

## ***Post-Paint>Fuselage>Fit rudder, elevator and elevator trim***

### **Objectives of this task:**

To fit the rudder, and elevator and elevator trim assembly to the empennage.

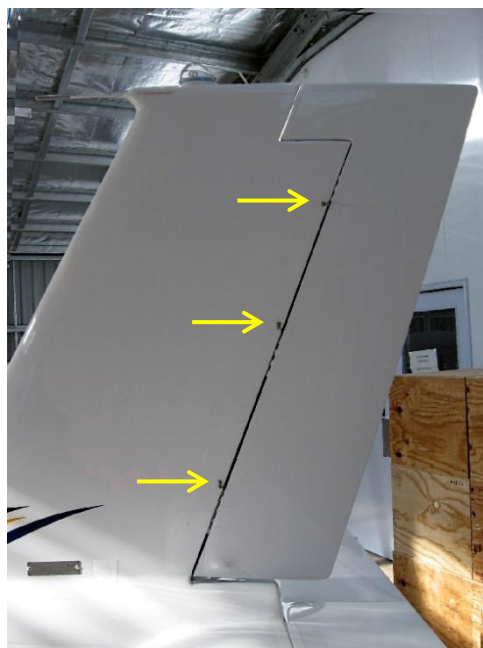
### **Fit the rudder**

Hold the rudder up to the vertical fin and fit it into place with the hinge pins: the top pin will be fitted up through the hinge from the bottom while the 2 lower pins will be fitted down from the top. Check for free movement of the rudder from stop to stop.

Locate the ends of the hinge pins in the retaining slots and secure each pin in place with pin retainers – the locations are arrowed at right.

Each pin retainer will be held in place with a 5/32" machine thread screw.

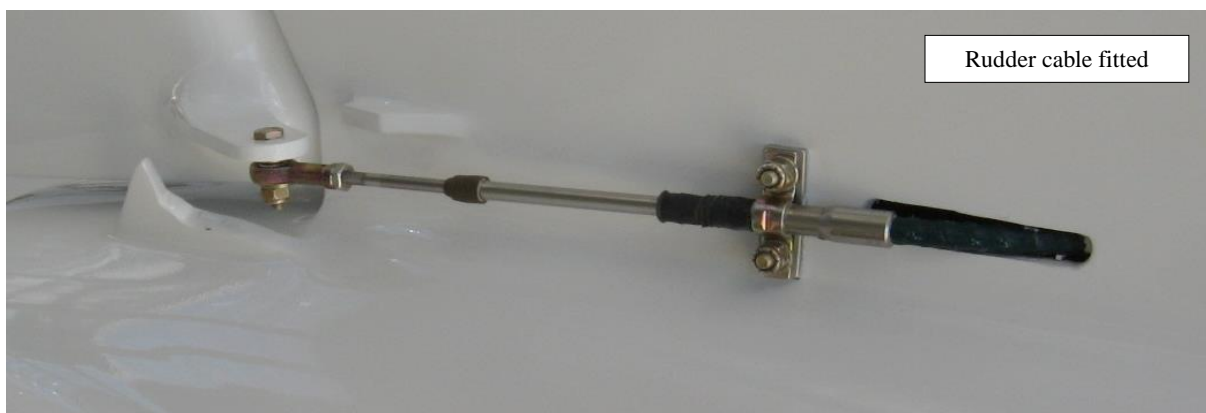
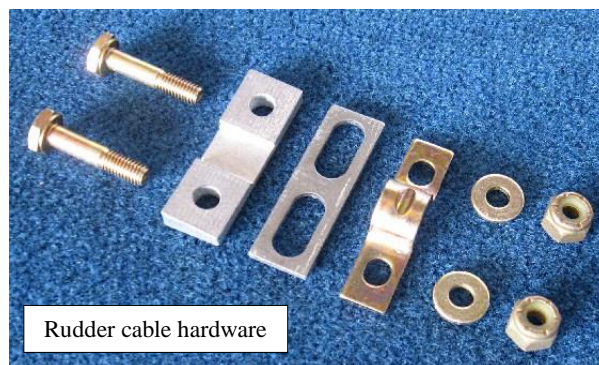
Mark each retainer screw with *TorqueSeal*.



### **Connect the rudder cable**

Withdraw the rudder cable from the slot at the base of the vertical fin and pull it out until the locating groove in the outer cable is level with the 2 mounting bolt holes in the side of the fin.

Clamp the outer cable to the fin with 2 x AN3-6A bolts fed from inside the fin, then the angled aluminium plate with the narrow side facing the front of the aircraft, the clamp backing plate, the saddle clamp (taking care to locate the locating key on the saddle clamp in the locating groove in the outer cable), then flat washers and Nyloc nuts, all as shown in the photo below.



