INSTRUCTION MANUAL

C.H.A.R.L.I.E Neonatal Resuscitation Simulator

LF01420 with ECG Simulator
LF01421 without ECG Simulator

Nasco HEALTHCARE

About the Simulator

Meeting your neonatal resuscitation program course curriculum with C.H.A.R.L.I.E., the Neonatal Resuscitation Simulator. The fully functional, manual simulator measures 191/2" (49.53 cm) from crown to heel and weighs approximately 81/2 lbs. (3.86 kg).

Practice all of the essentials of neonatal resuscitation with this simple simulator as well as any birthing scenario.

Features

- Airway, Breathing, Intubation, and Ventilation
- Birth Anomalies
- Chest Tube Placement
- CPR
- Defibrillation
- ECG Simulation (LF03670AU included with LF01420U)
- GI Tube Placement
- Interchangeable Genitalia
- I/O Infusion Left Leg
- Right IV Hand and Foot
- Catheterizing Male and Female Genitalia
- 7 Manual Palpable Pulse Points
- Patent Umbilicus with Venous and Arterial Access
- PICC Site in Left Arm

Caution
The infant simulator is constructed with electronic components. Extreme care should be used when utilizing fluid capable features of the simulator, so as to not damage electronics or cause harm to users.

List of Components

A. Full-Term Infant Simulator
B. 2 Airways (1 normal, 1 advanced)
C. Baby Powder
D. Blood, Pint Bottle with Blood Powder (shown mixed)
E. Carry Bag
F. Defibrillation Chest Insert (shown installed)
G. Intraosseous Skin, Left Leg, 2 (1 shown installed)
H. Intraosseous Bones, 12
I. Fluid Supply Bag, 2
J. IV Hand Skin, 2 (1 shown installed)
K. Vein System for IV Hand (shown installed)
L. IV Foot Skin, 2 (1 shown installed)
M. Vein System for IV Foot (shown installed)
N. Male Genitalia
O. Female Genitalia
P. Myelomeningocele Birth Defect
Q. Omphalocele Birth Defect
R. Umbilicus (shown installed)
S. 3 cc Syringe with Needle
T. 25-gauge Infusion Butterfly
U. 24 ml Syringe
V. 1/2 oz. Lubricant
W. Defibrillation Adapters (set of 4)
X. ECG Simulator (with LF01420U only)
Y. Latex Piece (not pictured)

Set Up

A. Installing the Airway

In addition to the normal airway, C.H.A.R.L.I.E. also includes a difficult airway featuring edema of the tongue and throat structures.

1. Thoroughly lubricate all outside surfaces of the airway and around the mouth of the simulator. (***See figure 1.***)
2. Gently insert your lubricated finger into the airway, over the tongue and epiglottis. ***(See figure 2.)***
3. Push the tube end of the airway into the mouth of the simulator. Slide the airway down into the head, making sure to free the lips as the airway slides into place. ***(See figure 3.)***
4. Gently pull up the defibrillation chest insert. Using caution to not detach the electronics, slide the tube from the airway into the hole at the top of the chest insert. ***(See figure 4.)***
5. Fit the chest insert back into the chest cavity. Ensure electronics are still attached.


Figure 1


Figure 2


Figure 3

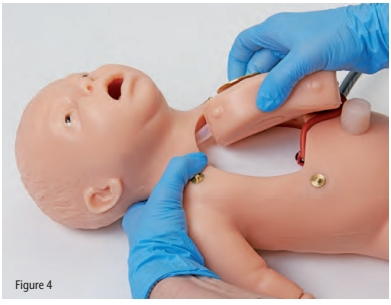


Figure 4

Set Up

B. Defibrillation Chest Insert, ECG Simulation
Alternate Chest Inserts, LF01401 Non-Defibrillation Bilateral Chest Insert and LF01402 Unilateral Chest Insert, are available for purchase.

