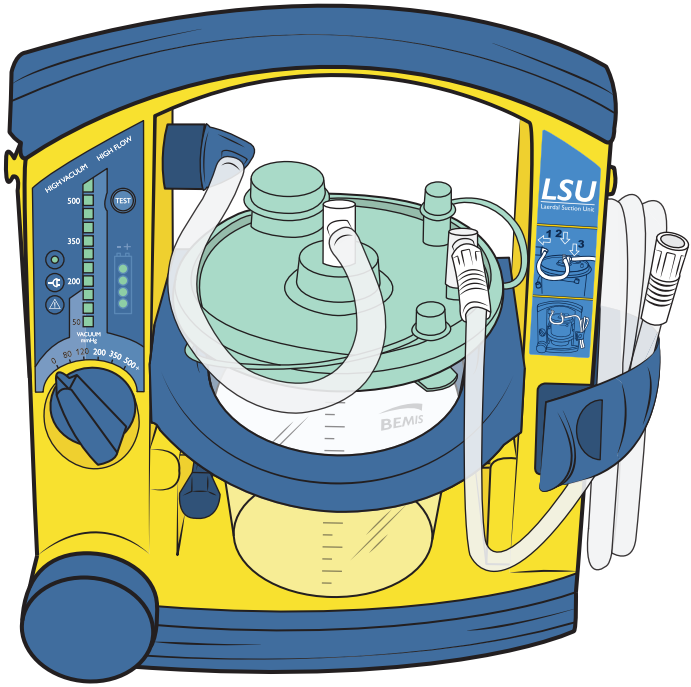
EN

Laerdal Suction Unit
BEMIS Disposable Canister

User Guide



Cat. No. 78002001

www.laerdal.com

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helping save lives

1 Cautions and Warnings

Read this User Guide carefully, and become thoroughly familiar with the operation and maintenance of the Laerdal Suction Unit (LSU) before using it.

The LSU should only be used by persons trained in the use of medical suction equipment.

The LSU is not suitable for use in the presence of flammable liquids or gases. There can be a danger of explosion or fire.

The LSU is not intended to be used in MRI enviriments.

Do not re-use the canister or patient tubing. Re-use will lead to increased risk of cross-contamination, degradation of performance and/or device malfunction. Laerdal is not responsible for any consequences of re-use.

Do not use the LSU under environmental conditions that are outside the ranges specified under section 9.6. This can endanger safety and adversely affect operation of the device.

Even if the Operating Knob is in "0" position, voltage is present on some of the internal circuitry, when the LSU is connected to mains. To fully remove power, pull out the Power Cord.

Battery:
- The LSU must be charged between each clinical use
- To maintain satisfactory operation of the battery, it is recommended to place the LSU on continuous charge when not in use.
- The LSU must be placed on charge for a minimum of 4 hours to reach full battery capacity. The fast charging gives approx. 80% battery capacity after 3 hours (for a new battery). Please note that repetitive 3 hour charging is not recommended.
- If it is not possible to place the LSU on continuous charge when not in use, make sure the battery is charged for a minimum of 4 hours at least once a month. If LSU battery is kept on constant charge, perform device test at least once a month to exercise battery.
- Do not store the battery when it is discharged. Always fully charge the battery before storage.

Do not block the Exhaust Outlet during use. This will lead to reduced flow and can also cause damage to the LSU.

If overflow of liquid from the Canister into the pump is suspected, discontinue use of the LSU and contact a Laerdal Service Center.

Disconnect the LSU from external power prior to cleaning. Use a minimum of liquid to prevent any electrical shock hazard.

Do not immerse the LSU or allow it to stand in water or other liquids. This might damage the device, and cause electrical hazard.

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

Use only accessories supplied by Laerdal or one of its authorized dealers to help ensure that the LSU operates satisfactorily.

℞ ONLY Caution: Federal (US) law restricts this device to sale by or on the order of a physician.

2 Introduction

2.1 Indications for Use

The LSU is a portable, electrically powered, medical suction equipment 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 suctioning, and lower vacuum levels are usually selected for tracheal suctioning and the suctioning of children and infants.

2.2 Contraindications

None known.

2.3 Features and Benefits

- Splash proof, rugged and solid.
- Easy access to the tubing.
- Equipped with an internal battery that can easily be replaced without using tools.
- Charging of battery can be done directly from AC or DC mains - no external charger is needed.
- Fast charge of 3 hours, giving approx. 80% battery capacity.
- Operation possible from internal battery and directly from AC or DC mains - no adapter is needed.
- A large combined ON/OFF switch and vacuum selector makes operation easy even with heavy-duty gloves.
- A green LED bar graph makes it easy to observe the actual vacuum level during operation.
- Another green LED bar graph indicates approx. remaining battery capacity.

2.4 Limited Warranty

The LSU comes with five (5) year limited warranty*. See the enclosed "Laerdal Global Warranty" for terms and conditions.
The warranty is also available at *www.laerdal.com*

* Excluding the canister, tubing systems and battery.

