



Time Constant Setting Implications On BLF21 Flowmeters

Before beginning a recording session using either the BLF21's standard analog ports or the optional RS-232 port it is necessary to set the time constant of output filter. The rear panel of all BLF21 models have switches labeled "T/C" with settings of 0.1, 1.0 and 3.0 seconds. The primary reason to use this switch is to allow for recording of instantaneous data, or data averaged over one or three seconds which will show the mean flow but not the pulsatility. The 0.1 T/C will show the heart beat synchronous pulsatility of the flow.

The impact of the time constant on recordings can be seen in Figure 1 below.

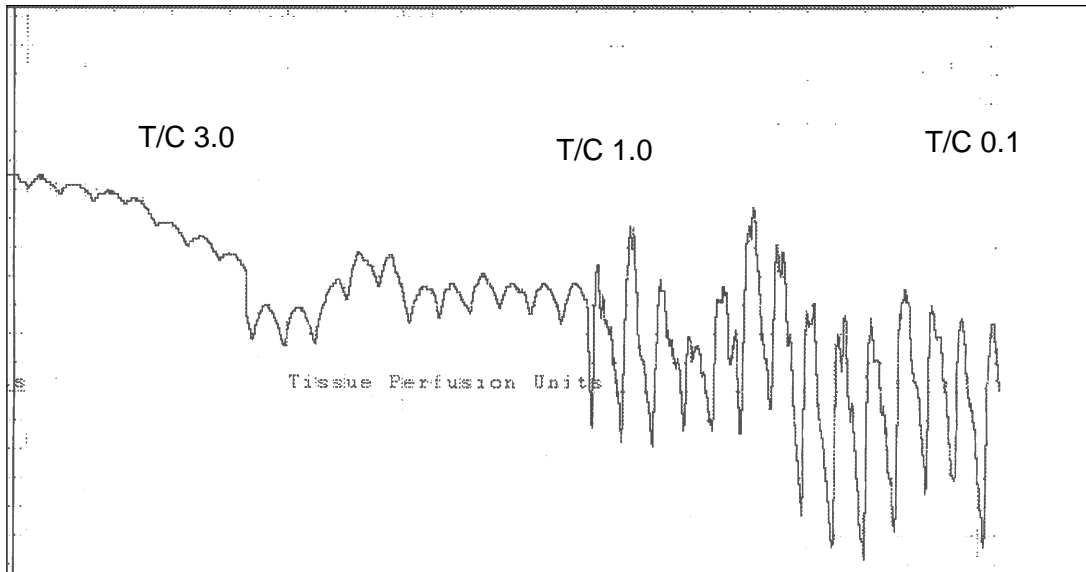


Fig. 1: Index finger blood flow using BLF21 and Type R probe first with T/C switch on 3.0, then 1.0, finally 0.1 sec.

Figure 2 shows the effect of the three time constant settings on the responsiveness of the output voltage to changes in meter measurements. The "events" recorded here are simply use the Mode Switch to move from "0" (0 TPU units) to "10 TPU" (calibrate recorder - 10 BLF units) for each of the time constant switch settings. In effect, the T/C switch selects one of the capacitance filters on the output.

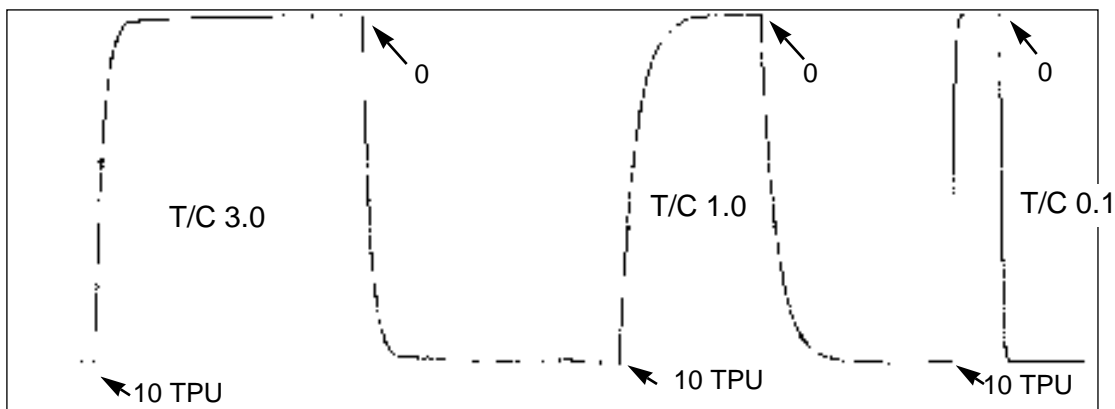


Fig. 2: Recorded by switching mode from "0" to "10 TPU" (0 to 0.5 volt output), the output maximized and then the mode was switched from "10 TPU" back to "0" and the signal fell to zero, for each of the three T/C's.



