




# Model 125 KED<sup>®</sup>

Kendrick Extrication Device



Read this Manual and Retain  
for Future Reference 

**FERNO<sup>®</sup>**

**Users' Manual**

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## Ferno Customer Relations

For ordering assistance or general information:

### CANADA AND THE U.S.A.

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### ALL OTHER LOCATIONS

For assistance or information, please contact your Ferno distributor. If you do not have a Ferno distributor, please contact Ferno Customer Relations:

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## Disclaimer

This manual contains general instructions for the use, operation and care of this product. The instructions are not all-inclusive. Safe and proper use of this product is solely at the discretion of the user. Safety information is included as a service to the user. All other safety measures taken by the user should be within and under consideration of applicable regulations and local protocol. Training on the proper use of this product must be provided before using this product in an actual situation.

Retain this manual for future reference. Include it with the product in the event of transfer to new users. Additional free copies are available upon request from Customer Relations.

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## Adverse Event Notice

In the event of an adverse event or serious incident related to the use of this device, the end user/operator must report the incident to Ferno-Washington, Inc. at 70 Weil Way, Wilmington, Ohio 45177 USA, 1-877-733-0911, or via email at [tscoordinator@ferno.com](mailto:tscoordinator@ferno.com). If the incident occurred in the European Union, report it to Ferno's Authorized EU Representative and the competent authority of the Member State in which the end user is established.



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The lot number is printed on a label sewn onto the head flap.



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# 1 - SAFETY INFORMATION

## 1.1 Warning

Warning safety alerts indicate a potentially hazardous situation that, if not avoided, could result in injury or death.

 <b>WARNING</b>
<b>Untrained operators can cause injury or be injured. Permit only trained personnel to apply the KED.</b>
<b>Improper use of the KED can cause injury. Use the KED only for the purpose described in this manual.</b>
<b>Improper application of the KED can cause injury. Apply the KED only as described in this manual.</b>
<b>An unattended patient can be injured. Stay with the patient at all times.</b>
<b>An unrestrained patient can be injured. Use appropriate patient restraints to secure the patient on the spine board and ambulance cot.</b>
<b>Attaching equipment or items to the KED can cause injury. Do not attach equipment or items to the KED.</b>
<b>Improper maintenance can cause injury. Maintain the KED only as described in this manual.</b>
<b>Modifying the KED can cause injury and damage. Use the KED only as designed by Ferno.</b>

## 1.2 Notice

Notices emphasize important, but not hazard-related information. Failure to follow Notices could result in product or property damage.







<b>NOTICE</b>

## 1.3 Bloodborne Disease Notice

To reduce the risk of exposure to blood or other potentially infectious materials when using the KED, follow the disinfecting and cleaning instructions in this manual.

## 1.4 Symbol Glossary

The symbols defined here are used on the KED and/or in this manual. Ferno uses symbols recognized by the International Standards Organization (ISO), American National Standards Institute (ANSI) and the emergency medical services industry.

Symbol	Definition
	General warning of potential injury
	Read the users' manual
	Do Not Cut Restraint Straps
	Load Capacity (Safe Working Load in pounds, kilograms, stone)
	Lock/Buckle
	Unlock/Unbuckle

## 1.5 Safety and Instruction Labels

Safety and instruction labels place important information from the users' manual on the KED. Read and follow label instructions. Replace worn or damaged labels immediately.

# 2 - OPERATOR FOCUS

## 2.1 Operator Training

Operator using the KED:

- must read and understand this manual.
- must have training on proper use of the KED.
- must have a training on emergency-medical service and emergency patient-handling procedures.
- must have the physical ability to assist the patient.
- must practice with the KED before using it with a patient.
- must keep training records. For a sample training record sheet, see "Training Record" on page 22.

 <b>WARNING</b>
<b>Untrained helpers can cause injury or be injured. Permit only trained personnel to apply the KED.</b>

## 3 - ABOUT THE KED

### 3.1 Description

The Ferno® Model 125 Kendrick Extrication Device (referred to as the KED® in this manual) is an emergency patient-handling device designed to aid in the immobilization and short transfer movement of patients with suspected spinal/cervical injuries.

The KED is designed for use by a minimum of two trained operators. Additional help may be preferred or needed. It is radiographically translucent.

Features include color-coded, sewn-in securing straps; wraparound head and torso flaps, head/chin straps; an Adjusta-Pad™ for padding; integrated carrying handles; and a carrying case.

### 3.2 General Specifications

Specifications are shown in the table. General specifications are rounded. Metric conversions are calculated before rounding the Imperial measurement. Ferno reserves the right to change specifications without notice. For more information, contact Ferno Customer Relations or your Ferno distributor (page 2).

