



**CARICHAIR POWER UNIT  
SERVICE MANUAL**

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### Power Unit

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## General Information

### A. Introduction

The CariChair Power Unit can be matched with the CariChair Cushion and with the Mobicare Plus.

This Carilex Service Manual provides repair and maintenance instructions for the CariChair Power Unit .

Any trained maintenance staff member can perform the procedures described in the sections of this manual that are designated Level 1.

Only manufacture-authorized service personnel can perform the procedures described in the sections of the manual that are designated Level 2.

If the system cannot be repaired using the procedures described in the Level 1 sections of this manual and there are no manufacture-authorized service personnel available, please contact Carilex Medical regarding repair and servicing

## B. Symbols Reference



Operating Instructions



Class II Equipment



Type BF Applied Part



Waste Electrical & Electronic Equipment (WEEE)



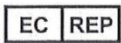
Declaration of Conformity to Medical Device Directive



Catalogue number



Caution



Authorized representative in the European Community

IP22

Protected against solid foreign objects  $\geq 12.5\text{mm}$  diameter (finger) and protected against falling water drops when enclosure tilted up to  $15^\circ$



Date of manufacture



Manufacturer



NRTL\_SGS Product Certification Mark

### Indications:

The air alternating mattress system is designed for patients who endure pressure ulcer and potential patients who wish to reduce the likelihood of pressure ulcer. The device is intended to treat and prevent pressure ulcers by facilitating blood circulation and decreasing pressure of each tissue's contact area. Anti-decubitus Air Alternating Mattress CariChair System intended to treat and/or prevent decubitus ulcers otherwise known as bed sores, pressure sores, and pressure ulcers. Always consults a physician or health professional before using this device.

### Contraindications:

Certain patient conditions are not suitable for using this type of device such as fracture of instable vertebrae and illness of instable vertebrae. Always consult a physician or health professional before using this device. The use of this system does not replace the regular repositioning, monitoring, and nursing of the patient. Certain patient conditions (e.g. unstable cervical fracture, fracture of unstable vertebrae and illness of unstable vertebrae) are contraindicated for use with this device. Always consult a physician or health professional before using this device.

## C. Safety Precautions

### Installation

To ensure the safety operation of the device, please inspect and verify all parts are installed and secured properly. DO NOT place anything on top of the power unit. Make sure the power cord and power adapter are underneath the chair frame to prevent possible hazards.



#### **Open Flames**

DO NOT use this device near the open flames, lighters or cigarettes due to the possible flammability hazard. Fail to do so could result in serious patient injury or device damage.

CAUTION: DO NOT SMOKE CIGARETTES, PIPES, CIGARS, OR ANY OTHER RELATED PRODUCTS ON OR AROUND THIS SYSTEM. FLAMMABILITY HAZARD EXISTS.



#### **Liquid Ingress**

DO NOT use this device in damp rooms to avoid moisture on plug and switch. Never plunge the power unit into water or liquids, not even when it is switch off.



#### **Component Failure**

The degraded or loosen components may affect the performance of the device. If the device doesn't function well, please contact your authorized local dealer for assistance.



#### **Electric Shock**

The touching live parts can result in a death or serious injury by electric shock. Check if the plug and the power cord of power unit are damaged before connecting. DO NOT use the damaged components for connection.



#### **Ambient Temperature**

If the device operates at ambient temperatures outside the state temperature range (see technical data), the performance may be affected and the device or the electronics and battery may get damaged.



#### **Cross Contamination**

This device should be disinfected thoroughly between patients to avoid of cross contamination.



#### **Patient Weight**

Be sure to verify the patient weight does not exceed system weight capacity.

## D. Warnings

### Installation

Use this cushion on proper chair frame and ensure to secure the cushion with the straps provided. Assist the patient sitting on the centre of cushion. Fail to do so could results in serious patient injury or device damage.



### Disassembly

Do NOT disassemble the power unit if you are not a qualified technician. Please contact your authorised local distributor for service.



### AP/APG Protection

This device is NOT AP/APG protected.



### Patient Repositioning

Reposition the patient once in awhile is still necessary when using this device.



### Disposal

Follow the national requirement to dispose power unit / accessories / waste products / residues etc.



### Power Adapter Plug

The AC power adapter plug is served to disconnect the device, do not position the equipment so that it is difficult to disconnect the device.



### Modification

Any modification of this device is NOT allowed.



### Power Switch

The power unit should be turned off when stopping operation is required.



### Children, Pets and Pests

Keep the device away from the children pet and pests as they can damage the device and impact the performance.



### Dust and Lint

Keep the device free from dust and lint.



### Flammability Hazard

DO NOT use the device in Hyperbaric Chamber or in the presence of flammable gases.



### Air Cell Puncture Hazard

Ensure that there are no protruding objects, sharp points or chair springs under the cushion as these could puncture the air cells and affect the performance.

