



Data Recording from BLF21 Flowmeters

Wave Form vs. Point Recording

Before selecting a means of recording, it is important to establish the purpose. Seeing a flow waveform can lead to a greater understanding of the system. Making sure that the signal shows heart beat synchronous pulsatility and is relatively smooth as opposed to a spike (probably indicating motion artifact) are reasons to look at, if not record, the waveform. Generated from the analog display, the waveform is continuously updated rather than the 2.5 times per sec that the digital display is. Waveform recording, however, requires more storage capacity than point recording via hand. If the purpose is to learn the maximum about the system under study, waveform recording should be the choice. If, however, the purpose is to monitor the relative perfusion to a site for gross changes, periodic single point sampling (or periodic waveform recordings) may be the right choice.

Hand Recording

For some procedures, hand recording of data from the digital display will suffice. One way of doing this is to watch the display for a set period (example, 30 seconds) and to record the lowest value seen during that period. The reason to use the lowest value is that all artifacts cause the reading to increase. Taking the lowest reading does cut off "normal" elevations in perfusion that are not artifacts, but this is an acceptable method as long as the investigator/user understands the assumption.

Chart Recorder

For recording waveforms as well as instantaneous voltage output, any of the myriad of chart recorders may be used. Connect the BLF21's rear panel analog (DC voltage) outputs port(s) to the recorder. In order to set up the recorder one needs to realize that the output is in DC voltage and that the absolute quantity of the voltage must be recorded. With many other inputs to recorders (EKG, for example) only the AC portion of the signal is of interest (showing the event, but not the magnitude of the voltage). In the nominal set up, the recorder will show full scale deflection with an input of 5 volts using the BLF's BNC port. The BLF supplies zero volts ($0.00 \pm 0.01v$) when its mode switch is in the "0" (zero) position. In the "10 TPU" (calibrate recorder) position the BLF supplies 1/2 volt ($0.50 \pm 0.01v$) through the jack (10% of full scale). In "MEA" (measure) mode, the BLF supplies voltage proportional to the TPU readout (1 volt for each 20 TPU).

The recorder must be set up correctly, or risk loss of data (off scale readings-too much gain), loss of resolution (not enough gain) or "overlapping" waveforms (too slow chart speed). Among the settings may be:

- AC or DC voltage (select DC)
- Gain or Sensitivity (volts/div)[select for anticipated readings]
- Zero position
- Chart speed

Example:

The chart paper is 50 divisions wide and the highest readings for this tissue are expected to be about 50 perfusion units (Fig. 1). Select a gain of 0.056 volt/div on the recorder. Select "0" (zero) mode on the BLF and adjust the recorder position so that the pen is at the lower edge. Use the mode switch to select "10 TPU" (calibrate recorder), this sends a 0.5 volt signal (10.0 TPU units) which corresponds to 9 divisions. A reading of 5.0 will correspond to 45 divisions leaving room above the expected high results to display pulsatility and have a margin. The chart speed should be selected at about 2 mm/sec to display the individual wave forms. After initial recording, adjust the speed to show desired detail.

If it is found that the maximum TPU = no more than 20, (See Fig 2), then by selecting a gain of 0.028 volts/div. the "CAL" result would be at 18 divisions and the waveforms will show more detail.

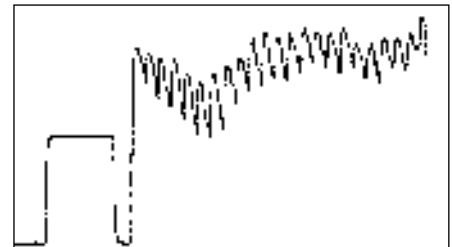


Fig. 1: Chart recording of human thumb perfusion using BLF21 and Type R probe.

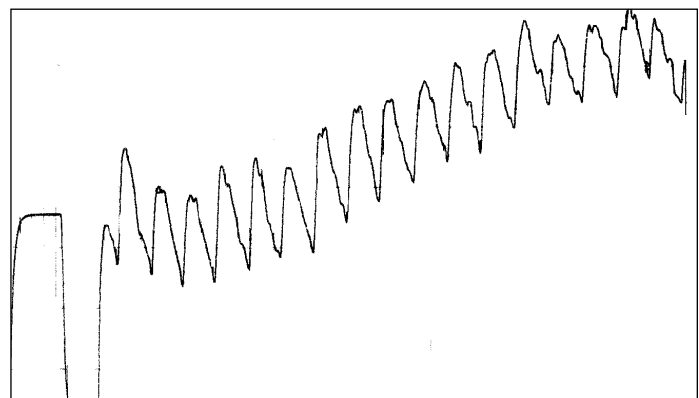


Fig. 2: Chart recording of human thumb perfusion using BLF21 and Type R probe as in Fig. 1 but with optimized settings.



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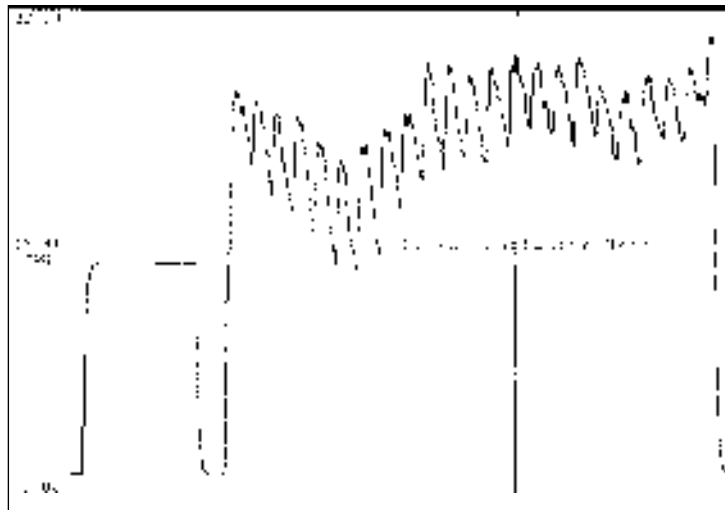


Fig. 1: Waveform simultaneously recorded with Fig. 1 but with WINDAQ, and played back and printed from WINDAQ/EX.

