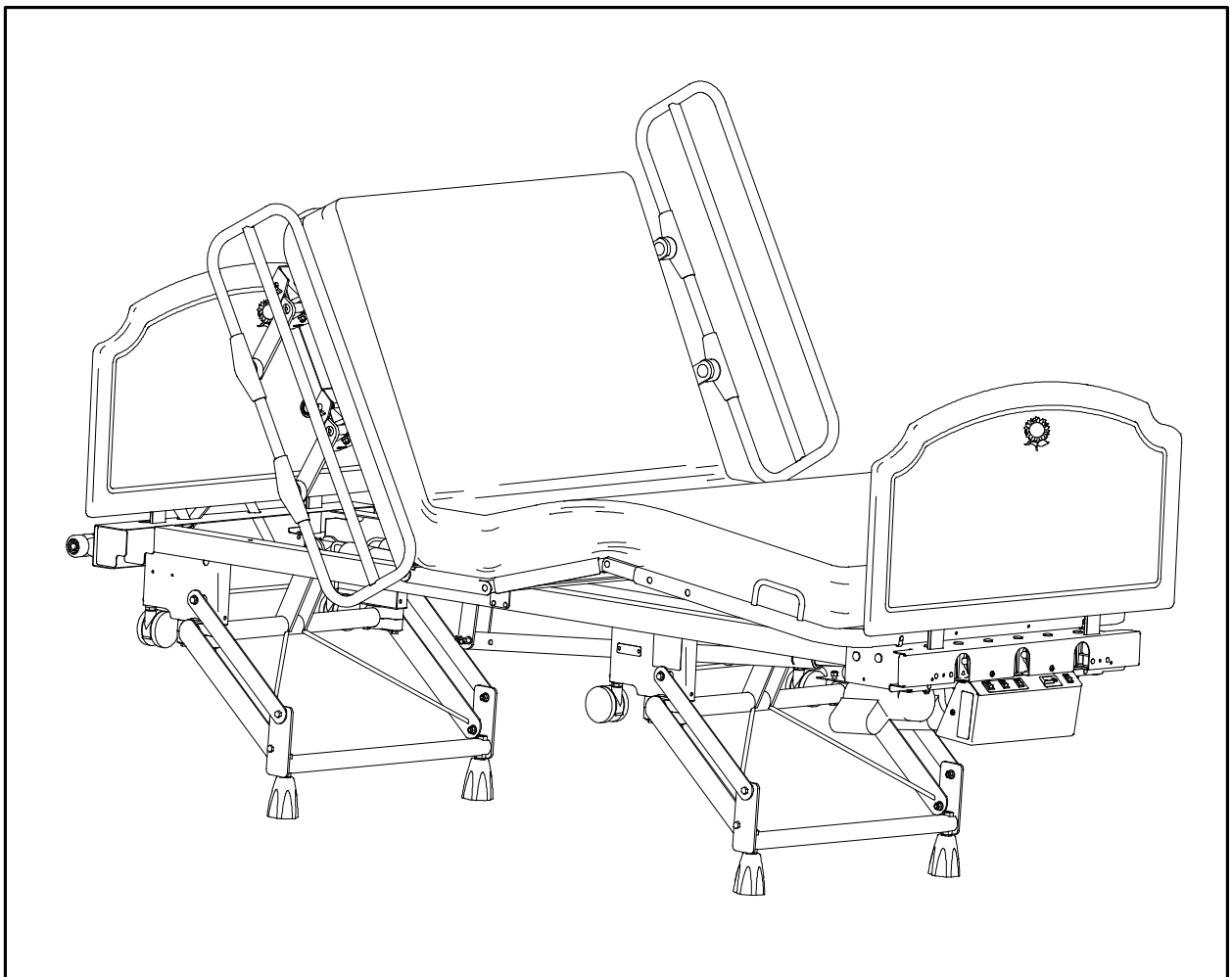


The SUNFLOWER™
MANUAL / ELECTRIC LONG TERM CARE BED

Product Number: FL18M1
FL18M2
FL18E1
FL18E2



Technical Assistance and Parts

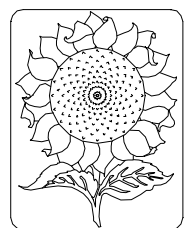
1 800 428-5025 (Service in English in Canada)

1 800 361-2040 (Service in French in Canada)

1 800 327-0770 (In the United States)

E-Mail (Canada): service@bertec.strykercorp.com

Manufactured by Stryker Bertec Medical Inc



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NOTE

Stryker Bertec Medical Inc gives special attention to the quality of the information found in this document. Any comments on its content will be most welcomed. Please forward your remarks to the Technical Service department (see section 1.2).

1. INTRODUCTION

This Maintenance manual is designed to assist you with the servicing of your Sunflower bed. Before servicing the bed, it is important to thoroughly read and understand all information in this manual.

Qualified service personnel should be able to refer to this manual at all time. A User manual, included in the Customer's Guide, is also available to assist you with the operation of the bed. This Maintenance manual is an integral part of the bed and should be turned over to the new user should the bed be sold or transferred.

1.1 BED SPECIFICATIONS *

Load Capacity	450 lb (204 kg)
Fowler Angle	0° to 85°
Knee Gatch Angle	0° to 30°
Sleep surface	36" x 76" - 78-1/2" (91.5cm x 193 cm - 199 cm) Accommodates 35" x 76" - 78" - 80" (89 cm x 193 cm - 198 cm - 203 cm) mattresses.
Minimum/Maximum Bed Height -FL18E1/M1 -FL18E2/M2	11 to 25 in. (28 to 63.5 cm) 12 to 26 in. (30.5 to 66 cm)
Bed Stabilizing System -FL18E1/M1 -FL18E2/M2	Reverse Lock System (Bed Normally Rests on Legs) Floor Lock System (Bed Normally Rests on Casters)
Overall Weight -FL18E1/E2 w/Full-Length Siderail and Designer Board. -FL18M1/M2 w/Full-Length Siderail and Designer Board.	288 lb (127 kg) 260 lb (118 kg)
Overall Dimensions -Length: 76" Bed w/o and w/Bumpers 80" Bed w/o and w/Bumpers -Width: Siderail down - Siderail up	84 1/8 in. - 86 1/4 in. (214 cm - 219 cm) 86 5/8 in. - 89 in. (220 cm - 226 cm) 39 1/4 in. - 42 in. (99.6 cm - 106.6 cm)
Electrical Requirements - All electrical requirements meet the CSA standard C22.2 No. 125 and UL 544 specifications for class 2G.	120 V, 50/60 Hz, 5 A

* Stryker Bertec Medical Inc. provides special attention to product improvement and reserves the right to change specifications without notice.

1.2 TECHNICAL SUPPORT

For questions regarding this product, contact one of the following Technical Service departments or your local representative:

In Canada:

Stryker Bertec Medical Inc
Service in English: 1 800 428-5025
Service in French: 1 800 361-2040
E-mail (Canada): service@bertec.strykercorp.com
70, 5th Avenue, P.O. Box 128
L'Islet (Quebec) G0R 2C0 Canada

In the United States:

Stryker Medical
1 800 327-0770
6300, Sprinkle Road
Kalamazoo, MI 49001-9799
USA

1.3 WARNING / CAUTION / NOTE DEFINITIONS

The words **WARNING**, **CAUTION** and **NOTE** carry special meanings and should be carefully reviewed.



WARNING

The personal safety of the patient or user may be involved. Disregarding this information could result in injury to the patient or user.



CAUTION

These instructions point out special procedures or precautions that must be followed to avoid damaging the equipment.

NOTE

Notes provide special information to make maintenance easier or important instruction clearer.

1.4 SAFETY PRECAUTIONS

The following is a list of safety precautions that must be observed when operating or servicing the Sunflower bed. They are repeated throughout the manual, where applicable. Carefully read and strictly follow them before operating or servicing this unit.



WARNING

- The Sunflower bed is not intended for pediatric use.
- It is important that all users have been trained and educated on the inherent hazards associated with the use of electric and manual beds. Bed mechanisms can cause serious injury to the patient or user. Operate bed only when all people are clear of the mechanisms.
- Electric Sunflower beds are equipped with a hospital grade plug for protection against shock hazard. It must be plugged directly into a properly grounded receptacle. Grounding reliability can be achieved only when a hospital grade receptacle is used.
- Always make sure the bed is resting on its legs or the caster brakes are applied when a patient is on the bed. Serious injury could occur if the bed moves while a patient is getting in or out of bed. Always check bed stability after having moved the bed and seated it on the floor or engaged the caster brakes.
- Possible fire hazard exists when this bed is used with oxygen administering equipment other than nasal, mask type or half bed-length tent type. It is recommended to disconnect the bed in such circumstances. When using a half bed-length tent type, ensure the siderails are outside the oxygen tent. Oxygen tent should not extend below the mattress support level.
- To help reduce the number and severity of falls by patients, always leave the bed in the lowest position and leave the siderails fully up when the patient is unattended. After raising the siderails, pull firmly on the siderail to ensure it is securely locked into the up position.
- Always keep siderails in the fully raised position and the sleep surface horizontal in its lowest position when the patient is sleeping unless the patient's medical conditions dictates otherwise. If the bed is equipped with half-length siderails and the sleep surface is not in the horizontal position, it is strongly recommended that only the head siderails be kept in their highest position and the foot siderails be stored on the side of the bed to avoid the risks of a patient becoming caught between the two siderail sections.

- Siderails, with or without their padded covers or nets, are not intended to serve as restraint devices to keep patient from exiting the bed. Siderails are designed to keep a patient from inadvertently rolling off the bed. It is the responsibility of the attending medical personnel to determine the degree of restraint necessary to ensure a patient will remain safely in bed. Failure to utilize the siderails properly could result in serious patient injury.
 - When a patient's condition requires greater safety measures for their security, you can remove completely the pendant control and install protective pads on the siderails.
 - When the sleep surface sections are articulated, ensure that all spaces created by the raised siderails are clear to avoid the patient's limb becoming trapped between siderails and boards, and between siderails (if applicable).
 - When large fluid spills occur in the area of the circuit board, cables and motors, immediately unplug the bed. Remove the patient from the bed and clean up the fluid. Have maintenance completely check the bed. Fluids can have an adverse effect on operational capabilities of any electrical product. **DO NOT** put the bed back into service until it is completely dried and has been thoroughly tested for safe operation.
 - Do not steam clean, hose off or ultrasonically clean the bed. Do not immerse any part of the bed. The electrical components of the bed may be damaged by exposure to water. Hand wash regularly all surfaces of the bed with a soft cloth moistened with a solution of lukewarm water and mild detergent. Wipe cleaned surfaces dry to avoid build up of cleaning substance. Inspect the mattress after each use. Discontinue use if any cracks or rips are found in the mattress cover which may allow fluid to enter the mattress. Failure to properly clean mattress or dispose of defective mattress will increase the risk of exposure to pathogenic substances which may cause injury to the patient or user.
 - Always unplug the bed power cord from the wall outlet when cleaning or servicing the bed. When working under the bed with the bed in the high position, always place blocks under the sleep surface and lock the casters to prevent injury.
 - When using the emergency hand crank during a power failure, unplug the power cord from the wall receptacle so that unexpected resumption of power will not rotate handle. Remove and store the crank before reconnecting the bed.
 - **Do not** attempt to fit a Patient Helper system on the Sunflower bed. Due to the bed lightness of weight, no receptacles are provided at the head end of the bed to install a such a device as it may cause the bed to tip on its side.
-

**CAUTION**

- Ensure that any bed malfunction is promptly reported to service personnel for immediate attention. Preventative maintenance should be performed periodically to ensure all bed features are functioning properly.
- Ensure that the power cord does not get trapped under a leg when the bed is seated on the floor, after having been moved.

1.5 STATIC DISCHARGE PROTECTION

The electronic circuits of the bed are protected from static electricity damage only while the bed is assembled in the plant. It is extremely important that all service personnel always use adequate static protection when servicing the electronic components of the bed.

Static Protection Equipment

The necessary equipment for a proper static protection are:

- 1 static wrist strap
- 1 grounding plug
- 1 test lead with a banana plug on one end and a alligator clip on the other.

Static Protection Procedure

1. Unplug the bed power cord from the wall receptacle.
2. Insert the grounding plug into a properly grounded hospital grade wall receptacle. Plug the banana plug of the test lead into the receptacle on the grounding plug. Connect the alligator clip on the other end of the test lead to a ground point on the bed.
3. Place the static control wrist strap on your wrist. Connect the clip at the other end of the wrist strap cord to a ground point on the bed.

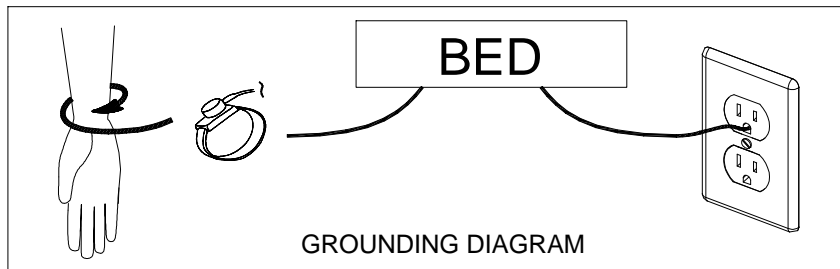


Figure 1.6

1.6 WARRANTY

1.6.1 Limited Warranty

All Stryker Bertec products are guaranteed against material or workmanship defects, improper operation of mechanisms, and premature wear of bed components under normal use conditions.

For questions regarding warranty, please contact Stryker Bertec Technical Service department (see section 1.2) or your local representative.

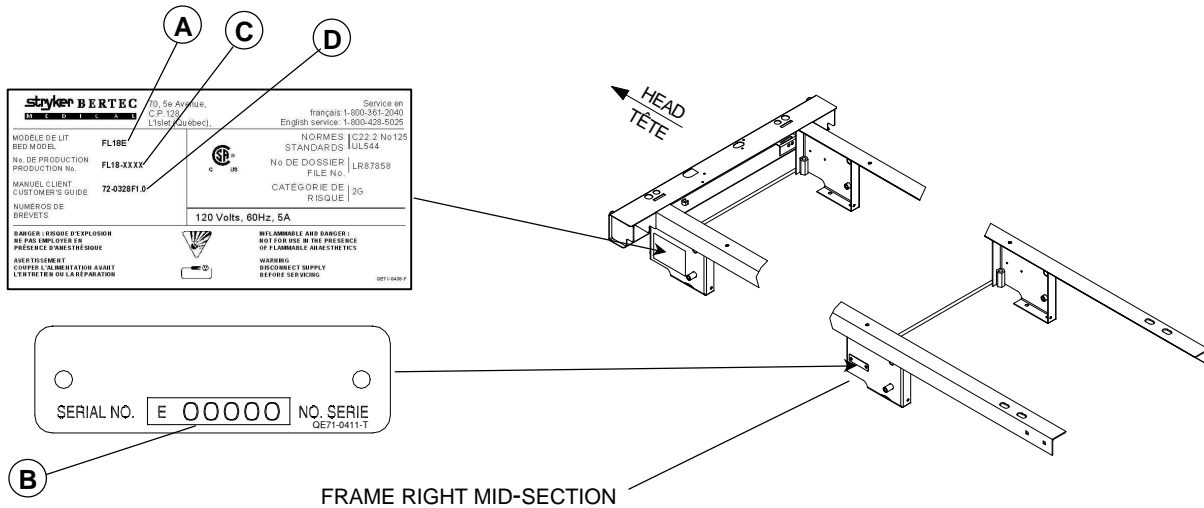
1.6.2 To Obtain Service and/or Replacement Parts

NOTE

Throughout this Maintenance manual, the words "right" and "left" refer to the right and left sides of a patient lying face up on the bed.

