

carilex®



**THERAFLO AP LOW AIR LOSS POWER UNIT
SERVICE MANUAL**

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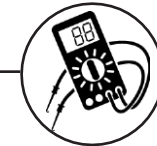


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General Information

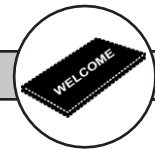
A. Introduction

The TheraFlo AP Power Unit can be matched with the TheraFlo AP 7" M-Set and with the TheraFlo 9" M-Set.

This Carilex Service Manual provides repair and maintenance instructions for the TheraFlo AP Low Air Loss Power Unit.

The sections of the manual designated as Level 1 can be performed by any trained staff member.

The sections of the manual designated as Level 2 can only be performed by Manufacture Authorized service personnel. If you are not authorized to do repairs please contact Carilex or your local distributor to receive a return authorization number and the details of where the unit can be sent for servicing.



B. Safety Precautions

Installation:

Verify mattress anchor straps are attached to bed frame securely. To ensure proper operation inspect and verify air cells are upright and in place. Test all bed frame functions to verify no interference. Do not place anything on the power unit. Route power cord underneath bed frame and verify freedom from hazard.

Bed Linens:

This device incorporates a waterproof cover that is moisture vapor permeable; therefore it is recommended to limit bed linens to one sheet in order to maximize the system's performance.

NOTE: Only "breathable" incontinent pads are recommended for use with this device.



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 + Mattress Maintenance Sections of this Manual for proper instructions. Failure to disinfect may result in cross contamination.



Weight Limitation:

Verify that the patient weight, therapeutic support surface, bed rails, etc. do not exceed weight capacity of bed frame. Verify patient weight does not exceed this device's weight capacity.



Entrapment:

When using side rails and/or assist devices, use a mattress thick enough and wide enough so that the gap between the top of the mattress and the bottom of the side rails and the gap between the side of the mattress and the side rails is small enough to prevent a patient from getting his or her head or neck between the mattress and the side rail. Failure to do so could result in serious patient injury or death.



Patient Falls:

Failure to use bed rails in raised position could lead to accidental patient falls. Air mattresses have soft edges that may collapse when patients roll to that edge.



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.



Fuse:

Danger! Risk of fire. Replace fuses as marked: T5A 250V (Power Fuse) and T1A 250V (PCB Fuse).

**IPX0:**

Don't immerse power unit in any liquid or spray any liquids directly on the power unit.

**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.

**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.

**Proper Mattress Set:**

The power unit and mattress are design to work together for patient's safety reason. Power unit should only be used with the correct mattresses recommended by the manufacture. Mismatching the power unit and mattress is strictly prohibited. Misusage may lead to patient risk.

**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

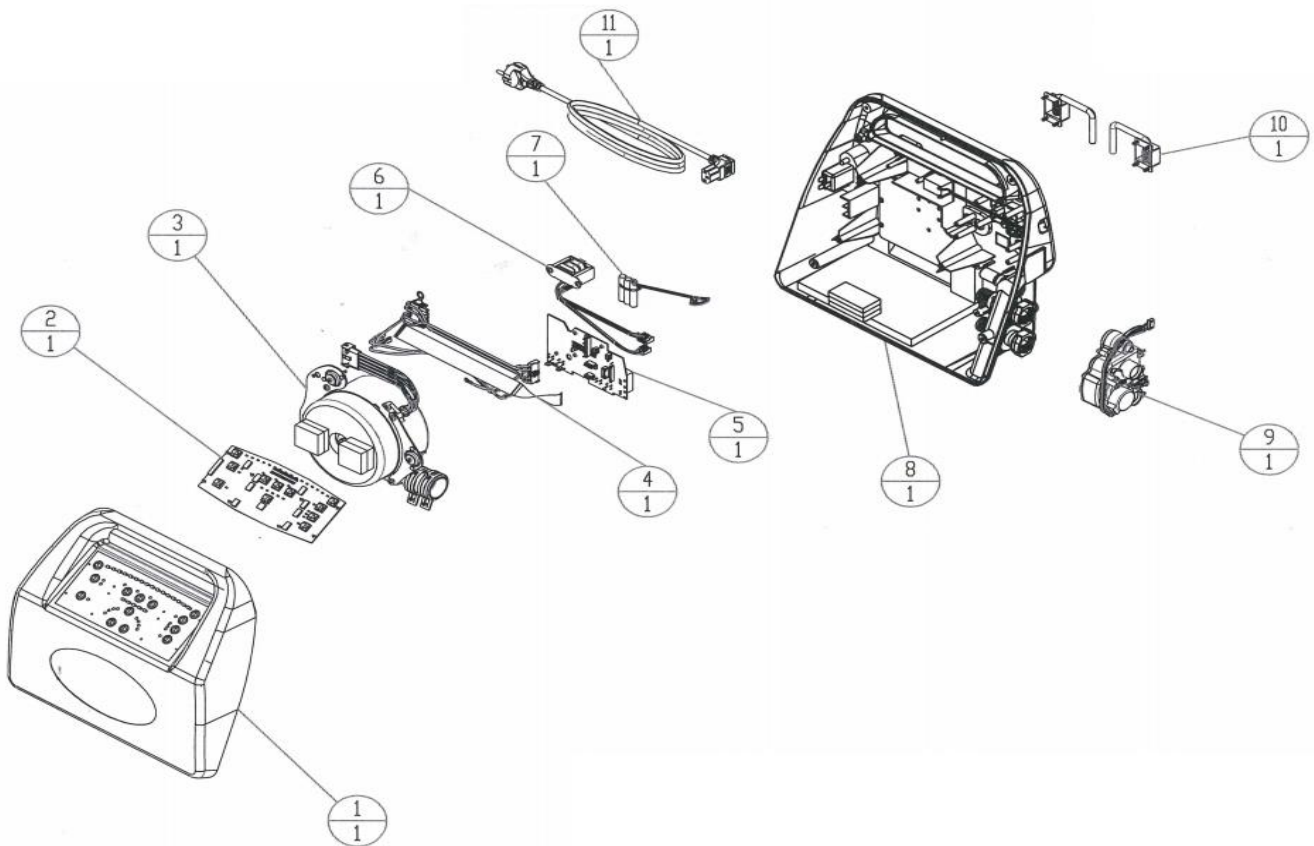
A. Introduction

The procedures described in the Maintenance - Level 1 section of this manual can be done by anyone on staff carefully following the exact instructions.

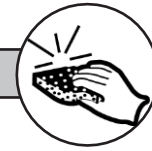


Power Unit

A. Part Identification Overview



| Items | Product |
|-------|------------------|
| #1 | P.U. Top Case |
| #2 | Control PCBA |
| #3 | Compressor Set |
| #4 | Conneting Wire |
| #5 | Power PCBA |
| #6 | Transformer Set |
| #7 | Battery Set |
| #8 | P.U. Bottom Case |
| #9 | Air Valve Set |
| #10 | Hook Set |
| #11 | Power Cord EU |



B. General Cleaning Instructions

ROUTINE CLEANING WHILE IN USE BY A SINGLE PATIENT:

 Always unplug power unit before cleaning.

Power unit can be cleaned by wiping down with damp cloth using soap and water or mild neutral detergent. Never spray cleaners or liquids directly on power unit.

