



Model AS-190

Vacuum Splints



Read this Manual and Retain
for Future Reference



FERNO®

Instructions for Use

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Ferno Customer Relations

For ordering assistance or general information:

CANADA AND THE U.S.A.

Telephone (Toll-free)	1.877.733.0911
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Fax (Toll-free)	1.888.388.1349
Fax	1.937.382.1191
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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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USERS' MANUALS

To request additional free users' manuals, contact Ferno Customer Relations, your Ferno distributor, or www.ferno.com.



Lot Number _____

Location: One strap of each splint

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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The products sold by Ferno are covered by a limited warranty, which is printed on all Ferno invoices. The complete terms and conditions of the limited warranty, and the limitations of liability and disclaimers, are also available upon request by calling Ferno at 1.800.733.3766 or 1.937.382.1451.



Medical Device



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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.

 **WARNING**

Untrained operators can cause injury or be injured. Permit only trained personnel to apply the splints and operate the valves.

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

Improper application can cause injury. Apply the splints and operate the valves only as described in this manual.

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

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

Improper parts can cause injury. Use only Ferno parts with the splints.

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

1.2 Notice

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

NOTICE

1.3 Bloodborne Disease Notice

To reduce the risk of exposure to bloodborne diseases such as HIV-1 and hepatitis when using the splints, follow the disinfecting and cleaning instructions in this manual.

1.4 Symbol Glossary

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



General Warning of Potential Injury



Read the Users' Manual



Operation Requires Two Trained Operators



Product meets European Union Standards



Do Not Cut

2 - OPERATOR FOCUS

2.1 Operator Training

Operator using the splints:

- must read and understand this manual.
- must have training on proper use of the splints.
- 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 splints before using it with a patient.
- must keep training records. For a sample training record sheet, see page 15.

 **WARNING**

Untrained operators can cause injury or be injured. Permit only trained personnel to apply the splints and operate the valves.

3 - ABOUT THE SPLINTS

3.1 Description

The Model AS-190 Vacuum Splint Kit is a set of three vacuum-activated splints, a vacuum pump, a repair kit, and a carrying case. Each vacuum splint is an emergency patient-care device designed to immobilize and support an injured part of the body.

The splints are for professional use only, by a minimum of two trained operators.

The splints are made of vinyl-coated polyester and filled with polystyrene beads. The splints fasten with hook-and-loop adjustment straps.

The kit contains splints in three sizes: small (Model AS-100), medium (Model AS-120), and large (Model AS-140). Individual splints are also available as replacement parts (See *Parts*, page 14).

The vacuum pump included with the kit includes an adapter to fit different valve styles.

The carrying case is constructed with pockets for the splints, repair kit, and vacuum pump.



WARNING

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

NOTICE

Splints purchased as replacements are not compatible with old versions of the vacuum pump. If your vacuum pump does not match the one shown on page 6, please order a new pump from Ferno (see *Parts*, page 14).

3.2 General Specifications

MODEL AS-100 SPLINT (SMALL)

Length	21 in./533 mm
Width	14 in./345 mm
Thickness	1.5 in./40 mm
Weight	0.90 lb./408 g

MODEL AS-120 SPLINT (MEDIUM)

Length	29 in./735 mm
Width	24 in./610 mm
Thickness	1.5 in./40 mm
Weight	1.95 lb./885 g

MODEL AS-140 SPLINT (LARGE)

Length	43 in./1075 mm
Width	27 in./685 mm
Thickness	1.5 in./40 mm
Weight	2.90 lb./1315 g

VACUUM PUMP

Pump Length	9.5 in./241 mm
Hose Length	24 in./610 mm
Pump Diameter	3 in./76 mm
Weight	1.40 lb./635 g

CARRYING CASE

Weight	1.25 lb./567 g
--------	----------------

MODEL AS-190 SET*

Length	33 in./840 mm
Width	13 in./340 mm
Thickness	9 in./230 mm
Weight	8.40 lb./3810 g

* Set includes one each Model AS-100, Model AS-120 and Model AS-140 splints, vacuum pump, repair kit, and carrying case.

Most general specifications are rounded to the nearest whole number. Metric conversions are calculated before rounding the Imperial measurements. For more information, contact Ferno Customer Relations (page 2) or your Ferno distributor.

Ferno reserves the right to change specifications without notice.

3.3 Components

The Models AS-100 (small), AS-120 (medium), and AS-140 (large) splints, plus a vacuum pump, vinyl repair kit, and carrying case are included in the Model AS-190 vacuum splint set. Components may also be purchased separately.



