

# SERVICE MANUAL

## TotalCare® Bed System From Hill-Rom



**Product No. P1900 (M model and newer)**



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# ***Chapter 1***

## ***Introduction***

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### **Purpose**

This manual provides requirements for the TotalCare® Bed System normal operation and maintenance. It also includes a parts list (in chapter 5) for ordering replacement components.

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### **Audience**

This manual is intended for use by only facility-authorized personnel. Failure to observe this restriction can result in severe injury to people and serious damage to equipment.

---

### **Reference Documents**

For more information (such as operating instructions, features, and product symbols), refer to the *TotalCare® Bed System and Duo2 System User Manual* (147607).

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

- CAUGHT HAZARD WARNING



- CHEMICAL HAZARD WARNING



- ELECTRICAL SHOCK HAZARD WARNING



## Overview

The TotalCare® Bed System is a comprehensive product ideally suited for acute patient care. The TotalCare® Bed System supplies, through its modular design, a one-product solution for acute care (including critical care), step down/progressive care, medical/surgical care, high acuity/subacute care, post anesthesia care, and certain emergency departments.

The TotalCare® Bed System includes mechanical, hydraulic, air, and electrical systems that together make a base configuration of standard features, positioning and environmental controls, bed setup controls, and a sleep surface. Many options and accessories are available in a modular form which gives the TotalCare® Bed System significant application versatility.

The TotalCare® Bed System has both electric and manual controls. Low voltage switches operate the electric controls and are accessible to the caregiver and the patient. Manual controls permit bed operation during transport or when electric power is not available. The head, knee, foot, and bed up/down functions are easily operated through the hydraulic manual control.

---

## Acronym List

There are several acronyms associated with the TotalCare® Bed System. For a list of acronyms, see table 1-1 on page 1-4

**Table 1-1. Acronym List**

Acronym	Definition
A/D	Analog-to-Digital
BPM	Bed Position Module
CLRT	Continuous Lateral Rotation Therapy
CPR	Cardiopulmonary Resuscitation
DPST	Double-Pole, Single-Throw
EEPROM	Electronic Erasable Programmable Read Only Memory
EPROM	Electronic Programmable Read Only Memory
ESD	Electrostatic Discharge or Electrical Static Discharge
FET	Field Effect Transistor
FM	Footboard Module
FPGA	Field Programable Gate Array (Logic Control)
GCIM	Graphic Caregiver Interface Module
GDC	Graphic Display Controller
IFM	Intermediate Frame Module
LAL	Low Air Loss
LCD	Liquid Crystal Display or Liquid Crystal Diode
LED	Light Emitting Diode
LON	Local Operating Network
MCM	Microclimate management (advanced LAL)

Acronym	Definition
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MUX	Multiplexer
NVRAM	Non-Volatile Random Access Memory
PACM	Power Assist Control Module
PAG	Amplifier/Indicator Board
PBM	Pulmonary Base Module
PCB	Printed Circuit Board
PCM	Power Control Module
PED	Patient Exit Detection
PIC	Microchip (Microcontroller type)
PM	Preventive Maintenance
PPM	Pulmonary Percussion Module
PRM	Pulmonary Rotation Module
PWM	Pulse Width Modulation
RAM	Random Access Memory
RAP	Repair Analysis Procedure
SCM	SideCom® Communication System Module
SM	Scale Module or Siderail Module
SPI	(Standard Industry Communication Protocol)
TFM	Treatment Foot Module
TFSCM	Treatment Foot Surface Control Module
TSCM	Treatment Surface Control Module
TSM	Treatment Surface Module

*Acronym List*

*Chapter 1: Introduction*

<b>Acronym</b>	<b>Definition</b>
TTM	Treatment Torso Module
UCM	User Control Module
VDE	Verband Deutscher Electrotechiker

## Specifications

### Physical Description

**Table 1-2. TotalCare® Bed System Specifications**

Feature	Dimension
Total Length (transport handles stored)	92.5" (235.0 cm)
Maximum Width (siderails stored)	36.5" (92.7 cm)
Maximum Width (siderails up)	40" (102 cm)
Maximum Headboard Height	52" (132 cm)
Maximum Siderail Height (without mattress)	14.75" (37.47 cm)
Minimum Underbed Clearance	4.25" (10.8 cm) 1.25" (3.2 cm) IntelliDrive® Transport System
Wheel Base	42" x 25.75" (107 cm x 65.4 cm) foot end, 42" x 23.5" (107 cm x 59.7 cm) head end
Short Stay Mattress Dimensions:	
Mattress Width	35" (88.9 cm)
Mattress Length	84" (213.4 cm)
Maximum Mattress Thickness	6" (15.2 cm)
Mattress Weight	33 lb (15.0 kg)
Treatment Surface Dimensions:	
Mattress Width	35" (88.9 cm)
Mattress Length	84" (213.4 cm)
Maximum Mattress Thickness	6" (15.2 cm)
Mattress Weight	33 lb (15.0 kg)
Pulmonary Surface Dimensions:	
Mattress Width	35" (88.9 cm)
Mattress Length	84" (213.4 cm)
Maximum Mattress Thickness	11" (28.0 cm)
Mattress Weight	37.5 lb (17.0 kg)
P500 Surface Dimensions:	
Mattress Width	35" (88.9 cm)
Mattress Length	84" (213.4 cm)
Maximum Mattress Thickness	9" (22.9 cm)
Mattress Weight	32.2 lb (14.6 kg)
Alternate mattresses: Recommended height above the mattress at the deck perimeter to the top of the siderail, per IEC 60601-2-38	8.7" (220 mm)

## Specifications

### Chapter 1: Introduction

Feature	Dimension
Caster Size	5" (13 cm) single wheel or 5" (13 cm) dual wheel or 6" (15.2 cm)
Total Weight	525 lb (238 kg) with minimum options 585 lb (265 kg) with maximum options
Head Section Inclination (maximum)	75°
Seat Section Inclination (maximum)	15°
Bed Height Range (nominal <sup>a</sup> )	15" to 34" (38 cm to 86 cm) for 5" (13 cm) single casters 15.5" to 34.5" (39 cm to 88 cm) for 5" (13 cm) dual casters 16.5" to 35.5" (42 cm to 90 cm) for 6" (15.2 cm) single casters
Bed Height Range (with mattress and 5" (13 cm) single casters)	21" to 45" (53 cm to 114 cm)
Trendelenburg Position (maximum)	15°
Bed Lift Capacity (maximum safe working load)	550 lb (249 kg)
Foot Section Lift capacity (maximum)	400 lb (181 kg)
Head Section Lift capacity (maximum)	200 lb (91 kg)
Maximum Height of Seat Section (in Trendelenburg position)	40" (102 cm)
Siderail Opening Size	4.34" (110.2 mm)
Distance between Siderails	< 2.4" (61 mm)

a. Measurement is from the floor to the top of the articulating deck (between the stepped sides).

## Electrical Description

### Accessory Receptacle (120V Model Only)

The maximum current available at the accessories receptacle is 12 A at 120 V AC. TotalCare® Bed Systems that have the optional accessory receptacle are equipped with two power cords, one for the accessory receptacle and one for the TotalCare® Bed System. The receptacle is isolated from the bed system's AC supply voltage power cord.

The accessory receptacle supplies up to 12 A of AC current. TotalCare® Bed Systems that have this option are equipped with two power cords, one for the accessory receptacle and one for the TotalCare® Bed System. The receptacle is isolated from the bed system's AC supply.

The bed power cable is gray, and the accessory receptacle power cable is black.

## Regulations, Standards, and Codes

### IEC 60601-1 Classifications

Type of protection against electric shock = Class I

Degree of protection against electric shock = Type B

Degree of protection against harmful ingress of water = IPX0

Intermittent operation = 3 minutes on/30 minutes off (120 V unit only)

Intermittent operation = 3 minutes on/45 minutes off (100 V, 110 V, 127 V, 220 V, 230 V, and 240 V units only)



### WARNING:

Do not use the TotalCare® Bed System with oxygen tents. Injury or damage could occur.

Use oxygen administering equipment of the nasal, mask, or ventilator type only. Do not use with oxygen tents.

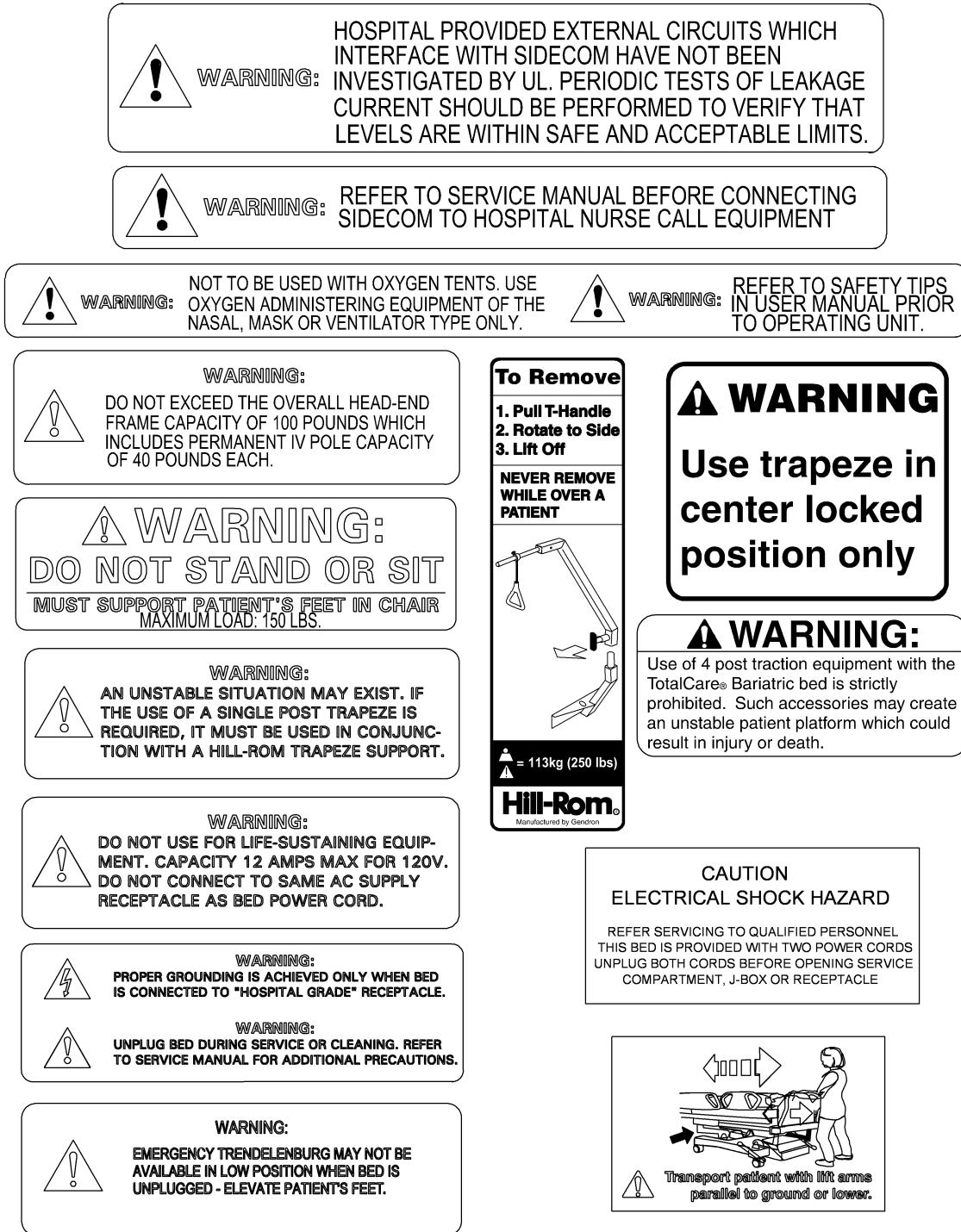
## **Model Identification**

**Table 1-3. Model Identification**

<b>Model Number</b>	<b>Description</b>
P1900M	TotalCare® Bed System with touch screen GCI
P1900N	TotalCare® Bed System with P500 option

## Warning and Caution Labels

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



147605\_1\_214

**NOTES:**

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# **Chapter 2**

## **Troubleshooting Procedures**

**2**

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### **Getting Started**



#### **WARNING:**

Only facility-authorized persons should service the TotalCare® Bed System. Service by unauthorized persons could cause injury or equipment damage.

Begin each procedure in this chapter with step 1. Follow the sequence outlined (each step assumes the previous step has been completed). In each step the normal operation of the product can be confirmed by answering **Yes** or **No** to the statement. Your response will lead to another 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.

To get data about the problem, start with the **Initial Actions**. To isolate or identify a problem and to make sure the repair after you complete each corrective action (replacing or adjusting a part, seating a connector, etc.) do the **Function checks**. The TotalCare® Bed System employs a built-in, fault analysis feature. Faults are displayed through the **Service required** indicator and/or the Graphical Caregiver Interface (GCI)® Control. The **Service required** indicator, on both intermediate siderail caregiver control panels, flashes to show a system malfunction.

The **Service required** indicator, when activated, shows the detected failure as a network fault message coded into three groups of flashes:

- The first flash group identifies the module number affected, followed by a 1 second delay.
- The second group of flashes shows the most significant number of the numerical fault code followed by another 1 second delay.
- The third group of flashes identifies the least significant number of the numerical fault code.

#### **NOTE:**

A 1 second delay separates each group.

To access the fault code information, simultaneously press the **TREND** and **REV TREND** control located on the intermediate siderail. To determine the fault code number, count the number of flashes in each group. After a 3 second delay, the completed fault code repeats once for each activation.

If multiple failures occur, the indicator may flash more than one fault code (see table 2-3 on page 2-16). A 60 second delay is required between consecutive activations of the fault codes.

The diagnostic GCI screens can be queried for system status information. To access the GCI Code screens, Do as follows:

1. Select the **Tools** tab on the GCI.
2. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
3. Select **Diagnostics**.
4. Select **Service Codes**. When selected, the diagnostic menu shows fault messages listed in numerical sequence and by fault code name. corrective actions are supplied within this chapter. The fault codes encountered show listed as follows, where “xxx” is the fault code:

ID	Code	1	2	3	4	Time
51	1	xxx	xxx	xxx	xxx	xxx

After you make sure the repairs with the functional checks, do **Final Actions**.

If the troubleshooting procedures do not isolate the problem, call Hill-Rom Technical Support.

## Initial Actions

To get data from operators about problems with the TotalCare® Bed System, use Initial Actions. Note symptoms or other information about the problem that the operator describes. This data helps identify the probable cause.

1. Someone who can explain the problem is available.

Yes    No

↓      → Go to “Function Checks” on page 2-5.

2. Ask that person to repeat or explain the problem. The problem can be repeated.

Yes    No

↓      → Go to “Function Checks” on page 2-5.

3. The problem is because of incorrect operator action.

Yes    No

↓      → Refer to table 2-1 on page 2-3, or go to “Function Checks” on page 2-5.

4. Instruct the operator to refer to the procedures in the *TotalCare® Bed System User Manual*. To make sure the correct operation of the TotalCare® Bed System is met, do “Function Checks” on page 2-5.

2

## Quick Reference Problem/Solution Matrix

The table below is supplied to quickly direct the technician to an applicable troubleshooting procedure if a problem with the bed system is readily identified.

**Table 2-1. Quick Reference Problem/Solution Matrix**

Problem	Solution
Patient air surface module with foot therapy—switch/stepper failures	RAP 2.1
Patient air surface module with foot therapy—pressure failures	RAP 2.2
Patient air surface module with foot therapy—blower/supply hose failures	RAP 2.4
Air blower malfunction	RAP 2.5
System power failures	RAP 2.6
Lockout control malfunction	RAP 2.7
Brake/steer malfunction	RAP 2.8

Problem	Solution
Indicators (LED) do not come on	RAP 2.9
Bed down control does not lower bed	RAP 2.10
Bed Up control does not raise bed	RAP 2.11
Chair position control malfunction	RAP 2.12
Bed flat control does not flatten bed	RAP 2.13
Caregiver control malfunction on head siderail and intermediate siderail	RAP 2.14
Reverse Trendelenburg/Trendelenburg control malfunction	RAP 2.15
Patient controls malfunction	RAP 2.17
CPR release malfunction	RAP 2.18
Emergency Trendelenburg malfunction	RAP 2.19
Trendelenburg/Reverse Trendelenburg malfunction	RAP 2.20
Hydraulic foot pump pedal does not raise bed	RAP 2.21
Siderail mechanism does not hold	RAP 2.22
SideCom® Communication System/Nurse Call malfunction	RAP 2.23
Bed Exit malfunction	RAP 2.24
Patient Exit/Priority Nurse Call malfunction	RAP 2.25
Night light does not come on	RAP 2.26
Patient entertainment malfunction	RAP 2.27
Patient light controls malfunction	RAP 2.28
Scale/GCI malfunction	RAP 2.29
Scale/GCI diagnostics and analog error troubleshooting	RAP 2.30
Scale/GCI—communication error	RAP 2.31
Scale/GCI—calibration error troubleshooting	RAP 2.32
Load beam—shorted excitation voltage	RAP 2.33
Hydraulic system malfunction	RAP 2.34
Hydraulic fluid leak	RAP 2.35
Maximum inflate malfunction	RAP 2.36
Treatment surface air bladders malfunction	RAP 2.37
Loss of therapy during transport	RAP 2.38

Problem	Solution
LON communication fault	RAP 2.39
Air manifold malfunction	RAP 2.40

## Function Checks

Function checks determine whether the TotalCare® Bed System is operating correctly. In the event of a malfunction, refer to the GCI, if equipped. Otherwise, refer to the siderail **Service required** indicator, and decode the flashes according to the fault codes detailed in “Fault Codes” on page 2-13.

Most caregiver control panel functions are available from both the right and left siderails. When you check the function controls, activate the control on each siderail to determine if the fault is contained in one or both of the siderails. If the **Service required** indicator flashes at any time during this procedure, go to the fault code list and do the corrective action (see table 2-3 on page 2-16).

1. Have you done the Initial Actions.

Yes    No

↓    → Go to “Initial Actions” on page 2-3.

2. Do as follows:

- a. Set the brake.
- b. Plug the left power cord into an applicable power source.
- c. Check for problems such as loose connections or damaged components.
- d. Articulate the patient surface to the flat position.

The **Service required** indicator on the caregiver control panel is on (not flashing).

Yes    No

↓    → Go to step 4.

3. Get fault codes by one of these methods:

- To read the fault message codes, simultaneously press the **TREND** and **REV TREND** control located on the intermediate siderail to flash fault codes on the flashing **Service required** indicator.
- Select the **Tools** tab on the GCI. Press the **Enter service code** button. Enter **812** for the code, and press **OK**. Select **Diagnostics**. Select **Service Codes**.

Fault codes are identified.

**Yes    No**

↓ → Go to table 2-3 on page 2-16.

4. Unplug the left power cord from its power source. The **Unplugged AC** indicator comes on.

**Yes    No**

↓ → Charge the battery.

5. Do these steps:

a. Plug the left power cord into an applicable power source.

b. Make sure all **lockouts** are disabled.

c. Press the **Bed Flat** control. The bed system moves to a flat level position.

**Yes    No**

↓ → Go to RAP 2.13.

6. With the bed system in the mid-height position, flat, and the foot section fully extended, press the individual section articulation controls (such as **Head Up**, **Head Down**, **Knee Up**, **Knee Down**, **Foot Up**, **Foot Down**, **Foot In**, **Foot Out**, **Bed Up**, **Bed Down**, **Trendelenburg and Reverse Trendelenburg**). The applicable section moves.

**Yes    No**

↓ → Operate the bed system from the opposite siderail.

7. The opposite siderail operates correctly.

**Yes    No**

↓ → Go to RAP 2.14.

8. With the footboard installed and the bed in the mid-height position, press and hold the **Chair** control. The bed system moves from bed to recliner to chair position and beeps when it gets to the chair position.

**Yes    No**

↓ → Go to RAP 2.12.

9. Remove the footboard. Press and hold the **Chair** control. The foot section continues downward to an 85° position.

Yes   No

↓      → Go to RAP 2.7.

10. Use the **Bed Flat** control to move the bed from the chair egress to the recliner, to the flat position. After a beep, the bed moves from chair egress to recliner, pauses, and then moves to the flat position.

Yes   No

↓      → Go to RAP 2.13.

11. With the bed system in the flat position, use the **patient** controls to raise the head section to the up position. The head and the knee sections automatically contour to a 50° head angle and 10° knee angle and do not drift down. (**Note:** 10° is midway through the knee range).

Yes   No

↓      → Go to RAP 2.17.

12. Use the **patient** controls to lower the head section to the flat position. The head and the knee sections move to the flat position.

Yes   No

↓      → Go to RAP 2.17.

13. Use the patient controls to raise the knee section to the up position. The knee section moves to the maximum up position, remains in the up position, and does not drift down.

Yes   No

↓      → Go to RAP 2.17.

14. Use the patient controls to lower the knee section to the flat position. The knee section moves to the flat position.

Yes   No

↓      → Go to RAP 2.17.

15. Put the bed system in the chair egress position. Press down on the foot **CPR/Trendelenburg** release pedal. The bed system flattens to the CPR position.

Yes   No

↓      → Go to RAP 2.18.

16. Use the foot controls to activate the Emergency Trendelenburg feature. The head end moves below the foot end.

Yes   No

↓      → Go to RAP 2.19.

17. Remove the AC power. Wait 45 seconds; then press the hilow **Bed Up** control, and pump the foot pump pedal. The bed system moves to the maximum high position, stays in the high position, and does not drift down.

**Yes    No**

↓      → Go to RAP 2.21.

18. Raise all of the siderails to the up position. All of the siderails lock in the up position.

**Yes    No**

↓      → Go to RAP 2.22.

19. Press the caregiver and patient **nurse call** controls. All nurse call features are operational.

**Yes    No**

↓      → Go to RAP 2.23.

20. Activate the **Bed Exit** feature and **Bed Exit** alarm on the GCI. The **Bed Exit** feature and alarm are operational.

**Yes    No**

↓      → Go to RAP 2.24.

The **Bed Exit** indicator on the GCI is **on**.

**Yes    No**

↓      → Go to RAP 2.24.

21. Deactivate the **Bed Exit** feature. The **Bed Exit** indicator on the GCI is **off**.

**Yes    No**

↓      → Go to RAP 2.25.

22. Cover the photocell. The night light is operational.

**Yes    No**

↓      → Go to RAP 2.26.

23. Activate the patient entertainment controls. The entertainment features are operational.

**Yes    No**

↓      → Go to RAP 2.27.

24. Activate the patient light features. The light features are operational.

**Yes    No**

↓      → Go to RAP 2.28.

25. If equipped, move through the various GCI screens. The GCI is functioning correctly.

Yes    No  
↓       → Go to RAP 2.28.

## Treatment Surface Diagnostics

If the **Service required** indicator flashes at any time during this procedure, go to the fault code table, and do the corrective action (see table 2-3 on page 2-16).

1. Have you done the Initial Actions.

Yes    No  
↓       → Go to "Initial Actions" on page 2-3.

2. Unplug the left power cord from its power source. The **Unplugged AC** indicator is on.

Yes    No  
↓       → Go to RAP 2.5.

3. Do as follows:

- a. Set the brakes.
- b. Check for problems such as loose connections or damaged components.
- c. Plug the left power cord into an applicable power source.
- d. Make sure all air hose routing is correct and the hoses are not kinked.

4. Articulate the patient surface to the flat position. The head, thigh, and seat zones inflate.

Yes    No  
↓       → Make sure all hose connections between the manifold and the hoses from the mattress are locked. Check for kinked hoses.

5. Squeeze and hold pressure on the head section. The head section deflates slightly within 30 seconds.

Yes    No  
↓       → Replace the control module, actuator, valve, or pressure sensor in the head section.

6. Release the pressure in the head section. The applicable head section inflates slightly within 30 seconds.

Yes    No  
↓       → Look for an incorrect electrical connection. Look for a kinked hose. Replace the air source blower.

7. Articulate the head section to 70°. After 30 seconds, wipe your hand firmly across the air mattress to make sure head, thigh, and seat zones are inflated. The head zone section has a lower (softer) pressure than the seat zone.

**Yes    No**

↓      → Calibrate the position sensors.

8. The system operates correctly.

**Yes    No**

↓      → Replace the head sensor and calibrate. See “Articulation Position Sensing System Calibration” on page 4-4.

9. Press the **Max-inflate** control on the intermediate siderail. After 30 seconds, wipe your hand across the foot section from the knee joint to the footboard, and make sure the three zones are inflated to a high pressure.

**Yes    No**

↓      → Calibrate the position sensors.

10. The system operates correctly.

**Yes    No**

↓      → Replace the sensor, and calibrate as necessary. See “Articulation Position Sensing System Calibration” on page 4-4.

11. Go to “Final Actions” on page 2-12.

## Air System Function Check

This test makes sure the air system works correctly, and it does not leak.

If the **service required** indicator flashes at any time during this procedure, go to the fault code table and do the corrective action (see table 2-3 on page 2-16).

1. Have you done the Initial Actions.

**Yes    No**

↓      → Go to “Initial Actions” on page 2-3.

2. Unplug the left power cord from its power source. The **Unplugged AC** indicator is on.

**Yes    No**

↓      → Charge the battery.

3. Do as follows:

a. Set the brakes.

b. Look for problems such as loose connections or damaged components.

- c. Plug the system power cord into an applicable power source. The surface initialization takes approximately 30 seconds.
  - d. Make sure all air hose routing is correct and the hoses are not kinked.
4. Press the Max-inflate control on the intermediate siderail. The blower turns off in less than 2 minutes.  
**Yes    No**  
↓       → Go to RAP 2.2.
5. Press the Normal mode. The Normal mode is active.  
**Yes    No**  
↓       → Go to RAP 2.2.
  6. The blower stays off for an additional 5 minutes.

2

**NOTE:**

Any patient movement may cause the blower to turn on prematurely.

**Yes    No**  
↓       → Go to RAP 2.2.

7. Go to “Final Actions” on page 2-12.

## Foot Section

This test makes sure the air module board has sent the correct air pressures to inflate the foot air cushions and has operated other features.

If the **service required** indicator flashes at any time during this procedure, go to the fault code table and do the corrective action (see table 2-3 on page 2-16).

1. Have you done the Initial Actions.  
**Yes    No**  
↓       → Go to “Initial Actions” on page 2-3.
2. Unplug the left power cord from its power source. The **Unplugged AC** indicator is on.  
**Yes    No**  
↓       → Charge the battery.
3. Do as follows:
  - a. Set the brakes.
  - b. Look for problems such as loose connections or damaged components.
  - c. Plug the system power cord into an applicable power source.
  - d. Make sure all air hose routing is correct and the hoses are not kinked.

**Yes      No**

↓            → Proceed to RAP 2.2.

4. Move the head section to the flat position and the foot section to the fully extended position.
5. Go to RAP 2.25.
6. Go to “Final Actions” on page 2-12.

---

## **Final Actions**

1. Complete the necessary preventive maintenance procedures. See “Preventive Maintenance Checklist” on page 6-13.
2. Complete all necessary administrative tasks.

## Fault Codes

The TotalCare® Bed System uses a detection system to determine any faults with the various system modules that function as sub-systems of the TotalCare® Bed System. These faults are sent from the faulted module to the TotalCare® Bed System communication network and are then shown through the **Service required** indicator and/or the GCI.

The TotalCare® Bed System alerts the caregiver to a system fault by repeatedly pulsing the **Service required** indicator on the intermediate caregiver siderail panel. The fault message can then be accessed through the **Service required** indicator by simultaneously press the **TREND** and **REV TREND** control located on the intermediate siderail. After a 3-second delay, the numeric fault message is then displayed in a coded series of flashes through the **Service required** indicator. The number of the module initiating the fault is displayed first and is found by counting the number of flashes emitted by the **Service required** indicator (see table 2-2 on page 2-14). After a 1-second delay, a series of flashes shows the numeric value of the first fault code group, which could be a number between 1 and 15. After another 1-second delay, another series of flashes shows the numeric value of the second, final fault code group, 1-15. After a 3-second delay, the **Service required** indicator repeats the complete fault code one time. Use table 2-3 on page 2-16 to look up the fault code. Find the row containing the three group fault code number and fault description. Do the applicable RAP to the correctethe problem.

If the GCI option is installed, the diagnostic GCI screens can be accessed for system status information. To access the GCI Code screens, do as follows:

1. Select the **Tools** tab on the GCI.
2. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
3. Select **Diagnostics**.
4. Select **Service Codes**. When selected, the diagnostic menu shows fault messages listed in numerical sequence and by fault code name. corrective actions are provided within this chapter.

**NOTE:**

Refer to ID and Field #1 in most cases.

## Module Identification

The module identification numbers used for fault isolation codes (see table 2-3 on page 2-16) are described in table 2-2 on page 2-14.

**Table 2-2. Table of Module Identification Numbers**

Module ID Number		Module Identification Description
LED	GCI	
1	10	Power control module
2	20	Right intermediate siderail module
3	30	Left intermediate siderail module
4	40	GCI
5	50	Weigh frame module
6	60	Reserved
7	70	Reserved
8	80	Patient air surface module with foot therapy (see RAP 2.1, RAP 2.2, and RAP 2.4)
8	85	P500 surface—LON interface P.C. board
8	87	P500 surface—Air control P.C. board or AC P.C. board
9	90	TFM (echelon)
9	91	TFM 8051
9	92	PPM 8051
9	93	PRM 8051
9	94	PBM 8051
9	95	TTM 8051
16	G0	Pendant
9	96	Low Air loss Module 8051

## Fault Codes

Use table 2-3 on page 2-16, table 2-4 on page 2-42, table 2-5 on page 2-43, or table 2-6 on page 2-68, find the module number in the first column, **Select Group** (1 to 5). Find the second blinked fault code number in the second column, **Code Group 1**, (1 to 10). Find the final, third, blinked fault code number in the third column, **Code Group 2** (1 to 15). A description of the cause/action for the fault code is found in column 4, **Description of Service Required Fault Code**.

The GCI fault codes are listed under the **GCI Control Code** columns of 2. The **ID** column lists the numeric identifier of the module affected, as referenced in table 2-2 on page 2-14, and the **Field 1** column lists the type of fault encountered (see table 2-3 on page 2-16).

**NOTE:**

For fault code ID 80, patient air surface module with foot therapy, see RAP 2.1, RAP 2.2, and RAP 2.4.

**Table 2-3. Fault Code Descriptions**

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
1	1	1	<b>Position sensor calibration mode</b> —Do the position sensor calibration procedure.	10	17
1	1	2	<b>Bed position sensors not calibrated</b> —Calibrate position sensors. If problem persists, check sensors and/or cabling. If problem persists replace power control module (PCM) P.C. board (refer to procedure 4.47).	10	18
1	1	3	<b>Network termination fault</b> —Check for additional fault codes, check that left user control module (UCM), SideCom® Communication System module (SCM), and treatment foot surface control module (TFSCM) is operational; check that jumper plugs are installed correctly at weigh frame junction P.C. board, and check all network cabling.	10	19
1	1	4	<b>FPGA configuration failure</b> —Cycle power. If the problem persists, replace the PCM P.C. board (refer to procedure 4.47).	10	20
1	1	5	<b>Solenoid update command to PIC failure</b> —Cycle power. If the problem persists, replace the PCM P.C. board (refer to procedure 4.47).	10	21
1	1	6	<b>Serial EEPROM write failure</b> —Check for additional fault codes or possible lockout failure, and replace the PCM P.C. board (refer to procedure 4.47).	10	22
1	1	7	<b>Serial EEPROM read failure</b> —Check for additional fault codes, possible lockout failure, and replace the PCM P.C. board (refer to procedure 4.47).	10	23
1	1	8	<b>Serial EEPROM confirm test failure</b>	10	24
1	1	9	<b>Neuron self-test failure</b>	10	25
1	1	10	<b>Neuron EEPROM failure</b>	10	26
1	1	11	<b>Lockout failure, EEPROM corrupted or uninitialized</b> —Make sure lockout operation. If the problem persists, replace the PCM P.C. board (refer to procedure 4.47).	10	27
1	1	12	<b>Calibration Recall failure</b> —EEPROM failure	10	28

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
1	1	13	<b>PSS Configuration failure</b> —EEPROM failure	10	29
1	2	1	<b>Position sensor failure</b> —The head position sensor voltage is out of range. Check the sensor mechanism, sensor output, and cabling. The sensor output should be between 0.5 V DC and 4.5 V DC. If no problem is found, reset the bed, and try to cause the fault.	10	33
1	2	2	<b>Position sensor failure</b> —The knee position sensor voltage is out of range. Check the sensor mechanism, sensor output, and cabling. The sensor output should be between 0.5 V DC and 4.5 V DC. If no problem is found, reset the bed, and attempt to duplicate the fault.	10	34
1	2	3	<b>Position sensor failure</b> —The foot articulation position sensor voltage is out of range. Check the sensor mechanism, sensor output, and cabling. The sensor output should be between 0.5 V DC and 4.5 V DC. If no problem is found, reset the bed, and attempt to duplicate the fault.	10	35
1	2	4	<b>Position sensor failure</b> —The foot retraction position sensor voltage is out of range. Check the sensor mechanism, sensor output, and cabling. The sensor output should be between 0.5 V DC and 4.5 V DC. If no problem is found, reset the bed, and attempt to duplicate the fault.	10	36
1	2	5	<b>Position sensor failure</b> —The foot hilow position sensor voltage is out of range. Check the sensor mechanism, sensor output, and cabling. The sensor output should be between 0.5 V DC and 4.5 V DC. If no problem is found, reset the bed, and attempt to duplicate the fault.	10	37
1	2	6	<b>Position sensor failure</b> —The head hilow position sensor voltage is out of range. Check the sensor mechanism, sensor output, and cabling. The sensor output should be between 0.5 V DC and 4.5 V DC. If no problem is found, reset the bed, and attempt to duplicate the fault.	10	38

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
1	4	1	<b>Communication failure RT_UCM</b> —Check for right UCM fault code. Check cabling. If problem persists replace the right UCM.	10	65
1	4	2	<b>Communication failure with LT_UCM</b> —Check for left UCM fault code. Check cabling. If problem persists, replace the left UCM.	10	66
1	4	3	<b>Communication failure with GCI</b> —Check cabling. If problem persists, replace the GCIM.	10	67
1	4	4	<b>Communication failure with Scale Module</b> —Check cabling. If problem persists, replace the SM.	10	68
1	4	6	<b>Communication failure with SideCom® Communication System Module</b> —Check cabling. Refer to RAP.	10	70
1	4	7	<b>Communication failure with TFSCM</b> —Check cabling. If problem persists, replace the TFSCM.	10	71
1	4	8	<b>Communication failure with PIC (PIC QUERY)</b> —Cycle power. If problem persists, replace the PCM P.C. board.	10	72
1	4	9	<b>Communication failure with PIC (UPDATE)</b> —Cycle power. If problem persists, replace the PCM P.C. board.	10	73
1	4	10	<b>Communication failure with caregiver pendant</b> —Check cabling. Test alternate auxiliary network connector. If problem persists replace the caregiver pendant.	10	74
1	4	11	<b>Communication failure with patient pendant</b> —Check cabling. Test alternate auxiliary network connector. If problem persists, replace the patient pendant.	10	75
1	5	1	<b>+15 V battery Voltage failure</b>	10	81
1	5	2	<b>+8.5 V battery Voltage failure</b>	10	82
1	5	3	<b>PCM node disabled</b> —Diagnostic mode entered	10	83
2	2	1	Replace right caregiver P.C. board	20	33
2	2	2	Replace right caregiver P.C. board	20	34

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
2	2	3	Replace right caregiver P.C. board	20	35
2	2	4	Replace right caregiver P.C. board	20	36
2	3	1	Replace right caregiver P.C. board	20	49
2	4	1	<b>Loss of communication with PCM</b> —Check cabling. If the problem persists, replace the right caregiver P.C. board.	20	65
2	7	2	Replace right caregiver P.C. board	20	85
2	7	1	Replace right caregiver P.C. board	20	113
3	2	1	Replace left caregiver P.C. board.	30	33
3	2	2	Replace left caregiver P.C. board.	30	34
3	2	3	Replace left caregiver P.C. board.	30	35
3	2	4	Replace left caregiver P.C. board.	30	36
3	3	1	Replace left caregiver P.C. board.	30	49
3	4	1	<b>Loss of communication with PCM</b> —Check cabling. If the problem persists, replace the left caregiver P.C. board.	30	65
3	7	2	Replace left caregiver P.C. board.	30	85
3	7	1	Replace left caregiver P.C. board.	30	113
5	1	1	<b>Improper starting address for page size</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	17
5	1	2	<b>Address out of range</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	18
5	1	3	<b>EEPROM busy too long</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	19
5	1	4	<b>EEPROM address not valid</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	20
5	1	5	<b>Neuron reset</b> —Shows the neuron went through reset. Normal on power up.	50	21

<b>Select Group</b>	<b>Code Group #1</b>	<b>Code Group #2</b>	<b>Description of Service Required Fault Code</b>	<b>GCI Control Code</b>	
				<b>ID</b>	<b>Field #1</b>
5	1	6	<b>Software generated reset</b> —Software caused the neuron to reset. This can occur due to an Electro Static Discharge (ESD) event; however, it should not happen very often. Could show problem with the A/D converter if it happens consistently.	50	22
5	1	7	<b>A/D time-out</b> —Invalid operation. This condition should not occur on a working board. Remove power, and reset the scale. If error is repeatable, replace the board.	50	23
5	1	8	<b>Could not read serial EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	24
5	1	9	<b>EEPROM busy too long</b> —Invalid operation. This condition should not occur on a working board. Remove power, and reset the scale. If error is repeatable, replace the board.	50	25
5	1	10	<b>Number of bytes to read out of range</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	26
5	1	11	<b>Number of bytes to read out of range</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	27
5	1	12	<b>EEPROM busy too long</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	28
5	1	13	<b>PED check sums do not match</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	29
5	1	14	<b>Error getting beam readings</b> —Look at additional error codes in the GCI or Service Required value field.	50	30
5	1	15	<b>Invalid diagnostic command</b> —A diagnostic command that it does not support was sent to the scale.	50	31

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	2	1	<b>Invalid range for A/D reading</b> —Possible causes are too much weight on a section of the bed, beam failure, board failure, or no weight on beams. Use diagnostics to read the A/D values, and determine which beam caused the invalid reading.	50	33
5	2	2	<b>Non-valid diagnostic command</b> —A diagnostic command that the scale did not recognize was sent.	50	34
5	2	3	<b>Floating point error, weight calc range error</b> —Scale can not calculate the weight, there is too much weight on the bed, the bed was not zeroed, or there is an open beam.	50	35
5	2	4	<b>Constructor returned error, invalid ranges</b> —The zero reading, A/D reading, or coefficients are not in range. Look at additional error codes in the GCI or Service Required value field.	50	36
5	2	6	<b>General calibration error, beam readings, zero readings, max values</b> —Error during calibration. Use the GCI to view the error history and additional error codes.	50	38
5	2	7	<b>Try to get PED readings, A/D error returned</b> —The A/D reading is not available. Look at additional error codes in the GCI or Service Required value field.	50	39
5	2	8	<b>Tried to get A/D readings</b> —The A/D timed out. Use diagnostics to view the A/D readings. Apply weight to the bed to see if the A/D readings change. A scale board power reset will re-initialize the A/D; however, if the problem persists, replace the board.	50	40
5	2	9	<b>Initial PED weight error</b> —PED must have a minimum weight on the bed to be enabled. The bed may need to be zeroed, or there may be a board/beam/frame problem.	50	41
5	2	10	<b>Alarm generated too many errors detected</b> —Errors were detected while monitoring PED. Look at additional error codes in the GCI or Service Required value field.	50	42

2

<b>Select Group</b>	<b>Code Group #1</b>	<b>Code Group #2</b>	<b>Description of Service Required Fault Code</b>	<b>GCI Control Code</b>	
				<b>ID</b>	<b>Field #1</b>
5	2	11	<b>PED weight too small</b> —PED was not enabled because the scale did not measure 50 lb or more on the bed. do a weigh function, and measure the weight on the bed. Zero the bed.	50	43
5	2	13	<b>PED_construct error reading set weigh offset, EEPROM error</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	45
5	3	3	<b>SAVE_PED error writing</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	51
5	3	4	<b>Save_coefficient_values</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	52
5	3	5	<b>Save_zero_values</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	53
5	3	6	<b>Save_beam_rdgs</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	54
5	3	7	<b>Save_offset_adj</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	55
5	3	8	<b>Save_offset_adj</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	56
5	3	9	<b>GET_ZERO_VALUES could not confirm</b> —Zero readings were not the same in at least two of the three serial EEPROM locations. Zero the bed and run the board self-test from diagnostics. If problem persists, replace the board.	50	57
5	3	10	<b>GET_ZERO_VALUES could not read</b> —Zero the bed. If problem persists, replace the board.	50	58

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	3	11	<b>GET_PED_VALUES could not confirm</b> —PED parameters were not the same in at least two of the three serial EEPROM locations. Run the board self-test from diagnostics. If problem persists, replace the board.	50	59
5	3	12	<b>GET_PED_VALUES could not read</b> —Enable PED again. If problem persists, replace the board.	50	60
5	3	13	<b>Coefficient could not confirm</b> —The coefficient value was not the same in at least two of the three serial EEPROM locations. Run the board self-test from diagnostics. If it passes, calibrate the scale again; if the error still persists, replace the board.	50	61
5	3	14	<b>Coefficient could not read</b> —Run the board self-test from diagnostics. If the board passes, use the diagnostic commands to make sure the calibration coefficients. If problem persists, replace the board.	50	62
5	3	15	<b>GET_OFFSET_ADJ_VALUES could not confirm</b> —The offset value was not the same in at least two of the three serial EEPROM locations. Run the board self-test from diagnostics. If it passes, zero the scale; if the error still persists, replace the board.	50	63
5	4	1	<b>GET_OFFSET_ADJ_VALUES could not confirm last weight</b> —The last weight value was not the same in at least two of the three serial EEPROM locations. Run the board self-test from diagnostics. If it passes, weigh the patient; if the error still persists, replace the board.	50	65
5	4	2	<b>GET_OFFSET_ADJ_VALUES could not confirm</b> —The offset value was not the same in at least two of the three serial EEPROM locations. Run the board self-test from diagnostics. If it passes, zero the scale; if the error still persists, replace the board.	50	66
5	4	3	<b>GET_OFFSET_ADJ_VALUES could not read last weight</b> —Weigh the patient. If problem persists, replace the board.	50	67

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	4	4	<b>GET_BEAM_RDGS could not confirm</b> —The calibration beam readings were not the same in at least two of the three serial EEPROM locations. Run the board self-test from diagnostics. This is not a fatal error; calibration data may be lost, but coefficients may be intact. Check the coefficient values with diagnostics.	50	68
5	4	5	<b>GET_BEAM_RDGS could not read</b> —Could not read the calibration beam readings. Run the board self-test from diagnostics.	50	69
5	4	6	<b>EEPROM_WRITE_BYTE could not write</b> —Could not write the value to EEPROM. Run the board self test from diagnostics.	50	70
5	4	7	<b>EEPROM_READ_BYTE could not read</b> —Could not read the EEPROM value. Run the board self-test from diagnostics.	50	71
5	4	8	<b>EEPROM_TEST error saving</b> —EEPROM failure, replace the board.	50	72
5	4	9	<b>EEPROM_TEST error confirming</b> —EEPROM failure, replace the board.	50	73
5	4	10	<b>EEPROM_TEST write/read compare</b> —EEPROM failure, replace the board.	50	74
5	4	11	<b>Coefficients not in range after calculated</b> —The coefficients were calculated, but the range is not valid. The beam readings may not have changed during calibration (a result of board failure, a faulty beam, or frame error). Run the board self-test from diagnostics. Use diagnostics to view the beam A/D readings and make sure they change when weight is added above each beam.	50	75
5	4	12	<b>WEIGH_ZERO_CMD no zero with PED on</b> —The bed cannot be zeroed with PED on.	50	76

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	4	13	<b>Error taking weight,</b> <b>PED_STATE_INITIAL_NO_WEIGHT</b> —Try a weigh function, and check error codes. Reset the scale. If the problem continues, check A/D readings with diagnostic commands.	50	77
5	4	14	<b>EEPROM_TEST read error</b> —EEPROM failure, replace the board.	50	78
5	4	15	<b>VALID_COEFFICIENT, ch0 not in range</b> —Coefficient is not in valid range. Use diagnostics to view the calibration coefficients. Run the board self-test from diagnostics. Use diagnostics to view the beam A/D readings, and make sure they change when weight is added above each beam. Calibrate the bed.	50	79
5	5	1	<b>VALID_COEFFICIENT, ch1 not in range</b> —Coefficient is not in valid range. Use diagnostics to view the calibration coefficients. Run the board self-test from diagnostics. Use diagnostics to view the beam A/D readings, and make sure they change when weight is added above each beam. Calibrate the bed.	50	81
5	5	2	<b>VALID_COEFFICIENT, ch2 not in range</b> —Coefficient is not in valid range. Use diagnostics to view the calibration coefficients. Run the board self-test from diagnostics. Use diagnostics to view the beam A/D readings, and make sure they change when weight is added above each beam. Calibrate the bed again.	50	82
5	5	3	<b>VALID_COEFFICIENT, ch3 not in range</b> —Coefficient is not in valid range. Use diagnostics to view the calibration coefficients. Run the board self-test from diagnostics. Use diagnostics to view the beam A/D readings, and make sure they change when weight is added above each beam. Calibrate the bed.	50	83
5	5	4	<b>Zero ch0, not in range</b> —Zero for right foot is not in a valid range. Zero the bed. This could be a serial EEPROM error. Run the board self-test from diagnostics.	50	84

2

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	5	5	<b>Zero ch1, not in range</b> —Zero for left foot is not in a valid range. Zero the bed. This could be a serial EEPROM error. Run the board self-test from diagnostics.	50	85
5	5	6	<b>Zero ch2, not in range</b> —Zero for left head is not in a valid range. Zero the bed. This could be a serial EEPROM error. Run the board self-test from diagnostics.	50	86
5	5	7	<b>Zero ch3, not in range</b> —Zero for right head is not in a valid range. Zero the bed. This could be a serial EEPROM error. Run the board self-test from diagnostics.	50	87
5	5	8	<b>VALID_AD_RDGS, readings ch0</b> —A/D beam readings for right foot are not in range. Could be too much weight on bed, A/D error, or beam failure. Run the board self-test from diagnostics.	50	88
5	5	9	<b>VALID_AD_RDGS, readings ch1</b> —A/D beam readings for left foot are not in range. There could be too much weight on bed, or A/D error, or a beam failure. Run the board self-test from diagnostics.	50	89
5	5	10	<b>VALID_AD_RDGS, readings ch2</b> —A/D beam readings for left head are not in range. Could be too much weight on bed, A/D error, or beam failure. Run the board self-test from diagnostics.	50	90
5	5	11	<b>VALID_AD_RDGS, readings ch3</b> —A/D beam readings for right head are not in range. There could be too much weight on bed, or A/D error, or a beam failure. Run the board self-test from diagnostics.	50	91
5	5	12	<b>PED readings ch0, not in range</b> —A/D beam readings for right foot are not in range. There could be too much weight on bed, or A/D error, or a beam failure. Run the board self-test from diagnostics.	50	92
5	5	13	<b>PED readings ch1, not in range</b> —A/D beam readings for left foot are not in range. There could be too much weight on bed, or A/D error, or a beam failure. Run the board self-test from diagnostics.	50	93

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	5	14	<b>PED readings ch2, not in range</b> —A/D beam readings for left head are not in range. There could be too much weight on bed, or A/D error, or a beam failure. Run the board self-test from diagnostics.	50	94
5	5	15	<b>PED readings ch3, not in range</b> —A/D beam readings for right head are not in range. There could be too much weight on bed, or A/D error, or a beam failure. Run the board self-test from diagnostics.	50	95
5	6	1	<b>Error writing to EEPROM</b> —Check with diagnostic self test. If self-test fails, replace the board.	50	97
5	6	2	<b>SAVE_PED_DELAY writing to EEPROM</b> —Enable PED. If problem persists, run diagnostic self-test. Then replace the board.	50	98
5	6	3	<b>Could not save PED state bits to EEPROM</b> —Enable PED. If problem persists, run diagnostic self-test. Then replace the board.	50	99
5	6	4	<b>Could not save to EEPROM, SAVE_PED_INIT_WEIGHT</b> —Enable PED. If problem persists, run diagnostic self-test. Then replace the board.	50	100
5	6	5	<b>PED_STATE_MONITOR, could not start PED, maximum PED error</b> —Run diagnostic self-test and check A/D readings. If problem persists, replace the board.	50	101
5	6	6	<b>Could not load beam readings or zero from cal data, EEPROM error</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	102
5	6	7	<b>Enabled PED and PCM not detected</b> —The scale cannot communicate with the PCM. Bed Exit cannot be enabled if the PCM is not detected.	50	103
5	6	9	<b>Time-out response from PCM</b> —Communication error that may not be related to scale. Check PCM.	50	105
5	6	10	<b>Time-out response from SCM</b> —Communication error that may not be related to scale. Check SCM.	50	106

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	6	11	<b>SAVE_SERIAL_NUMBER, error writing to EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	107
5	6	12	<b>GET_SERIAL_NUMBER—confirm failed</b> —Invalid operation—this condition should not occur on a working board. If error is repeatable, replace the board.	50	108
5	6	13	<b>GET_SERIAL_NUMBER—read time-out</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	109
5	6	15	<b>SAVE_ERRORS—EEPROM time-out</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	111
5	7	1	<b>GET_ERROR—confirm failed</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	113
5	7	2	<b>GET_ERROR—read time-out</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	114
5	7	3	<b>SAVE_ALARM—write time-out</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	115
5	7	4	<b>GET_ALARM—confirm failed</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	116
5	7	5	<b>GET_ALARM—read time-out</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	117
5	7	6	<b>Unrecognized command passed</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	118
5	7	7	<b>EEPROM error, offset</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	119

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	7	8	<b>EEPROM error, zero</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	120
5	7	9	<b>EEPROM error, coefficient</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	121
5	7	10	<b>Range for zero or coefficient is not valid</b> —Zero the bed, and run diagnostic self-test. Make sure A/D readings with diagnostics. If problem persists, replace the board.	50	122
5	7	11	<b>Could not save weight, EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	123
5	7	12	<b>Could not save coefficients to EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	124
5	7	13	<b>Could not save calibration data/beam readings to EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	125
5	7	14	<b>WEIGH_ZERO_CMD error saving offset, EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	126
5	7	15	<b>WEIGH_ZERO_CMD could not save zero to EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	127
5	8	1	<b>Could not get zero from EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	129
5	8	2	<b>Could not get coefficients from EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	130

<b>Select Group</b>	<b>Code Group #1</b>	<b>Code Group #2</b>	<b>Description of Service Required Fault Code</b>	<b>GCI Control Code</b>	
				<b>ID</b>	<b>Field #1</b>
5	8	4	<b>Could not save serial number to EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	132
5	8	5	<b>Could not write to EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	133
5	8	6	<b>Could not read from EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	134
5	8	7	<b>Could not write to EEPROM, new board test</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	135
5	8	8	<b>Could not read from EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	136
5	8	9	<b>A/D power up reset error</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	137
5	8	10	<b>Could not read serial number from EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, replace the board.	50	138
5	8	11	<b>Error getting A/D readings</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	139
5	8	13	<b>Error saving PED data to EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	141

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	8	14	<b>EEPROM write error, could not update coefficients</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	142
5	8	15	<b>Calculated weight too large, &gt; 327.67 kg</b> —Scale cannot calculate the weight because there is too much weight on the bed, the bed was not zeroed, or there is an open beam.	50	143
5	9	1	<b>Weight—RF    invalid range RF</b> —Calibration weight was added to the right foot, and the RF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	145
5	9	2	<b>Weight—RF    invalid range LF</b> —Calibration weight was added to the right foot, and the LF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	146
5	9	3	<b>Weight—RF    invalid range LH</b> —Calibration weight was added to the right foot, and the LH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	147
5	9	4	<b>Weight—RF    invalid range RH</b> —Calibration weight was added to the right foot, and the RH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	148

<b>Select Group</b>	<b>Code Group #1</b>	<b>Code Group #2</b>	<b>Description of Service Required Fault Code</b>	<b>GCI Control Code</b>	
				<b>ID</b>	<b>Field #1</b>
5	9	5	<b>Weight—LF    invalid range RF</b> —Calibration weight was added to the left foot, and the RF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	149
5	9	6	<b>Weight—LF    invalid range LF</b> —Calibration weight was added to the left foot, and the LF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	150
5	9	7	<b>Weight—LF    invalid range LH</b> —Calibration weight was added to the left foot, and the LH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	151
5	9	8	<b>Weight—LF    invalid range RH</b> —Calibration weight was added to the left foot, and the RH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	152
5	9	9	<b>Weight—LH    invalid range RF</b> —Calibration weight was added to the left head, and the RF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	153
5	9	10	<b>Weight—LH    invalid range LF</b> —Calibration weight was added to the left head, and the LF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	154

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	9	11	<b>Weight—LH    invalid range LH</b> —Calibration weight was added to the left head, and the LH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	155
5	9	12	<b>Weight—LH    invalid range RH</b> —Calibration weight was added to the left head, and the RH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	156
5	9	13	<b>Weight—RH    invalid range RF</b> —Calibration weight was added to the right head, and the RF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	157
5	9	14	<b>Weight—RH    invalid range LF</b> —Calibration weight was added to the right head, and the LF beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	158
5	9	15	<b>Weight—RH    invalid range LH</b> —Calibration weight was added to the right head, and the LH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	159
5	10	1	<b>Weight—RH    invalid range RH</b> —Calibration weight was added to the right head, and the RH beam reading was invalid. This could be a beam, board, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	161

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Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	10	3	<b>Cal zero RF not valid</b> —Zero value for the right foot beam was not valid. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	163
5	10	4	<b>Cal zero LF not valid</b> —Zero value for the left foot beam was not valid. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	164
5	10	5	<b>Cal zero LH not valid</b> —Zero value for the left head beam was not valid. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	165
5	10	6	<b>Cal zero RH not valid</b> —Zero value for the right head beam was not valid. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings.	50	166
5	10	7	<b>Right foot max in wrong place</b> —During calibration the weight was placed over the right foot, and this beam did not show the maximum reading. The beam wires connected to the board may be in the wrong location, or the calibration weight was placed in the wrong position during calibration.	50	167
5	10	8	<b>Left foot max in wrong place</b> —During calibration the weight was placed over the left foot, and this beam did not show the maximum reading. The beam wires connected to the board may be in the wrong location, or the calibration weight was placed in the wrong position during calibration.	50	168
5	10	9	<b>Left head max in wrong place</b> —During calibration the weight was placed over the left head, and this beam did not show the maximum reading. The beam wires connected to the board may be in the wrong location, or the calibration weight was placed in the wrong position during calibration.	50	169

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
5	10	10	<b>Right head max in wrong place</b> —During calibration the weight was placed over the right head, and this beam did not show the maximum reading. The beam wires connected to the board may be in the wrong location, or the calibration weight was placed in the wrong position during calibration.	50	170
5	10	11	<b>Error saving calibration zero data</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	171
5	10	12	<b>Error confirming calibration zero data</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	172
5	10	13	<b>Error getting calibration zero data</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	173
5	10	14	<b>WEIGH_SETWEIGHT_CMD error saving offset, EEPROM</b> —Invalid operation. This condition should not occur on a working board. If error is repeatable, after power reset, replace the board.	50	174
5	10	15	<b>FP error calculating coefficients</b> —The coefficients cannot be calculated. The beam readings may not have changed during calibration because of — board failure, a faulty beam, or frame error. Run the board self-test from diagnostics to test the board. Use diagnostics to view the beam A/D readings and make sure they change when weight is added above each beam.	50	175
8	1	1	<b>TFSCM pressure valve home position from closed failure</b> -TFSCM stepper motor problem, check cabling, replace module.	80	17
8	1	2	<b>TFSCM vacuum valve home position from closed failure</b> -TFSCM stepper motor failure - TFSCM cable disconnected - TFSCM valve control common disconnected - vacuum valve control disconnected.	80	18

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
8	1	3	<b>TFSCM pressure valve early close warning</b> - TFSCM stepper motor problem, check cabling, replace module.	80	19
8	1	4	<b>TFSCM pressure valve early close failure</b> - TFSCM stepper motor problem, check cabling, replace module.	80	20
8	1	5	<b>TFSCM vacuum valve early close warning</b> - TFSCM stepper motor problem, check cabling, replace module.	80	21
8	1	6	<b>TFSCM vacuum valve early close failure</b> - TFSCM stepper motor problem, check cabling, replace module.	80	22
8	1	7	<b>TFSCM pressure valve late close failure</b> - TFSCM stepper motor problem, check cabling, replace module.	80	23
8	1	8	<b>TFSCM vacuum valve late close failure</b> - TFSCM stepper motor problem, check cabling, replace module.	80	24
8	1	9	<b>TFSCM both valves open (both controls contacted)</b> - TFSCM stepper motor problem, check cabling, replace module.	80	25
8	2	1	<b>TSCM pressure valve home position from closed failure</b> - TSCM stepper motor problem, check cabling, replace module.	80	33
8	2	2	<b>TSCM vacuum valve home position from closed failure</b> - TSCM stepper motor problem, check cabling, replace module.	80	34
8	2	3	<b>TSCM pressure valve early close warning</b> - TSCM stepper motor problem, check cabling, replace module.	80	35
8	2	4	<b>TSCM pressure valve early close failure</b> - TSCM stepper motor problem, check cabling, replace module.	80	36
8	2	5	<b>TSCM vacuum valve early close warning</b> - TSCM stepper motor problem, check cabling, replace module.	80	37

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
8	2	6	<b>TSCM vacuum valve early close failure</b> - TSCM stepper motor problem, check cabling, replace module.	80	38
8	2	7	<b>TSCM pressure valve late close failure</b> - TSCM stepper motor problem, check cabling, replace module.	80	39
8	2	8	<b>TSCM vacuum valve late close failure</b> - TSCM stepper motor problem, check cabling, replace module.	80	40
8	2	9	<b>TFSCM both valves open (both controls contacted)</b> - TSCM stepper motor problem, check cabling, replace module.	80	41
8	3	1	LARCM removed while in therapy mode.	80	49
8	3	2	HARCM removed while in therapy mode.	80	50
8	3	3	PVCM removed while in therapy mode.	80	51
8	3	4	AUX 1 removed while in therapy mode.	80	52
8	3	5	AUX 2 removed while in therapy mode.	80	53
8	3	6	<b>Communication failure</b> - Missed message warning (P.C.M limit control status) - Check base to weigh frame signal cable, check continuity LONA and LONB signals from P2 to P8 through right siderail - Defective board - Check weigh frame to surface cable connections - Defective P.C. board - Defective cable - Missing jumper.	80	54
8	3	7	<b>Communication failure (P.C.M Limit control Status)</b> - Check base to weigh frame signal cable - Defective P.C. board.	80	55
8	3	8	<b>Communication failure</b> - Missed message warning (P.C.M articulation status) - Check base to weigh frame signal cable - Defective P.C. board.	80	56
8	3	9	<b>Communication failure (P.C.M articulation status)</b> - Check base to weigh frame signal cable - Defective P.C. board.	80	57

<b>Select Group</b>	<b>Code Group #1</b>	<b>Code Group #2</b>	<b>Description of Service Required Fault Code</b>	<b>GCI Control Code</b>	
				<b>ID</b>	<b>Field #1</b>
8	3	10	<b>Communication failure</b> - Missed message warning (P.C.M bed status) - Check base to weigh frame signal cable - Defective P.C. board.	80	58
8	3	11	<b>Communication failure (P.C.M bed status)</b> - Check base to weigh frame signal cable - Defective P.C. board - Check continuity LONA and LONB signals from P2 to P8 through right siderail - Defective P.C. board - Check weigh frame to surface cable connections - Defective P.C. board - Defective cable - Missing jumper - Defective P.C.M.	80	59
8	3	12	<b>Communication failure</b> - Missed message warning (right UCM control status) - Check continuity LONA and LONB signals from P2 to P8 through right siderail - Defective P.C. board - Check weigh frame to surface cable connections - Defective P.C. board - Defective cable - Missing jumper - Defective right UCM.	80	60
8	3	13	<b>Communication failure</b> - Missed message warning (left UCM control status) - Check left intermediate siderail cable LONA, LONB. Defective left UCM.	80	61
8	3	14	<b>Missed message warning (GCI control status)</b> - Check left intermediate siderail cable LONA, LONB. Replace cable - Check GCI cable - Right UCM not sending signal - Defective right UCM.	80	62
8	3	15	<b>Communication failure (No UCM control status)</b> - Check right intermediate siderail cable LONA, LONB. Replace cable.	80	63
8	4	1	Reserved	80	65
8	4	2	Reserved	80	66
8	4	3	Reserved	80	67
8	4	4	Reserved	80	68
8	4	6	Reserved	80	70
*	*	*	Reserved	80	71
8	4	8	Reserved	80	72
*	*	*	Reserved	80	73

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
8	4	10	Reserved	80	74
8	5	1	<b>Neuron memory corrupt warning</b> - Replace TFSCM module.	80	81
8	5	2	<b>Neuron memory corrupt failure</b> - TFSCM control failure. Replace TFSCM module.	80	82
8	5	3	<b>TSCM memory corrupt warning</b> - Replace TFSCM module.	80	83
8	5	4	<b>TSCM memory corrupt failure</b> . Replace TFSCM module.	80	84
8	5	5	<b>Bad TFSCM transducer calibration</b> - Replace TFSCM module.	80	85
8	5	6	<b>Bad TSCM transducer calibration</b> - Replace TSCM module.	80	86
8	6	1	Manifold pressure is below set point for more than 5 Seconds - Check manifold hoses - Replace manifold - Check blower. Do RAP 2.4.	80	97
8	6	2	Air source can not reach manifold pressure set-point change within 12 seconds - Check manifold hoses - Replace manifold - Check blower. Do RAP 2.4.	80	98
8	7	1	<b>Pressure override warning</b> - Check manifold hoses. Replace manifold. Check blower. Do a leak test.	80	113
8	7	2	<b>Maximum inflate count exceeded</b> - Check manifold hoses. Replace manifold. Check blower. Do RAP 2.2.	80	114
8	7	3	<b>Cushion inflate failure</b> - Check manifold hoses. Replace manifold. Check blower	80	115
8	7	4	<b>Cushion adjust count exceeded</b> - Check manifold hoses. Replace manifold. Check blower	80	116
8	8	1	<b>Pressure failure</b> - replace module. Do RAP 2.2. Do a leak test.	80	129
8	8	2	<b>Initialization failure</b> - Pressure failure, replace TSCM module. Do RAP 2.2. Do a leak test.	80	130
8	9	1	<b>Initialization failure</b> - Blower is not running. Do RAP 2.5.	80	145
8	9	2	Loss of AC power. Check AC power.	80	146

<b>Select Group</b>	<b>Code Group #1</b>	<b>Code Group #2</b>	<b>Description of Service Required Fault Code</b>	<b>GCI Control Code</b>	
				<b>ID</b>	<b>Field #1</b>
8	1	10	TFSCM invalid switch data.	80	26
8	1	11	TFSCM pressure valve will not close warning (switch always contacted).	80	27
8	1	12	TFSCM vacuum valve will not close warning (switch always contacted).	80	28
8	1	13	TFSCM both valves open warning (both switches contacted).	80	29
8	1	14	TFSCM pressure valve will not open warning (switch not contacted).	80	30
8	1	15	TFSCM vacuum valve will not open warning (switch not contacted).	80	31
8	2	10	TSCM invalid switch data.	80	42
8	2	11	TSCM pressure valve will not close warning (switch always contacted).	80	43
8	2	12	TSCM vacuum valve will not close warning (switch always contacted).	80	44
8	2	13	TSCM both valves open warning (both switches contacted).	80	45
8	2	14	TSCM pressure valve will not open warning (switch not contacted).	80	46
8	2	15	TSCM vacuum valve will not open warning (switch not contacted).	80	47
8	4	5	Missed message warning (PVCM status).	80	69
8	10	5	TFSCM pressure valve late close failure.	80	161
8	10	6	TFSCM vacuum valve late close failure.	80	162
8	10	7	TFSCM pressure valve late close warning.	80	163
8	10	8	TFSCM vacuum valve late close warning.	80	164
8	10	9	TSCM pressure valve late close failure.	80	165
8	10	10	TSCM vacuum valve late close failure.	80	166
8	10	11	TSCM pressure valve late close warning.	80	167
8	10	12	TSCM vacuum valve late close warning.	80	168

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**Table 2-4. Pendant Error Codes**

Select Group	Code Group #1	Code Group #2	Description of Service Required Fault Code	GCI Control Code	
				ID	Field #1
16	2	1	<b>U1_High row selection logic failure</b> —Replace the pendant.	G0	33
16	2	2	<b>U1_Low row selection logic failure</b> —Replace the pendant.	G0	34
16	2	3	<b>U2_High row selection logic failure</b> —Replace the pendant.	G0	35
16	2	4	<b>U2_Low row selection logic failure</b> —Replace the pendant.	G0	36
16	3	1	<b>Col_Fault column shorted high or low</b> —Replace the pendant.	G0	49
16	4	1	<b>PCM_Comm_Fail loss of communication UCM to PCM</b> —Check the pendant cable. If necessary, replace the pendant.	G0	65
16	7	1	<b>PWR_UP_COL_FAULT column shorted high or low or together</b> —Replace the pendant.	G0	113
16	9	1	<b>RELAY_FAULT Nurse Call relay logic failure</b> —Replace the pendant.	G0	145

**Table 2-5. Fault Code Descriptions**

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
<b>90</b>	<b>17</b>	Error writing alarm silence to EEPROM	Replace TFM Module.
<b>90</b>	<b>18</b>	EEPROM error WRITE_MINUTE_COUNTER	Replace TFM Module.
<b>90</b>	<b>20</b>	Error writing therapy counters	Replace TFM Module.
<b>90</b>	<b>21</b>	Error writing rotation, WRITE_ROTATION_EE	Replace TFM Module.
<b>90</b>	<b>22</b>	Error writing percussion, WRITE_PERCUSSION_EE	Replace TFM Module.
<b>90</b>	<b>23</b>	Error writing vibration, WRITE_VIBRATION_EE	Replace TFM Module.
<b>90</b>	<b>24</b>	Error writing perc_vib,WRITE_VIB_PERC_EE	Replace TFM Module.
<b>90</b>	<b>25</b>	EEPROM busy too long	Replace TFM Module.
<b>90</b>	<b>26</b>	Number of bytes to read out of range	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>27</b>	Number of bytes to read out of range	Reset Bed. Replace TFM if problem persists
<b>90</b>	<b>28</b>	EEPROM busy too long	Replace TFM Module.
<b>90</b>	<b>29</b>	TFM in safe state	Reset bed. Check for leaks by running diagnostic leak test (90 203) if problem persists.
<b>90</b>	<b>30</b>	TTM in safe state	Reset bed. Check for leaks by running diagnostic leak test (90 203) if problem persists.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
<b>90</b>	<b>31</b>	PBM in safe state	Reset bed. Check for leaks by running diagnostic leak test (90 203) if problem persists.
<b>90</b>	<b>33</b>	PRM in safe state	Reset bed. Check for leaks by running diagnostic leak test (90 203) if problem persists.
<b>90</b>	<b>34</b>	Default executed in case statement	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>35</b>	WRITE_SERIAL_EE, error writing serial number	Replace TFM Module.
<b>90</b>	<b>36</b>	WRITE_SERIAL_EE	Replace TFM Module.
<b>90</b>	<b>37</b>	WRITE_SERIAL_EE	Replace TFM Module.
<b>90</b>	<b>38</b>	WRITE_SERIAL_EE	Replace TFM Module.
<b>90</b>	<b>39</b>	WRITE_SERIAL_EE	Replace TFM Module.
<b>90</b>	<b>40</b>	READ_ROTATION_EE, error reading	Replace TFM Module.
<b>90</b>	<b>41</b>	READ_ROTATION_EE, error confirming	Replace TFM Module.
<b>90</b>	<b>42</b>	Manifold pressure failure on power up	See Pulmonary Surface Pressure Troubleshooting flowchart on page 2-177.
<b>90</b>	<b>43</b>	Timed out trying to go to position for pv	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>44</b>	Default executed in case statement	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>45</b>	% value for valve opening out of range	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>46</b>	Bad pressure	Reset Bed. Replace TFM if problem persists.

GCI Module ID	GCI Error Code	Description	corrective Action
90	47	Bad cmd	Reset Bed. Replace TFM if problem persists.
90	49	Cmd queue overflow	Reset Bed. Replace TFM if problem persists.
90	50	Bad target specified	Reset Bed. Replace TFM if problem persists.
90	51	Stale msg	Reset Bed. Replace TFM if problem persists.
90	53	Error reading on_time	Replace TFM Module.
90	54	Error reading off_time	Replace TFM Module.
90	55	Error reading start_time	Replace TFM Module.
90	56	Error reading therapy counters	Replace TFM Module.
90	57	Error saving data	Replace TFM Module.
90	58	Error saving data	Replace TFM Module.
90	59	Error saving data	Replace TFM Module.
90	60	Error saving/reading data	Replace TFM Module.
90	61	Error saving data	Replace TFM Module.
90	62	Error reading data from EEPROM, during reset	Replace TFM Module.
90	63	Error reading data	Replace TFM Module.
90	65	Error tfm_module	See Communications Error flowchart on page 2-176.
90	66	Error base_module	See Communications Error flowchart on page 2-176.
90	67	Error pv_module	See Communications Error flowchart on page 2-176.
90	68	Error ttm_module	See Communications Error flowchart on page 2-176.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
<b>90</b>	<b>69</b>	Error spare_module	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>70</b>	Error rot_module	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>71</b>	Timeout reading pressures	Reset bed. Replace TFM if problem persists.
<b>90</b>	<b>72</b>	Timeout, eeprom busy too long	Replace TFM Module.
<b>90</b>	<b>73</b>	Timeout, eeprom busy too long	Replace TFM Module.
<b>90</b>	<b>74</b>	Error writing rotation statistics	Replace TFM Module.
<b>90</b>	<b>75</b>	Error writing rotation statistics	Replace TFM Module.
<b>90</b>	<b>76</b>	Error writing rotation statistics	Replace TFM Module.
<b>90</b>	<b>77</b>	Error writing rotation statistics	Replace TFM Module.
<b>90</b>	<b>78</b>	SPI communication error to rotation module	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>79</b>	Detect line connection error to rotation module	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>81</b>	SPI communication error to pv module	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>82</b>	Detect line connection error to pv module	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>83</b>	Error reading/writing values	Replace TFM Module.
<b>90</b>	<b>84</b>	Having to resend command to base module for normal mode	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>85</b>	Having to resend command to rot module for normal mode	See Communications Error flowchart on page 2-176.
<b>90</b>	<b>86</b>	Error writing statistics indices	Replace TFM Module.
<b>90</b>	<b>87</b>	Error reading statistics indices	Replace TFM Module.

GCI Module ID	GCI Error Code	Description	corrective Action
90	88	Day date out of range for READ_TEN_MIN_STATS	Reset Bed. Replace TFM if problem persists.
90	89	Error writing diag statistics data	Replace TFM Module.
90	90	Day date out of range for READ_TEN_MIN_STATS	Reset Bed. Replace TFM if problem persists.
90	91	Error reading diag statistics data	Reset Bed. Replace TFM if problem persists.
90	94	Executed default in switch statement	Reset Bed. Replace TFM if problem persists.
90	95	PV state machine error	Reset Bed. Replace PPM if problem persists.
90	97	PV state machine, other modules will not stay in proper state during therapy	Reset Bed. Replace PPM if problem persists.
90	98	Checksum error with data	Reset Bed - Replace TFM if problem persists
90	99	Frequency from tfm or ppm does not match	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
90	100	Executed default: in switch statement	Reset Bed. Replace TFM if problem persists.
90	101	Executed default: in switch statement, transition section	Reset Bed. Replace TFM if problem persists.
90	102	Executed default: in switch statement, timer section	Reset Bed. Replace TFM if problem persists.
90	103	Mode or board cmd error, no match for the TFM, timeout	Reset Bed. Replace TFM if problem persists.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
<b>90</b>	<b>104</b>	Rotation level right out of range	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>105</b>	Rotation level left out of range	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>106</b>	Executed default: in switch statement	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>107</b>	Variable found out of range	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>108</b>	Error found, index for pv is not valid	Reset Bed. Replace TFM if problem persists.
<b>90</b>	<b>109</b>	No TFM communications, illegal configuration	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>110</b>	No TTM communications, illegal configuration	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>111</b>	No base communications, illegal configuration rot module, no base	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>113</b>	No base communications, illegal configuration, pv module, no base	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
<b>90</b>	<b>114</b>	PV module installed, but cannot communicate with module.	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>115</b>	Rotation module installed but cannot communicate with module.	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>116</b>	Rotation module removed during rotation.	No action required if module not installed, else see Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>117</b>	Loss of PCM communication - bed positions	See RAP 2.38.
<b>90</b>	<b>118</b>	Sending data to GCI and object_no not valid (2 or 3)	Reset Bed
<b>90</b>	<b>119</b>	Timeout, waiting for ready too long	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>120</b>	Mode or board cmd error, no match for the TTM, timeout	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>121</b>	Mode or board cmd error, no match for the BASE, timeout	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.
<b>90</b>	<b>122</b>	Mode or board cmd error, no match for the ROTATION, timeout	Reset Bed. See Communications Error flowchart on page 2-176 if problem persists.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
90	123	Loss of GCI communications	See RAP 2.29.
90	124	Loss of siderail left communications	See RAP 2.14.
90	125	Loss of siderail right communication	See RAP 2.14.
90	126	WRITE_MINUTE_COUNTER	Reset Bed. Replace TFM if problem persists.
90	127	WRITE_ALL_ROT_STATISTICS	Reset Bed. Replace TFM if problem persists.
90	129	READ_ALL_ROT_STATISTICS	Reset Bed. Replace TFM if problem persists.
90	130	READ_SINGLE_ROT_STATISTICS	Reset Bed. Replace TFM if problem persists.
90	131	WRITE_SINGLE_ROT_STATISTICS	Reset Bed. Replace TFM if problem persists.
90	132	WRITE_THERAPY_MIN_COUNTER	Reset Bed. Replace TFM if problem persists.
90	133	WRITE_OFF_MIN_COUNTER	Reset Bed. Replace TFM if problem persists.
90	134	WRITE_DIAG_TIME_STAMP2_EE	Reset Bed. Replace TFM if problem persists.
90	135	READ_DIAG_TIME_STAMP2_EE	Reset Bed. Replace TFM if problem persists.
90	136	WRITE_ROTATION_EE	Reset Bed. Replace TFM if problem persists.
90	137	WRITE_PERCUSSION_EE	Reset Bed. Replace TFM if problem persists.
90	138	WRITE_VIBRATION_EE	Reset Bed. Replace TFM if problem persists.
90	139	WRITE_STAT_INDEX	Reset Bed. Replace TFM if problem persists.

GCI Module ID	GCI Error Code	Description	corrective Action
90	140	READ_STAT_INDEX	Reset Bed. Replace TFM if problem persists.
90	141	WRITE_MOD_WEIGHT	Reset Bed. Replace TFM if problem persists.
90	142	READ_MOD_WEIGHT	Reset Bed. Replace TFM if problem persists.
90	143	WRITE_VIB_PERC_EE	Reset Bed. Replace TFM if problem persists.
90	145	READ_ROTATION_EE	Reset Bed. Replace TFM if problem persists.
90	146	READ_PERCUSSION_EE	Reset Bed. Replace TFM if problem persists.
90	147	READ_VIBRATION_EE	Reset Bed. Replace TFM if problem persists.
90	148	READ_VIB_PERC_EE	Reset Bed. Replace TFM if problem persists.
90	149	WRITE_SERIAL_EE	Reset Bed. Replace TFM if problem persists.
90	150	READ_ALARM_SILENCE_TIME	Reset Bed. Replace TFM if problem persists.
90	151	READ_RTC_POWER_DOWN	Reset Bed. Replace TFM if problem persists.
90	152	READ_THERAPY_MIN_COUNTER	Reset Bed. Replace TFM if problem persists.
90	153	READ_SERIAL_EE	Reset Bed. Replace TFM if problem persists.
90	154	Therapy_id variable is not in valid range	Reset Bed. Replace TFM if problem persists.
90	155	Index is out of range, fatal error	Reset Bed. Replace TFM if problem persists.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
90	156	Have PV or Rot module installed but no base	Reset Bed. Replace TFM if problem persists.
90	157	Have Rot module installed but no base	Reset Bed. Replace TFM if problem persists.
90	158	Error reading qfactor count data	Reset Bed. Replace TFM if problem persists.
90	159	Error writing qfactor data	Reset Bed. Replace TFM if problem persists.
90	161	Timer_expires()	Reset Bed. Replace TFM if problem persists.
90	162	Error writing statistics data to FRAM	Reset Bed. Replace TFM if problem persists.
90	163	Timer is not incrementing, error[3] is timer id	Reset Bed. Replace TFM if problem persists.
90	164	PPM module removed during pv	Reset Bed. Replace TFM if problem persists.
90	165	PRM modeul connected, but cannot communicate on power up	Reset bed. replace module if problem persists. Check communications with diagnostic code 90 245.
90	166	BASE module (PBM) connected, but cannot communiate on power up	Reset bed. Replace module if problem persists. Check communications with diagnostic code 90 245.
90	167	PPM module connected, but cannot communicate on power up	Reset bed. Replace module if problem persists. Check communications with diagnostic code 90 245.
90	168	TTM module, no communication	Reset bed. Replace module if problem persists. Check communications with diagnostic code 90 245.

GCI Module ID	GCI Error Code	Description	corrective Action
90	169	TFM module, no communication	Reset bed. Replace module if problem persists. Check communications with diagnostic code 90 245.
90	170	Rotation checksum error	Reset bed. If error persists, send a 90 159 code to clear EEPROM. Replace TFM if error persists.
90	171	Base module installed but no base communications	Reset bed. Replace module if problem persists. Check communications with diagnostic code 90 245.
90	172	More than one therapy is active at reset, will be cleared by software. Reset the bed.	No action required.
90	173	CSUM error for data sending to PV valve	Reset bed. If error persists, send a 90 159 code to clear EEPROM. Replace TFM if error persists.
90	174	Patient weight for module does not match or is zero	Reset bed. Take weight reading. If error persists, send a 90 159 code to clear EEPROM.
90	175	Patient weight not updated from GCI	Reset bed. Take weight reading. If error persists, send a 90 159 code to clear EEPROM. Make sure GCI is for TotalCare® Bariatric Plus Therapy System.
90	177	GCI SpO <sub>2</sub> RT® with LAL compatible command not received	Make sure GCI is for TotalCare® Bariatric Plus Therapy System.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
<b>90</b>	<b>178</b>	LAL module not communicating	Make sure LAL module is installed. Reset bed. Replace LAL module if problem persists.
<b>90</b>	<b>179</b>	Pressure request over 30" water	Reset bed. Replace TFM if problem persists.
<b>90</b>	<b>180</b>	Cannot determine EEPROM type	Reset bed. Replace TFM if problem persists.
<b>90</b>	<b>181</b>	EEPROM type is not valid	Reset bed. Replace TFM if problem persists.
<b>90</b>	<b>182</b>	Error writing shut off mode	Reset bed. If error persists, send a 90 159 code to clear EEPROM. Replace TFM if problem persists.
<b>90</b>	<b>183</b>	Error reading shut off mode	Reset bed. If error persists, send a 90 159 code to clear EEPROM. Replace TFM if problem persists.
<b>90</b>	<b>184</b>	No pressure reading from LAL module	No action required.
<b>90</b>	<b>185</b>	PV not Plus version	Reset bed. Replace P and V module if problem persists.
<b>90</b>	<b>186</b>	TFM not Plus version	Reset bed. Replace TFM if problem persists.
<b>90</b>	<b>187</b>	ROT not Plus version	Reset bed. Replace rotation module if problem persists.
<b>90</b>	<b>188</b>	Base not Plus version	Reset bed. Replace PBM module if problem persists.
<b>90</b>	<b>189</b>	TTM not Plus version	Reset bed. Replace TTM if problem persists.

GCI Module ID	GCI Error Code	Description	corrective Action
90	190	EEPROM error—installed_EE	Reset bed. If error persists, send a 90 159 code to clear EEPROM. Replace TFM if problem persists.
90	191	EEPROM error—Acclimate_timer	Reset bed. If error persists, send a 90 159 code to clear EEPROM. Replace TFM if problem persists.
90	193	State number is out of range	No action required.
90	194	In failure state	No action required.
90	195	Next level for training	No action required.
90	196	Started rotation	No action required.
90	197	Write error for module weight to EEPROM for LAL module	Send a 90 159 code; then reset the bed. If problem persists, add and remove the PRM or PPM module.
90	198	Read error for module weight from EEPROM for LAL module	Send a 90 159 code; then reset the bed. If problem persists, add and remove the PRM or PPM module.
90	220	Switch/case default executed	Reset Bed. Replace TFM if problem persists.
90	241	Switch/case default executed	Reset Bed. Replace TFM if problem persists.
90	245	Switch/case default executed	Reset Bed. Replace TFM if problem persists.
90	249	Switch/case default executed	Reset Bed. Replace TFM if problem persists.
91	75	Vacuum valve stuck zone 1	Reset bed. If code reshows, replace TTM.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
91	76	Vacuum valve stuck zone 2	Reset bed. If code reshows, replace TTM.
91	77	Vacuum valve stuck zone 3	Reset bed. If code reshows, replace TTM.
91	112	ERR_Z1_NO_CONTROL /* zone 1 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
91	113	ERR_Z2_NO_CONTROL /* zone 2 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
91	114	ERR_Z3_NO_CONTROL /* zone 3 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
91	115	ERR_Z1_NO_CONTROL2 /* zone 1 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
91	116	ERR_Z2_NO_CONTROL2 /* zone 2 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
91	117	ERR_Z3_NO_CONTROL2 /* zone 3 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
91	118	ERR_Z1_NOT_SAFE /* zone 1 not in safe limits */	See Pressure Failures flowchart on page 2-177.
91	119	ERR_Z2_NOT_SAFE /* zone 2 not in safe limits */	See Pressure Failures flowchart on page 2-177.
91	120	ERR_Z3_NOT_SAFE /* zone 3 not in safe limits */	See Pressure Failures flowchart on page 2-177.
91	121	Mode/hazard timeout	Reset bed. If code reshows, put the bed in the flat position. If code reshows, replace TTM.
92	75	Vacuum valve stuck zone 1	Reset bed. If code reshows, replace PPM.
92	76	Vacuum valve stuck zone 2	Reset bed. If code reshows, replace PPM.

GCI Module ID	GCI Error Code	Description	corrective Action
92	77	Vacuum valve stuck zone 3	Reset bed. If code reshows, replace PPM.
92	121	Mode/hazard timeout	Reset bed. If code reshows, put the bed in the flat position. If code reshows, replace PPM.
92	112	ERR_Z1_NO_CONTROL /* zone 1 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
92	113	ERR_Z2_NO_CONTROL /* zone 2 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
92	114	ERR_Z3_NO_CONTROL /* zone 3 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
92	115	ERR_Z1_NO_CONTROL2 /* zone 1 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
92	116	ERR_Z2_NO_CONTROL2 /* zone 2 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
92	117	ERR_Z3_NO_CONTROL2 /* zone 3 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
92	118	ERR_Z1_NOT_SAFE /* zone 1 not in safe limits */	See Pressure Failures flowchart on page 2-177.
92	119	ERR_Z2_NOT_SAFE /* zone 2 not in safe limits */	See Pressure Failures flowchart on page 2-177.
92	120	ERR_Z3_NOT_SAFE /* zone 3 not in safe limits */	See Pressure Failures flowchart on page 2-177.
93	75	Vacuum valve stuck zone 1	Reset bed. If code reshows, replace PRM.
93	76	Vacuum valve stuck zone 2	Reset bed. If code reshows, replace PRM.
93	77	Vacuum valve stuck zone 3	Reset bed. If code reshows, replace PRM.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
93	112	ERR_Z1_NO_CONTROL /* zone 1 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
93	113	ERR_Z2_NO_CONTROL /* zone 2 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
93	114	ERR_Z3_NO_CONTROL /* zone 3 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
93	115	ERR_Z1_NO_CONTROL2 /* zone 1 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
93	116	ERR_Z2_NO_CONTROL2 /* zone 2 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
93	117	ERR_Z3_NO_CONTROL2 /* zone 3 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
93	118	ERR_Z1_NOT_SAFE /* zone 1 not in safe limits */	See Pressure Failures flowchart on page 2-177.
93	119	ERR_Z2_NOT_SAFE /* zone 2 not in safe limits */	See Pressure Failures flowchart on page 2-177.
93	120	ERR_Z3_NOT_SAFE /* zone 3 not in safe limits */	See Pressure Failures flowchart on page 2-177.
93	121	Mode/hazard timeout	Reset bed. If code reshows, put the bed in the flat position. If code reshows, replace PRM.
94	75	Vacuum valve stuck zone 1	Reset bed. If code reshows, replace PBM.
94	76	Vacuum valve stuck zone 2	Reset bed. If code reshows, replace PBM.
94	77	Vacuum valve stuck zone 3	Reset bed. If code reshows, replace PBM.
94	112	ERR_Z1_NO_CONTROL /* zone 1 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.

GCI Module ID	GCI Error Code	Description	corrective Action
94	113	ERR_Z2_NO_CONTROL /* zone 2 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
94	114	ERR_Z3_NO_CONTROL /* zone 3 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
94	115	ERR_Z1_NO_CONTROL2 /* zone 1 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
94	116	ERR_Z2_NO_CONTROL2 /* zone 2 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
94	117	ERR_Z3_NO_CONTROL2 /* zone 3 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
94	118	ERR_Z1_NOT_SAFE /* zone 1 not in safe limits */	See Pressure Failures flowchart on page 2-177.
94	119	ERR_Z2_NOT_SAFE /* zone 2 not in safe limits */	See Pressure Failures flowchart on page 2-177.
94	120	ERR_Z3_NOT_SAFE /* zone 3 not in safe limits */	See Pressure Failures flowchart on page 2-177.
94	121	Mode/hazard timeout	Reset bed. If code reshows, put the bed in the flat position. If code reshows, replace PBM.
95	75	Vacuum valve stuck zone 1	Reset bed. If code reshows, replace TTM.
95	76	Vacuum valve stuck zone 2	Reset bed. If code reshows, replace TTM.
95	77	Vacuum valve stuck zone 3	Reset bed. If code reshows, replace TTM.
95	112	ERR_Z1_NO_CONTROL /* zone 1 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
95	113	ERR_Z2_NO_CONTROL /* zone 2 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
95	114	ERR_Z3_NO_CONTROL /* zone 3 not able to reach setpoint */	See Pressure Failures flowchart on page 2-177.
95	115	ERR_Z1_NO_CONTROL2 /* zone 1 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
95	116	ERR_Z2_NO_CONTROL2 /* zone 2 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
95	117	ERR_Z3_NO_CONTROL2 /* zone 3 not in tol for 15S */	See Pressure Failures flowchart on page 2-177.
95	118	ERR_Z1_NOT_SAFE /* zone 1 not in safe limits */	See Pressure Failures flowchart on page 2-177.
95	119	ERR_Z2_NOT_SAFE /* zone 2 not in safe limits */	See Pressure Failures flowchart on page 2-177.
95	120	ERR_Z3_NOT_SAFE /* zone 3 not in safe limits */	See Pressure Failures flowchart on page 2-177.
95	121	Mode/hazard timeout	Reset bed. If code reshows, put the bed in the flat position. If code reshows, replace TTM.
96	1	ERR_RS232_OVERFLOW /* warning only */	No action required.
96	2	ERR_RS232_BAD_BOF /* warning only */	No action required.
96	3	ERR_RS232_BAD_CRC /* warning only */	No action required.
96	4	ERR_RS232_TIMEOUT /* warning only */	No action required.
96	5	ERR_RS232_BAD_MID /* warning only */	No action required.
96	17	ERR_SPI_OVERFLOW /* warning only */	No action required.

GCI Module ID	GCI Error Code	Description	corrective Action
96	18	ERR_SPI_BAD_BOF /* warning only */	No action required.
96	19	ERR_SPI_BAD_CRC /* warning only */	No action required.
96	20	ERR_SPI_TIMEOUT /* warning only */	No action required.
96	21	ERR_SPI_BAD_MID /* warning only */	No action required.
96	32	ERR_5V_LO /* warning only */	No action required.
96	33	ERR_5V_HI /* warning only */	No action required.
96	34	ERR_15V_LO /* warning only */	No action required.
96	35	ERR_15V_HI /* warning only */	No action required.
96	48	ERR_TIMERS_NOT_RUNNING	Reset Bed. Replace TFM if problem persists.
96	49	ERR_TEST1 /* test 1 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	50	ERR_TEST2 /* test 2 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	51	ERR_TEST3 /* test 3 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	52	ERR_TEST4 /* test 4 error code */	Reserved. Reset bed. If code reshows, replace TFM.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
96	53	ERR_TEST5 /* test 5 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	54	ERR_TEST6 /* test 6 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	55	ERR_TEST7 /* test 7 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	56	ERR_TEST8 /* test 8 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	57	ERR_TEST9 /* test 9 error code */	Reserved. Reset bed. If code reshows, replace TFM.
96	64	ERR_BLOWER_FAIL	See Pressure Failures flowchart on page 2-177.
96	65	ERR_ATOD_FAIL	Replace TFM Module.
96	66	ERR_BLOWER_HAZARD	Replace TFM Module.
96	67	ERR_PV_PRS_HI /* hi press when PV is OFF */	Reserved. Reset bed. If code reshows, replace TFM.
96	68	ERR_PV_PRS_BAD /* out of range when PV is ON */	Reserved. Reset bed. If code reshows, replace TFM.
96	69	ERR_BAD_CAL_Z1 0x45 /* bad calibration data */	Reserved. Reset bed. If code reshows, replace LAL module.
96	70	ERR_BAD_CAL_Z2 0x46 /* bad calibration data */	Reserved. Reset bed. If code reshows, replace LAL module.

GCI Module ID	GCI Error Code	Description	corrective Action
96	71	ERR_BAD_CAL_Z3 0x47 /* bad calibration data */	Reserved. Reset bed. If code reshows, replace LAL module.
96	72	ERR_BAD_CAL_Z4 0x48 /* bad calibration data */	Reserved. Reset bed. If code reshows, replace LAL module.
96	73	ERR_BAD_CAL_PV 0x49 /* bad calibration data */	Reserved. Reset bed. If code reshows, replace LAL module.
96	74	ERR_BOOST_LOW_PRS 0x4A /* boost prs low during rot */	Reserved. Reset bed. If code reshows, replace LAL module.
96	75	Vacuum valve stuck zone 1	Reset bed. If code reshows, replace LAL module.
96	76	Vacuum valve stuck zone 2	Reset bed. If code reshows, replace LAL module.
96	77	Vacuum valve stuck zone 3	Reset bed. If code reshows, replace LAL module.
96	84	ERR_Z1_BAD_STATE /* bad state in state machine */	Reset Bed. Replace LAL module if problem persists.
96	85	ERR_Z2_BAD_STATE /* bad state in state machine */	Reset Bed. Replace LAL module if problem persists.
96	86	ERR_Z3_BAD_STATE /* bad state in state machine */	Reset Bed. Replace LAL module if problem persists.
96	87	ERR_Z4_BAD_STATE /* bad state in state machine */	Reset Bed. Replace LAL module if problem persists.
96	88	ERR_Z1_NO_NEW_DATA /* timeout waiting for new data */	Reset Bed. Replace LAL module if problem persists.
96	89	ERR_Z2_NO_NEW_DATA /* timeout waiting for new data */	Reset Bed. Replace LAL module if problem persists.

2

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
96	90	ERR_Z3_NO_NEW_DATA /* timeout waiting for new data */	Reset Bed. Replace LAL module if problem persists.
96	91	ERR_Z4_NO_NEW_DATA /* timeout waiting for new data */	Reset Bed. Replace LAL module if problem persists.
96	92	ERR_BAD_ZONE /* bad zone in motor state machine */	Reset Bed. Replace LAL module if problem persists.
96	93	ERR_BAD_ZONE2 /* bad zone in no new data err */	Reset Bed. Replace LAL module if problem persists.
96	96	ERR_Z1_LEAK /* zone leak during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.
96	97	ERR_Z2_LEAK /* zone leak during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.
96	98	ERR_Z3_LEAK /* zone leak during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.
96	99	ERR_Z1_NO_PRESS /* zone not up to pressure during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.
96	100	ERR_Z2_NO_PRESS /* zone not up to pressure during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.
96	101	ERR_Z3_NO_PRESS /* zone not up to pressure during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.
96	102	ERR_Z1_PRS_CTRL_FAIL /* zone failed prs control during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.
96	103	ERR_Z2_PRS_CTRL_FAIL /* zone failed prs control during leak test */	Reserved. Reset bed. If code reshows, replace LAL module.

GCI Module ID	GCI Error Code	Description	corrective Action
96	104	ERR_Z3_PRS_CTRL_FAIL /* zone failed prs control during leak test */	Reserved. Reset bed. If code reshows, replace LAL module
96	112	ERR_Z1_NO_CONTROL /* zone 1 not able to reach setpoint */	Pressure control failure. Reset bed. If code reshows, replace LAL module
96	113	ERR_Z2_NO_CONTROL /* zone 2 not able to reach setpoint */	Pressure control failure. Reset bed. If code reshows, replace LAL module
96	114	ERR_Z3_NO_CONTROL /* zone 3 not able to reach setpoint */	Pressure control failure. Reset bed. If code reshows, replace LAL module.
96	115	ERR_Z1_NO_CONTROL2 /* zone 1 not in tol for 15S */	Pressure control failure. Reset bed. If code reshows, replace LAL module.
96	116	ERR_Z2_NO_CONTROL2 /* zone 2 not in tol for 15S */	Pressure control failure. Reset bed. If code reshows, replace LAL module.
96	117	ERR_Z3_NO_CONTROL2 /* zone 3 not in tol for 15S */	Pressure control failure. Reset bed. If code reshows, replace LAL module.
96	118	ERR_Z1_NOT_SAFE /* zone 1 not in safe limits */	Pressure control failure. Reset bed. If code reshows, replace LAL module.
96	119	ERR_Z2_NOT_SAFE /* zone 2 not in safe limits */	Pressure control failure. Reset bed. If code reshows, replace LAL module.
96	120	ERR_Z3_NOT_SAFE /* zone 3 not in safe limits */	Pressure control failure. Reset bed. If code reshows, replace LAL module.

2

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>corrective Action</b>
96	121	Mode/hazard timeout	Reset bed. If code reshows, put the bed in the flat position. If code reshows, replace LAL module.
96	130	ERR_EE_BUSY /* eeprom still busy */	Replace LAL module.
96	131	ERR_EE_BADADDR /* eeprom bad address */	Replace LAL module.
96	132	ERR_EE_UNKNOWN /* eeprom error in init */	Replace LAL module.
96	133	ERR_EE_DATA_VER /* eeprom data make sure of fail */	Replace LAL module.
96	134	ERR_EE_S1ERROR /* eeprom data error Sector 1 */	Replace LAL module.
96	135	ERR_EE_S2ERROR /* eeprom data error Sector 2 */	Replace LAL module.
96	136	ERR_EE_S3ERROR /* eeprom data error Sector 3 */	Replace LAL module.
96	137	ERR_EE_S123MISMATCH /* eeprom data mismatch ALL */	Replace LAL module.
96	138	ERR_EEPROM_INIT /* eeprom init failure */	Replace LAL module.
96	139	ERR_EE_TEST1 /* eeprom test error 1 */	Reserved. Reset bed. If code reshows, replace LAL module.
96	140	ERR_EE_TEST2 /* eeprom test error 2 */	Reserved. Reset bed. If code reshows, replace LAL module.
96	141	ERR_EE_TEST3 /* eeprom test error 3 */	Reserved. Reset bed. If code reshows, replace LAL module.

GCI Module ID	GCI Error Code	Description	corrective Action
96	142	ERR_EE_TEST4 /* eeprom test pass count */	Reserved. Reset bed. If code reshows, replace LAL module.
96	144	ERR_SS_CODE 0x90 /* safe state error code */	Reserved. Reset bed. If code reshows, replace LAL module.
96	145	ERR_BAD_ROM_CHKSUM 0x91 /* rom checksum failed */	Reserved. Reset bed. If code reshows, replace LAL module.

For a list of fault codes for the NAWI Class III scale (European version), refer to table 2-6 on page 2-68. The fault codes listed in table 2-6 on page 2-68 are ones that differ from the fault codes listed in table 2-3 on page 2-16. If a fault code for the NAWI Class III scale (European version) is **not** listed in table 2-6 on page 2-68, refer to table 2-3 on page 2-16, and change the GCI Control Code ID to **51**.

**Table 2-6. Fault Code Descriptions for the NAWI Class III Scale (European Version)**

GCI Module ID	GCI Error Code	Description	corrective Action
51	33	<b>Invalid value passed to function</b> —Trying to read A/D value for nonexistent beam. This shows corruption of variables in RAM.	Reset the scale. If error is repeatable, replace scale board.
51	35	<b>A/D value out of range</b> —Possible causes are too much weight on section of bed, beam failure, board failure, or no weight on beam.	Use diagnostics to read A/D values, and determine which beam caused the invalid reading.
51	36	<b>Hit negative limit for total weight</b> —Possible causes are bed not zeroed correctly, EPROM corruption, or beam failure.	Look for additional error codes in the GCI Service required field. Check A/D readings on the GCI service screen. Attempt to calibrate the bed.
51	37	<b>Hit max limit for total weight</b> —Scale cannot calculate the weight because there is more than 204 kg on the bed, the scale was not zeroed, or there is an open beam.	Make sure the load on the bed is less than 204 kg, zero the scale, and check for an open beam.
51	44	<b>Default executed in case statement</b> —shows memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	45	<b>Calibration switch not enabled</b> —The Zero calibration command needs the calibration mode to be enabled.	Enable the Calibration mode by pressing the Calibration switch on the scale board for longer than 10 seconds.

GCI Module ID	GCI Error Code	Description	corrective Action
51	46	<b>SAVE_PULMONARY_MODULE_WEIGHT, error writing to EPROM</b>	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	47	<b>GET_PULMONARY_MODULE_W EIGHT, confirm failed</b> —The value was not the same in at least two of the three locations of EPROM.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	49	<b>GET_PULMONARY_MODULE_W EIGHT, read timeout</b> —EPROM read failure.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	55	<b>SAVE_DISPLAYED_WEIGHT</b> —Error writing to EPROM.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	63	<b>GET_DISPLAYED_WEIGHT could not confirm</b> —The value was not the same in at least two of the three locations of EPROM.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	71	<b>Attempted UNDO TARE with bed exit armed</b> —UNDO TARE command is not allowed if bed exit detection is enabled.	Disable the bed exit detection feature.
51	101	<b>Invalid state passed to PED state machine</b> —shows memory corruption.	If error is repeatable, replace the scale board.
51	107	<b>Timeout response A/D not sampling</b> —This causes an automatic reset of the scale board.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	118	<b>Gravity constants limits wrong</b> —A value outside of 9.59999 to 9.99999 has been entered.	Make sure the proper value is entered.
51	119	<b>save_zero_point A/D data out of range</b>	Monitor A/D readings in service screen, look for abnormal readings. Run diagnostic self test to further diagnose the problem.

GCI Module ID	GCI Error Code	Description	corrective Action
51	120	<b>save_zero_point error saving zero point data</b> —Error writing to EPROM.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	140	<b>Error saving tare, out of range</b> —The bed can be tared with following limits: total_tare—8 kg to 204 kg (sum of following values) tare_value—20 kg to 205 kg (weight tared) preset_value1—99 kg to 99 kg (weight auto compensated) preset_value2—10 kg to 10 kg (add-on module weight) Attempts to tare with weight outside these limits will generate this error.	Make sure the tare values are within the specified limits.
51	143	<b>Error saving undo tare out of range</b> —shows variable corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	171	<b>Check_beam_weight_limit right foot over max load limit</b>	Center the patient on the bed. Check for other error codes on the GCI. Check A/D readings on the GCI. If error is repeatable, replace the scale board.
51	172	<b>Check_beam_weight_limit left foot over max load limit</b>	Center the patient on the bed. Check for other error codes on the GCI. Check A/D readings on the GCI. If error is repeatable, replace the scale board.
51	173	<b>Check_beam_weight_limit left head over max load limit</b>	Center the patient on the bed. Check for other error codes on the GCI. Check A/D readings on the GCI. If error is repeatable, replace the scale board.

GCI Module ID	GCI Error Code	Description	corrective Action
51	174	<b>Check_beam_weight_limit right head over max load limit</b>	Center the patient on the bed. Check for other error codes on the GCI. Check A/D readings on the GCI. If error is repeatable, replace the scale board.
51	177	<b>Error saving coefficients</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	178	<b>Error reading coefficients</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	179	<b>Error saving gravity constants</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	180	<b>Error reading gravity constants</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	181	<b>Error saving undo tare</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	182	<b>Error reading undo tare</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	183	<b>Error saving tare</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	184	<b>Error reading tare</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.

GCI Module ID	GCI Error Code	Description	corrective Action
51	<b>185</b>	<b>Error saving pulm module weight</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	<b>186</b>	<b>Error saving bed exit</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	<b>187</b>	<b>Error saving/clear error log to EEPROM</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	<b>188</b>	<b>Error getting coeff from EEPROM</b> —EPROM failure or memory corruption.	Check for other error codes on the GCI. Recalibrate the scale. If error is repeatable, replace the scale board.
51	<b>189</b>	<b>Error getting zero point EEPROM</b> —EPROM failure or corruption.	Check for other error codes on the GCI. Zero the scale. If error is repeatable, replace the scale board.
51	<b>190</b>	<b>Error saving zero point</b> —EPROM failure or corruption.	Check for other error codes on the GCI. Rezero the scale. If error is repeatable, replace the scale board.
51	<b>191</b>	<b>Error reading zero point</b> —EPROM failure or corruption.	Check for other error codes on the GCI. Rezero the scale. If error is repeatable, replace the scale board.
51	<b>193</b>	<b>Error calculated weight is out of range</b>	Make sure the weight is between -204 kg and 204 kg.
51	<b>195</b>	<b>Error saving zero point</b> —Zero point is outside of 100 to 32767, or failure to write to EEPROM.	Check for other error codes on the GCI. Check range by observing zero range on the service screen. Reset the scale. If error is repeatable, replace the scale board.

GCI Module ID	GCI Error Code	Description	corrective Action
51	196	<b>Error reading zero point</b> —EPROM failure or data corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	197	<b>Error saving undo tare</b> —EPROM failure.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	198	<b>Error saving tare weight</b> —EPROM failure.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	199	<b>Error getting tare weight</b> —EPROM failure or RAM corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	202	<b>Error getting tare</b> —EPROM failure or RAM corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	203	<b>Process_gravity_const_error saving</b> —EPROM failure.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	204	<b>Process_gravity_const_error getting</b> —EPROM failure or RAM corruption.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	205	<b>Check-sum mismatch, RAM variables</b> —RAM failure.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.
51	206	<b>Gravity constant out of range</b>	Make sure values are between 9.599999 to 9.999999.
51	207	<b>ACR A/D register mismatch</b> —Values of critical registers of the A/D converter are different than settings.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.

GCI Module ID	GCI Error Code	Description	corrective Action
51	209	<b>SETUP A/D register mismatch—</b> Values of critical registers of the A/D converter are different than settings.	Check for other error codes on the GCI. Reset the scale. If error is repeatable, replace the scale board.

Table 2-7. GCI Error Codes

GCI Module ID	GCI Error Code	Description	Corrective Action
42	21	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	22	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	23	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	24	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	25	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	26	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	27	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	28	<b>Value range/reset warning.</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
42	29	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.

42	30	<b>Value range/reset warning</b>	No action is required. These warnings are logged for testing purposes only and do <b>not</b> impact operation of the GCI.
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**Table 2-8. GCI Error Codes—P500 Model**

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>Corrective Action</b>
85	199	Head angle out of range.	See “Head Angle out of Range” on page 2-250.
85	200	Foot angle out of range.	See “Foot Angle out of Range” on page 2-251.
85	201	Loss of communications with PCM.	See “Loss of PCM Communication” on page 2-247.
85	202	RCV (pio buff)comm buffer size too large or zero.	See “Inter-Mico Communication Error” on page 2-249.
85	203	Loss of communications with GCI.	See “Loss of GCI Communication” on page 2-248.
85	204	RCV (pio buff)csum error, next byte is command with error.	See “Inter-Mico Communication Error” on page 2-249.
85	205	Patient weight update not received from GCI.	See “Loss of GCI Communication” on page 2-248.
85	206	Default hit in send_output(), 2nd byte is value not defined.	See “Values not Defined” on page 2-253.
85	207	Default hit in gci_command_b (), 2nd byte is value not defined.	See “Values not Defined” on page 2-253.
85	209	Default hit in gci_command_a (), 2nd byte is value not defined.	See “Values not Defined” on page 2-253.
85	210	Default hit in send_to_network(), 2nd byte is value not defined.	See “Values not Defined” on page 2-253.
85	211	RCV (pio buff)comm buffer size too large or zero 20 times in a row.	See “Inter-Mico Communication Error” on page 2-249.
85	212	RCV (pio buff)csum error, too many in a row, service required.	See “Inter-Mico Communication Error” on page 2-249.
85	213	Too many rcv (pio buff) errors.	See “Inter-Mico Communication Error” on page 2-249.
85	214	Warning, turn assist cannot start.	See “Turn Assist can not Start” on page 2-254.
85	215	Cannot start turn assist, left intermediate siderail down.	See “Turn Assist can not Start” on page 2-254.
85	216	Patient weight received from GCI is out of range.	See “Patient Weight out of Range” on page 2-252.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>Corrective Action</b>
85	217	Head angle out of range.	See “Head Angle out of Range” on page 2-250.
85	218	Foot angle out of range.	See “Foot Angle out of Range” on page 2-251.
87	41	1 = DisconnectedMattress Error Present 0 = Error Not Present	See “Mattress Disconnected” on page 2-255.
87	43	1 = Ext_EEPROM_I2C Error Present 0 = Error Not Present	See “External EE Error” on page 2-256.
87	44	1 = EE_Data_Corrupt Error Present 0 = Error Not Present	See “EEPROM Data Corrupt” on page 2-257.
87	45	1 = ValveType Error Present 0 = Error Not Present	See “Valve Type” on page 2-258.
87	46	1 = UnderSolndVolts Error Present 0 = Error Not Present	See “Under Solenoid Voltage” on page 2-259.
87	47	1 = OverSolndVolts Error Present 0 = Error Not Present	See “Over Solenoid Voltage” on page 2-260.
87	48	1 = OverOnSupervisorVolts Error Present 0 = Error Not Present	See “Over On Supervisory Voltage” on page 2-261.
87	49	1 = UnderSupervisorVolts Error Present 0 = Error Not Present	See “Under Supervisory Voltage” on page 2-262.
87	50	1 = OverOffSupervisorVolts Error Present 0 = Error Not Present	See “Over Supervisory off Voltage Monitor” on page 2-263.
87	51	1 = ValveCurrentUnder Error Present 0 = Error Not Present	See “Valve Current Under Error” on page 2-264.
87	52	1 = ValveCurrentOver Error Present 0 = Error Not Present	See “Valve Current Over Error” on page 2-265.
87	53	1 = ValveCurrentTAUnder Error Present 0 = Error Not Present	See “Valve Current Under Error” on page 2-264.
87	54	1 = ValveCurrentTAOver Error Present 0 = Error Not Present	See “Valve Current Over Error” on page 2-265.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>Corrective Action</b>
87	55	1 = CAN_HeartBeat Error Present 0 = Error Not Present	See “CAN Heartbeat Missing” on page 2-266.
87	56	1 = InflateHead Error Present 0 = Error Not Present	See “Inflate Bladder Error” on page 2-267.
87	57	1 = InflateSeat Error Present 0 = Error Not Present	See “Inflate Bladder Error” on page 2-267.
87	58	1 = InflateHeel Error Present 0 = Error Not Present	See “Inflate Bladder Error” on page 2-267.
87	59	1 = VentHead Error Present 0 = Error Not Present	See “Deflate Baldder Error” on page 2-268.
87	60	1 = VentSeat Error Present 0 = Error Not Present	See “Deflate Baldder Error” on page 2-268.
87	61	1 = VentHeel Error Present 0 = Error Not Present	See “Deflate Baldder Error” on page 2-268.
87	62	1 = VentRTA Error Present 0 = Error Not Present	See “Deflate Baldder Error” on page 2-268.
87	63	1 = VentLTA Error Present 0 = Error Not Present	See “Deflate Baldder Error” on page 2-268.
87	64	1 = InflateLTA Error Present 0 = Error Not Present	See “Inflate Bladder Error” on page 2-267.
87	65	1 = InflateRTA Error Present 0 = Error Not Present	See “Inflate Bladder Error” on page 2-267.
87	66	1 = Excessive Leak Head Present 0 = Error Not Present	See “Excessive Leak” on page 2-269.
87	67	1 = Excessive Leak Seat Present 0 = Error Not Present	See “Excessive Leak” on page 2-269.
87	68	1 = Excessive Leak Foot Present 0 = Error Not Present	See “Excessive Leak” on page 2-269.
87	69	1 = Excessive Leak LTA Present 0 = Error Not Present	See “Excessive Leak” on page 2-269.
87	70	1 = Excessive Leak RTA Present 0 = Error Not Present	See “Excessive Leak” on page 2-269.
87	71	1 = EE Data Corrupt	See “EEPROM Data Corrupt” on page 2-273.
87	72	1= 24V Supply Out of Range	See “24V Sense” on page 2-272.

<b>GCI Module ID</b>	<b>GCI Error Code</b>	<b>Description</b>	<b>Corrective Action</b>
87	73	1= Blower Voltage Error Present	See “Blower Voltage” on page 2-274.
87	74	1= External EEPROM Error Present	See “Communication” on page 2-270.
87	75	1 = LI or ACB Heart Beat Missing	See “Heartbeat” on page 2-271.
87	77	1 =Blower Current Error Present	See “Blower Current” on page 2-275.

**Table 2-9. Diagnostic Commands**

<b>Prefix</b>	<b>Code</b>	<b>Description</b>
<b>90</b>	<b>99</b>	Display software revision for TFM and modules. <b>90 99 Module id, rev00, rev01, rev02, rev03, 0</b> Module id is 0-TFM neuron, 1-TFM 8051, 2-PPM, 3-PRM, 4-PBM, 5-TTM
<b>90</b>	<b>158</b>	Resets all pulmonary modules. The command is not echoed on the GCI screen. After the command is sent, press <b>ENTER</b> on the GCI to enter another diagnostic command.
<b>90</b>	<b>159</b>	Initialize new board.
<b>90</b>	<b>185</b>	Diagnostic function for the scale. Response from scale weight adjusted for modules. Do not send from the GCI.
<b>90</b>	<b>203</b>	Short valve cycle test then leak test - 203, leak test id (1, 2, 3). <b>90 203 leak test id, 0, 0, 0, 0, 0</b>
<b>90</b>	<b>219</b>	Clear leak test failure counts and error codes stored in FRAM. <b>90 219 219, 0, 0, 0, 0, 0</b>
<b>90</b>	<b>220</b>	Clear permanent valve counters. <b>90 220 220, 0, 0, 0, 0, 0</b>
<b>90</b>	<b>221</b>	BYPASS mode for simulator, DO nothing mode. <b>90 221 221, 0, 0, 0, 0, 0</b>
<b>90</b>	<b>222</b>	Clear permanent cycle counters. <b>90 222 222, 0, 0, 0, 0, 0</b>
<b>90</b>	<b>245</b>	Display communication quality factor: 103 is the best, 0 is the lowest. <b>90 245 TFM, PPM, PRM, PBM, TTM Updated every 2 minutes.</b>
<b>90</b>	<b>256</b>	Air system off for foam mattress.

## **2.1 Patient Air Surface Module with Foot Therapy— Switch/Stepper Failures**

1. Do any of these GCI error codes show:
  - 80—17 through 31 Treatment Foot Surface Control Module (TFSCM)
  - 80—33 through 47 Treatment Surface Control module (TSCM)
  - 80—161 through 164 (TFSCM)
  - 80—165 through 168 (TSCM)

**Yes    No**

↓      → Go to “Final Actions” on page 2-12.

2. Replace the shown module (refer to procedure 4.55). Do the Air System Function Check. See “Air System Function Check” on page 2-10. This solves the problem.

**Yes    No**

↓      → For assistance call Hill-Rom Technical Support.

3. Go to “Final Actions” on page 2-12.

## 2.2 Patient Air Surface Module with Foot Therapy—Pressure Failures

1. Do any of these GCI error codes show (see table 2-10 on page 2-83):

Yes    No

↓    → Go to “Final Actions” on page 2-12.

- 80—113—through 116 (TFSCM)
- 80—129—through 132 (TSCM)

**Table 2-10. Zone Valve Identification**

Zone	TFSCM	TSCM
001	Collapse (Orange)	Head (White)
002	Heel (Violet)	Thigh (Black)
003	Retract (Gray)	Seat (Red)

2. Make sure all six mattress hoses are correctly connected to the modules. A click is heard.

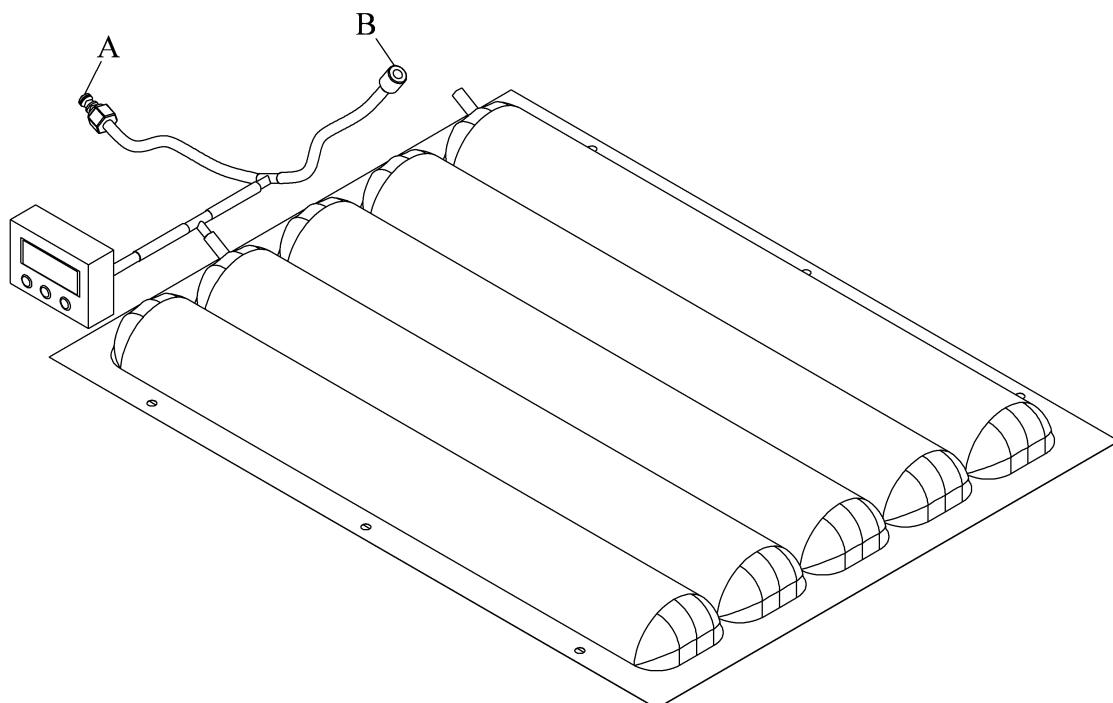
Yes    No

↓    → Go to “Air System Function Check” on page 2-10.

3. Do as follows:

- a. Disconnect the applicable mattress zone from the air manifold.
- b. Connect the male end (A) of the tester to the mattress and the female end (B) to the air manifold (see figure 2-1 on page 2-84).

**Figure 2-1. Leak Test Kit (SA9076)**



147605\_1\_138

**NOTE:**

The manometer is not included with the tester.

- c. Make sure the head section is below 30° and the foot section is flat and completely extended.
- d. Reset the bed, and let the mattress and test cushion to pressurize for 3 minutes. For mattress cushion pressures, refer to the applicable table:
  - **Treatment** models—refer to table 2-11 on page 2-85.
  - **Pulmonary** model when a pressure meter or manometer is used—refer to table 2-12 on page 2-85.
  - **P500** models—Go to the Diagnostics screen on the GCI. Select Cushion Pressures.
    - Verify the manometer readings with the GCI, refer to table 2-13 on page 2-86.

**Table 2-11. Mattress Cushion Pressures  
(Treatment Models)**

<b>Zone</b>	<b>Pressure (" H<sub>2</sub>O)</b>	<b>Pressure (mm Hg)</b>
Head (White)	10.0 ± 2.0	18.6 ± 3.7
Seat (Red)	13.0 ± 2.0	24.2 ± 3.7
Thigh (Black)	10.0 ± 2.0	18.6 ± 3.7
Collapse (Orange)	3.0 ± 1.0	5.6 ± 1.9
Retract (Gray)	3.0 ± 1.0	5.6 ± 1.9
Heel (Violet)	3.0 ± 1.0	5.6 ± 1.9

**Table 2-12. Mattress Cushion Pressures  
(Pulmonary Models when a Pressure Meter or Manometer is used)**

<b>Zone</b>	<b>Pressure (" H<sub>2</sub>O)</b>	<b>Pressure (mm Hg)</b>
Chest (White)	7.0 ± 2.0	13.1 ± 3.7
Seat (Red)	5.0 ± 2.0	9.3 ± 3.7
Thigh (Black)	8.8 ± 2.0	16.4 ± 3.7
Collapse (Orange)	3.0 ± 1.0	5.6 ± 1.9
Retract (Gray)	3.0 ± 1.0	5.6 ± 1.9
Heel (Violet)	3.0 ± 1.0	5.6 ± 1.9
Left Working (Yellow) (with Version 3.029 or lower software)	7.0 ± 2.0	13.1 ± 3.7
Left Working (Yellow) (with Version 3.031 or higher software)	10.0 ± 2.0	18.6 ± 3.7
Right Working (Green) (with Version 3.029 or lower software)	7.0 ± 2.0	13.1 ± 3.7
Right Working (Green) (with Version 3.031 or higher software)	10.0 ± 2.0	18.6 ± 3.7
Head (Clear)	5.0 ± 2.0	9.3 ± 3.7
Left Boost (Blue)	0.0 ± 1.0	0.0 ± 1.9
Right Boost (Clear)	0.0 ± 1.0	0.0 ± 1.9

**Table 2-13. Mattress Cushion Pressures  
(P500 Models)**

Zone	Pressure (" H <sub>2</sub> O)	Pressure (mm Hg)
Head (White)	± 1.0	±0.87
Seat (Red)	± 1.0	±0.87
Foot (Black)	± 1.0	±0.87
Right turn assist	± 1.0	±0.87
Left turn assist	± 1.0	±0.87

e. Disconnect the male end (A) of the tester from the mattress.

f. Let the air system pressurize an additional 30 seconds.

g. Unplug the bed from its power source.

The test cushion pressure decreases more than 1.0" H<sub>2</sub>O (1.9 mm Hg).

**Yes    No**

↓       → Go to step 5.

4. Do as follows:

a. Disconnect all three mattress hoses.

b. Replace the shown module (refer to procedure 4.55).

c. Go to “Air System Function Check” on page 2-10.

5. Do as follows:

a. Disconnect the female end (B) of the tester from the air manifold.

b. Connect the male end (A) of the tester to the shown mattress zone.

The shown mattress zone has a pressure of 0" H<sub>2</sub>O (0 mm Hg).

**Yes    No**

↓       → Go to step 7.

6. Replace the cushion and plumbing of the shown zone, and go to “Air System Function Check” on page 2-10.

7. The shown mattress zone pressure decreases more than 1.0" H<sub>2</sub>O (1.9 mm Hg) in 2 minutes.

**Yes    No**

↓       → Connect the mattress to the module, and go to “Air System Function Check” on page 2-10.

**NOTE:**

The mattress zone pressure is affected by any patient movement.

8. Replace the cushion and plumbing of the shown zone, and go to “Air System Function Check” on page 2-10.

**2**

**Table 2-14. Mattress Cushion Pressures  
(Pulmonary Models when a Pressure Meter or Manometer is used).**

Zone	Pressure (" H <sub>2</sub> O)	Pressure (mm Hg)
Chest (White)	5.6 ± 2.0	10.48 ± 3.7
Seat (Red)	7.2 ± 2.0	13.5 ± 3.7
Thigh (Black)	7.2 ± 2.0	13.5 ± 3.7
Collapse (Orange)	3.0 ± 1.0	5.6 ± 1.9
Retract (Gray)	3.0 ± 1.0	5.6 ± 1.9
Heel (Violet)	3.0 ± 1.0	5.6 ± 1.9
Left Working (Yellow)	7.2 ± 2.0	13.5 ± 3.7
Right Working (Green)	7.2 ± 2.0	13.5 ± 3.7
Head (Clear)	5.0 ± 2.0	9.3 ± 3.7
Left Boost (Blue)	0.0 ± 1.0	0.0 ± 1.9
Right Boost (Clear)	0.0 ± 1.0	0.0 ± 1.9

1. Before taking pressures, Do as follows:
  - a. Bed is flat and head section is all of the way down.
  - b. Zero the scale. Take the weight and accept it.
  - c. The pressures are a function of the head angle and the patient weight. When a weight of 0 pounds is accepted, the pressures default to the equivalent pressure for a 200 pound patient.

**Table 2-15. Mattress Cushion Pressures (Bariatric Plus)  
(Pulmonary Models when Using a Pressure Meter or Manometer).**

Zone	Pressure (" H <sub>2</sub> O)	Pressure (mm Hg)
Chest (White)	9.2 ± 2.0	17.2 ± 3.7
Seat (Red)	10.8 ± 2.0	20.2 ± 3.7
Thigh (Black)	10.8 ± 2.0	20.2 ± 3.7
Collapse (Orange)	3.0 ± 1.0	5.6 ± 1.9
Retract (Gray)	3.0 ± 1.0	5.6 ± 1.9
Heel (Violet)	3.0 ± 1.0	5.6 ± 1.9
Left Working	10.8 ± 2.0	20.2 ± 3.7

1. Before taking pressures, Do as follows:
  - a. Bed is flat and head section is all of the way down.
  - b. Zero the scale. Take the weight and accept it.
  - c. The pressures are a function of the head angle and the patient weight. When a weight of 0 pounds is accepted, the pressures default to the equivalent pressure for a 350 pound patient.

## 2.3 Pulmonary Mattress Air Valve Module Troubleshooting

After you make repairs to the bed, do this procedure without a patient on the bed. If the patient can not be removed, make sure there is minimal movement by the patient.

1. Do as follows:
  - a. At the GCI, access the **Service Required** screen.
  - b. At the **Service Required** screen, scroll to **Cushion pressure**, and press **Enter**.

**Table 2-16. Mattress Cushion Pressure Setpoints**

Pressure Setpoint	Positive Tolerance	Negative Tolerance
0 to 3	+ 0.7	- 0.2
> 3 to 17	+ 1.5	- 1.2
> 17	+ 6.0	- 2.0

The bed has a pressure tolerance or vacuum problem.

2. Do as follows:
  - a. Put the bed in Max-Inflate mode.

The blower shuts off in less than 1 minute and stays off for 3 minutes.

**Yes      No**  
 ↓            → Go to step 4.

The bed has a vacuum problem and the blower does not vacuum the air out.

The stepper motor cycles to open up release valve and air is let out.

The bed will alarm after 12 minutes if the bladder stays full under cushion pressures.

Air does not release.

3. Do as follows:
  - a. Check the motor by ohms ( $149 \pm 10\% = 134$  to  $164$  Ohms).
  - b. Check blue to green and red to black hose connections.
  - c. Change the applicable stepper motor.
4. do as follows steps to fix pressure problem:
  - a. Check to see if blower is on low speed.

- b. Go to the **Service** menu.
  - c. Select **Cushion Pressure**.
  - d. Check the applicable cushion pressure. Make sure it is solid and does not cycle up and down.
5. Switch the hose connection with a hose next to it.
- a. Check for changes in pressure values on the GCI.  
Cycle pressure changes on the GCI.
- Yes    No**  
↓       → Go to step 6.
- b. The mattress bladder has a leak. Replace the affected mattress bladder.
6. Remove the module that does not work correctly.
7. Remove the mattress fitting and check for cracks.
8. Check the 2 O-rings.  
O-rings are in good condition.
- Yes    No**  
↓       → Replace as necessary.
9. Replace the stepper motor.

**Table 2-17. Troubleshooting Help for Error Codes**

<b>Pressure</b>	<b>Vacuum</b>		<b>Error Code</b>	<b>Connection</b>
<b>TTM</b>				
P2	P1	CHEST	95-112 115 118	WHITE
P6	P3	SEAT	95-113 116 119	RED
P8	P7	THIGH	95-114 117 120	BLACK
<b>TFM</b>				
P1	P10	HEEL	91-112 115 118	PURPLE
P2	P11	RET	91-113 116 119	GRAY
P3	P12	COLL	91-114 117 120	ORANGE
<b>PBM</b>				
P2	P1	L WORK	94-112 115 118	YELLOW
P6	P3	R WORK	94-113 116 119	GREEN
P8	P7	HEAD	94-114 117 120	CLEAR

## 2.4 Patient Air Surface Module with Foot Therapy—Blower/Supply Hose Failures

1. Do any of these GCI error codes or failures show:

- 80—97
- 80—98
- 80—145—008
- blower noise excessive
- blocked or damaged supply hoses

Yes    No

↓    → Go to “Final Actions” on page 2-12.

2. Reset the bed and let it to initialize. The blower operated during initialization.

Yes    No

↓    → Go to RAP 2.5.

3. The blower noise is excessive.

Yes    No

↓    → Check the supply hoses for blockages, breaks, and disconnection. Replace the damaged hoses.

4. Remove the blower and check for glue pieces (refer to procedure 4.53). The blower contains glue pieces.

Yes    No

↓    → Replace the blower (refer to procedure 4.53).

5. Replace the blower (refer to procedure 4.53) and both supply hoses.

## 2.5 Air Blower Malfunction

1. The blower did not operate during bed initialization.  
**Yes    No**  
↓      → Go to “Final Actions” on page 2-12.
2. The frame functions operate correctly.  
**Yes    No**  
↓      → Go to RAP 2.6.
3. On the PCM move the P14 plug to P10. Make sure the black wire is toward the head of the bed. The blower started operation.  
**Yes    No**  
↓      → Go to step 6.
4. Check F8 on the PCM. F8 measures 15V DC on each side.  
**Yes    No**  
↓      → Replace the fuse/PCM board.
5. Replace the TFSCM and/or cable mounts and/or TSCM.
6. Measure P1-1 and P1-2. P1-1 and P1-2 measures 8V DC.  
**Yes    No**  
↓      → Replace the air source blower cable.
7. Replace the blower.
8. Disconnect P1 of the air source cable from the blower housing and measure the voltage between P1-4 and P1-5. The voltage is approximately 120 V AC.  
**Yes    No**  
↓      → Check for a damaged air source cable.
9. Press the **Enable** and **Normal** controls.
10. Measure the voltage between P1-1 and P1-2. The voltage rises to approximately +12V DC within 1 minute.  
**Yes    No**  
↓      → Go to step 12.
11. The air blower circuit operates correctly. Go to “Final Actions” on page 2-12.
12. Remove the covers from the TFSCM, and measure the voltage from the heat sink to the connector side of PTC R23 on the TFSCM. The voltage is between 14.0V DC and 16.0V DC.

**Yes      No**

↓      → Go to step 14.

13. Check for a faulty air source cable, signal distribution cable, or weighframe to surface cable (see figure 3-15 on page 3-47). Go to step 15.

14. Check voltage at fuse F6 on the PCM to see if it is between 14.0V DC and 16.0V DC.

**Yes      No**

↓      → Check the fuse to make sure it is not blown. If it is blown, replace the fuse and check blower operation. If it is not blown, replace the PCM (refer to procedure 4.42).

15. Check for a faulty power distribution cable or faulty weighframe to surface cable (see figure 3-15 on page 3-47). There is damage to the cable(s).

**Yes      No**

↓      → Replace the TFSCM (refer to procedure 4.55).

16. Replace the damaged cable. Check the blower operation again. The blower did operate during bed initialization.

**Yes      No**

↓      → Call Hill-Rom Technical Support.

17. Go to “Final Actions” on page 2-12.

## 2.6 System Power Failures

### AC Power Failure



#### **WARNING:**

Failure Install the hilow cylinder safety brace, and set the brakes before could cause injury or equipment damage.

1. Install the hilow cylinder safety brace. See “Hilow Cylinder Brace” on page 4-13.
2. The **Unplugged AC** indicator is **on** with the system power cord plugged into an applicable power source.

**Yes    No**

↓      → Go to “Initial Actions” on page 2-3.

3. Unplug the bed system from its power source. Use a voltmeter to measure the voltage at the power source. The voltage measures 104 V AC to 127 V AC.

**Yes    No**

↓      → Report the problem to the facility maintenance representative.

4. Check the power cord and plug connections. The power cord and plug connections are in good condition, without bent contacts or loose connections.

**Yes    No**

↓      → Replace the power cord.

5. Do as follows:

- a. Make sure the bed system is unplugged.
- b. Remove the base assembly cover.
- c. Remove the power control module cover. See “Power Control Module P.C. Board” on page 4-126.
- d. Disconnect the battery connector P15 from the power control module P.C. board. See “Power Control Module P.C. Board” on page 4-126.
- e. Check the wiring on the header connector P11 on the power control module P.C. board, for loose or damaged connections.

6. All connections at the connector P11 are in good condition.

**Yes    No**

↓      → Repair the connection, or replace the power cable.

7. Use a voltmeter meter to check the 15 A 3AG power fuses, F13 and F14, for electrical continuity (see table 2-18 on page 2-100) and See “Power Control Module P.C. Board” on page 4-126. The meter shows electrical continuity.

**Yes    No**

↓      → Replace the damaged fuse with a 15 A, 3AG fuse.

8. Do as follows:

- a. Plug the system into an applicable power source.

- b. Set the voltmeter scale to the AC scale, and at connector P11, measure the voltage from P11-1 to P11-2. The voltage measures 104 V AC to 127V AC.

**Yes    No**

↓      → Go to step 9.

9. The proper AC voltage is present at both the input and output of the AC line filter. See “Transformer” on page 4-123.

**Yes    No**

↓      → Replace the AC line filter (refer to procedure 4.41).

10. The transformer voltage taps produce the proper AC voltages.

**Yes    No**

↓      → Replace the transformer (refer to procedure 4.41).

11. Go to “Final Actions” on page 2-12.

## Low Voltage Power Failure

1. Unplug the bed system from its power source. Use a voltmeter, on AC setting, to measure the voltage at the power source. The voltage measures 104 V AC to 127V AC.

**Yes    No**

↓      → Report the problem to the facility maintenance representative.

2. Check the power cord and plug connections. The power cord and connections are in good condition, without bent contacts or loose connections.

**Yes    No**

↓      → Replace the power cord.

3. Do as follows:

- a. Remove the base assembly cover (see figure 4-3 on page 4-17).
- b. Remove the power control module cover See “Power Control Module P.C. Board” on page 4-126.
- c. Disconnect the battery connector P15 from the power control module P.C. board (see figure 4-48 on page 4-130).
- d. Check the wiring and plug connections on the power control P.C. board.

The connectors are tight and free of damage.

**Yes    No**

↓      → Repair or replace the damaged connectors.

4. Plug the bed system into an applicable power source. Use a voltmeter, on DC setting, make sure + 23 V is present at the output of the full-wave bridge assembly. The proper voltage is present.

**Yes    No**

↓      → Replace the full-wave bridge rectifier. See “Transformer” on page 4-123.

5. Do as follows when the bed is plugged in:

- a. Use a voltmeter to check the 23 V DC, 5 A power fuses F17 and F18 (see table 2-18 on page 2-100) and (figure 4-47 on page 4-129). The fuses have a voltage of 23 V DC on each side.

**Yes    No**

↓      → Replace the damaged 5A Nano SM fuse.

- b. Use a voltmeter to check the 8.5 V DC, 7 A power fuse F5. The fuse has a voltage of 22 V DC on each side.

**Yes    No**

↓ → Replace the damaged 7 A Nano SM fuse.

- c. Use a voltmeter to check the VBB, 3.5 A power fuse F2. The fuse has svoltage of 8 V DC on each side.

**Yes    No**

↓ → Replace the damaged 3.5 A Nano SM fuse.

- d. Use a voltmeter to check the + 15 V DC\_MTS, 3.5 A power fuse F6. The fuse has a voltage of 15 V DC on each side.

**Yes    No**

↓ → Replace the damaged 3.5 A Nano SM fuse.

- e. Use a voltmeter to check the + 15 V DC, 3.5 A power fuse F8. The fuse has a voltage of 15 V DC on each side.

**Yes    No**

↓ → Replace the damaged 3.5 A Nano SM fuse.

- f. Use a voltmeter to check the VBAT, 1.5 A power fuse F9. The fuse has a voltage of 8V DC on each side.

**Yes    No**

↓ → Replace the damaged 1.5 A Nano SM fuse.

- g. Use a voltmeter to check the + 15 V\_VBAT, 1.0A power fuse F10. The fuse has a voltage of 15 V DC on each side.

**Yes    No**

↓ → Replace the damaged 1.0A Nano SM fuse.

- h. Use a voltmeter to check the PCM, 1.5 A power fuse F1. The fuse has a voltage of 14 V DC on each side.

**Yes    No**

↓ → Replace the damaged 1.5 A Nano SM fuse.

6. With the bed system plugged in and all fuses good, the power supplies operate correctly.

**Yes    No**

↓ → Replace the Power Control Module P.C. board. See “Power Control Module P.C. Board” on page 4-126.

7. Connect the battery connector P15 to the power control module P.C. board.  
8. Go to “Final Actions” on page 2-12.

## Power Control Module Fuse Description

**Table 2-18. Power Control Module Fuse Description**

Fuse No.	Amp	Circuit Description
F1—	1.5	SB replaced by R208 at 1.85 amps.
F2—	3.5	SB replaced by R204 at 3.75 amps.
F3—	15.0	Slo-blow 3AB. New configuration placed before the F5, F17, & F18 combo.
F5—	7.0	Fast acting nano.
F6—	3.5	SB replaced by R205 at 3.00 amps.
F7—	7.0	Fast acting nano.
F8—	3.5	SB replaced by R206 at 3.00 amps.
F9—	1.5	SB replaced by R209 at 1.85 amps.
F10—	1.0	SB replaced by R202 at 1.60 amps.
F11—	7.0	Fast acting nano.
F16—	1.0	SB replaced by R201 at 1.60 amps.
F17 and F18—	5.0	Fast acting nano—parallel
DS1—Red		LED added for F7 and battery voltage presence detection.
DS2— Red		LED added F11 and +15 V FET drive presence detection.
DS3—Red		LED added for F3 and Bulk +23 V presence detection.
DS4—Green		LED added for +5 V presence.
DS5—Green		LED added for K1 activation with +15 and +8 V bulk presence.
DS6—Green		LED added for K2 activation with +12 V battery presence.
RT1—PTC	0.1	Added to protect external +5 V source to P2-6.
RT2—PTC	0.1	Added to protect external +5 V source to P18-4.
RT3—PTC	0.1	Added to protect external +5 V source to P2-13.

## 2.7 Lockout Control Malfunction

### Knee Lockout

1. At the same time press the **Lockout** and **Knee** controls. The **Knee Lockout** control indicator comes on, and the annunciator beeps twice.

Yes   No

↓ → Replace the caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

2. The **Knee Lockout** and indicator pass all functional checks.

Yes   No

↓ → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. For additional indicator troubleshooting methods, refer to RAP 2.9.



#### CAUTION:

The right and left siderail main caregiver control P.C. board cannot be interchanged with one another. Damage to equipment can occur.

3. Press the **Knee up and down** controls. The knee section does not move.

Yes   No

↓ → Replace the caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

4. At the same time press the **Lockout** and the **Knee** controls. The indicator light on the **Knee Lockout** control goes out.

Yes   No

↓ → Replace the caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

5. The problem is solved.

**Yes    No**

↓ → Check the siderail P.C. board cabling for proper connections.

6. The problem is solved.

**Yes    No**

↓ → Replace the weigh frame electrical junction box P.C. board. See  
“Weigh Frame Junction Electrical Box” on page 4-131. (For  
additional indicator troubleshooting methods, see RAP 2.9.)

7. Go to “Final Actions” on page 2-12.

## Head Lockout

1. At the same time press the **Lockout** and the **Head** controls. The **Head** Lockout control indicator comes on, and the annunciator beeps twice.

**Yes    No**

- ↓ → Make sure function operates on the opposite siderail by simultaneously pressing the **Head** Lockout control and the **Enable key** control on the opposite siderail.

2. The problem is solved.

**Yes    No**

- ↓ → Replace the caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

3. The **Head Lockout** and indicator pass all functional checks.

**Yes    No**

- ↓ → Replace the main caregiver control panel positioning P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. For additional indicator troubleshooting methods, see RAP 2.9.

4. Go to “Final Actions” on page 2-12.



### CAUTION:

The right and left siderail main caregiver positioning P.C. board cannot be interchanged with one another. Damage to equipment can occur.

5. The opposite siderail **Head Lockout** control, and the **Enable key** control indicator comes on.

**Yes    No**

- ↓ → Replace the weigh frame junction electrical box P.C. board. See “Weigh Frame Junction Electrical Box” on page 4-131. For additional indicator troubleshooting methods, see RAP 2.9.

6. Press the **Head Up or Down** control. The head section does not move.

**Yes    No**

↓ → Make sure the **Head Up/Down** function does not operate on the opposite siderail by simultaneously pressing the **Head** lockout control and the **Enable key** control on the opposite siderail.

7. The opposite bed siderail Head lockout control and the **Enable key** control indicator comes on.

**Yes    No**

↓ → Replace the caregiver control panel **Enable key** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

8. The problem is solved.

**Yes    No**

↓ → Replace the caregiver control panel P.C. board in the intermediate siderail.

9. The problem is solved.

**Yes    No**

↓ → Replace the weigh frame junction electrical box P.C. board. See “Weigh Frame Junction Electrical Box” on page 4-131. For additional indicator troubleshooting methods, see RAP 2.9.

10. Simultaneously press the Head lockout control and the **Enable key** control. The Head-Lockout control indicator extinguishes.

**Yes    No**

↓ → Replace the caregiver control panel P.C. board in the intermediate siderail. See “Weigh Frame Junction Electrical Box” on page 4-131.

11. The problem is solved.

**Yes    No**

↓ → Make sure the siderail cabling is correctly connected.

12. The problem is solved.

**Yes    No**

↓ → Replace the weigh frame electrical junction box P.C. board. See “Weigh Frame Junction Electrical Box” on page 4-131. For additional indicator troubleshooting methods, refer to RAP 2.9.

13. Go to “Final Actions” on page 2-12.

## Bed Up/Bed Down (Hilow) Lockout

1. Simultaneously press the **Hilow** lockout control and the **Enable key** control. The **Hilow** lockout control indicator comes on, and the annunciator beeps twice.

**Yes    No**  
↓ → Make sure the function operates on the opposite siderail by simultaneously pressing the Bed up/down-Lockout control and the **Enable key** control on the opposite siderail.
2. The opposite siderail functions.

**Yes    No**  
↓ → Replace the caregiver control panel **Bed up/Bed down** lockout and/or **Enable key** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)
3. The **Hilow** lockout and indicator pass all functional checks.

**Yes    No**  
↓ → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. For additional indicator troubleshooting methods, see RAP 2.9.
4. The **Hilow** lockout and indicator pass all functional checks.

**Yes    No**  
↓ → Replace the weigh frame junction electrical box P.C. Board. See “Weigh Frame Junction Electrical Box” on page 4-131.
5. Go to “Final Actions” on page 2-12.



### CAUTION:

The right and left siderail main caregiver positioning P.C. board cannot be interchanged with one another. Damage to equipment can occur.

6. The opposite bed siderail **Bed up/Bed down** lockout control and the **Enable key** control indicator comes on.

**Yes    No**

- ↓ → Replace the weigh frame junction electrical box P.C. board. See “Weigh Frame Junction Electrical Box” on page 4-131. For additional indicator troubleshooting methods, see RAP 2.9.

7. Press the **Hilow** arrow control. The bed system does not move up or down.

**Yes    No**

- ↓ → Make sure the function does not operate on the opposite siderail by simultaneously pressing the **Bed up/Bed down** lockout control and the **Enable key** control on the opposite siderail.

8. Simultaneously press the **Hilow** lockout control and the **Enable key** control. The **Hilow** lockout control indicator goes out.

**Yes    No**

- ↓ → Replace the caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

9. There are no additional fault codes.

**Yes    No**

- ↓ → Replace the damaged system cabling.

10. Go to “Final Actions” on page 2-12.

## 2.8 Brake/Steer Malfunction

1. Put the brake and steer pedal in the steer position. The **Brake not set** indicator comes on.

Yes   No

↓ → Make sure the adjustment and operation of the **Brake not set** control. See “Brake Set Sensor” on page 4-27.

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2. Check for loose wires and cabling.

Yes   No

↓ → Go to RAP 2.9.

3. Push and pull on the bed system. The steer feature is fully engaged and the two foot end casters lock in the steer position.

Yes   No

↓ → Repair the brake/steer assembly. See “Brake/Steer Linkage” on page 4-30 and “Foot End Caster Assembly” on page 4-18 for caster replacement and adjustment procedures.

4. The head end casters can swivel 360°.

Yes   No

↓ → Repair the brake/steer assembly. See “Head-End Caster Assembly” on page 4-22 and the “Brake/Steer Linkage” on page 4-30.

5. Put the brake/steer pedal in the brake position. The **Brake not set** indicator goes out.

Yes   No

↓ → Make sure the operation of the **Brake not set** control. See “Brake Set Sensor” on page 4-27. For additional indicator troubleshooting methods, refer to RAP 2.9.

6. Push and pull on the bed system. The brake function is fully engaged, all four casters are locked, and the bed system does not move.

Yes   No

↓ → Adjust the caster brakes. See “Foot Brake/Steer Pedal” on page 4-33.

7. Put the brake/steer pedal in the neutral position. The **Brake not set** indicator light comes on.

Yes   No

↓ → Make sure the operation of the **Brake not set** control. See “Brake Set Sensor” on page 4-27.

8. The **Brake not set** indicator comes on.

**Yes      No**  
↓            → Go to RAP 2.9.

9. All four casters can swivel 360°.

**Yes      No**  
↓            → Adjust the caster brake-to-wheel gap. See “Foot Brake/Steer Pedal” on page 4-33). (This step is not applicable to dual-wheel casters.)

10. Go to “Final Actions” on page 2-12.

## 2.9 Indicators (LED) Do Not Come On

1. If the GCI screen is dark, touch the screen. The GCI screen comes on.

Yes   No

↓ → Make sure the left power cord is plugged into a power receptacle.

2. Unplug the bed system from its power source. The **Unplugged AC power** indicator comes on, and after 30 seconds the GCI darkens.

Yes   No

↓ → Check the **Unplugged AC power** indicator on the left-hand intermediate siderail.

3. Plug the bed system into an applicable power source. The **Service required** and the **Chair position** indicator lights are off.

Yes   No

↓ → Make sure the **Service required** and the **Chair position** indicators on the left-hand intermediate siderail are off.

4. The **Bed exit** indicator is off when a person is on the sleep surface and stays on when a person is not on the sleep surface.

Yes   No

↓ → Make sure the bed exit cable is plugged into connector P-22 on the power control P.C. board.

5. The indicator operates correctly.

Yes   No

↓ → Replace the power control P.C. board mounted on the base frame. See “Power Control Module P.C. Board” on page 4-126.

The **Unplugged AC power** indicator is off.

Yes   No

↓ → Check the **Unplugged AC power** indicator on the left-hand side intermediate siderail.

6. The **Unplugged AC power** indicator function correctly on both siderails.

Yes   No

↓ → Troubleshoot the damaged siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

7. With the bed system unplugged, the **± (Battery Power)** charge indicator comes on.

Yes   No

↓ → Replace the battery.

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The ± (Battery Power) low indicator does not flash.

**Yes**   **No**

↓ → The battery is low and/or needs to be replaced. See “Battery” on page 4-121.

8. Set the brake/neutral/steer pedal to the Brake position. The **Brake not set** indicator light is off.

**Yes**   **No**

↓ → The **Brake not set** control is incorrectly adjusted. Make sure the control cable is correctly attached to the **Brake not set** control and is not loose. Replace the control cable if it is frayed or cut.

9. Release the brake/neutral/steer pedal from the brake position. The **Brake not set** indicator comes on.

**Yes**   **No**

↓ → The **Brake not set** control is incorrectly adjusted.

10. Make sure the control cable is correctly attached to the **Brake not set** control and is in good condition (not frayed, cut, or loose).

**Yes**   **No**

↓ → Repair or replace the cable.

11. Make sure the room light is off, and place your finger over the night light sensor.

12. Press the **Night light** control several times. The night light comes **on** and goes **off**.

**Yes**   **No**

↓ → If the bulb is burned out or loose, replace it. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise go to Step 13.

13. The night light can be turned **on** or **off** with the opposite siderail control.

**Yes**   **No**

↓ → Replace the caregiver control panel **Night light** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

14. The **Night light** control turns the lamp off and on.

**Yes      No**

↓      → Replace the main caregiver control panel positioning P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

15. Repeat the above procedures for the siderail control panel controls on the opposite side of the bed system.
16. Go to “Final Actions” on page 2-12.

**2**

## 2.10 Bed Down Control Will Not Lower Bed

1. Put the bed in a flat, high position. Press and hold the **Bed Down** control. The bed system lowers.

**Yes**   **No**

- ↓ → Determine if the bed system can be lowered with the opposite siderail control.

2. The bed lowers with the opposite siderail **Bed Down** control.

**Yes**   **No**

- ↓ → Replace the caregiver control panel **Bed Down** control P.C. board in the head siderail. See “Head Siderail P.C. Board” on page 4-45. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

3. The bed lowers.

**Yes**   **No**

- ↓ → Make sure the hilow hydraulic valve coil is operational. A click sounds each time the **Bed Down** control is pressed. See “Hydraulic Valve” on page 4-73.

4. There is a click each time the **Bed Down** control is pressed.

**Yes**   **No**

- ↓ → Put a piece of iron bearing metal plate near the face of the electric coil. The coil should have sufficient magnetic strength to attract the metal plate each time the **Bed Down** control is pressed. See “Hydraulic Manifold Valve Coil” on page 4-71.

5. The metal plate is attracted to the electric coil face each time the **Bed Down** control is depressed.

**Yes**   **No**

- ↓ → Check the voltage at the harness leads. If the voltage is proper, replace the valve coil. See “Hydraulic Manifold Valve Coil” on page 4-71.

6. The bed lowers and raises.

**Yes**   **No**

- ↓ → Check that the hydraulic hoses are not kinked or pinched.

7. Only the head section moves downward.

Yes   No

↓ → Check that hydraulic valve coil #14 is functional. See “Hydraulic Valve” on page 4-73.

8. The foot end only moves downward.

Yes   No

↓ → Check that hydraulic valve coil #16 is functional. See “Hydraulic Valve” on page 4-73.

9. Put the bed system in the flat, high position. Press and hold the **Bed Down** control. While the bed lowers, release the **Bed Down** control. The bed stops.

Yes   No

↓ → Make sure the hilow hydraulic valve is seating.

10. The bed system lowers and raises normally.

Yes   No

↓ → Check the hydraulic hose connectors for leaks and tighten the hydraulic fittings only if they are leaking fluid. See “Hydraulic Valve” on page 4-73.

11. Go to “Final Actions” on page 2-12.

2

## 2.11 Bed Up Control Does Not Raise Bed

1. Place the bed system in a flat, low position. Press and hold in the **Bed Up** control. The bed system rises.

**Yes    No**

- ↓ → Make sure the hydraulic pump motor runs when the **Bed Up** control is depressed. See “Hydraulic Power Unit” on page 4-75.

2. The hydraulic pump and motor operate normally.

**Yes    No**

- ↓ → Determine if the bed system can be raised with the opposite bed siderail **Bed Up** control.

3. The bed system rises normally when the opposite siderail **Bed Up** control is used.

**Yes    No**

- ↓ → Replace the suspected caregiver control panel **Bed Up** control P.C. board in the head siderail. See “Head Siderail P.C. Board” on page 4-45. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

4. The bed system rises normally.

**Yes    No**

- ↓ → The hilow hydraulic valve coils operate correctly. See “Hydraulic Manifold Valve Coil” on page 4-71. The hydraulic valve should click each time the chair control is depressed. See “Hydraulic Valve” on page 4-73.

5. There is an audible click each time the **Bed Up** control is depressed.

**Yes    No**

- ↓ → Remove the *bed up* hydraulic manifold valve coil from the valve stem (core) and place a piece of iron bearing metal plate near the face of the electric coil. The coil should have sufficient magnetic strength to attract the metal plate each time the **Bed Up** control is depressed. See “Hydraulic Manifold Valve Coil” on page 4-71.

6. The metal plate is attracted to the electric coil face each time the **Bed Up** control is depressed.

**Yes    No**

↓ → Replace the valve coil. See “Hydraulic Manifold Valve Coil” on page 4-71.

7. Only the head section moves upward.

**Yes    No**

↓ → Check that hydraulic valve coil #15 is functional. See “Hydraulic Manifold Valve Coil” on page 4-71.

8. Only the foot section articulates upward.

**Yes    No**

↓ → Check that the hydraulic valve coil #13 is functional. See “Hydraulic Manifold Valve Coil” on page 4-71.

9. The bed system raises normally.

**Yes    No**

↓ → Check that the hydraulic hoses do not leak, and are not kinked, or pinched. Tighten or replace when necessary.

10. Place the bed system in a flat, low position. Press and hold the **Bed Up** control. While the bed system rises, release the **Bed Up** control. The bed system stops and does not move downward.

**Yes    No**

↓ → Make sure the hilow hydraulic valve operates correctly. See “Hydraulic Valve” on page 4-73.

11. Go to “Final Actions” on page 2-12.

## 2.12 Chair Position Control Malfunction

**NOTE:**

Make sure the bed is in the **Flat** position, the footboard is installed, the brakes are not set, and the bed is in its lowest position.

1. Press and hold the **Chair** control. The bed begins to move.

**Yes    No**

↓ → The brakes are not locked. You hear a **beep**, and the **Brake not set** indicator flashes. (The bed will continue to move into the chair position, although the alarm comes on).

2. Set the brakes. The Brake not set indicator goes out, and the beep stops.

**Yes    No**

↓ → Go to RAP 2.8.

3. With the bed system in the lowest position, press the Chair control, the bed raises 4" (10 cm) above the lower limit as the bed level remains at 0° Trendelenburg angle.

**Yes    No**

↓ → Make sure the hydraulic pump motor runs when the **Chair** control is depressed.

4. The chair function operates when using the opposite siderail **Chair** control.

**Yes    No**

↓ → Check that the hydraulic hoses do not leak and are not kinked or pinched. Tighten or replace when necessary.

5. The chair function operates when using either siderail **Chair** control.

**Yes    No**

↓ → Replace the suspected caregiver control panel **Chair** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

6. The bed system articulates into the chair position using either side panel **Chair** control.

**Yes    No**

↓ → Replace the main caregiver control panel positioning P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

7. The bed system articulates into the chair position using either side panel **Chair** control.

**Yes**   **No**

↓ → Make sure the hilow hydraulic valve coils are operating correctly. There should be an audible click sounded each time the **Chair** control is depressed due to the actuation of the hydraulic valve. See “Hydraulic Manifold Valve Coil” on page 4-71 and “Hydraulic Valve” on page 4-73.

8. You hear a click each time the **Bed Down** control is pressed.

**Yes**   **No**

↓ → Remove the *chair* hydraulic manifold valve coil from the valve stem (core), and place a piece of iron bearing metal plate near the face of the electric coil. The coil should have sufficient magnetic strength to attract the metal plate each time the **Chair** control is depressed. See “Hydraulic Manifold Valve Coil” on page 4-71.

9. The metal plate is attracted to the electric coil face each time the **Chair** control is depressed.

**Yes**   **No**

↓ → Replace the valve coil. See “Hydraulic Manifold Valve Coil” on page 4-71.

10. Only the head end operates upward.

**Yes**   **No**

↓ → Check the operation of hydraulic valve coil #13. See “Hydraulic Manifold Valve Coil” on page 4-71.

11. Only the foot end operates upward.

**Yes**   **No**

↓ → Check the operation of hydraulic valve coil #15. See “Hydraulic Manifold Valve Coil” on page 4-71.

12. The foot section articulates down to 30° and pauses.

**Yes**   **No**

↓ → Make sure **Foot Down** hydraulic valve coils #6 and #7 operate correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

13. The foot section moves correctly.

**Yes**   **No**

↓ → Check that the hydraulic hoses are not kinked, pinched, or leaking. Torque or replace when necessary.

14. The foot section moves correctly.

**Yes    No**

- ↓ → Make sure the position sensors operate. Calibrate the position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

15. The head section rises to 55°, pauses, and then moves to the upper limit.

**Yes    No**

- ↓ → Make sure **Head Up** hydraulic valve coils #1 and #2 operate correctly. You should hear a click each time the **Head Up** control is pressed. See “Hydraulic Manifold Valve Coil” on page 4-71.

16. The head section rises to 55°, pauses, and then travels to the upper limit.

**Yes    No**

- ↓ → Check that the hydraulic hoses are not kinked, pinched, or leaking. Torque or replace when necessary. See “Hydraulic Valve” on page 4-73.

17. The head section rises to 55°, pauses, and then moves to the upper limit.

**Yes    No**

- ↓ → Make sure the position sensors are functional. Calibrate the position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

18. The foot section moves down to 70°, retracts to the recliner position, and stops.

**Yes    No**

- ↓ → Make sure the foot in hydraulic valve coils #9 and #12 operate correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

19. The foot section moves down 70°, retracts (recliner position) and stops.

**Yes    No**

- ↓ → Check for a loose or damaged position sensor, and calibrate the position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

20. The foot section moves down to 60° retracts (recliner position) and stops.

**Yes    No**

- ↓ → Make sure the foot down hydraulic valve coils #6 and #7 operate correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

21. The foot section moves down to 60° retracts (recliner position) and stops.

Yes   No

↓ → Replace the damaged valves. See “Hydraulic Valve” on page 4-73.

22. A continuous audible tone sounds until the **Chair** control is released, the **Remove ft board** indicator comes on, and the **Chair position** indicator **flashes**.

Yes   No

↓ → Look for a loose or damaged position sensor. Calibrate the position sensors.

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23. Remove the footboard. The **Remove ft board** indicator goes off.

Yes   No

↓ → Make sure the operation of the footboard control located in the weigh frame left footboard mounting hole.

24. Press and hold the **Chair** control. The bed system begins to articulate beyond 70°.

Yes   No

↓ → Look for a loose or damaged position sensor.

25. As the bed system articulates towards the chair egress position, make sure the **foot section** does not touch the floor. The **foot**, **chair** and **hilow** functions must reach their respective maximum mechanical limits.

Yes   No

↓ → Make sure the **Foot out** hydraulic valve coils #9 and #12 and **Foot in** valve coils #10 and #11 are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

26. Check that the hydraulic hoses are not kinked or pinched. If leaking, Tighten or replace the hydraulic fittings. Replace damaged valves. See “Hydraulic Valve” on page 4-73. Check for a loose or a damaged position sensor. Calibrate position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

27. Release the **Chair position** control. The **Chair position** indicator remains come ond.

Yes   No

↓ → Determine if the chair position indicator is come ond on the opposite siderail by pressing and releasing the **Chair** control. If so, replace the damaged siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. Make sure the position sensor calibrations.

28. Unlock the brakes. The system sounds a periodic audible beep, and the **Brake not set** indicator flashes.

**Yes    No**

- ↓ → Make sure the **Brake not set** control is correctly adjusted. Go to RAP 2.8. See “Power Control Module P.C. Board” on page 4-126.

29. Set the brakes, and repeat the above procedures for the opposite siderail caregiver control panel.

**Yes    No**

- ↓ → Make sure the **Brake not set** control is correctly adjusted. Go to RAP 2.8. See “Power Control Module P.C. Board” on page 4-126.

30. Cycle the bed from the low flat position to the full chair position and back to low flat. Articulation time is normal.

**Yes    No**

- ↓ → Make sure there are no restraints, obstructions, or accessories incorrectly attached to the frames. Check for proper hydraulic oil level in the reservoir, between the “A” and “B” level lines. Check for leaks in the hydraulic lines or cylinders. See “Hydraulic Power Unit” on page 4-75 and RAP 2.34.

31. The observed time for downward articulation is normal.

**Yes    No**

- ↓ → If the downward speed is slower than normal, check for a dirty or faulty valve. Clean or replace the valve. See “Hydraulic Valve” on page 4-73. In the event the down speed times are too fast, replace the down valve.

32. The system functions normally.

**Yes    No**

- ↓ → Replace the hydraulic manifold and pump. See “Hydraulic Power Unit” on page 4-75.

33. The system functions normally.

**Yes    No**

- ↓ → The CPR valve is not partially activated. See “CPR Release Valve” on page 4-104.

34. The system functions normally.

**Yes    No**

- ↓ → The foot articulation times are slow. Replace the foot articulation rod valve S7.

35. The system functions normally.

**Yes    No**

↓      → The retraction time is too slow. Replace the foot retraction rod valve S11.

36. The system functions normally.

**Yes    No**

↓      → If the problem persists, replace the hydraulic manifold and pump. See “Hydraulic Power Unit” on page 4-75 and RAP 2.34.

37. Go to “Final Actions” on page 2-12.

**2**

## 2.13 Bed Flat Control Will Not Flatten the Bed

**NOTE:**

Make sure the bed system is in the chair egress position. Make sure the brakes are locked. If the brakes are not locked, a periodic beep sounds, and the **Brake not set** indicator flashes.

1. Press an enabled **Flat** control. The bed system articulates, and the **Chair position** indicator flashes.

**Yes    No**

↓ → Make sure there are no function lockouts applied.

2. Determine if the same function operates on the opposite siderail by pressing and holding in the opposite caregiver siderail **Flat** control.

**Yes    No**

↓ → Replace the suspected caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

3. The system functions normally.

**Yes    No**

↓ → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

4. The system functions normally.

**Yes    No**

↓ → Make sure the hilow hydraulic valve coils are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

5. The system functions normally.

**Yes    No**

↓ → Make sure the hydraulic hoses do not leak and are not kinked or pinched. Tighten or replace the hydraulic hoses or fittings as necessary.

6. The system functions normally.

**Yes    No**

↓ → Replace the damaged valves. See “Hydraulic Valve” on page 4-73.

7. Only the head end operates downward.  
↓ → Check the hydraulic valve coil #14. See “Hydraulic Manifold Valve Coil” on page 4-71.

8. Only the foot end operates downward.

9. Check the hydraulic valve coil #2. See “Hydraulic Manifold Valve Coil” on page 4-71.

10. The system functions normally.

Yes   No

↓ → Make sure the hilow hydraulic valve is seating.

11. The system functions normally.

Yes   No

↓ → Check all hydraulic hose fittings for leaks. Tighten the hydraulic fittings only if they are leaking fluid. See “Hydraulic Valve” on page 4-73 for torquing instructions.

12. As the foot section reaches 60°, the bed system pauses, and an audible beep sounds.

Yes   No

↓ → Calibrate the position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

13. With the footboard installed, the **Remove ft board** indicator comes on.

Yes   No

↓ → Make sure the footboard control is operational.

14. Press and hold the **Flat** control. The **Remove ft board** indicator comes on before the foot section reaches 30° where the bed system pauses, an audible beep sounds, when the head section is at 55°, the bed pauses, and then continues to lower.

Yes   No

↓ → Calibrate the position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

15. The system functions normally.

Yes   No

↓ → Make sure the footboard control is functioning correctly.

16. As the foot and the head sections reach the flat position, make sure the head, knee and foot sections are at the flat position (0° Trendelenburg angle).

**Yes      No**

- ↓ → Calibrate the position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

17. Repeat the above procedures for the opposite siderail control panel.

**Yes      No**

- ↓ → Determine if the same function operates on the opposite siderail by pressing and holding in the opposite caregiver siderail **Flat** control.

18. The opposite siderail functions normally.

**Yes      No**

- ↓ → Replace the suspected caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

19. The system functions normally.

**Yes      No**

- ↓ → Replace the main caregiver control panel positioning P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

20. Go to “Final Actions” on page 2-12.

## 2.14 Caregiver Control Malfunction—Head Siderail and Intermediate Siderail

### Head Siderail

1. Press the **bed up** control. The bed system rises.

**Yes    No**

↓ → Make sure the hilow hydraulic valve coils are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

2. The system functions normally.

**Yes    No**

↓ → Check that the hydraulic hoses are not kinked or pinched. Tighten or replace the hydraulic fittings only if they leak fluid. See “Hydraulic Valve” on page 4-73.

3. The system functions normally.

**Yes    No**

↓ → Replace damaged valves. See “Hydraulic Valve” on page 4-73 and RAP 2.34.

4. Only the head end operates upward.

**Yes    No**

↓ → Check hydraulic valve coil #13.

5. Only the foot end operates upward.

**Yes    No**

↓ → Check hydraulic valve coil #15. See “Head Hydraulic Cylinder” on page 4-88 and RAP 2.22.

6. The system functions normally.

**Yes    No**

↓ → Determine if function operates on the opposite siderail by pressing the **Bed Up** control. See RAP 2.11 for additional troubleshooting procedures.

7. Press the **bed down** control. The bed system lowers.

**Yes    No**

↓ → Determine if the bed down function operates on the opposite siderail by pressing the **Bed Down** control.

8. The system functions normally.

**Yes    No**

- ↓ → Replace the caregiver control panel P.C. board in the head siderail. See “Siderail Mechanism Does Not Hold” on page 2-148. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

9. Put the P.C boards in their original positions.

10. The system functions normally.

**Yes    No**

- ↓ → Troubleshoot the weigh frame junction P.C. board. See “Weigh Frame Junction P.C. Board” on page 4-135.

11. The system functions normally.

**Yes    No**

- ↓ → If the problem persists, make sure the hilow hydraulic valve coil is operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

12. The system functions normally.

**Yes    No**

- ↓ → Check that the hydraulic hoses are not kinked or pinched. Torque the hydraulic fittings only if they are leaking fluid. See “Hydraulic Valve” on page 4-73.

13. Only the head end operates downward.

- ↓ → Check the hydraulic valve coil #14. If only the foot end operates downward, check the hydraulic valve coil #16. See “Hydraulic Valve” on page 4-73.

14. Go to “Final Actions” on page 2-12.

## Intermediate Siderail—Head Up/Head Down

1. Press the **Head Up/Head Down** control. The head section raises/lowers.  
**Yes    No**  
↓ → Check that the hydraulic hoses are not kinked or pinched.  
Tighten or replace the hydraulic fittings only if they leak fluid.
2. The system functions normally.  
**Yes    No**  
↓ → Make sure the hilow hydraulic valve coils are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.
3. The system functions normally.  
**Yes    No**  
↓ → Replace the damaged valves. See “Hydraulic Valve” on page 4-73 and RAP 2.34.
4. The system functions normally.  
**Yes    No**  
↓ → If only the head end operates upward, check the hydraulic valve coil #13. See “Hydraulic System Malfunction” on page 2-166.
5. The system functions normally.  
**Yes    No**  
↓ → If only the foot end operates upward, check the hydraulic valve coil #15. See “Head Hydraulic Cylinder” on page 4-88.
6. The system functions normally.  
**Yes    No**  
↓ → Replace the caregiver control panel **Head Up/Head Down** control P.C. board in the intermediate siderail. See “Siderail Mechanism Does Not Hold” on page 2-148.
7. The system functions normally.  
**Yes    No**  
↓ → Go to RAP 2.11 for additional troubleshooting techniques.
8. The system functions normally.  
**Yes    No**  
↓ → Replace the suspected caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function

boards may be used for this purpose. Return the P.C. boards to their original positions.)

9. The system functions normally.

**Yes    No**

↓ → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

10. Go to “Final Actions” on page 2-12.

## Intermediate Siderail—Knee Up/Knee Down

1. Press the **Knee Up/Knee Down** control. The knee section rises/lowers.

**Yes    No**

↓ → Make sure the opposite siderail functions.

2. The opposite siderail functions normally.

**Yes    No**

↓ → Replace the suspected caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

3. The system functions normally.

**Yes    No**

↓ → Make sure the hydraulic pump motor operates.

4. The opposite siderail functions normally.

**Yes    No**

↓ → Make sure the hydraulic fluid reservoir has sufficient fluid. See “Hydraulic System Fluid Fill” on page 4-69.

5. The system functions normally.

**Yes    No**

↓ → Check the hydraulic lines for kinks and leaks. Tighten or replace the hydraulic fittings only if they leak fluid. See “Hydraulic Fluid Leak” on page 2-169.

6. The system functions normally.

**Yes    No**

↓ → Check operation of the hydraulic coils. See “Hydraulic Manifold Valve Coil” on page 4-71.

7. The system functions normally.

**Yes    No**

↓ → See “Hilow Foot Hydraulic Cylinder” on page 4-80.

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8. The system functions normally.

**Yes    No**

↓ → Check the operation of the head hydraulic cylinder. See “Hilow Head Hydraulic Cylinder” on page 4-84.

9. The system functions normally.

**Yes    No**

↓ → Check the operation of the knee hydraulic cylinder. See “Knee Hydraulic Cylinder” on page 4-92.

10. Go to “Final Actions” on page 2-12.

## Intermediate Siderail—Foot Up/Foot Down

1. Press an enabled **Foot up/Foot down** control. The foot section rises/lowers.

**Yes    No**

↓ → Make sure the opposite siderail functions are normal.

2. The opposite siderail functions normally.

**Yes    No**

↓ → Make sure the hydraulic pump motor operates.

3. The system functions normally.

**Yes    No**

↓ → Check hydraulic lines for kinks and leaks. Tighten or replace the hydraulic fittings only if they leak fluid. See “Hydraulic Fluid Leak” on page 2-169.

4. The system functions normally.

**Yes    No**

↓ → Make sure the hydraulic reservoir has the proper amount of fluid. See “Hydraulic System Fluid Fill” on page 4-69 and RAP 2.35.

5. The system functions normally.

**Yes    No**

↓ → Replace the suspected caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

6. Go to “Final Actions” on page 2-12.

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## Intermediate Siderail—Foot Out/Foot In

1. Press an enabled **Foot out/Foot in** control. The foot section extends/retracts.

**Yes    No**

↓ → Make sure the opposite siderail functions.

2. The opposite siderail functions normally.

**Yes    No**

↓ → Make sure the hydraulic pump motor operates.

3. The system functions normally.

**Yes    No**

↓ → Make sure the hydraulic fluid reservoir has the proper amount of fluid. See “Hydraulic System Fluid Fill” on page 4-69.

4. The system functions normally.

**Yes    No**

↓ → Check the hydraulic lines for kinks and leaks. Tighten or replace the hydraulic fittings only if they leak fluid. See “Hydraulic Fluid Leak” on page 2-169.

5. The system functions normally.

**Yes    No**

↓ → Make sure the hydraulic valve coils are functioning correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

6. The system functions normally.

**Yes    No**

↓ → Replace the suspected caregiver control panel Knee Up arrow control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

7. Go to “Final Actions” on page 2-12.

## 2.15 Reverse Trendelenburg/Trendelenburg Control Malfunction

1. With the bed system in the flat position, press the **Reverse Trendelenburg** control. The head section rises and stops at approximately 15° above the foot end of the bed.

**Yes    No**

- ↓ → Make sure the mechanical linkages of the position sensors are correctly connected, and the sensor's cables are not broken, shorted, or disconnected.

2. The system functions normally.

**Yes    No**

- ↓ → Calibrate the position sensors. See "Articulation Position Sensing System Calibration" on page 4-4.

3. The system functions normally.

**Yes    No**

- ↓ → Make sure the hydraulic pump operates when the **Reverse Trendelenburg** control is pressed.

4. The system functions normally.

**Yes    No**

- ↓ → Make sure the hydraulic hoses are not kinked or pinched. Tighten or replace hydraulic fittings that leak fluid.

5. The system functions normally.

**Yes    No**

- ↓ → Make sure the hilow hydraulic valve coils are operating correctly. See "Hydraulic Manifold Valve Coil" on page 4-71.

6. The system functions normally.

**Yes    No**

- ↓ → Replace the damaged valves. See "Hydraulic Valve" on page 4-73 and RAP 2.34.

7. Toggle the system from **Reverse Trendelenburg** to the **Trendelenburg** position. The system functions normally.

**Yes    No**

- ↓ → If only the head end operates upward, check the hydraulic valve coil #13.

8. The system functions normally.

**Yes    No**

↓ → If only the foot end operates upward, check the hydraulic valve coil #15.

9. The system functions normally.

**Yes    No**

↓ → Check the head hydraulic cylinder for proper operation. See “Head Hydraulic Cylinder” on page 4-88.

10. The system functions normally.

**Yes    No**

↓ → Check the **Trendelenburg** and **Reverse Trendelenburg** control P.C. boards. See “Siderail Mechanism Does Not Hold” on page 2-148.

11. The opposite siderail **Trendelenburg** or **Reverse Trendelenburg** controls operate the bed system.

**Yes    No**

↓ → Replace the suspected caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

12. The system functions normally.

**Yes    No**

↓ → Replace the main caregiver control panel positioning P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. Go to step 14.

13. Go to “Final Actions” on page 2-12.

14. Press the **Head Up** arrow control. The knee section rises to 10° and stops while the head section rises to 55°, pauses, and continues up to the mechanical limits.

**Yes    No**

↓ → Make sure the opposite siderail operates correctly.

15. The system functions normally.

**Yes    No**

↓ → Make sure the mechanical linkages of the position sensors are correctly connected.

16. The system functions normally.

**Yes    No**

↓ → Make sure the sensor cables are not broken, shorted, or disconnected. Make sure the position sensors are calibrated. See “Articulation Position Sensing System Calibration” on page 4-4.

17. The system functions normally.

**Yes    No**

↓ → Make sure the hydraulic pump motor operates correctly.

18. The system functions normally.

**Yes    No**

↓ → See “Hydraulic System Fluid Fill” on page 4-69.

19. The system functions normally.

**Yes    No**

↓ → Make sure the hydraulic hoses are not kinked or pinched. Tighten or replace hydraulic fittings that leak fluid. See “Hydraulic Fluid Leak” on page 2-169.

20. The system functions normally.

**Yes    No**

↓ → Check the hydraulic manifold valve coil for proper operation. See “Hydraulic Manifold Valve Coil” on page 4-71.

21. The head section functions normally.

**Yes    No**

↓ → Check the head hydraulic cylinder for proper operation. See “Head Hydraulic Cylinder” on page 4-88.

22. The foot section functions normally.

**Yes    No**

↓ → Check the hilow Foot cylinder for proper operation. See “Hilow Foot Hydraulic Cylinder” on page 4-80.

23. The system functions normally.

**Yes    No**

- ↓ → Replace the intermediate panel control P.C. Board. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

24. Return the bed system to the flat position. Press the **Reverse Trendelenburg** control. Press the **Trendelenburg** control. The foot section rises and stops at approximately 15° above the head end of the bed system.

**Yes    No**

- ↓ → Make sure the mechanical linkage of the position sensors are correctly connected.

25. The system functions normally.

**Yes    No**

- ↓ → Make sure the sensor cables are not broken, shorted, or disconnected. Make sure the position sensors are calibrated. See “Articulation Position Sensing System Calibration” on page 4-4.

26. The hydraulic pump operates when the **Trendelenburg** control is pressed.

**Yes    No**

- ↓ → Make sure the hydraulic hoses are not kinked or pinched. Tighten or replace hydraulic fittings that leak fluid.

27. The system functions normally.

**Yes    No**

- ↓ → Make sure hilow hydraulic valve coils are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

28. The foot end functions normally.

**Yes    No**

- ↓ → If only the head end operates upward, check the hydraulic valve coil #13. See “Hydraulic Manifold Valve Coil” on page 4-71.

29. The head end functions normally.

**Yes    No**

- ↓ → If only the foot end operates upward, check the hydraulic valve coil #15. See “Hydraulic Manifold Valve Coil” on page 4-71.

30. The system functions normally.

**Yes**    **No**

↓    → Check and replace damaged hydraulic valves. See “Hydraulic Valve” on page 4-73 and RAP 2.34.

31. The system functions normally.

**Yes**    **No**

↓    → Replace the suspected caregiver control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

32. The opposite siderail control panel operates correctly.

**Yes**    **No**

↓    → Repeat above procedures for the opposite siderail control panels.  
Go to step 34.

33. Go to “Final Actions” on page 2-12.

34. Press the **Head Up** control. The knee section rises to 10°, and stops while the head section raises to 55°, pauses, and continues up to the mechanical limits.

**Yes**    **No**

↓    → Make sure the mechanical linkages of the position sensors are correctly connected.

35. The system functions normally.

**Yes**    **No**

↓    → Make sure the sensor cables are not broken, shorted, or disconnected. Make sure the position sensors are calibrated. See “Articulation Position Sensing System Calibration” on page 4-4.

36. The hydraulic pump operates when the **Head Up** arrow control is pressed.

**Yes**    **No**

↓    → Check that hydraulic hoses are not kinked or pinched. Tighten or replace only hydraulic fittings that leak fluid.

37. The system functions normally.

**Yes    No**

↓      → Make sure hilow hydraulic valve coils are operating correctly.  
See “Hydraulic Manifold Valve Coil” on page 4-71.

38. The head end functions normally.

**Yes    No**

↓      → If only the foot end operates upward, check the hydraulic valve coil #15. See “Hydraulic Manifold Valve Coil” on page 4-71.

39. The system functions normally.

**Yes    No**

↓      → Check and replace damaged hydraulic valves. See “Hydraulic Valve” on page 4-73 and RAP 2.34.

40. The opposite siderail control panels function correctly.

**Yes    No**

↓      → Repeat the above procedure for the opposite siderail control panel.

41. Go to “Final Actions” on page 2-12.

## 2.16 Hilow Function Raises the Unit Unevenly

1. Do as follows:
  - a. Place the unit in the fully lowered position, with the sleep surface flat.
  - b. Using a stopwatch, check the travel time of the hilow cylinders as you use the hilow function to raise the unit with **no** weight on the sleep surface.
  - c. Refer to table 2-19 on page 2-140, and check the travel time for Cylinder 1 to reach its limit.
  - d. Compare the travel time of Cylinder 2 to the value the Cylinder 1.

Cylinder 2's travel time is within the specification shown in the right-hand column.

**Yes    No**

↓      → Go to step 6.

2. Do as follows:

- a. Place the unit in the fully raised position, with the sleep surface flat.
- b. Using a stopwatch, check the travel time of the hilow cylinders as you use the hilow function to lower the unit with **no** present on the sleep surface.
- c. Refer to table 2-19 on page 2-140, and check the travel time of Cylinder 1 to reach its limit.
- d. Compare the travel time of Cylinder 2 to the to the travel time of Cylinder 1.

Cylinder 2's travel time is within the specification shown in the right-hand column.

**Yes    No**

↓      → Go to step 6.

2

**Table 2-19. Hilow Times**

<b>Hilow Up</b>		<b>Hilow Down</b>	
Cylinder 1 time (in seconds)	Cylinder 2 time (in seconds)	Cylinder 1 time (in seconds)	Cylinder 2 time (in seconds)
30	30 - 33	30	30 - 33
31	31 - 34	31	31 - 34
32	32 - 35	32	32 - 35
33	33 - 36	33	33 - 36
34	34 - 37	34	34 - 37
35	35 - 38	35	35 - 38
36	36 - 39	36	36 - 39
37	37 - 40	37	37 - 40
38	38 - 41	38	38 - 41
39	39 - 42	39	39 - 42
40	40 - 43	40	40 - 43
41	41 - 44		
42	42 - 45		
43	43 - 46		
44	44 - 47		
45	45 - 48		

## 3. Do as follows:

- Place the unit in the fully lowered position, with the sleep surface flat.
- Distribute a weight of 250 lb (113 kg) on the unit as follows:
  - 112.5 lb (51.0 kg) on the head section.
  - 62.5 lb (28.4 kg) on the seat section.
  - 50 lb (23 kg) on the knee section.
  - 25 lb (11 kg) on the foot section.

**NOTE:**

If a load of 250 lb (113 kg) is not available, have a person lay on the unit as an equivalent for the weight.

- Use a stopwatch to check the travel time of the hilow cylinders as you use the hilow function to raise the unit.

- d. Refer to table 2-19 on page 2-140, and check the travel time of Cylinder 1 to reach its limit in the left-hand **Hilow Up** column.
- e. Compare the travel time of Cylinder 2 to the value in the right-hand **Hilow Up** column directly next to the travel time of Cylinder 1.

**NOTE:**

Some differences exist from one cycle to the next. Do not expect the same results for every cycle.

Cylinder 2's travel time is within the specification shown in the right-hand column.

**Yes    No**

↓      → Go to step 6.

4. Do as follows:

- a. Place the unit in the fully raised position, with the sleep surface flat.
- b. Use a stopwatch to check the travel time of the hilow cylinders as you use the hilow function to lower the unit.
- c. Refer to table 2-19 on page 2-140, and check the travel time of Cylinder 1 to reach its limit in the left-hand **Hilow Down** column.
- d. Compare the travel time of Cylinder 2 to the value in the right-hand **Hilow Down** column directly next to the travel time of Cylinder 1.

Cylinder 2's travel time is within the specification shown in the right-hand column.

**Yes    No**

↓      → Go to step 6.

5. The problem still exists.

**Yes    No**

↓      → Go to "Final Actions" on page 2-12.

6. Check the hydraulic hoses for kinks or anything that limits the flow of hydraulic fluid. The hydraulic hoses are free from kinks and restrictions.

**Yes    No**

↓      → Replace the hydraulic hoses. If this solves the problem, go to "Final Actions" on page 2-12. Otherwise, go to step 7.

7. Replace the hydraulic power unit, refer to procedure 4.27. This solves the problem.

**Yes    No**

↓      → For assistance, call Hill-Rom Technical Support.

8. Go to "Final Actions" on page 2-12.

## 2.17 Patient Controls Malfunction

**NOTE:**

The patient controls do not operate when the bed is on battery power.

1. Put the bed in the flat position.
2. Press the **Head Up** control. As the head section raises, the knee section automatically rises. The knee section is limited to a maximum angle of 15°, and the head section goes to 55°, pauses, and continues to the limit.

**Yes    No**

- ↓ → Make sure the mechanical linkages of the position sensors are correctly connected.

3. The system functions normally.

**Yes    No**

- ↓ → Make sure the sensor cables are not broken, shorted, or disconnected. Make sure the position sensors are calibrated. See “Articulation Position Sensing System Calibration” on page 4-4.

4. The hydraulic pump operates when the **Head Up** arrow control is pressed.

**Yes    No**

- ↓ → Check that hydraulic hoses are not kinked or pinched. Tighten or replace only hydraulic fittings that leak fluid.

5. The system functions normally.

**Yes    No**

- ↓ → Make sure hilow hydraulic valve coils are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

6. The system functions normally.

**Yes    No**

- ↓ → Check and replace damaged hydraulic valves. See “Hydraulic Valve” on page 4-73 and RAP 2.34.

7. The system functions normally.

**Yes    No**

- ↓ → Go to RAP 2.11 for additional troubleshooting techniques.

8. The opposite siderail control panels function correctly.

**Yes    No**

- ↓ → Repeat the above troubleshooting procedures for the opposite siderail control panels.

9. Go to “Final Actions” on page 2-12.

## 2.18 CPR Release Malfunction

### NOTE:

The caregiver controls can be used while the CPR release function is activated.

### Foot Control

1. With the bed system in the chair-egress position and with a person who weighs more than 90 lb (41 kg) on the bed, hold the **CPR/TREN** control pedal down.

The head section moves to the flat position within 10 seconds, and the foot/knee sections move to the flat position within 25 seconds.

**Yes    No**

- ↓ → If the head section fails to go down, press the foot pedal, and push downward on the head section. (If the head section goes down, then the head hydraulic cylinder may be too tight, or there may be an obstruction that does not let the head section lower smoothly. Check and repair components as necessary).

2. The bed system functions normally.

**Yes    No**

- ↓ → Check the CPR linkage for proper adjustment. If the linkage is pulls the valve on the manifold, and the head section still does not lower, replace the manifold valve. See “CPR Release Valve” on page 4-104.

3. The bed system functions normally.

**Yes    No**

- ↓ → The actuation controls are correctly adjusted and functional. See “CPR Sensor” on page 4-107. Operate the **CPR/TREN** control pedal up and down to determine the control actuation and spring-loaded mechanical centering of the control actuator.

4. Make sure the electrical signal cable connections are connected and not shorted.

5. Connector P20 is connected to the power control P.C. board. See “Power Control Module P.C. Board” on page 4-126.

6. The bed system functions normally.

**Yes    No**

↓ → The **Service required** indicator comes on, check the adjustment of the CPR actuation control. The control must make contact before the hydraulic valve is opened.

7. The bed system functions normally.

**Yes    No**

↓ → Check that the hydraulic system is functional. See “**Hydraulic System Fluid Fill**” on page 4-69, RAP 2.35, “**Hilow Foot Hydraulic Cylinder**” on page 4-80, and “**Hilow Head Hydraulic Cylinder**” on page 4-84.

8. The bed system functions normally.

**Yes    No**

↓ → Check the mechanical linkages of the position sensors. Make sure sensor cables are not broken, shorted, or disconnected. Calibrate the position sensors. See “**Articulation Position Sensing System Calibration**” on page 4-4.

9. The treatment/sleep surface automatically inflates to a CPR-ready surface.

**Yes    No**

↓ → Go to RAP 2.37.

10. Go to “**Final Actions**” on page 2-12.

## 2.19 Emergency Trendelenburg Malfunction

1. With the bed system is in the flat position. Lift the **CPR/TREN** control pedal. The head end lowers 15° below the foot end.  
**Yes    No**  
↓ → Check the Emergency Trendelenburg linkage for adjustment. See “Emergency Trendelenburg Release Valve” on page 4-113.
2. Operate the **CPR/TREN** control pedal up and down. The spring loaded control actuator is mechanically centered between the micro-control leaf actuators.  
**Yes    No**  
↓ → Mechanically center the actuator between the **CPR/TREN** control pedal. See “Trendelenburg Sensor” on page 4-110 and “CPR Sensor” on page 4-107.
3. The system functions normally.  
**Yes    No**  
↓ → The **Service required** indicator comes on, check the adjustment of the Emergency Trendelenburg actuation control. The control must make contact before the hydraulic valve is opened.
4. The system functions normally.  
**Yes    No**  
↓ → Replace the Trendelenburg hydraulic valve.
5. The system functions normally.  
**Yes    No**  
↓ → Make sure both hilow cylinders are functioning correctly. See “Hilow Foot Hydraulic Cylinder” on page 4-80 and “Hilow Head Hydraulic Cylinder” on page 4-84.
6. Go to “Final Actions” on page 2-12.

2

## 2.20 Trendelenburg/Reverse Trendelenburg Malfunction

1. If you are unable to put the bed system in the **Trendelenburg/Reverse Trendelenburg** position, press the **Bed Up** control to raise the bed system to a higher position. Lift the **CPR/TREN** control pedal. The head end is 15° below the foot end.

**Yes    No**

- ↓ → Make sure the **CPR/TREN** actuation controls are correctly adjusted and functional. See “Emergency Trendelenburg Release Valve” on page 4-113.

2. The system functions normally.

**Yes    No**

- ↓ → Go to RAP 2.18.

3. Go to “Final Actions” on page 2-12.

## 2.21 Hydraulic Foot Pump Pedal Will Not Raise Bed

1. Raise the bed system with the optional hydraulic foot pump by pressing the **Bed Up** control and stepping down on the foot pump pedal repeatedly (maximum of 45 strokes).
2. The bed system rises as the foot pedal is repeatedly pumped.

**Yes    No**

↓ → Check for an audible solenoid valve click when the **Bed Up** control is depressed.

3. The solenoid valve clicks, and the bed system rises when using the foot pump.

**Yes    No**

↓ → Check that the battery is correctly charged, and there are no bed obstructions.

4. The bed system functions normally.

**Yes    No**

↓ → Check the foot pump linkage. Check the hydraulic system for leaks. Go to RAP 2.35.

5. The bed system functions normally.

**Yes    No**

↓ → Check and replace the solenoid valve coil if the proper voltage is supplied to the solenoid coil.

6. The bed system functions normally.

**Yes    No**

↓ → Replace the hydraulic manifold.

7. Repeat steps 1 through 6 using the opposite side pump pedal and siderail. See “Caregiver Control Malfunction—Head Siderail and Intermediate Siderail” on page 2-125.

8. Go to “Final Actions” on page 2-12.

## 2.22 Siderail Mechanism Does Not Hold

1. From the stowed position, pull the siderail up until it clicks in the up and locked position.

**Yes    No**

↓      → Check for obstructions, missing hardware, or loose fasteners.

2. Grasp the top of the siderail, and push and pull firmly on the siderail. The siderail remains latched in the locked position.

**Yes    No**

↓      → Check for obstructions or loose fasteners.

3. Stow the siderail as follows: pull the release handle out, and let the siderail swing down in a controlled manner to the fully stowed position.

**Yes    No**

↓      → Check for obstructions in the center arm, loose fasteners, missing spring, or binding.

4. Open the center arm and check for head siderail latch functionality.

5. Go to “Final Actions” on page 2-12.

## 2.23 SideCom® Communication System—Nurse Call Malfunction

1. With the SideCom® Communication System tester attached to the SideCom® Communication System board, one at a time, press each **Nurse Call** control. The nurse call indicator comes on as each control is pressed.

**Yes    No**

- ↓ → If the **Nurse Call** function operates on the opposite siderail, replace the suspected caregiver control panel nurse call control P.C. board. See “Nurse Call Switch P.C. Board” on page 4-55. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

2. The system functions normally.

**Yes    No**

- ↓ → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

3. The system functions normally.

**Yes    No**

- ↓ → Replace the SideCom® Communication System Nurse Call /Ped P.C. board. See “SideCom® Communication System and Nurse Call Module” on page 4-147.

4. Press the **TV** control on the patient control panel. The TV indicator comes on.

**Yes    No**

- ↓ → Press the **TV** control on the opposite siderail. If that control operates the television set, then replace the suspected caregiver control panel TV control P.C. board in the intermediate siderail. See “SideCom® Communication System Entertainment/Lighting Module” on page 4-145. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

5. The system functions normally.

**Yes      No**

↓      → Make sure connection between the SideCom® Communication System and the junction board. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52 and/or “SideCom® Communication System Entertainment/Lighting Module” on page 4-145.

6. Go to “Final Actions” on page 2-12.

## **2.24 Bed Exit Malfunction**

1. The bed exit and alarm system operates correctly.

**Yes    No**

↓       → Go to RAP 2.25.

2. Go to “Final Actions” on page 2-12.

**2**

## 2.25 Patient Exit/Priority Nurse Call Malfunction

1. With a reference weight greater than 75 lb (34.0 kg) on the bed, press the **Enable** control; within 16 seconds, press the **Bed Exit** control. Select an alarm delay of either 0, 2, 4, or 6 seconds. As each control is pressed, an indicator comes one.

**Yes    No**

- ↓ → Replace the caregiver control panel **Bed Exit detection** P.C. board that is in the left-hand intermediate siderail **Bed Exit alarm** control panel. See “Patient Exit Detection Alarm and Sleep Surface Siderail Controls” on page 4-58.

2. Press the enabled **Alarm On/Off** control to **on**. The Alarm indicator comes on.

**Yes    No**

- ↓ → Replace the caregiver control panel **Bed Exit** P.C. board in the **Bed Exit** module of the intermediate siderail. See “Patient Exit Detection Alarm and Sleep Surface Siderail Controls” on page 4-58.

3. The system functions normally.

**Yes    No**

- ↓ → The **nurse call** control operates. Replace the SideCom® Communication System Nurse Call /PED P.C. board.

4. The system and LED indicators function normally.

**Yes    No**

- ↓ → The alarm system operates, but the indicators fail to function.

5. Remove the weight from the bed system. The bed exit alarm sounds continuously and places a priority nurse call to the nurse station.

**Yes    No**

- ↓ → Go to RAP 2.29.

6. Press the enabled **Alarm On/Off** control to off. The audible bed exit alarm stops, and the priority nurse call is cancelled.

**Yes    No**

- ↓ → Replace the caregiver control panel **Alarm on/off** control P.C. board that is in the bed exit alarm control panel.

7. The system functions normally.

**Yes    No**

- ↓ → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

8. The system functions normally.

**Yes    No**

↓ → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

9. The system functions normally.

**Yes    No**

↓ → Replace the weigh frame junction P.C. board. See “Weigh Frame Junction P.C. Board” on page 4-135.

10. The system functions normally.

**Yes    No**

↓ → If the **nurse call** control operates, replace the SideCom® Communication System Nurse Call /PED P.C. board.

11. If the alarm system operates, but the indicator fails to function, see RAP 2.9.

12. Go to “Final Actions” on page 2-12.

## 2.26 Night Light Does Not come on

1. The night light comes on when the room light is dim.

**Yes    No**

↓      → Replace the lamp bulb or fixture if damaged.

2. Make sure the photocell functions.

**Yes    No**

↓      → Replace the photocell.

3. The system functions normally.

**Yes    No**

↓      → Make sure the night lamp cable connector is plugged into P-4 of the power control P.C. board. See “Night Light” on page 4-151.

4. The system functions normally.

**Yes    No**

↓      → Replace the power supply P.C. board. See “Power Control Module P.C. Board” on page 4-126.

5. Go to “Final Actions” on page 2-12.

## 2.27 Patient Entertainment Malfunction

1. Make sure of these:
  - a. The SideCom® Communication System of the bed system is connected to the room entertainment infrastructure.
  - b. The room music system operates.
2. Press the siderail **Music** control. The room music system comes on.

