SERVICE MANUAL

Resident™ LTC Bed

From Hill-Rom®

Product No. P870

For Parts Or Technical Assistance **man136rc**
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Resident™ LTC Bed Service Manual

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The only product warranty intended by Hill-Rom is the express, written warranty accompanying the bill of sale to the original purchaser. Hill-Rom makes no other warranty, express or implied, and in particular, makes no warranty of merchantability or fitness for a particular purpose.

Additional copies of this manual can be obtained from Hill-Rom.

Table of Contents

Chapter 2: Troubleshooting Procedures

Chapter 3: Theory of Operation

NOTES:

1

Chapter 1 Introduction

Chapter Contents

Purpose of this Manual

This manual provides information needed to operate and maintain the Hill-Rom® Resident™ LTC (long term care) bed. Both the manual and electric drive versions of the bed are covered. Additionally, a complete parts list for ordering replacement components is included in chapter 5.

Who Should Use This Manual

This manual is intended to be used by facility authorized maintenance personnel only. Failure to observe this restriction can result in serious damage to material and/or severe injury to people.

Organization of Manual

This service manual contains seven chapters.

Chapter 1: Introduction

You are currently reading chapter 1. This chapter defines the manual's purpose and who should use the information in the manual. It also describes the manual's organization and explains the various typographical conventions used throughout the manual. Also included is an introduction to the manual and electric drive versions of the product, specifications, model identification, safety tips, and Resident™ LTC bed warning and caution labels.

Chapter 2: Troubleshooting Procedures

Chapter 2 contains the proper Resident™ LTC bed troubleshooting procedures. In this chapter, the manual and electric versions of the bed are addressed in separate sections. Each section includes a troubleshooting introduction, initial actions, function checks, final actions, and repair analysis procedures.

Chapter 3: Theory of Operation

Chapter 3 contains the theory of operation for the electric drive version of the Resident™ LTC bed. Included are overall wiring and block diagrams, cable wiring diagrams, connector pinouts, component schematics, and subsystem theories.

Chapter 4: Removal, Replacement, and Adjustment Procedures

Chapter 4 includes removal, replacement, and adjustment procedures for the Resident™ LTC bed components. Once again, the manual and electric drive versions of the bed are addressed separately.

Chapter 5: Parts List

Chapter 5 contains Hill-Rom®'s warranty, replacement part ordering procedure, exchange policy, recommended spare parts lists, and illustrated parts lists.

Chapter 6: General Procedures

Chapter 6 contains cleaning and care, lubrication requirements, preventive maintenance, and Resident™ LTC bed tool and supply requirements.

Chapter 7: Accessories

Chapter 7 includes available Resident™ LTC bed accessories, illustrations, and mounting instructions.

Typographical Conventions Used in this Manual

This manual contains different typographical conventions designed to enhance readability and understanding of its content. Note the following examples:

- Standard text—used for standard text throughout the manual.
- **Boldface**—emphasizes a word or phrase.
- **NOTE:—** sets apart special information or important instruction clarification.
- The symbol below highlights a WARNING or CAUTION:

Figure 1-1. Warning and Caution Symbol

  - A WARNING identifies situations or actions that may affect patient or user safety. Disregarding a warning could result in patient or user injury.
  - A CAUTION points out special procedures or precautions that personnel must follow to avoid equipment damage.
- The symbol below highlights an electrical shock hazard WARNING:

Figure 1-2. Electrical Shock Hazard Warning

Introduction to the Resident™ LTC Manual Drive Bed

Operating Precautions

Before operating the bed, ensure that you read and fully understand the contents of this manual. It is important that you strictly adhere to the safety information contained within.

Bed Positions

The Resident™ LTC manual drive bed has three adjustable sections: head, knee, and hilow. The bed positions are shown in figures 1-3 through 1-7.

Figure 1-3. Hilow Limits of the Manual Drive Bed (High Position)

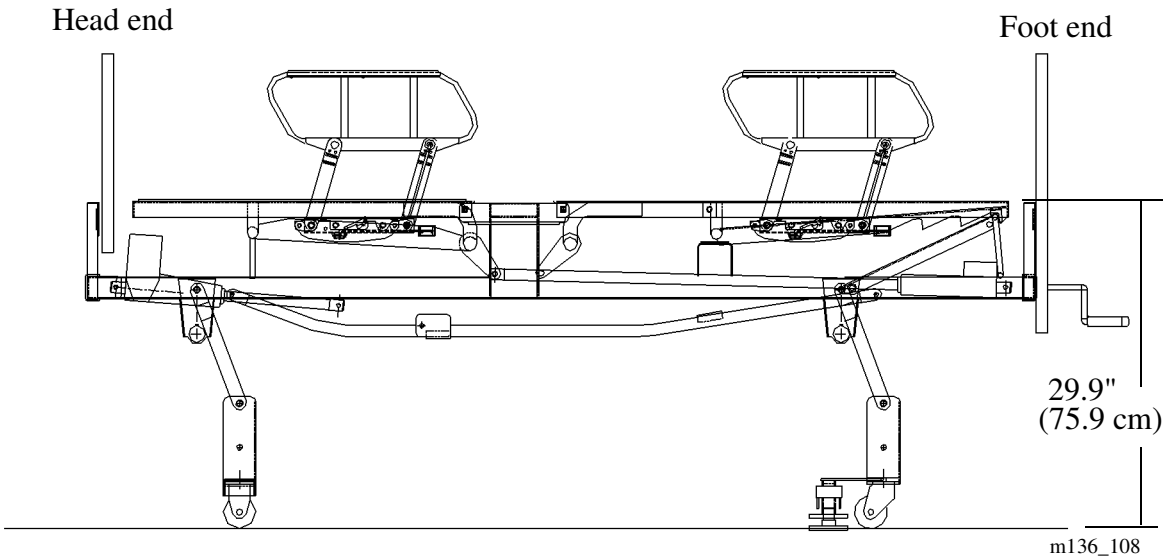


Figure 1-4. Hilow Limits of the Manual Drive Bed (Low Position)

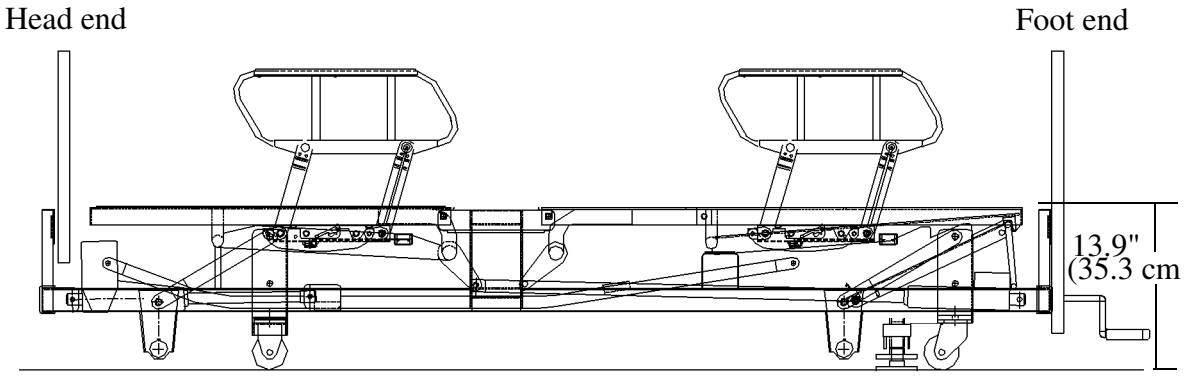


Figure 1-5. Head Section Position of the Manual Drive Bed

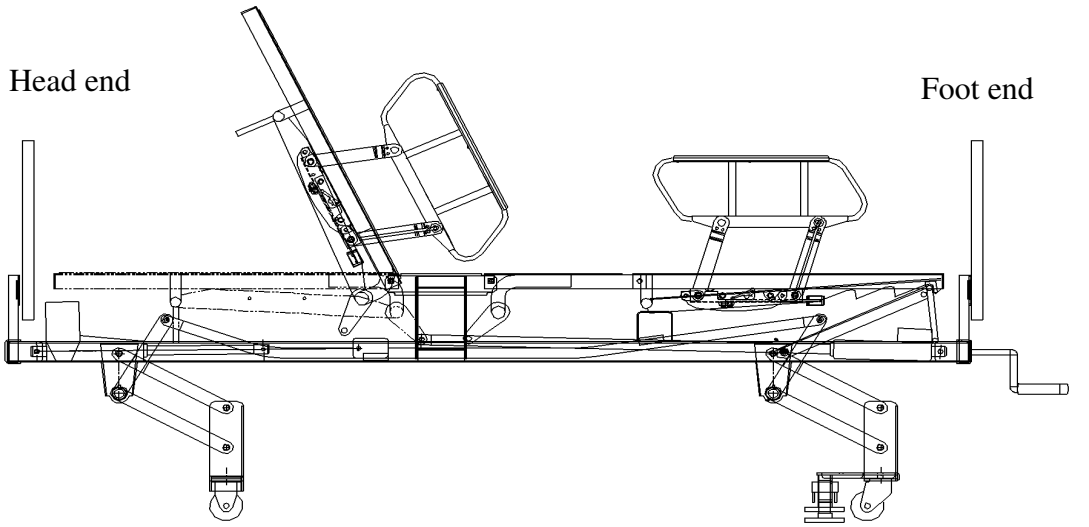


Figure 1-6. Knee Section Position of the Manual Drive Bed

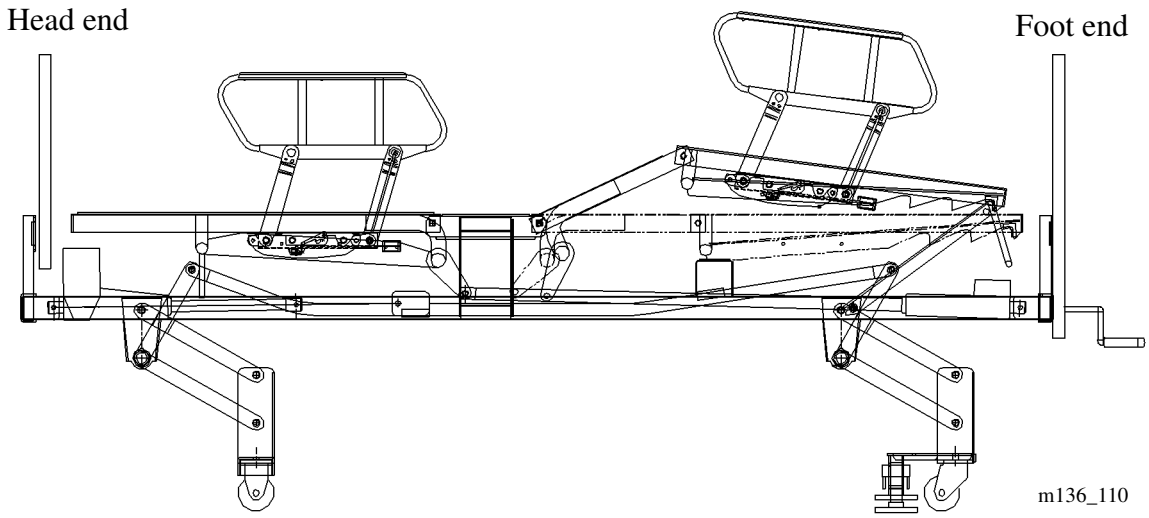
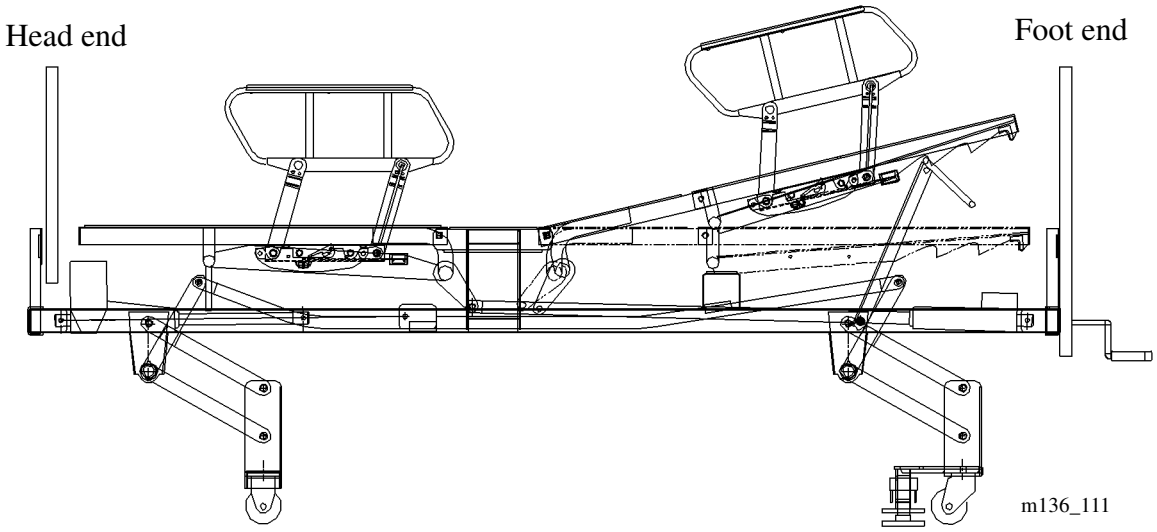


Figure 1-7. Knee Gatch (Foot Section) Position of the Manual Drive Bed



Resident™ LTC Manual Drive Bed Specifications

Physical Description

See table 1-1 on page 1-10 for Resident™ LTC manual drive bed specifications.

Table 1-1. Resident™ LTC Manual drive Bed Specifications

Feature	Dimension
Overall length in high position	95 1/4" (241.9 cm)
Overall length in low position	91 1/2" (232.4 cm)
Overall width (siderails up)	42" (106.7 cm)
Overall width (siderails stored)	36" (91.4 cm)
Sleep surface frame height (low position)	13.9" (35.3 cm)
Sleep surface frame height (high position)	29.9" (75.9 cm)
Minimum under bed clearance	5" (12.7 cm)
Maximum head incline elevation	60°
Maximum knee incline elevation	45°
Siderail height above sleep surface frame	12 1/2" (31.8 cm)
Bed mass (weight)	275 lb (124.7 kg)
Maximum safe working load—One 400 lb (181.4 kg) resident plus accessories	480 lb (217.7 kg)

NOTE:
The head section, knee section, and hilow functions of the Resident™ LTC manual drive bed are adjusted by manipulating the hand cranks located at the foot end of the bed.

WARNING:
Electric or manual drive bed mechanisms can cause serious injury if operated improperly. Operate the bed only when persons are clear of the mechanisms.

Head Section Inclination

The head section of the bed may be separately adjusted to obtain the desired degree of incline up to its limit of approximately 60° (± 2°). The head section control is a hand crank located at the foot end of the bed.

Head Angle Indicators

The head angle indicator decals are located at both sides of the bed on the sleep surface. These indicators provide a reference for approximately each 15° of head section incline up to 60°.

Knee Section Inclination

The knee section of the bed may be separately adjusted to obtain the desired degree of incline up to its limit of approximately 45° (± 2°). The knee section control is a hand crank located at the foot end of the bed.

Hilow

The bed may be adjusted to raise or lower the sleep surface to assist in positioning the resident, or for ease of bed entry/exit. Hilow is adjusted by means of a hand crank located at the foot end of the bed.

Steering

Swivel casters are located on the caster frame beneath the foot section of the bed. Fixed casters are located on the caster frame beneath the head section of the bed.

Brakes

The brakes are located on both sides of the swivel caster frame assembly at the foot end of the bed. Some models have individually operated brakes and require that both pedals be pressed and released separately.

Siderails

Siderails are located on both sides of the Resident™ LTC manual drive bed at the head and foot sections. The siderails are raised and lowered independently of each other. When not in use, safely store each siderail beneath the bed's sleep surface frame.

Siderails are visual reminders for residents that identify the location of the edge of the bed. They are not intended for use as a restraint device. Appropriate medical personnel must determine the level of restraint necessary to ensure a resident will remain safely in bed. Failure to do so could result in personal injury.

Bumper

A bumper assembly is secured to the fixed caster frame at the head end of the bed.

CAUTION:
Removing the bumper assembly could cause damage to the bed or facility.

IV Rod Sockets

Four IV rod sockets are provided. One is located at each outside corner of the bed. Each socket allows installation of an IV rod (accessory).

Sleep Surface Support Frame

There are two sleep surface support frames available for use with the Resident™ LTC manual drive bed. The mattress supporting spring fabric frame is 36" x 80" (91.4 cm x 203.2 cm) and has 90 supporting helical springs for the fabric assembly. The mattress supporting optional hard pan sleep surface frame is 36" x 80" (91.4 cm x 203.2 cm). The outer surfaces of the panels are formed down to prevent sharp edges.

Mattress Stop

A separate mattress stop is not available on the manual drive version of the Resident™ LTC manual drive bed. The foot panel acts as a mattress stop on this version preventing the mattress from sliding towards the foot end of the bed.

Mattress Configurations

There are several mattress configurations available for the Resident™ LTC manual drive bed. These configurations are indicated in table 1-2 on page 1-13.

Table 1-2. Mattress Options

Product Number	Description
P778	LTC mattress
P944	Comfortline® mattress
P783	Extended care mattress
P462 (P1416)	Unbundled ZoneAire® (mattress)

Head and Foot Panels

The head and foot panels fit over two vertical post type mountings located at each end of the bed and are removable by lifting vertically. The hand cranks must be detached from the manual head, knee, and hilow drive assemblies before the foot panel can be removed. These panels provide ease of bed mobility and steering control.

Drainage Bag Hooks

Drainage bag hooks are located on both sides of the bed beneath the sleep surface frame near the seat section.

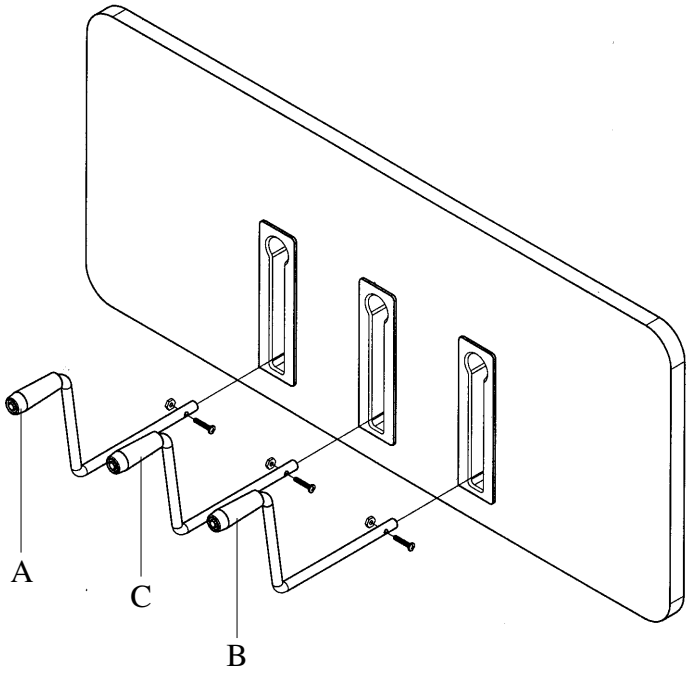
Mechanical Description

The Resident™ LTC manual drive bed is manually adjusted by manipulating the head, knee, and hilow drive assemblies.

Caregiver manual crank controls are located at the foot end of the bed (see figure 1-8 on page 1-14). These crank handles allow the caregiver to manually operate the head section, knee section, and hilow (bed height) to obtain the desired elevation within their respective travel limits. They can be tucked away in recesses in the footboard when not in use.

The head section can be adjusted by turning the right crank handle (A), the knee section can be adjusted by turning the left crank handle (B), and the hilow function is adjusted by turning the middle crank handle (C) (see figure 1-8 on page 1-14).

Figure 1-8. Crank Handle Configuration for the Manual Drive Bed



General Operation of the Resident™ LTC Manual Drive Bed

Siderail Operation

WARNING:
Siderails are visual reminders for residents that identify the location of the edge of the bed. They are not intended for use as a restraint device. Appropriate medical personnel must determine the level of restraint necessary to ensure a resident will remain safely in bed. Failure to do so could result in personal injury.

Raise the Siderail

- Grasp the siderail, and pull it outward from its stored position beneath the sleep surface frame.
- If the siderail is at the head end, rotate the siderail toward the head end of the bed to its fully raised position.
- If the siderail is at the foot end, rotate the siderail toward the foot end of the bed to its fully raised position.
- An audible click indicates that the siderail is completely raised and locked in place. To ensure the siderail is latched, give it a tug in the downward direction.

Lower the Siderail

- Grasp the siderail with one hand, and push inward on the release latch with the other.
- Rotate the siderail to its lowered position (rotate toward the head if at head end, and toward the foot if at the foot end of the bed).
- Push the siderail into its stored position beneath the sleep surface frame.

Bed Positions

WARNING:
Manual drive bed mechanisms can cause serious injury. Operate the bed only when persons are clear of the mechanisms.

Hilow

To raise the bed, locate the middle hand crank at the foot end of the bed. Turn the handle clockwise until the desired height is achieved.

To lower the bed, turn the middle hand crank at the foot end of the bed counterclockwise until the desired height is achieved.

Head Section

To raise the head section, locate the right hand crank at the foot end of the bed. Turn the handle clockwise until the desired incline is achieved.

To lower the head section, turn the right hand crank at the foot end of the bed counterclockwise until the desired incline is achieved.

Knee Section

To elevate the knee section, turn the left hand crank at the foot end of the bed clockwise until the desired incline is achieved.

To lower the knee section, turn the left hand crank at the foot end of the bed counterclockwise until the desired incline is achieved.

Steering

WARNING:
When moving the bed, guide it from the corners near the foot end of the bed! This will help keep legs clear of the frame and feet clear of the caster base. The Resident™ LTC bed is not intended to be used as a resident transport device.

Brakes

WARNING:
Set the brakes, and leave the bed in the low position when the resident is unattended. A resident might use the bed for support when getting on or off of the sleep surface. Give the bed a solid tug to ensure the brakes are set. Injury to the resident may occur if the brakes are not set.

Apply the brakes by depressing the brake pedal(s) with your foot.

Release the brakes by depressing the release arm next to the brake pedal.

Head and Foot Panels

To remove the head or foot panel, lift it straight up until the mounting plates on the panel disengage the plates welded to the IV rod sockets. Before removing the foot panel, the hand cranks must be removed. Remove the crank handle assemblies for the head, knee, and hilow drives by removing the nut and bolt located at the base of each crank handle. Set panels aside in an area where they will not be damaged.

To install either panel, align the mounting plates on the panel with the metal plates on the IV rod sockets. Lower the panel downward to engage. Once the foot panel is in place, attach the crank handle assemblies to the head, knee, and hilow drives through the slots in the mounted foot panel. Insert the screw and nut at the base of each crank handle and tighten with a wrench.

Introduction to the Resident™ LTC Electric Drive Bed

Operating Precautions

Before operating the bed, ensure that you read and fully understand the contents of this manual. It is important that you strictly adhere to the safety information contained within.

Bed Positions

The Resident™ LTC electric drive bed has three adjustable sections: head, knee, and foot. The bed positions are shown in figures 1-9 through 1-14.

Figure 1-9. Hilow Position of the Electric Drive Bed

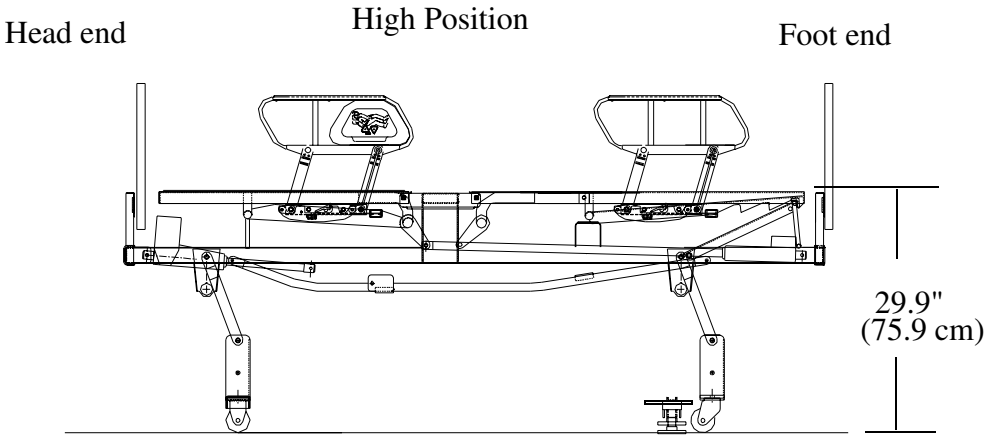


Figure 1-10. Automatic Contour Position of the Electric Drive Bed

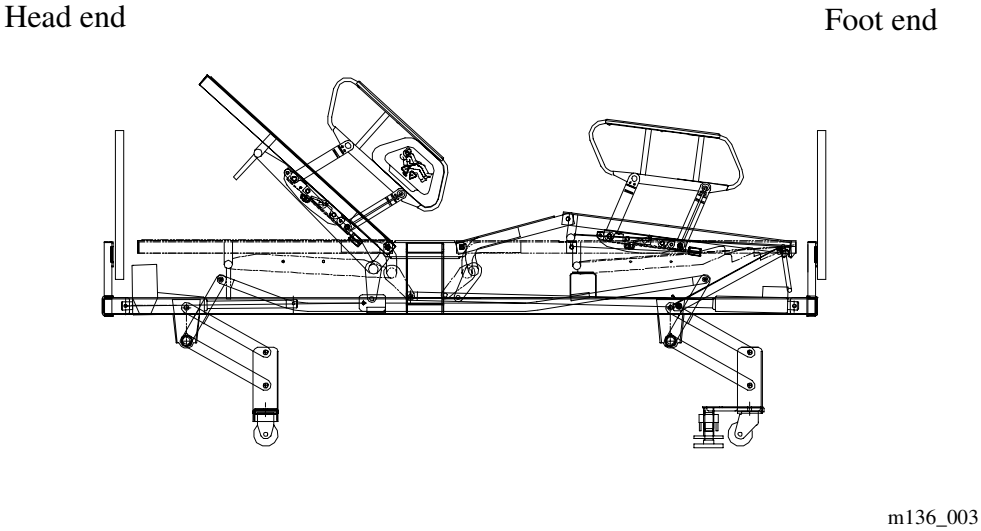


Figure 1-11. Head Section Position of the Electric Drive Bed

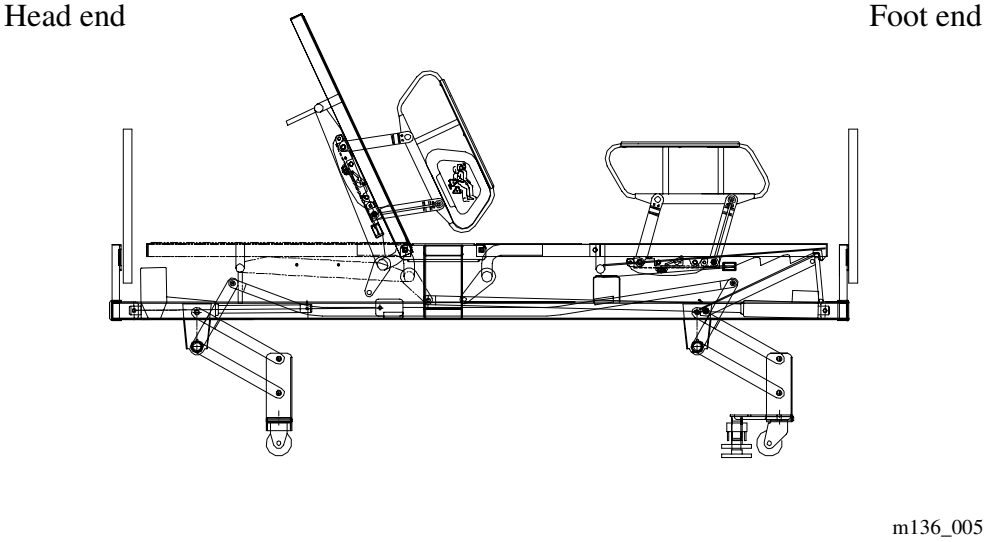


Figure 1-12. Knee Section Position of the Electric Drive Bed

Head end Foot end

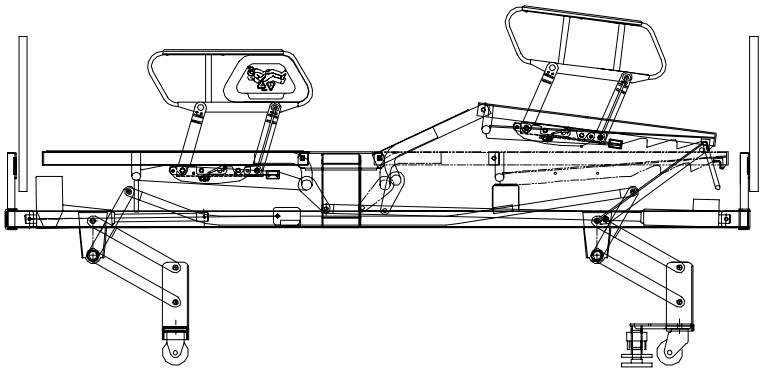


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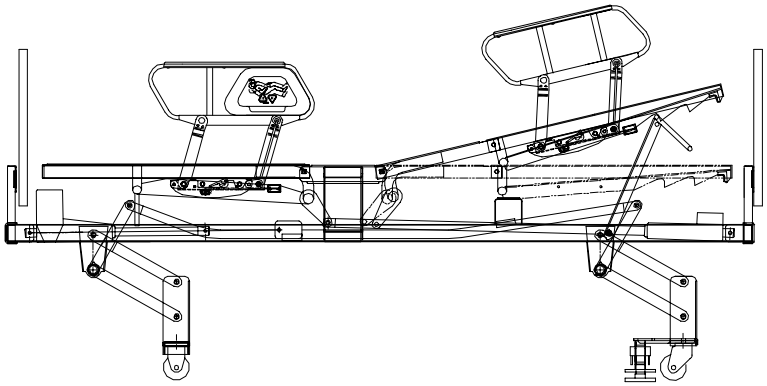
Figure 1-13. Knee Gatch (Foot Section) Position of the Electric Drive Bed

Head end Foot end



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Resident™ LTC Electric Drive Bed Specifications

Physical Description

See table 1-3 on page 1-21 for Resident™ LTC electric drive bed specifications.

Table 1-3. Resident™ LTC Electric Drive Bed Specifications

Feature	Dimension
Overall length in high position	95 1/4" (241.9 cm)
Overall length in low position	91 1/2" (232.4 cm)
Overall width (siderails up)	42" (106.7 cm)
Overall width (siderails stored)	36" (91.4 cm)
Sleep surface frame height (low position)	13.9" (35.3 cm)
Sleep surface frame height (high position)	29.9" (75.9 cm)
Minimum under bed clearance	5" (12.7 cm)
Maximum head incline elevation	60°
Maximum knee incline elevation	45°
Siderail height above sleep surface frame	12 1/2" (31.8 cm)
Bed mass (weight)	275 lb (124.7 kg)
Maximum safe working load— One 400 lb (181.4 kg) resident plus accessories	480 lb (217.7 kg)

NOTE:
The head section, knee section, hilow, and automatic contour functions may be electrically operated to achieve the desired bed position.

WARNING:
Electric or manual drive bed mechanisms can cause serious injury if operated improperly. Operate the bed only when persons are clear of the mechanisms.

Head Section Inclination

The head section of the bed may be separately adjusted to obtain the desired degree of incline up to its limit of approximately 65° (± 2°). Control of this function is via the handset control (see “Handset Control” on page 1-25). The

optional resident control panel on the inside of both head end siderails can also be used in the electric drive version to adjust the head section.

Head Angle Indicators

The head angle indicator decals are located at both sides of the bed on the sleep surface. These indicators provide a reference for approximately each 15° of head section incline up to 60°.

Knee Section Inclination

The knee section of the bed may be separately adjusted to obtain the desired degree of incline up to its limit of approximately 25° (± 2°). Control of the knee section is via a handset control (see "Handset Control" on page 1-25). The optional resident control panel on the inside of both head end siderails can also be used in the electric drive version to adjust the knee section.

Hilow

The bed may be adjusted to raise or lower the sleep surface to assist in positioning the resident, or for ease of bed entry/exit. Hilow is adjusted using the handset control (see "Handset Control" on page 1-25). The optional caregiver control panel located on the outside of both head end siderails can also be used in the electric drive version to raise and lower the sleep surface. This feature permits caregivers to control the hilow function of the bed while minimizing accessibility to the resident.

Automatic Contour

The automatic contour automatically raises the knee section of the bed to approximately 15° as the head section is elevated from a flat position, provided that knee section operation is not locked out by the control box lockout. Automatic contour positioning can be temporarily disabled by pressing both the HEAD Up and KNEE Down buttons at the same time.

Steering

Swivel casters are located on the caster frame beneath the foot section of the bed. Fixed casters are located on the caster frame beneath the head section of the bed.

Brakes

The brakes are located on both sides of the swivel caster frame assembly at the foot end of the bed. Some models have individually operated brakes and require that both pedals be pressed and released separately.

Siderails

Siderails are located on both sides of the Resident™ LTC electric drive bed at the head and foot sections. The siderails are raised and lowered independently of each other. The head end siderails can contain optional caregiver and resident controls which permit electrical adjustment of the head, knee, and hilow elevation.When not in use, safely store each siderail beneath the bed's sleep surface frame.

WARNING:
Siderails are visual reminders for residents that identify the location of the edge of the bed. They are not intended for use as a restraint device. Appropriate medical personnel must determine the level of restraint necessary to ensure a resident will remain safely in bed. Failure to do so could result in personal injury.

Bumper

A bumper assembly is secured to the fixed caster frame at the head end of the bed.

CAUTION:
Removing the bumper assembly could cause damage to the bed or facility.

IV Rod Sockets

Four IV rod sockets are provided. One is located at each outside corner of the bed. Each socket allows installation of an IV rod (accessory).

Sleep Surface Support Frame

There are two sleep surface support frames available for use with the Resident™ LTC electric drive bed. The mattress supporting spring fabric frame is 36" x 80" (91.4 cm x 203.2 cm) and has 90 supporting helical springs for the fabric assembly. The mattress supporting optional hard pan sleep surface frame

is 36" x 80" (91.4 cm x 203.2 cm). The outer surfaces of the panels are formed down to prevent sharp edges.

Mattress Stop

A mattress stop is located at the foot end of the spring frame. In its raised position, the mattress stop prevents the mattress from sliding towards the foot end of the bed.

Mattress Configurations

There are several mattress configurations available for the Resident™ LTC electric drive bed. These configurations are indicated in table 1-4 on page 1-24.

Table 1-4. Mattress Options

Product Number	Description
P778	LTC mattress
P944	Comfortline® mattress
P783	Extended care mattress
P462 (P1416)	Unbundled ZoneAire® (mattress)

Head and Foot Panels

The head and foot panels fit over two vertical post type mountings located at each end of the bed and are removable by lifting vertically. These panels provide ease of bed mobility and steering control.

Drainage Bag Hooks

Drainage bag hooks are located on both sides of the bed beneath the sleep surface frame near the seat section.

Electrical Description

SHOCK HAZARD:
One of the risks associated with the use of electrical equipment includes the potential for electrical shock. Train and educate personnel on the risks associated with electrical equipment.

The Resident™ LTC electric drive bed operates on 120V AC, 60 Hz, single phase power.

The electrical power system is mechanically insulated from the metal parts of the bed. No additional electrical components, such as isolation transformers, are required to make this bed meet applicable electrical codes.

Each bed is factory tested for complete operation with and without load. Each bed is tested for insulation integrity and micro leakage currents. Before shipment, each bed must indicate less than 100 micro amperage leakage current ungrounded.

The electrical supply cord (to the wall outlet) is #18 AWG low leakage, UL approved, two conductor with ground, type SJT. It extends approximately 116" (294.6 cm) from the head end of the bed.

Handset Control

The handset control provides electrical control of the head, knee, and hilow elevation. The buttons on the handset are pictorially labeled to indicate their function.

Siderail Resident Control Panel

An optional resident siderail control panel can be installed on the inside of both head end siderails for convenience. The resident can control the head and knee functions with the pictorially labeled activator buttons on both panels.

Siderail Caregiver Control Panel

An optional caregiver siderail control panel can be installed on the outside of both head end siderails. The control activators face the caregiver, minimizing accessibility to the resident. The bed's hilow function can be controlled through the manipulation of pictorially labeled activator buttons on either panel.

Control Box Lockout

WARNING:
Whenever a resident should be restricted from operating the resident or handset controls, activate the appropriate control lockout knob to prevent operation of the function. Otherwise, personal injury may occur.

The control box lockout is located at the foot end of the bed. The position of each control knob on the control lockout is pictorially labeled to indicate each governing function and the locked/unlocked position. See “Automatic Contour” on page 1-22.

Motor Actuators

There are three separate motor actuators which provide hilow, head, and knee operation. Each is built to withstand the common hazards of spills and cleaning liquids under normal conditions. These motor actuators are a plug-in design for easy removal in the event of problems. Each is specially designed for its individual function and has the following characteristics:

- 24 volt, DC motor
- Electronic overload protection, microswitch motor cutoff
- Totally enclosed, impact resistant motor housing
- Permanently lubricated
- Precision-rolled acme spindle for linear actuation of stainless steel piston
- Heavy-duty ball bearing spindle mount
- Flexible clutch drive to reduce vibration and noise

NOTE:
The battery pack accessory can provide emergency operation of the actuators to position the bed in event of a power failure.

Specifications for these motor actuators are as follows:

Hilow

- 12.60" (32.0 cm) actuator stroke
- 20 1/4" (51.4 cm) retracted length

Head

- 7 1/4" (18.4 cm) actuator stroke
- 46.38" (117.8 cm) retracted length

Knee

- 2.88" (7.3 cm) actuator stroke
- 39 1/4" (99.7 cm) retracted length

CAUTION:
The duty cycle (continuous operation) of any actuator should not be more than 10%. Otherwise, damage to the equipment can occur.

UL Classification

The Resident™ LTC electric drive bed is approved to UL 2601-1 standards and is classified as Class II double insulated electrical equipment.

The ground wire on the three prong plug is connected to a functional earth ground which protects the product against electrostatic discharge.

General Operation of the Resident™ LTC Electric Drive Bed

Siderail Operation

WARNING:
Siderails are visual reminders for residents that identify the location of the edge of the bed. They are not intended for use as a restraint device. Appropriate medical personnel must determine the level of restraint necessary to ensure a resident will remain safely in bed. Failure to do so could result in personal injury.

Raise the Siderail

- Grasp the siderail, and pull it outward from its stored position beneath the sleep surface frame.
- If the siderail is at the head end, rotate the siderail toward the head end of the bed to its fully raised position.
- If the siderail is at the foot end, rotate the siderail toward the foot end of the bed to its fully raised position.
- An audible click indicates that the siderail is completely raised and locked in place. To ensure the siderail is latched, give it a tug in the downward direction.

Lower the Siderail

- Grasp the siderail with one hand, and push inward on the release latch with the other.
- Rotate the siderail to its lowered position (rotate toward the head if at head end, and toward the foot if at the foot end of the bed).
- Push the siderail into its stored position beneath the sleep surface frame.

Bed Positions

SHOCK HAZARD:
One of the risks associated with the use of electrical equipment includes the potential for electrical shock. Train and educate personnel on the risks associated with electrical equipment.

WARNING:
Electric or manual drive bed mechanisms can cause serious injury if operated improperly. Operate the bed only when persons are clear of the mechanisms.

Hilow

To raise the bed, press and hold the HI/LO Up button on the handset control or the HI/LO button on the optional caregiver siderail control panel until the desired height is reached. Release the button.

To lower the bed, press and hold the HI/LO Down button on the handset control or the HI/LO Up button on the optional caregiver siderail control panel until the desired position is obtained. Release the button.

Head Section

To raise the head section, press and hold the HEAD Up button on the handset control or the HEAD Up button on the optional resident siderail control panel until the desired degree of incline is reached. Release the button.

To lower the head section, press and hold the HEAD Down button on the handset control or the HEAD Down button on the optional resident siderail control panel until the desired position is obtained. Release the button.

Knee Section

To elevate the knee section, press and hold the KNEE Up button on the handset control or the KNEE Up button on the optional resident siderail control panel until the desired degree of incline is reached. Release the button.

To lower the knee section, press and hold the KNEE Down button on the handset control or the KNEE Down button on the optional resident siderail control panel until the desired position is obtained. Release the button.