To Require Service

To obtain the service of a Stryker Field Service Representative for an on-site diagnosis and/or repair of a bed malfunction, contact Stryker Bertec Technical Service department (see section 1.2) or your local representative.

To Order Replacement Parts**Figure 1.7.2**

To order replacement parts, contact Stryker Bertec Technical Service Department (see section 1.2) or your local representative and provide the following information:

- Model number (A)
- Serial number (B)
- Production number (C)
- Name and part number of the defective part, which can be found in the Parts Lists included in the Customer's Guide, whose code number (D) is printed on the manufacturer's nameplate.

NOTE

It is very important that you refer to the Customer's Guide drawings and parts lists that are specific to the bed requiring repair.

- Description of the problem encountered.

NOTE

We will do our best to help you identify the parts to be replaced. However, if an error occurs when ordering, the user remains responsible for identifying parts to change.

Stryker Bertec will take back wrong parts ordered but will not assume shipping charges, and restocking fees will be charged to the user, unless a Technical Service Representative has been requested for an on-site diagnosis of the malfunction.

1.6.3 Return Authorization

Merchandise cannot be returned without approval from the Stryker Bertec Technical Service department. An authorization number will be provided, which must be clearly printed on the returned merchandise. Stryker Bertec reserves the right to charge shipping and restocking fees on returned items.

1.6.4 Damaged Merchandise

Claims for damaged merchandise must be made with the carrier within fifteen (15) days of receipt of merchandise. **DO NOT ACCEPT DAMAGED SHIPMENTS UNLESS SUCH DAMAGE IS NOTED ON THE DELIVERY RECEIPT AT THE TIME OF RECEIPT.** Upon prompt notification, Stryker Bertec will file a freight claim with the appropriate carrier for damages incurred. Claims will be limited in amount to the actual replacement cost. In the event that this information is not received by Stryker Bertec within the fifteen (15) days period following the delivery of the merchandise, or the damage was not noted on the delivery notice at the time of receipt, the customer will be responsible for payment of the original invoice in full.

Claims for any short shipment must be made within 5 days of invoice.

1.7 SET-UP PROCEDURES

It is important to ensure that the bed is working properly before it is put into service. The following list will help ensure that each part of the bed is tested.



CAUTION

Position the head end of the bed at least nine inches apart from the wall to prevent the wall from being damaged when the bed is lowered.

NOTE

Sunflower beds (**FL18**) may be fully or partially electric (**FL18E**) or completely manual (**FL18M**). Both electric and manual models may be equipped either with the Reverse Locking system (bed normally rests on legs) (**FL18E1 / FL18M1**) or the Floor Lock system (bed normally rests on casters) (**FL18E2 / FL18M2**).

1.7.1 Electric (FL18E1/E2) Bed Checklist



WARNING

Electric Sunflower beds are equipped with a hospital grade plug for protection against shock hazard. It must be plugged directly into a properly grounded receptacle. Grounding reliability can be achieved only when a hospital grade receptacle is used.

NOTE

When partially electric, the bed is equipped with a combination of electric and manual actuators. Note that on partially electric beds, the Hi-Lo command and bed-on-caster warning LED are present only when the optional powered Hi-Lo function is installed on the bed.

- Plug the power cord into a properly grounded hospital grade wall receptacle.
 - For both models, ensure that the On/Off switch LED goes on when the switch is turned on.
- Check (if present) the yellow bed-on-caster warning LED and the casters for proper operation by doing the following:
 - FL18E1:** Press and hold the Hi-Lo switch in the foot end control panel to lower the bed until it automatically stops. Release switch, press and hold it again to lower the bed onto its casters. Ensure the yellow bed-on-caster warning LED blinks when the bed is lowered onto its casters and goes out when the bed is brought back onto its legs. Check casters for proper operation when the bed is resting on them.

- FL18E2:** Press and hold the Hi-Lo switch in the foot end control panel to lower the bed until it rests onto its legs. Ensure that the yellow bed-on-caster warning LED goes off when the bed is lowered onto its legs and blinks when it is brought back onto its casters. Ensure the bed moves easily when resting on its casters. Apply the locking mechanism on all casters and try to move the bed to ensure it is properly stabilized.
- Connect the pendant control to the bed receptacles located on each side of the bed under the centre section of the sleeping surface:
 - Deactivate (allows access to pendant control commands) the optional lockout controls and test all pendant controls for proper operation.
 - Activate the optional lockout controls in the foot end control panel and ensure that they effectively lock the corresponding pendant controls.
- Using the Hi-Lo switch and/or the pendant controls and/or the hand cranks, fully raise and lower the sleeping surface, the Fowler and the Knee Gatch to ensure they all move smoothly.
- Foot support arm working properly.
- Check the emergency hand crank (optional) for proper operation in all available screw openings located at the foot end of the bed.
- Ensure the siderails raise and lower smoothly, and lock in the up position. If the bed is equipped with half-length siderails, ensure that rails lock in the down position.

If any problems are found during bed set-up, contact our Technical Service department (see section 1.2).

1.7.2 Manual (FL18M1/M2) Bed Checklist

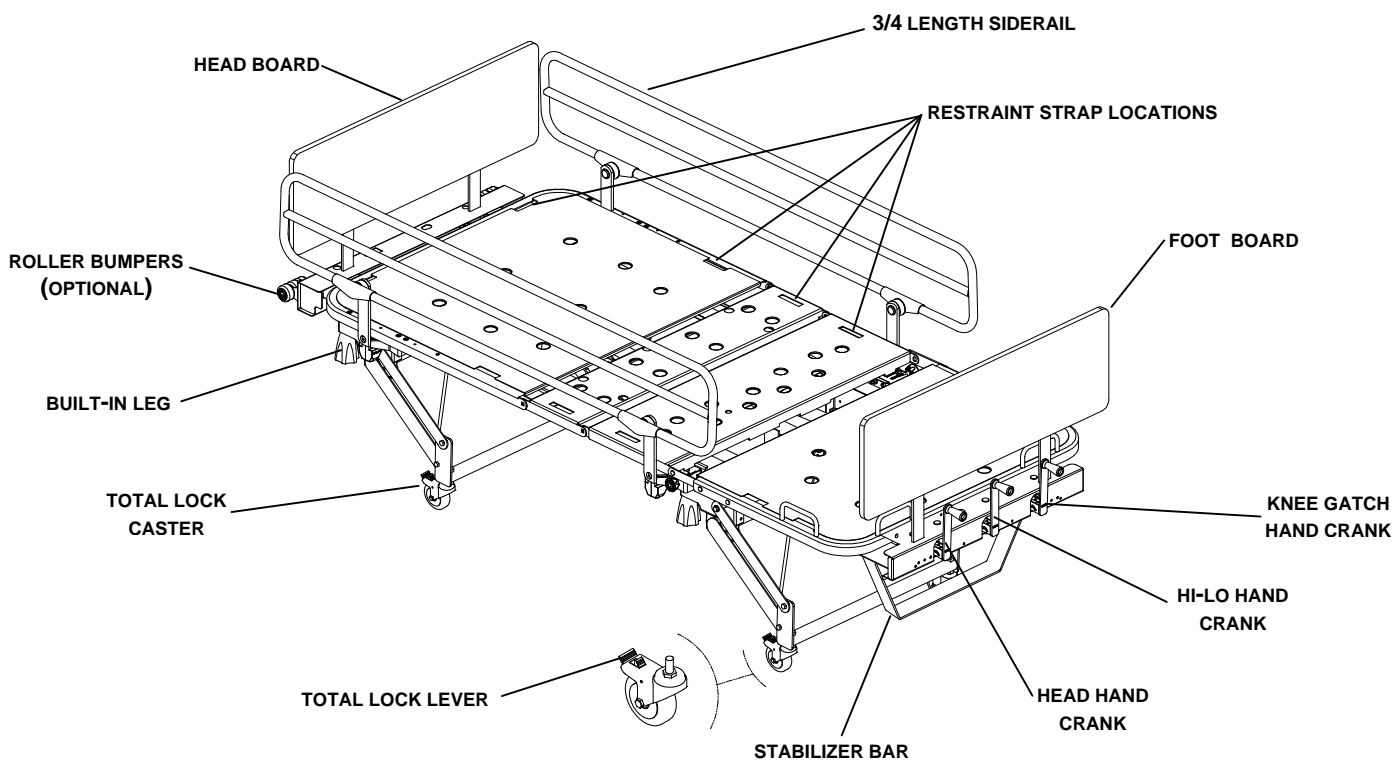
- Ensure the siderails raise and lower smoothly, and lock in the up position. If the bed is equipped with half-length siderails, ensure that rails lock in the down position.
- Using the three hand cranks, fully raise and lower the sleep surface, the Fowler and the Knee Gatch to ensure they operate properly.
- Foot support arm working properly.
- Ensure bed casters operate properly:
 - FL18M1:** Lower the sleep surface, using the hand cranks, until the bed rests on its casters and move the bed. Ensure the bed moves easily.
 - FL18M2:** Ensure the bed moves easily when resting on its casters. Apply the locking mechanism on each casters and try to move the bed to ensure it is properly stabilized.

If any problems are found during bed set-up, contact our Technical Service department (see section 1.2).

1.8 BED ILLUSTRATION

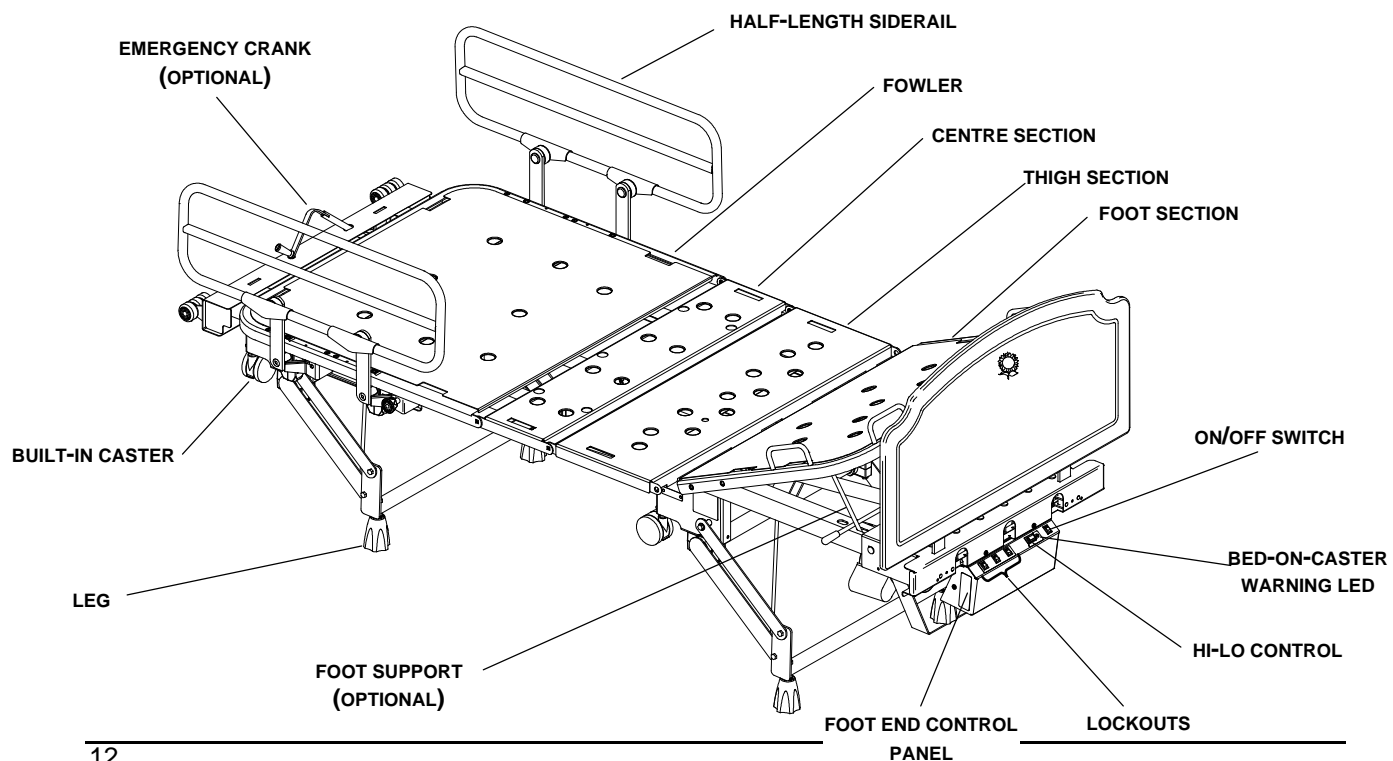
FL18M2 Bed (Floor Lock System - Bed Normally Rests on Casters)

Illustration of a fully manual bed equipped with three-quarter-length siderails.



FL18E1 Bed (Reverse Lock System - Bed Normally Rests on Legs)

Illustration of a fully electric bed equipped with half-length siderails.



2. CLEANING AND PREVENTATIVE MAINTENANCE**WARNING**

Always unplug the bed power cord from the wall outlet when cleaning or servicing the bed. Ensure that any bed malfunctions are immediately reported to the Maintenance personnel for immediate attention. Unattended bed malfunctions could lead to mechanism breakage, possibly causing injury to the patient or the user.

2.1 BED CLEANING AND MATTRESS CARE**CAUTION**

Do not use harsh cleaners, solvents or detergents. Do not steam clean, hose off or ultrasonically clean the bed. Do not immerse any part of the bed. The bed electrical parts may be damaged by exposure to water.

