

ENDOLITE

Instructions for The Endolite Four Bar Knee Disarticulation (E4BKD)

A four bar linkage mechanism designed to provide an artificial knee joint for a knee diarticulation lower limb prosthesis during normal locomotion.

To be fitted as part of an Endolite modular limb system.

019136 Four Bar Knee with PSPC (with tube and alignment)

019336 Four Bar Knee with SAKL (with tube and alignment)



Maximum amputee weight when used during normal walking

**Section 1
Section 2
Section 3
Section 4
Section 5**

**Limb Build
Static Alignment
Adjustments
Maintenance
Finishing Cosmesis**

Four Bar Knee Disarticulation

This manual describes limb build, setting up, alignment, maintenance and finishing the Cosmesis for the ENDOLITE E4BKD Unit (The Four Bar Knee Disarticulation)

TOOLS REFERRED TO:

NUMBER DESCRIPTION

| | |
|--------|-------------------------------|
| 940250 | T-HANDLE WRENCH KEY 2.5 AF |
| 940248 | T-HANDLE WRENCH KEY 2.0 AF |
| 940054 | PEG SPANNER, 2 OFF REQUIRED |
| 940057 | TORQUE WRENCH AND ADAPTOR KIT |

MATERIALS REFERRED TO:

| | |
|--------|-------------------------------------|
| 926001 | LOCTITE 222 |
| 926005 | LOCTITE 638 |
| 909507 | VELCRO SELF-ADHESIVE HOOK TAPE 20MM |
| 909514 | VELCRO NON-ADHESIVE LOOP TAPE 50MM |
| 909508 | VELCRO SELF-ADHESIVE LOOP TAPE 20MM |
| 930002 | TUBIGRIP |
| 561023 | FAIRING - UNSHAPED - LONG |
| 561024 | FAIRING - UNSHAPED - SHORT |