Automatic Contour

Lock out the automatic contour feature on the electric drive version as follows:

- Turn the knee section control lockout to the locked position.
- Turn the automatic contour control lockout to the locked position.
- Temporarily disable the automatic contour by pressing both the HEAD Up and KNEE Down buttons at the same time; however, releasing the KNEE Down button before the HEAD Up button is released will allow the automatic contour to activate, and the knee section will raise (until either the HEAD Up button is released or automatic contour is achieved). The automatic contour functions as follows:
- With the bed in its flat position, press and hold the HEAD Up button. Both the head and knee sections will elevate at the same time until the knee section reaches approximately 15°.
- Depressing the HEAD Up button will cause the head section to elevate until it reaches maximum inclination, but the knee section will stop at approximately 15°.
- Pressing the HEAD Down button with the head elevated above 15° causes only the head section to lower. Continuing to press the HEAD Down button will cause the knee section to begin lowering. Lowering of both sections will continue with the HEAD Down pressed until the flat position is reached. Releasing the HEAD Down button before the flat position is reached will cause the movement of both sections to stop.

Steering

WARNING:
When moving the bed, guide it from the corners near the foot end of the bed. This will help keep legs clear of the frame and feet clear of the caster base. The Resident™ LTC bed is not intended to be used as a resident transport device.

Brakes

WARNING:
Set the brakes, and leave the bed in the low position when the resident is unattended. A resident might use the bed for support when getting on or off of the sleep surface. Give the bed a solid tug to ensure the brakes are set. Injury to the resident may occur if the brakes are not set.

Apply the brakes by depressing the brake pedal(s) with your foot.

Release the brakes by depressing the release arm next to the brake pedal.

Mattress Stop

To raise the mattress stop, lift upward until the notches in the bent legs of the stop engage the slots in the spring frame. Rotate the stop toward the foot panel of the bed to lock it in the raised position.

To lower the mattress stop, rotate the stop toward the head end to disengage it from the slots in the spring frame, and lower the stop downward.

Head and Foot Panels

To remove the head or foot panel, lift it straight up until the mounting plates on the panel disengage the plates welded to the IV rod sockets. Set panels aside in an area where they will not be damaged.

To install either panel, align the mounting plates on the panel with the metal plates on the IV rod sockets. Lower the panel downward to engage.

Model Identification

Table 1-5. Model Identification

Model Number	Description
P870	Resident™ LTC bed

Safety Tips

SHOCK HAZARD:
One of the risks associated with the use of electrical equipment includes the potential for electrical shock. Train and educate personnel on the risks associated with electrical equipment.

SHOCK HAZARD:
Unplug the bed from its power source before servicing or cleaning the bed. Otherwise, a shock hazard exists. Refer to the *"Resident™ LTC Bed In-Service Manual"* and to specific sections in this manual for additional precautions.

SHOCK HAZARD:
Unplug the bed from its power source before unplugging any cables from the control lockout, or from the control box. An electrical shock hazard exists.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

WARNING:
Set the brakes and leave the bed in the low position when the resident is unattended. A resident might use the bed for support when getting on or off of the sleep surface. Give the bed a solid tug to ensure the brakes are set. Injury to the resident may occur if the brakes are not set.

WARNING:
Siderails are visual reminders for residents that identify the location of the edge of the bed. They are not intended for use as a restraint device. Appropriate medical personnel must determine the level of restraint necessary to ensure a resident will remain safely in bed. Failure to do so could result in personal injury.

WARNING:
Electric or manual drive bed mechanisms can cause serious injury if operated improperly. Operate the bed only when persons are clear of the mechanisms.

WARNING:
Only facility-authorized maintenance personnel should perform maintenance procedures on the Resident™ LTC bed. Otherwise, personal injury can occur.

WARNING:
When moving the bed, guide it from the corners, near the foot end of the bed. This will help keep legs clear of the frame and feet clear of the caster base. The Resident™ LTC bed is not intended to be used as a resident transport device.

WARNING:
Whenever a resident should be restricted from operating the resident or handset controls, activate the appropriate control lockout knob to prevent operation of that function. Otherwise, personal injury may occur.

WARNING:
Only facility-authorized maintenance personnel should troubleshoot the Resident™ LTC bed. Otherwise, personal injury can occur.

WARNING:
Use only accessories specifically identified for use with the Resident™ LTC bed. The use of accessories **not** identified for this bed could compromise the safety of the bed.

CAUTION:
Removing the bumper assembly could cause damage to the bed or facility.

CAUTION:
Overtightening the mounting screws can crack the P.C. boards.

CAUTION:
The hilow motor actuator connecting pin must align with its receptacle in the control box. Equipment damage may occur.

CAUTION:
Do not lower the bed frame while the oxygen tank holder is attached to the bed. Use the control box lockout to deactivate the hilow function. Damage to the equipment may occur.

CAUTION:
The duty cycle (continuous operation) of any actuator should not be more than 10%. Otherwise, damage to the equipment can occur.

CAUTION:
Do not use harsh cleaners, solvents, or detergents. Damage to the equipment can occur.

CAUTION:
Repeated soaking of the mattress materials will accelerate wear. Improper cleaning procedures may void the warranty.

CAUTION:
Many disinfectant cleaners, if used in high concentrations, have a softening effect on any painted or finished surface.

CAUTION:
Do not use any lubricant containing silicone anywhere on the Resident™ LTC bed. The self-lubricating quality of the oilite bearings and bushings will be neutralized.

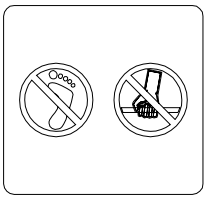
CAUTION:
Do not drop the printed circuit (P.C.) boards against the siderail or the sleep surface frame. Damage to the equipment may occur.

CAUTION:
Use care when removing the siderail labels to prevent damage. Replace damaged labels with new ones.

CAUTION:
Do not lower the bed frame while the trapeze support is attached to the bed. Use the control box lockout to deactivate the hilow function.

Warning and Caution Labels

Figure 1-14. Warning and Caution Labels at the Head End of the Resident™ LTC Manual/Electric Drive Bed



m136_007

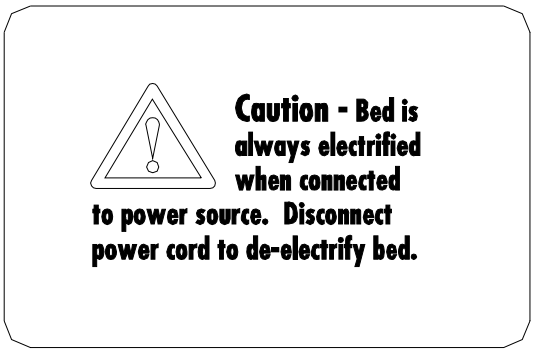


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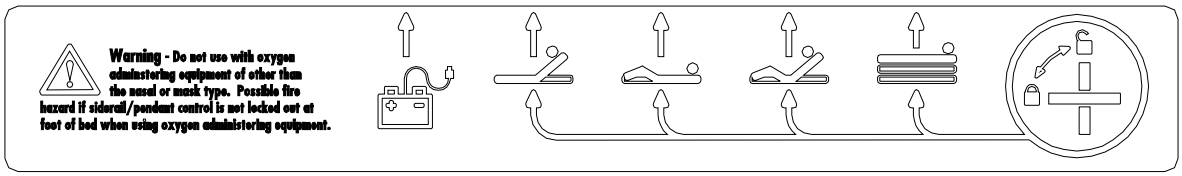
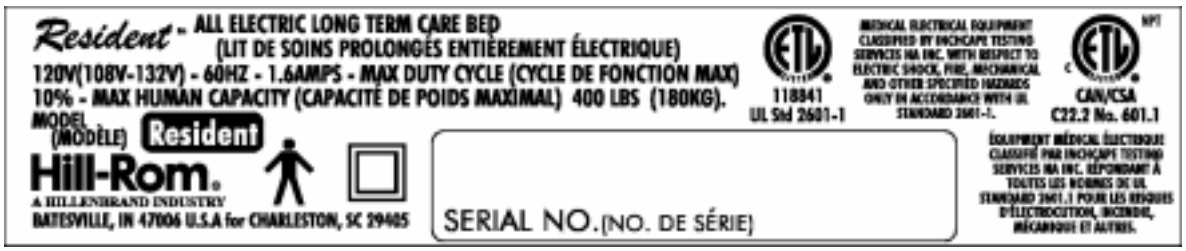
Figure 1-15. Warning and Caution Label at the Foot End of the Resident™ LTC Electric Drive Bed



m136_009

Figure 1-16. Serial Number Data Plate



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NOTES:

Chapter 2
Troubleshooting Procedures

2

Chapter Contents

NOTES:

Getting Started

This chapter is divided into three parts: troubleshooting procedures for the Resident™ LTC manual drive bed, troubleshooting procedures for the Resident™ LTC electric drive bed, and repair analysis procedures. Begin each procedure highlighted in this chapter with step 1. Follow the sequence outlined (each step assumes the previous steps are correct). Each step is the normal operational event of the product and can be confirmed by answering Y (yes) or N (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 order given.

Start with **Initial Actions** to begin gathering information about the problem.

Perform the **Function Checks** to isolate or identify a problem and to verify repair after completing each corrective action (replacing or adjusting a part, seating a connector, etc.).

Perform the **Final Actions** after the Function Checks to verify the repair.

If troubleshooting procedures do not isolate the problem, call Hill-Rom® Technical Support at (800) 445-3720 for assistance.

WARNING:
Only facility-authorized maintenance personnel should troubleshoot the Resident™ LTC bed. Otherwise, personal injury can occur.

Troubleshooting the Resident™ LTC Manual Drive Bed

2

Initial Actions—Manual Drive Model

Use Initial Actions to gather information from operators concerning problems with the Resident™ LTC bed. Note symptoms or other information concerning the problem that the operator identifies. This information helps identify the probable cause.

1. Someone who can explain the problem is available.

   Yes **No**
   ↓ → Go to "Function Checks—Manual Drive Model" on page 2-5.

2. Ask that person to demonstrate or explain the problem. The problem can be duplicated.

   Yes **No**
   ↓ → Go to "Function Checks—Manual Drive Model" on page 2-5.

3. The problem is a result of improper operator action.

   Yes **No**
   ↓ → Go to "Function Checks—Manual Drive Model" on page 2-5.

4. Instruct the operators to refer to the procedures in the *Resident™ LTC Bed In-Service Manual*. Perform the "Function Checks—Manual Drive Model" on page 2-5 to ensure proper operation of the Resident™ LTC manual drive bed.

Function Checks—Manual Drive Model

1. Initial Actions have been performed.

   Yes **No**
   ↓ → Go to "Initial Actions—Manual Drive Model" on page 2-4.

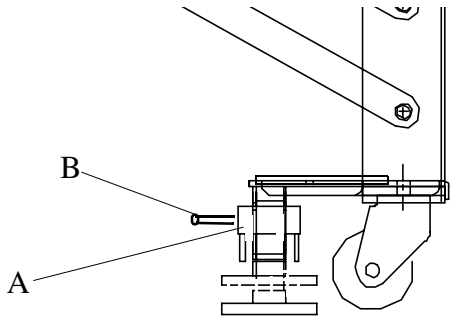
2. Inspect the brake pads for wear. Both brake pads are in good condition.

   Yes **No**
   ↓ → Go to RAP 2.1.

3. Apply the brakes by pressing the brake pedals (A) (see figure 2-1 on page 2-5). The brake is applied correctly, and the swivel casters do not roll. If the brake design has interconnecting linkage, **both** brakes are applied when either pedal is depressed.

   Yes **No**
   ↓ → Go to RAP 2.1.

Figure 2-1. Brake Pedal and Release Lever



m136_010

4. Press the brake release lever (B) to release the brake. The brake releases correctly, and the swivel casters roll freely. If the brake design has interconnecting linkage, pressing either of the brake release levers releases both brakes.

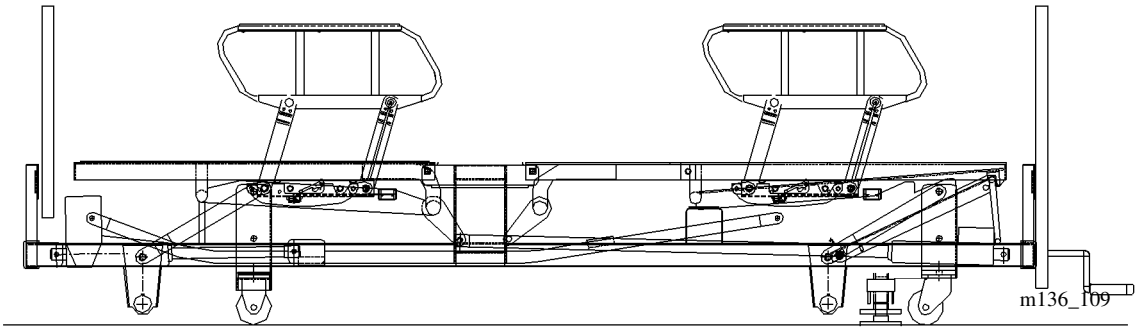
   Yes **No**
   ↓ → Go to RAP 2.1.

2

5. Raise, lower and store the siderails (see figure 2-2 on page 2-6). The siderails move without binding or requiring excessive force, and the latch locks the siderail into position.

   Yes **No**
   ↓ → Go to RAP 2.2.

Figure 2-2. Siderails In the Raised Position (Manual Model)



WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

6. Conduct a visual inspection of the lower frame assemblies, caster frame assemblies, the sleep surface frame assembly, and all connections and components of the manual hilow, knee, and head drive assemblies. All assemblies are in a good physical state of repair with no loose or missing screws, nuts, bolts, or washers.

   Yes **No**
   ↓ → Go to RAP 2.3.

7. Turning the hilow (middle) hand crank clockwise, raise the bed to its high position. The bed rises evenly to its high position.

   Yes **No**
   ↓ → Go to RAP 2.4.

8. Turning the hilow (middle) hand crank counterclockwise, lower the bed to its low position. The bed lowers evenly to its low position.

   Yes **No**
   ↓ → Go to RAP 2.4.

9. Turning the head (right) hand crank clockwise, raise the head section to its greatest inclined position. The head of the bed raises fully and evenly to approximately 60° as indicated by the head angle indicator decals located on both sides of the bed.

   Yes **No**
   ↓ → Go to RAP 2.5.

10. Turning the head (right) hand crank counterclockwise, lower the head section fully. The head section of the bed lowers fully and evenly to a flat position.

    Yes **No**
    ↓ → Go to RAP 2.5.

11. Turning the knee (left) hand crank clockwise, raise the knee section to its greatest inclined position. The knee section of the bed raises fully and evenly to approximately 45°.

    Yes **No**
    ↓ → Go to RAP 2.6.

12. Turning the knee (left) hand crank counterclockwise, lower the knee section fully. The knee section of the bed lowers fully and evenly to a flat position.

    Yes **No**
    ↓ → Go to RAP 2.6.

13. Go to “Final Actions—Manual Drive Model” on page 2-8.

Final Actions—Manual Drive Model

1. Complete the required preventive maintenance procedures. See “Preventive Maintenance Schedule—Manual Drive Model” on page 6-7.

2. Complete all required administrative tasks.

Troubleshooting the Resident™ LTC Electric Drive Bed

Initial Actions—Electric Drive Model

Use Initial Actions to gather information from operators concerning problems with the Resident™ LTC bed. Note symptoms or other information concerning the problem that the operator identifies. This information helps identify the probable cause.

1. Someone who can explain the problem is available.

   Yes **No**
   ↓ → Go to "Function Checks—Electric Drive Model" on page 2-10.

2. Ask that person to demonstrate or explain the problem. The problem can be duplicated.

   Yes **No**
   ↓ → Go to "Function Checks—Electric Drive Model" on page 2-10.

3. The problem is a result of improper operator action.

   Yes **No**
   ↓ → Go to "Function Checks—Electric Drive Model" on page 2-10.

4. Instruct the operators to refer to the procedures in the *Resident™ LTC Bed In-Service Manual*. Perform the "Function Checks—Electric Drive Model" on page 2-10 to ensure proper operation of the Resident™ LTC bed.

Function Checks—Electric Drive Model

2

1. Initial Actions have been performed.

   Yes **No**
   ↓ → Go to "Initial Actions—Electric Drive Model" on page 2-9.

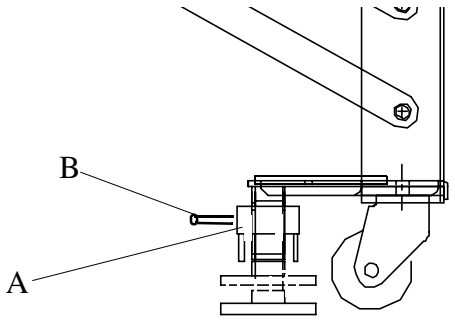
2. Inspect the brake pads for wear. Both brake pads are in good condition.

   Yes **No**
   ↓ → Go to RAP 2.1.

3. Apply the brakes by pressing the brake pedals (A) (see figure 2-3 on page 2-10). The brake is applied correctly, and the swivel casters do not roll. If the brake design has interconnecting linkage, **both** brakes are applied when either pedal is depressed.

   Yes **No**
   ↓ → Go to RAP 2.1.

Figure 2-3. Brake Pedal and Release Lever



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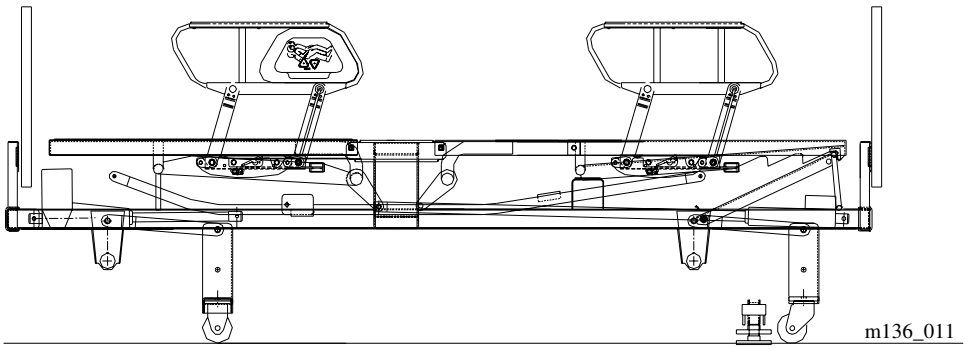
4. Press the brake release lever (B) to release the brake. The brake releases correctly, and the swivel casters roll freely. If the brake design has interconnecting linkage, pressing either of the brake release levers releases both brakes.

   Yes **No**
   ↓ → Go to RAP 2.1.

5. Raise, lower and store the siderails (see figure 2-4 on page 2-11). The siderails move without binding or requiring excessive force, and the latch locks the siderail into position.

   Yes **No**
   ↓ → Go to RAP 2.2.

Figure 2-4. Siderails In the Raised Position (Electric Model)



WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

6. Conduct a visual inspection of the lower frame assemblies, caster frame assemblies, the sleep surface frame assembly, and all connections and components of the electric hilow, knee, and head actuator assemblies. All assemblies are in a good physical state of repair with no loose or missing screws, nuts, bolts, or washers.

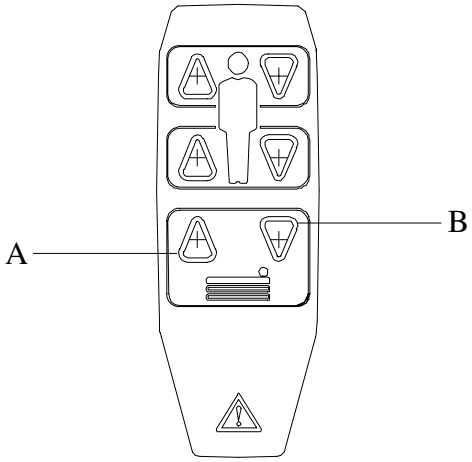
   Yes **No**
   ↓ → Go to RAP 2.3.

7. Using the handset control, operate each function (hilow, head, and knee) briefly to activate its respective motor actuator. Electricity is flowing to the motors, and bed functions respond to the control.

   Yes **No**
   ↓ → Go to RAP 2.12.

2

Figure 2-5. Handset Control (Hilow Actuator Control)



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8. Press the HI/LO Up button (A) on the handset control to raise the bed to its high position (see figure 2-5 on page 2-12). The bed rises evenly to its high position.

   Yes **No**
   ↓ → Go to RAP 2.7.

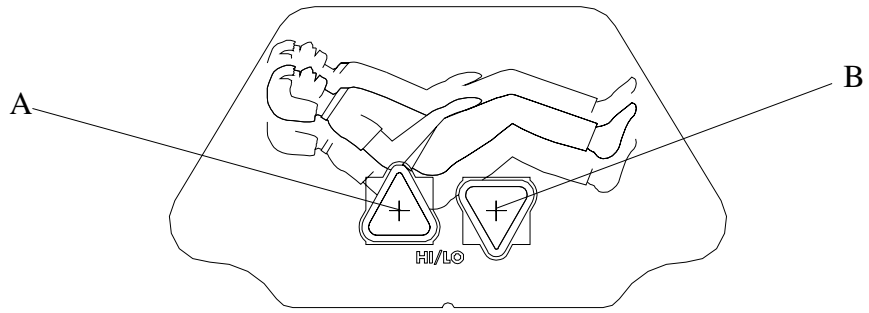
9. Press the HI/LO Down button (B) to lower the bed to its low position. The bed lowers evenly to its low position.

   Yes **No**
   ↓ → Go to RAP 2.7.

10. Repeat steps 8 and 9 using the optional caregiver siderail control panel (if equipped) (see figure 2-6 on page 2-13). After pressing the HI/LO Up button (A), the bed rises evenly to its high position. After pressing the HI/LO Down button (B), the bed lowers evenly to its low position.

    Yes **No**
    ↓ → Go to RAP 2.7.

Figure 2-6. Caregiver Siderail Control Panel (Hilow Actuator Controls)



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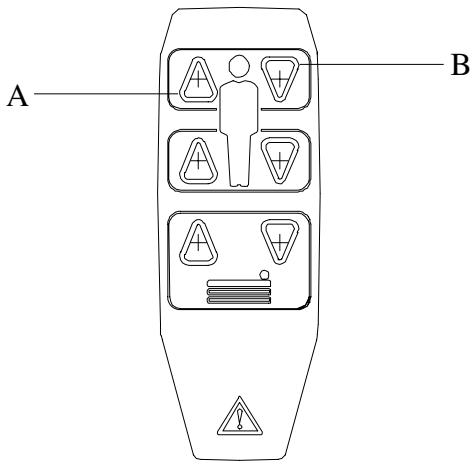
11. Press the HEAD Up button (A) on the handset control panel to raise the head section to its greatest inclined position (see figure 2-7 on page 2-13). The head of the bed raises fully and evenly to approximately 65° as indicated by the head angle indicator decals located on both sides of the bed.

Yes **No**
↓ → Go to RAP 2.8.

Figure 2-7. Handset Control (Head Actuator Controls)



m136_012

12. Press the HEAD Down button (B) to lower the head section fully. The head section of the bed lowers fully and evenly to a flat position.

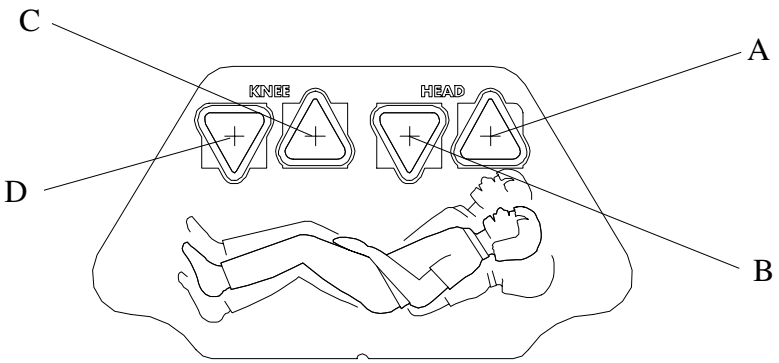
Yes **No**
↓ → Go to RAP 2.8.

2

13. Repeat steps 11 and 12 using the optional resident siderail control panel (if equipped) (see figure 2-8 on page 2-14). After pressing the HEAD Up button (A), the head section rises evenly to its high position. After pressing the HEAD Down button (B), the head section lowers evenly to its low position.

    Yes **No**
    ↓ → Go to RAP 2.8.

Figure 2-8. Resident Siderail Control Panel (Head and Knee Actuator Controls)



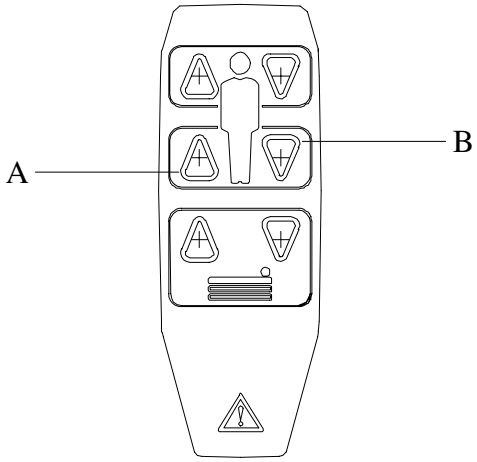
14. Press the KNEE Up button (A) on the handset control to raise the knee section of the bed to its greatest inclined position (see figure 2-9 on page 2-15). The knee section of the bed raises fully and evenly to approximately 25°.

    Yes **No**
    ↓ → Go to RAP 2.9.

15. Press the KNEE Down button (B) on the handset control to lower the knee section fully. The knee section of the bed lowers fully and evenly to a flat position.

    Yes **No**
    ↓ → Go to RAP 2.9.

Figure 2-9. Handset Control (Knee Actuator Controls)



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16. Repeat steps 14 and 15 using the optional resident siderail control panel (if equipped) (see figure 2-8 on page 2-14). After pressing the KNEE Up button (C), the bed rises evenly to its high position. After pressing the KNEE Down button (D), the bed lowers evenly to its low position.

    Yes **No**
    ↓ → Go to RAP 2.9.

17. With the bed in the flat position and automatic contour unlocked, operate the HEAD Up to achieve the automatic contour position. The head and knee sections rise together until the knee section reaches approximately 15° —at which point the knee section stops. The head section continues to rise if the HEAD Up button is depressed.

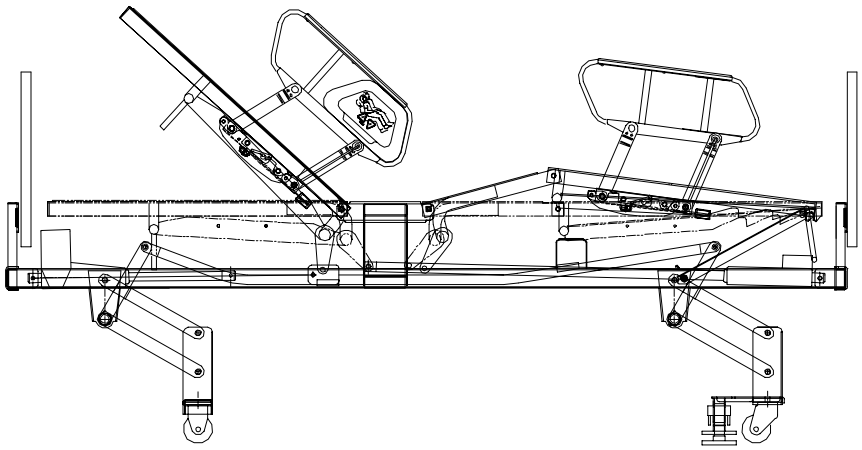
    Yes **No**
    ↓ → Go to RAP 2.10.

2

18. With the bed in the automatic contour position (see figure 2-10 on page 2-16), operate the head down function. Pressing the HEAD Down button (with the head section inclined above 15°) causes the head section only to lower. Continuing to press the HEAD Down button causes the knee section to begin lowering. Lowering of both sections continues (with the HEAD Down pressed) until the flat position is reached. Releasing the HEAD Down button before the flat position is reached causes both sections to stop moving.

Yes **No**
↓ → Go to RAP 2.10.

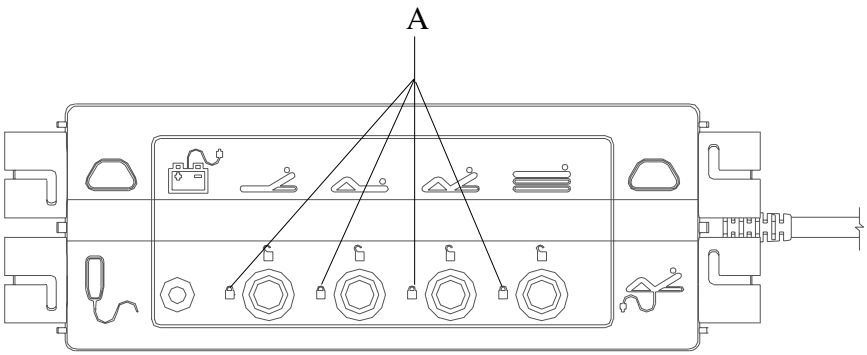
Figure 2-10. The Resident™ LTC Bed in the Automatic Contour Position



19. Turn the control lockout box knob for each function (one at a time) to the locked position (A), and attempt to operate that function (see figure 2-11 on page 2-17). Only the locked function (hilow, head, knee, and automatic contour) is prevented from operating, and the unlocked functions operate normally. (However, the automatic contour will not operate if the knee **or** automatic contour is locked.)

Yes **No**
↓ → Go to RAP 2.11.

Figure 2-11. Control Lockout Box



m136_015

20. Turn the control lockout box knobs (one at a time) to the unlocked position. The controlling function operates correctly.

    Yes **No**
    ↓ → Go to RAP 2.11.

21. Go to "Final Actions—Electric Drive Model" on page 2-18.

Final Actions—Electric Drive Model

1. Complete the required preventive maintenance procedures. See “Preventive Maintenance Schedule—Electric Drive Model” on page 6-9.
2. Complete all required administrative tasks.

2.1 Reduced Braking Ability

Individually Operated Brakes

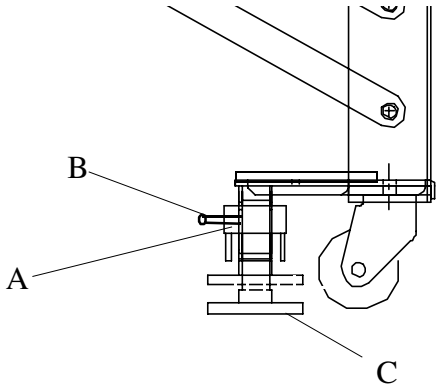
1. Press the brake pedal (A) (see figure 2-12 on page 2-19). The brake locks, and the bed does not move.

   Yes **No**
   ↓ → Go to step 3.

2. Press the release lever (B). The applied brake is released.

   Yes **No**
   ↓ → Go to step 4.

Figure 2-12. Individually Operated Brakes



3. The brake pads (C) on both brakes are not excessively worn or damaged.

   Yes **No**
   ↓ → Replace the worn brake pad (see "Individually Operated Brakes" on page 4-50).

4. Both brake pedals operate smoothly up and down.

   Yes **No**
   ↓ → Replace damaged or worn parts of the pedal assembly (see "Individually Operated Brakes" on page 4-50).

5. Go to "Final Actions—Manual Drive Model" on page 2-8 or "Final Actions—Electric Drive Model" on page 2-18.

2.2 Siderail Mechanical Malfunction

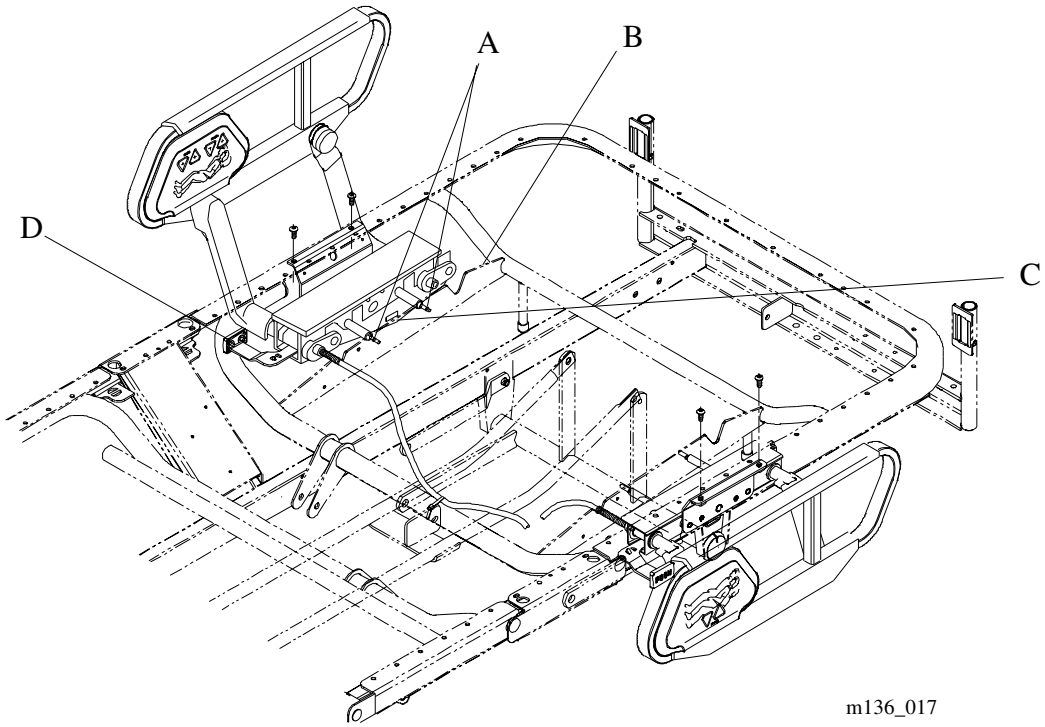
1. The siderail moves smoothly from/to the stored position.

   Yes **No**
   ↓ → Check that the slide rods are not bent, guide pins (A) enter the aligned holes through the channel assembly, and engage the holes in strap (B) (see figure 2-13 on page 2-20). Repair or replace the damaged parts (see "Siderails" on page 4-37).

   This solves the problem.

   Yes **No**
   ↓ → Go to step 5.

Figure 2-13. Siderail Assemblies (Shown with Electric Siderail Controls Installed)



2. The siderail rotates smoothly to the up position and latches correctly.

   Yes **No**
   ↓ → Go to step 5.

3. In the latched position, the siderail does not move inward where the link arms can contact the bed frame.

   Yes **No**
   ↓ → Go to step 7.

4. Push inward on the siderail release (D). This unlocks the siderail so it can be lowered and rotated smoothly to the down position.

   Yes **No**
   ↓ → Go to step 6.

5. The strap portion of the siderail arm assembly is not bent or distorted.

   Yes **No**
   ↓ → Straighten or replace the damaged parts (see "Siderails" on page 4-37).

6. The locking latch block (C) properly enters the slot in the strap portion of the arm assembly and disengages from the slot when the release lever is pushed.

   Yes **No**
   ↓ → Replace the bent or damaged parts (see "Siderails" on page 4-37).

7. The key latch at the inner side of the channel assembly engages the notch in the black pin when the siderail is latched.

   Yes **No**
   ↓ → Replace the bent or damaged parts (see "Siderails" on page 4-37).

8. Go to "Final Actions—Manual Drive Model" on page 2-8 or "Final Actions—Electric Drive Model" on page 2-18.

2.3 Loose, Bent, or Missing Hardware

1. Visual inspection indicates that there are no loose, bent, or missing screws, nuts, bolts, or washers on the lower frame assemblies, the caster frame assemblies, or the sleep surface frame assembly.

   Yes **No**
   ↓ → Tighten loose screws or nuts using compatible screwdrivers, pliers, or socket wrenches, as appropriate. Replace damaged or missing screws, nuts, bolts, or washers. Consult chapter 5 “Parts List” for the part number(s) of the appropriate replacement part(s).

2. Visual inspection indicates that there are no loose, bent, or missing screws, nuts, bolts, washers, pins, or rue ring cotters on the manual/electric drive assemblies or at their connection points on the bed frame.

   Yes **No**
   ↓ → Tighten the loose screws or nuts using compatible screwdrivers, pliers, or socket wrenches, as appropriate. Replace damaged or missing screws, nuts, bolts, washers, pins, and/or rue ring cotters. Consult chapter 5 “Parts List” for the part number(s) of the appropriate replacement part(s).

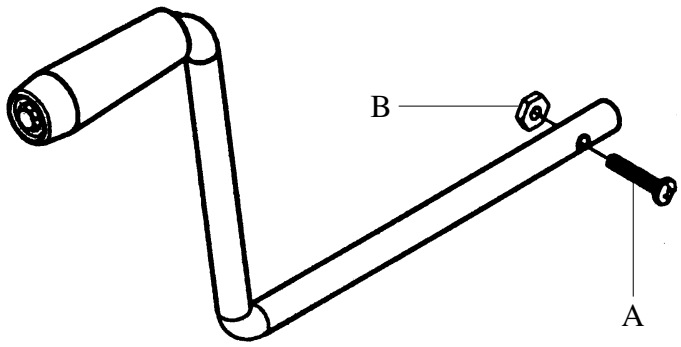
3. Go to “Final Actions—Manual Drive Model” on page 2-8 or “Final Actions—Electric Drive Model” on page 2-18.

2.4 Manual Hilow Function Does Not Raise or Lower Correctly

1. The bolt and nut securing the hilow crank handle to the hilow drive assembly are present and secure.

   Yes **No**
   ↓ → Ensure the bolt (A) and nut (B) securing the hilow crank handle to the hilow drive assembly are present and secure (see figure 2-14 on page 2-23). If the bolt or nut is missing, consult chapter 5 "Parts List" for the part number(s) of the appropriate replacement part(s).

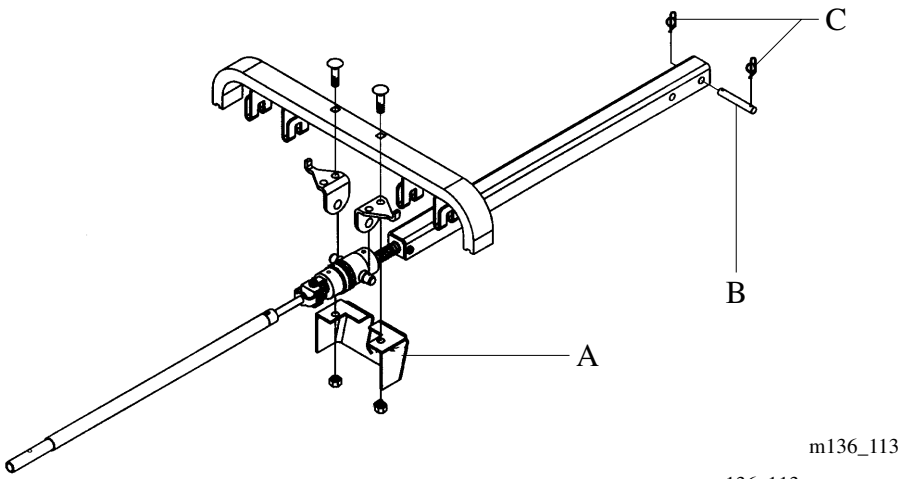
Figure 2-14. Crank Handle Assembly



2. The hilow support bracket (A) is present and secure (see figure 2-15 on page 2-23). The pin (B) and rue ring cotters (C) securing the hilow drive assembly to the bed frame assembly are also present and securely fastened.

   Yes **No**
   ↓ → Go to RAP 2.3.

Figure 2-15. Connection of the Manual Hilow Drive Assembly to the Main Bed Frame



3. The manual hilow drive screw assembly is well lubricated and turns freely.

   Yes **No**
   ↓ → Lightly lubricate the manual hilow drive screw assembly with P/N 8252 M-1 penetrating oil.

   This solves the problem.

   Yes **No**
   ↓ → Replace the manual hilow drive assembly (see "Manual Hilow Drive Assembly" on page 4-5).

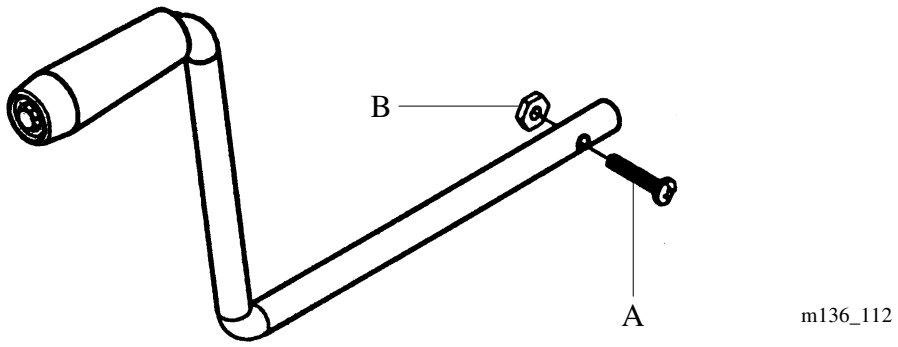
4. Go to "Final Actions—Manual Drive Model" on page 2-8.

2.5 Manual Head Section Does Not Raise or Lower Correctly

1. The bolt and nut securing the head crank handle to the head drive assembly are present and secure.

   Yes **No**
   ↓ → Ensure the bolt (A) and nut (B) securing the head crank handle to the head drive assembly are present and secure (see figure 2-16 on page 2-25). If the bolt or nut is missing, consult chapter 5 "Parts List" for the part number(s) of the appropriate replacement part(s).

