, curtailing water supply during a potential flood event. The alert system is also designed for use with building management systems; cellular network connectivity is available as well to suit the preference for wireless communication by text, email, or phone call. Cellular communication channels through the Syncta® platform. (The Cellular Gateway is a separate purchase.)

NOTICE

SentryPlus Alert technology is required to activate the flood sensor on the relief valve of the backflow preventer. Without the alert system, the sensor is a passive component that has no communication with any other device. (For more information, download IS-LFF113FP.)

Features

- Designed for installation upstream of RPZ backflow preventer
- Normally open shutdown control valve closes when continuous discharge from the RPZ relief valve is detected or when the Solenoid bypass is engaged
- Reverse flow design ensures failsafe operation by closing the valve in the event of diaphragm failure
- Position indicator provides local visual signal of valve closure
- Specially coated valve stem for added protection against corrosion
- When integrated, SentryPlus Alert technology mounted on the RPZ relief valve triggers closure of the control valve once continuous discharge indicates abnormality
- Alert system designed for use with Building Management System (BMS); compatible with cellular networks for alert notification by text, phone call, and/or email

Materials

Body & Cover	Ductile Iron ASTM A536
Coating	NSF Listed fusion bonded, epoxy lined
Trim	316 Stainless steel
Elastomers	Buna-N (Standard)
	EPDM (Optional)
	Viton® (Optional)
Stem, Nut & Spring	Stainless steel
Anti-Scale	Xylan® coated stem (Standard)
Tubing & Fittings	Copper/brass (Standard)
	Stainless steel (Optional)
Solenoid	Stainless steel, NEMA 4 General Purpose 110-VAC

OPERATING PRESSURE
Threaded = 400 psig
150 Flanged = 250 psig
300 Flanged = 400 psig
Grooved End = 400 psig

OPERATING TEMPERATURE
Buna-N: 160°F Maximum
EPDM: 300°F Maximum
Viton: 250°F Maximum

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

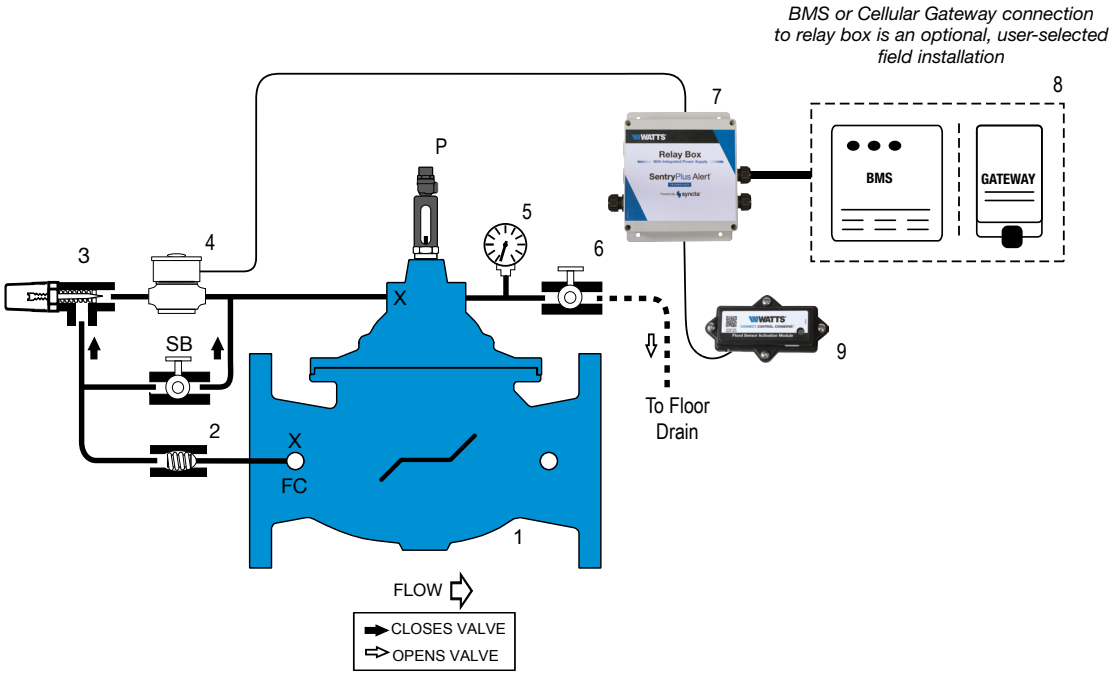
Use of the smart flood protection shutdown control valve with SentryPlus Alert technology does not replace the need to comply with all required instructions, codes, and regulations related to the installation, operation, and maintenance of an RPZ backflow preventer, including the need to provide proper drainage in the event of a discharge.

Watts is not responsible for the failure of alerts due to connectivity issues, power outages, or improper installation.

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.
Viton is a registered trademark of The Chemours Company, FC. LLC.
Xylan is a registered trademark of PPG Industries Ohio, Inc.

WATTS®

Schematic



Standard Components

1	Main Valve (Single Chamber)
2	Check Valve
3	Adjustable Closing Speed
4	2-Way Solenoid
5	Pressure Gauge
6	Manual Reset Ball Valve
7	Relay Box
8	BMS or Cellular Gateway (not included)
9	Sensor Activation Module
P	Position Indicator
SB	Solenoid Bypass
X	Isolation Cocks
FC	Flow Clean Strainer

Options and Accessories

- LS (Single NEMA 4 Limit Switch)
- LS2 (Dual NEMA 4 Limit Switch)

Operation

Series LFF113FP Flood Protection Shutdown Control Valve helps protect against property damage that can occur from continuous relief valve discharge. Typical conditions that can cause continuous discharge include the following:

- Fouled first check seat due to dirt, debris, or rocks
- Failed first check spring
- Clogged or blocked relief valve sensing line
- Failed relief valve diaphragm

The shutdown control valve is a normally open valve designed to be installed upstream of a Reduced Pressure Zone (RPZ) backflow prevention assembly. The control valve is equipped with a Solenoid bypass valve (normally closed) that manually closes the main valve when engaged.

