# ARROW 1 SERVICE DATA

## SECTION 11

# FLYING CONTROLS

# MECHANICAL

(This data supersedes previous issue dated 20 December 1956)

15 FEB 58

# ARROW 1 SERVICE DATA

## LIST OF REVISIONS

| DATE | PAGE NO. | DATE | PAGE NO. |
|---|---|---|---|

# ARROW 1 SERVICE DATA



## TABLE OF CONTENTS

# ARROW 1 SERVICE DATA



TABLE OF CONTENTS (Cont'd)

# ARROW 1 SERVICE DATA



## LIST OF ILLUSTRATIONS

# ARROW 1 SERVICE DATA



## DESCRIPTION

### GENERAL

1 The flying controls are fully power operated by a system which comprises mechanical, hydraulic, electronic and electrical components. Power operation eliminates the necessity for mass balancing, and also permits the entire surfaces to be trimmed, eliminating the need for trimming tabs.

2 There is no direct mechanical linkage between the cockpit controls and the control surfaces, so without hydraulic power no control is possible. For this reason, as a safety measure, two independent flying control hydraulic systems are fitted. See Arrow 1 Service Data - Flying Controls Hydraulics for the hydraulic operation, and Electrical Systems - Flying Controls for the electrical operation.

3 The system gives full rate operation throughout a hydraulic fluid temperature range of 0°F to 275°F. A limited rate performance is given at temperatures down to -20°F, but at temperatures below -20°F it is necessary to warm up the hydraulic fluid before flight by running the engines and operating the controls. Warm-up from -65°F to 0°F takes approximately six minutes.

4 Incorporated in the flying control system is an automatic damping system which adjusts the control surfaces to stabilize the aircraft in pitch, roll and yaw, and also automatically co-ordinates the movement of the rudder with the pilot's control movements of the ailerons and elevators.

### MODES OF CONTROL

5 There are three modes of control:

(a) Normal mode.

(b) Automatic flight mode.

(c) Emergency mode.

### NORMAL MODE

6 The normal mode is the primary mode of operation. Forces exerted on the control column are converted into signals by a stick force transducer incorporated in the aileron and elevator circuits at the control column. The signals are modified by an electronic network and an air data computing system and are then fed to parallel servos in the respective control circuits. The parallel servos are electro-hydraulic units which convert the amplified signals into hydraulic power to actuate the respective rear quadrants.

7 The rear quadrants are linked mechanically to hydraulic actuator control valves which direct fluid to the appropriate side of the actuator pistons. The movement of the actuator pistons is transmitted to the control surfaces by control linkages. See figs 6 and 9.

8 Modified signals originating from the stick force transducers are also fed to electro-hydraulic differential servos, which are fitted in the actuator linkage as part of the damping system. This increases the speed of response of the control surfaces to control column movement.

9 Movement of each parallel servo from neutral progressively increases the inductance of a feed-back transformer which is fitted in a feed-back circuit to nullify the signal to the parallel servo. When control surface movement reaches a position to achieve the commanded manoeuvre, the feed-back signal nullifies the input signal to the parallel servo terminating its movement.

### DAMPING IN THE NORMAL MODE

10 Damping in the normal mode is provided about all three axes, and is controlled by electrical signals fed through damping networks by inputs from a pitch rate gyro and a roll rate gyro for pitch and roll damping, and by a yaw rate gyro and lateral accelerometer for yaw damping. See Arrow 1 Service Data - Electrical Systems - Flying Controls.

### PITCH DAMPING

11 In the pitch axis, short-term movements, i.e. movements at rates of more than four cycles per second, are damped out by the

differential servos in the elevator actuator linkage. Movements at rates of less than four cycles per second, i.e. long-term movements, are damped out by the elevator parallel servo during normal flight.

12 During corrective damping movements of the differential servos, the actuator linkages reposition the actuator control valves which in turn direct hydraulic fluid to the appropriate side of the actuator pistons to effect movement of the control surfaces through the control linkages. The oscillatory movement of the linkages are not fed back to the control column because the parallel servos prevent movement of the rear quadrants.

13 During take-off and landing all damping is provided by the rate gyro through the differential servos.

ROLL DAMPING

14 In the roll axis, aileron damping movement is controlled during normal flight by electronic signals derived from a roll rate gyro feeding to the differential and parallel servos. All damping signals are fed to the differential servos, and signals deriving from long-term movements are also fed to the parallel servo. The differential and parallel servos transmit damping movement to the control surfaces in the same way as with pitch damping.

15 The damping signal to the aileron parallel servo is switched off when a landing gear down selection is made.

YAW DAMPING AND RUDDER TURN CO-ORDINATION

16 Yaw damping and rudder turn co-ordination in the normal mode is provided by a normal yaw damping system, which is controlled automatically by electronic signals.

17 The signals automatically initiate movement of a rudder dual differential servo which operates a rudder actuator control valve through the rudder actuator linkage. The control valve in turn directs hydraulic fluid to the appropriate side of the rudder actuator piston. The actuator piston rod is mechanically linked to the control surface by the rudder control linkage. See Arrow 1 Service Data - Flying Controls Hydraulics for the operation of the differential servo, the rudder actuator control valve and the rudder actuator and linkage. See fig 10 for the rudder control linkage.

18 The yaw damping system is duplicated to provide emergency yaw damping and turn co-ordination should the normal damping system fail, or should control of the aircraft be reverted to the emergency mode. See para 28. A hydraulically driven emergency alternator provides the electrical supply for yaw damping when the normal a-c supply is not available.

19 A portion of the yaw damping signal is nullified when the landing gear is selected down. This allows the pilot to introduce intentional yaw if necessary during the landing approach.

PILOT FEEL IN THE NORMAL MODE

20 Pilot feel at the control column is provided artificially by the electronic network. Stick force required for manoeuvring in normal flight is proportional to normal acceleration ('g') for the elevators and is proportional to rate of roll for the ailerons. During landing and take-off, feel is proportional to the degree of movement of the aileron and elevator control surfaces.

'G' COMMAND LIMIT

21 To prevent overstressing the aircraft structure, the amount of 'g' which may normally be pulled is limited. This is achieved by mechanical stops which limit the output from the stick force transducer.

'G' LIMITER

22 A 'g' limiter controlled by two accelerometers is provided to transfer elevator control from the normal mode to the emergency mode in the event that failure of any of the components in the elevator circuits produces conditions of excessive 'g'. 'G' limiting is then manually controlled by the pilot.

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FIG. 1 FLYING CONTROLS SCHEMATIC

RATE OF ROLL COMMAND LIMIT

23 To prevent overstressing the structure, the rate of roll which may normally be commanded is limited. This is achieved by mechanical stops which limit the output from the stick force transducer.

RATE OF ROLL LIMITER

24 A rate of roll limiter controlled by an accelerometer is provided to transfer aileron control from the normal mode to the emergency mode in the event that failure of any of the components in the aileron circuits causes excessive roll rates. Rate of roll is then manually controlled by the pilot.

LIMITATION ABOUT THE YAW AXIS

25 To prevent overstressing the structure due to excessive sideslip or lateral acceleration, the complete normal damping system is disengaged by a rudder monitor should the aircraft exceed a pre-set lateral acceleration or an angle of sideslip of $10^{o}$. Control in all three axes is then in the emergency mode.

RE-ENGAGING INTO THE NORMAL MODE

26 The pilot may re-engage into the normal mode from the emergency mode after limiter disengagement in any of the three axes, by depressing a re-engage button located on the damper function selector panel on the LH console in the pilot's cockpit.

TRIMMING IN THE NORMAL MODE

27 Trimming is normally not necessary for straight and level flight in the normal mode but the pilot may trim to a manoeuvre by operating a four-way switch located on the handgrip on the control column. The switch has four effective positions UP, DOWN, LEFT and RIGHT. The pilot must hold the switch in the desired position until the required manoeuvre is achieved. The switch is spring-loaded to assume a neutral position when released.

NORMAL MODE DISENGAGEMENT

28 The normal mode is automatically disengaged by limiter disengagement in the event of failure of the components in the normal mode system. The normal mode may also be disengaged by the pilot depressing an emergency button located on the damper function selector panel on the LH console in the pilot's cockpit or by depressing the emergency damping switch on the control column handgrip.

29 When the normal mode is disengaged, pre-engage circuits are made which energize the components to ensure smooth re-engagement should the pilot select re-engage by depressing the ENGAGE button on the damper function selector panel.

AUTOMATIC FEEL TRIM

30 Automatic feel trim is provided in the elevator circuit to prevent a change in pilot feel during changeover from the normal to the emergency mode.

31 An elevator feel-and-trim unit is fitted between the elevator rear quadrant and the aircraft structure to provide pilot feel and trim when in the emergency mode. (See fig 12). When control is in the normal mode, the electric motor operated trim unit is actuated by signals derived from a pressure sensing ram in the elevator parallel servo. This operates the trim motor in such a manner that parallel servo load is transmitted to the feel spring in the feel-and-trim unit. Thus, on changeover to the emergency mode there is no change in pilot feel.

32 There is no provision for automatic feel trim in the aileron system.

PRESSURE TRIM

33 Pressure trim circuits, controlled by hydraulic pressure sensing rams in the parallel servos, permit re-engagement into the normal mode from the emergency mode, only when pressures in the parallel servos are equalized. This ensures smooth re-engagement free from undesirable control column movement.

AUTOMATIC FLIGHT MODE

34 The automatic flight mode provides for controlling the aircraft automatically by signals from a ground control station, the aircraft fire control system, or the airborne navigational instruments. It also provides for pilot assist functions when the aircraft is controlled by the pilot.

AUTOMATIC CONTROL IN THE AUTOMATIC FLIGHT MODE

35 The automatic flight mode provides for automatic control of the aircraft by signals from an integrated coupler feeding into the parallel servo and damping networks. The inputs into the integrated coupler are from any one of the following sources:

(a) Automatic ground control interceptor (A.G.C.I.).

(b) Attack.

(c) Automatic navigation.

(d) Automatic ground control approach (A.G.C.A.).

PILOT ASSIST FUNCTIONS OF THE AUTOMATIC FLIGHT MODE

36 The automatic flight mode in conjunction with the damping system provides for the following pilot assist functions:

(a) Pitch attitude hold.

(b) Roll attitude hold.

(c) Heading hold.

(d) Mach hold.

(e) Altitude hold.

EMERGENCY DISENGAGEMENT OF THE AUTOMATIC FLIGHT MODE

37 The automatic flight mode is automatically disengaged by limiter disengagement in the event of failure of the components in the automatic flight control system or the damping system, and control reverts to the emergency mode. The automatic flight mode may also be disengaged by depressing the automatic flight disengage switch on the control column handgrip, and control reverts to the normal mode.

38 In the automatic flight mode with no stick force applied, the elevator feel-and-trim unit is trimmed to within $\pm$ .5 'g' from the straight and level flight condition of 1 'g' by the elevator automatic trim circuit, so that in the event of 'g' limiter disengagement, the pitch acceleration is automatically reduced to within the range of + .5 'g' to + 1.5 'g'.

EMERGENCY MODE

39 The emergency mode is the mechanical mode of operation, and is a secondary system to the normal mode of operation. In this mode the hydraulic actuator control valves are actuated mechanically through conventional cable and quadrant circuits by movement of the control column and if necessary the rudder bar.

40 Emergency yaw damping and rudder turn co-ordination only are retained in the emergency mode.

41 Fig 1 illustrates the routing of the cables. Each control cable circuit is fitted with a cable tension regulator quadrant to compensate for structural deflections and thermal expansion. All straight runs of the control cables are covered with swaged aluminum alloy tubing. Bare sections of cable occur at pulley locations and at cable end connections. Guards are fitted at all pulleys and quadrants to retain the cables in the grooves. All cables are routed through fairleads at points where chafing against the airframe or adjacent controls would otherwise occur.

42 Pilot feel is provided in the emergency mode by springs in feel-and-trim units in the elevator, aileron and rudder circuits. A 'g' bob weight supplements the feel in the elevator system, providing, to a limited extent, a stick force per 'g' feel. The feel-and-trim units also provide for adjustment of the control surfaces to achieve trim in the emergency mode. The rudder feel-and-trim unit also incorporates a hinge moment limitation system which restricts rudder movement, preventing high loads from being inadvertently applied to the vertical stabilizer at high air speeds.

CONTROL COLUMN (Fig 2)

43 The control column located in the pilot's cockpit is of the conventional stick type. The control column handgrip incorporates the four-way switch for aileron and elevator trim, the emergency damping switch push button, the automatic flight disengage switch push button, a missile firing trigger switch and a nose wheel steering switch push button. The stick force transducer is secured to the control tube immediately below the stick grip by taper pins and self-locking nuts.

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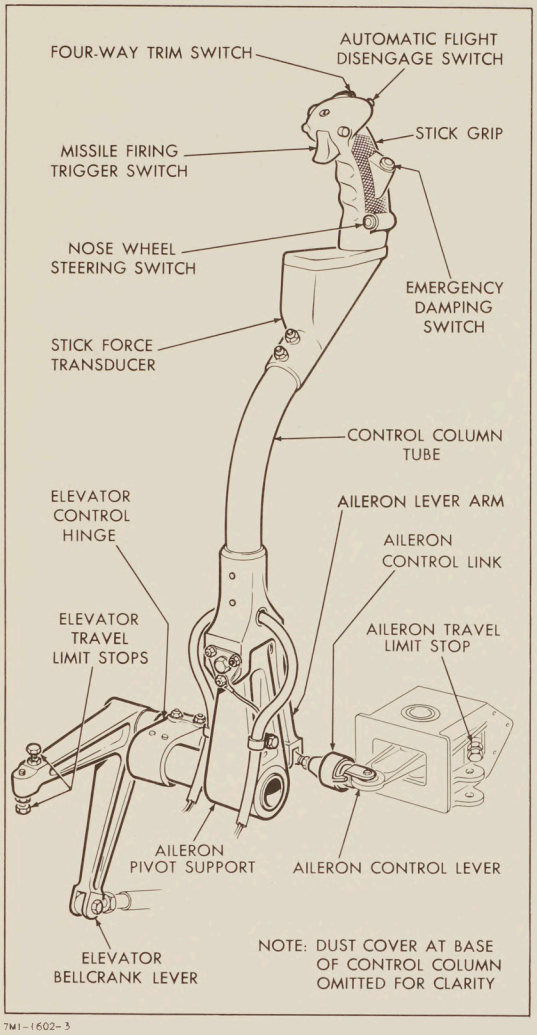


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FIG. 2 CONTROL COLUMN

44 The base of the control tube is riveted to an aileron lever arm which is pivot mounted to an aileron pivot support. The aileron pivot support is in turn secured to an elevator control hinge torque tube by taper pins and self-locking nuts.

45 The maximum total travel at the handgrip for elevator movement is 10.01 inches and the maximum total travel at the handgrip for aileron movement is 9.10 inches.

RUDDER BAR ASSEMBLY (Fig 3)

46 The rudder bar assembly consists of left hand and right hand pedal assemblies suspended by rudder pedal suspension tube assemblies from support brackets riveted to the top longerons. The pedal assemblies are connected by push rods to a cross tube assembly mounted on a vertical torque tube which rotates in a torque tube bearing housing. The torque tube and bearing housing pass through the cockpit floor into the nose wheel well. The rudder cable tension regulator quadrant and nose wheel steering quadrant are fitted at the lower end of the torque tube. A travel limit arm in the centre of the cross tube assembly contacts two adjustable travel limit stops to limit rudder movement. A rudder self centre unit is fitted between the travel limit arm and the structure at station 120, and is a double acting strut which returns the rudder bar assembly to its central position when the load on the pedals is released, following a pilot commanded movement of the rudder bar.

47 Provision is made to retain the rudder bar assembly in its central position during rigging operations by inserting a rigging pin in rigging pin holes located in the rudder stop bracket and in the travel limit arm.

48 The rudder pedals' fore-and-aft position is adjustable and each pedal is retained in the desired fore-and-aft position by a spring-loaded pawl engaging with a serrated quadrant on each pedal assembly. The pawl may be disengaged to readjust the pedal position by pulling on a pedal adjust handle at the base of the main instrument panel. The handle is connected to the pawls by Bowden cables. A pedal adjustment tension spring and cable assembly returns each rudder pedal assembly to its fully aft position on pawl disengagement, if no load is applied to the rudder pedals.