VINYL REPAIR KIT



CARRYING CASE



VACUUM PUMP



MODEL AS-100 SPLINT



MODEL AS-140 SPLINT

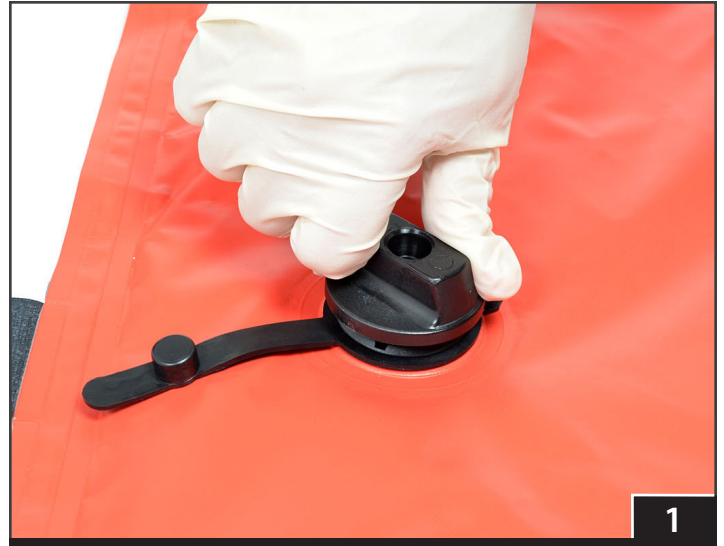


MODEL AS-120 SPLINT

4 - USING THE PUMP AND VALVES

4.1 Connecting the Pump

1. Attach the removable valve knob to the splint if separated and tighten securely (Figure 1).
2. Remove the valve-plug tab from the removable valve knob and valve adapter from the pump hose if needed (Figure 2).
3. Insert the pump-hose fitting into the center of the removable valve knob (Figure 2).



4.2 Evacuating the Air

Use the pump provided to evacuate the air from the vacuum splint. Squeeze the black plastic handle (Figure 3) repeatedly until the splint obtains the desired firmness.

Note: If air is drawn into the splint during the air-evacuation procedure, tighten the knob.

4.3 Disconnecting the Pump

When the splint has been fitted to the patient and the air evacuated to provide a rigid device, disconnect the pump as follows:

1. Disconnect the pump from the valve knob.
2. Insert the valve-plug tab into the knob to prevent air loss while the splint is in use (Figure 4).



5 - USING THE SPLINTS

5.1 Before Placing the Splints In Service

- Personnel who will work with the splints need to read this manual.
- Confirm that the splints operate properly. See *Inspecting the Splints*, page 12.

5.2 General Guidelines for Use

- Medical advice is beyond the parameters of this manual.
- It is the users' responsibility to ensure safe practices for the patient and themselves.
- Follow standard emergency patient-handling procedures when applying and operating the splints.
- Applying a vacuum splint requires a minimum of two trained operators. One operator manually stabilizes the injured area while the second operator applies the splint.
- Stay with the patient at all times.
- Use the splints only when they are fully operational.
- Do not cut the splints.
- Use caution when using sharp objects near the splints.

5.3 Choosing the Correct Splint

Choose the splint size that best suits the injury. The splint should be large enough to extend beyond the joints on both sides of the injury (Figure 5 and Figure 6).

If the injury is a dislocation, the splint should be large enough to extend beyond both sides of the dislocated joint.

WARNING

Improper application can cause injury. Apply the splints and operate the valves only as described in this manual.

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

NOTICE

Sharp objects can damage the splints. Use care when using sharp objects near the splints.



5.4 Applying a Splint

The vacuum splint is an airtight bag partially filled with tiny polystyrene beads.

Evacuating the air from the splint (using the vacuum pump supplied) causes the beads to interlock and the splint to become rigid. Introducing air into the splint allows the beads to move freely and the splint to become pliable.

If the type of patient injury permits, apply the splint with the opening positioned to allow access to check the patient's injury and/or the pulse in the patient's extremity.

To apply a splint:

1. **One operator manually stabilizes the injured part of the body throughout the splinting procedure** (Figure 7). The other operator applies the splint.
2. Lay the splint flat with the valve upward and smooth the splint to a uniform thickness.
3. Using EMS-approved immobilization techniques, place the splint (valve on the outside) around the injury. Make sure you have access to the valve.
4. Secure the splint in place using the hook-and-loop adjustment straps and fastening strip (Figure 7).
5. Connect the vacuum pump to the valve. For complete instructions, see *Connecting the Pump*, page 7.
6. The pump operator begins evacuating the air from the splint by repeatedly squeezing the pump handle. If the splint draws air into the splint as you attempt to evacuate the air, tighten the valve knob.
7. As air is evacuated from the splint, the second operator continues to manually stabilize the splinted area of the body and, if necessary, gently molds the splint to the body (Figure 8).
8. Continue the procedure until the splint is as rigid as desired. Follow your medical protocols and training.
9. Disconnect the vacuum pump from the splint (See *Disconnecting the Pump*, page 8).
10. Tighten the adjustment straps if necessary.



NOTICE

The valve knob **must be tightened firmly** to function. If you hear air being drawn into the splint as you attempt to pump out the air, tighten the valve knob.



