The Triple Action™ Stance/Swing Control ankle joint provides:

- Independent adjustment features that correspond to the phases of the gait cycle
- Simplification and optimization of alignment and range-of-motion
- Independent alignment adjustment of the sagittal plane ankle angle of ± 10°

**Swing phase**

The 1st rocker spring (RS1) adjusts the plantarflexion resist torque. Spring compression is limited by an internal pin.

The 2nd rocker spring (RS2) has been optimized to slow the progression of the tibia over the foot in mid stance.

The 3rd rocker spring (RS3) adjusts the dorsiflexion resist torque and provides assertive resistance to dorsiflexion in mid to late stance to stabilize the knee. Spring compression is limited by an internal pin.
Pre Ambulation Bench Adjustment Procedure

Check that both RS1 and RS3 are fully tightened to lock the stirrup. Note that over tightening the set screws will result in binding of the component. There should be no motion in the AFO at this stage. If the patient’s weight exceeds 180 lbs., or there is high neuromuscular tone, replace the RS1 spring and pin with the optional high torque spring and pin included with the component. The alignment setting should be set to 0°. Note that 0° alignment corresponds to the fabrication ankle angle of the orthosis.

With the patient standing, check the alignment of the ankle, knee and hip. Weight should be distributed evenly between the hind foot and forefoot. If necessary, re-adjust the alignment setting.

To change the Ankle Alignment Setting (Figure 1), unlock the alignment lock nut by turning CCW, rotate the Alignment Cam to place the AFO in the desired position then retighten the alignment lock nut.

Preliminary Adjustment Procedure

With the patient seated on the exam table, don the orthosis and shoe; fully extend the knee to ensure that the patient has adequate ROM. Adjust the ankle alignment as necessary.

1st Rocker Resist (Initial Setting of RS1): Determine the minimum RS1 setting required to maintain the ankle position against the RS3 stop (to overcome gravity and resting neuromuscular tone) by slowly decreasing the RS1 setting until the ankle moves away from the RS3 stop.

Note: When making adjustments to the RS1 or RS3 settings, always count the number of turns of the adjustment screw away from the locked position.

The RSI setting should maintain the position of the ankle throughout swing phase. If necessary, increase the RS1 torque setting until this is achieved.

Toe Clearance and Position of the Foot at Initial Contact: Observe the clearance of the toes in swing, as well as the position of the foot at initial contact. If there is inadequate clearance of the foot in swing, or the heel does not contact the floor before the toe at initial contact, increase the AS setting towards dorsiflexion in 2° increments until there is adequate clearance for the toes in swing and heel strike occurs at initial contact.

3rd Rocker Resist (RS3 Adjustment Procedure): Resist Setting 3 (RS3) adjusts the dorsiflexion resist torque. To change RS3, place the alignment lock nut wrench (Figure 2) onto the alignment lock nut. Use the T-handle hex adjustment wrench to hold the RS3 adjustment screw while turning the lock nut ¼ turn CCW to permit rotation of the adjustment screw. Rotate the adjustment screw CCW to decrease the torque setting.

Adjusting Knee Stability in Stance Phase

Note that the effect of component settings on knee stability may vary depending upon the nature of the patient’s biomechanical deficits. The RS1, RS3 and AS settings may all influence knee stability through the stance phase of gait depending upon the nature of the patient’s biomechanical deficits. The AS setting may additionally be adjusted to augment torque adjustments and optimize knee stability in stance phase. Changing AS toward dorsiflexion may help to resist knee extension, while changing AS toward plantarflexion may help to resist knee flexion in mid/late stance.

If there is inadequate AS adjustment range, it may be necessary to alter the footwear or fabrication angle of the AFO. If the RS1 or AS settings are adjusted to enhance knee stability, use care to maintain toe clearance and heel strike.

Excessive knee flexion at mid or late stance may be improved by reducing RS1, increasing RS3 and/or changing the alignment setting towards plantarflexion. Note that RS1 and AS may have more influence at mid stance, while AS and RS3 may be more influential in late stance.

Excessive knee extension at mid stance may be reduced by increasing RS1, and/or changing the alignment setting towards dorsiflexion. Note that RS3 may have more influence reducing excessive knee extension in late stance.

Walking

The RSI setting should maintain the position of the ankle throughout swing phase. If necessary, increase the RS1 torque setting until this is achieved.
**Parts Included**

The Becker Triple Action ankle joint Alignment Tool and Fabrication Kits (Figure 1) include the following parts:

1. Alignment bushings
2. Alignment rod
3. Alignment tube
4. Component spacers

**Setting the Ankle Axis in the Mold**

(Parts Required: Alignment rod (2) and Alignment tube (3))

**Step 1. Assemble the Alignment Tool**

• Carefully push the flat end of the alignment rod through the hole in the alignment tube (Figure 2).

