



**VT 200 NEGATIVE PRESSURE WOUND THERAPY SYSTEM  
SERVICE MANUAL**

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## General Information

### A. Introduction

This Carilex Service Manual provides repair and maintenance instructions for the VT 200 System.

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 or your local distributor to receive a return authorization number and a return address where the system can be sent for repair and servicing.

## B. Safety Precautions



### Open Flames:

Do not expose this device to open flames, lighters, or cigarettes. This device draws room air continuously, therefore cigarette smoking is not recommended near this device. Cigarette smoke may damage internal components. Cigarettes may ignite bed linens.

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

## C. Warnings



### Cross Contamination:

This device should be decontaminated between patient installations. Refer to Power Unit and Mattress Maintenance Sections of this Manual for proper instructions. Failure to disinfect may result in cross contamination.



### Risk of Electric Shock:

DO NOT open back cover. This device is NOT user serviceable. This device should only be opened by qualified personnel approved by Carilex. Refer all service to your local Carilex authorized dealer.



### Oxygen Equipment:

Explosion risk if used in the presence of flammable anesthetics.



### Electrical:

Do not insert items into any opening of the power unit. This could short internal components, which could cause fire or electrical shock. This product is NOT AP/APG protected. REFER SERVICING TO QUALIFIED PERSONNEL ONLY.



### IP22:

In accordance with the acceptance conditions as required by IEC 60529-V2.2:2013



### Class II product:

This product is a Class II product. Do NOT cut or remove the grounding prong for shock prevention from the plug on this product if it is present. In the event that a non-compatible wall receptacle is found, it is the customer's personal responsibility and obligation to contact a qualified electrician to replace it with a compatible wall receptacle in accordance with the National Electrical Code.



### Extension Cord:

If for any reason, you find it necessary to use an extension cord, ONLY use an appropriate extension cord that has the same or higher electrical rating as the device it is being connected to.



### Hospital Grade receptacle:

Note: Grounding reliability can only be achieved when the plug is connected to an equivalent receptacle marked "Hospital Grade" or "Hospital Only".

## 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

PH2 Screwdriver .....