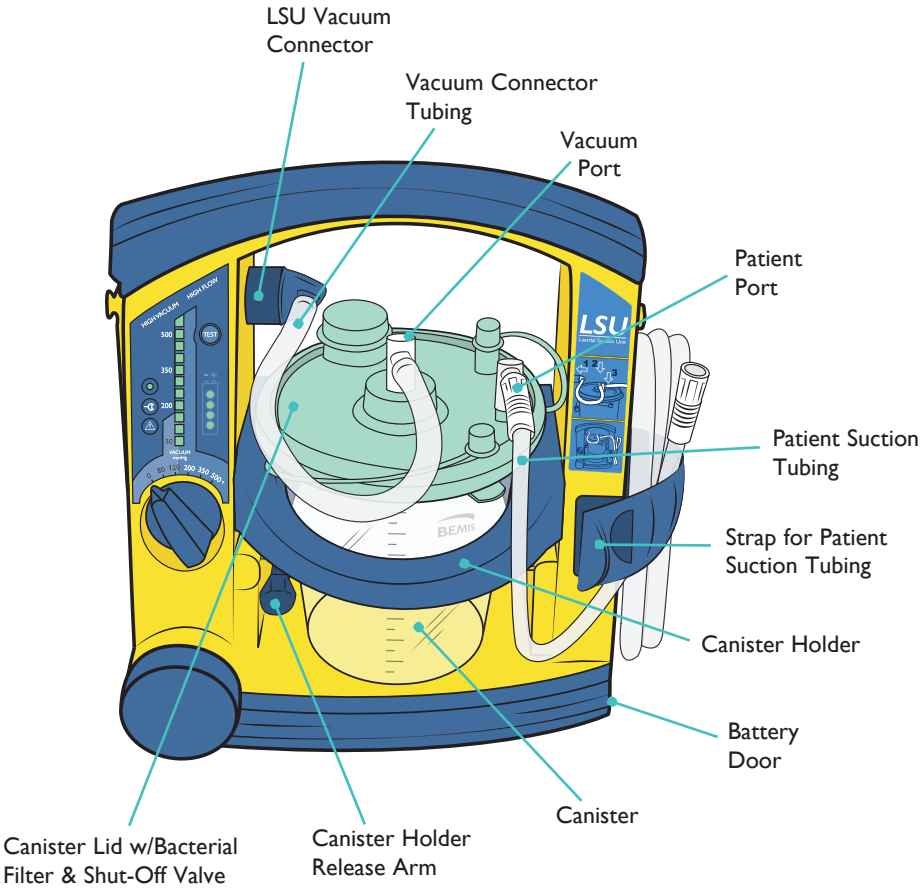
2.5 Unpacking

- Remove the LSU from its packaging and inspect all parts for damage. If there are any signs of damage or if any parts are missing, immediately notify Laerdal or one of its authorized dealers.
- Insert the battery according to section 5.6.
- Place the LSU on charge for a minimum of 4 hours to make sure you have a fully charged battery (see section 5.4).
- Perform the Device Test according to section 3.2.3.

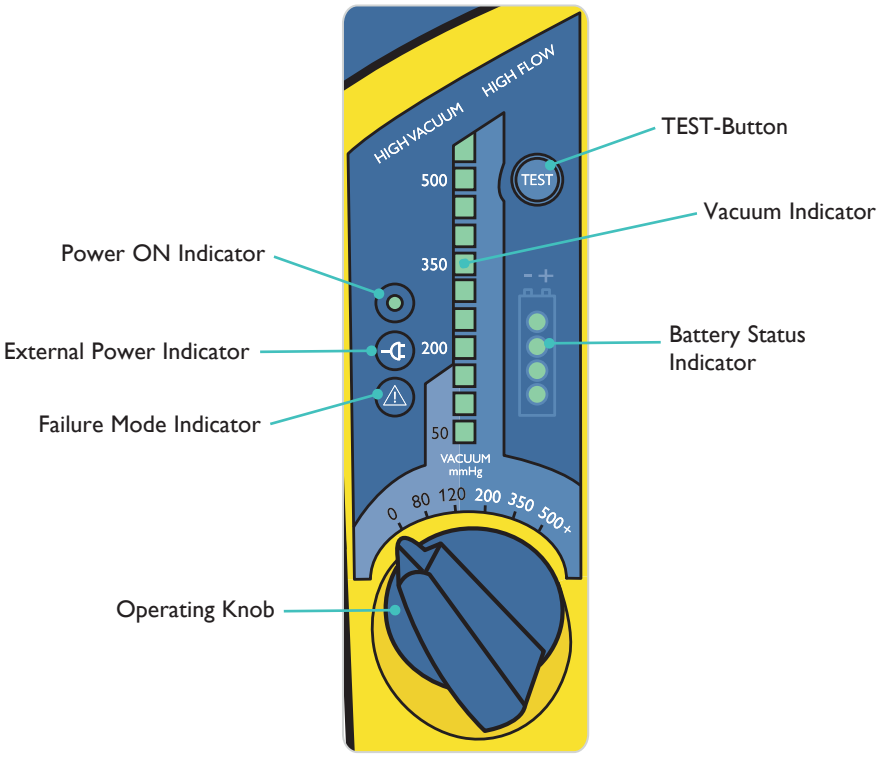
3 Description

3.1 Quick Reference Guide

LSU w/Disposable Canister

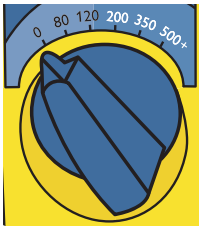


3.2 User Interface



3.2.1 Operating Knob

The Operating Knob is a combined ON/OFF switch and vacuum selector, located at the bottom of the User Interface.



The LSU is switched ON by turning the Operating Knob to the required setting. Each setting indicates the maximum achievable vacuum level for the selected position (80, 120, 200, 350, 500+ mmHg). The free air flow value changes along with the increasing vacuum settings (see section 9.4 for details). The LSU is switched OFF by resetting the Operating Knob to “0”.

3.2.2 Indicators

3.2.2.1 Power ON Indicator

This green LED has 3 modes:

- It is lit continuously while the LSU is switched ON.
- It flashes rapidly (approx. twice per second) during the Device Test.
- It flashes slowly (approx. once per second) while the Automatic Power-save Function is activated, if the Device Test is interrupted and when the battery is discharged.

