* 1. PRESSURE REDUCING VALVE with INTEGRAL BACK-UP

1. Supply a *insert size* Singer Model *specify model as 106/S106/206/S206* – PR-SM Pressure Reducing Control Valve with Integral Back-Up.
   1. The valve shall be equipped with the following available options:
      1. *specify*
      2. *specify*
      3. *specify*.
   2. Singer Valve schematic *specify*.
2. Function: The valve shall have a primary and a secondary main valve operating system, which shall be independently operated by separate primary and secondary pilot control systems. The primary operation shall be a pilot operated pressure reducing valve which will reduce a high inlet pressure to a low outlet pressure. The valve shall modulate to maintain a relatively constant downstream pressure regardless of fluctuations in supply pressure or flow rate. Should a failure of the primary valve operation or primary pilot system occur, resulting in downstream pressure increase, the secondary valve and pilot operating system shall quickly override the primary valve and pilot system to modulate and maintain a steady outlet pressure.
3. Operation: The primary pressure reducing pilot shall be a normally open Singer Model 160 Pressure Reducing Pilot that reacts to small changes in downstream pressure, which modulates the lower primary main valve bonnet pressure, hydraulically adjusting the inner valve assembly position to maintain a constant downstream pressure. The secondary (back-up) downstream pressure control pilot shall be a normally closed Singer Model 81-RP, which acts to open when pressure rises 3-5psi above the pressure setting of the primary Model 160 pilot. When downstream pressure meets or exceeds the pilot set point of the 81-RP pilot, the pilot opens to direct inlet supply pressure into the upper secondary bonnet, assuming full control of the inner valve assembly to modulate valve position and maintain a constant downstream pressure at the higher Model 81-RP pilot set point.
   1. Quality Assurance
4. The control valve shall be tested prior to shipment. The standard test shall include a functional stroke, pressure and leak test of valve body, seat, fitted pilots and accessories.
5. The control valve shall be covered by a minimum three (3) year warranty against defects in materials and workmanship. The AISI 316 stainless steel seat ring shall be covered by a lifetime guarantee.
6. All control valve maintenance and repairs shall be possible without removing the main valve body from the line, when installed in accordance with manufacturer’s recommendations.
   1. Main Valve
7. The main valve shall be a Singer *specify main valve model number (106/S106/206/S206)* -PGM double chamber, dual diaphragm actuated *specify (full/reduced)* port model.
8. Main valves, 6” (150mm) and larger, shall provide smooth frictionless motion to ensure a low flow stability to *specify minimum USGPM or L/s*, achieved using SRD-Single Rolling Diaphragm technology.
9. The main valve, adapter and bonnet shall be constructed of ASTM A536 (Grade 65/45/12) ductile iron.
10. The main valve bonnet and adapter shall be located using two or more locating guide pins to maintain the inner valve assembly alignment and for ease of maintenance.
11. The main valve trim, consisting of seat ring and primary and secondary stems shall be constructed of AISI 316 stainless steel. The valve stems shall have wrench flats for ease of maintenance.
12. The main valve shall provide a drip-tight seal using a mechanically retained resilient disc, having a rectangular cross section, against the stationary AISI 316 stainless steel seat ring.
13. The stationary AISI 316 stainless steel seat ring of main valves 2.5” (65mm) and larger shall be held in place using Spiralock® self-locking screws and seat ring retainers.
14. All internal and external ferrous components, including all mating surfaces, shall be coated with an NSF-61 approved fusion bonded epoxy to a minimum of 10 mils DFT-Dry Film Thickness.
15. The main valve elastomers: diaphragms, resilient disc and seals, shall be of EPDM or Buna-N.
16. All main valve fasteners (bolts, nuts, studs, cap screws) shall be supplied as AISI 18-8 or 304 stainless steel. All bonnet bolts shall be fitted with stainless steel washers to prevent damage to the bonnet coating.
17. Valve shall have flanged, threaded or grooved end connections. Flanged connections shall be *specify ANSI/ASME B16.42 Class 150#/300# or ISO 7005-2 PN10/16/25/40* flange drilled, faced and rated. Threaded connections shall be *specify NPT or BSPT*.
