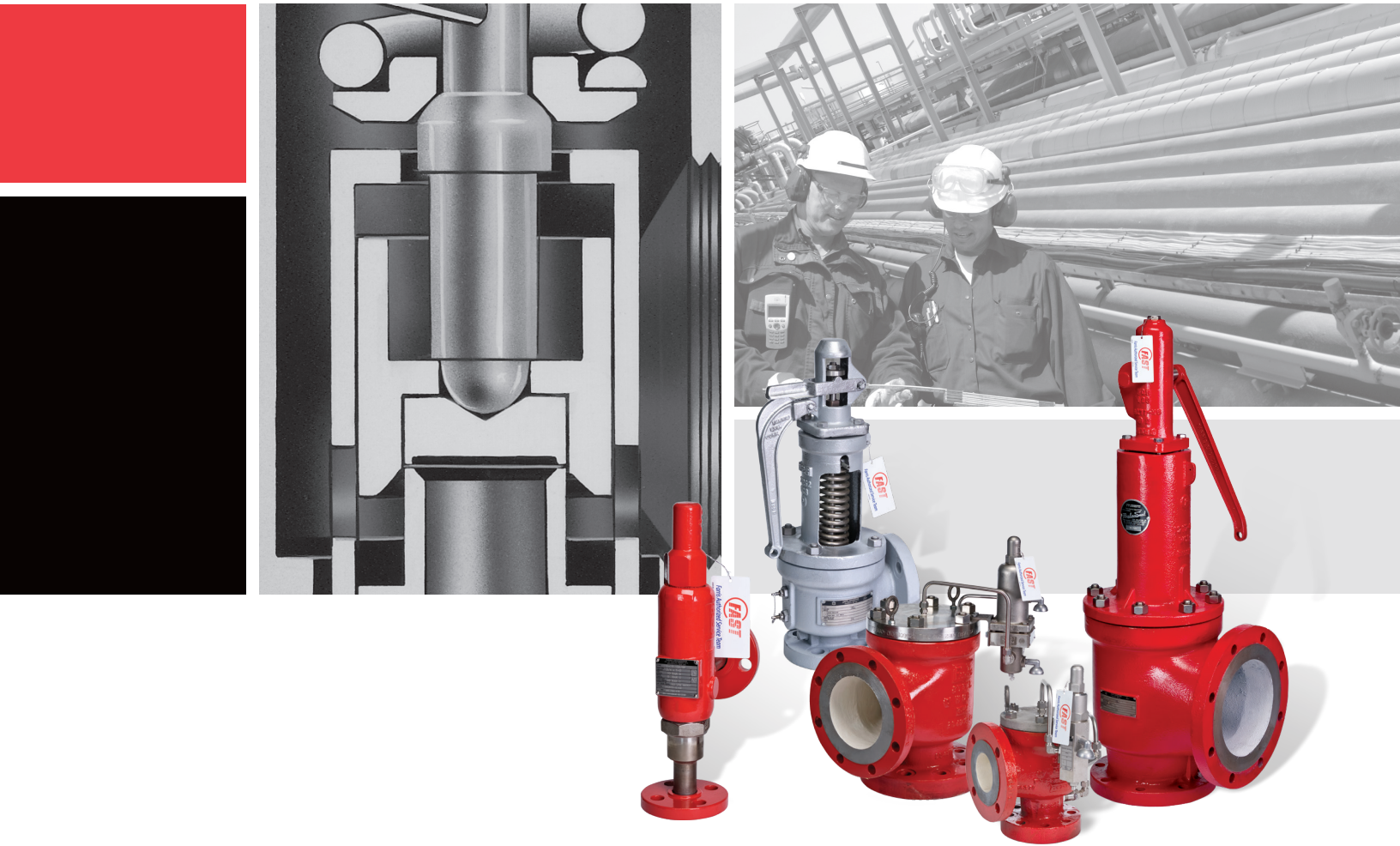


# General Installation and Maintenance Instructions





# Table of Contents

These maintenance and installation instructions are applicable to Farris Series 2600, 2700, 2850, 2856, 1890, 1896M, 3800, 4200 and 6400 pressure relief valves.

Safety Warning & Instruction System .....	1	Installation.....	3-4
General Safety Instructions.....	1-2	Typical PRV Installation Schematic .....	4
Introduction .....	3	Maintenance Basics .....	5
Receiving Inspection, Storage & Handling.....	3	Valve Reference Drawings.....	6-9
Pre-Installation Testing .....	3		

Farris Product Line Scope					
Series	ASME Certification			Pressure Equipment Directive	
	Section	Test Fluids	Code Symbol	Compliance	Directive Mark
2600	Section VIII	Air, Steam & Water		yes	CE
2600L	Section VIII	Water & Air		yes	CE
2700	Section VIII	Air, Steam & Water		yes	CE
3800	Section VIII	Air, Steam & Water		yes	CE
4200	Sections I & VIII	Air & Steam		yes	CE
6400	Sections I & VIII	Air & Steam		no	Not Available
1890	Section VIII	Air, Steam, & Water		no	
1896M	Section VIII	Air, Steam, & Water		no	
2850*	Section VIII	Air & Steam		no	
2856*	Section VIII	Air & Steam		no	

\*Available for non-ASME code liquid applications.