Germicidal disinfectant, used as directed, and/or Chlorine Bleach products are not considered mild detergents. These products are corrosive in nature and may cause damage to your bed if used improperly. If these types of products are used, ensure the beds are rinsed with clean water and thoroughly dried following cleaning. Failure to properly rinse and dry the beds will leave a corrosive residue on the surface of the bed, possibly causing premature corrosion of critical components. Failure to follow the above directions when using these types of cleaners may void this product warranty.

2.1.1 Cleaning Beds

- Hand wash all surfaces of the bed with a soft cloth moistened with a solution of lukewarm water and a mild detergent.
- Wipe the bed clean and dry thoroughly to avoid build up of cleaning solution.

2.1.2 Mattress Care**WARNING**

Failure to properly clean mattress covers or dispose of defective mattresses will increase the risk of exposure to pathogenic substances which may cause injury to the patient or the user.

Inspection

- Implement local policies to address regular care, maintenance, and cleaning of mattresses and covers. The cover cleaning and sterilization procedures can be found below and on the mattress label.
- Inspect mattress cover surface (also zip fasteners and cover inner surface if mattresses have zip fasteners) regularly for signs of damage. If the mattress cover is stained, soiled, or torn, examine the mattress, and seek instructions from the infection control nurses, as the mattress may harbour micro-organisms. If the mattress is wet or badly stained, withdraw the mattress from service.
- Seek the advice of infection control nurse in case of heavy soiling or infection, as general cleaning procedures are unlikely to be adequate.

Cleaning and Sterilization

- Stains: Wash with lukewarm water using a mild detergent. Rinse with water and let dry.
- Tough stains and sterilization: Chlorine bleach substance diluted with ten parts of water.

2.2 LUBRICATION

Listed below are the lubrication points and their recommended interval checks. When needed, lubricate these points with OG2 grease (Stryker Bertec part No M0027).



WARNING

The use of type of grease different than the one recommended (OG2 grease) could lead to deterioration of critical parts and to mechanism failure, resulting in injury to the patient or operator and damage to the bed.



CAUTION

The bed uses oil-impregnated shoulder spacers at hinge points. **Do not** lubricate these shoulder spacers. When shoulder spacers are found worn, they must be replaced.

Do not lubricate the siderail sleeve bearings and positioning guide, and the foot section wire clamps used as gliders (see figure 2.2.3A, page 16).

2.2.1 Periodic Checklists

The bed lubrication points need to be checked and greased as needed at the following intervals:

Annually:

- Check actuator screws (electric as well as manual actuators) and apply grease as needed (see section 2.2.2 below).
- Check clevis pins hooking actuator tubes and Hi-lo connecting tube and apply grease as needed.
- Check spring hooks and apply grease as needed.

Every Two Years:

- Check rail shafts and apply grease as needed. Apply grease on both sides of the nylon washers.
- Check Hi-Lo mechanism moulded bearings and apply grease as needed. Loosen locknuts holding the Hi-Lo moulded bearings to the frame and inject grease.

2.2.2 Actuator Screw Lubrication Procedure

To lubricate electric and manual actuator screws, their treads must first be uncovered as much as possible by positioning the mattress support sections and bed height at determined positions. The plastic dust cover is then removed to reach the screw. Once grease is applied on the whole screw, screw the tube in half its course, then fill 16 ml (0.5 oz) of grease into the 1/2" Ø hole located 2-1/2" from the tube end facing the bed foot end. Run screws in and out a few times using the pendant control commands or the hand cranks to spread the grease evenly.

Hi-Lo actuator screw: Lower the bed to minimum height, remove actuator dust cover, and apply grease as indicated. Replace dust cover.

Head actuator screw: Raise bed to maximum height, remove actuator dust cover, and apply grease as indicated. Replace dust cover.

Knee Gatch actuator screw: Lower knee Gatch to flat position, remove actuator dust cover, and apply grease as indicated. Replace dust cover.

2.2.3 Lubrication Points Illustrated

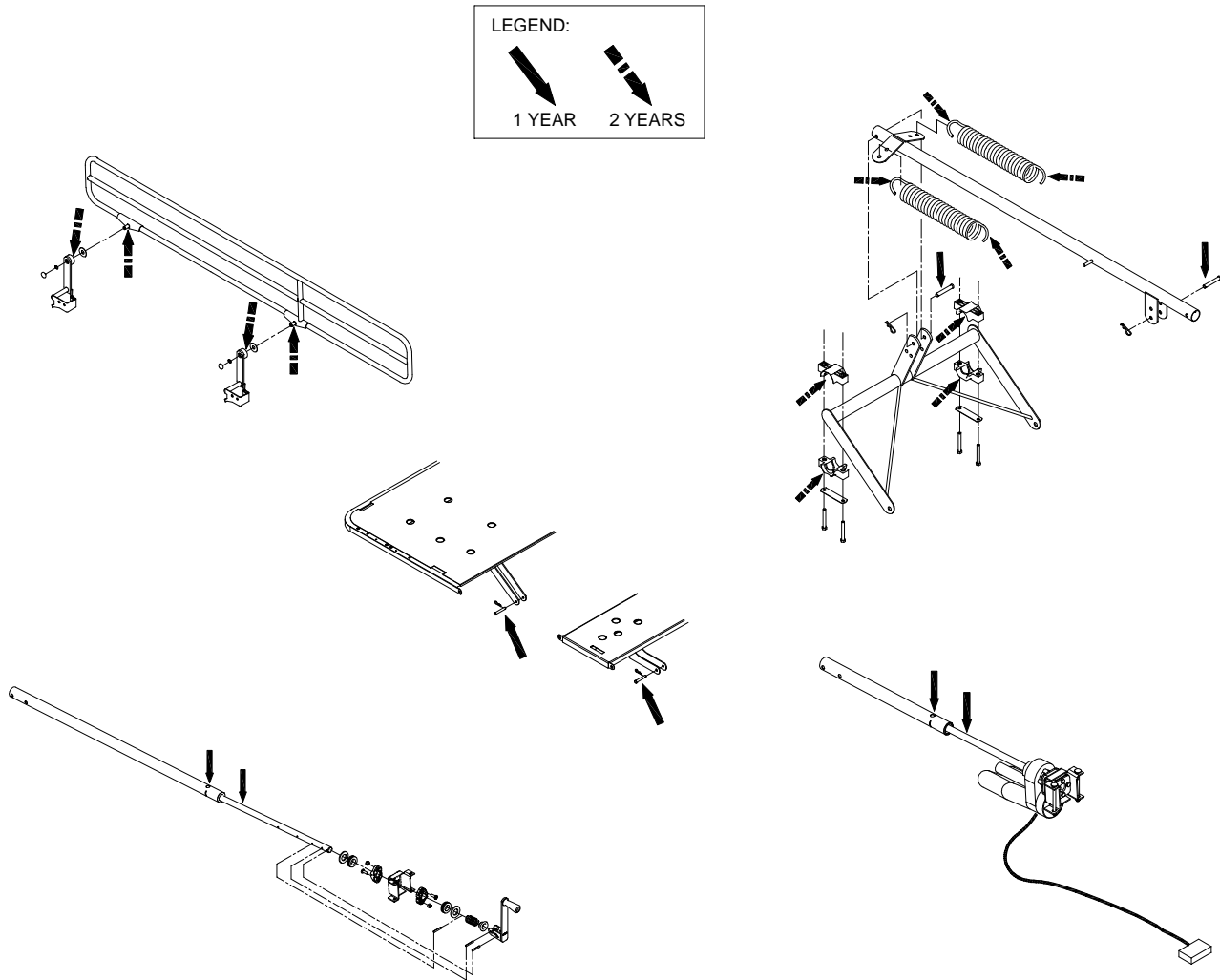


Figure 2.2.3

NOTE

The following siderail and foot section components do not need lubrication.

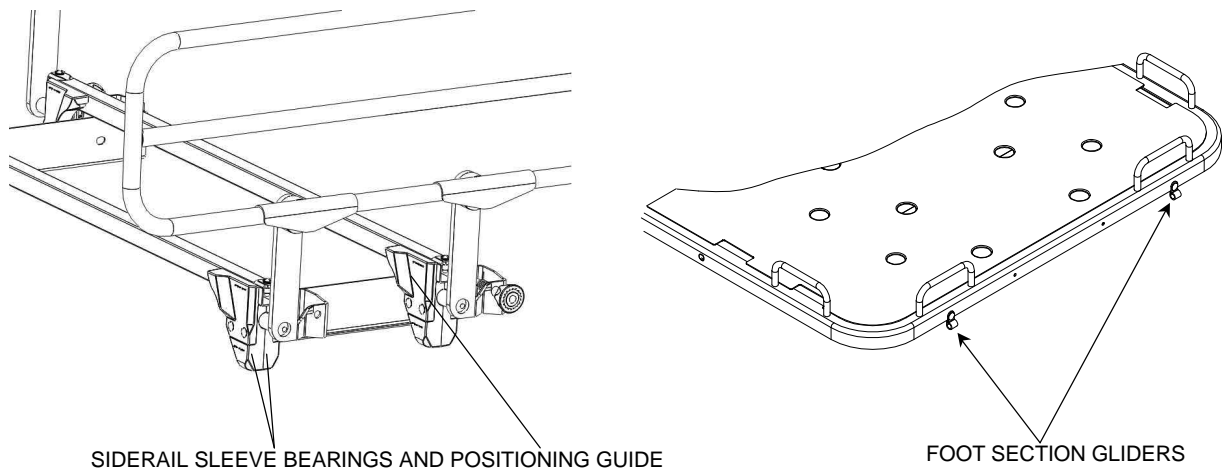


Figure 2.2.3A

2.3 PREVENTATIVE MAINTENANCE PROGRAM

The following scheduled maintenance and inspection program has been devised to ensure a long and productive life to your Sunflower bed. Each item on the schedule should be checked and any necessary adjustments made during the preventative maintenance process. Persistence in performing it **annually** will help minimize bed failures and reduce downtimes.



WARNING

Only qualified service personnel should perform the procedures detailed in this Maintenance manual. Failure to observe this restriction can result in serious damage to material and/or severe injury to people.

2.3.1 Annual checklist

Checklist Common to Electric and Manual Beds



CAUTION

The bed uses oil-impregnated shoulder spacers at hinge points. **Do not** lubricate these shoulder spacers. When shoulder spacers are found worn, they must be replaced.

- Inspection for excessive wear of all the oil-impregnated bronze shoulder spacers found in the following components of the bed. Replace as needed.
 - Linkage of the mattress support sections together
 - Hi-Lo lever mechanism
- Inspection of all bolt, locknut and screw tightening. Tighten if necessary
- Inspect and lubricate as needed all lubrication points (see section 2.2, "Lubrication").
- Siderails move and latch properly
- Foot support arm intact and working properly
- No cracks or splits in head and foot boards
- Head end bumpers secure and working properly
- No rips or cracks in mattress cover
- FL18E1 and FL18M1: All casters roll properly.
- FL18E2 and FL18M2: All casters roll properly. Check caster locking mechanism and tire for cuts, wear, tread life, etc.
- Emergency hand crank (optional) working properly.

Electric Bed Checklist

- On/Off, Hi-Lo (if applicable) and lockout control (if applicable) switches in the foot end control panel working properly.
- Bed lowering on casters (FL18E1) or legs (FL18E2) using the Hi-Lo (if applicable) switch (see section 1.7.2, "Electric Beds (FL18E1/E2)", page 11) working properly:
 - FL18E1: Yellow bed-on-casters warning LED blinks when bed is lowered onto its casters and goes off when bed is brought back onto its legs.
 - FL18E2: Yellow bed-on-casters warning LED blinks when bed is resting on its casters and goes off when bed is lowered onto its legs.
- Pendant control functions working properly
- Power cord not frayed
- No cables worn or pinched
- All electrical connections tight.
- All ground secure to the frame
- Measure bed current leakage and ground impedance (check with our Technical Service department (see section 1.2) for the acceptable value).

NOTE

Preventative maintenance may need to be performed more frequently based on the usage level of the bed.

Serial No. _____

Completed By: _____

Date: _____

2.3.2 Recommended Spare Parts

The following is a list of recommended on hand spare parts for the Sunflower bed.

Electronic/Electrical Assembly Parts

PC Board	QDF14-0990
PC Board stand of pins	QDF8011
Right angle strain relief bushings	QPN1207
Power cord/connector	QDF18-0220/QDF8041
Micro switch	QDF9026
Micro switch support	18-0222-P
On/Off switch and wiring	QDF17-0140
Function lockout wiring	QDF18-0221
Rocker switch (for lockout control)	QDF9570
Pendant control (three functions)	FA640080

Actuator Assembly Parts

Knee Gatch actuator	QDF18-0249
Head and Hi-Lo actuators	18-0260
Crank handle	18-0205
Hitch pin/clevis pin	QDF7874/VG50B1250

Siderail Assembly Parts

Plunger	18-0319
Nylon glider	QPNH1502
Protective cap	QPN-18748
Retainer ring	QDF7859

Mattress Support Parts

Mattress retainer	QPN-14034-2
Plastic Wiring clamp (used as gliders on the foot section)	QDF9522

Base Assembly Parts

Faultless 3" caster	RA3S
Caster	18-0325 (FL18E2/M2)
Plastic leg	QP18-0079-07

Miscellaneous Parts

Spring pin	VG10B0636
Shoulder spacer	QDF17-0020
Bumper wheel	QPC-14-0321
Sand Grey aerosol spray paint (for sand grey painted beds)	DDCAP-GSP
OG-2 grease	M0027
Thread locker - medium strength	M008

3. TROUBLESHOOTING

Before calling the Technical Service department, please consult the following checklist.

3.1 CHECKLIST

PROBLEM	CAUSE	SOLUTION
No power to bed (green On/Off LED does not go on)	Main power switch in the OFF position.	Place On/Off switch in the ON position.
	Bed not plugged.	Plug bed power cord.
	Bed plugged into a defective wall outlet.	Check wall outlet.
No bed up or down motion	Hi-Lo lockout (optional) control activated	Deactivate Hi-Lo lockout.
	Pendant control cable not connected to bed receptacle	Connect pendant control cable.
	Following intensive use, the actuator thermal protection switch has turned motor off.	Refrain from using the bed for about twenty minutes.
No Fowler up or down motion	Fowler lockout control (optional) activated.	Deactivate Fowler lockout control.
	Pendant control cable not connected to bed receptacle.	Connect pendant control cable.
	Following intensive use, the actuator thermal protection switch has turned motor off.	Refrain from using the bed for about twenty minutes, the time for the motor to reset itself.
No Gatch up or down motion	Knee Gatch lockout control (optional) activated.	Deactivate knee Gatch lockout control.
	Pendant control cable not connected to bed receptacle.	Connect pendant control cable.
	Following intensive use, the actuator thermal protection switch has turned motor off.	Refrain from using the bed for about twenty minutes, the time for the motor to reset itself.
Pendant control commands do not function at all	No power to bed.	Turn the On/Off switch on or plug the bed or check wall outlet.
	All lockout controls (optional) activated.	Deactivate lockout controls.
	Pendant control not connected to bed receptacle	Connect pendant control cable.
On/Off LED blinks continually		Call our Technical Service department (see section 1.2).
Yellow bed-on-casters warning LED does not blink when bed is resting on its casters		Call our Technical Service department (see section 1.2).

