# SERVICE MANUAL

## The Vest® Airway Clearance System, Models 104, 105, and 205

From Hill-Rom

205

105

104

**Product No. P104, P105, and P205**

150754 REV 2

Second Edition

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**NOTE:**
The rear cover is a comprehensive list of Technical Support data for Hill-Rom. The item discussed in this manual is not available in all of the countries listed on the rear cover.

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**NOTES:**

# Table of Contents

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# Chapter 1 Introduction

## Purpose

This manual gives the correct operation and maintenance procedures for The Vest® Airway Clearance System, Models 104, 105, and 205. It also gives a parts lists (in chapter 5) to order replacement components.

## Audience

This manual is intended for use by only facility-approved persons. Failure to obey this restriction can cause injury to people and damage to the equipment.

## Reference Documents

For more data (such as operation instructions, features, and product symbols), refer to *The Vest® Airway Clearance System, Model 104 User Manual* (USR128) **or** *The Vest® Airway Clearance System, Model 105 User Manual* (145330) **or** *The Vest® Airway Clearance System, Model 205 User Manual* (140643).

## Document Symbols

This manual contains different typefaces and symbols to make the content easier to read and understand:

- Standard text—used for regular data.
- **Boldface text**—emphasizes a word or phrase.
- **NOTE:**—sets apart special data or important instruction clarification.
- WARNING, RELATIVE CONTRAINDICATION, or CAUTION

  - A WARNING identifies situations or procedures that can have an effect on patient or user safety. To ignore a warning could cause patient or user injury.
  - A RELATIVE CONTRAINDICATION identifies situations or procedures that can have an effect on patient safety.
  - A CAUTION identifies special procedures or precautions that persons must obey to prevent equipment damage.
- CAUGHT HAZARD WARNING

- CHEMICAL HAZARD WARNING


- ELECTRICAL SHOCK HAZARD WARNING

# Specifications

## Physical Description

**Table 1-1. Physical Specifications**

| Feature | Dimension |
|---|---|
| Air Pulse Generator weight | 17 lb (8 kg) |
| Air Pulse Generator height | 9.5" (24.1 cm) |
| Air Pulse Generator width | 13" (33 cm) |
| Air Pulse Generator depth | 9.5" (24.1 cm) |
| Stand weight | 65 lb (29 kg) |
| Stand height—lowest position | 29" (74 cm) |
| Stand height—highest position | 39" (99 cm) |
| Inflatable vest material—Chest Vest | Polyvinyl chloride (PVC)-coated polyester with polyurethane-coated nylon |
| Inflatable vest material—Full Vest | Polyurethane-coated nylon |
| Inflatable vest material—Wrap Vest | Polyester with PVC, polyurethane, or PVC/polyurethane blend coating |
| Electrical specification | 100 V AC to 230 V AC, 50 Hz to 60 Hz<br>3.4 A @ 100 V AC<br>2.0 A @ 230 V AC |
| Fuse specification | 2 each 4 A, 5 x 20 mm (Littelfuse®[a] part number F4AL250V) |

a. Littelfuse® is a registered trademark of Littelfuse, Inc.

**Table 1-2. Environmental Conditions for Transport and Storage**

| Condition | Range |
|---|---|
| Temperature | -40°F to 158°F (-40°C to 70°C) |
| Relative humidity | 95% non-condensing |
| Atmospheric pressure | 500 hPa to 1060 hPa |

**Table 1-3. Environmental Conditions for Use**

| Condition | Range |
|---|---|
| Temperature | 50°F to 93°F (10°C to 34°C) ambient temperature |
| Relative humidity range | 30% to 75% non-condensing |
| Atmospheric pressure | 700 hPa to 1060 hPa |

**Table 1-4. Classification and Standards**

| Standard | Classification |
|---|---|
| Technical and Quality Assurance | UL/EN/IEC 60601-1<br>CAN/CSA C22.2 No. 601.1<br>ISO 13485 |
| Equipment Classification | Class II |
| Degree of Protection Against Electric Shock | BF with type F applied part |
| Classification According to Directive 93/42/EEC | IIa |
| Degree of Protection Against Ingress of Water | IPX 0 |
| Degree of Protection Against the Presence of Flammable Anaesthetic Mixtures | Not for use with flammable anaesthetics. |

The Vest® Airway Clearance System, Model 104 and 105 is a continuous operation device classified with Underwriters Laboratories Inc.®[1] (UL) in the United States and licensed with Health Canada.

1. Underwriters Laboratories Inc.® is a registered trademark of Underwriters Laboratories Inc.

## Model Identification

See table 1-5 on page 1-5 for The Vest® Airway Clearance System, Models 104, 105, and 205 Model Identification.

**Table 1-5. Model Identification**

| Model Number | Description |
|---|---|
| P104 | The Vest® Airway Clearance System, Model 104 |
| P105 | The Vest® Airway Clearance System, Model 105 |
| P205 | The Vest® Airway Clearance System, Model 205 |

## Safety Tips

**WARNING:**
Only facility-approved maintenance persons can troubleshoot The Vest® Airway Clearance System. Injury or equipment damage could occur.

**WARNING:**
Follow the item's manufacturer's instructions. Failure to do so could cause injury or equipment damage.

**WARNING:**
Only facility-approved maintenance persons can do preventive maintenance on The Vest® Airway Clearance System. Injury or equipment damage could occur.

**WARNING:**
If The Vest® Airway Clearance System fails part of the preventive maintenance functional checks, repair The Vest® Airway Clearance System before it is used on a patient. Failure to do so could cause injury or equipment damage.

**SHOCK HAZARD:**
Disconnect the unit from its power source. Failure to do so could cause injury and equipment damage.

**SHOCK HAZARD:**
Keep the unit in a dry environment and do not permit moisture or liquid to pool on the unit. Injury or equipment damage could occur.

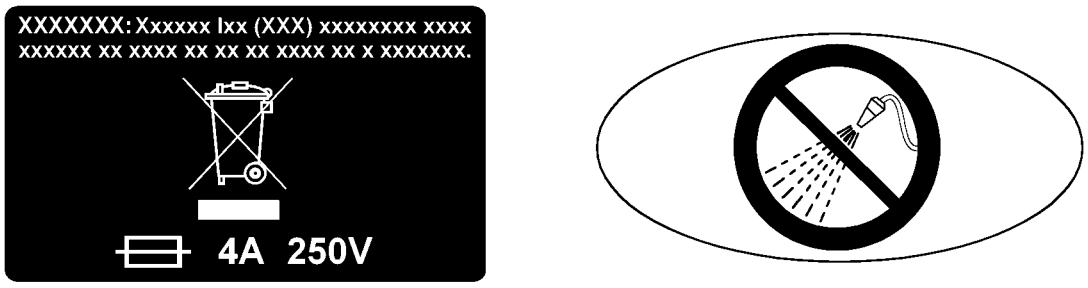
**CAUTION:**
Do not use harsh cleaners, solvents, or detergents. Equipment damage could occur.

**CAUTION:**
Always wear a properly grounded antistatic strap when you touch printed circuit boards. Failure to do so could cause damage to the equipment.

**CAUTION:**
Do not put the screwdriver in the center hole between the top two screws (see the ”Do Not Use Screwdriver” detail in figure 4-1 on page 4-3). Equipment damage could occur.

# Warning and Caution Labels

**Figure 1-1. Warning and Caution Labels**




Models 105 and 205

150754_1_010


Model 104

# Chapter 2
# Troubleshooting Procedures

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## Getting Started

**WARNING:**
Only facility-approved maintenance persons can troubleshoot The Vest® Airway Clearance System. Injury or equipment damage could occur.

Start each procedure in this chapter with step 1. Follow the sequence outlined (each step assumes the last step has been completed). In each step, the correct operation of the item can be confirmed with a **Yes** or **No** answer to the statement. Your response will go to a different step in the procedure, a repair analysis procedure (RAP), or a component replacement. If more than one component is listed, replace them in the given order.

Start with **Initial Actions** to gather data about the problem.

Do the **Function Checks** to isolate or identify a problem and to validate the repair after you complete each corrective procedure (replace or adjust a part, seat a connector, etc.).

Do the **Final Actions** after the Function Checks to validate the repair.

If troubleshooting procedures do not isolate the problem, phone Hill-Rom Technical Support at 800-445-3720.

## Initial Actions

Use Initial Actions to gather data from operators about problems with The Vest® Airway Clearance System. Annotate symptoms or other data about the problem the operator describes. This data helps identify the probable cause.

1. Someone who can show you the problem is available.

   **Yes** **No**
   ↓ → Go to “Function Checks” on page 2-2.

2. Tell that person to demonstrate or show you the problem. The problem can be duplicated.

   **Yes** **No**
   ↓ → Go to “Function Checks” on page 2-2.

3. The problem is caused by incorrect operator procedure.

   **Yes** **No**
   ↓ → Go to “Function Checks” on page 2-2.

4. Do the “Function Checks” on page 2-2. to make sure The Vest® Airway Clearance System operates properly.

## Function Checks

1. Initial Actions have been done.

   **Yes** **No**
   ↓ → Go to “Initial Actions” on page 2-1.

2. Connect The Vest® Airway Clearance System to AC power. The Vest® Airway Clearance System works properly.

   **Yes** **No**
   ↓ → Go to table 2-1 on page 2-3 or “Output Pressure Adapter Test Specifications” on page 2-7.

3. Output pressure test has been done.

   **Yes** **No**
   ↓ → Go to “Output Pressure Adapter Test Specifications” on page 2-7.

4. Go to table 2-1 on page 2-3 or “Output Pressure Adapter Test Specifications” on page 2-7.. Go to “Final Actions” on page 2-2.

## Final Actions

1. Do the required preventive maintenance procedures. See “Preventive Maintenance” on page 6-3.

2. Do all required administration tasks.

# Rapid Problem/Solution Identification Tables



If an error code shows in the top left corner of the LCD (see figure 2-1 on page 2-3), use the subsequent table to identify the applicable troubleshooting procedure (see table 2-1 on page 2-3).