### General Notes

1. All valves are stamped with the appropriate ASME Code "V" or "UV" stamp as noted above.
2. In addition to the appropriate ASME Code stamp, valves shipped into the European market are marked with the "CE" symbol indicating compliance with the Pressure Equipment Directive.
3. Valves may also be supplied to ASME Code Section III, "NV" stamp.

## Safety Warning & Instruction System

You will find safety warnings and instruction labels in this manual. These have been included to ensure your safety and must be followed. Safety labels are vertically oriented rectangles as shown in the samples below. These labels consist of three panels inside a border. Each safety label will communicate the following three key pieces of information using narrative and pictorials.

- The nature and severity of the hazard.
- The consequence of the hazard, if not avoided.
- The precautions and measures required to avoid the hazard.

The top panel of the safety label illustrates the signal word (DANGER, WARNING, or CAUTION) which communicates the severity of the hazard, per the explanations to the right. The center panel contains a pictorial which communicates the nature of the hazard, and the possible consequence of hazard if not avoided. In some cases, the pictorial may depict the precautions or measures required to avoid the hazard. The bottom panel will then contain the remaining narrative information needed to ensure all three key pieces of information have been conveyed.



### **DANGER:**

Indicates hazards which, if not avoided, will result in serious injury or death.

### **WARNING:**

Indicates hazards which, if not avoided, could result in serious injury or death.

### **CAUTION:**

Indicates hazards which, if not avoided, could result in minor or moderate injury.

### **NOTICE:**

"NOTICE" is reserved for instructions given to prevent property, product, or environmental harm.

### **SAFETY INSTRUCTIONS:**

"SAFETY INSTRUCTIONS" indicates processes or procedures recommended to ensure safety.

## General Safety Instructions

These general installation and maintenance instructions are provided by Farris Engineering to its customers as general guidance for the handling, storage, and installation of Farris valves. Pressure relief valves are critical components in pressurized systems that ensure the safety of personnel and property. Always follow all manufacturer and industry standard recommendations relating to proper installation, testing, maintenance, and reconditioning.

This should not be considered an exhaustive manual and it does not cover the full maintenance and repair of valves. Certain configurations, applications, and usages may not be covered. All information presented in this manual is subject to change without notice. If there is specific information needed that is not covered in this manual, the customer is advised to contact Farris. The purchaser should also contact Farris regarding any possible changes in information or specifications. Please use the contact information on the back of this manual.

To ensure reliable and safe operation of Farris valves, installation, testing, maintenance, adjustment, and repair shall only be performed by qualified personnel having the required skills and training. No repair, assembly, adjustment or testing performed by individuals other than Farris-authorized representatives shall be covered by the warranty extended by Farris to its customers. All applicable regulations, directives, codes and standards shall be adhered to when performing these activities. Failure to follow proper test procedures or failure to use proper test equipment will lead to incorrect test results, damage to the valve and will invalidate the warranty.

Likewise, use of parts in any maintenance or repair activity other than factory-supplied OEM parts will invalidate the warranty extended by Farris to its customers. Incorrect selection or application of Farris valves on the part of the customer is not covered by the warranty extended by Farris to its customers.

These general instructions have been provided not only to ensure the proper installation and maintenance of Farris pressure relief valves, but also to provide for the safety of personnel who handle our products. Failure to follow these procedures could result in severe bodily harm or even death.

## General Safety Instructions, cont.

All possible hazards may not be identified in this manual. Conduct your own safety risk assessment given your specific system, environment, and configuration, and ensure proper control procedures are in place to prevent personal injury or illness and property, product or environmental harm.

### **DANGER**

- When the valve is under pressure, do not place any part of your body near or in the path of the outlet of the main valve or other discharge areas. Doing so will result in serious injury or death upon valve discharge.
- If a test gag is provided with the valve, it must be removed prior to installation. Failure to do so will result in equipment failure, serious injury or death in the instance of an overpressure event.

### **WARNING**

- Never attempt to remove, adjust, maintain, or repair a pressure relief valve while it is installed in a pressurized system unless you have been properly trained to do so. Doing so may result in serious injury or death.
- Ensure proper isolation of any energy sources and residual pressures by complying with all local, state and country-specific regulations/directives applying to energy control procedures (lockout/tagout).
- Ensure that the pressure relief valve and system is at an ambient temperature before inspecting, servicing, or repairing. The valve, system, and contents may be extremely hot or cold. Failure to do so may result in serious injury.
- The discharge from the main valve outlet or any other vents, should be piped or vented to a safe location to eliminate the potential for serious injury or damage during relief operation.
- Prior to valve disassembly, ensure that proper controls are implemented to address potential exposures to hazardous substances, including gases, liquids, or process byproducts contained in or contaminating the valve. Consult applicable material safety data sheets (MSDSs) and established exposure limits for the substances expected to be present to ensure proper exposure controls are implemented. Failure to do so could result in serious injury or illness.

