90-ADJ-PRV SERIES

Field Adjustable Pressure Reducing Valves

Installation / Operation / Maintenance

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1. MODELS AND SIZES

The Cla-Val 90-ADJ-PRV series is a Field Adjustable pressure reducing valve available in 1.5" and 2.5" sizes. System designers have the option to choose from a range of six different spring settings for both the 1.5" and 2.5" size valves allowing them to satisfy all required inlet/outlet pressure ratios.

Size	Valve Model	Configuration	Inlet	Outlet
1.5"	90-ADJ-PRV-15-FF	Angle Body (90-Degree)	Female NPT	Female NPT
	90-ADJ-PRV-15-FM	Angle Body (90-Degree)	Female NPT	Male Hose Thread
	90-ADJ-PRV-15-GG*	Angle Body (90-Degree)	Grooved Pipe	Grooved Pipe
2.5"	90-ADJ-PRV-25-FF	Angle Body (90-Degree)	Female NPT	Female NPT
	90-ADJ-PRV-25-FM	Angle Body (90-Degree)	Female NPT	Male Hose Thread
	90-ADJ-PRV-25-SG*	Inline Body	Grooved Pipe	Grooved Pipe
	90-ADJ-PRV-25-ST	Inline Body	Female NPT	Female NPT

*The grooved version of the 90-ADJ-PRV is limited for use within a sprinkler system and is not intended for connection to a fire hose.

2. APPLICATION GUIDELINES

A) Automatic Sprinkler Systems

The 90-ADJ-PRV is listed by Underwriters Laboratories as a Special System Water Control Valve – Pressure Reducing and Pressure Control Type (VLMT), and also meets the listing requirements for indicating valves. Installation requirements of these pressure reducing valves in automatic sprinkler systems are defined in the Standard for Installation of Sprinkler Systems, NFPA 13. The 2.5" valve is listed for use in Class I and Class III systems; the 1.5" valve is listed for use in Class II systems. In addition, the 90-ADJ-PRV is also listed as a checking device, eliminating the need for a separate check valve.

These valves are typically used in automatic sprinkler systems where supply riser pressures exceed 175 psi. When designing sprinkler systems that include this valve, please observe the following limitations:

Valve Model	Spring Setting	Max. Flow [GPM]	Max. Inlet Pressure [psig]
90-ADJ-PRV-15 FF, FM, and GG 1.5"	1	300	375
	2	300	325
	3	300	270
	4	300	190
	5	300	175
	6	300	175
90-ADJ-PRV-25 FF, FM, and GG 2.5"	1	500	390
	2	500	365
	3	500	330
	4	500	310
	5	500	245
	6	500	210

90-ADJ-PRV-25 SG, ST 2.5”	1	500	390
	2	500	350
	3	500	315
	4	500	300
	5	500	255
	6	500	230

Automatic Sprinkler Systems Installation Requirements:

1. To permit easy replacement or repair of the 90-ADJ-PRV, pipe unions or rubber gasketed couplings are to be installed immediately upstream or downstream of the valve.
2. A relief valve of not less than 1/2” NPT is to be installed on the downstream side of the pressure reducing valve; and,
3. Pressure gauges are to be installed on the inlet and outlet sides of each pressure reducing valve.
4. 90-ADJ-PRV Valve Type should be selected to provide an outlet pressure not exceeding 165 psig at the maximum inlet pressure.
5. A line-sized Tee connection is advised to be installed downstream of valves to allow full flow testing as required every 5 years by NFPA 25.
6. The minimum residual inlet pressure shall not be less than 50 psig.
7. Upon system completion, each valve must be tested under both flow and no-flow conditions to verify that static and residual outlet pressures and flow rates satisfy system design requirements as per NFPA 13.

B) Standpipe Systems

The 90-ADJ-PRV Series is suitable for use as a pressure reducing hose valve in standpipe systems. Cla-Val 90-ADJ-PRV valves are listed by Underwriters Laboratories as Standpipe Equipment Pressure Reducing Devices (VUTX); the 2.5” valve can be used for Class I and Class III systems while the 1.5” valve can be used for Class II systems.

Standpipe Installation Requirements:

1. NFPA 14 requires that hose valve outlet pressure for Class I and Class III service be no greater than 175 psi and no less than 100 psi. When permitted by the authority having jurisdiction, pressures less than 100 psi may be allowed; discharge pressure shall not be less than 65 psig.
2. Class II hose valve must be limited to a maximum residual outlet pressure of 100 psi; discharge pressure shall not be less than 65 psig.
3. Upon completion of the system, each Cla-Val 90-ADJ-PRV valve shall be tested in accordance with the Standard for the Installation of Standpipe and Hose Systems, NFPA 14, to verify that the installation is correct, that the valves are operating properly, and that the inlet and outlet pressures at the valve are in accordance with the system design.

C) Supervisory Switch

Housing assemblies are available for the attachment of a push-button supervisory switch to the 90-ADJ-PRV in both the 1.5” and 2.5” size. A listed normally open (NKK SB4011NOM) or normally closed (NKK SB4011NCM) switch may be specified.

D) General System Installation Instructions

1. Flush system thoroughly to remove rust, scale, or any other foreign debris that could damage the internal components of the valve.
2. Install the valve with the flow direction arrow oriented in the direction of flow; tighten valve to system using the hex surface provided. Alternate means of installation could result in serious damage to valve.
3. Bleed all trapped air from system to ensure accurate reading at the outlet. Trapped air may cause outlet pressure fluctuations at low flow conditions.
4. Valves are to be tested after installation in accordance with NFPA 13 or NFPA 14, or both NFPA 13 and 14, whichever is applicable.
5. Maintenance, inspection, and testing should be performed periodically after installation in accordance with NFPA 25, the Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection System.

3. VALVE CARE AND MAINTENANCE

The 90-ADJ-PRV series valve is classified as an Automatic Valve, and should not require repair during normal operating conditions. It is imperative for the system to be free of any debris to ensure a long life of the valve. After installation and testing of the valve, be sure to fill the system slowly to prevent water hammer. Annual flow tests are recommended to allow the valve to reset itself, and clear any debris from the system. If repair is necessary, the system should be drained, and access can be gained to the internal components by disassembling the bonnet from the body. Contact the factory for additional support and replacement components.

*Refer to NFPA 25 for required test frequency and methods

** Flow tests should be compared with previous test results

4. VALVE SETTING SELECTION

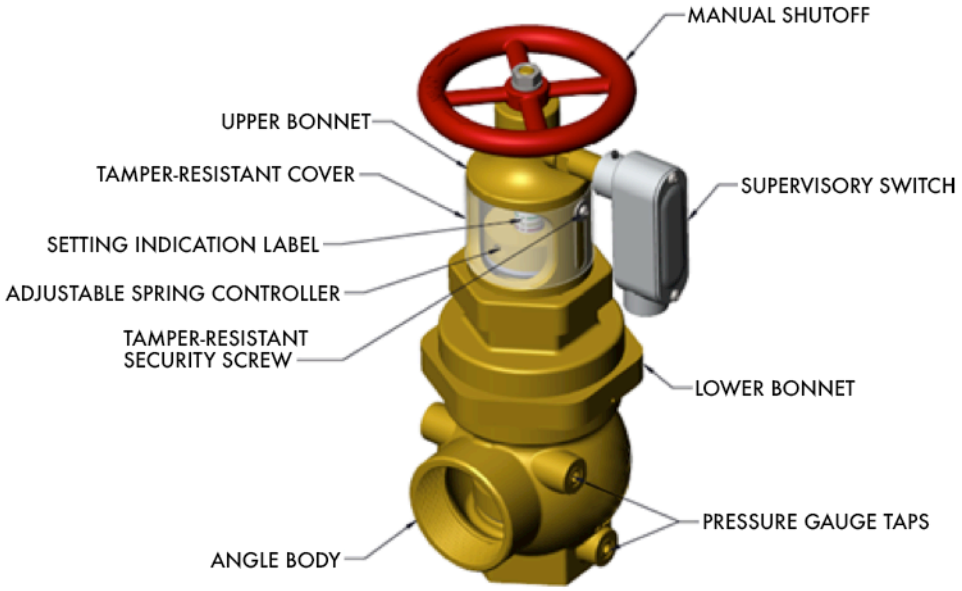
In order to accurately select the correct valve spring setting, complete water supply data will be required, including the residual pressure at each valve location. To select the correct valve for each location, use the following steps:

1. Determine the residual pressure at the valve inlet.
2. Determine the demand required at the outlet of the valve in gallons per minute.
3. Use the *Residual Pressure Chart* with the desired body size, style, and flow range; locate the inlet residual pressure on the vertical axis of the chart and draw a horizontal line across the chart.
4. Locate the desired residual valve outlet pressure on the horizontal axis of the chart and draw a vertical line.
5. The flow curve closest to the intersection of the two lines will be the appropriate valve setting.
6. Using the static inlet pressure from the water supply data, locate this value on the vertical axis of the *Static Pressure Chart*. Draw a horizontal line across to the flow curve, and from the flow curve vertically down to the horizontal axis. The static outlet pressure is at the intersection of the vertical line and the horizontal axis***.