PROBLEM	CAUSE	SOLUTION
Yellow bed-on-casters warning LED always on		Call our Technical Service department (see section 1.2).
The bed will not lower onto its casters or legs using the Hi-Lo switch		Call our Technical Service department (see section 1.2).
Bed down movement does not stop automatically before casters reach the floor		Call our Technical Service department (see section 1.2).

4. MAINTENANCE PROCEDURE

This section contains step-by-step procedures to assist with the maintenance and servicing of the Sunflower bed.



WARNING

Only qualified service personnel should perform the procedures detailed in this Maintenance manual. Failure to observe this restriction can result in serious damage to material and/or severe injury to people.

Always unplug the bed power cord from the wall outlet when cleaning or servicing the bed. When working under the bed with the bed in the high position, always place blocks under the sleep surface and lock the casters to prevent injury.

NOTE

In the text, the word "right" and "left" refer to the right and left sides of a patient lying face up on the bed.

4.1 MATTRESS SUPPORT SECTIONS (MANUAL /ELECTRIC BEDS)

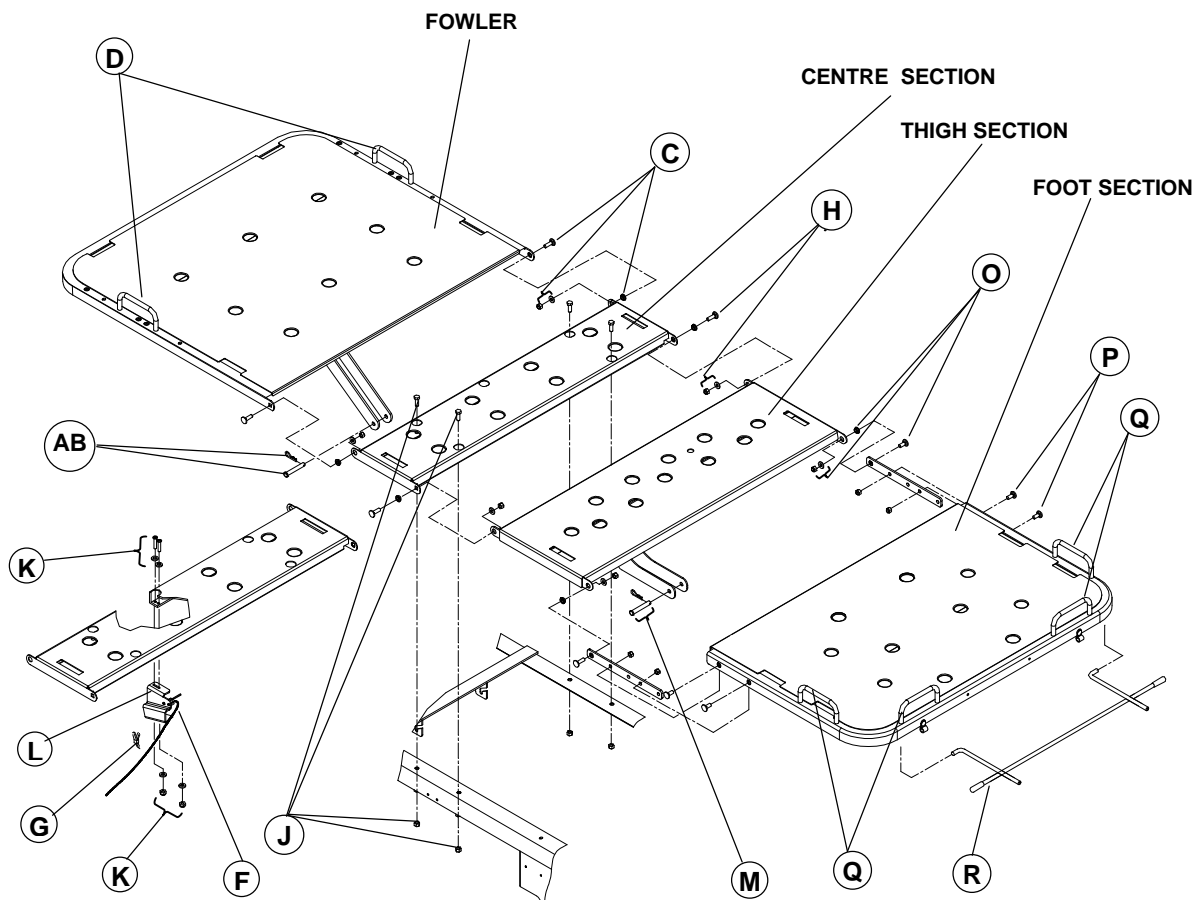


Figure 4.1

NOTE

Unless otherwise stated, all the following replacement procedures (4.1.1 to 4.1.4) will refer to figure 4.1 above.

4.1.1 Fowler Replacement

Required Tools:

1/2" Wrench

2 Phillips Screwdriver

Long Nose Pliers

OG-2 Grease (P/N M0027)

Thread Locker-Medium Strength (P/N M008)

Procedure:

1. Raise bed to high position and bring mattress support to horizontal position.
2. Unplug (if applicable) bed power cord from the wall socket.
3. If the bed is equipped with half-length siderails, lower both siderails, remove the four screws (**S**, fig. 4.1A below) holding the two siderail supports to the head section and remove siderails.

NOTE

Apply medium-strength thread locker on screw treads before re assembly.

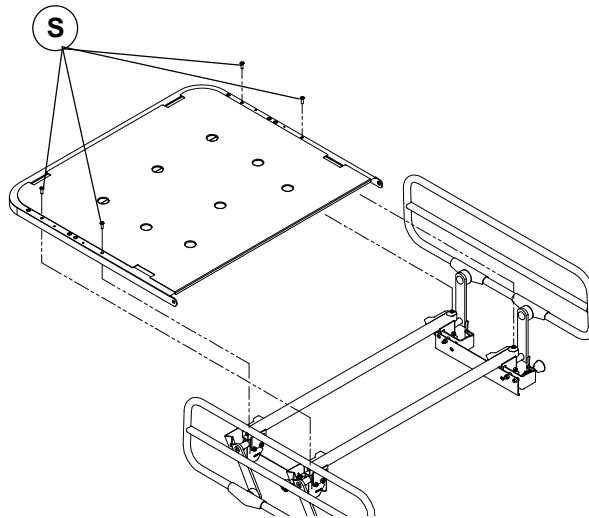


Figure 4.1A

4. Remove hitch pin/clevis pin (**AB**) hooking the actuator tube to the head section lever arms and lay tube down.

NOTE

Apply grease on the clevis pin before re assembly.

5. Remove the two bolts/shoulder spacers/washers/locknuts (**C**) linking the head section to the centre section.

NOTE

Check the bronze shoulder spacers for wear and replace as needed.

6. Remove the damaged head section.
7. Transfer the two side mattress retainers (**D**) from the damaged head section to the new section. Replace as needed.
8. Reverse the procedure to assemble the new head section.
9. Check Fowler for proper operation before returning bed to service.

4.1.2 Centre Section Replacement

NOTE

Instructions specific to beds equipped with a powered Hi-Lo function are identified with an **E** at the beginning of the instruction.

Required Tools:

1/2" Wrench	1/2" Socket Wrench
# 2 Phillips Screwdriver	Cutting Pliers

Procedure:

1. Raise bed to high position and bring mattress support to horizontal position.
2. Unplug (if applicable) bed power cord from the wall socket .
3. **E-** Use a marker to mark, on the frame, the position of the centre section.

NOTE

Be sure to replace the new section on the frame exactly at the same position the damaged one was so as to preserve the limit switch setting.

4. **E-** Disconnect the two wires (**F**) from the micro switch. Take note of the locations of the wires so they will be reconnected properly.
5. **E-** Cut the two ty-raps (**G**) holding the cables to the centre section.
6. Remove the four bolts/shoulder spacers/washers/locknuts (**C,H**) linking the centre section to the Fowler and thigh sections. Check the bronze shoulder spacers for wear and replace as needed.
7. Remove the four bolts/locknuts (**J**) holding the centre section to the frame. Remove damaged section and lay it on a workbench.
8. **E-** Remove the two screws/washers(4)/locknuts (**K**) holding the micro switch support (**L**) to the centre section and fasten support to the new section.
9. Reverse procedure to assemble the new centre section. If the bed is equipped with a powered Hi-Lo function, read the following Caution.

**CAUTION**

The micro switch support must be adjusted before tightening the two screws/locknuts (**K**) holding it to the centre section. Proceed as follow:

10. Fasten the micro switch support to the new centre section using the screws/washers(4)/locknuts (**K**). Position the support so that the screw heads are centred in both slots. Tighten locknuts slightly.
11. Lower the bed until the casters (FL18E1) or legs (FL18E2) are 1/4" off the floor.
12. Move the support until a "click" is heard, then fasten tight both screws/locknuts (**K**).
13. Check limit switch operation before returning bed to service:

FL18E1: Lower the mattress support until the casters reach the floor (see section 1.7.1, "Electric Beds(FL18E1/E2)" page 11) and check that the yellow bed-on-caster warning LED goes on blinking the moment the bed is resting on its casters. Check that it stops blinking as soon as the bed is brought back onto its legs.

FL18E2: Lower the mattress support until the legs reach the ground (see section 1.7.1, "Electric Beds(FL18E1/E2)", page 11) and check that the yellow bed-on-caster warning LED stops blinking the moment the bed is resting on its legs. Check that blinking resume when the bed is brought back onto its casters.

4.1.3 Thigh Section Replacement

Required Tools:

1/2" Wrench
OG-2 Grease (P/N M0027)
Long Nose Pliers

Procedure:

1. Raise bed to high position and bring mattress support to horizontal position.
2. Unplug (if applicable) bed power cord from the wall socket.
3. Remove the hitch pin/clevis pin (**M**) holding the actuator tube to the thigh section lever arms and lay tube down.

NOTE

Apply grease on the clevis pin before reinstalling it.

4. Remove the four bolts/shoulder spacers/washers/locknuts (**H,O**) linking the thigh section to the centre section and the extension plate.

NOTE

Check the bronze shoulder spacers for wear and replace as needed.

5. Remove the damaged thigh section.
6. Reverse the procedure to assemble the new thigh section.
7. Check knee Gatch for proper operation before returning bed to service.

4.1.4 Foot Section Replacement

Required Tools:

1/2" Wrench
2 Phillips Screwdriver

Procedure:

1. Raise bed to high position and bring mattress support to horizontal position.
2. Unplug (if applicable) bed power cord from the wall socket.
3. Remove the four bolts/locknuts (**P**) holding the head section to the extension plates.

NOTE

Check the bronze shoulder spacers for wear and replace as needed.

Take note of the locations of the bolts so they will be replaced properly.

4. Remove the damaged foot section.
5. Transfer the four mattress retainers (**Q**) and the optional foot support (**R**) from the damaged foot section to the new section. Replace as needed.
6. Reverse the procedure to assemble the new foot section.
7. Check foot section for proper operation before returning the bed to service.

4.2 SIDERAIL COMPONENTS

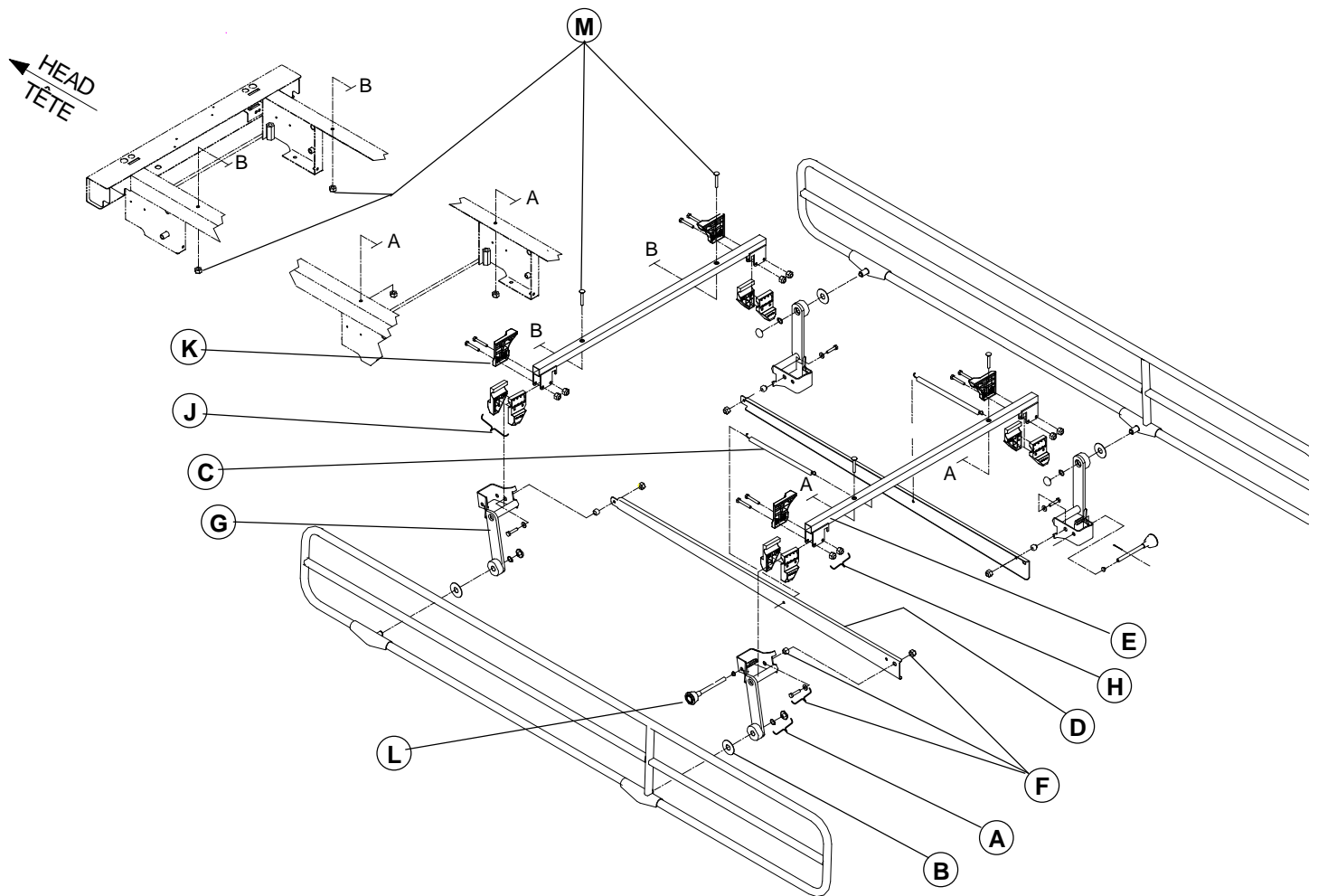


Figure 4.2

NOTE

Unless otherwise stated, all the following replacement procedures (4.2.1 to 4.2.5) will refer to figure 4.2 above.