- To ensure the valve is free to operate, check the inlet and outlet piping for potential obstructions which may exist as a result of process fluid solidification, polymerization or other system problems. Failure to do so could render the valve inoperable, leading to serious injuries or damage in the event of system over-pressurization.
- Use extreme caution when inspecting a pressure relief valve for leakage. Always stay clear of the valve outlet during seat leakage testing as the valve can suddenly open fully causing serious injury. Doing so could result in serious burn, chemical or injection injury.
- Use all appropriate personal protective equipment to protect against process hazards, including but not limited to, pressurization, temperature extremes, noise, and chemical hazards. Failure to do so could result in serious injury or death.

### **CAUTION**

- Always use the appropriate tools, and in the correct manner, for adjustment or servicing of valves. Failure to do so could result in injury.

### **SAFETY INSTRUCTIONS**

- It is the responsibility of the customer and user of Farris valves to properly train their personnel on all required maintenance procedures and safety standards to prevent injuries.
- Farris can provide comprehensive training on the maintenance and repair of all Farris products. Contact your local Farris representative or the factory.

### **NOTICE**

- Improper handling, storage, installation and maintenance of a PRV can cause damage to the valve and will invalidate the warranty. Please follow all recommended procedures.

## Introduction



These installation and maintenance instructions are being provided to ensure the proper installation, repair and safe operation of Farris pressure relief valves. Pressure relief valves are precision instruments and should only be installed and repaired by personnel who have been properly trained and qualified to provide this service. Correct installation is essential for plant, property, personnel and public safety. Failure of a pressure relief valve can lead to catastrophic overpressure of equipment and/or the release of effluent under pressure. Effluent may be hazardous and all precautions should be taken to ensure safe disposal.

## Receiving Inspection, Storage & Handling



Cleanliness is essential to the satisfactory operation and tightness of a pressure relief valve. Prior to installation the following practices should be followed:

- Upon receipt, look for any shipping damage. Inspect packaging for evidence that the valve has been tipped over or dropped.
- Verify the nameplate data against ordering documents.
- Confirm that factory wire seals are in place and not broken.
- If it appears that the wire seal has been broken, the name plate information does not match documentation, or if the packaging or valve appear to have been damaged in transit, please contact your local Farris representative.
- Inlet & outlet covers should be left in place until the valve is installed.
- Valves should be moved and installed with the stem upright, in the vertical position.

**Note:** Pilot operated relief valves should never be lifted or handled using the tubing, piping, pilot, or pilot brackets. Use the lifting eyes provided on the main valve body to move the valve.

- Care should be taken to keep the inlet and outlet clean and free of foreign material.
- Valves that are not immediately installed in service should be stored indoors, in the original container and in an area free of dirt and other contamination. The storage area should be at normal temperatures (50 to 100 °F/10 to 38 °C).



## Pre-Installation Testing

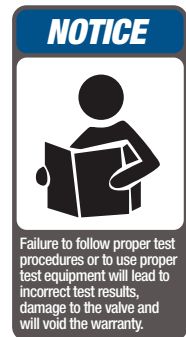
Before installation, it is important to confirm the set pressure and seat tightness. This testing should only be performed by trained and qualified personnel using proper test equipment.

When performing pre-installation testing please note the following:

- Testing must only be performed using the correct test fluids. Air, gas and vapor service valves must be tested using air as the test fluid. Liquid service valves should be tested on water and steam service valves must be tested on steam.

**Note:** For pilot operated relief valves on liquid service, introducing liquid into the dome area of the main valve and pilot assembly during pre-installation testing may later cause problems when the valve is placed into service. An air test may be substituted to confirm valve functions, but set pressures may vary from actual setting due to the difference in test media.

- Set pressure testing must be performed first, followed by seat leakage testing. Seat leakage testing is performed at 90% of set pressure. For valves set at 50 psig (3.45 barg) or below, the test pressure is 5 psig (0.35 barg) below the set pressure.
- If qualified personnel and proper test equipment are not available the pre-installation testing should be skipped.



## Installation



Pressure relief valve performance can be adversely affected by improper installation. To ensure good performance and safe operation of the valve these guidelines should be followed. Failure to do so could result in valve failure, serious injury or death.

- Pressure relief valves may contain sharp surfaces. Proper personal protective equipment (PPE) should be used.
- Before installing a valve, depressurize the system.
- Always install valves upright with the stem in the vertical position and the inlet at the bottom. Remove the optional test gag, if supplied.
- Install valves close to the pressure source so that inlet pressure loss is no more than 3% of set pressure.
- To avoid reducing the valve's actual capacity, be sure piping connected to the valve's inlet/outlet connections is equal to or larger than the valve connections.
- Avoid installing valves close to equipment that can cause pressure fluctuations, such as compressor discharge lines.