18. Due to the potential for noise, vibration and erosion damage from cavitation, the valve manufacturer shall provide, upon request, a computerized sizing and cavitation analysis, using independent third party software. Cavitation analysis shall provide the status of cavitation based on customer supplied parameters as to valve size, flow rate requirements and pressure conditions. The cavitation analysis shall also provide information as to Cv factor, percent of valve lift, cavitation index and noise level.
19. The valve manufacturer shall be able to supply cavitation control trim which shall be engineered to be optimized to the actual operating parameters of the control valve application and warranted to perform correctly and prevent main valve cavitation damage under the stated conditions. Orifice plates or other non-engineered cavitation control devices shall not be used to prevent or minimize valve cavitation.
    1. Pilot Controls
20. The pressure reducing primary pilot shall be a Singer Model 160 normally open pilot with a spring to adjust the pressure setting. The pilot shall be self-cleaning and self-flushing with the outlet of the pilot located at the bottom of the pilot flow with the pilot stem out of the waterway and guide free from any debris build-up.
    1. The pilot trim, consisting of a seat ring, stem and yoke shall be constructed of AISI 316 stainless steel.
    2. The adjustable pilot spring range shall be supplied with a spring range of *specify range (20 to 200psi, 5-50psi, 10-80psi or 100-300psi)*. The pilot shall be factory preset at *specify setpoint* psi.
    3. The pilot body and spring casing shall be constructed of *specify material (ASTM B62 bronze or ASTM A351 CF8M stainless steel)*.
21. The surge control secondary pilot shall be a Singer Model 81-RP normally closed pilot with a spring to adjust the pressure setting.
    1. The pilot trim, consisting of a seat ring, stem and inner valve, shall be constructed of AISI 316 stainless steel.
    2. The adjustable pilot spring range shall be supplied with a spring range of *specify range (20 to 200psi, 5-50psi, 10-80psi or 100-300psi)*. The pilot shall be factory preset at *specify setpoint* psi.
    3. The pilot body and spring casing shall be constructed of *specify material (ASTM B62 bronze or ASTM A351 CF8M stainless steel*.
    4. The pilot elastomers: diaphragm, inner valve and seals, shall be of EPDM or Buna-N.
22. A fixed restriction shall be supplied as AISI 303 stainless steel with an orifice bore selected by the manufacturer based on the valve size and operation.
23. The adjustable flow stabilizer shall be a Singer Model 26 self-cleaning opening speed control, supplied as a stainless steel assembly. Optional for main valve sizes 10” (250mm) and larger.
24. The pilot fittings shall be supplied as *specify material (ASTM B16 brass or AISI 316 stainless steel)*.
25. The pilot tubing shall be supplied as *specify material (ASTM B280 seamless copper or AISI 316 stainless steel or PTFE lined flexible braided stainless steel)*.
26. For valves 4” (100mm) and larger, (3) pilot isolation ball valves shall be supplied as standard. Pilot isolation ball valve(s) shall be constructed of *specify material (B16 brass or 316 stainless steel)* with stainless steel handle operator.
27. For valves 4” (100mm) and larger, a pilot strainer shall be supplied as standard. Strainer material to be ASTM A351 CF8M stainless steel with a 40-mesh or 80-mesh 316 stainless steel screen. The external pilot strainer shall have a removable plug for easy maintenance access to the pilot screen and have provision for installation of a ball valve for pilot screen flushing.
28. The control valve shall be supplied with a Singer Model X107 Position Indicator as standard. The valve position indicator shall provide a visual reference to the main valve open position. The indicator stem rod shall be AISI 316 stainless steel, threaded or pinned to the main valve stem. The indicator rod shall move within a *specify material (B16 brass or 303 stainless steel)* hexagonal housing having a clear Pyrex sight glass. A cap and bleed valve shall be provided to purge any air that may become trapped within the main valve bonnet and stem cap.
    1. Control Valve Components – Available Options
29. specify.