To Install the Defibrillation Chest Insert and Connect Interactive ECG Simulator:

1. Remove the wire from under the white plate in the base of the chest cavity. ***(See figure 5.)***

   Note: The white plate is adhered to the body of the simulator. Removal of the white plate should not be attempted.
2. Connect the wire from the defibrillation chest plate to the wire extending from the base of the chest cavity. ***(See figure 6.)***
3. Fit the chest insert back into the chest cavity.
4. Use the round defibrillation adapter posts for manual defibrillation.
5. Screw the round defibrillation adapter posts into the defibrillation chest insert. ***(See figures 7 and 8.)***

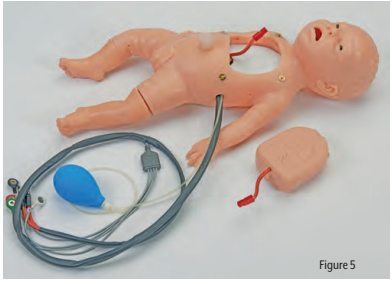


Figure 5

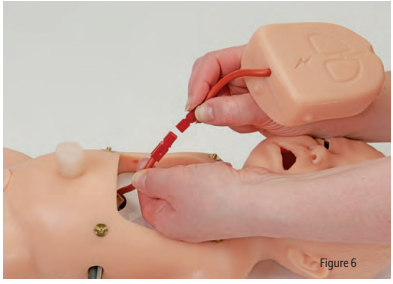


Figure 6


Figure 7

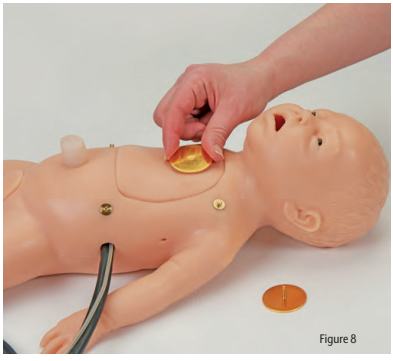


Figure 8

Set Up

6. Screw the round defibrillation adapter post into the defibrillation chest post site on the posterior of the simulator. ***(See figure 9.)***
7. Included with the simulator is a set of defibrillation adapters 101-054U, for use with training cables (sold separately). See the section for supplies and replacement parts for part number information.
8. Attach defibrillation cables coming from the left side of the manikin labeled sternum and apex to the LF03670A Interactive ECG Simulator. ***(See figure 10.)***
9. Connect the labeled cords to the appropriate labeled holes in the top of the LF03670A Interactive ECG Simulator Sternum and Apex.
10. To view the waveforms produced by the Interactive ECG Simulator, connect the 4 colored limb leads coming from the left side of the infant simulator to the same colored snaps on the side of the Interactive ECG Simulator. ***(See figure 11.)***
11. Connect the limb leads from your defibrillator/monitor to the appropriate anterior sites on the infant simulator. ***(See figure 12***; defibrillator shown not included.)


Figure 9


Figure 10

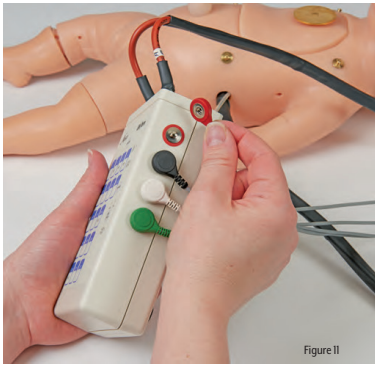


Figure 11

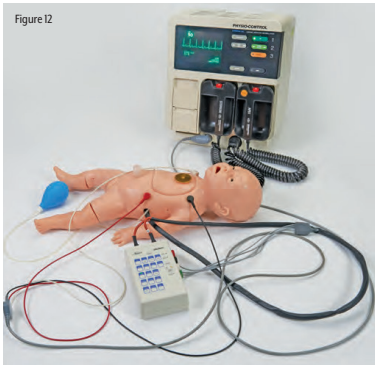


Figure 12

Set Up

C. IV Hand and Foot

Both the right hand and foot are equipped with functional IV access for infusion practice.

Caution

The infant simulator is constructed with electronic components Extreme care should be used when utilizing fluid capable features of the simulator, so as to not damage electronics or cause harm to users.