## Maintenance - Level 1

### A. Introduction

Any trained maintenance staff member can perform the procedures described in the sections of this manual that are designated Level 1.

### B. Tools Required

Wire Cutters .....



Sharp Knife .....



## Power Unit

### A. Part Identification Overview

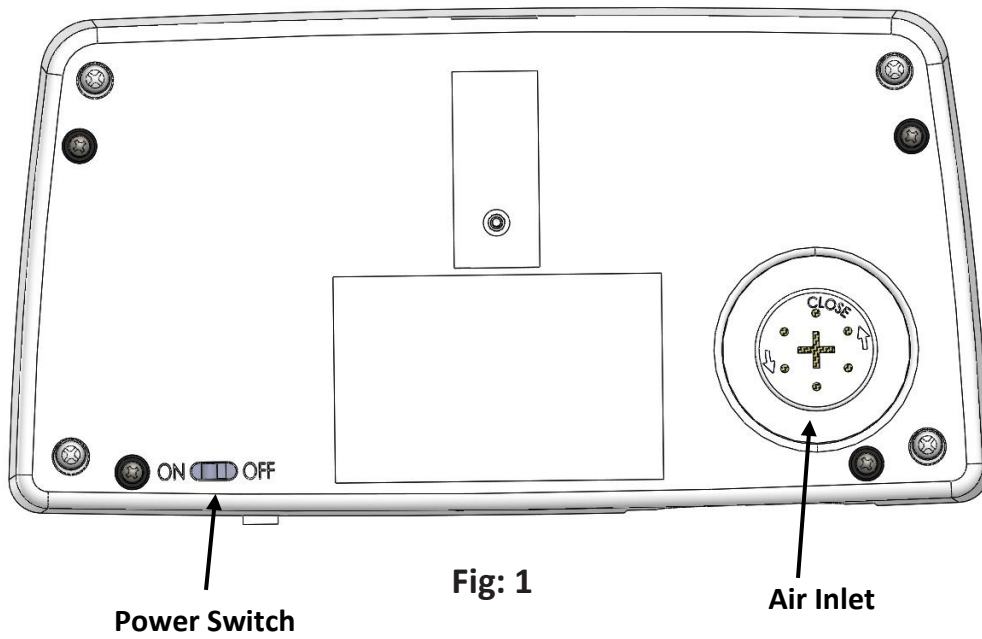
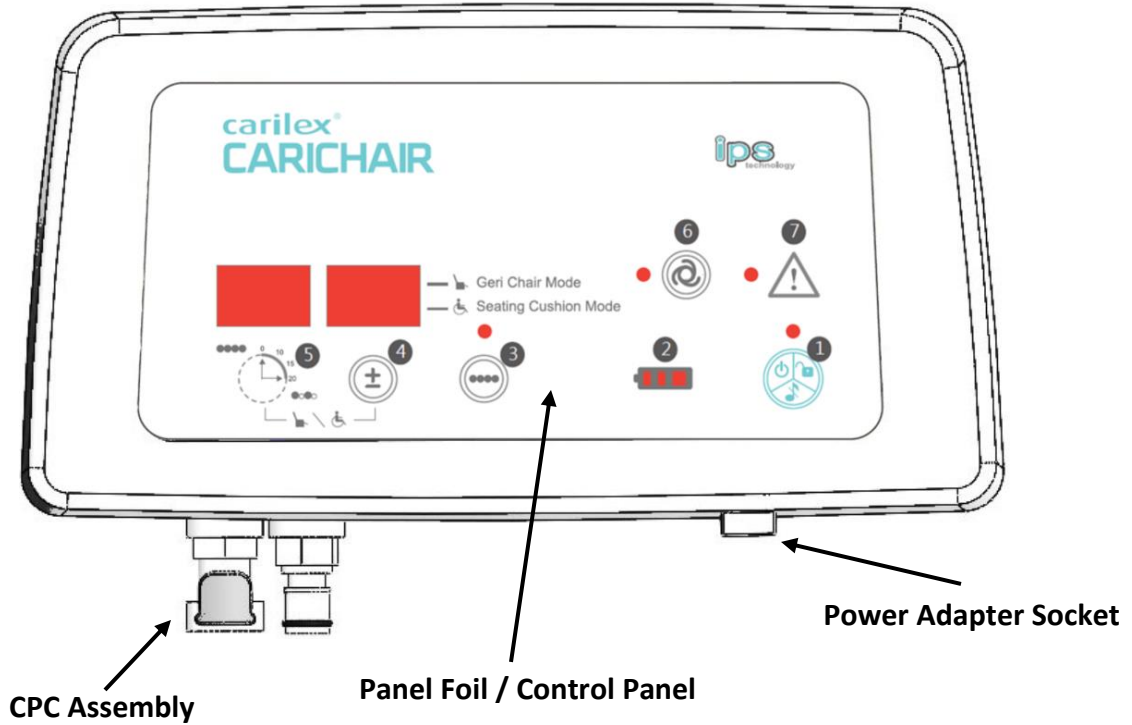
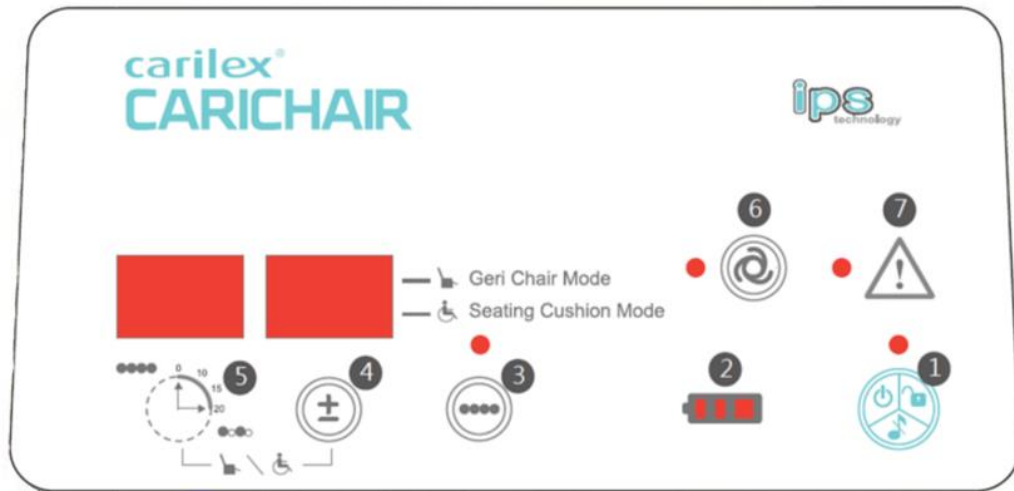