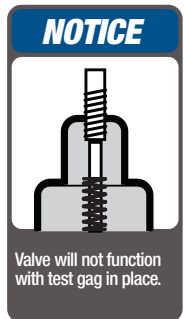
- Install valves away from equipment that may cause turbulence, such as reducing stations, orifice plates/nozzles, and other valves and fittings.
- Make sure all inlet and outlet piping is properly supported to avoid putting excessive load on the valve. Provide drainage from the discharge piping or valve body.
- On valves with bellows, remove plastic shipping plugs from the bonnet and vent in a safe direction. Do not pipe bonnet vents to a pressurized system that would introduce backpressure.
- Clean inlet and outlet flange surfaces and valve interior cavity to remove rust inhibitors.
- Remove the inlet and outlet flange protectors and any extraneous packing or documentation materials inside the valve body or nozzle.
- Test levers are provided on some valves to allow the user to manually verify that the valve trim is free to move. Test levers should only be pulled when system pressure is greater than 75% of set pressure in order to avoid potential damage to the valve. In addition the valve should never be carried by the test lever as this can move the disc off the seat resulting in damage to both parts.
- Tighten all inlet and outlet flange bolts evenly. Leave enough room to allow for in-line maintenance and adjustments.

### Additional Instructions for Pilot Valve:

- Pilot valves are equipped with bug vent(s) on the pilot control bonnet and/or body. Check to be sure vents have not been plugged.
- The pilot control discharge is vented to atmosphere since the volume released when the valve opens is small. If a release to atmosphere is not permitted, then vent the discharge to a safe location. Do not pipe discharge to a pressurized system that would introduce backpressure unless it is a balanced pilot control design.
- On pilot valves supplied with field test connections, remove the plastic shipping plug from the isolation valve and assure that it is partially open.

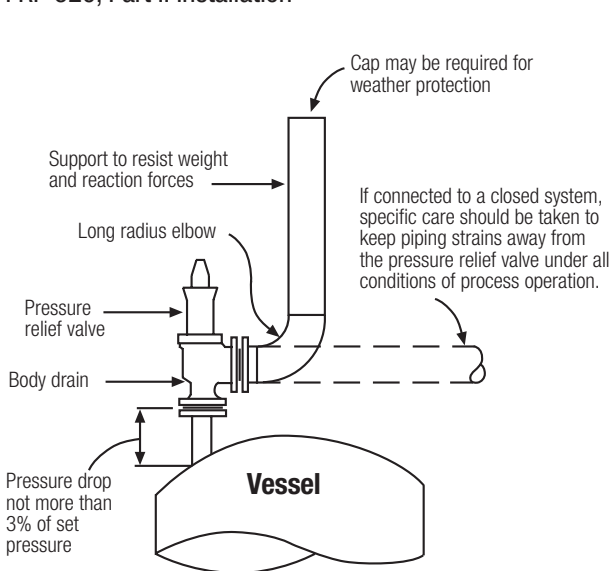
### System Start Up and Testing:

It is recommended that the valve be isolated during pressure testing of the system either by blanking, closing a stop valve or using a test tag. If a test gag is used, exercise extreme caution to avoid damaging the valve stem or seat by over tightening the gag screw. Gag screws should be installed hand tight and should always be removed after system testing has been completed. Remove the optional test gag, if supplied.



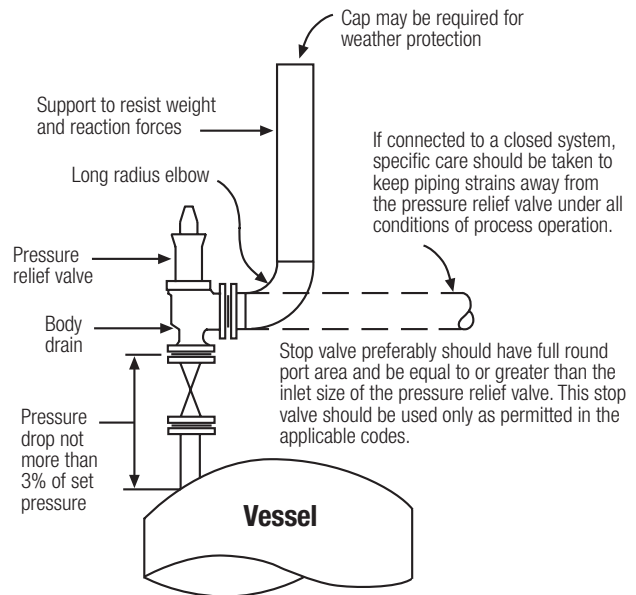
## Typical PRV Installation

### API RP 520, Part II Installation



Recommended Typical Pressure Relief Valve Installation Without Shutoff Valve

Figure 1.1



Recommended Typical Pressure Relief Valve Installation With Shutoff Valve

Figure 1.2

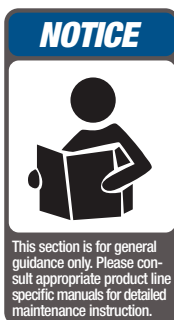
## Maintenance Basics



Pressure relief valve maintenance should only be performed by trained and qualified personnel using proper test equipment. Repairs by unqualified personnel or use of improper test equipment may lead to poor valve performance.