** Ensure valves that have been intended for use in Sprinkler applications are compliant with the guidelines set by UL and NFPA 13.*
*** Ensure valves that have been intended for use in Standpipe applications are compliant with the guidelines set by UL and NFPA 14.*
**** Note: If the static outlet pressure exceeds the maximum outlet pressure as specified by NFPA 13 or NFPA 14, the next valve setting to the left of the selected valve setting shall be used and verified with the process above.*

Alternatively, a Valve Spring Calculator is available upon request.

Proper performance is dependent upon licensed, qualified personnel performing regular, periodic testing according to Cla-Val specifications and instructions, as well as prevailing governmental and industrial standards and codes. Failure to do so will release Cla-Val of any liability that it might have otherwise had with respect to that device. Such failure could also result in an improperly functioning device.



5. FIELD SETTING INSTRUCTIONS for 90-ADJ-PRV Series

1. Remove the Tamper-resistant security screws from the clear cover by using an ADJ-T Security tool provided with the valve. (If Supervisory Switch is installed, you may need to tilt this switch for access.) See Figure 1.

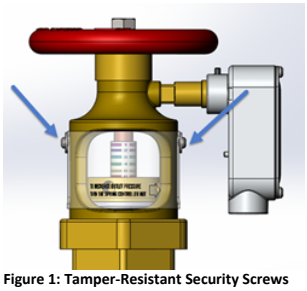


Figure 1: Tamper-Resistant Security Screws

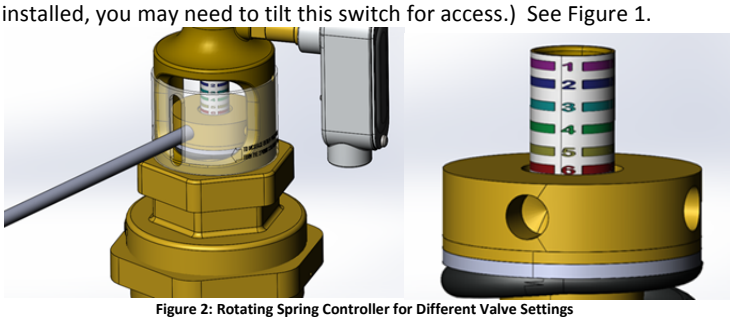


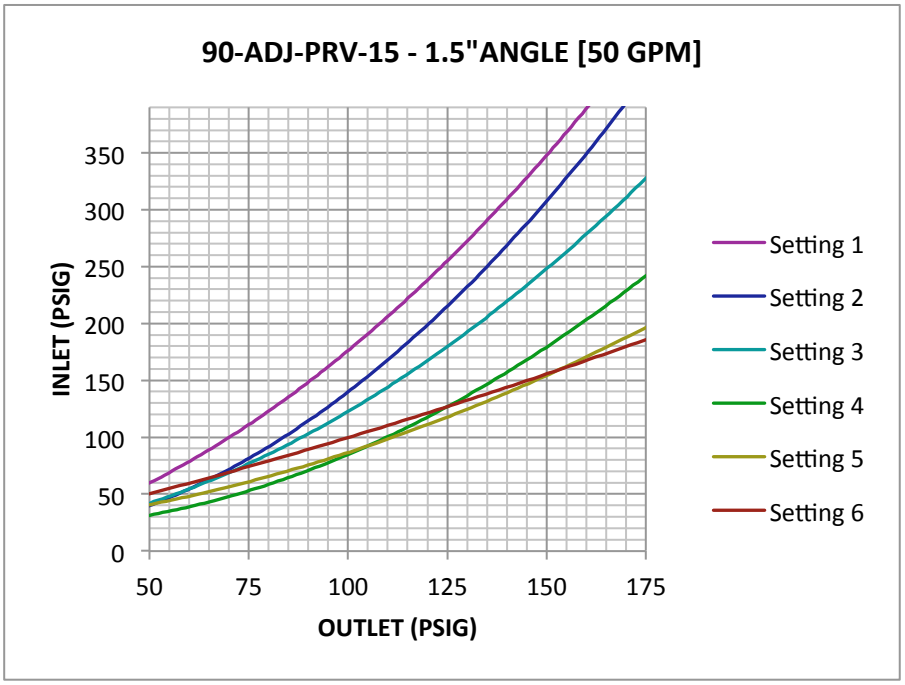
Figure 2: Rotating Spring Controller for Different Valve Settings

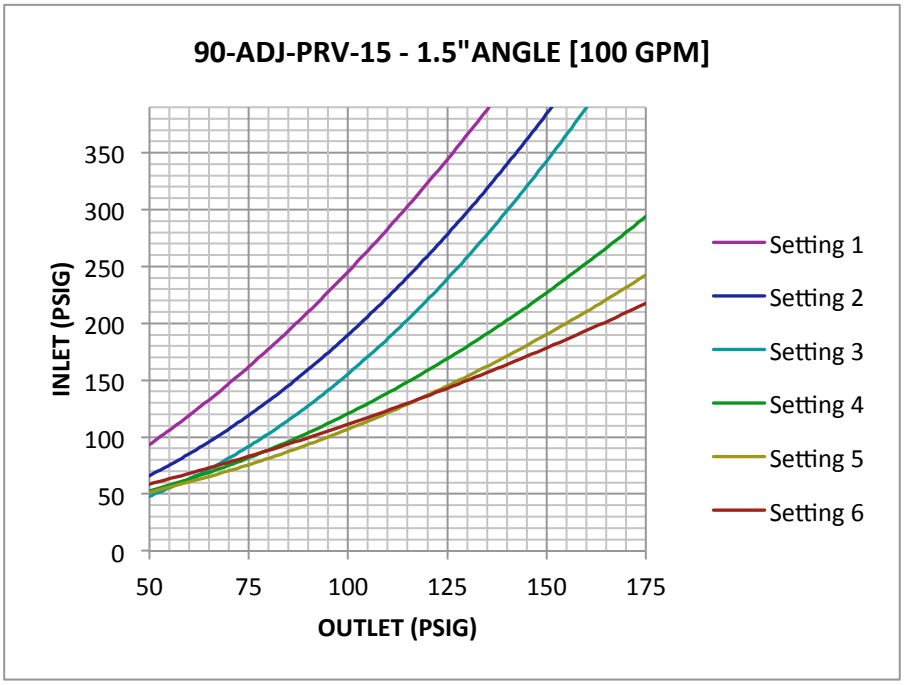
2. Rotate the clear cover as required: Insert adjustment tool (provided with the valve) through the slot in the clear cover and into the hole in the Adjustable Spring Controller. See Figure 2.
3. Rotate the Spring Controller until the top of the Spring Controller is aligned with the desired mark on the Indication Label (See Figure 2). Turn Clockwise to go from Valve Setting number 1 through 6.
4. When rotation limit is reached during adjustment remove the tool from the Spring Controller hole and re-insert the tool into the next available hole.
5. When the proper adjustment is obtained, verify the outlet pressure is correct with pressure gauges both upstream and downstream of the valve (during both flow and no-flow pressure testing). Make adjustments as required (Counterclockwise rotation of the Spring Controller is possible).
6. Once the valve is properly adjusted, replace the tamper-resistant security screw that was removed in step 1.

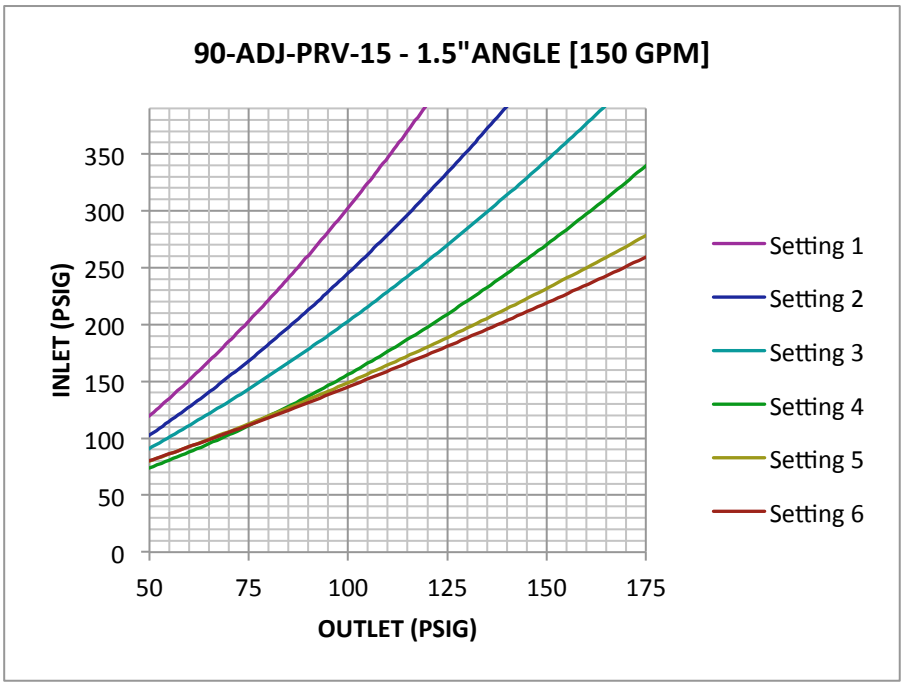
*** ADJ-T Security Tool and Adjustment Tool should be stored in a special location for Fire Department use.