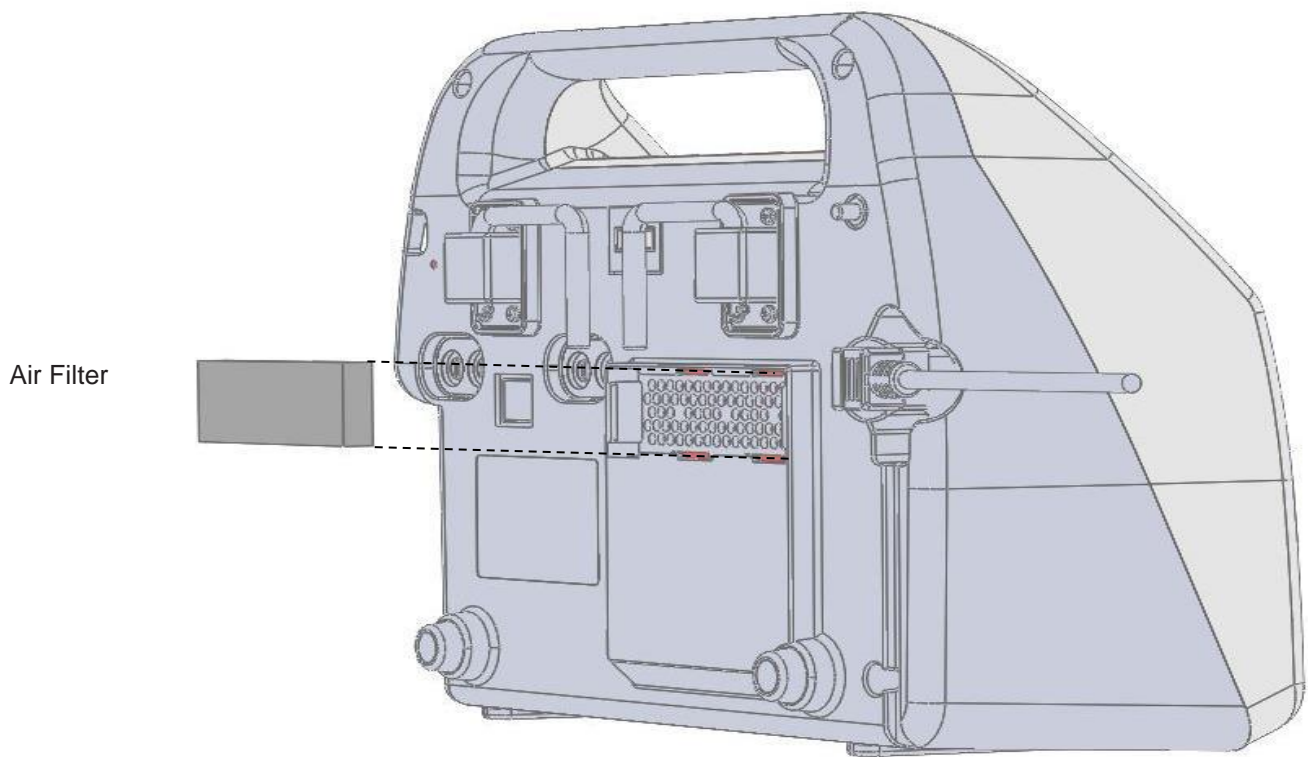
LAUNDRY/DECONTAMINATION BETWEEN PATIENTS:

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



C. Clean/Replace Air Filter

1. Remove the filter from rear chassis.
2. Check for excess dirt or dust. The filter should be cleaned with mild soap and water or, if necessary, replaced with a Genuine replacement filter.
3. Thoroughly air dry before reinserting.
4. To reinsert, place the air filter back to the rear chassis.

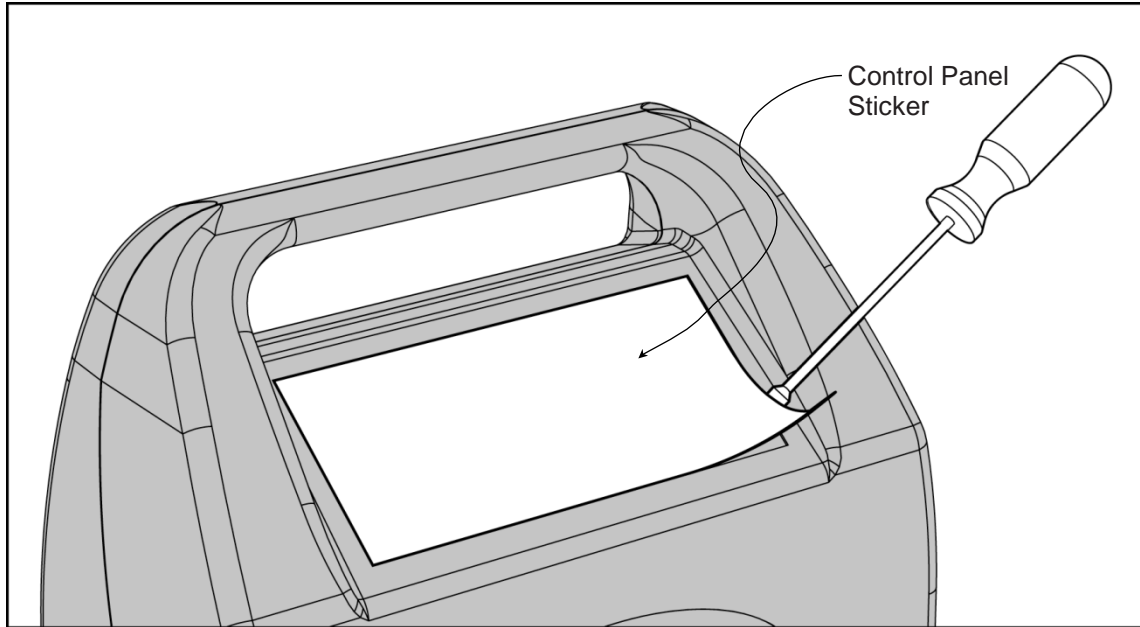




D. Control Panel Sticker Replacement

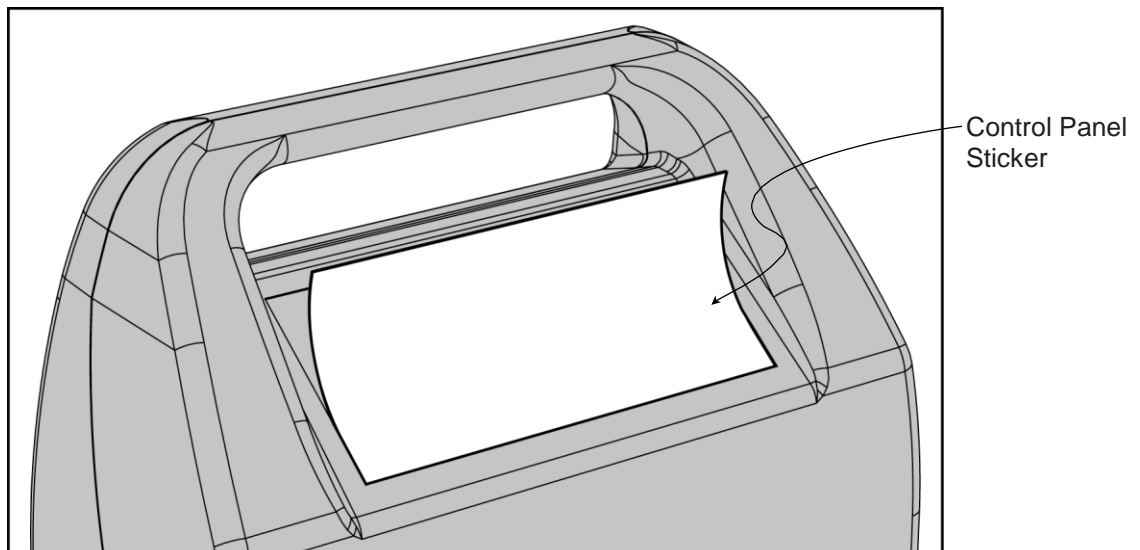
1. To Remove Control Panel Sticker

The control panel sticker is held in place by a self-adhesive backing. Use a small, thin, flat bladed screwdriver to pry up an edge and gently remove control panel sticker.



2. To Replace Control Panel Sticker

Clean surface thoroughly to remove any excess adhesive that may have been left behind. Then apply the new control panel sticker by removing the backing material and position sticker as shown. Slowly roll down the control panel sticker, pressing firmly on the entire surface to ensure adhesion.