There are some differences in procedures depending on the type of siderail equipping the bed: full, three-quarter or half-length siderails. They will be clearly indicated in the procedures.

4.2.1 Rail Replacement

Required Tools:

Retaining Ring Pliers

Mallet

Slotted Screwdriver (small)

OG-2 Grease (P/N M0027)

Procedure:

1. Raise bed to high position and bring mattress support to horizontal position.
2. Unplug (if applicable) bed power cord from the wall socket.
3. Raise siderail requiring repair.

4. Remove the two protective caps/retaining rings (**A**). Use the small slotted screwdriver to remove the caps.

NOTE

Replace the protective caps using a mallet, replace item if damaged during the procedure.

5. Remove rail, keep the two nylon washers (**B**).

NOTE

Apply grease on the new rail shafts before assembling it.

6. Reverse procedure to assemble the new rail.
7. Check rail for proper operation before returning bed to service.

4.2.2 Transfer Plate Replacement

Required Tools:

Two 7/16" Wrench

Procedure:

1. Raise siderail requiring repair.
2. Raise bed to high position.
3. Position mattress support sections depending on siderail type equipping the bed:
Full and three-quarter length siderails: Bring head and foot sections to the high position and attach them together.
Half-length siderail: Raise the head section enough to gain access to the siderail mechanism.
4. Unplug (if applicable) power cord from the wall socket.
5. **Half-length siderail:** Proceed with step 6, beds equipped with head half-length siderails have no springs.
Full and three-quarter length siderails : Remove spring (**C**) hooked to the transfer plate (**D**) and siderail support (**E**).
6. Lower siderail.
7. Remove the two bolts/washers/spacer sleeves/locknuts (**F**) holding the transfer plate (**D**) to the two siderail arms (**G**).

NOTE

Do not fasten bolt too tight, a torque of 100 lbf-in (11.3 N-m) is enough. Over tightening will impede the siderail rotational movement and may cause damage to the spacer sleeve.

8. Reverse procedure to assemble the new transfer plate.

4.2.3 Siderail Arm Replacement

Required Tools:

Two 7/16" Wrench

Long Nose Pliers

Procedure:

1. Raise bed to high position.
2. Unplug (if applicable) power cord from the wall socket.
3. Remove rail completely (see section 4.2.1).
4. Position mattress support sections depending on siderail type equipping the bed:

Full and three-quarter length siderails: Bring head and foot sections to the high position and attach them together to secure their positions.

Half-length siderail: Bring head section to horizontal position.

5. **Half-length:** Proceed with step 6, beds equipped with head half-length siderails have no springs.

Full and three-quarter length: Remove spring (C) hooked to the transfer plate (D) and siderail support (E).

6. Remove the two bolts/locknuts (H) holding the two sleeve bearings (J) and the positioning guide (K) to the siderail arm (G). Hold bearings and guide before removing the bolts to prevent them from falling off. Remove bearings and guide.

NOTE

Note carefully the positions of the two sleeve bearings (the angled part of both sleeves should be directed toward the sleep surface) so as to replace them correctly.

Do not fasten bolt too tight, a torque of 100 lbf-in (11.3 N-m) is enough. Over tightening will impede the siderail rotational movement and may cause damage to the sleeve bearings and the positioning guide.

7. Transfer (replace if needed) the release latch knob (L) on the new siderail arm.

8. Remove the bolts/washers/spacer sleeves/locknuts (F) holding the siderail arm (G) to the transfer plate (D).

NOTE

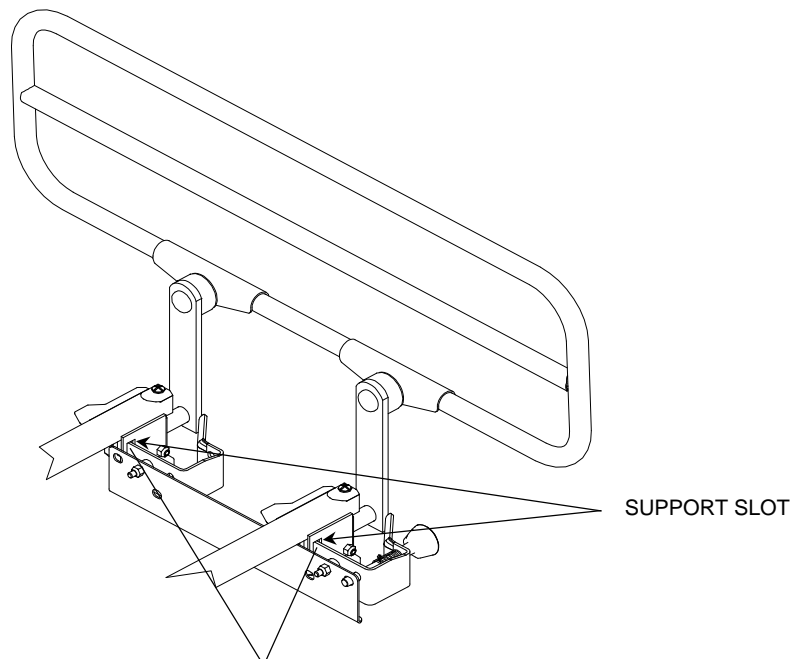
Do not fasten bolt too tight, a torque of 75 lbf-in (8.5N-m) is enough. Over tightening will impede the siderail rotational movement and may cause damage to the spacer sleeve.

9. Reverse procedure to assemble the new siderail arm.

NOTE

Do not grease the sleeve bearings and the positioning guide.

When assembling the sleeve bearings and the positioning guide, place the arm vertically (rail raised position) and ensure that the back of the siderail arm is positioned inside the siderail support slot (see figure 4.2A below).



BACK SIDERAIL ARM POSITIONED INSIDE THE SUPPORT SLOT
AFTER ASSEMBLY

4.2.4 Sleeve Bearings and/or Positioning Guide Replacement

Required Tools:

7/16" Wrench

Procedure:

1. Raise bed to high position and raise siderail requiring repair.
2. Unplug power cord from the wall socket.
3. Remove the two bolts/locknuts (**H**) holding the sleeve bearings (**J**) and the positioning guide (**K**) to the siderail arm (**G**). Hold bearings and guide before removing the bolts to prevent them from falling off. Remove bearings and guide.

NOTE

Note carefully the positions of the two sleeve bearings (the angled part of both sleeves should be directed toward the sleep surface) so as to replace them correctly.

Do not fasten bolt too tight, a torque of 100 lbf-in (11.3 N-m) is enough. Over tightening will impede the siderail rotational movement and may cause damage to the sleeve bearings and the positioning guide.

4. Reverse procedure to assemble new sleeve bearings and/or positioning guide.

NOTE

Do not grease the sleeve bearings and positioning guide.

4.2.5 Siderail Support Replacement

Required Tools:

7/16" Wrench

#2 Phillips Screwdriver

Thread Locker-Medium Strength (P/N M008)

Procedure:

1. Raise the head or foot section depending on the siderail support to be replaced.
2. Raise bed to high position and raise both siderails.
3. **Half-length siderail:** Proceed with step 4, beds equipped with head half-length siderails have no springs.
Full and three-quarter length siderails: Remove the two springs (**C**) hooked to the transfer plates (**D**) and siderail supports (**G**).
4. Remove the four bolts/locknuts (**H**) holding the sleeve bearings (**J**) and the positioning guide (**K**) to the siderail arms (**E**). Hold bearings and guide before removing the bolts to prevent them from falling off. Remove bearings and guide.

NOTE

Note carefully the positions of the two sleeve bearings (the angled part of both sleeves should be directed toward the sleep surface) so as to replace them correctly.

Do not fasten bolt too tight, a torque of 100 lbf-in (11.3 N-m) is enough. Over tightening will impede the siderail rotational movement and may cause damage to the sleeve bearings and the positioning guide.

Full and three-quarter length siderail: Remove the two bolts/locknuts (**M**) holding the siderail support to the frame and remove damaged siderail support.

Half-length siderail: Remove the two screws (O, fig. 4.2B below) holding the damaged siderail support to the head section.

NOTE

Apply medium-strength thread locker on screw treads before re assembly.

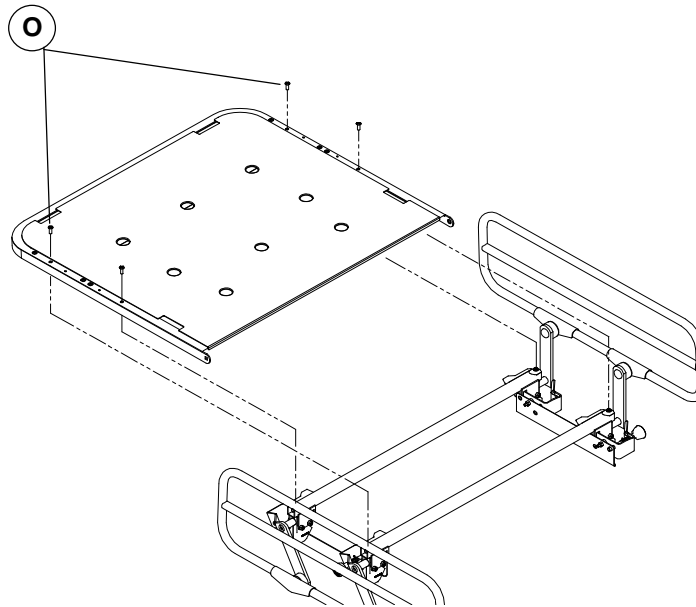


Figure 4.2B

5. Reverse procedure to assemble new siderail support.

NOTE

The sleeve bearings and the positioning guide do not need any lubrication.

4.3 CASTER AND LEG COMPONENTS

4.3.1 Caster and Leg Replacement for FL18E1/FL18M1 Beds

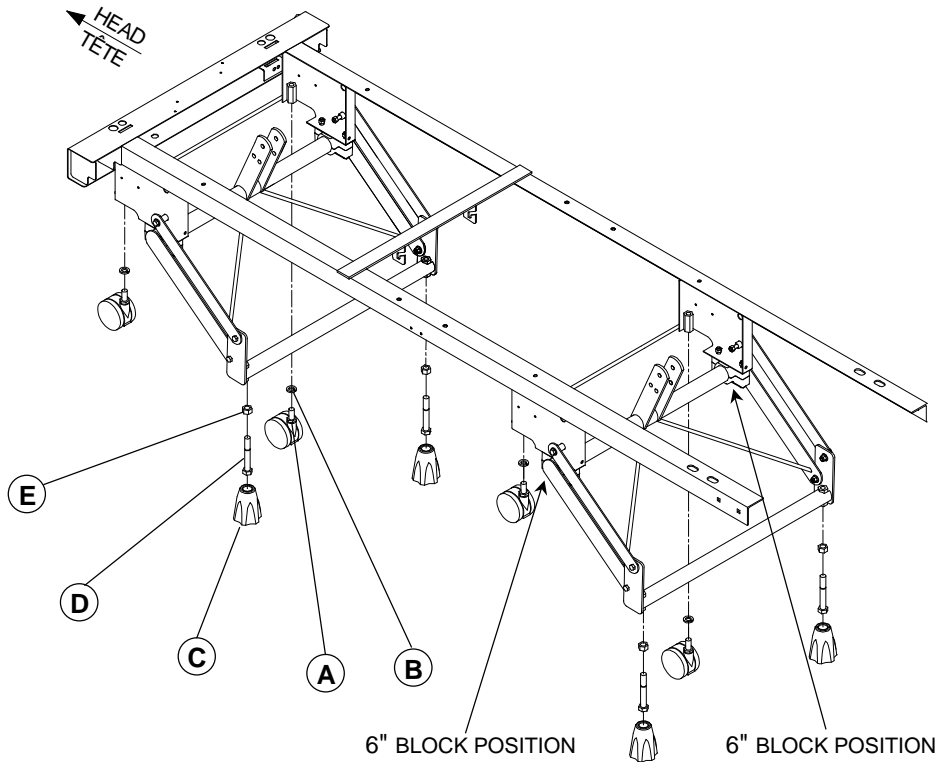


Figure 4.3.1

Caster replacement

Required Tools:

3/4" Wrench

Procedure:

1. Raise bed to high position.
2. Unplug (if applicable) power cord from the wall socket.
3. Loosen nut (A) and unscrew damaged caster. Keep the spring lock washer (B).
4. Reverse procedure to assemble the new caster.

Leg Replacement

Required Tools

3/4" Wrench

Two 6" High Blocks

Procedure:

1. Raise bed enough to place two 6" high blocks under both sides of the head or foot Hi-Lo lever.
2. Lower bed until head or foot end legs are 6" off the floor.
3. Unplug (if applicable) the power cord from the wall socket.
4. Remove plastic leg (C) from bolt (D) by pulling it down.

If only replacing the plastic leg, proceed with step 5 and end procedure.

If replacing the bolt holding the plastic leg, proceed with step 6 until the end of the procedure.

5. Reverse procedure to assemble the new plastic leg.

End of procedure.

