vessl
prosthetics

# Kinn™

## Automatic Volume Management System
## Instructions For Use

# Table of Contents


| | |
|---|---|
| Product Overview | 2 |
| Warnings and Precautions | 3 |
| Technical Specification | 5 |
| Fabrication Instructions - 4-Hole Adapter | 6 |
| Fabrication Instructions - Lamination Plate | 6 |
| Panel Preparation and Attachment | 13 |
| Kinn System Assembly | 15 |
| Kinn Setup | 18 |
| User Instructions | 20 |
| Maintenance | 21 |
| Troubleshooting | 22 |
| Manufacturer Contact Information | 24 |

# Product Overview

The Kinn Automatic Volume Management System (Fig. 1) is a socket volume management system that features automatic volume adjustment and vertical shock absorption. The Kinn system is attached to the distal end of the socket with a lamination plate or 4-hole adapter. Kinn contains a shock absorber that reduces vertical forces and activates the volume management mechanism through compression of the system. The system's manual and automatic tensioning allow for active and passive socket fit optimization. The maximum tension setting can be adjusted per patient preference.

**Fig. 1**

# Indications for Use

- Individual with transtibial amputation, unilateral or bilateral
- Patient weight under 220 lbs / 100 kg
- Patient experiences limb volume change
- Patient benefits from shock absorption

# Contraindications for Use

- Individual with transfemoral amputation
- Patient weight over 220 lbs / 100 kg
- Use of posterior mount foot

## Warnings and Precautions

- Please review the indications and contraindications sections of the manual before patient selection and device use to ensure the proper integration of the Kinn system into the patient's prosthesis.
- The Kinn system may only be fit on the patient by a certified prosthetist. The Kinn system is intended to be used in conjunction with custom-fabricated prosthetic sockets and traditional prosthetic componentry.
- Kinn is not a suspension system; it is a volume management system. The prosthetist must choose the appropriate suspension system for the patient.
- Do not overtighten the pre-set tension nor the manual dial; excessive tension may cause discomfort or circulatory issues.
- Failure to follow the Instructions for Use may cause product failure and will void the warranty.
- Loss of suspension can occur if the cable fails.
- Keep cable away from open flame and sharp edges (and instruct patients to do the same).
- The dial must always rotate forwards. See Fig. 2 for a visual reference.


Right leg medial dial
Left leg lateral dial
Right leg lateral dial
Left leg medial dial

**Fig. 2**

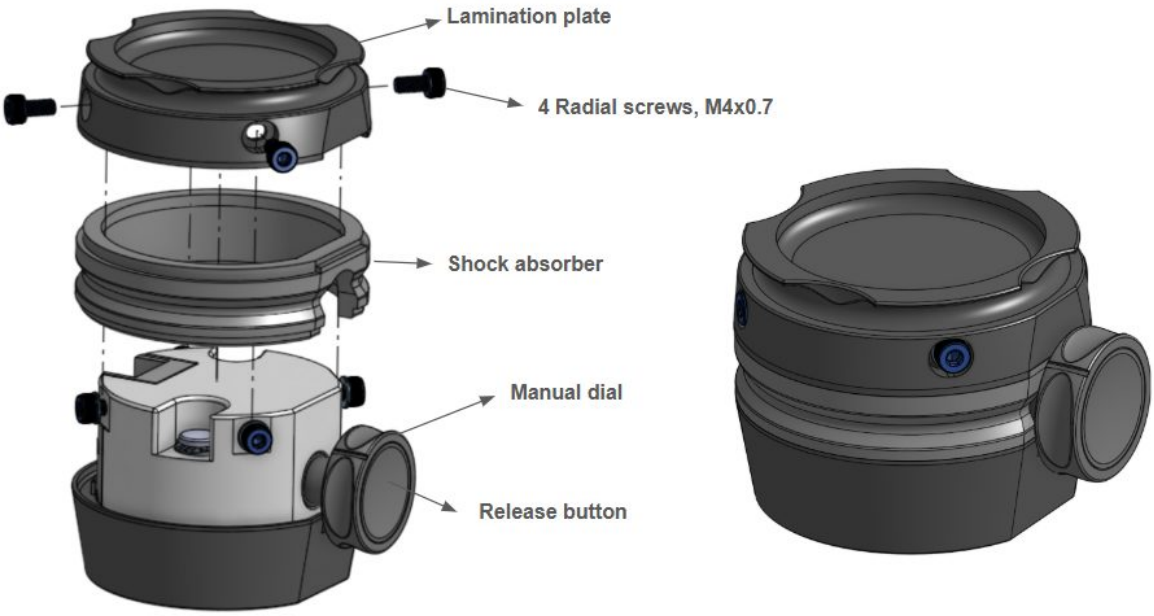
Lamination plate
4 Radial screws, M4x0.7
Shock absorber
Manual dial
Release button