These basic instructions apply to all Farris valve series. They do not provide information specific to product lines. For more detailed maintenance instructions, please consult the appropriate manuals for the valve under consideration. As a general rule, these procedures apply to all pressure relief valves:

- Proper personal protective equipment (PPE) should be used.
- Before repairing or servicing a valve, depressurize the system.
- For valves, that have been in service, a review of the material safety data sheet (MSDS) of process effluent should be done prior to disassembly. Proper controls should be in place to address potential exposures to hazardous substances, including gases, liquids, process media, or process by-products contained in the valve.
- External surfaces of the valve, including flange face surfaces and threaded connections, should be examined for any signs of damage or rough handling.
- Completely disassemble the valve and thoroughly clean all parts.
- Parts should be examined for signs of corrosion or excessive wear. Particular attention should be given to ensure all threads are clean and free of burrs.
- Examine the stem to ensure it is straight.
- Lap the nozzle seat and disc seating surfaces to a flat mirror finish.
- Reassemble valve making sure to lubricate all threaded and bearing surfaces.
- Standard repair procedure requires that all gaskets and soft goods such as O-ring seals be replaced with new parts.



- Valve should be calibrated to the set pressure indicated on the nameplate unless a new pressure is required. When the set pressure is being changed maintenance personnel must confirm if the existing spring is acceptable or if a new spring is required.
- Testing must only be performed using the correct test fluids. Air, gas and vapor service valves must be tested using air as the test fluid, liquid service valves should be tested on water, and steam service valves must be tested on steam.

**Note:** For pilot operated relief valves on liquid service, introducing liquid into the dome area of the main valve and pilot assembly during maintenance testing may cause problems when placed in service. The setting and testing of the pilot control may be done separately from the main valve on the proper fluid. An air test may be substituted to confirm valve functions, but set pressures may vary from actual setting due to the difference in test media.

- Set pressure testing must be performed first, followed by seat leakage testing. Seat leakage testing is performed at 90% of set pressure. For valves set at 50 psig (3.45 barg) or below, the test pressure is 5 psig (0.35 barg) below the set pressure.
- After the repair has been completed, all external adjustments should be wire-sealed to prevent tampering. Inlet and outlet openings should be sealed until the valve is ready for installation in order to prevent foreign material from entering the valve.