Fig: 1

## B. Control Panel Reference



**Fig: 2**

1. Power/Mute/Unlock
2. Battery Indicator
3. Static Mode
4. Comfort Setting
5. Dynamic Mode Cycle Time
6. Pressure Monitoring LED
7. Low Pressure Alarm LED

## C. Switching On the Power Unit

1. Switch on the power switch on the back of the power unit. (Fig: 1).
2. Press the power button (1) on the control panel (Fig: 1).

## D. General Power Unit Maintenance

### Body and CPC Assembly

1. Thoroughly inspect the body casing and panel foil for any damage, such as cracks, where moisture might get inside.
2. Check the CPC assembly for damage that may have occurred through impact or misuse.
3. Check that the O-ring on the male CPC connector (Fig: 3) is in place and not damaged or cracked.

### Power Adapter

1. Thoroughly check the full length of the power cord for any damage such as brittleness or splits.
2. Check the power adapter casing for any damage such as cracking or splitting.



**IF THE POWER ADAPTER IS DAMAGED IN ANY WAY, DISCARD IT IMMEDIATELY**



**Rubber Seal  
(O-Ring)**

**Fig: 3**

## E. General Cleaning Instructions



**ALWAYS UNPLUG THE POWER UNIT BEFORE CLEANING**



**NEVER SPRAY LIQUIDS DIRECTLY ONTO A POWER UNIT**



**NEVER IMMERSE A POWER UNIT IN ANY LIQUID**

### Routine Cleaning During Use

1. Dampen a clean cloth with soap and water or a mild, neutral detergent and then wipe the power unit.

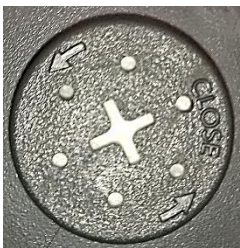
### Routine Decontamination Between Patients

1. Dampen a clean cloth with soap and water or a mild, neutral detergent and then wipe the power unit.
2. Disinfect the power unit with hospital grade registered disinfectant. Let the power unit stand for the appropriate contact time, according to the manufacturer's instructions.
3. Dry the power unit using a clean, dry cloth or disposable paper towels.
4. Wrap the power unit in plastic and store in a cool, dry place.

