Attachment D:

Excerpts from
United Airlines DC-8 Maintenance Manual

UNITED AIRLINES

ELEVATOR - REMOVAL/INSTALLATION/CHECK

RELATED TO:
SM 23-55-20-02-ES

1. General
   A. Suitable hoisting equipment and fixture 5710699 should be used for handling the elevator assemblies. Each assembly weighs 415 pounds.
   B. Three attaching points for the sling are provided in the upper surface of each elevator, two in the leading edge at Stations 104 and 176 and one near the trailing edge at Station 142.
   C. LINE MAINTENANCE - When ordering the elevator, also order insurance spare hinge hardware Kit KI753. The kit hardware is to be used only to replace unserviceable hinge components.
   D. On customer airplanes, consult CM/OV 29-27-00-01/201 for additional requirements, limitations and part number information.
   E. Part numbers shown in Figure 201 are not stocked and should be ordered from DACO.

2. Special Tools and Materials
   A. Special Tools
      (1) Elevator Sling, 5710699 (Non-Stock)
      (2) Gauge, 1SF2025-27-51H2 clearance, (Non-Stock)
      (3) Gauge, 1SF2025-27-51H3 clearance, (Non-Stock) (if required)
   B. Materials
      (1) Kit, KI753 (Non-Stock) as applicable per Paragraph 1.C.
      (2) Ref. Figure 201 as required.
   C. Referenced Procedures
      (1) Required
         (a) MM 23-27-00-07/201, Flight Control Surfaces - Adjustment
         (b) MM 23-27-30-03/201, Elevator Control Rig
         (c) MM 23-27-33-13/201, Elevator Geared Tab Crank Interference.
         (d) MM 23-55-20-03/201, Elevator Push Rod Guide Clearance
         (e) CM/OV 29-27-00-01/201, Flight Control Systems - Part Identification.
         (f) GN/MM 1-0-12-1, Safetying - General Information
         (g) AD 63-8-2, Airworthiness Directive (EG Ref)
         (h) AD 18-01-15, Airworthiness Directive (EG Ref)

UNITED AIRLINES

3. Removal/Installation/Ch
A. Removal
(1) Open access doors as necessary.
(2) At elevator damper, disconnect the link from the fitting installed on the trailing edge of the horizontal stabilizer.
(3) Disconnect the inboard and outboard geared tab drive cranks from the links installed on the trailing edge of the horizontal stabilizer.
(4) Disconnect the control tab drive rod from the drive crank on the elevator control tab outboard drive torque tube (Ref. Figure 201).
(5) Index and remove the drive crank and the elevator control tab outboard drive torque tube from the flange of the elevator control tab inboard drive tube. Save for reinstallation as the part is line reamed with inboard drive tube and is not to be interchanged.
(6) Install the elevator sling per Figure 205. Take up a slight tension.
(7) Remove the bolts that attach the elevator to the torque tube.
(8) Remove the nut from the eyebolt at each of the hinge points and remove the elevator.

B. Installation

NOTE: During assembly of one particular DC8 left elevator identified as UA MR55201-004, the geared tab outboard pushrod fitting located at the elevator front spar was mislocated. This requires use of a special 121-3519 3802768-1 arm assembly, bent per Figure 204. This special arm was installed by DACO and should be kept with this elevator. Rework of the elevator to correct this misalignment would be very costly and should not be attempted.

(1) Check control tab operating rods for correct installation per Figure 202.
(2) Hoist the elevator into place at the horizontal stabilizer.

CAUTIONS: 1) WHEN ENGAGING ELEVATOR EYEBOLTS, CHECK THAT EYEBOLTS ENGAGE FREELY. IF THERE IS ANY BINDING, CHECK FOR PRELOAD OF TORQUE TUBE ATTACHMENT. EXCESSIVE FORCE WILL DAMAGE ELEVATOR.
2) CHECK ALIGNMENT OF TORQUE TUBE PADS.

UNITED AIRLINES

(3) Install the nut on the eyebolt of each of the elevator hinge points.

(4) Torque the inboard nut to between 3360 and 3600 inch-pounds. Torque the other hinge eyebolt nuts to between 650 to 720 inch-pounds.

(5) Install the bolts that attach the elevator to the inboard elevator hinge fitting. Torque the nuts to between 240 and 280 inch-pounds.