49 The maximum total rudder pedal movement is 6.31 inches.

ELEVATOR CONTROL CIRCUIT (Figs 4 and 5)

50 Fore-and-aft movement of the control column rotates an elevator control pivot fitting about its hinge. A bellcrank lever is mounted

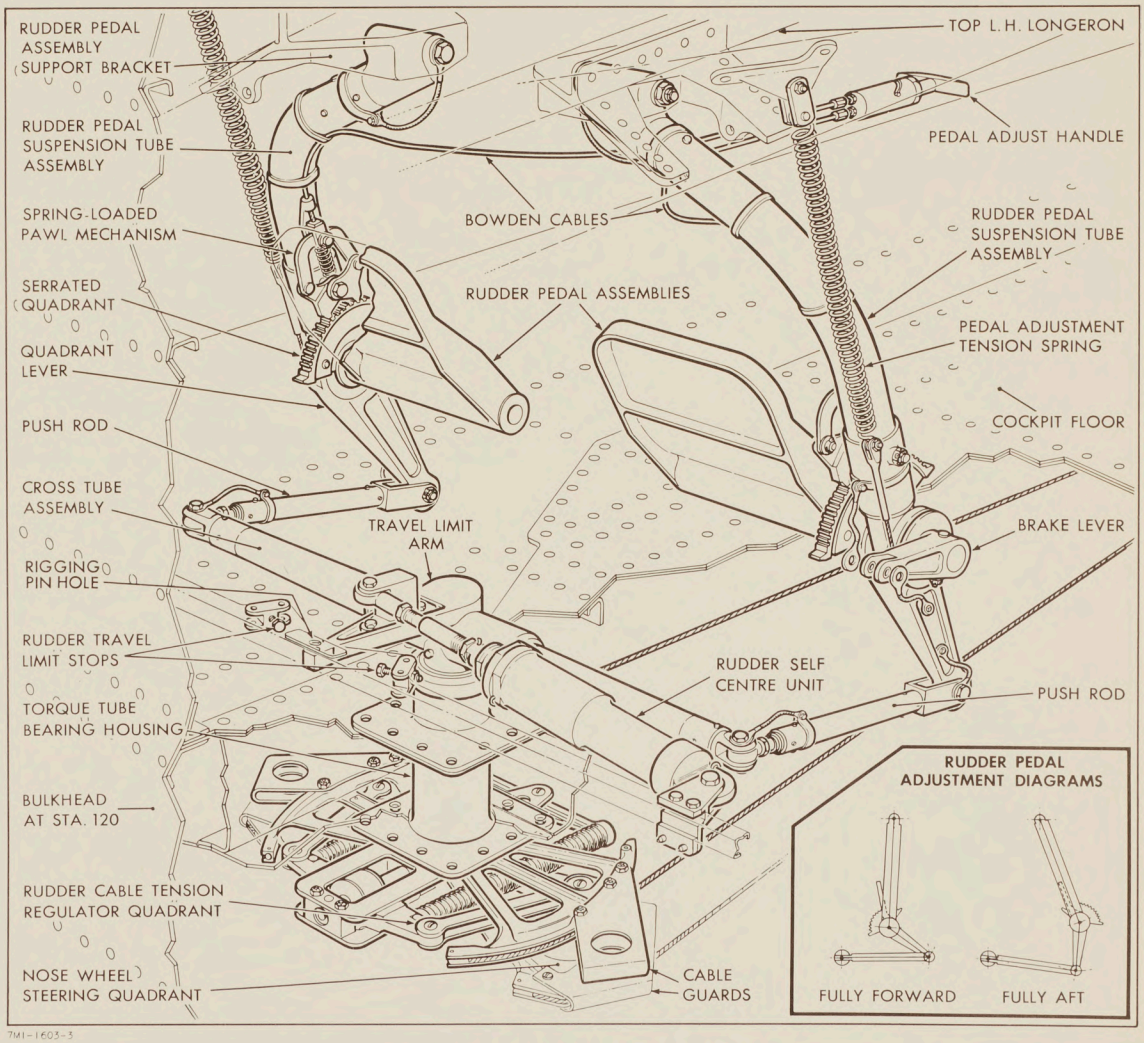


FIG. 3 RUDDER BAR ASSEMBLY

on the pivot fitting shaft and rotates with each pivot fitting movement. The lower arm of the bellcrank lever is connected by a push rod to a lever mounted on the elevator cable tension regulator torque tube to transmit the rotary movement of the bellcrank to the quadrant and operate the cables. The upper arm of the bellcrank lever is fitted with upper and lower travel limit stops which contact upper and lower faces of a travel limit bracket to limit up and down movement of the elevators.

51 The 'g' bob weight is secured to a lever which is mounted on the elevator cable tension regulator torque tube. A torsion spring fitted between the regulator torque tube and the RH quadrant support bracket, balances the quadrant against the weight of the 'g' bob weight. The spring is pre-torqued through 150° on assembly.

52 Provision is made to retain the quadrant in its central position during rigging operations

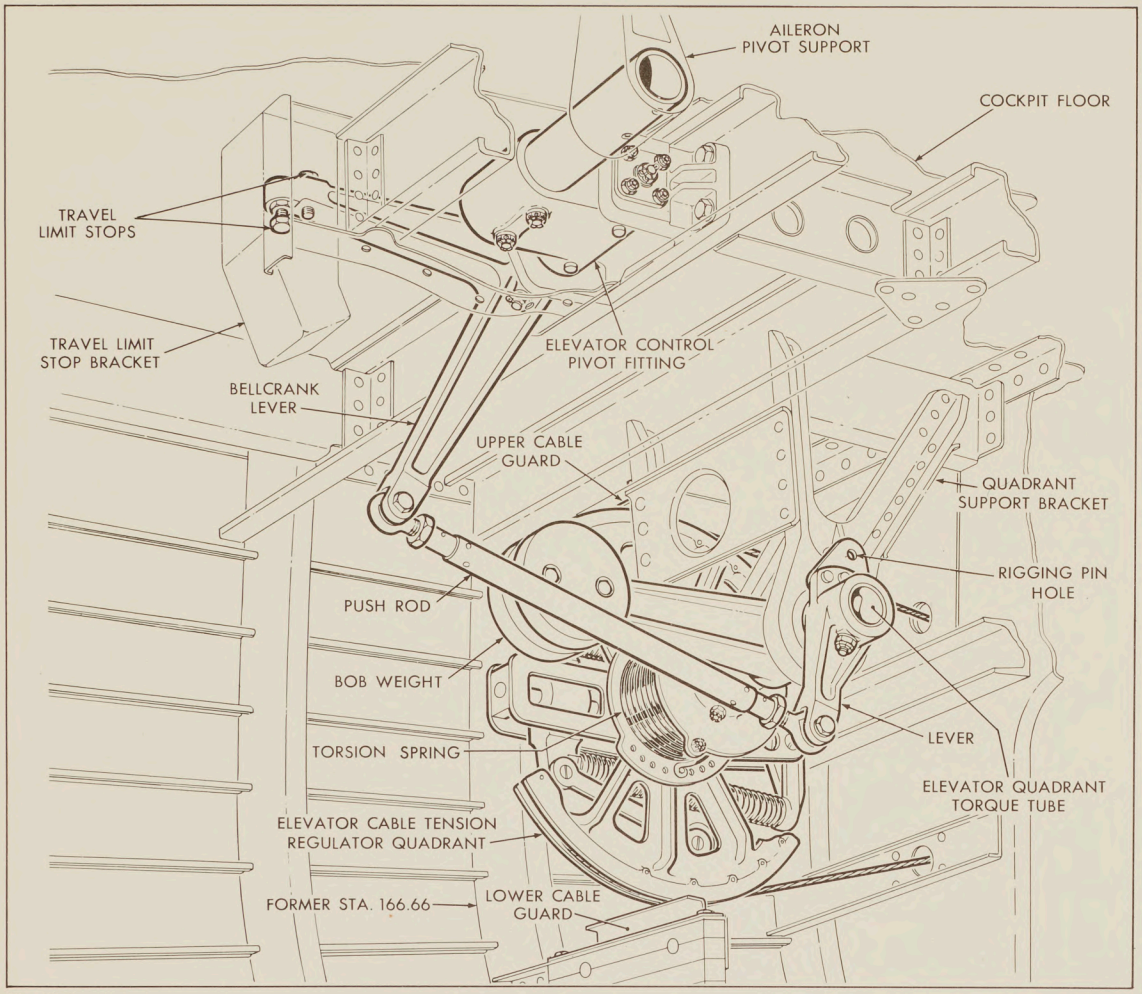


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FIG. 4 ELEVATOR CABLE TENSION REGULATOR QUADRANT AND LINKAGE

by inserting a rigging pin through rigging pin holes located in an extension of the lever on the quadrant torque tube and in the quadrant support bracket.

53 Control cables attached to the elevator cable tension regulator quadrant run aft along the top right-hand side of the armament bay. At the rear of the armament bay the cables then pass upwards and aft to terminate at the elevator rear quadrant which is mounted on a quadrant shaft located below the inner wing bottom skin at station 675.75 in the engine bay.

ELEVATOR REAR QUADRANT AND LINKAGE (Fig 5)

54 The elevator rear quadrant assembly rotates on bearings in quadrant mounting fittings suspended from the inner wing bottom skin. The quadrant assembly consists of a top quadrant and a bottom quadrant each secured to the right-hand end of the quadrant shaft by means of taper pins and self-locking nuts. A right-hand lever is built integrally with the top quadrant, and a left-hand lever is riveted to the left-hand extremity of the quadrant shaft.

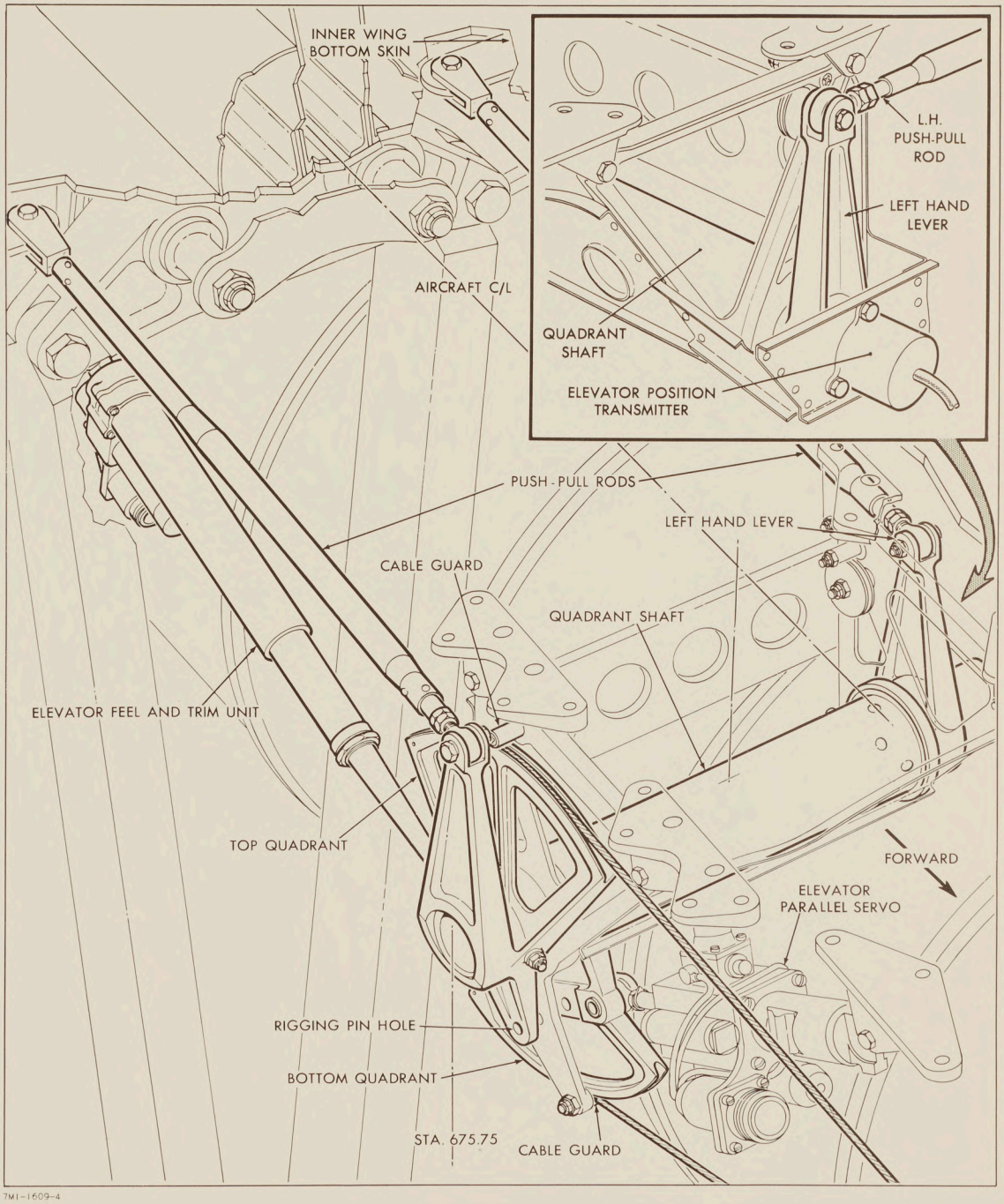


FIG. 5 ELEVATOR REAR QUADRANT AND LINKAGE

Each lever is linked to its respective elevator actuator linkage by a push-pull rod and a bellcrank to convey movement of the rear quadrant assembly to each elevator actuator control valve.

55 The elevator parallel servo is fitted between a forward attachment point on the bottom quadrant and the inner wing bottom skin structure.

56 The elevator feel-and-trim unit is fitted between a rear attachment point on the bottom quadrant and an elevator feel-and-trim emergency release mechanism lever fitted to the inner wing bottom skin structure. See para 81.

57 Provision is made to retain the quadrant in its central position during rigging operations by inserting a rigging pin through rigging pin holes located in an extension lug on the top quadrant, a fixed lower cable guard arm, and a quadrant centering hole in the bottom quadrant.

ELEVATOR CONTROL LINKAGE (Fig 6)

58 The elevator control linkage for each elevator consists of six bellcrank levers interconnected by a control rod. The inboard lever is the master bellcrank lever which is rotated about its pivot point on rib 1 on the inner wing outer trailing edge by extension or retraction of the elevator actuator piston rod. Each bellcrank lever is connected to its corresponding control fitting on the elevator by an elevator control link. Rotation of the bellcranks causes fore-and-aft movements of the control links to lower or raise the elevator about the elevator hinge on the top skin.

59 The rear bearing of each link is an eccentric bearing with a notched flange, the rotation of which varies the pin centre length of the link for rigging purposes. The eccentric bearings are locked in the desired position by a rigging adjustment locking plate, the arm of which is secured to the elevator bottom skin.

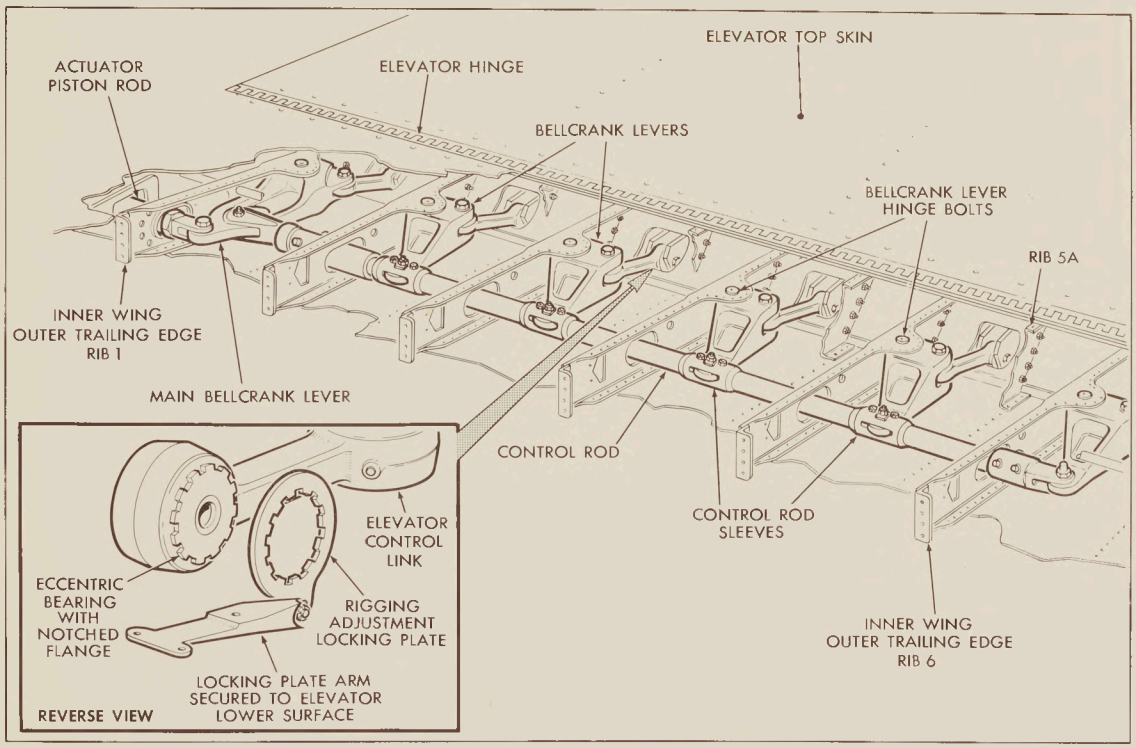


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FIG.6 ELEVATOR CONTROL LINKAGE

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Each lever is linked to its respective elevator actuator linkage by a push-pull rod and a bellcrank to convey movement of the rear quadrant assembly to each elevator actuator control valve.