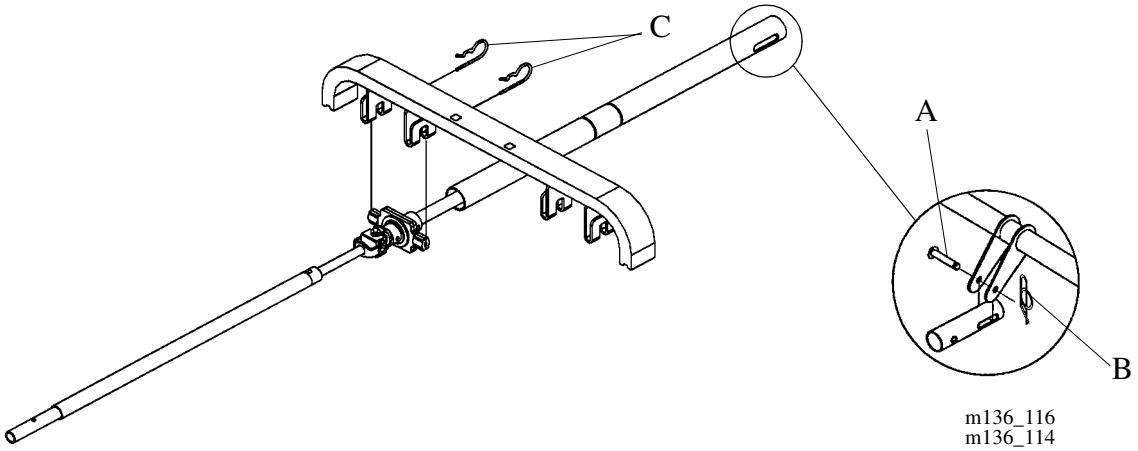
Figure 2-16. Crank Handle Assembly



2. The manual head drive assembly is securely fastened to anchor points on the bed frame with the pin (A), rue ring cotter (B), and hair pins (C) (see figure 2-17 on page 2-25).

   Yes **No**
   ↓ → Go to Rap 2.3.

Figure 2-17. Connection of the Manual Head Drive Assembly to the Main Bed Frame



3. The manual head drive screw assembly is well lubricated and turns freely.

   Yes **No**
   ↓ → Lightly grease the manual head drive screw assembly with P/N SA3351 grease.

   This solves the problem.

   Yes **No**
   ↓ → Replace the manual head drive assembly (see "Manual Head Drive Assembly" on page 4-9).

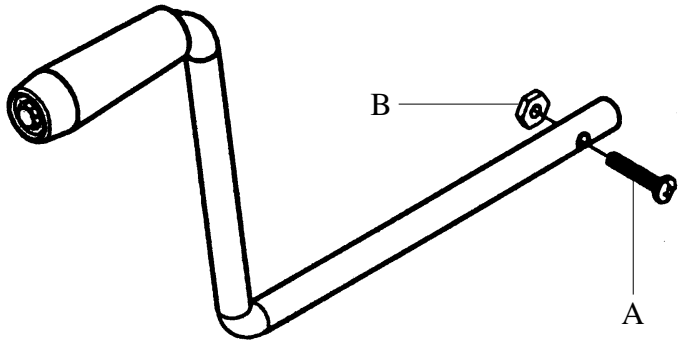
4. Go to "Final Actions—Manual Drive Model" on page 2-8.

2.6 Manual Knee Section Does Not Raise or Lower Correctly

1. The bolt and nut securing the knee crank handle to the knee drive assembly are present and secure.

   Yes **No**
   ↓ → Ensure the bolt (A) and nut (B) securing the knee crank handle to the knee drive assembly are present and secure (see figure 2-18 on page 2-27). If the bolt or nut is missing, consult chapter 5 "Parts List" for the part number(s) of the appropriate replacement part(s).

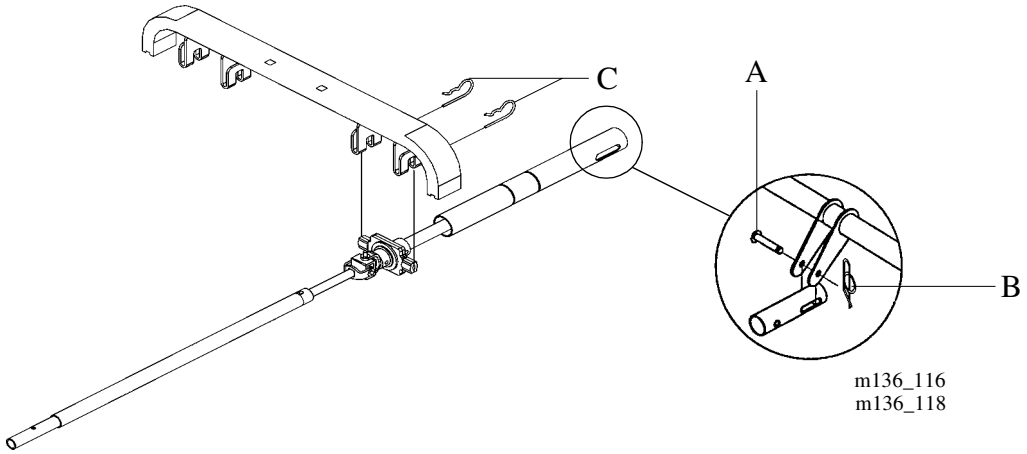
Figure 2-18. Crank Handle Assembly



2. The manual knee drive assembly is securely fastened to anchor points on the bed frame with the pin (A), rue ring cotter (B), and hair pins (C) (see figure 2-17 on page 2-25).

   Yes **No**
   ↓ → Go to RAP 2.3.

Figure 2-19. Connection of the Manual Knee Drive Assembly to the Main Bed Frame



3. The manual knee drive screw assembly is well lubricated and turns freely.

   Yes **No**
   ↓ → Lightly grease the manual knee drive screw assembly with P/N SA3351 grease.

   This solves the problem.

   Yes **No**
   ↓ → Replace the manual knee drive assembly (see "Manual Knee Drive Assembly" on page 4-13).

4. Go to "Final Actions—Manual Drive Model" on page 2-8.

2.7 Electric Hilow Does Not Raise or Lower Correctly

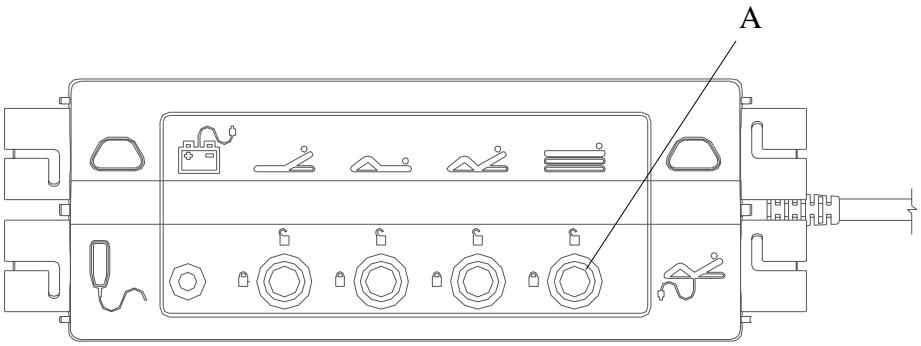
1. The bed is plugged into the appropriate power source.

   Yes **No**
   ↓ → Connect a good power cord to the wall outlet (see figure 2-34 on page 2-44).

2. Ensure that the control lockout knob for the hilow function (A) is in the unlocked position (see figure 2-20 on page 2-29).

   Yes **No**
   ↓ → Turn the knob to the unlocked position.

Figure 2-20. Control Lockout Box Hilow Function

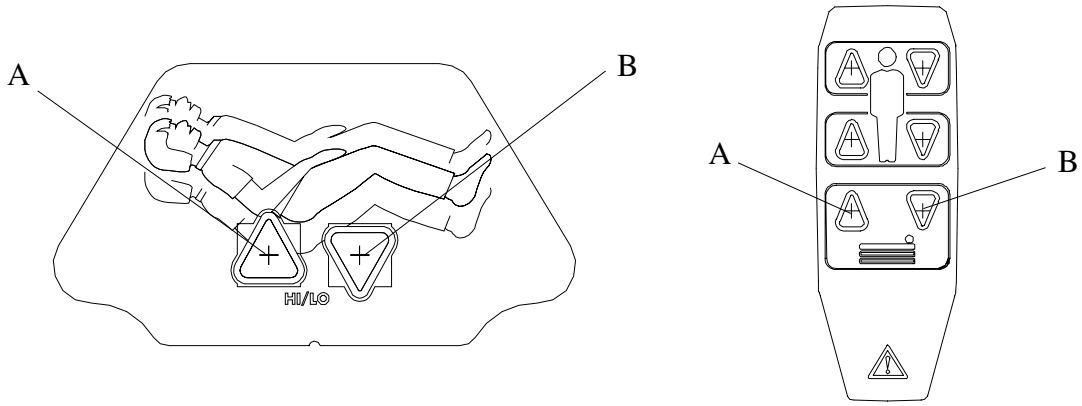


m136_018

3. Press the HI/LO Up button (A) or the HI/LO Down button (B) on the handset or optional siderail controls (if available) (see figure 2-21 on page 2-30). This creates a relay clicking sound in the control box on top of the hilow motor actuator.

   Yes **No**
   ↓ → If a clicking sound is heard with one control actuated but not the other(s), go to RAP 2.13. If a relay clicking sound is not heard when **any** of the controls are pressed, go to RAP 2.11 step 8.

Figure 2-21. Hilow Controls



m136_020
m136_019

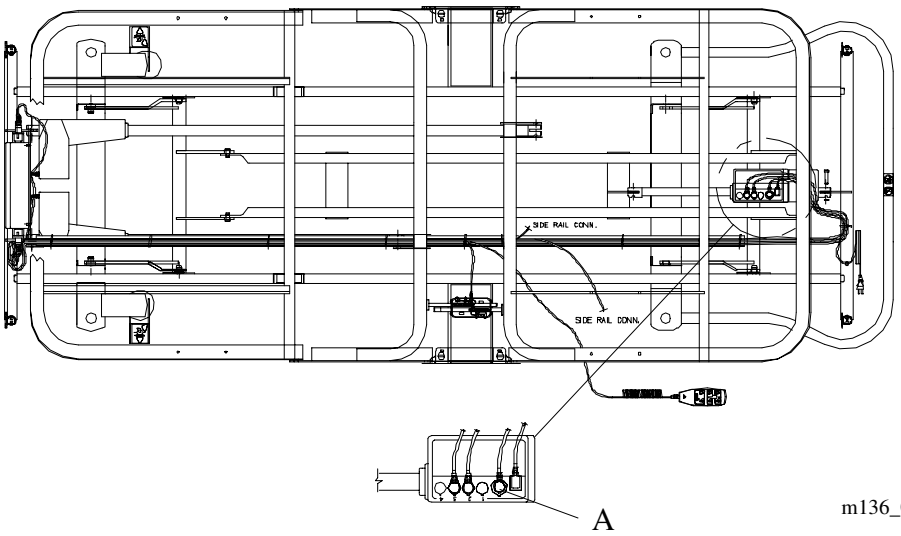
4. The power/hilow cable (A) is firmly connected to its receptacle on the control box, and the routing to the control lockout box shows no visible damage (see figure 2-22 on page 2-30).

   Yes **No**
   ↓ → Plug the cable firmly into its receptacle, or replace the damaged cable if necessary.

   This solves the problem.

   Yes **No**
   ↓ → Replace the hilow motor actuator assembly (see "Hilow Motor Actuator" on page 4-16).

Figure 2-22. Hilow Cable Routing Between the Control Box and the Control Lockout



m136_021

5. The bed rises when the HI/LO Up button is pressed and stops when the button is released. The distance from the floor to the top of the spring frame surface with the bed at its high position is approximately 29.9" (75.9 cm).

   Yes **No**
   ↓ → Go to step 9.

6. The bed lowers when the HI/LO Down button is pressed and stops when the button is released. The distance from the floor to the top of the spring frame surface with the bed in its low position is approximately 13.9" (35.3 cm).

   Yes **No**
   ↓ → Go to step 9.

7. Turn the control lockout knob for the hilow function to the locked position. This prevents hilow operation. Turn the control lockout knob for the hilow function to the unlocked position. This allows hilow operation.

   Yes **No**
   ↓ → Go to RAP 2.11.

8. Go to "Final Actions—Electric Drive Model" on page 2-18.

9. Another part of the bed interferes with the hilow movement to the maximum height or flat position.

   Yes **No**
   ↓ → Replace the hilow motor actuator (see "Hilow Motor Actuator" on page 4-16).

10. Eliminate the interference with the hilow operation of the bed.

    This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom® Technical Support at (800) 445-3720.

11. Go to "Final Actions—Electric Drive Model" on page 2-18.

2.8 Electric Head Section Does Not Raise Or Lower Correctly

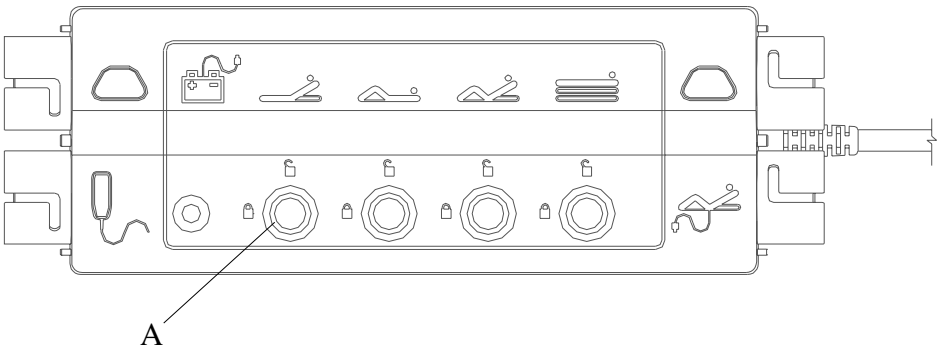
1. The bed is plugged into the appropriate power source.

   Yes **No**
   ↓ → Connect a good power cord to the wall outlet (see figure 2-34 on page 2-44).

2. Ensure that the control lockout knob for the head function (A) is in the unlocked position (see figure 2-23 on page 2-32).

   Yes **No**
   ↓ → Turn the knob to the unlocked position.

Figure 2-23. Control Lockout Box Head Function

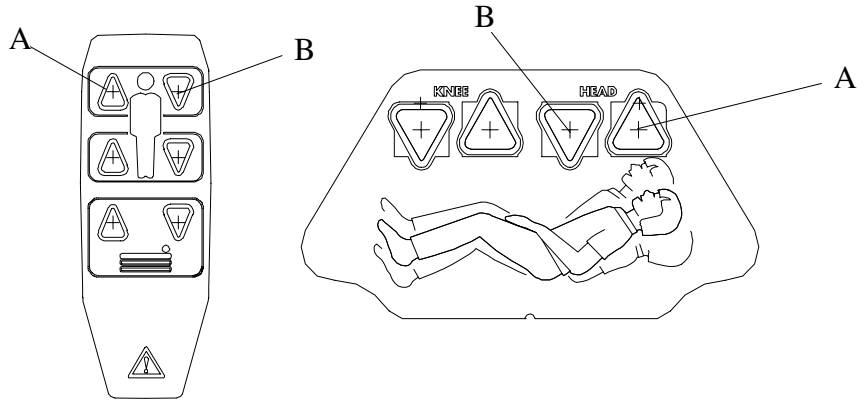


m136_022

3. Press the HEAD Up (A) or the HEAD Down (B) button on the handset or optional siderail controls (if available) (see figure 2-24 on page 2-33). This creates a relay clicking sound in the control box on top of the hilow motor actuator.

   Yes **No**
   ↓ → If a clicking sound is heard with one control actuated but not the other(s), go to RAP 2.13. If a relay clicking sound is not heard when **any** of the controls are pressed, go to RAP 2.11 step 8.

Figure 2-24. Head Controls



m136_023

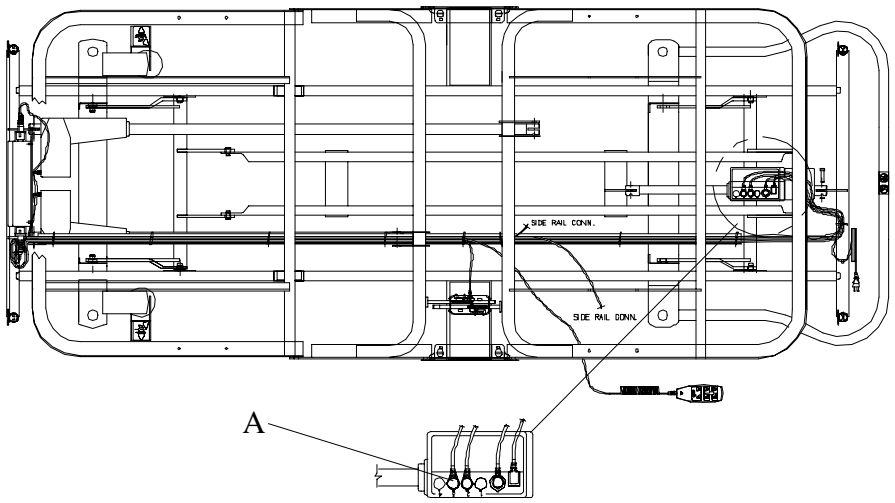
4. The head motor actuator cable (A) is firmly connected to its receptacle on the control box (on top of the hilow motor actuator), and the routing to the control lockout box shows no visible damage (see figure 2-25 on page 2-33).

   Yes **No**
   ↓ → Plug the cable firmly into its receptacle, or replace the damaged cable if necessary.

   This solves the problem.

   Yes **No**
   ↓ → Replace the head motor actuator (see "Head Section Motor Actuator" on page 4-18).

Figure 2-25. Head Cable Routing Between the Control Box and the Control Lockout



m136_024

2

5. The head section rises when the HEAD Up button is pressed and stops when the button is released. Press and hold the HEAD Up button. This adjusts the incline of the head section up to its limit of approximately 65°.

   Yes **No**
   ↓ → Go to step 9.

6. Press the HEAD Down button. This adjusts the incline of the head section, and travel stops when the button is released. Press and hold the HEAD Down button. This adjusts the head section down to the flat position.

   Yes **No**
   ↓ → Go to step 9.

7. Turn the control lockout knob for the head function to the locked position. This prevents head operation. Turn the control lockout knob for the head function to the unlocked position. This allows the head section to be operated up and down.

   Yes **No**
   ↓ → Go to RAP 2.11.

8. Go to "Final Actions—Electric Drive Model" on page 2-18.

9. Another part of the bed interferes with the head section movement to the maximum incline or flat position.

   Yes **No**
   ↓ → Replace the head motor actuator (see "Head Section Motor Actuator" on page 4-18).

10. Eliminate the interference with the head movement of the bed.

    This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom® Technical Support at (800) 445-3720.

11. Go to "Final Actions—Electric Drive Model" on page 2-18.

2.9 Electric Knee Section Does Not Raise Or Lower Correctly

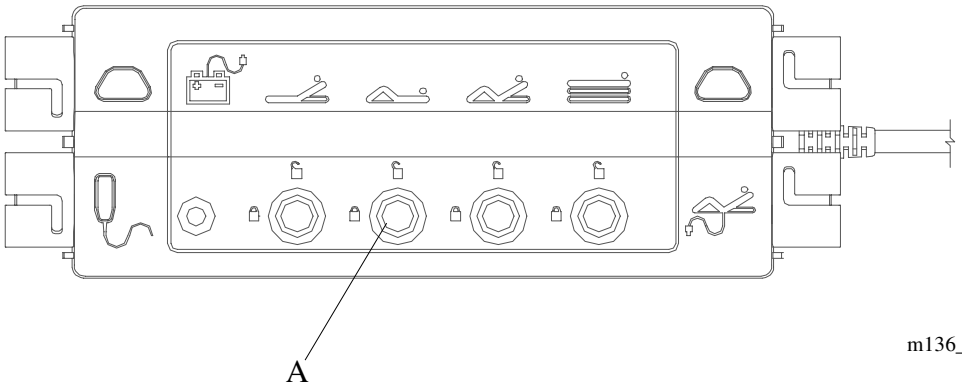
1. The bed is plugged into the appropriate power source.

   Yes **No**
   ↓ → Connect a good power cord to the wall outlet (see figure 2-34 on page 2-44).

2. Ensure that the control lockout knob for the knee function (A) is in the unlocked position (see figure 2-26 on page 2-35).

   Yes **No**
   ↓ → Turn the knob to the unlocked position.

Figure 2-26. Control Lockout Box Knee Function

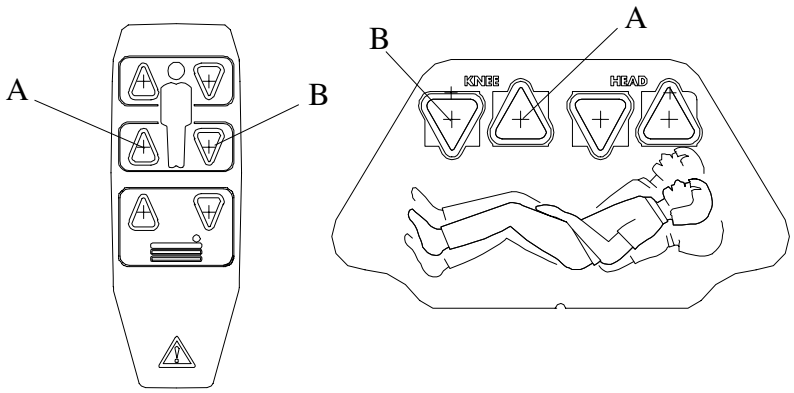


3. Press the KNEE Up (A) or the KNEE Down (B) button on the handset or optional siderail controls (if available) (see figure 2-27 on page 2-36). This creates a relay clicking sound in the control box on top of the hilow motor actuator.

   Yes **No**
   ↓ → If a clicking sound is heard with one control actuated but not the other(s), go to RAP 2.13. If a relay clicking sound is not heard when **any** of the controls are pressed, go to RAP 2.11 step 8.

2

Figure 2-27. Knee Controls



m136_026

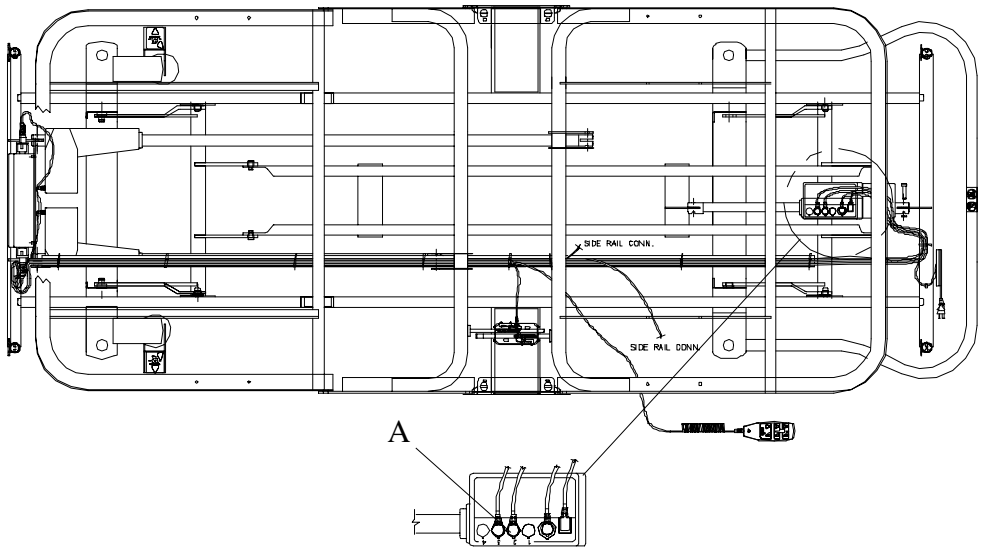
4. The knee motor actuator cable (A) is firmly connected to its receptacle on the control box (on top of the hilow motor actuator), and the routing to the control lockout shows no visible damage (see figure 2-28 on page 2-36).

   Yes **No**
   ↓ → Plug the cable firmly into its receptacle, or replace the damaged cable if necessary.

   This solves the problem.

   Yes **No**
   ↓ → Replace the knee motor actuator assembly (see "Knee Section Motor Actuator" on page 4-20).

Figure 2-28. Knee Cable Routing Between the Control Box and the Control Lockout



m136_027

5. The knee section rises when the KNEE Up button is pressed and stops when the button is released. Press and hold the KNEE Up button. This adjusts the incline of the knee section up to its limit of approximately 25°.

   Yes **No**
   ↓ → Go to step 9.

6. Press the KNEE Down button. This adjusts the incline of the knee section, and travel stops when the button is released. Press and hold the KNEE Down button. This adjusts the knee section to the flat position.

   Yes **No**
   ↓ → Go to step 9.

7. Turn the control lockout knob for the knee function to the locked position. This prevents knee section operation. Turn the lockout knob to the unlocked position. This allows the knee to be operated up and down.

   Yes **No**
   ↓ → Go to RAP 2.11.

8. Go to "Final Actions—Electric Drive Model" on page 2-18.

9. Another part of the bed interferes with the knee movement to the maximum incline or flat position.

   Yes **No**
   ↓ → Replace the knee motor actuator assembly (see "Knee Section Motor Actuator" on page 4-20).

10. Eliminate the interference with the knee movement of the bed.

    This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom® Technical Support at (800) 445-3720.

11. Go to "Final Actions—Electric Drive Model" on page 2-18.

2.10 Automatic Contour Does Not Function Correctly

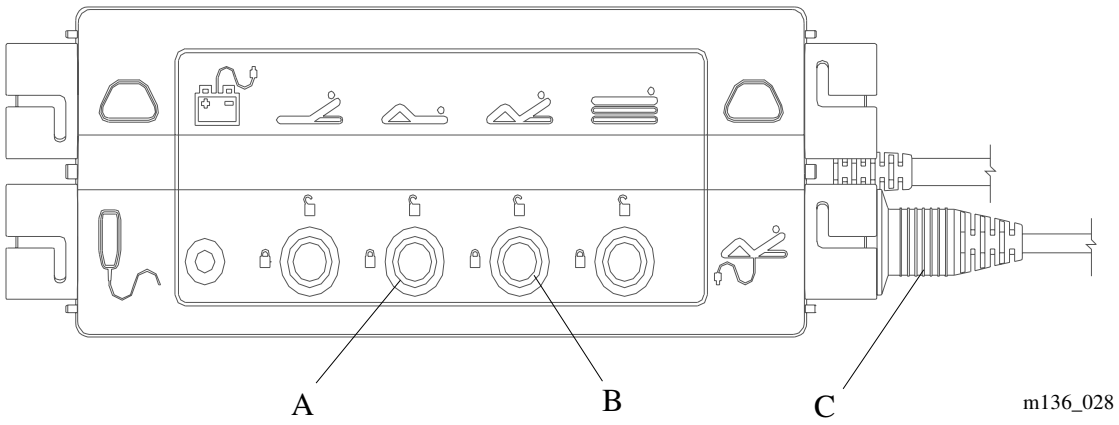
1. The bed is plugged into the appropriate power source.

   Yes **No**
   ↓ → Connect a good power cord to the wall outlet (see figure 2-34 on page 2-44).

2. Ensure that the control lockout knobs for the knee (A) and the automatic contour (B) are in the unlocked position.

   Yes **No**
   ↓ → Turn the knob(s) to the unlocked position.

Figure 2-29. Control Lockout Box Knee and Automatic Contour Functions



3. With the bed in its flat position, press and hold the HEAD Up button. Both the head and knee sections elevate at the same time until the knee section reaches approximately 15°. Continuing to depress the HEAD Up button causes the head section to elevate until it reaches maximum inclination. The knee section stops at approximately 15°.

   Yes **No**
   ↓ → Go to step 5.

4. Pressing the HEAD Down button with the head section inclined above 15° causes only the head section to lower. Continuing to press the HEAD Down button causes the knee section to begin lowering. Lowering of both sections continues (with HEAD Down pressed) until the flat position is reached. Releasing the HEAD Down button before the flat position is reached causes both sections to stop moving.

   Yes **No**
   ↓ → Go to step 5.

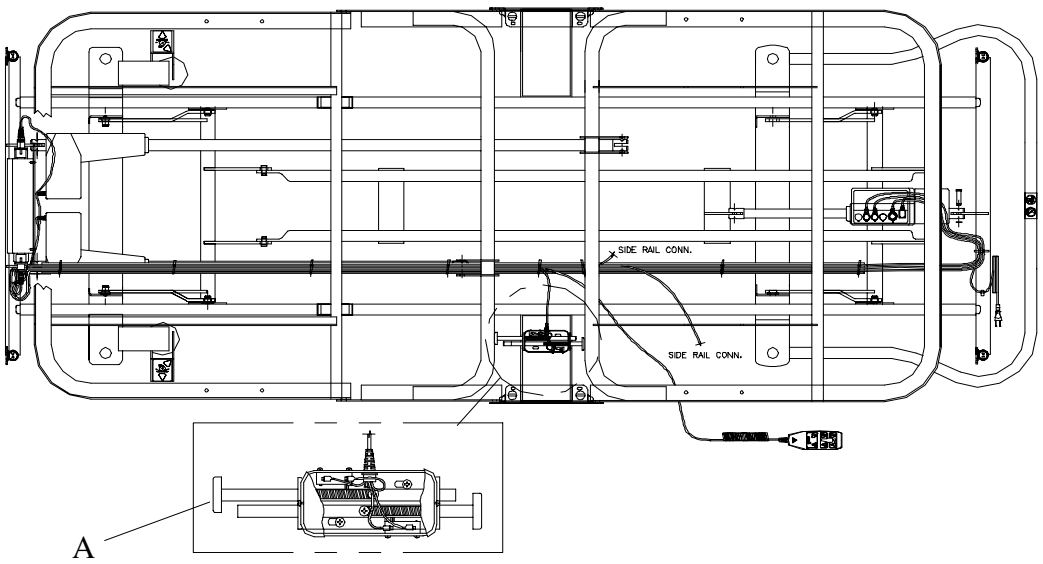
5. The automatic contour cable (C) is firmly connected to its receptacle on the control lockout box. Routing to the automatic contour module shows no visible damage.

   Yes **No**
   ↓ → Plug the cable firmly into its receptacle, or replace the damaged cable if necessary.

6. Press inward on the knee plunger (A) of the automatic contour module with the HEAD Up button depressed (see figure 2-30 on page 2-39). The knee section rises.

   Yes **No**
   ↓ → Replace or repair the automatic contour module (see "Automatic Contour Module" on page 4-22).

Figure 2-30. Automatic Contour Module



m136_029

7. Turn the control lockout knob for the automatic contour function (B) to the locked position (see figure 2-29 on page 2-38). This prevents automatic contour operation. Turn the control lockout knob to the unlocked position. This allows automatic contour operation.

   Yes **No**
   ↓ → Go to RAP 2.11.

8. Go to "Final Actions—Electric Drive Model" on page 2-18.

2.11 Control Lockout Does Not Function Correctly

1. The bed is plugged into the appropriate power source.

   Yes **No**
   ↓ → Connect a good power cord to the wall outlet (see figure 2-34 on page 2-44).

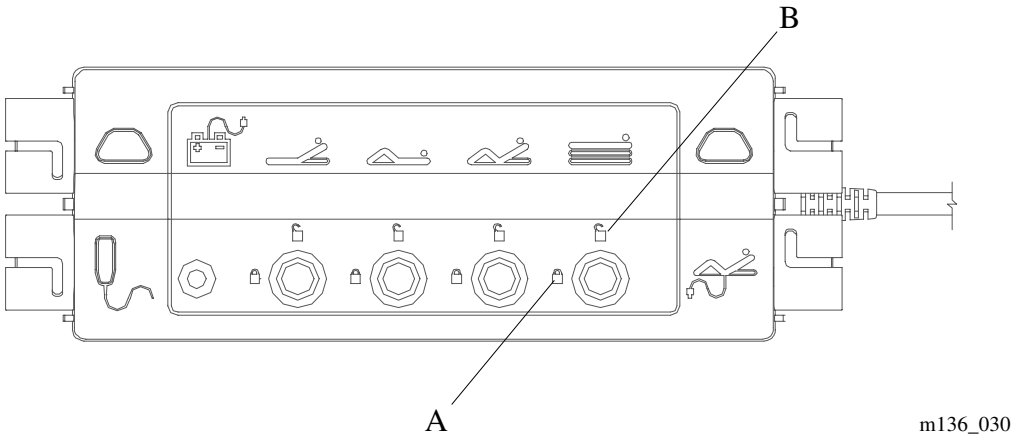
2. The head motor actuator cable is firmly connected to its receptacle on the control box (on top of the hilow motor actuator), and the routing to the control lockout box shows no visible damage (see figure 2-25 on page 2-33).

   Yes **No**
   ↓ → Plug the cable firmly into its receptacle, or replace the damaged cable if necessary.

3. Turn the control lockout knobs for each function to the locked position (A) (see figure 2-31 on page 2-41). This prevents operation of those functions (hilow, head, knee, and automatic contour), but does not prevent operation of the unlocked functions.

   Yes **No**
   ↓ → Go to step 5.

Figure 2-31. Control Lockout Functions



4. Turn the control lockout knob (for each function) to the unlocked position (B). This allows operation of that function.

   Yes **No**
   ↓ → Go to step 5.

2

5. Press the Up or Down buttons on the handset or both optional siderail controls (if available). This creates a relay clicking sound in the control box (on top of the hilow motor actuator).

   Yes **No**
   ↓ → If a clicking sound is heard with one control actuated but not the other(s), go to RAP 2.13. If a relay clicking sound is not heard when **any** of the controls are pressed, go to step 6.

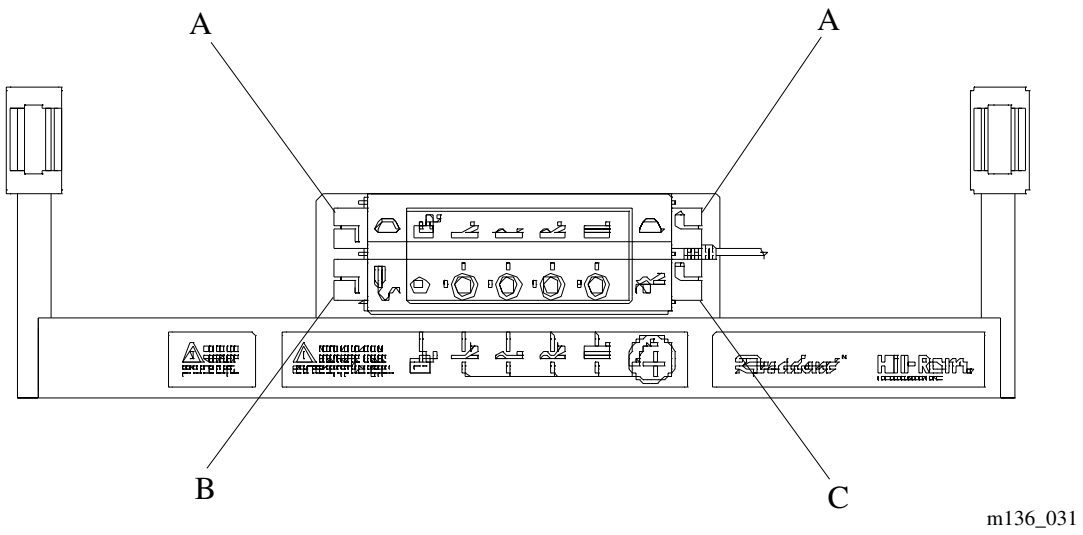
6. The siderail control cables (A) (if available), the handset control cable (B), and the automatic contour cable (C) are firmly connected to their respective receptacles on the control lockout box and are in good condition (see figure 2-32 on page 2-42).

   Yes **No**
   ↓ → Connect the cables, and replace any that are damaged.

   This solves the problem.

   Yes **No**
   ↓ → Go to step 8.

Figure 2-32. Control Lockout Cable Connections



7. Go to “Final Actions—Electric Drive Model” on page 2-18.

8. Unplug the bed from its power source or unplug the handset control cable (B) from the control lockout (if the optional siderail controls are installed, unplug one of the siderail controls (A) from the control lockout).

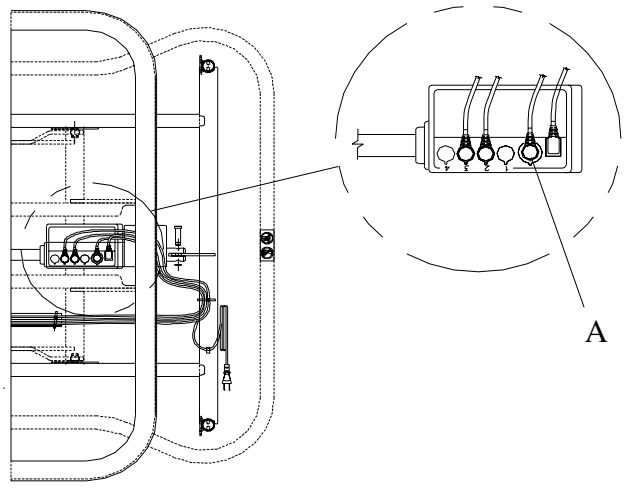
9. Identify the location of all wire ties with a white marker, and cut the wire ties holding the control cables to the metal channel. Unplug the control lockout cable (A) from the control box, and plug the disconnected handset (or siderail control) in its place (see figure 2-33 on page 2-43).

10. Plug bed into an appropriate power source, and press control buttons to operate the bed's functions. All motor actuators operate in both directions, but not as indicated on the control (i.e.: head may be operated by the HI/LO buttons, etc.).

SHOCK HAZARD:
Unplug the bed from its power source before unplugging any cables from the control lockout, or from the control box. An electrical shock hazard exists.

Yes **No**
↓ → Call Hill-Rom® Technical Support at (800) 445-3720.

Figure 2-33. Control Lockout Cable Connection at Control Box



11. Replace control lockout box (see "Control Lockout Box" on page 4-33).

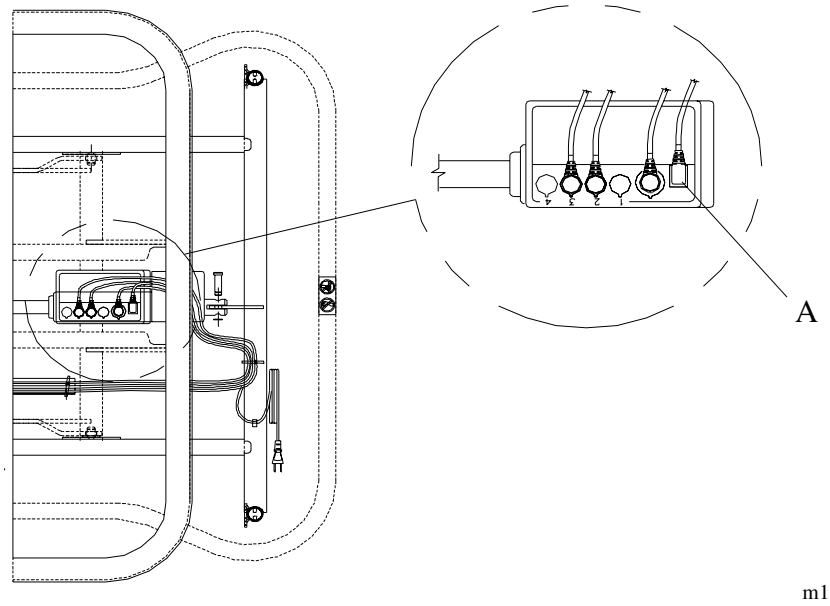
12. Go to "Final Actions—Electric Drive Model" on page 2-18.

2.12 None Of The Electrical Functions Operate

1. The bed is plugged into the appropriate power source.

   Yes **No**
   ↓ → Connect the power cord (A) to the wall outlet (see figure 2-34 on page 2-44).

Figure 2-34. Power Cord Location At the Control Box Assembly



2. All cables are firmly connected to the control box assembly.

   Yes **No**
   ↓ → Connect the cables to their respective receptacles.

3. Ensure that the control lockout knob for each of the operating functions is in the unlocked position (see figure 2-31 on page 2-41).

   Yes **No**
   ↓ → Turn the knobs to the unlocked position.

4. The siderail control cables (A) (if available) and the handset control cable (B) are firmly connected to their respective receptacles on the control lockout box and are in good condition (see figure 2-32 on page 2-42).

   Yes **No**
   ↓ → Connect the cables, and replace any that are damaged.

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom® Technical Support at (800) 445-3720.

5. Press the Up and Down buttons for each function on the handset and on the optional siderail controls (if available). This creates a relay clicking sound in the control box (on top of the hilow motor actuator).

   Yes **No**
   ↓ → If a clicking sound is heard with one control actuated but not the other(s), go to RAP 2.13. If a relay clicking sound is not heard when **any** of the controls are pressed, replace the control box (see "Control Box" on page 4-35).

6. Go to "Final Actions—Electric Drive Model" on page 2-18.

2.13 Siderail Control/Handset Control Does Not Operate Correctly

1. The optional siderail control cables (A) (if available) and the handset control cable (B) are firmly connected to their respective receptacles on the control lockout box and are in good condition (see figure 2-32 on page 2-42).