NOTE: A .040 inch maximum gap tolerance is permitted between the elevator and inboard elevator hinge fittings before torquing the nuts. If the gap tolerance should exceed the .040 inch dimension, shim as necessary with inboard elevator hinge fitting assembly shim washers. (Ref. Figure 201.) After reshimming and checking that gap is within tolerance install lock washer 2700697 and nut 2700696. Torque nut as tight as possible by hand, then tighten it as required for alignment with lock washer. Bend washer tab into nut slot to lock nut.

(6) Install the drive crank and the elevator control tab outboard drive torque tube to the flange of the elevator control tab inboard drive torque tube. Install the same outboard drive torque tube section as removed in Paragraph 3.A, (5) in the position indexed. Safety the outboard drive torque tube attach bolt heads per GN/MM 1-0-12-1, single lockwire method.

NOTE: Outboard drive torque tube attach bolts on early DC8's had non-drilled heads and were not safetied. This installation is satisfactory until it is disturbed, at which time drilled head NAS6704HU4 bolts must be used and safetied.

(7) Connect the control tab drive rod to the drive crank on the elevator control tab torque tube. (Ref. Figure 202). Safety nut with cotter pin.

(8) Connect the inboard and outboard geared tab drive cranks to the links installed in the trailing edge of the horizontal stabilizer. Safety nut with cotter pin.

(9) Connect the link on the inboard elevator damper to the fittings installed in the trailing edge of the horizontal stabilizer. Safety nuts with cotter pins. Make sure that the damper allows full travel of the elevator.

(10) Measure the elevator and tab clearances and note limits given in 27-00-07/201.

C. Check

(1) Recheck installation for being complete and safetied.

(2) Check and adjust elevator and tab travels per 27-30-03/201.

(3) Operate the elevator full travel up and down. At the geared tab inboard drive mechanism, check the crank for interference with the link, per Figure 203. Interference will result in a mark in the crank boss radius, as shown. Any interference must be corrected. Assure that the large cutout in link mates with crank.

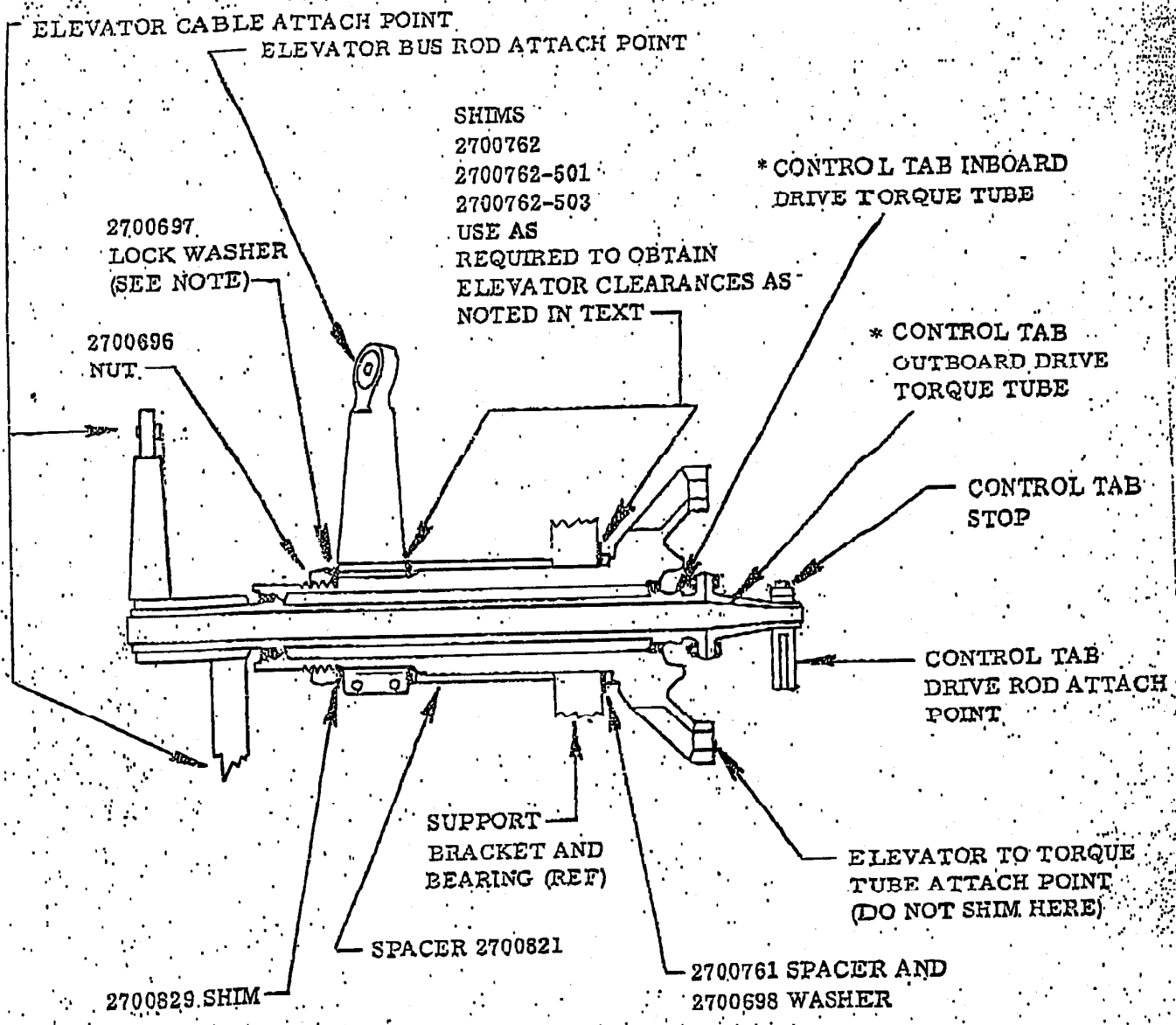
(4) Check that the pushrod has at least 3/32 inch clearance from the pushrod guide throughout tab travel (elevator in neutral) using clearance gauge 1SF2025-27-51H-2. Clearance is acceptable if the gauge can be moved fore-aft over the length of the pushrod with no more than light hand force. If clearance is not within limits, reposition the pushrod guide trough per 55-20-03/201 to obtain 1/8 inch clearance as checked with clearance gauge 1SF2025-27-51H-3. (Engineering Reference FAA AD 63-8-2).

