

# LCSU 4

## Laerdal Compact Suction Unit 4

Español	Indicaciones de uso
Français	Mode d'emploi
Deutsch	Bedienungsanleitung
Italiano	Istruzioni d'uso
Nederlands	Gebruiksaanwijzing
Português	Instruções de utilização
Svenska	Bruksanvisning
Suomi	Käyttöohjeet
Dansk	Brugsvejledning
Norsk	Bruksanvisning
Polski	Wskazówki dotyczące stosowania
Ελληνικός	Οδηγίες χρήσης
中文	使用指南
日本語	使用説明書
한국어	사용설명서
русский	Инструкция по эксплуатации
Český	Návod k použití
Íslenska	Notkunarleiðbeiningar



**REF** Cat. No. 880051



**REF** Cat. No. 880061

### Directions for Use



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## 1 LCSU 4 Overview

### Important Information

These Directions for Use cover two versions of LCSU 4; one configured with 800 ml Canister, and one with 300 ml Canister. Unless otherwise specified, the information in these Directions for Use applies to both versions.

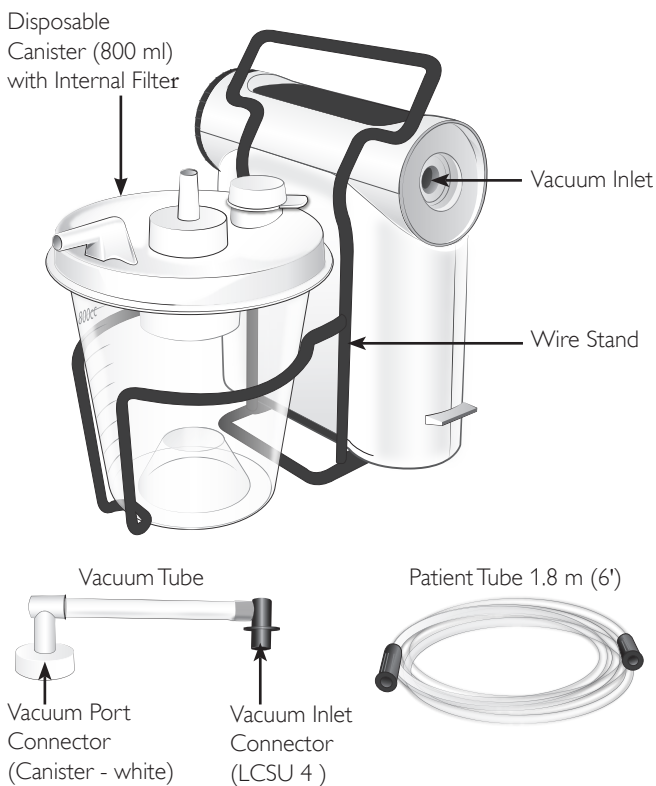
#### Important

Inspect all parts when unpacking. If there are signs of damage or parts are missing - immediately notify the seller. Do not attempt to use the LCSU 4 if parts are damaged or missing, or if the Battery has not been sufficiently charged.

#### LCSU 4 - 800 ml (Cat. No. 880051)

##### Items Included:

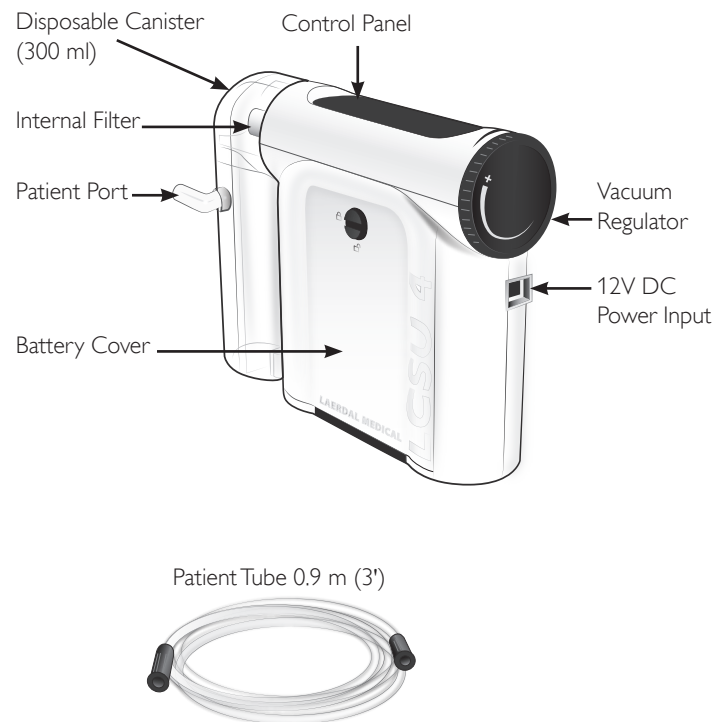
- LCSU 4 Main Unit
- 800 ml Disposable Canister
- Patient Tube 1.8 m (6')
- AC/DC Adapter charger, w/AC Power-cord
- Battery
- Directions for Use
- Carry Bag (for 800 ml version)
- Wire Stand
- Vacuum Tube