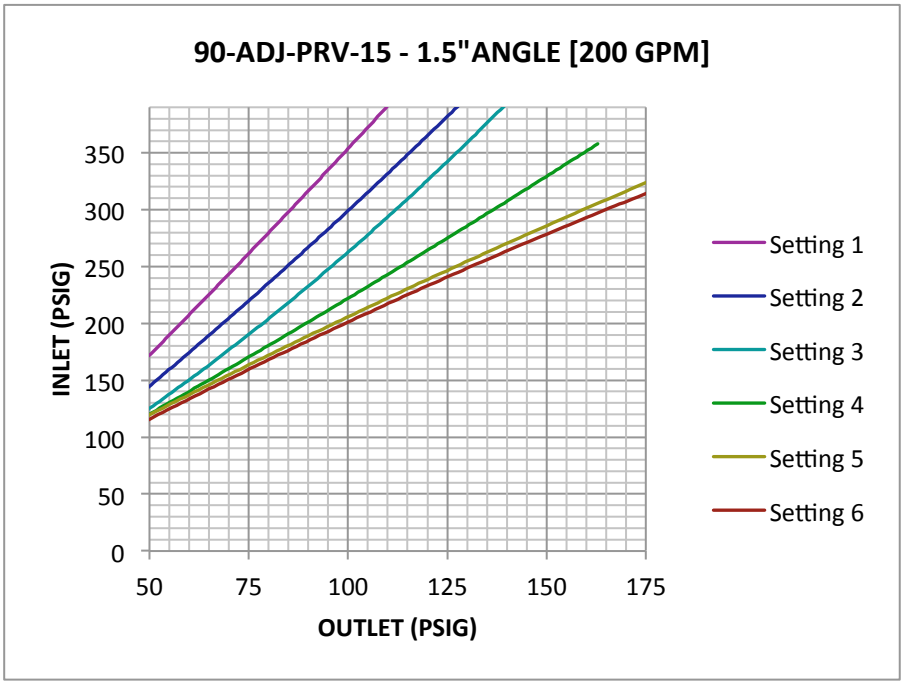
6. FLOW CHARTS

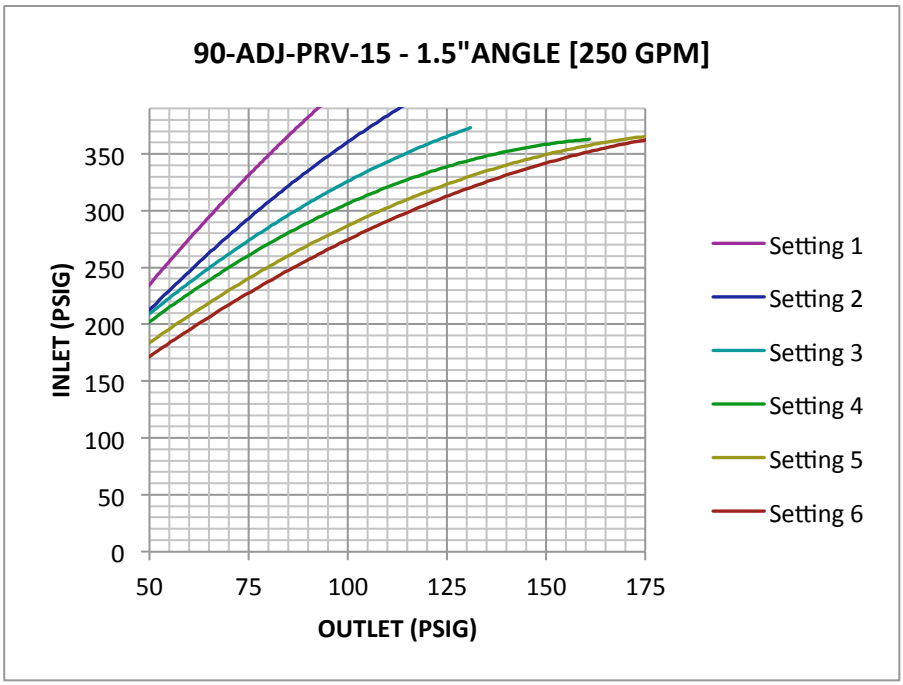
NOTE: the outlet pressures shown on the following charts are subject to a tolerance of +-10%

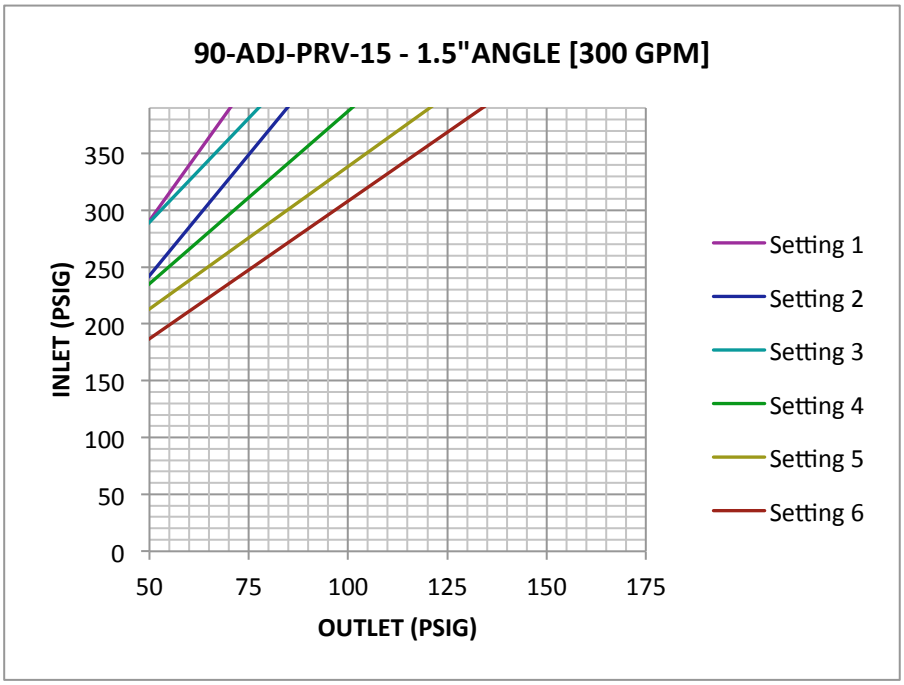


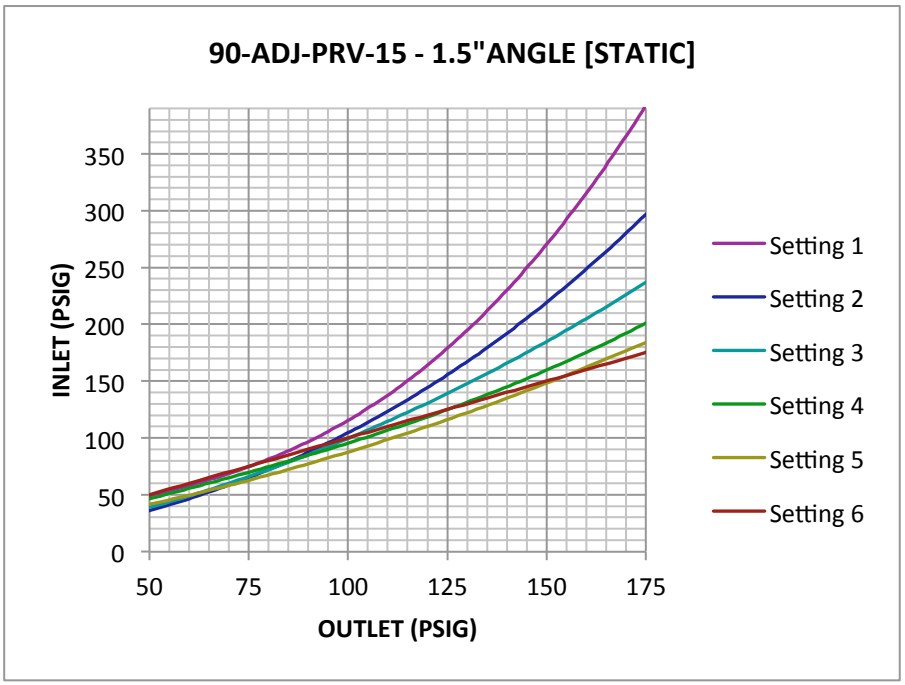


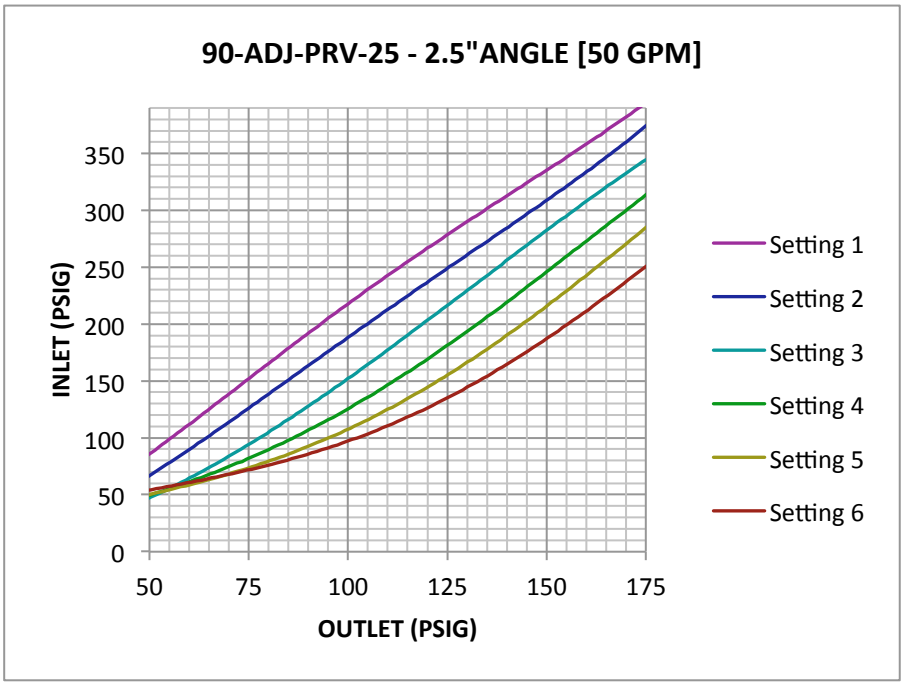

90-ADJ-PRV-15 - 1.5"ANGLE [150 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