Fit the rod end to the rudder drive arm with an AN3-8A bolt fitted from the top and down through the drive arm, then an AN960-416 (3/16") flat washer, then the rod end followed by an AN960-515 (1/4") flat washer and a Nyloc nut as shown above.

Tighten each Nyloc nut to safety and mark the end of each nut with *TorqueSeal*.

### Adjust the rudder travel



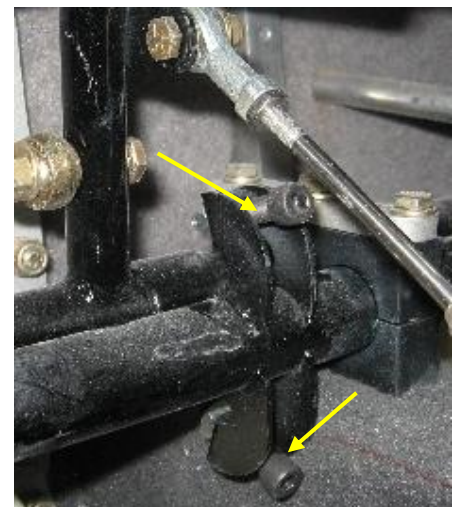
Make a template that will sit over the rear of the empennage and tape it in place. Find the centreline of the fuselage and mark a 5mm offset to the **right** of the centreline onto the template, then mark **78mm** each side of that offset mark as shown in the photos above.

Place a saw stool under the front of the fuselage to lift the nose wheel off the ground and then adjust the rudder cable length so that the rudder sits on the 5mm right mark with the rudder pedals centred, with the pedals all level. Lock both rod end lock nuts firmly and mark each one with *TorqueSeal*.

Now use the rudder pedal adjustment set screws (shown arrowed at right) to adjust the rudder travel so that the rudder deflects *exactly* 98mm to each side of the offset centre mark as shown in the photos above.

When this has been done tighten up both of the lock nuts firmly and mark each one with *TorqueSeal*.

The rudder is now adjusted.



Rudder pedal adjustment detail

### Fit the elevator

Hold the elevator up to the horizontal stabiliser and fit the hinge pins in place: all pins are fitted by pushing them in from the outside of the hinge and towards the rudder.

Check for free movement of the elevator from stop to stop.

Locate the ends of the hinge pins in the retaining slots, push the trim lever on the console fully forward and then apply a length of *Wotan* cloth tape to the top of the gap between the elevator and the horizontal stabiliser as shown at right, pressing the tape over the top of the hinge pins so that they break through the tape surface. Use one length of tape on each side of the tailplane, make sure that there are no wrinkles and press the tape firmly down.

Secure each hinge pin in place with pin retainers.

Each pin retainer will be held in place with a 5/32" machine thread screw.

Mark each retainer screw with *TorqueSeal*.

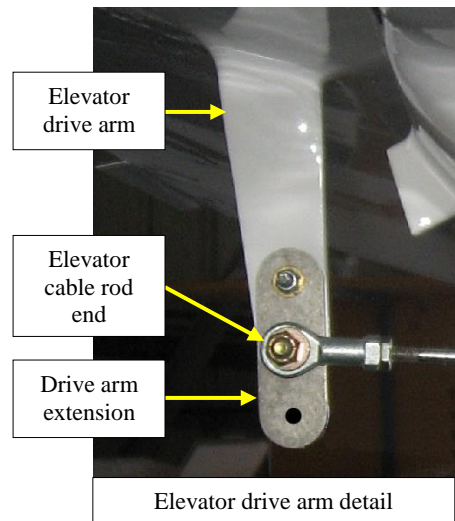


## Connect the elevator cable

Fit the drive arm extension to the elevator drive arm: secure with an M4 x 25 bolt, washer and Nyloc nut through the top hole. Tighten firmly and trim off any excess bolt length.

Fit the elevator cable rod end to the elevator drive arm with an AN3-10A bolt fitted through the lower hole in the elevator drive arm and the centre hole in the drive arm extension. Fit an AN960-416 (3/16") flat washer, then the rod end followed by an AN960-515 (1/4") flat washer and a Nyloc nut.

Do not tighten the Nyloc nut or the rod end lock nut until the cable length has been adjusted in the next step.



## Adjust the elevator travel

Use the supplied deflection templates to check the up and down travel of the elevator.



Hold the control stick all the way forward (have someone help you) and check the amount of down deflection and adjust the cable length (by screwing the rod ends in or out an equal amount at each end of the cable) until the down deflection is correct.