#### LCSU 4 - 300 ml (Cat. No. 880061)

##### Items Included:

- LCSU 4 Main Unit
- 300 ml Disposable Canister
- Patient Tube 0.9 m (3')
- AC/DC Adapter charger, w/AC Power-cord
- Battery
- Directions for Use
- Carry Bag (for 300 ml version)



- The main suction unit is the same for both versions.
- Each version can easily be converted to the other Canister option by ordering additional parts.
- For a complete parts overview (see Chapter 8).

## 2 Description and Intended Use

### Intended Use

The LCSU 4 is a portable, electrically powered, medical suction device intended for field and transport use. It is intended for intermittent operation to remove secretions, blood or vomit from a patient's airway to allow ventilation. Higher vacuum levels are generally selected for oropharyngeal suction, and lower vacuum levels are usually selected for tracheal suctioning and the suctioning of children and infants.



#### Important

- Do not use this unit until you have carefully read and fully understood these Directions for Use. Contact Laerdal Medical or its authorized distributor for additional information if required.
- Federal law (USA) restricts the LCSU 4 to sale by or on the order of a physician or other licensed medical authority.
- Use only Laerdal accessories supplied directly by Laerdal Medical or one of its authorized distributors to ensure that the LCSU 4 operates satisfactorily.



### Cautions and Warnings

#### Cautions

- The LCSU 4 is not suitable for use in the presence of flammable liquids or gases; danger of explosion or fire.
- Do not use the LCSU 4 under environmental conditions that are outside ranges specified. This can endanger safety and adversely affect device operation.
- Ingress of suctioned material into the pump can damage and/or disable the device. If suctioning of liquid from the Canister or patient into the pump is suspected, do not use the LCSU 4. Contact Laerdal Medical or your authorized distributor for advice.

#### Warnings

- The LCSU 4 should only be used by persons trained in the use of medical suction equipment, and according to local protocol.
- Unauthorized service attempts, opening or tampering with the LCSU 4 or its electrical components can damage or disable the device, and will void the Limited Warranty.

### Limited Warranty

The LCSU 4 comes with a two (2) year limited warranty, excluding the Canisters, Tubing systems and Battery. See "Laerdal Global Warranty" for terms and conditions, available on [www.laerdal.com](http://www.laerdal.com). The Battery is warranted for 90 days. Laerdal does not provide Service Parts for this product. Excluding the internal Battery, there are no user-serviceable/user-replaceable parts inside the LCSU 4 Main Unit.

### 3 LCSU 4 Setup

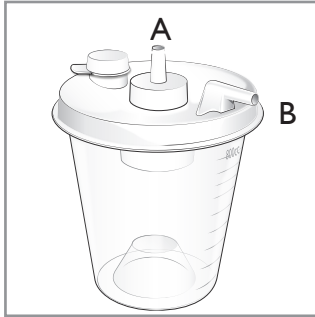
#### Prepare the LCSU 4 for Operation



##### Important

All models are shipped with the Battery inside the unit, but not connected. Connect the Battery and charge it fully before using the unit. See Charging Instructions (Chapter 5).