Inspect the KED if the load capacity has been exceeded. See “Inspecting the KED” on page 20.

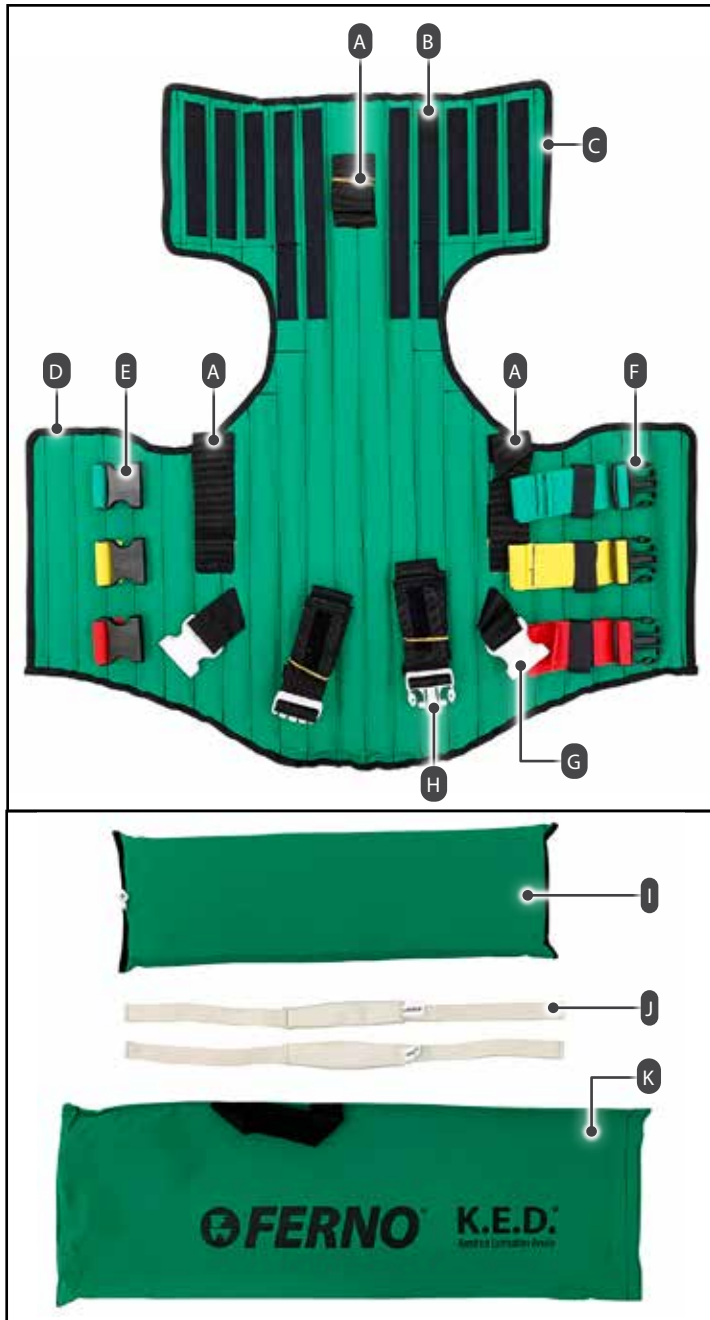
Dimensions	Imperial	Metric
Length Flat	33 in	83 cm
Length Rolled in Case	35 in	90 cm
Width Flat	32 in	80 cm
Width Rolled in Case	11 in	27 cm
Thickness Flat	1 in	3 cm
Thickness Rolled, in Case	6 in	14 cm
Weight	7 lb, 11 oz	3 kg
Load Capacity	500 lb	227 kg / 35.7 st

### 3.3 Components

Symbol	Definition
A	Lifting Handle, (3)
B	Hook-and-Loop Fastening Strips (10)
C	Head Flap (2)
D	Torso Flap (2)
E	Torso Strap Buckle (3)
F	Torso Strap (3)
G	Leg Strap Buckle (2)
H	Leg Strap (2)
I	Adjusta-Pad
J	Head Strap (2)
K	Carry Case

**⚠ WARNING**

**Improper use of the KED can cause injury. Use the KED only for the purpose described in this manual.**



## 4 - FEATURES

### 4.1 Restraints

The KED has five quick-release, snap-lock plastic buckles. The three torso-strap buckles are black; the two leg-strap buckles are white.

**Buckling:** Insert the prongs (A) of the male buckle/tang into the female buckle/receiver (B) until it locks into place. Always confirm that the buckle is securely fastened (Figure 1).