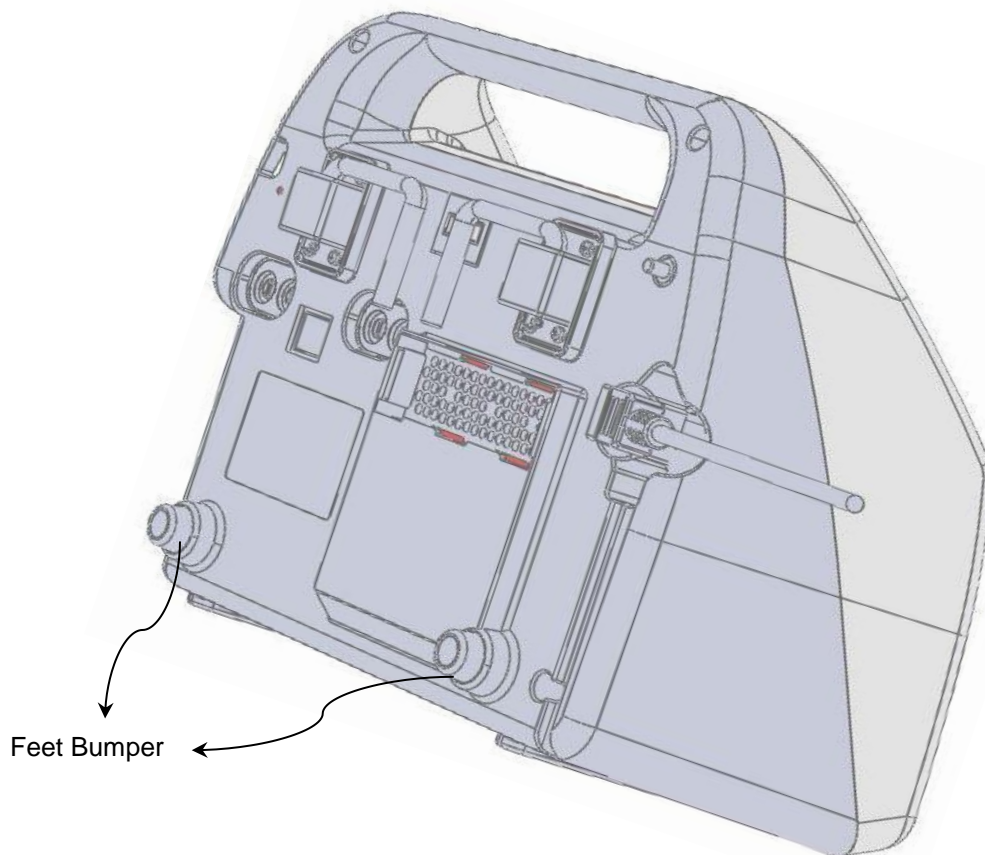




E. Feet Bumper Replacement

1. To Remove Feet Bumpers

The feet bumpers are held in place by a self-adhesive backing. Use a small, flat bladed screwdriver to pry up an edge and gently remove it.



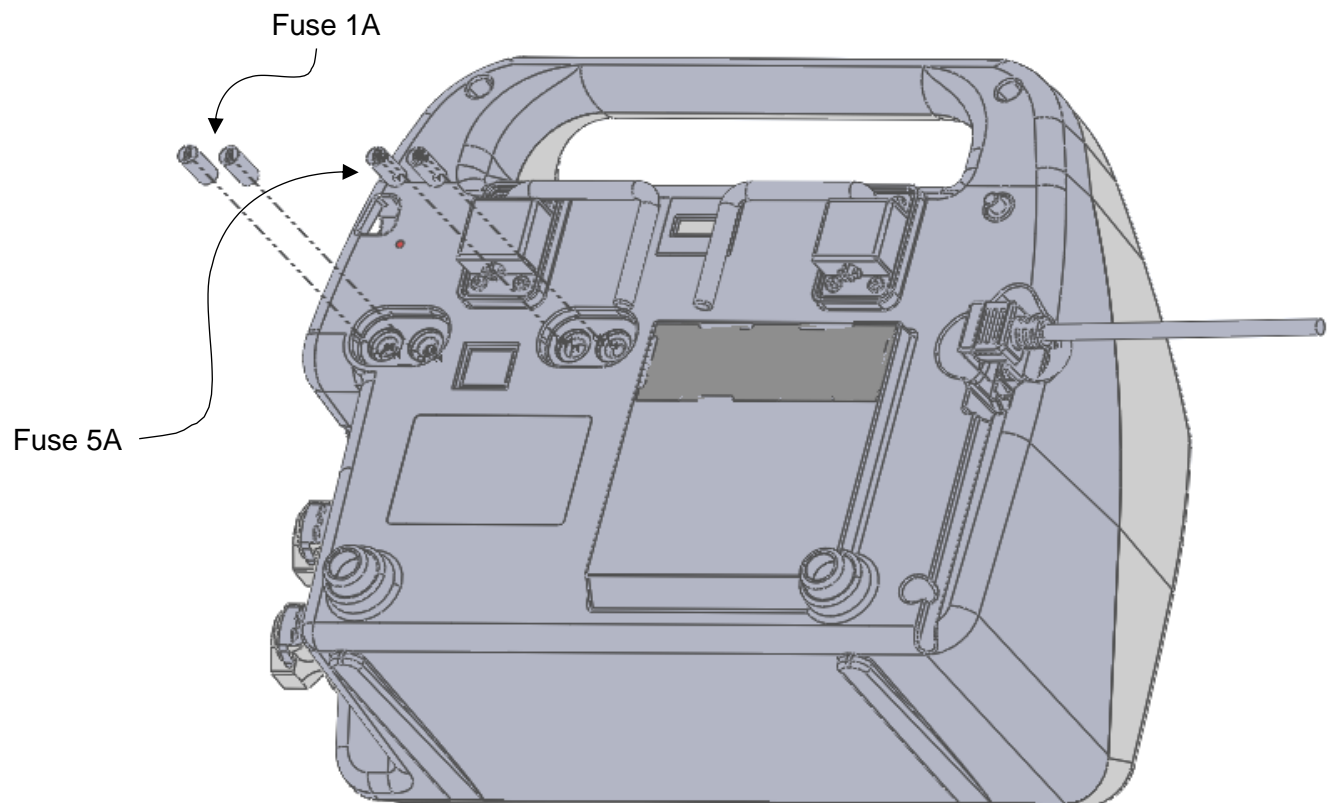
2. To Replace Feet Bumpers

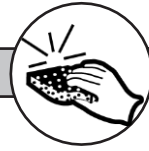
Clean surface thoroughly to remove any excess adhesive that may have been left behind. Then apply the new part by removing the backing material and position as shown. Press firmly to ensure adhesion.



F. Fuse or Fuse Cap Replacement

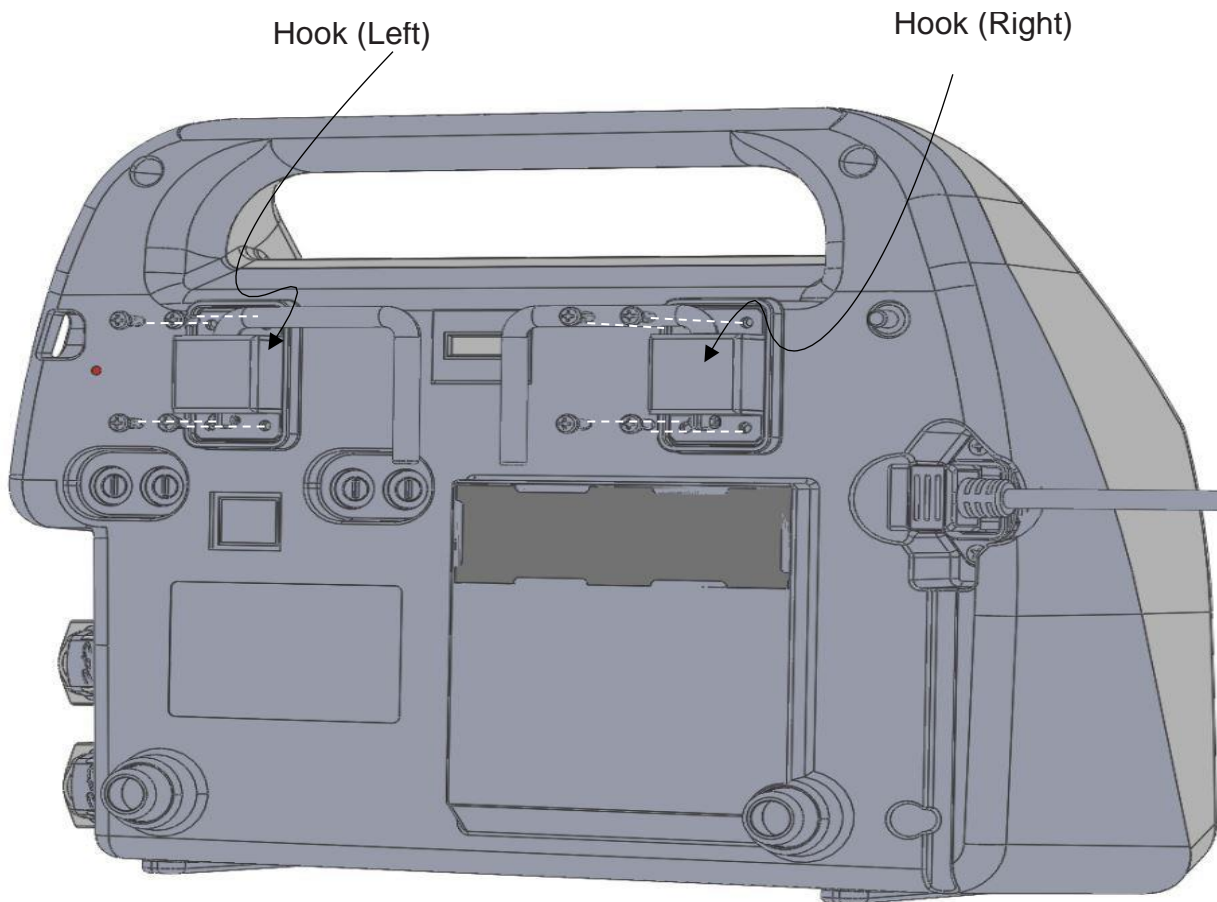
1. Push in and turn counter clockwise one quarter turn then the fuse cap will pop out. You can remove the fuse.
2. To replace, insert fuse to fuse cap, push in and turn one quarter clockwise.
3. Note two different fuse values