**Yes**   **No**  
↓      → Make sure all cable are correctly connected.
3. The system functions normally.

**Yes**   **No**  
↓      → Replace the caregiver control panel **Music** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.
4. The **Music** control operates.

**Yes**   **No**  
↓      → Replace the SideCom® Communication System—Entertainment/Lighting P.C. board. See “SideCom® Communication System Entertainment/Lighting Module” on page 4-145.
5. The system functions normally.

**Yes**   **No**  
↓      → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.
6. The system functions normally.

**Yes**   **No**  
↓      → Replace the weigh frame junction board. See “Weigh Frame Junction P.C. Board” on page 4-135.
7. With the music on, press the **Music** control. The music goes **off**.

**Yes**   **No**  
↓      → Replace the caregiver control panel **Music** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

2

8. Press the **TV** control. The room television comes on.

**Yes    No**

↓      → Make sure the TV is in the proper mode, and all cables are correctly connected.

9. The system functions normally.

**Yes    No**

↓      → Replace the caregiver control panel **TV** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

10. When the TV works, press the **TV** control. The television goes off.

**Yes    No**

↓      → Replace the main caregiver control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52 and RAP 2.23.

11. Go to “Final Actions” on page 2-12.

## 2.28 Patient Light Controls Malfunction

1. Press the **Read Light** control. The patient read light comes on.  
**Yes**   **No**  
↓      → Check and replace the lamp bulb or fixture if damaged.
2. Press the **Read Light** control on the opposite siderail. The lamp comes on.  
**Yes**   **No**  
↓      → Replace the suspected caregiver control siderail **Read Light** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)
3. Press the **Read Light** control. The patient reading light system is activated.  
**Yes**   **No**  
↓      → Make sure the lamp bulb and all cables are correctly connected.
4. The system functions normally.  
**Yes**   **No**  
↓      → Replace the caregiver control panel **Read** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.
5. Press the siderail **Room Light** control. The room light comes on.  
**Yes**   **No**  
↓      → Make sure all lamp bulbs and cabling are correctly connected.
6. The system functions normally.  
**Yes**   **No**  
↓      → Replace the caregiver control panel **Room Light** control P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.
7. Go to “Final Actions” on page 2-12.

## 2.29 Scale/GCI Malfunction

**NOTE:**

The patient weigh system calibration must be done without a patient on the bed, and with the bed free of all loose articles. The bed must be on a level surface with the mattress in a flat position. The brakes must be applied.

1. Calibrate the scale, see “Patient Weigh System Calibration (Non-NAWI Class III Scale Only)” on page 4-9. The calibration was successfully completed.

**Yes    No**

- ↓ → Make sure all cables are correctly connected, and the power cord is plugged into an applicable power source.

2. The system operates correctly.

**Yes    No**

- ↓ → The **Service** indicator lamp shows no fault codes. To troubleshoot the scale weigh system, see “Graphical Caregiver Interface (GCI)® Control” on page 4-64 and “Scale Control—Patient Exit Detection (PED) Module” on page 4-139. If the system still does not function correctly, go to step 4.

3. Stow the GCI. This completes the calibration of the TotalCare® Bed System weigh frame. Go to “Final Actions” on page 2-12.
4. The scale sends back a message such as “Center Patient in bed before proceeding.” One of the load beam readings is out of range. Go to RAP 2.30.
5. The scale sends back a message such as “Task request cannot be achieved at this moment.” The GCI cannot communicate with the scale, or the scale board detects errors. Go to RAP 2.31.
6. The weight is always 0. Zero the scale, apply weight, and then do a weigh function. do the “Patient Weigh System Calibration (Non-NAWI Class III Scale Only)” on page 4-9.
7. The scale sends back a value at the end of calibration that is not a valid coefficient (value <100). There is a calibration error. Go to RAP 2.32.

## 2.30 Scale/GCI—Diagnostics and Error Troubleshooting

### Diagnostics

1. The A/D readings for each channel must be evaluated. This is done with the diagnostic commands sent to the scale.
  - a. Select the **Tools** tab on the GCI.
  - b. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
  - c. Select **Diagnostics**.
  - d. Select **Service Codes**.
  - e. Select **ID**. Enter 50.
  - f. Select **COM**. Enter 166.
  - g. Press **Send Request**.

**NOTE:**

After a few seconds, some values from the scale show in the response field on the screen. The A/D readings for channel 0 (RF) are the first two response values (first and second position), and the next set of response values (third and fourth position) are the channel 1 (LF) A/D readings (see table 2-20 on page 2-159).

**Table 2-20. A/D Readings and Response Value Positions**

Channel	ID	COM	Response Value Position
0 (RF)	50	166	First and second
1 (LF)	50	166	Third and fourth
2 (LH)	50	167	First and second
3 (RH)	50	167	Third and fourth

2. Calculate the actual value (counts) for the RF: multiply the first position by 256 and add the second position to that value. This can also be done for the LF. See the example that follows for channel 0 (RF).

After this Node/command is sent, a response like this will be received:

ID	COM	Response
50	166	039 123 038 321 000 000

The A/D readings for channel 0 (RF) =  $39 \times 256 + 123 = 10107$  counts

The A/D readings for channel 1 (LF) =  $38 \times 256 + 321 = 10049$  counts

3. Calculate the values for the head beams the same way. The only differences are that you must select the values for command (COM) as **167**, and the data is for channel 2 (LH) and channel 3 (RH).
4. If the counts you calculated are 0, or <500, the scale does not operate. The scale sends a code to the GCI to show the error message “Center Patient in bed.”
5. If all of the response values (first through fourth position) are 0 or 255, one of the load beams is shorted out. Go to RAP 2.33.
6. If only one of the four positions of the response value is 0, switch the beam connectors on the scale board, and view the readings again.
7. If the 0 value follows the load beam, the problem is in the load beam, wiring, or connector. Replace the load beam, if necessary (refer to procedure 4.46).
8. If the 0 value is still on the same channel, replace the damaged scale board (refer to procedure 4.45).
9. If the response is the problem, read the load beam value with diagnostics. See “Diagnostics” on page 2-159.
10. Add some weight to the bed, and make a note of the new load beam value. When weight is applied to the bed, a good load beam will show an increase.

## 2.31 Scale/GCI—Communication Error

Use diagnostics to do a test of the communication between the scale and the GCI. See “Diagnostics” on page 2-159, step thru step d.

1. Select the **Tools** tab on the GCI.
2. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
3. Select **Diagnostics**.
4. Select **Service Codes**.
5. Select **ID**. Enter 50.
6. Select **COM**. Enter 100.
7. Press **Send Request**.
8. After a few seconds, some values from the scale show in the response field on the screen.
9. The scale responds with values from 0 through 5.

**Yes      No**

↓ → Check the wiring between the PCM and the scale. The scale board could be damaged, or the problem may be the GCI. To help determine the problem, replace the scale board (refer to procedure 4.45) or the GCI (refer to procedure 4.22).

10. This confirms the scale and GCI do communicate. Go to “Final Actions” on page 2-12.

## 2.32 Scale/GCI—Calibration Error Troubleshooting

1. At the end of calibration, the scale looks for several error conditions. If the load beam wires are connected to the wrong connector, or the load beam response does not track the calibration weight, errors are generated. The table below shows the possible error codes returned instead of the coefficients (see table 2-21 on page 2-162).

**Table 2-21. Calibration Error Codes**

Error Codes	Description
1	Beam readings are not valid.
2	Zero readings are not valid.
4	Max reading for weight on right foot is improper.
5	Max reading for weight on left foot is improper.
6	Max reading for weight on left head is improper.
7	Max reading for weight on right head is improper.
20	Matrix calculation error.
21	Coefficient range error.

2. Possible errors are: a load beam that does not respond, calibration weight placed in the wrong position (weight was placed above the left head load beam instead of the right head load beam), beam wires connected into the wrong connector, or a scale board failure (refer to procedure 4.45).

## 2.33 Load Beam—Shorted Excitation Voltage

1. Use diagnostics to read the A/D readings. See “Diagnostics” on page 2-159. All 4 channels display a value of 255, or a very high value (count).

Yes    No

↓       → Go to step 3.

2. One of the load beams may have the -5V shorted out to ground. See “Load Beam—Shorted Excitation Voltage Tests” on page 2-164.

3. All 4 channels show a value of 0, or a very low value (count).

Yes    No

↓       → Go to “Final Actions” on page 2-12.

4. One of the load beams may have the +5V shorted out to ground. See “Load Beam—Shorted Excitation Voltage Tests” on page 2-164.

2

## Load Beam—Shorted Excitation Voltage Tests

Below are three tests to find a shorted excitation voltage in a load beam when the load beam is connected to the bed, and one test when the load beam is not connected to the bed. Before you do any of the tests, make sure the load beams are connected (electrically).

### Test 1

1. Using a voltmeter, check for a shorted load beam as follows (see figure 3-22 on page 3-48):
  - a. Measure the voltage from the scale board cover to the black wire beam connector. The black wire, pin 2, should measure -4.75V to -5.25V.
  - b. Measure the voltage from the scale board cover to the red wire beam connector. The red wire, pin 5, should measure 4.75V to 5.25V.
2. If the voltages are not in those ranges, disconnect the load beams, one at a time, until the voltage changes to the proper value. The last beam disconnected is the shorted beam.

### Test 2

Using the diagnostic commands to monitor the A/D readings, check for a shorted load beam as follows (see “Diagnostics” on page 2-159):

1. Disconnect the load beams, one at a time, and monitor the A/D readings.
2. When the A/D readings change to a reasonable value, the last load beam you disconnected is the one with the short. The load beam that is disconnected will give wrong A/D readings.

### Test 3

If the problem is intermittent, use a multimeter to check for a shorted load beam as follows:

1. Disconnect the load beam from the scale board.
2. Connect the multimeter to the bed frame.
3. Connect the other side of the multimeter to one of the load beam wires (red, black, white, or green). The resistance should measure more than 5000 ohms.

#### Test 4

1. To do a test on a load beam that is not mounted in the bed, connect the multimeter to the load beam body instead of to the bed frame. The resistance should measure more than 5000 ohms.

2

## 2.34 Hydraulic System Malfunction

1. With the bed system in a low position, the hydraulic pump motor turns on when you press the **Bed Up** control.

**Yes    No**

↓ → Make sure the hilow hydraulic valve coils are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

2. The hydraulic hoses function correctly.

**Yes    No**

↓ → Check that the hydraulic hoses are not kinked or pinched. Tighten or replace the hydraulic fittings, only if leaking.

3. The valves function correctly.

**Yes    No**

↓ → Replace the damaged valves. See “Hydraulic Valve” on page 4-73.

4. The system operates correctly.

**Yes    No**

↓ → If only the head end operates upward, check hydraulic valve coil #13. (If only the foot end operates upward, check hydraulic valve coil #15.)

5. The system operates correctly.

**Yes    No**

↓ → See RAP 2.11 for additional troubleshooting techniques.

6. When you press the **Chair** control, the bed system moves into the chair position.

**Yes    No**

↓ → Make sure the brake is set and the hydraulic valve coils are operating correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

7. The hydraulic hoses function correctly.

**Yes    No**

↓ → Check that the hydraulic hoses are not kinked or pinched. Tighten or replace the hydraulic fittings, only if leaking.

8. The valves function correctly.

**Yes    No**

↓ → Replace any damaged valves. See “Hydraulic Valve” on page 4-73.

9. The system operates correctly.

Yes   No

↓ → See RAP 2.12 for additional troubleshooting techniques.

10. With the sleep surface flat, alternately press the **Foot In/Out** controls. The foot section length extends and retracts.

Yes   No

↓ → Make sure the hydraulic motor comes on. See “Hydraulic Manifold Valve Coil” on page 4-71.

11. The hydraulic hoses function correctly.

Yes   No

↓ → Check that hydraulic hoses are not kinked or pinched. Tighten or replace the hydraulic fittings that leak. Replace any damaged valves.

12. The hydraulic valve operates correctly.

Yes   No

↓ → See “Hydraulic Valve” on page 4-73 and “Retracting Foot Hydraulic Cylinder” on page 4-96.

13. Press the **Knee Up/Down, Head Up/Down, and Foot Up/Down** arrow controls. All functions operate correctly.

Yes   No

↓ → Use the opposite siderail functions to make sure the bed can be articulated.

14. The hydraulic pump motor operates correctly.

Yes   No

↓ → Make sure the hydraulic pump motor operates. See “Hydraulic Power Unit” on page 4-75 or “Hydraulic System Fluid Fill” on page 4-69.

15. The hydraulic hoses operates correctly.

Yes   No

↓ → Check for kinked or loose hydraulic hose fittings. See RAP 2.35.

16. The hydraulic valve coils function correctly.

Yes   No

↓ → Make sure the hydraulic valve coils are operate correctly. See “Hydraulic Manifold Valve Coil” on page 4-71.

17. The hydraulic cylinders operate correctly.

**Yes      No**

↓      → Make sure the hydraulic cylinders are in alignment and correctly attached. See “Hilow Foot Hydraulic Cylinder” on page 4-80, “Hilow Head Hydraulic Cylinder” on page 4-84 and “Knee Hydraulic Cylinder” on page 4-92.

18. Go to “Final Actions” on page 2-12.

## 2.35 Hydraulic Fluid Leak

1. You can see hydraulic fluid on a fitting or hose.

**Yes    No**

↓      → Check all hydraulic hoses, fittings, cylinders, and hydraulic manifold for leaks. Tighten the hydraulic fittings only if they are leaking fluid.

2. The hydraulic fluid level is up to the “B” level line on the side of the hydraulic fluid reservoir. See “Hydraulic System Fluid Fill” on page 4-69.

3. The bed does not move downward. There is no visible sign of a leak.

**Yes    No**

↓      → Make sure the hilow hydraulic valves are seating. See “Hydraulic Valve” on page 4-73.

4. Go to “Final Actions” on page 2-12.

2

## **2.36 Maximum Inflate Malfunction**

1. With the blower motor on, press the **Max-inflate** control on the left-hand caregiver siderail. The blower speed increases to its maximum rpm and all mattress zones inflate to their maximum pressure of 25" H<sub>2</sub>O (47 mm Hg).

**Yes      No**

↓      → Make sure blower motor voltage is at least 115V AC.

2. Check all air lines for kinks and proper connections. Check complete mattress surfaces for leaks. If problem persists:

Make sure there are no functions locked out. If not, replace the suspected caregiver surface control panel P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52.

3. Go to “Final Actions” on page 2-12.

## 2.37 Treatment Surface and P500 Air Bladders Malfunction

1. When the bed is in the flat position, all air bladders are inflated.

**Yes    No**

↓      → Go to step 3.

2. Go to “Final Actions” on page 2-12.

3. Check the filter intake for dirt or other obstructions. The filter is free of dirt and other obstructions. See “Low Noise Blower Assembly” on page 4-159 or “Compressor—P500 Model” on page 4-259.

**Yes    No**

↓      → Clean the filter and/or remove the obstructions.

4. The air supply hose has no obstructions/kinks and has proper connections at the air manifold and air bladders. The air supply hoses look good.

**Yes    No**

↓      → Remove the air hose obstruction, and make sure the hoses are connected at air manifold and cushions.

5. Check for damaged bladders in the mattress. All bladders are good.

**Yes    No**

↓      → Replace the damaged bladders.

6. Go to “Final Actions” on page 2-12.

2

## 2.38 Loss of Therapy During Transport

**NOTE:**

The information below is used as a guide to make sure therapy continues during transport.

1. The battery is fully charged.

**Yes    No**

↓      → Replace the low charged battery with a correctly charged battery.



**WARNING:**

A ventilator supports life for most patients. Ventilators have alarms that normally sound when a ventilator is disconnected. A disconnected ventilator must immediately be connected. Injury could occur.

2. All peripheral treatment and life support equipment are correctly stowed and ready for transport.

**Yes    No**

↓      → Correctly stow ventilators and other life support devices such das: external and internal pacemakers, internal automatic defibrillator, emergency defibrillator, and IV pumps. Make sure you follow the manufacturers' and caregiver recommendations. Make sure adequate persons are available for transport.

3. There is no electrical interference.

**Yes    No**

↓      → The treatment surface is designed not to emit electrical energy that interferes with the doance of devices at the bedside. If there is interference contact Hill-Rom Technical Support.

4. Ready for transport, go to "Final Actions" on page 2-12.

## 2.39 Local Operating Network (LON) Communication Fault

1. The bed operates and there are no LON service requests or LON failure symptoms.

**Yes    No**

↓ → Check all cables for opens, shorts, and improper connections.

2. There are no blown electrical power fuses.

**Yes    No**

↓ → Using a voltmeter, find any blown electrical fuses. See “Power Control Module P.C. Board” on page 4-126.

3. The battery is fully charged.

**Yes    No**

↓ → Using a voltmeter, recharge the battery. See “Battery” on page 4-121.

4. Use the **Chair** control to put the bed in the chair position.

**Yes    No**

↓ → If there is a malfunction, the P.C. board must be replaced. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52. (For troubleshooting purposes, remove the caregiver control P.C. board from the siderail on the opposite side of the bed. Only like P.C. function boards may be used for this purpose. Return the P.C. boards to their original positions.)

5. The position sensors function correctly.

**Yes    No**

↓ → Calibrate all position sensors. See “Articulation Position Sensing System Calibration” on page 4-4.

6. The caregiver control panel operates correctly.

**Yes    No.**

↓ → Troubleshoot the main caregiver control panel positioning P.C. board in the intermediate siderail. See “Main Caregiver P.C. Board or Patient Control Switch P.C. Board” on page 4-52, “Weigh Frame Junction P.C. Board” on page 4-135, “Scale Control—Patient Exit Detection (PED) Module” on page 4-139 and “Weigh Frame Junction P.C. Board” on page 4-135.

7. Go to “Final Actions” on page 2-12.

## 2.40 Air Manifold Malfunction

1. The foot treatment surface operates correctly.

**Yes    No**

↓ → Make sure the foot mattress hoses are correctly connected. Make sure there are no kinked air hoses. Check for fault codes. Check foot mattress bladders for leaks. Make sure the foot surface treatment module operates. See “Air Module—Manifold Assembly” on page 4-164. Make sure all position sensors operate correctly. See “Articulation Position Sensing System Calibration” on page 4-4.

2. Put the bed in the flat position with the foot section fully extended. All foot mattress bladders are fully inflated.

**Yes    No**

↓ → Make sure the blower motor operates and the bed system is flat and extended. Make sure the surface treatment module operates. See “Air Module—Manifold Assembly” on page 4-164.

3. Retract the foot section. The alternate foot bladders deflate.

**Yes    No**

↓ → Make sure the foot mattress hoses are correctly connected. Make sure there are no kinked air hoses. Check for fault codes. Make sure all position sensors operate correctly. See “Articulation Position Sensing System Calibration” on page 4-4 and “Short Stay Surface” on page 4-176.

4. Place the system in the chair position. The foot mattress bladders fully deflate.

**Yes    No**

↓ → Make sure there are no kinked air hoses. Check for fault codes. Make sure the surface treatment module operates. See “Air Module—Manifold Assembly” on page 4-164. Make sure all position sensors operate correctly. See “Articulation Position Sensing System Calibration” on page 4-4.

5. The surface mattress inflates and deflates correctly.

**Yes    No**

↓ → Make sure all mattress hoses are correctly connected. Make sure there are no kinked air hoses. Check for fault codes. Check mattress for leaks. Make sure the surface treatment module operates. See “Air Module—Manifold Assembly” on page 4-164.

6. Put the bed system in the chair position. The head and thigh are partially deflated.

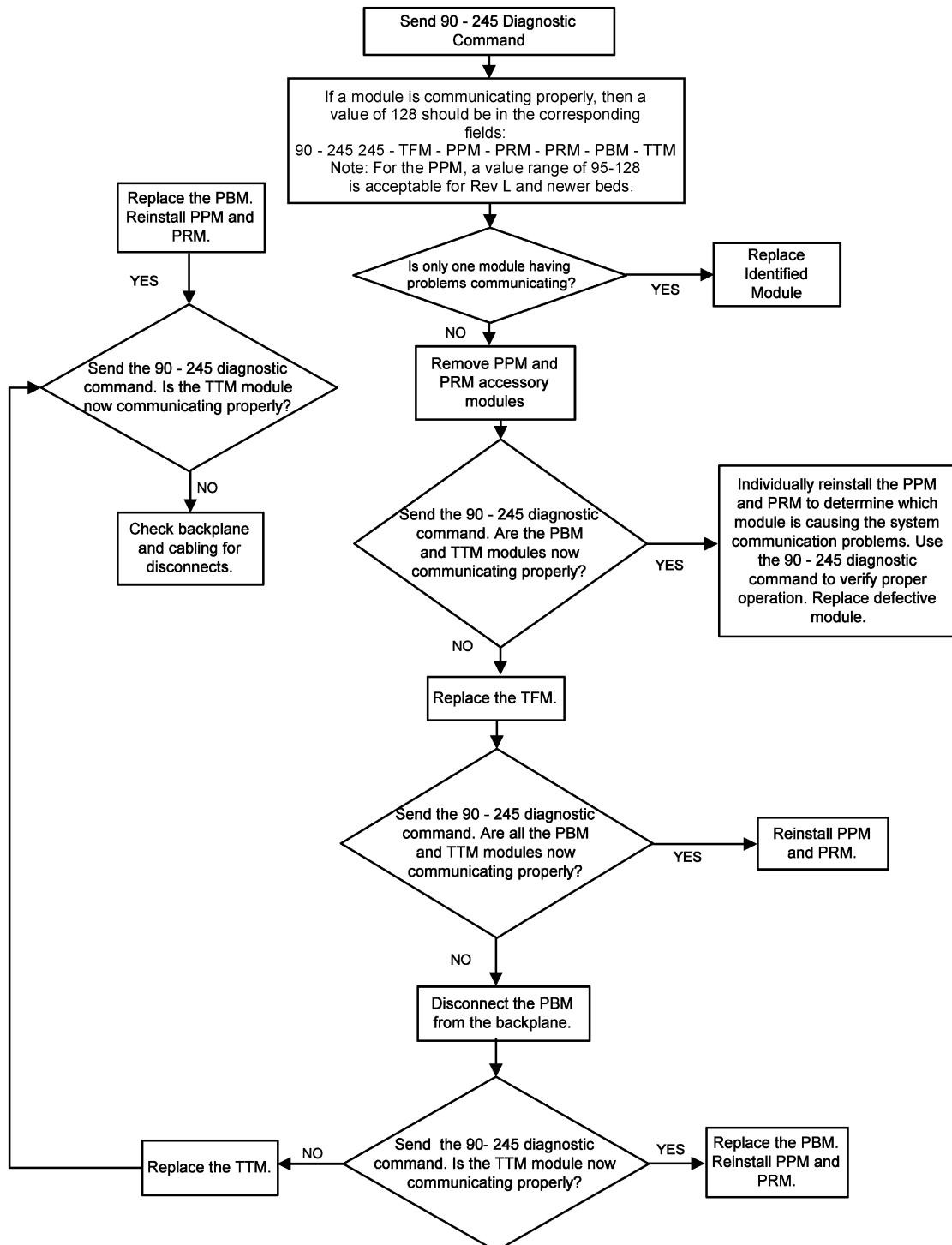
**Yes    No**

↓ → Make sure all mattress hoses are correctly connected. Make sure there are no kinked air hoses. Check for fault codes. Make sure the surface treatment module operates. See “Air Module—Manifold Assembly” on page 4-164. Make sure all position sensors operate correctly. See “Articulation Position Sensing System Calibration” on page 4-4.

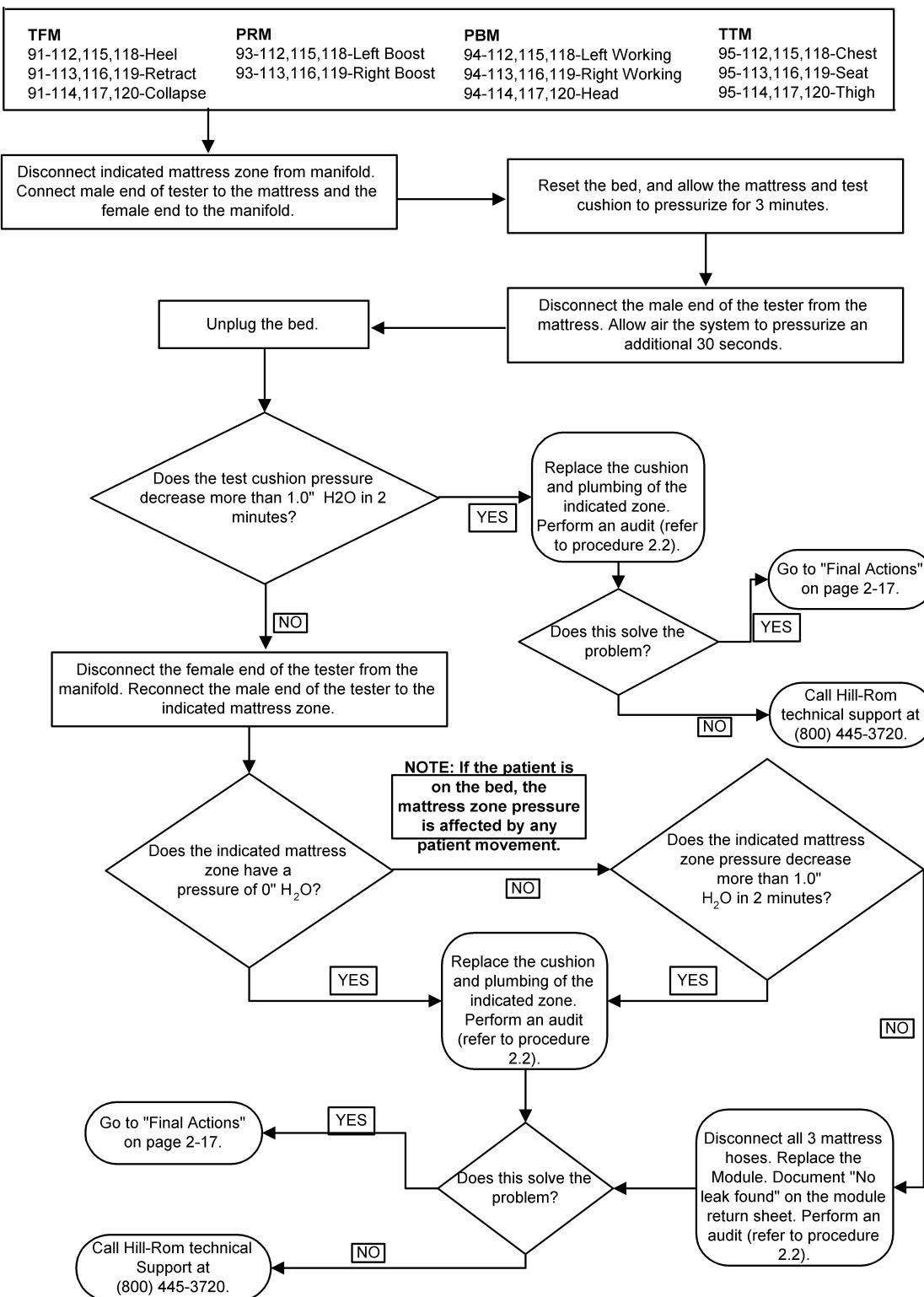
7. Go to “Final Actions” on page 2-12.

2

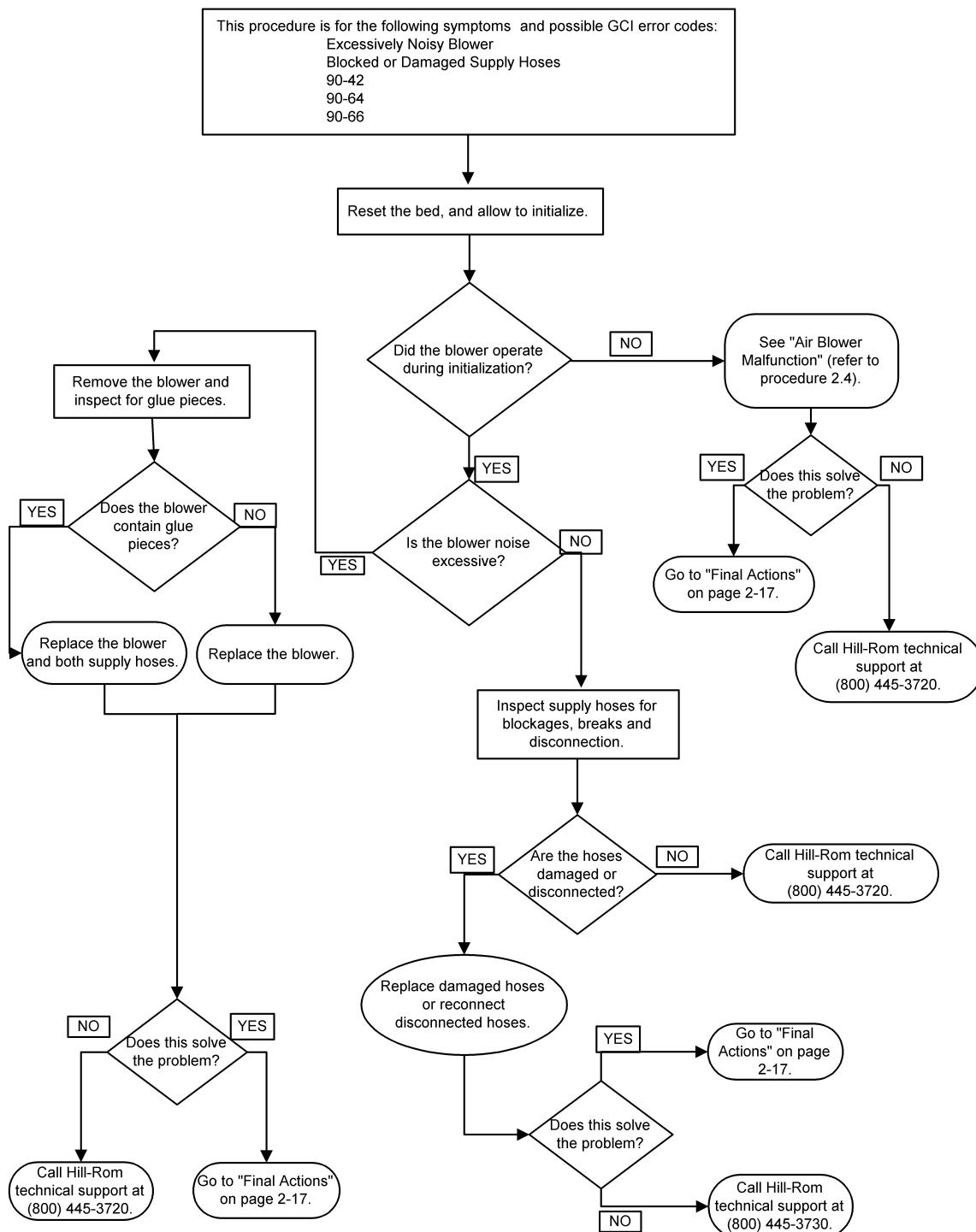
## 2.41 Pulmonary Module Communication Failures



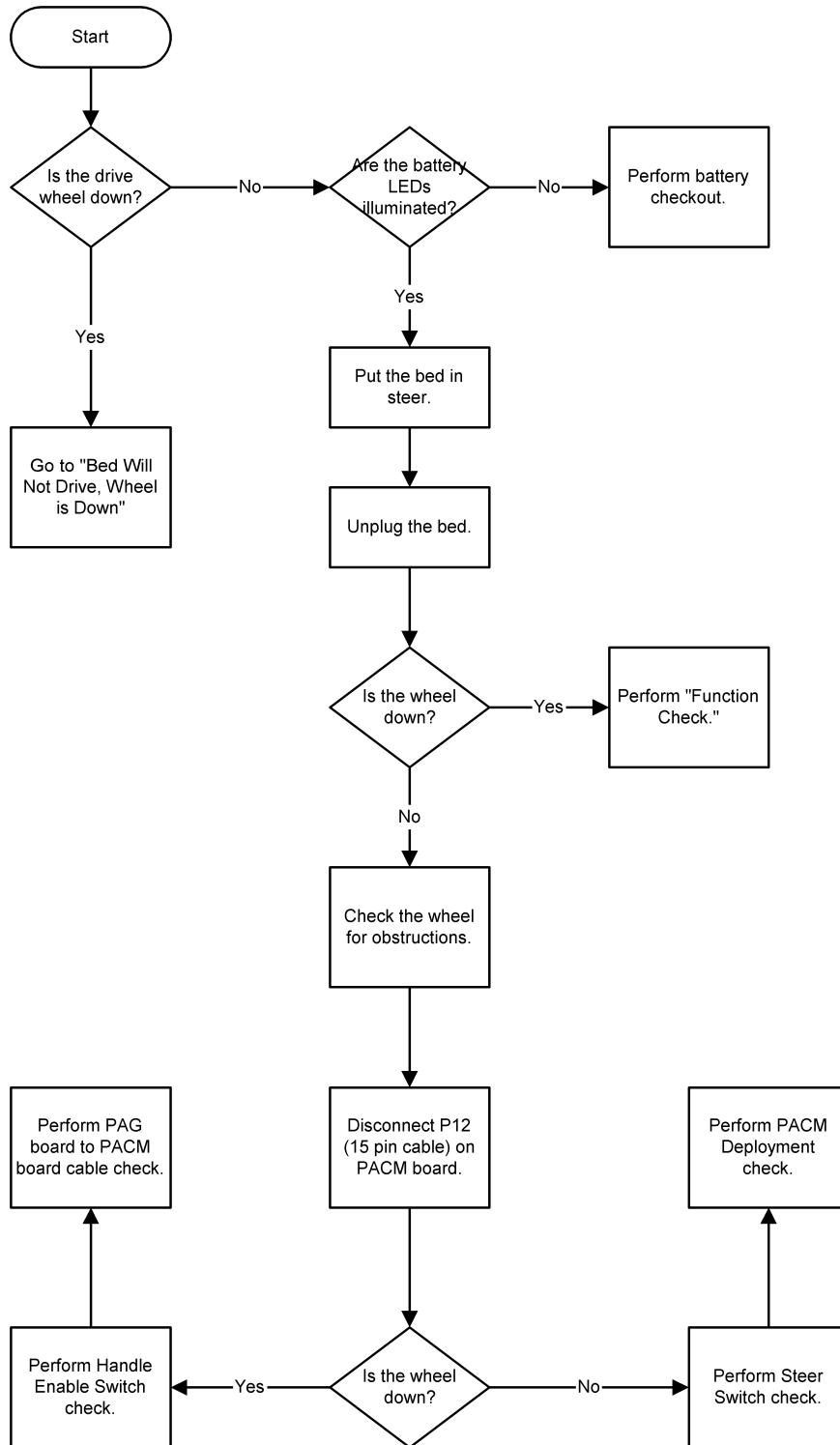
## 2.42 Pulmonary Surface Pressure Failures



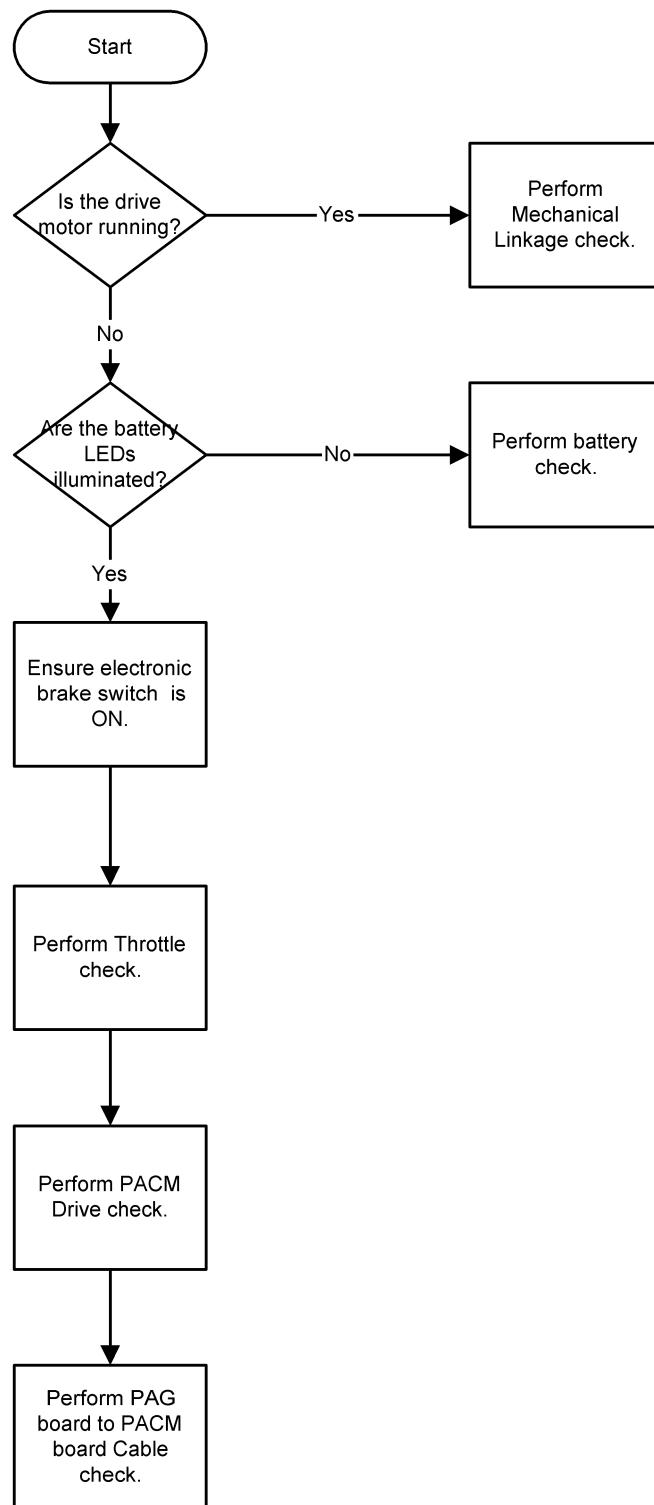
## 2.43 Blower/Supply Hose Failures



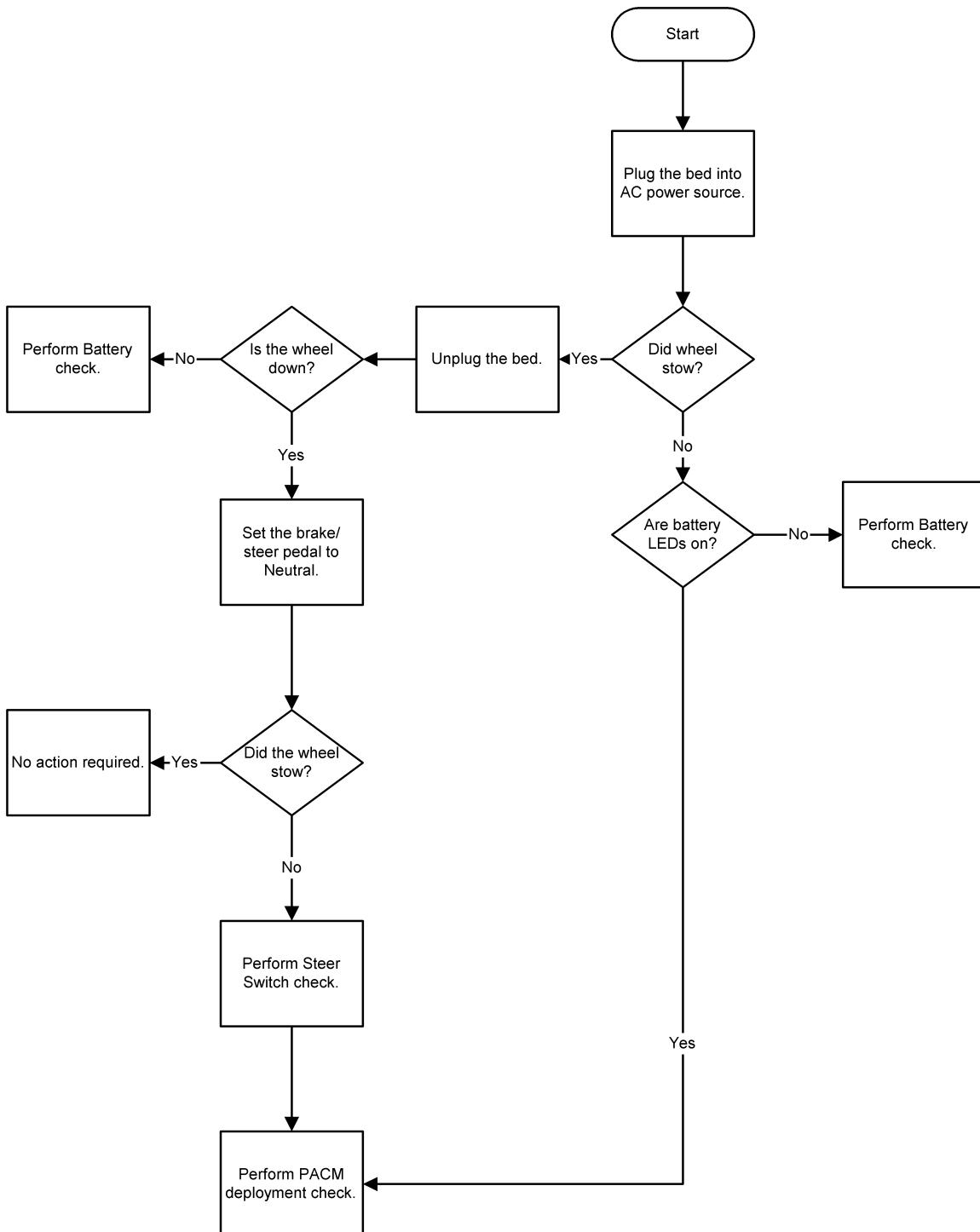
## 2.44 Bed Will Not Drive (IntelliDrive® Transport System)



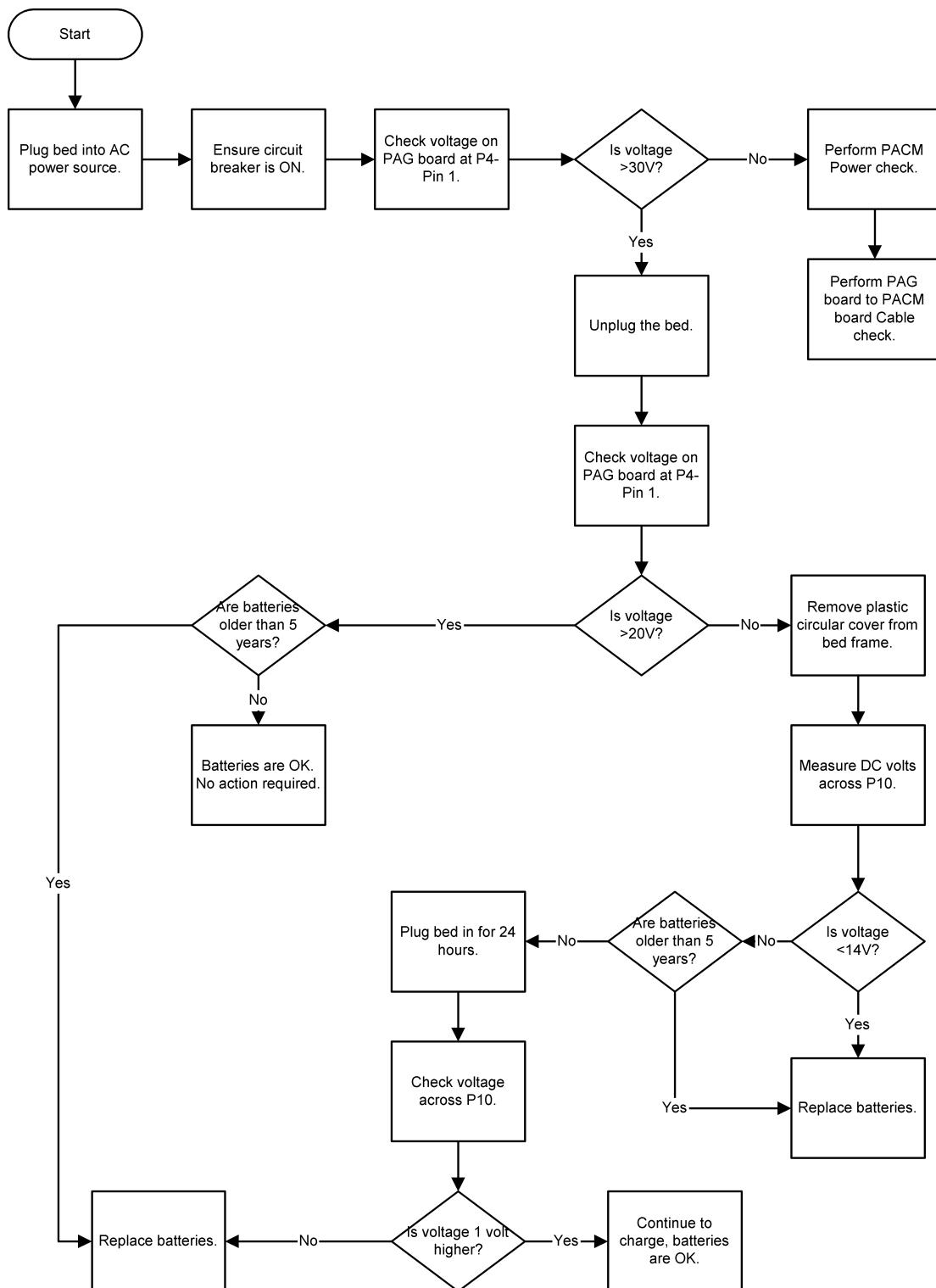
## 2.45 Bed Will Not Drive, Wheel Is Down (IntelliDrive® Transport System)



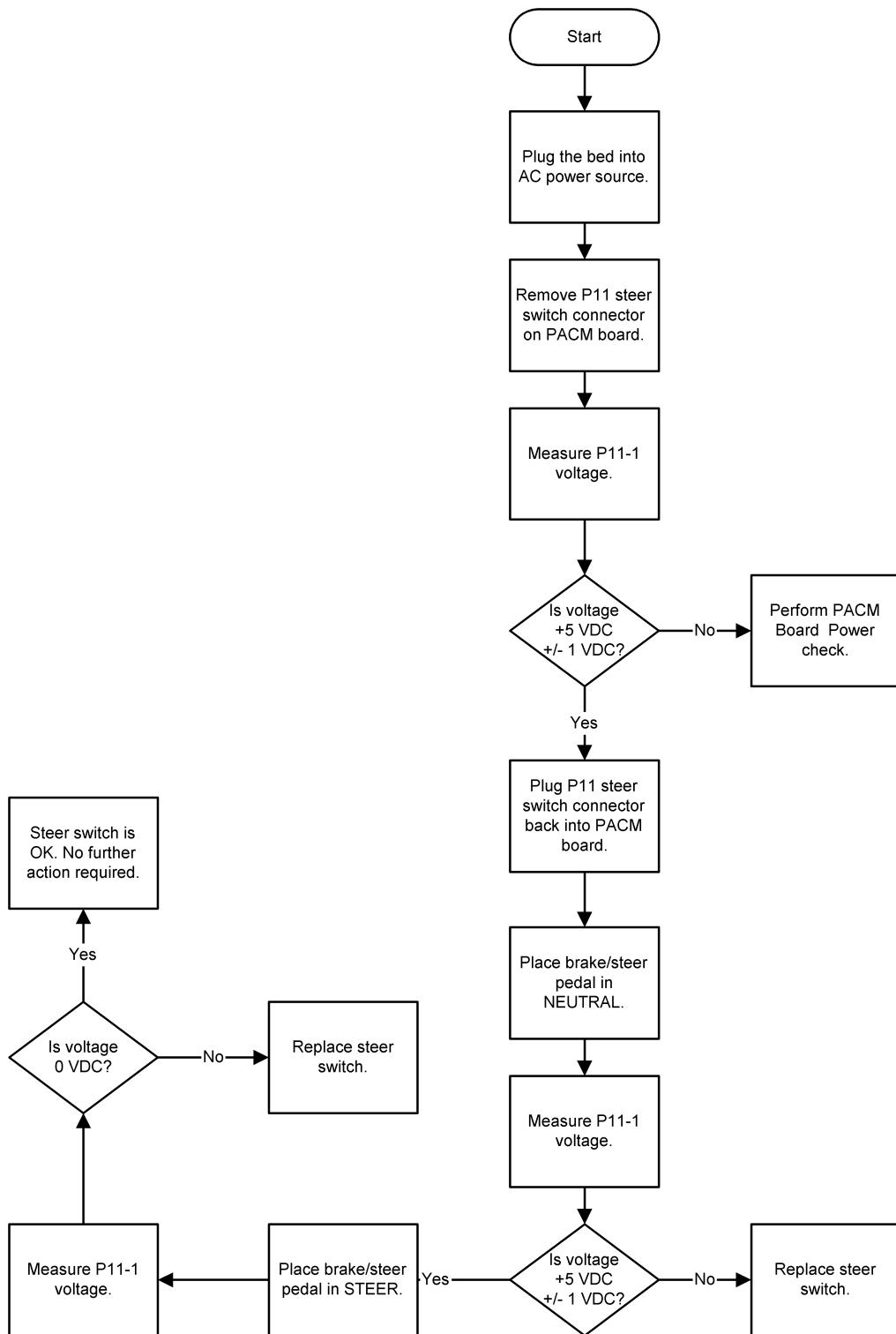
## 2.46 Wheel Will Not Stow (IntelliDrive® Transport System)



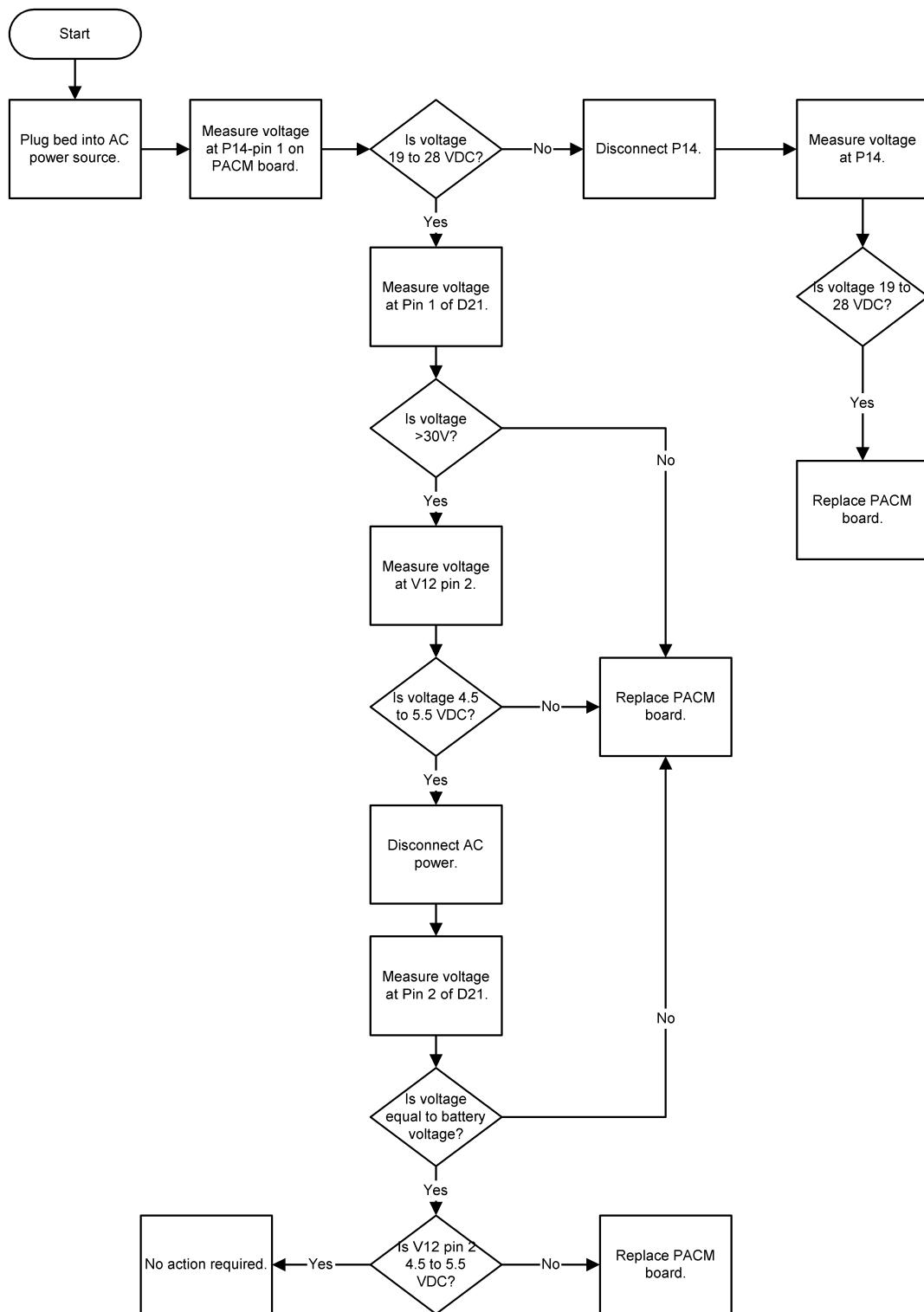
## 2.47 Battery Check (IntelliDrive® Transport System)



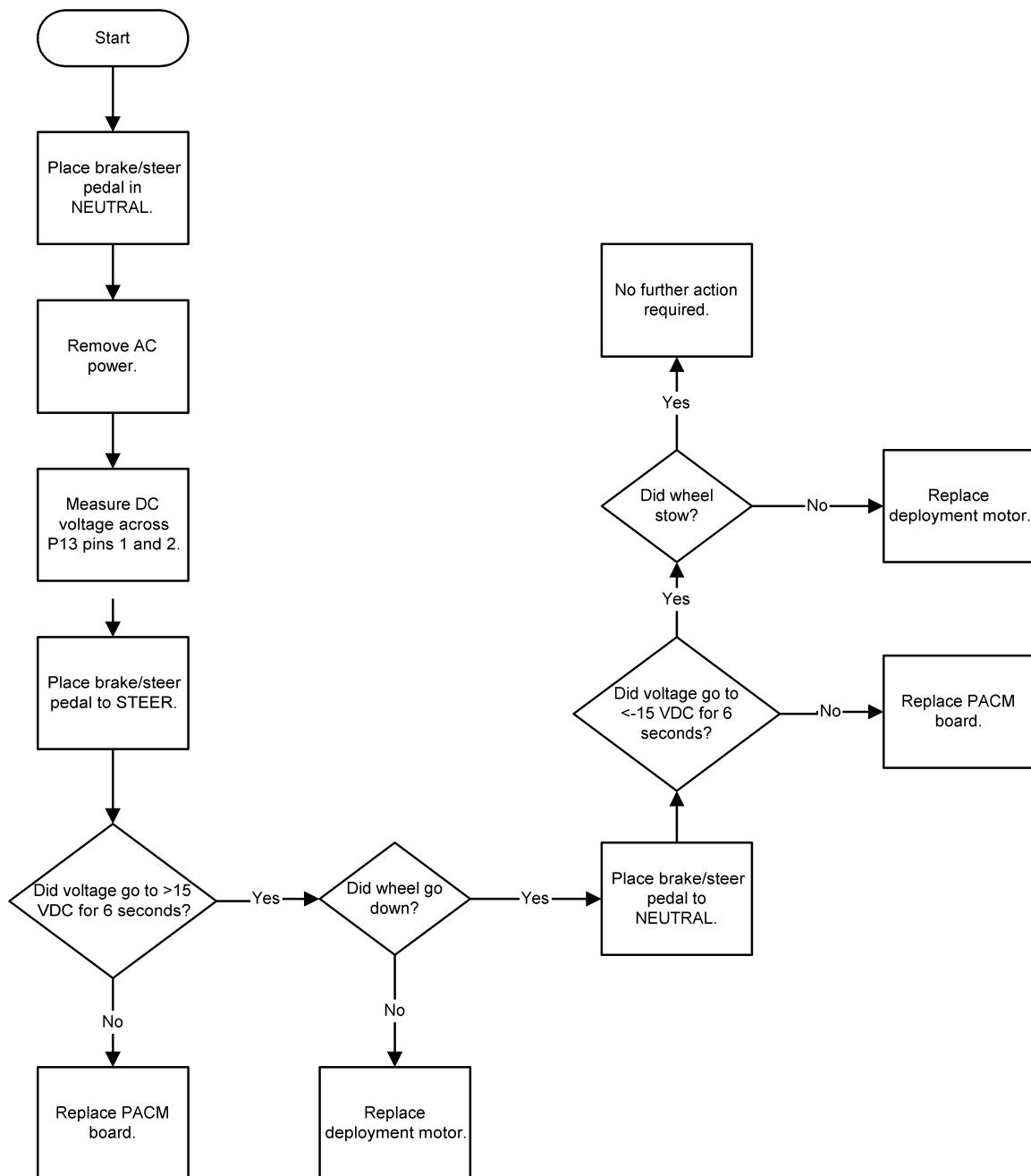
## 2.48 Steer Switch Check (IntelliDrive® Transport System)



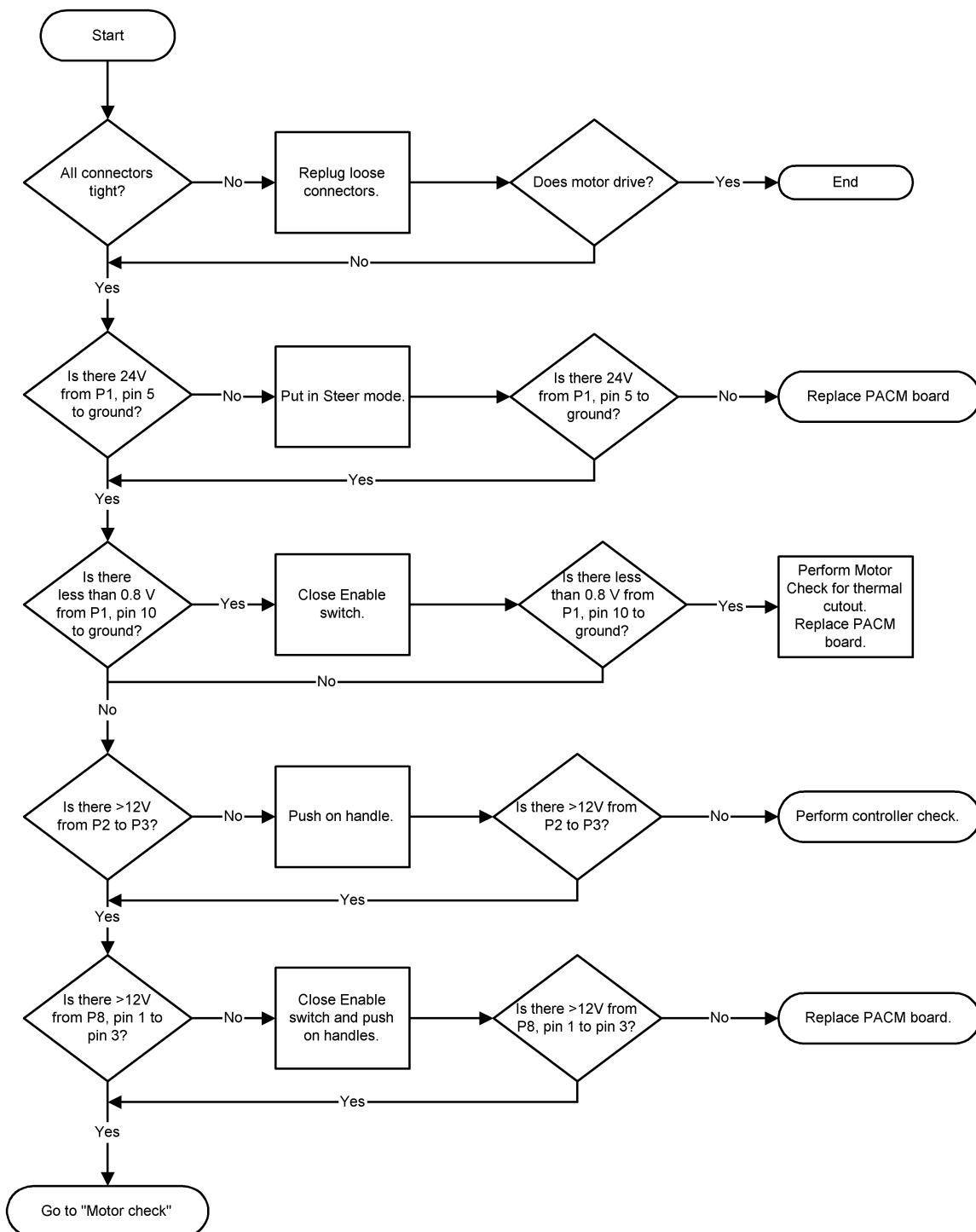
## 2.49 PACM Board Power Check (IntelliDrive® Transport System)

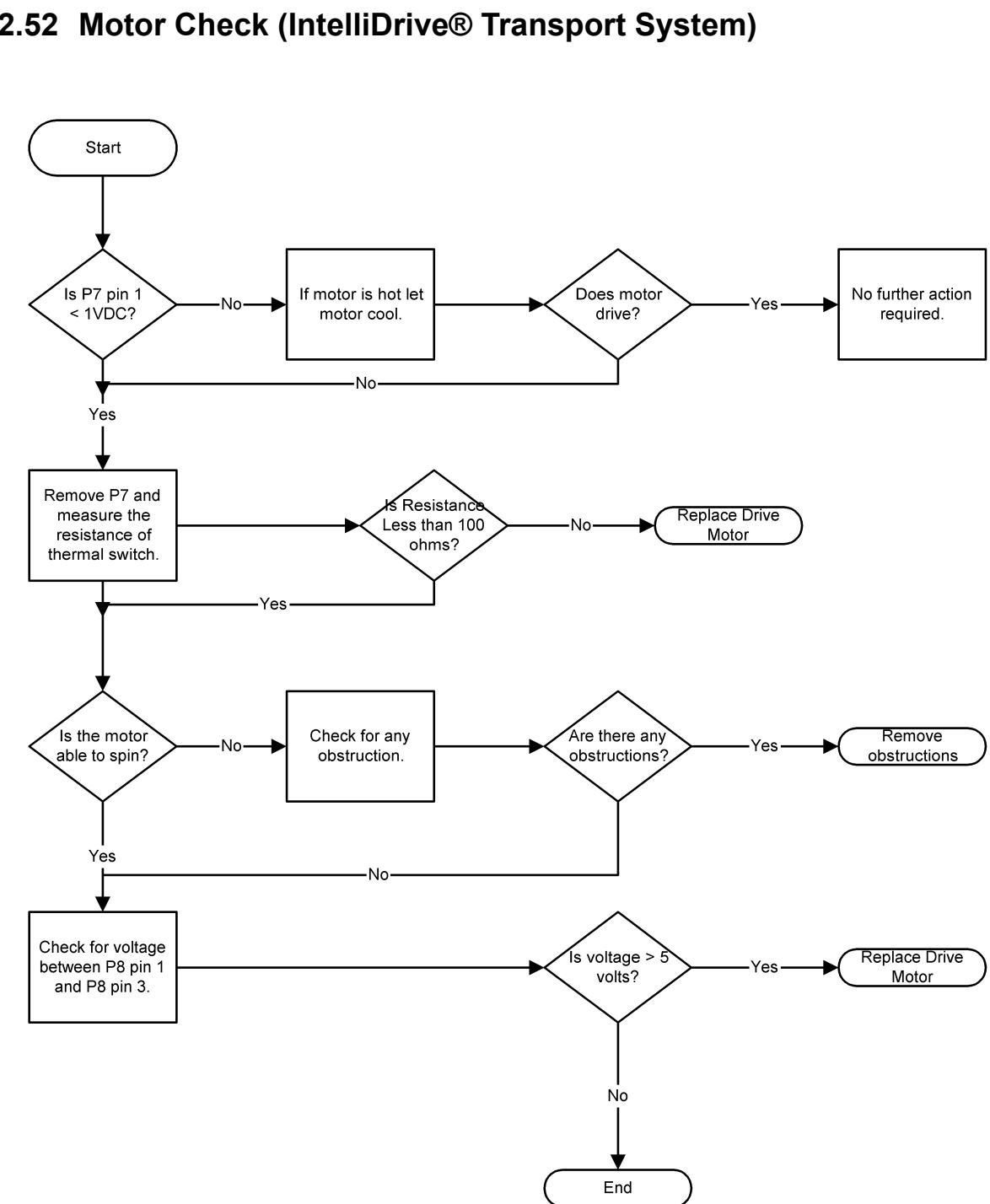


## 2.50 PACM Board Deployment Check (IntelliDrive® Transport System)

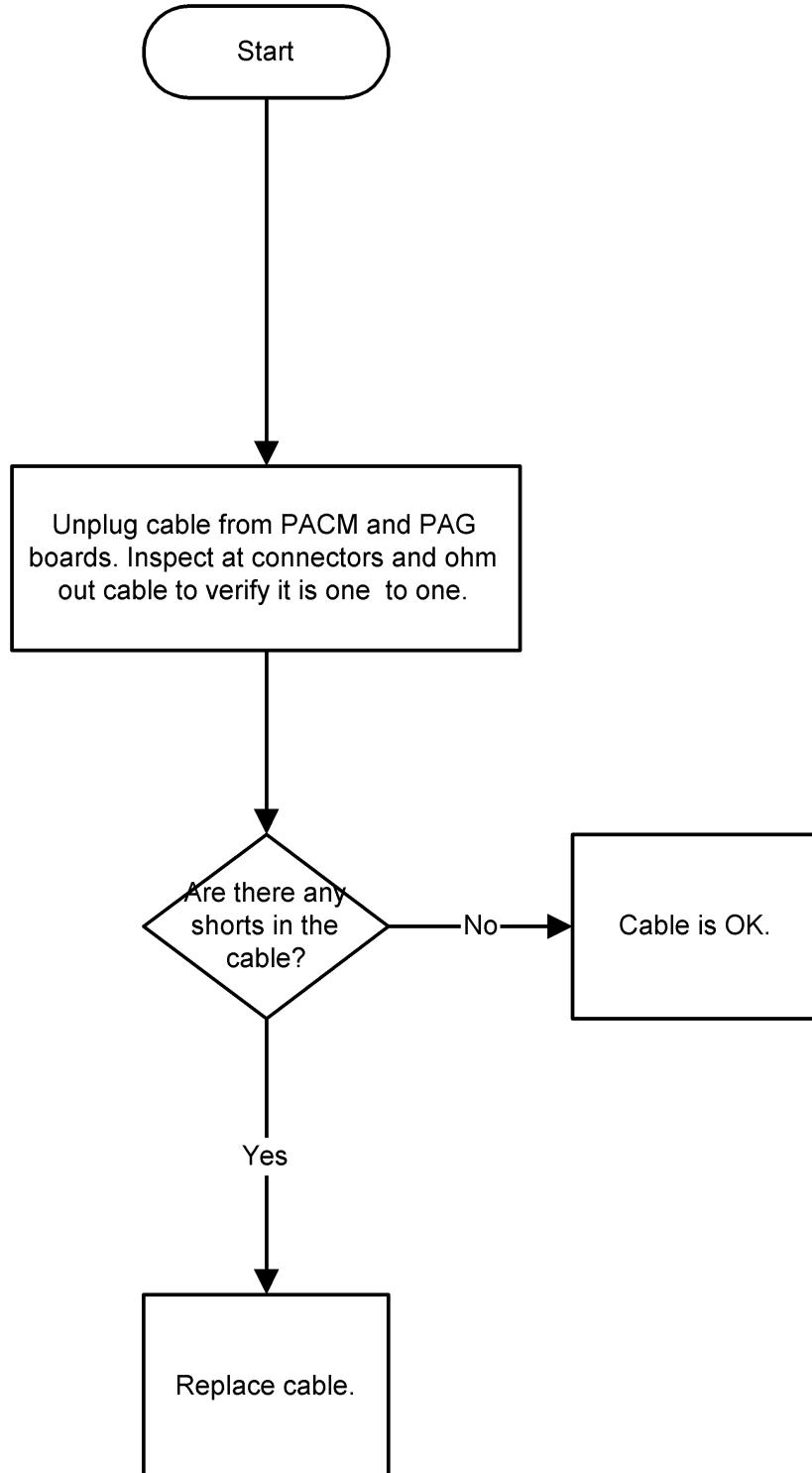


## 2.51 PACM Board Drive Check (IntelliDrive® Transport System)

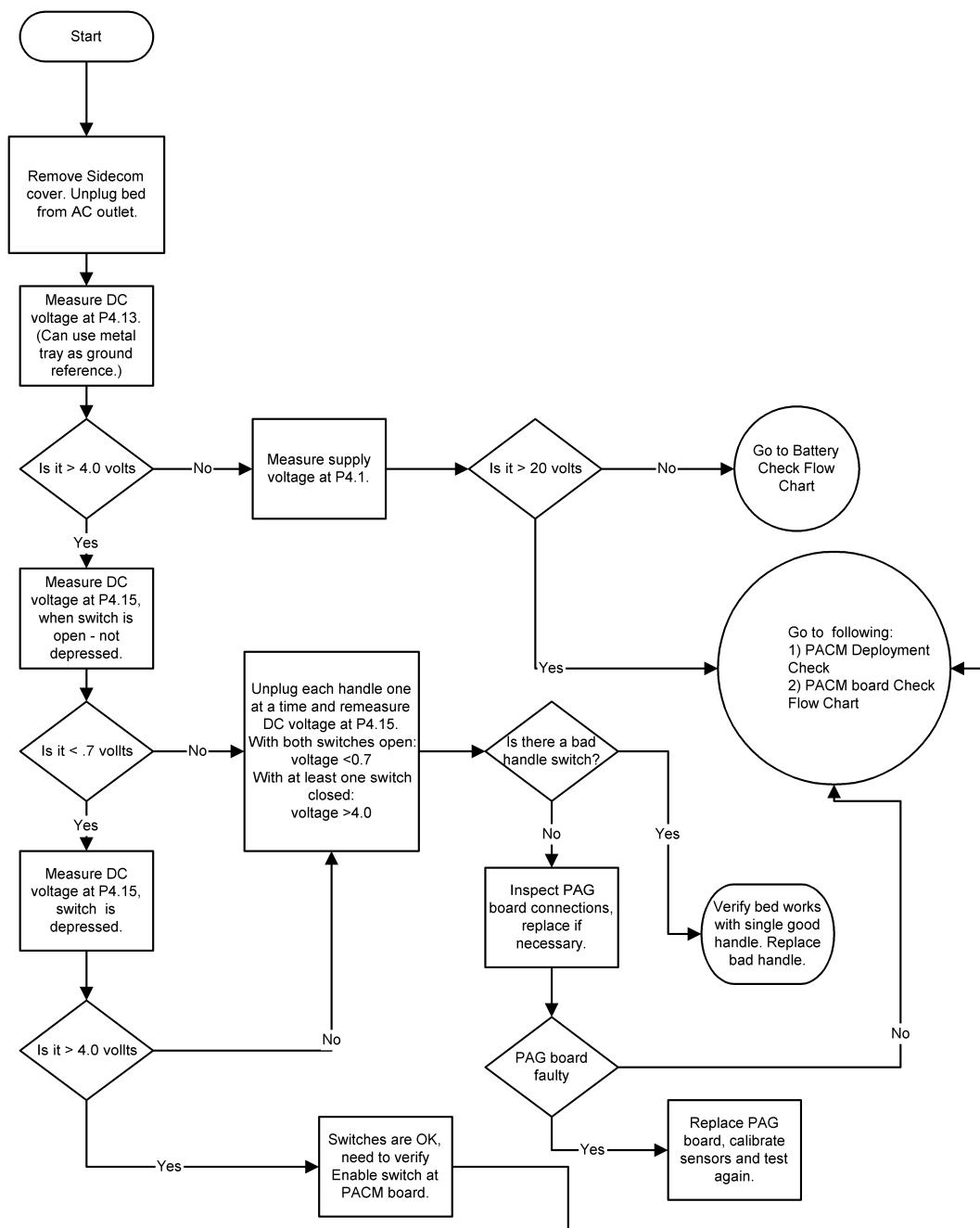




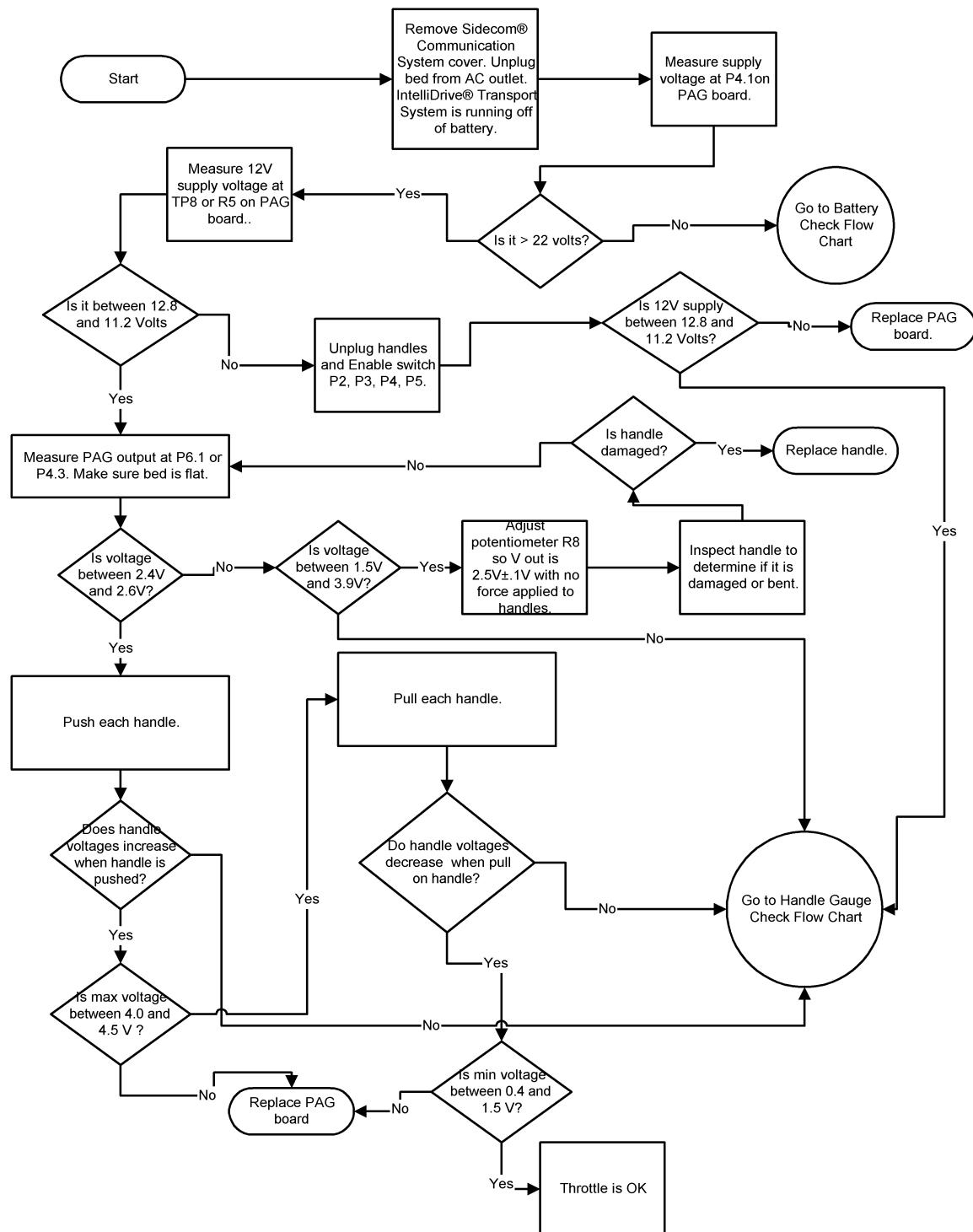
## 2.53 PACM to PAG Board Cable Check (IntelliDrive® Transport System)



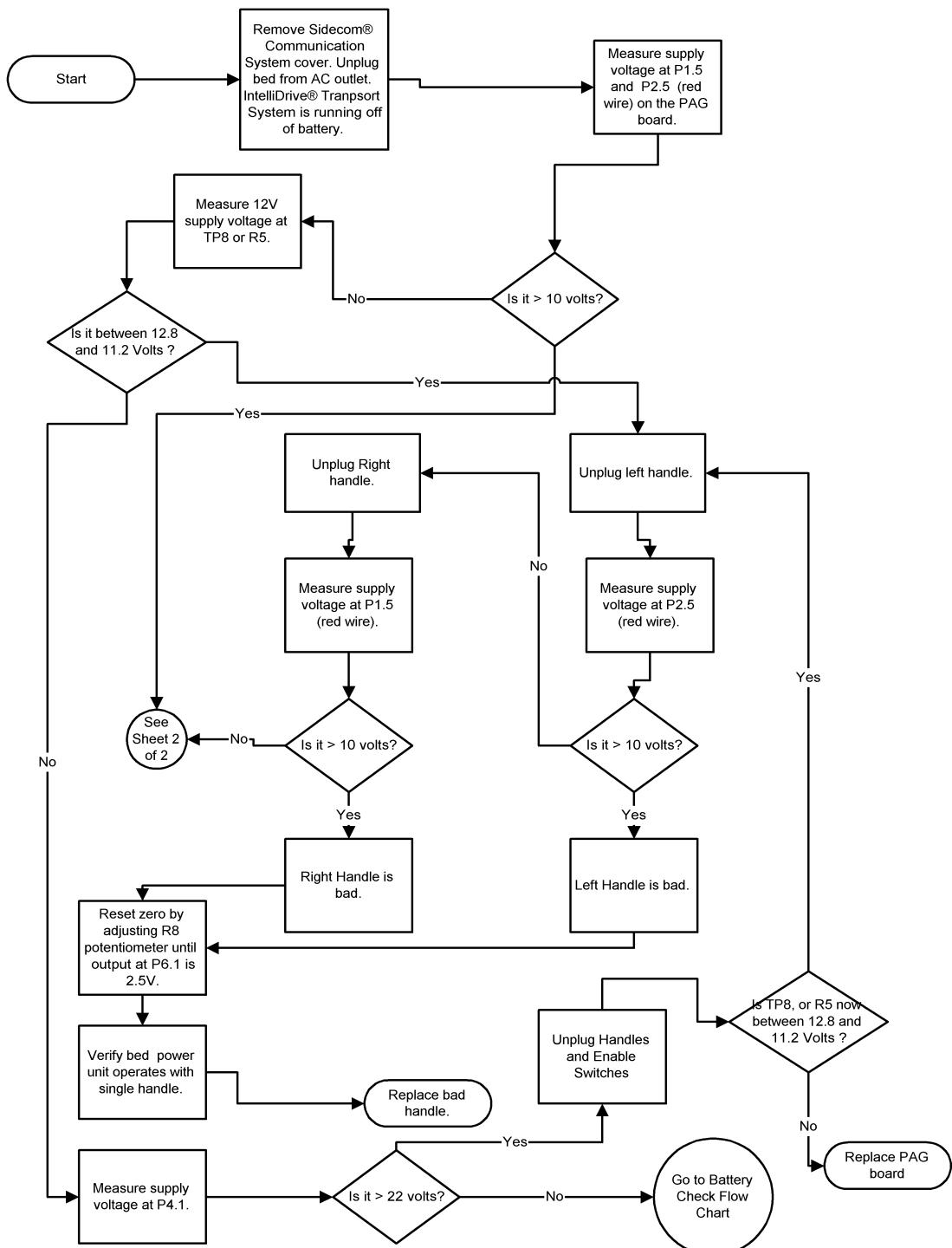
## 2.54 Handle Enable Switch Check (IntelliDrive® Transport System)



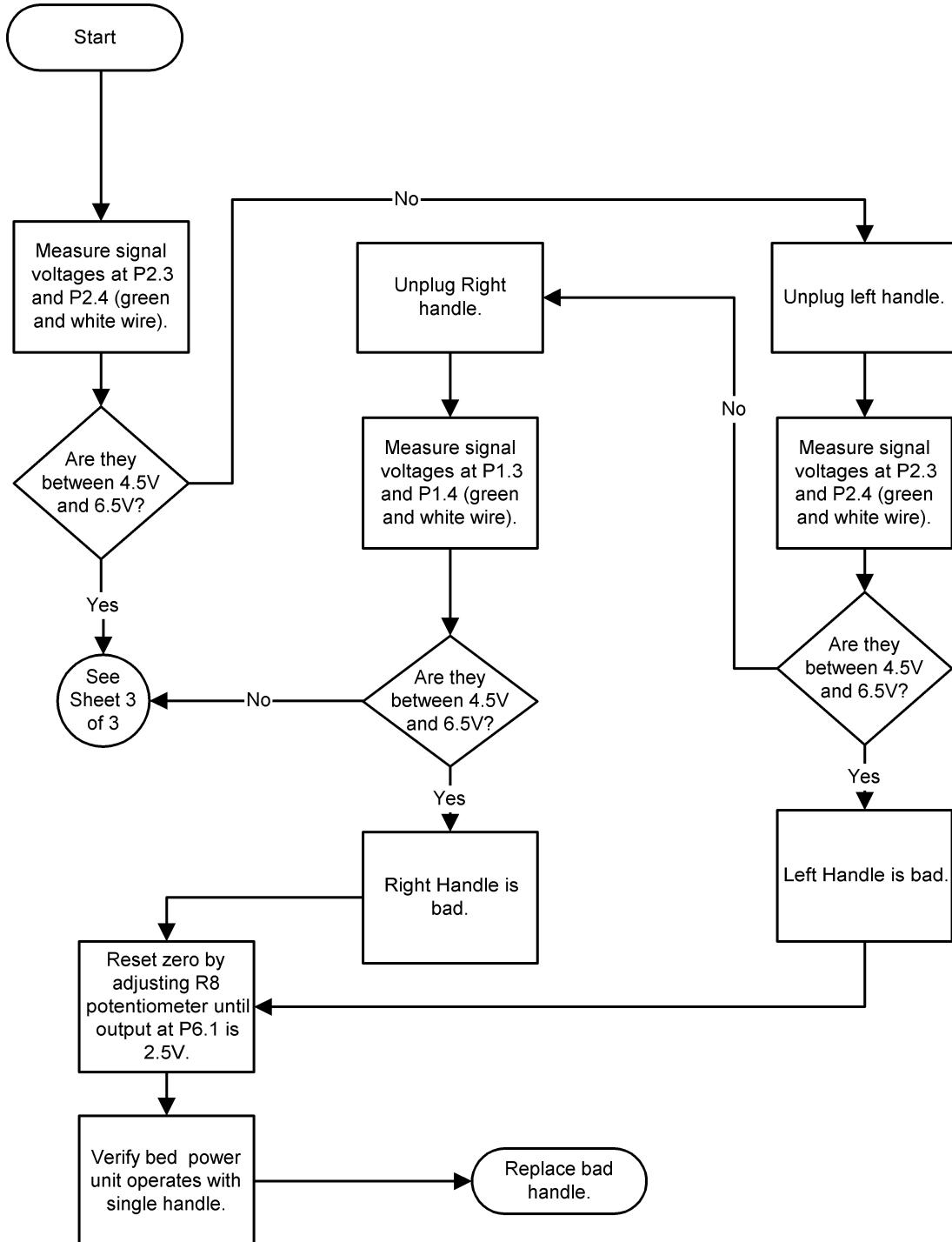
## 2.55 Throttle Check (IntelliDrive® Transport System)



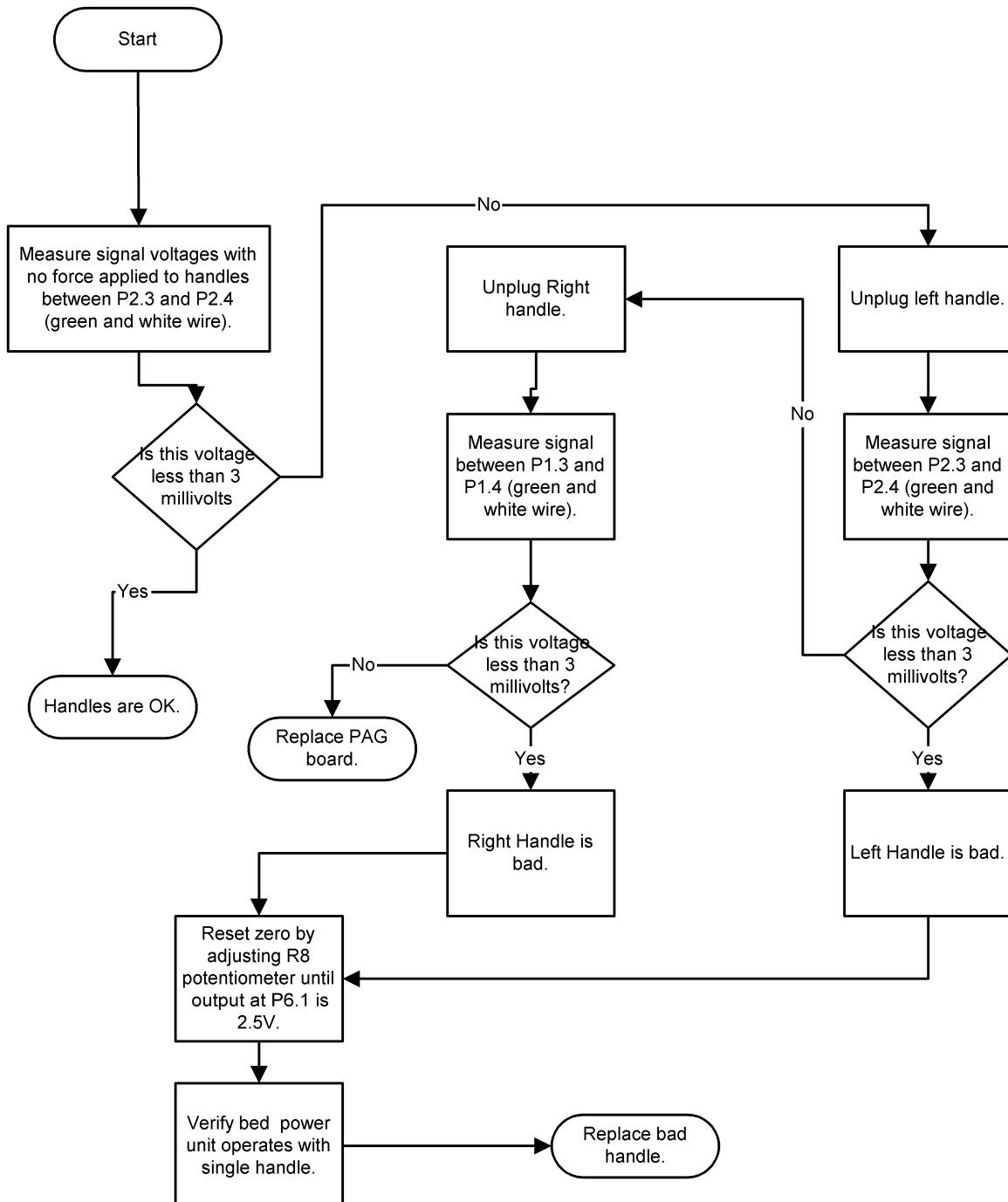
## 2.56 Handle Gauge Check (IntelliDrive® Transport System) (Sheet 1 of 3)



## 2.57 Handle Gauge Check (IntelliDrive® Transport System) (Sheet 2 of 3)



## 2.58 Handle Gauge Check (IntelliDrive® Transport System) (Sheet 3 of 3)



## 2.59 Controller Check—IntelliDrive® Transport System

1. Remove the drive box from the bed.
2. Place the drive box on wooden supports so the drive belt will not touch the ground when it deploys.
3. Connect the bed cables that go into the box.
4. Find DS 1 on the PACM board.
5. Look at DS 1:
  - LED DS 1 is off—The controller is either not powered or does not get a KS 1 signal (which should be there if the wheel is deployed).
  - LED DS 1 is on and steady—Controller operates correctly.
  - LED DS 1 flashing—Make a note the flash pattern. Use the brake/steer pedal to cycle the drive belt. Observe the LED DS 1. If LED DS 1 still flashes, refer to table 2-22 on page 2-194 for error codes.

**Table 2-22. Controller Error Codes**

Flash Code	Description	Possible Cause
□ □	Thermal Cutback	1) Make sure the bed temperature is within the normal operation range (15° to 40° C). 2) Check for mechanical binding or item stuck in drive train or belt. 3) Replace the controller.
□ □□	Throttle Fault 1	1) Make sure the controller gets approximately 2.5V input when the handles are neutral, 4.0 V when they are pushed forward, and 1.0 V when they are pulled back. If these are not the voltages, the problem is in either the PAG board, the cable from controller to PAC board, or the cable from PAC to PAG. 2) If voltages are OK, replace controller.
□ □□□	SPD Limit Pot Fault	1) Check the cable from controller to PAC board and cable from PAC to PAG board. 2) Replace Controller. 3) Replace PAG board.
□ □□□□	Low Battery Voltage	1) Make sure the controller gets the correct battery voltage. 2) Replace the controller.
□ □□□□□	Overvoltage	1) Make sure the controller gets the correct battery voltage. 2) Replace the controller.

<b>Flash Code</b>	<b>Description</b>	<b>Possible Cause</b>
□□ □	Main OFF Fault	1) Check motor wiring. 2) Make sure the controller gets the correct battery voltage. 3) Replace the controller.
□□ □□□	Main Cont FLTS	1) Check motor wiring. 2) Make sure the controller gets the correct battery voltage. 3) Replace the controller.
□□ □□□□	Main ON Fault	1) Check motor wiring. 2) Make sure the controller gets the correct battery voltage. 3) Replace the controller.
□□□ □	PROC/Wiring Fault	1) Replace the controller.
□□□ □□	Brake ON Fault	1) Replace the controller.
□□□ □□□	Precharge Fault	1) Make sure the controller gets the correct battery voltage. 2) Replace the controller.
□□□ □□□□	Brake OFF Fault	1) Replace the controller.
□□□ □□□□□	HPD	1) Replace the controller.
□□□□ □	Current Sense Fault	1) Check motor wiring. 2) Make sure the controller gets the correct battery voltage. 3) Replace the controller.
□□□□ □□	HW Failsafe	1) Check motor wiring. 2) Replace the controller.
□□□□ □□□	EEPROM Fault	1) Replace the controller.
□□□□ □□□□	Power Section Fault	1) Check motor wiring. 2) Make sure the controller gets the correct battery voltage. 3) Replace the controller.

## 2.60 Visual Inspection—IntelliDrive® Transport System

Tools required:      Flashlight                          Inspection mirror

1. Check the unit for external damage.
2. Using the mirror and flashlight, examine for debris around the pulleys and levers.
3. Examine the belt for damage and proper engagement on the pulleys.
4. Remove the drive unit from the bed.
5. Examine the links and levers in the motor area for damage.
6. Remove the drive mechanism cover.
7. Examine the tension on the drive belt.
8. Examine the overall condition of all components in the drive box.
9. Install the unit onto the bed.

## 2.61 PAG Board Debugging—IntelliDrive® Transport System

### NOTE:

When you work on the IntelliDrive® Transport System use extreme caution. Whenever you are measure voltages or make adjustments to the PAG board, it is suggested that you take the bed out of steer. This will raise the wheel and prevent bed movement.

### Enable Switches

The enable switches are installed in the handles at the handle grip. If either switch is pressed, while force is applied to the handles, the bed will move. If the handles are pushed towards the patient, the bed will move forward. If the handles are pulled, the bed will move backwards. To check the enable switches do as follows:

1. Remove the SideCom® Communication System cover so you can see the PAG board.
2. Make sure both enable switches are plugged into the PAG board at P3 and P5. The switches are connected in parallel, or combined on the PAG board. These voltages are for a functional system:
  - P4.13 4.0-5.1 V
  - P4.15 0-.5 V when switch is opened
  - P4.15 4.0-5.1 V when switch is depressed or closed

If you think a switch does not operate correctly, the switches can be unplugged at P3 and P5. A meter can be used to measure switch continuity from the end of the switch cable. An operational switch will close only when the switch is pressed. If it is always opened, or always closed, the switch or cable is bad. In either case replace the handle assembly. The bed will operate if only one switch functions. You can unplug the defective switch from the PAG board and make sure the bed power unit operates when you use the good switch.

If there is not a voltage at P4.13, make sure the battery voltage or the battery charge voltage is there. The battery voltage can be measured at P4.1. This voltage will be greater than 32 V when the bed is plugged into AC power. When the bed is unplugged from AC power, the battery voltage at P4.1 will be greater than 22 V if the batteries are charged. If no voltage is there, or the battery voltage is low, go to the battery checkout procedure.

If the switches check out correctly, and the voltage at P4.15 does not toggle when the switch is pressed, there may be a problem on the PAG board or the 15-pin connector at P4. Unplug the cable connected to P4 and check the

connector pins at P4 on the PAG board. Also, check connectors P3 and P5 where the enable switches plug into the PAG board.

The combined enable switch signal runs down the head lift arm to the PACM board through the PAG-PACM board cable (68441). To make sure the signal is being received at the PACM board, unplug the 15-pin cable from the PACM board and measure continuity across pins 13 (orange) and 15 (white/orange). When either switch is pressed the switch closure can be measured across the pins.

### Throttle Debugging

The base part of the handle that connects to the frame contains a strain element that supplies an output signal proportional to the force applied to the handle. The handles are very similar to the load beams used in the scale system. The PAG board amplifies this signal and supplies an output to the PACM board.

Make sure the output signal is proper at P6.1 or P4.3. The plated SideCom® Communication System tray can be used as a ground reference. When no force is applied to the handle the output signal should measure 2.4V to 2.6V DC. The zero voltage output can be adjusted if you turn potentiometer R8 until the output signal measures 2.5V. When either handle is pushed, the output signal will increase until it reaches 4.0V to 4.5V. When either handle is pulled the output signal will decrease until it reaches 0.4V to 1.5V. This shows that the throttle circuit operates correctly.

Before you make any adjustments make sure of the supply voltages. The supply voltage at P4.1 will measure more than 22 V on an operational system. If there is no voltage, or the battery voltage is low, go to the battery checkout procedure.

The excitation voltage, P1.5 and P2.5 (red wire) will measure 10V to 12V on an operational board. Also, the signal voltages at P1.3, P2.3, P1.4, and P2.4 will be approximately half the voltage measured at P1.5 and P2.5. These are the green and white wires on the handle connectors P1 and P2. If the excitation voltage is lower than 10V, unplug the connectors P1 and P2 one at a time to see if the voltage comes into range. If this occurs, one of the handles is probably damaged and must be replaced. If the voltage never comes into range, make sure the 12V supply at TP8 or R5 on the PAG board. If you think there is a bad strain element, unplug the bad handle, readjust the zero output to 2.5V with potentiometer R8. Make sure the bed power unit operates using the good handle. Replace the damaged handle.

If the output voltage at P6.1 cannot be adjusted to within 2.4V to 2.6V with the potentiometer R8, and no force applied to the handles, the strain element may be damaged. The bed will operate with a single handle after the zero is adjusted. To check the handles, unplug one of the handles and see if R8 can be adjusted so the output signal is 2.5V. The handle that will not permit adjustment of the potentiometer to bring the output signal to 2.5V is the damaged handle.

The motor controller will not operate unless it sees the connection to the 4700 ohm resistor on the PAG board. To make sure the signal is being received at the PACM board, unplug the 15-pin cable from the PACM board and measure the resistance across pins 5 (brown) and 6 (white/brown). The resistance must measure 4700 ohms +/- 5%. If this measurement fails, check the cable for continuity and check the PAG board. The cable connections are the same on both ends. If the cable checks out, check the connector P4 on the PAG board. If the cable is bad, replace the cable, otherwise replace the PAG board.

## 2.62 NAWI Class IIII Scale (European Version)/Graphical Caregiver Interface (GCI)® Control Malfunction

### NOTE:

If the GCI has a user interface that shows a continuous weight, it is a NAWI Class IIII Scale (European version). This scale system is required for Europe; however, it may be installed in other countries. The following procedure applies **only** to the NAWI Class IIII Scale.

1. The bed is plugged into an applicable power source.

**Yes    No**

↓ → Plug the unit into an applicable power source. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 2.

2. Check all cabling of the NAWI Class IIII Scale and GCI. All cabling is securely connected.

**Yes    No**

↓ → Securely connect all cabling. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 3.

3. At the GCI, do as follows to view the fault codes from the scale P.C. board:

To help determine the cause when problems are encountered, the GCI logs the fault codes from the scale P.C. board. To access the GCI Code screens, Do as follows:

- a. Select the **Tools** tab on the GCI.
- b. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
- c. Select **Diagnostics**.
- d. Select **Service Codes**. When selected, the diagnostic menu shows fault messages listed in numerical sequence and by fault code name. corrective actions are provided within this chapter. The fault codes encountered show listed as follows, where “xxx” is the fault code:

ID	Code	1	2	3	4	Time
51	1	xxx	xxx	xxx	xxx	xxx

### NOTE:

All fault codes for the NAWI Class IIII Scale (European version) start with the ID **51**.

- e. To help determine the problem, refer to table 2-6 on page 2-68 for a listing of NAWI Class IIII Scale (European version) fault codes.

The problem still exists.

Yes    No

↓       → Go to “Final Actions” on page 2-12.

4. The scale sends back the message **Center patient in bed before proceeding**.

Yes    No

↓       → Go to step 6.

5. One of the load beam readings is out of range. Go to RAP 2.63.

6. The scale sends back the message **Task request cannot be achieved at this moment**.

Yes    No

↓       → Go to step 8.

7. The GCI cannot communicate with the scale, or the scale P.C. board detects errors. Go to RAP 2.64.

8. The weight is always **0**.

Yes    No

↓       → Go to step 10.

9. Calibrate the scale (refer to procedure 4.2). The problem still exists.

Yes    No

↓       → Go to “Final Actions” on page 2-12.

10. At the end of calibration, the scale sends back a value that is greater than **100**.

Yes    No

↓       → A calibration error exists. Go to RAP 2.65.

11. The GCI shows the message **Task request cannot be achieved Minimum tare**.

Yes    No

↓       → Go to step 13.

12. The scale fails the Tare and Auto compensation commands. Do as follows:

a. Go to the **Service Menu**.

b. Scroll to *Scale Service*, and press **Enter**. The **Scale Service** screen shows (see figure 2-2 on page 2-202).

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**Figure 2-2. Scale Service Screen**

Scale Services

Local Gravity:  
9.800561 m/sec<sup>2</sup>

Calibration Location Gravity:  
9.800564 m/sec<sup>2</sup>

1	2	3
4	5	6
7	8	9
.	0	Clear

Cancel Continue

**Scale Weight: 0.05 Kg**       Calibration     Stable     Zero Point

147605\_1\_252

- c. Scroll to *View Readings*, and press **Enter**. The A/D readings, calibration coefficients, and zero point values for each load beam display (see figure 2-3 on page 2-202).

**Figure 2-3. Scale Service—View Readings Screen**

Scale Services

Zone	A/D Readings	Calibration	Zero
Right Foot	6648	908	6643
Left Foot	7405	907	7407
Right Head	5069	901	5070
Left Head	4293	902	4292

Tare	Preset 1	Preset 2	Zero Corr.
0.00	0.00	0.00	0.00

OK

**Scale Weight: 0.05 Kg**       Calibration     Stable     Zero Point

147605\_1\_255

- d. Read the values for **Tare**, **Preset 1**, **Preset 2**, and **Zero Corr.**, and add the values for **Tare**, **Preset 1**, and **Preset 2**.

**Tare + Preset 1 + Preset 2** is positive.

**Yes**    **No**  
↓       → Go to step 15.

13. The problem still exists.

**Yes**    **No**  
↓       → Go to “Final Actions” on page 2-12.

14. Go to step 20.

15. The PPM and PRM modules were removed during calibration.

**Yes**    **No**  
↓       → Remove the PPM and PRM modules, and then calibrate the scale  
(refer to procedure 4.2). If this solves the problem, go to “Final  
Actions” on page 2-12. Otherwise, go to step 16.

16. Items are being added to or removed from the bed.

**Yes**    **No**  
↓       → Go to step 19.

17. The autocompensation feature is used when items are both added to and  
removed from the bed.

**Yes**    **No**  
↓       → When you add or remove items on the bed, use the  
autocompensation feature. If this solves the problem, go to  
“Final Actions” on page 2-12. Otherwise, go to step 18.

18. When you add items to bed, take the first weight reading **without** the item  
added, add the item to the bed, and then take the second weight reading  
**with** the item added. The problem still exists.

**Yes**    **No**  
↓       → Go to “Final Actions” on page 2-12.

19. Add the values for **Tare**, **Preset 1**, **Preset 2**, **Zero-Corr**, and the **weight  
display**. **Tare + Preset 1 + Preset 2 + Zero Corr + weight display** is  
-17.99 lb (-8.16 kg) or greater.

**Yes**    **No**  
↓       → If this value is less than -17.99 lb (-8.16 kg), the bed **cannot** be  
tared. Recalibrate the scale (refer to procedure 4.2). If this solves  
the problem, go to “Final Actions” on page 2-12. Otherwise, call  
Hill-Rom Technical Support at 800-445-3720 for assistance.

20. For assistance, call Hill-Rom Technical Support.

## 2.63 Scale/GCI Diagnostics and Error Troubleshooting Diagnostics (NAWI Class IIII Scale—European Version Only)

1. To access the GCI Code screens, Do as follows:
  - a. Select the **Tools** tab on the GCI.
  - b. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
  - c. Select **Diagnostics**.
  - d. Select **Service Codes**. When selected, the diagnostic menu shows fault messages listed in numerical sequence and by fault code name. corrective actions are provided within this chapter. The **Scale Service** screen shows (see figure 2-4 on page 2-204).

**Figure 2-4. Scale Service Screen**

The figure shows a screenshot of the 'Scale Services' screen. At the top, it says 'Scale Services'. Below that, there are two input fields: 'Local Gravity:' containing '9.800561 m/sec<sup>2</sup>' and 'Calibration Location Gravity:' containing '9.800564 m/sec<sup>2</sup>'. To the right of these fields is a numeric keypad with digits 1 through 9, a decimal point, and a 'Clear' button. At the bottom of the screen, it says 'Scale Weight: 0.05 Kg' and has three checked checkboxes: 'Calibration', 'Stable', and 'Zero Point'. There are also 'Cancel' and 'Continue' buttons at the bottom.

147605\_1\_252

- e. Scroll to *View Readings*, and press **Enter**. The A/D readings, calibration coefficients, and zero point values for each load beam display (see figure 2-5 on page 2-205).

**Figure 2-5. Scale Service—View Readings Screen**


Scale Services			
Zone	A/D Readings	Calibration	Zero
Right Foot	6648	908	6643
Left Foot	7405	907	7407
Right Head	5069	901	5070
Left Head	4293	902	4292

Tare	Preset 1	Preset 2	Zero Corr.
0.00	0.00	0.00	0.00

**Scale Weight: 0.05 Kg**       Calibration     Stable     Zero Point

147605\_1\_255

f. Check the A/D readings for each zone.

The A/D readings for a zone is outside the range of **5000** to **25000**.

**Yes**   **No**

↓ → Go to “Final Actions” on page 2-12.

2. Do as follows:

a. Record the A/D reading for the zone that is outside the range of **5000** to **25000**.

b. Add weight to the bed.

c. Record the A/D readings for the zone.

When weight is added to the bed, the load beam value increases.

**Yes**   **No**

↓ → Replace the load beam (refer to procedure 4.46). If this solves the problem, go to step 8. Otherwise, go to step 3.

3. The A/D readings for **all** zones are outside the range of **5000** to **25000**.

**Yes**   **No**

↓ → Go to step 5.

4. Go to RAP 2.66. The problem still exists.

**Yes**   **No**

↓ → Go to “Final Actions” on page 2-12.

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5. Only **one** A/D reading of the four zones is outside the range of **5000** to **25000**.

**Yes    No**

↓ → For assistance, call Hill-Rom Technical Support.

6. Switch the load beam connectors, and then check the A/D readings for each load beam again. The out-of-range A/D reading follows the load beam.

**Yes    No**

↓ → Replace the scale P.C. board (refer to procedure 4.45). If this solves the problem, go to step 8. Otherwise, go to step 7.

7. Replace the load beam (refer to procedure 4.46). This solves the problem.

**Yes    No**

↓ → For assistance, call Hill-Rom Technical Support.

8. Do as follows:

- a. Calibrate the NAWI Class III Scale (European version) (refer to procedure 4.2).

**NOTE:**

If the scale P.C. board is replaced, the seal on the scale P.C. board breaks, and the scale **must** be calibrated.

- b. Have Hill-Rom Technical Support or an approved agency make sure the calibration.

**NOTE:**

After a NAWI Class III Scale (European version) is calibrated, its calibration **must** be verified by Hill-Rom or an approved agency.

The scale passes verification testing.

**Yes    No**

↓ → Go to RAP 2.67.

9. The problem still exists.

**Yes    No**

↓ → Go to “Final Actions” on page 2-12.

10. For assistance, call Hill-Rom Technical Support.

## 2.64 Scale/GCI—Communications Error (NAWI Class IIII Scale—European Version Only)

2

1. Do as follows:
  - a. Using diagnostics, test the communication between the scale and the GCI (refer to procedure 2.63).
  - b. Scroll the values for **ID** to **50** for the scale and **100** for command, and press **Enter**.
  - c. Scroll to **Send Node/command**, and press **Enter**. After a brief pause, some values from the scale shows in the response field on the screen.

The scale responds with values **0** through **5**.

**Yes    No**

↓ → Go to step 3.

2. The scale and the GCI communicate. Go to “Final Actions” on page 2-12.
3. Check the wiring between the PCM and the scale. The wiring is securely connected.

**Yes    No**  
↓ → Securely connect the wiring between the PCM and the scale. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 4.
4. Replace the GCI (refer to procedure 4.22). The problem still exists.

**Yes    No**  
↓ → Go to “Final Actions” on page 2-12.

### NOTE:

If you suspect a failure to be in either the GCI or the scale, first try replacing the GCI to avoid the need for scale calibration.

5. Do as follows:

- a. Replace the scale P.C. board (refer to procedure 4.45).
- b. Calibrate the NAWI Class IIII Scale (European version) (refer to procedure 4.2).

### NOTE:

If the scale P.C. board is replaced, the seal on the scale P.C. board breaks, and the scale **must** be calibrated.

- c. Have Hill-Rom Technical Support or an approved agency make sure the calibration.

**NOTE:**

After a NAWI Class III Scale (European version) is calibrated, its calibration **must** be verified by Hill-Rom or an approved agency.

The scale passes verification testing.

**Yes    No**

↓      → Go to RAP 2.67.

6. The problem still exists.

**Yes    No**

↓      → Go to “Final Actions” on page 2-12.

7. For assistance, call Hill-Rom Technical Support.

## 2.65 Scale/GCI Calibration Error (NAWI Class IIII Scale—European Version Only)

1. Calibrate the scale (refer to procedure 4.2). At the end of calibration, the scale returns error codes after it checks for error conditions.

**Yes    No**

↓ → No calibration errors exist. Go to “Final Actions” on page 2-12.

2. Do as follows:

- a. Refer to table 2-23 on page 2-209 for a list of possible calibration error codes, and identify the error condition the scale shows.

**Table 2-23. Calibration Error Codes**

Error Code	Description
1	Beam readings are not valid.
2	Zero readings are not valid.
4	Maximum reading for weight on right foot is improper.
5	Maximum reading for weight on left foot is improper.
6	Maximum reading for weight on left head is improper.
7	Maximum reading for weight on right head is improper.
20	Matrix calculation error.
21	Coefficient range error.

- b. Check the positions of the calibration weight.

The calibration weight is correctly positioned on the bed.

**Yes    No**

↓ → correctly put the calibration weight on the bed. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 3.

3. Check the load beam. The load beam wiring is connected to the proper connector.

**Yes    No**

↓      → Connect the load beam wiring to the proper connector. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 4.

4. Replace the load beam (refer to procedure 4.46). The problem still exists.

**Yes    No**

↓      → Go to step 6.

5. Replace the scale P.C. board (refer to procedure 4.45). This solves the problem.

**Yes    No**

↓      → For assistance, call Hill-Rom Technical Support.

6. Do as follows:

- a. Calibrate the NAWI Class IIII Scale (European version) (refer to procedure 4.2).

**NOTE:**

If the scale P.C. board is replaced, the seal on the scale P.C. board breaks, and the scale **must** be calibrated.

- b. Have Hill-Rom Technical Support or an approved agency make sure the calibration.

**NOTE:**

After a NAWI Class IIII Scale (European version) is calibrated, its calibration **must** be verified by Hill-Rom or an approved agency.

The scale passes verification testing.

**Yes    No**

↓      → Go to RAP 2.67.

7. The problem still exists.

**Yes    No**

↓      → Go to “Final Actions” on page 2-12.

8. For assistance, call Hill-Rom Technical Support.

## 2.66 Load Beam—Shorted Excitation Voltage (NAWI Class IIII Scale—European Version Only)

1. To access the GCI Code screens, do as follows:
  - a. Select the **Tools** tab on the GCI.
  - b. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
  - c. Select **Diagnostics**.
  - d. Select **Service Codes**. When selected, the diagnostic menu shows fault messages listed in numerical sequence and by fault code name. corrective actions are provided within this chapter. The **Scale Service** screen shows (see figure 2-6 on page 2-211).

**Figure 2-6. Scale Service Screen**

The figure shows a screenshot of the 'Scale Services' screen from a GCI device. At the top, it says 'Scale Services'. Below that, 'Local Gravity:' is displayed with a value of '9.800561 m/sec<sup>2</sup>'. To its right is a numeric keypad with a backspace key. Below the gravity input is 'Calibration Location Gravity:' with a value of '9.800564 m/sec<sup>2</sup>'. To its right is another numeric keypad with a decimal point, zero, and a 'Clear' button. At the bottom left is a 'Cancel' button, and at the bottom right is a 'Continue' button. At the very bottom, it says 'Scale Weight: 0.05 Kg' and has three checked checkboxes: 'Calibration', 'Stable', and 'Zero Point'. The entire screen is framed by a grey border.

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- e. Scroll to **View Readings**, and press **Enter**. The A/D readings, calibration coefficients, and zero point values for each load beam display (see figure 2-7 on page 2-212).

**Figure 2-7. Scale Service—View Readings Screen**

Scale Services			
Zone	A/D Readings	Calibration	Zero
Right Foot	6648	908	6643
Left Foot	7405	907	7407
Right Head	5069	901	5070
Left Head	4293	902	4292

Tare	Preset 1	Preset 2	Zero Corr.
0.00	0.00	0.00	0.00

**OK**

**Scale Weight: 0.05 Kg** Calibration    Stable    Zero Point

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f. Check the A/D readings for each zone.

All four zones display an A/D reading of **0** or another very low value (count).

**Yes   No**

↓ → Go to “Final Actions” on page 2-12.

2. A load beam may have the +5 V shorted to ground. Make sure the load beams are electrically connected, and test the load beam shorted excitation voltage (see “Load Beam—Shorted Excitation Voltage Tests” on page 2-212).

## Load Beam—Shorted Excitation Voltage Tests

### Test 1

1. Using a calibrated digital voltmeter, do as follows to check for a shorted load beam:
  - a. Measure the voltage from the scale P.C. board to the **black** wire beam connector, and record the voltage at pin 2.
  - b. Measure the voltage from the scale P.C. board cover to the **red** wire beam connector, and record the voltage at pin 5.

The **black** wire, pin 2, measures **0 V**, and the **red** wire, pin 5, measures **4.75 V** to **5.25 V**.

**Yes   No**

↓ → Go to step 3.

2. Go to “Test 2” on page 2-213.
3. Do as follows:
  - a. Disconnect the load beams, one at a time, until the voltage changes to the proper value.
  - b. When the voltage changes to the proper value, replace the last load beam disconnected (refer to procedure 4.46).

This solves the problem.

Yes    No

↓    → Go to “Test 2” on page 2-213.

4. Go to “Final Actions” on page 2-12.

## Test 2

1. Do as follows to check for a shorted load beam:
  - a. Disconnect the load beams, one at a time, and monitor the A/D readings until the A/D readings change to within the range of **5000** to **25000**.
  - b. When the A/D readings change to within the range of **5000** to **25000**, replace the last load beam disconnected (refer to procedure 4.46).

This solves the problem.

Yes    No

↓    → Go to step 3.

2. Go to “Final Actions” on page 2-12.

3. The problem is intermittent.

Yes    No

↓    → Go to step 5.

4. Go to “Test 3” on page 2-213.

5. The load beam is **not** mounted in the bed.

Yes    No

↓    → For assistance, call Hill-Rom Technical Support.

6. Go to “Test 4” on page 2-214.

## Test 3

1. The problem is intermittent.

**Yes    No**

↓ → For assistance, call Hill-Rom Technical Support.

2. Using a calibrated digital multimeter, do as follows to check each load beam, one at a time, for a short:
  - a. Disconnect the load beam from the bed.
  - b. Connect one side of the multimeter to the bed frame.
  - c. Connect the other side of the multimeter to one of the load beam's wires—red, black, white, or green.

The resistance measures greater than **5000** ohms.

**Yes    No**

↓ → Replace the load beam (refer to procedure 4.46). If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, call Hill-Rom Technical Support.

3. For assistance, call Hill-Rom Technical Support.

#### Test 4

1. The load beam is **not** mounted in the bed.

**Yes    No**

↓ → For assistance, call Hill-Rom Technical Support.

2. Using a calibrated digital multimeter, do as follows to check each load beam, one at a time, for a short:
  - a. Connect one side of the multimeter to the body of the load beam.
  - b. Connect the other side of the multimeter to one of the load beam's wires—red, black, white, or green.

The resistance measures greater than **5000** ohms.

**Yes    No**

↓ → Replace the load beam (refer to procedure 4.46). If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, call Hill-Rom Technical Support.

3. For assistance, call Hill-Rom Technical Support.

## 2.67 Scale Fails Verification Testing (NAWI Class IIII Scale—European Version Only)

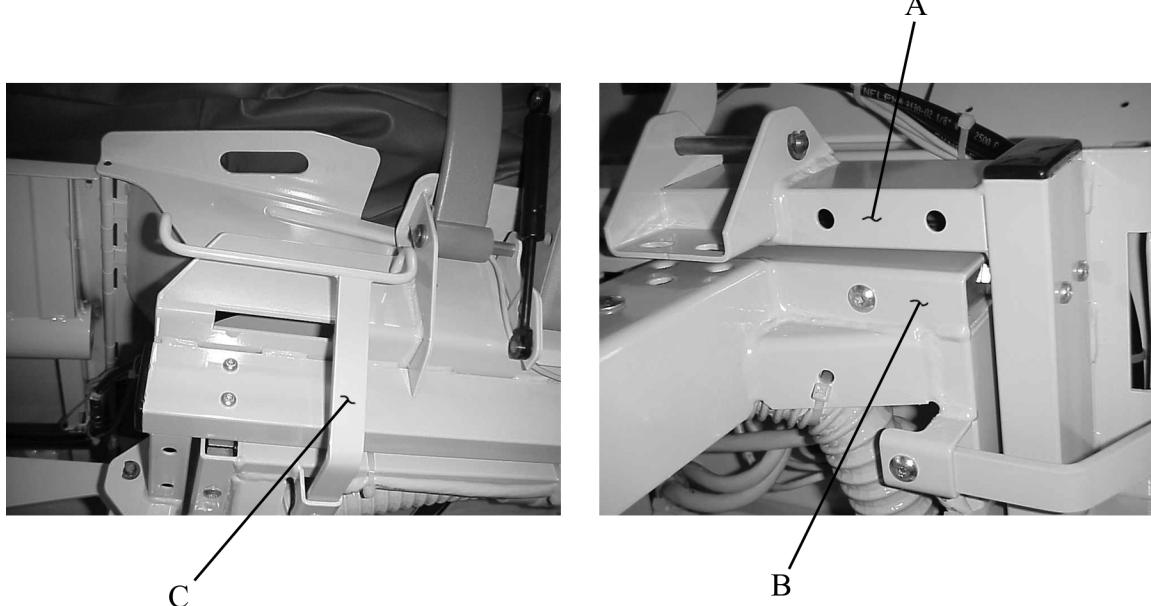
1. Check the load beam mounting screws. The load beam mounting screws are tight.

Yes    No

↓    → Tighten the load beam mounting screws. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 2.

2. Check for interference, such as pinched or rubbing cables, wire ties, or hoses, in the gap between the weigh frame (A) and the intermediate frame (B) (see figure 2-8 on page 2-215). The weigh frame (A) and the intermediate frame (B) are free from interference.

Figure 2-8. Frame Interference



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Yes    No

↓    → Remove the interference from the gap between the weigh frame (A) and the intermediate frame (B). If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 3.

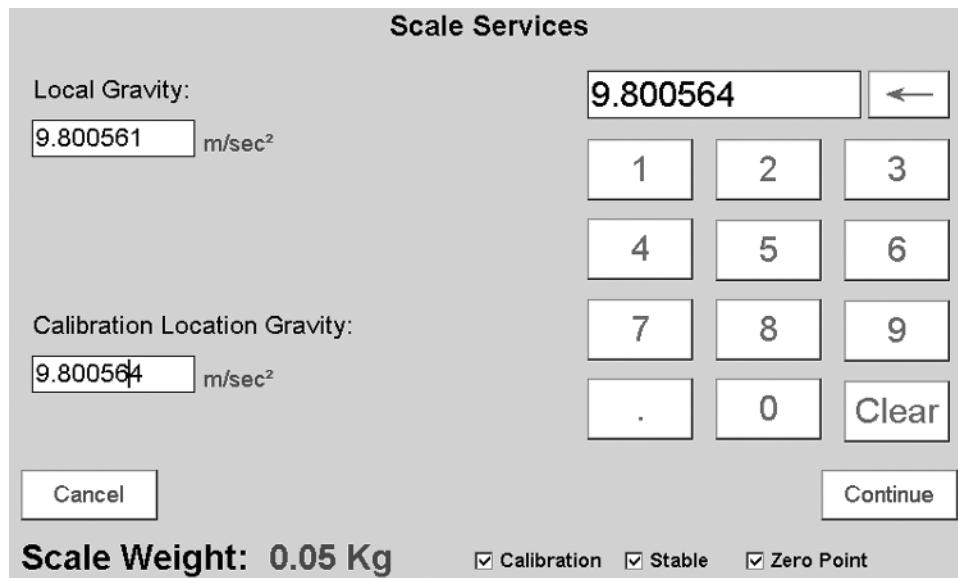
3. Check the drainage bag holders (C). The drainage bag holders (C) are in good condition and not bent.

**Yes      No**

↓ → Replace the damaged drainage bag holder. If this solves the problem, go to “Final Actions” on page 2-12. Otherwise, go to step 4.

4. To access the GCI Code screens, do as follows:
  - a. Select the **Tools** tab on the GCI.
  - b. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
  - c. Select **Diagnostics**.
  - d. Select **Service Codes**.
  - e. Select **Scale Services** (see figure 2-9 on page 2-216).

**Figure 2-9. Scale Service Screen**



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- f. Scroll to *View Readings*, and press **Enter**. The A/D readings, calibration coefficients, and zero point values for each load beam display (see figure 2-10 on page 2-217).
5. Check for a discrepancy in the calibration coefficients. One calibration coefficient is significantly different from the others. Calibration coefficients will normally be different; however, the variation will be less than a few hundred counts.

**Figure 2-10. Scale Service—View Readings Screen**

Scale Services			
Zone	A/D Readings	Calibration	Zero
Right Foot	6648	908	6643
Left Foot	7405	907	7407
Right Head	5069	901	5070
Left Head	4293	902	4292

Tare	Preset 1	Preset 2	Zero Corr.
0.00	0.00	0.00	0.00

OK

**Scale Weight: 0.05 Kg**       Calibration     Stable     Zero Point

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2

**NOTE:**

For example, refer to table 2-24 on page 2-217, where the calibration coefficient for the left head is 1147, representing the response of 114.7 A/D counts per kg. The right foot calibration coefficient is lower than the others by more than 100, with a response of 90 A/D counts per kg, indicating possible interference between the right foot of the weigh frame and the intermediate frame.

**Table 2-24. Calibration Coefficients (Example)**

Left head	1147
Right head	1199
Left foot	1117
Right foot	900

**NOTE:**

A/D counts represent a voltage response from the load beam when weight is applied to it.

**Yes    No**

↓      → For assistance, call Hill-Rom Technical Support.

6. Remove the interference from the frame. The problem still exists.

**Yes    No**

↓      → Go to “Final Actions” on page 2-12.

7. For assistance, call Hill-Rom Technical Support.

## 2.68 Gravity Constants/Coefficients (NAWI Class III Scale—European Version Only)

### Introduction

Gravity constants are a function of latitude and altitude and change by geographical location. For examples of some gravity constants for different locations, refer to table 2-25 on page 2-218.

**Table 2-25. Gravity Constants**

Northern Europe Gravity: 9.8176	Central Europe Gravity: 9.808	Southern Europe Gravity: 9.8033
Finland	Belgium	Austria
Iceland	Czech Republic	Bulgaria
Norway	Denmark	France
Sweden	Germany	Greece
	Ireland	Hungary
	Latvia	Italy
	Lithuania	Portugal
	Luxembourg	Romania
	Netherlands	Slovakia
	Poland	Slovenia
	United Kingdom	Spain
		Switzerland

A bed calibrated in one location and then used in another location **must** make an allowance for the change in gravity at its place of use if the error for the scale is greater than  $\pm 0.25$  kg.

The load beams measure the force applied by a mass:

Force = mass\*acceleration, where acceleration = gravity constant

When the gravity constant changes due to a change in geographical location, an error occurs due to the difference in gravity. The scale stores the gravity value for the place of calibration and the place of use. When the bed is manufactured, these values are set in the scale through the GCI. The weight is propered by the ratio of the two values:

$$\text{Weight} = \text{weight measured} * (\text{gravity constant where calibrated}) / (\text{gravity constant where used})$$

If a bed is serviced and calibrated, set the gravity values accordingly (see “Changing Gravity Constants/Coefficients” on page 2-219). If the bed is calibrated and used at the same geographical location, the values will be the same, and the ratio is 1. When the ratio is 1, no properion to the weight reading is necessary.

2

## Changing Gravity Constants/Coefficients

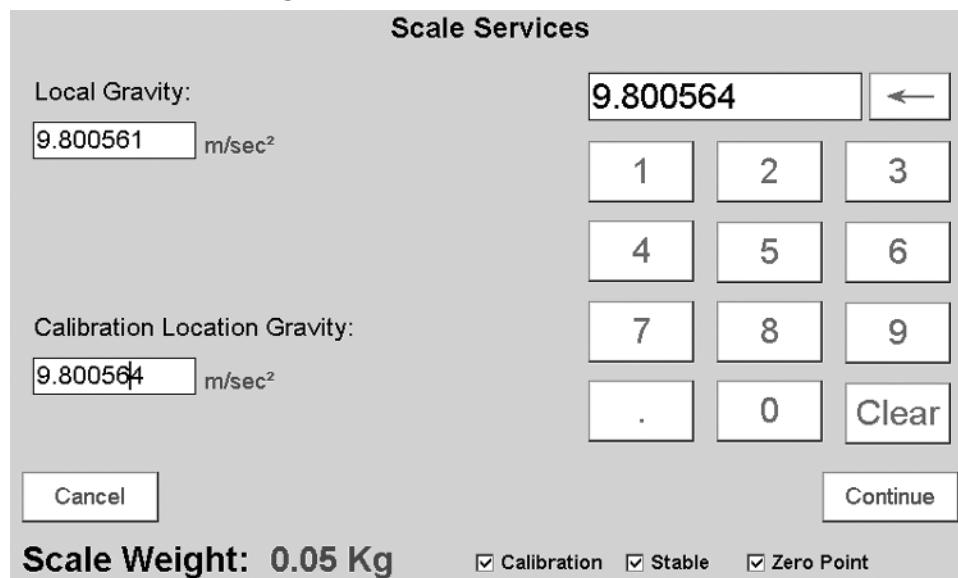
1. Activate the Calibration mode as follows:

**NOTE:**

Unless the scale is in Calibration mode, it will not accept new values from the GCI and the gravity values **cannot** be changed.

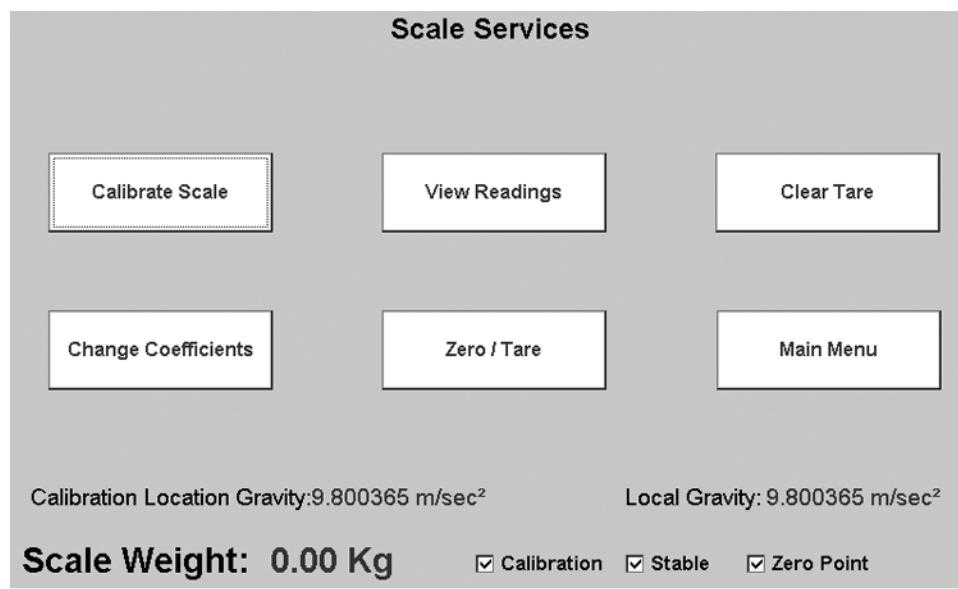
- a. Break the seal on the scale board cover, and remove the scale board cover from the unit.
- b. At the scale P.C. board, press and hold the **Calibration** switch (SW1) for 10 seconds until two beeps sound and the **Calibration mode** indicator on the **Scale Service** screen comes on (see figure 2-11 on page 2-220). For more information on the functions of the **Scale Service** screen, refer to “Scale Service Screen Functions (NAWI Class IIII Scale—European Version Only)” on page 2-222.

Figure 2-11. Scale Service Screen



- At the Scale Service screen, select **Change coefficients**. The **Change Coefficients** screen shows. For more information on the **Change Coefficients** screen, refer to “Scale Service Screen Functions (NAWI Class III Scale—European Version Only)” on page 2-222.

Figure 2-12. Change Coefficients Screen



3. Look at the **Local gravity** and **Calibration location gravity** values.
4. To change the gravity coefficients, do as follows at the **Change Coefficients** screen:
  - a. Select **Change coefficients**.
  - b. Change the **Changed Gravity Coefficients** values to the applicable gravity constants. For examples of some gravity constants for different locations, refer to table 2-25 on page 2-218.
  - c. Do **one** of these:
    - To **clear** changes, scroll to **CLEAR Changes**.
    - To **cancel** the changes the gravity coefficients and return to the **Scale Service** screen, scroll to **Cancel/Return**.
    - To **accept** the changes, scroll to **ACCEPT Changes**.
  - d. After you accept the changes to the gravity coefficients, make sure the current **Local gravity** and **Calibration location gravity** values match the **Changed Gravity Coefficients** values.
  - e. Calibrate the NAWI Class IIII Scale (European version) (refer to procedure 4.2).

**NOTE:**

If the scale P.C. board is replaced, the seal on the scale P.C. board breaks, and the scale **must** be calibrated.

- f. Have Hill-Rom Technical Support or an approved agency make sure the calibration. If the scale fails verification testing, go to RAP 2.67.

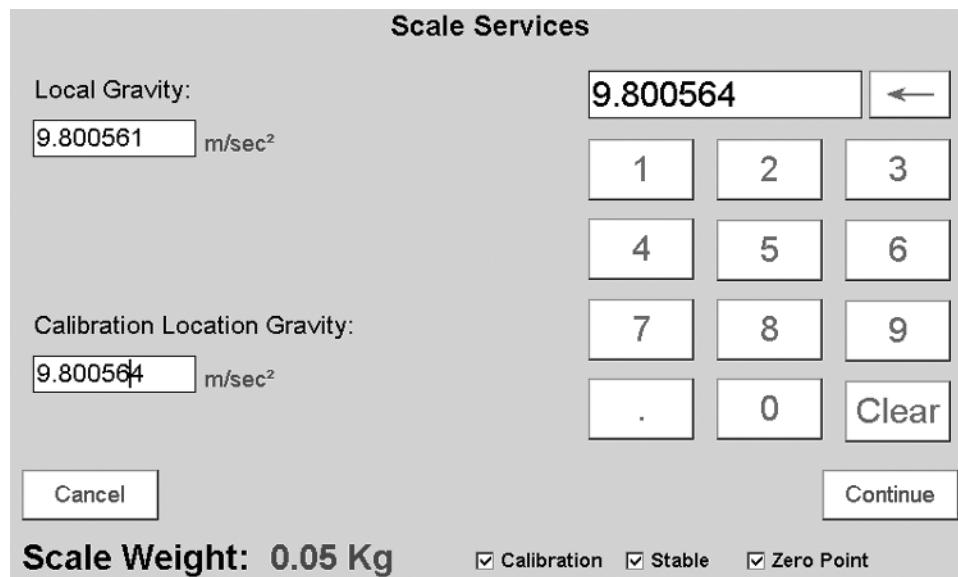
**NOTE:**

After a NAWI Class IIII Scale (European version) is calibrated, its calibration **must** be verified by Hill-Rom or an approved agency.

## 2.69 Scale Service Screen Functions (NAWI Class IIII Scale—European Version Only)

### Scale Service Screen

Figure 2-13. Scale Service Screen



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### Functions

At the Scale Service screen, you may do these functions:

- Calibrate the scale—scroll to **Calibrate scale**.
- View or change the gravity coefficients—scroll to **Change coefficients**. Refer to “Change Coefficients Screen” on page 2-223.
- View additional data from the scale, such as A/D readings and calibration information—scroll to **View readings**. Refer to “Scale Service—View Readings Screen” on page 2-224.
- Tare the scale—scroll to **Zero/Tare**.
- Clear all tare values, scroll to **Clear tare**.
- Return to the Service screen—scroll to **GO TO Service menu**.

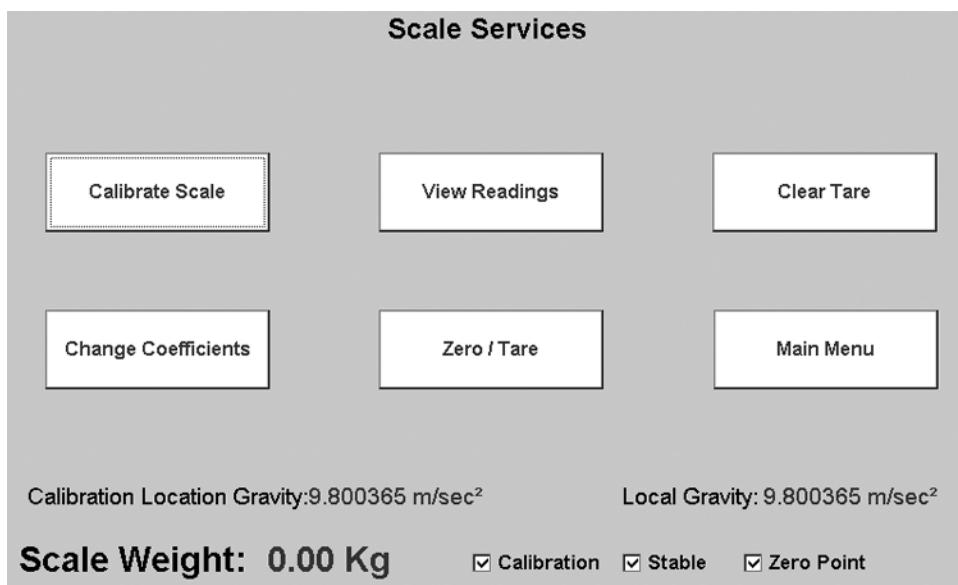
## Indicators

These indicators show on the **Scale Service** screen:

- **Calibration mode**—comes on when the **Calibration** switch (SW1) on the scale P.C. board is pushed.
- **Stable equilibrium**—comes on if the weight readings vary only 0.5 kg for 5 seconds.
- **Zero point**—comes on after a zero tare function if the weight is within 0.125 kg of the zero tare value.

## Change Coefficients Screen

Figure 2-14. Change Coefficients Screen



## Functions

At the **Change Coefficients** screen, you may do these functions:

- Changing the **Changed Gravity Coefficients** values—scroll to **Change coefficients**.

**NOTE:**

The **Calibration mode** indicator must be on to enable changing the gravity values.

- Clear changes—scroll to **CLEAR Changes**.
- Accept changes—scroll to **ACCEPT Changes**.
- Cancel changes to the gravity coefficients, and return to the **Scale Service** screen—scroll to **Cancel/Return**.

**Values**

Theese values show on the **Change Coefficients** screen:

- **Local gravity** shows the current value for the local gravity value stored in the scale P.C. board.
- **Calibration location gravity** shows the current value for the calibration location gravity value stored in the scale P.C. board.

**Scale Service—View Readings Screen**

**Figure 2-15. Scale Service—View Readings Screen**

Scale Services				
Zone	A/D Readings	Calibration	Zero	
Right Foot	6648	908	6643	
Left Foot	7405	907	7407	
Right Head	5069	901	5070	
Left Head	4293	902	4292	
Tare	Preset 1	Preset 2	Zero Corr.	
0.00	0.00	0.00	0.00	
				OK
Scale Weight: 0.05 Kg <input checked="" type="checkbox"/> Calibration <input checked="" type="checkbox"/> Stable <input checked="" type="checkbox"/> Zero Point				

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## Values

These values show on the **Scale Service—View Readings** screen:

- **Weight** shows the weight on the bed in 0.05 kg resolution.
- **Zone** shows the load beam or signal channel, as defined as the patient's reference to the left or right side. For example, the right foot load beam is the same side as the patient's right when the patient is in the bed.
- **A/D Readings** shows the signal readings from the load beams. If weight is added above a load beam, the A/D readings increase.
- **Calibration** shows the calibration values stored in the scale after it is calibrated. For example, the value **1400** represents 140 counts/kg.
- **Zero** shows the zero point values recorded during calibration and the weight on the bed **prior** to calibration.
- **Tare** shows the tare value after a zero tare function.
- **Preset1** shows the tare value from an autocompensation operation.
- **Preset2** shows the tare value from the added and removed TotalCare SpO<sub>2</sub>RT® Pulmonary Therapy System rotation and percussion modules after the bed is tared.
- If the weight on the bed is between 0 kg and -8 kg after the bed is calibrated, **Zero-Corr.** shows the zero properion part of the zero tare function.

## 2.70 Hydraulic System Malfunction

If a problem with the hydraulic system is readily identified, refer to table 2-26 on page 2-226 for Deltrol units or table 2-27 on page 2-235 and table 2-28 on page 2-244 for Delta units to quickly determine an applicable troubleshooting solution.

**Table 2-26. Hydraulic System Malfunction**

Condition	Possible Cause	Solution
The head cylinder does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S7) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of $16\ \Omega$ to $18\ \Omega$ .
	The valve (S7) is defective (see figure 2-16 on page 2-233).	Swap the valve with a known good valve. If the problem continues, replace the valve.
	The valve (S8) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	The CPR valve (A) has contamination on its seat (see figure 2-17 on page 2-234).	Remove and clean the valve seat.
The head cylinder moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve (S8) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	The CPR valve (A) has contamination on its seat (see figure 2-17 on page 2-234).	Remove and clean the valve seat.
	#1 P.C. has contamination in its orifice.	Replace the hydraulic power unit.
The head cylinder moves down.	The valve (S8) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	The CPR valve (A) has contamination on its seat (see figure 2-17 on page 2-234).	Remove and clean the valve seat.

Condition	Possible Cause	Solution
The head cylinder does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S8) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S8) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
The head cylinder moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve (S8) has contamination in its seat orifice (see figure 2-16 on page 2-233).	Remove and clean the valve seat orifice.
The head cylinder moves up unintentionally.	The valve (S7) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
The knee cylinder does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S5) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S5) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
	The valve (S6) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
The knee cylinder moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve (S6) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	#2 P.C. has contamination in its seat.	Replace the hydraulic power unit.
The knee cylinder moves down.	The valve (S6) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The knee cylinder does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S6) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S6) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
The knee cylinder moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve (S6) has contamination in its seat orifice (see figure 2-16 on page 2-233).	Remove and clean the valve seat orifice.
The knee cylinder moves up unintentionally.	The valve (S5) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
The foot articulation cylinder does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S1) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S1) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
The foot articulation cylinder moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	Port 3 has contamination in its orifice (see figure 2-17 on page 2-234).	Remove and clean the orifice.
	#3 P.C. has contamination on its seat (see figure 2-17 on page 2-234).	Replace the hydraulic power unit.
The foot articulation cylinder moves down.	POCV 3 has contamination on its seat (see figure 2-17 on page 2-234).	Replace the POCV.

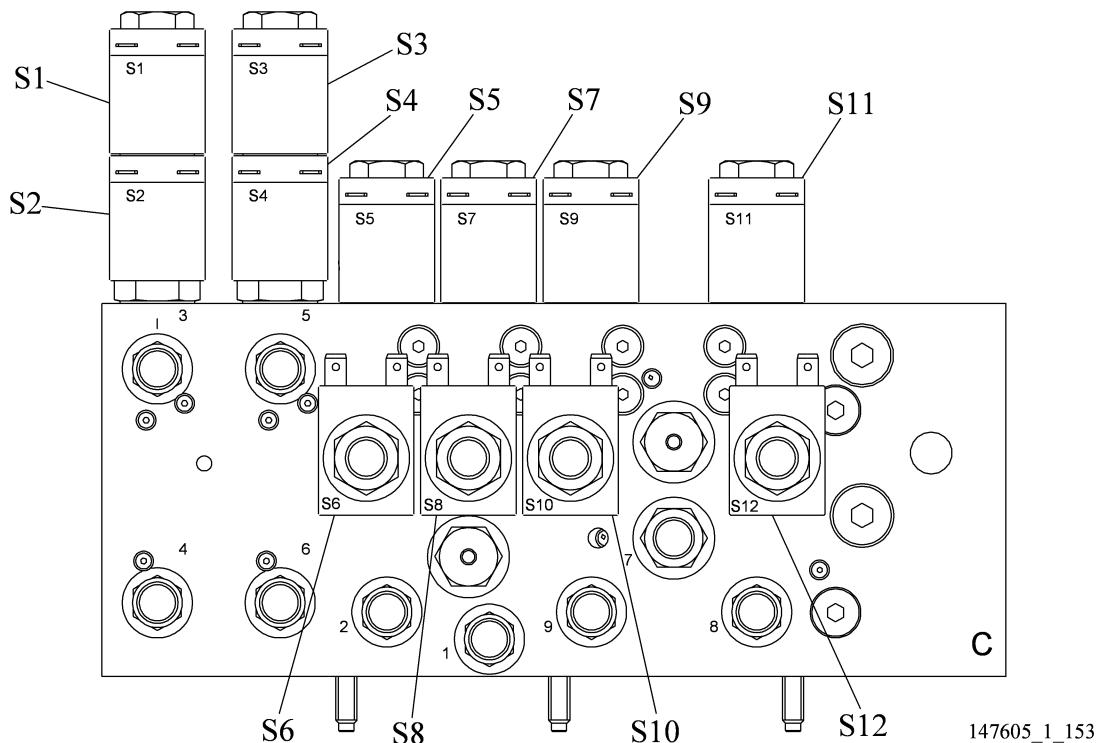
Condition	Possible Cause	Solution
The foot retraction cylinder moves out slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	Port 5 has contamination in its orifice.	Remove and clean the orifice.
The foot articulation cylinder does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage.
	POCV 3 and 5 are switched (see figure 2-17 on page 2-234).	Switch the POCVs.
	The valve coil (S2) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of $16 \Omega$ to $18 \Omega$ .
	The valve (S2) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
The foot articulation cylinder moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	Port 3 has contamination in its orifice (see figure 2-17 on page 2-234).	Remove and clean the orifice.
	#3 P.C. has contamination on its seat (see figure 2-17 on page 2-234).	Replace the hydraulic power unit.
The foot retraction cylinder does not move out.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S3) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of $16 \Omega$ to $18 \Omega$ .
	The valve (S3) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
The foot retraction cylinder moves out.	POCV 5 has contamination on its seat (see figure 2-17 on page 2-234).	Replace the POCV.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The foot retraction cylinder does not move in.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S4) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S3) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
The foot retraction cylinder moves in slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	#5 P.C. has contamination in its orifice (see figure 2-17 on page 2-234).	Replace the hydraulic power unit.
The foot hilow does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S1) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S1) is defective (see figure 2-16 on page 2-233).	Swap the valve with a known good valve. If the problem continues, replace the valve.
	The valve (S12) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
The foot hilow moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve (S12) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	#8 P.C. has contamination in its orifice.	Replace the hydraulic power unit.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The foot hilow drifts down.	The valve (S12) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
The foot hilow does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage.
	The valve coil (S12) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S12) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
The foot hilow moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage.
	The valve (S12) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	#8 P.C. has contamination in its orifice.	Replace the hydraulic power unit.
The foot hilow moves up unintentionally.	The valve (S11) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
The head hilow does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil (S9) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of 16 Ω to 18 Ω.
	The valve (S9) is defective (see figure 2-16 on page 2-233).	Replace the valve with a known good valve. If the problem continues, replace the valve.
	A washer is missing from POCV 7 (see figure 2-17 on page 2-234).	Install a washer on POCV 7.
	The valve (S10) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	The Emergency Trendelenburg valve (B) has contamination on its seat (see figure 2-17 on page 2-234).	Remove and clean the valve seat.

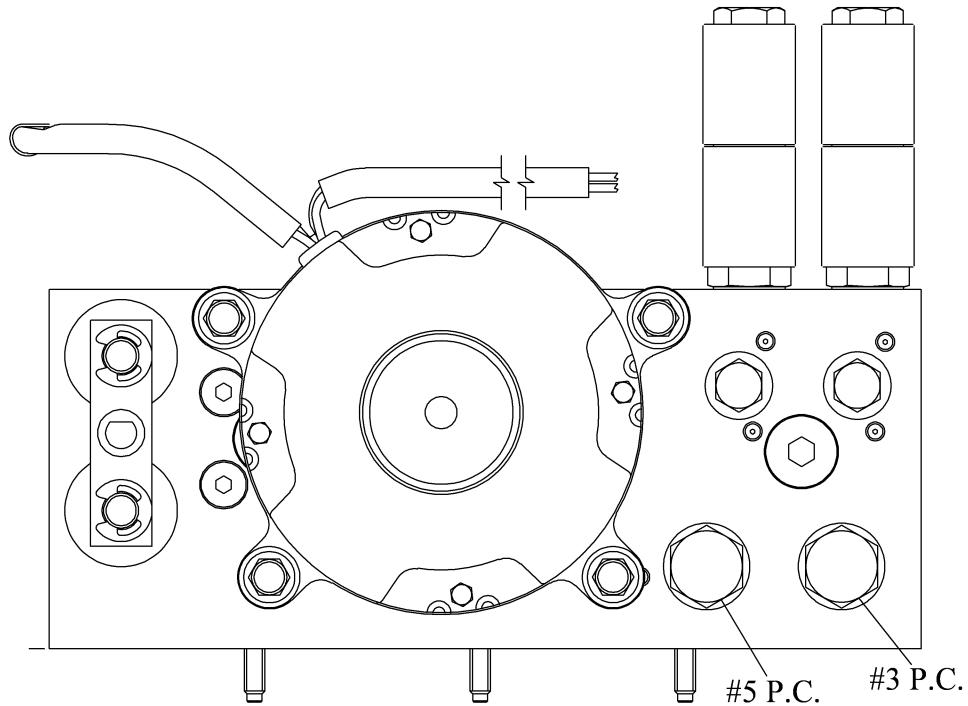
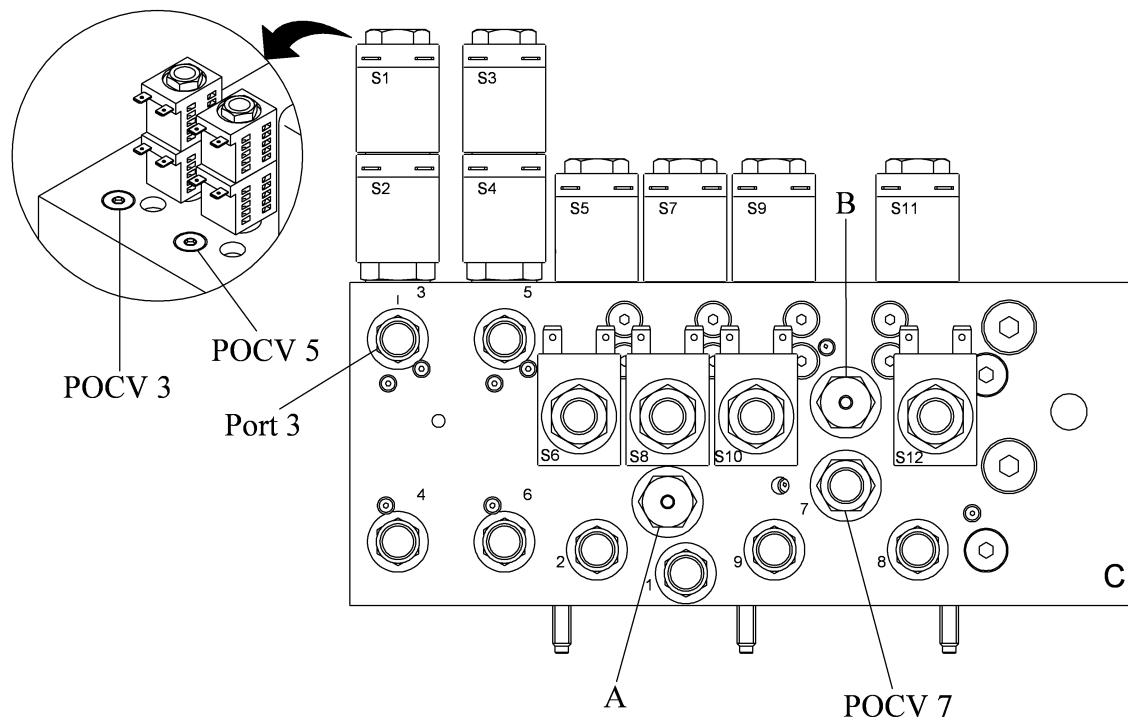
<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The head hilow moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve (S10) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	The Emergency Trendelenburg valve (B) has contamination on its seat (see figure 2-17 on page 2-234).	Remove and clean the valve seat.
	#9 P.C. has contamination in its orifice.	Replace the hydraulic power unit.
The head hilow drifts down.	The valve (S10) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	The Emergency Trendelenburg valve (B) has contamination on its seat (see figure 2-17 on page 2-234).	Remove and clean the valve seat.
The head hilow does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage.
	The valve coil (S10) is defective (see figure 2-16 on page 2-233).	Do an ohm check on the valve coil. Make sure it is within the specification of $16\ \Omega$ to $18\ \Omega$ .
	The valve (S10) is defective (see figure 2-16 on page 2-233).	Swap the valve with a known good valve. If the problem continues, replace the valve.
The head hilow moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve (S10) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.
	#9 P.C. has contamination in its orifice.	Replace the hydraulic power unit.
The head hilow moves up unintentionally.	The valve (S9) has contamination on its seat (see figure 2-16 on page 2-233).	Remove and clean the valve seat.

Figure 2-16. Coils and Valves



147605\_1\_153

Figure 2-17. Check Valves



147605\_1\_154

**Table 2-27. Hydraulic Power Unit**

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
All functions fail to extend or retract.	Connector to wiring harness is loose.	Remove wiring harness connection to board. Check contacts. Reconnect harness and test.
All functions fail to extend.	Reservoir is empty.	Check hoses and manifold for leaks. Replace or tighten hoses as necessary. If leakage is from manifold replace hydraulic power unit. Add oil (refer to procedure 4.24). Purge air (refer to procedure 4.76).
	Motor is disconnected.	Remove motor power connector from the board and motor. Check contacts. Reconnect plugs and test.
	Capacitor is defective.	Check connections to the capacitor. Replace capacitor if necessary.
Foot pump fails to raise function.	Air present in hydraulic system.	Purge air (refer to procedure 4.76).
The head lags foot when raising the bed with foot pump.	Contamination in relief valve #2.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The foot lags the head when raising the bed with foot pump.	Contamination in relief valve #3.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
One section of bed lags when raising the bed with foot pump.	Foot pump is defective.	Replace hydraulic power unit.
Emergency Trend function fails to lower.	Mechanical linkage to ET valve is not correctly adjusted.	Adjust ET valve linkage.
	Emergency Trend function has contamination in its orifice	Replace the hydraulic power unit.
CPR function fails to lower.	Mechanical linkage to CPR valve is not correctly adjusted.	Adjust CPR valve linkage.
	CPR function has contamination in its orifice.	Replace the hydraulic power unit.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The head cylinder does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S01 is defective.	do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S01 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The head cylinder moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	CPR valve linkage is holding valve open.	Adjust CPR valve linkage.
	CPR valve has contamination on its seat.	Replace the CPR valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The head cylinder drifts down	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The CPR valve has contamination on its seat.	Replace the CPR valve.
	The valve S02 has contamination on its seat.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The head cylinder does not move down.	The valve coil S02 is defective.	do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S02 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The head cylinder moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The head cylinder moves up unintentionally.	The valve S01 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The knee cylinder does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S03 is defective.	do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S03 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The knee cylinder moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The knee cylinder drifts down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve S04 has contamination on its seat.	Swap the valve with a known good valve. If the problem ceases, replace the valve.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The knee cylinder does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S04 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S04 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The knee cylinder moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The knee cylinder moves up unintentionally.	The valve S03 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The foot articulation cylinder does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S05 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve coil S08 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The foot articulation cylinder does not move up. (continued)	The valve S05 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The valve S08 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot articulation cylinder moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot articulation cylinder drifts down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve S06 has contamination on its seat.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The foot articulation cylinder does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S06 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve coil S07 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S06 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The valve S07 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The foot articulation cylinder moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	RV3 is defective.	Replace RV3.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot retraction cylinder does not move out.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S09 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve coil S12 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S09 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The valve S12 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot retraction cylinder moves out slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot retraction cylinder drifts out.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve S12 has contamination on its seat.	Swap the valve with a known good valve. If the problem ceases, replace the valve.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The foot retraction cylinder does not move in.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S10 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve coil S11 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S10 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The valve S11 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot retraction cylinder moves in slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot hilow does not move up	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S13 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S13 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.

<b>Condition</b>	<b>Possible Cause</b>	<b>Solution</b>
The foot hilow moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot hilow drifts down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve S14 has contamination on its seat.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The foot hilow does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S14 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.
	The valve S14 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The foot hilow moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The foot hilow moves up unintentionally.	The valve S13 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The head hilow does not move up.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S15 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.

Condition	Possible Cause	Solution
The head hilow does not move up. (continued)	The valve S15 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The Emergency Trendelenburg valve has contamination on its seat.	Replace the Emergency Trendelenburg valve.
	The pilot operated check pilot piston has contamination holding it closed.	Replace the hydraulic power unit.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The head hilow moves up slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The Emergency Trendelenburg valve is held open by the mechanical linkage.	Adjust the Emergency Trendelenburg valve mechanical linkage.
	The Emergency Trendelenburg valve has contamination on its seat.	Replace the Emergency Trendelenburg valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The head hilow drifts down.	The Emergency Trendelenburg valve is held open by the mechanical linkage.	Adjust the Emergency Trendelenburg valve mechanical linkage.
	The Emergency Trendelenburg valve has contamination on its seat.	Replace the Emergency Trendelenburg valve.
	The valve S16 has contamination on its seat.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
The head hilow does not move down.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The valve coil S16 is defective.	Do a resistance check on the valve coil. Make sure it is within the range of 14-16 Ohms. If the coil is out of limits replace the coil.

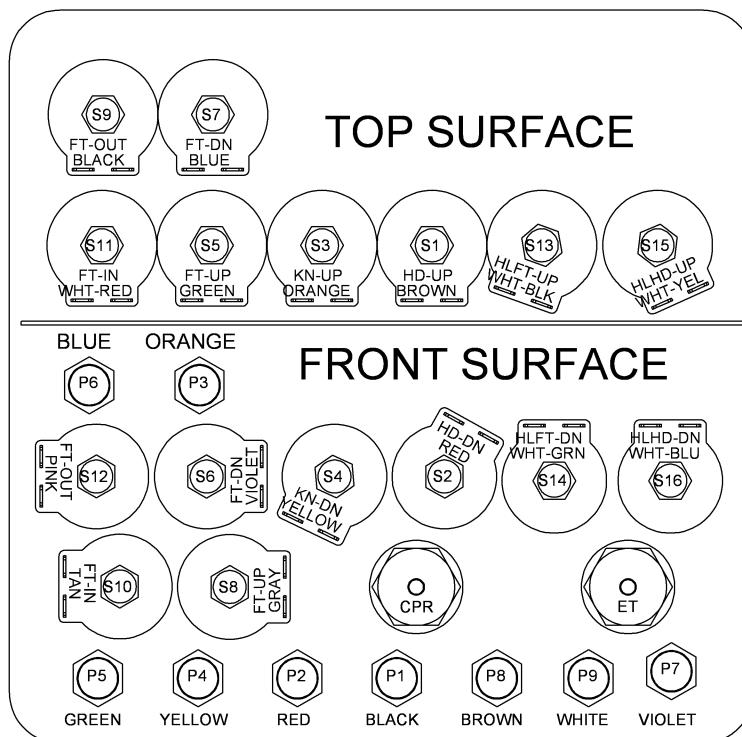
Condition	Possible Cause	Solution
The head hilow does not move down. (continued)	The valve S16 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The head hilow moves down slowly.	The hose is damaged.	Check the hose for kinks, leaks, or damage. If necessary, replace the hose.
	The flow control has contamination in its orifice.	Replace the hydraulic power unit.
The head hilow moves up unintentionally.	The valve S15 is defective.	Swap the valve with a known good valve. If the problem ceases, replace the valve.

**Table 2-28. Application Notes—Hydraulic Power Unit**

Action	Description
Replacing the reservoir	When replacing the reservoir, it is important that the contamination held by the screen not migrate into the system. The preferred method is to replace the reservoir without moving the screen if possible.
Replacing the HC S3P	Hydraulic valve replacement procedure 4.30 will work but installation torque should be $150 \pm 30$ in-lb rather than $90 \pm 10$ in-lb.
Replacing the hydraulic manifold valve coil	Hydraulic manifold valve coil procedure 4.29 will work but the coil nut should be torqued to $48 \pm 12$ in-lb on the new style (after April 24, 2007). The older style should be torqued to $40 \pm 12$ in-lb.
Replacing the MA S2F	Hydraulic valve replacement procedure 4.30 will work but installation torque should be $150 \pm 30$ in-lb rather than $90 \pm 10$ in-lb.
Replacing the MA MCF	CPR Release valve replacement procedure 4.39 will work but installation torque should be $150 \pm 30$ in-lb rather than $90 \pm 10$ in-lb.

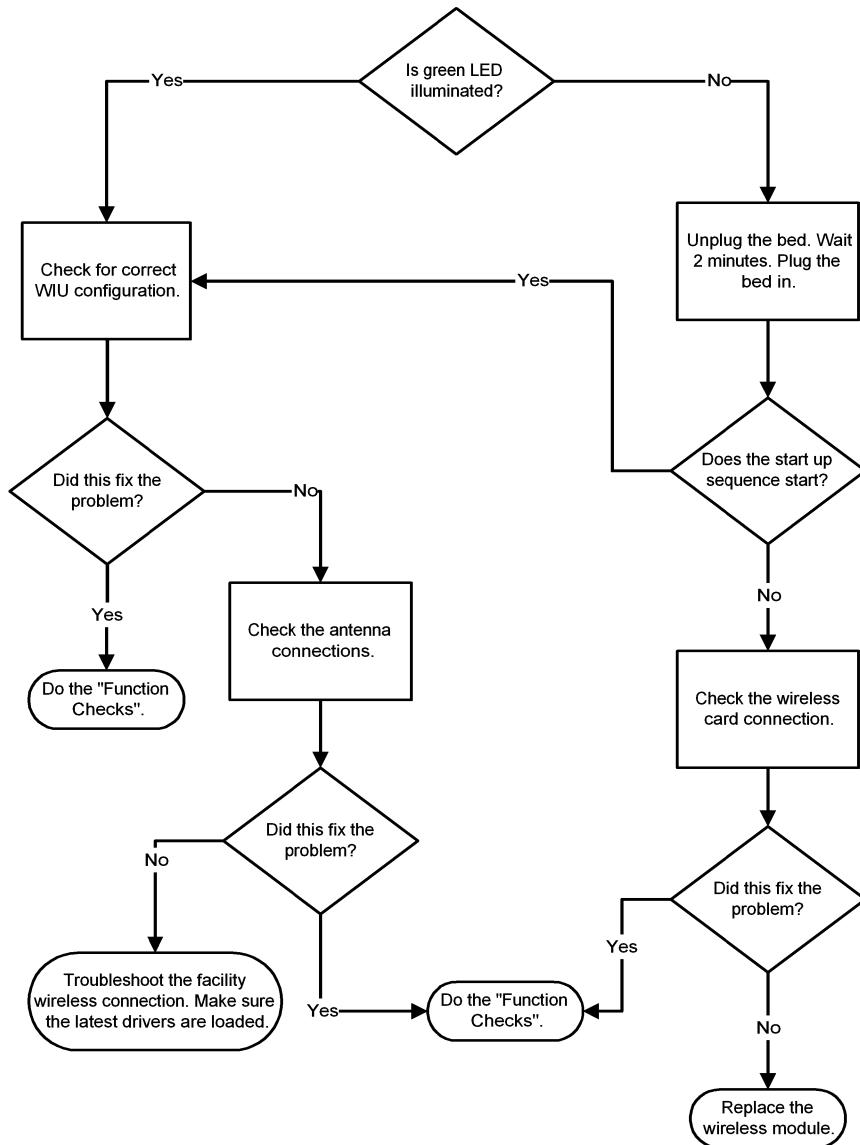
Action	Description
Replacing the MA CV	Hydraulic valve replacement procedure 4.30 will work but installation torque should be $150 \pm 30$ in-lb rather than $90 \pm 10$ in-lb.
Replacing the MA RV	Hydraulic valve replacement procedure 4.30 will work but installation torque should be $150 \pm 30$ in-lb rather than $90 \pm 10$ in-lb.

Figure 2-18. Delta Power Unit



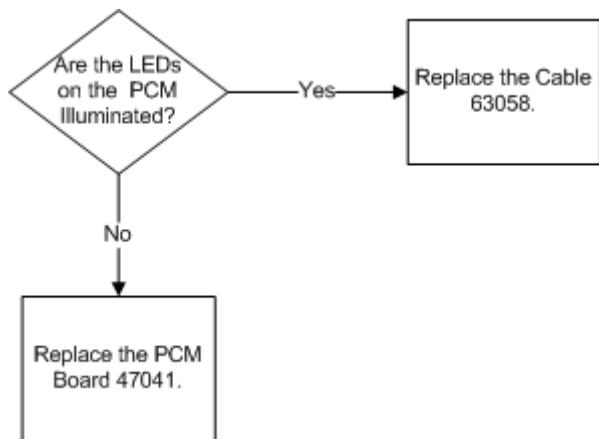
147605\_2\_350

## 2.71 Wireless Module Does Not Connect to the Facility

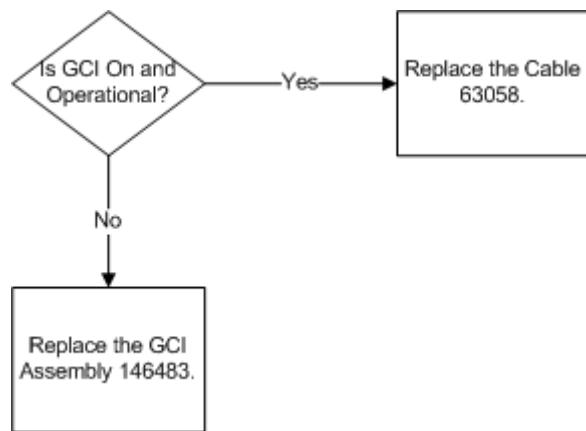


## 2.72 Loss of PCM Communication

2

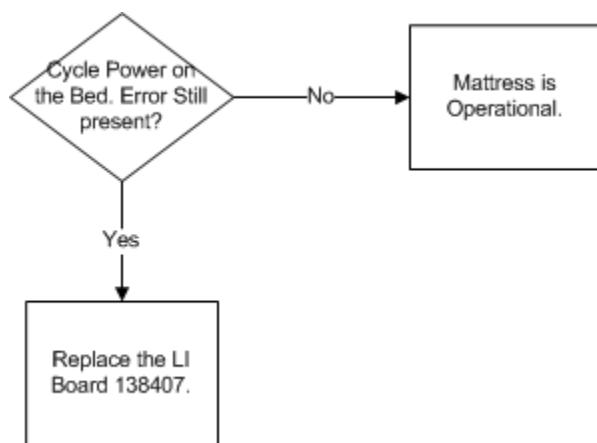


## 2.73 Loss of GCI Communication

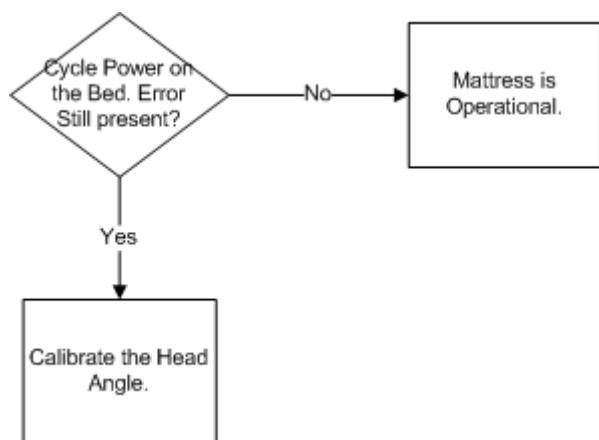


## 2.74 Inter-Mico Communication Error

2

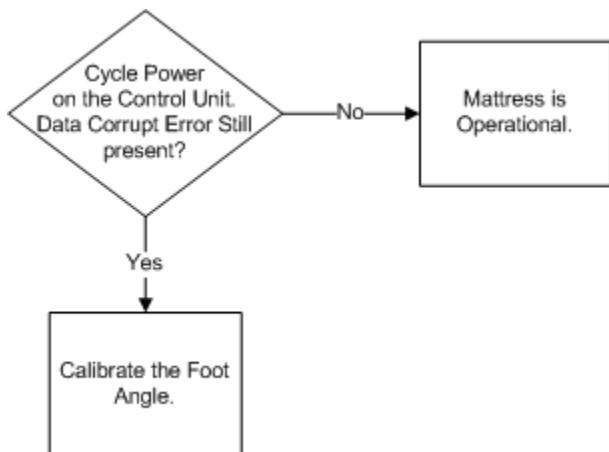


## 2.75 Head Angle out of Range

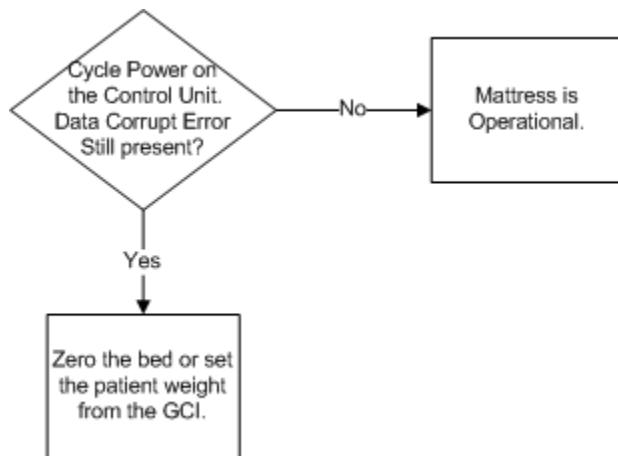


## 2.76 Foot Angle out of Range

2

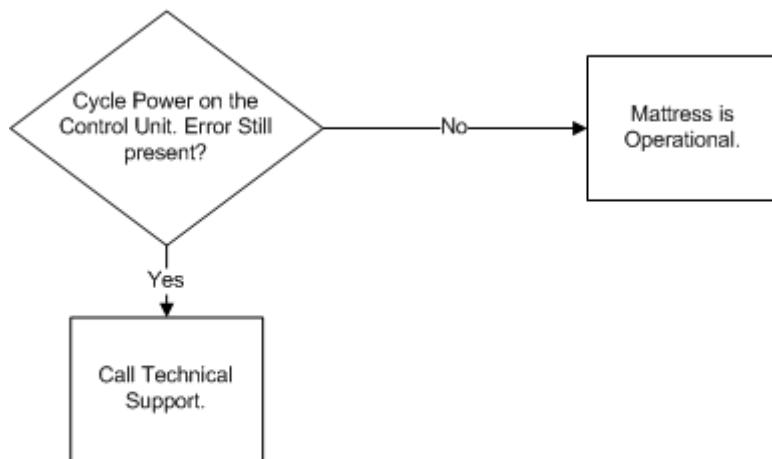


## 2.77 Patient Weight out of Range



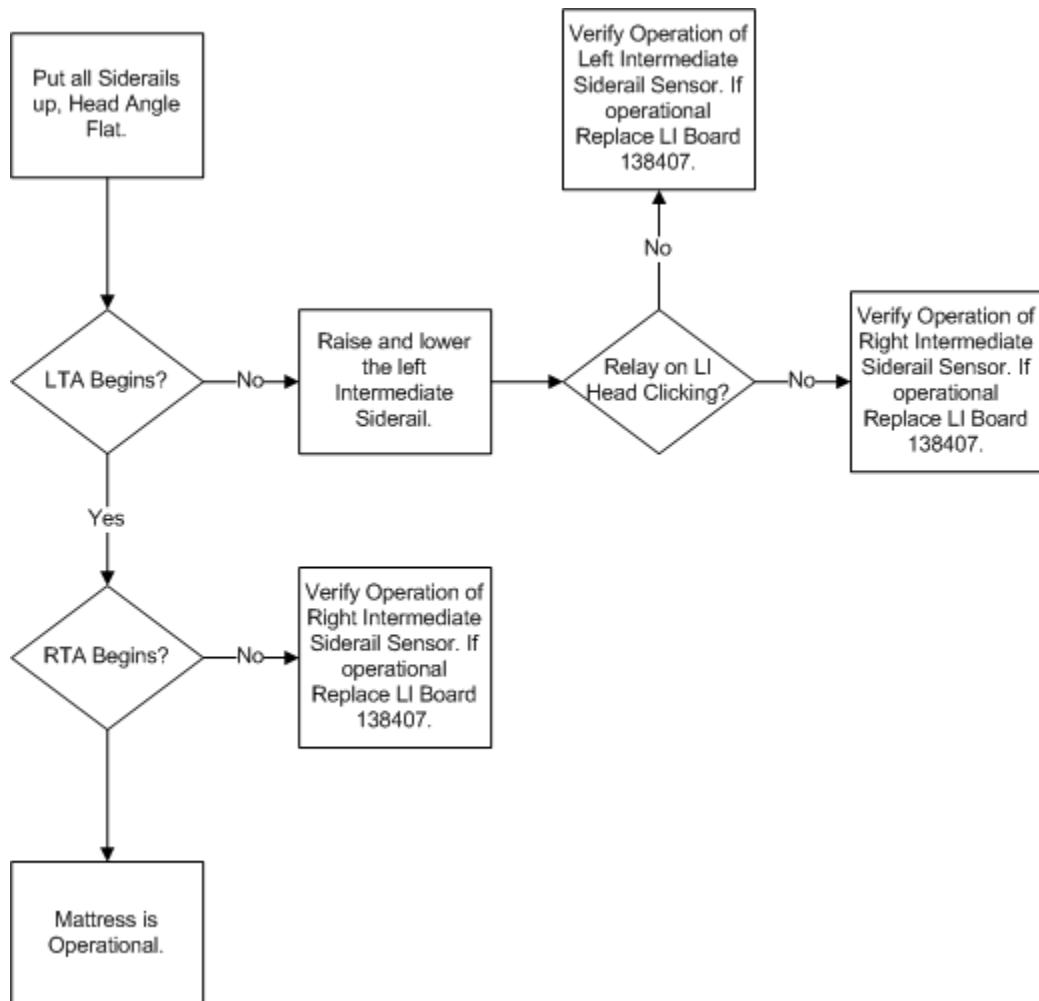
## 2.78 Values not Defined

2



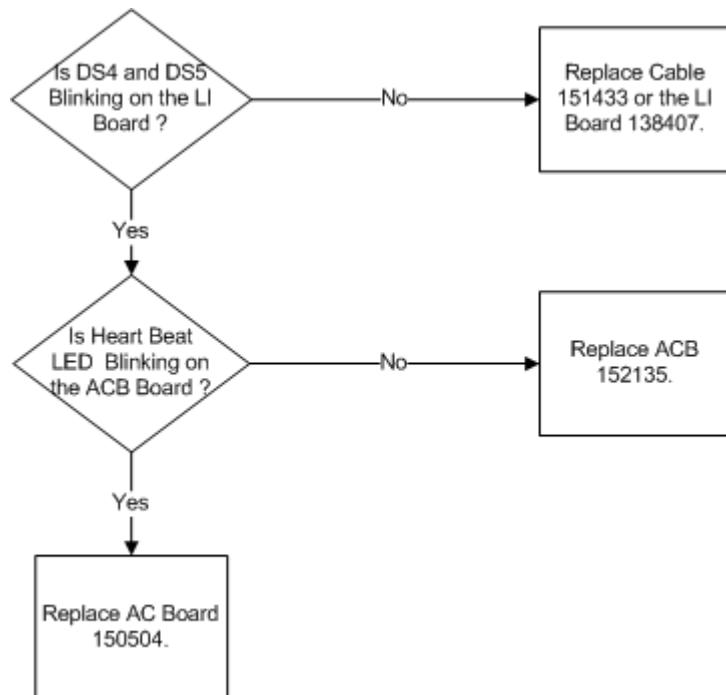
These should never occur, contact technical support.

## 2.79 Turn Assist can not Start

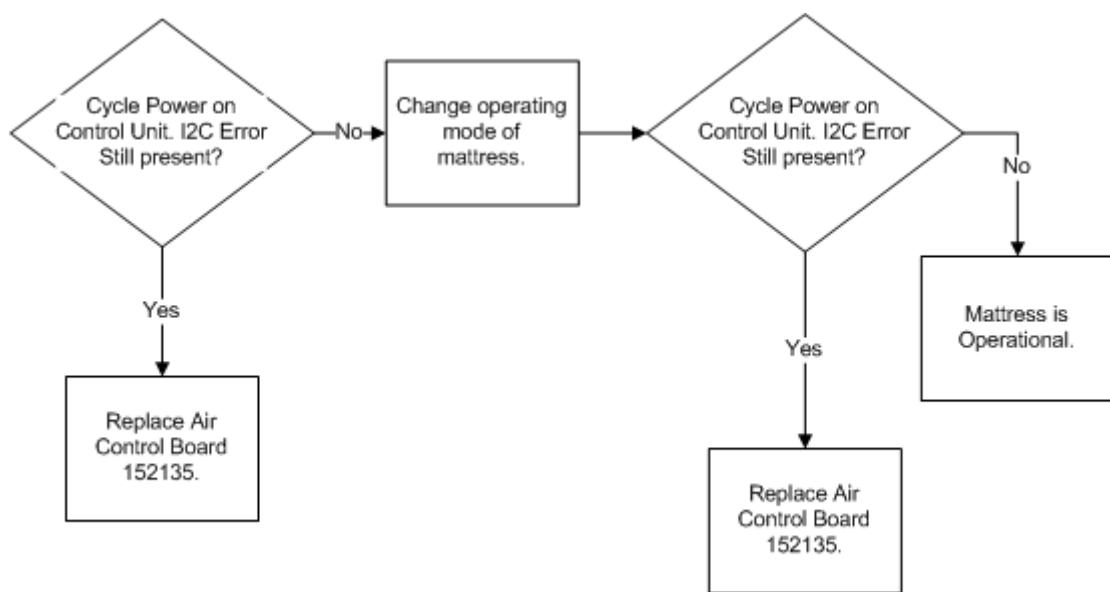


## 2.80 Mattress Disconnected

2

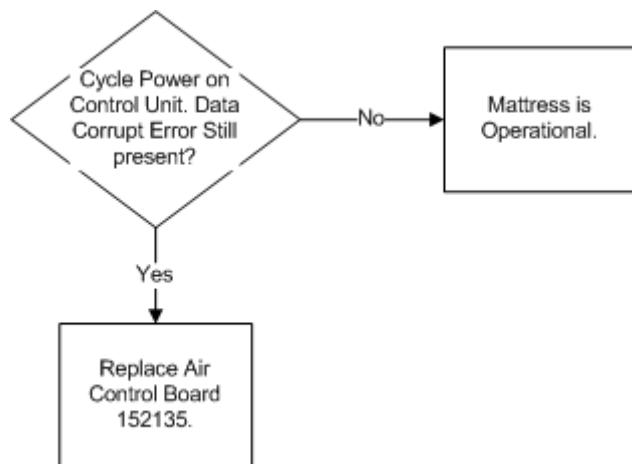


## 2.81 External EE Error

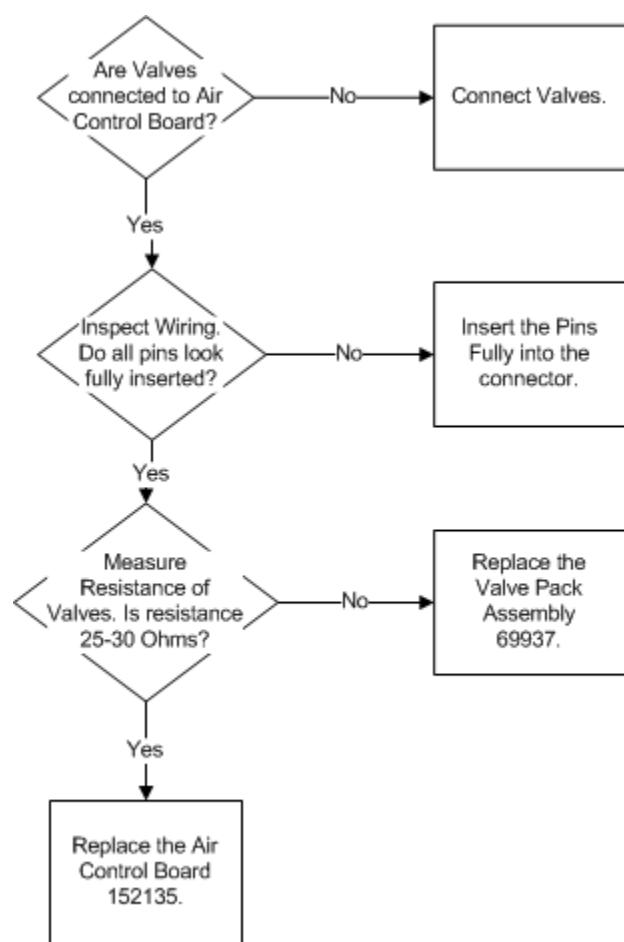


## 2.82 EEPROM Data Corrupt

2

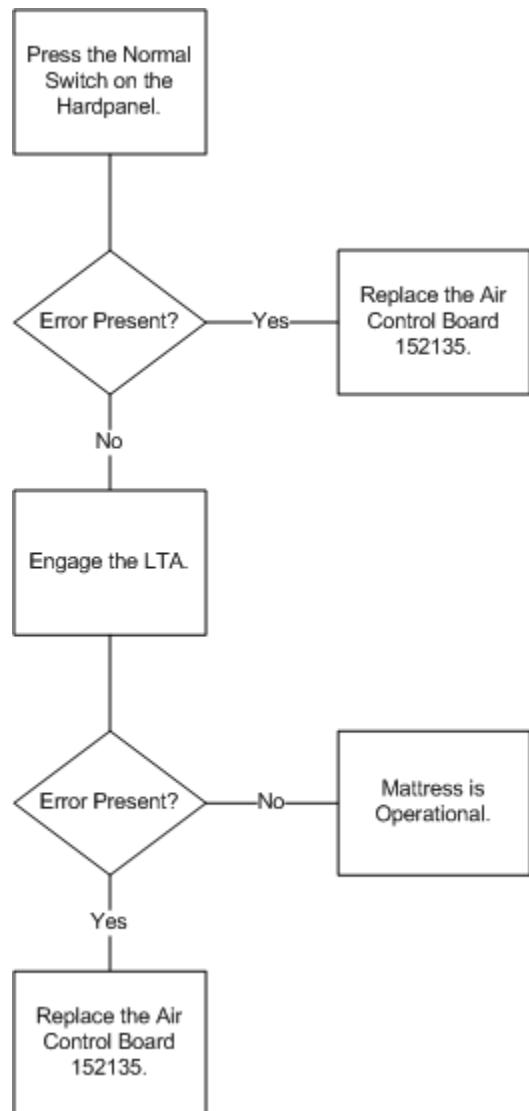


## 2.83 Valve Type

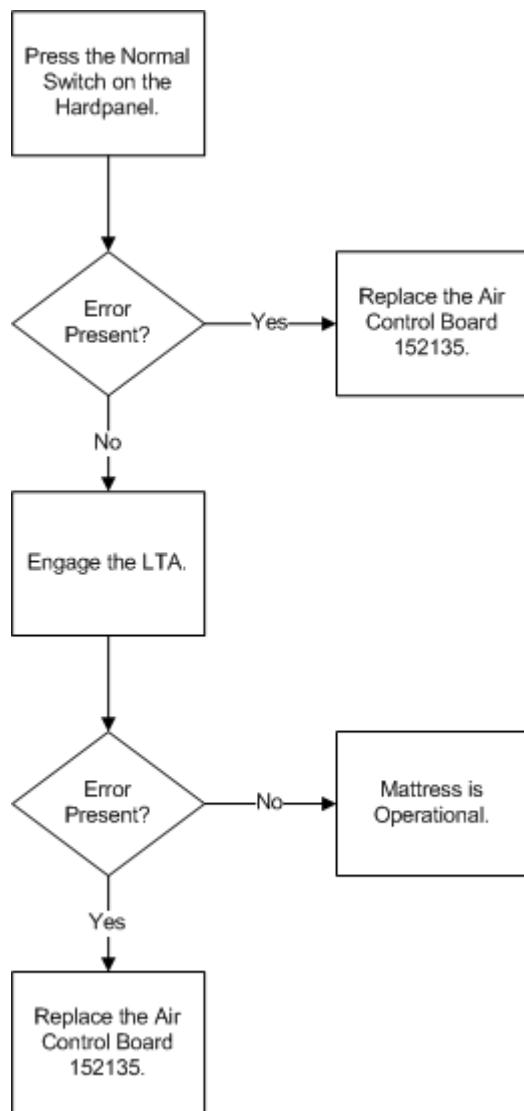


## 2.84 Under Solenoid Voltage

2

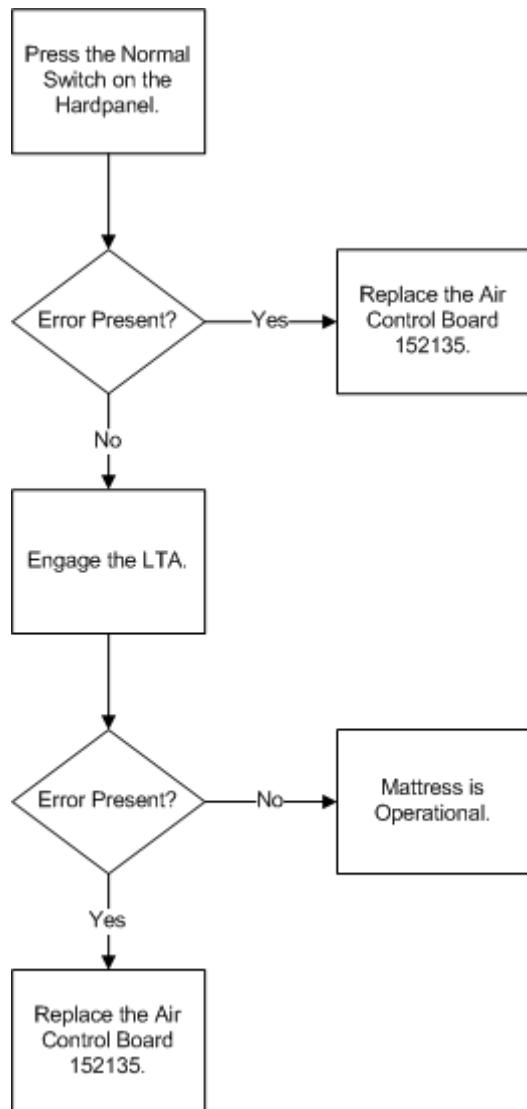


## 2.85 Over Solenoid Voltage

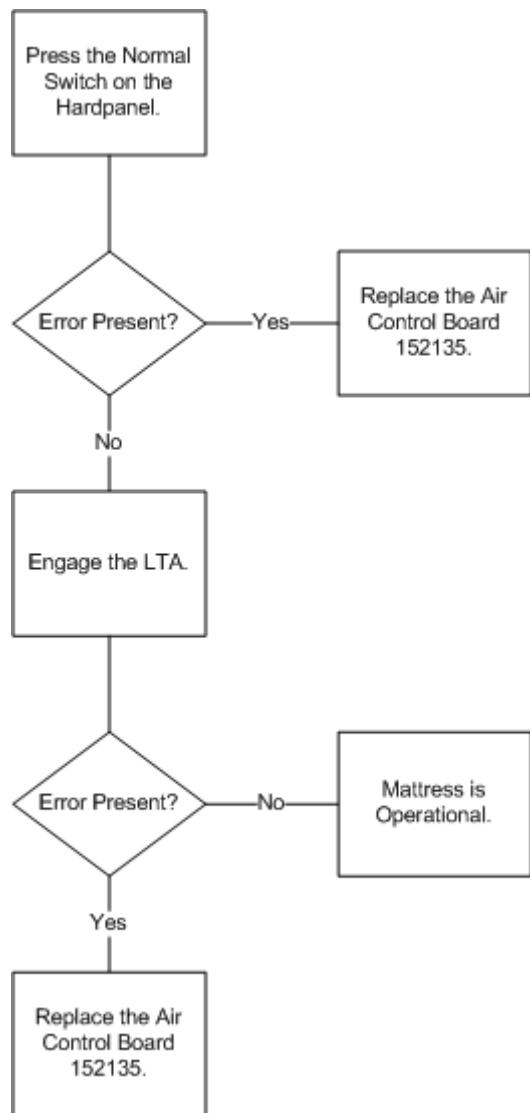


## 2.86 Over On Supervisory Voltage

2

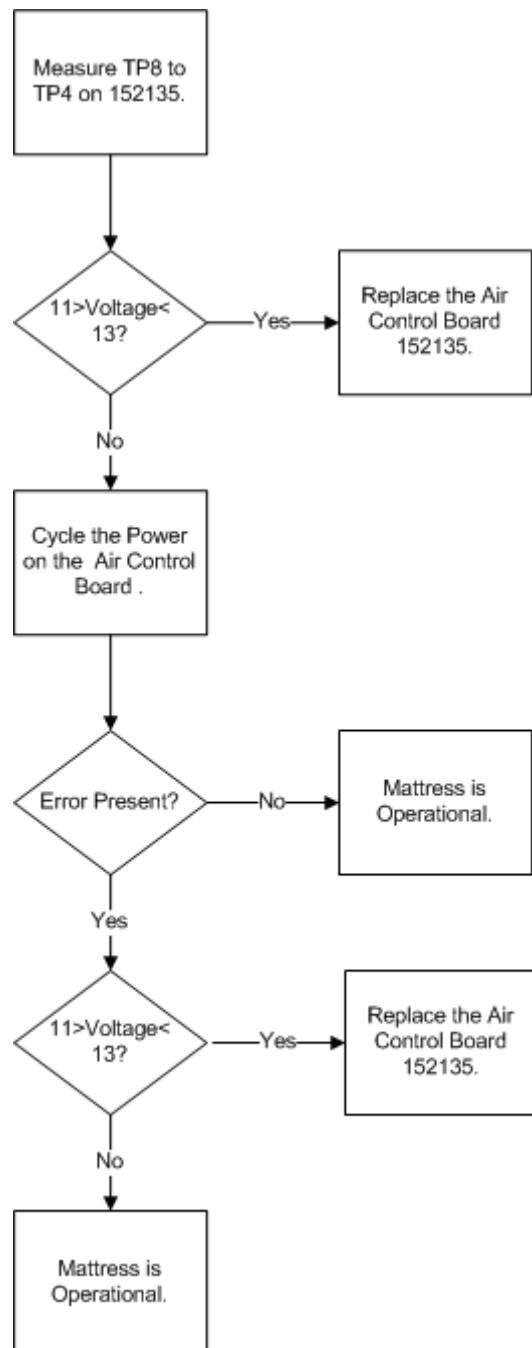


## 2.87 Under Supervisory Voltage

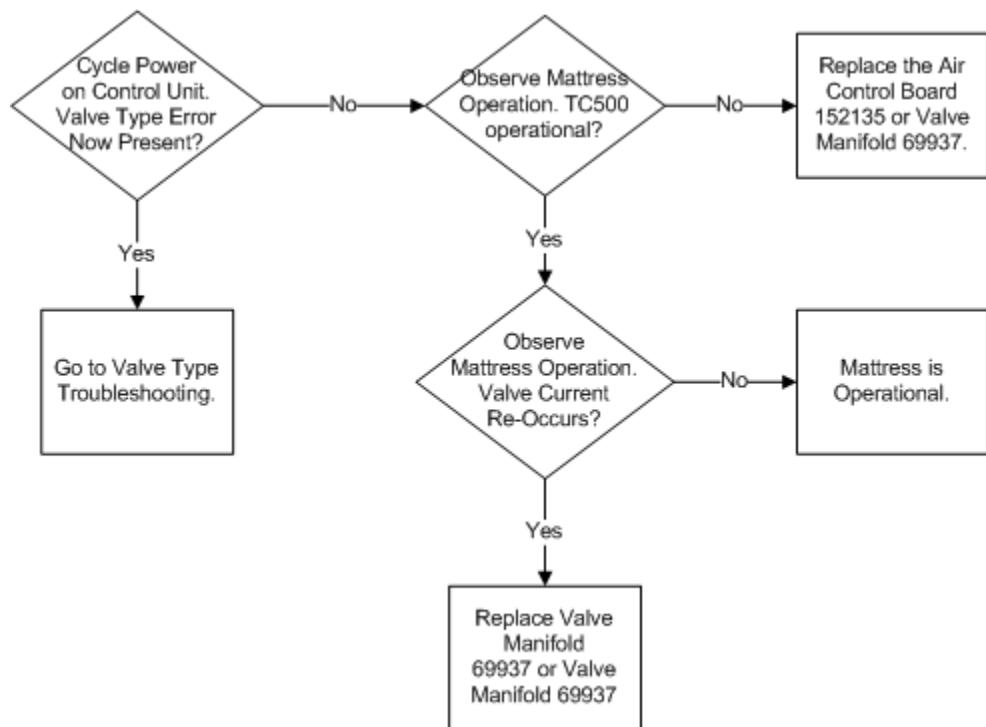


## 2.88 Over Supervisory off Voltage Monitor

2

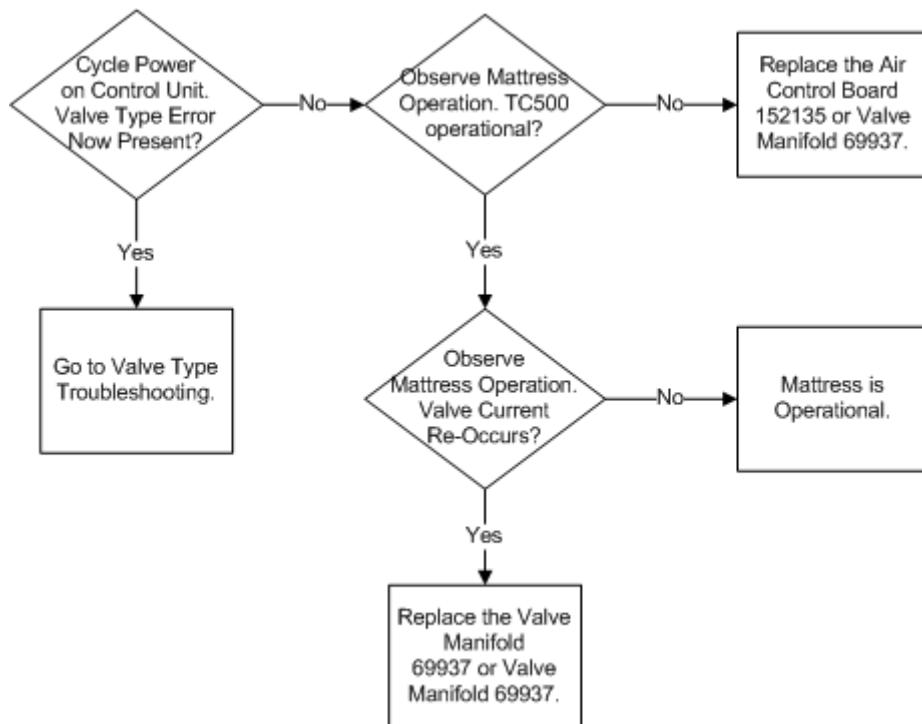


## 2.89 Valve Current Under Error

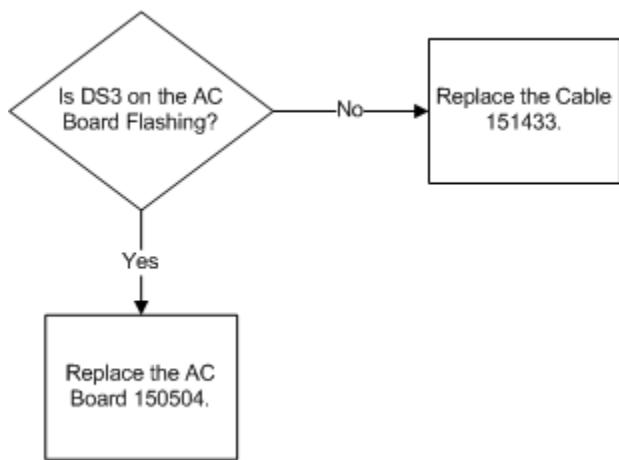


## 2.90 Valve Current Over Error

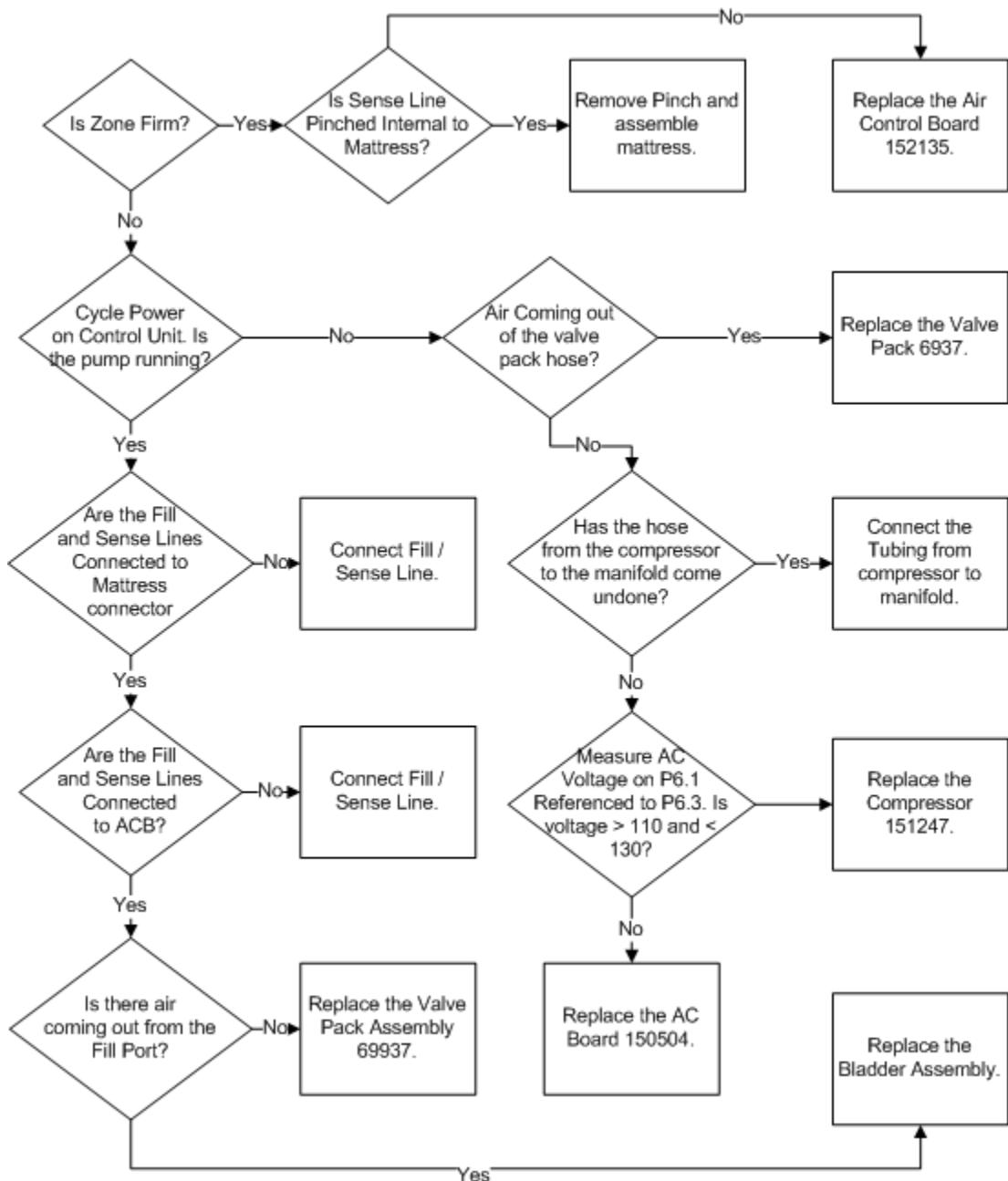
2



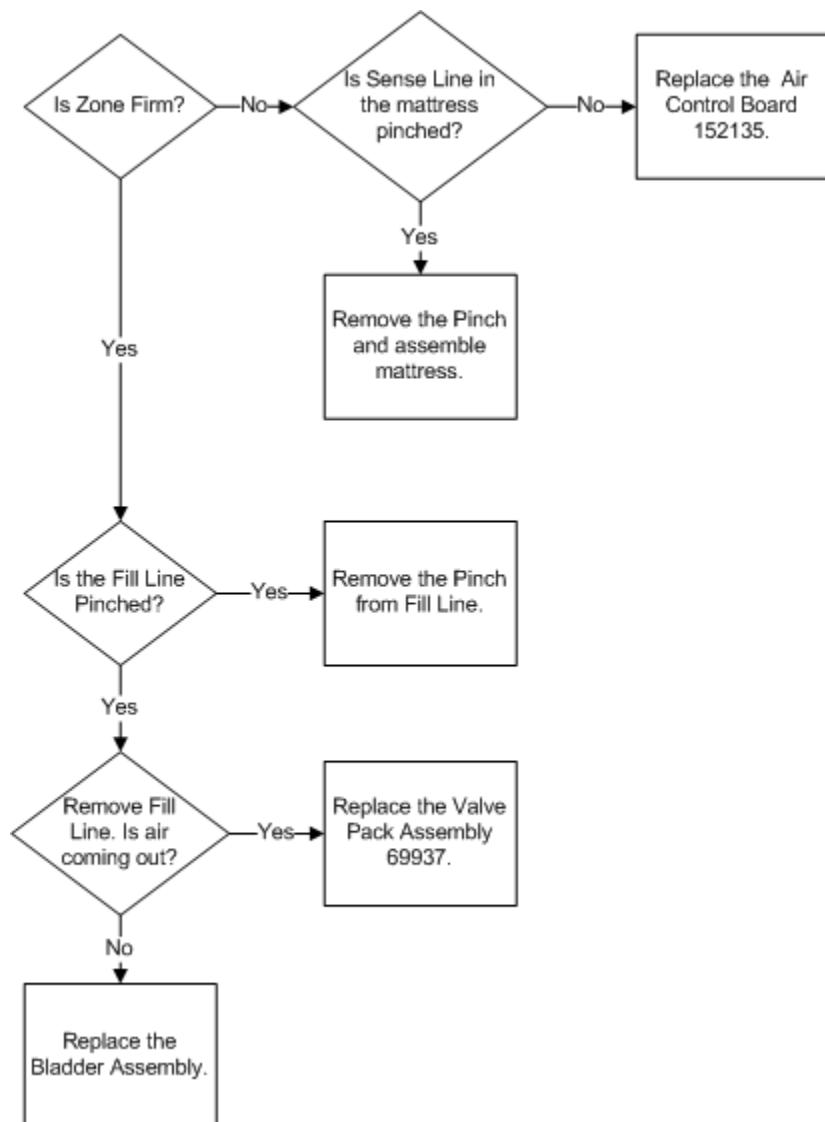
## 2.91 CAN Heartbeat Missing



## 2.92 Inflate Bladder Error

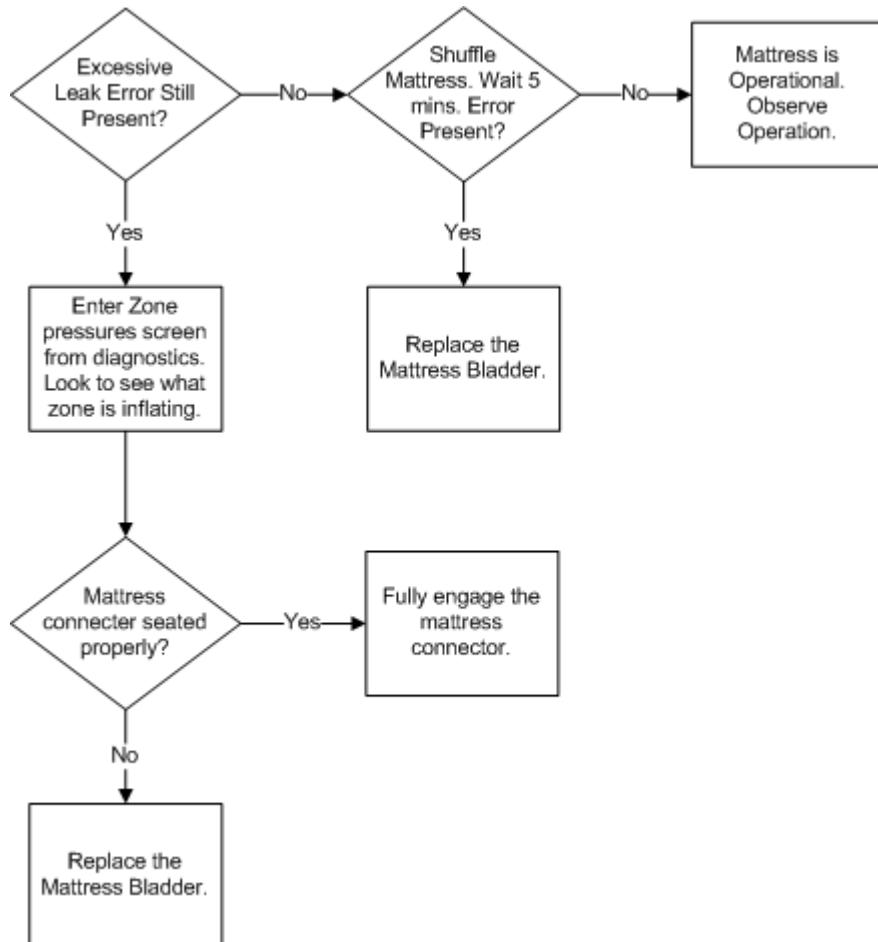


## 2.93 Deflate Baldder Error

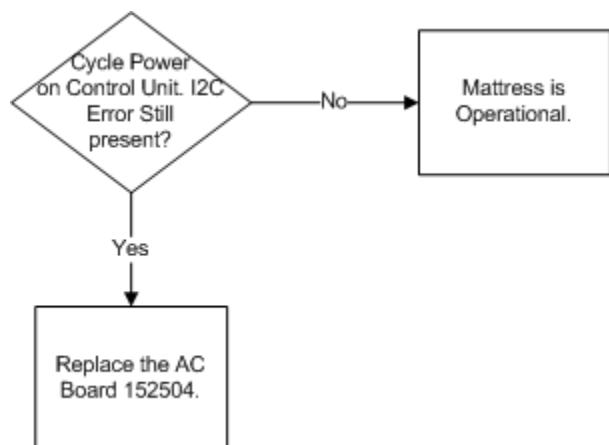


## 2.94 Excessive Leak

2

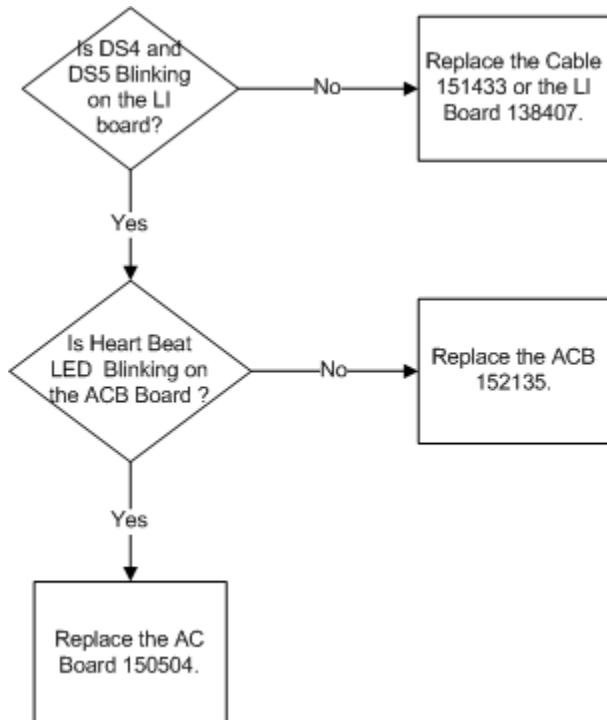


## 2.95 Communication

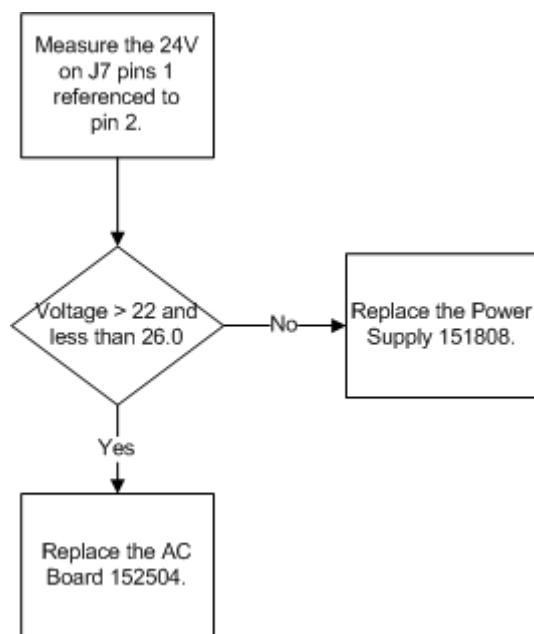


## 2.96 Heartbeat

2

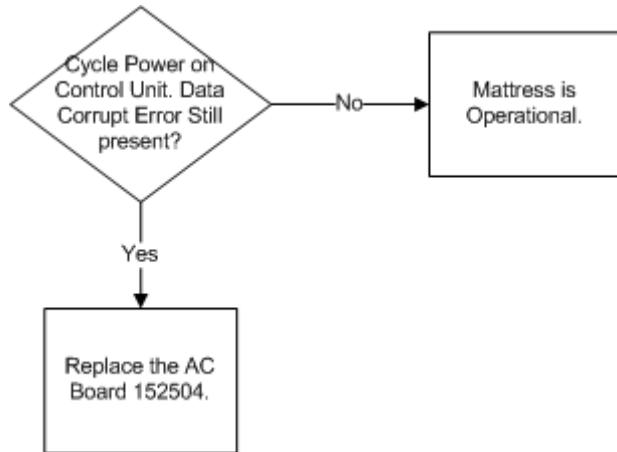


## 2.97 24V Sense

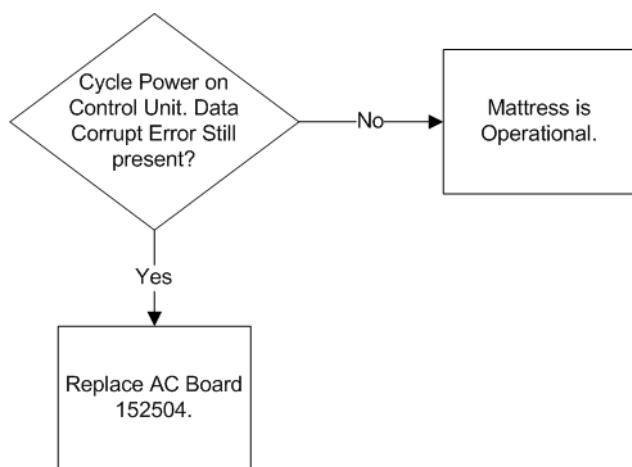


## 2.98 EEPROM Data Corrupt

2

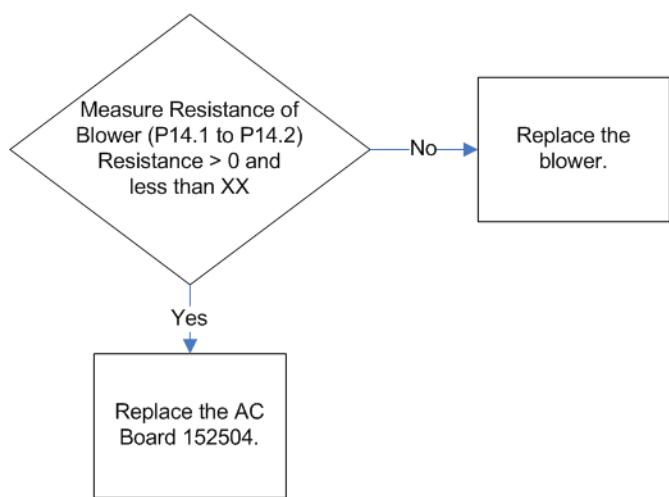


## 2.99 Blower Voltage



## 2.100 Blower Current

2



**NOTES:**

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# ***Chapter 3***

# ***Theory of Operation***

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## **Introduction**

The TotalCare® Bed System, a product of modular design, is made up of mechanical, hydraulic, electrical, and air systems integrated into a flexible platform that helps with the care of patients with comfort and ease. These systems are dependent and interrelated to each other to supply continuous total system operation. The “Theory of Operation” sections gives a basic description of these primary systems.