5.5 Checking an Injury After the Splint Has Been Applied

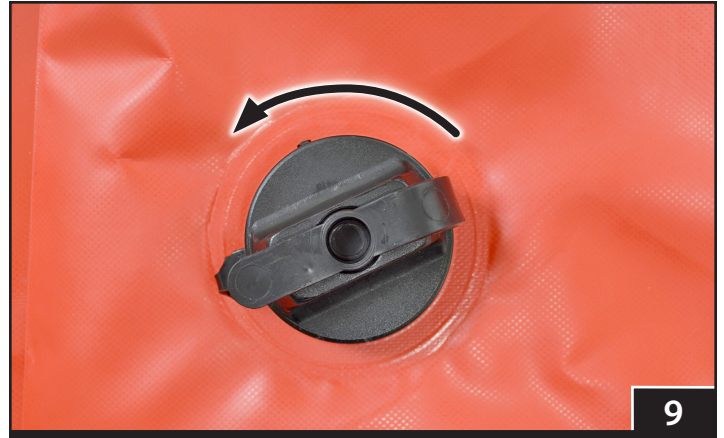
To check an injury once the splint is in place, manually stabilize the injured area as you carefully pull the edges of the splint back. If necessary, unfasten the adjustment straps.

After checking the injury, carefully move the edges of the splint back into position. If necessary, refasten the adjustment straps.

5.6 Removing the Splint From the Patient

The vacuum pump is not used when removing the splint from the patient.

1. **One operator manually stabilizes the injured area of the body throughout the splint removal procedure.**
2. The second operator unfastens the adjustment straps.
3. Open the air valve by turning the valve knob counter-clockwise to allow air into the splint. As air flows in, the splint will become pliable (Figure 9). **Note:** You can completely unthread the valve knob from the valve if desired (Figure 10).
4. When the splint is pliable, gently remove the splint while stabilizing the injured area of the body.



5.7 Storing the Splints

Store clean, dry splints in the carrying case pockets. Slide the vacuum pump into the pocket in the bottom of the carrying case.



6 - MAINTENANCE

6.1 Maintenance Schedule

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

Keep maintenance records. A sample maintenance record sheet is provided on page 15.

When using maintenance products, follow the manufacturers' directions and read the manufacturers' material safety data sheets. You can purchase a recommended disinfectant from your Ferno distributor or Ferno Customer Relations (page 2).

6.2 Disinfecting and Cleaning the Splints

1. **To disinfect:** Apply disinfectant to all surfaces of the splint, following the disinfectant manufacturer's instructions for application method and contact time. Ferno recommends you inspect the splint for damage as you disinfect it.
2. **To clean: Close the air valve.** Wash the splint with warm, soapy water and a soft cloth. Rinse with clear water. Dry the vinyl with a towel. Allow the hook-and-loop fastening strips to air-dry.
3. Store only clean, dry splints in the carrying case.

6.3 Inspecting the Splints

Have your service's equipment maintenance personnel inspect the splints regularly. Follow the checklist at right and operate each splint through all its functions as described in this manual. If inspection shows damage or excessive wear, remove the splint from service and repair or replace it. See *Parts*, page 14.

Note: Minor rips or punctures in the splint can be repaired. A vinyl-repair kit is included with the full-kit Model AS-190, or order a repair kit from your Ferno distributor. See *Parts*, page 14.



WARNING

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

Minimum Maintenance Intervals	Each Use	As Needed	Each Month
Disinfecting (this page)	•		
Cleaning (this page)		•	
Inspecting (this page)		•	•

NOTICE

Solvents may soften the splint fabric. Use only soap and water to clean the splints.

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

Keep the interior of the splint dry. Close the air valve before cleaning. Liquids that enter the splint can cause mold and mildew.

INSPECTION CHECKLIST

- Are all components present?
- Does each splint become rigid and hold the rigidity after the air is drawn out?
- Is each splint in good condition (free of rips and punctures)?
- Does each splint valve operate properly?
- Does the pump valve connector attach properly to the air valve of each splint?
- Does the vacuum pump operate properly?
- Does the carrying case zipper operate properly?

6.4 Using the Repair Kit

Note: Use the repair kit supplied (Figure 11) to repair small rips or punctures in the vacuum splints. If the damage is large or cannot be repaired with the kit, replace the splint.

A patch can be used on any smooth part of the splint. Allow 30 minutes to 24 hours for the patch to set in place.

1. Clean and dry the area to be repaired.
2. Cut the repair patch approximately 3/4" (19 mm) larger than the hole. Round the corners of the patch.
3. Apply the glue to the patch.
4. Place the patch over the center of the hole. Press firmly and work from the center out to remove all air bubbles.
5. Allow a minimum of 30 minutes for the patch to seal. The longer the patch remains undisturbed, the stronger it will bond to the splint. If possible, wait 24 hours before using the splint.



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7 - PARTS

7.1 Worldwide

To order Ferno parts, contact your Ferno distributor or Ferno Customer Relations, page 2.

7.2 Parts List

Description	Kit
Vacuum Pump	083-1965
Carrying Case	038-2916
Vinyl Repair Kit	083-1966
Model AS-190 (Set of 3 Splints)	037-4861
Model AS-100 (Small) Splint	037-4862
Model AS-120 (Medium) Splint	037-4863
Model AS-140 (Large) Splint	037-4864



WARNING

Improper parts can cause injury. Use only Ferno parts with the splints.

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

TRAINING RECORD

Date	Name	Training Method

MAINTENANCE RECORD

Date	Maintenance Performed	By

Aviation

Military

Mortuary

EMS

Rescue
