

Nasco

HEALTHCARE

Blood Pressure Simulator

LF01095U

INSTRUCTION MANUAL



WARNING: Products may contain dry natural rubber.

5-Year Warranty

ABOUT THE SIMULATOR

The Nasco **Life/form**® Blood Pressure Simulator is designed for years of maintenance free operation as a training tool for not only the nurse, doctor, or pre-hospital health care provider, but also for anyone involved in the training of health care professionals.

The Nasco **Life/form**® Blood Pressure Simulator has digitally recorded blood pressure sounds that can be varied by pulse rate and volume. The different Korotkoff phases can be identified and an optional auscultatory gap can be selected. A palpable radial pulse is present in the wrist. For additional uses, purchase the Amplifier/Speaker System (LF01189U) for group demonstrations or review.

LIST OF COMPONENTS

- Case
- Arm with speaker wire
- Electronic control unit
- 6 “AA” batteries
- Sphygmomanometer

GENERAL INSTRUCTIONS FOR USE INSTALLING THE BATTERIES

Take the Blood Pressure Electronic Control Unit from the box and turn it over, placing it face down onto a padded work surface. Locate the “Open” compartment on the back of the panel where the batteries are to be installed. (See *figure 1.*) Place your thumb or index finger on the “Open” compartment and push up. This will open the battery compartment. The compartment is marked as to the “+” and “-” positions of the batteries. The battery bracket is now accessible to the user.



Figure 1

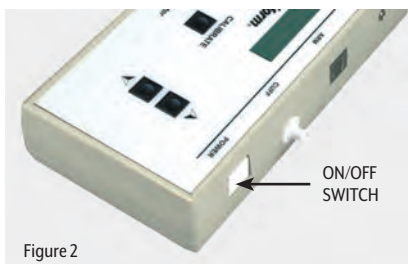


Figure 2

Install six “AA” batteries as indicated by the orientation diagram embossed in the bottom of the bracket. It is recommended that alkaline batteries be used for increased battery life. After the batteries have been properly installed, reassemble the Blood Pressure Simulator by simply reversing the disassembly procedures. Place the unit face up on the work surface and turn it on by pressing the on/off switch on the top right of the unit. (See *figure 2.*) Observe the display and verify that a readable display is present, indicating proper battery installation.

Note: The control box has a battery saving feature which will turn the unit off after about 8-10 minutes if no keys are used within that period of time.

The next step is to connect the simulated arm and speaker assembly along with the sphygmomanometer cuff and gauge assembly included with the unit. First, locate the end of the pressure line attached to the sphygmomanometer that has the male luer fitting attached to it. Attach this to the female luer fitting at the top of the unit marked CUFF. (See *figure 3.*) After the pressure line has been properly installed, locate the plug that is at the end of the wire which extends from the simulated arm assembly. Insert the plug from the arm into the jack at the top of the unit marked ARM. (See *figure 4.*)

At this point the Blood Pressure Simulator is ready for use. The unit has been factory calibrated for use with the accessories included in the kit. No further calibration adjustments should be necessary at this time. If the unit is to be used with a sphygmomanometer other than that supplied with the unit, or if recalibration is necessary at a later date, then see the section titled “Calibration Procedures.”

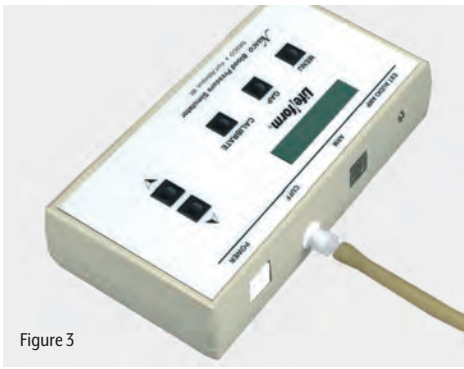


Figure 3



Figure 4

Pressure Simulator is ready for use. The unit has been factory calibrated for use with the accessories included in the kit. No further calibration adjustments should be necessary at this time. If the unit is to be used with a sphygmomanometer other than that supplied with the unit, or if recalibration is necessary at a later date, then see the section titled “Calibration Procedures”.

FAMILIARIZING YOURSELF WITH THE NASCO **Life/form**® BLOOD PRESSURE SIMULATOR CONTROL PANEL

Under the display window are three buttons: Menu, Gap, and Calibrate. (See figure 5.) The systolic pressure is set by pressing the Menu key once. The pressure is adjusted up or down using the up and down arrow keys. (See figure 6.) The diastolic pressure is set by pressing the Menu key a second time. Adjust the setting up or down with the arrow up and down keys. (See figure 7.) The heart rate is set by pressing the Menu key a third time, and adjusting the rate with the arrow up and down keys. The pulse rate can be set from 0 beats per minute to 300 beats per minute. (See figure 8.) The palpitation can be set to either on or pulseless. When the pulseless setting is used, the diastolic and systolic pressures will automatically be set to 0.