6. Loosen nut (E) and remove damaged bolt (D) completely.

7. Install new bolt but do not tighten the lock nut yet.

8. Install the plastic leg on the bolt and turn the leg until bed is levelled.

9. Tighten lock nut.

4.3.2 Leg and Caster Replacement for FL18E2/FL18M2 Beds

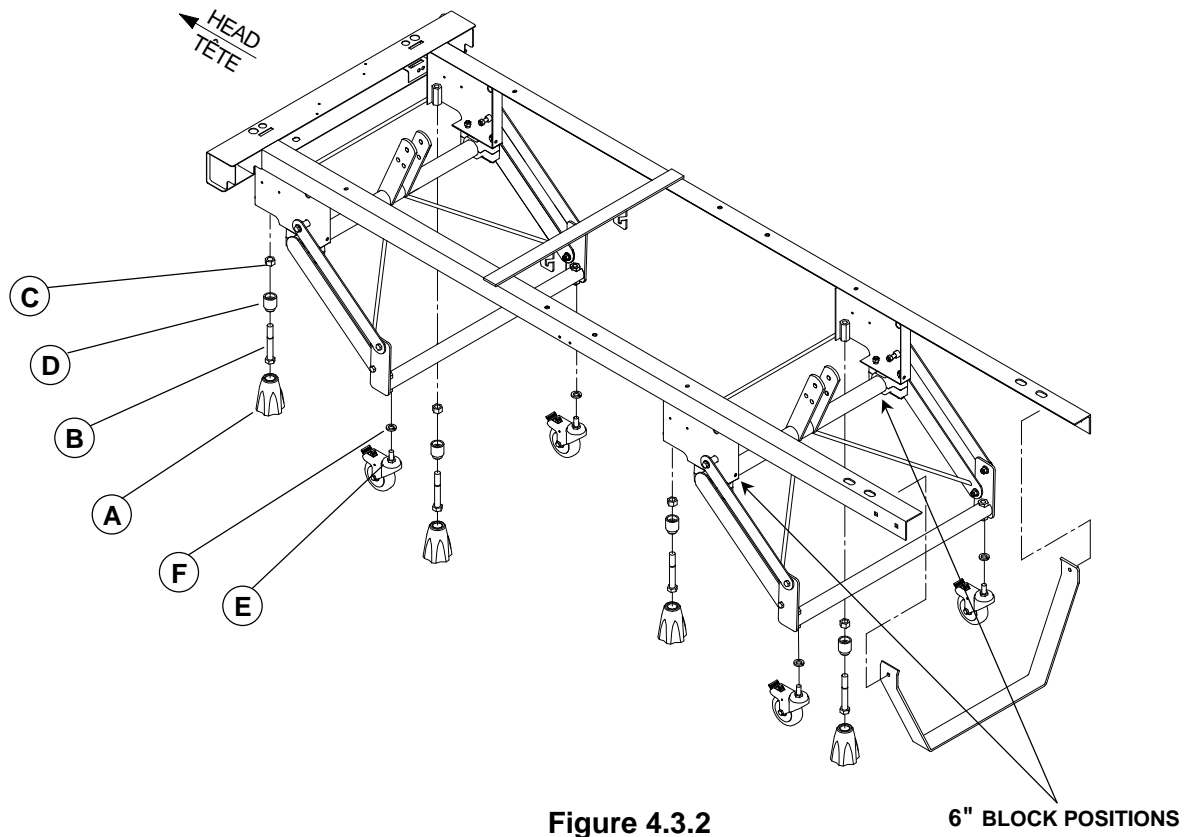


Figure 4.3.2

6" BLOCK POSITIONS

Leg Replacement

Required Tools:

3/4" Wrench

Procedure:

1. Raise bed to high position.

2. Unplug (if applicable) power cord from the wall socket.

3. Remove soft plastic leg (A) from bolt (B) by pulling it down.

If only replacing the soft plastic leg, proceed with step 4 and end procedure.

If replacing the bolt (B) holding the plastic leg, proceed with step 5.

4. Reverse procedure to assemble the new plastic leg.

End of procedure

5. Loosen nut (**C**) and unscrew bolt (**B**) completely. Remove damaged bolt and keep bushing (**D**).
6. Install the new bolt but do not tighten the lock nut yet.
7. Install plastic leg on bolt.
8. Lower the bed until it rests completely on its legs.
9. Adjust leg by turning it clockwise until it firmly rests on the floor.
10. Tighten lock nut.

Caster replacement

Required Tools:

3/4" Wrench

Procedure:

1. Raise bed enough to place two 6" high blocks under both sides of the head or foot Hi-Lo lever.
2. Lower bed until head or foot end casters are 6" off the floor.
3. Unplug (if applicable) power cord from the wall socket.
4. Unscrew caster out of position using nut (**E**) . Remove caster. Keep spring lock washer (**F**).
5. Reverse procedure to assemble new caster.

4.4 ELECTRICAL SYSTEM COMPONENTS

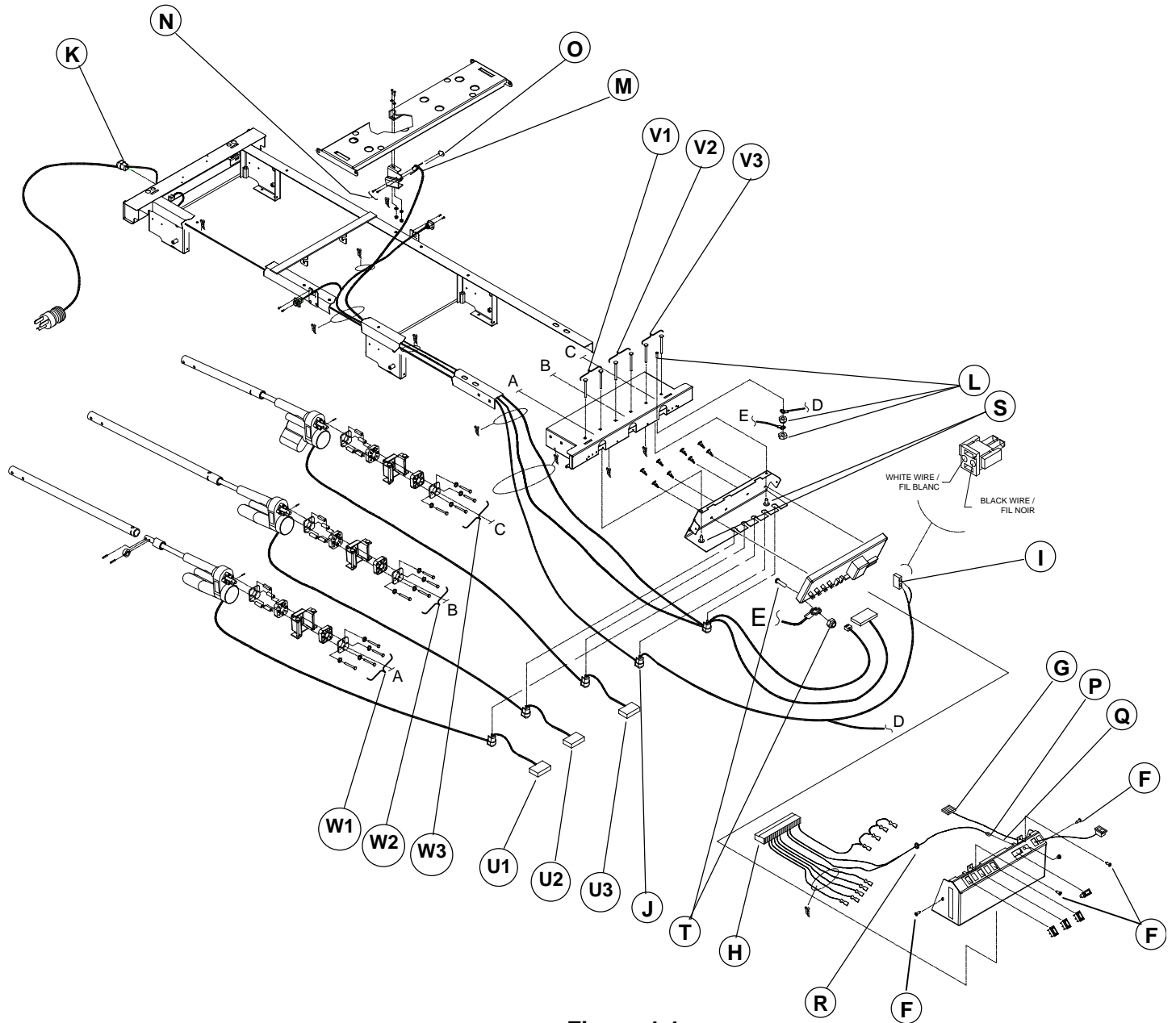


Figure 4.4

NOTE

Unless otherwise stated, all the following replacement procedures (4.4.1 to 4.4.7) will refer to figure 4.4 above.

4.4.1 Power Cord Replacement

NOTE

Step 4 of this procedure requires that the connector (I) be removed from the power cord (the connector does not pass through the orifice provided for the power cord at the head end case of the bed). A special tool (contact extraction tool) enables the removal of the connector without damaging the connector sockets. If this tool is not available and the power cord is cut to remove the connector, be sure to order the connector (P/N QDF8041) in addition to the power cord.

Required Tools:

# 2 Phillips Screwdriver	Side Cutting Pliers
Hand Pliers	Contact Extraction Tool

Procedure:

1. Raise bed to high position and unplug power cord from the wall socket.
2. Remove the four screws (F) holding the cover of the foot end control panel. Disconnect the On/Off (G) and lockout control (H) cables from the PC Board and remove cover. Carefully note the connecting positions of these two cables.
3. Disconnect the power cord connector (I) from the PC Board (position J7).
4. Remove the strain relief bushings holding the power cord to the PC Board casing (J) and to the head end case (K).
5. Remove the two nuts (L) holding the ground wires to the frame and free the power cord ground wire.

NOTE

Be sure to replace the ground wire at the same position it was before removal.

6. Remove connector (I) from power cord extremity (see note at the beginning of this procedure).
7. Free the power cord from the ty-raps holding it to the frame.
8. Remove damaged power cord.

NOTE

Insert power cord through the head end case orifice provided before assembling connector on power cord. Remember that the connector does not pass through this orifice.

9. Reverse procedure to assemble the new power cord.
10. Test the bed electric functions before returning it to service

4.4.2 Limit Switch Replacement

NOTE

The limit switch function differs depending on the electric bed model. It is present only on beds equipped with a powered Hi-Lo function.

- FL18E1 model (bed normally resting on its casters): the limit switch prevents the bed from being inadvertently lowered on its casters by stopping automatically the lowering movement to a preset height. It also triggers the blinking of the yellow bed-on-caster warning LED as soon as the bed is resting on its casters. It will also cause the LED to stop blinking as soon as the bed is back on its legs.

- FL18E2 model (bed normally resting on their casters): it triggers the blinking of the yellow bed-on-caster warning LED when the bed is resting on its casters. It will also cause the LED to stop blinking when the bed is seated on its legs.

Required tools:

#1 Phillips Screwdriver

Procedure:

1. Raise bed to high position and unplug power cord from the wall socket.
2. Disconnect the two wires (**M**) from the micro switch. Take note of the locations of the cables so they will be reconnected properly.
3. Remove the two screws (**N**) holding the micro switch to the support and remove defective micro switch. Keep the mounting plate (**O**).
4. Reverse procedure to assemble the new micro switch.

4.4.3 Foot End Control Panel Switches and Wiring Replacement**Required Tools:**

2 Phillips Screwdriver

Procedure:

1. Raise bed to high position and unplug power cord from the wall socket.
2. Properly ground yourself (see section 1.5, "Static Discharge Precautions")
3. Remove the four screws (**F**) holding the cover of the foot end control panel. Disconnect the On/Off (**G**) and lockout control (**H**) cables from the PC Board and remove cover. Carefully note the connecting positions of these two cables.
4. Test switches and wiring to determine the defective part.
5. To remove defective switch or wiring:
Switch: Proceed with step 6 and 8, and end procedure.
Wiring: Proceed with step 9 through the end.
6. Squeeze both sides of the defective switch and slide it out its housing. Remove defective switch.
7. Reverse procedure to assemble the new switch.
8. Test bed functions for proper operation before returning it to service.
End of procedure.
9. To remove defective wiring (On/Off or lockout control /Hi-Lo wiring), disconnect all wires from switches. Be sure to carefully note the wires connecting positions. To remove the yellow LED (**P**), first remove the plastic collar (**Q**) with a small knife blade then pop the LED out its plastic housing (**R**) by pushing on it from the outer side of the cover.
10. Reverse procedure to assemble the new wiring.

NOTE

The lockout control wiring comprises the yellow warning LED. Two plastic mounting parts (a plastic collar and housing) are included in the wiring replacement kit. Follow these steps to install the LED into its housing:

11. Insert the LED into the plastic collar.
12. Insert and push the LED to snap it into the plastic housing fitted beforehand on the cover orifice.
13. Fit the collar over the receptacle to lock LED in place.

NOTE

Be sure the On/Off and lockout control /Hi-Lo connectors are properly connected to the PC Board: the green wire of the On/Off cable connector must face pin 11 of connector J3 and the red wire of the lockout control /Hi-Lo cable connector must face pin 1 of connector J5.

14. Test On/Off/ lockout control /Hi-Lo controls, and the yellow bed-on-caster warning LED for proper operation before returning bed to service.

4.4.4 PC Board Replacement

Required Tools:

2 Phillips Screwdriver 3/8" Wrench

Long Nose Pliers

Procedure:

1. Raise bed to high position and unplug power cord from the wall socket.
2. Remove the four screws (**F**) holding the cover of the foot end control panel. Disconnect the On/Off (**G**) and lockout control (**H**) cables from the PC Board and remove cover. Carefully note the connecting positions of these two cables.
3. Properly ground yourself (see section 1.5, "Static Discharge Precautions").
4. Remove the bolt/nuts(2) (**L**) holding the PC Board and power cord ground wires to the frame. Remove ground wires.

NOTE

Be sure to replace the ground cables exactly at the same position they were before removal. Use a 5/16" wrench to hold the bolt while fastening both nuts.

5. Remove all cables connected to the PC Board but carefully note their connecting positions before doing so.
6. Remove the strain relief bushings holding the cables to the PC Board casing
7. Remove the two screws (**S**) holding the PC Board casing to the frame adjustable section. Remove casing and lay it on a workbench.
8. Remove bolt/locknut (**T**) holding the PC Board ground wire to the board. Remove ground wire.
9. Disengage the defective PC Board from the casing stand off pins. Remove defective PC Board.
10. Reverse procedure to assemble new PC Board.

NOTE

Ensure the PC Board DIP switches are properly set before closing the PC Board casing cover:

FL18E1: DIP switch # 1 = On; # 2 = Off; # 3 = Off; # 4 = On.

FL18E2: DIP switch # 1 = Off; # 2 = On; # 3 = On; # 4 = Off.

11. Test bed electric functions for proper operation before returning bed to service.

4.4.5 Fowler Actuator Replacement

Required Tools:

#2 Phillips Screwdriver	1/2" and 7/16" Wrenches
Cutting Pliers	Long Nose Pliers

Procedure:

1. Raise bed to high position.
2. Lower Fowler to flat position.
3. Raise knee Gatch to high position
4. Manually lift the foot section and fold it back toward the head end of the bed. Attach the foot section to the Fowler to secure its position.
5. Unplug power cord from the wall socket.
6. Remove hitch pin and clevis pin (**AB**, fig. 4.1, page 22) hooking the actuator tube to the head section lever arms.

NOTE

Apply grease on the clevis pin before putting it back in place.