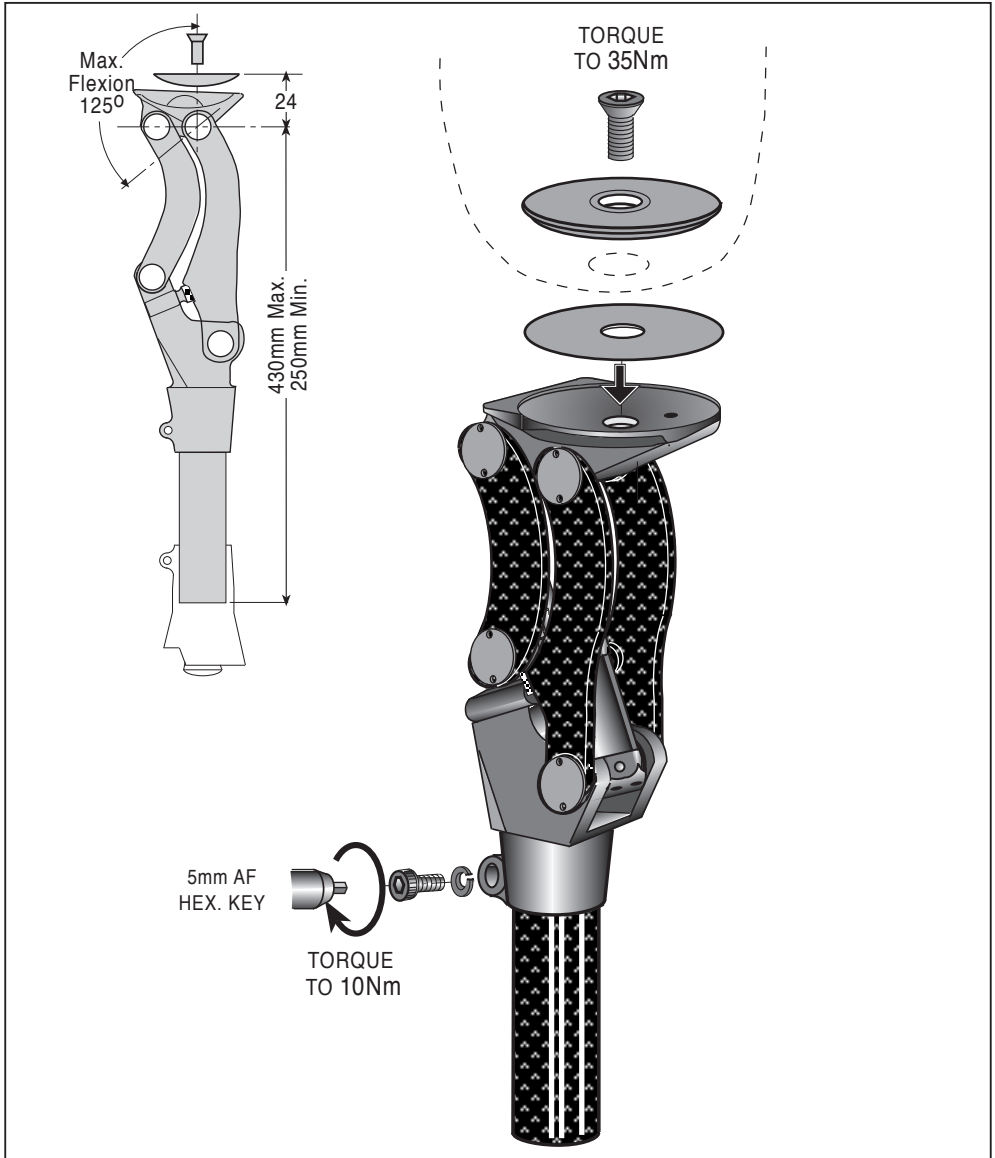
IMPORTANT:-

1. **Hazardous and Inflammable Products**
In accordance to COSHH regulations, Safety Data Sheets are available on request for all products referred to in these instructions.

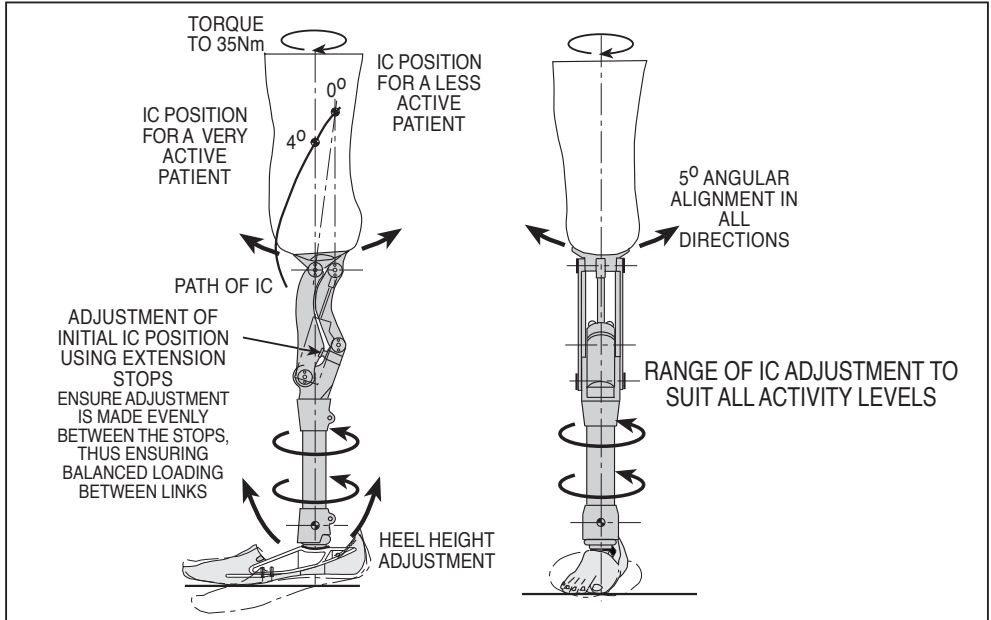
FOUR BAR KNEE DISARTICULATION

The user/attendant should be aware of potential finger trap hazards at all times.

Section 1: Limb Build



Section 2: Static Alignment



Section 3: Adjustments

Adjustment of Stability

Set initial position of Instantaneous Centre of Rotation (IC) to suit activity level of wearer by adjusting the two red extension stop screws.

