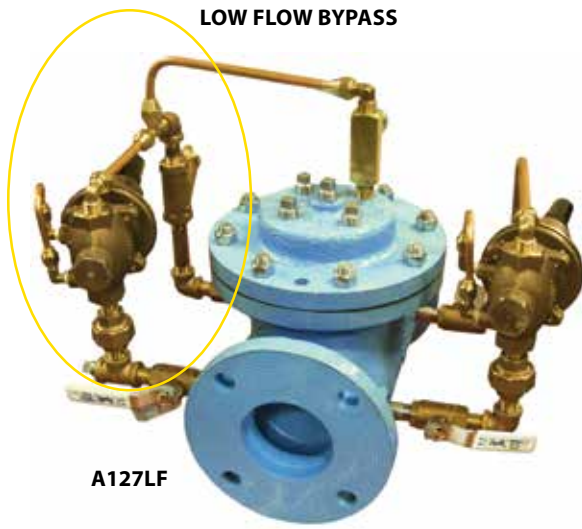


CONTROL VALVES

Pressure Reducing Valve Sizing Guide



A127LF

Sizing pilot operated reducing valves is not a complicated process. It starts with determining requirements and following these guidelines in valve size selection. Sizing the PRV involves two factors; Pressure Drop or Differential and Flow Rate.

STEP 1 –

Determine the application type where the valve is being used. Refer to the comments “Sizing Guidelines” under the category selected on page 5 and 6.

- Commercial / Residential Buildings –
- Refer to the fixture usage table for examples of usage in these types of applications.
- Distribution System
- Process System

STEP 2 –

Determine the pressure differential – this is the difference between the inlet pressure (–) minus the outlet pressure.

Example:

INLET 100 psi – OUTLET 50 psi (the pressure desired in the system) Difference = 50 psid

INLET 80 psi – OUTLET 40 psi (the pressure desired to provide to the system) Difference = 40 psid

STEP 3 –

Determine the flow rate (range) that your system may require, Minimum and Maximum flows.

STEP 4 –

Select the valve size from the table on the next page that best fits the application conditions. Select the valve size that provides minimum and maximum flow ranges (min.-max.) for the pressure drop/differential that was calculated. The following types of PRV applications may apply.

SINGLE VALVE

One valve can handle the minimum and maximum at the pressure drop/differential required.

Example: INLET 100 psi with 50 psi OUTLET pressure (differential 50 psi), flows from 25 gpm to 500 gpm. Line size is 4". Valve selection would be the reduced port 4". Outlet pressure would be constant 50 psi over the required flow range.

- 4" Full Port Valve 38-1000 gpm.
- 4" Reduced Port Valve (4" flanges x 3" internals) 29-630 gpm

SINGLE VALVE WITH LOW-FLOW BYPASS

Valves can be equipped with a direct acting regulator or low flow bypass to regulate extremely low flows. This bypass regulator, mounted on the larger main valve, is set at a pressure of 5-10 psi higher than the main valve pilot. It reduces pressure under low flow conditions until the flow rate increases beyond its capacity and the outlet pressure drops. When pressure reaches the main valve pilot setting, it opens to provide pressure at the higher flows. The low-flow bypass configuration is typical for use in “building applications.”

- Direct acting low flow regulators have limited flow capacity. They are most effectively applied to valves sizes 6" x 4" and smaller.

PARALLEL PRESSURE REDUCING VALVES

If one (1) valve is capable of handling the low flow requirements but not the high flow, then two parallel valves may be required. Similar to the low flow bypass, the smaller PRV controls the lower flow rates at a slightly higher pressure setting than the larger PRV. This PARALLEL configuration allows pressure control over a wide range of flows.

- To avoid a gap in flow ranges, select valves so the smaller valve high flow overlaps the larger valve low flow.

Example: INLET 80 psi with 40 psi OUTLET pressure (differential 40 psi) Flows from 10 gpm to 800 gpm.