# Farris Valve – 2600 Series

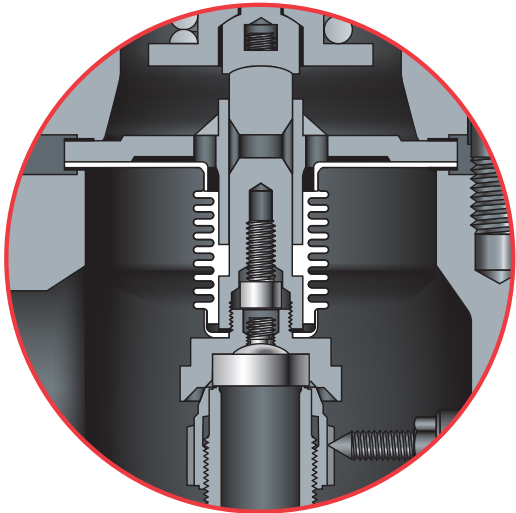
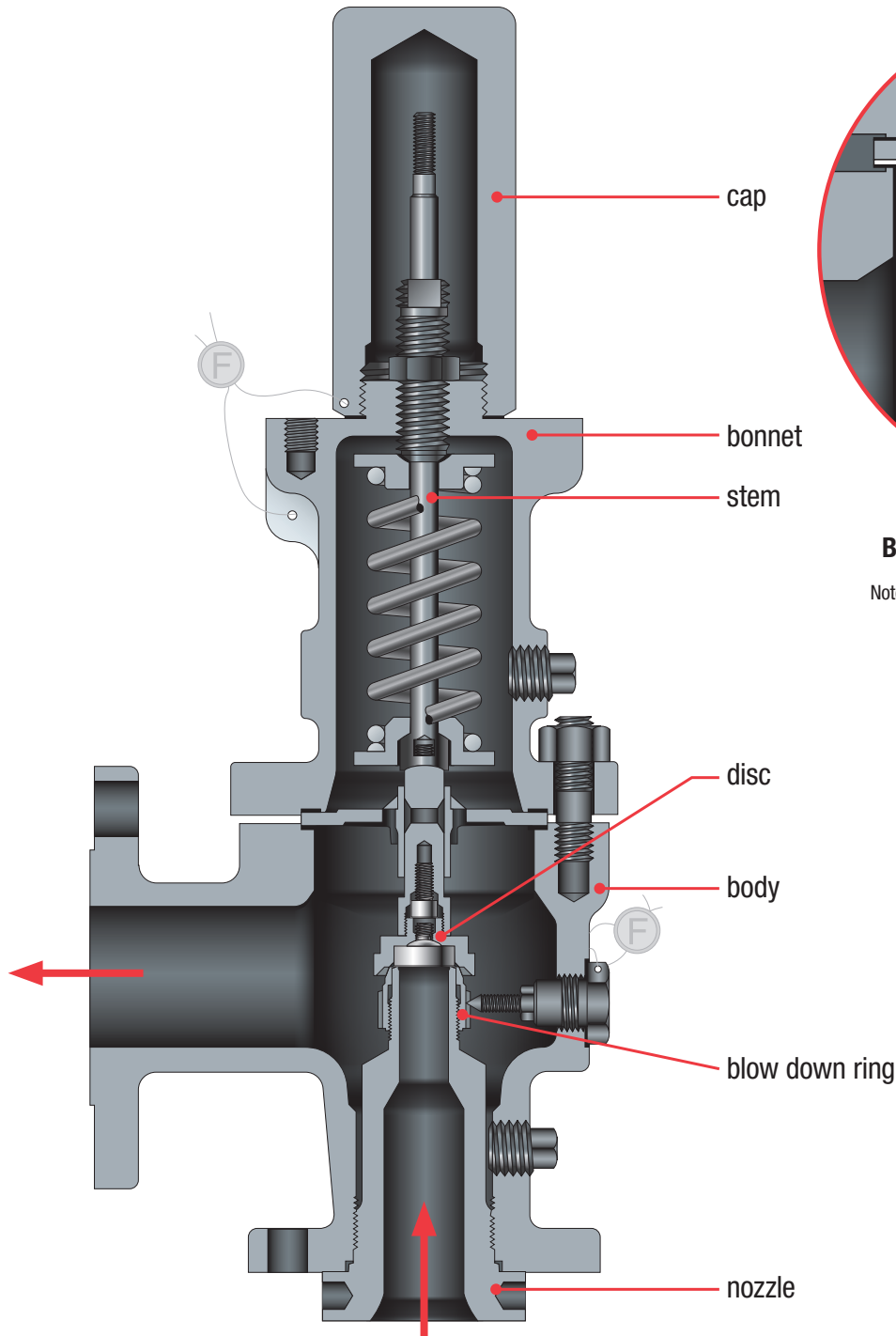
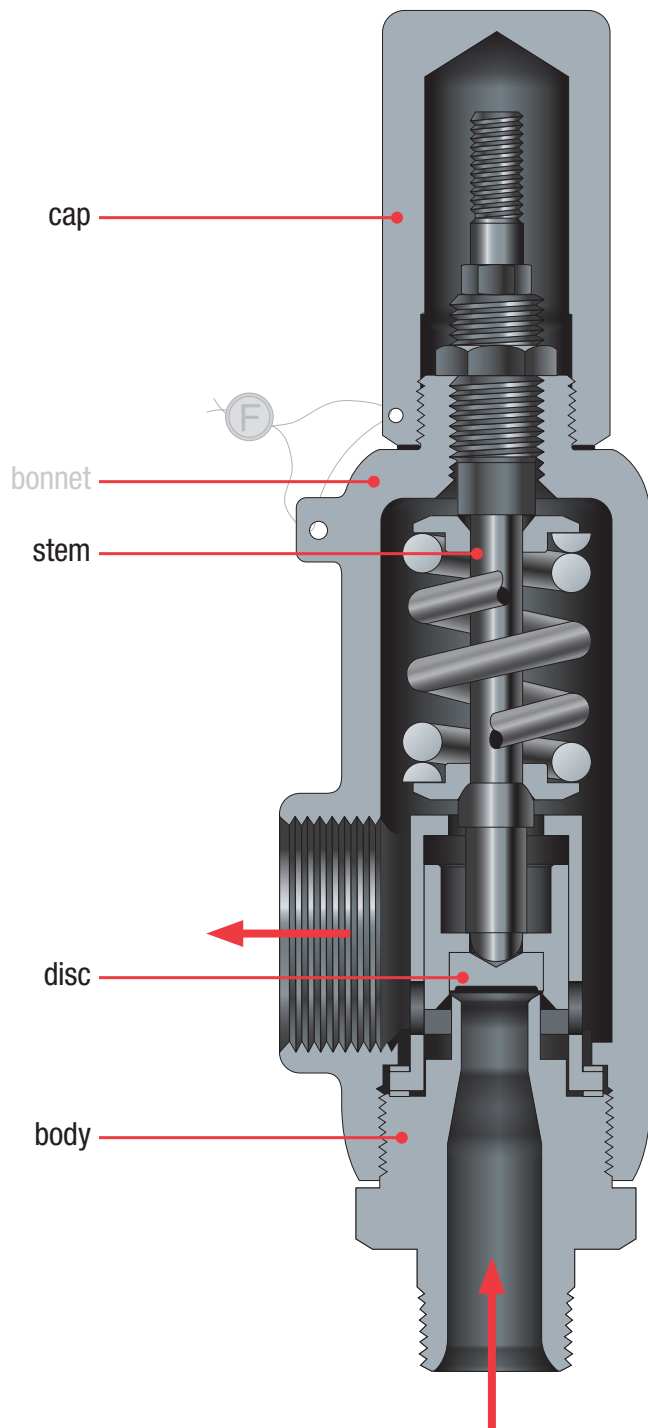