Both screws must be adjusted equally to ensure that loads are taken equally by the two anterior links. Use tool 940250.

IMPORTANT

When a SAKL Unit is used, stability of the 4 Bar Mechanism is not a primary consideration. In this case, the two adjuster stops should be backed off to allow the SAKL to go into lock with the rear links of the 4 Bar Mechanism vertical, and the Extension Stops evenly readjusted.

THIS IS IMPORTANT as it is these stops which take the extension load, not the SAKL.

As a guide, the most stable position is with top pivot of the posterior links directly over the lower pivot (i.e. posterior links vertical); this position will be suitable for less active wearers.

For wearers who require reduced stability, the posterior links may be angled slightly forward in order to gain a freer walking action (see diagram)

Socket Alignment

After the most comfortable position of the IC has been set, it may be found necessary to re-establish the flexion angle of the socket. This is accomplished by loosening the socket attachment screw and tilting the socket to suit.

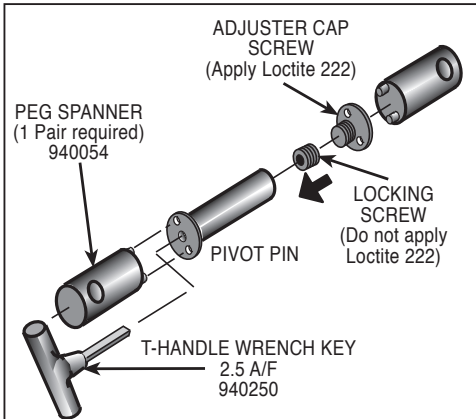
NB. Prior to final alignment of the socket apply Loctite 222 (926001) to the socket attachment screw. Once socket alignment is complete, torque tighten to 35Nm. Torque tighten cradle/shin attachment bolt to 10Nm.

IMPORTANT

Before assembling the socket, ensure that the distal end thickness is a minimum 5mm and maximum of 6mm thick.

FOUR BAR KNEE DISARTICULATION

Section 3: Adjustments continued



Typical Pivot Pin Arrangement

Removing Side Play between Links and Pivots

Before any adjustments can be made there are a number of LOCKING SET SCREWS to be removed, using TOOL 940248. These are denoted by **A** in the diagram on Page 5.

- 1 - off in TRUNNION OF PSPC (NB none in SAKL)
- 2 - off in CHASSIS
- 1 - off in CRADLE

Loosen the ADJUSTER CAP INTERNAL LOCKING SCREW (using tool 940250), which is accessed via the hole in the pivot pin.

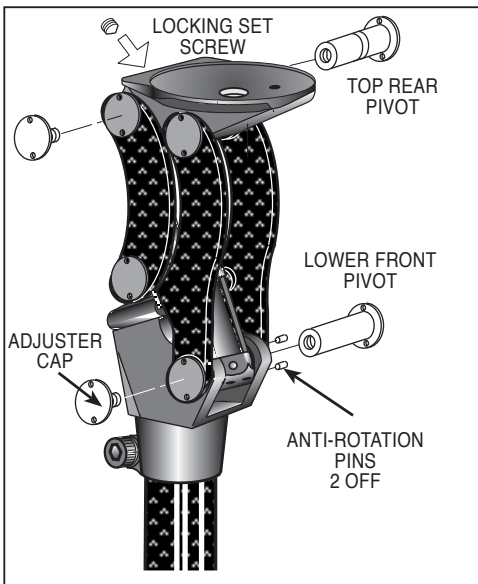
Ensure the internal locking screw rotates independently of the pivot pin. Using PEG SPANNER 940054, tighten ADJUSTER CAP SCREW to eliminate side play with nominal increase in friction in the pivot then retighten INTERNAL LOCKING SCREW.

Suggested order:-
FRONT BOTTOM
FRONT TOP
REAR TOP
REAR BOTTOM

in each case tightening the internal locking screw before moving to the next pivot.

Apply Loctite 222 to all PIVOT PIN LOCKING SET SCREWS (A), refit and tighten.