3.2.2.2 External Power Indicator

This green LED is continuously lit while external AC- or DC-power is connected.

3.2.2.3 Failure Mode Indicator

The red LED is lit when a possible malfunction of the LSU has been detected. If lit turn the LSU OFF, and then ON again to check if the indication disappears*. Provided that the indication does not occur again the LSU can be operated. If the Indicator continues to be lit after three OFF/ON cycles and after replacing the battery with a fully charged battery, discontinue use and contact a Laerdal Service Center. (See section 6).

*Failure Mode Indication caused by external electrical interference may occur on any digital equipment including the LSU. Such fault will usually not be repeated.

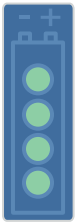
3.2.2.4 Vacuum Indicator

This green LED bar graph displays the actual vacuum level during operation of the LSU. Each fully lit segment represents 50 mmHg. If a segment has a weak light, this represents 25 mmHg (e.g. 125 mmHg means 2 fully lit and 1 weakly lit segments).

mmHg	80	120	200	350	500
kPa	11	16	27	47	67
mBar	107	160	267	467	667

3.2.2.5 Battery Status Indicator

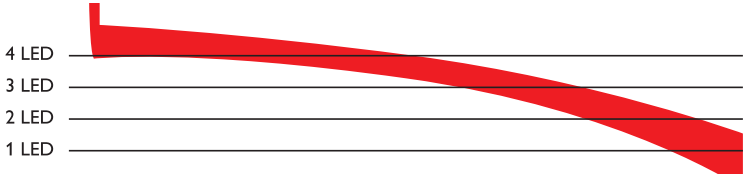
During operation from internal battery and during charging the displayed values must only be used as indications.
Several parameters can influence battery capacity e.g. device settings, state of battery, temperature etc.



This green LED bar graph has 3 functions:

During operation from internal battery - indicates approx. remaining battery capacity.

Note: *Immediately after turning the LSU ON and immediately after switching from external power to internal battery operation, all 4 LED's will flash for 5 seconds before the remaining battery capacity is displayed. Due to the nature of voltage based battery capacity measurement, the battery status indication may differ from unit to unit. Each battery may vary in voltage versus remaining capacity, thus allowing for variability in the reading. Other outside variables such as temperature may also affect accuracy. The indication is targeted to show battery capacity as indicated below. The graph shows how the accuracy of the indication can vary.*



TYPICAL REMAINING BATTERY CAPACITY (for a new battery stored in room temperature)	OUTPUT
> 50%	4 LEDs lit.
30 - 50%	3 LEDs lit.
20 - 30%	2 LEDs lit.
< 20%	1 LED lit.
Battery Low; (min. 1 minute of operation left based on 500+ mmHg/free flow).	1 LED flashes.

Note: *If the LSU or the NiMH battery has been stored at low temperatures (< 12 °C / < 54 °F), the LSU may indicate lower remaining battery capacity than actual when first switched on. This is due to the nature of NiMH batteries. The battery indicator may flash on one LED, which normally indicates Battery Low. The LED may continue to flash until the LSU temperature is above 12 °C / 54 °F and the LSU is switched off and on again. The low battery indication in this instance is not a correct indication of the residual battery capacity.*

During charging - indicates approx. achieved battery capacity.

CAPACITY	OUTPUT*
< 75%	The LED's will be lit sequentially.
75-80%	3 LED's lit and 4th flashing.
> 80%	4 LED's lit.

*Note: *If no battery is installed, the battery status indicator will be fully lit for approx. 5 sec. until it is automatically turned off.*

During the Device Test - indicates which step of the test is currently in progress or which corresponding test result is being displayed:
LED 1 (lower LED) lit = STEP 1, LED 2 lit = STEP 2 etc.

3.2.3 TEST-Button 

This button allows you to run a 4-step user initiated Device Test program to identify whether the LSU operates satisfactorily, is assembled correctly, or if it needs service:

- STEP 1 - Checking for occlusions in the Suction System (including canister and tubing).
- STEP 2 - Checking the vacuum build-up efficacy of the Pump System.
- STEP 3 - Checking the max. achievable vacuum level of the LSU. (reaches this level within 10 seconds).
- STEP 4 - Checking for air leakage in the Pump System (including canister and tubing).

To indicate that the LSU is in test mode, the Power ON Indicator  will flash rapidly (approx. twice per second) until you exit the test program.

BEFORE YOU START THE DEVICE TEST

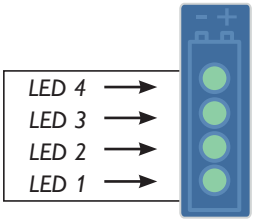
- Before you press the TEST-Button, make sure the Patient Suction Tubing is not occluded or bent.

DEVICE TEST DESCRIPTION

- Press and hold the TEST-Button while setting the Operating Knob to 500+ mmHg.
  Note: *Do not release the TEST-Button until min. 2 seconds after the Operating Knob has been set to 500+ mmHg. The test will start immediately.*

- As soon as LED 2 of the Battery Status Indicator comes on (takes approx. one second) fully occlude the Patient Suction Tubing.*

- Keep the tubing occluded until LED 1 comes on. To read the test results see next page.