## F. Air Inlet Maintenance

*It is recommended that the air inlet is serviced annually.*

1. Turn the air filter clockwise a short way and lift it to remove it from the power unit. (Fig: 4)
2. Remove the cotton filter from the air inlet cover. (Fig: 5)
3. Wipe any dust from the air inlet cover and power unit casing using a dry cloth.
4. Place a new cotton filter into the air inlet cover and return it to the casing, fitting the lugs on the air inlet cover into the larger side of the slot in the casing and then turning the air inlet cover anti-clockwise until it is secure. (Fig: 5)



**Fig: 4**



**Fig: 5**

## G. Replacing the Panel Foil



**NEVER SPRAY LIQUIDS DIRECTLY ONTO A POWER UNIT**



**IF LIQUID IS ALLOWED INTO THE CASING OF THE POWER UNIT, EXTENSIVE DAMAGE MAY RESULT**

1. The panel foil is held in place by a self-adhesive backing. Use a small, thin, flat bladed knife to pry up an edge and gently pull the panel foil to remove it. (Fig: 6)
2. Clean the surface thoroughly to remove any excess adhesive that may remain on the body case.
3. Remove the backing material from the new panel foil and position it on the pump casing. Slowly roll down the new panel foil pressing firmly on the entire surface to ensure full adhesion and taking care when fitting the panel foil over the potentiometer shaft.



**Fig: 6**

## Maintenance and Repair - Level 2

### A. Introduction

The procedures described in Maintenance and Repair – Level 2 must only be carried out by manufacture-authorized service personnel. If your system cannot be repaired using the instructions in the Level 1 sections of this manual and you are not a manufacture-authorized service person, please contact Carilex Medical regarding repairs.

**Be sure to seal the power unit with a new “WARRANTY VOID IF BROKEN” sticker after carrying out any of the procedures designated Level 2 and fill out a Product Service Record and email to Carilex Medical or to your distributor.**

### B. Tools Required

Philips PH2 Screwdriver .....



Wire Cutters .....



Sharp Knife .....

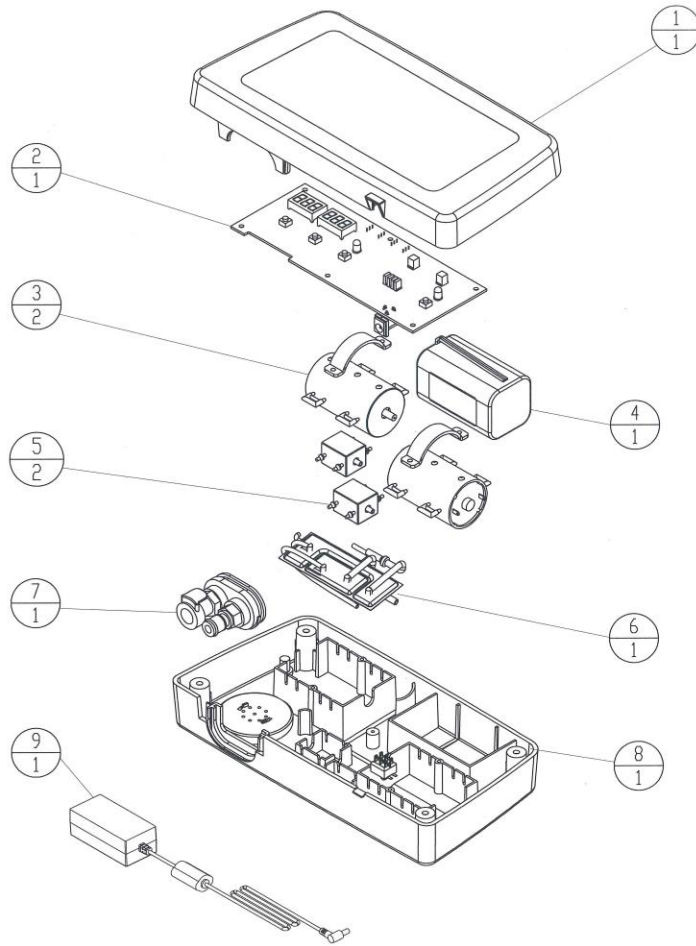


Superglue .....



## Power Unit

### A. Part Identification Overview



**Fig: 7**

1. Top Case
2. Control PCBA
3. Compressor
4. Battery Assembly
5. Solenoid Valve Set
6. Silicone Tube Set
7. CPC Assembly
8. Bottom Case
9. Power Adapter

## B. Replacing the Top Case



**ALWAYS DISCONNECT THE POWER ADAPTER FROM THE POWER UNIT AND SWITCH THE POWER SWITCH OFF BEFORE CARRYING OUT REPAIRS ON THE POWER UNIT**

1. Remove the four screws from the rear of the power unit. (Fig: 8)
2. Remove and layover the top case taking care not to pull on the silicone tubes and wires. (Fig: 9)
3. Remove the connectors and silicone tubes from the control PCBA. (Fig:12)
4. Disconnect the battery. (Fig: 10)
5. Remove the six screws from the control PCBA and lift the control PCBA from the top case. (Fig: 12)
6. Reverse the procedure to install the new unit, taking care that the plastic isolation panel is secured onto the Control PCBA (Fig: 11) and ensuring that the wire and silicone tube routing is exactly as found and complete a function test once the top case has been replaced and secured.



**TAKE CARE NOT TO TRAP ANY WIRES OR SILICONE TUBES BETWEEN THE TOP AND BOTTOM CASES AS THIS MAY RESULT IN MALFUNCTION OF THE POWER UNIT**



To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as the back panel of your computer.