   Yes **No**
   ↓ → Connect the cables, and replace any that are damaged.

   This solves the problem.

   Yes **No**
   ↓ → Replace or repair the malfunctioning control (see "Optional Siderail Control Panels" on page 4-27, or see "Handset Control" on page 4-31).

2. Go to "Final Actions—Electric Drive Model" on page 2-18.

Chapter 3
Theory of Operation

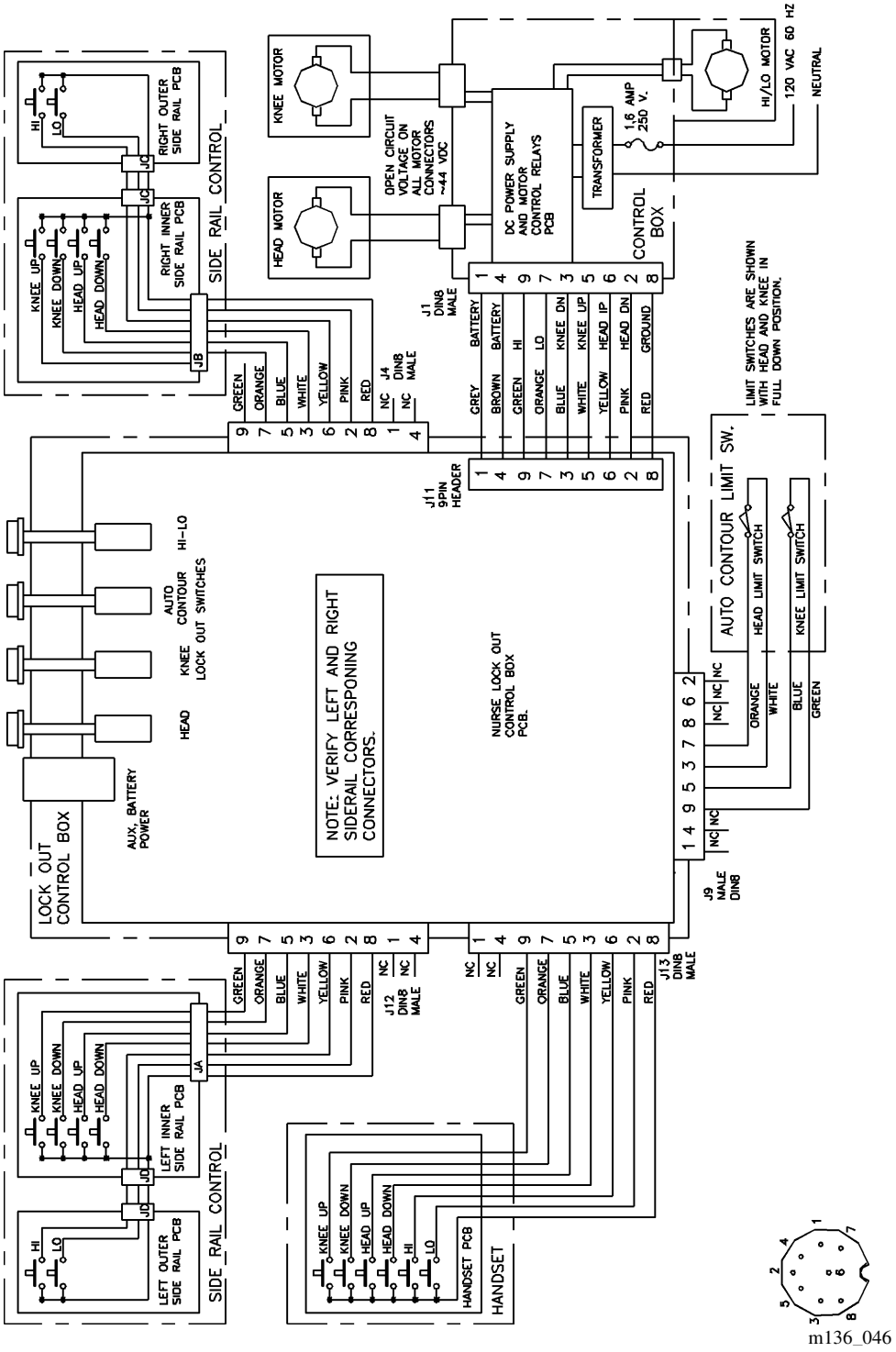
Chapter Contents

3

NOTES:

Electrical System Block Diagram

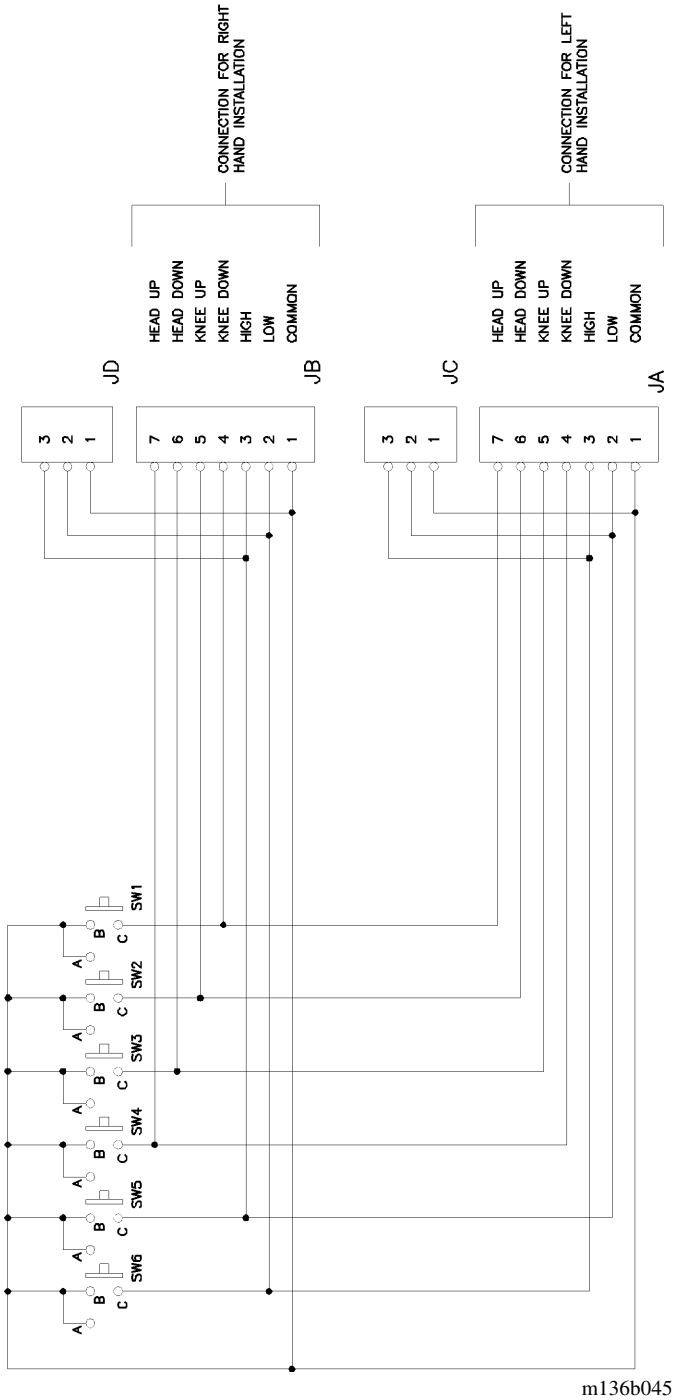
Figure 3-1. Electrical System Block Diagram



3

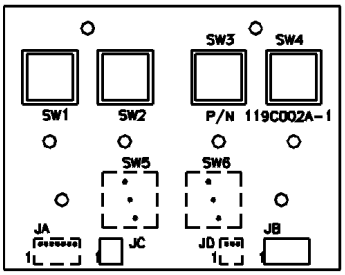
Siderail Control Schematic

Figure 3-2. Siderail Control Schematic

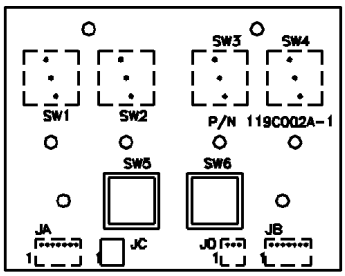


Siderail Control Circuit Boards

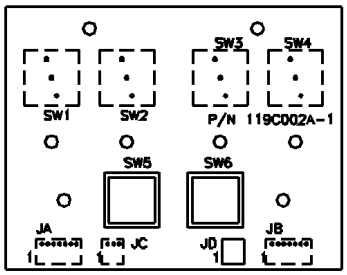
Figure 3-3. Siderail Control Circuit Boards



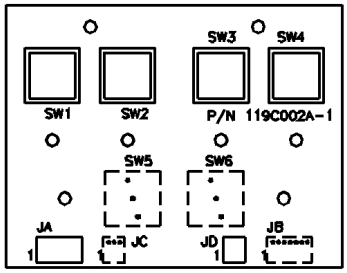
Inside right-hand siderail



Outside right-hand siderail



Outside left-hand siderail



Inside left-hand siderail

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3

Electrical Theory of Operation

The Hill-Rom® Resident™ LTC bed incorporates three separate motor actuators to provide the following operational features:

- Hilow (bed height)–this function raises and lowers the entire sleep surface.
- Head section–this function raises and lowers the head section of the bed.
- Knee section–this function raises and lowers the knee section of the bed.
- Automatic contour–this is an automatic function that is activated during operation of the head section (unless locked out). As the head section inclines, the knee section of the bed also inclines to a maximum of 15° (± 2°). If the automatic contour is temporarily disabled by pressing both the HEAD Up and KNEE Down buttons at the same time, releasing the KNEE Down button will allow the automatic contour function to activate regardless of the degree of head section inclination.

These features are controlled by using the handset and/or the optional siderail control panels in conjunction with the control lockout box.

When the Resident™ LTC bed is plugged into a 120V AC, 60 Hz power source, a transformer within the control box reduces the incoming voltage to 42V AC. This 42V AC is then rectified to 42V DC and supplied to the input side of a "normally open" switching circuit and to the input side of a "normally open" motor actuator circuit.

The switching circuit consists of the following:

- The coils of six different relays, one for each possible motor actuator function
- Four isolation switches in the caregiver control lockout box
- Six momentary contact switches in the handset control
- Six momentary contact switches in each siderail control
- Two limit switches in the automatic contour module

The motor actuator circuit consists of the following:

- The “normally open” contacts of the six relays in the switching circuit (two relays for each motor actuator)
- The windings of the three motor actuators
- Two limit switches in each motor actuator

When one of the momentary contact switches in the switching circuit is activated, the circuit of that specific function is completed, and DC voltage flows to the isolation switch in the caregiver control lockout box. If this isolation switch is in the locked position, the circuit remains “open” and no motor actuator operation occurs. If the isolation switch is in the unlocked position, current flows to the relay coil corresponding to the motor actuator function activated. Current flow to the relay coil closes the “normally open” contacts and allows current flow through the relay to the corresponding motor actuator limit switches and then to the motor windings to operate the motor actuator. As long as the momentary contact switch is activated, the corresponding motor actuator continues to operate until its physical travel limit is reached. When the motor actuator reaches the physical limit of its travel (in either direction), an integral limit switch corresponding to the travel position is activated and “opens” the circuit to stop current flow to the motor actuator. With this integral limit switch “open”, the motor actuator can only operate in the opposite direction until this limit switch is “closed”, at which time normal operation in either direction is possible.

When the automatic contour isolation switch (on the control lockout box) is in the unlocked position, and the relay corresponding to the head up function is activated, current also flows to the coil of the relay corresponding to the knee up function. This current flows from the knee up coil through the “up” limit switch in the automatic contour module to the knee motor actuator. When the knee section reaches an angle of 15° (± 2°), the “normally closed” contacts of the “up” limit switch (in the automatic contour module) “open,” and operation of the knee section is stopped—the head up function will continue to operate independently (if activated). When the head down function is activated, current is also provided to the “normally open” contacts of the “down” limit switch in the automatic contour module—this “down” limit switch is “closed” and completes the circuit to allow current to the relay coil corresponding to the knee down function (lowering the knee section while the head section is being lowered). When the automatic contour isolation switch on the control lockout box is placed in the locked position, automatic contour is disabled, allowing the head and knee sections to operate independently.

Motor Actuators

The three motor actuators are built to withstand the common hazards of spills and cleaning liquids under normal conditions. These motor actuators are a plug-in design for easy removal in the event of problems. Each is especially designed for the individual function it is to perform and has the following characteristics:

- 24 volt, DC motor
- Electronic overload protection, microswitch motor cutoff
- Totally enclosed, impact resistant, motor housing
- Permanently lubricated
- Precision-rolled acme spindle for linear actuation of stainless steel piston
- Heavy-duty ball bearing spindle mount

The battery pack accessory can provide emergency operation of the actuators to position the bed in event of a power failure.

NOTE:
The duty cycle (continuous operation) of any actuator should not be more than 10%.

Hilow

- 12.60" (32.0 cm) actuator stroke
- 20.25" (51.4 cm) retracted length

Head

- 7.25" (18.4 cm) actuator stroke
- 46.38" (117.8 cm) retracted length

Knee

- 2.88" (7.3 cm) actuator stroke
- 39.25" (99.7 cm) retracted length

Handset Control

The handset control provides electrical control of head, knee, and hilow elevation. The buttons on the handset are pictorially labeled to indicate their function.

Optional Resident and Caregiver Siderail Controls

Resident and caregiver controls are located on both head end siderails and on a separate handset control. These controls allow the resident and caregiver to electrically operate the head section, knee section, and hilow (bed height) to obtain the desired elevation within their respective travel limits. With the head end siderail in the raised position, the control panels are easily accessible to the resident. A control lockout box is located at the foot end of the bed to enable deactivation of each electrically operated function (see "Control Lockout Box" on page 3-9).

Resident Control Panel

A resident control panel is located on the inside of both head end siderails for convenience. The pictorially labeled activator buttons on both panels control the head and knee functions.

Caregiver Control Panel

A caregiver control panel is located on the outside of both head end siderails. The control activators face the caregiver, minimizing accessibility to the resident. The pictorially labeled activator buttons on both panels control the bed's hilow function.

Control Lockout Box

The control lockout box is located at the foot end of the bed. The control lockout is pictorially labeled to indicate each governing function and the locked/unlocked position of each control knob. Whenever a resident should be restricted from operating the resident or handset controls, activate the appropriate control lockout to prevent operation of a function.

NOTES:

Chapter 4
Removal, Replacement, and Adjustment Procedures

Chapter Contents

4

NOTES:

4.1 Manual Hilow Drive Assembly

Tools required:	Crescent wrench	T25 torx head screwdriver
	Needle nose pliers	Jack stands
	Socket wrench	5/8" deep-well socket
	Phillips head screwdriver	Light oil (P/N 8252)

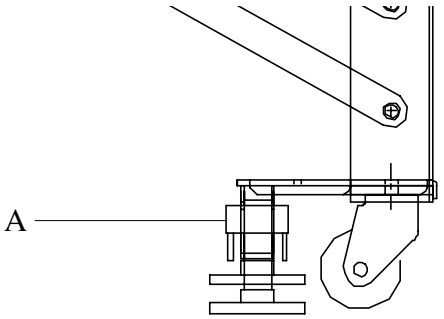
Removal

WARNING:
Only facility-authorized maintenance personnel should perform maintenance procedures on the Resident™ LTC bed. Otherwise, personal injury can occur.

1. Remove the mattress from the bed.

2. Set both brakes on the bed by fully depressing the brake pedals (A) located on both sides of the swivel caster frame assembly at the foot end of the bed (see figure 4-1 on page 4-5). If the brake design has interconnecting linkage, both brakes are applied when either pedal is depressed. Give the bed a solid tug to ensure the brakes are set.

Figure 4-1. Brake Pedal Assembly



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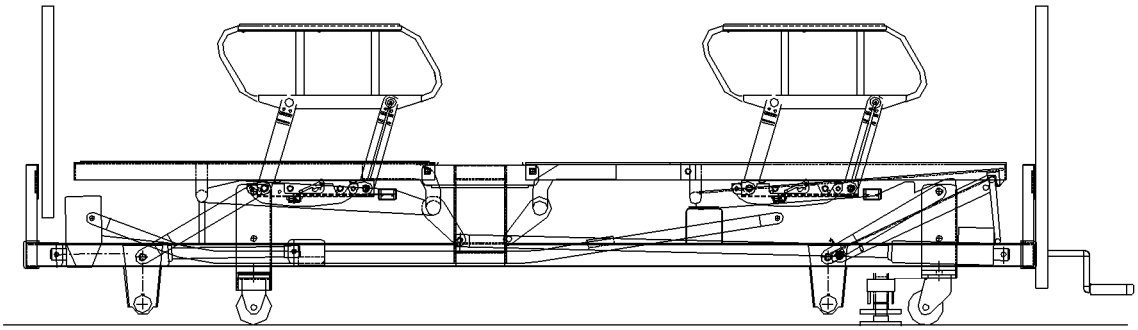
3. Adjust the bed sleep surface to its lowest position by turning the hilow crank handle (middle handle) counterclockwise until it stops (see figure 4-2 on page 4-6).

WARNING:
Electric or manual drive bed mechanisms can cause serious injury if operated improperly. Operate the bed only when persons are clear of

the mechanisms.

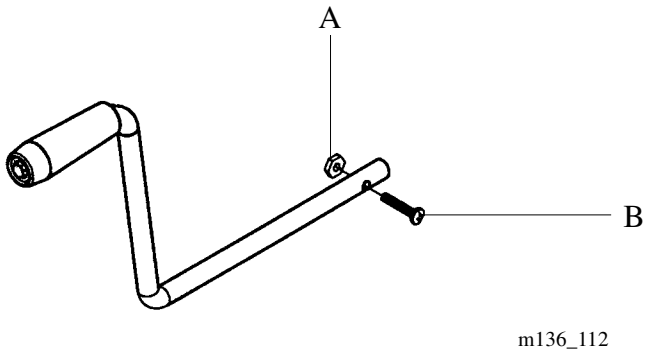
Figure 4-2. Manual Drive Bed in the Low Position



4. Adjust the head and knee functions to their lowest (horizontal) positions by turning the head and knee crank handles (left and right handles, respectively) counterclockwise until they stop.

5. Remove the crank handle assembly for the hilow drive by removing the nut (A) and bolt (B) located at the base of the crank handle (see figure 4-3 on page 4-6).

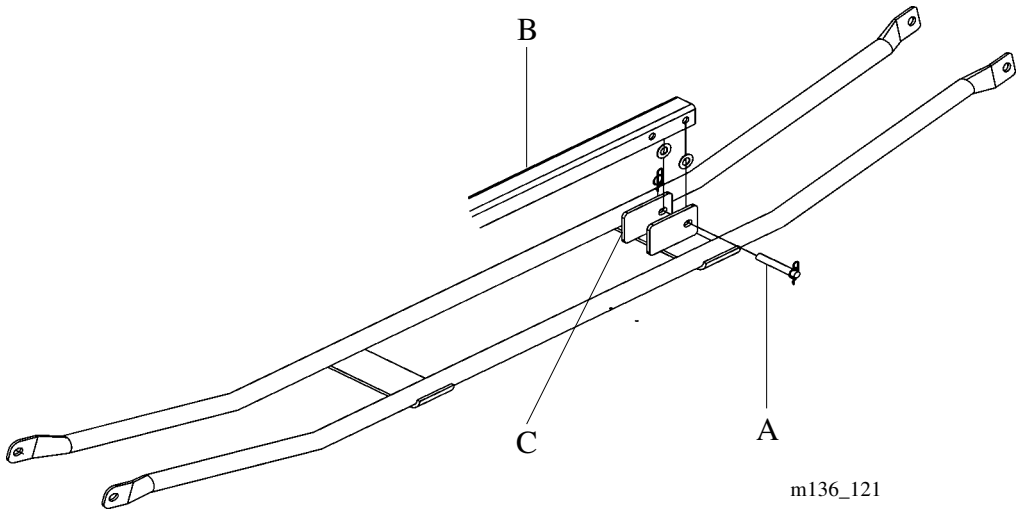
Figure 4-3. Crank Handle Assembly



6. Manually raise the head section assembly, and secure it temporarily to the thigh section assembly to gain access to the pivot connector pin.

7. Remove the rue ring cotters from the pin (A) securing the manual hilow screw assembly (B) to tabs on the pivot connector weldment (C) (see figure 4-4 on page 4-7). Remove the pin and the two washers.

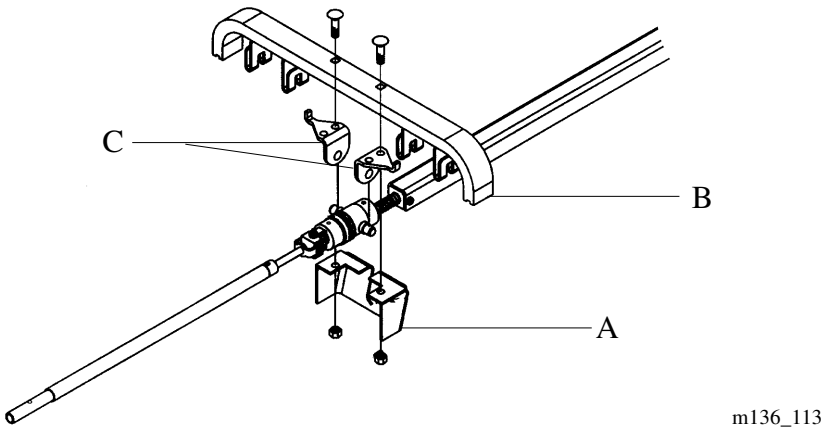
Figure 4-4. Removal of the Hilow Screw Assembly from the Pivot Connector Weldment



8. Raise the foot section assembly, and fold it over toward the thigh section assembly to gain access to the hilow support brackets.

9. Use the socket wrench with a 9/16" deep-well socket to remove the nuts and carriage bolts securing the hilow support bracket (A) and the two mounting brackets (C) to the hilow support cross beam (B) (see figure 4-5 on page 4-7). Remove the hilow drive assembly.

Figure 4-5. Removal of the Hilow Drive Assembly from the Frame Assembly



Replacement

1. Using light oil, lubricate the hilow screw assembly threads.

2. Insert the carriage bolts through holes on the top of the hilow support cross beam. Place a mounting bracket on each side of the universal collar assembly of the manual hilow drive. Slide the mounting brackets onto the carriage bolts ensuring tabs on the mounting brackets are inserted in the slots on the cross beam.

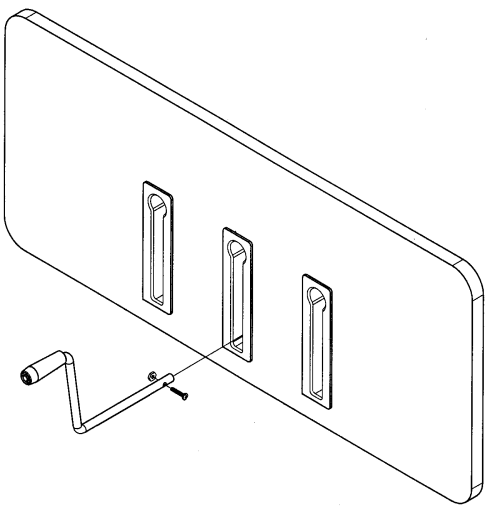
3. Slide the hilow support bracket onto the bolts then use nuts to attach the entire assembly to the hilow support cross beam. Tighten with the socket wrench and 9/16" deep-well socket.

4. Manually raise the head section assembly, and secure it temporarily to the thigh section assembly to gain access to the pivot connector.

5. Position the channel assembly of the hilow drive between the tabs on the pivot connector weldment. Insert the pin through the tabs, washers, and holes in the channel assembly and secure with two rue ring cotters (see figure 4-4 on page 4-7).

6. Insert the hilow hand crank assembly through the middle slot on the foot panel and attach to the hilow drive assembly with the bolt and nut (see figure 4-6 on page 4-8).

Figure 4-6. Attachment of the Hand Crank Assembly to the Hilow Drive



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7. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Manual Drive Model” on page 2-5.

4.2 Manual Head Drive Assembly

Tools required: Needle nose pliers, Crescent wrench, Phillips head screwdriver, Lithium grease (P/N SA3351)

Removal

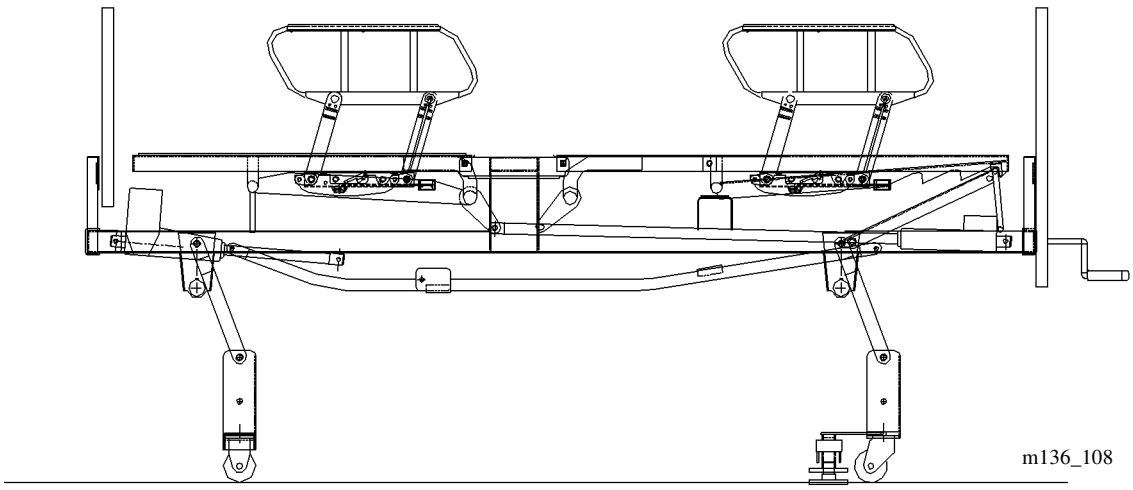
WARNING:
Only facility-authorized maintenance personnel should perform maintenance procedures on the Resident™ LTC bed. Otherwise, personal injury can occur.

1. Remove the mattress from the bed.

2. Set both brakes on the bed by fully depressing the brake pedals located on both sides of the swivel caster frame assembly at the foot end of the bed. If the brake design has interconnecting linkage, both brakes are applied when either pedal is depressed. Give the bed a solid tug to ensure the brakes are set.

3. Adjust the bed sleep surface to its highest position by turning the hilow crank handle (middle handle) clockwise until it stops (see figure 4-7 on page 4-9).

Figure 4-7. Manual Bed in the High Position



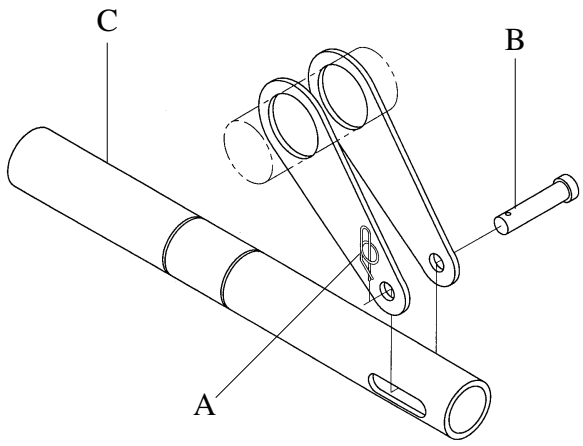
WARNING:
Electric or manual drive bed mechanisms can cause serious injury if operated improperly. Operate the bed only when persons are clear of the mechanisms.

4. Adjust the head and knee functions to their lowest (horizontal) positions by turning the head and knee crank handles (left and right handles, respectively) counterclockwise until they stop.

5. Remove the crank handle assembly for the head drive by removing the nut and bolt located at the base of the crank handle.

6. Remove the rue ring cotter (A) from the pin (B) securing the head drive assembly (C) to yokes on the head section frame (see figure 4-8 on page 4-10). Remove the pin.

Figure 4-8. Removal of the Head Drive Assembly from Head Section Yokes



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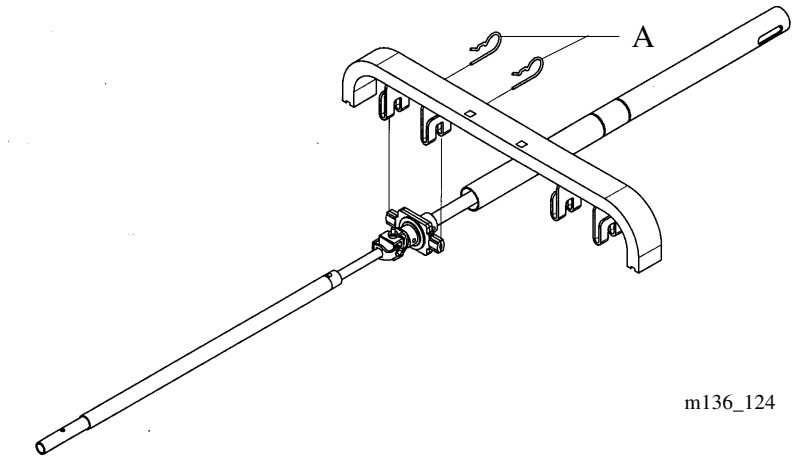
7. Remove the hair pins (A) from anchor points on the frame crossbar, then remove the head drive assembly (see figure 4-9 on page 4-11).

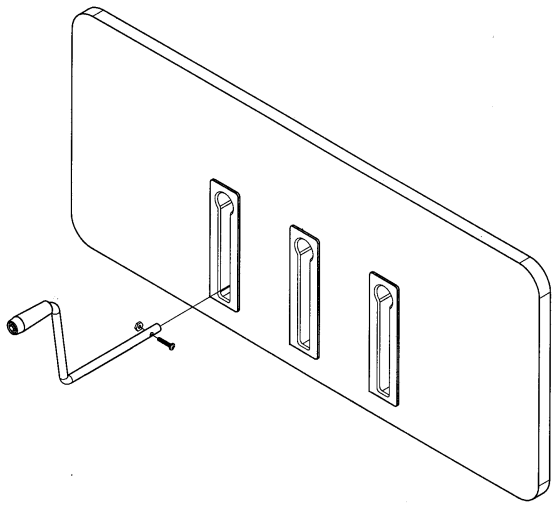
Figure 4-9. Removal of the Head Drive Assembly from the Frame Crossbar



Replacement

1. Using lithium grease, lightly grease the head screw assembly threads.
2. Attach the head drive assembly to the frame crossbar by inserting two hair pins through the anchor points.
3. Position the end of the head drive assembly in the yokes on the head section. Insert a pin through the yokes and through holes in the end of the head drive assembly. Secure with one rue ring cotter (see figure 4-8 on page 4-10).
4. Insert the head drive hand crank assembly through the slot on the foot panel and attach to the head drive assembly with the bolt and nut (see figure 4-10 on page 4-12).
5. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Manual Drive Model” on page 2-5.

Figure 4-10. Attachment of the Hand Crank to the Head Drive Assembly



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4.3 Manual Knee Drive Assembly

Tools required:	Needle nose pliers	Phillips head screwdriver
	Crescent wrench	Lithium grease (P/N SA3351)

Removal

WARNING:
Only facility-authorized maintenance personnel should perform maintenance procedures on the Resident™ LTC bed. Otherwise, personal injury can occur.

1. Remove the mattress from the bed.

2. Set both brakes on the bed by fully depressing the brake pedals located on both sides of the swivel caster frame assembly at the foot end of the bed. If the brake design has interconnecting linkage, both brakes are applied when either pedal is depressed. Give the bed a solid tug to ensure the brakes are set.

3. Adjust the bed sleep surface to its highest position by turning the hilow crank handle (middle handle) clockwise until it stops.

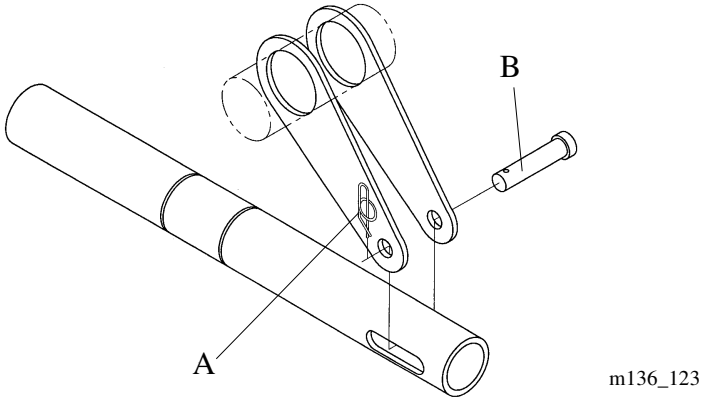
WARNING:
Electric or manual drive bed mechanisms can cause serious injury if operated improperly. Operate the bed only when persons are clear of the mechanisms.

4. Adjust the head and knee functions to their lowest (horizontal) positions by turning the head and knee crank handles (left and right handles, respectively) counterclockwise until they stop.

5. Remove the crank handle assembly for the knee drive by removing the nut and bolt located at the base of the crank handle.

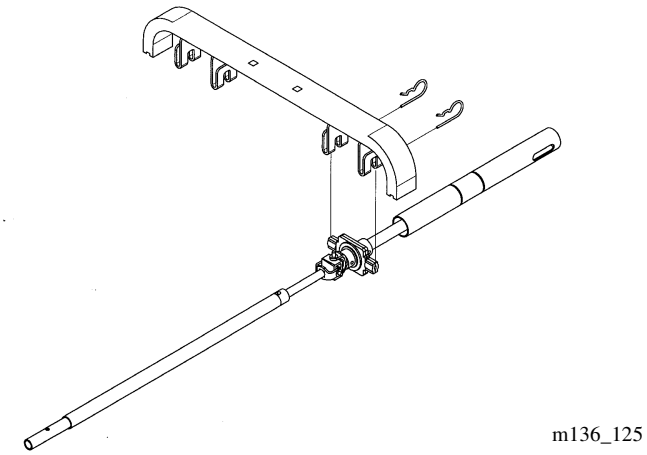
6. Remove the rue ring cotter (A) securing the knee drive assembly to yokes on the thigh section. Remove the pin (B) (see figure 4-11 on page 4-14).

Figure 4-11. Removal of the Knee Drive Assembly from Thigh Section Yokes



7. Remove the hair pins from anchor points on the bed frame crossbar, then remove the knee drive assembly (see figure 4-12 on page 4-14).

Figure 4-12. Removal of the Knee Drive Assembly from the Frame Crossbar



Replacement

1. Using lithium grease, lightly grease the knee screw assembly threads.

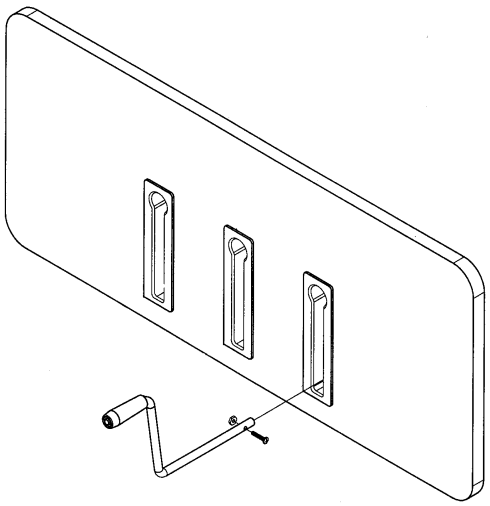
2. Attach the knee drive assembly to the bed frame by inserting two hair pins through the anchor points (see figure 4-12 on page 4-14).

3. Position the end of the knee drive assembly in the yokes on the thigh section. Insert a pin through the yokes and through holes at the end of the knee drive assembly. Secure with one rue ring cotter.

4. Insert the knee drive hand crank assembly through the slot on the foot panel, and attach it to the knee drive assembly with the bolt and nut (see figure 4-13 on page 4-15).

5. Perform an operational check of the hilow, head, and knee functions. See "Function Checks—Manual Drive Model" on page 2-5.

Figure 4-13. Attachment of the Hand Crank to the Knee Drive Assembly



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4.4 Hilow Motor Actuator

Tools required:	E-ring pliers	Pin punch
	Hammer	Pliers
	Diagonal cutters	Lithium grease (P/N SA3351)

Removal

1. Remove the mattress, and manually raise the head section of the bed to gain access to the hilow motor actuator.

2. Use jack stands to block up beneath the bed to maintain its hilow position when removing the hilow motor actuator from the bed.

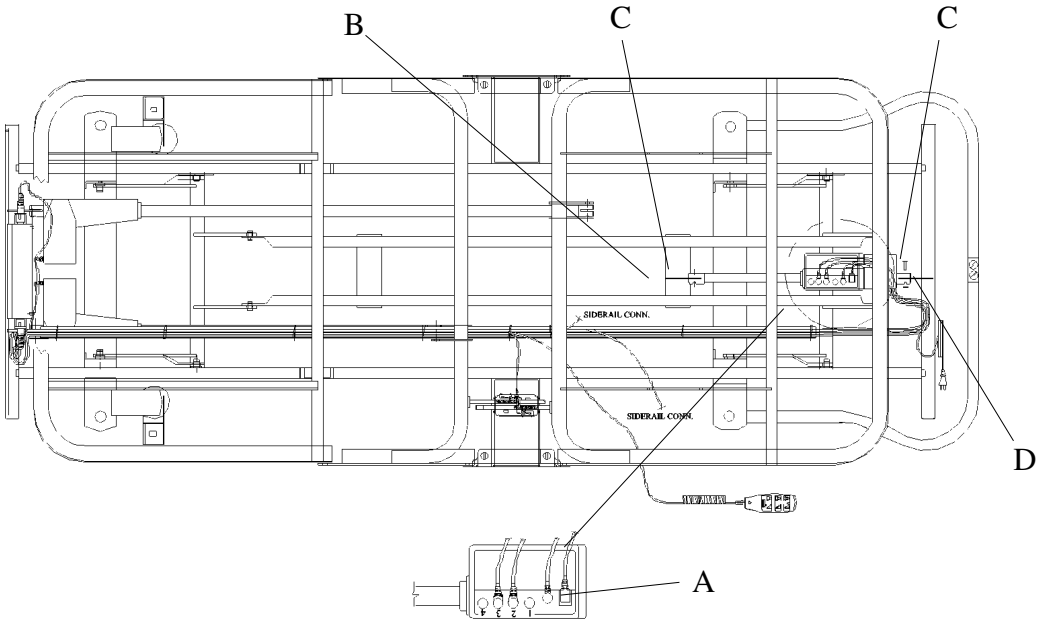
3. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

4. Disconnect **all** cables from the control box assembly (A) on top of the hilow motor actuator (see figure 4-14 on page 4-17).

Figure 4-14. Hilow Motor Actuator



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5. Remove the control box from the hilow motor actuator (refer to procedure 4.11).

6. Remove the E-rings from the clevis pins (C) connecting the hilow actuator to the pivot connector weldment (B) and the main frame (D).

7. Remove the hilow motor actuator.

Replacement

1. Assemble in reverse order.

2. Ensure that **all** cables are properly connected to the control box.

3. Lubricate the hilow motor actuator rod with lithium grease.

4. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.

4.5 Head Section Motor Actuator

Tools required:	E-ring pliers	Pin punch
	Hammer	Pliers
	Diagonal cutters	Lithium grease (P/N SA3351)

Removal

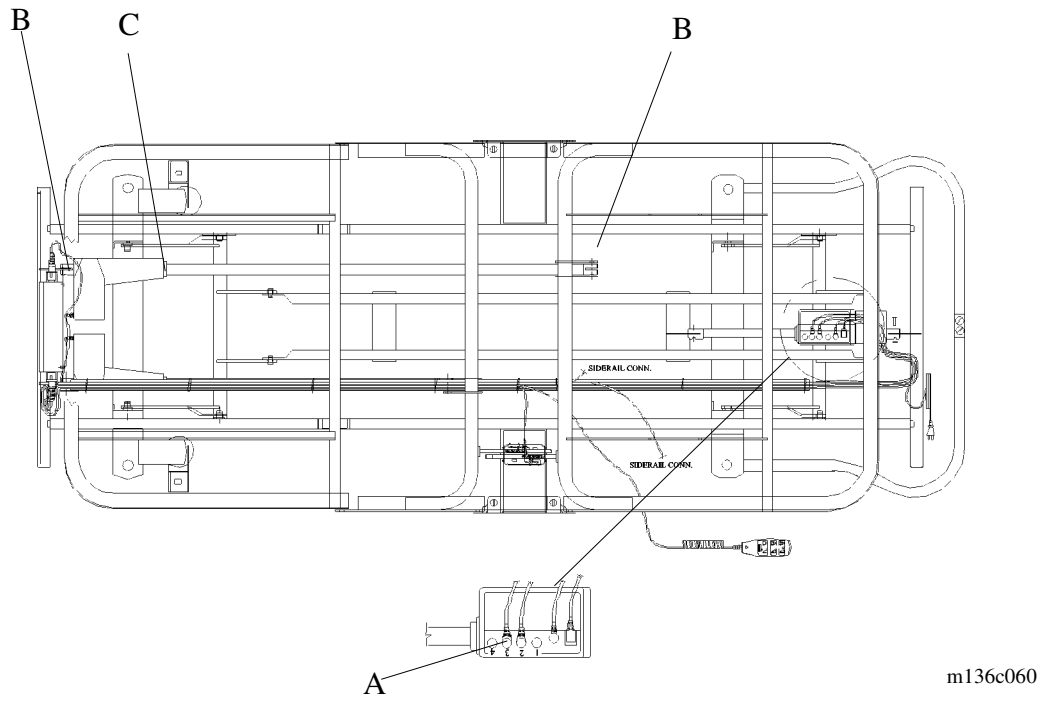
1. Remove the mattress, and completely lower the head section of the bed.

2. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

3. Manually raise the head section of the bed, and unplug the head motor actuator cable (A) from the control box (see figure 4-15 on page 4-18).

Figure 4-15. Head Section Motor Actuator



NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

4. Remove the cable ties with the diagonal cutters.

5. Manually raise the foot section assembly, and fold it over toward the thigh section assembly for easier access to the head motor actuator (C).

6. Remove the E-rings from the clevis pins (B) connecting the head motor actuator to the main frame and to the weldment on the head section crosstube.

7. Remove the clevis pins (B) connecting the head motor actuator to the head section crosstube and to the main frame.

8. Remove the head motor actuator (C) and its connecting cable as an assembly.

Replacement

1. Assemble in reverse order.

2. Ensure that **all** control cables are properly routed and connected to the control box.

3. Install the cable ties to secure the control cables where they will not be damaged during bed operation.

4. Lubricate the head motor actuator rod with lithium grease.

5. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.).

4.6 Knee Section Motor Actuator

Tools required:	E-ring pliers	Pin punch
	Hammer	Pliers
	Diagonal cutters	Lithium grease (P/N SA3351)

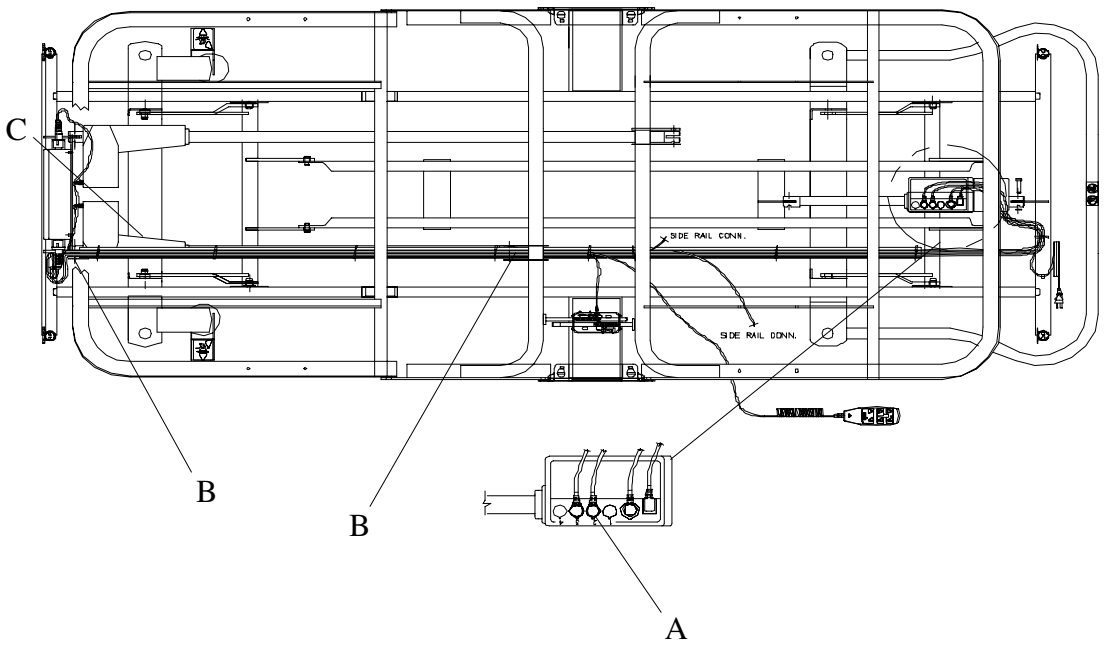
Removal

1. Remove the mattress, and completely lower the head section of the bed.
2. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

3. Manually raise the head section of the bed, and unplug the knee motor actuator cable (A) from the control box (see figure 4-16 on page 4-20).

Figure 4-16. Knee Section Motor Actuator



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NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

4. Remove the cable ties with the diagonal cutters.

5. Manually raise the foot section assembly of the bed, and fold it over onto the thigh section assembly to access the knee motor actuator (C).

6. Remove the E-rings from the clevis pins (B) connecting the knee motor actuator to the weldment on the main frame and to the weldment on the knee section crosstube.

7. Remove the clevis pins (B) connecting the knee motor actuator to the knee section crosstube and to the main frame.

8. Remove the knee motor actuator (C) and connecting cable as an assembly.

Replacement

1. Assemble in reverse order.

2. Ensure that **all** control cables are properly routed and connected to the control box.

3. Install the cable ties to secure the control cables where they will not be damaged during bed operation.

4. Lubricate the knee motor actuator rod with lithium grease.

5. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.

4.7 Automatic Contour Module

Tools required: Phillips head screwdriver Diagonal cutters

Removal

1. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

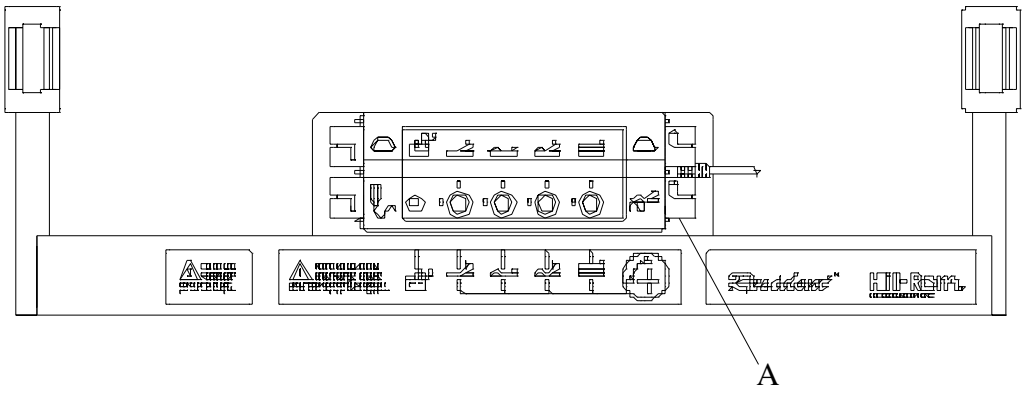
2. Remove the mattress from the bed. If a hard pan sleep surface is installed on the bed, remove the seat pan from the seat area of the frame.

3. Disconnect the automatic contour cable (A) from the control lockout box (see figure 4-17 on page 4-22).

NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

4. Remove the attached cable ties.

Figure 4-17. Control Lockout Box



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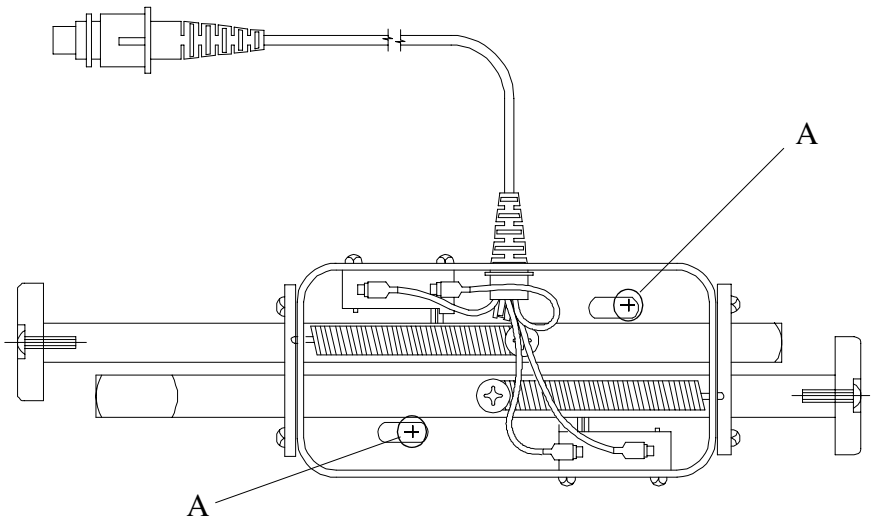
5. Remove the two screws securing the cover to the automatic contour module (A) (see figure 4-18 on page 4-23). Remove the cover.

6. Remove the two screws (A) securing the automatic contour module to the weldment bracket (see figure 4-18 on page 4-23). Remove the module with the attached cable as an assembly.

Figure 4-18. Automatic Contour Module—Cover Removed

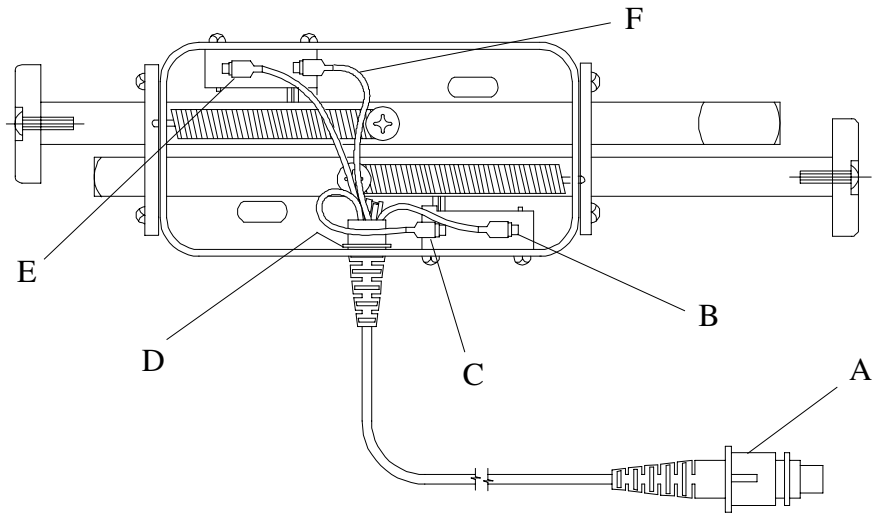


Replacement

1. Assemble in reverse order.

2. Check that the cable (A) is secured to the automatic contour module by the snap ring (D) (see figure 4-19 on page 4-24).

Figure 4-19. Automatic Contour Module—Internal Wire Connections



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3. Check that the wires (B, C, E, and F) are connected to the microswitches inside the automatic contour module. The green wire (B), blue wire (C), white wire (E), and orange wire (F) connect as shown.

4. Ensure that **all** cables are properly routed, and the automatic contour module cable (A) is connected to the control lockout box (see figure 4-17 on page 4-22).

5. Install cable ties to secure the control cables where they will not be damaged during bed operation.

6. Perform an operational check of the automatic contour functions (see "Function Checks—Electric Drive Model" on page 2-10). Adjust the module as necessary (see "Adjustment" on page 4-25).

Adjustment

1. With the automatic contour module installed on the bed and its cover removed, plug the bed into an appropriate power source.

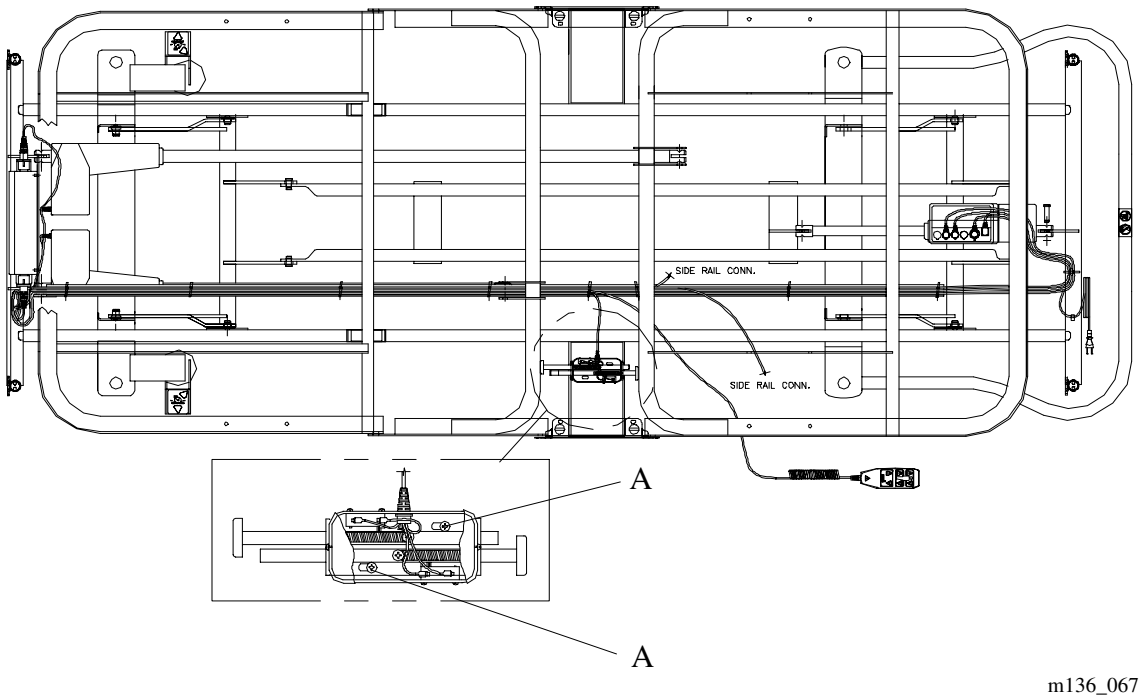
2. Press the HEAD Up button to raise the head. Check the head angle indicator decals (located at both sides of the bed on the sleep surface) to observe the degree at which the knee section stops rising. This should be approximately 15°. Continue to raise the head section until clearance exists between the sleep surface crosstube and the plunger at the head end side of the automatic contour module.

3. Press the HEAD Down button to lower the head section. Check the head angle degree at which the knee section begins to lower. This should be approximately 15°. Continue to lower the head and knee sections to the flat position.

4. If adjustment is necessary:

   a. Loosen, do not remove, the two screws (A) securing the automatic contour module to the weldment bracket (see figure 4-20 on page 4-25).

Figure 4-20. Automatic Contour Module—Cover Removed



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b. Slide the automatic contour module assembly toward the head end of the bed to decrease the knee up angle. Slide the automatic contour module assembly toward the foot end of the bed to increase the knee up angle.

c. Tighten both screws after making the necessary adjustment.

d. Perform an operational check of the automatic contour function after each adjustment.

5. Install the cover on the automatic contour module, and secure it with two phillips head screws.

4.8 Optional Siderail Control Panels

Tools required: Phillips head screwdriver T25 torx head screwdriver
Diagonal cutters

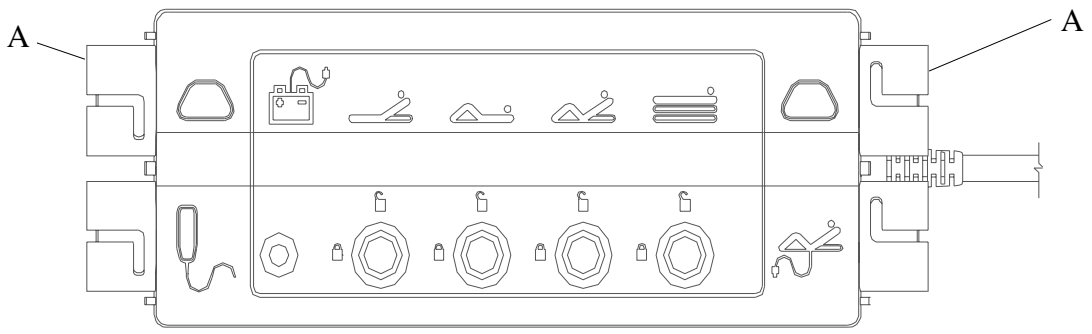
Removal

1. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

2. Disconnect the siderail control cable from connection (A) at the control lockout box (see figure 4-21 on page 4-27).

Figure 4-21. Location Of Siderail Control Cable Connections At Control Lockout



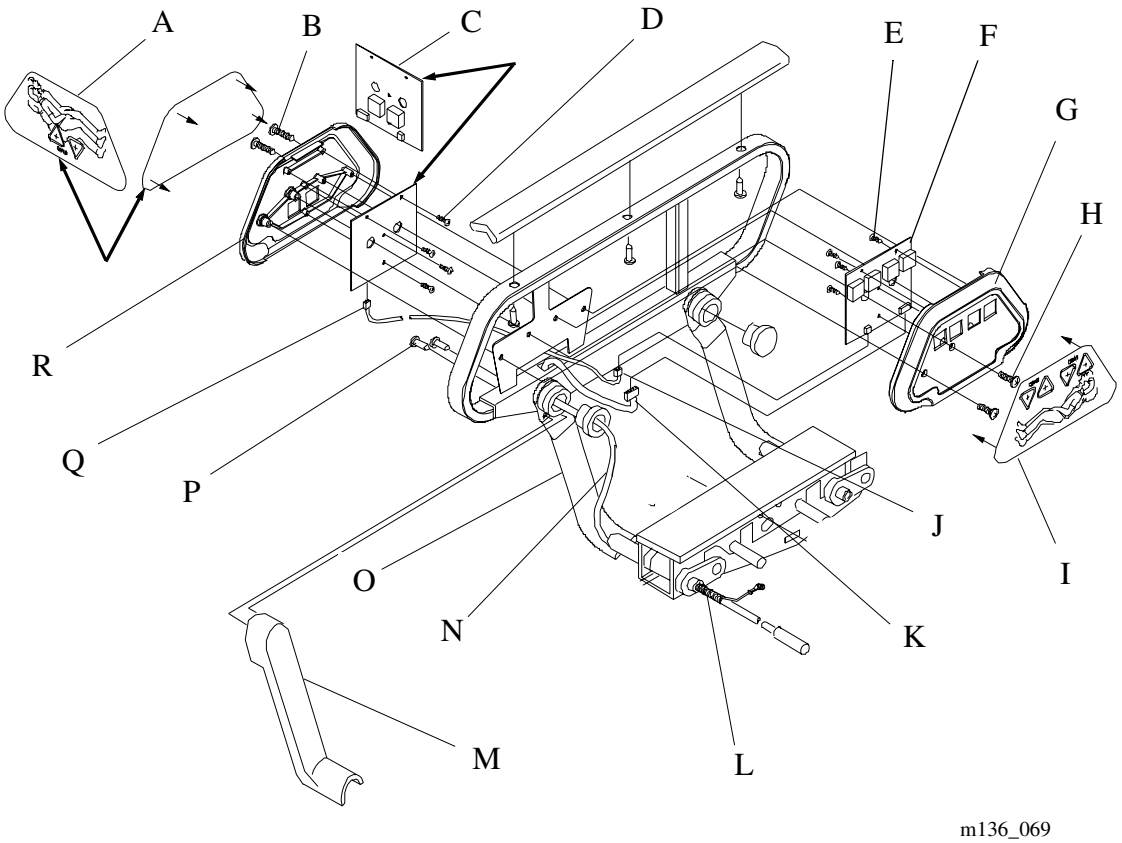
NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

3. Remove the attached cable ties.

4. Carefully peel the hilow label (A) from the outer surface of the siderail control (R) and the head/seat label (I) from the inner surface of the control (G) (see figure 4-22 on page 4-28).

CAUTION:
Use care when removing the siderail labels to prevent damage. Replace damaged labels with new ones.

Figure 4-22. Optional Siderail Control Panel—Right Hand Shown



5. Remove the two phillips head screws (H) securing the inboard housing (G) and the two phillips head screws (B) securing the outboard housing (R) to each other. Carefully separate the two housings. Do not drop either housing to prevent damage to the installed printed circuit boards.

CAUTION:
Do not drop the printed circuit (P.C.) board against the siderail or the sleep surface frame. Damage to the equipment may occur.

6. If the main cable (N) to the control lockout is being replaced:
   a. Remove the two torx head screws (P) securing the wire cover (M) to the siderail pivot arm (O). Remove the cover from the siderail.
   b. Carefully remove the four phillips head screws (E). Separate the head/knee P.C. board (F) from the inner housing(G).

c. Clip the cable wires approximately 1" (2.54 cm) from the connector (K). Slide this connector from the P.C. board. Use the color-coded wires as a guide when connecting the new cable to the connector.

d. Pull the siderail control cable (N) free of the siderail.

e. Insert the new cable through the spring (L) installed in the siderail. Route it up the siderail arm, through the bushing, and through the cutout in the bottom of the siderail.

f. Connect the new cable to the connector using the color-coded wires in the removed connector as a guide for proper connections (see "Siderail Control Schematic" on page 3-4).

g. Slide the cable connector (K) onto the P.C. board.

h. Position the head/knee P.C. board (F) to the inner housing (G), and secure it with the four phillips head screws (E). Use care when tightening the mounting screws to prevent damage to the P.C. board.

CAUTION:
Overtightening the mounting screws can crack the P.C. board.

i. While ensuring that control cable (N) is centered inside the wire cover (M), maneuver the cover into position on the siderail pivot arm (O).

j. Install the two torx head screws (P) to secure the wire cover to the siderail pivot arm.

7. If the head/knee P.C. board (F) is to be replaced, proceed as follows:

a. Carefully remove the four phillips head screws (E) securing the head/knee P.C. board (F) to the inner housing (G).

b. Slide the control cable connector (K) from its terminal on the head/knee P.C. board.

c. Side the cable connector (J) from its terminal on the head/knee P.C. board, and remove the head/knee P.C. board.

d. Connect the cable (J) leading from the hilow P.C. board (C) to its terminal on the replacement head/knee P.C. board (F).

e. Connect the control cable connector (K) to its terminal on the head/knee P.C. board (F).

f. Position the head/knee P.C. board to the inner housing (G), and secure it with the four phillips head screws (E). Use care when tightening the mounting screws to prevent damage to the P.C. board.

CAUTION:
Overtightening the mounting screws can crack the P.C. board.

8. If the hilow P.C. board is to be replaced, proceed as follows:
   a. Carefully remove the four phillips head screws (D) securing the hilow P.C. board (C) to the outer housing (R).
   b. Slide the cable connector (Q) from the hilow P.C. board, and remove the hilow P.C. board (C).
   c. Connect the cable connector (Q) leading from the head/knee P.C. board (F) to its terminal on the replacement hilow P.C. board (C).
   d. Position the hilow P.C. board (C) to the outer housing (R), and secure it with the four phillips head screws (D). Use care when tightening the mounting screws to prevent damage to the P.C. board.

CAUTION:
Overtightening the mounting screws can crack the P.C. board.

Replacement

1. Assemble in reverse order. Replace the siderail labels (A and I) if damaged.
2. Ensure that the connected control cable is properly routed along the main frame and connected to the control lockout box.
3. Install the cable ties to secure the control cable where it will not be damaged during bed operation.
4. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.

4.9 Handset Control

Tools required: Diagonal cutters

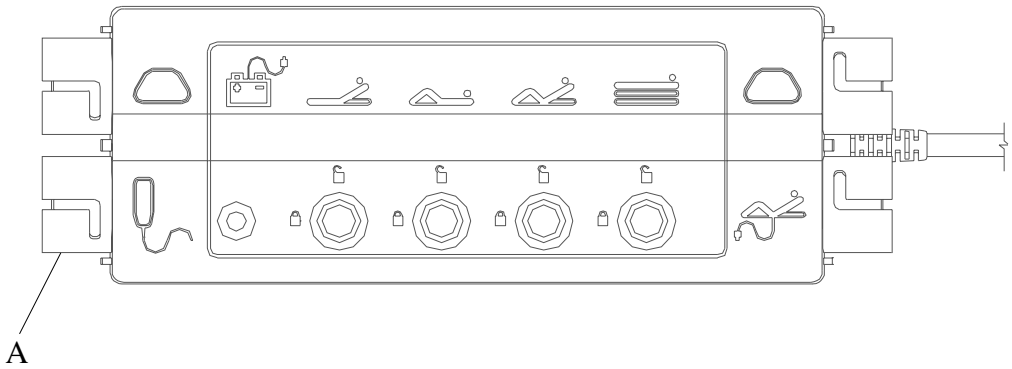
Removal

1. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

2. Disconnect the handset control cable from its connection (A) at the control lockout box (see figure 4-23 on page 4-31).

Figure 4-23. Location Of Handset Control Connection At Control Lockout Box



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NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

3. Remove the attached cable ties.

4. Remove the handset control and the attached cable as an assembly.

Replacement

1. Assemble in reverse order.

2. Ensure that the connected cable is properly routed and connected to the control lockout box.

3. Install the cable ties to secure the handset control cable where it will not be damaged during bed operation.

4. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.

4.10 Control Lockout Box

Tools required: Phillips head screwdriver Diagonal cutters

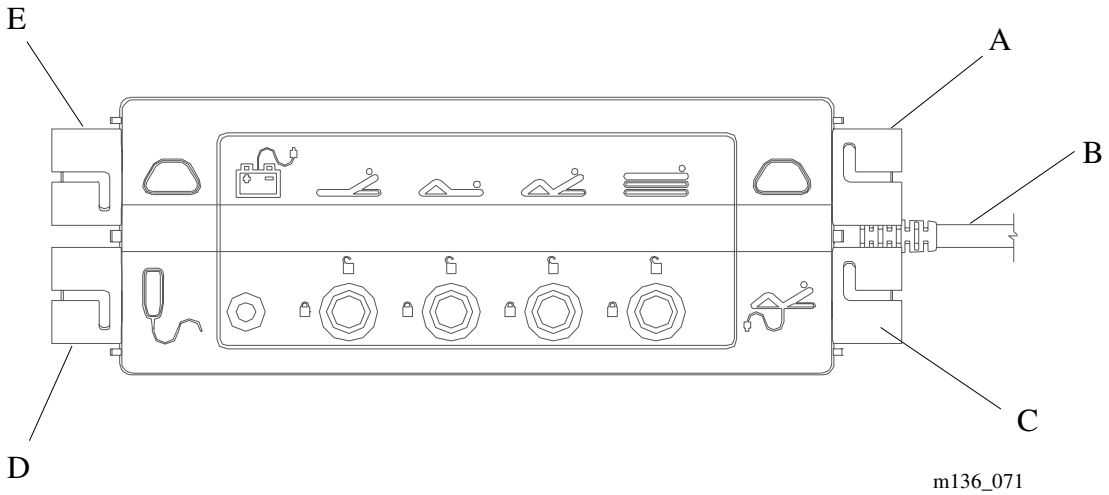
Removal

1. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

2. Disconnect, if applicable, the left-hand siderail cable (A), right-hand siderail cable (E), handset cable (D), and the automatic contour cable (C) from the control lockout box (see figure 4-24 on page 4-33).

Figure 4-24. Location Of Control Lockout Box Cable Connections



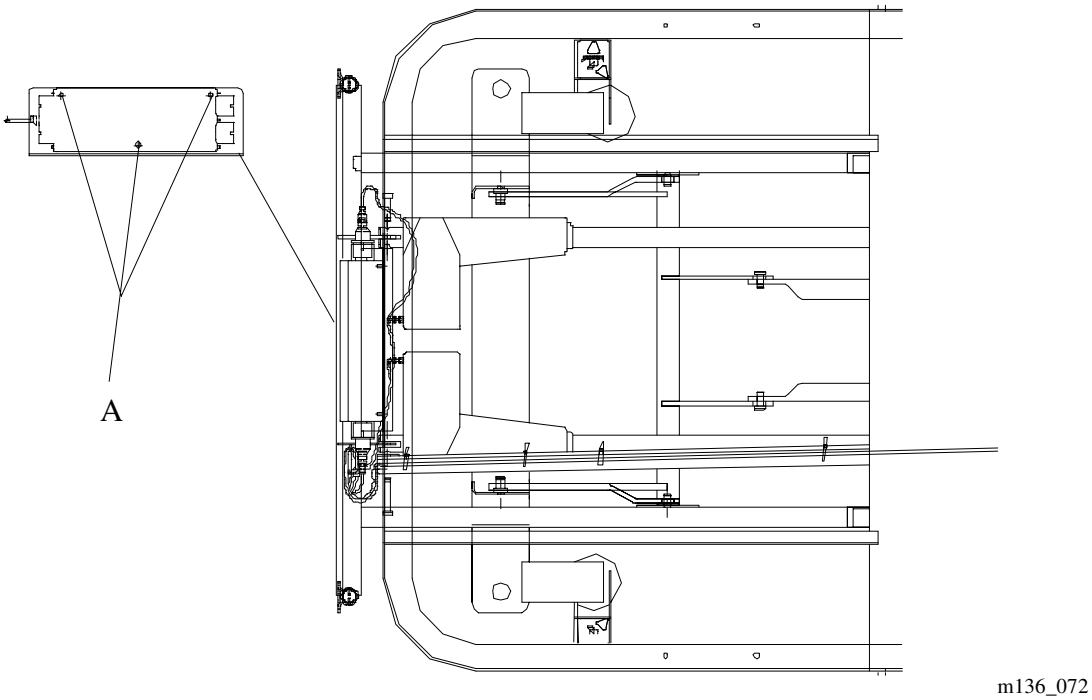
3. Disconnect the power/hilow cable (B) from the control box mounted on top of the hilow motor actuator (see figure 4-14 on page 4-17).

NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

4. Remove the attached cable ties.

5. Remove the three screws (A) mounting the control lockout box to the foot of the main frame (see figure 4-25 on page 4-34). Remove the control lockout with the attached cable as an assembly.

Figure 4-25. Control Lockout Box Mounting Screws



4

Replacement

1. Assemble in reverse order.
2. Ensure that the power/hilow cable is properly routed and connected to the control box (mounted on top of the hilow motor actuator).
3. Install the cable ties to secure the power/hilow cable where it will not be damaged during bed operation.
4. Connect the siderail cables, handset cable, and automatic contour cable to their respective receptacles on the control lockout box.
5. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.

4.11 Control Box

Tools required: Phillips head screwdriver

Removal

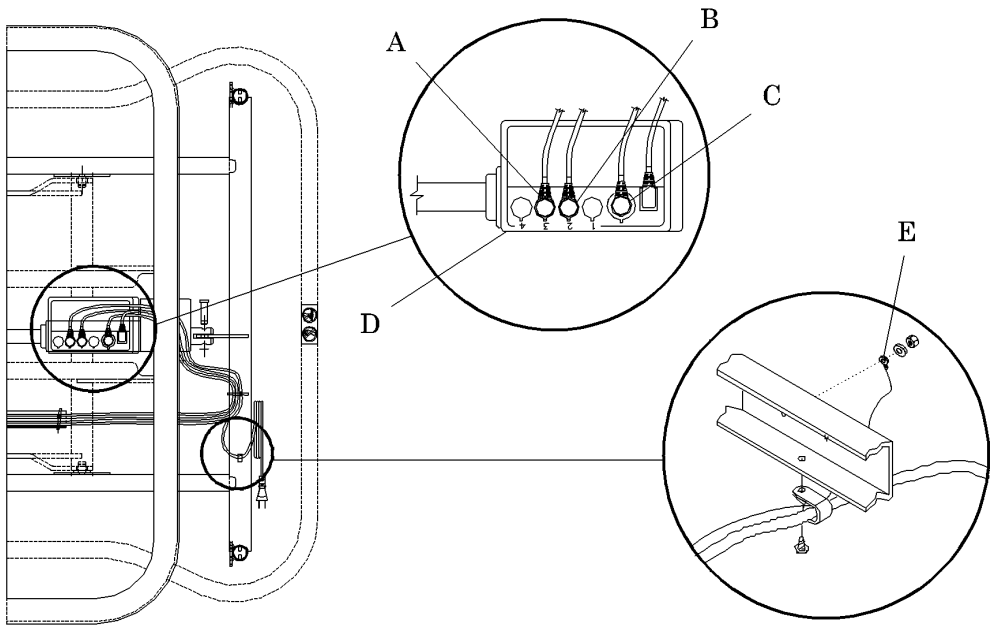
1. Remove the mattress, and raise the head section of the bed to gain access to the control box.

2. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

3. Disconnect the head motor actuator cable (A), knee motor actuator cable (B), and power/hilow cable (C), from the control box, and disconnect the ground wire (E) from the head end channel, if present (see figure 4-26 on page 4-35).

Figure 4-26. Control Box



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4. Slide the plastic door (D) towards the center of the bed, and remove this door (for access to a hidden mounting screw).

5. Remove the hidden mounting screw (securing the control box to the hilow motor actuator.

6. Slide the control box toward the center of the bed, and remove it from the hilow motor actuator.

Replacement

1. Assemble in reverse order.

2. Ensure that the base of the control box correctly engages its mounting slides on top of the hilow motor actuator. The hilow motor actuator connecting pin must align with its receptacle in the control box.

CAUTION:
The hilow motor actuator connecting pin must align with its receptacle in the control box. Equipment damage may occur.

3. Ensure that all cables are properly connected to the control box.

4. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.

4.12 Siderails

Tools required: T25 torx head screwdriver Diagonal cutters
Teflon® lubricant (P/N SA0646)

Removal

The optional caregiver and resident controls can be mounted on the head end siderails.

1. Raise the bed to gain access to the underside of the sleep surface frame assembly.

2. If equipped with electrical components, unplug the bed from its power source.

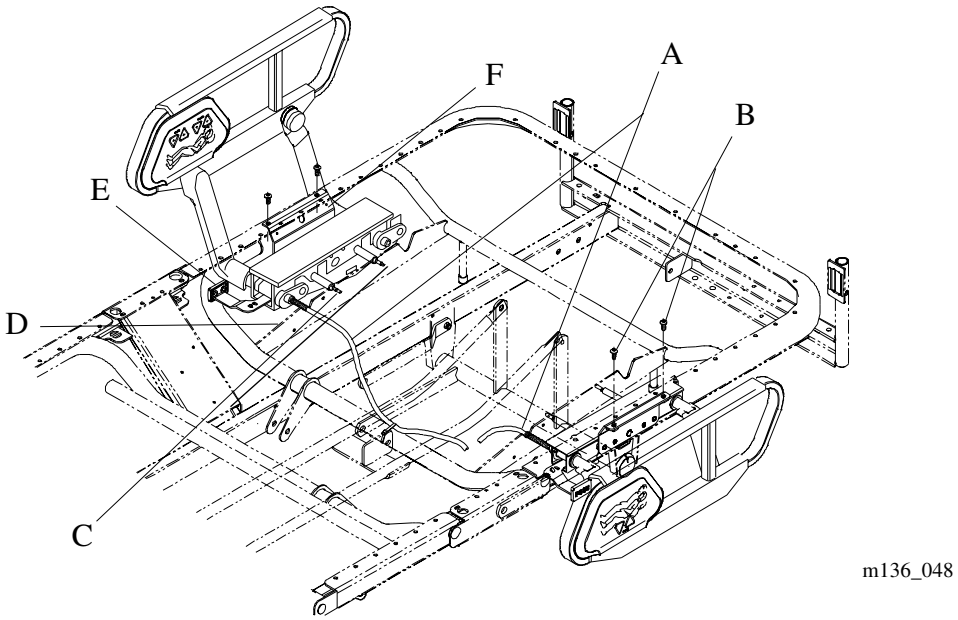
SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

3. If the siderail has caregiver/resident controls, disconnect the siderail control cable (A) from the control lockout (see figure 4-27 on page 4-38).

NOTE:
Record the cable routing and placement of cable ties for replacement purposes.

4. Remove the attached cable ties.

Figure 4-27. Head Section Siderails With Controls



5. Raise the siderail.
6. Remove the two torx head screws (B), taking care not to drop the siderail.
7. Remove the entire siderail assembly downward from the sleep surface frame assembly.

Replacement

1. With the siderail control correctly installed (if appropriate) and the mounting plate (F) inserted into the siderail, position the siderail assembly beneath the sleep surface frame assembly. The siderail release latch (E) is to be toward the center of the bed.
2. Ensure that the guide pins (C) on the mounting plate (F) correctly enter the holes in the sleep surface frame at (D).
3. Install the torx head screws (B) and tighten securely.
4. If the siderail has caregiver and resident controls:
   a. Route the siderail control cable (A) along the main frame, and connect it to the control lockout box.
   b. Install cable ties to secure the siderail control cable to the cable channel where it will not be damaged during bed operation.

5. Lubricate the siderail latching mechanism with Teflon® lubricant.
6. Raise, lower, and store the siderail to ensure it functions correctly.

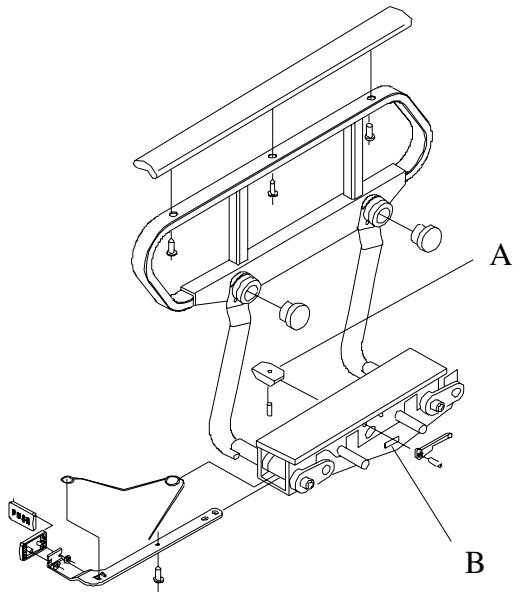
4.13 Siderail Latch

Tools required: Drift punch, Hammer, Crescent wrench, Teflon® lubricant (P/N SA0646)

Adjustment

1. Raise the bed to gain access to the underside of the siderail assembly.
2. Raise the siderail.
3. Check the alignment of the latch block (A) and with the notch in the strap assembly (B) (see figure 4-28 on page 4-40).

Figure 4-28. Siderail Latch Mechanism



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4. Use a punch and hammer to move the latch block upward, or use a crescent wrench to bend the strap so the latch block aligns with the notch in the strap assembly (B).
5. Lubricate the latch mechanism with Teflon lubricant.
6. Raise and lower the siderail to ensure the siderail latch functions correctly.

4.14 Sleep Surface Frame Assembly

Tools required:	E-ring pliers	Ratchet with 3" extension
	5/8" socket	Jack stands

Removal

1. Remove the mattress and raise the hilow to gain access to the motor actuator connections on the sleep surface frame.

2. Use jack stands to block up beneath the bed's main frame to maintain its hilow position when disconnecting the motor actuators from the sleep surface frame.

WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

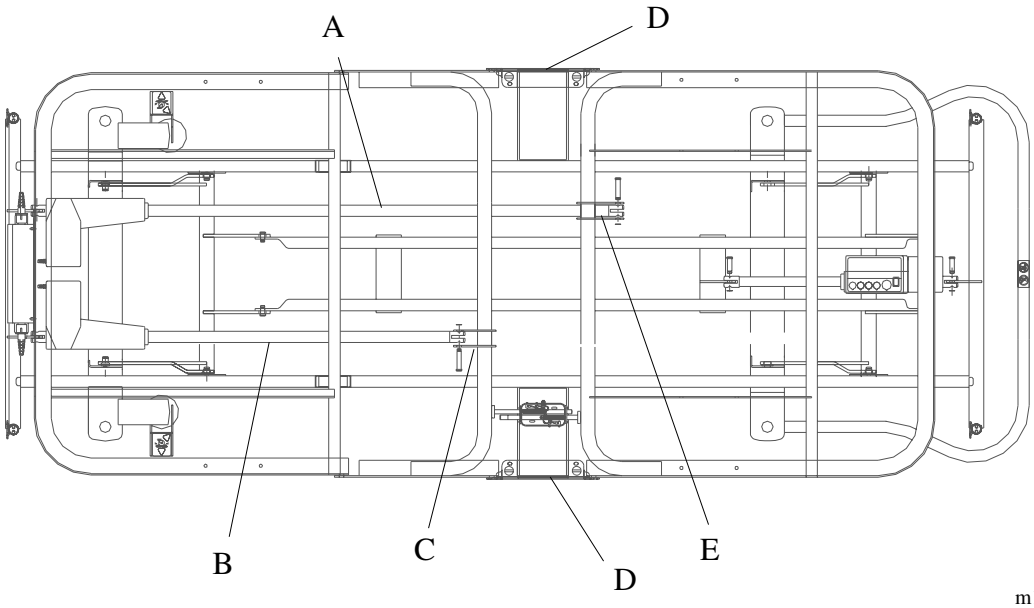
3. Unplug the bed from its power source.

SHOCK HAZARD:
Unplug the bed from its power source. An electrical shock hazard exists.

4. Remove all siderails from the bed (see "Removal" on page 4-37).

5. Remove the rue cotter ring and pin connecting the head motor actuator (A) to the head section crosstube bracket (D) (see figure 4-29 on page 4-42).