**Fig. 3**

# Technical Specification

| Specification | Value |
|---|---|
| Build Height with Lamination Plate | 1.98”/ 50.5 mm (Uncompressed) |
| Build Height with 4-Hole Adapter | 2.15”/ 54.5 mm (Uncompressed) |
| Vertical Compression | Up to 0.16”/ 4 mm |
| Kinn Unit Weight (without lamination plate or 4-hole adapter) | 1 lb/ 454 gram |
| Platform Diameter | 2.60”/ 66 mm |
| Lamination Plate Diameter | 2.83”/ 72 mm |
| 4-Hole Adapter Diameter | 2.91”/ 74 mm |
| Tube Outer Diameter | 0.16”/ 4 mm (tube for single cable) |
| Cable Tensile Strength | 850 lb/385 kg |
| Patient Weight Limit | 220 lb/100 kg |
| Shock Absorber, Soft Rating | 100 lbs to 200 lbs/ 45 kg to 91 kg |
| Shock Absorber, Medium Rating | 200 lbs to 220 lbs/ 91 kg to 100 kg |

# Fabrication Instructions - 4-Hole Adapter

If you selected the 4-hole adapter and would like fabrication instructions for that version, scan the QR code below or contact **support@vesslpro.com**.

# Fabrication Instructions - Lamination Plate

The kit comes with a lamination plate (Fig. 4). When laminating the socket with a pin suspension system, ensure there is space between the bottom of the pin lock and the top of the Kinn system to allow the pin to extend through the lock without hitting the top of the Kinn lamination plate.