Fig: 8

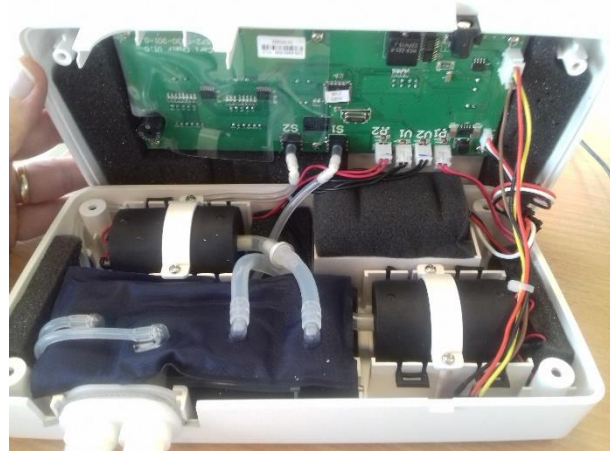


Fig: 9

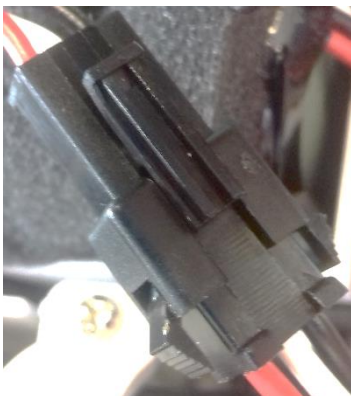


Fig: 10



Fig: 11

## C. Replacing the Control PCBA

1. Follow the steps in “Replacing the Top Case” to remove the Control PCBA.
2. Reverse the procedure to install the new Control PCBA, ensuring that wire and silicone tube routing is exactly as found and complete a function test once the top case has been replaced and secured.

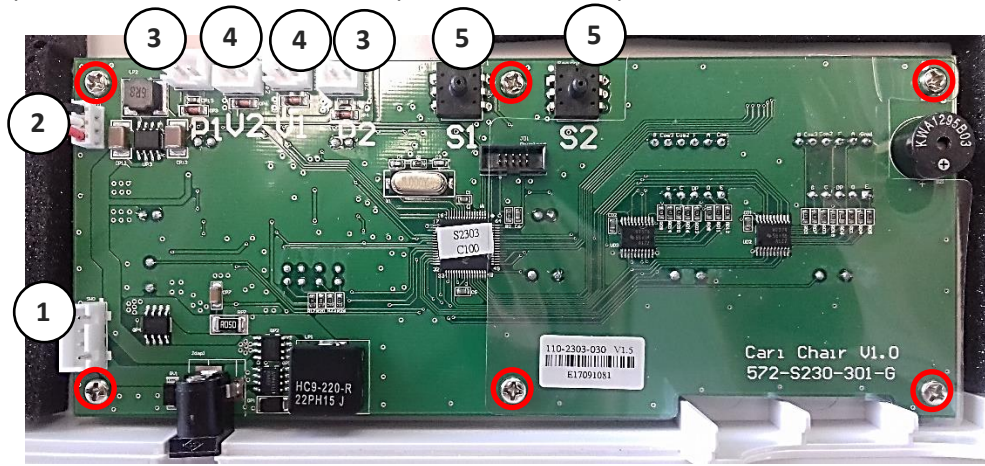


Fig: 12

1	Power Switch
2	Battery Wire
3	2 Compressor Connectors
4	2 Solenoid Valve Connectors
5	2 Pressure Sensors

## D. Replacing the Compressor

1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Disconnect 2-pin compressor connector from Control PCBA. (Fig: 12)
3. Disconnect silicone tube from the compressor. (Fig: 13)
4. Remove the four black suspension rubbers on the sides of the compressor from the power unit casing. (Fig: 13)
5. Gently lift the compressor from the power unit casing.
6. Reverse procedure to install the new compressor, ensuring that wire and silicone tube routing is exactly as found and complete a function test once the top case has been replaced and secured.