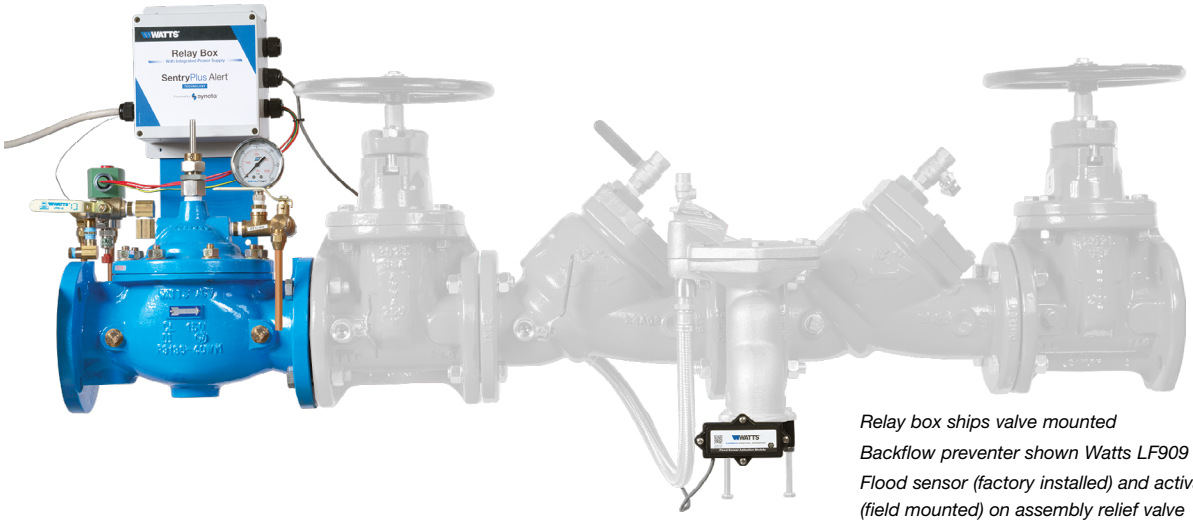
Two conditions must be met for the main valve to close: A continuous discharge through the relief valve (for a period of time greater than the set time delay), and a source of power to the system so that the Solenoid bypass valve can be engaged.

When there is a continuous discharge through the flood sensor mounted to the relief valve, the attached sensor activation module is triggered to energize the relay box and engage the Solenoid bypass valve. (The activation module has an adjustable time delay to avoid closure of the main valve from intermittent or nuisance relief valve discharge.)

If flow stops, the main valve remains closed even if the electrical service is interrupted. The valve is a latching system that must be reset manually.

The shutdown control valve includes valve-mounted relay box, prewired Solenoid bypass valve, manual reset with pressure gauge, position indicator, flood sensor activation module, and ground wire. The position indicator provides a visual sign that the main valve is closed. The screwdriver-operated test cock atop the indicator furnishes a controlled method of air removal from the cover chamber during valve start-up or troubleshooting.

Typical Installation



Relay box ships valve mounted
Backflow preventer shown Watts LF909 Large
Flood sensor (factory installed) and activation module (field mounted) on assembly relief valve

Specification

The Flood Protection Shutdown Control Valve shall be a normally open diaphragm valve installed upstream of the Reduced Pressure Zone backflow preventer assembly, and shall automatically close if the RPZ relief valve begins to discharge continuously. When the flood sensor on the assembly relief valve is activated, it can detect continuous discharge and trigger the activation module to energize the Solenoid bypass valve to close the main valve. (A time delay function in the activation module shall prevent the main valve from closing when intermittent discharges occur.) Once closed, the flood protection shutdown valve shall be reset manually.

The relay box with integrated power supply shall be valve mounted with the relay prewired to the Solenoid valve. The valve shall be equipped with a position indicator to provide a visual sign of valve closure. The position indicator shall be a stainless steel indicating rod that follows main valve stem movement as seen through a cylindrical borosilicate glass sight tube.

The relay box may also be connected to a Building Management System (BMS)/PLC controller. Alerts on potential flooding shall be handled by the BMS application. The alert technology shall also be compatible with cellular networks to suit user preference for wireless communication by text, email, or phone call. Cellular communication shall channel through the Syncta platform. (Separate purchase of the Cellular Gateway is required for field installation.)

The flood protection shutdown control valve, relay box, and SentryPlus Alert technology shall be provided by the same manufacturer and be covered by a single warranty policy.

The main valve shall be a hydraulically operated, single diaphragm actuated, globe or angle pattern valve. Y-pattern valves shall not be permitted. The valve shall contain a disc and diaphragm assembly that forms a sealed chamber below the valve cover, separating operating pressure from line pressure. The diaphragm shall be constructed of nylon reinforced Buna-N, shall not seal directly against the valve seat, and shall be fully supported by the valve body and cover. Rolling diaphragm construction will not be allowed and there shall be no pistons operating the main valve or any pilot controls.

The main valve body and cover shall be Ductile Iron ASTM A536, and all internal cast components shall be Ductile Iron or CF8M (316) Stainless Steel. All ductile iron components, including the body and cover, shall be lined and coated with an NSF 61 Certified epoxy coating applied by the electrostatic heat fusion process. All main valve throttling components (valve seat and disc guide) shall be stainless steel. The valve body and cover must be machined with a 360-degree locating lip to assure proper alignment.