**Step 2. Locate the Medial Ankle Joint Axis**

• Drill a hole for the alignment rod through the medial side of the mold at the distal tip of the medial malleolus, or at the desired medial ankle axis location (Figure 3).
• Push the point end of the alignment rod through the hole in the mold until the point contacts the lateral inside surface of the mold (Figure 4).
• Apply slight pressure to keep the point in contact with the mold. Do not push the point through the mold at this time.

**Step 3. Determine the Coronal Ankle Axis Alignment**

• Rotate the alignment tube into the coronal plane (Figure 5).
• Adjust the coronal plane orientation of the ankle axis using the alignment tube as a visual reference with respect to the axis of the mold.

**Step 4. Determine the Tibial Torsion**

• Rotate the alignment tube into the transverse plane (Figure 6).
• Adjust the tibial torsion of the ankle axis using the alignment tube as a visual reference.
• Orient the alignment tube parallel to the medial border of the foot to mechanically-align the ankle axis.
• Orient the alignment rod parallel with the malleoli to anatomically align the ankle axis.

**Step 5. Set the Alignment Rod**

• To set the ankle axis location on the lateral ankle side of the mold, assertively tap the flat end of the alignment rod with a plastic mallet. This will drive the rod point into the lateral side of the mold and indicate the hole location with a bump on the outside of the mold.
• Remove the alignment rod from the mold and drill a hole for the alignment rod through the lateral side of the mold at the specified location.
• Re-insert the alignment rod through the holes in the mold and fill the mold with plaster to produce the positive model (Figure 7).
The component spacer replaces the Triple Action component body and aligns the stirrup and proximal upright for fabrication. The alignment bushing holds the proximal upright and stirrup to the component spacer and slides easily onto the alignment rod for contouring.

Step 1. Disassemble the Triple Action Component

- Loosen, but do not remove, the 1st and 3rd rocker adjustment screws.
- Remove the pivot screw (Figure 8).
- Remove the cam screw.
- Remove the proximal upright from the component body by pulling the pivot bushing, which is lightly pressed into the proximal upright, out of the component body and stirrup.
- Slide the stirrup out of the clevis and remove the damper clip.
- Remove the pivot bushing from the proximal upright by re-installing the pivot screw in the pivot bushing and gently tapping the pivot screw with a plastic mallet to drive the pivot bushing out of the proximal upright. Use care not to damage the pivot screw or bushing during this procedure.

Step 2. Assemble the Fabrication Tool

- To assemble the fabrication tool, first install the alignment bushing in the proximal upright by carefully pushing it through the pivot bushing hole from the mold-side of the proximal upright (Figure 9). The shoulder of the bushing will be closest to the mold when correctly installed.
- Attach the proximal upright to the component spacer by pressing the alignment bushing through the large hole in the component spacer. When correctly oriented, the pin in the component spacer will align with the small hole in the proximal upright.
- Attach the stirrup to the component spacer and proximal upright by pressing the alignment bushing through the pivot hole in the stirrup. The pin pressed into the component spacer will pass through the orientation hole in the stirrup to align the proximal upright with the stirrup. This alignment between the stirrup and the proximal upright corresponds to the 0° alignment setting of the Triple Action component (Figure 10).
- Slide the fabrication tool onto the alignment rod as shown in (Figure 11).

Step 3. Contour the Proximal Upright and Stirrup

- IMPORTANT: The pivot bushing head of the assembled Triple Action ankle joint protrudes 3mm [1/8"] from the proximal upright. When contouring the proximal upright and stirrup, add this head height to achieve the desired clearance between the Triple Action component and the mold. When contouring the proximal upright and stirrup, do not mar or bend the stirrup or proximal upright on the component side of the standard relief contours. Refer to the Triple Action Fabrication Template for additional information.

Step 4. Fabricate the Orthosis

- After contouring the proximal upright and stirrup, secure them to the positive model using adhesive or your preferred method.
- Remove the alignment rod from the mold, leaving the alignment bushing and component spacer attached.
- Cover the stirrup head with foam or other material to prevent damage when the orthosis is cut-away after fabrication.
- Thermoform or laminate the orthosis.
- Establish the desired trim lines using the Triple Action Fabrication Template. Note that the distal trim line of the tibial section should be 50mm [2"] proximal to the pivot bushing and the shape of the anterior distal trim line should provide clearance for the alignment lock nut. The proximal trim line of the foot section should be 30mm [1 3/16"] distal to the pivot bushing.

Step 5. Reassemble the Component

- Remove the alignment bushing and component spacer from the proximal upright and stirrup.
- Clean the proximal upright and stirrup.
- Gently press the pivot bushing back into the proximal upright.
- Prior to re-assembly, lubricate the stirrup head and damper clip using Teflon grease.
- Re-assemble the component (Figure 8).
- Ensure that the damper clip is correctly oriented in the clevis prior to inserting the stirrup head into the clevis.
- Secure the pivot screw and cam screw using a small amount of thread locking adhesive.

Step 6. Assemble the Orthosis

- After assembly, attach the component to the orthosis using the provided machine screws.
- Apply thread locking adhesive to all machine screws before delivery.

NOTE: The RS1 and RS3 set screws, do not require thread locking adhesive.