



Gaumard[®]
Simulators for Health Care Education

HAL[®] S315.400 User Guide



HAL is an interactive educational system developed to assist a certified instructor. It is not a substitute for a comprehensive understanding of the subject matter and not intended for clinical decision making.

User Guide 16.9.1
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Table of Contents

Table of Contents	3
Care and Cautions	4
Caution	4
Maintenance	4
Getting Started.....	4
Overview	4
Working with HAL	5
Pneumatic Control Panel.....	5
BVM, CPR, and Chest Rise.....	6
Intubation	6
Disable lungs independently.....	7
Airway Complications	7
Surgical Airway	7
Installing Surgical Cricoid Insert, Cricothyroid Membrane, and Skin	7
Installing Surgical Trachea Assembly.....	8
Bilateral Needle Decompression	9
Chest drain.....	10
Troubleshooting	11
Consumable Parts List	11
Contact Us	13

Care and Cautions

Caution

Store HAL[®] in a cool, dry place. Extended storage above 85 degrees Fahrenheit (29 Celsius) will cause the simulator to soften and slowly warp. It is acceptable to *operate* HAL[®] at an ambient temperature of 95 degrees Fahrenheit (35 Celsius).

Do not store the simulator while it is pressurized. Doing may damage the internal air reservoirs. At the end of an exercise, always depressurize the system by setting the Release/Hold switch to the Release position.

Do not intubate without lubricating the airway adjunct with mineral oil lubricant (provided). Failure to do so will make intubation very difficult and is likely to result in damage.

Do not perform surgical exercises on the ventilation insert.

Do not add liquids to the hemothorax sites. Doing so will damage the simulator and void the warranty.

Maintenance

HAL should be cleaned with a cloth dampened with diluted liquid dishwashing soap. If medical adhesives remain on the skin, clean with alcohol wipes.

Apply talcum powder to the face to reduce the silicone tackiness.

Do not use GooGone[®] or similar products, as the citric acid in the formula will cause pitting of the various materials comprising your simulator.

HAL[®] is "splash-proof" but not water-proof. Do not submerge or allow fluid to enter the interior of the simulator.

Getting Started

Overview

The HAL S315.400 is a multipurpose airway and trauma trainer with the following features:

- Adult male upper body and head
- Silicon face/head skin for realistic jaw thrust, head tilt / chin lift
- Realistic airway which is manually programmable to include tongue edema, laryngospasm, and pharyngeal swelling
- BVM + CPR
- Realistic chest compression and recoil
- Intubate using conventional adjuncts
- Inflating lungs produces realistic chest rise
- Right mainstem intubation
- Lungs can be disabled independently
- Surgical airway procedures such as tracheostomy and needle or surgical cricothyrotomy
- Replaceable crico/trachea cover and trachea
- Bilateral needle decompression at 2nd intercostal space
- Bilateral chest tubes at 5th intercostal space
- Gastric distention

Accessories

- (1) Ventilation trachea insert (installed)
- (1) Surgical trachea base
- (5) Surgical trachea inserts
- (10) Trachea Skin Covers
- (10) Simulated cricothyroid membrane
- (1) Surgical cricoid insert
- Mineral oil lubricant
- Manual air pump
- (5) Needle decompression inserts
- Instructions for Use
- Carrying bag

Working with HAL

Pneumatic Control Panel

The HAL S315.400 features are driven by pressurized air held in the system's internal reservoir. There are no electronics and no electric power is required to operate the system.



To operate the simulator, first pressurize the system using the manual air pump included. Then, activate and deactivate features using the control panel to simulate complications as the student provides care.

PRESSURIZING THE SYSTEM

The mechanical switches located on the control panel redirect pressurized air from the internal reservoir to activate features such as laryngospasm and tongue edema. Activating features consumes air pressure from the internal reservoir. It may be necessary to refill the system after several exercises.

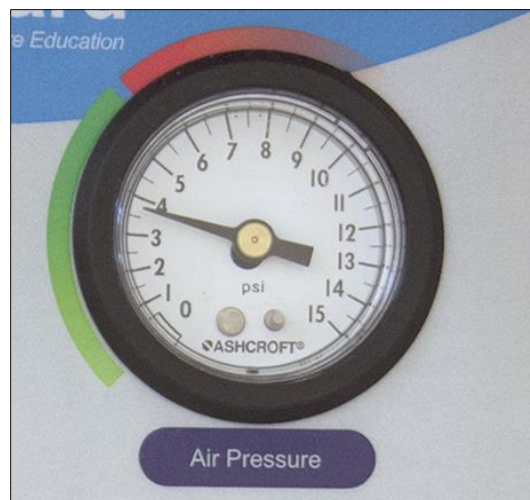


Follow the steps below to pressurize the system prior to starting a simulation session.