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## **Bed Frame**

### **Base Frame Module**

The base frame module includes the base frame, casters, brake and steer components, and a lift mechanism. The module includes most of the components of the hydraulic system, air system, and electrical power system.

### **Intermediate Frame Module**

The intermediate frame module connects the articulating deck/weigh frame module to the base frame lifting mechanism. With the diagnostic patient weight option includes, the intermediate frame module becomes the platform on which scale system weight sensing components (load beams) are installed. Anything attached to this frame is not weighed by the scale system. For this reason, IV Rods, drainage bag holders, and other accessories are attached to the intermediate frame.

### **Articulating Deck/Weigh Frame Module**

The articulating deck/weigh frame module includes a segmented deck, on which the sleep surface rests, and a supporting tubular steel frame. The deck is segmented into four sections: the head, the knee, the seat, and the retracting foot. These sections, with the exception of the seat section, may be adjusted under the caregiver’s control to change the patient’s positioning.

If the bed system is equipped with the optional scale system, any item put on the articulating deck/weigh frame will be weighed.

## **Siderail Module**

The Siderail Module (SM) includes the left and right head siderails and left and right intermediate siderails. In the up position, they are intended to make the patient aware of the proximity of the sleep surface edge. The siderails may be lowered below the patient surface to permit patients to enter or exit the bed, and to give a caregiver unobstructed access to the patient. Caregiver controls, patient controls, and entertainment modules are installed on the siderails. The head siderails are installed on the articulating deck head section, and the intermediate siderails are installed on the weigh frame.

## **Headboard Module**

The Headboard Module is a flat stationary panel vertically installed on the weigh frame near the head end. The headboard's intended functions are as follows:

- Hold items on the head end of the bed and off the weigh frame/intermediate frame
- Use as an emergency CPR board

The headboard can be quickly removed in a single step, without tools, by a caregiver to do CPR or to gain access to the patient's head from the head end.

## **Footboard Module**

The Footboard Module (FM) is a panel installed on the foot section of the articulating deck in such a way that it stays perpendicular to the surface of the foot section. The footboard's intended functions are as follows:

- Support the bottoms of the patient's feet in the chair and bed modes to prevent foot drop.
- Use as a surface for patients to reposition themselves.
- Use as a grip areas for caregivers during transport.
- Help keep the patient not slip off the foot end.
- Help prevent unauthorized patient exit from the foot end.

## **Hydraulic System**

### **Basic Description**

The hydraulic system supplies power to articulate the patient deck of the bed system, including raising and lowering the bed. This system consists of a motor-driven pump, a valve manifold, a reservoir for hydraulic fluid, hoses, and hydraulic actuating cylinders.

With the bed system plugged into an appropriate power source, the hydraulic system is activated through the use of the caregiver controls. A bed system equipped with the battery allows the caregiver to articulate the bed system by pumping the foot pedal while simultaneously holding in an articulation switch.

The hydraulic system is a closed system. It does not require fluid refill as part of the preventive maintenance. The hydraulic pump has an output of 0.33 gal/min (0.021 liter/sec) at approximately 500 psi (3447 kPa) and a full load torque (full bypass relief valve pump setting) of 900 psi (6205 kPa).

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## **Theory of Operation**

### **Power Unit**

The hydraulic power unit pressurizes and distributes fluid to the hydraulic cylinders that articulate the frames of the bed system. This unit consists of a motor-driven pump, manifold, reservoir, and an optional foot pump. The bed system's power control module sends power to the pump motor and solenoid valves on the manifold in response to a user's activation of a siderail switch. The manifold valves are energized in order to direct the pressurized fluid from the pump to the appropriate cylinder, or to permit the fluid inside the cylinder to run back to the reservoir.

Two valves on the manifold are mechanically activated without any electrical power. These are for the emergency CPR and Trendelenburg function.

### **Cylinders**

There are six hydraulic cylinders that articulate the frames of the bed system. Four of them—the head, the knee, and lift cylinders are powered in extension only. This causes the downward movement of the frames to depend on gravity, as the movements are not powered in the downward direction. The other two cylinders used for foot extension and articulation are powered both in extension and retraction.

## Hydraulic Manifold Assembly

The manifold assembly selectively directs the hydraulic fluid flow to/from the actuating cylinders for bed system articulating functions: hilow (bed up/down), head up/down, knee up/down, foot in/out, foot up/down, Trendelenburg, Reverse Trendelenburg, CPR, and manual pump. The respective actuating cylinders hold these functions at any specified position.

There are two hydraulic manifold suppliers, Deltrol and Delta. They have slightly different internal designs, but operate the same from a user perspective.

The **Deltrol** manifold consists of six **up or raise** solenoid operated cartridge valves that are interchangeable from function to function, and six **down or lower** solenoid operated cartridge valves that are not interchangeable from function to function. Eight flow control, pressure-compensated valves (P.C. valves) and 12 isolation check valves are non-serviceable items.

The **Delta** manifold consists of eight **up or raise** solenoid operated cartridge valves that are interchangeable from function to function, and eight **down or lower** solenoid operated cartridge valves that are not interchangeable from function to function. Thirteen flow control, pressure-compensated valves (P.C. valves) and 12 isolation check valves are non-serviceable items.

During the bed raise operation, for the applicable energized single-action function switch (head, knee, etc.), the pump motor operates at the same time as the activated raise solenoid valve. For the applicable energized double-action function switch (foot up/down and foot in/out, etc.), a return solenoid valve operates with an activated raise solenoid and pump motor. The hydraulic oil flows through the P.C. valve, the raise solenoid valve, and the actuating cylinder. The cylinder rod extends. The P.C. valve lets a fixed rate of fluid flow to pass through the raise solenoid valve that compensates for a loaded or empty bed. Each P.C. valve function has its own unique flow rate that is factory-set and not adjustable in the field. The use of more than one function at a time does not affect the actuating cylinder speed rate. A rod, lock-up valve does not permit the head actuating cylinder to extend when the foot end of the bed system is loaded. An isolation check valve is installed before each solenoid valve and after the pump. This valve does not permit oil to flow back through the pump when the solenoid valve is energized and the pump is off.

During the bed down operation, the down solenoid valve energizes. This action opens the down valve and lets oil flow out of the cylinder through the down valve to the tank. Built into the down valve seat is a calibrated restrictor orifice to control the down speed. A P.C. valve controls the hilow function down speed. A filter screen on the down valve protects the orifice and keeps the P.C. valve from plugging. The maximum opening on the filter screen is 0.009"

(0.23 mm). The load on the bed system does not significantly affect the down speed, except head and knee, and using more than one function at a time does not affect the actuating cylinder down speed rate. Each function has its own unique restrictor orifice or P.C. valve. The solenoid valves are not interchangeable.

Single acting functions: **Deltrol**, the up and down solenoid valves are normally closed, 2-position, 2-way valves; **Delta**, the up and down solenoid valves are normally closed, 2-position, 3-way valves. These valves are designed and factory-tested for zero leaks across the seat.

Double acting foot functions: **Deltrol**, normally closed 3-position, 4-way valves with pilot pressure operated check valves; **Delta**, normally closed 2-position, 3-way valves with 2-position, 2-way solenoid operated check valves. In the non-energized or normal condition, these valves prevent the load from drifting. The mating parts are made of hardened steel.

### CPR and Trendelenburg Release Valves

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The CPR and Trendelenburg valves, normally closed soft seat valves, unseat against pressure by means of a mechanically operated linkage that pulls the release pin. These two release valves on the bed system are on the front of the manifold.

One of the release valves on the patient left side of the manifold is the Trendelenburg valve. This valve lets hydraulic oil from the head hilow actuating cylinder flow back to the tank. The speed is preset and controlled by an orifice by lifting the pedal on the bed system to actuate the release valve.

The other release valve on the left-hand side of the manifold is the CPR valve. This valve lets hydraulic oil from the head cylinder flow back to the tank. The speed is preset and controlled by an orifice. A Dressed pedal on the bed system actuates the CPR function.

### Manual Hydraulic Control

The hydraulic foot pump raises the bed when there is no wall outlet power. It is not necessary to use the hydraulic foot pump for head down, knee down, or bed down functions. The appropriate caregiver control switch lowers the selected function.

The raise bed functions when you pump the manual hydraulic control foot pedal until the bed system reaches the applicable position. The battery option permits use of the appropriate caregiver controls.

### **Motor (100 V/110 V Only)**

The 120 V hydraulic pump motor used with a 100 mfd capacitor has these specifications:

- 90 V to 110 V AC, 60/50 Hz
- 0.4 hp, 1750 rpm, single-phase
- Intermittent duty
- Thermal reset
- 5.5A—TRMS current at each full load
- Mechanically insulated from all metal parts

### **Motor (120 V/127 V Only)**

The 120 V hydraulic pump motor has these specifications:

- 104 V to 127 V AC, 60/50 Hz
- 0.4 hp, 1750 rpm, single-phase
- Intermittent duty
- Thermal reset
- 5.5A—TRMS current at each full load
- Mechanically insulated from all metal parts

### **Motor (220 V/230 V/240 V only)**

The 230 V hydraulic pump motor has these specifications:

- 207 V to 253 V AC, 60/50 Hz
- 0.4 hp, 1550/1325 rpm, single-phase
- Intermittent duty
- Thermal reset
- 2.8A—TRMS current at each full load
- Mechanically insulated from all metal parts

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## **Electronic System**

### **Basic Description**

The electronic system includes modules, options, and accessories that are primarily made up of electronic components. Information flow between the

electronic modules is primarily accomplished through the use of a twisted pair network channel. The modules are connected in a peer-to-peer fashion which enables any one module to directly communicate with another without the need for a master controller. Each module is then connected to its appropriate sensors or actuators to perform its specific function.

## **Basic Architecture**

### **Power Control Module**

The Power Control Module (PCM) resides in the base frame. It interfaces with the network and directly with the Bed Position Module (BPM). Primary functions of the Power Control Module are as follows:

- Generate the necessary power sources needed by the electronic modules.
- Accept bed system articulation network commands, receive articulating deck section positions via the bed position module, and then control the hydraulic manifold solenoids and pump motor accordingly.
- Receive lockout status information from the network. Bed system articulation requests will be qualified with the caregiver and patient lockout status, present bed positions, and pre-determined logic control of bed system movements to determine which solenoids in the hydraulic manifold should be actuated.
- Provide power to the treatment surface air source motor. This module shall handle all possible AC supply voltage inputs and include all international requirements.
- Supply power to operate the hydraulic solenoids and air manifold actuators when the bed system is not connected to AC supply.

### **Bed Position Module**

The BPM consists of position sensors, safety switches, an emergency Trendelenburg switch, a CPR switch, and a junction P.C. board. It interfaces directly with the power control module.

The junction P.C. board resides in the weigh frame with the sensors remotely mounted on the base frame lift arms and articulating deck section pivots.

Primary functions of the junction P.C. board are as follows:

- Distribute power and the network channel data to all network nodes on the weigh frame and intermediate frame.
- Facilitate the signal distribution to the position sensors and safety switches on the upper frames.

## **User Control Module**

The User Control Module (UCM) resides on the intermediate siderail and sends data to the network node. The caregiver control/indicator panel supplies these:

- Control switches and indicators for caregiver positions, patient positions, nurse call, and light/entertainment selections
- Network node that controls the bed setup switches and indicators—includes sleep surface, night light, patient control back light, and patient exit detection features
- P.C. board for the sleep surface, night light, and patient control back light features that are bundled together on unique overlays
- Network connection for the GCI module

## **SideCom® Communication System Module**

The SideCom® Communication System module supplies the gateway between the network and standard 37-pin sub-miniature SideCom® Communication System interface. It resides in the intermediate frame and connects to the network node and the User Control Module.

## **Scale Module**

The Scale Module (SM) supplies the patient weigh feature, which consists of load sensors and electronics. It receives requests to do different weigh tasks and to report the measurements back to the network node. The Scale Module resides in the intermediate frame. When the Trendelenburg or diagnostic patient weight option, the Intermediate Frame Module (IFM) is the platform where the weight sensing components (load beams) are mounted.

The Scale Module stores operational parameters in the non-volatile memory and achieves a diagnostic level for applications, such as to measure weight change during dialysis.

## **Power Control Module**

### **Basic Description**

The Power Control Module is divided into two primary sections: the power supply, and positioning and power monitoring. The power supply consists of the power control P.C. board, transformer, line filter, full-wave bridge assembly, and battery. The positioning and power monitoring consists of the power control module P.C. board and solenoid actuator coils. The power

control module resides in the base frame module, interfaces with the network, and communicates directly with the bed positioning module.

As a primary function, the power control module supplies the necessary power voltages needed by other electronic modules. Additional functions accept bed articulation network commands, receive articulating deck/weigh frame positions through the bed positioning module, and control the hydraulic manifold solenoids and pump motor. Also, the power control module accepts lockout status information from the network. Bed articulation requests, which position the solenoids in the hydraulic manifold, are qualified by the caregiver and patient lockout status, the present bed position, and a pre-determined logic control of bed movements. The power control module also supplies power to the treatment surface air modules, and handles all AC supply voltage input requirements.

If the bed system is not connected to AC supply voltage, the power control module uses battery-supplied power to operate the hydraulic solenoids and air manifold actuators. The battery also powers the bed status indicators and nurse call feature.

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## Theory of Operation

### Power Control Module P.C. Board

The power control module P.C. board converts AC power to DC power for distribution to all modules in the base, intermediate, and articulating deck/weigh frames. It accepts articulation commands through the network, converting these commands to output functions that control bed movement through the solenoid actuator valves and hydraulic pump. The positioning and power monitoring segment sense and control power lines. Interface to the bed position module is provided by the signal distribution connector. Discrete connections on the weigh frame junction P.C. board are provided for base frame module linear sensors and safety switches. A pass-through connector supplies an access to the air blower assembly from the power control module.

### Filter

The filter section contains 30,000 uf capacitance to filter the DC voltage provided by the transformer and the full-wave bridge rectifier. A resistor to ground supplies a means to discharge the capacitors when AC power is removed. The analog-to-digital (A/D) converter on the power control module monitors the AC power input and indicates when there is no AC power. The filter section output is 23V DC filtered at nominal line and full load conditions.

### **Battery Charger**

The battery charger supplies battery charging and battery condition monitoring for a 12V DC, 7.2A, sealed, lead-acid battery. The battery charger uses two modes to charge the battery: a **constant-75 oma** mode when the battery is partially discharged, and a **float-condition** mode when the battery is nearly-fully charged. The power control module microprocessor determines when to charge the battery in the float-condition mode and instructs the charge disable line to shut off the current and stop battery charging. A test jack is available at the output of the battery charger that furnishes an accurate reading of the battery charge voltage.

### **Battery Latch Relay**

The battery latch, single-pole, single-throw, relay disconnects the bed from the battery when the battery becomes approximately 50% discharged and the bed system is not connected to AC power. The battery, through battery latch relay contacts, disconnects to prevent the battery from becoming deeply discharged and to increase the life of the battery.

The battery latch relay also protects electronic components by interrupting the bed operation to maintain valid operation when module voltage falls below minimum input voltage. The power control module A/D converter monitors the battery voltage to determine the charged condition of the battery. A reverse-voltage diode minimizes damage if the battery is not properly installed.

### **8.5V Regulator**

The 8.5V regulator converts 23V DC or 12V battery voltage to 8.5V DC. The 23V DC and 12V battery voltages are rectified by a diode before being applied to the power control module circuit. The regulator keeps the power output at 8.5V DC without interruption if the bed is unplugged or a brownout occurs. The regulator converts voltage approximately 85% efficiency. If the duty cycle exceeds 95%, the regulator enables the short circuit protection (crowbar) circuit. The short protection circuit turns the FET off and keeps the short on the output from overstressing the FET. The power control module A/D converter monitors the 8.5V DC, and when the 8.5V DC is no longer being supplied, the A/D converter furnishes a signal to sound an audible alarm.

### **8.5V Crowbar**

The 8.5V crowbar circuit monitors the output of the 8.5V regulator. In a single fault condition, if the FET shorts or the gate drive remains on, the 8.5V crowbar circuit limits the output of the 8.5V regulator to 27V DC. If the output voltage exceeds approximately 15V DC, the silicon controlled rectifier in the crowbar circuit draws enough current to open the 7A fuse that supplies the

FET with its nominal 23V DC. The crowbar circuit prevents any damage to the assemblies that use the 8.5V DC generated from the power control module.

### **15.5V Regulator**

The 15.5V regulator converts 23V DC or 12V battery voltage to 15.5V DC. The 23V DC and 12V battery voltage is rectified by a diode before the input is applied to the power control module circuit. The regulator keeps the power output at 12 to 15.5V DC without interruption if the bed is unplugged or a brownout occurs. The regulator converts voltage at approximately 85% efficiency. If the duty cycle exceeds 95%, the regulator enables the short circuit protection circuit. The short protection circuit turns the FET off and keeps the short on the output from overstressing the FET. The power control module A/D converter monitors the 15.5V DC, and when the 15.5V DC is no longer being supplied, the A/D converter furnishes a signal to the **Service required** indicator.

### **Night Light Control**

The night light control turns the voltage on and off to the night light. The transformer supplies 14V AC to the power control module. A triac changes the voltage to on and off states. The **neuron** controls logic voltage levels through the logic control (FPGA).

### **Hydraulic Pump Motor Control**

The hydraulic pump motor control turns the voltage on and off to the hydraulic pump motor. The hydraulic pump motor operates from AC line voltage. This circuit is isolated from the low voltage DC controls by a relay on the PCM.

### **Power Distribution**

The power control module performs as a junction board for the AC line voltages. The primary fuse is in this section and protects these AC line components: hydraulic pump motor, air blower motor, and the transformer that generates low level voltages required by the bed. The connectors are configured to make sure proper connection to the power control module board.

### **VBB/15V VBAT Relay**

The double-pole, single-throw (DPST) relay during battery operation lets the power control module to remove control module voltages that are not needed, except for the first 30 seconds to position control circuits after AC power removal. The **neuron** and the AC failure detection circuits directly control the VBB/15V\_BAT relay.

### **AC Failure Detector**

The AC failure detector recognizes when AC power has been removed from the bed. The AC failure detector supplies an output logic level signal to the PIC microcontrollers to indicate a loss of AC power. When power failure indication is received, the PIC microcontroller notifies the **neuron** to turn off the VBB/15V\_BAT relay. After restoration of AC power, the detector circuit also restarts the Pulse Width Modulation (PWM) circuit without disabling the short circuit protection.

### **Master Microcontroller (Neuron)**

The master microcontroller consists of an echelon **neuron** that mediates the data transfer from the power control module to all other modules within the TotalCare® Bed System through the network transceiver via the signal distribution, LON expansion and scale/patient exit detection (PED) connectors. The primary function of the **neuron** is to control bed articulations through Pulse Width Modulation (PWM), solenoid-actuator, and controlled outputs from the logic control (FPGA). The **neuron** controls the on and off state of the VBB/ 15V\_VBAT power supply. The **neuron** also supplies the memory-mapped address signals and data flow through the logic control (FPGA) to/from the slave microcontrollers (PIC) parallel slave port. It also supplies frequency control of the piezo audible alarm device, program control of FPGA, and SPI interface control to a serial EEPROM and patient exit detection module (PEDM). Finally, the **neuron** reads the status of each safety switch through the logic control (CPLD).

### **Serial EEPROM**

The serial EEPROM stores critical data parameters that may be lost during power fluctuations. The **neuron** controls the serial EEPROM through the SPI bus interface.

### **Scale/PED Connector**

The scale/PED connector interfaces with the Scale Module and Patient Exit Detection (PED) module. The **neuron** connects to the scale/PED P.C. boards through the SPI bus interface and LON expansion connectors.

### **LON Expansion Connector**

The LON expansion connector supplies an expansion capability for future module designs. It interfaces directly with the **neuron**.

### **Power Control Signals**

The power control signals from the **neuron** and microcontroller (PIC) control the on/off states of the VBB/15V\_VBAT relay, hydraulic pump, night light, and BATT VOLT relay.

### **Solenoid Voltage Supervisor (FET)**

The Solenoid Voltage Supervisor (FET) supplies single fault protection from circuit failure of unassisted articulated movement. It connects directly to 15V\_VBAT and supplies voltage to the solenoid actuators through the high side switch. The microcontroller (PIC) controls the FET via request from the **neuron**. The FET enables closed loop control of the solenoid actuators. If the **neuron** fails, the microcontroller (PIC) disables the FET, turning off power to all solenoid actuators.

### **Piezo Device**

The piezo device is the source of audible tones, providing audible tones at frequencies between 100 Hz to 4 kHz. It uses a redundant voltage supply VBAT diode or 15V\_VBAT as short circuit protection. The **neuron** controls the piezo frequency and duty cycle.

### **Network Transceiver**

The network transceiver supplies the RS-485 network serial communication control signals to the signal distribution connector. The transceiver supplies the communication interface from the power control module to all other modules connected to the LON network.

### **Slave Microcontroller (PIC)**

The slave microcontroller's (PIC) primary function is normalizing position sensing information from the bed position module and monitoring power supply voltages. The position information channels through the analog multiplexer (MUX) from the switch and sensor connector and signal distribution connector. The slave microcontroller monitors the power monitoring and sensing signals. It supplies the pulse width modulated (PWM) frequency to the logic control (FPGA). In addition, it directly drives the solenoid voltage supervisor (FET) for the solenoid high side voltage and drives the hydraulic pump upon requests from the **neuron**. If power fails, the slave microcontroller (PIC) notifies the **neuron**.

### **Power Monitoring and Sensing Signals**

The power monitoring and sensing signals provided from the power supply section of the power control module are VBATT\_15V\_MON, BATT\_VOLT\_MON, VBATT\_8.5V\_MON, AC\_FAIL, and

BATTERY\_STATE. These signals detect out-of-tolerance voltage conditions and generate indications for **Service required** and early warning statuses.

#### **Night Light Sensor Connector**

The night light sensor connector supplies 5V DC power and interfaces with the photo sensing device. The sensor output signal connects directly to the analog multiplexer (MUX), and then to the microcontroller (PIC) which detects the amount of ambient light within a patient environment, and controls the operation of the night light on/off switch.

#### **Logic Control (CPLD)**

The logic control (CPLD) supplies the solenoid actuator control logic, safety switch interface, network termination interface, and night light control output. It mediates the protocol and data flow between the **neuron** and the microcontroller (PIC). The microcontroller (PIC) sends a Pulse Width Modulated (PWM) signal to the logic control (FPGA), which divides the PWM signal by 2 and selects for transmission, reception or processing (gates) the 12 solenoid output driver bits.

#### **Solenoid MOSFET Drivers**

The solenoid MOSFET drivers are **low** side n-channel switches that accept logic-level signals from the logic control (FPGA). Solenoid control bits turn the solenoid MOSFET drivers on or off through solenoid connectors that output to solenoid actuator pairs. A p-channel voltage supervisory MOSFET supplies **high** side power to the solenoid actuator coils. When disabled, the solenoid voltage supervisor (FET) overrides all solenoid MOSFET drivers in the circuit. The logic control (FPGA) and drivers allow the solenoid actuator coils to pull in with full supply current, and then drop down to a holding current. The logic control (FPGA) divides the pulse width modulated (PWM) signal provided by the microcontroller (PIC) into two time-sliced 31.25 kHz, 50% duty cycle PWM signals. This feature conserves the power supply and battery energy. The solenoid MOSFET drivers power the  $16\Omega$  nominal, actuator coils. The pull-in current is approximately 1A and drops approximately 400 mA under PWM control.

#### **Pulse Width Modulation (PWM)**

The pulse width modulated (PWM) signal is a continuous 62.5 kHz, 87.5% duty cycle PWM signal from the microcontroller (PIC) that is sent to the logic control (FPGA). The PWM signal is divided by the logic control (FPGA) into two time-sliced 31.25 kHz, 50% duty cycle PWM signals. The PWM signals gate 12 solenoid output driver outputs. The **neuron** enables or disables the PWM signal.

### **Solenoid Actuator Connector**

The solenoid actuator connector interfaces the low side switching voltages with these solenoid actuator coils: Head Hilow Up, Head Hilow Down, Foot Hilow Up, Foot Hilow Down, Foot In, Foot Out, Foot Down, Foot Up, Knee Down, Knee Up, Head Up and Head Down. This connector also allows a signal common for the high side drive which means that individual high side commons are connected in a daisy chain configuration at the actuator through the solenoid actuator cable assembly.

### **Brake-Not-Set Switch Connector**

This **Brake not set** safety switch connector supplies 5V DC power and interfaces with the **Brake not set** safety switch, which detects if the brake mechanism is not engaged. The safety switch output goes to the logic control (CPLD), and then to the **neuron** which reads the signal status. The switch is on the base frame, but it is a component of the BPM, which is on the weigh frame.

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### **Head/Foot Hilow Sensor Connector**

This Head/Foot hilow connector supplies 5V DC power and interfaces with the Head and Foot hilow position sensors. The sensor output signals connect directly to the analog multiplexer (MUX), and then to the microcontroller (PIC), which senses the position of Bed Hilow and Trendelenburg angles. The sensors are on the base frame, but they are components of the bed position module (BPM), which is on the weigh frame.

### **Analog Multiplexer (MUX)**

The Power Control Module contains two 8-channel, analog multiplexer (MUX) devices for bed positioning and power monitoring. One of the two MUX devices receives linear positioning sensor inputs. The second MUX device receives data from monitored voltages, patient exit sensors, and the night light photo sensor. Each MUX device has two outputs that connect to Analog-to-Digital (A/D) converter input channels of the microcontroller (PIC).

### **VBAT Voltage**

The power supply section of the power control module P.C. board produces the VBAT voltage that is nominally 8.5V DC. This voltage is present any time the bed is connected to an AC source. If the battery is working correctly, the battery supplies 8.5V DC for the VBAT voltage. The VBAT voltage supplies the power control module, scale module, and both caregiver positioning modules. The regulator voltage output goes through a protective fuse to the weigh frame junction P.C. board. The fuse protects the wiring in the bed and allows continued operation of the bed if the fuse opens. The remaining modules use different outputs to keep the bed operational.

### **VBB Voltage**

The power supply section of the power control module P.C. board produces the VBB voltage that is nominally 8.5V DC. This voltage is present any time the bed is connected to an AC source. If the battery is working correctly, the VBB voltage remains present for an additional 30 seconds after the AC power is unplugged from the bed. This allows the modules that use the VBB voltage to return to a safe condition after loss of AC power. The regulator voltage output goes through normally-closed relay contacts and a protective fuse to the weigh frame junction P.C. board. The fuse protects the wiring in the bed and allows continued operation of the bed if the fuse opens. The remaining modules use different outputs to keep the bed operational.

### **15V BAT Voltage**

The power supply section of the power control module P.C. board produces the 15V\_BAT voltage that is nominally 15.5V DC. This voltage is present any time the bed is connected to an AC source. If the battery option is present, the battery supplies 12V DC for the 15V\_BAT voltage. The 15V\_BAT voltage supplies the power control module, scale module, and both caregiver positioning modules. The 15V\_BAT voltage output goes through a protective fuse to the weigh frame junction P.C. board. The fuse protects the wiring in the bed and allows continued operation of the bed if the fuse opens. The remaining modules use different outputs to keep the bed operational.

### **15V Voltage**

The power supply section of the power control module P.C. board produces the 15V voltage that is nominally 15V DC. This voltage is present any time the bed is connected to an AC source. The 15V voltage remains present for an additional 30 seconds after the AC power is unplugged from the bed. This allows the modules that use the 15V voltage to return to a safe condition after loss of AC power. The regulator voltage output goes through normally-closed relay contacts and a protective fuse to the weigh frame junction P.C. board. The fuse protects the wiring in the bed and allows continued operation of the bed if the fuse opens. The remaining modules use different outputs to keep the bed operational.

### **5V Regulator**

The 5V regulator converts the VBAT voltage produced by the power supply section of the power control module to a nominal voltage of 5V DC. The voltage regulator supplies voltage for all logic devices residing in the positioning and power monitoring section of the power control module, as well as the night light and relays. It also supplies the reference voltage to the analog-to-digital (A/D) converter in the slave microcontroller for position

sensing and power monitoring. The signal distribution connector delivers supply voltages to the safety switches and position sensors in the BPM.

#### **Power Monitor/Reset**

The power monitor/reset line detects a low voltage output condition on the 5V power supply. When a low voltage condition or power supply fault occurs, the power monitor/reset line drives “low” and applies a low signal to the **neuron**, logic control (CPLD) and microcontroller (PIC). When the voltage trips after  $350 \pm 100$  ms, the threshold drives the reset line to “high.” The threshold voltage is 4.65V DC.

#### **Signal Distribution Connector**

The signal distribution connector supplies the signal and 5V DC interfaces to/from the bed position sensors and safety switches. It also supplies connection to the LON network via the BPM junction P.C. board. It routes the air source blower speed control signals to the air source control connector.

#### **CPR/Emergency Trendelenburg Activated Switch Connector**

The CPR/Emergency Trendelenburg activated switch connector supplies the interface from the CPR activated switch. The switch is on the base frame, but it is a component of the bed position module (BPM).

#### **Air Source Control Connector**

The air source control connector supplies the interface from the weigh frame junction P.C. board to the air source blower assembly through the signal distribution connector. The air source blower assembly is on the base frame, but it is a component of the modular therapy system.

#### **Solenoid Actuator Coils**

The solenoid actuator coils are electro-mechanical inductive devices that control specific articulated movements of the bed system. The pulse width modulated (PWM) signal opens and closes the solenoid actuator coils on the low side of the solenoid MOSFET drivers. The ESR of the actuator coils is 15 to  $17\Omega$ .

### **Bed Position Module**

#### **Basic Description**

The bed position module (BPM) consists of position sensors, safety switches, CPR switch, and a weigh frame junction P.C. board. The P.C. board distributes power and the network channel data to all network nodes. It facilitates the

signal distribution to the position sensors and safety switches. The P.C. board resides in the articulating deck/weigh frame module with the sensors remotely mounted on the base frame lift arms and articulating deck/weigh frame pivots. The BPM interfaces directly with the power control module (PCM).

## **Theory of Operation**

### **Weigh Frame Junction P.C. Board**

The weigh frame junction P.C. board distributes power, signal, and the network data to all modules in the upper frame, left and right User Control Modules, left and right GCI module, treatment surface, and SideCom® Communication System modules that have two network connection points to allow for inclusion in the network loop. The network is provided as a stub to the auxiliary network port. The network terminator jumper block supplies the means to include the treatment surface and SideCom® Communication System modules in the network.

### **Power Connector**

The power connector accepts power from the power control module on the base frame. Ground is distributed on the P.C. board through an inner layer ground plane. The switches and sensors receive 5V DC, via the switch and sensor connector.

### **Signal Connector**

The signal connector interconnects signals that traverse to the base frame module. Primarily it connects all switch and sensor signals to the power control module. It also supplies the network and treatment surface blower control signal connections.

### **Network Terminator Jumper Block**

The network terminator jumper block allows configuration of the network. If a treatment surface module is plugged into the connector, the jumper block positions the treatment surface module in the network loop. If a Treatment Surface Module (TSM) is not plugged into the connector, the jumper block connects the network input and output signals present at the treatment surface connector together. The SideCom® Communication System module in a similar fashion uses an identical jumper block. A signal is distributed serially through the treatment surface and SideCom® Communication System modules to detect their presence. Thus, the Power Control Module detects when the jumper blocks are positioned to include the modules but are not present, which is an improperly terminated network.

#### **Treatment Surface Connector**

The Treatment Surface connector supplies an interconnect point for power, signal, and the network to all treatment surface modules. The signal portion of the treatment surface connector consists of treatment surface modules that control the air blower residing on the base frame.

#### **SideCom® Communication System Connector**

The SideCom® Communication System connector supplies an interconnect point for power, signal, and the network to the SideCom® Communication System module. The audio channels and the volume control signals travel to the siderails and to the auxiliary port for future considerations.

#### **Left and Right Intermediate Siderail Connectors**

The left and right intermediate siderail connectors are interconnect points for power, signal, and network control signals that are needed for intermediate siderail controls. The signals consist of the head siderail hilow switch and the volume control. Two network connections keep the right intermediate siderail and the GCI in the network loop. A network connection keeps the left intermediate siderail in the network loop, and it contains the network termination resistor.

#### **Left and Right Head Siderail Connector**

Left and right head siderail connectors provide interconnect points for the hilow switches and speakers in the head siderails. The hilow switch inputs connect to the intermediate siderail node while the speaker connects directly to the SideCom® Communication System connector.

#### **Auxiliary Network Connector**

The auxiliary network connector supplies power, signal, and the network to remote modules that include the patient control pendant, interactive television pendant, and diagnostic tools. The signals consist of the SideCom® Communication System module's speaker right and volume control channels.

#### **Switch and Sensor Connector**

The switch and sensor connector supplies power for the safety switches and bed position sensors in the base frame. Signals from safety switches and bed position sensors return to the connector.

#### **Head, Knee, Foot Articulating and Foot Retract Linear Sensors**

The head, knee, foot articulating, and foot retract linear sensors sense the positions of the articulating deck for the head, knee, and foot sections.

**Bed and Foot Hilow Linear Sensors**

The bed and foot hilow linear sensors sense the height and angles of the intermediate frame for the bed and foot sections.

**Remove Ft Board Detection Switch**

The remove footboard detection switch detects the presence/absence of the footboard on the bed.

**CPR Activated Switch**

The CPR activated switch detects the activation of the CPR pedal.

**Emergency Trendelenburg Switch**

The Emergency Trendelenburg switch detects the articulation of the Emergency Trendelenburg pedal.

**Brake Not Set Switch**

This Brake not set switch detects the state of the brake.

## **Scale Module**

**Basic Description**

The scale module (SM) supplies the patient weighing features. Its main components are the load beam sensors, software, and electronics. The Scale Module measures the voltage from the load beam sensor and generates a voltage proportional to the applied force or load.

The scale module software computes the weight on the bed, and supplies weigh, zero, calibration, set weight, and patient exit detection functions that are initiated via network commands. The scale module hardware and P.C. board assembly contain and support these:

- High resolution A/D converter
- Analog multiplexer for selecting the appropriate beam signal
- Regulated power supply
- Serial EEPROM for nonvolatile memory
- Echelon 3150 microcontroller that supports circuitry, such as EEPROM, reset, and oscillator

### **Load Beams**

The load cells in the scale system generate a 2.6 mv signal for 600 lb (271 kg) of applied load. The bridge excitation or supply voltage adjusts the magnitude of the response. This magnitude value is multiplied by 2.6 mv. For example, if the bridge excitation voltage is 10V, the voltage will be 26 mv at 400 lb (180 kg). If the reading from a load cell with a 10V DC excitation voltage is 10 mv, then the applied weight is  $(400/26 \text{ mv}) \times 10 \text{ mv} = 153.85 \text{ lb (69.28 kg)}$ .

These sensors have a linear response, which simplifies calibration and predicts their behavior. There are four load beams. Each is installed near the corner of the bed. They are identified by bed corner locations: right head, left head, left foot, and right foot, which are referenced by a patient's position when laying on their back. The scale electronics scan the signals from all four beams, and divides each beam signal by a scaling factor to convert from voltage, or A/D counts, to weight. The software then combines the four weight or beam readings and sends this value to the network.

### **Calibration**

Before the scale is used, it must be calibrated. The system is calibrated by placing a known weight on the bed at four positions and recording beam readings which are used to generate a matrix. It is important that the scale is calibrated with the bed as a system, so scale electronics, frame effects, and beam variations are calibrated out of the system. The calibration weight represents the maximum load the beam will see in normal operation. Before a calibration, the bed is zeroed, and then the calibration weight is moved to four corners of the bed, readings are recorded, and a matrix is generated. At the end of the calibration, the matrix is solved for the calibration coefficients, which are stored in nonvolatile memory.

## **Theory of Operation**

### **Load Cell**

A load cell generates an output that is proportional to the applied weight or force.

### **Scale Module P.C. Board**

The scale module P.C. board assembly contains the electronics required to interface between the load cells and the network. The scale module P.C. board supplies the bridge excitation voltage for the load cell sensors. The A/D converter converts the sensor output to digital representation. The analog multiplexer selects the load cell to be digitized by the A/D converter. The network microcontroller reads the A/D converter digital output.

**Digital Power Supply Regulator**

The digital power supply regulator supplies a regulated 4.75 to 5.25V DC power supply voltage.

**Analog Supply Regulator**

The analog power supply regulator supplies a regulated 4.75 to 5.25V DC power supply voltage.

**Analog Supply Negative Regulator**

The analog power supply regulator supplies a regulated negative 4.75 to 5.25V DC power supply voltage.

**A/D Converter**

The A/D converter measures an analog input voltage and supplies a digital number, which is proportional to the analog input voltage amplitude. The resolution is 16 bits which supplies a range of 0-65535 counts.

**Analog Multiplexer**

The analog multiplexer selects one of the four load cell signals and inputs to the A/D converter. The network microcontroller selects the control signals to determine the appropriate load cell.

**Power Monitor**

The power monitor holds the network microcontroller in a reset condition until the regulated power supply is functional.

**EEPROM**

The serial EEPROM supplies nonvolatile memory storage for preservation of data if power is removed.

**Network Microcontroller**

The network microcontroller executes programmable instructions to control the analog multiplexer, A/D converter, EEPROM, and network communications.

## **Graphical Caregiver Interface (GCI)® Control**

### **Basic Description**

The GCI module supports the diagnostic patient weight options, and treatment surface accessories. It uses a graphic display along with a software menu

structure to provide full caregiver interaction. The GCI automatically recognizes what supported features are on the bed and supplies the appropriate controls to the user. The GCI is located on the intermediate siderails and electrically connects to the network.

## Theory of Operation

### Graphical Caregiver Interface (GCI)® Control P.C. Board

The GCI P.C. board supplies a user interface that consists of Liquid Crystal Display (LCD) and touch screen. The GCI translates user input into bed functions that are furnished to the network via the echelon network controller. The GCI P.C. board also supplies a real-time clock and nonvolatile memory.

## User Control Module

3

### Basic Description

The user control module (UCM) supplies control switches and indicators that are used by caregivers for patient positioning and lockouts. The UCM module accepts data from these siderail modules: nurse call, patient lighting and entertainment, patient positioning, enhanced entertainment, patient exit and detection, and mattress modules. The UCM, an echelon-based node, uses RS-485 interface to communicate to other nodes on the TotalCare® Bed System. The UCM supplies the RS-485 network connection for the GCI. The user control modules reside in the intermediate siderails and connect to the network.

These caregiver controls are on the caregiver control siderail panels: Head Up/Down arrows, Knee Up/Down arrows, Foot Up/Down arrows, Foot adjust extend/retract arrows, Boost button, chair symbol, Trendelenburg/Reverse Trendelenburg symbols, flat symbol, lock symbol, Lockouts—Knee, Head, Hi-Lo, and Foot on the intermediate siderails. The Bed up/down controls are on the outside of the head siderail.

These indicators are on the caregiver control siderail panels: Brake not set, Remove ft board, Unplugged, battery condition Charged/Low, Service required, and Lockouts—Knee, Head, Bed up/down, and Foot.

### Basic Architecture

#### Nurse Call Control Assembly

The nurse call control assembly supplies three nurse call switches on each siderail. Two switches are on the patient side of the rail. One is primarily used when the bed is in the bed configuration, and the other switch when the bed is configured in the chair position. The third nurse call switch on the caregiver

side of the rail is used primarily by the caregiver. Each nurse call switch is back lighted when the SideCom® Communication System module is present. Each nurse call switch has an Nurse answer indicator that blinks when a nurse call signal has been placed. Once the call has been answered, the light remains on indicating an open microphone.

The nurse call assembly also includes a speaker.

#### **Patient Articulation Assembly**

The patient articulation assembly supplies the patient with four switches on the intermediate siderail. These switches provide the patient with these arrow functions: Head Up, Head Down, Knee Up, and Knee Down. The Head Up/down switches are back lighted. The back lighting indication comes on when the bed is plugged into an AC power outlet.

#### **Patient Entertainment Assembly**

The patient entertainment assembly supplies the patient with four switches on the intermediate siderail. The entertainment switches provide the patient with these functions: Room light, Read light, Music, TV up/TV down. The room and read light switches are back lighted. The back lighting comes on when the bed is plugged into AC power outlet. There is a volume control included with this module.

#### **Enhanced Entertainment Assembly**

The enhanced entertainment assembly supplies the patient with two additional switches used for enhanced entertainment features. This module is used on both left and right siderails.

#### **Treatment User Control Assembly**

The treatment user control assembly supplies the caregiver with the controls to use the treatment surface option. It supplies the caregiver with these controls: Max-Inflate with indicator, Normal with indicator, and Alarm Silence with indicator.

#### **Bed Up/Down Assembly**

The Bed Up/down assembly on the head siderail contains two switches: Bed up and Bed down. The assembly connects to the weigh frame junction P.C. board.

## Theory of Operation

### Power Supply Circuit

The power supply circuit regulates the VBATT voltage supplied by the PCM, to provide the 5V digital voltage used by the UCM. VBATT voltage keeps the siderail controls active when AC power is removed, and the battery option is present.

### PTC Circuit

The PTC supplies protection to limit the current drawn by the UCM to 500 mA.

### Low Voltage Monitor

The low voltage monitor circuit monitors the 5V supply voltage and holds the echelon in reset when the power supply voltage falls below a safe operating level.

### RS-485 Transceiver

The RS-485 transceiver uses the RS-485 protocol and operates at 78.5 kHz. This circuit contains transzorbs to help protect against Electrical Static Discharges (ESD) events.

### Row Selection Logic

Due to the limited I/O lines on the echelon, row selection logic adds 16 rows of additional circuitry. The UCM has the capability to read up to 58 different switches.

### Caregiver/Patient Control Switch Matrix

The caregiver/patient control switch matrix contains up to 58 switches that are located on the UCM or subassemblies. Two switches pressed at the same time are always valid. If three or more switches are pressed at the same time, the UCM does not propagate any switch closures. Exceptions are pressing of the Enable key and any nurse call switches that close no matter how many other switches have been pressed. Certain combinations of switches used for calibration and diagnostics are also valid. These switch combinations are limited to rows of switches located on the caregiver controls.

### LED Display Driver

The echelon microcontroller communicates to LED display drivers via an SPI interface. These display drivers control up to 66 different LED indicators. The indicators are on the UCM P.C. board or any of the sub-modules. The

brightness of the LED indicators may be varied by hardware changes of replacing a single resistor or by software changes that only provide a limited control of LED brightness.

#### **Echelon 10 MHZ Circuit**

The UCM uses an Echelon microcontroller to run the application code and provide communications within the network. When the voltage hits 4.75V, the 5V supply voltage resets using the power-on reset and low voltage detecting circuits to place the Echelon microcontroller in the reset mode. The application code for the node stores into a one-time, 32K x 8 programmable Read Only Memory.

#### **Speaker**

The speaker supplies nurse call and entertainment audio to the bed from the Nurse call system. It is also used as a microphone to allow the patient to speak to a caregiver over the nurse call system.

#### **Volume Control**

The volume control on the patient entertainment UCM controls the volume level to each speaker. The volume control does not turn off the nurse call audio to the bed.

#### **Column Verification Circuitry**

The column verification circuit supplies the UCM the ability to toggle the I/O lines 4 through 7 and to make sure that the neuron reads the closure of the switches.

#### **ESD Protection**

The Electrical Static Discharge (ESD) protection circuits protect the row selection logic outputs and the column inputs from ESD events. These output/input lines have an increased chance of an ESD event because the components are located on the siderails and connected by cable assemblies.

#### **Row Verification Circuit**

The row verification circuit verifies that the proper row has been selected. It confirms that the hardware is performing the operation that the software is requesting. If a fault is detected, no switch closures occur.

### **Bed Exit Alarm**

The SideCom® Communication System module communicates a Patient Exit Detection alarm condition input from the network to the central nursing station.

The GCI supplies a visual alarm when a Patient Exit Detection alarm condition is received from the network.

The GCI displays an alarm message regarding system malfunctions.

The UCM and SideCom® Communication System module output a nurse call alarm signal to the facility information system network after the control is pressed as part of the nurse call control option.

## **SideCom® Communication System Module**

**3**

### **Basic Description**

This module supports the TotalCare® Bed System echelon network image for all module input software variables.

The SideCom® Communication System module supplies the gateway between the network and the standard 37-pin, sub-miniature, SideCom® Communication System interface. It connects to the network node and the UCM, and resides in the intermediate frame.

The SideCom® Communication System module consists of the interface connectors and P.C. boards. With the bed system in any position, the auxiliary network port located on the SideCom® Communication System module at the head end of the intermediate frame is easily accessible.

### **Theory of Operation**

#### **Patient Lighting/Entertainment**

When the bed system is equipped with the patient lighting/entertainment control option, after the patient presses an entertainment/lighting switch, control signals with entertainment/lighting data are sent to the facility information system interface. The SideCom® Communication System module outputs the lighting/entertainment control signal to the facility information system interface within 500 ms.

#### **Nurse Call**

When the bed system is equipped with the nurse call option, after pressing a nurse call switch, the UCM and SideCom® Communication System module

output a nurse call alarm signal to the facility information system network within 500 ms.

The SideCom® Communication System module supplies direct connections between the facility audio channels and the UCM speakers and volume control via the BPM.

#### **Patient Exit Detection**

When the bed system is equipped with the Patient Exit Detection option, SideCom® Communication System module with remote Patient Exit Detection is available. The SideCom® Communication System module communicates a Patient Exit Detection alarm condition input from the network to the central nursing station. The local and/or remote Patient Exit Detection alarm activates within  $\pm 1$  s of the selected delay setting.

The Patient Exit Detection module consists of a sensor(s) on the intermediate frame that detects the presence of the patient in the bed. The sensed exit data is fed to the SideCom® Communication System module and to the facility information system interface P.C. board, or fed to the network node through the weigh frame junction P.C. board. Upon receiving a Patient Exit Detection signal, the SideCom® Communication System module signals the nurse call (remote alarm state), and initiates audible and visual alarms (local alarm state).

When the Patient Exit Detection is armed, a communication failure between the Patient Exit Detection feature and the SideCom® Communication System module automatically places a nurse call signal to the facility information system.

#### **Periodic Alarm**

If the bed exit system is armed, the bed system sounds the periodic audible alarm when periodic communications between the power control module, scale module, and SideCom® Communication System module fail.

#### **Interactive Television Control Pendant**

The interactive television control pendant module connects to either the auxiliary network port or the weigh frame junction P.C. board.

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## **Air System**

### **Basic Description**

The air system consists of components and enclosures required to generate and distribute pressurized air to the control modules. The system consists of a

blower housed in the base, air plumbing, control modules, and an air manifold. The blower supplies pressurized air and a vacuum, which are piped through the air plumbing to the air manifold. The air manifold distributes the air to the control modules, which are housed in the manifold. The control modules contain the valves necessary to maintain the proper air pressure in the bladders.

### **Blower Description**

The blower is housed inside of a blower box on the base, which is designed to reduce noise and allow intake air to be filtered. The blower supplies pressure and vacuum to the air manifold. The blower is an AMETEK multifunction brushless DC blower with an internal control board. The blower board converts 115V AC signal, and a 0-12V DC incoming signal into a speed control signal. The internal control board is responsible for driving the blower. The blower pressure level is monitored through a pressure tap in the air manifold. The blower pressure is maintained at the proper level by an algorithm (mathematical formula) based upon the output of the manifold pressure sensor measured in the Treatment Foot Surface Control Module (TFSCM) and the applicable pressure. The blower speed is increased or decreased in response to the comparison of these two electrical signals. The blower is equipped with a thermal shutoff circuit. If the temperature exceeds the limit, the thermal shutoff circuit removes power from the blower.

### **Air Plumbing Description**

The air plumbing consists of two 1.25" (3.18 cm) ID hoses running from the blower to the air manifold. The hoses run inside the base of the bed until reaching the foot end lift arms. The line delivering pressure to the manifold is routed up the foot end lift arm on the patient's left side. The vacuum line is routed up the foot end lift arm on the patient's right side. Both hoses contain a section of retractable hose to pass across the shearless pivot area of the bed. The hoses terminate at the inlets to the air manifold.

### **Air Manifold**

The air manifold receives supply air from the air plumbing and acts as an accumulator and distribution point for the pressure and vacuum. The manifold contains seven supply ports for pressure and seven supply ports for vacuum. Five sets of ports are dedicated to the removable control modules and have shutoff valves to prevent leaks if the removable control modules are not installed. The other two sets of ports are for the TFSCM and the Treatment Surface Control Module (TSCM).

The manifold also acts as the base support for all of the control modules. Each control module can be inserted into only one specific position in the manifold. When the control module is properly inserted, the manifold supply ports

provide pressure and vacuum to the module and also provide a manifold bulkhead. The manifold bulkhead allows the control modules to be properly connected to the sleep surfaces.

The air manifold also has a pressure and vacuum tap located near the TFSCM. These taps allow the TFSCM to monitor and control the pressure being supplied to the manifold.

### **Control Modules**

The control modules consist of components and enclosures required to direct and control the airflow from the air source to the patient surfaces as required for specified functions. Control modules dock to the air manifold and articulating deck/weigh frame. The TFSCM regulates the air pressure in the foot section air cushion modules. And, the TSCM regulates the air pressure in the head and thigh section of the air cushion modules.

The control modules consist of a set of valves, actuators, pressure transducers, and electronic P.C. boards. They are responsible for maintaining the proper air pressure in the sleep surface zones. Each zone can be controlled to an independent amount of pressure. The control modules are designed to control a specific number of zones. The TFSCM and the TSCM both control three zones.

The control module works by receiving pressure and vacuum supply from the air manifold and using this as the supply for a set of valves. Each zone has a linear actuator positioned between a pressure and vacuum valve. If that zone requires pressure to be increased, the actuator moves to the pressure valve and activates it. If vacuum is needed, the actuator moves to the vacuum valve and activates it. Once the proper pressure is achieved, the actuator moves to a position of not activating either valve.

The valves are directly plumbed to the sleep surface zone and also to a pressure transducer in the control module. The pressure transducer senses the pressure in the sleep surface zone. Through the use of a complex algorithm, the electronic P.C. board converts this pressure into a new set position for the linear actuator. While the bed is on, the pressure is continually controlled to a specific level.

### **P500 Air System**

The air system contains these components: air mattress, pneumatic system, control board, scale system, and the air board software, which manages the entire operation of the above items.

The air mattress contains five air bladders: head, seat, heel, left turn assist and right turn assist. The head, seat, and heel bladders are used to support the patient. The left and right turn assist bladders are used to aid the caregiver in turning a patient in order to change linens or reposition the patient.

The pneumatic system consists of the pneumatic valves, air compressor, MCM blower (for MCM models), and mattress connector. The control board and software currently support two different valve types. The SMC pneumatic valves are a pilot pressure operated valve. They pull very little current due to their pilot operation; however, the pilot pressure must be maintained in order for the valves to work correctly. The second type is the MAC valve which has a standard solenoid construction. The MAC valves draw much more current than the SMCs and therefore; the MAC valves are pulse width modulated after the valve has been actuated to reduce the amount of current draw. The power supply board controls the air compressor. The air system commands the power supply to turn on the compressor by the CAN network. The mattress connector has a hall effect sensor so as to detect the presence of the air mattress.

The air control board has the hardware to activate the valves, read pressures from the air bladders, detect the presence of the air mattress, give an audible alarm to the caregiver, store operating variables in non-volatile memory, measure valve currents and supply voltages, and measure head angle.

The compressor is housed in a box in the base frame. It is designed to reduce noise and allow intake air to be filtered. The compressor supplies pressure and vacuum to the air manifold. The compressor is a linear pump with an internal control board. The internal control board drives the compressor. The compressor is maintained at the proper level by an algorithm based on the output of the manifold pressure sensor measured in the mattress.

The scale system supplies load beam data by the CAN network. This data, along with the measurements of the head section FSRs, are used to determine patient weight, detect the presence of a patient, and detect if a patient is sitting up.

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## Sleep Surfaces

### Basic Description

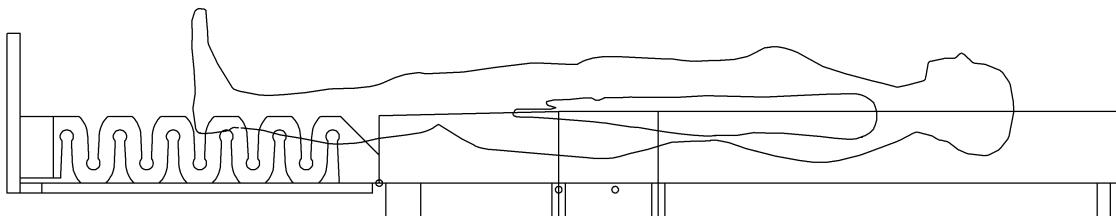
The sleep surface products consist of the primary surface that supports the patient from the head to the knee, and the foot surface that supports the patient from the knee to the foot. Both the primary and foot surfaces are enclosed in a zippered one-piece ticking and rest upon the articulating deck/weigh frame.

The two sleep surface products include the short stay surface and the treatment surface.

## Foot Surface

The short stay surface contains an all-foam foot section (see figure 3-1 on page 3-32).

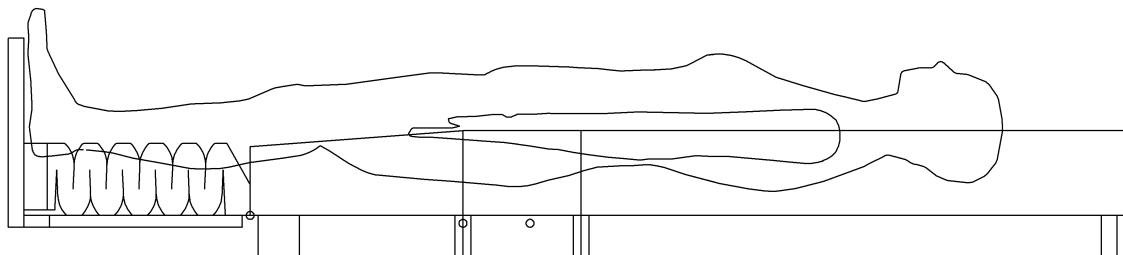
**Figure 3-1. Foam Foot Surface (Fully Extended)**



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Retraction of the foot surface is achieved through both compression and closure of the air channels in its construction (see figure 3-2 on page 3-32). The foam foot section does not collapse in the direction perpendicular to the deck.

**Figure 3-2. Foam Foot Surface (Retracted)**

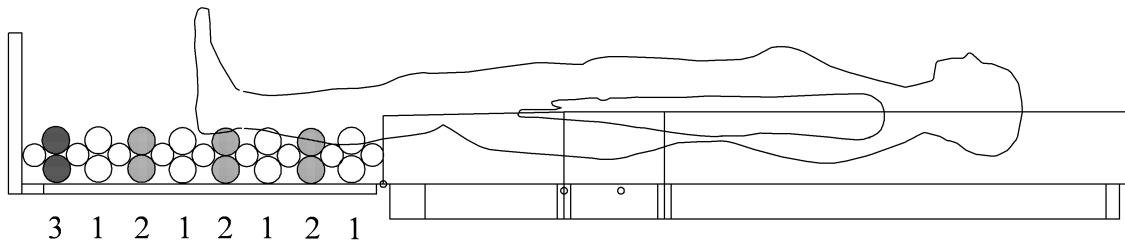


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The treatment surface contains an air foot surface (see figure 3-3 on page 3-33). These three zones create the air foot surface:

- Zone 1—Retracting zone
- Zone 2—Collapsing zone
- Zone 3—Heel relief zone

**Figure 3-3. Air Foot Surface (Fully Extended, All Zones Inflated)**

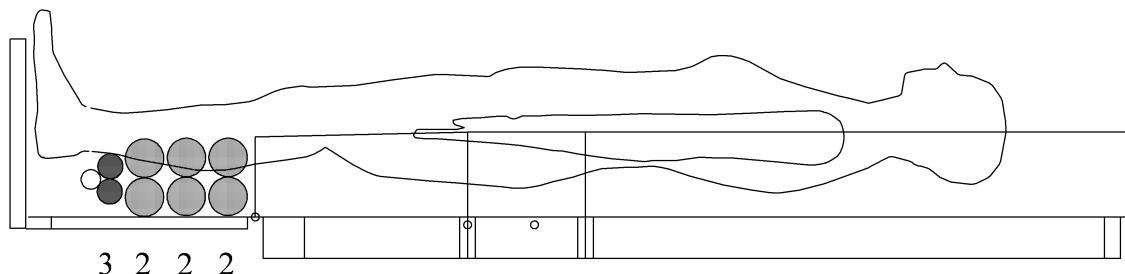


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Retraction of the foot surface is achieved by deflating zone 1 (see figure 3-3 on page 3-33). Heel management can then be achieved by slightly inflating zone 2 and deflating zone 3, which is adjacent to the footboard.

**Figure 3-4. Air Foot Surface (Heel Relief Retracted, Zone 1 Deflated)**



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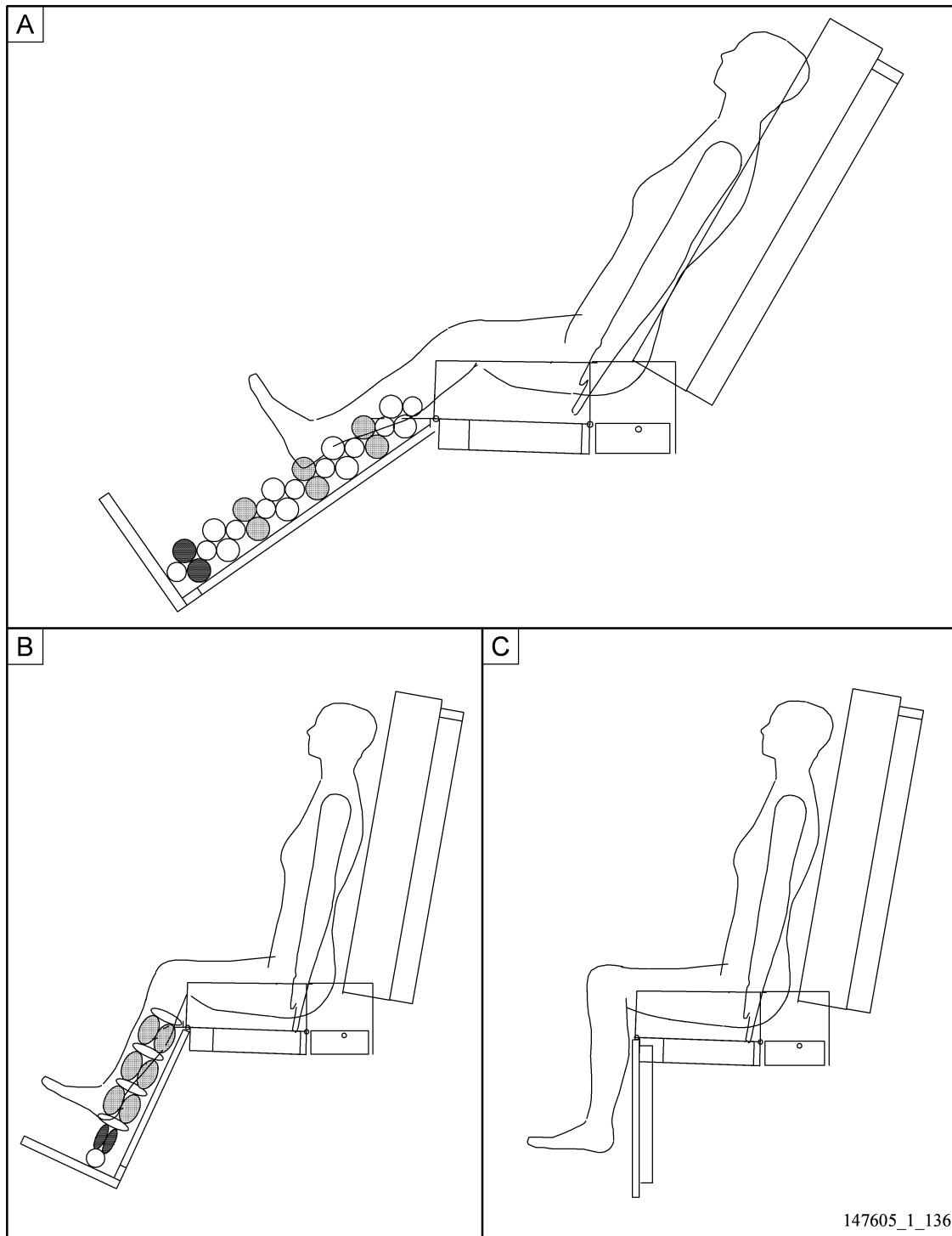
For chair positions, all three zones are deflated in different amounts to achieve both retraction and collapse (see figure 3-5 on page 3-34):

- For the Chair position, Zone 1 begins retraction, and Zone 2 begins collapse (see view A).
- For the Recliner position, Zone 1 is partially retracted, Zone 2 is partially collapsed, and Zone 3 is completely deflated (see view B).
- For the Chair Egress position, Zone 1 is fully retracted, and Zone 2 is fully collapsed (see view C).

**NOTE:**

For the unit to achieve the Chair Egress position, the footboard must be removed.

**Figure 3-5. Chair Operation—Air Foot Surface Functional**

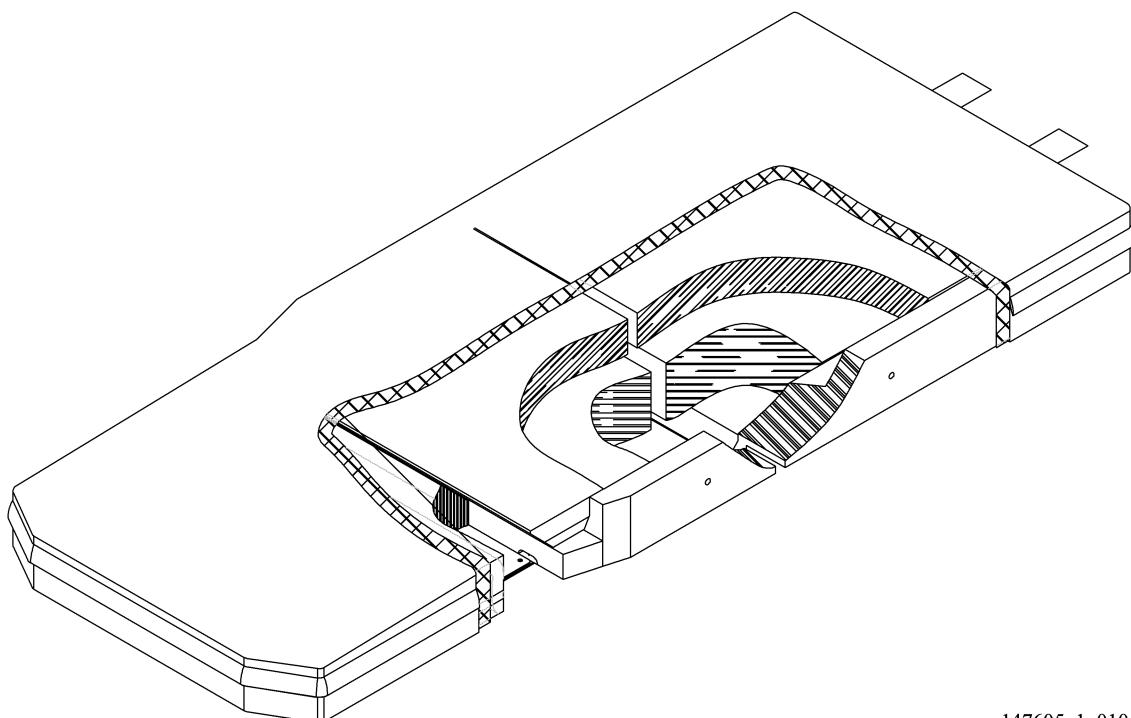


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## Primary Surface

The short stay surface contains a layered, all-foam, primary surface (see figure 3-6 on page 3-35). This surface supplies limited pressure distribution characteristics and also does not adjust to changes in frame articulation angles.

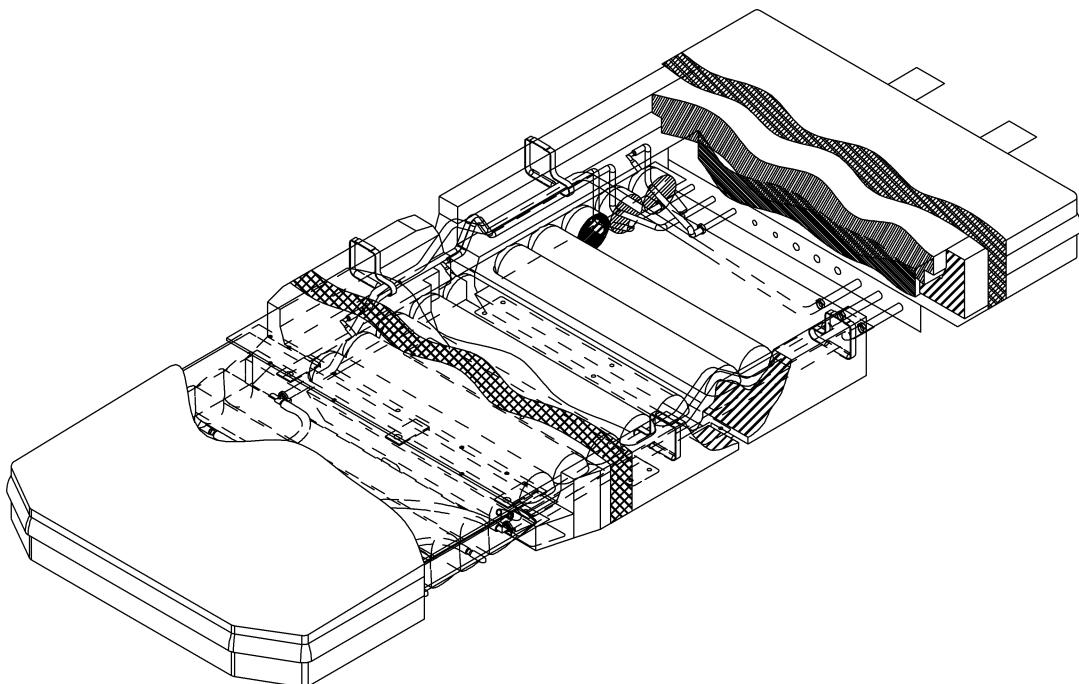
**Figure 3-6. Short Stay Surface**



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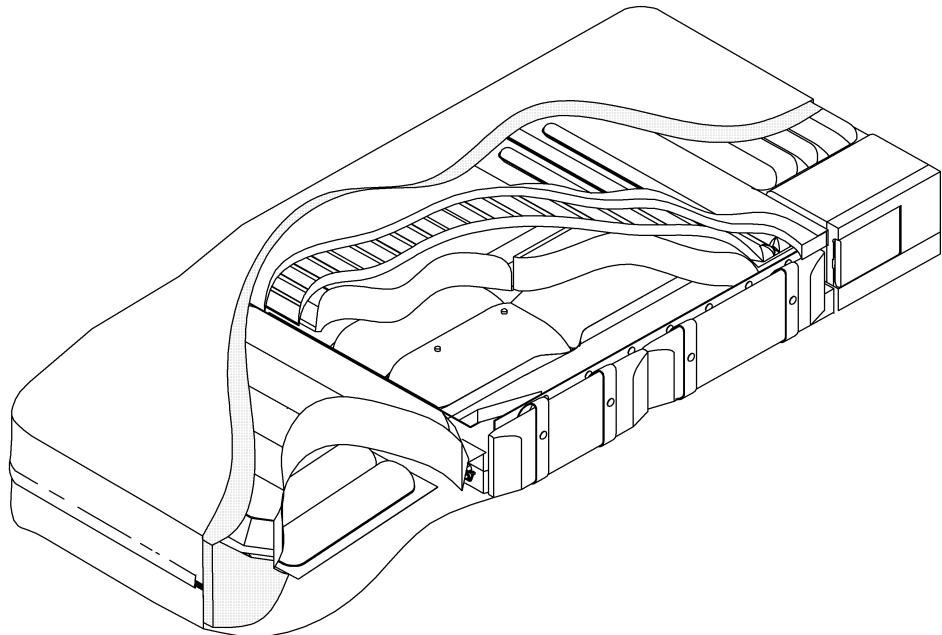
The treatment surface contains an air-cushion-over-foam primary surface (see figure 3-7 on page 3-36). This surface supplies optimum pressure distribution characteristics and adjusts to changes in head articulation angles. Optimum pressure distribution is maintained by increasing bladder pressure in the seat and thigh zones, and decreasing bladder pressure in the head zone with increases in head articulation.

**Figure 3-7. Treatment Surface**

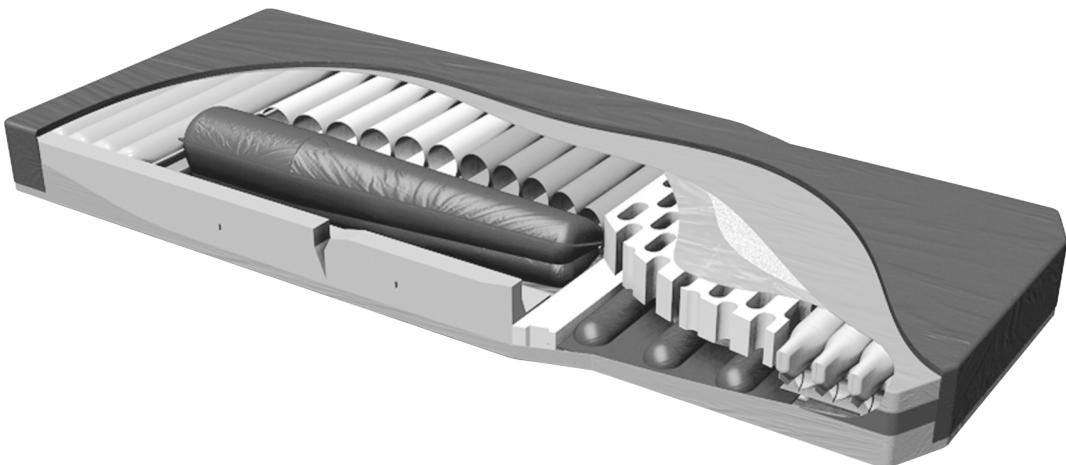


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**Figure 3-8. Pulmonary Surface**



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**Figure 3-9. P500 Surface**

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## **IntelliDrive® Transport System**

The IntelliDrive® Transport System is a battery powered, motor driven power assist feature for transporting a TotalCare® Bed System with minimal effort. It consists of special force-sensing push handles, an amplifier/indicator board (PAG) and a power assist box. The power assist box contains: batteries, drive motor, deployment motor for raising and lowering the drive wheel, motor speed controller, a Power Assist Control Module (PACM), drive belt, and pulleys.

### **Push Handles**

The push handles incorporate strain gauges to sense the force applied by a caregiver in either a forward or reverse direction. The strain gauges are connected to the PAG board physically installed under the TotalCare® Bed System's SideCom® Communication System cover. Each push handle also incorporates an enable switch, at least one of which must be pressed to enable the power assist feature to drive the bed.

### **Amplifier/Indicator Board (PAG)**

The PAG board contains amplifier circuitry to convert the signals from the strain gauges into a throttle signal for the drive motor. The PAG board produces a regulated +12VDC signal from the battery voltage to excite the strain gauges. The strain gauge signals are then combined such that the forces applied to each handle are added together. Pushing with force F1 on one handle and with force F2 on the other handle is equivalent to pushing with force F1 +

F2 on a single handle. Likewise, pushing on one handle with force F1 and pulling on the other handle with the same force F1 will effectively be the same as no force. The resultant signal produced by the amplifier circuit is shifted by additional circuitry to provide an output of 2.4 to 2.6 volts V DC as a neutral level. A net push causes this level to increase, producing a forward throttle signal to the motor controller. A net pull on the handles causes this level to decrease, producing a reverse throttle signal to the motor controller. The full scale forward throttle signal is about 4.0 volts and the full scale reverse throttle signal is about 1.0 volt.

The PAG board also parallels the enable switches in the handles to produce one enable signal to the IntelliDrive® Transport System box.

The last piece of the PAG board is the indicator for the battery gas gauge. Five LEDs indicate the remaining charge in the battery with each successive LED representing approximately 20 percent of the battery capacity.

## **Power Assist Control Module**

The PACM consists of a printed circuit board mounted to a heat-sink plate. The plate supplies essential heat-sinking for power components of the circuit board and secondarily supplies for mounting the assembly inside the IntelliDrive® Transport System box. The PACM supplies these functions:

- Battery charger
- Battery gas gauge
- Deployment control
- Enable switch logic and relay
- Drive motor over-temperature protection
- Low-battery shutoff

## **Battery Charger**

The battery charger operates from 23V DC produced at the bridge rectifier of the TotalCare® Bed System whenever the bed is plugged in. It consists of two stages. The first is a DC to DC converter to step the nominal 23V up to 34V DC. The 34V supply powers the second stage, a charger based on the TI/Unitrode®<sup>1</sup> 3906 chip. This charger has three modes of operation: trickle charge, bulk charge, and float charge.

Upon application of 23V DC power to the IntelliDrive® Transport System, the charger begins in mode 1, producing a trickle charge current of 20 to 30 mA to

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1. Unitrode® is a registered trademark of Unitrode Corporation.

bring the battery voltage up to 22.5V. In the event a battery has a defective cell, this low level current will not produce a hazardous situation. If the battery is capable of taking a charge, its voltage will eventually come up to 22.5V. (If the battery has been deeply discharged, this may take several days.) Once the voltage is above the trickle threshold, the charger circuit changes to mode 2. In this mode, bulk charging occurs during which current is limited to 750 mA. The charger stays in this mode until the battery voltage is approximately 29V to 30V. At this point, the current slowly drops off as the battery nears full charge. When the current drops to 75 mA, the charger enters mode 3, the float charge mode. In this mode the charger output will drop to 27.8V to keep the battery topped off. A status output of the 3906 goes high indicating to the gas gauge that charging is complete.

There is one adjustment required on the battery charger circuit. With the battery disconnected, and the 23V DC applied, connect a 1 watt, 1.2K Ohm resistor to the battery connector, P10. Adjust R41 until the voltage across P10 is  $27.8V \pm 0.1V$ . This sets the float charge voltage.

The 23V DC causes the battery disconnect relay to close, thereby connecting the battery to the charger and to the IntelliDrive® Transport System circuitry. In addition, the 23V DC supplies power to raise the drive wheel, if deployed, regardless of the condition of the battery.

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## Battery Gas Gauge

The battery gas gauge is based on the TI/Benchmarq®<sup>1</sup> 2013H gas gauge chip. The key to the operation of the gas gauge is a 0.005 Ohm resistor between battery minus and IntelliDrive® Transport System ground. The 2013H monitors the voltage across this resistor as a function of time, interpreting positive voltages as current into the battery (charging) and negative voltages as current out of the battery (discharging). The battery capacity is indicated by a five segment LED indicator connected to the PACM. Each LED represents approximately 20% of the nominal battery capacity. For example, five LEDs lit means there is 80 to 100% capacity in the battery, 4 LEDs lit means 60 to 79%, etc. One LED lit indicates the remaining capacity is less than 20%. When the battery has discharged to about 21.5V, the chip outputs status information which causes the PACM to disconnect the battery in order to prevent deeply discharging the battery.

In the event that discharge occurs such that the battery disconnects or that a battery is replaced, when the AC power is reapplied, the gas gauge chip assumes the battery is empty. The chip will output the above mentioned status information until it senses a charging current and a battery voltage above 22V.

1. Benchmarq® is a registered trademark of Benchmarq Microelectronics Inc.

Until this level is reached, the chip will not light any LEDs nor will the battery relay stay connected if the AC power is removed.

## **Deployment Control**

There are three operator inputs to the deployment control circuitry: AC power to the bed, the steer switch, and the enable switch. Limit switch inputs, reflecting the deployed and stowed positions of the deployment motor, are the remaining inputs to this circuitry. A state-machine makes up the heart of the deployment control. There are two stable states corresponding to the fully-down and fully-up positions of the drive wheel. Once in the fully-up state, the state machine will remain there as long as the AC power is applied, or the steer switch is open or the enable switch is closed. When these are all true concurrently: no AC power, steer switch closed, and enable switch open, the logic debounces this condition for more than 100 milliseconds and if still valid, transitions to a state where power is applied to the deployment motor to lower the wheel. At this time a 6.4 second timer is started. The state-machine remains in this state until the deployed limit switch input occurs or the timer expires. The state-machine then transitions to the fully-down state where power is removed from the motor and a signal is output to the motor controller releasing its /INHIBIT input.

Once in the fully-down state, the state-machine will remain there until either AC power is applied or the steer switch is opened. Again, this condition is debounced for more than 100 milliseconds, and if still present, then the state-machine transitions to a state that applies power to the motor to raise the wheel. The 6.4 second timer is started and the /INHIBIT to the motor controller is asserted. The state-machine remains in this state until the stowed limit switch input occurs or the timer expires. The state-machine then transitions to the fully-up state where power to the motor is turned off and the /INHIBIT input of the motor controller is maintained.

Additional logic is incorporated such that if the state-machine is deploying or stowing the drive mechanism and an input occurs that dictates the opposite direction, the new condition is debounced. If still present after 100 milliseconds, the state-machine goes briefly to a neutral state where the motor is turned off and the 6.4 second timer is reset. The state machine then transitions to the state where power is applied to run the motor in the new direction. The timer is restarted at this time as well.

## **Enable Switch Logic and Relay**

The enable switch, when closed, supplies an input to the logic which removes the /INHIBIT input to the motor controller. At the same time, a relay is energized which connects the drive motor to the motor controller output. A valid throttle input from the PAG board will cause the motor controller to drive

the motor in the applicable direction. When the enable switch is subsequently opened, the logic again asserts the /INHIBIT signal to the motor controller, causing it to decelerate the drive motor to a stop. The relay opens after a three second delay, allowing the motor controller time to stop the motor before disconnecting it from the motor controller. As a back-up, the normally closed relay contact shorts the motor producing a further braking effect. This effect will slow or stop the drive motor even if the battery becomes disconnected.

Since a discharged or disconnected battery cannot energize the relay, there needs to be a means to override the braking effect in the event that the wheel is down when the battery fails. A switch connected in series with the motor can be opened by the operator. This will remove the short across the drive motor to allow the motor to be manually driven.

As stated previously, the enable switch must be open along with the steer switch closed and the AC power must be absent to deploy the drive mechanism. A stuck enable switch, one failed closed, will prevent the mechanism from deploying, thus identifying a failed switch.

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## Drive Motor Over-Temperature Protection

The drive motor has a normally closed thermal switch which opens upon the motor reaching a maximum allowable temperature level. This switch produces an input to the logic that causes the /INHIBIT input to the motor controller to be asserted. The motor controller will bring the drive motor to a stop in this case. In situations where the drive motor is operated under high load (such as, powering the bed up a ramp) for more than a minute or so, self-resetting fuses (PTCs) interrupt the power connection to the motor controller. As with the thermal switch opening, the motor controller will bring the drive motor to a stop. To manually push the bed in either of these circumstances, the drive wheel can be stowed or the manual override switch can be opened. Upon cooling down of the motor, the thermal switch closes and the PTCs reset. If the override switch is closed, power assist can be resumed.

## Low-Battery ShutOff

The gas gauge chip monitors the battery capacity. When the chip detects the battery at its end of discharge voltage, the logic disconnects the battery to prevent it from deeply discharging.

## Drive Motor Brake

The motor relay controlled by the handle enable switch is SPDT, and is configured such that when off, its NC contact shorts the motor and when energized, its NO contact connects the motor to the motor controller to allow the motor to run.

A DC permanent magnet motor acts as a generator when manually driven. The short circuit provided by the NC relay contact makes it difficult for the generator to turn (the bed becomes difficult to push) and acts as a brake for the bed. This brake gives the bed a controlled coast if the enable switch is released on a ramp or if a low battery disconnects on a ramp.

Because of the shorted motor when the bed has reached the bottom of the ramp, it will be very hard to push. The override switch in the end of the drive box when off, opens the short circuit and allows the bed to be pushed with relative ease. When the override switch is off, it disconnects the motor from the controller and so it must be turned on to restore the drive functions.

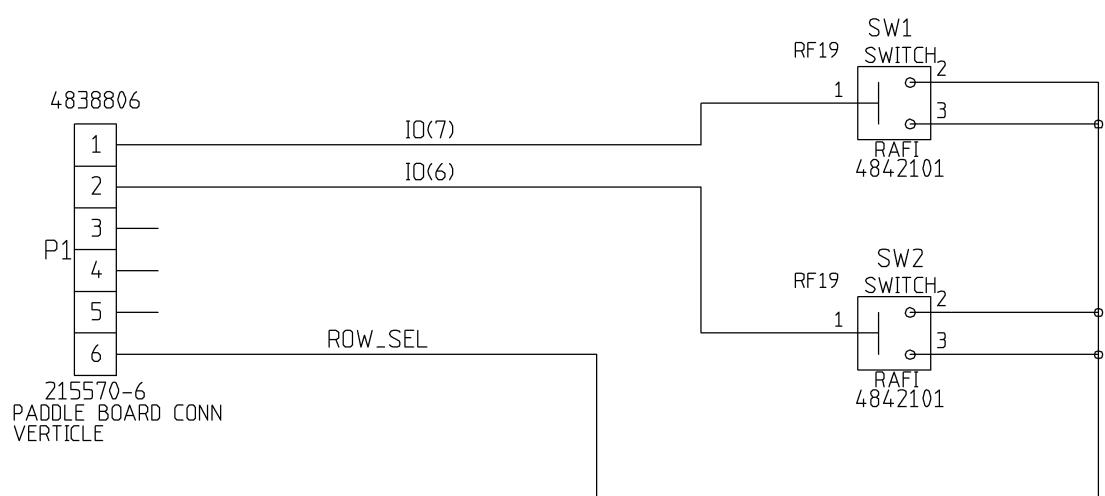
**NOTE:**

The override switch being off does not turn the IntelliDrive® Transport System off, and so the unit will continue to discharge the battery. The circuit breaker is the only means to turn the unit off. The override switch should be left on except when you want to manually push the bed when the drive wheel is down.

## Bed System Wiring Schematics

### Schematic—UCM Position and Enter

Figure 3-10. P.C. Board Wiring Diagram—UCM Positioning and Enter (P/N 48392)

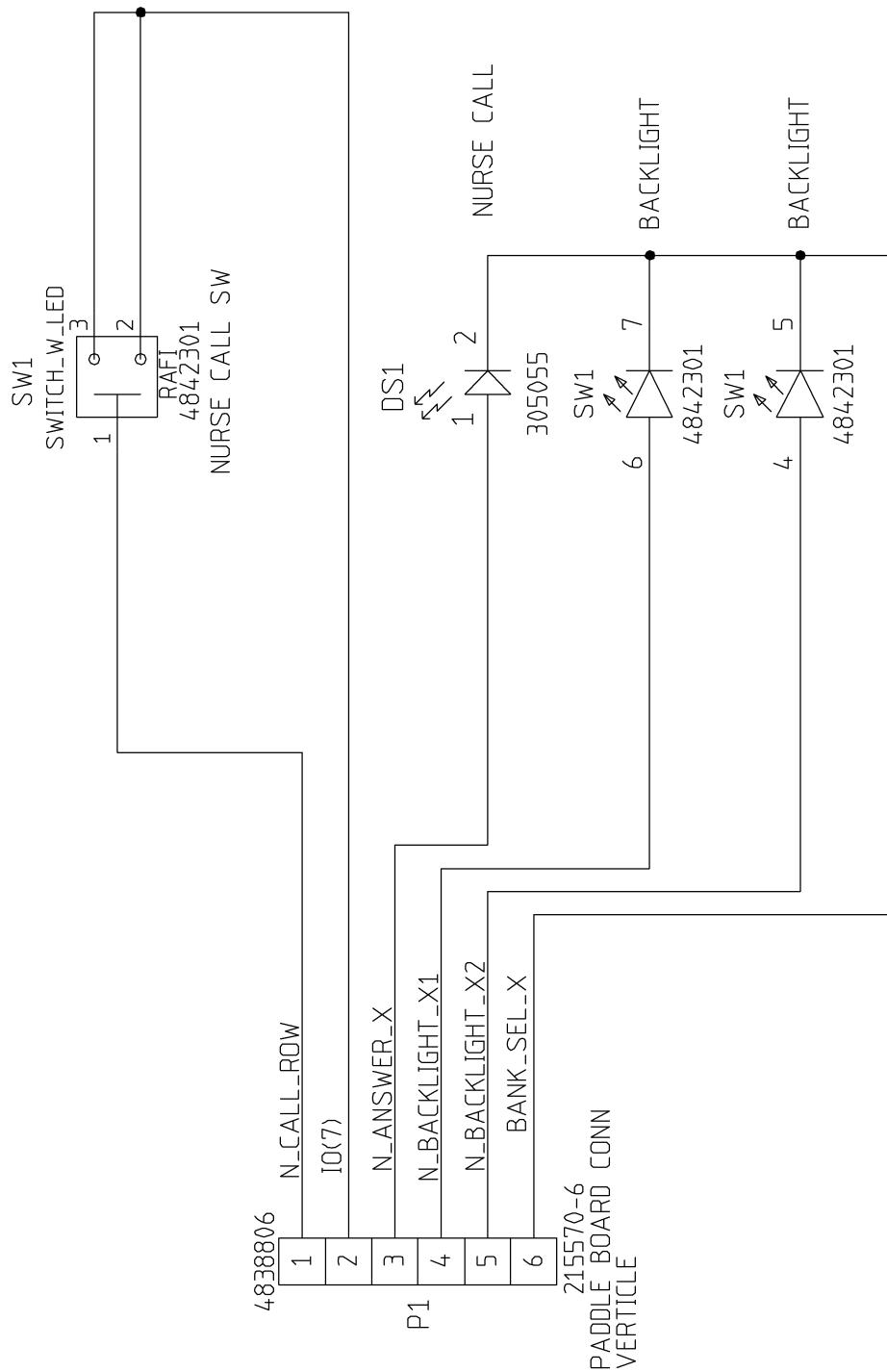


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## Schematic—UCM Nurse Call

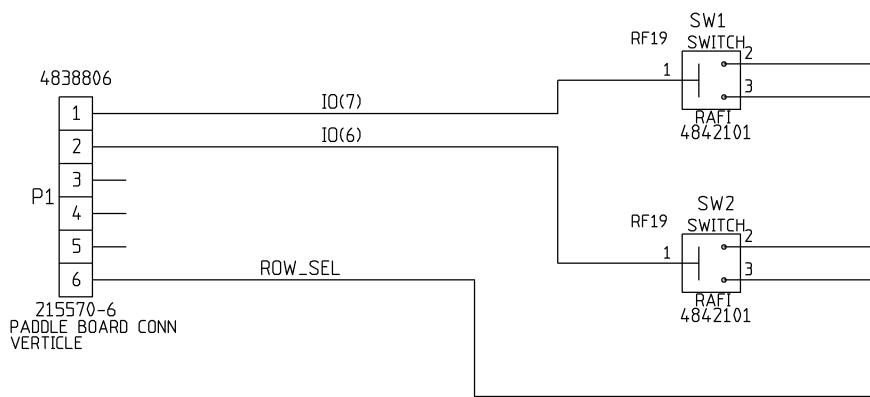
Figure 3-11. P.C. Board Wiring Diagram—UCM Nurse Call (P/N 47420)



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## Schematic—Enhanced Entertainment

Figure 3-12. Enhanced Entertainment

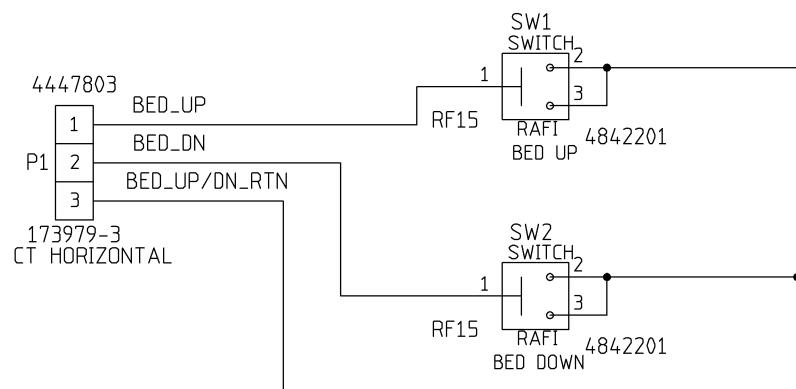


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## Schematic—Bed Up/Down

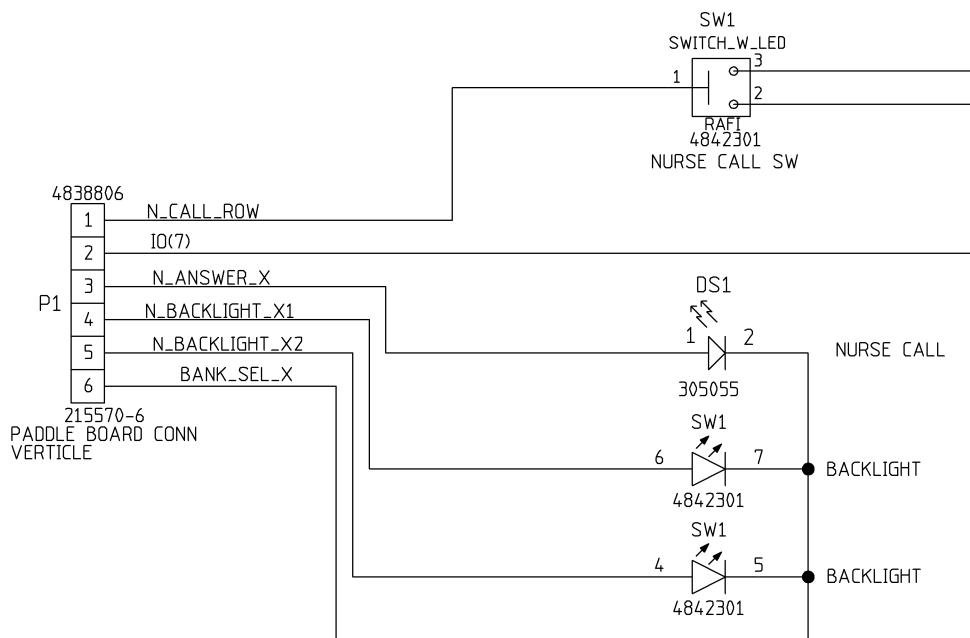
**Figure 3-13. Bed Up/Down**



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## Schematic—Nurse Call Module

**Figure 3-14. Nurse Call Module**



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**Figure 3-15. System Wiring Diagram—TotalCare® Bed System (M model beds)**

Refer to fold-out FO 3-1 at the rear of this manual.

**Figure 3-16. P.C. Board Wiring Diagram—Nurse Call Module**

Refer to fold-out FO 3-2 at the rear of this manual.

**Figure 3-17. P.C. Board Wiring Diagram—Pulmonary Power Distribution**

Refer to fold-out FO 3-3 at the rear of this manual.

**Figure 3-18. P.C. Board Wiring Diagram—UTV Control Board**

Refer to fold-out FO 3-4 at the rear of this manual.

**Figure 3-19. P.C. Board Wiring Diagram—Treatment Foot Module**

Refer to fold-out FO 3-5 at the rear of this manual.

**Figure 3-20. P.C. Board Wiring Diagram—Treatment Torso Module**

Refer to fold-out FO 3-6 at the rear of this manual.

**Figure 3-21. P.C. Board Wiring Diagram—Pulmonary and Percussion Module**

Refer to fold-out FO 3-7 at the rear of this manual.

**Figure 3-22. P.C. Board Wiring Diagram—Scale, OIML**

Refer to fold-out FO 3-8 at the rear of this manual.

**Figure 3-23. P.C. Board Wiring Diagram—Power Assist Gauge**

Refer to fold-out FO 3-9 at the rear of this manual.

**Figure 3-24. P.C. Board Wiring Diagram—Power Assist Control**

Refer to fold-out FO 3-10 at the rear of this manual.

**Figure 3-25. P.C. Board Wiring Diagram—Power Control Module**

Refer to fold-out FO 3-11 at the rear of this manual.

**Figure 3-26. P.C. Board Wiring Diagram—Wireless Module**

Refer to fold-out FO 3-12 at the rear of this manual.

**Figure 3-27. P.C. Board Wiring Diagram—Wireless Module Support**

Refer to fold-out FO 3-13 at the rear of this manual.

**Figure 3-28. P.C. Board Wiring Diagram—Right User Control Module**

Refer to fold-out FO 3-14 at the rear of this manual.

**Figure 3-29. P.C. Board Wiring Diagram—Left User Control Module**

Refer to fold-out FO 3-15 at the rear of this manual.

**Figure 3-30. P.C. Board Wiring Diagram—Weighframe Junction**

Refer to fold-out FO 3-16 at the rear of this manual.

**Figure 3-31. P.C. Board Wiring Diagram—Treatment Seat Control Module**

Refer to fold-out FO 3-17 at the rear of this manual.

**Figure 3-32. P.C. Board Wiring Diagram—Hydraulic System**

Refer to fold-out FO 3-18 at the rear of this manual.

**Figure 3-33. System Wiring Diagram—TotalCare® Bed System (N model beds)**

Refer to fold-out FO 3-19 at the rear of this manual.

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**Figure 3-34. Air Control Board Wiring Diagram—TotalCare® Bed System (N model beds)**

Refer to fold-out FO 3-20 at the rear of this manual.

**Figure 3-35. Interface Board Wiring Diagram—TotalCare® Bed System (N model beds)**

Refer to fold-out FO 3-21 at the rear of this manual.

**Figure 3-36. Air Surface Wiring Diagram—TotalCare® Bed System (N model beds)**

Refer to fold-out FO 3-22 at the rear of this manual.

**NOTES:**

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# ***Chapter 4***

## ***Removal, Replacement, and Adjustment Procedures***

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### **Tool and Supply Requirements**

- Kit—hilow cylinder brace (P/N SA1695)
- Kit—leak test (P/N SA9076)
- Kit—Torx®<sup>1</sup> bits P/N SA1561, includes (T10 Torx® bit P/N SA4949, T25 Torx® bit P/N SA4950, and T45 Torx® bit P/N SA4951)
- T25 Torx® head screwdriver
- T10 Torx® head screwdriver
- Wheel blocks
- 2" x 4" safety block
- 8" #2 phillips head screwdriver
- 6" #2 phillips head screwdriver
- 0.073" feeler gauge
- 7/16" deep well socket
- 7/16" socket
- 7/16" open end wrench
- Ratchet
- Ball peen hammer
- 1/4" drift punch
- Jack, 600 lb (272 kg) lift capacity
- 4" x 4" x 30" (10 cm x 10 cm x 76 cm) wood jacking brace
- Needle nose pliers
- T15 Torx® head screwdriver
- 1/4" nut driver

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

- 3/8" nut driver
- Thin applicator knife
- 9/16" open end wrench
- 9/16" open end torque adapter
- 9/16" deep well socket
- Large basting syringe
- 1/4" flexible Tygon®<sup>1</sup> hose
- 1/2 gal container, clean
- Small funnel
- 5/8" open end wrench
- 5/8" deep well socket
- Towels
- Clean cloth
- 1/4" open end wrench
- 1/4" open end wrench
- AC/DC volt/ohms meter (multimeter)
- 3 AG fuse puller
- Calibration weights, 200 lbs (91 kg)
- 4" diagonal cutters
- Torque wrench, 0 in-lb to 50 in-lb (0 N·m to 5.6 N·m)
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 17.0 N·m)
- Ground fault detector
- Hydraulic fluid, P/N 31699s
- Loctite®<sup>2</sup> adhesive, 242
- 5/16" wrench
- Antistatic strap
- Safety analyzer
- Wire cutters
- 1/2" socket or box wrench
- Screwdriver

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1. Tygon® is a registered trademark Norton Company.

2. Loctite® is a registered trademark of Loctite Corporation.

- 7/8" deep well socket
- 5/8" open end torque adapter
- 1/4" box end wrench
- 3/8" box end wrench
- Small screwdriver
- 1/4" deep well socket
- Jewelers screwdriver
- Volt meter
- Crimping tool
- Adhesive remover
- Safety glasses
- Black marker
- Marking pen
- Pen or pencil

These tools and supplies are required for NAWI Class III scale beds:

- Weigh set, 200 kg, Class M1 or better
- Dummy plug (P/N 306981)
- Marked zone board, with max weight of 10 kg
- Thinblade screwdriver
- Window cleaner
- White gloves with rubber facing
- Calculator
- Tape measure

## 4.1 Articulation Position Sensing System Calibration

Tools required: None

Calibrate the articulation position sensing system whenever components are replaced in the articulation positioning system or the articulation functions do not track correctly within their designed range.

### Calibration Procedure with the Graphical Caregiver Interface (GCI)® Control

To calibrate the TotalCare® Bed System equipped with the Graphical Caregiver Interface (GCI)® Control, do as follows:

**NOTE:**

If the bed alarm sounds during calibration, you must silence the alarm before you can continue.

1. Place the bed in the full up and flat position.
2. Turn the casters perpendicular to the bed at the foot end, so that when the “Foot down” articulation lowers it doesn’t hit the casters.
3. Select the **Tools** tab on the GCI.
4. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
5. Select **Diagnostics**.
6. Select **Calibrate Sensors**.
7. Select **Head down**.
8. Press **Head down** until the section reaches the mechanical limit.
9. Press **Take Reading**.
10. Select **Head up**.
11. Press **Head up** until the section reaches the mechanical limit.
12. Press **Take Reading**.
13. Select **Knee up**.
14. Press **Knee up** until the section reaches the mechanical limit
15. Press **Take Reading**.

16. Select **Knee down**.
17. Press **Knee down** until the section reaches the mechanical limit.
18. Press **Take Reading**.
19. Select **Foot Up**.
20. Press **Foot Up** until the section reaches the mechanical limit.
21. Press **Take Reading**.
22. Select **Foot down**.
23. Press **Foot down** until the section reaches the mechanical limit.
24. Press **Take Reading**.
25. Return to **Foot up**.
26. Select **Foot Out**.
27. Press **Foot Out** until the section reaches the mechanical limit.
28. Press **Take Reading**.
29. Select **Foot in**.
30. Press **Foot in** until the section reaches the mechanical limit.
31. Press **Take Reading**.
32. Select **Hi-Lo down**.
33. Press **Hi-Lo down** until the section reaches the mechanical limit.
34. Press **Take Reading**.
35. Select **Hi-Lo up**.
36. Press **Hi-Lo up** until the section reaches the mechanical limit.
37. Press **Take Reading**.
38. Select **Save settings**.
39. Select **Back**.
40. Select **Exit**.

41. Select **Back to main menu.**

42. Reset the power on the bed.

## Calibration Procedure without the Graphical Caregiver Interface (GCI)® Control

To calibrate a TotalCare® Bed System not equipped with a Graphical Caregiver Interface (GCI)® Control, do as follows:

**NOTE:**

If bed alarm sounds during calibration, you must silence the alarm before you can continue.

1. Plug the bed into an appropriate power source.
2. Place the bed in the full up and flat position.
3. Turn the casters perpendicular to the bed at the foot end, so that when the “Foot down” articulation lowers, the foot section does not hit the casters.
4. Simultaneously press the **FullChair, Bed Flat, Trendelenburg, and Reverse Trendelenburg** controls, and hold approximately 15 s until an audible beep sounds.
5. Release the controls. The **Service required** lamp flashes. The bed is now in the calibration mode.
6. Press **Head Down**, and hold until the section reaches the mechanical limit.
7. To place the reading into memory, simultaneously press the **Head Down** control and **Trendelenberg** control.
8. Press **Head Up**, and hold until the section reaches the mechanical limit.
9. To place the reading into memory, simultaneously press the **Head Up** control and **Trendelenberg** control.
10. Press **Knee Down**, and hold until section reaches the mechanical limit.
11. To place the reading into memory, simultaneously press the **Knee Down** and **Trendelenberg** control.
12. Press **Knee Up**, and hold until the section reaches the mechanical limit.
13. To place the reading into memory, simultaneously press the **Knee Up** control and **Trendelenberg** control.
14. Return the knee to flat.
15. Press **Foot Raise**, and hold until the section reaches the mechanical limit.

16. To place the reading into memory, simultaneously press the **Foot Raise** control and **Trendelenberg** control.
17. Press **Foot Lower**, and hold until the section reaches the mechanical limit.
18. To place the reading into memory, simultaneously press the **Foot Lower** control and **Trendelenberg** control.
19. Select **Foot Extend**, and hold until the section reaches the mechanical limit.
20. To place the reading into memory, simultaneously press the **Foot Extend** control and **Trendelenberg** control.
21. Select **Foot Retract**, and hold until the section reaches the mechanical limit.
22. To place the reading into memory, simultaneously press the **Foot Retract** control and **Trendelenberg** control.
23. Select **Hi-Lo Up**, and hold until the section reaches the mechanical limit.
24. To place the reading into memory, simultaneously press the **Hi-Lo Up** control and **Trendelenberg** control.
25. Select **Hi-Lo Down**, and hold until the section reaches the mechanical limit.
26. To place the reading into memory, simultaneously press the **Hi-Lo Down** control and **Trendelenberg** control.
27. To store all calibration data placed into memory, simultaneously press the **Foot Retract**, **Foot Extend**, **Foot Raise**, and **Foot Lower** panel controls, and hold approximately 15 s until an audible beep sounds.
28. Release the controls. The **Service required** indicator goes out. The TotalCare® Bed System position sensors are now calibrated.

## **4.2 Patient Weigh System Calibration (Non-NAWI Class IIII Scale Only)**

Tools required: 200 lb (91 kg) weight

**NOTE:**

To calibrate a NAWI Class IIII Scale—European version, refer to procedure 4.77.

Do the patient weigh system calibration procedure without a patient or any loose articles on the sleep surface.

1. Remove the patient and any loose articles from the sleep surface.
2. Make sure the bed is on a level surface.
3. Make sure the bed is in the flat position.
4. Apply the foot brake.
5. Remove all equipment from the foot section equipment sockets and secondary drainage bag holders.
6. To access the service screen, do as follows:
  - a. Select the **Tools** tab on the GCI.
  - b. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
  - c. Select **Diagnostics**.
7. From the **Service Menu**, select **Calibrate scale**.
8. Verify that the following appear on the screen: **Bed is not in trend, All side rails are up, Foot section is flat, and Head is below 30 degrees**.
9. Select **Continue**.
10. The scale will zero.
11. Enter the calibration weight, 200.0 lb (91 kg).
12. Put the calibration weight on the left foot area.
13. Select **Continue**.
14. The GCI screen flashes **Please wait... 60 sec**. The timer counts down to zero.

15. Put the calibration weight on the right foot area.
16. Select **Continue**.
17. The GCI screen flashes **Please wait.... 60 sec**. The timer counts down to zero.
18. Put the calibration weight on the left head area.
19. Select **Continue**.
20. The GCI screen flashes **Please wait.... 60 sec**. The timer counts down to zero.
21. Put the calibration weight on the right head area.
22. The GCI screen flashes **Please wait.... 60 sec**. The timer counts down to zero.
23. The GCI screen displays **New coefficient** and the calibration coefficient values. (If the coefficients are in the range of 0100-4500, the calibration is valid. Values less than 10 indicate an error during the calibration. For error codes, view the **Service required status** screens.)
24. Go to the **Main Menu**.
25. The sale calibration is complete.

## 4.3 Cover—Head End

Tools required: Hilow cylinder brace (P/N SA1695)  
T25 Torx®<sup>1</sup> head screwdriver

### Removal



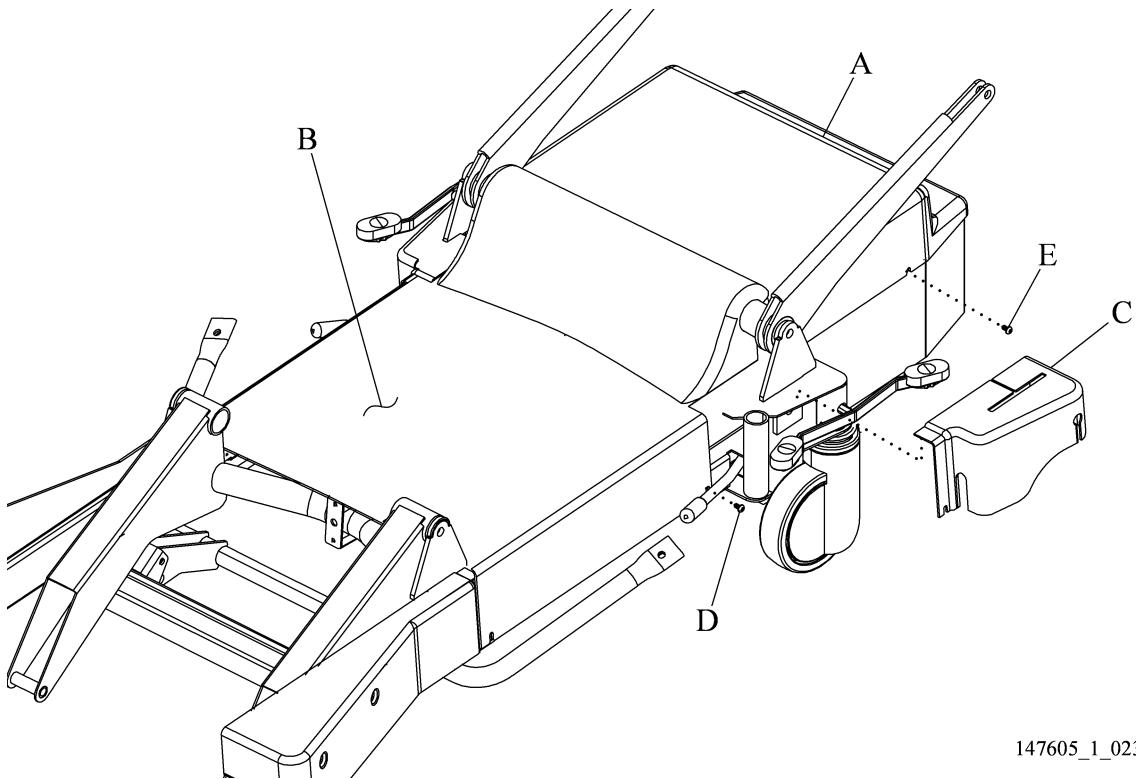
#### WARNING:

Failure to set the brakes, and install the hilow cylinder brace could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the maximum height to gain access to the base frame covers.
3. To remove the tub base cover (A), do as follows (see figure 4-1 on page 4-11):
  - a. Remove the mounting screws (E) from the tub base cover (A).
  - b. Lift the tub base cover (A) from the base frame.

**Figure 4-1. Head Base Frame and Caster Covers**

4



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4. To remove the top center base cover (B), perform the following:
  - a. Remove the mounting screws (D) from the top center base cover (B).
  - b. Lift the top center base cover (B) from the base frame.
5. To remove the head end base caster cover (C), perform the following:
  - a. Manually spread the cover slit for the foot pedal, and remove the head-end base caster cover (C).
  - b. Lift the head end base caster cover (C) from the frame as you twist the cover past the lift arm brace.
6. Install the hilow cylinder brace (refer to procedure 4.4).

## **Replacement**

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.4 Hilow Cylinder Brace

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Hilow cylinder brace (P/N SA1695) or  
Hilow cylinder brace (P/N SA1658)

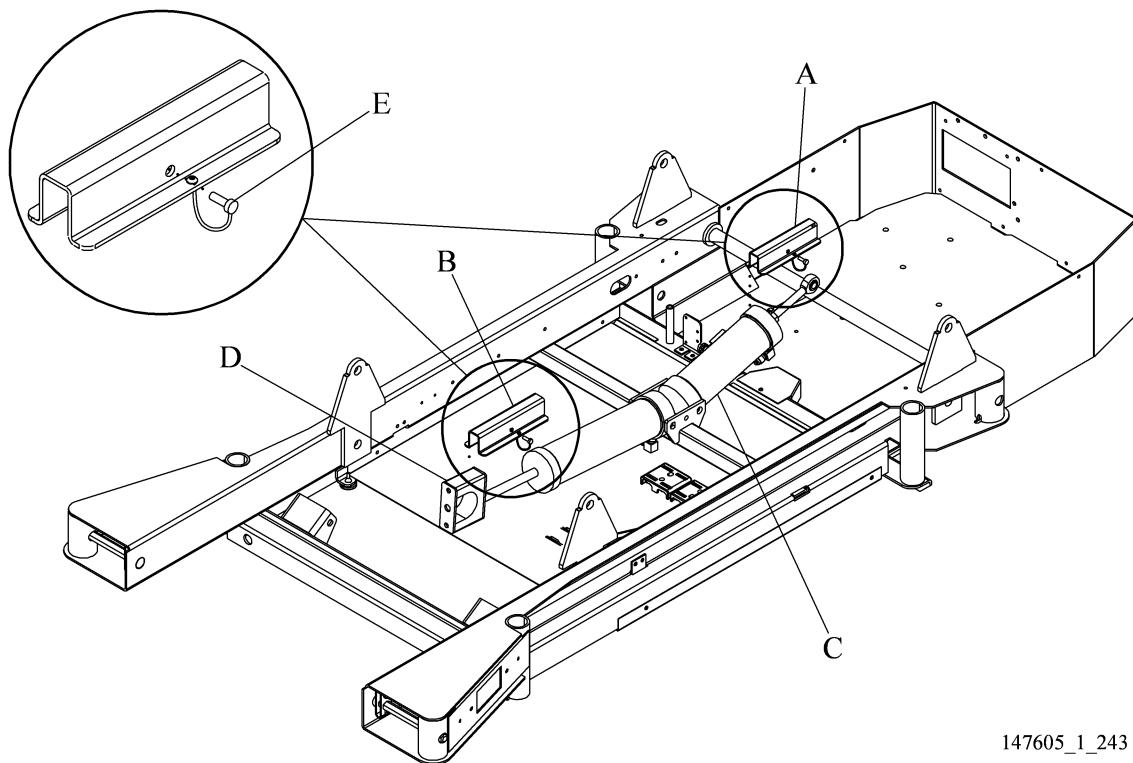
### Installation

#### NOTE:

There are two styles of cylinder braces. Cylinder brace SA1695 can be used on all models of hilow cylinders. Cylinder brace SA1658 can be used on hilow cylinders that are black in color only.

The hilow cylinder brace includes two brace sections, the hilow head cylinder safety brace (A) and the hilow foot cylinder safety brace (B), for use on the hilow head cylinder (C) and the hilow foot cylinder (D) (see figure 4-2 on page 4-13).

**Figure 4-2. Hilow Cylinder Brace—SA1695**



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**WARNING:**

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the maximum height to gain access to the base frame covers.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.
4. Remove the head end covers to gain access to the hilow head cylinder (C) and the hilow foot cylinder (D).

**NOTE:**

The short cylinder safety brace is used for the head cylinder, and the long cylinder safety brace is used for the foot cylinder.

5. Install the hilow head cylinder safety brace (A) on the extended push rod of the hilow head cylinder (C).
6. Insert the ball lock pin (E) into the cylinder safety brace (A).
7. Install the hilow foot cylinder safety brace (B) on the extended push rod of the hilow foot cylinder (D).
8. Insert the ball lock pin (E) into the cylinder safety brace (B).
9. Lower the bed on to the cylinder safety braces until there is no weight on the cylinders.

## Removal

1. Plug the bed into an appropriate power source.
2. Raise the bed to the maximum limit.



**WARNING:**

Do not remove the safety braces with weight on the safety braces.  
Injury or equipment damage could occur.

3. Remove the ball lock pins (E) from the cylinder safety braces (A and B).

4. Remove the hilow head cylinder safety brace (A) and the hilow foot cylinder safety brace (B) from the hilow head cylinder (C) and the hilow foot cylinder (D).
5. Install the head end covers (refer to procedure 4.3).

## **Head of Bed Cylinder Brace**

1. Raise the head section to approximately 70 degrees.

**NOTE:**

The brace will not install correctly when the head is fully raised.

2. Install the foot hilow brace (larger one) against the head cylinder end cap. Make sure the brace does not touch the head section frame.
3. Install the head hilow brace (smaller one) against the head section pin connection with the chamfered end towards the pin connection. Make sure the head hilow brace contacts the head section arm.
4. Install the pin in both braces.
5. Lower the head section approximately 65 degrees, until the braces touch.

## 4.5 Caster Cover—Foot End

Tools required: Hilow cylinder brace (P/N SA1695)  
T25 Torx®<sup>1</sup> head screwdriver

### Removal



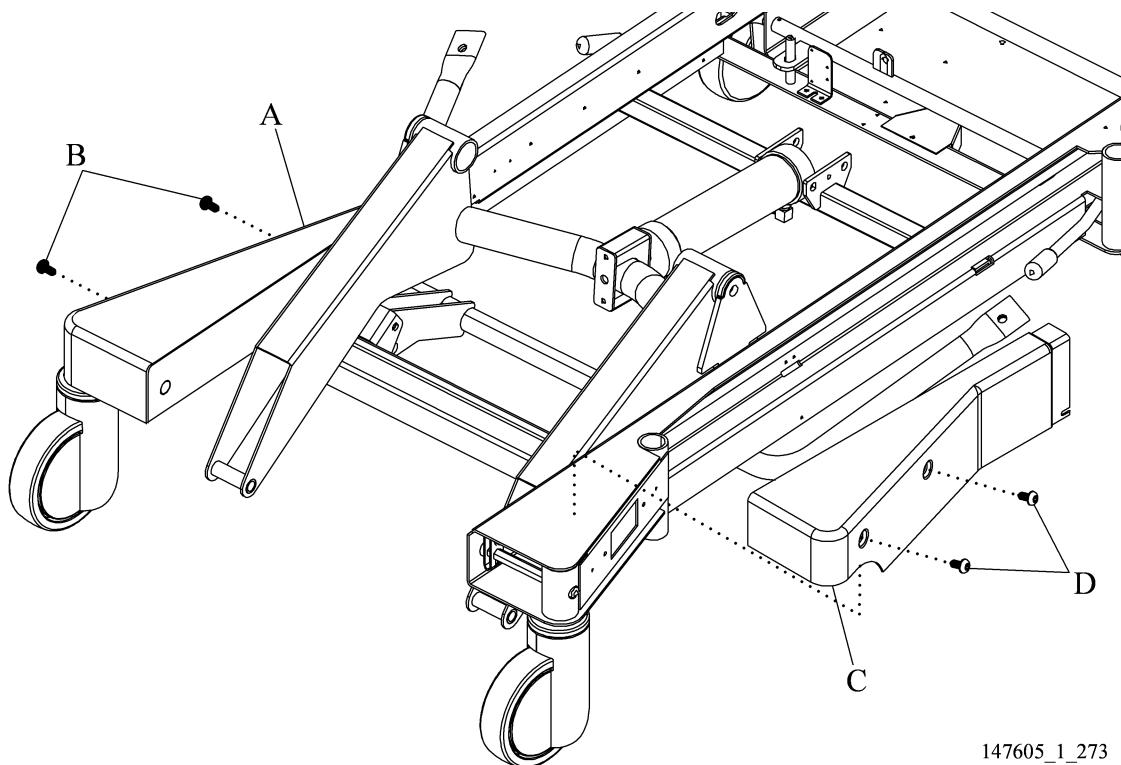
#### WARNING:

Set the brakes, and install the hilow cylinder brace. Failure to do so could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the maximum height to gain access to the base frame covers.
3. Remove the head end covers (refer to procedure 4.3).
4. Install the hilow cylinder brace (refer to procedure 4.4).
5. To remove the right, foot-end base caster cover (A), perform the following (see figure 4-3 on page 4-17):
  - a. Remove the two mounting screws (B) from the right foot end base caster cover (A).
  - b. Remove the right, foot-end base caster cover (A).

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**Figure 4-3. Foot End Base Caster Cover**

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6. To remove the left, foot-end base caster cover (C), perform the following:
  - a. Remove the two mounting screws (D) from the left caster cover (C).
  - b. Remove the left caster cover (C).

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.6 Foot End Caster Assembly

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- 0.073" feeler gauge
- 7/16" socket
- Ball peen hammer
- 1/4" drift punch
- Small screwdriver
- Jack, 600 lb (272 kg) lift capacity
- 4" x 4" x 30" (10 cm x 10 cm x 76 cm) wood jacking beam
- Wheel block
- Torque wrench, 50 in-lb to 100 in-lb (5.6 N·m to 11.3 N·m)

### Removal



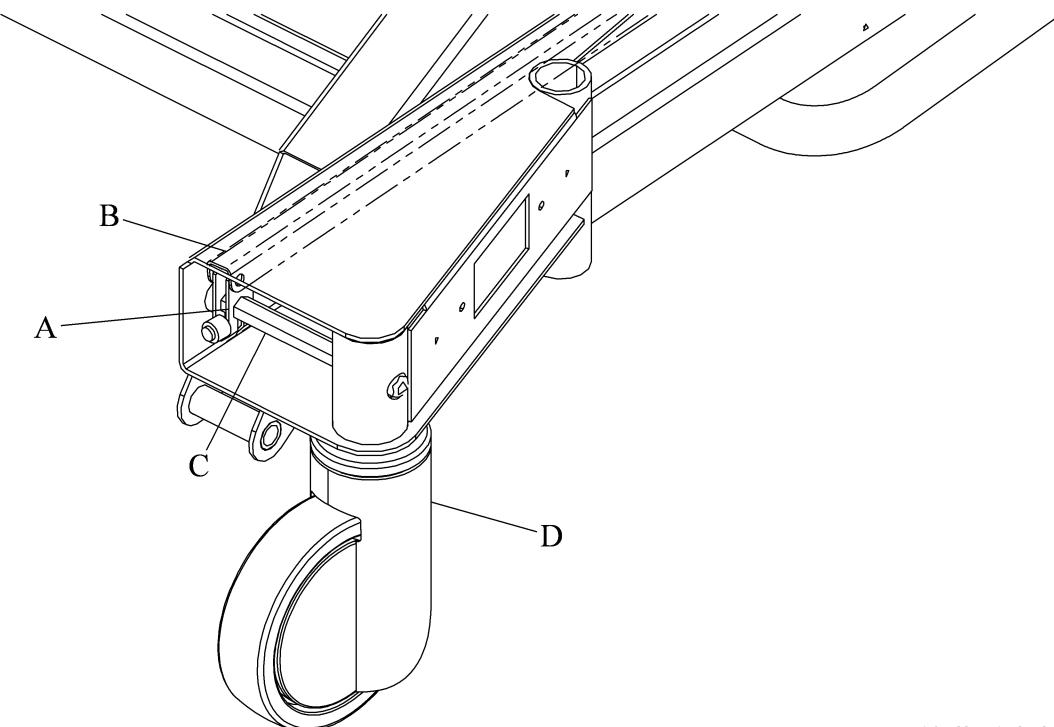
#### WARNING:

Set the brakes, install the wheel blocks, and install the hilow cylinder brace. Failure to do so could cause injury or equipment damage.

1. Set the brakes.
2. Install the wheel blocks.
3. Raise the bed.
4. Put the bed in the Trendelenburg position.
5. Install only the foot-end hilow cylinder brace (refer to procedure 4.4).
6. Remove the foot-end caster cover for access to the caster hex rod (refer to procedure 4.5).
7. Verify that the brake/steer pedal is in the neutral position.
8. Loosen the clamp (A) that attaches the brake actuating linkage (B) to the caster hex rod (C) (see figure 4-4 on page 4-19).

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**Figure 4-4. Foot End Caster Brake Actuating Linkage**

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9. Install the wheel blocks at the opposite end of the bed, and put the brake pedal in the neutral position.

**WARNING:**

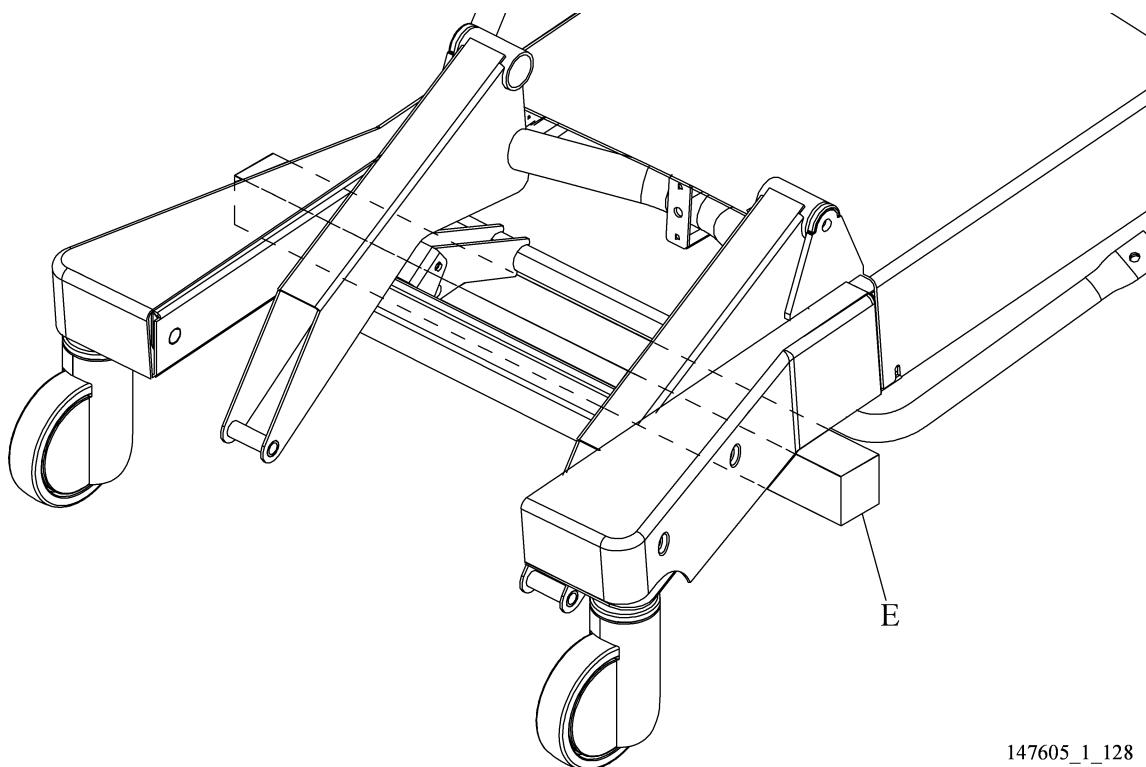
The jack must be able to lifting 600 lb (272 kg). Use the jack only on a firm flat surface capable of supporting 600 lb (272 kg). Injury or equipment damage could occur.

**CAUTION:**

Do not raise or lift the bed by the corners of the frame. The bed must be raised at the end with the use of a crossbeam support that can lift 350 lb (159 kg). Equipment damage could occur.

10. Put the jack in the center of a 4" x 4" x 30" (10 cm x 10 cm x 76 cm) wood jacking brace (E), and raise the caster just off of the floor (see figure 4-5 on page 4-20).

**Figure 4-5. Foot End Base Cover and Jacking Location**



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11. Slide the caster hex rod (C) from the caster that is being replaced (see figure 4-4 on page 4-19).
12. Use the jack to raise the foot end of the bed approximately 4" (10 cm), or high enough for the caster to drop out of the caster housing (D).

## Replacement

**NOTE:**

Do all caster adjustments before you install the foot-end caster cover.

1. Make sure the replacement caster is the same type as the one removed.

**NOTE:**

Make sure the caster is in the neutral position.

2. Install the caster hex rod (C) through the caster, and seat it inside the frame.
3. Lower the jack, and remove the wood jacking brace (E) (see figure 4-5 on page 4-20).
4. Attach the brake actuating linkage (B) to the caster hex rod (C) (see figure 4-4 on page 4-19).

5. Tighten the clamp (A) to 60 in-lb (6.8 N·m) of torque.
6. Adjust the foot caster.
7. Install the foot end caster cover (refer to procedure 4.5).
8. Remove the wheel blocks.
9. Do the “Function Checks” on page 2-5.

## **Adjustment**

1. Make sure the brake/steer pedal is in the neutral position.
2. Carefully punch out the plastic cap that is on the body of the caster.
3. Turn the screw counterclockwise to decrease tension or clockwise to increase the tension on the wheel.
4. Do the “Function Checks” on page 2-5.

**4**

## 4.7 Head-End Caster Assembly

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- 0.073" feeler gauge
- Ball peen hammer
- 1/4" drift punch
- 7/16" socket
- Jack, 600 lb (272 kg) lift capacity
- Small screwdriver
- Torque wrench, 50 in-lb to 100 in-lb (5.6 N·m to 11.3 N·m)
- Wheel blocks

### Removal



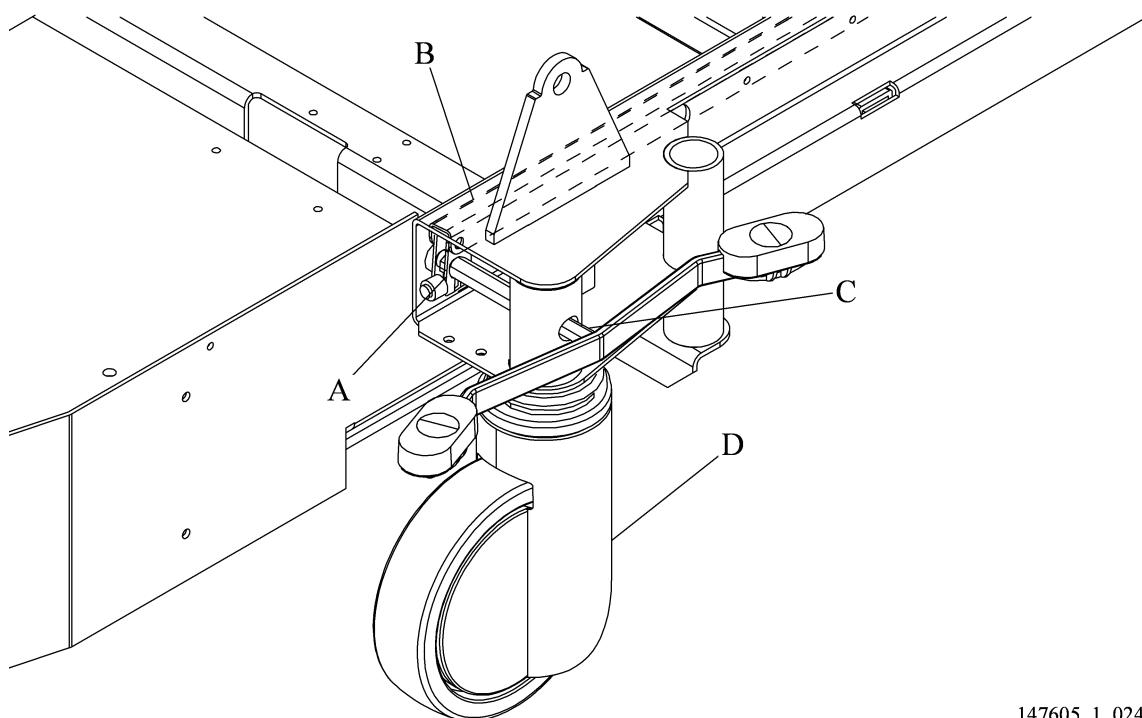
#### WARNING:

Set the brakes, install the wheel blocks, and install the hilow cylinder brace. Failure to do so could cause injury or equipment damage.

1. Set the brakes.
2. Install the wheel blocks.
3. Raise the bed.
4. Remove the tub base cover for access to the caster hex rod (refer to procedure 4.3).
5. Place the bed in the Trendelenburg position as necessary to work on the head caster (D) (see figure 4-6 on page 4-23).
6. Install the hilow cylinder brace (refer to procedure 4.4).

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**Figure 4-6. Head End Brake Actuating Linkage**

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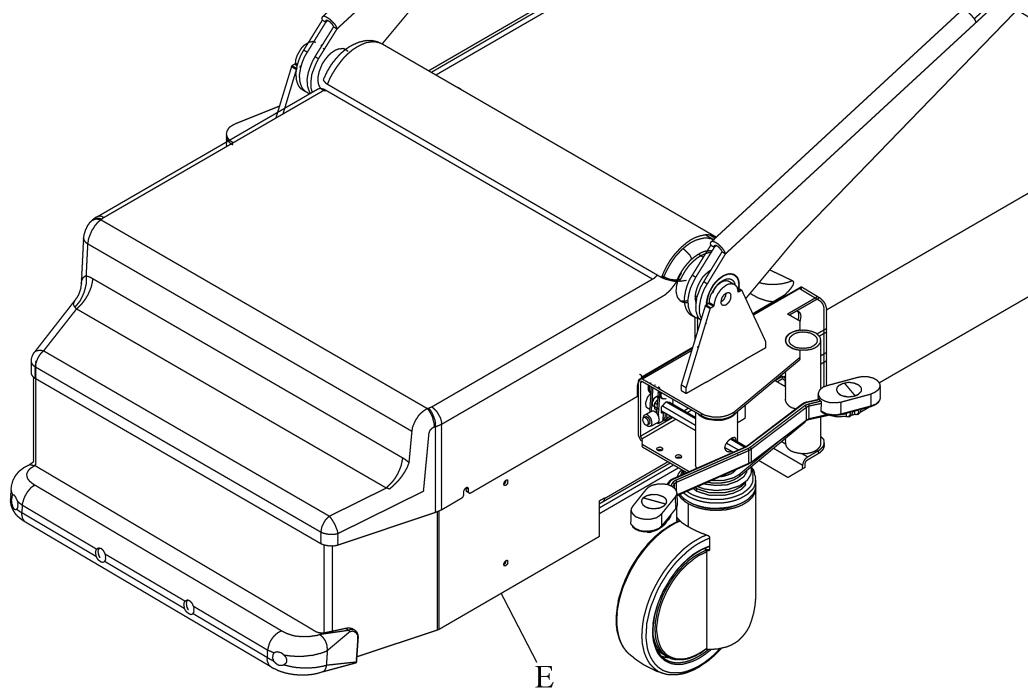
7. Make sure the brake/steer pedal (C) is in the neutral position.
8. Loosen the connecting clamp (A) that attaches the brake actuating linkage (B) to the brake/steer pedal (C).

**WARNING:**

Failure to install the jack in the correct location can cause injury.

9. Put the jack in the center of the bottom plate (E) of the base frame at the head end of the frame (see figure 4-7 on page 4-24).

**Figure 4-7. Jack Position for Changing Head End Casters**



147605\_1\_025

10. Raise the head end until the head caster (D) is just off of the floor (see figure 4-6 on page 4-23).
11. Slide the brake/steer pedal (C) out of the head caster (D).
12. Use the jack to raise the head end of the base frame high enough for the head caster (D) to drop out of the base frame.

## Replacement

1. Make sure the replacement head caster (D) is the same type as the one removed.

**NOTE:**

Verify that the caster is in neutral position.

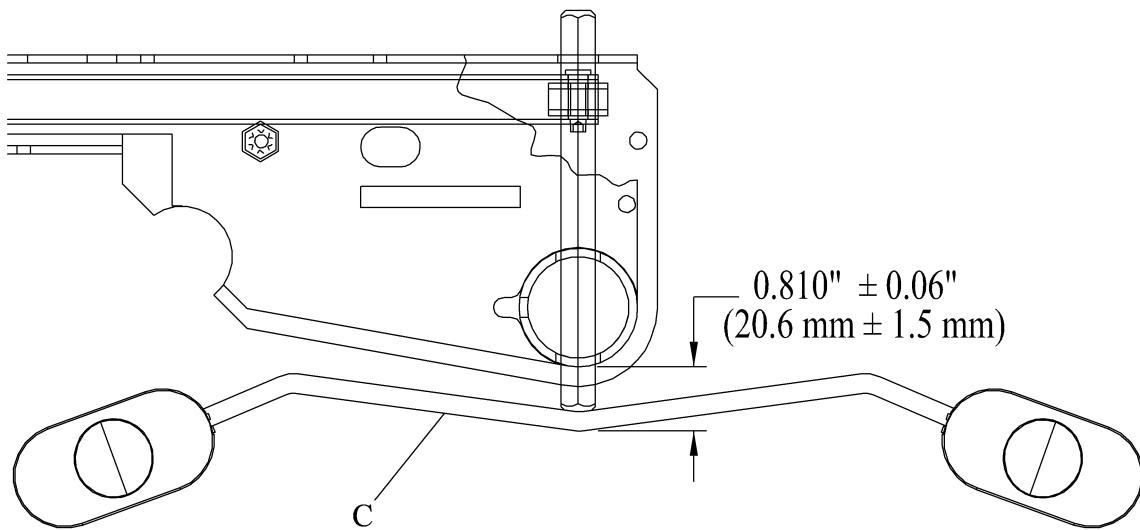
2. Insert the head caster (D) into the base frame.
3. Manually install the brake/steer pedal (C) through the head caster (D), and install it inside the frame brake/steer hex transfer shaft (torque tube).

**NOTE:**

The orange tab on the brake/steer pedal goes toward the foot end of the bed.

4. Use the jack to lower the base frame until the head caster (D) is just above the floor and free to turn.
5. Attach the brake actuating linkage (B) to the brake/steer pedal (C).
6. Make sure the distance between the base and the brake/steer pedal (C) is  $0.81" \pm 0.06"$  ( $20.6 \text{ mm} \pm 1.5 \text{ mm}$ ) (see figure 4-8 on page 4-25).

**Figure 4-8. Brake/Steer Pedal**



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7. Tighten the clamp (A) to 60 in-lb (6.8 N·m) of torque (see figure 4-6 on page 4-23).
8. If necessary, adjust the head caster (D).
9. Remove the jack, and set the caster brakes.
10. Remove the wheel blocks.
11. Remove the hilow cylinder brace (refer to procedure 4.4).
12. Install the head end base cover, the tub cover, and the head caster covers (refer to procedure 4.3).
13. Do the “Function Checks” on page 2-5.

## **Adjustment**

1. Make sure the brake/steer pedal is in the neutral position.
2. Carefully punch out the plastic cap that is on the body of the caster.
3. Turn the screw counterclockwise to decrease tension or clockwise to increase the tension on the wheel.
4. Remove the wheel blocks.
5. Do the “Function Checks” on page 2-5.

## 4.8 Brake Set Sensor

Tools required:

- Hilow cylinder brace (P/N SA1695)
- 6" #2 phillips head screwdriver
- 1/4" nut driver
- Needle nose pliers
- 1/4" deep socket
- Torque wrench, 0 in-lb to 50 in-lb (0 N·m to 5.6 N·m)
- Wheel blocks
- Safety glasses

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.

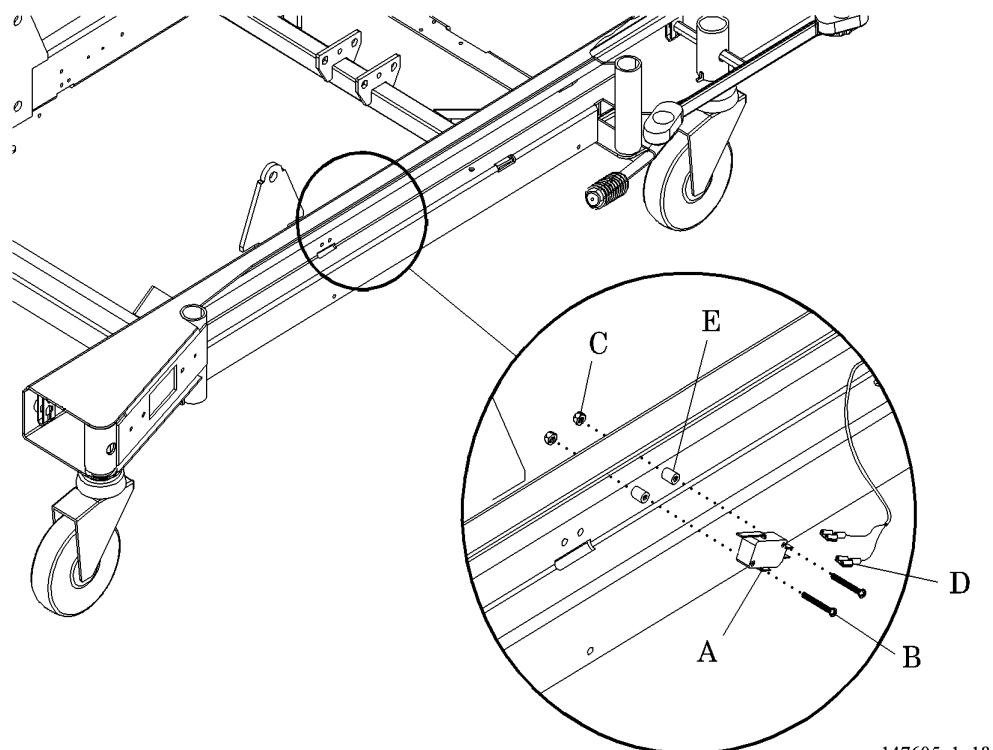
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#### WARNING:

Install the hilow cylinder brace before working under the raised section of the bed. Failure to do so could result in personal injury or equipment damage.

4. Install the hilow cylinder brace (refer to procedure 4.4).
5. Install the wheel blocks.
6. Make sure the brake/steer pedal is in the neutral position.
7. Remove the two spade-connected wires (D) from the brake set sensor switch (A) (see figure 4-9 on page 4-28).

**Figure 4-9. Brake Set Sensor**

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8. Remove the two bolts (B), two nuts (C), two spacers (E), and the brake set sensor switch (A) from the base frame.

## Replacement

1. Make sure the replacement parts are the same type as the ones removed.
2. Do the removal procedure in reverse order.
3. Install the bolts (B) and nuts (C), finger-tighten tight only, to attach the brake set sensor switch (A) and spacers (E) to the base frame.



### CAUTION:

Do not overtighten the bolts. Damage to the brake set sensor switch could occur.

4. Tighten the bolts (B) that attach the brake set sensor switch (A) to the base frame. Do not overtighten the bolts (B).
5. Tighten the nuts (C) to 15 in-lb (1.7 N•m) of torque.

6. Make sure the brake and brake set sensor switch operates correctly.
7. Remove the hilow cylinder brace (refer to procedure 4.4).
8. Do the “Function Checks” on page 2-5.

**4**

## 4.9 Brake/Steer Linkage

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- 8" #2 phillips head screwdriver
- 0.073" feeler gauge
- 7/16" deep well socket
- Ratchet
- ¼" drift punch
- ¼" nut driver
- Ball peen hammer
- Wheel blocks
- Torque wrench, 0 in-lb to 50 in-lb (0 N·m to 5.6 N·m)

### Removal

1. Set the brakes.
2. Install the wheel blocks.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.



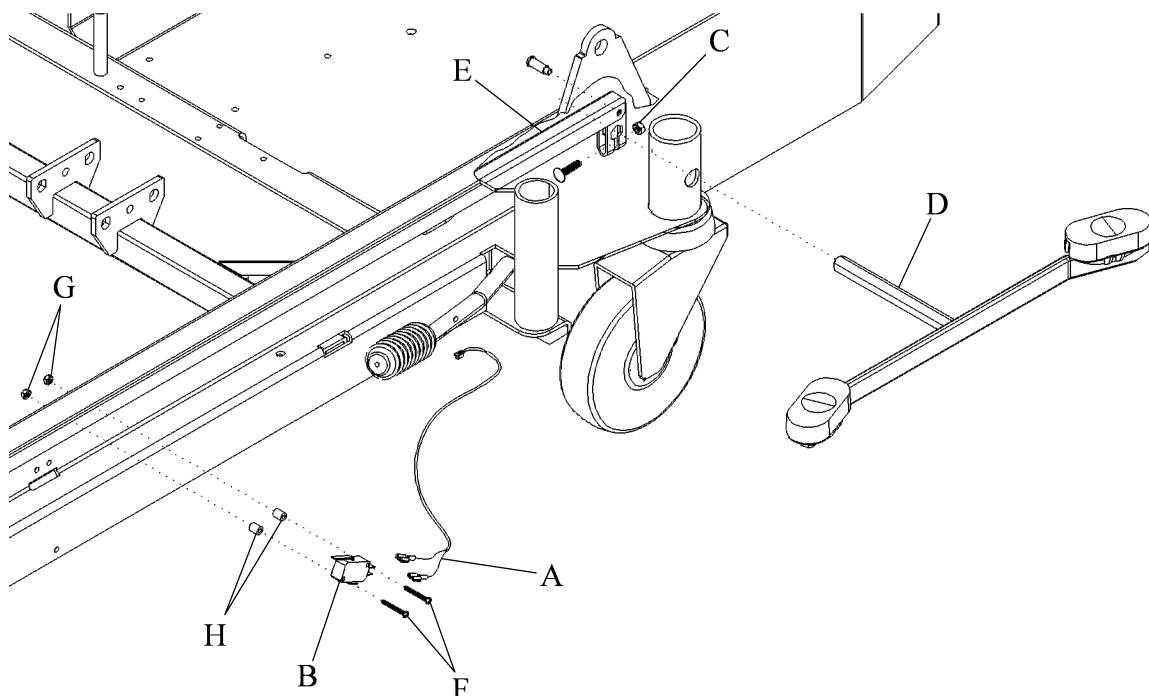
#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

6. Install the hilow cylinder braces (refer to procedure 4.4).
7. For the right-hand brake/steer linkage, remove the brake set sensor switch (B) (see figure 4-10 on page 4-31):

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**Figure 4-10. Brake/Steer Linkage**

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- a. Remove the two spade-connected wires (A) from the brake set sensor switch (B).
- b. Remove the two screws (F), spacers (H), and nuts (G).
- c. Remove the brake set sensor switch (B) from the bed frame.
8. Loosen the clamps (C), and remove the brake/steer hex rods (D) from the casters.
9. Remove the brake transfer actuator bar (E) from the base frame.

## Replacement

1. Make sure the replacement parts are of the same type as the ones removed.
2. Do the removal procedure in reverse order.
3. Install the nuts (G), spacers (H), and screws (F), to attach the brake set sensor switch (B) and the spade connected wires (A).
4. Tighten the clamp bolts (refer to procedure 4.10) to 15 in-lb (1.7 N•m) of torque.

5. Adjust the brake/steer linkage for correct operation.
6. Use the brake/steer hex rods (D) to lock and unlock the brakes. Make sure brake operate correctly.
7. Remove the hilow cylinder brace (refer to procedure 4.4).
8. Install the frame and the caster covers.
9. Remove the wheel blocks.
10. Do the “Function Checks” on page 2-5.

## Adjustment

1. Make sure the brake/steer pedal is in the neutral position.
2. Use a  $\frac{1}{4}$ " drift punch and ball peen hammer to adjust the brake pressure as follows:
  - a. Gently tap the clamp (C) clockwise to increase the brake pressure.
  - b. Gently tap the clamp (C) counterclockwise to decrease the brake pressure.
3. Adjust the gap between the brake shoe and the wheel to  $0.073" + 0.023"$  ( $1.85 \text{ mm} + 0.58 \text{ mm}$ ).
4. Use the  $0.073"$  feeler gauge to make sure the gap between the brake shoe and the wheel is correct.
5. Use the brake/steer foot pedal to apply the brakes. Make sure the wheel is locked.
6. Do the “Function Checks” on page 2-5.

## 4.10 Foot Brake/Steer Pedal

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- 7/16" socket
- Ball peen hammer
- 1/4" drift punch
- Wheel blocks
- Torque wrench, 50 in-lb to 100 in-lb (5.6 N·m to 11.3 N·m)

### Removal



#### WARNING:

Block the wheels, and install the hilow cylinder safety brace before working under the raised section of the bed. Failure to do so could result in personal injury or equipment damage.

1. Install the wheel blocks.
2. Make sure the brake/steer actuator is in the neutral position.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.

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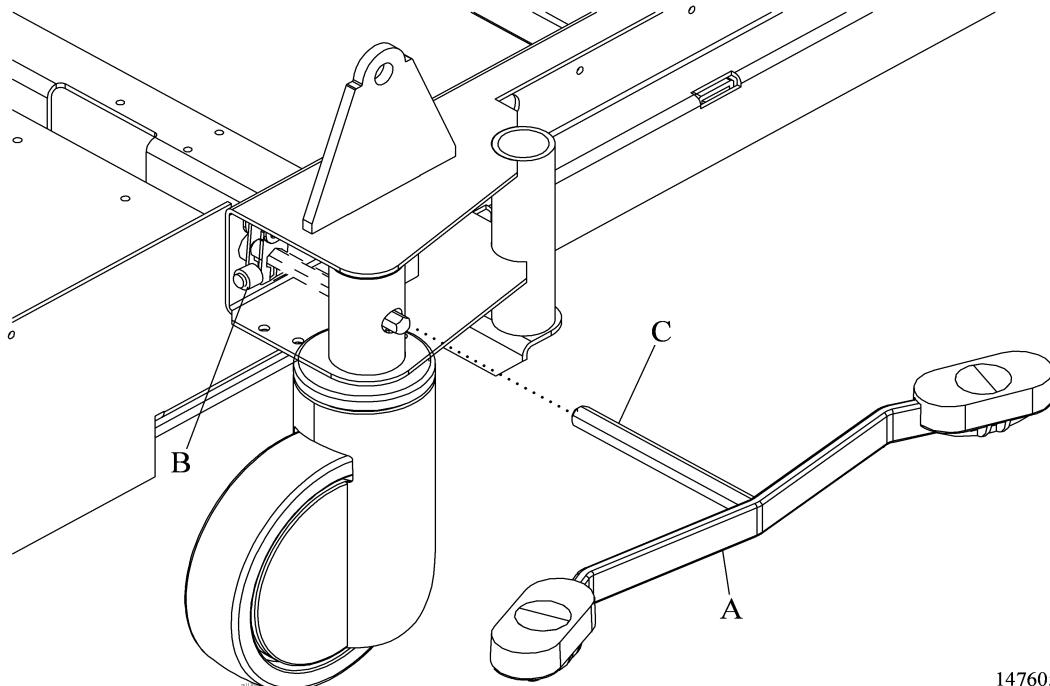
#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.
6. Install the hilow cylinder brace (refer to procedure 4.4).
7. Loosen the clamp bolt (B) (see figure 4-11 on page 4-34).

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**Figure 4-11. Brake Actuator Assembly**



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8. Pull the actuator hex rod (C) outward, and remove the brake foot pedal assembly (A) from the base frame.

## Replacement

1. Do the removal procedure in reverse order.
2. Make sure the orange tab is toward the foot end of the bed.
3. Tighten the clamp bolt (B) to 60 in-lb (6.8 N•m) of torque.
4. Remove the hilow cylinder brace (refer to procedure 4.4).

## Adjustment

1. Make sure the brake/steer pedal is in the neutral position.
2. Use a  $\frac{1}{4}$ " drift punch and ball peen hammer to adjust the brake pressure as follows:
  - a. Gently tap the clamp clockwise to increase the brake pressure.
  - b. Gently tap the clamp counterclockwise to decrease the brake pressure.
3. Adjust the gap between the brake shoe and the wheel to  $0.073" + 0.023"$  ( $1.85 \text{ mm} + 0.58 \text{ mm}$ ).
4. Use the  $0.073"$  feeler gauge to make sure the gap between the brake shoe and the wheel is correct.
5. Use the brake/steer foot pedal to apply the brakes. Make sure the wheel is locked.
6. Do the “Function Checks” on page 2-5.

4

## 4.11 Foot Brake/Steer Pedal Pad

Tools required:

- Hilow cylinder brace (P/N SA1695)
- Wheel blocks
- Needle nose pliers

### Removal



#### WARNING:

Set the brakes, block the wheels, and install the hilow cylinder safety brace before working under the raised section of the bed. Failure to do so could result in personal injury or equipment damage.

#### NOTE:

The brake pedal button is red, and the pedal button is green.

1. Set the brakes.
2. Block the wheels.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

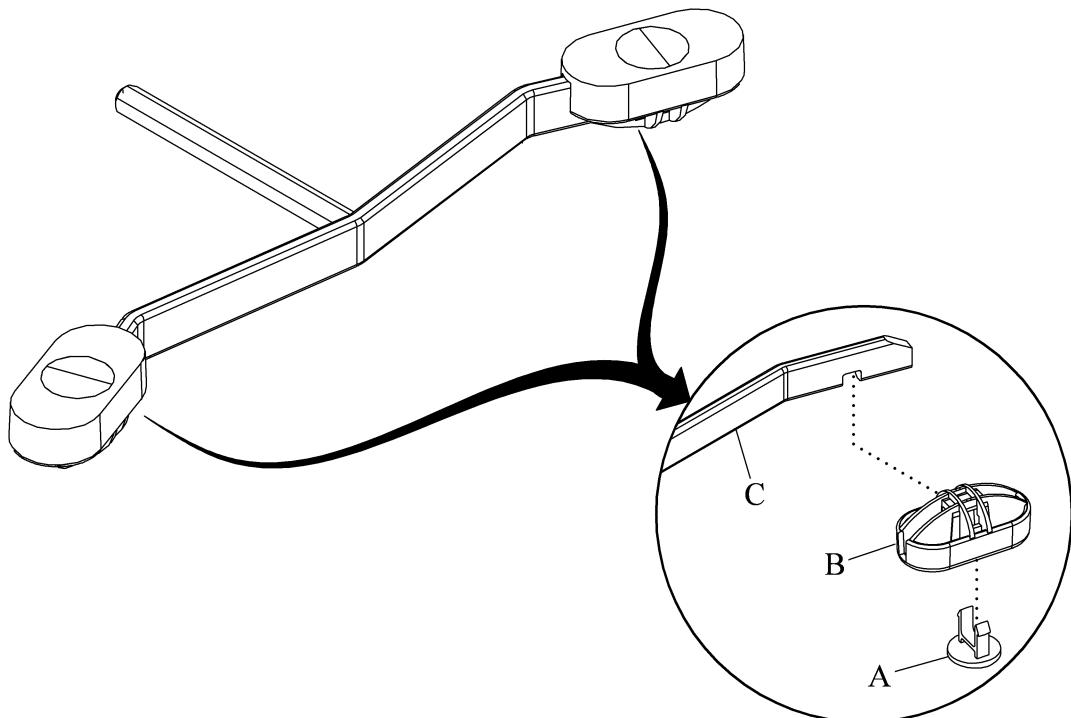
3. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.
6. Install the hilow cylinder brace (refer to procedure 4.4).
7. If necessary, raise or lower the bed to gain access to the foot pump pedal.
8. Squeeze the bottom of the pedal button (A) (see figure 4-12 on page 4-37).

**Figure 4-12. Foot Brake/Steer Pedal Pad**

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9. Push the pedal button (A) through and away from the pedal pad (B).
10. Hold the pedal pad (B), and pull it from the pedal actuator arm (C).

## Replacement

1. Slide the pedal pad (B) on to the pedal actuator arm (C).

**NOTE:**

The brake pedal button is red, and the pedal button is green.

2. Insert the pedal button (A) into the pedal pad (B), and press/snap the pedal button (A) into position.
3. Remove the hilow cylinder brace (refer to procedure 4.4).
4. Do the “Function Checks” on page 2-5.

## **4.12 Foot Pump Pedal**

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- Needle nose pliers

### **Removal**



#### **WARNING:**

Set the brakes, and install the hilow cylinder brace before working under the raised section of the bed. Failure to do so could result in personal injury or equipment damage.

1. Set the brakes.



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.



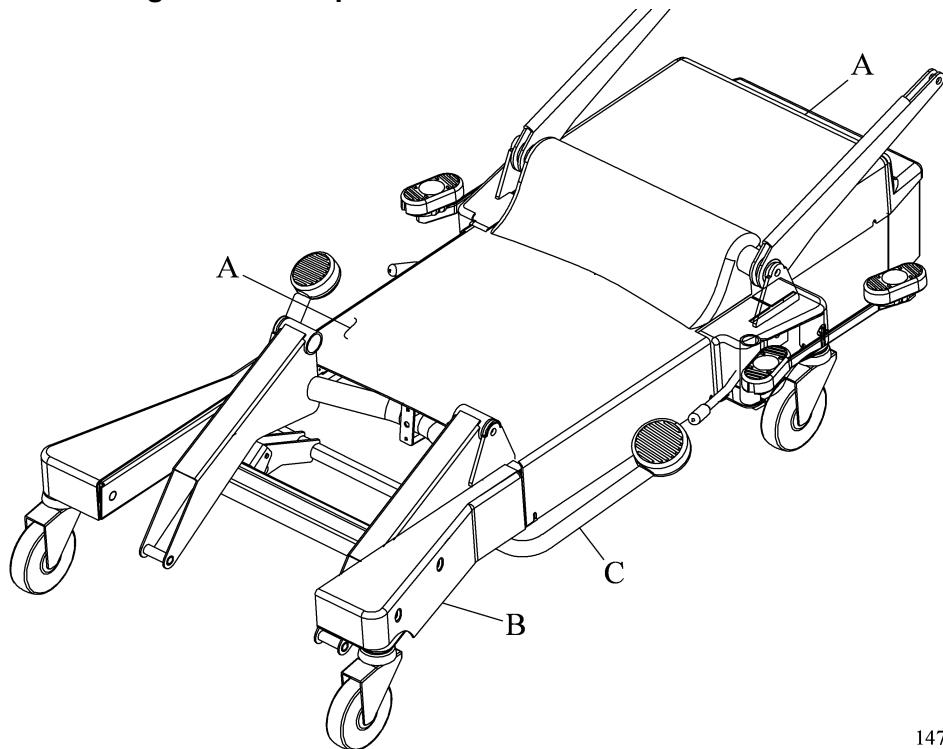
#### **WARNING:**

Failure to disable the battery could cause injury or equipment damage.

3. Disable the battery (refer to procedure 4.74).
4. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame (see figure 4-13 on page 4-39).

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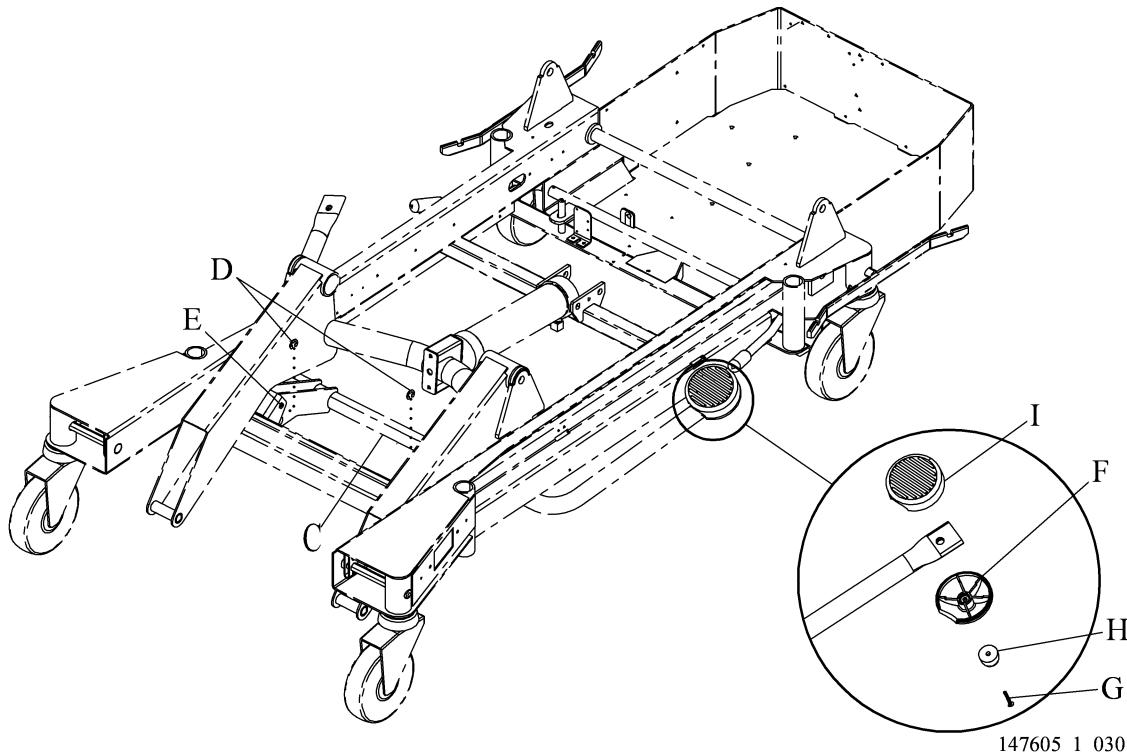
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**Figure 4-13. Top Center Base and Tub Base Covers**

147605\_1\_185

4

5. Install the hilow cylinder braces (refer to procedure 4.4).
6. Release the tension on the foot pump cable through the adjustment opening at the front of the base tub.
7. Remove the two E-rings (D) and D-pins (E) that attach the foot pump pedal (C) to the base frame (see figure 4-14 on page 4-40).

**Figure 4-14. Foot Pump Pedal Actuating Linkage**

8. Remove the foot pump pedal (C) from under the base frame.
9. Remove the two screws (G) and bumpers (H) from the foot pump pedal bottom caps (F).
10. Remove the top foot pump pedal pad (I) from the foot pump pedal (C).

## Replacement

**NOTE:**

As you align the holes, hold down the lever for the foot pump pedal to connect the foot pump weldment linkages.

1. Do the removal procedure in reverse order. Make sure to use new E-rings.
2. Do the “Function Checks” on page 2-5.

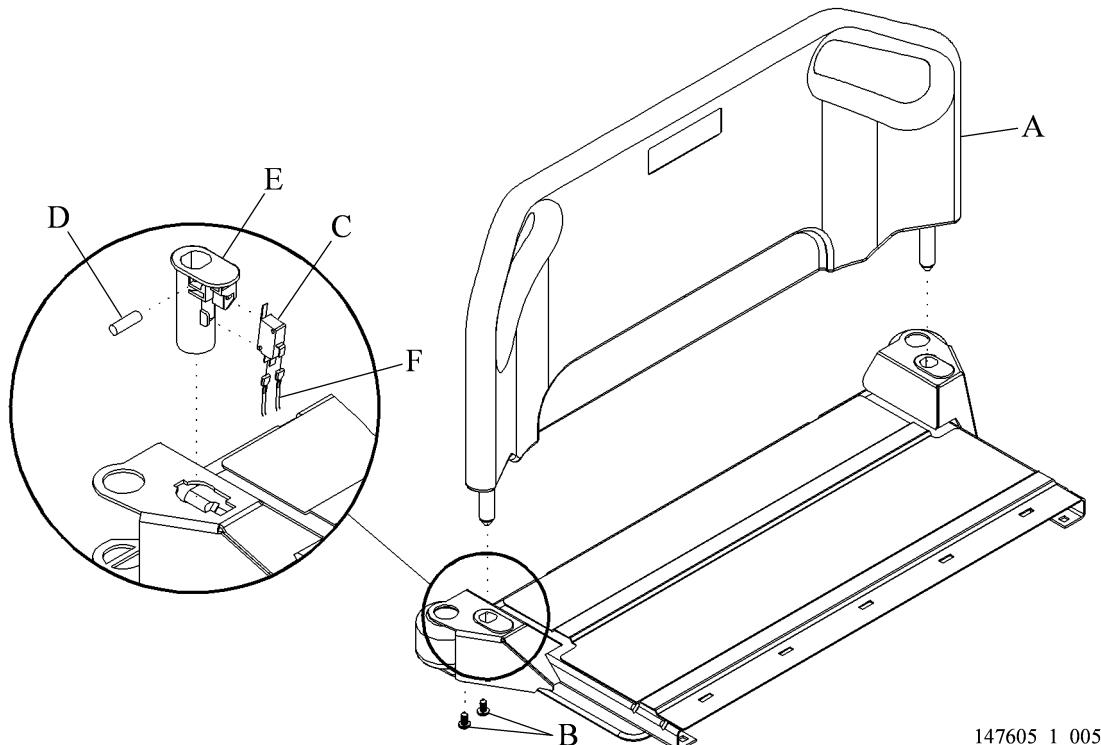
## 4.13 Footboard Switch

Tools required:    Needle nose pliers  
                            T25 Torx®<sup>1</sup> head screwdriver

### Removal

1. Set the brakes.
2. Raise or lower the bed to gain access to work on the footboard switch.
3. Put the foot section in the flat position.
4. Remove the footboard (A) from the frame (see figure 4-15 on page 4-41).

**Figure 4-15. Footboard Switch**



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5. Remove roller bumper.
6. Remove the two screws (B) that attach the footboard socket (E) to the frame.
7. Carefully disconnect the wires and turn and remove, but not fully, the footboard socket (E) from the frame.

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8. Remove the two wires (F) from the footboard switch (C).
9. Make sure the dowel pin (D) is in the footboard socket (E) after the footboard socket (E) is removed.
10. Remove the footboard switch (C) from the footboard socket (E).

## **Replacement**

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.14 Head Siderail

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Hilow cylinder brace (P/N SA1695)  
Small screwdriver  
5/8" open end wrench

### Removal



#### WARNING:

Failure to set the brakes, and install the hilow cylinder brace could cause injury or equipment damage.

1. Set the brakes.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.



#### WARNING:

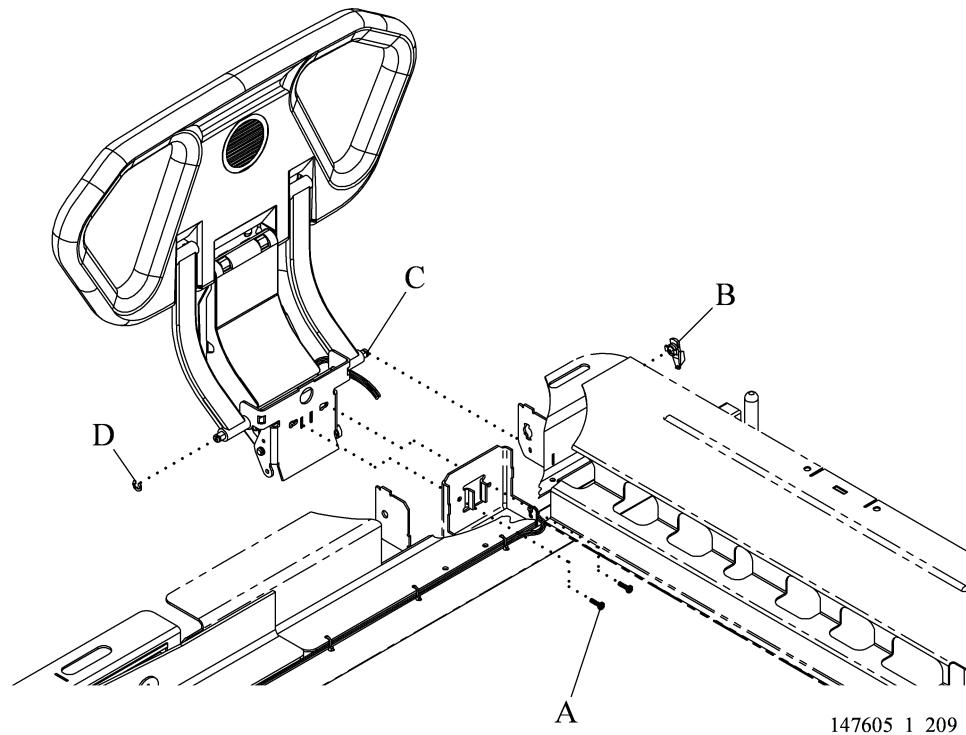
Failure to disable the battery could cause injury or equipment damage.

3. Disable the battery (refer to procedure 4.74).
4. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.
5. Install the hilow cylinder brace (refer to procedure 4.4).
6. Remove the mattress.
7. Raise the head siderail.
8. Unplug the siderail cable from the weigh frame junction box.
9. Remove the cable ties that attach the siderail cable to the frame.
10. Remove the siderail cable from the frame (refer to procedure 4.44).
  - For the left-hand siderail, reference junction board connector P1.
  - For the right-hand siderail, reference junction board connector P7.

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11. Remove the two screws (A) from the center arm mounting plate (see figure 4-16 on page 4-44).

**Figure 4-16. Head Siderail**



12. Remove the E-clip (B) from the hinge pin (C).
13. Remove the hinge pin (C).
14. Remove the head siderail with its wiring harness.

## Replacement

1. Make sure the replacement head siderail is the same type as the one removed.
2. Do the removal procedure in reverse order.
3. Do the “Function Checks” on page 2-5.

## 4.15 Head Siderail P.C. Board

Tools required: T10 Torx®<sup>1</sup> head screwdriver  
T25 Torx® head screwdriver

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).

#### NOTE:

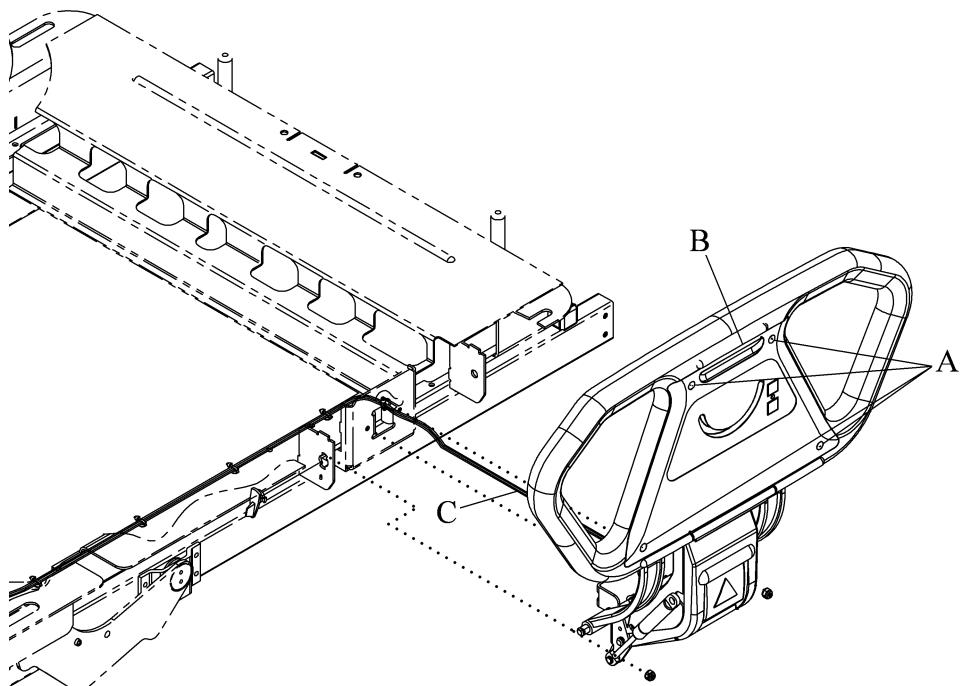
The head end and intermediate siderail removal procedures are identical.

3. To get access to the head siderail P.C. board, raise the head end or intermediate siderail.
4. Remove the four panel mounting screws (A) from the head siderail panel (B) (see figure 4-17 on page 4-46).

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**Figure 4-17. Head Siderail Panel**



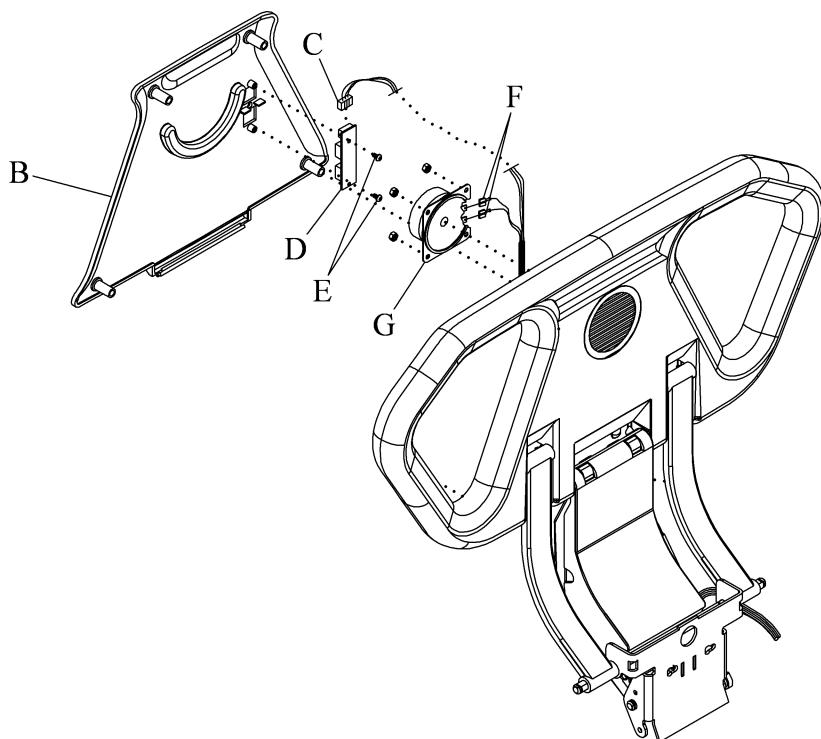
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**CAUTION:**

Use care not to put stress on the connecting cable. Equipment damage could occur.

5. Carefully separate the head siderail panel (B) from the siderail while you support the weight of the head siderail panel (B). Use care not to put stress on the connecting cable (C).
6. Disconnect the connecting cable (C) attached to the Head Up/Down P.C. board (D) (see figure 4-18 on page 4-47).

**Figure 4-18. Head Siderail P.C. Board Removal**

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7. Remove the two retaining screws (E) that attach the Head Up/Down P.C. board (D) to the head siderail panel (B).
8. Remove the Head Up/Down P.C. board (D).
9. Remove the connecting cable (C).
  - a. Disconnect both wires (F) attached to the speaker assembly (G).
  - b. Remove all cable ties that attach the connecting cable (C) and harness to the frame.

## Replacement

1. Make sure the replacement Head Up/Down P.C. board (D) is the same type as the one removed.
2. Do the removal procedure in reverse order.
3. Do the “Function Checks” on page 2-5.

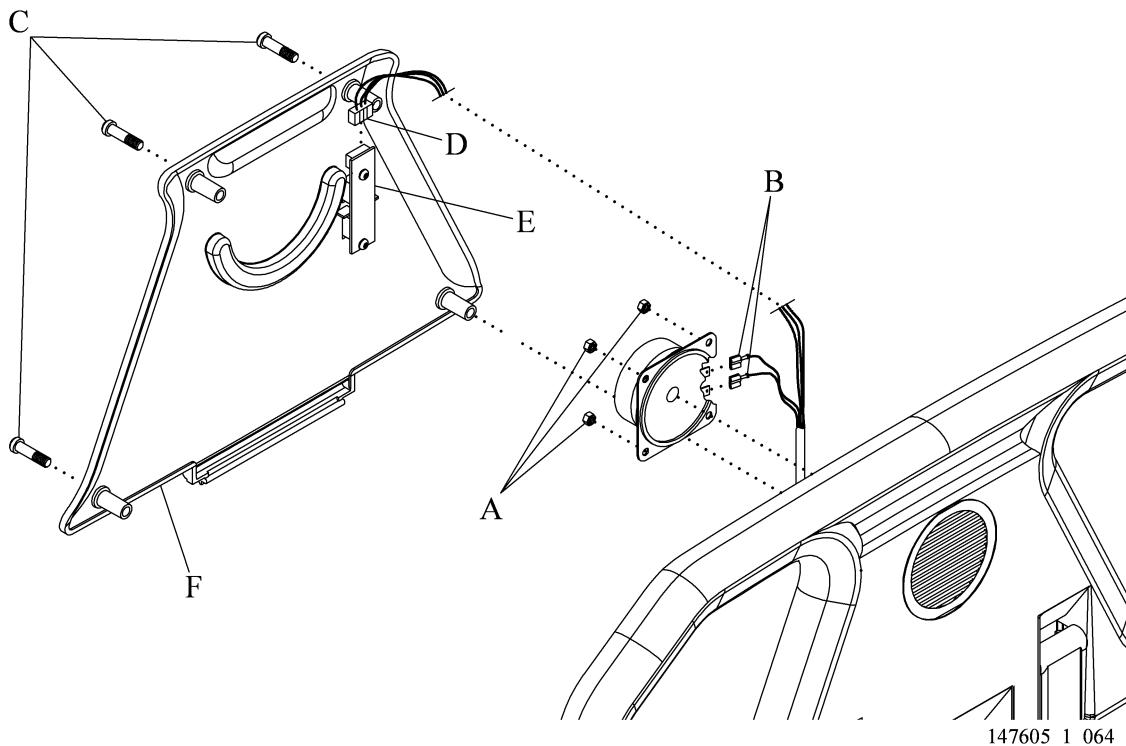
## 4.16 Speaker

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
1/4" nut driver

### Removal

1. Remove the four screws (C) from the siderail panel (F) (see figure 4-19 on page 4-48).

**Figure 4-19. Speaker Removal**



2. Remove the head siderail panel (F).
3. Disconnect the cable (D) from the siderail P.C. board (E).
4. Disconnect the speaker wires (B) from the two speaker spade connectors.
5. Remove the four mounting nuts (A) that attach the speaker to the head siderail.
6. Remove the speaker from the head siderail.

### Replacement

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1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.



4

## 4.17 Intermediate Siderail

Tools required:    T15 Torx®<sup>1</sup> head screwdriver  
                    T25 Torx® head screwdriver

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).