Section 4: Maintenance



Removal and Refitting of Knee Controls

Loosen the LOCKING SET SCREW in the top trunnion of the KNEE CONTROL UNIT with TOOL 940248, if applicable. Loosen the ADJUSTER CAP INTERNAL LOCKING SCREW in the TOP REAR PIVOT SHAFT, using PEG SPANNER 940054 located in the ADJUSTER CAP to prevent rotation. Using a SECOND PEG SPANNER located in the PIVOT SHAFT, unscrew the ADJUSTER CAP and withdraw the SHAFT. (Refer to Typical Pivot Pin Arrangement).

Note and collect the 6 OFF THRUST WASHERS on this assembly.

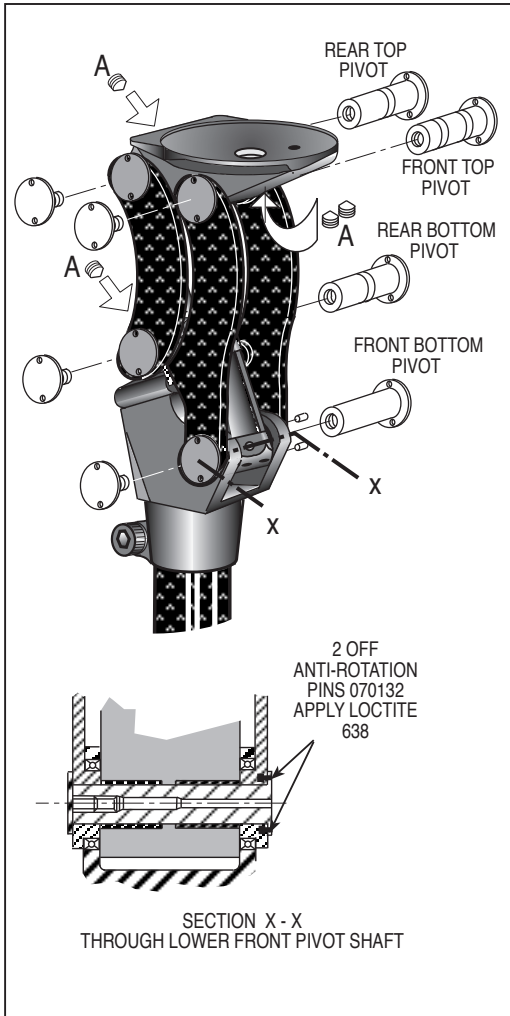
Repeat this procedure for the LOWER FRONT PIVOT SHAFT, but in this case note there are 4 OFF THRUST WASHERS (none between links, pivot shaft and adjuster cap).

Remove the KNEE CONTROL UNIT.

Clean parts and reassemble in reverse order ensuring that appropriate THRUST WASHERS are positioned on both SHAFTS. Apply one drop of Loctite 222 to thread of ADJUSTER CAP only, tighten and adjust both shaft assemblies as described in **ADJUSTMENT OF SIDEPLAY**. Retighten all LOCKING SCREWS.

NB. The sequence of removal, refitting operations is not important.

Section 4: Maintenance continued



Removal and Replacement of Carbon Fibre Links

NB Links should only be replaced as a set of four (Kit 239931).

Remove all **FOUR PIVOT PINS** following the procedure described in **REMOVAL AND REFITTING OF KNEE CONTROL UNITS** and discard the **FOUR CARBON FIBRE LINKS**.

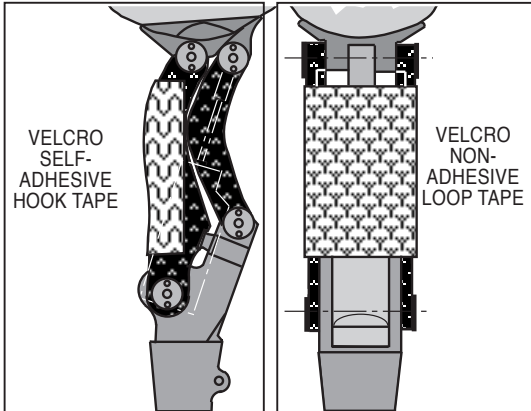
Fit 2 off **ANTI-ROTATION PINS 070132** to **NEW FRONT LOWER LEFT HAND LINK** using the minimum amount of **LOCTITE 638 (926005)**.