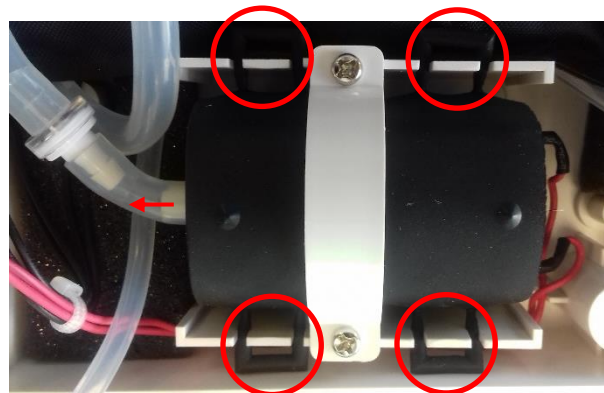


Fig: 21

## E. Replacing the Battery Assembly

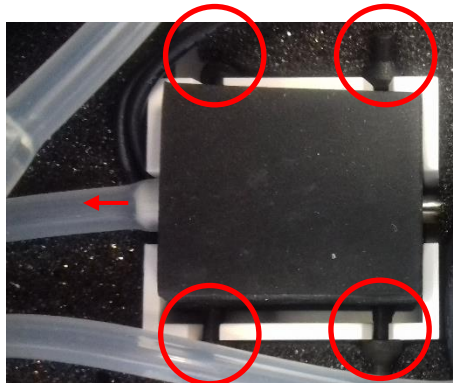
1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Disconnect the battery assembly wire from the Control PCBA battery wire. (Fig: 14)
3. Lift the battery assembly from the power unit.
4. Unwrap the foam from around the battery assembly. (Fig: 14)
5. Reverse the procedure to install a new battery assembly, ensuring that wire and silicone tube routing is exactly as found and complete a function test once the top case has been replaced and secured.



**Fig: 14**

## F. Replacing the Solenoid Valve Assembly

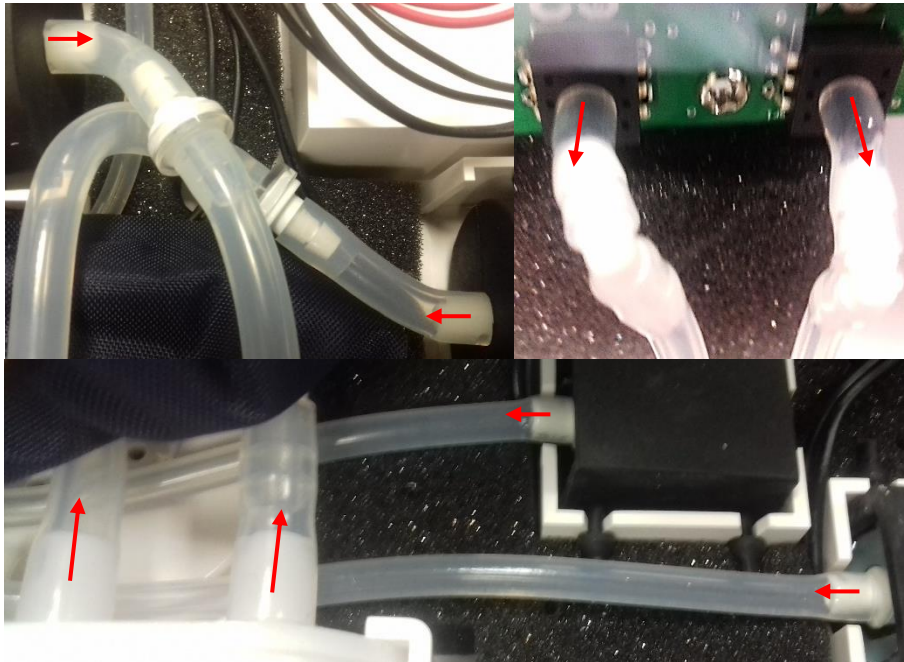
1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Disconnect 2-pin solenoid valve connector from Control PCBA. (Fig: 12)
3. Disconnect silicone tube from the solenoid valve. (Fig: 15)
4. Remove the four black suspension rubbers on the sides of the solenoid valve from the power unit casing. (Fig: 15)
5. Gently lift the solenoid valve from the power unit casing.
6. Reverse procedure to install the new solenoid valve, ensuring that wire and silicone tube routing is exactly as found and complete a function test once the top case has been replaced and secured.



**Fig: 15**

## G. Replacing the Silicone Tube Set

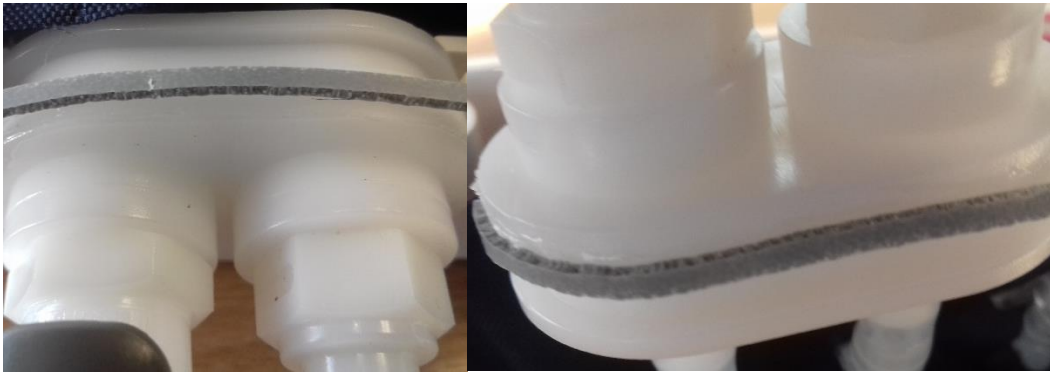
1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Remove the two wide silicone tubes from the compressors (Fig: 16)
3. Remove the two wide silicone tubes from the CPC assembly (Fig: 16)
4. Remove the two narrow silicone tube from the pressure sensors. (Fig: 16)
5. Remove the two narrow silicone tubes from the solenoid valves. (Fig: 16)
6. Lift the silicone tube set from the power unit.
7. Reverse the procedure to install the new silicone tube set, ensuring that the silicone tube routing is exactly as found and complete a function test once the top case has been replaced and secured.