1. Dip the non-fitting end of the vein tubing into the provided lubricant. ***(See figure 13.)***
2. Feed the tubing through the lateral hole just above the hand.
3. Form a loop over the vein channel. The loop should be approximately in the middle of the vein tubing section.
4. From the medial side of the vein channel, feed the tubing through the remaining hole. ***(See figure 14.)***
5. Adjust the tubing so that it lies securely in the vein channel.
6. Attach the Luer fitting to the open end. ***(See figure 15.)***
7. Generously powder the inside of the hand skin. ***(See figure 16.)***


Figure 13


Figure 14


Figure 15


Figure 16

Set Up

8. Carefully pull the skin over the hand, taking care not to dislodge the vein tubing. ***(See figure 17.)***
9. Follow the same procedure for the foot. ***(See figure 18.)***
10. Connect the hand tubing to the foot tubing as shown. ***(See figure 19.)***
11. Connect the free ends of the hand and foot tubing to the fluid supply bags as shown. ***(See figure 20.)***

Figure 17

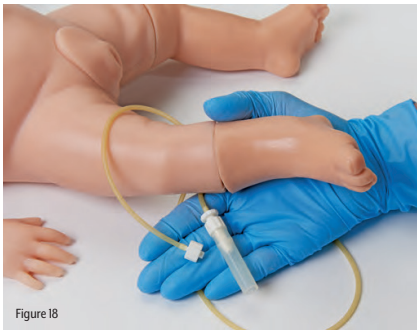


Figure 18

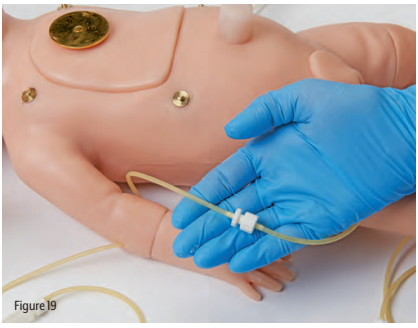


Figure 19


Figure 20

Set Up

D. I/O Leg

The left leg incorporates an intraosseous infusion feature. Palpable landmarks include the patella and the tibial tuberosity. Any commercially available intraosseous device may be used to place the needle. The bone is prefilled with simulated blood and will provide flashback when the needle is properly inserted.

1. To replace the bone, simply peel off the outer skin. ***(See figure 21.)***
2. Flex the foot downward, and pop the bone out.

Figure 21

Set Up

3. When installing the new bone, make sure it is correctly positioned in the leg cavity. ***(See figures 22 and 23.)***
4. Replace the skin. A light dusting of baby powder on the inside of the skin will help it to slide on easily. ***(See figure 24.)***

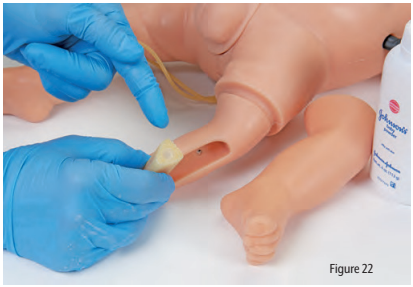


Figure 22


Figure 23


Figure 24


Figure 25

E. Patent Umbilicus

The umbilical stump features a patent umbilical vein and one patent umbilical artery. Up to 5 ml of fluid or simulated blood may be infused into, or withdrawn from, the umbilical reservoir through either vessel.

1. To fill the reservoir within the abdomen, gently pull the umbilical stump free from the abdomen of the infant simulator,being cautious to not disconnect the pulse system.
2. Using the supplied 24 ml syringe, depress simulated blood into the abdomen of the infant simulator. ***(See figure 25.)***
3. Replace the umbilical stump, being careful to not kink the tubing for the pulse system.

Set Up

4. If the pulse system tubing should become disconnected, simply reconnect the stump at the outlet of the pulse system, located just below the opening of the reservoir before replacing the stump.
5. To empty the reservoir, gently detach the stump from the body and remove fluids with a syringe or paper towel. The reservoir may be left open to air dry.
6. Allow all components to completely air dry after each use before re-assembly or storage.

F. GI

The left nostril will accept an 8 FR NG tube that will pass into a small tube embedded in the chest cavity of the infant simulator.
Note: This is for tube placement only. No fluids should be infiltrated into the simulated stomach cavity.