1. Set the “Release/Hold” switch to the “Hold” position.
2. Connect the manual air pump to the “Air Inlet” port.



3. Slowly begin pumping to pressurize. Monitor the “Air Pressure” dial closely and **STOP** pumping when the Air Pressure dial reaches the **3 psi mark**.



Do not exceed the recommended pressure marked green. Filling the system beyond its capacity will stress the internal mechanics and cause damage the simulator.

4. Keep the “Release/Hold” switch on the “Hold” position and disconnect the manual air pump.

The simulator is now ready for use. At the end of the simulation session, release the reservoir pressure by setting the “Release/Hold” switch to the “Release” position.

Do not store the simulator while it is pressurized. Doing may damage the internal air reservoirs.

BVM, CPR, AND CHEST RISE

HAL displays realistic chest rise when ventilated with a breathing valve mask.



Moreover, chest recoil allows care providers to perform compressions and practice CPR positioning and rhythm.



INTUBATION

HAL allows for realistic jaw thrust, head tilt and chin lift. The airway has anatomical landmarks and can be intubated orally or nasally. In addition, intubating and ventilating the esophagus leads to visible gastric distention.



Manually lubricate the ET tube, airway, and nasal opening prior to performing an intubation exercise.

Do not spray mineral oil directly into the mouth or the airway.

Do not introduce liquids into the airway or the esophagus, as internal damage may result.

SPECIFICATIONS

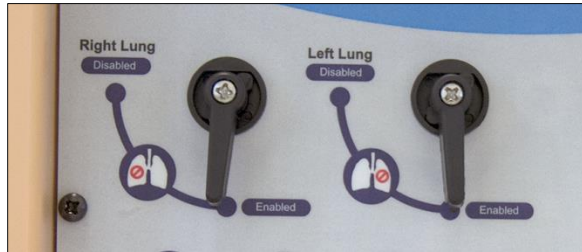
Procedure	Recommended Device Size
Intubation (Blade size)	Miller 4 or MAC 3.5
LMA	Size 4
Nasal Intubation	8 mm outer diameter max
Oral Intubation	ETT 7 or 7.5

RIGHT MAINSTEM INTUBATION

If the endotracheal tube is inserted too deep, the left lung is automatically disabled, realistically demonstrating right mainstem intubation. Correct the tube position to re-enable the left lung rise during bagging.

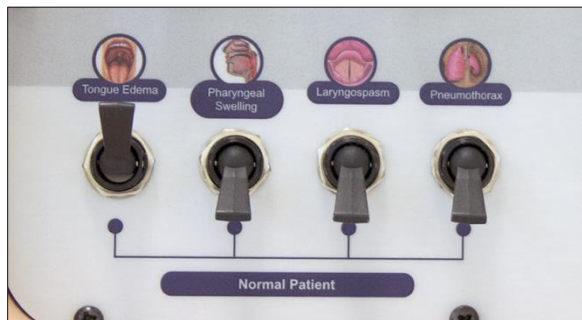
DISABLE LUNGS INDEPENDENTLY

Using the lung lever controls, manually disable each lung to simulate pneumothorax or a collapsed lung.



AIRWAY COMPLICATIONS

To activate the **tongue edema**, **pharyngeal swelling** or **laryngospasm** feature, set the feature switch to the on position. After the care provider intervenes, flip the switch down to the “Normal Patient” position to relieve the complication.

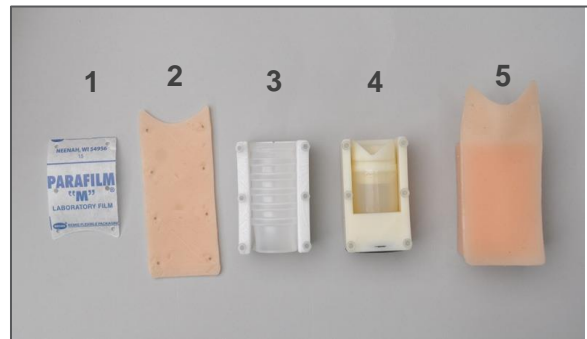


SURGICAL AIRWAY

HAL includes two replaceable surgical airway inserts. The inserts allow users to perform tracheostomy or cricothyrotomy procedures with real medical equipment. The surgical inserts feature anatomical landmarks. Also, a simulated cricothyroid membrane, and trachea skin cover are provided.

A separate ventilation insert is pre-installed, which is designed to maintain a tight air seal during ventilation and intubation exercises. Interchange the airway inserts as needed.