Figure 4-29. Sleep Surface Frame Assembly—Top View



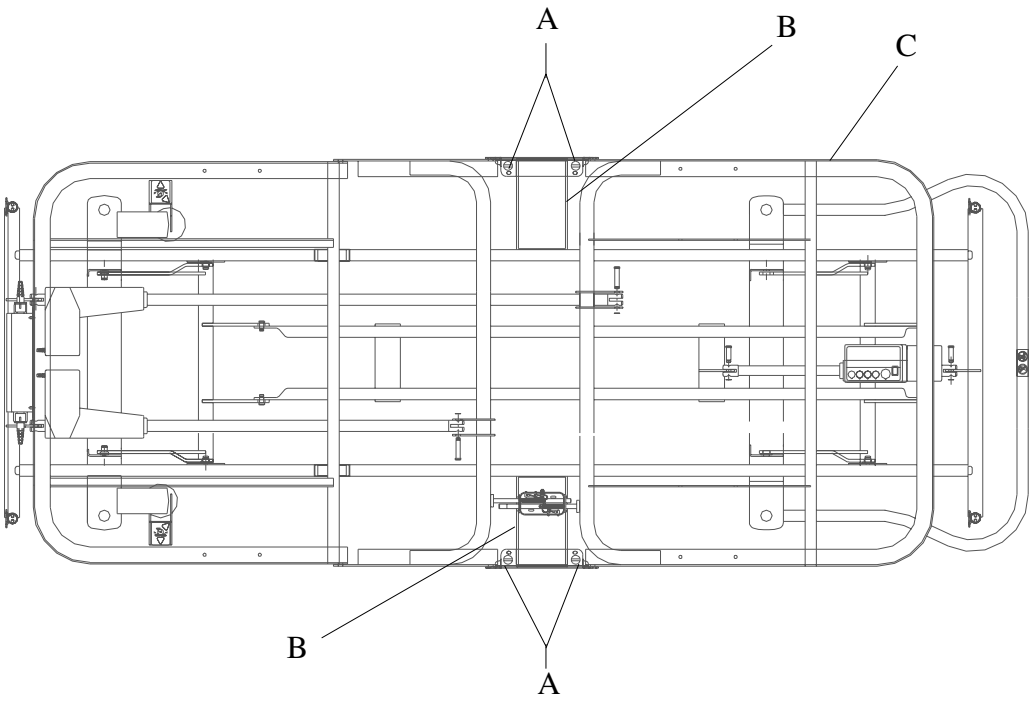
6. Remove the rue cotter ring and pin connecting the knee motor actuator (B) to the knee section crosstube bracket (C).

7. If the bed has a spring frame sleep surface, disconnect the spring coils from the main frame weldment brackets (D).

8. If the bed has a hard pan sleep surface, remove the torx head screws fastening the seat pan to the main frame weldment brackets (D).

9. Remove the nuts and washers (A) attaching the sleep surface frame (C) to the main frame weldment brackets (B) (see figure 4-30 on page 4-43).

Figure 4-30. Sleep Surface Frame Attaching Points to Main Frame



10. Remove the shoulder screws and washers.

11. Lift the sleep surface frame assembly (C) from the main frame.

Replacement

1. Assemble in reverse order.

2. Ensure that all three motor actuators are properly connected and all E-rings are installed.

3. Perform an operational check of the hilow, head, and knee functions. See “Function Checks—Electric Drive Model” on page 2-10.

4.15 Fixed Casters

Tools required:	Ratchet with 3" extension	1/2" socket
	1/2" wrench	3/4" socket
	Jack stands	

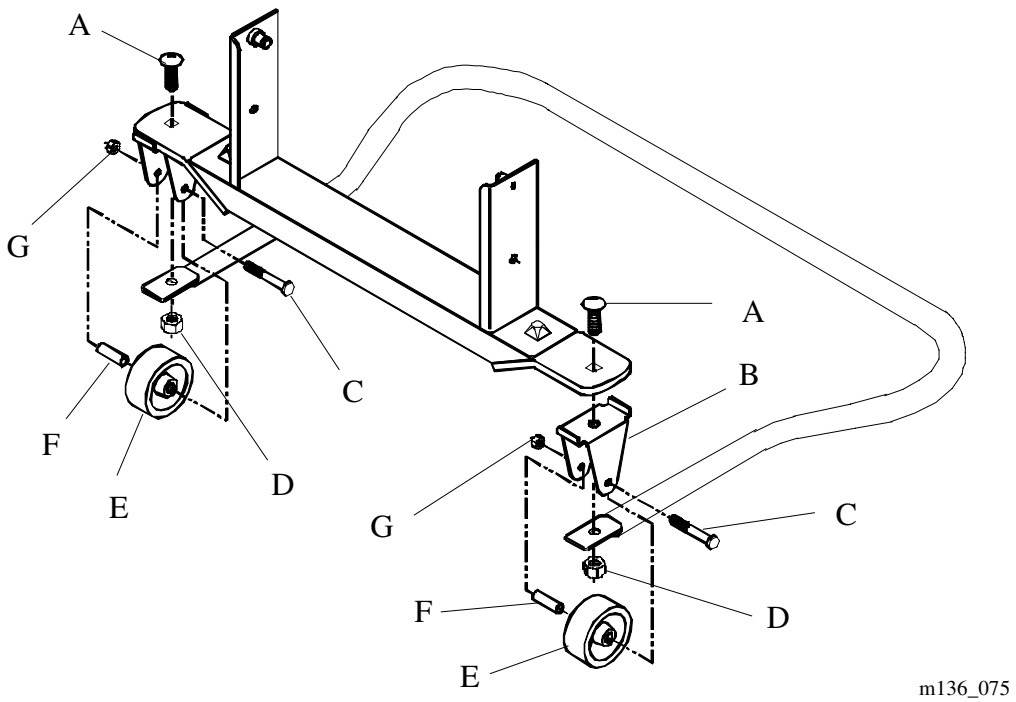
Removal

1. Use jack stands to block up beneath the bed's main frame to raise the caster frame high enough to allow for caster removal.

WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

2. Remove the locknut (G) and the caster wheel bolt (C) (see figure 4-31 on page 4-44).

Figure 4-31. Fixed Casters And Frame Assembly



3. Remove the caster wheel (E) and bushing (F).

4. Remove the locknut (D) and carriage bolt (A).

5. Pull downward on the caster housing (B) to remove it from the frame and bumper assembly.

Replacement

Assemble in reverse order.

4.16 Fixed Casters (model B)

Tools required:	Ratchet with 3" extension	1/2" socket
	1/2" wrench	3/4" socket
	Jack stands	

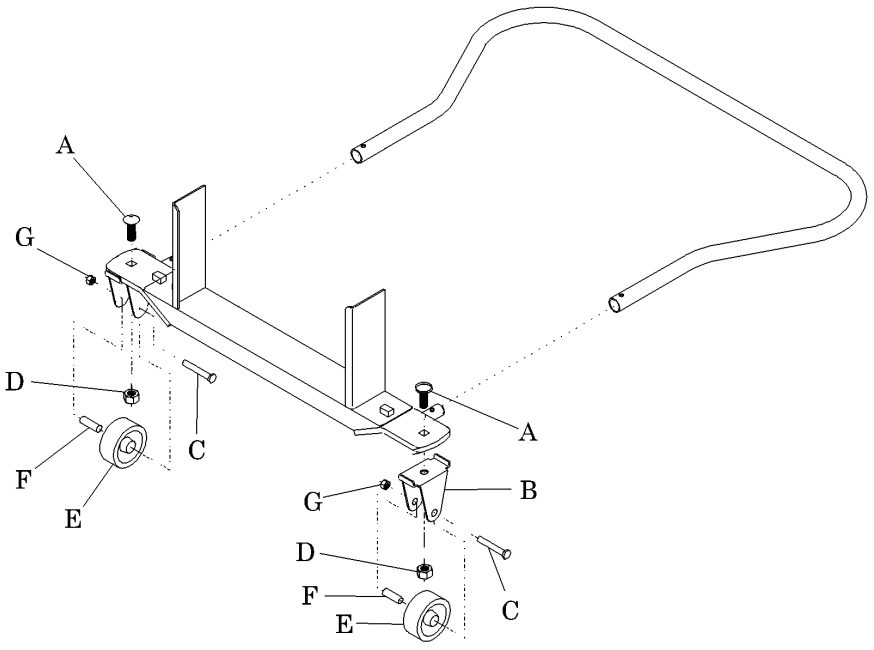
Removal

1. Use jack stands to block up beneath the bed's main frame to raise the caster frame high enough to allow for caster removal.

WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

2. Remove the locknut (G) and the caster wheel bolt (C) (see figure 4-32 on page 4-46).

Figure 4-32. Fixed Casters And Frame Assembly



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3. Remove the caster wheel (E) and bushing (F).

4. Remove the locknut (D) and carriage bolt (A).
5. Pull downward on the caster housing (B) to remove it from the frame.

Replacement

Assemble in reverse order.

4.17 Swivel Casters

Tools required:	Ratchet with 3" extension	1/2" socket
	1/2" wrench	3/4" socket
	Jack stands	

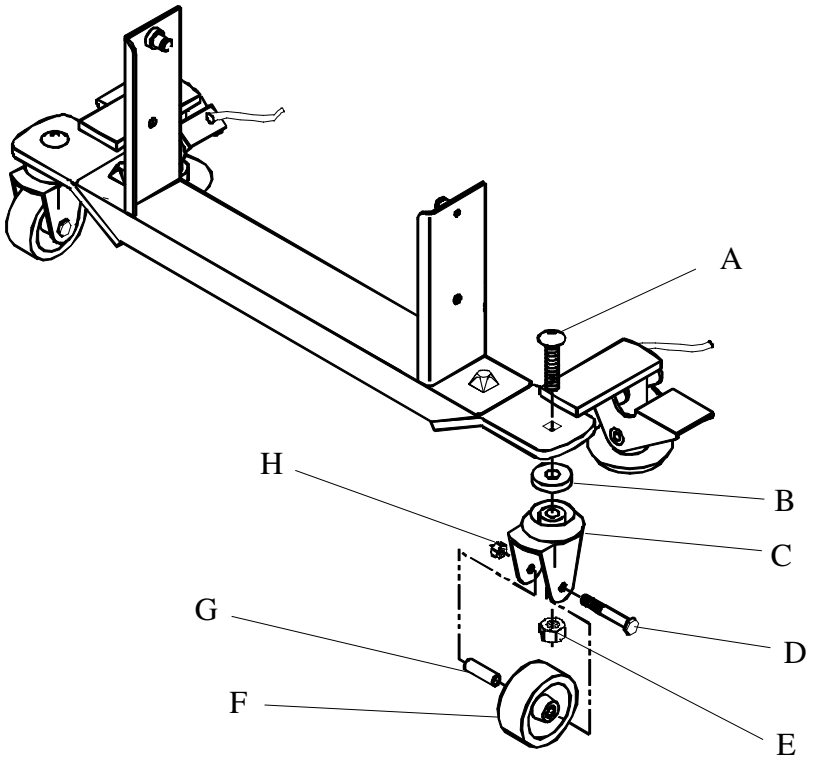
Removal

1. Use jack stands to block up beneath the bed's main frame to raise the caster frame high enough to allow for caster removal.

WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

2. Remove the locknut (H) and caster wheel bolt (D) (see figure 4-33 on page 4-48).

Figure 4-33. Swivel Caster and Frame Assembly



m136_076

3. Remove the caster wheel (F) and bushing (G).
4. Remove the locknut (E), carriage bolt (A), and washer (B).
5. Pull downward on the caster housing (C) to remove it from the caster frame.

Replacement

Assemble in reverse order.

4.18 Individually Operated Brakes

Tools required:	Ratchet with 3" extension	1/2" socket
	1/2" wrench	3/4" socket
	Pin punch	Hammer
	Jack stands	

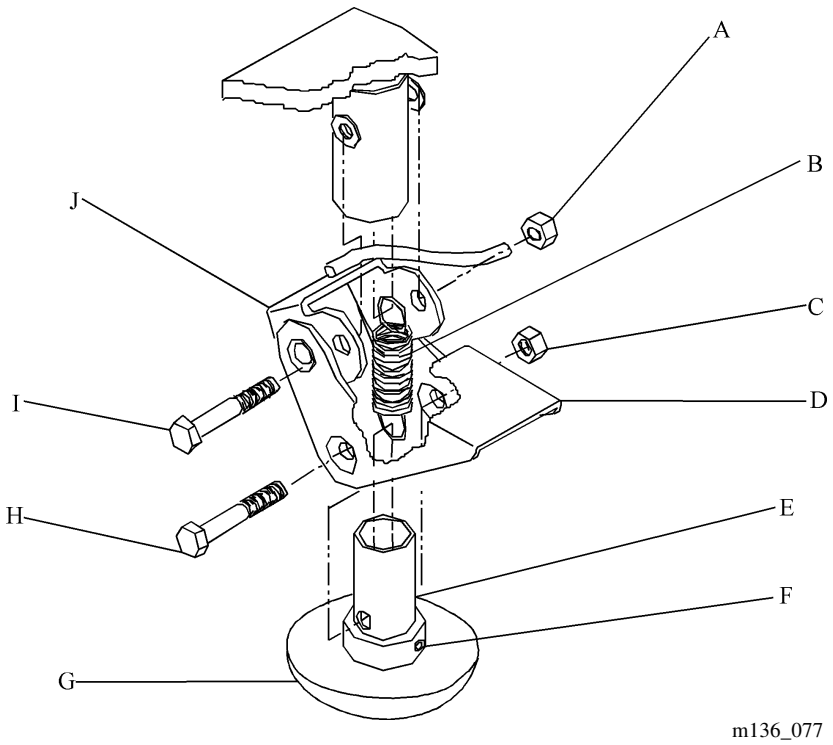
Removal

1. Use jack stands to block up beneath the bed's main frame to raise the caster frame high enough to allow for brake assembly removal.

WARNING:
It is not advisable or necessary for personnel to have their entire body below the sleep surface and within the confines of the bed. If service personnel need to get under the bed, use suitable jackstands to block up the bed frame as an added precaution.

2. Remove the locknut (C) and bolt (H) (see figure 4-34 on page 4-50). Remove the brake pad (G) and the lower tube (E) downward from the assembly.

Figure 4-34. Individually Operated Brakes



3. If the brake pad (G) is to be replaced, remove the roll pin (F), and separate the brake pad from the lower tube (E).

4. Remove the locknut (A) and bolt (I). Remove the spring (B), the pedal (D), and the release lever (J) downward from the upper tube.

Replacement

1. Assemble in reverse order.

2. Ensure that the bolts (I and H) are through the ends of the spring (B).

3. Perform an operational check of the brake (see “Function Checks—Electric Drive Model” on page 2-10).

4.19 Bumper Assembly

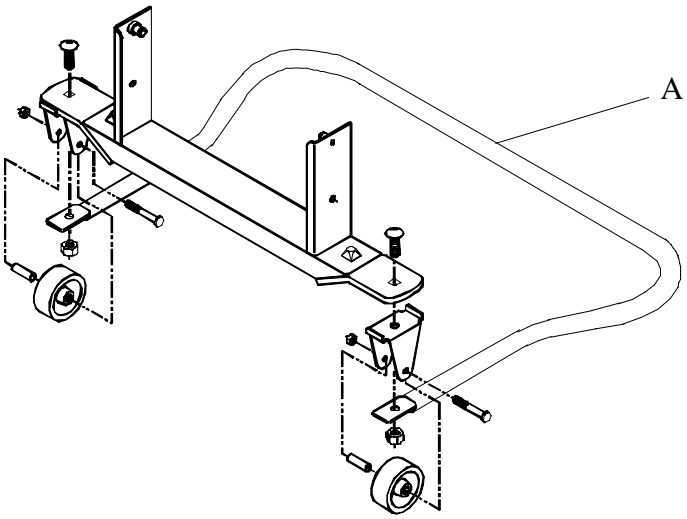
Tools required:	Ratchet with 3" extension	1/2" socket
	1/2" wrench	3/4" socket
	Jack stands	

Removal

1. Remove both fixed casters from the caster frame (see“Removal” on page 4-44).

2. Pull downward on the bumper (A), and remove it from the fixed caster frame (see figure 4-35 on page 4-52).

Figure 4-35. Bumper Assembly



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Replacement

Assemble in reverse order.

4.20 Bumper Assembly (model B)

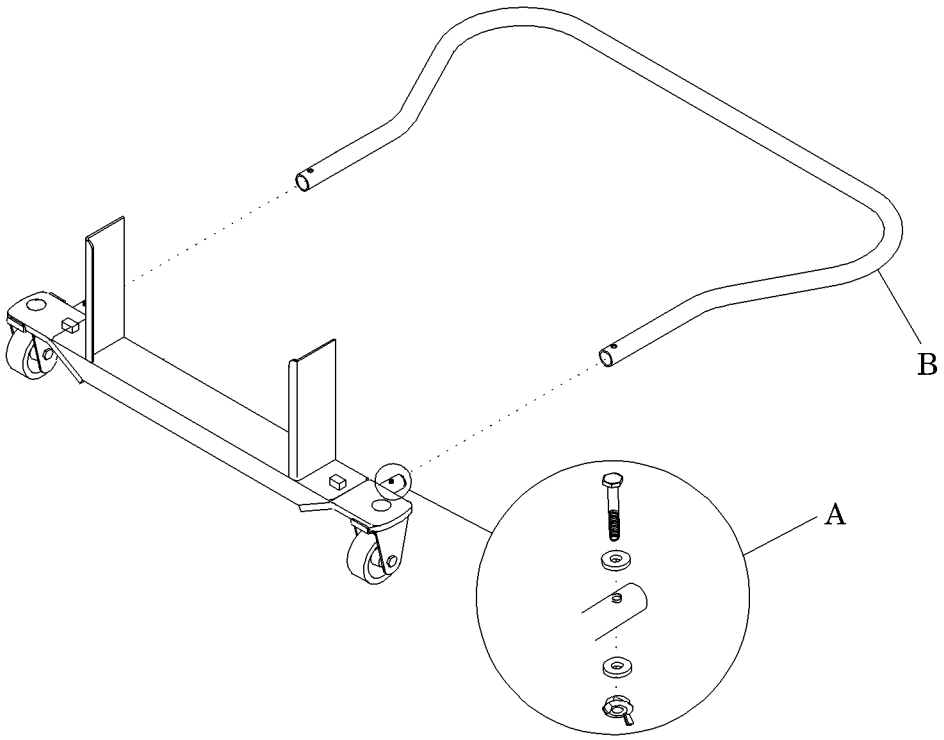
Tools required: 1/2" wrench

Removal

1. Remove a wing nut, two washers, and a bolt (A) from each side of the bed bumper assembly at the head end.

2. Slide the bed bumper (B) off of the bed frame at the head end.

Figure 4-36. Bumper Assembly (model B)



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Replacement

Assemble in reverse order.

NOTES:

Chapter 5
Parts List

Chapter Contents

5

NOTES:

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 customer. 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.

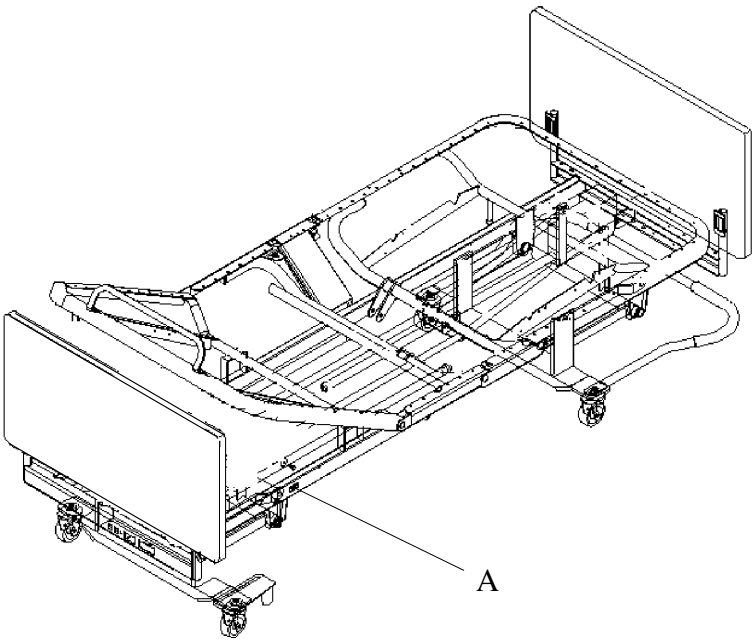
Revised April 17, 1997

NOTES:

Service Parts Ordering

Using the parts lists in this manual, identify the part number(s) you require. Find the product number and serial number on the product identification label (A) (see figure 5-1 on page 5-5).

Figure 5-1. Product Identification Label Location



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Call Hill-Rom Technical Support at (800) 445-3720 with the following information:

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

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

To order parts, a $40.00 minimum will prevent a charge for processing your order.

Terms:

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

Address all inquiries to:

ATTN TECHNICAL SUPPORT—PARTS
HILL-ROM COMPANY
1069 STATE ROUTE 46 E
BATESVILLE IN 47006-9167

Address all return goods to:

ATTN SERVICE STORES
DISTRIBUTION CENTER DOOR D23
HILL-ROM COMPANY
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, obtain one by phoning Hill-Rom Technical Support at (800) 445-3720.

Exchange Policy

The following are Hill-Rom's policies for in-warranty and out-of-warranty exchanges.

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 pertains **only** to 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 Hill-Rom's internal use). 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, obtain one by phoning Hill-Rom Technical Support at (800) 445-3720.

Out-of-Warranty Exchanges

You are expected to return the inoperative parts/product 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, obtain one by phoning Hill-Rom Technical Support at (800) 445-3720. If you fail to return the equipment within 30 days, Hill-Rom will invoice your facility for **the difference between the exchange price and the new price of the part**.

Recommended Spare Parts

Table 5-1 is a listing of recommended spare parts for the Resident™ LTC bed. The quantities are adequate for servicing 25 or more beds.

Table 5-1. Recommended Spare Parts

Part Number	Quantity	Description
60084 (870)	1	Pendant
49898 (870)	4	Wheel assembly

NOTES:

Sleep Surface Frame Assembly

Figure 5-2. Sleep Surface Frame Assembly

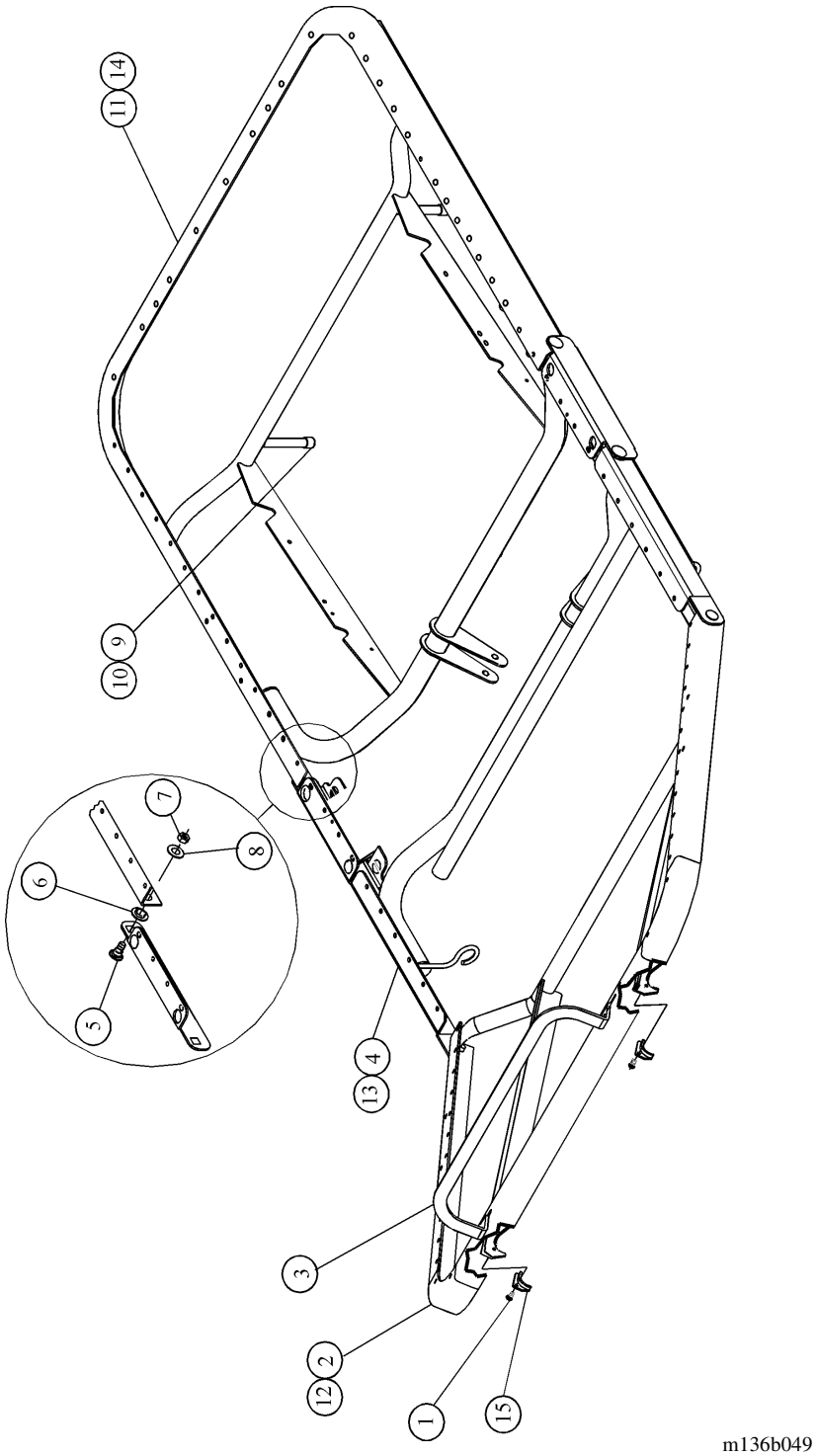

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Table 5-2. Sleep Surface Frame Assembly

Item Number	Part Number	Quantity	Description
1	43878 (870)	2	Torx button head screw
2	489540133 (870)	1	Foot section assembly
3	39901 (870)	1	Mattress stop—pc
4	489550133 (870)	1	Thigh section assembly
5	37104 (870)	6	Shoulder screw
6	4630 (870)	6	Oilite bushing
7	90234-22 (870)	6	Locknut
8	4540 (870)	6	Washer
9	34838 (870)	4	Vinyl cap
10	25329 (870)	As required	Adhesive
11	459590233 (870)	1	Head section assembly
12	489540233 (870)	1	Foot section assembly
13	489550233 (870)	1	Thigh section assembly
14	459590133 (870)	1	Head section assembly
15	19887 (870)	2	Foot rack insert

Lower Frame Assembly

Figure 5-3. Lower Frame Assembly

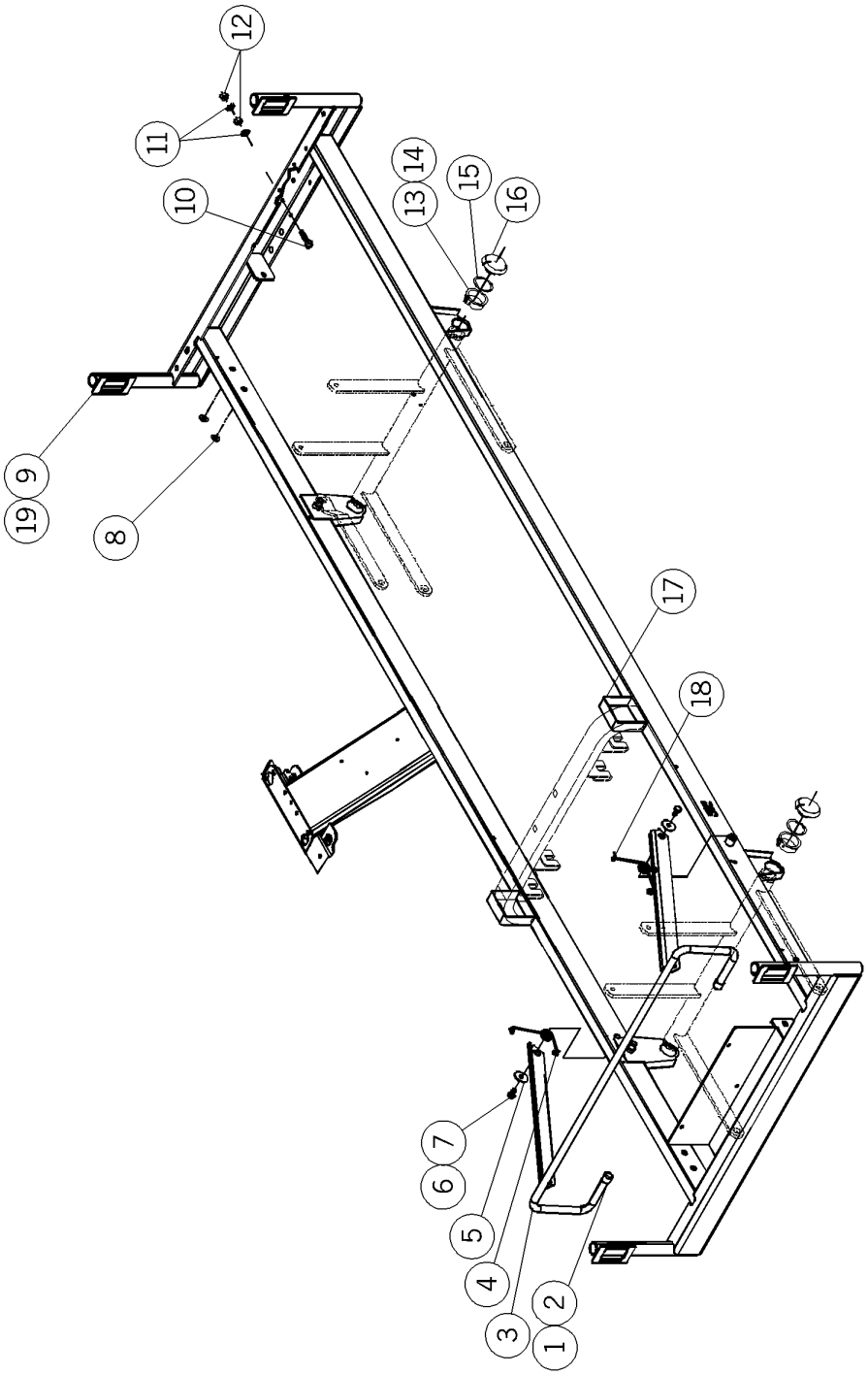

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Table 5-3. Lower Frame Assembly

Item Number	Part Number	Quantity	Description
1	34838 (870)	4	Vinyl cap
2	25329 (870)	As required	Adhesive
3	32616 (870)	1	Foot rack assembly
4	19528 (870)	1	Spring—rh (electric version only)
5	3869 (870)	2	Washer
6	9936 (870)	2	Hex bolt
7	SA4841 (870)	As required	Red Loctite®
8	33358 (870)	8	Plug button
9	497370133 (870)	1	Lower frame assembly (electric version only)
10	15338 (870)	1	Screw
11	23208 (870)	2	Lockwasher
12	28837 (870)	2	Hex nut
13	24452 (870)	4	Bushing
14	8252 (870)	As required	Oil
15	24449 (870)	4	Retaining ring
16	33355-33 (870)	4	Pointer
17	49802 (870)	2	Rubber, protective sheet (electric version only)
18	33047 (870)	1	Spring lh (electric version only)
19	61499 (870)	1	Lower frame (manual version only)

NOTE:
Item 19 contains support bar pictured in figure 5-3, where item 9 requires item 17, also pictured.

Caster Frame Assemblies—"A" Version

Figure 5-4. Caster Frame Assemblies—"A" Version

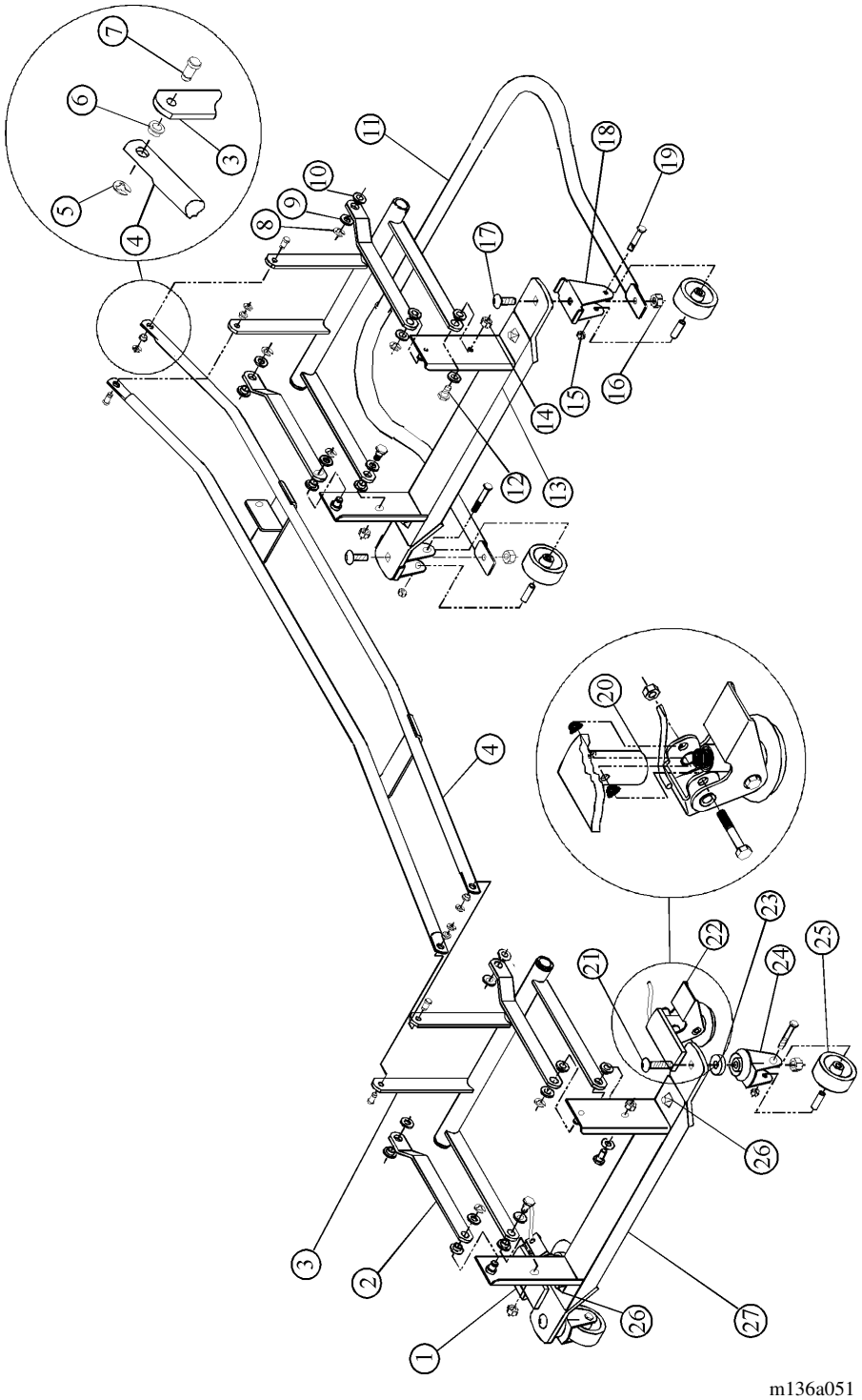

Table 5-4. Caster Frame Assemblies—"A" Version

Item Number	Part Number	Quantity	Description
1	4989702 (870)	1	Brake, floor lock colson, right-hand
2	4972833 (870)	4	Pivot arm upper
3	4972333 (870)	2	Lower pivot arm
4	4974733 (870)	1	Pivot connector weldment
5	35326 (870)	4	E-ring
6	36570 (870)	4	Oilite bushing
7	4973301pl (870)	4	Clevis pin
8	49893 (870)	8	E-ring
9	49895 (870)	12	Washer
10	49800 (870)	12	Bushing
11	497340133 (870)	1	Bumper baseboard
12	49735pl (870)	2	Bolt, shoulder
13	497190133 (870)	1	Caster base frame—head
14	9428 (870)	4	Nut
15	831 (870)	4	Locknut
16	49896 (870)	4	Prevailing locknut
17	4989401 (870)	2	Carriage screw
18	4972733 (870)	2	Caster fork rigid head
19	90019-36 (870)	2	Screw
20	4989701 (870)	1	Brake, floor lock colson, left-hand
21	4989402 (870)	2	Carriage screw
22	90016-36 (870)	2	Screw
23	60088 (870)	2	Washer
24	49891 (870)	2	Caster swivel
25	49898 (870)	4	Wheel assembly
26	44336 (870)	4	Base, bumper
27	497190233 (870)	1	Caster base lower—foot

Caster Frame Assemblies—"B" Version

Figure 5-5. Caster Frame Assemblies—"B" Version

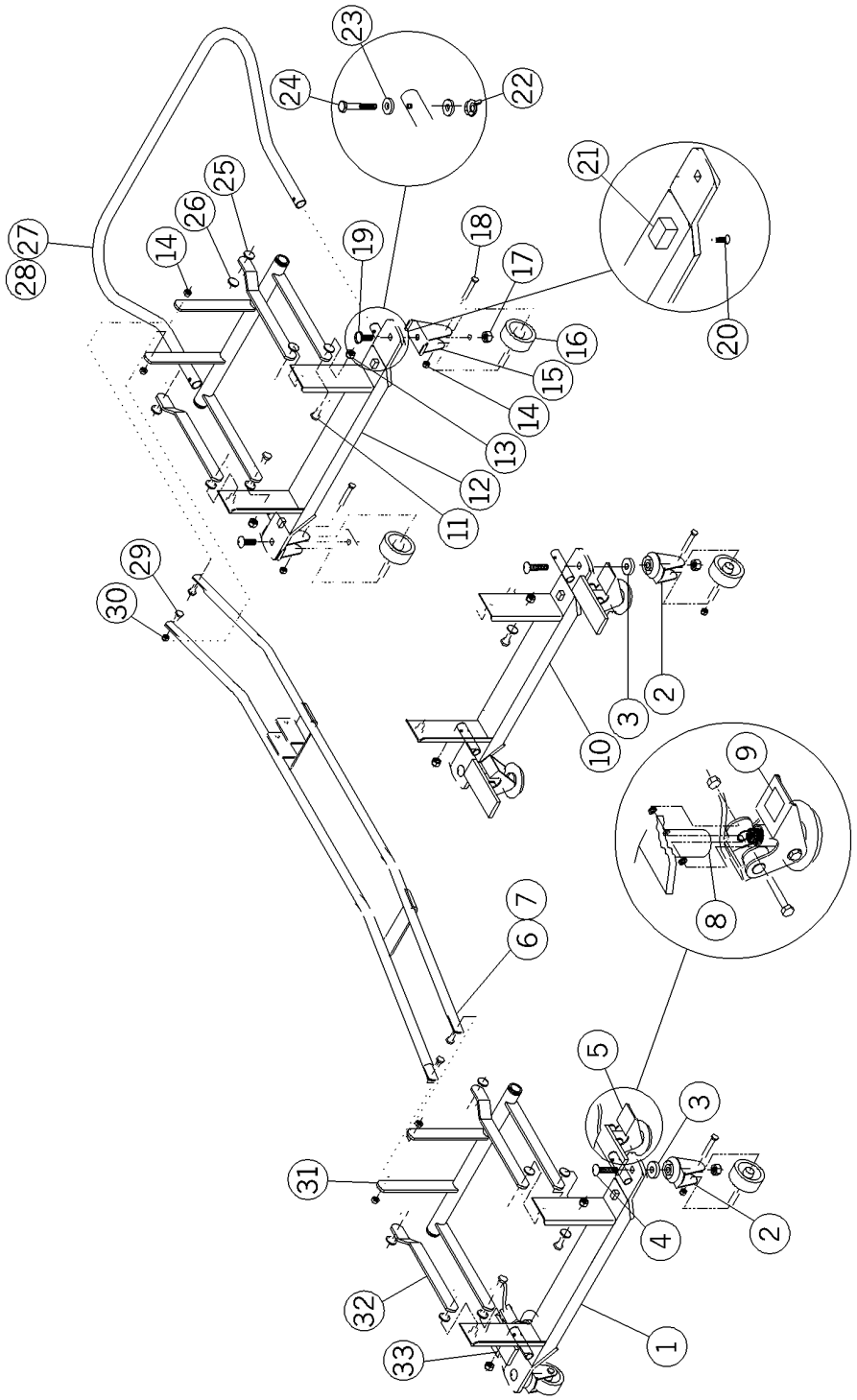

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Table 5-5. Caster Frame Assemblies—"B" Version