Reassemble in reverse order, using **NEW CARBON FIBRE LINKS**, as previously described in **REMOVAL AND REFITTING OF KNEE CONTROL UNITS**.

Adjust **SHAFT ASSEMBLIES** as previously described in **ADJUSTMENT OF SIDEPLAY BETWEEN LINKS AND PIVOTS**.

FOUR BAR KNEE DISARTICULATION

Section 5: Finishing Cosmesis



STAGE 1

Ensure that the SOCKET ATTACHMENT, CRADLE and ANKLE ATTACHMENT BOLTS have been torque tightened as required.

STAGE 2

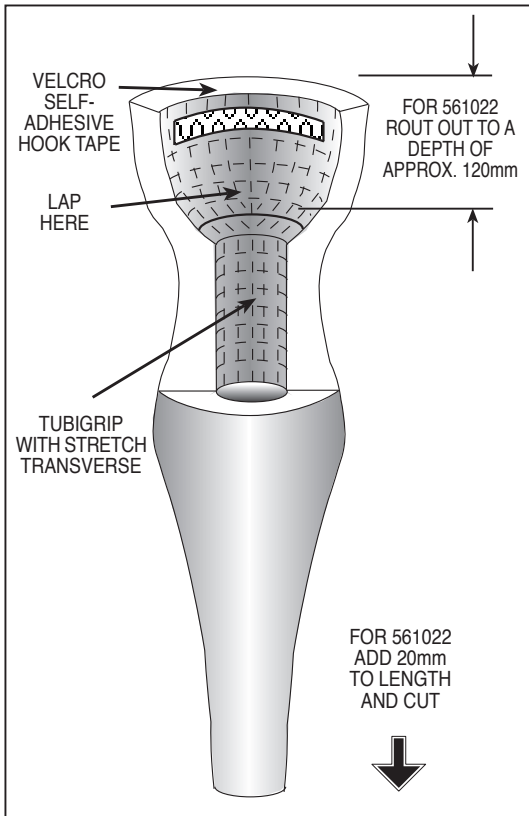
Remove the foot.

STAGE 3

Attach a length of self-adhesive VELCRO HOOK TAPE, 20mm wide (909507) to the outside of each ANTERIOR LINK. Flex the limb and fit non-adhesive VELCRO LOOP TAPE, 50mm wide (909514) across the front of the 4 BAR UNIT. This is to support the cosmesis. See diagram.

STAGE 4

Prepare ANKLE FAIRING as normal.



STAGE 5

Select either UNSHAPED LONG FAIRING (561023) or UNSHAPED SHORT FAIRING (561024).

For 561021, rout internal circumference to match sockets.

Determine the required heights of the fairing, add 40mm to proximal and cut to suit.

For 561022, rout out internal proximal diameter to a depth of 120mm. Measure from end of socket to ankle. Transfer this measurement to the cosmesis add 20mm and cut to length.

STAGE 6

Reinforce the inside lower diameter of the cosmesis to the bottom of the mechanism cavity with TUBIGRIP (930002), then stretch going transverse as shown in the diagram. Reinforce internal knee area with TUBIGRIP, stretch going longitudinal. Bond with THIXOFIX.

NB.

With long fairings, it is advisable to attach a length of TUBIGRIP down the inside anterior area of the fairing. This will reduce any frictional noises between socket and fairing.

STAGE 7

Fit the cosmesis to the limb, add VELCRO (909507) to the socket A-P, attach FOOT and ANKLE COSMESIS as normal and shape to size. Finish with one or two under stockings and a final fabric stocking.

Maintenance Instructions for the Four Bar Knee Disarticulation

No specific maintenance is required of this device; however in normal service an Endolite limb should be inspected annually to check for correct function, lubrication and security of assembly.

THE WEARER TO BE ADVISED

1. Any changes in performance should be reported to the practitioner.
2. Do not hold mechanism whilst in operation, potential finger trap hazard.

STORAGE AND HANDLING

No special storage or handling requirements are associated with this device.
Use product packaging supplied.

ENDOLITE

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