Do not perform surgical exercises on the ventilation insert.



- 1 Simulated cricothyroid membrane
- 2 Trachea skin cover
- 3 Surgical trachea assembly
- 4 Surgical cricoid insert
- 5 Ventilation insert

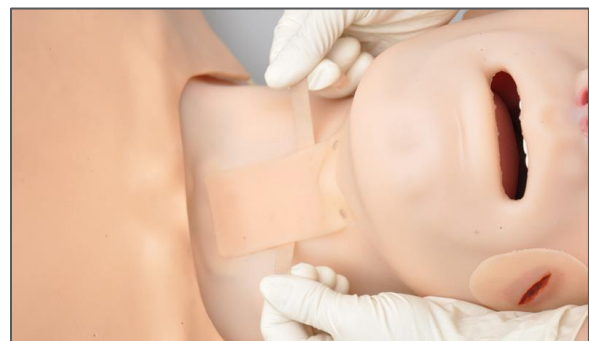
The assembly of surgical cricoid and trachea inserts allows for the use of tactical cricothyrotomy and tracheostomy kits.

Perform lateral or medial incisions on the replaceable trachea skin covers.

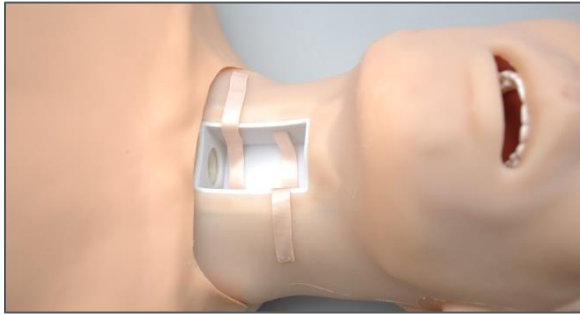
INSTALLING SURGICAL CRICOID INSERT, CRICOTHYROID MEMBRANE, AND SKIN

To install the surgical cricoid insert and the cricothyroid membrane:

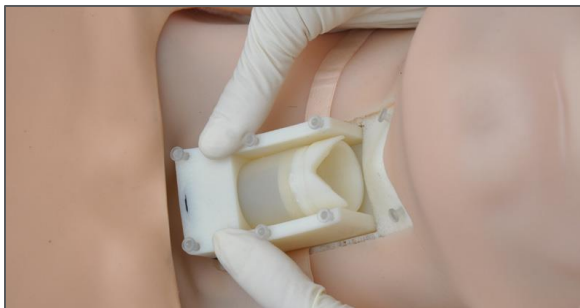
1. Remove the ventilation airway insert by pulling on the ribbons located on either side



- Adjust the ribbons to accommodate the surgical neck insert



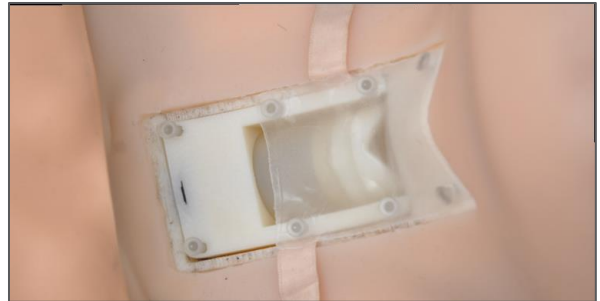
- Place the surgical cricoid insert inside the cavity with the opening towards the head and gently press it down into position



- Remove the paper cover from the simulated cricothyroid membrane



- Place the simulated cricothyroid membrane onto the insert and secure it by stretching the precut holes around the pins as shown below



- Place the trachea skin cover over the assembly inserting the holes around the 4 pairs of pins



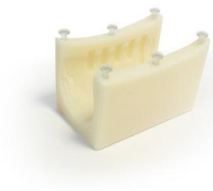
The surgical assembly is ready to perform cricothyrotomy procedures.

INSTALLING SURGICAL TRACHEA ASSEMBLY

Surgical trachea assembly includes:

Surgical trachea base

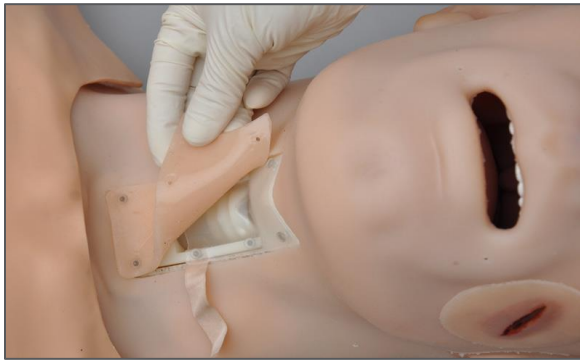
Surgical trachea insert



1. Place the surgical trachea insert inside the trachea base
Notice that the opening of the surgical trachea insert is facing up.