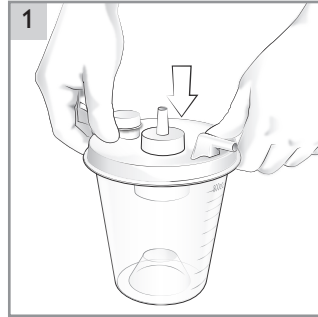
#### Assemble 800 ml Version



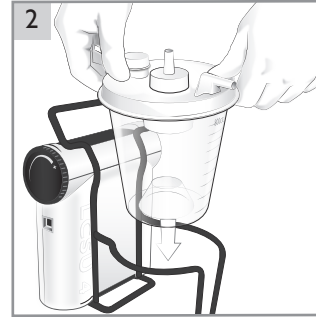
##### Canister Ports

A - Vacuum Port

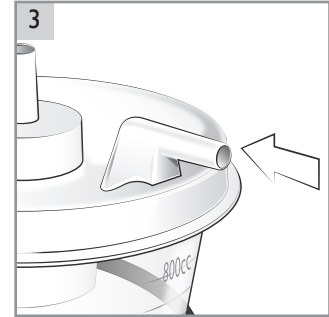
B - Patient Port



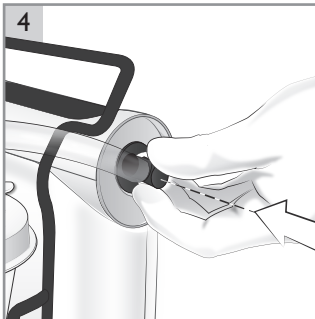
1 Secure the Lid to the Canister.



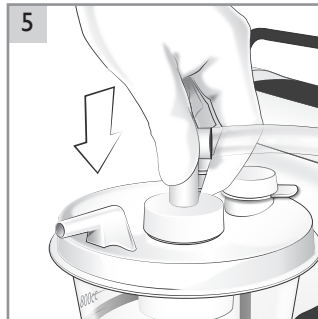
2 Place the Canister into Wire Stand.



3 Ensure that the Patient Port is accessible.



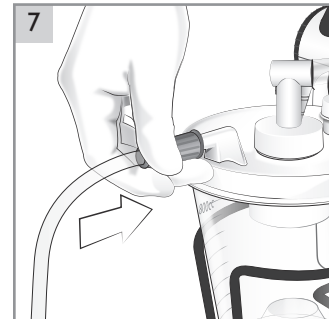
4 Attach the Connector to the Vacuum Port Connector on the Suction Unit.



5 Attach the WHITE Connector to the Vacuum Port Connector on the Canister.



6 Check that all Vacuum Tube connections are firmly attached.



7 Attach the Patient Tube to Patient Port on the Canister.



##### Important

The 800 ml Canister has an internal Filter in the Lid. The Canister is disposable and cannot be cleaned. The Filter automatically stops suction/flow when the Canister is full, or the Filter becomes saturated if the unit tips onto its side during use.



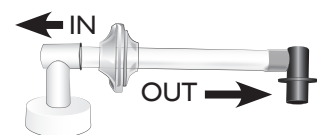
##### Caution

Always use the 800 ml Canister supplied by Laerdal, which has an internal Filter. Never connect any type of Patient Tubing directly to the LCSU 4 Vacuum Inlet Port Connection. Overflow of suctioned material into the LCSU 4 pump will result in loss of suction and permanent damage to the unit. In the event of overflow, do not use the LCSU 4. Contact Laerdal Medical or your authorized distributor.

#### Operation with High Efficiency Filter Kit

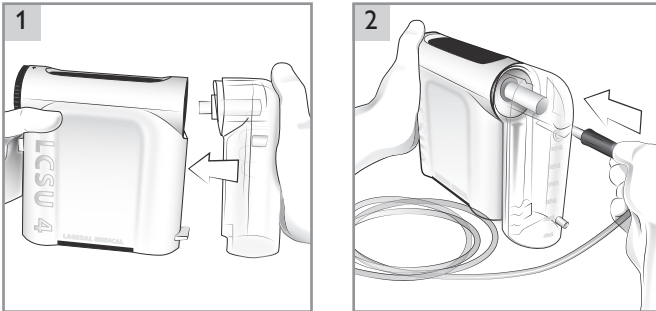
To increase filtration efficiency the Vacuum Tube may be replaced with a High Efficiency Filter Kit (Cat. No. 886116).

Ensure Filter IN points towards the WHITE connector, and OUT towards the BLUE. For Cleaning and Maintenance, see Chapter 6.



## Assemble 300 ml Version

- 1 Push the upper port connection into the Vacuum Inlet and check that the lower part of the Canister clicks in place.
- 2 Connect the Patient Tube to the Patient Port. Ensure that all connections are secure to prevent leakage.



### Important

- The 300 ml Canister is sealed, with an internal Filter. The Canister is disposable and cannot be cleaned. The Filter automatically stops suction/flow when the Canister is full, or the Filter becomes saturated if the unit tips onto its side during use.
- The 300 ml Canister (Cat. No. 886100) can also be used with the previous model LCSU 3. However, the LCSU 4 cannot be used with LCSU 3 Canisters.
- To improve the upright stability, a Wire Stand (Cat. No. 886115) is offered as an Optional Accessory. This adds both a handle and a foot to the unit.