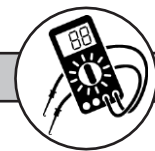


G. Hanging Hook Replacement

1. Remove the 8x screws as shown. (4X screws for each hanger hook).
2. Reverse procedure to install new hanger hook



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Testing - Level 1

A. Introduction

The procedures described in the Testing - Level 1 section of this manual can be done by anyone on staff carefully following the exact instructions.

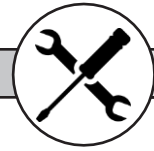
B. Tools Required

1. Manometer.....



C. Test Procedures

| FUNCTIONAL TEST | | | |
|-----------------|---|------|----|
| Step | Directions | Pass | |
| | | Yes | No |
| 1 | Plug AC power, chose 7" or 9", confirm with Power Button, verify orange standby indicator is blink after 2 minutes (valve fix position) the indicator is lit. | | |
| 2 | Press Power Button, Verify green ON indicator is lit and blower spins up (air is flowing out connectors). | | |
| 3 | Verify indicator in patient weight region above 65kg(150lbs) is lit and Static mode indicator is lit. | | |
| 4 | Press patient weight decrease and increase buttons and verify all patient weight indicators function. | | |
| 5 | Press alternating mode button and verify alternating mode indicator is lit. Also press alternating cycle time button and verify 5 · 10 · 15 cycle time indicators function. | | |
| 6 | Press pulsate mode button and verify pulsate mode indicator is lit. | | |
| 7 | Press static mode button and verify static mode indicator is lit. | | |
| 8 | Press upright button and verify upright indicator is lit. Listen and verify blower speed increases slightly. | | |
| 9 | Press Upright button and verify Upright indicator is lit. Verify blower speed increases significantly. | | |
| 10 | Press panel lock button and verify panel lock indicator is lit. Verify front panel buttons are disabled (except power button), hold for 4 seconds to disengage. | | |



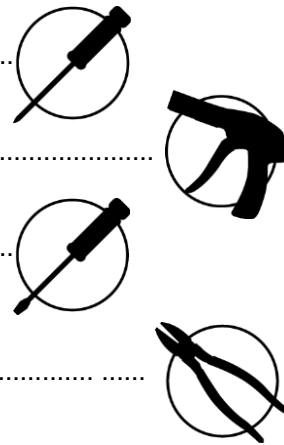
Repair - Level 2

A. Introduction

Factory authorized service personnel are the only people allowed to use the Repair - Level 2 section of this manual. If you are not authorized to do repairs please contact Carilex or your local distributor to receive a return authorization number and the details of where you can send the unit for servicing.

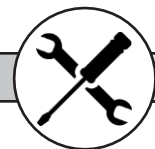
B. Tools Required

1. Phillips head screw driver.....
2. Cable tie gun
3. Flat blade screwdriver.....
4. Pliers.....

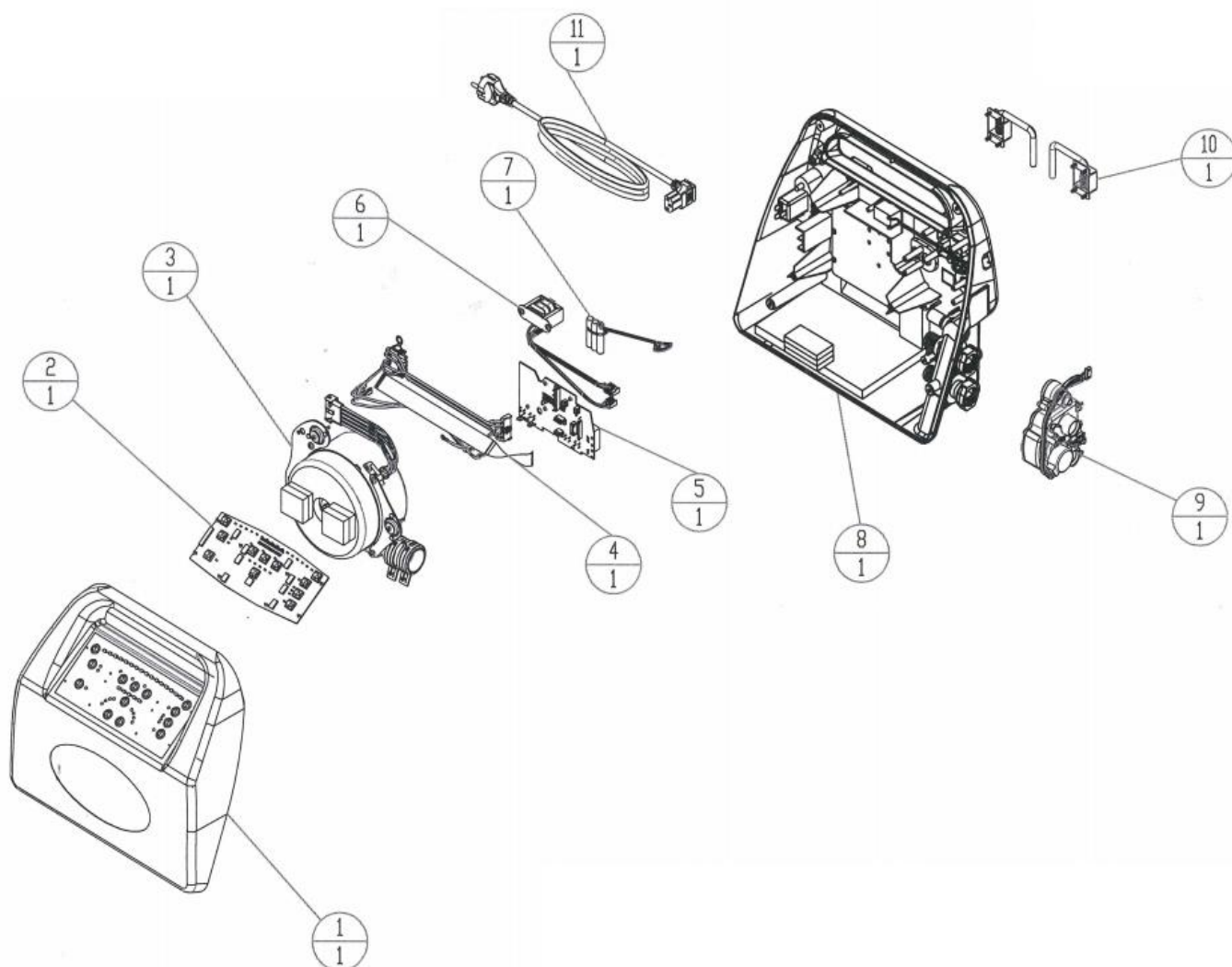


NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

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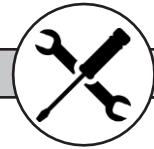


A. Part Identification Overview



| | |
|-----|------------------|
| #7 | Battery Set |
| #8 | P.U. Bottom Case |
| #9 | Air Valve Set |
| #10 | Hook Set |
| #11 | Power Cord EU |

