Title: Vital Signs Monitor	Date: November 25, 2010
By: Welch Allyn, Skaneateles Falls, NY	**DISCLAIMER: THIS PROCEDURE PROVIDED "AS IS" AND WITH POSSIBLE FAULTS. USER MUST VERIFY BEFORE USE. NEITHER PROVIDER NOR WEBSITE ASSUMES ANY RESPONSIBILITY FOR ITS USE.**
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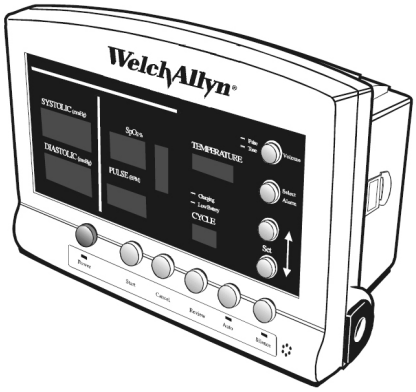
1. General
   Applies to Vital Signs monitors in the 52000 series.



2. Reference Documents
   The manufacturer no longer supports this unit. However user and service manuals can be found on the internet. Example:

   http://meenamedical.com/uploads/Manuals/BloodPressure/service_manual_WA_52000.pdf

3. Tools
   Digital Manometer, Blood Pressure Simulator, Temperature Calibration Key

4. Accessories
   Power Supply 8V, 0.75A; Temperature probe, SP02 probe, cuff with hose.

5. Basic PM Procedure

   5.1. Physical Inspection
   If necessary, wipe down with a weak disinfectant or a 5-10% bleach solution (careful around the buttons). If the buttons have impaired movement due to contamination, the button case holes can be cleaned after the front panel PC boards are temporarily removed.

   Check case, power cord, accessory cords, and hoses for integrity. Battery is adequately charged when charging icon no longer flashes. If the battery measures less than 6V after an 8 hour charge, replacement is due.

   5.2. Time and Date Check/Change
   Initiate the monitor's internal configuration settings menu by powering on the unit while pressing and holding the <Start> button. The first message displayed is the revision level of the internal software. Press the <Review> button four times to advance to the Date Set screen. The year, month, and day will appear in the systolic, diastolic and heart rate displays respectively. Use the <Select Alarm> button to select the date item to be changed. When selected, the date item will flash. Use the <SET> buttons (arrow up or arrow down) to change the selected date item.
   After making all the desired date changes, press the <REVIEW> button to save the changes and advance to the Time Set Screen.

   5.3. SpO2 Functional Check (if supplied).

Use SpO2 simulator to check the SpO2 functionality (including heart rate). Otherwise, the average healthy person will normally measure in the high 90's as a reference. Also, note that the heart rate display section correctly indicates the subject's heart rate.

5.4. Temperature Calibration Check

Use the 9600 Plus Calibration Tester to check the SureTemp thermometer accuracy. If this calibrator is not available, you may use a subject of known body temperature as a check.

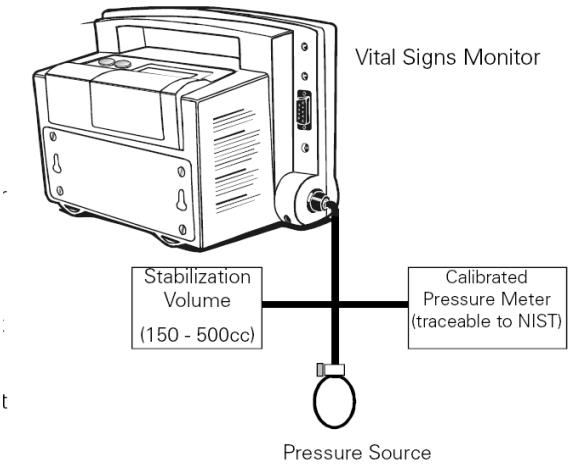
Note: To change from C to F or vice versa, enter into the Setup/Configuration mode as described above. Hit <Review> until the temperature display shows three dashes "---". Hit either <Set> button to change this unit of measure. Finally, hit <Review> to save changes and then turn unit off.