Figure 5



Figure 6

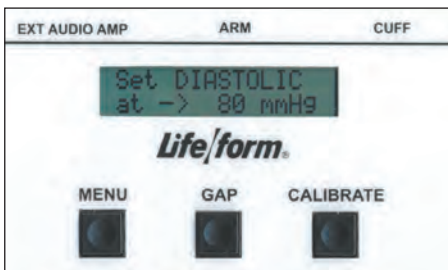


Figure 7

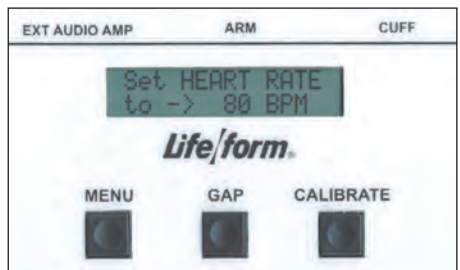


Figure 8

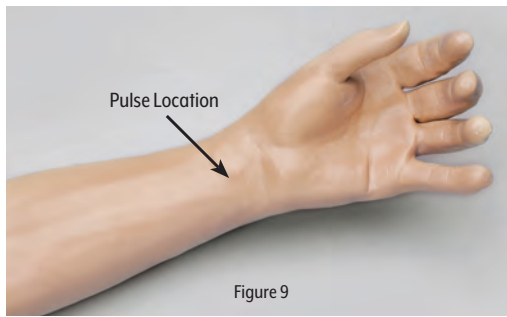


Figure 9

PALPABLE PULSE FEATURE

The Nasco **Life/form**® Blood Pressure Simulator also incorporates a palpable pulse at the radial location. (See figure 9.) Palpations can be felt upon start-up of the unit or after blood pressure settings have been made. Press the Menu key repeatedly until “Set PALPATION” menu appears. “Pulse ON” is defaulted and enables the palpation feature.

The pulse in the wrist will begin when the electronic box is turned on. During the actual blood pressure reading, the palpable pulse will turn off when the cuff is inflated and surpasses the systolic set point. It will turn on again when the cuff is deflated 20 mmHg BELOW the diastolic set point.

NOTE: The pulse feature is turned off during this time to allow students to clearly hear the Korotkoff sounds through the stethoscope without interference from the background noise of the pulse feature in the wrist. The palpable pulse is delicate and should be palpated lightly as you would with a real patient. Pressing too hard can damage the pulse feature.

Make sure the cable from the blood pressure arm is properly connected to the electronic box and the Palpation feature is in the “PULSE ON” mode. A pulseless condition can be simulated by switching your unit to the “pulseless” mode. Press the Menu key repeatedly until “Set PALPATION” menu appears. By pressing the down arrow at this point, palpations can be disabled, causing the simulator to be pulseless. When in the “pulseless” mode, all settings are automatically reset to 0 and all blood pressure sounds are disabled. The pulseless setting will also turn off the sounds in the arm. The pulse will always be on unless the pulseless feature is activated or if the systolic or heart rate levels are set to zero. To do this, press the Menu key four times.



Figure 10



Figure 11

The down arrow key will set the pulse to pulseless. Press the arrow up key to turn the pulse back on. (See figure 10.) Located to the right of the Menu key is the auscultatory Gap key. (See figure 11.) This key is included to simulate the auscultatory gap that is sometimes present between phase 1 and phase 2 sounds in which no audible sound is noted during this portion of auscultation. This control function is included so that the trainee can become familiar with this phenomenon. Pressing the Gap key simply turns the gap function off or on. When the key is pressed, a message will briefly appear that the auscultatory gap is enabled or disabled. Also the main display will show (at the bottom right of the display) either AGap:Y (for on) or AGap:N (for off).

The arrow up and down keys also control the volume of the sounds that are present in the arm. From the main menu, press the up arrow key to increase the volume, press the down arrow key to decrease the volume. The volume levels can be adjusted from level 1 (the lowest volume) to level 7 (the highest volume).

USING THE NASCO *Life/form*® BLOOD PRESSURE SIMULATOR

First, verify that the pressure line tubing from the sphygmomanometer and the audio line coming from the simulated arm assembly are properly connected to the blood pressure simulator unit, as previously described in the set up procedures. Apply the sphygmomanometer cuff and gauge to the simulated arm assembly in the usual manner. Apply the stethoscope to the simulated arm, also in the usual manner. Set the systolic and diastolic controls to the desired levels. Select the auscultatory gap if desired. Finally, adjust the pulse rate control to the desired setting.