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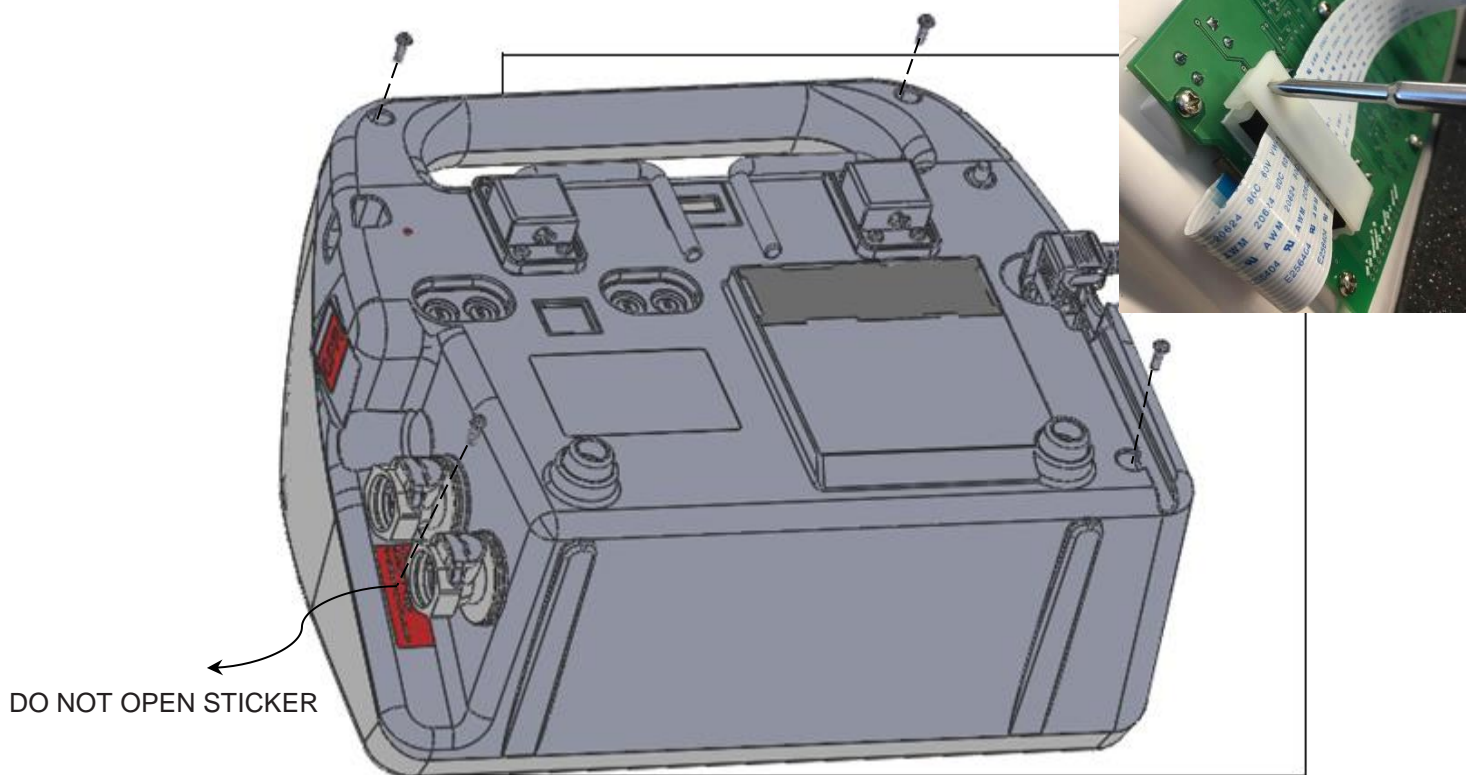
B. Replacing the Top Case

⚠ MAKE SURE UNIT IS UNPLUGGED FROM POWER BEFORE OPENING

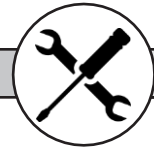
1. Using a Phillips screw driver, remove the 4x screws as shown in the illustration. Note that you have to break through the “Do Not Open” sticker at the location where the access hole is between the hose connectors.
2. Carefully pull the unit apart. Un-clip FPC connector from control PCBA then remove FPC connector carefully.
3. Separate the two halves of the chassis.
4. Follow the steps in “Replacing the control PCBA” to remove the control PCBA.
5. Reverse procedure to close the unit back.
6. Be sure to put a new Do Not Open sticker in place and fill out a Product Service Record Form (found at the end of this manual) and fax/mail to Carilex.

⚠ FPC connector is rather delicate and fragile. Be sure to handle carefully, always insert the connection of FPC connector perpendicular to the PCBA. DO NOT TILT, poor connection will cause unit malfunction.

FPC connector detail

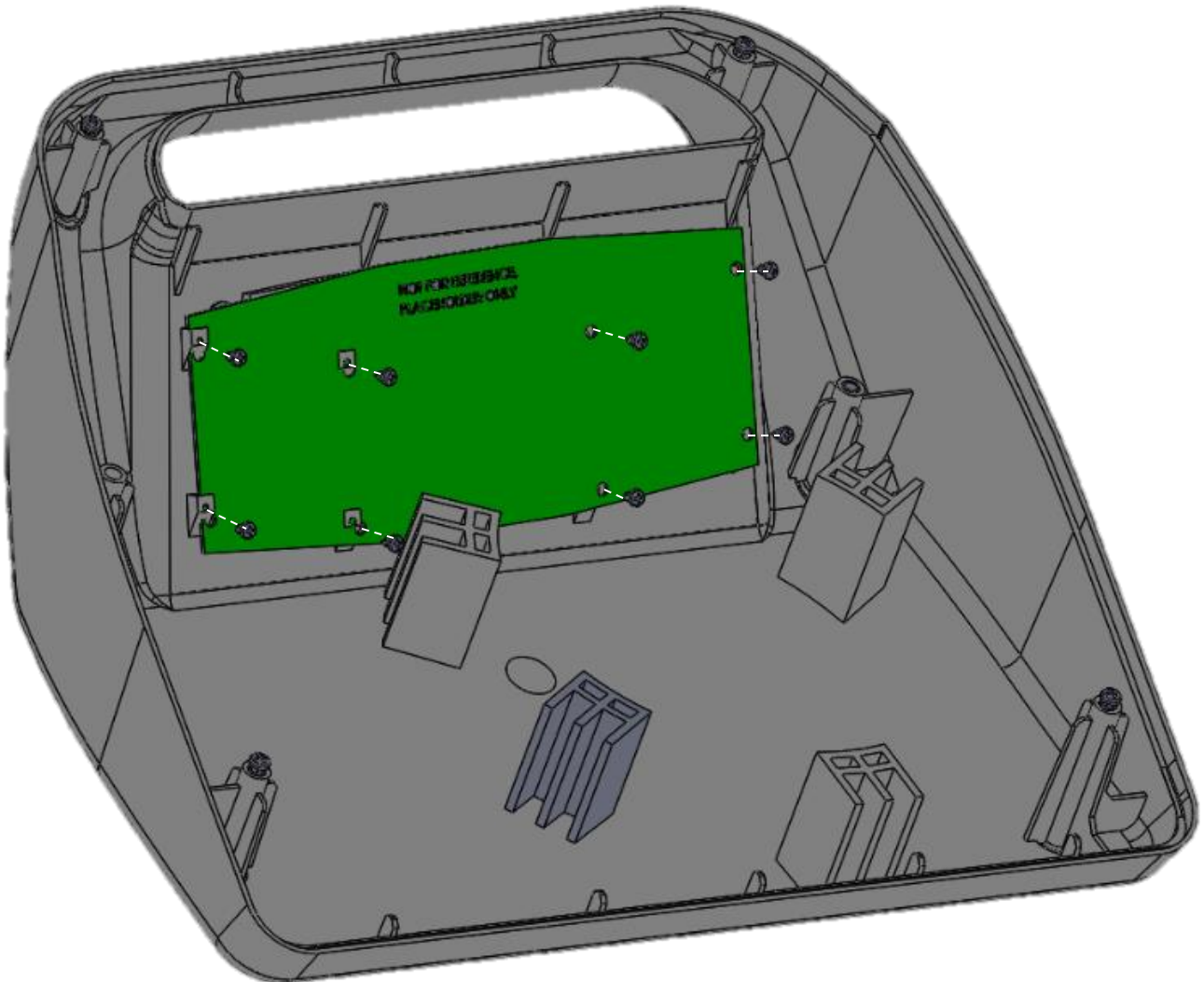


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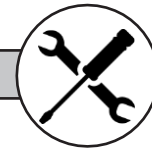


C. Replacing the Control PCBA

1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Take out the 8x screws that hold the control PCBA in place. Remove the PCBA and replace it with a new one. Remember not to apply too much pressure when re-attaching the screws.
3. Follow instructions in step “Replacing the Top Case” for closing the unit and re-connecting the FPC.