### Caution

Do not attempt to install or use LCSU 3 Canisters on LCSU 4.



Cat. No. 886115

## Check Before Each Use

- 1 The Unit should not be damaged.
- 2 The Unit should be clean.
- 3 All parts should be properly assembled (Canister, Tubes etc.).
- 4 Perform Device Test after each reassembly (see Chapter 6).
- 5 Check Battery level: While performing the Device Test the Battery level should not illuminate RED. If the Battery level illuminates RED, the Battery should be charged. See Charging Instructions (Chapter 5).

### Important

For both models - always have an extra Canister available in case the first Canister is filled completely, or the unit becomes tipped on to its side and the Filter becomes saturated and stops the suction/flow.

### Warning

If the Canister on either model fills and the shut-off mechanism activates, and you have no spare Canister ready for immediate replacement, shut off LCSU 4 and utilize alternative methods according to local protocol to clear patient's airway. Continued efforts to suction with LCSU 4 Canister(s) filled may cause overflow that will prevent suctioning, damage the pump, void the unit warranty, and lead to prolonged downtime.

## 4 User Instructions

### Power Source Options

#### Internal Battery Operation

LCSU 4 is equipped with an internal Battery, NiMH 12 volt 1.6 Ah.

If the unit is to be run on Battery power, any external power source must be unplugged.

#### External 12V DC Operation

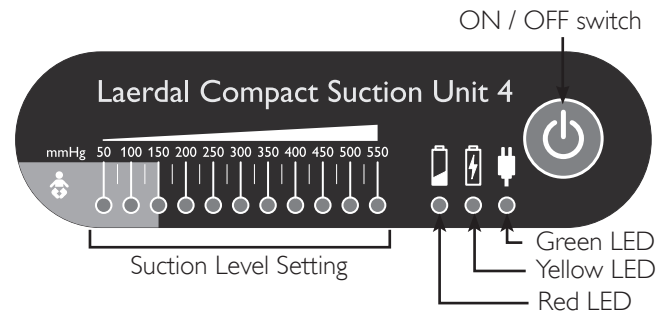
DC Power-cord for connection to vehicle 12V DC is required. Plug the smaller power connector into the LCSU 4 12V DC Power Input Connection. Plug the larger connector into the vehicle 12V DC power receptacle.

#### External AC Operation

AC/DC Adapter Charger required. Plug the smaller DC output cord power connector into the LCSU 4 12V DC Power Input Connection. Plug the AC input line cord power connector into a grounded AC mains supply receptacle. When in use, it is normal that the AC/DC Adapter Charger becomes warm.



### Control Panel and Indicator Symbols



#### Suction Level Setting

- The Scale illuminates 'Green' to indicate the level of vacuum/suction strength
- The 'Light Blue' area indicates reduced suction levels for infants and small children

The LEDs have two brightness levels. Half illuminated indicates a halfway vacuum level, e.g., 175 is indicated by a fully illuminated 150 and a half illuminated 200 LED.

LED Indicator	Status
Green	External Power is connected
Yellow	Battery is charging (Will go off when Battery is fully charged)
Red	Battery level is low




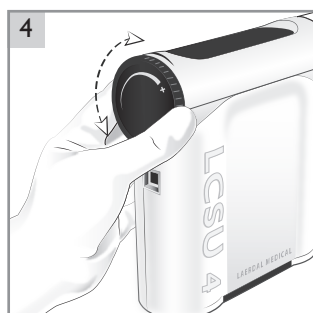
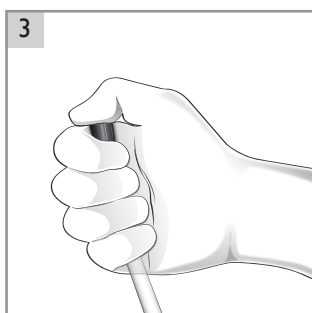
#### Warning

If the Low Battery symbol illuminates, immediately switch to an external power source to avoid interrupted operation. If the LCSU 4 does not receive external power, the Low Battery indicator will remain on and the unit performance will drop rapidly leading to complete LCSU 4 shutdown.