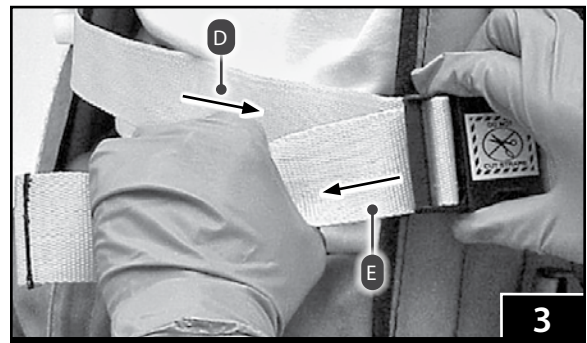
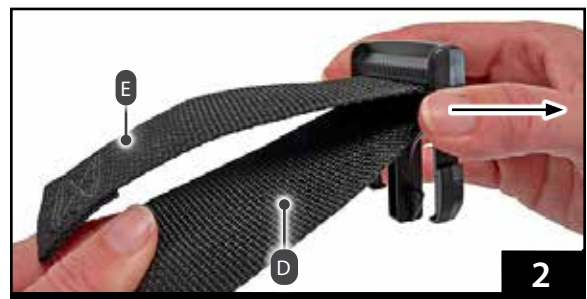
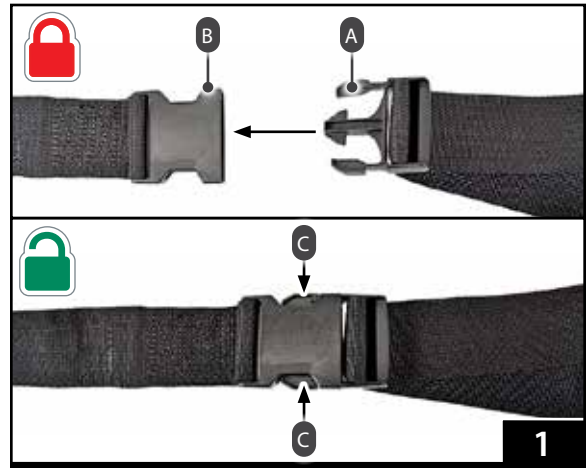
**Unbuckling:** Squeeze the male buckle prongs (C) to release the female buckle/receiver (Figure 1). Separate the straps.

#### Lengthening:

1. Unbuckle the restraint.
2. Grasp the tang or receiver, turn it perpendicular to the webbing, and pull it away from the strap anchored to the KED (D) until the strap is the desired length (Figure 2).
3. Repeat with each strap as needed.

#### Shortening:

1. Grasp the loose end and of the strap (E) and pull the webbing through the tang or receiver until the strap is the desired length (Figure 2 or Figure 3).
2. To avoid jostling the patient if the strap is already buckled, use the feed-and-pull method: Feed excess strap from the anchored side of the restraint (D) into the buckle, then pull the loose end of the strap (E) with the other hand. Repeat until the strap is snug on the patient.
3. Repeat with each strap as needed.



### NOTICE

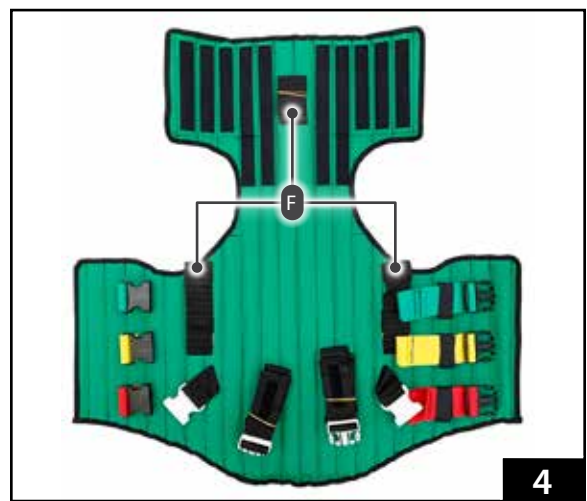


Do not cut straps or buckles. The various restraint straps and buckles are permanently attached to the KED and are not replaceable.

### 4.2 Lifting Handles

The KED is constructed with three lifting handles (F), (Figure 4). They are designed to provide firm grasping points to help move the patient and KED as a single unit.

Use the lifting handles to help move the patient and KED during positioning and during extrication.



### 4.3 Adjusta-Pad

The foam-filled Adjusta-Pad (G) can be used to fill the gap that may exist between the KED and the head, cervical collar or neck, and shoulders. The Adjusta-Pad may also be used to fill space when the KED is used as a splint.

The patient's medical condition, body structure, and head shape determine the need for padding. When properly positioned in the KED, most patients will not need padding. When used, follow your medical advisor's guidelines.