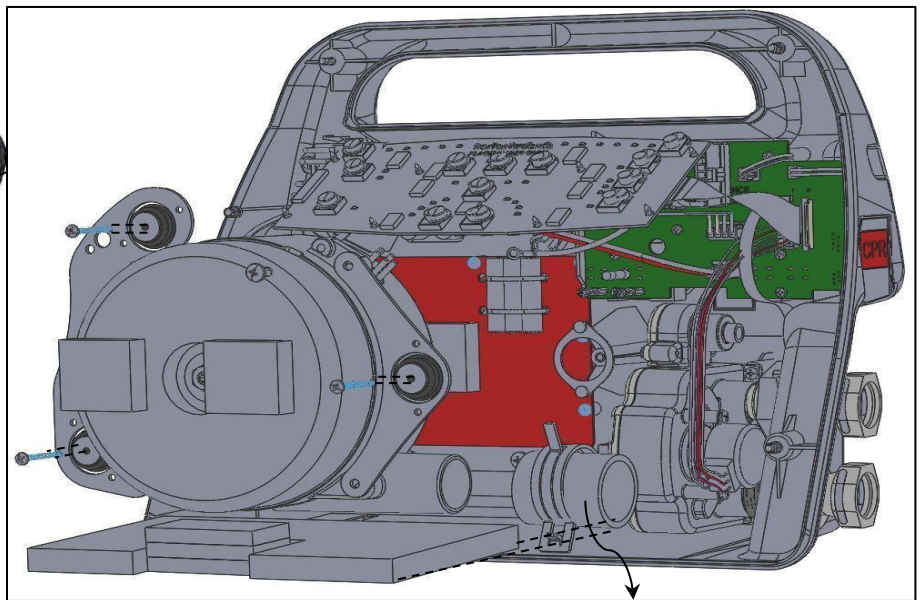
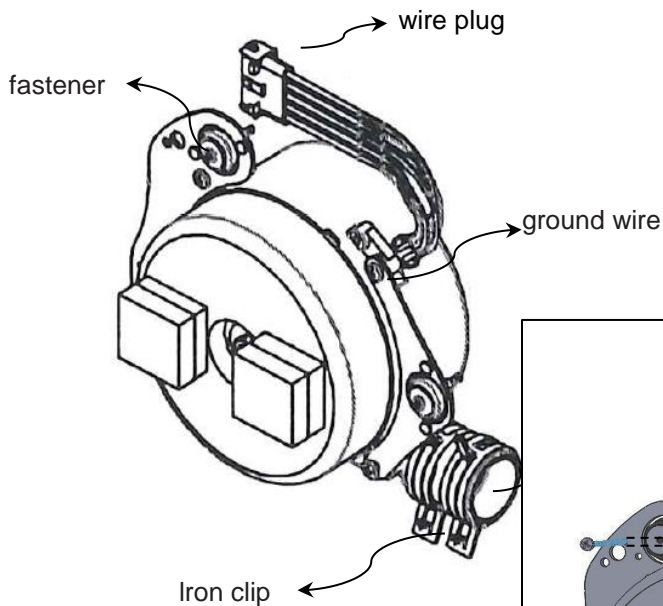


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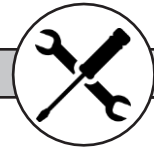
D. Replacing the Blower

1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Cut the cable ties that bind all the wires together.
3. Loosen and remove the wire plug.
4. Unscrew the ground wire from the blower.
5. Unscrew the 3 fasteners (3x screws) that fix the blower to the rear chassis.
6. Losing the Iron Clip (use plier) on the blower outlet then gently pull the blower out from the chassis.
7. Reverse procedure to install new unit.
8. After re-assembly refer to step “Replacing the Top Case” for closing the unit and re-connecting the FPC.



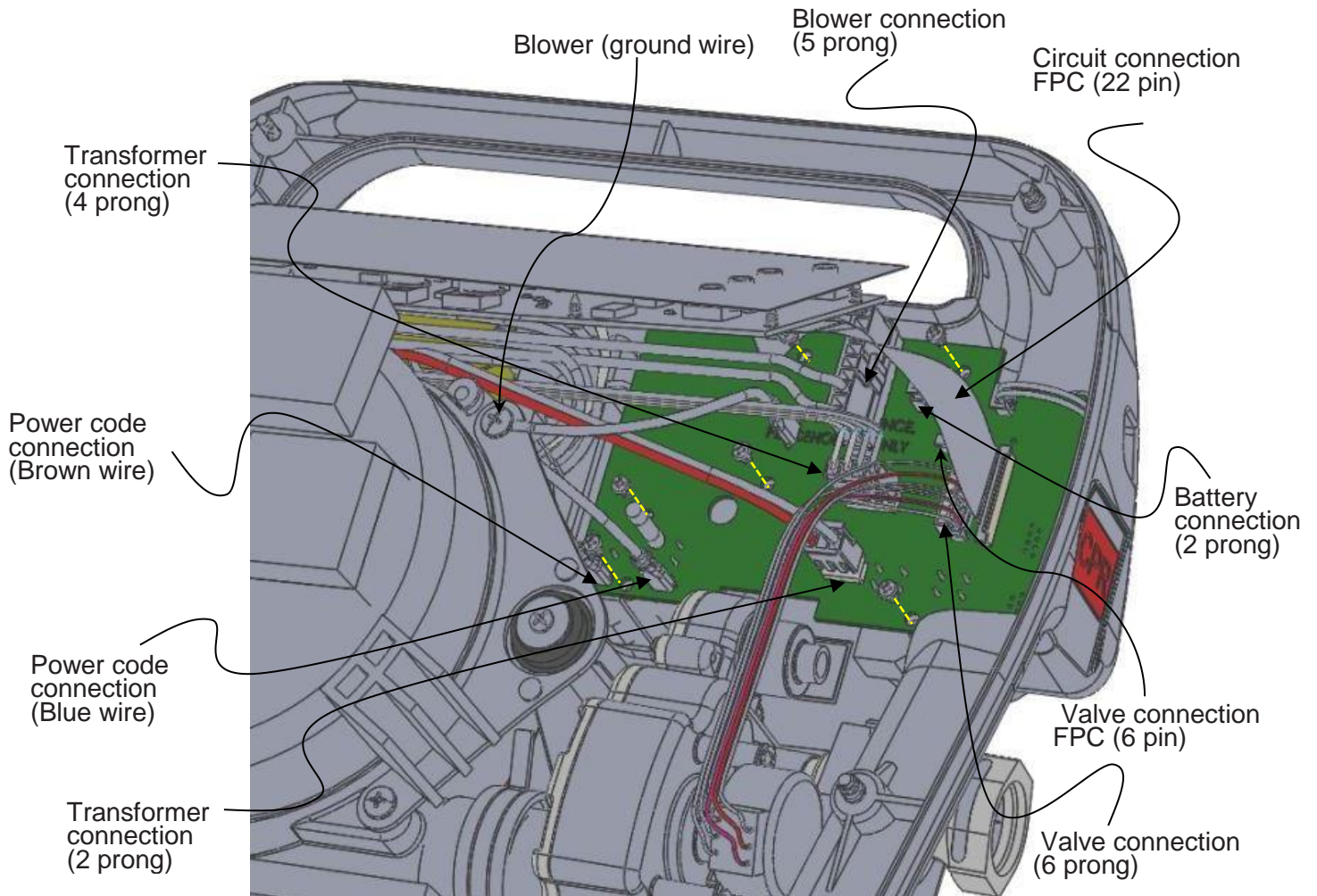
rubber tube

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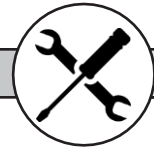


E. Replacing the Power PCBA

1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Remove 10X connectors from the PCBA.
3. Unscrew the 6x screws that hold the board in place.
4. Remove the board and replace it with a new one. Remember not to apply too much pressure when re-attaching the screws.
5. After re-assembly refer to step “Replacing the Top Case” for closing the unit and re-connecting the FPC.