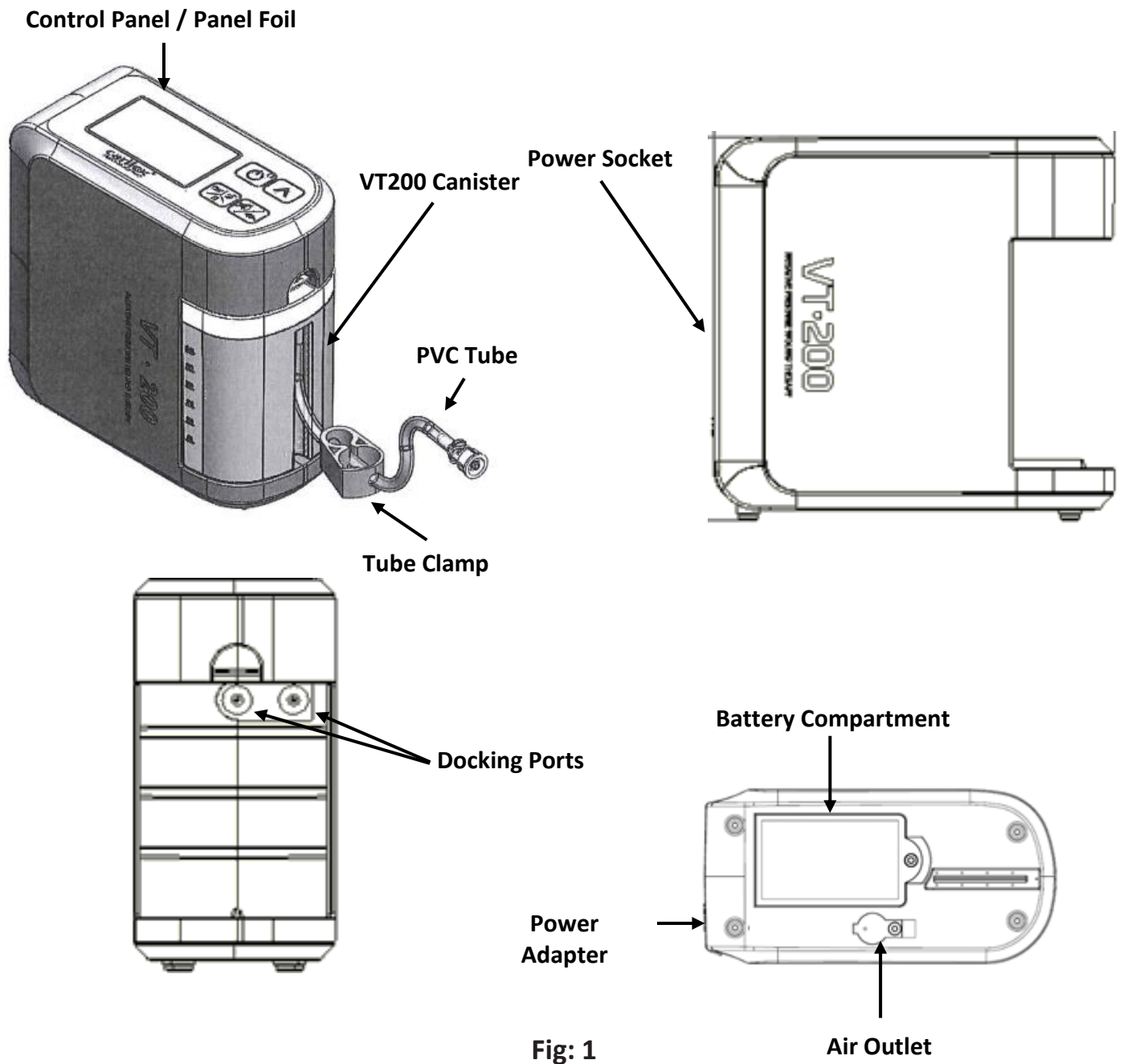


Sharp Knife .....

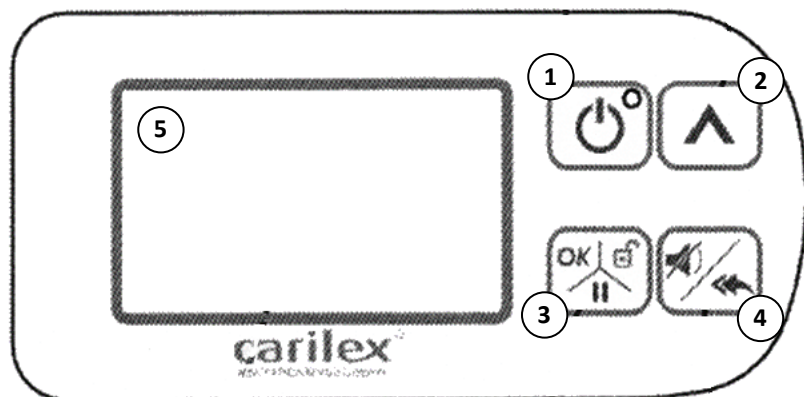


## Power Unit

### A. Part Identification Overview



## B. Control Panel Reference



1	Power Button
2	Up Button
3	OK/Unlock/Pause Button
4	Mute/Return Button
5	LCD Display

**Fig: 2**



## C. General Maintenance

### Body and Docking Ports

1. Thoroughly inspect the body casing and panel foil for any damage, such as cracks, where moisture might get inside.
2. Remove the canister from the unit then inspect and clean the docking ports, checking for any signs of foreign matter or damage.

### 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.



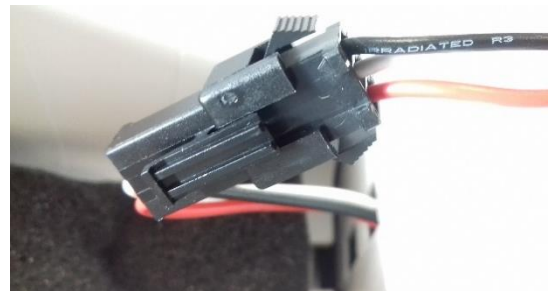
**IF THE POWER ADAPTER IS DAMAGED IN ANY WAY, DISCARD IT IMMEDIATELY**

### Battery

1. Remove the screw from the battery compartment cover (Fig: 3) and then lift the cover from the power unit.
2. Lift the battery from the battery compartment and disconnecting the battery wire. (Fig: 4)
3. Inspect the battery for swelling and the battery outer casing, wires and connector for damage.



**Fig: 3**



**Fig: 4**



**IF THE BATTERY IS DAMAGED IN ANY WAY, DISCARD IT IMMEDIATELY ACCORDING LOCAL BATTERY DISPOSAL PROCEDURES**

## D. 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.

## E. Air Outlet Maintenance

1. Remove the screw from that air outlet cover (Fig: 3) and lift the cover from the power unit.
2. Check the silencing filter for dust, replace it if necessary and then reverse the procedure to replace the air outlet cover.

## F. 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: 5)
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. Carefully press down the new panel foil ensuring full adhesion to the entire surface.



**Fig: 5**

## 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 Inc. regarding repairs.

**Be sure to seal the power unit with a new Do Not Open sticker after carrying out any of the procedures designated Level 2 and fill out a Product Service Record and email to Carilex Medical Inc. or to your distributor.**

### B. Tools Required

PH2 Screwdriver .....