**Figure 2-1. Error Code Location—Model 105 and 205**

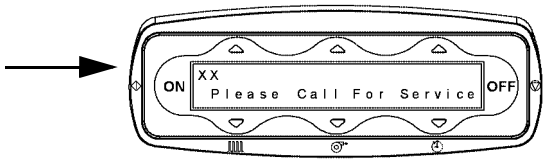



**Table 2-1. LCD Error Codes—Model 105 and 205**

| Error on LCD | Description | Solution |
|---|---|---|
| 1 | The blower response not correct | Examine the cable connector. Examine the mount alignment. Replace the blower with known good part. Replace the blower if the problem does not continue. Replace the power supply P.C. board if the problem does continue. |
| 2 | The generator response not correct | Examine the cable connector. Examine the mount alignment. Replace the generator with a known good part. Replace the generator if the problem does not continue. Replace the power supply P.C. board if the problem does continue. |
| 3 | The blower and the generator response not correct | Examine the ribbon cable. Replace the power supply P.C. board with a known good part. Replace the ribbon cable if the problem does continue. Replace the power supply P.C. board if the problem does not continue. |

| Error on LCD | Description | Solution |
|---|---|---|
| 4 | Communication error | Disconnect the UIF port cable. Replace the UIF port cable with a known good cable. Replace the UIF P.C. board if the problem does not continue. Replace the power supply P.C. board if the problem does continue. |
| 5, 6, or 7 | Communication error | Examine the keypad to the power supply cable. Replace the keypad if the problem continues. |
| 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 25, 36, or 37 | self-test failure | Replace the UIF P.C. board. |
| 22, 23, or 24 | Part incompatibility | Validate the part numbers. Replace the power supply P.C board if the problem continues. |
| 26, 27, 28, 29, 30, or 31 | Communication error | Disconnect the UIF port cable. Replace the UIF port cable with a known good cable. Replace the UIF P.C. board if the problem does not continue. Replace the power supply P.C. board if the problem does continue. |
| 32 | The pulse generator current limit reached | Replace the generator. |
| 33 or 35 | Uncontrolled diaphragm | Send the unit to Hill-Rom. |
| 34 | The blower current limit reached | Replace the blower. |
| 71, 72, 73, 74, 76, 77, 86, 87, 88, or 89 | self-test failure | Replace the UIF P.C. board. |
| 75 | self-test failure | Make sure the remote bulb bleed hole is not blocked. Replace the keypad with a known good part. Replace the keypad if the problem does not continue. Replace the UIF P.C. board if the problem does continue. |

| Error on LCD | Description | Solution |
|---|---|---|
| 78, 79, 80, 81, 82, 83, 84, or 85 | self-test failure | Replace the power supply P.C. board. |
| 90 | self-test failure | Disconnect the UIF port cable. Replace the UIF port cable with a known good cable. Replace the UIF P.C. board if problem does not continue. Replace the UIF port cable if the problem does continue. |



**Table 2-2. LCD Error Codes—Model 104**

| Error on LCD | Description | Solution |
|---|---|---|
| 1 | The blower response not correct | Examine the cable connector. Examine the mount alignment. Replace the blower with known good part. Replace the blower if the problem does not continue. Replace the power supply P.C. board if the problem does continue. |
| 2 | The generator response not correct | Examine the cable connector. Examine the mount alignment. Replace the generator with a known good part. Replace the generator if the problem does not continue. Replace the power supply P.C. board if the problem does continue. |

| Error on LCD | Description | Solution |
|---|---|---|
| 3 | The blower and the generator response not correct | Examine the ribbon cable. Replace the power supply P.C. board with a known good part. Replace the ribbon cable if the problem does continue. Replace the power supply P.C. board if the problem does not continue. |
| 4 | Communication error | Disconnect the UIF port cable. Replace the UIF port cable with a known good cable. Replace the UIF P.C. board if the problem does not continue. Replace the power supply P.C. board if the problem does continue. |

**Table 2-3. Other Malfunctions**

| Error | Solution |
|---|---|
| The unit does not power on. | Go to “Unit Does Not Power On” on page 2-11. |

# Output Pressure Adapter Test Specifications



## Idle Mode—Setup

1. Connect a power cord to the air control unit's AC power input receptacle and to an applicable 120 V AC line receptacle.
2. Make sure the control unit energizes.
3. Make sure all of the pixels are displayed correctly on the screen (see figure 2-2 on page 2-7).

**Figure 2-2. Idle Mode—Setup Screen**


**NOTE:**
The initial screen will continue for approximately 25 seconds.

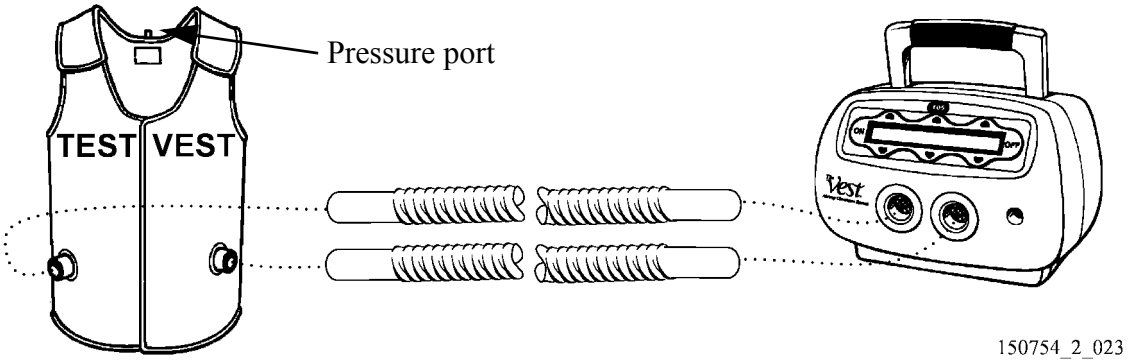
4. Make sure the unit passes the self-test and that no error codes are displayed.

## Test Vest (155877) Setup

1. Set up the Test Vest (see figure 2-3 on page 2-8) as follows:
   a. Connect the air hoses to the air generator outlets.
   b. Connect the air hoses to the test vest.
   c. Set up the facility's pressure measurement equipment and connect the pressure transducer of the Test System to the pressure port on the test vest.

**NOTE:**
Test System requirements: Response > 200 Hz and reads the minimum and maximum Hz values.

**Figure 2-3. Test Vest Setup**




## Ready Mode—Setup

1. Attach the test vest and the vest hoses to the air control unit's air output ports.

2. Put the Remote Control to the air control unit's control port on the case front.

3. Push the air controls unit's arrow button (above the word **NORMAL**). This is the primary screen (see figure 2-4 on page 2-8).

**Figure 2-4. Ready Mode—Setup (Primary Screen)**


## Ready Mode—Test

1. Push the air control unit's **ON** button (see figure 2-5 on page 2-8).

**Figure 2-5. Ready Mode—Test**

2. Make sure that after approximately 4 seconds (or until the vest fully inflates) the test vest pressurizes to a standby pressure level. Monitor the maximum pressure value for pressure—pressure that does not pulsate. The value must not be larger than 0.20 Psi (1.38 kPa).



## Run Mode—Test

1. Push the unit's **ON** button.

2. If the unit was correctly powered OFF at the last session, the unit will show **12 HZ 4 10 MIN** on the top line and **"Press ON to Inflate"** on the bottom line. This is the unit' **NORMAL** screen (see figure 2-6 on page 2-9).

**Figure 2-6. Run Mode—Test**


3. Adjust the Hz button (above the XX Hz) to make sure the air control unit is set to: **5 Hz 4 10 MIN**.

4. Push the unit's **ON** button to start pulsations.

5. Make sure the pulsations start.

6. Make sure the displays reads: **5 Hz (± 1 Hz) 4 10 MIN**.

7. Write the value on the Travel Document.

8. Set the unit to: **15 Hz 10 20 MIN**.

9. Make sure you have a peak pressure of >= 0.45 Psi (3.10 kPa) and <= 0.65 Psi (4.81 kPa).

10. Momentarily push the Remote Control and make sure the pulsations stop.

11. Press the Remote Control again.

12. Make sure the pulsation frequency decreases.

13. Release the Remote Control and make sure the pulsations stop.

14. Push the Remote Control and make sure the pulsations start.

15. Set the unit to: **20 Hz 10 1 MIN**.

16. Push the Remote Control and start a stopwatch at the same time.

17. Make sure the pressure test equipment reads: **20 Hz ± 4 Hz**.

18. Permit the unit to operate until the 1 minute set time elapses.

19. Make sure the vest pulsations stop after 1 minute and the unit reads "**Session Complete - Press ON for Main Menu**".

20. Set the unit to: **15 Hz 1 1 MIN**.

21. Make sure you have a peak pressure of >= 0.26 Psi (1.79 kPa) maximum.

22. Set the unit to: **20 Hz 4 10 MIN**.

23. Make sure the pressure equipment values are put into the device before it is turned off.

24. Push the unit's **OFF** button two times and make sure that the unit displays **"Incomplete XX Min Remain. Press ON for Main Menu"**.

25. Push the unit's **ON** button and make sure the primary screen is displayed.

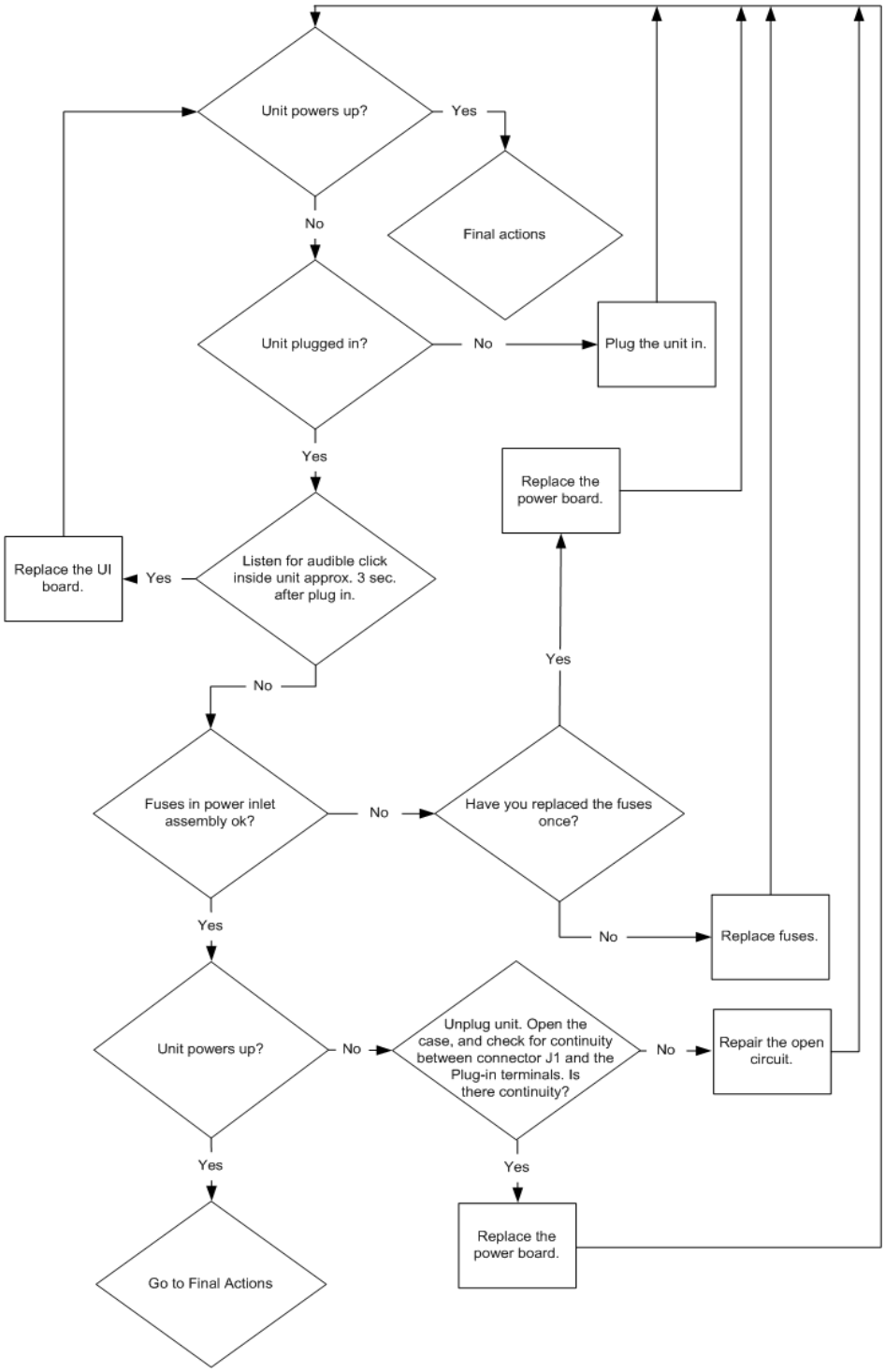
**NOTE:**
Let your local Hill-Rom representative (identified on the rear cover of this manual) know if you have a unit that does not meet the specified pressure measurements.

