



fabrication instructions



Axis Locking Shoulder Joint Models:

1. SJ90 BK exoskeletal with mechanical lock

SJ100 BK endoskeletal with mechanical lock (not shown)

SJ92 BK exoskeletal with electric lock (not shown)

SJ102 BK endoskeletal with electric lock (not shown)

HARDWARE

2. SJ64 Mounting Ring

Screws

- 3. M3 x 20mm Mounting Screws
- 4. M3 x 30mm Mounting Screws

Allen Wrenches

- 5. 0.050" Hex key
- 6. 0.062" Hex key
- 7. T10 Torx key
- 8. 0.156" Hex key
- 9. 3mm Hex key



- 1. SJ63 Straight Mounting Plate
- 2. SJ60 3 Spoke Mounting Plate
- 3. SJ43 Lock Release Kit
- 4. SJ45 Nudge Kit

PRE-PROSTHETIC ASSESSMENT

- 1. Determine optimal interface and frame design.
- 2. If considering myoelectric prosthetic control, evaluate & determine if sites are available.
- 3. Establish shoulder mounting location and humeral plate offset or straight mounting angle.
- 4. Attempt to match contralateral side measurements for horizontal and vertical alignment.

PATIENT IMPRESSION CASTING

- A mannequin is shown for instructional presentation. Using plaster bandage or fiberglass tape, cast patients' amputated side.
- 2. Prepare negative impression for positive model



CREATING POSITIVE MODEL

- Mix plaster and fill the casting and position a ³/₄" steel pipe into the model for holding in a vice.
- 2. Determine appropriate anatomical position for shoulder joint. Measure and mark vertical and horizontal lines for mounting location. Include shoulder joint and frame thickness when establishing dimensions from mid-line.
- 3. Delineate the interface trim lines on the model for optimum comfort, range of motion, and stability.



PREPARATION FOR LAMINATION

Place circular mounting ring on the model and mark center location including the attachment screw holes.

Note: Ensure the vertical mounting plane for shoulder has a slight inward angle to prevent humeral section contact with the inner socket region. Sketch an outline of socket trim lines on model.



FABRICATE SOCKET

 Cover model with nylon stretch stockinette. Transfer shoulder joint position onto fabric. Use temporary adhesive tape to attach mounting ring.



2. Cover model with second layer of stretch nylon. Maintain mounting ring location, apply inner PVA bag.



 Layup model with approximately 2-3 layers of carbon braid and in-between with 2-3 layers of nyglass stockinette.



- Apply outer PVA bag and prepare for vacuum application of thermosetting resin.
- 5. Apply resin and allow to cure.



6. Separate frame from model, sketch trim lines, cut and trim to finish dimensions.



 Remove mounting ring from model and position inside frame. Mark location of all mounting holes. Check exterior mounting surface is flat, sand if as necessary.





 Drill (12) 0.125 in. dia. holes for M3 screws and 0.5 in. dia. center hole. Deburr center hole to prevent damage to wiring.



ATTACH SHOULDER TO FRAME

1. Install mounting ring inside frame.

Note: Counter sunk holes need to face inward.



 Start with the shorter M3 x 20mm mounting screw. Insert through mounting ring.



 Check screw protrusion is .45 in to .55 in. Cut screws to length if too long. Avoid use of longer 30mm mounting screws unless frame thickness requires use.



 Position the shoulder on the frame. Orient lock mechanism to point straight downward or slightly forward.



 Install (3) screws through mounting ring and frame into the shoulder. Tighten securely to approximately 9 inch lbs. torque. (1 Nm)



 Unlock the shoulder and test it rotates freely. If not, loosen screws to see if they prevent rotation.



 Remove and cut screws if necessary to prevent jamming.

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 Install remaining (7) screws for total of (10). Secure to 9 inch lbs. torque. (1 Nm) Ensure shoulder rotates freely.



DETERMINE BUILD HEIGHT AND ALIGNMENT

(Exoskeletal models SJ90 BK and SJ92 BK only. For Endoskeletal models SJ100 BK and SJ 102 BK, refer to Espire Endo Adapter Technical Instructions.)

 Determine humeral section length from center axis of shoulder joint to center axis of elbow. Decide if the 35 degree offset plate or straight plate creates the optimal cosmesis and alignment. Include the minimum build height of elbow 1.75 in.



 Fashion a humeral replication sleeve using your preferred material. This example uses 1mm polyethylene sheeting.



 Position replication sleeve over the Lamination collar and temporarily attach. Make sure anti-rotation pin is in the ANTERIOR position, to align with front of humeral section.



