

# **T e s t   a n d   C a l i b r a t i o n**

## **C h e c k   P r o c e d u r e**

### **M o d e l   3 1 0 0   a n d   3 1 0 0   w i t h**

### **V i p - P a k**

This test is designed so that an in-field calibration can be performed without the need of any test equipment. But, it does require the test fixture and the use of the built-in chart recorder and computer interface.

If the system you are testing has the computer/VIP option you can test the interface by following all of the tests listed below and refer to the signal displayed on the monitor instead of the chart recorder or you may choose to do them simultaneously.

Notes for the Bio-Med: To access the scope mode for testing the computer interface you will need to follow the instructions below.

- a. Power up the entire system (switch located on right side of the cart).
  - b. When the computer display shows the choices menu you will need to press the F3 button on the computer keyboard. This will initialize the scope mode. All signals that are displayed on the chart recorder should also be displayed on the scope screen. Amplitudes on the monitor should be 125% of the amplitudes on the chart.
1. Remove the top cover of the unit. This consists of removing 6 screws from each side of the cover (total of 12). Some of the mounting screws are also used to attach the rubber feet to the side of the instrument. Once the screws are removed simply lift the cover up and away from the instrument.
  2. Inside this instrument you'll see several vertical plug-in circuit cards. You will need to remove one of these. The circuit card with a label that reads 8.0, 8.1 or 8.3. This is the high frequency card and it is necessary to remove it temporarily so the test card can be installed.
  3. Install the test card. Make sure that the test card is installed with the components facing the same direction as all of the other cards are.
  4. Connect the test cable (provided with the test card) from the  $\frac{1}{8}$  mini-phone jack on the test card to the  $\frac{1}{4}$ " phone jack on back panel of the MINI-LAB labeled EXTERNAL RECORDER INPUT.
  5. Turn the MINI-LAB on and set the front panel controls as follows:
    - a. OUTPUT FILTER to 28 Hz.

- b. VOLUME to MIN.
- c. DOPPLER RECORDING selector to NORMAL or BOTH.
- d. PPG/VPR/DOP switch to DOP.
6. Set the chart paper speed to 5MM/SEC. And adjust the SIZE control to 0.
7. Adjust the POSITION control so that the trace is 5mm (1 division) from the bottom edge of the graph paper.
8. Adjust the SIZE control to 10, set the HI/LO switch on doppler to HI position.
9. Put the CAL. switch on the test card to the A position. Turn the test card power to the ON position.
10. The trace should be moving near the top of the graph to near the bottom of the graph continuously, 30mm (+/- 3mm).
11. Push the STOP button.
12. Disconnect the test cable from the EXTERNAL RECORDER INPUT JACK located on the back of the MINI-LAB.
13. Remove the test cable from the test card.
14. Set the chart speed to the 5MM/SEC position.
15. Turn the Model 80 power OFF.
16. Adjust the POSITION control so that the trace is in the middle of the graph.
17. Turn the Model 80 power ON.
18. The trace should move to 5mm (+/- 2mm) from the top edge of the graph on the paper and the FLOW DIRECTION bar graph should have five green LED's on.
19. Set the CAL. switch on the test card to the center position B. The pen should move to 5mm (+/- 2mm) from the bottom of the paper and the FLOW DIRECTION bar graph should show five red LED's on.
20. Set the CAL. switch on the test card to the OSC. position. The trace should move rapidly from near the top of the graph to near the bottom. The waveform should be near 27-33 mm peak to peak.
21. Rotate the OUTPUT FILTER switch to the 14 Hz. position then to the 7 Hz. position. Note that the size of the signal on the graph gets smaller with each position of the OUTPUT FILTER switch.
22. Switch the test card OFF.

23. Turn the MINI-LAB OFF.
24. Remove the test card and replace the RF card.
25. Place the top cover into place and secure it using the same screws that were removed at the start of the test.
26. You'll need to connect a mercury column to the air fittings on the instrument and check that the pressure display is within 5 mm Hg.

**Warning: do not use the built-in cuff inflator to bring pressure in the system up. Doing so can cause serious damage to the mercury column. Pump up the pressure using a hand bulb type manometer.**

27. Connect the mercury column to the air fitting labeled VPR SENSING.
28. Press the button labeled VPR on the instrument. This will allow the pressure in the VPR port to be monitored on the LCD display.
29. Pump the pressure up to 40 mm Hg and compare the reading on the mercury column and that on the LCD display. They should be within 5 mm Hg.
30. Pump the pressure up to 200 mm Hg and compare the two readings. They should be within 5 mm Hg.
31. Disconnect the mercury column from the VPR fitting and move it over to the air fitting labeled B.P. OCCLUDING.
32. Press the B.P. button on the instrument. This will allow the LCD to display the pressure in the B.P. Port.
33. Follow the same tests as listed on lines 29 and 30.
34. Disconnect the mercury column.
35. Test complete.