# Unit Does Not Power On



If The Vest® Airway Clearance System does not power on, refer to the Power On Flow Diagram (see figure 2-7 on page 2-11).

**Figure 2-7. Power On Flow Diagram**



**NOTES:**

# Chapter 3
# Theory of Operation

## Introduction

There is no Theory of Operation for The Vest® Airway Clearance System, Models 104, 105, and 205.

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**NOTES:**

# Chapter 4
# Removal, Replacement, and Adjustment Procedures

## Tool and Supply Requirements

The tools required to service The Vest® Airway Clearance System, Models 104, 105, and 205 are as follows:

- Screwdriver
- T15 Torx®[1] head screwdriver, long shank
- T20 Torx® head screwdriver
- T10 Torx® head screwdriver
- Wire cutters
- Rubber hammer
- #1 phillips head screwdriver
- 1/8" hex wrench
- Antistatic strap

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1. Torx® is a registered trademark of Acument Intellectual Properties, LLC.

# 4.1 Case

Tools required: T15 Torx®[1] head screwdriver, long shank

## Removal

**SHOCK HAZARD:**
Disconnect the unit from its power source. Failure to do so could cause injury and equipment damage.

**CAUTION:**
Always wear a properly grounded antistatic strap when you touch printed circuit boards. Failure to do so could cause damage to the equipment.

1. Put on a properly grounded antistatic strap.
2. Disconnect the unit.

**CAUTION:**
Do not put the screwdriver in the center hole between the top two screws (see the “Do Not Use Screwdriver” detail in figure 4-1 on page 4-3). Equipment damage could occur.

3. Remove the nine screws (A) that attach the rear half (B) to the front half (C) (see figure 4-1 on page 4-3).
4. Divide the front half (C) from the rear half (B) sufficiently to disconnect the cables (D) and (E).
5. Disconnect the UIF port cable (D).
6. Disconnect the UIF ribbon cable (E).
7. Remove the front half (C) from the rear half (B).
8. Put the front half (C) face down.

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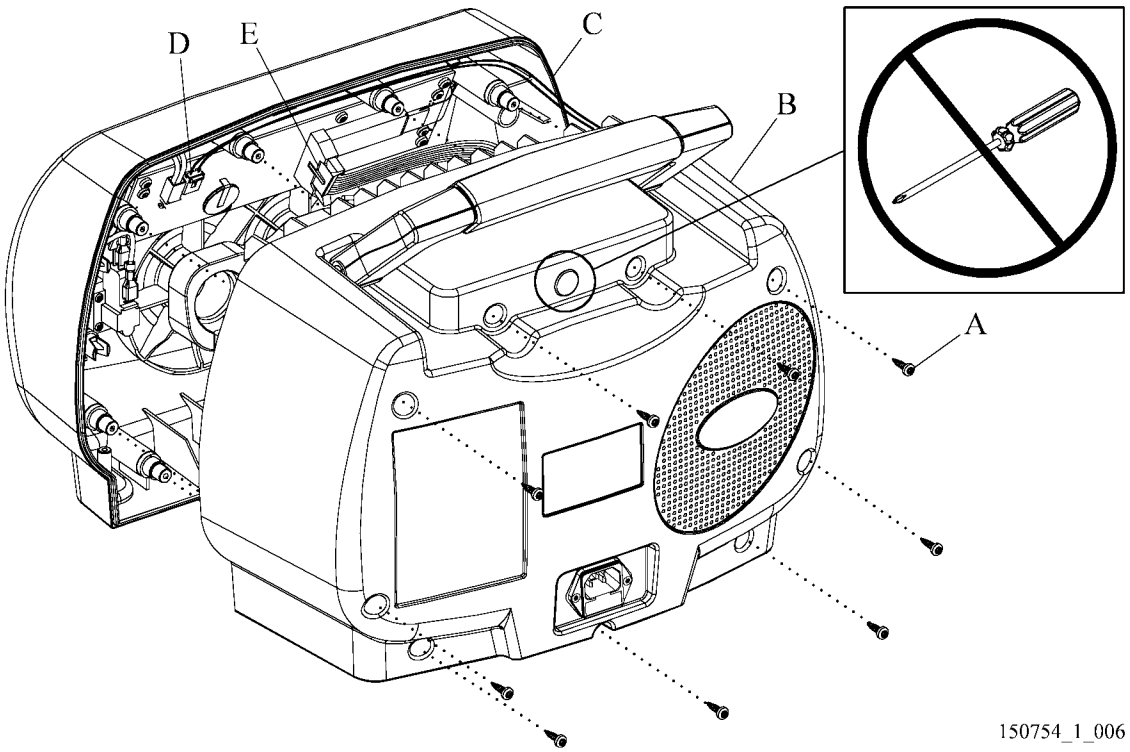
**Figure 4-1. Case**






## Replacement

1. Make sure the rubber grommet (F) is on the stud adjacent to the position where the blower (H) is mounted (see figure 4-3 on page 4-6).
2. Do the removal procedure in opposite order.
3. Do the “Function Checks” on page 2-2

## 4.2 UIF P.C. Board and Keypad

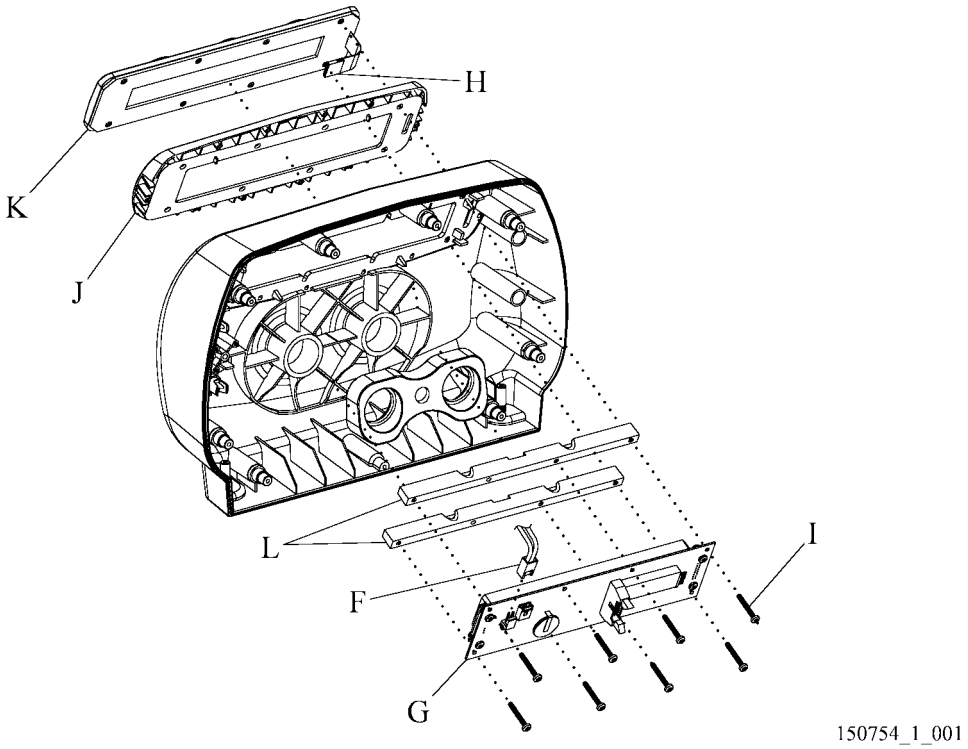
Tools required: T15 Torx®[1] head screwdriver, long shank

### Removal

1. Do the “Removal” procedure for the Case (see “Removal” on page 4-2).

2. Disconnect the pressure switch cable (F) from the UIF P.C. board (G) (see figure 4-2 on page 4-4).

**Figure 4-2. UIF P.C. Board and Keypad**




3. Disconnect the keypad cable (H) from the UIF P.C. board (G).

4. Remove the eight screws (I) that attach the bezel (J), keypad (K), and stand-off brackets (L) to the UIF P.C. board (G).

5. Remove the keypad (K).

6. Remove the UIF P.C. board (G).

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## Replacement

1. Remove the cover film on the UIF P.C. board (G) (see figure 4-2 on page 4-4), if a new one is installed.

2. Do the removal procedure in opposite order.

3. Do the ”Replacement” procedure for the Case (see “Replacement” on page 4-3).

4. Do the “Function Checks” on page 2-2.

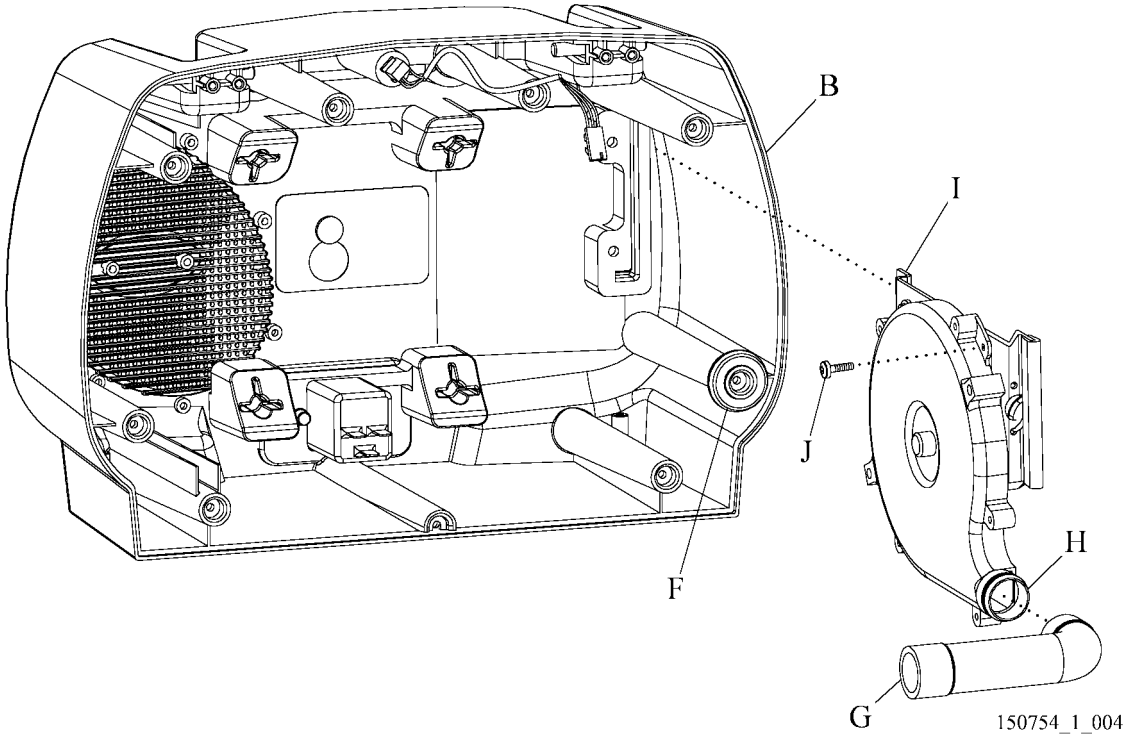
## 4.3 Blower

Tools required: T15 Torx®[1] head screwdriver, long shank
T20 Torx® head screwdriver
Wire cutters

### Removal

1. Do the "Removal" procedure for the Case (see "Removal" on page 4-2)
2. Put the rear half (B) on its rear (see figure 4-1 on page 4-3).
3. Write down the cable routes.
4. Remove the grommet (F) (see figure 4-3 on page 4-6).