55 The elevator parallel servo is fitted between a forward attachment point on the bottom quadrant and the inner wing bottom skin structure.

56 The elevator feel-and-trim unit is fitted between a rear attachment point on the bottom quadrant and an elevator feel-and-trim emergency release mechanism lever fitted to the inner wing bottom skin structure. See para 81.

57 Provision is made to retain the quadrant in its central position during rigging operations by inserting a rigging pin through rigging pin holes located in an extension lug on the top quadrant, a fixed lower cable guard arm, and a quadrant centering hole in the bottom quadrant.

## ELEVATOR CONTROL LINKAGE (Fig 6)

58 The elevator control linkage for each elevator consists of six bellcrank levers interconnected by a control rod. The inboard lever is the master bellcrank lever which is rotated about its pivot point on rib 1 on the inner wing outer trailing edge by extension or retraction of the elevator actuator piston rod. Each bellcrank lever is connected to its corresponding control fitting on the elevator by an elevator control link. Rotation of the bellcranks causes fore-and-aft movements of the control links to lower or raise the elevator about the elevator hinge on the top skin.

59 The rear bearing of each link is an eccentric bearing with a notched flange, the rotation of which varies the pin centre length of the link for rigging purposes. The eccentric bearings are locked in the desired position by a rigging adjustment locking plate, the arm of which is secured to the elevator bottom skin.

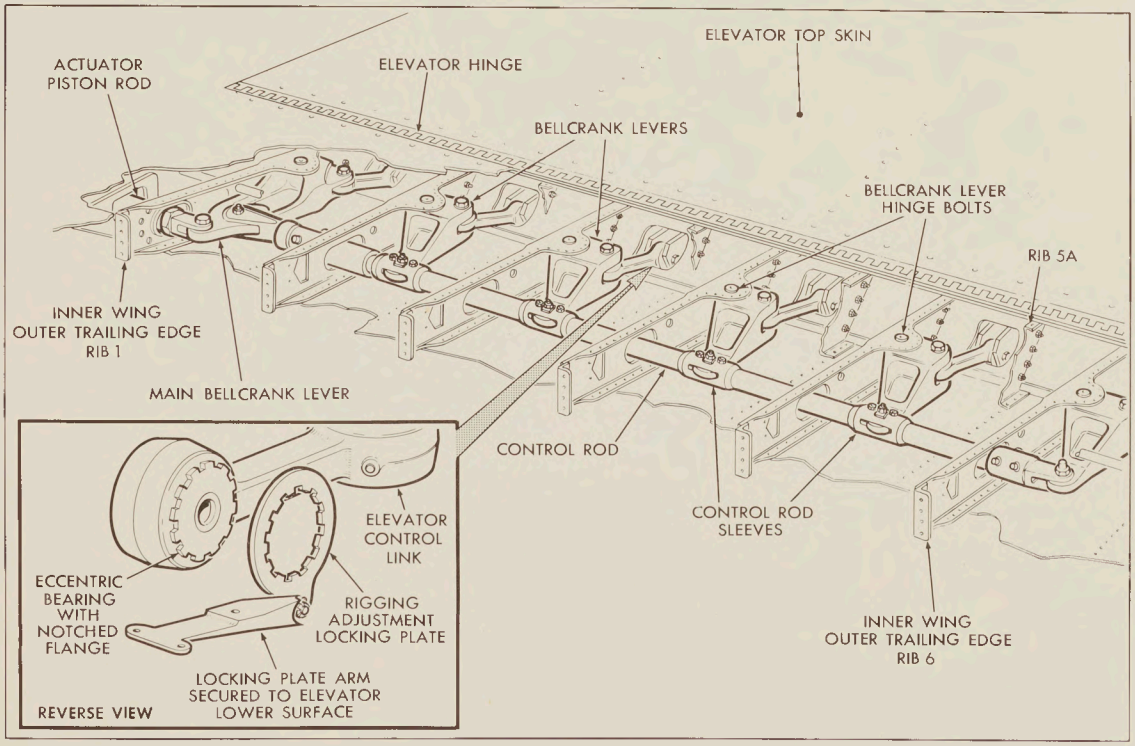


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FIG. 6 ELEVATOR CONTROL LINKAGE

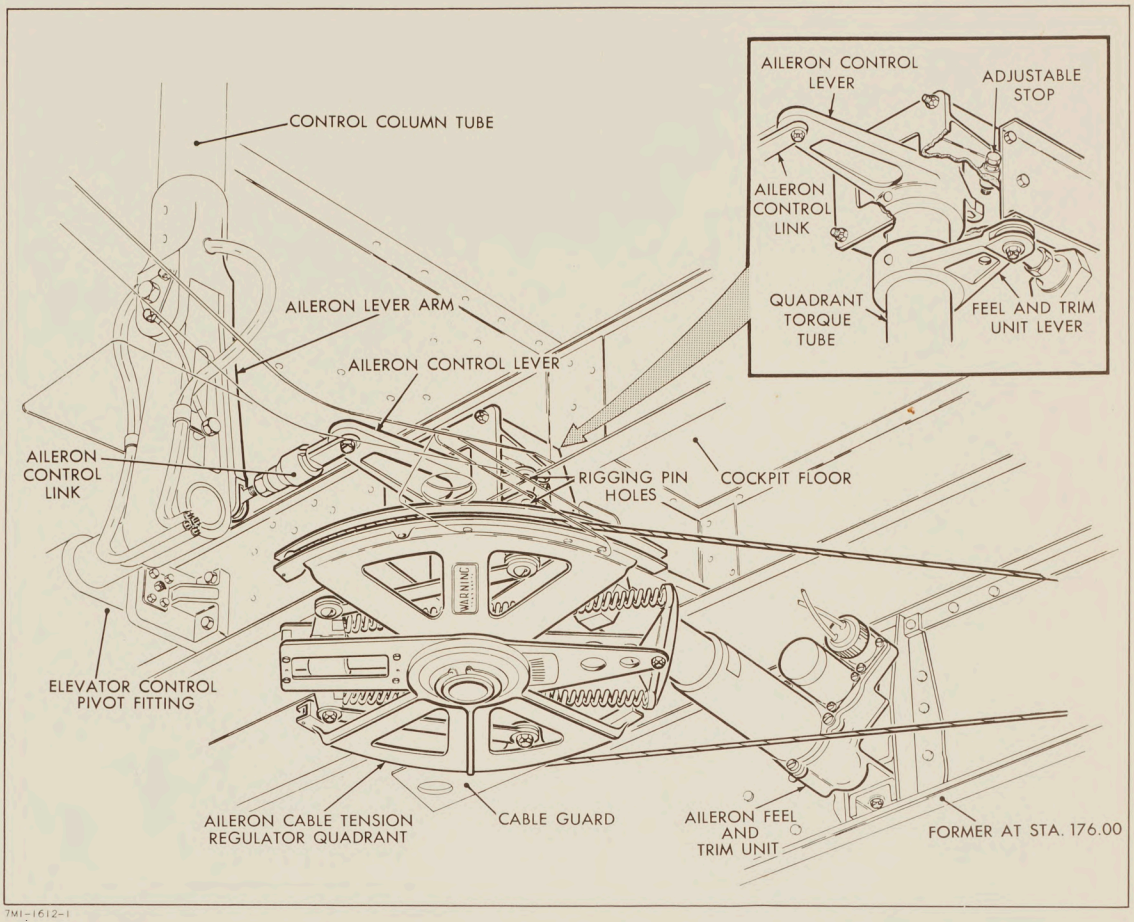


FIG. 7 AILERON CABLE TENSION REGULATOR QUADRANT AND LINKAGE

AILERON CONTROL CIRCUIT - FUSELAGE (Figs 7 and 8)

60 The aileron lever arm at the base of the control column pivots on the aileron pivot support during lateral movement of the control column. The lower arm of the pivot lever is linked by an aileron control link to an aileron control lever which is secured to the aileron cable tension regulator torque tube. Control cables attached to the quadrant are operated by the rotary movement of the quadrant.

61 The aileron feel-and-trim unit is attached by means of a lever to the quadrant torque tube at one end, and to a channel on the former at station 176.00 at the other end.

62 Provision is made to retain the quadrant in its central position during rigging operations by inserting a rigging pin through rigging pin holes located in lugs on the travel limit stop housing and in the aileron feel-and-trim unit lever.

63 The aileron control cables run aft along the top left-hand side of the armament bay. From the rear of the armament bay, the cables then pass upwards and aft to terminate at the aileron rear quadrant, the housing of which is secured to mounting brackets on the bottom skin of the inner wing at station 683.14 in the engine bay.

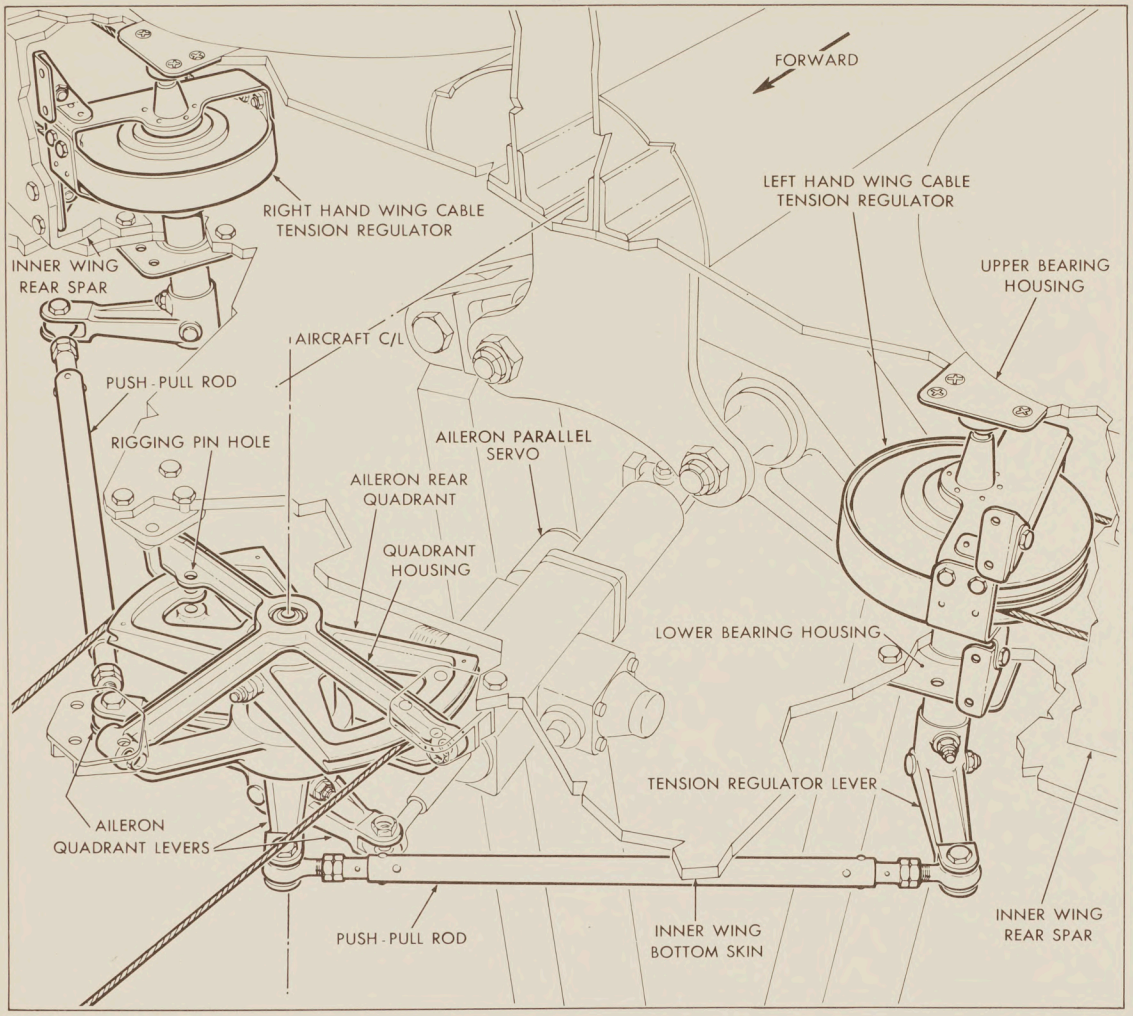


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FIG. 8 AILERON REAR QUADRANT AND LINKAGE

AILERON REAR QUADRANT AND LINKAGE (Fig 8)

64 The aileron rear quadrant is mounted on a torque tube which rotates on a bearing in the quadrant housing. A parallel servo lever is also secured to the torque tube. The aileron parallel servo is mounted between the servo lever and the structure.

65 The quadrant torque tube is rotated by extension or retraction of the parallel servo during normal mode operation, and by the aileron cables during emergency mode operation. The rotation of the quadrant is transmitted to each of the wing tension regulator levers by means of a quadrant lever and a push-pull rod.

66 The quadrant may be locked in its central position for rigging purposes by inserting a rigging pin into rigging pin holes in the quadrant housing and the quadrant.

AILERON CONTROL CABLE CIRCUITS - INNER WING

67 The control cable circuits in each side of the inner wing are operated by linkages from the aileron rear quadrant to the wing cable tension regulator quadrants. Cables from these regulators run along the rear face of the rear spars to a quadrant mounted on the pivot point of each aileron actuator. A push rod connects each quadrant to its actuator linkage.

AILERON CONTROL LINKAGE (Fig 9)

68 The aileron control linkage for each aileron consists of seven bellcrank levers interconnected by a control rod. The third lever from the inboard end of the linkage is the master bellcrank lever, which is rotated about its pivot on rib 3 of the outer wing trailing edge by extension or retraction of the aileron actuator piston. Each bellcrank lever is connected to its corresponding control fitting on the aileron by an aileron control link. Rotation of the bellcranks causes fore-and-aft movement of the control links to lower or raise the aileron about the aileron hinge on the top skin.

69 The rear bearing of each aileron control link is an eccentric bearing with a notched

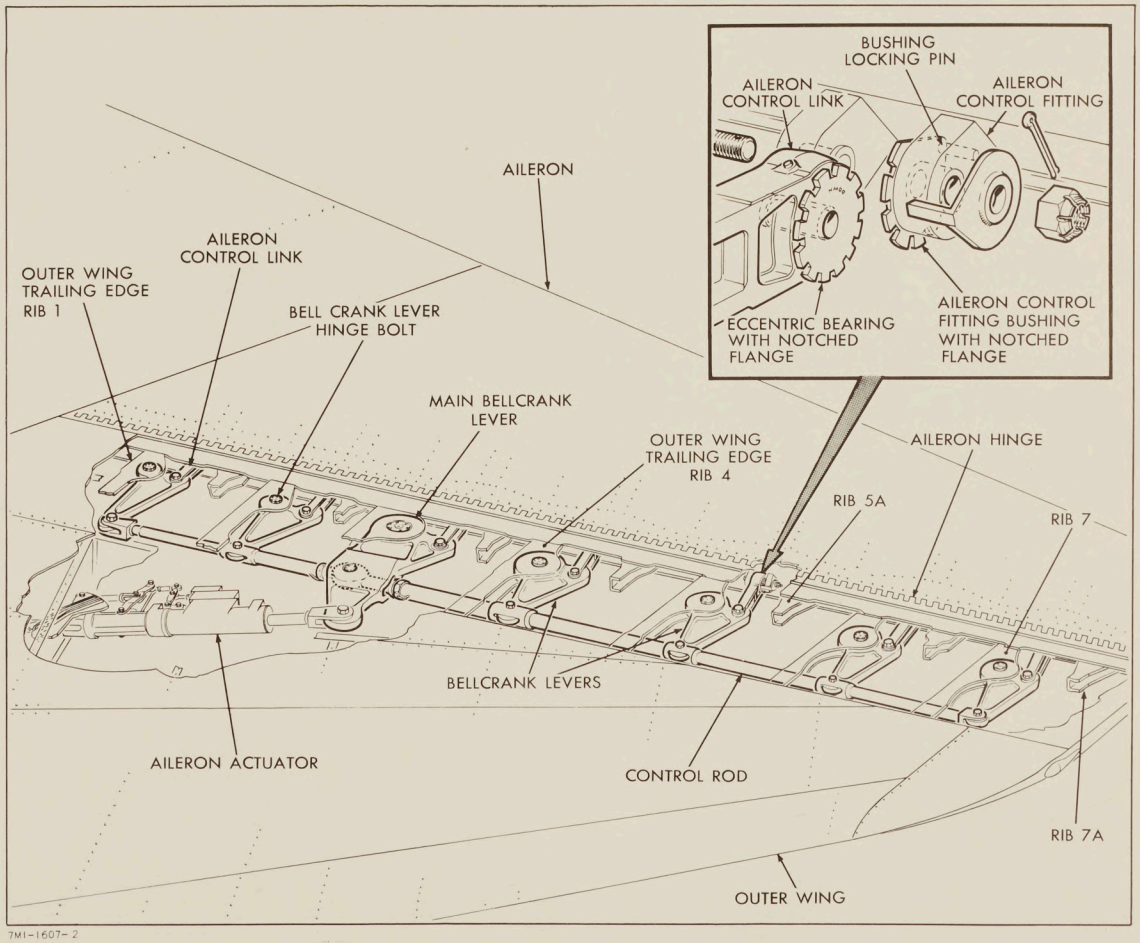



FIG. 9 AILERON CONTROL LINKAGE

flange, the rotation of which varies the pin centre length of the link for rigging purposes. Each eccentric bearing is locked in the desired position to a control fitting bushing with a notched flange by means of a tab washer. The bushing is locked to the control fitting by a bushing locking pin. The notches on the control fitting bushing are further apart than the notches on the bearing to provide for vernier adjustment of the eccentric bearing.