An alternate reference is a glass of lukewarm water with a known temperature between 90 and 104 degrees F. Monitor results can be checked in either the Normal mode or the Monitor mode. If the temperature is in Normal mode, the user can easily switch to Monitor mode without entering the Monitor's internal configuration mode. To do this, remove the probe from the probe holder in the main unit, attach a new probe cover, and wait one minute (do not place probe anywhere at this time). After one minute the Monitor will automatically switch to temperature Monitor mode, and the green "Monitor Mode" display will be illuminated on the temperature display. After the probe is replaced in the holder, the Monitor will revert back to Normal temperature mode.

5.5. NIBP Check

Use a Simulator if available to check performance. If not available, verify the pressure accuracy and non-leak integrity of the unit as detailed in step "Pressure Accuracy" below. Then perform a routine automatic NIBP check on a human subject to verify pumping and valve bleed functionality.

Calibration Check Set-up



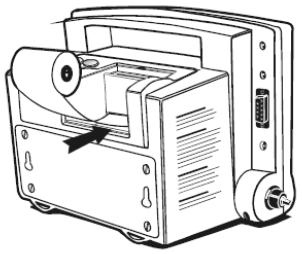
5.6. Pressure Accuracy

Enter the internal configuration mode by pressing and holding the <Power> and <Start> buttons simultaneously. When the display is settled, Hit <Review> until "CAL" appears in the Diastolic window. Then press the <Start> button to close the device's internal valve, which allows application of an external pressure. Connect the monitor as shown to a calibrated pressure meter. Use a fixed volume or a C blood pressure cuff wrapped around a cylinder for the stabilization volume (100cc recommended). Be sure this setup is leak-free before proceeding. Small leaks (usually in the hose and cuff but sometimes internal) can confuse program computations.

Note: Leak Check When pressurized, the unit should not leak more than 5mmHg/15secs when attached to a 100cc cylinder at 245 – 255 mmHg; per Service Manual.

Pressurize to slightly above 250 mmHg. Slowly bleed the pressure to approximately 250 mmHg, clamp, and record the pressure reading and the measurement standard. Repeat this step for 150 and 50 mmHg (approximate). If the differences between Vital Signs and the pressure measurement standard are within ±3 mmHg at all specified pressures, then the device is within

calibration. If the Vital Signs needs re-calibration, the procedures are included in the Spot Vital Signs Service Manual. (The above accuracy information condensed from this manual.)



5.7. Printer Check

If installed, the operator may control the printer using the two buttons (FEED, PRINT) located on the top rear face of the Monitor. Pressing the FEED button advances the paper. The PRINT button will generate the printout of all the stored blood pressure, temperature, pulse rate and SpO2 data in the Monitor. The unit will store and print a maximum of 99 data sets.

Rev History: Initial Release November 25, 2010

APPENDIX

ERROR CODES	
CODE	ISSUE
C01	Measurement cycle was cancelled by operator
C02	Autozero Failure
C03	Inflation too rapid
C04	Excessive inflation time
C05	Excessive noise (pressure)
C06	Measurement was outside patient condition of Monitor's measurement range (pressure)
E10	Cuff overpressure condition
C20	Broken/missing probe (temp)
E0.0 thru E9.9	Internal malfunction (temp)
"P"	Temperature Loss of tissue contact

FINAL CHECKLIST	
Cleanliness, Cracks	
Date, Time	
NIBP	
Temperature	
SP02	
Printer	
Electrical Safety	

CONDITION	TEMPERATURE	DISPLAY
Temperature is outside of high measurement range of the Monitor.	Fahrenheit	108 ⌈
	Celsius	42 ⌈
Temperature is outside of low measurement range of the Monitor.	Fahrenheit	84 ⌊
	Celsius	28 ⌊