PH1 Screwdriver .....



Small Flat Screwdriver .....



Sharp Knife .....

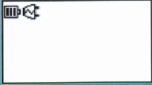




Superglue .....

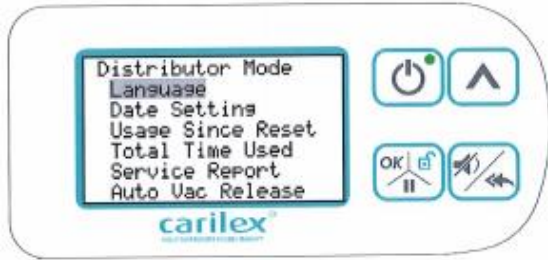


### C. Reset patient information

If your system need to reset patient information, that must only be carried out by manufacture-authorised service personnel.

1. Plug in the Power adapter. You can see the standby mode .

2. Press  &  and hold the button for 10 seconds to enter “Distributor Mode”. (Fig①)





(Fig:①)


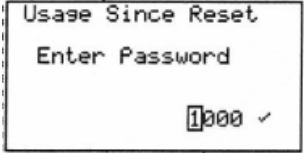



(Fig:

②)


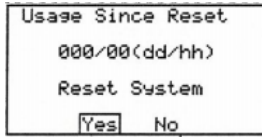

3. Press the the button  we choose “Usage Since Reset” (Fig:②), then Press the  to enter “Usage Since Reset”.

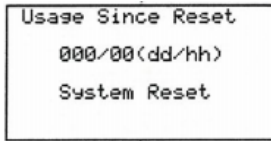
4. Enter the password number “1416”  
<Number setting>:



(1). Press the button  to choose first number “1”, you can see the screen ,

and press the button  to enter the next number.

(2). Enter the last number and press  button, you can see the screen .

(3). Press the  to reset screen , choose the “Yes” and press  button one

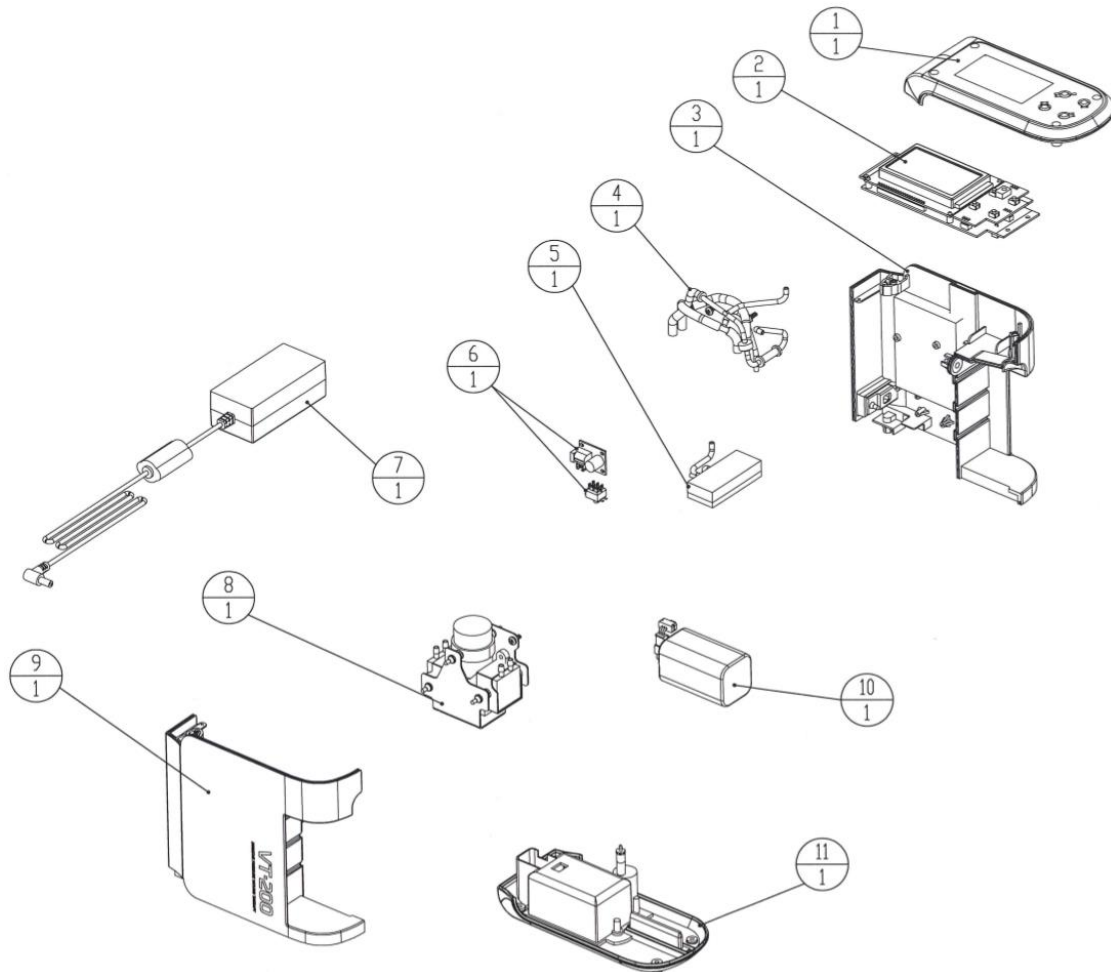
more time you can see the screen .