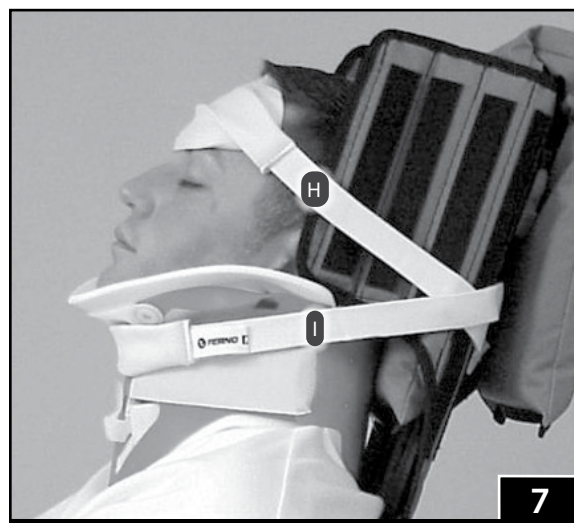
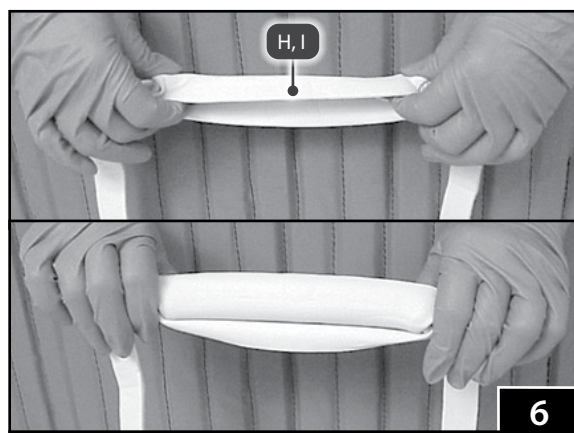
1. Determine whether to use the pad single thickness or folded (G).
2. Follow your local protocols to apply the Adjusta-Pad. Use caution and avoid hyperextending or flexing the patient's neck.
3. Secure the patient's head with the head straps.



### 4.4 Head Straps

Two head straps (H, I) are provided. They can be used to secure the KED head flaps in place or to secure the KED when it is used as a splint. Follow your local protocols for the proper method to attach head straps.

1. Grasp the first strap with both hands (H) and turn the center pad fully inside-out, exposing the rubber (I), (Figure 6).
2. Center the pad at the patient's eyebrows with the rubber against the skin. Position the strap ends at a downward angle and secure them to the fastening strips on the KED head flaps (Figure 7). The downward angle reduces the chance for the strap to slip upward on the forehead.
3. When applying a second strap over a rigid cervical collar, place the strap beneath the "chin" of the cervical collar. Then, position the strap ends horizontally, or at an angle to secure them to the fastening strips on the head flaps (Figure 7).
4. When applying a second strap to a patient without a cervical collar, grasp the strap with both hands and turn the center pad fully inside-out, exposing the rubber. Then, place the strap over the patient's chin and attach the strap ends to the fastening strips on the head flaps.
5. Confirm the strap placement does not prevent the patient from opening his/her mouth.



## 5 - USING THE KED

### 5.1 Before Placing the KED in Service

- Before use, personnel who will work with the KED must read and understand this manual. Appropriate skills and training are also required. See “Operator Focus” on page 4.
- Confirm that the KED operates properly. See “Inspecting the KED” on page 20.

### 5.2 General Guidelines for Use

The KED is a rigid device with a variety of strapping configurations and is adaptable to many emergency medical situations. Medical advice is beyond the parameters of this manual. It is the operators’ responsibility to ensure safe practices for the patient and themselves. A **minimum** of two trained operators is required.

Operators must:

- Follow standard emergency patient-handling procedures when applying the KED.
- Communicate with one another and use coordinated movements when moving the patient.
- Stay with the patient at all times.
- Use additional trained helpers as needed to assist moving and carrying the patient and KED.
- If a cervical collar is used, apply the cervical collar according to local protocols and the manufacturer’s instructions.
- Maintain manual stabilization of the patient’s head and neck until the patient is properly secured.
- After transferring the KED with patient to a spine board or ambulance cot, secure the patient with additional restraints (not supplied).

### 5.3 Removing the KED from the Carrying Case

1. Stand the carrying case upright with the open end upward.
2. Place your foot on the corner of the case (J) as you remove the KED from the case (Figure 8).
3. Unroll the KED and lay the Adjusta-Pad and head straps aside.