Note: *If you need to interrupt the test and revert to normal operation, turn the Operating Knob to another position and then select the required setting.*

** If the tubing is not occluded within 2 minutes, the test will be interrupted and the Power ON Indicator will start to flash slowly (approx. once per second). To restart the test, set the Operating Knob to "0" and then start over again.*

TO DISPLAY THE TEST RESULTS:

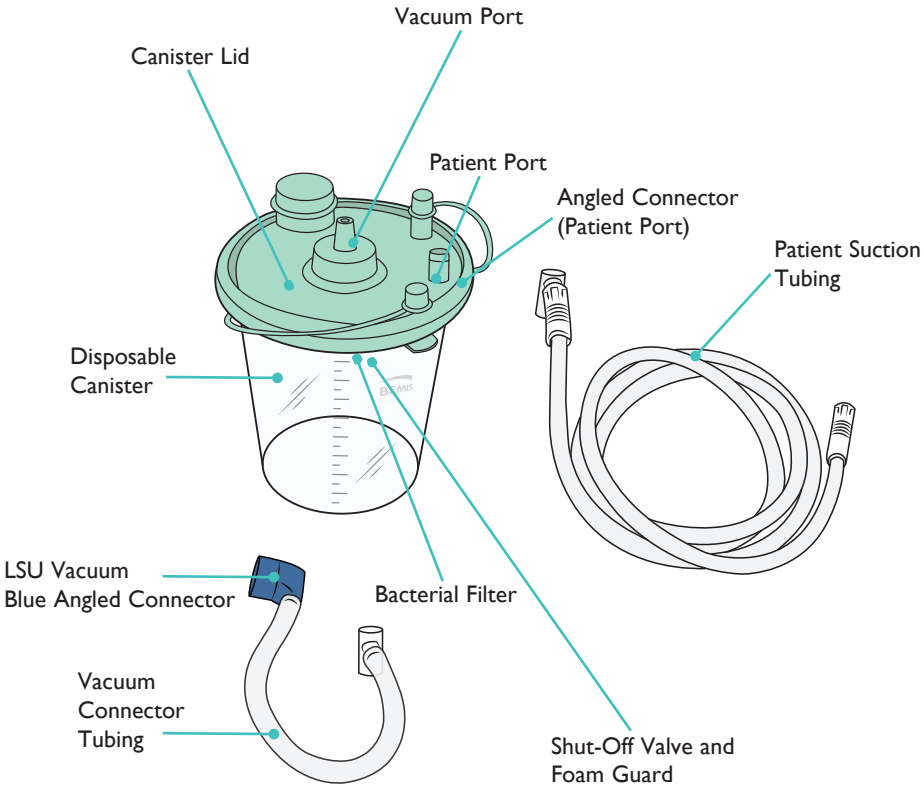
After the test is completed, the Vacuum Indicator will automatically display the result from STEP 1. To display the results from STEP 2, 3 and 4, simply press the TEST-Button once for each STEP. If you continue pressing the button after the STEP 4 result has been displayed, the earlier results will be repeated (STEP 1,2,3,4,1,etc.). To exit the test program, set the Operating Knob to another position.

TEST STEP **DISPLAYED ON THE BATTERY STATUS INDICATOR**	**TEST RESULT** **DISPLAYED ON THE VACUUM INDICATOR**	**ACTION** **IF TEST FAILED**
STEP 1 - Occlusions	*Test Passed:* *≤ 100 mmHg.*	*Check possible occlusions (e.g. twisted tubing) and run the Device Test again.*
STEP 2 - Vacuum Build-Up Efficacy - within 3 seconds	*Test Passed:* *≥ 300 mmHg.*	*Check Connectors, Tubes and Canister Lid for leakage or damage. Check exhaust outlet for occlusion and run the Device Test again*
STEP 3 - Max. Achievable Vacuum - within 10 seconds	*Test Passed:* *≥ 500 mmHg.*	*Check Connectors, Tubes and Canister Lid for leakage or damage. Check exhaust outlet for occlusion and run the Device Test again*
STEP 4 - Air Leakage	*Test Passed:* *≥ 450 mmHg.*	*Check Connectors, Tubes and Canister Lid for leakage or damage and run the Device Test again*

Note: *If the LSU does not pass one or more of the steps in this test after suggested actions are taken, contact Laerdal Service Center (see section 6).*

3.3 BEMIS™ HI-FLOW Suction Canister

The disposable Canister consists of:
- A 1200 ml transparent plastic Canister.
- Bacterial Filter - 99.99% DOP rated.
- Shut-Off Valve and Foam Guard seals tightly to prevent fluid overflow.



The Canister Lid contains a Shut-Off Valve that shuts off the vacuum if the Canister is full or the LSU tips over. To reset the valve, remove the Vacuum Connector Tubing from the LSU.

Note: *All parts are Single Use and must be replaced after each use.*

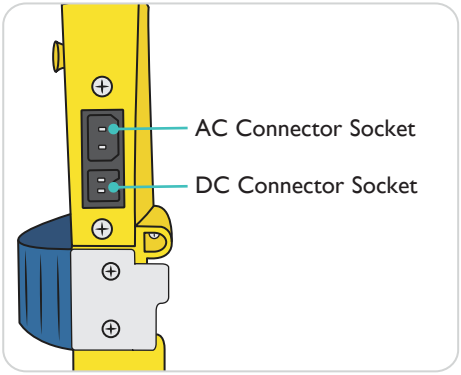
3.4 Power Sources / Connector Sockets

The LSU is delivered with an AC Power Cord for connection to AC mains and a DC Power Cord for connection to DC mains.

The device can be operated from the internal battery, and can be operated or charged from the following external Power Sources:

- AC mains when used with the AC Power Cord: (Max. length 1.5 m.) 100-240 VAC (50/60 Hz).
- DC mains when used with the DC Power Cord: (Max. length 1.5 m.) 12-28 VDC.

A Wall Bracket to hold the LSU during operation and charging is available separately (see section 8).