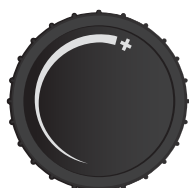


## How to Operate and Adjust Suction level

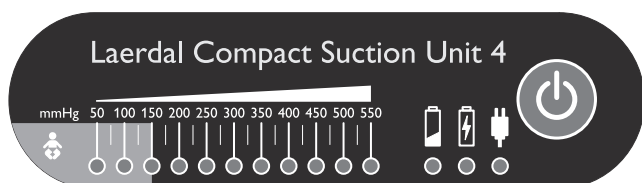
- 1 Unwind the Patient Tube (check that no kinks will obstruct flow).
- 2 Turn the unit “ON” by pressing the button (  ).
- 3 Block the Patient Tube.



- 4 Set desired Suction Vacuum level by turning the Vacuum Regulator.
  - Turn clockwise (+) to increase vacuum
  - Turn counter-clockwise to decrease vacuum



- 5 The Vacuum level will display on the 50 – 550 mmHg scale.



- 6 When the desired Vacuum level is reached; unblock and then block the Patient Tube.  
Result: Unit should return to the desired level.
- 7 Apply necessary suction therapy. If desired, a suction tip or catheter could be attached to the Patient Tube.

### Important

If LCSU 4 does not maintain the desired suction performance level, refer to Troubleshooting instructions (see Chapter 7).

## After Each Use

- 1 When finished with suctioning, let LCSU 4 run for a moment to allow all suctioned material to flow from the Patient Tube into the Canister.
- 2 Disconnect and dispose of Canister and Patient Tube.
- 3 Clean the exterior and any reusable parts of the LCSU 4 assembly according to instructions (see Chapter 6).
- 4 Perform Device Test (see Chapter 6).
- 5 Place Battery on charge (see Chapter 5).

## Battery Charging

### Important

Use only Laerdal Battery Cat. No. 886113.

### Caution

Use of other than Laerdal brand Battery may result in errors related to the Battery status indicator, reduction of the Battery operation time, failure to effectively operate LCSU 4, and/or give rise to hazards to operator and/or patient.

## When in operational use

- 1 An empty Battery must charge up to 5 hours to reach full capacity.
- 2 Battery run time: Approximately 45 minutes of continuous operation at zero vacuum level (free flow), fully recharged.
- 3 Always fully charge Battery - before and after each use.

To prolong Battery lifetime it is recommended to place the Battery on continuous charge. It will not harm the unit. If continuous charging is not possible, charge Battery for minimum 24 hours once a month. Completely discharging the Battery will shorten its useful life.

## When stored unused for > 3 months

- Fully charge Battery before storing
- Recharge every 3-6 months

## Battery Test

When in operational use, the Battery should be tested every 6-12 months.

- 1 Start the test with a fully charged Battery.
- 2 Set Max Vacuum level.
- 3 Let the unit run for 20 minutes (free flow).
- 4 Block the Patient Tube.
- 5 If Vacuum level fails to reach 550 mmHg the Battery should be replaced.

## 5 Battery Information

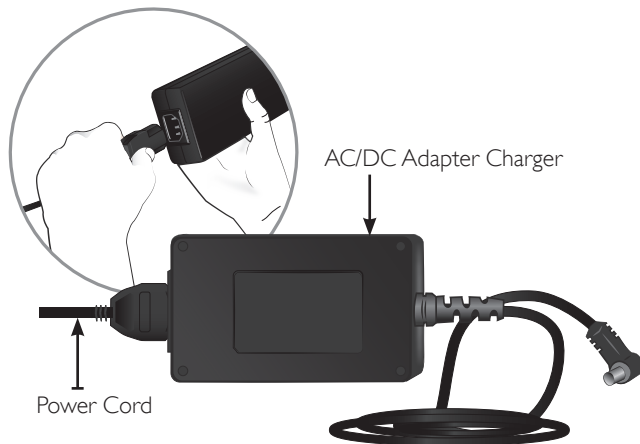
### Charging Operations

#### Caution

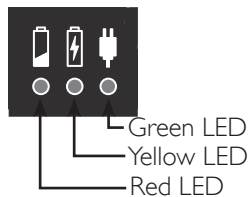
Do not operate the unit for more than a few minutes if the RED Low Battery indicator is illuminated. Recharge the Battery as soon as possible.

#### AC/DC Adapter Charger (Cat. No. 886111)

Primarily the Battery is charged while installed within the LCSU 4 unit by using the standard AC/DC Adapter Charger.