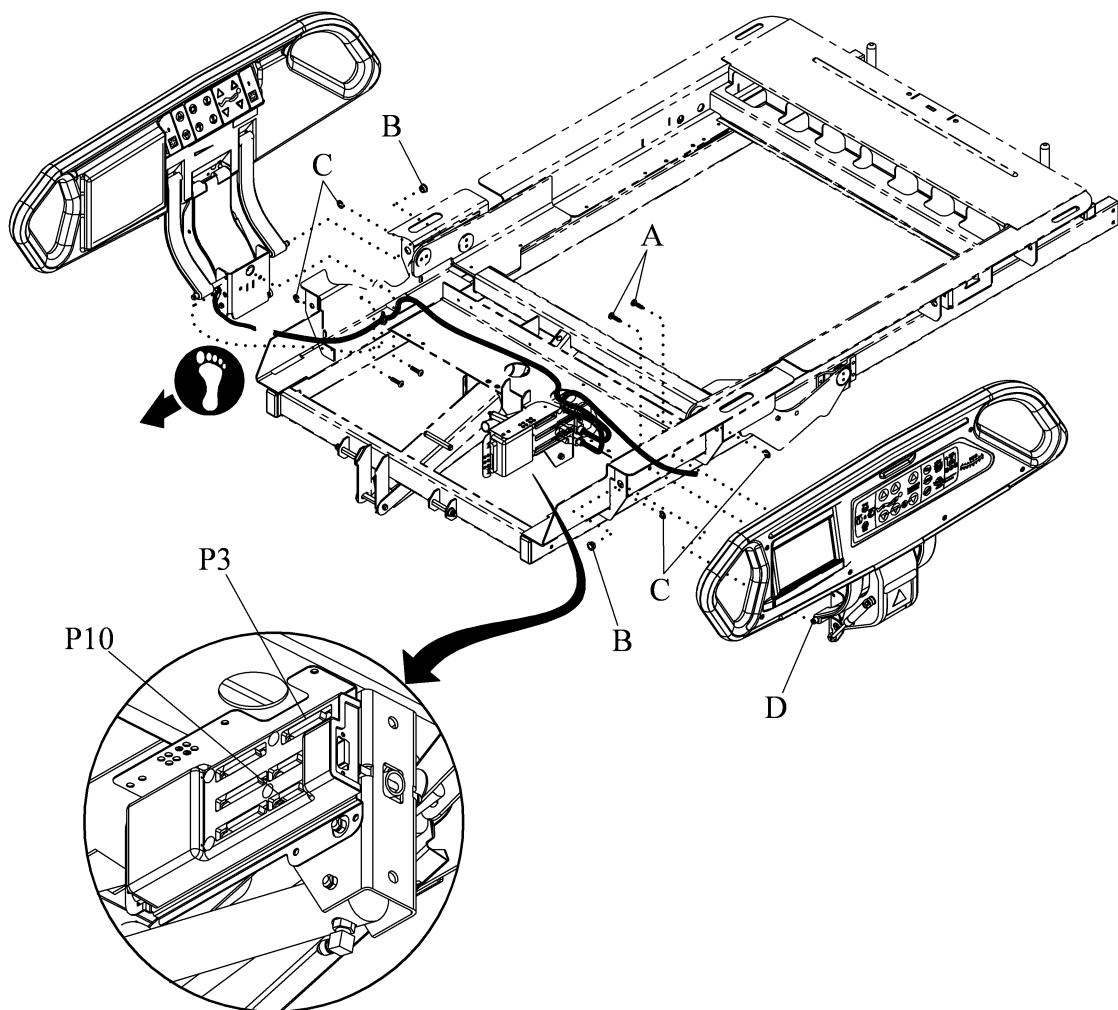
#### NOTE:

Disconnect the intermediate siderail cable from the wiring harness. The intermediate siderail cable should remain with the removed siderail.

3. Disconnect the intermediate siderail cable from the wiring harness as follows:
  - a. Remove all cable ties from the harness.
  - b. Disconnect the in-line harness connector at the weigh frame junction electrical box (plug P10 left and plug P3 right).
4. Remove the two screws (A) from the center arm mounting plate (see figure 4-20 on page 4-51).
5. Remove the bushing (B).
6. Remove the E-clips (C) from the hinge pin.
7. Remove the hinge pin.
8. Remove the intermediate siderail and the wiring harness.

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**Figure 4-20. Intermediate Siderail**

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## Replacement

1. Do the removal procedure in the reverse order.
2. Do the “Function Checks” on page 2-5.

## **4.18 Main Caregiver P.C. Board or Patient Control Switch P.C. Board**

Tools required:    T10 Torx®<sup>1</sup> head screwdriver  
                    T25 Torx® head screwdriver  
                    Antistatic strap

### **Removal**

**NOTE:**

Do not remove the intermediate siderail from the bed to service the main caregiver P.C. board or patient control switch P.C. board.

1. Raise the intermediate siderail to the up and locked position.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.



**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

3. Disable the battery (refer to procedure 4.74).
4. Remove the six screws (A) that attach the cover to the intermediate siderail (see figure 4-21 on page 4-53).



**CAUTION:**

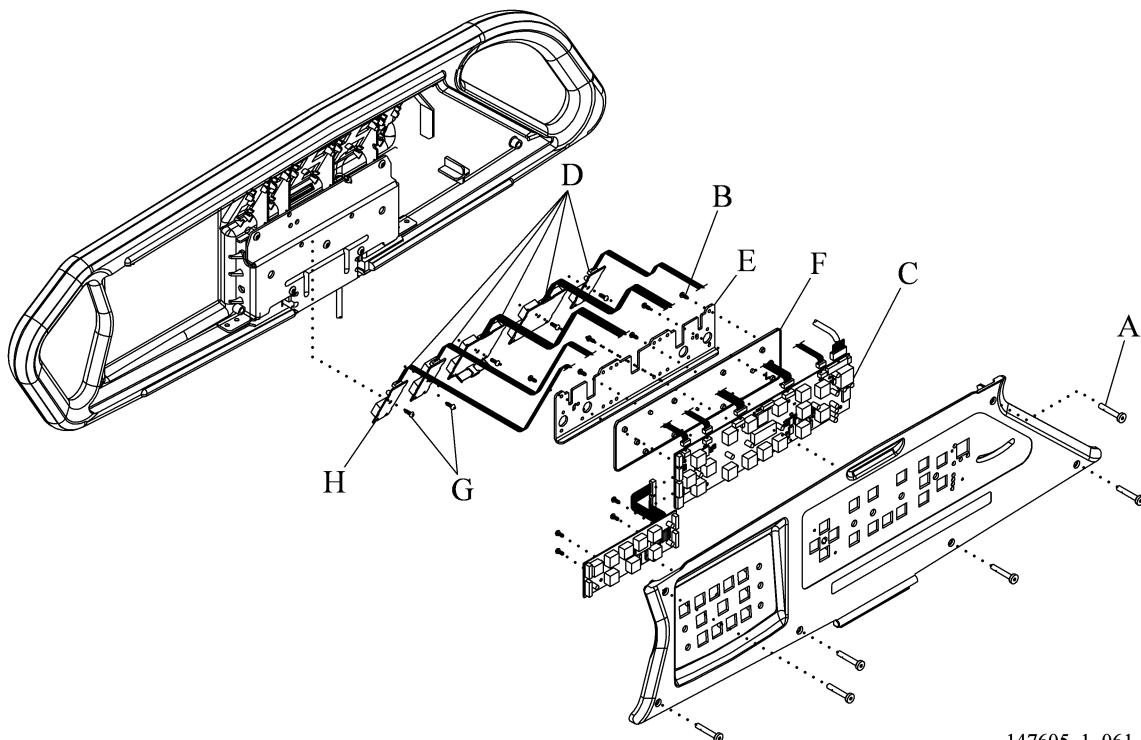
Failure to wear an antistatic strap can cause equipment damage.

5. Put on the antistatic strap.

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**Figure 4-21. Intermediate Siderail P.C. Board Removal**



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**CAUTION:**

Support the weight of the front panel to prevent stress on the connecting P.C. board cable. Failure to do so could cause equipment damage.

6. Support the weight of the cover, and carefully separate it from the intermediate siderail.
7. Loosen the P.C. board mounting screws (B).
8. Disconnect all cable connectors from the main caregiver P.C. board (C) or the patient control switch P.C. board (D) to be removed.



**CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.



**CAUTION:**

For shipping and storage, put the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

9. To remove the main caregiver P.C. board (C), perform the following:
  - a. Remove the five mounting screws (B) that attach the main caregiver P.C. board (C) and stiffener (E) to the cover.
  - b. Remove the stiffener (E) and insulator (F).
  - c. Carefully lift the main caregiver P.C. board (C) by its edges from the cover.
10. To remove the patient control switch P.C. boards (D), perform the following:
  - a. Remove the mounting screws (G) that attach the patient control switch P.C. boards (H) to the intermediate siderail.
  - b. Carefully spread the side catches along one edge of the patient control switch P.C. board (H).
  - c. Lift out the patient control switch P.C. board (H) from the patient side intermediate siderail.

## **Replacement**



**CAUTION:**

Do not bend the connector pins of the connecting cable. Equipment damage can occur.

1. Do the removal procedure in reverse order.
2. Align and firmly install each connecting cable into its corresponding cable connector. Use care not to bend the connector pins.
3. Make sure to put the GCI ribbon connector under the lower corner mounting post.
4. Do the “Function Checks” on page 2-5.

## 4.19 Nurse Call Switch P.C. Board

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- T10 Torx® head screwdriver
- Antistatic strap

### Removal

**NOTE:**

Do not remove the intermediate siderail from the bed to service the nurse call control P.C. board.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the six screws (A) that attach the cover (B) to the intermediate siderail (C) (see figure 4-22 on page 4-56).

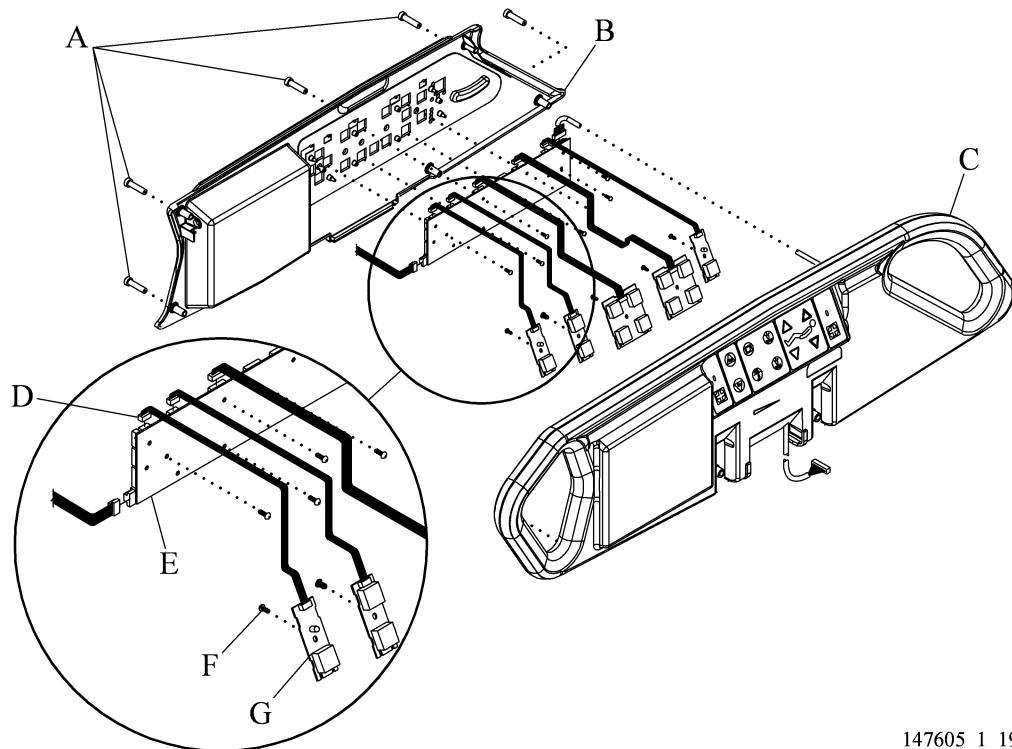


**CAUTION:**

Failure to wear an antistatic strap can cause equipment damage.

4. Put on the antistatic strap.

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**Figure 4-22. Nurse Call Control P.C. Board**

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**CAUTION:**

Support the weight of the front panel to prevent stress on the interconnecting P.C. board cable. Failure to do so could result in equipment damage.

5. Support the weight of the cover (B), and carefully separate it from the intermediate siderail (C).
6. Disconnect the nurse call control cable (D) from P9 or P10 on the caregiver positioning P.C. board (E).
7. Remove the mounting screw (F) that attaches the nurse call P.C. board (G) to the intermediate siderail (C).
8. Carefully spread the side catches along one edge of the nurse call P.C. board (G).

**CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.

**CAUTION:**

For shipping and storage, put the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

9. By its edges, lift the nurse call P.C. board (G) from the intermediate siderail (C).

## Replacement

1. Press one edge of the nurse call control P.C. board (G) behind the P.C. board siderail tabs.
2. Carefully snap the nurse call control P.C. board (G) into place.

**CAUTION:**

Do not bend the connector pins of the connecting cable. Equipment damage can occur.

3. Use care not to bend the connector pins as you align and firmly install the cable (D) into the caregiver positioning P.C. board (E) connector P9 or P10.
4. Do the removal procedure in reverse order.
5. Do the “Function Checks” on page 2-5.

## 4.20 Patient Exit Detection Alarm and Sleep Surface Siderail Controls

Tools required:    T25 Torx®<sup>1</sup> head screwdriver  
                    T10 Torx® head screwdriver  
                    Antistatic strap

### Removal

**NOTE:**

The PED P.C. board and sleep surface siderail control P.C. board are the same.

**NOTE:**

Do not remove the intermediate siderail from the bed to service the Patient Exit Detection P.C. board.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the six screws (A) that attach the cover (B) to the intermediate siderail (C) (see figure 4-23 on page 4-59).



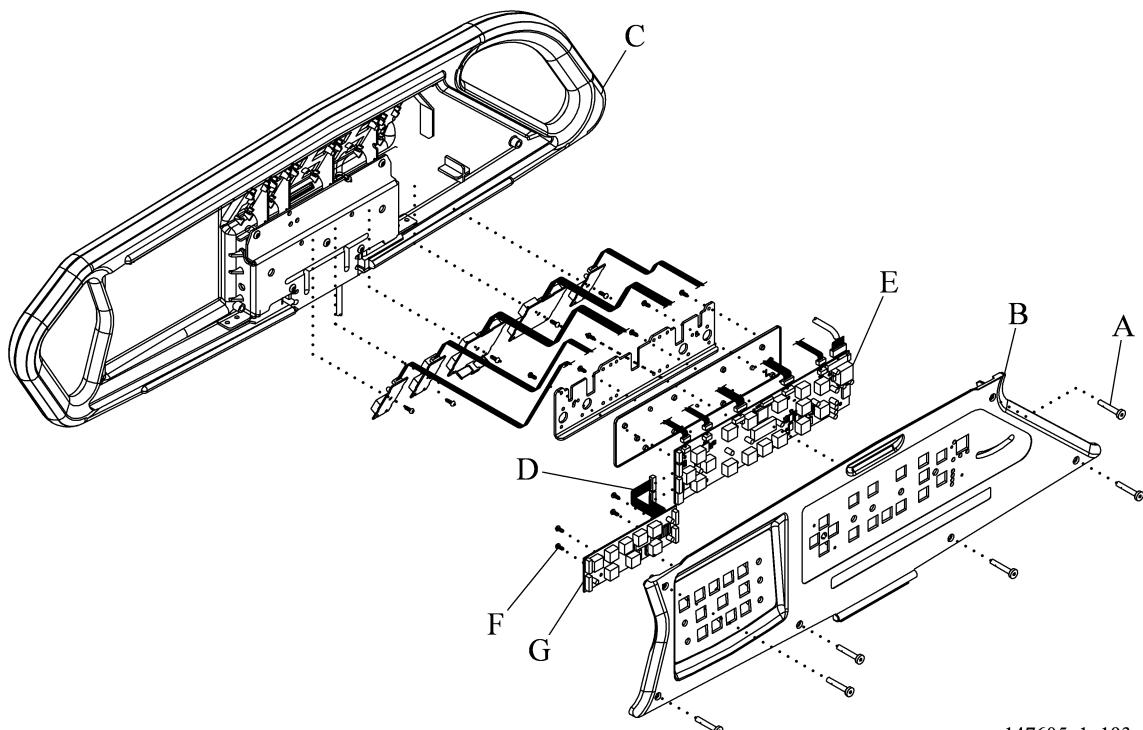
**CAUTION:**

Failure to wear an antistatic strap can cause equipment damage.

4. Put on the antistatic strap.

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**Figure 4-23. Patient Exit Detection (PED) P.C. Board**

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4

**CAUTION:**

Support the weight of the bed setup control cover to prevent stress on the connecting P.C. board cable. Failure to do so could result in equipment damage.

5. Support the weight of the cover (B).
6. Disconnect the Patient Exit Detection (PED) cable (D) from the caregiver positioning P.C. board (E).
7. Remove the mounting screws (F) that attach the PED P.C. board (G) to the cover (B).



**CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.



**CAUTION:**

For shipping and storage, put the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

8. Remove the PED P.C. board (G) from the cover (B).

## Replacement

1. Do the removal procedure in reverse order.



**CAUTION:**

Do not bend the connector pins of the connecting cable. Equipment damage can occur.

2. Use care not to bend the connector pins as you align and firmly install the cable into its P.C. board connector.
3. Do the removal procedure in reverse order.
4. Do the “Function Checks” on page 2-5.

## 4.21 Entertainment and Volume Control

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
T15 Torx® head screwdriver  
Antistatic strap

### Removal

**NOTE:**

Do not remove the intermediate siderail from the bed to service the entertainment P.C. board.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the six screws (A) that attach the cover (B) to the intermediate siderail (C) (see figure 4-24 on page 4-62).

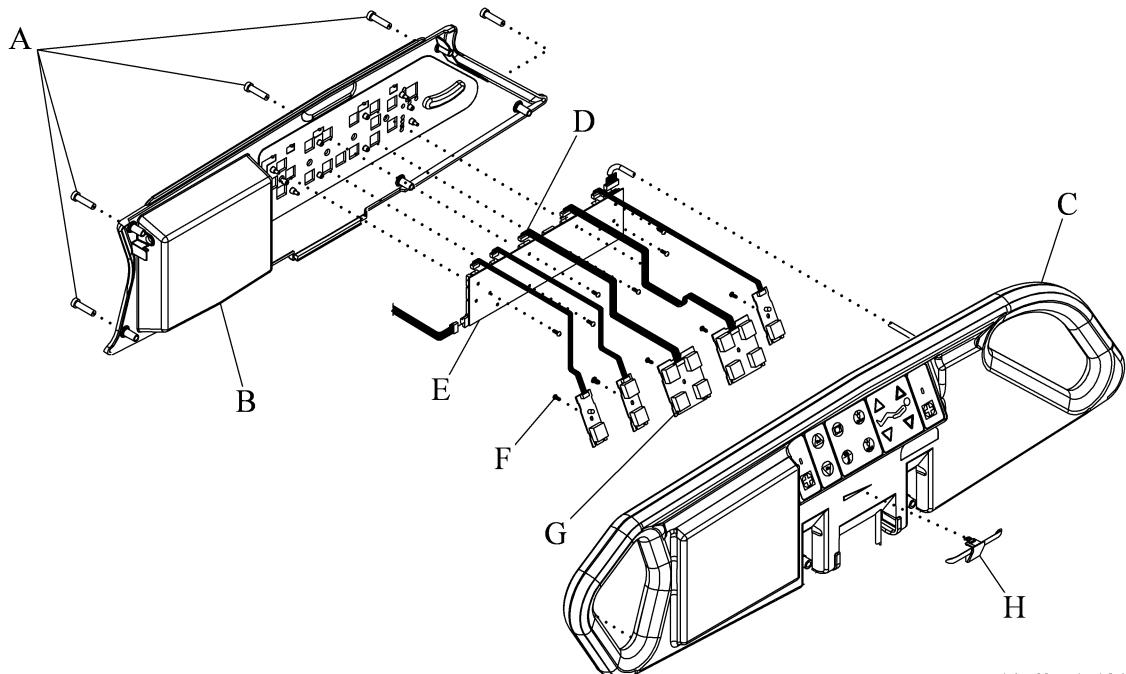


**CAUTION:**

Failure to wear an antistatic strap can cause equipment damage.

4. Put on the antistatic strap.

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**Figure 4-24. Entertainment and Volume Control**

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**CAUTION:**

Support the weight of the front cover to prevent stress on the connecting P.C. board cables. Failure to do so could result in equipment damage.

5. While you support the weight of the cover (B), disconnect the entertainment cable connector (D) from the caregiver control P.C. board (E).

**CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.

**CAUTION:**

For shipping and storage, put the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

6. Remove the P.C. board mounting screw (F).
7. Carefully spread the side catches along one edge of the entertainment P.C. board (G).

8. Remove the entertainment P.C. board (G) from the intermediate siderail (C).
9. Remove the patient volume slide (H) from the P.C. board volume slide tab.

## Replacement

**CAUTION:**

Do not bend the connector pins of the connecting cable. Equipment damage can occur.

1. Do the removal procedure in reverse order.
2. Use care not to bend the connector pins when you align and firmly install the entertainment P.C. board (G) connecting cable into the caregiver positioning P.C. board connector P2.
3. Do the “Function Checks” on page 2-5.

## 4.22 Graphical Caregiver Interface (GCI)® Control

Tools required: T25 Torx®<sup>1</sup> head screwdriver

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.

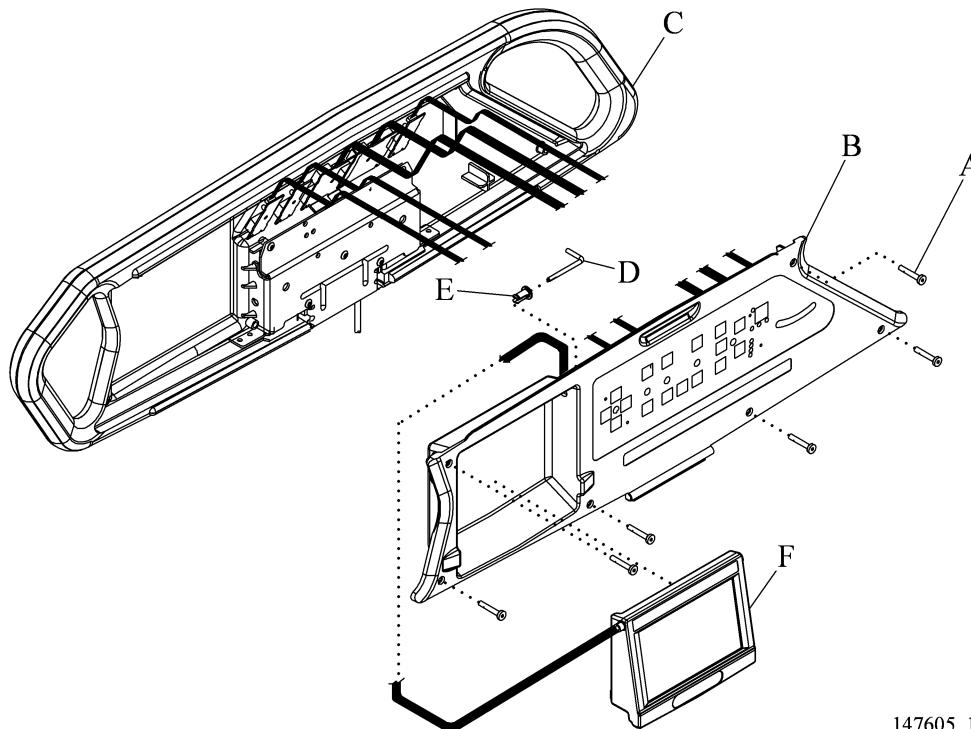


#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the six screws (A) that attach the cover (B) to the intermediate siderail (C) (see figure 4-25 on page 4-64).

**Figure 4-25. Graphical Caregiver Interface (GCI)® Control**



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4. While you support the weight of the cover (B), disconnect the GCI cable from the caregiver control P.C. board.
5. Remove the hinge (D) and grommet (E) from the GCI (F).
6. Remove the GCI from the cover (B).

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

4

## 4.23 Head Angle Indicator/Trendelenburg Indicator

Tools required:    Thin applicator knife  
                            Clean, soft cloth

**NOTE:**

The head angle indicator and Trendelenburg indicator replacement procedures are the same; the differences are the location. The head angle indicator is on the head siderail, and the Trendelenburg indicator is on the intermediate siderail.

**NOTE:**

The indicator ball is sealed in the roller groove behind the removable plastic laminate.

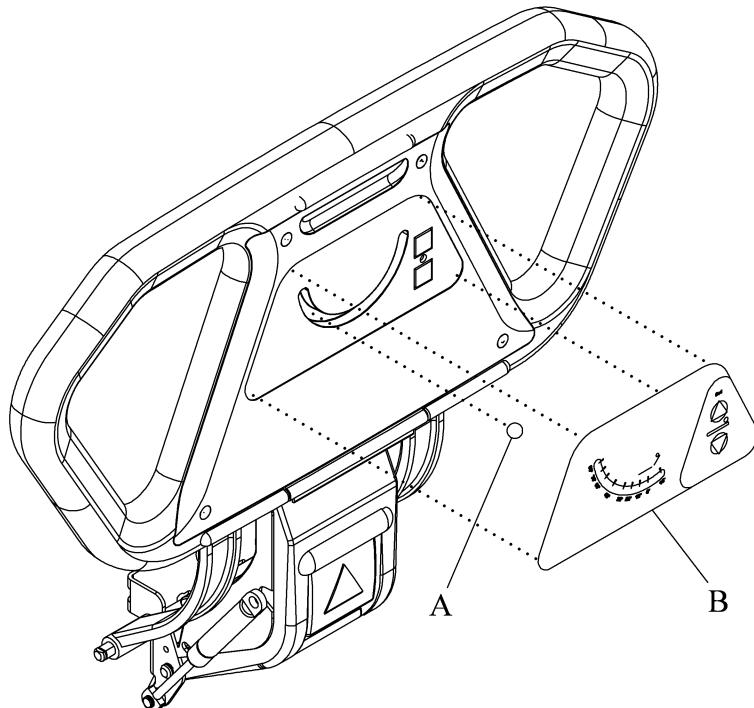
### Removal

1. Remove the plastic laminate (B) (see figure 4-26 on page 4-67).
  - a. Use your fingernail or a thin applicator knife to pry up the edge of the plastic laminate (B).
  - b. Peel the plastic laminate (B) in a swift motion from the face of the siderail.

**NOTE:**

The head angle indicator is shown in figure 4-26 on the head siderail. The Trendelenburg indicator is on the intermediate siderail.

2. Remove the indicator ball (A) from the roller groove.

**Figure 4-26. Head Angle Indicator**

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4

## Replacement

1. Put the indicator ball (A) into the roller groove.
2. Align the plastic laminate (B) with the siderail face.
3. With the protective back partially peeled away, align and apply a tacky edge of the plastic laminate (B) to the face of the siderail.
4. Make sure the indicator ball (A) is in the roller groove.

**CAUTION:**

Do not get wrinkles or air pockets in the surface of the plastic laminate. Equipment damage can occur.

5. Remove the protective backing, and slowly apply the plastic laminate (B). Do not get wrinkles or air pockets in the surface of the plastic laminate (B).
6. Smooth out the plastic laminate (B), and apply firm pressure to set the plastic laminate (B) adhesive.

7. Wipe the plastic laminate (B) face with a clean, soft cloth, and return the siderail to service.
8. Do the “Function Checks” on page 2-5.

## 4.24 Hydraulic System Fluid Fill

Tools required: Small funnel  
5/8" open end wrench  
Hydraulic fluid (P/N 36199S)

1. Put the bed in this position:
  - Bed fully raised
  - Head down
  - Knee down
  - Foot fully extended and raised
2. Remove the tub base cover (refer to procedure 4.3).
3. Remove the plug (A) from the hydraulic reservoir (B):

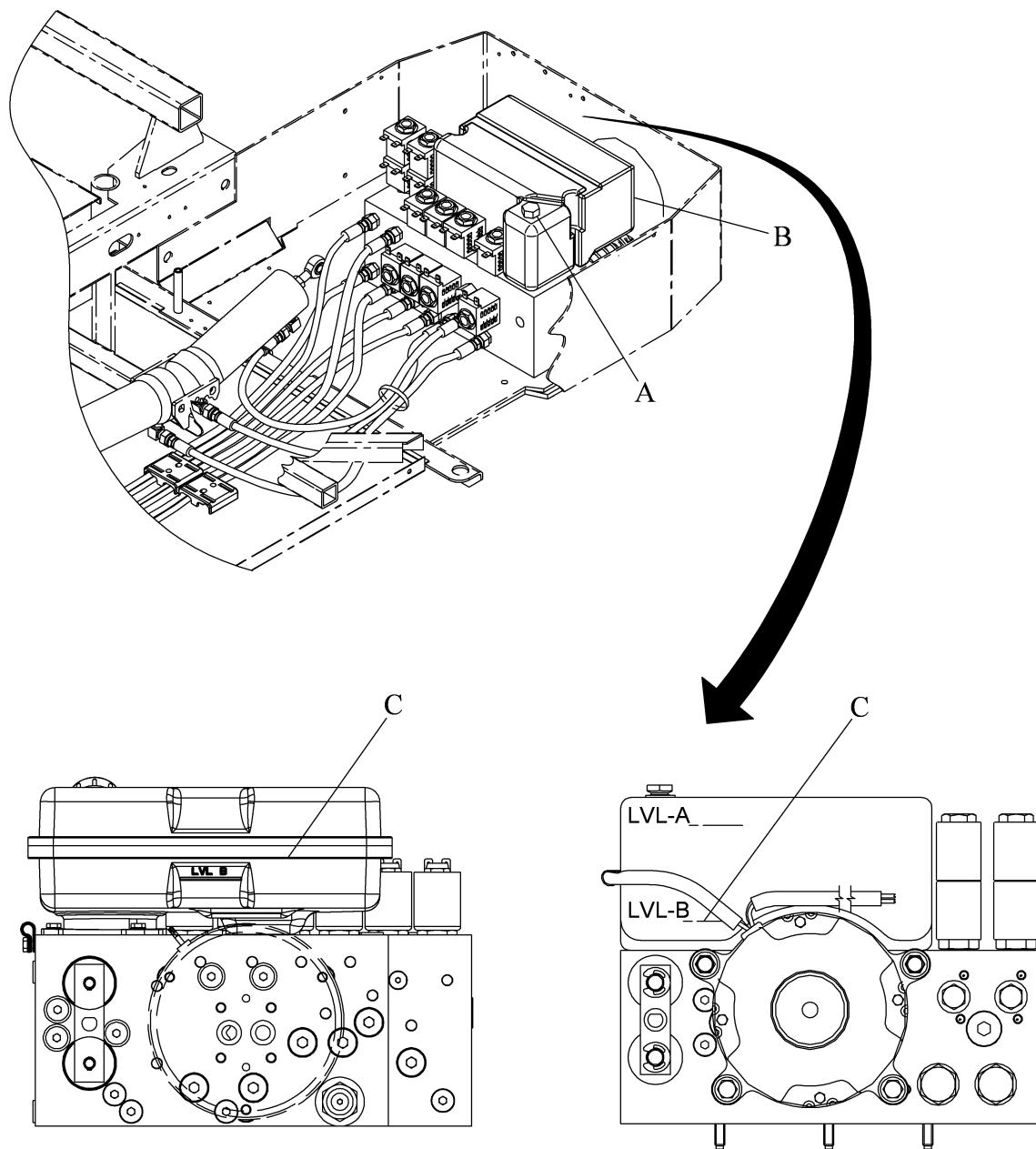


### WARNING:

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when you pour or handle the fluid. Failure to wash hands or clothing after contact can cause injury. For more information about this product, refer to its MSDS.

4. Fill the reservoir to the **Level B** (C).
5. Install the plug (A) into the hydraulic reservoir (B).
6. Operate the bed up and down to examine for leaks.
7. If there are no leaks, install the tub base cover (refer to procedure 4.3).

**Figure 4-27. Hydraulic Fluid Level**



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## 4.25 Hydraulic Manifold Valve Coil

Tools required:

- Hilow cylinder brace (P/N SA1695)
- $\frac{3}{4}$ " open end wrench
- Needle nose pliers
- Torque wrench, 0 in-lb to 50 in-lb (0 N·m to 5.6 N·m)

### Removal

1. Set the brakes.
2. Raise the bed to the high position.



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

3. Install the hilow cylinder brace (refer to procedure 4.4).



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.

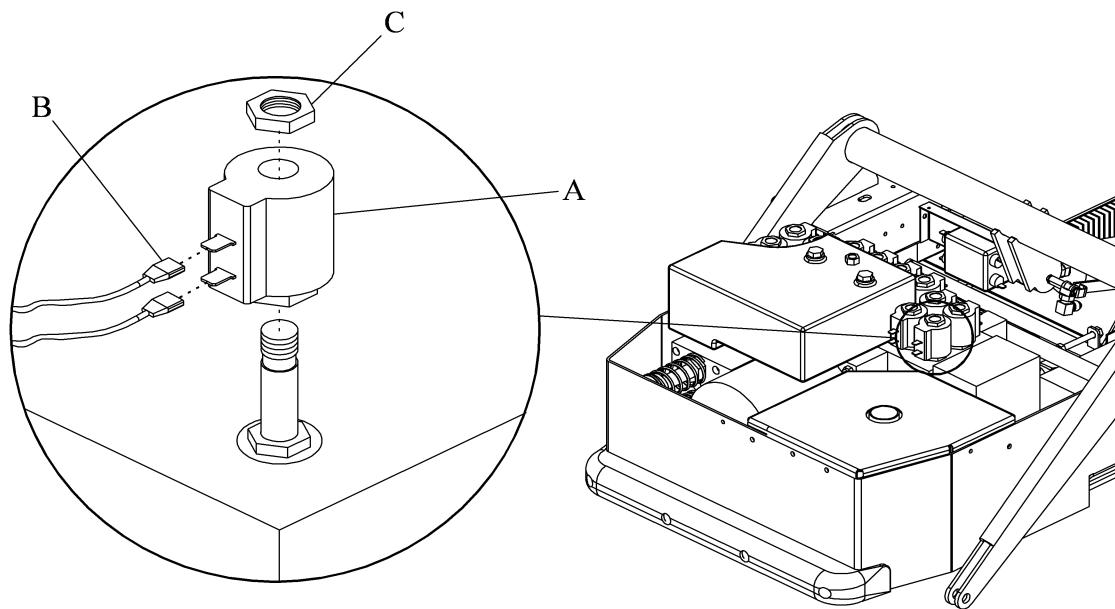


#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).
6. Remove both wire spade connectors (B) from the valve coil (A) (see figure 4-28 on page 4-72).

**Figure 4-28. Hydraulic Valve Coil**



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7. Remove the mounting nut (C) from the top end of the valve core.
8. Lift the valve coil (A) from the valve core.
9. Remove the valve coil (A).

## Replacement

1. Make sure the valve coil (A) is of the same type as the one removed.
2. Tighten the nut to  $40 \text{ in lb} \pm 5 \text{ in lb}$  ( $4.5 \pm .6 \text{ N}\cdot\text{m}$ ) of torque.
3. Do the removal procedure in reverse order.
4. Do the “Function Checks” on page 2-5.

## 4.26 Hydraulic Valve

Tools required:

- Hilow cylinder brace (P/N SA1695)
- 7/8" deep well socket
- Large basting syringe
- Ratchet
- 1/4" Tygon®<sup>1</sup> flexible hose
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 17.0 N·m)

### Removal

1. Set the brakes.
2. Raise the bed to the high position.
3. Put the sleep surface in the flat position.



#### **WARNING:**

Failure to install the hilow cylinder brace before working under the raised section of the bed could result in personal injury or equipment damage.

4. Install the hilow cylinder brace (refer to procedure 4.4).

4



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

5. Unplug the bed from its power source.



#### **WARNING:**

Failure to disable the battery could cause injury or equipment damage.

6. Disable the battery (refer to procedure 4.74).



#### **CAUTION:**

Before you remove the hydraulic manifold valves, support all applicable assemblies to prevent movement from the loss of hydraulic cylinder pressure.

7. Remove the hydraulic valve coil (refer to procedure 4.25).

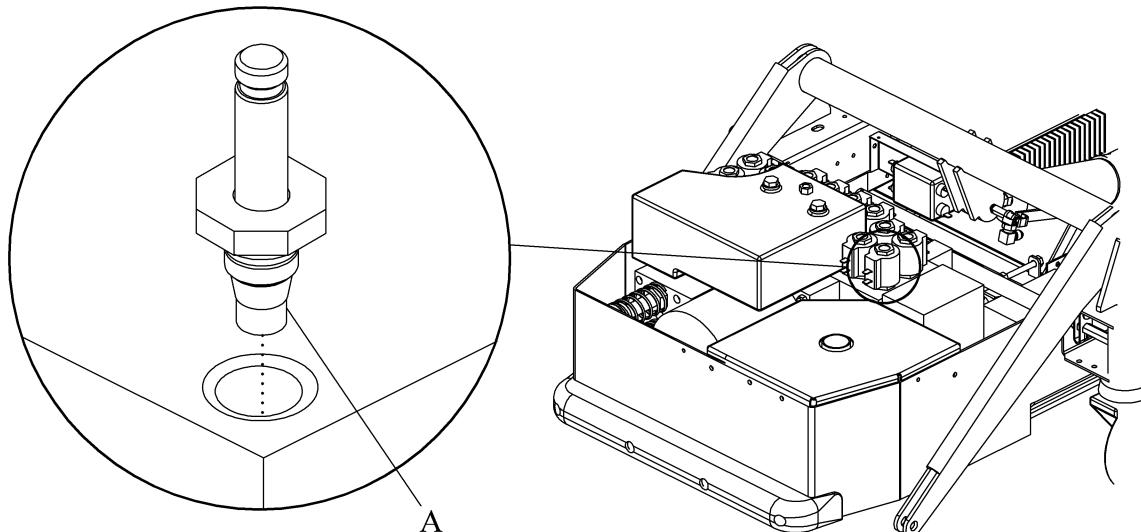
1. Tygon® is a registered trademark of Norton Company.

**CAUTION:**

Do not damage the valve O-rings during removal of the hydraulic valve from the hydraulic manifold. Equipment damage can occur.

8. Remove the hydraulic valve (A) from the hydraulic manifold (see figure 4-29 on page 4-74). Use care not to damage the valve O-rings.

**Figure 4-29. Hydraulic Actuation Valve**



147605\_1\_104

## Replacement

**CAUTION:**

Make sure the hydraulic oil is removed from the valve chamber before you install the hydraulic valve. Damage to the O-rings can occur if this is not done correctly.

1. Remove the hydraulic oil from the valve chamber.
2. Make sure the replacement valve (A) is the same type as the one removed.
3. Tighten the hydraulic valve to  $150 \pm 30$  in-lb ( $16.948 \pm 3.390$  N·m) of torque.
4. Complete the valve installation in reverse order of the removal steps.

## 4.27 Hydraulic Power Unit

Tools required:

- Hilow cylinder brace (P/N SA1695)
- Black marker
- ½" open end wrench
- 9/16" open end wrench
- 5/8" open end wrench
- 9/16" open end torque adapter
- 7/16" deep well socket
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 16.9 N·m)
- Towels

### Removal



#### WARNING:

Failure to set the brakes, and install the hilow cylinder brace could cause injury or equipment damage.

1. Set the brakes.
2. Raise the intermediate frame to the upper limit.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.

4



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.
6. Install the hilow cylinder brace (refer to procedure 4.4).



**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when you pour or handle the fluid. Failure to wash hands or clothing after contact can cause injury. For more information about this product, refer to its MSDS.



**WARNING:**

The hydraulic lines may contain pressure. Disconnect the lines slowly to prevent rapid escape of hydraulic fluid. Injury may occur.

7. Remove four coils on the bottom side, and remove all wires from the coils.
8. Remove the screw that holds the bridge rectifier to the hydraulic power unit (B), leave the wires connected if possible.

**NOTE:**

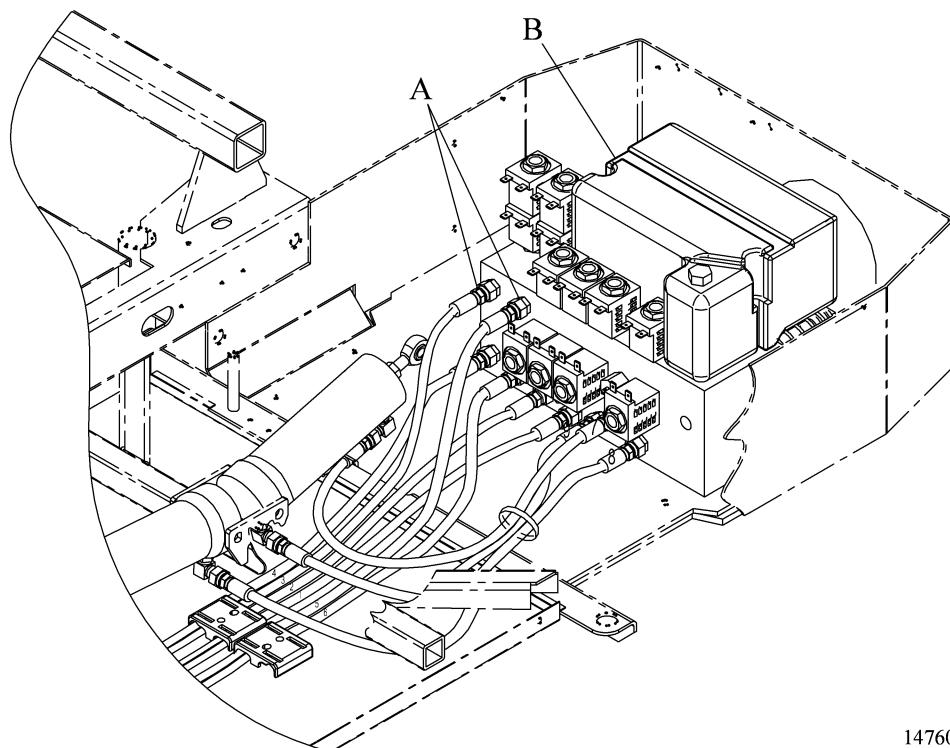
The bridge rectifier will need to be reinstalled on the new hydraulic power unit.

9. Remove the hairpins to disconnect the CPR and emergency Trendelenburg linkages.
10. Remove the capacitor from the top disconnector.

**NOTE:**

The bridge rectifier must be removed before the hoses.

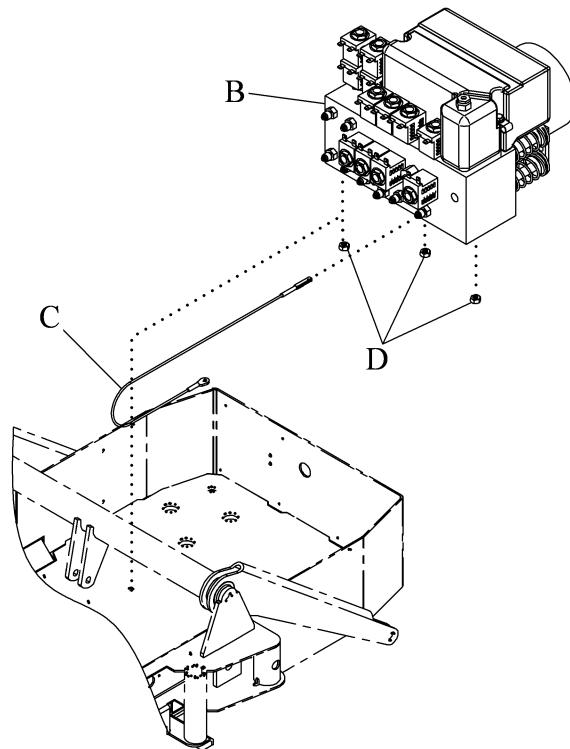
11. Disconnect all nine hydraulic lines (A) from the hydraulic power unit (B) (see figure 4-30 on page 4-77).

**Figure 4-30. Hydraulic Lines**

147605\_1\_049

4

12. Plug each hydraulic line (A) with absorbent towels to prevent oil spills.
13. Disconnect the foot pump cable assembly (C) from the hydraulic power unit (B) (see figure 4-31 on page 4-78).

**Figure 4-31. Hydraulic Power Unit**

147605\_1\_048

14. Disconnect all wires (refer to procedure 4.25).
15. Remove the three locknuts (D) that attach the hydraulic power unit (B) to the bottom of the base frame.

**WARNING:**

The hydraulic manifold assembly with pump weighs approximately 50 lb (23 kg). Use assistance, as necessary, to prevent personal injury or equipment damage.

16. With the help of another person, remove the hydraulic power unit (B) from the base frame.

**Replacement**

1. Make sure that all replacement parts are the same type as the ones removed.
2. Do the removal procedure in reverse order.
3. Tighten the three locknuts (D) to 60 in-lb  $\pm$  10 in-lb (6.8 N•m  $\pm$  1.12 N•m) of torque.

4. Tighten the hydraulic lines (A) to 90 in-lb  $\pm$  10 in-lb (10.2 N•m  $\pm$  1.1 N•m) of torque (see figure 4-30 on page 4-77).
5. Install the screw to attach the bridge rectifier to the hydraulic power unit.
6. Install the hairpins to connect the CPR and emergency Trendelenburg linkages.
7. Fill the reservoir (refer to procedure 4.24).
8. Remove the hilow cylinder brace (refer to procedure 4.4).
9. Remove air from the hydraulic system as follows:
  - a. Raise and lower the bed four times.
  - b. Put the bed in and out of the chair position four times.
10. Make sure the bed does not drift downward when it is in the flat, full up position.
11. Do the “Function Checks” on page 2-5.

## 4.28 Hilow Foot Hydraulic Cylinder

Tools required:

- 2" x 4" safety block
- Needle nose pliers
- 5/8" open end wrench
- 5/8" open end torque wrench
- 7/16" deep well socket
- ½" open end wrench
- ¼" drift punch
- Ball peen hammer

### Removal



#### WARNING:

Failure to set the brakes, and install a 2" x 4" safety block between the base and the foot lift could cause injury or equipment damage.

1. Set the brakes.
2. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame (see figure 4-32 on page 4-81).
3. Put a 2" x 4" safety block between the base and the foot lift, and lower the bed to the low limit.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.

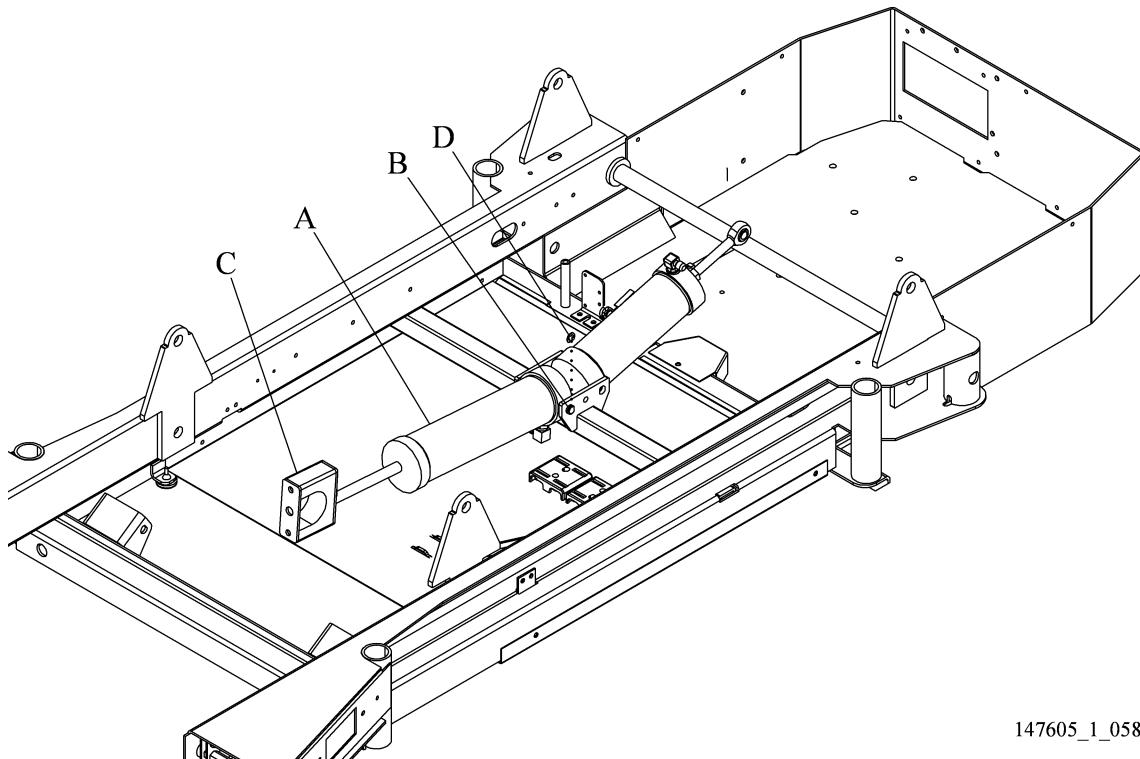


#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).

Figure 4-32. Hilow Foot Hydraulic Cylinder



147605\_1\_058

4



**CAUTION:**

A loose or removed hydraulic cylinder hose will cause loss of hydraulic pressure within that system. Install all braces and supports before you begin to work on any component of the hydraulic system.

6. Remove the E-clip (D) from the mounting shaft (B) of the hilow foot hydraulic cylinder (A).
7. Remove the PCM housing assembly.
8. Use a ball peen hammer and drift punch to lightly tap out the pivot mounting shaft (B) at the blank end of the hilow foot hydraulic cylinder (A).
9. Remove the two nuts that attach the rod end clamp (C) to the frame, foot-end, lift arm.
10. Separate and remove the free half of the rod end clamp (C).

**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when pouring or handling. Failure to wash hands or clothing after contact can cause personal injury. For more information about this product, refer to its MSDS.

**WARNING:**

The hydraulic lines may contain pressure. Disconnect the lines slowly to prevent rapid escape of hydraulic fluid. Personal injury may occur.

11. Loosen the hydraulic hose from the hilow foot hydraulic cylinder (A).
12. Lift the foot hydraulic cylinder (A) above the oil reservoir, and remove the hydraulic hose.
13. Put a cap on the hose, or suspend it at a level above the reservoir oil level until the replacement foot hydraulic cylinder (A) is ready for installation.

## Replacement

1. Make sure the foot hydraulic cylinder (A) is the same type of cylinder as the one removed.
2. Connect the hydraulic hose to the foot hydraulic cylinder (A) fitting.
3. Tighten the hydraulic hose coupling to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.
4. Do the removal procedure in reverse order. Make sure the cylinder is installed in the center.
5. Fill the reservoir (refer to procedure 4.24).
6. Plug the bed into an appropriate power source.
7. Raise the bed off of the safety block, and remove the 2" x 4" safety block.
8. Remove the air from the hydraulic system as follows:
  - a. Raise and lower the bed from the full up to the full down position for four times.
  - b. Put the bed in the chair position and flat position three times.

9. Make sure the bed does not drift downward when it is in the flat, full up position.
10. Install the base frame covers (refer to procedure 4.3).
11. Operate the hilow foot section to the full upper and lower limits. Make sure the position sensors function correctly.
12. Do the “Function Checks” on page 2-5.

**4**

## 4.29 Hilow Head Hydraulic Cylinder

Tools required:

- 2" x 4" safety block
- Needle nose pliers
- 5/8" open end wrench
- 5/8" open end torque wrench
- ½" open end wrench
- ¼" drift punch
- Ball peen hammer

### Removal



#### WARNING:

Failure to set the brakes, and install a 2" x 4" safety block between the base and the foot lift could cause injury or equipment damage.

1. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.5) from the base frame (see figure 4-33 on page 4-85).
2. Set the brakes.
3. Put a 2" x 4" safety block between the base and the foot lift.
4. Lower the bed to the low limit with the emergency Trendelenburg engaged (fully retracted).
5. Raise the head section to the full up position.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

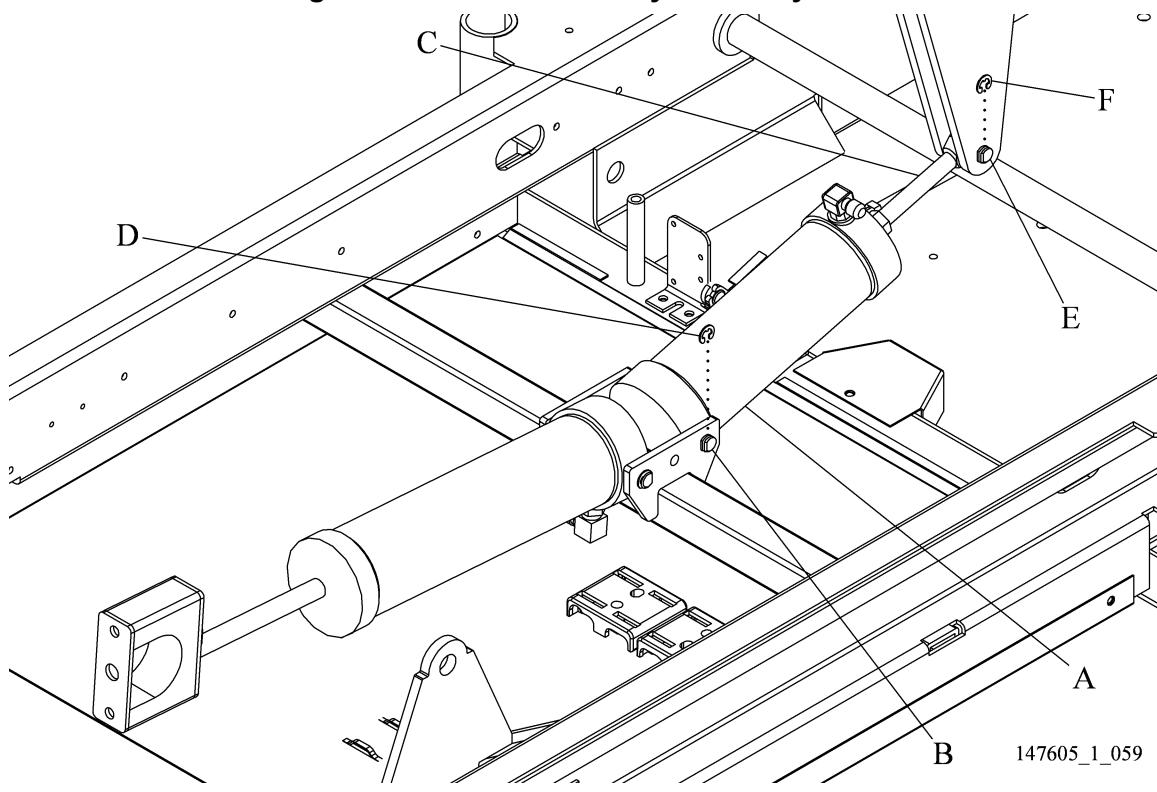
6. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.74).

**Figure 4-33. Hilow Head Hydraulic Cylinder**

4

**CAUTION:**

A loose or removed hydraulic cylinder hose will cause loss of hydraulic pressure within that system. Install all braces and supports before you begin to work on any component of the hydraulic system.

8. Remove the PCM assembly. Remove the E-clip (D) from the mounting shaft (B) at the blind end of the head hydraulic cylinder (A).
9. Remove the E-clip (F), and disconnect the position sensor (Head, Hi-Lo).
10. Lightly tap out the pivot shaft (C) at the base end of the head hydraulic cylinder (A) cap.
11. Lightly tap out the pivot mounting shaft (B) at the blind end of the head hydraulic cylinder (A).

**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when pouring or handling. Failure to wash hands or clothing after contact can cause personal injury. For more information about this product, refer to its MSDS.

**WARNING:**

The hydraulic lines may contain pressure. Disconnect the lines slowly to prevent rapid escape of hydraulic fluid. Personal injury may occur.

12. Loosen the hydraulic hose from the head hydraulic cylinder (A).
13. Remove the hydraulic hose and head hydraulic cylinder (A).
14. Put a cap the hydraulic hose until the replacement head hydraulic cylinder (A) is ready for installation.

## Replacement

1. Connect the hydraulic hose to the hilow head hydraulic cylinder (A) fitting.
2. Tighten the hydraulic hose coupling to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.
3. Do the removal procedure in reverse order.
4. Fill the reservoir (refer to procedure 4.24).
5. Plug the bed into an appropriate power source.
6. Raise the bed off the 2" x 4" safety block, and remove the 2" x 4" safety block.
7. Remove the air from the hydraulic system as follows:
  - a. Raise and lower the bed from the full up to the full down position for four times.
  - b. Put the bed in the chair position and flat position three times.
8. Make sure the bed does not drift downward when it is in the flat, full up position.
9. Install the base frame covers (refer to procedure 4.3).

10. Operate the hilow head section to the bed's full upper and lower limits.  
Check that the position sensors function correctly.
11. Do the "Function Checks" on page 2-5.

**4**

## 4.30 Head Hydraulic Cylinder

Tools required:

- Hilow cylinder brace (P/N SA1695)
- 5/8" open end wrench
- 5/8" open end torque wrench
- 9/16" open end wrench
- 4" needle nose pliers
- ¼" drift punch
- Ball peen hammer
- 2" x 4" safety block (2)
- 9/16" open end torque adapter
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 17.0 N·m)

### Removal

1. Raise the bed to the maximum height.
2. Make sure the head section is flat.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

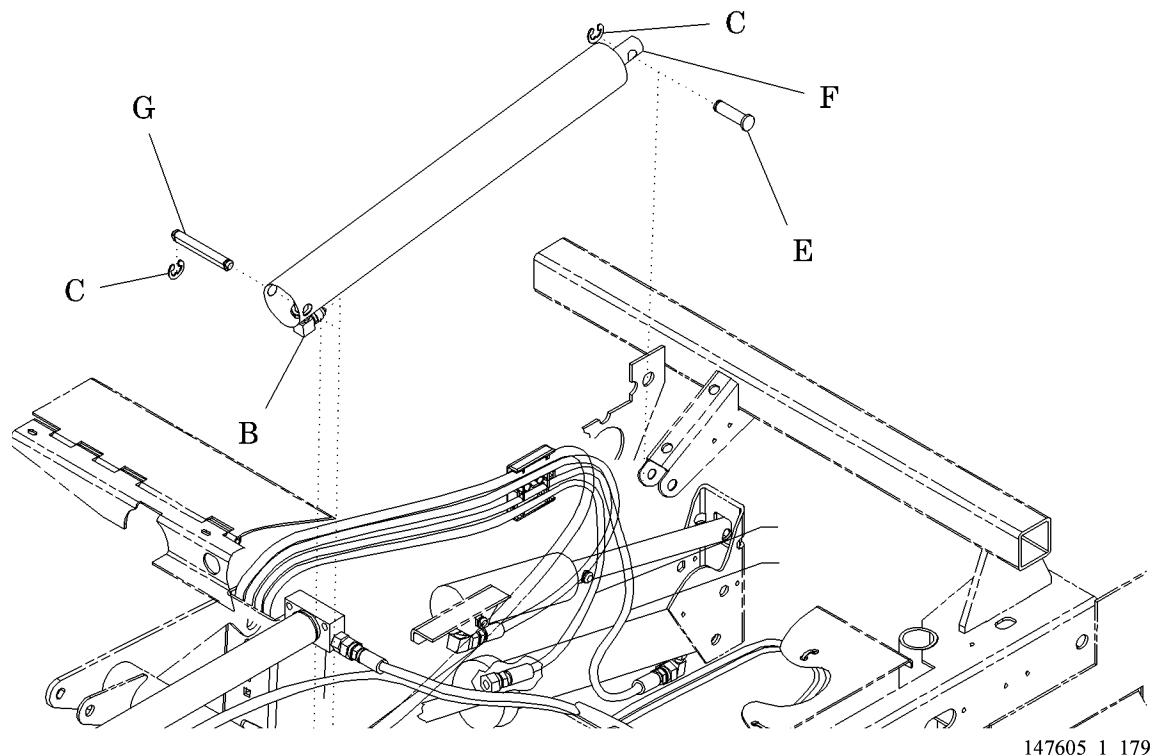
6. Install the hilow cylinder braces (refer to procedure 4.4).

**CAUTION:**

A loose or removed hydraulic cylinder hose will cause loss of hydraulic pressure within that system. Install all braces and supports before you begin to work on any component of the hydraulic system.

7. Remove the E-clips (C) from the clevis pin (E) and D-pin (G) (see figure 4-34 on page 4-89).

**Figure 4-34. Head Hydraulic Cylinder**



4

8. Lower the head section.
9. Lightly tap out the clevis pin (E) that is at the end of the cylinder push rod (F).
10. Lightly tap out the D-pin (G) that is at the blind end of the cylinder cap.

**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when pouring or handling. Failure to wash hands or clothing after contact can cause personal injury. For more information about this product, refer to its MSDS.

**WARNING:**

The hydraulic lines may contain pressure. Disconnect the lines slowly to prevent rapid escape of hydraulic fluid. Personal injury may occur.

11. Loosen the hydraulic hose from the cylinder fitting (B).
12. Remove the hydraulic hose and head hydraulic cylinder.
13. Cap the hose until the replacement head hydraulic cylinder is ready for installation.

## Replacement

1. Connect the hydraulic hose to the cylinder fitting (F).
2. Tighten the hose fitting to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.
3. Do the removal procedure in reverse order.
4. Fill the reservoir (refer to procedure 4.24).
5. Remove the hilow cylinder brace (refer to procedure 4.4).
6. Plug the bed into an appropriate power source.
7. Remove the air from the hydraulic system as follows:
  - a. Raise and lower the bed from the full up to the full down position for four times.
  - b. Put the bed in the chair position and flat position three times.
8. Make sure the bed does not drift downward when it is in the flat, full up position.
9. Install the base frame covers (refer to procedure 4.3).

10. Operate the head section to the full upper and lower limits. Check that the position sensors function correctly.
11. Do the “Function Checks” on page 2-5.

**4**

## 4.31 Knee Hydraulic Cylinder

Tools required:

- Hilow cylinder brace (P/N SA1695)
- 5/8" open end wrench
- 5/8" open end torque adapter
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 16.9 N·m)
- ½" open end wrench
- 4" needle nose pliers
- ¼" drift punch
- Ball peen hammer
- 2" x 4" safety block (3)

### Removal

1. Set the brakes.
2. Raise the bed to the maximum height.
3. Put the 2" x 4" safety blocks under the knee section at each end of the upper frame.
4. Raise the head section to its upper limit, and install a 2" x 4" safety block.
5. Press the **Knee Down** control for 2 s.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

6. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.74).
8. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.



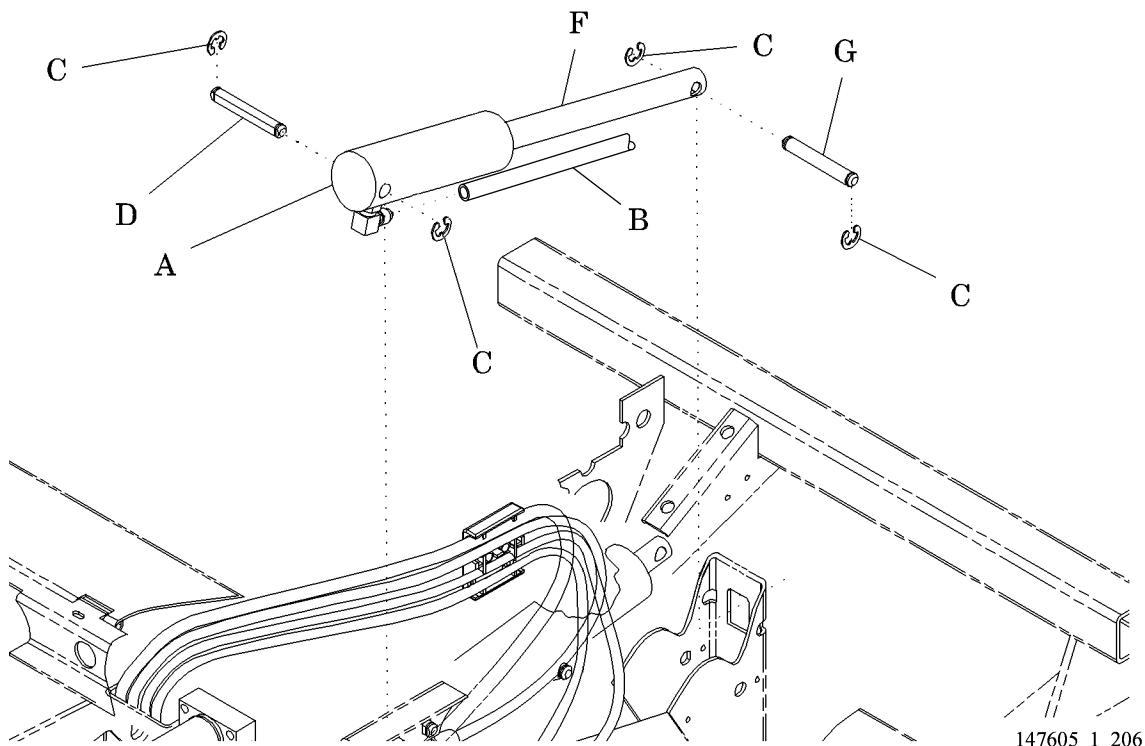
#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

9. Install the hilow cylinder brace (refer to procedure 4.4).

**CAUTION:**

A loose or removed hydraulic cylinder hose will cause loss of hydraulic pressure within that system. Install all braces and supports before you begin to work on any component of the hydraulic system.

**Figure 4-35. Knee Hydraulic Cylinder****4**

10. Remove one E-clip (C) from each D-pin (D and G) (see figure 4-35 on page 4-93).
11. Pull out the D-pin (G) that is at the end of the cylinder push rod (F).
12. Lightly tap out the D-pin (D) that is at the cap end of the cylinder (A).

**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when pouring or handling. Failure to wash hands or clothing after contact can cause personal injury. For more information about this product, refer to its MSDS.

**WARNING:**

The hydraulic lines may contain pressure. Disconnect the lines slowly to prevent rapid escape of hydraulic fluid. Personal injury may occur.

13. Loosen the hydraulic hose (B) from the cylinder (A).
14. Remove the hydraulic hose (B).
15. Cap the hydraulic hose (B) until the replacement cylinder (A) is ready for installation.

## Replacement

1. Use a 5/8" open end wrench and a 1/2" open end wrench to connect the hydraulic hose (B) to the cylinder (A) fitting.
2. Tighten the hydraulic hose fitting to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.
3. Do the removal procedure in reverse order.
4. Fill the reservoir (refer to procedure 4.24).
5. Remove the hilow cylinder brace (refer to procedure 4.4).
6. Plug the bed into an appropriate power source.
7. Use the **Head Up** control to extend the head cylinder.
8. Remove the air from the hydraulic system as follows:
  - a. Raise and lower the bed from the full up to the full down position for four times.
  - b. Put the bed in the chair position and flat position three times.
9. Make sure the bed does not drift downward when it is in the flat, full up position.

10. Install the base frame covers (refer to procedure 4.3).
11. Cycle the knee section through the full upper and lower limits four times.  
Check that both position sensors function correctly
12. Do the “Function Checks” on page 2-5.

**4**

## 4.32 Retracting Foot Hydraulic Cylinder

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- 5/8" open end wrench
- 5/8" open end torque adapter
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 16.9 N·m)
- ½" open end wrench
- 7/16" deep well socket
- 2" x 4" safety block (2)

### Removal

1. Set the brakes.
2. Raise the bed to the maximum height.
3. Put the 2" x 4" safety blocks under each end of the upper frame.
4. Extend the foot end 1" to 2" (3 cm to 5 cm).
5. Place the bed into the flat position.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

6. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.74).
8. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

9. Install the hilow cylinder brace (refer to procedure 4.4).

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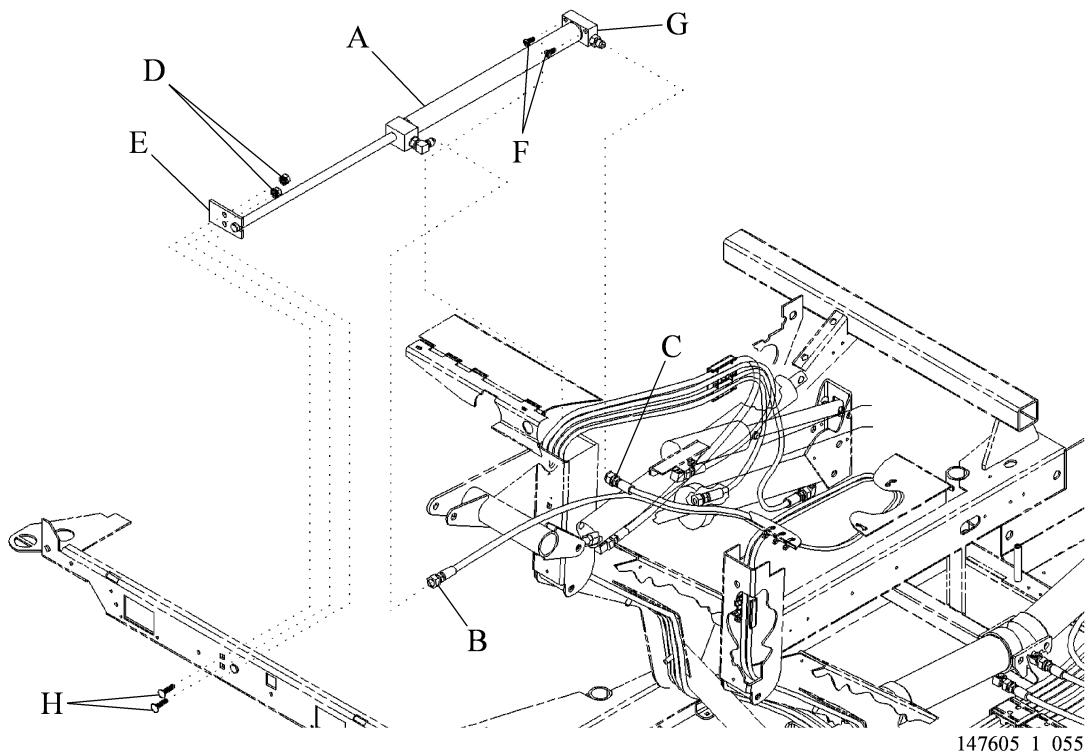
1. Torx® is a registered trademark of Acument Intellectual Properties, LLC.

**CAUTION:**

A loose or removed hydraulic cylinder hose will cause loss of hydraulic pressure within that system. Install all braces and supports before you begin to work on any component of the hydraulic system.

10. Loosen and remove the two hydraulic hoses (B and C) from the cylinder fittings (G).

**Figure 4-36. Retracting Foot Hydraulic Cylinder**



4

11. Put a cap the two hydraulic hoses (B and C).

**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when pouring or handling. Failure to wash hands or clothing after contact can cause personal injury. For more information about this product, refer to its MSDS.

**WARNING:**

The hydraulic lines may contain pressure. Disconnect the lines slowly to prevent rapid escape of hydraulic fluid. Personal injury may occur.

12. Remove the two bolts (F) that attach the foot retracting hydraulic cylinder (A) to the frame.
13. Remove the two nuts (D) and bolts (H) from the push rod mounting plate (E) (see figure 4-36 on page 4-97).

## Replacement

1. Use a 5/8" open end wrench and a 1/2" open end wrench to connect the hydraulic hoses (B and C) to the cylinder fittings (G).
2. Tighten both hydraulic hose fittings (B and C) to  $90 \pm 10$  in-lb (10.2  $\pm$  1.1 N·m) of torque.

**CAUTION:**

The bolts can damage any of the three position sensor cables if they have shifted during replacement. Use caution when you install these bolts. Damage to equipment can occur.

3. Do the removal procedure in reverse order.
4. Fill the reservoir (refer to procedure 4.24).
5. Remove the hilow cylinder brace (refer to procedure 4.4).
6. Plug the bed into an appropriate power source.
7. Verify that the bed does not drift downward when placed in the flat, full up position.
8. Install the base frame covers (refer to procedure 4.3).
9. Fully extend and retract the foot section four times.

10. Make sure there are no leaks and that both position sensors work correctly.
11. Do the “Function Checks” on page 2-5.

**4**

### 4.33 Articulating Foot Hydraulic Cylinder

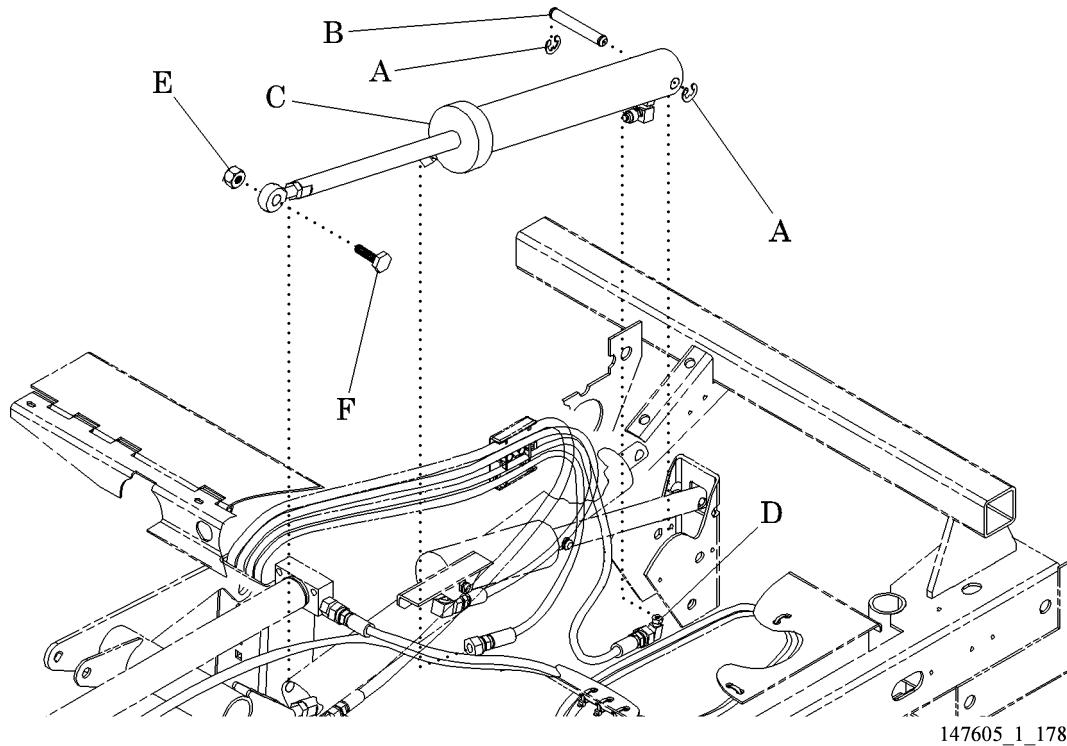
Tools required:

Hilow cylinder brace (P/N SA1695)	
5/8" open end wrench	2" x 4" safety brace
9/16" open end wrench	9/16" deep well socket
5/8" open end torque adapter	1/2" open end wrench
4" needle nose pliers	1/4" drift punch
Ball peen hammer	
Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 16.9 N·m)	

#### Removal

1. Set the brakes.
2. Raise the bed to a height that permits access to the foot articulation cylinder (C) (see figure 4-37 on page 4-100).

**Figure 4-37. Articulating Foot Hydraulic Cylinder Removal**



**NOTE:**

Make sure the foot section is supported.

3. Put a 2" x 4" safety block under the articulated foot frame.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.



**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).
6. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.



**WARNING:**

Failure to install the hilow cylinder brace could cause injury or equipment damage.

7. Install the hilow cylinder braces (refer to procedure 4.4).

**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when pouring or handling. Failure to wash hands or clothing after contact can cause personal injury. For more information about this product, refer to its MSDS.

**WARNING:**

The hydraulic lines may contain pressure. Disconnect the lines slowly to prevent rapid escape of hydraulic fluid. Personal injury may occur.

**CAUTION:**

A loose or removed hydraulic cylinder hose will cause loss of hydraulic pressure within that system. Install all braces and supports before you begin to work on any component of the hydraulic system.

8. Slowly loosen and remove the hydraulic hoses (D) from the foot articulation cylinder (C).
9. Remove the nut (E) and bolt (F) from the push rod of the foot articulation cylinder (C).
10. Remove the E-clips (A) from the D-pin (B).
11. Lightly tap out the D-pin (B) that is at the base end of the foot articulation cylinder (C).
12. Remove the foot articulation cylinder (C).
13. Put a cap the hydraulic hoses (D).

## Replacement

1. Connect the hydraulic hoses (D) to the foot articulation cylinder (C) fittings.
2. Tighten the hydraulic hose (D) fittings to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.
3. Do the removal procedure in reverse order.
4. Fill the reservoir (refer to procedure 4.24).
5. Remove the hilow cylinder brace (refer to procedure 4.4).

6. Plug the bed into an appropriate power source.
7. Make sure the bed does not drift downward when placed in the flat, full up position.
8. Install the base frame covers (refer to procedure 4.3).
9. Operate the articulating foot section to the full upper and lower limits.  
Make sure the position sensors work correctly.
10. Do the “Function Checks” on page 2-5.

**4**

## 4.34 CPR Release Valve

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- 7/8" deep well socket
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 16.9 N·m)
- 7/16" open end wrench
- Large basting syringe
- ¼" flexible Tygon®<sup>2</sup> hose
- Towels

### Removal

1. Place the bed in the flat, raised position.
2. Make sure the head and knee sections are flat.
3. Set the brakes.



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

4. Remove the base frame head and tub covers (refer to procedure 4.3).
5. Install the hilow cylinder brace (refer to procedure 4.4).



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

6. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.74).

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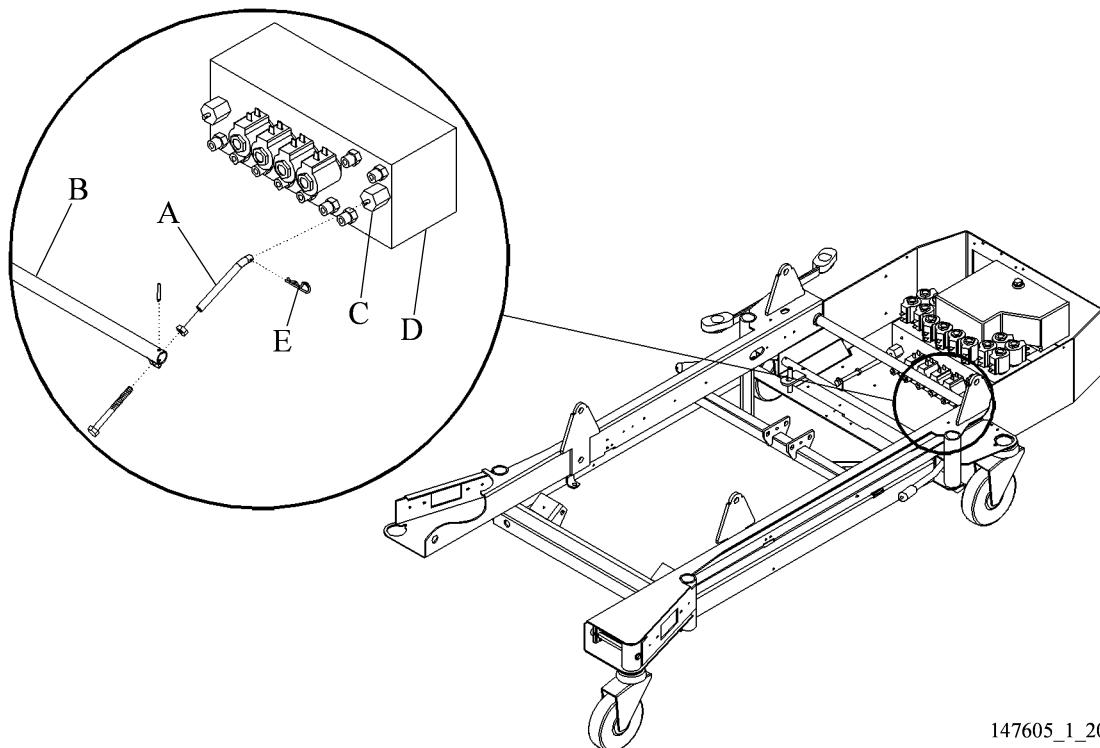
1. Torx® is a registered trademark of Acument Intellectual Properties, LLC.  
2. Tygon® is a registered trademark of Norton Company.

**WARNING:**

Hydraulic fluid can be an irritant. Do not ingest, and keep away from eyes and mouth. Wear eye protection and gloves when pouring or handling. Failure to wash hands or clothing after contact can cause personal injury. For more information about this product, refer to its MSDS.

8. Remove the hydraulic oil from the oil reservoir.
9. Remove the cotter pin (E).

**Figure 4-38. CPR Release Valve**



4

**CAUTION:**

Use care not to damage the CPR release valve O-rings. Failure to do so could cause equipment damage.

10. Remove the valve core and CPR release valve from the hydraulic manifold (refer to procedure 4.26).

## Replacement

1. Install the valve core and put the cotter pin (E) on the CPR release valve (C).
2. Manually insert the CPR release valve (C), and tighten it by hand until it is snug.
3. Remove the cotter pin (E).
4. Tighten the CPR release valve (C) to  $90 \pm 10$  in-lb ( $10.168 \pm 1.12$  N·m) of torque
5. Connect the mechanical CPR valve linkage (A) between the CPR actuator (B) and CPR release valve (C).
6. Install the cotter pin (E) to connect the emergency Trendelenburg valve linkage (A) to CPR release valve (C).
7. Press the emergency Trendelenburg foot lever to the mechanical stop, and adjust the emergency Trendelenburg valve linkage (A) until the CPR release valve (C) releases the hydraulic pressure, and lets the bed lower against the bracing.
8. Add hydraulic oil to the reservoir as necessary (refer to procedure 4.24). Observe the fill lines on the side of the reservoir.
9. Release the CPR actuator (B), and make sure the lower CPR sensor switch makes electrical contact just before the CPR release valve (C) opens.
10. Plug the bed into an appropriate power source.
11. Bleed air from the hydraulic system as follows:
  - a. Raise and lower the bed four times.
  - b. Put the bed in the chair and float position three times.
12. Make sure the bed does not drift downward when placed in the flat, full up position.
13. Install the base frame covers (refer to procedure 4.3).
14. Do the “Function Checks” on page 2-5.

## 4.35 CPR Sensor

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T15 Torx®<sup>1</sup> head screwdriver
- 1/4" open end wrench
- 4" needle nose pliers
- T25 Torx® head screwdriver

### Removal

1. Place the bed in the flat, raised position.
2. Set the brakes.



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

3. Remove the base frame head and tub covers (refer to procedure 4.3).
4. Install the hilow cylinder braces (refer to procedure 4.4).



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

5. Unplug the bed from its power source.



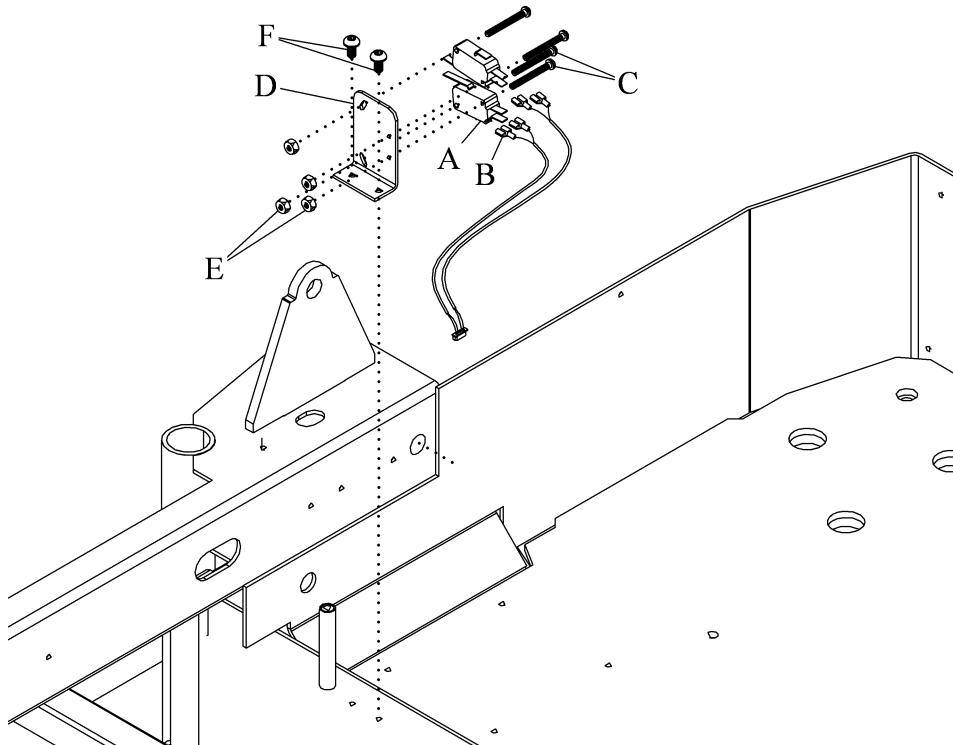
#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

6. Disable the battery (refer to procedure 4.74).
7. Remove the sense wires (B) from the lower CPR switch assembly (A) (see figure 4-39 on page 4-108).

4

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

**Figure 4-39. CPR Sensor Switch**

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8. Remove the two screws (F).
9. Lift out the sensor switch bracket assembly (D).

**NOTE:**

It may be necessary to remove the noise filter.

10. Remove the two switch mounting bolts (C) and nuts (E) that attach the CPR switch assembly (A) to the CPR/Trendelenburg switch bracket (D).
11. Remove the CPR switch assembly (A) from the CPR/Trendelenburg switch bracket (D).

## Replacement

1. Do the removal procedure in reverse order.
2. Press the CPR foot lever to the mechanical stop, and adjust the CPR switch assembly (A) until it makes electrical contact just before the CPR release valve opens.
3. Install the two switch mounting bolts (C) and nuts (E) to secure the CPR switch assembly (A) to the CPR/Trendelenburg switch bracket (D).

4. Use the CPR foot pedal to make sure the CPR/Trendelenburg functions operate correctly.
5. Install the base frame covers (refer to procedure 4.3).
6. Do the “Function Checks” on page 2-5.

4

## 4.36 Trendelenburg Sensor

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- T15 Torx® head screwdriver
- ¼" open end wrench
- 4" needle nose pliers

### Removal

1. Place the bed in the flat, raised position.
2. Set the brakes.



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

3. Remove the base frame head and tub covers (refer to procedure 4.3).
4. Install the hilow cylinder braces (refer to procedure 4.4).



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

5. Unplug the bed from its power source.



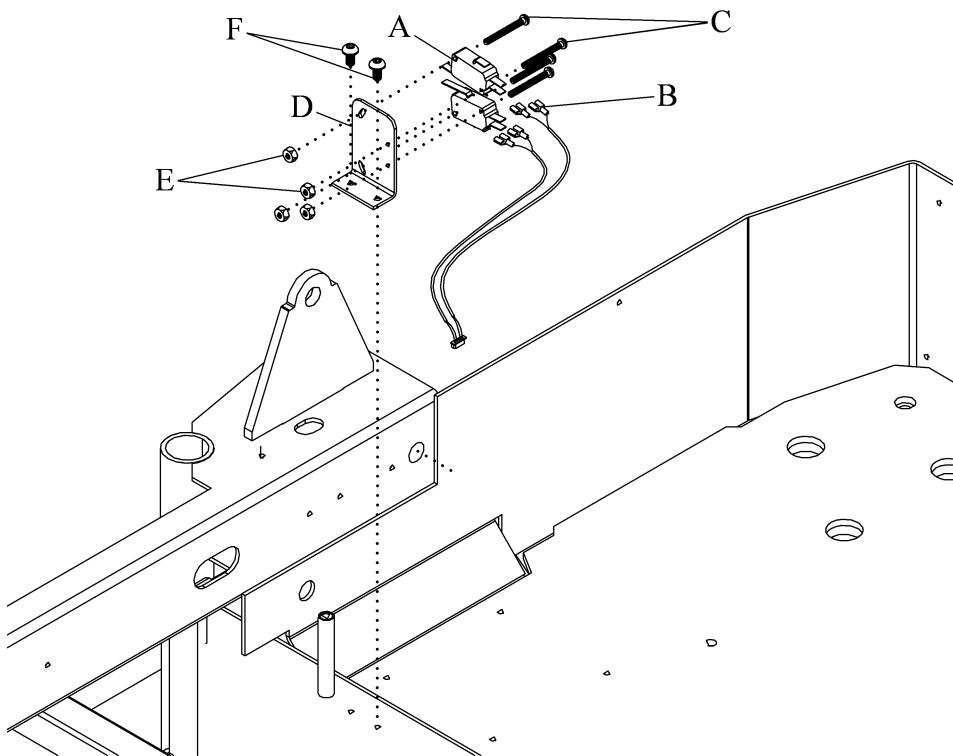
#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

6. Disable the battery (refer to procedure 4.74).
7. Remove the Trendelenburg sense wires (B) from the upper Trendelenburg switch assembly (A) (see figure 4-40 on page 4-111).

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**Figure 4-40. Trendelenburg Sensor Switch**

147605\_1\_207

4

8. Remove the two screws (F).
9. Lift out the sensor switch bracket assembly (D).

**NOTE:**

It may be necessary to remove the noise filter.

10. Remove the two switch mounting bolts (C) and nuts (E) that attach the Trendelenburg switch assembly (A) to the switch bracket assembly.
11. Remove the Trendelenburg switch assembly (A) from the switch bracket assembly.

## Replacement

1. Do the removal procedure in reverse order.
2. Raise the Trendelenburg foot lever to the mechanical stop, and adjust the Trendelenburg switch assembly (A) until it makes electrical contact just before the Trendelenburg release valve opens.
3. Tighten the two switch mounting bolts (C) and nuts (E) to secure the Trendelenburg switch assembly (A) to the switch bracket assembly.

4. Use the Trendelenburg foot pedal to make sure the CPR/Trendelenburg functions operate correctly.
5. Install the base frame covers (refer to procedure 4.3).
6. Do the “Function Checks” on page 2-5.

## 4.37 Emergency Trendelenburg Release Valve

Tools required: Hilow cylinder brace (P/N SA1695)  
T25 Torx®<sup>1</sup> head screwdriver  
7/8" socket  
9/16" open end wrench  
Large basting syringe  
1/4" flexible Tygon®<sup>2</sup> hose  
½ gal container, clean  
Towels

### Removal



#### WARNING:

Failure to set the brakes, and install the hilow cylinder safety brace could cause injury or equipment damage.

1. Place the bed in the flat, raised position.
2. Make sure the head and knee sections are flat.
3. Set the brakes.
4. Remove the base frame head and tub covers (refer to procedure 4.3).
5. Install the hilow cylinder braces (refer to procedure 4.4).

4



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

6. Unplug the bed from its power source.

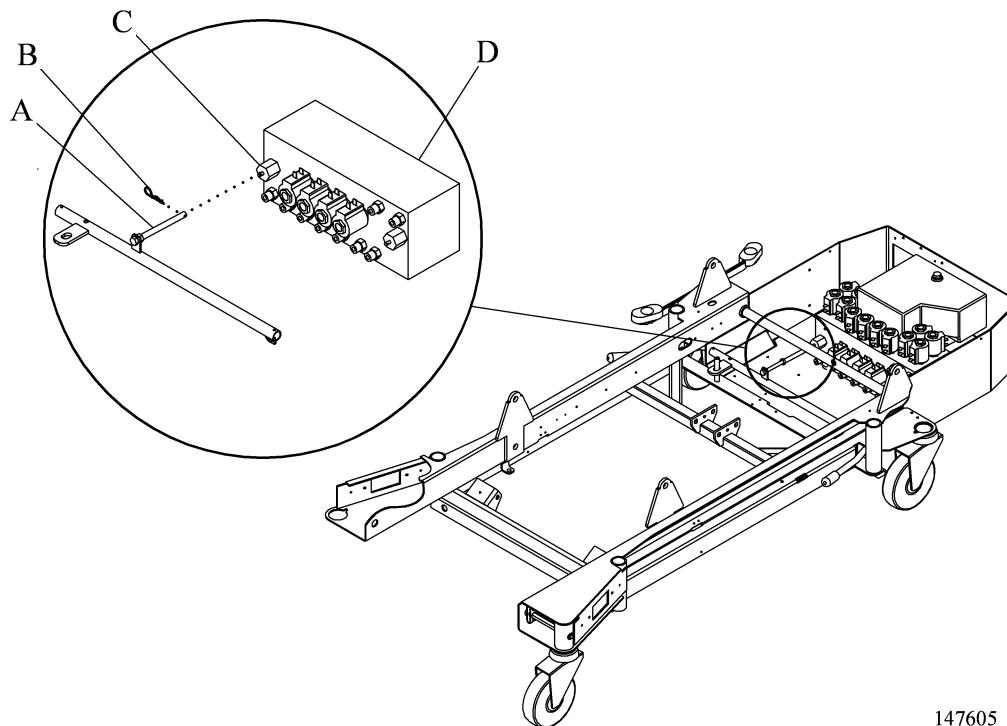


#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.74).
8. Remove the hydraulic oil from the oil reservoir.
9. Remove the mechanical Trendelenburg valve linkage from between the Trendelenburg actuator and Trendelenburg release valve (C) (see figure 4-41 on page 4-114).

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2. Tygon® is a registered trademark of Norton Company.

**Figure 4-41. Trendelenburg Release Valve**

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**CAUTION:**

Use care not to damage the valve O-rings. Failure to do so can result in damage to equipment.

10. Remove the valve core (A) and Trendelenburg release valve (C) from the hydraulic manifold (D) (refer to procedure 4.26).

**Replacement**

1. Install the valve core (A) and put the cotter pin (B) on the Trendelenburg release valve (C).
2. Manually insert the Trendelenburg release valve (C) into the hydraulic manifold (D), and tighten it by hand.
3. Remove the cotter pin (B).
4. Tighten the Trendelenburg release valve (C) to 90 in-lb (10.2 N•m) of torque
5. Connect the mechanical Trendelenburg valve linkage between the Trendelenburg actuator and Trendelenburg release valve (C).

6. Add hydraulic oil to the reservoir as necessary (refer to procedure 4.24). Observe the level lines shown on the side of the reservoir.
7. Release the Trendelenburg actuator, and make sure the upper Trendelenburg sensor switch makes electrical contact just prior to the opening of the Trendelenburg release valve (C).
8. Plug the bed into an appropriate power source.
9. Bleed air from the hydraulic system.
  - a. Raise and lower the bed four times.
  - b. Put the bed in the chair and flat position three times.
10. Make sure the bed does not drift downward when placed in the flat, full up position.
11. Install the base frame covers (refer to procedure 4.3).
12. Do the “Function Checks” on page 2-5.

## 4.38 Position Sensors

Tools required:

- Hilow cylinder brace (P/N SA1695)
- T25 Torx®<sup>1</sup> head screwdriver
- Wire cutters
- Adhesive remover
- 2" x 4" safety block

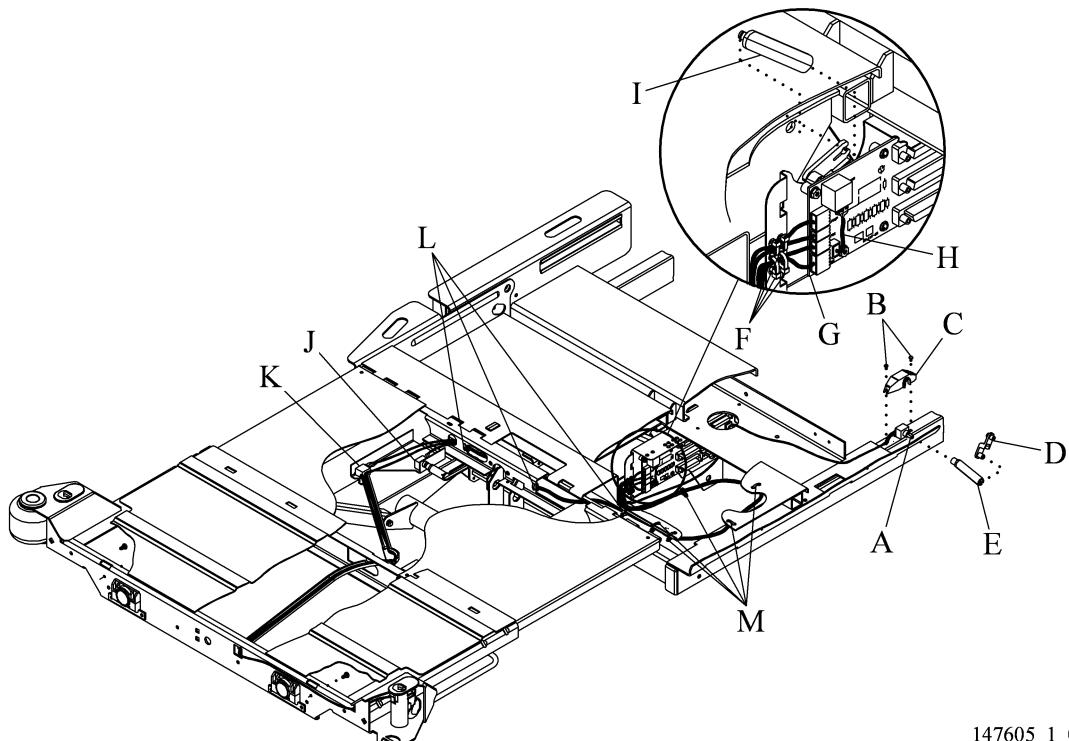
**NOTE:**

Do this procedure for these position sensors: head, knee, foot articulation, and foot retraction. For the hilow position sensor, refer to "Hilow Position Sensor" on page 4-119.

### Removal

1. Set the brakes.
2. Raise the bed to a height that permits access to the weigh frame junction box (G) (see figure 4-42 on page 4-116).
3. Extend the articulating deck.

**Figure 4-42. Position Sensor**



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**WARNING:**

Failure to install the hilow cylinder brace could cause injury or equipment damage.

4. Remove the base frame head and tub covers (refer to procedure 4.3).
5. Install the hilow cylinder brace (refer to procedure 4.4).

**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

6. Unplug the bed from its power source.

**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.75)
8. To remove the head position sensor and cable assembly (A), do as follows:
  - a. Raise the head of the bed and install the safety blocks.
  - b. Remove the two screws (B) that attach the head sensor cover (C) to the weigh frame. Make a note of the position of the screws. There are two different lengths.
  - c. Remove the adhesive that attaches the head sensor short link (D) and the head sensor long link (E) to the head position sensor and cable assembly (A) on the long link.
  - d. Remove the head sensor short link (D) and the head sensor long link (E) from the head position sensor and cable assembly (A).
  - e. Remove the two small cable ties (F) that attach the head position sensor and cable assembly (A) to the weigh frame junction box (G).
  - f. Disconnect the head position sensor and cable assembly (A) from the weigh frame junction box (G).
  - g. Remove the head position sensor and cable assembly (A) from the weigh frame.
9. To remove the knee position sensor and cable assembly (H), perform the following:
  - a. Remove the knee position sensor link (I) from the knee position sensor and cable assembly (H).
  - b. Remove the weigh frame junction board.

- c. Disconnect the knee position sensor and cable assembly (H) from the weigh frame junction box (G).
  - d. Remove the knee position sensor and cable assembly (H) from the weigh frame junction box (G).
10. To remove the foot articulation position sensor and cable assembly (J) or foot retraction position sensor and cable assembly (K), perform the following:
- a. Remove the three small cable ties (L) and five large cable ties (M) that attach the foot articulation position sensor and cable assembly (J) and foot retraction position sensor and cable assembly (K) to the weigh frame.
  - b. Remove the two small cable ties (F) that attach the foot articulation position sensor and cable assembly (J) and foot retraction position sensor and cable assembly (K) to the weigh frame junction box (G).
  - c. Disconnect the foot articulation position sensor and cable assembly (J) or foot retraction position sensor and cable assembly (K) from the weigh frame junction box (G).
  - d. Remove the 1/2" nut on the backside of the sensor.
  - e. Remove the foot articulation position sensor and cable assembly (J) or foot retraction position sensor and cable assembly (K) from the weigh frame.

## Replacement

**NOTE:**

Every position sensor wire is oriented toward the center of the bed.

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.39 Hilow Position Sensor

Tools required: Hilow cylinder brace (P/N SA1695)  
Wire cutters

### Removal

1. Set the brakes.
2. Raise the bed to the high position.
3. Remove the tub base cover and top center base cover (refer to procedure 4.3) and the foot end caster covers (refer to procedure 4.5).



#### **WARNING:**

Failure to install the hilow cylinder brace could cause injury or equipment damage.

4. Install the hilow cylinder brace (refer to procedure 4.4).



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

5. Unplug the bed from its power source.



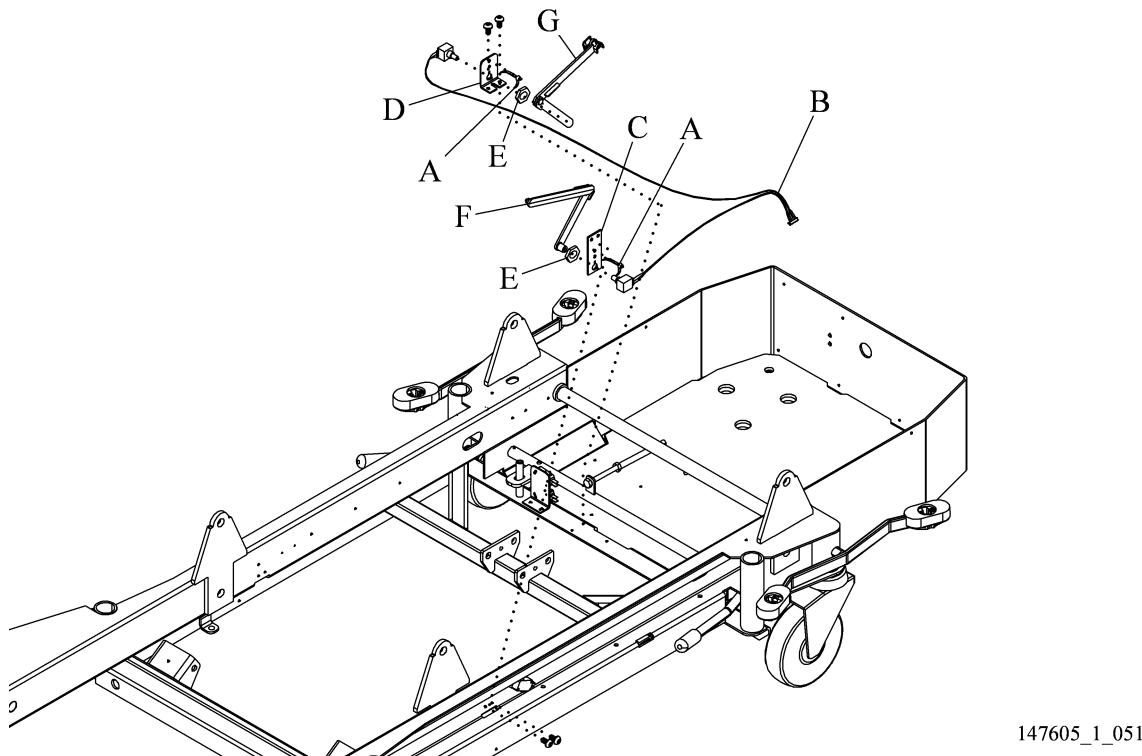
#### **WARNING:**

Failure to disable the battery could cause injury or equipment damage.

6. Disable the battery (refer to procedure 4.74).

7. Remove the two large cable ties (A) that attach the hilow position sensor and cable assembly (B) to the foot lift sensor mounting bracket (C) and head lift sensor mounting bracket (D) (see figure 4-43 on page 4-120).

**Figure 4-43. Hilow Position Sensor**



8. Loosen the two nuts (E) that attach the hilow position sensor and cable assembly (B) to the lower lift sensor links (F).
9. Remove the hilow position sensor and cable assembly (B) from the lower lift sensor links (F), the foot lift sensor mounting bracket (C), and head lift sensor mounting bracket (D).
10. Disconnect the hilow position sensor and cable assembly (B) from the PCM, and remove the hilow position sensor and cable assembly (B) from the base frame.

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.40 Battery

Tools required: Hilow cylinder brace (P/N SA1695)  
T25 Torx®<sup>1</sup> head screwdriver  
4" needle nose pliers  
Blocks

### Removal



#### WARNING:

To prevent injury, do not short the battery terminals.

1. Set the brakes.
2. Block the wheels.
3. Raise the bed to the full up position.
4. Remove the head and tub covers (refer to procedure 4.3).



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

5. Install the hilow cylinder brace (refer to procedure 4.4).

4



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

6. Unplug the bed from its power source.

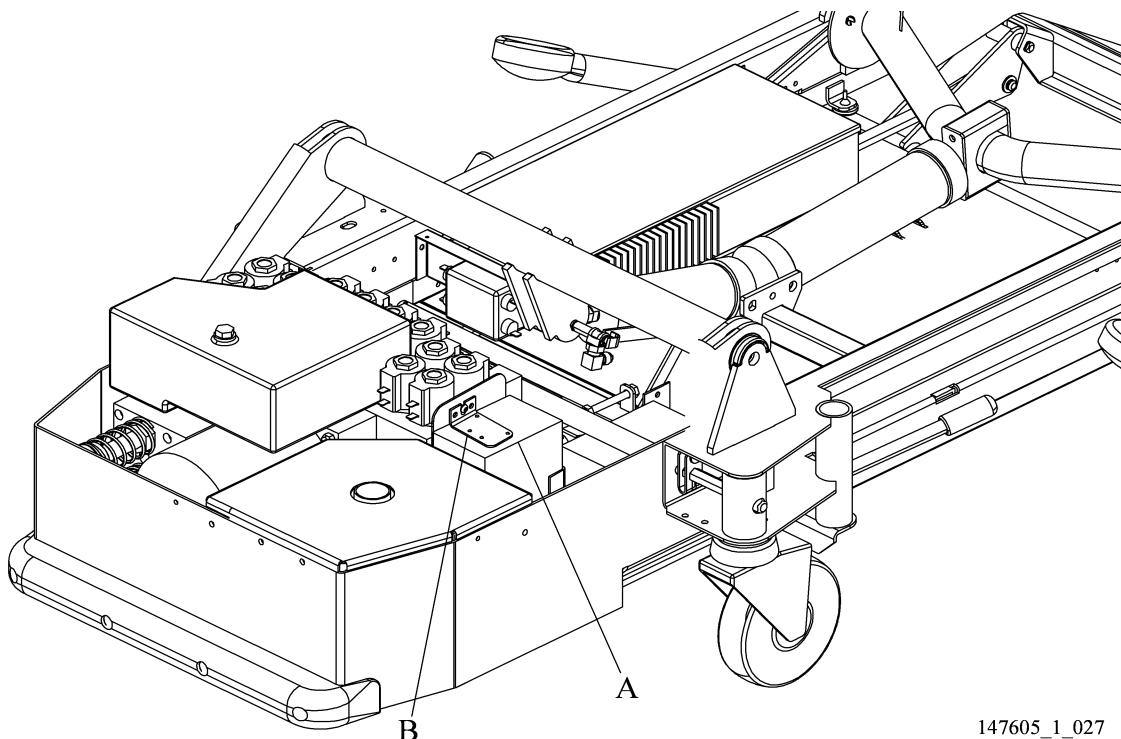


#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.74).

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**Figure 4-44. Battery**

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8. Disconnect the positive and negative cables from the battery (A) spade terminals (see figure 4-44 on page 4-122).
9. Remove the bolt and the battery clamp (B) from the battery compartment.
10. Carefully lift the battery (A) from the battery compartment.
11. Discard the old battery according to facility protocols.

## Replacement

1. Do the removal procedure in reverse order.
2. Observe the electrical polarity of the battery (A), connect the battery (A) spade terminals to the circuit wiring.
3. Do the “Function Checks” on page 2-5.

## 4.41 Transformer

Tools required: Hilow cylinder brace (P/N SA1695)  
T25 Torx®<sup>1</sup> head screwdriver  
Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 16.9 N·m)

### Removal



#### WARNING:

Set the brakes, and install the hilow cylinder safety brace before working under the raised section of the bed. Failure to do so could result in personal injury or equipment damage.

1. Set the brakes.
2. Block the wheels.
3. Remove the head and tub covers (refer to procedure 4.3).
4. Raise the bed to the full up position.
5. Install the hilow cylinder brace (refer to procedure 4.4).
6. Put the bed in the flat position.

4



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

7. Unplug the bed from its power source.

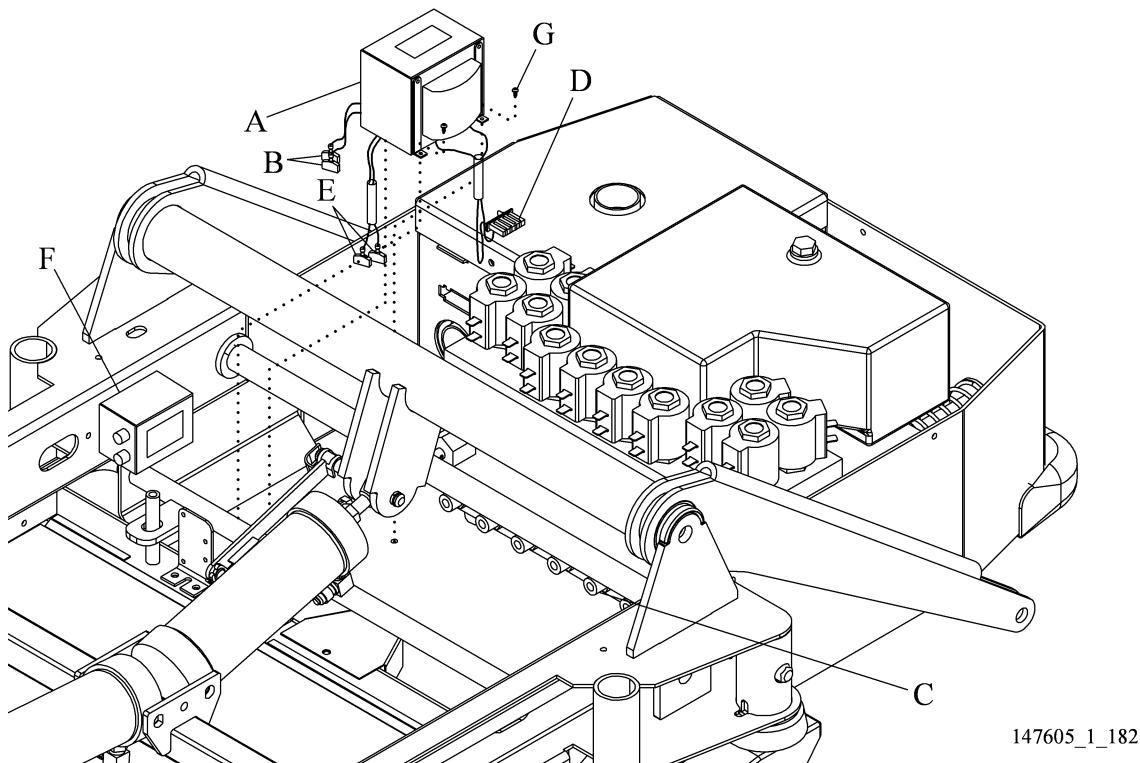


#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

8. Disable the battery (refer to procedure 4.74).
9. Disconnect the transformer cables from the full-wave bridge rectifier (B) assembly (see figure 4-45 on page 4-124).

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**Figure 4-45. Transformer Replacement**

10. Disconnect the + 14 volt transformer cable from the power supply P.C. board assembly.
11. Disconnect transformer cables from the line filter (F).
12. Remove the four mounting bolts (G) that attach the transformer (A) to the frame bottom plate.
13. Remove the transformer (A).

## Replacement

1. Make sure the replacement transformer (A) is the same type as the one removed.
2. Install the transformer (A).
3. Install the four mounting bolts (G) that attach the transformer (A) to the frame bottom plate.
4. Tighten the four mounting bolts (G) to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.

5. Connect the T3 and T4 transformer cables to the line filter (F).
6. Connect the + 14 volt (NL1) transformer cable to the Power Control Module P.C. board assembly.
7. Connect the T1 and T2 transformer cables to the full-wave bridge (B) assembly.
8. Make sure the transformer (A) operates correctly.
9. Remove the hilow cylinder brace.
10. Install the base frame covers (refer to procedure 4.3).
11. Plug the bed into an appropriate power source.
12. Do the “Function Checks” on page 2-5.

A large, bold, black number '4' is centered within a solid black rectangular box.

## 4.42 Power Control Module P.C. Board

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- T15 Torx® head screwdriver
- Hilow cylinder brace (P/N SA1695)
- 4" needle nose pliers
- AC/DC volt ohm meter
- 3 AG fuse puller
- Small screwdriver

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.
2. Remove the tub base cover and top center base cover (refer to procedure 4.3).



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

3. Install the hilow cylinder brace (refer to procedure 4.4).



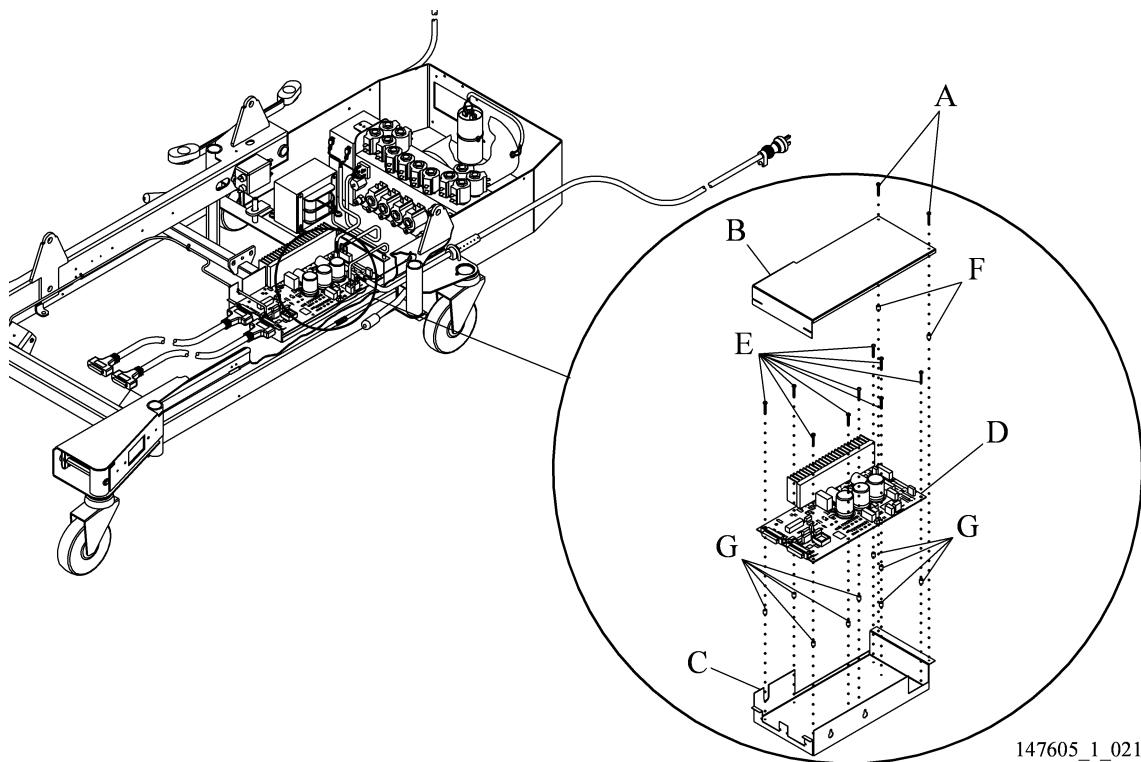
#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the head-left caster cover, and tub covers (refer to procedure 4.3).
6. Remove the two screws (A) and long plastic spacers (F) that attach the Power Control Module P.C. board cover (B) to the Power Control Module P.C. board enclosure (C) (see figure 4-46 on page 4-127).

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**Figure 4-46. Power Control Module**

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7. Make sure all fuses on the Power Control Module P.C. board assembly (D), operate correctly. Replace fuses as necessary. See “Power Control Module P.C. Board Fuse Locations” on page 4-129.
8. Disconnect the AC power cord connector P11 from the Power Control Module P.C. board assembly (D).
9. Disconnect the transformer + 5 V DC connector P19, and the + 23 V DC P6 connector from the Power Control Module P.C. board assembly (D).
10. Disconnect the AC line filter connector P9 from the Power Control Module P.C. board assembly (D).
11. Disconnect the battery connector P15, photosensor connector P3, and Patient Exit Detection connector P22.
12. Disconnect the signal connectors P21, P12, P18, P13, P22, P9, P14, P20, P4, P5, P22, and P16 from the Power Control Module P.C. board. See “Power Control Module Connector Locations” on page 4-130.
13. Remove the P2 and P7 25-pin connectors.



**CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.



**CAUTION:**

For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

14. Remove the eight screws (E) and long plastic spacers (G) that attach the Power Control Module P.C. board assembly (D) to the Power Control Module P.C. board enclosure (C).
15. Remove the long plastic spacers (G) from the screws (E).
16. Hold the Power Control Module P.C. board assembly (D) by the edges and remove it from the Power Control Module P.C. board enclosure (C).

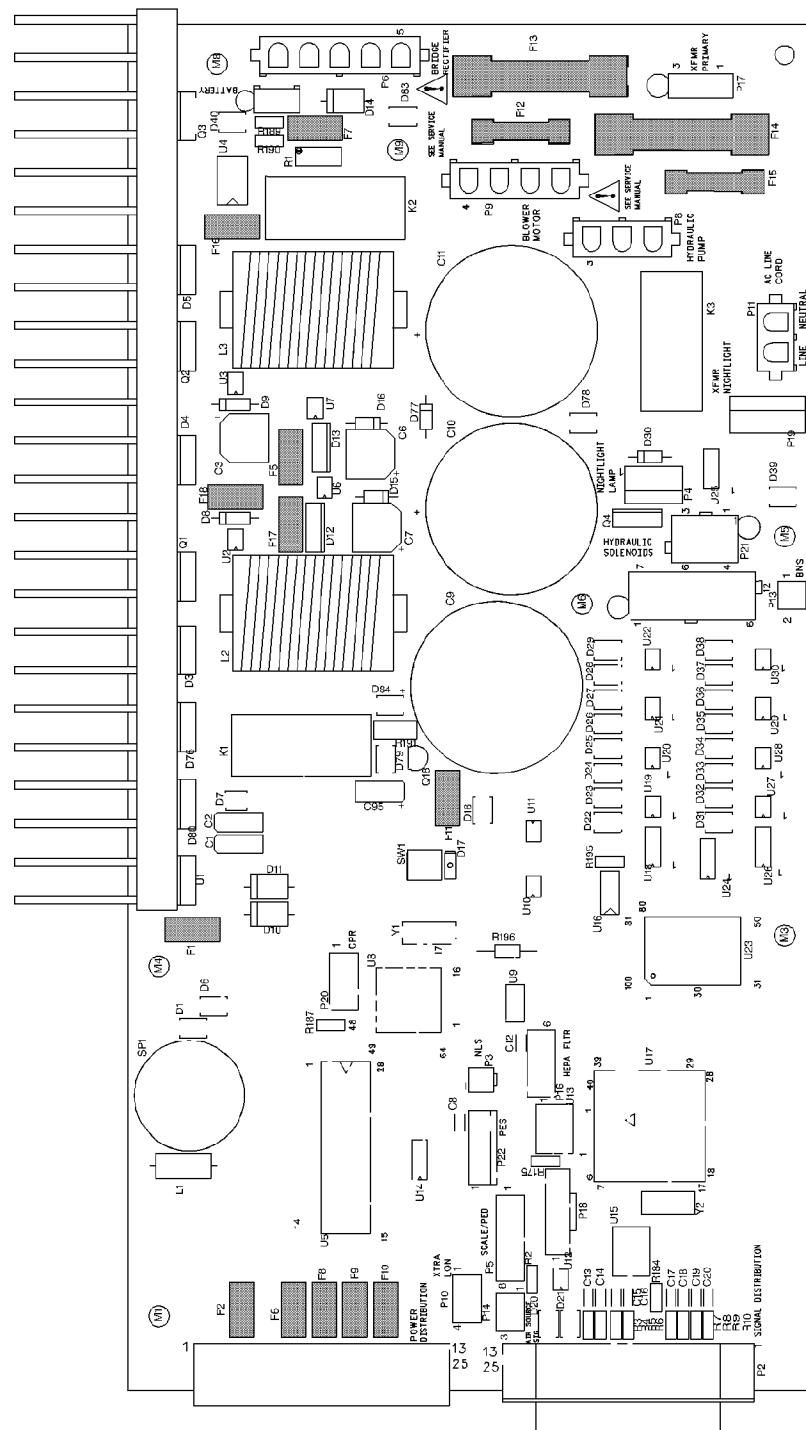
## Replacement

**NOTE:**

Make sure the long plastic spacers are on the screws when you replace the Power Control Module P.C. board assembly.

1. Do the removal procedure in reverse order.
2. From the **Diagnostic** screen on the Graphical Caregiver Interface (GCI)® Control, send a **10-166** code.
3. Do the “Function Checks” on page 2-5.

Figure 4-47. Power Control Module P.C. Board Fuse Locations



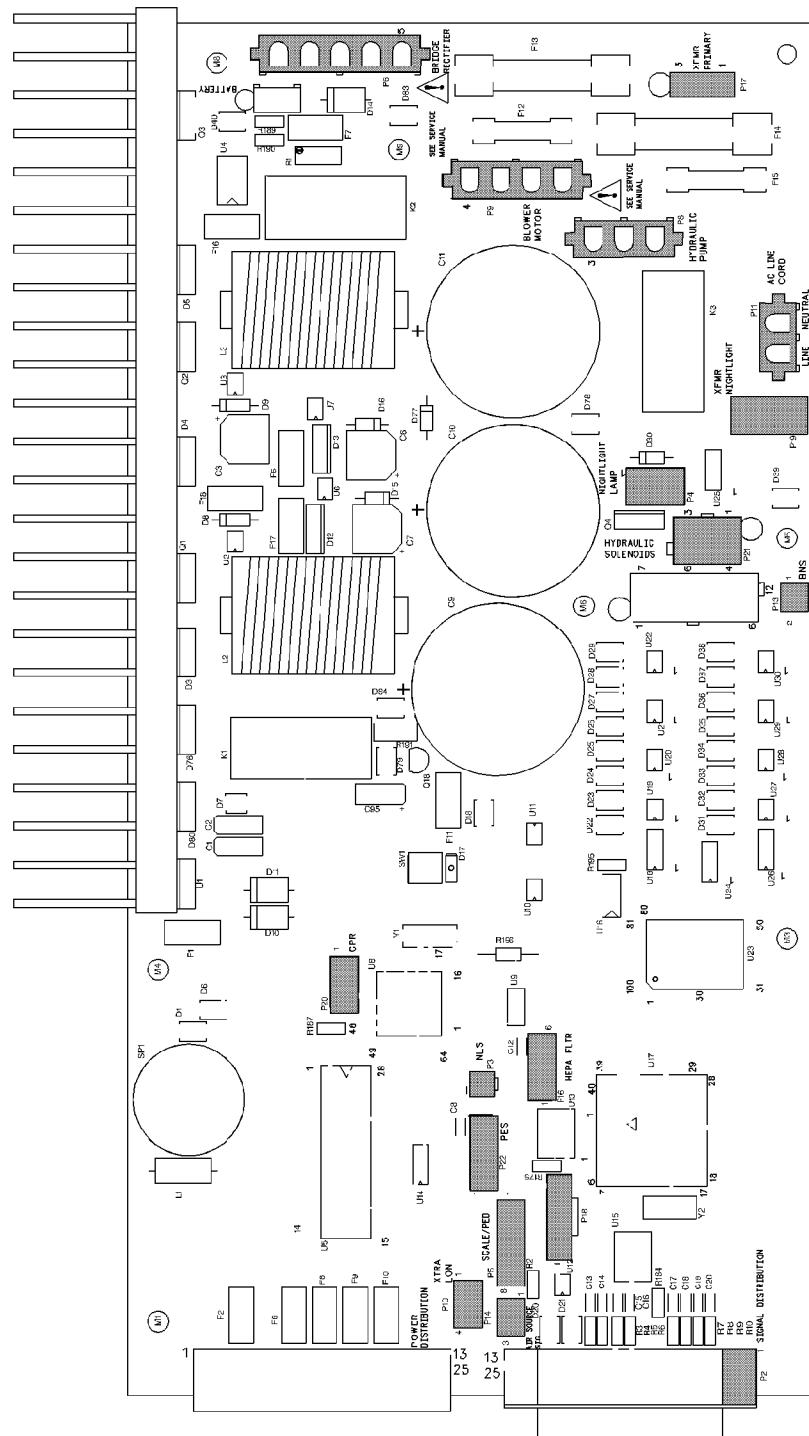
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#### 4.42 Power Control Module P.C. Board

Chapter 4: Removal, Replacement, and Adjustment Procedures

**Figure 4-48. Power Control Module Connector Locations**



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## 4.43 Weigh Frame Junction Electrical Box

Tools required: Hilow cylinder brace (P/N SA1695)  
AC/DC volt ohm meter  
T15 Torx®<sup>1</sup> head screwdriver

### Removal

1. Raise the bed.
2. Remove the tub base cover and top center base cover (refer to procedure 4.3).



#### WARNING:

Failure to install the hilow cylinder brace before working under the raised section of the bed could result in personal injury or equipment damage.

3. Install the hilow cylinder brace (refer to procedure 4.4).



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.



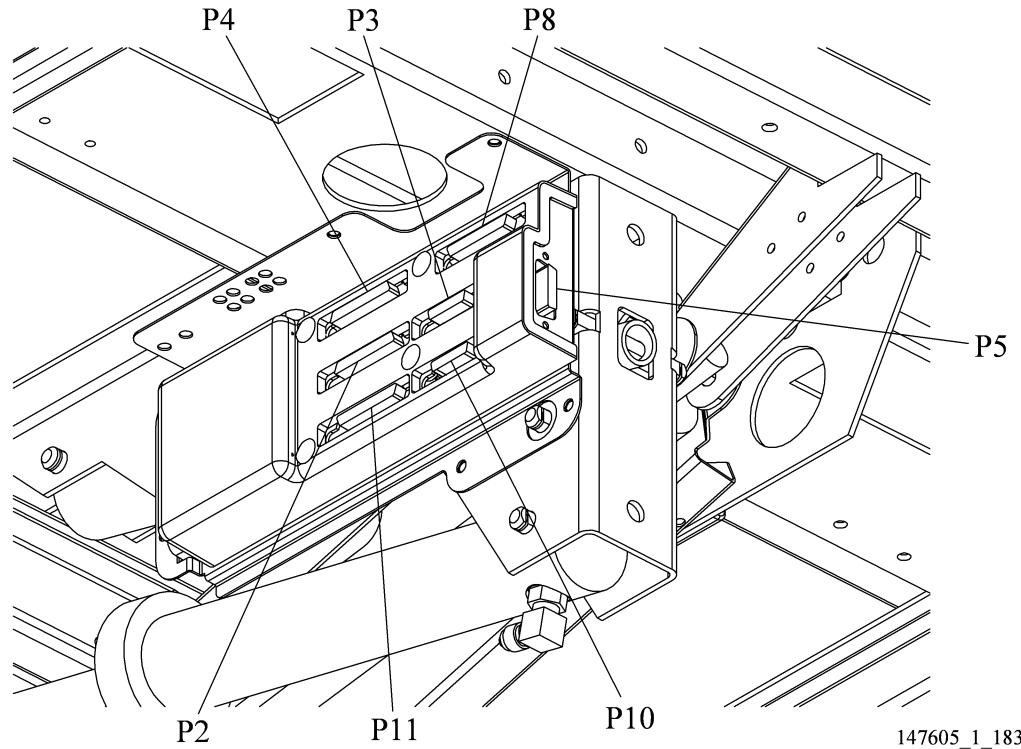
#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).
6. Remove the assembly cover.
7. From the weigh frame junction electrical box, disconnect the electrical connectors (P2, P3, P4, P5, P8, P10, and P11) (see figure 4-49 on page 4-132).

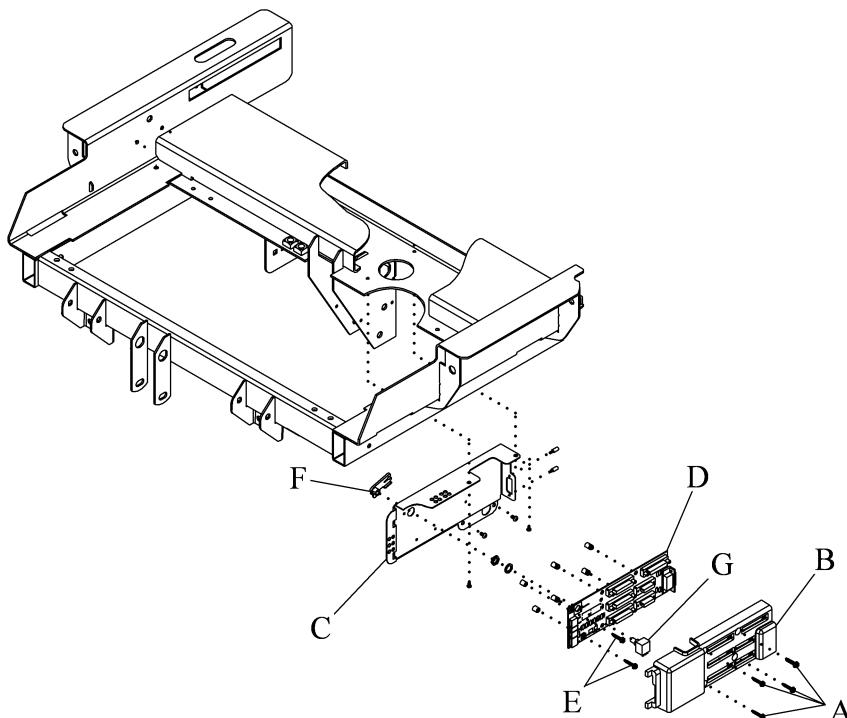
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**Figure 4-49. Weigh Frame Electrical Junction Box**



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8. Remove the four screws (A) that attach the junction box cover (B) to the junction box base plate (C) (see figure 4-50 on page 4-133).

**Figure 4-50. Weigh Frame Electrical Junction Box Removal**

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9. Remove the cable ties and the hardware that attach the wires and cables to the weigh frame junction box P.C. board assembly (D).
10. Disconnect the weigh frame junction box P.C. board assembly (D) board cables and wires P9, P12, P14, P15, and P16.
11. Disconnect the connectors JP3 and JP2 from the weigh frame junction box P.C. board assembly (D).
12. Slowly lift the left end of the weigh frame junction box P.C. board assembly (D) outward and away from the junction box base plate (C).
13. Remove the thigh sensor crank (F) of the knee sensor potentiometer (G) from the sensing linkage.
14. Remove the two screws (E) that attach the weigh frame junction box P.C. board assembly (D) to the junction box base plate (C).
15. Loosen the connector nuts on P5 (see figure 4-49 on page 4-132).



**CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.



**CAUTION:**

To ship and store the P.C. board, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

16. Measure and record the electrical position of the M1 knee sensor potentiometer (G) (see figure 4-50 on page 4-133).
17. Move the weigh frame junction box P.C. board assembly (D) outward and to the left to remove the junction box base plate (C) from the bracket.
18. Remove the weigh frame junction box P.C. board assembly (D) from the junction box base plate (C).
19. Remove the junction box base plate (C) from the frame.

## Replacement

1. Make sure the new knee sensor potentiometer (G) is the same electrical position as recorded in the removal step 16 above.
2. Do the removal procedure in reverse order.
3. Do the “Function Checks” on page 2-5.

## 4.44 Weigh Frame Junction P.C. Board

Tools required: Hilow cylinder brace (P/N SA1695)  
T15 Torx®<sup>1</sup> head screwdriver  
AC/DC volt ohm meter

### Removal

1. Raise the bed.
2. Remove the tub base cover and top center base cover (refer to procedure 4.3).



#### **WARNING:**

Failure to install the hilow cylinder brace could cause injury or equipment damage.

3. Install the hilow cylinder brace (refer to procedure 4.4).



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.



#### **WARNING:**

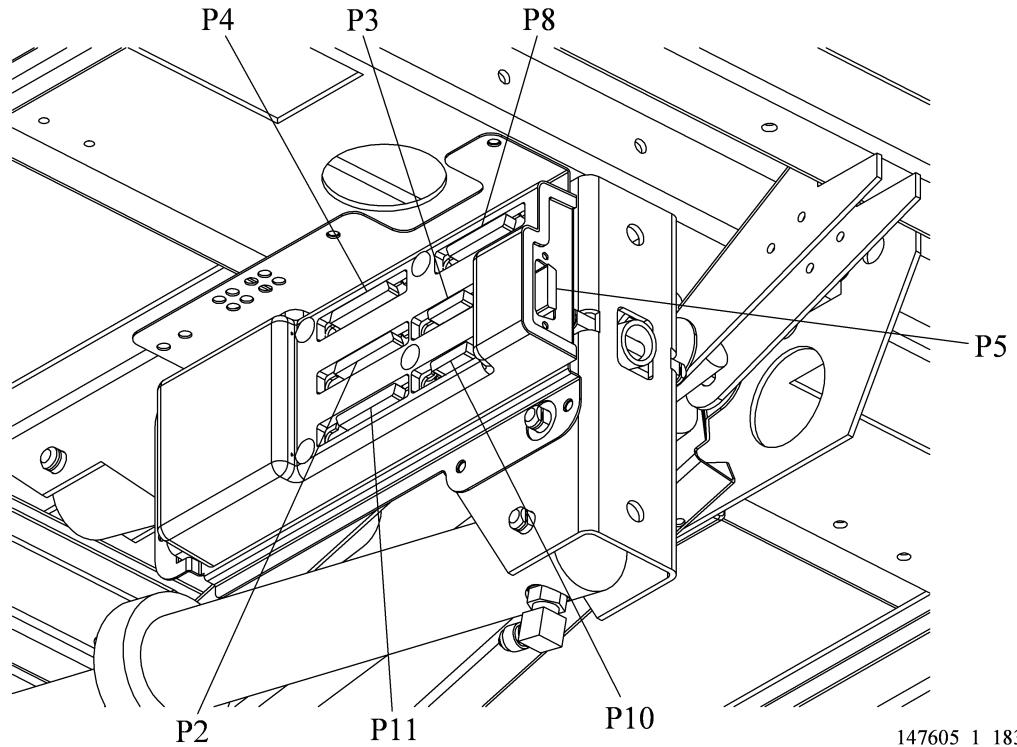
Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).
6. From the weigh frame junction electrical box, disconnect the electrical connectors (P2, P3, P4, P5, P8, P10, and P11) (see figure 4-51 on page 4-136).

4

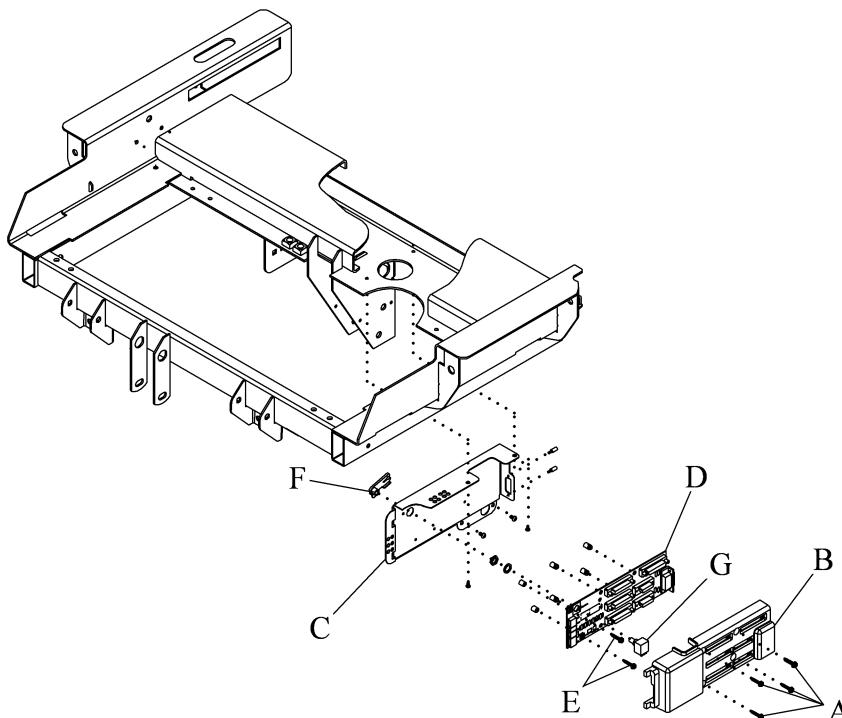
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**Figure 4-51. Weigh Frame Electrical Junction Box**



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7. Remove the four screws (A) that attach the junction box cover (B) to the junction box base plate (C) (see figure 4-52 on page 4-137).

**Figure 4-52. Junction Box P.C. Board Removal**

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4

8. Remove the junction box cover (B).
9. Remove the cable ties and hardware that attach the wires and cables attached to the junction box P.C. board assembly (D).
10. Disconnect the junction box P.C. board assembly (D) cables and wires P9, P12, P14, P15, and P16.
11. Disconnect the JP2 and JP3 connectors from the junction box P.C. board assembly (D).
12. Remove the mounting screws (E) that attach the junction box P.C. board assembly (D) to the junction box base plate (C).
13. Slowly lift the left end of the junction box P.C. board assembly (D) away from the junction box base plate (C).
14. Remove the shaft of the knee sensor potentiometer (G) from the sensing linkage (F).
15. Loosen the connector nuts on P5 (see figure 4-51 on page 4-136).



**CAUTION:**

To prevent component damage, make sure that your hands are clean, and **only** handle the P.C. board by its edges.



**CAUTION:**

To ship and store the P.C. board, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

16. Move the weigh frame junction box P.C. board assembly (D) outward and to the left to remove the junction box base plate (C) from the bracket (see figure 4-51 on page 4-136).
17. Remove the weigh frame junction box P.C. board assembly (D) from the junction box base plate (C).
18. Measure and record the electrical position of the M1 knee sensor potentiometer (G) .

## Replacement

1. Make sure the new knee sensor potentiometer (G) is the same electrical position as recorded in the removal step 18, above.
2. Do the removal procedure in reverse order.
3. Do the “Function Checks” on page 2-5.

## 4.45 Scale Control—Patient Exit Detection (PED) Module

Tools required: Hilow cylinder brace (P/N SA1695)  
T25 Torx®<sup>1</sup> head screwdriver  
T15 Torx® head screwdriver

### Removal

1. Set the brakes.
2. Raise the bed.
3. Remove the tub base cover and top center base cover (refer to procedure 4.3).



#### **WARNING:**

Failure to install the hilow cylinder brace could cause injury or equipment damage.

4. Install the hilow cylinder brace (refer to procedure 4.4).



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

5. Unplug the bed from its power source.

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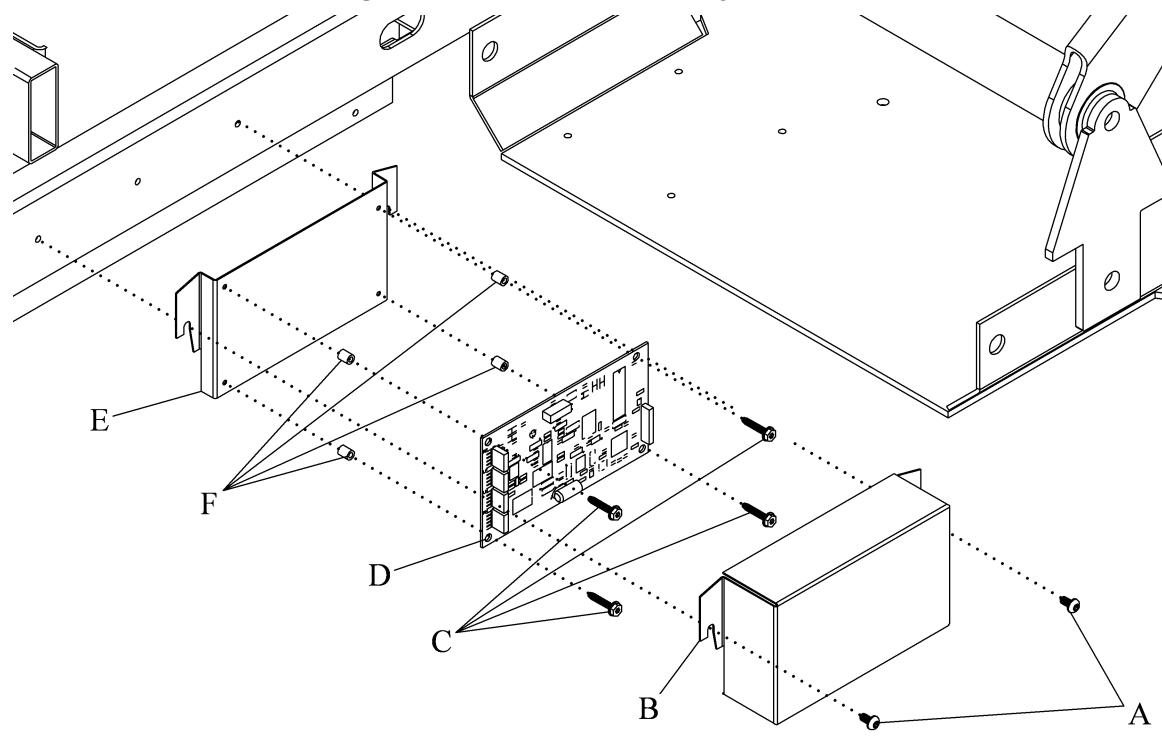


#### **WARNING:**

Failure to disable the battery could cause injury or equipment damage.

6. Disable the battery (refer to procedure 4.74).
7. Loosen the mounting bolts (A) that attach the scale assembly module to the base frame (see figure 4-53 on page 4-140).

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**Figure 4-53. Scale Assembly Module**

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8. Slide the scale assembly module upward, and remove it from the base frame.
9. As you support the base plate (E) and its cables remove the module cover (B) from the scale assembly module.
10. Slide the base plate (E) off the mounting bolts (A).
11. Disconnect all cable connectors from the P.C. board (D).
12. As you support the base plate (E) and its cables remove the module cover (B) from the base plate (E).
13. Remove the mounting bolts (C) that attach the P.C. board (D) and four spacers (F) to the base plate (E).

**CAUTION:**

To prevent component damage, make sure that your hands are clean, and **only** handle the P.C. board by its edges.

**CAUTION:**

To ship and store the P.C. board, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

14. Hold the P.C. board (D) by the edges, and remove it and the four spacers (F) from the base plate (E).

## Replacement

1. Do the removal procedure in reverse order.
2. Connect the four weigh frame load cells and the auxiliary power supply cable connectors, P1 through P5, to the P.C. board (D). Make sure the correct beam wires are on the connectors 3, 2, 1, and 4, top to bottom.
3. Calibrate the scale:
  - NAWI Class IIII Scale European version—refer to procedure 4.77.
  - Non-NAWI Class IIII Scale—refer to procedure 4.2.
4. Do the “Function Checks” on page 2-5.

## 4.46 Weigh Load Beam

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- Torque wrench, 50 in-lb to 150 in-lb (5.6 N·m to 16.9 N·m)
- Calibration weights 200 lb (91 kg)
- 4" diagonal cutters
- Hilow cylinder brace (P/N SA1695)

### Removal

1. Raise the weigh frame to its maximum height.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

3. Disable the battery (refer to procedure 4.74).
4. Remove the base frame head cover (refer to procedure 4.3).



#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

5. Install the hilow cylinder brace (refer to procedure 4.4).
6. Remove the headboard.
7. Remove all weight and the sleep surface from the weigh frame surface.
8. Disconnect the load beam cable from the applicable Scale Module connector (refer to procedure 4.45).
9. Cut the cable ties that attach the load beam cable.
10. Remove the two screws (B) that attach the bottom of the load beam (D) to the intermediate frame (see figure 4-54 on page 4-143).

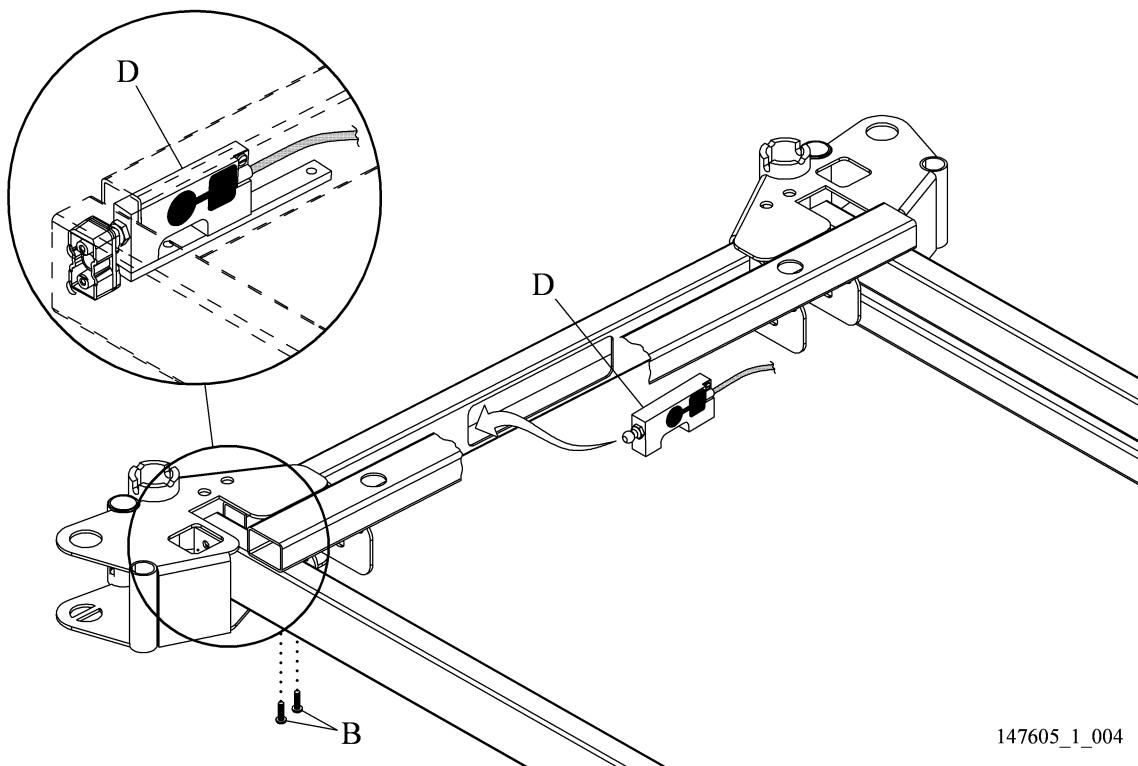
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**NOTE:**

It is necessary to remove ground screw at the foot end.

**Figure 4-54. Weigh Load Beam**



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11. Use a second person or blocks to support the corner of the weigh frame.
12. Gently lift the weight of the weigh frame from the load beam (D).
13. With the load beam (D) free, gently pull on the load cell cable to carefully pull the load cell out from the intermediate frame channel toward the position of the load beam (D).

**NOTE:**

For the foot-end load beam assembly you must remove the plate first.

14. Remove the  $\frac{1}{4}$ " plate from the bottom of the load beam (D).

## Replacement

1. Install the  $\frac{1}{4}$ " plate on the bottom of the load beam (D).
2. Tighten the mounting bolts to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.

3. Put the load beam (D) and  $\frac{1}{4}$ " plate into the intermediate frame, and slide it into position.
4. Align the mounting holes with the intermediate frame, and make sure the ball of the load beam (D) is installed in the load bearing block mount.
5. Install the screws (B) into the slotted mounting hole of the  $\frac{1}{4}$ " plate on the load beam (D).
6. Tighten the screws (B) to  $90 \text{ in-lb} \pm 10 \text{ in-lb}$  ( $10.2 \text{ N}\cdot\text{m} \pm 1.1 \text{ N}\cdot\text{m}$ ) of torque.
7. Calibrate the scale:
  - NAWI Class III Scale European version—refer to procedure 4.77.
  - Non-NAWI Class III Scale—refer to procedure 4.2.
8. Do the “Function Checks” on page 2-5.

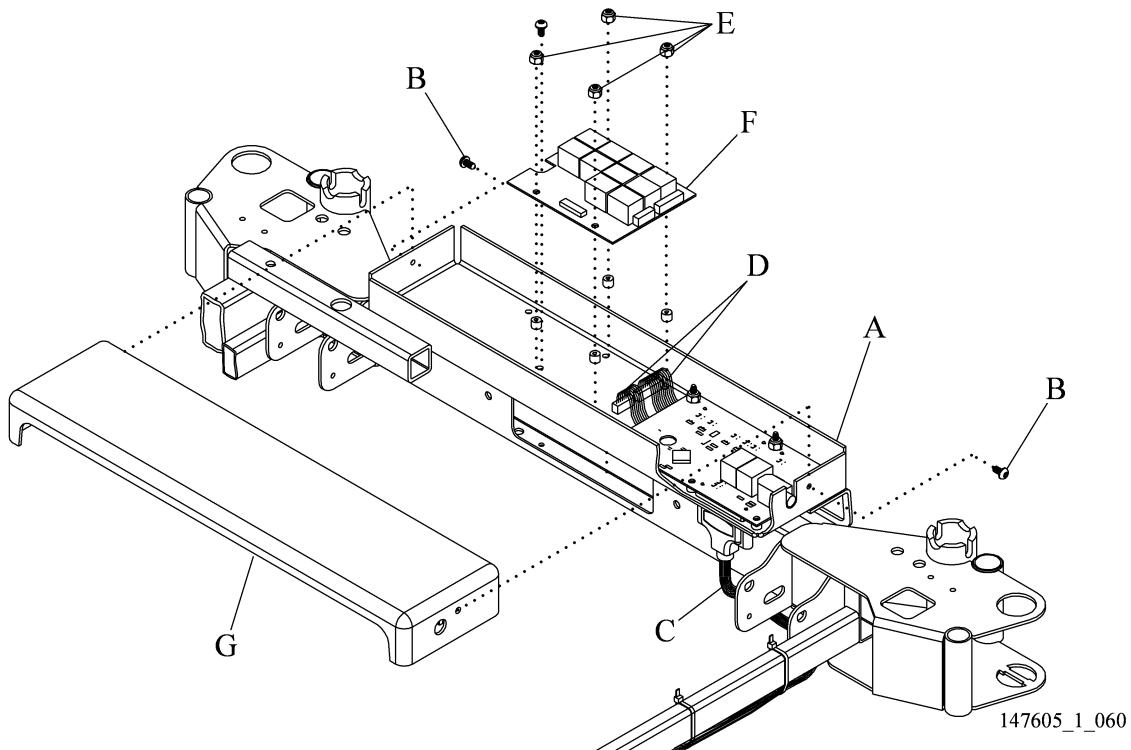
## 4.47 SideCom® Communication System Entertainment/Lighting Module

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
5/15" deep well socket and ratchet

### Removal

1. Put the frame at a height to get access to the SideCom® Communication System (A) (see figure 4-55 on page 4-145).

**Figure 4-55. SideCom® Communication System Entertainment/Lighting P.C. Board**



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.

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**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

3. Disable the battery (refer to procedure 4.74).
4. Remove the headboard.
5. Remove the two mounting screws (B) that attach the cover (G) to the SideCom® Communication System (A).
6. Remove the cover (G) from the SideCom® Communication System (A).
7. Disconnect the weigh frame cable assembly (C) from the left end of the SideCom® Communication System (A).
8. Disconnect the two connecting cables (D) from the Nurse Call/Patient Exit Detection P.C. board.
9. Remove the four mounting nuts (E) that attach the entertainment/lighting P.C. board (F) to the SideCom® Communication System (A).



**CAUTION:**

To prevent component damage, make sure that your hands are clean, and **only** handle the P.C. board by its edges.



**CAUTION:**

To ship and store the P.C. board, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

10. Remove the entertainment/lighting P.C. board (F) from the SideCom® Communication System (A).

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

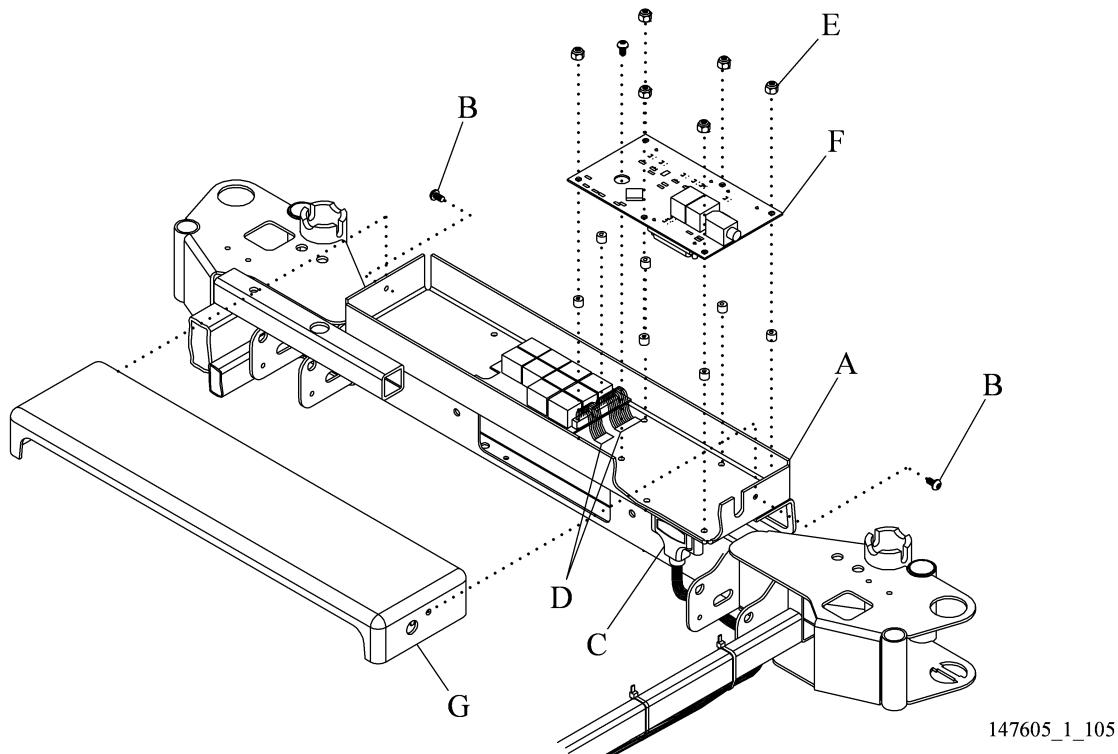
## 4.48 SideCom® Communication System and Nurse Call Module

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
5/15" deep well socket and ratchet

### Removal

1. Put the frame at a height to get access to the SideCom® Communication System (A) (see figure 4-56 on page 4-147).

**Figure 4-56. SideCom® Communication System Nurse Call/Patient Exit Detection P.C. Board**



4



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.



#### **WARNING:**

Failure to disable the battery could cause injury or equipment damage.

3. Disable the battery (refer to procedure 4.74).

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4. Remove the headboard.
5. Remove the two mounting screws (B) that attach the cover (G) to the SideCom® Communication System (A).
6. Remove the cover (G) from the SideCom® Communication System (A).
7. Disconnect the weigh frame cable assembly (C) from the left end of the SideCom® Communication System (A).
8. Disconnect the two connecting cables (D) from the entertainment/ lighting P.C. board.
9. Remove the six mounting nuts (E) that attach the Nurse Call/Patient Exit Detection (PED) P.C. board (F) to the SideCom® Communication System (A).



**CAUTION:**

To prevent component damage, make sure that your hands are clean, and **only** handle the P.C. board by its edges.



**CAUTION:**

To ship and store the P.C. board, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

10. Remove the nurse call/PED P.C. board (F) from the SideCom® Communication System (A).

## **Replacement**

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.49 SideCom® Communication System Universal Television (UTV) Module

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
5/15" deep well socket and ratchet

### Removal

1. Put the frame at a height to get access to the SideCom® Communication System (A) (see figure 4-57 on page 4-150).



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.



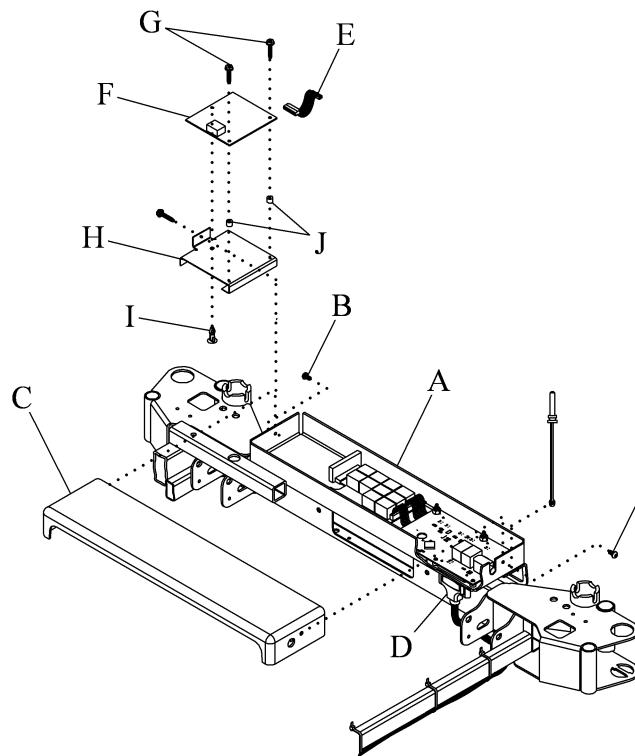
#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

3. Disable the battery (refer to procedure 4.74).
4. Remove the headboard.
5. Remove the two mounting screws (B) that attach the cover (C) to the SideCom® Communication System (A).
6. Remove the cover (C) from the SideCom® Communication System (A).
7. Disconnect the weigh frame cable assembly (D) from the left end of the SideCom® Communication System (A).
8. Disconnect the ribbon cable (E) from the universal television (UTV) P.C. board (F).
9. Remove the two screws (G) that attach the UTV P.C. board (F) and two plastic spacers (J) to the UTV bracket (H).
10. Remove the standoff (I) that attaches the UTV P.C. board (F) to the UTV bracket (H).

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**Figure 4-57. SideCom® Communication System Universal Television (UTV) Module****CAUTION:**

To prevent component damage, make sure that your hands are clean, and **only** handle the P.C. board by its edges.

**CAUTION:**

For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

11. Remove the UTV P.C. board (F) and the two plastic spacers (J) from the SideCom® Communication System (A).

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.50 Night Light

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Hilow cylinder brace (P/N SA1695)

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the base and head covers from the base frame (refer to procedure 4.3).



#### WARNING:

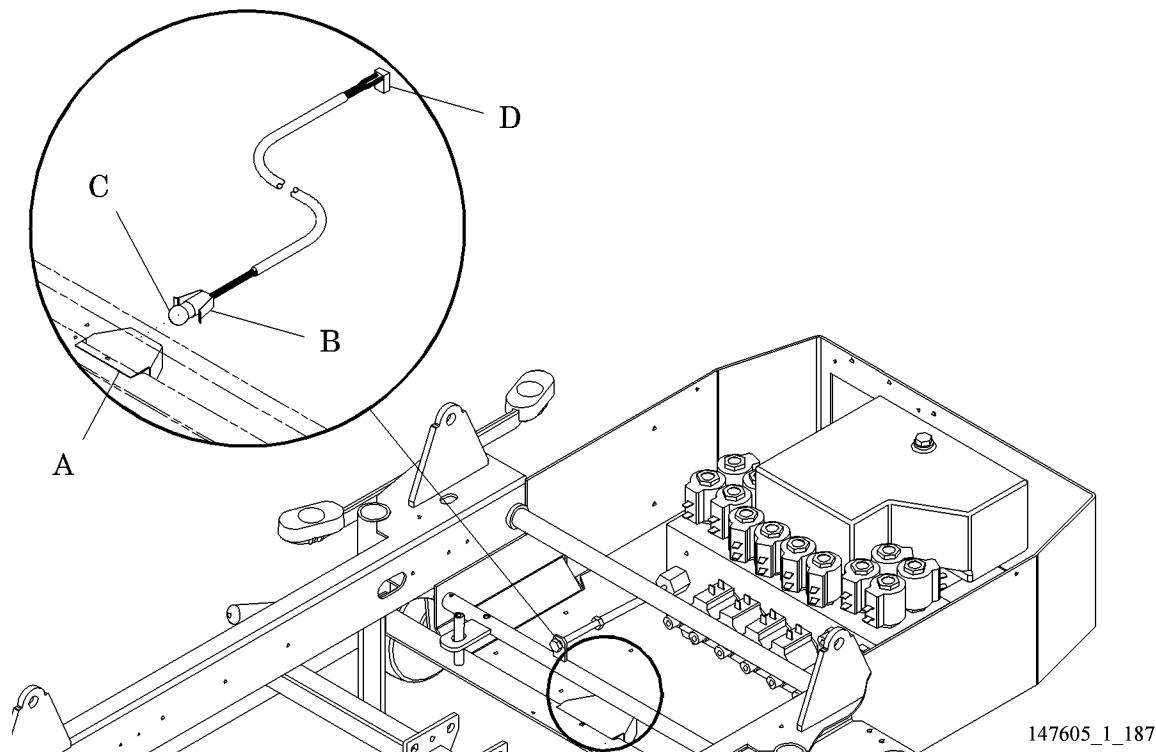
Failure to install the hilow cylinder brace could cause injury or equipment damage.

4. Install the hilow cylinder brace (refer to procedure 4.4).
5. Find the night light housing (A) (see figure 4-58 on page 4-152).

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**Figure 4-58. Night Light**

6. Squeeze the sides of the lamp bracket (B).
7. Remove the lamp (C) and the lamp bracket (B) from the night light housing (A).
8. Press in on the lamp (C), turn it counter-clockwise, and remove it from the lamp bracket (B) from under the frame.

## Replacement

1. Install the new lamp (C) into the socket of the lamp bracket (B).
2. Squeeze together the sides of the lamp bracket (B).
3. Install the lamp (C) and the lamp bracket (B) into the night light housing (A).
4. Make sure the night light cable plug (D) is correctly connected to the Power Control Module plug, P4.
5. Plug the unit into an appropriate power source.

**NOTE:**

If necessary, cover the photosensor in the foot end of the base frame to turn on the lamp.

6. Observe the operation of the lamp (C).
7. Remove the cylinder safety braces.
8. Install the base and head covers (refer to procedure 4.3).
9. Do the “Function Checks” on page 2-5.

## 4.51 Night Light Photo Sensor

Tools required:    T25 Torx®<sup>1</sup> head screwdriver  
                            Hilow cylinder brace (P/N SA1695)

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the base and head covers from the base frame (refer to procedure 4.3).



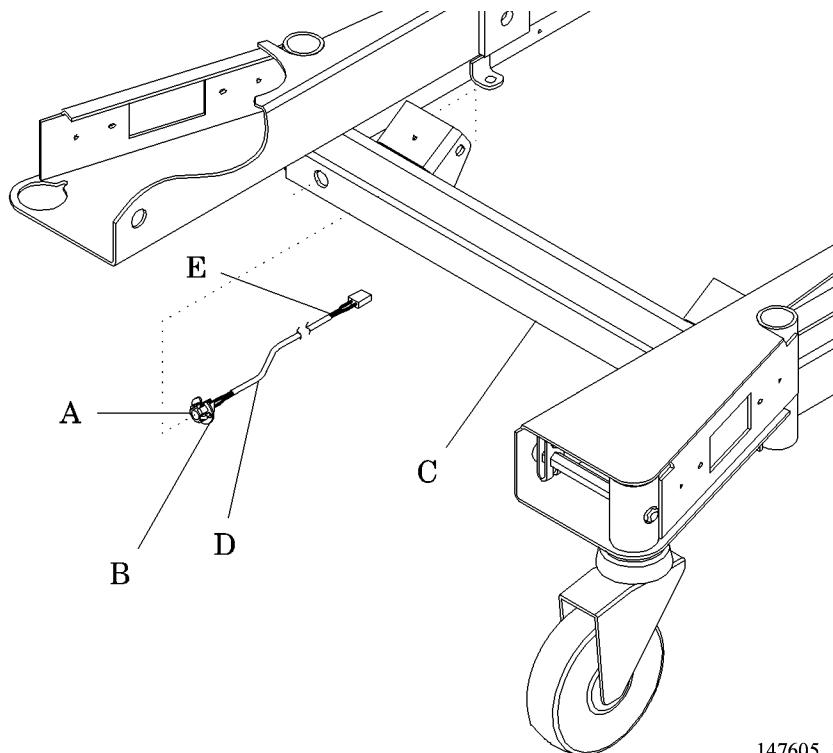
#### WARNING:

Failure to install the hilow cylinder brace could cause injury or equipment damage.

4. Install the hilow cylinder brace (refer to procedure 4.4).
5. Find the night light photocell (A) (see figure 4-59 on page 4-155).

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**Figure 4-59. Night Light Photo Sensor**

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6. Remove the plastic snap ring (B) from the face of the photo sensor (D), and remove the photo sensor (D) from the foot-end frame (C).
7. Pull the photo sensor (D) and photo sensor cable (E) out through the foot-end frame (C).
8. Disconnect the photo sensor cable (E) from the Power Control Module and remove the cable tie.

## Replacement

1. Put the new photo sensor cable (E) through the foot-end frame (C).
2. Install the photocell (A) into the photocell hole in the right end of the foot end frame (C).
3. Install the plastic snap ring (B) over the protruding face of the photo sensor (D).
4. Connect the photo sensor cable (E) to the Power Control Module at P3.
5. Plug the bed into an appropriate power source.

**NOTE:**

If necessary, cover the photo sensor to turn on the lamp.

6. Observe the operation of the lamp.
7. Install the base and head covers (refer to procedure 4.3).
8. Do the “Function Checks” on page 2-5.

## 4.52 Accessory Receptacle Module

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
5/16" wrench  
Ground fault detector  
Crimping tool  
4" diagonal cutters  
Hilow cylinder brace (P/N SA1695)

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

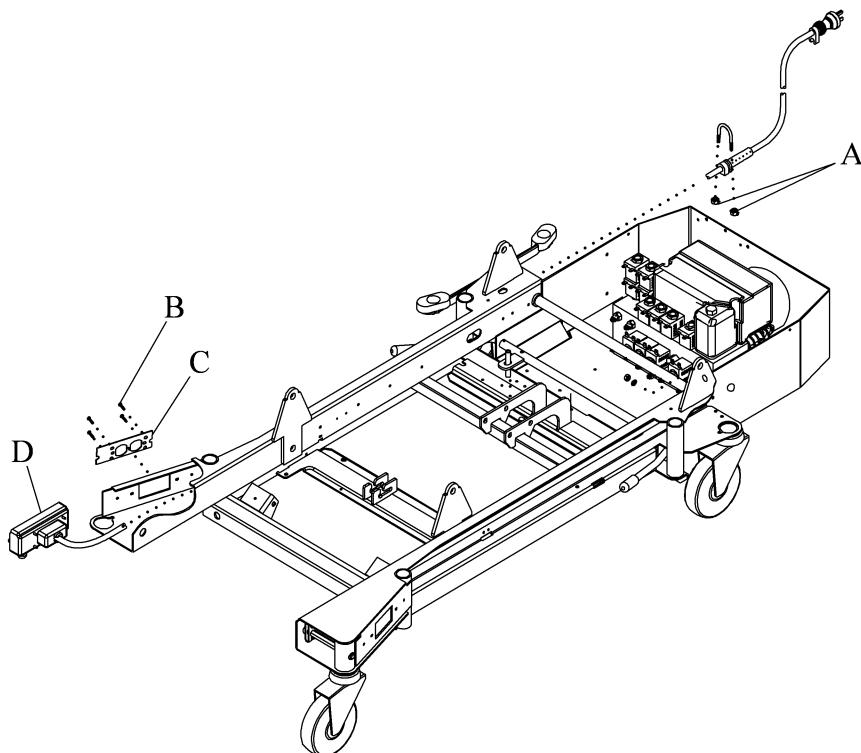
Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the base and head covers from the base frame (refer to procedure 4.3).
4. Remove the head caster covers from the right-hand side of the bed (refer to procedure 4.3).
5. Remove the foot caster covers from the right-hand side of the bed (refer to procedure 4.6).
6. Install the hilow cylinder brace (refer to procedure 4.4).
7. Remove the nuts (A) and auxiliary power cord clamp from the base frame (see figure 4-60 on page 4-158).

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**Figure 4-60. Accessory Receptacle Module**

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8. Remove the four mounting screws (B) from the base frame.
9. Remove the spacer (C).
10. Remove the accessory receptacle (D) from the base frame.

**NOTE:**

The power cord will come out the hole where the receptacle was installed.

## Replacement

1. Do the removal procedure in reverse order.
2. Use a ground fault detector to do an electrical check on the accessory receptacle (D) ground.
3. Do the “Function Checks” on page 2-5.

## 4.53 Low Noise Blower Assembly

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- ½" socket with ratchet
- #2 phillips head screwdriver
- ¼" nut driver

### Removal

1. Remove the tub base cover and center base cover (refer to procedure 4.3).



#### **WARNING:**

Failure to set the brakes could cause injury or equipment damage.

2. Set the brakes.



#### **WARNING:**

Failure to install the hilow cylinder brace could cause injury or equipment damage.

3. Install the hilow cylinder brace (refer to procedure 4.4).



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.



#### **WARNING:**

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).

6. Slide the capacitor (A) out from the cable ties on the blower box cover (Q), and remove the capacitor (A) from the blower box cover (Q) (see figure 4-61 on page 4-160).

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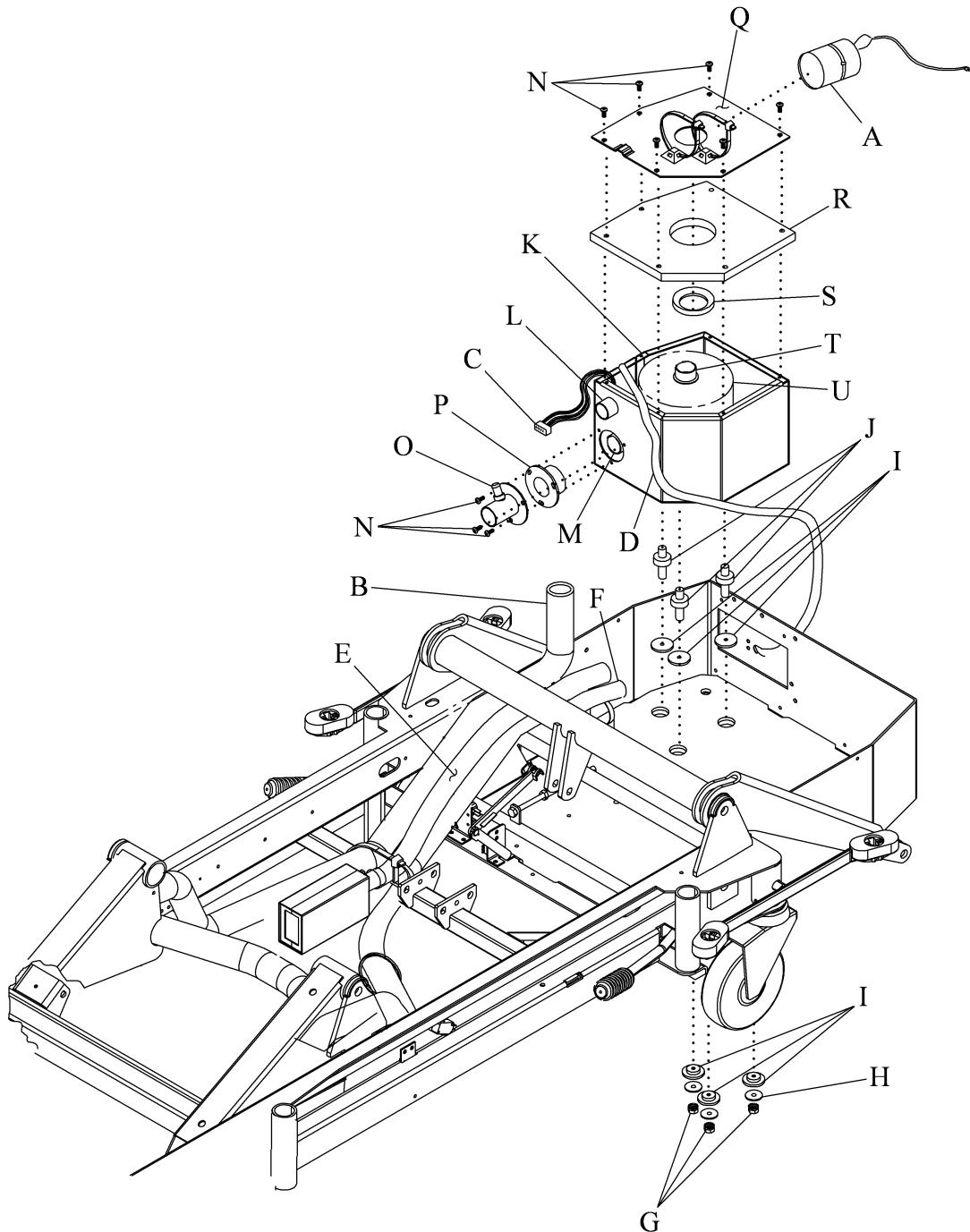
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#### 4.53 Low Noise Blower Assembly

#### Chapter 4: Removal, Replacement, and Adjustment Procedures

**Figure 4-61. Low Noise Blower Assembly**



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7. Loosen the hose clamp, and disconnect the vacuum port hose (B) from the blower box (K).
8. Disconnect the blower power cable (C).
9. Disconnect the pressure vent hose (D) from the tube on the pressure port flange (O).
10. Loosen the hose clamp, and disconnect the intake/exhaust muffler hose (E).
11. Loosen the hose clamp, and disconnect the pressure port hose (F).
12. Remove the three keps nuts (G), washers (H), and isolation bushings (I) from the three isolation mounts (J) on the bottom of the blower box (K).
13. Remove the blower box (K), three isolation mounts (J), and three isolation bushings (I) from the bed.
14. Put the blower box (K) on its side make sure the intake/exhaust port (L) and pressure port (M) are up.
15. Remove the screws (N) from the pressure port flange (O).
16. Remove the pressure port flange (O) and pressure port seal (P) from the blower box (K).
17. Remove the screws (N) from the blower box cover (Q).
18. Remove the blower box cover (Q) and top insulation foam (R) from the blower box (K).
19. Remove the vacuum port seal (S) from the vacuum port (T) on the blower motor (U).
20. Remove the blower motor (U) from the blower box (K).



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## Replacement

1. Install the short ends of the three isolation mounts (J) into the bottom of the blower motor (U).
2. Put the blower power cable (C) under the pressure port (M), and install the blower motor (U) into the blower box (K).
3. Install the vacuum port seal (S) on the vacuum port (T) make sure the thin edge side facing up.

4. Install the top insulation foam (R) and the blower box cover (Q) on the blower box (K). Put the blower power cable (C) under the indentation in the blower box cover (Q).
5. Install the six screws (N) to attach blower box cover (Q) and top insulation foam (R) to the blower box (K).
6. Put the blower box (K) on its side. Make sure the intake/exhaust port (L) and pressure port (M) are up.
7. Install one isolation bushing (I) on each isolation mount (J). Make sure the larger diameter side is towards the blower box (K).
8. Apply thread locker to the threads of the three isolation mounts (J).
9. Align the holes in the pressure port seal (P) with the holes in the blower box (K) and install the pressure port seal (P) on to the pressure port (M).
10. Align the holes in the pressure port flange (O) with the holes in the pressure port seal (P) and the holes in the blower box (K), and install the pressure port flange (O).
11. install the screws (N) to attach the pressure port flange (O).
12. Place the blower box (K) into the bed frame so that the three isolation mounts (J) go through the holes in the bed frame.
13. Install the pressure port hose (F) on the pressure port flange (O), and tighten the hose clamp.
14. Connect the blower power cable (C) to the bed frame connector.
15. Install the intake/exhaust muffler hose (E) on to the intake/exhaust port (L), and tighten the hose clamp.
16. Install the vacuum port hose (B) on to the vacuum port (T), and tighten the hose clamp.
17. Install the isolation bushings (I) on to the isolation mounts (J) under the base tub. Make sure the smaller diameter sides are up towards the base tub.
18. Install the washers (H) and keps nuts (G) on the isolation mounts (J).
19. Tighten the keps nuts (G) until the ends of the isolation mount (J) studs are even with the top of the keps nuts (G). Do not tighten any further.
20. Put the pressure vent hose (D) around the blower box (K), and push the end on to the small tube on the pressure port flange (O).

**NOTE:**

Make sure the pressure vent hose is completely on.

21. Install the capacitor (A) into the two cable ties on the top of the blower box cover (Q). Make sure the capacitor (A) does not extend past the edge of the hydraulic reservoir.
22. Remove the hilow cylinder braces (refer to procedure 4.4).
23. Install the tub base cover and center base cover (refer to procedure 4.3).
24. Plug the bed into an appropriate power source.
25. Do a function check of the bed as follows:
  - a. Make sure no errors occur after the power is restored.

**NOTE:**

The initialization of the mattress takes approximately 30 s.

- b. Press the **Max-Inflate** control, and make sure the blower turns off within 5 min.
- c. Press the **Normal** mode control, and make sure the normal mode engages.
- d. Retract the foot section by any amount, and make sure the Heel Suspension mode comes on.
- e. Make sure the blower turns off within 5 min.
- f. Make sure the blower stays off for 5 min.

**NOTE:**

Any movement on the surface of the bed may cause the blower to turn on prematurely.

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

## 4.54 Air Module—Manifold Assembly

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- 6" #2 Phillips head screwdriver
- Screwdriver

### Removal

1. Set the brakes.

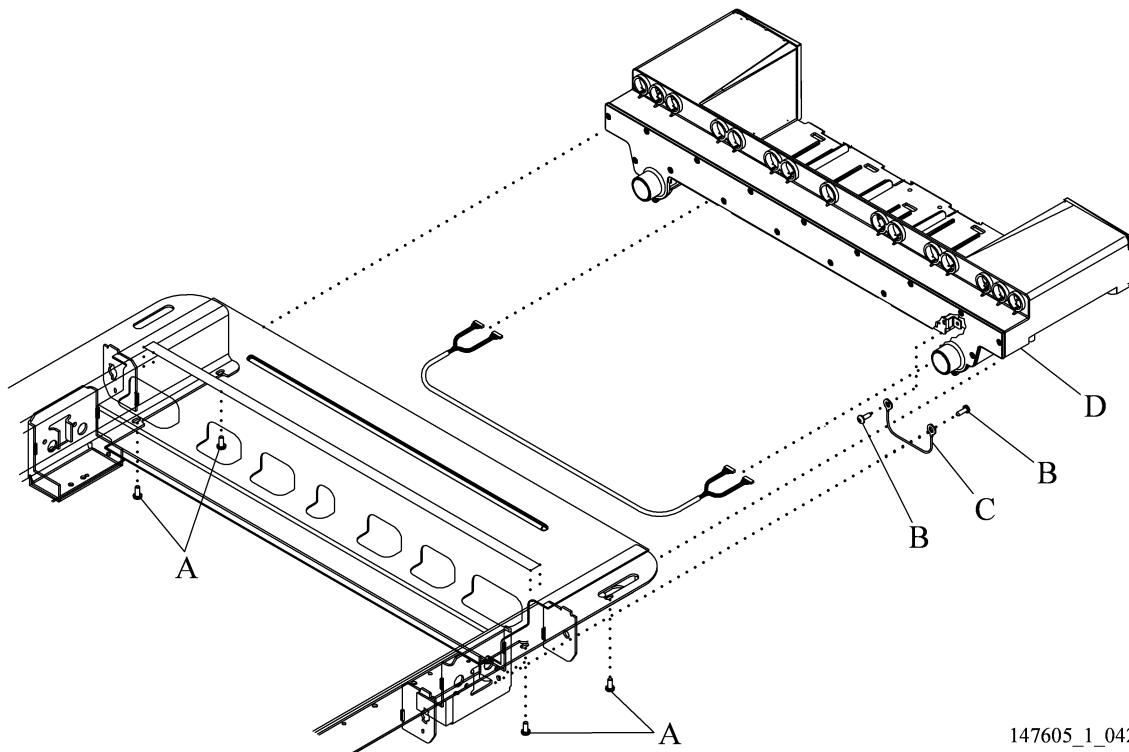


#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed from its power source.
3. Remove the treatment foot surface control module (TFSCM) and the treatment surface control module (TSCM) (refer to procedure 4.55).
4. Remove the four mounting screws (A) that attach the manifold assembly (D) to the intermediate frame (see figure 4-62 on page 4-164).

**Figure 4-62. Air Module—Manifold Assembly**



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5. Remove the two screws (B) and the ground strap (C).
6. Disconnect the air hoses from the manifold connections.
7. Disconnect the TFSCM cable connections, and carefully pull them through the cable access hole of the manifold assembly (D).
8. Remove the manifold assembly (D).

## Replacement

1. Install the TFSCM and the TSCM (refer to procedure 4.55).
1. Put the TFSCM cable through the cable access hole of the manifold assembly (D), and connect the TFSCM cable connections.
2. Connect the air hoses to the manifold connections.
3. Install the two screws (B) and the ground strap (C).
4. Install the four mounting screws (A) that attach the manifold assembly (D) to the intermediate frame.
5. Install the four sems screws that attach the TFSCM cover (refer to procedure 4.55).
6. Do the “Function Checks” on page 2-5.

## **4.55 Treatment Foot Surface Control Module (TFSCM) and Treatment Surface Control Module (TSCM)**

Tools required: Phillips head screwdriver

### **Removal**

1. To remove the treatment foot surface control module (TFSCM) (D), perform the following (see figure 4-63 on page 4-167):
  - a. At the head-left side remove the two sems screws (A) that attach the TFSCM cover (B) and access door (C) to the manifold assembly (I).
  - b. Remove the TFSCM cover (B) and access door (C) from the manifold assembly (I).

**NOTE:**

When you remove the TFSCM, make a note of the hose connections.

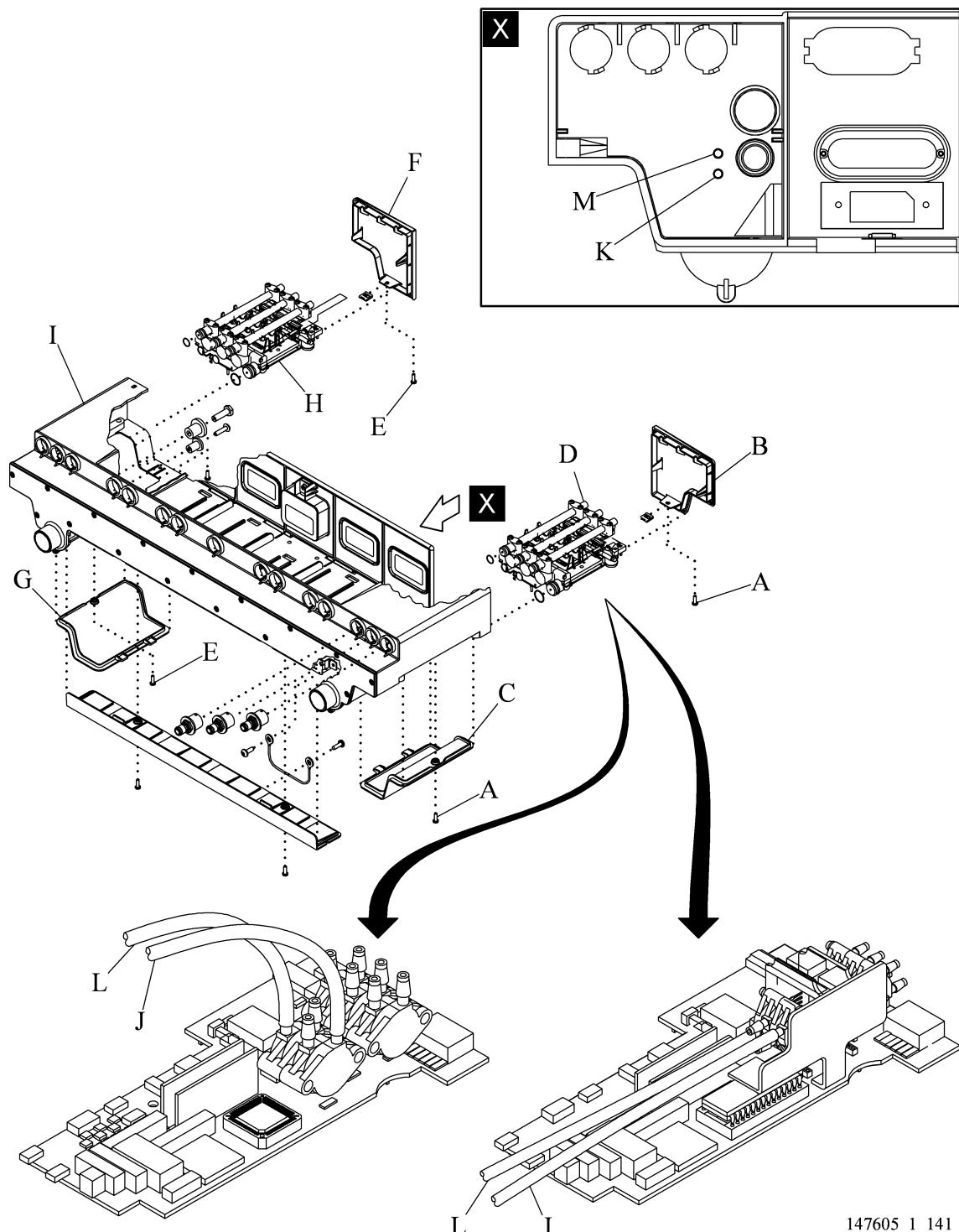
- c. Disconnect the P1, P2, P5, and P12 connections from the TFSCM (D) P.C. board.
  - d. Disconnect the air hose connections from the mattress.
  - e. Gently pull the TFSCM (D) straight out from the manifold assembly (I).
2. For the treatment surface control module (TSCM) (H), perform the following:
    - a. At the head-right side remove the two sems screws (E) that attach the TSCM cover (F) and access door (G) to the manifold assembly (I).
    - b. Remove the TSCM cover (F) and access door (G) from the manifold assembly (I).
    - c. Disconnect the P2 and P5 connections from the TSCM P.C. board.
    - d. Disconnect the air hose connections from the mattress.

**NOTE:**

Some force may be necessary to pull the TSCM from the manifold assembly.

- e. Gently pull the TSCM (H) straight out from the manifold assembly (I).

**Figure 4-63. Treatment Foot Surface Control Module  
and Treatment Surface Control Module**



## **Replacement**

1. Put the TFSCM (D) or TSCM (H) in the manifold assembly (I).
2. Align the sensor tubes and hoses with the pressure transducer ports and reference ports of the manifold assembly (I). Make sure the hoses are connected to the correct port.
3. Connect the sensor tube (J) to the reference port (K) inside the manifold assembly (I) (see view X).
4. Connect the sensor tube (L) to the reference port (M) inside the manifold assembly (I) (see view X).
5. Firmly push in to fully install and connect the TFSCM (D) or TSCM (H) in the manifold assembly (I).
6. Connect these cables:
  - a. For the TFSCM (D) connect P1, P2, P5, and P12.
  - b. For the TSCM (H) connect P2 and P5.
7. Install the two sems screws (A or E) to secure the TSCM cover (F) or TFSCM cover (B) and access door (C or G) to the manifold assembly (I).
8. Do the “Function Checks” on page 2-5.

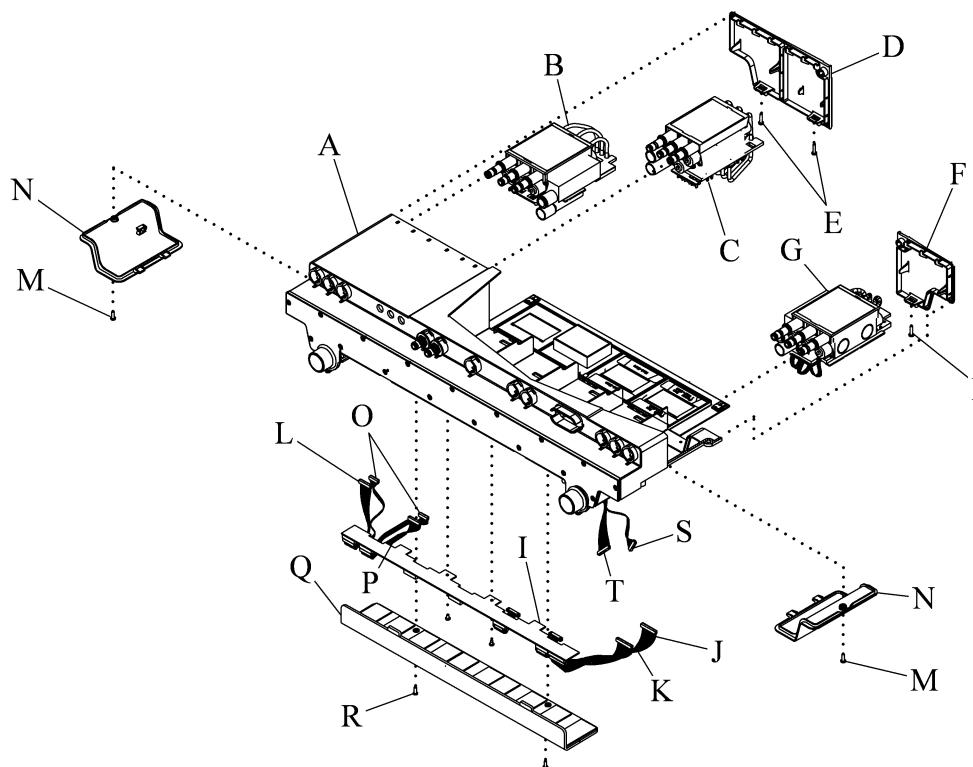
## 4.56 Treatment Foot Module, Treatment Torso Module, and Pulmonary Base Module (Pulmonary Models)

Tools required: T15 Torx®<sup>1</sup> head screwdriver  
Phillips head screwdriver

### Removal

1. To remove the treatment foot module (TFM), do as follows:
  - a. Remove the screw (M) that attaches the access door (N) to the manifold assembly (A) (see figure 4-64 on page 4-169).

**Figure 4-64. Treatment Foot Module, Treatment Torso Module, and Pulmonary Base Module**



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- b. Remove the screw (H) that attaches the manifold cover (F) to the manifold assembly (A).
- c. Remove the two screws (R) from the backplane board cover (Q).
- d. Remove the backplane board cover (Q).
- e. Disconnect these from the TFM: 15 pin cable (J), the 14 pin cable (K), the 8 pin cable (S), the 10 pin cable (T).