External power connection will cause the External Power Indicator  to be lit.

3.5 Automatic Power-save Function

The LSU has an Automatic Power-save Function that switches OFF the pump motor. While in this mode, the Power ON Indicator  will flash slowly (approx. once per second).

This function will be activated when the Operating Knob is set to 200, 350 or 500+ mmHg and the actual vacuum level has been continuously higher than 120 mmHg for 2 minutes.

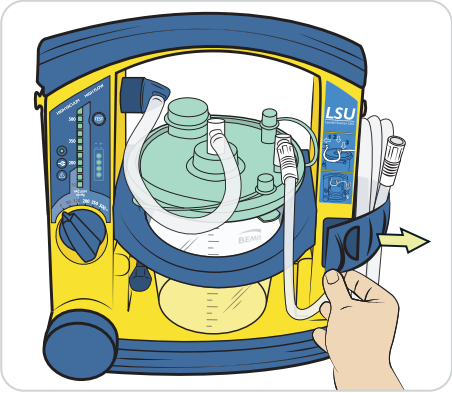
To exit the Power-save Mode and revert to normal operation, set the Operating Knob to any position and then go back to required setting.

4. Operation

4.1 Getting Started

Note: *Read all the Cautions and Warnings listed in section 1 thoroughly before you use the LSU.*

1. Check that no parts are missing and that all parts are clean.
2. If you decide to operate the LSU from external power, connect either external AC- or DC-power to the LSU as described in section 3.4. If you decide to operate the LSU from internal battery, check that battery is installed.
3. Ensure the Patient Suction Tubing is securely connected to the Patient Port on the Canister Lid.
4. Check that a suction catheter is attached to the patient suction tube or suction adapter. Do not use the suction tube or suction adapter without a suction catheter attached. Proceed as follows:



5. Release the Patient Suction Tubing by releasing the Strap.

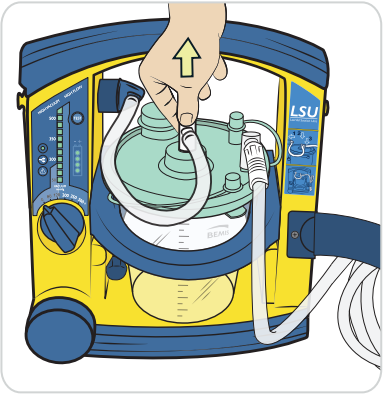
6 The LSU should be operated in the upright position to prevent overflow of suctioned material.

7. Set the Operating Knob to the required vacuum level, and the LSU will automatically be switched ON and start to operate. The green Power ON Indicator  is continuously lit while the LSU is switched ON.

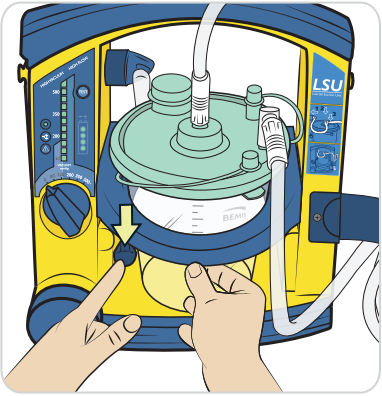
4.2 Replace the Canister

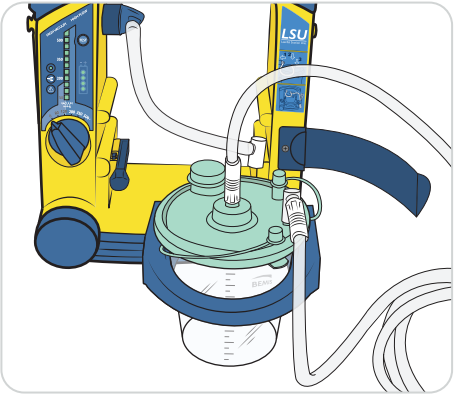
Note: *It is recommended to replace the Canister when it is 3/4 full. When liquid reaches the top of the Canister, the LSU will not suction any more liquid. If overflow of liquid from the Canister into the pump is suspected, contact a Laerdal Service Center for advice (see section 6). Overflow of suctioned material can damage the device.*

To remove the Canister, proceed as follows:



1. Disconnect the Angled Connector from the Vacuum Port on the Lid. Connect the "suction end" of the Patient Suction Tubing to the Vacuum Port to avoid spillage.





2. To release the Canister Holder, press down the Canister Holder Release Arm while sliding the Holder towards you. Remove the Canister from the Holder.
3. Safely dispose of the contents of the Canister according to local protocols.
4. Replace parts according to section 3.3.
5. Install the Canister in the Holder, slide the Holder into position and connect tubing to the Canister. Ensure the lid is properly sealed.

4.3 After Use

- When suction is complete, set the Vacuum Switch to "0" and inspect all parts for damage or excessive wear. Replace parts if necessary.
- Clean the LSU according to section 5.3.
- Perform the Device Test according to section 3.2.3.
- Place the LSU on charge (see section 5.4).

5. Maintenance

5.1 General

- Make sure the maintenance instructions under section 4.3 are followed.
- If the device is not in frequent use (i.e. less than once a month), the Device Test should be performed both on a monthly basis and after each use.

5.2 Battery

- To maintain satisfactory operation of the battery, it is recommended to place the LSU on continuous charge when not in use.
- Replace the battery when it does not pass the Battery Quality Check (see section 5.5 for details), or after 3 years.
- Do not store the LSU with an discharged battery.

