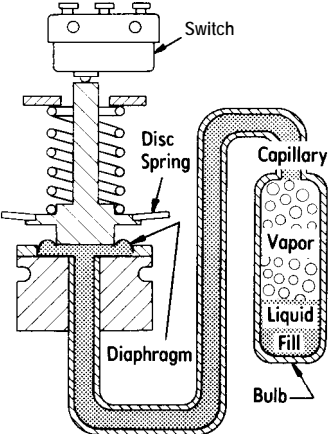
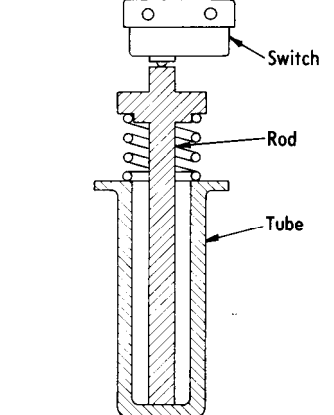
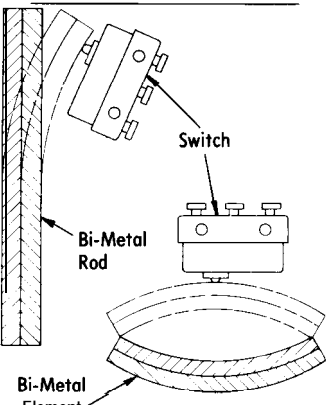
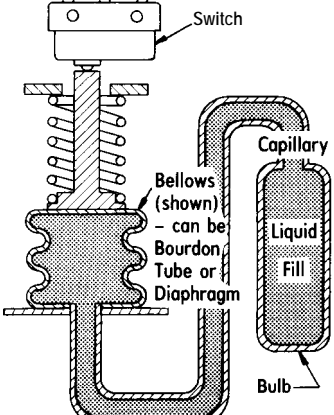


# TEMPERATURE SWITCH DESIGN PRINCIPLES

DESIGN PRINCIPLE	HOW IT WORKS	ADVANTAGES	DISADVANTAGES
<p><b>VAPOR PRESSURE</b></p>	 <p>A temperature bulb is partially filled with a chemical liquid. As temperatures increase the liquid vaporizes causing an increase in pressure above the liquid. At a predetermined pressure the sensing element (bellows, bourdon tube, or diaphragm) changes its position in relation to the electrical switch resulting in a switching of contact position.</p>	<ol style="list-style-type: none"> <li>1. Insensitive to ambient temperature variations.</li> <li>2. Fast response time.</li> <li>3. Mount in any position.</li> <li>4. Suitable for remote control.</li> <li>5. Excellent accuracy</li> </ol>	<ol style="list-style-type: none"> <li>1. Leakage of fluid may cause setting shift.</li> <li>2. Higher cost.</li> </ol>
<p><b>ROD AND TUBE</b></p>	 <p>A rod is joined concentrically inside a tube. The tube is made from a material which expands at a rate greater than the rod expands. As temperatures increase the tube increases in length relative to the rod causing the rod to change its position in relation to the electrical switch resulting in a switching of contact position.</p>	<ol style="list-style-type: none"> <li>1. Low cost.</li> <li>2. Compact.</li> </ol>	<ol style="list-style-type: none"> <li>1. Not suitable for remote control</li> <li>2. Sensitive to ambient temperature variations.</li> <li>3. Setting drift.</li> </ol>
<p><b>BI-METAL</b></p>	<p><b>TWO TYPICAL EXAMPLES</b></p>  <p>Two dissimilar metals are bonded together in the form of a flat rectangular sensing element. As the temperature rises one laminate of metal expands at a higher rate. This puts a bending force on the element causing it to move in relation to an electrical switch resulting in a switching of contact position.</p>	<ol style="list-style-type: none"> <li>1. Low cost.</li> <li>2. Compact.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sensitive to shock and vibration.</li> <li>2. Sensitive to ambient temperature variations.</li> <li>3. Not suitable for remote control.</li> <li>4. Relatively low accuracy.</li> <li>5. Cannot take large overtemperature conditions.</li> </ol>
<p><b>LIQUID FILL</b></p>	 <p>A temperature bulb and sensing element (bellows, bourdon tube, or diaphragm) are filled with a chemical liquid. As the temperature rises the liquid expands causing the sensing element to move in relation to an electrical switch resulting in a switching of contact position.</p>	<ol style="list-style-type: none"> <li>1. Low cost.</li> <li>2. Compact.</li> <li>3. Fair accuracy.</li> <li>4. Wide range.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sensitive to shock and vibration.</li> <li>2. Sensitive to ambient temperature,</li> <li>3. Poor response time.</li> <li>4. Leakage of fluid cause setting shift.</li> </ol>