(4). Finally, press  button back to Distributor Mode (Fig:①), and Press  hold the button for 3

seconds to standby mode.

## Power Unit

### A. Part Identification Overview



**Fig: 14**

1. Top Case Set
2. Control PCBA and LCD Display
3. Rear Case Set
4. Silicone Tube Set
5. Solenoid Valve Set
6. Power PCBA Set
7. Power Adapter
8. Vacuum Motor
9. Front Case Set
10. Battery Set
11. Bottom Case Set

## B. Replacing the Top Case

1. Follow the instructions in “Replacing the Panel Foil” to remove the panel foil.
2. Remove the four screws from the top of the power unit. (Fig: 15)
3. Remove and lay aside the top case. (Fig: 16)
4. Reverse the procedure to install the new top case then complete a function test once the unit is closed.



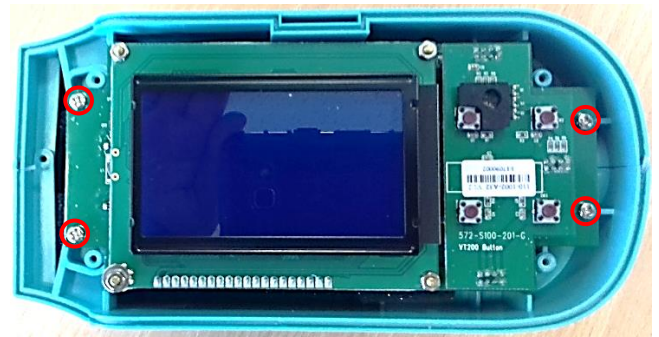
**ALWAYS DISCONNECT THE POWER ADAPTER FROM THE POWER UNIT BEFORE CARRYING OUT REPAIRS ON THE POWER UNIT**



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: 15**



**Fig: 16**

## C. Replacing the Control PCBA

1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Remove the four screws from the control PCBA. (Fig: 16)
3. Turn the control PCBA over and disconnect the five connectors and two narrow silicone tubes. (Fig: 17)
4. Gently lift out the control PCBA.
5. Reverse procedure to install a new control PCBA, ensuring that the wire and silicone tube routing is exactly as found and that the silicone tubes are not kinked then complete a function test once the unit is closed.

1	Vacuum Motor Connector
2	Power PCBA Connector
3	Battery Connector
4	Solenoid Valve Connector
5	Pressure Sensor (Connect Solenoid Valve)
6	Pressure Sensor (Connect Vacuum Motor)



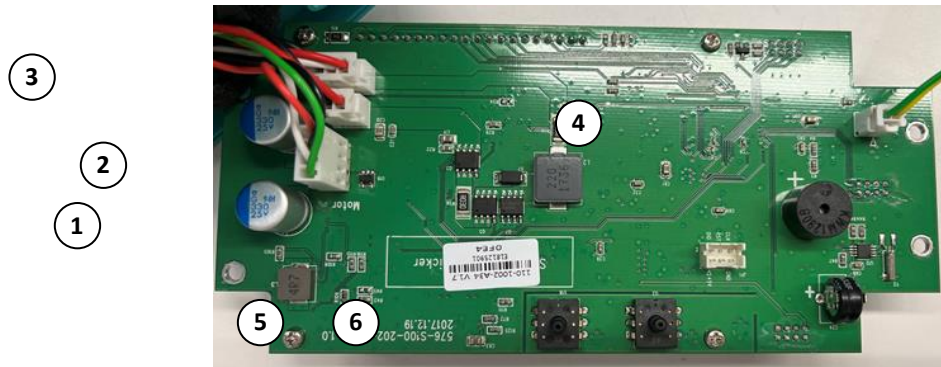


Fig: 17

## D. Replacing the Solenoid Valve Set

1. Follow the steps in “Replacing the Control PCBA” to remove the control PCBA.
2. Disconnect the solenoid valve connector and silicone tube from the control PCBA. (Fig: 17)
3. Disconnect the solenoid valve silicone tube from the docking port. (Fig: 19)
4. Reverse the procedure to install a new solenoid valve set, ensuring that the wire and silicone tube routing is exactly as found and that the silicone tubes are not kinked then complete a function test once the power unit is closed.