The disc and diaphragm assembly shall contain a Buna-N synthetic rubber disc with a rectangular cross-section that is securely retained on 3½ sides by a disc retainer and disc guide. Diaphragm assemblies using bolts or cap screws for component retention will not be permitted. Direction of flow through the valve shall be the under-the-disc design.

The exposed portion of the seat disc shall contact the valve seat and seal drip-tight. The disc and diaphragm assembly must be guided by two separate bearings (one installed in the valve cover and the other concentrically located within the valve seat) to avoid deflection and assure positive disc-to-seat contact. Center-guided valves will not be permitted. The main valve spring shall be the manufacturer's heavy or extra heavy spring design. All necessary repairs shall be made from the top of the valve while the body remains in line.

The Pilot Control System shall contain a Flo-Clean Strainer, NEMA 4, 120 VAC 60HZ 2-Way Solenoid with Manual Operator, Manual Reset Ball Valve, Pressure Gauge, Visual Position Indicator, Relay Box, and Isolation Ball Valves on all body connections. The relay box shall be valve mounted. The flood sensor shall be included with select backflow preventers or retrofitted in the field on existing installations.

The valve shall be Watts 113FP (globe) or 1113FP (angle) Flood Protection Shutdown Control Valve.

Flow Data for ACV F100 (Globe)/F1100 (Angle)

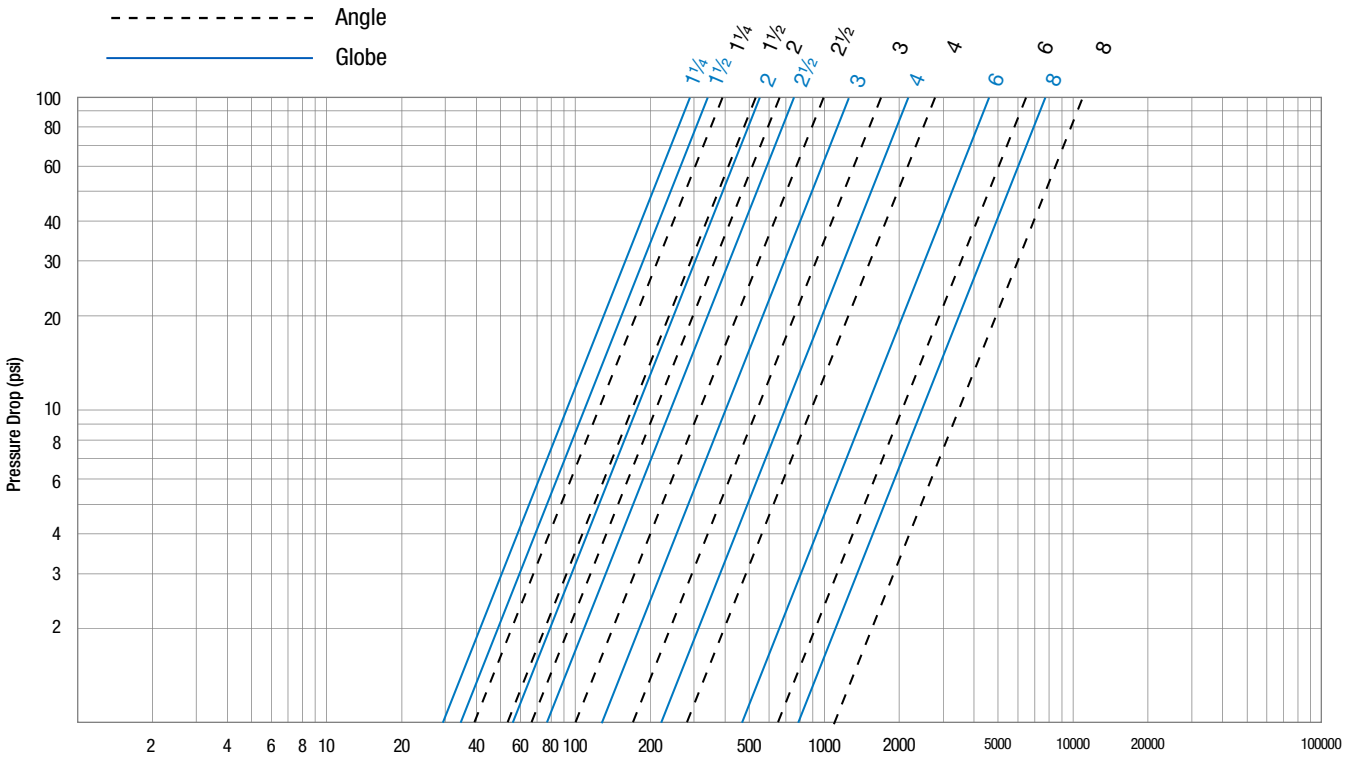
	VALVE SIZE - INCHES	1¼	1½	2	2½	3	4	6	8
SUGGESTED	Maximum Continuous Flow Rate GPM (Water)	93	125	208	300	460	800	1800	3100
	Maximum Intermittent Flow Rate GPM (Water)	115	158	260	370	570	1000	2300	3900
	Minimum Flow Rate GPM (Water)	3	5	6	9	15	16	17	25
C_V	Factor GPM (Globe)	29	34	55	75	125	220	460	775
	Factor GPM (Angle)	39	53	66	99	170	280	650	1100

- Maximum continuous flow based on velocity of 20 feet per second.
- Maximum intermittent flow based on velocity of 25 feet per second.
- Minimum flow rates based on a 20 to 40 psi pressure drop.
- The C_v Factor of a value is the flow rate in U.S. GPM at 60°F that causes a 1 psi drop in pressure.
- C_v factor can be used in the following equations to determine Flow (Q) and Pressure Drop (ΔP):

  Q (Flow) = $C_v\sqrt{\Delta P}$ ΔP (Pressure Drop) = $(Q/C_v)^2$

- The C_v factors stated are based upon a fully open valve.
- Many factors should be considered in sizing control valves including inlet pressure, outlet pressure, and flow rates.
- For sizing questions including cavitation analysis consult Watts with system details.