#### WARNING

**Improper application of the KED can cause injury. Apply the KED only as described in this manual.**

**An unattended patient can be injured. Stay with the patient at all times.**

#### Recommended Strap Fastening Order

- Middle
- Bottom
- Legs
- Head
- Top





## 5.4 Positioning the KED

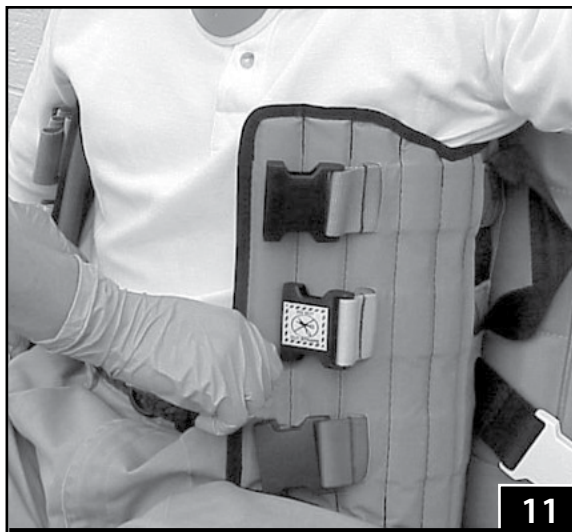
1. **First Operator (Holding Patient's Head):** Hold the patient's head and neck in neutral alignment while the KED is applied (K), (Figure 9). Be prepared to lift one elbow to allow the KED to be maneuvered behind the patient.
2. **Second Operator:** Check behind the patient for articles (wallet, belt, etc.) that could interfere with sliding the KED between the patient and the vehicle seat.
3. **Assistant:** If a third operator is present, coordinate with the First Operator to move the patient forward just enough to assist the Second Operator as he/she slides the KED between the patient and seat.
4. **Second Operator:** Orient the KED with the buckle side toward the seat. Grasp the KED at the top of the head flap and the top corner of the torso flap closest to the patient, tilt the KED at about a 45-degree angle, and slide it behind the patient (Figure 9).
5. **Second Operator:** Work the KED downward between the patient and seat back until it clears the vehicle roof line and can be properly positioned behind the patient's head when turned vertical (Figure 10).
6. **Second Operator:** Use the lift handles to center the KED behind the patient. If using leg straps, disconnect them from the fastening strips at the top of the KED and lay them clear of the KED.
7. After the KED is positioned behind the patient, if leg straps will be used, remove them from the fastening strips and lay the loose straps within reach.



## 5.5 Applying the KED

Position the patient as fully as possible against the KED to minimize the need for padding behind the patient's head. Be aware that some patients may not be able to sit fully back into the KED due to body shape or medical condition.

1. **First Operator:** Continue to hold the patient's head and neck in neutral alignment while the KED is applied.
2. **Second Operator:** Lift the patient's arms only as required to wrap both torso flaps around the patient.
3. **Second Operator:** Using the lift handles, raise and adjust the KED to place the torso flap top edges firmly against the armpits (Figure 11). This reduces the possibility of the patient slipping downward when he/she is lifted. If an assistant is present, continue to hold the KED in place using the lift handles until the straps are buckled.
4. **Second Operator:** Before fastening the straps, confirm the patient is sitting back against the KED as fully as his/her body structure and condition allow. To check and adjust the patient's position, one operator continues to hold the patient's head in alignment while the second operator gently presses on the patient's chest area just below the cervical collar (Figure 12).
5. Remove the middle (yellow) strap (L) from its holder and buckle it (Figure 13). Do not finish tightening the strap at this time.
6. Remove the bottom (red) strap (M) from its holder and buckle it (Figure 13). Do not finish tightening the strap at this time.



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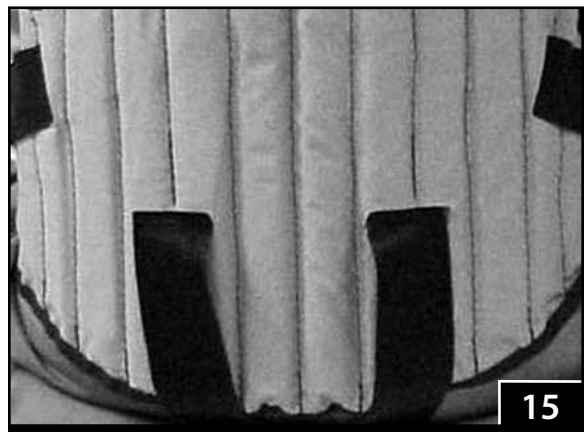
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7. If using the leg straps, pass each leg strap between the leg and car seat. Using both hands, “see-saw” each strap into position under the patient’s leg and buttock (Figure 14).
8. Reach behind the patient and make sure both straps lay straight downward, as close as possible to the body midline (Figure 15).
9. Follow your medical advisor’s recommendations for the use of leg straps. Either “criss-cross” the straps at the groin and buckle the straps on the opposite side of the KED (Figure 16), or buckle each strap to its side of origin.
10. Snug both straps, leaving space for two or three fingers laid flat between the strap and the patient’s leg. Do not finish tightening the straps at this time.
11. Do not buckle the top strap at this time. Buckling this strap and tightening all straps will be completed before moving the patient.