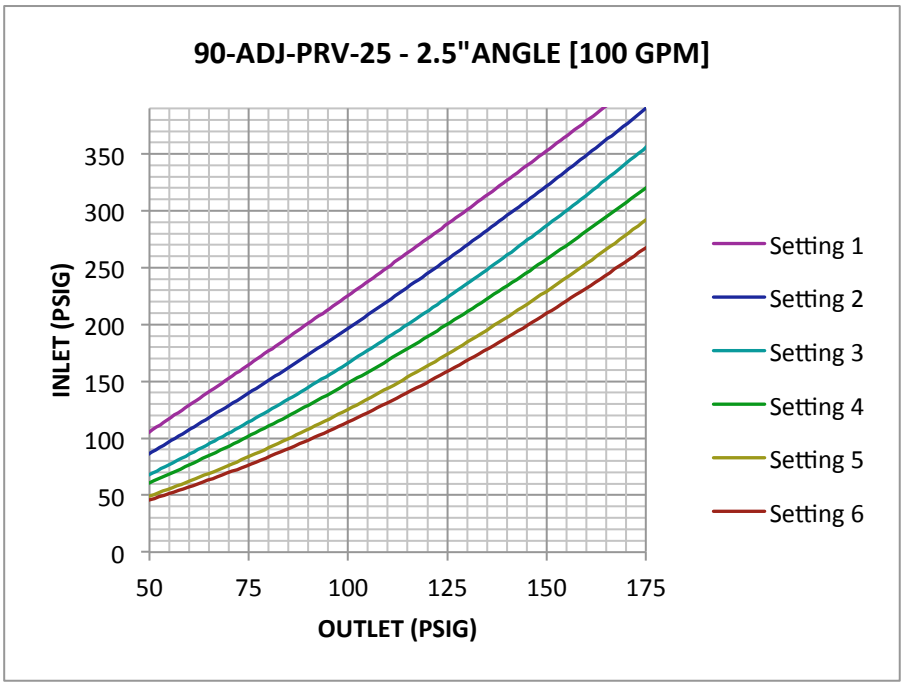

90-ADJ-PRV-15 - 1.5"ANGLE [200 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

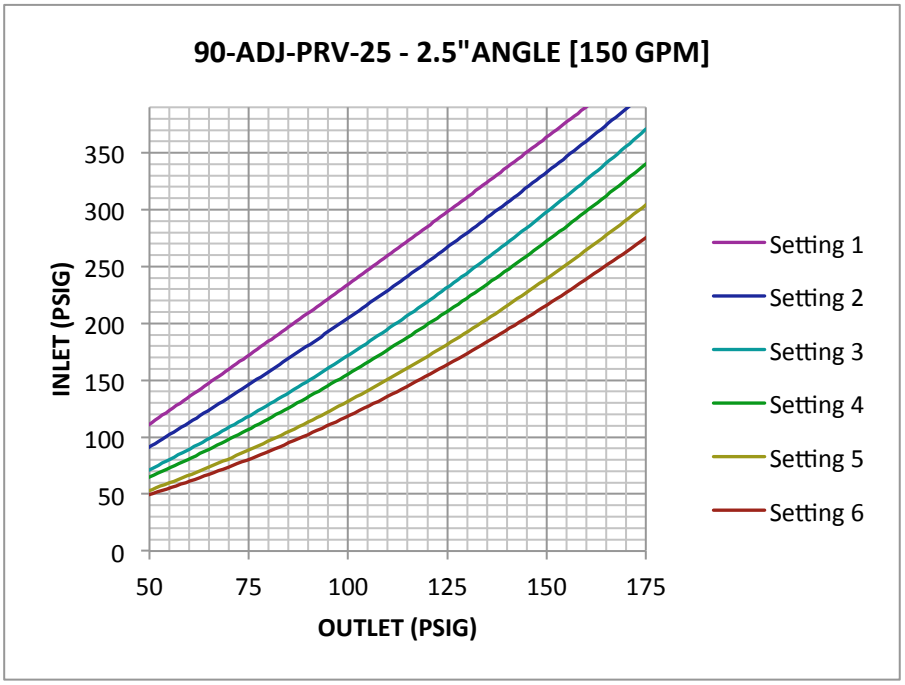

90-ADJ-PRV-15 - 1.5"ANGLE [250 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