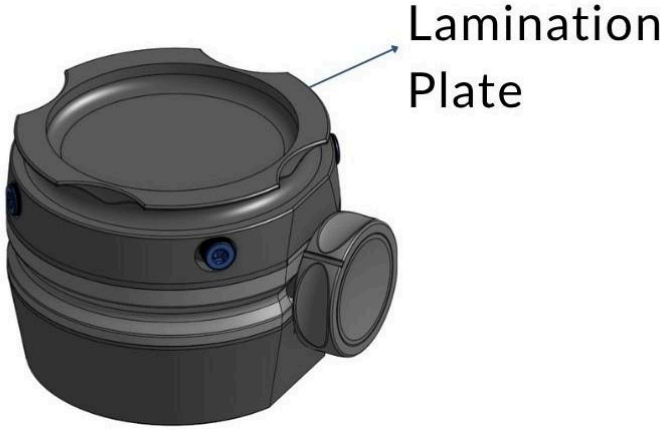


**Fig. 4**

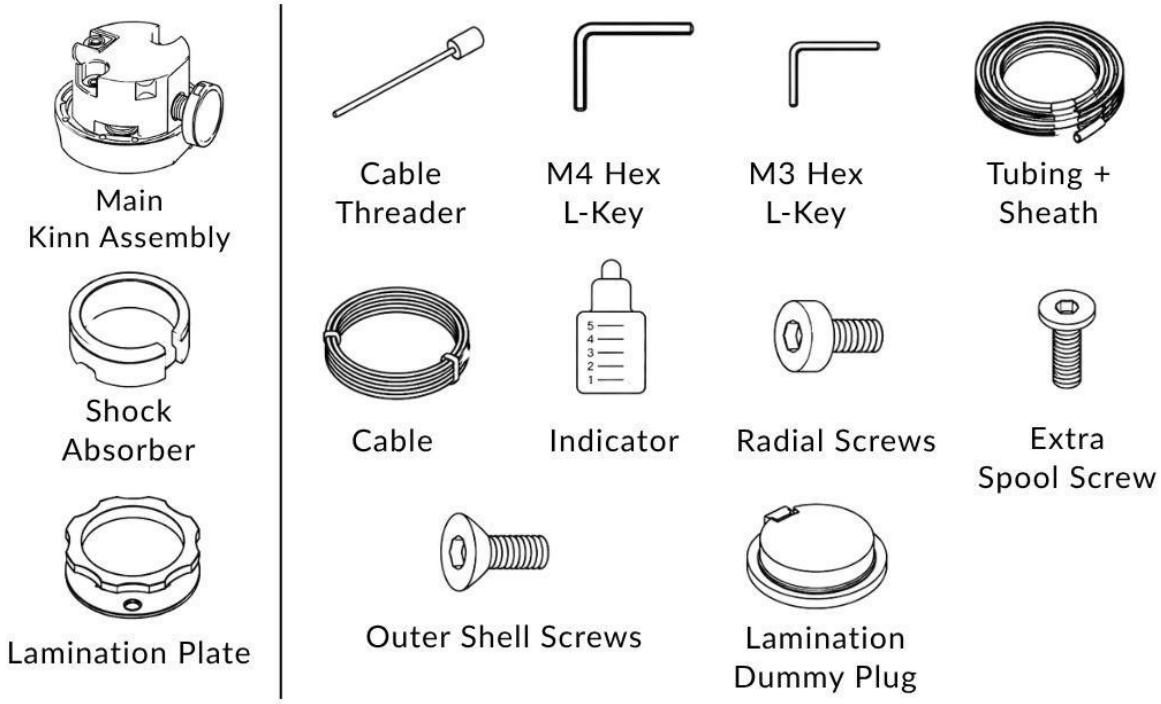


**Fig. 5**

1. Flexible inner socket:
    a. Pull a flexible inner liner.
    b. Use the flexible material of choice with a final thickness of approximately 3-4 mm.

2. First lamination:
    a. Laminate a layer over the mold/flexible inner liner. Ensure the lamination has one braid to prevent the tube from being pulled through.
    b. Include lock-in lamination per the lock manufacturer's instructions.
    c. Prep the surface of the initial lamination by roughing/sanding and thoroughly cleaning with rubbing alcohol.

d. Ensure the pin release button/suspension valve and the Kinn dial are fabricated on the same side.

3. Transferring alignment:
    a. Attach the Kinn system to the lamination plate.
    b. Install the pyramid adapter onto the distal end of the Kinn system.
    c. Attach the Kinn system to the vertical alignment jig.
    d. Once alignment is transferred, remove the Kinn system.

4. Lamination plate attachment:
    a. The rotational direction of the lamination plate is critical. Ensure that the Cable Tubing Insertion Port is aligned with the planned tubing pathway (opposite side of the manual dial).
    b. Apply fast-curing adhesive to the proximal side of the lamination plate. (Fig. 6)

**Fig. 6**

    c. Adhere the socket to the lamination plate with appropriate alignment. Ensure no sharp edges/surfaces.
    d. Add an expanding foam to give the prosthesis a better shape.
    e. Once the alignment is transferred, remove the Kinn system.

5. Panel and Tubing Layout:

a. Draw the tubing pathway onto the carbon fiber lamination so that it starts and ends ¼ inch (6 mm) apart at the Cable Tubing Insertion Port, (Fig. 7a) crossing each panel horizontally twice. (Figs. 7b & 7c)