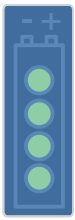
5.3 Clean the Cabinet

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

- Use a cloth or sponge that is dampened with a mild detergent (hand dish-washing liquid or similar) to clean the external surfaces of the LSU. Use a detergent that is compatible with the materials listed under section 9.7, and follow the detergent manufacturer´s instructions.
- Use a cloth or sponge dampened with water and wipe the surfaces again.
- Dry the surfaces using a clean cloth or a paper towel.

5.4 Charge the Battery

The internal rechargeable battery can be charged directly from external AC- or DC-power as described in section 3.4. No external charger is needed. To charge the battery, proceed as follows:



1. Make sure the Operating Knob is set to "0". Connect either external AC- or DC-power to the LSU and charging will start automatically.

2. During charging the Battery Status Indicator will indicate approx. achieved battery capacity (see section 3.2.2.5 for details).

3. The LSU must be placed on charge for a minimum of 4 hours to reach full battery capacity. The fast charging gives approx. 80% capacity after 3 hours (for a new battery). Repetitive charging for only 3 hours is not recommended.

Note:

- *To maintain satisfactory operation of the battery, it is recommended to place the LSU on continuous charge immediately after use.*
- *It is recommended to always fully charge the battery. Repetitive charging to a lower capacity level will reduce battery life.*
- *If it is not possible to place the LSU on continuous charge when not in use, make sure the battery is charged for a minimum of 4 hours at least once a month.*
- *Do not store the battery when it is discharged. Always fully charge the battery before storage.*
- *The recommended ambient temperature for charging is from 15 °C to 25 °C (59 °F to 77 °F).*
- *The battery will not be charged when the LSU is in operation.*
- *If no battery is installed, the battery status indicator will be fully lit for approx. 5 sec. until it is automatically turned off.*

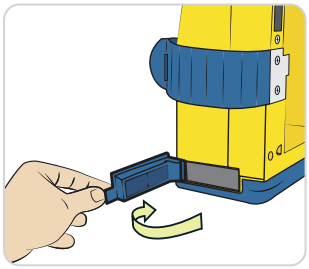
5.5 Check the Battery Quality

If poor battery quality is suspected, charge the battery for a minimum of 4 hours and then perform the following test without connection to external power:

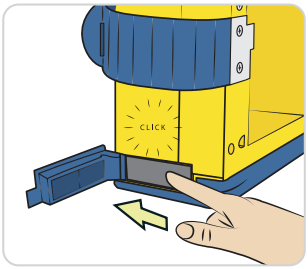
- Run the Device Test and then let the LSU operate continuously at 500+ mmHg/free flow for 20 minutes.
- If the LSU stops before completing the 20 minutes, the battery should be discarded.

5.6 Replace the Battery

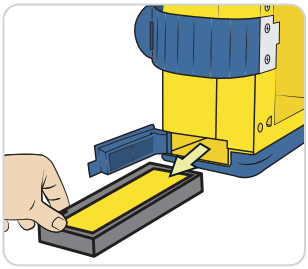
Note: *Use only batteries recommended by Laerdal or one of its authorized dealers.*



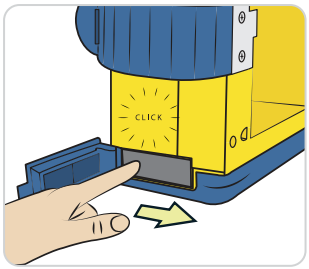
1. Open the Battery Door.



2. To remove the battery, push and move it slightly to the left and then release.



3. Withdraw the battery from the LSU.*



4. To insert a battery, push it fully in and then to the right to lock it.
5. Close the Battery Door.
6. After inserting the battery, place the LSU on charge unless a fully charged battery is inserted.

6. Servicing

There are no user serviceable parts inside the cabinet. Do not open the cabinet. It is recommended that the LSU is serviced at a minimum of every three years. Note that the required service interval may be shorter or longer depending upon actual frequency of use. Refer servicing to a Laerdal Service Center or Laerdal authorized LSU servicer. Remove LSU from service if there is a suspicion of suction liquid in the unit and contact Laerdal Contaminated suction units will not be serviced by Laerdal Medical.

*If you are discarding the battery, dispose of safely according to local protocols.

7. Troubleshooting

FAULT	CONDITION	ACTION
The LSU does not operate with the AC or DC Power Cord connected.	External Power Indicator is not lit when the Operating Knob is set to "0".	Check power cord connections and the external AC- or DC-power source.
	External Power Indicator is lit.	The LSU must be returned for service (see section 6).
The LSU cannot be operated from the internal battery.	Power ON Indicator is OFF.	Check that battery is installed.
		Place the LSU on charge.
		If still faulty after charging completed, remove and replace the battery (see section 5.6).
The LSU operates, but little or no suction available.	Floater valve is closed.	Unplug the Filter/Vacuum Tubing to release the vacuum
	Canister full.	Remove and replace the Canister (see section 4.2).
	Poor vacuum connection between Pump Unit and Canister.	Install the Vacuum Connector Tubing correctly.
	Patient Suction Tubing twisted or blocked.	Untwist the Patient Suction Tubing and/or clear blockage or replace the tubing.
Battery Status Indicator is not ON.	Battery is not charged.	Check power cord connections and that battery is installed
Vacuum Indicator indicates more than 100 mmHg with free air flow	Tube(s) is kinked or twisted	Straighten / untwist the tube(s).