Headloss

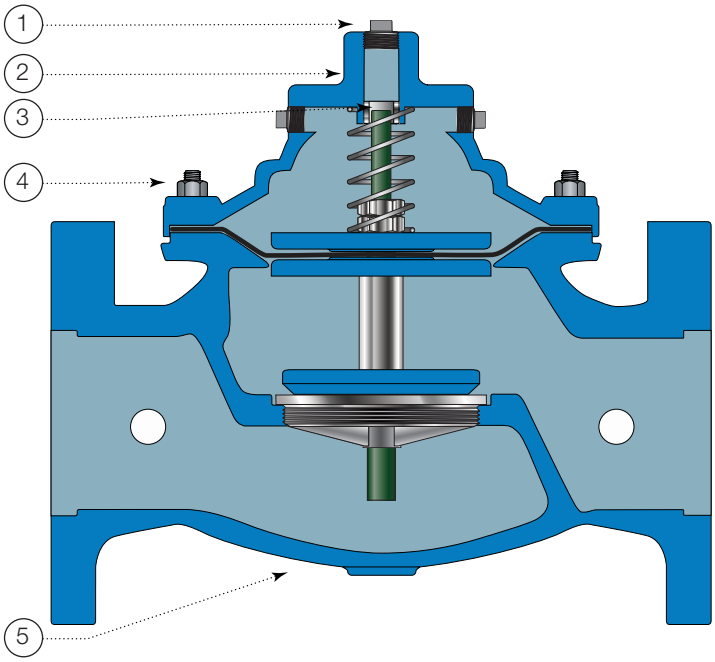


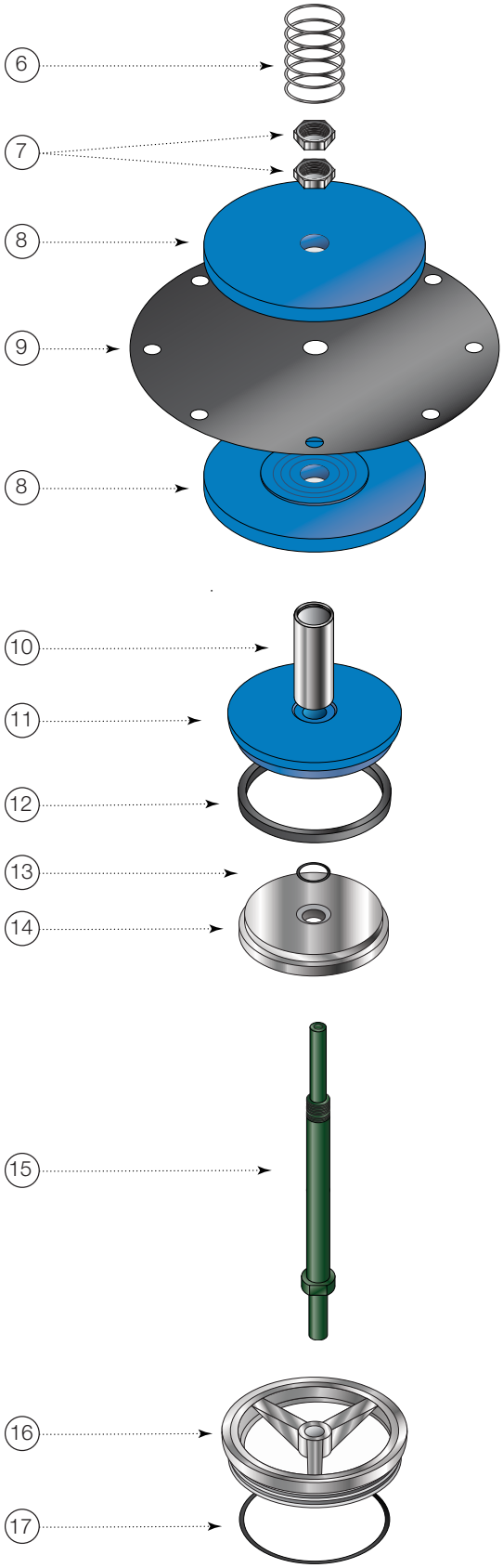
The C_v Factor of a value is the flow rate in U.S. GPM at 60°F that will cause a 1 psi drop in pressure.
The factors stated are based upon a fully open valve.
Cv factor can be used in the following equations to determine Flow (Q) and Pressure Drop (Δ P):

Q (Flow) = $C_v\sqrt{\Delta P}$ Δ P (Pressure Drop) = $(Q/C_V)^2$

Typical Main Valve

(Threaded and Flanged design)