## RUDDER CONTROL CIRCUIT

70 Movement of the rudder pedals operates the rudder cables attached at the forward end of the rudder cable tension regulator quadrant through the rudder bar assembly. The cables run aft from the quadrant along each side of the armament bay. At the rear of the armament bay the cables then pass upwards and aft to the end of the duct bay where they pass up into the

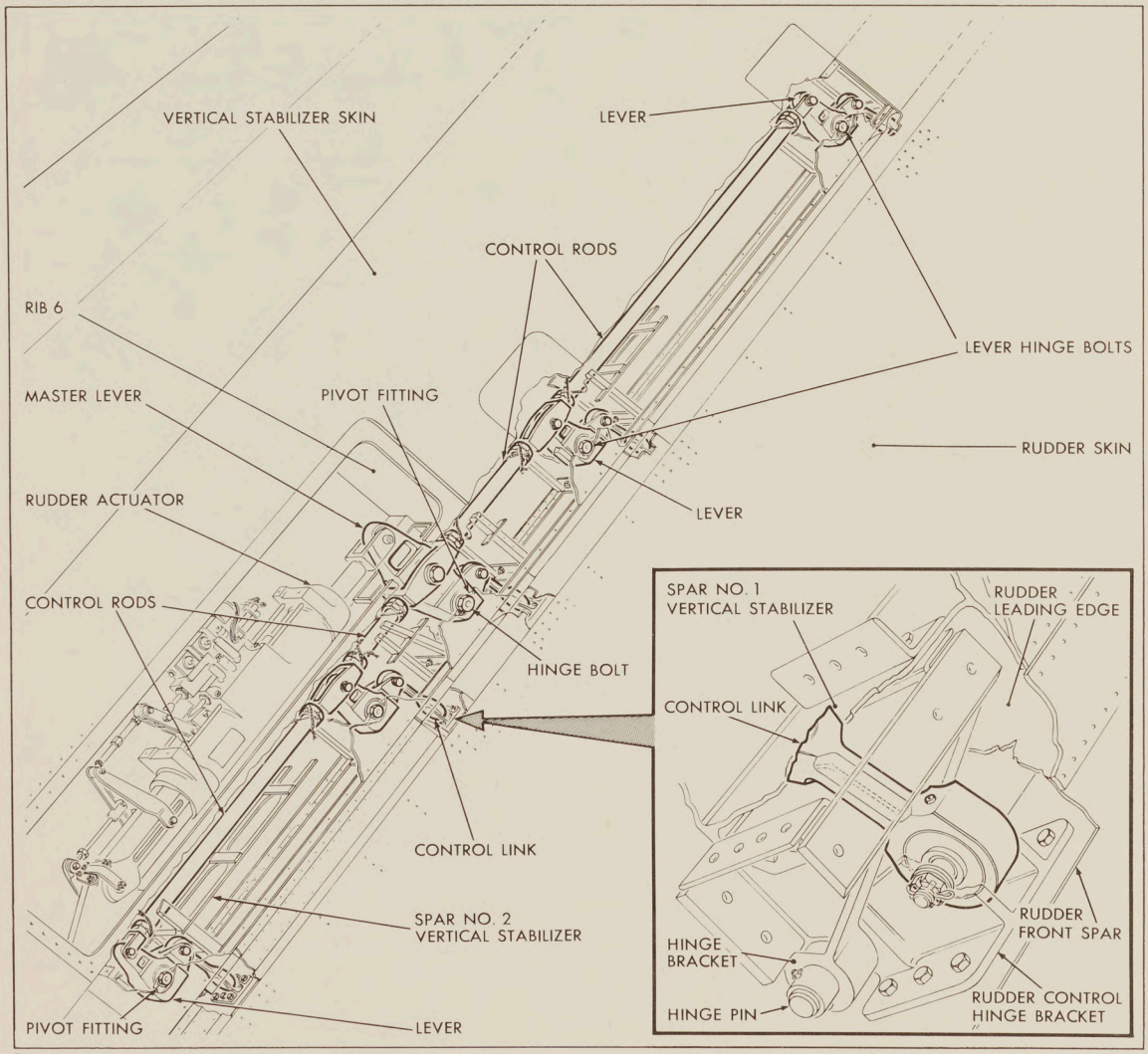



FIG. 10 RUDDER CONTROL LINKAGE

vertical stabilizer and terminate at a rudder rear quadrant. An electric trim unit is built integrally with the rear quadrant, and the feel-and-trim and hinge moment limitation system is attached to the quadrant. See para 84. The quadrant is linked to the rudder actuator linkage by a push-pull rod and a bellcrank lever. The actuator piston rod is attached to a system of mechanical linkage to convey movement to the control surface.

RUDDER CONTROL LINKAGE (Fig 10)

71 The rudder control linkage consists of five bellcrank levers interconnected by control rods. The centre lever is the master lever which is rotated about its pivot point by extension or retraction of the rudder actuator piston. Each bellcrank lever is connected to its corresponding rudder control hinge bracket by a control link. Rotation of the bellcranks causes fore-and-aft movement of the control links to turn the rudder about hinge pins at the right hand side of each of the five pick-up points. The control rods are adjustable for rigging purposes.

CABLE TENSION REGULATOR QUADRANTS IN FUSELAGE (Fig 11)

72 Three of these units are located in the nose wheel bay and compensate for structural deflections and temperature changes affecting the ailerons, elevators and rudder control cables.

73 Each cable tension regulator quadrant assembly consists of two half quadrants which rotate independently on bearings about the quadrant torque tube secured to the main body of the quadrant assembly. Each half quadrant is linked to an upper crossbar with an integral barrel which slides along a centre shaft at the forward end of the main body. Tensioning springs are secured at one end to the upper crossbar, and at the other end to the lower crossbar, which is pivot-mounted to the aft end of the main body.

74 Changes in cable tensions are compensated for by the tensioning springs which slide the barrel on the crossbar along the centre shaft, the movement being transmitted to the half quadrants through the links.

75 During a control movement the increased tension on one cable tilts the crossbar, locking the barrel on the centre shaft. Further movement rotates the complete assembly to operate the cables.

76 When the differential loading on the cables is released, the quadrant assembly returns to its central position and automatic cable tensioning recommences.

77 Provision is made to set or check cable tensions over a wide range of temperatures. A compensation scale is built integrally with each side of the main body of the quadrant. A line etched on each half quadrant is aligned with the appropriate setting on the respective compensation scale during tensioning of the cables. The total compensation range is 2.50 inches with each increment on the compensation scale measuring 0.125 inch, and cable tensions vary between 40 lb and 60 lb over the full range of compensation.

CABLE TENSION REGULATORS IN WINGS

78 The aileron cable tension regulator quadrants located aft of the rear spar at the inboard end of each side of the inner wing, are of the revolving type comprising two cable drums, one mounted immediately above the other. The aileron rear cable is secured to the top drum, and the aileron front cable is secured to the bottom drum. The drums, which are spring-loaded, rotate independently to compensate for changes in cable tensions when there is no differential load on the cables, and lock together to rotate simultaneously in the same direction during a control movement.

79 Provision is made to set or check cable tensions over a wide range of temperatures. Two compensation scales are etched on opposite sides of the top drum. A line etched on each side of the main body of the quadrant is aligned with the appropriate setting on the compensation scales during tensioning of the cables. The total compensation range is 1.28 inches per cable and the cable tensions vary between 40 lb and 60 lb over the full range of compensation.

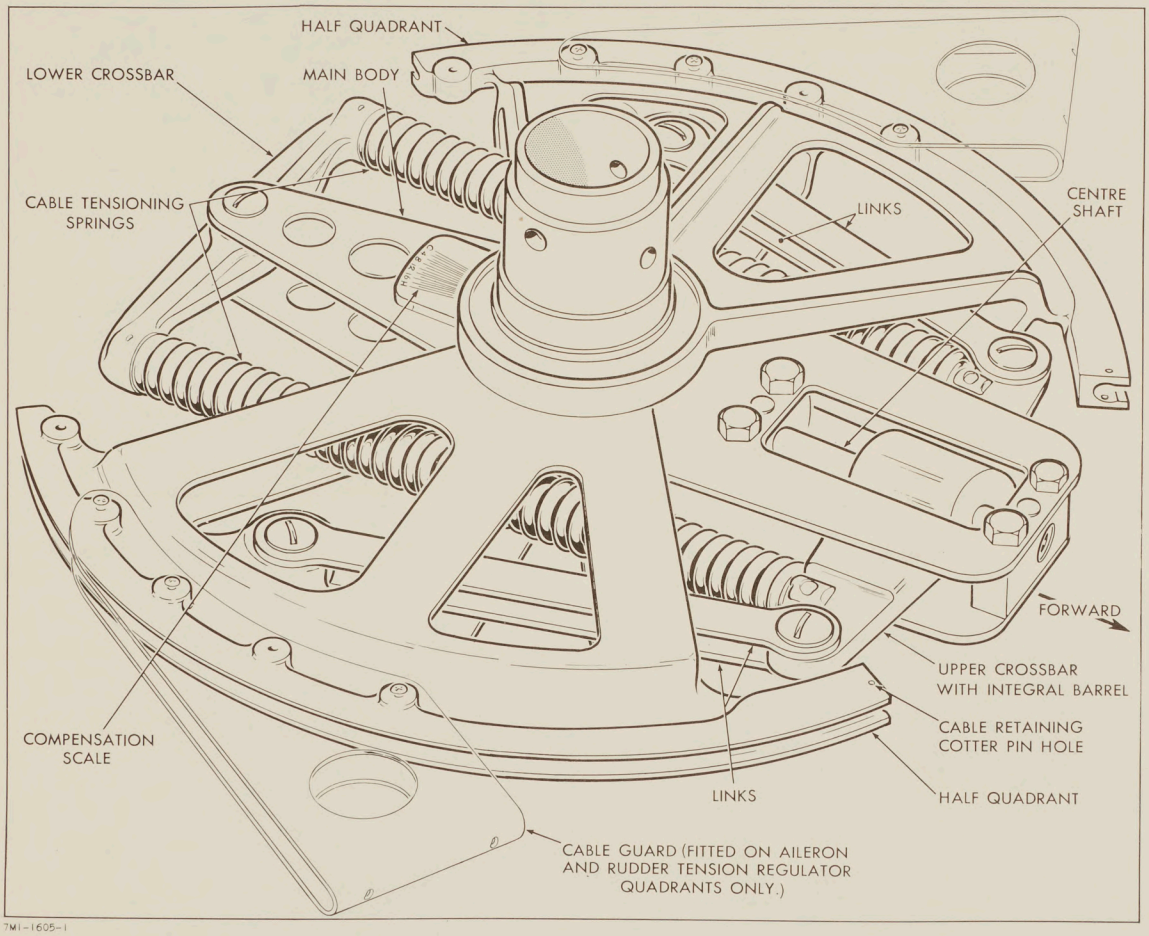
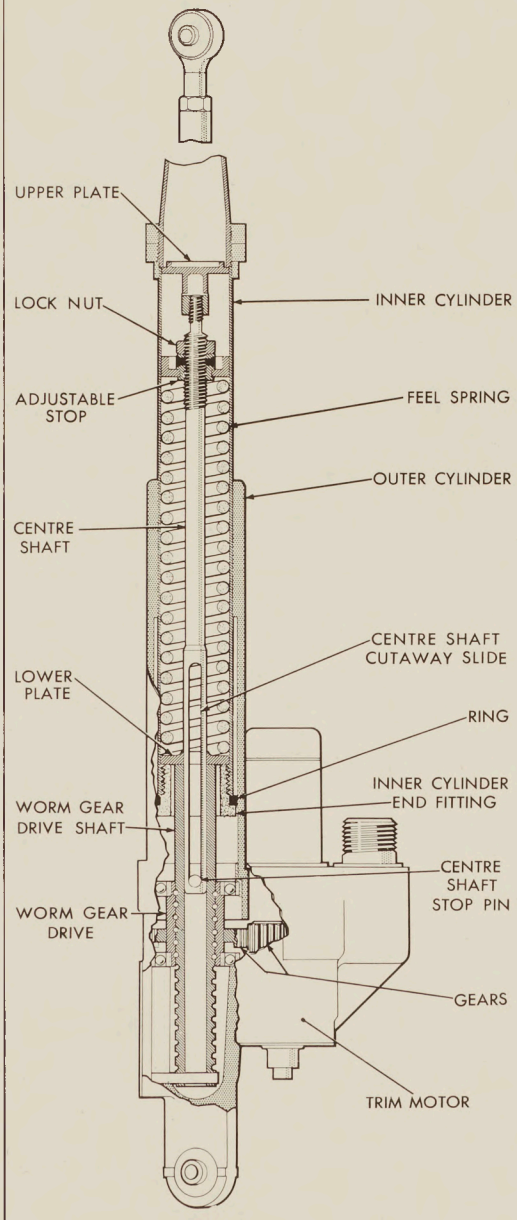



FIG. 11 CABLE TENSION REGULATOR QUADRANT (FUSELAGE)

ELEVATOR FEEL-AND-TRIM UNIT (Fig 12)

80 The elevator feel-and-trim unit allows adjustment of the elevators to achieve longitudinal trim and also provides pilot feel during the emergency mode of flight control. Trim is controlled by fore-and-aft movement of the four-way switch on the control column handgrip in the emergency mode, and trimming of the unit is automatically controlled by signals from a pressure pick-off operated by the pressure sensing ram in the parallel servo, in the normal mode. See para 31.

81 One end of the elevator feel-and-trim unit is connected to the elevator rear quadrant, and the other end is secured to an electric actuator operated elevator feel-and-trim emergency release mechanism. The release mechanism is fitted to permit the pilot to eliminate the feel-and-trim unit from the system in the event of jamming, seizing or runaway of the unit. The disengage unit is controlled by an ELEV TRIM DISENGAGE switch on the forward LH console in the pilot's cockpit. See fig 12 for the operation of the elevator feel-and-trim unit and fig 13 for the operation of the elevator feel-and-trim emergency release mechanism.




7MI-1613-1

**DESCRIPTION**

WITH THE TRIM CENTRAL, THE FEEL AND TRIM UNIT IS EXTENDED OR RETRACTED BY MOVEMENT OF THE ELEVATOR REAR QUADRANT FROM CENTRE. BOTH THE EXTENSION AND RETRACTION STROKES OF THE UNIT COMPRESS THE FEEL SPRING TO PROVIDE FEEL WHEN IN THE EMERGENCY MODE.

EXTENSION STROKE

THE INNER CYLINDER TELESCOPES WITHIN THE OUTER CYLINDER TO EXTEND THE UNIT, AND THE INNER CYLINDER END FITTING MOVES THE LOWER PLATE, COMPRESSING THE FEEL SPRING. THE UPPER END OF THE SPRING IS RETAINED BY THE ADJUSTABLE STOP SECURED TO THE CENTRE SHAFT. THE CENTRE SHAFT STOP PIN IN TURN HOLDS THE CENTRE SHAFT ASSEMBLY AGAINST THE SPRING.