8. Parts List

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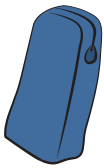

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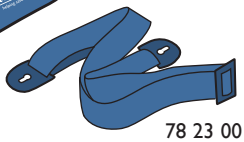

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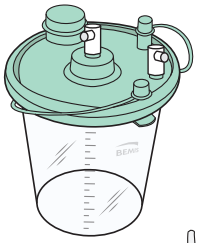

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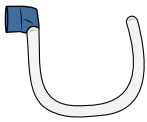

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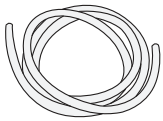

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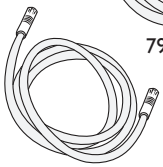

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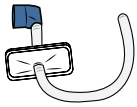
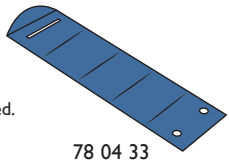


78 04 13 34

Catalogue Number	Description
78 00 20 01	LSU w/Bemis Canister (not illustrated)
	Consumables
88 30 00	Disposable Bemis Canister & Suction Tubing (12/pkg.)
78 04 12	Disposable Patient Tubing
78 04 22	Coaxial Vacuum Connector, 33 cm, 10 pack
79 46 02	Disposable Patient Tubing w/o tip
78 04 13 34	High Efficiency Filter kit, Coaxial, 37 cm
79 19 00	LSU 12V Socket Adapter (to convert DIN plug to standard US 12V accessory plug) Not illustrated.
	Accessories
78 20 00	Carrying Bag (full covering)
78 26 00	Wall Bracket w/DC-Power Cord (not illustrated)
78 26 10	Wall Bracket w/AC-Power Cord US (not illustrated)
78 26 40	Wall Bracket w/o Power Cord (not illustrated)
78 23 00	Shoulder Strap
78 24 00 01	Side Pouch
78 04 40	External charger kit (not illustrated)
	Parts
78 04 20	Bemis Canister Holder
78 04 33	Strap for Tubing
78 04 32	Release Arm
78 02 00	DC-Power Cord
78 02 10	AC-Power Cord US
78 08 00	LSU Battery - NiMH
78 04 34	Hook for strap (not illustrated)



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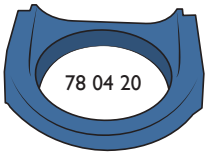

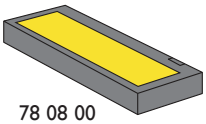

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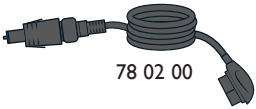

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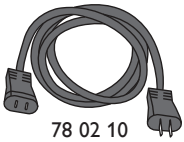

78 02 10

Note: *Parts or product configurations are subject to change without notice.*

9. Specifications

9.1 Classification
Electrically powered medical suction equipment for field and transport use, according to ISO10079-1.

High vacuum/high flow.

The LSU is designed for use in road ambulances in accordance with IEC 60601-1-12.

Not suitable for use in the presence of flammable liquids or gases.

Internally powered/class II equipment type BF, according to IEC 60601-1.

Protection class IP34*, according to IEC 60529.

* - Protected against solid foreign objects of 2.5 mm Ø and greater.
- Protected against splashing water.
- Protected against access with a wire.

MEDICAL ELECTRICAL EQUIPMENT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the accompanying documents.

Portable and mobile RF communication equipment can affect MEDICAL ELECTRICAL EQUIPMENT.

Warning:
MEDICAL ELECTRICAL EQUIPMENT should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the MEDICAL ELECTRICAL EQUIPMENT should be observed to verify normal operation in the configuration in which it will be used.

9.2 General tolerance
Overall tolerance ± 5%

9.3 Physical Characteristics

Size:	315 mm (12.4 in) x 330 mm (13 in) x 160 mm (6.3 in), (h x w x d).
Weight:	3.7 Kg (8.2 lbs) including NiMH battery.
Canister:	Shipped with BEMIS HI-FLOW Suction Canister, 1200cc (ml).
Patient Suction Tubing (non-sterile):	0.25 in (6.5 mm) inside diameter x 72 in (1.8 m) length.

9.4 Operation

Approx. free air flow at different settings:

80 mmHg	120 mmHg	200 mmHg	350 mmHg	500+mmHg
12 l/min.	16 l/min.	20 l/min.	25 l/min.	> 30 l/min.

l = litre at standard atmospheric pressure and temperature.

Approx. battery operation time at different settings: (free air flow) (±10%)

80 mmHg	120 mmHg	200 mmHg	350 mmHg	500+mmHg
3 h 45 min.	2 h	1 h 20 min.	50 min.	30 min.

Approx. noise levels at different settings: (free air flow)

80 mmHg	120 mmHg	200 mmHg	350 mmHg	500+mmHg
46 dBA	48 dBA	51 dBA	55 dBA	57 dBA

Vacuum - Max.:	> 500 mmHg (67 kPa).
Vacuum - Range:	80 - 500+ mmHg (11 - 67 kPa).
Vacuum Indicator accuracy:	+/- 5% of full scale.

Expected Service Life
10 years contingent on following service guidelines. See Service and Maintenance section.

9.5 Power Requirements

Operating/charging:	100-240 VAC, 50-60 Hz, or 12-28 VDC.*
Battery:	12 VDC 2 Ah, NiMH, rechargeable.
Charging Time:	3 hours for approx. 80% battery capacity, 4 hours for fully charged.
Vehicle Supply:	12-28 VDC nominal.
Fuses:	The LSU fuses must be replaced by a Laerdal Service center. (See section 6).
Supply Mains:	When the unit is connected to SUPPLY MAINS through one of its power cords, SUPPLY MAINS voltages are present within the unit. To isolate the unit from SUPPLY MAINS, disconnect the unit from the power cord, or disconnect the power cord from SUPPLY MAINS. If placed in a mounting bracket, disconnect the unit from the mounting bracket.

*The external AC power source must be able to deliver a current of 1A minimum and the external DC power 5A minimum (LSU has an internal fuse for polarity protection), if not the LSU may switch to battery operation.