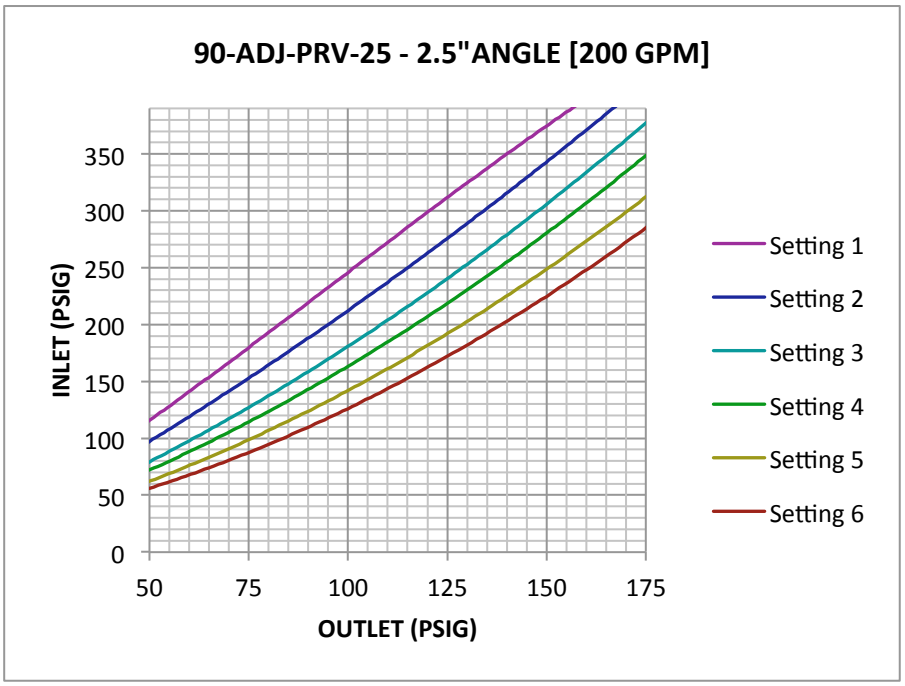

90-ADJ-PRV-15 - 1.5"ANGLE [300 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-15 - 1.5"ANGLE [STATIC]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"ANGLE [50 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"ANGLE [100 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"ANGLE [150 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6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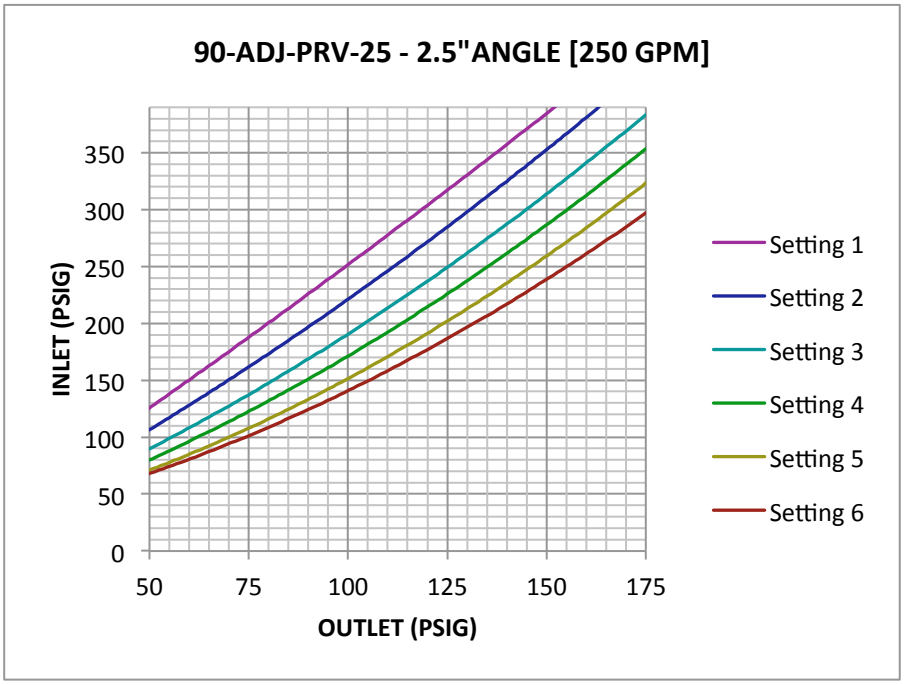
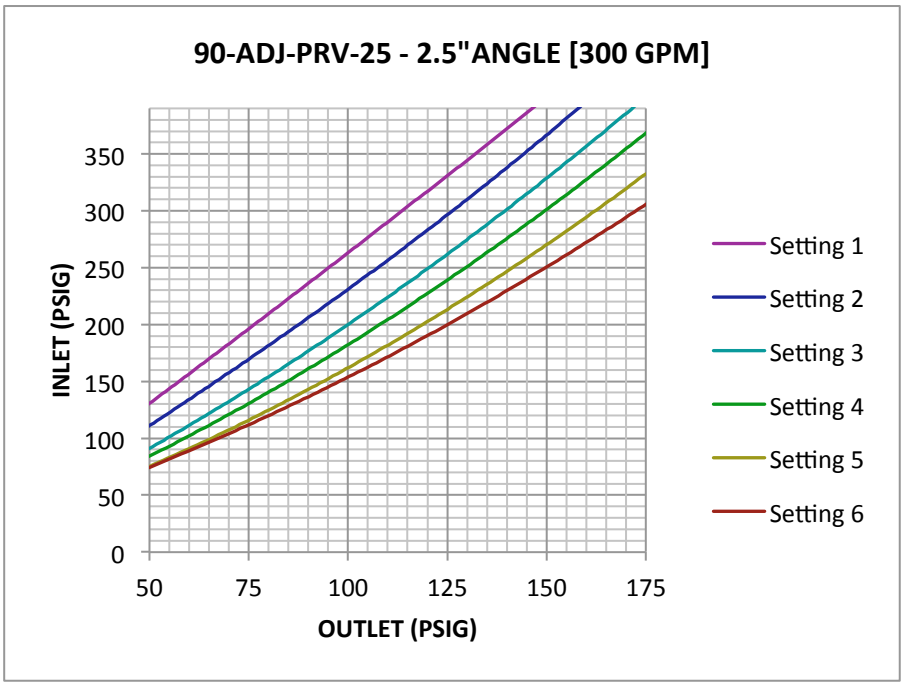
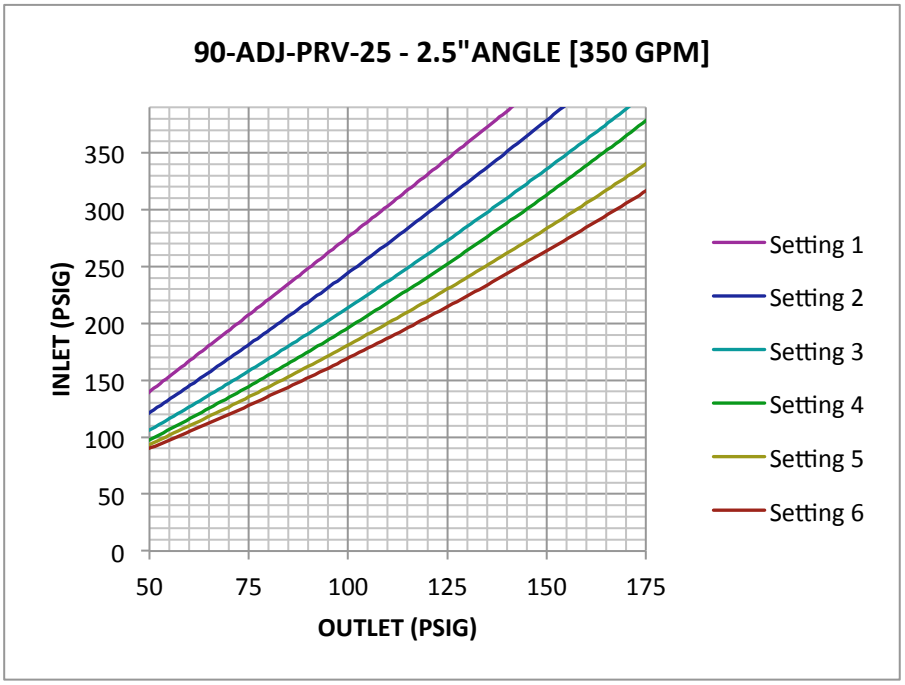
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"ANGLE [250 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"ANGLE [300 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6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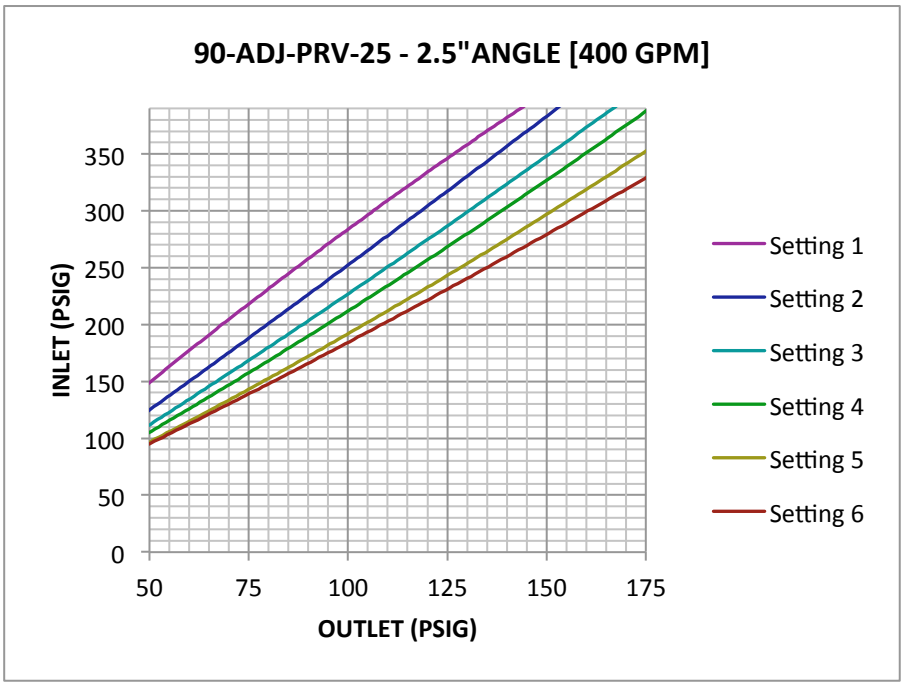
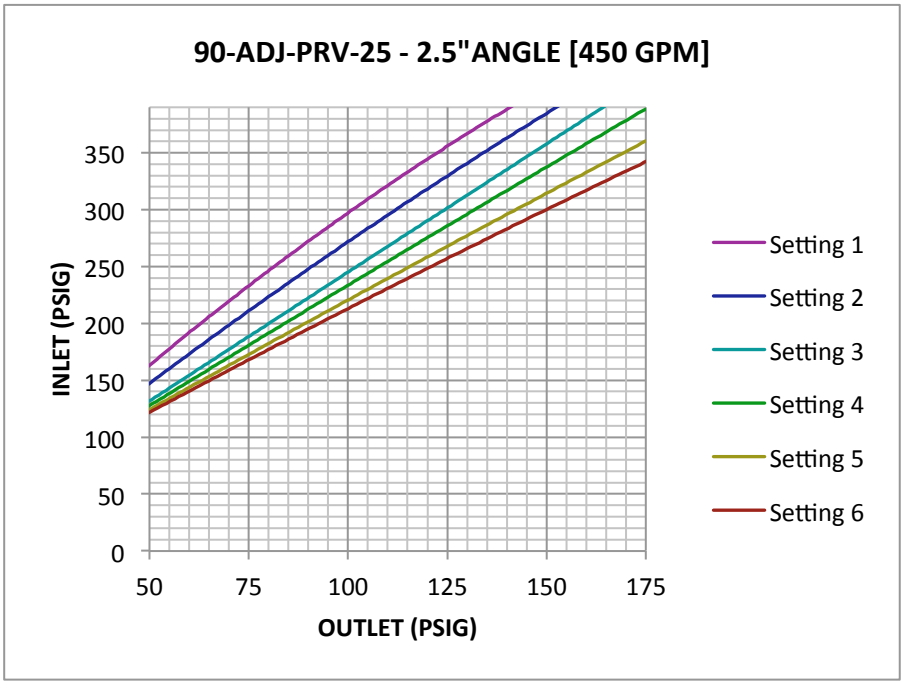
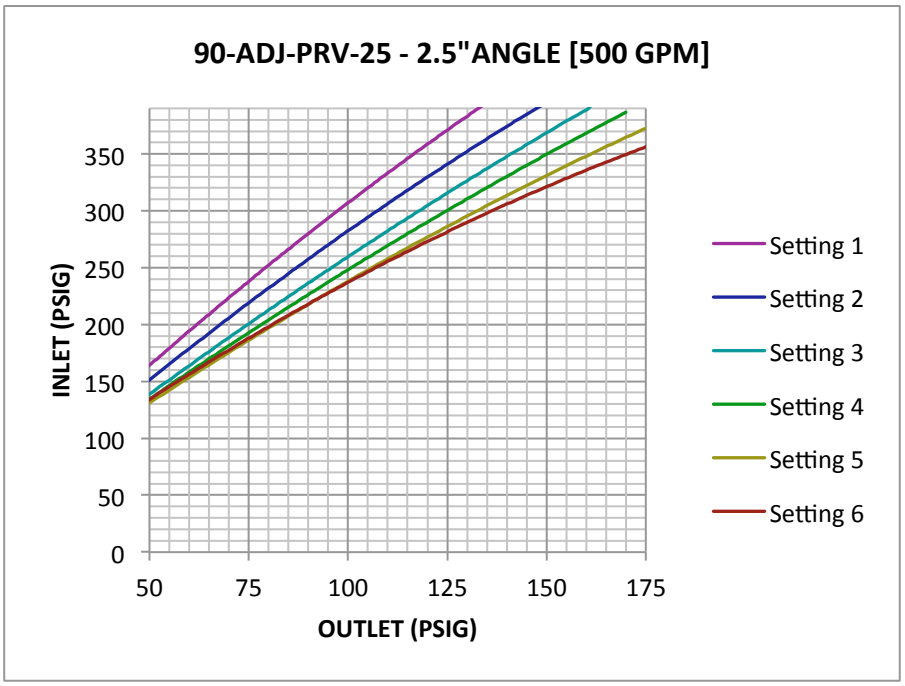
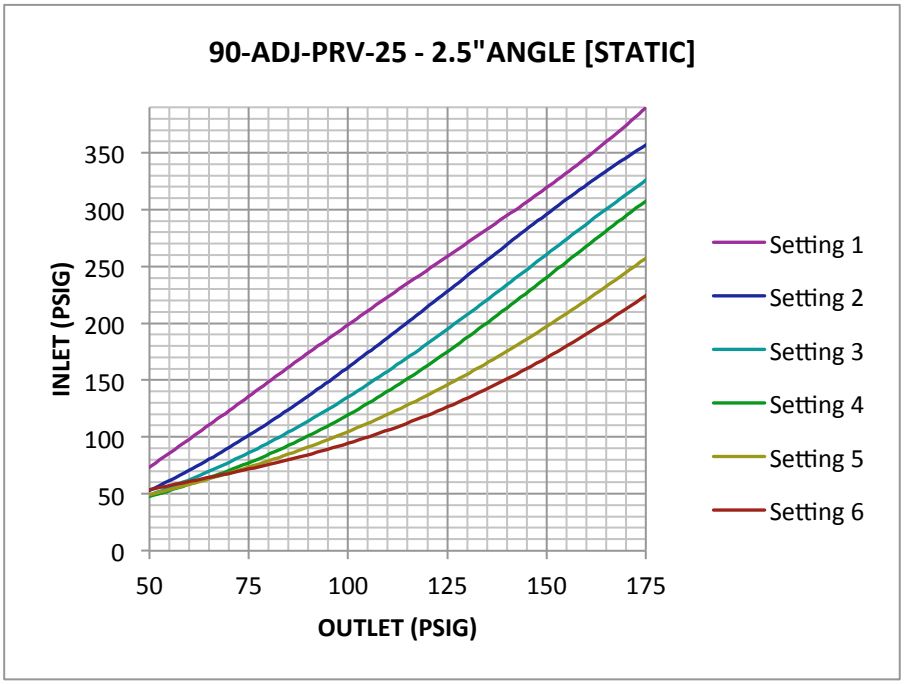
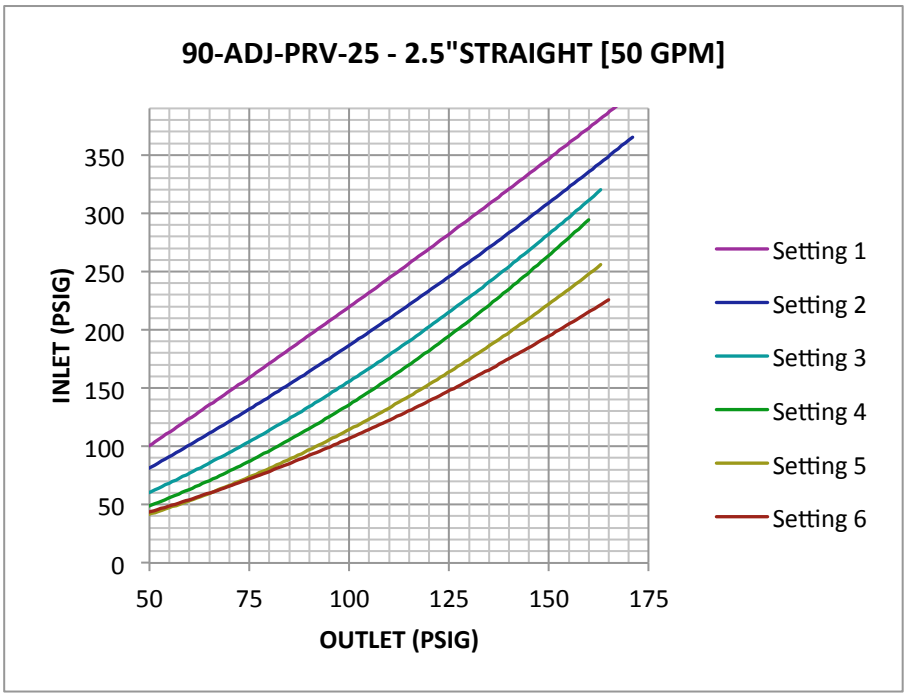
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