7. Cut ty-rap holding cables under the foot end adjustable frame.
8. Remove the four screws (**F**) holding the cover of the foot end control panel. Disconnect the On/Off (**G**) and lockout control (**H**) cables from the PC Board and remove cover. Carefully note the connecting positions of these two cables.
9. Disconnect the head actuator cable (**U1**) from the PC Board. Note carefully its connecting position.
10. Remove the strain relief bushing holding the actuator cable to the PC Board casing. Free cable from the bushing. Replace bushing if damaged.
11. Remove the two bolts/locknuts (**V1**) holding the actuator support to the frame adjustable section.

NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

12. Remove actuator assembly from its location. *Note: to ease the removal of the actuator on the **FL18E2** bed model, you may want to remove the stabilizer bar located at the head end of the bed (see section 4.7, step 9 and figure 4.7, page 47-48).*
13. Remove the four bolts (**W1**) holding the actuator to its support. Remove defective actuator. Keep mounting parts in good condition, replace those damaged.
14. Reverse procedure to assemble the new head actuator. Do not hook the actuator tube yet, read the following caution.

**CAUTION**

It is important to adjust the new head actuator before hooking up its tube. Proceed as follow:

15. The actuator tube still not hooked, plug the bed and lower the actuator to its lowest limit using the pendant control command.
16. Raise and support the end of the head section for approximately 3/16", then turn, if needed, the tube in either direction to align holes and insert the clevis pin.
17. Remove support under the head section, and using the pendant control Fowler command, raise Fowler a few degrees, then lower it to flat position. The actuator should reaches its lower limit the moment the head section comes to rest on the frame.

4.4.6 Hi-Lo Actuator Replacement

Required Tools:

#2 Phillips Screwdriver	5/16", 1/2" and 7/16" Wrench
Long nose pliers	Cutting pliers

Procedure:

1. Raise bed to high position.
2. Place jack stands or any other adjustable support under the four corners of the bed frame. Adjust the supports under the frame so that the bed upper limit will be preserved while replacing the Hi-Lo actuator.
3. Unplug power cord from the wall outlet.
4. Remove the clevis pin/hitch pin (**A3**, fig. 4.5, page 42) hooking the actuator tube to the Hi-Lo connecting tube.

NOTE

Apply grease on the clevis pin before putting it back in place.

5. Remove the four screws (**F**) holding the cover of the foot end control panel. Disconnect the On/Off (**G**) and lockout control (**H**) cables from the PC Board and remove cover. Carefully note the connecting positions of these two cables.
6. Remove the bolt/nuts (**L**) holding the two ground cables to the frame.

NOTE

Be sure to replace the ground cables exactly at the same position they were before removal. Use a 5/16" wrench to hold the bolt while fastening both nuts.

7. Disconnect the actuator cable (**U2**) from the PC Board. Note carefully its connecting position.
8. Remove the strain relief bushing holding the actuator cable to the PC Board casing. Remove cable from the bushing. Replace bushing if damaged.
9. Remove the two screws (**S**) holding the PC board casing to the frame. Remove casing and let it hang down (cables will retain it).
10. Remove the bolts/locknuts (**V2**) holding the actuator support to the adjustable frame section.

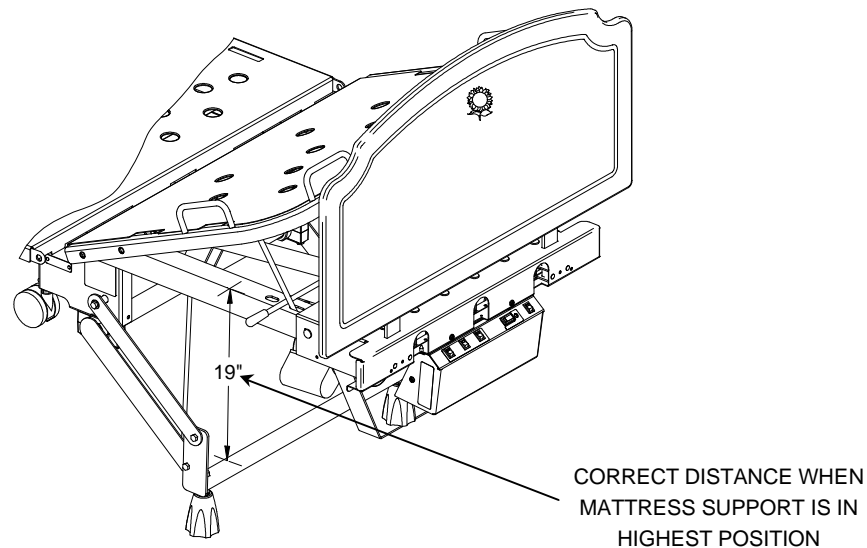
NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

11. Remove Hi-Lo actuator assembly from its location. *Note: to ease the removal of the actuator on the **FL18E2** bed model, you may want to remove the stabilizer bar located at the head end of the bed (see section 4.7, step 9 and figure 4.7, page 47-48).*
12. Remove the four bolts (**W2**) holding the actuator to its support. Remove defective actuator. Keep mounting parts in good condition, replace those damaged.
13. Reverse procedure to assemble the new Hi-Lo actuator.
14. Test bed for proper operation before returning it to service.

NOTE

Do not rotate the new actuator tube before assembling it so as to preserve its adjustment. If the bed was at its highest position and well supported during the procedure, and the new actuator tube was not rotated, no adjustment should be necessary after the assembly of the new actuator, except maybe a slight rotation of the tube in either direction to align holes. To ensure the bed high position setting is correct, measure the distance between the leg support tube and the top of the frame (see figure 4.4.8, next page). It should be 19".

**Figure 4.4.8**

4.4.7 Knee Gatch Actuator Replacement

Required Tools:

Long nose Pliers

1/2" and 7/16" Socket Wrenches

#2 Phillips Screwdriver

Side Cutting pliers

Procedure:

1. Raise bed to high position.
2. Lower knee Gatch to flat position
3. Manually lift the foot section and fold it back toward the head end of the bed. Attach the foot section to the bed to prevent it from falling.
4. Unplug power cord from the wall socket.
5. Remove hitch pin and clevis pin (**M**, fig. 4.1, page 22) holding the actuator tube to the thigh section lever arms.

NOTE

Apply grease on the clevis pin before putting it back in place.

6. Cut ty-rap holding cables under the foot end adjustable frame.
7. Remove the four screws (**F**) holding the cover of the foot end control panel. Disconnect the On/Off (**G**) and lockout control (**H**) cables from the PC Board and remove cover. Carefully note the connecting positions of these two cables.
8. Disconnect the actuator cable (**U3**) from the PC Board. Note carefully its connecting position.
9. Remove the strain relief bushing from its housing. Remove cable from the bushing.
10. Remove the two bolts/locknuts (**V3**) holding the actuator support to the foot end adjustable frame.

NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

11. Remove the actuator assembly from its position. *Note: to ease the removal of the actuator on the **FL18E2** bed model, you may want to remove the stabilizer bar located at the head end of the bed (see section 4.7, step 9 and figure 4.7, page 47-48).*

12. Remove the four bolts (**W3**) holding the actuator to its support. Remove defective actuator. Keep mounting parts in good condition, replace those damaged.
13. Reverse procedure to assemble the new knee Gatch actuator. Do not hook the actuator tube yet, read the following caution.



CAUTION

It is important to adjust the new knee Gatch actuator before hooking up its tube. Proceed as follow:

14. The actuator tube still not hooked, plug the bed and lower the actuator to its lowest limit using the pendant control command.
15. Raise and support the thigh section for approximately 3/16", then turn, if needed, the tube in either direction to align holes and insert the clevis pin.
16. Remove support under the thigh section, and using the pendant control command, raise knee Gatch a few degrees, then lower it to flat position. The actuator should reaches its lower limit the moment the thigh section comes to rest on the frame.

4.5 HI-LO MECHANISM COMPONENTS

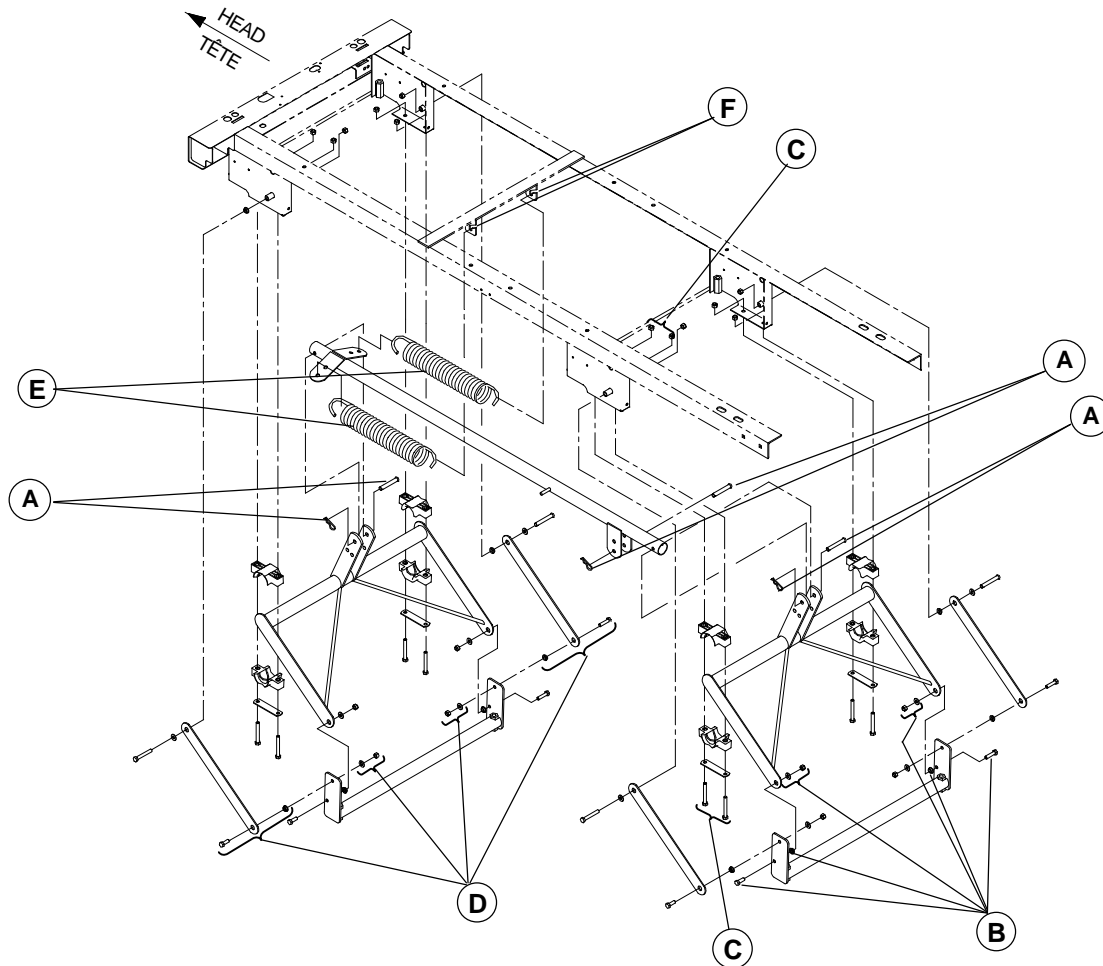


Figure 4.5

NOTE

Unless otherwise stated, all the following replacement procedures (4.5.1 to 4.5.3) will refer to figure 4.5 above.

4.5.1 Hi-Lo Lever Replacement

Required Tools:

Long Nose Pliers

1/2" Wrench

Four Jack Stands

OG-2 Grease (P/N M0027)

Procedure:

1. Raise bed to high position.
2. Place adjustable jack stands under the four corner of the frame.
3. Lower bed until it comes to rest on the stands and the Hi-Lo levers are loose.
4. Unplug (if applicable) power cord from the wall outlet.
5. **Head end Hi-Lo lever:** Remove the clevis pin/hitch pin (**A1**) hooking the Hi-Lo connecting tube to the Hi-Lo lever arms.

Foot end Hi-Lo lever: Remove the two clevis pins/hitch (**A2, A3**) pins hooking the Hi-Lo connecting tube and the Hi-Lo actuator tube to the Hi-Lo lever arms.

NOTE

Apply grease on the clevis pin before putting it back in place.

6. Remove the bolt/shoulder spacer/washer/locknut (**B**) holding each side of the Hi-Lo lever to the leg support.
7. Remove the two bolts/reinforcement plates/moulded bearings /locknuts (**C**) holding each side of the Hi-Lo lever to the frame.
8. Reverse procedure to assemble the new Hi-Lo lever.
9. Test bed for proper operation before returning it to service

4.5.2 Leg Support Replacement

Required Tools:

1/2" Wrench Two Jack Stands

Procedure:

1. Raise bed to high position.
2. Place two jacks stands or any other support under each side of the head or foot end frame.
3. Lower bed until it comes to rest on the stands.
4. Unplug (if applicable) power cord from the wall outlet.
5. Remove the bolt/shoulder spacer/washer/locknut (**D**) holding the lower part of the left and right stabilizers to each side of the leg support.
6. Remove the bolt/shoulder spacer/washer/locknut (**B**) holding each side of the leg support to the Hi-Lo lever. Remove defective leg support.
7. Reverse procedure to assemble the new leg support.
8. Test bed for proper operation before returning it to service.

4.5.3 Hi-Lo Connecting Tube Replacement

Required Tools:

Long Nose Pliers Four Jack Stands OG-2 Grease (P/N M0027)

Procedure:

1. Raise bed to high position.
2. Place jack stands or any other support under the four corners of the bed frame.
3. Lower bed on the stands until it is easy to remove the clevis pins hooking the connecting tube to the Hi-Lo levers.
4. Unplug (if applicable) power cord from the wall socket.
5. Remove the two clevis pins/hitch pins (**A1, A2**) hooking the connecting tube to the Hi-Lo levers.
6. Remove the two springs (**E**). Note the two openings (**F**) on the frame hooks enabling easy removal of the springs.

NOTE

Apply grease on the spring hooks before re assembly.

7. Remove damaged connecting tube.
8. Reverse procedure to assemble the new connecting tube.
9. Test bed for proper operation before returning it to service.