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**Chapter 4: Removal, Replacement, and Adjustment Procedures**

- f. Remove the TFM (G) from the manifold assembly (A).
2. To remove the pulmonary base module (PBM) (C), perform the following:
  - a. Remove the screw (M) that attach the access door (N) to the manifold assembly (A).
  - b. Remove the two screws (E) that attach the manifold cover (D) to the manifold assembly (A).
  - c. Remove the two screws (R) from the backplane board cover (Q).
  - d. Remove the backplane board cover (Q).
  - e. Disconnect the cable (O) from the PBM (C).
  - f. Disconnect the PBM cable (P) from the PBM (C).
  - g. Remove the PBM (C) from the manifold assembly (A).
3. To remove the treatment torso module (TTM) (B), perform the following:
  - a. Remove the screw (M) that attach the access door (N) to the manifold assembly (A).
  - b. Remove the two screws (E) that attach the manifold cover (D) to the manifold assembly (A).
  - c. Remove the two screws (R) from the backplane board cover (Q).
  - d. Remove the backplane board cover (Q).
  - e. Disconnect the cable (O) from the TTM (B).
  - f. Disconnect the TTM cable (L) from the TTM (B).
  - g. Remove the TTM (B) from the manifold assembly (A).

## **Replacement**

1. To install the TFM (G), perform the following:
  - a. Install the TFM (G) into the manifold assembly (A).
  - b. Connect theese to the TFM (G) these from the TFM: 15 pin cable (J), the 14 pin cable (K), the 8 pin cable (S), the 10 pin cable (T).
  - c. Install two screws (R) to attach the backplane board cover (Q) to the manifold assembly (A).
  - d. Install the screw (H) to attach the manifold cover (F) to the manifold assembly (A).
  - e. Install the screw (M) to attach the access door (N) to the manifold assembly (A).
2. To install the PBM (C), perform the following:

- a. Install the PBM (C) into the manifold assembly (A).
  - b. Connect the PBM cable (P) to the PBM (C).
  - c. Connect the cable (O) to the PBM (C).
  - d. Install the two screws (R) to attach the backplane board cover (Q) to the manifold assembly (A).
  - e. Install the two screws (E) to attach the manifold cover (D) to the manifold assembly (A).
  - f. Install the screw (M) to attach the access door (N) to the manifold assembly (A).
3. To install the TTM (B), perform the following:
    - a. Install the TTM (B) into the manifold assembly (A).
    - b. Connect the TTM cable (L) to the TTM (B).
    - c. Connect the cable (O) to the TTM (B).
    - d. Install two screws (R) to attach the backplane board cover (Q) to the manifold assembly (A).
    - e. Install the two screws (E) to attach the manifold cover (D) to the manifold assembly (A).
    - f. Install the screw (M) to attach the access door (N) to the manifold assembly (A).
  4. Do the “Function Checks” on page 2-5.

## 4.57 Treatment Surface

Tools required: None

### Removal

**NOTE:**

Disassemble the sleep surface only to the level necessary.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

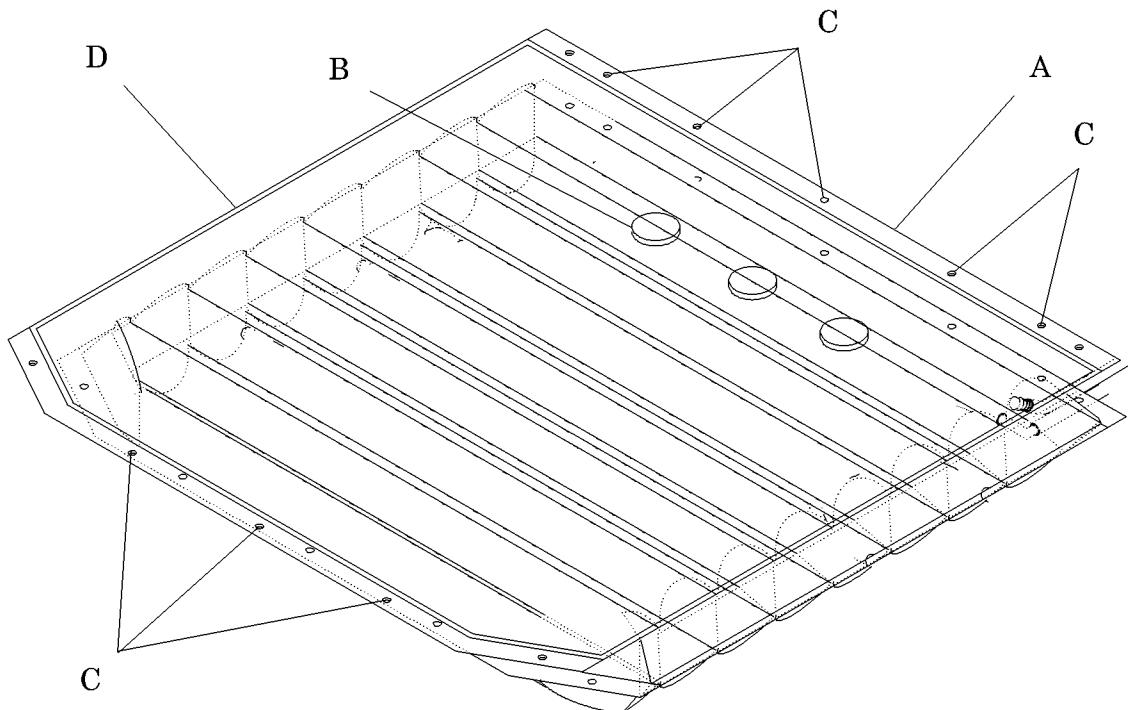
1. Unplug the bed from its power source.



**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Lift the head end of the sleep surface to expose the air hose manifold connections.
4. Press the air hose connector thumb release, and disconnect each color-coded air hose from the manifold.
5. Open the zipper on the sleep surface ticking from around the head and foot ends of the sleep surface.
6. Remove the rubber O-rings (B) from each of the three grooved buttons that is on the head and foot sections and remove the cloth acrylic fire barrier (see figure 4-65 on page 4-173).

**Figure 4-65. Foot Section**

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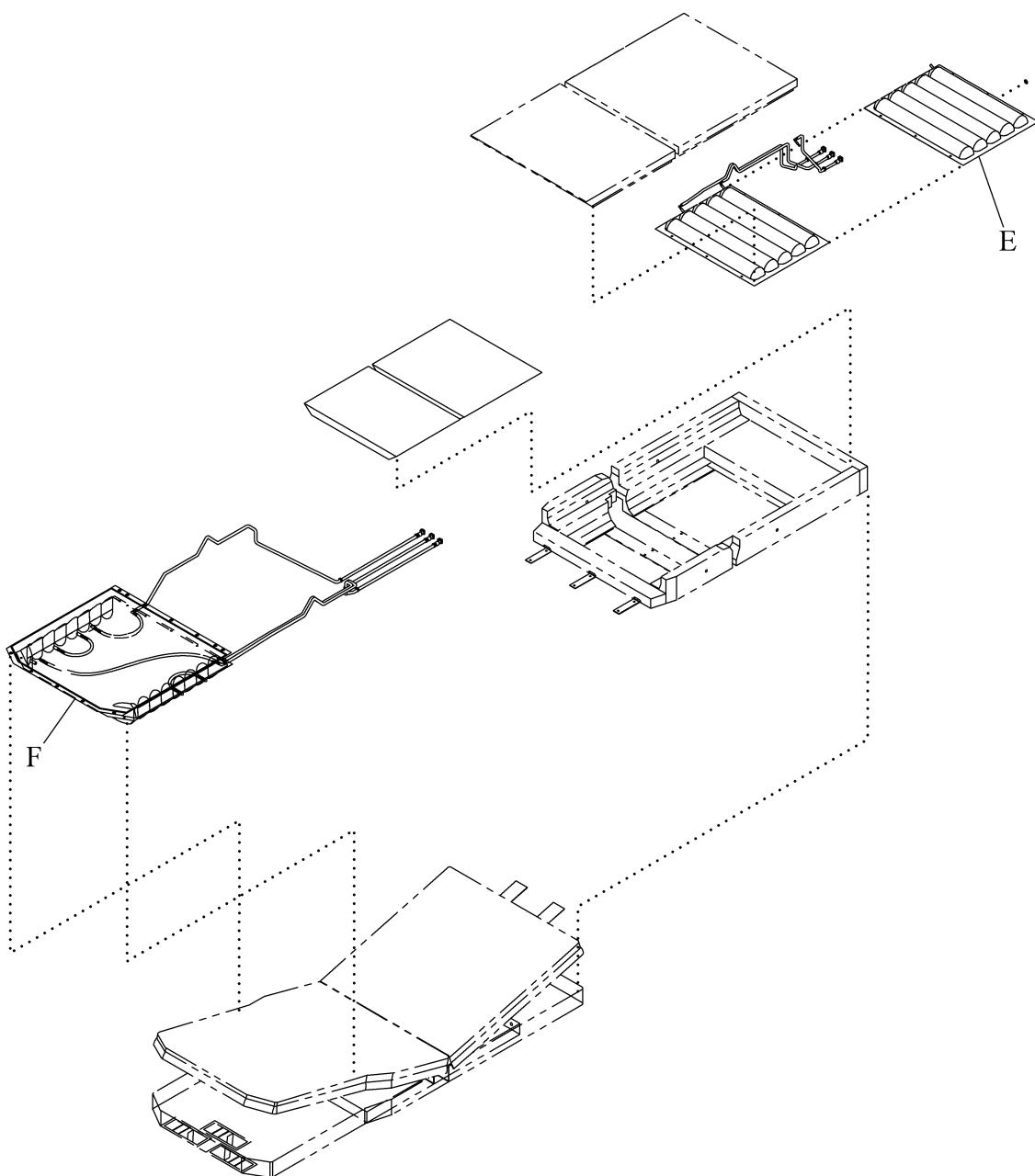
7. Press the buttons (C) through the button holes in the thigh bladder to remove the foot air bladder from the thigh bladder.
8. Press the buttons (C) through the button holes in the slip sheet, and remove the slip sheet (D) from the foot air bladder (A).

**NOTE:**

Hose routing is very important for proper operation of the treatment surface. Incorrect hose routing can cause kinks in hoses and bed malfunction.

9. Make a record of the routing of all hoses.
10. Disconnect all air hoses from the head and torso air bladders (E) (see figure 4-66 on page 4-174).
11. Disconnect all air hoses from the foot air bladder (F) (if necessary).
12. Examine the air bladders for stains.
13. Clean the bladder surfaces with disinfectant.

**Figure 4-66. Treatment Surface**



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14. Discard any foam that was stained.
15. Inflate the bladders, and then feel, listen, or apply soapy water to find air leaks. Discard any bladders with leaks, and replace them.

## Replacement

1. Make sure all sleep surface material is new or correctly disinfected before you assemble the surface.
2. Install the universal foundation so it extends approximately 1" (3 cm) past the upper edge of the back surface.
3. Do the removal procedure in reverse order.
4. Connect all air hoses to their correct connections. Route the hoses noted during the removal procedure.
5. Make sure the sleep surface components are fully contained in the acrylic fire barrier.
6. Put the sleep surface in the ticking. Close the zipper.
7. Connect all external sleep surface air hoses to their correct color-coded manifold connections.
8. Plug the bed into an appropriate power source.
9. Partially inflate the treatment surface.
10. Smooth out any bulges.
11. Press the **Max-inflate** control and make sure the air bladders completely fill.
12. Press the **Chair** control, and adjust the bed to make sure the treatment surface operates correctly throughout both inflate and deflate cycles.
13. Do the “Function Checks” on page 2-5.

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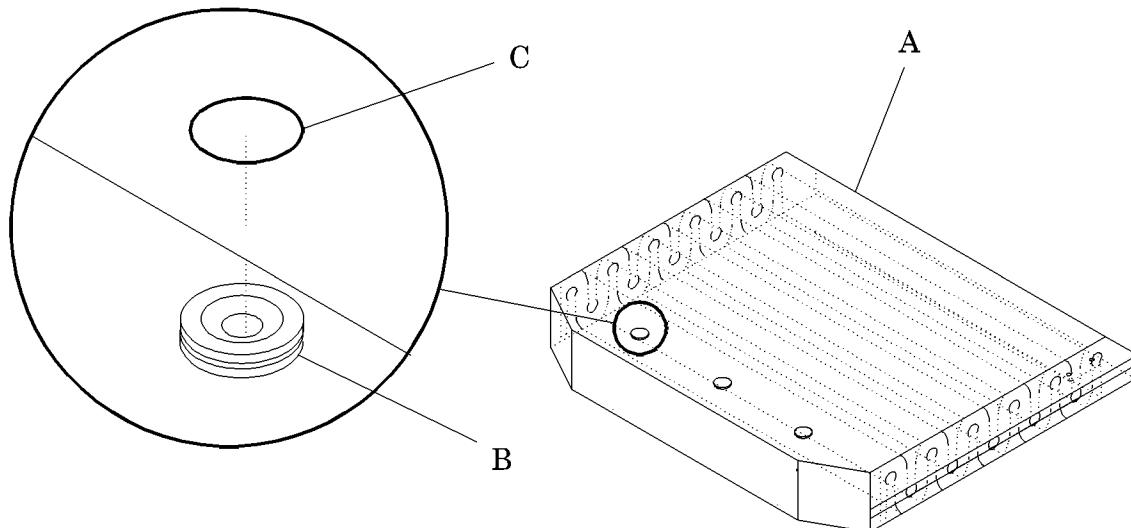
## 4.58 Short Stay Surface

Tools required: None

### Removal

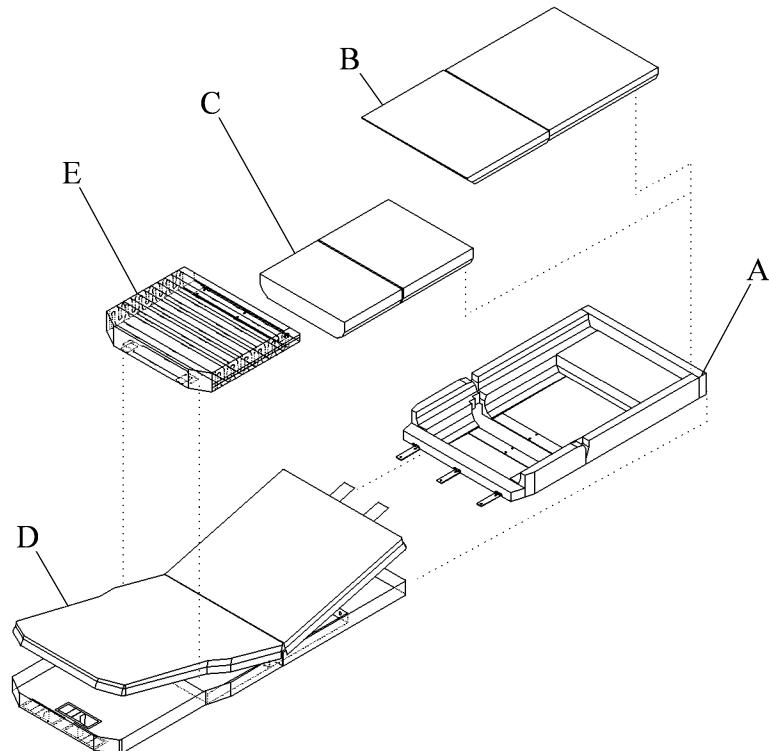
1. Put the bed in the flat position.
2. Raise the bed to the high position.
3. Open the zipper on the sleep surface ticking.
4. Removing the rubber O-rings (C) from each of the three grooved buttons (B) that is on the head and foot sections to remove the cloth acrylic fire barrier (see figure 4-67 on page 4-176).

**Figure 4-67. Fire Barrier O-ring Removal**



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5. Remove the fire barrier from the two plastic fingers that is at the sock end of the barrier.
6. Lift the foam mattress pads (B and C) from the foam foundation (A) (see figure 4-68 on page 4-177).

**Figure 4-68. Short Stay Surface**

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7. Examine all surfaces of each component for stains.
8. Discard all foam that has stains.

## Replacement

1. Replace all foam that has stains.
2. Do the removal procedure in reverse order.
3. Make sure all of the foam components are fully contained in the acrylic fire barrier.
4. Make sure to put the “grooved buttons” face down toward the bed deck, so they will not touch the patient.
5. Install and align the sleep surface sections in the compartments of the frame.
6. Press the **Chair** control, and adjust the bed to make sure the surface operates correctly.
7. Do the “Function Checks” on page 2-5.

## 4.59 Short Stay Sleep Surface—Remove from Bed

Tools required: None

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Lift up on the foot and head ends of the surface until the magnets (on the foot end) in the ticking material release from the frame.
4. Slide the surface off the bed.

### Replacement

1. Put the surface on the bed frame with the narrow end on the foot end of the bed.
2. Plug the unit into an appropriate power source.
3. Do the “Function Checks” on page 2-5.

## 4.60 Air Sleep Surface—Remove from Bed

Tools required: None

### Removal



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### **WARNING:**

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Make sure the seat belt is disconnected.
4. Raise the head end of the bed frame to get access to the air hose connectors on the manifold assembly.



#### **CAUTION:**

Failure to disconnect the air hoses could cause equipment damage.

5. Disconnect the quick-disconnect air hoses.
6. Lift up on the foot and head ends of the sleep surface until the magnets in the foot end release the sleep surface.
7. Slide the sleep surface off the bed.

4

### Replacement

1. Put the sleep surface on the bed frame with the air hoses towards the head end of the bed.

#### **NOTE:**

All air hoses run underneath the cushions inside the sleep surface.

2. Connect the quick-disconnect air hoses to the manifold assembly. Match the color of the air hose with same-colored connector.
3. Plug the unit into an appropriate power source.
4. Do the “Function Checks” on page 2-5.

## 4.61 Pulmonary Surface

Tools required: None

### Removal

**NOTE:**

Disassemble the pulmonary surface only to the level necessary.

1. Fully retract the foot section.

**NOTE:**

It is not necessary to retract the foot section if the foot cushion is not to be replaced.

2. Raise the bed to the highest position.
3. Make sure the sleep deck is in the flat position.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

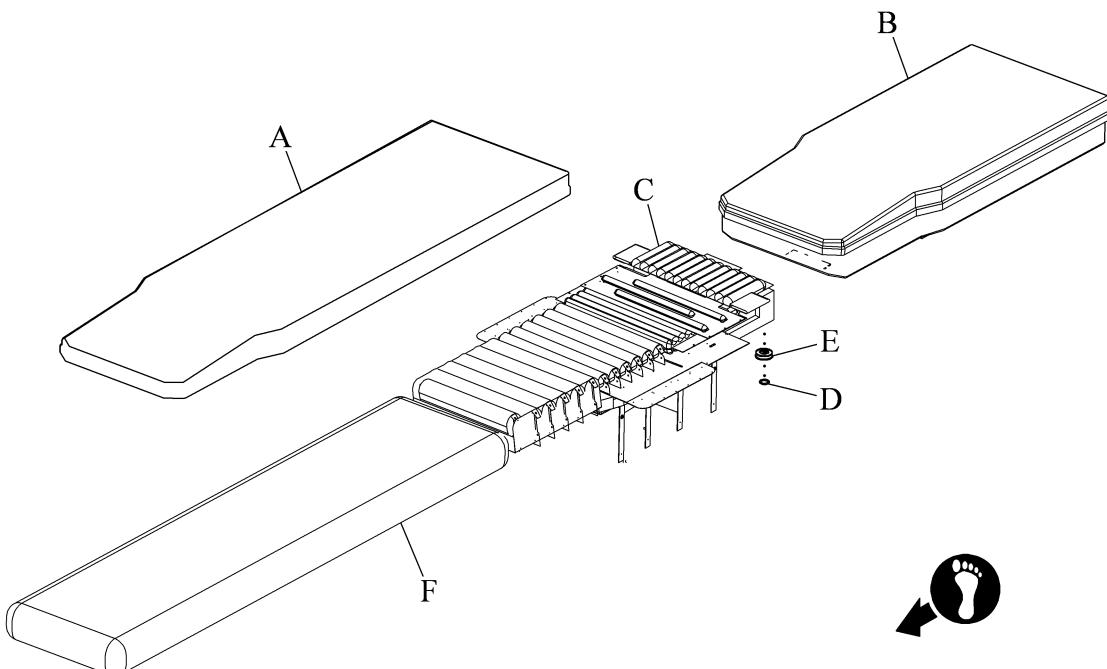
4. Unplug the bed from its power source.



**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.75)
6. Disconnect the mattress from the air manifold.
7. Unzip the low air loss coverlet (A) from the ticking (B) (see figure 4-69 on page 4-181).
8. Remove the low air loss coverlet (A) from the mattress (C).
9. Turn the mattress (C) over and unzip the zipper.

**Figure 4-69. Pulmonary Surface Ticking Removal**

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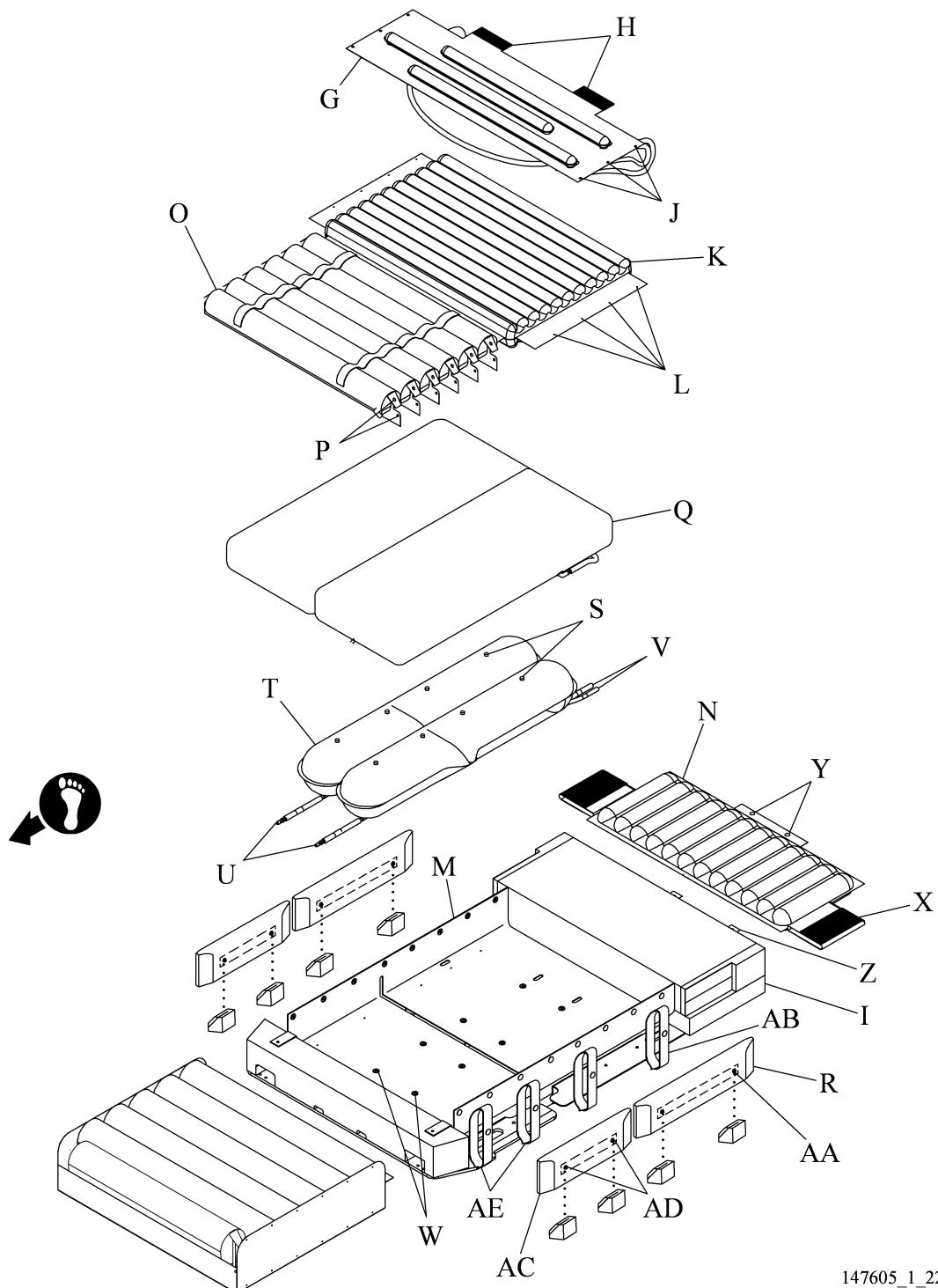
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10. Turn the mattress (C) over.
11. Pull down the upper ticking (B) as far as possible.
12. Remove the O-ring (D) from around the snap disk (E) at the head end of the fire barrier (F).
13. Remove the fire barrier (F) as far as necessary.

**CAUTION:**

Hose routing is very important for correct operation of the pulmonary surface. Incorrect hose routing can cause hose kinks or bed malfunction.

14. Note in **detail** the routing of all the hoses.
15. Remove the percussion/vibration cushion (G) as follows (see figure 4-70 on page 4-182):

**Figure 4-70. Pulmonary Surface Cushion Removal**

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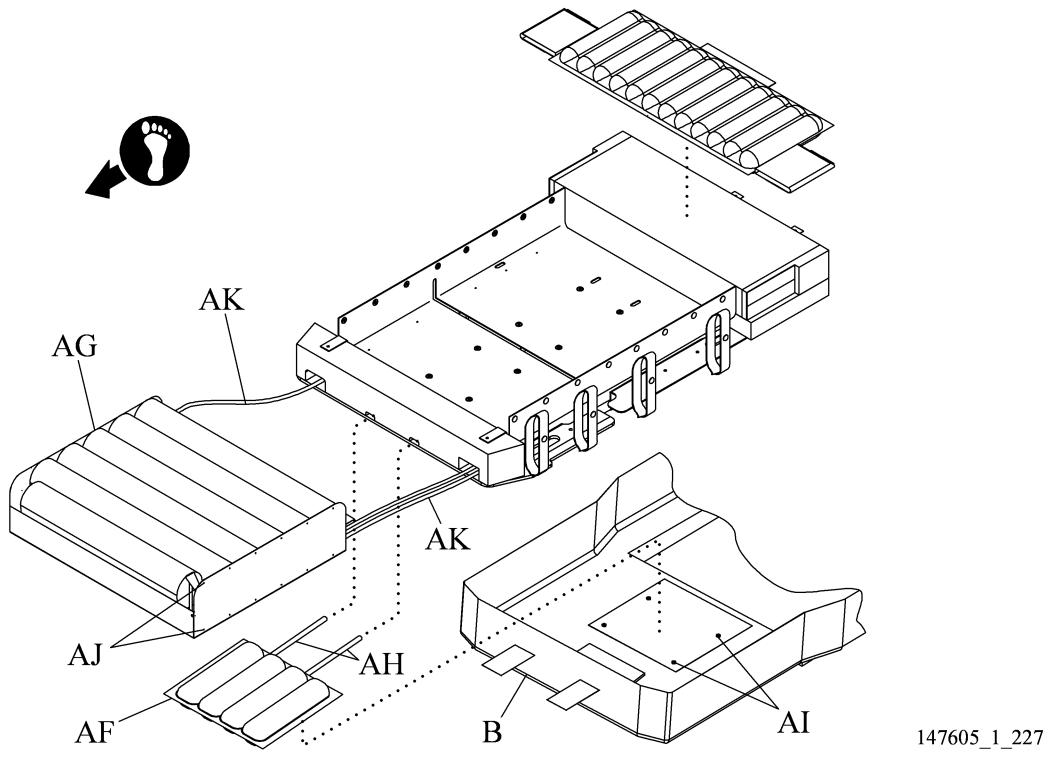
- a. Release the Velcro®<sup>1</sup> strips (H) on the head end of the percussion/vibration cushion (G) that attaches it to the head section cushion (I).
  - b. Disconnect the six snaps (J) on the ends of the percussion/vibration cushion (G).
  - c. Disconnect the air hoses from the percussion/vibration cushion (G).
  - d. Remove the percussion/vibration cushion (G). The cushion should be attached to outside of the mattress wall.
16. Remove the treatment cushion (K) as follows:
- a. On both sides of the treatment cushion (K), disconnect the 8 snaps (L) (four per side) that attach the treatment cushion (K) to the substrate (M).
  - b. Release the hook and loop fasteners (not shown) at the head end of the treatment cushion (K) that attach it to the head cushion (N).
  - c. Disconnect the air hoses from the treatment cushion (K).
  - d. Remove the treatment cushion (K).
17. Remove the seat thigh cushion (O) as follows:
- a. Disconnect the 24 snaps (P) (12 on each side, 2 on each bladder) that attach the seat cushion (O) to the substrate (M).
  - b. Disconnect the air hoses from the seat cushion (O).
  - c. Remove the seat cushion (O).
18. Remove the working cushion (Q) as follows:
- a. On both sides of the working cushion (Q) at the head end, disconnect the air hose that is on the side of the mattress (R) and the substrate (M).
  - b. For each half of the working cushion (Q), disconnect the four snaps (S) that attach the working cushion (Q) to the torso boost cushion (T).
  - c. Remove the working cushion (Q).
19. Remove the torso boost cushion (T) as follows:
- a. At the foot end of the torso boost cushion (T), disconnect the air hoses (U).
  - b. At the head end of the torso boost cushion (T), disconnect the air hoses (V).

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- c. For each torso boost cushion (T), disconnect the four snaps (W) that attach it to the substrate (M).
  - d. Remove the torso boost cushion (T).
20. Remove the head cushion (N) as the follows:
- a. Release the Velcro®<sup>1</sup> strips (X) that attach the head cushion (N) to the head section foam (I).
  - b. Disconnect the two snaps (Y) that attach the head cushion (N) to the two straps (Z).
  - c. Disconnect the air hose from the head cushion (N).
  - d. Remove the head cushion (N).
21. Remove the head bolster assembly (R) as follows:
- a. Disconnect the two snaps (AA) that attach the head bolster assembly (R) to the two straps (AB).
  - b. Remove the head bolster assembly (R) from the two straps (AB).
22. Remove the thigh bolster assembly (AC) as follows:
- a. Disconnect the two snaps (AD) that attach the thigh bolster assembly (AC) to the two straps (AE).
  - b. Remove the thigh bolster assembly (AC) from the two straps (AE).
23. Remove the foot boost assembly (AF) as follows (see figure 4-71 on page 4-185):
- a. If installed, lift the foot cushion (AG) up and out of the way.
  - b. Disconnect the air hoses (AH) from the foot boost assembly (AF).
  - c. Disconnect the four snaps (AI) on the lower ticking (B).
  - d. Remove the foot boost assembly (AF).

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**Figure 4-71. Foot Cushion Removal**

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24. Remove the foot cushion (AG) as follows:

- a. Disconnect the 24 snaps (AJ).
- b. Disconnect the air hoses (AK) from the foot cushion (AG).
- c. Remove the foot cushion (AG).

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.62 Battery—IntelliDrive® Transport System

Tools required:    T25 Torx®<sup>1</sup> head screwdriver  
                     $\frac{1}{4}$ " box end wrench  
                    Hilow cylinder braces (SA1695)

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Turn the circuit breaker to the off position. Failure to do so could result in personal injury or equipment damage.

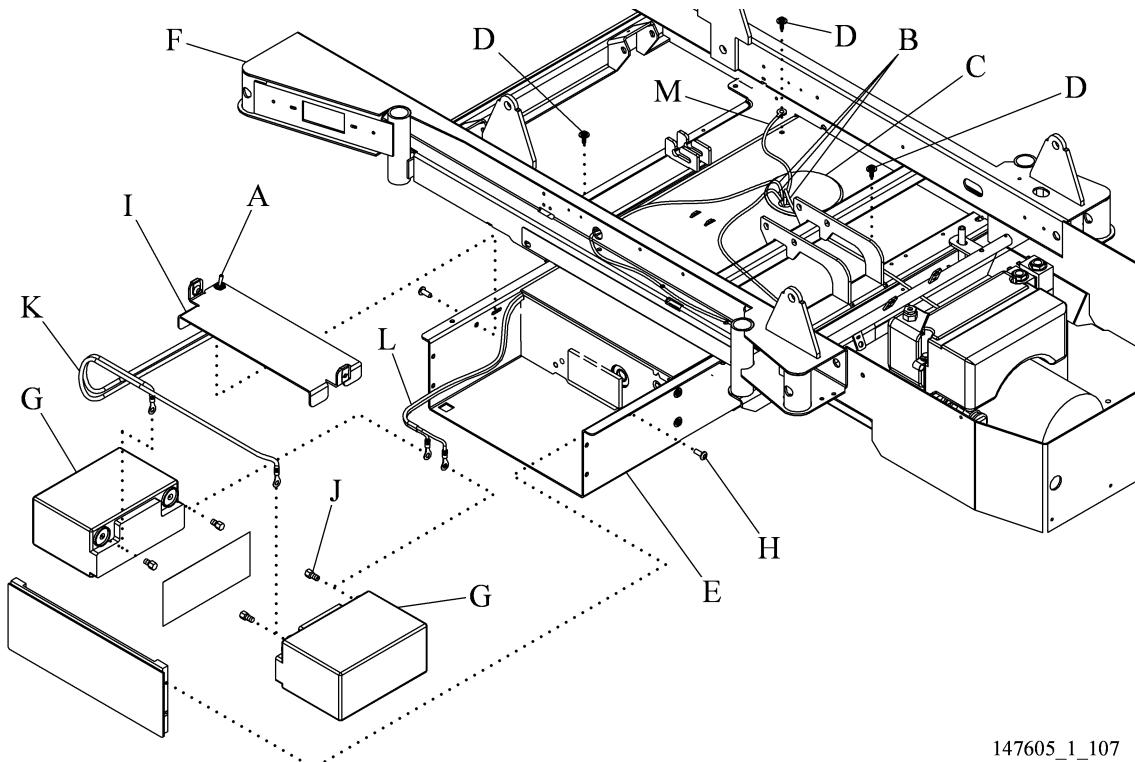
2. On the front of the drive box (E), turn the circuit breaker (A) to the **off** position (see figure 4-72 on page 4-187).
3. Remove the center base cover (refer to procedure 4.3).
4. Install the Hilow cylinder braces (refer to procedure 4.4).
5. Remove the accessory cover (C) from the bottom of the bed.
6. Disconnect the three cables (B) from to the PACM board.
7. Remove the three screws (D) that attach the drive box (E) to the bed (F).
8. Disconnect the ground strap (M) from the bed.
9. Slide the drive box (E) toward the patient's left side of the bed until you get access to the batteries (G).
10. Remove the two screws (H) that attach the retaining bracket (I) to the drive box (E).
11. Remove the retaining bracket (I).
12. Turn the batteries (G) to the vertical position.
13. Remove the two bolts (J) that attach the harnesses (K and L) to the battery (G).

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14. Remove the battery (G) from the drive box (E).
15. Discard the old battery according to facility protocols.

**Figure 4-72. Battery Removal—IntelliDrive® Transport System**



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## Replacement

1. Do the removal procedure in reverse order.



### WARNING:

Make sure the black wire on the battery is connected to the negative terminal on the battery and the red wire is connected to the positive terminal on the battery. Failure to do can result in personal injury or equipment damage.

2. Connect the black wire to the negative terminal and the red wire to the positive terminal on the battery.
3. Do the “Function Checks” on page 2-5.

## 4.63 PACM Board—IntelliDrive® Transport System

Tools required:    T25 Torx®<sup>1</sup> head screwdriver  
                            Hilow cylinder braces (SA1695)

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

Turn the circuit breaker to the off position. Failure to do so could result in personal injury or equipment damage.

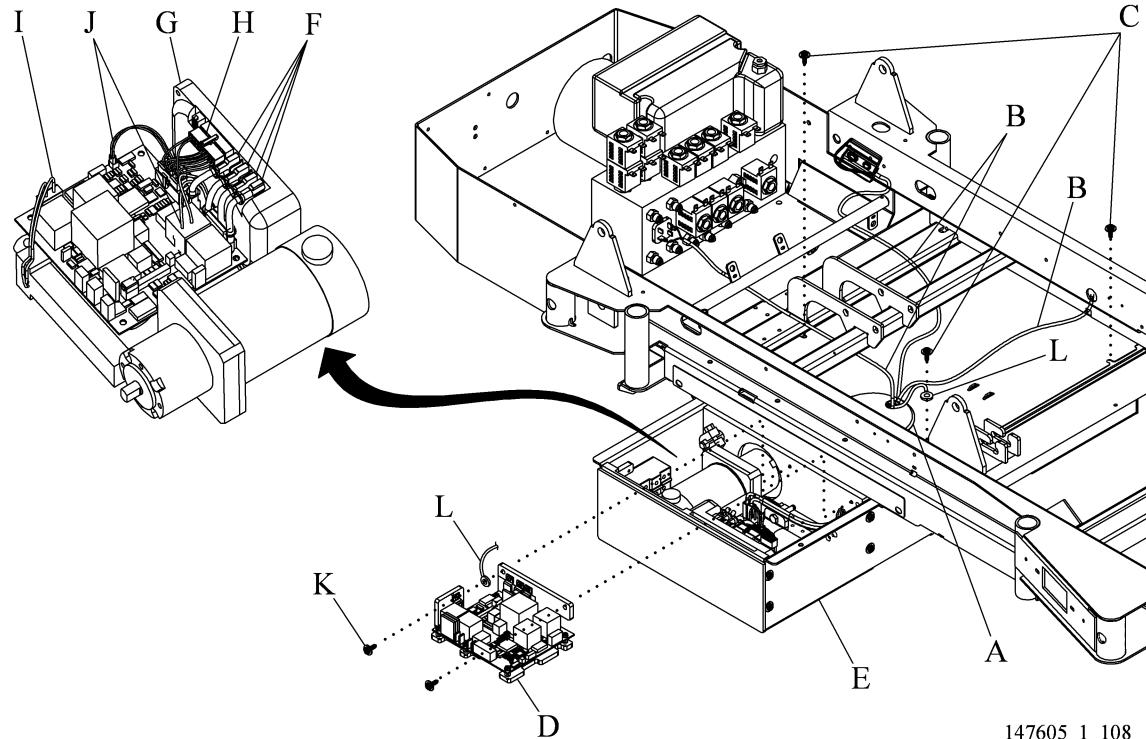
2. On the front of the drive box, turn the circuit breaker to the **off** position.
3. Remove the center base cover (refer to procedure 4.3).
4. Install the hilow cylinder braces (refer to procedure 4.4).
5. Remove the accessory cover (A) from the bottom of the bed (see figure 4-73 on page 4-189).
6. Disconnect the three cables (B) running to the PACM board (D).
7. Disconnect the ground strap (L) from the bed.
8. Remove the three screws (C) that attach the drive box (E) to the bed.
9. Slide the drive box (E) to the patient's right side of the bed until you get access to the PACM board (D).
10. Disconnect the four wires (F) that connect the PACM board (D) to the motor controller (G) from the PACM board (D).
11. Disconnect the motor controller harness (H) from the PACM board (D).
12. Disconnect the linear actuator cable (I) from the PACM board (D).
13. Disconnect the two drive motor cables (J) from the PACM board (D).

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14. Remove the two screws (K) that attach the PACM board (D) to the drive box (E).
15. Remove the PACM board (D) from the drive box (E).

**Figure 4-73. PACM Board Removal**



4

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.64 Drive Motor—IntelliDrive® Transport System

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- Phillips head screwdriver
- 7/16" deep well socket
- Ratchet

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



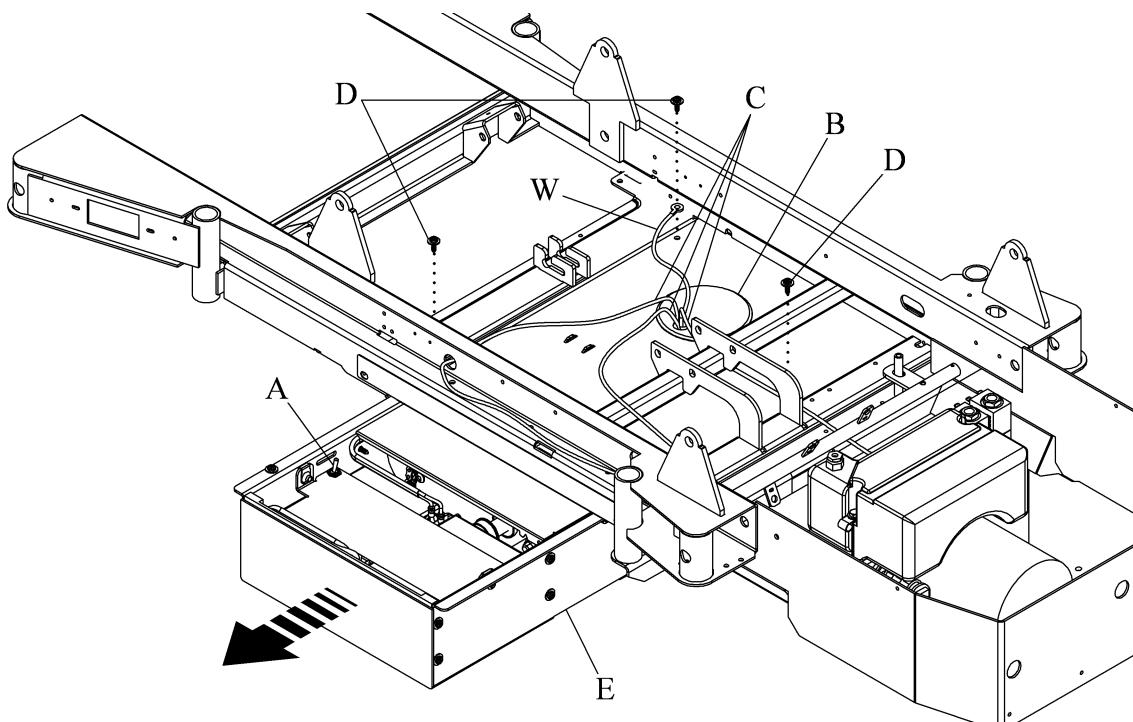
#### WARNING:

Failure to turn the circuit breaker to the off position could cause injury or equipment damage.

2. On the front of the drive box (E), turn the circuit breaker (A) to the **off** position (see figure 4-74 on page 4-191).
3. Remove the center base cover (refer to procedure 4.3).
4. Install the hilow cylinder braces (refer to procedure 4.4).
5. Remove the accessory cover (B) from the bottom of the bed.

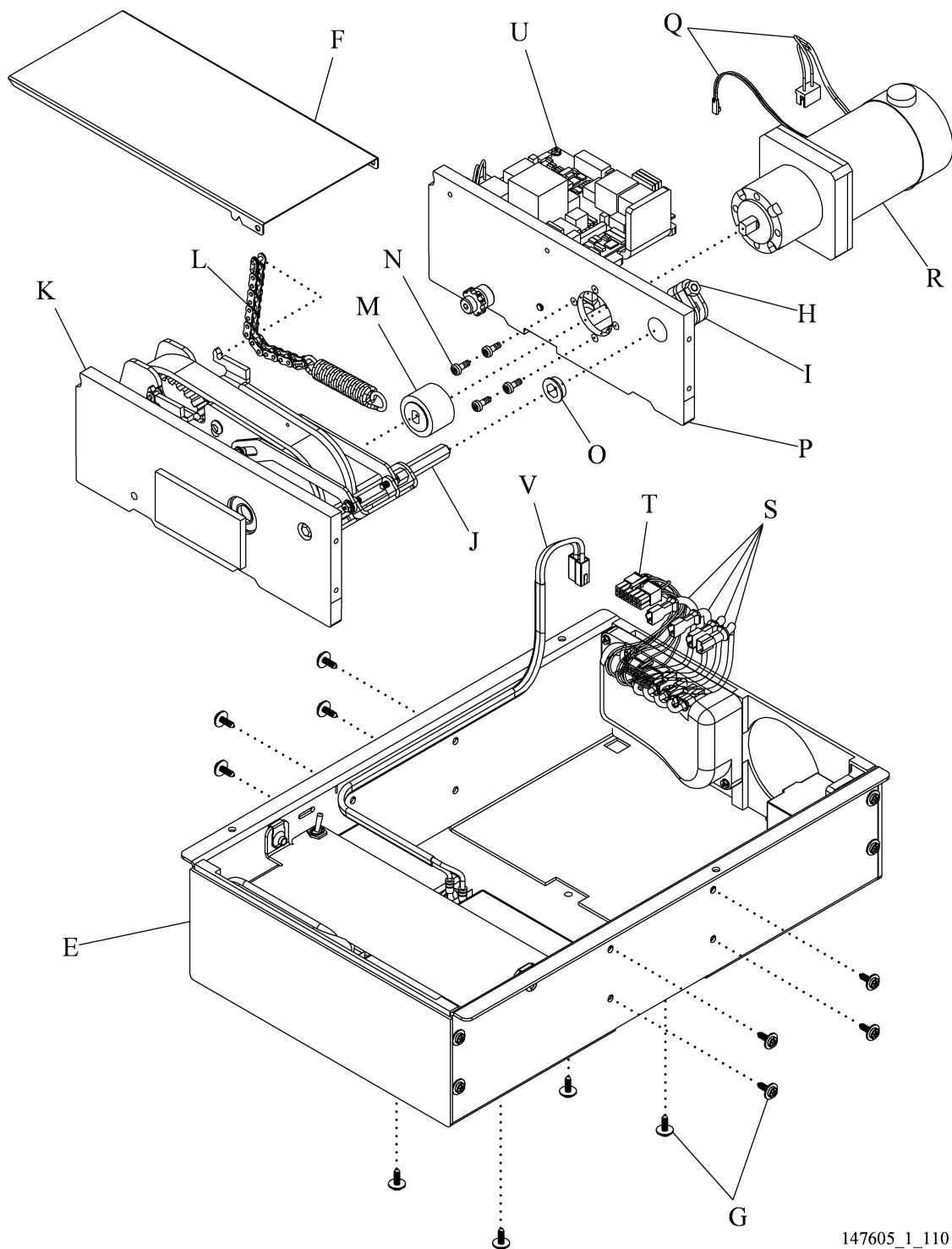
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**Figure 4-74. Drive Box Removal**

4

6. Disconnect the three cables (C) connected to the PACM board.
7. Disconnect the ground strap (W) from the bed.
8. Remove the three screws (D) that attach the drive box (E) to the bed.
9. Slide the drive box (E) out from under the bed.
10. Disconnect the two drive motor cables (Q) from the PACM board (U) (see figure 4-75 on page 4-192).
11. Disconnect the four controller wires (S) from the PACM board (U).
12. Disconnect the controller harness (T) from the PACM board (U).
13. Disconnect the battery cable (V) from the PACM board (U).
14. Remove the cover (F).

**Figure 4-75. Drive Motor Removal**

15. Remove the 12 screws (G) that attach the drive assembly (K) to the drive box (E).

**NOTE:**

It may be necessary to loosen the remaining screws on the box so the drive assembly can be removed.

16. Remove the drive assembly (K) from the drive box (E).
17. Loosen the nut (H) on the linear actuator lever (I).
18. Disconnect the linear actuator lever (I) from the drive assembly hex rod (J).
19. Remove the drive assembly (K) from the motor mounting plate (P).
20. Remove the drive motor coupler (M) from the drive motor (R).
21. Remove the plastic bushing (O) from the drive assembly hex rod (J).
22. Remove the chain/spring assembly (L) from the drive unit (K).
23. Remove the four screws (N) that attach the drive motor (R) to the motor mounting plate (P).
24. Remove the drive motor (R) from the motor mounting plate (P).

## Replacement

1. Do the removal procedure in reverse order.

**NOTE:**

The battery end of the drive box goes toward the patients-left side of the bed.

**NOTE:**

The ground strap goes under the screw that attach the drive box to the bed.

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

## 4.65 Drive Belt—IntelliDrive® Transport System

Tools required:    T25 Torx®<sup>1</sup> head screwdriver  
                            Hilow cylinder braces (SA 1695)

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

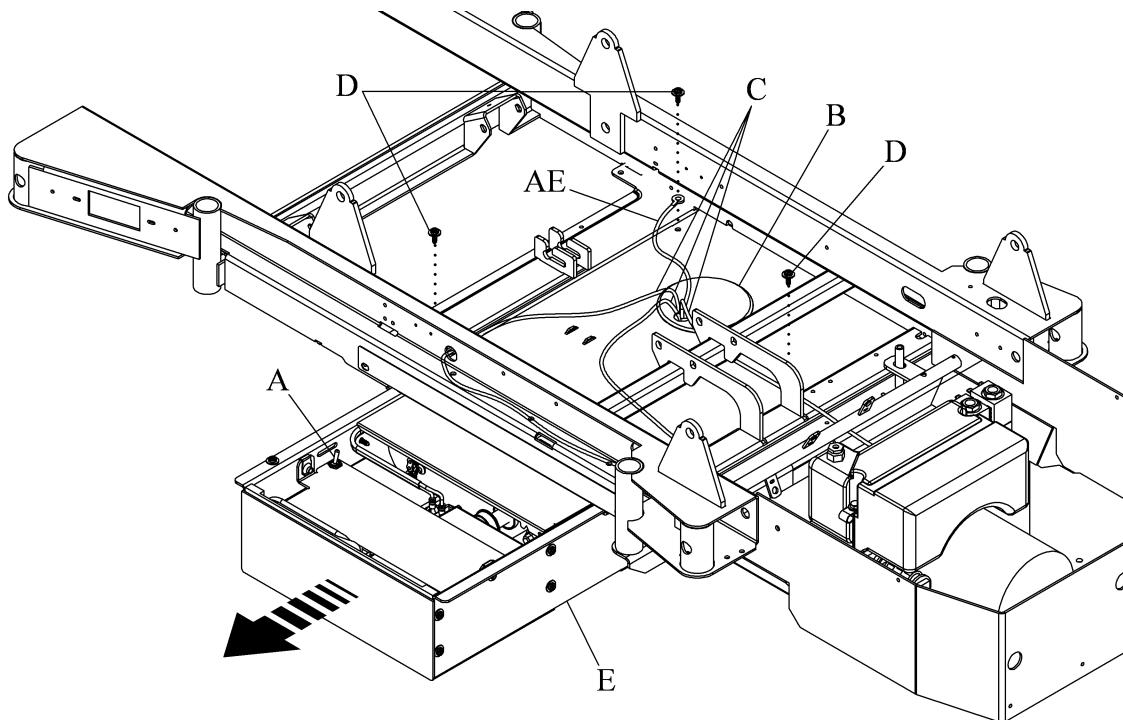
Failure to turn the circuit breaker to the off position could cause injury or equipment damage.

2. On the front of the drive box (E), turn the circuit breaker (A) to the **off** position (see figure 4-76 on page 4-195).
3. Remove the center base cover (refer to procedure 4.3).
4. Install the hilow cylinder braces (refer to procedure 4.4).
5. Remove the accessory cover (B) from the bottom of the bed.

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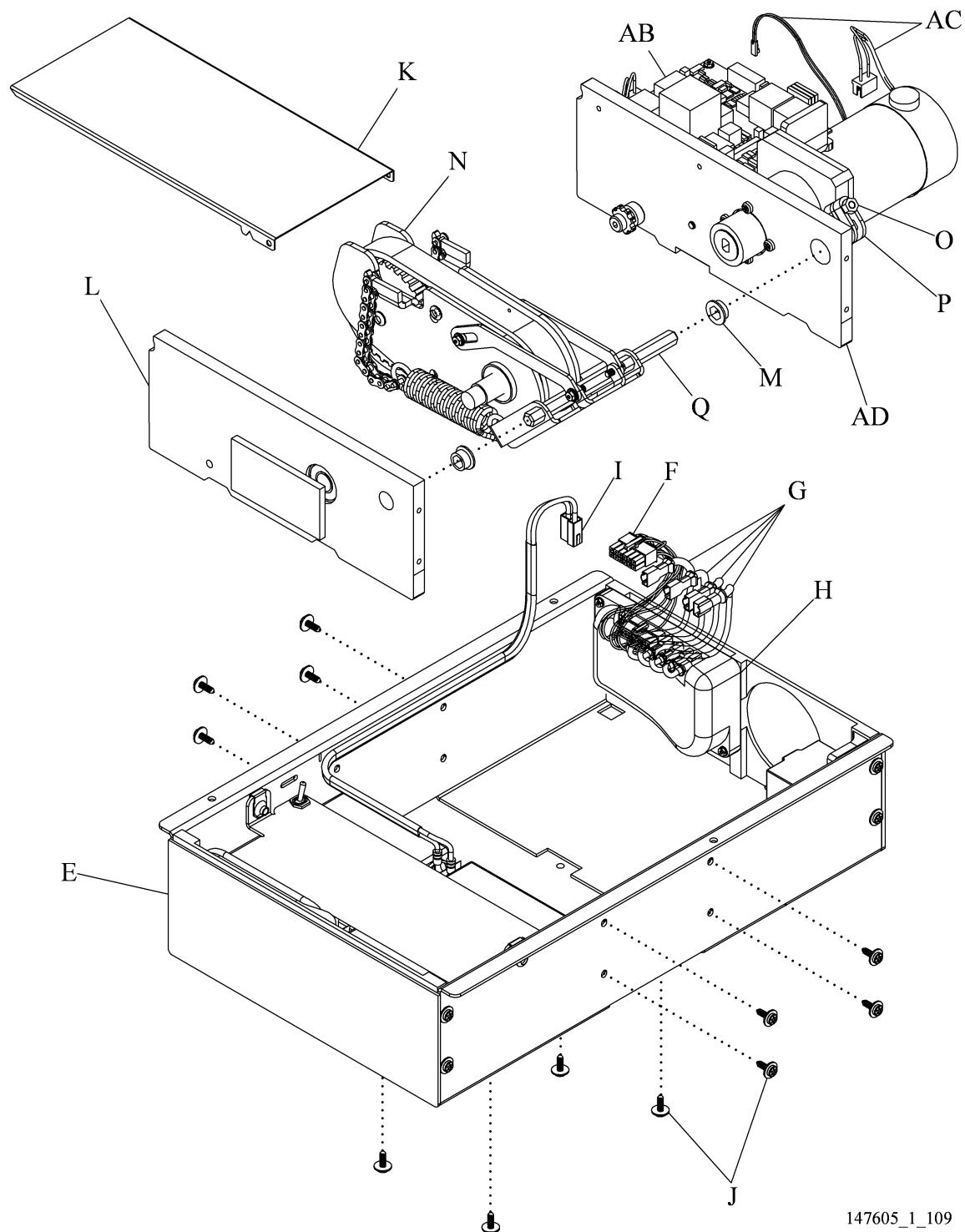
**Figure 4-76. Drive Box Removal**



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6. Disconnect the three cables (C) connected to the PACM board.
7. Remove the three screws (D) that attach the drive box (E) to the bed.
8. Disconnect the ground strap (AE) from the bed.
9. Slide the drive box (E) out from under the bed.
10. Disconnect the two drive motor cables (AC) from the PACM board (AB) (see figure 4-77 on page 4-196).
11. Disconnect the wires (F, G, and I) from the controller (H) and the PACM board (AB).
12. Remove the cover (K).

**Figure 4-77. Drive Unit Removal**

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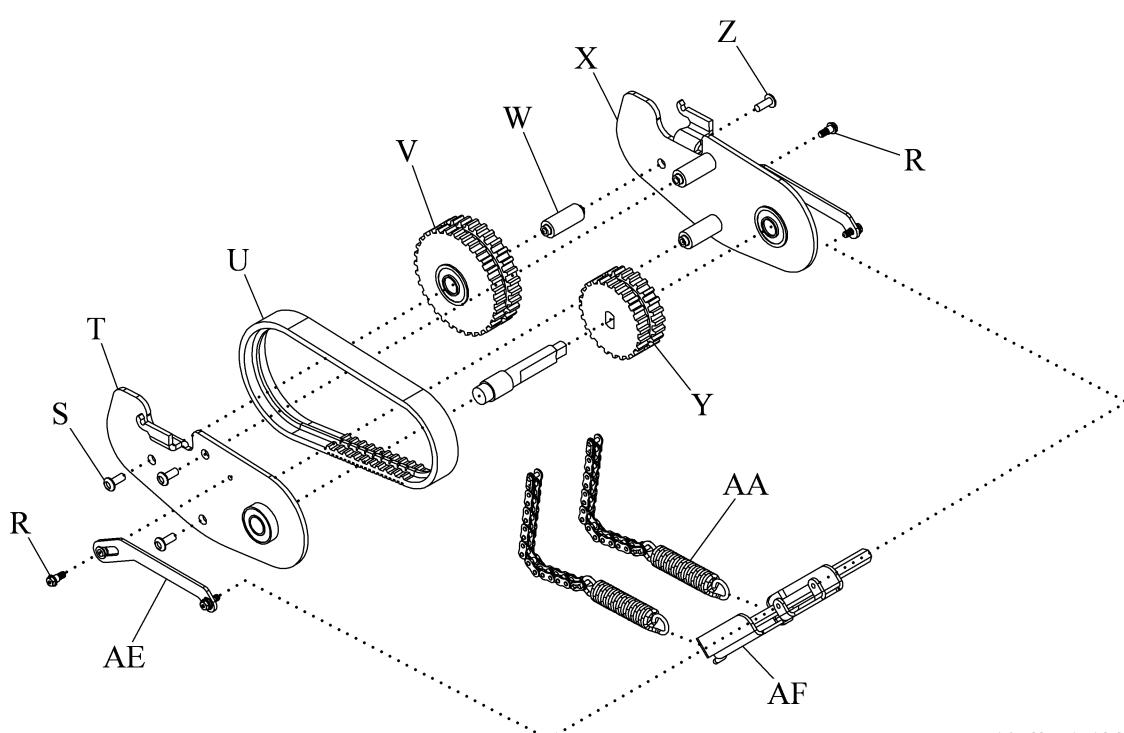
13. Remove the 12 screws (J) that attach the drive assembly (N) to the drive box (E).

**NOTE:**

It may be necessary to loosen the remaining screws on the box so the drive assembly can be removed.

14. Remove the drive assembly (N) from the drive box (E).
15. Loosen the nut (O) on the linear actuator lever (P).
16. Disconnect the linear actuator lever (P) from the drive assembly hex rod (Q).
17. Remove the drive assembly (N) from the motor mounting plate (AD).
18. Remove the drive plate (L) from the drive assembly (N).
19. Remove the chain/spring assembly (AA) from the plate (AF) (see figure 4-78 on page 4-197).

**Figure 4-78. Drive Belt Removal**



20. Remove the two screws (R) that attach the return links (AE) to the pulley side plates (T and X).
21. Rotate the return links (AE) up and out of the way.
22. Remove the three screws (S) that attach the left-side pulley plate (T) to the drive assembly.
23. Remove the left-side pulley plate (T).
24. Remove the screw (Z) that attach the right-side pulley plate (X) to the pulley shaft (W).
25. Remove the pulley (V) and belt (U) from the drive assembly.
26. Remove the belt from the two pulley's (V and Y).

**NOTE:**

Each pulley has a groove through the middle of it to accept the raised section on the drive belt.

## **Replacement**

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.66 PAG Board—IntelliDrive® Transport System

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
3/8" nut driver

### Removal



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### **WARNING:**

Failure to turn the circuit breaker to the off position could cause injury or equipment damage.

2. On the front of the drive box, turn the circuit breaker to the **off** position.
3. Remove the two screws (A) that attach the cover (B) to the bed (see figure 4-79 on page 4-200).
4. Remove the cover (B) from the bed.
5. Disconnect the cables (not shown) from the PAG board (D).
6. Remove the four nuts (C) that attach the PAG board (D) to the bed.

4



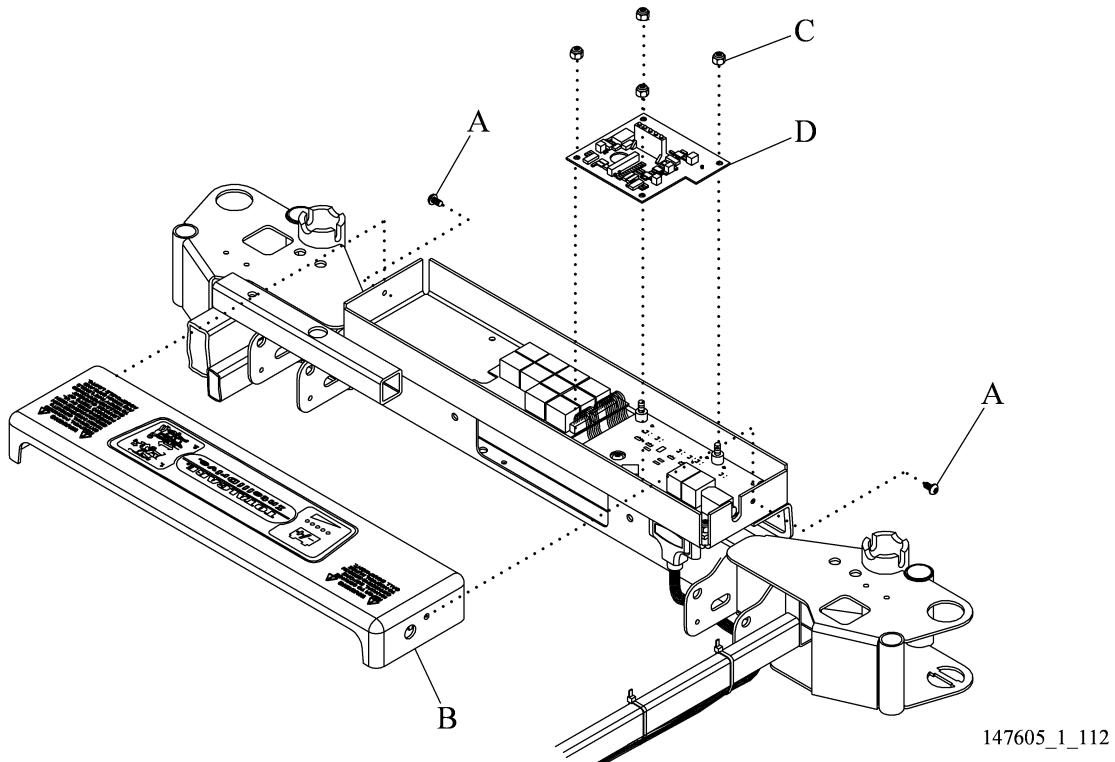
#### **CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.

7. Remove the PAG board (D) from the bed.

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**Figure 4-79. PAG Board Removal**



## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.67 Transport Handle—IntelliDrive® Transport System

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Wire cutters  
7/16" open end wrench  
Volt meter  
Jewelers screwdriver

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



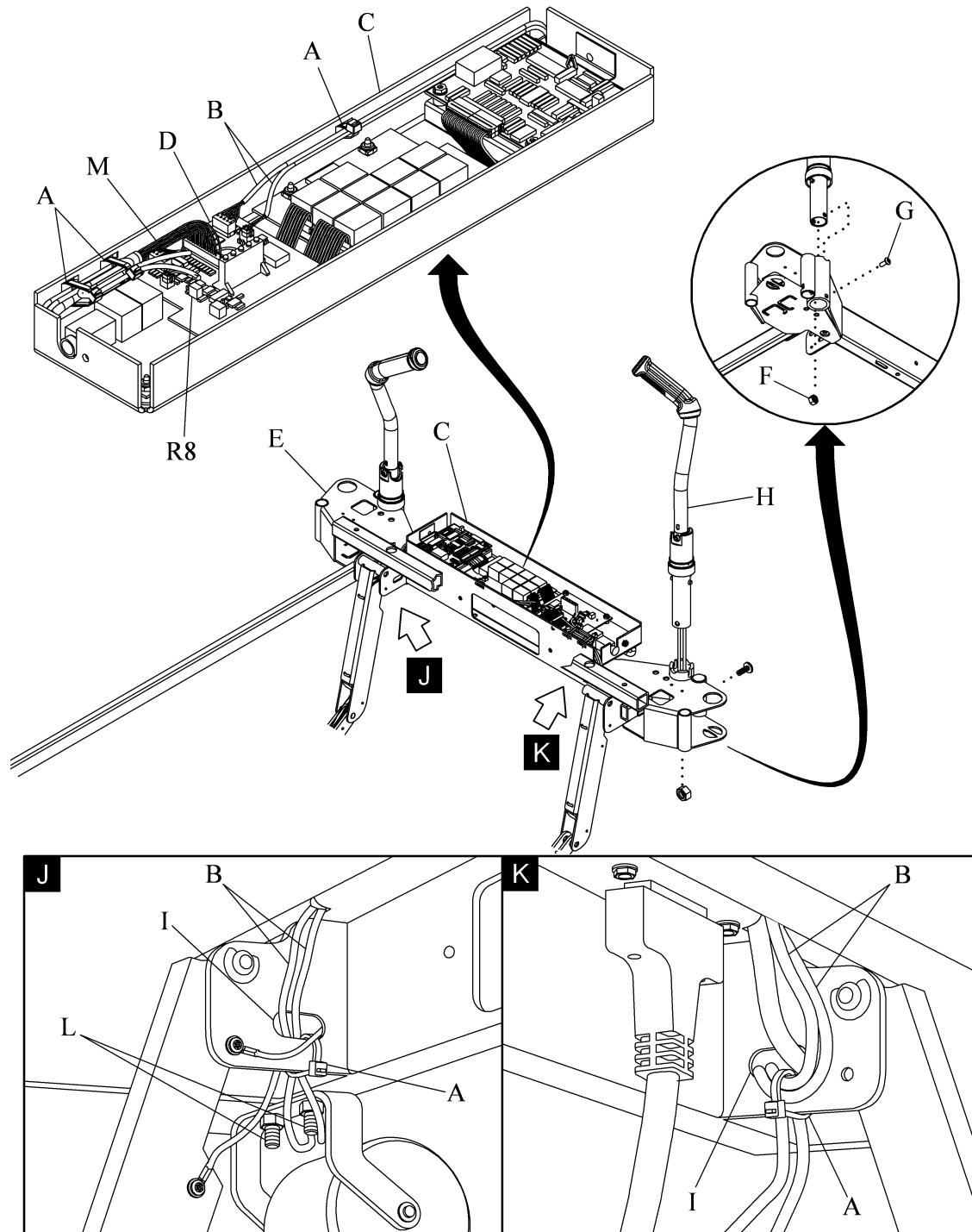
#### WARNING:

Failure to turn the circuit breaker to the off position could cause injury or equipment damage.

2. At the front of the drive box, turn the circuit breaker to the **Off** position.
3. Remove the two screws that attach the SideCom® Communication System cover to the bed, and remove the cover.
4. Remove the cable tie (A) that attaches the transport handle cables (B) to the inside of the SideCom® Communication System box (C) (see figure 4-80 on page 4-202).
5. Disconnect the transport handle cables (B) from the PAG P.C. board (D).
6. Remove the cable tie (A) that attaches the transport handle cables (B) to the bed (E).
7. Remove the nut (F) and screw (G) that attach the transport handle (H) to the bed (E).
8. Remove the transport handle (H) from the bed (E).

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**Figure 4-80. Transport Handle**

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## Replacement

1. Put the transport handle cables (B) of the new transport handle (H) through the bed (E).
2. Install the transport handle (H) on the bed (E).
3. Align the mounting hole in the transport handle (H) with the hole in the bed (E).
4. Install the nut (F) and screw (G) through the bed (E) into the transport handle (H).

**NOTE:**

For easier access to the nut, put the wrench through the roller bumper bracket.

5. Stow the transport handle (H).
6. Put the transport handle cables (B) through the bed frame slot (I) and up toward the SideCom® Communication System box (C) (see view J or K).
7. Put the transport handle cables (B) through to the PAG P.C. board (D) and do as follows:
  - Connect the enable switch cable (two-pin) to connector **P5** on the PAG P.C. board (D).
  - Connect the strain gauge cable (five-pin) to connector **P2** on the PAG P.C. board (D).

**4****CAUTION:**

Make sure there is sufficient slack in the transport handle cables to permit them to pass over the roller bumper mounting bolts when the handles are raised and lowered. Failure to do so could result in equipment damage.

8. Make sure there is sufficient slack in the transport handle cables (B) to permit them to pass over the roller bumper bolts (L) (see view J).
9. Install a cable tie (A) to secure the transport handle cables (B) to the bed frame slot (I) (see view J or K).
10. Raise the transport handle (H). Make sure the transport handle cables (B) do **not** rest on the roller bumper bolts (L) (see view J).
11. Install a cable tie (A) to secure the transport handle cables (B) to the SideCom® Communication System box (C).

12. When you install the **left-hand** transport handle (H), fold **only** the ends of the left transport handle cables (B) over approximately 3" (8 cm) three times.
13. Make sure the PAG-to-PACM P.C. board cable (M) is under the left transport handle cables (B) inside the SideCom® Communication System box (C).
14. Install two cable ties (A) to secure the transport handle cables (B) and the PAG-to-PACM P.C. board cable (M) to the SideCom® Communication System box (C).
15. Use a common ground to make sure the voltage on the PAG P.C. board (D) at **P6**, pin 1, is between 2.49 V DC and 2.51 V DC. If necessary, adjust **R8**.
16. Install the two screws to secure the SideCom® Communication System cover to the bed.
17. Do the “Function Checks” on page 2-5.

## 4.68 Motor Controller—IntelliDrive® Transport System

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Hilow cylinder braces—SA1695  
T15 Torx® head screwdriver

### Removal



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



#### WARNING:

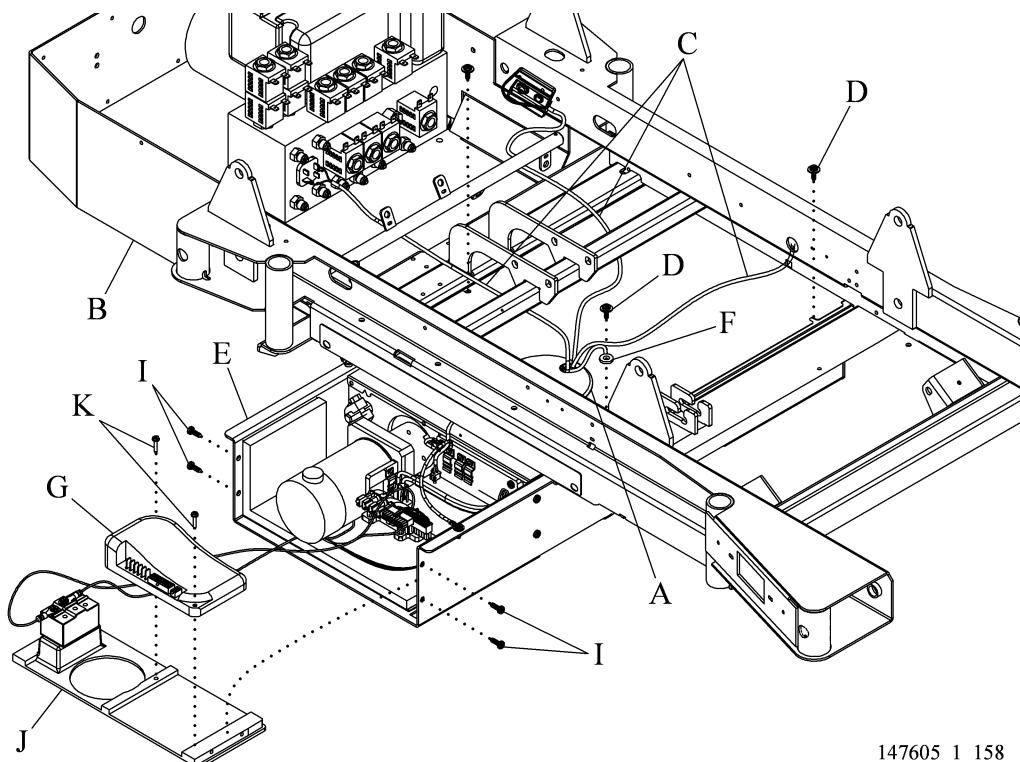
Failure to turn the circuit breaker to the off position could cause injury or equipment damage.

2. At the front of the drive box, turn the circuit breaker to the **Off** position.
3. Remove the center base cover (refer to procedure 4.3).
4. Install the hilow cylinder braces (refer to procedure 4.4).
5. Remove the accessory cover (A) from the bottom of the bed (B) (see figure 4-81 on page 4-206).

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**Figure 4-81. Motor Controller**

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6. Disconnect the three cables (C) connected to the PACM P.C. board.
7. Remove the three screws (D) that attach the drive box (E) to the bed (B).
8. Disconnect the ground strap (F) from the bed (B).
9. Slide the drive box (E) to the right side of the bed to get access to the motor controller (G).
10. Disconnect the wires from the motor controller (G).
11. Remove the four screws (I) that attach the end plate (J) to the drive box (E).
12. Remove the end plate (J) from the drive box (E).

**NOTE:**

It is not necessary to disconnect the wires from the override switch in the end plate.

13. Remove the two screws (K) that attach the motor controller (G) to the end plate (J).
14. Remove the motor controller (G).

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

4

## 4.69 Siderail Control Cable

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- T10 Torx® head screwdriver
- Tape measure
- Marking pen
- String
- Needle nose pliers
- Antistatic wrist strap

### Removal

1. Set the brakes on the bed.
2. Raise the bed to its highest position.



#### WARNING:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.



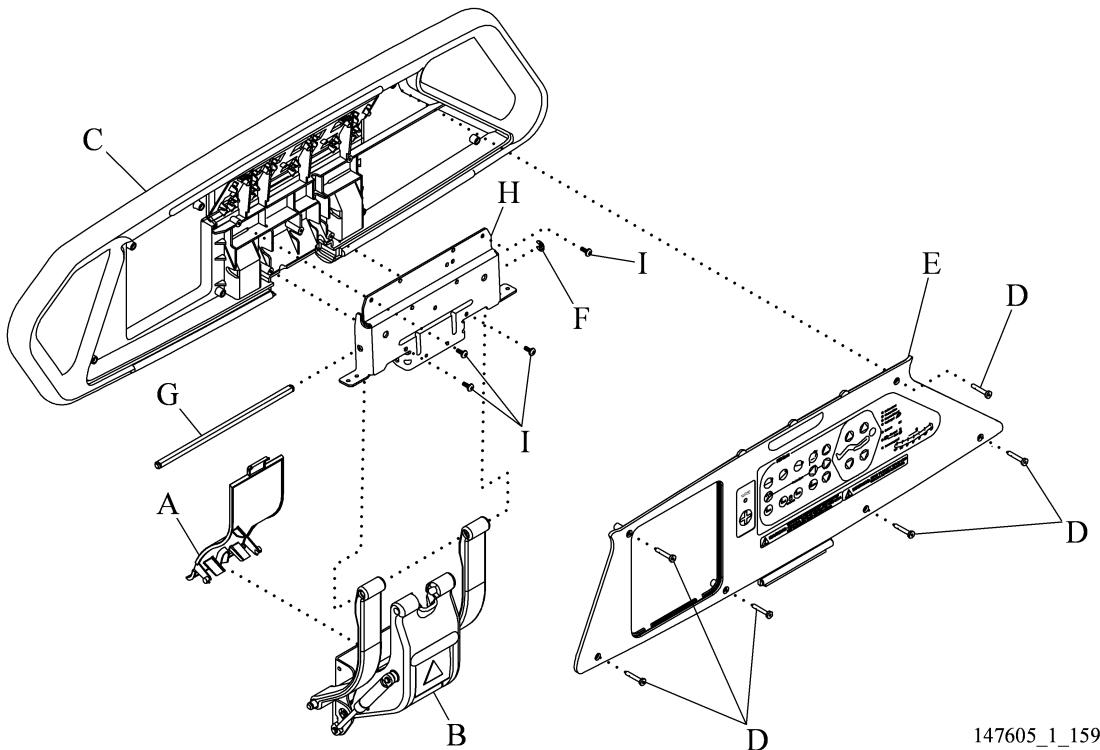
#### WARNING:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the cover (A) from the center arm (B) from the applicable intermediate siderail (C) (see figure 4-82 on page 4-209).

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**Figure 4-82. Siderail****4**

6. Raise the siderail (C) to the up and locked position.

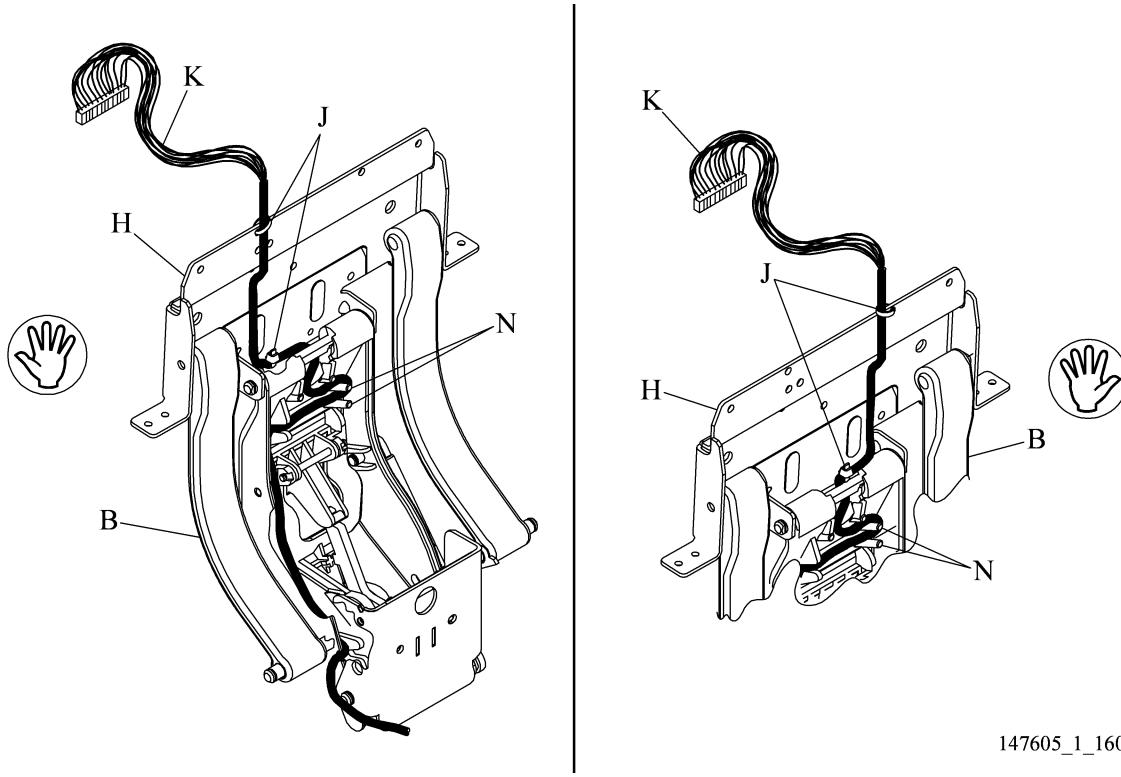
**CAUTION:**

Failure to put on the antistatic wrist strap could cause equipment damage.

7. Put on the antistatic wrist strap, and connect it to a ground strap on the bed frame.  
•
8. Remove the six screws (D) that attach the siderail cover (E) to the siderail (C).
9. Remove the siderail cover (E) from the siderail (C).
10. Carefully disconnect all of the cables from the siderail cover (E).
11. Remove the E-ring (F) that attaches the D-pin (G) to the bracket (H).
12. Remove the D-pin (G) from the bracket (H).
13. Remove the four screws (I) that attach the siderail (C) to the bracket (H).

14. Remove the siderail (C).
15. Remove the two cable ties (J) that attach the siderail cable (K) to the bracket (H) (see figure 4-83 on page 4-210).

**Figure 4-83. Siderail Cable**



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16. On a **right-hand** siderail (C) only (see figure 4-82 on page 4-209), cut and remove the cable tie (J) that attaches the siderail cable (K) and siderail detection switch cable, if installed, to the bed frame (see figure 4-83 on page 4-210).
17. Remove the siderail cable (K) from the center arm (B).
18. Disconnect the siderail cable (K) from the weigh frame P.C. board.
19. Tie the string around the end of the siderail cable (K) at the weigh frame P.C. board.

**NOTE:**

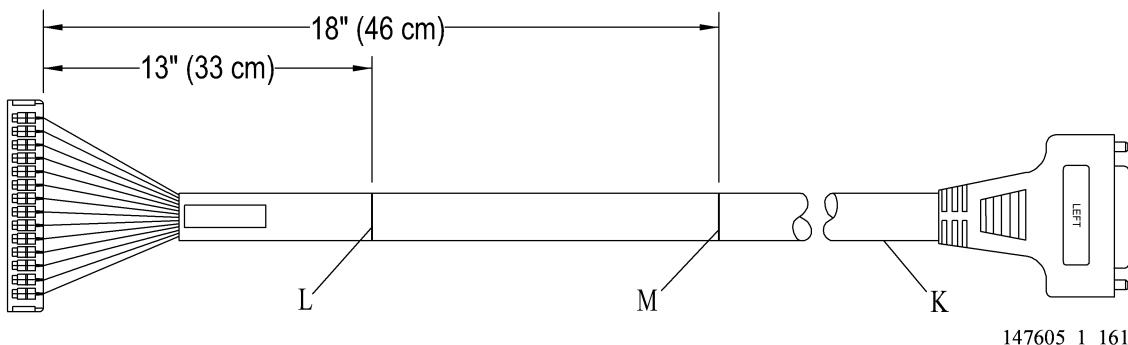
During installation of the new siderail cable, the string acts as a pull string.

20. Remove the siderail cable (K) from the bed.
21. Remove the string from the end of the siderail cable (K).

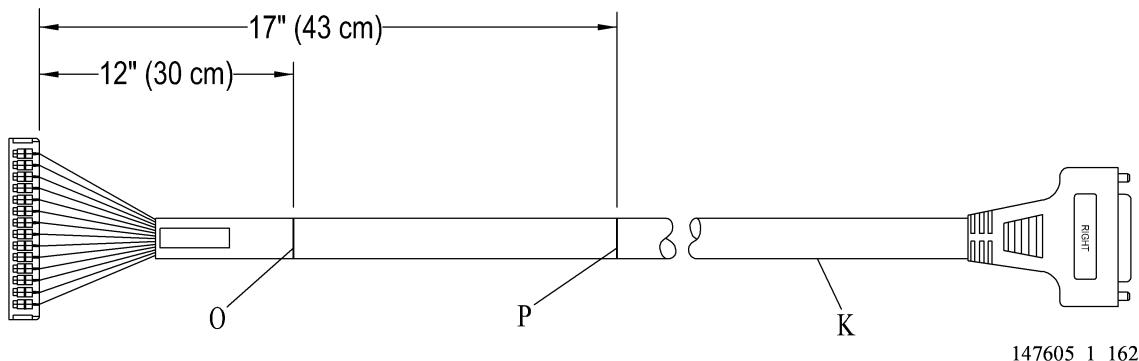
## Replacement

1. On a **left-hand** siderail cable (K) only, do as follows (see figure 4-84 on page 4-211):

**Figure 4-84. Left-Hand Siderail Cable Markings**



- a. Put a mark on the new siderail cable (K) at 13" (33 cm) and 18" (46 cm) from the siderail P.C. board connector end of the siderail cable (K).
  - b. Put the P.C. board connector end of the new siderail cable (K) under the D-pin (G) at the top of the center arm (B) (see figure 4-82 on page 4-209).
  - c. Install a cable tie (J) at the 13" (33 cm) mark (L) (see figure 4-84 on page 4-211) to secure the siderail cable (K) to the bottom of the bracket (H) (see figure 4-83 on page 4-210).
  - d. Put the siderail cable (K) through to the bottom of the center arm (B) (see figure 4-83 on page 4-210) so the 18" (46 cm) mark (M) (see figure 4-84 on page 4-211) is between the two posts (N) in the center arm (B) (see figure 4-83 on page 4-210).
  - e. Put the siderail cable (K) through the cable hole on the underside of the bed frame.
2. On a **right-hand** siderail cable (K) only, do as follows (see figure 4-85 on page 4-212):

**Figure 4-85. Right-Hand Siderail Cable Markings**

- a. Put a mark the new siderail cable (K) at 12" (30 cm) and 17" (43 cm) from the siderail P.C. board connector end of the siderail cable (K).
  - b. Put the P.C. board connector end of the new siderail cable (K) under the D-pin (G) at the top of the center arm (B) (see figure 4-82 on page 4-209).
  - c. Install a cable tie (J) at the 12" (30 cm) mark (O) (see figure 4-85 on page 4-212) to secure the siderail cable (K) to the bottom of the bracket (H) (see figure 4-83 on page 4-210).
  - d. Put the siderail cable (K) through to the bottom of the center arm (B) (see figure 4-83 on page 4-210) so the 17" (43 cm) mark (P) (see figure 4-85 on page 4-212) is between the two posts (N) in the center arm (B) (see figure 4-83 on page 4-210).
  - e. Put the siderail cable (K) down the center arm (B) to the bed frame.
  - f. Put the siderail cable (K) under the center arm (B) to the head end of the bed.
  - g. Put the siderail cable (K) through the cable hole on the underside of the bed frame.
  - h. At the cable tie mount, secure the siderail cable (K) and siderail detection switch cable to the bed frame.
3. Tie the string to the end of the new siderail cable (K), and pull the string through the cable hole to put the new siderail cable (K) in the bed.
  4. Connect the new siderail cable (K) to the weigh frame P.C. board.
  5. Install a cable tie (J) to attach the siderail cable (K) to the top of the bracket (H) so the siderail cable (K) is toward the head end of the bed.
  6. Put the siderail (C) next to the bracket (H) (see figure 4-82 on page 4-209).

**CAUTION:**

When you install the screws, make sure the siderail is tight against the bracket. Failure to do so could cause gaps between the bracket and the siderail, and cause the siderail to operate incorrectly.

7. Make sure the siderail (C) is tight against the bracket (H), and install the four screws (I) that attach the siderail (C) to the bracket (H).

**NOTE:**

The bracket is tapped for screws. If the siderail is **not** tight against the bracket, the screws could bottom out before the siderail is correctly attached.

**CAUTION:**

Failure to wear an antistatic strap could cause component damage.

8. Put on the antistatic wrist strap, and connect it to a ground strap on the bed frame.
9. Place the siderail cover (E) next to the siderail (C).
10. Connect the siderail cable (K) to the P.C. board (see figure 4-83 on page 4-210).
11. Install the six screws (D) to secure the siderail cover (E) to the siderail (C) (see figure 4-82 on page 4-209).
12. Install the cover (A) on the center arm (B).
13. Raise and lower the siderail (C) twice to make sure it operates correctly.
14. Make sure the siderail cable (K) is **not** pinched (see figure 4-83 on page 4-210). Repair as necessary.
15. Do **one** of these as applicable:
  - On a **right-hand** siderail, install the GCI control (refer to procedure 4.22).
  - On a **left-hand** siderail, install the setup control panel (refer to procedure 4.18).
16. Do the “Function Checks” on page 2-5.

## 4.70 Power Cord

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- 5/16" wrench
- Antistatic strap
- Hilow cylinder brace (P/N SA695)
- Safety analyzer

### Removal

1. Raise the bed to the high position.



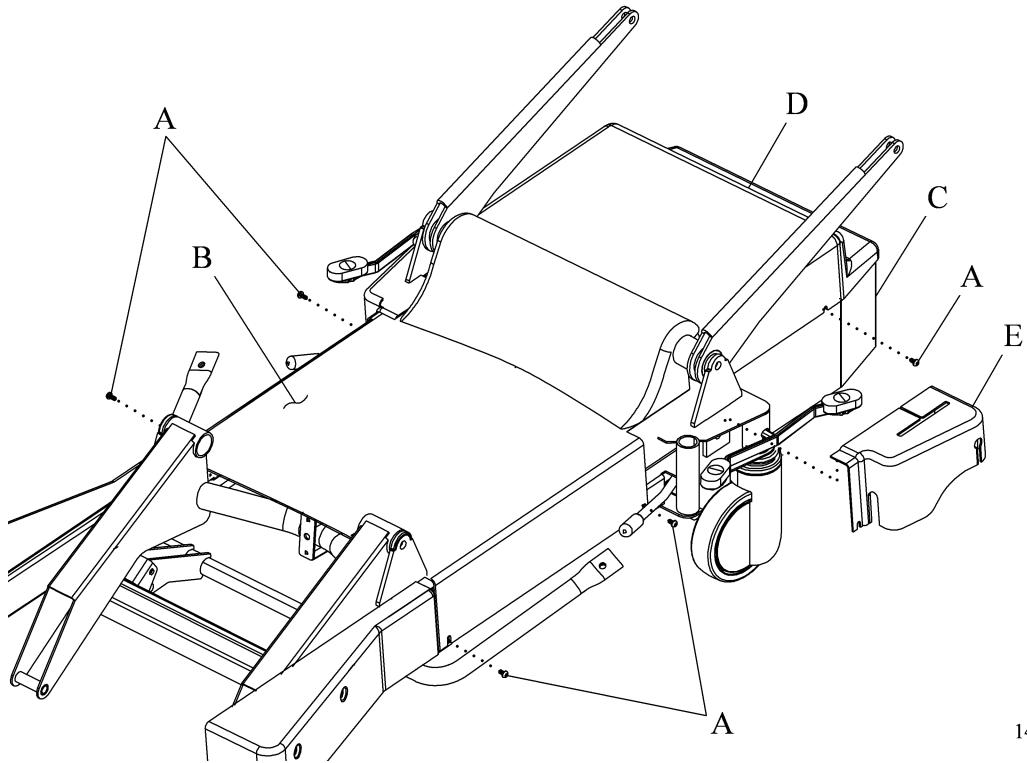
#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

2. Unplug the bed.
3. Disable the battery (refer to procedure 4.74)..
4. Remove the four screws (A) that attach the center base cover (B) to the bed (C) (see figure 4-86 on page 4-215).

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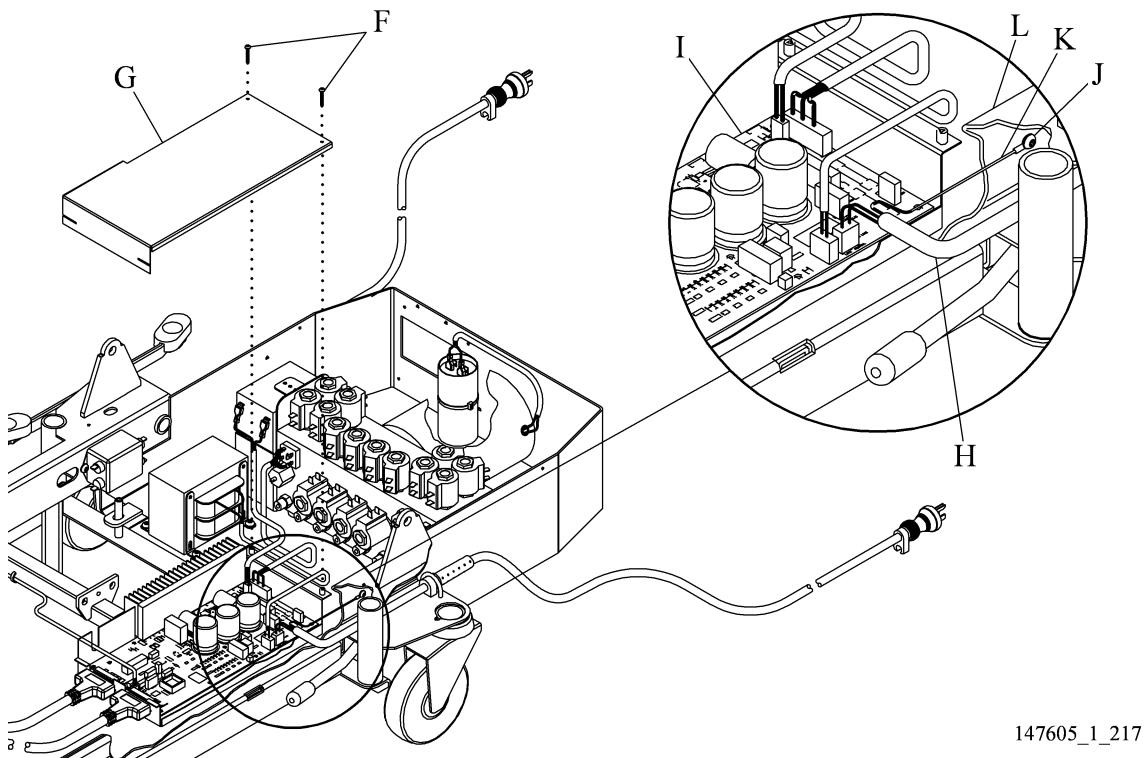
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**Figure 4-86. Cover Removal**

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5. Remove the center base cover (B).
6. Remove the two screws (A) that attach the head-end tub cover (D) to the bed (C).
7. Remove the head-end tub cover (D).
8. Remove the head-end left caster cover (E).
9. Install the cylinder braces (see procedure 4.4).
10. Remove the two screws (F) that attach the PCM cover (G) to the bed (see figure 4-87 on page 4-216).

**Figure 4-87. Power Cord Disconnect**

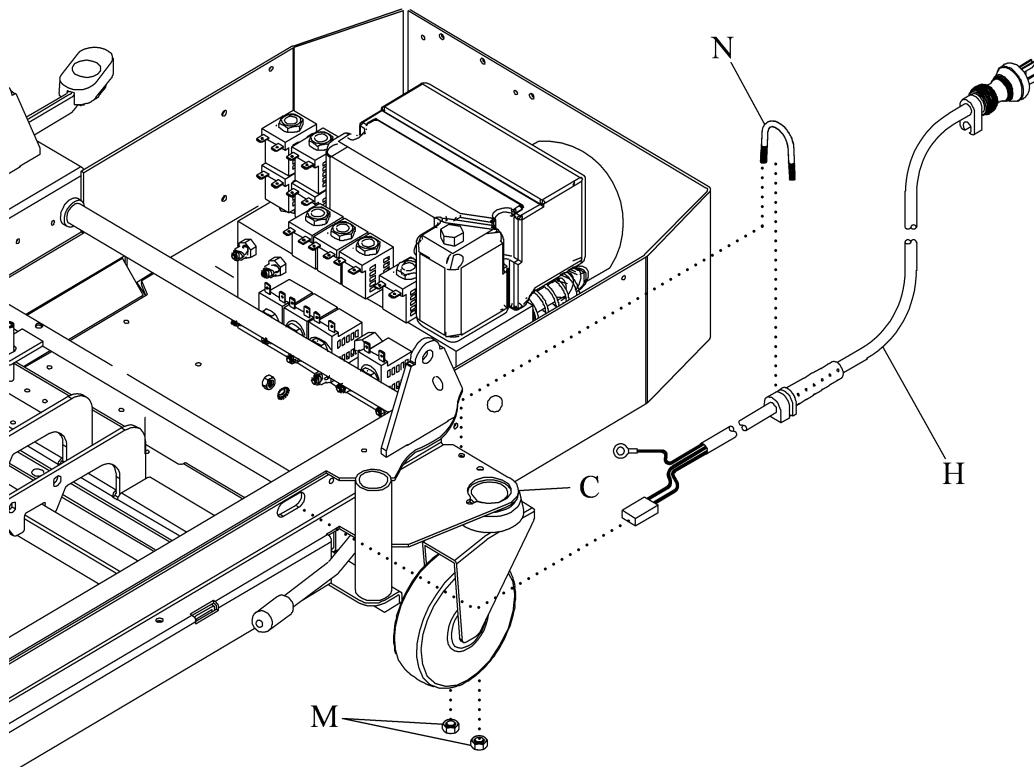
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11. Remove the PCM cover (G).

**CAUTION:**

Failure to wear an antistatic strap could cause component damage.

12. Put on the antistatic strap.
13. Disconnect the power cable (H) from the PCM board (I).
14. Remove the screw (J) that attach the ground strap (K) to the bed frame (L).
15. Remove the two nuts (M) that attach the U-bolt (N) to the bed (C) (see figure 4-88 on page 4-217).

**Figure 4-88. Power Cord Removal**

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16. Remove the U-bolt (N).
17. Remove the power cord (H) from the bed (C).

## Replacement

1. Do the removal procedure in reverse order.
2. Make sure the electrical ground resistance is less than 200 milliohms.
3. Make sure the leakage current is less than 100 milliohms.
4. Do the “Function Checks” on page 2-5.

## 4.71 Wireless Module

Tools required:

- T25 Torx®<sup>1</sup> head screwdriver
- Wire cutters
- Antistatic strap

### Removal

1. Set the brakes.
2. Raise the bed to the high position.
3. Raise the head section to the full up position.



#### **WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed.
5. Disable the battery (refer to procedure 4.74).
6. Remove the center base cover.
7. Remove the two screws (B) that attach the foot-end left caster cover (C) to the bed (see figure 4-89 on page 4-219).
8. Remove the foot-end, left, caster cover (C) from the bed.
9. Remove the head-end, left, caster cover (D) from the bed.
10. Remove the two screws (E) that attach the sidecom cover (G) to the bed.
11. Remove the dummy plug (F).
12. Remove the sidecom cover (G).



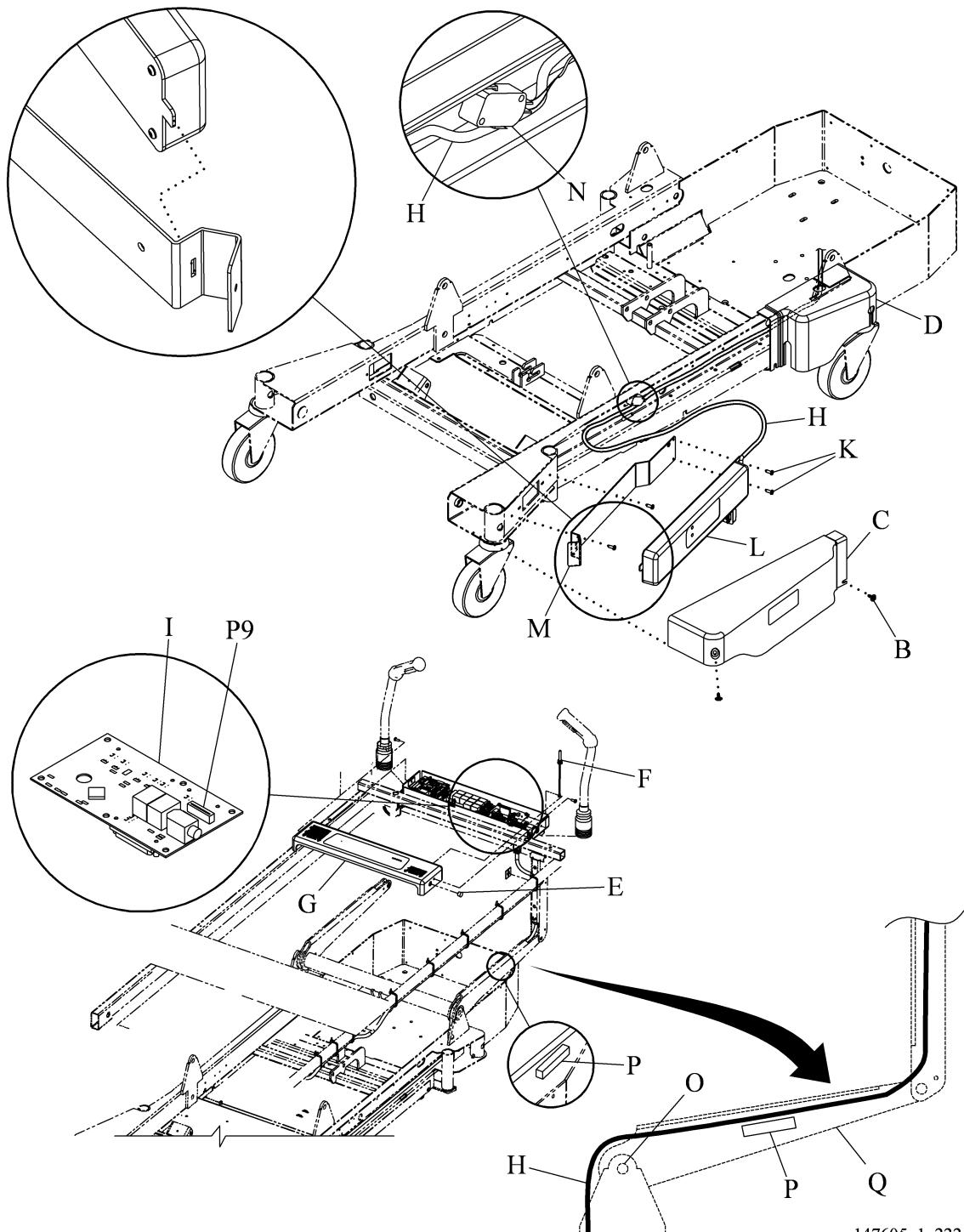
#### **CAUTION:**

Failure to wear an antistatic strap can cause equipment damage.

13. Put on the antistatic strap.
14. Disconnect the cable (H) from the communication P.C. board (I) at connector (P8).

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**Figure 4-89. Wireless Module**

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15. Remove the two screws (K) that attach the wireless module (L) to the mount bracket (M).
16. Cut and remove any cable ties that attach the wireless module cable (H) to the bed.
17. Remove the wireless module (L).

## Replacement

1. Do the removal procedure in reverse order.

**NOTE:**

The cable (H) goes under the brake set detection switch (N), over the lower lift arm hinge (O), between the foam block (P) and the lower lift arm (Q).

2. Do the “Function Checks” on page 2-5.
3. Configure the wireless module. Refer to *The OnSite™ System Software Installation Guide* (P004443).

## 4.72 Patient Helper

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
1/2" socket or box wrench

### Removal



#### WARNING:

Do not remove the Patient Helper when a patient is in the bed. Patient injury or equipment damage could occur.

4. Set the brakes.
5. Raise the bed to the high position.



#### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

6. Unplug the bed from its power source.



#### SHOCK HAZARD:

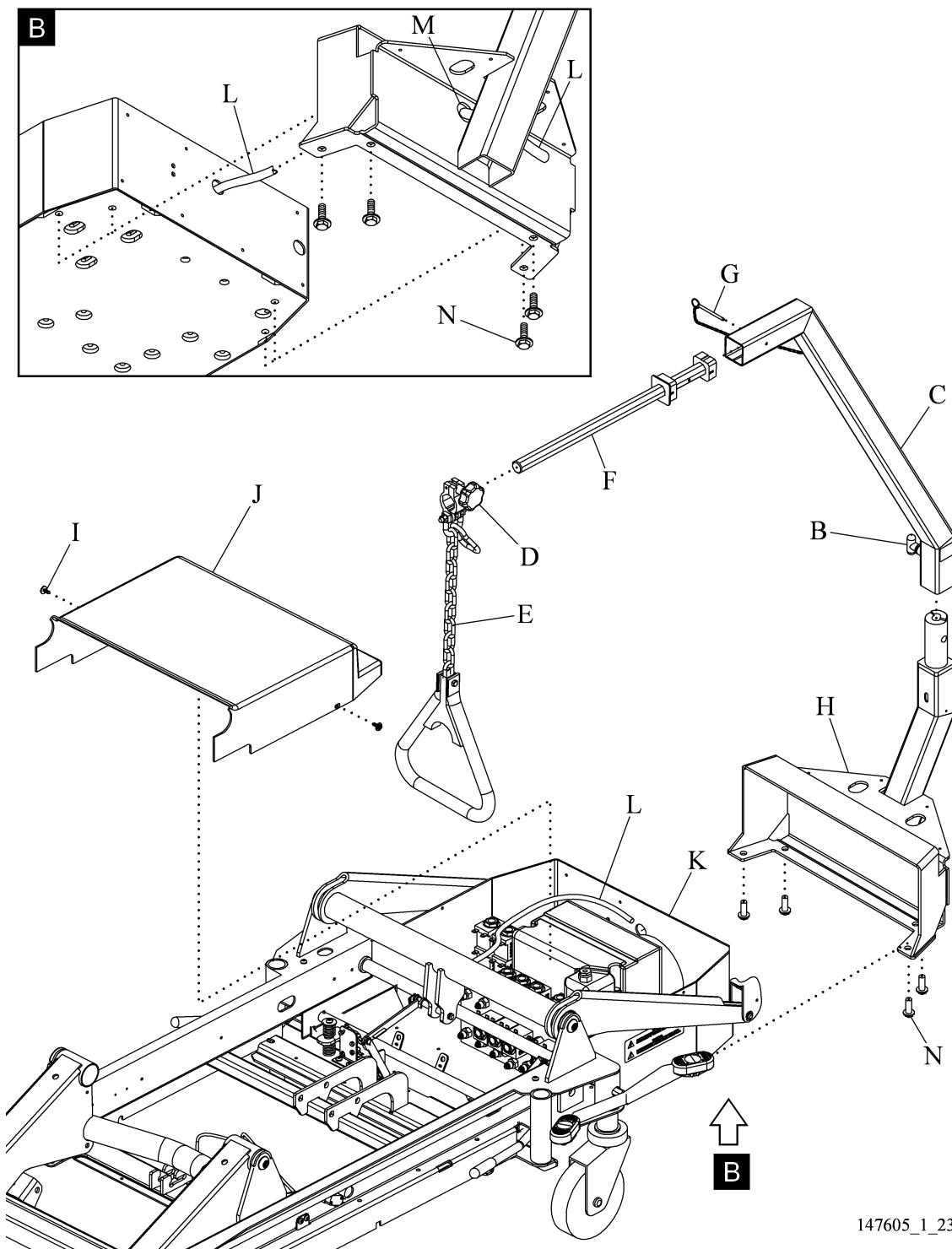
Failure to disable the battery could cause injury or equipment damage.

7. Disable the battery (refer to procedure 4.74).
8. Remove the headboard.
9. Pull the T-handle (B) that is at the bottom of the upright arm (C), and turn the upright arm (C) so it is toward the side of the bed (see figure 4-90 on page 4-222).
10. Loosen the clamp (D) of the trapeze handle assembly (E), and remove the assembly (E) from the horizontal arm (F).
11. Remove the release pin (G) that attaches the horizontal arm (F) to the upright arm (C).
12. Remove the horizontal arm (F).
13. Pull the T-handle (B), and lift the upright arm (C) off the trapeze base (H).
14. Remove the two screws (I) that attach the tub base cover (J) to the base frame (K).

4

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

Figure 4-90. Patient Helper



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15. Remove the cover (J).
16. From the inside of the base frame (K), pull the hose (L) out of the opening (M) in the trapeze base (H) and the opening in the base frame (K). And, let the hose (L) lay inside the base frame (K).
17. Remove the four bolts (N) that attach the trapeze base (H) to the base frame (K).
18. Remove the trapeze base (H) from the base frame (K).

## Replacement



### **WARNING:**

Do not install the Patient Helper when a patient is in the bed. Patient injury could occur.

1. Do step 16 through step 18 of the removal procedure in reverse order.



### **CAUTION:**

Failure to have the hose the correct distance away from the insulation at the back of the arm of the trapeze base could cause equipment damage.

2. Put your finger through the opening at the base of the arm on the trapeze base (H). And make sure the hose (L) is 0.5" to 1" (13 mm to 3 cm) away from the insulation at the back of the arm of the trapeze base (H).
3. Do step 5 through step 15 of the removal procedure in reverse order.



### **WARNING:**

Failure to correctly attach the Patient Helper arm assembly could cause it to fall. Personal injury or equipment damage could occur.

4. Make sure the upright arm (C) locks into the center position when the trapeze handle (E) is over the center of the bed.
5. Do the “Function Checks” on page 2-5.

4

## 4.73 Line Manager

Tools required: 5/64" hex wrench

### Removal

1. Set the brakes.
2. Raise the bed to the highest position.
3. Raise the head section to 15°.



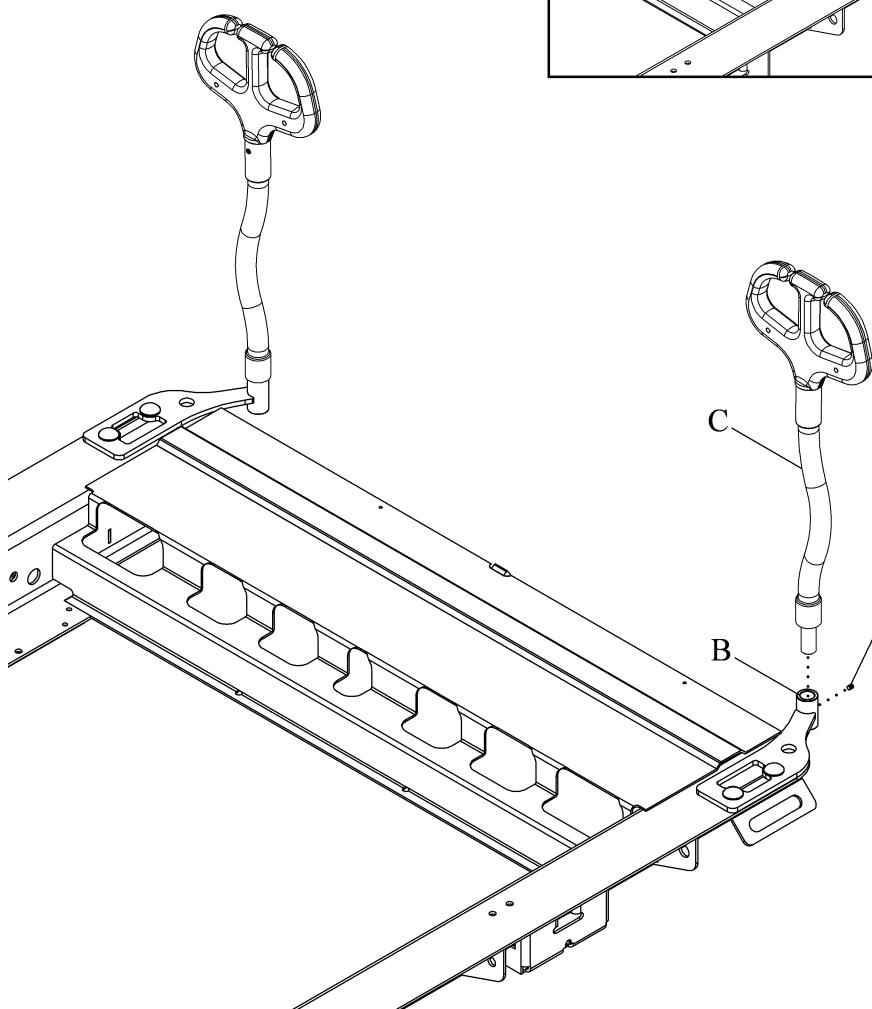
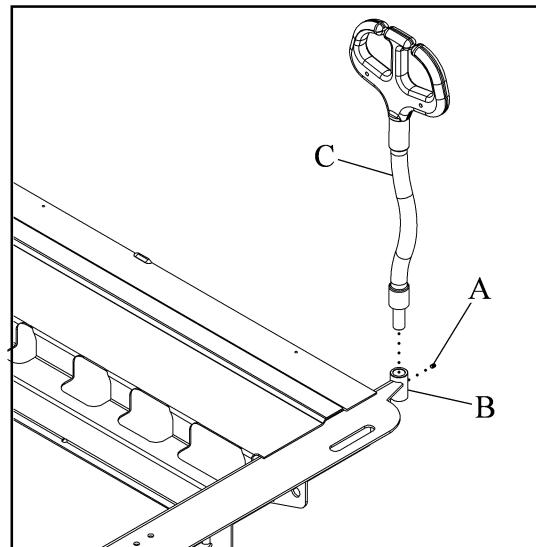
#### WARNING:

Failure to unplug the bed could cause personal injury or equipment damage.

4. Unplug the bed from its power source.
5. Disable the battery (refer to procedure 4.74).
6. Disconnect the mattress.
7. Pull the mattress down approximately 12" (30.5 cm).
8. Loosen the setscrew (A).
9. Remove the setscrew (A) from the mount (B).
10. Remove the line manager (C) from the mount (B).

### Replacement

1. Do the removal procedure in reverse order.

**Figure 4-91. Line Manager**

4

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## 4.74 Disable Battery Operation

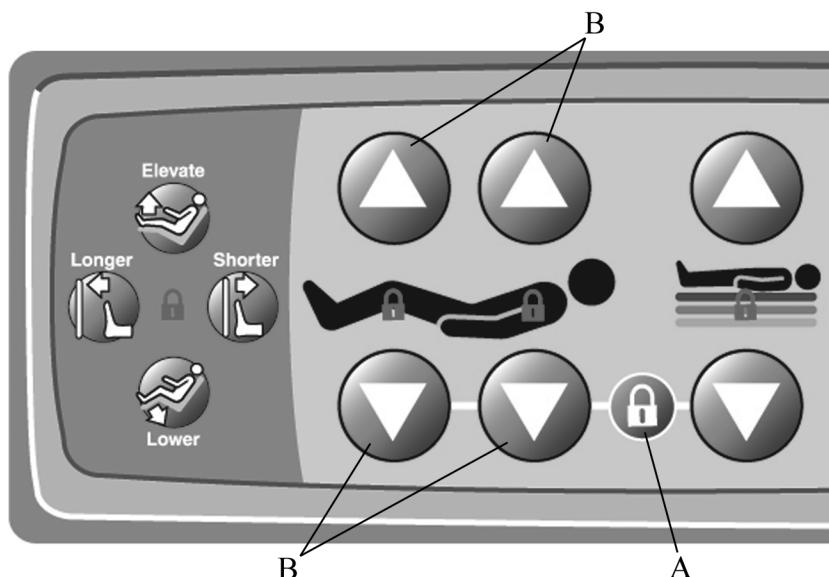


### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.
2. Make sure all four lockout controls are engaged (A) (see figure 4-92 on page 4-226); the lockout indicators (A) are on.

**Figure 4-92. Lockout Controls**



3. If a lockout control is not on, simultaneously press the **Lock out** control (B) and the applicable function control (A). The lockout indicator will come on and an a tone will sound.
4. At the same time, press the **Head Up/Down** and **Knee Up/Down** controls (C) for approximately 5 seconds. The battery will be disabled when the lockout indicators go off.

## 4.75 Electrical Fuse Blown—Damaged Cable/P.C. Board Combination Identification

Tools required: AC/DC volt/ohms meter (multimeter)

In the event of a blown fuse, perform the following procedure to identify the damaged cable/P.C. board combination that caused the fuse to blow:



### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

1. Unplug the bed from its power source.



### SHOCK HAZARD:

Failure to disable the battery could cause injury or equipment damage.

2. Disable the battery (refer to procedure 4.74).
3. Remove the tub base, top center (refer to procedure 4.3), and foot end base covers (refer to procedure 4.6) from the base frame.
4. Disconnect the signal/power cables at the Power Control Module P.C. board.
5. Disconnect all cables at the weigh frame junction P.C. board.
6. Replace the damaged fuse.
7. Plug the unit into an appropriate power source.
8. Wait 30 s.
9. Make sure of the voltage on both sides of the replaced fuse.
10. If the fuse blows again, go to step 10.

4



### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

11. Unplug the bed from its power source.



**SHOCK HAZARD:**

Failure to disable the battery could cause injury or equipment damage.

12. Disable the battery (refer to procedure 4.74).
13. Disconnect all the cables from the Power Control Module P.C. board except for the AC cables.
14. Replace the fuse.
15. Plug the unit into an appropriate power source.
16. Wait 30 s.
17. Make sure of the voltage on both sides of the replaced fuse.
18. If the fuse blows again, examine the power cables, and replace as necessary.
19. After examination, if the power cables are not damaged, replace the Power Control Module P.C. board.
20. If no problems are located, gradually assemble the bed to identify the damaged cable/P.C. board combination that has blown the fuse.
21. Once the damaged cable/P.C. board combination has been identified, disconnect the cable from the P.C. board.



**SHOCK HAZARD:**

Failure to unplug the bed could cause injury or equipment damage.

22. Unplug the bed from its power source.



**SHOCK HAZARD:**

Failure to disable the battery could cause injury or equipment damage.

23. Disable the battery (refer to procedure 4.74).
24. Disconnect all the cables from the Power Control Module P.C. board and weigh frame junction P.C. board except for the cable identified in step 18.
25. Replace the fuse.
26. Plug the unit into an appropriate power source.

27. Wait 30 s.
28. Make sure of the voltage on both sides of the replaced fuse to determine whether the cable or the P.C. board is damaged.
29. Replace the damaged cable or P.C. board.
30. Do the “Function Checks” on page 2-5.

## 4.76 Bleed the Hydraulic System

Tools required: None

1. Fully raise and lower the bed four times.
2. Put the bed in the flat and chair position three times.
3. Raise the head section to the full up position.



### WARNING:

Care should be taken when you press the CPR foot pedal. The head section will drop down. Injury or equipment damage could occur.

4. Hold the **Head up** control and press down on the CPR foot pedal. This will force the hydraulic fluid and air from the hydraulic lines and back into the hydraulic tank.
5. Repeat steps 1 through 4 three times.

## 4.77 Verify Operation of the NAWI Class IIII Scale (NAWI Class IIII Scale—European Version Only)

Tools required:

- T25 Torx®<sup>1</sup> screwdriver
- Calculator
- White gloves with rubber facing
- Window cleaner
- Clean cloth
- Pen or pencil
- Antistatic strap
- Thin blade screwdriver
- Voltmeter
- Multimeter
- Marked zone board with a maximum weight of 10 kg
- Dummy plug (P/N 3069801)
- Weight set, 200 kg, **Class M1** or better

The weight set, 200 kg, should include the following:

- Ten 50 g weights
- One 500 g weight
- Four 5 kg weights
- Four 1 kg weights
- One 200 g weight
- Twenty 10 kg weights

### NOTE:

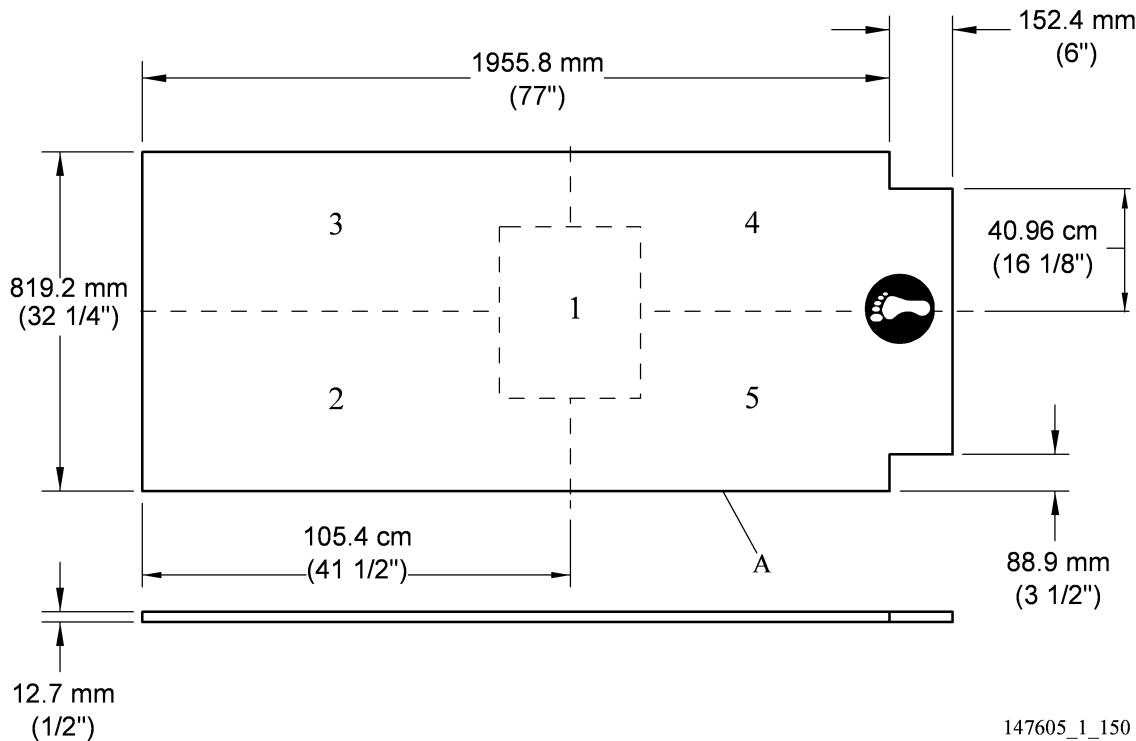
Cast iron or stainless steel weights may be used for this verification, as long as they meet the **Class M1** requirements.

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

## Marked Zone Board

1. Make sure the marked zone board (A) meets the following dimensions (see figure 4-93 on page 4-232):

**Figure 4-93. Zone Board Dimensions**



2. If necessary, perform the following:
  - a. Divide the marked zone board (A) into four equal quadrants.
  - b. Starting at the head left quadrant and working clockwise through the quadrants, mark the quadrants as Zones 2 through 5.
  - c. Mark the area where the four quadrants meet in the center board as Zone 1.

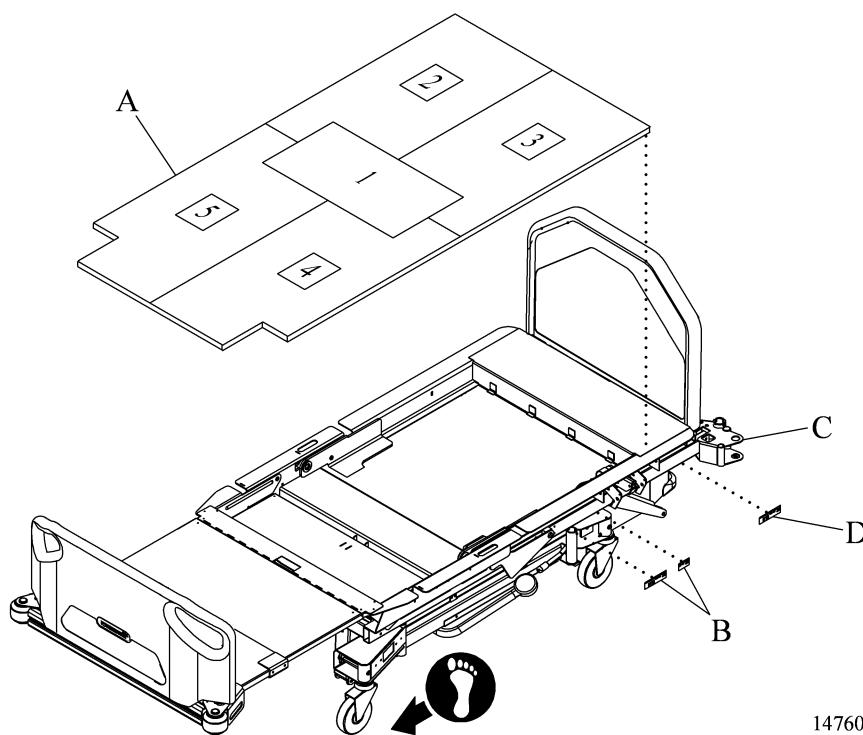
## Setup

1. Make sure the weight set is within current calibration:
  - If any weights are dropped or otherwise appear damaged, replace them.
  - If skin contacts a weight, or if dirt is visible on a weight, wipe down the weight with window cleaner and a clean, non-abrasive cloth between calibrations.

2. Make sure the bed is on a flat, stable surface.
3. Set the brakes.
4. Remove the mattress from the bed.
5. If the bed has an air system installed, perform the following:
  - a. Disconnect the MTS cable (P8) from the weigh frame junction P.C. board.
  - b. Install the dummy plug on the weigh frame junction P.C. board.
6. Plug the bed into an appropriate power source.
7. If the bed has an air system installed, perform the following:
  - a. On the GCI, access the **Service** screen.
  - b. Go to the diagnostic screen.
  - c. Send a **10 166** diagnostic code to disable the air system.
8. Raise the bed to its highest position.
9. Fully extend the foot section, and make sure the sleep deck is **flat**.
10. Make sure that no external weights are on the bed and no outside weight interferences exist:
  - Make sure that no accessories are installed on the bed.
  - Make sure the pulmonary therapy modules are removed.
11. On the “NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)” on page 4-247, record the following information:
  - Bed model number
  - Serial number
  - Upgrade kit serial number
  - Current date
  - Inspector number
  - Current time
  - Current temperature
  - Current humidity

12. Install the altitude and latitude and green M labels (B) on the bed (C) at the foot end side of the siderail latch (see figure 4-94 on page 4-234).

**Figure 4-94. Label Installation and Zone Board Placement**



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13. Install the kit serial number upgrade label (D) next to the bed serial number label.
14. Place the marked zone board (A) on the bed (C).

## Verification of the NAWI Class IIII Scale

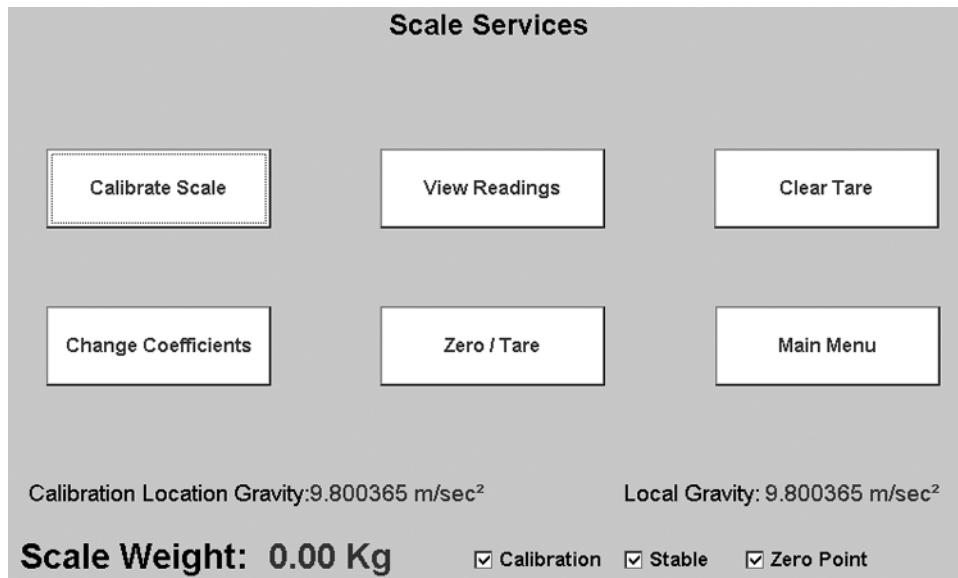
### Gravitational Constant

The diagnostic GCI screens can be queried for system status information. To access the GCI Code screens, do as follows:

1. Select the **Tools** tab on the GCI.
2. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
3. Select **Diagnostics**.
4. Select **Calibrate Scale**.

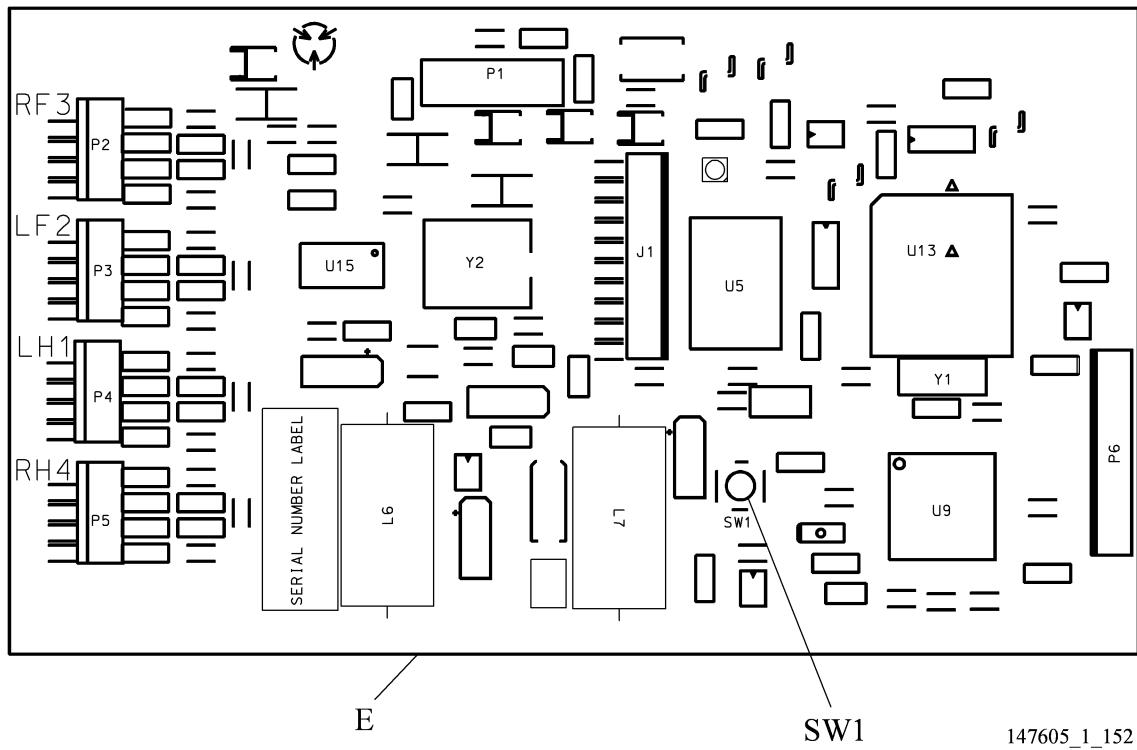
5. The **Scale Services** screen appears (see figure 4-95 on page 4-235).

**Figure 4-95. Scale Services Screen**



6. At the **Scale Services** screen, verify that the **Calibration mode** indicator is marked. If the **Calibration mode** indicator is **not** illuminated, press the calibration button (SW1) on the scale P.C. board (E) to activate it (see figure 4-96 on page 4-236).

Figure 4-96. Scale P.C. Board



- At the Scale Service screen, select **Change Coefficients**. The **Change Coefficients** screen appears (see figure 4-97 on page 4-236).

Figure 4-97. Change Coefficients Screen

Scale Services

Local Gravity:  
9.800564 m/sec<sup>2</sup>

Calibration Location Gravity:  
9.800564 m/sec<sup>2</sup>

Scale Weight: 0.05 Kg

Calibration    Stable    Zero Point

Cancel   Continue

1 2 3  
4 5 6  
7 8 9  
. 0 Clear

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8. Verify that the **Calibration location gravity** reading is correct for the location of the unit (see table 4-1 on page 4-237).

**Table 4-1. Calibration Location Gravities**

<b>Northern Europe Gravity: 9.8176</b>	<b>Central Europe Gravity: 9.808</b>	<b>Southern Europe Gravity: 9.8033</b>
Finland	Belgium	Austria
Iceland	Czech Republic	Bulgaria
Norway	Denmark	France
Sweden	Germany	Greece
	Ireland	Hungary
	Latvia	Italy
	Lithuania	Portugal
	Luxembourg	Romania
	Netherlands	Slovakia
	Poland	Slovenia
	United Kingdom	Spain
		Switzerland

4

9. If the **Calibration location gravity** reading is **not** correct, refer to the on-screen menu, and enter the correct gravity constant for the **Local gravity** reading. To select each digit, press **Enter** to move the cursor from digit to digit.

## Calibration



### CAUTION:

Use only white cloth gloves with rubber facing when handling the stainless steel weights. Failure to do so could result in equipment damage.

1. Put on white cloth gloves with rubber facing.

**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

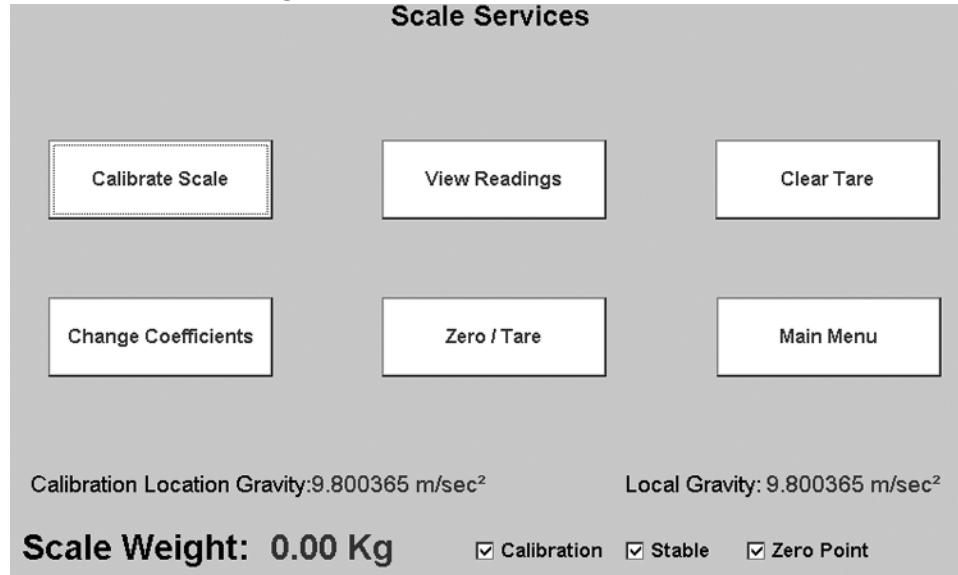
2. **Gently** place 200 kg of weight on the center of the marked zone board (A) (see figure 4-94 on page 4-234).
3. Wait 30 seconds, and then remove the weight from the marked zone board (A).

**CAUTION:**

When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.

4. Put on the antistatic strap, and attach it to a ground strap on the bed.
5. Select the **Tools** tab on the GCI.
6. Press the **Enter service code** button. Enter **812** for the code, and press **OK**.
7. Select **Diagnostics**.
8. Select **Calibrate Scale**.
9. The **Scale Services** screen appears (see figure 4-98 on page 4-238).

**Figure 4-98. Scale Service Screen**  
**Scale Services**



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10. At the scale P.C. board (E), press the calibration switch (SW1) for 10 seconds until it beeps twice (see figure 4-96 on page 4-236). Make sure the **Calibration Mode** indicator is illuminated.
11. At the **Scale Service** screen, select **Calibrate Scale**. Make sure the siderails are in the **lower** position, and follow the on-screen instructions:
  - Make sure there is **no** movement on the bed. To minimize movement of the bed during calibration, keep the GCI control **down**.
  - If movement occurs on the bed, repeat step 11.

**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

12. When directed by the on-screen instructions, **gently** center 100 kg of weight on the four quadrants of the marked zone board (A) (see figure 4-94 on page 4-234).
13. Unplug the bed from its power source.
14. When the relay on the PCM P.C. board clicks, plug the unit into an appropriate power source.
15. Remove the weight from the marked zone board (A).

**4****Repeatability**

1. At the GCI, place the bed in **Service Mode**, and select **View Readings**. The **View Readings** screen appears.
2. Record the indication unloaded as **I<sub>0</sub>** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-2 on page 4-247).

**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

3. **Gently** center 100 kg of weight on the marked zone board (A) (see figure 4-94 on page 4-234).
4. Record the indication of load **I** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-2 on page 4-247).

5. Remove the weight from the marked zone board (A).
6. Calculate  $P = I - I_0$ , and record in the appropriate row on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-2 on page 4-247).
7. Repeat step 1 through step 6 two more times.
8. Subtract the smallest **P** value from the largest **P** value, and record the result in the **P<sub>MAX</sub> - P<sub>MIN</sub>** row on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-2 on page 4-247).



**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

9. **Gently** replace the 100 kg load with a 200 kg load, and repeat step 2 through step 8.
10. If the **P<sub>MAX</sub> - P<sub>MIN</sub>** value for both the 100 kg load and the 200 kg load is less than or equal to the **MPE** value, mark the **Pass** box on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-2 on page 4-247). Otherwise, mark the **Fail** box, and go to “Function Checks” on page 2-5 to troubleshoot the unit.

## Discrimination

1. Do the following to place the display in **Caregiver Mode**:
  - a. Unplug the bed from its power source.
  - b. Plug the bed into an appropriate power source.
  - c. At the GCI, select **Scale Functions**.



**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

2. **Gently** place 5 kg of weight on the marked zone board (A), and then **gently** add ten additional weights of 50 g each on the marked zone board (A) (see figure 4-94 on page 4-234).

3. Record the scale reading in the **I<sub>1</sub>** column on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-3 on page 4-248).
4. Remove one 50 g weight at a time until the scale reading reduces by 0.5 kg and the display movement stabilizes.
5. Record the weight removed as  $\Delta L$  on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-3 on page 4-248).

**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

6. **Gently** place one 50 g weight on the marked zone board (A), and then **gently** add 700 g of weight on the marked zone board (A).
7. Record the scale reading as **I<sub>2</sub>** in the appropriate row on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-3 on page 4-248).
8. Calculate **I<sub>2</sub> - I<sub>1</sub>**, and record the result on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-3 on page 4-248).
9. Unload the scale, and then repeat step 1 through step 8 two more times, replacing the 5 kg load with a 100 kg load and then a 200 kg load.
10. If all three rows of **I<sub>2</sub> - I<sub>1</sub>** values equal **0.5 kg**, mark the **Pass** column on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-3 on page 4-248). Otherwise, mark the **Fail** column, and go to “Function Checks” on page 2-5 to troubleshoot the unit.
11. Remove all weights from the marked zone board (A).

**4****Accuracy of Tare Device**

1. Make sure the display is in **Caregiver Mode**.



**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

2. **Gently** place 25 kg of weight on the bed.
3. Record the pre-tare scale indication on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-4 on page 4-248).
4. Tare the scale, and record the new scale reading on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-4 on page 4-248).



**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

5. **Gently** add 50 g of weight until the display changes by **0.5 kg**.
6. Record the amount of weight added in the **ΔL** column on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-4 on page 4-248).
7. Calculate **E = 250 g - ΔL**, and record the results on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-4 on page 4-248).
8. If the calculated value of **E** is less than or equal to the **MPE** value, then mark the **Pass** column on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-4 on page 4-248). Otherwise, mark the **Fail** column, and go to “Function Checks” on page 2-5 to troubleshoot the unit.
9. Remove all weights from the marked zone board (A), and undo the tare (see figure 4-94 on page 4-234).

## **Eccentricity**

1. Make sure that no load exists on the marked zone board (A).
2. At the Graphical Caregiver Interface (GCI)® Control, access the **View Readings** screen, and record the indication unloaded as **I<sub>0</sub>** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-5 on page 4-248).

3. Calculate the error,  $E_0$ .

**CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

4. **Gently** center 70 kg of weight in Zone 2 of the marked zone board (A) (see figure 4-94 on page 4-234).
5. Record the scale reading as **I** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-5 on page 4-248), and then calculate the error,  $E$ , and the corrected error,  $E_C$ .
6. Repeat step 1 through step 5 for Zones 3 through 5 on the marked zone board (A) (see figure 4-94 on page 4-234).

**NOTE:**

It is **not** necessary to check Zone 1 of the marked zone board.

7. Compare all values of  $E_C$  to the corresponding **MPE** value. If all  $E_C$  values are less than or equal to the **MPE** value, mark the **Pass** column on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-5 on page 4-248). Otherwise, mark the **Fail** column, and go to “Function Checks” on page 2-5 to troubleshoot the unit.
8. Remove the weight from the marked zone board (A) (see figure 4-94 on page 4-234).

**Tare (Weighing Test)****4****CAUTION:**

To avoid equipment damage, place the weights **gently** on to the marked zone board.

1. **Gently** place 20 kg of weight on the marked zone board (A), and then record the scale reading as **I** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-6 on page 4-249).
2. Do the following to tare the scale from the **View Readings** screen:
  - a. Press the **Cancel/Return** button to back up one menu level.
  - b. Select **Tare**, and follow the on-screen instructions.

- c. Return to the **View Readings** screen.
3. Referring to the **Load** column in table 4-6 on page 4-249, start with the tared load of **0**, and perform the following:
  - a. **Gently** place the weight listed in the **Interval Weights** column on the marked zone board (A), and record the scale reading on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-6 on page 4-249) (see figure 4-94 on page 4-234).
  - b. One row at a time, increase the weight load, and then record the scale reading on the form.
  - c. After 180 kg of weight is reached, begin removing weight in the intervals listed, one row at a time, and record the scale readings on the form.
4. Calculate the error,  $E = I - L$ .
5. Calculate the corrected error,  $E_C = E - E_0$ , with  $E_0$  the error calculated at a load of **0**.
6. Remove 20 kg of weight from the marked zone board (A) (see figure 4-94 on page 4-234).
7. With no load on the marked zone board (A), tare the scale again.
8. **Gently** place 50 kg of weight on the marked zone board (A).
9. Record the scale reading as **I** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-7 on page 4-249), and then tare the scale again.
10. Return to the **View Readings** screen.
11. Referring to the **Load** column in table 4-7 on page 4-249, start with the tared load of **0**, and perform the following:
  - a. **Gently** place the weight listed in the **Load** column on the marked zone board (A), and record the scale reading as **I** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-7 on page 4-249) (see figure 4-94 on page 4-234).
  - b. One row at a time, increase the weight load, and then record the scale reading on the form.

- c. After 150 kg of weight is reached, begin removing weight in the intervals listed, one row at a time, and record the scale readings on the form.
12. Repeat step 1 through step 11.
13. Calculate the error,  $E = I - L$ , for each row, and then record the results on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-7 on page 4-249).
14. Compare all values of  $E_C$  to the corresponding **MPE** value. If all  $E_C$  values are less than or equal to the **MPE** value, mark the **Pass** column on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-7 on page 4-249). Otherwise, mark the **Fail** column, and go to “Function Checks” on page 2-5 to troubleshoot the unit.
15. Remove all weight from the marked zone board (A) (see figure 4-94 on page 4-234).
16. Tare the scale again, and select the **View Readings** menu.

### Errors of Indication (Weighing Doance)

1. If necessary, access the **View Readings** screen.



#### CAUTION:

To avoid equipment damage, place the weights **gently** on to the marked zone board.

2. Referring to the **Load** column in table 4-8 on page 4-250, start with the tared load of **0**, and perform the following:
  - a. **Gently** place the weight listed in the **Interval Weights** column on the marked zone board (A), and record the scale reading as **I** on the *NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)* (see table 4-8 on page 4-250).
  - b. One row at a time, increase the weight load, and then record the scale reading on the form.
  - c. After 200 kg of weight is reached, begin removing weight in the intervals listed, one row at a time, and record the scale readings on the form.
3. For each row, subtract the load value from the scale reading, and record the value in the **E = Scale Reading - Load** column on the “NAWI Class IIII

Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)” on page 4-247.

4. Subtract the error calculated at zero,  $E_0$ , from the error,  $E$ , to calculate the corrected error,  $E_C$ , and record the results on the form.
5. Compare all values of  $E_C$  to the corresponding **MPE** value. If all  $E_C$  values are less than or equal to the **MPE** value, mark the **Pass** column on the “NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)” on page 4-247. Otherwise, mark the **Fail** column, and go to “Function Checks” on page 2-5 to troubleshoot the unit.

### **Sealing, Stamping, and Marking**

1. If the scale passes all tests, ensuring correct functioning of all devices and correct construction, mark the **Sealing, Stamping, and Markings** and **Conformity** boxes as **Pass** on the “NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)” on page 4-247. Otherwise, mark the **Conformity** box as **Fail**, and contact Hill-Rom Technical Support at (800) 445-3720.
2. Install the two mounting screws to secure the scale P.C. board cover.
3. Place the seal labels over each mounting screw.
4. Install the base frame covers.

### **Declaration of Conformity, Signature of Observer, and Release for Distribution**

1. After all prior steps are completed and passed, sign the “NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)” on page 4-247.
2. Save the completed “NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)” on page 4-247, and return it to:

HILL-ROM COMPANY, INC.  
1069 STATE ROUTE 46 EAST  
BATESVILLE, IN 47006-9167

ATTN: QUALITY ASSURANCE (MAIL CODE P58)

## NAWI Class IIII Scale EC Verification Report Form (NAWI Class IIII Scale—European Version Only)

<b>Model #</b>	<b>Date</b>	
<b>Serial #</b>	<b>Inspector #</b>	
<b>Upgrade Kit Serial #</b>	<b>Time</b>	
<b>Temperature</b>	<b>Humidity</b>	
<b>Visual Inspection</b> (Requirement 8.3.2)	<b>Pass</b> <b>Fail</b>	

**Table 4-2. Repeatability (Requirement 3.6.1, Test A.4.10)**

Load of $\frac{1}{2}\text{MAX} = 100 \text{ kg}$				Load of MAX = 200 kg			
1	Indication of zero ( $I_0$ )	Scale Reading/Indication (I)	$P = I - I_0$	4	Indication of zero ( $I_0$ )	Scale Reading/Indication (I)	$P = I - I_0$
2				5			
3				6			
$P_{\text{MAX}} - P_{\text{MIN}} =$				$P_{\text{MAX}} - P_{\text{MIN}} =$			
MPE  0.5 kg				MPE  0.75 kg			
PASS ( $P_{\text{MAX}} - P_{\text{MIN}}$ for either test $\leq$ MPE)				FAIL ( $P_{\text{MAX}} - P_{\text{MIN}}$ for either test $>$ MPE)			

**Table 4-3. Discrimination (Requirement 3.8, Test A.4.8)**

Load (L)	Indication (I <sub>1</sub> )	Removed Load ( $\Delta L$ )	Added 1/10d	Extra Load 1.4d	Indication (I <sub>2</sub> )	I <sub>2</sub> - I <sub>1</sub>
5.5 kg			50 g	700 g		
100.5 kg			50 g	700 g		
200.5 kg			50 g	700 g		
PASS (I <sub>2</sub> - I <sub>1</sub> equals d for each load)						
FAIL (I <sub>2</sub> - I <sub>1</sub> does <b>not</b> equal d for each load)						

**Table 4-4. Accuracy of Tare Device (Requirement 4.7.3, Test 4.6.2)**

Load (L)	Pre-Tare Indication	Scale Reading/Indication (I)	$\Delta L$	Error (E = 250 g - $\Delta L$ )	MPE
25 kg					125 kg
PASS (E ≤ MPE)					
FAIL (E > MPE)					

**Table 4-5. Eccentricity (Requirement 3.6.2, Test A.4.7)**

Zone	Load (L)	Scale Reading/Indication (I)	Error (E = I - L)	Corrected Error (E <sub>C</sub> = E - E <sub>0</sub> , with E <sub>0</sub> = Error calculated at 0)	MPE
1	0		E <sub>0</sub>		0.25 kg
	70 kg				0.5 kg
2	70 kg				0.5 kg
3	70 kg				0.5 kg
4	70 kg				0.5 kg
5	70 kg				0.5 kg
PASS (E <sub>C</sub> ≤ MPE)					
FAIL (E <sub>C</sub> > MPE)					

**Table 4-6. Tare (Weighing Test)—First Tare Load at 20 kg  
(Requirements 3.5.3.3 and 3.5.3.4, Tests A.4.6.1 and A.4.6.3)**

Load (L)	Indication of 20 kg before tare:			MPE
	Scale Reading/ Indication (I)	Error (E = I - L)	Corrected Error ( $E_C = E - E_0$ , with $E_0$ = Error calculated at 0)	
0 kg		$E_0$		0.25 kg
5 kg				0.25 kg
25 kg				0.25 kg
100 kg				0.5 kg
180 kg				0.75 kg
100 kg				0.5 kg
25 kg				0.25 kg
5 kg				0.25 kg
0 kg				0.25 kg

**Table 4-7. Tare (Weighing Test)—Second Tare Load at 50 kg  
(Requirements 3.5.3.3 and 3.5.3.4, Tests A.4.6.1 and A.4.6.3)**

Load (L)	Indication of 50 kg before tare:			MPE
	Scale Reading/ Indication (I)	Error (E = I - L)	Corrected Error ( $E_C = E - E_0$ , with $E_0$ = Error calculated at 0)	
0 kg		$E_0$		0.25 kg
5 kg				0.25 kg
25 kg				0.25 kg
100 kg				0.5 kg
180 kg				0.75 kg
100 kg				0.5 kg
25 kg				0.25 kg
5 kg				0.25 kg
0 kg				0.25 kg

PASS ( $E_C \leq MPE$ )	
FAIL ( $E_C > MPE$ )	

4

**Table 4-8. Errors of Indication (Weighing Doance Test)  
 (Requirements 3.5.1, 3.5.3, and 3.5.3.4, Tests A.4.4 to A.4.6)**

Load (L)	Indication of 50 kg before tare:			MPE
	Scale Reading/ Indication (I)	Error (E = I - L)	Corrected Error ( $E_C = E - E_0$ , with $E_0$ = Error calculated at 0)	
0 kg		$E_0$		0.25 kg
5 kg				0.25 kg
25 kg				0.25 kg
100 kg				0.5 kg
180 kg				0.75 kg
100 kg				0.5 kg
25 kg				0.25 kg
5 kg				0.25 kg
0 kg				0.25 kg
				PASS ( $E_C \leq MPE$ )
				FAIL ( $E_C > MPE$ )

<b>Sealing, Stamping, and Markings:</b>	<b>Pass</b>	<b>Fail</b>
<b>Conformity (Requirement 8.3.1 and EC-type approval):</b>	<b>Pass</b>	<b>Fail</b>

<b>Signature of Observer</b>
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## 4.78 Blower—P500 Model

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Kit—hilow cylinder brace (P/N SA1695)  
5/16" nut driver

### Removal



#### WARNING:

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the full up position.



#### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.



#### SHOCK HAZARD:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base covers (refer to procedure 4.3).



#### WARNING:

Failure to install the hilow cylinder braces could cause injury or equipment damage.

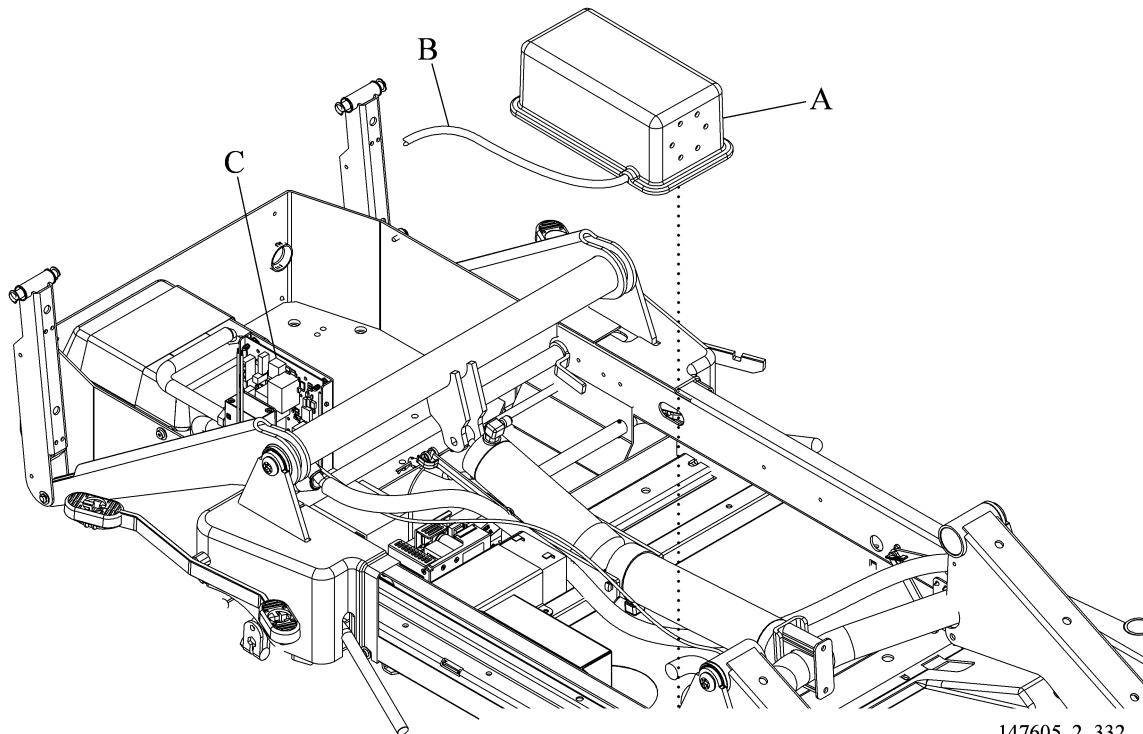
6. Install the hilow cylinder brace (refer to procedure 4.4).
7. Disconnect the air hose on the blower (A) (see figure 4-99 on page 4-252).
8. Disconnect the blower power cable (B) from the air control P.C. board (C).
9. Remove the blower (A) from the bed.

#### NOTE:

The blower is held in place with hook and loop tape.

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**Figure 4-99. Blower Removal**

## Replacement

1. Do the removal procedure in reverse order.
2. Reset the hour meter as follows:
  - a. Go to the Service Screens in the GCI.
  - b. Go to the Diagnostic Commands.
  - c. Send a 10 102 command to reset the hour meter.
3. Do the “Function Checks” on page 2-5.

## 4.79 Power Supply P.C. Board—P500 Model

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Kit—hilow cylinder brace (P/N SA1695)  
Needle nose pliers

### Removal



#### WARNING:

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the full up position.



#### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.



#### SHOCK HAZARD:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base covers (refer to procedure 4.3).



#### WARNING:

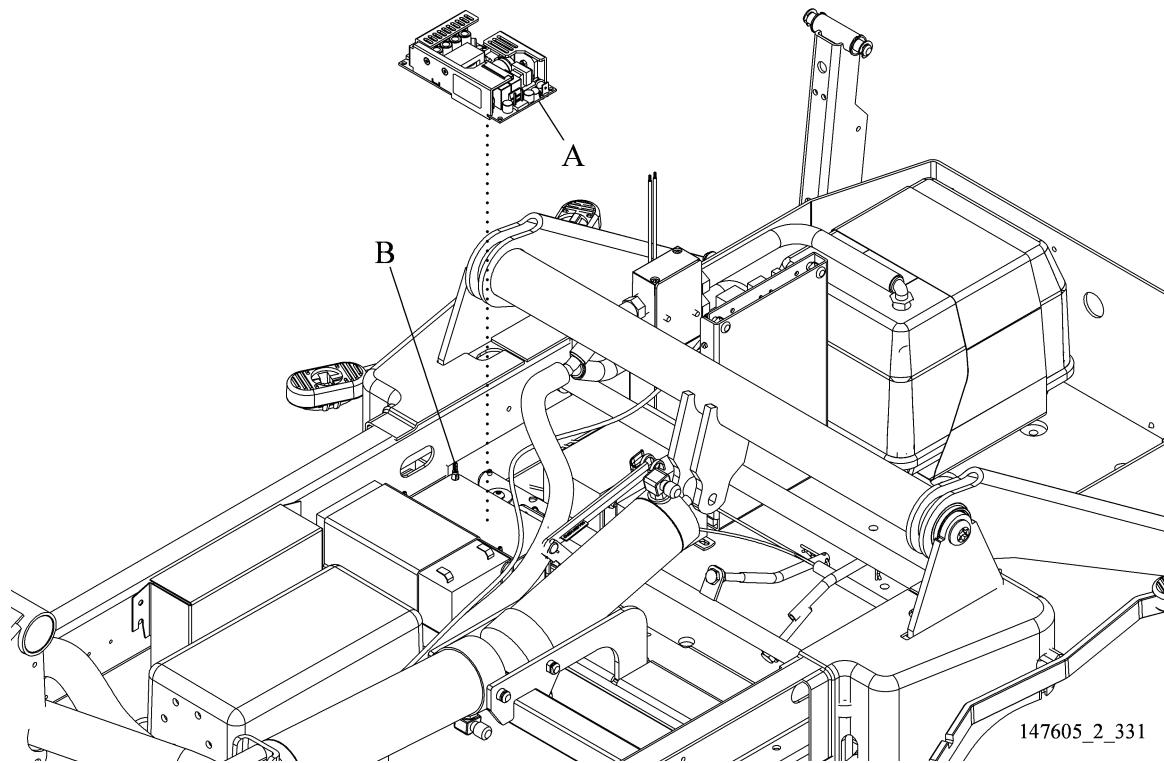
Failure to install the hilow cylinder braces could cause injury or equipment damage.

6. Install the hilow cylinder brace (refer to procedure 4.4).
7. Disconnect the cables connected to the power supply P.C. board (A) (see figure 4-100 on page 4-254).
8. Pinch the ends of the stand offs (B).
9. Remove the power supply P.C. board (A).

4

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**Figure 4-100. Power Supply P.C. Board—P500**



## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.80 Bed Battery—P500 Model

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Kit—hilow cylinder brace (P/N SA1695)

### Removal



#### **WARNING:**

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the full up position.



#### **SHOCK HAZARD:**

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.
  

**SHOCK HAZARD:**  
Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base covers (refer to procedure 4.3).



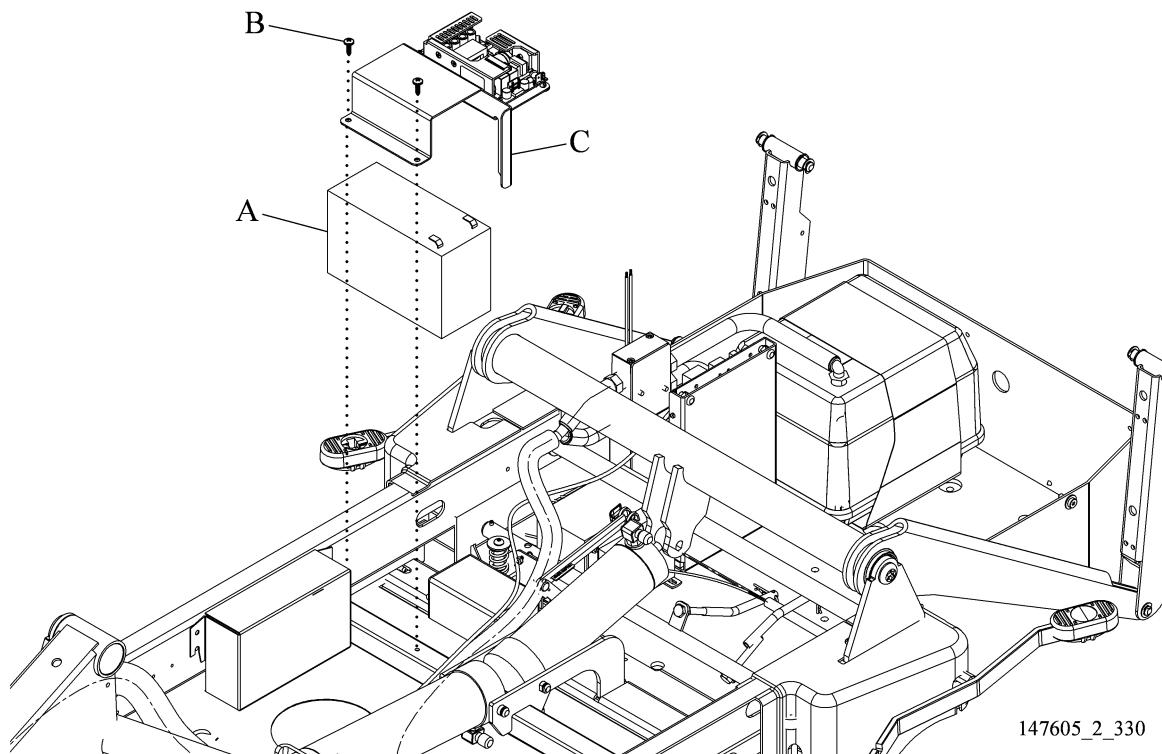
#### **WARNING:**

Failure to install the hilow cylinder braces could cause injury or equipment damage.

6. Install the hilow cylinder brace (refer to procedure 4.4).
7. Disconnect the battery cables from the battery (A) (see figure 4-101 on page 4-256).
8. Remove the two screws (B) that attach the battery bracket (C) to the bed.
9. Remove the battery bracket (C).
10. Remove the battery (A).
11. Discard the old battery according to facility protocols.

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**Figure 4-101. Battery Removal—P500 Model**



## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.81 AC Control P.C. Board—P500 Model

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Kit—hilow cylinder brace (P/N SA1695)  
Needle nose pliers

### Removal



#### **WARNING:**

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the full up position.



#### **SHOCK HAZARD:**

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.



#### **SHOCK HAZARD:**

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base covers (refer to procedure 4.3).

4



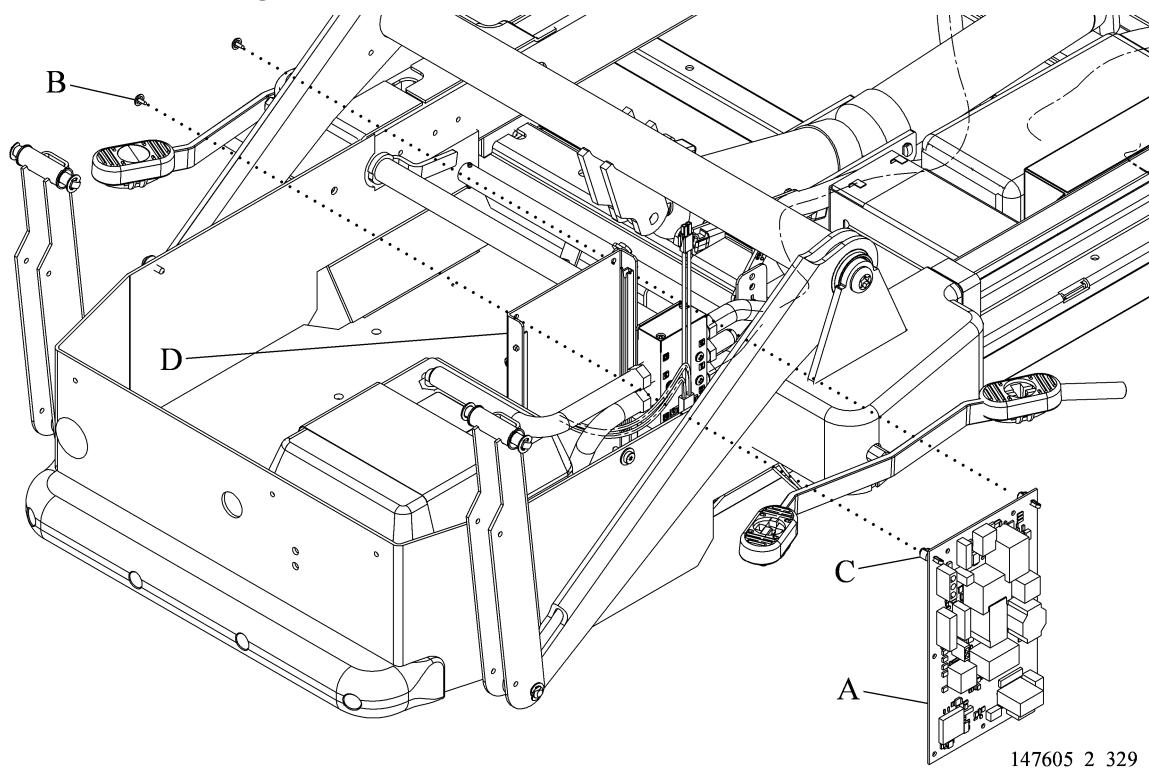
#### **WARNING:**

Failure to install the hilow cylinder braces could cause injury or equipment damage.

6. Install the hilow cylinder brace (refer to procedure 4.4).
7. Remove the two stand-off plugs (B) from the stand-offs (C).
8. Remove the AC control P.C. board (A) from the mount bracket (D).
9. Disconnect any cables on the AC control P.C. board (A).

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**Figure 4-102. AC Control P.C. Board—P500 Model**



## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.82 Compressor—P500 Model

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Kit—hilow cylinder brace (P/N SA1695)  
7/16" socket  
Ratchet

### Removal



#### WARNING:

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the full up position.



#### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

3. Unplug the bed from its power source.



#### SHOCK HAZARD:

Failure to disable the battery could cause injury or equipment damage.

4. Disable the battery (refer to procedure 4.74).
5. Remove the tub base covers (refer to procedure 4.3).



#### WARNING:

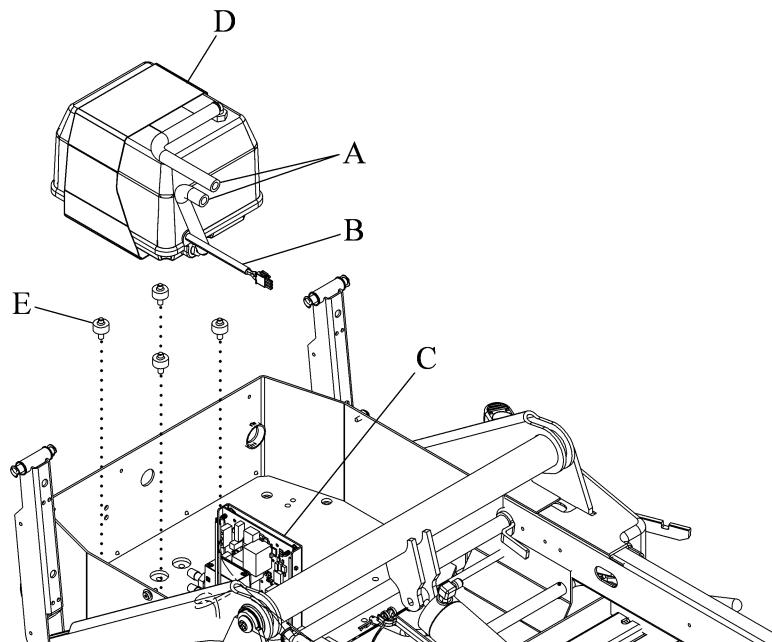
Failure to install the hilow cylinder braces could cause injury or equipment damage.

6. Install the hilow cylinder brace (refer to procedure 4.4).
7. Disconnect the air hoses (A) from the switching valve (see figure 4-103 on page 4-260).
8. Disconnect the power cable (B) from the air control P.C. board (C).
9. Remove the four nuts (under the bed) that attach the compressor assembly (D) to the bed.

4

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**Figure 4-103. Compressor—P500 Model**



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10. Remove the compressor assembly (E).

11. Remove the four isolators (E).

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.83 Air Control P.C. Board and LON to CAN Interface P.C. Boards—P500 Model

Tools required: T25 Torx®<sup>1</sup> head screwdriver  
Wire cutters

### Removal



#### WARNING:

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the full up position.
3. Raise the head section to 45 degrees.



#### SHOCK HAZARD:

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.
  

4

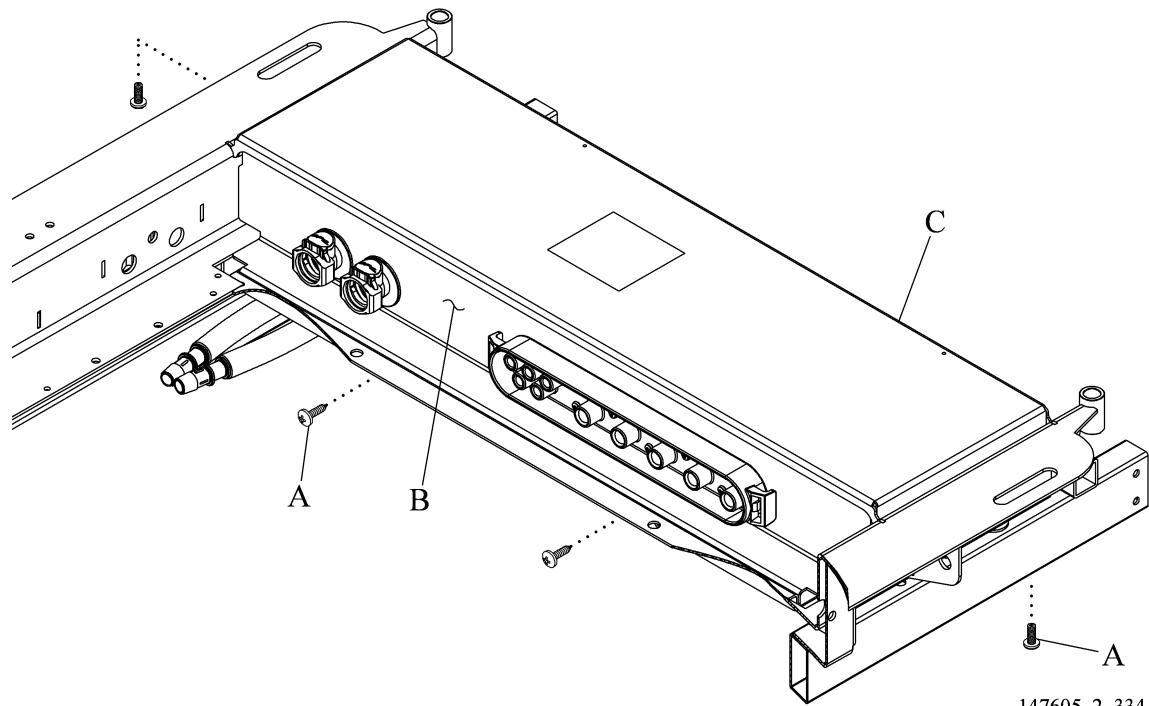
  

#### SHOCK HAZARD:

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).
6. Remove the four screws (A) that attach the manifold box (B) to the bed (C) (see figure 4-104 on page 4-262).

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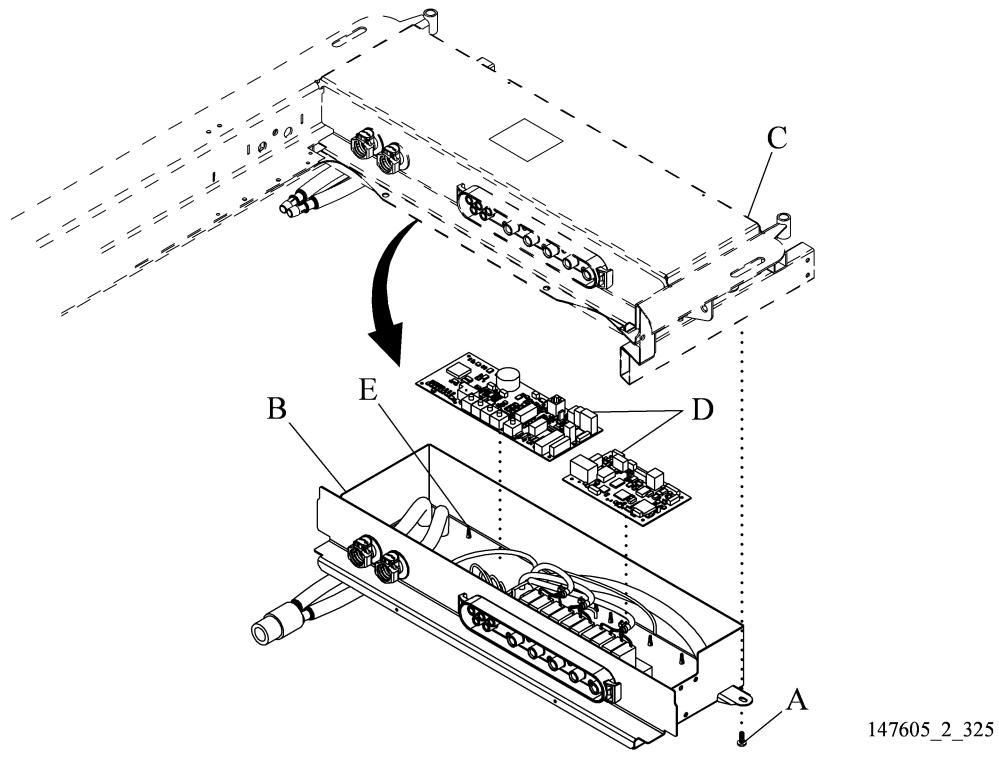
**Figure 4-104. Manifold Removal—P500**

7. Lower the back edge of the manifold box (B).

**NOTE:**

Take careful notes of the hose and cable positions on the P.C. board being removed.

8. Disconnect the hoses and cables on the P.C. board (D) being removed (see figure 4-105 on page 4-263).
9. Pinch the ends of the stand-offs (E).
10. Remove the P.C. board (D).

**Figure 4-105. Air Control and LON to CAN Interface P.C. Board**

4

## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## **4.84 Manifold Assembly—P500 Model**

Tools required:    T25 Torx®<sup>1</sup> head screwdriver  
                            Wire cutters



### **WARNING:**

Failure to set the brakes could cause injury or equipment damage.

1. Set the brakes.
2. Raise the bed to the full up position.
3. Raise the head section to 45 degrees.



### **SHOCK HAZARD:**

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.
  

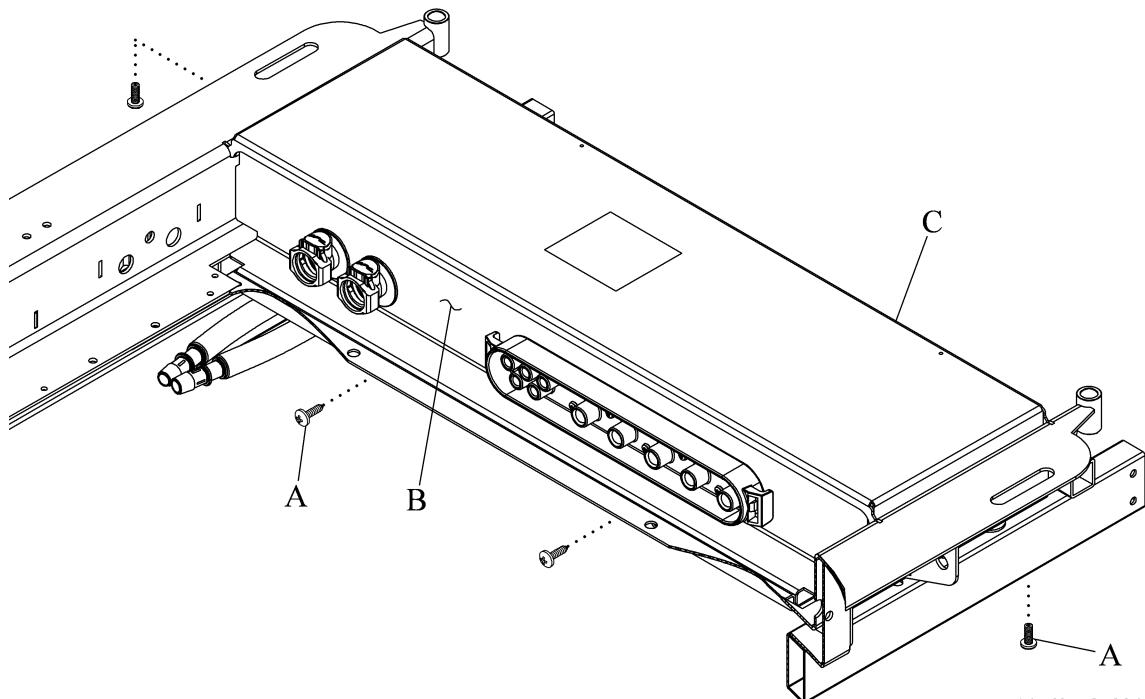
### **SHOCK HAZARD:**

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.74).
6. Remove the four screws (A) that attach the manifold box (B) to the bed (C) (see figure 4-106 on page 4-265).

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**Figure 4-106. Manifold Removal**

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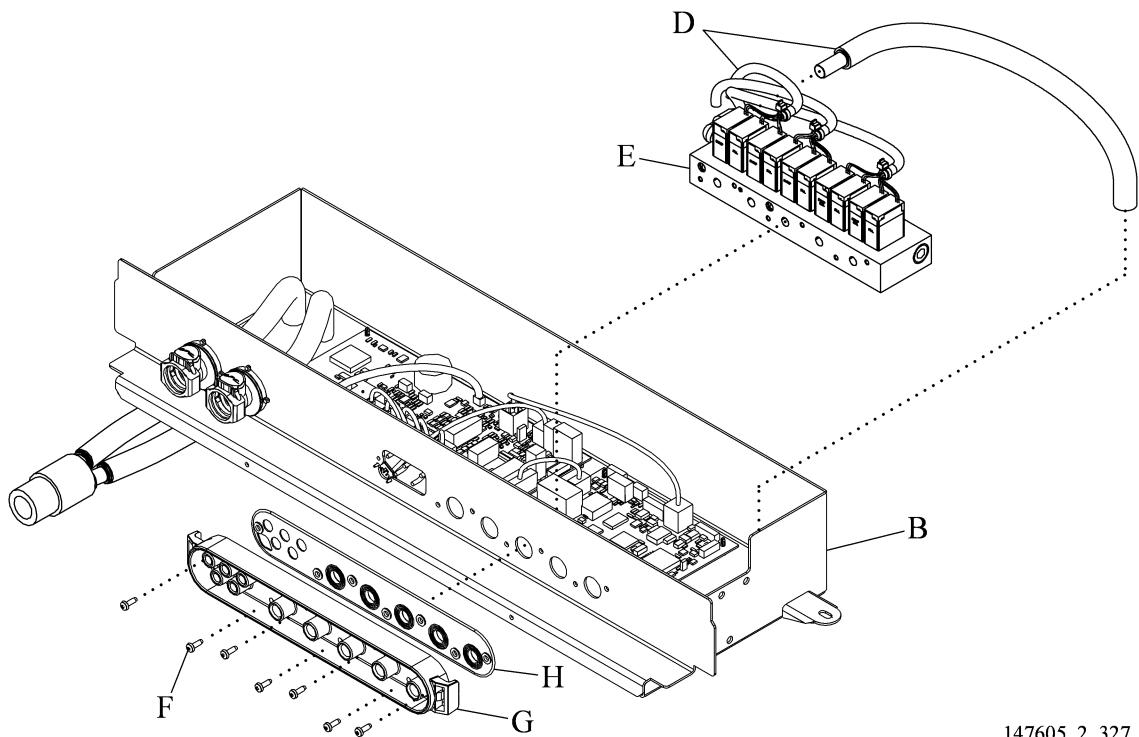
7. Lower the back edge of the manifold box (B).

**NOTE:**

Take careful notes of the hose and cable positions on the manifold assembly.

8. Disconnect the hoses (D) on the manifold assembly (E) (see figure 4-107 on page 4-266).
9. Remove the seven screws (F) that attach the mattress coupling (G) and gasket (H) to the manifold box (B).
10. Remove the manifold assembly (E).

**Figure 4-107. Manifold Assembly**



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## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

## 4.85 Mattress Assmby—P500 Model

Tools required: None

### Removal

**NOTE:**

Disassemble the surface only to the level necessary.

1. Fully retract the foot section.

**NOTE:**

It is not necessary to retract the foot section if the foot cushion is not to be replaced.

2. Raise the bed to the highest position.
3. Make sure the sleep deck is in the flat position.



**WARNING:**

Failure to unplug the bed could cause injury or equipment damage.

4. Unplug the bed from its power source.



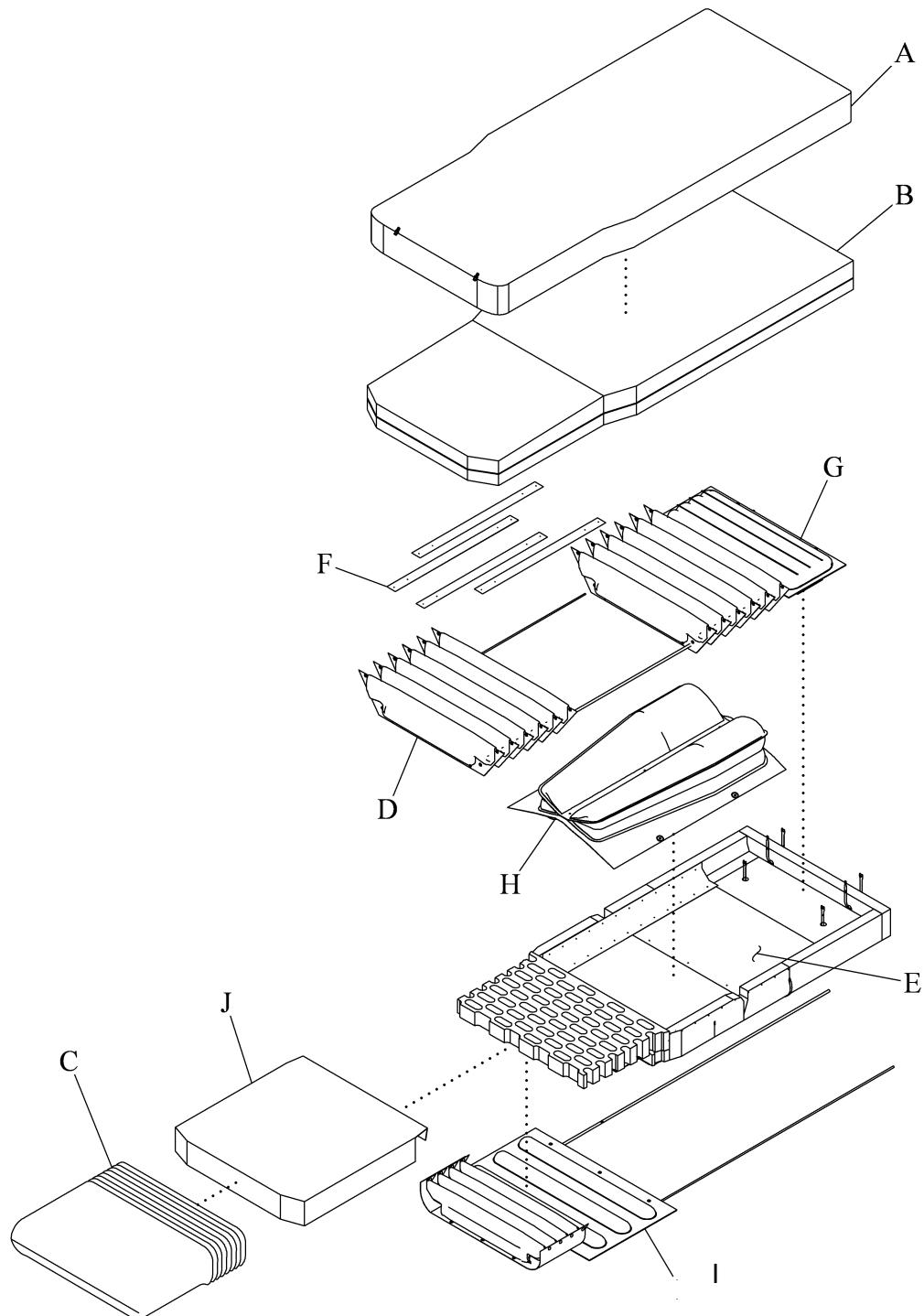
**WARNING:**

Failure to disable the battery could cause injury or equipment damage.

5. Disable the battery (refer to procedure 4.75)
6. Disconnect the mattress from the air manifold.
7. Unzip the coverlet (A) from the ticking (B) (see figure 4-108 on page 4-268).
8. Disconnect the coverlet (V) air hoses from the mattress.
9. Remove the coverlet (A) from the mattress.
10. Turn the mattress over and unzip the zipper.
11. Turn the mattress over.
12. Pull down the upper ticking (B) as far as possible.
13. Open the end of the fire barrier (C).
14. Remove the fire barrier (C) as far as necessary.

4

Figure 4-108. Mattress Assembly—P500 Model



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**CAUTION:**

Hose routing is very important for correct operation of the P500 surface. Incorrect hose routing can cause hose kinks or bed malfunction.

15. Note in **detail** the routing of all the hoses.
16. Remove the seat cushion (D) as follows:
  - a. Disconnect the 24 snaps (12 on each side, 2 on each bladder) that attach the cushion (D) to the substrate (E).
  - b. Disconnect the straps (F) that connect the seat cushion (D) to the head cushion (G).
  - c. Disconnect the air hoses from the seat cushion (D).
  - d. Remove the seat cushion (D).
17. Remove the head cushion (G) as follows:
  - a. Disconnect the 24 snaps (12 on each side, 2 on each bladder) that attach the cushion (G) to the substrate (E).
  - b. Disconnect the straps (F) that connect the seat cushion (D) to the head cushion (G).
  - c. Disconnect the air hoses from the head cushion (G).
  - d. Remove the head cushion (G).
18. Remove the turn bladders (H) as follows:
  - a. Disconnect the 4 snaps that attach the bladder (H) to the substrate (E).
  - b. Disconnect the air hoses from the bladder (H).
  - c. Remove the bladder (H).
19. Remove the foot cushion (I) as follows:
  - a. Remove the foot cushion cover (J).
  - b. Disconnect the air hoses from the foot cushion (I).
  - c. Remove the foot cushion (I).

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## Replacement

1. Do the removal procedure in reverse order.
2. Do the “Function Checks” on page 2-5.

**NOTES:**

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# **Chapter 5**

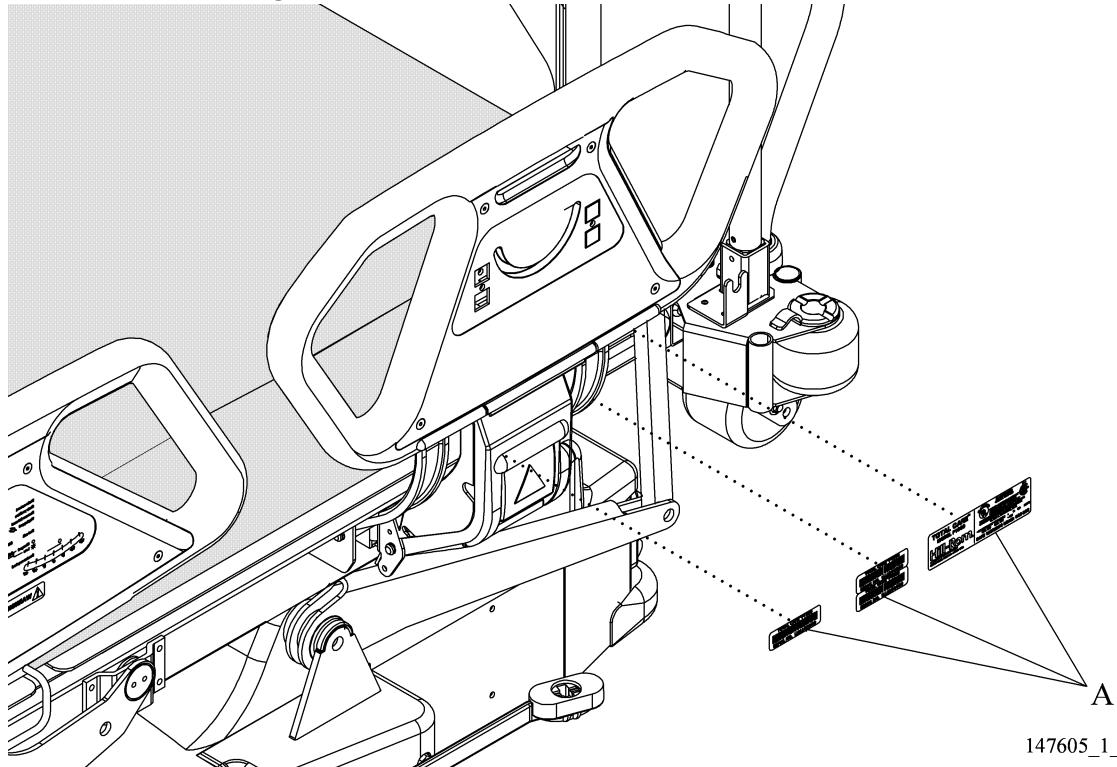
## **Parts List**

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### **Service Parts Ordering**

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

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



**5**

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Contact Hill-Rom Technical Support with the data that follows:

- Customer account number
- Purchase order number
- Product number
- Serial number
- Part number(s)

To promptly order parts, request part prices and availability, or follow up on a service order, use this Hill-Rom fax number:

812-934-8472

**Terms:**

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

**Address all inquiries to:**

ATTN TECHNICAL SUPPORT—PARTS  
HILL-ROM COMPANY, INC.  
1069 STATE ROUTE 46 E  
BATESVILLE IN 47006-9167

**Address all return goods to:**

ATTN SERVICE STORES  
DISTRIBUTION CENTER DOOR D23  
HILL-ROM COMPANY, INC.  
COUNTY ROAD 300E  
BATESVILLE IN 47006-9167

**NOTE:**

To eliminate possible delays or incorrect billings, **do not** return any items without a Return Material Authorization (RMA) number. When a return is requested, an RMA packet is included with each order. This packet includes an RMA number, instructions, and a shipping label. If an RMA number is not available, contact Hill-Rom Technical Support.

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## **Exchange Policy**

The policies that follow are for in-warranty and out-of-warranty exchanges from Hill-Rom.

### **In-Warranty Exchanges**

In some cases, Hill-Rom will request that parts/products be returned for inspection. When this occurs, you are expected to return parts/products within 30 days of receipt of the exchange part. If you fail to return the inoperative parts/products within the 30 day period, Hill-Rom will invoice your facility for the full selling price of the parts/products.

**NOTE:**

The preceding billing procedure is **only** for parts/products that Hill-Rom requests to be returned.

In some cases, the invoice accompanying the parts will show the full selling price (only for internal use at Hill-Rom). Do not confuse this price with your price.

**Do not** return any parts without an RMA number. When parts/products have been requested to be returned, Hill-Rom will include an RMA packet with the parts/products shipment. If an RMA number is not available, contact Hill-Rom Technical Support.

### **Out-of-Warranty Exchanges**

You are expected to return the inoperative parts/products within 30 days of receipt of the exchange part. Hill-Rom will include an RMA packet with the parts/products shipment. If an RMA number is not available, contact Hill-Rom Technical Support. Hill-Rom will invoice your facility for the full selling price of the parts/products. Upon return of the inoperative parts/products, Hill-Rom will issue a credit to your facility for **the difference between the exchange price and the full selling price of the parts/products**.

**NOTES:**

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**Warranty**

## HILL-ROM COMPANY, INC. LIMITED WARRANTY

Hill-Rom Company, Inc. (Hill-Rom) has a long tradition of providing superior products and service to our customers. Our goal is "Total Customer Satisfaction". In that spirit, Hill-Rom is proud to offer the following warranty.

### **GENERAL WARRANTY (APPLICABLE UNLESS A SPECIFIC WARRANTY IS LISTED)**

Hill-Rom warrants to the original purchaser that its products and replacement parts shall be free from defects in material and workmanship for a period of one (1) year from date of delivery. Hill-Rom's obligation under this warranty is expressly limited to supplying replacement parts and/or service for, or replacing, at its option, any product which is, in the sole discretion of Hill-Rom, found to be defective. In addition to the foregoing one year warranty, Hill-Rom warrants to the original purchaser that the frame and welds on its products will be free from structural defects for the life of the product. Any product upgrade or modification initiated by Hill-Rom does not affect the original product warranty.

### **SPECIFIC WARRANTIES**

#### **MATTRESS WARRANTIES**

Hill-Rom warrants to the original purchaser that its mattress product shall be free from defects in material and workmanship for a period of two (2) years from date of delivery. However, electro mechanical mattress components (compressors, valves, printed circuit boards, hoses, and couplers) are covered by the general one (1) year warranty.

#### **EXPENDABLES WARRANTIES**

A sixty (60) day limited warranty from date of delivery applies to expendable parts such as cushions, coverlets, software diskettes, locator badge batteries, dome light incandescent bulbs, overhead fluorescent tubes, heating elements, temperature probes, filter sheets, and microspheres. This warranty is limited to replacement of the parts covered.