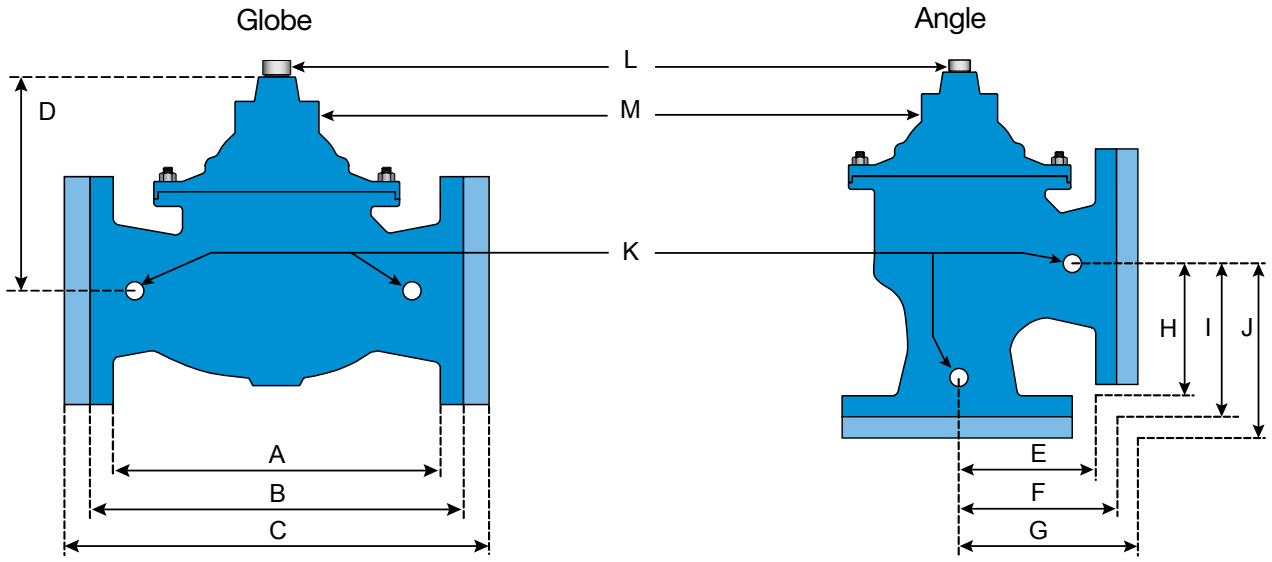
ITEM	DESCRIPTION	MATERIAL
1	Pipe Plug	Lead Free Brass
2	Cover	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
3	Cover Bearing	ASTM A276 304 Stainless Steel
4	Stud with Cover Nut and Washer	ASTM A570 Gr.33 Zinc Plated Steel
5	Body	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
6	Spring	ASTM A276 302 Stainless Steel
7	Stem Nut	ASTM A276 304 Stainless Steel
8	Diaphragm Washer	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
9	Diaphragm*	Buna-N (Nitrile)
10	Spacer	ASTM A276 304 Stainless Steel
11	Quad Seal Retainer	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
12	Quad Seal*	Buna-N (Nitrile)
13	O-Ring*	Buna-N (Nitrile)
14	Quad Seal Plate	ASTM A743 CF8M (316) Stainless Steel
15	Shaft / Stem	ASTM A276 304 Stainless Steel -Xylan coated
16	Seat Ring	ASTM A743 CF8M (316) Stainless Steel
17	Seat Gasket*	Buna-N (Nitrile)

** Contained in Main Valve Repair Kit*

NOTICE

If the unit is installed in any orientation other than horizontal (cover up) or if extreme space constraints exist, consult customer service before or at the time of order.

Dimensions



VALVE SIZE	GLOBE THREAD		GLOBE 150#		GLOBE 300#		COVER TO CENTER		ANGLE THREAD		ANGLE 150#		ANGLE 300#		ANGLE THREAD		ANGLE 150#		ANGLE 300#		PORT SIZE NPT	PORT SIZE NPT	PORT SIZE NPT	SHIPPING WEIGHT*	
	A		B		C		D		E		F		G		H		I		J		K	L	M		
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*in.*	*in.*	*lb*	*kg*
1¼	7¼	184					3½	89	3¼	83					1⅞	48					¼	½	⅛	15	7
1½	7¼	184	8½	216			3½	89	3¼	83	4	102			1⅞	48	4	102			¼	½	⅛	15	7
2	9⅜	238	9⅜	238	10	254	4 15⁄16	125	4	102	4	102	4¼	108	4	102	4	102	4¼	108	½	½	¼	35	16
2½	11	279	11	279			7	178	5½	140	5½	140	5 13⁄16	148	4	102	4	102	4 5⁄16	110	½	½	⅜	65	30
3	10½	267	12	305	13¼	337	7	178	5¼	133	5¾	146	6⅛	156	5¼	133	5¾	146	6⅛	156	½	½	⅜	95	43
4			15	381	15⅝	397	8⅝	219			6¾	171	7⅛	181			6¾	171	7⅛	181	½	½	⅜	190	86
6			20	508	21	533	11¾	298			8½	216	8⅞	225			8½	216	8⅞	225	½	½	½	320	145
8			25⅜	645	26⅜	670	15¾	400			11	279	11½	292			11	279	11½	292	½	1	½	650	295

Grooved End Dimensions*

VALVE SIZE	GLOBE GROOVED		COVER TO CENTER		ANGLE GROOVED		ANGLE GROOVED		PORT SIZE (NPT)	PORT SIZE (NPT)	SHIPPING WEIGHT*	
	A		B		C		D		E	F		
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*in.*	*lb*	*kg*
1¼	8½	216	5½	140	4¼	108	3¼	83	⅜	¼	25	11
1½	8½	216	5½	140	4¼	108	3¼	83	⅜	¼	25	11
2	9	229	6½	165	4¾	121	3¼	83	⅜	½	40	18
2½	11	279	7½	191	5½	140	4	102	½	½	65	29
3	12½	318	8¼	210	6	152	4¼	108	½	½	95	43
4	15	381	10⅝	270	7½	191	5	127	¾	¾	190	86
6	20	508	13⅜	340					¾	¾	320	145
8	25⅜	645	16	406					1	1	650	295

**Available as configured item. Contact customer service for more details.*

Valve Cover Chamber Capacity

VALVE SIZE (IN INCHES)	1¼	1½	2	2½	3	4	6	8
Fluid ounces	4	4	4	10	10	22	70	
U.S. Gallons								1¼

Valve Travel

VALVE SIZE (IN INCHES)	1¼	1½	2	2½	3	4	6	8
Travel by inches	⅜	⅜	½	⅝	¾	1	1½	2

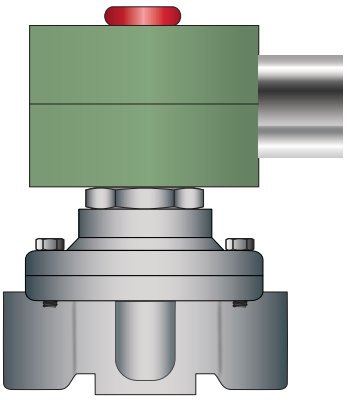
Accessories

Model 50 - Position Indicator

Model 50 Position Indicator is installed in the topmost cover port of the main valve and provides a visual sign of valve position.