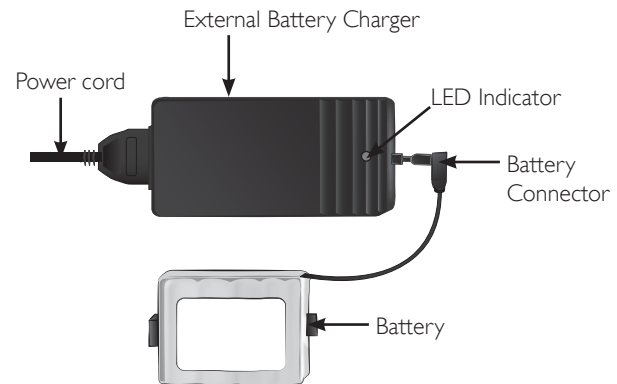
Follow the LED status on the Control Panel on the LCSU 4 and charge the Battery as necessary.



LED Indicator	Status
Red LED illuminated	Battery level low
Yellow LED illuminated	Charging
Yellow LED flashes	Battery almost charged
Yellow LED switches off	Battery is fully charged
Green LED illuminated	Connected to AC/DC

#### External Battery Charger (Cat. No. 886112)

The Battery can be charged externally by removing it from the LCSU 4 unit and using the External Battery Charger.



An empty Battery must charge up to 5 hours to reach full capacity.

Follow the LED Indicator and charge the Battery as necessary.

LED Indicator	Status
LED not illuminated	Plugs not connected
Yellow LED flashes	Charging is pending
Yellow LED illuminated	Charging
Green LED illuminated	Battery is fully charged (*)
Red LED flashes	Charge failure

\* The Battery can be left on continuous charge, even if the Green LED is illuminated. It will not harm the units.

#### Caution

Do not cover the Charger. When in use, it is normal that the Charger and the Battery becomes warm.

## Cleaning



### Cautions

- Disconnect the LCSU 4 from external power prior to cleaning.
- Use a minimum of liquid to prevent any electrical shock hazard. Do not immerse the LCSU 4, or allow it to stand in water or other liquids. This can damage the device and/or cause electrical shocks resulting in injury to persons.



### Warning

Do not pump any cleaning solution or other liquids through the vacuum pump, i.e. through the Vacuum Connector. This can damage the LCSU 4.

### Main Cabinet

- 1 Disconnect from external power supply.
- 2 Clean Cabinet surfaces by carefully wiping with a soft cloth or sponge with mild detergent. Use hand dishwashing liquid or similar that is compatible with the Material Chart (see Chapter 10).
- 3 Dry all surfaces using a clean cloth or paper towel.

### Canisters and Patient Tubes

Dispose after use.



### Important

The Canisters and Patient Tubes are all disposable items. Do not attempt to clean or reuse these. Due to the risk of cross contamination, all disposable items must be replaced after each use. They are for single-patient use only.

### Vacuum Tube (for 800 ml version) and Wire Stand

Wash by immersing and scrubbing in liquid detergent and water solution.

- 1 Rinse thoroughly in pure water.
- 2 Allow to dry. Disinfect if desired.

### High Efficiency Filter Kit (for 800 ml Version)

- Filter cannot be cleaned or disinfected.
- Replace Filter immediately if contamination or discoloration is observed, or if it gets wet.

\* If the unit is used on patients in areas where cross contamination is an issue, it is recommended that the Filter is replaced after each use.

### Carry Bags

Wipe Bags according to instructions provided above for Main Cabinet. Do not launder.

### Device Test

After each reassembly, and before returning a LCSU 4 to operational use, the Device Test should be performed:

- 1 Start the test with a fully charged Battery
- 2 Turn the unit "ON"
- 3 Block the Patient Tube
- 4 Set Suction Vacuum level to 550 mmHg
- 5 Unblock and then Block the Patient Tube again.
- 6 Result: Unit should return to 550 mmHg setting.
- 7 Repeat procedure for 300 mmHg and 50 mmHg settings.



### Cautions

Do not attempt to use any LCSU 4 that has not passed the above test. If the LCSU 4 unit does not test satisfactorily, recheck all parts of the assembly and test once again. If necessary, contact Laerdal Medical or one of its authorized distributor.

### Disposal

When discarding the LCSU 4, we recommend it be discarded according to local protocol.

This appliance is marked according to the European directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE). By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.



The symbol on the product, or on the documents accompanying the product, indicates that this appliance may not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. Disposal must be carried out in accordance with local environment regulations for waste disposal.