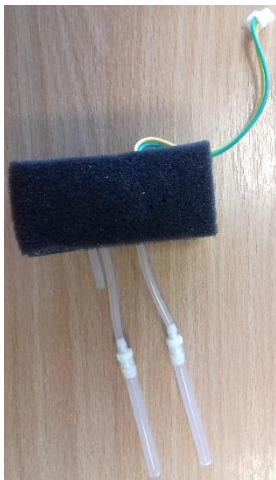


Fig: 18

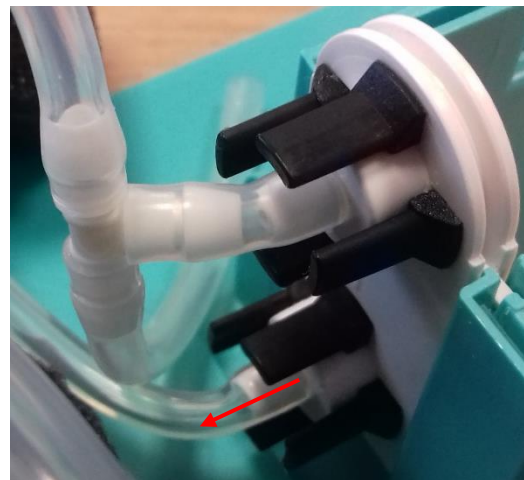


Fig: 19

## E. Replacing the Bottom Case

1. Stand the power unit upside down.
2. Follow the steps in “General Maintenance – Battery” to remove the battery from the power unit.
3. Remove the four screws from the bottom of the power unit. (Fig: 20)
4. Carefully lift the bottom case from the power unit and disconnect the silicone tube from the air outlet. (Fig: 21)
5. Reverse the procedure to install the new bottom case, ensuring that the wire and silicone tube routing is exactly as found, that the air outlet silicone tube is not kinked and then complete a function test once the power unit is

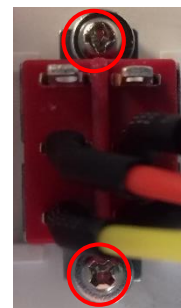
closed. (Note: If the power unit is before V.1004 model, should be use a PH1 screwdriver to remove the two screws from the power switch.(Fig: 22))



**Fig: 20**



**Fig: 21**



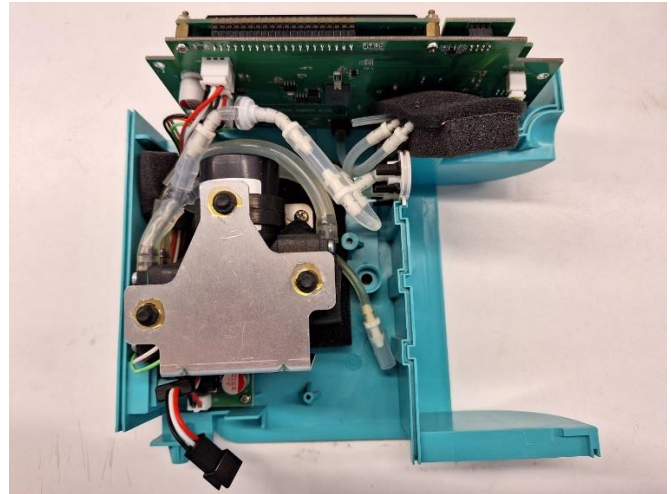
**Fig: 22**

## F. Replacing the Front Case

1. Follow the steps in “Replacing the Control PCBA” to remove the top case and the screws securing the control PCBA.
2. Follow the steps in “Replacing the Bottom Case” to remove the bottom case.
3. Remove the screw from the rear case. (Fig: 22)
4. Place the power unit down on its rear case and lift the front case from the power unit. (Fig: 23)
5. Reverse the steps to replace the front case ensuring that all wire and silicone tube routing is exactly as found then complete a function test once the power unit is closed.



**Fig: 23**



**Fig: 24**

## G. Replacing the Silicone Valve Set

1. Follow the steps in “Replacing the Front Case” to remove the front case.
2. Remove the silicone tubes from both docking ports. (Fig: 19 and Fig: 27)
3. Remove silicone tube from the pressure sensor connected to the vacuum motor (Fig: 17)
4. Remove the four silicone tubes from the vacuum motor (Fig: 29)
5. Reverse the procedure to install a new silicone valve set ensuring that all wire and silicone tube routing is exactly as found (Fig: 30) and that none of the silicone tubes are kinked then complete a function test once the power unit is closed.