(5) Check inboard and outboard geared tab mechanism for clearances as shown in Figure 206 Details I and II. Elevator must be at 12.5° and 12° trailing edge up (TEU) during accomplishment of this check. (Ref. FAA AD 78-01-15) It is permissible to remove up to .020 material from crank to provide clearance. If additional clearance is required, trim the cutout edge up to .030. Contact SFOEG-DC8 Aircraft Technical Services if additional corrective action is required.

(6) Check all bolts for proper safety, and reinstall all removed access plates.

(7) Install all fairings and access plates.

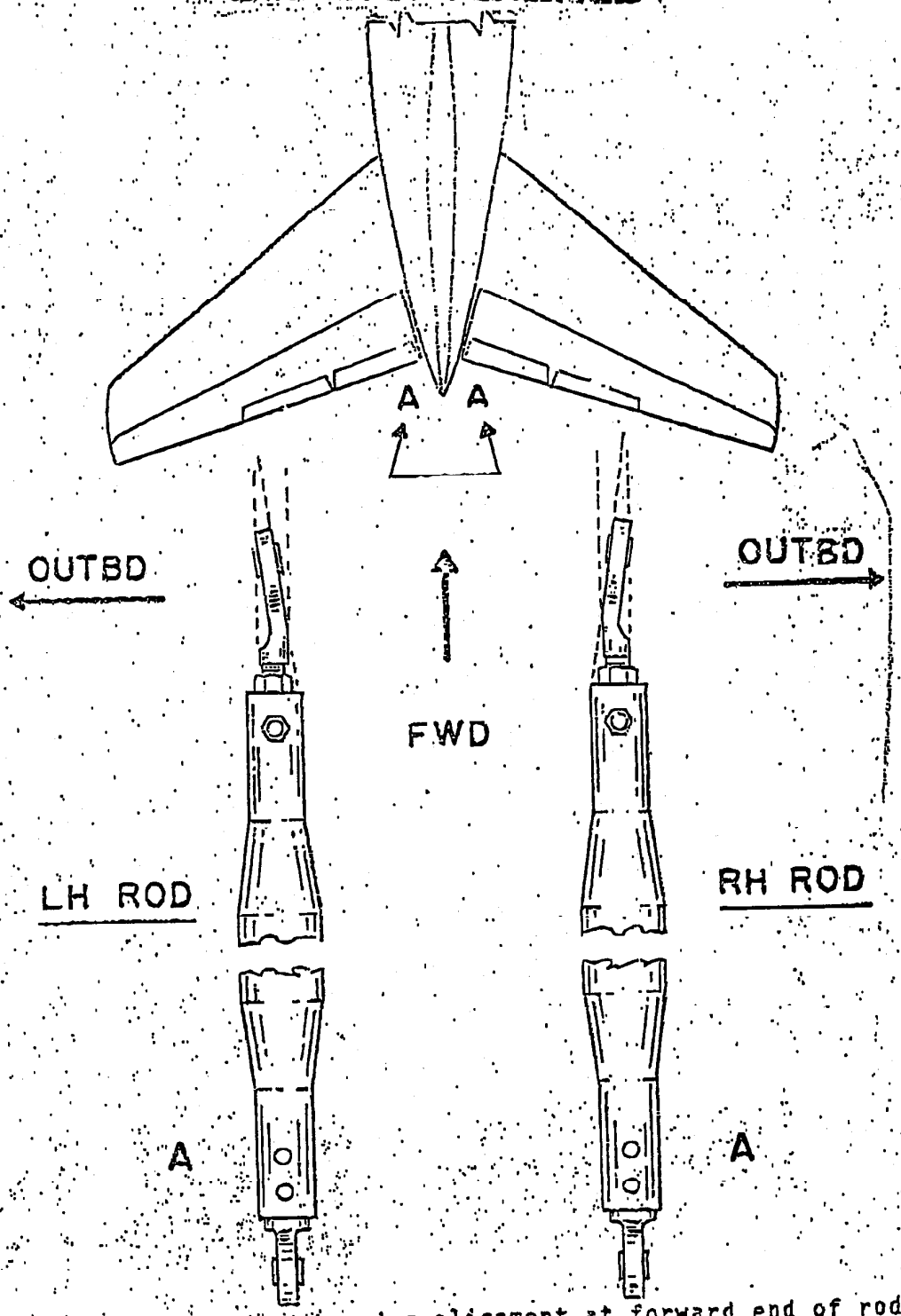
UNITED AIRLINES



* THESE ARE MATCHED PARTS AND ARE NOT INTERCHANGEABLE PER PARAGRAPH 3, A (5) AND 3, B (5) OF TEXT.

FIGURE 201 - ELEVATOR CONTROL TAB AND ELEVATOR BUS LINKAGE

UNITED AIRLINES



NOTE: For bolt and bearing alignment at forward end of rod Offeset in rod end fitting must be located outboard as shown.