Figure 1.6  
**BalanSeal® Bellows Safety Valve**

Note: Bonnet vent must be open on bellows design.

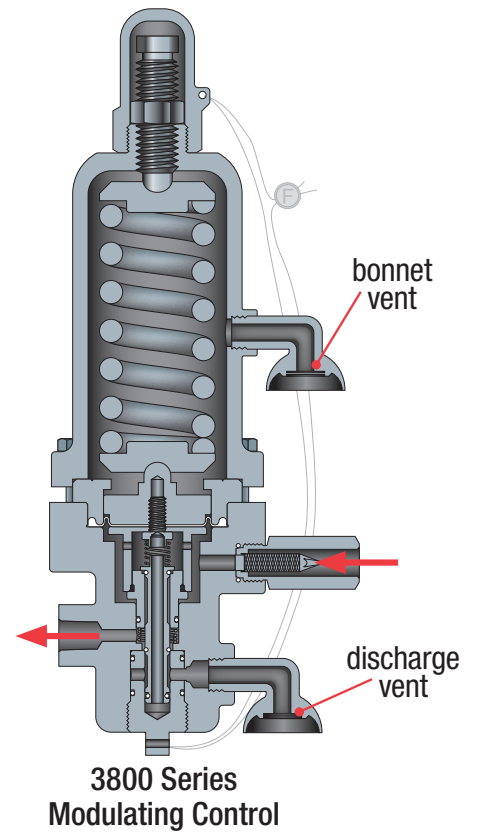
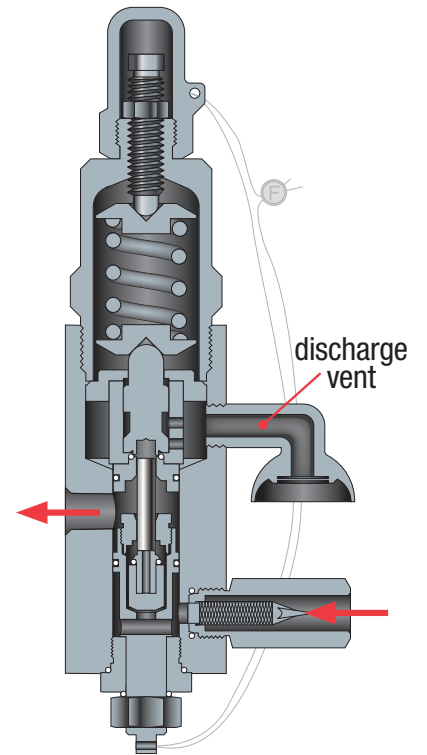
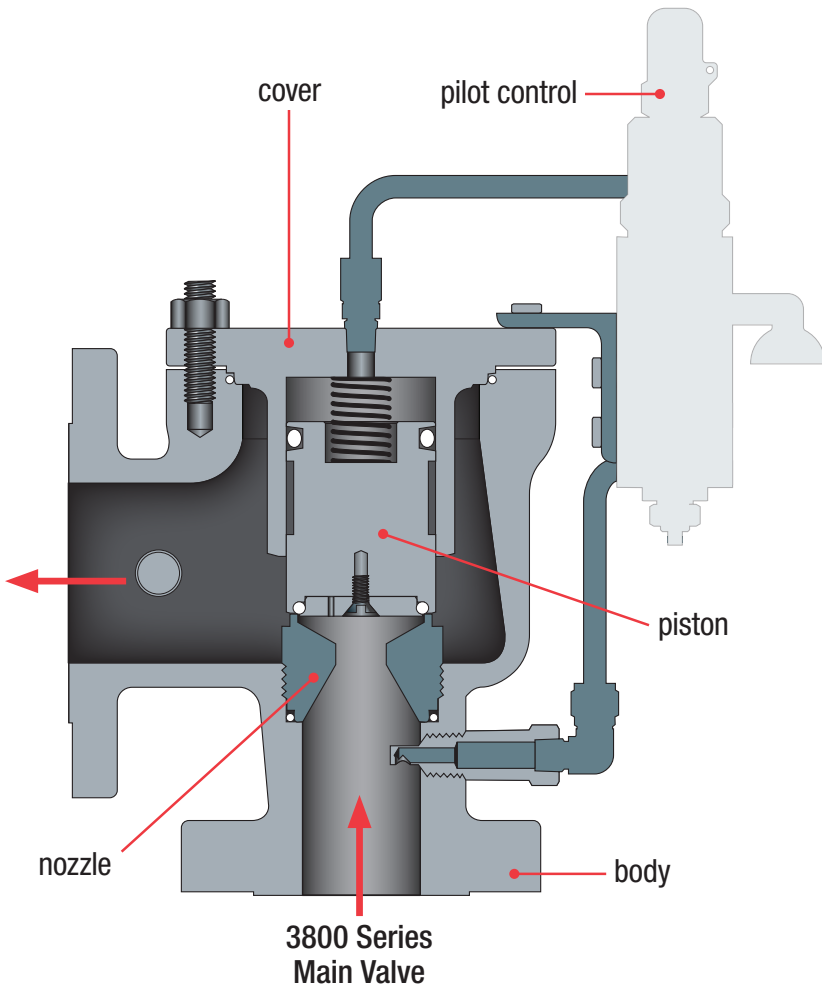