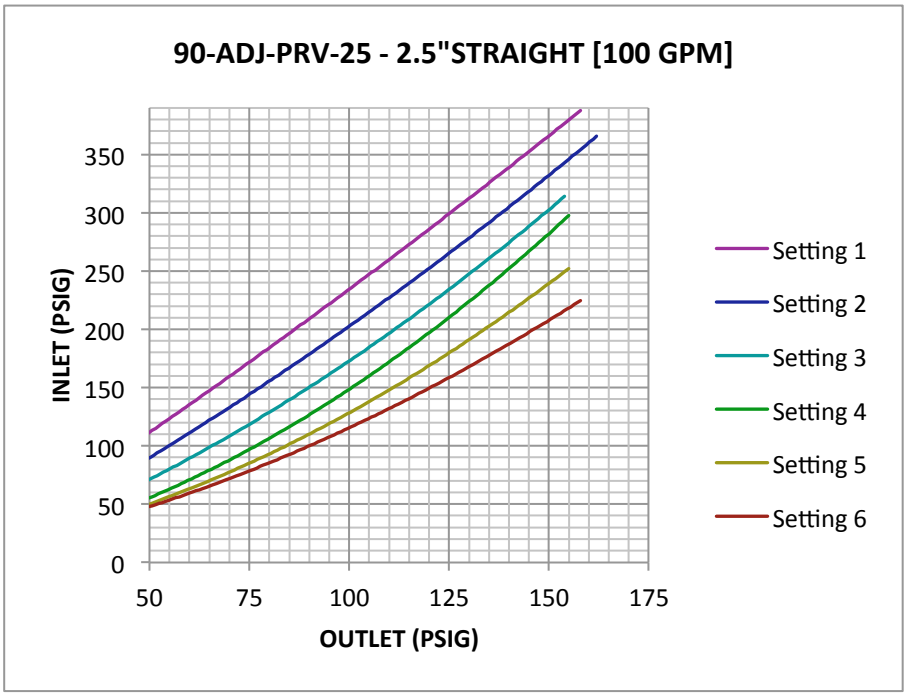

90-ADJ-PRV-25 - 2.5"ANGLE [400 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