Item Number	Part Number	Quantity	Description
1	610360233 (870)	1	Caster base weldment, foot
2	49891 (870)	2	Caster swivel
3	60088 (870)	2	Washer
4	4989402 (870)	2	Carriage screw
5	4989701 (870)	1	Brake, floor lock colson, lh
6	6150301pc (870)	1	Pivot connector weldment (80")
7	6150302pc (870)	1	Pivot connector weldment (76")
8	SA3351 (870)	As required	Lithium grease
9	61208 (870)	1	Label, brake LTC
10	6108633 (870)	1	Caster base frame assembly
11	4973501pl (870)	4	Bolt, shoulder
12	6162301 (870)	1	Caster base lower frame
13	9023428 (870)	4	Locknut
14	831 (870)	8	Locknut
15	4972733 (870)	2	Caster fork rigid head
16	49898 (870)	4	Wheel assembly
17	49896 (870)	4	Prevailing locknut
18	90016-36 (870)	4	Screw
19	4989401 (870)	2	Carriage screw
20	43389 (870)	4	Hilow torx screw
21	44336 (870)	4	Base bumper
22	61078 (870)	2	Nut wing
23	27251 (870)	4	Washer
24	90018-24 (870)	2	Hex head machine bolt
25	49800 (870)	12	Bushing
26	19678 (870)	8	Tru-arc ring
27	61035 (870)	1	Bumper baseboard (80")
28	6103501 (870)	1	Bumper baseboard, 76" bed
29	60257pl (870)	4	Shoulder bolt
30	36570 (870)	4	Oilite bushing
31	4972333 (870)	2	Lower pivot arm
32	4972833 (870)	4	Pivot arm upper
33	4989702 (870)	1	Brake, floor lock colson, rh

Surface Assemblies

Figure 5-6. Surface Assemblies

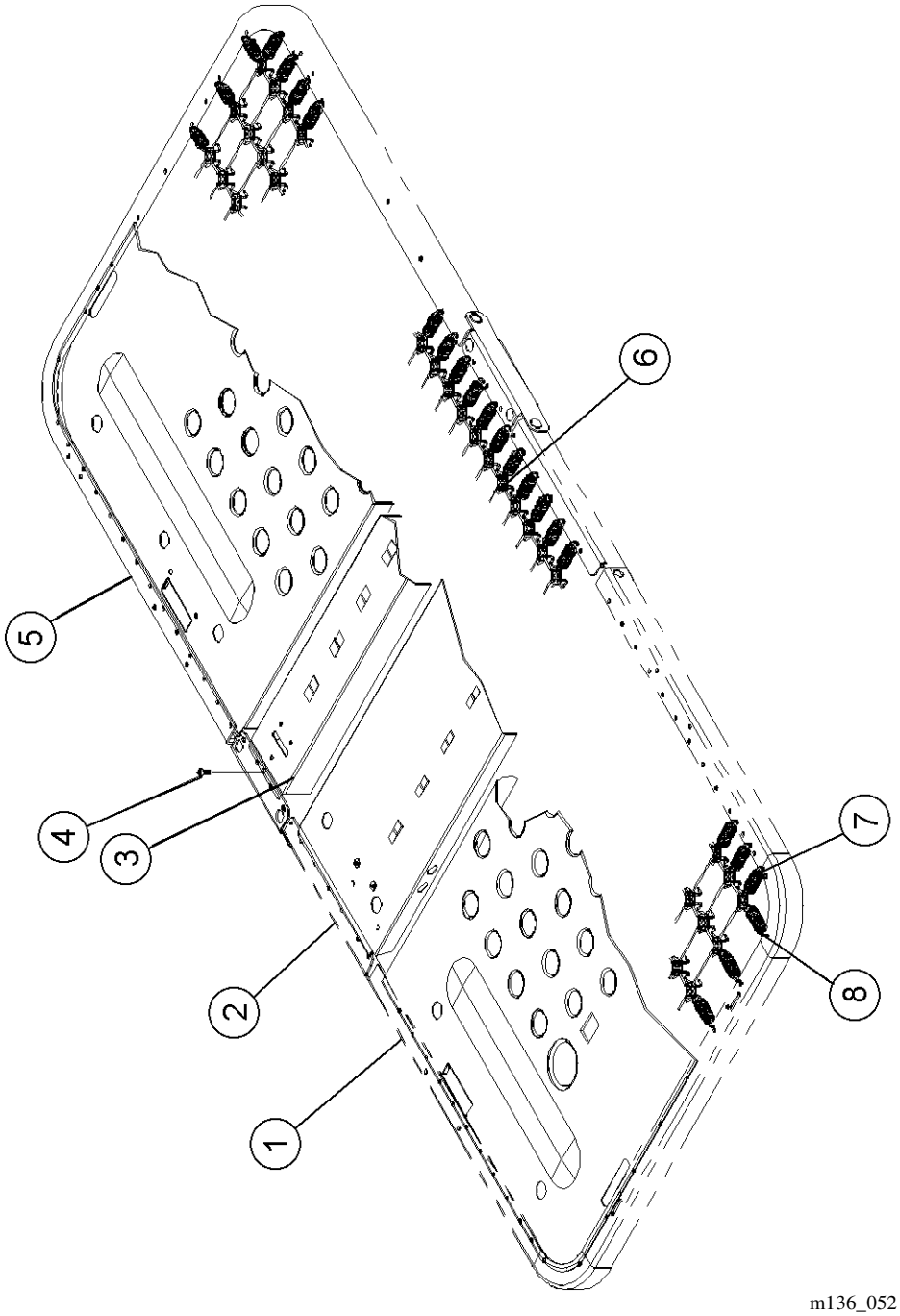

Table 5-6. Surface Assemblies

Item Number	Part Number	Quantity	Description
1	489540233 (870)	1	Foot section assembly
2	489550233 (870)	1	Thigh section assembly
3	45884-33 (870)	1	Seat pan
4	43878 (870)	2	Torx button head screw
5	459590133 (870)	1	Head section assembly
6	12084 (870)	1	Fabric
7	34532 (870)	69	Helical spring
8	34531 (870)	21	Helical spring

Electrical and Label Assemblies

Figure 5-7. Electrical and Label Assemblies

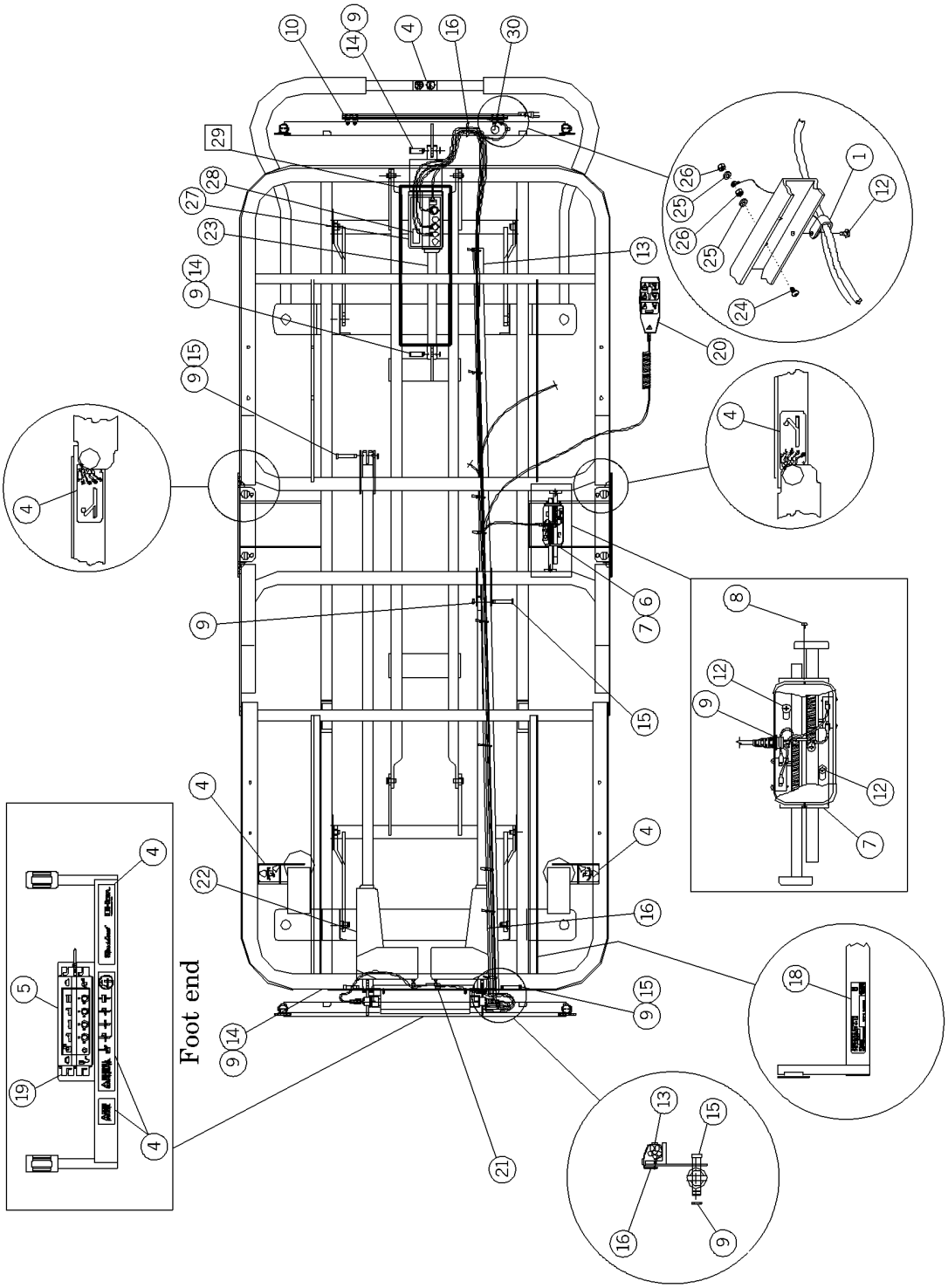

Table 5-7. Electrical and Label Assemblies

Item Number	Part Number	Quantity	Description
1	25200 (870)	1	Speed clamp
2	60085 (870)	As required	Loctite® activator
3	SA4841 (870)	As required	Red Loctite
4	61209 (870)	1	Label, sheet bundle
5	60086 (870)	3	Self tapping screw
6	3302001 (870)	1	Automatic contour module
7	22319-01 (870)	1	Cover—automatic contour
8	90235-06 (870)	2	Screw
9	61615 (870)	6	Rue ring cotter
10			
11			
12	18252 (870)	3	Screw
13	60097 (870)	1	Angle wire harness support weldment
14	61653pl (870)	4	Clevis pin
15	4453 (870)	2	Pin
16			
17	19124 (870)	11	Large cable tie
18			
19	49801 (870)	1	Lockout control box
20	60084 (870)	1	Pendant
21	60082 (870)	1	Actuator, knee
22	60081 (870)	1	Actuator, head
23	6185601 (870)	1	Actuator, hilow
24	15338 (870)	1	Screw
25	23208 (870)	2	Lockwasher
26	28837(870)	2	Hex nut
27	6185602 (870)	1	Control box
28	44002 (870)	1	Label protective earth
29	6185603 (870)	1	Control box/hilow actuator assembly
30	62241 (870)	1	Label, ground

Manual Drive Module and Label Assemblies

Figure 5-8. Manual Drive Module and Label Assemblies

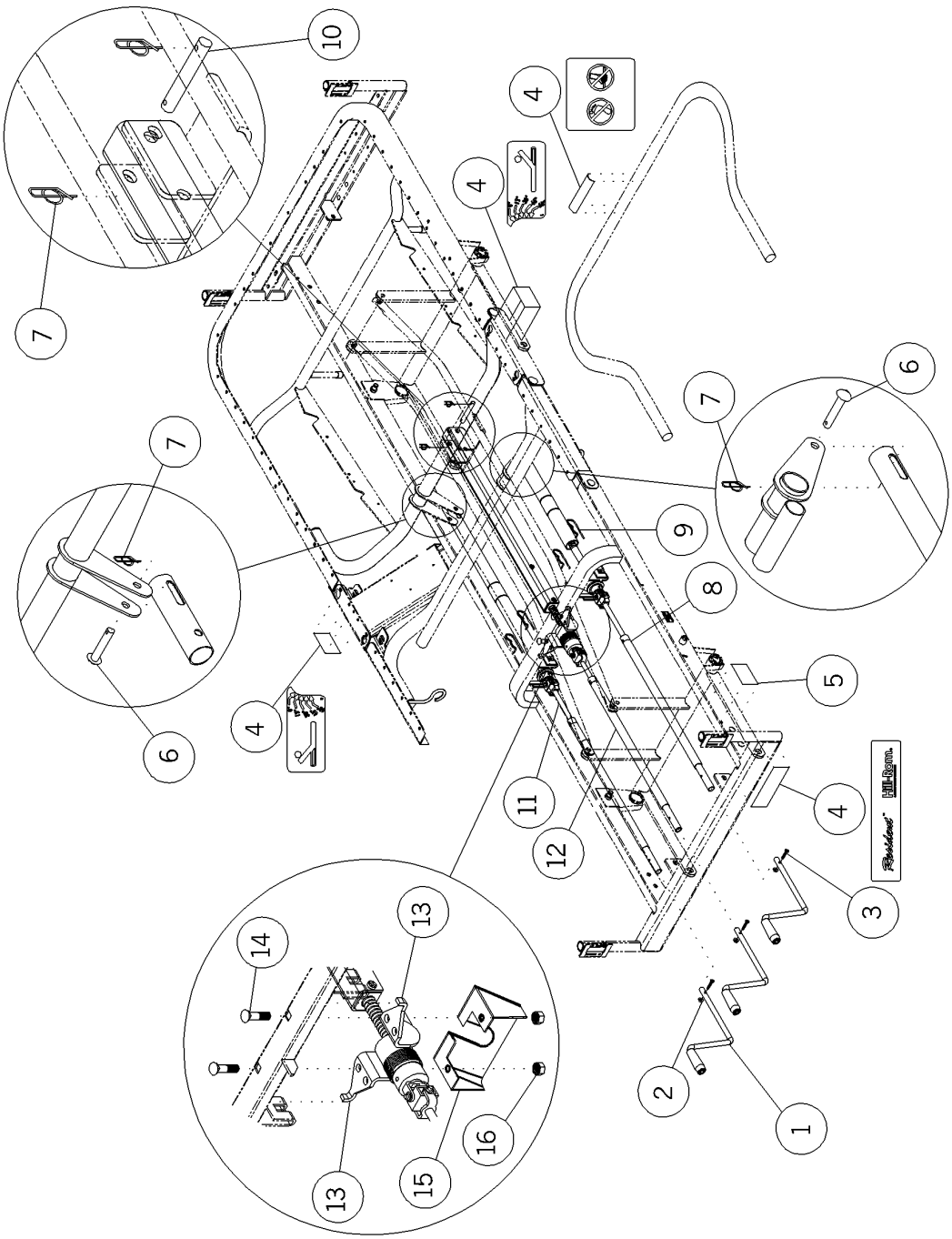

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Table 5-8. Manual Drive Module and Label Assemblies

Item Number	Part Number	Quantity	Description
1	28727 (870)	3	Crank assembly
2	755 (870)	3	Locknut
3	9935 (870)	3	Screw
4	61209 (870)	1	Label, sheet bundle
5	6007301 (870)	1	Label, data plate/serial number
6	4453 (870)	2	Pin
7	61615 (870)	4	Rue ring cotter
8	4594002 (870)	1	Knee screw assembly
9	24556 (870)	4	Hair pin
10	61466pl (870)	1	Pin
11	4594001 (870)	1	Head screw assembly
12	61470 (870)	1	Manual hilow screw assembly
13	24529 (870)	2	Hilow mount
14	24764 (870)	2	Screw
15	61693 (870)	1	Bracket hilow retainer
16	9428 (870)	2	Nut

Siderail Assemblies

Figure 5-9. Siderail Assemblies

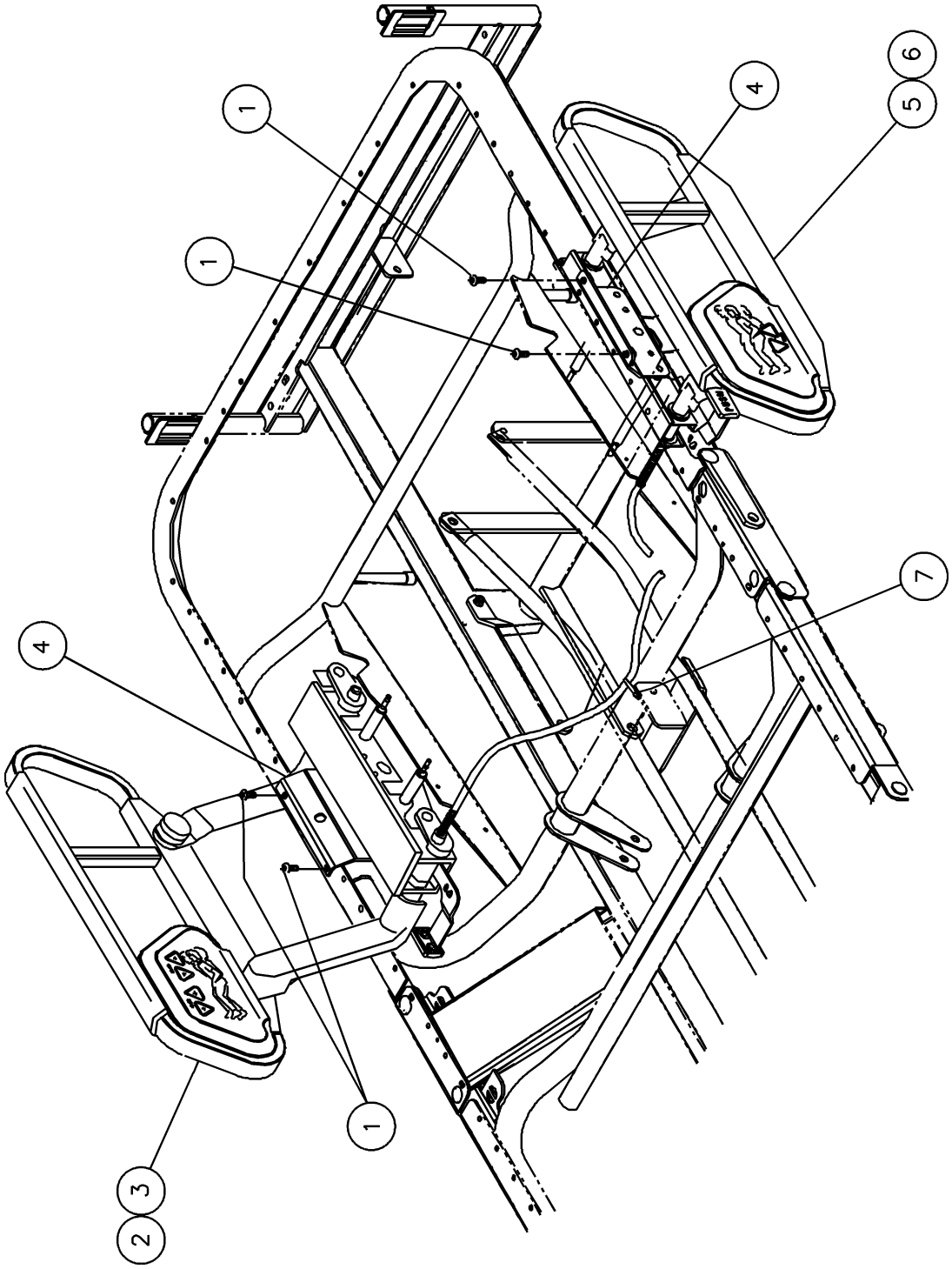

Table 5-9. Head End Siderail—Without Control

Item Number	Part Number	Quantity	Description
1	43880 (870)	4	Torx pan head screw
2	6005502 (870)	1	Head rail assembly, right-hand
4	23485 (870)	2	Slide bracket assembly
5	6005501 (870)	1	Head rail assembly, left-hand

Table 5-10. Head End Siderail—With Control

Item Number	Part Number	Quantity	Description
1	43880 (870)	4	Torx pan head screw
3	6005602 (870)	1	Head rail right-hand electric
4	23485 (870)	2	Slide bracket assembly
6	6005601 (870)	1	Head rail left-hand electric
7	19124 (870)	1	Large cable tie

Table 5-11. Foot End Siderail

Item Number	Part Number	Quantity	Description
1	43880 (870)	4	Torx pan head screw
2	6005401 (870)	1	Footrail assembly (left-hand)
4	23485 (870)	2	Slide bracket assembly
5	6005402 (870)	1	Footrail assembly (right-hand)

Head End Siderail Assemblies—With Control

Figure 5-10. Head End Siderail Assemblies—With Control

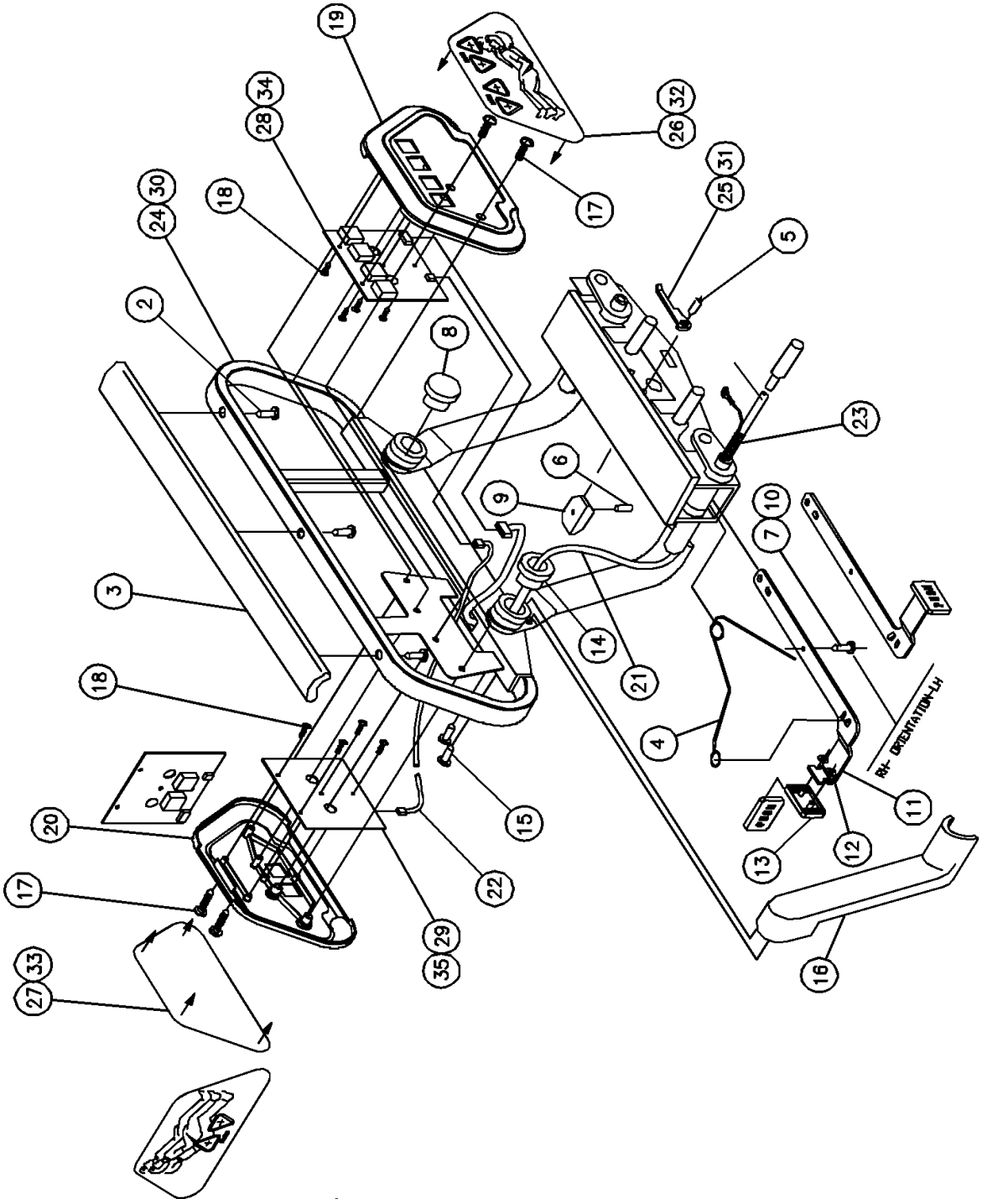

Table 5-12. Head End Siderail Assemblies—With Control

Item Number	Part Number	Quantity	Description
1	SA3351 (870)	As required	Lithium grease
2	90188-08 (870)	3	Hilow thread forming screw
3	49803 (870)	1	Top cane
4	35261 (870)	1	Spring
5	35072 (870)	1	Shoulder screw
6	44328 (870)	1	Spiral pin
7	37387 (870)	1	Shoulder screw
8	29457-33 (870)	1	Hole plug
9	26078 (870)	1	Latch block
10	SA4841 (870)	As required	Red Loctite®
11	39412 (870)	1	Release arm
12	17291 (870)	2	Pushnut
13	19562 (870)	1	Latch cover
14	28717 (870)	1	Bushing
15	90166-01 (870)	2	Screw
16	19833-33 (870)	1	Wire cover
17	9018816 (870)	4	Hilow screw
18	90349-05 (870)	8	Hilow screw
19	4991701 (870)	1	Side reminder switch housing
20	4991702 (870)	1	Side reminder switch housing
21	49934 (870)	1	Cable, siderail control
22	49932 (870)	1	Cable, interconnect
23	41544 (870)	1	Ground strap assembly
24	498050533 (870)	1	Side reminder, head—left-hand, electric
25	39713 (870)	1	Key latch (left-hand)
26	6007601 (870)	1	Siderail control label, inner, left
27	6007101 (870)	1	Siderail control label, outer, left
28	6011304 (870)	1	Siderail control, left-hand, inner
29	6011303 (870)	1	Siderail control, left-hand, outer
30	498050633 (870)	1	Side reminder, head—right-hand, electric
31	39714 (870)	1	Key latch (right-hand)
32	6007602 (870)	1	Siderail control label, inner, right

Item Number	Part Number	Quantity	Description
33	6007102 (870)	1	Siderail control label, outer, right
34	6011301 (870)	1	Siderail control, right-hand, inner
35	6011302 (870)	1	Siderail control, right-hand, outer

NOTES:

Siderail Assemblies—Without Control

Figure 5-11. Siderail Assemblies—Without Control

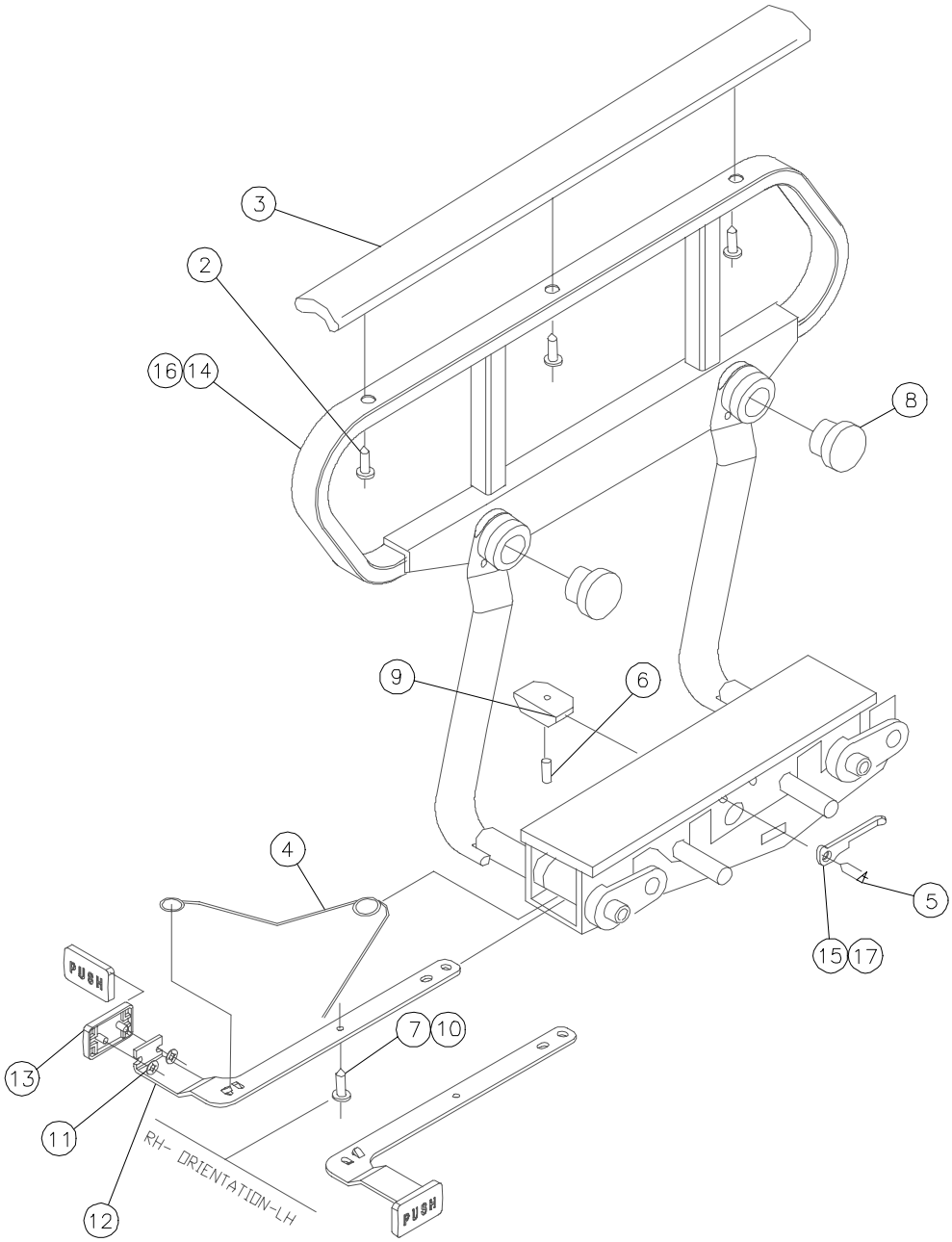

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Table 5-13. Siderail Assemblies—Without Control

Item Number	Part Number	Quantity	Description
1	SA3351 (870)	As required	Lithium grease
2	90188-08 (870)	3	Hilow thread forming screw
3	49803 (870)	1	Top cane
4	35261 (870)	1	Spring
5	35072 (870)	1	Shoulder screw
6	44328 (870)	1	Spiral pin
7	37387 (870)	1	Shoulder screw
8	29457-33 (870)	2	Hole plug
9	26078 (870)	1	Latch block
10	SA4841 (870)	As required	Red Loctite®
11	39412 (870)	1	Release arm
12	17291 (870)	2	Pushnut
13	19562 (870)	1	Latch cover
14	39713 (870)	1	Key latch (left-hand)
15	498050333 (870)	1	Side reminder, head, left-hand, non-electric
16	39714 (870)	1	Key latch (right-hand)
17	498050233 (870)	1	Side reminder, head, right-hand, non-electric

Standard Head and Foot Panel Assemblies—P4069

Figure 5-12. Standard Head and Foot Panel Assemblies—P4069

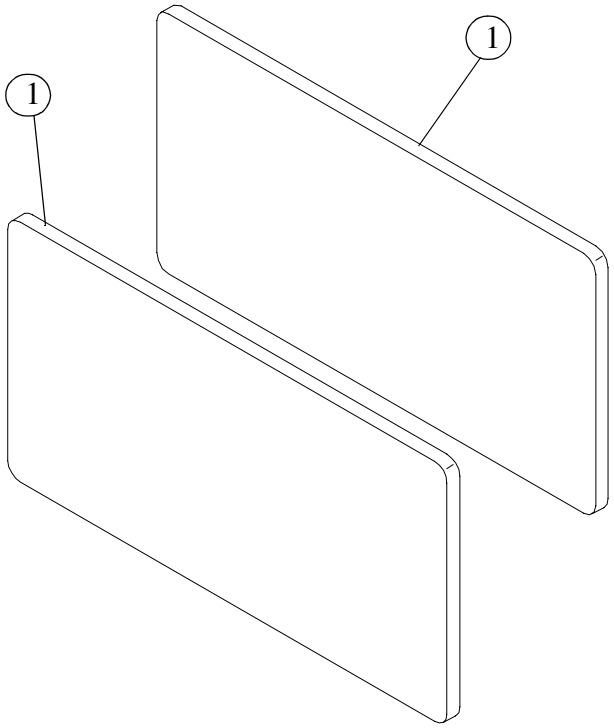

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Table 5-14. Standard Head and Foot Panel Assembly—P4069

Item Number	Part Number	Quantity	Description
1	112416 (870)†	1	Head or foot panel (specify manual drive)
Not shown	34813 (870)	1	Label
Not shown	31773 (870)	8	Screw
Not shown	39153 (870)	2	Panel bracket—four hole

† Specify wood or laminate finish.

Standard Foot Panel Assembly (manual drive)—P4069

Figure 5-13. Standard Foot Panel Assembly (manual drive)—P4069

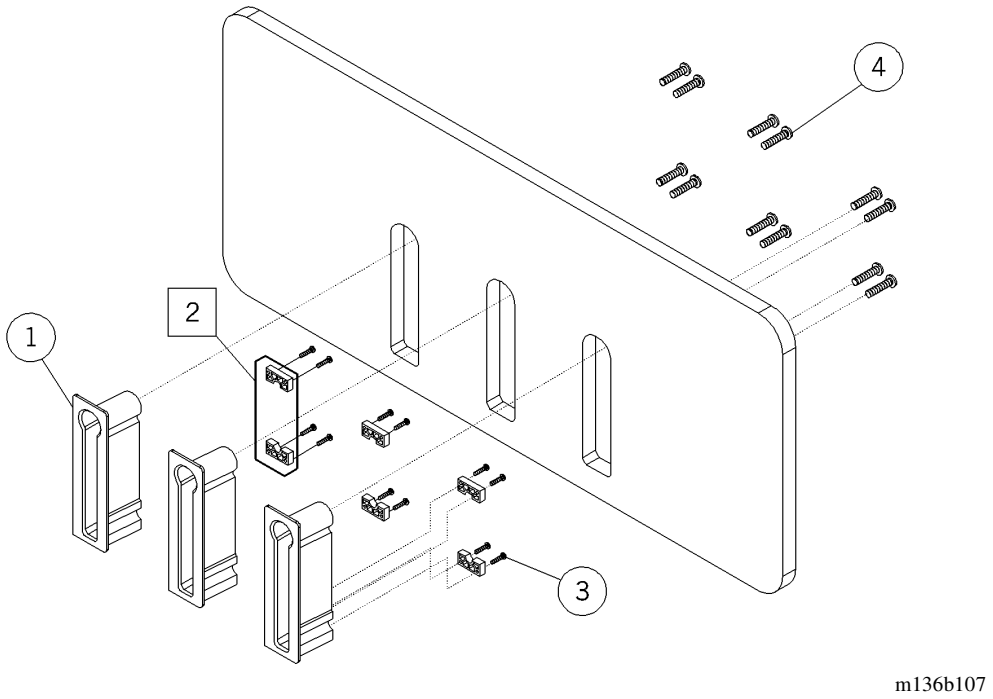

Table 5-15. Standard Foot Panel Assembly (manual drive)—P4069

Item Number	Part Number	Quantity	Description
1	24594	3	Crank insert
2	24600	6	Crank Guide
3	24816	12	Screw
4	24810	12	Screw

Hearthside Head and Foot Panel Assemblies—P4071

Figure 5-14. Hearthside Head and Foot Panel Assemblies—P4071

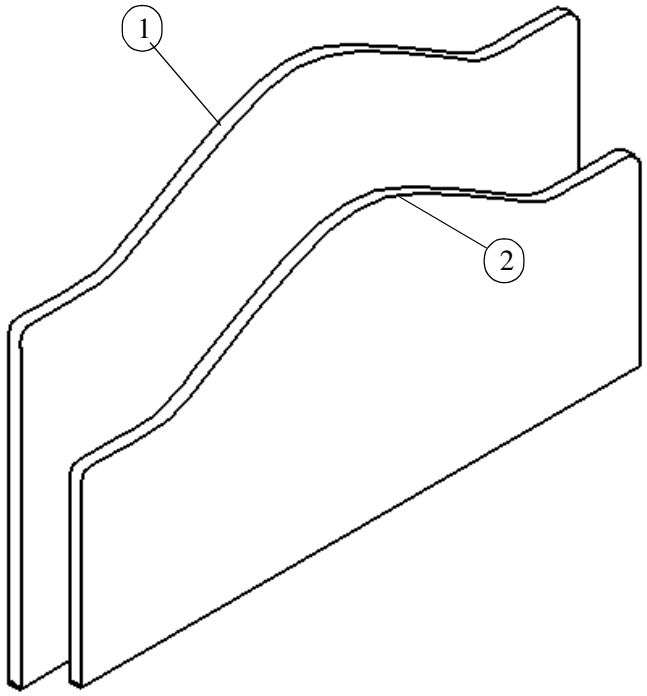

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Table 5-16. Hearthside Head and Foot Panel Assemblies—P4071

Item Number	Part Number	Quantity	Description
1	11287301 (870)†	1	Head panel (Hearthside)
2	11287302 (870)†	1	Foot panel (specify manual drive) (Hearthside)
Not shown	34813 (870)	1	Label
Not shown	31773 (870)	16 (8 per panel)	Screw
Not shown	39153 (870)	4 (2 per panel)	Panel bracket—four hole

† Specify wood or laminate finish.

