4.4 TUNING THE CONTROLLER MANUALLY

4.4.1 Controllers Fitted with Output 1 Only

Before starting to tune the Controller to the load, check that the Setpoint High and Low Limits (**SPHi** and **SPLo**) are set to safe levels - see Subsections 4.2.12 and 4.2.13.

The following simple technique may be used to determine values for proportional band (**Pb1**), derivative time constant (**rAtE**) and integral time constant (**rSEt**).

NOTE

This technique is suitable for use only with processes which are not harmed by large fluctuations in the process variable. It provides an acceptable basis from which to start fine tuning for a wide range of processes.

1. Set the setpoint to the normal operating process value (set it to a lower value if overshoot beyond the normal operating process value is likely to cause damage).

2. Select ON/OFF Control (i.e. set **Pb1** = 0).

3. Switch on the process. Under these conditions, the process variable will oscillate about the setpoint and the following parameter values should be noted:

   (a) The peak-to-peak variation (P) of the first cycle i.e. the difference between the highest value of the first overshoot and the lowest value of the first undershoot - see Figure 4-4)

   (b) The cycle time (T) of this oscillation in minutes (see Figure 4-4)

4. The control parameters should then be set at follows:

Pb1: $\frac{P}{\text{Scale Range}} \times 100$

rSEt: T Minutes

rAtE: $\frac{T}{6}$ Minutes

NOTE

After setting up the parameters, set the Controller to Operator Mode (see Subsection 4.6) to prevent unauthorised adjustment to the values.

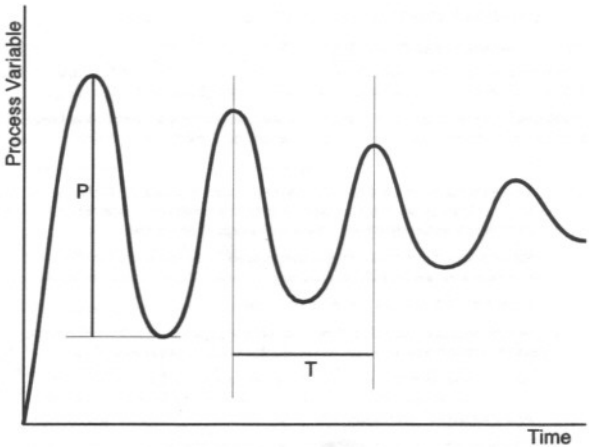

Figure 4-4 Manual Tuning Parameters (Output 1 Only)

4.4.2 Controllers Fitted with Output 1 and Output 2

Before starting to tune the Controller to the load, check that the Setpoint High and Low Limits (**SPHi** and **SPLo**) are set to safe levels - see Subsections 4.2.12 and 4.2.13.

The following simple technique may be used to determine values for proportional band (**Pb1**), derivative time constant (**rAtE**) and integral time constant (**rSEt**).

NOTE

This technique is suitable for use only with processes which are not harmed by large fluctuations in the process variable. It provides an acceptable basis from which to start fine tuning for a wide range of processes.

1. Tune the Controller using Output 1 only as described in Subsection 4.4.1.

2. Set **Pb2** to the same value as **Pb1** and monitor the operation of the Controller in dual output mode. If there is a tendency to oscillate as control passes into the Output 2 proportional band, increase the value of **Pb2**. If the process appears to be over-damped in the region of the Output 2 proportional band, decrease the value of **Pb2**.

3. When values of proportional bands, integral time constant and derivative time constant have been determined for tuning, if there is a kick as control passes from one output to the other, set **OL** to a positive value to introduce some overlap. Adjust the value of **OL** by trial and error until satisfied.