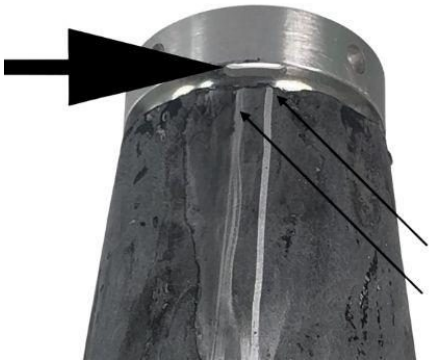

**Fig. 7a**
**Cable Tubing Insertion Port**

**Fig. 7b**
**Posterior socket view**

**Fig. 7c**
**Anterior socket view**

b. Tubing pathway tips:

i. Keep the tubing 0.5” from the top and bottom edges of each panel.
ii. Keep the tubing parallel to the bottom of each panel.
iii. Curve the tubing 0.5” from the last panel, keeping the curve radius no sharper than 15mm.
iv. Follow the same path back to the cable tubing insertion port.
v. The tubing should be evenly spaced on each panel.
vi. The example shown is a common 3-panel configuration (1 medial, 1 posterior, 1 lateral), but you can choose whichever panel configuration is best for your patient.

6. Glue on Tubing:
    a. Ensure that you are using the tubing which has sheath around it.
    b. Take one end of the tubing and place it through the cable entry slot on the lamination plate. Leave 1” of length inside the lamination plate.
    c. Adhere the tubing along the drawn pathway using small dots of glue every 2 cm. Use super glue and an accelerator to expedite the process. (Fig. 8)

**Fig. 8**

    d. Cut the tubing so that 0.5” can be placed through the cable tubing insertion port on the lamination plate. (Fig. 9)

**Fig. 9**

    e. Pack the ends of both tubes with clay in order to prevent resin from entering.
    f. Seal the insertion port using a fast-setting adhesive like Fabtec. (Fig. 10)

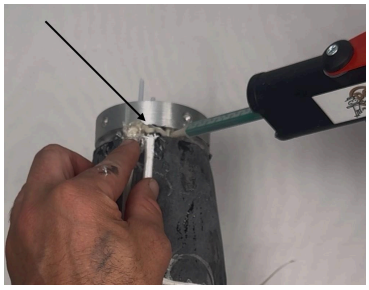

**Fig. 10**

7. Insert lamination dummy:
    a. Apply a thin coat of petroleum jelly to the outside of the lamination dummy.
    b. Place the lamination dummy into the distal surface of the lamination plate. Ensure that the terminal ends of the tubing are inserted into the dummy. (Figs. 11 & 12)

**Fig. 11**

**Fig. 12**

    c. Fill the 4 screw holes with putty.
    d. Apply stretch tape over the exposed distal surface.

8. Second Lamination:
    a. Pull lamination materials over the socket, tying into the lamination plate groove and reflecting back over the socket.
    b. Pull PVA bag and laminate as usual.
    c. Laminate the socket using caution to not displace the tubing or cable tubing insertion port. (Fig. 13)

**Fig. 13**

d. Extra resin will be needed. Use caution to remove air bubbles around the tubing. (Fig. 13)
e. Toward the end of lamination, tape can be applied over the lamination plate to squeeze out excess resin.

# Panel Preparation and Attachment

The next step in the socket fabrication process is to prep and attach the panels.

1. Cut panels: (Fig. 14)
    a. Remove the socket from the mold and remove the flexible inner socket.
    b. Mark the locations of the panels.
    c. With caution, cut along the lines with a cast saw or Dremel for more precise cuts.
    d. Sand all edges until smooth.

**Fig. 14**

2. Pad panels: (Fig. 15)
    a. Scuff the back side of each panel.
    b. Glue padding to the back of each panel piece.
    c. Pads should be made of a medium-density foam of ~5mm and should be convex with skived edges.

**Fig. 15**

3. Attach panels:
   a. Clear out all tubing of clay and sanding debris. You can put some paper towels on the end of the cable threader and pull it through the tubing several times to clear it.
   b. Tie a single overhand knot into one end of the cable. (Fig. 16)

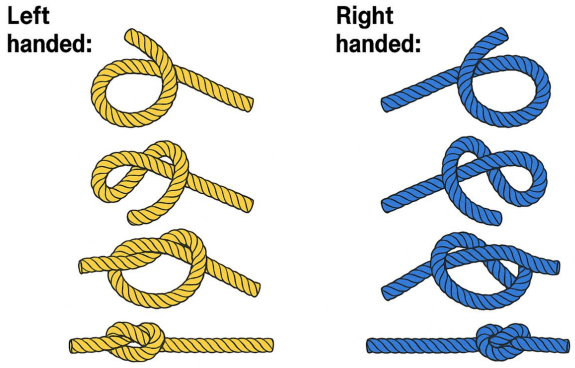


**Fig. 16**

   c. Using the cable threader, feed cable through the socket and panels, starting and ending at the cable tubing insertion port. (Fig. 17)
   d. Use caution to correctly orient each panel.