G. Pulses

C.H.A.R.L.I.E. features seven functioning pulse sites: right and left femoral, right and left brachial ***(See figure 26)***, right and left carotid ***(See figure 27)***, and the umbilical stump. ***(See figure 28)***

Figure 26

Figure 27

Figure 28

Set Up

H. Genitals
The male and female genital inserts may be used interchangeably. The genital inserts are for catheter placement practice and not designed to deliver fluids. The anal opening may be used for the administration of rectal medications in suppository form.

Do not attempt to infuse fluids.

To interchange and install genitals:

1. Select either male of female genitals.
2. Apply baby powder to the back side of the genital insert.
3. Slide the insert into place in the infant simulator. ***(See figures 29 and 30.)***


Figure 29


Figure 30

I. Defects
Two different birth defects are included with the infant simulator. The omphalocele birth defect fits over the patent umbilicus. ***(See figure 31.)*** The neural tube defect fits into the hole on the back of the infant simulator. ***(See figure 32.)***


Figure 31


Figure 32

Instructions for Use

Caution
The simulator is constructed with electronic components. Extreme care should be used when utilizing fluid capable features of the simulator, so as to not damage electronics or cause harm to users.

A. NG Tube
The patent left nostril may be used for practice in NG tube insertion and care. Nasco recommends a 5 FR NG tube. An embedded tube in the simulator simulates a small stomach reservoir. The reservoir is not intended to accept fluid.

1. Ensure all appliances used for nasogastric tube insertion are generously lubricated with the supplied lubricant.
2. Follow general practice guidelines to place the tube.
3. Adhesive tape will not adhere to the material of the face. Use an alternative method to secure the tube.
4. Clean any excess lubricant following each use.
5. Allow simulator to air dry completely before re-assembly or storage.

B. Intubation
Nasco recommends a standard 3.5 mm ET tube, #1 LMA, and a #1 Miller blade.

1. Always thoroughly lubricate all equipment before use with the supplied lubricant.
2. Adhesive tape will not adhere to the material of the face. Use an alternative method to secure the ET tube.
3. The infant simulator may also be ventilated with a bag valve mask.
4. The airway may be removed for cleaning following each use.
5. Allow the simulator and airways to air dry completely before re-assembly or storage.

Instructions for Use

C. CPR and Defibrillation

The infant simulator comes with anInteractiveECGSimulator(LF03670AU) with part number LF01420U. Any Nasco Healthcare Life/form® Interactive ECG Simulator (LF03670AU) will work with part number LF01421U. The Interactive ECG Simulator acts as the load box and can accept up to 360 joules of energy. Compressions can be performed on the defibrillation chest insert or alternate chest insert sold separately (see section for replacement parts and available supplies).

1. Follow the setup instructions on pages 6 and 7 to connect the infant simulator to the Interactive ECG Simulator.
2. Ensure the defibrillation chest insert is connected. ***(See figure 33.)***
3. Use the round defibrillation adapter posts for manual defibrillation.
4. Screw the round defibrillation adapter posts into the defibrillation chest insert. ***(See figure 34.)***
5. Screw the round defibrillation adapter post into the defibrillation chest post site on the posterior of the simulator. ***(See figure 35.)***
6. Included with the simulator is a set of chest post adapters 101-054U, for use with training cables (sold separately). See the section for supplies and replacement parts for part number information.
7. Press the on-off button on the Interactive ECG Simulator. NSR (Normal Sinus Rhythm) and adult age group are the default selections.
8. Press the age group button to select pediatric rhythms. ***(See figure 36.)***
9. Pressing any of the rhythm buttons will select that rhythm.
10. To convert, select the initial rhythm to display.
11. Press the convert button.