Selection options would be:

LOW FLOW	
1 1/2" flow range	5 gpm - 154 gpm
2" flow range	9 gpm - 260 gpm
HIGH FLOW	
4" flow range	38 gpm - 1000 gpm
6" x 4" flow range	41 gpm - 1100 gpm

PARALLEL PRESSURE REDUCING VALVE APPLICATION

FIRE PROTECTION CONTROL VALVES

Pressure Reducing Valve

129FC SERIES



The Model 129FC automatically reduces high pressure in building riser pipe to a pressure that can be easily handled by the fire protection components it supplies.

FEATURES:

- Maintains constant discharge pressure despite variations in demand or inlet pressure.
- Eliminates pressure fall off.
- Easily adjusted for discharge pressure ranging from 50-165 psi.
- Easily cleaned, repaired and adjusted without removal from the line.
- Underwriters Laboratories listed, Control Number 1855. (manufactured by OCV Control Valves)
- Diaphragm assembly guided top and bottom is the only moving part of the main valve.
- UL / ULC Listed for pressure control service in sizes 1.5" - 8", globe or angle configuration. (manufactured by OCV Control Valves)
- Horizontal or vertical mounting in all sizes.
- ANSI Flanged Class 150 or Class 300.
- Grooved end flanges available on 1.5" - 6".
- Screwed end flanges available on 1.5", 2", 2.5" and 3".

* See Specifications sheet for options

Fire Pump Relief Valve

108FC SERIES



The Model 108FC automatically relieves excess fire pump discharge pressure, to prevent the pressure from exceeding the rating of the fire system components.

FEATURES:

- Limits maximum pump discharge pressure.
- Adjustable 60-180 psi or 100-300 psi.
- Factory tested and pre-set to your requirements.
- UL Listed & Factory Mutual Approved for both split-case centrifugal and vertical turbine pumps. (manufactured by OCV Control Valves)
- Sizes 3" - 8", globe and angle pattern.
- ANSI Flanged Class 150, Class 300, and 300 inlet x 150 outlet.

* See Specifications sheet for options

Thermal Expansion Pressure Relief Valve

1330FC SERIES



The model 1330FC is a two-way, normally closed valve, that senses pressure under its diaphragm and balances it against an adjustable spring load. An increase in pressure above the spring set point tends to make the valve open.

FEATURES:

- UL Listed. (manufactured by OCV Control Valves)
- 1330FC meets the NFPA 13 requirement for an approved thermal expansion relief valve to be installed downstream of all pressure reducing valves in all sprinkler systems.
- Field adjustable spring range 60-175 psi for accurate control.
- Local sense line (self-contained sense loop).
- All parts replaceable while valve is installed.
- Bronze, stainless steel or nickel aluminum bronze construction.

* See Specifications sheet for options

Pump Suction Control Valve

108FPS SERIES



The model 108FPS is used to prevent the fire pump from outdrawing the available supply. In so doing, it protects the pump suction supply from damage associated with a pressure that is too low or backflow and assures adequate supply pressure to the fire system components.

FEATURES:

- Maintains minimum pump suction pressure.
- Installs on fire pump discharge; senses pump suction.
- Suction pressure is adjustable with single screw.
- Adjustable 5-30 psi range.
- Sizes 3" - 8", globe and angle
- Pilot-operated main valve.
- Maintain without removal from the line.
- Adjustable opening speed.
- Factory tested and can be pre-set to your requirements.
- Factory Mutual Approved. (manufactured by OCV Control Valves)

* See Specifications sheet for options

ADDITIONAL WATER APPLICATION SOLUTIONS

Pressure Relief/Back Pressure

A108 SERIES

NSF



In many liquid piping systems, it is vital that line pressure is maintained within relatively narrow limits. This is the function of the A108 Pressure Relief/Back Pressure Series of the Apollo control valves. Installed in the main flow line, the standard Model A108 acts as a back pressure or pressure sustaining valve. In this configuration, the valve maintains a constant upstream pressure regardless of fluctuating downstream demand. When used in a bypass line, the same model will function as a relief valve, protecting the system against potentially damaging surges.