## H. Replacing the Power PCBA

1. Follow the steps in “Replacing the Front Case” to remove the front case.
2. Use a small, flat screwdriver to open the magnetic collar. (Fig: 25)
3. Remove the power PCBA wire from the magnetic collar.
4. Using a PH1 screwdriver, remove the three screws from the power PCBA. (Fig: 26)
5. Remove the power PCBA connector from the control PCBA. (Fig: 17)
6. Reverse the procedure to install a new power PCBA, ensuring that all silicone tube routing and wire routing is exactly as found and that none of the silicone tubes are kinked then complete a function test once the power unit is closed.

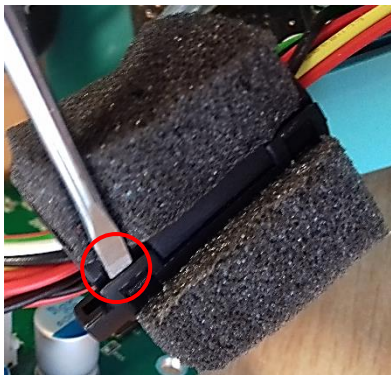


Fig: 25

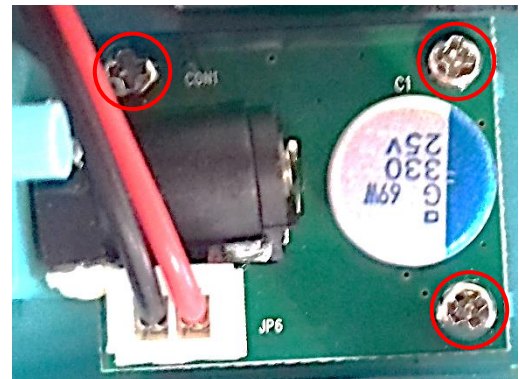
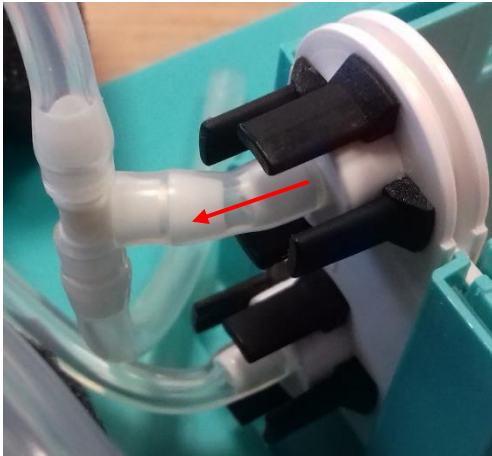


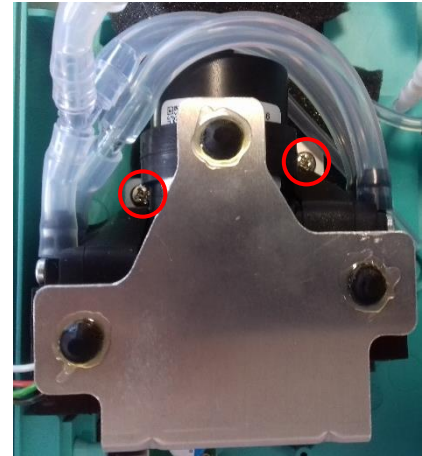
Fig: 26

## I. Replacing the Vacuum Motor

1. Follow the steps in “Replacing the Front Case” to remove the front case.
2. Use a small, flat screwdriver to open the magnetic collar. (Fig: 25)
3. Remove the vacuum motor wire from the magnetic collar.
4. Remove the vacuum motor silicone tube from the docking port. (Fig: 27)
5. Remove the two screws from the vacuum motor plate. (Fig: 28)
6. Remove the four silicone tubes from the vacuum motor. (Fig: 29)
7. Lift the vacuum motor from the rear case.
8. Reverse the procedure to install a new vacuum motor, ensure that all wire and silicone tube routing is exactly as found (Fig: 30) and that none of the silicone tubes are kinked then complete a function test once the power unit is closed.



**Fig: 27**



**Fig 28**



**Fig: 29**



**Fig: 30**

## J. Replacing the Docking Port Set

1. Follow the steps in “Replacing the Front Case” to remove the front case.
2. Remove the silicone tubes from the docking ports. (Fig: 19 and Fig: 27)
3. Slide the docking port set out of the rear case. (Fig: 31)
4. Reverse the procedure to install a new vacuum motor, ensure that all wire and silicone tube routing is exactly as found and that none of the silicone tubes are kinked then complete a function test once the power unit is closed.