**Fig: 16**

## H. Replacing the CPC assembly

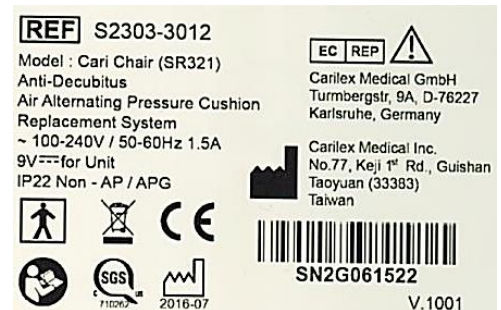
1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Carefully remove the grey sealing foam from the top of CPC assembly. (Fig: 17)
3. Remove the silicone tubes from the CPC assembly. (Fig: 16)
4. Lift the CPC assembly from its slot in the bottom case. (Fig: 9)
5. Remove the grey sealing foam from the bottom of the CPC assembly. (Fig: 17)
6. Reverse the procedure to install the new CPC assembly, gluing the grey sealing foam back onto the CPC assembly, ensuring that each silicone tube is returned to the correct side of the CPC assembly and that the silicone tube routing is otherwise exactly as found and complete a function test once the top case has been replaced and secured.



**Fig: 17**

## I. Replacing the Bottom Case

1. Follow the steps in “Replacing the Top Case” to remove the top case, including disconnecting the power switch.
2. Follow the steps in “Replacing the Compressor” without disconnecting the silicon tubes to remove both of the compressors from the bottom case.
3. Follow the steps in “Replacing the Solenoid Valve Assembly” without disconnecting the silicone tubes to remove both of the solenoid valve assemblies from the bottom case.
4. Follow the steps in “Replacing the CPC Assembly” without disconnecting the silicone tubes to remove the CPC assembly from the bottom case.
5. Follow the steps in “Replacing the Battery Assembly” to remove the battery assembly from the bottom case.
6. Using a small, thin, flat-bladed knife, lift the corner of the information sticker (Fig: 18) on the bottom case and pull it away gently.
7. Reverse the procedure to install the new bottom case, ensuring that the information sticker (Fig: 18) is replaced securely using super glue if required, ensuring that the wire and silicone tube routing is exactly as found, that any cable ties that were removed are replaced with new cable ties and complete a function test once the top case has been replaced and secured.



**Fig: 18**

## Testing

### A. Introduction

The procedures described in this section of the manual can be carried out by any trained member of staff.

### B. Tools Required

Service Kit

CPC assembly .....