# Farris Valve – 2700 Series



← direction of flow

# Farris Valve – 3800 Series



← direction of flow



# Farris Aftermarket Services

## Real Value Behind Every Valve.

Farris Engineering's aftermarket department and global FAST Center Network adds value to every Farris valve. At Farris, our work is never done. Once we sell you a valve, our FAST Team is there to keep your valves in service and your plant safe. Our FAST Centers are:

**Responsive.** Farris Engineering and its FAST Centers understand the need to quickly and efficiently respond to customer needs.

- **Global Access** - FAST Centers work with and in our extensive representative network, providing support to all global regions.
- **24/7 Valve Service and Replacement** - FAST Centers offer quick, localized testing and repair of valves, or the prompt installation of new Farris ASME certified valves.
- **Mobile Repair Units** - Available at select FAST Centers.

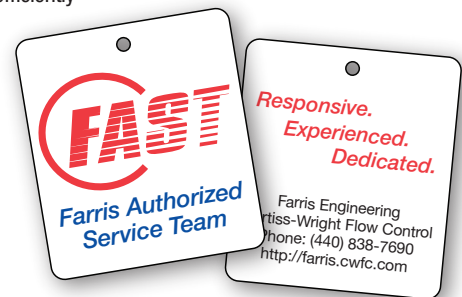
**Experienced.** Farris Engineering recognizes the value of having pressure relief valve experts as close to the customer as possible. This is accomplished through comprehensive training offered at the factory or on-site. FAST Center sales personnel and technicians are able to provide valuable experience to their customers.

- **Valve Expertise** - Every FAST Center is technically supported by Farris Engineering, a leader in valve design.
- **Factory Trained Technicians** - FAST technicians go through mandatory training consisting of classroom lecture and hands-on practical instruction on Farris Engineering pressure relief valves, repair procedures and applicable codes and standards. The result is a team of highly skilled technicians capable of handling both routine and complex pressure relief valve requirements around the world.
- **OEM parts** - FAST Centers use only OEM parts, restoring valves to OEM specifications. All valves are assembled and tested to ASME standards.



**Dedicated.** FAST Centers have committed to large investments in inventory, equipment and certifications to better support the customers in their territory.

- **Local Inventory** - Every FAST Center carries a large inventory of new pressure relief valves and spare parts, backed by a web-based global inventory to draw from.
- **ASME Certification** - FAST Centers carry all the required certifications to assemble, set and test Farris valves.
- **VR Certification** - FAST Centers have VR certification issued by The National Board of Boiler and Pressure Vessel Inspectors to effectively and efficiently repair all pressure relief valves where applicable.



10195 Brecksville Road, Brecksville, OH 44141 USA • Telephone: 440-838-7690 • Fax: 440-838-7699 • <http://farris.cwfc.com>

**Facilities:** Brecksville, Ohio, USA; Brantford, Ontario, Edmonton, Alberta, Canada; Corby, Northants, UK; Delhi, India; Tianjin, Beijing, China; Dubai, U.A.E.

**Offices Worldwide:** For a listing of our global sales network, visit our website at <http://farris.cwfc.com>.

While this information is presented in good faith and believed to be accurate, Farris Engineering, division of Curtiss-Wright Flow Control Corporation, does not guarantee satisfactory results from reliance on such information. Nothing contained herein is to be construed as a warranty or guarantee, expressed or implied, regarding the performance, merchantability, fitness or any other matter with respect to the products, nor as a recommendation to use any product or process in conflict with any patent. Farris Engineering, division of Curtiss-Wright Flow Control Corporation, reserves the right, without notice, to alter or improve the designs or specifications of the products described herein.