RETRACTION STROKE

THE INNER CYLINDER TELESCOPES WITHIN THE OUTER CYLINDER TO RETRACT THE UNIT, AND THE UPPER PLATE SECURED TO THE INNER CYLINDER DEPRESSES THE CENTRE SHAFT ASSEMBLY COMPRESSING THE FEEL SPRING, AND SLIDING THE CENTRE SHAFT CUTAWAY ALONG THE CENTRE SHAFT STOP PIN. THE LOWER END OF THE FEEL SPRING IS RETAINED BY THE WORM GEAR DRIVE SHAFT.

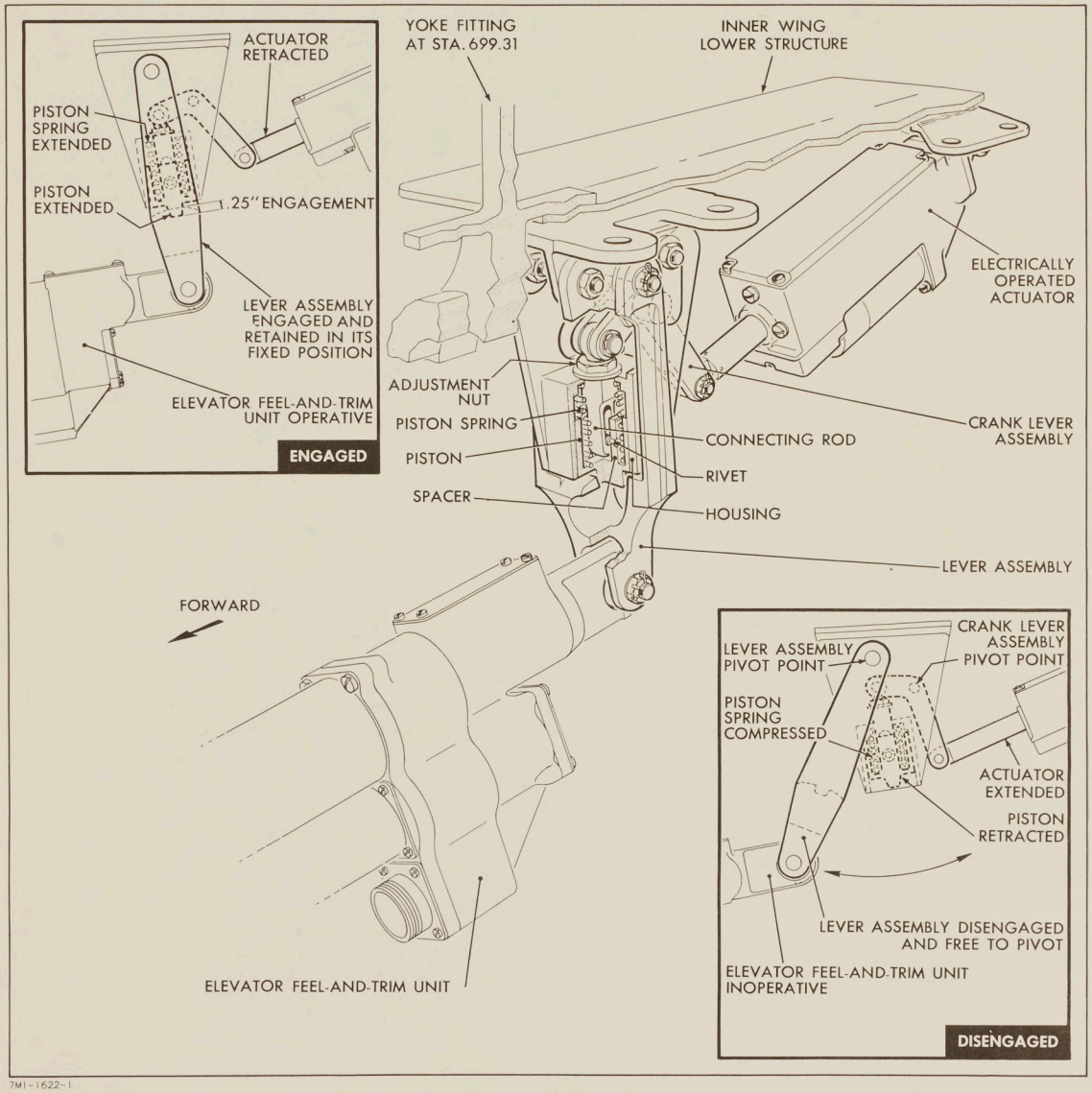
TRIMMING THE UNIT

THE NO-LOAD LENGTH OF THE UNIT MAY BE CHANGED BY THE ELECTRIC MOTOR OPERATED WORM GEAR DRIVE EXTENDING OR RETRACTING THE DRIVE SHAFT. THIS IN TURN RESETS THE LOWER PLATE AND THE CENTRE SHAFT STOP PIN, AND THE SPRING IS REPOSITIONED, CHANGING THE NO-LOAD LENGTH OF THE UNIT.

NOTE

THE TRIM DRIVE MECHANISM IS FITTED WITH A CLUTCH, WHICH DISENGAGES WHEN EXCESSIVE LOADS ARE FELT WITHIN THE MECHANISM. THIS ENABLES THE PILOT TO HOLD AGAINST A RUNAWAY TRIM MOTOR WITH A FORCE OF 65 LB. (APPROX.) AT THE CONTROL COLUMN.

FIG. 12 ELEVATOR FEEL-AND-TRIM UNIT SCHEMATIC




7MI-1622-I

FIG. 13 ELEVATOR FEEL-AND-TRIM EMERGENCY RELEASE MECHANISM

## AILERON FEEL-AND-TRIM UNIT

82 The aileron feel-and-trim unit allows adjustment of the ailerons to achieve lateral trim and also provides pilot feel during the emergency mode of flight control. Trim is controlled by lateral movement of the four-way switch on the control column handgrip.

83 One end of the feel-and-trim unit is connected by means of a lever to the aileron cable tension regulator torque tube in the nose wheel well, and the other end is secured to a bracket on the forward face of the former at station 176.00. The operation of the unit is similar to that of the elevator feel-and-trim unit, but there is no automatic feel trim

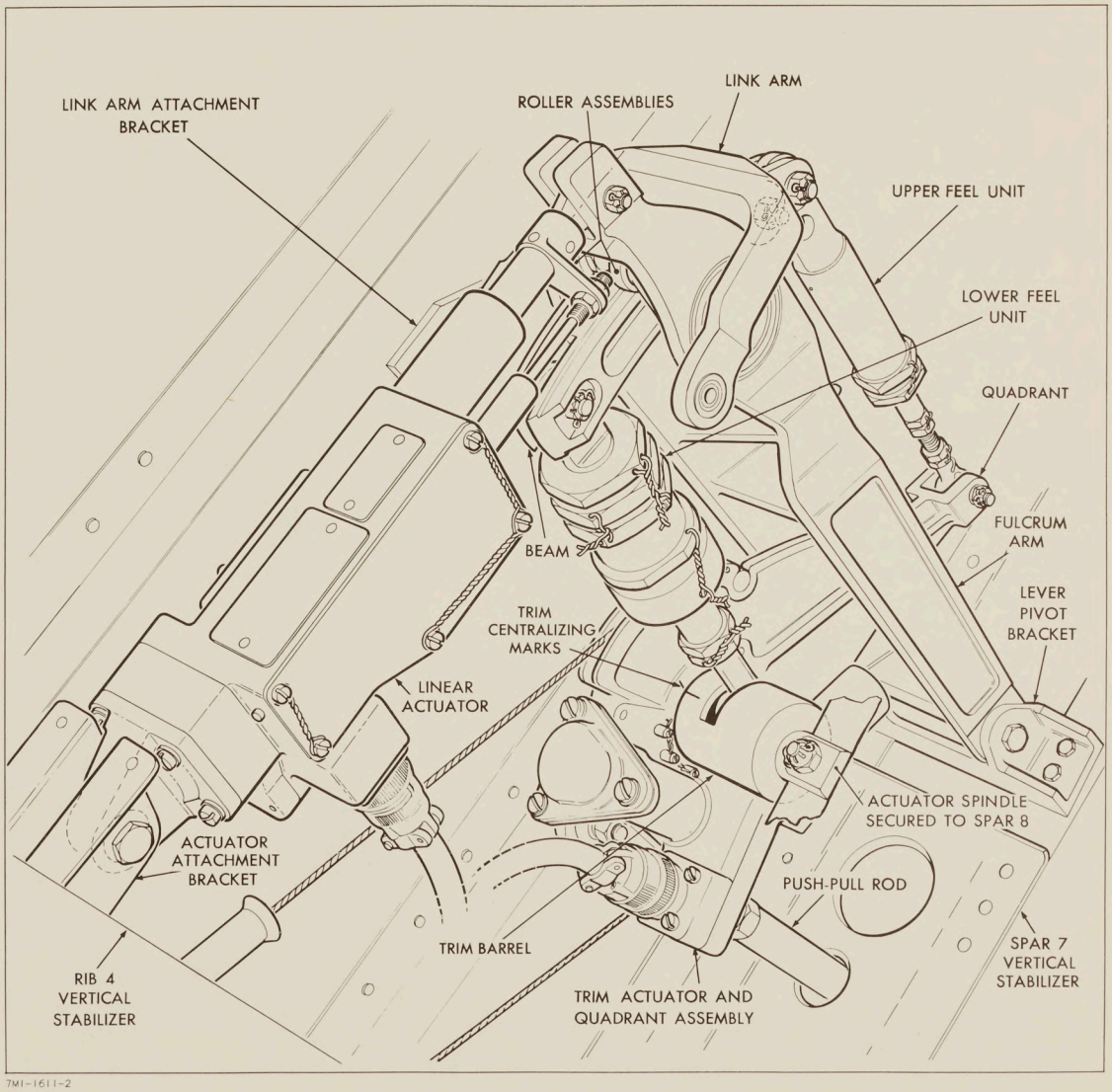
provision and no clutch is fitted to the trim drive.

RUDDER FEEL-AND-TRIM AND HINGE MOMENT LIMITATION SYSTEM
(Figs 14 and 15)

84 The rudder feel-and-trim and hinge moment limitation system located on the forward face of spar 7 in the vertical stabilizer performs the following functions:

(a) Supplies pilot feel.

(b) Progressively restricts rudder movement in proportion to the increase of aerodynamic loads on the rudder.




7MI-1611-2

FIG. 14 RUDDER FEEL-AND-TRIM AND HINGE MOMENT LIMITATION SYSTEM

(c) Resets the position of the rudder to achieve directional trim when the rudder trim switch on the LH console in the pilot's cockpit is operated.

85 The rudder feel-and-trim and hinge moment limitation system consists of a quadrant with an integral trim mechanism, an upper and a lower feel unit, a linear actuator and a fulcrum arm. The lower end of the upper feel unit is pivot mounted to the quadrant, and the lower end of the lower feel unit is pivot mounted to the quadrant through the trim mechanism. The feel units are interconnected at their upper ends by a beam, which is connected to the structure by a link arm. The beam is retained by rollers which are bearing mounted to the fulcrum arm. The linear actuator is secured to the structure at one end, and to the upper end of the fulcrum arm at the other end. The fulcrum arm is pivot mounted at its lower end to the structure. See inset 1 of fig 15.

86 The linear actuator is extended or retracted by signals which are proportional to indicated air speed. At low indicated air speeds, the linear actuator is in its fully retracted position, and the rollers on the fulcrum arm are positioned close to the beam lower pivot point. Because of the close proximity of the beam lower pivot point to the rollers and the comparatively large leverage from the beam upper pivot point to the rollers, the beam is able to tilt with a small compression of the spring in the lower feel unit. The spring in the upper feel unit is also compressed slightly to hold in equilibrium the forces on each side of the rollers. In this position 150 lb of pilot effort rotates the quadrant 30°. See inset 2 of fig 15.

NOTE

The springs are compressible from each end, and the degree of movement in each direction per given pilot effort is the same.

87 As airspeed increases, the linear actuator extends and the rollers on the fulcrum arm are repositioned progressively closer to the beam upper pivot point. The force required to tilt the beam and so rotate the quadrant is then increased due to the increased leverage between the rollers and the beam lower pivot point, and the force of the lower feel unit spring. Equilibrium is maintained by compression of the spring in the upper feel unit balancing the forces on each side of the rollers. When the linear actuator is fully extended, 150 lb of pilot effort rotates the quadrant 1-1/2°. See inset 3 of fig 15.

88 The electrically operated trim actuator resets the position of the lower attachment point of the lower feel unit with respect to the quadrant up to a maximum of 20° in the appropriate direction when LEFT or RIGHT is selected on the rudder trim switch.

89 Maximum trim movement can be obtained only at low airspeeds when the linear actuator is fully retracted. In this position, movement of the lower attachment point of the lower feel unit is very restricted owing to the small distance between the beam lower pivot point and the rollers. Consequently the operation of the trim motor rotates the quadrant with respect to the lower attachment point to tilt the beam and maintain its equilibrium by balancing the forces at each side of the fulcrum lever rollers. This resets the no-load position of the quadrant. See inset 4 of fig 15.

90 As airspeed increases and the linear actuator extends, the distance between the beam lower pivot point and the rollers increases, allowing more movement of the lower feel unit during trimming. In consequence, the rotation of the lower attachment point of the lower feel unit is increased, and the movement of the quadrant is decreased for a given angle of trim. See inset 5 of fig 15.

91 The trim unit may be set in its central position during rigging operations by operating the rudder trim switch to bring the trim centralizing lines on the quadrant and on the trim barrel into alignment.

SPEED BRAKES

92 Two hydraulically operated speed brakes are installed on the undersurface of the fuselage aft of the armament bay, one on each side of the centre line of the aircraft. The power to

# ARROW 1 SERVICE DATA

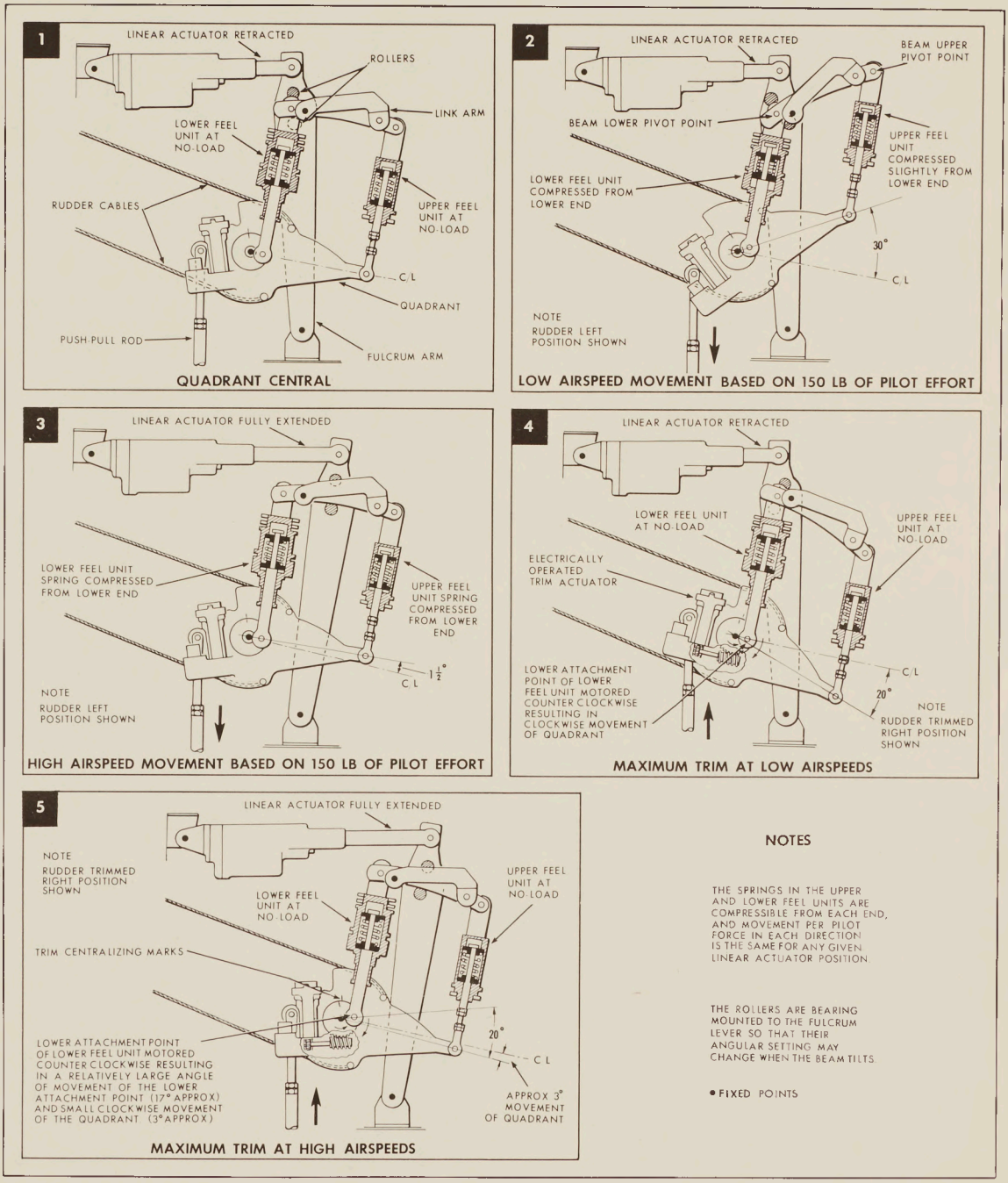



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FIG. 15 RUDDER FEEL-AND-TRIM AND HINGE MOMENT LIMITATION SYSTEM FUNCTION SCHEMATICS

# ARROW 1 SERVICE DATA



operate the speed brakes is derived from the Utility Hydraulic System. For the operation of the speed brakes, see Arrow 1 Service Data - Utility Hydraulics - Speed Brakes.