**Fig. 17**

   e. **Note:** Leave a maximum of 10cm (4”) of excess cable length on each end, cutting off the excess cable. Tie the two ends of the cable together to create a stopper knot. If tying one knot is too large on the spool, you can tie one knot at each end of the cable. (Fig. 18)

**Fig. 18**

# Kinn System Assembly

1. Attach cable to Kinn spool (Fig. 19):
   a. Slide the shock absorber over the cable.
   b. Feed cable through the spool side of the main Kinn assembly.
   c. Loosen and remove the screw on the spool.

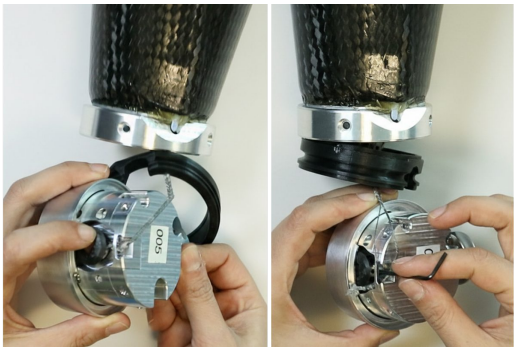

**Fig. 19**

   d. Create a figure-8 with the cable. (Fig. 20)
   e. Fold it over itself to create a loop. (Fig. 21)
   f. Place the cable and knots under the spool screw and then tighten the spool screw. (Fig 22)

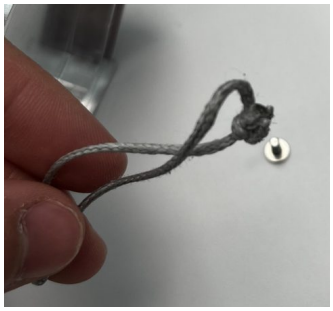

**Fig. 20**

**Fig. 21**

**Fig. 22**

**Note:** Ensure that the cable spool is wrapping around in the correct direction:

- Left lateral/right medial: Attach the cable so it is positioned to the left of the spool. (Fig 23)

**Fig. 23**

- Right lateral/Left medial: Attach the cable so it is positioned to the right of the spool. (Fig. 24)

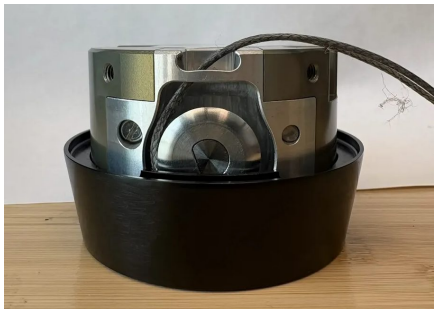

**Fig. 24**

g. Twist the manual dial to pre-wrap 2 rotations of cable onto the spool.
h. Using the cutout at the top of the inner shell, fasten the spool screw onto the spool.

11. Attach the inner shell assembly onto the lamination plate.

a. Ensure the shock absorber dial cutout is aligned with the dial. While holding the shock absorber and the outer shell, withdraw the inner shell to reveal the four screw holes. Push up on the dial to align the inner shell holes with the lamination plate holes. holes with the lamination plate holes. (Fig. 25)

**Fig. 25**

b. Align the inner shell with the lamination plate and proceed to fasten the four radial screws. (Tighten to a torque of 4.5 N·m). (Fig. 26)