## 5.6 Securing the Patient's Head

The patient's medical condition, body structure, and head shape determine the need for padding. Follow your local protocols for the use of padding.

1. With the patient properly positioned against the KED, fill any gap between the KED and the patient's head, cervical collar, or shoulders with the Adjusta-Pad or rolled towels (Figure 17). Take care to not hyperextend or flex the patient's neck. Fold the Adjusta-Pad for additional thickness if needed.
2. **Operator Holding Patient's Head:** Hold the patient's head and neck in neutral alignment while the second operator applies the head flaps and head straps.
3. **Second Operator:** Wrap the head flaps around the patient's head (Figure 18).
4. **Operator Holding the Patient's Head:** Move one hand at a time and hold the head flap to the patient's head (Figure 18).
5. **Second Operator:** With both hands, turn the center of a head strap fully inside-out so the rubber will be against the patient's forehead. Position the strap at the patient's eyebrows and secure the strap to the head flap fastening strips at a downward angle (Figure 19). The angled placement minimizes the chance that the strap can slide upward on the forehead.
6. **Second Operator:** Place the second strap under or on the chin area of the cervical collar and position the strap ends as horizontally as possible. Secure the strap ends to the fastening strips on the head flaps (Figure 19). Take care to not apply the strap so snugly that the patient cannot open his/her mouth.



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## 5.7 Final Adjustments

Use final adjustments to confirm the KED is firmly in place from the lower spine to the head and is high up under the armpits to prevent movement during extrication.

1. Prepare the long spine board and ambulance cot.
2. Remove the top strap from its holder and buckle it. Adjust and tighten the strap.
3. Check and tighten the middle (yellow) strap.
4. Check and tighten the bottom (red) strap.
5. Check and tighten the leg straps.

## 5.8 Transferring the Patient

A typical transfer pivots the patient with his/her back toward the midline of the vehicle. Follow your local protocols to move the patient.

1. **Two Operators:** Using coordinated movements and working from the same side of the vehicle, grasp the KED side lift handles, pivot and tilt the patient to position his/her back toward the center of the vehicle (Figure 20).
2. **Two Operators:** Maintain your grip on the side lift handles, grasp the patient under the knees and lift the patient to allow the long spine board to be slid between the patient and the seat (Figure 21).
3. **Third Operator/Assistant:** Slide the head end of the long spine board as far as possible under the patient so the patient will be near the correct position when laid on the spine board.
4. **Two Operators:** Lower the patient onto the spine board.



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5. **Operators/Helpers:** Lift the spine board and patient out of the vehicle and place them on an ambulance cot (Figure 22). Use additional help as needed to carry the weight of the patient.
6. **Trained Operators:** Immediately loosen the KED top torso strap (Figure 23) to allow the patient more chest expansion. Keep the remaining straps tighten to provide stability for the patient during the transport to the hospital.
7. **Trained Operators:** Tighten leg straps if necessary. Properly applied leg straps typically loosen when the patient is placed supine on the spine board.
8. **Operators/Helpers:** Secure the patient, KED, and long spine board to the ambulance cot using primary restraints suitable for use in a motor vehicle.

**WARNING**

An unrestrained patient can be injured. Use appropriate patient restraints to secure the patient on the spine board and ambulance cot.



## 6 - SPECIAL SITUATIONS

### 6.1 Guidelines

The KED may be adapted for use in special circumstances. Some possible adaptations are presented in this section. Always follow your medical director's guidelines, Emergency Medical Service training, and local protocols. Medical advice is determined by the user and controlling EMS. Information shown here are to be taken as guidelines only.

### 6.2 Pregnant Patient

Possible adaptations:

- Torso flap slats may be folded inward to leave the abdomen exposed.
- Strap configurations may be modified depending on the patient's abdomen and breast size. Two possible configurations are shown: fastening the bottom strap to the middle buckle and middle strap to the bottom buckle (Figure 24); or using all three straps but criss-crossing the top and bottom straps (Figure 25).

#### WARNING

Attaching equipment or items to the KED can cause injury.  
Do not attach equipment or items to the KED.



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### 6.3 Pediatric Patient

Possible adaptations:

- If the child is taller/longer than the KED, Ferno recommends you place the child on a long spine board for full support.
- A folded blanket may be used for additional padding to allow the KED flaps and restraints to be applied normally across a small patient (Figure 26).



### 6.4 Angulated Neck

Possible adaptations:

- When it is not desirable to straighten the patient's neck, fold the head flaps inward (N) to leave the patient's neck area free (Figure 27).
- Rolled towel(s) and head strap(s) can be used to provide support as deemed medically appropriate.