Warning:
The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the LSU as replacement parts for internal components, may result in increased emission or decreased immunity of the LSU.

9.6 Environmental Conditions

Operating/Charging Temperature:	0 °C (32 °F) to + 40 °C (104 °F)
Recommended Charging Temperature:	15 °C (59 °F) to + 25 °C (77 °F)
Long Term Storage Temperature:	0 °C (32 °F) to + 40 °C (104 °F)
Max. 24 hour Storage Temperature:	-30 °C (-22 °F) to +70 °C (158 °F) The time required for the LSU to warm from the mini mum storage temperature between uses until it is ready for intended use is min 90 minutes at room temperature. The time required for the LSU to cool from the maxi mum storage temperature between uses until it is ready for intended use is min 90 minutes at room temperature.
Humidity (Operating & Storage):	5-95% RH non-condensing
Altitude	0 - 4000 m

9.7 Material Chart

Cabinet front:	Poly Carbonate/Acrylonitrile Butadiene Styrene (PC/ABS)
Protector for front:	Styrene Ethylene Betyl Styrene (SEBS)
Cabinet back:	PC/ABS
Cabinet base w/Protector:	PC/ABS + SEBS
Battery door:	SEBS
Connector retainer for battery:	Poly Oxy Methylene (POM)
Operating Knob:	POM
Rotor for Vacuum Switch knob:	PC/ABS
Manifold for vacuum:	POM
Canister Holder:	Polypropylen(PP)
Handle w/Protector:	PC/ABS + SEBS
Manifold for exhaust:	POM
Strap for patient suction tubing:	SEBS
Canister Holder Release Arm:	POM
User Interface	Polyester
Vacuum Connector:	Silicone
Vacuum Connector Tubing:	Silicone
Disposable Canister:	General Purpose Polystyrene (GPPS)
Disposable Canister Lid:	High-Densisty Polyethylene (HDPE)
Patient Suction Tubing:	Polyvinylchloride “flexible” (PVC)
Wall bracket:	Aluminium + Steel + POM + PE + PVC
Full covering Carrying Bag:	PVC coated Polyester
Side Pouch:	PVC coated Polyester

9.7.1 Dismantling/Disposal

When discarding the LSU, we recommend it be dismantled and discarded according to local protocol. Dismantle the LSU by unscrewing the screws on the back side of the LSU, remove the components and sort according to the table in 9.7. The cleaned LSU can also be delivered to your local Laerdal Medical representative for dismantling/disposal. Laerdal Medical AS will not charge any fee for the dismantling; Sender is responsible for the cost of the shipment.

9.8 Symbols

Direct Current


Alternating Current


Class II Equipment, according to IEC 60601-1


Type BF applied part, according to IEC 60601-1

IP34 Protection class ref. IEC 60529


Do not reuse

Date of production


Warning/Caution


Consult User Guide


The products is eligible to bear the CSA Mark with adjacent indicator 'US' for US


Caution: Federal law (USA) restricts this device to sale by or on the order of a physician

Electromagnetic Conformity

Laerdal Suction Unit is intended for use in the following environments: Professional Healthcare Facility environment and Emergency Medical Services environment.

Essential performance of the LSU is identified as connection of the patient hos to the exhaust outlet must be prevented by coding of the outlet and identifying the exhaust using a label on the device. EMC disturbances cannot affect this behavior.

No particular actions are required to maintain safety and performance with regard to electromagnetic disturbances for the expected service life.

⚠ Warning

Use of this equipment adjacent to or stacked with other equipment should be avoide because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

⚠ Warning

Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

⚠ Warning

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the LSU, including cables specified by the Laerdal Medical. Otherwise, degradation of the performance of this equipment could result.

Electromagnetic Emissions Tests

Emissions Test	Standard or test method	Compliance
RF emissions	CISPR 11	Group 1 Class B
Harmonic emissions	IEC 61000-3-2	Class A
Voltage fluctuations/ flicker emissions	IEC 61000-3-3	Complies

Electromagnetic Immunity Tests

Immunity Test	Standard or test method	Compliance Level
Electrostatic discharge	IEC 61000-4-2	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air
Radiated RF EM fields	IEC 61000-4-3	3 V/m 80 MHz – 2.7 GHz 80 % AM at 1 kHz
Proximity fields from RF wireless communications equipment	IEC 61000-4-3	380-390 MHz: 27 V/m 430-470 MHz: 28 V/m 704-787 MHz: 9 V/m 800-960 MHz: 28 V/m 1700-1990 MHz: 28 V/m 2400-2470 MHz: 28 V/m 5100-5800 MHz: 9 V/m
Rated power frequency magnetic fields	IEC 61000-4-8	30 A/m 50 Hz or 60 Hz
Electrical fast transients / bursts, AC power port	IEC 61000-4-4	± 2 kV 100 kHz repetition frequency
Surges: Line-to-line, AC power port	IEC 61000-4-5	± 0.5 kV, ± 1 kV
Conducted disturbances induced by RF fields, AC power port	IEC 61000-4-6	3 V; 0.15 MHz – 80 MHz 6 V in ISM bands between 0.15 MHz and 80 MHz 80 % AM at 1 kHz
Voltage dips, AC power port	IEC 61000-4-11	0 % UT; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % UT; 1 cycle and 70 % UT; 25/30 cycles Single phase: at 0°
Voltage interruptions, AC power port	IEC 61000-4-11	0 % UT; 250/300 cycle
Electrical transient conduction along supply lines, DC power port	ISO 7367-2	Test pulse severity level: III in Table A2 of ISO 7637-2

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