**Fig. 26**

12. Use the provided M6 × 1.0 × 10 mm screw to attach the Kinn unit to the pyramid adapter. (Fig. 27)

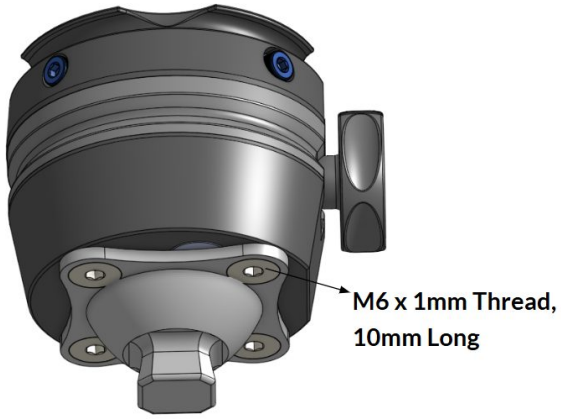


**Fig. 27**

# Kinn Setup

Adjust the volume of the socket in two ways: manually by rotating the Kinn dial (Fig. 28), or automatically by walking. Automatic adjustment relies on a preset tension. Follow the instructions below to adjust the system and preset tension settings.

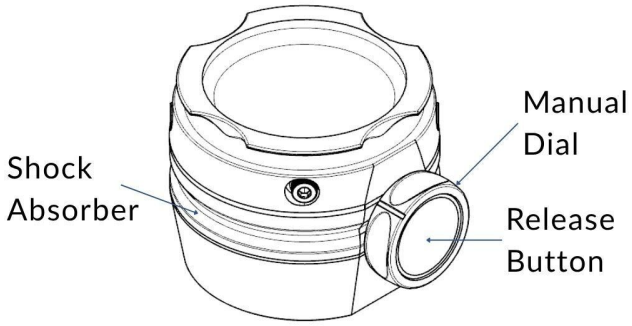


**Fig. 28**

## Manual Socket Panel Tension Adjustment

1. To manually tighten the panels, rotate the dial forward. Warning: the manual dial can tighten the socket panels beyond the maximum tension setting.
2. The release button, when pushed, will disengage the Kinn system and release the tension in the cable, relaxing the socket panels.
3. The manual dial also acts as a visual indicator; it lets you know if the line is being reeled in or not. When the dial stops rotating, the pressure limit has been reached.

Note: The manual dial is intended for fine-tuning the fit upon donning or for temporary adjustments to sudden, significant volume changes. If the patient uses the manual dial frequently, this may indicate that the automatic tension setting needs to be adjusted.

# Tension Setting

The set screw on the distal face of the Kinn system sets the tension level of the socket panels. (Fig. 29) The setting is based on patient and prosthetist preference.

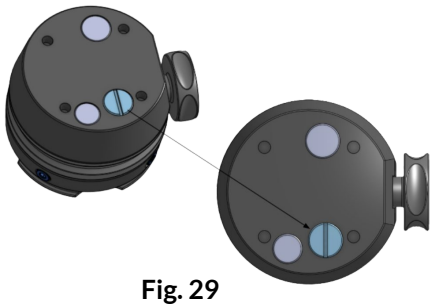

**Fig. 29**

The tension setting can be adjusted using the provided tension setting indicator. (Fig. 30) The tension setting indicator will show you how tight the cable tension is, with lower values indicating a looser fit and higher values indicating a tighter fit.

**Fig. 30**

To set the tension:

1. Attach the tension setting indicator to a screwdriver. Use the indicator to note the initial depth, which serves as a reference (Fig 31).
2. Have the patient don the prosthesis and manually tighten the socket panels by turning the manual dial until the socket is comfortable.
3. Note the location of the notch in the manual dial.

**Fig. 31**

4. Get the patient to stand and walk for 2 minutes. Note the new position of the notch. Have the patient walk 5 more steps.
    a. If the notch position remains the same, the dial is not rotating and the set tension has been reached.

b. If the notch has changed position, the dial is still rotating and the set tension has not yet been reached. Have the patient walk until the notch in the manual dial stops moving.

5. Then, assess the socket fit with the patient.
    a. If the socket is loose, tighten the set screw ½ a turn to increase the set tension limit and repeat steps 2-4. Note the new screw depth with the indicator.
    b. If the socket is too tight, loosen the screw ½ a turn to decrease the set tension limit and repeat steps 2-4. Note the new screw depth with the indicator.