FIGURE 202 - ELEVATOR CONTROL TAB DRIVE ROD INSTALLATION

RADIUS WHERE INTERFERENCE OCCURS, IF ANY

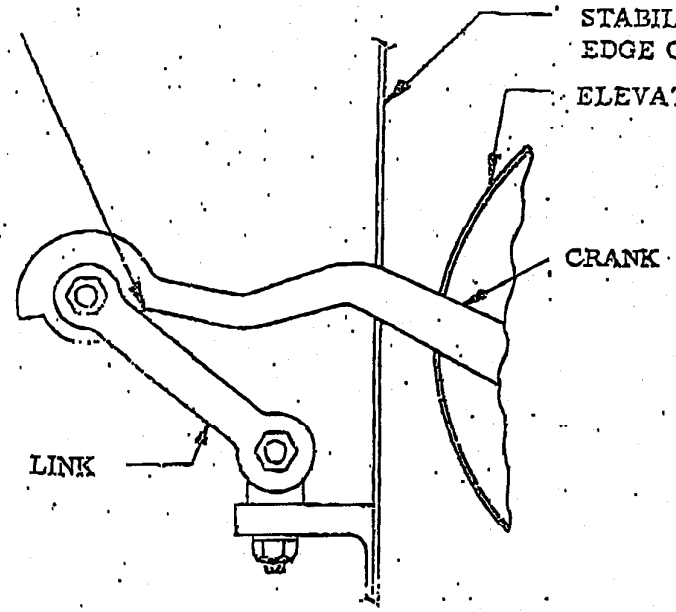