#### **TO OBTAIN PARTS AND SERVICE**

In the United States, call Hill-Rom Technical Support Department at 800-445-3720, Monday through Friday. In Canada, call Hill-Rom Technical Support Department at 800-267-2337, Monday through Friday. Outside the United States and Canada, call your authorized Hill-Rom Distributor. In order to expedite service, we request you furnish the following information: customer identification number, product model number, serial number, and description of problem. A qualified specialist will provide, via telephone (United States and Canada), or FAX (Outside the United States and Canada), troubleshooting assistance for facility personnel and provide necessary parts to make repairs. If troubleshooting determines the need for on-site technical service, a qualified service representative will be dispatched. Replacement of non-technical items will be the responsibility of the customer. If requested by Hill-Rom, products or parts for which a warranty claim is made shall be returned prepaid to Hill-Rom's factory.

#### **OUT OF WARRANTY EXCHANGE POLICY**

After the expiration of the original warranty, upon request, Hill-Rom will ship as a replacement, components such as selected: motors and printed circuit boards, for like units returned to Hill-Rom by the original purchaser at a substantial savings. Please call Hill-Rom Technical Support Department for current pricing.

#### **PARTS AVAILABILITY POLICY**

Hill-Rom will offer parts for new and remanufactured products for ten (10) years from date of sale; for communications products for five (5) years from date of sale.

Note: Some original component parts and assemblies may not be available; functional equivalents may be substituted.

**THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE. HILL-ROM'S OBLIGATION UNDER THESE WARRANTIES SHALL NOT INCLUDE ANY LIABILITY FOR LOSS OF PROFITS, DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES OR DELAYS.** Some states, provinces, or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply. Any improper or negligent use, any alterations or repairs not in accordance with Hill-Rom's manuals or performed by others in such manner as in Hill-Rom's sole judgment affects the product materially and adversely, shall void these warranties. These warranties do not cover failures due to misuse, abuse, neglect, or lack of routine maintenance. No employee or representative of Hill-Rom is authorized to change these warranties in any way or grant any other warranty unless in writing and signed by a Hill-Rom officer. These warranties provide specific legal rights; but, there may be other available rights, which vary from state to state, province to province, or country to country.

Revised July 6, 2001

Hill-Rom Company, Inc., 1069 State Route 46 E, Batesville, IN 47006-9167

**NOTES:**

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## **Warranty Statement—Wireless Interface Unit**

This warranty statement **only** applies to the wireless interface unit.

The following is a general description of the Limited Warranty that accompanies OnSite™ System software. Please refer to the applicable Equipment Purchase and License Agreement for additional provisions and customer specific variations of the terms and conditions of this Limited Warranty. Any variations between the Agreement and the below Limited Warranty shall be resolved in favor of the Equipment Purchase and License Agreement Warranty. Hill-Rom warrants for a period of fifteen (15) months from the date of delivery or twelve (12) months from the date of installation, whichever occurs first, that OnSite shall perform in accordance with its published specifications and the documentation. Hill-Rom warrants that the hardware be free from defects in material and workmanship during the period outlined above and that the Licensed Software shall perform substantially in accordance with the published specifications and documentation. Hill-Rom's obligations under this warranty are expressly limited to repairing or replacing, at its option within such period, any component of the system, which is, in the reasonable discretion of Hill-Rom, found defective. THE FOREGOING EXPRESS WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. HILL-ROM DOES NOT WARRANT THAT THE OPERATION OF THE SYSTEM WILL BE ERROR FREE OR UNINTERRUPTED. HILL-ROM SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES INCLUDING LOST REVENUES AND LOST PROFITS EVEN IF NOTIFIED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES. Hill-Rom reserves the right, within its sole discretion, to amend this Limited Warranty with respect to future OnSite purchases.

**NOTES:**

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## Recommended Spare Parts

For a recommended spare parts list to service five or more units, see table 5-1 on page 5-9.

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

Part Number	Quantity	Description
4714301	1	Permanent infusion support module
471430301S	1	Transport handle, lh
471430302S	1	Transport handle, rh
49144	2	IV hook
47246	1	Cable assembly, foot pump
144486	1	Cable assembly, accessory AC receptacle (accessory AC receptacle model only)
4733601	1	Cable assembly, line cord (North American 120V model only)
6006201	1	Capacitor, motor (North American 120V model only)
4840501	1	Battery, lead acid, sealed (battery model only)
147342	1	Power/control P.C. board assembly, 120V
47290	2	Extrusion, slider pivot
49174	4	Pad, brake/steer pedal
491420160	2	Button, brake pedal
491420258	2	Button, steer pedal
SA1695	1	Kit, hilow cylinder brace
SA1689	1	Fuse kit for power control module power control board
SA1561	1	Torx® <sup>a</sup> bits
SA9076	1	Leak test kit (air module models only)
64531	2	Bladder connector
6548801	2	Intermediate siderail detection switch
6548802	1	Siderail detection switch, lh, head
6548803	1	Siderail detection switch, rh, head
63392s	1	Treatment foot surface control module
63393S	1	Treatment surface control module

<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
6548701S	1	P.C. board assembly, weight frame junction box
146143	1	Blower, multi-stage
4735701	1	Right caregiver positioning P.C. board assembly
4736001	1	Left caregiver positioning P.C. board assembly
36199S	1	Hydraulic fluid—quart
6543034	2	Valve solenoid cartridge (C and D model beds)
6543032	2	Hydraulic coil
146483	1	Graphical Caregiver Interface (GCI)® Control module
68276	2	PAG board (IntelliDrive® Transport System beds only)
68363	2	PACM board (IntelliDrive® Transport System beds only)
69316	2	Spring, drain assembly (IntelliDrive® Transport System beds only)
68285	2	Belt (IntelliDrive® Transport System beds only)
68307	2	Motor controller (IntelliDrive® Transport System beds only)
6835001	1	Transport handle, left assembly (IntelliDrive® Transport System beds only)
6835002	1	Transport handle, right assembly (IntelliDrive® Transport System beds only)
139105	2	Battery, 12 V (IntelliDrive® Transport System beds only)

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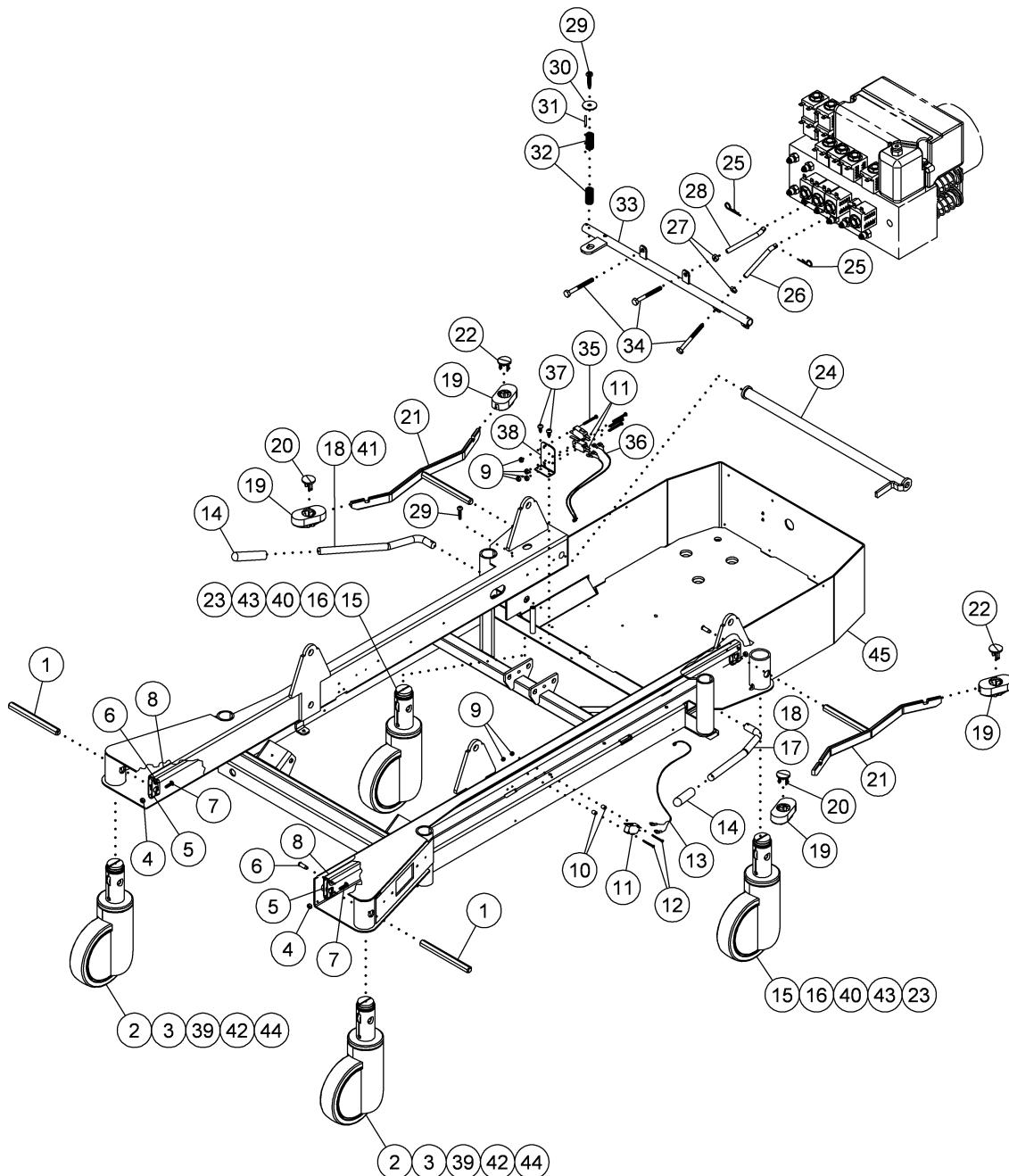
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**5**

## Base Module—Pedal Assemblies

Figure 5-2. Base Module—Pedal Assemblies



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**Table 5-2. Base Module—Pedal Assemblies**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	47184pl	2	Hex shaft
2	4723902	2	Caster, 5" single wheel brake/steer (single wheel standard height caster model only)
3	4724002	2	Caster, 5" twin wheel brake/steer (twin wheel caster model only)
4	4435	4	Locknut
5	47220pl	4	Lever, brake/steer
6	47221pl	4	Shoulder flat head rivet
7	4582202	4	Bolt, round head square neck
8	4718248	2	Link, brake/steer
9	20605	6	Locknut
10	49164	2	Long plastic spacer
11	3071301	3	Limit safety switch
12	34402	2	Screw
13	3054501	1	Cable assembly, brake not set switch
14	64036	2	Sleeve, $\frac{1}{2}$ " x 2.625 vinyl
15	4723901	2	Caster, 5" single wheel brake (single wheel standard height caster model only)
16	4724001	2	Caster, 5" twin wheel brake (twin wheel caster model only)
17	472500148	1	Pedal, lh CPR/Emergency Trendelenburg
18	39172	As required	Adhesive
19	49174	4	Pad, brake/steer pedal
20	491420160	2	Button, brake pedal
21	4914748	2	Weldment, brake/steer pedal
22	491420258	2	Button, steer pedal
23	6831001	2	Caster, 6" integral, brake (IntelliDrive® Transport System beds and extended height beds)
24	68586pc	1	Weldment, brake/steer torque tube
25	49138	2	Hairpin, cotter
26	6616402pl	1	Link, emergency Trendelenburg
27	91	2	Nut standard hex
28	6616401pl	1	Link, CPR

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
29	43879	3	Torx® <sup>a</sup> button head screw
30	44783	1	Washer
31	37275	1	Roll pin
32	47251	2	Compression spring
33	6616348	1	CPR/emergency Trendelenburg torque, weldment
34	9001844	2	Screw, hex cap
35	19555	4	Screw
36	4849901	1	Cable assembly, CPR/emergency Trendelenburg activated sensor
37	43878	2	Torx® button head screw
38	47318pl	1	Bracket, switch
39	4723904	2	Caster, 5" single wheel steer (single wheel extended height caster)
40	4723903	2	Caster, 5" single wheel brake (single wheel extended height caster)
41	472500248	1	Pedal, rh CPR/emergency Trendelenburg
42	6390602	1	Caster, 5" single wheel, brake/steer (single wheel integral caster)
43	6390601	1	Caster, 5" single wheel, brake (single wheel integral caster)
44	6831002	2	Caster, 6" integral, brake (beds equipped with an IntelliDrive® Transport System)
	6831003	2	Caster, 6" integral, brake/steer (extended height beds)
45	68516	1	Weldment, base frame

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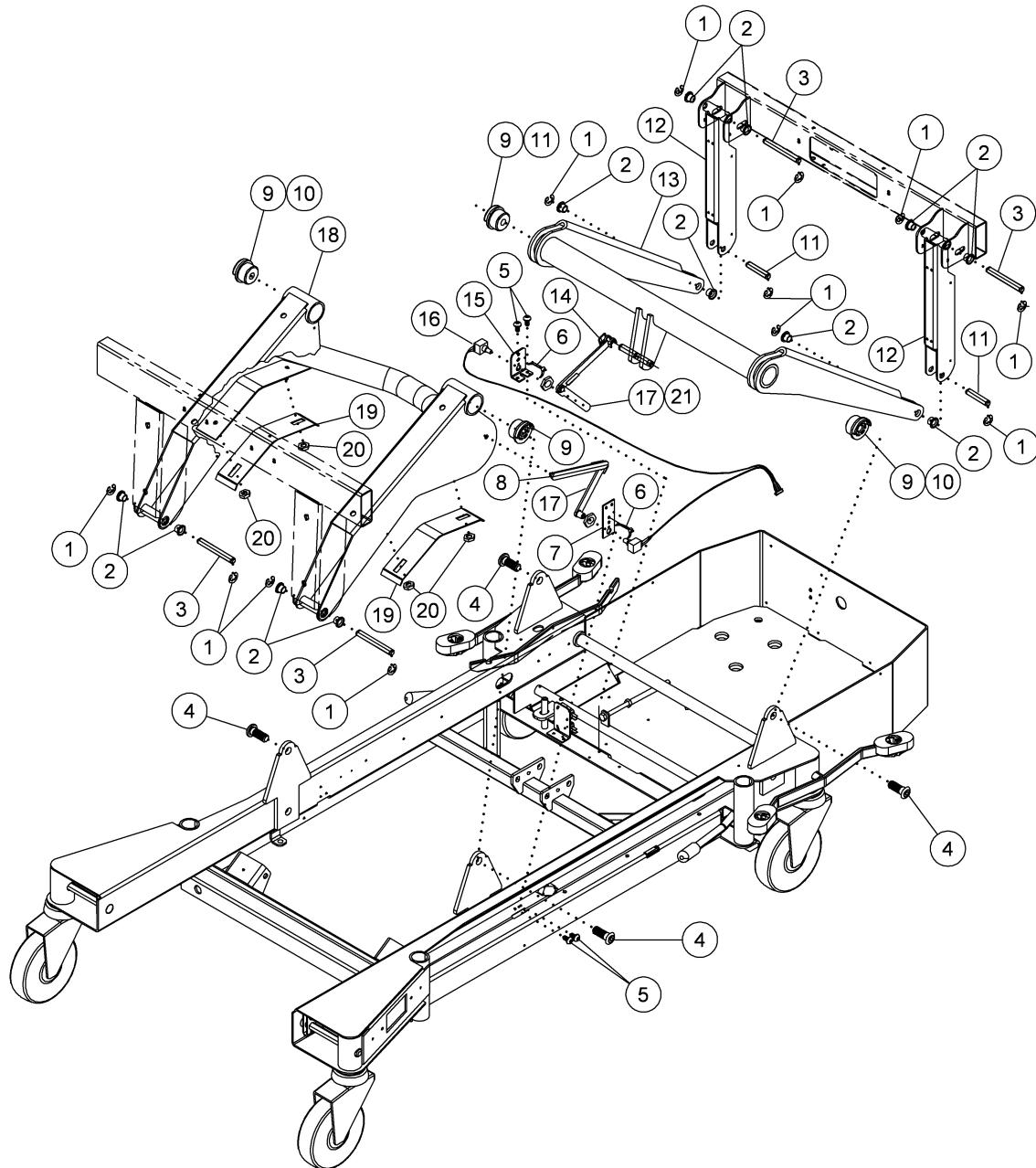
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## Base Module—Hilow Assemblies

Figure 5-3. Base Module—Hilow Assemblies



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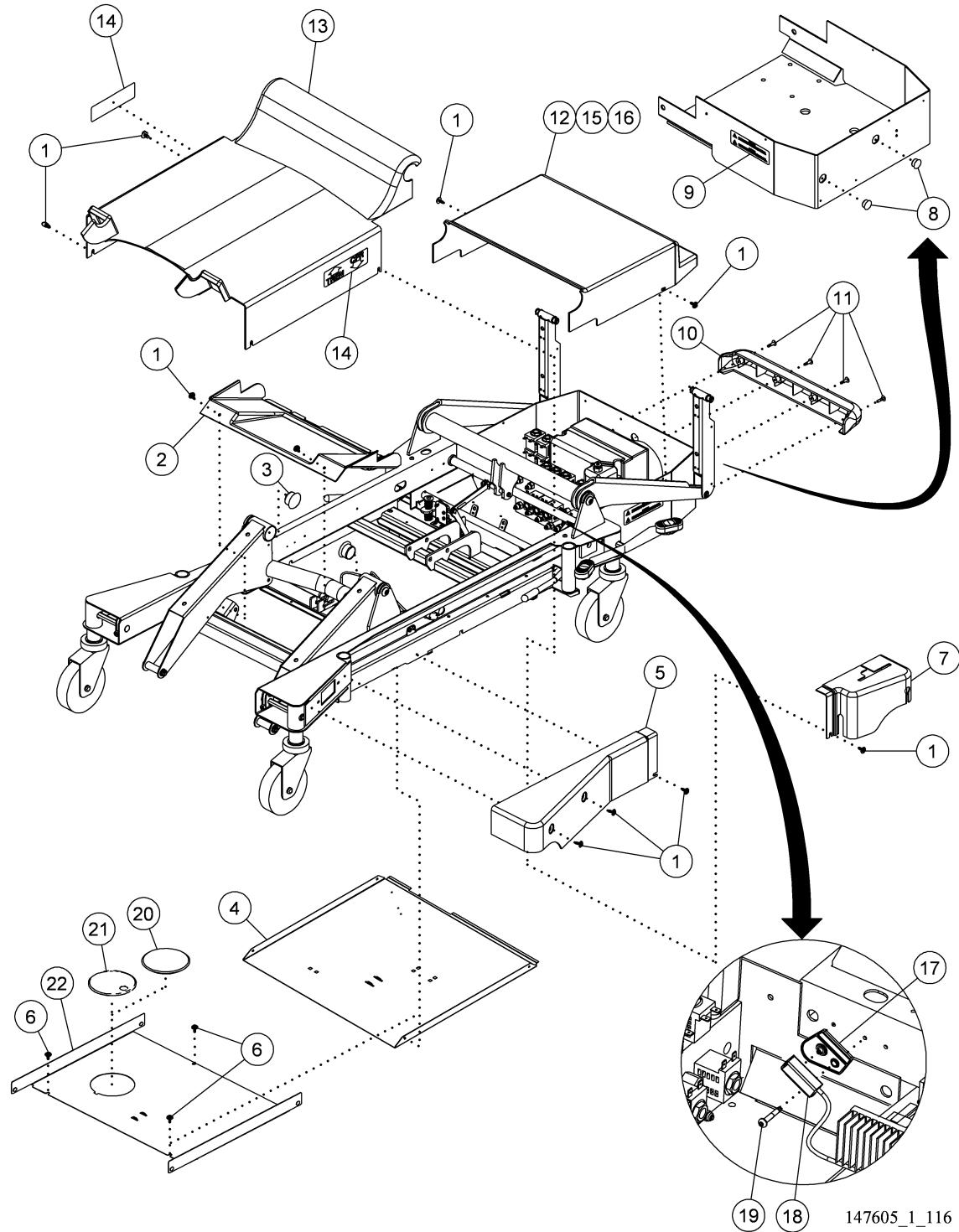
**Table 5-3. Base Module—Hilow Assemblies**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	35325	13	E-ring
2	90340-06	12	DU flange bushing
3	4727104pl	4	D-pin
4	47243	4	Truss head bolt
5	43878	4	Torx® <sup>a</sup> button head screw
6	19124	2	Large cable tie
7	47289pl	1	Sensor mounting bracket, foot lift
8	4915802	1	Link, position sensor (foot hilow)
9	47229	4	Bearing, hilow lift flange
10	SA3351	As required	4 oz. lithium grease
11	4727107pl	2	D-pin
12	4950948	2	Weldment, free link
13	4716548	1	Weldment, hilow head lift
14	47287	1	Hilow link, head
15	47293pl	1	Sensor mounting bracket, head lift
16	4850201	1	Cable assembly, hilow position sensor
17	47288	2	Lift sensor link, lower
18	4716748	1	Weldment, hilow foot lift
19	4914548	2	Retainer, hose/cable
20	49146	4	Self-threading nut
21	39172	As required	Adhesive

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## Base Module—Cover Assemblies

Figure 5-4. Base Module—Cover Assemblies



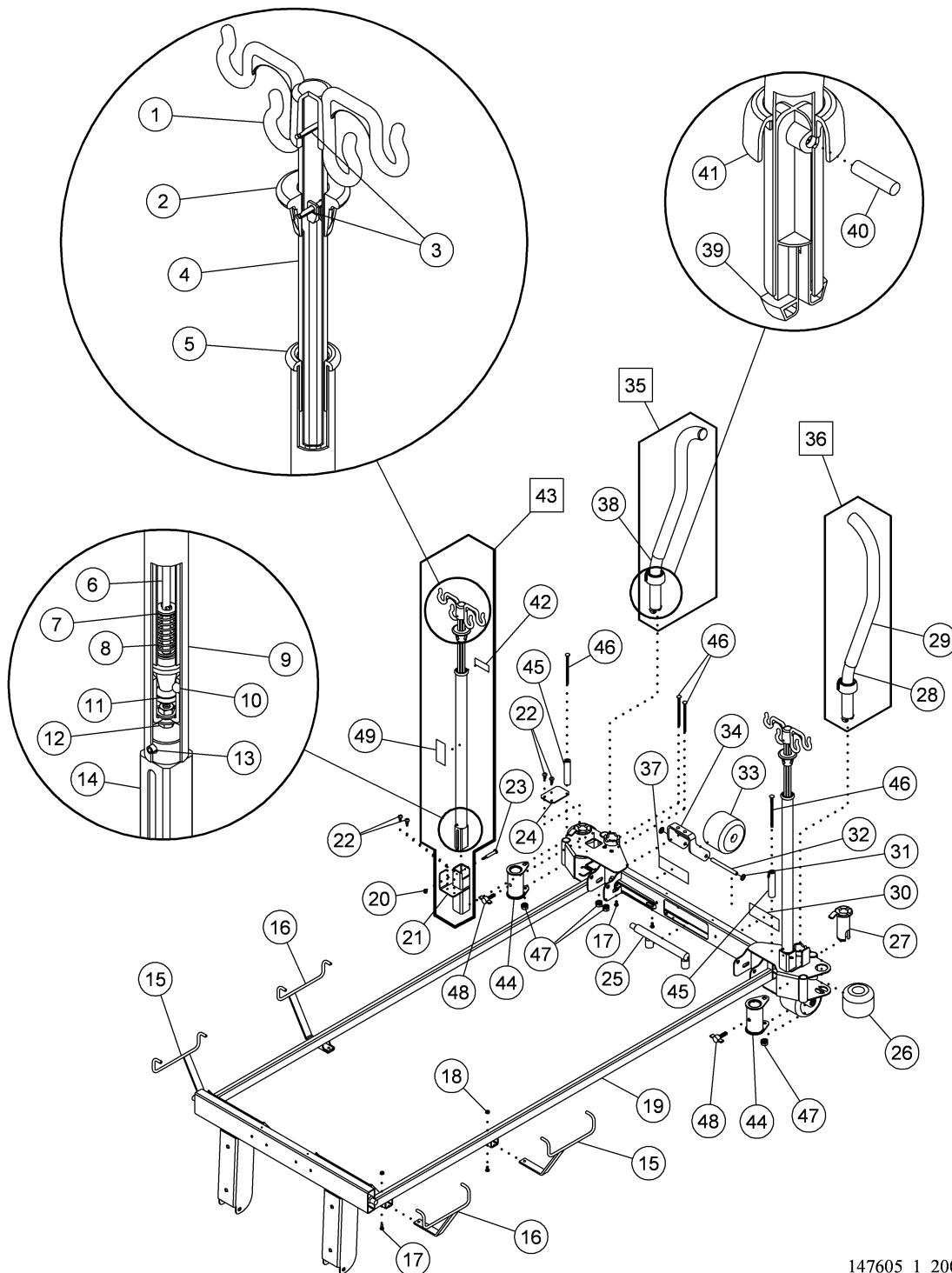
**Table 5-4. Base Module—Cover Assemblies**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	47172	8	Screw #10-32 x 5/8" tapping
2	4947148	1	Cover, foot end base
3	3815605	2	Hole plug
4	4718148	1	Pan, base bottom
5	491700148	1	Cover, lh foot end base
6	47172	3	Screw
7	491690148	1	Cover, lh head end base
8	3815604	1 or 2	Hole plug
9	49486	1	Label, ground caution
10	4729463	1	Bumper, louvered base
11	43726	4	Shoulder screw—truss, Torx® <sup>a</sup>
12	64581	1	Cover, tub
13	4916848	1	Cover, top center base
14	49492	2	Label, CPR/emergency Trendelenburg pedal
15	62024	1	Insulation foam, rear case cover
16	62025	1	Insulation foam, rear base cover
17	68482	1	Steer switch spacer (IntelliDrive® Transport System beds only)
18	68483	1	Steer switch (IntelliDrive® Transport System beds only)
19	43879	1	Screw (IntelliDrive® Transport System beds only)
20	6848501	1	Access cover, without hole
21	6848502	1	Access cover, with hole (IntelliDrive® Transport System beds only)
22	68321	1	Dust cover

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## Intermediate Frame Module

Figure 5-5. Intermediate Frame Module



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**Table 5-5. Intermediate Frame Module**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49144	2	IV hook (permanent ISS model only)
2	4438901	2	Release (permanent ISS model only)
3	10904	4	Roll pin (permanent ISS model only)
4	4440001	2	Weldment, upper tube (permanent ISS model only)
5	4439601	2	Bearing (permanent ISS model only)
6	4439001	2	Plunger (permanent ISS model only)
7	2449	6	Washer (permanent ISS model only)
8	34418	2	Compression spring (permanent ISS model only)
9	47306pl	2	Base pipe—IV pole (permanent ISS model only)
10	44393	6	Roller ball (permanent ISS model only)
11	44383	2	Ball retainer (permanent ISS model only)
12	40497	4	#10-32 keps nut (permanent ISS model only)
13	49482	2	Spiral pin (permanent ISS model only)
14	47317	2	Extension, IV pole (permanent ISS model only)
15	4713601	2	Weldment, drainage hook, rh
16	4713602	2	Weldment, drainage hook, lh
17	49521	4 or 12	1/4"-20 x 5/8" six-lobe Torx® <sup>a</sup> screw
18	4435	4	Locknut
19	47125	1	Weldment, intermediate frame
20	755	2	Locknut (permanent ISS model only)
21	4713448	2	Weldment, permanent infusion support (permanent ISS model only)
22	43878	4 or 6	Torx® button head screw
23	1439901	2	Shoulder bolt (permanent ISS model only)
24	47162	2	Plate, cover
25	49189pl	4	Weldment, dummy load beam (model without scale only)
26	47219	2	Bumper
27	4715301	2	Bumper pin

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
28	4950501	1	Transport handle, lh (transport handle model only)
29	70084	2	Cover (transport handle model only)
30	49485	1	Label, head end capacity
31	25210	4	Push nut
32	25208	2	Axle
33	3455764	2	Roller bumper
34	4950748	2	Roller bumper bracket
35	471430302S	1	Handle assembly, rh
36	471430301S	1	Handle assembly, lh
37	49484	1	Label, trapeze caution
38	4950502	1	Transport handle, rh (transport handle model only)
39	49506	2	Plug, transport handle (transport handle model only)
40	64784	2	Groove pin 1/4" x 1 3/8" shearproof (transport handle model only)
41	49127	2	Cover, transport handle mechanism (transport handle model only)
42	49495	2	Label, IV pump mounting (permanent ISS model only)
43	4714301	1	Permanent infusion support module (P1924) (permanent ISS model only)
44	63439	2	Weldment, ISS adapter (ISS adapter socket model only)
45	63443	2	Spacer, ISS adapter (ISS adapter model only)
46	6322101	4 or 6	Square neck bolt
47	831	4 or 6	Locknut
48	38135	2	Knob assembly (ISS adapter model only)
49	6709007	1	Label, safe working load

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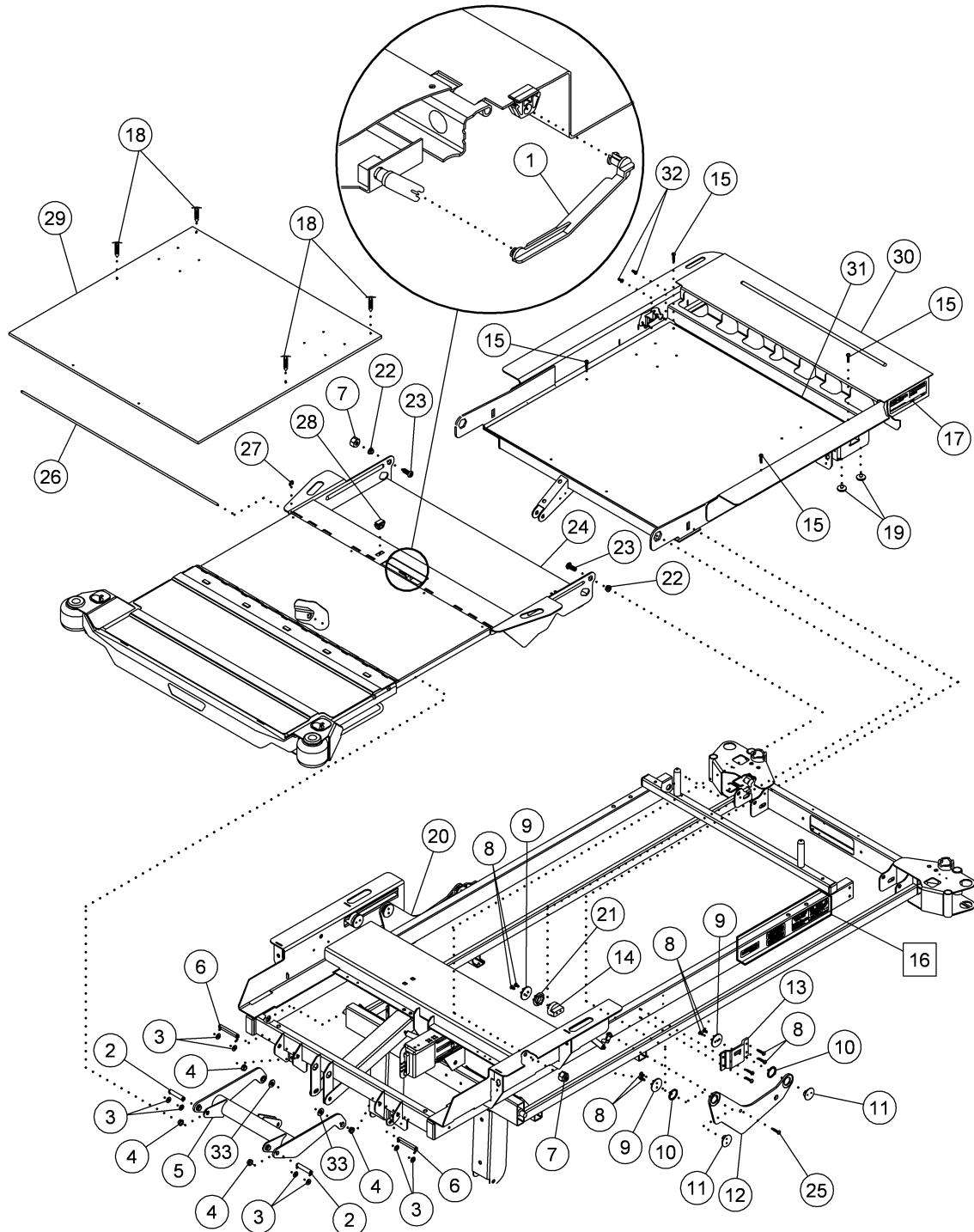
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## Articulating Deck Module

Figure 5-6. Articulating Deck Module



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**Table 5-6. Articulating Deck Module**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49160	1	Sensor link, knee
2	4727106pl	4	D-pin
3	3532501	16	Retaining ring
4	49498	10	Bushing, keyed
5	4729548	1	Weldment, swing link
6	4727109pl	2	D-pin
7	49200	2	Hex stop nut
8	63166	12	Lobe, special head type, #23 screw
9	47292plf	6	Retainer, slider pivot
10	49131	4	Washer, plastic
11	49128	4	Bearing, self-lubricating
12	4727001	1	Arm, retracting, lh
13	4912948	2	Bracket, mount, retracting arm
14	65577	2	Slide pivot
15	44489	4	Six-lobe pan head screw (head panel without air model only)
16	6274001	1	Label, serial number
17	4647505	1	Label (Federal Drug Administration) (fluoroscopy model only)
18	63346	4	Clip (head panel with air model only)
19	41344	2	Plug bumper
20	4727002	1	Arm, retracting, rh
21	65578	2	Washer
22	36570	2	Oilite® <sup>a</sup> bushing
23	49139	4	Cap screw, button head socket
24	4718548	1	Weldment, thigh section
25	42142	2	Pan head screw
26	49133	1	Pin, thigh hinge
27	49494	1	E-ring
28	49159	1	Sensor pivot lug, knee
29	49126	1	Fluoroscopy panel (fluoroscopy model only)

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
30	6557948	1	Head section weldment
	141286	1	Head section weldment, bariatric
31	4912548	1	Standard head section panel (standard head section panel model only)
32	64765	8	Screw, $\frac{1}{4}$ "-20 low profile
33	41298	4	Washer—nylon

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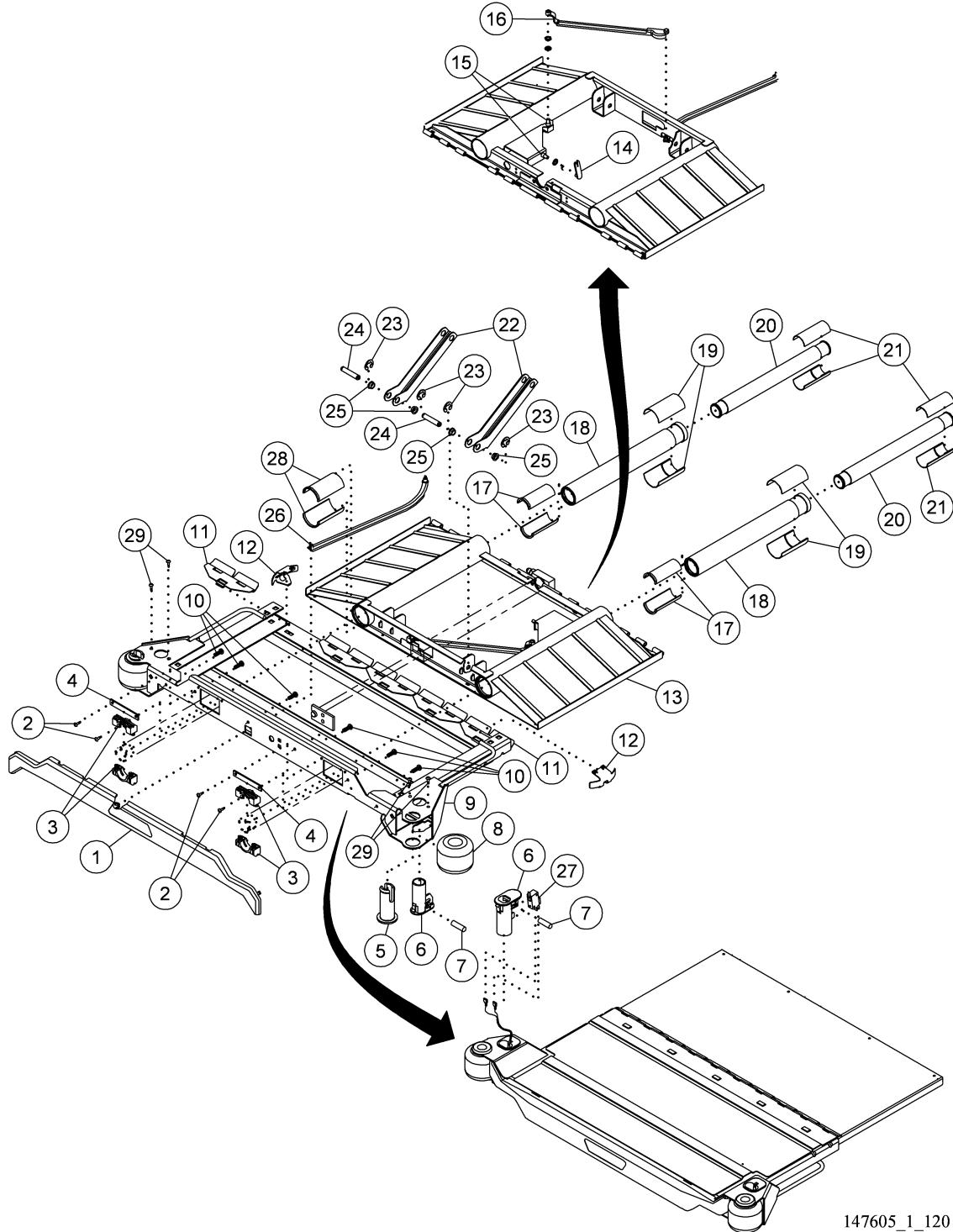
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## Articulating Deck Module—Foot Section

Figure 5-7. Articulating Deck Module—Foot Section



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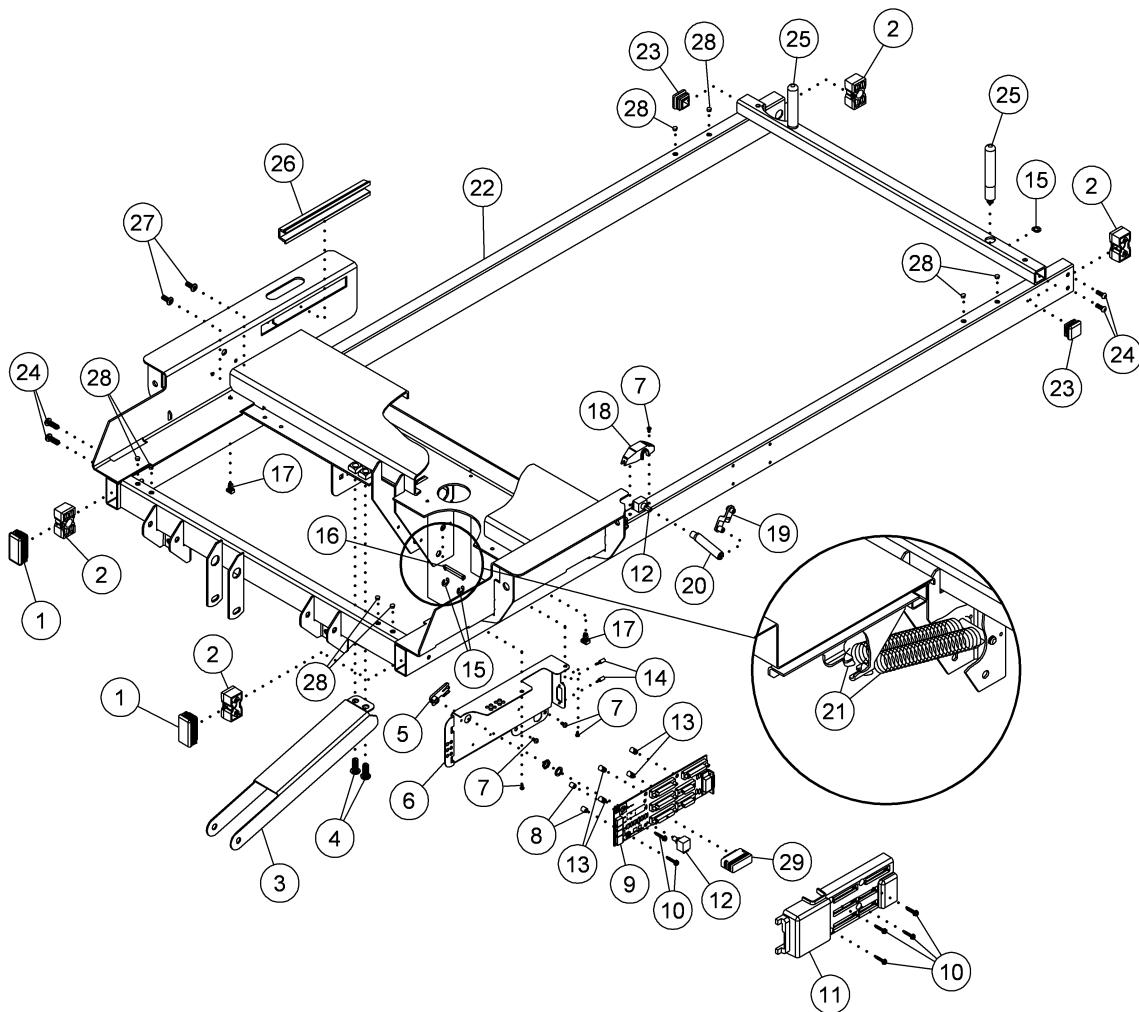
**Table 5-7. Articulating Deck Module—Foot Section**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49464	1	Cover, moving foot section
2	43878	17	Torx® <sup>a</sup> button head screw
3	47213	4	Terminator, foot slide
4	4917648	2	Retainer bar, foot slide
5	4715302	2	Bumper pin
6	49461	2	Socket, footboard
7	49517	1	Dowel pin, stainless
8	47219	2	Bumper
9	4720148	1	Weldment, moveable foot
10	42142	15	Pan head screw
11	4913448	5	Wiper, moving foot
12	47215	2	Slide, corner, foot section
13	4719248	1	Weldment, fixed foot
14	49156	1	Sensor crank, foot articulation
15	39172	As required	Adhesive
16	49151	1	Sensor crank, foot extension
17	47208	4	Split bushing, front, inner slide
18	47217pl	2	Tube, slide intermediate
19	47207	4	Split bushing, rear, outer slide
20	47218pl	2	Tube, slide inner
21	47209	4	Split bushing, rear, inner slide
22	4721048	2	Link, floating, foot section
23	3532501	16	Retaining ring
24	4727106pl	4	D-pin
25	49498	10	Bushing, keyed
26	49152	1	Sensor link, foot extension
27	3071301	1	Limit safety switch
28	47206	4	Split bushing, front, outer slide
29	42140	4	Screw

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## Weigh Frame Module

Figure 5-8. Weigh Frame Module



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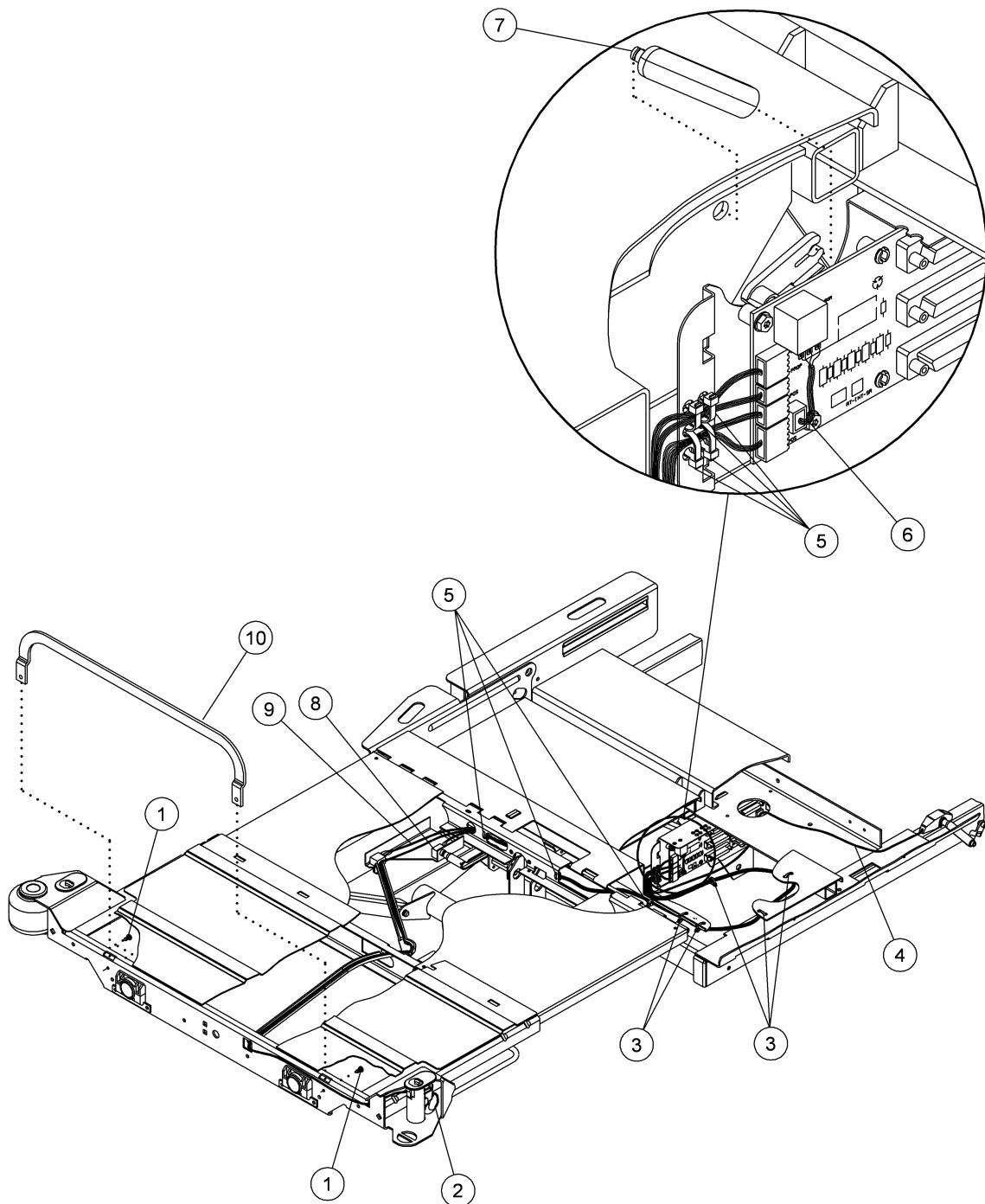
**Table 5-8. Weigh Frame Module**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	4917702	2	Plug, frame tube
2	49135	4	Bearing, load beam, weigh frame
3	4730448	1	Channel, head cylinder
4	49139	4	Cap screw, button head socket
5	49157	1	Sensor crank, knee
6	49197pl	1	Base plate, junction box
7	43878	17	Torx® <sup>a</sup> button head screw
8	49164	2	Long plastic spacer
9	6548701s	1	P.C. board assembly, weigh frame junction box
10	49508	6	Screw, formed, hex washer
11	4919848	1	Cover, junction box
12	39172	As required	Adhesive
13	49173	4	Self-retaining spacer
14	42006	2	Screw lock
15	3532501	16	Retaining ring
16	4727105pl	3	D-pin
17	40421	2	Cable tie mount
18	49455	1	Cover, head sensor
19	49154	1	Short link, head sensor
20	49155	1	Long link, head sensor
21	49195	2	Spring, extension
22	4911648	1	Weldment, weigh frame
23	4917701	2	Plug, frame tube
24	42142	14	Pan head screw
25	49124pl	2	Post, head panel
26	47290	2	Extrusion, slider pivot
27	64765	8	Screw, ¼"-20 low profile
28	62816	8	Hole plug
29	3069801	1	Adapter (non-SideCom® Communication System beds)

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## Weigh Frame Module—Cable Routing and Mattress Retainer

Figure 5-9. Weigh Frame Module—Cable Routing and Mattress Retainer



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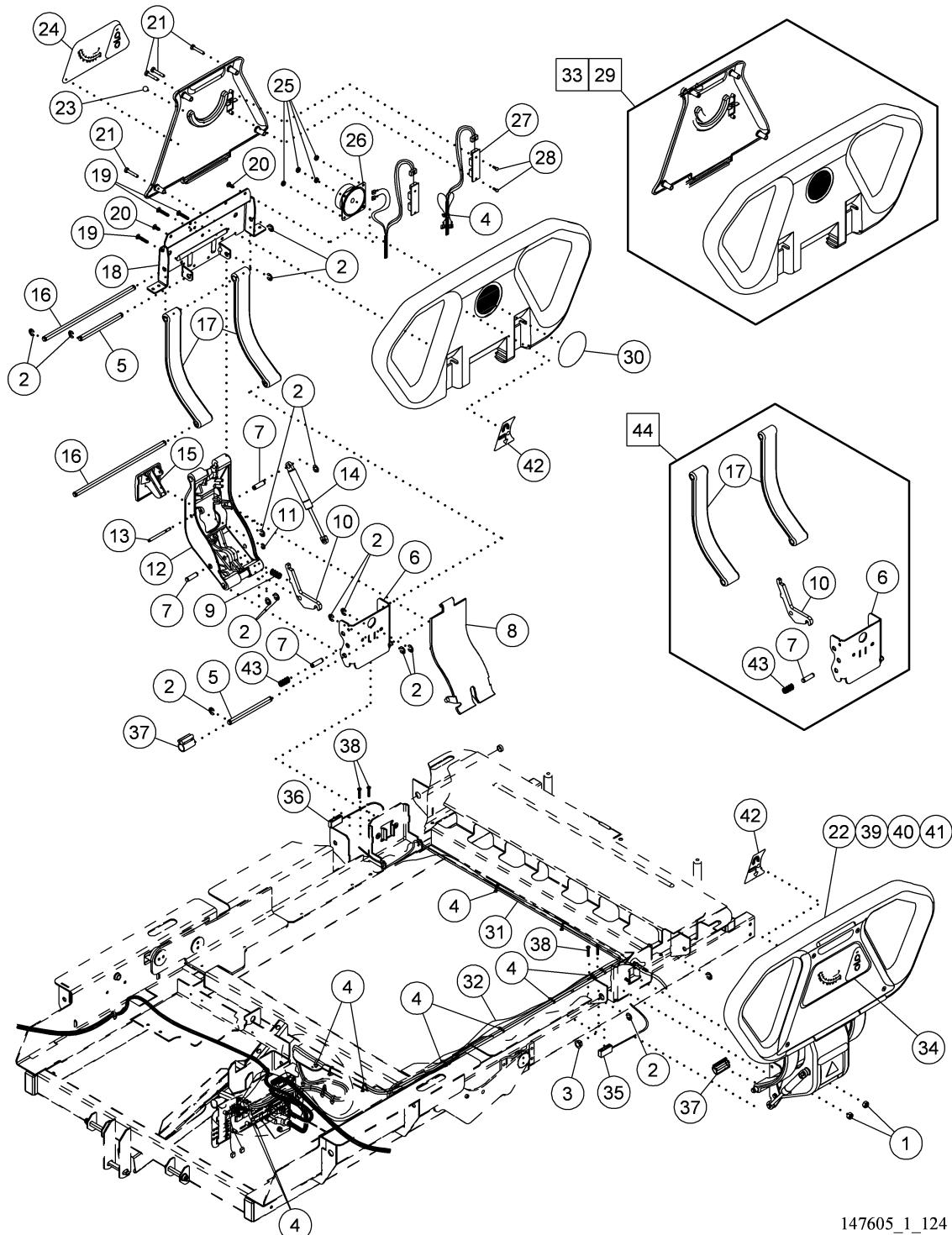
**Table 5-9. Weigh Frame Module—Cable Routing and Mattress Retainer**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	43878	2	Torx® <sup>a</sup> button head screw (mattress retainer model only)
2	3054401	1	Footprop detection switch cable assembly
3	19124	5	Large cable tie
4	3054601	1	Head position sensor and cable assembly
5	14450	7	Small cable tie
6	3058401	1	Cable assembly, knee position sensor
7	4915801	1	Link, position sensor (knee)
8	3054603	1	Foot articulation position sensor and cable assembly
9	3054602	1	Foot retraction position sensor and cable assembly
10	4917848	1	Mattress stop, foam foot (mattress retainer model only)

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## Head Siderail Module

Figure 5-10. Head Siderail Module



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**Table 5-10. Head Siderail Module**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	20802	2**	Keps nut
2	3532501	15**	Retaining ring
3	36570	1**	Oilite® <sup>a</sup> bushing
4	19124	22**	Cable tie
5	4727102pl	2**	D-pin
6	68872-48	1**	Weldment, siderail mount
7	68861	3**	Pin, latch
8	63250	1**	Center cover arm
9	49111	1**	Spring, latch bias
10	68860	1**	Spring, latch bias
11	49193	1**	E-ring
12	62753	1**	Center arm, siderail
13	47144pl	1**	Shaft, siderail release lever pivot
14	47323	1**	Dampener
15	47256	1**	Release lever, siderail
16	69078pl	2**	D-pin
17	68873	2**	Siderail arm, outer support with bearing
18	47274	1**	Bracket, upper rail
19	42140	3**	Screw
20	42142	2**	Pan head screw
21	4727302	4**	Screw
22	47146102s	1	Head siderail (lh), without speakers
23	47272	1**	Angle ball
24	14723002	1	Label, head angle indicators, rh (rh siderail only)
25	28562	4**	Palnut (model with speaker only)
26	38873	1**	Speaker (model with speaker only)

a. Oilite® is a registered trademark of Beemer Precision, Incorporated.

\*\* Quantities shown are per siderail.

Item Number	Part Number	Quantity	Description
27	4843301	1	P.C. board assembly, bed up/down
28	4214101	2	Screw, hilow
29	6537101	1	Head siderail assembly, rh
30	49453	1**	Label, blank speaker (model without speaker only)
31	6305902	1	Cable assembly, weigh frame to head siderail, rh (rh siderail only)
32	6305901	1	Cable assembly, weigh frame to head siderail, lh (lh siderail only)
33	6537102	1	Head siderail assembly, lh
34	14723001	1	Label, head angle indicator lh (lh siderail)
35	6548802	1	Head siderail detection switch, lh (lh siderail with head siderail detection switch option)
36	6548803	1	Head siderail detection switch, rh (rh siderail with head siderail detection switch option)
37	65465	1**	Magnet assembly (siderail with head siderail detection switch option only)
38	65614	4**	Screw, with patch (siderail with head siderail detection switch option)
39	47146103s	1	Head siderail, rh, without speakers
40	47146100s	1	Head siderail, lh, with speakers
41	47146101s	1	Head siderail, rh, with speaker—English
42	66937	2	Pulmonary shoulder location label
43	68913	1**	Spring, latch
44	P1950A03	1**	Intermediate siderail upgrade (when ordering any parts contained in this kit for a non-pulmonary bed with a serial number D034AM6995 and earlier, order this kit as the parts contained are <b>not</b> backwards compatible)

\*\* Quantities shown are per siderail.

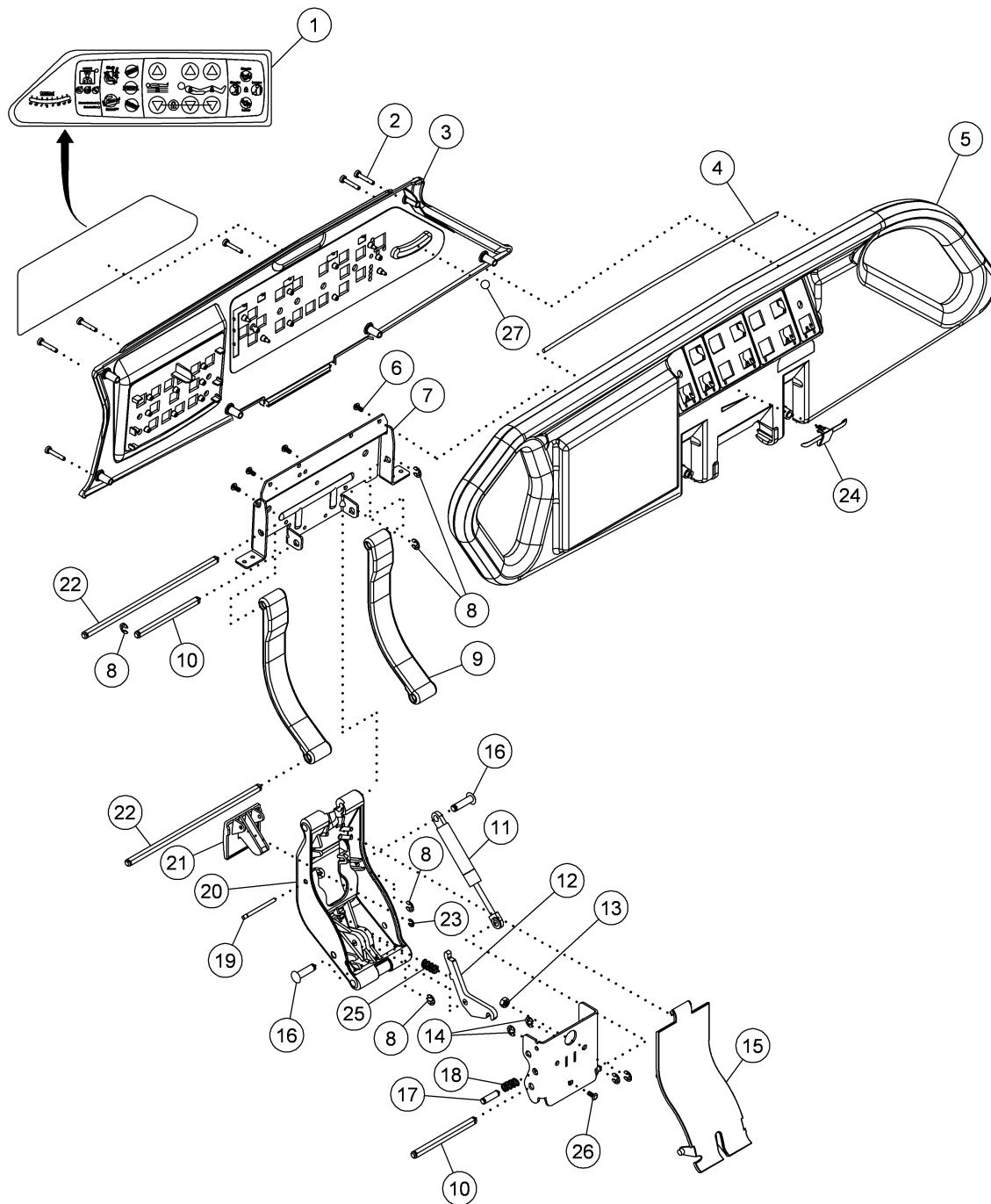
**NOTES:**

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**5**

## Intermediate Siderail Assembly—RH (Sheet 1 of 2)

Figure 5-11. Intermediate Siderail Assembly—RH (Sheet 1 of 2)



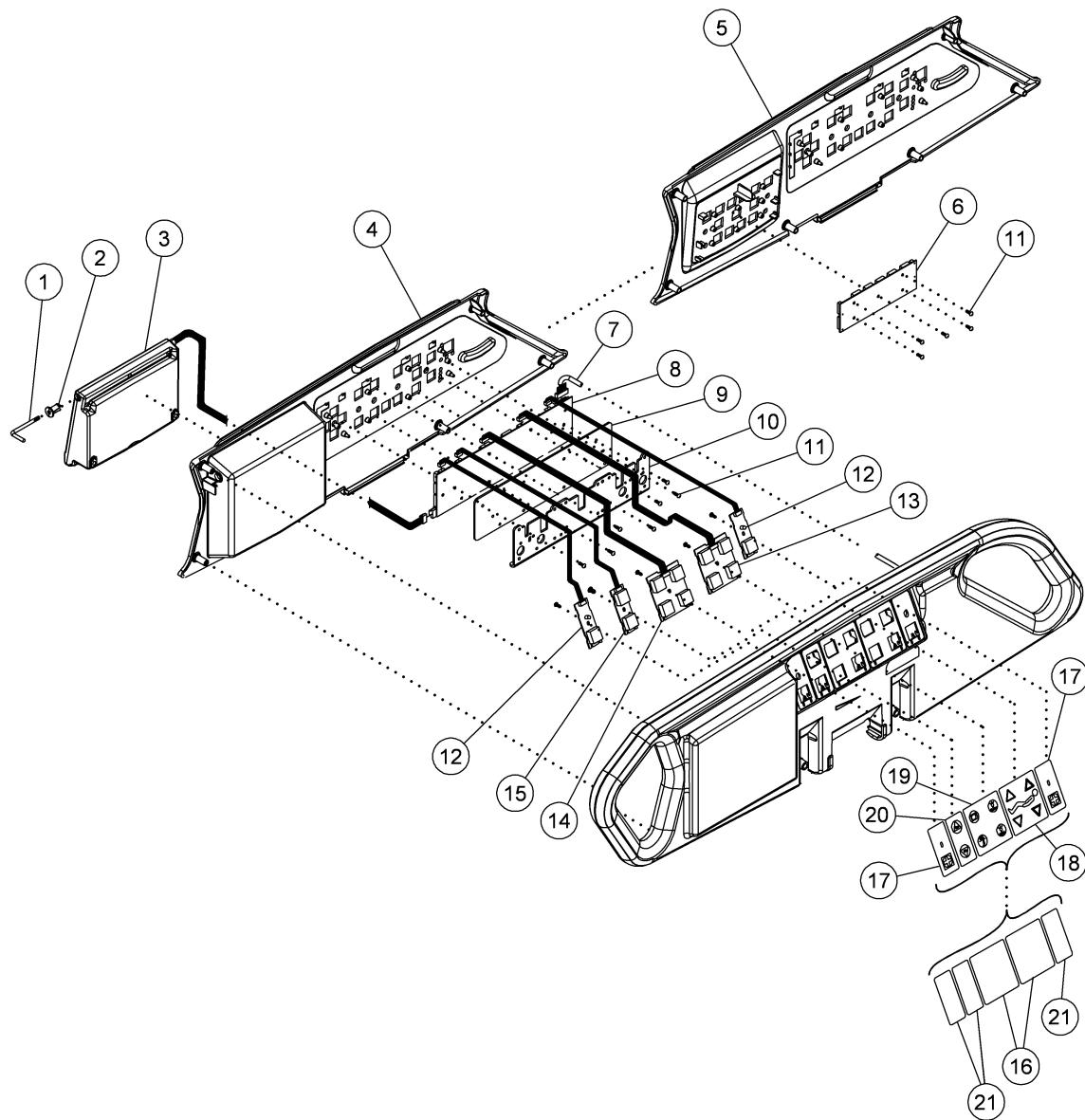
147605\_1\_241

**Table 5-11. Intermediate Siderail Assembly—RH (Sheet 1 of 2)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	147340102	1	Label, caregiver controls, without nc (see “International Labels—Right-Hand Intermediate Siderail” on page 5-138 for international labels)
	147228102	1	Label, caregiver controls, with nc
2	4214102	6	Screw, plastic
3	147749	1	Cover, rh, without GCI
4	71550	1	Gasket, top
5	146439	1	Siderail assembly, rh
6	438800	4	Screw, 1/2-20 x 5/8"
7	47274	1	Bracket
8	3532501	7	E-ring, 5/16"
9	68873	2	Sidearm
10	4727102	2	D-pin, 3/8" x 4.310"
11	67230	1	Dampener
12	68860	1	Latch
13	71542	1	Nut, 1/4-20, self clinching
14	18890	2	E-ring, 1/4"
15	63250	1	Cover, center arm
16	140314	2	Pin, clevis
17	68861	1	Latch pin
18	68913	1	Spring
19	47144	4	Shaft
20	62753	1	Center arm
21	47256	1	Release lever
22	69078	2	D-pin, 3/8 x 9.610"
23	49193	1	E-ring, oil dip
24	47286	1	Volume slide
25	49111	1	Spring
26	69377	1	Screw
27	47272	1	Angle ball

## Intermediate Siderail Assembly—RH (Sheet 2 of 2)

Figure 5-12. Intermediate Siderail Assembly—RH (Sheet 2 of 2)



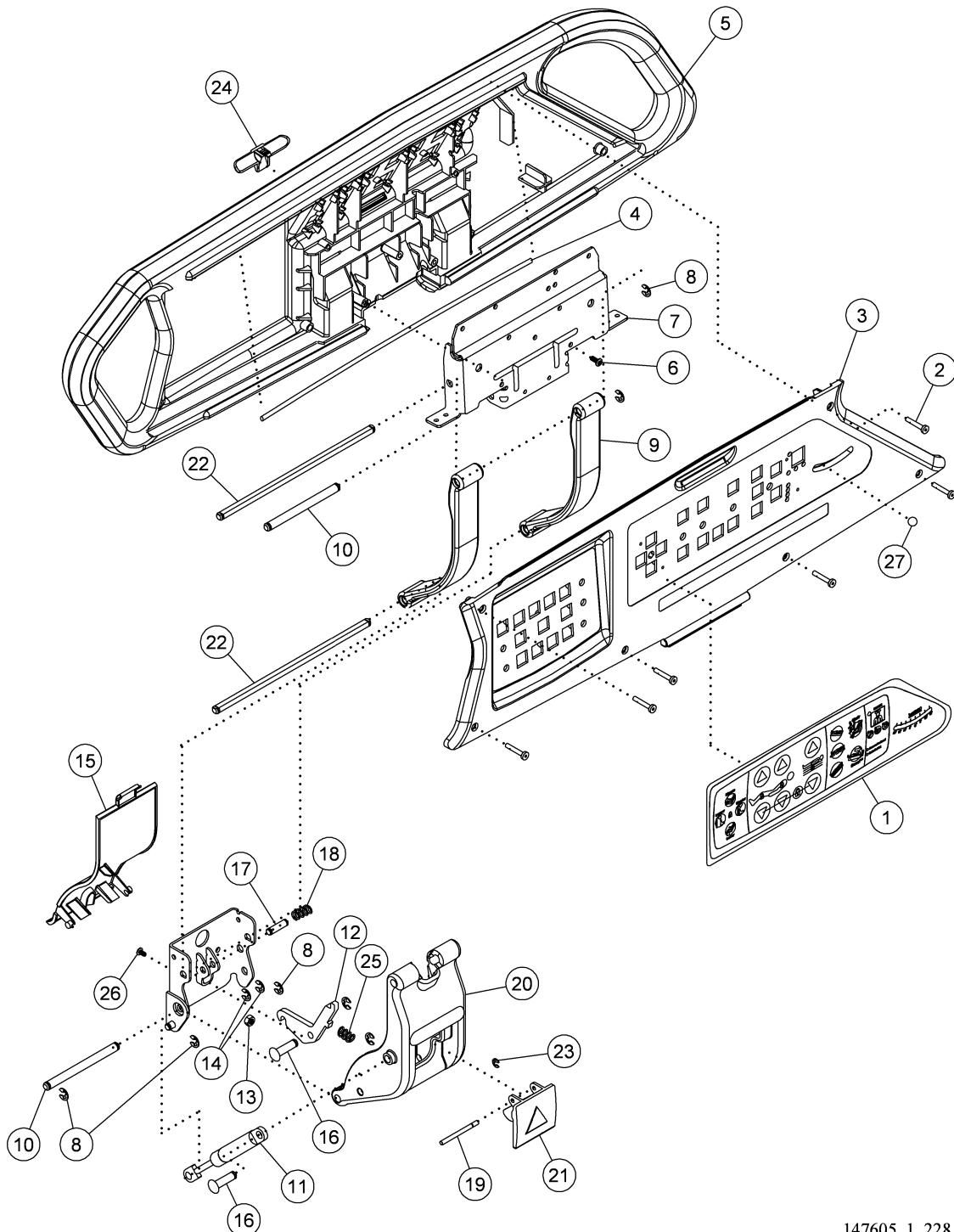
147605\_1\_248

**Table 5-12. Intermediate Siderail Assembly—RH (Sheet 2 of 2)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	69839	1	Axle shaft
2	150680	1	Bushing, GCI pivot
3	146483	1	GCI module
4	146751	1	Siderail cover, rh, with GCI
5	147749	1	Siderail cover, rh, without GCI
6	14584702	1	P.C. board assembly
7	14450002	1	Cable, siderail
8	143548	1	P.C. board, caregiver control, rh
9	146753	1	P.C. board insulator
10	71014	1	P.C. board plate
11	4214102	7	Screw, #6-19 x .350
12	4742001	2	P.C. board, nurse call
13	4839203	1	P.C. board, patient positioning, rh
14	4839204	1	P.C. board, patient entertainment, rh
15	14722901	1	P.C. board, patient, enhanced entertainment
16	49452	2	Label, blank, 4-button
17	147228102	2	Label, nurse call
18	14723502	1	Label, patient positioning, rh
19	14722902	1	Label, patient, entertainment, rh
20	14722903	1	Label, patient, enhanced entertainment
21	49451	3	Label, blank, 2-button

## Intermediate Siderail Assembly—LH (Sheet 1 of 2)

Figure 5-13. Intermediate Siderail Assembly—LH (Sheet 1 of 2)



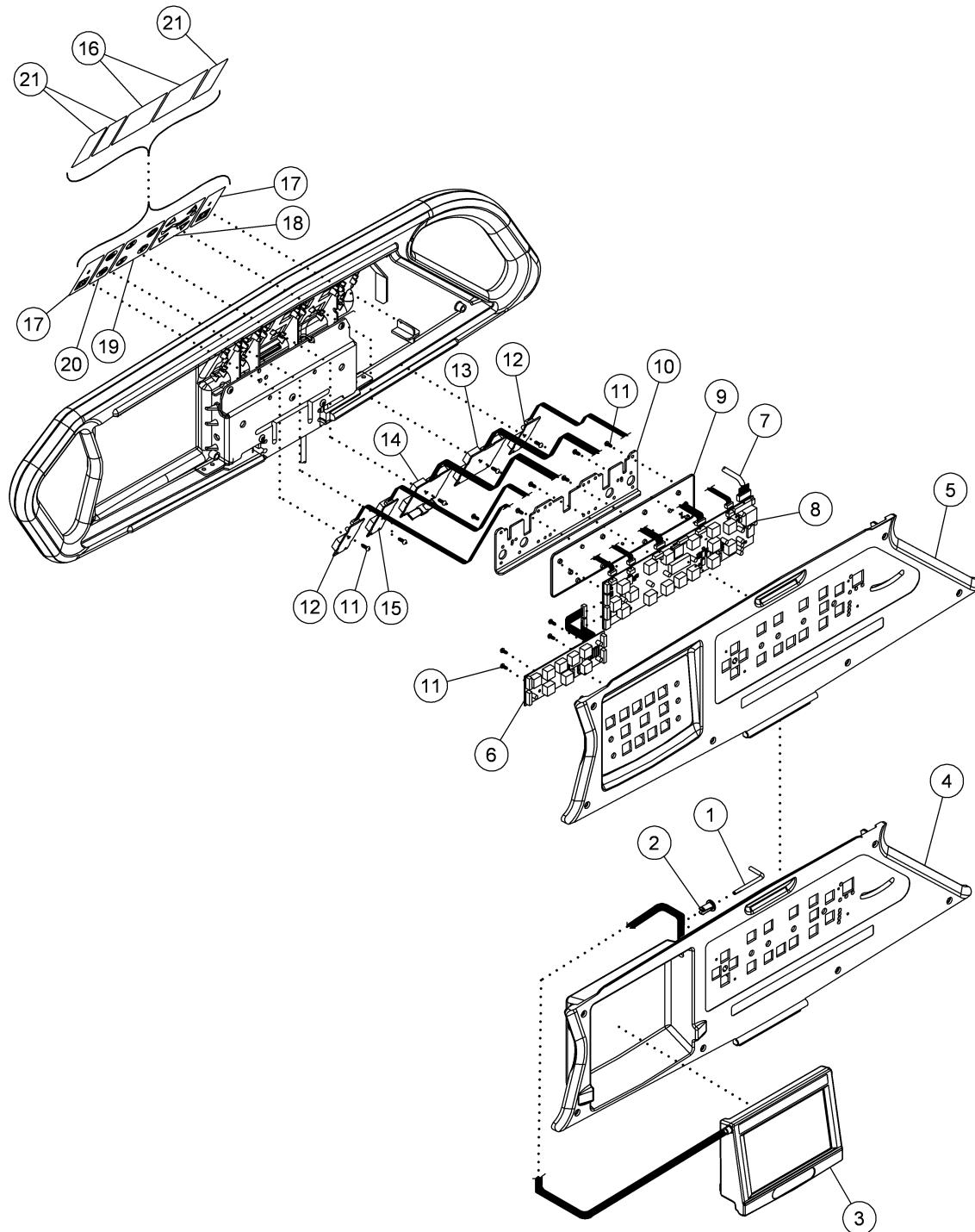
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**Table 5-13. Intermediate Siderail Assembly—LH (Sheet 1 of 2)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	147340101	1	Label, caregiver controls, without nc (see “International Labels—Left-Hand Intermediate Siderail” on page 5-146 for international labels)
	147228101	1	Label, caregiver controls, with nc
2	4214102	6	Screw, plastic
3	147748	1	Cover, lh, without GCI
4	71550	1	Gasket, top
5	146360	1	Siderail assembly, lh
6	438800	4	Screw, 1/2-20 x 5/8"
7	47274	1	Bracket
8	3532501	7	E-ring, 5/16"
9	68873	2	Sidearm
10	4727102	2	D-pin, 3/8" x 4.310"
11	67230	1	Dampener
12	68860	1	Latch
13	71542	1	Nut, 1/4-20, self clinching
14	18890	2	E-ring, 1/4"
15	63250	1	Cover, center arm
16	140314	2	Pin, clevis
17	68861	1	Latch pin
18	68913	1	Spring
19	47144	4	Shaft
20	62753	1	Center arm
21	47256	1	Release lever
22	69078	2	D-pin, 3/8 x 9.610"
23	49193	1	E-ring, oil dip
24	47286	1	Volume slide
25	49111	1	Spring
26	69377	1	Screw
27	47272	1	Angle ball

## Intermediate Siderail Assembly—LH (Sheet 2 of 2)

Figure 5-14. Intermediate Siderail Assembly—LH (Sheet 2 of 2)



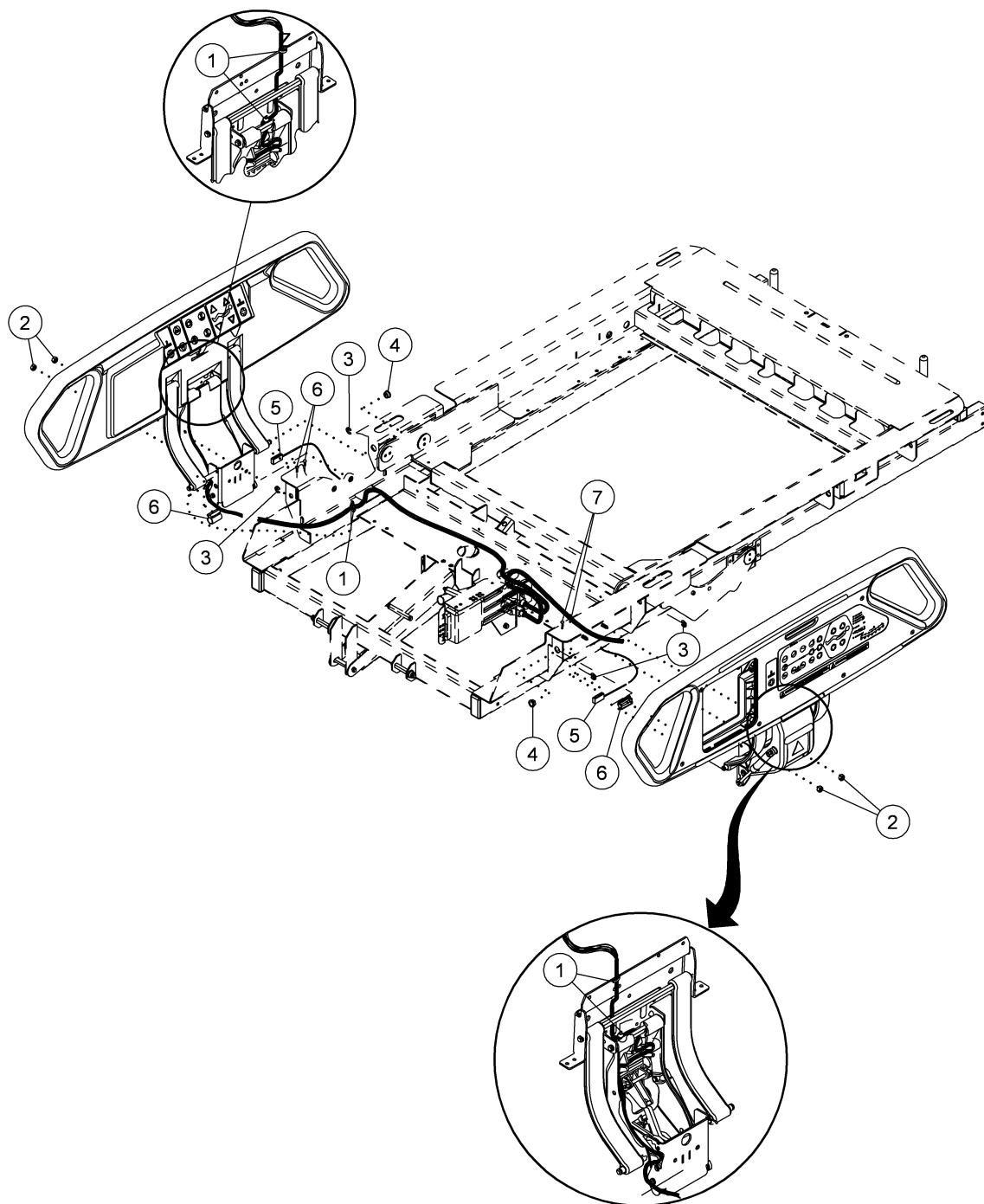
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**Table 5-14. Intermediate Siderail Assembly—LH (Sheet 2 of 2)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	69839	1	Axle shaft
2	150680	1	Bushing, GCI pivot
3	146483	1	GCI module
4	146750	1	Siderail cover, lh, with GCI
5	147748	1	Siderail cover, lh, without GCI
6	14584701	1	P.C. board assembly
7	14450001	1	Cable, siderail
8	143551	1	P.C. board, caregiver control, lh
9	146753	1	P.C. board insulator
10	71014	1	P.C. board plate
11	4214102	7	Screw, #6-19 x .350
12	4742001	2	P.C. board, nurse call
13	4839201	1	P.C. board, patient positioning, lh
14	4839202	1	P.C. board, patient entertainment, lh
15	14722901	1	P.C. board, patient, enhanced entertainment
16	49452	2	Label, blank, 4-button
17	147228	2	Label, nurse call
18	14723501	1	Label, patient positioning, lh
19	147229101	1	Label, patient, entertainment, lh
20	14722903	1	Label, patient, enhanced entertainment
21	49451	3	Label, blank, 2-button

## Intermediate Siderail Assembly—Installation and Cable Routing

Figure 5-15. Intermediate Siderail Assembly—Installation and Cable Routing



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**Table 5-15. Intermediate Siderail Assembly—Installation and Cable Routing**

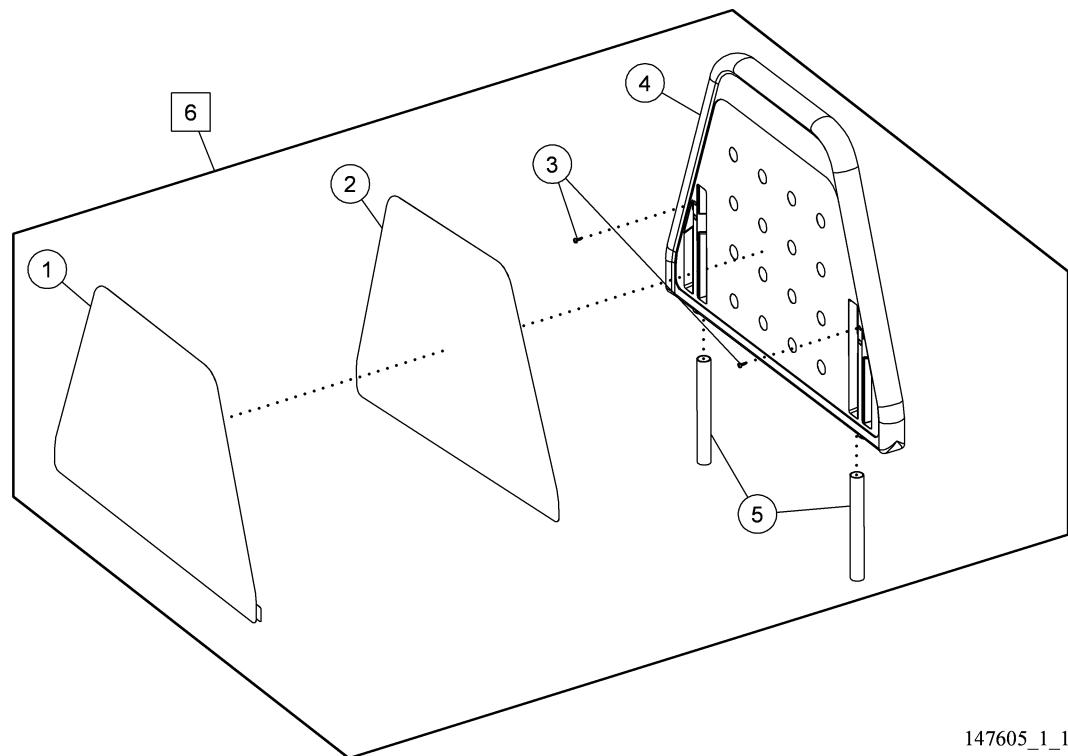
<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	19124	5	Large cable tie
2	20802**	2	Keps nut
3	3532501**	2	Retaining ring
4	36570**	1	Oilite® <sup>a</sup> bushing
5	6548801**	1	Intermediate siderail detection switch (siderail with intermediate siderail detection switch option only)
6	65465**	1	Magnet assembly (siderail with intermediate siderail detection switch option only)
7	65614**	2	#6-32 x 0.375 screw with patch (siderail with intermediate siderail detection switch option only)

a. Oilite® is a registered trademark of Beemer Precision, Incorporated.

\*\* Quantities shown are per siderail.

## Headboard Assembly—P1921B

Figure 5-16. Headboard Assembly—P1921B



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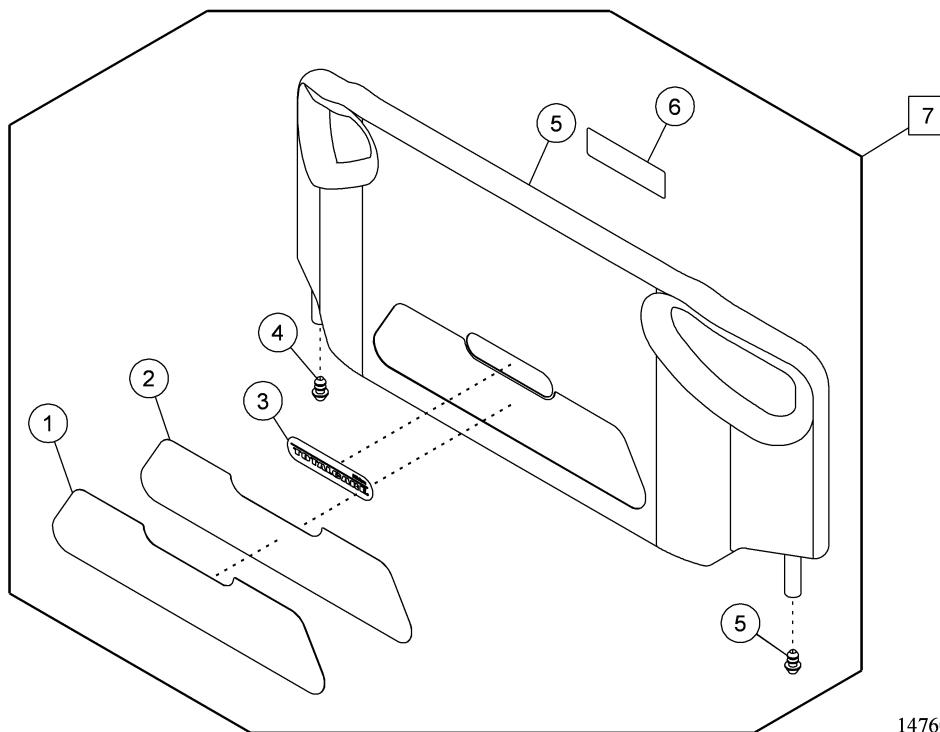
Table 5-16. Headboard Assembly—P1921B

Item Number	Part Number	Quantity	Description
1	69169*	1	High pressure laminate (HPL) insert, headboard
2	69168	1	Adhesive, headboard
3	90038-02	2	Screw
4	68699	1	Panel, head
5	69167	2	Tube, mounting, headboard
6	P1921B	1	Head panel

\* Specify high pressure laminate color.

## Footboard Module—P1922

Figure 5-17. Footboard Module—P1922



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Table 5-17. Footboard Module—P1922

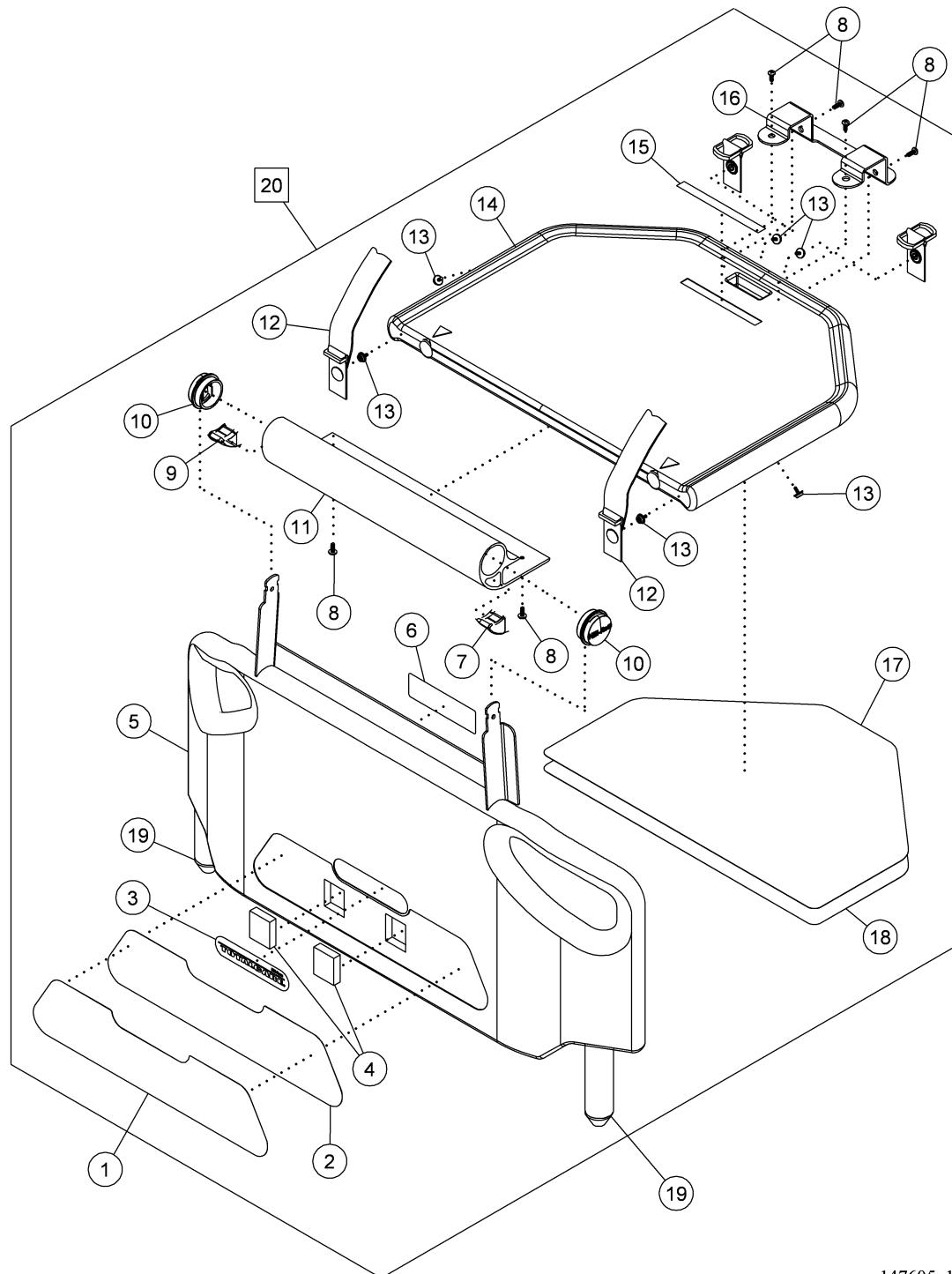
Item Number	Part Number	Quantity	Description
1	49510*	1	High pressure laminate insert, footboard
2	49511	1	Adhesive footboard
3	49513	1	Nameplate
4	406370148	2	End cap
5	64144	1	Panel, foot
6	49491	1	Label, stand or sit caution
7	P1922B	1	Footboard assembly, complete

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\* Specify high pressure laminate color.

## Transport Shelf Module—P1923

Figure 5-18. Transport Shelf Module—P1923



147605\_1\_142

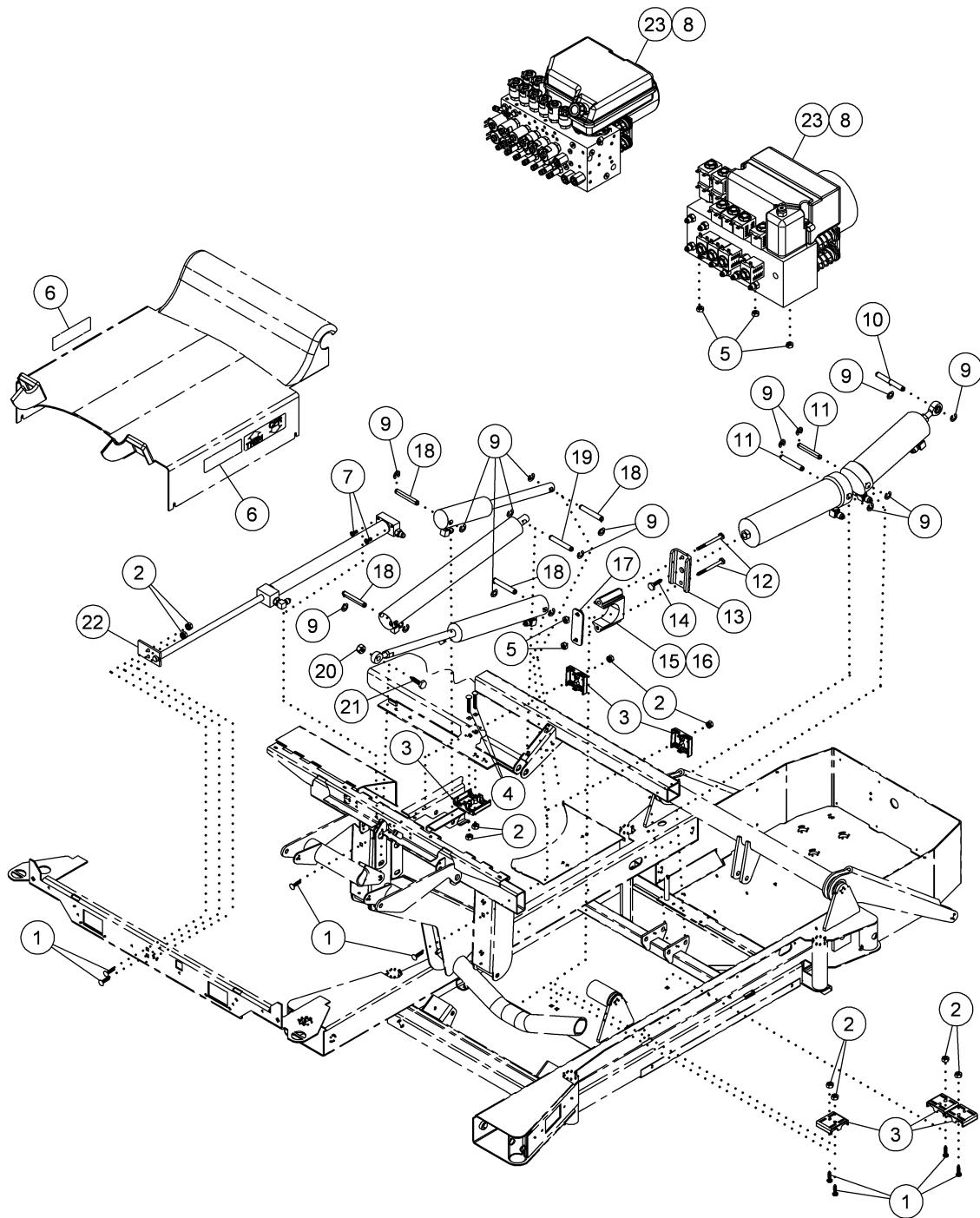
**Table 5-18. Transport Shelf Module—P1923**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49510*	1	High pressure laminate insert, footboard
2	49511	1	Adhesive footboard
3	49513	1	Nameplate
4	49528	2	Magnet
5	6414401	1	Shelf foot panel
6	49491	1	Label, stand or sit caution
7	6474901	1	Plug, shelf extrusion lh
8	46260	6	Screw
9	6474902	1	Plug, shelf extrusion rh
10	4345501	2	Hub
11	49523	1	Extrusion
12	49532	2	Utility strap
13	62628	6	Male snap
14	49527	1	Utility shelf
15	49530	1	Label group
16	4953148	1	Handle bracket
17	49462	1	Adhesive headboard
18	49472*	1	High pressure laminate insert, headboard
19	406370148	2	End cap
20	P1923	1	Transport shelf assembly, complete

\* Specify high pressure laminate color.

## Hydraulic System Module

Figure 5-19. Hydraulic System Module



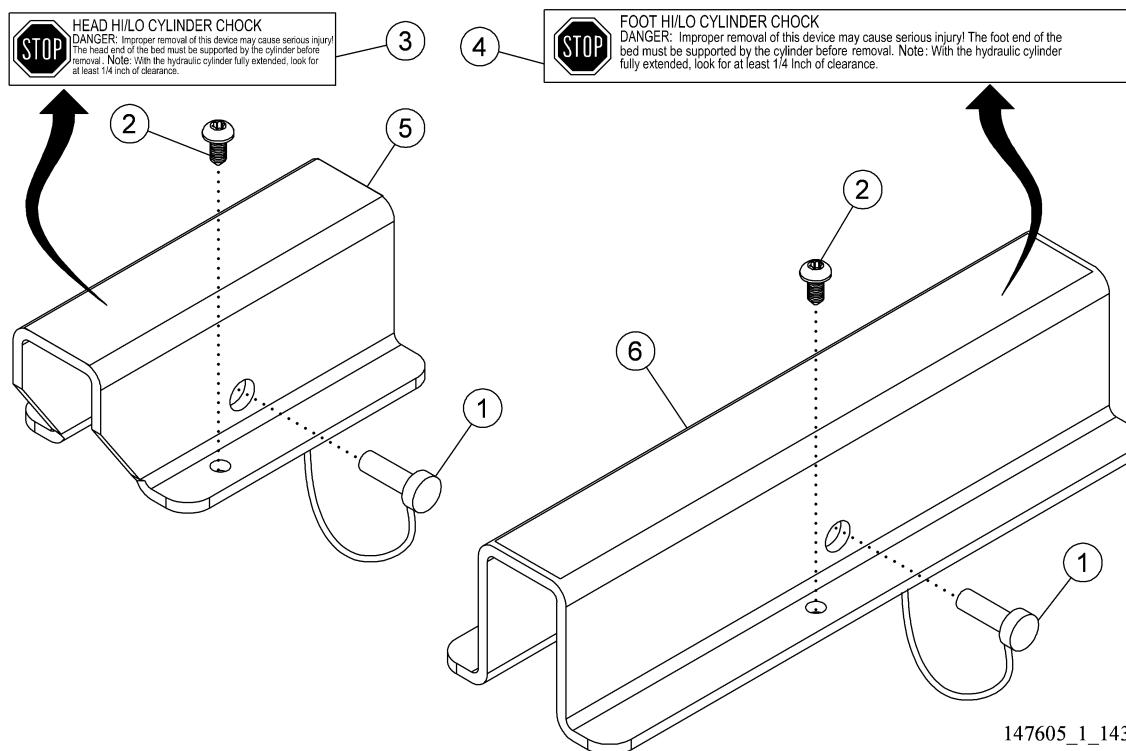
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**Table 5-19. Hydraulic System Module**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	4582201	8	Round square neck bolt
2	20802	10	Keps nut
3	47198	3	Clamp, hose/cable
4	4582203	2	Round square neck bolt
5	4435	4 or 5	Locknut
6	49487	1	Emergency Trendelenburg warning label (North American 120V model without foot pump only)
7	64765	2	Screw, ¼"-20 low profile
8	6543021	1	Hydraulic power unit (North American 120V models only)
	6543031	1	Hydraulic power unit (230V models only)
9	35325	16	E-ring
10	4727103pl	1	D-pin
11	4727109pl	2	D-pin
12	9001844	2	Screw, hex cap
13	4913048	1	Channel, hilow foot cylinder
14	49166	1	Hex cap screw
15	47238	1	Block, hilow foot cylinder bearing
16	SA3351	As required	4 oz. lithium grease
17	47237pl	1	Plate, hilow foot cylinder
18	4727105pl	4	D-pin
19	4727107pl	1	D-pin
20	49200	1	Hex stop nut
21	90017-20	1	Bolt
22	47199	1	Plate, cylinder retainer
23	36199s	As required	Hydraulic fluid—quart

## Hilow Cylinder Brace Kit—SA1695

**Figure 5-20. Hilow Cylinder Brace Kit—SA1695**



**Table 5-20. Hilow Cylinder Brace Kit—SA1695**

Item Number	Part Number	Quantity	Description
1	36832	2	Ball lock pin
2	43878	2	Torx® <sup>a</sup> button head screw
3	6561501	1	Warning label, hilow head cylinder
4	6561502	1	Warning label, hilow foot cylinder
5	654840154	1	Brace, hilow head cylinder safety
6	654840254	1	Brace, hilow foot cylinder safety

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

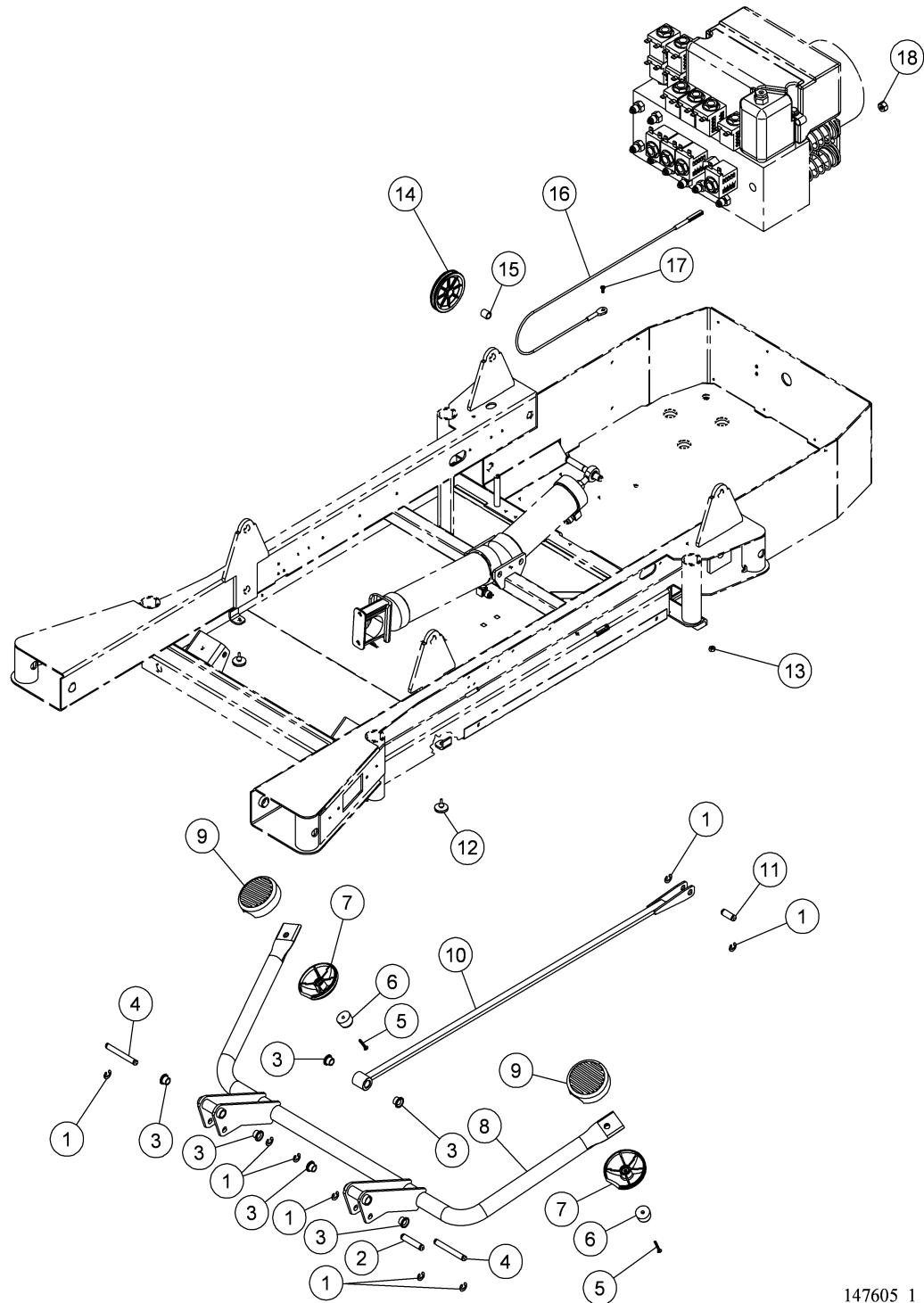
**NOTES:**

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## Hydraulic System Foot Pump

Figure 5-21. Hydraulic System Foot Pump



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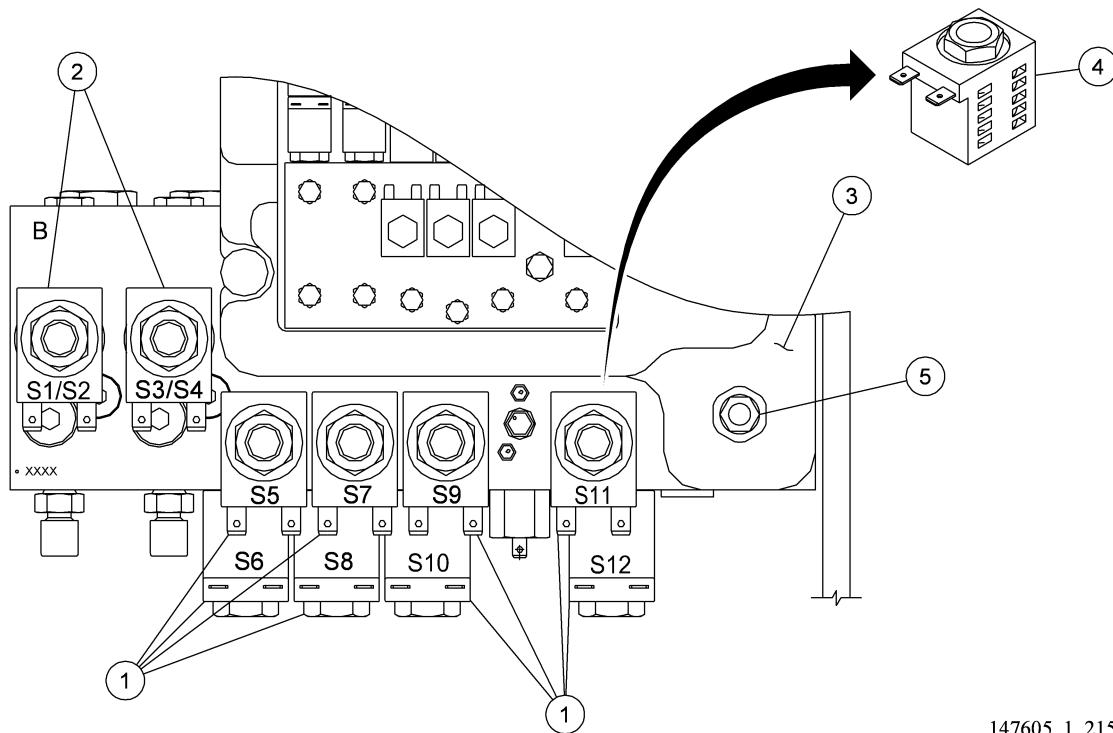
**Table 5-21. Hydraulic System Foot Pump**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	35325	8	E-ring
2	4727106pl	1	D-pin
3	90340-06	6	DU Flange bushing
4	4727104pl	2	D-pin
5	42140	2	Screw
6	33603	2	Bumper
7	4917265	2	Cap, foot pump pedal bottom
8	4716848	1	Weldment, foot pump pedal
9	4917165	2	Pad, foot pump pedal top
10	4716948	1	Weldment, foot pump linkage
11	4727108pl	1	D-pin
12	41344	2	Plug bumper
13	4435	1	Locknut
14	47247	1	Sheave, foot pump cable
15	9026309	1	Sleeve bearing
16	4724601	1	Cable assembly, foot pump
17	49521	1	1/4"-20 x 5/8" six-lobe Torx® <sup>a</sup> screw
18	49200	1	Hex stop nut

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

## Hydraulic System Manifold—Deltrol

Figure 5-22. Hydraulic System Manifold—Deltrol



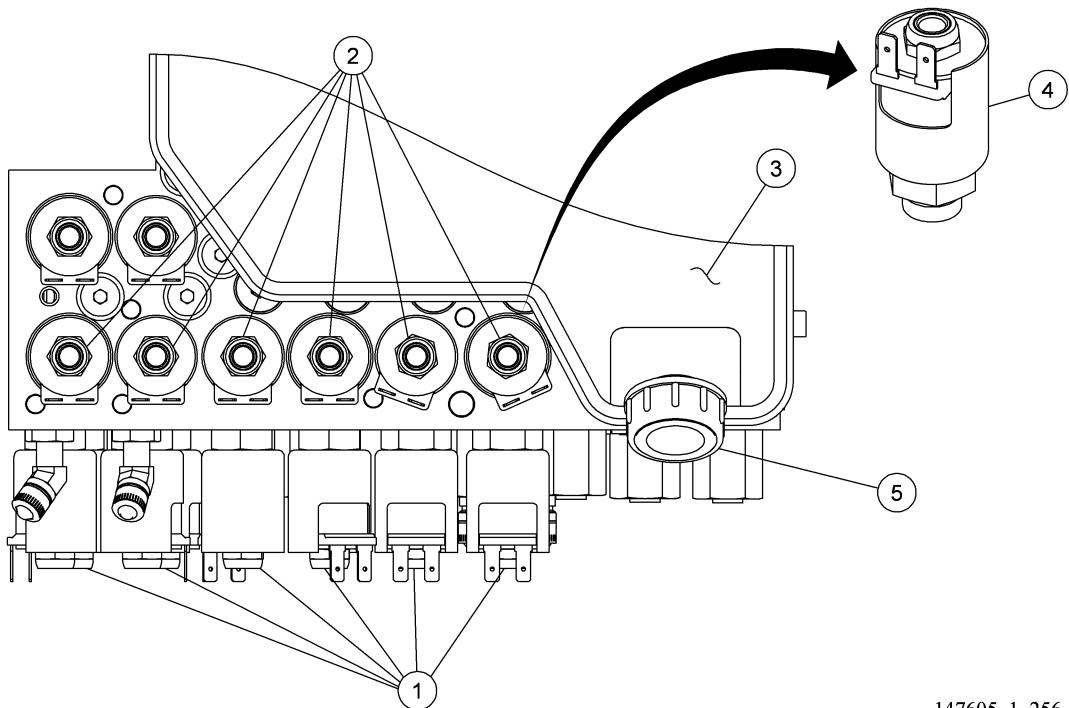
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Table 5-22. Hydraulic System Manifold—Deltrol

Item Number	Part Number	Quantity	Description
1	6543035	8	Valve, solenoid, 2-way, 2-position
2	6543034	2	Valve, solenoid, 4-way, 3-position
3	36199s	As required	Hydraulic fluid—quart
4	6543032	12	Coil
5	6543042	1	Breather cap
Not shown	6543038	2	CPR and Emergency Trendelenburg valve
Not shown	139120	8	Valve, pilot

## Hydraulic System Manifold—Delta

Figure 5-23. Hydraulic System Manifold—Delta



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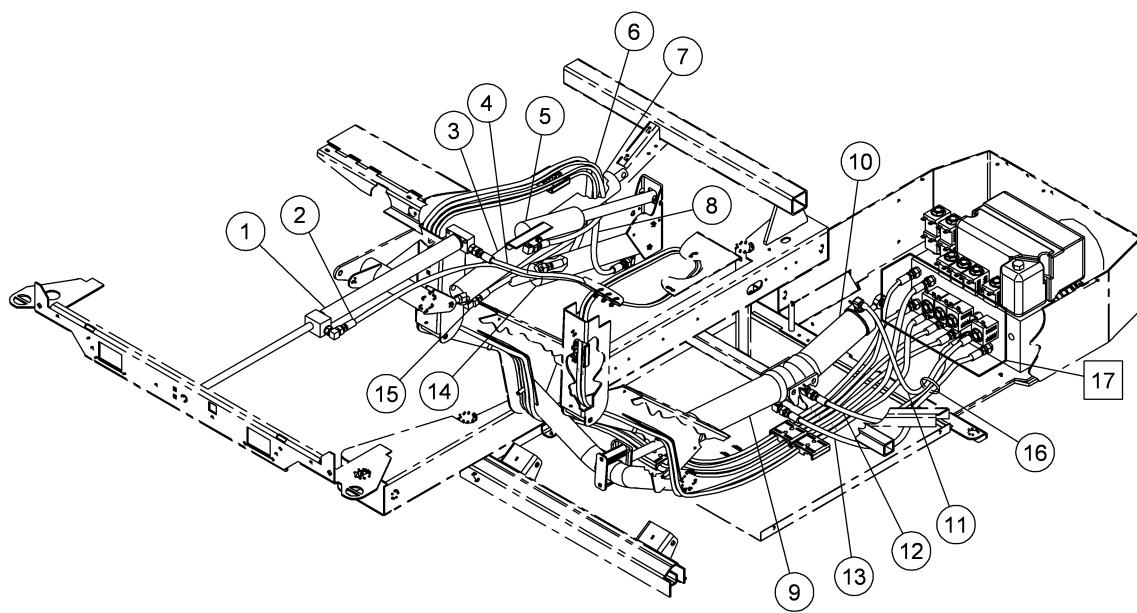
Table 5-23. Hydraulic System Manifold—Delta

Item Number	Part Number	Quantity	Description
1	6543051	8	Valve, solenoid, 2-way, 2-position
2	6543052	2	Valve, solenoid, 3-way, 2-position
3	36199s	As required	Hydraulic fluid—quart
4	6543032	16	Coil
5	6543055	1	Breather cap
Not shown	6543054	2	CPR and Emergency Trendelenburg valve

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## Hydraulic System Module—Hose and Cylinder Assemblies

Figure 5-24. Hydraulic System Module—Hose and Cylinder Assemblies



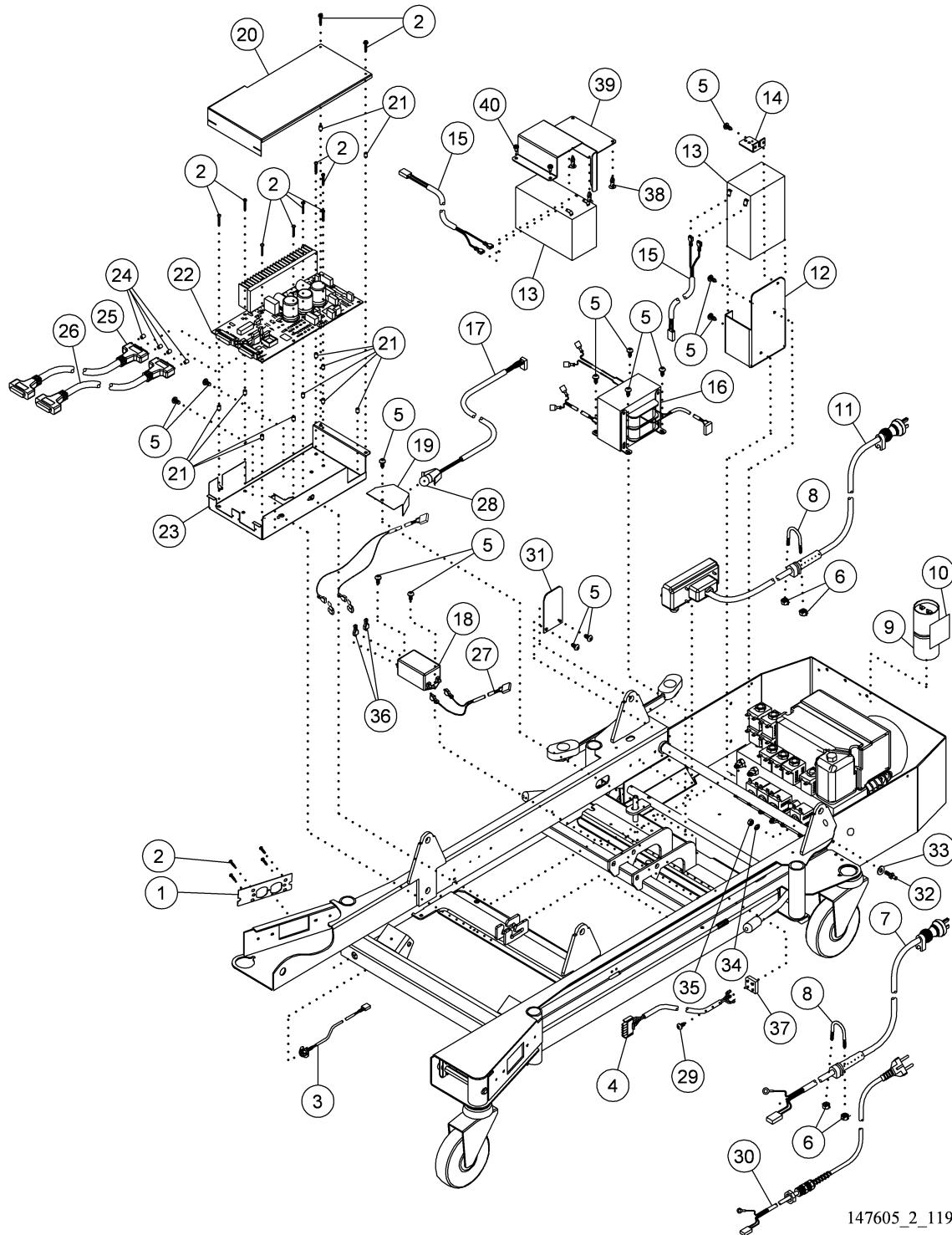
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**Table 5-24. Hydraulic System Module—Hose and Cylinder Assemblies**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	4918117	1	Cylinder assembly foot retraction (hydraulic)
2	6543006	1	Hose assembly foot retraction cylinder (rod end)
3	6543014	1	Cylinder assembly head hydraulic
4	6543005	1	Hose assembly foot retraction cylinder (blind end)
5	6543013	1	Cylinder assembly knee hydraulic
6	6543002	1	Hose assembly, knee cylinder
7	6543004	1	Hose assembly foot articulation cylinder (rod end)
8	6543003	1	Hose assembly foot articulation cylinder (blind end)
9	6543016	1	Cylinder assembly hilow foot hydraulic
10	6543015	1	Cylinder assembly hilow head hydraulic
11	6543007	1	Hose assembly hilow head cylinder (rod end)
12	6543009	1	Hose assembly hilow head cylinder (blind end)
13	6543008	1	Hose assembly hilow foot cylinder
14	6543012	1	Cylinder assembly foot articulation hydraulic
15	6543001	1	Hose assembly head cylinder
16	19124	1	Large cable tie
17	6543000	1	Hose kit, hydraulic cylinder

## Power Control Module

Figure 5-25. Power Control Module



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**Table 5-25. Power Control Module**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	144843	1	Intermediate cover
2	69988	10 or 12	Screw
3	68742S	1	Night light sensor/cable assembly (night light model only)
4	4734001S	1	Cable assembly bridge
5	43878	26 or 27	Screw, machine, pan
6	11247	2 or 4	Locknut
7	4733601	1	Cable, line cord (North American model only)
8	49179	1 or 2	U-bolt
9	6006201	1	Capacitor, motor (110 V/120 V/127 V model only)
	6359701	1	Capacitor, motor, 440 V (220 V/230 V/240 V model only)
	71547	1	Capacitor, motor, 250 V AC (100V model only)
10	64565	1	Cable tie mount, adhesive back
11	144486	1	Cable, accessory AC receptacle (accessory AC receptacle model only)
12	6616548	1	Bracket, battery (battery model only)
13	4840501	1	Battery, lead acid, sealed (battery model only)
14	47293pl	1	Sensor mounting bracket, head lift (battery model only)
15	4734901S	1	Cable assembly, battery (battery model only)
16	4704301S	1	Transformer assembly, North America (120 V)
	70919	1	Transformer assembly, 220 V/230 V/240 V
	70918	1	Transformer assembly, 100V/110V/127V
17	4853601S	1	Cable assembly, night light (night light model only)

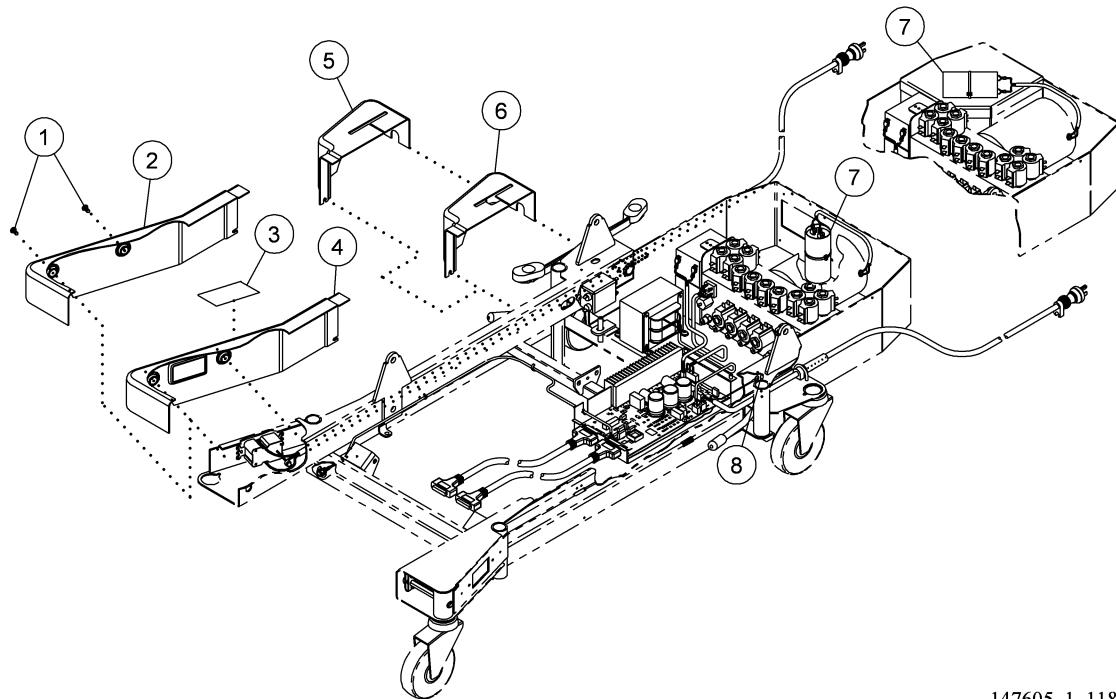
Item Number	Part Number	Quantity	Description
18	4143910	1	Filter, power line (power line filter <b>without</b> air module only)
	3084201	1	Filter, power line, 10A (power line filter <b>with</b> air module only)
19	49175pl	1	Enclosure, night light (night light model only)
20	47224pl	1	Cover, power/control P.C. board
21	49164	11	Long plastic spacer
22	147342	1	Power/control P.C. board assembly (110 V/120 V/127 V model only)
	147341	1	Power/control P.C. board assembly, 230 V (220 V/230 V/240 V model only)
23	47223pl	1	Enclosure, power/control P.C. board
24	42006	4	Screw lock
25	4853801	1	Cable assembly, power distribution
26	4851001	1	Cable assembly, signal distribution
27	4733701	1	Cable assembly, AC power
	70922	1	Cable assembly, 127 V/240 V
	70920	1	Cable assembly, 100 V/220 V
	70921	1	Cable assembly, AC, 110 V/230 V
28	4734501	1	Lamp, miniature incandescent, 13.5V, 0.59A
29	63166	1	Lobe, special head type, #23 screw
30	6351201	1	Cable assembly, Continental Europe
	6351202	1	Cable assembly, Switzerland
	6351203	1	Cable assembly, United Kingdom
	6351204	1	Cable assembly, Australia
	6351208	1	Cable assembly, AC, Japan
	6351209	1	Cable assembly, AC, Taiwan
	6351210	1	Cable assembly, AC, China
	6351206	1	Cable assembly, AC, Italy
	6351205	1	Cable assembly, AC, Denmark
	6351207	1	Cable assembly, AC, Saudi Arabia
31	4714948	1	Barrier, high voltage
32	44125	1	Plug (230 V model only)

Item Number	Part Number	Quantity	Description
33	44127	1	Washer, color-coded green/yellow (230 V model only)
34	44128	1	Washer, serrated lock (230 V model only)
35	44126	1	Nut (230 V model only)
36	3084501	2	Faston® <sup>a</sup> tab adapter (power line <b>with</b> air module model only)
37	4840401	1	Diode, rectifier, 25A, 100A, D34A
38	3976305	4	Standoff
39	151260	1	Bracket, battery, wound care model only
40	43878	2	Screw

a. Faston® is a registered trademark of The Whitaker Corporation.

## Power Control Module—Labels and Cover Assemblies

**Figure 5-26. Power Control Module—Labels and Cover Assemblies**



147605\_1\_118

**Table 5-26. Power Control Module—Labels and Cover Assemblies**

Item Number	Part Number	Quantity	Description
1	47172	2	Screw #10-32 x 5/8" tapping
2	4917002	1	Cover, rh foot base (model without accessory AC receptacle only)
3	140276	1	Label, receptacle capacity (beds with accessory outlet)
4	144024	1	Cover, rh foot end base (accessory AC receptacle model only)
5	4916902	1	Cover, rh head end base (model without accessory AC receptacle only)
6	491690448	1	Cover, rh head base (accessory AC receptacle model only)
7	19124	4	Large cable tie
8	44002	1	Label protective earth

**NOTES:**

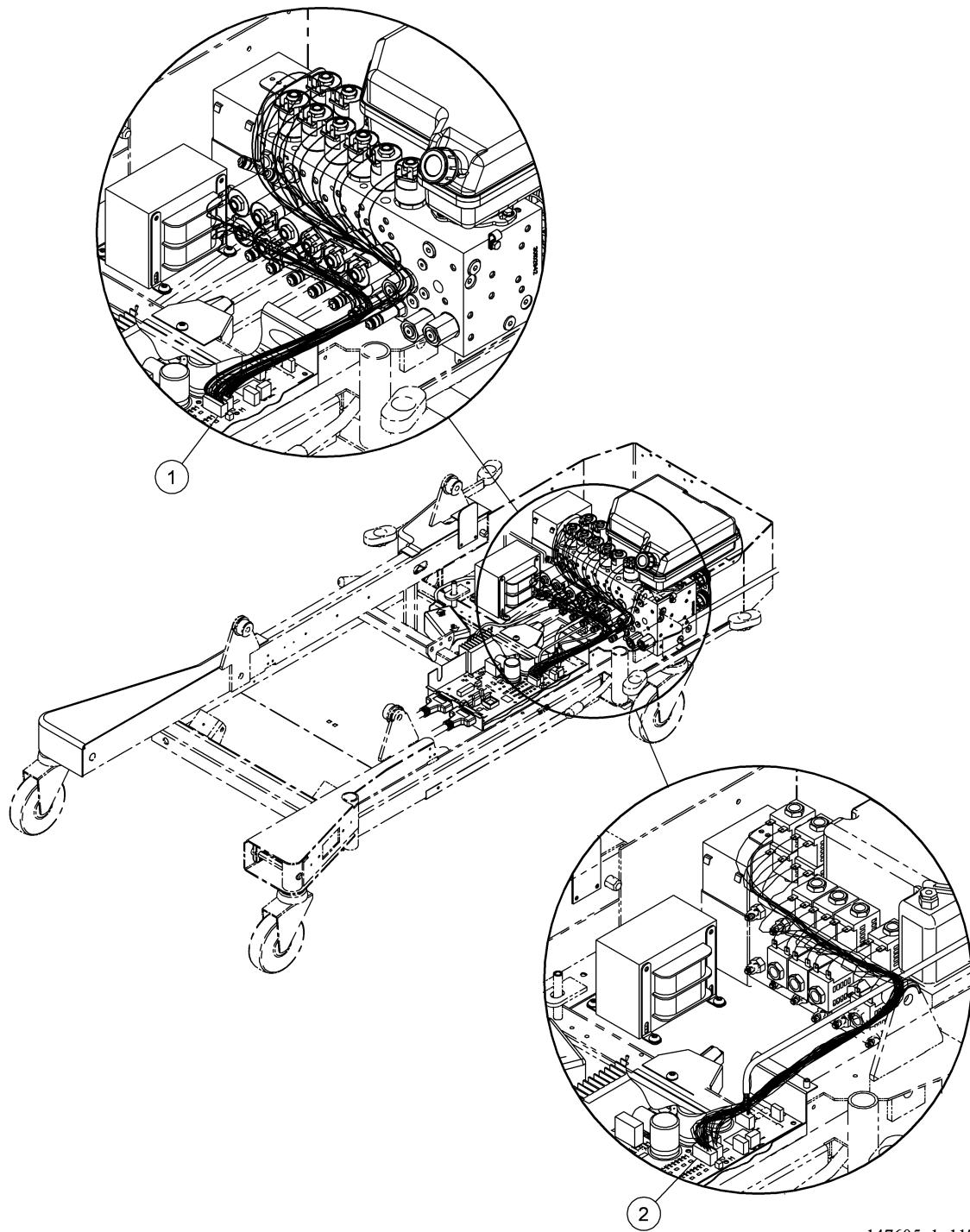
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## **Power Control Module—Bed Solenoid Cable Routing**

**Figure 5-27. Power Control Module—Bed Solenoid Cable Routing**



147605\_1\_117

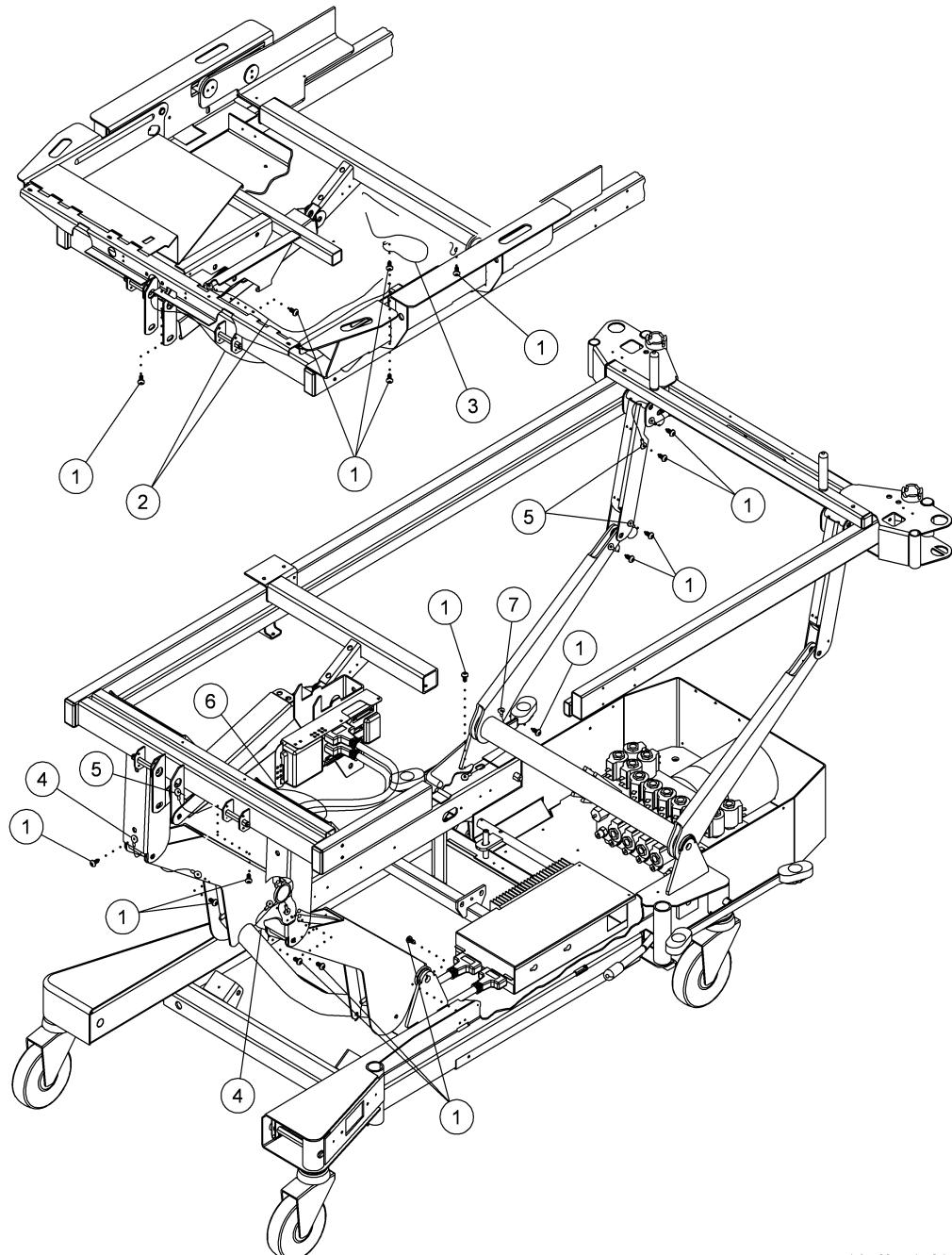
**Table 5-27. Power Control Module—Bed Solenoid Cable Routing**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	66166025	1	Cable assembly, bed solenoid (Delta models only)
2	6616601	1	Cable assembly, bed solenoid (Deltrol models only)

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## **Power Control Module—Signal/Power Distribution Ground Strap Assemblies**

**Figure 5-28. Power Control Module—Signal/Power Distribution Ground Strap Assemblies**



147605\_1\_015

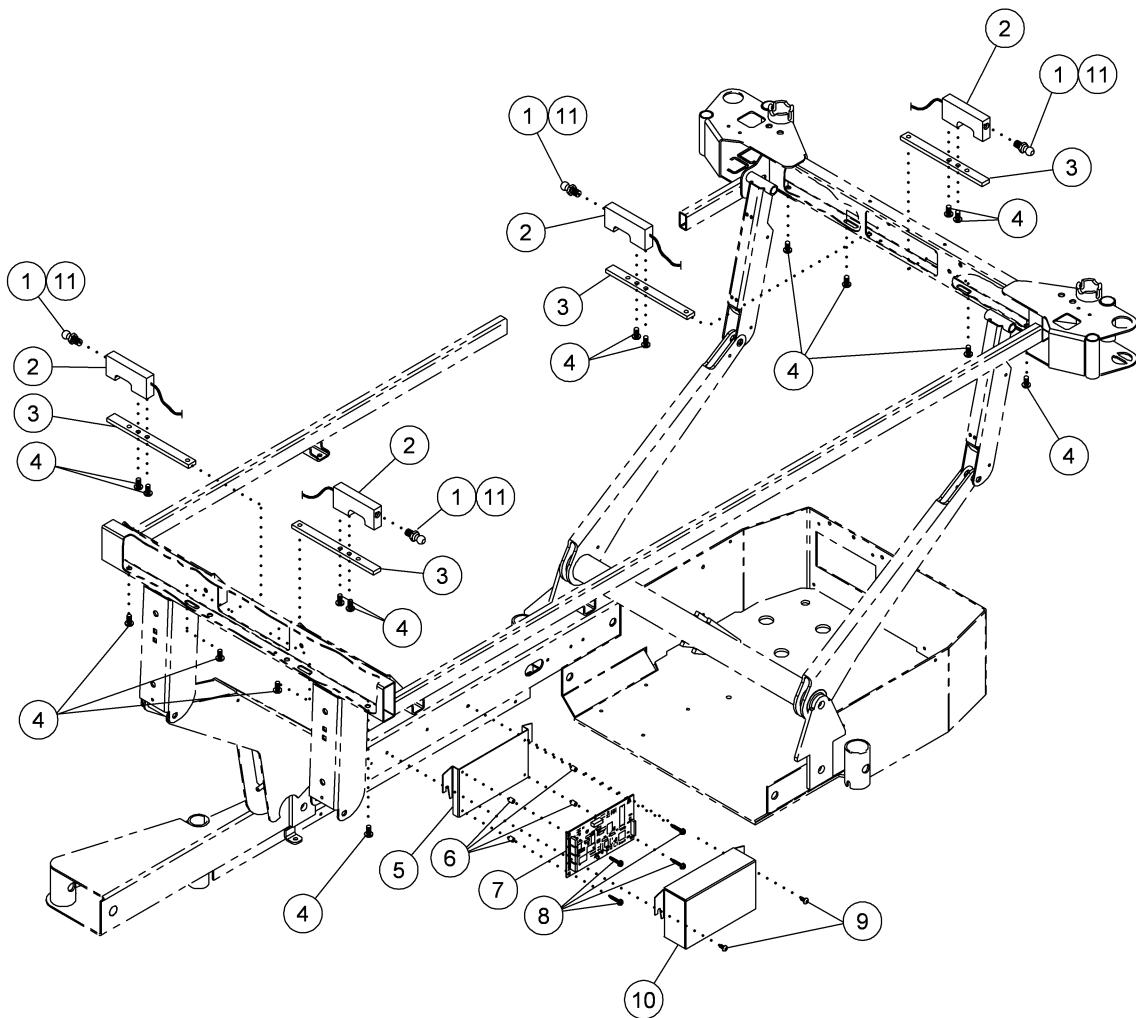
**Table 5-28. Power Control Module—Signal/Power Distribution Ground Strap Assemblies**

Item Number	Part Number	Quantity	Description
1	43878	17	Torx® <sup>a</sup> button head screw
2	3924016	2	Ground strap assembly, 27"
3	39240-02	1	Ground strap
4	3924008	2	Ground strap assembly
5	3924004	3	Ground strap assembly
6	3924015	1	Ground strap assembly, 48"
7	3924017	1	Ground strap assembly, 5.5"

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

## Scale Module

Figure 5-29. Scale Module



147605\_1\_019

**Table 5-29. Scale Module**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	38052	4	Ball stud—gas cylinder, critical care unit (for load beam)
2	137757	4	Load beam Jr—600 lb
3	47135pl	4	Plate, load beam mount intermediate frame
4	49521	16	1/4"-20 x 5/8" six-lobe Torx® <sup>a</sup> screw
5	47227pl	1	Bracket, scale P.C. board
6	49164	4	Long plastic spacer
7	67761	1	OIML scale P.C. board assembly (OIML scale beds only)
	135690	1	P.C. board, scale, TotalCare® Bed System (standard scale bed only)
8	49508	1	Screw, formed, hex washer
9	43878	2	Torx® button head screw
10	47228pl	1	Cover, scale P.C. board
11	8328	As required	8 oz. Loctite® <sup>b</sup> adhesive

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

b. Loctite® is a registered trademark of Loctite Corporation.

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## Scale Module—Cable Routing

Figure 5-30. Scale Module—Cable Routing

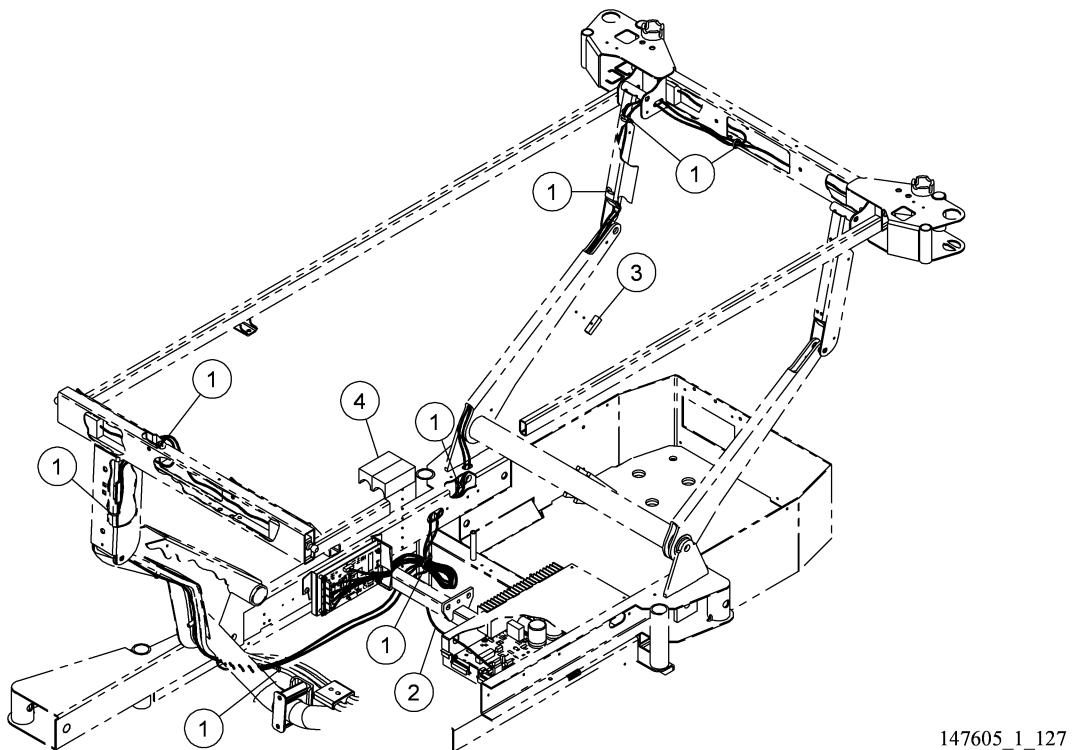


Table 5-30. Scale Module—Cable Routing

Item Number	Part Number	Quantity	Description
1	19124	8	Large cable tie
2	4706201	1	Cable assembly, scale/patient exit detection
3	4088901	1	Sponge
4	67528	1	Electromagnetic interference (EMI) suppressor (OIML scale beds only)

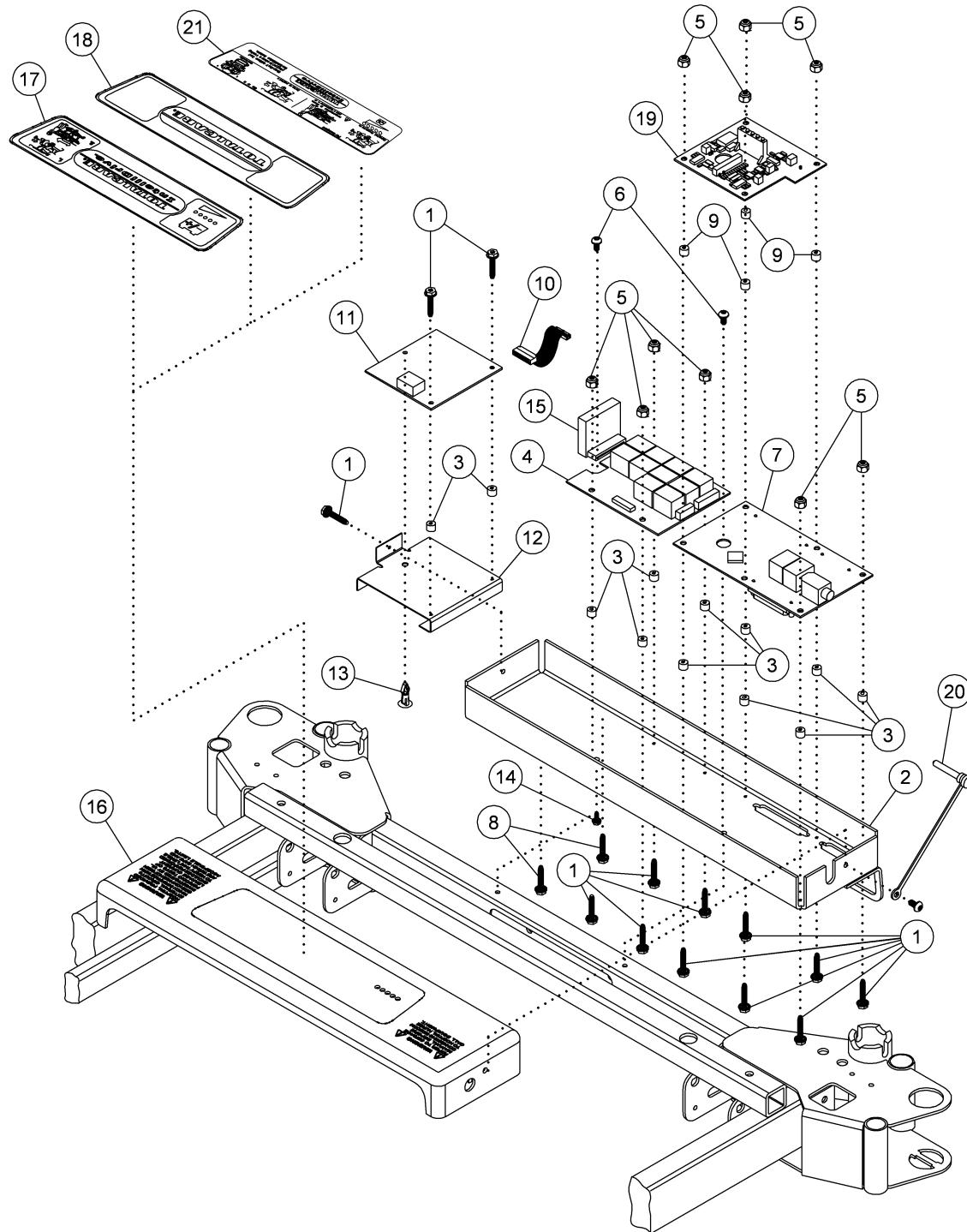
**NOTES:**

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## SideCom® Communication System

Figure 5-31. SideCom® Communication System



147605\_1\_204

**Table 5-31. SideCom® Communication System**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49508	4 to 13	Screw, formed, hexwasher
2	49497PL	1	Weldment, SideCom® Communication System enclosure
3	49463	4 to 12	Spacer, plastic
4	4843601	1	P.C. board assembly, SideCom® Communication System—entertainment/lighting (standard patient lighting/entertainment model only)
	484602		P.C. board assembly, SideCom® Communication System—entertainment/lighting (enhanced entertainment)
	6317902		P.C. board assembly, SideCom® Communication System—entertainment/lighting (UTV board, used with enhanced entertainment)
	4843602	1	P.C. board assembly, SideCom® Communication System—entertainment/lighting (standard patient lighting/entertainment and universal television models only)
5	11247	4 to 10	Nut
6	43878	2	Torx® <sup>a</sup> button head screw
7	142012	1	P.C. board assembly, SideCom® Communication System—nurse call, standard (nurse call/patient exit detection model only)
8	47161	2	#6-32 x 5/8" type F six-lobe screw (universal television model only)
9	6874501	4	Spacer (IntelliDrive® Transport System beds only)
10	63495	1	Ribbon cable (universal television model only)
11	6317902	1	Universal television control board assembly (universal television model only)
12	64172	1	Bracket, universal television (universal television model only)
13	3976301	1	Standoff (universal television model only)

Item Number	Part Number	Quantity	Description
14	40601	1	Screw (nurse call/patient exit detection model only)
15	4476701	1	Television module standard (enhanced patient lighting/entertainment model only)
16	68521	1	Cover, SideCom® Communication System
17	6836501S	1	Battery charge label (IntelliDrive® Transport System beds only)
18	6836502	1	Label, head end, battery charge
19	68276	1	PAG board (IntelliDrive® Transport System beds only)
20	345121	1	Dummy plug
21	144694101	1	Battery charge label (IntelliDrive® Transport System beds only)
	144694102	1	Transport label (non-IntelliDrive® Transport System beds)

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

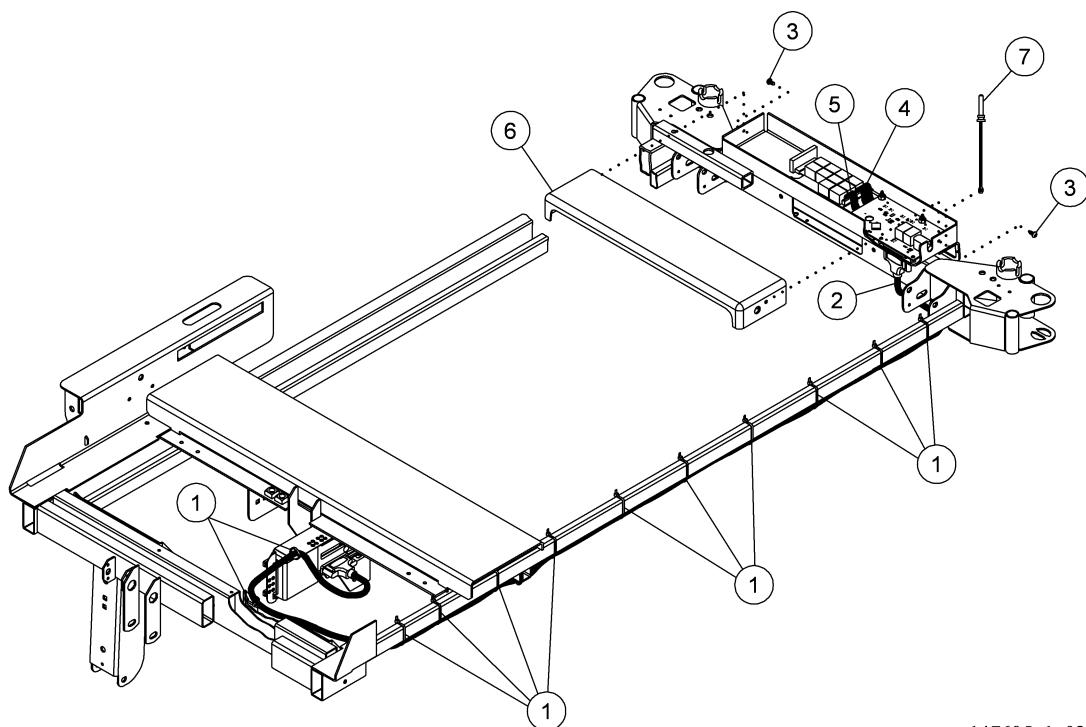
**NOTES:**

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## SideCom® Communication System—Cable Routing

Figure 5-32. SideCom® Communication System—Cable Routing



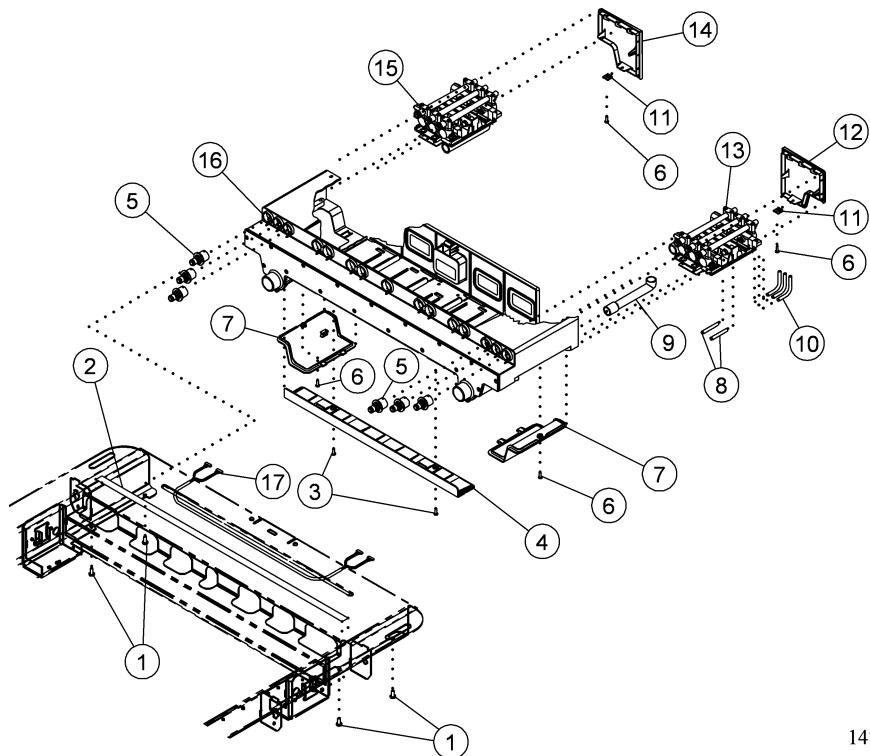
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**Table 5-32. SideCom® Communication System—Cable Routing**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	19124	12	Large cable tie
2	4853701	1	Cable assembly, weigh frame—SideCom® Communication System
3	49493pl	2	Screw, formed, pan
4	3064601	1	Cable assembly, SideCom® Communication System—entertainment (standard patient lighting/entertainment, enhanced patient lighting/entertainment, and universal television models only)
5	3064501	1	Cable assembly, SideCom® Communication System—entertainment (standard patient lighting/entertainment, enhanced patient lighting/entertainment, and universal television models only)
6	47308	1	Cover, SideCom® Communication System
7	34512	1	Dummy plug

## Air Module—Treatment Manifold Assembly

Figure 5-33. Air Module—Treatment Manifold Assembly



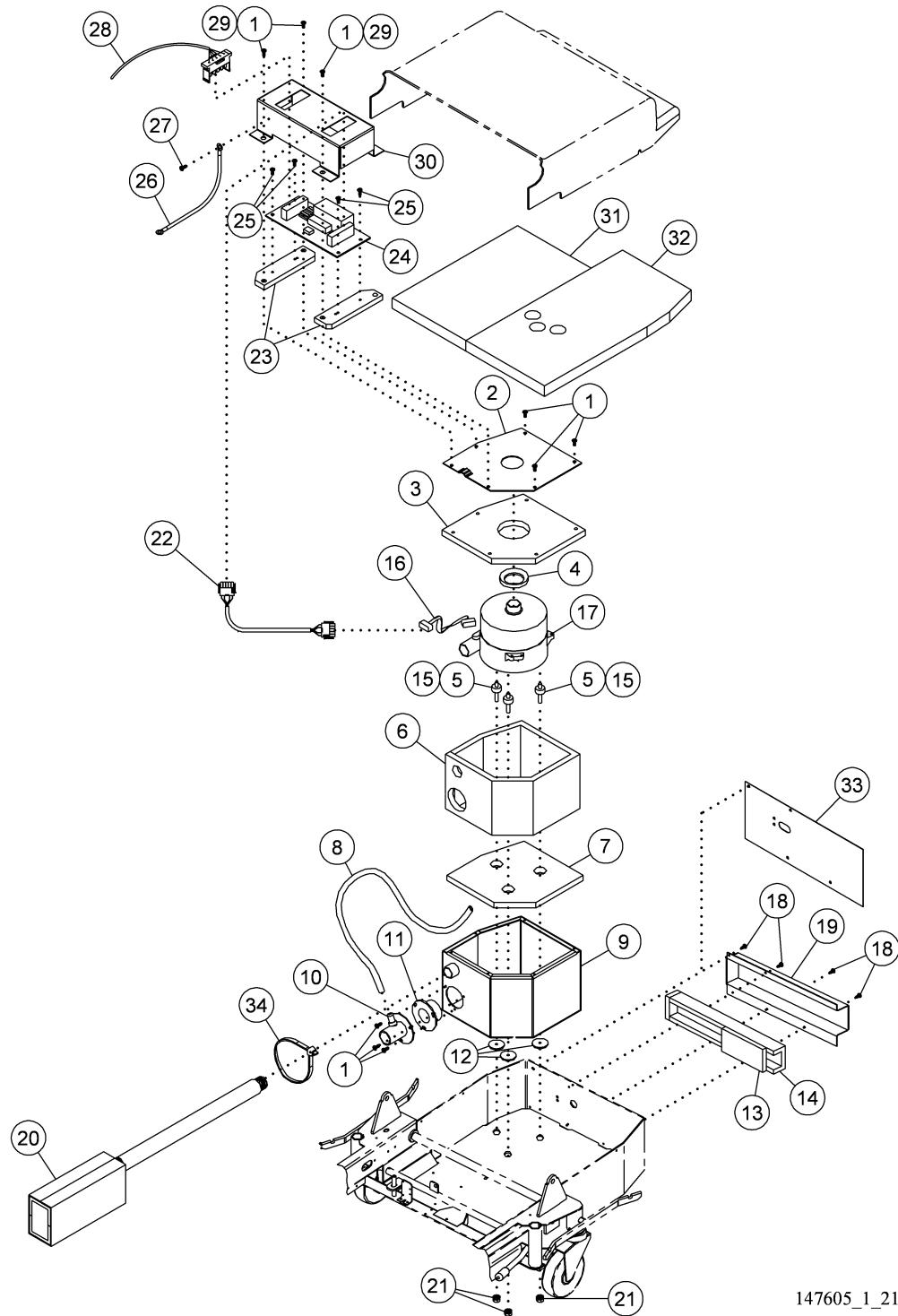
147605\_2\_125

**Table 5-33. Air Module—Treatment Manifold Assembly**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49435	4	Screw, external tooth sems
2	61068	1	Bladder connection position label
3	4914102	2	Screw, sems
4	49417	1	Cover connector, manifold
5	64531	3	Bladder connector, permanent module
6	62567	4	Nylon screw #6-32 x ½"
7	49418	2	Access door, permanent module, manifold
8	6144202	2	Sensor tube
9	4943202	1 or 2	Molded tube, red
10	63044	3 or 6	Sensor tube—formed
11	61133	2	Nut, U-type
12	494190148	1	Treatment foot surface module cover
13	63392S	1	Treatment foot surface control module
14	494190248	1	Treatment surface module cover
15	63393S	1	Treatment surface control module (treatment surface control module model only)
16	62775	1	Manifold assembly
17	3054801	1	Cable assembly, treatment foot surface control module to treatment surface control module (treatment surface control module model only)

## Air Module—Low Noise Blower Assembly Kit

Figure 5-34. Air Module—Low Noise Blower Assembly Kit



147605\_1\_213

**Table 5-34. Air Module—Low Noise Blower Assembly Kit**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	63166	10 or 13	Screw, lobe
2	6437448	1	Cover, blower enclosure
3	64447	1	Insulation, blower assembly top
4	64416	1	Seal, blower assembly, vacuum port
5	64449	3	Mount, $\frac{1}{4}$ "-20 stud, isolation ("A" or "B" model only)
	6444901	3	Mount, isolation ("C" or later model only)
6	64448	1	Insulation, blower assembly, side wall
7	64446	1	Insulation, blower assembly, bottom
8	64572	1	Hose, pressure vent
9	6446848S	1	Blower enclosure weldment assembly
10	6446948S	1	Pressure port tube/flange assembly
11	64417	1	Seal, blower assembly pressure port
12	66433	3	Washer, blower assembly isolation
13	64571	1	Insulation, tub wall
14	64570	1	Insulation, blower muffler
15	SA3618	As required	Blue Loctite® <sup>a</sup> threadlocker, 10 cc bottle
16	6453001S	1	Cable assembly, blower motor
17	146143	1	Blower, 120 V, multi-stage
18	43878	8	Torx® <sup>b</sup> button head screw
19	6458248S	1	Weldment, muffler
20	67228	1	Intake/exhaust muffler assembly
21	20802	3	Nut, keps, hex
22	71789	1	Cable, blower isolation adapter (110 V/230 V model only)
23	71724	2	Bracket, P.C. board (110 V/230 V model only)
24	71700	1	Blower isolation P.C. board assembly (110 V/230 V model only)
25	4214101	4	Screw, hilow (110V/230V model only)
26	3924013	1	Ground strap assembly—17" (110 V/230 V model only)

Item Number	Part Number	Quantity	Description
27	49493	1	Screw, formed, pan (110 V/230 V model only)
28	4853501S	1	Cable assembly, air source, 120 V
	70939	1	Cable assembly, air source, 110 V/230 V
	70940	1	Cable assembly, air source, 127 V/240 V
	70938	1	Cable assembly, air source, 110 V/220 V
29	43879	3	Torx® button head screw (110 V/230 V model only)
30	71726PL	1	P.C. board bracket (110 V/230 V model only)
31	62024	1	Insulation foam, rear base cover
32	62025	1	Insulation foam, rear base cover
33	64660	1	Plate, vent hose (if applicable)
34	31844	3	Cable tie

a. Loctite® is a registered trademark of Loctite Corporation.

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

**NOTES:**

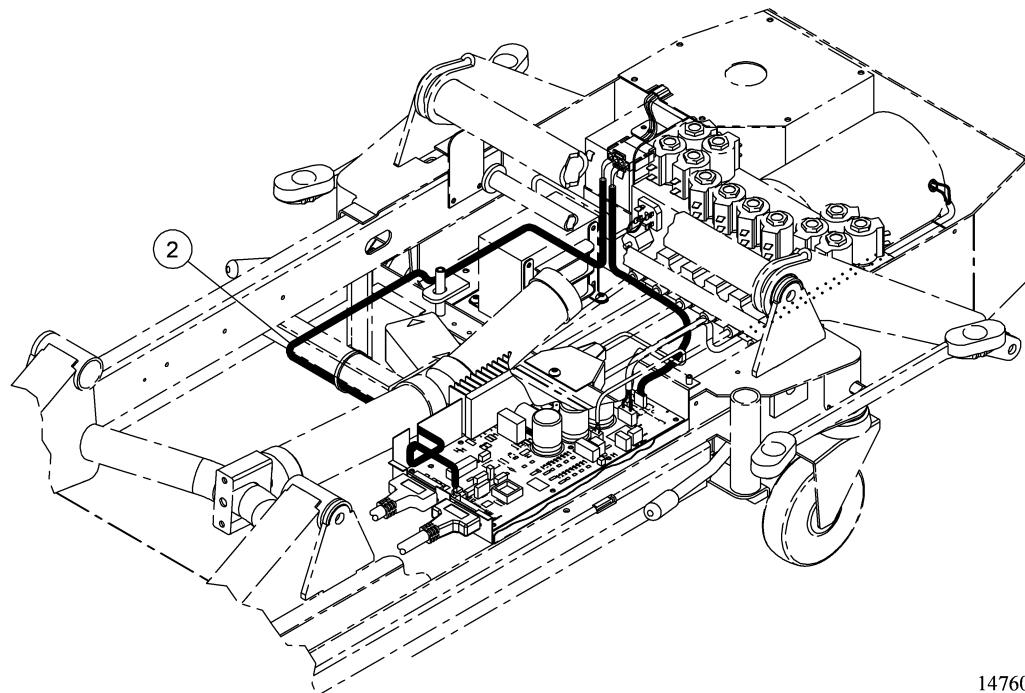
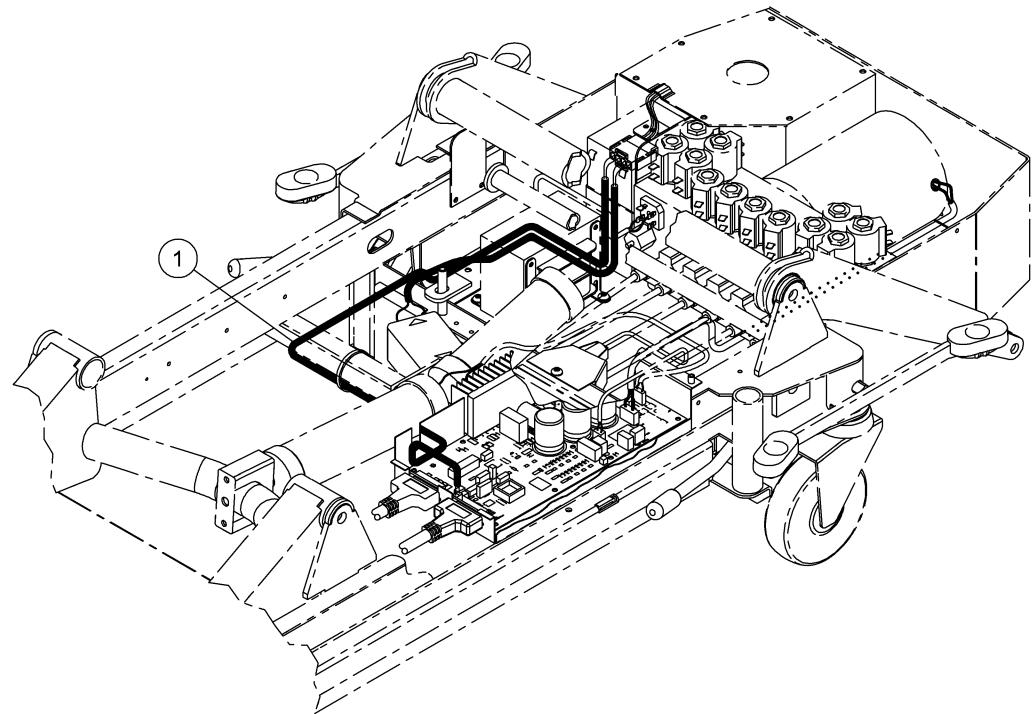
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## Air Module—Air Source Cable Assembly Routing—120V and 230V

Figure 5-35. Air Module—Air Source Cable Assembly Routing—120V and 230V



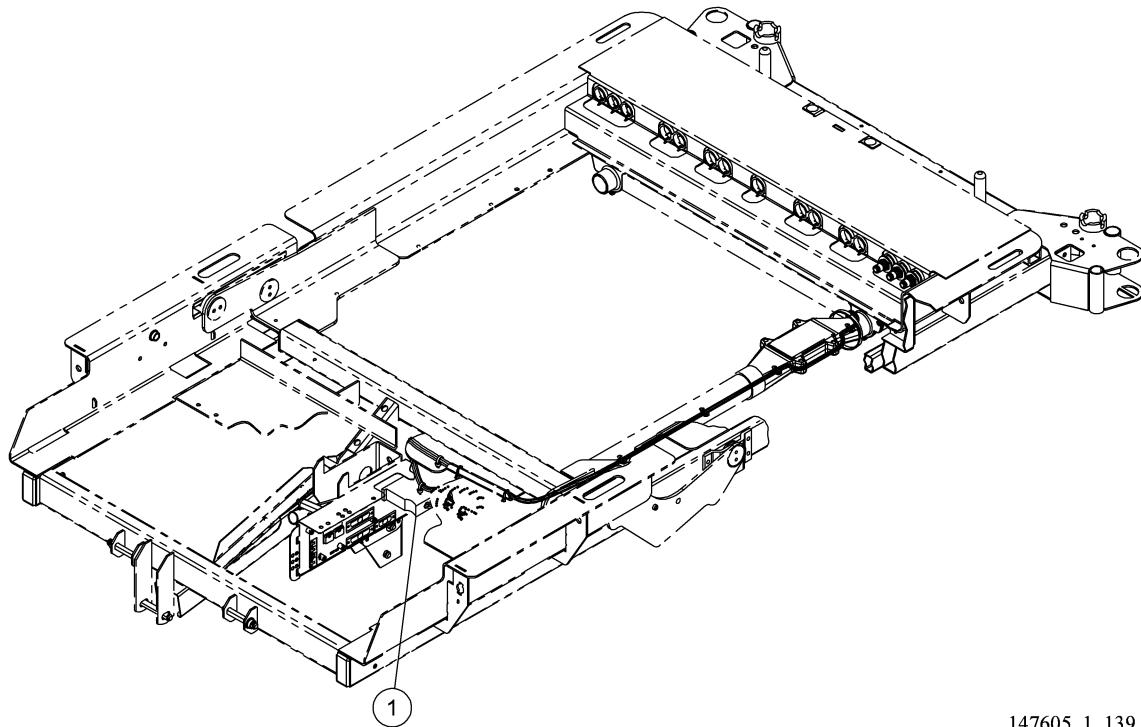
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**Table 5-35. Air Module—Air Source Cable Assembly Routing—  
120V and 230V**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	4853501	1	Cable assembly, air source (North American 120V model only)
2	6350901	1	Cable assembly, air source (230V model only)

## Air Module—Weigh Frame Cable Assembly Routing

Figure 5-36. Air Module—Weigh Frame Cable Assembly Routing



147605\_1\_139

Table 5-36. Air Module—Weigh Frame Cable Assembly Routing

Item Number	Part Number	Quantity	Description
1	6305801	1	Cable assembly, weigh frame (routes between P8 on the weigh frame junction P.C. board assembly and P1 and P12 on the TFSCM P.C. board assembly)

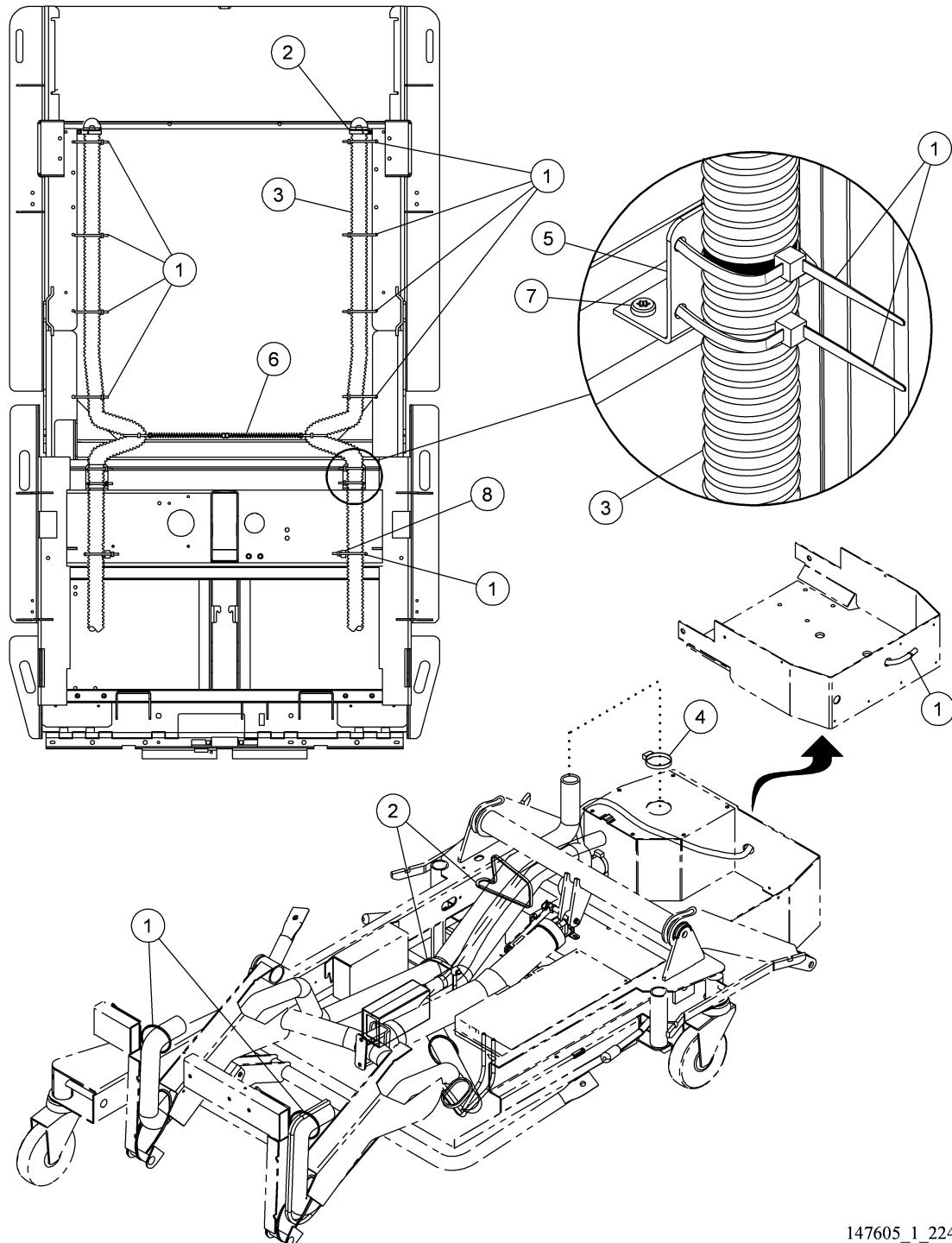
**NOTES:**

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## Air Module—Supply Hose Assembly and Routing (Treatment and Pulmonary)

Figure 5-37. Air Module—Supply Hose Assembly and Routing (Treatment and Pulmonary)



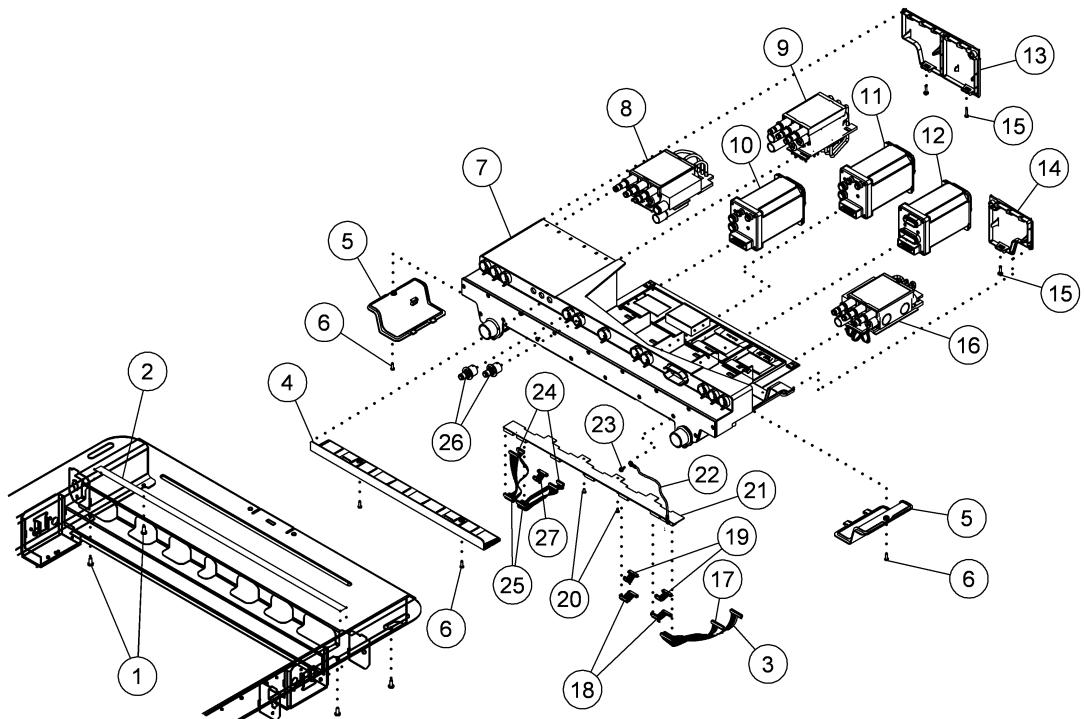
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**Table 5-37. Air Module—Supply Hose Assembly and Routing (Treatment and Pulmonary)**

Item Number	Part Number	Quantity	Description
1	19124	8 or 10	Large cable tie
2	31844	4 or 5	Cable tie
3	140446	1 or 2	Assembly supply hose
4	64694	2	Hose clamp
5	140443	2	Bracket, air hose mounting
6	140444	2	Spring, extension
7	44489	4	Screw
8	40421	2	Cable tie mount

## Air Module—Pulmonary Manifold Assembly

Figure 5-38. Air Module—Pulmonary Manifold Assembly



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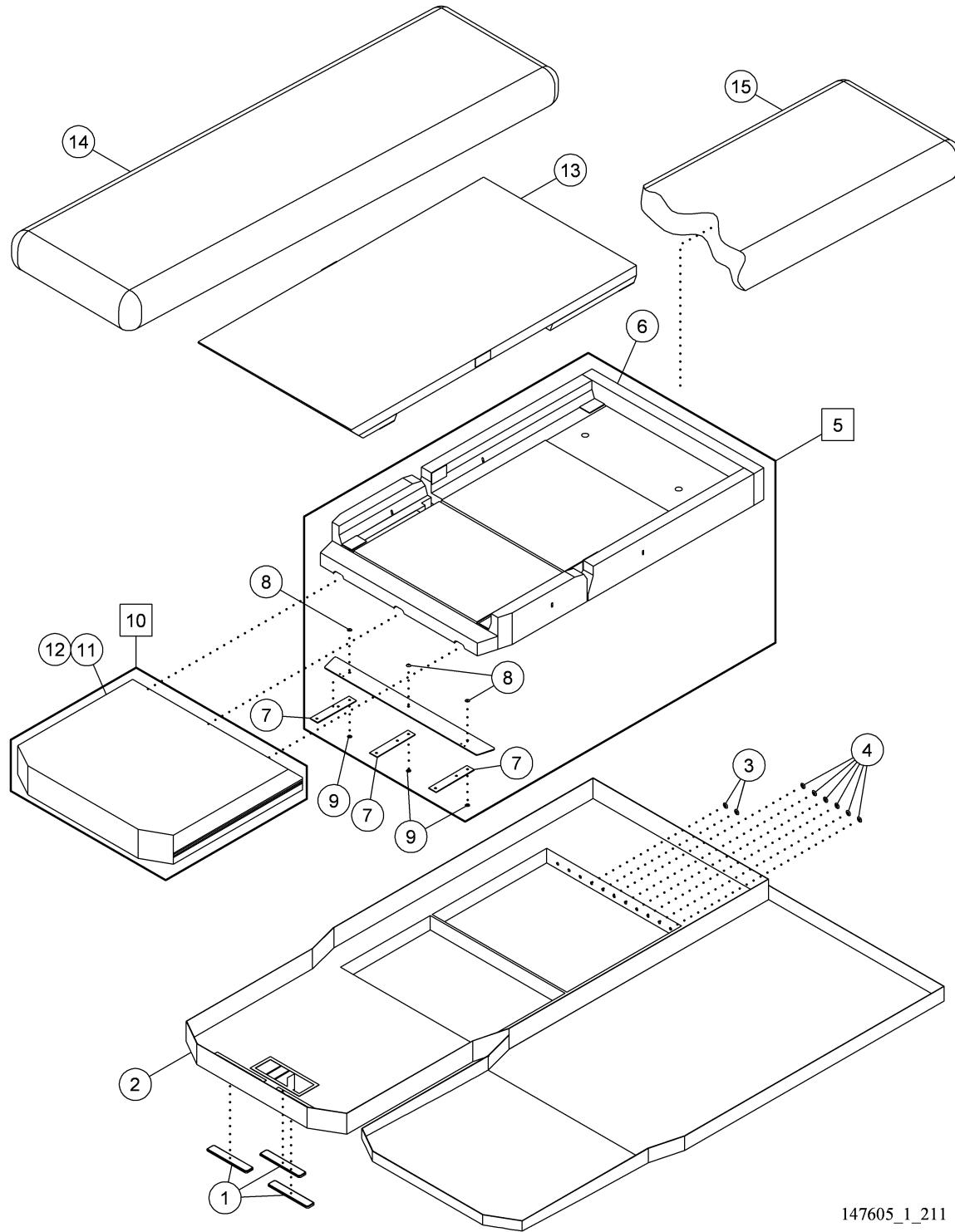
**Table 5-38. Air Module—Pulmonary Manifold Assembly**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49435	4	Screw
2	61068	1	Label, bladder connection position
3	66547	1	Cable, 15-pin, TFM to backplane
4	49417	1	Connector cover, manifold
5	49418	2	Access door, permanent module
6	4914102	4	Screw
7	144764	1	Air manifold
8	143196	1	Treatment torso module (TTM)
9	142133	1	Pulmonary base module (PBM)
10	P1966A	1	Low air loss module
11	P1939	1	Percussion and vibration module
12	P1938	1	Rotation module
13	66926	1	Air manifold cover, rh
14	66925	1	Air manifold cover, lh
15	67237	2	Screw
16	142131	1	Treatment foot module (TFM)
17	66541	1	Cable, 14-pin, TFM to backplane
18	66546	2	Cable, 11-pin, drawer to backplane
19	66917	2	Cable, 8-pin, drawer to backplane
20	6695404	2	Screw
21	48448	1	Circuit board, air manifold backplane
22	3924008	1	Ground strap
23	67214	1	Screw
24	66916	2	Cable, TFM, base-RS232-to backplane
25	66544	2	Cable, backplane to PBM/TTM
26	64531	4	Bladder connector
27	141772	1	Cable, ribbon, low air loss
Not shown	142528	1	Door stop (rental beds only)
Not shown	143392	2	Screw (for P/N 142528) (rental beds only)

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## **Short Stay Surface—P1915EC8, P1915EAZZ, P1915EA25, and P1915EA28**

**Figure 5-39. Short Stay Surface—P1915EC8, P1915EAZZ, P1915EA25, and P1915EA28**



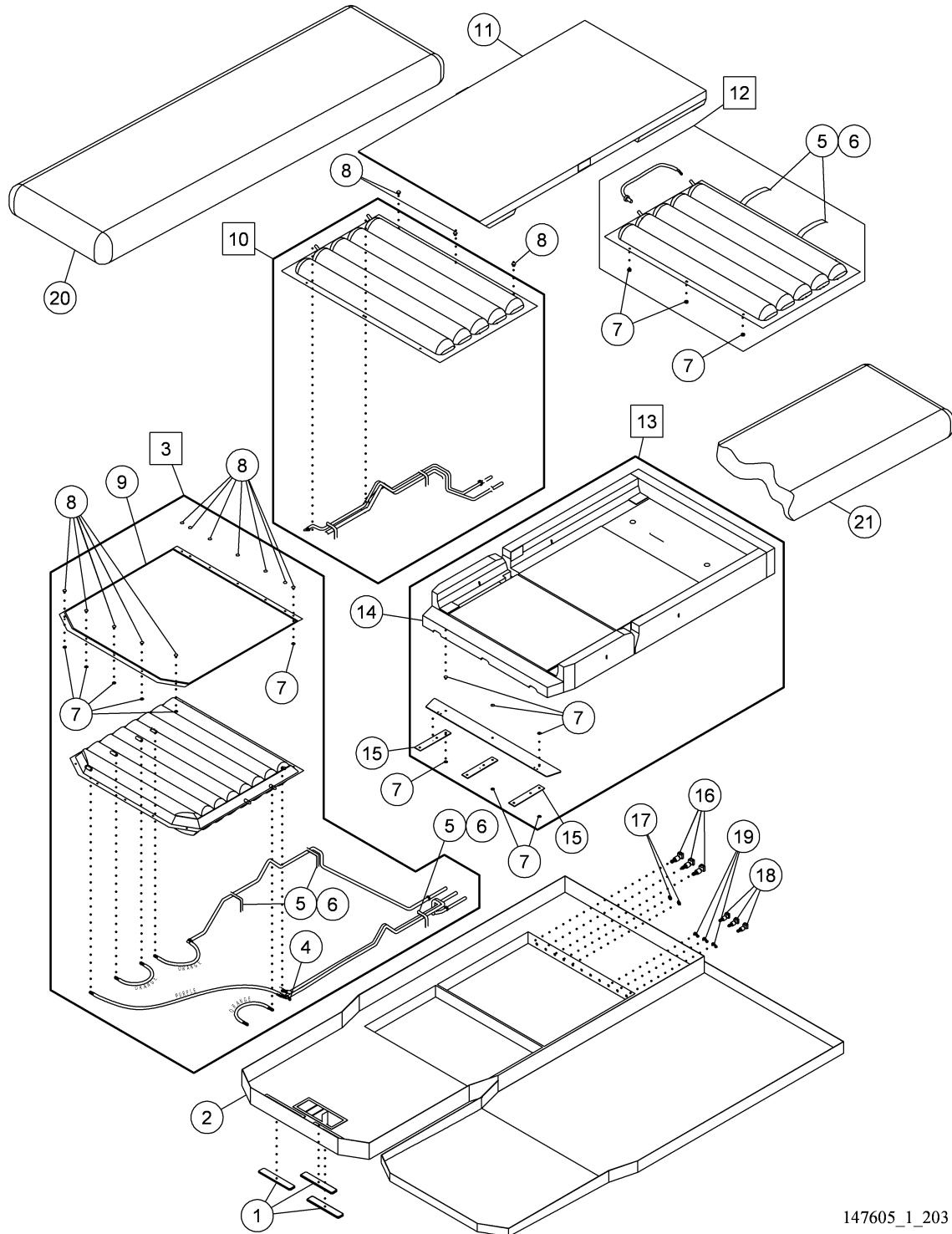
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**Table 5-39. Short Stay Surface—P1915EC8, P1915EAZZ, P1915EA25, and P1915EA28**

Item Number	Part Number	Quantity	Description
1	SA4589	3	Magnet
2	14012801	1	Ticking assembly (United States units only)
	72518	1	Ticking assembly (United Kingdom units only)
	72526	1	Ticking assembly (Italian units only)
	128408	1	Ticking assembly (French and European units only)
3	4933601	5	Cap plug, $\frac{1}{2}$ "
4	4933602	6	Cap plug, $\frac{3}{4}$ "
5	65328	1	Foundation foam
6	65330	1	Head tray foam
7	49326	3	Foot strap
8	6050601	3	Snap rivet, female
9	6050602	3	Snap rivet, male
10	4941401	1	Foam foot module
11	49442	1	Foam foot assembly
12	49370	1	Foam foot slip sock
13	71805	1	Continuous topper foam
14	71663	1	Sheer liner, short stay
15	49409	1	Fire barrier

## Treatment Surface—P1915EE9, P1915EA24, and P1915EA27

Figure 5-40. Treatment Surface—P1915EE9, P1915EA24, and P1915EA27



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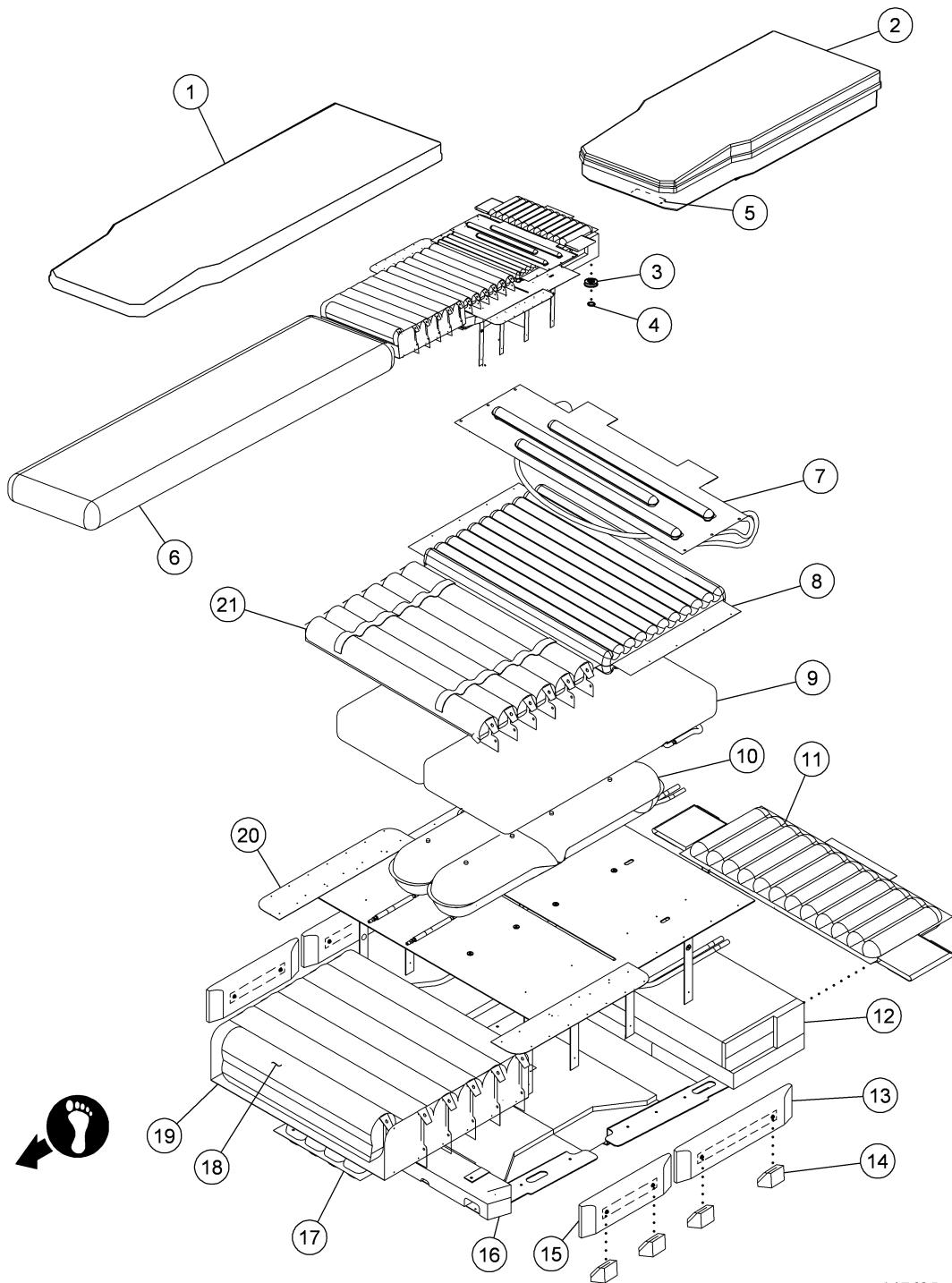
**Table 5-40. Treatment Surface—P1915EE9, P1915EA24, and P1915EA27**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	SA4589	3	Magnet
2	140134	1	Ticking assembly (United States, French, and European units only)
	72518	1	Ticking assembly (United Kingdom units only)
	128410	1	Ticking assembly (Italian units only)
3	49368	1	Air foot module
4	19124	2	Cable ties
5	4923802	6	Velcro® <sup>a</sup> hook
6	4923803	6	Velcro® loop
7	6050601	21	Snap rivet, female
8	6050602	21	Snap rivet, male
9	49369	1	Slip sheet
10	64544	1	Thigh air bladder assembly
11	71805	1	Continuous topper foam
12	64543	1	Torso air bladder assembly
13	65327	1	Foundation foam
14	65329	1	Head tray foam
15	49326	3	Foot strap
16	4932901	3	Quick disconnect
17	4933601	2	Cap plug, ½"
18	4932902	3	Quick disconnect, 3/8"
19	19124	3	Cable tie
20	70192	1	Sheer liner
21	49409	1	Fire barrier

a. Velcro® is a registered trademark of Velcro Industries, BV (a Dutch Corporation).

## Pulmonary Surface (P1916EA) (Sheet 1 of 3)

Figure 5-41. Pulmonary Surface (P1916EA) (Sheet 1 of 3)



147605\_1\_229

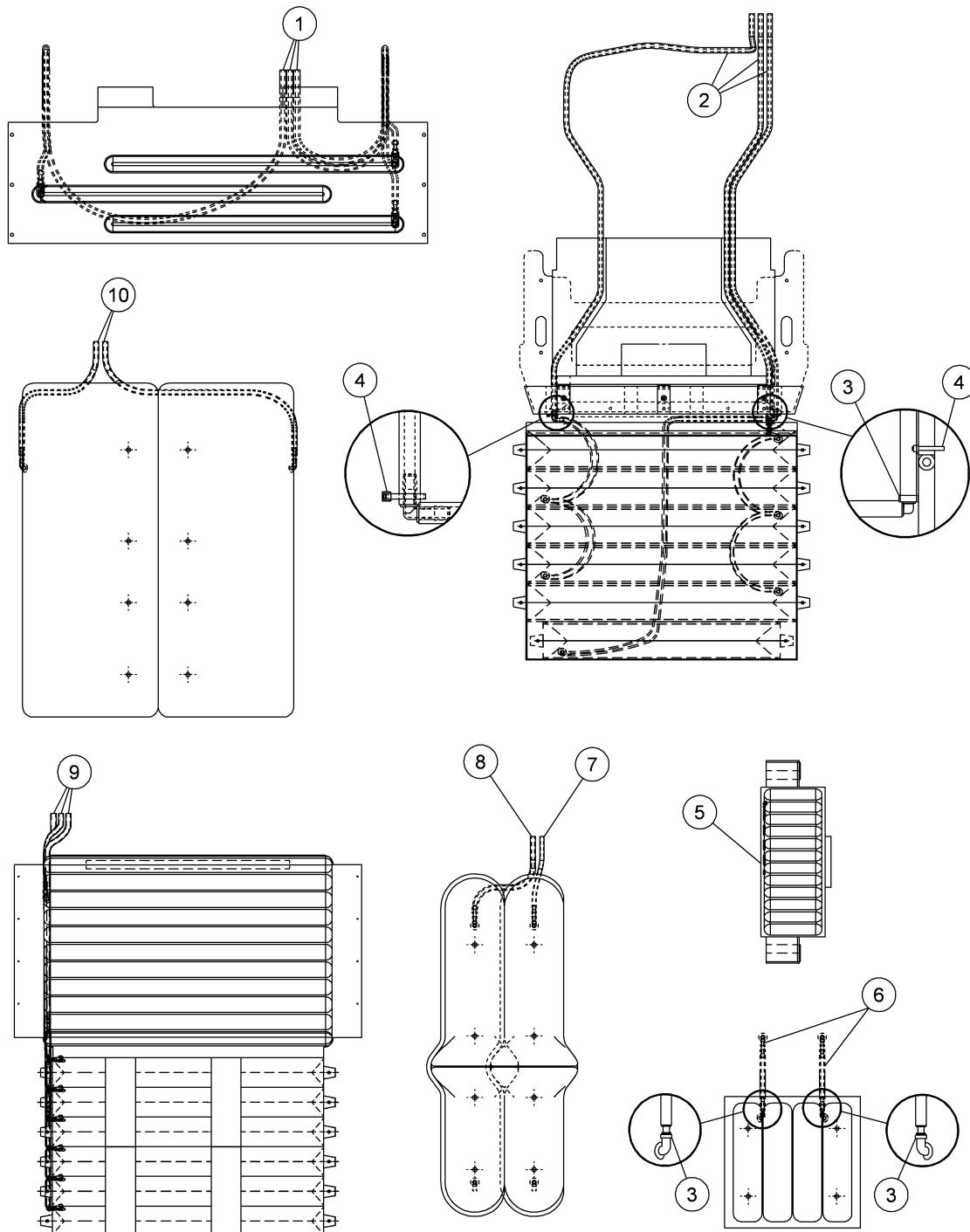
**Table 5-41. Pulmonary Surface (P1916EA) (Sheet 1 of 3)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	P1843A1	1	Low airloss cover
	P1843A3	1	Low airloss cover, Dartex® <sup>a</sup>
2	14013701	1	Ticking assembly, United States
	134798	1	Ticking assembly, Italy
	134799	1	Ticking assembly, United Kingdom
3	49410	1	Super snap disk
4	4935703	1	O-ring
5	49243	3	Magnet
6	4932704	1	Fire barrier
7	132660	1	Percussion and vibration cushion
8	132659	1	Treatment cushion
9	65997	1	Working cushion
10	66066	2	Boost cushion, torso
11	132665	1	Head cushion
12	132674	1	Head assembly
13	66086	2	Head bolster assembly
14	135715	8	Foam block
15	66087	2	Thigh bolster assembly
16	135728	1	Thigh assembly
17	66088	1	Foot boost assembly
18	144543	1	Foot cushion assembly
19	132661	1	Heel cushion mounting substrate
20	132658	1	Cushion mounting substrate
21	132662	1	Seat and thigh cushion assembly
Not shown	6050601	21	Snap rivet, female
Not shown	6050602	21	Snap rivet, male

a. Dartex® is a registered trademark of Dartex Coatings Limited Corporation.