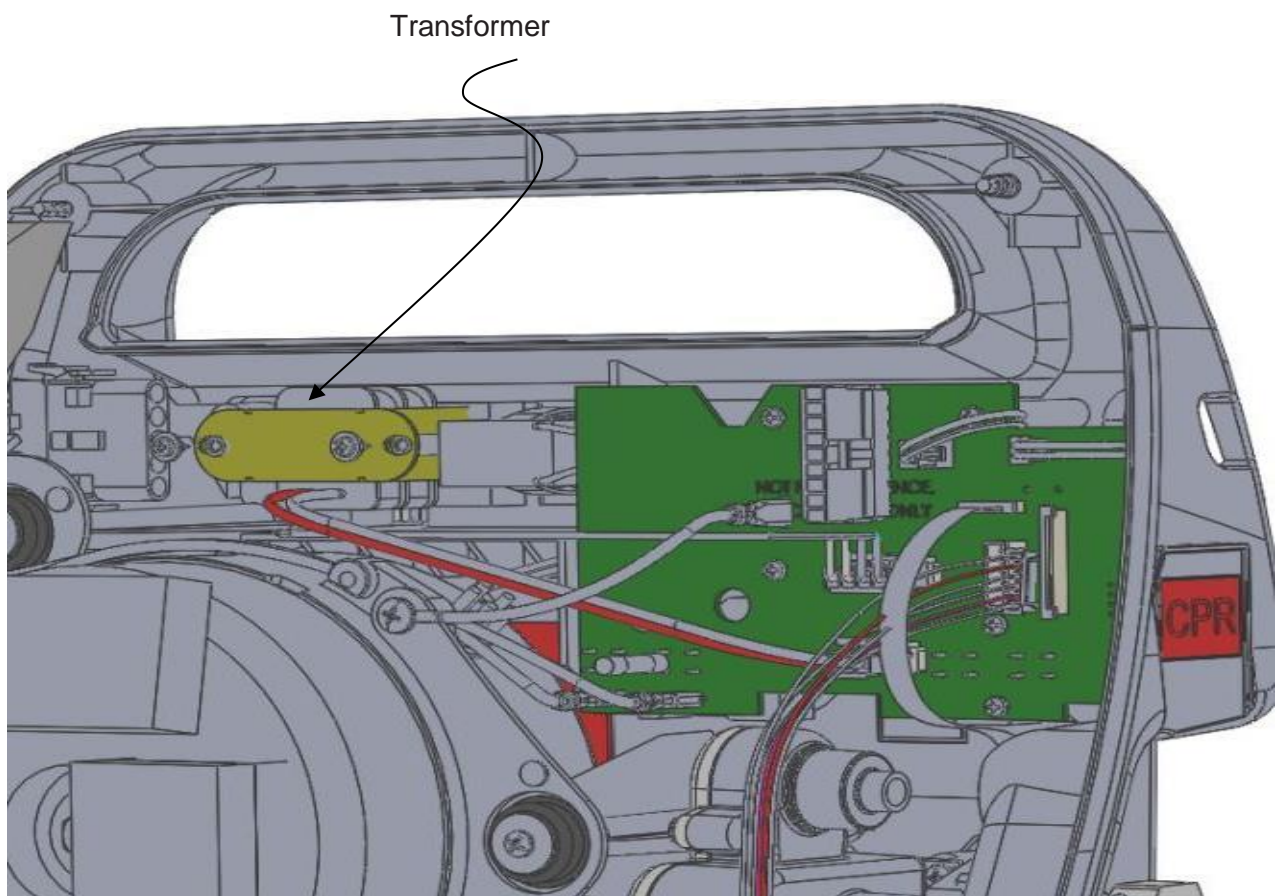


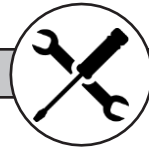
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F. Replacing the Transformer

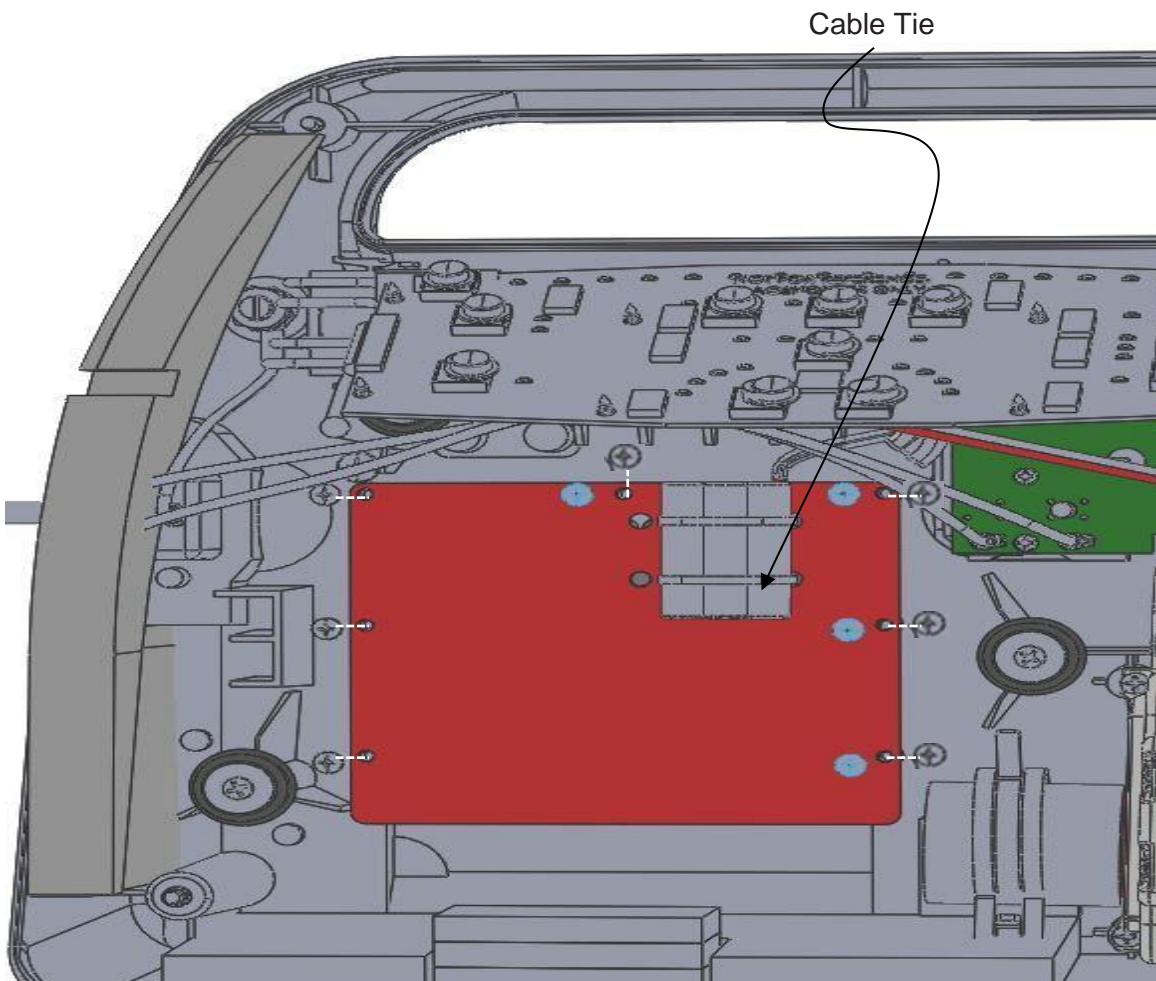
1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Cut the cable ties that bind all the wires together.
3. Loosen and remove the 2X transformer wire connectors from the power PCBA.
4. Remove the 2x screws holding the transformer to the rear chassis.
5. Reverse steps to re-assemble the transformer.
6. After re-assembly refer to step “Replacing the Top Case” for closing the unit and re-connecting the FPC.



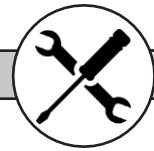


G. Replacing the Battery

1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Follow the steps in “Replacing the blower” to remove the blower.
3. Cut the cable ties that fixed the battery on battery PCB.
4. Disconnect the 2-pin battery wire from the power PCBA and remove the battery pack.
5. Unscrew the 7x screws that hold the battery PCB in place.
6. Reverse step to replace the battery.
7. After replace the battery, refer to step “Replacing the Blower” & “Replacing the Top Case” for closing the unit and re-connecting the FPC.