2. Remove the trachea skin cover from the simulator



3. Remove the surgical cricoid insert
4. Place the surgical cricoid insert inside the cavity with the opening towards the head and gently press it down into position



The surgical trachea is indicated above.

5. Reattach the skin cover over the assembly and secure it by stretching the precut holes around the pins.



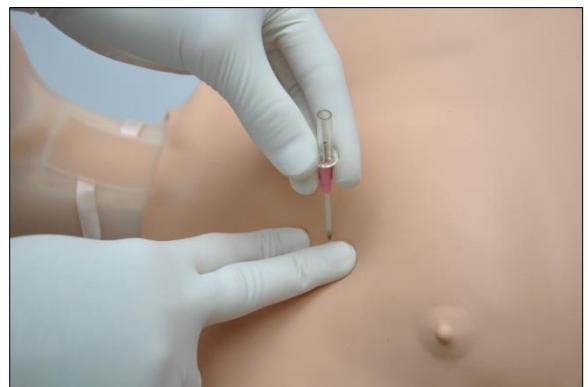
The surgical assembly is ready to perform tracheostomy procedures.

This surgical assembly can be used for cricothyrotomy procedures as well. In that case add the simulated cricothyroid membrane as described in the previous section.

Trachea skin cover, cricothyroid membrane, and surgical trachea insert are consumable items.

BILATERAL NEEDLE DECOMPRESSION

Bilateral needle decompression sites are located at the second intercostal space. To enable the feature, set the Pneumothorax feature to the on position. Air from the internal reservoir will fill the decompression site. Treat the tension pneumothorax with a needle to release the trapped air. Turn the pneumothorax release switch to the off position to stop the flow of air through the decompression site.



REPLACING NEEDLE DECOMPRESSION INSERTS

The needle decompression sites accommodate several puncture exercises. Follow the steps below to replace the insert after the site is unable to retain the pressure due to multiple puncture marks.

1. Unfasten the chest skin Velcro attachments located each side and at the shoulders.
2. Turn the ribcage over to access the decompression sites.
3. Roll back the fastener rings to remove the decompression site tube from the holder.
4. Place a fastener ring on the new tube and slide it a few inches from the end.
5. Connect the new tube onto the air adapter and slide the fastener ring back into place to secure the tubing onto the adapter.
6. Coat the tubes with lubricant or talcum powder and insert the tubing back into the holder
7. Replace the rib cage and tightly Velcro the chest skin into place.

CHEST DRAIN

HAL features bilateral chest drain sites at the 5th intercostal space. The sites are compatible with 32 French straight thoracic catheters only.



Do not introduce liquids into the hemothorax sites. Doing will damage the simulator and void the warranty.

Troubleshooting

Symptom	Possible Cause	Solution
No chest rise	L/R lung is disabled	Set the lung control to enabled
System does not retain pressure	Pressure switch is set to "Release"	Set the Release/Hold switch to Hold.
	Pneumothorax Release is activated	Deactivate the Pneumothorax Release feature.
	Needle decompression sites puncture sites are leaking air	Replace the needle decompression sites.
	Filling bulb is not sealed to the pressure port	

Consumable Parts List

Refer to the list below when purchasing consumable and replacement items for the HAL S315.400 simulator.

Consumables	
S315.400.M2.923.L	Set of 10 Trachea skin covers (light skin)
S315.400.M2.923.M	Set of 10 Trachea skin covers (medium skin)
S315.400.M2.923.D	Set of 10 Trachea skin covers (dark skin)
S315.400.M2.984	Set of 5 Surgical trachea inserts
S315.400.M2.990	Set of 10 Simulated cricothyroid membrane
S315.400.M2.893.L	Ventilation trachea insert (light skin)
S315.400.M2.893.M	Ventilation trachea insert (medium skin)
S315.400.M2.893.D	Ventilation trachea insert (dark skin)
S315.400.M2.999	Surgical trachea base
S315.400.974	Surgical cricoid insert
S315.400.927	Set of lungs
S315.400.M2.712.BD.L	Chest skin with bilateral chest drain sites (light)
S315.400.M2.712.BD.M	Chest skin with bilateral chest drain sites (medium)
S315.400.M2.712.BD.D	Chest skin with bilateral chest drain sites (dark)

S315.400.M2.898	Set of Ribs
S315.400.M2.898.2	Set of Ribs with needle decompression sites
S315.400.M2.181	4 oz. Mineral oil
S315.400.M2.927	Manual air pump



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