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Chapter 1, Problem 3P

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Problem

Identify the various elements that might be present in a control system involving a thermostatically controlled electric heater.

Step-by-step solution

Step 1 of 2

A thermostatically controlled electric heater is an example of a closed loop control system. A closed loop control system in the most basic form consists of five elements. These are the Comparison element, Control Element, Correction element, Process element and Measurement element.

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Step 2 of 2

Considering a thermostatically controlled electric heater, its elements will be,
Comparison element: The Thermostat is the comparison element as it compares the controlled variable and the reference value. The controlled variable is the temperature of the room while the reference value is the set temperature.
Control element: The Thermostat is also the Control element as it controls the operation of the switch or relay.
Correction element: A switch or relay is the correction element which operates the heater. The operation of the switch or relay is dependent on the input from the thermostat.
Process element: The Electric heater is the process element as it changes the temperature of the room.
Measurement element: The measurement element is a sensor which measures the controlled variable. In this system, the most common type is the bimetallic strip type of sensor.

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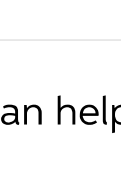
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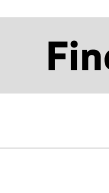
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domestic central heating system involving a bimetallic thermostat and that involving a microprocessor.

illustrate your answer by an example.

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