**Figure 4-3. Blower**




5. Remove the air hose (G).
6. Disconnect the blower cable from the power supply P.C. board (see "Cable Routing" on page 4-18).

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7. Cut and remove the cable ties that attach the blower cable to the rear half (B) (see figure 4-9 on page 4-18).

8. Remove the blower (H) (see figure 4-3 on page 4-6).

9. Cut and remove the cable tie that attaches the blower cable to the mount bracket (I).

**NOTE:**
If a replacement blower has the mount bracket pre-installed by the manufacturer, do not do step 10.

10. Remove the three screws (J) that attach the blower (H) to the mount bracket (I).

## Replacement

1. Make sure the cable routes are correct (see “Cable Routing” on page 4-18).

2. Do the removal procedure in opposite order.

3. Replace cable ties (see figure 4-9 on page 4-18).

4. Do the ”Replacement” procedure for the Case (see “Replacement” on page 4-3).

5. Do the “Function Checks” on page 2-2.

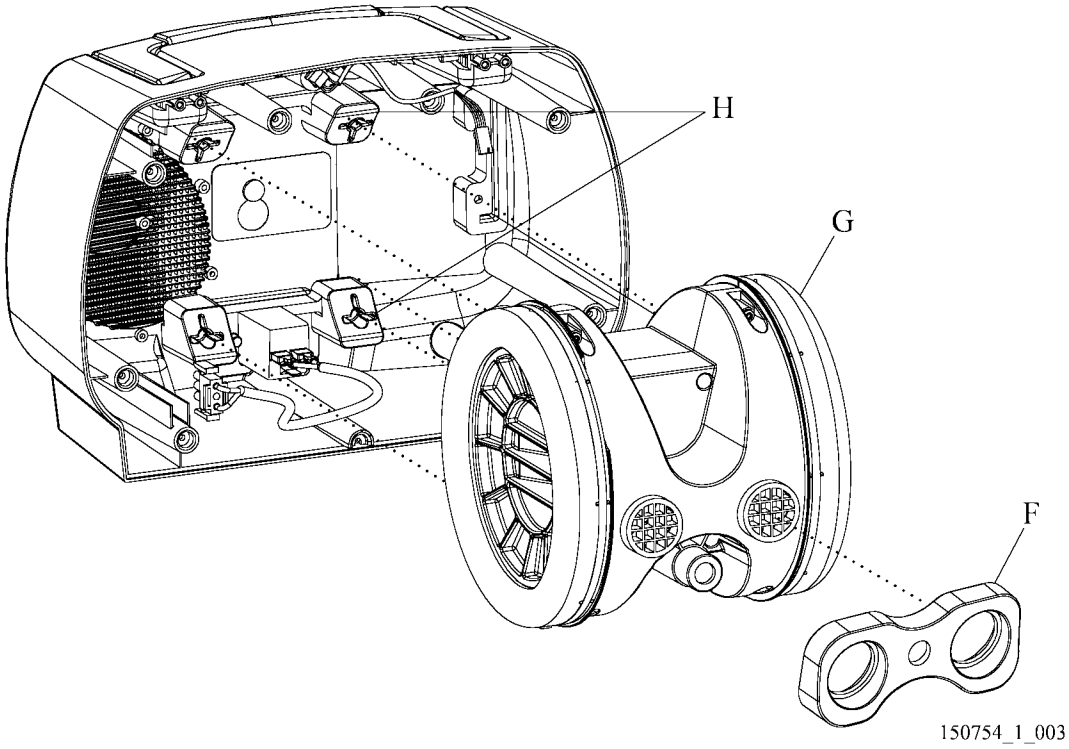
# 4.4 Generator

Tools required: T15 Torx®[1] head screwdriver, long shank
Wire cutters

## Removal

1. Do the “Removal” procedure for the Case (see “Removal” on page 4-2)
2. Put the rear half (B) on its rear.
3. Write down the cable routes.
4. Remove the front pressure seal (F) from the generator (G) (see figure 4-4 on page 4-8).

**Figure 4-4. Generator**




5. Disconnect the generator power cable from the power supply P.C. board (see “Cable Routing” on page 4-18).
6. Cut and remove the cable tie that is used to attach the power inlet cable to the generator (G) (see figure 4-9 on page 4-18).

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7. Disconnect the air hose (G) (see figure 4-3 on page 4-6) from the generator (G) (see figure 4-4 on page 4-8).

8. Remove the generator (G).

## Replacement

1. Make sure the cable routes are correct (see “Cable Routing” on page 4-18).

2. Do the removal procedure in opposite order.

3. Do the ”Replacement” procedure for the Case (see “Replacement” on page 4-3).

4. do the “Function Checks” on page 2-2.

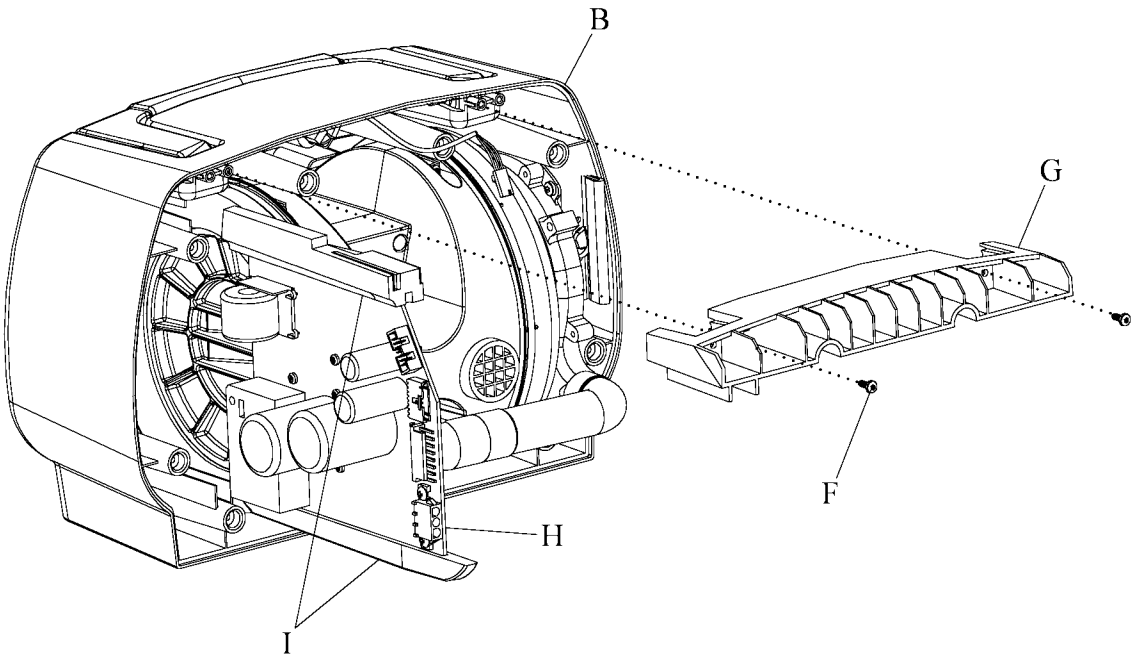
## 4.5 Power Supply P.C. Board

Tools required: T15 Torx®[1] head screwdriver, long shank
Wire cutters

### Removal

1. Do the "Removal" procedure for the Case (see "Removal" on page 4-2).
2. Put the rear half (B) on its rear (see figure 4-5 on page 4-10).

**Figure 4-5. Power Supply P.C. Board**




3. Remove the two screws (F) that attach the handle clamp (G) to the rear half (B).
4. Remove the handle clamp (G).
5. Write down the cable connections and cable routes for the cables attached to the power supply P.C. board (H).
6. Disconnect all cables on the power supply P.C. board (H).
7. Remove the power supply P.C. board (H).

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8. Remove the top and bottom mounts (I) from the power supply P.C. board (H).

## Replacement

1. Make sure the cable routes are correct (see “Cable Routing” on page 4-18).

**NOTE:**
The lower mount is tapered. The small part of the taper goes to the rear end of the Power Supply P.C. board.

2. Do the removal procedure in opposite order.

3. Make sure the power supply P.C. board (H) is fully seated before you attach the front half (see figure 4-5 on page 4-10).