### 6.5 Using Monitoring Systems

Possible adaptations:

- Fold torso flaps inward to provide more chest exposure as needed (Figure 28).
- Loosening two of the three chest straps can allow defibrillation while maintaining some immobilization.





## 6.6 Using the KED as a Splint

Possible adaptations include placing the patient on a long spine board and applying the KED with the head portion toward the patient's feet. Position the KED torso section a little above the waist and centered on the patient.

- **Hip or femur stabilization:** Secure torso flaps around the patient and head flaps around the injured leg. Head straps may be used to help secure the leg (Figure 29).
- **Pelvic stabilization:** Secure torso flaps around the patient's pelvic area and head flaps around both patient legs. Head straps may be used to help secure the legs (Figure 30).



## 7 - STORING THE KED

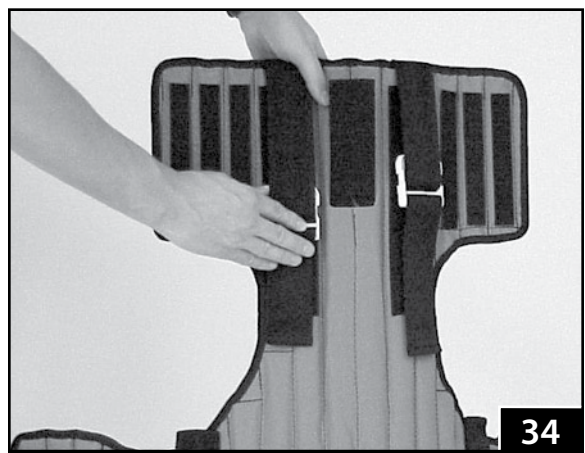
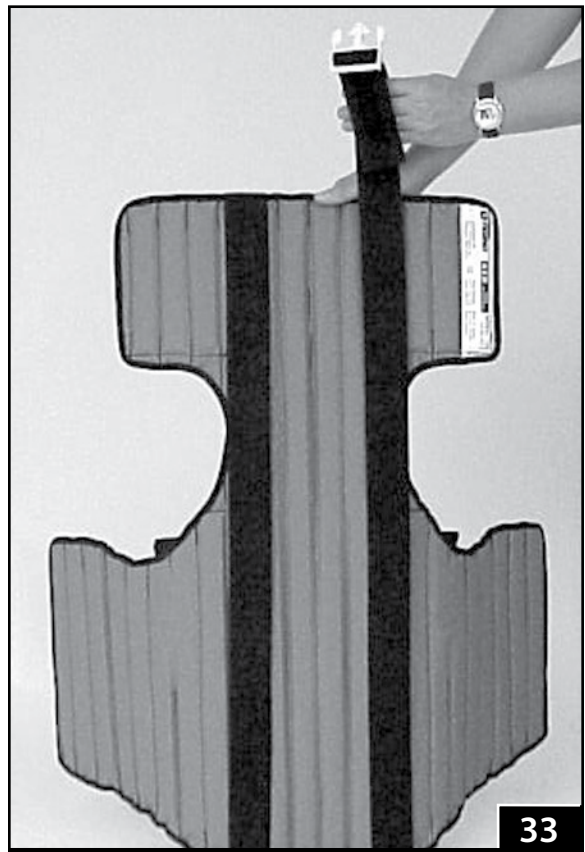
### 7.1 Proper Storage

Use care when storing the KED, such as proper storage of the torso straps, will allow the KED to be quickly deployed. Proper storage of leg straps will keep them out of the way when not in use.

1. Lengthen each torso strap until only 3"-4" of webbing remain.
2. Turn the buckle under (O), flush against the strap (Figure 31).
3. Fold the strap material beneath the buckle and continue folding the strap accordion fashion (P), (Figure 31).
4. Secure the folded restraint with the hook-and-loop fastener strap around the buckle (Q), (Figure 32). This will enable the buckle to be pulled free without tangles and in a single motion.
5. Repeat Steps 1-4 for each torso strap.

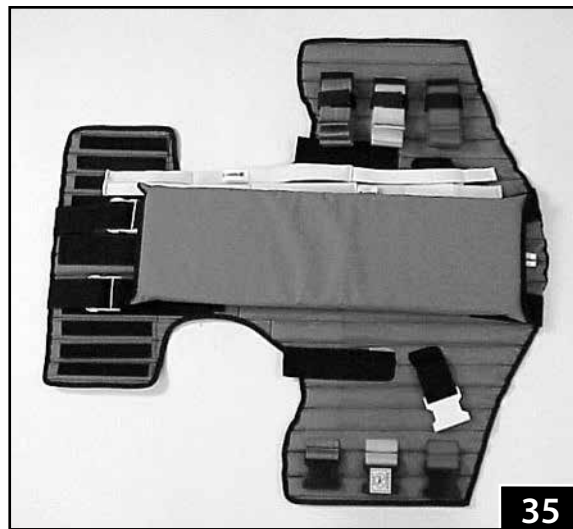


6. Lengthen each leg strap until about 6" of webbing has not passed backward through the buckle slide.
7. Beginning where the strap is mounted to the KED, route the strap down and around the bottom edge of the KED and then up around the inside (non-buckle side) of the KED (Figure 33).
8. Turn the buckle under to rest flush against the webbing and secure the strap in place by pressing its hook-and-loop fastening strip against a fastening strip on the outside (buckle-side) of the KED (Figure 34).