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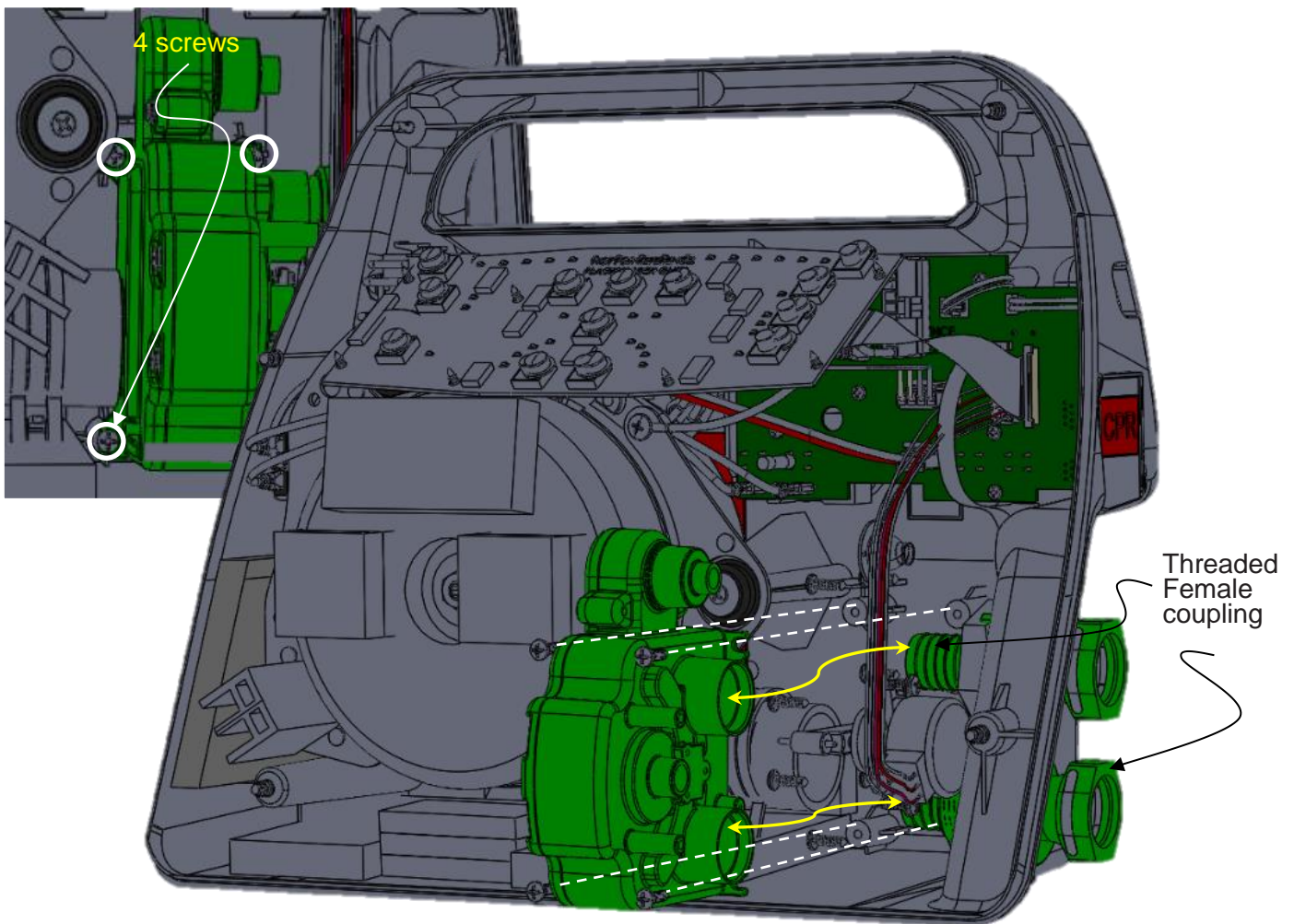


H. Replacing the Valve

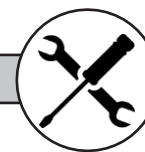
1. Follow the steps in “Replacing the Top Case” to remove the top case.
2. Refer to section F to remove the blower.
3. Remove FPC connector from power PCBA.
4. Remove 6 pin wire connector from power PCBA.
5. Unscrew the 4x screws as illustration.
6. Pull the valve out from the rear chassis.
7. Reverse procedure to install new unit.

⚠ When installing new unit, tilt the valve slightly to ensure the two-valve outlet are tightly fitted to the air coupling on the rear chassis.

8. After-assembly refer to step “Replacing the Blower” & “Replacing the Top Case” for closing the unit and re-connecting the FPC.



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I. Replacing the Bottom Case

1. Follow the steps in “Replacing the Hanging Hooks” to remove the Hanging Hooks from the bottom case.
2. Follow the steps in “Replacing the Top Case” to remove the top case.
3. Follow the steps in “Replacing the Blower” to remove the Blower from the bottom case.
4. Follow the steps in “Replacing the Power PCBA” to remove the Power PCBA from the bottom case.
5. Follow the steps in “Replacing the Valve” to remove the Valve from the bottom case.
6. Follow the steps in “Replacing the Transformer” to remove the Transformer from the bottom case.
7. Follow the steps in “Replacing the Battery Assembly” to remove the Battery Assembly from the bottom case.
8. Using a small, thin, flat-bladed knife, lift the corner of the information sticker on the bottom case and pull it away gently.
9. Reverse the procedure to install the new bottom case, ensuring that the information sticker is replaced securely using super glue if required and that the wire and tube routing is exactly as found.

REF S2202-3115

Model : SR366 Entrix
 Medical Electrical Air Pump for
 Antidecubitus Mattress System
 Medical Device Class IIa
 AC220-240V / 50HZ 0.1A
 Fuse rating : 1A / 250V
 IP21 Non - AP / APG
 Electrical classification: Class II, BF Type



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SN2G051422

2016-09-09

Made in Taiwan V.A



Testing

A. Function Test

| FUNCTIONAL TEST | | | |
|-----------------|---|------|----|
| Step | Directions | Pass | |
| | | Yes | No |
| 1 | Plug AC power, chose 7" or 9", confirm with Power Button, verify orange standby indicator is blink after 2 minutes (valve fix position) the indicator is lit. | | |
| 2 | Press Power Button, Verify green ON indicator is lit and blower spins up (air is flowing out connectors). | | |
| 3 | Verify indicator in patient weight region above 65kg(150lbs) is lit and Static mode indicator is lit. | | |
| 4 | Press patient weight decrease and increase buttons and verify all patient weight indicators function. | | |
| 5 | Press alternating mode button and verify alternating mode indicator is lit. Also press alternating cycle time button and verify 5 、 10 、 15 cycle time indicators function. | | |
| 6 | Press pulsate mode button and verify pulsate mode indicator is lit. | | |
| 7 | Press static mode button and verify static mode indicator is lit. | | |
| 8 | Press upright button and verify upright indicator is lit. Listen and verify blower speed increases slightly. | | |
| 9 | Press Upright button and verify Upright indicator is lit. Verify blower speed increases significantly. | | |
| 10 | Press panel lock button and verify panel lock indicator is lit. Verify front panel buttons are disabled (except power button), hold for 4 seconds to disengage. | | |
| 11 | Power off, switch the rocker switch to switch the power unit off | | |

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Trouble Shooting

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 Inc regarding repairs.

ONLY FACTORY APPROVED PERSONNEL ARE AUTHORIZED TO USE THE REPAIR SECTION OF THIS MANUAL



B. Power Unit

| No Lights on Power Unit | No Airflow from Power Unit | Excessive Noise from Power Unit | Excessive Vibration from Power Unit | Airflow from Power Unit Stops Intermittently | Troubleshooting |
|-------------------------|----------------------------|---------------------------------|-------------------------------------|--|---|
| ★ | ★ | | | | <ul style="list-style-type: none"> • Check that the wall socket is working • Check that the power cable is plugged into the wall socket and the power unit • Check the fuses in the power cable and in the power unit • Level 2: Check that all internal wires are connected and not broken |
| ★ | | | | | <ul style="list-style-type: none"> • Level 2: Check that all internal wires are connected and not broken • Level 2: Change the control PCBA for a new one and check its function using B: Function Test in Testing – Level 1 |
| | ★ | | | | <ul style="list-style-type: none"> • Level 2: Check that all internal wires are connected and not broken • Check that all internal tubes are connected and not punctured |
| | | ★ | ★ | | <ul style="list-style-type: none"> • Level 2: Check that the blower is correctly mounted in the bottom case • Level 2: Check that the valve set is mounted correctly in the bottom case |
| | | ★ | | | |
| | | | ★ | | |
| | | | | ★ | <ul style="list-style-type: none"> • Verify that the correct mattress is being used • Verify that the air filter is clean |

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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 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# _____ 是否建議開立 Customer Complain <input type="checkbox"/> No(Consumables/ User error/ others _____). <input type="checkbox"/> 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) | | | |