A stainless steel indicating rod threads into the tapped portion of the main valve stem and moves inside of a cylindrical Pyrex sight tube. The indicating rod travels up and down, following main valve stem movement. The housing protects the sight tube and indicating rod, and allows visibility on two sides.

The screwdriver-operated test cock installed on the top of the Model 50 housing provides a controlled method of removal of air from the cover chamber during start-up or troubleshooting of the main valve.



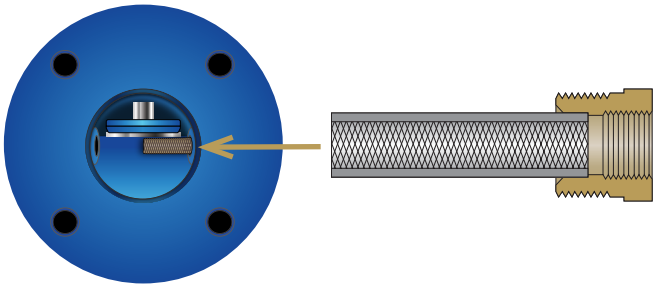
Solenoid

The Solenoid is prewired to the relay box and is equipped with a Solenoid Bypass (SB) valve that is normally closed. The bypass valve manually closes the main valve when engaged.

Opening the Solenoid bypass valve pressurizes the main valve cover as indicated by the Pressure Gauge (5), closing the main valve.

Closing the Solenoid bypass valve and opening the Manual Reset Ball Valve (6) returns the main valve to the fully open position. The pressure gauge returns to zero (0) when the main valve is fully open.

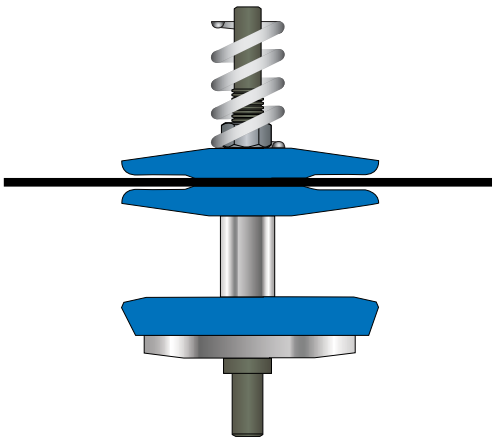
NOTE: The manual reset ball valve must be closed for normal operation.



Valve Inlet

Valve Pilot Circuit with Strainer

The valve pilot circuit is equipped with a Model 60 Flo-Clean Strainer which is used to filter the fluid passing through the control pilot circuit and provide protection to pilot circuit speed controls and pilots. This component is installed in the inlet body port of the main valve, exposing the strainer element to main line flow. The currents and flow across the screen create a self-scouring effect, cleaning the filter element.



Main Valve

The main valve is provided standard with a specially coated main valve stem for standby service. The special coating helps deter the effects of hard water and mineral deposits which may prohibit proper valve operation.

The main valve is also provided standard with a heavy cover spring for additional operating differential.

SentryPlus Alert Technology

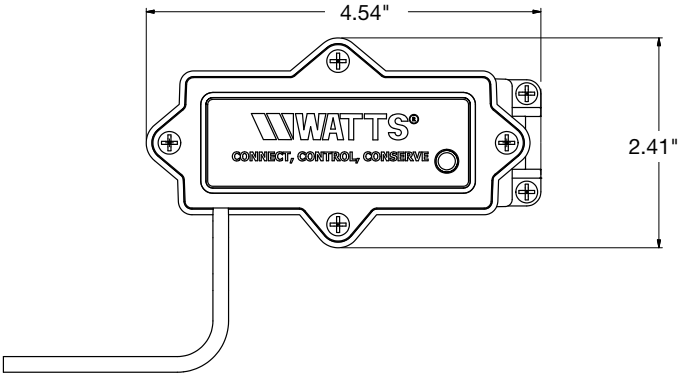
The alert system can be installed with no disruption to service.

Activation module with 8-foot cable

Ground wire

Activation module with cable

Ground wire



Activation Module

The activation module contains the electronic circuit assembly, interfaces with the flood sensor, and provides connectivity to the BMS input terminal or the Cellular Gateway. Weight: <0.25 lb.

The module is designed with adjustable settings for wet threshold (sensitivity to water discharge) and timer delay (duration before alarm). For more information on custom flood sensor settings, download IS-FloodSensor-Settings 2144.

Ground Wire

24 AWG

Solid core, uninsulated, tinned copper wire

RoHS compliant

5 feet

Cellular Gateway

The Cellular Gateway is hardwired to the relay box for constant communication between the two devices. In turn, the Cellular Gateway communicates to the Watts Syncta platform when a qualifying discharge event occurs. Specifically, a signal about potential flood conditions from the Cellular Gateway prompts the Syncta application to alert users by email, phone call, or text message.

NOTE: This item is sold separately.