4.6 MANUAL ACTUATOR COMPONENTS

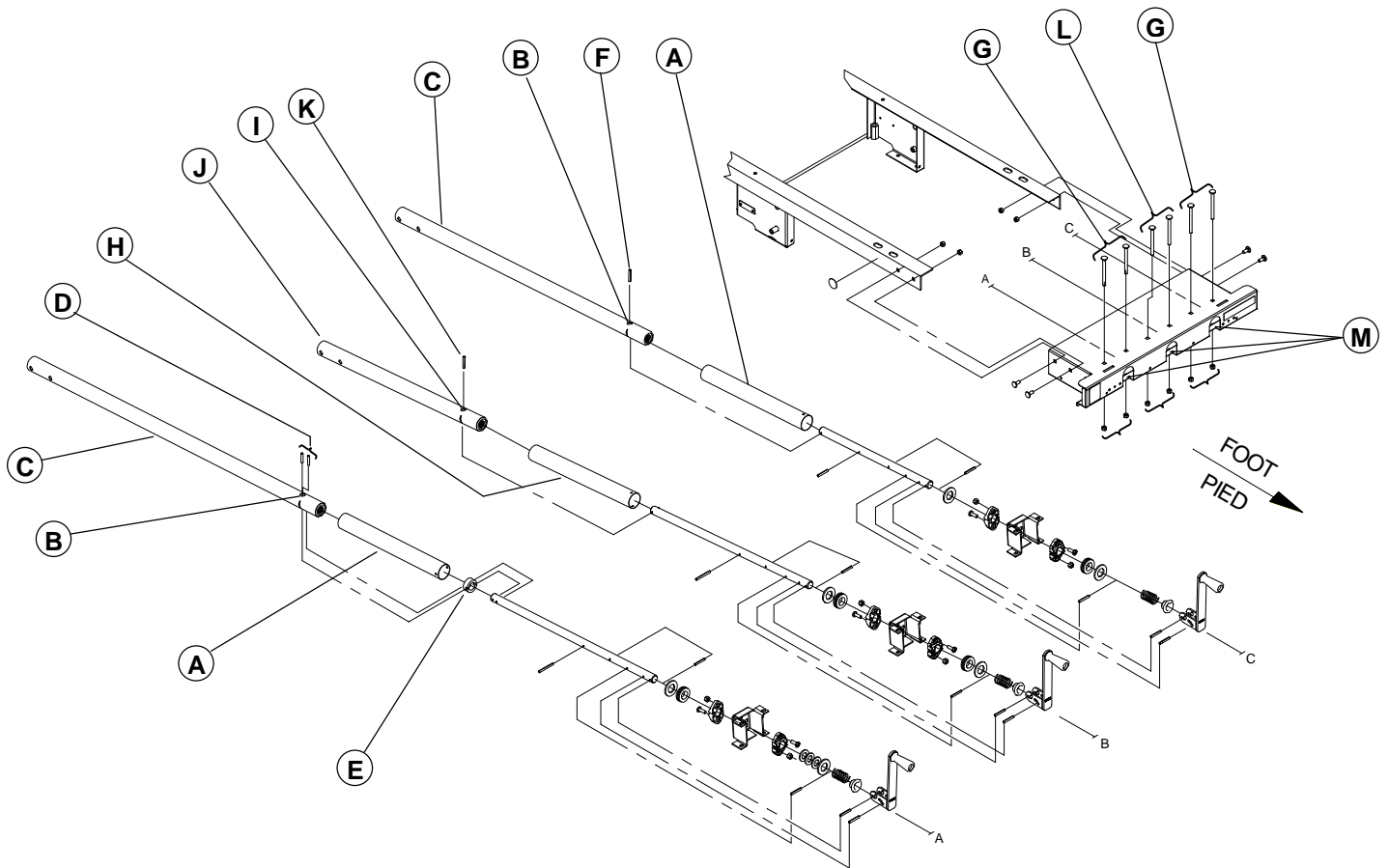


Figure 4.6

NOTE

Unless otherwise indicated, all the following replacement procedures (4.6.1 to 4.6.2) will refer to figure 4.6 above.

4.6.1 Fowler and Knee Gatch Actuator Replacement

Required Tools:

Hammer

3/16" Punch

OG-2 Grease (P/N M0027)

1/2" Socket Wrench

Long Nose Pliers

Procedure:

1. Position the bed and mattress support sections depending on the actuator requiring repair:

Fowler Actuator:

- Raise bed to high position. Bring Fowler to flat position.
- Raise knee Gatch to high position. Lift foot section and fold it back toward the head end of the bed. Attach the foot section using a ratchet tie-down strap to secure its position.

Knee Gatch Actuator:

- Raise bed to high position. Lower knee Gatch to flat position.
- Lift foot section to maximum height and attach it using a ratchet tie-down strap to secure its position.

2. Remove clevis pin/hitch pin (see **AB, M**, fig. 4.1, page 22) hooking the actuator tube to the head or thigh section.

NOTE

Apply grease on the clevis pin before reinstalling it.

3. Remove and slide the plastic dust cover (**A**) toward the tube, passed the \varnothing 1/2" hole (**B**) located at the beginning of the tube (foot end extremity of the tube).
4. Remove the actuator tube (**C**) from the screw as per following instructions:

Fowler Actuator Tube:

- Unscrew the tube until the first of the two spring pins (**D**) locking in the screw guide (**E**) appears through the tube \varnothing 1/2" hole (**B**).
- Remove both spring pins. Remove the tube. Keep the screw guide. Replace damaged pins.

NOTE

Apply grease on the screw and the screw guide when reassembling the tube.

Knee Gatch Actuator Tube:

- Unscrew the tube until the spring pin (**F**) locking in the tube appears through the tube \varnothing 1/2" hole (**B**).
- Remove spring pin. Remove the tube. Replace damaged pins.

NOTE

Apply grease on the screw and the screw guide when reassembling the tube.

5. Remove the two bolts/locknuts (**G**) holding the actuator support to the frame adjustable section.

NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

6. Remove the actuator assembly. Move the assembly toward the inside of the bed to remove it. The handle has to pass through the orifice (**H**) of the frame adjustable section. *Note: to ease the removal of the actuator on the **FL18M2** bed model, you may want to remove the stabilizer bar located at the head end of the bed (see section 4.7, step 9 and figure 4.7, page 47-48).*
7. Replace damaged components.
8. Reverse procedure to assemble the actuator. Do not hook the actuator tube yet. Read the following caution.



CAUTION

The Fowler or knee Gatch actuator must be adjusted before hooking up its tube.

Fowler Manual Actuator:

9. Ensure the Fowler lies completely flat.
10. Screw the tube in until it stops.
11. Hook the actuator tube to the head section lever arms. Turn tube in either direction to align holes and insert clevis pin.

Knee Gatch Actuator

12. Ensure the knee Gatch lies completely flat.
13. Screw the tube out until it stops.
14. Hook the actuator tube to the thigh section lever arms. Turn tube in either direction to align holes and insert clevis pin.

15. Test bed for proper operation before returning it to service.

4.6.2 Hi-Lo Actuator Replacement

Required Tools:

Hammer	3/16" Punch	OG-2 Grease (P/N M0027)
1/2" Socket Wrench	Long Nose Pliers	

Procedure:

1. Raise bed to high position.
2. Place jack stands or any other adjustable support under the four corners of the bed frame. Adjust the supports under the frame so that the bed upper limit will be preserved while replacing the Hi-Lo actuator.
3. Remove and slide the plastic dust cover (**A**) toward the tube, passed the \emptyset 1/2" hole (**B**) located at the beginning of the tube (foot end extremity of the tube).
4. Remove the tube (**C**) from the screw as per following instructions:
 - Unscrew the tube until the spring pin (**I**) locking in the tube appears through the tube \emptyset 1/2" hole (**B**).
 - Remove spring pin. Remove the tube. Replace damaged pins.

NOTE

Apply grease on the screw and the screw guide when reassembling the tube.

5. Remove the two bolts/locknuts (**G**) holding the actuator support to the frame adjustable section.

NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

6. Remove the actuator assembly. Move the assembly toward the inside of the bed to remove it. The handle has to pass through the orifice (**H**) of the frame adjustable section. *Note: to ease the removal of the actuator on the **FL18E2** bed model, you may want to remove the stabilizer bar located at the head end of the bed (see section 4.7, step 9 and figure 4.7, page 47-48).*
7. Replace damaged components.
8. Reverse procedure to assemble the actuator. Do not hook the actuator tube yet. Read the following caution.



CAUTION

The Hi-Lo manual actuator must be adjusted before hooking up its tube.

9. Ensure the bed has kept its upper limit setting. To ensure the bed high position setting is correct, measure the distance between the leg support tube and the top of the frame (see figure 4.4.8, page 40. It should be approximately 19".
10. Screw the tube in until it stops.
11. Hook the actuator tube to the Hi-Lo connecting tube lever arms. Turn tube in either direction to align holes and insert clevis pin.
12. Test bed for proper operation before returning it to service.

4.7 FRAME ADJUSTABLE SECTION REPLACEMENT (MANUAL AND ELECTRIC BEDS)

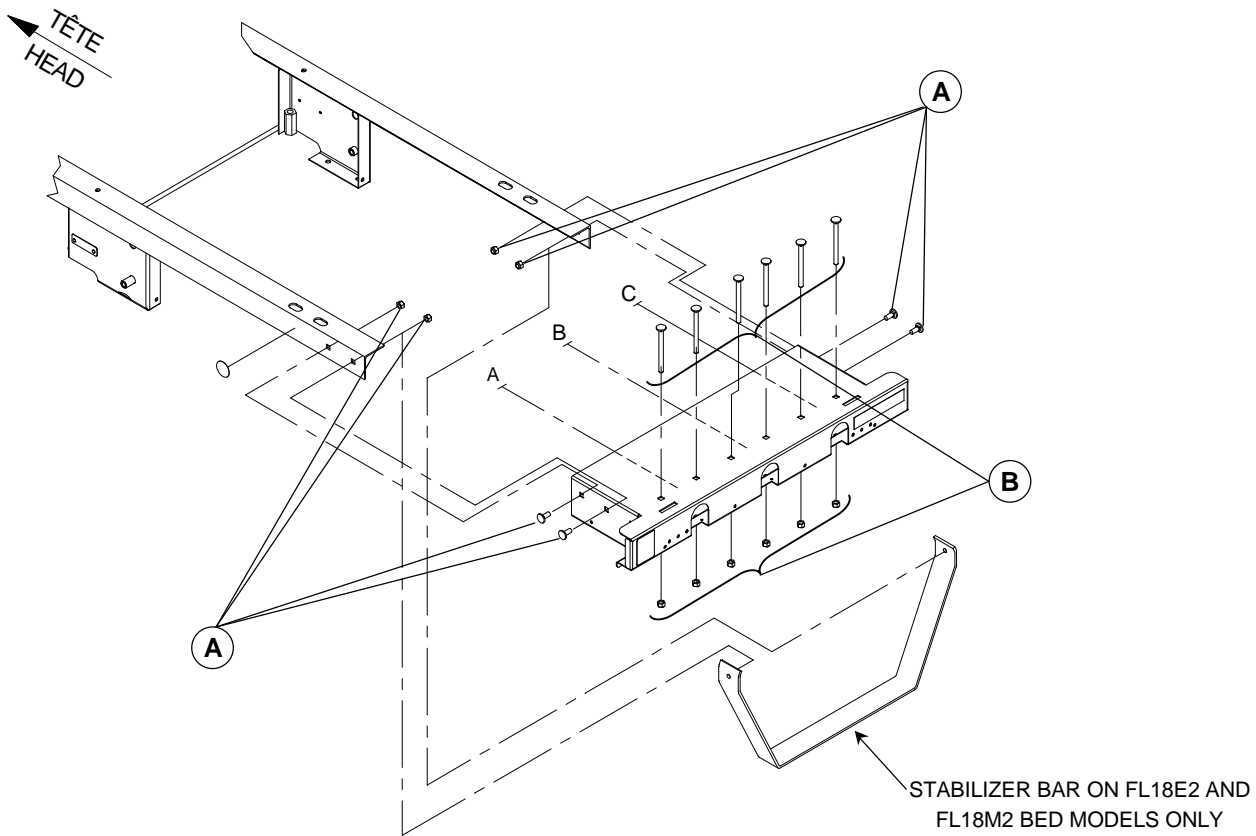


Figure 4.7

Required Tools:

Long Nose Pliers

3/8" and 1/2" Wrenches

No 2 Phillips Screwdriver

OG-2 Grease (P/N M0027)

Procedure:

1. Raise bed to high position.
2. Place jack stands or any other supports under the four corners of the bed frame.
3. Lower the bed until it comes to rest on the stands.
4. Lower Fowler and knee Gatch to flat position.
5. Lift the foot section manually and attach it to the mattress support to prevent it from falling off.
6. Unplug (if applicable) power cord from the wall outlet.
7. Remove the three clevis pins/hitch pins (**AB, M**, fig. 4.1, page 22; **A3**, fig. 4.5, page 42) hooking the three actuator tubes to the mattress support sections and Hi-Lo connecting tube.

NOTE

Apply grease on the clevis pin before reinstalling it.

8. **Manual Bed:** Proceed with step 9 through step 12 and end procedure.
Electric Bed: Proceed with step 13 through the end.
9. Remove the four bolts/locknuts (**A**) holding the frame adjustable section to the frame. *Note: **FL18E2** and **FL18M2** beds are equipped with a stabilizer bar at the head end of the bed, attached with the frame adjustable section to the frame. Hold the bar while removing bolts/locknuts **A**.*

NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

10. Remove adjustable section with actuators and tubes altogether and lay on a workbench.
11. Remove the six bolts/locknuts (**B**) holding the three actuator supports to the frame adjustable section. Remove the three actuator from the adjustable section.

NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

12. Reverse procedure to assemble the new frame adjustable section.
 13. Test bed for proper functioning before returning it to service
- End of procedure.

14. Remove the four screws (**F**, fig. 4.4, page 34) holding the cover of the foot end control panel. Disconnect the On/Off (**G**, fig. 4.4, page 34) and lockout control (**H**, fig. 4.4, page 34) cables from the PC Board and remove cover. Carefully note the connecting positions of these two cables.
15. Cut ty-raps (3) holding cables to the frame adjustable section.
16. Remove the bolt/2 nuts (**L**, fig. 4.4, page 34) holding the two ground cables to the frame. Remove the ground wires.

NOTE

Be sure to replace the ground cables exactly at the same position they were before removal. Use a 5/16" wrench to hold the bolt while fastening both nuts.

17. Remove the two screws (**Y**, fig. 4.4, page 34) holding the PC board casing to the frame. Remove casing and let it hang down (cables will hold it).
18. Support the three actuators to prevent them from falling off when the frame adjustable section will be removed.
19. Remove the six bolts/locknuts (**B**) and the four bolts/locknuts (**A**) holding respectively the three actuator supports to the frame adjustable section and the frame adjustable section to the frame. *Note: **FL18E2** and **FL18M2** beds are equipped with a stabilizer bar at the head end of the bed, attached with the frame adjustable section to the frame. Hold the bar while removing bolts/locknuts **A**.*

NOTE

Do not fasten the locknuts too tight. A torque of 130 lbf-in is enough.

20. Remove damaged section.
21. Reverse procedure to assemble the new frame adjustable section.
22. Test bed electric commands for proper operation before returning it to service.

APPENDIX A: CONNECTION DIAGRAM

