

## TECHNICAL LITERATURE RSL STEEPER MECHANICAL HANDS – ADULT SIZES 3¼", 3", 2¾"

The hand is constructed with a plastic base (except the 2½" size which is aluminium alloy) onto which a pressed metal chassis is attached. Finger units, which carry integral bearings are mounted on this chassis and are controlled by a linkage. This linkage is driven by a spring loaded pulley which is in turn controlled by a pulley which is in turn controlled by a pull cable. An arrangement is provided to allow the hand to be positively locked in the closed position.

### **DELIVERY INSTRUCTIONS**

- Fasten the handplate (wrist attachment fitting) to the hand using the three self tapping screws provided (No: 6 x ½").
- Lock the handplate into the wrist unit on the prosthesis.

### **The operating cord must now be set to length.**

- With the amputee standing and the prosthesis held vertically downward against the side of the body, the operating cable termination will usually lie against the prosthesis at a point slightly above the wrist unit.
- The method of cable attachment is now selected. This will either be a loop in the cable, locked by a ferrule (UK), or a ball termination (**USA and EUROPE**).
- When the cable is attached to the hand and the position of the prosthesis described with the cable is not quite in tension.
- The cable attachment is now crimped into position using the appropriate tool.
- The amputee is then asked to operate the hand a few times to test the force required and the pitch force available.
- If the performance of the hand is adequate then the cosmetic glove should be fitted as described. The hand is now ready for use. If the grip force has to be altered, please refer to the instructions.

### **GENERAL NOTES**

- When the hand is not normally to be detached from the prosthesis, the cable from the hand may be left long so that it can run under the glove and terminate with the operating system high on the forearm. If however the hand is frequently interchanged with functional devices, then a small round hole should be punched in the glove at the cable exit from the hand and the cable terminated as described in (1) and (2) above.
- If a complete prosthesis is being manufactured for use with this type of hand, it is important to position any external wrist controls so that they do not foul the operating cable when the hand is positioned in its desired range of wrist rotation.
- For ease of hand removal, it may be convenient to trim the glove to about ½" (10mm) proximal to the wrist face.
- A carrying lock is provided which engages when the hand is fully closed and no tension exists in the operating cable.

### **ADJUSTMENT OF THE SPRING CLOSURE FORCE (the 2½" hand cannot be adjusted).**

The RSLSteeper Mechanical Hands are provided with a facility for adjustment of the grip force. The spring which provides the hand closure force is wrapped around a spacer which is mounted on the pulley spindle. Tangs on the spring act against a series of pegs fitted to the chassis and to a single peg on the pulley. Adjustment of the closure force is carried out by changing the spring location on the chassis pegs. To determine what is appropriate for an individual user the hand plate must be attached and the operating cable set to length. The cosmetic glove must not be fitted at this stage. The hand will be supplied set at 'standard'. If an increased setting is required the following procedure must be followed.

- Remove the hand from the prosthesis
- Remove the cosmetic glove (if fitted).
- Remove the handplate (wrist attachment fitting) taking care to save the screws.
- Gently warm the hand cover with a hot air gun and slide it gently back over the hand base.

### **Hand with front (palmar) pull.**

- Place the hand on the workbench, palmar side downward
- Hold the hand firmly with the thumb on the dorsal finger surface.
- Using a screwdriver with a notch in the blade, lever the arm of the main drive spring off its peg and slowly lift towards the peg which is located to the base of the hand. Use the upper surfaces of the finger mouldings as a fulcrum.
- When the tip of the spring is clear of the chassis plate it is captured on the tool tip, lifted over and rested on the rear peg.
- Refit the handplate and retest on the prosthesis.
- If the grip is now satisfactory, refit the hand shell and a cosmetic glove (see instructions).

### **Hand with back (dorsal) pull.**

Place the hand on the workbench, palmer side downward.

- Hold the hand firmly across the dorsal surface of the fingers.
- Using the base of the cable guide as a fulcrum and using the tool described in 4.3, lever the arm of the main drive spring off its peg and capture it on the tool tip.
- Lift the arm onto the peg nearest to the base of the fingers and rest it in position.
- Refit the hand plate and retest on the prosthesis.
- If the grip is now satisfactory, refit the hand shell and a cosmetic glove (see instructions).

### **CONVERSION TO BACK PULL VOLUNTARY CLOSING**

The RSL Steeper range of mechanical hands is designed for voluntary opening but a simple conversion enables it to be changed to voluntary closing if this is desired. It is available in back or front pull versions, dependant on the choice of cable system.

- Gently heat and remove the palm case.
- Relieve the tension on the main coil spring.
- Remove the circlip from the end of the pulley pivot pin and push out the pulley pin.
- Remove the main coil spring.
- Reverse the direction of the cable around the pulley.
- Fit a reversed coil spring, B19306 left or B19307 right.
- Refit the pulley pivot pin and secure it with the circlip.
- Remove the plastic cable guide (two screws) from the medial position and re-position on the lateral side using the existing tapped holes.

NOTE: On the 2.5" hand it may be necessary to remove material from one side of the plastic guide to allow correct alignment with the existing holes.

### **FITTING A PVC COSMETIC GLOVE TO THE RSL STEEPER MECHANICAL HAND**

- Lightly lubricate the fingers, thumb and palm case. If talc is used to be sure to remove any surplus, since powder in the hand mechanism must be avoided.
- Mount the hand vertically in a suitable jig.
- Warm the glove for about three minutes, using either a domestic hair drier, a hot gun or an oven set on minimum. Take care to avoid localised overheating. NOTE: DO NOT USE A NAKED FLAME.
- With the hand in the closed position pull the heated glove over the hand, manipulating it carefully to avoid excessive stretching.
- When the tips of the fingers have entered the palm of the glove, the hand should be partially opened. This will allow the glove to be pushed down over the fingers and the thumb.
- The glove should fit closely over all fingers and the thumb. It should cover the hand, and when fitted to be prosthesis, extend up the forearm without wrinkles, folds or bridging. Areas of stretch, formed during the fitting process can be removed by careful application of local heating.
- The top of the glove can be trimmed back as desired taking care to avoid damage to the operating cable.

NOTE: If an exit hole is required for the operating cable, it is important that this is punched cleanly. A ragged hole made by piercing or cutting will lead to premature failure.

## MAINTENANCE INSTRUCTIONS

- Remove the cosmetic glove. The gentle application of heat from a hot air gun will make the glove pliable. It can then be cut off if damaged or carefully removed.
- Remove the hand plate by releasing the three retaining screws.
- Remove the palm case retaining screws. After heating gently, slide the palm case off over the base of the hand.
- Removal of the pulley assembly.
- Note the position of the main spring (4) before disassembly.
- Carefully release the spring arm from the peg (1,2,3).
- Remove both circlips (6) from the pulley spindle (7).
- Remove the main spring (4) and the bush. Swing the pulley assembly clear of the main frame.
- Remove the circlip from the pulley (5) and the drive link.
- Removing the cable
- Remove the cable from the assembly, first cutting of the ferrule or ball end.
- Re-assembly
- Reassemble in reverse order using a new cable assembly (8)
- It is advisable to clean all parts in a paraffin wash. On reassembly lightly grease the spindle (7) bush (9) and spring (4).
- It is recommended that new circlips (6) are used on re-assembly.

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