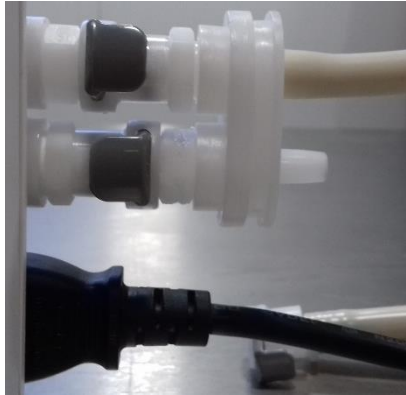
## Power Unit

### A. Function Test

Stage	Steps
Power On	<ul style="list-style-type: none"> <li>• Switch on the power switch on the back of the unit</li> <li>• Press the power button on the control panel to power on the power unit</li> <li>• The power unit will power on with the setting that was previously used, the control panel should display the relevant lights</li> </ul>
Start Up	<ul style="list-style-type: none"> <li>• Attach a CPC assembly to the CPC assembly on the underside of the pump</li> <li>• Press on both pipes to block the air until you hear a click</li> <li>• Remove your fingers from the pipes</li> </ul>
Cycle Time	<ul style="list-style-type: none"> <li>• Press the cycle time button to cycle through the cycle time settings</li> <li>• The cycle time LED display should change with each press</li> </ul>
Comfort Setting	<ul style="list-style-type: none"> <li>• Press the comfort setting button to cycle through the comfort settings</li> <li>• The comfort setting LED display should change with each press</li> </ul>
Cushion Type	<ul style="list-style-type: none"> <li>• Press the cycle time and comfort setting buttons together for 3 seconds</li> <li>• The cushion type on the comfort setting LED display should change</li> </ul>
Static	<ul style="list-style-type: none"> <li>• Press the static mode button</li> <li>• The static mode LED should light and the cycle time should change to '0'.</li> </ul>
Solenoid Valves	<ul style="list-style-type: none"> <li>• Attach a manometer with a vent to one of the tubes and block the other with your finger</li> <li>• You should hear two clicks after the compressors have stopped pumping</li> <li>• Vent the air from the manometer</li> <li>• The compressor should pump briefly then the solenoid valve should click open and closed, releasing the excess pressure in the tube</li> <li>• Check that the reading on the manometer shows this</li> <li>• Attach the manometer to the other tube and repeat the process</li> </ul>
Power off	<ul style="list-style-type: none"> <li>• Press the power button to switch the power unit off</li> <li>• If the power unit does not switch off but displays the lock symbol on the LED display, press and hold the power button to unlock the control panel then press it again to switch the power unit off</li> <li>• Switch off the power switch on the back of the unit</li> </ul>

## B. Flow Test

1. Power up the unit and attach a CPC assembly as described in “Function Test”.
2. Power up and connect the flow meter to one of the tubes and put your finger over the other. (Fig: 19)
3. Take note of the reading on the flow meter. (Fig: 20) If the flow is less than 1.8 L/min then the power unit may require servicing.




**Fig: 19**





**Fig: 20**



**Fig: 21**

 The minimum flow in this test is based on the TIC TF601-D flow meter as found in the Carilex Service Kit. Flow readings may vary between different flow meters and configurations.

 When taking a reading from the flow meter, ensure that its silicone tube is not kinked. (Fig: 21)

 Ensure that all meters used in testing are properly calibrated.

## Troubleshooting

### A. Introduction

The procedures described in Troubleshooting that are marked Level 2 must only be carried out by manufacture-authorized service personnel. All other procedures in described in Troubleshooting can be carried out by any trained maintenance personnel.

If your system cannot be repaired using the instructions in the Level 1 sections of this manual and you are not a manufacture-authorized service person, please contact Carilex Medical regarding repairs.

## B. Power Unit

No Lights on Power Unit	No Airflow from Power Unit	Battery Error (Orange battery LED flashing and buzzer sounding)	Excessive Noise / Vibration from Power Unit	Troubleshooting Guidelines
★	★			<ul style="list-style-type: none"> <li>Check that the power switch is on</li> <li>Level 2: Check that all internal wires are connected and not broken</li> </ul>
★				<ul style="list-style-type: none"> <li>Level 2: Change the control PCBA for a new one and check its function using "A. Function Test"</li> </ul>
	★			<ul style="list-style-type: none"> <li>Check the battery indicator for low battery</li> <li>Check the CPC assembly for blockages</li> <li>Level 2: Check the compressors using "B. Flow Test"</li> <li>Level 2: Check that all internal wires are connected and not broken</li> <li>Level 2: Check that all internal tubes are connected and not punctured</li> </ul>
		★		<ul style="list-style-type: none"> <li>Level 2: Change the battery for a new one</li> <li>Level 2: Change the control PCBA for a new one and check its function using "A. Function Test"</li> </ul>
			★	<ul style="list-style-type: none"> <li>Level 2: Check that the compressors are correctly mounted in the bottom case</li> </ul>



**ENSURE THAT THE POWER ADAPTER IS NOT CONNECTED TO THE POWER UNIT AND THAT THE POWER SWITCH IS OFF BEFORE OPENING THE POWER UNIT CASE**



**ENSURE THAT THE POWER UNIT CASE IS CLOSED AND SCREWED TOGETHER BEFORE CONNECTING THE POWER ADAPTER**



## Product Service Record

F101.03

General Information		
Date:		
Service Technician:		
Company:		
Location:		
Product Serviced:		
Serial Number:		
Device Article Number:		
Invoice Number:		
In Warranty	Yes / No	
General Problems Description:		
Parts Replaced or Repaired	Problems Identified	Serial Number (Record if applicable)
		Old: New:
		Old: New:
		Old: New:
		Old: New:
		Old: New:
For Carilex QA Division use only: 類別：A: 硬體設計類 B:軟體設計類 C:機構設計類 D:製造品質 E:檢驗品質 F: 供應商品質 G:其他 是否建議開立 ECR <input type="checkbox"/> No. <input type="checkbox"/> Yes, ECR/ECN#_____		
For Carilex Sales Div. use only: (已經超過保固期之維修費用請打 D/N 收款, 請在此記錄 D/N#) Device sent back to customer on _____ via _____ (表格與 D.C.C 發行之最新版本相符)		