FEATURES:

- Relief: Maintains a constant inlet pressure by relieving excess high pressure.
- Sustaining: Prevents pressure from dropping below a minimum.
- Inlet pressure is accurate over a wide range of flow.
- Inlet pressure is adjustable with a complete range of control springs.
- Quick opening with controlled closing.
- Isolation ball valves to facilitate maintenance and troubleshooting.
- Spring ranges (inlet setting): 5-30 psi, 20-80 psi, 20-200 standard psi, and 100-300 psi.
- High pressure model A108-2HP spring ranges (inlet setting): 200-750 psi.

* See specifications sheet for material options.

Solenoid Control

A115 SERIES

NSF



The Apollo Series A115 Solenoid Control Valve is designed to provide on/off or open/close control of fluids in response to an electrical signal. The valve consists of the basic Apollo model A65 with solenoid-operated pilot. With the appropriate solenoid, the valve may be normally closed (energize to open) or normally open (energize to close).

FEATURES:

- The A115 Series provides responsive control in answer to such triggering devices as clocks, timers, relays, probes, pressure or temperature sensors.
- Available for AC or DC voltages.
- Wider range of sizes and flow capacity than is available with direct-acting solenoid valves.
- Valves can be equipped with Manual Override solenoid operation.
- Solenoid feature can be added to other hydraulic control functions.
- Isolation ball valves to facilitate maintenance and troubleshooting.

* See specifications sheet for material options.

Differential Control

A110 SERIES

NSF



The Apollo A110 Series Differential Control Valve is designed to accurately control the pressure difference between any two points. In some systems this means the valve remains closed until pressure differential commands its opening. It is a pilot operated, modulating type valve which controls pressure accurately and consistently at the desired setting.

FEATURES:

- Opens on increasing differential.
- Dual pilot sense lines can be valve or remote connected.
- Differential is adjustable over complete range of control springs.
- Isolation ball valves to facilitate maintenance and troubleshooting.
- Spring ranges (outlet setting): 5-30 psid, 20-80 psid, 20-200 psid, and 100-300 psid.

* See specifications sheet for material options.

ADDITIONAL WATER APPLICATION SOLUTIONS

Rate of Flow

A120 SERIES

NSF



The Apollo Series A120 Rate of Flow control valve is designed to control or limit flow to a predetermined rate, regardless of fluctuations in downstream or upstream pressure.

FEATURES:

- Self contained, including the differential sensing orifice plate and pilot.
 - Flow rate is field adjustable (within orifice bore range).
 - Extra sensitive differential pilot specifically designed for rate of flow application.
 - Works equally well on all types of clean, nonabrasive liquids.
 - Isolation ball valves to facilitate maintenance and troubleshooting.
- * See specifications sheet for material options.

Float Control

A800 SERIES

NSF



The Apollo Series A800 Float Control Valves are designed to maintain a desired level in a tank or reservoir by opening for filling the tank when fluid is below the high level point and closing tightly when the desired level is reached.

FEATURES:

- The A800 is a non-modulating valve; either full open or full closed. It is available in two basic configurations:
 1. Model A800, with the float pilot provided separate from the main valve for remote mounting. This configuration is used when the fill line is located at the bottom of the tank.
 2. Model A800VM, with the float pilot mounted on the main valve. This configuration is typically used when the fill line is located at the top of the tank.
 - All Series A800 valves include an Apollo Model A65 Basic Valve assembly and a Model A814 three-way rotary float pilot. For faster operation, valves 8" and larger also include a three-way auxiliary pilot.
 - Isolation ball valves to facilitate maintenance and troubleshooting.
- * See specifications sheet for material options.

Diaphragm Check

A94 SERIES

NSF



The Apollo Series A94 Check Valve is a simple on-off valve that opens to allow forward flow when inlet pressure exceeds outlet and closes tightly to prevent backflow when outlet pressure exceeds inlet pressure.