Now have your helper hold full back stick and check the amount of up deflection: it should be very close to correct if the down deflection is OK, however you may need to make some fine adjustments to equalise elevator travel until both up and down deflections are correct. The elevator must clear the rudder and the down stop by 2mm at full deflection. Recheck the up and down deflections and then lock the rod end lock nuts at each end of the cable and mark each rod end lock nut with *TorqueSeal*. The elevator is now adjusted.

## Assemble and fit the elevator trim assembly

Refer to the drawing on the next page: Assemble the trim pivot: press the 2 sealed bearings into the hub and then pop rivet the assembly together. Assemble the trim spring unit, adjust the rod end to almost full thread depth and tighten the lock nut.

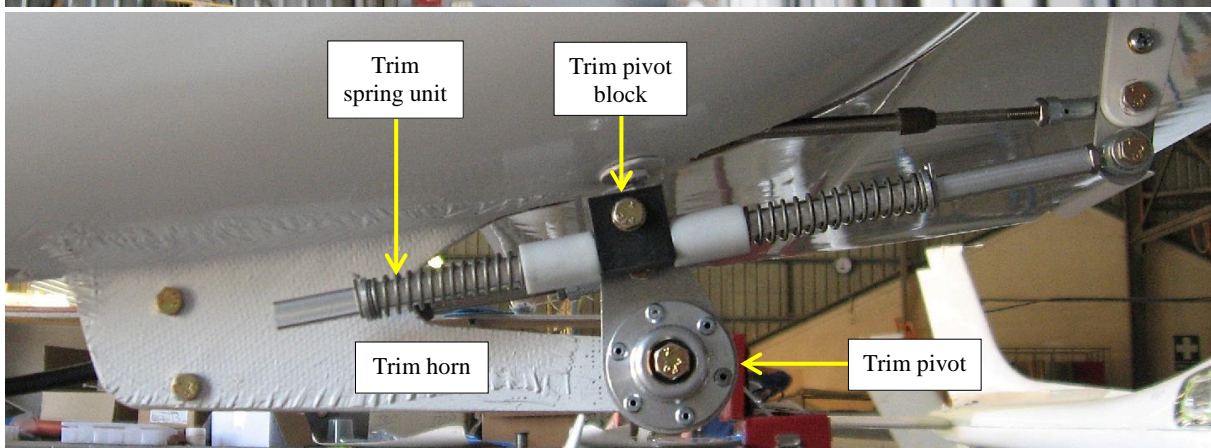
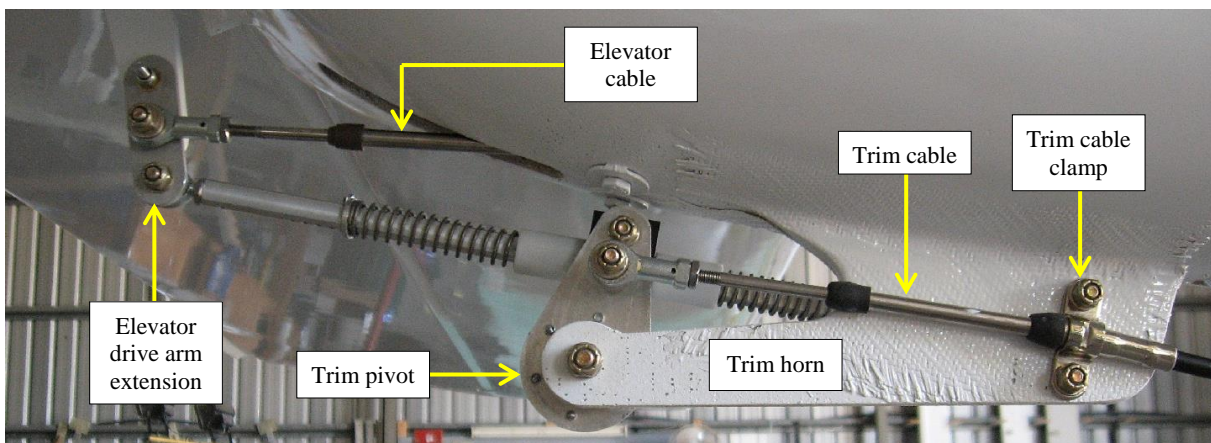
Connect the trim spring unit to the trim pivot with an AN3-13A bolt through the black pivot block in the middle of the spring assembly and the top hole in the trim pivot arm, taking careful note of the arrangement of the washers and the sleeve between the two items.

Connect the trim cable rod end to the trim pivot with an AN3-12A bolt through lower hole in the trim pivot arm. Fit the trim pivot to the trim horn with an AN4-14A bolt.

Fit the rod end of the trim spring unit to the bottom hole in the elevator drive arm extension with an AN3-07A bolt.