4. Do the ”Replacement” procedure for the Case (see “Replacement” on page 4-3).

5. Do the “Function Checks” on page 2-2.

## 4.6 Fuses

Tools required: Screwdriver

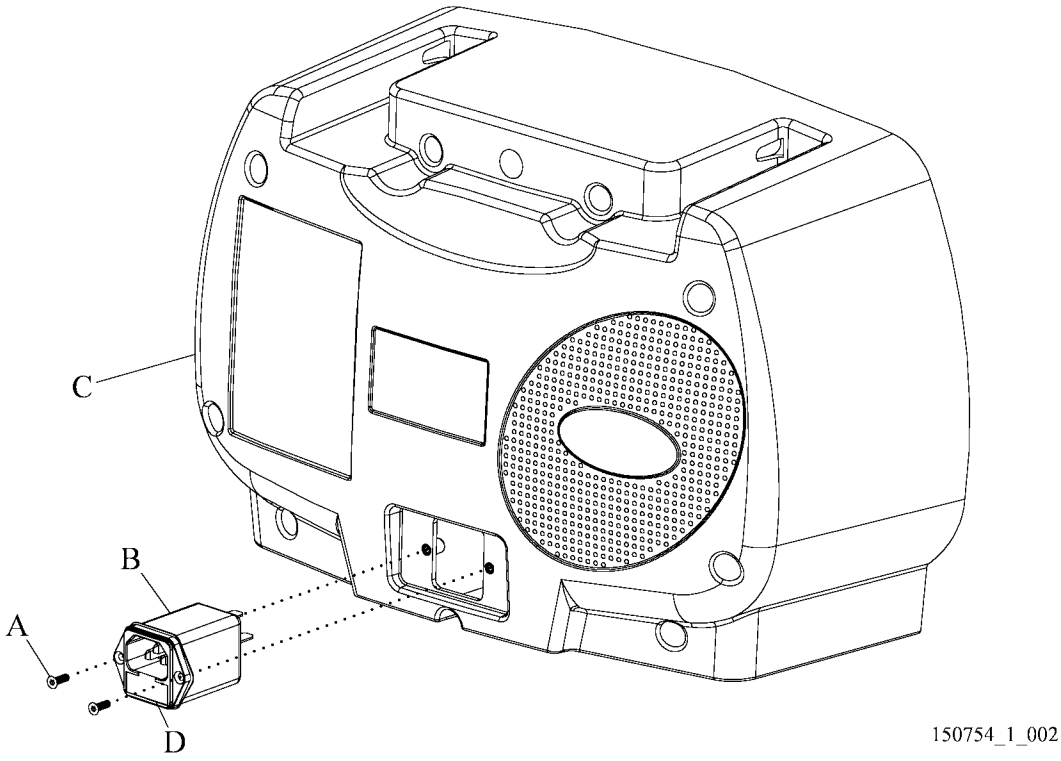
### Removal

**SHOCK HAZARD:**
Disconnect the unit from its power source. Failure to do so could cause injury and equipment damage.

1. Disconnect the unit.

2. Remove the two screws (A) that attach the power filter (B) to the rear half (C) (see figure 4-6 on page 4-12).

**Figure 4-6. Fuses**




3. Remove the fuse holder (D) from the power filter (B).

4. Remove the fuses.

### Replacement

1. Install new fuses in the fuse holder (D).

2. Do the removal procedure in opposite order.
3. Do the Function Checks on page 2-2.

## 4.7 Power Filter

Tools required: T10 Torx®[1] head screwdriver

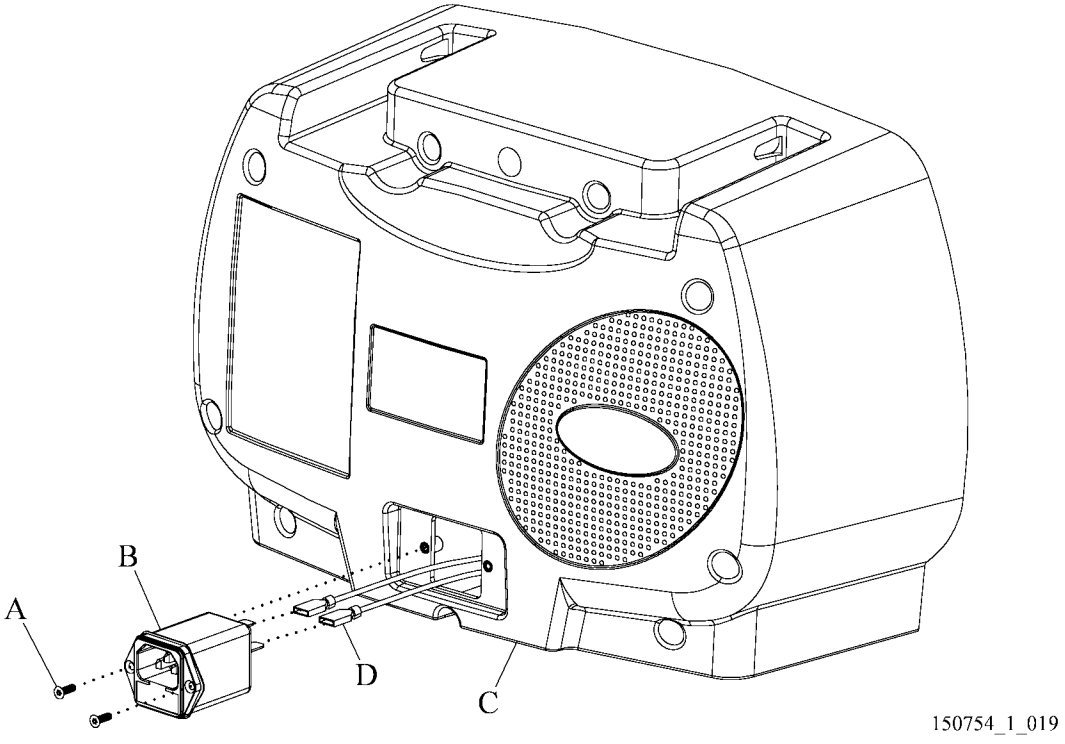
### Removal

**SHOCK HAZARD:**
Disconnect the unit from its power source. Failure to do so could cause injury and equipment damage.

1. Disconnect the unit.

2. Remove the two screws (A) that attach the power filter (B) to the rear case (C) (see figure 4-7 on page 4-14).

**Figure 4-7. Power Filter**




3. Remove the power filter (B) sufficiently to get access to the wires (D).

4. Disconnect the wires (D) from the power filter (B).

1. Torx® is a registered trademark of Acument Intellectual Properties, LLC.

## Replacement

1. Do the removal procedure in opposite order.
2. Do the “Function Checks” on page 2-2.

# 4.8 Pressure Switch

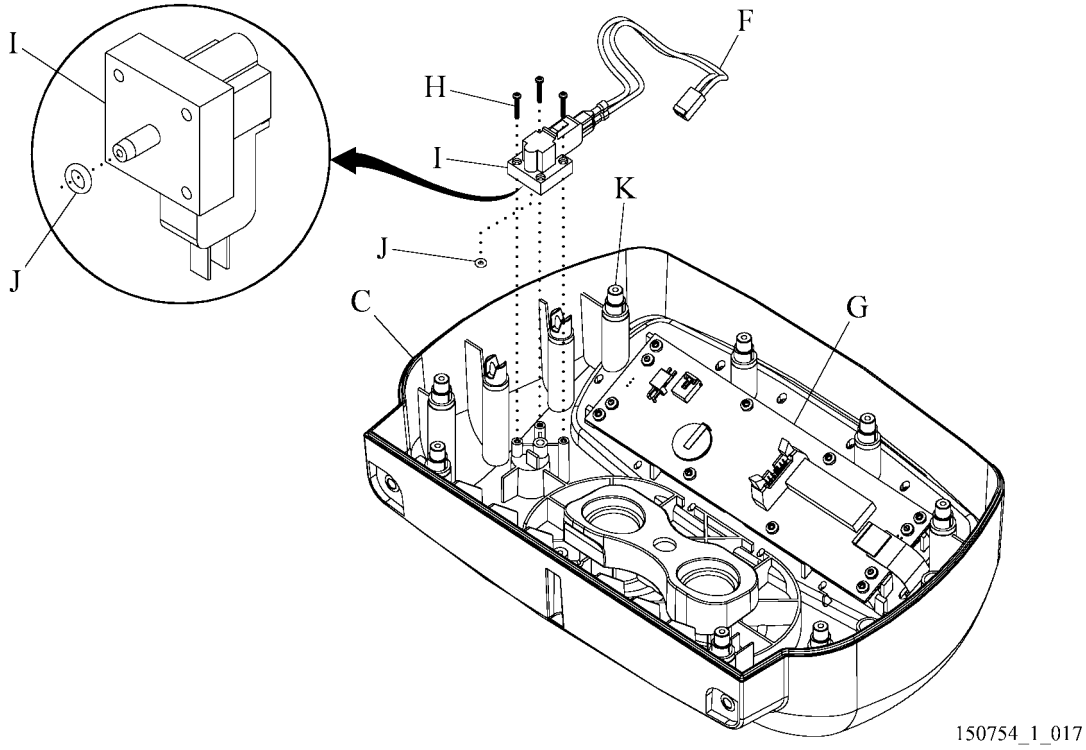
Tools required: T20 Torx®[1] head screwdriver, long shank
#1 phillips head screwdriver

## Removal

1. Do the "Removal" procedure for the Case (see "Removal" on page 4-2)

2. Disconnect the pressure switch cable (F) from the UIF P.C. board (G) (see figure 4-8 on page 4-16).

**Figure 4-8. Pressure Switch**




3. Remove the three screws (H) that attach the pressure switch (I) to the front half (C).

4. Remove the pressure switch (I) and O-ring (J) from the front half (C).

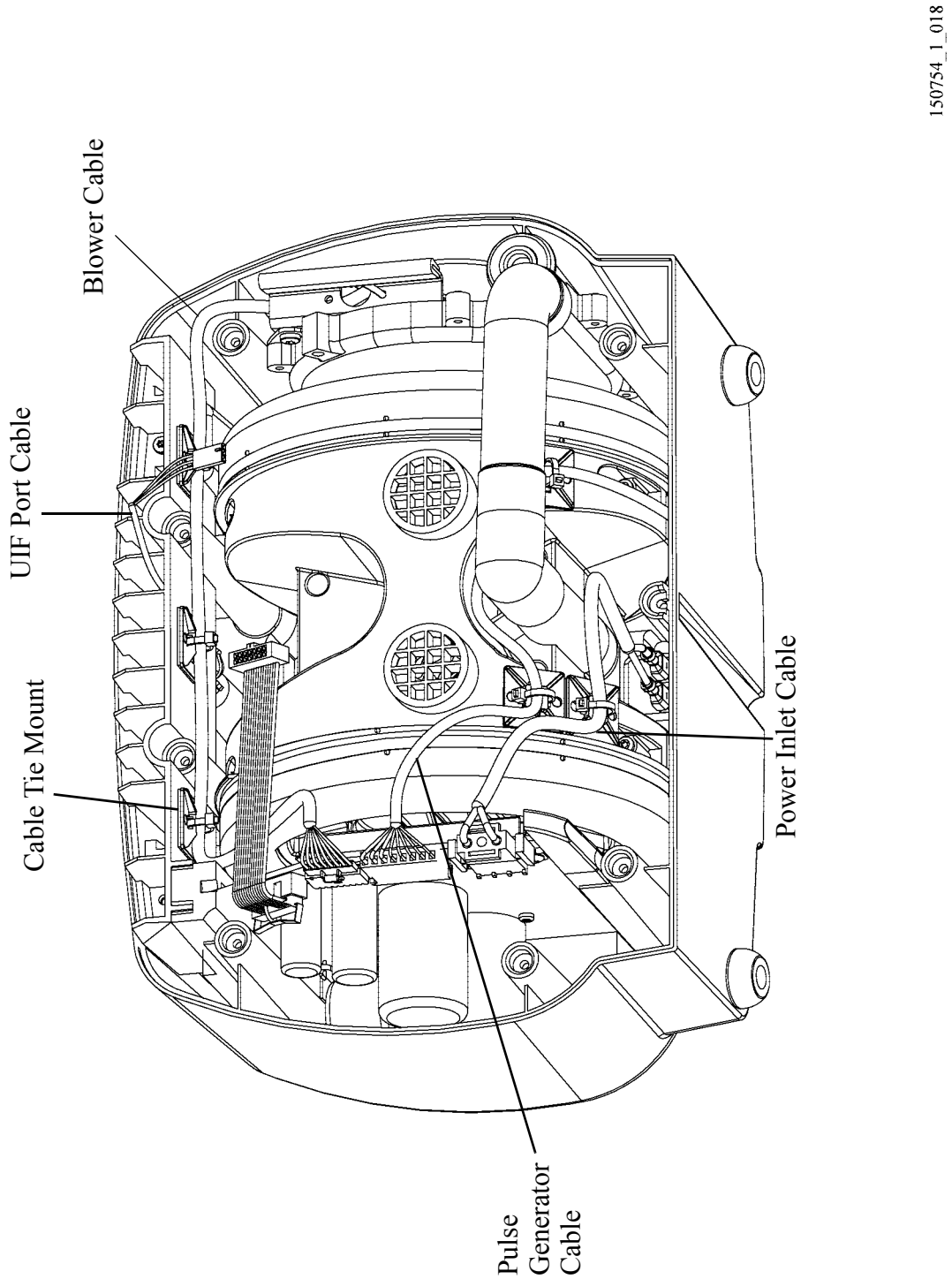
1. Torx® is a registered trademark of Acument Intellectual Properties, LLC.

## Replacement

1. Make sure the O-ring (J) is installed (see figure 4-8 on page 4-16).
2. Put the pressure switch cable (F) around the outside of the stud (K).
3. Make sure the cable routes are correct (see “Cable Routing” on page 4-18).
4. Do the removal procedure in opposite order.
5. Do the ”Replacement” procedure for the Case (see “Replacement” on page 4-3).
6. Do the Function Checks on page 2-2.

# 4.9 Cable Routing

**Figure 4-9. Cable Routing**



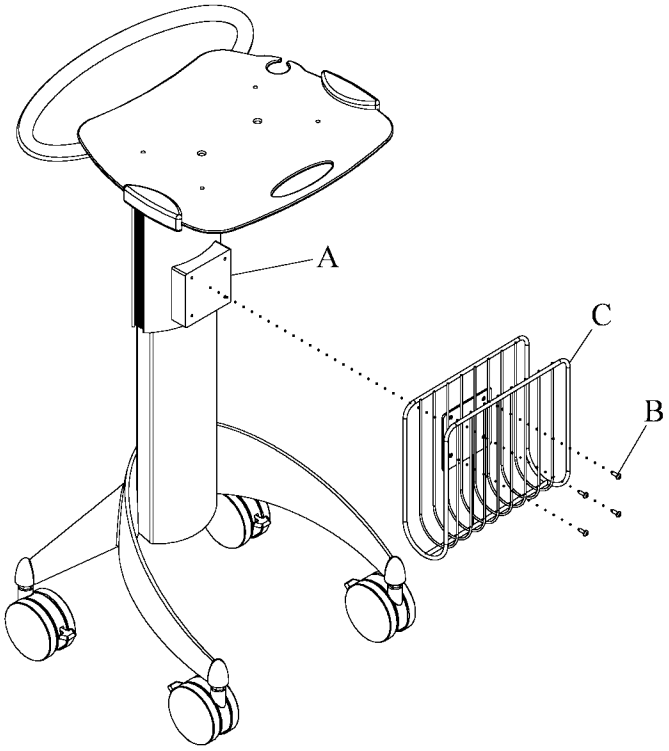
## 4.10 Basket

Tools required: 1/8" hex wrench

### Removal

1. Lock all casters.
2. Lift the cart (A) to the full up position (see figure 4-10 on page 4-19).
3. Remove the four screws (B) that attach the basket (C) to the cart (A).
4. Remove the basket (C).

**Figure 4-10. Basket**




### Replacement

1. Do the removal procedure in opposite order.

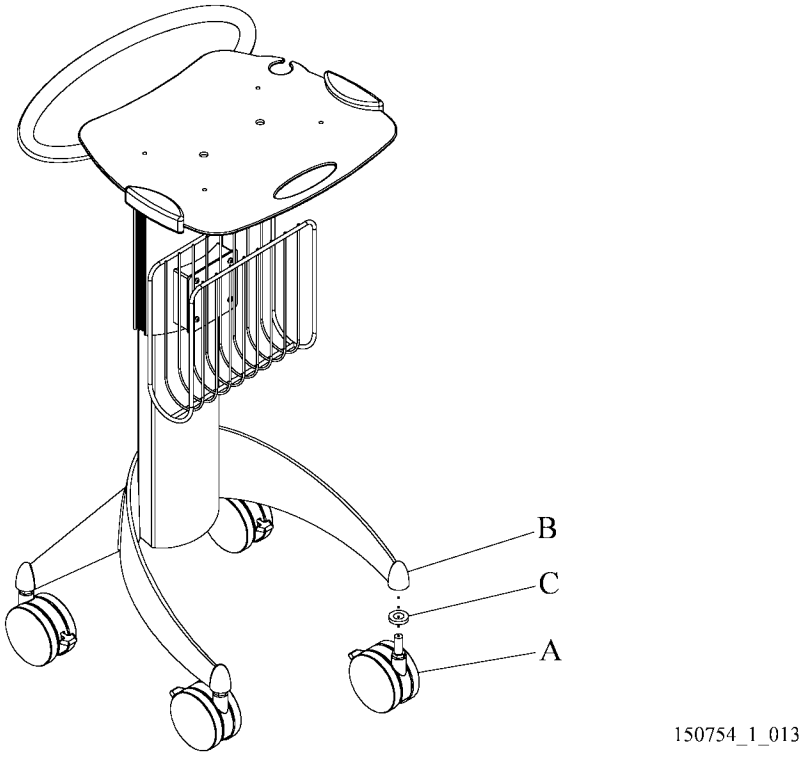
# 4.11 Caster

Tools required: Rubber hammer

## Removal

1. Lock all casters (A) (see figure 4-11 on page 4-20).
2. Lower the cart (B) to the full down position.
3. Remove the caster (A) and the washer (C) from the cart (B).
4. Remove the washer (C).

**Figure 4-11. Caster**




## Replacement

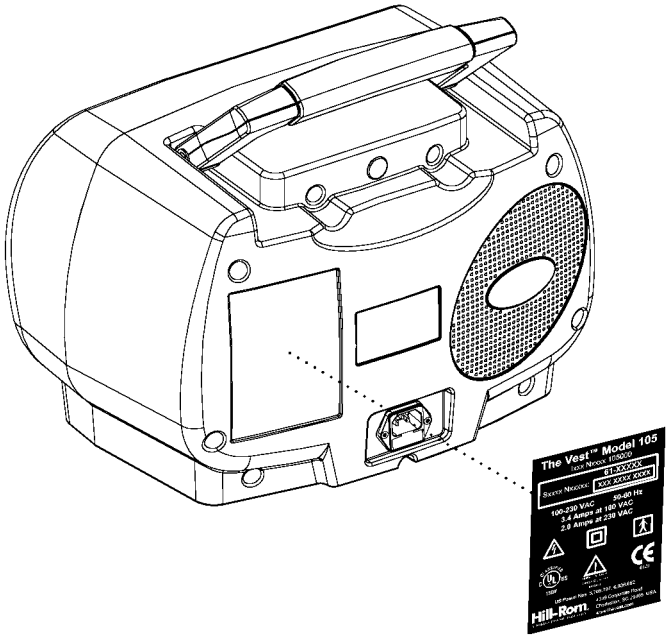
1. Do the removal procedure in opposite order.
2. Make sure the washer (C) is installed on the caster (A).
3. Tap the caster (A) to make sure it is fully seated in the cart (B).

# Chapter 5
# Parts List

## Service Parts Ordering

Use the parts lists in this manual to identify part number(s). Find the product number and serial number on the product identification label (see figure 5-1 on page 5-1).

**Figure 5-1. Product Identification Label Location**




150754_1_011

Model 105 and 205 shown

5

Phone Hill-Rom Technical Support at 800-445-3720 with the data below:

- Six-digit customer account number
- Purchase order number
- Product number
- Serial number
- Part number(s)

Hill-Rom also provides a fax number to order parts, inquire about part prices and availability, or follow up on a service order. The fax number is 812-934-8472.

A $40.00 minimum part order will prevent extra fees charged to process your order.

**Terms:**

- Net 30 days
- F.O.B. Batesville, IN
- Prepaid shipping charges added to invoice
- All orders shipped UPS ground unless specified

**United States and Canada customers address all inquiries to:**

ATTN TECHNICAL SUPPORT—PARTS
HILL-ROM, INC.
4349 CORPORATE ROAD
CHARLESTON SC, 29405

**Europe customers address all inquiries to:**

HILL-ROM CLINITRON HOUSE
ASHBY PARK
ASHPY DE LA ZOUCH
LE65 1 JG
LEICHESTERSHIRE, GB

**Address all return goods to:**

ATTN VEST SERVICE RETURN
HILL-ROM, INC.
4349 CORPORATE ROAD
CHARLESTON SC, 29405

**NOTE:**
To decrease delays or incorrect charges, **do not** send items without a Return Material Authorization (RMA) number. When a return is requested, an RMA packet is included with each order. This packet includes a RMA number, instructions, and a label to ship the item with. If a RMA number is not available, phone Hill-Rom Technical Support at 800-445-3720 for one.

# Exchange Policy

For the United States and Canada customers only.

The policies for in-warranty and out-of-warranty exchanges from Hill-Rom are as follows:

## In-Warranty Exchanges

In some cases, it will be necessary to send parts/products to Hill-Rom for inspection. When this occurs, you are expected to send the parts/products in less than 30 days of receipt of the changed part. If you fail to send the parts/products that do not operate in less than 30 days, Hill-Rom will invoice your facility for the full sell price of the parts/products.

**NOTE:**
The above procedure pertains **only** to parts/products that Hill-Rom wants returned.

In some cases, the invoice that accompanies the parts will show the full sell price (only for internal use at Hill-Rom). This price is not your price.

**Do not** send parts without a RMA number. When it is necessary to send defective parts/products to Hill-Rom, Hill-Rom will include a RMA packet with the new parts/products shipment. If a RMA number is not available, phone Hill-Rom Technical Support at 800-445-3720 for one.

## Out-of-Warranty Exchanges

You are expected to send the parts/products that do not operate in less than 30 days of receipt of the changed part. Hill-Rom will include an RMA packet with the new parts/products shipment. If a RMA number is not available, phone Hill-Rom Technical Support at 800-445-3720 for one. If you fail to send the parts/products that do not operate in less than 30 days, Hill-Rom will invoice your facility for the full sell price of the parts/products. When the parts/products that do not operate are received, Hill-Rom will give a credit for the discounted price.

## Recommended Spare Parts

See table 5-1 on page 5-5 for a recommended spare parts list to service one unit.

**Table 5-1. Recommended Spare Parts**

| Part Number | Quantity | Description |
|---|---|---|
| 200337000S | 1 | Pneumatic switch kit |
| 142124S | 1 | Power filter kit, 105 and 205 |
| 135977S | 1 | Power filter kit, 104 |
| 300569000S | 1 | Blower assembly w/bracket, 105 and 205 |
| 153445 | 1 | Blower assembly w/bracket, 104 |
| 300571000S | 1 | Pulse generator kit |
| 200160007S | 1 | Screw, #6-32 x 1" pan head Torx®[a] kit |
| 200150002S | 1 | Screw, #6-19 x 3/8" Torx® head kit |
| 200150003S | 1 | Screw, #6-19 x 1/2" Torx® head kit |
| 145683 | 1 | P.C. board LCD assembly, 105 and 205 |
| 300589000S | 1 | P.C. board LCD assembly, 104 |
| 142100 | 1 | Cable assembly, main board to UIF board |
| 142159 | 1 | Cable assembly, UIF to device port |
| 140349 | 1 | Power supply, P.C. board assembly |
| 142335 | 1 | Rubber keypad assembly |
| 300592000 | 1 | Seal, front pressure |
| 140663 | 1 | Tubing blower |
| 200945028 | 1 | Grommet, 5/8" ID x 1-1/8" OD 5" |
| 155877 | 1 | Test vest |
| 143513 | 1 | Basket replacement kit |
| 143512 | 1 | Caster replacement kit |

a. Torx® is a registered trademark of Acument Intellectual Properties, LLC.

# Control Unit (Sheet 1 of 2)

**Figure 5-2. Control Unit (Sheet 1 of 2)**

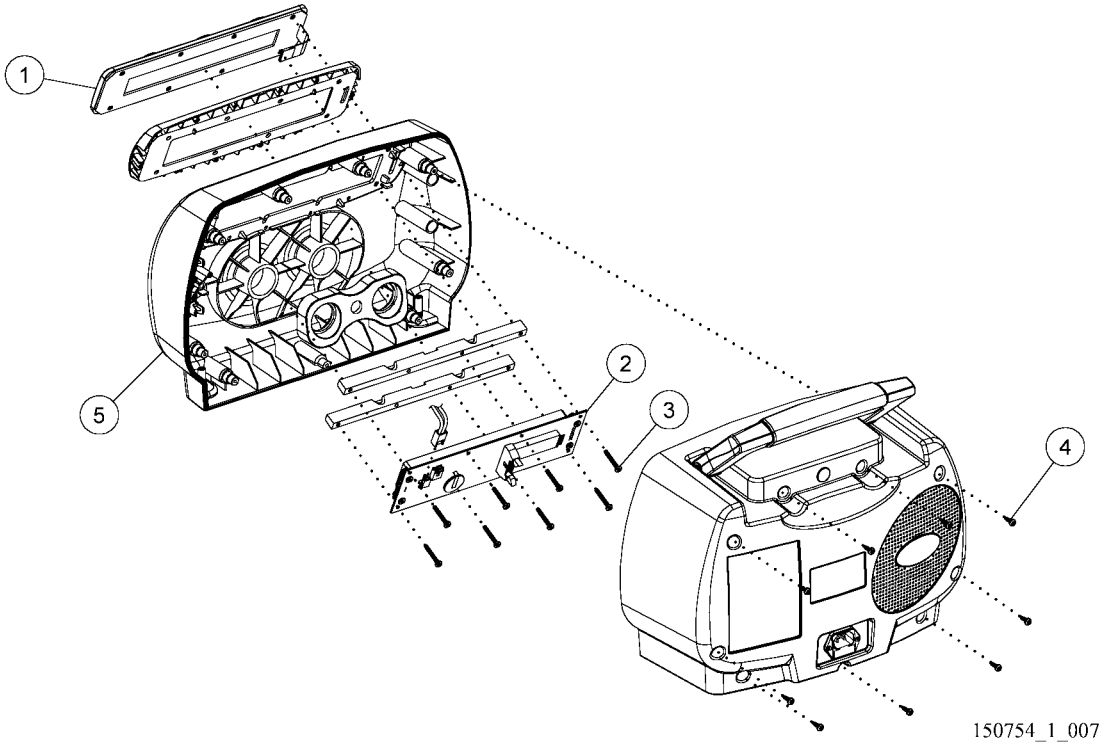



**Table 5-2. Control Unit (Sheet 1 of 2)**

| Item Number | Part Number | Quantity | Description |
|---|---|---|---|
| 1 | 142335 | 1 | Keypad |
| 2 | 145683 | 1 | UIF P.C. board, 105 and 205 |
| | 300589000 | 1 | Assembly, LCD, 104 |
| 3 | 2001600007 | 8 | Screw |
| 4 | 2001500003 | 9 | Screw |
| 5 | 142202 | 1 | Front case |
| Not shown | 142232 | 1 | Remote control bulb |

# Control Unit (Sheet 2 of 2)

**Figure 5-3. Control Unit (Sheet 2 of 2)**

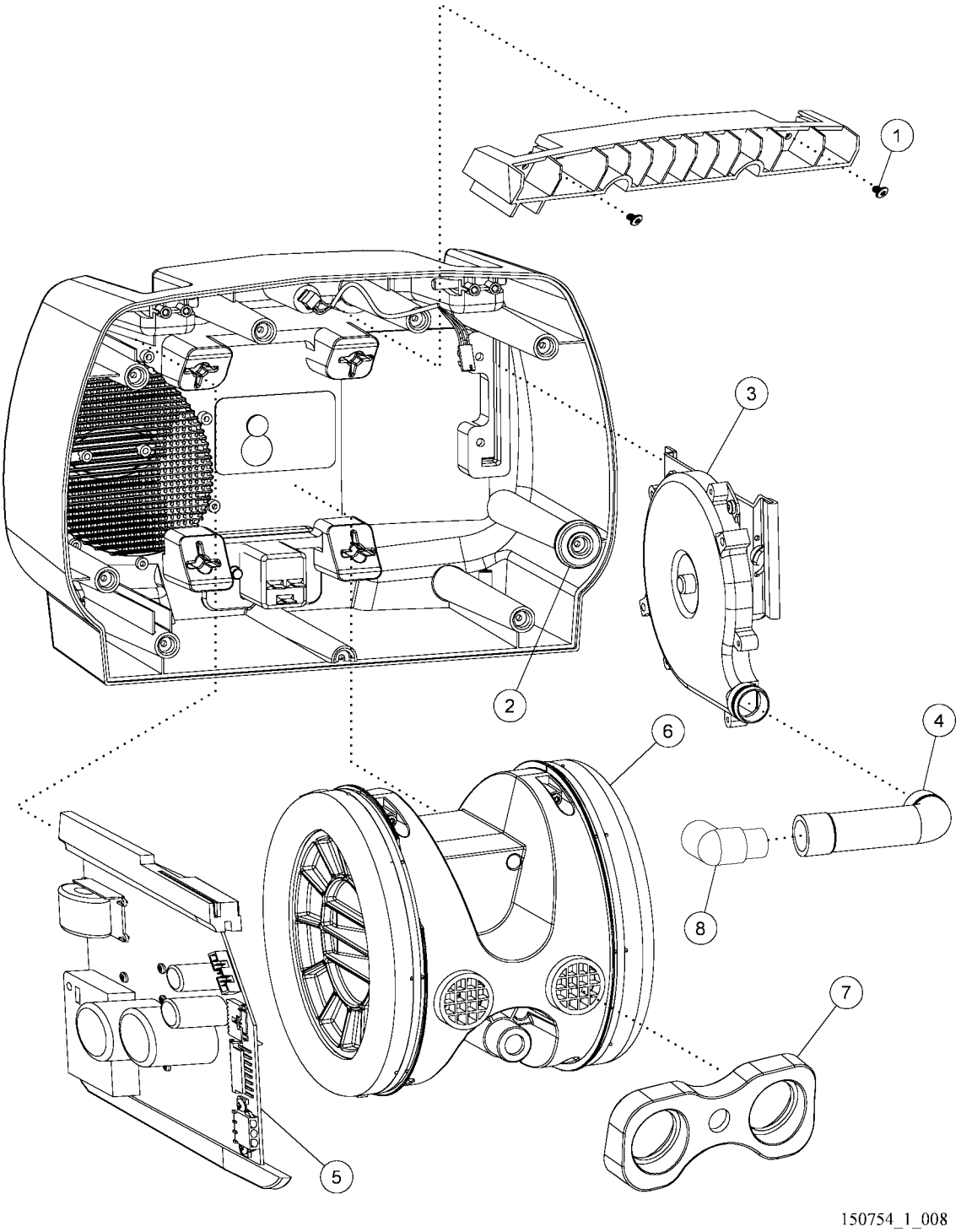


**Table 5-3. Control Unit (Sheet 2 of 2)**

| Item Number | Part Number | Quantity | Description |
|---|---|---|---|
| 1 | 2001500002 | 2 | Screw |
| 2 | 200945028 | 1 | Grommet |
| 3 | 300569000 | 1 | Blower, 104, 105 and 205 |
| 4 | 140663 | 1 | Tubing |
| 5 | 140349 | 1 | Power supply P.C. board, 105 and 205 |
| | 300646000 | 1 | Power supply P.C. board, 104 |
| 6 | 300571000 | 1 | Generator |
| 7 | 3005592000 | 1 | Front pressure seal |
| 8 | 200419000 | 1 | Elbow |