FEATURES:

- Non-surge opening and/or closing when equipped with adjustable opening and/or closing speed controls.
 - Equipped with valve position indicator on all models.
 - Isolation ball valves to facilitate maintenance and troubleshooting.
- * See specifications sheet for material options.

ADDITIONAL WATER APPLICATION SOLUTIONS

Digital Electronic Valve

A22 SERIES

NSF

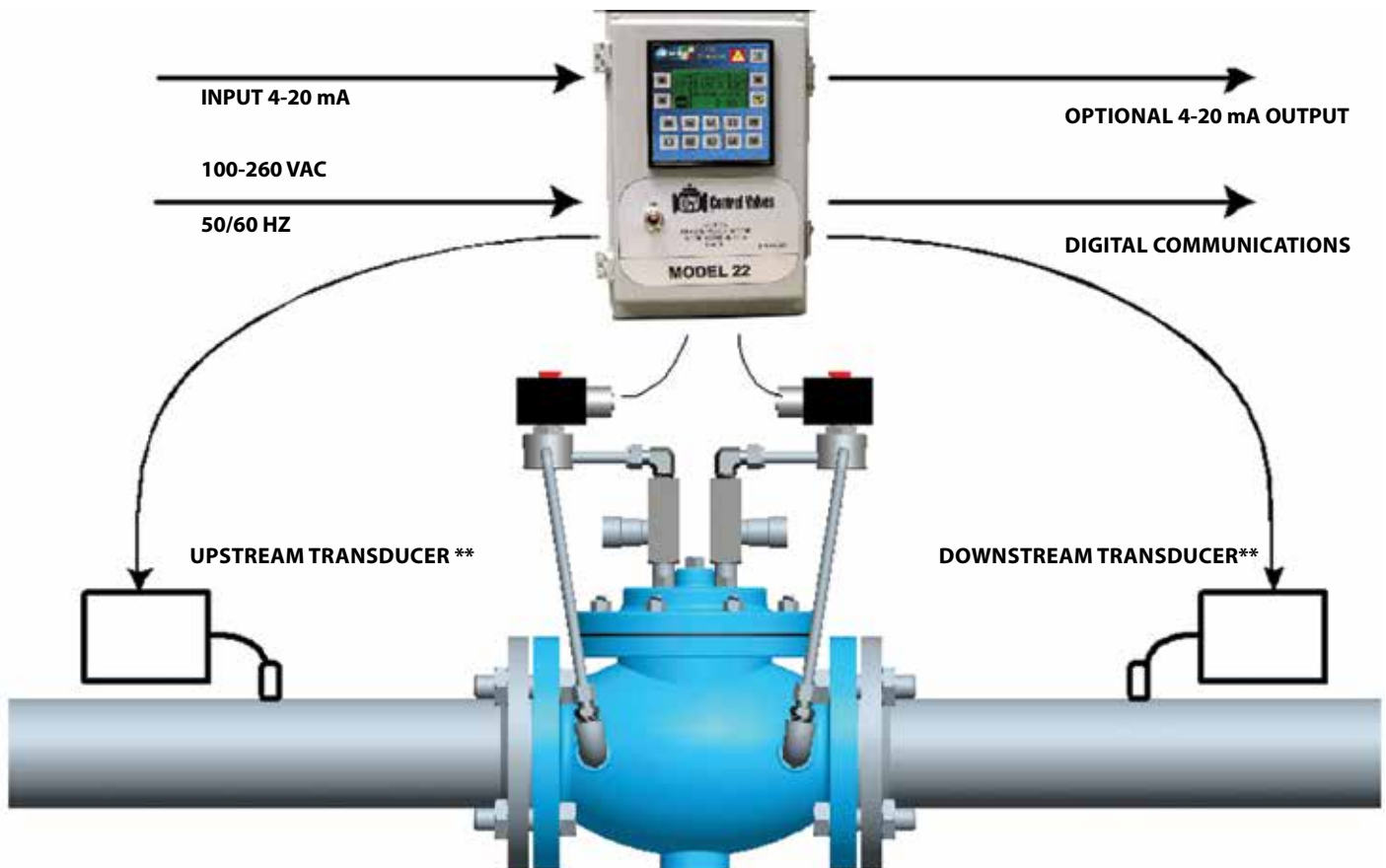


With the development and proliferation of high level SCADA systems comes the need for automatic control valves to interface with such systems. The Apollo Series A22 Digital Electronic Control Valves were specifically designed for this task. While retaining the advantages of simplicity and operation from line pressure, these valves offer a level of ease of operation and degree of control not previously achieved.

FEATURES:

- Can be used as part of a SCADA system, or as a “stand alone.”
- Extreme stability over a wide range of flows.
- Useful when set points must be changed frequently.
- Can be used to control almost any process variable.
- Hydraulic pilot backup available.
- Can be configured to accept all common process signals (4-20 mA, 0-5 volt, etc).
- Can be configured for low head pressure applications.
- Simple valve sizing.
- Isolation ball valves to facilitate maintenance and troubleshooting.

* See specifications sheet for material options.



** PRESSURE TRANSDUCER, FLOW METER, LEVEL TRANSMITTER, THERMOCOUPLE OR RTD

CONTROL VALVES

Valve Flow Characteristics



General flow characteristics for on/off valve sizes are listed below. DO NOT use this data to size modulating valves. Refer to earlier sizing information in this brochure for sizing valves.

FLOW CHARACTERISTICS:

