**application:** For proportional or two-position control of hot or cold water in coils of heating or cooling systems. Used for mixing service (V5013B) to direct one of two inlets to a common outlet, and for diverting (V5013C) flow from a common inlet to one of two outlets.

**construction:** Three-way mixing (Fig. 2) or diverting (Fig. 3). Constant total flow throughout full plug travel. Spring-loaded, self-adjusting Teflon packing. Single-piece body as cage type inner-valve permitting easy service and repair. Linkage provided with strain-relief mechanism assuring tightest possible close-off without putting excessive strain on the motor. Linkage has easy-to-read, valve-position indicator. Modutrol motor positions valve stem.

**assembly:** Complete electric motorized valve assembly consists of a V5013B or V5013C 3-Way Valve Body, Q455 Linkage, and Modutrol motor. Select the required components from combinations available in Table 2.

**motor:** Used to position valve stem. Capacitor type with oil immersed gear train. Select required motor from Table 2.

**maximum ambient temperature:** M7023—hot water chilled water 125 F; other motors listed, 125 F.

**minimum ambient temperature:** minus 20 F. (Note: This applies to motor only. Valve stem or body must not go below 32 F.)

**mounting position:** Upright preferred. Other positions acceptable.

**linkage specifications:** Connects motor to valve. Has provision for mounting with set screws to valve bonnet and for mounting motor. Select required linkage from Table 2.

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**TABLE 1**

**DIMENSIONS (IN INCHES)**

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>With M644, M944</th>
<th>With M7023 Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2</td>
<td>9-1/2</td>
<td>6-7/16</td>
<td>18</td>
<td>9-1/4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>6-5/8</td>
<td>18-5/8</td>
<td>19-7/8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>8-11/16</td>
<td>20-31/32</td>
<td>22-7/32</td>
<td></td>
</tr>
</tbody>
</table>

**body:**

**MODELS:** V5013B Mixing; V5013C Diverting.

**SIZES:** 2-1/2 through 4 in.

**END CONNECTIONS:** Flanges.

**CAPACITY:** See Table 3 for Cv's.

**RATINGS:** See Table 3 for close-off and Table 4 for body and packing.

**FLOW CHARACTERISTICS:** Characterized for proportional linear flow at ports A and B and constant total flow through Port AB.

**LIFT:** 2-1/2 and 3 in. sizes, 3/4 in.; 4 in. size, 1-1/2 in.

**BODY:** 125 psi cast iron, single-piece body.

**PACKING:** Four-section, Teflon-cone, spring-loaded, self-adjusting.

**STEM:** Stainless steel.

**SEATS:** Replaceable bronze. Both seats held in place by bronze cages and sealed to body by rubber "O" rings.

**PLUG:** Bronze skirted, metal-to-metal seating.

**FINISH:** Gray paint.

**TABLE 2**

**Control Action** | **Motor** | **Linkage Number**
---------------------|-----------|-------------------|
Two-Position, Reversing, Non-Spring Return, SPDT | M644 | Q455C (for 2-1/2 & 3") Q455D (for 4") |
Floating, SPDT | M944 | Q455D |
Proportional, Non-Spring Return | M7023A-C | Q455D |

*Motors recommended have 60 second timing & 160 degree stroke.

**TABLE 3**

**CLOSE-OFF RATINGS**

<table>
<thead>
<tr>
<th>Body Size (In.)</th>
<th>Cv (^a)</th>
<th>Maximum Pressure Differential for Close-off (^b) (psig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2</td>
<td>63.0</td>
<td>Q455C, Q455D</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>X, X</td>
</tr>
<tr>
<td>4</td>
<td>160</td>
<td>X, 9</td>
</tr>
</tbody>
</table>

\(^a\)Means application not recommended.

\(^b\)For determining required Cv, see page J-6 in "Automatic Controls Catalog." Form 77-0300.

For V5013B Mixing, close-off pressure is the maximum pressure difference between the outlet and either of the two inlets.

For V5013C Diverting, close-off pressure is the maximum pressure difference between the inlet and either of the two outlets.

**TABLE 4**

**VALVE RATINGS**

<table>
<thead>
<tr>
<th>Body</th>
<th>Cast-iron—125 psi max., 353 F max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close-off</td>
<td>See Table 3</td>
</tr>
<tr>
<td>Capacity</td>
<td>See Table 3</td>
</tr>
<tr>
<td>Maximum Pressure Differential for Quiet Water Service</td>
<td>20 psi</td>
</tr>
<tr>
<td>Packing</td>
<td>Alternate Hot and Cold Water—100 psi max., 40 F min., 240 F max.; 140 F max. differential temperature.</td>
</tr>
</tbody>
</table>

**inner valve construction:**

![Diagram](image)

Fig. 2—V5013B Three-Way Mixing Valve.
**typical operation:** V5013B Mixing (Fig. 4)—When used in a heating application with Port B connected to a hot water boiler, Port A connected to a bypass, and Port AB connected to a load, a fall in temperature at the controller will move the valve stem up opening to Port B and closing to Port A increasing fluid temperature to the load.

V5013C Diverting (Fig. 5)—When used in a heating application with Port A connected to a coil, Port B connected to a coil bypass, and Port AB connected to the supply, a fall in temperature at the controller will move the valve stem up opening to Port A and closing to Port B increasing the flow of hot water through the coil.