# Use, Maintenance and Troubleshooting

## User Instructions

### Donning Socket

1. Before donning the socket, press the release button and loosen the panels on the socket to allow for easier donning.
2. Slide the limb into the socket and take appropriate steps to secure the suspension system used.
3. Turn the manual dial until the socket panels tighten to the desired level on the limb.
4. Stand and walk. Every step taken will automatically tighten the socket panels until the set tension level has been reached.

### Doffing Socket

1. Sit down and unload weight from the prosthesis.
2. Press the release button on the Kinn system.

3. The panel system should now be loose enough to comfortably doff the socket; additional cable can be pulled out to further loosen the system by pulling on the panels.
4. Remove the prosthesis.

### Manual Dial

- When the panels are completely relaxed (i.e., you have pressed the release button) and you twist the manual dial, it should be easy to twist.
- If the patient has donned the socket and is trying to use the manual dial to tighten the panels against the limb, it is normal that the manual dial is difficult to turn. That is an intentional design feature to ensure the patient does not overtighten the system.

## Maintenance

### Cable Maintenance

- Routinely check for wear or damage; look for broken fibers in the cable around areas of high wear.
- Replace the cable if a significant amount of fibers are broken, and proactively replace the cable every six months.

### Replacing the Cable

1. Remove four radial screws from the lamination plate or 4-hole adapter.
2. While pressing the release button, pull down on Kinn.
3. Remove the cable from the spool by unfastening the screw on the spool and pull the cable out of the tubing.
4. Thread the new cable through the tubing and re-attach Kinn as outlined in the Kinn System Assembly section.

### Replacing the Shock Absorber

If the patient prefers a stiffer or more pliant shock absorber, a replacement shock absorber of a different durometer can be ordered and switched out in the clinic.

1. Remove four radial screws from the lamination plate or 4-hole adapter.
2. While pressing the release button, pull down on Kinn.
3. Remove the line from the spool by unfastening the screw on the spool.
4. Slide off the shock absorber and replace it with a new one by sliding it in place.
5. Reattach the Kinn system as outlined in the Kinn System Assembly section.

## Troubleshooting

### Panel Compression

If the panels do not provide sufficient compression:

- Tighten the distal set screw.
- Increase panel padding thickness.
- If the panels are compressing the limb too much and the patient feels too much pressure, try loosening the distal set screw.
- Ensure the panels are moving as the patient walks; there is a notch in the dial to help check the dial position after the patient walks. If the dial is not moving, detach Kinn and check that the cable is not getting pinched within the Kinn assembly (for example, getting pinched on the spool or where the Kinn assembly connects to the lamination plate).

## Lamination Plate Alignment

- If the holes of the main Kinn assembly are sitting under the shock absorber (Fig. 32a), pull up on the manual dial to unseat the Kinn assembly from the shock absorber (Fig. 32b and 32c) and align the Kinn assembly holes with the lamination plate. (Fig. 32d)

**Fig. 32a**

**Fig. 32b**

**Fig. 32c**

**Fig. 32d**

## Tubing into Lamination or 4-Hole Dummy

1. If the full 0.5” of tubing does not seat fully into the dummy, try trimming the tubing slightly shorter and securing the dummy firmly in place with tape and downward pressure.
2. Ensure the dummy remains stable and flush before proceeding to lamination.

## Attaching the Cable to Spool

1. Fully remove the spool screw, then re-position the cable and knots in place according to the method outlined in the “Kinn System Assembly” section.
2. Apply a small amount of Vaseline to the tip of the allen key to hold the screw steady during reinsertion.

### Valve and Suspension System Selection

- Vessl does not prescribe a specific valve type or locking mechanism, as these will vary based on patient needs and clinical preference.
- If using a pin lock suspension system with the Kinn system, ensure the pin is fully engaged before the patient begins walking.
- If difficulty engaging or disengaging the pin lock is encountered, press the Kinn release button first to relax the socket panels and then retry.
- For guidance on valve selection and compatible locking mechanisms, contact Vessl support.

## Manufacturer Contact Information

Reach out to support@vesslpro.com or call 226-376-1525. Vessl's address is 1300-100 Collip Circle, London, ON, Canada, and you can find more information on our website at vesslpro.com.

Kinn™ Automatic Volume Management System
IFU-0001 Rev 3
Released: 2026-07-16