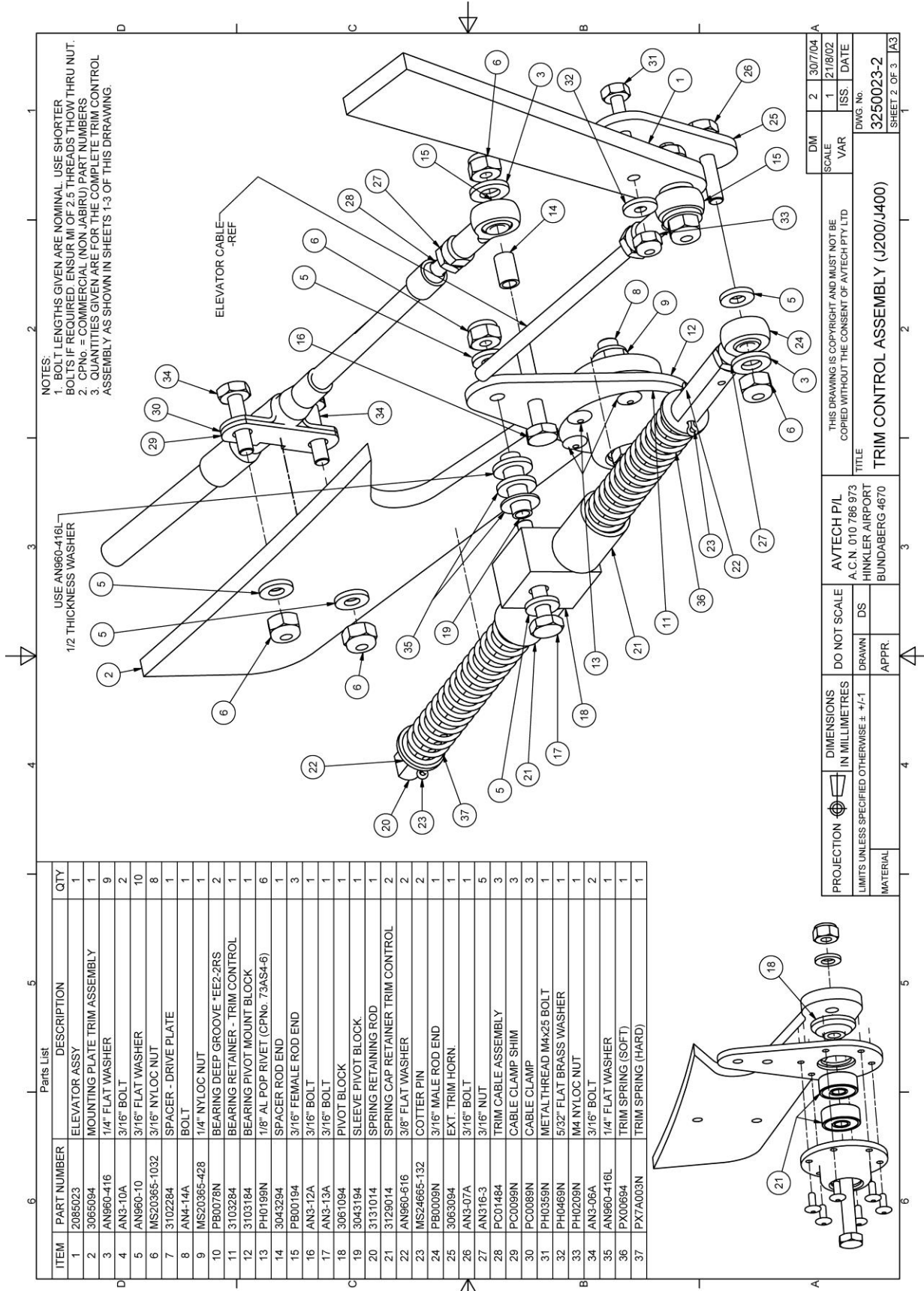
Push the trim lever on the console fully forward, hold the trim pivot arm fully forward as shown at right, align the trim cable as shown, then drill the 2 x 3/16" trim cable clamp holes through the trim horn.

If you are working alone you can wedge the trim pivot into position for this step.



Attach the outer trim cable to the right hand side of the trim horn with 2 x AN3-06A bolts fitted through trim horn, the clamp backing plate and then the saddle clamp and securing with flat washers and Nyloc nuts, taking care to locate the locating key on the saddle clamp in the locating groove in the outer cable before tightening the Nyloc nuts to safety.

Use the supplied deflection templates to re-check the up and down travel of the elevator.



This completes the *Post-Paint>Fuselage>Fit* rudder, elevator and elevator trim task.