## Model 125 KED®

9. Lay the KED flat, buckles upward. Center the Adjusta-Pad with one end at the bottom of the KED (Figure 35).
10. Press one end of each head strap against the head flap hook-and-loop fastening strips. Lay the straps parallel with the Adjusta-Pad.
11. Fold one torso flap over the Adjusta-Pad and tuck the edge of the flap under the pad (Figure 36).
12. Continue to roll the folded portion of the KED over the remaining torso flap (Figure 37 and Figure 38).
13. Slide the KED into its carrying case.



## 8 - MAINTENANCE

### 8.1 Maintenance Schedule

The KED requires regular maintenance. Set up and follow a maintenance schedule. The table at right represents minimum intervals for maintenance.

Keep maintenance records. For a sample record sheet, see "Maintenance Record" on page 23.

When using maintenance products, follow the manufacturers' directions and read the manufacturers' material safety data sheets.

### 8.2 Service Life

Many factors affect a product's service life, including frequency of use (high-volume versus low-volume ambulance service); local environment (extreme temperature, high humidity, etc.); maintenance (adherence to the inspection and maintenance schedule); and other factors.

Follow the disinfecting, cleaning, and inspection procedures in this manual to ensure long life for the KED.

### 8.3 Disinfecting and Cleaning

Before disinfecting or cleaning, open the KED and separate the loose pieces (Adjusta-Pad and head straps).

**To disinfect:** Apply disinfectant to all surfaces, following the disinfectant manufacturer's instructions for application method and contact time. Wipe with a clean cloth.

**To clean:**

1. Add a disinfectant cleaner to warm water, following the disinfectant manufacturer's instructions.
2. Wash head straps with the warm water/cleaner solution and a sponge.
3. Lightly scrub the KED, Adjusta-Pad, and carry case with the warm water/cleaner solution and a medium-bristle brush.
4. Rinse all parts with warm, clear water.
5. Allow all pieces to dry completely before returning them to the carry case. Be aware that moisture can be absorbed through the sewing holes and wet the battens inside the KED. Allow 2-36 hours for complete drying based on humidity and the amount of water absorbed during use or during cleaning.

### 8.4 Inspecting the KED

Have your service's equipment maintenance personnel inspect the KED regularly. Follow the checklist at right and operate the KED through all its functions as described in this manual.

If inspection shows damage or excessive wear, remove the KED from service until repair is made. See "Parts" on page 21.

**WARNING**

**Improper maintenance can cause injury. Maintain the KED only as described in this manual.**

Minimum Maintenance	Each Use or Daily	As Needed	Monthly
Disinfecting (this page)	•		
Cleaning (this page)		•	
Inspecting (this page)		•	

**NOTICE**

Disinfectants and cleaners containing bleach, phenolics or iodines can cause damage. Do not use products containing these chemicals.

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Using abrasive cleaning compounds or applicators on the KED can cause damage. Do not use abrasive materials to clean the KED.

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Storing a damp/wet KED in its carrying case can encourage the growth of mold. Do not return the KED to its carrying case until thoroughly dry.

### Inspection Checklist

- Are all components present?
- Is the KED free of excessive wear?
- Is all stitching secure?
- Are vertical battens inside the KED solid and unbroken?
- Are torso and leg straps, and lifting handles in good condition?
- Are all buckles free of visible damage and do they operate properly?
- Are head straps free of excessive wear and is their stitching secure?
- Is the Adjusta-Pad in good condition?

## 9 - PARTS

### 9.1 Parts List

Contact Ferno Customer Relations (page 2) or your Ferno distributor for product information or to order replacement head/chin straps.

Part	Description	Qty
081-9928	Head/Chin Strap	2



#### WARNING

**Attaching improper items to the KED can cause injury. Use only Ferno-approved items on the KED.**

**Improper parts and service can cause injury. Use only Ferno parts and Ferno-approved service on the KED.**

**Modifying the KED can cause injury and damage. Use the KED only as designed by Ferno.**





Aviation

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Military

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Mortuary

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EMS

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Rescue

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