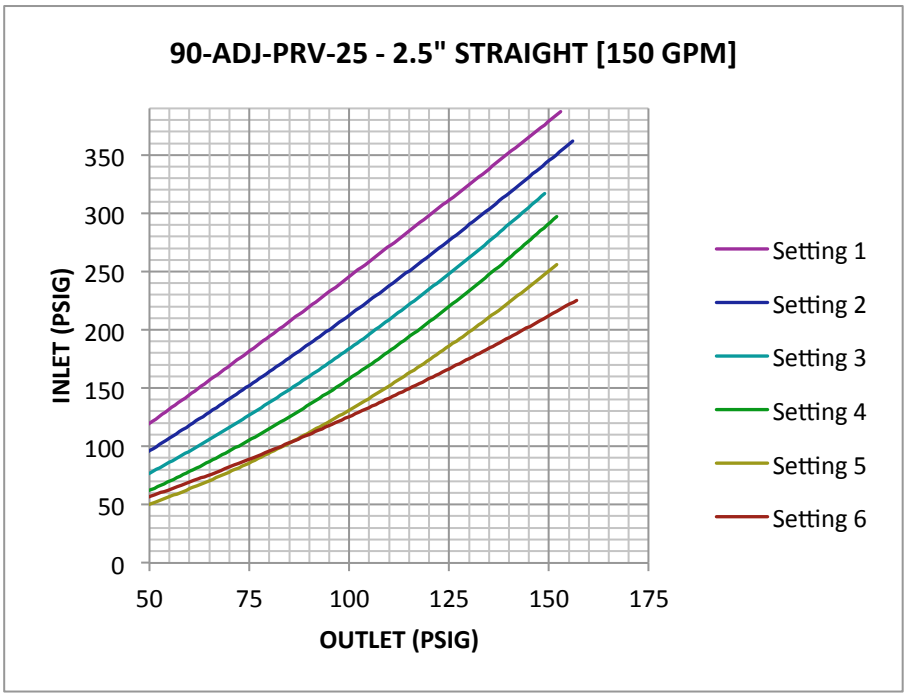

90-ADJ-PRV-25 - 2.5"ANGLE [450 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"ANGLE [500 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"ANGLE [STATIC]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"STRAIGHT [50 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5"STRAIGHT [100 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6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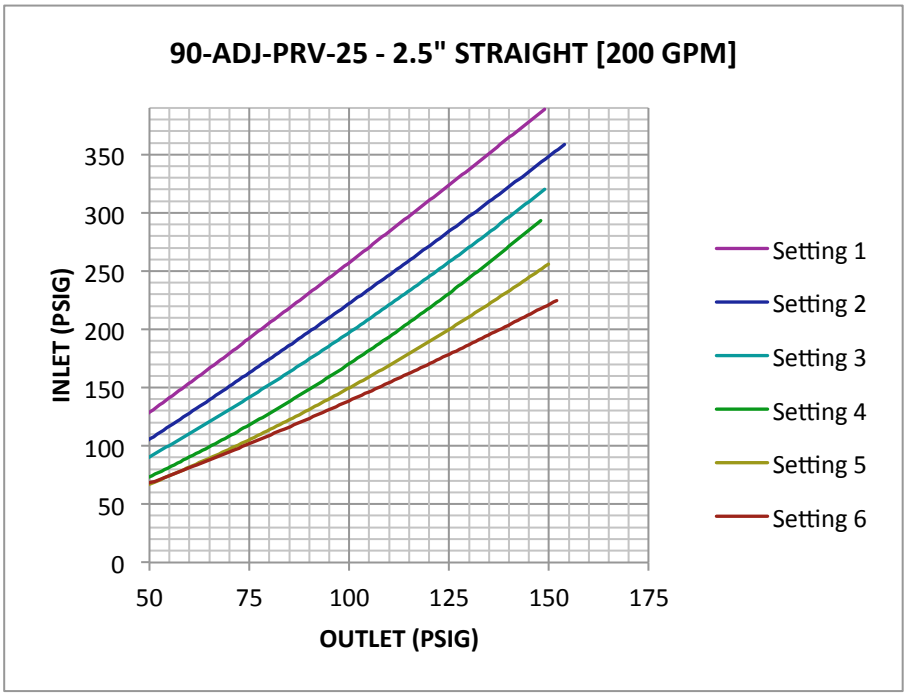
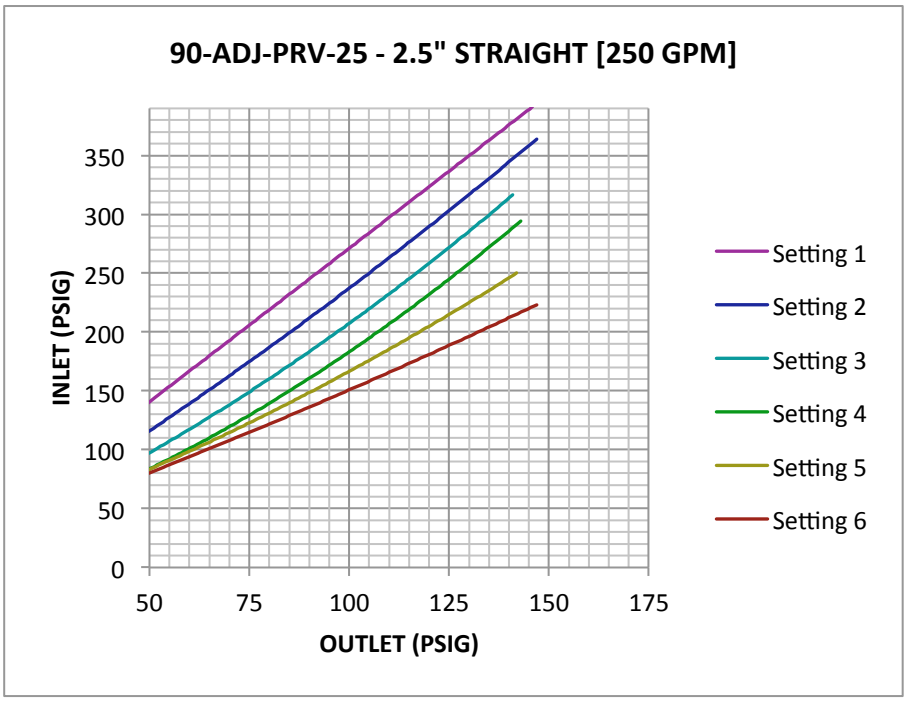
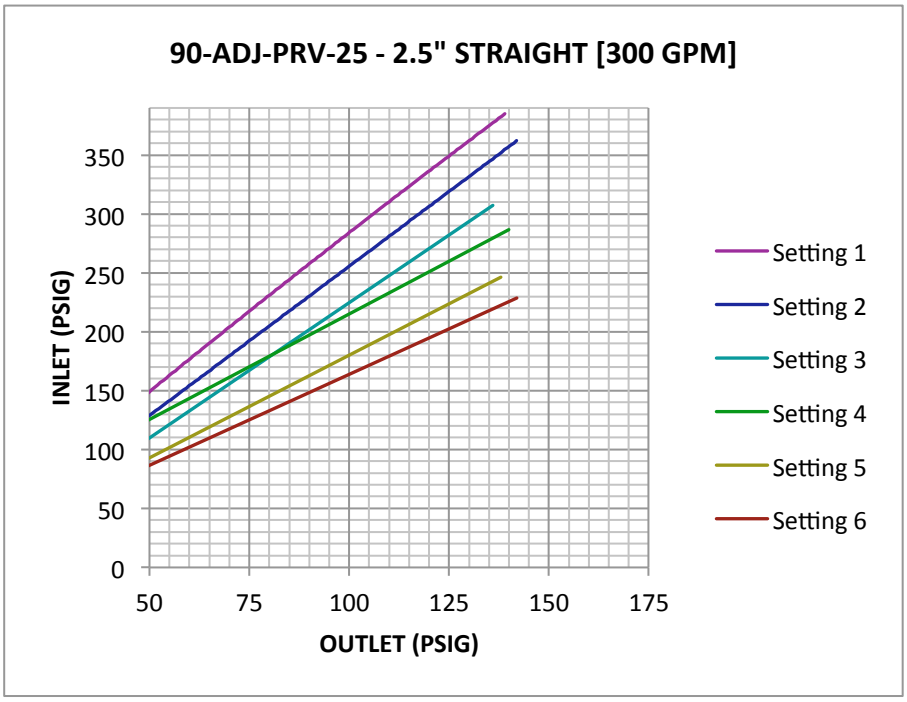
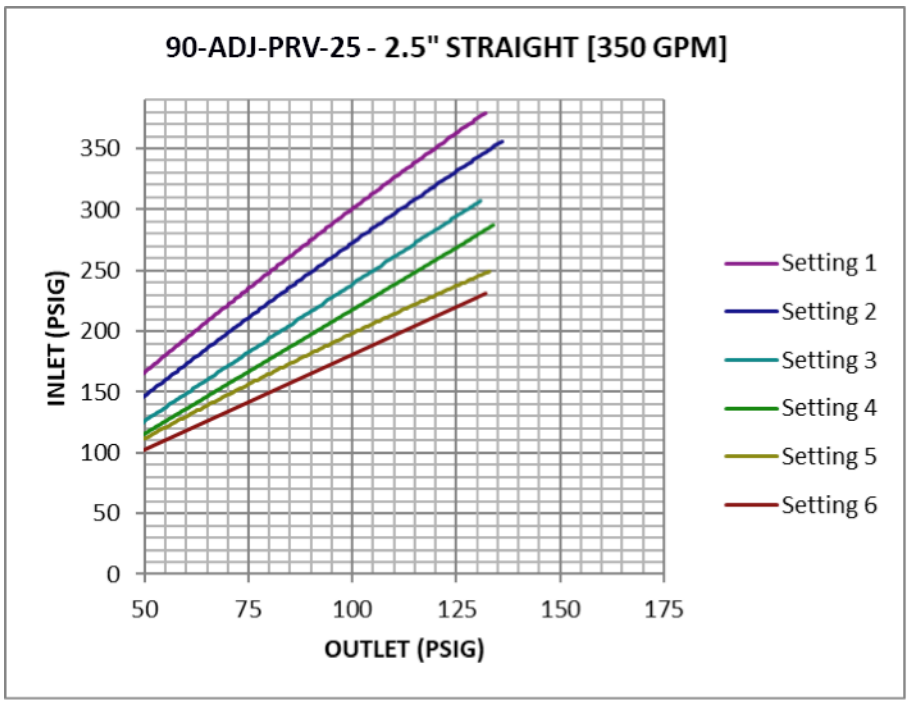
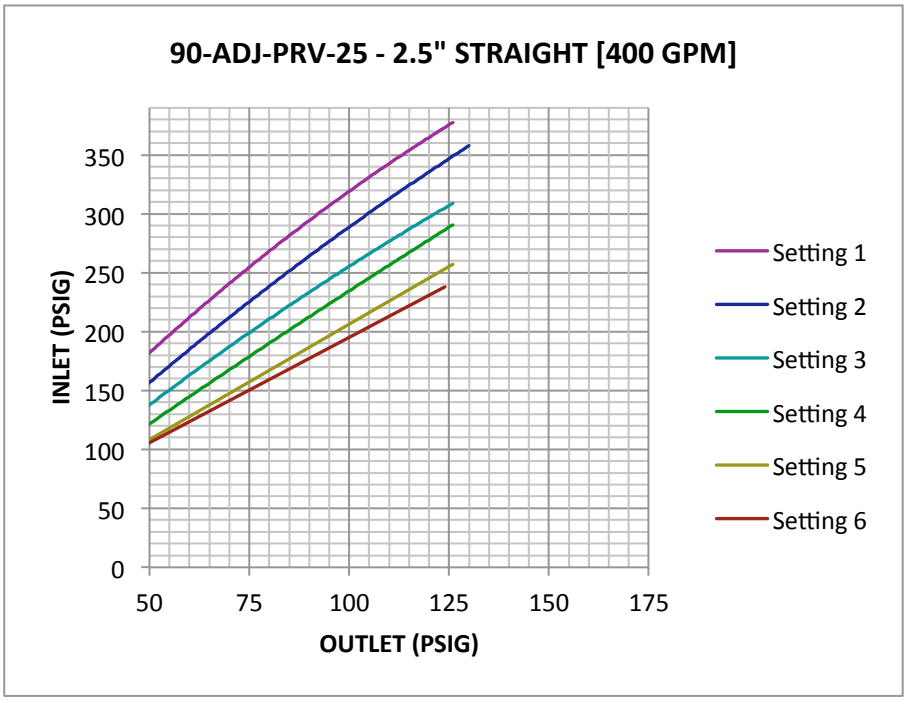
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