## Pulmonary Surface (P1916EA) (Sheet 2 of 3)

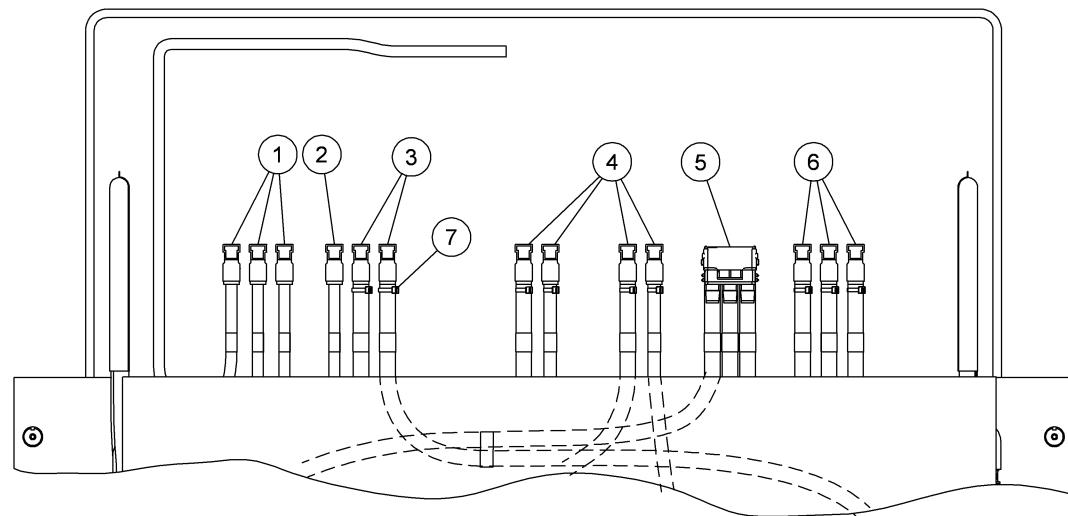
Figure 5-42. Pulmonary Surface—P1916EA (Sheet 2 of 3)



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**Table 5-42. Pulmonary Surface (P1916EA) (Sheet 2 of 3)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	66964	1	Plumbing assembly, P and V cushion
2	132673	1	Plumbing assembly, foot
3	67272	3	Ring clamp
4	19124	2	Cable tie
5	132654	1	Plumbing assembly, head cushion (clear)
6	66957	1	Plumbing assembly
7	66960	1	Plumbing assembly, boost, left (blue)
8	66959	1	Plumbing assembly, boost, right (clear)
9	132675	1	Plumbing assembly, treatment cushion
10	66961	1	Plumbing assembly, working cushion
Not shown	144420	1	Plumbing assembly, low airloss

**Pulmonary Surface (P1916EA) (Sheet 3 of 3)****Figure 5-43. Pulmonary Surface (P1916EA) (Sheet 3 of 3)**

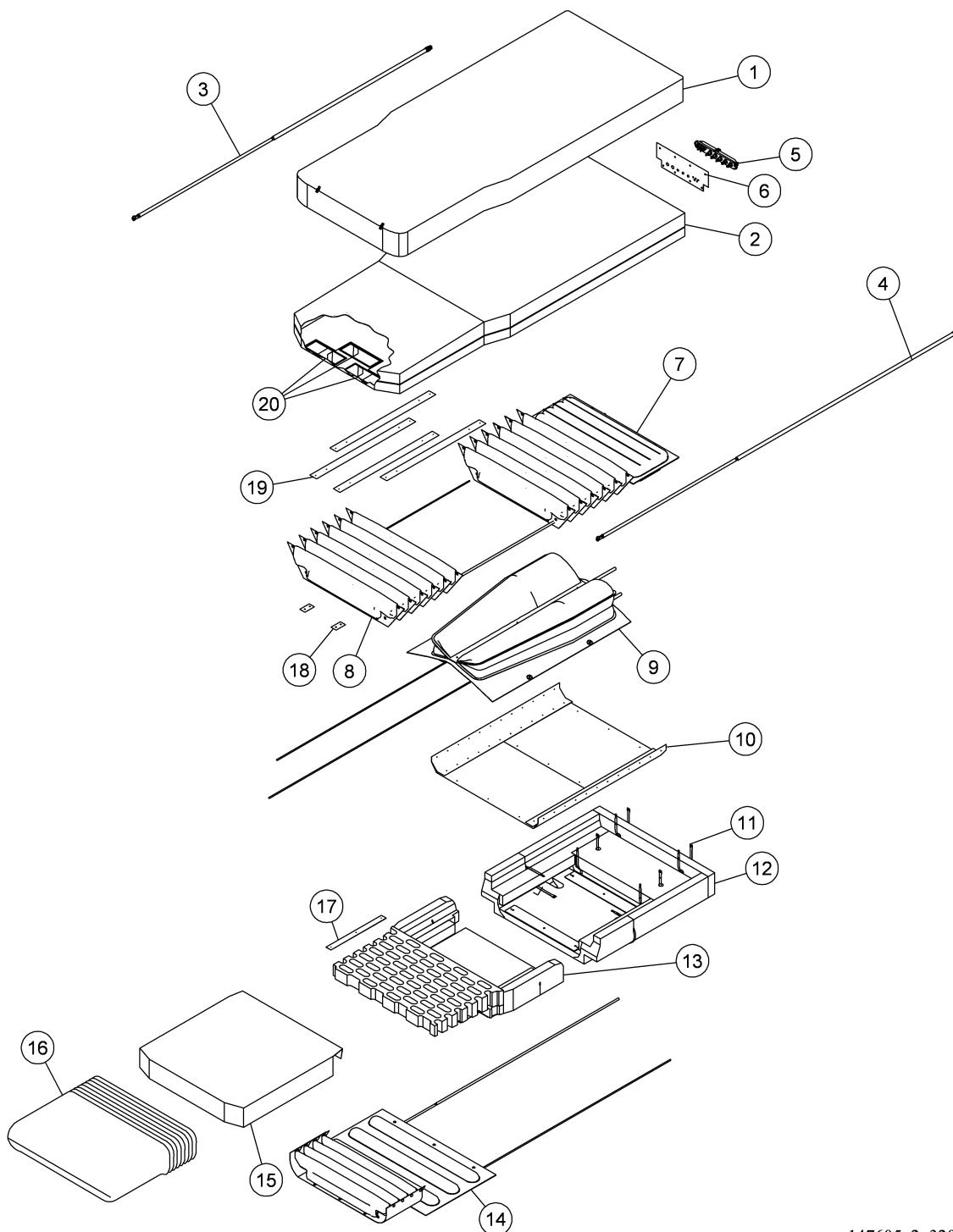
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**Table 5-43. Pulmonary Surface (P1916EA) (Sheet 3 of 3)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	132066	3	Quick disconnect, 1/4" barb
2	4932901	3	Quick disconnect, 1/4" barb
3	4932902	4	Quick disconnect, 3/8" barb
4	66913	2	Quick disconnect, APC, 3/8" barb
5	66685	1	Percussion and vibration connector
6	132067	1	Quick disconnect, 3/8" barb
7	19124	9	Cable tie

## P500 Surface (P1918A)

Figure 5-44. P500 Surface (P1918A)



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**Table 5-44. P500 Surface (P1918A)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	1844A1	1	Topper, MCM
	1844A3	1	Topper, non-MCM
2	151750	1	Cover assembly
3	151831	1	Tube assembly, right LAL fill
4	151996	1	Tube assembly, left LAL fill
5	1500060034	1	Interface connector
6	1000050767	1	Patten interface
7	151807	1	Cushion, head treatment
8	151821	1	Cushion, seat treatment
9	152265	1	Turn assist assembly
10	151600	1	Cushion mount substrate
11	147664	6	Fastener, hook and loop
12	151822	1	Head foam assembly
13	151823	1	Thigh foam assembly
14	152134	1	Cushion, foot treatment
15	151704	1	Foot assembly, shear cover
16	100010006	1	Fire barrier
17	1000050687	1	Attachment strap, foot
18	143128	2	Strap, bottom bladder
19	100050686	4	Attachment strap, seat
20	SA4589	3	Magnet

**NOTES:**

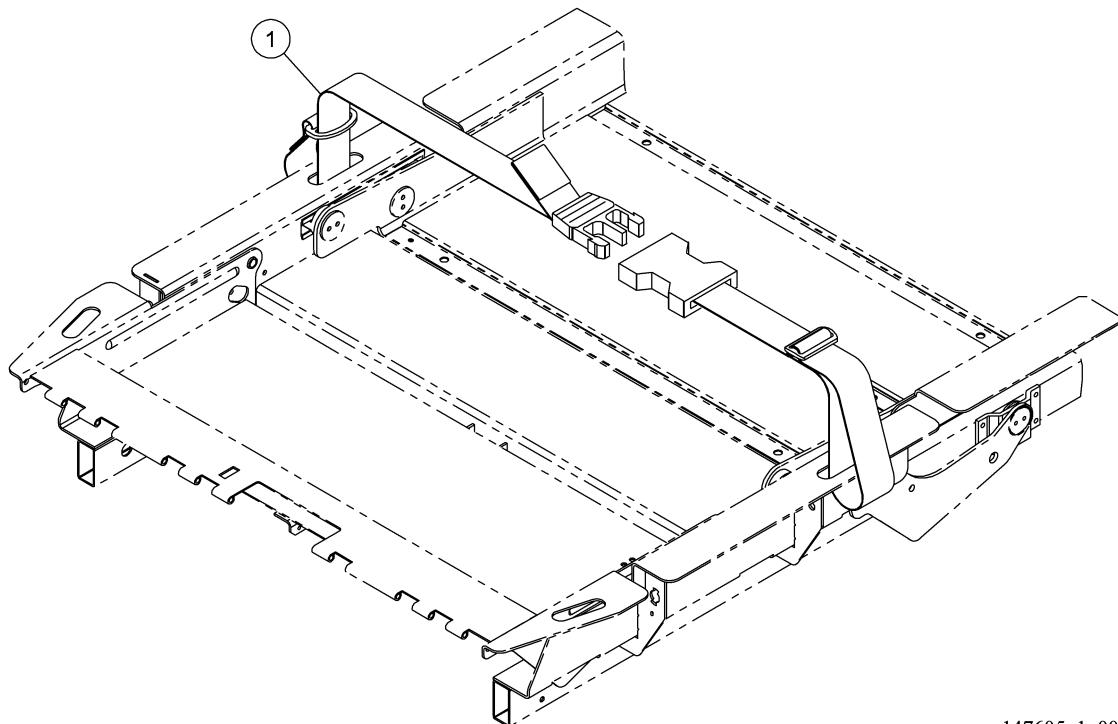
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## **Seatbelt—P1926**

**Figure 5-45. Seatbelt—P1926**



147605\_1\_002

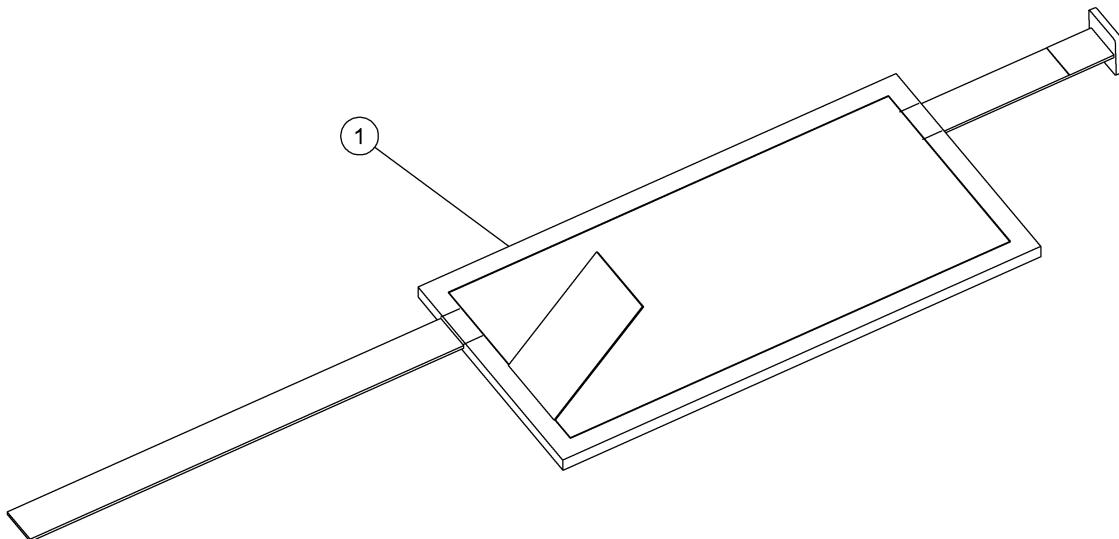
**Table 5-45. Seatbelt—P1926**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	47302	1	Seatbelt assembly

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## **Foot Pad—P1929**

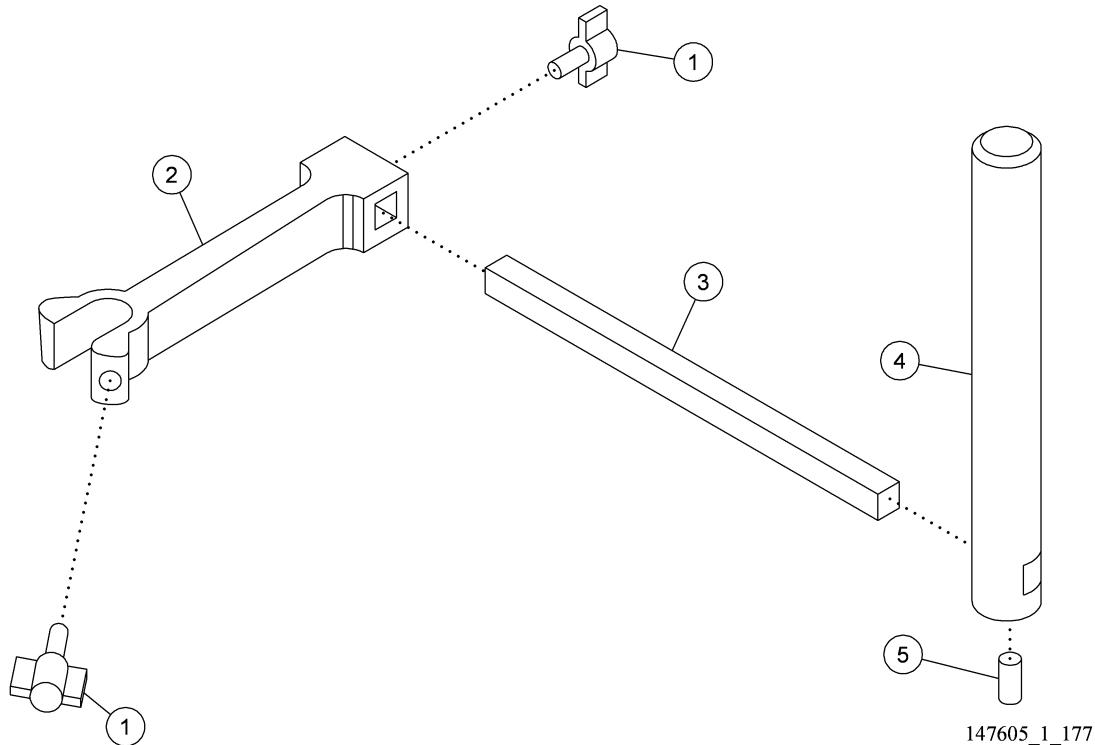
**Figure 5-46. Foot Pad—P1929**



147605\_1\_244

**Table 5-46. Foot Pad—P1929**

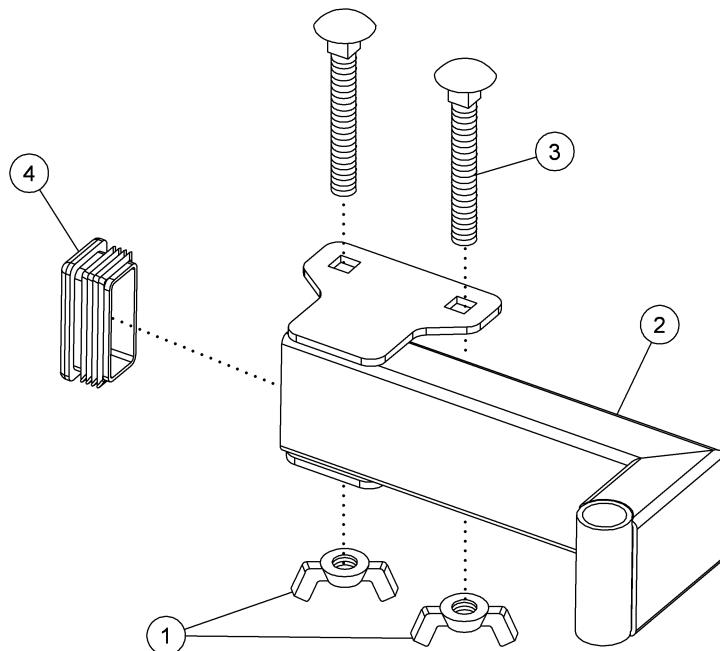
<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	P1929	1	2" foot pad—TotalCare® Bed System

**Transducer Holder—P294****Figure 5-47. Transducer Holder—P294****Table 5-47. Transducer Holder—P294**

Item Number	Part Number	Quantity	Description
1	38135	2	Knob assembly
2	38743	1	Transducer mount extrusion
3	38742	1	Extrusion rod—transducer mount
4	38744	1	Height adjustment rod
5	90301-16	1	Setscrew

## Traction Bracket—P1940

Figure 5-48. Traction Bracket—P1940



147605\_1\_012

Table 5-48. Traction Bracket—P1940

Item Number	Part Number	Quantity	Description
1	63222	2	Wing nut, 5/16"-18
2	62798	1	Traction bracket assembly
3	63221	2	5/16"-18 round head square neck bolt
4	4917702	1	Plug, frame tube

5

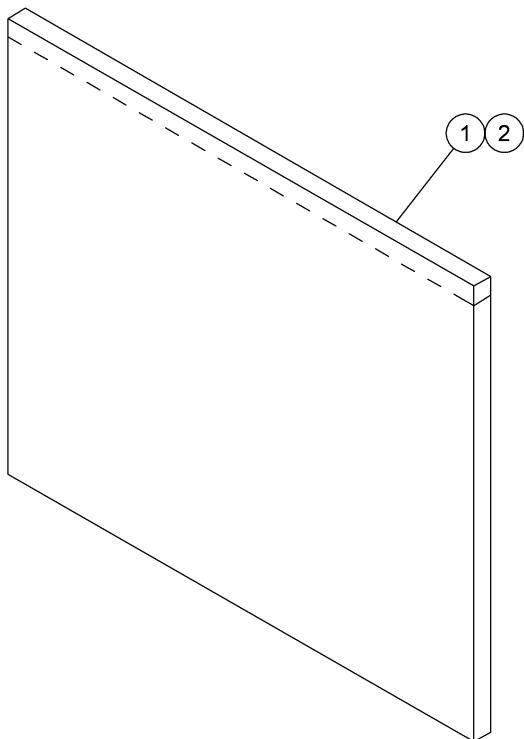
**NOTE:**

For use with traction equipment from Texas Medical Industries, Inc. (TMI) or Orthopedic Systems, Inc. **only**.

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## X-Ray Cassette Envelope—P289

Figure 5-49. X-Ray Cassette Envelope—P289



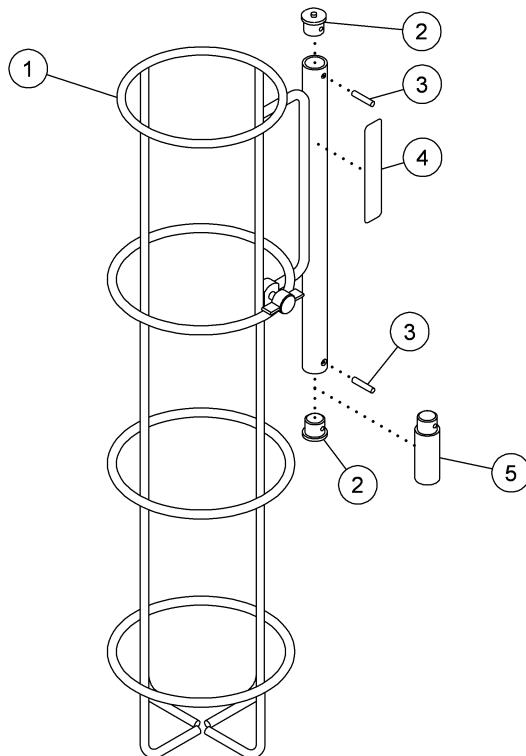
147605\_1\_045

Table 5-49. X-Ray Cassette Envelope—P289

Item Number	Part Number	Quantity	Description
1	P289A	1	Sleeve/cover (small)
2	P289B	1	Sleeve/cover (large)

## Oxygen Tank Holder—P27601

Figure 5-50. Oxygen Tank Holder—P27601



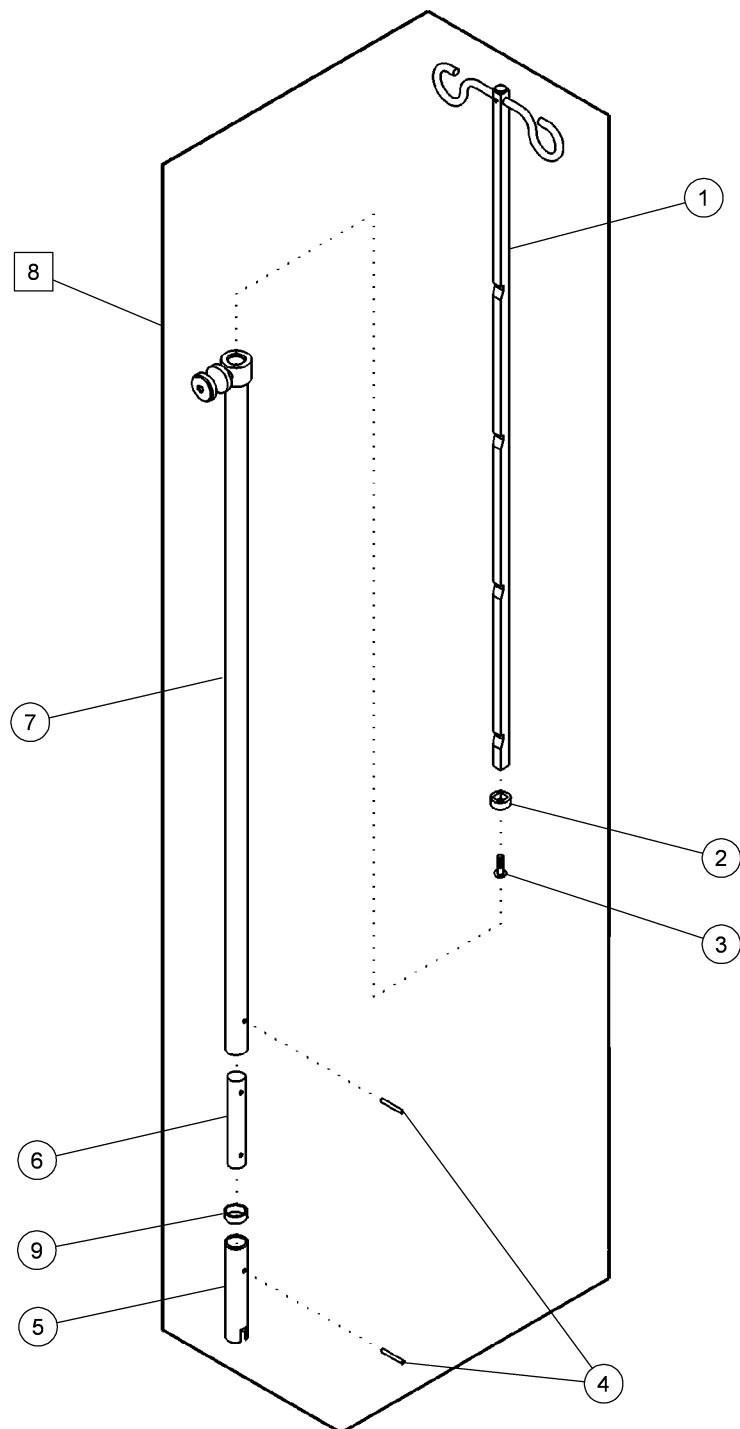
147605\_1\_201

Table 5-50. Oxygen Tank Holder—P27601

Item Number	Part Number	Quantity	Description
1	42703	1	Oxygen tank holder
2	3633901PL	2	Tube end
3	9685	2	Roll pin
4	67873	1	Label
5	3633901	1	Extension

## IV Pole—P2217

Figure 5-51. IV Pole—P2217



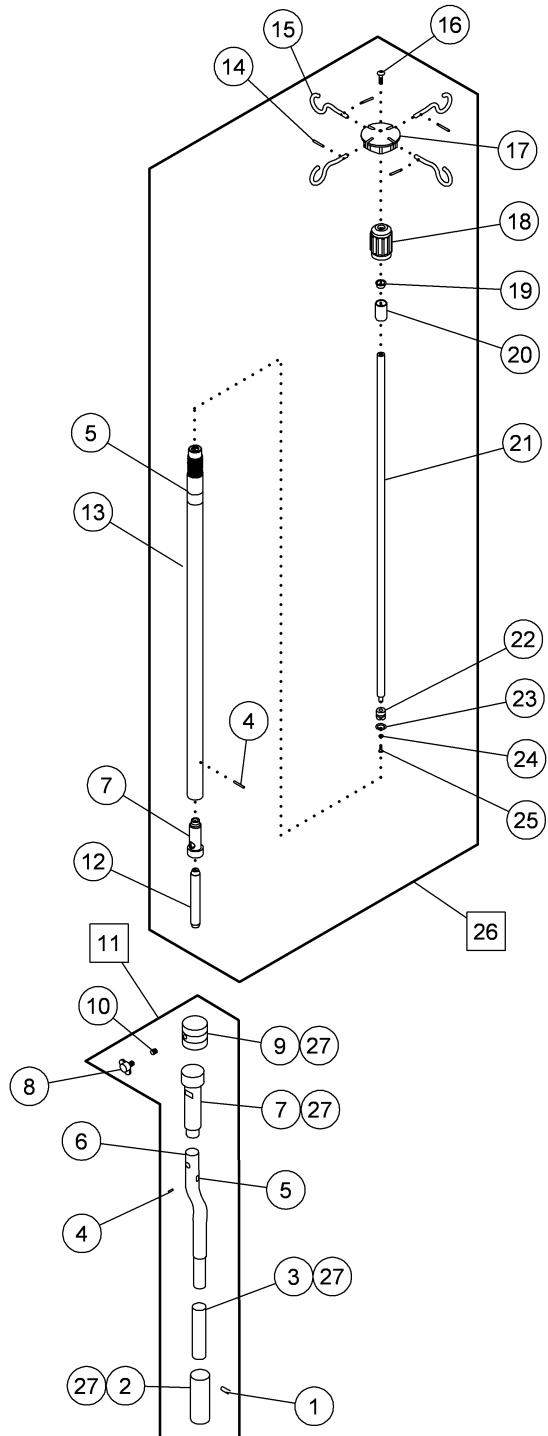
147605\_1\_202

**Table 5-51. IV Pole—P2217**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	32534	1	Extension rod assembly
2	32202	1	Nylon guide
3	10866	1	Screw
4	10640	1	Roll pin
5	32201	1	Extension
6	20858	1	Coupling
7	32199	1	Outer tube assembly
8	2217	1	IV rod
9	20859	1	Spacer

## Infusion Support System—P155-12

Figure 5-52. Infusion Support System—P155-05

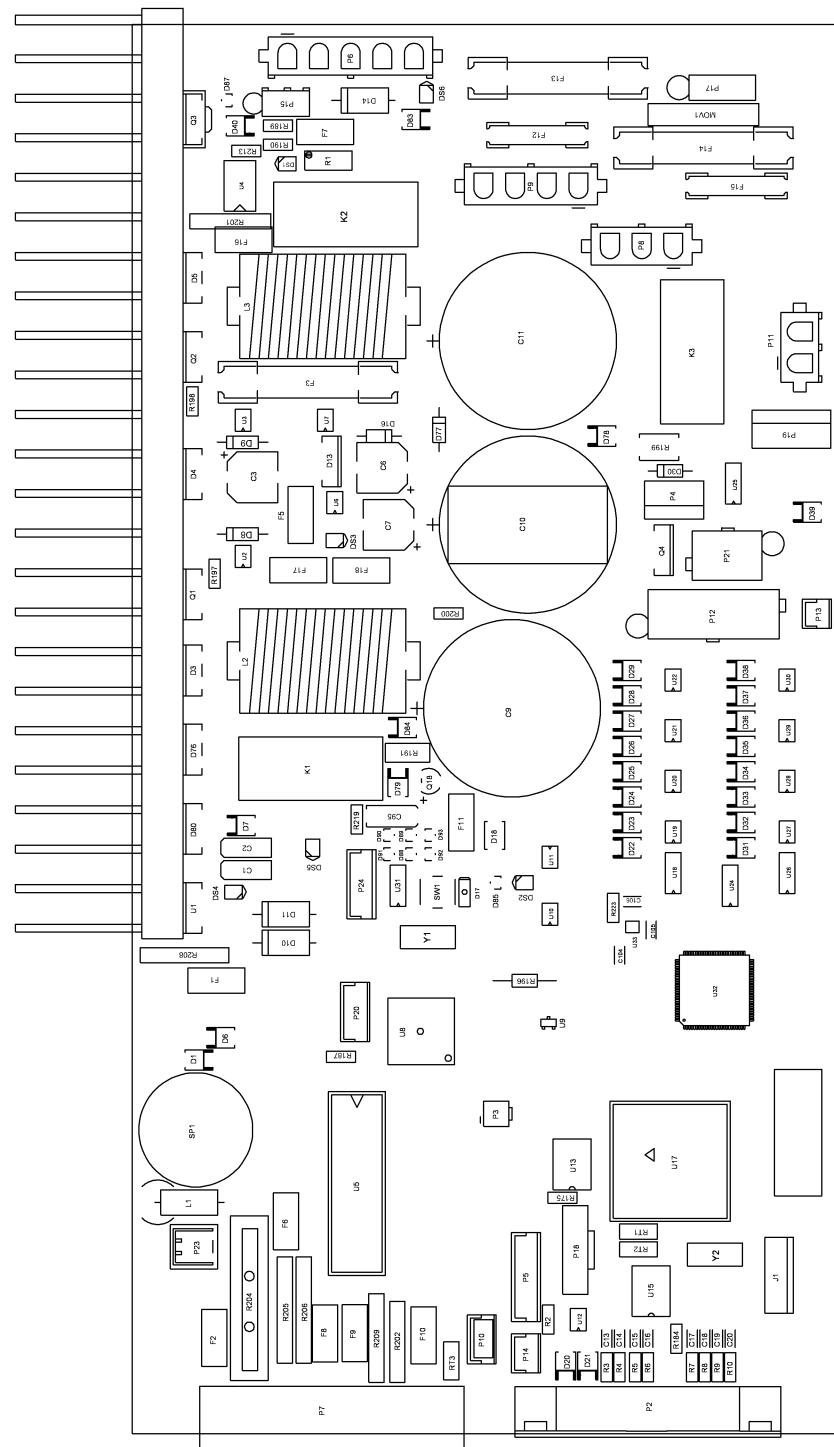


**Table 5-52. Infusion Support System—P155-05**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	35373	1	Roll pin
2	35025	1	Outer insulator
3	35008	1	Stiffener
4	35334	2	Spring pin
5	35044	2	Label
6	35024	1	Oblique tube
7	35022	2	Inner insulator
8	38135	1	Knob assembly
9	35023	2	Stanchion end
10	35012	1	Thread insert
11	P159	1	Offset bar
12	35005	1	Locator
13	35021	1	Transfer pole
14	35018	4	Roll pin
15	35003	4	IV hook
16	17290	1	Mounting screw
17	35001	1	Hub
18	35002	1	Collet
19	35007	1	Ferrule complete
20	35004	1	Insert
21	35026	1	Telescoping tube
22	35020	1	End cap
23	35019	1	O-ring
24	864	1	Washer
25	17232	1	Screw
26	P158	1	Transfer pole
27	35015	As required	Epoxy

## P.C. Board Component Layout—Power Control Top

Figure 5-53. P.C. Board Component Layout—Power Control Top



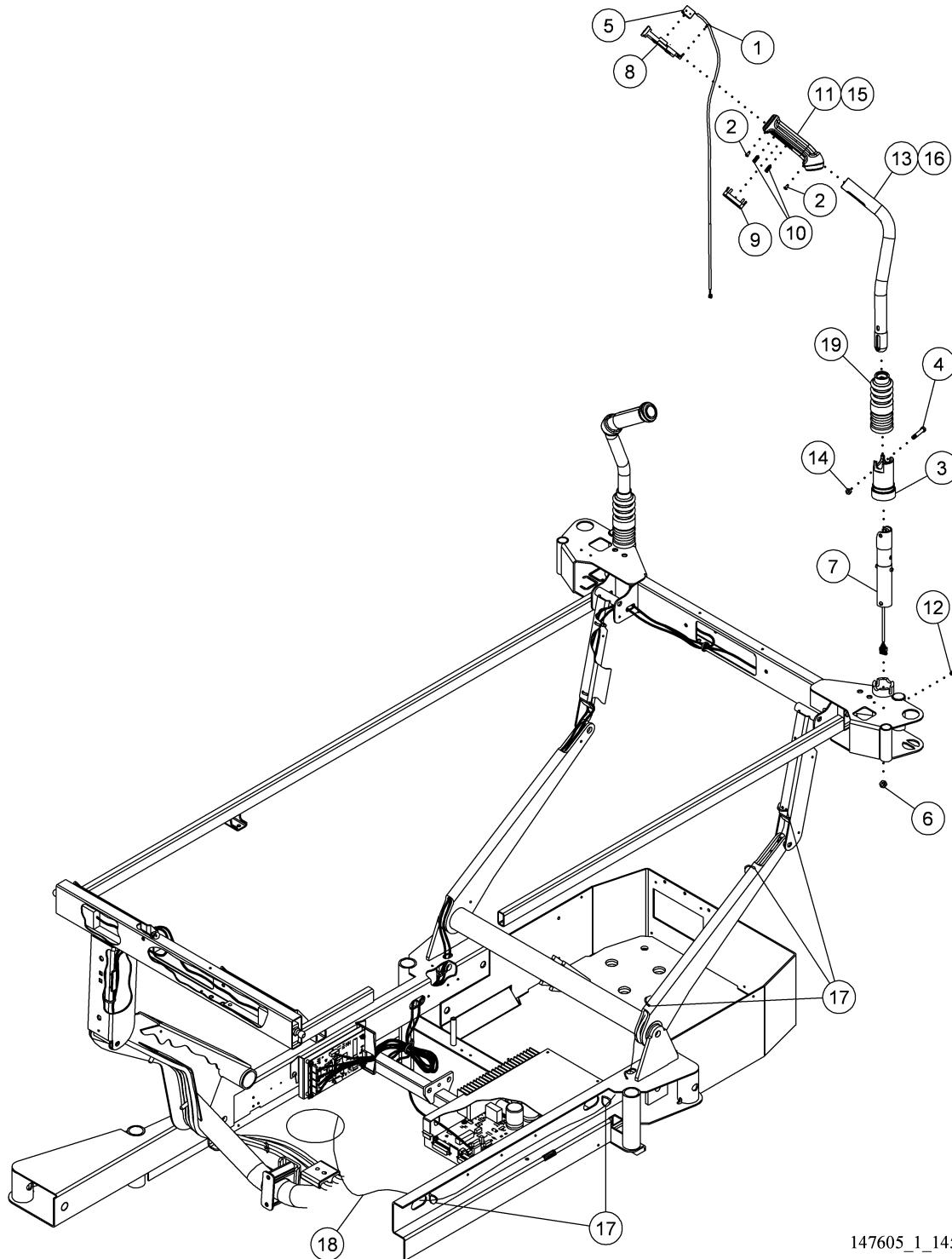
147605\_1\_192

**Table 5-53. P.C. Board Component Layout—Power Control Top**

Component Symbol	Part Number	Description
F1, F9	3049201	Fuse, 1½A, 125V, with block
F2, F6, F8	3049206	Fuse
F5, F7, F11	3049204	Fuse
F10, F16	3049205	Fuse
F3, F13, F14	4840315	Fuse
F12, F15	43144	Fuse holder, P.C. board, clip (230V model only)
F3, F13, F14	4840201	Fuse holder, P.C. board, clip (North American 120V model only)
F17, F18	3049203	Fuse
All of the above	SA1689	Fuse kit for power control module power control board

## Transport Handle Wiring—IntelliDrive® Transport System

Figure 5-54. Transport Handle Wiring—IntelliDrive® Transport System



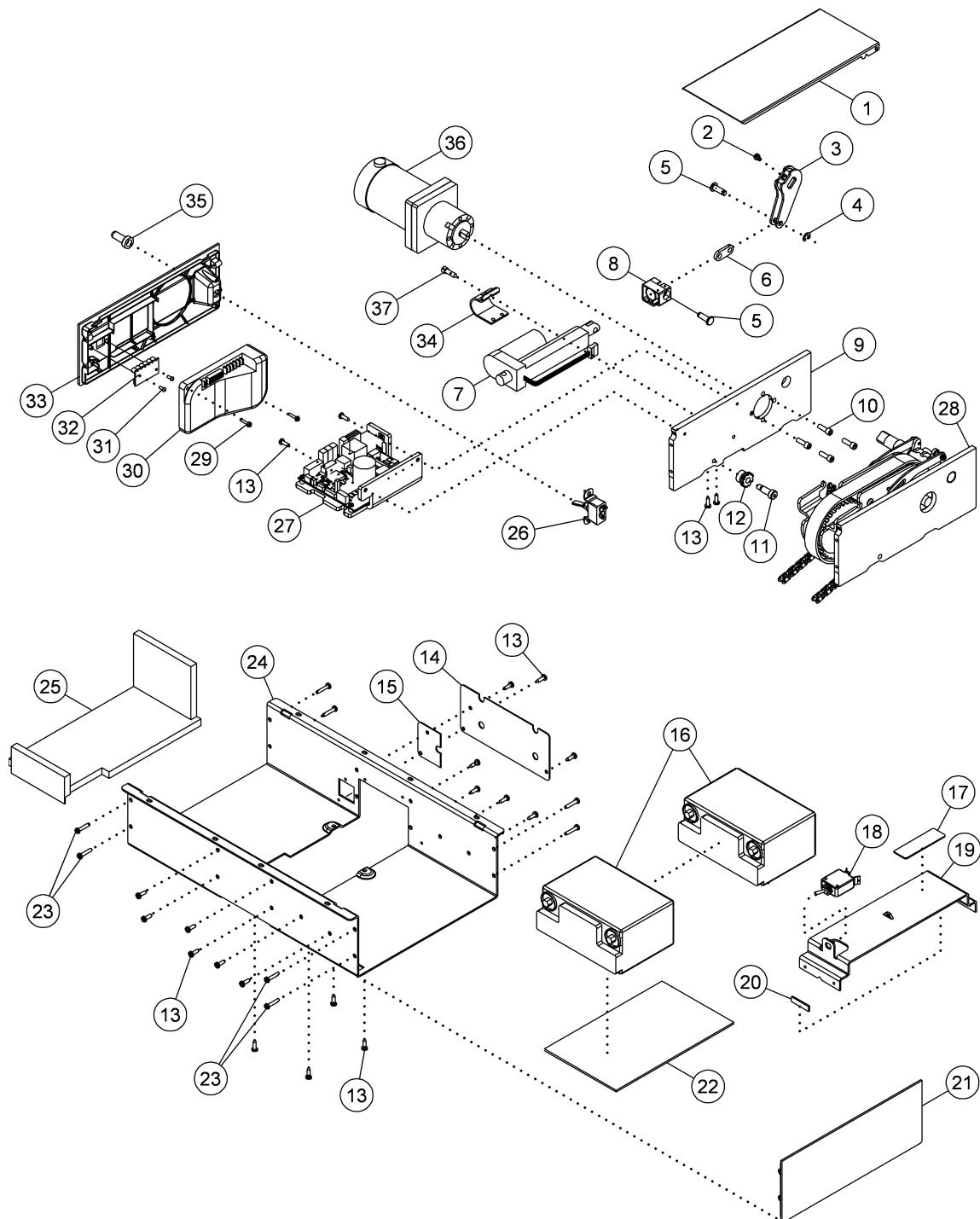
147605\_1\_145

**Table 5-54. Transport Handle Wiring—IntelliDrive® Transport System**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	14450	2	Cable tie, small
2	66876	4	Screw
3	68301	2	Coupler shield
4	68302	2	Screw, shoulder
5	68303	2	Handle, switch assembly
6	4435	2	Locknut
7	68349	2	Handle, strain gauge assembly
8	68351	2	Enable switch housing
9	68352	2	Enable switch button
10	68354	4	Spring
11	6836201	1	Handle grip, lh
12	49521	2	Screw
13	6874401pl	1	Handle weldment, lh
14	777	2	Locknut
15	6836202	1	Handle grip, rh
16	6874402pl	1	Handle weldment, rh
17	19124	5	Cable tie
18	68441	1	Cable (PAG to PACM P.C. board)
19	69130	2	Bellows, handle

## IntelliDrive® Transport System—Drive Box

Figure 5-55. IntelliDrive® Transport System—Drive Box



147605\_1\_219

**Table 5-55. IntelliDrive® Transport System—Drive Box**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	7046848	1	Cover, drive mechanism
2	70342	1	Screw
3	70411PL	1	Weldment, lever, linear actuator
4	35325	1	E-ring
5	35306PL	4	Hinge pin
6	128983	1	Link, linear actuator
7	69739	1	Linear actuator
8	70052	1	Guide, linear actuator
9	128990	1	Motor mount assembly
10	43728	5	Screw
11	69824	2	Screw
12	68306	2	Sprocket
13	69077	25	Screw
14	128989	1	Cover, actuator lever
15	128991	1	Gasket
16	139105	2	Battery, 12 V
17	30252	1	Label
18	68295	1	Circuit breaker
19	69196PC	1	Bracket, battery retainer
20	69354	1	Foam, battery retainer
21	69931	1	End plate, battery side
22	68869	1	Pad, battery
23	42140	8	Screw
24	128984	1	Pan
25	68865	1	Kit, Sound reducing
26	70097	1	Switch
27	70246	1	PACM P.C. board
28	128985	1	Plate, drive compartment
29	49508	2	Screw
30	68307	1	Motor controller
31	42141	4	Screw
32	72300P	1	Battery indicator
33	69932	1	End plate, motor side

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
34	7046748	1	Strap, mounting linear actuator
35	72135	1	Boot, toggle switch
36	71529	1	Motor gear
37	43728	3	Screw
38 (not shown)	7081301	1	Label, LED, english

**NOTES:**

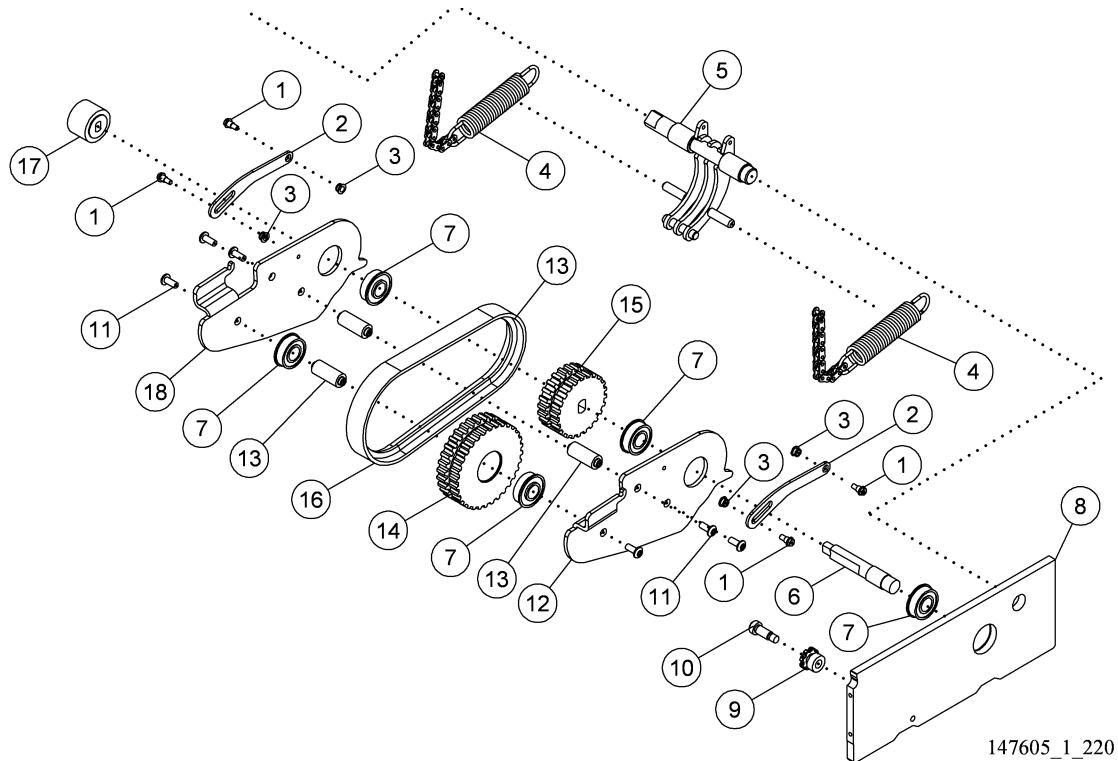
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## **IntelliDrive® Transport System—Drive Belt**

**Figure 5-56. IntelliDrive® Transport System—Drive Belt**

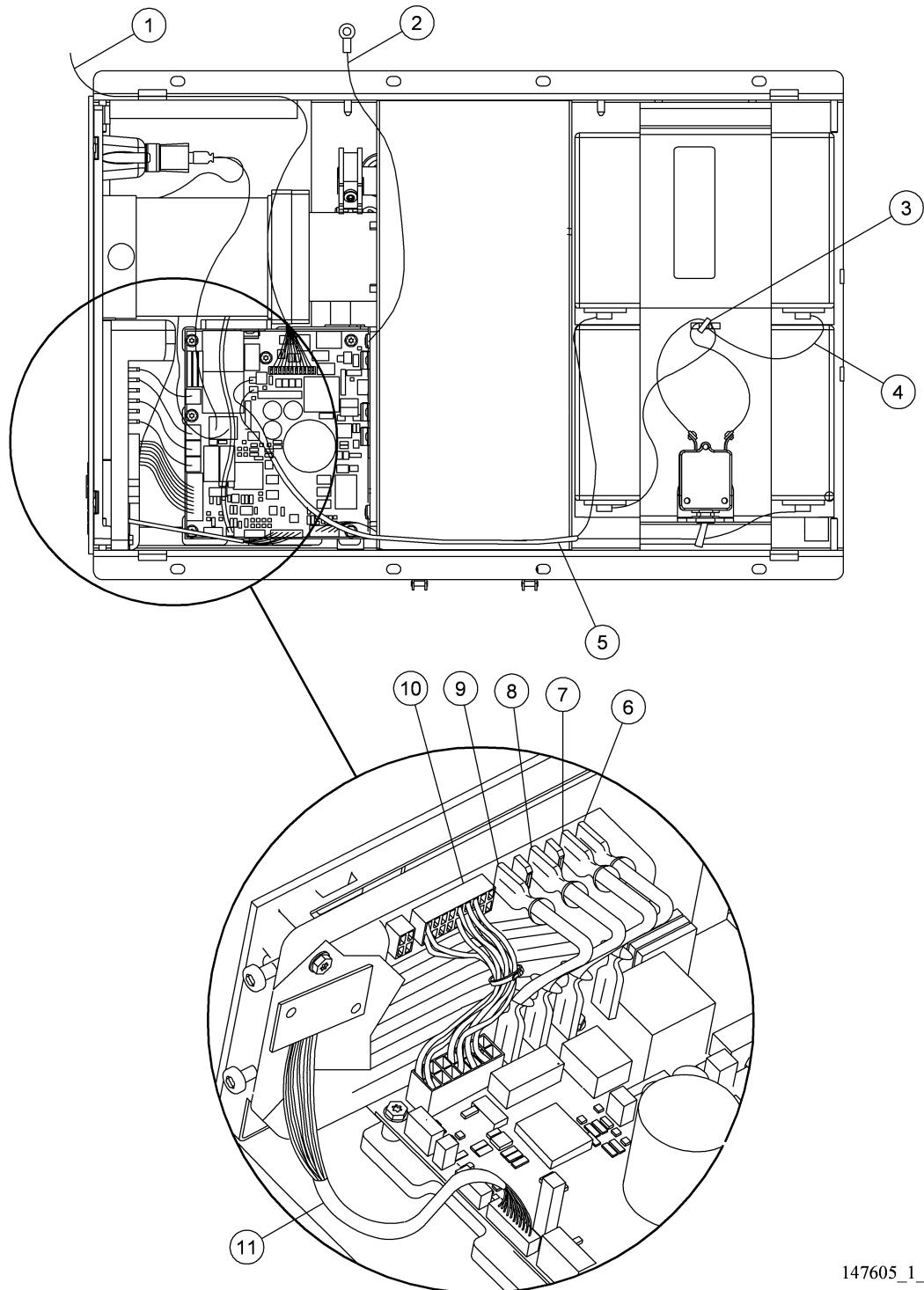


**Table 5-56. IntelliDrive® Transport System—Drive Belt**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	68809	4	Screw
2	70636	2	Return link
3	68808	4	Bearing
4	69316	2	Chain/spring assembly
5	6974302PL	1	Weldment
6	68291P	1	Drive shaft
7	68284	5	Bearing
8	69738PL	1	Plate
9	68306	2	Sprocket
10	69824	2	Screw
11	49521	6	Screw
12	6974501PL	1	Pulley side plate, lh
13	68290	6	Shaft, drive pulley
14	68287	1	Pulley, 32 teeth
15	68286	1	Pulley, 24 teeth
16	68285	1	Belt
17	68292	1	Coupling drive
18	6974502PL	1	Pulley side plate, rh

## **IntelliDrive® Transport System—Wiring**

**Figure 5-57. IntelliDrive® Transport System—Wiring**



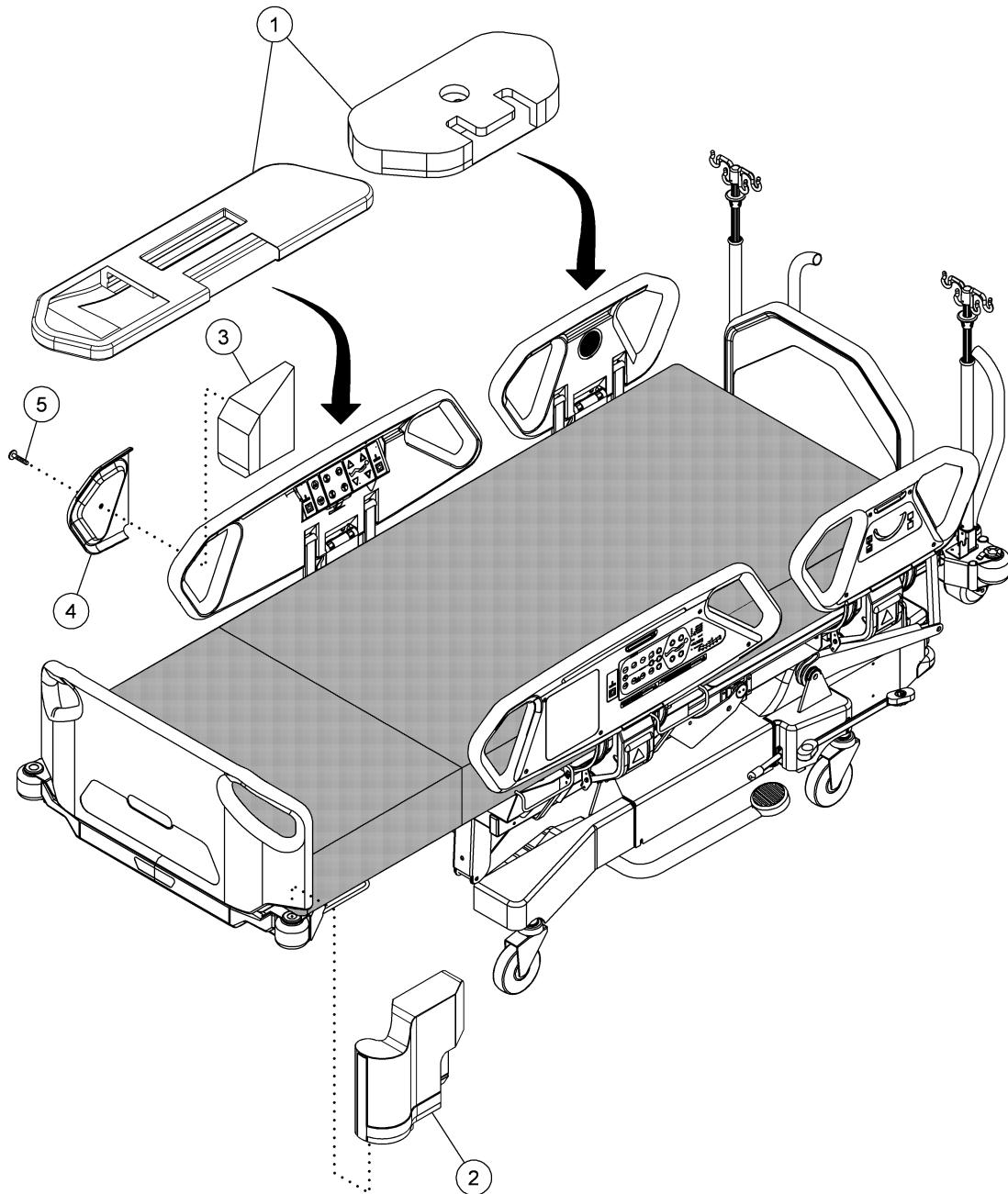
147605\_1\_221

**Table 5-57. IntelliDrive® Transport System—Wiring**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	70057	1	Cable (J-box to PACM)
2	3924001	1	Ground strap assembly
3	19124	1	Cable tie
4	68436	2	Harness, circuit breaker
5	68437	1	Harness, battery (battery to P.C. board)
6	6843801	1	Wire, motor controller (green)
7	6843802	1	Wire, motor controller (white)
8	6843803	1	Wire, motor controller (black)
9	6843804	1	Wire, motor controller (red)
10	68435	1	Harness, motor controller logic
11	70056	1	Cable assembly, battery indicator

## Siderail Pads and Extenders

Figure 5-58. Siderail Pads and Extenders



147605\_1\_247

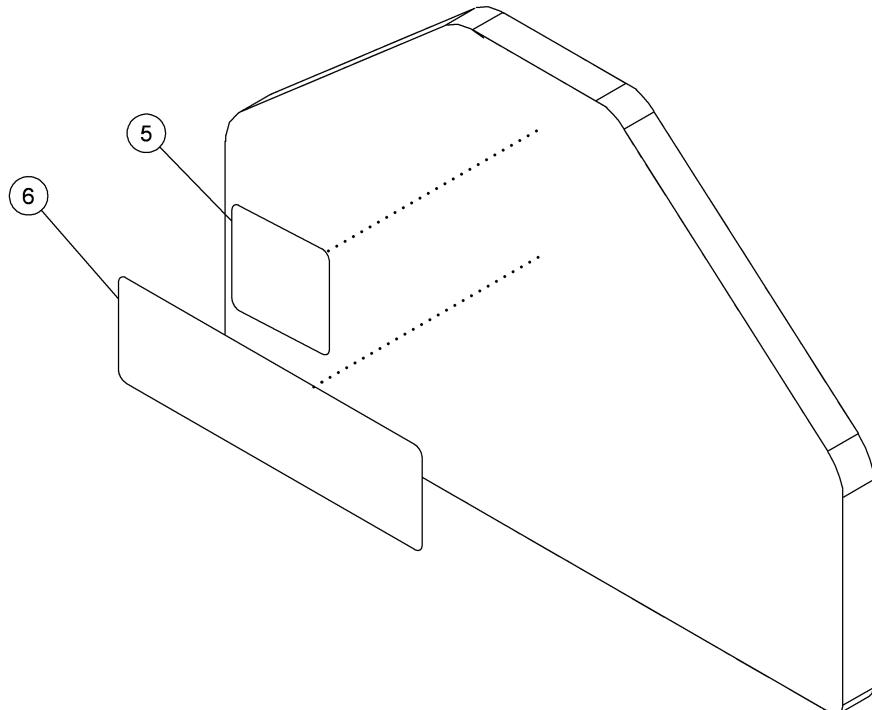
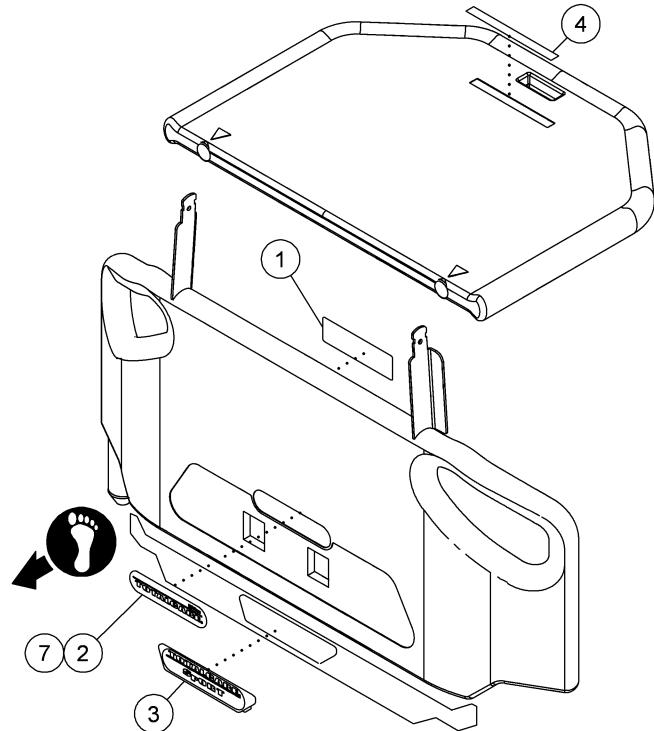
**Table 5-58. Siderail Pads and Extenders**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	P1970A	1	Siderail pads (set)
2	P1969A	1	Foot end extender kit
	148266	1	Foot extender, lh
	148386	1	Foot extender, rh
3	15042701	1	Siderail extender, lh, std
	15042702	1	Siderail extender, rh, std
	15042801	1	Siderail extender, lh, wide
	15042802	1	Siderail extender, rh, wide
4	15043601	1	Cover plate, lh (for use with 70674)
	15043602	1	Cover plate, rh (for use with 70674)
	15043701		Cover plate, lh (with screw knob)
	15043702		Cover plate, rh (with screw knob)
5	70674	2	Screw, T45
6 (not shown)	P1968A01	1	Siderail extender kit, standard

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## **International Labels—Foot Prop, Transport Shelf, and Headboard**

**Figure 5-59. International Labels—Foot Prop, Transport Shelf, and Headboard**



**Table 5-59. International Labels—Foot Prop, Transport Shelf, and Headboard**

Item Number	Part Number	Quantity	Description
1	49491101	1	Label, stand or sit caution—English
	49491201	1	Label, stand or sit caution—German
	49491301	1	Label, stand or sit caution—French
	49491401	1	Label, stand or sit caution—Spanish
	49491501	1	Label, stand or sit caution—Portuguese
	49491601	1	Label, stand or sit caution—Italian
	49491701	1	Label, stand or sit caution—Dutch
	49491801	1	Label, stand or sit caution—Swedish
	49491901	1	Label, stand or sit caution—Arabic
	494911001	1	Label, stand or sit caution—Chinese—Traditional
	494911101	1	Label, stand or sit caution—Chinese—Simplified
	494911201	1	Label, stand or sit caution—Japanese
	494911301	1	Label, stand or sit caution—Greek
2	49513	1	Nameplate
3	68753	1	Label—TotalCare SpO <sub>2</sub> RT® Pulmonary Therapy System
4	49530101	1	Label group—English
	49530201	1	Label group—German
	49530301	1	Label group—French
	49530401	1	Label group—Spanish
	49530501	1	Label group—Portuguese
	49530601	1	Label group—Italian
	49530701	1	Label group—Dutch
	49530801	1	Label group—Swedish
	49530901	1	Label group—Arabic
	495301001	1	Label group—Chinese—Traditional
	495301101	1	Label group—Chinese—Simplified
	495301201	1	Label group—Japanese
4 (continued)	495301301	1	Label group—Greek

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
5	65049203	1	Label, CPR board—German
	65049303	1	Label, CPR board—French
	65049403	1	Label, CPR board—Spanish
	65049503	1	Label, CPR board—Portuguese
	65049603	1	Label, CPR board—Italian
	65049703	1	Label, CPR board—Dutch
	65049803	1	Label, CPR board—Swedish
	65049903	1	Label, CPR board—Arabic
	650491003	1	Label, CPR board—Chinese—Traditional
	650491103	1	Label, CPR board—Chinese—Simplified
	650491203	1	Label, CPR board—Japanese
	650491303	1	Label, CPR board—Greek
6	65049204	1	Label, headboard warning—German
	65049304	1	Label, headboard warning—French
	65049404	1	Label, headboard warning—Spanish
	65049504	1	Label, headboard warning—Portuguese
	65049604	1	Label, headboard warning—Italian
	65049704	1	Label, headboard warning—Dutch
	65049804	1	Label, headboard warning—Swedish
	65049904	1	Label, headboard warning—Arabic
	650491004	1	Label, headboard warning—Chinese—Traditional
	650491104	1	Label, headboard warning—Chinese—Simplified
	650491204	1	Label, headboard warning—Japanese
	650491304	1	Label, headboard warning—Greek
7	147742	1	Label, internet

**NOTES:**

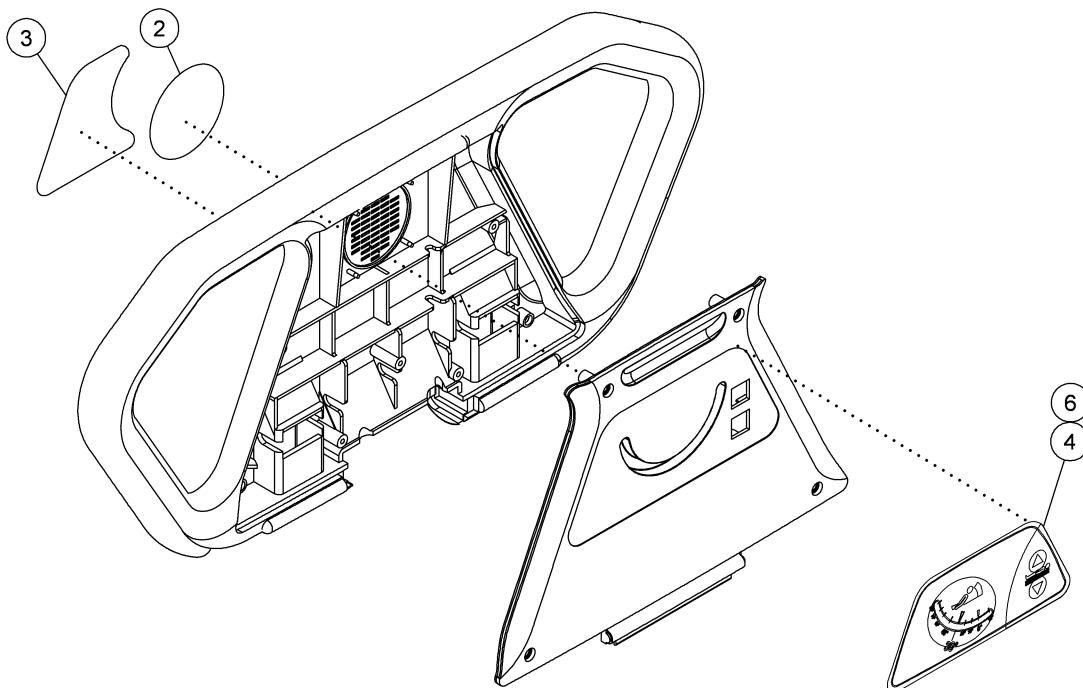
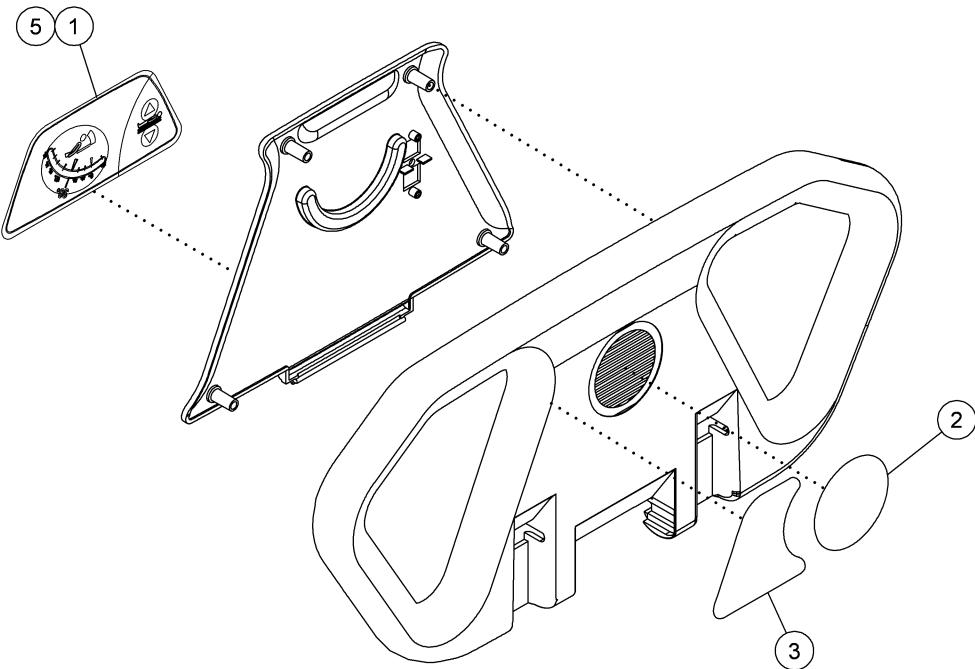
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## **International Labels—Head End Siderail**

**Figure 5-60. International Labels—Head End Siderail**



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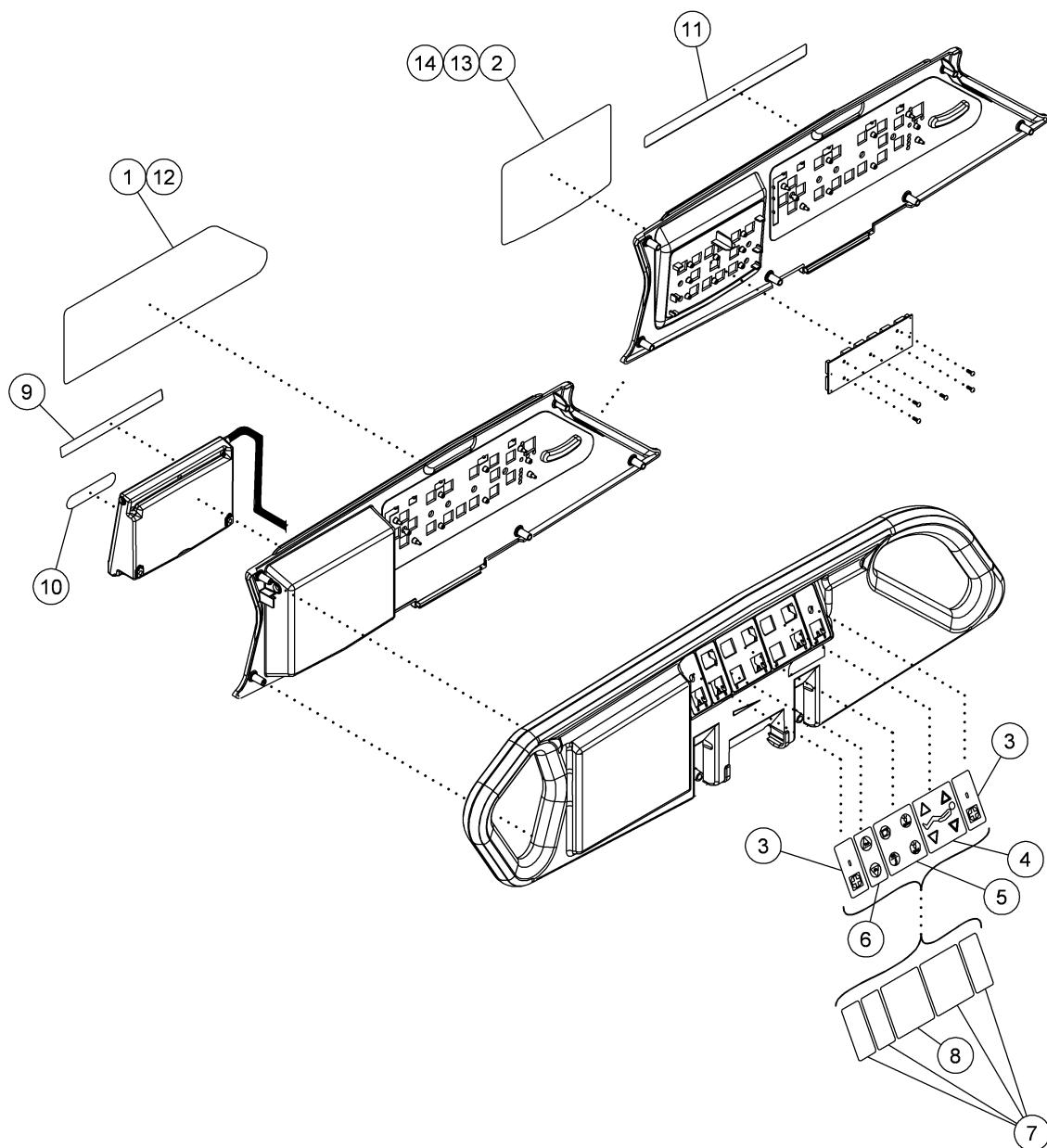
**Table 5-60. International Labels—Head End Siderail**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	14723002	1	Label, head angle/hilow, rh
2	49453	1	Label, blank speaker (beds <b>without</b> SideCom® Communication System only)
3	66937	1	Label, pulmonary shoulder location, lh and rh
4	14723001	1	Label, head angle/hilow, lh
5	149604001		Label, head angle/hilow, lh, bariatric
6	149604002		Label, head angle/hilow, rh, bariatric

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## **International Labels—Right-Hand Intermediate Siderail**

**Figure 5-61. International Labels—Right-Hand Intermediate Siderails**



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**Table 5-61. International Labels—Right-Hand Intermediate Siderails**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	147228102	1	Label, caregiver control, nc, rh—English
	147228202	1	Label, caregiver control, nc, rh—German
	147228302	1	Label, caregiver control, nc, rh—French
	147228402	1	Label, caregiver control, nc, rh—Spanish
	147228502	1	Label, caregiver control, nc, rh—Portuguese
	147228602	1	Label, caregiver control, nc, rh—Italian
	147228702	1	Label, caregiver control, nc, rh—Dutch
	147228802	1	Label, caregiver control, nc, rh—Swedish
	147228902	1	Label, caregiver control, nc, rh—Arabic
	147228102		Label, caregiver control, nc, rh—English
	1472281002	1	Label, caregiver control, nc, rh—Chinese—Traditional
	1472281102	1	Label, caregiver control, nc, rh—Chinese—Simplified
	1472281202	1	Label, caregiver control, nc, rh—Japanese
	1472281302	1	Label, caregiver control, nc, rh—Greek
	1472281402		Label, caregiver control, nc, rh—Russian
	1472281502		Label, caregiver control, nc, rh—Thai
	1472281602		Label, caregiver control, nc, rh—Korean
	1472281702		Label, caregiver control, nc, rh—Danish
	1472281802		Label, caregiver control, nc, rh—Hungarian
	1472281902		Label, caregiver control, nc, rh—Norwegian

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1 (continued)	1472282002		Label, caregiver control, nc, rh—Slovenian
	1472282102		Label, caregiver control, nc, rh—Czech
	1472282202		Label, caregiver control, nc, rh—Slovakian
2	1472271		Label, hard panel, pulmonary—English
	1472272		Label, hard panel, pulmonary—German
	1472273		Label, hard panel, pulmonary—French
	1472274		Label, hard panel, pulmonary—Spanish
	1472275		Label, hard panel, pulmonary—Portuguese
	1472276		Label, hard panel, pulmonary—Italian
	1472277		Label, hard panel, pulmonary—Dutch
	1472278		Label, hard panel, pulmonary—Swedish
	1472279		Label, hard panel, pulmonary—Arabic
	14722710		Label, hard panel, pulmonary—Trad. Chinese
	14722711		Label, hard panel, pulmonary—Simp. Chinese
	14722712		Label, hard panel, pulmonary—Japanese
	14722713		Label, hard panel, pulmonary—Greek
	14722714		Label, hard panel, pulmonary—Russian
	14722715		Label, hard panel, pulmonary—Thai
	14722716		Label, hard panel, pulmonary—Korean
	14722717		Label, hard panel, pulmonary—Danish
	14722718		Label, hard panel, pulmonary—Hungarian
	14722719		Label, hard panel, pulmonary—Norwegian
	14722720		Label, hard panel, pulmonary—Slovenian
	14722721		Label, hard panel, pulmonary—Czech
	14722722		Label, hard panel, pulmonary—Slovakian

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
3	1472321	3	Label, Nurse Call—English
	1472322	3	Label, Nurse Call—International
4	14723502		Label, patient articulation
5	147229102	1	Label, patient entertainment, rh—English
	147229202	1	Label, patient entertainment, rh—International
6	14722903	1	Label, patient, up/down control
7	49451	1	Label, blank two-button
8	49452	1	Label, blank four-button
9	14723301	1	Label, GCI—Pulmonary
	14723302	1	Label, GCI—treatment and short stay
	14723304	1	Label, GCI—P500
10	147234		Label, GCI Hill-Rom logo
11	65049102	1	Label, siderail warning—English
	65049202	1	Label, siderail warning—German
	65049302	1	Label, siderail warning—French
	65049402	1	Label, siderail warning—Spanish
	65049502	1	Label, siderail warning—Portuguese
	65049602	1	Label, siderail warning—Italian
	65049702	1	Label, siderail warning—Dutch
	65049802	1	Label, siderail warning—Swedish
	65049902	1	Label, siderail warning—Arabic
	650491002	1	Label, siderail warning—Chinese—Traditional
	650491102	1	Label, siderail warning—Chinese—Simplified
	650491202	1	Label, siderail warning—Japanese
12	147340102		Label, caregiver control, no nc, rh—English
	147340202		Label, caregiver control, no nc, rh—German

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
12 (continued)	147340302		Label, caregiver control, no nc, rh—French
	147340402		Label, caregiver control, no nc, rh—Spanish
	147340502		Label, caregiver control, no nc, rh—Portuguese
	147340602		Label, caregiver control, no nc, rh—Italian
	147340702		Label, caregiver control, no nc, rh—Dutch
	147340802		Label, caregiver control, no nc, rh—Swedish
	147340902		Label, caregiver control, no nc, rh—Arabic
	1473401002		Label, caregiver control, no nc, rh—Chinese—Traditional
	1473401102		Label, caregiver control, no nc, rh—Chinese—Simplified
	1473401302		Label, caregiver control, no nc, rh—Greek
	1473401402		Label, caregiver control, no nc, rh—Russian
	1473401502		Label, caregiver control, no nc, rh—Thai
	1473401602		Label, caregiver control, no nc, rh—Korean
	1473401702		Label, caregiver control, no nc, rh—Danish
	1473401802		Label, caregiver control, no nc, rh—Hungarian
	1473401902		Label, caregiver control, no nc, rh—Norwegian
	1473402002		Label, caregiver control, no nc, rh—Slovenian
	1473402102		Label, caregiver control, no nc, rh—Czech
	1473402202		Label, caregiver control, no nc, rh—Slovakian

Item Number	Part Number	Quantity	Description
13	1476861		Label, hard panel, treatment—English
	1476862		Label, hard panel, treatment—German
	1476863		Label, hard panel, treatment—French
	1476864		Label, hard panel, treatment—Spanish
	1476865		Label, hard panel, treatment—Portuguese
	1476866		Label, hard panel, treatment—Italian
	1476867		Label, hard panel, treatment—Dutch
	1476868		Label, hard panel, treatment—Swedish
	1476869		Label, hard panel, treatment—Arabic
	14768610		Label, hard panel, treatment—Trad. Chinese
	14768611		Label, hard panel, treatment—Simp. Chinese
	14768612		Label, hard panel, treatment—Japanese
	14768613		Label, hard panel, treatment—Greek
	14768614		Label, hard panel, treatment—Russian
	14768615		Label, hard panel, treatment—Thai
	14768616		Label, hard panel, treatment—Korean
	14768617		Label, hard panel, treatment—Danish
	14768618		Label, hard panel, treatment—Hungarian
	14768619		Label, hard panel, treatment—Norwegian
	14768620		Label, hard panel, treatment—Slovenian
	14768621		Label, hard panel, treatment—Czech
	14768622		Label, hard panel, treatment—Slovakian
	147687		Label, hard panel, short stay

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
14	1519581	1	Label, hard panel, wound care—English
	1519582	1	Label, hard panel, P500 — German
	1519583	1	Label, hard panel, P500 —French
	1519584	1	Label, hard panel, P500 — Spanish
	1519585	1	Label, hard panel, P500 — Portuguese
	1519586	1	Label, hard panel, P500 —Italian
	1519587	1	Label, hard panel, P500 —Dutch
	1519588	1	Label, hard panel, P500 — Swedish
	1519589	1	Label, hard panel, P500 —Arabic
	15195810	1	Label, hard panel, P500 — Chinese—Traditional
	15195811	1	Label, hard panel, P500 — Chinese—Simplified
	15195812	1	Label, hard panel, P500 — Japanese
	15195813	1	Label, hard panel, P500 —Greek
	15195814	1	Label, hard panel, P500 — Russian
	15195817	1	Label, hard panel, P500 —Danish
	15195818	1	Label, hard panel, P500 — Hungarian
	15195819	1	Label, hard panel, P500 — Norwegian
	15195820	1	Label, hard panel, P500 — Slovenian
	15195821	1	Label, hard panel, P500 —Czech
	15195822	1	Label, hard panel, P500 — Slovakian

**NOTES:**

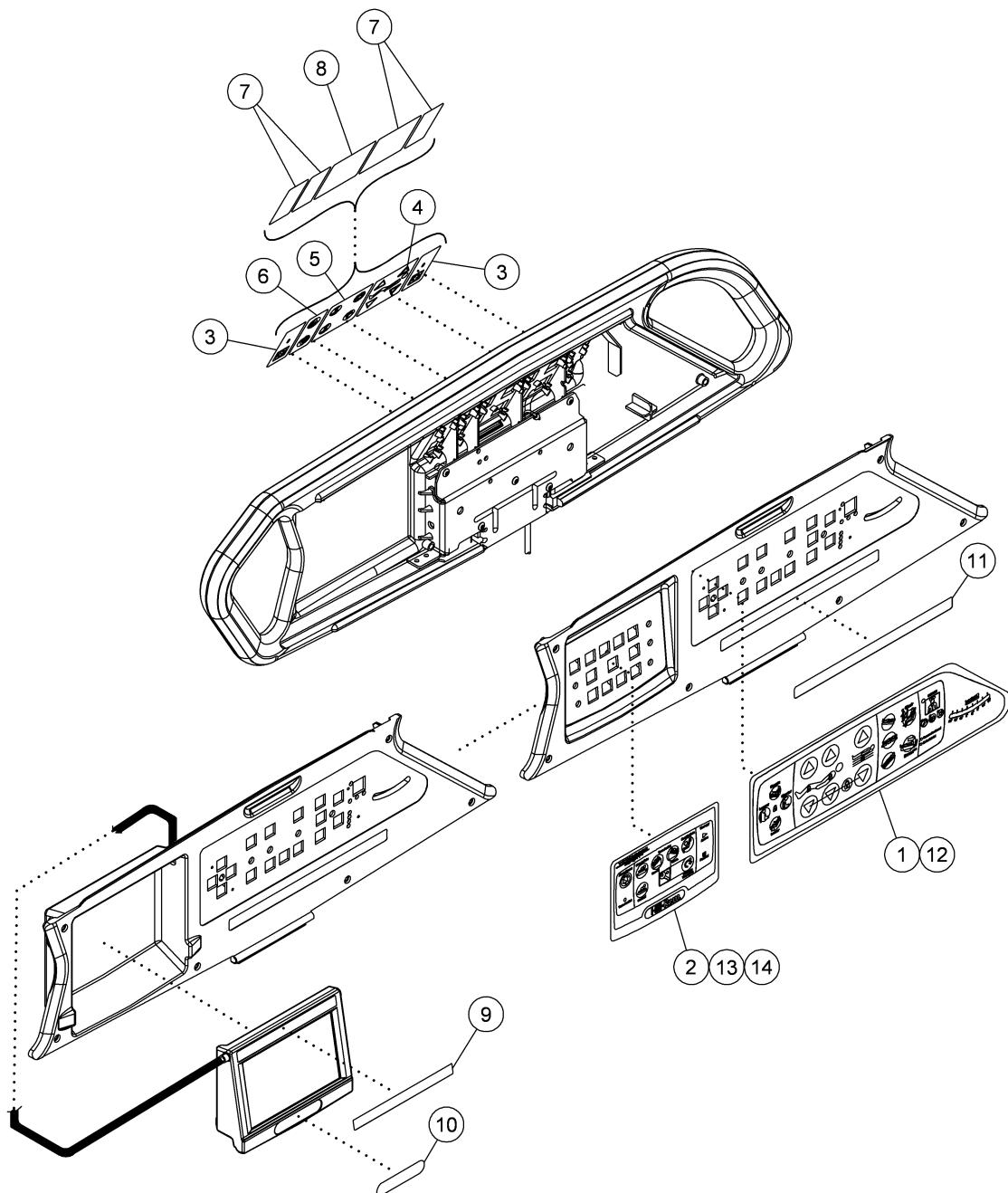
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## **International Labels—Left-Hand Intermediate Siderail**

**Figure 5-62. International Labels—Left-Hand Intermediate Siderail**



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**Table 5-62. International Labels—Left-Hand Intermediate Siderail**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	147228101	1	Label, caregiver control, nc, lh—English
	147228201	1	Label, caregiver control, nc, lh—German
	147228301	1	Label, caregiver control, nc, lh—French
	147228401	1	Label, caregiver control, nc, lh—Spanish
	147228501	1	Label, caregiver control, nc, lh—Portuguese
	147228601	1	Label, caregiver control, nc, lh—Italian
	147228701	1	Label, caregiver control, nc, lh—Dutch
	147228801	1	Label, caregiver control, nc, lh—Swedish
	147228901	1	Label, caregiver control, nc, lh—Arabic
	147228101	1	Label, caregiver control, nc, lh—English
	1472281001	1	Label, caregiver control, nc, lh—Chinese—Traditional
	1472281101	1	Label, caregiver control, nc, lh—Chinese—Simplified
	1472281201	1	Label, caregiver control, nc, lh—Japanese
	1472281301	1	Label, caregiver control, nc, lh—Greek
	1472281401	1	Label, caregiver control, nc, lh—Russian
	1472281501	1	Label, caregiver control, nc, lh—Thai
	1472281601	1	Label, caregiver control, nc, lh—Korean
	1472281701	1	Label, caregiver control, nc, lh—Danish
	1472281801	1	Label, caregiver control, nc, lh—Hungarian

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1 (continued)	1472281901	1	Label, caregiver control, nc, lh—Norwegian
	1472282001	1	Label, caregiver control, nc, lh—Slovenian
	1472282101	1	Label, caregiver control, nc, lh—Czech
	1472282201	1	Label, caregiver control, nc, lh—Slovakian
2	1472271	1	Label, hard panel, pulmonary—English
	1472272	1	Label, hard panel, pulmonary—German
	1472273	1	Label, hard panel, pulmonary—French
	1472274	1	Label, hard panel, pulmonary—Spanish
	1472275	1	Label, hard panel, pulmonary—Portuguese
	1472276	1	Label, hard panel, pulmonary—Italian
	1472277	1	Label, hard panel, pulmonary—Dutch
	1472278	1	Label, hard panel, pulmonary—Swedish
	1472279	1	Label, hard panel, pulmonary—Arabic
	14722710	1	Label, hard panel, pulmonary—Trad. Chinese
	14722711	1	Label, hard panel, pulmonary—Simp. Chinese
	14722712	1	Label, hard panel, pulmonary—Japanese
	14722713	1	Label, hard panel, pulmonary—Greek
	14722714	1	Label, hard panel, pulmonary—Russian
	14722715	1	Label, hard panel, pulmonary—Thai
	14722716	1	Label, hard panel, pulmonary—Korean
	14722717	1	Label, hard panel, pulmonary—Danish
	14722718	1	Label, hard panel, pulmonary—Hungarian
	14722719	1	Label, hard panel, pulmonary—Norwegian
	14722720	1	Label, hard panel, pulmonary—Slovenian

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
2 (continued)	14722721	1	Label, hard panel, pulmonary—Czech
	14722722	1	Label, hard panel, pulmonary—Slovakian
3	1472321	3	Label, Nurse Call—English
	1472322	3	Label, Nurse Call—International
4	14723502	1	Label, patient articulation
5	147229101	1	Label, patient entertainment, lh—English
	147229201	1	Label, patient entertainment, lh—International
6	14722903	1	Label, patient, up/down control
7	49451	1	Label, blank two-button
8	49452	1	Label, blank four-button
9	14723301	1	Label, GCI—Pulmonary
	14723302	1	Label, GCI—treatment and short stay
	14723304	1	Label, GCI—P500
10	147234	1	Label, GCI Hill-Rom logo
11	65049102	1	Label, siderail warning—English
	65049202	1	Label, siderail warning—German
	65049302	1	Label, siderail warning—French
	65049402	1	Label, siderail warning—Spanish
	65049502	1	Label, siderail warning—Portuguese
	65049602	1	Label, siderail warning—Italian
	65049702	1	Label, siderail warning—Dutch
	65049802	1	Label, siderail warning—Swedish
	65049902	1	Label, siderail warning—Arabic
	650491002	1	Label, siderail warning—Chinese—Traditional
	650491102	1	Label, siderail warning—Chinese—Simplified
	650491202	1	Label, siderail warning—Japanese
	650491302	1	Label, siderail warning—Greek

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
12	147340101	1	Label, caregiver control, no nc, lh—English
	147340201	1	Label, caregiver control, no nc, lh—German
	147340301	1	Label, caregiver control, no nc, lh—French
	147340401	1	Label, caregiver control, no nc, lh—Spanish
	147340501	1	Label, caregiver control, no nc, lh—Portuguese
	147340601	1	Label, caregiver control, no nc, lh—Italian
	147340701	1	Label, caregiver control, no nc, lh—Dutch
	147340801	1	Label, caregiver control, no nc, lh—Swedish
	147340901	1	Label, caregiver control, no nc, lh—Arabic
	1473401001	1	Label, caregiver control, no nc, lh—Chinese—Traditional
	1473401101	1	Label, caregiver control, no nc, lh—Chinese—Simplified
	1473401201	1	Label, caregiver control, no nc, lh—Japanese
	1473401301	1	Label, caregiver control, no nc, lh—Greek
	1473401401	1	Label, caregiver control, no nc, lh—Russian
	1473401501	1	Label, caregiver control, no nc, lh—Thai
	1473401601	1	Label, caregiver control, no nc, lh—Korean
	1473401701	1	Label, caregiver control, no nc, lh—Danish
	1473401801	1	Label, caregiver control, no nc, lh—Hungarian

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
12 (continued)	1473401901	1	Label, caregiver control, no nc, lh—Norwegian
	1473402001	1	Label, caregiver control, no nc, lh—Slovenian
	1473402101	1	Label, caregiver control, no nc, lh—Czech
	1473402201	1	Label, caregiver control, no nc, lh—Slovakian
13	147687	1	Label, hard panel, short stay
	1476861	1	Label, hard panel, treatment—English
	1476862	1	Label, hard panel, treatment—German
	1476863	1	Label, hard panel, treatment—French
	1476864	1	Label, hard panel, treatment—Spanish
	1476865	1	Label, hard panel, treatment—Portuguese
	1476866	1	Label, hard panel, treatment—Italian
	1476867	1	Label, hard panel, treatment—Dutch
	1476868	1	Label, hard panel, treatment—Swedish
	1476869	1	Label, hard panel, treatment—Arabic
	14768610	1	Label, hard panel, treatment—Chinese—Traditional
	14768612	1	Label, hard panel, treatment—Japanese
	14768613	1	Label, hard panel, treatment—Greek
	14768614	1	Label, hard panel, treatment—Russian
	14768615	1	Label, hard panel, treatment—Thai
	14768616	1	Label, hard panel, treatment—Korean
	14768617	1	Label, hard panel, treatment—Danish
	14768618	1	Label, hard panel, treatment—Hungarian
	14768619	1	Label, hard panel, treatment—Norwegian
	14768620	1	Label, hard panel, treatment—Slovenian
	14768621	1	Label, hard panel, treatment—Czech

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
13 (continued)	14768622	1	Label, hard panel, treatment—Slovakian
14	1519581	1	Label, hard panel, P500 —English
	1519582	1	Label, hard panel, P500 —German
	1519583	1	Label, hard panel, P500 —French
	1519584	1	Label, hard panel, P500 —Spanish
	1519585	1	Label, hard panel, P500 —Portuguese
	1519586	1	Label, hard panel, P500 —Italian
	1519587	1	Label, hard panel, P500 —Dutch
	1519588	1	Label, hard panel, P500 —Swedish
	1519589	1	Label, hard panel, P500 —Arabic
	15195810	1	Label, hard panel, P500 —Chinese—Traditional
	15195811	1	Label, hard panel, P500 —Chinese—Simplified
	15195812	1	Label, hard panel, P500 —Japanese
	15195813	1	Label, hard panel, P500 —Greek
	15195814	1	Label, hard panel, P500 —Russian
	15195817	1	Label, hard panel, P500 —Danish
	15195818	1	Label, hard panel, P500 —Hungarian
	15195819	1	Label, hard panel, P500 —Norwegian
	15195820	1	Label, hard panel, P500 —Slovenian
	15195821	1	Label, hard panel, P500 —Czech
	15195822	1	Label, hard panel, P500 —Slovakian

**NOTES:**

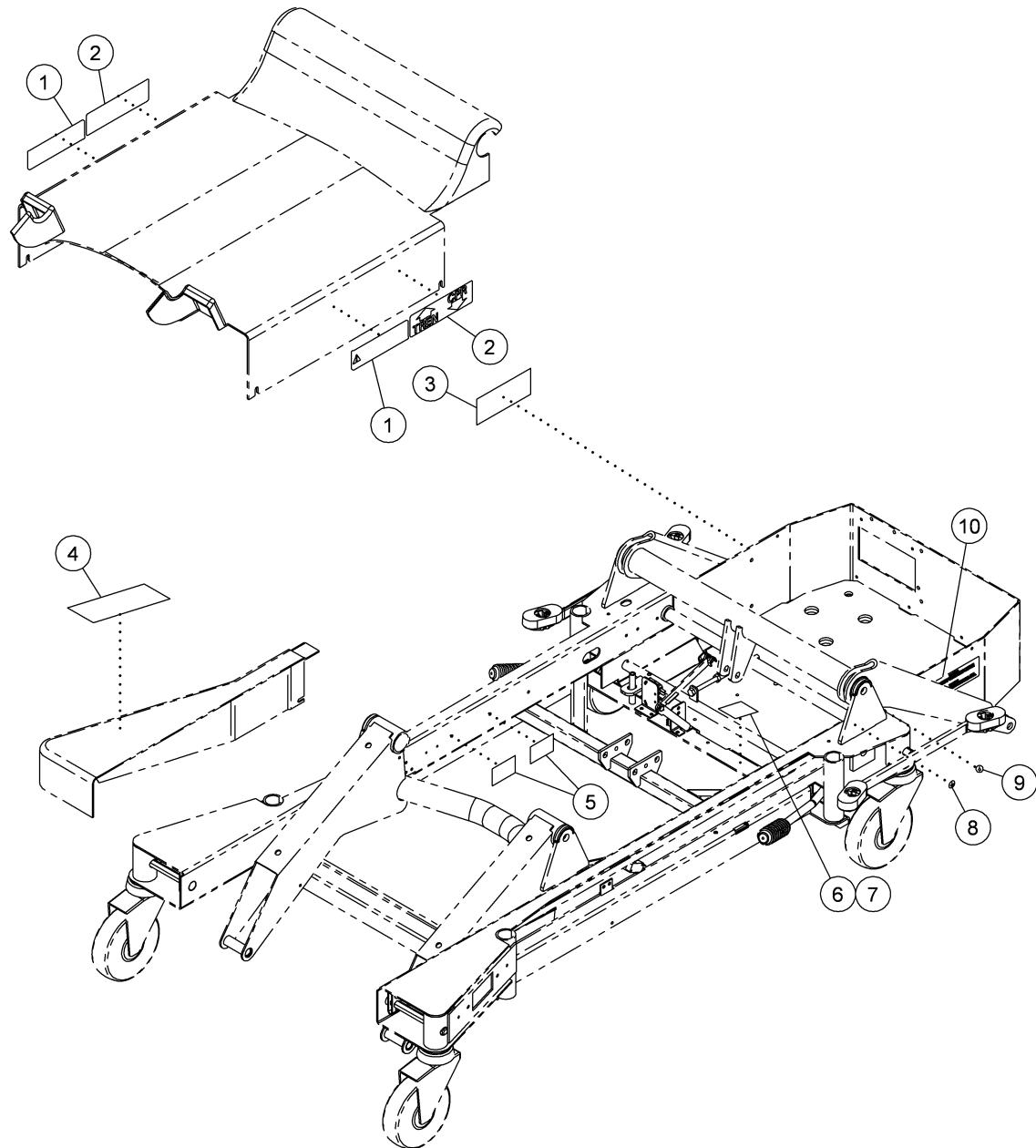
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## **International Labels—Base Frame and Covers**

**Figure 5-63. International Labels—Base Frame and Covers**



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**Table 5-63. International Labels—Base Frame and Covers**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	49487101	2	Label, emergency Trendelenburg warning—English (beds <b>without</b> foot pump only)
	49487201	2	Label, emergency Trendelenburg warning—German (beds <b>without</b> foot pump only)
	49487301	2	Label, emergency Trendelenburg warning—French (beds <b>without</b> foot pump only)
	49487401	2	Label, emergency Trendelenburg warning—Spanish (beds <b>without</b> foot pump only)
	49487501	2	Label, emergency Trendelenburg warning—Portuguese (beds <b>without</b> foot pump only)
	49487601	2	Label, emergency Trendelenburg warning—Italian (beds <b>without</b> foot pump only)
	49487701	2	Label, emergency Trendelenburg warning—Dutch (beds <b>without</b> foot pump only)
	49487801	2	Label, emergency Trendelenburg warning—Swedish (beds <b>without</b> foot pump only)
2	49492101	2	Label, CPR/emergency Trendelenburg pedal—English
	49492201	2	Label, CPR/emergency Trendelenburg warning—German
	49492301	2	Label, CPR/emergency Trendelenburg pedal—French
	49492401	2	Label, CPR/emergency Trendelenburg pedal—Spanish
	49492501	2	Label, CPR/emergency Trendelenburg pedal—Portuguese
	49492601	2	Label, CPR/emergency Trendelenburg pedal—Italian

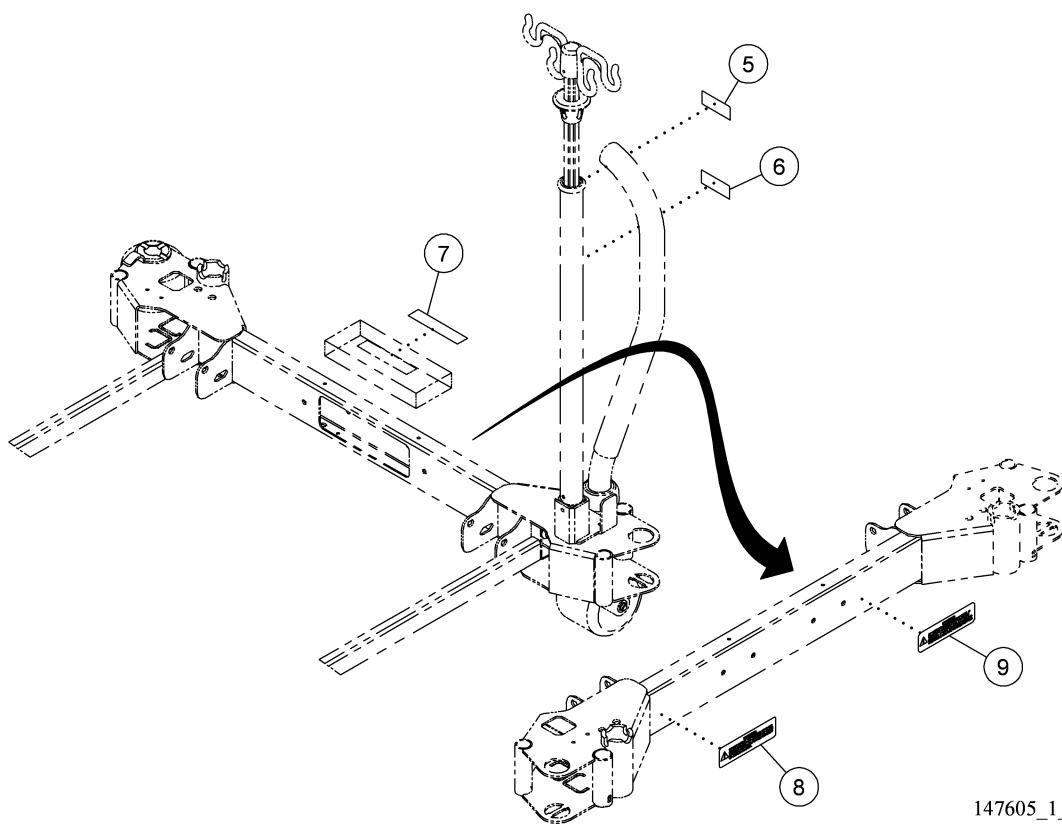
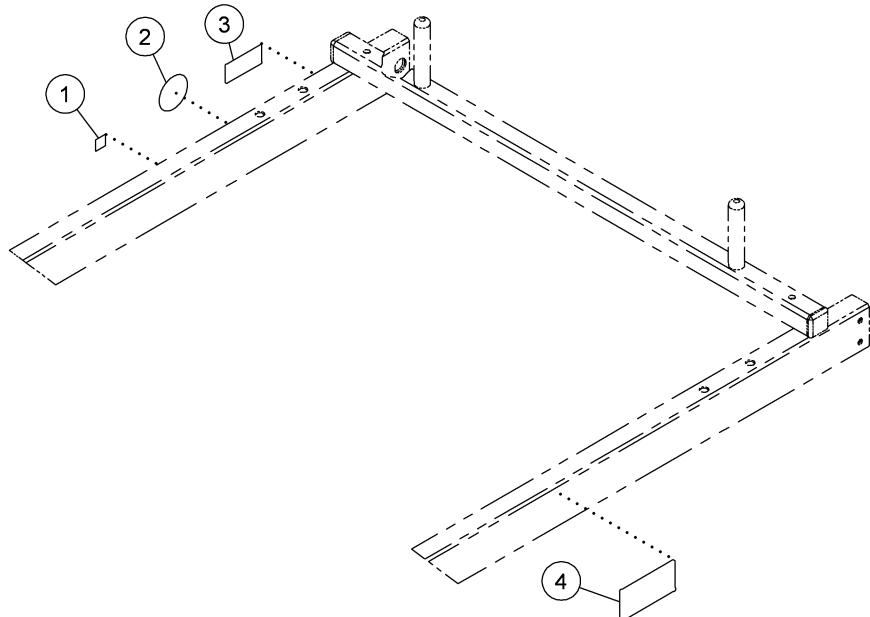
<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
2 (continued)	49492701	1	Label, CPR/emergency Trendelenburg pedal—Dutch
	49492801	1	Label, CPR/emergency Trendelenburg pedal—Swedish
	49492901	1	Label, CPR/emergency Trendelenburg pedal—Arabic
	494921001	1	Label, CPR/emergency Trendelenburg pedal—Chinese—Traditional
	494921101	1	Label, CPR/emergency Trendelenburg pedal—Chinese—Simplified
	494921201	1	Label, CPR/emergency Trendelenburg pedal—Japanese
	494921301	1	Label, CPR/emergency Trendelenburg pedal—Greek
3	62746	1	Label, caution (English accessory receptacle beds only)
4	49489	1	Label, receptacle capacity (English accessory receptacle beds only)
5	71046	2	Label, scale seal (OIML scale beds only)
6	69347101	1	Label, fuse, 120V bed—English
	69347401	1	Label, fuse, 120V bed—Spanish
	69347501	1	Label, fuse, 120V bed—Portuguese
	69347901	1	Label, fuse, 120V bed—Arabic
	693471001	1	Label, fuse, 120V bed—Chinese—Traditional
	693471201	1	Label, fuse, 120V bed—Japanese

Item Number	Part Number	Quantity	Description
7	69348101	1	Label, fuse, 230V bed—English
	69348201	1	Label, fuse, 230V bed—German
	69348301	1	Label, fuse, 230V bed—French
	69348401	1	Label, fuse, 230V bed—Spanish
	69348501	1	Label, fuse, 230V bed—Portuguese
	69348601	1	Label, fuse, 230V bed—Italian
	69348701	1	Label, fuse, 230V bed—Dutch
	69348801	1	Label, fuse, 230V bed—Swedish
	69348901	1	Label, fuse, 230V bed—Arabic
	693481001	1	Label, fuse, 230V bed—Chinese—Traditional
	693481101	1	Label, fuse, 230V bed—Chinese—Simplified
	693481301	1	Label, fuse, 230V bed—Greek
8	44002	1	Label, protective earth
9	44464	1	Label, patental equalization
10	49486101	1	Label, ground caution—English
	49486201	1	Label, ground caution—German
	49486301	1	Label, ground caution—French
	49486401	1	Label, ground caution—Spanish
	49486501	1	Label, ground caution—Portuguese
	49486601	1	Label, ground caution—Italian
	49486701	1	Label, ground caution—Dutch
	49486801	1	Label, ground caution—Swedish
	49486901	1	Label, ground caution—Arabic
	494861001	1	Label, ground caution—Chinese—Traditional
	494861101	1	Label, ground caution—Chinese—Simplified
	494861201	1	Label, ground caution—Japanese
	494861301	1	Label, ground caution—Greek

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## **International Labels—Head End**

**Figure 5-64. International Labels—Head End**



**Table 5-64. International Labels—Head End**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	46960	1	Label, consult accompanying documentation
2	46770	1	Label, CE (International beds <b>without</b> scale only)
	64068	1	Label, CE with TUV identification (International beds <b>with</b> scale only)
3	42446	1	Label, VDE
4	63551	1	Label, patent marking
5	49495101	2	Label, IV pump mounting—English (permanent IV pole beds only)
	49495201	2	Label, IV pump mounting—German (permanent IV pole beds only)
	49495301	2	Label, IV pump mounting—French (permanent IV pole beds only)
	49495401	2	Label, IV pump mounting—Spanish (permanent IV pole beds only)
	49495501	2	Label, IV pump mounting—Portuguese (permanent IV pole beds only)
	49495601	2	Label, IV pump mounting—Italian (permanent IV pole beds only)
	49495701	2	Label, IV pump mounting—Dutch (permanent IV pole beds only)
	49495801	2	Label, IV pump mounting—Swedish (permanent IV pole beds only)
	49495901	2	Label, IV pump mounting—Arabic (permanent IV pole beds only)
	494951001	2	Label, IV pump mounting—Chinese—Traditional (permanent IV pole beds only)
	494951101	2	Label, IV pump mounting—Chinese—Simplified (permanent IV pole beds only)
	494951201	2	Label, IV pump mounting—Japanese (permanent IV pole beds only)
5 (continued)	494951301	2	Label, IV pump mounting—Greek (permanent IV pole beds only)

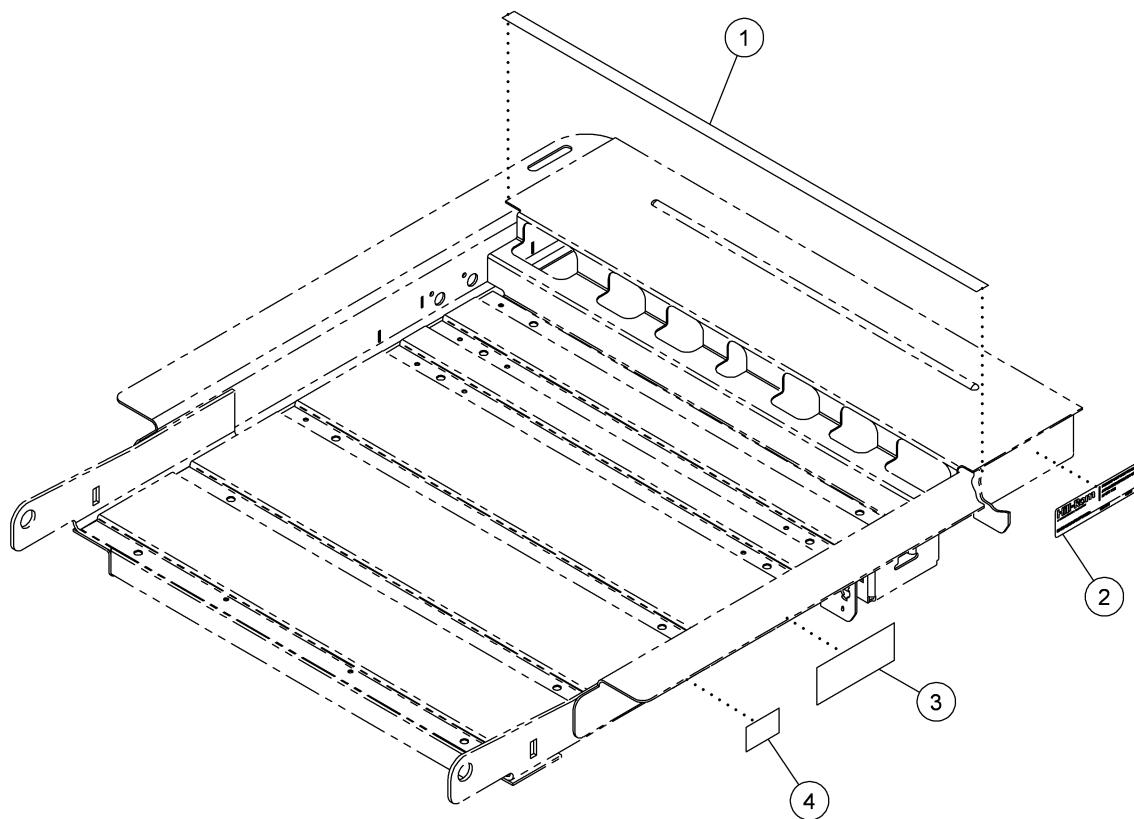
<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
6	67090-07	2	Label, swivel, infusion support (permanent IV pole beds only)
7	65049201	1	Label, SideCom® Communication System warning—German (Nurse Call beds only)
	65049301	1	Label, SideCom® Communication System warning—French (Nurse Call beds only)
	65049401	1	Label, SideCom® Communication System warning—Spanish (Nurse Call beds only)
	65049501	1	Label, SideCom® Communication System warning—Portuguese (Nurse Call beds only)
	65049601	1	Label, SideCom® Communication System warning—Italian (Nurse Call beds only)
	65049701	1	Label, SideCom® Communication System warning—Dutch (Nurse Call beds only)
	65049801	1	Label, SideCom® Communication System warning—Swedish (Nurse Call beds only)
	65049901	1	Label, SideCom® Communication System warning—Arabic (Nurse Call beds only)
	650491001	1	Label, SideCom® Communication System warning—Chinese—Traditional (Nurse Call beds only)
	650491101	1	Label, SideCom® Communication System warning—Chinese—Simplified (Nurse Call beds only)
	650491201	1	Label, SideCom® Communication System warning—Japanese (Nurse Call beds only)
7 (continued)	650491301	1	Label, SideCom® Communication System warning—Greek (Nurse Call beds only)

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
8	49485101	1	Label, head end capacity—English
	49485201	1	Label, head end capacity—German
	49485301	1	Label, head end capacity—French
	49485401	1	Label, head end capacity—Spanish
	49485501	1	Label, head end capacity—Portuguese
	49485601	1	Label, head end capacity—Italian
	49485701	1	Label, head end capacity—Dutch
	49485801	1	Label, head end capacity—Swedish
	49485901	1	Label, head end capacity—Arabic
	494851001	1	Label, head end capacity—Chinese—Traditional
	494851101	1	Label, head end capacity—Chinese—Simplified
	494851201	1	Label, head end capacity—Japanese
	494851301	1	Label, head end capacity—Greek
9	49484101	1	Label, trapeze caution—English
	49484201	1	Label, trapeze caution—German
	49484301	1	Label, trapeze caution—French
	49484401	1	Label, trapeze caution—Spanish
	49484501	1	Label, trapeze caution—Portuguese
	49484601	1	Label, trapeze caution—Italian
	49484701	1	Label, trapeze caution—Dutch
	49484801	1	Label, trapeze caution—Swedish
	49484901	1	Label, trapeze caution—Arabic
	494841001	1	Label, trapeze caution—Chinese—Traditional
	494841101	1	Label, trapeze caution—Chinese—Simplified
	494841201	1	Label, trapeze caution—Japanese
	494841301	1	Label, trapeze caution—Greek

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## **International Labels—Head Section Weldment**

**Figure 5-65. International Labels—Head Section Weldment**



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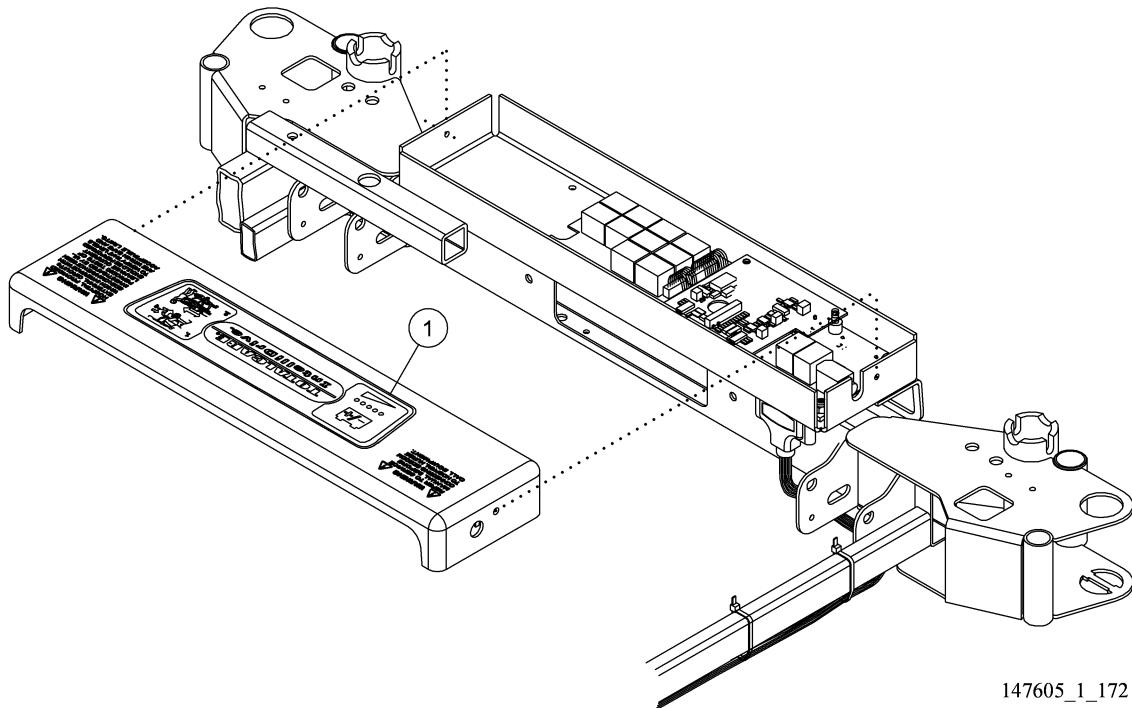
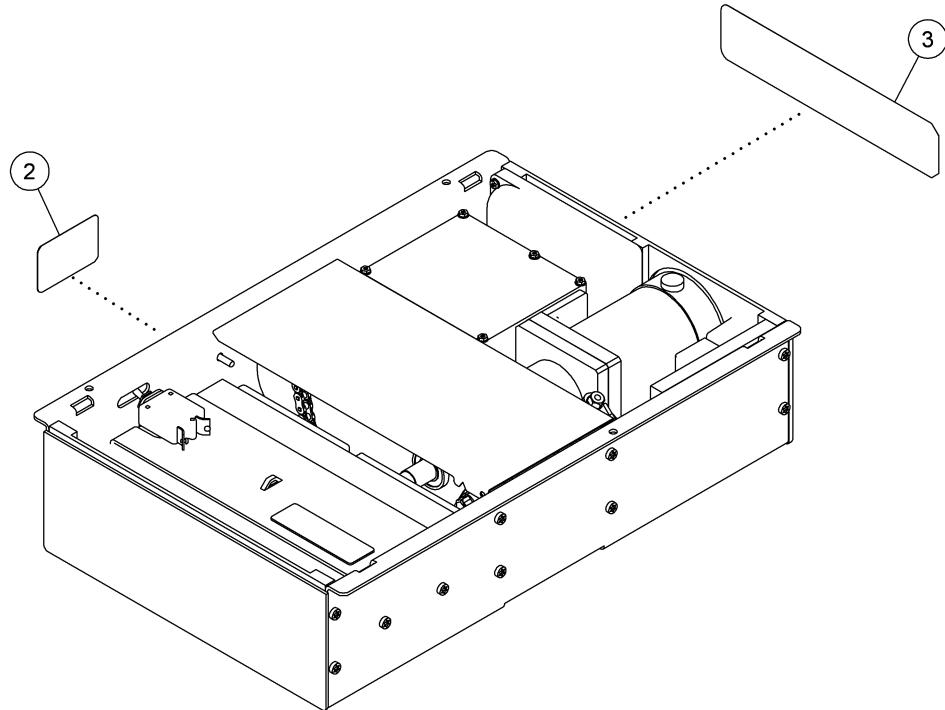
**Table 5-65. International Labels—Head Section Weldment**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	61068	1	Label, bladder connection position (prevention and pulmonary surface beds only)
2	4647505	1	Labels (English fluoroscopy beds only)
3	7081503	1	Label, European Norm (EN) scale (OIML scale beds only)
4	71422	1	Label, OIML LAT/AIT, Southern Europe (Southern European OIML scale beds only)
	71423	1	Label, OIML LAT/AIT, Central Europe (Central European OIML scale beds only)
	71424	1	Label, OIML LAT/AIT, Northern Europe (Northern European OIML scale beds only)

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## **International Labels—IntelliDrive® Transport System**

**Figure 5-66. International Labels—IntelliDrive® Transport System**



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**Table 5-66. International Labels—IntelliDrive® Transport System**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	68365101	1	Label, battery charge—English
	68365201	1	Label, battery charge—German
	68365301	1	Label, battery charge—French
	68365401	1	Label, battery charge—Spanish
	68365501	1	Label, battery charge—Portuguese
	68365601	1	Label, battery charge—Italian
	68365701	1	Label, battery charge—Dutch
	68365801	1	Label, battery charge—Swedish
	68365901	1	Label, battery charge—Arabic
	683651001	1	Label, battery charge—Traditional Chinese
	683651101	1	Label, battery charge—Simplified Chinese
	683651201	1	Label, battery charge—Japanese
	683651301	1	Label, battery charge—Greek
2	68797101	1	Label, on/off toggle—English
	68797201	1	Label, on/off toggle—German
	68797301	1	Label, on/off toggle—French
	68797401	1	Label, on/off toggle—Spanish
	68797501	1	Label, on/off toggle—Portuguese
	68797601	1	Label, on/off toggle—Italian
	68797701	1	Label, on/off toggle—Dutch
	68797801	1	Label, on/off toggle—Swedish
	68797901	1	Label, on/off toggle—Arabic
	687971001	1	Label, on/off toggle—Traditional Chinese
	687971101	1	Label, on/off toggle—Simplified Chinese
	687971201	1	Label, on/off toggle—Japanese
	687971301	1	Label, on/off toggle—Greek

Item Number	Part Number	Quantity	Description
3	68874101	1	Label, IntelliDrive® Transport System override—English
	68874201	1	Label, IntelliDrive® Transport System override—German
	68874301	1	Label, IntelliDrive® Transport System override—French
	68874401	1	Label, IntelliDrive® Transport System override—Spanish
	68874501	1	Label, IntelliDrive® Transport System override—Portuguese
	68874601	1	Label, IntelliDrive® Transport System override—Italian
	68874701	1	Label, IntelliDrive® Transport System override—Dutch
	68874801	1	Label, IntelliDrive® Transport System override—Swedish
	68874901	1	Label, IntelliDrive® Transport System override—Arabic
	688741001	1	Label, IntelliDrive® Transport System override—Chinese—Traditional
	688741101	1	Label, IntelliDrive® Transport System override—Chinese—Simplified
	688741201	1	Label, IntelliDrive® Transport System override—Japanese
	688741301	1	Label, IntelliDrive® Transport System override—Greek

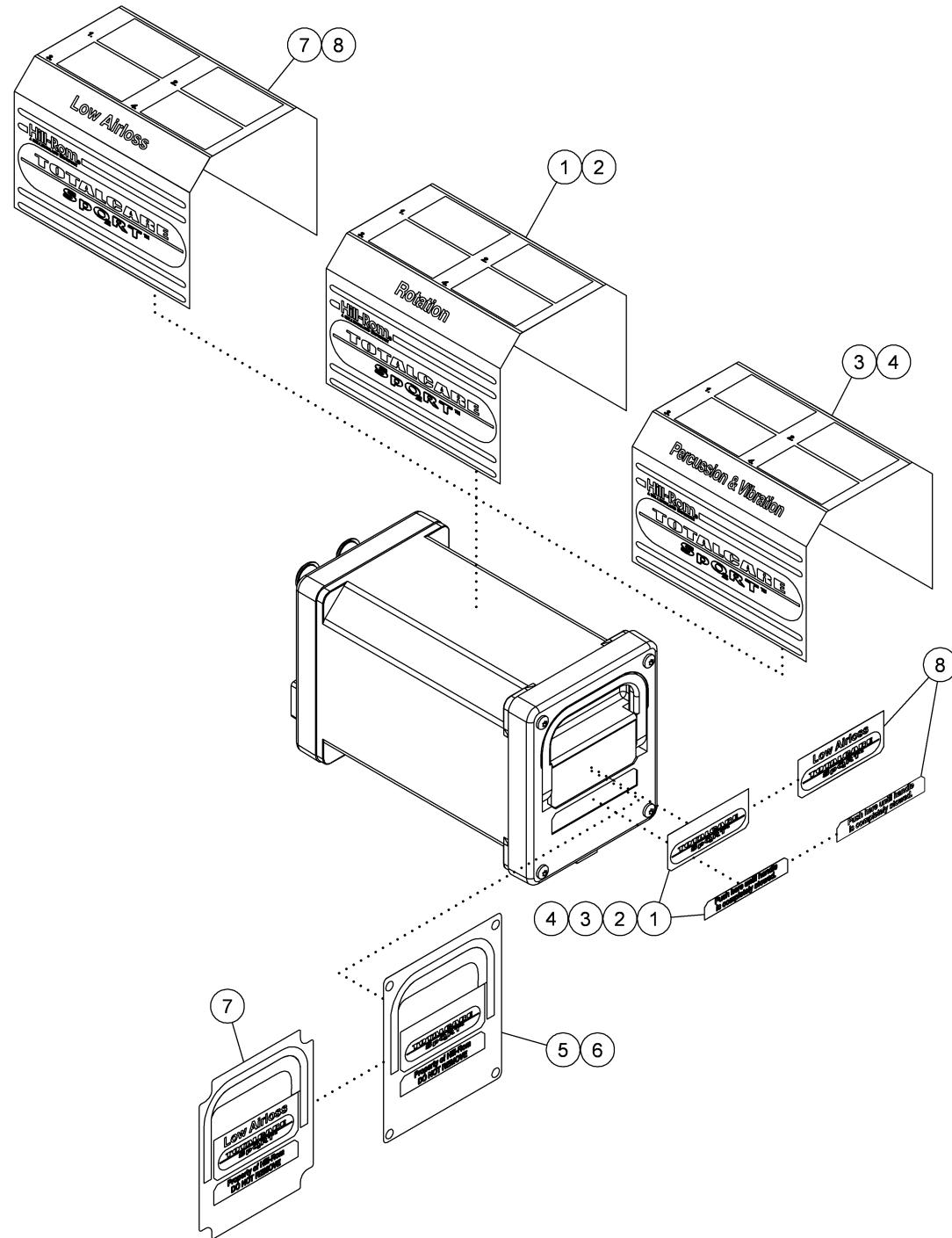
**NOTES:**

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**5**

## International Labels—Pulmonary Therapy Modules

Figure 5-67. International Labels—Pulmonary Therapy Modules



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**Table 5-67. International Labels—Pulmonary Therapy Modules**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	66932101	1	Label, rotation—English
	66932201	1	Label, rotation—German
	66932301	1	Label, rotation—French
	66932401	1	Label, rotation—Spanish
	66932501	1	Label, rotation—Portuguese
	66932601	1	Label, rotation—Italian
	66932701	1	Label, rotation—Dutch
	66932801	1	Label, rotation—Swedish
	66932901	1	Label, rotation—Arabic
	669321001	1	Label, rotation—Chinese—Traditional
	669321101	1	Label, rotation—Chinese—Simplified
	669321201	1	Label, rotation—Japanese
	669321301	1	Label, rotation—Greek
2	70030	1	Label, pulmonary rotation (removable rental therapy modules only) (English beds only)
3	66933101	1	Label, percussion and vibration (P/V)—English
	66933201	1	Label, P/V—German
	66933301	1	Label, P/V—French
	66933401	1	Label, P/V—Spanish
	66933501	1	Label, P/V—Portuguese
	66933601	1	Label, P/V—Italian
	66933701	1	Label, P/V—Dutch
	66933801	1	Label, P/V—Swedish
	66933901	1	Label, P/V—Arabic
	669331001	1	Label, P/V—Chinese—Traditional
	669331101	1	Label, P/V—Chinese—Simplified
	669331201	1	Label, P/V—Japanese
	669331301	1	Label, P/V—Greek
4	70029	1	Label, pulmonary P/V (removable rental therapy modules only) (English beds only)

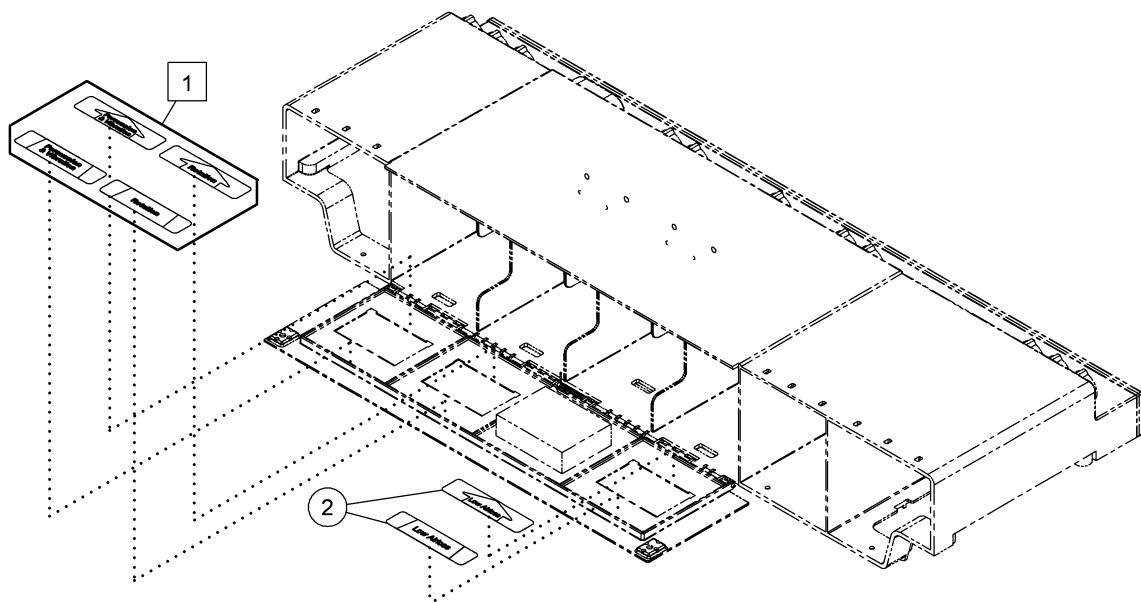
<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
5	67756101	1	Label, module handle—English (rental rotation therapy modules only)
	67756201	1	Label, module handle—German (rental rotation therapy modules only)
	67756301	1	Label, module handle—French (rental rotation therapy modules only)
	67756401	1	Label, module handle—Spanish (rental rotation therapy modules only)
	67756501	1	Label, module handle—Portuguese (rental rotation therapy modules only)
	67756601	1	Label, module handle—Italian (rental rotation therapy modules only)
	67756701	1	Label, module handle—Dutch (rental rotation therapy modules only)
	67756801	1	Label, module handle—Swedish (rental rotation therapy modules only)
	67756901	1	Label, module handle—Arabic (rental rotation therapy modules only)
	677561001	1	Label, module handle—Chinese—Traditional (rental rotation therapy modules only)
	677561101	1	Label, module handle—Simplified Chinese (rental rotation therapy modules only)
	677561201	1	Label, module handle—Japanese (rental rotation therapy modules only)
	677561301	1	Label, module handle—Greek (rental rotation therapy modules only)

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
6	67757101	1	Label, module handle—English (rental P/V therapy modules only)
	67757201	1	Label, module handle—German (rental P/V therapy modules only)
	67757301	1	Label, module handle—French (rental P/V therapy modules only)
	67757401	1	Label, module handle—Spanish (rental P/V therapy modules only)
	67757501	1	Label, module handle—Portuguese (rental P/V therapy modules only)
	67757601	1	Label, module handle—Italian (rental P/V therapy modules only)
	67757701	1	Label, module handle—Dutch (rental P/V therapy modules only)
	67757801	1	Label, module handle—Swedish (rental P/V therapy modules only)
	67757901	1	Label, module handle—Arabic (rental P/V therapy modules only)
	677571001	1	Label, module handle—Chinese—Traditional (rental P/V therapy modules only)
	677571101	1	Label, module handle—Simplified Chinese (rental P/V therapy modules only)
	677571201	1	Label, module handle—Japanese (rental P/V therapy modules only)
	677571301	1	Label, module handle—Greek (rental P/V therapy modules only)
7	71473141	1	Label, module handle, low airloss—non-removable module
8	71473140	1	Label, module handle, low airloss—removable module

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## **International Labels—Pulmonary Air Manifold**

**Figure 5-68. International Labels—Pulmonary Air Manifold**



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**Table 5-68. International Labels—Pulmonary Air Manifold**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	66977101	1	Label, air manifold—English
	66977201	1	Label, air manifold—German
	66977301	1	Label, air manifold—French
	66977401	1	Label, air manifold—Spanish
	66977501	1	Label, air manifold—Portuguese
	66977601	1	Label, air manifold—Italian
	66977701	1	Label, air manifold—Dutch
	66977801	1	Label, air manifold—Swedish
	66977901	1	Label, air manifold—Arabic
	669771001	1	Label, air manifold—Traditional Chinese
	669771101	1	Label, air manifold—Simplified Chinese
	669771201	1	Label, air manifold—Japanese
	669771301	1	Label, air manifold—Greek
2	142108101	1	Label, low airloss for door—English
	142108201		Label, low airloss for door—German
	142108301		Label, low airloss for door—French
	142108401		Label, low airloss for door—Spanish
	142108501		Label, low airloss for door—Portuguese
	142108601		Label, low airloss for door—Italian
	142108701		Label, low airloss for door—Dutch
	142108801		Label, low airloss for door—Swedish
	142108901		Label, low airloss for door—Arabic
	1421081001		Label, low airloss for door—Chinese, traditional
	1421081101		Label, low airloss for door—Chinese, simplified
	1421081201		Label, low airloss for door—Japanese
	1421081301		Label, low airloss for door—Greek
	1421081401		Label, low airloss for door—Russian

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
2 (continued)	1421081701		Label, low airloss for door—Danish
	1421081801		Label, low airloss for door—Hungarian
	1421081901		Label, low airloss for door—Norwegian
	1421082001		Label, low airloss for door—Slovenian
	1421082101		Label, low airloss for door—Czech
	1421082201		Label, low airloss for door—Slovakian

## Wireless Module

Figure 5-69. Wireless Module

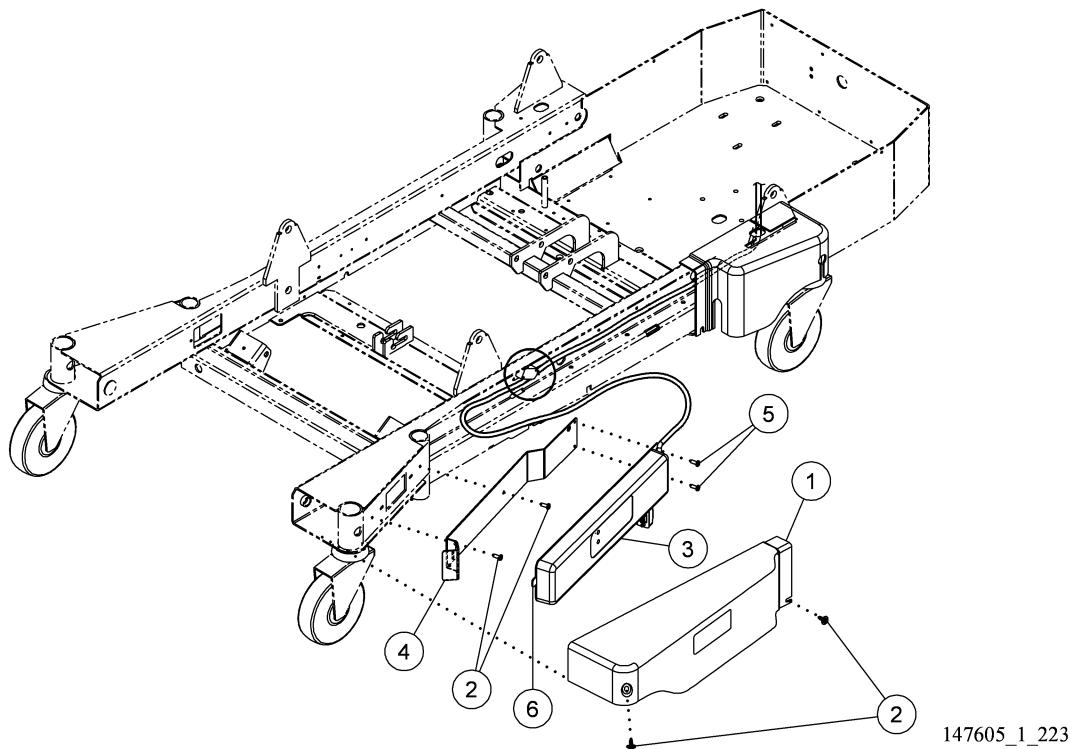
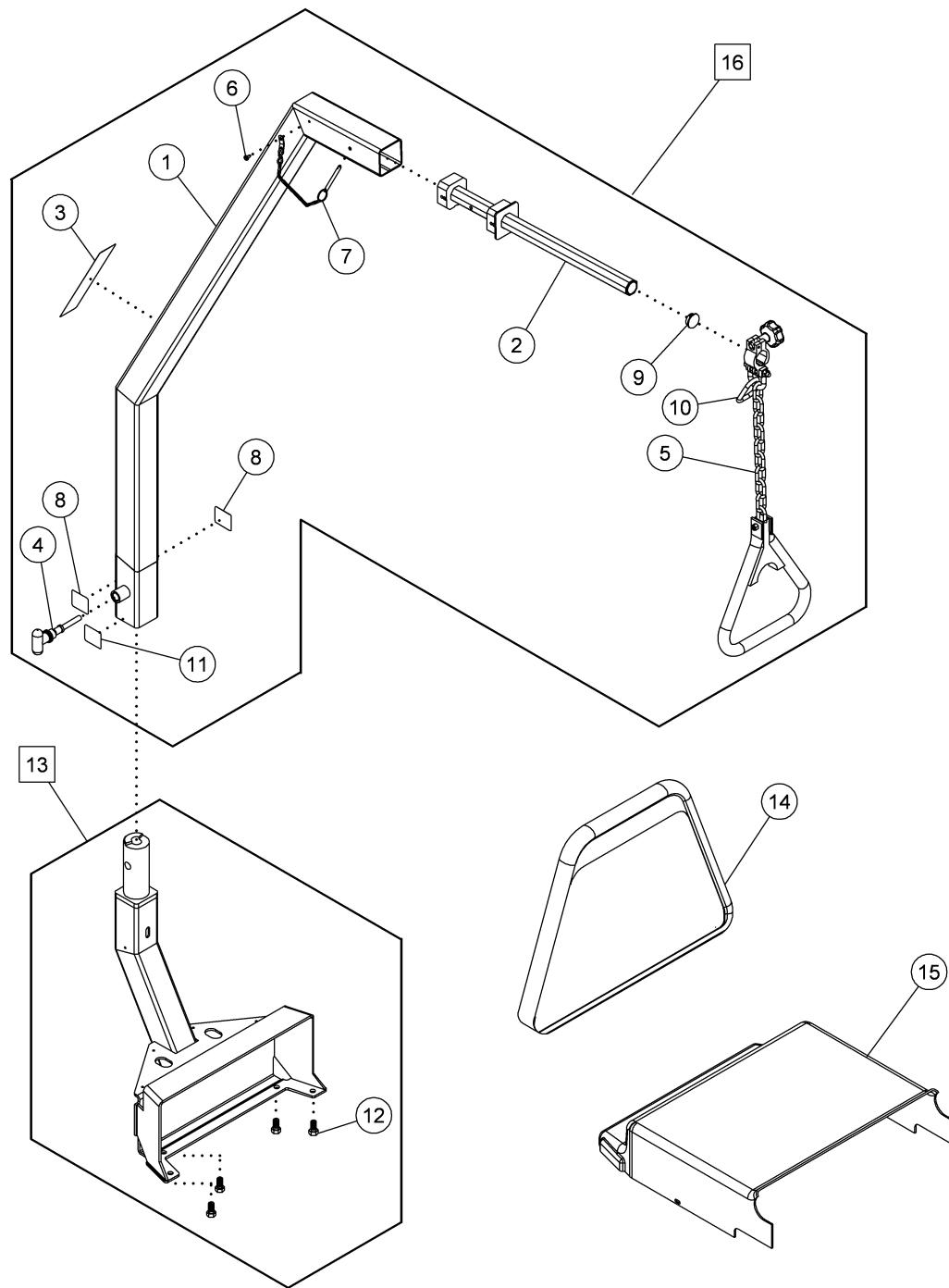


Table 5-69. Wireless Module

Item Number	Part Number	Quantity	Description
1	144985	1	Cover assembly
2	47172	4	Screw
3	141997	1	Wireless assembly
4	142116	1	Bracket, adapter mounting
5	49493	2	Screw
6	142117	1	Mount bracket

## Patient Helper

Figure 5-70. Patient Helper



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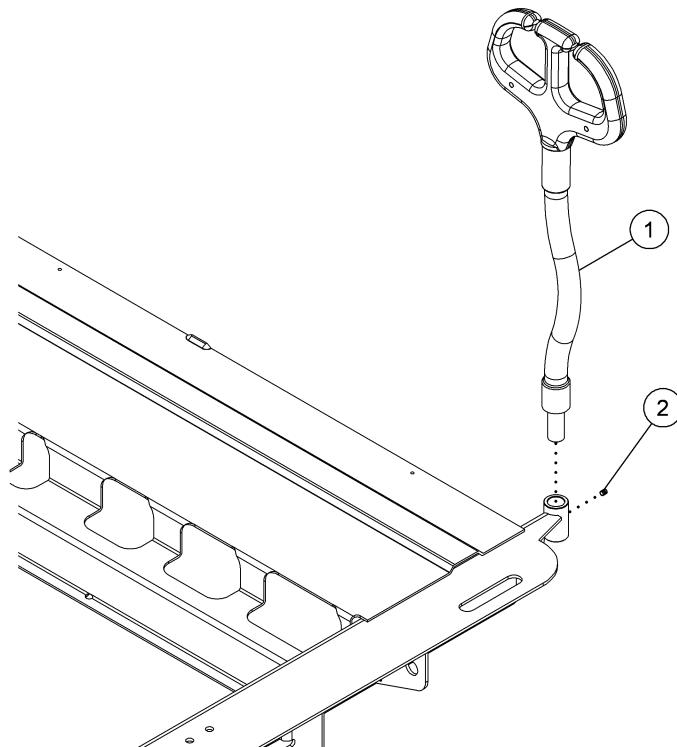
**Table 5-70. Patient Helper**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	146163	1	Weldment, arm assembly
2	146164	1	Arm assembly
3	145947	1	Label, safe working load and removal
4	135665	1	Pin, weld in quick release (T-handle)
5	1200010003	1	Trapeze handle assembly
6	43878	1	Screw, 10-32, machine
7	135801	1	Release pin
8	137691	2	Label, warning trapeze
9	138295	1	End cap
10	136794	1	Interlocking spring snap
11	143586	1	Label, trapeze instruction
12	4729601	4	Bolt, hex, flange 5/16-18
13	P1842A	1	Patient Helper base
14	P1849A	1	Headboard, TotalCare® Bariatric Plus
15	144245	1	Cover, tub, Patient Helper
16	P1851A	1	Patient Helper arm

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## **Line Manager**

**Figure 5-71. Line Manager**



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**Table 5-71. Line Manager**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	146287	2	Flex arm
2	9010102	2	Set screw

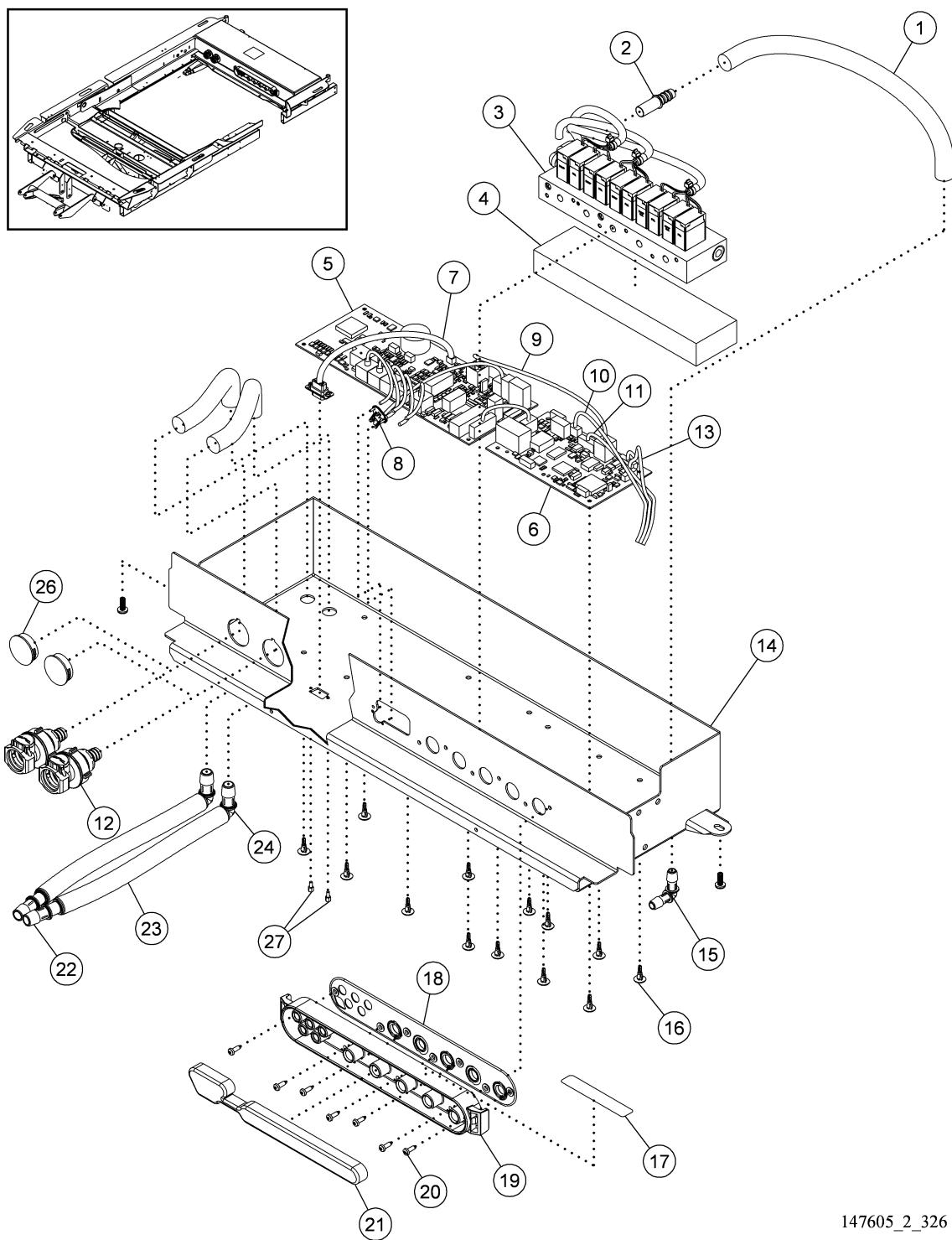
**NOTES:**

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**5**

## Air System—P500 Model (Sheet 1 of 3)

Figure 5-72. Air System—P500 (Sheet 1 of 3)



147605\_2\_326

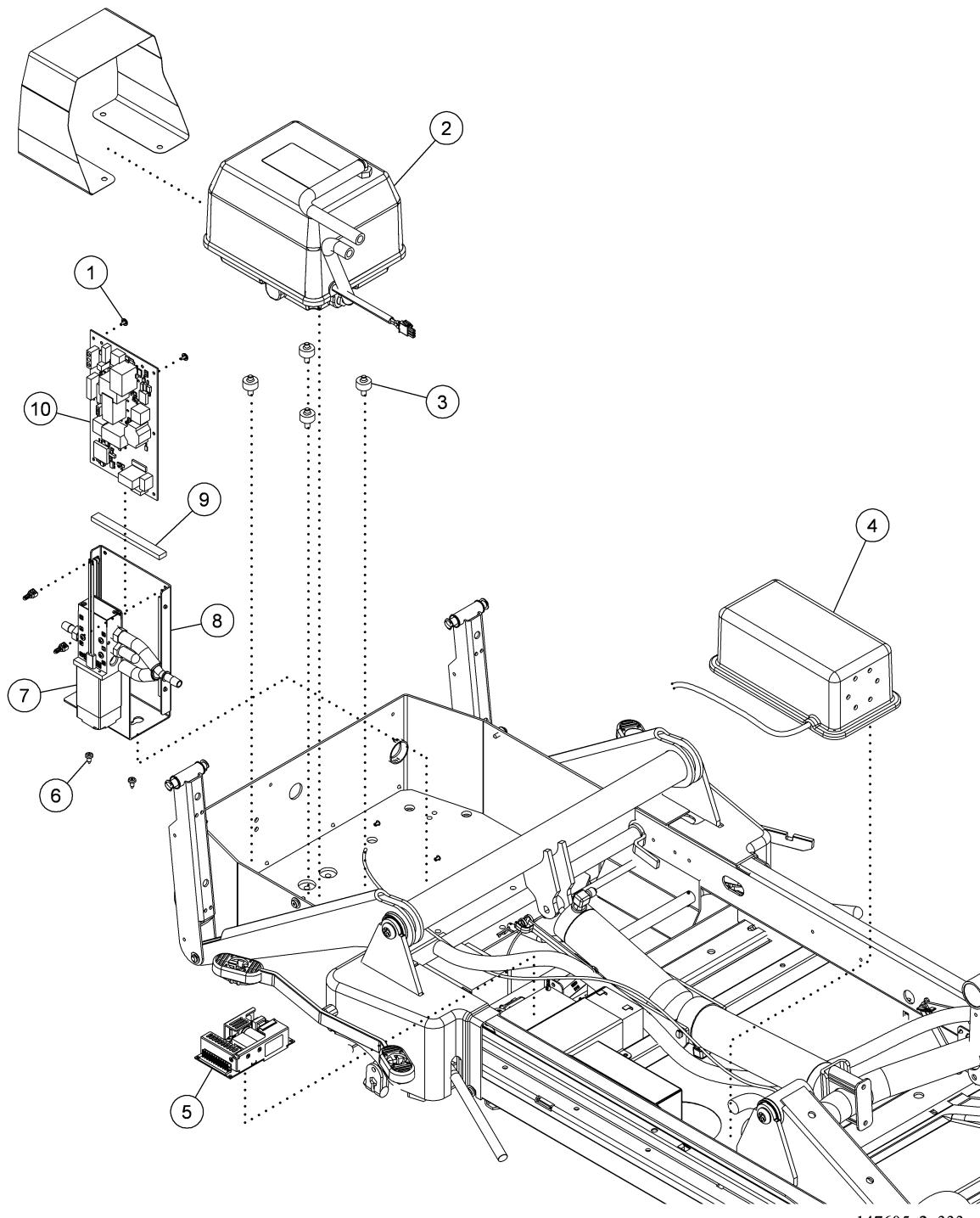
**Table 5-72. Air System—P500 (Sheet 1 of 3)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	152752	1	Tubing, .375 ID
2	152759	1	Barbed connector
3	69937	1	Manifold
4	153259	1	Foam diffuser
5	152135	1	Air control P.C. board
6	138407	1	LON to CAN interface P.C. board
7	152358	1	Cable, Aux. CAN
8	7042401	1	Switch, hall effect
9	6896201	1	Scale comm cable
10	151435	1	Cable, siderail switch
11	151433	1	Cable, AC-LON interface
12	152751	2	Quick coupling
13	6305801	1	Cable assembly
14	151258	1	Weldment
15	152749	1	.375 x .375 elbow
16	3976305	13	Standoff
17	70943	1	Label, disconnect
18	69943	1	Gasket
19	69941	1	Connector
20	69988	7	Screw
21	71011	1	Cover
22	152748	2	.5 x .5 connector
23	152754	2	Tubing, .5 ID
24	152746	2	.5 x .5 elbow connector

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## Air System—P500 Model (Sheet 2 of 3)

Figure 5-73. Air System—P500 (Sheet 2 of 3)



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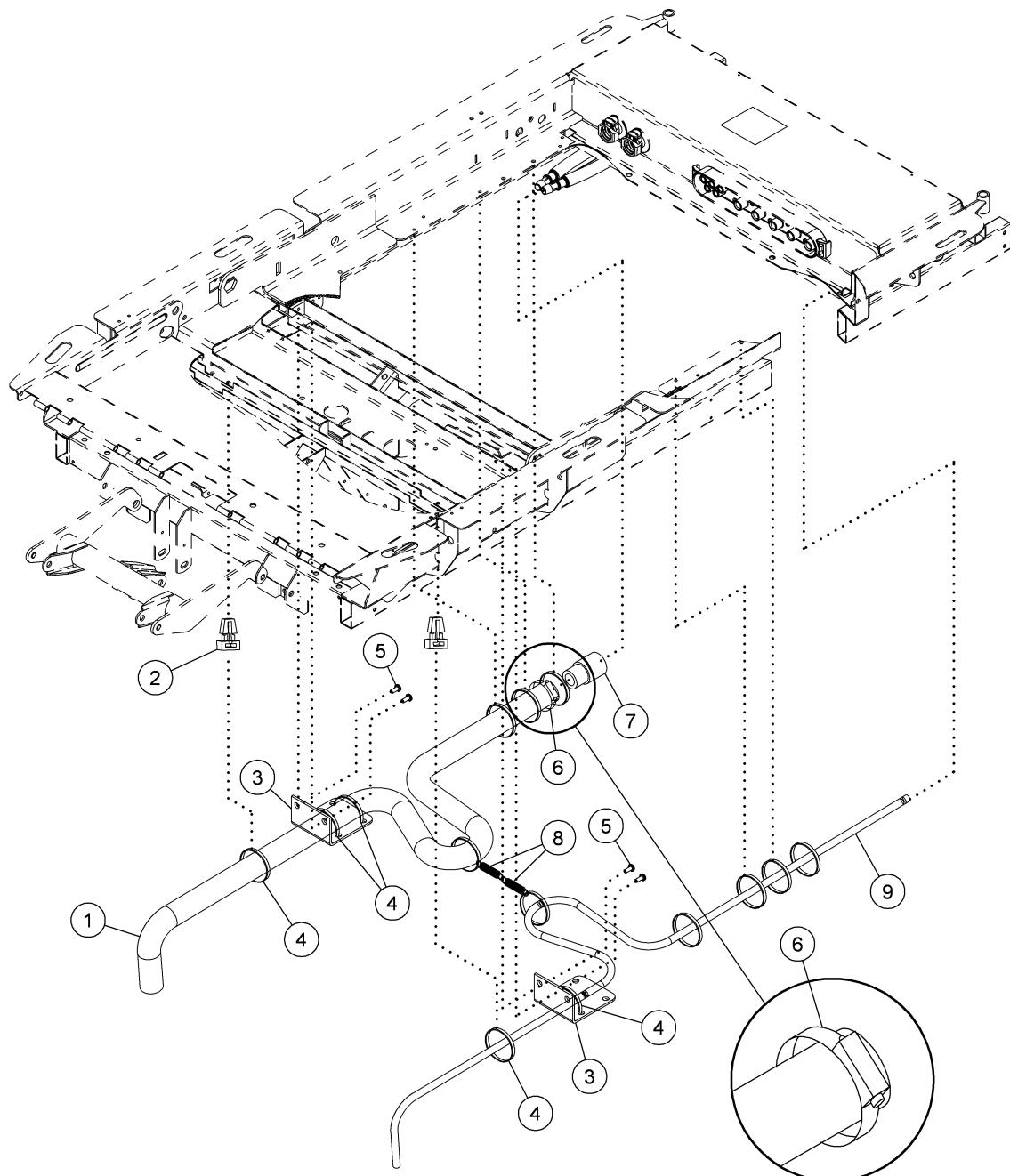
**Table 5-73. Air System—P500 (Sheet 2 of 3)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	47172	2	Standoff
2	151274S	1	Compressor
3	6444902	4	Standoff
4	152220	1	Blower
5	150504	1	AC control P.C. board
6	43878	2	Screw
7	151960S	1	Valve, 4-way
8	69386	1	Bracket
9	4411306	1	Foam block
10	151808	1	Power supply

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## Air System—P500 Model (Sheet 3 of 3)

Figure 5-74. Air System—P500 (Sheet 3 of 3)



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**Table 5-74. Air System—P500 (Sheet 3 of 3)**

<b>Item Number</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	152919	1	Hose, vaccum
2	40421	2	Cable tie mount
3	140443	2	Bracket
4	19121	22	Cable tie
5	43878	4	Screw
6	64694	2	Hose clamp
7	151899	1	Y-connector
8	140444	2	Soring, extension
9	152706	1	Hose

**NOTES:**

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# **Chapter 6**

## **General Procedures**

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### **Cleaning and Care**

**WARNING:**

Follow the product manufacturer's instructions. Failure to do so could result in personal injury or equipment damage.

**SHOCK HAZARD:**

Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

**WARNING:**

Do not expose the unit to excessive moisture that would allow for liquid pooling. Personal injury or equipment damage could occur.

**CAUTION:**

Do not use harsh cleaners/detergents such as scouring pads or heavy duty grease removers or solvents such as acetone. Equipment damage could occur.

**CAUTION:**

Make sure the metal platform is dry before you put the mattress on the bed. Failure to do so could result in equipment damage.

If there is no visible soil with possible body fluids, we recommend that you clean the unit with a mild detergent and warm water. To disinfect, use a combination cleanser/disinfectant as explained in "Disinfecting" below.

In either case, make sure the metal platform is dry before you put the mattress on the bed.

## **General Cleaning**

Clean the unit with a lightly dampened cloth and ordinary disinfectants. Do not use excessive liquid. Let the metal platform dry before you put the mattress on the bed.

## **Steam Cleaning**

Do not use any steam cleaning device on the TotalCare® Bed System. Excessive moisture can damage mechanisms in this unit.

## **Cleaning Hard to Clean Spots**

To remove difficult spots or stains, use standard household cleaners and a soft bristle brush.

## **Disinfecting**

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

## **Cleaning Medical Fluid Spills**

Fluid spills should be wiped up as soon as possible. Always unplug the unit from its power sources before you clean up major fluid spills. Some fluids used in the hospital environment, such as iodophor and zinc oxide creams, can cause permanent stains.

To remove temporary stains, wipe vigorously with a lightly-dampened sponge or rag and an approved cleaner/disinfectant solution.

## **Cleaning Blood and Excreta**

If possible, wipe up excess blood and excreta when it is wet, since the cleaning process is more difficult after these substances dry. When there is blood or other body fluids, we recommend the use of an intermediate-level (tuberculocidal) detergent/disinfectant.

## **Cleaning the Mattress and the Low Airloss Coverlet**

### **NOTE:**

There are two types of Low Airloss Coverlets for the TotalCare SpO<sub>2</sub>RT® Bed L model: wipe only and machine washable. You can identify the coverlets by

their color and material. The wipe only coverlet is the same color and material as the mattress. The machine washable coverlet is a darker color and different material than the mattress.

Prepare a Treatment or Pulmonary Surface for Cleaning

1. Engage Max-Inflate.
2. Unplug the bed from its power source.
3. Remove the surface, as follows:
  - a. Make sure the seat belt is unlatched.
  - b. Raise the head section of the mattress for easier access to the air hose connectors on the manifold assembly.
  - c. Disconnect the quick-disconnect air hoses. Air hoses are color-coded for correct installation.
  - d. Lift up on the foot and head ends of the surface until the magnets inside the ticking release the frame. Slide the surface off the articulating deck.

Clean and Disinfect a Short Stay, Treatment, or Pulmonary Mattress, and a Wipe only Coverlet

1. Wipe down the surface with chlorine bleach (50 ppm to 150 ppm) or mild detergent and warm water followed by an approved intermediate level disinfectant.

**NOTE:**

2.5 oz of bleach per 10 gal of water is approximately 100 ppm of available chlorine.

2. Let the bleach or disinfectant stay on the surface as instructed in the manufacturer's instructions.
3. Remove the bleach or disinfectant, and rinse with warm water.
4. Let the mattress and/or coverlet completely air dry.

### Cleaning and Disinfecting a Machine Washable Coverlet

For a lightly soiled coverlet, you may wipe it clean as described above. However, when there are signs of heavy soil such as body fluids and/or substances, machine wash the coverlet as follows. During the wash cycle, soak the coverlet in the disinfectant or bleach.

1. Remove the coverlet.
2. Machine wash the coverlet with chlorine bleach (50 ppm to 150 ppm) or detergent and an effective intermediate level disinfectant. (For customers in the US, the disinfectant should be registered with the Environmental Protection Agency.)

**NOTE:**

2.5 oz of bleach per 10 gal of water is approximately 100 ppm of available chlorine.

- Use the bleach or disinfectant as instructed in the manufacturer's instructions.
- To determine the amount of bleach or disinfectant to use, determine the amount of water in the washer, and follow the manufacturer's dilution instructions.
- During the wash cycle, soak the coverlet in the disinfectant or bleach.
- Let the coverlet rinse thoroughly in clean water.



**CAUTION:**

Do **not** use high temperatures to dry the coverlet. Air dry or select a low or non-heat dry cycle such as air fluff. High temperatures could destroy the coating that makes the coverlet waterproof yet breathable.

3. Use the **lowest** temperature setting of the dryer to dry the coverlet. Do **not** use high temperatures.

### Replace a Treatment or Pulmonary Surface after Cleaning

1. Return the sleep deck to the level position, and fully extend the foot section.
2. Put the Treatment or Pulmonary surface on the sleep deck with the air hoses towards the head of the system.
3. Connect the applicable quick-disconnect connectors at the head end to the manifold assembly. Match the color of the air hose with the same-colored connector.

4. Make sure the Treatment or Pulmonary surface extends completely to the footboard.

## **Damage/Repair Surface Ticking**



### **WARNING:**

Examine the surfaces periodically to make sure the ticking is in good condition. Failure to do so could cause injury.

Tears, holes, and cracks in the sleep surface ticking will compromise surface impermeability and infection resistance. Repairs to the ticking are not recommended.

## Component Handling



### **CAUTION:**

To prevent component damage, make sure your hands are clean, and **only** handle the P.C. board by its edges.



### **CAUTION:**

When you handle electronic components, wear an antistatic strap. Failure to do so could result in component damage.



### **CAUTION:**

For shipping and storage, put the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

## P.C. Board

Be careful with the P.C. board when you service it, or these problems may occur:

- P.C. board damage
- Shortened P.C. board life
- Unit malfunctions

When you service the P.C. board, do as follows:

- Make sure hands are clean and free of moisture, oily liquids, etc.
- **Only** touch the P.C. board by its outer edges.
- Do not touch the P.C. board components. Finger contact with the board surface and/or with its components can leave a deposit that will result in board (and component) deterioration.
- When you work with electronics, wear an applicable antistatic strap, and make sure it is correctly grounded.
- Service the removed P.C. board at a static-free workstation that is correctly grounded.
- For shipping and storage, put the removed P.C. board in an antistatic protective bag.

## Lubrication Requirements



### **WARNING:**

Follow the product manufacturer's instructions. Failure to do so could result in personal injury or equipment damage.



### **CAUTION:**

Do not use silicone-based lubricants. Equipment damage could occur.

Oilite®<sup>1</sup> bearings and bushings are used in several places on the system. By retaining oil, the pores give a self-lubricating quality to the bearings and bushings. If any silicone-based lubricant is applied to the bearings and bushings or anywhere else on the system, this self-lubricating quality is neutralized.

It is safe to apply these lubricants to the system (see table 6-1 on page 6-7):

**Table 6-1. Lubricants**

Part Number	Description
8252 (100)	2 oz m-1 oil (apply to Oilite® bearings and bushings)
SA3351 (100)	4 oz lithium grease

1. Oilite® is a registered trademark of Beemer Precision, Incorporated.

## Preventive Maintenance



### WARNING:

Only facility-authorized persons should service the TotalCare® Bed System. Service by unauthorized persons could cause injury or equipment damage.

It is necessary for the TotalCare® Bed System to have an effective maintenance program. We recommend that you do **semi-annual** preventive maintenance (PM) and testing for Joint Commission certification. PM and testing not only meet Joint Commission requirements but can help make sure of a long, operative life for the TotalCare® Bed System. PM will minimize downtime due to excessive wear.

The PM schedule that follows guides you through a normal PM procedure on the TotalCare® Bed System. During this PM process, examine each item on the schedule, and make the necessary adjustments.

Follow the PM schedule with the corresponding PM checklist. This checklist is designed to keep a running maintenance history and subsequent repair costs for one TotalCare® Bed System. However, your facility can modify this checklist or design another to fit your needs. Two effective ways to reduce downtime and make sure the patient remains comfortable are to keep close records and maintain the TotalCare® Bed System.

## Preventive Maintenance Schedule

The TotalCare® Bed System maintenance program must be effective to make sure that the life span of the bed will be long and productive. Completion of a maintenance program and performing checks on a recommended basis will help to minimize and reduce time between breakdown failures.

The preventive maintenance schedule outlined (see table 6-2 on page 6-8) is intended to guide the technician through normal preventive maintenance on the TotalCare® Bed System. Each item on the schedule must be checked and any necessary adjustments must be performed.

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

Function	Procedure
Bed scale	Calibrate the scale. Refer to “Patient Weigh System Calibration (Non-NAWI Class III Scale Only)” on page 4-9 or “Verify Operation of the NAWI Class III Scale (NAWI Class III Scale—European Version Only)” on page 4-231.

<b>Function</b>	<b>Procedure</b>
Caregiver control panel	Do a test the bed function controls for correct operation of the function and momentary operation. Do a test all of the lockout controls, and make sure each control operates correctly.
Casters	Examine the casters for cuts, wear, tread life, etc.
Central brake and steer	Do a test the brake casters to determine if the bed moves when you engage the brake. Do a test the steer mode to determine if both foot end casters lock in the steer mode (see removal, replacement, and adjustment procedures for additional information).
Chair limits	Operate the chair control from the flat position to the chair egress position limits. Make sure the position sensors operate correctly.
Communications	Examine and test the communication junction box. Do a test on the SideCom® Communication System features for correct operation. Inspect the communication cable, include the male and female pins in the plug.
Control modules	Cleaning of this space as required.
CPR release	Do a test on the CPR release for correct operation and reset of the head cylinder.
Head section slide pivots, self-lubricating bearing, and slider pivot extrusions	Look for damage, and make sure the head section operates correctly. Replace components as necessary.
Electrical test	Do a test on the bed for electrical leakage. Ground resistance must be less than $0.20\ \Omega$ . Leakage current must be less than $65\ \mu A$ for 115V models, and less than $122\ \mu A$ for 230V models. Also, examine for leakage current at the nurse call connections. If the leakage current is greater than $65\ \mu A$ on a 115V bed or $122\ \mu A$ on a 230V bed, do as follows: <ul style="list-style-type: none"> <li>• Make sure the blower motor is isolated from the bed frame.</li> <li>• Make sure the hydraulic pump motor is isolated from the bed frame.</li> <li>• Examine the power cord for damage.</li> <li>• Examine the line filter for damage.</li> </ul>

<b>Function</b>	<b>Procedure</b>
Emergency Trendelenburg limits	<p>Make sure that the pedals are accessible on both sides of the bed, and do a test on pedal functions as follows:</p> <ul style="list-style-type: none"> <li>• Lift the emergency Trendelenburg pedal. The head end lowers from the level position to 12°, relative to the foot end. Look at the Trendelenburg indicator for degree accuracy of bed position.</li> <li>• Make sure both emergency Trendelenburg pedals operate without AC power or battery power.</li> </ul>
Foot articulating cylinder	Make sure the cylinder operates correctly.
Foot hilow cylinder	Make sure the cylinder operates correctly.
Foot retracting cylinder	Make sure the cylinder operates correctly.
Headboard and footboard	Make sure the head and footboard are in good condition.
Head cylinder	Make sure the cylinder operates correctly.
Head hilow cylinder	Make sure the cylinder operates correctly.
Head limits	Operate the head section to the full upper and lower limits. See “Specifications” on page 1-7. Make sure the position sensors operate correctly.
Hilow limits	Operate the bed to the full upper and lower limits. See “Specifications” on page 1-7. Make sure the head and foot hilow position sensors operate correctly.
Hydraulic tank	Make sure the correct correct level of hydraulic fluid in the reservoir (refer to procedure 4.29).
Knee cylinder	Make sure the cylinder operates correctly.
Knee limits	Operate the knee section to the full upper and lower limits. See “Specifications” on page 1-7. Make sure the position sensors operate correctly.
LED indicators	Make sure all indicators on the caregiver control panel and the GCI operate correctly.
Night light	Make sure the night light operates correctly.
Overall appearance	<p>Make sure the general condition of the bed is good. Touch up the paint where necessary.</p> <p>Examine the accessories, and replace as necessary.</p> <p>Examine the hose connectors for identification and for correct connection.</p>
Pivot points	Put grease all pivot points on the bed.

Function	Procedure
Power cord and plug	Examine the power cords and plugs for cuts, nicks, breaks, frays, and for correct grounding.
Trendelenburg limits	Operate the bed to the Trendelenburg and Reverse Trendelenburg position limits. See “Specifications” on page 1-7. Make sure the limits and indicators operate correctly.
Siderail controls	Do a test on the siderail controls for correct operation, and do a test for momentary operation of the controls.
Siderail frame	Make sure the siderails latch correctly. When the siderail is latched, a <b>click</b> should be heard. Gently pull on the siderail to make sure it is latched correctly. If it is difficult to latch, make sure the latch is clean, and look for obstructions. If wear is found, replace the latch components. Do a test on the dampener cylinders. Release each siderail from the up position and let it fall freely. Siderails should lower in a slow, smooth action.
Siderail cables	Examine the siderail cables for cuts, nicks, breaks, frays, and excessive wear. Replace as necessary.
Short stay surface	Examine the ticking for punctures, cuts, or tears. Examine inside the short stay surface for fluids, moisture, and stains. If there are any of these conditions, replace the ticking and all of the contaminated internal components. Examine the foam for cuts or excessive wear. Replace components as necessary.
Treatment, P500, and Pulmonary surface	Examine the ticking and air bladders for punctures, cuts, or tears. Examine inside the treatment surface for fluids, moisture, and stains. If there are any of these conditions, replace the ticking and all of the contaminated internal components. Examine the air blower. Examine the surface control modules for condition. Examine all of the hose connections (to the manifold, mattress, and inside of the mattress) and make sure the O-rings on the manifold connectors are in good condition. Make sure the controls and each zone operate correctly. Examine the foam for cuts or excessive wear. Replace components as necessary.
Drive belt (IntelliDrive® Transport System)	Look for damage. Replace if you see any of these: <ul style="list-style-type: none"><li>• Belt is off of the pulley</li><li>• Divot is greater than <math>\frac{1}{2}</math>" in length</li><li>• Internal steel belt is broken and comes out of the surface of the belt</li><li>• Material breakdown due to unknown foreign substance</li></ul>

<b>Function</b>	<b>Procedure</b>
Transport handle zero (IntelliDrive® Transport System)	Refer to “Throttle Check (IntelliDrive® Transport System)” on page 2-190.
Intake/exhaust assembly	Examine the intake/exhaust filter for cleanliness and condition. Clean or replace as necessary.
Patient helper (if installed)	Examine for physical damage. Make sure all hardware and attachments are correctly installed and the correct headboard is installed on the bed.
Blower (P500 only)	On the GCI diagnostic screen, send a 10 103 command. Examine the hour meter in the diagnostic screen on the GCI. Replace the blower if the hours are 30,000 or greater. See “Blower—P500 Model” on page 4-251.

# Preventive Maintenance Checklist

**Table 6-3. Preventive Maintenance Checklist**

Date			Function
Manufacturer	Model Number	Serial Number	
Hill-Rom			Bed scale
			Caregiver control panel
			Casters
			Central brake and steer
			Chair limits
			Communications
			Control modules
			CPR release
			Head section slide pivots, self-lubricating bearing, and slider pivot extrusions
			Electrical test
			Emer. Trendelenburg
			Foot artic. cylinder
			Foot hilow cylinder
			Foot retracting cylinder
			Headboard
			Footboard
			Head cylinder
			Head hilow cylinder
			Head limits
			<b>Labor Time:</b>
			<b>Repair Cost:</b>
			<b>Inspected By:</b>
			<b>Legend</b>
			L=Lube
			C=Clean
			A=Adjust
			R=Repair or Replace
			O=Okay
			N=Not Applicable
			Remarks:
			Total Cost for This Page

6

Manufacturer	Model Number	Serial Number			<b>Labor Time:</b>	<b>Repair Cost:</b>	<b>Inspected By:</b>	Legend	
			Total Cost for	This Page				L=Lube	C=Clean
Hill-Rom					Hyd. tank			A=Adjust	
					Knee cylinder			R=Repair or	
					Knee limits			Replace	
					LED indicators			O=Okay	
					Night light			N=Not	
					Overall appearance			Applicable	
					Pivot points			Remarks:	
					Power cord and plug				
					Trendelenburg limits				
					Siderail controls				
					Siderail frame				
					Siderail cables				
					Short stay surface				
					Treatment surface				
					Pulmonary surface				
					Drive belt				
					Transport handle zero				
					Intake/exhaust asm.				
					Patient helper				
					Hilow limits				
					Blower (P500 model)				

# **Chapter 7**

## **Accessories**

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### **Accessories**



#### **WARNING:**

Only the accessories identified below are authorized for use with the TotalCare® Bed System. Use of accessories **not** listed below could cause injury or equipment damage.

Accessories may be added or removed without the use of tools at the point of patient care by a caregiver. Accessories are interchangeable within a product configuration. For TotalCare® Bed System accessories, see table 7-1 on page 7-1.

**Table 7-1. Accessories List**

<b>Product Number</b>	<b>Description</b>
P15512	ISS bedpole unit
P27601	Vertical oxygen holder
P294	Transducer holder
P1926	Physical safety restraints (seat belt)
P1927	Sheet management
P1928	Footprop alignment
P1929	2" foot pad—TotalCare® Bed System
P1930	Siderail pad
P1940	Fracture frame adapter brackets, TotalCare® Bed System (for use with traction equipment from Texas Medical Industries, Inc. (TMI) or Orthopedic Systems, Inc. <b>only</b> )
P2217	Standard IV rod
P1934	Pendant control (without nurse call)
P193401	Pendant control (with nurse call)

## 7.1 Infusion Support System—P155-12

Tools required: None

Each Infusion Support System can support one infusion pump plus two liters of intravenous solution.

### Installation



#### **WARNING:**

Do not exceed IV rod weight capacity. Personal injury or equipment damage could occur.

1. Hang up to 40 lb (18.1 kg) on an IV rod.



#### **CAUTION:**

Do not mount infusion pumps on the lower section of an IV rod. Interference with head section articulation could result.

2. Hang pumps on the upper section of an IV rod.



#### **WARNING:**

When you lower the upper section of an IV rod, always hold the upper section of the pole before you pull the release knob. Failure to do so could cause injury or equipment damage.

3. To use or raise, follow these steps:

- a. Lift the IV pole from its stored position from behind the headboard.
- b. Make sure the pole drops and locks into position.
- c. Raise the upper section of the pole to the applicable height.

4. To lower the upper section of an IV rod, follow these steps:

- a. Hold the upper section of the rod.
- b. Pull the release knob.
- c. Hold the upper section of the rod as you lower it.

## 7.2 Oxygen Tank Holder—P27601

Tools required: None

The oxygen tank holder attaches to the head end of the intermediate frame in a vertical position. The Oxygen Tank Holder holds one E-size oxygen tank with a regulator.

### Installation

1. Install the mounting bar vertically into a mounting socket at the head end of the intermediate frame.
2. Put one E-size oxygen tank in the holder.
3. Tighten the holder thumbscrew.

**NOTE:**

The thumbscrew makes sure the oxygen tank does not rotate in the holder.

### Removal

1. Loosen the thumbscrew.
2. Lift the tank out of the holder.
3. Lift up on the tank holder, and remove it from the mounting sockets.

## 7.3 Physical Safety Belts—P1926

Tools required: None



### WARNING:

Do not use the physical safety belts as a restraint device. Personal injury could occur.



### WARNING:

Patient injury may result if patient seat belts or straps are attached to any place other than their designated weigh frame attachment points.

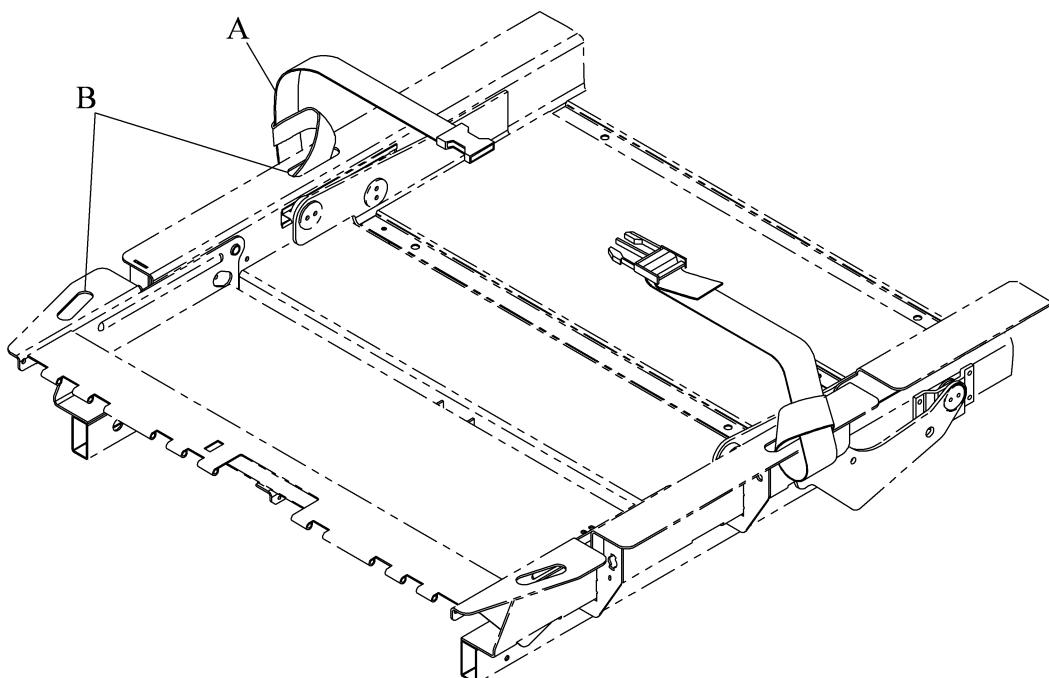
## Installation

1. Install seat belts (A) only through the weigh frame attachment points (B) (see figure 7-1 on page 7-5).
2. Adjust the weigh frame to make sure the seat belts or any other patient accessories do not interfere with the frame movement.

## Removal

Do the installation in reverse order.

**Figure 7-1. Physical Restraint Attachment Locations**



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## 7.4 Standard IV Rod—P2217

Tools required: None



### WARNING:

Do not exceed IV rod weight capacity, personal injury or equipment damage could result.



### WARNING:

When you lower the upper section of an IV rod, always hold the upper section of the pole before you pull the release knob. Failure to do so could cause injury or equipment damage.

## Installation

1. Install the IV rod in an equipment socket at a head end corner of the bed.
2. Turn the pole a quarter turn to lock it in place.

## Removal

Do the installation in reverse order.

## 7.5 Fracture Frame Adapter Brackets—P1940

Tools required: None



### **WARNING:**

Install the fracture frame adapter brackets before you use the full fracture frame equipment with the TotalCare® Bed System. Use of the full fracture frame without the fracture frame adapter brackets could cause structural failure of the bed and/or the traction equipment, loss of chair egress capability, and scale inaccuracy. Injury or equipment damage could occur.



### **WARNING:**

Lock out the knee controls when a full fracture frame is used for mounting Buck's traction. Failure to do so could result in personal injury or equipment damage.



### **WARNING:**

Lock out the head and knee controls when a full fracture frame is used for cervical traction. Failure to do so could result in personal injury or equipment damage.



### **WARNING:**

Do not use the fracture frame equipment to push or steer the bed. Use the transport handles, foot prop, or the siderails. Failure to do so could result in personal injury or equipment damage.

## **Installation**

1. Raise the head and thigh section approximately 20°.



### **SHOCK HAZARD:**

To minimize the risk of electrical shock or damage to equipment, disconnect all electrical power to the TotalCare® Bed System before you work on it. Failure to do so could result in personal injury or equipment damage.

2. Unplug the bed from its power source.
3. Disable the battery. See “Disable Battery Operation” on page 4-226.
4. Set the brake casters to the brake position.

**NOTE:**

The mounting holes for the adapter brackets are on the weigh frame, under the head and thigh section of the bed.

5. Slide and put the mounting plate for the frame adapter bracket over the tube of the weigh frame.
6. Align the square holes in the frame adapter bracket mounting plate with the round holes in the weigh frame of the bed.
7. Install the carriage bolts from the top of the weigh frame, and tighten the wing nut on the bottom of the weigh frame.
8. Repeat step 5 through step 7 to install the remaining three frame adapter brackets on the bed.

**WARNING:**

Refer to the manufacturer's user manual for the fracture frame equipment to correctly install and setup the fracture frame. Failure to do so could cause injury or equipment damage.

9. Install the fracture frame equipment. Refer to the manufacturer's instructions.

**WARNING:**

After the fracture frame equipment is installed, examine the thigh section for correct and unobstructed movement. Make sure the siderails operate correctly and latch in the up position. Failure to do so could result in personal injury or equipment damage.

**WARNING:**

Fracture frames used with the fracture frame adapter brackets should be no taller than 54" (137 cm) from the top of the brackets. Possible personal injury or equipment damage could occur.

**WARNING:**

Fracture frames used with the TotalCare® Bed System should not extend beyond the head end, foot end, or sides of the bed. Possible personal injury or equipment damage could occur.

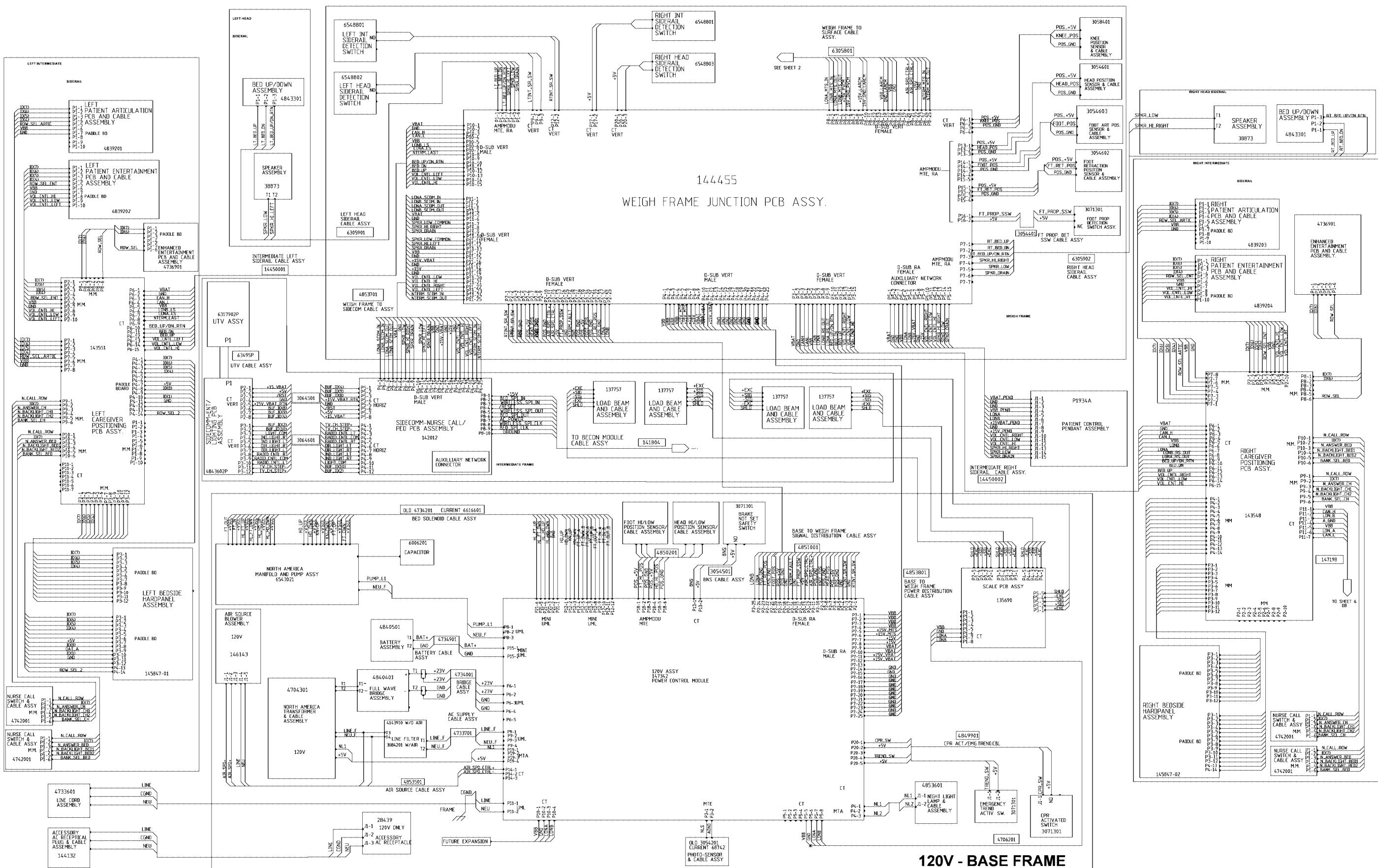
## Removal

Reverse the installation procedure to remove the fracture frame adapter brackets.