Wiring the Relay Box

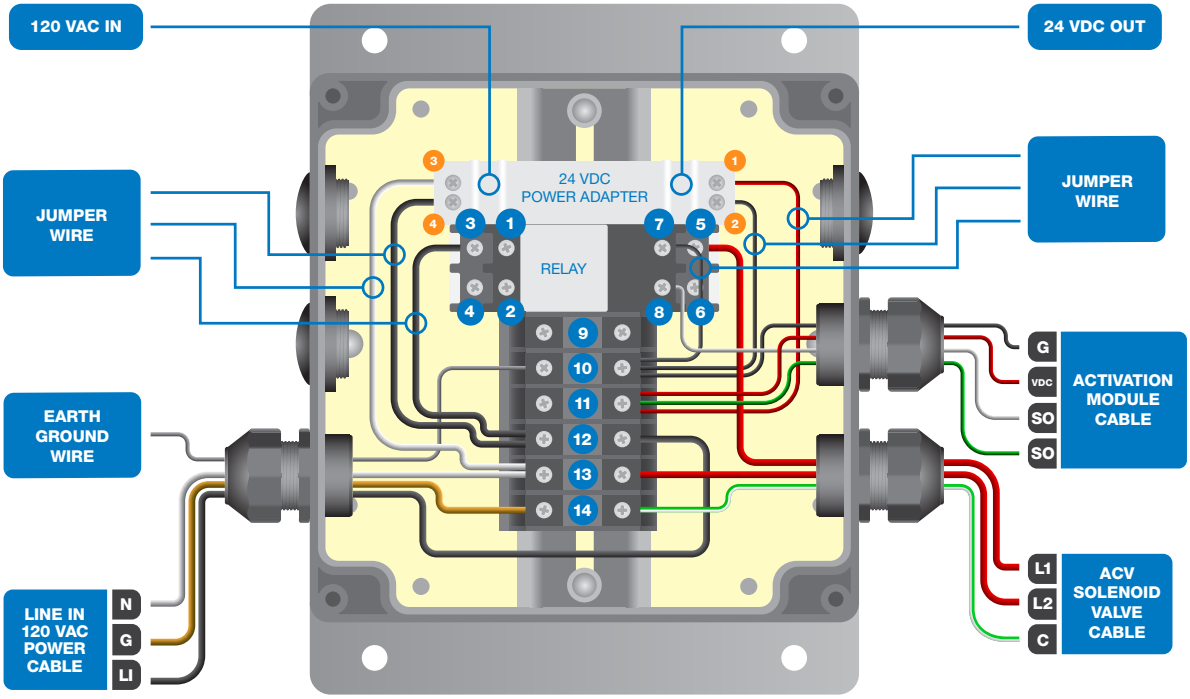
The relay box shall contain the electromagnetic device used to operate the LFF113FP Solenoid bypass valve. The relay box shall receive the signal from the flood sensor activation module and in turn shall be wired directly to the Solenoid valve.

Here, terminals 9 to 14 are numbered for reference and can be used in any order to make the cross-connections between the left and the right sides of the terminal block.

Relay terminals 4 and 6 shall be assigned for connection to the input terminals of the a building management system (BMS) or Cellular Gateway for real-time notification of potential flooding.

NOTICE

Certified electrician required to connect to the mains power and activation module to relay box.



Jumper Wire

Auxiliary terminal 12A to power adapter terminal 4 (AC/L)

Auxiliary terminal 12A to relay terminal 3

Auxiliary terminal 13A to power adapter terminal 3 (AC/N)

Earth Ground Wire

Metal base to auxiliary terminal 10A

Line In 120 VAC Power Cable

L1 to auxiliary terminal 12B

Ground to auxiliary terminal 14A

Neutral to auxiliary terminal 13A

BMS Cable (see page 10)

Input 1 to relay terminal 4

Input 1 to relay terminal 6

Cellular Gateway Cable (see page 10)

Input 1 to relay terminal 4

Input 1 to relay terminal 6

Ground to auxiliary terminal 10A

Power (+) 24VDC to auxiliary terminal 11A

Jumper Wire

Auxiliary terminal 11B to power adapter terminal 1 (+V)

Auxiliary terminal 10B to power adapter terminal 2 (-V)

