

SCOPE

- I 1.1 This practice covers the layout of piping manifolds and sizing of block and bypass valves at control and protective system valve stations.
- I 1.2 **An asterisk (*)** indicates that a decision by the Owner's Engineer or purchaser is required, that **additional information** is to be furnished by the Owner's Engineer, or that information for Owner's Engineer approval is to be supplied by the vendor or contractor.

SUMMARY OF ADDITIONAL REQUIREMENTS

- I 2.1 **Table 1** lists the practices and standards which shall be used with this practice.
- I * 2.2 **Table 2** lists the practice and standard which shall be used with this practice, as specified by the Purchaser.

TABLE 1

PRACTICES	
IP 3-6-4	Vents and Drains, Flushing and Cleaning Connections
IP 3-16-1	Flanged Joints, Gaskets, and Bolting
IP 15-7-2	Protective Systems
STANDARDS	
ISA Standards	
S75.03	Face-to-Face Dimensions for Flanged Globe-Style Control Valve Bodies (ANSI Classes 125, 150, 250, 300, and 600)
S75.04	Face-to-Face Dimensions for Flangeless Control Valves (ANSI Classes 150, 300, and 600)
ANSI / ISA Standards	
S75.08	Face-to-Face Dimensions for Flanged Clamp or Pinch Valves Bodies (ANSI Classes 150, 300, 600, 900, 1500, and 2500)
S75.15	Face-to-Face Dimensions for Butt-weld-End Globe-Style Control Valve Bodies (ANSI Classes 150, 300, 600, 900, 1500, and 2500)
S75.16	Face-to-Face Dimensions for Flanged Globe-Style Control Valve Bodies (ANSI Classes 900, 1500, and 2500)
S75.22	Face-to-Centerline Dimensions for Flanged Globe-Style Angle Control Valve Bodies (ANSI Classes 150, 300, and 600)

TABLE 2

PRACTICE	
IP 15-9-1	Control Valves
STANDARD	
ASME Code	
B 31.3	Process Piping

CONTROL VALVE LOCATION

- O,R 3.1 **Automatic control valves** shall be installed in horizontal lines. Globe and angle style valves shall be installed with the valve actuators above the valves, and with the valve stems vertical. Rotary style valves shall be installed with the shafts horizontal except in cryogenic services where the shaft shall be vertical.
- M,O 3.2 **Location of valves in the line and orientation of handwheels and instruments mounted on valves** shall be such as to permit access for manual operation, emissions monitoring, inspection, and maintenance. Clearance shall be provided above and below the valve/actuator assembly to permit removal of the assembly from the line for maintenance. Valves installed at a location other than grade shall be accessible from a permanently installed platform.

IP 3-6-2		Piping at Control and Protective System Valve Stations	
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VALVE MANIFOLDS

- O,M * 4.1 **Block and bypass valves** shall be installed with all control valves, except when approved by the Owner's Engineer, they may be omitted in applications where a process shutdown or slowdown can be tolerated.
- O,M * 4.2 Use of **block and bypass valves with protective system shutdown valves** shall be per **IP 15-7-2**.
- S 4.3 **Protective system valve station block or bypass valves** shall have a nameplate engraved as follows:

CAUTION

**THIS VALVE TO BE USED ONLY FOR
CHECKING PROTECTIVE SYSTEMS**

- Nameplates** shall be **securely fastened** to the valve. Adhesive fastening is not acceptable.
- M 4.4 **3/4 in. (1.8 cm) drain valves** shall be installed between the control valve or protective system valve and its upstream and downstream block valves, when block valves are used.
- S 4.5 **The bypass line and bypass valve** shall be sized to pass a flow rate most nearly equal to the flow rate through the selected control valve at 100% open. This requirement is waived for control valves which have no downstream safety valve facilities (e.g., steam turbine steam control valve, cooling tower water flow valve, tower recycle and reflux control valves, etc.).
- M,O 4.6 The following **arrangement and clearance requirements** apply to the design of control valve manifolds:
- Where the control valve is line sized, provide minimum straight length of 6 in. (150 mm) or one pipe diameter, whichever is larger, both upstream and downstream of the control valve.
 - For rotary control valves, allow sufficient length of straight pipe on one side of the valve to permit removal of the line flange bolting.
 - If butterfly valve is used, ensure that the disk can clear inside of pipe during rotation.
 - Expander or reducing flanges shall not be used in control valve manifolds.
 - Install control valve close to grade or platform with 12 in. (300 mm) minimum clearance.
 - Adequate clearance shall be provided for rodding out of drain valve connections.
 - Clearance shall be provided to permit the removal of the actuator with the valve in the line. The minimum clearance provided shall be 12 in. (300 mm).
 - Adequate support shall be provided for the control valve manifold such that the control valve or the bypass valve may be removed without significant movement of the station piping.
 - Minimize the distance between the upstream manifold piping and the bypass valve.
- S 4.7 **Block and bypass valves** shall conform to the greater of the upstream or downstream line design rating.
- S,R 4.8 For **control valves in flashing and high pressure vapor letdown services**, the downstream piping shall increase to the downstream line size, immediately after the control valve.
- S 4.9 For **flangeless valve installation in piping systems with a design temperature greater than 400°F or 200°C**, flanges and bolting material shall be selected to have the same nominal coefficient of thermal expansion as the body material of the valve.

Revision Memo

9/68 Original Issue of Basic Practice
1/70 Revision 1
1/74 Revision 2
6/82 Revision 3
6/86 Revision 4
12/91 Revision 5
6/97

Revision 0 - Original Issue of International Practice

General technical and editorial update to align IP with company and Industry standards. Added **IP 3-16-1**, Flanged Joints, Gaskets and Bolting to **Table 1**. Added **ASME Code B31.3**, Process Piping to **Table 2**. Deleted **API RP550** as reference (withdrawn). Added **Par. 4.6** specifying arrangement and clearance requirements for control valve manifolds.

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