FIGURE 203 - GEARED TAB INBOARD DRIVE LINKAGE

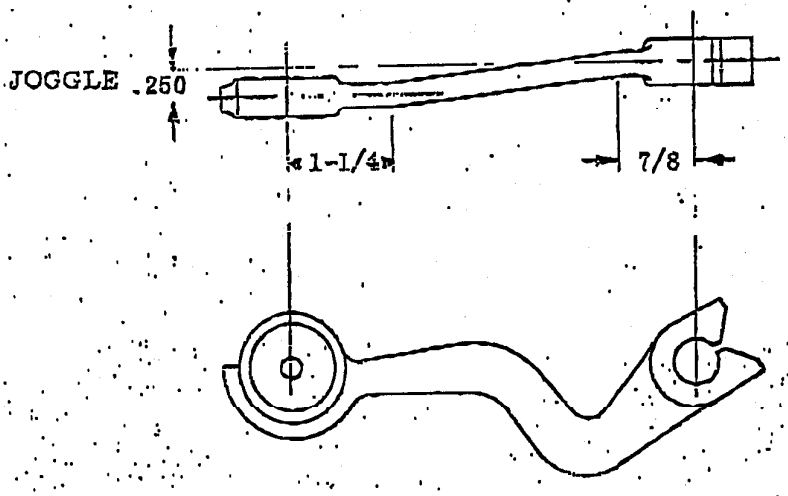
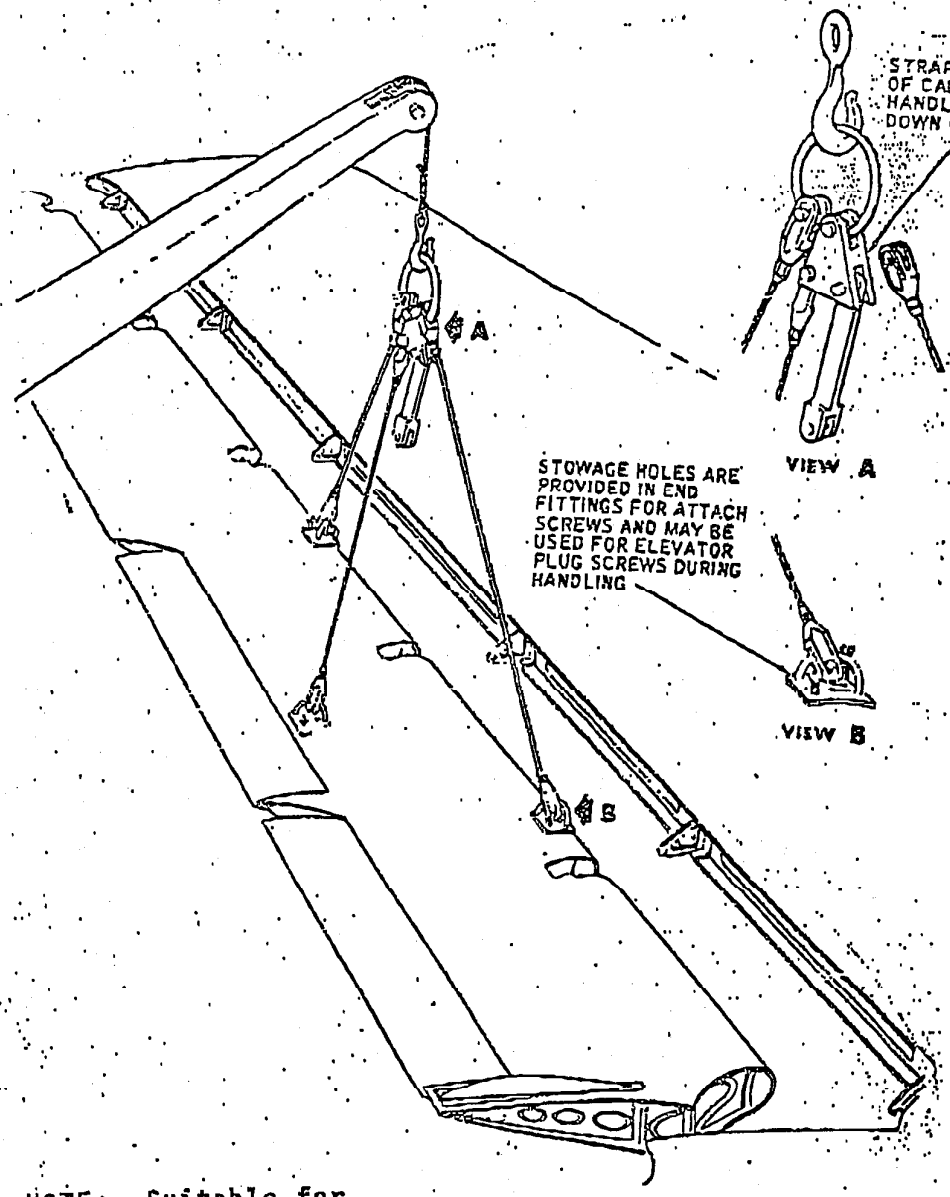