Valve Size	US	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"	10"	12"	14"	16"	24"
	Metric	DN32	DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250	DN300	DN350	DN400	DN600
Globe Cv	US	23	27	47	68	120	200	450	760	1250	1940	2200	2850	6900
	Metric	5.5	6.5	11.3	16.3	28.7	47.9	108	182	299	465	527	683	1653
Angle Cv	US	30	35	65	87	160	270	550	1000	1600	2400	--	4000	--
	Metric	7.2	8.4	15.6	20.8	38.3	64.7	132	240	383	575	--	958	--

$$DP = sg \left(\frac{Q}{Cv} \right)^2$$

where:

Q = Flow Rate in USGPM (U.S.) or

Cv = Flow Rate in USGPM @ 1 psi pressure drop (U.S.) or

DP = Pressure drop in psi (U.S.) or

sg = specific gravity of line fluid

Q = Flow Rate in liters/sec (Metric)

Cv = Flow Rate in liter/sec @ 1 bar pressure drop (Metric)

DP = Pressure drop in bar (Metric)

Reduced Port Valve Flow Characteristics



General flow characteristics for on/off valve sizes are listed below. DO NOT use this data to size modulating valves. Refer to earlier sizing information in this brochure for sizing valves.

FLOW CHARACTERISTICS:

Flange Size (inches)	3"	4"	6"	8"	10"*	12"*	16"*	18"	20"	24"
Interior Port (inches)	2"	3"	4"	6"	8"	10"	12"	16"	16"	16"
Flange Size (Metric)	DN80	DN100	DN150	DN200	DN250	DN300	DN400	DN450	DN500	DN600
Interior Port (Metric)	50	80	100	150	200	250	300	400	400	400
Cv (US Gal @ 1 PSID)	70	135	215	480	--	--	--	3000	3300	3600
Cv (L/Sec @ 1 bar)	16.7	32.3	51.4	114.7	--	--	--	717	789	860

*consult factory

$$DP = sg \left(\frac{Q}{Cv} \right)^2$$

where:

Q = Flow Rate in USGPM (U.S.) or

Cv = Flow Rate in USGPM @ 1 psi pressure drop (U.S.) or

DP = Pressure drop in psi (U.S.) or

sg = specific gravity of line fluid

Q = Flow Rate in liters/sec (Metric)

Cv = Flow Rate in liter/sec @ 1 bar pressure drop (Metric)

DP = Pressure drop in bar (Metric)