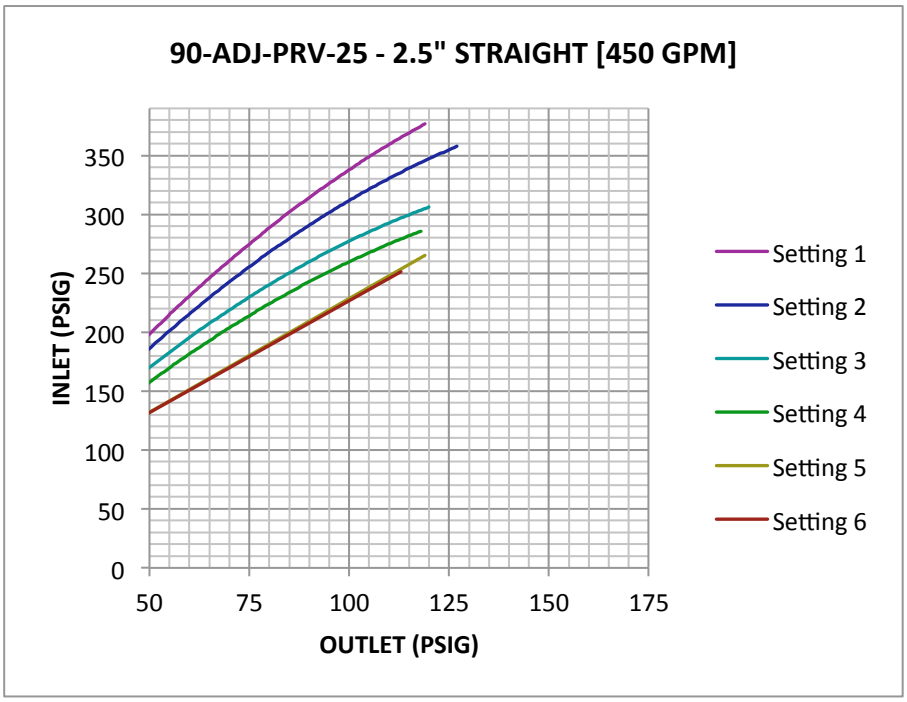

90-ADJ-PRV-25 - 2.5" STRAIGHT [200 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

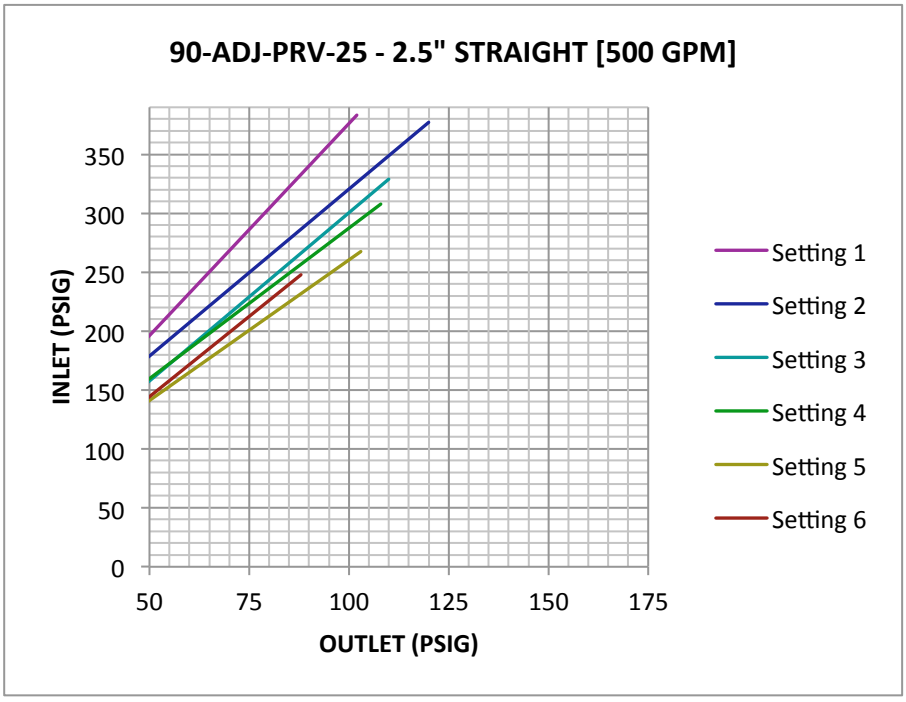

90-ADJ-PRV-25 - 2.5" STRAIGHT [250 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

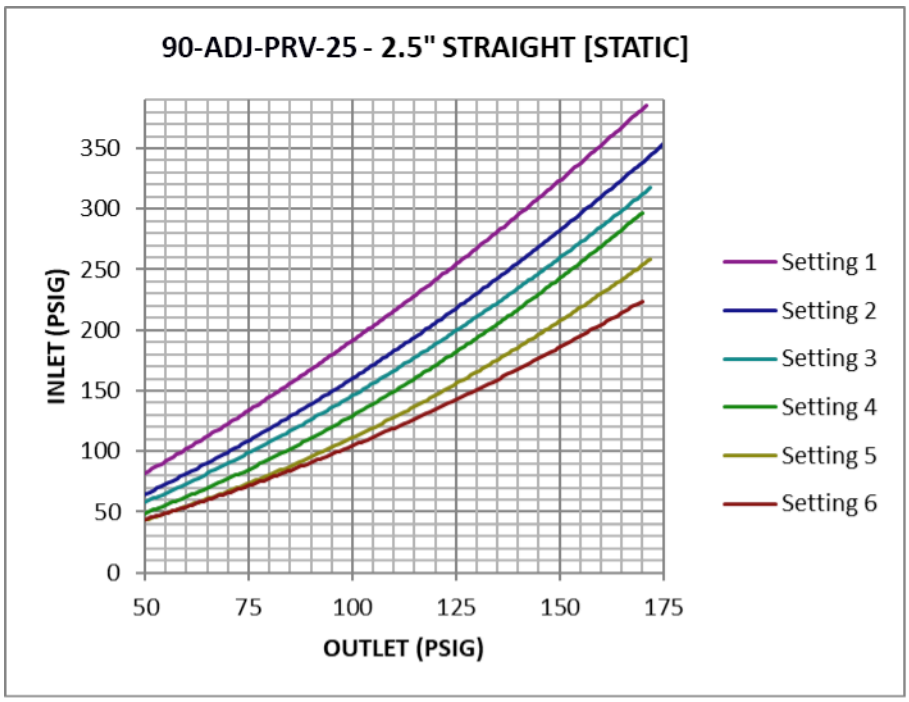

90-ADJ-PRV-25 - 2.5" STRAIGHT [300 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5" STRAIGHT [350 GPM]
INLET (PSIG)
350
300
250
200
150
100
50
0
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5" STRAIGHT [400 GPM]
INLET (PSIG)
350
300
250
200
150
100
50
0
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5" STRAIGHT [450 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5" STRAIGHT [500 GPM]
INLET (PSIG)
0
50
100
150
200
250
300
350
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6


90-ADJ-PRV-25 - 2.5" STRAIGHT [STATIC]
INLET (PSIG)
350
300
250
200
150
100
50
0
50
75
100
125
150
175
OUTLET (PSIG)
Setting 1
Setting 2
Setting 3
Setting 4
Setting 5
Setting 6

When protecting life and property, depend on Cla-Val.

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N-90-ADJ-PRV (R-06/2019)