To proceed with the simulated blood pressure measurement, first close the valve on the sphygmomanometer bulb tightly and begin pumping air into the cuff until the gauge reads higher than the preset systolic level chosen. Once this point is reached, loosen the valve on the bulb slightly to allow the gauge pressure reading to decrease slowly. While monitoring the arm assembly with the stethoscope, note the point on the sphygmomanometer gauge when the first Korotkoff sound is heard. This will be the systolic blood pressure. Allow the pressure in the cuff to continue to decrease until the point at which the last pulse is heard, noting the reading on the gauge. This is the diastolic blood pressure.

Compare the results of reading the systolic and diastolic blood pressures on the gauge with the respective settings on the simulator. If the readings were accurate, they should compare favorably with the preset values. If the auscultatory gap had been selected, then an absence of an audible pulse would have been noticed during what would have been the phase 2 Korotkoff sound. It is this lack of an audible pulse that is considered an auscultatory gap. Note that in reality the auscultatory gap can be present in either the phase 1 or phase 2 Korotkoff sounds. If it is desired to demonstrate the sounds heard while measuring a subject's blood pressure to the trainee or group of trainees, an auxiliary amplifier/speaker system is available (LF01189U). If the auxiliary speaker is used, the speaker is plugged into the EXT AUDIO AMP jack located next to the ARM output jack at the top of the unit. Adjust the volume control to increase the output of the auxiliary speaker amplifier, and proceed with the blood pressure measurement sequence as it would normally be performed, except that the stethoscope need not be used. Instead, listen to the sounds as they emanate from the speaker amplifier, noting the differences in the Korotkoff phases being presented.

The Nasco **Life/form**® Blood Pressure Simulator is programmed to demonstrate the 5 Korotkoff phases, including an auscultatory gap, which can be heard during auscultation of a subject while measuring the subject's blood pressure. Each is distinctly different and present for only a portion of the measurement sequence.

LOW BATTERY INDICATOR

When the battery supply diminishes to a level near the point that the unit will no longer function properly, the “low batt” segment of the systolic pressure display will activate when the pressure in the sphygmomanometer cuff reaches above 20 mmHg. At this point, the batteries should be replaced as soon as possible in order to insure proper operation of the unit. Refer to the section titled “Installing the Batteries.”

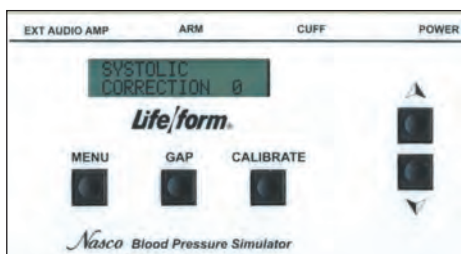


Figure 12

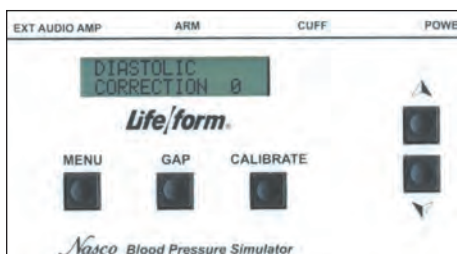


Figure 13

CALIBRATION PROCEDURES

To calibrate the simulator, set the unit up as described in the section titled “Using The Nasco **Life/form**® Blood Pressure Simulator.” Apply the cuff to the simulated arm. Set the control box systolic pressure to 150 mmHg and set the diastolic pressure to 70 mmHg. Proceed with a simulated blood pressure measurement. Note the discrepancy in the readings between the gauge and the control box. Set the systolic “offset.” Example: If the blood pressure reading was taken and the sounds started at 148 mmHg, then the offset is +2. If the sounds started at 152 mmHg, the offset is -2. For this example, assume that the sounds started at 148 mmHg. Press and hold the Calibration key until the systolic correction window appears. (See figure 12.) Using the arrow down key set the correction to +2. Set the diastolic offset. Example: If the blood pressure reading was taken and the sounds stopped at 72 mmHg, the offset is -2; or if the sounds stopped at 68 mmHg, the offset is +2. For this example, assume that the sounds stopped at 72 mmHg. From the systolic window, press the Menu key to change the diastolic window. (See figure 13.) With the arrow up key, set the correction to -2. Press the Menu key again and the message “CALIBRATION COMPLETE” will appear. The main menu window will be displayed.



