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Chapter 1, Problem 1P

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Problem

Identify the sensor, signal conditioner and display elements in the measurement systems of (a) a mercury-in-glass thermometer, (b) a Bourdon pressure gauge.

Step-by-step solution

Step 1 of 3

In a measurement system, the sensor responds to a quantity and translates it into a corresponding signal. The Signal Conditioner manipulates this signal so that it can be displayed while the Display system displays the manipulated signal.

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Step 2 of 3

(a)
Mercury-in-glass thermometer:
Sensor: Mercury is the Sensor as it responds to the temperature.
Signal Conditioner: The Capillary tube is the signal conditioner as it allows for significant change in level of mercury.
Display: The marking along the tube is the display as it allows the temperature to be read.

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Step 3 of 3

(b)
Bourdon Pressure Gauge:
Sensor: The curved Bourdon tube is the sensor as it deflects due to change in pressure.
Signal Conditioner: The gear system is the signal conditioner as it magnifies the movement of the end of the Bourdon tube
Display: The Circular Scale is the display element as it indicates the pressure.

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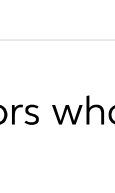
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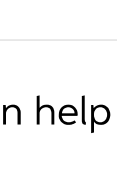
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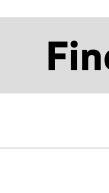
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