## RIGGING PROCEDURE

### GENERAL

93 Prior to any rigging operations, the aircraft must be left standing in a hangar at a regulated temperature for a minimum of 12 hours to allow the structure to assume the temperature of the ambient air.

94 Before proceeding to rig the flying controls, support the aircraft on jacks in the normal ground attitude and adjust as necessary to bring the aircraft to a laterally level position. See Arrow 1 Service Data - General Information. It is not necessary to place the aircraft in rigging position. For the purpose of the following instructions it is assumed that the elevators, ailerons and rudder surfaces, actuators, hydraulic lines and linkages are already installed, that the flying control hydraulic system is operative, and that the actuators, differential servos, control valves and linkages are correctly rigged and are set in their central position. See fig 16. It is also assumed that the control cables are fitted but not tensioned. For identification of cable routes see fig 1.

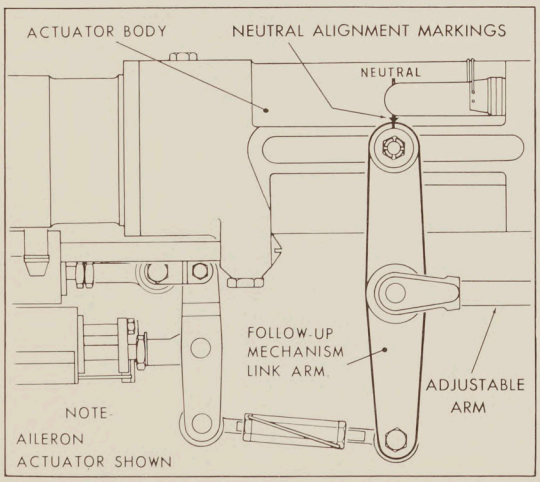


FIG. 16 NEUTRAL POSITION OF THE ACTUATOR LINKAGES

NOTE

The parallel servos and the aileron and elevator feel-and-trim units must not be connected to their respective quadrants until the initial rigging has been completed.

95 To avoid repetitive instructions, it is assumed that all turnbuckles are in safety and locked, and that all bolts, pins, nuts, washers, locknuts and bonding leads in the control linkages are correctly fitted and locked on completion of any rigging operation. It is also assumed that all covers, access panels and equipment removed for purposes of accessibility, are correctly replaced and secured on completion of the rigging operations.

96 In each of the following procedures, a hydraulic test machine trailer and an electric ground power unit must be connected to provide hydraulic and electrical power for movement of the control surfaces. See Arrow 1 Service Data - Flying Controls Hydraulics.

97 In these instructions, a control surface is said to be in the 'neutral' position when it is in line with its fixed surface (i.e. wing or vertical stabilizer). A control surface is said to be in its 'mean' position when it is in the central position of its travel. For the ailerons and rudder the 'neutral' position coincides with the 'mean' position. For the elevators, the 'mean' position is $5^{o}$ up with respect to 'neutral'.

### ELEVATOR CONTROLS

98 The procedure for rigging the elevator controls is as follows:

(a) Pin-lock the elevator tension regulator quadrant and the elevator rear quadrant in the mean position.

(b) Tension the elevator cables equally at the turnbuckles located below the armament bay roof until the reading on the compensation scales on the elevator tension regulator quadrant is at the appropriate setting for the ambient temperature. See fig 17.

# ARROW 1 SERVICE DATA

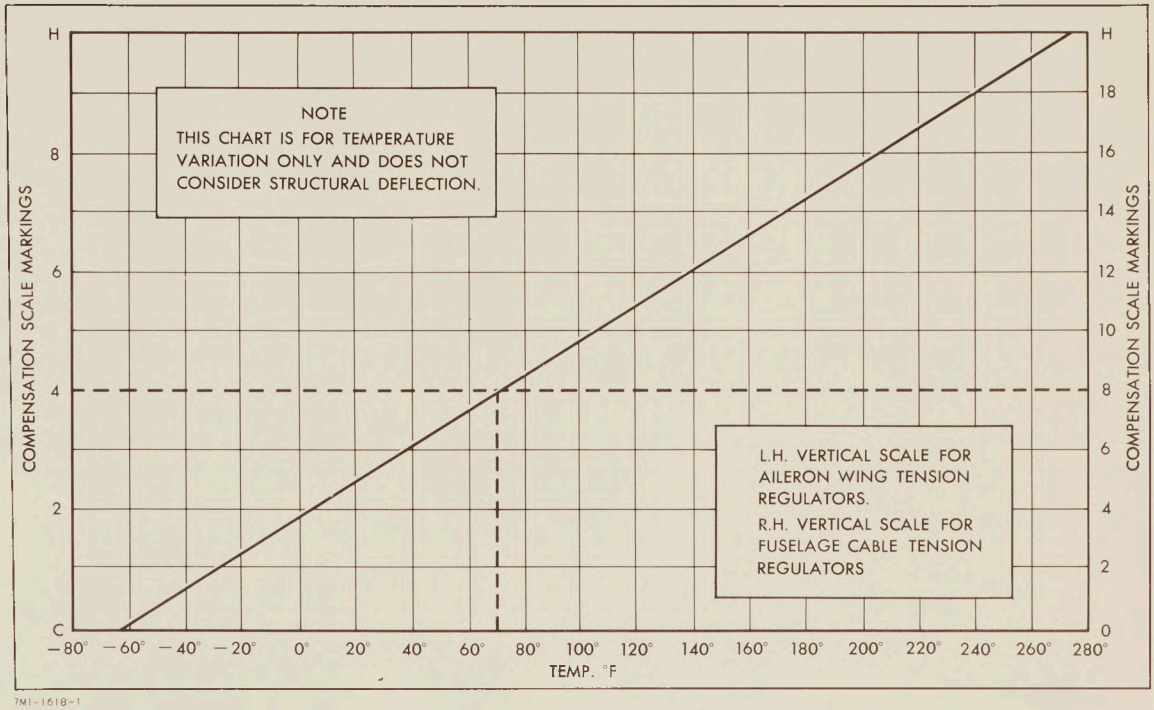


FIG. 17 PROVISIONAL CABLE TENSIONING CHART

NOTE

It is essential that both cables be tightened evenly or the tension regulator quadrant will lock and an inaccurate reading will be obtained.

CAUTION

It is not necessary to adjust or dismantle any of the cable tension regulator quadrants and it is dangerous to attempt to do so, as the springs, being under constant load, will react violently unless prevented by the proper restraining fixtures.

(c) Vibrate the cables to remove friction at the contact points along the cable run. Recheck the setting on the compensation scales and reset if necessary.

(d) Check the cable tensions with a tension meter. The reading should be between 40 lb and 60 lb (1/8 inch cable).

(e) Adjust the push rod from the bellcrank to the quadrant lever below the cockpit floor to set the control column in its mean position in the fore-and-aft plane. This setting is achieved by positioning the grip reference mark 11.34 inches aft of the face of the main instrument panel.

(f) Disconnect the elevator actuators from the elevator control linkages and set the elevators in their mean position (5° above neutral) using an inclinometer. Retain the elevators in position by means of the aileron and elevator support. See Arrow 1 Service Data - General Information.

NOTE

The neutral setting of the elevators may be obtained by aligning the elevator skins with the inner wing skins, by means of a straight edge, the forward end of which must not be placed more than 18 inches forward of the inner wing rear spar.

# ARROW 1 SERVICE DATA



(g) Check that the elevator actuators and linkages are in their central position (see fig 16) and adjust each piston rod end to line up with the hole at its attachment point in the elevator control linkage master bellcrank lever. Fit the bolts.

CAUTION

Do not alter the pre-set adjustment of the rods in the actuator linkages.

(h) Adjust the push-pull rods from the elevator rear quadrant so as to line up the fork ends with the holes at their attachment points in the bellcrank levers in the actuator linkages. Fit the bolts.

(j) Remove the rigging pins securing the elevator tension regulator quadrant and the elevator rear quadrant, and remove the aileron and elevator support.

(k) With hydraulic power on, check the ranges of movement. See fig 18. Adjust the travel limit stops in the nose wheel bay if necessary.

(m) Check that the full travel of the elevator corresponds with the full fore-and-aft movement of the control column. See fig 19.

(n) Set the elevator parallel servo to its fully extended position and, with the control column fully forward, adjust the servo rod end

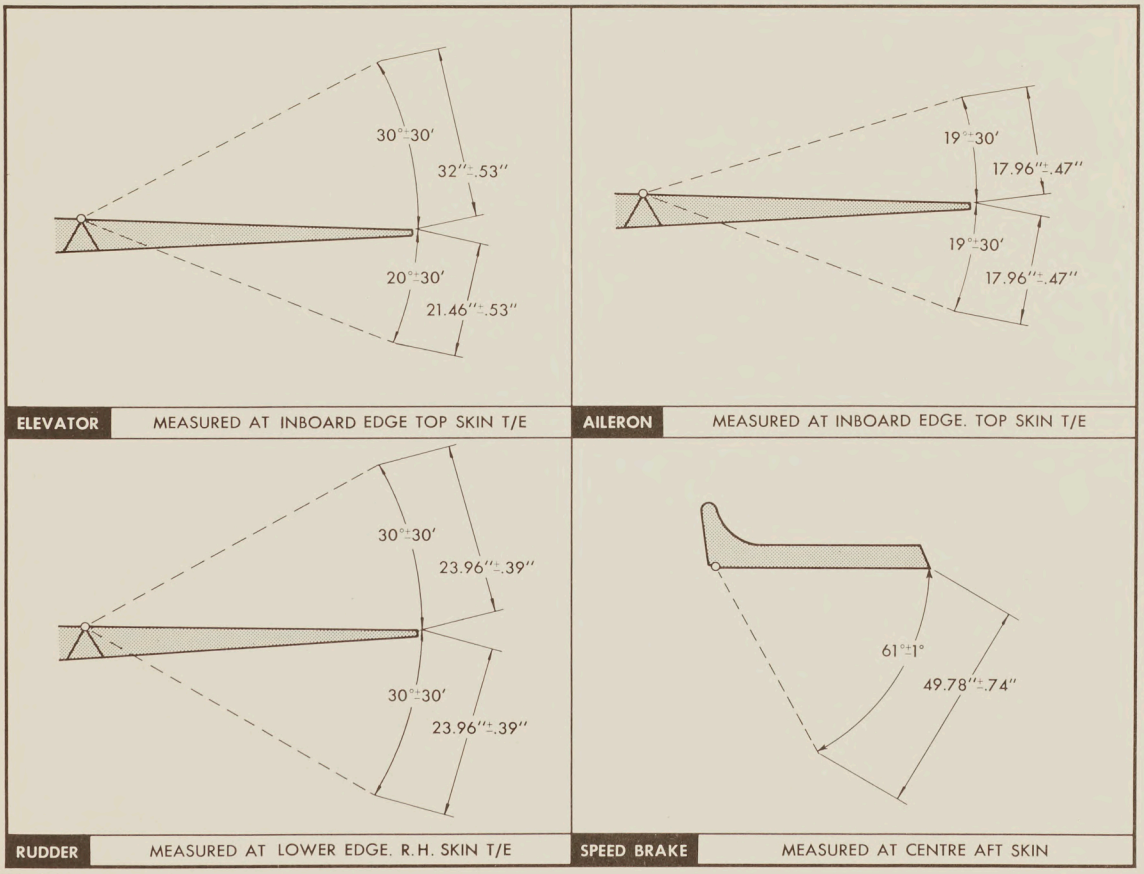


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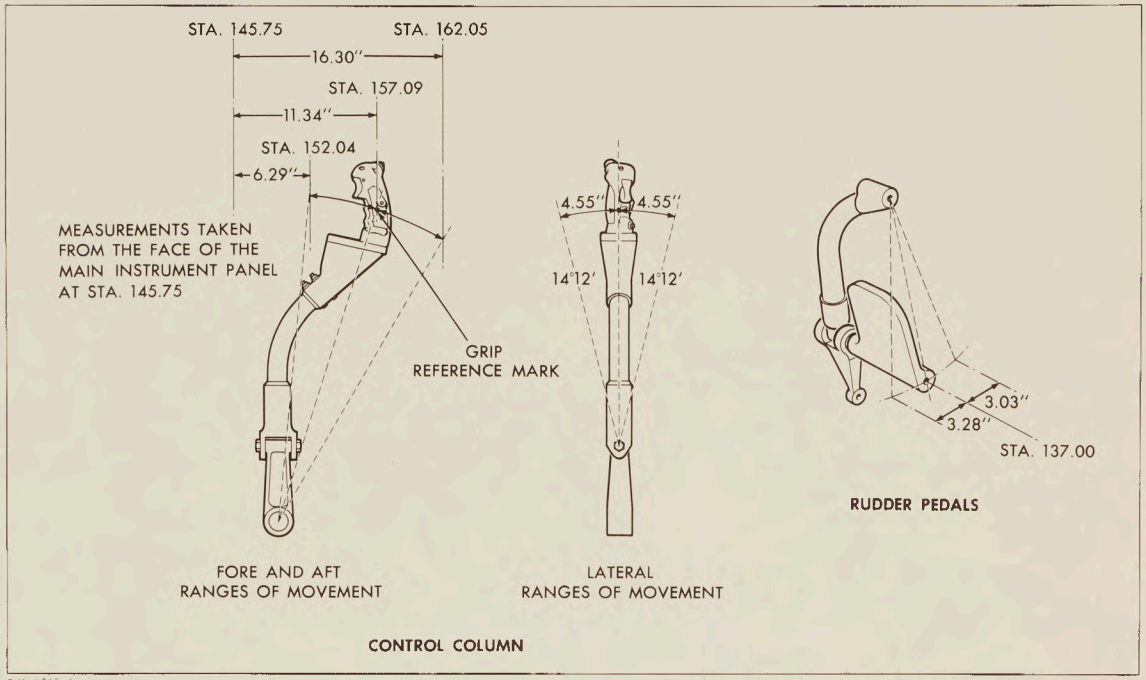
FIG. 18 RANGES OF MOVEMENT OF CONTROL SURFACES




7M1-1615-1

FIG. 19 RANGES OF MOVEMENT OF COCKPIT CONTROLS

to align with the hole in its attachment point on the elevator rear quadrant. Extend the rod end by one half turn and fit the bolt.

(p) Move the control column fully aft and re-check the travel to ensure that the inclusion of the parallel servo has not restricted travel.

(q) Set the control column to obtain an elevator setting of 18° up from neutral. This may be achieved by measuring the angle of the elevator at neutral by means of an inclinometer and resetting the elevator to an 18° difference reading on the inclinometer. Retain in position by placing a support below each elevator.

(r) Fully extend the elevator feel-and-trim unit by operating the four-way switch on the control column handgrip aft.

(s) Adjust the feel-and-trim unit rod end to align with the hole at its attachment point in the elevator rear quadrant. Fit the bolt.

(t) Remove the elevator supports and re-check the travel to ensure that the feel-and-trim unit has not restricted travel.

NOTE

Should travel be restricted in one direction, adjust the rod end of the feel-and-trim unit in the appropriate direction in small increments until full travel is obtained.

(u) Position the control column to set the elevator in its neutral position, and check the maximum elevator trim movements by operating the four-way switch on the control column handgrip to obtain full trim in each direction, and measuring the deflection of the elevators. The maximum trim movements must be as follows:

(1) Elevator up movement - 17° - 19° (18.34 - 20.34 inches) from neutral.

(2) Elevator down movement - 5.7°-7.7° (6.2 - 8.2 inches) from neutral.

AILERON CONTROLS

99 The procedure for rigging the aileron controls is as follows:

# ARROW 1 SERVICE DATA



(a) Pin-lock the aileron tension regulator quadrant and the aileron rear quadrant in the neutral position.