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Exponential curves describe the charging or discharging of the capacitance filters. From Figure 3 we see the theoretical curves closely resemble the actual curves in Figure 2.

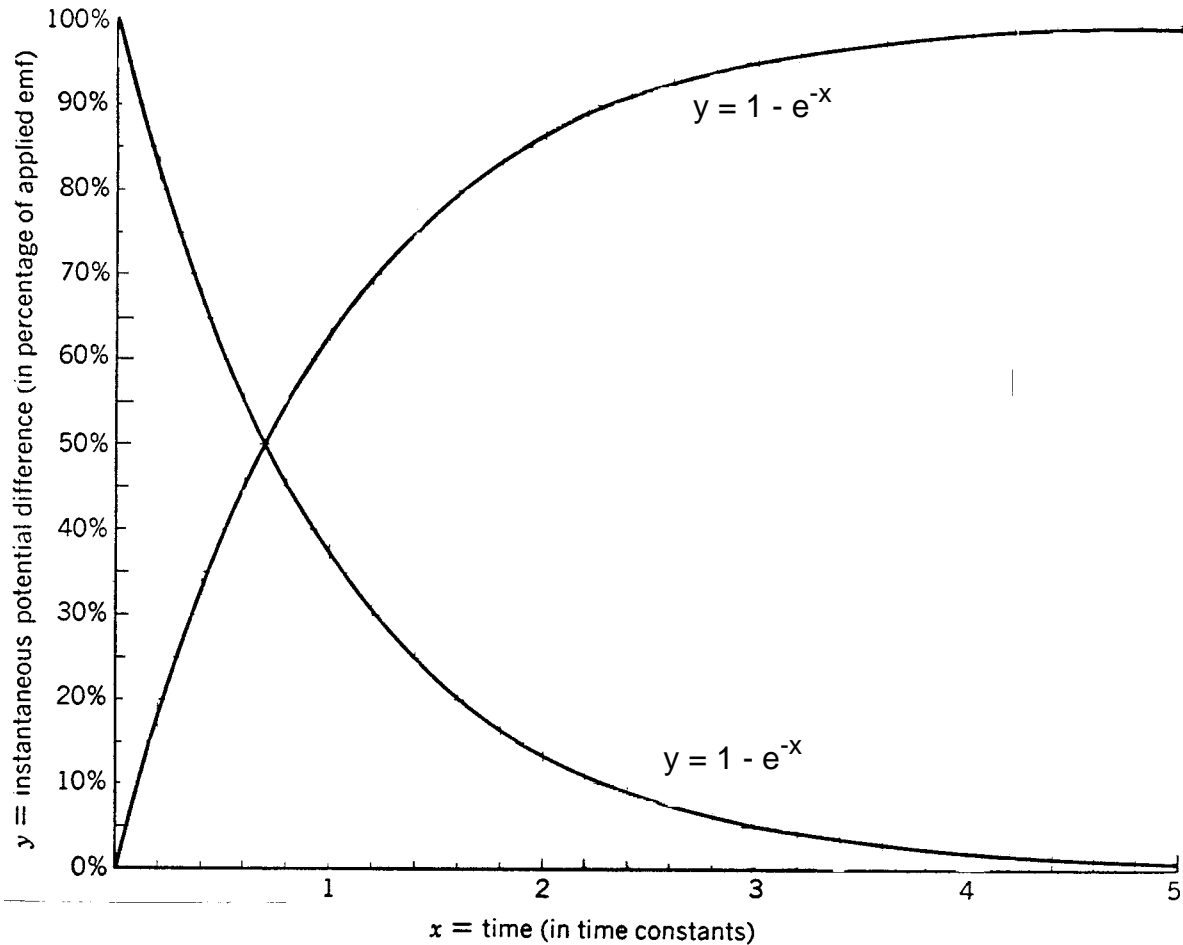


Fig. 3: Universal exponential curves for the graphical solution of the charge and discharge of capacitors in DC circuits.¹

Reference: Jackson, H.W., Introduction to Electrical Circuits, Prentice-Hall Inc., Englewood Cliffs, NJ, p. 228, 1959.