For more detailed information about treatment, recovery and recycling of this product, please contact your local city office, your household waste disposal service or the Laerdal representative where you purchased the product.

## 7 Troubleshooting

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### Troubleshooting



#### Warning

Potential for Electrical shock. Do not attempt to open or disassemble pump or electrical accessories.

#### **LCSU 4 will not power “ON”**

- 1 Verify that the Battery is properly installed and charged.
- 2 Check alternative 12V DC or AC sources.

#### **LCSU 4 runs, no Vacuum, or insufficient Vacuum**

- 1 Verify proper Canister and Tubing connections.
- 2 Check system for leaks in Canister and Tubing connections.
- 3 Check Canister overflow protection float (800 ml).
- 4 Check if the Filter has been shut-off (300 ml).

#### **Vacuum too high or too low.**

Turn Vacuum Regulator to increase or reduce vacuum level.

#### **Battery will not charge**

- 1 Verify that the Battery is installed and connected.
- 2 Re-connect source power and observe charge (all connections).

#### **Battery seems insufficient**

- 1 Charge the Battery for 5 hours.
- 2 Perform the Battery Test.



#### Important

If the LCSU 4 condition is not resolved, contact Laerdal Medical or one of its authorized distributors for advice.

## Main Units, Accessories and Parts

## LCSU 4 (Main Unit versions)

Cat. No.	Item	
880051	LCSU 4, 800 ml	Complete unit
880061	LCSU 4, 300 ml	Complete unit

## Consumables

Cat. No.	Item	Quantity
886100	300 ml Disposable Canister w/tubing	Qty. 1
886102	800 ml Disposable Canister w/tubing	Qty. 1
886104	800 ml Disposable Canister w/o tubing	Qty. 6
886105	Patient Tube 1.8 m (6') Disposable	Qty. 1
886106	Vacuum Tube	Qty. 1

## Accessories

Cat. No.	Item	Quantity
886108	Wire Stand (for 800 ml)	Qty. 1
886115	Wire Stand (for 300 ml)	Qty. 1
88006005	Carry Bag (for 300 ml)	Qty. 1
884600	Carry Bag (for 800 ml)	Qty. 1
886111	AC/DC Adapter Charger w/o Power-cord	Qty. 1
886112	External Battery Charger	Qty. 1
884500	DC Power-cord	Qty. 1
886107	Replacement Filter	Qty. 10
886116	High Efficiency Filter Kit	Qty. 1



886108



886115



886111

## Spare Parts

Cat. No.	Item	Quantity
886113	Battery, 12 V DC NiMH, Rechargeable	Qty. 1
886123	Battery Cover (door)	Qty. 1
886124	Rubber Feet	Qty. 2
886125	Shoulder Strap for bags	Qty. 1
886126	AC Power-cord US	Qty. 1
886127	AC Power-cord EU	Qty. 1
886128	AC Power-cord UK	Qty. 1



886113



AC Power-cord



886126







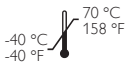















886127



886128

## 9 Glossary of Symbols

Product Symbols	Definition	Packaging Symbols	Definition
	This product is in compliance with the essential requirements of Council Directive 93/42/EEC Medical Device Directive, as amended by Council Directive 2007/47/EC, class IIa		Do not cut
	Single Use		Fragile. Handle with care
IP12	The degree of protection provided by the chassis according to IP12		Keep dry
	Unique product type identification		Transport storage temperature range
	Serial number		Humidity
	UL Classified		Atmospheric pressure
	Center positive polarity indicator		
	Direct Current		
	Date of production		
	Warning / Caution		
	Important		
	Recycle		
	Type BF applied part		
	Disposal must be carried out in accordance with local environment regulations for waste disposal.		
	Does not contain Latex		

## Power Source Options

### Battery

Rechargeable, NiMH 12 volt 1.6 Ah

DC Power-cord (12 V)  
Dry Location Use Only

AC/DC Adapter Charger  
Input: 100-240 V, 50-60 Hz, 1.2 Ah  
Output: +12 V, 3.4 Ah  
Dry Location Use Only

External Battery Charger  
Input: 110-240 V, 50-60 Hz, 250 mA  
Output: +18.5 V, 0.6 Ah  
Dry Location Use Only

## Environmental Conditions

Operating Temperature Range:  
0 °C (+32 °F) – +40 °C (+104 °F)