Fig: 31

## K. Replacing the Rear Case

1. Follow the steps in “Replacing the Front Case” to remove the front case.
2. Follow the steps in “Replacing the Docking Port Set” to remove the docking port set.
3. Follow the steps in “Replacing the Power PCBA” to remove the power PCBA.
4. Follow the steps in “Replacing the Vacuum Motor” to remove the vacuum motor.
5. Use a small, thin, flat-bladed knife, lift the corner of the information sticker on the rear case and pull then gently pull the sticker away from the case.
6. Reverse the procedure to install the new rear case, ensuring that the information sticker (Fig: 32) is replaced securely using super glue if required, that the wire and silicone tube routing is exactly as found and that none of the silicone tubes are kinked then complete a function test once the power unit is closed.

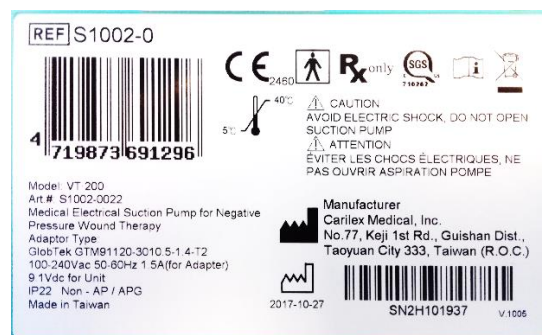


Fig: 32

## 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

Multimeter with DC voltage mode .....



## Power Unit

### A. Function Test

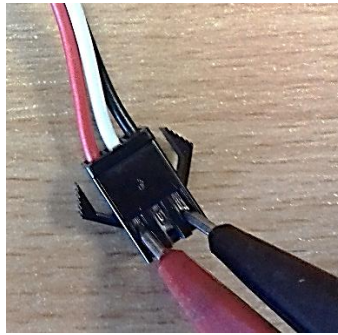
Stage	Steps
Power On	<ul style="list-style-type: none"> <li>• Plug the power adapter into the wall socket and into the power unit</li> <li>• Switch the wall socket on</li> <li>• Press and hold the power button and the up button for 5 seconds</li> <li>• The power unit will display its start screen and then the 'Select Therapy' list</li> </ul>
Buttons	<ul style="list-style-type: none"> <li>• Press the up button to scroll through the 'Select Therapy' list Press the OK button to select a therapy</li> <li>• Press the return button to return to the 'Select Therapy' list</li> </ul>
Vacuum Motor, Solenoid Valve and Pressure Sensors	<ul style="list-style-type: none"> <li>• Attach a canister to the power unit and closed tight the clip from the canister</li> <li>• Select 'Intermittent' from the 'Select Therapy' list then press the OK button to confirm</li> <li>• Set the 'High' pressure to -200mmHg then press the OK button to confirm</li> <li>• Set the 'High' time to 01min then press the OK button to confirm</li> <li>• Set the 'Low' pressure to -20mmHg then press the OK button to confirm</li> <li>• Set the 'Low' time to 01min then press the OK button to confirm</li> <li>• Check that the reading on the LCD display quickly reaches 200mmHg <math>\pm 5</math> and that the manometer confirms the reading</li> <li>• Wait for the solenoid valve to open and check that the reading on the LCD display quickly reaches 20mmHg <math>\pm 5</math> and that the manometer confirms the reading</li> </ul>
Power Off	<ul style="list-style-type: none"> <li>• Press and hold the Power button to switch the power unit off</li> <li>• Switch the wall socket the power unit off then disconnect the power adapter from both</li> </ul>



## B. Battery Voltage Test

*The battery should be charged and voltage tested every six months.*

1. Follow the steps in “General Maintenance – Battery” to remove the battery from the power unit.
2. Set your multimeter to DC voltage mode and measure the voltage between the red and black wires on the battery. (Fig: 33)
3. If the voltage is lower than 6V replace the battery with a new battery.
4. Connect the battery to the power unit, return it to the battery compartment and secure the battery compartment.
5. Plug the power adapter into the power unit allowing four hours for the battery to charge.



**Fig: 33**



**STORE THE BATTERY IN A DRY ENVIRONMENT**

	Minimum Temperature	Maximum Temperature	Maximum Relative Humidity
Charged battery	-20°C	35°C	70%
Charging battery	5°C	40°C	70%



**ALWAYS DISPOSE OF DEFECTIVE BATTERIES IN ACCORDANCE WITH LOCAL ENVIRONMENTAL REGULATIONS**

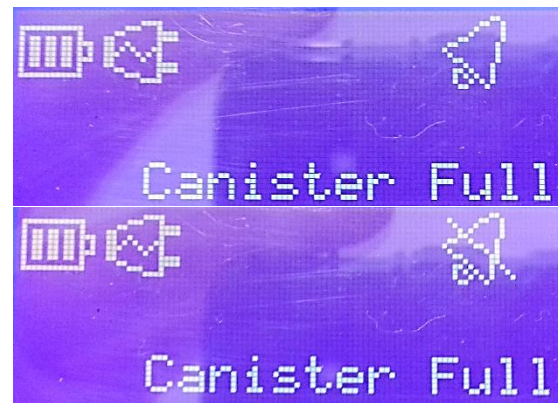
### C. Alarm Test

*The following test can be used to check that the alarm is functioning correctly.*