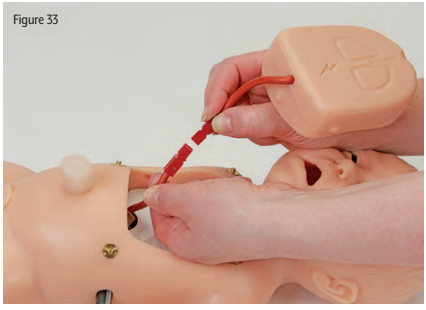


Figure 33


Figure 34


Figure 35

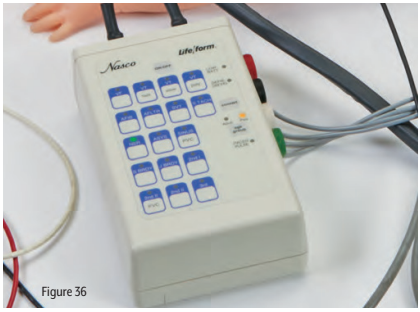


Figure 36

12. Select the rhythm to display after conversion. This rhythm will be blinking.
13. Shock the manikin using industry standards for infant defibrillation. The blinking rhythm will then turn solid on the Interactive ECG Simulator and will be the rhythm displayed on your defibrillator/ monitor.

Note: 20 joules of energy is enough to convert; do not go over the industry standard for infant defibrillation.

D. PICC Line

The left arm will accept a 2 FR catheter via the molded access site. It is intended for practice in site care only. ***(See figure 37.)***

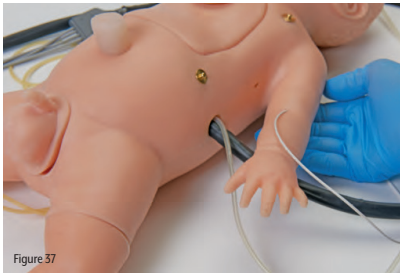


Figure 37

Do not attempt to infuse fluids.

1. Lubricate the catheter thoroughly with the supplied lubricant before insertion. Use an alternative method to secure. Most adhesives do not stick well to the infant simulator's skin.
2. Remove all devices from the infant simulator after each use.

Instructions for Use

E. Performing IV Injection and Withdrawals

Both the right hand and foot are equipped with functional IV access and infusion practice.

1. Make sure all clamps are closed on the fluid supply bags.
2. Add 1 pint of distilled water only to the pint bottle with blood powder; shake it to mix.
3. Hang one bag (A) and fill with 100-500 cc of prepared blood mixture. Hang no higher than 18" above the surface of the arm (fluid supply stand shown sold separately, LF01022U).
4. Close the cap tightly and lay the other bag (B) on the same surface as the infant simulator. Make sure that bag (B) cap is closed tightly.
5. Make sure all connections are secure. Open both clamps and let the blood run through until all the air has been displaced from the tubing. ***(See figure 38.)***
6. For blood sampling, close the clamp on Bag B, leaving the Bag A clamp open.

   Note: Simulate cleansing IV, injection, and withdrawal sites using distilled water. Multiple or prolonged exposure to harsh antiseptics, such as alcohol or iodine, could damage or stain the simulator. Using any fluids besides distilled water is not recommended.
7. For injections or infusions, close the Bag A clamp and open the Bag B clamp.
8. The position of the bags may be switched when Bag B is full.
9. Always drain the blood and run clear water through the system at the end of each use.
10. Allow all components to air dry completely after each use and before re-assembly or storage. Pressing any of the rhythm buttons will select that rhythm.

Figure 38

Instructions for Use

F. Performing IV Infusions

1. Procure a 3rd IV bag (sold separately, LF01130).
2. Begin with a fully pressurized system.
3. Insert the IV needle or butterfly into a vein. Flashback will indicate a proper insertion.
4. Attach the needle or butterfly to the tubing from the infusion solution or fluid supply Bag C using the small latex piece. ***(See figure 39.)***
5. Open the clamp on fluid supply Bag B.
6. Open the clamp from the infusion solution.
7. Proof of proper procedure will be evidenced by the flow of fluid from the infusion solution or fluid supply Bag C.

   Note: Simulate cleansing IV, injection, and withdrawal sites using distilled water. Multiple or prolonged exposure to harsh antiseptics such as alcohol or iodine could damage or stain the simulator. Performing infusions can dilute your simulated blood solution; ensure Bag B is mostly empty before infusing.
8. Always drain the blood and run clear water through the system at the end of each use.
9. Allow all components to air dry completely after each use and before re-assembly or storage.