(b) Tension the aileron cables in the fuselage circuit equally at the turnbuckles located below the armament bay roof until the reading on the compensation scales on the aileron tension regulator quadrant is at the appropriate setting for the ambient temperature. See fig 17.

(c) Vibrate the cables to remove friction at the contact points along the cable run. Recheck the setting on the compensation scales and reset if necessary.

(d) Check the cable tensions with a tension meter. The reading should be between 40 lb and 60 lb (1/8 inch cable).

(e) Adjust the link from the control column aileron lever and the lever on the cable tension regulator torque tube located below the cockpit floor, to set the control column laterally vertical. This may be verified by placing an inclinometer on the side of the control column tube.

(f) Set each wing tension regulator to neutral by adjusting the push-pull rod from the aileron rear quadrant lever to the tension regulator lever until the rod is at 90° to the tension regulator lever with the holes in alignment. Fit the bolt.

(g) Disconnect the aileron actuators from the aileron control linkages and set the ailerons in the neutral position by aligning the aileron skins with the outer wing skins by means of a straight edge, the forward end of which must not be placed forward of the outer wing rear spar. Retain the ailerons in position by means of the aileron and elevator support. See Arrow 1 Service Data - General Information.

(h) Check that each aileron actuator and linkage is in its neutral position (see fig 16) and adjust each piston rod end to align with the hole at its attachment point in the aileron control linkage master bellcrank lever. Fit the bolt.

CAUTION

Do not alter the pre-set adjustment of the rods in the actuator linkages.

(j) Tension each set of aileron cables in the wing circuits equally, at the turnbuckles in the elevator actuator compartment in the inner wing, maintaining the neutral position of the actuators and linkages, until the reading on the compensation scales on the aileron wing tension regulator is at the appropriate setting for the ambient temperature. See fig 17.

(k) Vibrate the cables to remove friction at the contact points along the cable run. Recheck the settings on the compensation scales and reset if necessary.

(m) Check the cable tensions with the tension meter. The reading should be between 40 lb and 60 lb (1/8 inch cable).

(n) Remove the rigging pins securing the aileron tension regulator quadrant and the aileron rear quadrant, and remove the aileron and elevator support.

(p) With hydraulic power on, check the ranges of movement. See fig 18. Adjust the travel limit stops in the nose wheel bay if necessary.

(q) Check that the full travel of the ailerons corresponds with the full lateral travel of the control column. See fig 19.

(r) Set the aileron parallel servo to its fully extended position, and with the control column fully over to the left, align the servo rod end with the hole in its attachment point on the lever on the aileron rear quadrant torque tube. Extend the rod end by one half turn and fit the bolt.

(s) Move the control column fully over to the right and re-check the travel to ensure that the inclusion of the parallel servo has not restricted travel.

(t) Refit the rigging pins.

(u) Set the aileron feel-and-trim unit in its mean position, and adjust its rod end to align with the hole in its attachment point on the lever on the aileron cable tension regulator torque tube in the nose wheel bay. Fit the bolt.

NOTE

The feel-and-trim unit mean position may be established by fully extending the unit by operating the four-way switch on the control column handgrip and measuring the extended length of the unit, and then fully retracting the unit and measuring the retracted length. The mean position is the position midway between the extended and retracted positions.

(v) Remove the rigging pins and re-check the travel to ensure that the inclusion of the feel-and-trim unit has not restricted travel.

NOTE

Should travel be restricted in one direction, adjust the rod end of the feel-and-trim unit to obtain full travel.

(w) Position the control column to set the ailerons in the neutral position, and check the maximum trim movement by operating the four-way switch on the control column handgrip to obtain maximum trim, and measuring the deflection of each aileron. The maximum up and down movement of each aileron must be $7.5^{o}$ - $7.7^{o}$ (7.2 - 7.4 inches).

RUDDER CONTROLS

100 The procedure for rigging the rudder controls is as follows:

(a) Disconnect the rudder self centre unit at its attachment fitting on the travel limit arm.

(b) Pin-lock the rudder bar in the neutral position.

(c) Adjust the self centre unit rod end to align with the hole in its attachment fitting on the travel limit arm. Fit the bolt.

(d) Set the rudder rear quadrant in the neutral position as follows:

(1) Set the feel-and-trim actuator to neutral by operating the rudder trim switch on the LH console in the pilot's cockpit until the trim centralizing lines on the quadrant and the trim barrel are in alignment. See fig 14.

(2) Disconnect the linear actuator from the fulcrum lever arm.

(3) Rotate the quadrant until the fulcrum lever arm can be moved freely backwards and forwards between the two feel units without producing any quadrant movement.

(4) Reconnect the linear actuator.

(e) Tension the rudder cables equally at the turnbuckles located below the armament bay roof until the reading on the compensation scales on the rudder tension regulator quadrant is at the appropriate setting for the ambient temperature. See fig 17.

(f) Vibrate the cables to remove friction at the contact points along the cable run. Re-check the setting on the compensation scales and reset if necessary.

(g) Check the cable tensions with a tension meter. The reading should be between 40 lb and 60 lb (1/8 inch cable).

(h) Check that the rudder rear quadrant is still in neutral following cable tensioning.

(j) Set the rudder in its neutral position by aligning the rudder trailing edge with the vertical stabilizer trailing edge.

(k) Check that the rudder actuator and linkage is in the neutral position (see fig 16) and adjust the actuator rod end to align with the hole at its attachment point in the master bellcrank lever. Fit the bolt.

(m) Adjust the rod from the rudder rear quadrant to the actuator linkage to align with the hole at its attachment point in the bellcrank lever. Fit the bolt.

(n) Remove the rigging pin from the rudder travel limit arm.

(p) With hydraulic power on, check the ranges of movement. See fig 18. Adjust the travel limit stops in the cockpit if necessary.

(q) Check that the full movement of the rudder corresponds with the full fore-and-aft travel of the rudder pedals. See fig 19.

(r) Position the rudder pedals to set the rudder in its neutral position, and check the maximum trim movement by operating the rudder trim switch on the LH console in the pilot's cockpit to obtain maximum trim in each direction, and measuring the rudder deflection. The maximum rudder trim movements in each direction must be $19^{o}$ - $21^{o}$ (15.2 - 16.8 inches.

SPEED BRAKES

101 The procedure for rigging the speed brakes is as follows:

(a) Disconnect the speed brake jack rod ends from the speed brake levers.

(b) With hydraulic power on select IN on the speed brake selector. See Arrow 1 Service Data - Utility Hydraulics - Speed Brakes.

NOTE

The jacks must be held clear of the structure during their operation.

(c) Align the speed brakes with the surrounding skin line.

(d) Adjust the jack rod end to align with the hole at its attachment point in the brake lever. Fit the bolt.

(e) Operate the speed brake slowly to the OUT position and back to the IN position. Recheck the speed brake alignment with the skin.

NOTE

Any slight misalignment of the speed brakes must be corrected by a small adjustment of the jack rod ends.

(f) Operate the speed brakes to the OUT position and check the range of movement. See fig 19.

# ARROW 1 SERVICE DATA
## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Control Column | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1552-3 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Pilot's control for the operation of the ailerons and elevators.

LOCATION

Pilot's cockpit.

ACCESS

MEN X MINUTES

Unobstructed in the pilot's cockpit and nose landing gear well.

REPLACEMENT PROCEDURE

MEN X MINUTES

Bolt the aileron pivot lever to the aileron pivot support.
Bolt the aileron pivot lever to the aileron control link.
Bolt the electric cable clips, spacers, and bonding jumper to the aileron pivot support.
Connect the electrical connection.
Install the dust cover over the control column at the cockpit floor.
Check the control column mean position with the aileron and elevator tension regulator quadrant rigging pins fitted.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Check for security, damage, corrosion, wear, and freedom and range of movement. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hydraulic test machine trailer.
Cockpit access stand.
B4 stand.
Rigging pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Stick Force Transducer | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1552-383 | | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To transmit signals proportional to stick force via the electronic networks, to actuate the parallel servos.

LOCATION

At the top of the control column tube.

ACCESS — MEN X MINUTES

Unobstructed in the pilot's cockpit.

REPLACEMENT PROCEDURE — MEN X MINUTES

Replace the complete control column assembly.
See page 29.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Check for security, damage and corrosion. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hydraulic test machine trailer.
Electrical ground power unit.
Cockpit access stand.
Rigging pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Rudder Pedals | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1552-195, 6 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

Pilot's control for the operation of the rudder, the nose wheel steering and the brakes.

**LOCATION**

Pilot's cockpit.

**ACCESS** — MEN X MINUTES

Restricted owing to the close proximity of the main instrument panel.
It may be necessary to remove the main instrument panel.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

Align the pedal adjustment Bowden cables to the spring-loaded pawl mechanism. Fit the pin.
Bolt the tension spring to the pedal adjustment cable.
Align the upper hinge point to its bracket on the top longeron. Fit the bolt.
Bolt the brake push rod and the bonding clips to the brake lever.
Bolt the lower push rod and the bonding clip to the rudder pedal lever.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Check the pedal assembly for security, damage and corrosion, and for range and freedom of movement.<br>Check the operation of the pedal adjustment and parking brake. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hydraulic test machine trailer.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Aileron Feel-and-Trim Unit | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1552-341 | Airesearch | 39872-2 | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

**FUNCTION**

To provide trim adjustment, and pilot's artificial feel in the emergency mode of flight control.

**LOCATION**

Nose landing gear bay.

**ACCESS**

Unobstructed in the nose landing gear bay.

MEN X MINUTES

**REPLACEMENT PROCEDURE**

Bolt the unit to its bracket on the front face of the former at station 176.00.
Pin-lock the aileron cable tension regulator quadrant in neutral.
Set the feel-and-trim unit in its central position, and adjust the rod end to align with the hole at its attachment point on the regulator torque tube.
Bolt in position.
Connect the electrical connection.

MEN X MINUTES

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Check for security, damage, corrosion and wear.<br>Check the aileron controls for range and freedom of movement. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hydraulic test machine trailer.
B4 stand.
Rigging pin.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Elevator Feel-and-Trim Unit | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1562-247 | Airesearch | 39872-1 | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

**FUNCTION**

To provide trim adjustment and pilot's artificial feel in the emergency mode of flight control.
To provide automatic trim in the normal mode of flight control.

**LOCATION**

Engine bay.

**ACCESS** | MEN X MINUTES

Accessible through No. 3 service panel.

**REPLACEMENT PROCEDURE** | MEN X MINUTES

Bolt the unit to the attachment lever at station 701.67.
Pin-lock the elevator rear quadrant in the mean position.
Set the feel-and-trim unit in its central position and adjust the rod end to align with the hole at its attachment point on the elevator rear quadrant.
Bolt in position.
Connect the electrical connection.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Check for security, damage, corrosion and wear.<br>Check the elevator controls for range and freedom of movement. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hydraulic test machine trailer.
B4 stand.
Rigging pin.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Rudder Feel-and-Trim and Hinge Moment Limitation System | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1583-145 | Avro Aircraft Ltd. and Airesearch | Trim Unit - 39886<br>Linear Actuator -39852 | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

**FUNCTION**

To provide trim adjustment and pilot's artificial feel in the emergency mode of flight control.
To prevent inadvertent application of large rudder deflections at high speeds.

**LOCATION**

In the vertical stabilizer between spars 7 and 10, and ribs 4 and 5.

**ACCESS** — MEN X MINUTES

Through the access door in the LH side of the vertical stabilizer.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

Position the rear quadrant complete with trim actuator, linear actuator, and the feel and limitation mechanism to the vertical stabilizer. Fit the quadrant actuator spindle attachment bolts.
Bolt the link to the link attachment brackets.
Bolt the fulcrum lever to the lever pivot bracket.
Bolt the linear actuator to the actuator attachment bracket.
Bolt the push-pull rod from the rudder actuator linkage to the rear quadrant.
Connect the rudder cables to the rudder rear quadrant.
Fit the cotter pins.
Re-rig the rudder controls.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Check for security, damage, corrosion and wear.<br>Check for freedom and range of movement of the rudder controls. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hydraulic test machine trailer.
Electrical ground power unit.
B5 stand.
Rigging pin.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Aileron Cable Tension Regulator Quadrant in Fuselage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1552-165 | Pacific Scientific | XR86-5001-50-00 | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To compensate for temperature changes and structural deflections affecting the aileron cables in the fuselage.

**LOCATION**

Nose landing gear bay.

**ACCESS**

Unobstructed in the nose landing gear bay.

MEN X MINUTES

**REPLACEMENT PROCEDURE**

Slide the quadrant torque tube through the feel-and-trim unit lever into position in its bearings in the lever mounting.
Secure the aileron lever to the torque tube by means of one threaded taper pin.
Secure the feel-and-trim unit lever to the torque tube by means of one threaded taper pin.
Fit the aileron front cables to the quadrant.
Re-rig the aileron controls.

MEN X MINUTES

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Check for security, damage, corrosion and wear.<br>Check cable tensions and attachments. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cable tension meter.
B4 stand.
Rigging Pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Elevator Cable Tension Regulator Quadrant | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1552-165 | Pacific Scientific | XR86-5001-50-00 | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To compensate for temperature changes and structural deflections affecting the elevator cables.

LOCATION

Nose landing gear bay.

ACCESS

MEN X MINUTES

Unobstructed in the nose landing gear bay.

REPLACEMENT PROCEDURE

MEN X MINUTES

Secure the elevator cable tension regulator quadrant to the torque tube by means of two threaded taper pins.
Bolt the quadrant assembly support bracket to the structure.
Connect the push-pull rod from the elevator control linkage to the lever on the inboard end of the quadrant torque tube.
Connect the elevator control cables to the quadrant.
Re-rig the elevator controls.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Check for security, damage, corrosion and wear.<br>Check cable tensions and attachments. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cable tension meter.
B4 stand.
Rigging Pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Rudder Cable Tension Regulator Quadrant | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1552-165 | Pacific Scientific | XR86-5001-50-00 | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To compensate for temperature changes and structural deflections affecting the rudder cables.

LOCATION

Nose landing gear bay.

ACCESS

Unobstructed in the nose landing gear bay.

MEN X MINUTES

REPLACEMENT PROCEDURE

Insert the rudder cable tension regulator quadrant torque tube into the rudder pedestal bearing housing.
Secure the torque tube to the rudder bar cross tube fitting in the cockpit by means of two threaded taper pins.
Install and secure the nose wheel steering quadrant to the torque tube.
Connect the rudder cables to the quadrant.
Re-rig the rudder controls.

MEN X MINUTES

# ARROW 1 SERVICE DATA

UNCLASSIFIED

| INSPECTION | MEN X MINUTES |
|---|---|
| Check for security, damage, corrosion and wear.<br>Check cable tensions and attachments. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cable tension meter.
Cockpit access stand.
B4 stand.
Rigging pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Aileron Rear Fuselage Quadrant | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1562-143 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

**FUNCTION**

To relay the required control movement to the aileron actuators.

**LOCATION**

Engine bay.

**ACCESS** — MEN X MINUTES

Accessible through No. 3 service panel.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

With the aileron rear fuselage quadrant secure in its housing, bolt the assembly to its attachment brackets on the inner wing bottom skin.
Connect to the assembly the push-pull rods that lead to the aileron cable tension regulators in the wings.
Connect the aileron control cables in the fuselage to the aileron rear fuselage quadrant.
Re-rig the aileron controls.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Check for security, damage, corrosion and wear. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cable tension meter.
Rigging pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Elevator Rear Quadrant | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1562-163 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To relay control movement to the elevator actuators.

**LOCATION**

Engine bay.

**ACCESS** — MEN X MINUTES

Accessible through No. 3 service panel.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

With the elevator rear quadrant secure in its housing, bolt the assembly to its attachment brackets on the inner wing bottom skin.
Connect the push-pull rods to the lever at each end of the torque shaft.
Connect the elevator control cables to the elevator rear quadrant.
Re-rig the elevator controls.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Check for security, damage, corrosion and wear. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cable tension meter.
Rigging pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Aileron Cable Tension Regulators in Wings | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1562-207, 8 | Pacific Scientific | R75-9006-50-00 | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To compensate for temperature changes and structural deflections affecting cable circuits in the wings.

**LOCATION**

In the inner wing, adjacent to the elevator actuator.

**ACCESS**

Accessible through the elevator actuator compartment panel, on the top surface of the inner wing.

MEN X MINUTES

**REPLACEMENT PROCEDURE**

Bolt the aileron cable tension regulator in its position between the upper and lower skins of the inner wing.
Connect the push-pull rod attached to the aileron rear quadrant assembly, to the lever on the lower end of the regulator torque shaft.
Connect the aileron control cables in the wings to the pulleys of the cable tension regulators.
Re-rig the aileron controls.