Operating Relative Humidity:  
0 - 95% (non condensing)

Operating Atmospheric Pressure:  
10.2 Psi (70 kPa) – 15.4 Psi (106 kPa)

Storage & Transport Temperature:  
-40 °C (-40 °F) – +70 °C (+158 °F)

Storage & Transport Relative Humidity:  
0 - 95% (non condensing)

Storage & Transport Atmospheric Pressure:  
7.3 Psi (50 kPa) – 15.4 Psi (106 kPa)

## Physical Characteristics

### Dimensions

- 880051 (LCSU 4, 800 ml):  
23.6 cm x 19 cm x 23.6 cm (9.3" x 7.5" x 9.3")
- 880061 (LCSU 4, 300 ml):  
18.5 cm x 26.2 cm x 8.12 cm (7.3" x 10.3" x 3.2")

### Weight

- 880051 (LCSU 4, 800 ml): 1.97 kg (4.35 lbs)
- 880061 (LCSU 4, 300 ml): 1.53 kg (3.375 lbs)

### Canister Capacity

- 300 ml
- 800 ml

## Performance

### Air flow @ Vacuum Inlet

All configurations: 30 LPM (free flow) typical (May be less when running from internal battery)

Vacuum - Max.: 550+ mmHg  
Vacuum - Range: 50 - 550+ mmHg  
Vacuum Indicator accuracy: +/- 5% of full scale

## Filter Specifications

Internal Filter of the 300 ml Disposable Canister  
Porous plastic filter, PE material.

Internal Filter of the 800 ml Disposable Canister  
Aerostate HEPA rated bacterial filter. White, unfinished surface, cellulose with wet strength resin.

## High Efficiency Filter Kit

With the High Efficiency Filter Kit installed the unit is in accordance with ISO 10079-1. The Kit reduces the Air flow and Battery run time. The filter is HEPA rated, hydrophobic, with an efficiency of 99.97% down to a particle size of 0.3 µm.

Filter material: PTFE 1 µm  
Water entry pressure: Min. 0.20 bar/150 mmHg/2.90 psi (Flow to Canister)  
Water entry pressure: Min. 0.87 bar/650 mmHg/12.57 psi (Flow to Main Unit)  
Airflow resistance: Max. 0.09 bar/67 mmHg/1.30 psi at 30 LPM Air flow  
Nominal Filter diameter: 60 mm  
Filter housing: Translucent or transparent

## Material Chart

Cabinet:	PC
Battery Cover:	PC
Vacuum Regulator:	PC
Bottom Cover:	PC
Vacuum Inlet Connector:	TPR
Control Panel:	PVC
800 ml Disposable Canister:	GPPS
- Lid:	HDPE
- Internal Filter:	Aerostate
Vacuum Tube:	Silicone, K-Resin
Vacuum Port Connector:	TPR
Vacuum Inlet Connector:	PC
High Efficiency Filter:	PP
Filter housing:	K-Resin
300 ml Disposable Canister:	PS
- Internal Filter:	PE
Patient Port:	PP
Patient Tube:	PVC
Wire Stands:	Steel, PVC

## Electrical Requirements

100-240 VAC 50~60 Hz 1.2 A Max; 12 VDC, 3.4 Ah

## 11 Regulatory Information

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### International Travel

This suction unit is equipped with an AC/DC Adapter Charger allowing operation on any AC voltage (100-240 VAC, 50/60Hz). However the correct power cord must be used to connect to adapter wall power.

### Regulatory Information

#### Classification

This product is in compliance with the essential requirements of Council Directive 93/42/EEC Medical Device Directive, as amended by Council Directive 2007/47/EC, class IIa

- Electrically powered medical suction equipment for field and transport use, according to ISO10079-1:1999
- High flow/High vacuum, 50 – 550 mmHg
- Not suitable for the use in the presence of flammable liquids or gases.
- Internally powered/class I equipment type BF, according to IEC 60601-1
- Protection class IPI2 and standard power supply
- Intermittent Operation: 30 minutes on, 30 minutes off

#### Certifications

IEC 60601-1 : 1988 (2nd edition); IEC 60068-2-6/IEC 60068-2-64/IEC 60068-2-27/IEC 60068-2-31; CAN/CSA-C22.2 No. 601.1-M90, 2005; UL 60601-1, EN 60601-1-2 : 2007, EN ISO 10079-1 : 2009 (Except requirement of 500 ml volume in claim 59.11.1, due to the 300 ml Canister option)



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