FIGURE 204 - SPECIAL ARM ASSEMBLY - USED ON MR55207-004 ELEVATOR

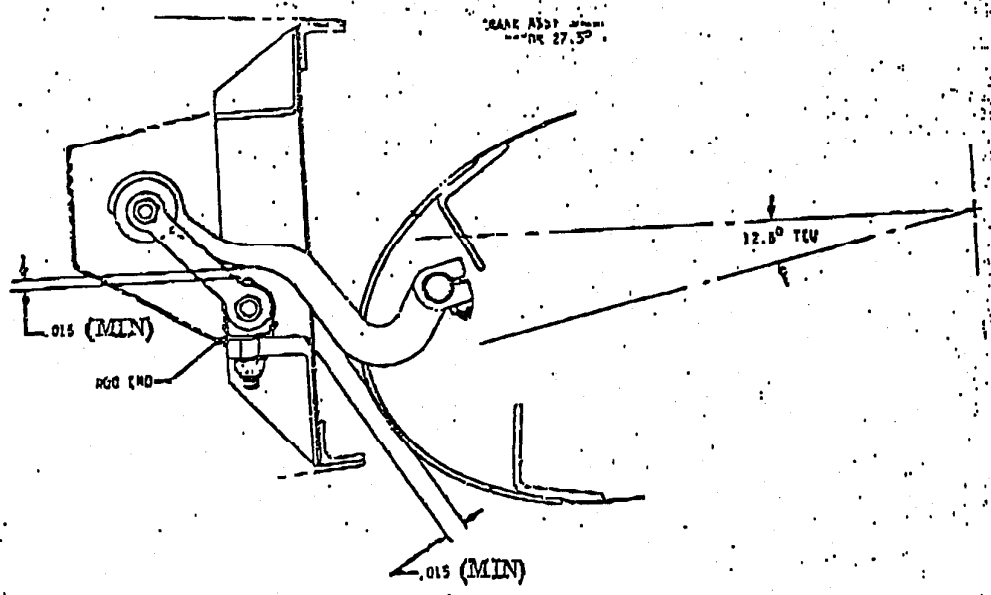
UNITED AIRLINES



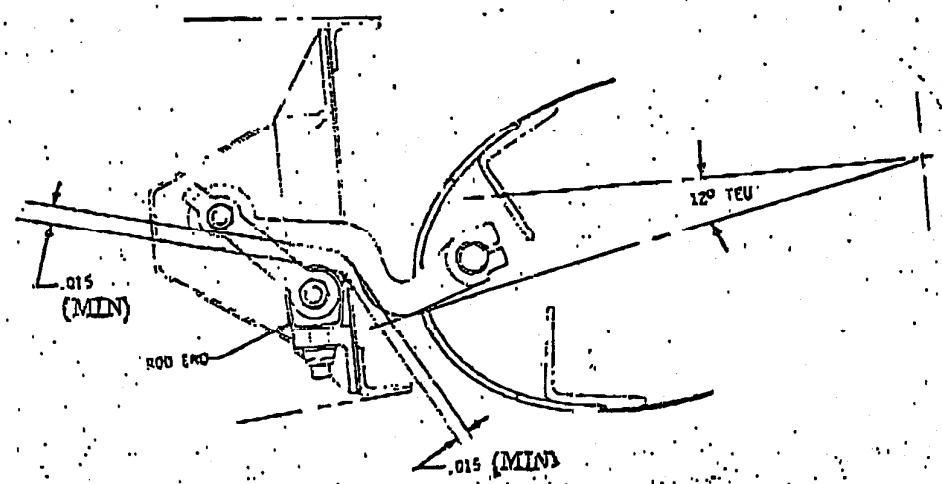
NOTE: Suitable for installation and general handling of left or right elevator.

FIGURE 205 - ELEVATOR SLING - INSTALLATION

UNITED AIRLINES



DETAIL I - INBOARD GEARED TAB MECHANISM



DETAIL II - OUTBOARD GEARED TAB MECHANISM

FIGURE 206 - ELEVATOR INSTALLATION CLEARANCES CHECKS
(REF FAA AD78-01-15)