4. Temporarily attach shoulder exoskeletal mounting ring to the sleeve. Measure and mark location to achieve desired length (minus elbow build height).



5. Attach humeral section to elbow. Secure lamination collar clamp and check alignment in the Sagittal and Frontal planes.



- Check elbow attachment angle. Avoid positions resulting in pre- extension or pre-flexion exceeding 5°.
- Carefully attach the arm to the shoulder and verify measurements are acceptable.



8. Remove arm, detach humeral section.

EXOSKELETAL HUMERAL FABRICATION

(Models SJ90 BK and SJ92 BK only.)

Lamination Dummy and Collar

The silicone lamination dummy must be used during the test fitting and fabrication processes to protect the lamination collar from excess rigid foam or resin.

Note: The lamination collar is made from nylon. Do not apply direct heat or exceed temperatures of 150°F (65°C).

Contact College Park if you require an extra lamination collar to use during test socket fittings.



 Apply silicone glue, silicone grease or a petroleum release agent to the inside area of the collar to prevent bonding of resins and rigid foam on the inside collar and escape underneath the silicone protected edge.



 Reattach lamination collar and fill humeral section with plaster or rigid foam. Position ³/₄" steel pipe at either end depending on preference.



3. Sculpt and modify to shape. Flatten area where humeral plate attaches.



 If necessary, shorten or modify the humeral plate to fit the humeral section. Drill additional holes or add notches on the humeral plate to allow for resin saturation.



 Position humeral plate on positive model. Mark location to achieve appropriate length. Modify and recess humeral plate into model for a smooth exterior finish.



 Continue shaping model through axillary region to obtain full range of motion and to prevent impingement of clothing.



- Apply inner PVA bag. Then add carbon braid or tubular stockinette to achieve a lightweight strong lamination. In this case we used 2X layers carbon braid with a finished stockinette.
- 8. Protect the humeral mounting screw area with silicone glue or tape.



9. Sandwich the humeral plate between layers.



10. Apply outer PVA bag and lamination process.



11. Allow resin to cure.



 Remove lamination dummy, then remove inner plaster or foam.



13. Clean any masking or resin from lamination collar.



 Trim to finish dimensions and make an access hole at the top for cables to pass through.



ROUTING CABLES THROUGH THE SHOULDER JOINT

(Exoskeletal models SJ90 BK and SJ92 BK only. For Endoskeletal models SJ100 BK and SJ102 BK, refer to Espire Elbow Endo Adapter Kit Technical Instructions.)

Both input and output wires are routed through the center of the shoulder joint.



If using shoulder joint with electric lock (SJ92 BK), a hole entering the socket must be provided for the lock output wire.



INSTALL TRUSIGNAL AC ELECTRODES

1. 2 Site AC myo wire harness and electric ground wire harness.



 Route wire harness plugs from inside of socket through center of shoulder joint.

Note: TruSignal boards do not fit through center of shoulder joint.



 Insert electrode wires through access hole made in humeral section.



4. Route the wires over top of yoke plate and through center of shoulder to inside of frame.



5. Lay wires in the center channel of yoke plate. Align humeral section exoskeletal attachment plate.



 Install (6) 4 x 40 in Humeral Screws. Torque to 5 in-lb (0.5 N-m).



7. Check wires move freely at center of shoulder.



INSTALL OTTO BOCK ELECTRODES

 Route blue/gray cables in same manner as Trusignal AC electrodes.



 Align exoskeletal plate with shoulder yoke. Install (6) 4 x 40 in Humeral Screws. Torque to 5 in-lb (0.5 N-m).



 Install electrodes in frame liner in accordance with manufacturer's instructions.

SHOULDER REGION CLEARANCE (AXILLARY AND THORACIC)

Verify there is clearance with rotation and abduction/adduction at the shoulder joint, between shoulder lock button and humeral section.



LOCK RELEASE POSITION

Lock button position relative to frame front.



ATTACHMENT TO ESPIRE ELBOW

1. Attach cables to input board.

Refer to Espire Elbow Technical Manual - Pro and Hybrid for detailed information.

2. Connect the Espire Elbow to the prosthesis using the clamp ring.

Refer to Espire Elbow Technical Manual - Pro and Hybrid OR Espire Elbow Technical Manual - Classic Plus, Classic and Basic for detailed information (available at college-park.com).

REFERENCE IMAGES

SIDE VIEW



FRONT VIEW



REAR VIEW



TECHNICAL ASSISTANCE / EMERGENCY SERVICE 24/7/365

College Park's regular office hours are Monday through Friday, 8:30 am - 5:30 pm (EST). After hours, an emergency Technical Service number is available by calling the main line.







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