# Power Cord

**Figure 5-4. Power Cord**

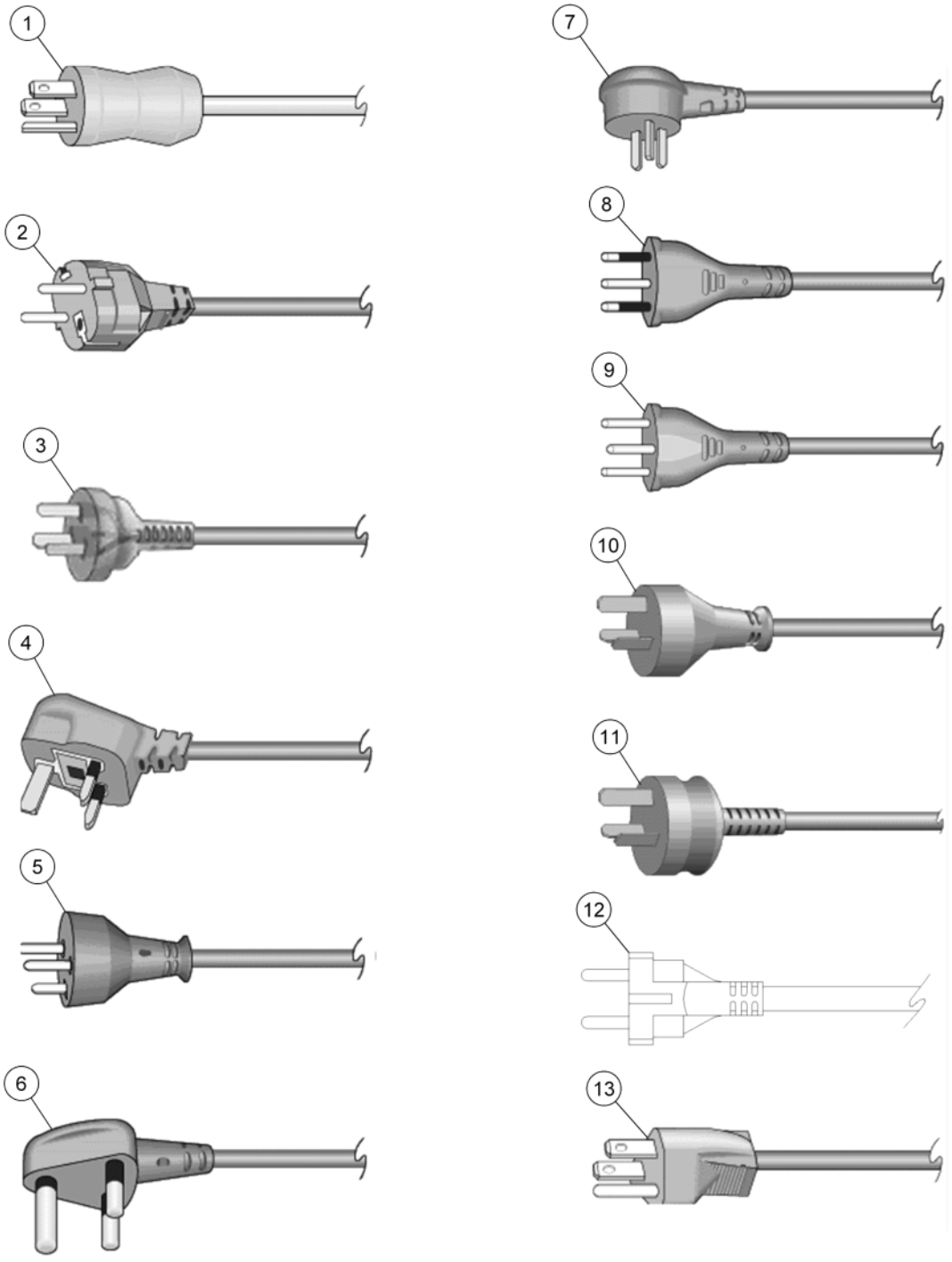


**Table 5-4. Power Cord**

| Item Number | Part Number | Quantity | Description |
|---|---|---|---|
| 1 | P200754000 | 1 | Power cord, North America |
| 2 | P200754001 | 1 | Power cord, Continental Europe |
| 3 | P200754002 | 1 | Power cord, Australia and New Zealand |
| 4 | P200754003 | 1 | Power cord, UK and Ireland |
| 5 | P200754004 | 1 | Power cord, Denmark |
| 6 | P200754005 | 1 | Power cord, India and South Africa |
| 7 | P200754006 | 1 | Power cord, Israel |
| 8 | P200754007 | 1 | Power cord, Italy |
| 9 | P200754008 | 1 | Power cord, Switzerland |
| 10 | P200754009 | 1 | Power cord, Argentina |
| 11 | P200754010 | 1 | Power cord, China |
| 12 | P200754011 | 1 | Power cord, Russia |
| 13 | P200754100 | 1 | Power cord, Japan |

# Cart

**Figure 5-5. Cart (Model 205)**

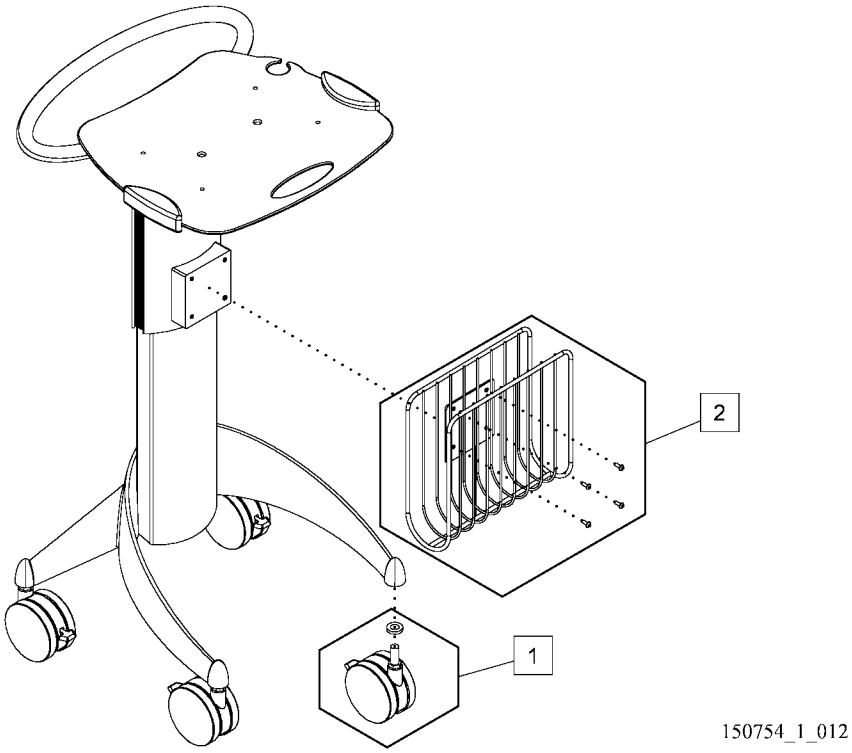



**Table 5-5. Cart**

| Item Number | Part Number | Quantity | Description |
|---|---|---|---|
| 1 | 143512 | 4 | Caster kit |
| 2 | 143513 | 4 | Basket kit |

**NOTES:**

# *Chapter 6 General Procedures*

## Cleaning and Care

**WARNING:**
Follow the item's manufacturers instructions. Failure to do so could cause injury or equipment damage.

**SHOCK HAZARD:**
Disconnect the unit from its power source. Failure to do so could cause injury or equipment damage.

**SHOCK HAZARD:**
Keep the unit in a dry environment and do not permit moisture or liquid to pool on the unit. Injury or equipment damage could occur.

**CAUTION:**
Do not use harsh cleaners, solvents, or detergents. Equipment damage could occur.

If there is no sign of soilage with possible body fluids, we recommend that you clean the unit with a weak detergent and warm water. If disinfection is desired, you can use a combination cleanser/disinfectant as explained in "Disinfect" on page 6-2.

### Steam Clean

The sterile handle of The Vest® Airway Clearance System is the only component that can be steam cleaned. Too much moisture can damage mechanisms in this unit.

### Hard to Clean Stains

To remove stains, we recommend that you use ordinary household cleansers and a soft-bristled brush. To loosen heavy, dried-on soil, it is possible that the stain needs to be saturated with ordinary household cleansers first.

### Disinfect

When there is sign of soilage and between patients, we recommend that you disinfect the unit with a tuberculocidal disinfectant. (For customers in the US, the disinfectant must be registered with the Environmental Protection Agency.)

Dilute and use the disinfectant in accordance with the manufacturer's instructions.

## Lubrication Requirements

There are no lubrication requirements for The Vest® Airway Clearance System.

## Preventive Maintenance

**WARNING:**
Only facility-approved maintenance persons can do preventive maintenance on The Vest® Airway Clearance System. Injury or equipment damage could occur.

**WARNING:**
If The Vest® Airway Clearance System fails part of the preventive maintenance functional checks, repair The Vest® Airway Clearance System before it is used on a patient. Failure to do so could cause injury or equipment damage.

It is necessary that The Vest® Airway Clearance System has a good maintenance program. We recommend that you do annual preventive maintenance (PM) and tests for the Joint Commission. PM and tests not only meet Joint Commission requirements but will help make sure The Vest® Airway Clearance System has a long, operative life. PM will keep downtime to a minimum.

The PM schedule that follows, guides the technician through a correct PM procedure on The Vest® Airway Clearance System. Check each item on the PM schedule, and make the necessary adjustments.

Follow the PM schedule with the applicable PM checklist. This checklist is designed to keep a sequential maintenance history and subsequent repair costs for one The Vest® Airway Clearance System. You can change this checklist or make one to fit your needs. Keep clear records and keep The Vest® Airway Clearance System in good condition to decrease downtime and make sure the patient remains comfortable.

## Preventive Maintenance Schedule

**Table 6-1. Preventive Maintenance Schedule**

| Function | Procedure |
|---|---|
| Power cord | Examine for frayed power cord and components. Replace the damaged parts if necessary.<br>Examine the plug for damage. Make sure the plug is a one-piece molded plug assembly. If it is not, replace the plug cord assembly.<br>Replace any plug cord assembly that shows any of these:<br>• Discoloration of the plug molding around the plug blades; this could occur if the plug blades have overheated or arced.<br>• Any signs of cracking; this could occur if the plug has been bent and straightened to a point past its useful life.<br>• Loose fit of the plug blade (the plug blade moves in the molding); this could occur if the molding has overheated or the blades have been bent and straightened to a point past their useful life.<br>Replace the power cord, if damaged. |
| Performance | Plug the unit into an applicable power source. Make sure the unit works correctly (see “Function Checks” on page 2-2). |
| Leakage Current Test | The Vest® Airway Clearance System must be less than 65 microamperes to continue in service. |
| General appearance | Examine the aesthetics of The Vest® Airway Clearance System and make sure it is clean. See “Cleaning and Care” on page 6-1. |
| Cart (Model 205 only) | Make sure the unit is attached correctly.<br>Make sure the casters are in good condition.<br>Make sure the basket is in good condition and attached to the cart.<br>Make sure the handle is in good condition.<br>Make sure the cart height adjustment works correctly. |

## Preventive Maintenance Checklist

**Table 6-2. Preventive Maintenance Checklist**

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Function |
| Hill-Rom Company, Inc. | Manufacturer | | | | | | | | | | | | | | | | | | | | | Power cord |
| | | | | | | | | | | | | | | | | | | | | | | Performance |
| | | | | | | | | | | | | | | | | | | | | | | Leakage Current Test |
| | | | | | | | | | | | | | | | | | | | | | | General appearance |
| | | | | | | | | | | | | | | | | | | | | | | Cart |
| | | | | | | | | | | | | | | | | | | | | | | |
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| | Serial Number | | | | | | | | | | | | | | | | | | | | | |
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| Total Cost for This Page | | | | | | | | | | | | | | | | | | | | | | Labor Time: |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Repair Cost: |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Inspected By: |
| | | | | | | | | | | | | | | | | | | | | | | **Legend**<br>L=Lube<br>C=Clean<br>A=Adjust<br>R=Repair or Replace<br>O=Okay<br>N=Not Applicable<br>Remarks: |

**NOTES:**

# Chapter 7
# Accessories

## Accessories

There are no accessories for The Vest® Airway Clearance System, Models 104, 105, and 205.

**NOTES:**


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Tel: 800-445-3720
www.hill-rom.com

**US Rental Therapy**
Hill-Rom Company, Inc.
Tel: 800-638-2546

**St. Paul, MN**
Hill-Rom Company, Inc.
Tel: 651-490-1468 or 800-426-4224
www.thevest.com

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