Auxiliary terminal 10B to relay terminal 7

Activation Module Cable

Ground to auxiliary terminal 10B

24 VDC In to auxiliary terminal 11B

Signal Out (white) to relay terminal 8

Signal Out (green) to auxiliary terminal 11B

ACV Solenoid Valve Cable

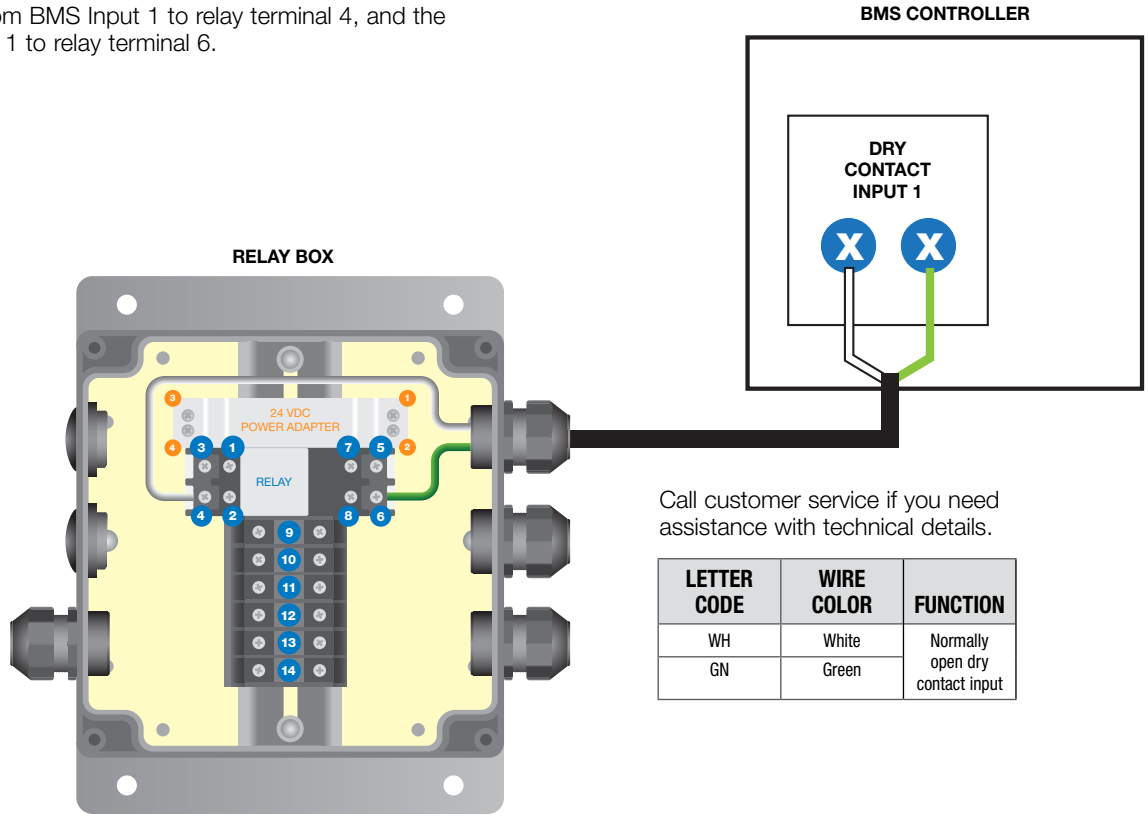
L1 to relay terminal 5

L2 to auxiliary terminal 13B

Common to auxiliary terminal 14B

Connecting the BMS to the Relay Box

One wire shall run from BMS Input 1 to relay terminal 4, and the other wire from Input 1 to relay terminal 6.



Call customer service if you need assistance with technical details.

LETTER CODE	WIRE COLOR	FUNCTION
WH	White	Normally open dry contact input
GN	Green	

Connecting the Gateway to the Relay Box

OPTIONAL: Cellular network connectivity to receive alerts through Syncta is an optional field installation that is chosen and completed by the user.

A 4-conductor cable shall connect the Cellular Gateway terminals to the relay box terminals.

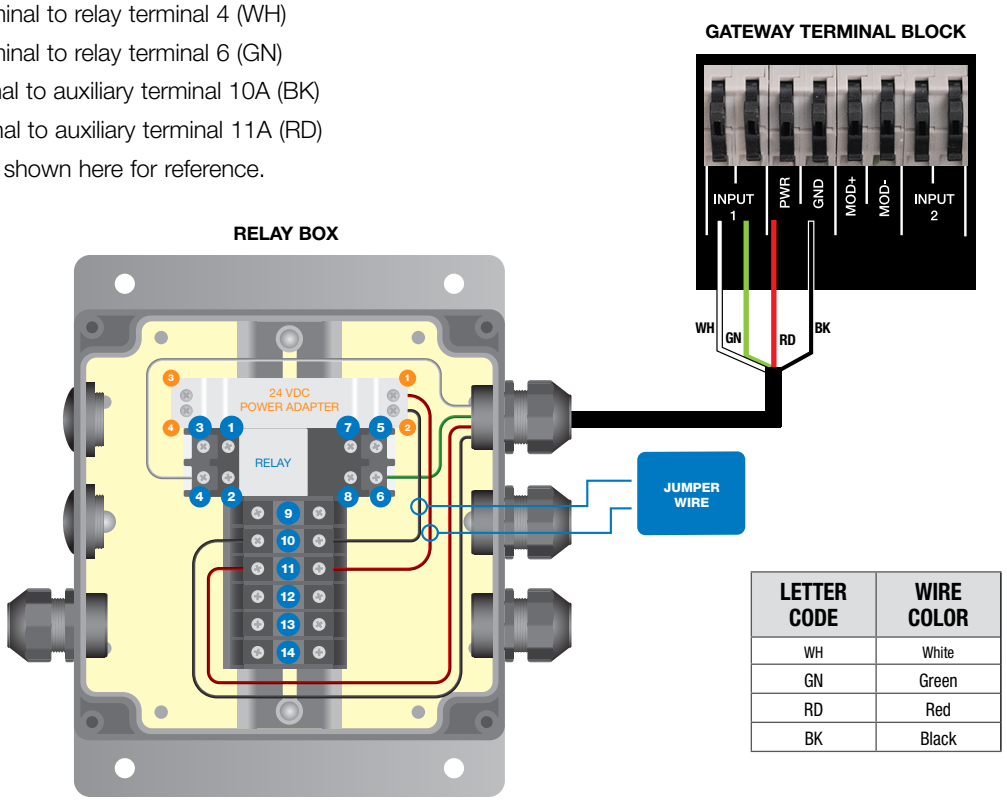
Gateway Input 1 terminal to relay terminal 4 (WH)

Gateway Input 1 terminal to relay terminal 6 (GN)

Gateway GND terminal to auxiliary terminal 10A (BK)

Gateway PWR terminal to auxiliary terminal 11A (RD)

NOTE: Jumper wires shown here for reference.



LETTER CODE	WIRE COLOR
WH	White
GN	Green
RD	Red
BK	Black

USA: T: (978) 689-6066 • Watts.com
Canada: T: (888) 208-8927 • Watts.ca
Latin America: T: (52) 55-4122-0138 • Watts.com

ES-LFF113FP 2505