1. Remove the canister from the power unit.
2. Press and hold the power button on the control board for 3 seconds to switch the power unit on.
3. Select 'Continuous' from the 'Select Therapy' list then press the OK button twice to start the therapy.
4. Cover the left docking port with your finger to block it. (Fig: 34)
5. The pressure reading on the LCD display shouldn't change during the test and after a while the alarm will sound.
6. The mute button will toggle the alarm sound on and off, ensure that the sound is on and that you can hear it. (Fig: 35)
7. If the alarm does not sound and all of the silicone tubes are connected correctly, replace the control PCBA.



**Fig: 34**



**Fig: 35**

## Troubleshooting

### A. Introduction

The procedures described in Troubleshooting that are marked Level 2 must only be carried out by manufacture-authorised 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-authorised service person, please contact Carilex Medical Inc regarding repairs.



**ENSURE THAT THE POWER SUPPLY IS NOT CONNECTED TO THE POWER UNIT BEFORE OPENING THE POWER UNIT CASE**



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

## B. Power Unit

No Power Supply Symbol	Battery Failure Symbol	No Display	Call for Service	Troubleshooting Guidelines
★				<ul style="list-style-type: none"> <li>• Check that the power adapter is connected to the wall socket and power unit and that the wall socket is switched on</li> <li>• Check that the LED on the power adapter is on</li> </ul>
	★			<ul style="list-style-type: none"> <li>• Check that battery is connected to the power unit</li> <li>• Check the voltage in the battery using “Battery Voltage Test”</li> <li>• Level 2: Replace the Control PCBA and check its function with “Function Test”</li> </ul>
		★		<ul style="list-style-type: none"> <li>• Check that the power adapter is connected to the wall socket and power unit and that the wall socket is switched on</li> <li>• Check that the LED on the power adapter is on</li> <li>• Check that the battery is connected to the power unit</li> <li>• Check the voltage in the battery using “Battery Voltage Test”</li> <li>• Level 2: Replace the control PCBA and check its function with “Function Test”</li> </ul>
			★	<ul style="list-style-type: none"> <li>• Hold the power and return buttons together for 10 seconds to enter ‘Distributor Mode’</li> <li>• Scroll down to ‘Service Report’ and press the OK button</li> <li>• The LCD display will show a list of service issues and dates <ul style="list-style-type: none"> <li>○ For example, Check battery: year/month/day</li> </ul> </li> <li>• If after correcting these issues the LCD display is still showing call for service, change the control PCBA <ul style="list-style-type: none"> <li>• After repair, select ‘Service Report’ in ‘Distributor Mode’ and Erase.</li> <li>• press the return button to return to ‘Distributor Mode’</li> </ul> </li> </ul>

System Unresponsive to Buttons	Continuous Alert	High Target Pressure Not Reached	Low Target Pressure Not Reached	Troubleshooting Guidelines
★				<ul style="list-style-type: none"> <li>• Level 2: Replace the control PCBA and check its function with “Function Test”</li> </ul>
	★			<ul style="list-style-type: none"> <li>• Check the docking ports for blockages</li> <li>• Check the canister docking tubes for blockages</li> <li>• Check the LCD display for low battery</li> <li>• Level 2: Check the silicone tubes connected to the pressure sensors for damage or kinking</li> <li>• Level 2: Check the silicone tubes connected to the solenoid valve for damage or kinking</li> <li>• Level 2: Replace the solenoid valve and check its function with “Function Test”</li> <li>• Level 2: Replace the control PCBA and check its function with “Function Test”</li> </ul>
		★		<ul style="list-style-type: none"> <li>• Level 2: Check that none of the silicone tubes are kinked</li> <li>• Level 2: Check that all of the silicone tubes are connected correctly</li> </ul>
			★	<ul style="list-style-type: none"> <li>• Level 2: Replace the control PCBA and check its function with “Function Test”</li> <li>• Level 2: Replace the vacuum motor and check its function with “Function Test”</li> </ul>



**Product Service Record**

F101.04

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)	Function Test
		Old: New:	Follow Service Manual: NO. _____ Result: <input type="checkbox"/> PASS <input type="checkbox"/> NG
		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 驗品質 E:檢  
F: 供應商品質 G:其他

是否建議開立 ECR No.  Yes, ECR/ECN# \_\_\_\_\_

是否建議開立 Customer Complain

No(Consumables/ User error/ others \_\_\_\_\_).

Yes(Abnormal function/ Volume of abnormal quality/ others \_\_\_\_\_), CC NO. \_\_\_\_\_

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)