Figure 14



Figure 15



Figure 16



Figure 17

Preparing Your Equipment for Use with the Nasco Blood Pressure Simulator

To adapt your sphygmomanometer for use with the simulator, it is first necessary to obtain the luer fitting and the T-fitting included with the simulator, which is also available through your Nasco catalog sales office. Using a wire cutting pliers or similar instrument, carefully cut the pressure line of the sphygmomanometer about 2" from the gauge. (See figure 14.) Take the T-fitting and insert it between the two ends of tubing that were previously cut. (See figure 15.) Assemble the portion of pressure line tubing over the remaining barbed end on the T-fitting. (See figure 16.) Lastly, take the loose end of the tubing and push the male luer fitting into it. (See figure 17.) Attach the male luer fitting to the fitting marked CUFF at the top of the unit. Once all of the necessary connections have been properly made, go to the section titled "Calibration Procedures" and calibrate the unit. When the calibration procedures have been completed, the simulator is ready for use.

SUPPLIES/REPLACEMENT PARTS FOR BLOOD PRESSURE SIMULATOR

- LF01096U** Electronic Control Unit with Sphygmomanometer
- LF01189U** Amplifier/Speaker System
- LF01072U** Replacement Cuff with Gauge
- LF01125U** Electronic Control Unit Only

Actual product may vary slightly from photo. Nasco Healthcare reserves the right to change product color, materials, supplies, or function as needed.

Other Available *Life/form* Simulators

- LF01121U Advanced IV Arm
- LF01131U Venipuncture and Injection Arm
- LF01139U Advanced IV Hand
- LF03953U **CRiSis™** Manikin, Complete
- LF03955U Deluxe **CRiSis™** Manikin
- LF03956U Deluxe "Plus" **CRiSis™** Manikin
- LF03965U Adult **CRiSis™** Auscultation Manikin
- LF03966U Adult **CRiSis™** Auscultation Manikin with ECG Simulator



LF01121U



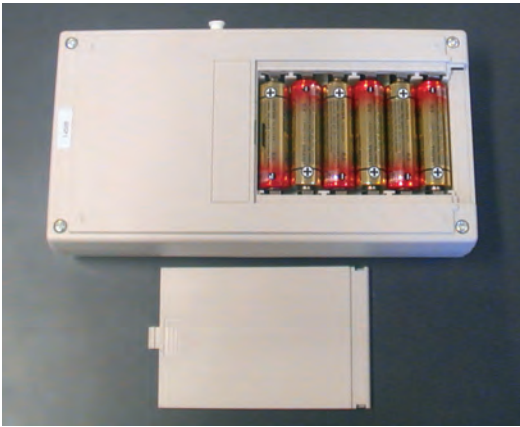
LF03955U

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HEALTHCARE

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Blood Pressure Arm USER HELP GUIDE

NO SOUNDS/PULSE:



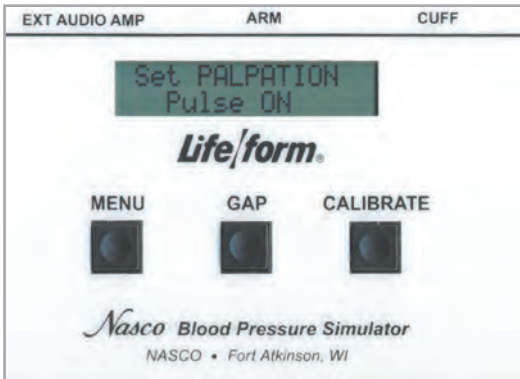
- **Check batteries.** Make sure batteries are fully charged and positioned correctly.
- We recommend that batteries be removed when not in use.



- **Check cable connections.** Make sure blood pressure cuff and arm cable are connected to control box.
- **Verify control box is on.** The control box powers down after 8 minutes if not used.
- **Check volume setting.** Make sure volume on control box/speaker is turned up.



- **Applying too much pressure to pulse.** The pulse is delicate and should be palpated lightly. Pressing too hard can damage the pulse, causing the feature to stop working.



- **Verify palpation mode is set to “Pulse On.”** If control box is set to pulseless, all blood pressure sounds are disabled. During the blood pressure reading, the palpable pulse will turn off when the cuff is inflated and surpasses the systolic set point. The pulse will turn on again when the cuff is deflated 20 mmHg below the diastolic point.

CALIBRATING ANEROID GAUGE ON SPHYGMOMANOMETER:



- **Make sure gauge is set at zero.** If the gauge is not at zero, a needle-nose pliers can be used to calibrate it. Locate the two flat spots on the end of the gauge; slowly turn clockwise or counter-clockwise until the needle is set at zero.



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