G. Chest Tube

A chest tube may be inserted into the site in the left mid-axial line. This is a nonfunctioning site that may be used for practice in chest tube care. ***(See figure 40.)***


Figure 39

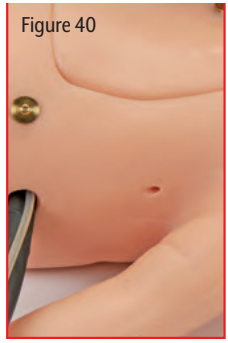


Figure 40

Instructions for Use

1. Apply a small amount of the provided lubricant to chest tube appliances.
2. Use an alternative method to secure. Most adhesives do not stick well to the infant simulator's skin.
3. Remove all devices from the infant simulator after each use.
4. Ensure the infant simulator and chest tube site are clean and dry after each use.

H. Umbilicus

The umbilicus may be catheterized through the vein or the artery. Always lubricate catheters before insertion.

1. To take blood samples, pull out the umbilicus, using caution to not disconnect the pulse system tubing.
2. Fill the reservoir with approximately 2-4 cc of blood mixture, and replace umbilicus. ***(See figures 41 and 42.)***
3. To infuse fluids, leave the reservoir empty. ***(See figure 43.)***
4. Maximum capacity is approximately 5 cc.
5. After each use, remove the umbilicus, using caution to not disconnect the pulse system tubing, and empty the reservoir with the syringe.
6. Wipe out remaining fluid with a paper towel.
7. Leave open to air dry.

Figure 41

Figure 42

Figure 43

Instructions for Use

I. Catheterization

The interchangeable genital inserts are for catheter placement practice and not designed to deliver fluids. ***(See figures 44 and 45.)***

1. Select either male or female genital insert.
2. Fit into the body of the manikin; apply baby powder to the back side of the genital insert for ease in insertion to the infant simulator.
3. Either genital insert will accept a 5 FR straight urinary catheter.
4. Always lubricate the catheter before use.
5. Genital inserts are not designed to deliver fluids.
6. Remove all appliances after each use.
7. Ensure the infant simulator and genital inserts are clean and completely dry after each use and before re-assembly or storage.

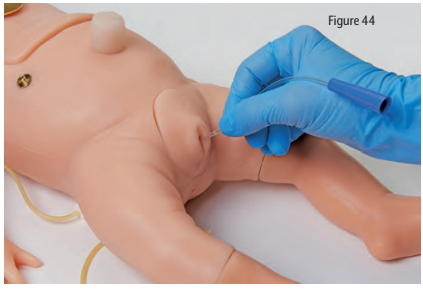


Figure 44


Figure 45

J. Administering Rectum Medications, Performing a Temperature

The anal opening may be used for the administration of rectal medications in suppository form or performing a simulated rectal temperature. Do not attempt to infuse fluids.

1. Always lubricate anything that will be inserted into the rectum with the supplied lubricant.
2. Remove administered medications or appliances after each use
3. Ensure the rectum is clean and completely dry after each use and before re-assembly or storage.

Instructions for Use

K. IO Leg

The left leg incorporates an intraosseous infusion feature.

1. Install a new, pre-filled bone.
2. Ensure the bone is properly placed within the infant simulator. ***(See figure 46.)***
3. Replace the foot skin.
4. Any commercially available intraosseous device may be used to place the needle. The bone is prefilled with simulated blood and can provide flashback when the needle is properly inserted.
5. Palpable landmarks include the patella and the tibial tuberosity.

Figure 46

6. A small amount of the supplied lubricant on the surface of the skin will prevent devices from grabbing during the procedure. Skin surfaces can become tacky with handling.
7. Bones can be punctured multiple times. Flashback may not be visible with multiple or initial punctures.
8. Ensure all devices are removed following each procedure.
9. Remove and discard used bones.
10. Ensure the infant simulator is clean and dry after each use.
11. Remove leg skin to ensure the leg is clean and dry after each use.
12. Allow to air dry completely.

L. Pulses

C.H.A.R.L.I.E. features seven functioning pulse sites: right and left femoral, right and left brachial ***(See figure 26)***, right and left carotid ***(See figure 27)***, and the umbilical stump. ***(See figure 28)***

1. Gently pump the inflation bulb to activate the pulses as desired.

Figure 47

Note: A disconnect anywhere in the tubing will cause a loss of air pressure, resulting in failure of the entire pulse system. If none of the pulses are working, check the connection in the umbilical cavity to make sure the fitting is securely attached.