Heirloom Head and Foot Panel Assemblies—P4072

Figure 5-15. Heirloom Head and Foot Panel Assemblies—P4072

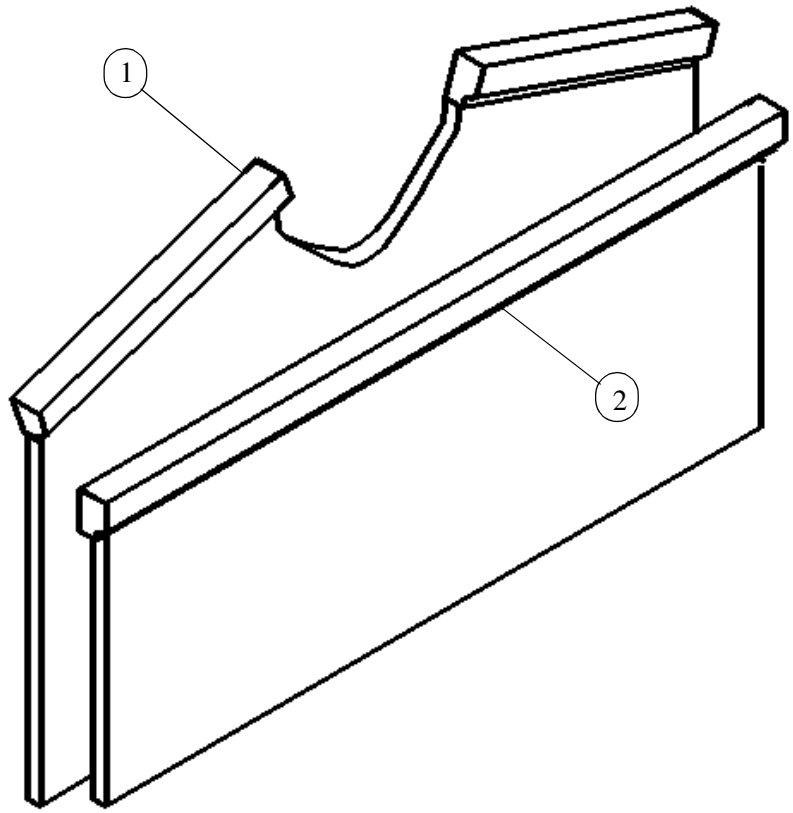

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Table 5-17. Heirloom Head and Foot Panel Assemblies—P4072

Item Number	Part Number	Quantity	Description
1	112874 (870)	1	Headboard (Heirloom)
2	112875 (870)	1	Footboard (specify manual drive) (Heirloom)
Not shown	34813 (870)	1	Label
Not shown	31773 (870)	16 (8 per panel)	Screw
Not shown	39153 (870)	4 (2 per panel)	Panel bracket—four hole

Post Style Head and Foot Panel Assemblies—P4073

Figure 5-16. Post Style Head and Foot Panel Assemblies—P4073

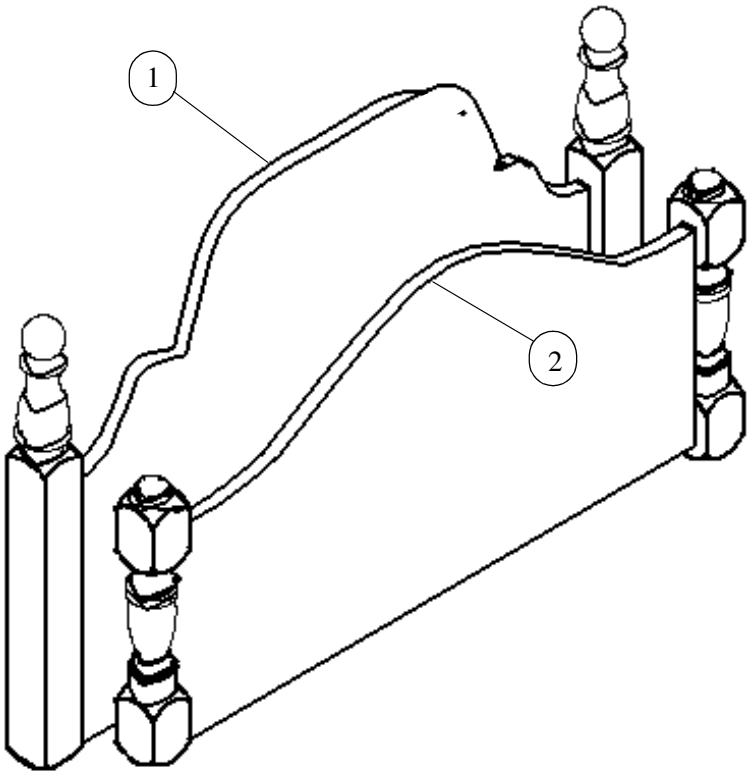

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Table 5-18. Post Style Head and Foot Panel Assemblies—P4073

Item Number	Part Number	Quantity	Description
1	112876 (870)	1	Headboard (Post)
2	112877 (870)	1	Footboard Artisan (specify manual drive) (Post)
Not shown	34813 (870)	1	Label
Not shown	31773 (870)	16 (8 per panel)	Screw
Not shown	39153 (870)	4 (2 per panel)	Panel bracket—four hole

Dentil Head and Foot Panel Assemblies—P4074

Figure 5-17. Dentil Head and Foot Panel Assemblies—P4074

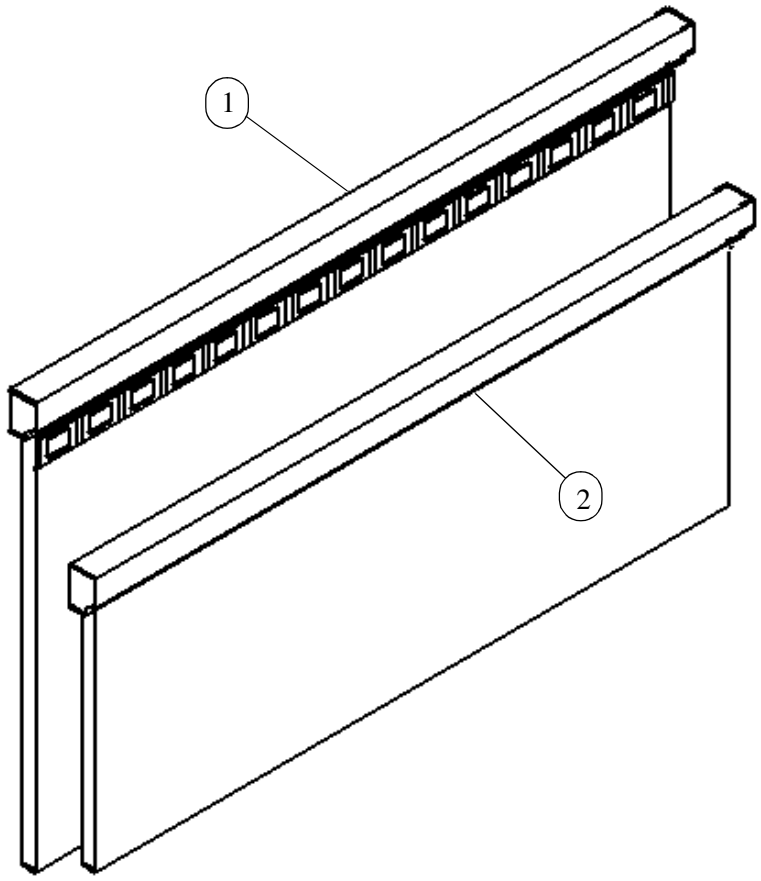


Table 5-19. Dentil Head and Foot Panel Assemblies—P4074

Item Number	Part Number	Quantity	Description
1	112878 (870)	1	Head panel (Dentil)
2	112879 (870)	1	Foot panel (specify manual drive) (Dentil)
Not shown	34813 (870)	1	Label
Not shown	31773 (870)	16 (8 per panel)	Screw
Not shown	39153 (870)	4 (2 per panel)	Panel bracket—four hole

NOTES:

Chapter 6
General Procedures

Chapter Contents

6

NOTES:

Cleaning and Care

SHOCK HAZARD:
Unplug the bed from its power source before servicing or cleaning the bed. Otherwise, a shock hazard exists. Refer to the *Resident™ LTC Bed In-Service Manual* and to specific sections in this manual for additional precautions.

General Cleaning

Clean the bed frame with a lightly dampened cloth and ordinary disinfectants. Do not subject any area to excessive amounts of liquid.

Steam Cleaning

Do not use any steam cleaning device on the Resident™ LTC bed. The excessive moisture involved can damage mechanisms and components in the bed.

Hard to Clean Spots

Use standard household cleaners and/or a soft bristle brush to remove troublesome spots or stains. Heavy dried-on soil and excreta may first require soaking to loosen.

CAUTION:
Do not use harsh cleaners, solvents, or detergents. Damage to the equipment may occur.

Disinfection

Dilute disinfectants and/or germicides as specified on the manufacturer's label.

Mattress Care

Clean the mattress fabric's surface with neutral soap suds and lukewarm water. Rinse with clear water, and allow the fabric to dry.

CAUTION:
Repeated soaking of the mattress materials will accelerate wear. Improper cleaning procedures may void the warranty.

Care of Wood Head and Foot Panels

Hill-Rom® wood products are treated with a resin based sealer and finish which provide resistance to abrasion, staining, fluids, and fire.

Clean the headboard and foot panel by wiping with a soft cloth dampened with a suitable cleaning solution: wipe with a dry cloth. Use diluted ammonia, detergent, and bleach **solutions** to clean the wood surfaces.

CAUTION:
Many disinfectant cleaners, if used in high concentrations, have a softening effect on any painted or finished surface.

The Centers for Disease Control recommend EPA approved hospital disinfectants, used at the manufacturers' suggested dilutions or bleach at 1:100 dilution (1/4 cup to 1 gallon water) to clean environmental surfaces such as the Resident™ LTC bed.

Do not allow a wet cloth to lay on the wooden surfaces. Immediately wipe up any liquid spilled on the surface to prevent possible damage to the finish.

Apply a liquid furniture polish to the wood surfaces to protect the finish.

Lubrication Requirements

Hill-Rom® uses oilite bearings and bushing in several places throughout the Resident™ LTC bed. Oilite bearings and bushings have pores that retain oil and provide them with a self-lubricating quality. This self-lubricating quality is neutralized if any lubricant containing silicone is used on them or anywhere else on the bed.

CAUTION:
Do not use any lubricant containing silicone anywhere on the Resident™ LTC bed. The self-lubricating quality of the oilite bearings and bushings will be neutralized.

The following lubricants can be safely used on the Resident™ LTC bed:

- P/N 8252 M-1 penetrating oil (small bottle—use on oilite bearings and bushings)
- P/N SA3351 grease (use on actuator rods)
- P/N SA0646 Teflon® spray lubricant, dry (aerosol spray can—use anywhere else that the bed needs lubrication)

Preventive Maintenance

The Resident™ LTC bed must have an effective maintenance program. We recommend that you perform preventive maintenance and testing annually. This not only meets Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requirements, but will help to ensure a long and productive live for the Resident™ LTC bed. This will help minimize downtime due to excessive wear failures.

The preventive maintenance schedules that follow are intended to guide the technician through a normal preventive maintenance procedure on the Resident™ LTC bed. Check each item on the schedule and make any necessary adjustments during the preventive maintenance process.

The preventive maintenance schedules are intended to be used in conjunction with the preventive maintenance checklists following them. The checklists are designed to keep a running history of maintenance and subsequent repair costs for one individual Resident™ LTC bed. However, the facility can modify or invent another to fit their needs. Keeping accurate records and maintaining the Resident™ LTC bed and its accessories are two good ways of reducing down time.

Preventive Maintenance Schedule—Manual Drive Model

Table 6-1. Preventive Maintenance Schedule—Manual Drive Model

Function	Procedure
Hilow limits	Crank the hilow function to the upper and lower limits to ensure proper function of the hilow drive assembly. Lubricate the drive mechanism.
Head limits	Crank the head function from the flat to its maximum angle of 60° (± 2°) to ensure proper function of the head drive assembly. Lubricate the drive mechanism.
Knee limits	Crank the knee function from the flat to its maximum angle of 45° (± 2°) to ensure proper function of the knee drive assembly. Lubricate the drive mechanism.
Brakes	Test the brakes to determine if the bed moves when the brakes are activated.
Casters	Test the swivel casters to ensure they do not bind. Check all caster tires for cuts, wear, tread, etc. Replace if necessary.
Siderails	Inspect for proper up, down, and storage operation. Inspect the locking latch for proper operation. Lubricate the mechanism.
Pivot points	Lubricate all pivot points on the bed.
Head and foot panels	Check aesthetics. Clean and touch up if necessary.
Overall appearance	Inspect the condition of the labels, paint, and general aesthetics. Replace labels, touch-up paint, and clean if necessary.

Preventive Maintenance Checklist—Manual Drive Model

Table 6-2. Preventive Maintenance Checklist—Manual Drive Model

Date																						**Function**
Hill-Rom® Company Inc.	**Manufacturer**																					Hilow limits
																						Head limits
																						Knee limits
																						Brakes
																						Casters
																						Siderails
																						Pivot points
																						Head and foot panels
	Model Number																					Overall appearance
	Serial Number																					
	Total Cost for This Page																					Labor Time:
																						Repair Cost:
																						Inspected By:
																						Legend L=Lube C=Clean A=Adjust R=Repair or Replace O=Okay N=Not Applicable Remarks:

Preventive Maintenance Schedule—Electric Drive Model

Table 6-3. Preventive Maintenance Schedule—Electric Drive Model

Function	Procedure
Hilow limits	Operate the hilow function to the upper and lower limits to ensure proper function of the hilow actuator limit switches.
Automatic contour limits	When the head section is activated from the flat position, the knee will raise to an angle of 15° (± 2°). The automatic contour control lockout switch defeats this function.
Head limits	Operate the head function from the flat to its maximum angle of 65° (± 2°) to ensure proper function of the head actuator limit switches.
Knee limits	Operate the knee function from the flat to its maximum angle of 25° (± 2°) to ensure proper function of the knee actuator limit switches.
Brakes	Test the brakes to determine if the bed moves when the brakes are activated.
Casters	Test the swivel casters to ensure they do not bind. Check all caster tires for cuts, wear, tread, etc. Replace if necessary.
Siderails	Inspect for proper up, down, and storage operation. Inspect the locking latch for proper operation. Lubricate the mechanism.
Control lockout box	Test each control lockout switch individually to ensure proper operation.
Handset control	Test each operating function individually to ensure that when pressed, the corresponding function operates correctly, and when released, travel stops.
Optional siderail control panels (if available)	Test each operating function individually to ensure that when pressed, the corresponding function operates correctly and when released, travel stops.
Wiring condition and routing	Check the power cord, plug, and wiring for cuts, nicks, or breaks. Ensure that the wiring is routed where it is not pinched. Replace if necessary.
Pivot points	Lubricate all pivot points on the bed.
Head and foot panels	Check aesthetics. Clean and touch up if necessary.
Overall appearance	Inspect the condition of the labels, paint, and general aesthetics. Replace labels, touch-up paint, and clean if necessary.

Preventive Maintenance Checklist—Electric Drive Model

Table 6-4. Preventive Maintenance Checklist—Electric Drive Model

Date																						**Function**
Hill-Rom® Company Inc.	**Manufacturer**																					Hilow limits
																						Automatic contour limits
																						Head limits
																						Knee limits
																						Brakes
																						Casters
																						Siderails
																						Control lockout box
	Model Number																					Handset control
																						Siderail control panels
																						Wiring condition/routing
																						Pivot points
																						Head and foot panels
																						Overall appearance
	Serial Number																					
	Total Cost for This Page																					Labor Time:
																						Repair Cost:
																						Inspected By:
																						Legend L=Lube C=Clean A=Adjust R=Repair or Replace O=Okay N=Not Applicable Remarks:

Tool and Supply Requirements

The tools listed below are required to service the Resident™ LTC bed.

Two part Loctite® (19269 activator, Loctite 262)
Teflon® lubricant (P/N SA0646)
Lithium grease (P/N SA3351)
Penetrating oil (P/N 8252 M-1)
E-ring pliers
Diagonal cutters
Jack stands
T25 torx head screwdriver
Phillips head screwdriver
Ratchet
3" extension
1/2" socket
9/16" socket
5/8" socket
3/4" socket
7/16" wrench
1/2" wrench
3/4" wrench
Pin punch
Hammer

6.1 Leakage Current Test for Electric Drive Model

NOTE:
The following leakage current test is used only for those units that do not have the factory installed ground wire. For those units that have the factory installed wire, perform a standard leakage current test.

The leakage current test is designed to test the level of patient environment safety. Maximum allowable electrical current for the Resident™ LTC electric drive bed is 300µA per UL 2601-1. Perform the following test using a double insulated product test adapter (see figure 6-1 on page 6-13).

NOTE:
Consult the test equipment manufacturer to obtain a product test adapter.

1. Unplug the bed from its power source.

2. Plug the leakage test analyzer into the AC wall outlet.

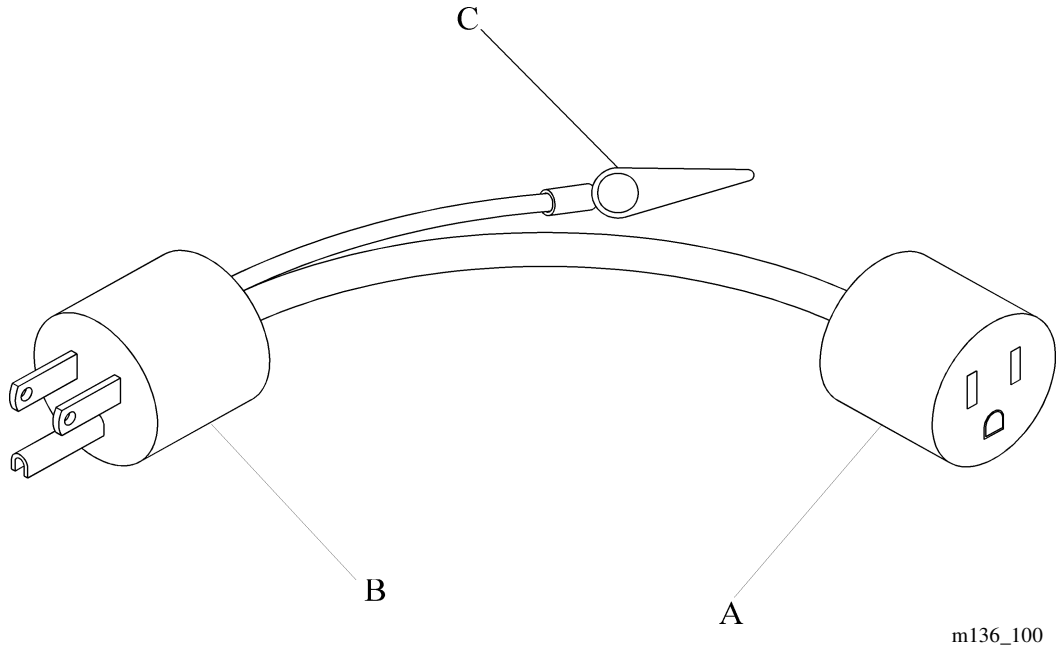
3. Plug the male (A) connector of the double insulated product test adapter into the test receptacle of the analyzer.

4. Plug the Resident™ LTC electric drive bed power cord into the female connector (B) of the double insulated product test adapter.

SHOCK HAZARD:
One of the risks associated with the use of electrical equipment includes the potential for electrical shock. Train and educate personnel on the risks associated with electrical equipment.

5. Attach the alligator clip lead (C) to an exposed **non-painted** screw that is screwed into the bed frame at the head end.

Figure 6-1. Double Insulated Product Test Adapter



6. Turn on the leakage analyzer, and set the function knob to μA case leakage.

7. Toggle the ground and polarity switches to obtain eight separate readings.

8. Record the current leakage that is displayed on the analyzer in table 6-5 for each setting.

Table 6-5. Current Leakage Test Values

Unit On:	G/NP:	NG/NP:	G/RP:	NG/RP:
Unit Off:	G/NP:	NG/NP:	G/RP:	NG/RP:

NOTES:

Chapter 7
Accessories

Chapter Contents

7

Accessories

WARNING:
Use only accessories specifically identified for use with the Resident™ LTC bed. The use of accessories **not** identified for this bed could compromise the safety of the bed.

Accessories may be added or removed at the point of resident care by a caregiver. Accessories are interchangeable within a product configuration.

Table 7-1. Accessories List

Product Number	Description
P2217	IV rod
P846	Trapeze support bracket
P276	Oxygen tank holder
P441A	Ambulatory assist rail
P1433	Comfortline® mattress
P9912A	Bed extender
P442A	Auxiliary power supply
P865A	Trendelenburg/Reverse Trendelenburg adapter
P866	Three-quarter length siderails
P867	Full length siderails
P9951	Electric upgrade kit
P4069††	Standard head and foot panels
P4071††	Hearthside head and foot panels
P4072††	Heirloom head and foot panels
P4073†	Post head and foot panels
P4074†	Dentil head and foot panels

† Specify wood finish.
†† Specify wood or laminate finish.

7.1 IV Rod (P2217)

The two-sectioned, telescopic IV rod mounts in any of the sockets located at the four corners of the bed. The rod is adjustable in length so that it may be raised or lowered with respect to the bed frame.

Installation

Tools required: None

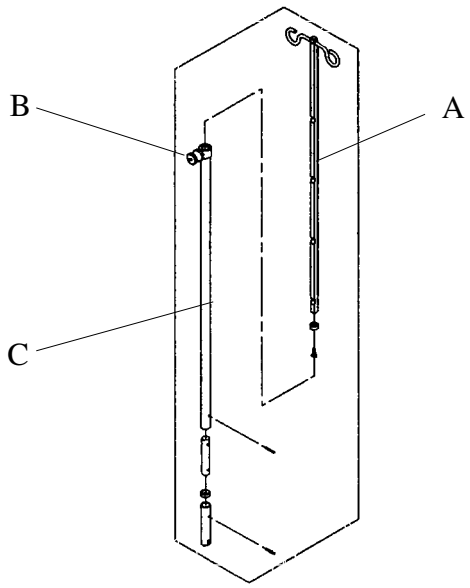
Insert the rod into the desired socket and twist the lower section clockwise to lock in place.

Adjusting

1. To extend the rod, pull upward on the upper section (A) to the desired height (see figure 7-1 on page 7-4).

2. To lower the rod, pull outward on the release knob (B), and manually lower the upper section (A) into the lower section (C).

Figure 7-1. IV Rod—P2217



Removal

To remove the rod, twist the lower section counterclockwise and lift it from the socket.

7.2 Trapeze Support (P846)

The trapeze support assembly may be secured to either the head end or foot end of the main frame.

CAUTION:
Do not lower the bed frame while the trapeze support is attached to the bed. Use the control box lockout to deactivate the hilow function.

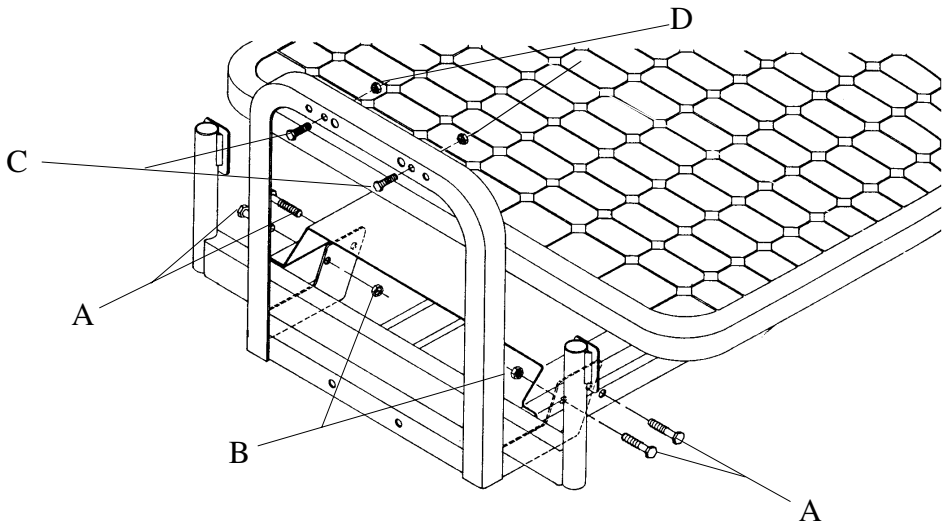
Installation

Tools required: 1/2" socket Drive ratchet
1/2" wrench

1. Remove the hole plugs from the lower frame at the end of the bed to which the trapeze support is to be installed.

2. Position the trapeze support on the main frame as illustrated in (see figure 7-2 on page 7-5).

Figure 7-2. Trapeze Support—P846



3. Using the screws (A) and locknuts (B), fasten the trapeze support to the main frame of the bed.

4. Use the screws (C) and locknuts (D) to prevent side slippage of the trapeze used.

7.3 Oxygen Tank Holder (P27601)

The oxygen tank holder will hold an E size tank.

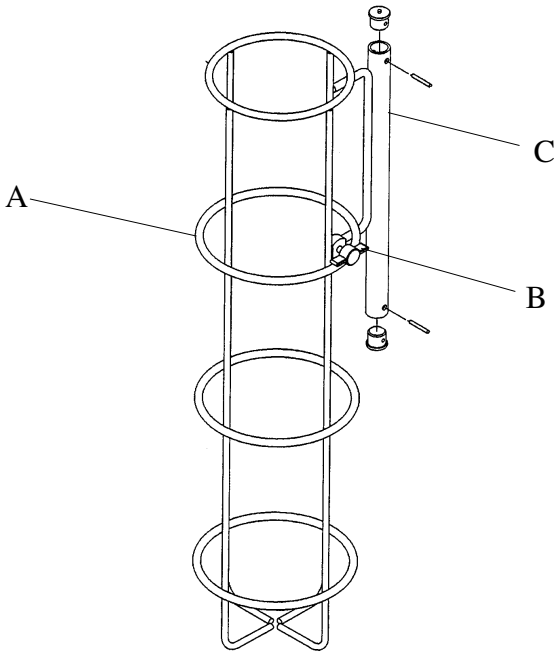
CAUTION:
Do not lower the bed frame while the oxygen tank holder is attached to the bed. Use the control box lockout to deactivate the hilow function. Damage to the equipment may occur.

Installation

Tools required: None

1. Place the tank holder's mounting bar (C) into one of the four IV sockets located at the corners of the bed (see figure 7-3 on page 7-6).

Figure 7-3. Oxygen Tank Holder—P27601



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2. Place the oxygen tank into the holder (A).

3. Secure the tank in the holder by turning the red thumbscrew (B) clockwise until it stops.

7.4 Three-quarter Length Siderails (P866)

The 3/4 length siderails are available as an accessory and replace the existing head and knee siderails. When these siderails are used, only the handset control is used to operate the hilow, head, and knee functions.

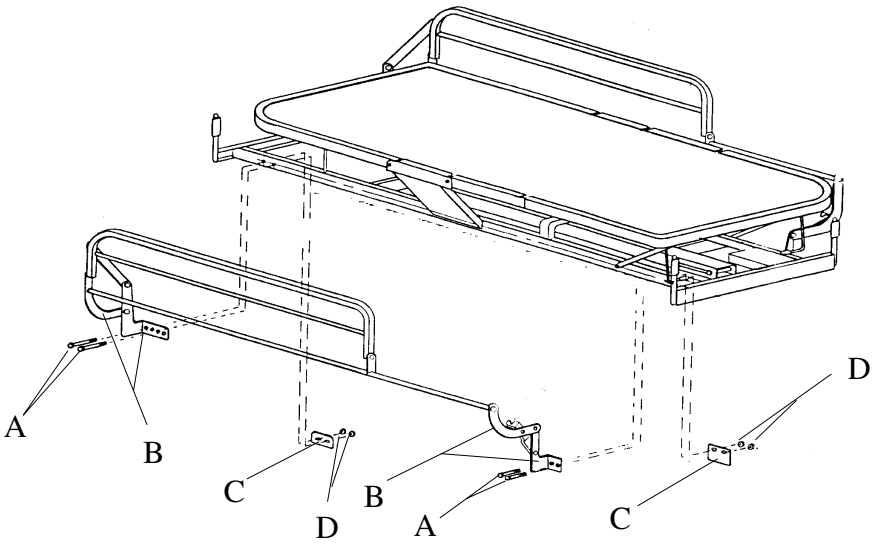
Installation

Tools required: 1/2" socket Drive ratchet
1/2" wrench

1. Remove the hole plugs from both sides of the lower frame at the head and foot end of the bed (at the locations where the 3/4 length siderails will mount).

2. Rotate the arms and mounting brackets (B) of the 3/4 length siderails to the up position (see figure 7-4 on page 7-7).

Figure 7-4. Three-quarter Length Siderails—P866



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3. Position the siderail to the bed frame with the latch end of the siderail at the foot end of the bed.

4. Position the mounting brackets of the siderail against the side of the lower frame while aligning the holes in the brackets with the holes in the frame.

5. Insert the hex head screws (A) through the mounting brackets and the holes in the lower frame.

6. Place the backing plates (C) over the hex head screws protruding through the lower frame.

7. Thread the nuts (D) onto the hex head screws and tighten securely.

8. Repeat steps 2 through 7 to mount the remaining siderail.

9. Check the siderail operation to ensure it operates correctly. There should be no evidence of binding.

7.5 Full Length Siderails (P867)

Full length siderails are available as an accessory to replace the existing head and knee siderails. When these siderails are used, only the handset control is used to operate the hilow, head, and knee functions.

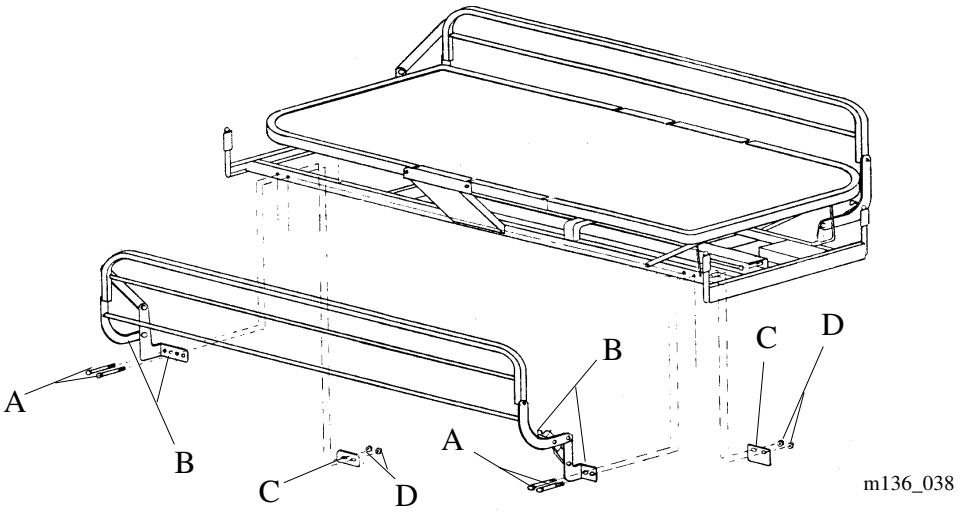
Installation

Tools required: 1/2" socket Drive ratchet
1/2" wrench

1. Remove the hole plugs from both sides of the lower frame at the head and foot end of the bed (at the locations where the full length siderails will mount).

2. Rotate the arms and mounting brackets (B) of the full length siderails to the up position (see figure 7-5 on page 7-9).

Figure 7-5. Full Length Siderails—P867



3. Position the siderail to the bed frame with the latch end of the siderail at the foot end of the bed.

4. Position the mounting brackets of the siderail against the side of the lower frame while aligning the holes in the brackets with the holes in the frame.

5. Insert the hex head screws (A) through the mounting brackets and the holes in the lower frame.

6. Place the backing plates (C) over the hex head screws protruding through the lower frame.

7. Thread the nuts (D) onto the hex head screws and tighten securely.

8. Repeat steps 2 through 7 to mount the remaining siderail.

9. Check the siderail operation to ensure it operates correctly. There should be no evidence of binding.

7.6 Standard Head and Foot Panels (P4069)

The head and foot panels fit over two vertical post type mountings located at each end of the bed and are removable by lifting vertically.

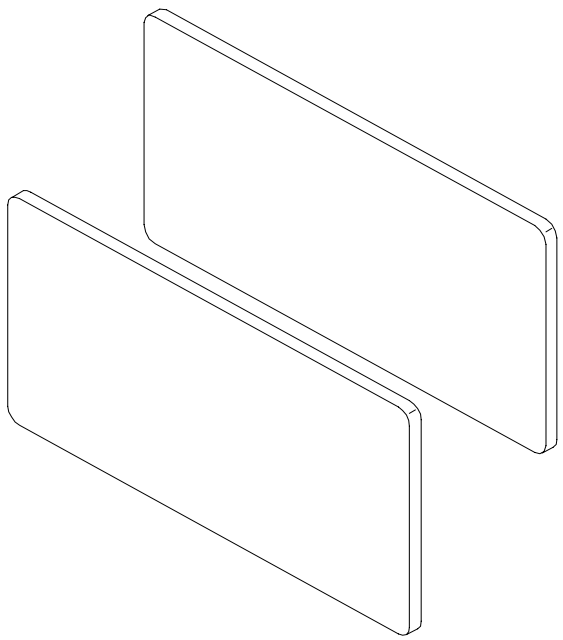
These panels provide ease of bed mobility and steering control. The head panel can be used as a cardiopulmonary resuscitation (CPR) board.

Installation

Tools required: None

Align the panel brackets with the post mountings and slide vertically downward until fully engaged (see figure 7-6 on page 7-11).

Figure 7-6. Standard Head and Foot Panels—P4069



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7.7 Hearthside Head and Foot Panels (P4071)

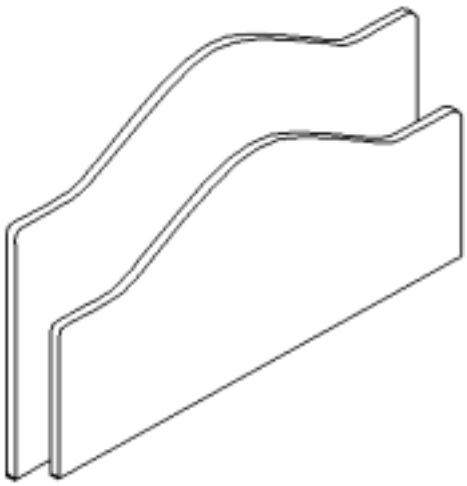
The head and foot panels fit over two vertical post type mountings located at each end of the bed and are removable by lifting vertically.

Installation

Tools required: None

Align the panel brackets with the post mountings and slide vertically downward until fully engaged (see figure 7-7 on page 7-12).

Figure 7-7. Hearthside Head and Foot Panels—P4071



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7.8 Heirloom Head and Foot Panels (P4072)

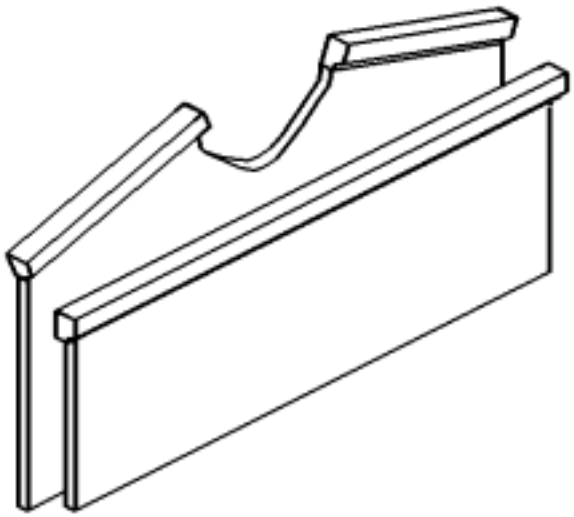
The head and foot panels fit over two vertical post type mountings located at each end of the bed and are removable by lifting vertically.

Installation

Tools required: None

Align the panel brackets with the post mountings and slide vertically downward until fully engaged (see figure 7-8 on page 7-13).

Figure 7-8. Heirloom Head and Foot Panels—P4072



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7.9 Post Style Head and Foot Panels (P4073)

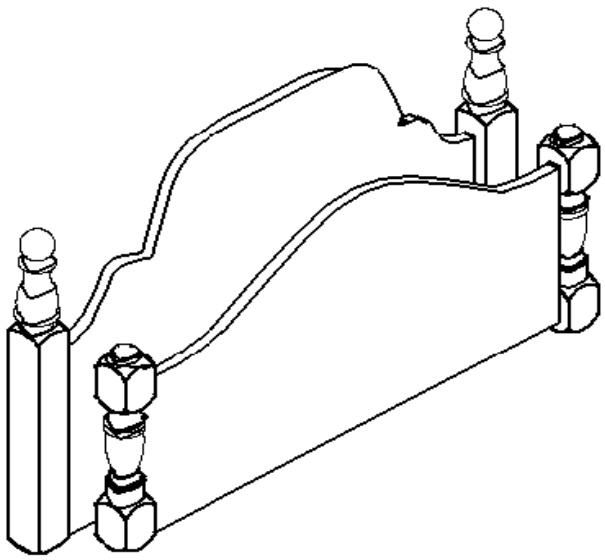
The head and foot panels fit over two vertical post type mountings located at each end of the bed and are removable by lifting vertically.

Installation

Tools required: None

Align the panel brackets with the post mountings and slide vertically downward until fully engaged (see figure 7-9 on page 7-14).

Figure 7-9. Post Stye Head and Foot Panels—P4073



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7.10 Dentil Head and Foot Panels (P4074)

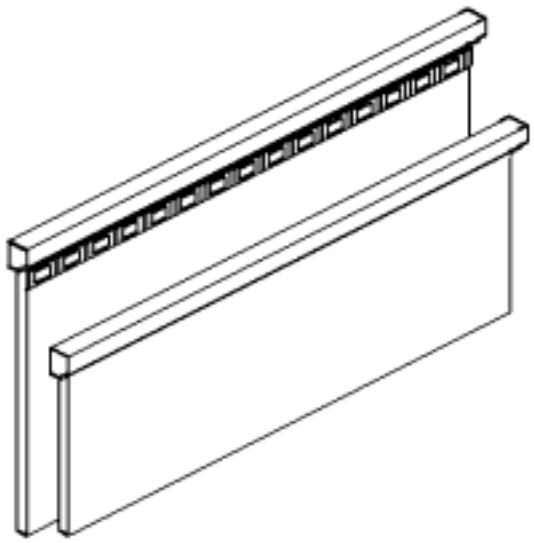
The head and foot panels fit over two vertical post type mountings located at each end of the bed and are removable by lifting vertically.

Installation

Tools required: None

Align the panel brackets with the post mountings and slide vertically downward until fully engaged (see figure 7-10 on page 7-15).

Figure 7-10. Dentil Style Head and Foot Panels—P4074



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7.11 Comfortline® Mattress (P1433)

A 5" (12.7 cm) thick Comfortline mattress is available as an accessory.

Installation

Tools required: None

1. Remove the existing mattress from the bed.
2. Remove the shipping wrappings from the Comfortline mattress.
3. Place the Comfortline mattress on the sleep surface with the label “head section” at the head end of the bed.
4. Raise the mattress stop at the foot end of the bed to keep the mattress from sliding toward the foot panel.

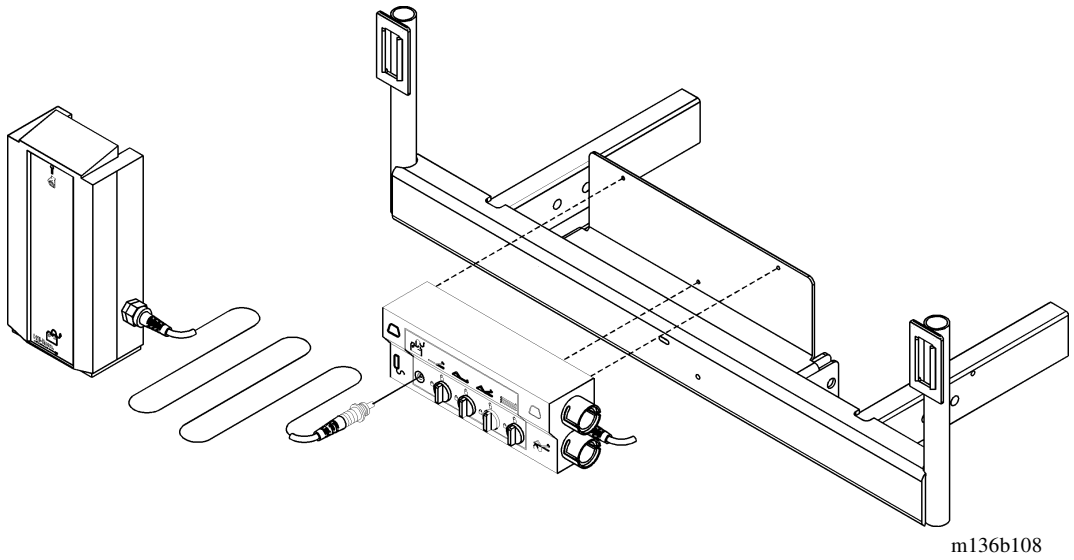
7.12 Ambulatory Assist Rail (P441A)

The ambulatory assist rail is available as an accessory to aid the resident when getting into or exiting the bed.

7.13 Auxiliary Power Supply (P442)

The auxiliary power supply accessory is available to enable operation of the actuators to position the bed in event of a power failure. This power supply charges through a standard 120VAC, 60 cycle outlet and can be fully charged in 24 hours. The auxiliary power supply will allow up to 15 complete cycles of the hilow and the head section when fully charged. The power supply unit is connected to the control lockout box (see figure 7-11 on page 7-17).

Figure 7-11. Auxiliary Power Supply Bed Connection



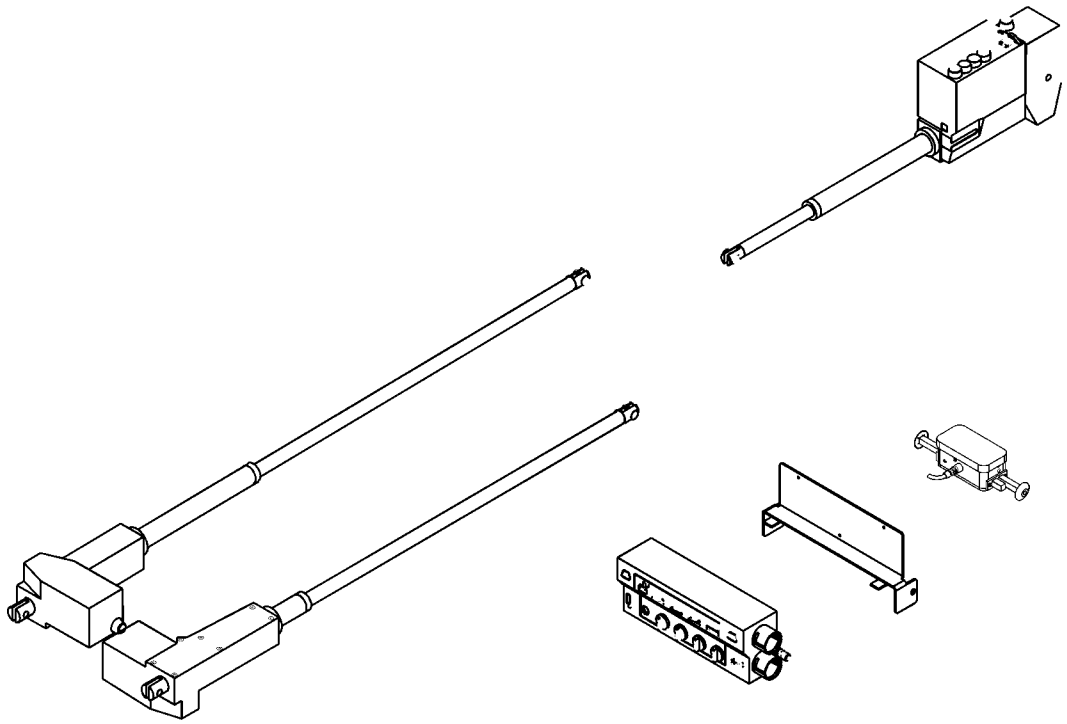
7.14 Trendelenburg/Reverse Trendelenburg Adapter (P865)

The Trendelenburg adapter is available as an accessory. This accessory is used with the hilow function to achieve Trendelenburg/Reverse Trendelenburg.

7.15 Resident™ LTC Bed Electric Upgrade Kit (P9951)

All necessary hardware and instructions to install the electric upgrade kit (P9951) are contained in the kit. Major components of the kit are shown below (see figure 7-12 on page 7-18). The mounting hardware and wiring harness was omitted in figure 7-12 for clarity.

Figure 7-12. Electric Upgrade Kit—P9951



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