**NOTES:**

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System Wiring Diagram—TotalCare® Bed System (M model beds) (Sheet 1 of 5) (150409)



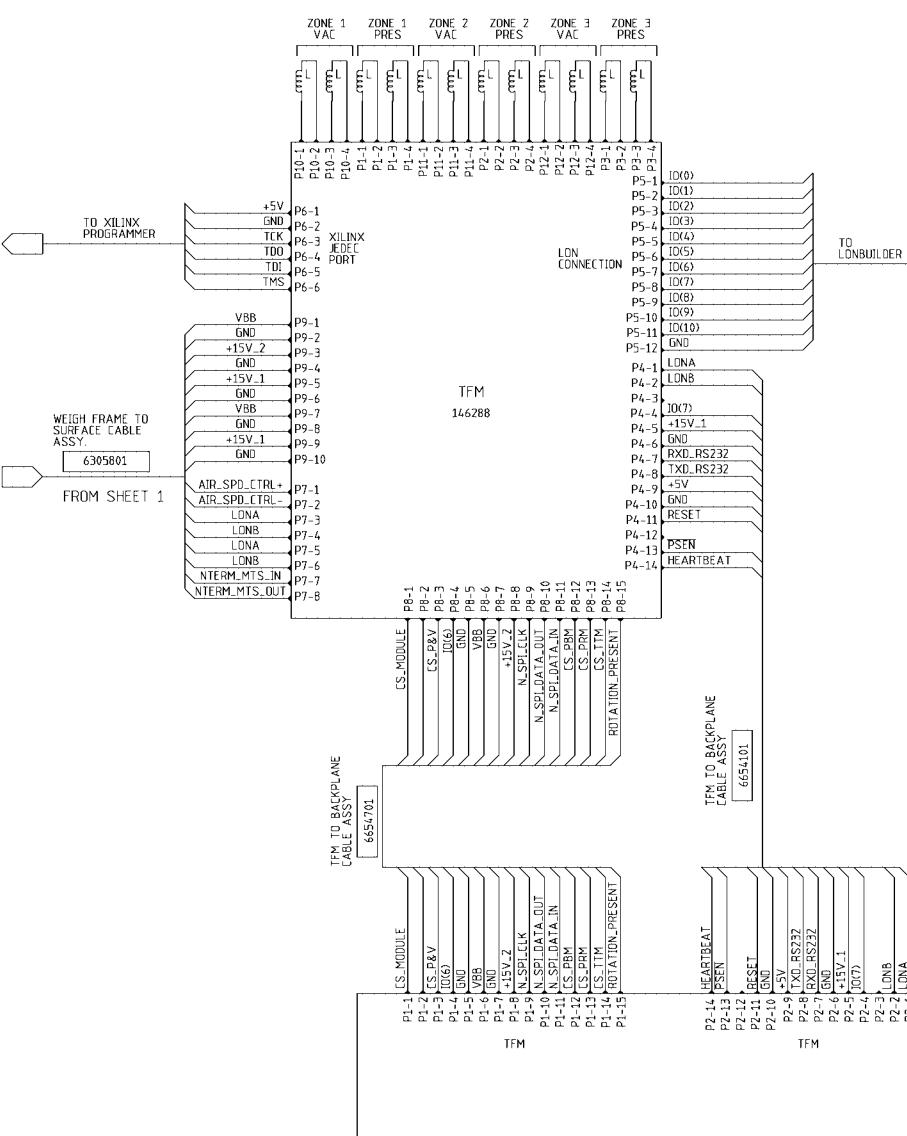
**See FO 3-1.4 for  
additional voltages**

# System Wiring Diagram—TotalCare® Bed System (M model beds) (Sheet 2 of 5) (150409)

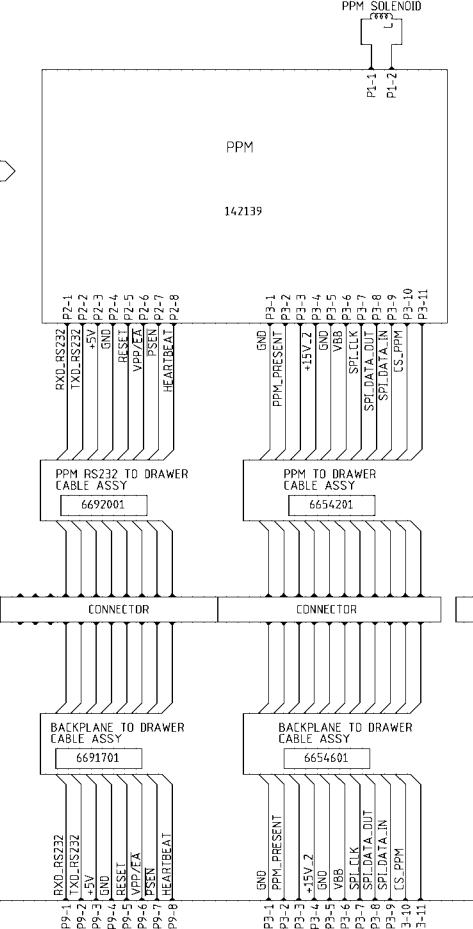
## Total Care SPORT PLUS

### PULMONARY WIRING DIAGRAM

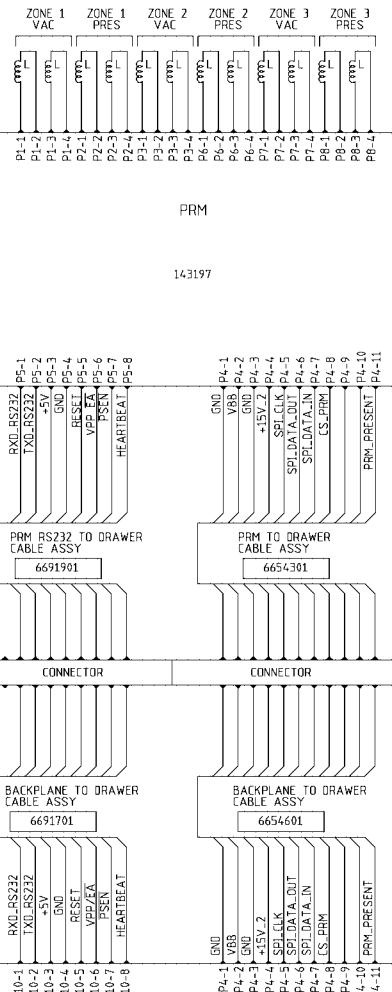
MODULE 146312



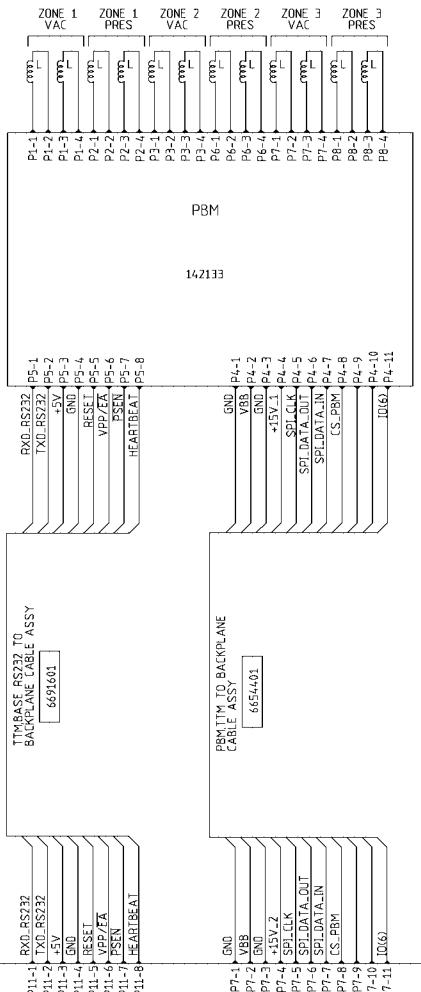
MODULE P1939E



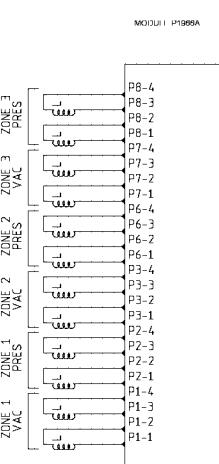
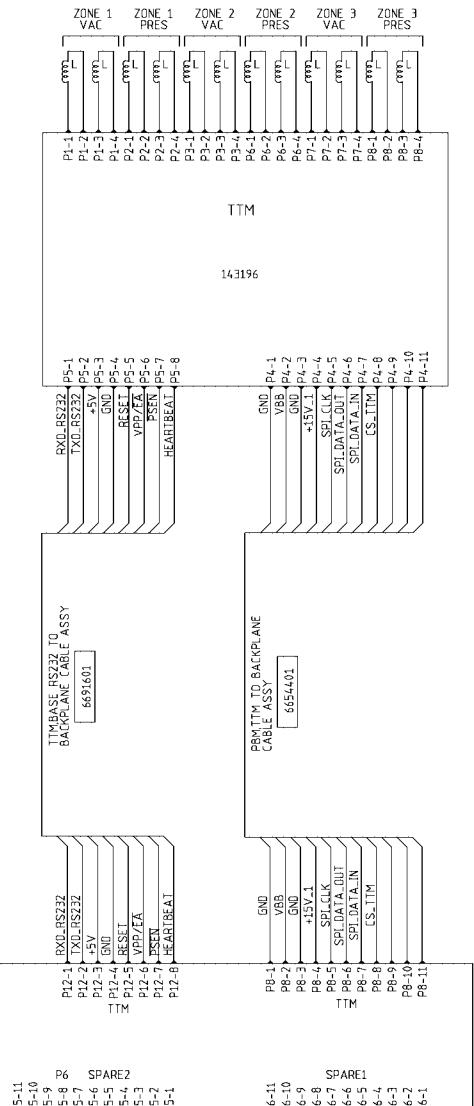
MODULE P1938E



MODULE 142162

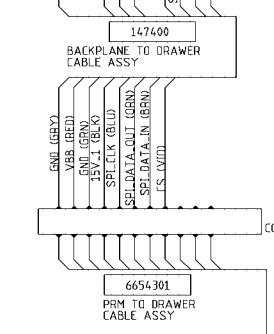


MODULE 147016



143197

LAL



143197

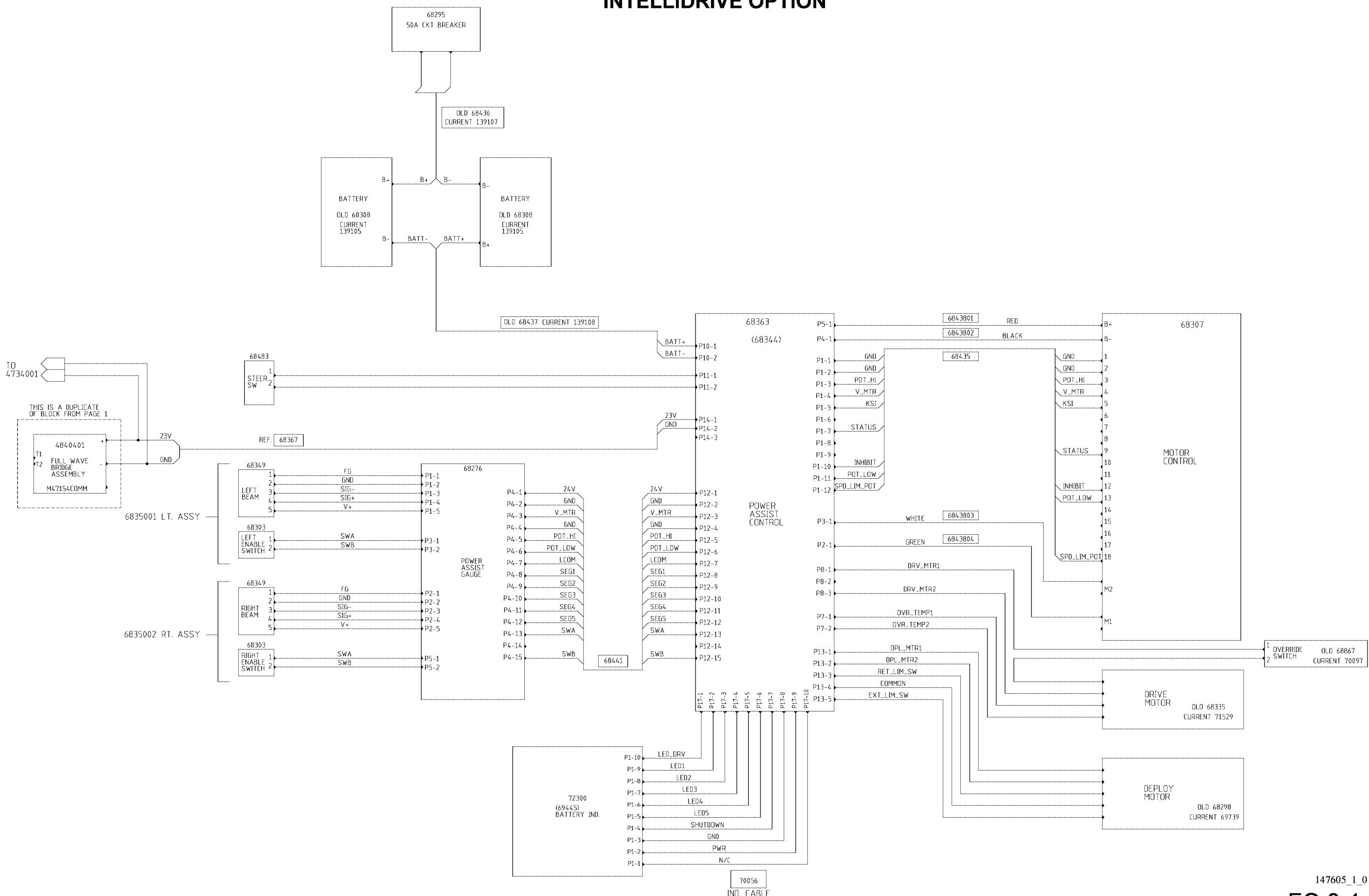
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FO 3-1.2

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# System Wiring Diagram—TotalCare® Bed System (M model beds) (Sheet 3 of 5) (150409)

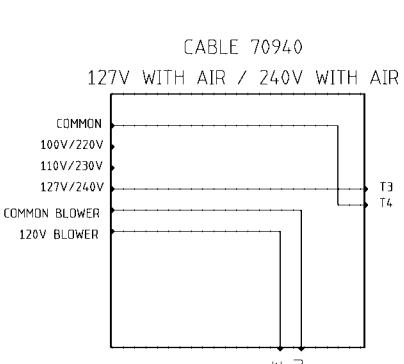
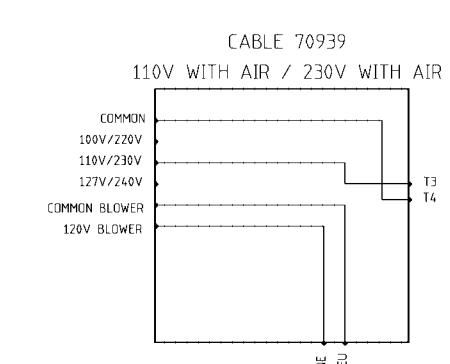
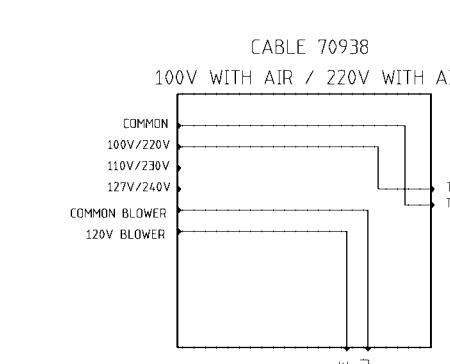
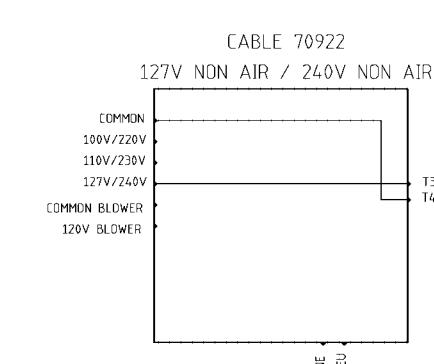
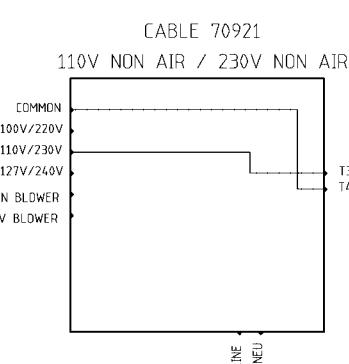
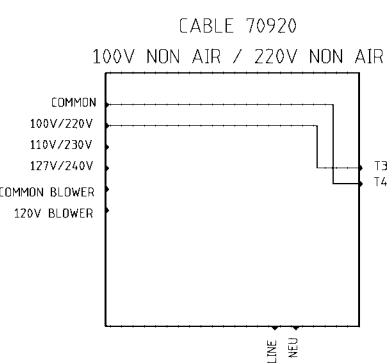
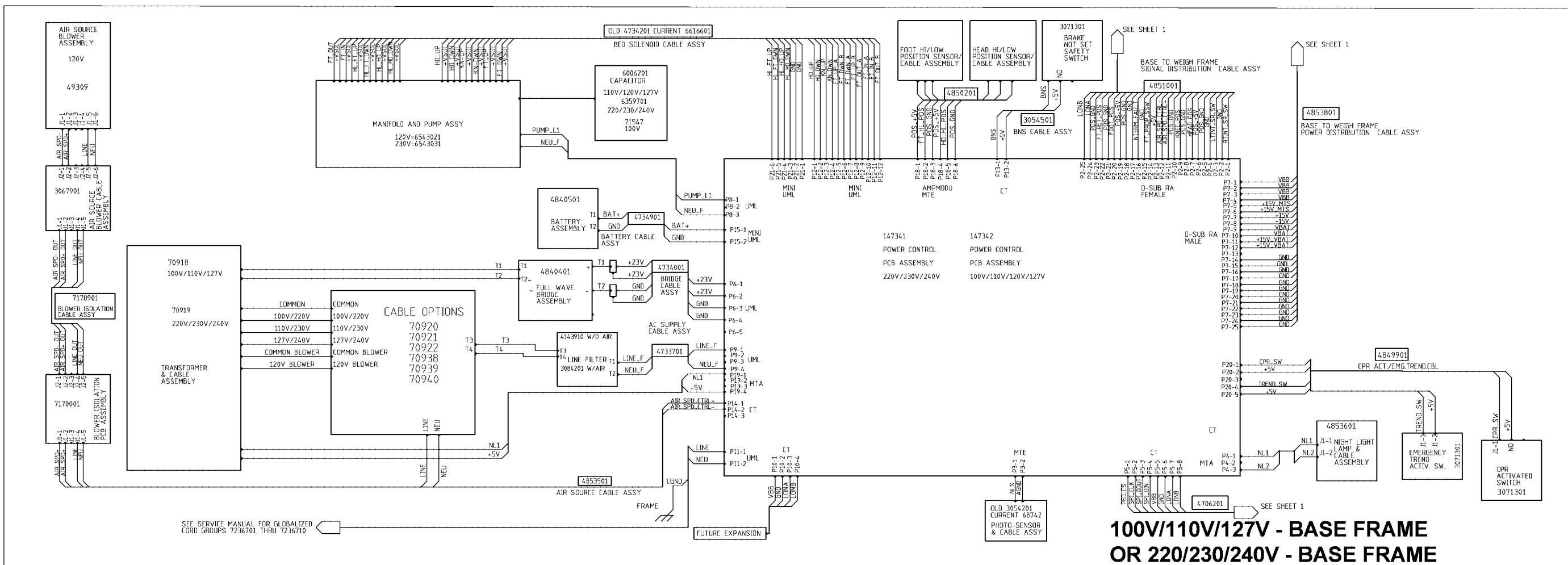
## INTELLIDRIVE OPTION



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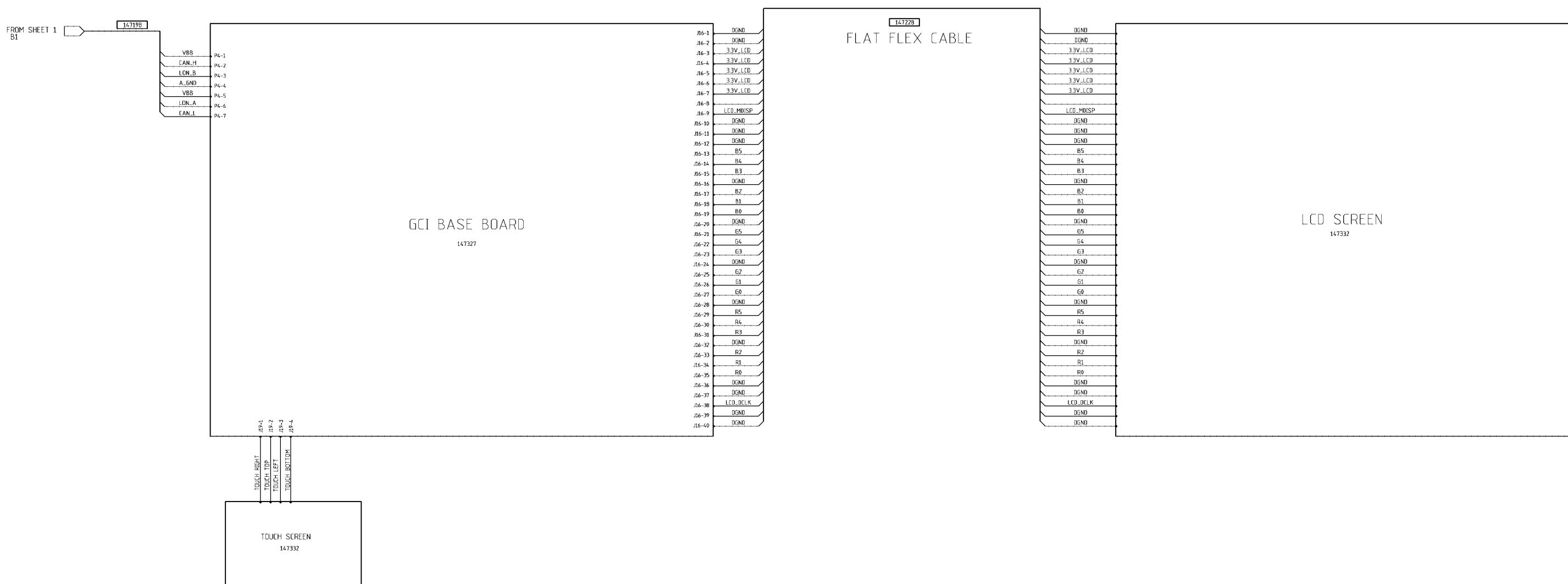
FO 3-1.3

# System Wiring Diagram—TotalCare® Bed System (M model beds) (Sheet 4 of 5) (150409)

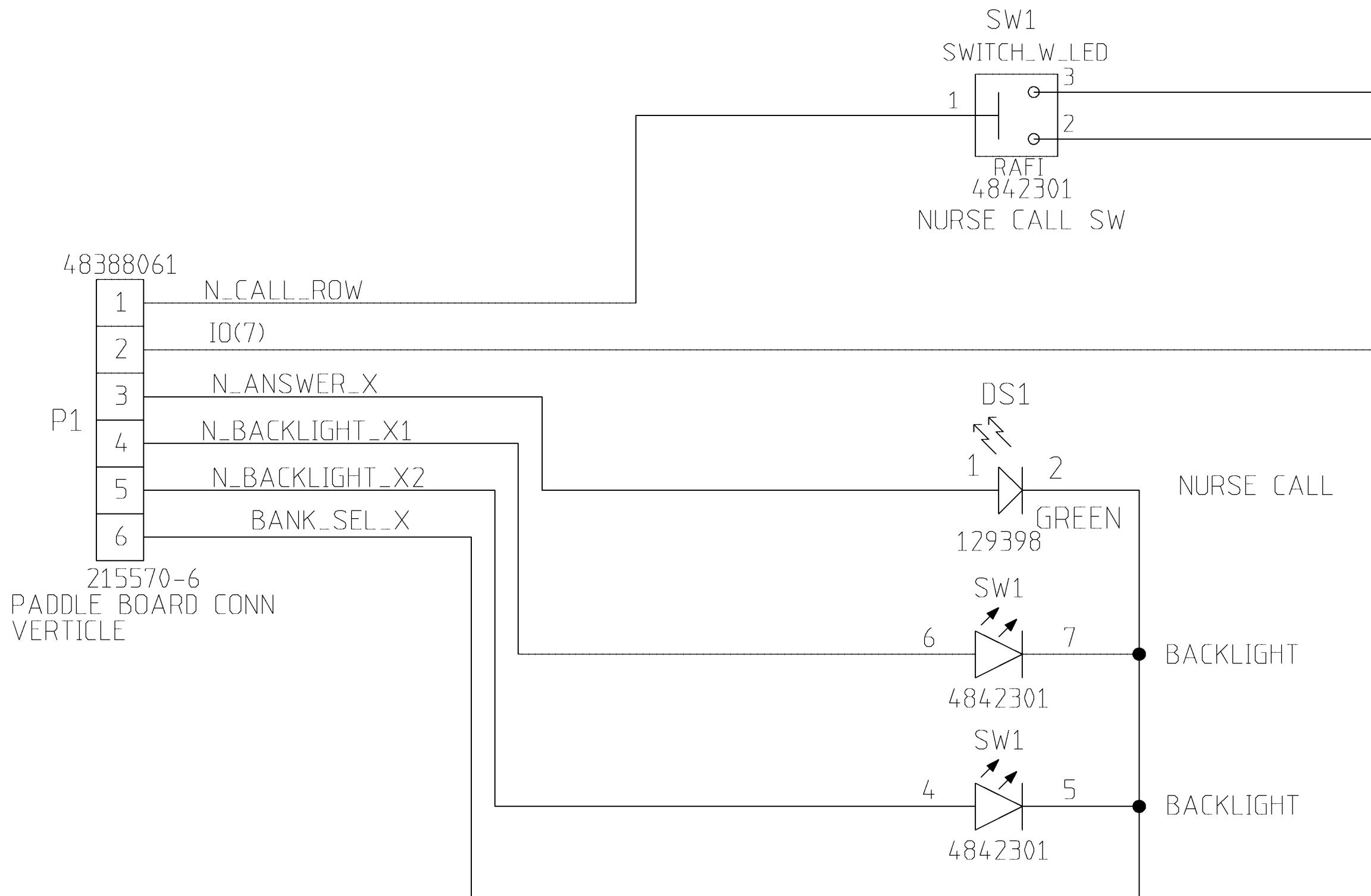


# System Wiring Diagram—TotalCare® Bed System (M model beds) (Sheet 5 of 5) (150409)

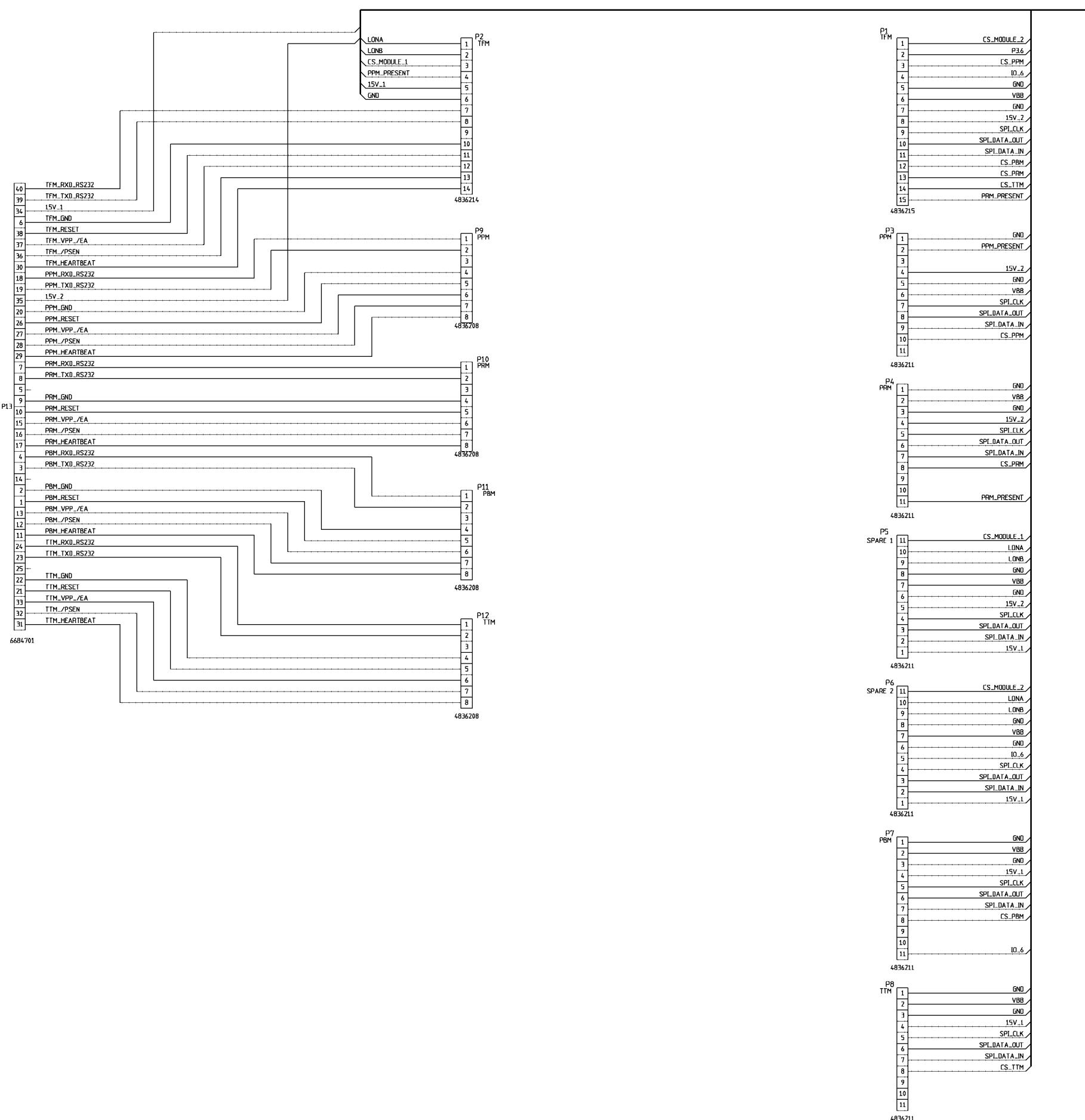
TOTAL CARE SPORT PLUS GCI WIRING DIAGRAM



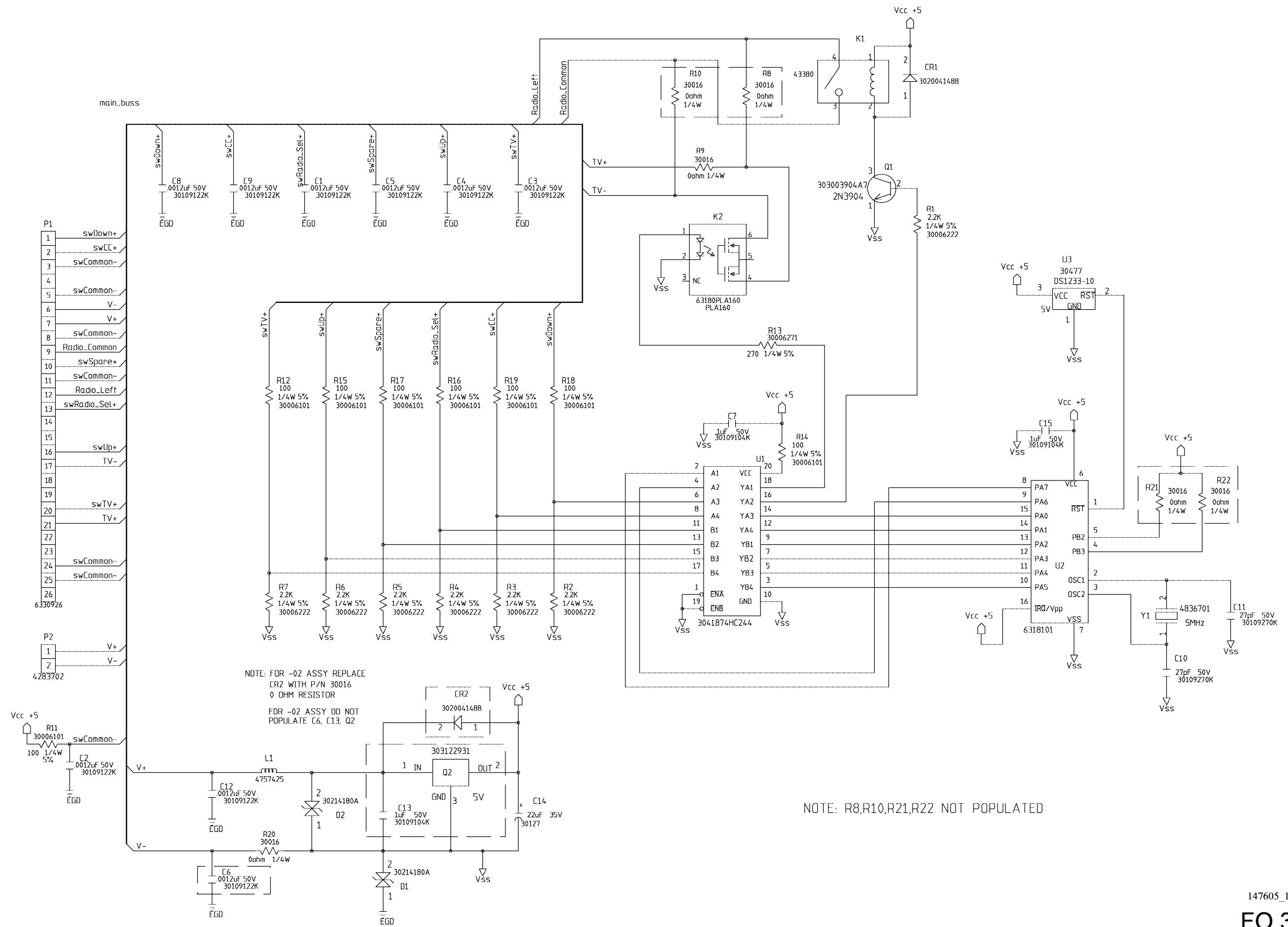
P.C. Board Wiring Diagram—Nurse Call Module (47418)



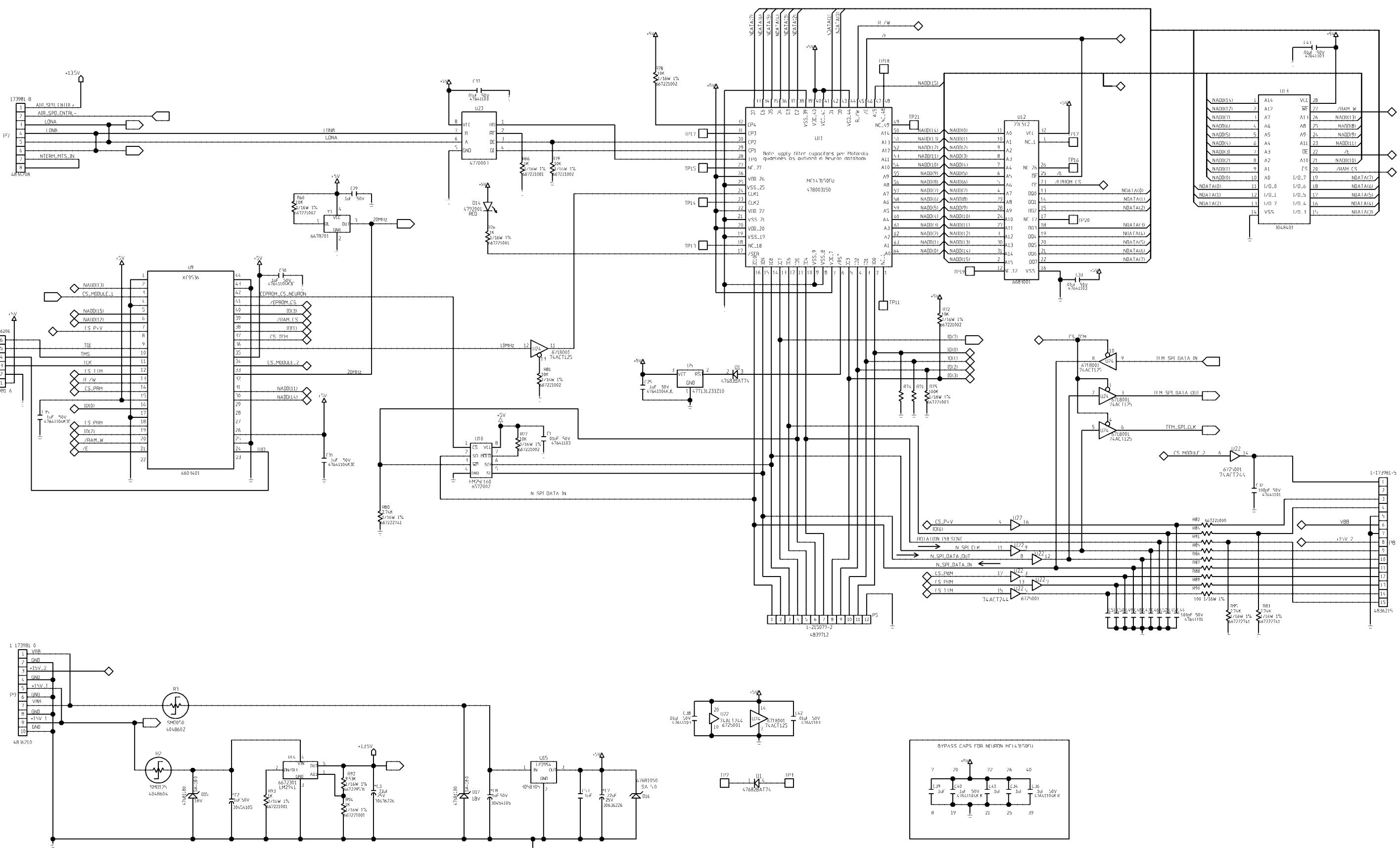
# P.C. Board Wiring Diagram—Pulmonary Power Distribution (48446)



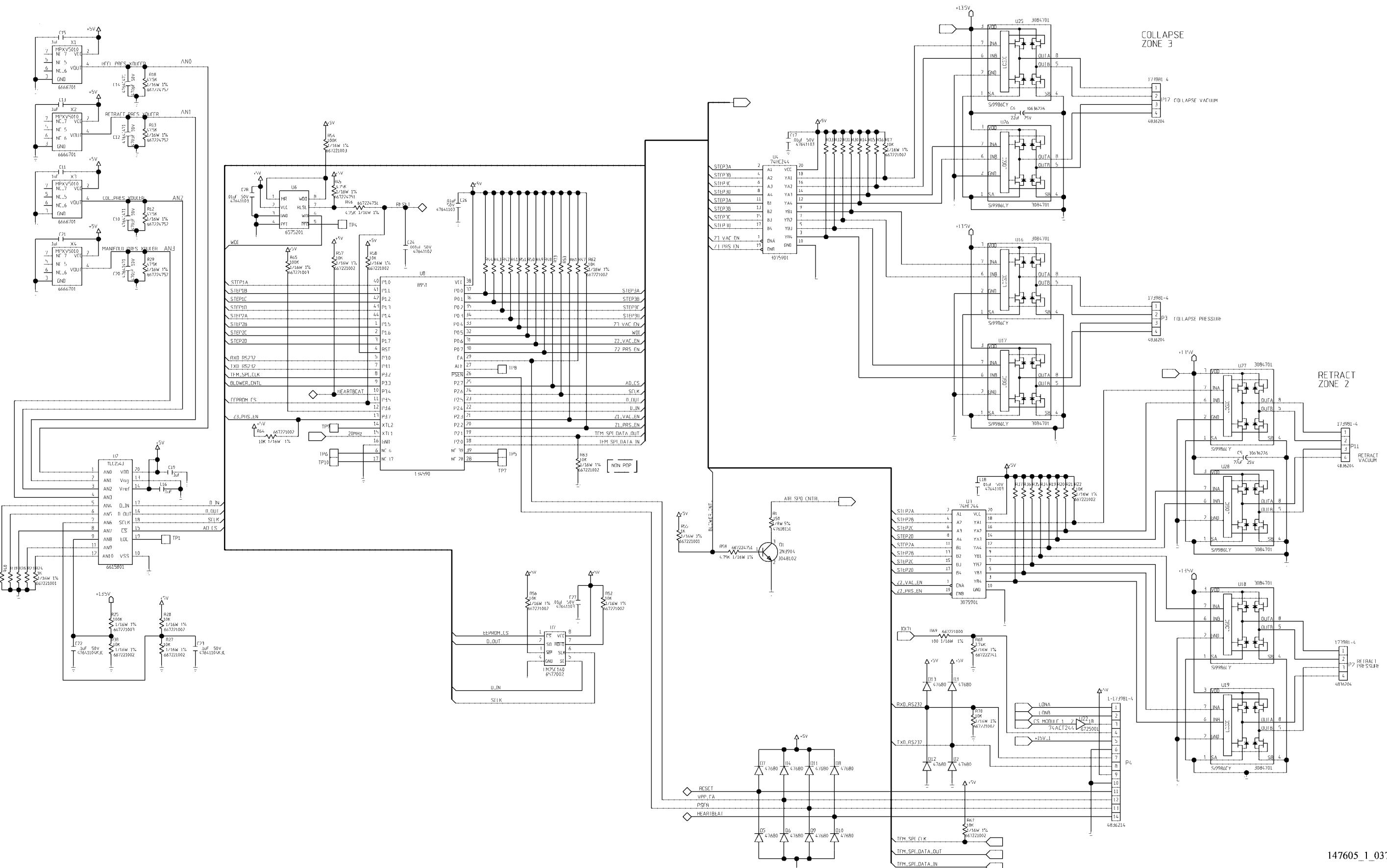
# P.C. Board Wiring Diagram—UTV Control Board (63177)



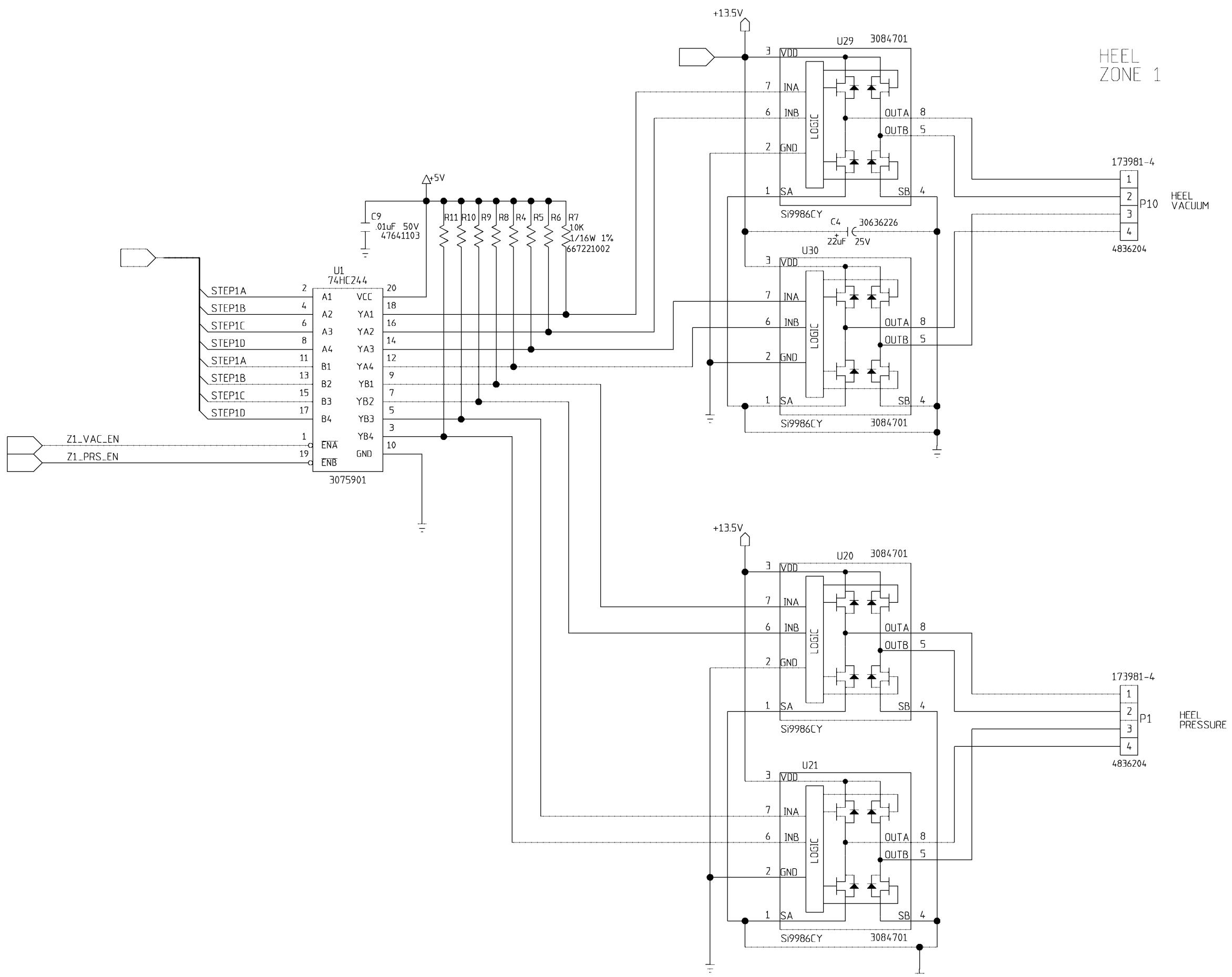
# P.C. Board Wiring Diagram—Treatment Foot Module (Sheet 1 of 3) (64760)



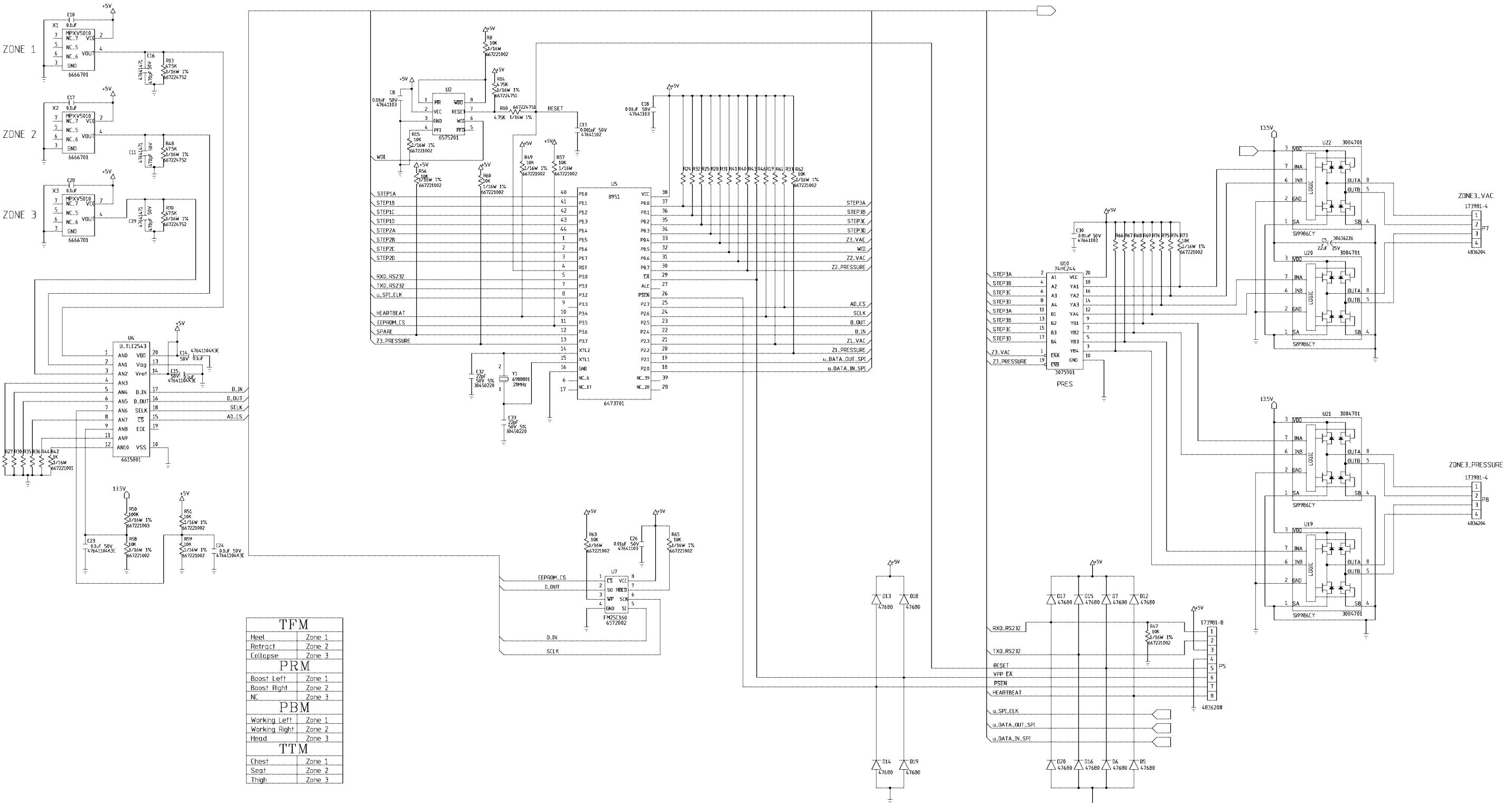
P.C. Board Wiring Diagram—Treatment Foot Module (Sheet 2 of 3) (64760)



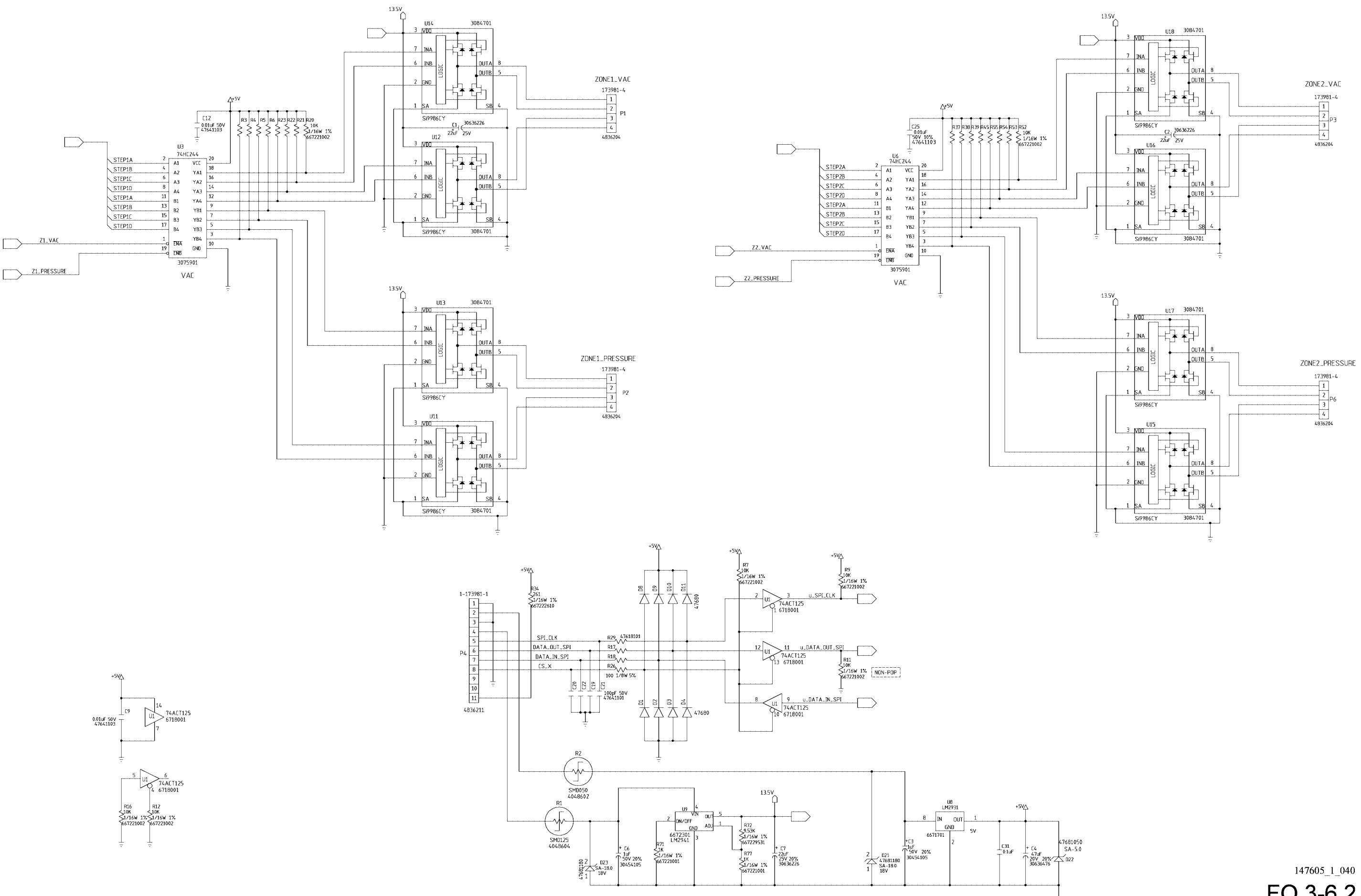
P.C. Board Wiring Diagram—Treatment Foot Module (Sheet 3 of 3 (64760))



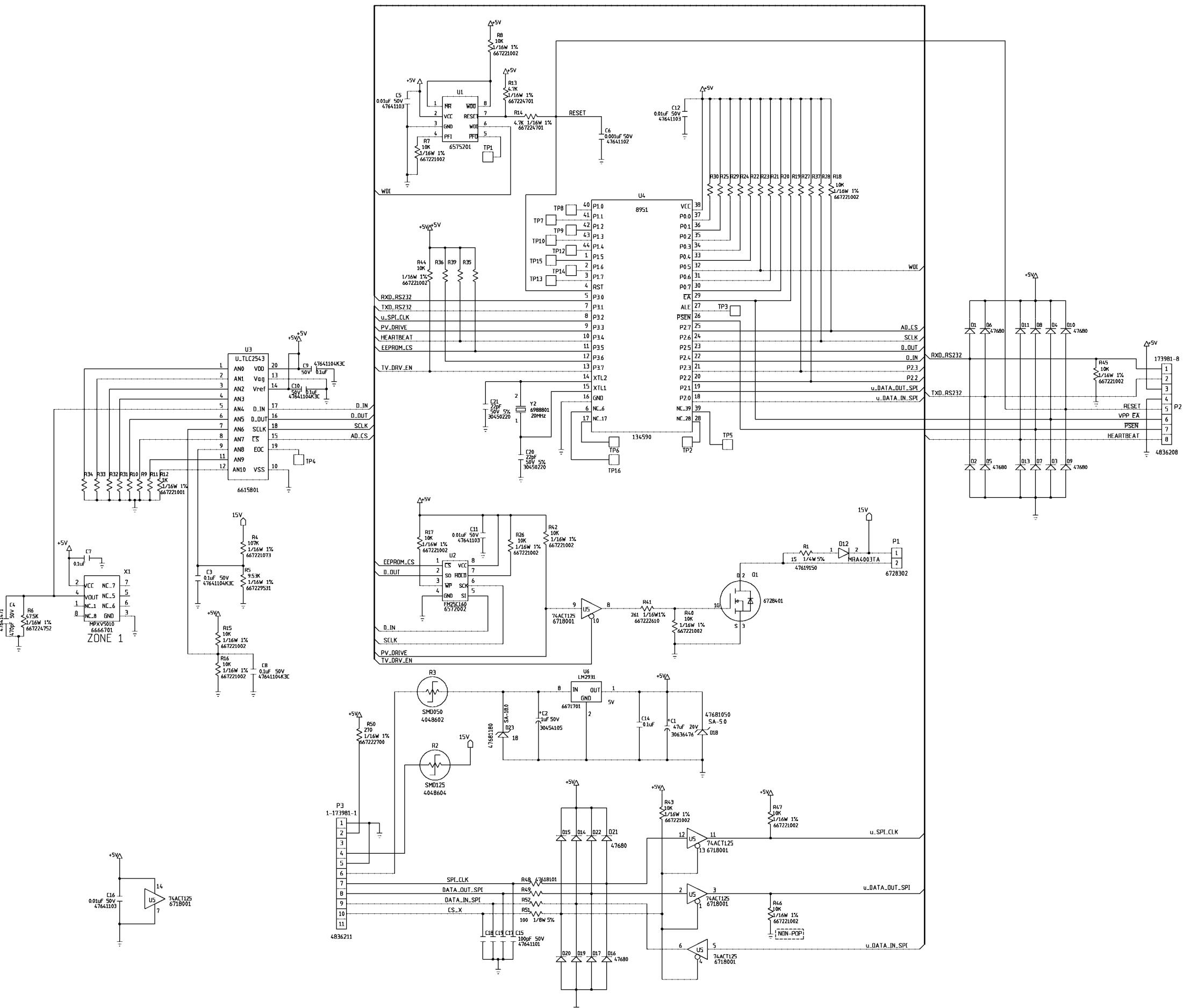
# P.C. Board Wiring Diagram—Treatment Torso Module (Sheet 1 of 2) (65744)



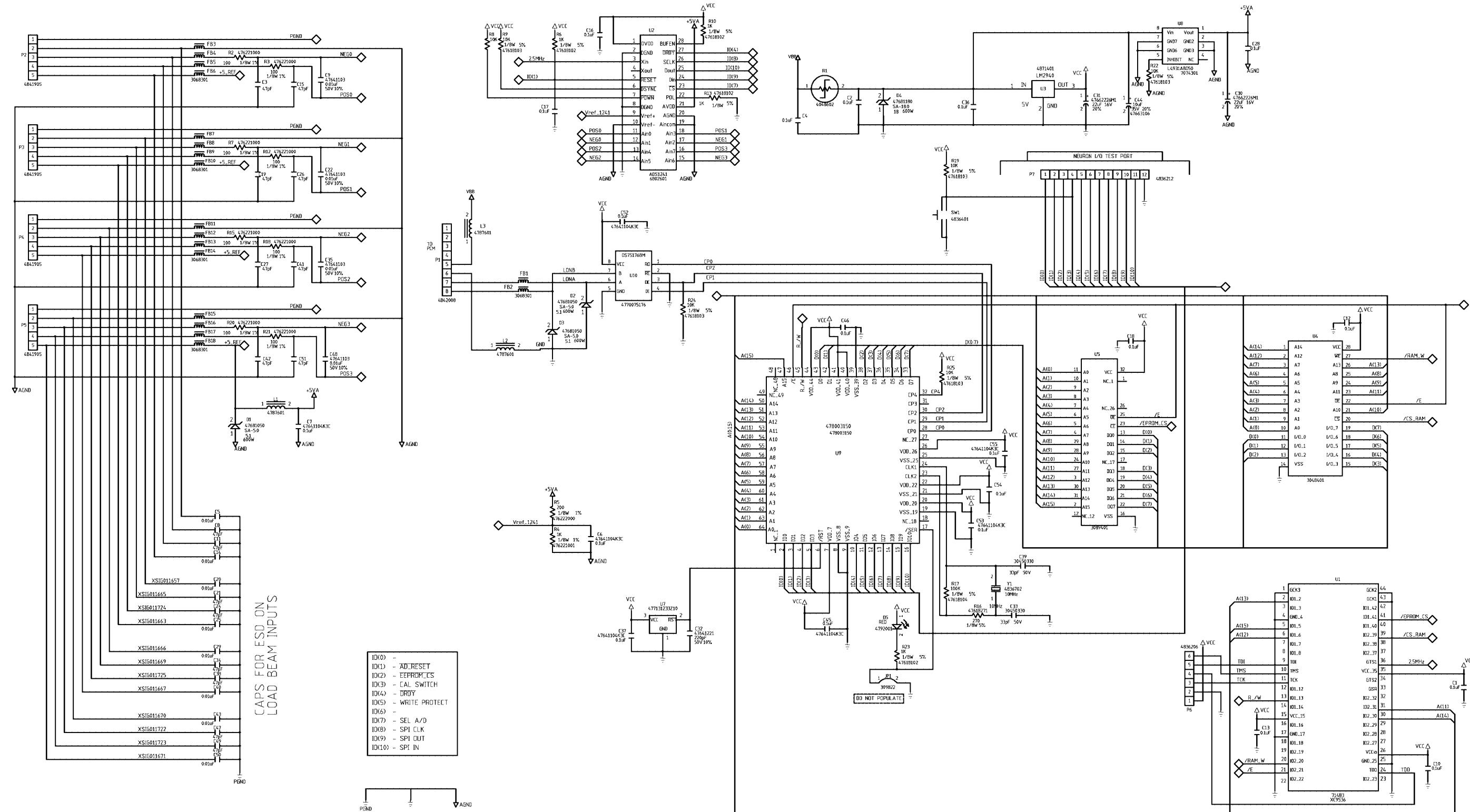
# P.C. Board Wiring Diagram—Treatment Torso Module (Sheet 2 of 2) (65744)



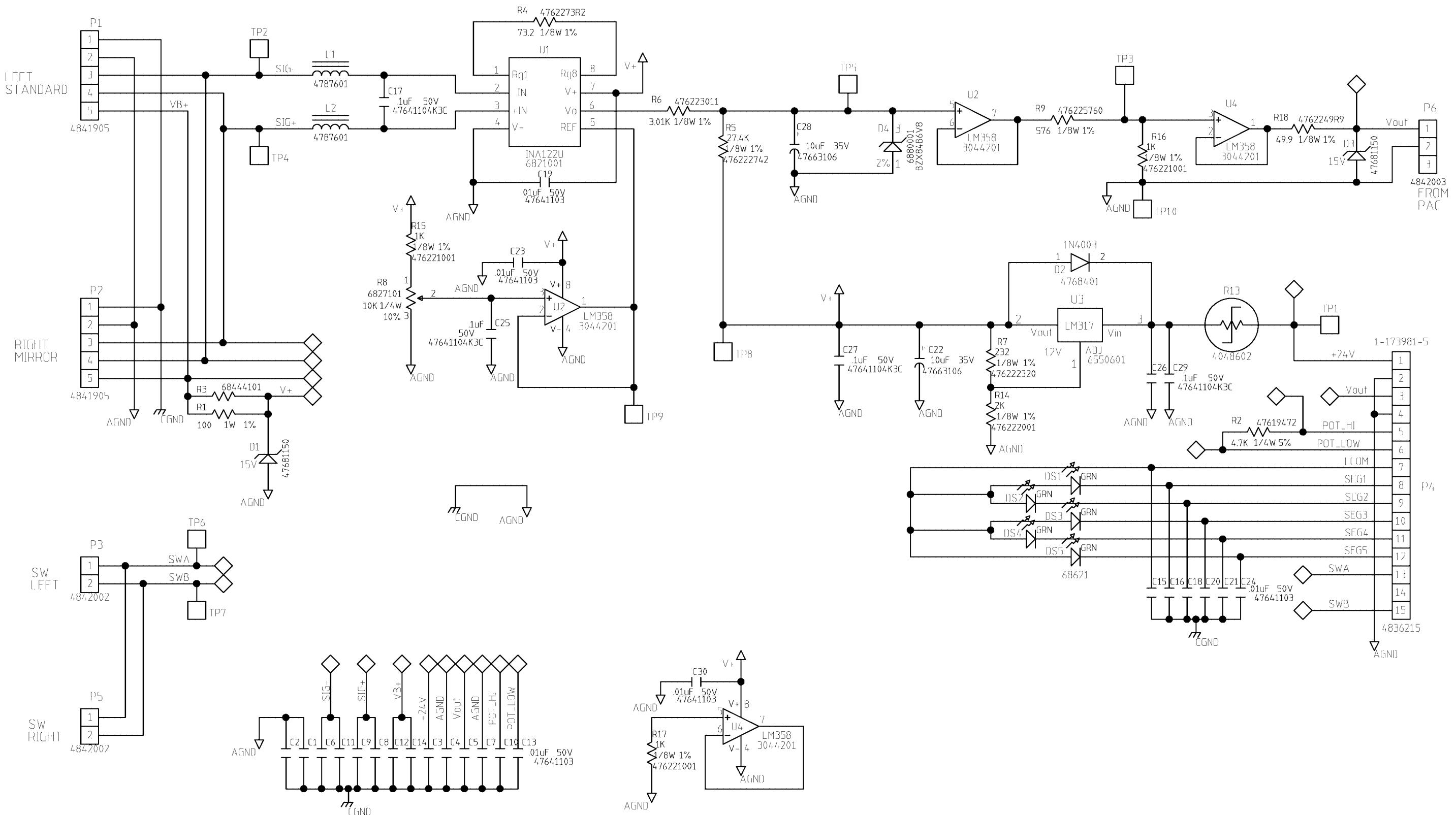
# P.C. Board Wiring Schematic Diagram—Pulmonary and Percussion Module (66227)



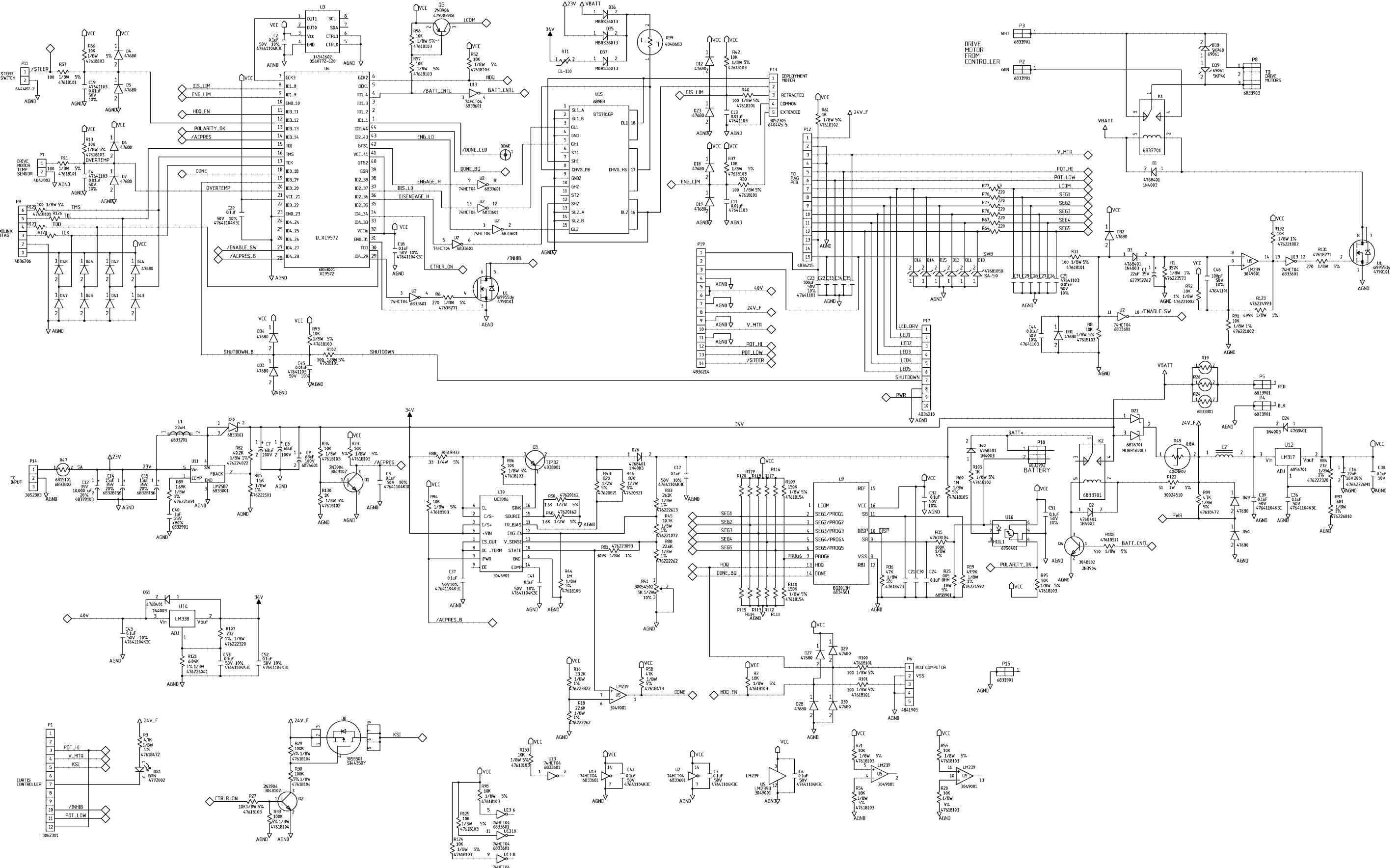
# P.C. Board Wiring Diagram—Scale, OIML (67759)



# P.C. Board Wiring Diagram—Power Assist Guage (68274)



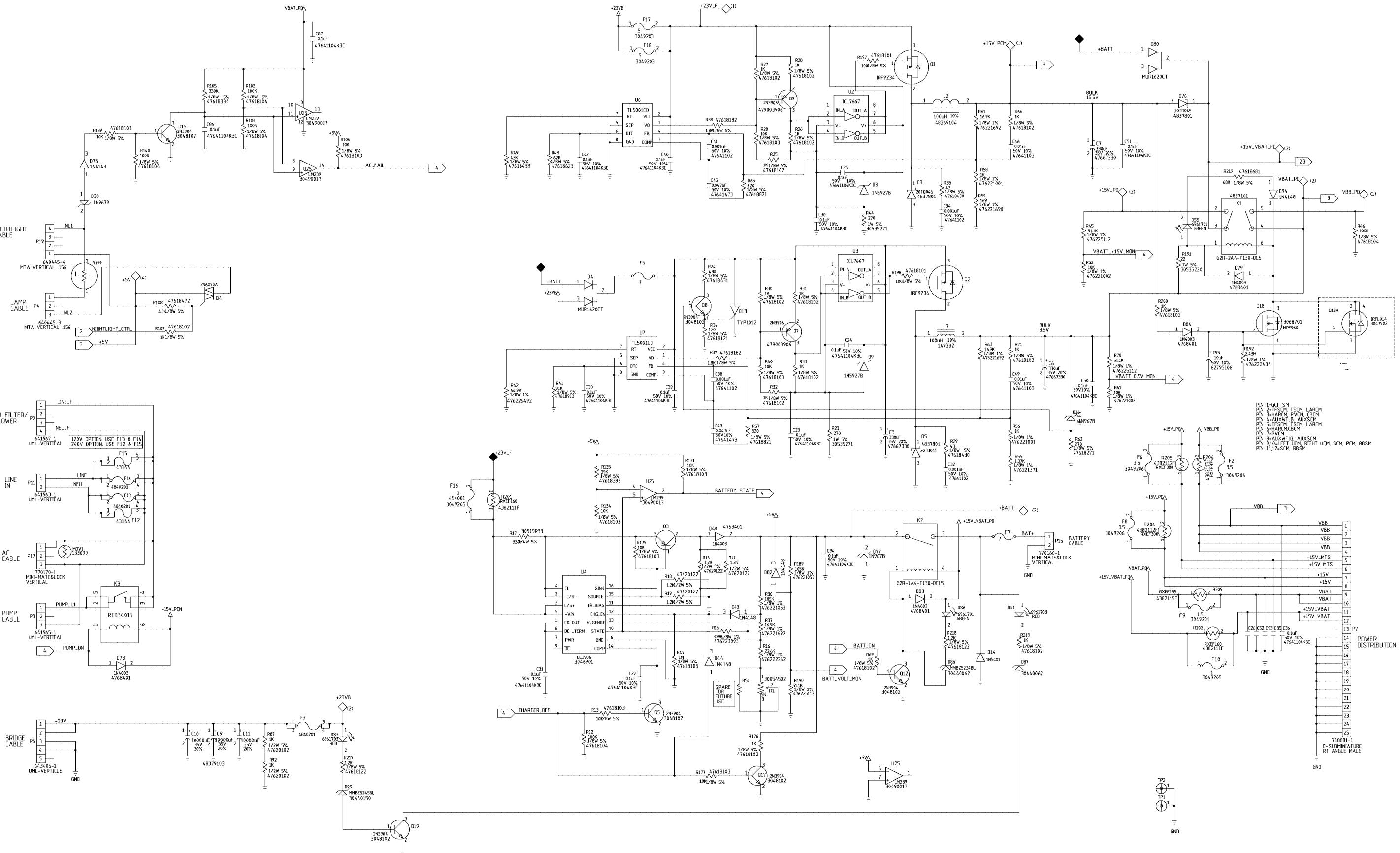
# P.C. Board Wiring Schematic Diagram—Power Assist Control (68342)



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FO 3-10

P.C. Board Wiring Diagram—Power Control Module (Sheet 1 of 4) (130064)



```

GCI, SM
TFSCM, TSCM, LARCM
HARCM, PVCM, CBCM
AUXWFJB, AUXSCM
TFSCM, TSCM, LARCM
HARCM,CBCM
PVCM
AUXWFJB, AUXSCM
-LEFT UCIM, RIGHT UCIM, SCM, PCM, RBSM

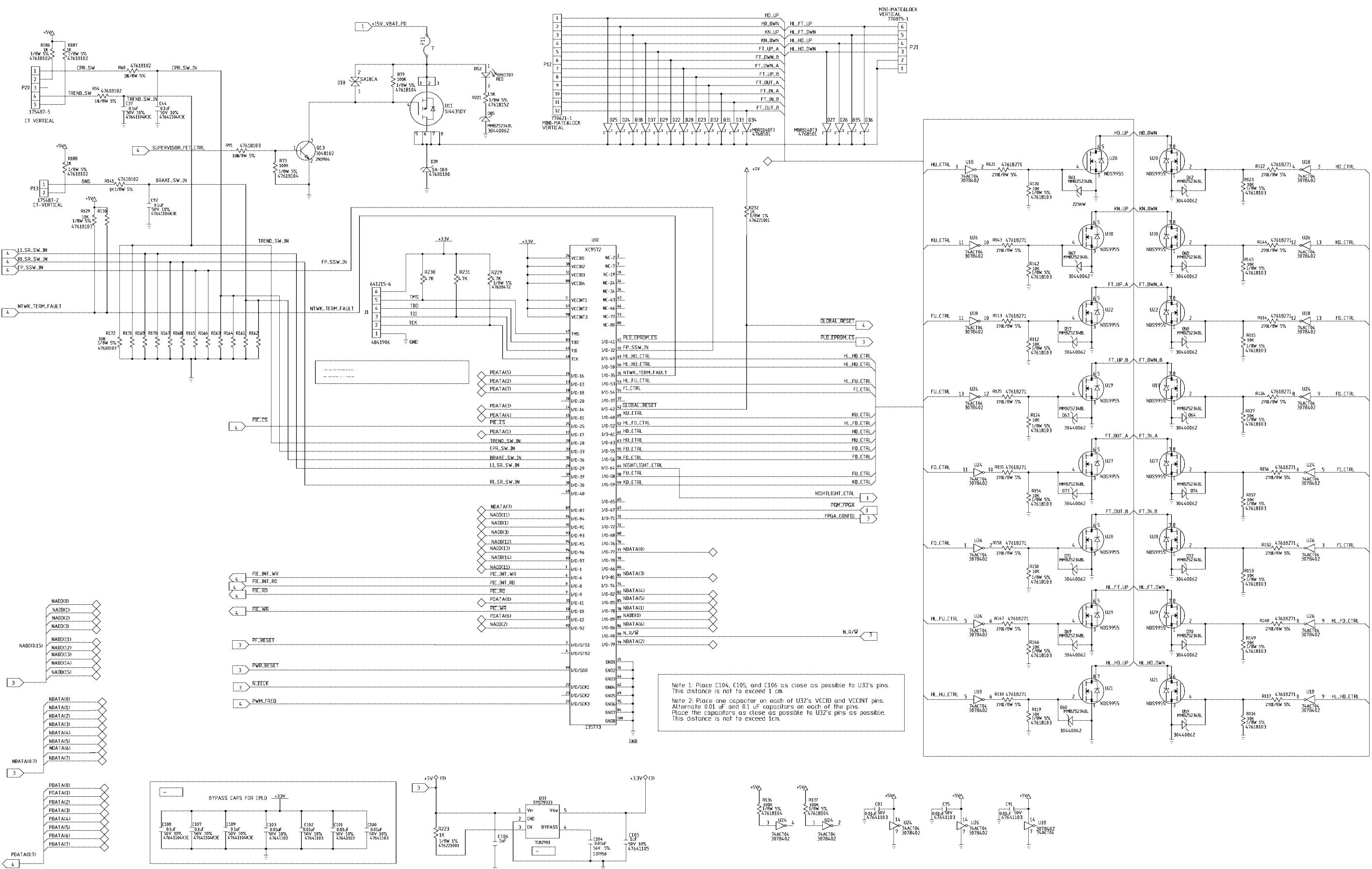
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FO 3-11.1

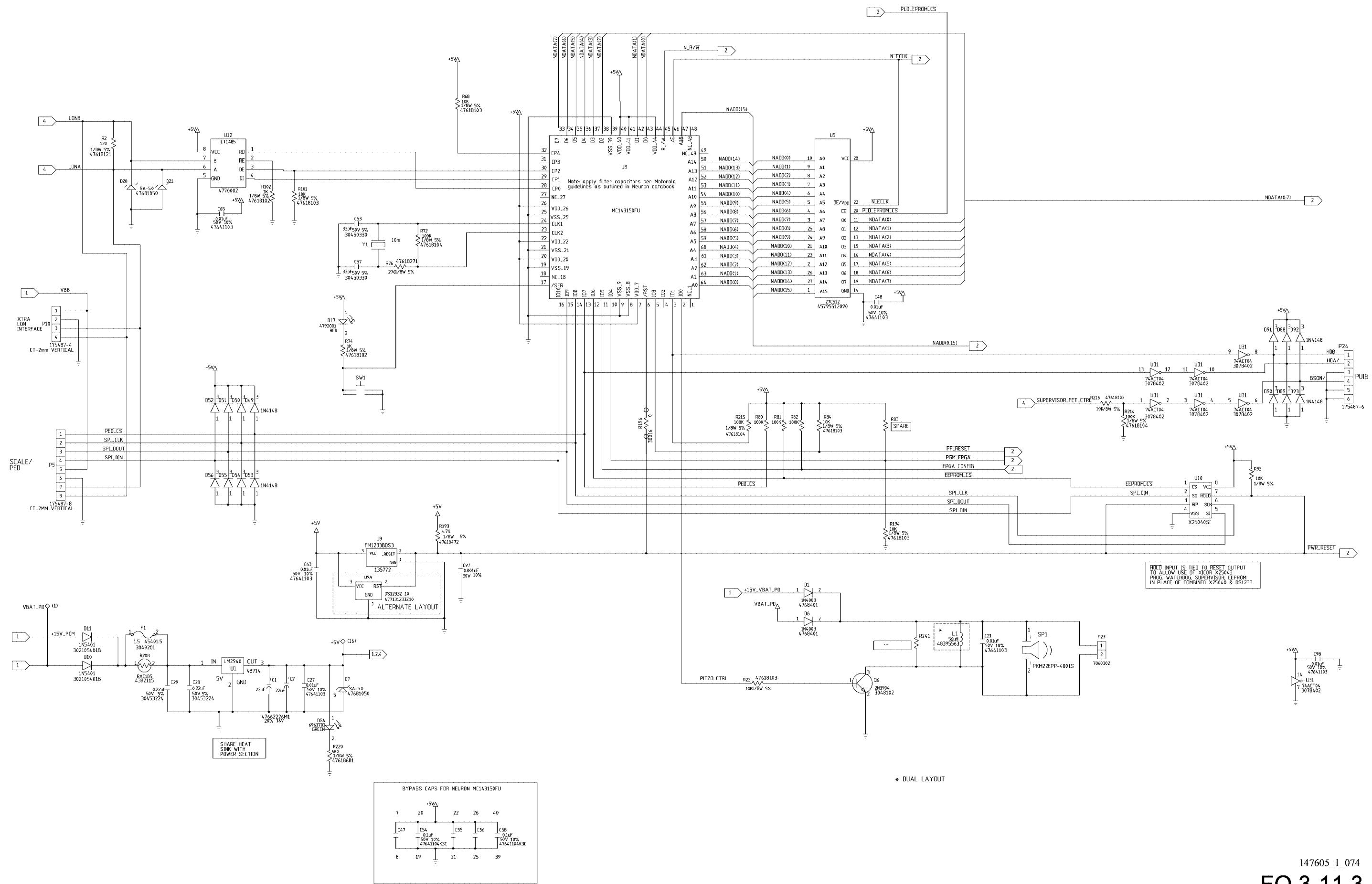
# P.C. Board Wiring Diagram—Power Control Module (Sheet 2 of 4 (130064))



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FO 3-11.2

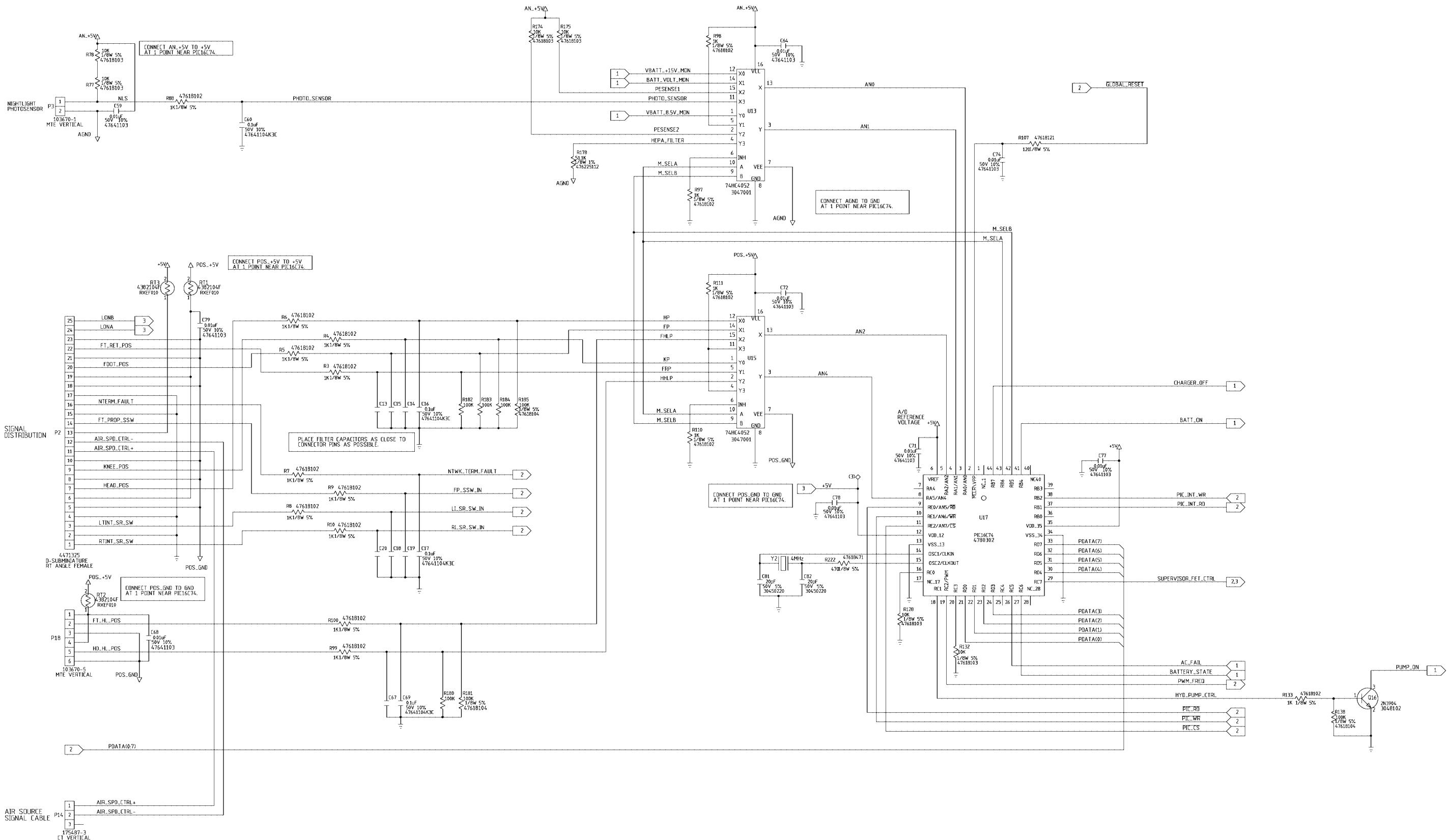
# P.C. Board Wiring Diagram—Power Control Module (Sheet 3 of 4) (130064)



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FO 3-11.3

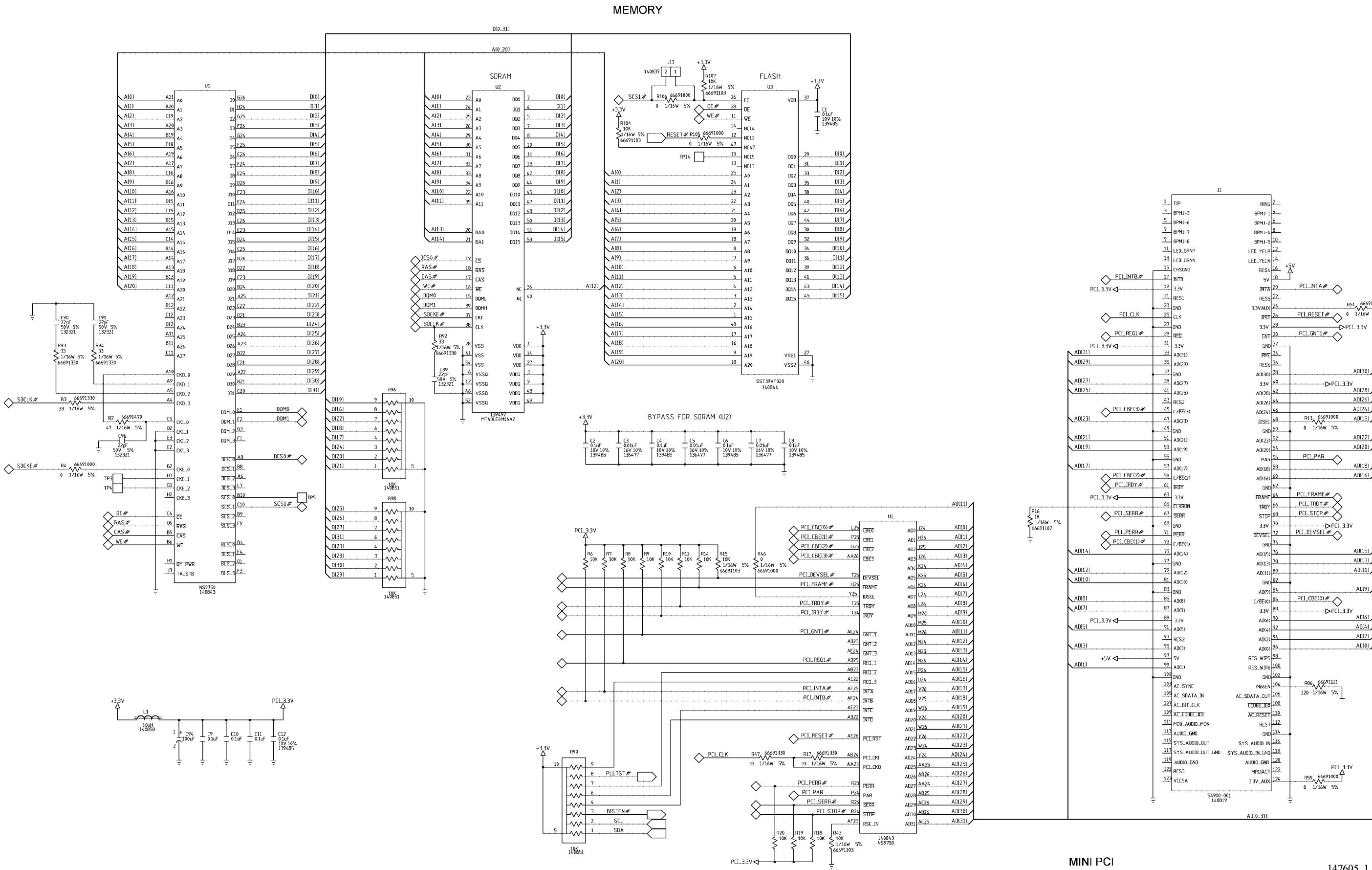
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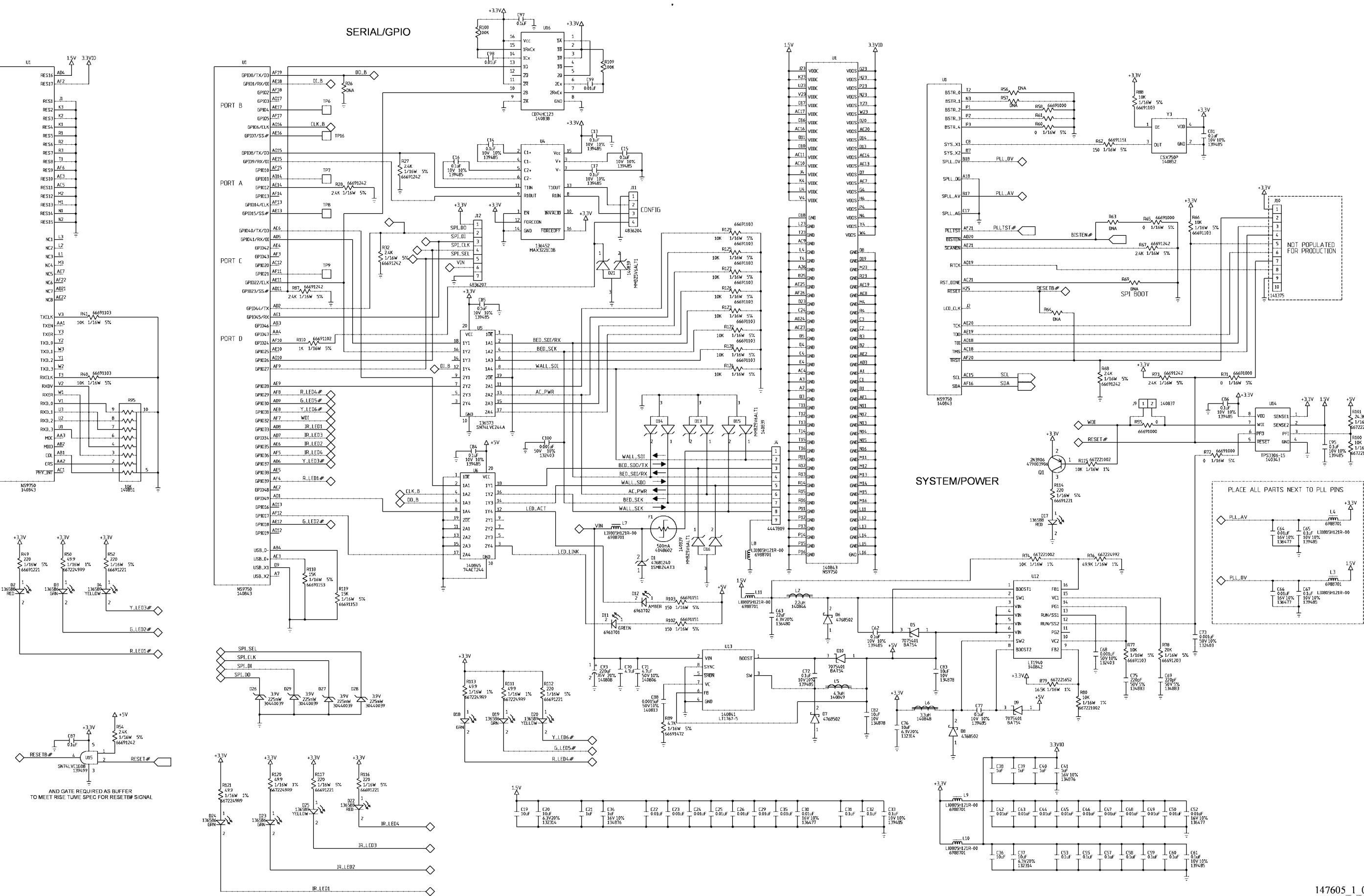
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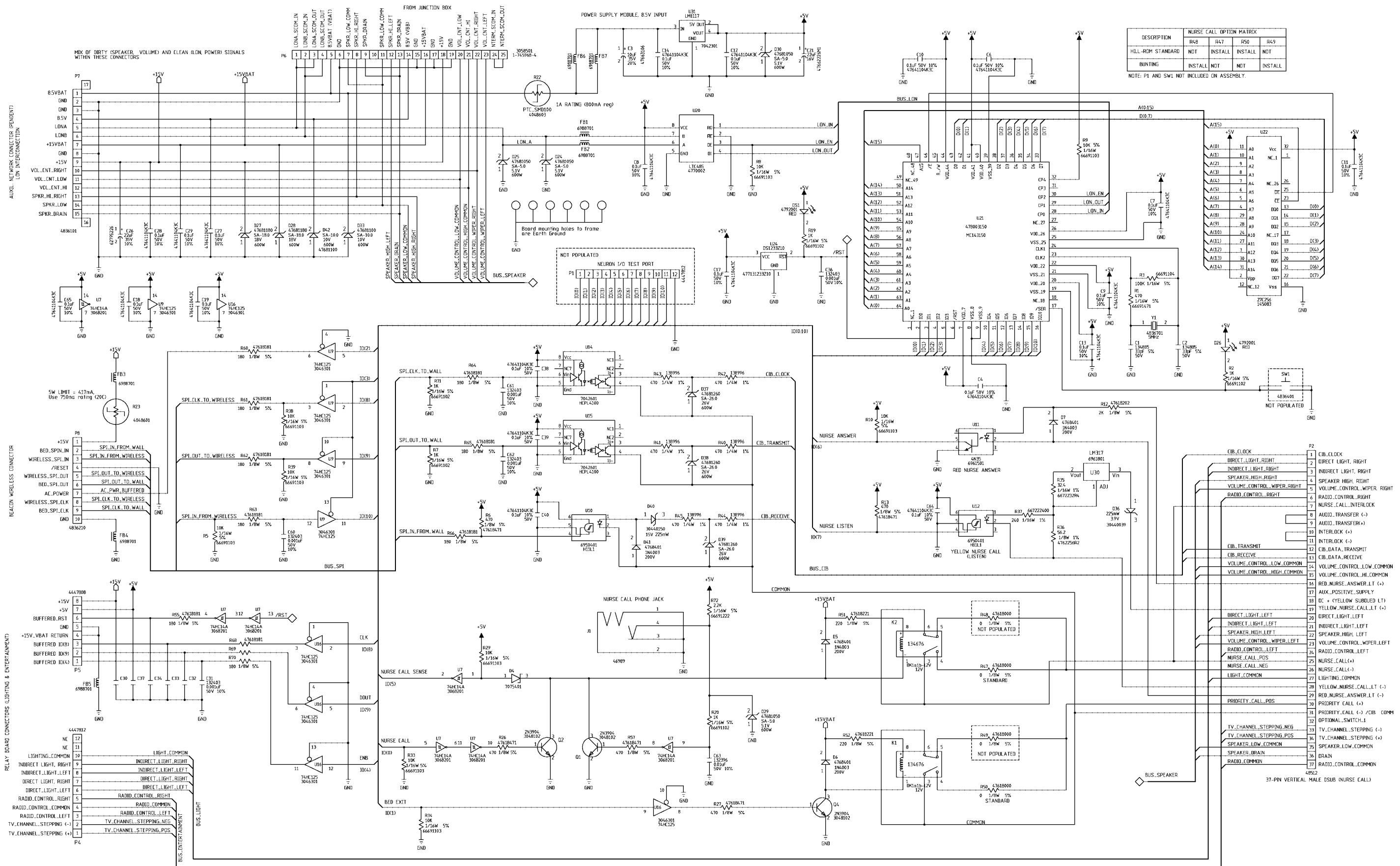
# P.C. Board Wiring Diagram—Wireless Module (Sheet 1 of 2) (139375)



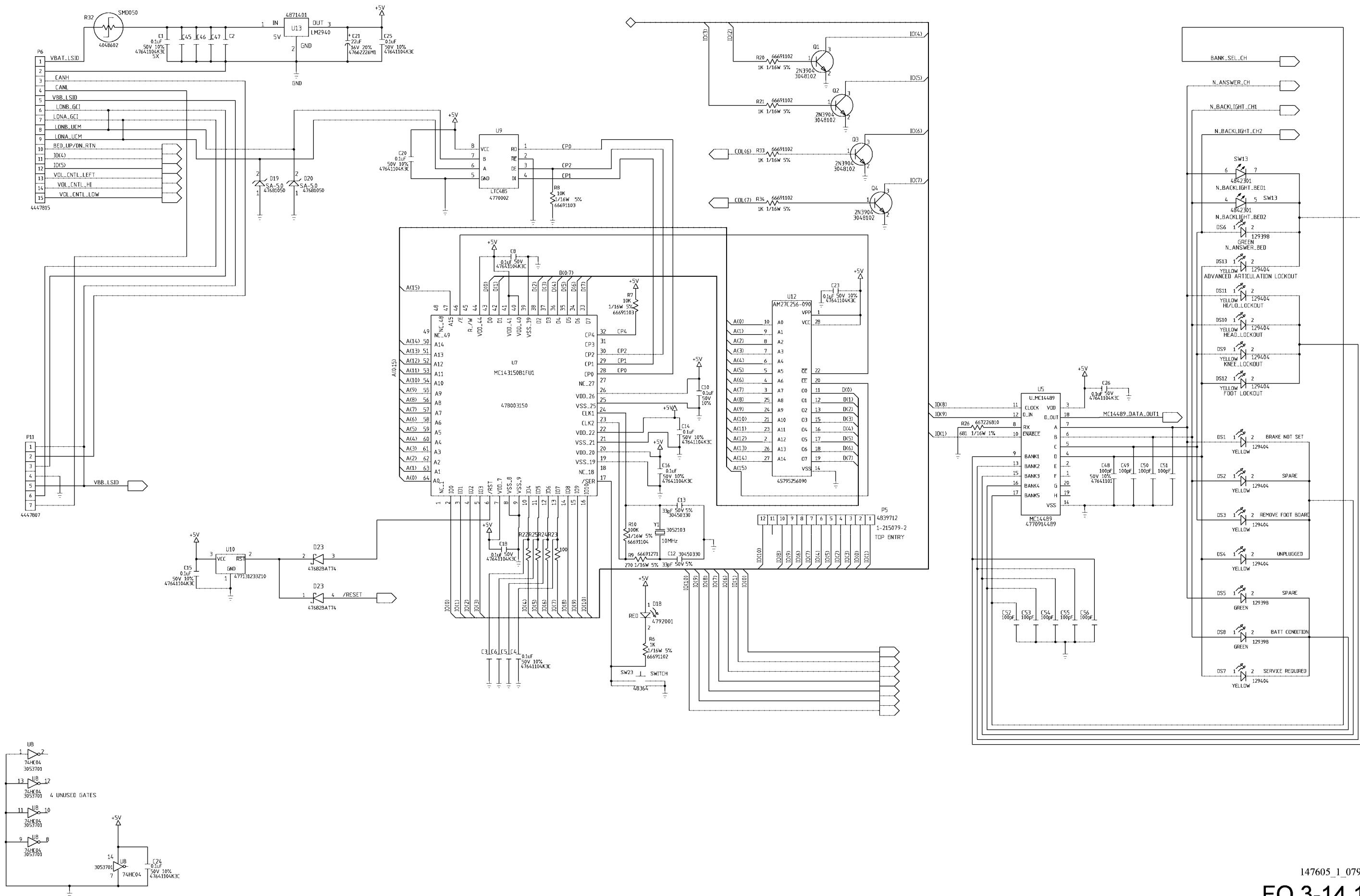
# P.C. Board Wiring Diagram—Wireless Module (Sheet 2 of 2) (138375)



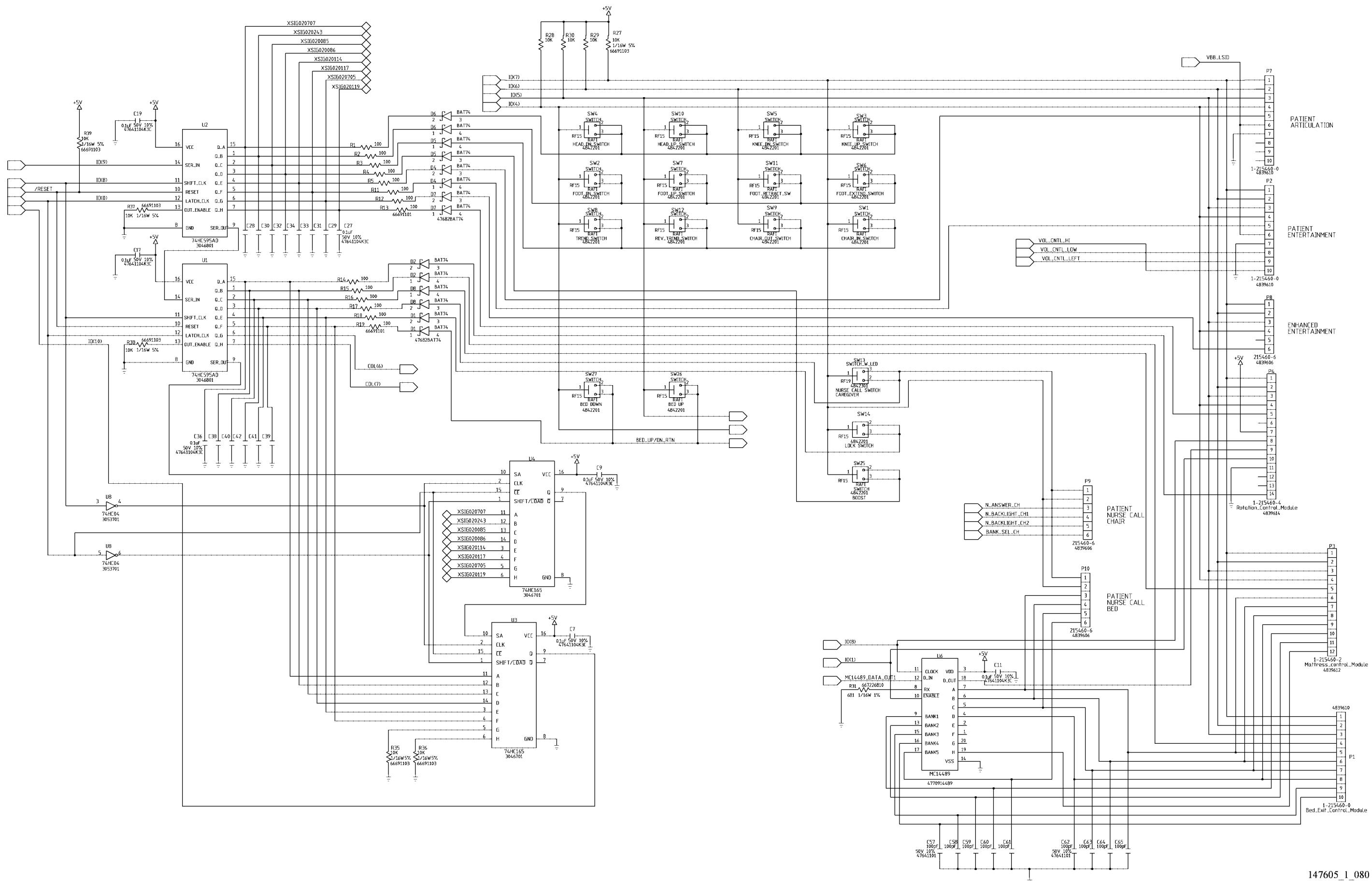
# P.C. Board Wiring Schematic Diagram—Wireless Module Support (139428)



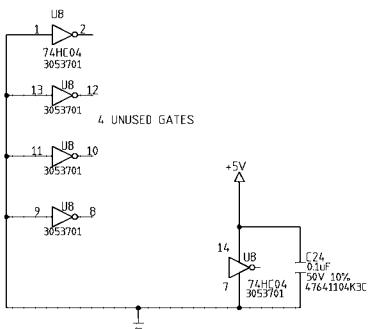
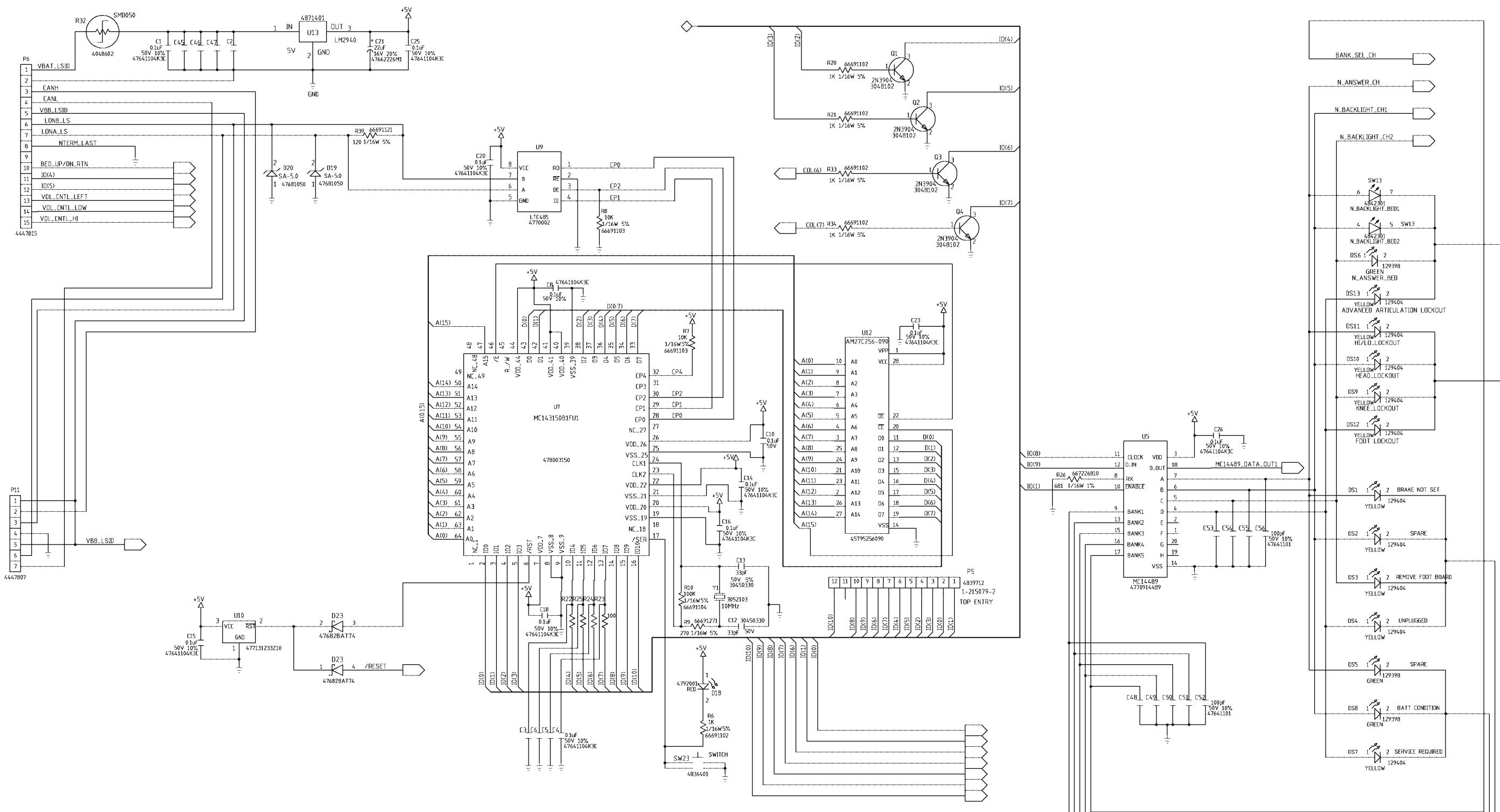
# P.C. Board Wiring Schematic Diagram—Right User Control Module (Sheet 1 of 2) (143546)



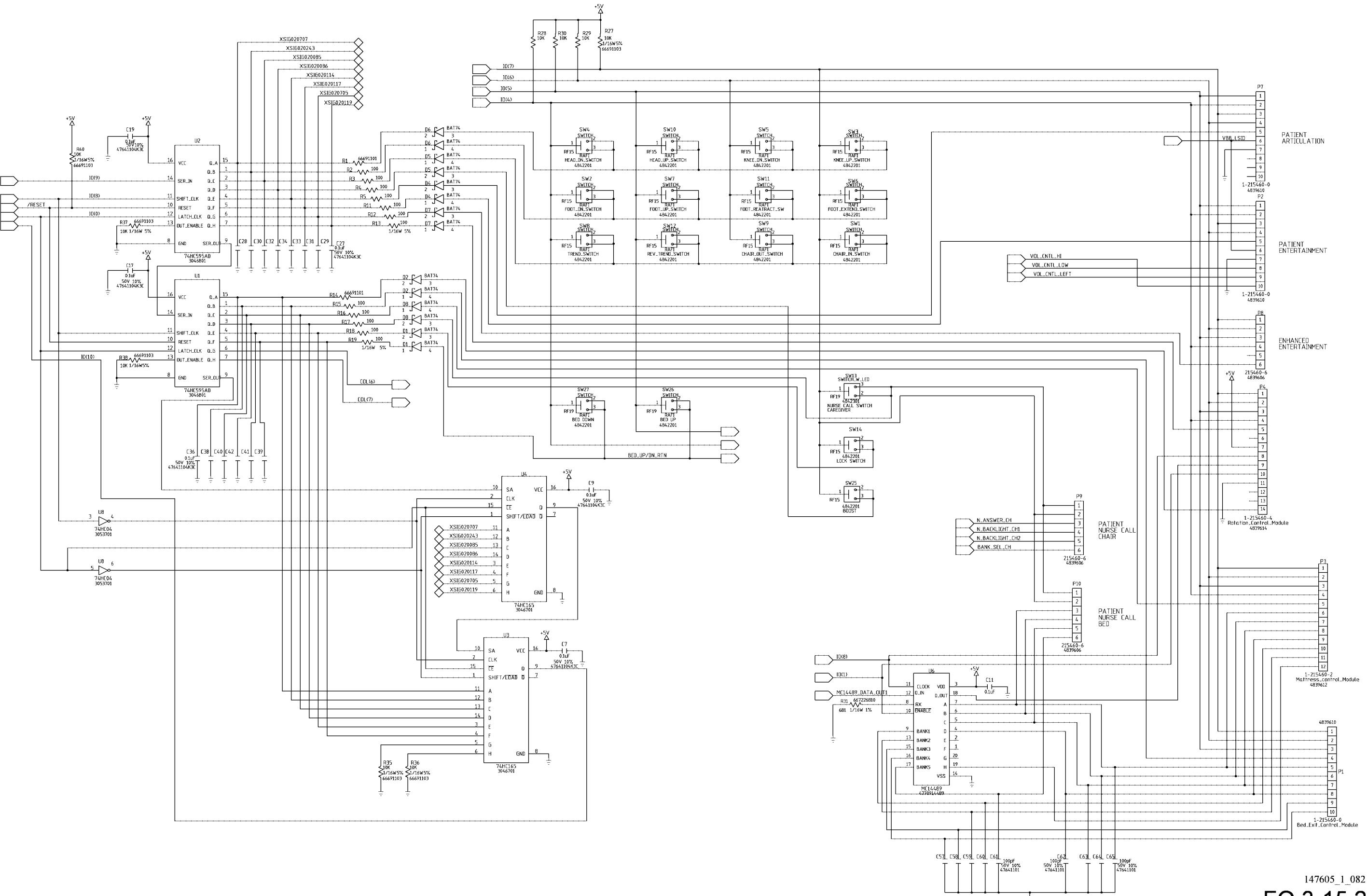
# P.C. Board Wiring Schematic Diagram—Right User Control Module (Sheet 2 of 2) (143546)



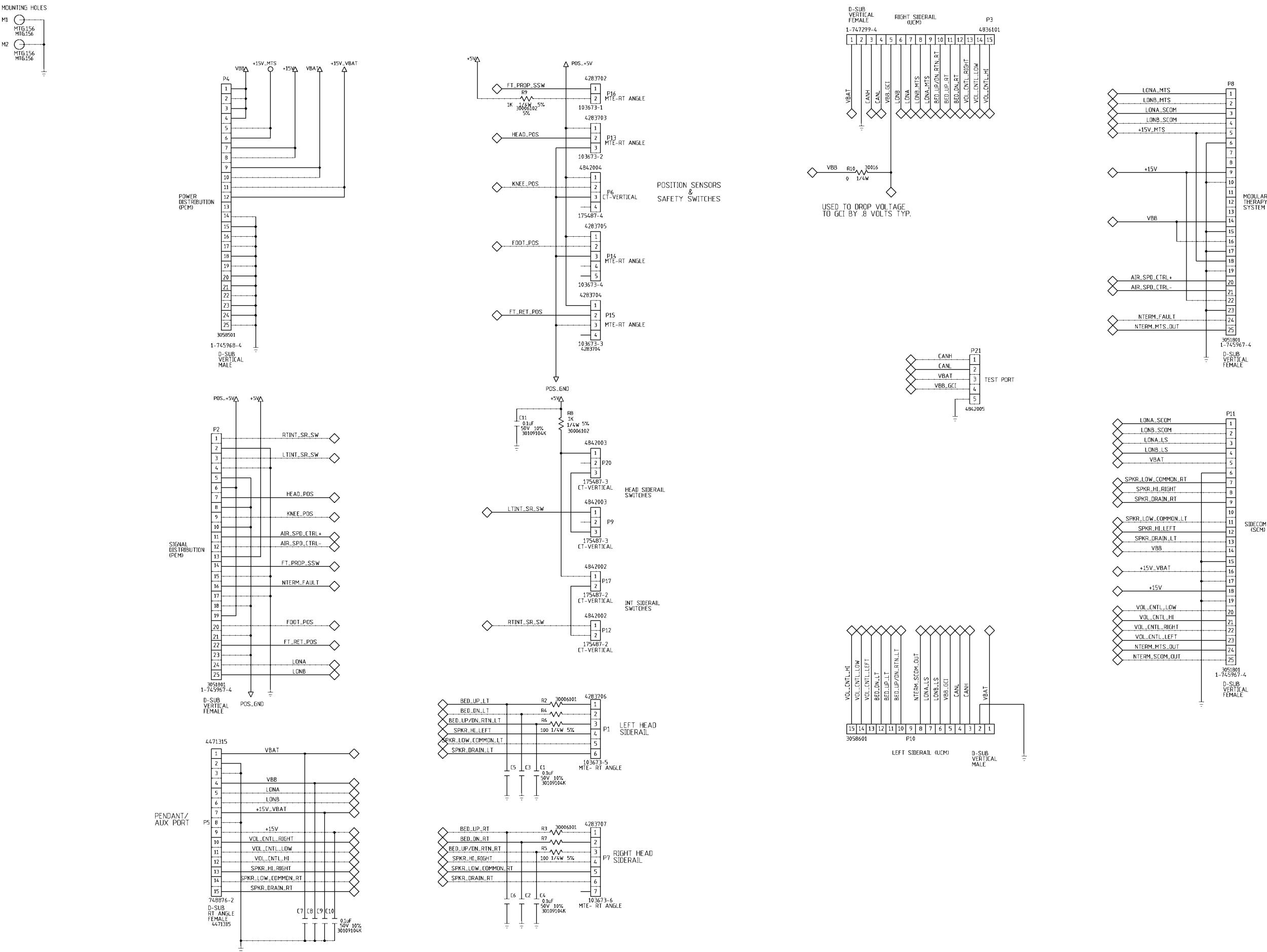
P.C. Board Wiring Schematic Diagram—Left User Control Module (Sheet 1 of 2) (143549)



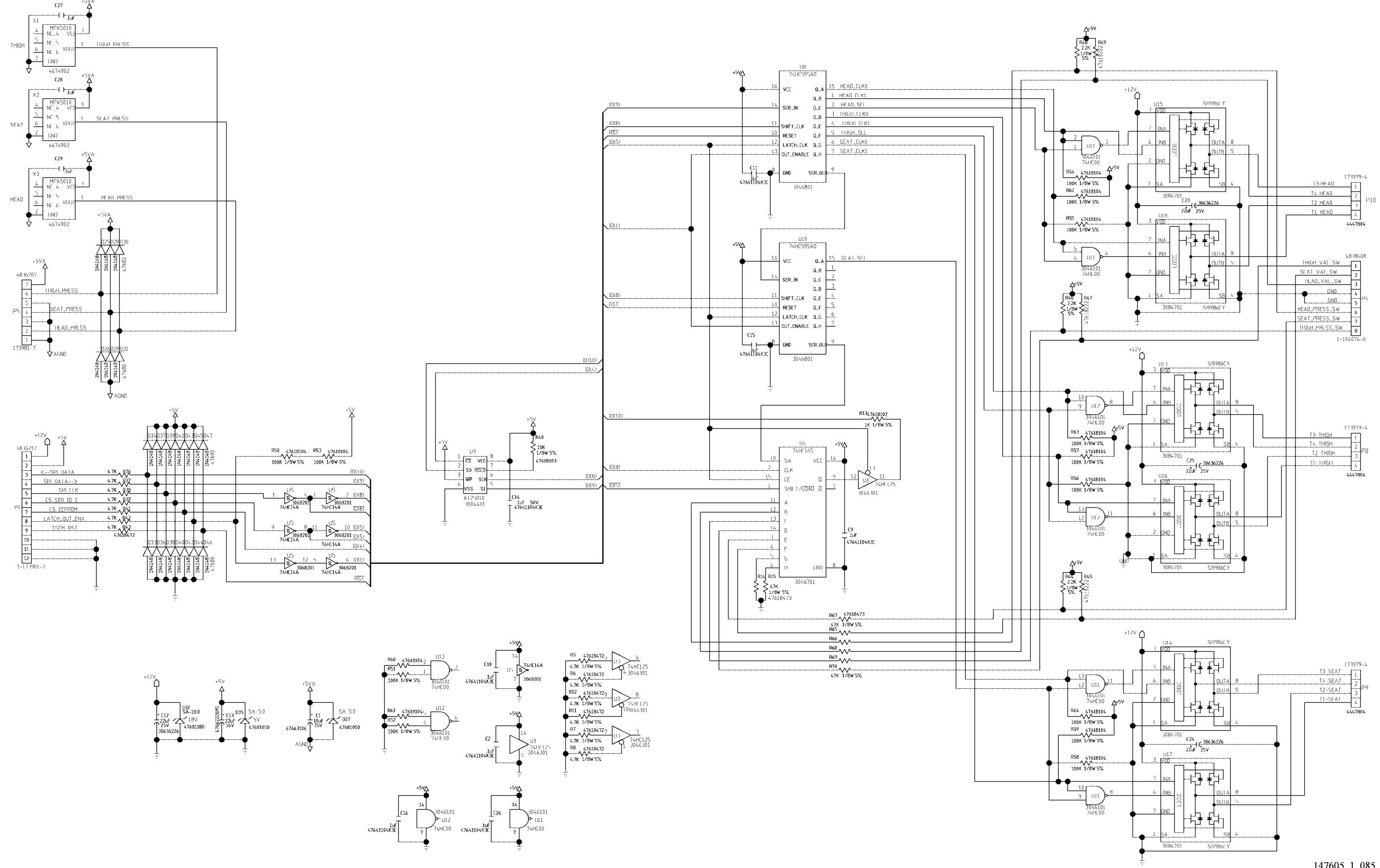
P.C. Board Wiring Schematic Diagram—Left User Control Module (Sheet 2 of 2) (143549)



# P.C. Board Wiring Diagram—Weighframe Junction (144453)

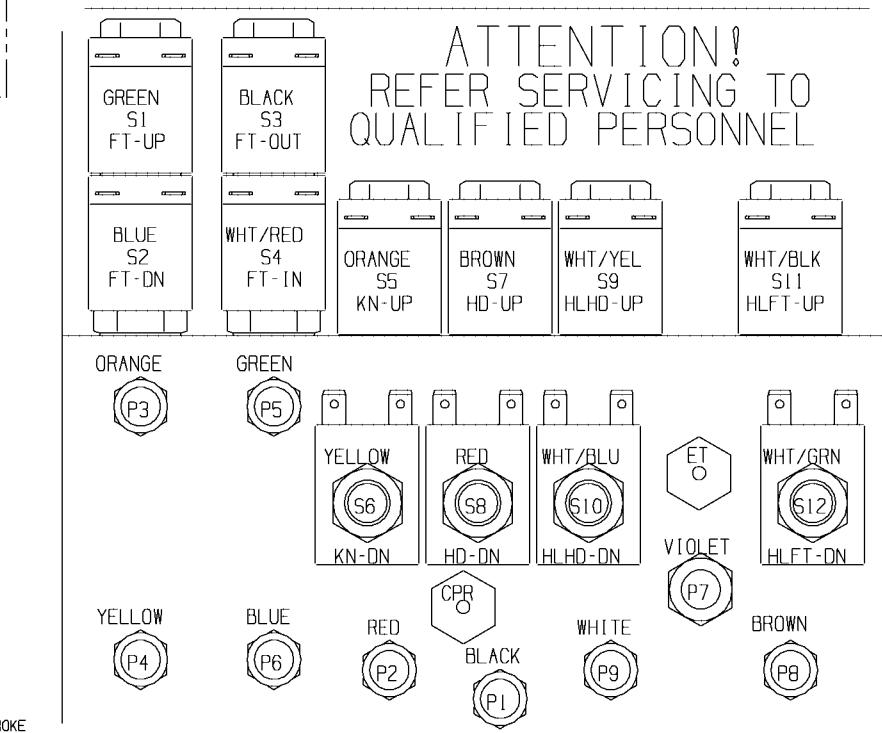
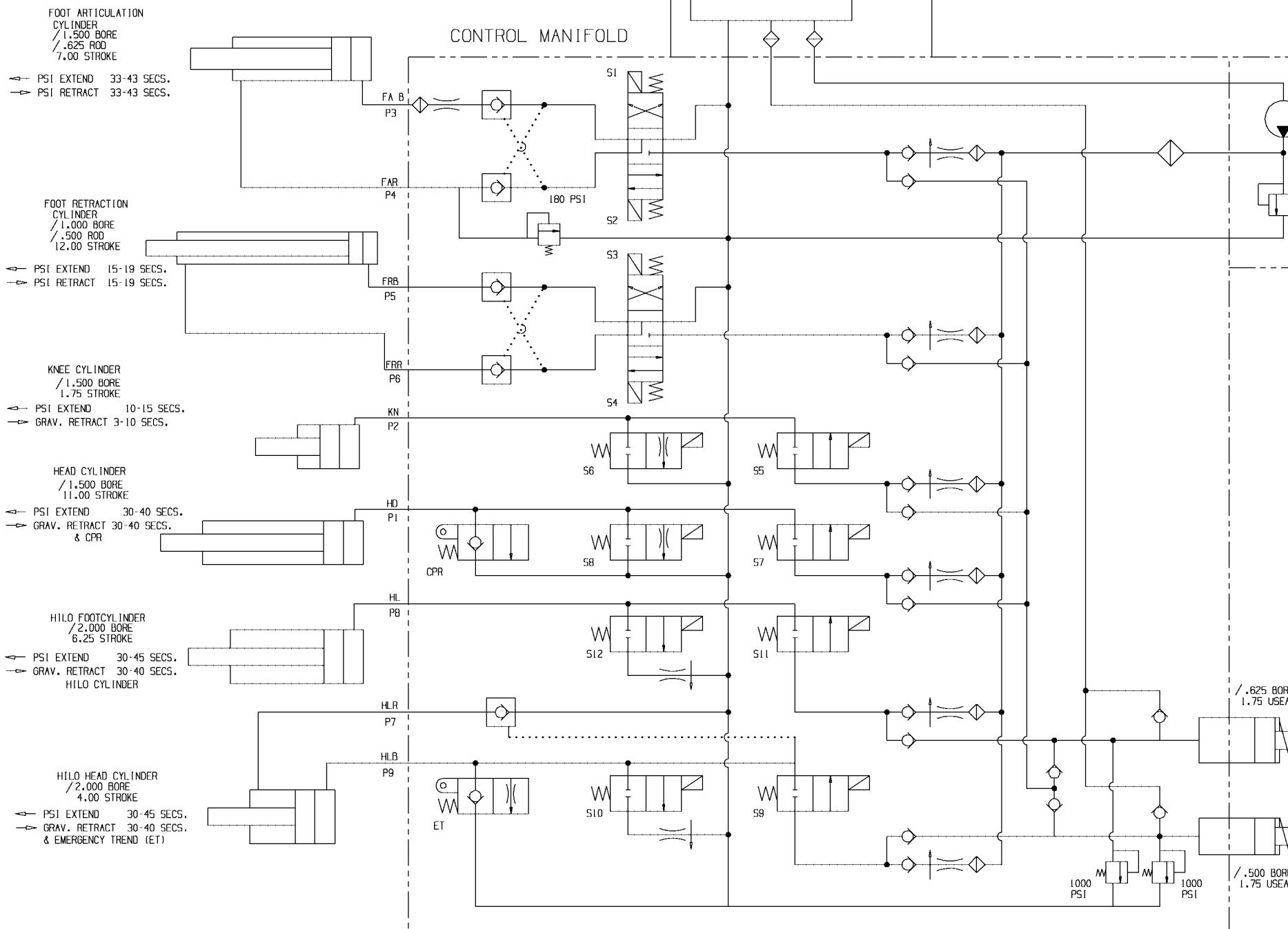


## P.C. Board Wiring Diagram—Treatment Seat Control Module (66237)

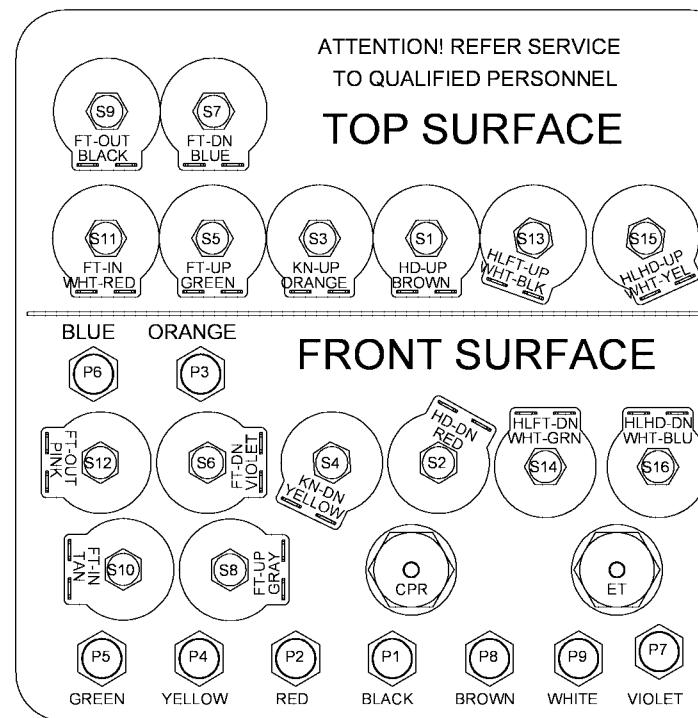
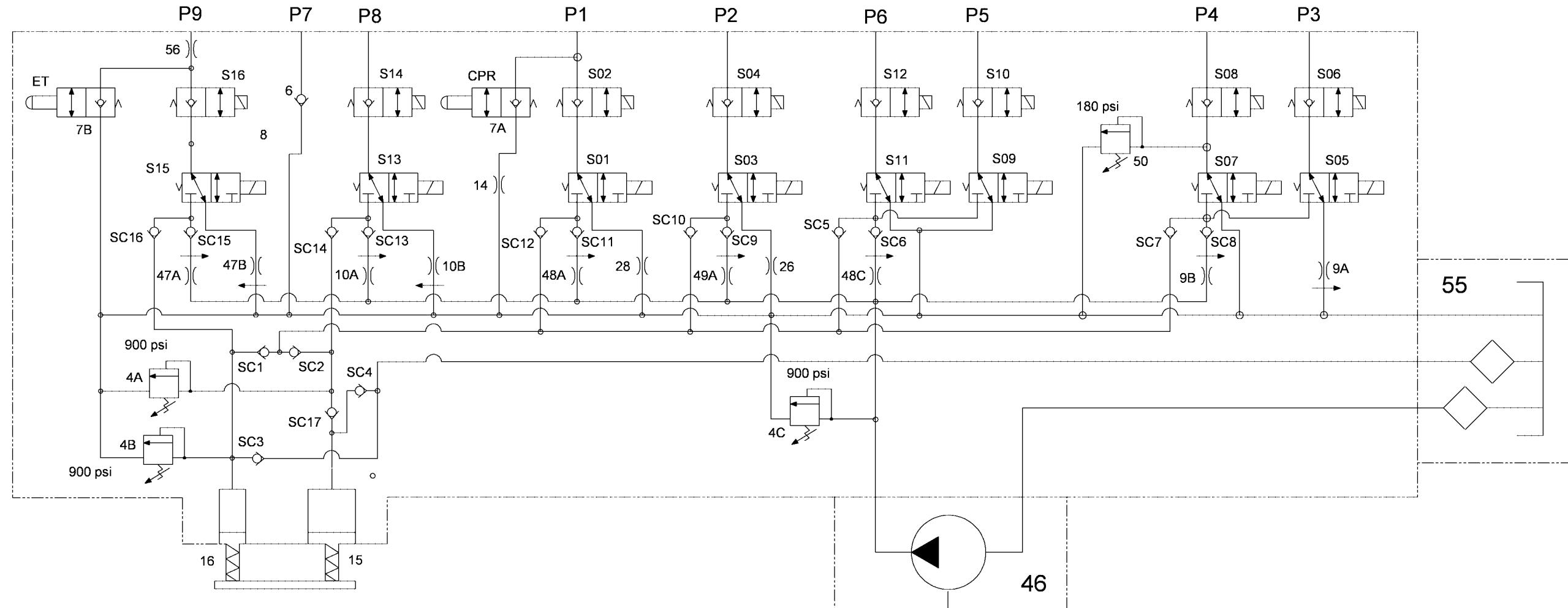


## HYDRAULIC CIRCUIT

RESERVOIR



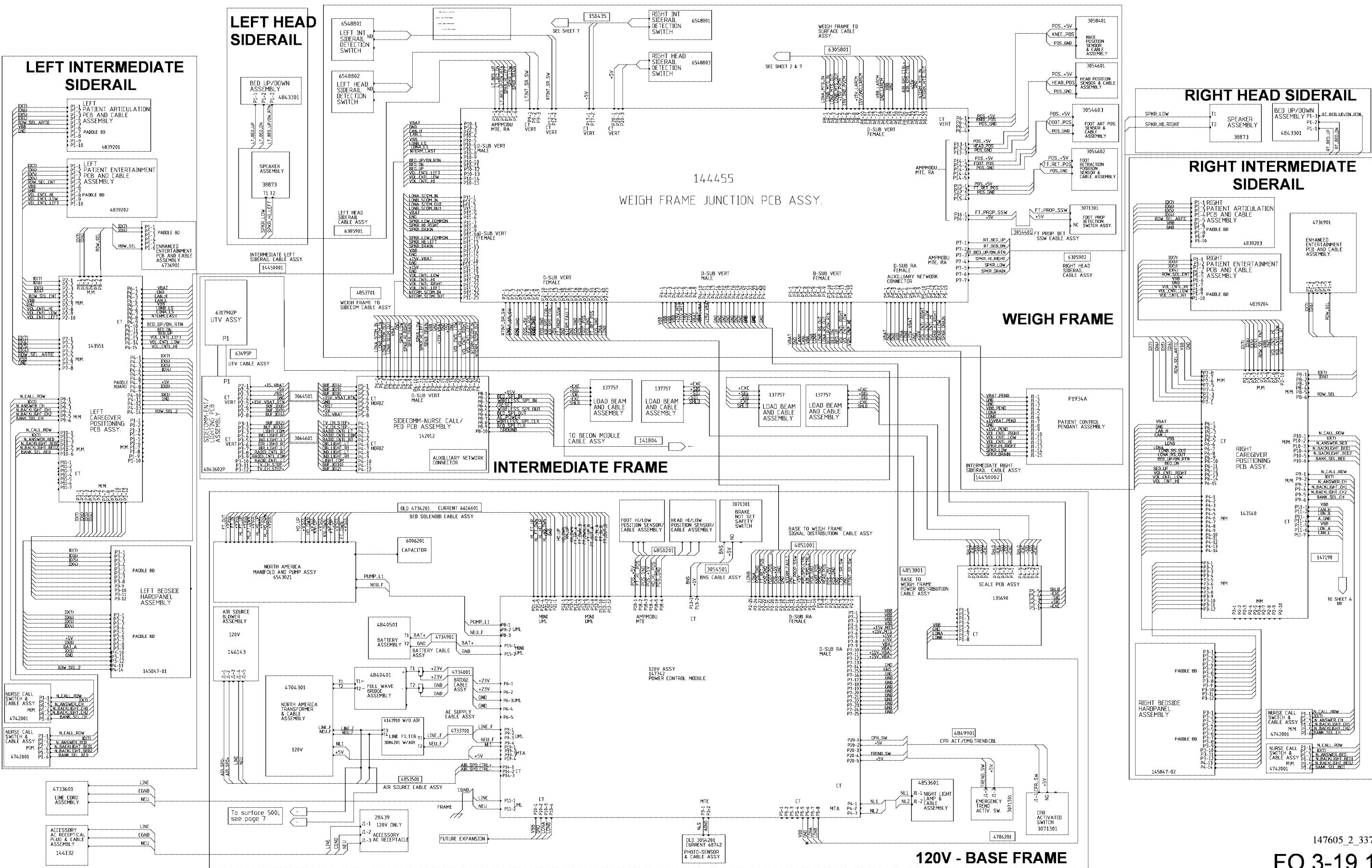
P.C. Board Wiring Diagram—Hydraulic System (Sheet 2 of 2) (65430)



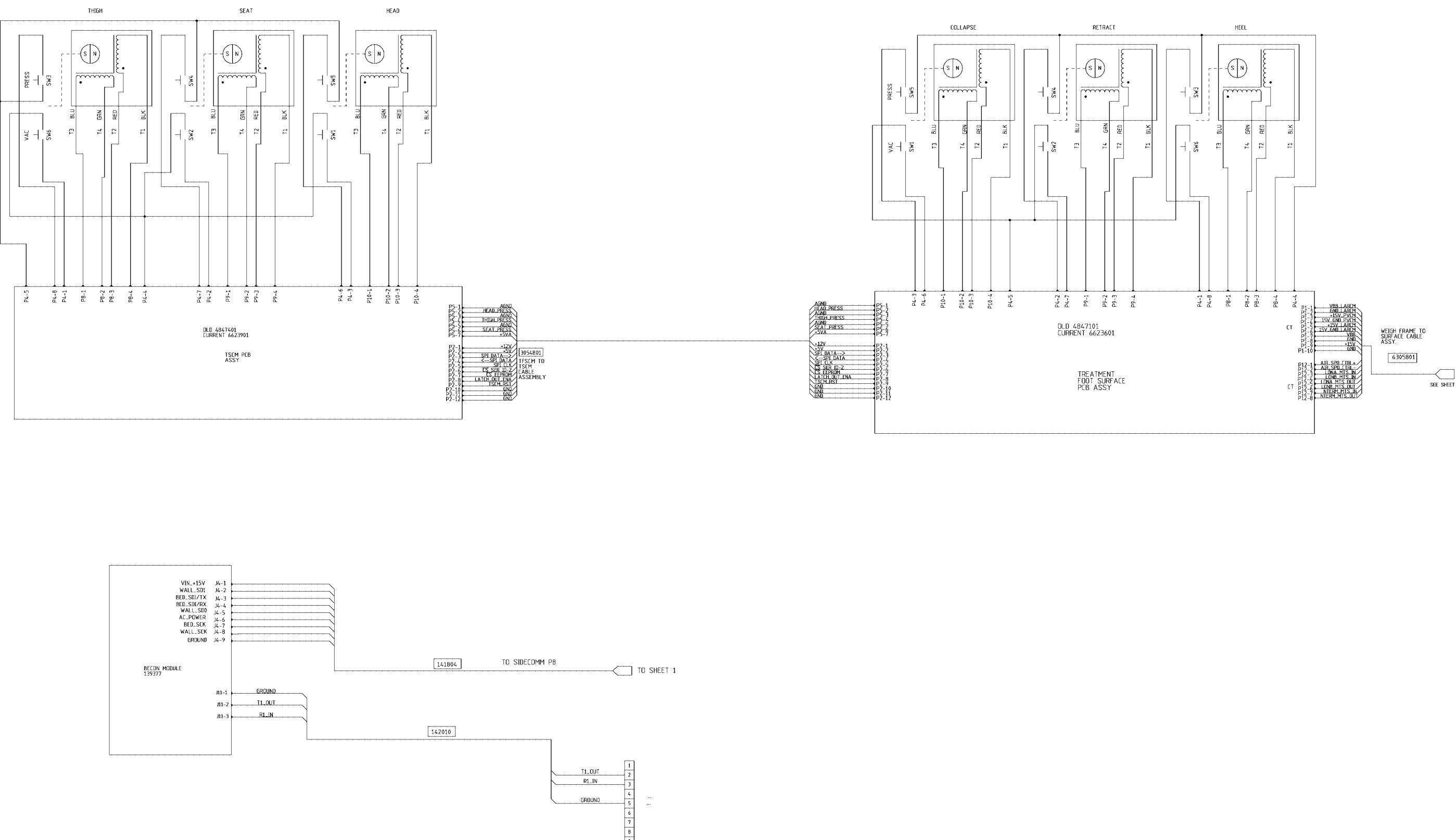
147605\_1\_272

FO 3-18.2

System Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 1 of 7) (150409)



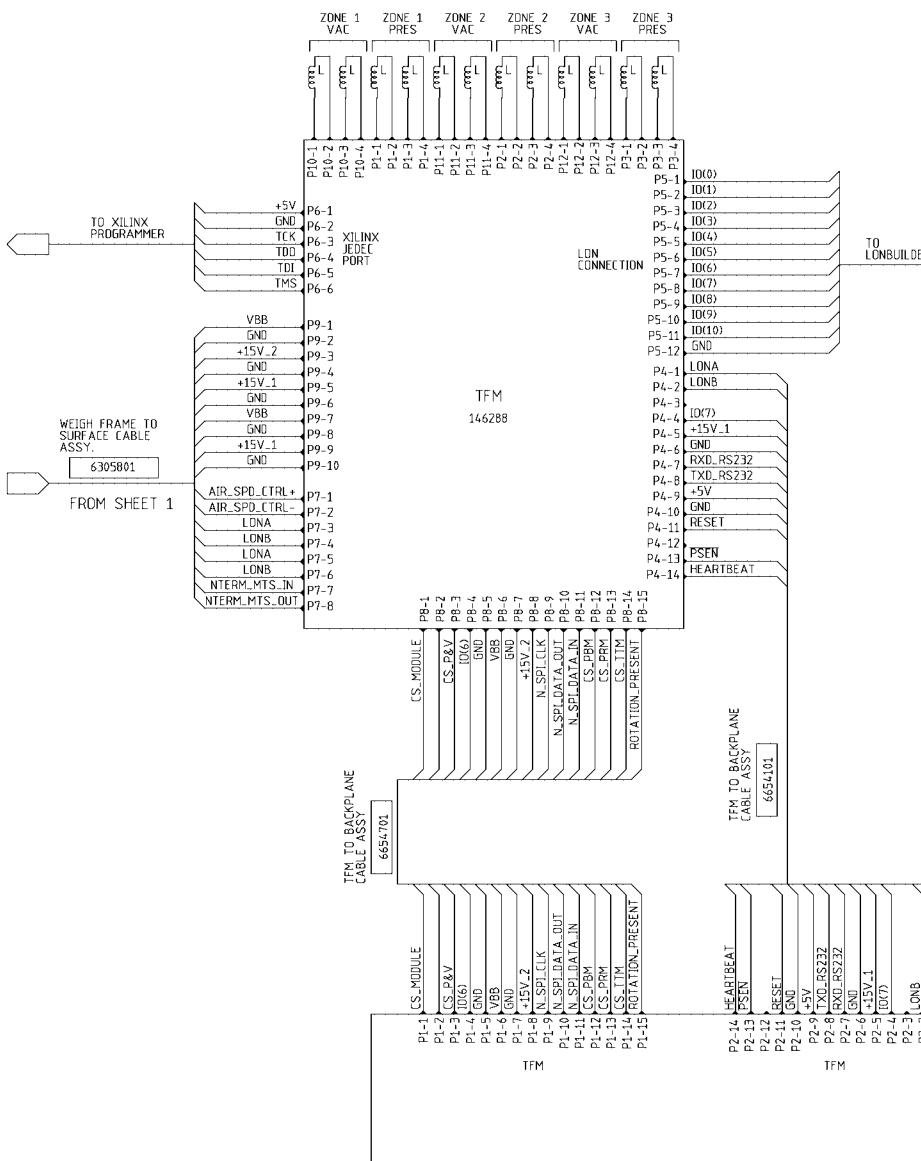
# System Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 2 of 7) (150409)



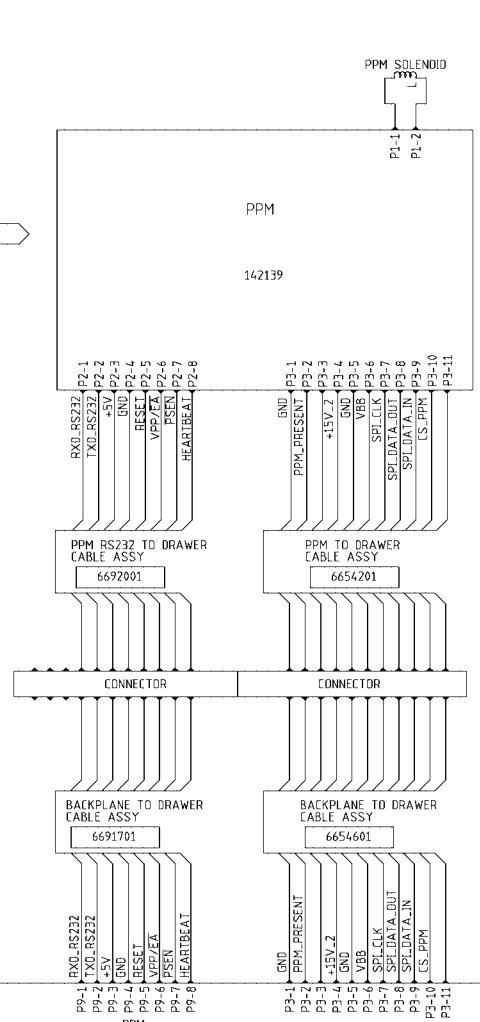
System Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 3 of 7) (150409)

## **Total Care SPORT PLUS PULMONARY WIRING DIAGRAM**

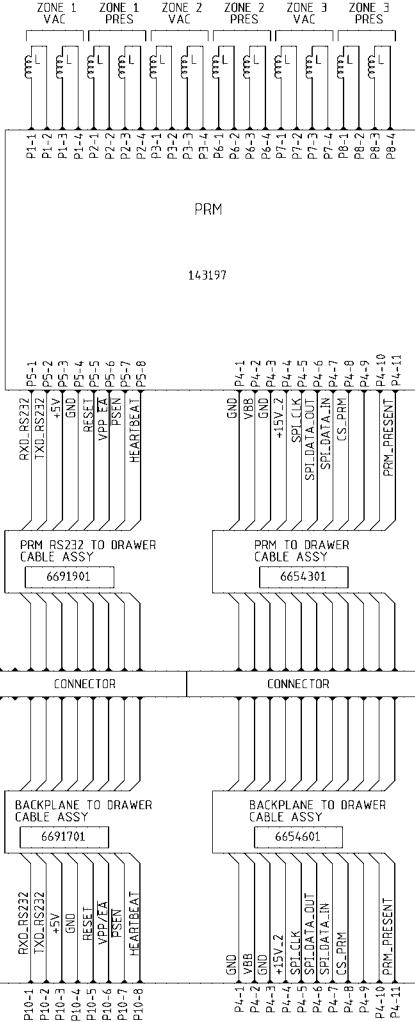
# MODULE 146312



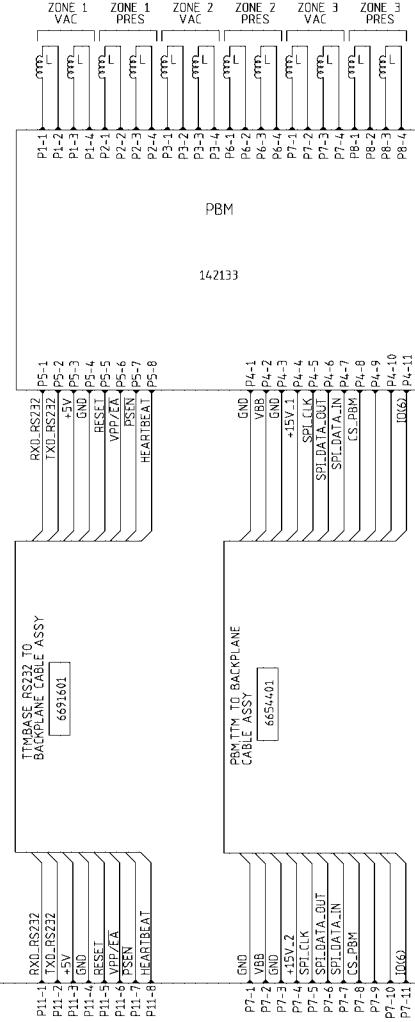
MODULE P1939E



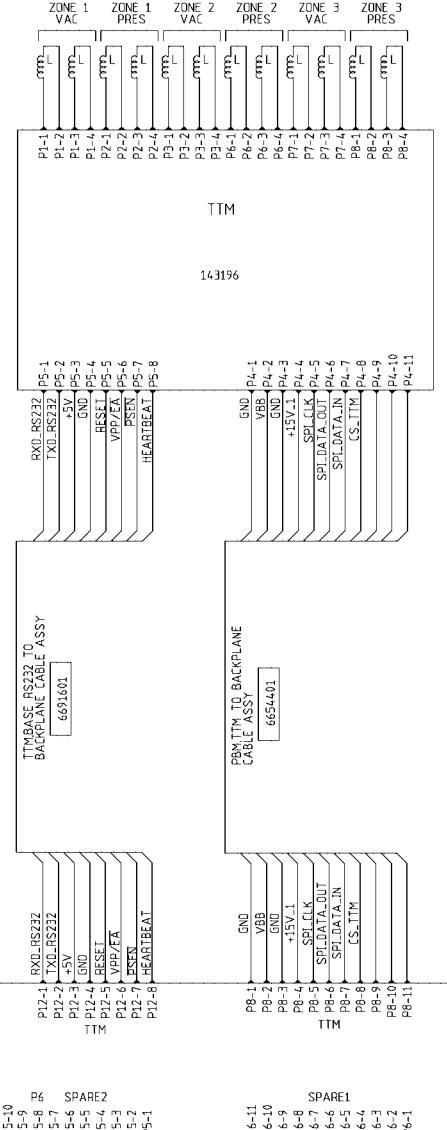
MODULE P1938E



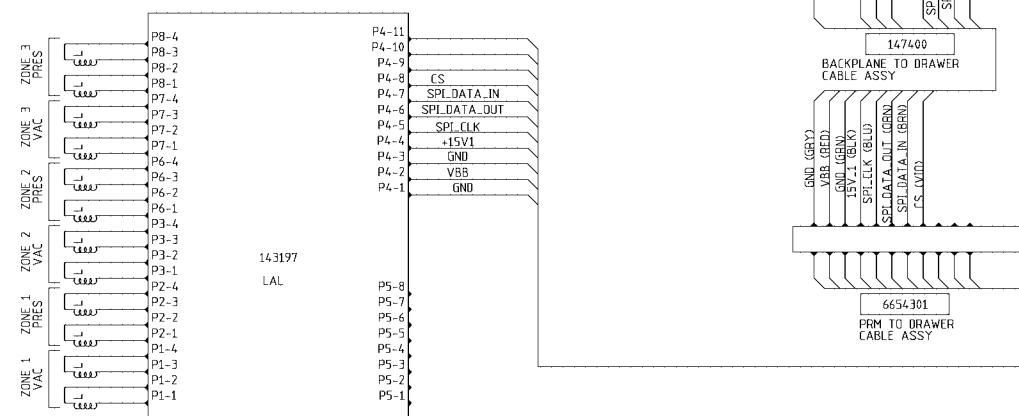
MODULE 142162



MODULE 147016

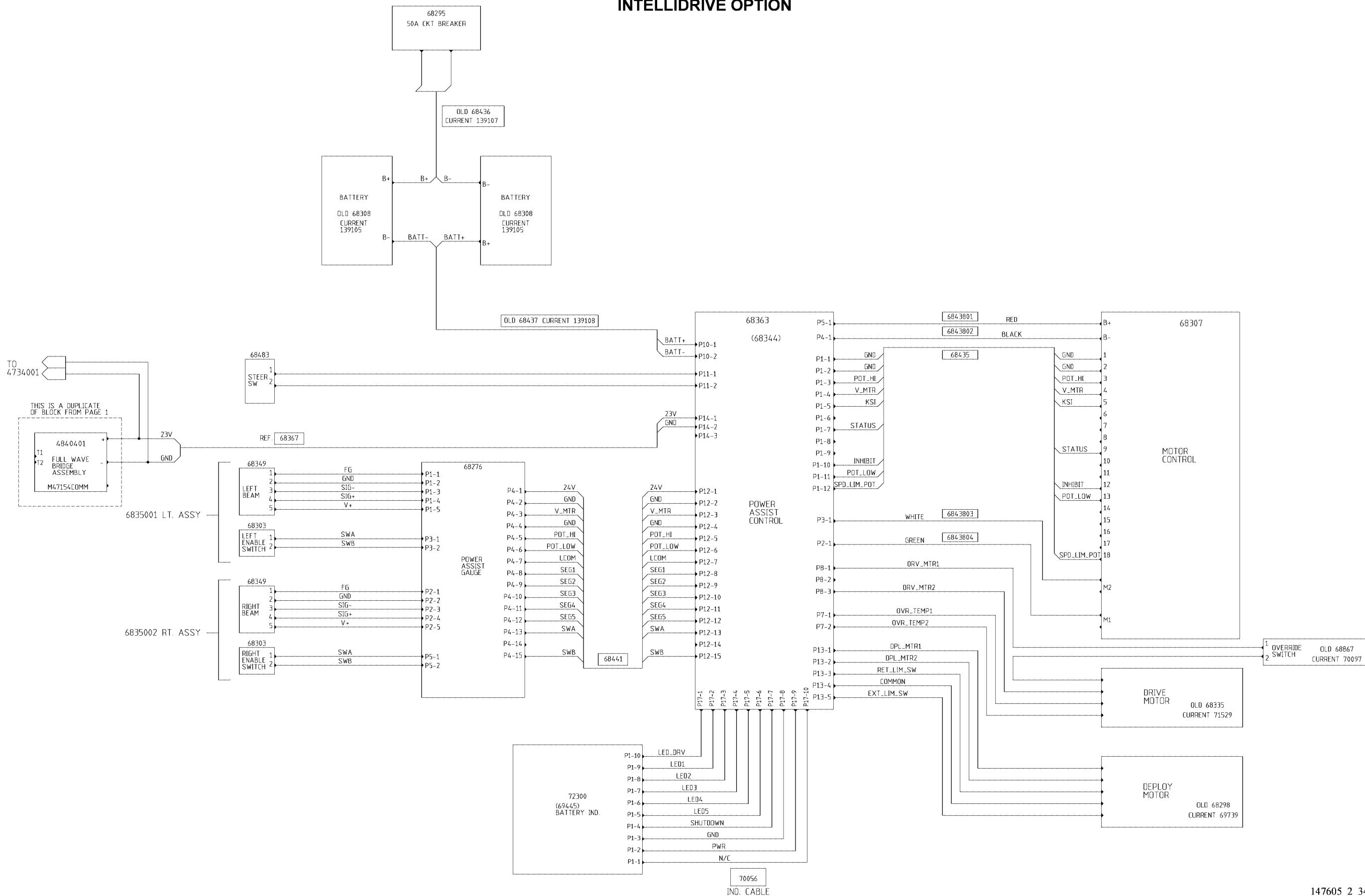


MODULE P1966A

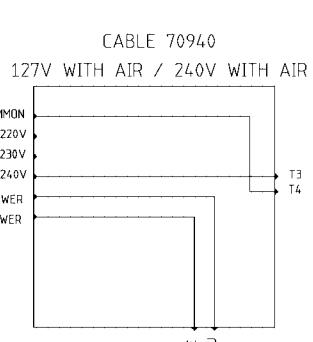
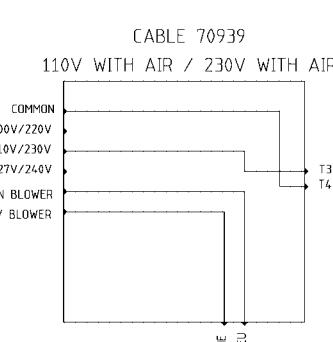
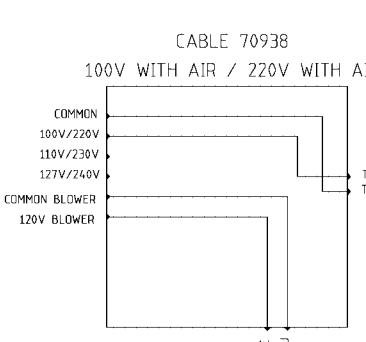
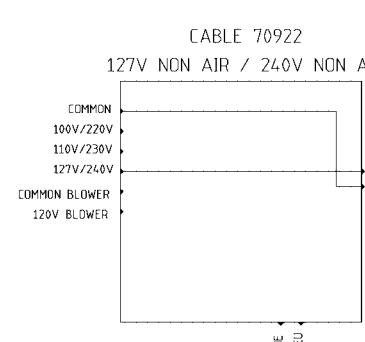
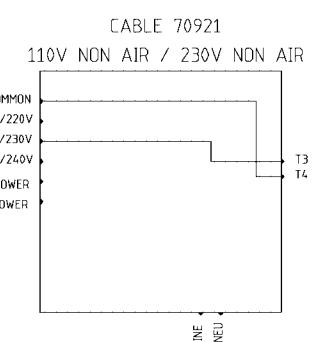
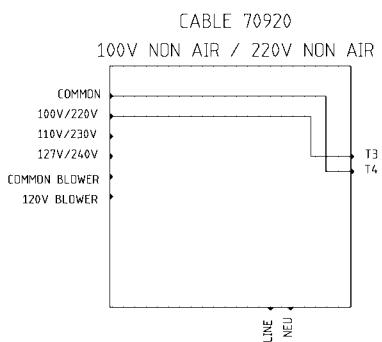
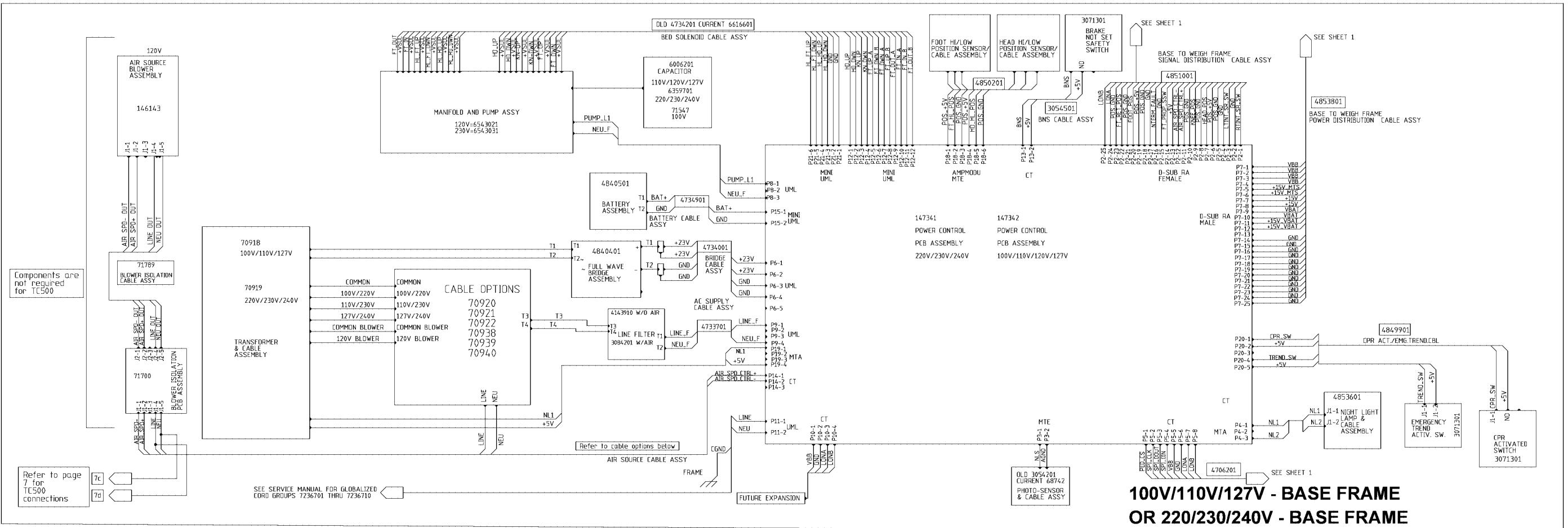


# System Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 4 of 7) (150409)

## INTELLIDRIVE OPTION

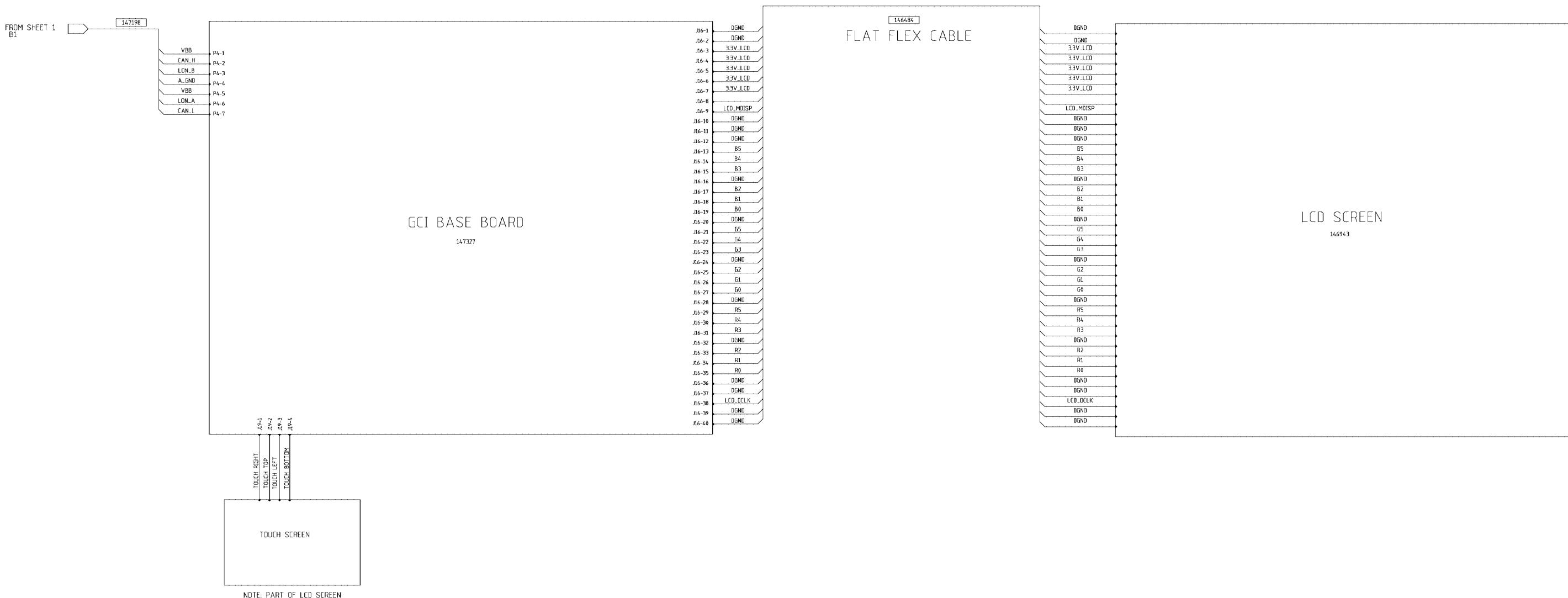


System Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 5 of 7) (150409)

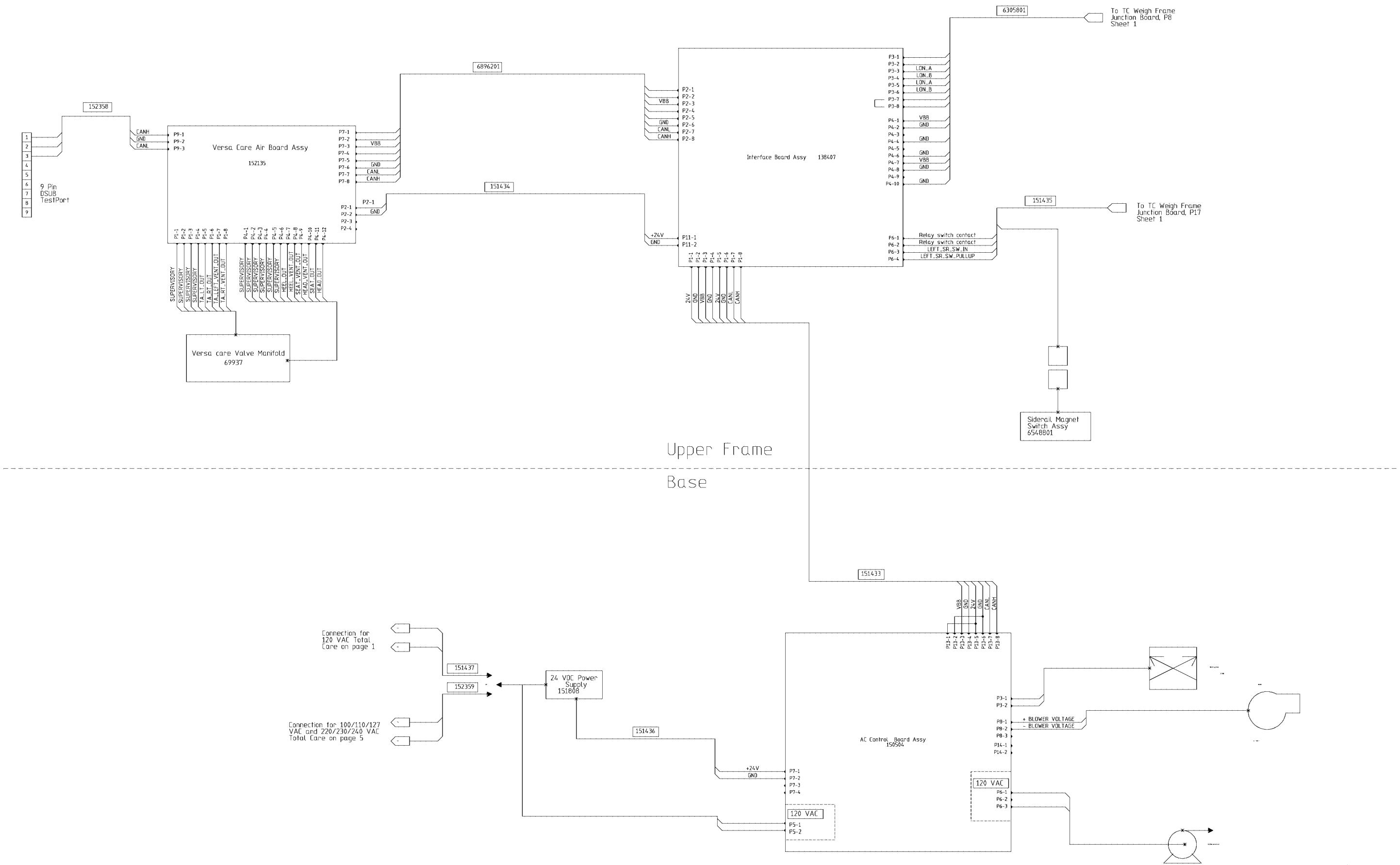


# System Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 6 of 7) (150409)

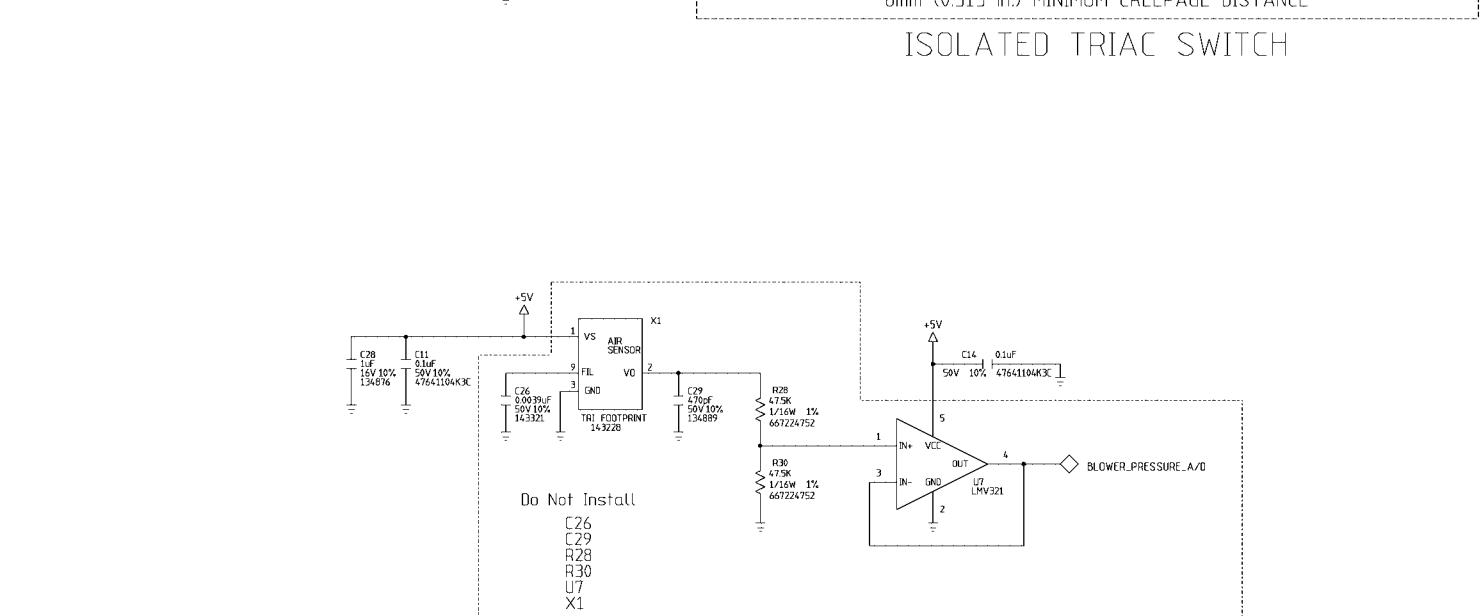
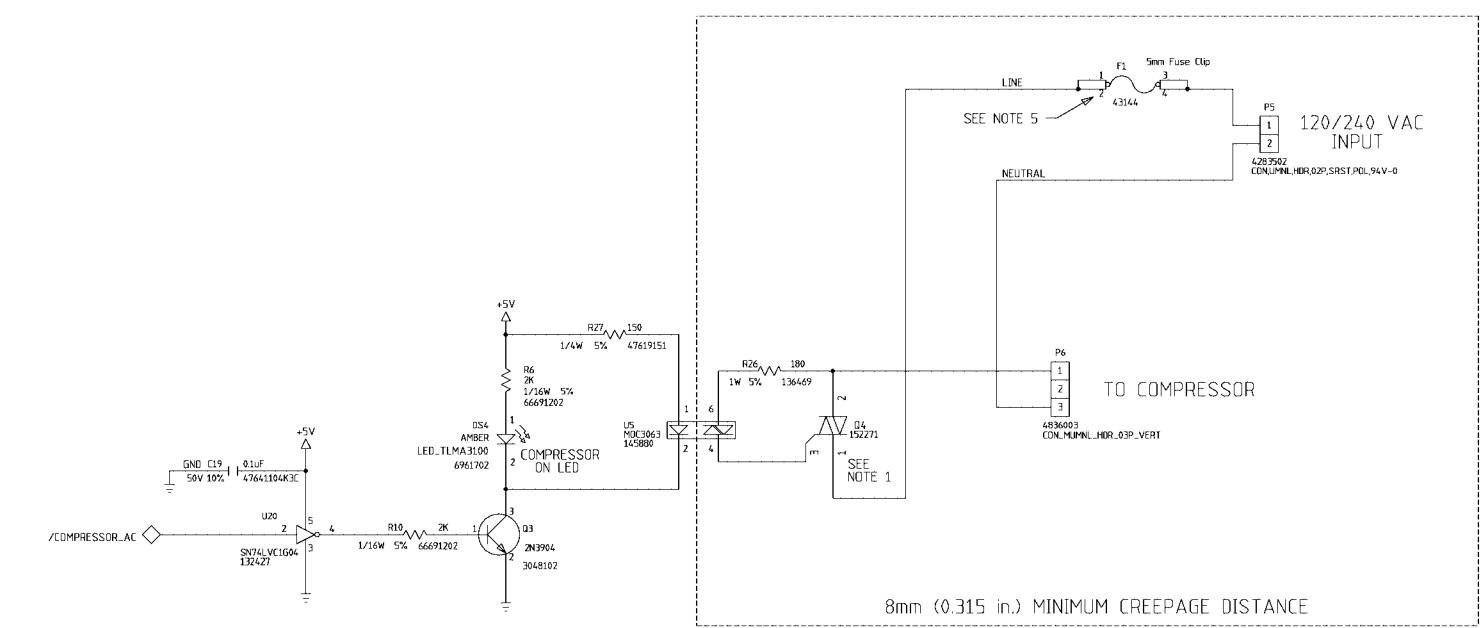
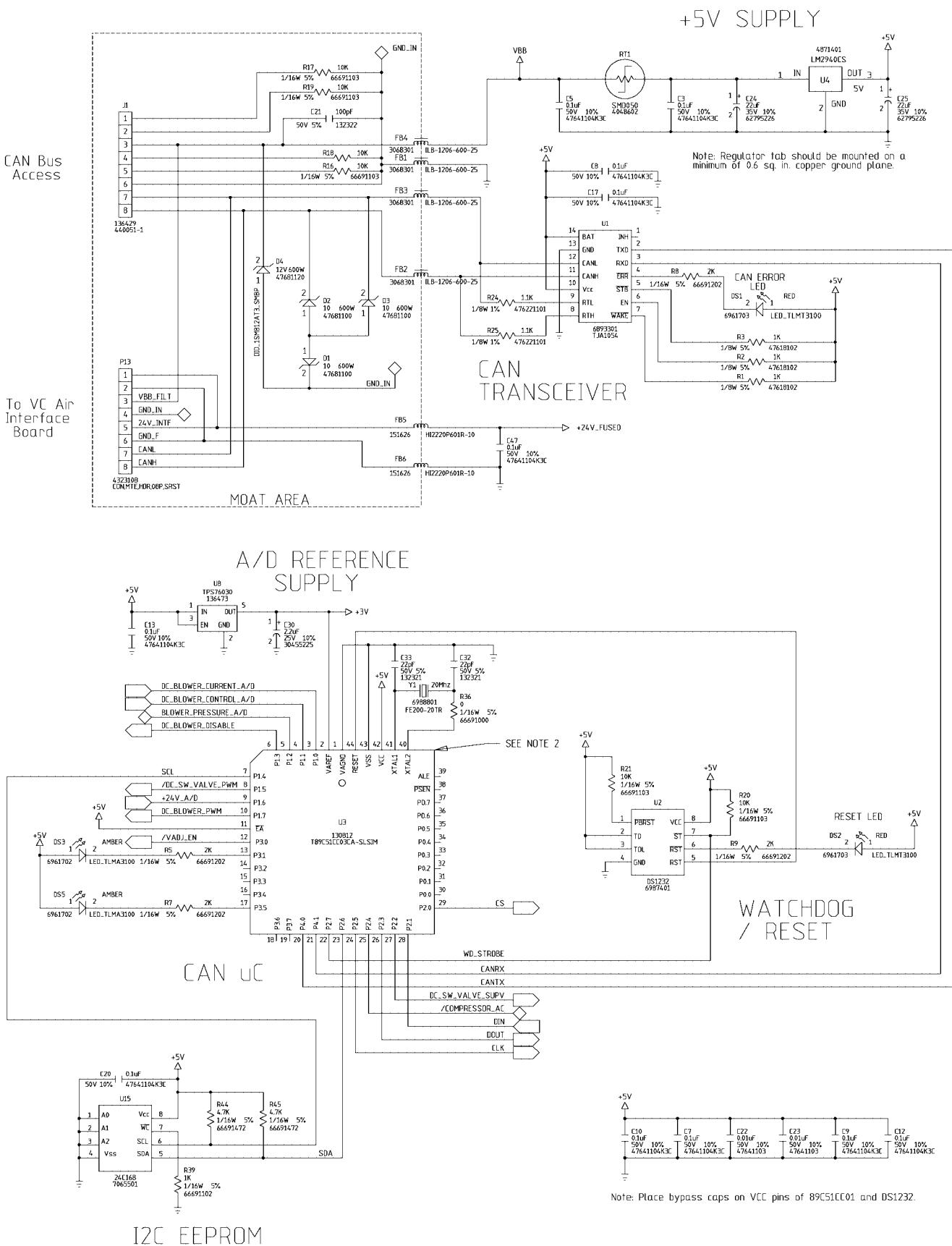
## TOTAL CARE SPORT PLUS GCI WIRING DIAGRAM



# System Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 7 of 7) (150409)

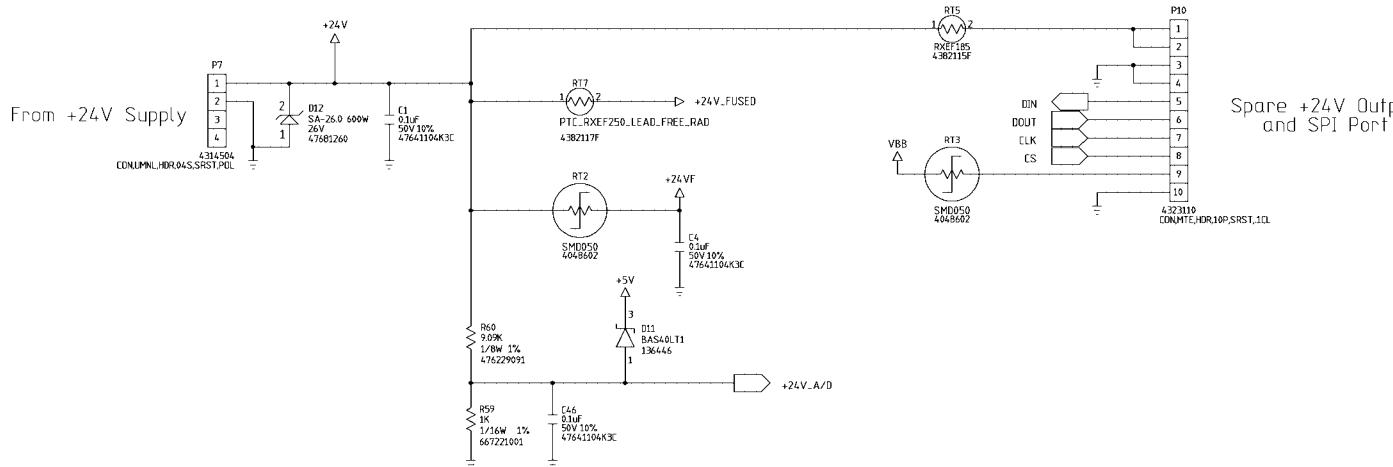


# AC Control Board Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 1 of 2) (150502)



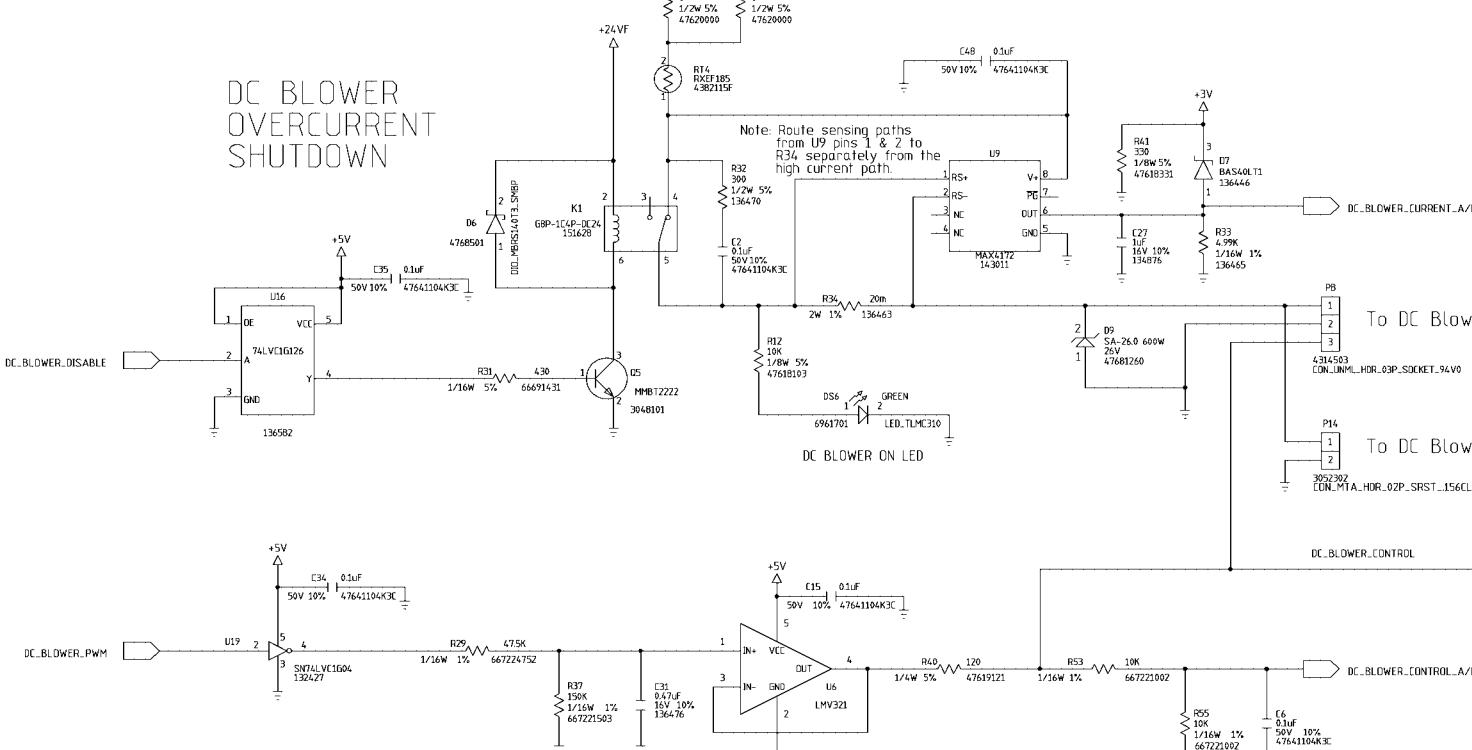
AC Control Board Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 2 of 2) (150502)

+24VDC INPUT FOR BLOWER, SWITCHING VALVE, & VERSACARE AIR INTERFACE BOARD



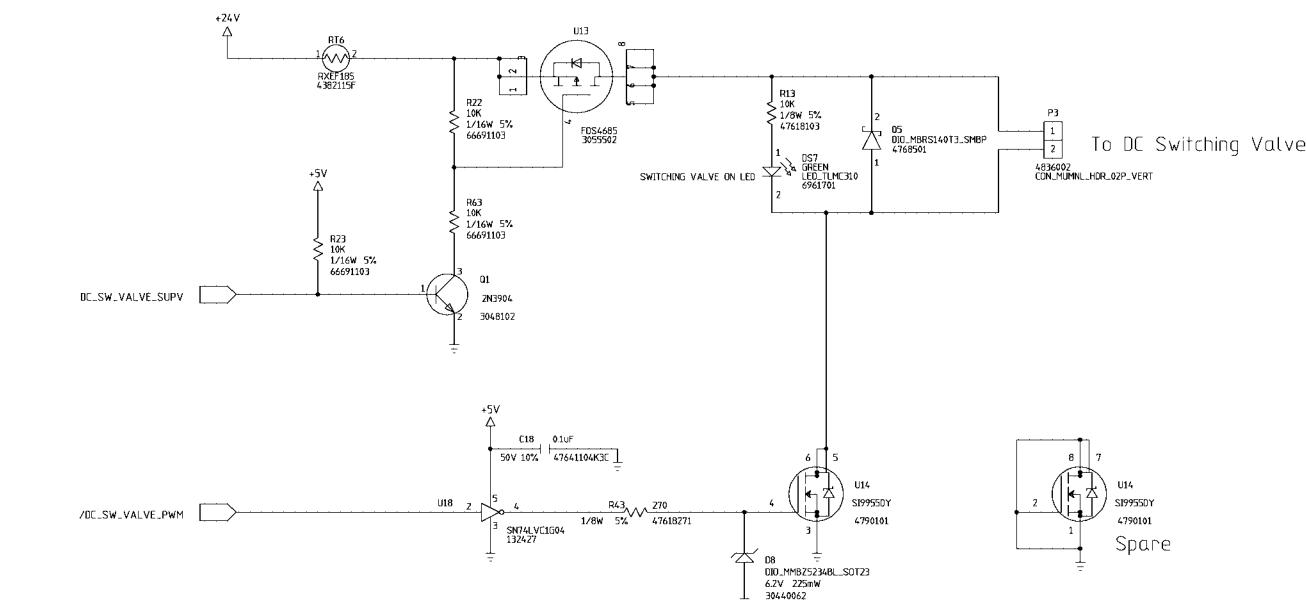
Note: Install R47 when Minijammer Blower is used.  
Install R46 when Microjammer Blower is used.

DC BLOWER  
OVERCURRENT  
SHUTDOWN

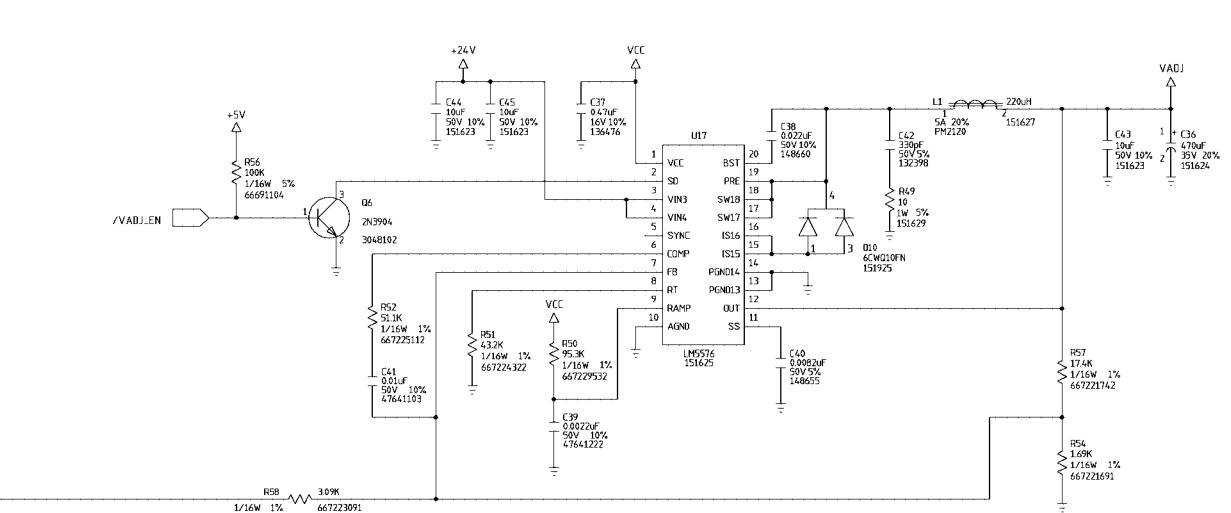


Do Not Install  
B47

## DC BLOWER PWM CONTROL VOLTAGE



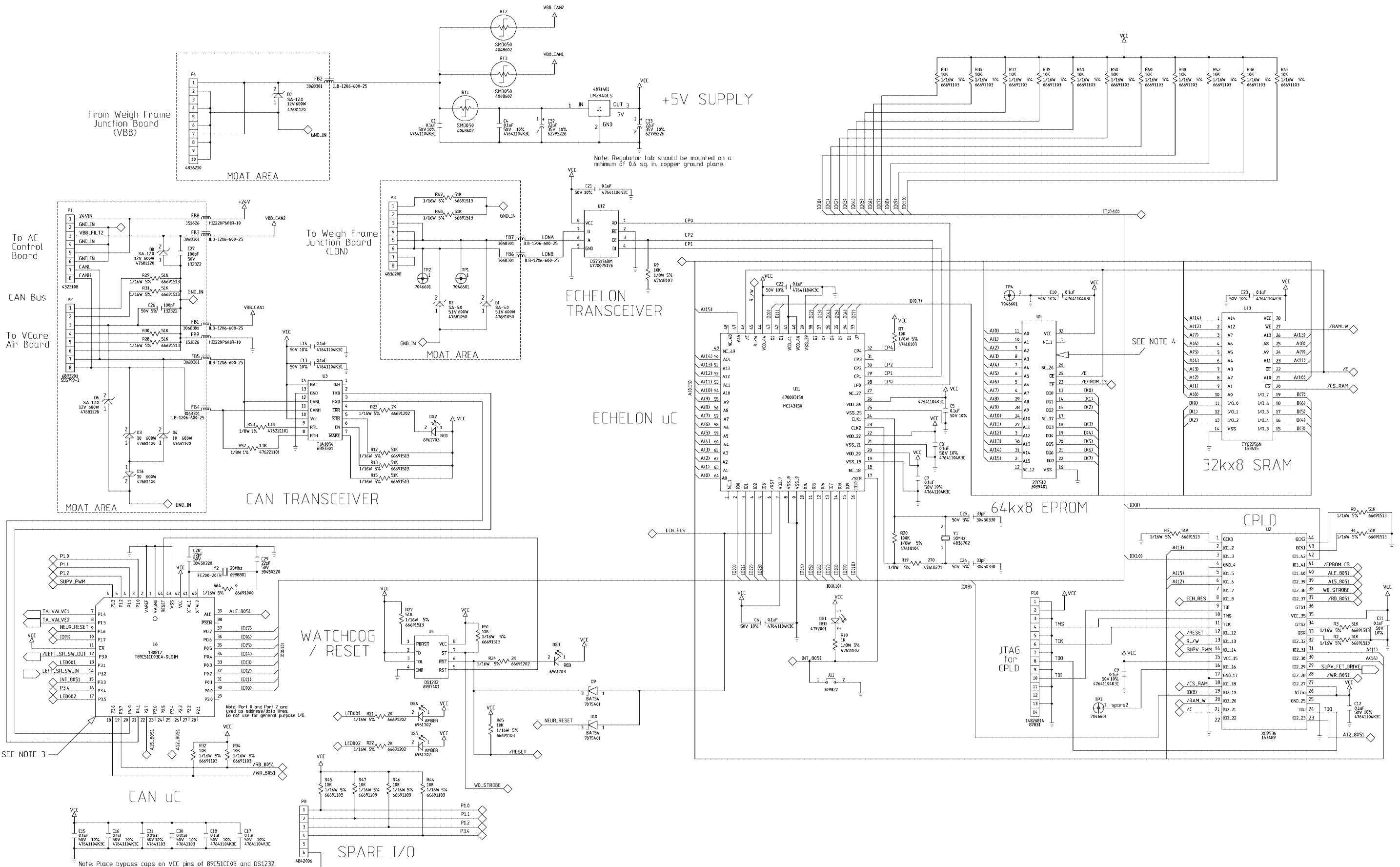
DC SWITCHING VALVE CONTROL



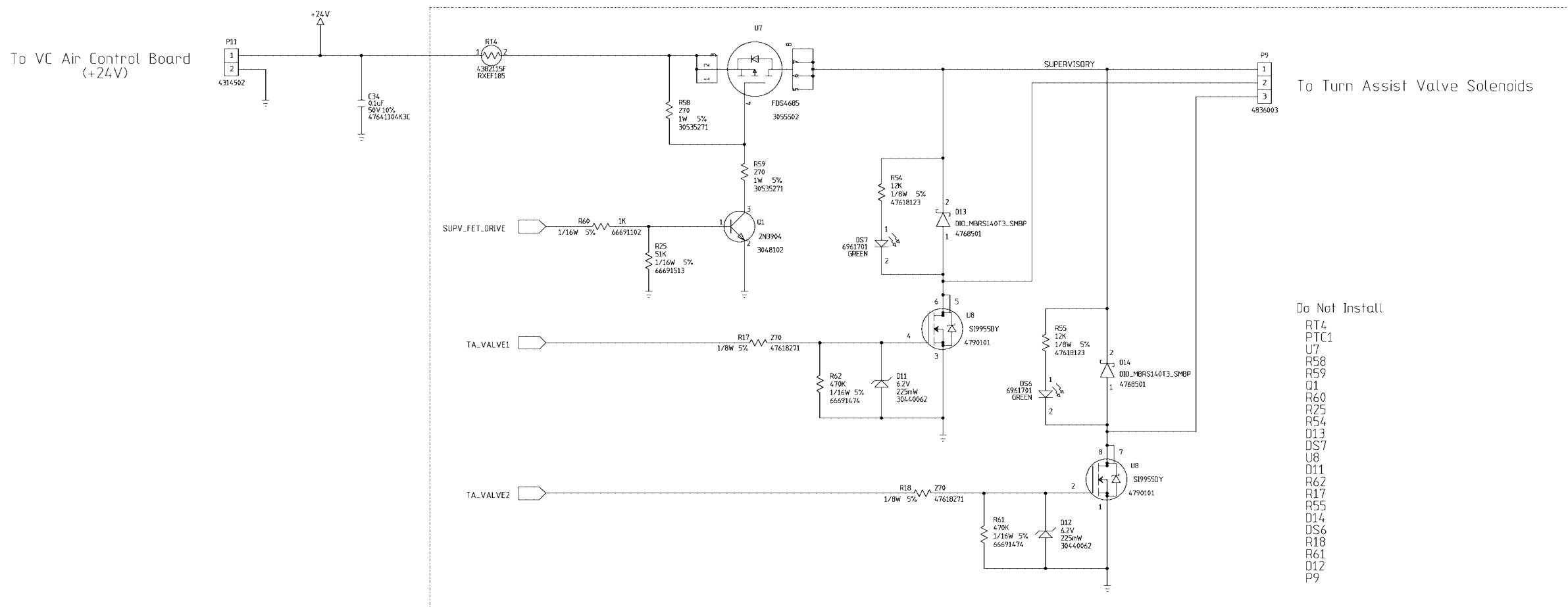
## ADJUSTABLE BUCK REGULATOR FOR MICROJAMMER DC BLOWER (20VDC @ 3A MAX)

Note:  
 If DC\_BLOWER\_PWM = 0%, then VADJ = 0 VDC  
 If DC\_BLOWER\_PWM = 70%, then VADJ = 14 VDC  
 If DC\_BLOWER\_PWM = 100%, then VADJ = 20 VDC

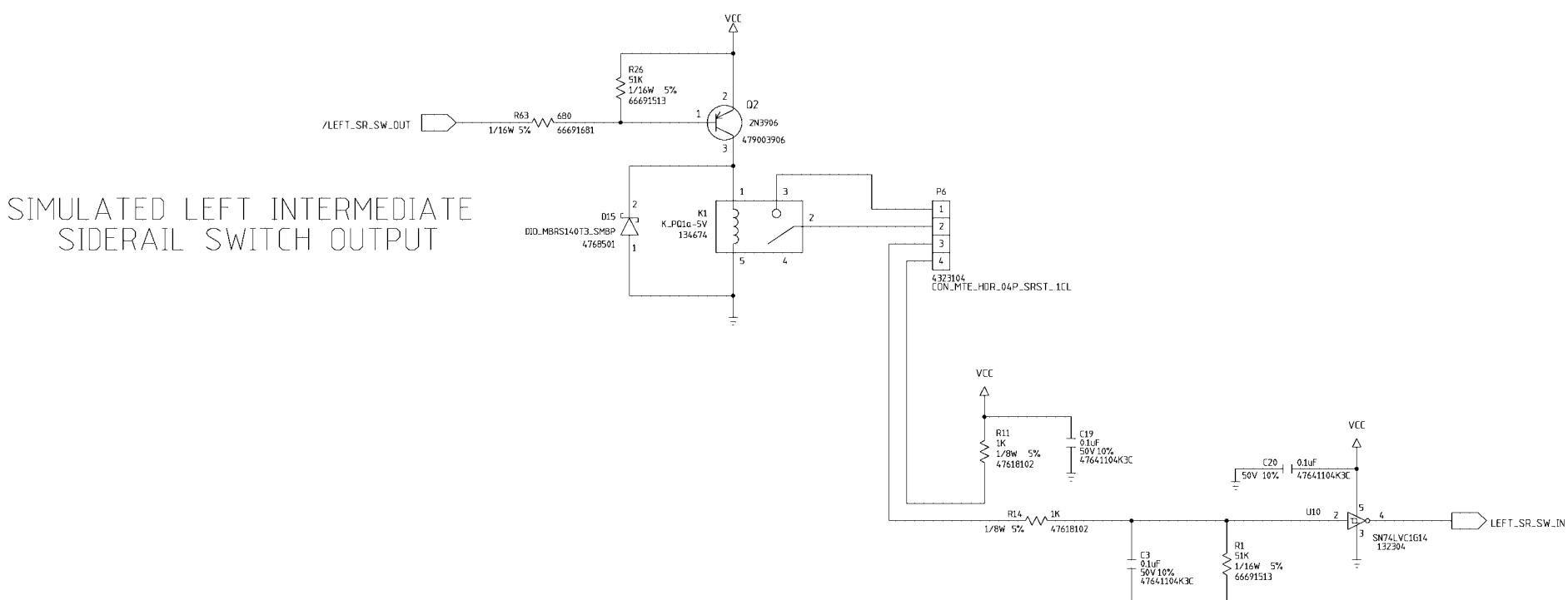
# Interface Board Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 1 of 2) (138405)



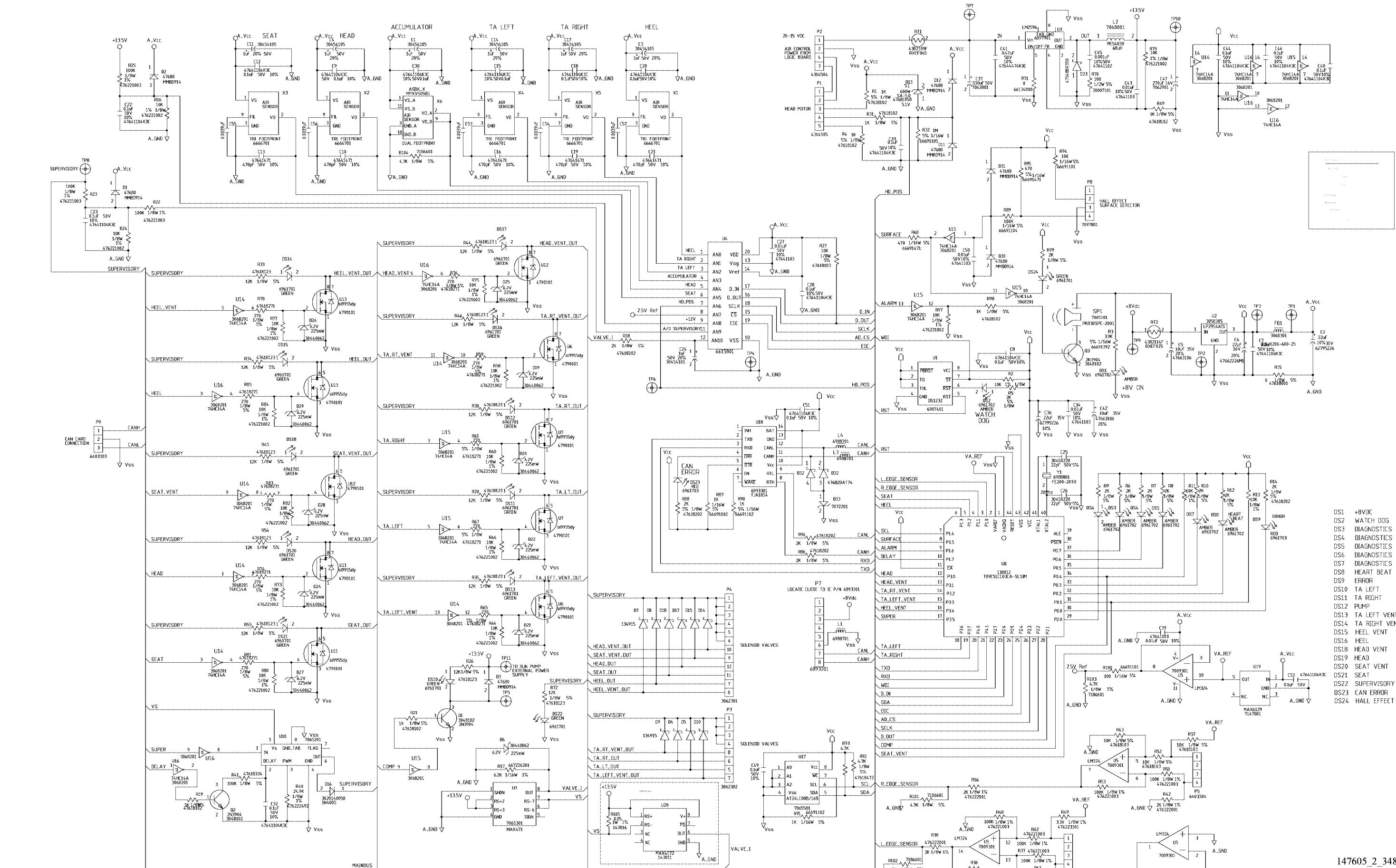
# Interface Board Wiring Diagram—TotalCare® Bed System (N model beds) (Sheet 2 of 2) (138405)



## TURN ASSIST VALVE SOLENOID CONTROL



Air Surface Wiring Diagram—TotalCare® Bed System (N model beds) (141364)



DS1	+8VDC
DS2	WATCH DOG
DS3	DIAGNOSTICS
DS4	DIAGNOSTICS
DS5	DIAGNOSTICS
DS6	DIAGNOSTICS
DS7	DIAGNOSTICS
DS8	HEART BEAT
DS9	ERROR
DS10	TA LEFT
DS11	TA RIGHT
DS12	PUMP
DS13	TA LEFT VENT
DS14	TA RIGHT VENT
DS15	HEEL VENT
DS16	HEEL
DS18	HEAD VENT
DS19	HEAD
DS20	SEAT VENT
DS21	SEAT
DS22	SUPERVISORY
DS23	CAN ERROR
DS24	HALL EFFECT



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