Figure 48

Figure 49

Troubleshooting

1. Accidentally disconnecting or kinking the pulse system tubing in the umbilical stump when filling or cleaning the abdominal reservoir, or when reinstalling the umbilical stump, will cause failure of the entire pulse system.
2. The omphalocele defect fits directly over the umbilical stump; there is no need to remove the stump.
3. Be aware that most adhesives do not stick well to the infant simulator's skin; use an alternative method to secure devices.
4. With handling, the skin of the simulator and skin components will become tacky. A dusting of baby powder will give a more lifelike quality to the skin.

Care and Maintenance

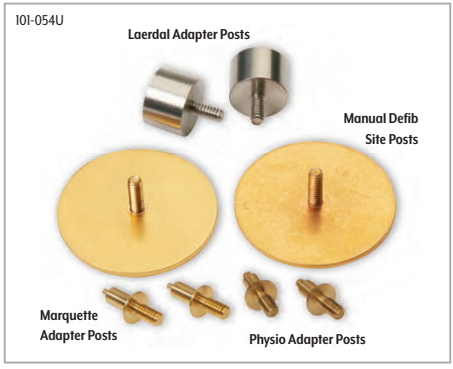
Several of the infant simulator components are completely washable and may be immersed in water. Perform the below care and maintenance procedures after each use.

1. Ensure all medical devices and appliances are removed from the infant simulator after each use.
2. Remove all components (hand and foot skins, umbilicus, birth defects, lung plate, and airway).
3. Wipe the simulator and umbilicus with pulse system tubing with a damp cloth. Avoid the chest cavity with electronic components. Avoid the pulse tubing on the umbilicus and in the abdominal reservoir.
4. Allow to air dry completely.
5. Wipe the abdominal reservoir with a damp cloth.
6. Allow to air dry completely.
7. Wash the components (airways, hand and foot skins, birth defects, and genitals) gently in warm soapy water.
8. Rinse and dry thoroughly.
9. Allow all components to air dry completely after each use and before re-assembly or storage.
10. A dusting of baby powder to baby body and all components prior to storage is recommended.
11. Store the clean, dry simulator and the components in a clear plastic bag to discourage dust or other materials from settling on the clean simulator.
12. Certain surfaces can become damaged from prolonged exposure to the simulator and its components.
13. Stubborn dirt or grime may be removed by using Nasco Cleaner (sold separately, LF09919U) or Tub O' Towels® (sold separately, 9731398). Simply apply the Nasco Cleaner to the soiled surface and wipe clean with a cloth or use Tub O' Towels® pre-moistened cloth. Avoid areas with electronic components with Nasco Cleaner and premoistened Tub O' Towels®.
14. A dusting of baby powder will give a more quality to the skin.
15. Simulated blood will stain surfaces, clothing, and certain components of the simulator.

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

Supplies and Replacement Parts

LF01401	Bilateral Chest Insert
LF01402	Unilateral Chest Insert
LF01403	Airway
LF01404	Replacement IV Hand Skin and Vein
LF01405	Replacement IV Foot Skin and Vein
LF01406	Umbilicus
LF01407	Birth Defects
LF01408	Replacement Advanced Airway
LF01409	Defibrillation Chest Insert
LF01410	Genitalia
LF01411	I/O Skin
LF01412	Umbilicus with Pulse
LF03670A	ECG Simulator
LF09919	Nasco Cleaner
101-054	Adapter Set
101-092	I/O Bone and Blood Capsule, Pack of 12
175-0-Z02	Zoll Training Cables
175-0-Z10	Medtronic Physio Quick Combo Training Cables
175-0-Z13	Phillips Training Cables



Other Available Simulators

LF00714	Clots and Hemorrhages Complete Set
LF01400	Newborn Nursing Skills and ALS Simulator
LF01280	Micro-Preemie Simulator

Nasco HEALTHCARE

NASCO HEALTHCARE

HC190001INM26 06/21