MEN X MINUTES

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Check for security, damage, corrosion and wear.<br>Check cable tensions. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cockpit access stand.
Cable tension meter.
B4 stand.
Wing mats.
Rigging pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Aileron Fuselage Cables - Front | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1550-15, 16 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To convey control column lateral movement to the aileron rear quadrant.

**LOCATION**

Front fuselage - Centre fuselage.

**ACCESS** — MEN X MINUTES

In the nose landing gear well - unobstructed.
Through the air conditioning panel (76 screws).
Through the electronic equipment bay (33 camlocs).
In the armament bay with the missile pack lowered.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

Draw the new cables into position from rear to front.
Bolt the pulleys in position at station 228.00 and station 280.00.
Refit the clevis pins to the pulley bracket at station 188.48.
Fit the cables to the aileron cable tension regulator quadrant. Fit the cotter pins.
Fit the turnbuckles between the aileron front and rear cables.
Tension the aileron fuselage cables with the front and rear quadrants pin-locked neutral.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion and correct routing.<br>Check that the turnbuckles are in safety and are correctly locked.<br>Examine the cable attachment to the aileron cable tension regulator quadrant in the nose landing gear well. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Rigging pins.
Cable tension meter.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Aileron Fuselage Cables - Rear | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| L.H. 7-1562-391<br>R.H. 7-1562-387 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To convey control column lateral movement to the aileron rear quadrant.

**LOCATION**

Centre fuselage - Duct bay - Engine bay.

**ACCESS**

| | MEN X MINUTES |
|---|---|
| In the armament bay with the missile pack lowered.<br>Through the electrics bay access panel (62 camlocs).<br>Through No. 1 service panel (47 camlocs, eight screws), and through No. 2 service panel (42 camlocs) with the front flying controls compensator and the utility hydraulic accumulator removed.<br>Through No. 3 service panel (36 camlocs). | |

**REPLACEMENT PROCEDURE**

| | MEN X MINUTES |
|---|---|
| Draw the new cables into position from front to rear.<br>Refit the guide pin to the pulley bracket at station 629.00.<br>Bolt the pulleys in position at station 485 and station 512.00.<br>Fit the cables to the aileron rear quadrant. Fit the cotter pins.<br>Fit the turnbuckles between the aileron front and rear cables.<br>Tension the aileron fuselage cables with the front and rear quadrants pin-locked neutral. | |

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion and correct routing.<br>Check that the turnbuckles are in safety, and are correctly locked.<br>Examine the cable attachment to the aileron rear quadrant in the engine bay. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cable tension meter.
B4 stand.
Rigging pins.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Aileron Wing Cables | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| Front 7-1562-83<br>Rear 7-1562-85 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To convey movement of the aileron rear quadrant to the aileron actuators.

**LOCATION**

Inner wing trailing edge.

**ACCESS**

MEN X MINUTES

Accessible for inspection through the following panels:
1. Elevator jack access panels.
2. Aileron jack access panels.
3. Elevator bellcrank access panels.

Accessible for removal of cables by removing the elevator control box skin.

**REPLACEMENT PROCEDURE**

MEN X MINUTES

Draw the inboard cables into position, and secure to the wing tension regulator quadrant.
Draw the outboard cables into position, and secure to the actuator quadrant.
Refit all pulley guard pins and fairleads.
Fit the turnbuckles between the inboard and outboard cables.
Tension the aileron wing cables with the wing tension regulators set in the neutral position and the actuator linkages central.
Slide the cable shields into position and secure by means of one bolt to its outboard attachment bracket.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion, and correct routing.<br>Check that the turnbuckles are in safety, and are correctly locked.<br>Examine the cable attachments to the wing tension regulators and the actuator quadrants. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Cable tension meter.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Elevator Front Cables | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| Upper - 7-1550-11<br>Lower - 7-1550-12 | Avro Aircraft Ltd | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To convey control column fore-and-aft movement to the elevator rear quadrant.

**LOCATION**

Front fuselage - Centre fuselage.

**ACCESS** — MEN X MINUTES

In the nose landing gear well - unobstructed.
Through the air conditioning panel (76 screws).
Through the electronic equipment bay (33 camlocs).
In the armament bay with the missile pack lowered.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

Draw the new cables into position from rear to front.
Bolt the pulleys in position at station 280.00.
Refit the clevis pins to the pulley brackets at station 194.00 and station 228.00.
Fit the cables to the elevator tension regulator quadrant.
Fit the cotter pins.
Fit the turnbuckles between the elevator front and rear cables.
Tension the elevator cables with the front and rear quadrants pin-locked in the mean position.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion, and correct routing.<br>Check that the turnbuckles are in safety, and are correctly locked.<br>Examine the cable attachments to the elevator tension regulator quadrant. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Rigging pins.
Cable tension meter.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Elevator Rear Cables | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| Upper - 7-1562-334<br>Lower - 7-1562-335 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To convey control column fore-and-aft movement to the elevator rear quadrant.

**LOCATION**

Centre fuselage - Duct bay - Engine bay.

**ACCESS**

| | MEN X MINUTES | |
|---|---|---|
| In the armament bay with the missile pack lowered.<br>Through the electrics bay access panel (62 camlocs).<br>Through No. 1 service panel (47 camlocs eight screws), and through No. 2 service panel (42 camlocs) with the front flying controls compensator and the utility hydraulics accumulator removed.<br>Through No. 3 service panel. | | |

**REPLACEMENT PROCEDURE**

| | MEN X MINUTES | |
|---|---|---|
| Draw the new cables into position from front to rear.<br>Refit the guide pin to the pulley bracket at station 620.49.<br>Bolt the pulleys in position at station 485 and station 512.<br>Fit the cables to the elevator rear quadrant.<br>Fit the cotter pins.<br>Fit the turnbuckles between the elevator front and rear cables.<br>Tension the elevator cables with the front and rear quadrants pin-locked in the mean position. | | |

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion and correct routing of cables. Check that the turnbuckles are in safety, and are correctly locked. Examine the cable attachments to the elevator rear quadrant. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Rigging pins.
Cable tension meter.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Rudder Front Cables | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| L.H. - 7-1550-14<br>R.H. - 7-1550-13 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

**FUNCTION**

To convey movement of the rudder pedals to the rudder rear quadrant.

**LOCATION**

Front fuselage - Centre fuselage.

**ACCESS**

MEN X MINUTES

In the nose landing gear well - Unobstructed.
Through the air conditioning panel (76 screws).
Through the electronic equipment bay (33 camlocs).
In the armament bay with the missile pack lowered.

**REPLACEMENT PROCEDURE**

MEN X MINUTES

Draw the new cable into position from rear to front.
Bolt the pulleys in position at station 228.00 and station 280.00.
Refit the clevis pins to the pulley bracket at station 188.00.
Fit the cables to the rudder cable tension regulator quadrant. Fit the cotter pins.
Fit the turnbuckles between the rudder front and rear cables.
Tension the rudder cables with the rudder bar pin-locked central, and the rudder rear quadrant set in its central position.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion and correct routing of cables.<br>Check that the turnbuckles are in safety and are correctly locked.<br>Examine the cable attachments to the elevator rear quadrant. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Rigging pins.
Cable tension meter.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Rudder Centre Cables | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| L.H. - 7-1562-355<br>R.H. - 7-1562-357 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To convey movement of the rudder pedals to the rudder rear quadrant.

**LOCATION**

Centre fuselage - Duct bay.

**ACCESS**

MEN X MINUTES

In the armament bay with the missile pack lowered.
Through the electrics bay access panel (62 camlocs).
Through the hydraulic bay access panel (52 camlocs), with the utility hydraulics compensator removed.

**REPLACEMENT PROCEDURE**

MEN X MINUTES

Draw the new cables in position from front to rear.
Feed the rudder rear cables through the cable shields.
Connect the rudder centre cables to the rudder rear cables.
Clip the cable shields in position.
Bolt the pulleys in position at station 485.00 and station 507.52.
Fit the turnbuckles between the rudder front and centre cables.
Tension the rudder cables with the rudder bar pin-locked central, and the rudder rear quadrant set in its central position.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion and correct routing of cables. Check that the turnbuckles are in safety, and are correctly locked.<br>Examine the cable attachments to the elevator rear quadrant. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Rigging pins.
Cable tension meter.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Rudder Rear Cables | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| L.H. - 7-1583-171<br>R.H. - 7-1583-177 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To convey rudder pedal movement to the rudder rear quadrant.

**LOCATION**

Duct bay - Vertical stabilizer.

**ACCESS**

MEN X MINUTES

Through the hydraulic bay access panel (52 camlocs) with the utility hydraulics compensator removed.
Through the hinge moment limiter access panel on the L.H. side of the vertical stabilizer (61 screws).

**REPLACEMENT PROCEDURE**

MEN X MINUTES

Draw the new cables into position from the duct bay through the vertical stabilizer.
Fit the cables to the rudder rear quadrant.
Fit the cotter pins.
Feed the rudder rear cables through the cable shields.
Connect the rudder centre cables to the rudder rear cables.
Clip the cable shields in position.
Tension the rudder cables with the rudder bar pin-locked central and the rudder rear quadrant set in its central position.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| Examine the cables for fraying, pulled swaged ends, corrosion and correct routing of cables. Check that the turnbuckles are in safety and are correctly locked. Examine the cable attachments to the elevator rear quadrant. | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Rigging pins.
Cable tension meter.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Bellcrank Levers - Aileron Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| See Remarks column | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN- ESTIMATED- 50 hours initially

**FUNCTION**

To connect the aileron control rod via links to the aileron.

**LOCATION**

Outer wing trailing edge.

**ACCESS**

MEN X MINUTES

Accessible for lubrication through lubrication access holes in the bottom skin of the aileron control box. Accessible for removal of levers only when the aileron control box is removed from the wing.

**REPLACEMENT PROCEDURE**

MEN X MINUTES

Fit the bellcrank levers to the control rod.
Position the control rod and lever assembly to the control box. Fit the pivot bolts.
Bolt the aileron control links to the bellcrank levers.
Refit the rib anchor nut plates.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES |
|---|---|
| | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Mobile cradle.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

Bellcrank lever part numbers are as follows:

No. 1 - 7-1564-525,6
No. 2 - 7-1564-533,4
No. 3 - 7-1564-541,2
No. 4 - 7-1564-547,8
No. 5 - 7-1564-555,6
No. 6 - 7-1564-563,4
No. 7 - 7-1564-571,2

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Control Rod - Aileron Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1564-257 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To connect the aileron bellcrank levers and synchronize their movements.

**LOCATION**

Outer wing trailing edge.

**ACCESS**

MEN X MINUTES

Accessible only when the aileron control box is removed from the outer wing.

**REPLACEMENT PROCEDURE**

MEN X MINUTES

The replacement procedure is the same as for the aileron bellcrank levers. See page 69.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES |
|---|---|
| | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Mobile cradle.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA



## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Link - Aileron Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1564-531, -537, -545 -533, -561, -567, -573 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 50 hours initially

**FUNCTION**

To connect the bellcrank levers to the aileron.

**LOCATION**

Outer wing trailing edge.

**ACCESS**

Unobstructed when the aileron is raised.

MEN X MINUTES

**REPLACEMENT PROCEDURE**

With the aileron in the fully 'up' position, remove and replace the links one at a time, adjusting the eccentric bearing with notched flange to obtain alignment.
Bolt and lock in position.
Refit the link fairings.
Check that the neutral position of the aileron corresponds to the centre position of the actuator linkage.

MEN X MINUTES

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Hydraulic test machine trailer.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA
## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Bellcrank Levers - Elevator Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| Standard - 7-1562-603, 4<br>Master - 7-1562-605, 6 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 50 hours initially

**FUNCTION**

To connect the elevator control rod via links to the elevator.

**LOCATION**

Inner wing trailing edge.

**ACCESS** — MEN X MINUTES

Accessible with the elevator control box lower skin removed - 500 screws (approx.).

**REPLACEMENT PROCEDURE** — MEN X MINUTES

Position each bellcrank lever to its pivot fitting.
Fit the pivot bolt.
Bolt the bellcrank levers to the control rod.
Bolt the elevator actuator rod end to the master bellcrank lever.
Bolt the links to the bellcrank levers.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES |
|---|---|
| | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Hydraulic test machine trailer.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Control Rod - Elevator Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1562-14 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

**FUNCTION**

To connect the elevator bellcrank levers and synchronize their movement.

**LOCATION**

Inner wing trailing edge.

**ACCESS** — MEN X MINUTES

Accessible for inspection through two access panels - 25 screws and 11 screws respectively.
Accessible for removal only when the elevator control box is removed from the inner wing.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

Slide the control rod into position from outboard to inboard.
Fit the bellcrank levers. See page 75.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES |
|---|---|
| Check for cracks, corrosion, damage and wear. | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
B5 stand.
Hydraulic test machine trailer.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Link - Elevator Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1562-617 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 50 hours initially

FUNCTION

To connect the elevator bellcrank levers to the elevator.

LOCATION

Inner wing trailing edge.

ACCESS

MEN X MINUTES

Accessible with the elevator control box lower skin removed - 500 screws (approx.).

REPLACEMENT PROCEDURE

MEN X MINUTES

With the elevator in the fully 'up' position, remove and replace the links one at a time, adjusting the eccentric bearing with notched flange to obtain alignment.
Bolt and lock in position.
Check that the elevator mean position corresponds with the centre position of the actuator linkage.

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Hydraulic test machine trailer.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA
## COMPONENT DATA SHEET

| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Bellcrank Levers - Rudder Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1583-221 7-1583-223 7-1583-225 7-1583-227 7-1583-229 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 50 hours initially

FUNCTION

To connect the rudder control rod via links to the rudder.

LOCATION

Vertical stabilizer trailing edge.

ACCESS

Accessible only when the rudder control box is removed from the vertical stabilizer.

MEN X MINUTES

REPLACEMENT PROCEDURE

MEN X MINUTES

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
B5 stand.
Aerostand.
Control box support sling.
Hydraulic test machine trailer.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA
## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Control Rods - Rudder Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1583-275,6,7,8 | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To connect the rudder bellcrank levers and synchronize their movements.

LOCATION

Vertical stabilizer trailing edge.

ACCESS

MEN X MINUTES

Limited accessibility for inspection through access holes.
Accessible for removal only when the rudder control box is removed from the vertical stabilizer.

REPLACEMENT PROCEDURE

MEN X MINUTES

# ARROW 1 SERVICE DATA

| INSPECTION | MEN X MINUTES | |
|---|---|---|
| | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
B5 stand.
Aerostand.
Control box support sling.
Hydraulic test machine trailer.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Link - Rudder Control Linkage | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1583-257 (Links 1, 2, 4, 5)<br>7-1583-255 (Link 3) | Avro Aircraft Ltd. | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 50 hours initially

**FUNCTION**

To connect the rudder bellcrank levers to the rudder.

**LOCATION**

Vertical stabilizer trailing edge.

**ACCESS**

Unobstructed with the rudder hard over to the right.

MEN X MINUTES

**REPLACEMENT PROCEDURE**

With the rudder held hard over to the right, bolt the link to the bellcrank lever and to the rudder control hinge bracket.

MEN X MINUTES

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES |
|---|---|
| | |

| FUNCTIONAL CHECKS | MEN X MINUTES |
|---|---|
| | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
B5 stand.
Hydraulic test machine trailer.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

# ARROW 1 SERVICE DATA

## COMPONENT DATA SHEET



| SYSTEM | SUB-SYSTEM | COMPONENT | REF. NO. |
|---|---|---|---|
| FLYING CONTROLS MECHANICAL | | Bearings - Flying Control Linkages | 15 |

| AVRO PART NO. | MANUFACTURER | MAN'F'R'S PART NO. | AIRCRAFT EFFECTIVITY |
|---|---|---|---|
| 7-1500-21 | Shafer | | 25201 |

OVERHAUL LIFE: KNOWN– ESTIMATED– 50 hours initially

**FUNCTION**

To provide smooth low friction movement of the linkages between the actuators and the control surfaces.

**LOCATION**

In the elevator, aileron and rudder linkages.

**ACCESS** — MEN X MINUTES

Accessible for lubrication with the control box access panels and plugs removed.

**REPLACEMENT PROCEDURE** — MEN X MINUTES

The bearings are a shrink fit and must not be removed and replaced. Complete replacement of the relevant bellcrank levers and/or the links must be carried out if bearings are faulty.

# ARROW 1 SERVICE DATA



| INSPECTION | MEN X MINUTES | |
|---|---|---|
| | | |

| FUNCTIONAL CHECKS | MEN X MINUTES | |
|---|---|---|
| | | |

GROUND HANDLING AND GROUND TEST EQUIPMENT

Mobile cradles and slings.
B4 stand.
B5 stand.
Aerostand.
Hydraulic test machine trailer.
Electrical ground power unit.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS