ARROW 1 SERVICE DATA

SECTION 28

ENGINE INTAKE AND RAMP DE-ICING SYSTEM

This data supersedes previous issue dated 14 Dec 56

CONFIDENTIAL

ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The engine air intake ducts and ramps are de-iced by an electro-thermal de-icing boot system. The area protected extends from the ramp leading edge to a point approximately 12 inches inside the air intake duct.

2 Each intake and ramp is fitted with seven neoprene rubber boots with moulded in heating elements for shedding areas and parting strips. Three boots cover the ramp and four cover the intake duct. The boots are attached to the aircraft skin by adhesive EC 1300L and can be removed and replaced individually. The ramp leading edge and the boundary layer bleed area are covered by thin stainless steel sheet for protection, and to assist distribution of heat in the boundary layer bleed area.

3 Thermo-switches are fitted behind the boots in each shedding area and at critical points in the parting strips to prevent overheating of the elements. The wiring for the heating and parting strip elements and for the thermo-switches is led through the aircraft skin from a short grommet moulded to each boot.

4 Each engine supplies the electrical power to de-ice its own intake so that in case of an engine failure, the intake of the operating engine is maintained free of ice.

5 For description and operation of the electrical system see Arrow 1 Service Data - Electrical System - Engine Intake De-icing.

REMOVAL AND INSTALLATION

GENERAL

6 Extreme care must be used when handling the de-icer boots to prevent damage to the moulded in electrical heating elements and excessive bending or twisting must be avoided. Stretching must also be avoided especially during removal, as a permanent stretch set will produce wrinkling on replacement.

7 If more than one boot is removed install the boot sections in the following sequence: Nos. 7, 1, 2, 6, 3, 5 and 4. This sequence is used both during preliminary fitting and on installation.

CAUTION

When using adhesive EC 1300L and Toluene, Methyl Ethyl Ketone and FO 136 solvents, strict precautions against fire hazards must be observed as the adhesive and the solvents are highly inflammable.

DE-ICER BOOT REMOVAL

8 The following procedure must be used to remove an unserviceable de-icer boot:

(a) Disconnect the electrical connections.

(b) Apply a minimum amount of Methyl Ethyl Ketone to the bond line, to soften the adhesive. Tension should be applied to peel back the boot while the solvent is applied to the bond line. The removal must be slow enough to allow the solvent to undercut the adhesive and prevent damage to the boot. The solvent should not be allowed to contact the adhesive of the adjacent boots in quantities sufficient to soften the bond line.

DE-ICER BOOT PRELIMINARY FITTING

9 To obtain a preliminary fitting of a de-icer boot, proceed as follows:

(a) Pass the de-icer boot electrical leads through the hole in the structure and position the boot. In the case of boot No. 1 position the metal leading edge of the boot to line up with the leading edge of the ramp. No. 7 boot is positioned to line up the bleed air holes in the boot with those on the ramp.

(b) Check that the electrical lead grommets and the electro-thermal switches do not foul the edge of the holes.

(c) Trim the edges of the boot to fit as required. It should not be necessary to trim inside the mould lines to obtain a perfect fit.

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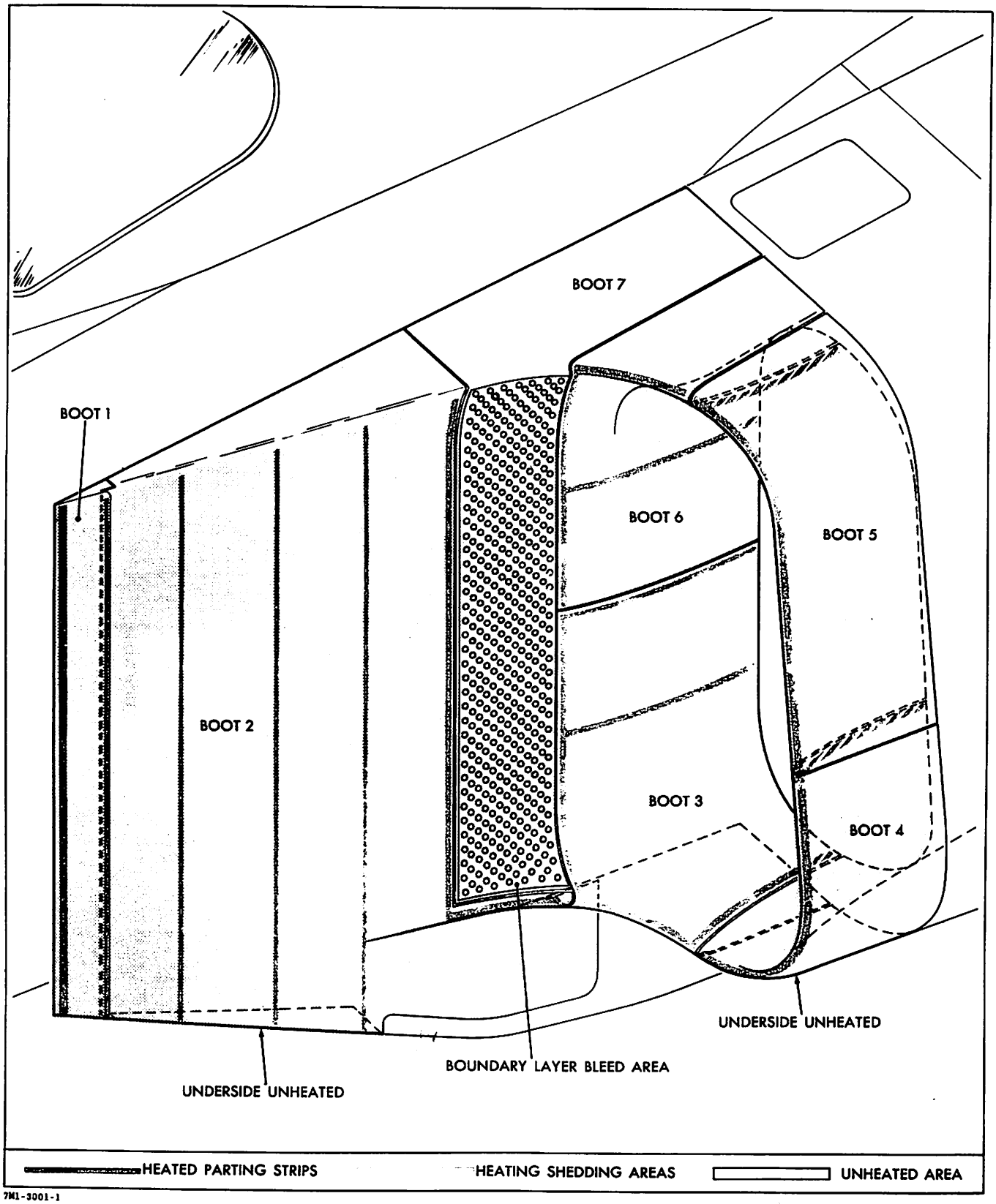

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FIG. 1 ENGINE INTAKE AND RAMP DE-ICING - INSTALLATION

Mark the position of the boot section on the structure using a chalk line or masking tape.

(d) When fitting is completed, remove the boot.

PREPARATION OF THE METAL SURFACES

10 To prepare the metal surfaces for bonding proceed as follows:

(a) Wash the bonding area on the structure with Methyl Ethyl Ketone using a lint free cloth.

(b) Wipe the bonding area with a fresh lint free cloth dampened with Methyl Ethyl Ketone and while still wet, wipe with a clean dry lint free cloth.

(c) Ensure that all corners and skin joints are dry by blowing out with clean dry compressed air.

NOTE

On completion of the cleaning process, care must be taken to ensure that the treated surfaces do not become contaminated with oil, grease or finger marks.

PREPARATION OF THE BOOT SURFACES AND TEST SPECIMENS

11 To prepare the boot surfaces for bonding proceed as follows:

(a) Measure and record the resistance of all the boot heating circuits.

(b) Wash the entire bonding surface area of the boot, including in the case of boot No. 1, the metal leading edge, with Toluene using a clean lint free cloth. The cloth should be changed frequently to avoid recontamination of the cleaned areas.

(c) Repeat the cleaning process in para (b) at least once.

(d) Allow the solvent to dry completely.

(e) Prepare test specimens approximately 1 x 8 inches from boot material trimmed from the edges during preliminary fitting. Two test specimens are required for each batch of adhesive used. Clean the test specimens as described in sub-para (b) to (d).

INSTALLATION OF THE DE-ICER BOOT AND TEST SPECIMENS

12 In the event that more than one boot is to be installed, the sequence described in para 7 must be used.

13 During the installation of the boot the two test specimens must be applied to an adjacent part of the structure for each batch of adhesive used, using the procedure described in para 14. Leave approximately 1 inch at the end of the specimen free of adhesive to enable a spring scale to be attached.

14 To install a de-icer boot proceed as follows:

(a) Apply a smooth even coat of EC 1300L adhesive to the bonding surface of the boot using a clean dry brush. In the case of boot No. 1 the stainless steel leading edge and the area of the ramp structure to which the metal leading edge of the boot is to be bonded must also be coated. Ensure that the whole area is covered up to the edges, leaving no gaps.

(b) Allow 12 minutes to dry.

(c) Apply a second coat to the boot bonding surface and the structure bonding surface simultaneously. Ensure that the complete bonding areas are covered and that the initial coat on the boot is not disturbed.

(d) Allow 1 minute to elapse for the solvent to evaporate and the adhesive to become tacky. Place one edge of the boot in position aligning it with the marks made during the preliminary fitting.

(e) Roll the boot progressively on to the structure using rubber hand rollers. Ensure that no air is trapped to form bubbles. The maximum time allowed to elapse between commencing the application of the second coat of adhesive and the final contact should not exceed 7 minutes otherwise a poor bond will result. The optimum time is 4 minutes.

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(f) Roll the entire area applying pressure and giving particular attention to the edges to obtain a firm and continuous bond.

(g) Clean the surrounding surfaces and remove excess adhesive with solvent FO 136. Ensure that excessive solvent is not permitted to contact the bonded joints.

(h) Measure and record the resistance of all the heating elements and compare with the readings recorded at para 6. Any discrepancy will necessitate removal of the defective boot.

(j) Allow to stand for 24 hours at room temperature after completion of the bond. Apply a household iron or the equivalent with a surface temperature of approximately 400°F to the bonded area with an even pressure. This ensures a reasonably void free bond between the boot and the ramp structure.

ADHESIVE PEEL TEST

15 Test the peel strength of the adhesive, 24 hours after the installation of the boot and the test specimens, by attaching a spring scale to the unbonded end of each test strip in turn. Record the force required to peel back each strip at a rate of one inch per minute with the force applied at 180° to the surface.

16 If the force required to peel the test specimen is above 8 pounds the bond may be considered acceptable. If the force required is less than 8 pounds carry out the following test:

(a) Using the procedure described in para 8 carefully lift one corner of the boot sufficiently to enable a spring scale to be attached.

(b) Apply a force to the scale at 180° to the surface and in a diagonal direction across the boot.

(c) The bond may be considered acceptable if a force of 8 pounds per inch width or more can be applied.

(d) Re-bond the corner using the process used during the initial installation. See para 10 to 14.

(e) If the bond fails under the test described in sub-para (a) to (c) the complete boot must be removed and reinstalled.

GAP FILLING

17 Any gaps between the edges of adjacent boots or between the edges of the boot and the skin should be filled with gap filler EC 1239.

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	ENGINE INTAKE AND RAMP DE-ICING	BOOT NO. 1	20-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-91 LH 7-2055-92 RH	B.F. Goodrich Co.	G-11901-11 LH G-11901-12 RH	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Fitted to air intake ramp to remove ice.

LOCATION

Engine air intake ramp leading edge - left and right.

ACCESS

Accessible on leading edge of air intake ramp - left and right.

MEN X MINUTES	

REPLACEMENT PROCEDURE

See Removal and Installation of De-Icer Boots.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check boots for signs of overheating, damage and lifting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Panel de-icing test.
AC electrical ground power supply.
B5 access stand.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	ENGINE INTAKE AND RAMP DE-ICING	Boot No. 2	20-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-93 LH 7-2055-94 RH	B.F. Goodrich & Co	G-11902-13 LH G-11902-14 RH	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Fitted to air intake ramp to remove ice.

LOCATION

Engine air intake ramp - left and right.

ACCESS

Accessible on air intake ramp - left and right.

MEN X MINUTES	

REPLACEMENT PROCEDURE

See Removal and Installation of De-icer Boots

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check boots for signs of overheating, damage and lifting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Panel de-icing test.
AC electrical ground power unit.
B5 access stand.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	ENGINE INTAKE AND RAMP DE-ICING	Boot No. 3	20-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-95 LH 7-2055-96 RH	B.F.Goodrich Co.	G-11903-17 LH G-11903-18 RH	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Fitted to air intake to remove ice.

LOCATION

Engine air intake - lower inboard section right and left.

ACCESS

Accessible on the lower inboard section of air intake.

MEN X MINUTES	

REPLACEMENT PROCEDURE

See Removal and Installation of De-icer Boots.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check boots for signs of overheating, damage and lifting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Panel de-icing test.
AC electrical ground power unit.
B5 access stand.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	ENGINE INTAKE AND RAMP DE-ICING	Boot No. 4	20-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-97 LH 7-2055-98 RH	B.F.Goodrich Co.	G-11904-21 LH G-11904-22 RH	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Fitted to air intake to remove ice.

LOCATION

Engine air intake - lower outboard section left and right.

ACCESS

Accessible on lower outboard edge of air intake - left and right.

MEN X MINUTES

REPLACEMENT PROCEDURE

See Removal and Installation of De-icer Boots

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check boots for signs of overheating, damage and lifting.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Panel de-icing test.
AC electrical ground power unit.
B5 access stand.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	ENGINE INTAKE AND RAMP DE-ICING	Boot No. 5	20-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-101 LH 7-2055-102 RH	B.F.Goodrich Co.	G-11905-23 LH G-11905-24 RH	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Fitted to air intake to remove ice.

LOCATION

Engine air intake - upper outboard section left and right.

ACCESS

Accessible on upper outboard edge of air intake - left and right.

MEN X MINUTES	

REPLACEMENT PROCEDURE

See Removal and Installation of De-icer Boots.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check boots for signs of overheating, damage and lifting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Panel de-icing test.
AC electrical ground power supply.
B5 access stand.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	ENGINE INTAKE AND RAMP DE-ICING	Boot No. 6	20-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-103 LH 7-2055-104 RH	B.F.Goodrich Co.	G-11906-25 LH G-11906-26 RH	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Fitted to air intake to remove ice.

LOCATION

Engine air intake - upper section left and right.

ACCESS

Accessible on upper edge of air intake - left and right.

MEN X MINUTES	

REPLACEMENT PROCEDURE

See Removal and Installation of De-icer Boots.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check boots for signs of overheating, damage and lifting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Panel de-icing test.
AC electrical ground power unit.
B5 access stand.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	ENGINE INTAKE AND RAMP DE-ICING	Boot No. 7	20-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-117 LH 7-2055-118 RH	B.F.Goodrich Co.	G-12384-117 LH G-12384-118 RH	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Fitted to air intake ramp to remove ice.

LOCATION

Between ramp and engine intake - left and right.

ACCESS

Accessible on ramp and engine intake - left and right.

MEN X MINUTES

REPLACEMENT PROCEDURE

See Removal and Installation of De-icer Boots.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check boots for signs of overheating, damage and lifting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Panel de-icing test.
AC electrical ground power unit.
Cockpit access stand.
B5 access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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SECTION 29

ELECTRICAL SYSTEM
ENGINE INTAKE AND
RAMP DE-ICING

(This data supersedes previous issue dated 8 May 57)

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ELECTRICAL SYSTEM

ENGINE INTAKE AND RAMP DE-ICING

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 A de-icing system is fitted to prevent ice building up on the engine air intake ducts and ramps and on the engine guide vanes. The ducts and ramps are de-iced by electro-thermal boots, and the guide vanes by hot air from the engine compressor.

2 An electrical ice detection and control system governs current delivery to the de-icing boots and to the hot air shut-off valve.

ICE DETECTION

3 An ice detection circuit is provided for each engine air intake duct. Included in each circuit is a detector probe and a reference probe, both being mounted on a bracket positioned approximately 12 inches inside the duct. Each probe incorporates a heating element and has a number of holes in its forward and aft face. The reference probe is continuously heated from the main d-c bus, and the detector probe is heated intermittently during icing conditions.

4 The detector and reference probes are connected to opposite sides of a pressure switch. During ice free conditions, the airflow through the holes of both probes creates a pressure on both sides of the pressure switch, which keeps the switch contacts open.

5 When icing conditions are encountered, formation of ice on the forward holes of the detector probe decreases the pressure on the detector probe side of the pressure switch and the switch contacts close. This action relays a 28V DC supply to the heating element in the detector probe and to a de-icing cycling time controller which initiates the operation of the de-icing circuits. The supply circuit to the de-icing cycling time controller is interconnected with the master warning system. This effects the illumination of the ICE indicator light on the master warning panel and the amber coloured master indicator light located on the main instrument panel.

6 When the heating element melts the ice on the detector probe, the pressure switch contacts open and interrupt the supply to the heating element and cycling time controller.

7 The pulse from the RH ice detection circuit to the cycling time controller is routed via the normally closed contacts of a RH ice detector relay.

8 The pulse from the LH ice detection circuit energizes a LH ice detector relay which has two pairs of normally open contacts. When this relay is energized, one pair of contacts completes the pulse circuit to the cycling time controller. The other pair energizes the RH ice detector relay which prevents pulses from the RH detector being fed to the controller. The controller feeds back a holding supply for this relay so that once it starts operating, the LH detector becomes the master detector.

ENGINE INTAKE AND RAMP DE-ICING

9 Two circuits are provided, one for the LH and one for the RH engine. These circuits are electrically identical, and independent but for the cycling time controller which is common to both circuits. The following description, therefore, applies equally to each circuit.

10 The de-icing boots are manufactured from synthetic rubber and embody electrically heated elements. When the system is operative some of the elements are intermittently heated and the others are continuously heated. Those which are intermittently heated are arranged in groups, each group constituting a shedding area. The continuously heated elements are arranged to form a system of parting strips which circumscribe the shedding areas and separate them each from the other. The parting strips range in width between one-eight inch and one-half inch. The number of shedding areas and parting strips contained in a particular boot depends upon the dimensions of that boot.

11 During icing conditions, the parting strips, being continuously heated, prevent the formation of large ice masses. The intermittent operation of the shedding areas melts the undersurface of any ice that forms between parting strips and permits it to be swept off by the airflow.

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12 Seven de-icing boots, with a total of twelve shedding areas and seventeen parting strips are fitted over an area extending from the leading edge of the ramp to approximately 12 inches inside the air intake duct.

13 Of the twelve shedding areas, all but two are equipped with electro-thermal switches or sensors, each switch being attached to the underside of its shedding area. Two parting strips are also fitted with electro-thermal switches.

14 The shedding area sensors are connected in series and are in circuit with the supply line to the coil of a control relay in the load distributor. The two parting strip sensors are likewise connected and they are in circuit with the supply line to the coil of a parting strip power supply relay. If the temperature of a shedding area or parting strip exceeds 70°-80°F the appropriate sensor will operate and interrupt the supply circuits to the heating elements. To provide an operating differential, the sensor does not re-establish the circuit until the temperature of the shedding area or parting strip decreases to 55°-65°F.

15 The configuration of each boot is as follows:

Boot 1; ramp leading edge,	1 shedding area 1 parting strip
Boot 2; ramp,	4 shedding areas 4 shedding area sensors 6 parting strips 2 parting strip sensors
Boot 3; engine air intake duct,	2 shedding areas 4 parting strips 1 shedding area sensor
Boot 4; engine air intake duct,	1 shedding area 1 shedding area sensor 2 parting strips
Boot 5; engine air intake duct,	1 shedding area 1 shedding area sensor 2 parting strips
Boot 6; engine air intake duct,	2 shedding areas 2 shedding area sensors 2 parting strips
Boot 7; ramp, boundary layer bleed area,	1 shedding area 1 shedding area sensor

16 The shedding areas are designed to impose a load demand of 3840 Va from the power source of 115 volts. To attain this figure, the shedding area of boot 1 is connected in parallel with one shedding area of boot 2. Likewise one shedding area of boot 3 operates in parallel with one shedding area of boot 6. The ten supply circuits for the shedding areas are connected via a terminal strip to a load distributor, the operation of which is controlled by the cycling time controller.

17 When the first pulse from the ice detection circuit is received by the controller, a supply circuit is completed via the parting strip sensors to the parting strip power supply relay. This relay, when energized, completes supply circuits from the A, B and C phases of the relevant LH or RH main AC bus-bars. The parting strip power demand is shared equally by the three phases.

18 When a preselected number of detection circuit pulses have been received by the controller, an enabling pulse circuit is completed to the load distributor. The pulses required by the controller before it supplies the enabling pulse can be adjusted to any number from 4 to 12.

19 A stepping contactor, incorporated in the load distributor, is set in motion by the enabling pulse. The stepping contactor provides a sequence of twelve 3-phase 115 volts AC pulses of a preset duration, the supplies being derived from the relevant LH or RH main AC bus-bars. Ten of the twelve pulses are used, one to each shedding area, commencing with the ramp leading edge. The duration of the pulses can be adjusted as required between 4 and 12 seconds.

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Classification cancelled/changed to
by authority of (date) 3 May 59
Signature Golfpooler Rank F/L

ARROW 1 SERVICE DATA

ENGINE INSTALLATION

#187

ARROW 1 SERVICE DATA

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ENGINE INSTALLATION

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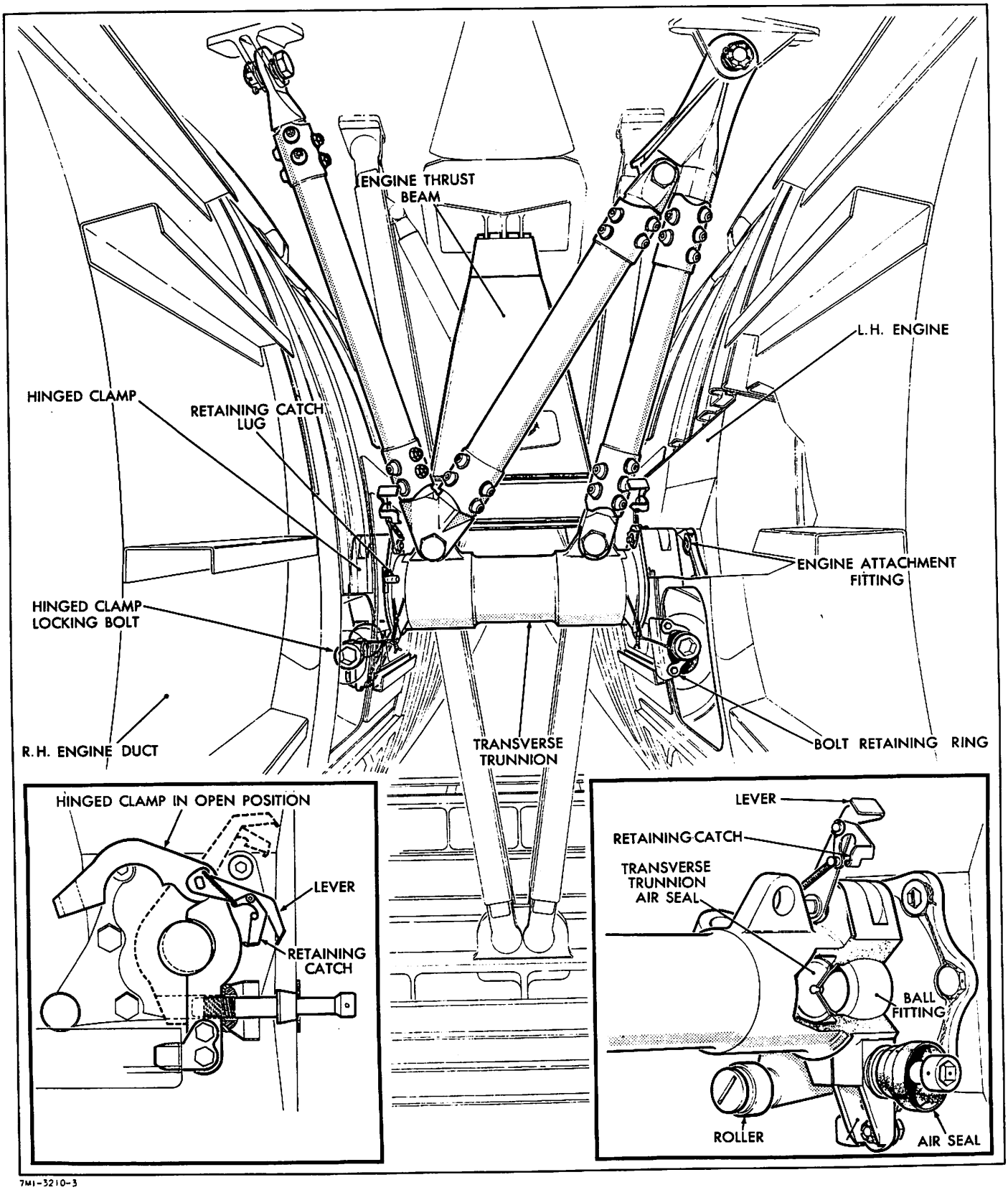

FIG. 1 ENGINE SUSPENSION - FRONT INBOARD

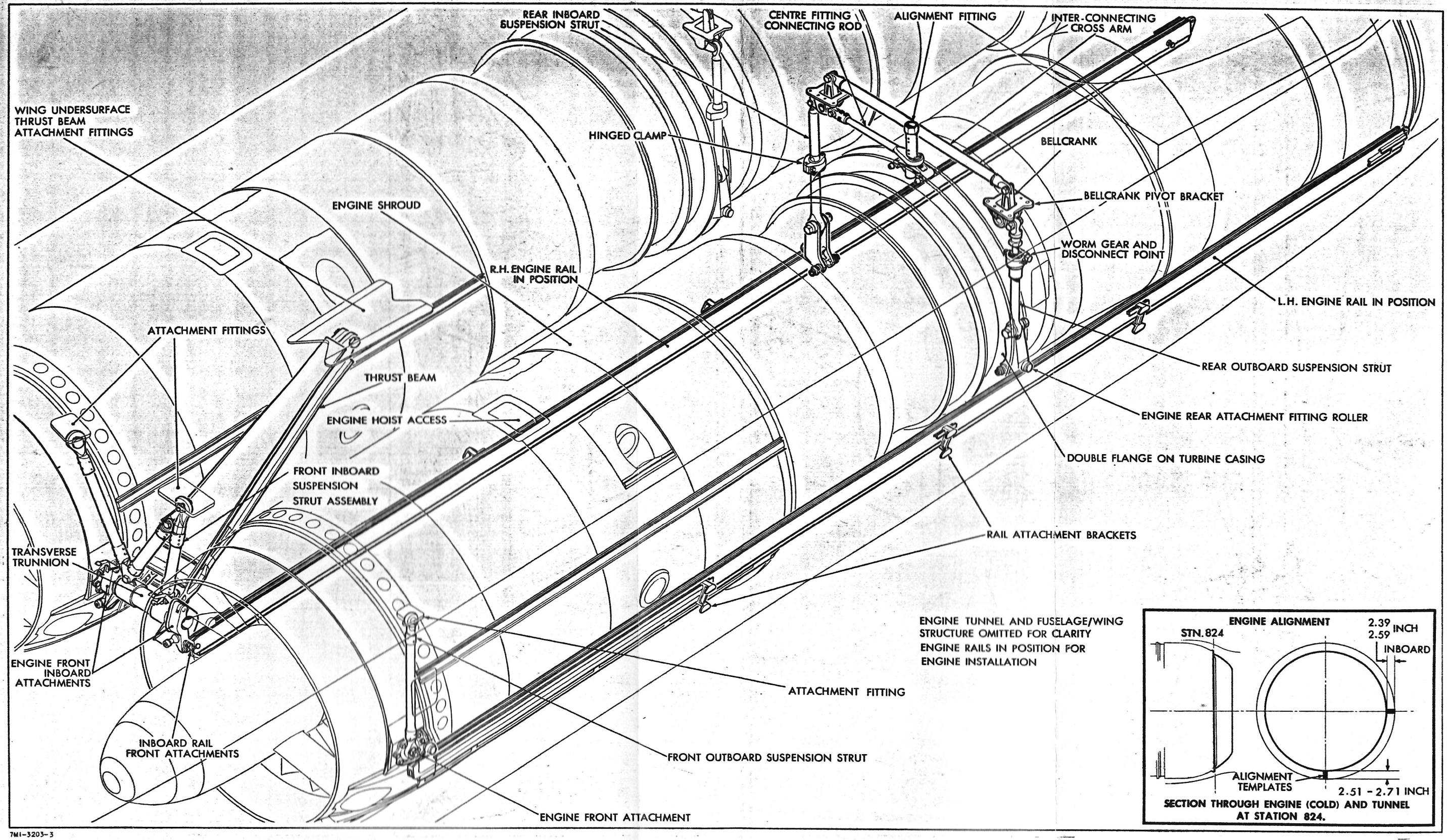

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FIG. 2 ENGINE SUSPENSION AND ALIGNMENT

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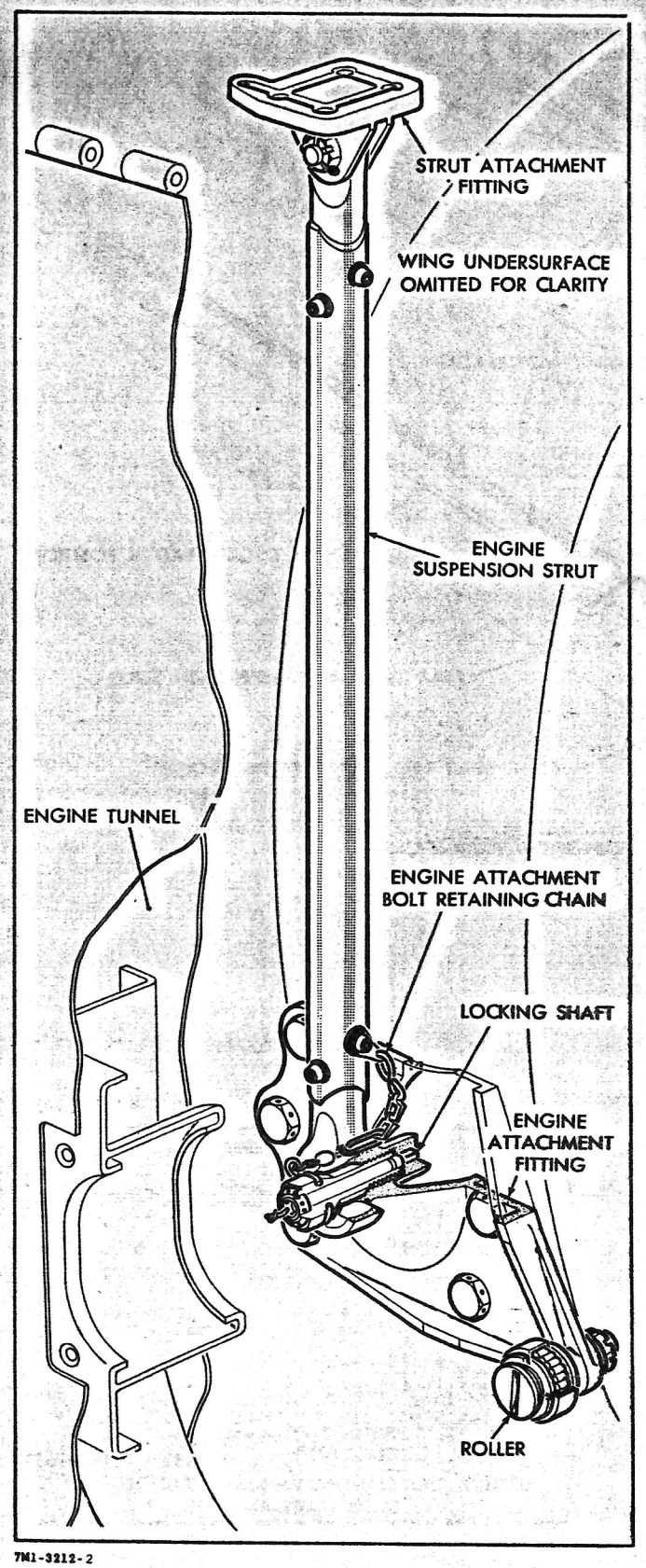

FIG. 3 ENGINE SUSPENSION - FRONT OUTBOARD

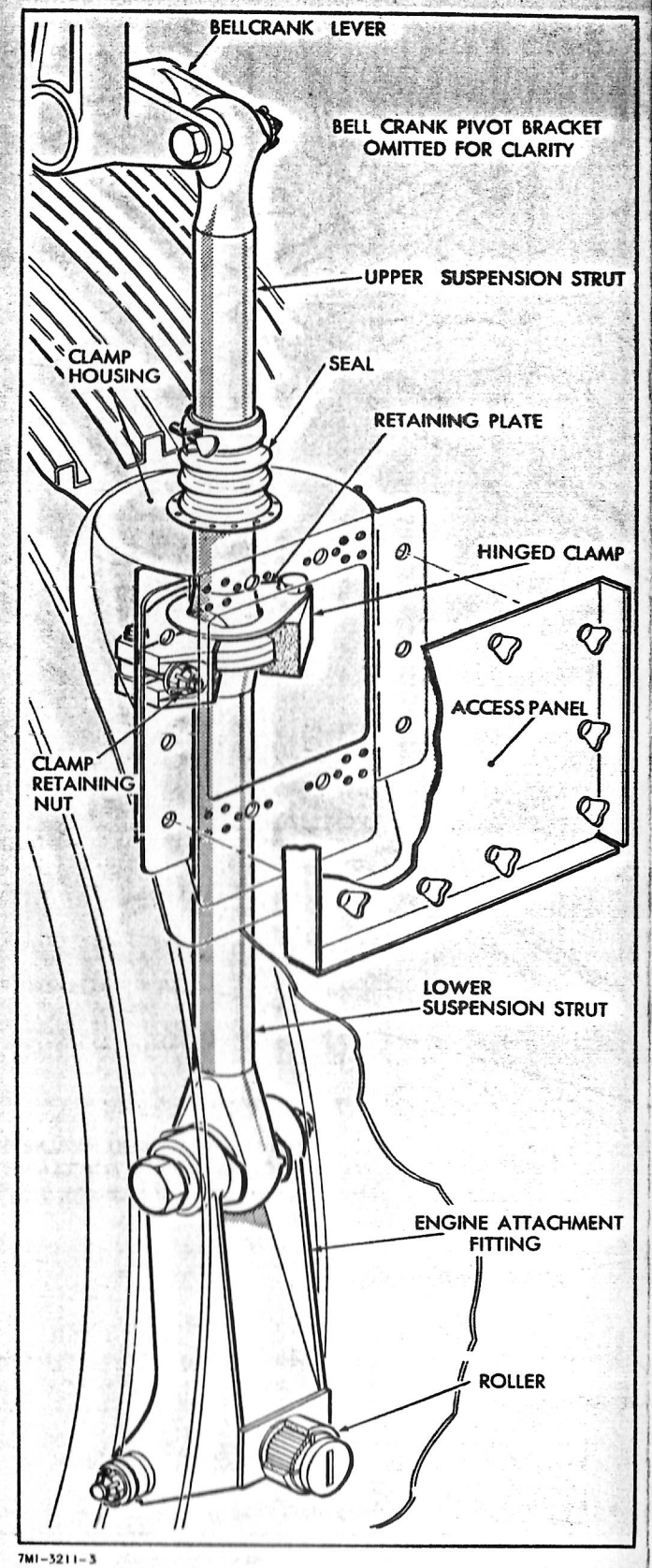

FIG. 4 ENGINE SUSPENSION - REAR INBOARD

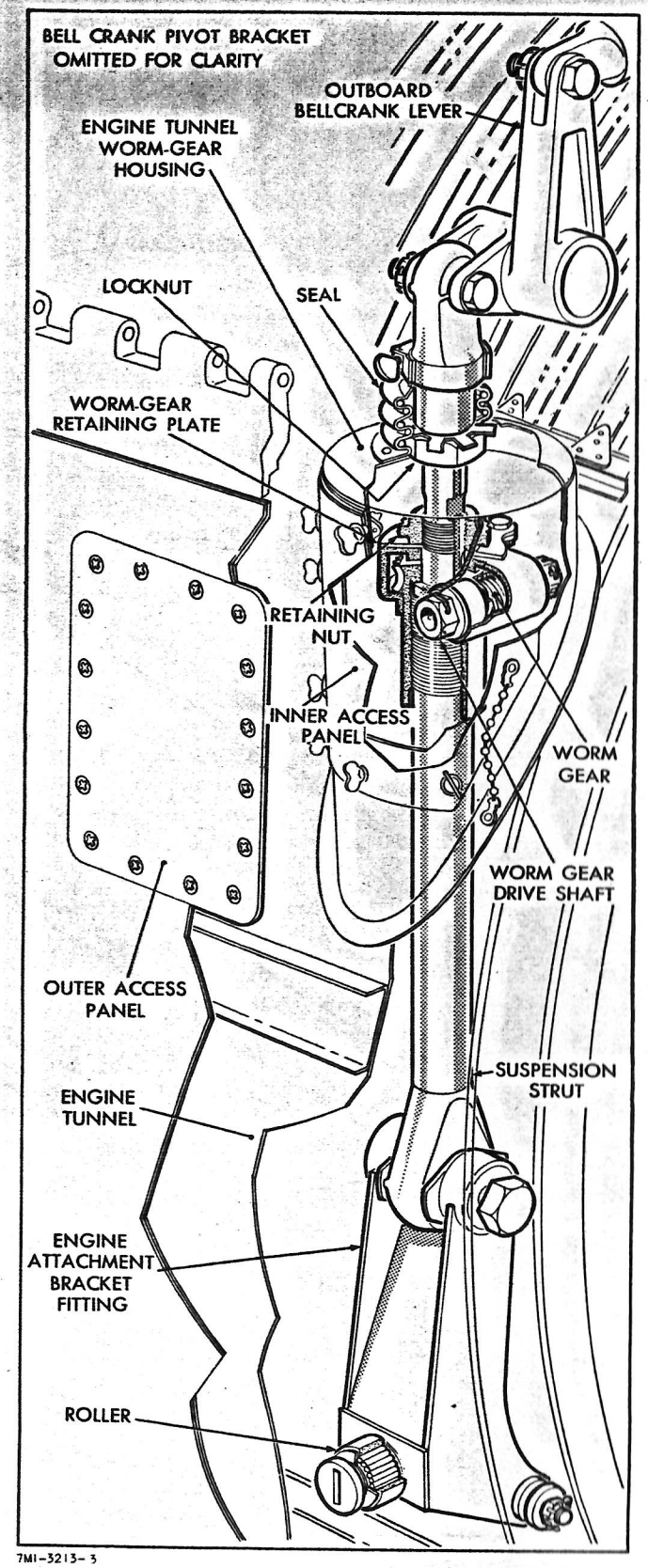

FIG. 5 ENGINE SUSPENSION - REAR OUTBOARD

ARROW 1 SERVICE DATA

UNCLASSIFIED

LOCATION OF ELECTRICAL COMPONENTS - FIRE PROTECTION

ITEM NO.	DESCRIPTION
E1	**FORWARD CIRCUIT BREAKER PANEL**
-45	5A CB, FIRE EXTINGUISHER, LH ENGINE
-46	5A CB, FIRE EXTINGUISHER RH ENGINE
-47	5A CB, FIRE EXTINGUISHER, HYDRAULIC BAY
-49	10A CB, SECOND SHOT SUPPLY, LH ENGINE AND HYDRAULIC BAY
-50	10A CB, SECOND SHOT SUPPLY, RH ENGINE
-51	5A CB, FIRE DETECTION, HYDRAULIC BAY
E3	**FORWARD ACCESSORY PANEL**
-5	RELAY, LH ENGINE LOCK ON
-6	RELAY, RH ENGINE LOCK ON
E4	**DISTRIBUTION PANEL**
E5	**MAIN ACCESSORY PANEL**
-69	FIRE DETECTION CONTROL UNIT, LH ENGINE
-70	FIRE DETECTION CONTROL UNIT, RH ENGINE
-71	FIRE DETECTION CONTROL UNIT, HYDRAULIC BAY
E6	**FORWARD RELAY PANEL**
-9	RELAY, HYDRAULIC BAY LOCK ON
-21	RELAY, SECOND SHOT
E14	**FIRE AND FUEL PANEL**
-5	FIRE WARNING INDICATOR AND EXTINGUISHER PUSH SWITCH (LH ENGINE)
-6	FIRE WARNING INDICATOR AND EXTINGUISHER PUSH SWITCH (RH ENGINE)
-7	FIRE WARNING INDICATOR AND EXTINGUISHER PUSH SWITCH, HYDRAULIC BAY
-10	SECOND SHOT SWITCH
-24	CRASH SWITCH
E20	**AFT CIRCUIT LIMITER PANEL**
-37	5A FUSE, FIRE DETECTION, LH ENGINE
-38	5A FUSE, FIRE DETECTION, RH ENGINE
E21	**REFUELLING AND TEST PANEL**
-8	SWITCH, FIRE DETECTION GROUND TEST

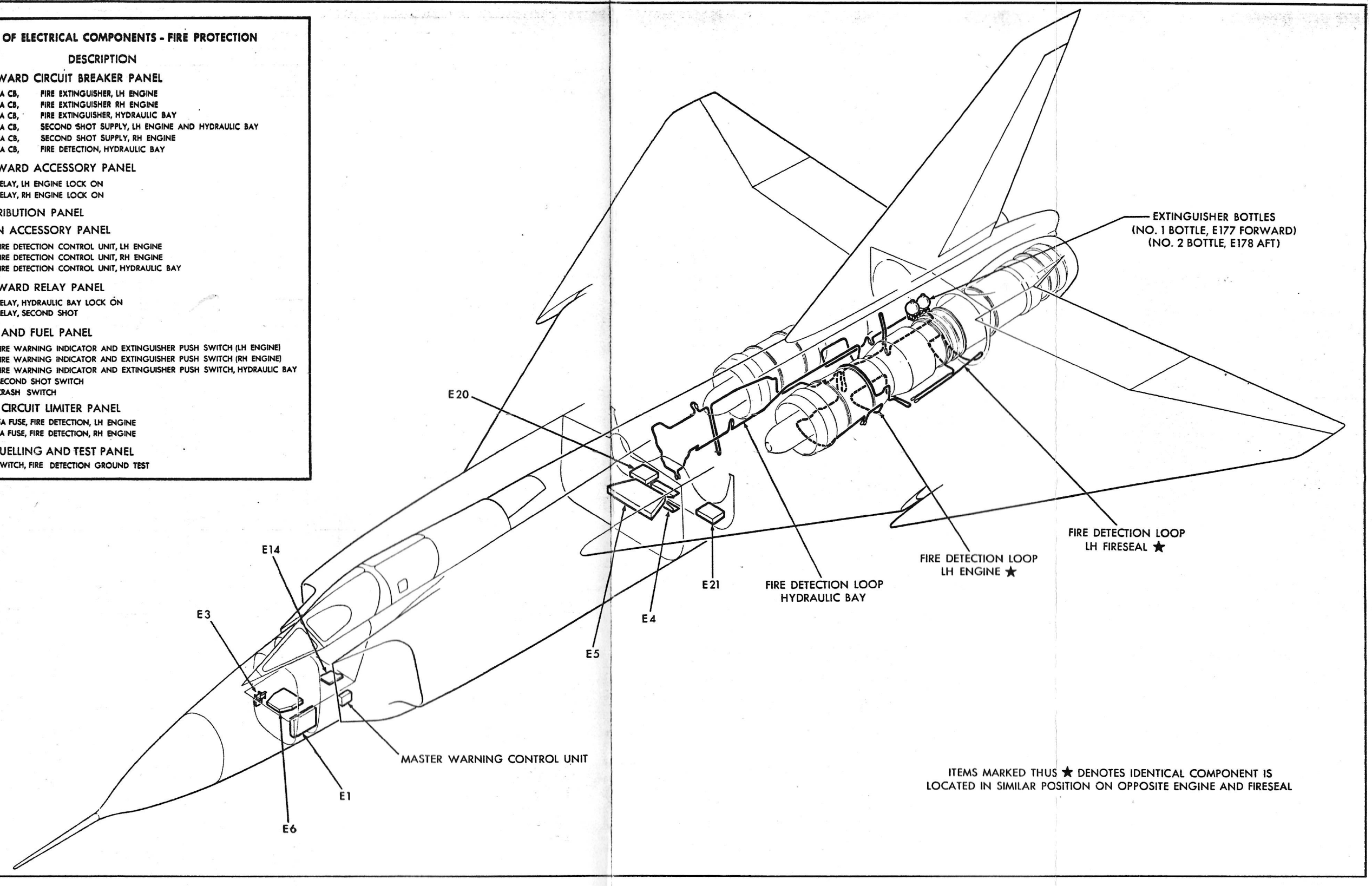

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FIG. 4 LOCATION OF ELECTRICAL COMPONENTS - FIRE PROTECTION

Pg 6 of Part II

ARROW 1 SERVICE DATA

SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFF'TY	REF. NO.
ENGINE INSTALLATION		25201	25

DESCRIPTION

General

1. The aircraft is powered by two Pratt and Whitney YJ75-P-3 gas turbine engines with afterburners. Each engine develops approximately 15,500 lb. thrust without afterburning and 23,800 lb. thrust with afterburner operating. The engines are mounted in two tunnels located in the rear fuselage. The engine installation allows for engine expansion and is so designed that the engine is unaffected by airframe structural flexing.

Engine Suspension (Figs 1, 2, 3, 4 and 5)

2. Each engine is attached to three suspension struts and a common thrust beam. The suspension struts and thrust beam are secured to attachments on the lower surface of the wing.

3. The engine thrust is transmitted through the front inboard attachment to the thrust beam and aircraft structure. The front inboard attachment consists of a ball fitting, a hinged clamp and a transverse trunnion. The ball fitting is attached to the engine compressor casing and is secured in the clamp. The clamp is made in two halves which are hinged at the top and are locked by a bolt at the bottom. A lever and a retaining catch are provided to open the clamp and maintain it open during engine removal and installation. The RH and LH clamps are mounted on the transverse trunnion which is attached to the lower end of the thrust beam.

4. The engine front outboard attachment consists of a suspension strut attached at its upper end to a fitting on the lower surface of the wing, and at its lower end to an engine attachment fitting. Both ends of the strut have spherical bearings. The lower attachment bolt is wire locked to a locking shaft inserted through the bolt and into the engine fitting.

5. The inboard and outboard rear suspension struts are connected together by two bellcranks and a cross arm. This arrangement permits vertical alignment of the engine by adjustment of the length of the outboard strut only. The engine is prevented from twisting during adjustment by a lateral alignment fitting. Spherical bearings at each end of both suspension struts allow for engine expansion. Seals fitted to each suspension strut isolate the engine tunnel from the hydraulic and equipment bay.

6. To facilitate removal and installation of the engine the inboard strut is made in two sections, locked together by a hinged clamp. A retaining plate retains the clamp on the upper section of the strut when the clamp is released.

7. The outboard strut is also constructed in two sections with a long tubular worm gear driven nut on the upper section, and the lower section threaded to fit into the nut. The nut provides the adjustment for raising and lowering the engine in the tunnel. The nut is disengaged from the lower section of the strut for engine removal.

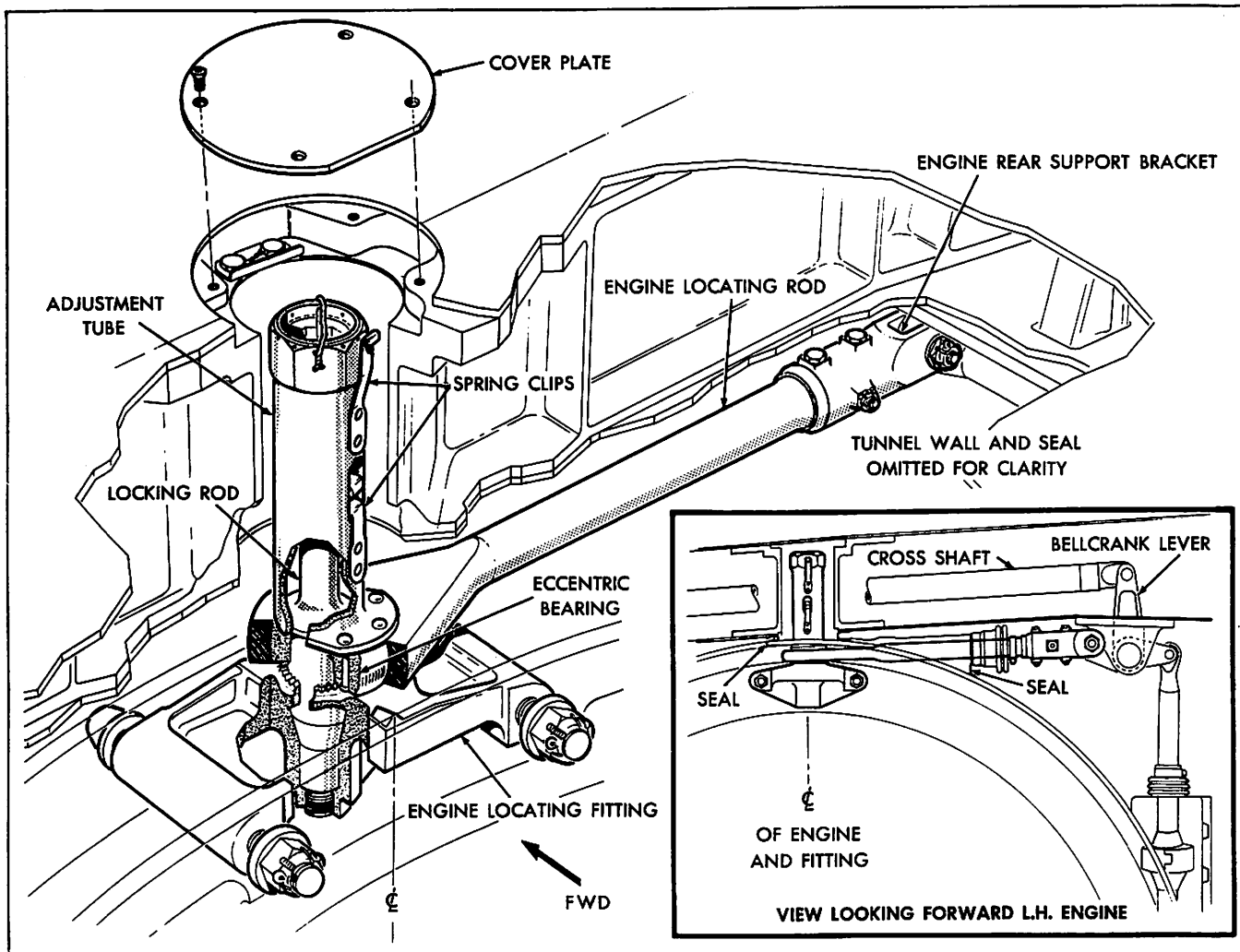

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FIG. 6 ENGINE LATERAL ALIGNMENT FITTING

Engine Lateral Alignment

8. The rear section of the engine is secured to the aircraft structure by a transverse rod which is attached to the rear inboard suspension fitting. The rod is secured to the engine fitting by means of an eccentric bearing. Positioning of the bearing adjusts the lateral location of the engine. A tube rivetted to the bearing allows the bearing to be turned after removal of an access panel on the wing upper skin. A rod, fitted inside the tube and screwed into the engine fitting, clamps the bearing to the engine fitting. Spherical bearings are fitted to both ends of the transverse rod to allow for engine expansion.

Engine Cooling (Figs. 7 and 8)

9. The engine cooling system provides for the varying cooling requirements under all conditions from ground running to maximum aircraft speed. During ground running and at low aircraft speeds a depression exists in the engine air intake. This causes duct gills fitted forward of the engine intake to close, and all air entering the intake passes through the engine. The air intake depression operates a pressure switch which supplies

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electrical power to actuate an air ejection control valve, This valve directs compressor bleed air to an ejector nozzle located forward of the transverse firewall. The nozzle ejects a stream of H.P. air through a vent in engine access panel number two. The venturi effect caused by the air ejection nozzle and the afterburner nozzle, creates a depression in the forward and rear ends of the engine tunnel. This depression causes blow-in air flaps to open and allow air at atmospheric pressure to enter the engine tunnel. The depression at the air ejection nozzle draws air forward and through holes in the forward end of the engine shroud to cool the engine compressor and ventilate the forward section of the engine to atmosphere. This area beneath the engine shroud and forward of the transverse firewall is designated Zone 1. The depression at the afterburner nozzle draws cooling air rearward to cool the hot end of the engine. This area above the engine shroud and to the rear of the transverse firewall is designated Zone 2.

10. At air speeds above Mach 0.5 ram air in the engine air intake opens the duct gills, and approximately 15% of the ram air passes through the gills to cool the forward and rear sections of the engine. Ram air is also directed through the three heat exchangers located below the engine air intake.

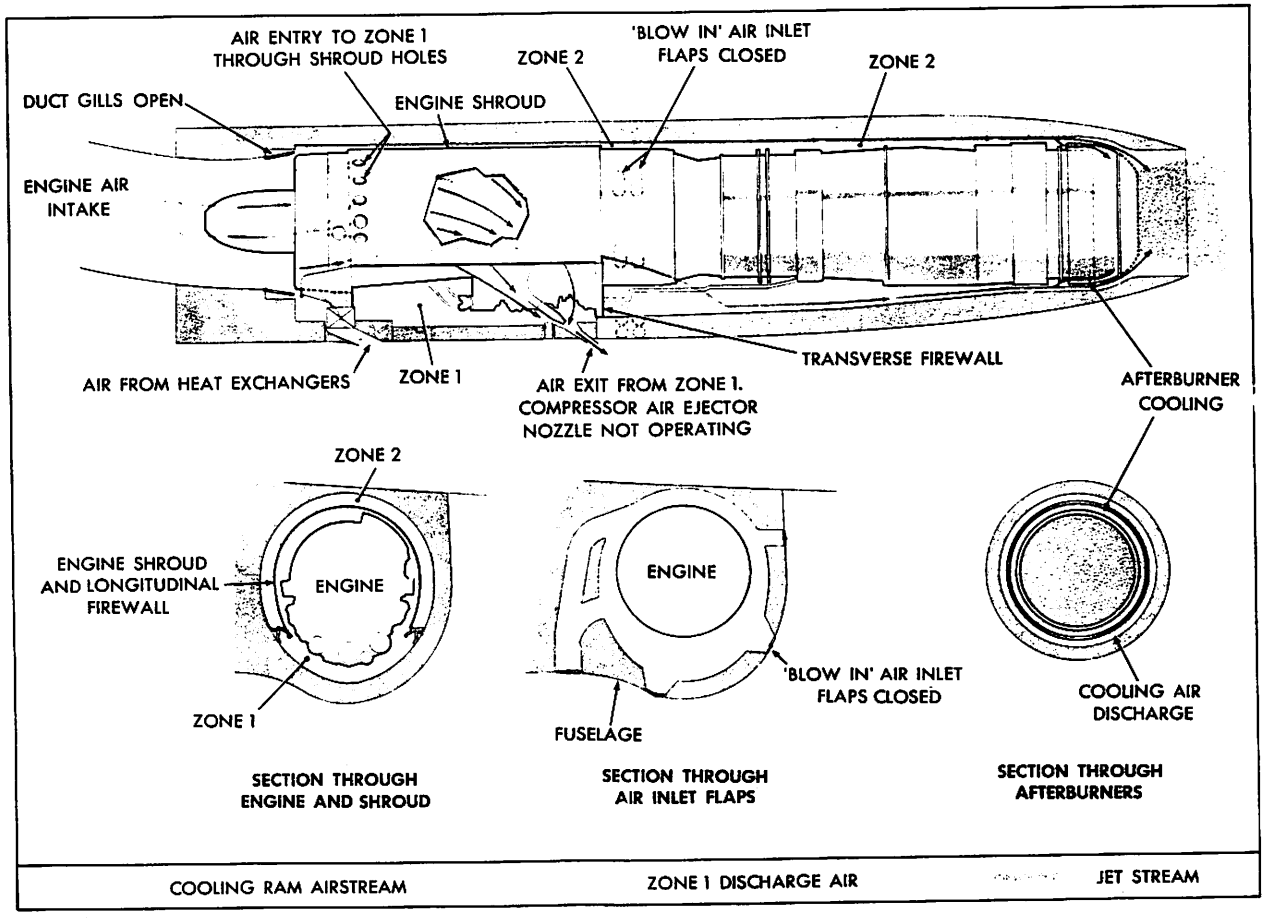

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FIG. 7 ENGINE COOLING - GROUND RUNNING AND AIRSPEEDS BELOW MACH 0.5

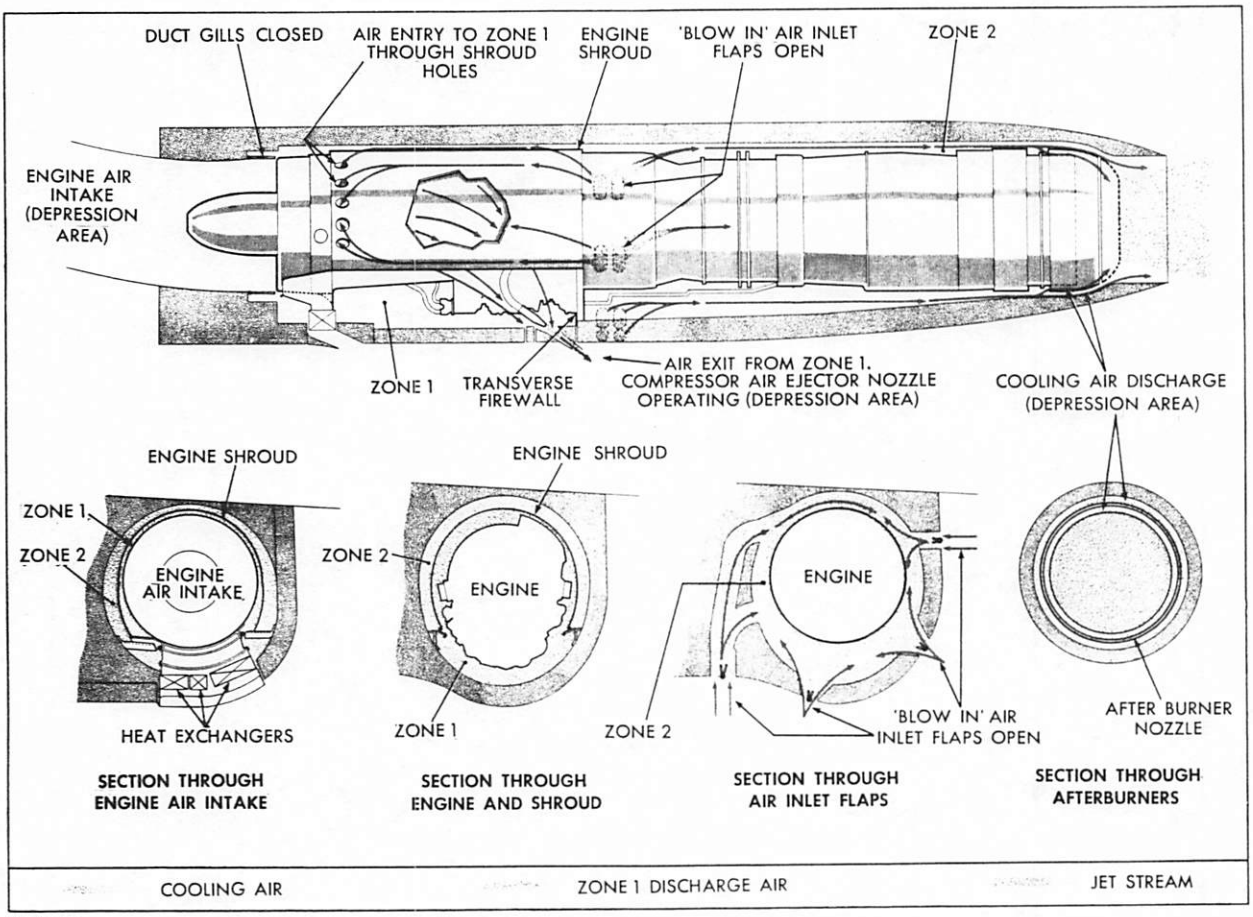

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FIG. 8 ENGINE COOLING - AIRSPEEDS ABOVE MACH 0.5

Air Ejection System (Fig. 9)

11. The air ejection system provides a flow of cooling air over the forward part of the engine and is designed to operate during ground running and in flight at speeds below Mach 0.5. See para 9.

12. The air ejection system consists of a pipeline tapped into the air conditioning bleed manifold and an air ejection valve operated by an electric actuator. A pressure switch located on the structure below the engine intake senses a pressure drop in the intake and supplies electrical power to actuate the valve. High pressure air is ejected from a nozzle on the end of the pipeline through a vent hole in number two engine access panel. The venturi effect set up by the air jet creates a depression around the forward section of the engine, drawing in cooling air through the blow-in flaps and through holes in the forward part of the engine shroud.

Engine Oil System (Fig. 10)

13. The engine oil is contained in a saddle type tank fitted on top of the engine compressor case. The tank is replenished by pumping the oil into a connection under the engine. An overflow valve is fitted adjacent to the filler connection to indicate when the tank is full.

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ARROW 1 SERVICE DATA

14. The engine oil is cooled by two oil-to-fuel and one oil-to-air heat exchangers. The oil is pumped from the engine to the oil-to-air heat exchanger located below the engine intake adaptor ring. This heat exchanger is equipped with a relief valve to by-pass the oil during cold starting or in the event of the heat exchanger becoming choked.

15. From the oil-to-air heat exchanger the oil is passed to an oil-to-fuel heat exchanger fitted between the engines in the equipment bay. Oil flow through this component is controlled by a solenoid operated by-pass valve which opens and allows oil to pass through the heat exchanger when the afterburner is operating. This heat exchanger is a section of a combination heat exchanger which provides cooling for the utility hydraulics, flying control hydraulics, accessories drive oil, and engine oil. The engine oil is

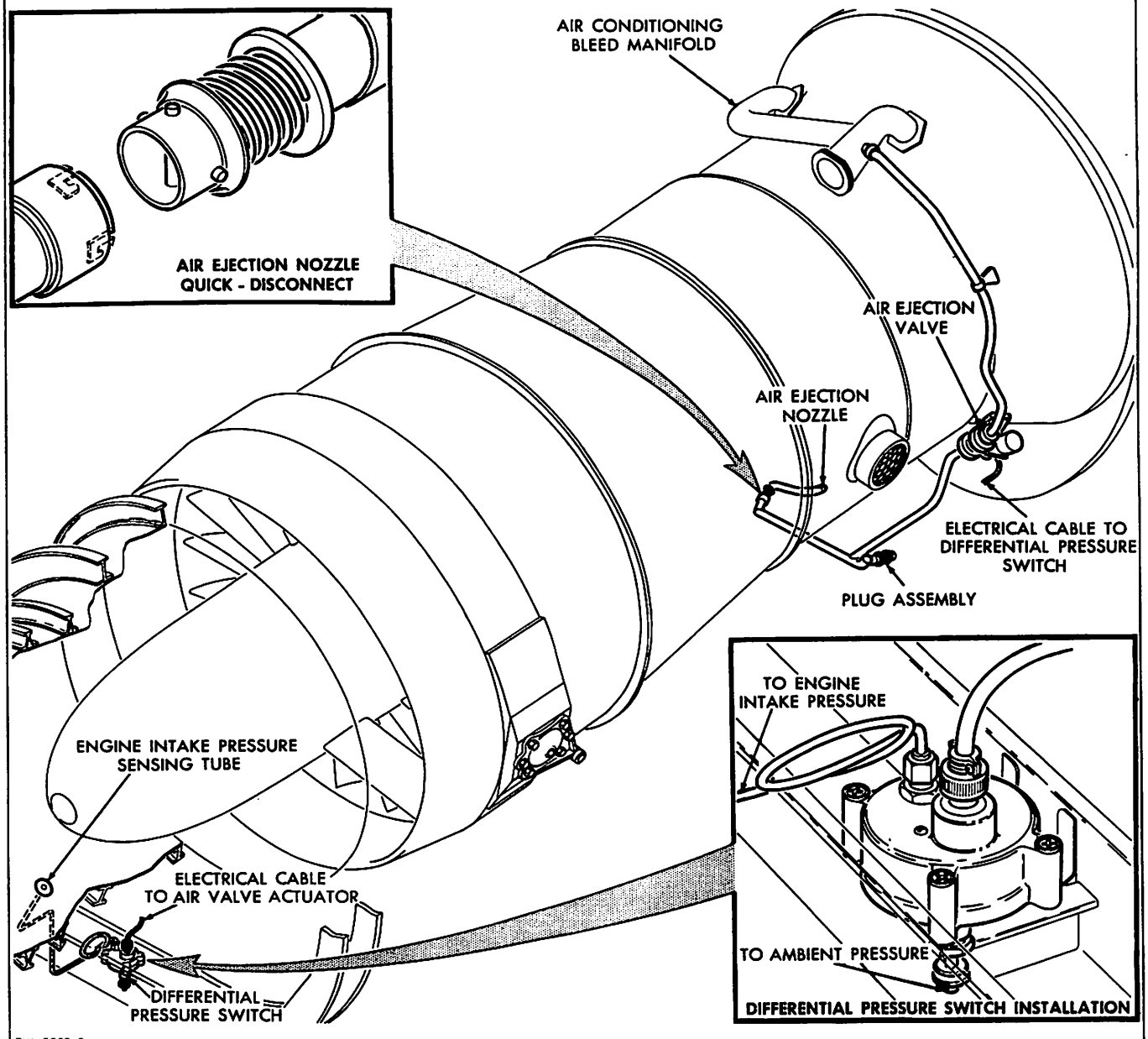

FIG. 9 AIR EJECTION SYSTEM

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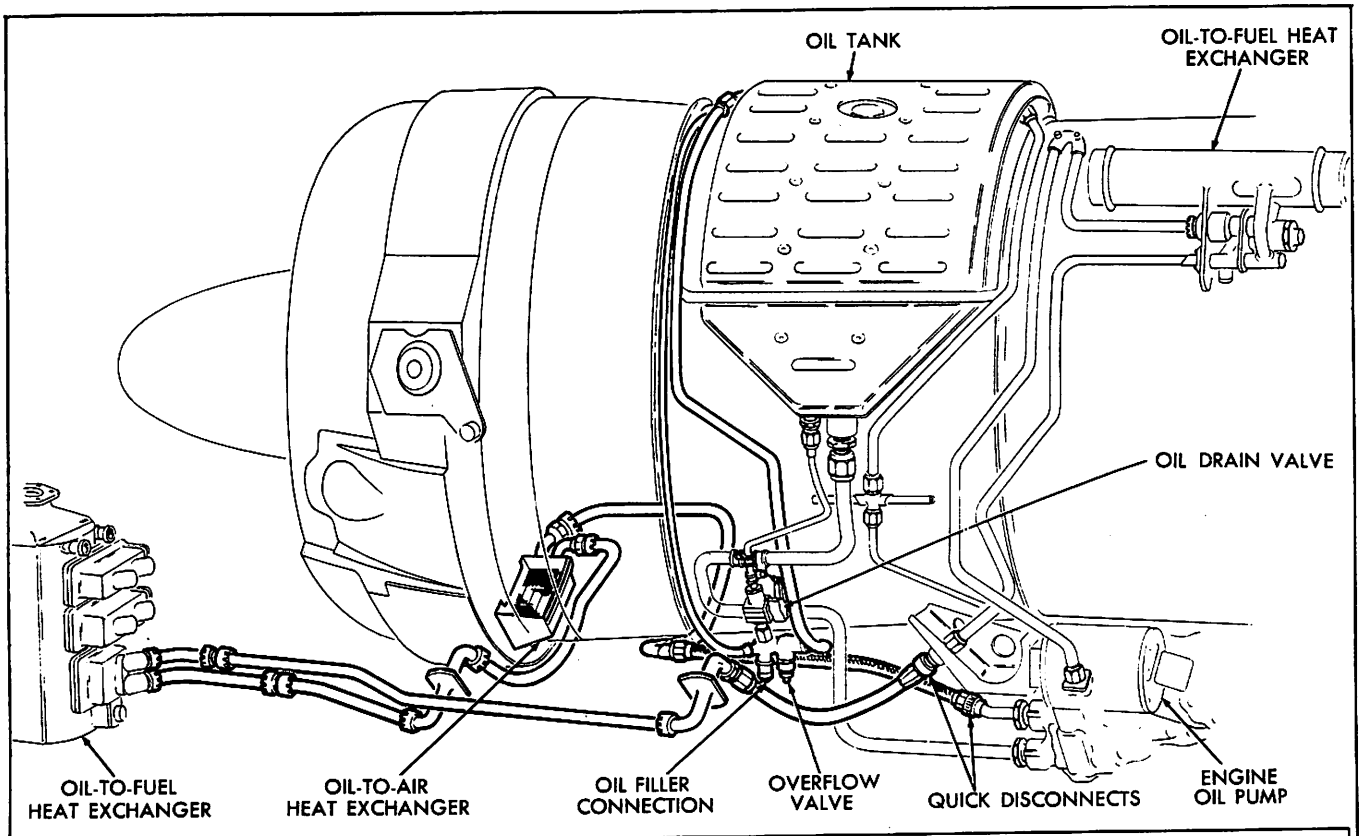

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FIG. 10 ENGINE OIL SYSTEM

finally cooled by an oil-to-fuel heat exchanger fitted on the LH side of the engine behind the oil tank.

16. The latter oil-to-fuel heat exchanger and the oil tank are both engine components.

Pressure Ratio System (Fig. 11)

17. The pressure ratio system senses the pressure differential between the engine intake and the turbine outlet and transmits this to an electrical indicator in the cockpit. The indicator reading is used to compute the engine thrust.

18. The system consists of a pressure ratio transducer located between the tunnels in the engine bay. This unit is connected by pipelines to pressure probes in the engine intake and turbine outlet. Flexible pipelines and quick disconnects connect the engine

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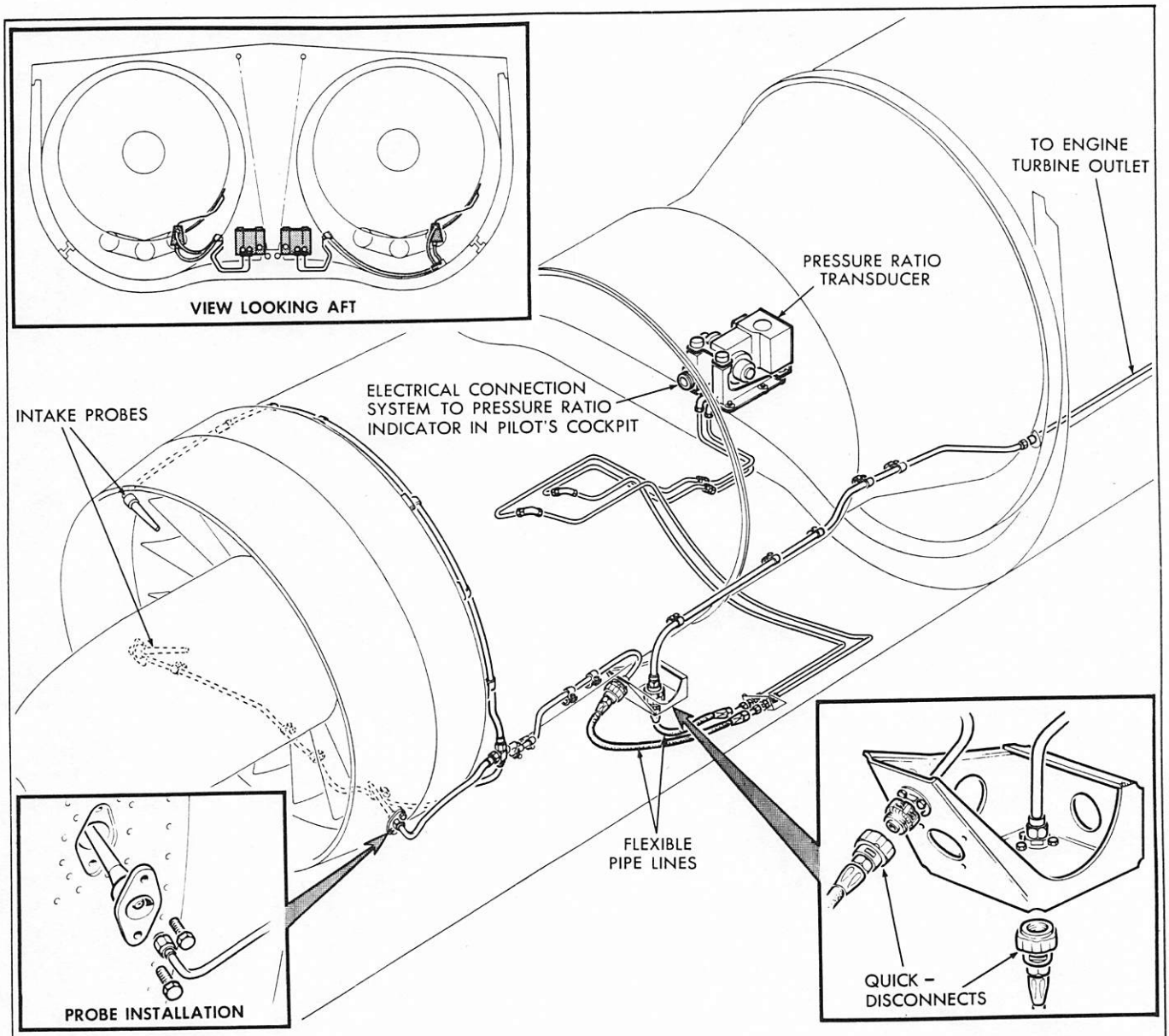

FIG. 11 PRESSURE RATIO SYSTEM

pipelines to the pipelines on the structure.

Engine Service Connections (Figs. 12 and 13)

19. Quick disconnects are used wherever practicable to facilitate engine removal and replacement. Access doors on the undersurface and removable panels on the side of the aircraft provide access to the connections and suspension struts.

Engine Installation (Fig. 14)

20. Prior to installation the engine is built up into a complete power plant by fitting equipment which is not supplied by the engine manufacturer. Two guide rails are installed in the engine tunnel, each being locked in position by a locating pin

and a thumb screw.

21. The power plant is lowered on to the engine change stand and is secured to the stand rear attachment. Alignment of the stand with the aircraft is achieved by locking the rear of the stand and adjusting the height of the forward legs. These legs incorporate a hydraulic jack and are raised by operating a hand pump and lowered by opening a valve. The two rails are secured to the engine stand by inserting a connecting pin.

22. The engine rests on four rollers, one fitted on each engine attachment fitting. A cranking mechanism on the rear of the engine stand provides a chain drive to the engine-to-stand attachment. Cranking of the two handles winds the engine onto the rails and into the engine tunnel.

23. When the engine is secured to the suspension struts and raised into position (see para 2), the engine stand is disconnected and the rails are withdrawn from the aircraft.

Ground Running Safety Precautions (Fig. 15)

24. In addition to normal jet aircraft ground running safety precautions, extra care should be exercised when observing the danger area around the intake and jet wake. Ear protectors should be worn at all times and ground test equipment placed as far as is practicable from the aircraft.

25. When carrying out high power ground runs the aircraft must be located on a running up base. This is equipped with two ground picket points and two concrete curbs with steel facings. The aircraft main wheels are positioned in the curbs and each main landing gear leg is secured to a picket point with a steel tie bar. Threaded end fittings provide the tie bar with adjustment for length.

26. An engine compressor relief valve vents a hot air blast from an oval shaped louvre in the side of the fuselage, just aft of the landing gear. Personnel and equipment should be kept at least five feet away from this area.

27. Interphone communication is necessary between the ground equipment operator and the occupant of the pilot's cockpit. In the event of an internal engine fire, the engine should be motored with the power levers OFF and all fuel and start switches OFF, until the fire is extinguished.

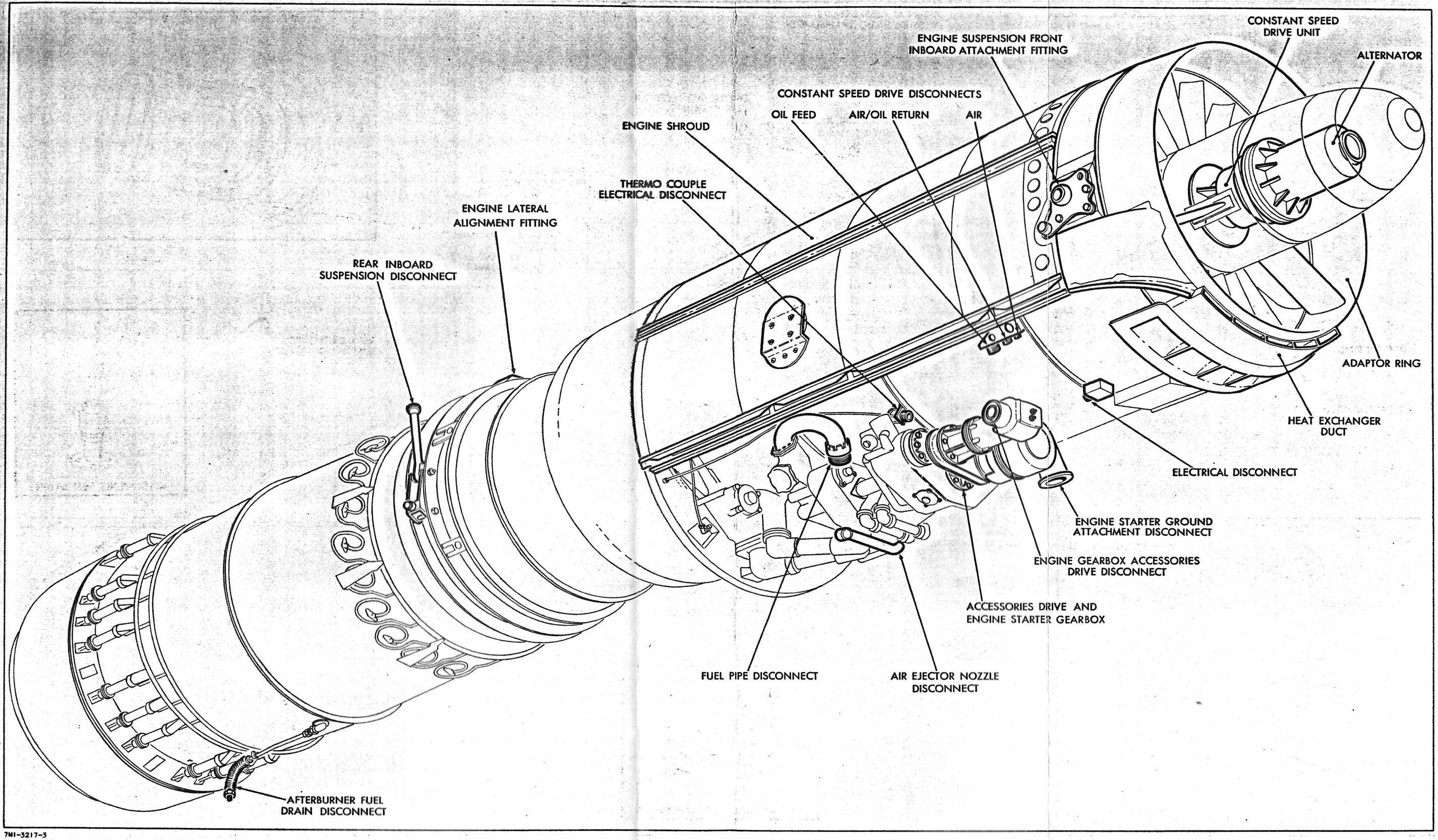

FIG. 12 ENGINE DISCONNECT POINTS - INBOARD

ARROW 1 SERVICE DATA

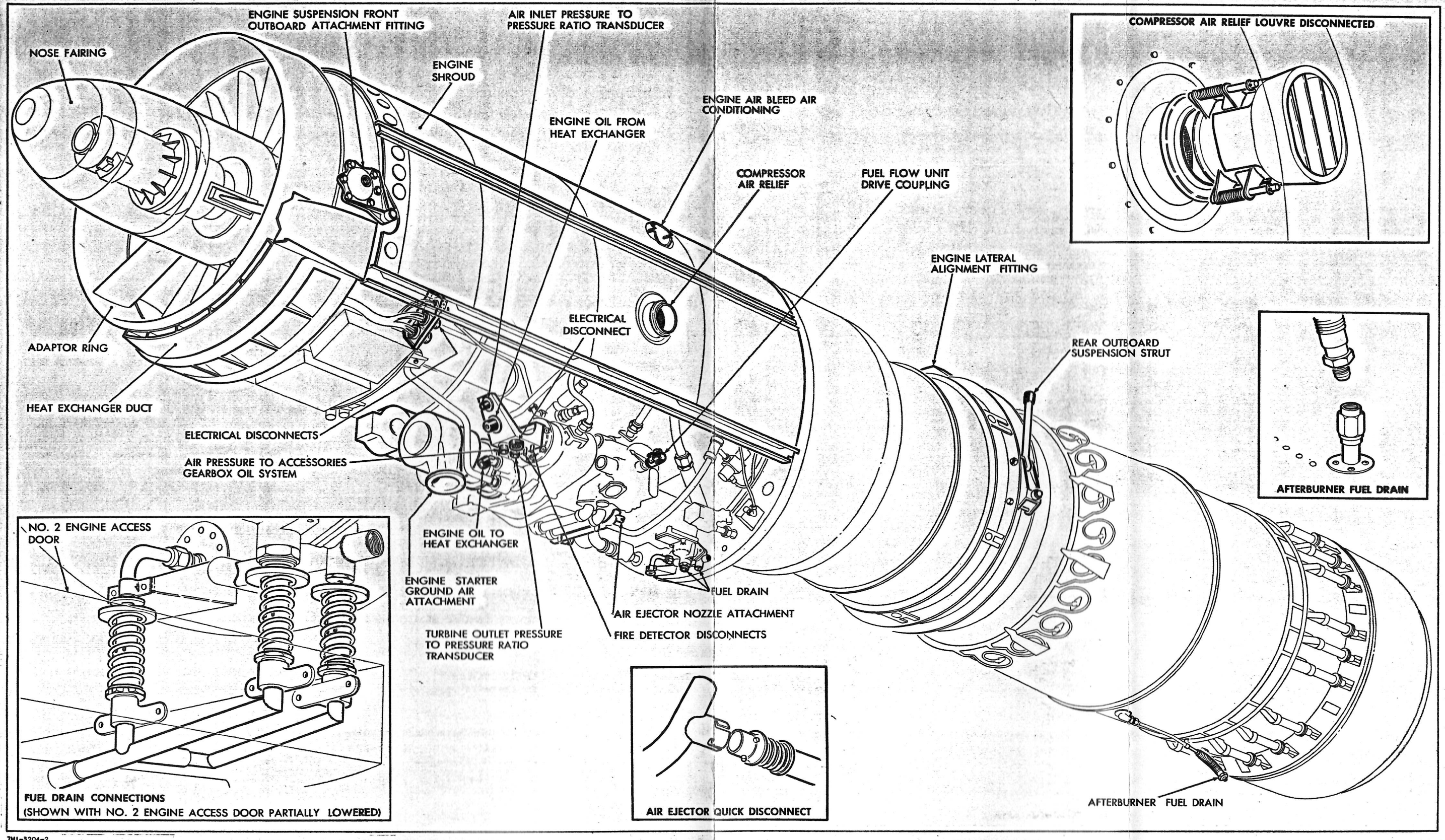

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FIG. 13 ENGINE DISCONNECT POINTS - OUTBOARD

ARROW 1 SERVICE DATA

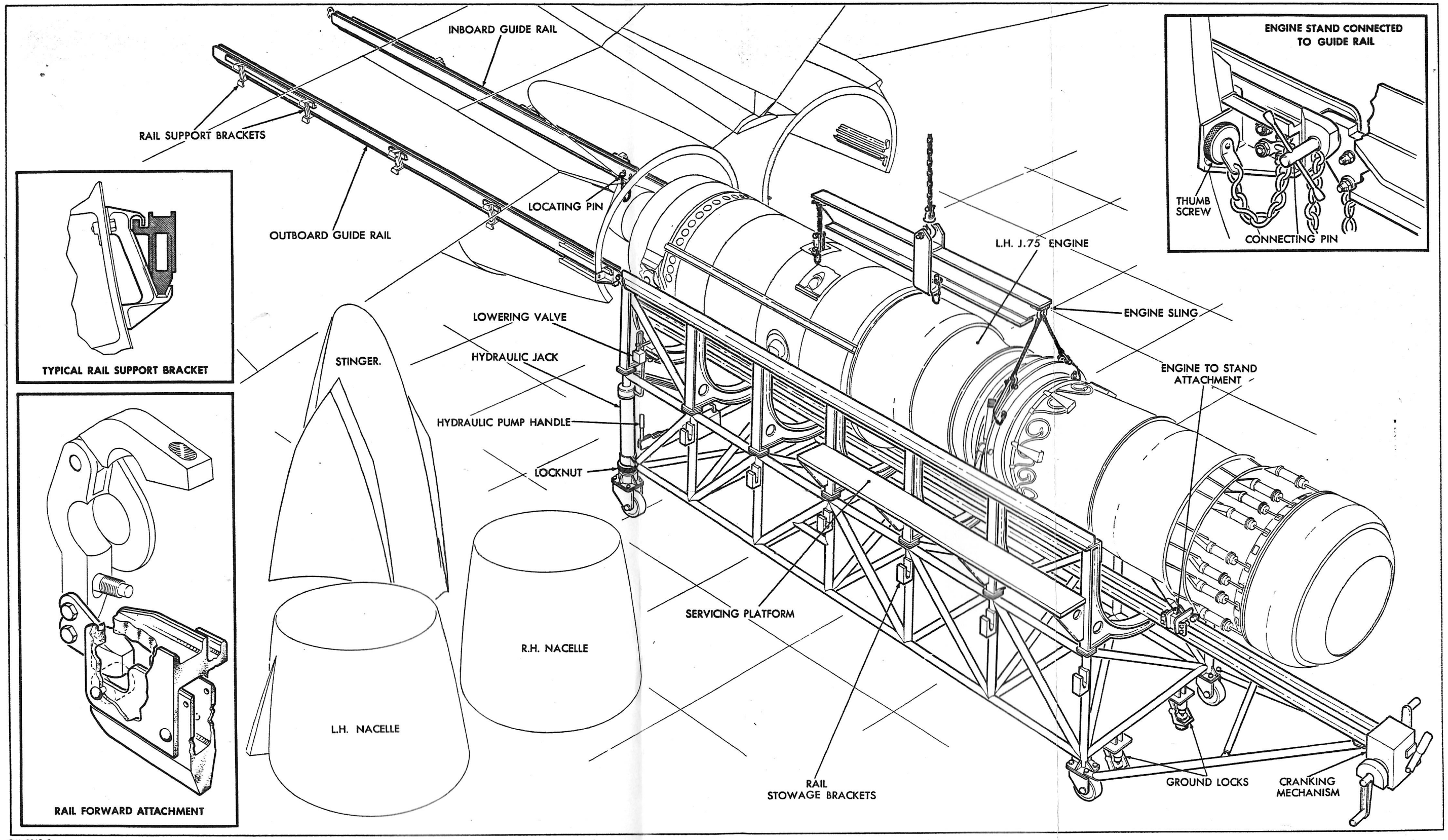

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FIG. 14 ENGINE CHANGE STAND AND RAILS

ARROW 1 SERVICE DATA

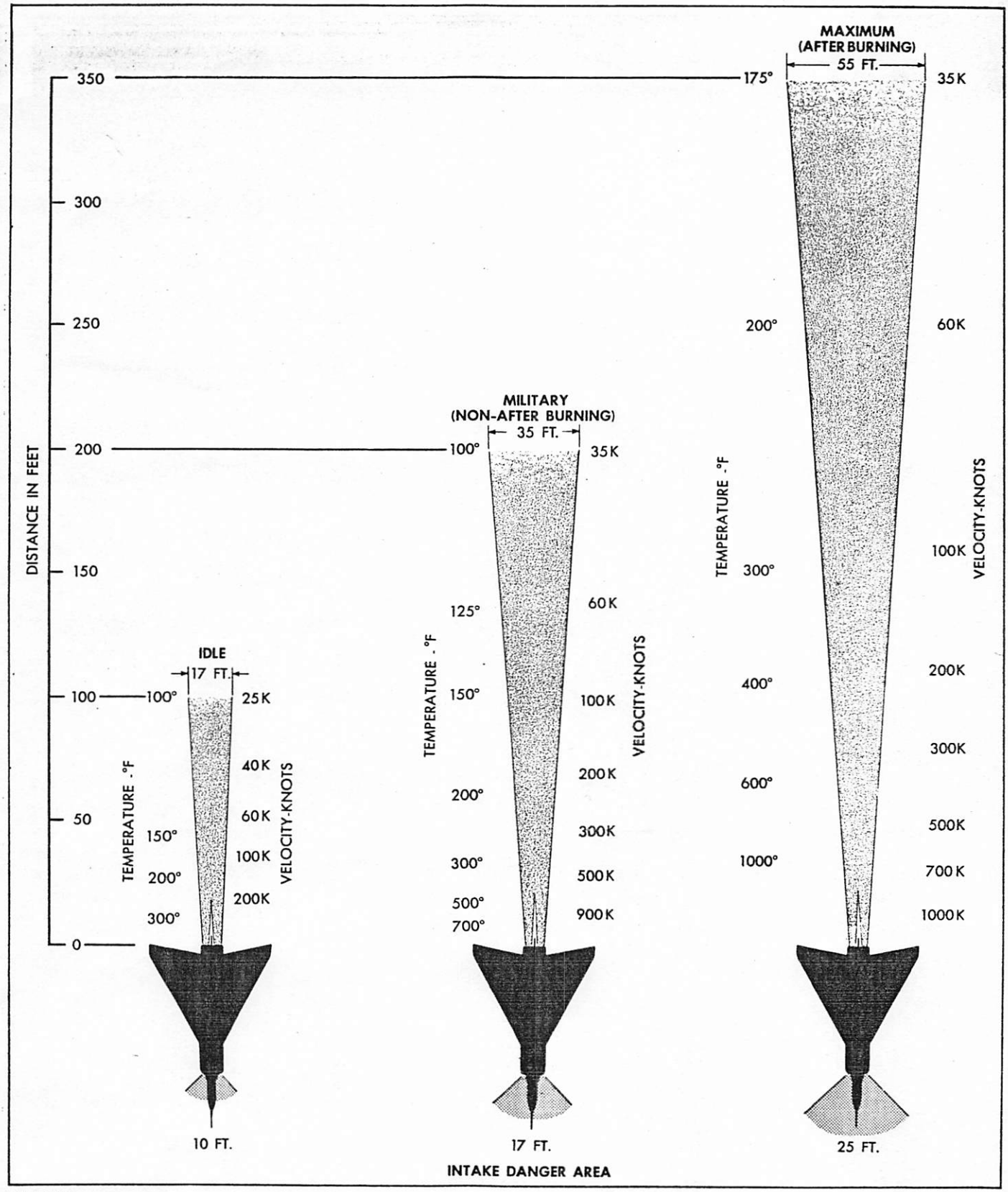

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FIG. 15 JET WAKE AND INTAKE DANGER AREAS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE INSTALLATION		Oil-to-air Heat Exchanger	25-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2556-3/4			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To cool oil from engine oil system.

LOCATION

Below the engine air intake adaptor ring, station 577-581.

ACCESS

MEN X MINUTES

Engine must be removed to service this component.
Access for limited visual inspection through the cooling air exit.

REPLACEMENT PROCEDURE

MEN X MINUTES

Place heat exchanger in position and fit four mounting bolts.
Fit slip joint and install four retaining nuts.
Install the engine.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check the heat exchanger core and air exit for obstruction. Check for oil leaks. Check for security, corrosion and damage.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Engine installation equipment.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ISSUE	1								
DATE	2 May 57								

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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE INSTALLATION		Air Turbine Starter	25-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2995-6	AiResearch		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To start the aircraft engine.

LOCATION

On engine input gearbox.

ACCESS

MEN X MINUTES

Accessible through front engine access door.

REPLACEMENT PROCEDURE

MEN X MINUTES

Install the starter on the engine input gearbox.
Connect electrical wiring.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Remove level plug and check lubricant. Check for wear and shaft distortion.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ISSUE	1								
DATE	2 May 57								

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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE INSTALLATION		Ejection Control Valve	25-3

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1895-41			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To control the supply of engine bleed air to the air ejection system.

LOCATION

Outboard side of the engine.

ACCESS

MEN X MINUTES

Accessible through engine access door No. 2.
33 camlocs and three latches.

REPLACEMENT PROCEDURE

MEN X MINUTES

Secure the valve on the engine.
Connect air piping - two Marmon couplings.
Connect electrical wiring.
Install the engine.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check for security and damage. Check position of indicator.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Engine installation equipment.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ISSUE	1								
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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE INSTALLATION		Differential Pressure Switch	25-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1856-11			25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

Senses pressure differential between the engine intake and ambient pressure.
Controls the actuation of the ejector control valve.

LOCATION

Below the engine intake duct. Station 548 - 553.

ACCESS

MEN X MINUTES

Accessible through electrics access door.
74 camlocs.

REPLACEMENT PROCEDURE

MEN X MINUTES

Secure to the structure with four bolts.
Connect pressure sensing line.
Connect electrical wiring.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Ensure the inlets are free from obstruction and damage. Check switch for security, corrosion and damage.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 stand.
Duct walkway.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ISSUE	1								
DATE	2 May 57								

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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE INSTALLATION		Oil Filler Drain Valve	25-5

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1095-1265			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To provide an indication of a full tank during oil replenishing.

LOCATION

Lower right hand side of the engine.

ACCESS

MEN X MINUTES

Accessible through oil filler access panel in engine access door No. 1 - three latches, ten camlocs.

REPLACEMENT PROCEDURE

MEN X MINUTES

Secure the valve to the engine - three bolts.
Connect the oil filler and oil drain pipelines.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the valve seats, after disconnecting the ground service rig. Check for damage, security and correct operation.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Engine ground service rig.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ISSUE	1								
DATE	2 May 57								

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4-5

ARROW 1 SERVICE DATA

SECTION 24

ENGINE CONTROLS

(This data supersedes previous issue dated 15 Feb 57)

11 OCT 57

Revised 1 Mar 58

ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

ENGINE CONTROLS

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ARROW 1 SERVICE DATA

DESCRIPTION

General

1. The engine thrust is controlled by twin power levers mounted in a control box located on the left hand side of the pilot's cockpit. The two power levers can be operated independently or together to give military rated power in the fully forward position, engine idling speed in the rear IDLE position, and engine shut down when the levers are moved upward and rearward to the OFF position. The afterburners can be selected by depressing the power levers at any point during the last third of their forward travel.

2. Movement of the power levers is transmitted through connecting rods to cable quadrants below the cockpit floor. Two cables from each quadrant are guided by pulleys and fairleads to a pulley attached to a universal coupling in each engine bay. The universal couplings are quick disconnect type and are connected to the fuel control unit of each engine. Cable tension regulators are fitted in the cable run to each engine.

Power Levers and Control Box Assembly (Fig. 1)

3. Each power lever comprises two main sections, upper and lower, the upper section sliding vertically in roller guides mounted on the lower section. A cam roller on the upper section operates in a cam slot to provide three vertical positions of the lever. The lever is retained in any one of these three positions by the engagement of a pair of spring-loaded balls in the lower section of the lever with one of three pairs of indents in the upper section. The two spring-loaded balls are provided with set screws to adjust the break-out force. The cam slot is contoured so that the levers can be depressed during the last 21° of forward travel. Depressing the lever will cause the cam roller to ride down in the cam slot and bear on a spring-loaded afterburner switch cam which in turn actuates an afterburner micro-switch. This micro-switch energizes the afterburner fuel control unit and fuel igniter circuits.

4. The rear end of the slot is contoured to provide a stop for the IDLE position and also to allow the lever to be raised in an upward direction. Raising the lever requires a break-out force of eight pounds, and the lever is held in this position by the upper set of indents. Moving the lever aft to the OFF position requires a force of 15 pounds to overcome a spring-loaded cam plate, which locks the power lever in the OFF position. A force of 15 pounds is required to move the lever forward, with an additional downward force of eight pounds to move the lever into the IDLE position.

5. Adjustable stops are fitted to the control box at the forward end of the power lever travel to provide adjustment of the military rated power position of each lever. The stops are adjusted so that there is 0.1 inch of additional lever movement beyond the military rated power position of the fuel control unit.

6. An engine relight switch is mounted on each lever, and the right hand lever also carries a speed brake switch and a press-to-transmit switch.

Operation of Power Levers

7. Each power lever may be operated throughout the full range from IDLE to military rated without using the afterburner. During the last third of forward travel the lever can be depressed to switch on the afterburner. The afterburner can be switched off at any position within this range by lifting the lever. If, when the lever is depressed and the afterburner is

ARROW 1 SERVICE DATA

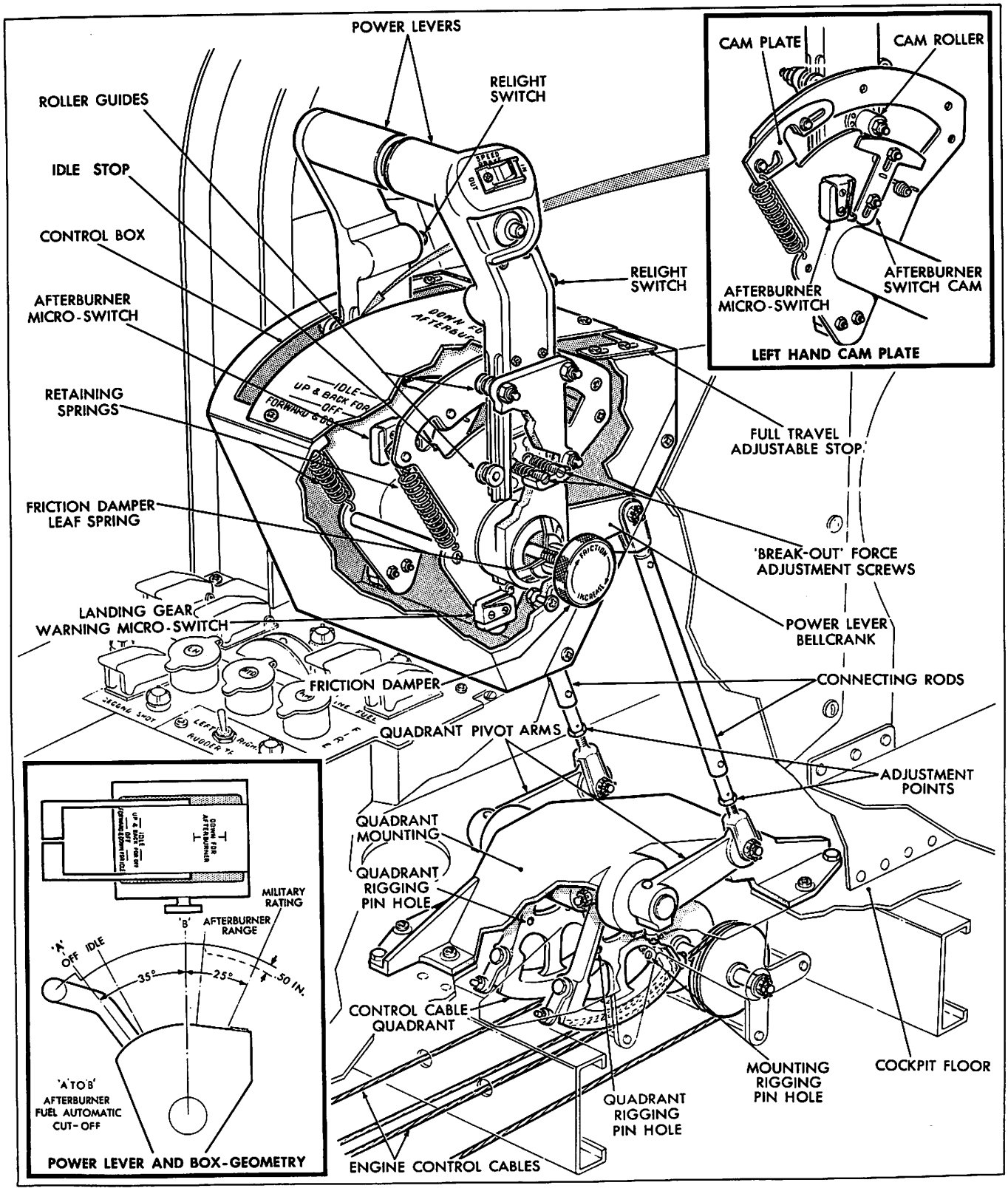

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FIG 1 CONTROL BOX AND QUADRANT

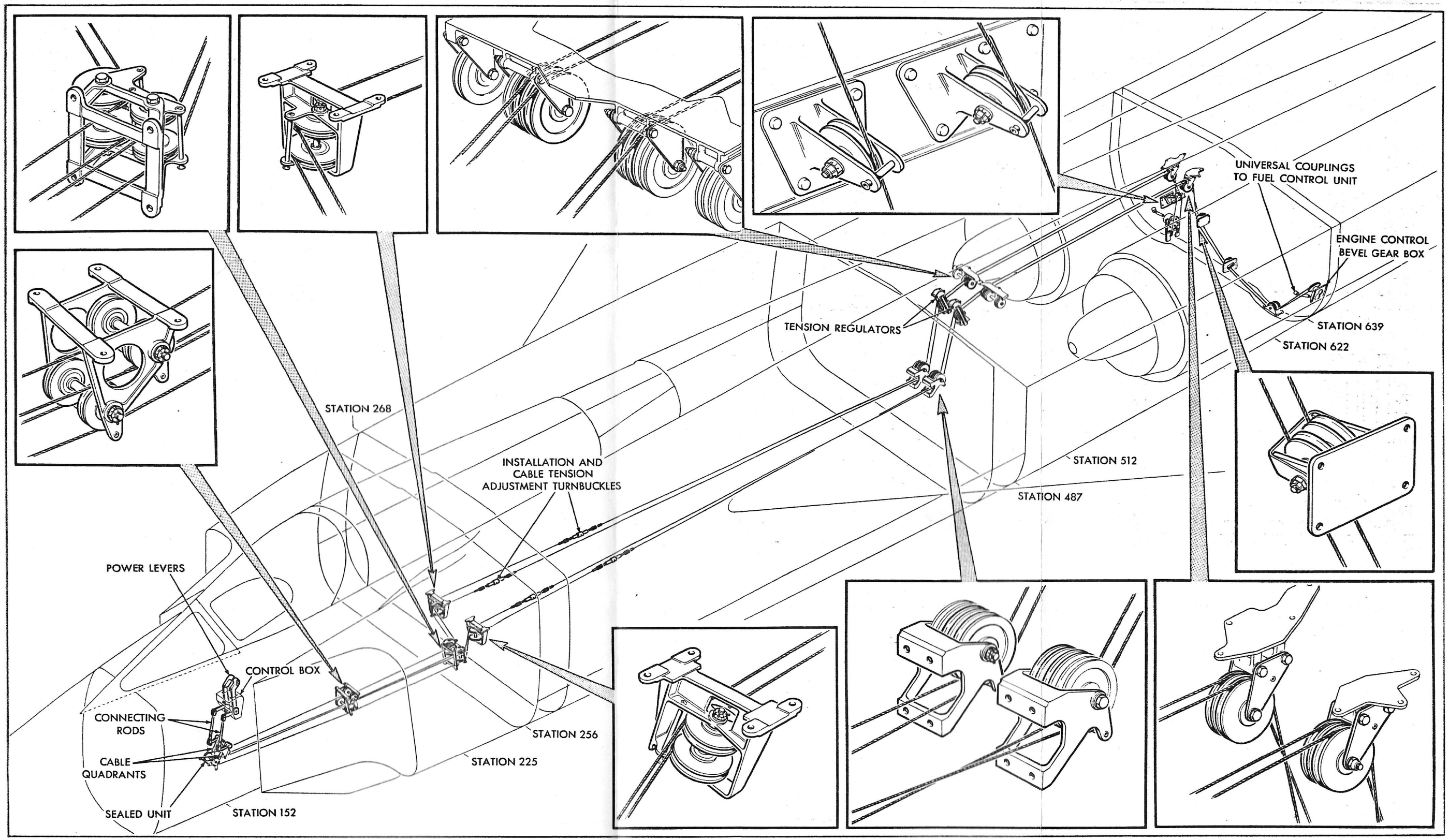

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FIG 2 ENGINE CONTROLS SCHEMATICS

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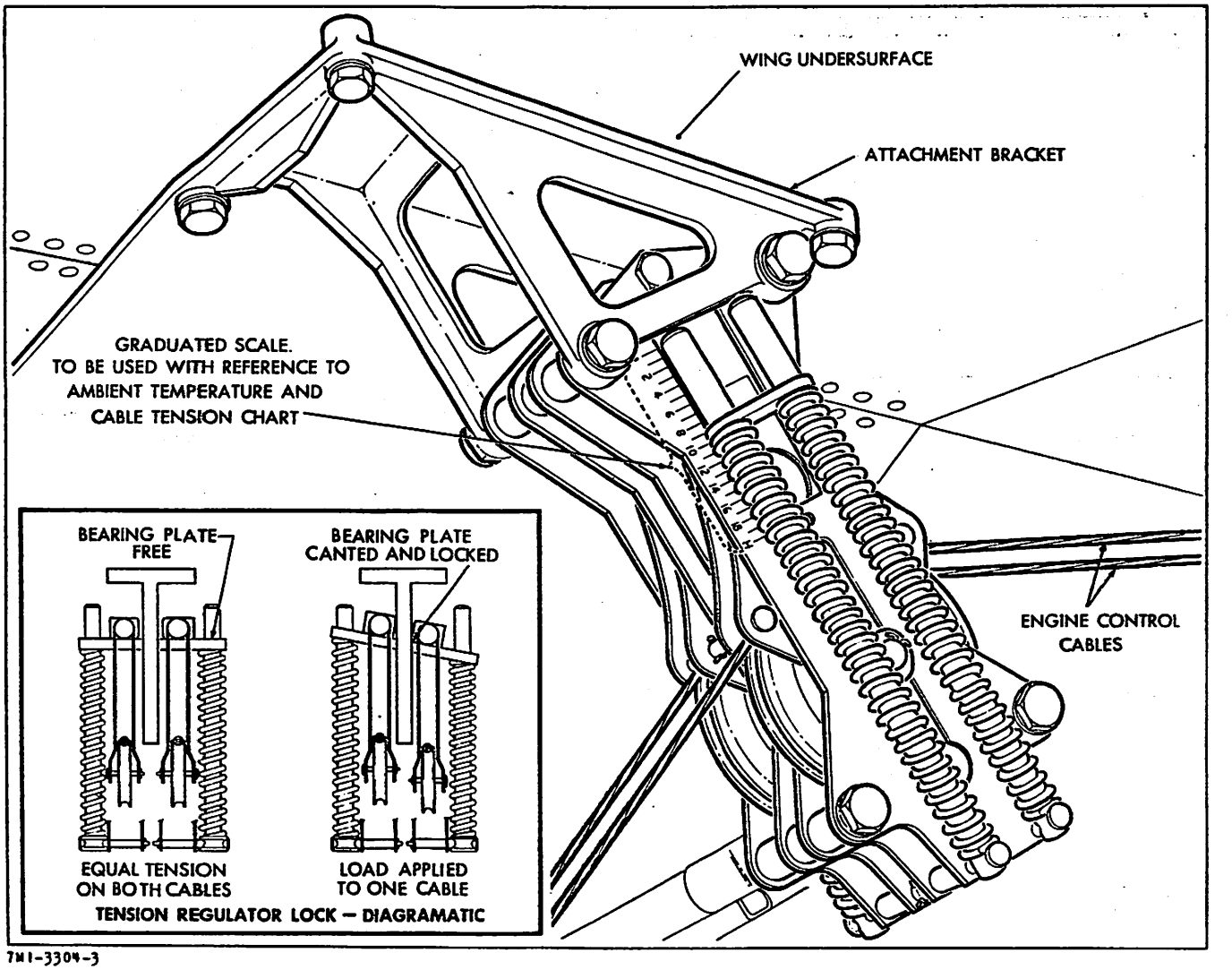

FIG. 3 CABLE TENSION REGULATOR

operating, it becomes necessary to reduce power quickly, retracting the lever aft of the afterburner on range will cause the cam roller to ride up the ramp in the cam slot and position the lever in the mid-vertical position, relieving the pressure on the micro-switch and switching off the afterburner. A hydro-mechanical unit within the afterburner fuel system cuts off the afterburner whenever the power lever is retracted out of the forward 25° of lever movement. This unit is independent of the electrical system and will operate to shut off the afterburner in the event of an electrical failure The afterburner cannot be operated again until the electrical circuit is restored.

Quadrant Mounting and Cable Runs

8. Each power lever bellcrank is connected to a quadrant pivot arm through an adjustable connecting rod. The two quadrants are pivoted in a mounting located in the cockpit floor below the power lever control box. Sealed bearings in this mounting permit the power lever movement to be transmitted to the quadrant without loss of cabin air pressure.

9. Cables connected to the quadrants are led through the front fuselage and armament bay to the engine bay by pulley wheels positioned as shown in Fig. 2. In the armament bay the cables are protected and guided by fairleads. Cable tension is adjusted by turnbuckles installed in the cable runs where they pass through the armament bay.

10. The cables are connected to pulley assemblies located in the LH side of each engine bay at station 641. Each pulley assembly drives a universal coupling which is attached to the engine fuel control unit. The left-hand pulley assembly incorporates a bevel gearbox. See Fig 5.

Cable Tension Regulator (Fig 3)

11. A cable tension regulator is installed in each cable run at station 495. The regulator maintains an even tension on the cables by compensating for structural deflection and temperature changes.

12. Each tension regulator consists of a frame body, two pulley wheels and their guides, and four springs. The pulley wheels and guides are attached to a bearing plate sliding within the frame body. This bearing plate carries a canted bush mounted centrally and sliding on a slide shaft rigidly attached to the frame body. The two pairs of springs bear against the ends of the bearing plate. Tension changes affecting both cables are compensated for by movement of the bearing plate and pulley wheels sliding as a unit on the slide shaft. A load applied to one cable only causes the bearing plate to misalign itself and the canted bush locks on the slide shaft, preventing individual pulley movement. The limit of compensation by the regulator is approximately 2.5 inches.

13. A graduated scale engraved on the body of the regulator is used with reference to an ambient temperature and cable tension chart when setting the cable tension. The chart gives the scale number to which the cables and regulator must be set to correct for ambient temperature.

Universal Couplings (Figs 4 and 5)

14. Each universal coupling consists of an inner tube sliding within an outer tube and containing a compression spring. A key fitted to the inner tube engages with a locking slot in the outer tube to prevent the two tubes turning in relation to each other and to lock the coupling in the retracted position when disconnected from the fuel control unit. The inner tube is attached by a ball joint to the engine control cable pulley at the right-hand engine, and to the bevel gearbox at the left-hand engine. Each outer tube is connected by two drive pins and a nut to a drive coupling.

Drive Couplings (Fig 6)

15. Each drive coupling has serrations which match with serrations on the fuel control unit, and is secured to the fuel control unit by a retaining nut. Access to the retaining nut is through a cut-away in the drive coupling. A spring locking clip on the drive coupling locks the universal coupling nut and provides an attachment point for wirelocking the retaining nut.

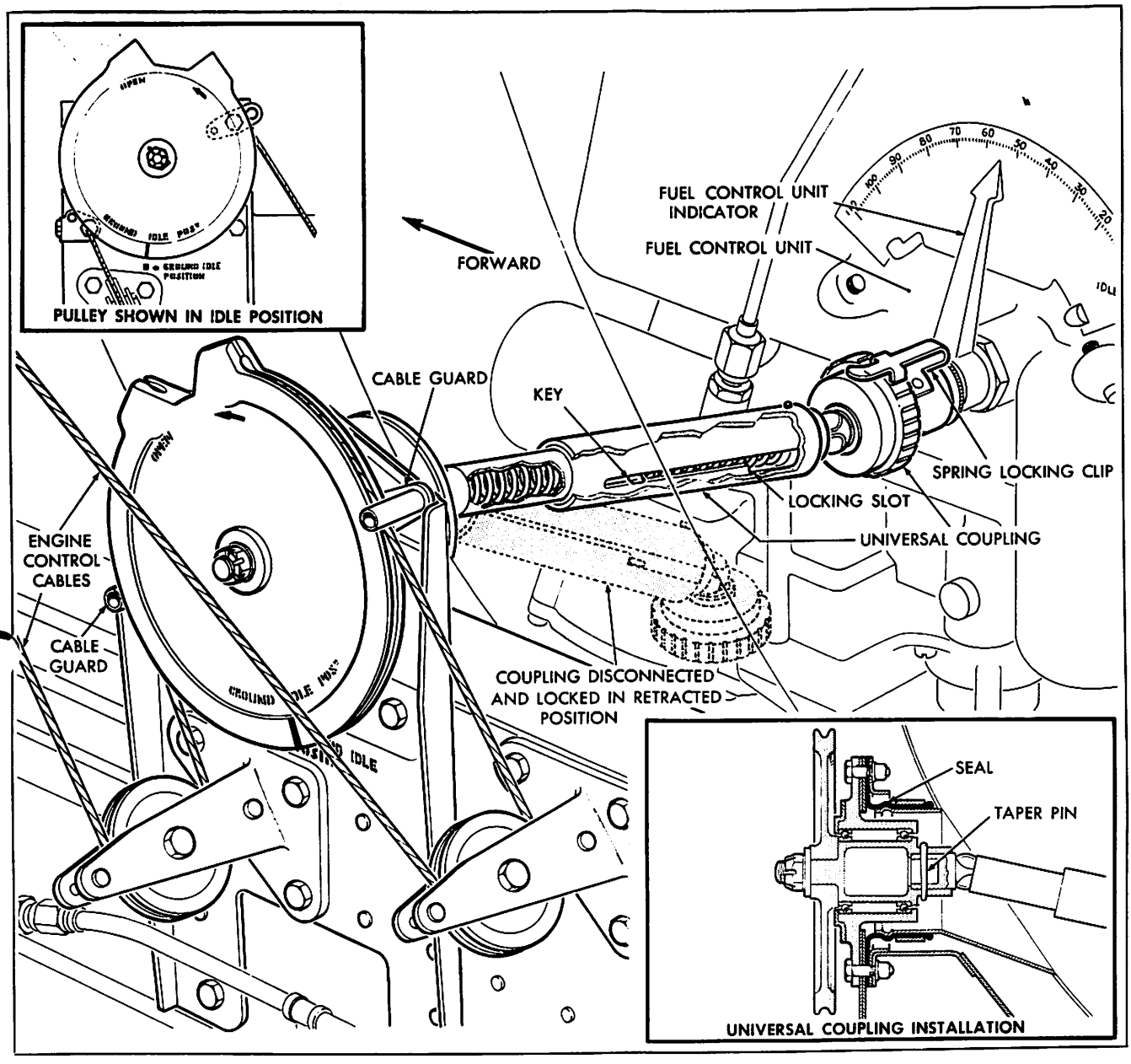

FIG. 4 RH ENGINE CONTROLS - ENGINE BAY

TESTING AND SERVICING

General

16. Servicing the engine control system entails the two operations of tensioning the cables and adjusting the setting of the power levers. Tensioning the cables is carried out by adjustment of the turnbuckles in the armament bay. Positioning the power levers in the correct relation to the fuel control units is accomplished by adjustment at the universal couplings in the engine bay and at the power lever connecting rods.

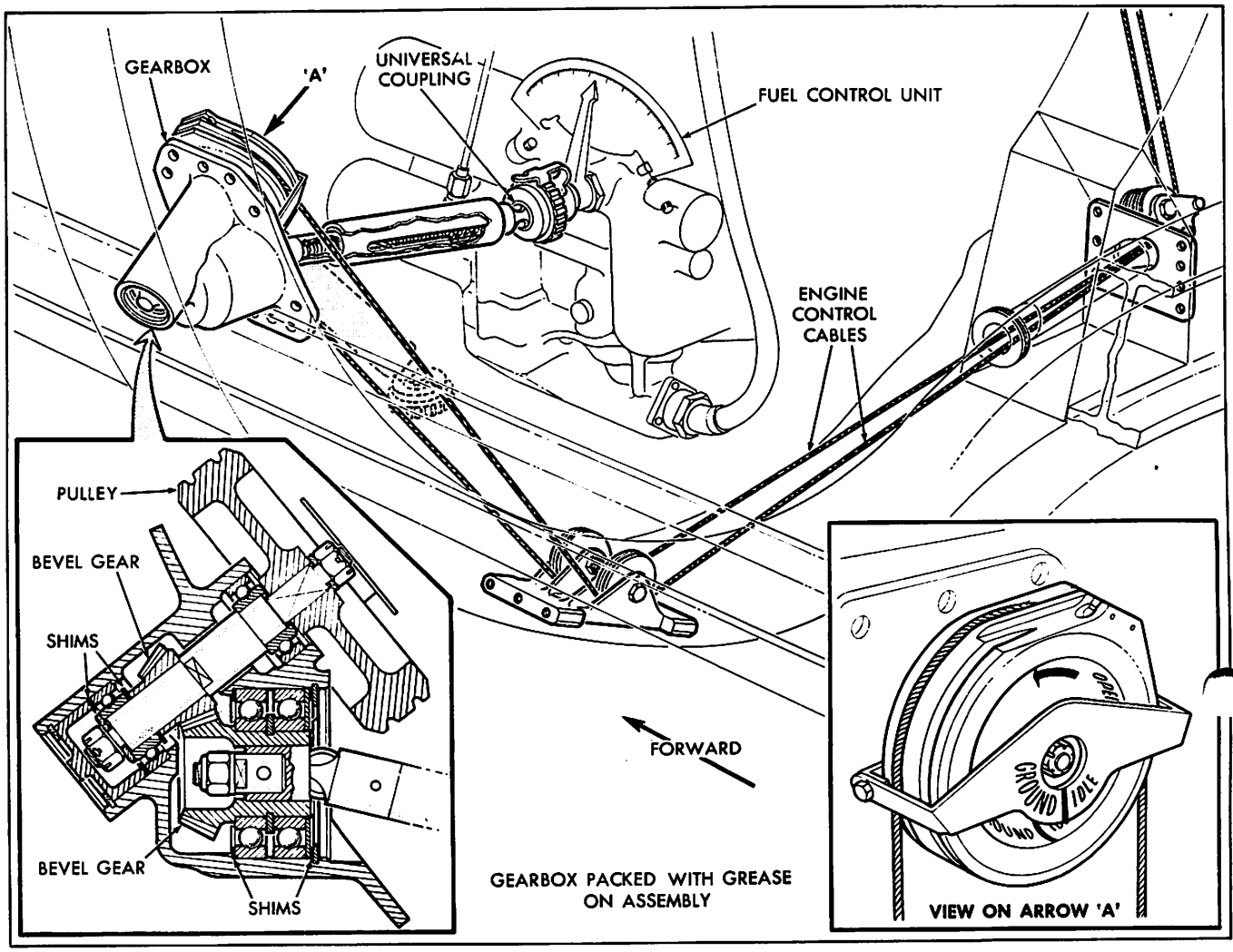

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FIG 5 LH ENGINE CONTROLS - ENGINE BAY

17. Before tensioning the control cables the aircraft should be allowed to stand for approximately 12 hours at a constant temperature to enable the aircraft component temperatures to stabilize. During adjusting and tensioning the aircraft should be supported by the landing gear on firm, level ground with the engines installed.

Tensioning the Control Cables

18. To tension the control cables, position the aircraft as in para 17, and proceed as follows:

(a) Line up the rigging-pin holes in the control cable quadrants with the holes in the quadrant mounting and insert a rigging-pin to lock the quadrant in this position.

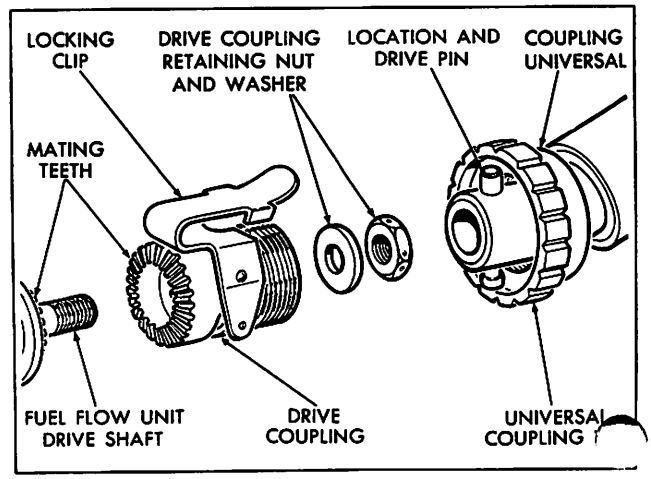

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FIG 6 DRIVE COUPLING

ARROW 1 SERVICE DATA

(b) Check that the GROUND IDLE POSITION mark on the control pulley in the engine bay is lined up with the corresponding mark on the cable guard.

(c) Break the locking wire on both turnbuckles in the armament bay, and adjust both cables simultaneously until the number indicated on the tension regulator scale coincides with the number obtained from the ambient temperature correction chart. See Fig 7. Ensure that the GROUND IDLE POSITION marks on the control pulley and cable guard in the engine bay remain aligned during this operation.

(d) Vibrate the cable system by drumming on the cable. This will tend to remove any friction in the cable run. Note any change in regulator position and correct accordingly.

(e) A quick check of the rigging may be made by applying an equal load to the pair of cables. This should compress the cable regulator with a smooth, even movement.

(f) Check that the turnbuckles are in safety and wirelock.

(g) Repeat the procedure for the other engine.

(h) Remove the rigging-pin.

Rigging the Engine Controls

19. Before commencing to rig the engine controls, position the aircraft as described in para 17. Check that the control cables are correctly tensioned and proceed as follows:

(a) Disconnect the universal coupling and the drive coupling from the fuel control unit drive shaft.

(b) Check the power lever for unrestricted travel throughout its range.

(c) Slacken the friction damper completely and use a spring balance to check that the break out force required to move the power lever from one vertical position to the next is eight pounds. Adjust on the set screws if necessary.

(d) Disconnect the power lever connecting rod from the lever on the quadrant mounting, and check that the force required to pull the power lever from the upper IDLE position to OFF and from OFF to the upper IDLE position is 13-17 pounds. Connect the connecting rod to the lever on the quadrant mounting.

(e) Set the power lever in the IDLE position and tighten the friction damper to retain the lever in this position.

(f) Set the fuel control unit to the IDLE setting.

(g) Assemble the drive coupling to the universal coupling shaft, and extend the shaft until the teeth on the coupling mesh with the teeth on the fuel control unit drive shaft.

(h) If the teeth do not mesh with the fuel control unit when the pointer setting is within the idling tolerance of 7^{o} - 15^{o} adjust the power lever connecting rods until they are meshed. Check that the connecting rod end is in safety and tighten the lock-nut.

ARROW 1 SERVICE DATA

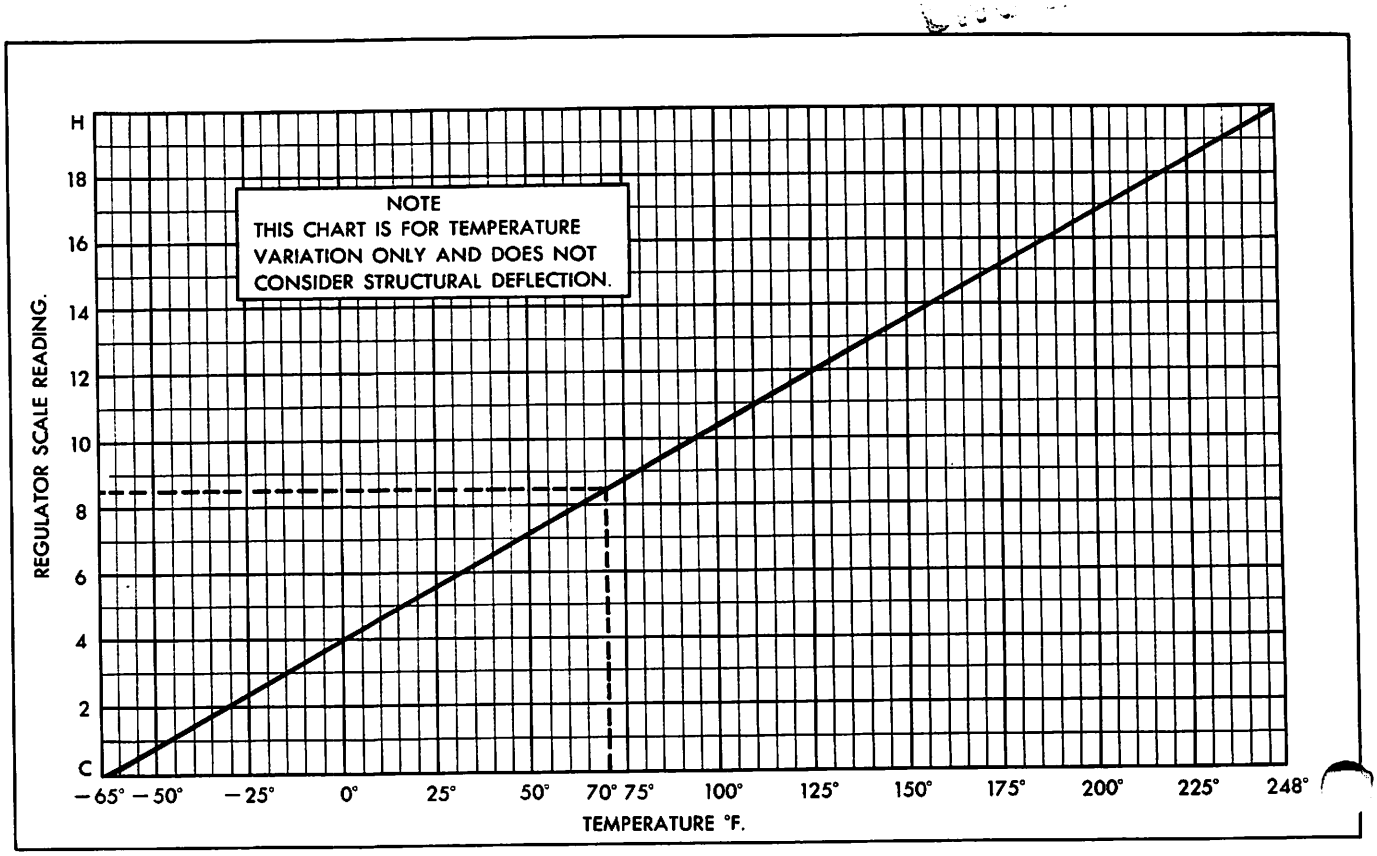

FIG. 7 AMBIENT TEMPERATURE AND CABLE TENSION CHART

(j) When the teeth have meshed satisfactorily, mark the relative positions of the fuel control unit drive shaft and the drive coupling, and remove the drive coupling from the universal coupling shaft.

(k) Fit the drive coupling to the fuel control unit drive shaft with the teeth meshed and the marks aligned. Secure the coupling to the fuel control unit with the retaining nut and washer. Wirelock the nut to the drive coupling locking clip.

(m) Extend the universal coupling shaft and attach it to the drive coupling with the nut fully tightened and locked by the spring clip.

(n) Slacken the screws on the full travel stop on the power lever control box, and move the power lever forward until the fuel control unit indicator indicates M.R. on the scale. Adjust the full travel stop so that the power lever has 0.1 inches of overtravel beyond this position.

(p) Check the IDLE, OFF and military rated positions of the power lever relative to the fuel control unit indicator.

(q) Repeat the procedure for the other engine.

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE CONTROLS		Control Box	14

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7. 1452 - 66	Hansen-Lynn Co. Inc.	5L3380	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Provides the pilot with means of adjusting the engines to a required power setting. Provides a mounting for afterburner switches, engine relight switches, press-to-transmit switch, speed brake switch and landing gear warning switches.

LOCATION

Front cockpit - L.H. console.

ACCESS | MEN X MINUTES

Through console panel &-1052-4485
on L.H. console. 9 Airloc fasteners.

REPLACEMENT PROCEDURE | MEN X MINUTES

Install box with 9 screws.
Connect bonding lead.
Attach connecting rods.
Connect electrical connector.
Install console panel, 9 Airloc fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check power levers for full travel and unrestricted movement throughout the whole range. Check operation of friction damper. Check switches for security. Check adjustment of IDLE and military rated settings on engine run.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Ground starting vehicle.
Electric ground power unit.
Cockpit access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE CONTROLS		Quadrant Mounting	14

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7. 1452-5	AVRO Aircraft		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To transmit power lever movement to the control cables without loss of cabin air pressure.

LOCATION

Front cockpit, below L.H. console.

ACCESS

Through panel 7.1052-4485, 9 Airloc fasteners.

MEN X MINUTES

REPLACEMENT PROCEDURE

Install quadrant mounting using 4 bolts and nuts, 18 screws.
Seal to cockpit floor to Avro process standard No. 20.
Attach connecting rods.
Attach cables to quadrants.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for unrestricted travel throughout the full range of the power levers. Inspect linkage for security, damage, corrosion and wear.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Cockpit Access Stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ENGINE CONTROLS		Cable Tension Regulator	14

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7. 1462-21	Pacific Scientific	R. 90-2001-35-00	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To maintain correct tension on the engine control cables throughout temperature variations and structural deflection.

LOCATION

Duct bay, on lower skin of inner wing, station 495.

ACCESS

Through electrics access panel. 74 Camlocs.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Install on top bracket with two bolts.
Attach to bottom bracket, two bolts.
Install cables.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Inspect for security, damage, corrosion and wear.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

B. 4 Stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 25

ENGINE SERVICES

ELECTRICS

(This data supersedes previous issue dated 25 Feb 57)

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

ELECTRICAL SYSTEM

ENGINE SERVICES

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9	Location of Electrical Components - Engine Services	10
ROUTING DIAGRAMS		
10	Engine Service Circuits	11
11	Engine Starting and Ignition	12

ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The electrical circuits of the engine services include instrument circuits, warning circuits, engine starting control, ignition and relight circuits. Electrically identical circuits are provided for each engine.

ENGINE STARTING AND IGNITION (Fig 1)

2 The engines are started by compressed air supplied from a mobile starter cart. The starting cycle is initiated and controlled by electrical circuits which are actuated by switches located in the front cockpit.

3 Interconnection between the starter cart and the aircraft is by a cable which plugs into an engine starting receptacle located on the lower section of the nose landing gear. The starter plug incorporates a lanyard type quick-release to prevent unnecessary delay in take-off after the engines have been started.

4 The starter cable consists of the starting control circuit wiring for two compressed air control valves, an interphone line, and two battery powered DC supply circuits. The interphone line permits intercommunication between the aircrew and the ground crew and the reception of telescramble communications from the operations control centre. The DC supply circuits are used to supply power to the battery bus-bar in lieu of the aircraft battery. When the starting cable plug is connected to the starting receptacle, the aircraft starting power relay is energized. This action isolates the aircraft battery and transfers the battery bus-bar load onto the external battery.

5 The starting circuits permit the engines to be started singly or simultaneously and facilitate interrupting the starting cycle.

6 The starting cycle is initiated by selecting the starting switch to the START position. This completes a supply circuit from the emergency DC bus-bar to the starting relay. The ground return for the starting relay is completed through a centrifugal control switch fitted on the engine starter. The starting relay, when energized, completes the following three circuits:

(a) A self-holding circuit which is operative until the engines are started or the starting cycle is interrupted.

(b) A supply circuit which opens the compressed air control valve on the engine starter cart.

(c) A preparatory supply circuit to a centrifugal advance switch fitted on the engine starter.

7 When the engine starter switch is released, the supply circuit for the engine starting relay is maintained through the relay open contacts of a manual reset relay.

8 The advance centrifugal switch closes when the starter attains 700 rpm. This action completes the preparatory supply circuit from the starting relay to an ignition relay. The ignition relay, when energized, completes the power supply circuits to the engine spark igniters.

9 The control centrifugal switch opens when the starter attains 3020 rpm. This action renders the starting circuits inoperative by interrupting the self-holding ground return circuit of the starting relay which interrupts the supply to the advance centrifugal switch and to the compressed air control valve.

10 If the engine fails to start, the starting cycle can be interrupted by selecting the RESET position on the engine starting switch. This selection energizes the manual relay which interrupts the power supply to the starting relay.

RELIGHTING (Fig 1)

11 A push-button relight switch is fitted on each power lever. When either switch is depressed, a circuit is completed from the emergency DC bus-bar to the relevant LH or RH ignition relay. The ignition relay, when energized, completes the power supply circuits to the engine spark igniters.

ARROW 1 SERVICE DATA

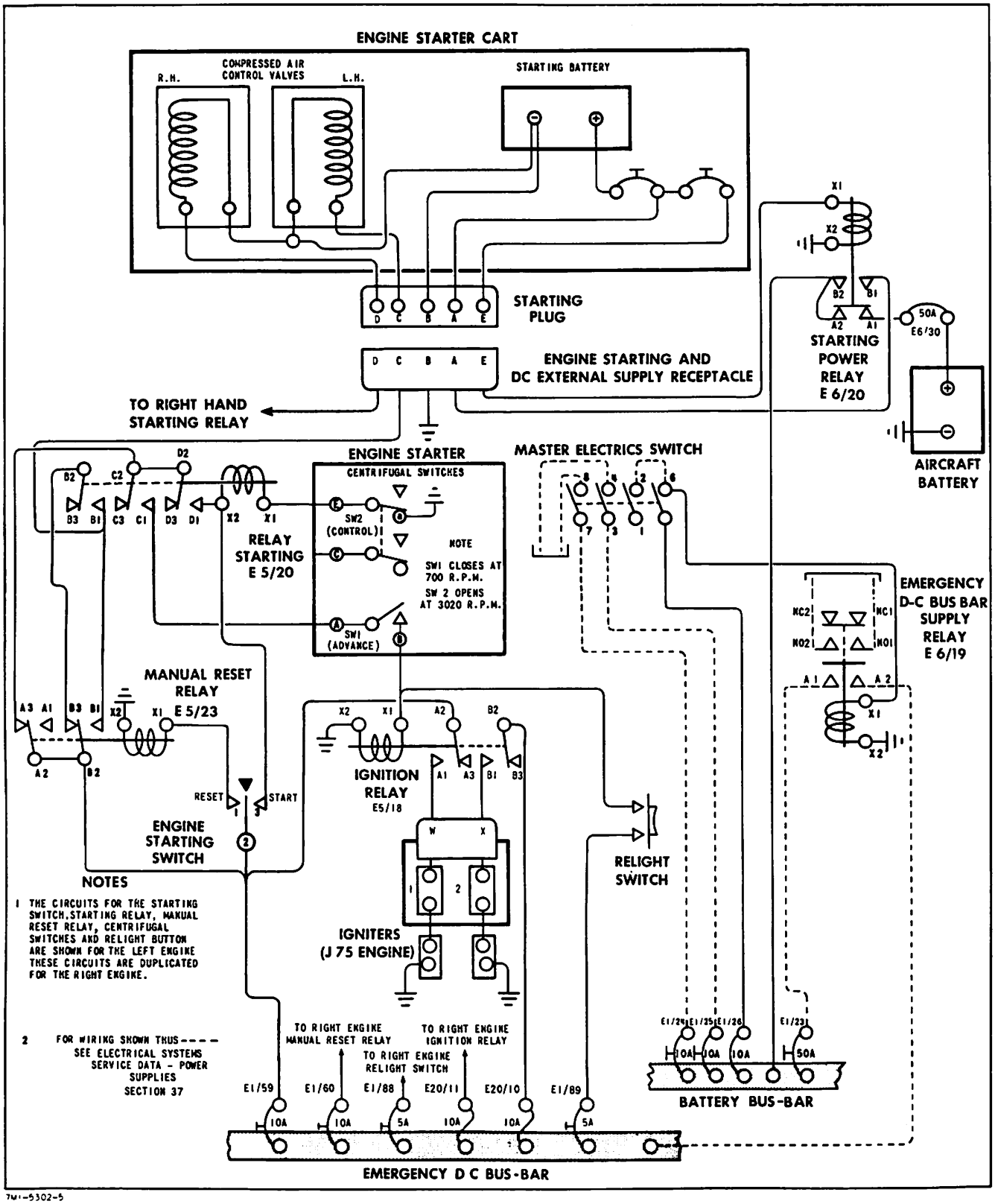

FIG. 1 ENGINE STARTING IGNITION SCHEMATIC

EXHAUST GAS TEMPERATURE INDICATION

12 Exhaust gas temperature indication for each engine is provided by two separate self-exciting chromel-alumel thermocouple circuits. Each circuit consists of a transistorized indicator actuated by four parallel-connected thermocouples located on the turbine discharge shroud ring of the engine. The indicators derive a 115 volts AC supply from "A" phase of the main bus-bars and incorporate two red warning flags which are visible when the power is off.

PRESSURE RATIO INDICATION

13 The pressure ratio between the engine air intake and the turbine discharge outlet is utilized by the pressure ratio indication system to provide a measure of thrust being developed by the engine. Two systems are provided, one for each engine, each consisting of a ratio indicator, or ratiometer, located on the main instrument panel in the front cockpit, and a pressure ratio transducer located at station 664 of the fuselage. Pressure indications, taken from the engine air intake and the turbine discharge outlet, are translated into an electrical signal by the pressure ratio transducer and transmitted to the ratio indicator. The system operates on 115 volts AC supply derived from "A" phase of the main bus-bars.

OIL PRESSURE WARNING (Fig 2)

14 An OIL PRESS warning light for each engine is fitted on the master warning panel. If the oil pressure of the LH or the RH engine drops below 25 psi, the appropriate L or R OIL PRESS warning light and the amber coloured master warning light illuminate. Each warning light is controlled by a pressure switch mounted on the LH side of the corresponding engine gear box. Both circuits derive their power supply from the main DC bus-bar via the master warning control unit.

ENGINE INLET FUEL PRESSURE WARNING (Fig 3)

15 A FUEL PRESS warning light for each engine is fitted on the master warning panel. If the LH or the RH engine inlet fuel pressure drops below 16.4 $\pm$ 0.5 psia, the appropriate L or R FUEL PRESS warning light and the amber coloured master light illuminate. Each

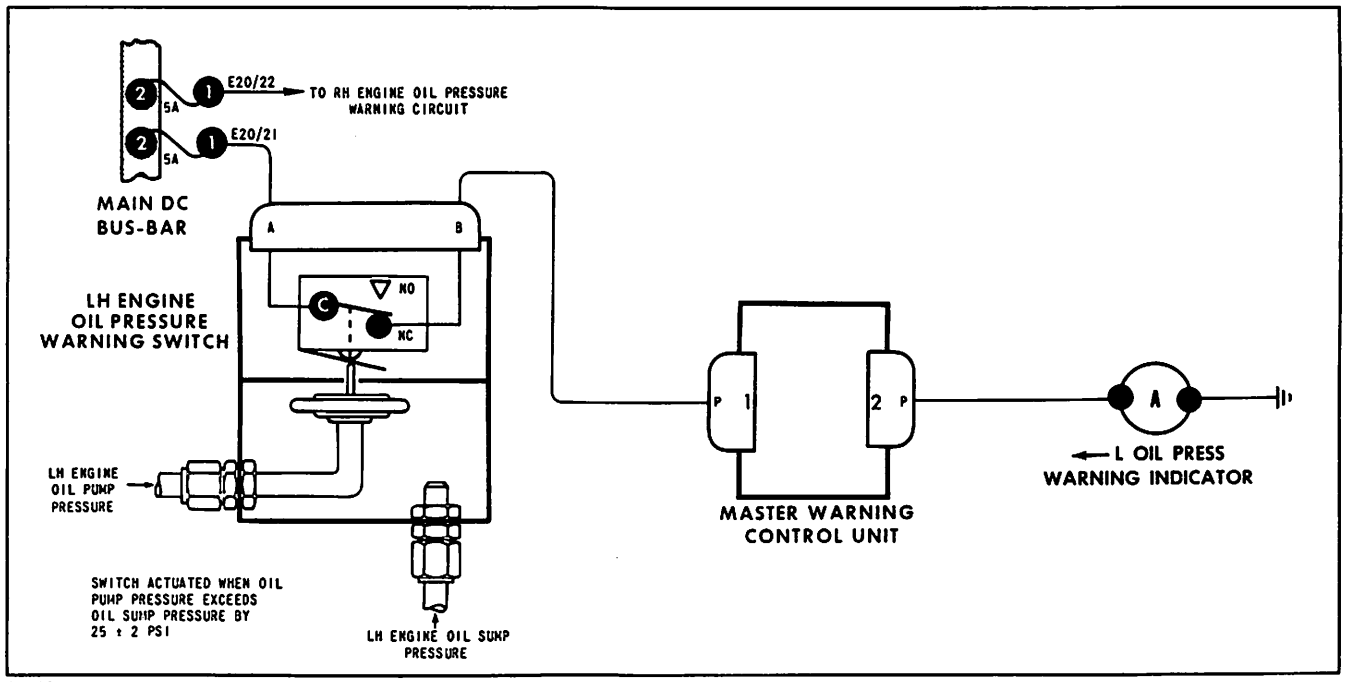

FIG. 2 OIL PRESSURE WARNING SCHEMATIC

ARROW 1 SERVICE DATA

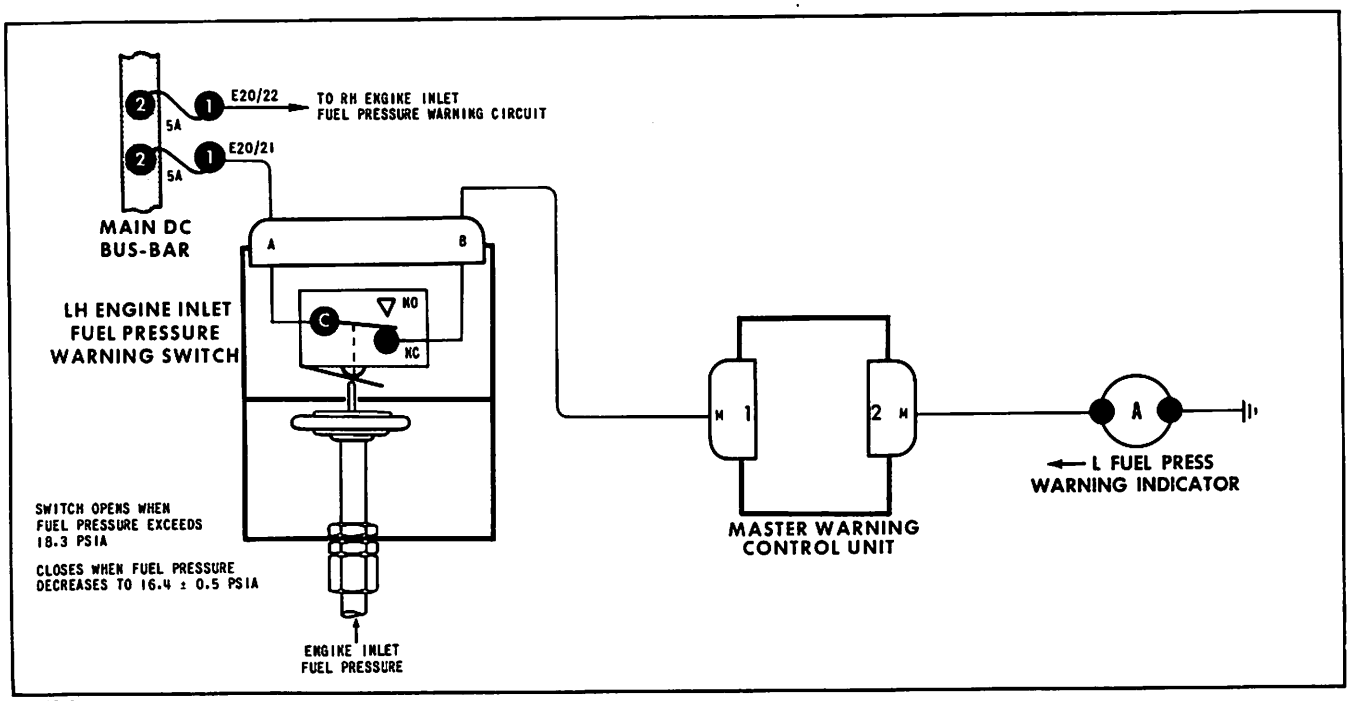

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FIG. 3 ENGINE INLET FUEL PRESSURE WARNING SCHEMATIC

warning light is controlled by a pressure switch tapped into the corresponding engine fuel inlet line at station 549 of the fuselage which is downstream from the low pressure cock. Both circuits derive their power supply from the main DC bus-bar via the master warning system control unit.

AFTERBURNER OPERATION (Fig 4)

16 The afterburner is brought into operation by advancing the power lever to the afterburner range and then depressing the lever. This action closes a micro-switch fitted on the power lever assembly. The micro-switch, when closed, completes a supply to energize the afterburner relay which, in turn, completes circuits to initiate the operation of the hydro-mechanical unit and open the fuel-to-oil heat exchanger by-pass valve. The hydro-mechanical unit provides fuel to the afterburner igniters and fuel nozzles and opens the afterburner discharge nozzle. The fuel-to-oil heat exchanger by-pass valve, when open, permits engine oil to pass through the heat exchanger. A power supply for both circuits is derived from the main DC bus-bar.

ZONE 1 EJECTOR (Fig 5)

17 The zone 1 ejector is fitted to assist in engine cooling at low airspeeds and when ground running.

18 The system consists of a differential pressure switch which controls an ejector valve actuator. The pressure switch, located on the structure below the engine intake, is acted upon by the engine air intake pressure and atmospheric pressure. At low airspeeds or when ground running, a depression at the engine intake causes a pressure differential to exist across the pressure switch. When the pressure differential is such that atmospheric pressure exceeds engine intake pressure by 2.0 ± 0.25 inches of water, the pressure switch closes. This action completes a supply circuit to the ejector valve relay which completes a supply circuit to the ejector valve actuator to open the ejector valve. The ejector valve is fitted in the bleed line from the high pressure compressor and air is ejected to atmosphere through zone 1 of the engine bay. The system derives a power supply from the main DC bus-bar.

ARROW 1 SERVICE DATA

LOW PRESSURE COMPRESSOR OVERSPEED INDICATOR (Fig 6)

19 An ENG O'SPEED indicator light for each engine is fitted on the master warning panel. Steady illumination of a light denotes failure of the corresponding engine low pressure compressor speed limiter. Note that the light may illuminate momentarily when the afterburner is switched on and off. If the low pressure rotor speed increases to between 7260 and 7330 rpm, this will close a centrifugal switch incorporated in the speed limiter. When closed, the switch completes a supply circuit to the appropriate ENG O'SPEED indicator light and the amber coloured master light via the master warning control unit. Both circuits derive their power supply from the main DC bus-bar.

ENGINE EMERGENCY FUEL CONTROL AND WARNING (Fig 7)

20 The emergency fuel control provides an emergency fuel supply to the engine in the event of a malfunction of the hydro-mechanical fuel control unit. An ENG EMER FUEL ON warning light is fitted on the master warning panel and illuminates when either the LH or the RH engine fuel control unit is in the emergency selection.

21 Two solenoid operated control valves are incorporated in each engine fuel control unit. One valve controls the normal fuel flow to the engine, and the other the emergency flow to the engine.

22 Selecting the LH or the RH ENGINE FUEL switch, located on the fire and fuel panel, to

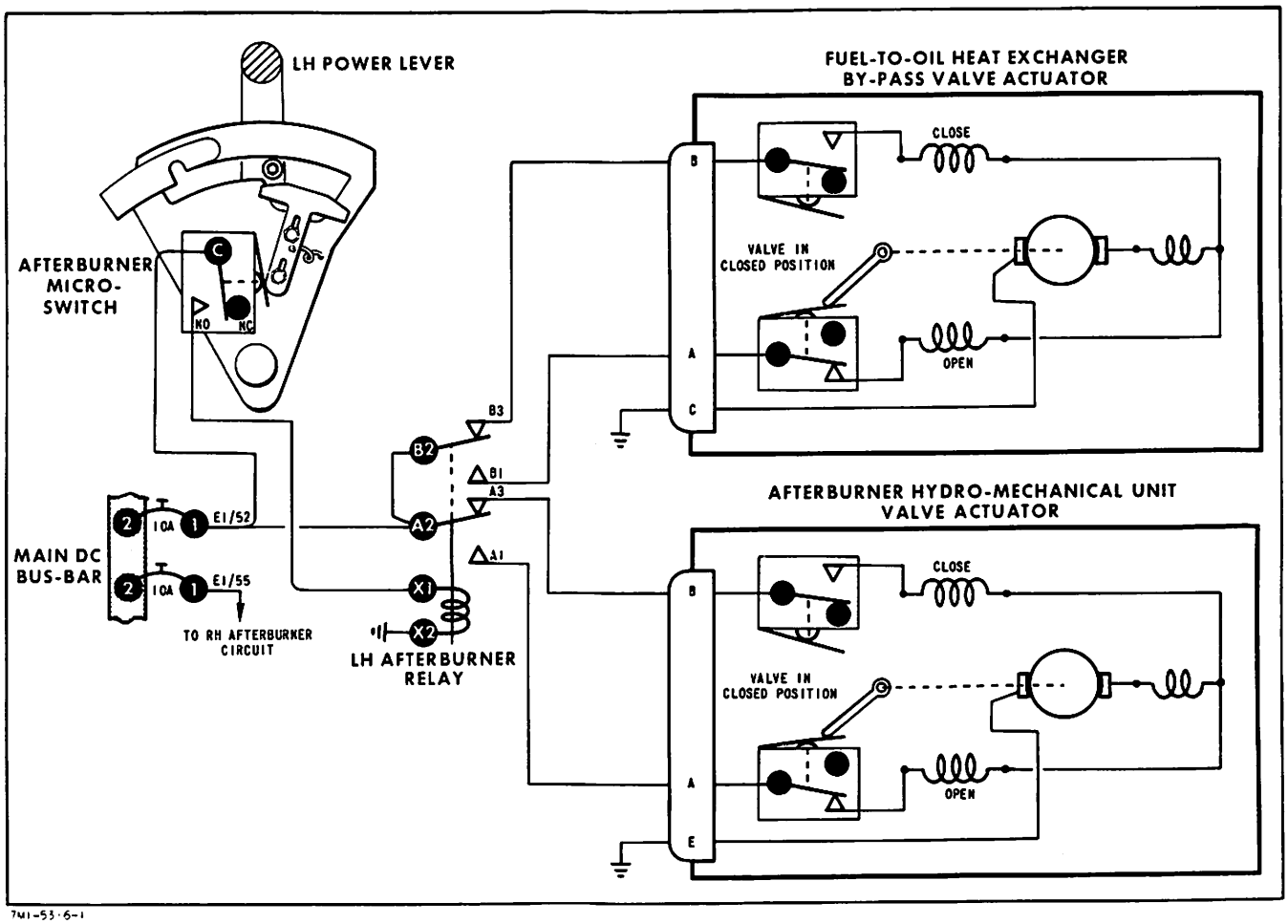

FIG. 4 AFTERBURNER CIRCUIT SCHEMATIC

ARROW 1 SERVICE DATA

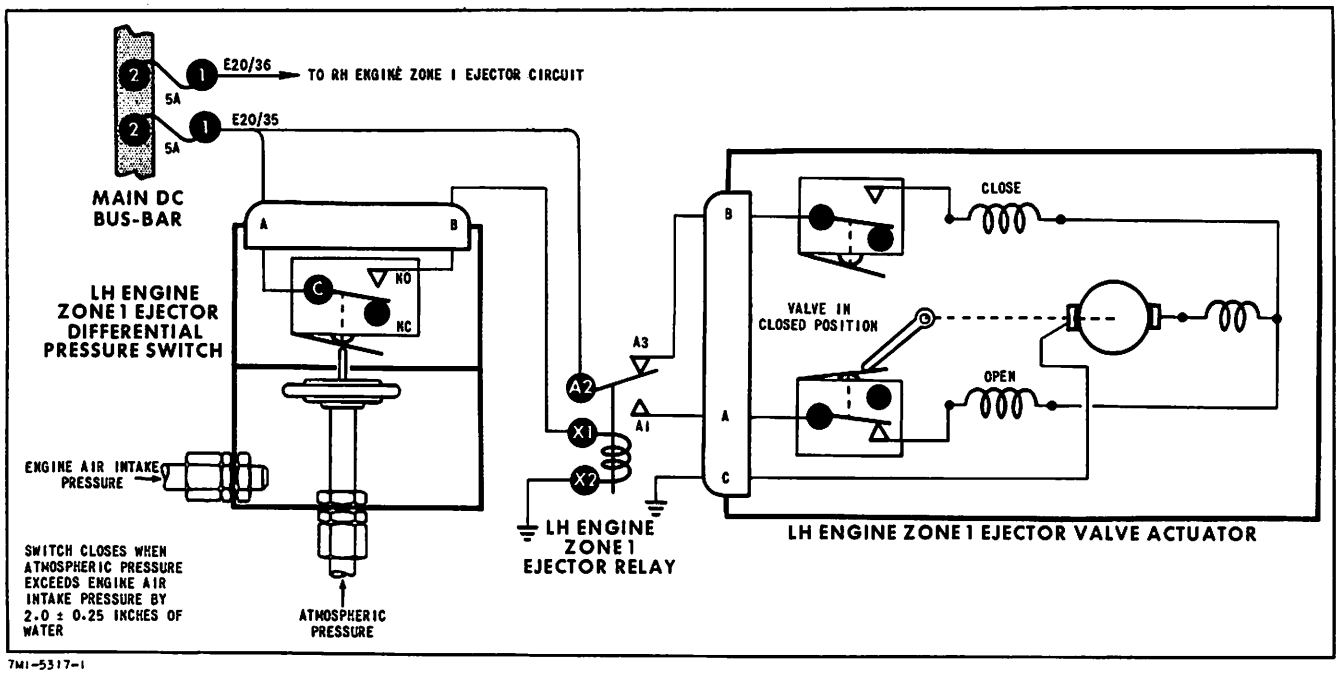

FIG. 5 ZONE 1 EJECTOR SCHEMATIC

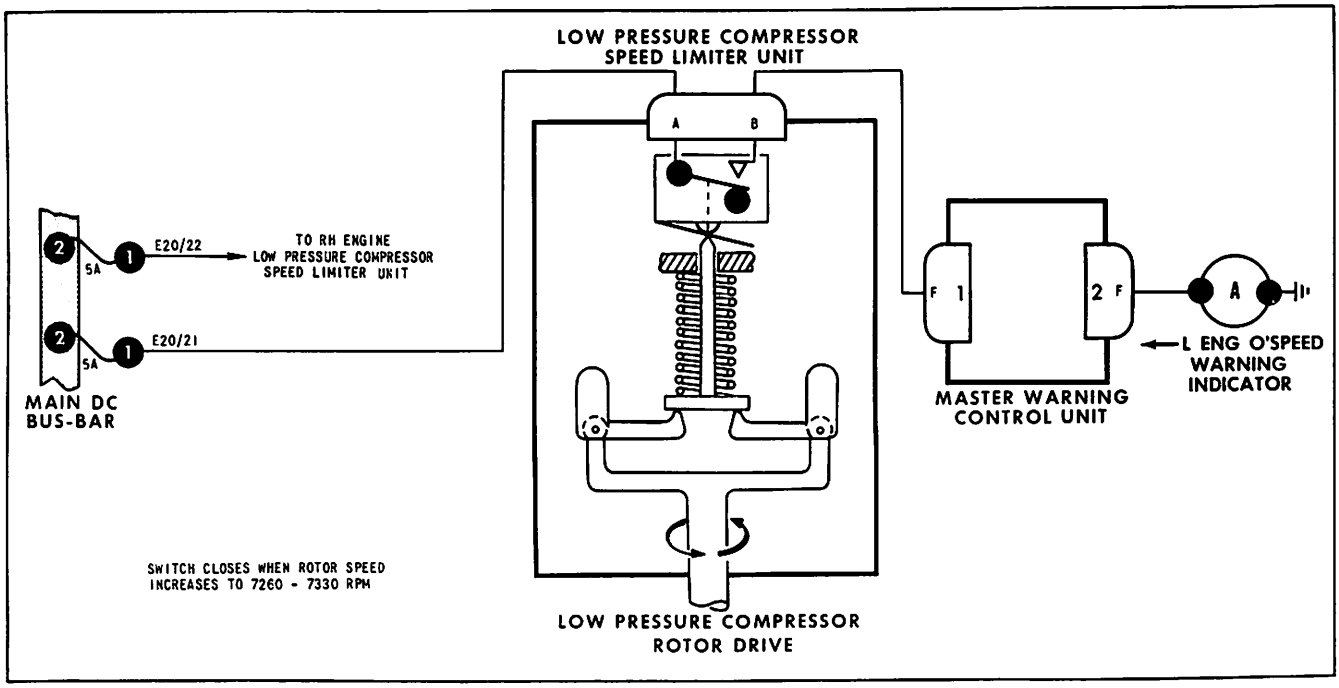

FIG. 6 LOW PRESSURE COMPRESSOR OVERSPEED INDICATION SCHEMATIC

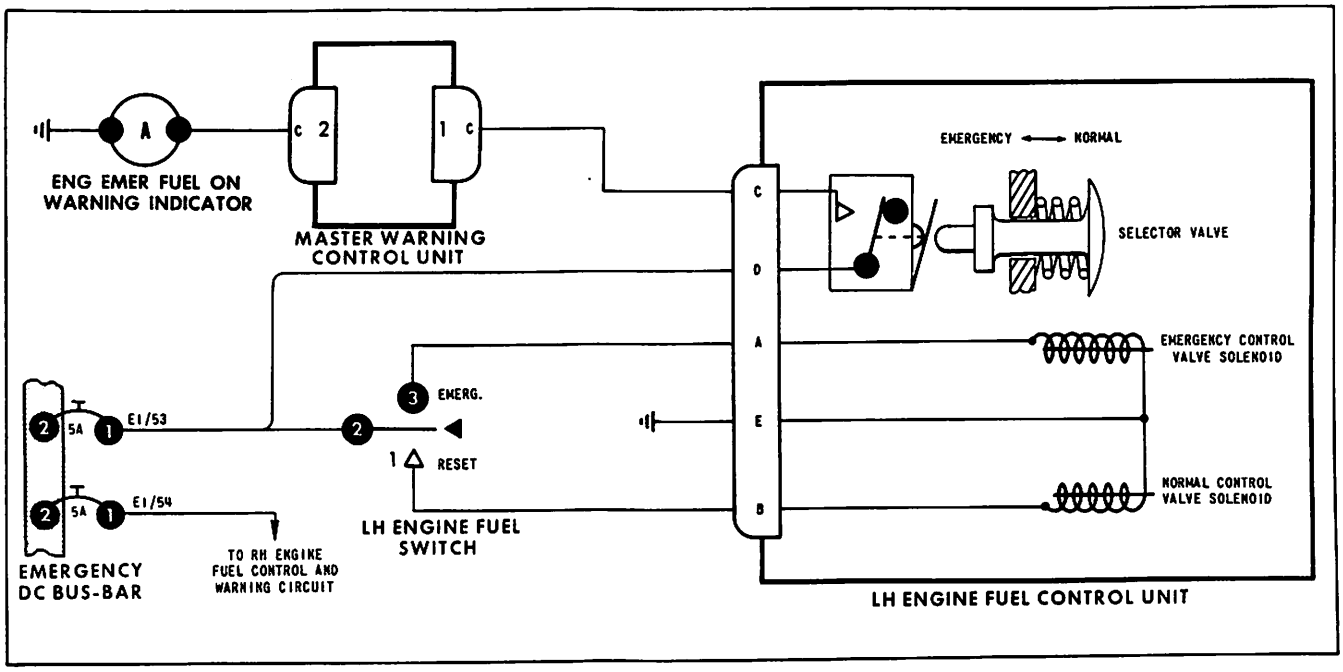

FIG. 7 ENGINE EMERGENCY FUEL CONTROL AND WARNING SCHEMATIC

the EMERG position completes a supply circuit to the emergency control valve solenoid in the appropriate engine control unit. The solenoid, when energized, actuates the control valve to the open position to bleed off the fuel behind the selector valve. This action causes a pressure difference to exist across the selector valve which is sufficient to overcome the force of a spring on the valve seat and shuttle the valve to the emergency position. At the extreme end of its travel the valve closes a switch which completes a supply circuit to the warning light.

23 Holding the LH or the RH ENGINE FUEL switch to the RESET position completes a supply circuit to the normal control valve solenoid in the appropriate engine control unit. The solenoid, when energized, actuates the control valve to the open position allowing the fuel pressure to equalize across the selector valve. This action permits spring force to shuttle the selector valve to the normal position. A fail-safe feature is incorporated in the selector valve which hydraulically locks the valve in the last selected position.

R.P.M. INDICATION (Fig 8)

24 Engine R.P.M. indicators, graduated in percentage of maximum engine rpm, are fitted on the pilot's main instrument panel. The LH engine rpm indicator is electrically connected to a tachometer generator which is driven by the high pressure compressor gearbox of the LH engine; the RH engine rpm indicator is likewise connected to the RH engine. Each tachometer generator develops a three phase alternating current, the frequency of which varies directly with the speed of its respective engine. The indicators incorporate a self-starting synchronous AC motor which, when driven by the tachometer generator, rotates a magnet assembly at a speed relative to the frequency of the respective engine tachometer generator, in effect the speed of the appropriate high pressure compressor rotor. Rotation of the magnet assembly in turn exerts a magnetic torque on a drag disc to which a pointer is attached. The degree of pointer movement is proportionate to the magnet assembly speed and indicates the engine speed on the graduated dial.

FUNCTION TESTING

GENERAL

25 With the exception of the engine relighting circuits, the engine electrical systems are

ARROW 1 SERVICE DATA

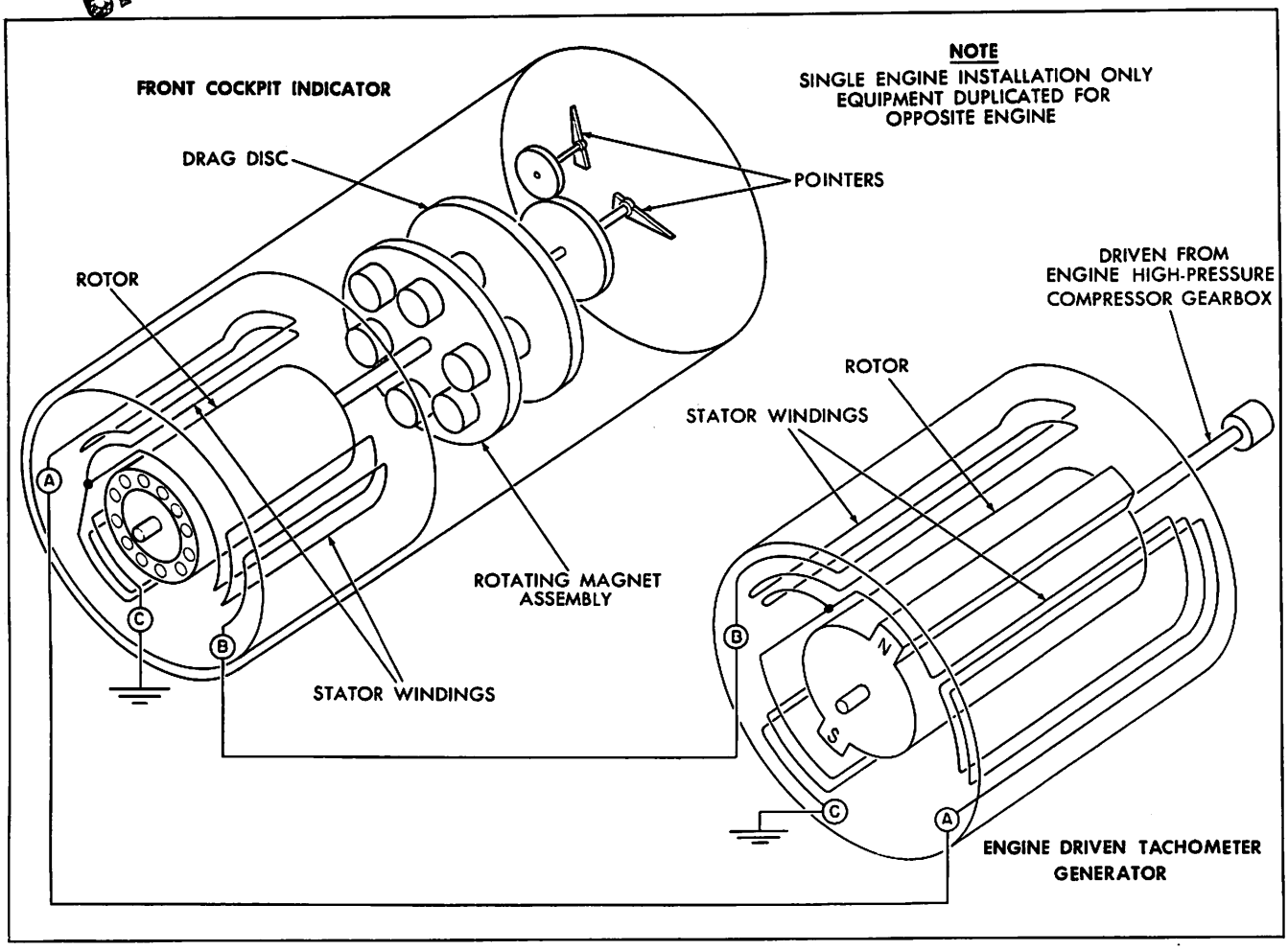

FIG. 8 R.P.M. INDICATION SCHEMATIC

function tested during the engine run described in Arrow 1 Service Data, Power Plant - Section 23.

ENGINE RELIGHTING

26 To check the serviceability of the engine relighting circuits proceed as follows:

(a) Ensure that a source of AC power is connected to the external AC supply receptacle or, alternatively, connect a source of DC power to the engine starting receptacle on the nose gear leg. In either case, select the master electrical switch to the on position.

(b) Check that on panel E1, the circuit breakers marked L and R START, RIGHT RELIGHT, LEFT RELIGHT and EMERG DC are selected on.

(c) Remove current limiters L and R IGNITION #2 from panel E20.

(d) Depress the LH engine RELIGHT switch located on the LH power lever, and check for an audible indication that No. 1 spark igniter, on the LH engine, operates. Release the switch.

(e) Depress the RH engine RELIGHT switch located on the RH power lever, and check for an audible indication that No. 1 spark igniter, on the RH engine, operates. Release the switch.

(f) Refit current limiters L and R IGNITION #2 into their holders in panel E20, and on panel E1 switch off circuit breakers L and R START.

ARROW 1 SERVICE DATA

(g) Depress the LH engine RELIGHT switch and check for an audible indication that No. 2 spark igniter, on the LH engine, operates. Release the switch.

(h) Depress the RH engine RELIGHT switch and check for an audible indication that No. 2 spark igniter, on the RH engine, operates. Release the switch.

ARROW 1 SERVICE DATA

UNCLASSIFIED

LOCATION OF ELECTRICAL COMPONENTS — ENGINE SERVICES

ITEM NO.	DESCRIPTION
E1	**CIRCUIT BREAKER PANEL**
-19	5A CB, EXHAUST GAS TEMPERATURE INDICATION, LH ENGINE
-20	5A CB, EXHAUST GAS TEMPERATURE INDICATION, RH ENGINE
-52	10A CB, AFTERBURNER FUEL CONTROL, LH ENGINE
-53	5A CB, FUEL CONTROL, LH ENGINE
-54	5A CB, FUEL CONTROL, RH ENGINE
-55	10A CB, AFTERBURNER FUEL CONTROL, RH ENGINE
-59	10A CB, STARTING CONTROL, LH ENGINE
-60	10A CB, STARTING CONTROL, RH ENGINE
-88	5A CB, RELIGHT, RH ENGINE
-89	5A CB, RELIGHT, LH ENGINE
E4	**DISTRIBUTION PANEL**
E5	**MAIN ACCESSORY PANEL**
-11	RELAY, ZONE 1 EJECTOR LH ENGINE
-16	RELAY, ZONE 1 EJECTOR RH ENGINE
-18	RELAY, IGNITION LH ENGINE
-19	RELAY, STARTING RH ENGINE
-20	RELAY, STARTING LH ENGINE
-22	RELAY, STARTING RESET RH ENGINE
-23	RELAY, STARTING RESET LH ENGINE
-32	RELAY, IGNITION RH ENGINE
-50	RELAY, AFTERBURNER LH ENGINE
-51	RELAY, AFTERBURNER RH ENGINE

ITEM NO.	DESCRIPTION
E6	**FORWARD RELAY PANEL**
-20	RELAY, STARTING POWER
E11	**MAIN INSTRUMENT PANEL**
-67	INDICATOR, EXHAUST GAS TEMPERATURE, LH ENGINE
-68	INDICATOR, EXHAUST GAS TEMPERATURE, RH ENGINE
-69	INDICATOR, PRESSURE RATIO LH ENGINE
-70	INDICATOR, PRESSURE RATIO RH ENGINE
-75	INDICATOR, RPM LH ENGINE
-76	INDICATOR, RPM RH ENGINE
E14	**FIRE AND FUEL PANEL**
-8	SWITCH, FUEL CONTROL LH ENGINE
-9	SWITCH, FUEL CONTROL RH ENGINE
E15	**MASTER WARNING PANEL**
-10	INDICATOR LIGHT, OIL PRESSURE, RH ENGINE
-11	INDICATOR LIGHT, OIL PRESSURE, LH ENGINE
-12	INDICATOR LIGHT, FUEL PRESSURE, RH ENGINE
-13	INDICATOR LIGHT, FUEL PRESSURE, LH ENGINE
-14	INDICATOR LIGHT, EMERGENCY FUEL, LH OR RH ENGINE
-19	INDICATOR LIGHT, ENGINE OVERSPEED, LH ENGINE
-20	INDICATOR LIGHT, ENGINE OVERSPEED, RH ENGINE

ITEM NO.	DESCRIPTION
E20	**AFT CIRCUIT LIMITER PANEL**
-10	10A FUSE, IGNITION NO 2 LH ENGINE
-11	10A FUSE, IGNITION NO 2 RH ENGINE
-21	5A FUSE, OIL AND FUEL PRESSURE WARNING, LH ENGINE
-22	5A FUSE, OIL AND FUEL PRESSURE WARNING, RH ENGINE
-33	5A FUSE, PRESSURE RATIO INDICATION, LH ENGINE
-34	5A FUSE, PRESSURE RATIO INDICATION, RH ENGINE
-35	5A FUSE, ZONE 1 EJECTOR, LH ENGINE
-36	5A FUSE, ZONE 1 EJECTOR, RH ENGINE
E1500	**POWER LEVER ASSEMBLY**
-2	PUSH SWITCH, RELIGHT LH ENGINE
-3	PUSH SWITCH, RELIGHT RH ENGINE
-4	MICRO-SWITCH, AFTERBURNER CONTROL, LH ENGINE
-5	MICRO-SWITCH, AFTERBURNER CONTROL, RH ENGINE
E16	**POWER AND STARTING PANEL**
-3	SWITCH, STARTING AND RESET LH ENGINE
-4	SWITCH, STARTING AND RESET RH ENGINE

FOR LOCATION OF COMPONENTS ON PANELS E1, E4, E5, E6, E11 AND E20 SEE ARROW 1 SERVICE DATA, ELECTRICAL SYSTEM - GENERAL INFORMATION, SECTION 36. FOR COMPONENTS ON PANEL E15 SEE ARROW 1 SERVICE DATA, ELECTRICAL SYSTEM MASTER WARNING, SECTION 38.

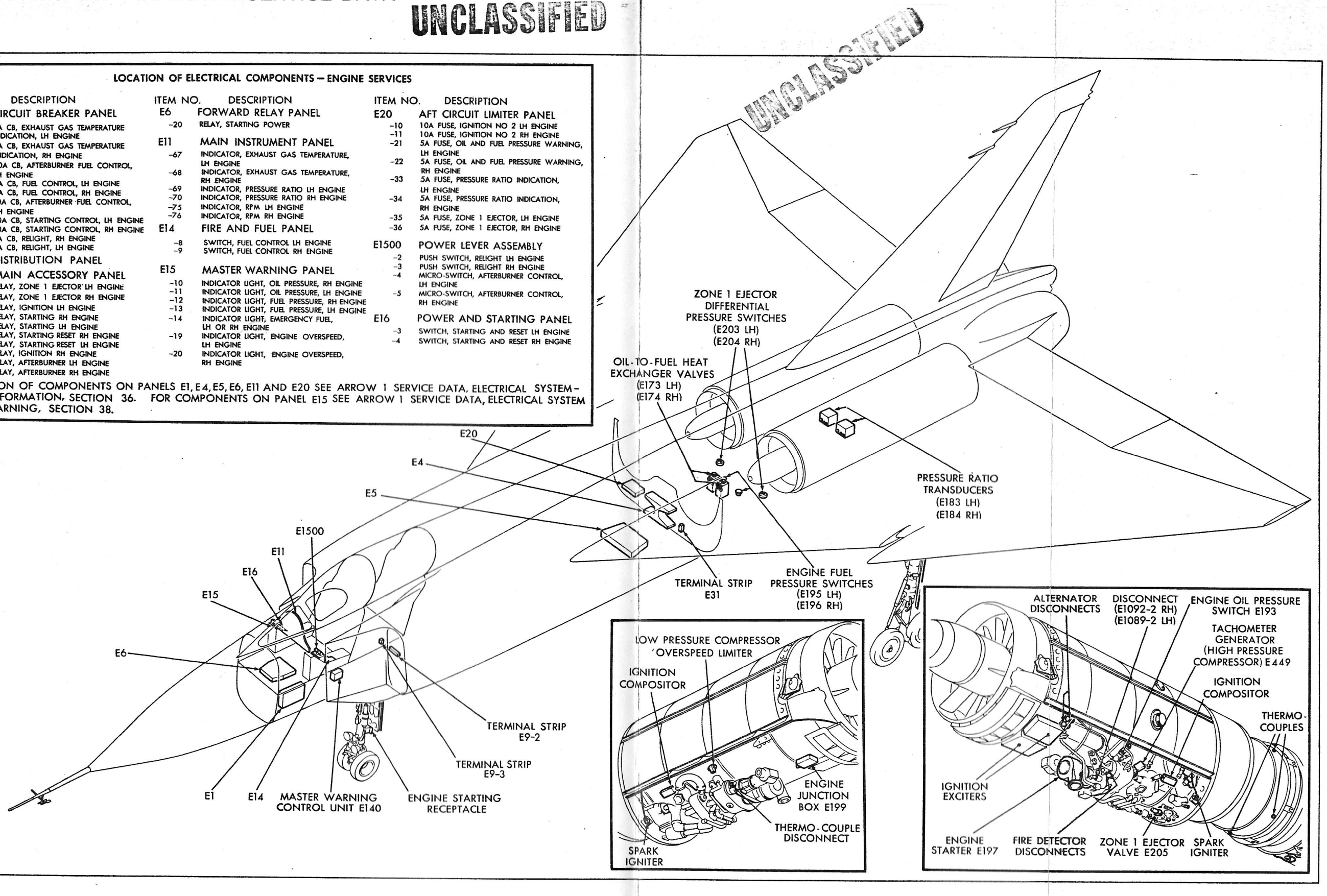

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FIG. 9 LOCATION OF ELECTRICAL COMPONENTS - ENGINE SERVICES

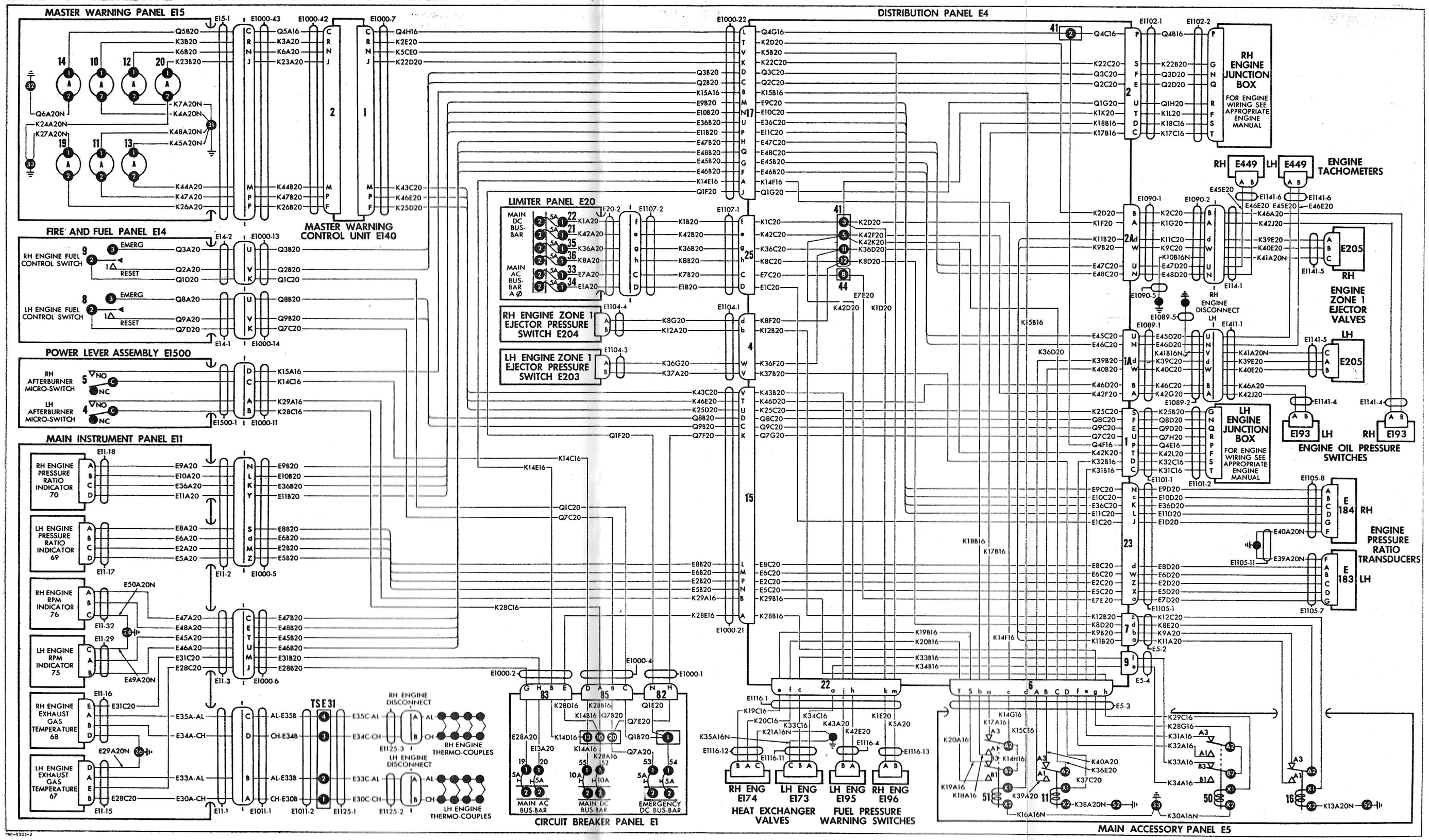

FIG. 10 ENGINE SERVICE CIRCUITS

ARROW 1 SERVICE DATA

UNCLASSIFIED

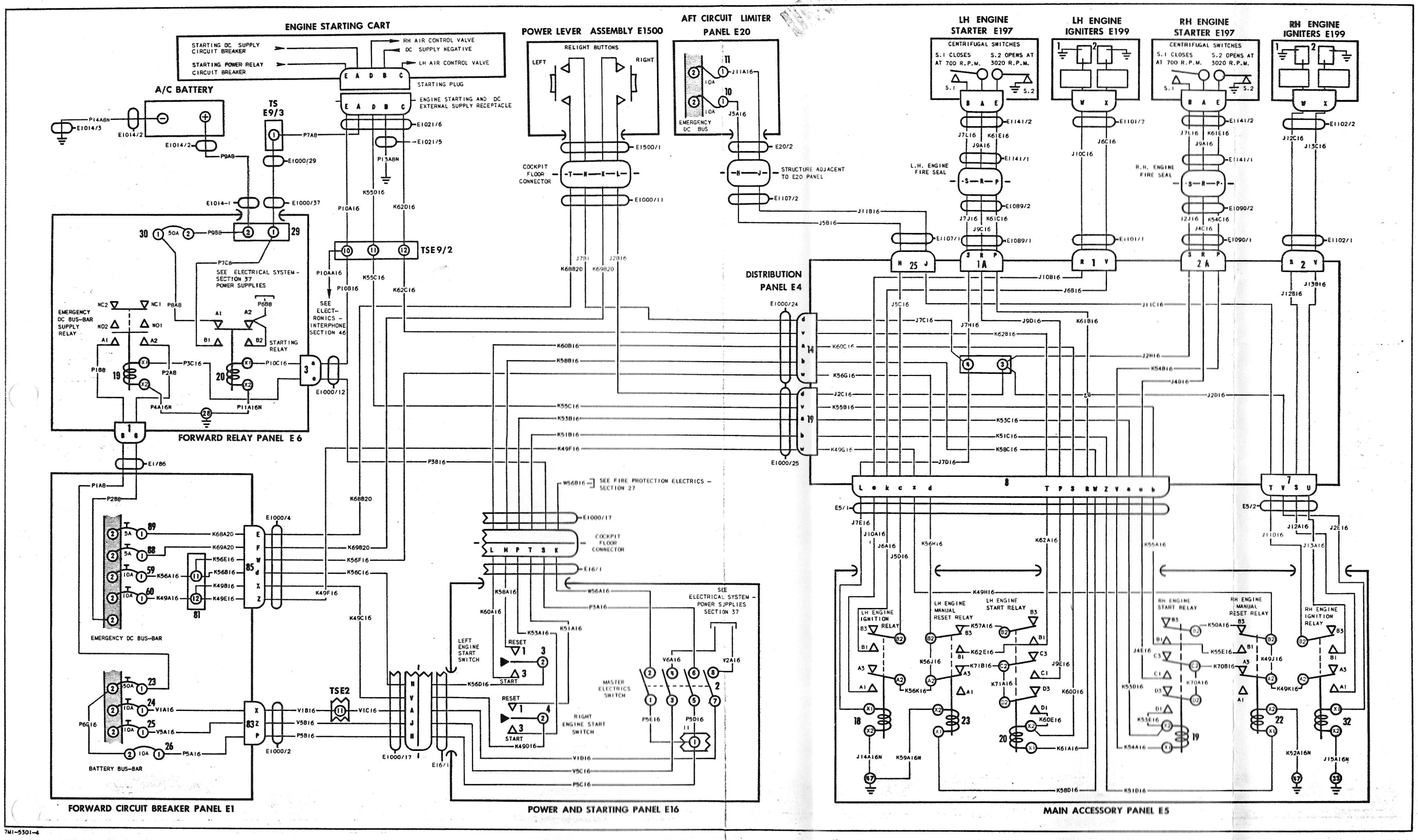

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FIG. 11 ENGINE STARTING AND IGNITION

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Engine Starting Switches - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler-Hammer	8812K13	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To energize the engine starting relays and, when required, interrupt the starting cycle. Individual switches are fitted for the LH engine starting relay, and the RH engine starting relay.

LOCATION

In front cockpit, RH console on panel E16.

ACCESS

MEN X MINUTES

Unobstructed, when panel E16 is removed from the RH console.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure switch to panel with the lock washer and retaining nut supplied.
Fit and secure the circuit wiring to the switch terminals.
Refit the panel in the console and secure - four quick fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Operate the switches and check that the lever action is smooth and that the make and break is not sluggish or rough.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Starting Relays - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
		MS25024-1	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To complete the starter circuits and open or close the starter cart compressed air control valve. The relays control the operation of their respective LH or RH system.

LOCATION

Main Accessories Panel E5 which is fitted on the armament bay roof.

ACCESS

Unobstructed, when the panel is released and lowered from its forward mounts by removing two pip pins.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the relay to the panel - four mounting screws.
Fit and secure the circuit wiring to the relay terminals.
Raise and position Panel E5, secure by inserting the two pip pins.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the relays are securely fitted. Check that the circuit connections to the relays are properly and securely fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Manual Reset Relays - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CSR-133			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

When energized, by selecting the reset position on the LH or RH engine starting switch, interrupts the corresponding LH engine or RH engine starting cycle.

LOCATION

Main Accessories Panel E5 which is fitted on the armament bay roof.

ACCESS

MEN X MINUTES

Unobstructed when the panel is released and lowered from its forward mounts by removing two pip pins.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the relay to the panel - two mounting screws.
Fit and secure the circuit wiring to the relay terminals.
Raise and position the panel, secure by inserting the two pip pins.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the relays are securely fitted. Check that the circuit connections to the relays are securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Starting Power Relay	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-128			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Transfers the battery bus load and, consequently, the emergency bus load from the aircraft battery to the external supply.

LOCATION

Relay panel E6 which is fitted on the roof of the nose wheel bay.

ACCESS

Unobstructed, when the cover of relay panel E6 is removed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure the relay to the panel - four mounting screws.
Fit and secure the circuit wiring to the relay terminals.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the relay is securely mounted. Check that the circuit connections to the relay are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

Unclass...

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Relight Switch - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-S-151			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To facilitate engine relight.

LOCATION

LH engine relight switch located on LH engine power lever.
RH engine relight switch located on RH engine power lever.

ACCESS — MEN X MINUTES

Remove the access plate on the side of power lever - four screws.

REPLACEMENT PROCEDURE — MEN X MINUTES

Draw the circuit wires out of the power lever and solder to the switch terminals.
Fit and secure the switch to the power lever with the lock washer and nut supplied.
Refit and secure the access plate - four retaining screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the circuit wires are soldered properly and securely. Operate the switch and check that the action is not rough.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Engine Starting and DC External Supply Receptacle	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
1CS-C-142	Albert & J.M. Anderson		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To facilitate interconnection between the engine starter cart and the aircraft. Interconnected circuits include battery supply, starting control and intercommunication.

LOCATION

Nose landing gear, lower section.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the receptacle to its mounting bracket - 4 bolts.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Inspect receptacle for signs of arcing or pitting of the contacts. Check that the receptacle is securely mounted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Exhaust Gas Temperature Indicator	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1252-13	Minneapolis-Honeywell		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To indicate in degrees C the turbine outlet temperature.

LOCATION

Front cockpit, main instrument panel.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the electrical connector.
Locate the indicator in the main instrument panel and secure - two screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the instrument is securely mounted. Check that the electrical connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Ratiometer, Engine Pressure - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1252-16	Minneapolis-Honeywell		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 350 hours

FUNCTION

To transform electrical signals from a pressure ratio transducer into an indication of the engine pressure ratio which is a measure of thrust being developed by the engine.

LOCATION

Front cockpit, main instrument panel.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the electrical connector.
Locate the indicator in the main instrument panel and secure - two screws.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the instrument is securely mounted. Check that the electrical connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Pressure Ratio Transducer LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1858-13	AiResearch		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 350 hours

FUNCTION

To resolve, as an electrical signal, pressure indications taken from the engine air intake and the turbine discharge outlet and transmit the resultant to the ratiometer in the front cockpit.

LOCATION

Station 664 inside the fuselage LH and RH.

ACCESS

	MEN X MINUTES	
Remove the hydraulic compensator access panel at station 665 - 26 screws.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure the unit to the structure - four mounting screws. Fit and secure two pipe lines. Fit and secure the electrical connector.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the pipe lines are securely and properly fitted. Check that the electrical connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Pressure Switch, Engine Oil - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1195-13	Century Electronics c/o Garrett		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To complete a supply circuit to a warning indicator if the oil pressure drops below a limit of 25 psi.

LOCATION

Mounted on the engine gear box adjacent to the oil pressure relief valve.

ACCESS

Accessible through the front access door of the engine - seven latches and 30 camlocs.

MEN X MINUTES

REPLACEMENT PROCEDURE

Screw the switch onto the adaptor mount and then fit and secure the locknut.
Fit and secure the oil line.
Fit and secure the electrical connector.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the electrical connector and the oil line are securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Pressure Switch, Engine Inlet Fuel - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1656-51	Hydra Electric		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To complete a supply circuit to a warning indicator if the engine inlet fuel pressure drops below a limit of 16.4 ± 0.5 psia.

LOCATION

Inside the fuselage at station 549, LH and RH, mounted on the base of a fitting at the outlet of the heat exchanger.

ACCESS — MEN X MINUTES

Remove the hydraulic bay access door - 52 camloc fasteners.

REPLACEMENT PROCEDURE — MEN X MINUTES

Locate the pressure switch on its mounting flange.
Fit and secure two retaining bolts and nuts.
Fit and secure the pressure line.
Fit and secure the electrical connector.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely and properly fitted. Check that the pressure line and the electrical connector are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Afterburner Micro-switches, LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-S-152			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To initiate the operation of the afterburner hydro-mechanical unit and open the fuel-oil heat exchanger valve when the throttle lever is in the afterburner range.

LOCATION

In the power lever box, LH console front cockpit.

ACCESS — MEN X MINUTES

Remove the power lever box from the console.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the micro-switch to its mounting bracket - two bolts and nuts.
Connect and secure circuit wiring to the micro-switch terminals.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the micro-switch is securely mounted. Check that the circuit wiring is securely and properly connected.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Zone 1 Ejector Valve - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1895-41	Barber-Colman c/o Rousseau		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To control the supply of engine bleed air used to draw stagnant air from the engine compartment. The valve is controlled by the zone 1 ejector differential pressure switch.

LOCATION

In the LH engine air bleed line, station 538.7.

ACCESS | MEN X MINUTES

Remove the engine access door number 2 - 33 camlocs and 3 latches.

REPLACEMENT PROCEDURE | MEN X MINUTES

Locate the valve in position on the engine bleed air duct, station 538.7.
Locate the two stud screws, incorporated in the body of the valve, in the engine bleed air duct.
Fit and secure two nuts and lockwashers.
Connect and secure the electrical connector.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely and properly fitted. Check that the electrical connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Differential Pressure Switch, Zone 1 Ejector - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1856-11	Parmatic Engineering		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To control the operation of the zone 1 ejector valve by sensing the pressure differential between atmospheric pressure and the pressure at the engine air intake.

LOCATION

Duct bay at station 557-562, RH and LH.

ACCESS

MEN X MINUTES

Accessible by removing the hydraulic bay access door - 52 camlocs.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate the pressure switch on its mounting bracket between stations 557 and 562, ensuring that the vent tube from base of switch is located in the grommet fitted in the mounting bracket.
Fit and secure four mounting bolts and lock washers.
Fit and secure the pressure line.
Fit and secure the electrical connector.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely and properly fitted. Check that the pressure line and the electrical connector are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Ignition Relays LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CSR-122			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To complete the power supply circuit to the engine spark igniters when energized.
Energizing circuit is completed when the engine attains 700 rpm or the relight switch is depressed.

LOCATION

Main Accessories Panel E5 which is fitted on the armament bay roof.

ACCESS

Unobstructed when the panel is released and lowered from its forward mounts by removing two pip pins.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure the relay to the panel - four mounting screws.
Fit and secure the circuit wiring to the relay terminals.
Raise and position the panel, secure by inserting the two pip pins.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the relays are securely fitted. Check that the circuit connections to the relays are properly and securely fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	ENGINE SERVICES	Zone 1 Ejector Relays - LH and RH	11-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To complete the supply circuit to the 'open' and 'close' fields of the Zone 1 ejector valve actuator.
In the de-energized condition, the relay completes the supply to the 'close' field.

LOCATION

Main Accessories panel E5 which is fitted on the armament bay roof.

ACCESS

MEN X MINUTES

Unobstructed when the panel is released and lowered from its forward mounts by removing two pip pins.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the relay to the panel - two mounting bolts.
Fit and secure the circuit wiring to the relay terminals.
Raise and position the panel, secure by inserting the two pip pins.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely and properly fitted. Check that the pressure line and the electrical connector are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 26

FIRE PROTECTION SYSTEM

(This data supersedes previous issue dated 14 June 1957)

CONFIDENTIAL

ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

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DESCRIPTION

GENERAL

1 The fire protection system minimizes fire hazards, and detects and provides a means of extinguishing any outbreak of fire in the two engine bays and in the equipment and hydraulic bay. The system is operated by the pilot selecting the appropriate switch on the FIRE panel on the LH console.

2 Fire extinguishing is achieved by discharging Freon chemical into the affected area from two container bottles.

3 For convenience, the fire protection system is described by reference to its various functions, under the following headings; engine insulation, fire isolation, fire detection and fire extinguishing.

ENGINE INSULATION

4 The inside wall of each engine tunnel is lined with an insulation blanket to prevent engine heat from radiating to the surrounding structure and equipment. The blanket is made of a heat resistant material covered by steel foil, and is secured to the inner skin of each engine tunnel by Camloc fasteners. See Arrow 1 Service Data - Section 2 - Structure for blanket installation.

FIRE ISOLATION (Fig 1)

5 Each engine is fitted with an engine shroud and a transverse firewall. A spring-loaded transverse fire seal and two longitudinal fire seals are fitted inside each engine tunnel. The lower inboard and outboard edges of the engine shroud make contact with the two longitudinal fire seals. The spring-loaded transverse fire seal engages with the engine transverse firewall to isolate the engine fuel and oil system components, in the lower forward area of the engine, from the engine hot end and afterburner area. Cooling air enters through holes in the forward end of the shroud and ventilates to atmosphere the fuel and oil vapours in this area, through a vent in engine access panel number two. The spring-loaded transverse fire seal is spring-loaded to the sealed position and can be pulled clear of the engine firewall during installation and removal of the engine. Two release cables and keyhole slotted brackets enable the fire seal to be locked in the released position. The engine cooling is described in Arrow 1 Service Data - Section 23 - Power Plant.

FIRE DETECTION

6 The fire detection system is operated by continuous loop type detectors, one being routed through each of the engine bays, and one through the equipment and hydraulic bay. Three combined fire warning lights and selector switches are fitted on the LH console in the front cockpit, one for each area. Overheating of a detector causes the relevant warning light to illuminate. Depressing the appropriate switch then directs fire extinguisher fluid into the affected area. The electrical circuits of the fire detection and selector systems are described in Arrow 1 Service Data - Section 27 - Fire Protection - Electrics.

FIRE EXTINGUISHING (Figs 2 and 3)

7 The fire extinguishing system consists of two spherical storage bottles, six solenoid operated outlet valves and three outlet pipes leading to discharge nozzles in the three areas.

8 The two bottles are assembled as a supply unit with the six solenoid operated valves and are secured within the fuselage in a cradle. The cradle is located on the centre line of the aircraft and mounted on the rear undersurface of the centre wings. A wire cable attached to the supply unit runs over a pulley attached to the cradle, and down to an attachment point inside number four service panel. This enables the supply unit to be lifted or lowered during installation and removal. Each bottle contains twelve pounds of Freon and is pressurized with nitrogen to 400 psi. A pressure gauge is fitted to each bottle to indicate the nitrogen pressure. A blow-off safety valve with a fusible metal core is fitted at the top of each bottle. Should the bottle be subjected to excessive temperature the fusible plug will melt and release the contents. A restrictor is fitted in the valve to prevent a blast of escaping fluid from damaging surrounding equipment.

9 Three solenoid operated valves are fitted

ARROW 1 SERVICE DATA

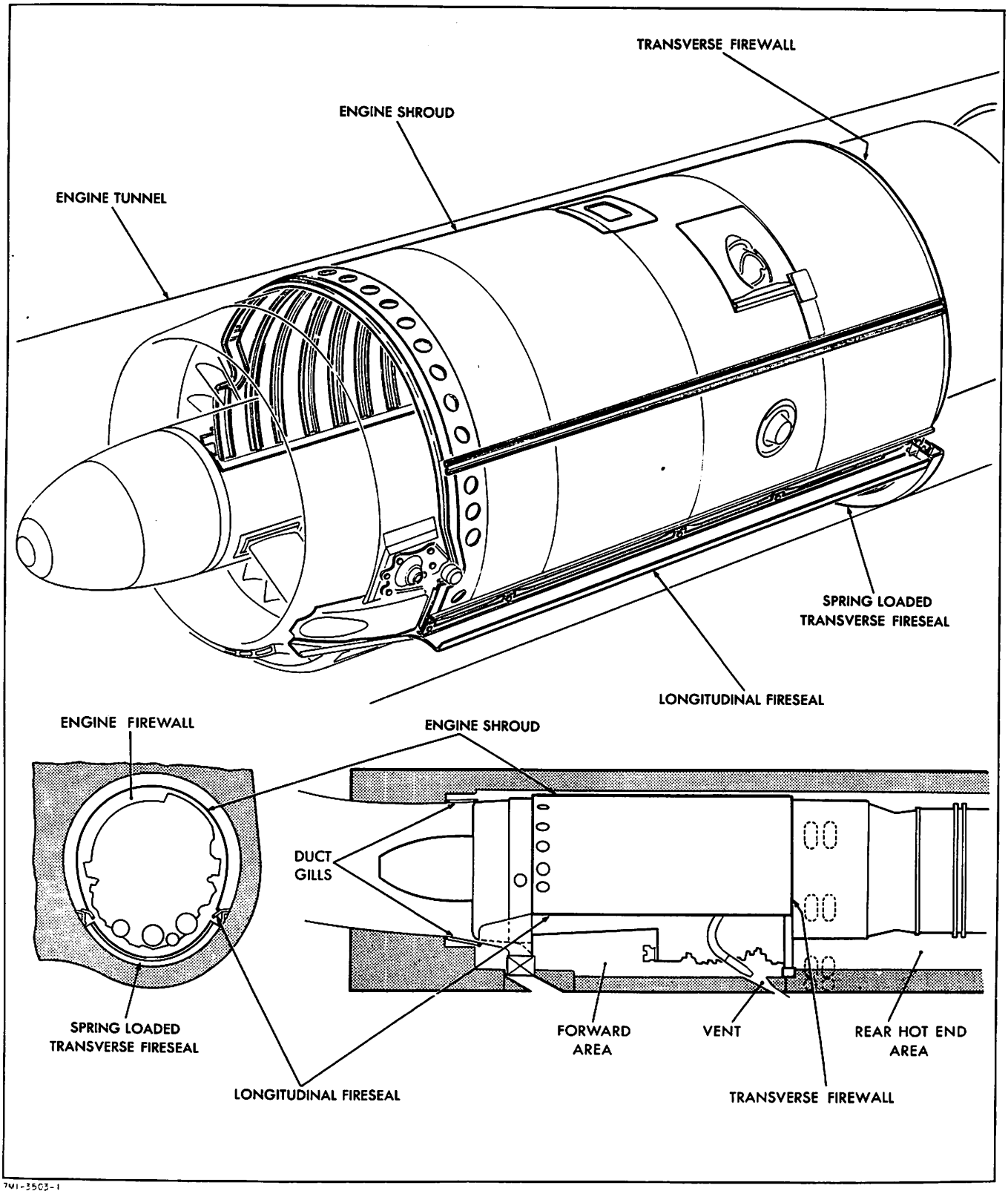

FIG. 1 FIRE ISOLATION - SCHEMATIC

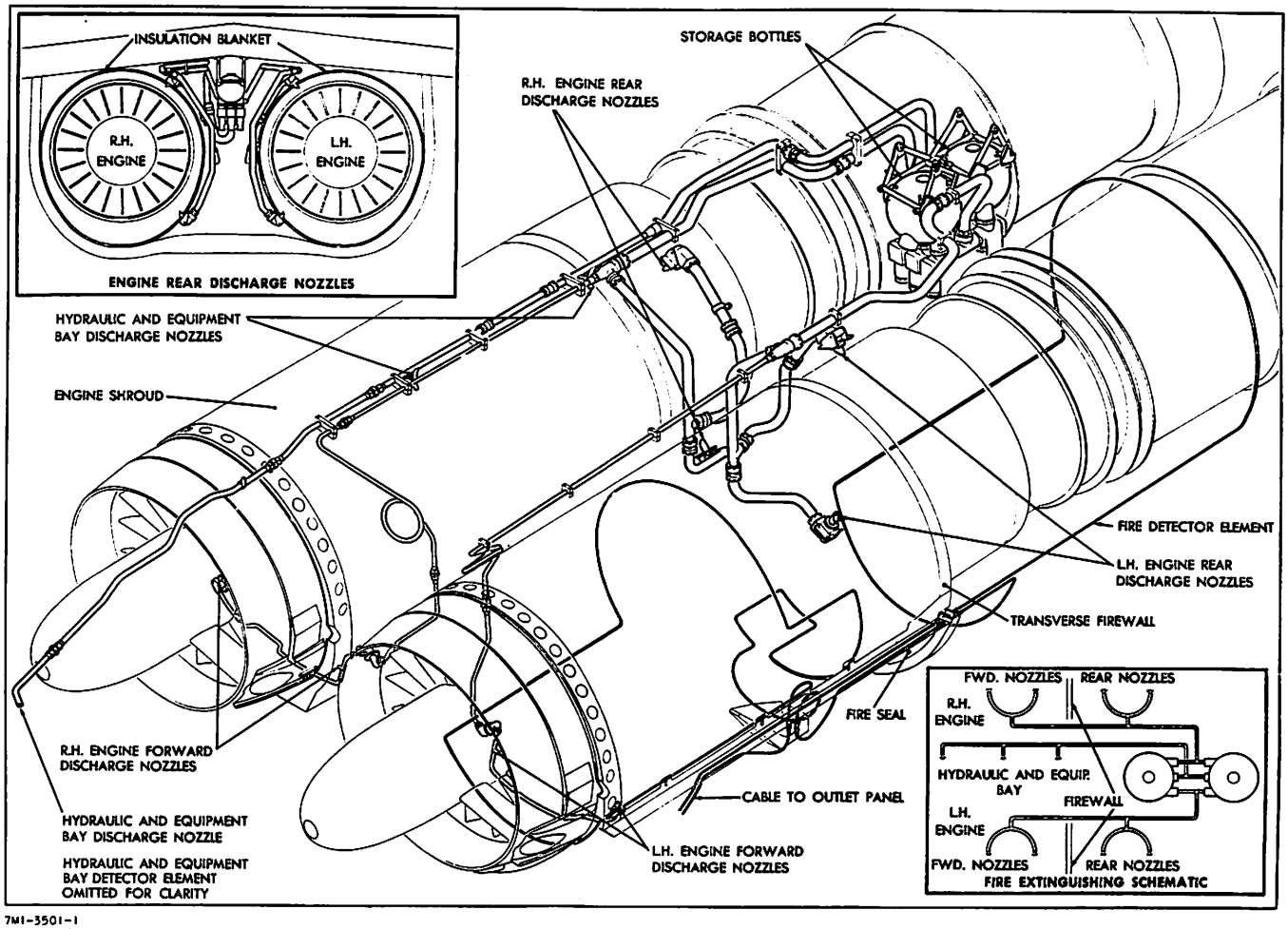

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FIG. 2 FIRE EXTINGUISHER SYSTEM

on each bottle and are connected together in three pairs, to permit extinguisher fluid to be discharged from either bottle into any one of the three discharge pipes.

10 The three discharge pipes run forward from the supply unit to the RH engine, the LH engine, and to the hydraulic and equipment bay. See fig 2. The two engine pipelines are each equipped with two large and two small discharge nozzles. The two large nozzles discharge to the rear of the transverse firewall and into the engine hot end and afterburner area. The two small nozzles discharge under the forward end of the engine shroud and into the forward area of the engine. The third discharge pipe runs parallel with the RH engine pipeline and is equipped with three nozzles all discharging into the hydraulic and equipment bay. See fig 2.

11 A FIRE panel on the LH console in the front cockpit contains three combined warning lights and selector switches marked LH, HYD and RH. When one of these switches is pressed the contents of one bottle is discharged into the affected area. The two bottles can be used to extinguish fires in any two of the three areas. If the contents of one bottle have been discharged into an area and a fire persists, or relights, the contents of the second bottle can be discharged into the same area by selecting SECOND SHOT on a toggle switch located to the left of the three warning lights on the same panel.

TESTING AND SERVICING

REMOVING THE SUPPLY UNIT (Fig 3)

12 Access to the fire extinguisher bottle

ARROW 1 SERVICE DATA

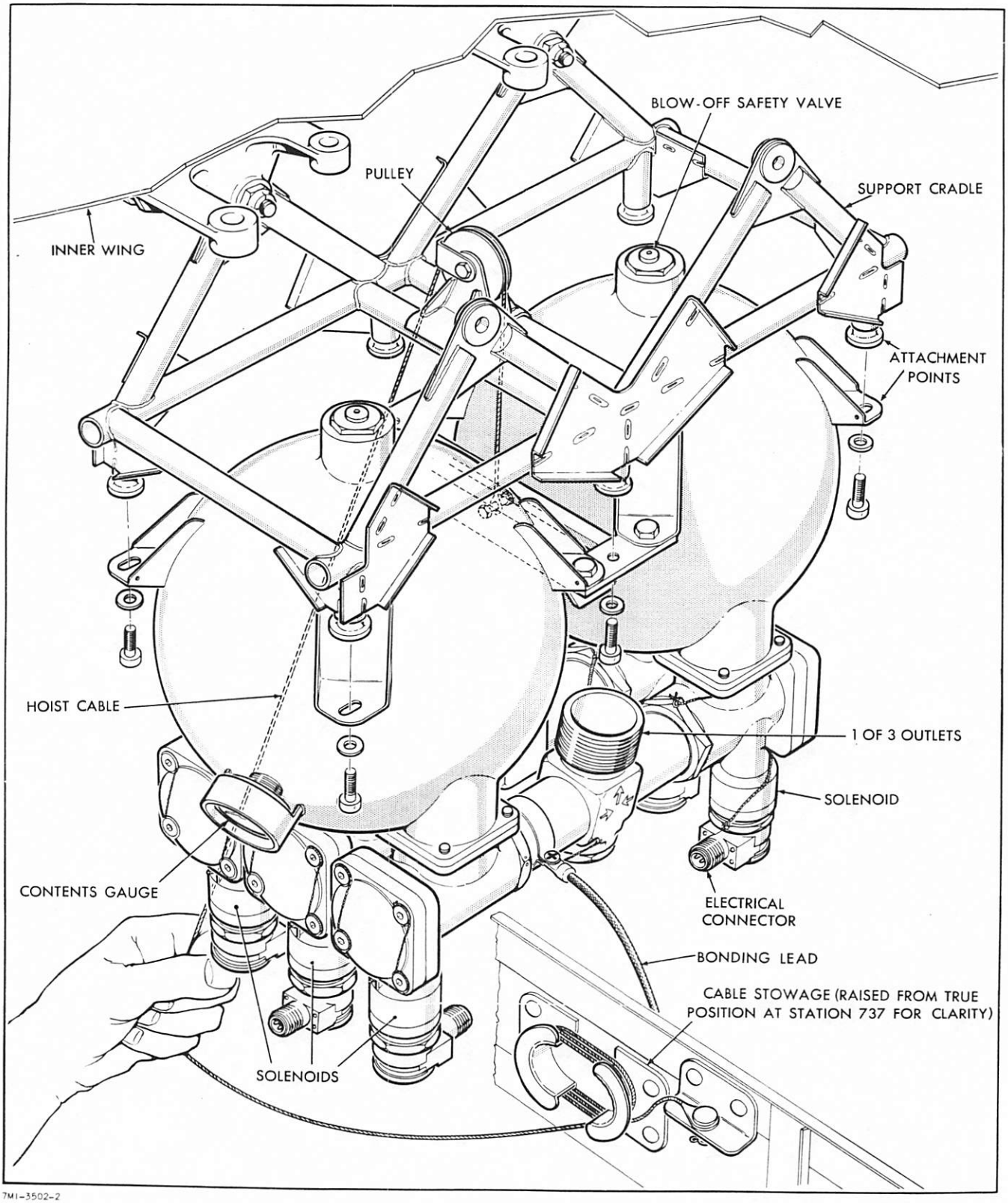

FIG. 3 FIRE EXTINGUISHER BOTTLE INSTALLATION

installation is through the number four service panel. To remove the supply unit, proceed as follows:

(a) Break the locking wire and remove the six electrical connectors from their receptacles.

(b) Detach the bonding lead clamps from the three outlet pipe lines.

(c) Break the locking wire and remove the three pipeline connections at the outlets.

(d) Install transit plugs in the open outlets.

(e) Uncoil the hoist cable from its stowage and take the weight of the supply unit.

(f) Break the locking wire and remove the six socket headed bolts attaching the supply unit to the support cradle.

(g) Lower the supply unit to the extent of the cable.

(h) Support the supply unit and remove the hoist cable attachment bolt.

INSTALLING THE SUPPLY UNIT (Fig 3)

13 To replace the supply unit, proceed as follows:

(a) Check the pressures of the two bottles by reference to the chart. See fig 4.

(b) Transfer the bonding leads and clamps from the removed supply unit.

(c) Attach the hoist cable to the supply unit by its attachment bolt.

(d) Hoist the supply unit and guide it into position below the support cradle.

(e) Install the six attachment bolts and wirelock them to the holes provided in the support cradle.

(f) Connect the three pipelines to their respective outlets and wirelock the connections to the blanking plugs located below the connection.

(g) Connect the bonding leads to the pipelines with clamps.

(h) Connect the six electrical connectors to their receptacles and wirelock them.

(j) Stow the hoist cable on the stowage provided.

REMOVING A BOTTLE FROM THE SUPPLY UNIT

14 A bottle, together with its three tee joints and solenoid operated valves, can be removed from the supply unit. As the valves are retained with the bottle it is not necessary to release the nitrogen pressure.

CAUTION

Do not slacken the four socket headed screws attaching each tee joint to the bottle or the four socket headed screws securing the blanking plate to each valve. The bottle, together with its three tee joints, valves and solenoids, is retained as an assembled unit.

15 To remove a bottle from the supply unit, proceed as follows:

(a) Break the lockwire and unscrew the three 2 inch tube nuts securing the outlet pipes to the three tee joints of the bottle to be removed.

(b) Remove the two bolts securing the bottle to the connecting bracket.

(c) Remove the bottle from the supply unit.

(d) Install transit plugs in all open unions.

INSTALLING A BOTTLE IN THE SUPPLY UNIT

16 To install a bottle in the supply unit, proceed as follows:

(a) Check the weight of the bottle assembly. Empty and filled weights for each bottle are marked on the bottle.

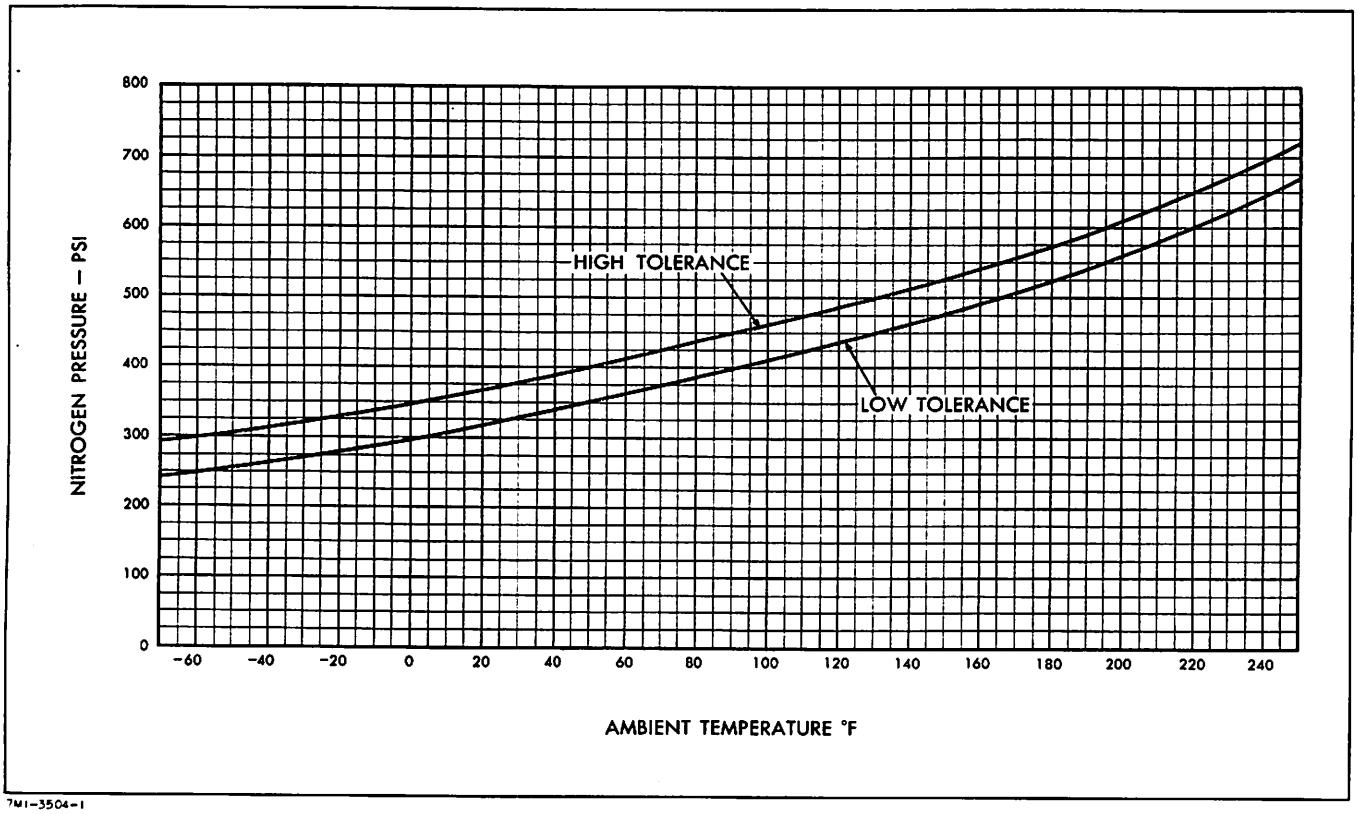

FIG. 4 AMBIENT TEMPERATURE AND NITROGEN PRESSURE CHART

(b) Check the pressure in the bottle by reference to the ambient temperature and nitrogen pressure chart. See fig 4.

(c) Place the bottle in position in the supply unit, and install the two mounting bolts through the lugs on the bottle and the holes in the connecting bracket.

(d) Tighten the three 2 inch tube nuts securing the three outlet pipes to the tee joints. Wirelock the tube nuts.

TESTING THE FIRE EXTINGUISHER SYSTEM PIPELINES

17 To test the fire extinguisher system pipelines, proceed as follows:

(a) Remove the supply unit. See para 12.

(b) Using suitable adaptors, connect an outside source of air pressure at approximately 75 psi to the three pipelines to the LH and RH engine bays and the hydraulic and equipment bay.

(c) With air flowing into the pipelines, check that air flows out of the four nozzles in each engine bay and the three nozzles in the hydraulic and equipment bay.

NOTE

The four nozzles in each engine bay can only be checked with the engine removed. For details of engine removal and installation see Arrow 1 Service Data - Section 23 - Power Plant.

(d) Shut off and remove the outside source of air pressure.

(e) Check all pipeline joints for tightness and lockwiring.

(f) Replace the supply unit. See para 13.

ARROW 1 SERVICE DATA

18 For details of testing the electrical circuit see Arrow 1 Service Data - Section 27 - Fire Protection - Electrics.

PURGING THE FIRE EXTINGUISHER SYSTEM

19 After the fire extinguisher system has been operated it is necessary to blow out the discharge lines and nozzles and to clean the affected area.

WARNING

Freon extinguisher fluid is toxic. Care must be taken not to inhale excessive quantities of vapour. The fluid must not be allowed to come in contact with the mouth.

20 If the fire extinguisher system has been discharged into one of the engine bays, proceed as follows:

(a) Remove the affected engine. See Arrow 1 Service Data - Section 23 - Power Plant. Rectify the cause of fire, repair the damage and clean the engine.

(b) Remove the fire extinguisher supply unit. See para 12.

(c) Using a suitable adaptor, connect a source of air pressure at approximately 75 psi to the affected pipeline.

(d) Blow out all traces of fire extinguisher fluid from the pipeline and the four discharge nozzles.

(e) Thoroughly clean with a clean cloth all traces of fluid from the engine tunnel.

21 If the fluid has been discharged into the hydraulic and equipment bay, proceed as follows:

(a) Remove all access panels and open all access doors to the equipment bay.

(b) Blow out the pipelines and nozzles as described in para 19(b), (c) and (d).

(c) Clean off all traces of extinguisher fluid.

(d) Rectify the cause of the fire and repair the damage.

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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
FIRE PROTECTION		Supply Unit	23

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2558-21	Walter Kidde		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Provides storage for fire extinguisher chemical and means of releasing the chemical from any of three outlets.

LOCATION

Between the engines at station 724.

ACCESS

MEN X MINUTES

Release 28 Camloc fasteners and lower engine service door number four.

REPLACEMENT PROCEDURE

MEN X MINUTES

See Testing and Servicing.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check pressure contents at the gauges. Check the blow off safety valve. Check discharge ports and control valves. Check electrical connectors for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 27

FIRE PROTECTION

ELECTRICS

(This data supersedes previous issue dated 15 Feb 58)

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ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The fire protection system is comprised of fire detection and fire extinguisher actuation circuits.

2 The fire detection circuits detect and indicate overheating conditions in the LH engine compartment, the RH engine compartment and the hydraulic bay which is the section of the fuselage between the engine compartments. In addition to the hydraulic equipment, fuel system and electrical system components are located in this section.

3 In the extinguisher actuation circuits two fire extinguishers are fitted which can be discharged individually into any two of the three fire detection areas. Alternatively, both extinguishers can be discharged into any one of the three areas or both extinguishers can be discharged simultaneously by the operation of a switch, marked CRASH-FIRE, located in the front cockpit. In this case, the content of one extinguisher is discharged into both the LH and the RH engine compartments, and the content of the remaining extinguisher is discharged into the hydraulic bay.

FIRE DETECTION CIRCUITS

4 The three fire detection circuits are electrically identical. Each circuit is comprised of a number of lengths of a specially constructed heat detector conduit, a detector control unit and a fire warning indicator light which, when depressed, actuates the corresponding actuation circuit of the extinguishers.

5 The detector conduit consists of two uninsulated wires embedded in an insulating material which has a negative co-efficient of temperature, i.e. a rise in temperature results in a drop in the insulation resistance value. The wires and the insulating material are contained in a conductive sheathing of Inconel which is grounded at intervals to the aircraft structure. One of the core wires is connected to the sheathing and the other is series connected to the control unit.

6 The lengths of detector conduit can be constructed to have different operating limits by increasing or decreasing the resistance value of the insulating material for any given temperature. This permits a complete circuit to indicate overheating conditions at different temperatures along its length. The detector circuits of the engine compartments are assembled in this manner.

7 The conduit lengths fitted forward of the engine firewall are constructed to have resistance-temperature characteristics that enable an overheat warning indication to be given if the temperature exceeds 260°C (500°F), or if at least six inches of the conduit is subjected to 315°C (600°F). The conduit lengths fitted aft of the firewall are constructed to have resistance-temperature characteristics that enable an overheat warning indication to be given if the temperature exceeds 307°C (585°F), or if at least six inches of the conduit is subjected to 380°C (715°F). The detector conduits in the hydraulic bay are constructed to have resistance-temperature characteristics that enable an overheat warning indication to be given if the ambient temperature exceeds 232°C (405°F) or if at least six inches of the conduit is subjected to 288°C (550°F).

8 As the detector circuits are formed in loops, they will continue to operate normally despite a break occurring in the live core wire. To facilitate checking this core wire for continuity, a switch, located on the Refuelling and Test panel E21, is provided to interrupt the loop and ground the core wire. This simulates an overheat condition and continuity of the wire will be indicated if the relevant fire warning light illuminates. The switch is a three-pole type and grounds all three detection circuits simultaneously. To restrict the current flow when the detector circuits are grounded, a current limiting resistor for each circuit is inserted between the test contacts of the switch and ground.

9 The detector control unit is basically an electronic switch which operates a circuit relay. This relay, when energized, completes a supply circuit from the emergency DC bus to the fire warning indicator located in the cockpit. The control unit incorporates two

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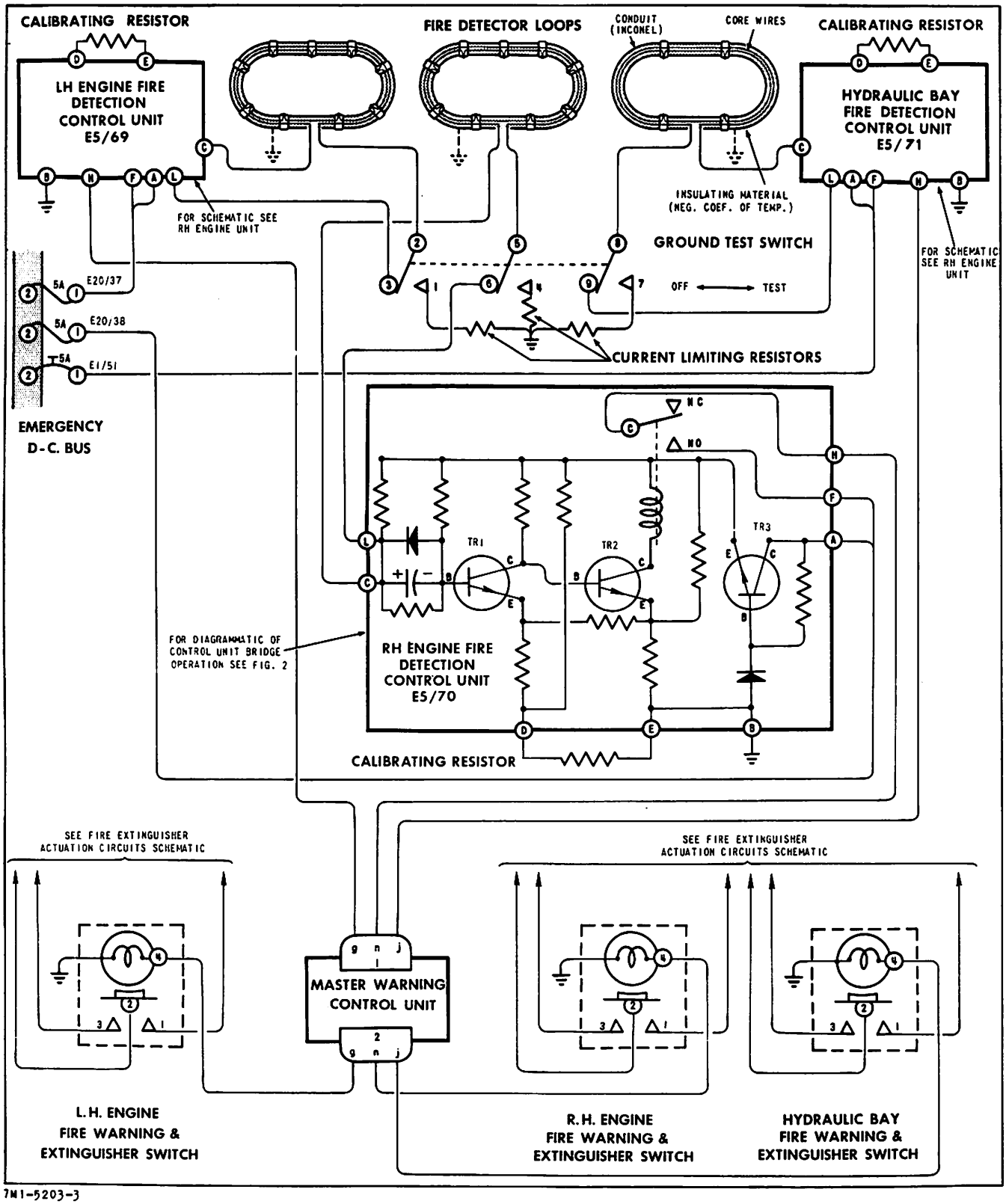

FIG. 1 FIRE DETECTION CIRCUITS SCHEMATIC

transistors which perform the switching function, the circuit relay and a resistance bridge circuit which uses the sensing element as one leg of the bridge and a calibrating resistor as its opposite leg. A third transistor and its current components maintain a constant supply voltage of 24 volts for the detection circuits. The circuit is effective to a lower limit of 17 volts and an upper limit of 31 volts. The calibrating resistor, fitted externally on the control unit, facilitates calibration of the system to the required temperature operating limit. Increasing the ohmic value of the calibrating resistor will increase the temperature operating limit. Conversely, decreasing the ohmic value will decrease the temperature operating limit.

FIRE DETECTOR CONTROL UNIT OPERATION (Fig 2)

10 When the ambient temperature in the fire detection area is normal, the sensing element resistance will be of a value that will unbalance the bridge. The unbalanced condition of the bridge causes a potential difference to develop between the base (B) and the emitter (E) of the first stage (TR1); i.e. the base becomes more positive with respect to the emitter.

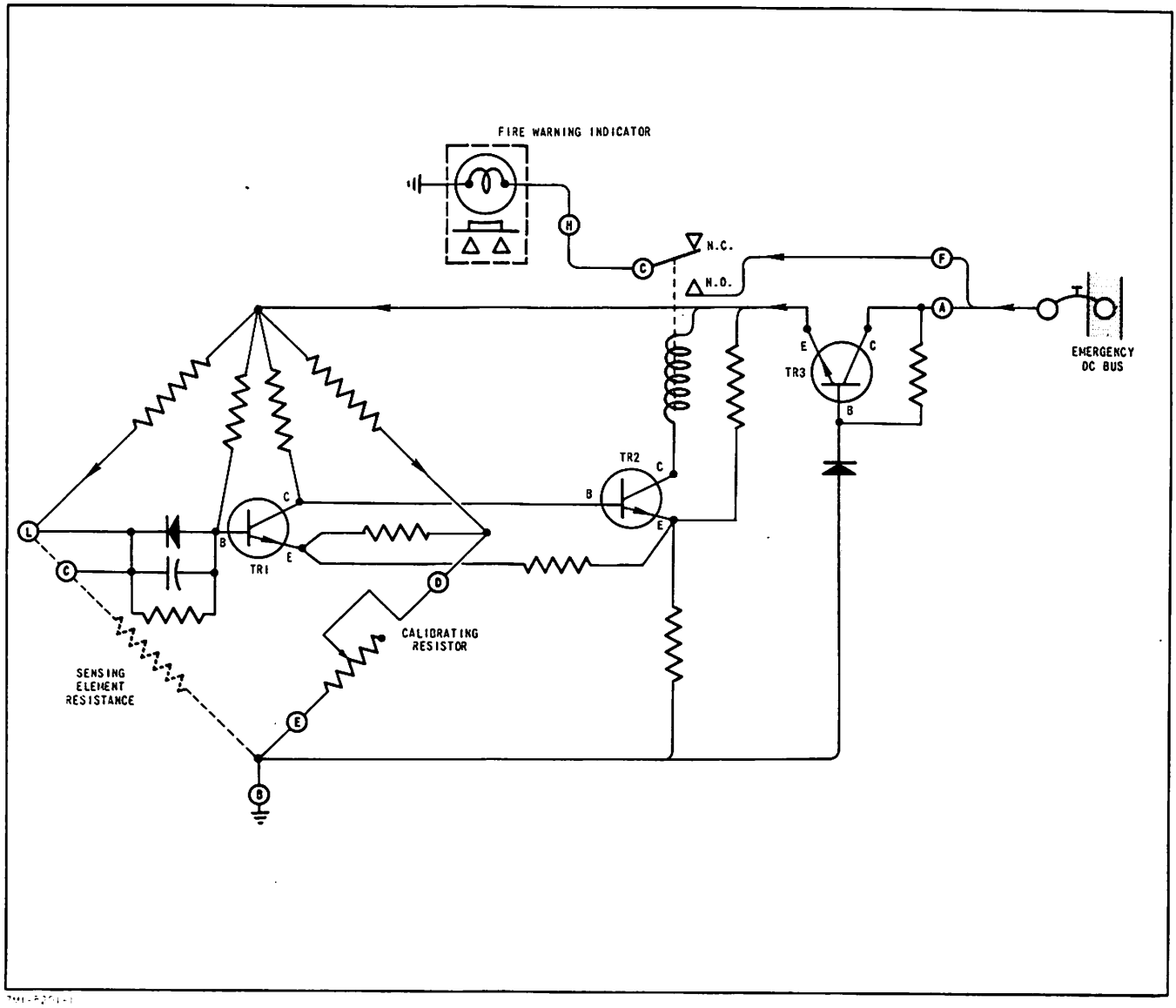

FIG. 2 DIAGRAMMATIC OPERATION OF DETECTOR CONTROL UNIT

This condition permits current to flow in the collector (c) circuit and causes the voltage appearing on the base (B) of the second stage (TR2) to develop a negative bias. The value of this bias is such that the transistor does not conduct.

11 If an overheat condition occurs in the fire detection area, the sensing element resistance decreases in resistance to a point where the bridge is balanced and no potential difference will exist between the base and emitter of the first stage (TR1). When this condition exists, the transistor does not conduct. When current does not flow in the first stage collector circuit, the potential appearing on the base of the second stage (TR2) increases. The increase is such that the base potential becomes positive with respect to the emitter and current flows in the collector circuit so energizing the circuit relay coil. The relay, when energized, completes the supply to the relevant fire warning indicator.

12 The first stage (TR1) incorporates a circuit designed to improve detector sensing when the resistance of the sensing element decreases rapidly. The circuit consists of a resistor-capacitor network which restricts the rate of voltage drop across the input to TR1 and also provides a differential between the cut-in and cut-out of the circuit.

EXTINGUISHER ACTUATION CIRCUITS

13 Two fire extinguisher actuation circuits, namely, a first shot circuit and a second shot circuit, are provided for each of the three fire detection areas. The first shot circuits are actuated by depressing the relevant fire warning indicator. The second shot circuits which are inoperative until the corresponding first shot circuits have been selected, are actuated by operating a second shot switch.

14 Due to the fact that the first shot circuit of the LH engine compartment and the hydraulic bay, discharge the same extinguisher, the operation of these circuits is interrelated. When the fire warning indicator of the LH engine is depressed, two supply circuits, both derived from the battery bus via the L FIRE PROTECT circuit breaker on panel E1, are completed. One supply releases the appropriate extinguisher and the other supply energizes an engine lock-on relay. The supply to the extinguisher is completed via the relay open contacts of a lock-on relay in the hydraulic bay extinguisher actuation circuit. If the hydraulic bay actuation circuit was actuated prior to operating the LH engine circuit, the hydraulic bay lock-on relay will be energized which transfers the supply through the relay closed contacts to the remaining extinguisher. The lock-on relay, when energized, does the following:

(a) Completes a self-holding circuit which holds the relay in the energized position until the supply circuit is interrupted, i.e. selecting the master electrical switch to OFF.

(b) Completes a preparatory supply circuit to the relay-open contact of a second shot relay.

(c) Transfers the hydraulic bay first shot circuit to the remaining extinguisher.

15 The hydraulic bay extinguisher circuit, when actuated by depressing the hydraulic bay fire warning indicator, completes a supply circuit, derived from the battery bus via the HYD. BAY FIRE PROTECT circuit breaker on panel E1, to a lock-on relay and, via the relay-open contacts of the LH engine lock-on relay, to the relevant extinguisher. If the LH engine extinguisher circuit has been actuated prior to the hydraulic bay, this lock-on relay will be energized which transfers the supply through the relay-closed contacts to the remaining extinguisher.

16 An engine lock-on relay is incorporated in the RH engine extinguisher circuit. When the RH engine fire warning indicator is depressed, a supply circuit, derived from the battery bus via the R. FIRE PROTECT circuit breaker on panel E1, is completed directly to the extinguisher and to the lock-on relay. The lock-on relay, when energized, completes a self holding circuit and a second shot circuit.

17 The self holding circuits of the lock-on relays derive their supply from the battery bus via an automatic reset circuit breaker on panel E1 and a set of contacts of the master electrical switch.

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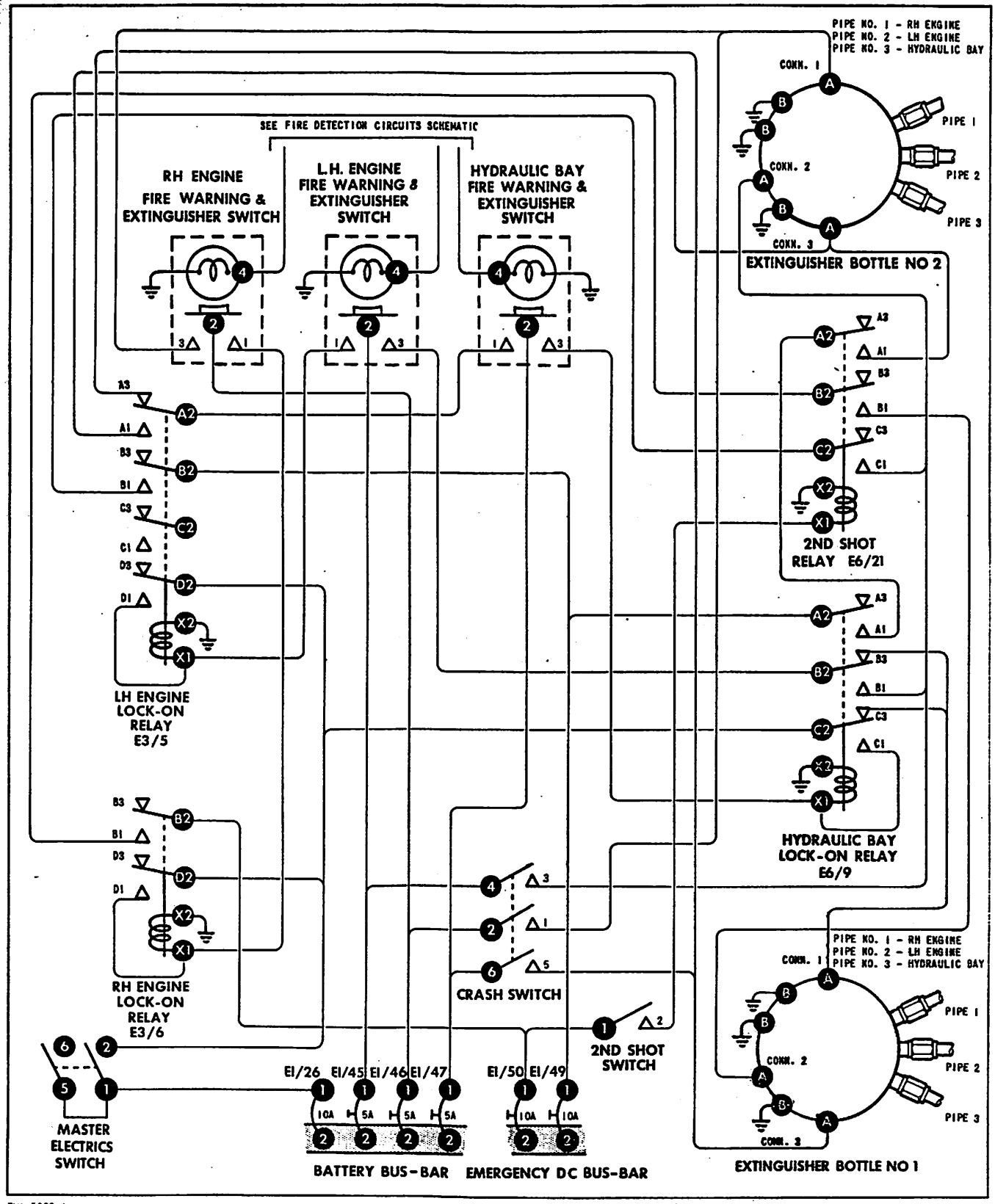

FIG. 3 FIRE EXTINGUISHER ACTUATION CIRCUITS SCHEMATIC

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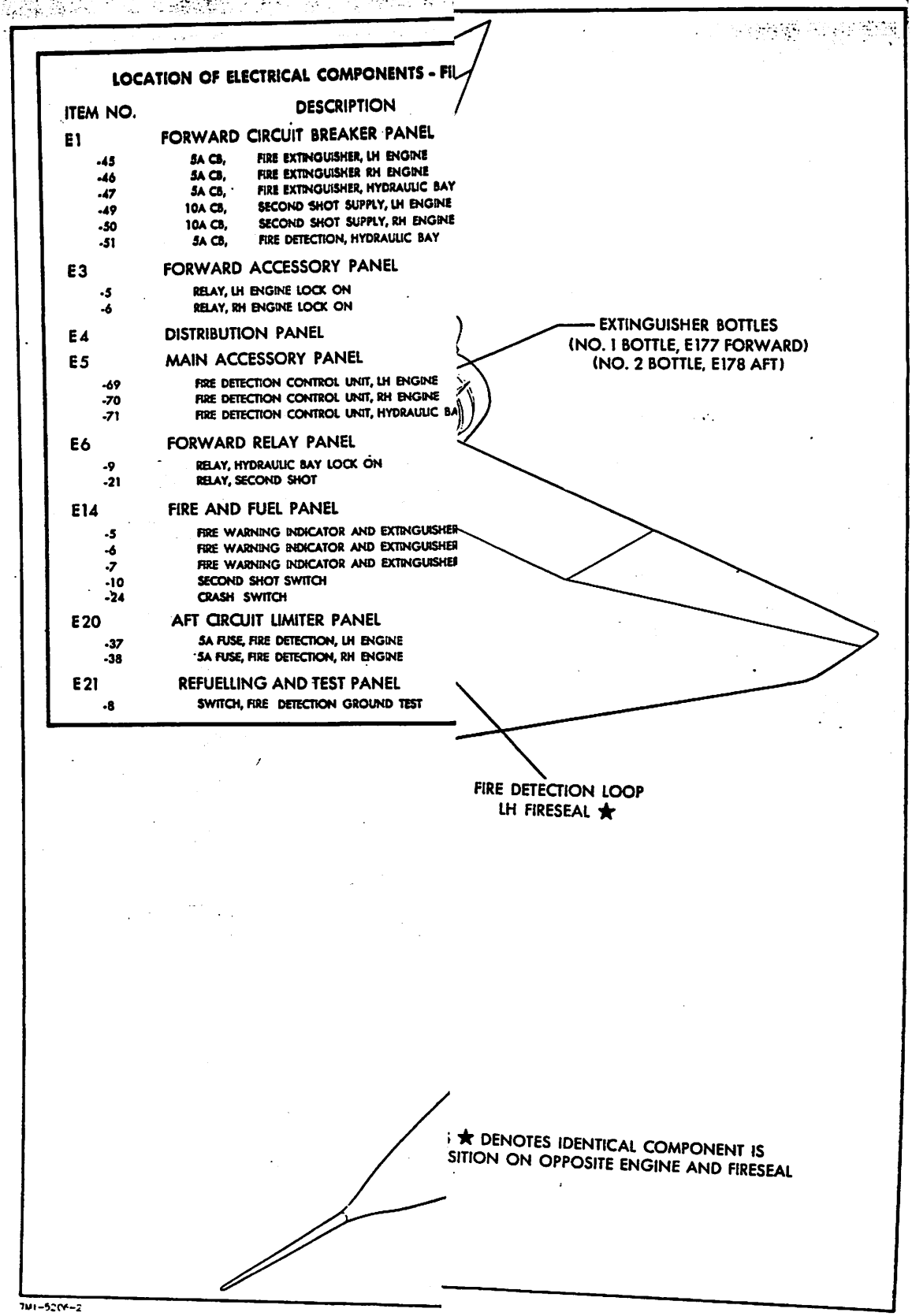

FIG. 4 LOCATION OF ELI

18 The second shot circuits are identical in operation. Operating the SECOND SHOT switch will complete a supply circuit to the second shot relay. This relay, when energized, completes all three second shot circuits, but only one will be 'live' due to the operation of the first shot circuit. The LH engine and hydraulic bay second shot circuits, derive a supply from the emergency DC bus-bar via the L L/P COCK. FIRE CONT circuit breaker on panel E1. The RH engine second shot circuit derives its supply from the emergency DC bus-bar via the R L/P COCK. FIRE CONT circuit breaker on panel E1.

19 The pilot's CRASH-FIRE switch is parallel connected with the second shot circuit of the LH engine, the first shot circuit of the RH engine, and the first shot circuit of the hydraulic bay. When the switch is operated supply circuits are completed from the battery bus-bar to discharge both extinguishers. The second shot circuit of the LH engine and the first shot circuit of the RH engine discharge the same extinguisher into the LH and RH engine compartments. The first shot circuit of the hydraulic bay discharges the remaining extinguisher into the hydraulic bay.

FUNCTION TESTING

FIRE DETECTION CIRCUITS FUNCTION TEST

20 To check the serviceability of the fire detection system proceed as follows:

(a) Connect a source of DC power to the external DC supply receptacle and select the MASTER ELEC switch to the on position.

(b) Select and hold the FIRE DETECTION switch, located on the refuelling and test panel E21, to the TEST position. Note that the LH, HYD and RH fire warning lights, located on the LH console, and the red master warning lights, located on the main instrument panel, are illuminated. Release the FIRE DETECTION switch.

FIRE EXTINGUISHER ACTUATION CIRCUITS FUNCTION TEST

21 To check the continuity and operation of the fire extinguisher actuation circuits proceed as follows:

(a) Disconnect cables E1116/5, E1116/6 and E1116/7 from extinguisher bottle No. 1 and cables E1116/8, E1116/9 and E1116/10 from extinguisher bottle No. 2.

(b) Connect a test light between pins A and B of each of the above cable plugs.

(c) Depress the LH fire warning light and check that an indication of supply is obtained at the plug of cable E1116/5.

(d) Hold the SECOND SHOT switch to the 'on' position and check that an indication of supply is obtained at the plug of cable E1116/9.

(e) Release the SECOND SHOT switch and depress the HYD fire warning light. An indication of supply should be obtained at the plug of cable E1116/10.

(f) Momentarily, interrupt the lock-on relay supply circuit by selecting the MASTER ELECTRICS switch to OFF then ON. No indication should be obtained at the plugs.

(g) Depress the HYD fire warning light and check that an indication of supply is obtained at the plug of cable E1116/7.

(h) Hold the SECOND SHOT switch to the 'on' position and check that an indication of supply is obtained at the plug of cable E1116/10.

(j) Release the SECOND SHOT switch and depress the LH fire warning light. An indication of supply should be obtained at the plug of cable E1116/9.

(k) Repeat operation (f).

(m) Depress the RH fire warning light and check that an indication of supply is obtained at the plug of cable E1116/8.

(n) Hold the SECOND SHOT switch to the 'on' position and check that an indication of supply is obtained at the plug of cable E1116/6.

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(p) Repeat operation (f).

(q) Actuate the pilots CRASH-FIRE switch and check that an indication of supply is obtained at the plug of cables E1116/8, E1116/9 and E1116/7.

(r) Prior to reconnecting the cables, check the solenoids of the extinguishers for continuity with an ohmmeter. Check that a resistance of approximately 40 ohms is indicated between pin A and pin B of the three receptacles on each extinguisher.

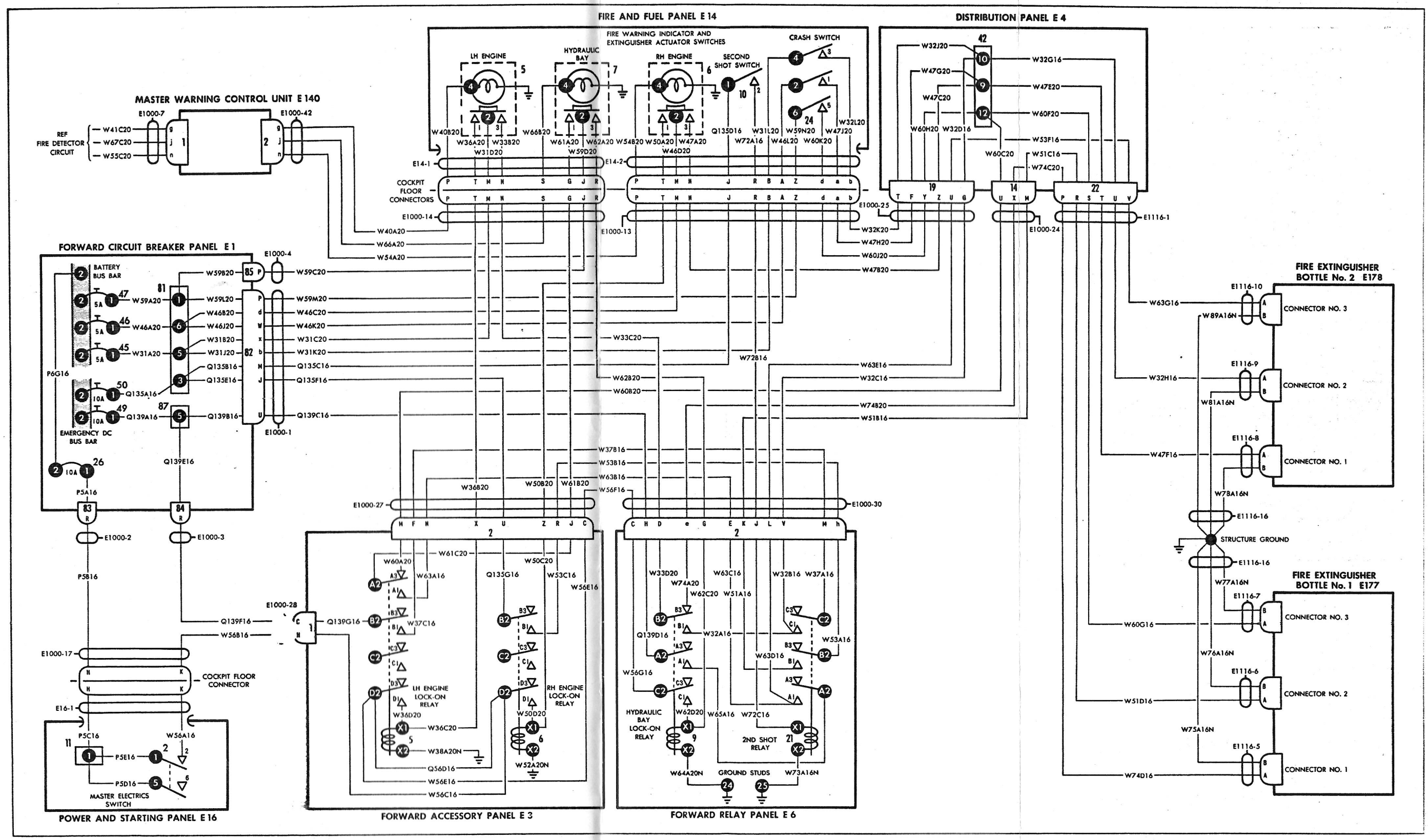

FIG. 5 FIRE EXTINGUISHER ACTUATION CIRCUITS

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ARROW 1 SERVICE DATA

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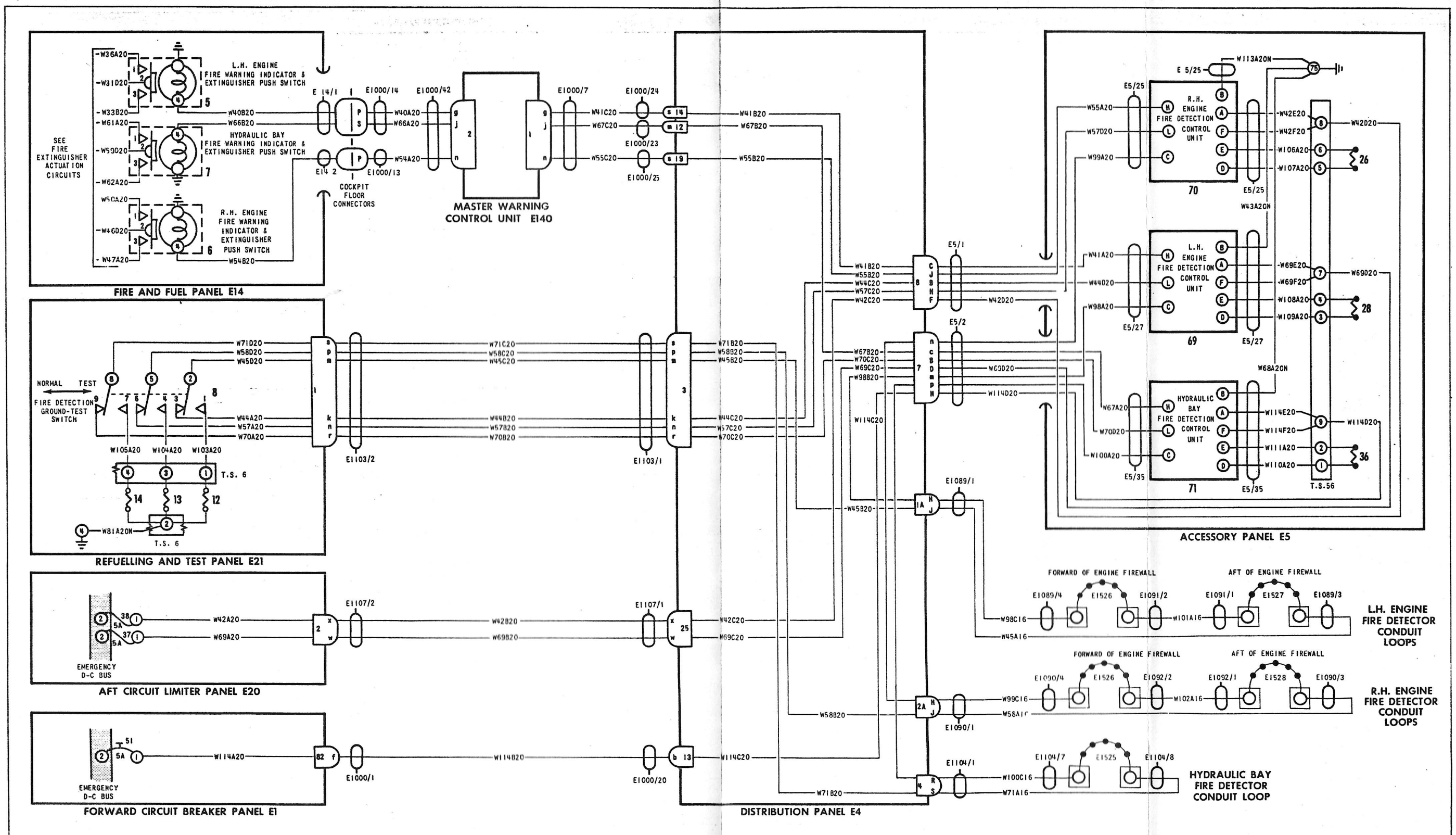

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FIG. 6 FIRE DETECTION CIRCUITS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Fire Warning Light and Extinguisher Push Switches - 3	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-S-155			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To serve as a combined fire warning indicator and fire extinguisher actuation switch. One assembly for each of the three detection areas, viz. LH engine compartment, RH engine compartment and the Hydraulic Bay.

LOCATION

Front cockpit LH console, panel E14.

ACCESS — MEN X MINUTES

Unobstructed when panel E14 is removed from the LH console - four quick-fasteners.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure assembly to panel E14 using lock-washer and nut provided.
Solder circuit wires to lugs.
Refit panel in console - four quick-fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the indicator is securely mounted on the panel. Check that the circuit wires are securely and properly soldered. Depress the indicator light and check that the spring return action is positive.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Fire Detector Control Units - 3	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1154-18	Walter Kidde	P/N 871510	25201

OVERHAUL LIFE: KNOWN- - ESTIMATED- 350 hours

FUNCTION

To complete a supply circuit to the fire warning light when overheat conditions are detected. Three units are fitted which operate in conjunction with their corresponding LH engine compartment, RH engine compartment and Hydraulic Bay fire detection circuits.

LOCATION

Main Accessory Panel E5, located on bulkhead at station 485 in the Missile Bay.

ACCESS

Lower the missile pack and release E5 panel from its forward mounts by removing two pip pins.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure unit to panel with four screws. Connect and secure circuit wiring to terminals. Raise and position panel, secure with the two pip pins.

MEN X MINUTES

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Fire Protection Loop (Portion forward of LH and RH engine firewall)	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1195-29 (3 off) 7-1195-27 (1 off)	Walter Kidde		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To detect ambient temperatures in excess of 260°C (500°F) or localized heating in excess of 315°C (600°F).

LOCATION

Engine compartment forward of firewall (LH and RH)
Detector length 32 feet, assembled from four lengths.

ACCESS — MEN X MINUTES

When engine is removed, unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Connect and secure the electrical connectors at both ends of the length of conduit to the connectors of the adjacent lengths.
Fit and secure the length of conduit to the aircraft structure with the fixed securing clips.

CONFIDENTIAL

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the electrical connectors are securely and properly fitted throughout the length of the loop. Check that the loop is fitted securely, throughout its length, to the aircraft structure.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Fire Protection Loop (Portion aft of LH and RH engine firewall)	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1158-77 (1 off) 7-1158-71 (1 off)	Walter Kidde	805267	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To detect ambient temperatures in excess of 307°C (585°F) or localized heating in excess of 380°C (715°F).

LOCATION

Engine compartment aft of firewall (LH and RH)
Detector length 28 feet, assembled from 2 lengths.

ACCESS

When engine is removed, unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Connect and secure the electrical connectors at both ends of the length of conduit to the connectors of the adjacent lengths.
Fit and secure the length of conduit to the aircraft structure with the fixed securing clips.

MEN X MINUTES

CONFIDENTIAL
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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the electrical connectors are securely and properly fitted throughout the length of the loop. Check that the loop is fitted securely, throughout its length, to the aircraft structure.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Fire Protection Loop (Hydraulic Bay)	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1150-5027 (8 off) 7-1150-5029 (1 off)	Walter Kidde		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To detect ambient temperatures in excess of 232°C (450°F) or localized heating in excess of 288°C (550°F).

LOCATION

Hydraulic Bay.
Detector length 85 feet, assembled from nine lengths.

ACCESS — MEN X MINUTES

Hydraulic Bay access doors.

REPLACEMENT PROCEDURE — MEN X MINUTES

Connect and secure the electrical connectors at both ends of the length of conduit to the connector of the adjacent lengths.
Fit and secure the length of conduit to the aircraft structure with the fixed securing clips.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the electrical connectors are securely and properly fitted throughout the length of the conduit. Check that the loop is fitted securely, throughout its length, to the aircraft structure.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Fire Detector Test Switch	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
9CS-S-160			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To facilitate testing the core wire of the fire detector conduits for continuity.

LOCATION

Refuel and Ground Test panel E21, located forward of LH speed brake.

ACCESS

MEN X MINUTES

Open hinged access panel, forward of LH speed brake.
Remove panel E21 by releasing 11 camloc fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure switch to panel using lock-washer and nut supplied.
Connect and secure circuit wires to switch terminals.
Refit panel - 11 camloc fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the switch is securely mounted. Operate the switch and check that the lever action is smooth and that the make and break is not sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Fire Protection Relays - Engine Lock-on, LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS25024-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

When energized, by depressing the corresponding LH engine or RH engine fire warning light, the relays complete a supply circuit in preparation for a second shot.

LOCATION

Panel E3, located on the RH wall of the nose wheel bay.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure relay in panel E3 using four mounting screws.
Connect and secure circuit wires to relay terminals.

MEN X MINUTES

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the relay is securely mounted. Check that the circuit wiring is securely and properly connected to the relay terminals.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Hydraulic Bay Lock-on Relay	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS25024-1			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

When energized, by depressing the hydraulic bay fire warning light, the relay transfers the LH engine extinguisher actuation to the remaining extinguisher and completes a circuit in preparation for a second shot.

LOCATION

Panel E6, located on the roof of nose wheel bay.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure relay to panel using four mounting screws.
Connect and secure circuit wires to relay terminals.

MEN X MINUTES	

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the relay is securely mounted. Check that the circuit wiring is securely and properly connected to the relay terminals.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Second Shot Switch	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler - Hammer	8811K15	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To complete the supply for the extinguisher actuation second shot circuits.

LOCATION

Front cockpit LH console, panel E14.

ACCESS — MEN X MINUTES

Unobstructed when panel E14 is removed from the console - seven quick-fasteners.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure switch and guard to panel using lock-washer and nut supplied.
Connect and secure circuit wires to switch.
Fit and secure panel E14 in the console with seven quick-fasteners.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the switch and its guard are securely and properly fitted. Operate the switch and check that the lever action is smooth and that the make and break is not sluggish or rough.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	FIRE PROTECTION	Second Shot Relay	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS25024-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

When energized, by operating the second shot switch, completes the preparatory second shot actuation circuit set-up by the selected first shot actuation circuit.

LOCATION

Panel E6, located on the roof of nose wheel bay.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure relay on panel E6 using four mounting screws.
Connect and secure circuit wires to relay terminals.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the relay is securely mounted. Check that the circuit wiring is securely and properly fitted to the relay terminals.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

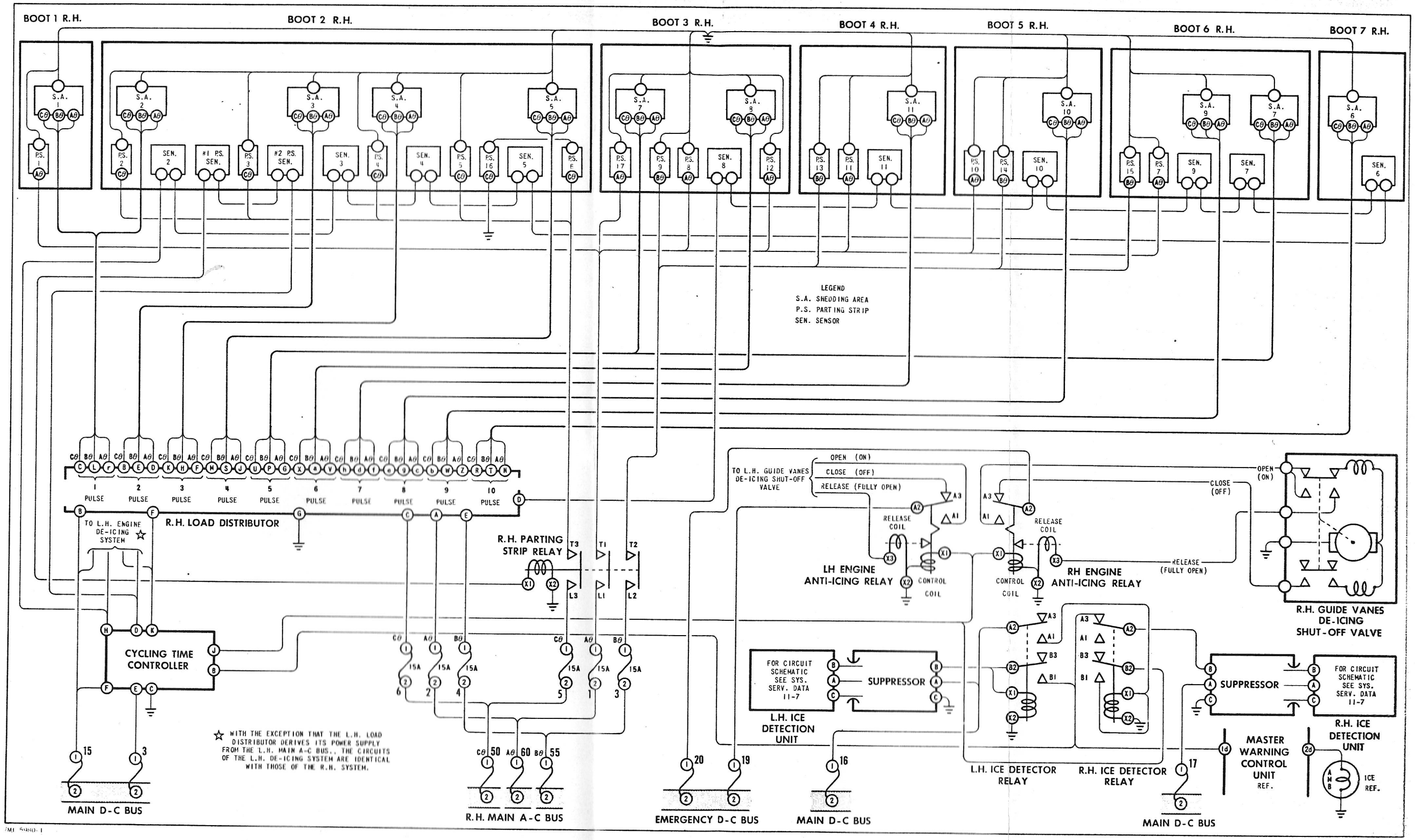

FIG. 1 ENGINE INTAKE AND RAMP DE-ICING SCHEMATIC

20 If insufficient detection circuit pulses are received by the controller to start an initial or subsequent cycle, it automatically initiates a clearing cycle of the shedding areas after a preselected waiting period. Upon completing this cycle the system reverts to the off condition. The duration of the waiting period can be adjusted as required between 40 and 160 seconds.

GUIDE VANES DE-ICING

21 Individual, electrically identical circuits are provided for the LH and the RH engine. The following description is applicable to each circuit.

22 The operation of the guide vanes de-icing circuit is initiated by the cycling time controller when the first pulse is received from the ice detection circuit. The controller provides a power supply to energize an engine anti-icing relay. This relay, when energized, transfers a supply circuit from the 'close' field to the 'open' field of a shut-off valve. This action permits hot air, bled from the engine compressor, to be directed onto the guide vanes. The shut-off valve supply is derived from the emergency DC bus-bar.

23 A characteristic of the shut-off valve is that once actuated it must complete its travel before it can reverse direction. To ensure that the valve will open fully, an electromechanical locking circuit operates in conjunction with the control coil of the anti-icing relay. This circuit mechanically locks the control coil in the energized position. The lock is released by the release coil of the anti-icing relay which is energized by a supply circuit completed when the shut-off valve is fully open. However, the relay will remain in the energized position as long as the de-icing control signal is applied.

ARROW 1 SERVICE DATA

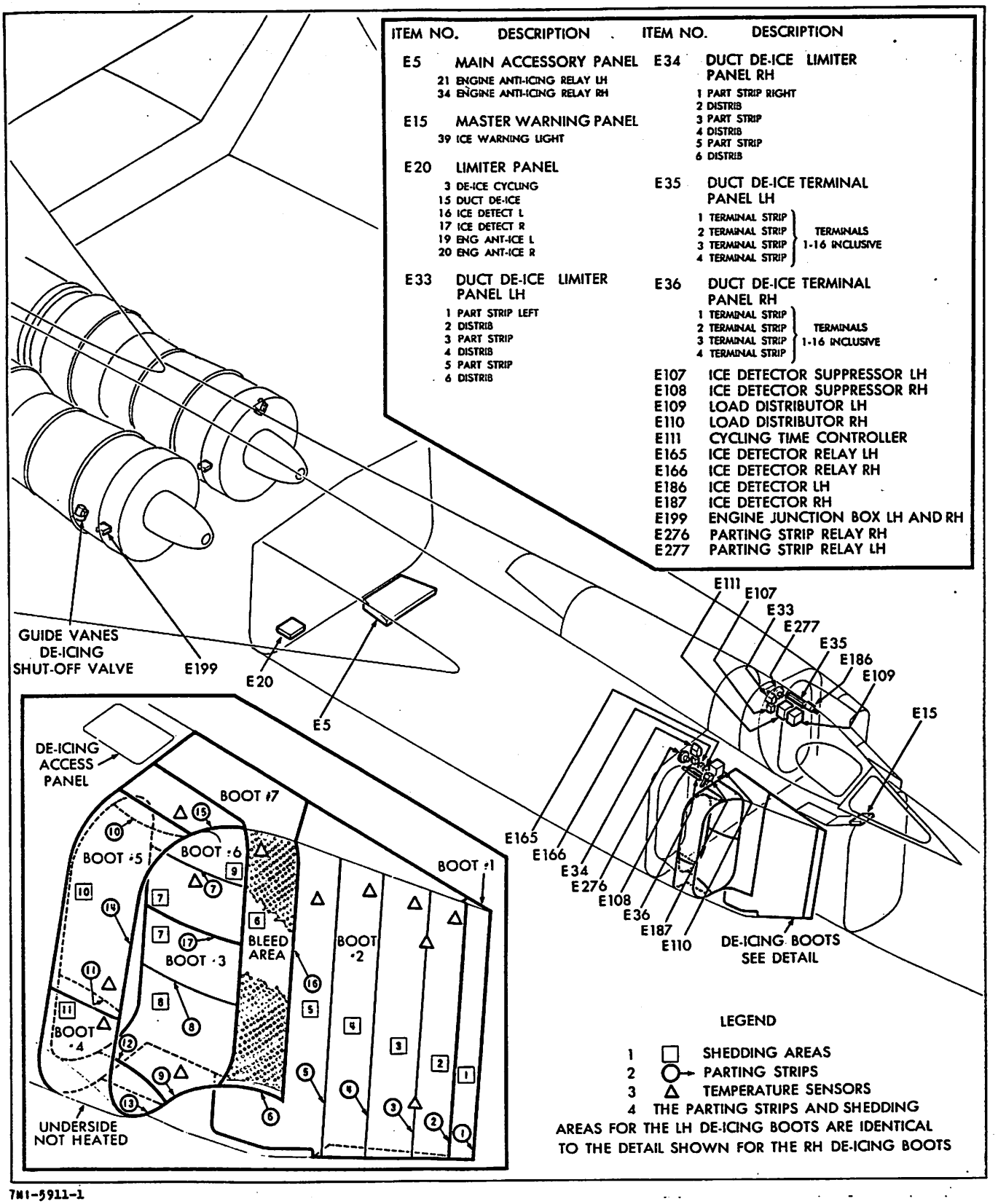

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FIG. 2 LOCATION OF ENGINE INTAKE AND RAMP DE-ICING ELECTRICAL COMPONENTS

ARROW 1 SERVICE DATA

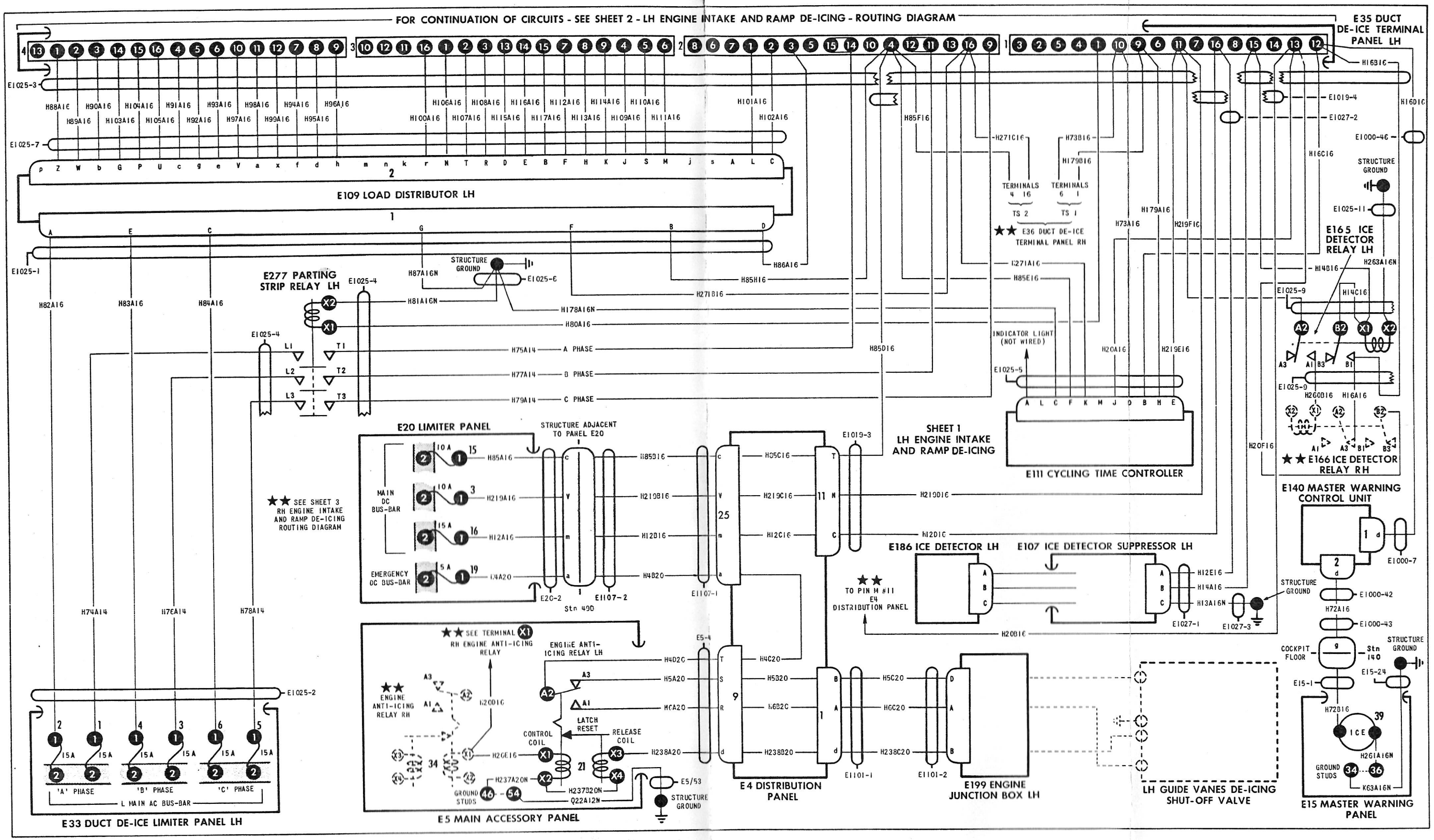

FIG. 3 ENGINE INTAKE AND RAMP DE-ICING (SHEET 1 OF 4)

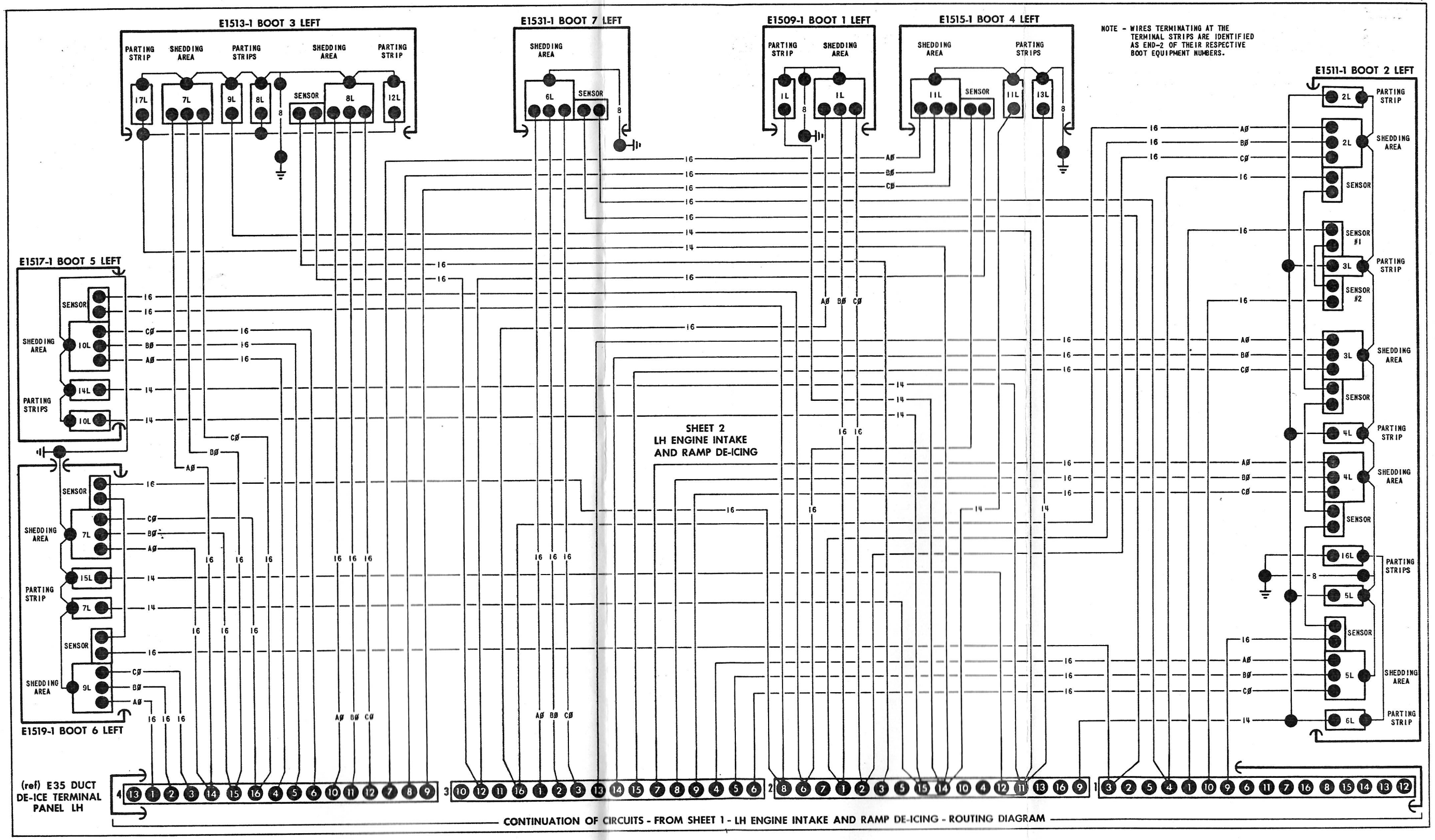

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FIG. 3 ENGINE INTAKE AND RAMP DE-ICING (SHEET 2 OF 4)

ARROW 1 SERVICE DATA

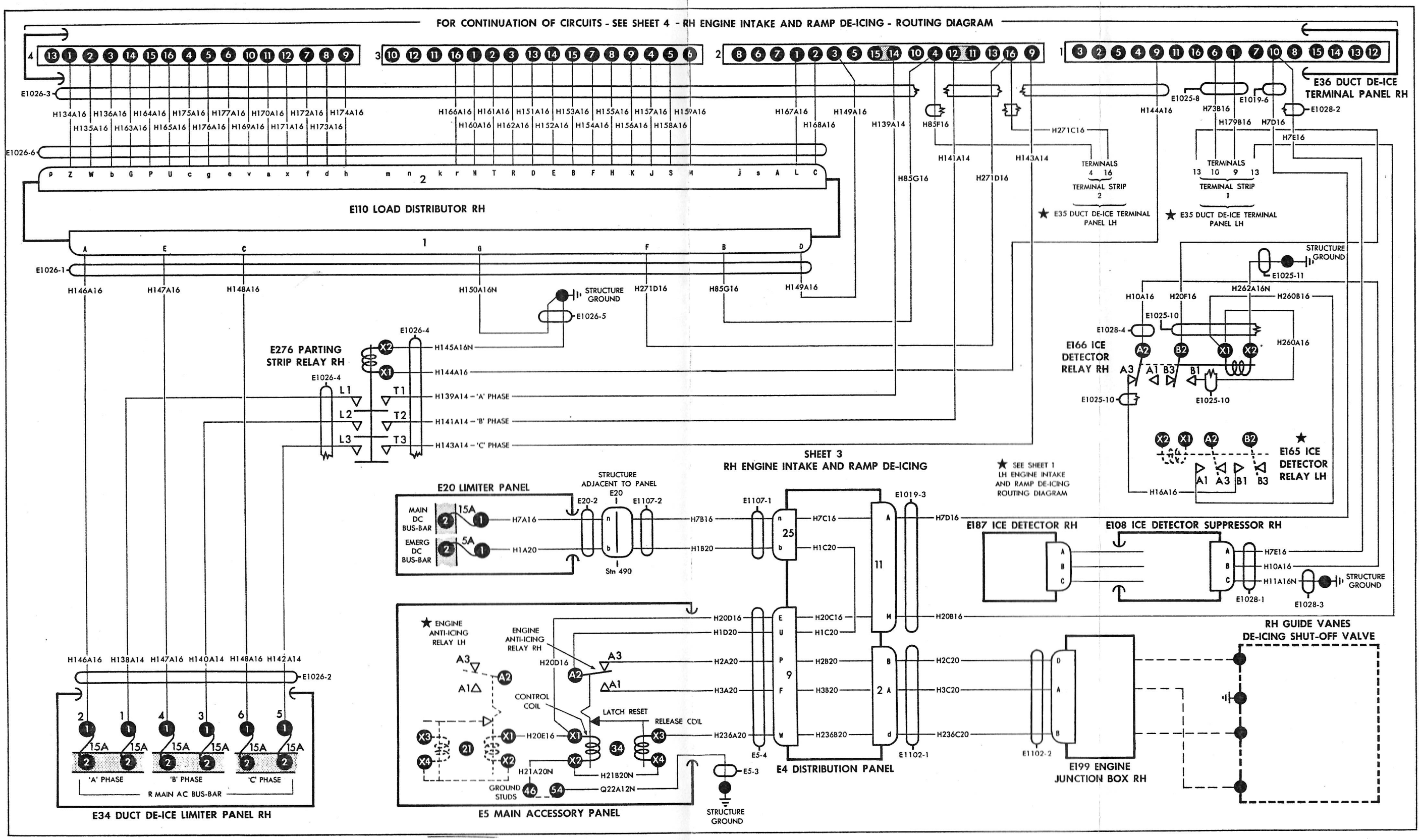

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FIG. 3 ENGINE INTAKE AND RAMP DE-ICING (SHEET 3 OF 4)

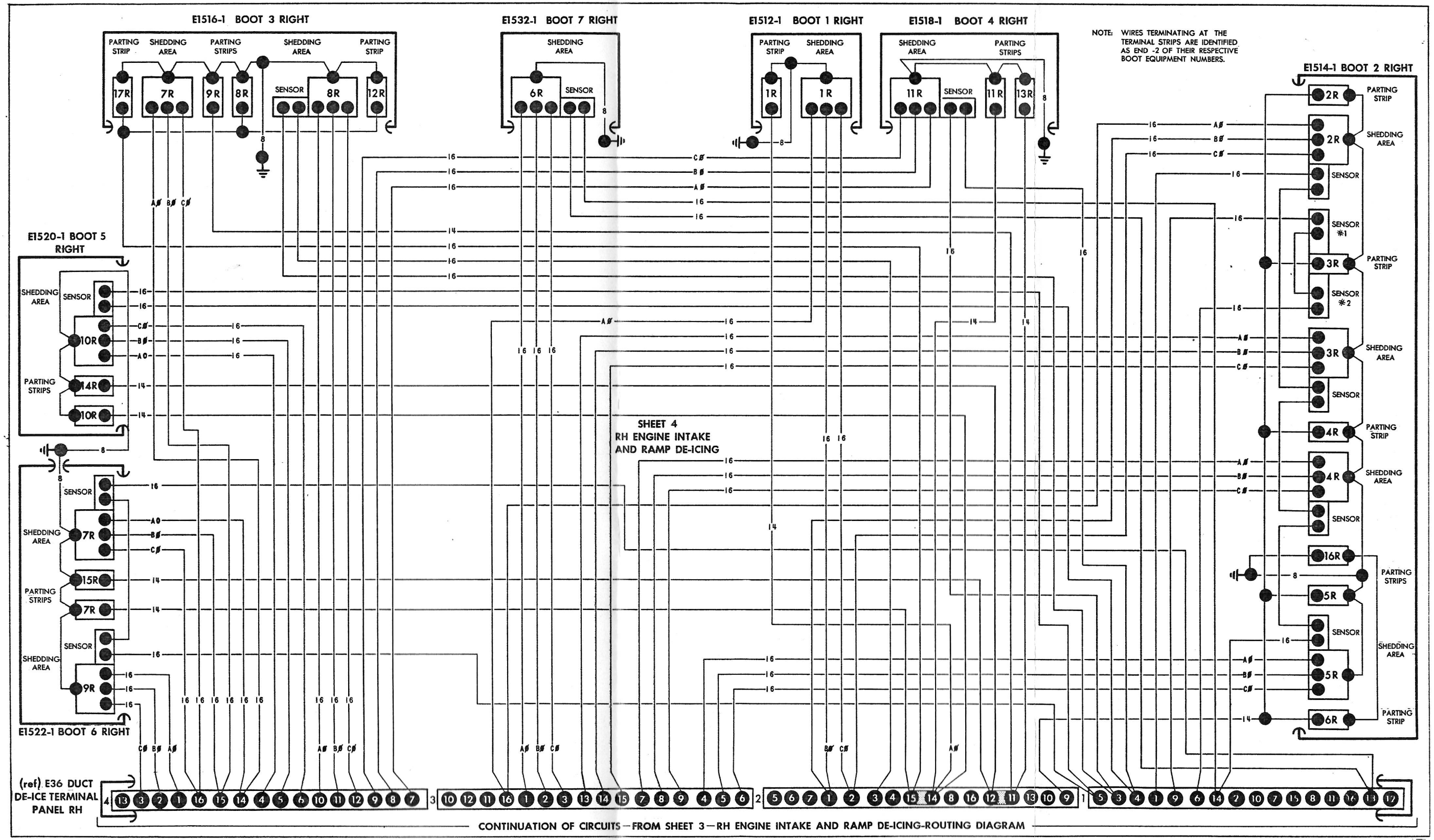

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FIG. 3 ENGINE INTAKE AND RAMP DE-ICING (SHEET 4 OF 4)

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Cycling Time Controller	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2052-13	B.F Goodrich Co.	G-11861	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To initiate the operation of the air intake ramps and ducts de-icing and the guide vanes de-icing upon receiving a preselected number of from 4 to 12 pulses from the ice detection circuits.

LOCATION

Top of the LH engine air intake aft of station 214.

ACCESS

Unobstructed upon removal of panel extending from station 214 to 228 on top of the air intake, 24 - 3/16 inch screws.

MEN X MINUTES

REPLACEMENT PROCEDURE

Locate the unit in its mounting tray and secure by turning the fastener clockwise.
Wirelock the fastener.
Fit and secure one electrical connector.
Refit and secure the access panel.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Examine the unit, electrical wiring and connector for cleanliness, security and damage. Check the wirelocking on the fastener for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Load Distributor - LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2052-12	B.F. Goodrich Co.	G-11860	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide a sequence of twelve 3-phase AC pulses with provision for adjusting the duration of the pulses between 4 and 12 seconds.

LOCATION

Top of the relevant LH or RH engine air intake aft of station 214.

ACCESS

MEN X MINUTES

Unobstructed upon removal of panel extending from station 214 to 228 on top of the engine air intake, 24 - 3/16 inch screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate the unit in its mounting tray and secure by turning the fastener clockwise.
Wirelock the fastener.
Fit and secure two electrical connectors.
Refit and secure the access panel.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Examine the unit, electrical wiring and connectors for cleanliness, security and damage. Check the wirelock on the fastener for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Suppressor - LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-105	PSC Applied Research Ltd.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To suppress RF interference which may be generated by the ice detector.

LOCATION

Top of the relevent LH or RH engine air intake at station 228.

ACCESS

Unobstructed, upon removal of panel extending from station 214 to 228 on top of the air intake, 24 - 3/16 inch screws.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the unit to the structure - four bolts.
Fit and secure one electrical connector.
Fit and secure the prefitted cable to the ice detector unit.
Refit the load distributor, see page 13.
Refit and secure the access panel.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Examine the unit, electrical wiring and connector for cleanliness, damage and security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Ice Detector - LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-27	PSC Applied Research Ltd.	108-00142	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide electrical pulses when icing conditions are present, the frequency of the pulses being dependent upon the rate of icing.

LOCATION

Protrudes into the relevant LH or RH engine air intake at station 214.

ACCESS

Unobstructed upon removal of panel extending from station 214 to 228 on top of the engine air intake, 24 - 3/16 inch screws.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure the unit to the structure - three bolts.
Fit and secure one electrical connector.
Refit and secure the access panel.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Examine the unit, electrical wiring and connector for cleanliness, security and damage. Check that the holes in the probes are not blocked.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Limiter Panel - LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-53 LH 7-2055-54 RH	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To mount the current limiters of certain circuits of the engine de-icing system.

LOCATION

Top of the relevant LH or RH air intake at station 228.

ACCESS — MEN X MINUTES

Unobstructed upon removal of panel extending from station 214 to 228 on top of the engine air intake, 24 - 3/16 inch screws.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the panel to the structure - nine bolts.
Connect and secure the circuit wiring.
Refit and secure the access panel.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the panel is securely mounted and that the circuit wiring is securely and properly connected. Check that the limiters are not discoloured and are serviceable.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Terminal Panel - LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-67 LH 7-2055-68 RH	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To serve as a break point for the air intake and ramp de-icing circuit wiring.

LOCATION

Top of the relevant LH or RH air intake at station 214.

ACCESS

	MEN X MINUTES	
Unobstructed upon removal of panel extending from station 214 to 228 on top of the engine air intake, 24 - 3/16 inch screws.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure the panel to the structure - four screws. Connect and secure the circuit wiring. Refit and secure the access panel.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the panel is securely mounted and that the circuit wiring is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Relay - Ice Detector LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To eliminate the possibility of both ice detectors introducing signals to the controller at the same time. Gives the LH detector preference over the RH detector.

LOCATION

Top of the air intake RH side at station 220.

ACCESS

MEN X MINUTES

Unobstructed upon removal of the access panel extending from station 214 to 228 on top of the air intake, 24 - 3/16 inch screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the unit to the structure - two bolts.
Connect and secure the circuit wiring - six connections.
Refit and secure the access panel.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Examine the unit and electrical wiring for cleanliness, damage and security.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Relay - Engine Anti-Icing LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-133	Cook Electric Co. (Canadian Diaphlex Ltd)	645-22	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To open and close the engine guide vanes anti-icing valve. In the unenergized condition, the relay completes a supply circuit to the 'close' field of the valve actuator. When the relay is energized by a signal from the ice detector, the supply is transferred to the 'open' field of the valve actuator.

LOCATION

Mounted on panel E5, located in the missile bay at station 436 to 458.

ACCESS

Unobstructed upon removal of the missile pack.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure the unit to the structure - four bolts.
Connect and secure the circuit wiring - seven connections.
Refit and secure the missile pack.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Examine the unit and electrical wiring for cleanliness, damage and security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE INTAKE AND RAMP DE-ICING	Relay - Parting Strips LH and RH	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS-24143-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To complete the three-phase supply to the parting strips. The energizing circuit from the cycling time controller is completed via the normally-closed parting strip sensors.

LOCATION

Top of the relevant LH or RH engine air intake at station 228.

ACCESS

Unobstructed upon removal of the access panel extending from station 214 to 228 on top of the air intake, 24 - 3/16 inch screws.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the unit to the structure - four bolts.
Connect and secure the circuit wiring - eight connections.
Refit and secure the access panel.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Examine the unit and electrical wiring for cleanliness, damage and security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 30

ACCESSORIES DRIVES AND GEARBOXES

18 NOV 57
Revised 1 Mar 58

ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

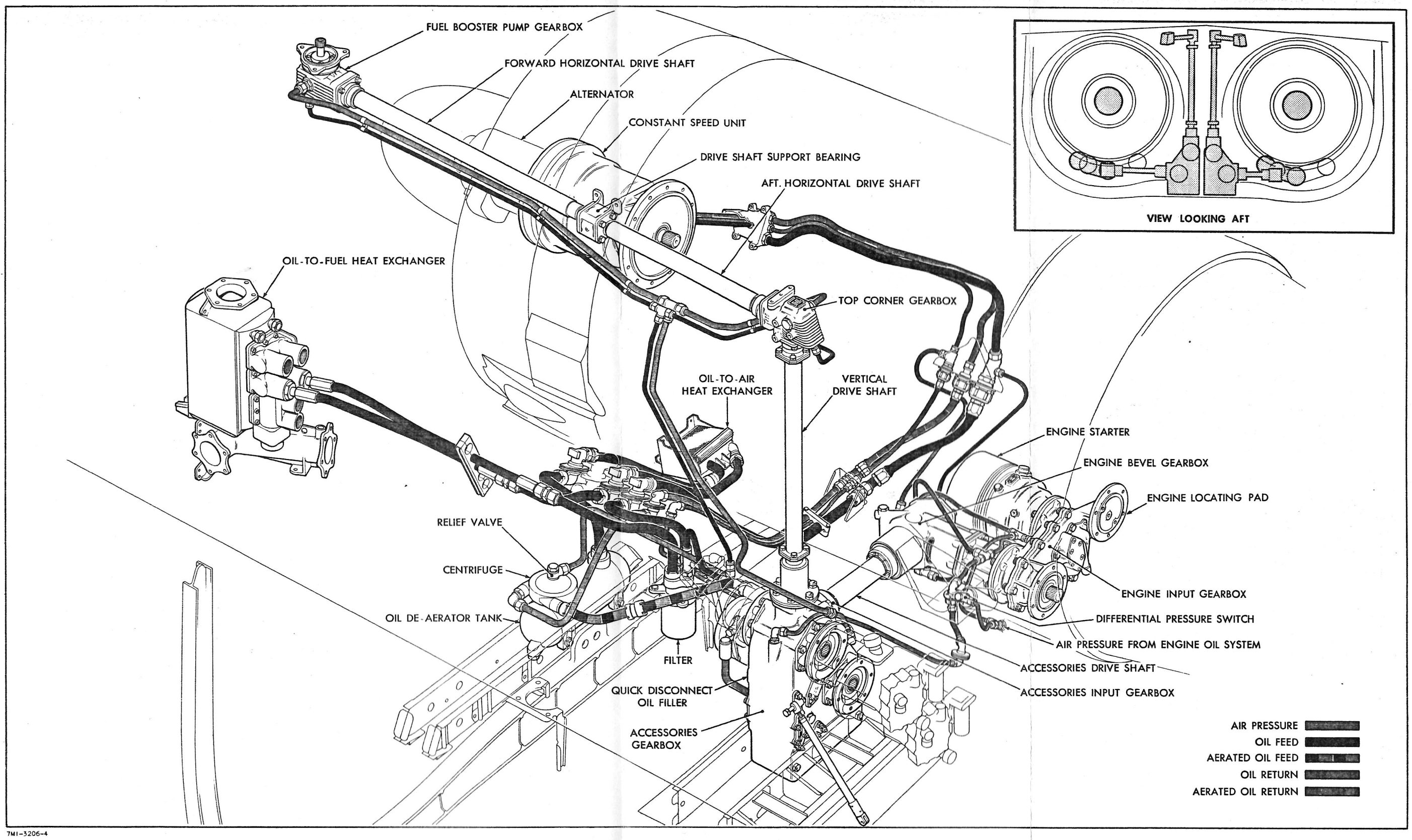

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FIG. 1 ACCESSORIES DRIVES AND GEARBOXES INSTALLATION

81-187

ARROW 1 SERVICE DATA

DESCRIPTION

General

1. An accessories drive system for driving the components required to power the aircraft systems, is driven from each engine. The two systems are similar, each providing geared drives to power two flying control hydraulic pumps, one utility hydraulic pump and drive shafts which operate fuel booster pumps.

2. Each drive system has a self-contained lubricating system which also supplies oil to a constant speed unit for driving an alternator. System venting is achieved by communication with the main engine breathing system.

3. Quick disconnects are provided on all pipelines connecting components installed on the engine to components installed on the airframe.

Engine Input Gearbox

4. An engine input gearbox is mounted on the centre and RH drive pads of the engine accessories drive case. The gearbox is driven by a single drive taken from the engine centre pad and provides two output drives, one inboard which drives the engine bevel gearbox, and one outboard which transmits the engine starter drive to the engine. The two drives rotate in a clockwise direction at a ratio of 0.823 to 1 of N2 compressor speed.

Engine Bevel Gearbox

5. The engine bevel gearbox is mounted on the engine input gearbox and transmits the drive from this gearbox to a drive shaft. The engine bevel gearbox contains two meshed bevel gears which change the direction of drive, and a flexible output drive.

6. The flexible output drive comprises a spur gear, an internally splined ring gear, and a serrated output drive. The spur gear teeth have convex crowns and mate with the splines of the ring gear which are of sufficient length to allow an end float movement of 0.75 inch and still retain full engagement with the spur gear. Misalignment of the splined ring gear up to 2^{o} in any direction is allowed for by the convex configuration of the spur gears. The serrated output drive is riveted to the splined ring and is externally threaded to receive the drive shaft coupling. A spring tensioned leather seal around the outer edge of the ring gear and an H-section disc with an 'O' ring seal provide sealing for the flexible unit.

Accessories Drive Shaft

7. An accessories drive shaft equipped with a quick disconnect coupling at each end transmits the drive from the engine bevel gearbox to the accessories input gearbox. A shear section is incorporated at the driving end of the shaft to protect the engine in the event of seizure in the accessories gearbox.

8. Each end of the shaft has serrated teeth and involute splines are machined on the outer surface. A two-piece, spring-loaded coupling nut is fitted on each end. See Fig 2. The coupling nut consists of an inner threaded section and an outer casing together with four steel locking balls, four dowels, a coil spring and a circlip. It is secured to the drive shaft by the circlip and is limited in its forward travel by the rear face of the involute splines.

ARROW 1 SERVICE DATA

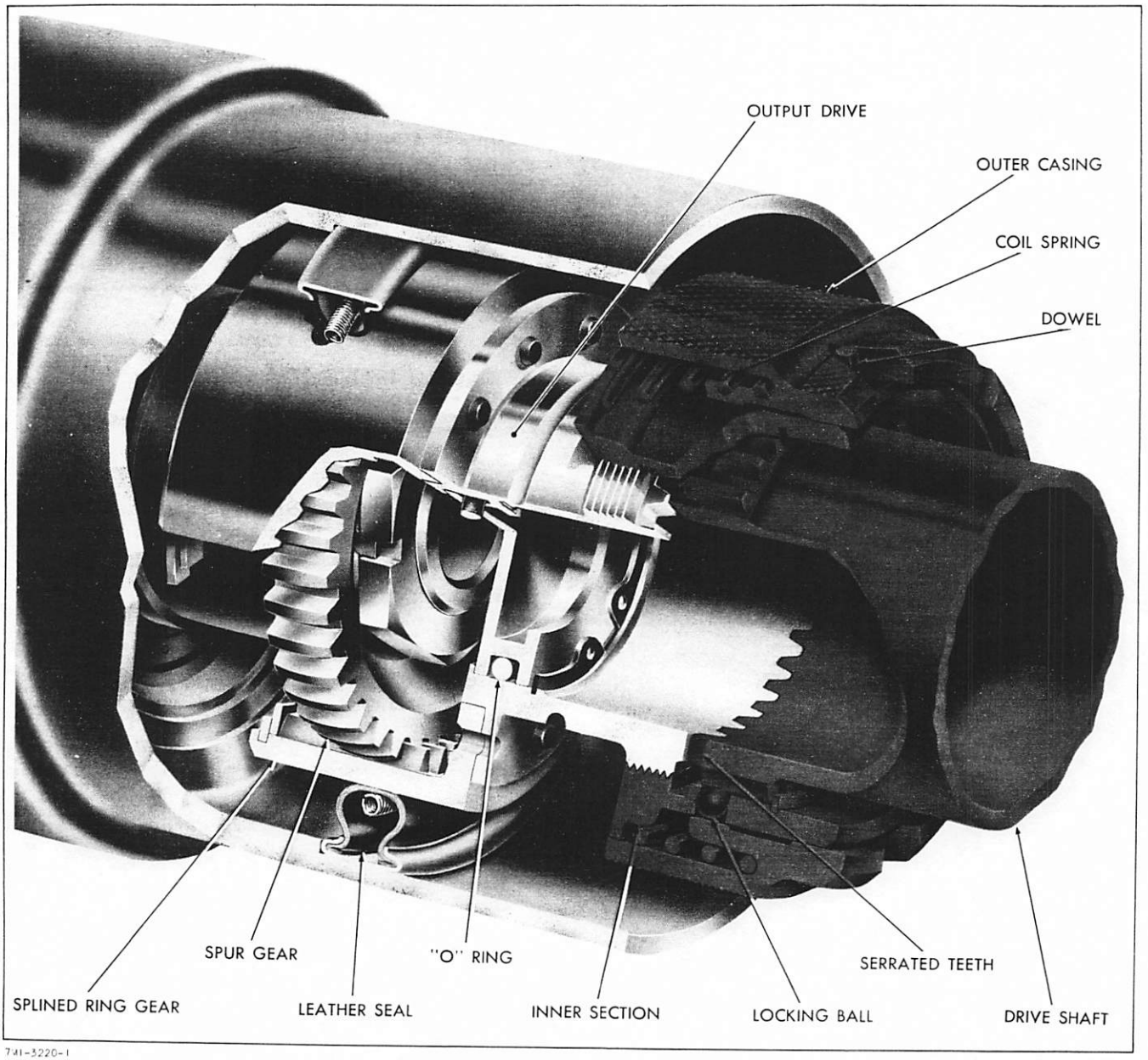

FIG. 2 FLEXIBLE DRIVE AND COUPLING

9. The coil spring assembled between the inner and outer casings of the nut forces the two sections apart and the four locking balls are brought into engagement with the drive shaft splines. This locks the shaft to the inner section of the nut which in turn is locked to the outer casing by the four dowels. When the coupling is disconnected, the outer casing is moved towards the gearbox. This compresses the spring and allows the balls to move into a grooved annulus in the outer casing. The coupling is then free to be unscrewed from the gearbox, the movement of the outer casing being transmitted to the inner threaded section by the four dowels.

Accessories Input Gearbox

10. The accessories input gearbox is driven from the accessories drive shaft. By means of

ARROW 1 SERVICE DATA

two bevel gears it changes the direction of the drive to the accessories gearbox through 90°. The drive is taken through a flexible input drive which is similar in construction to the output drive of the engine bevel gearbox. The shaft of the output bevel gear is splined at one end to mate with the female spline of the accessories gearbox input spur gear. The opposite end of the shaft mounts the drive gear of the main oil pump which is housed in this unit. The gearbox case also houses the main oil pressure relief valve.

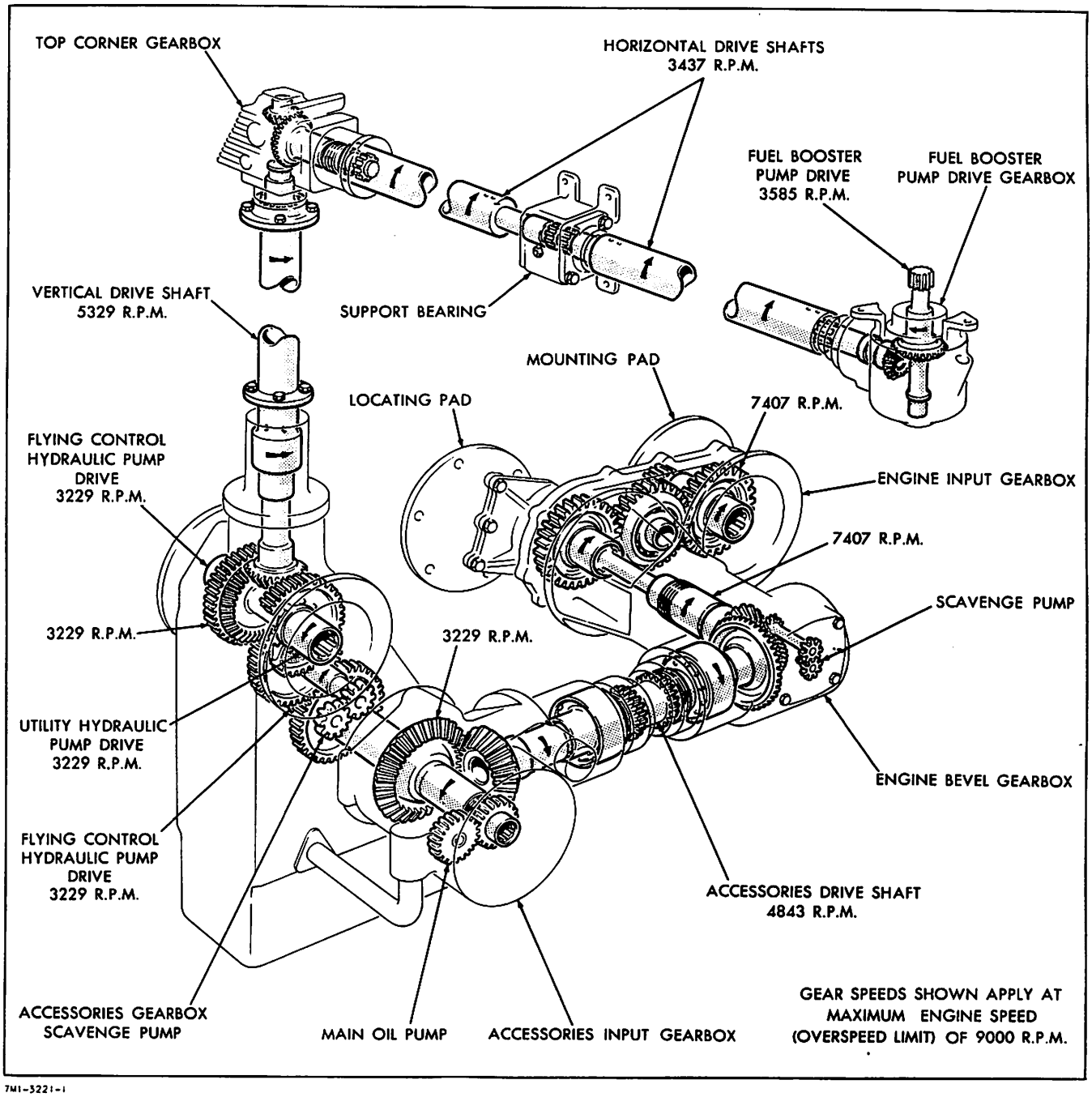

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FIG. 3 GEAR SPEEDS AND ROTATIONS

ARROW 1 SERVICE DATA

Accessories Gearbox

11. The accessories gearbox is secured to the structure, between the engines, in the hydraulic and equipment bay. It is fitted with five external driving flanges, two on the forward face, two on the rear face and one on top of the gearbox. Power for these driving flanges is derived through a train of internal spur and bevel gears, and shafting with splined output attachments. See Fig 3.

12. The forward upper flange powers the hydraulic pump serving the utility hydraulic system. The two rear flanges drive the two hydraulic pumps for the flying controls hydraulic system. The vertical drive shaft for the fuel booster pump is mounted onto and driven from the top flange.

13. The gearbox case is divided into a wet section and a dry section. The wet section forms a lubrication system reservoir with a capacity of approximately one gallon. An oil outlet line is provided from the reservoir to the main pressure pump. A quick disconnect pressure oil filling valve is mounted on the forward face of the gearbox. Adjacent to the filling valve is a sight filling gauge. A magnetic plug installed at the bottom of the gearbox permits draining and also aids in visual detection of excessive wear or failure of the gears or bearings.

Vertical Drive Shaft

14. The vertical drive shaft transmits the power from the top output flange of the accessories gearbox to the top corner gearbox. It is coupled in place with bolted flanges that permit easy installation and removal. When installed it has an end float of .75 inch.

Top Corner Gearbox

15. The top corner gearbox is mounted on the thrust beam of the front inboard engine suspension. It contains two meshed bevel gears which receive the transmitted power from the vertical drive shaft and change it to a horizontal output at reduced speed.

Horizontal Drive Shafts and Support Bearing

16. The horizontal fore and aft drive shafts transmit the drive from the top corner gearbox to the fuel booster pump drive gearbox. A support bearing mounted on a V-strut at station 592 provides a coupling and central support for the two shafts. The support bearing end of each shaft is fitted with a female splined drive and the other end a male splined drive. An internally splined support bearing accommodates both the male splines of the fore-and-aft drive shafts combining them in one single driving unit. The internally splined shaft of the support bearing is supported by two ball bearings housed in a casting. The housing is equipped with an alemite fitting for grease lubrication.

Fuel Booster Pump Drive Gearbox

17. The fuel booster pump drive gearbox is secured to the undersurface of the wing skin at station 552, immediately below the fuel booster pump. The gearbox houses two bevel gears that transmit the drive from the horizontal drive shafts to the fuel booster pump.

Alternator Constant Speed Drive Unit (Fig 4)

18. An alternator constant speed drive unit is mounted on the engine power take-off pad on the forward end of the N1 compressor shaft. The unit functions as a hydraulic differential transmission and maintains a constant output shaft speed of 8,000 rpm over a varying range of input speeds.

ARROW 1 SERVICE DATA

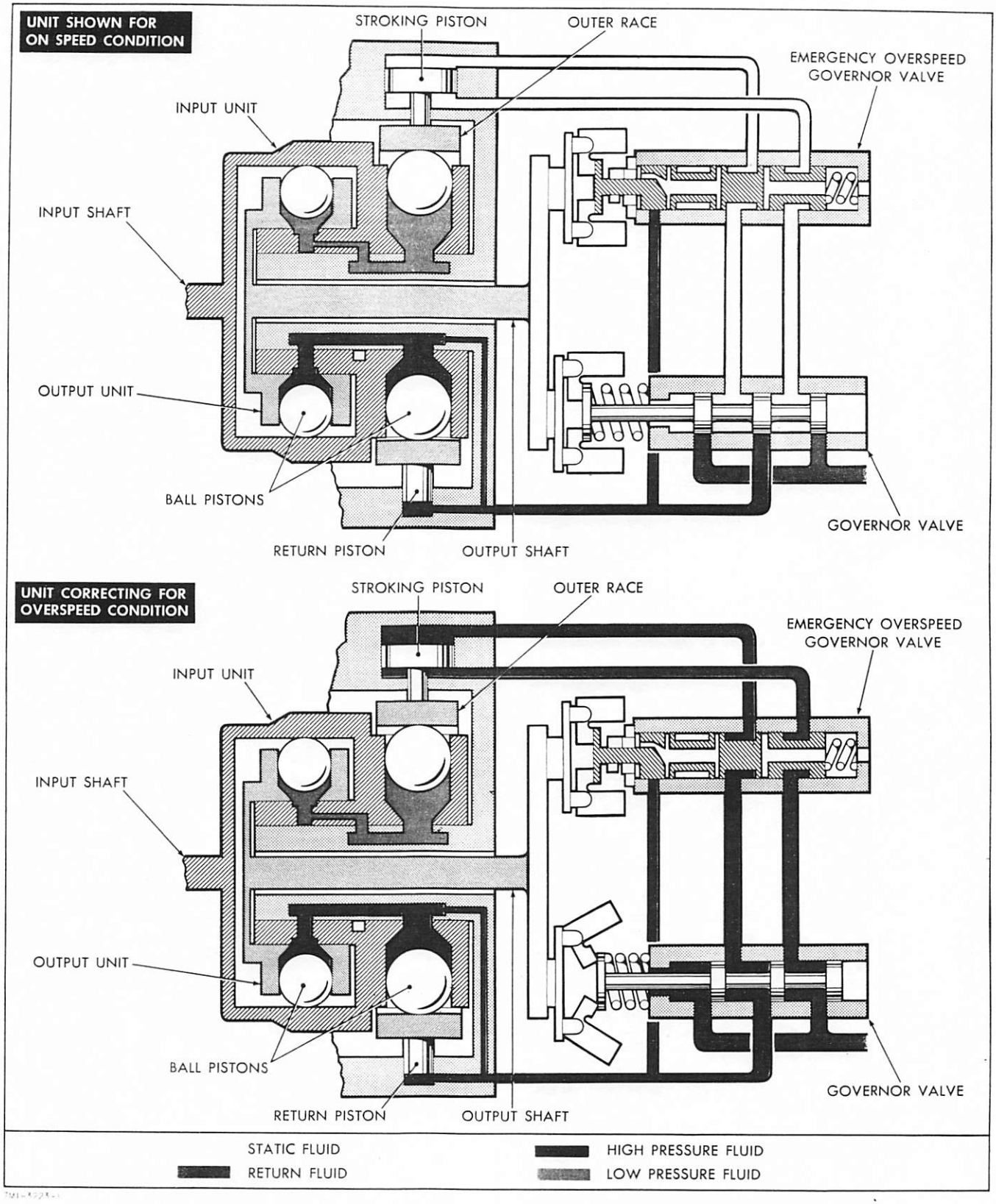

FIG. 4 ALTERNATOR CONSTANT SPEED DRIVE UNIT - SCHEMATIC

ARROW 1 SERVICE DATA

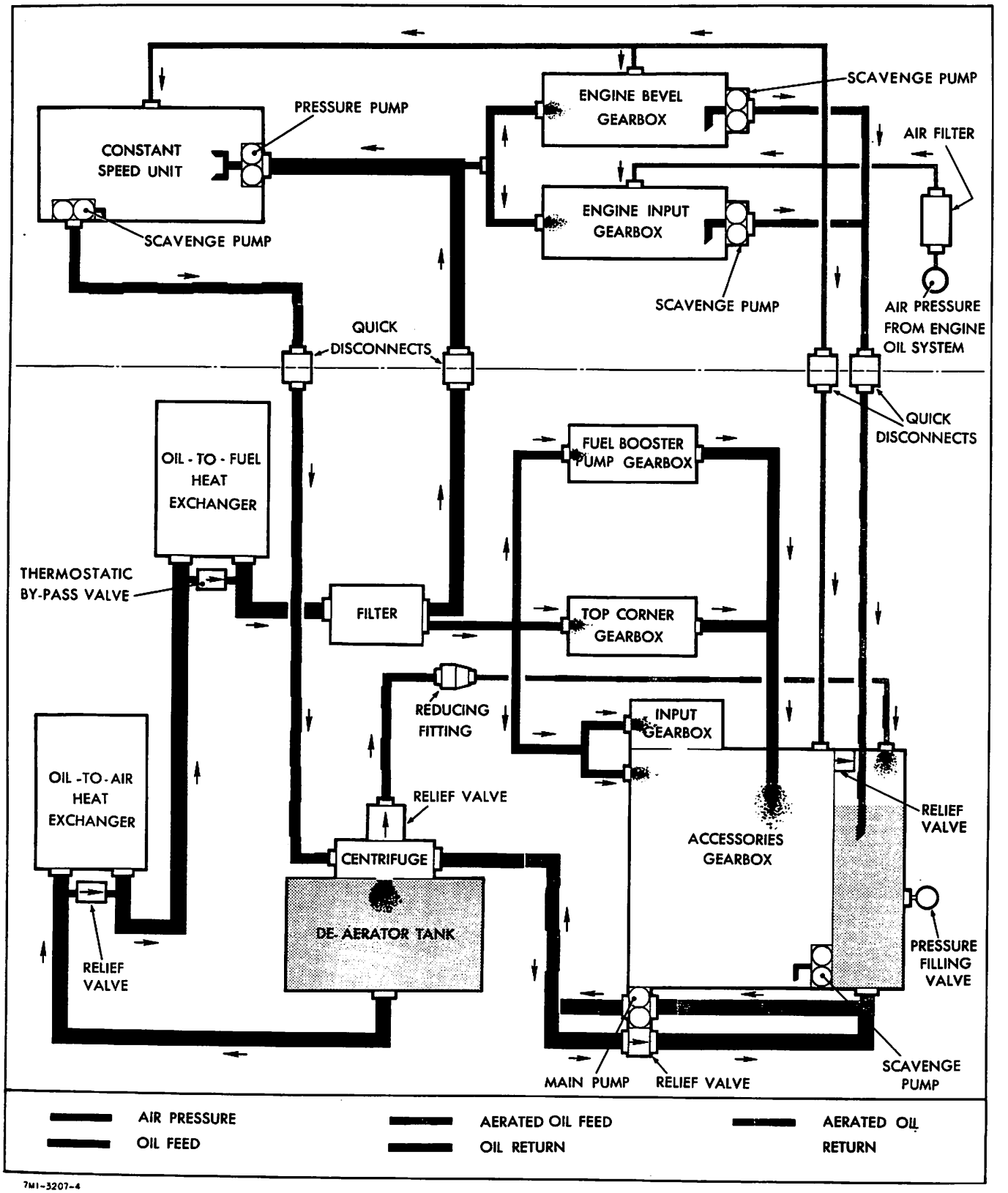

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FIG. 5 LUBRICATION SYSTEM - SCHEMATIC

19. The hydraulic constant speed drive is a single unit containing a hydraulic pump and a hydraulic motor. The pump is designated the input unit and the motor the output unit. The input and output units are of the radial ball piston type and employ a free floating ball in place of the conventional piston and connecting rod. A primary fly ball governor driven from the output shaft together with stroking pistons, positions the variable delivery input unit to govern the output speed. In the event of unsafe overspeeding an emergency overspeed governor reduces the output speed to a safe level.

20. The input and output units each consist of a cylinder block with seven cylinders and ball pistons. The input unit is a variable displacement type unit with the piston stroke governed by the position of an outer race. The ball pistons are held against the outer race by centrifugal force when the unit is operating. Positioning of the outer race is controlled by a stroking piston and a return piston.

21. The output unit receives hydraulic pressure from the input unit and converts this to mechanical power which is then transmitted from the output cylinder block to the output shaft. The output unit is a fixed displacement type motor which varies in speed when pressure fluid displacement from the input unit is varied.

22. A flyball type governor controls a spool type governor valve which directs pressure fluid to either side of the stroking piston, and so varies the input unit displacement when the fly-weights sense a speed variation.

23. The emergency overspeed governor is driven by the output shaft and consists of a mechanical flyball type governor and a spool type transfer valve. When unsafe overspeeding occurs the transfer valve is actuated and ports pressure fluid to move the stroking piston, thus reducing the displacement of the input unit and the output speed.

Lubrication System

24. Each accessories drive system is lubricated by a separate self-contained system. The system also supplies the constant speed unit with oil for lubrication and operation. An oil jet nozzle installed at the inlet port to each gearbox supplies a suitable oil spray pattern to the relative gears and bearings. The main accessories gearbox incorporates a series of oil jet nozzles that are connected to the inlet port by internal coring. The oil outlet of each gearbox is positioned above the lowest point of the casing to provide a small reservoir of lubricant during starting and initial running.

25. System pressure is maintained at 45 psi under normal conditions by the de-aerator tank relief valve. The volume of oil delivered to any unit is controlled by the size of the pipe supplying the jet and the viscosity of the oil. Pipe dimensions are varied throughout the system to suit the requirements of each component. The main oil pump is provided with a relief valve that relieves at 200 psi. If excessive pressures are produced within the system the valve relieves to by-pass the oil back to the inlet side of the pump.

Oil Feeds and Cooling (Fig 5)

26. Oil contained in the reservoir section of the accessories gearbox is drawn out through the main outlet pipe by the suction side of the main pump and forced by the pump to the centrifuge section of the de-aerator tank.

De-aerator Tank (Fig 6)

27. The de-aerator tank, fitted between the engines forward of the gearboxes, acts as an oil

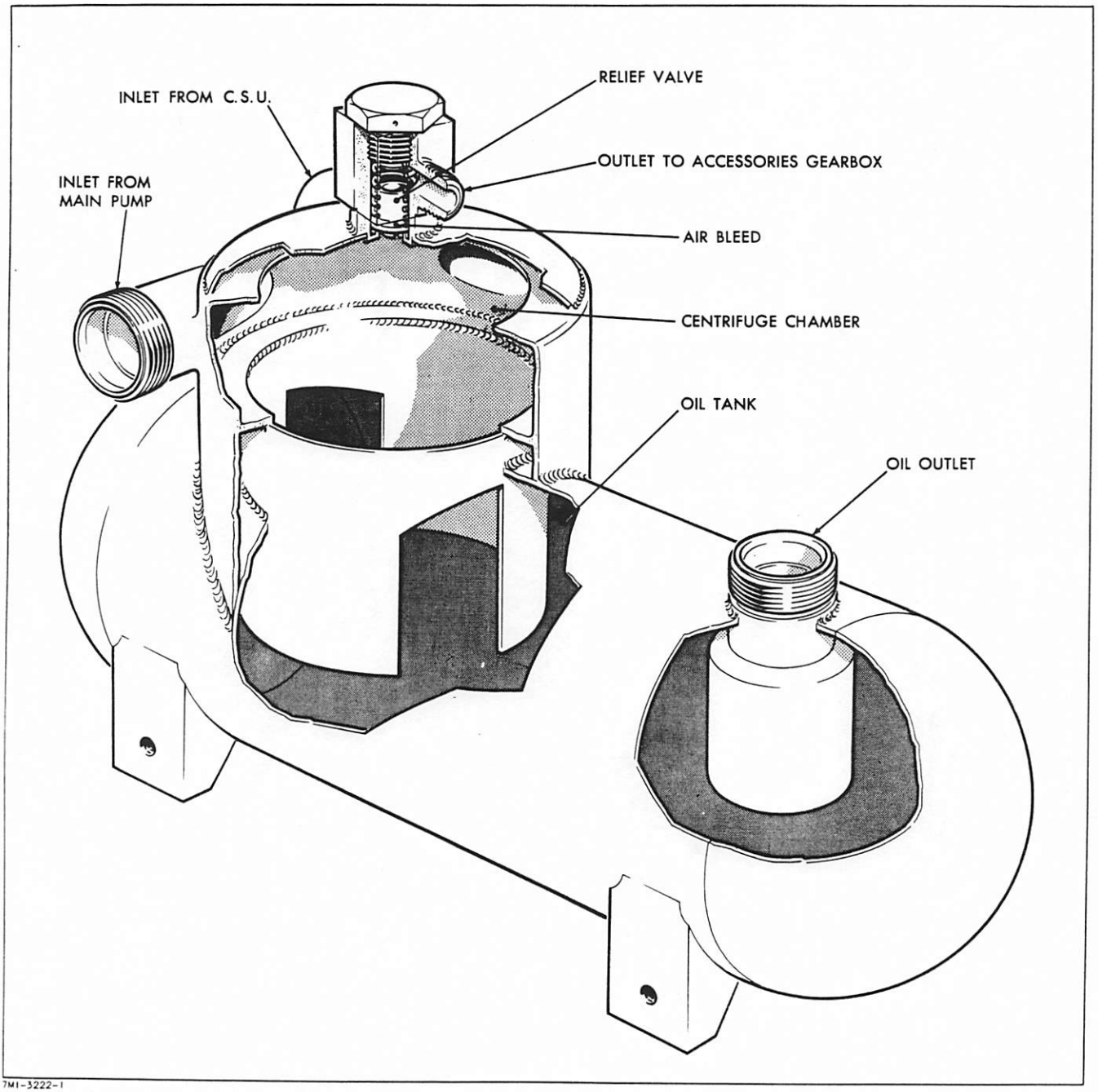

FIG. 6 DE-AERATOR TANK

and air separator, and also as an additional oil reservoir for the system. Air separation is achieved by ejecting the oil from twin jets into a centrifuge chamber. The centrifuge action of the oil in the chamber together with a partial settling of the oil into the reservoir section provides the required air and oil separation.

28. The unit comprises a tank section, a centrifuge, a pressure relief valve and a main oil outlet. The centrifuge section is hemi-spherical in contour with two jets, one of 3/4 inch

diameter and the other 1/2 inch diameter, arranged at the side of the centrifuge chamber at approximately 90° to each other. The 3/4 inch diameter jet receives the pressure flow from the main supply pump and the 1/2 inch diameter jet receives the scavenge flow from the constant speed unit. A pressure relief valve is mounted on top of the centrifuge chamber and relieves excess pressure.

29. The arrangement of the two jets in the centrifuge chamber imparts a swirling motion to the fluid within the chamber and induces the separation of the air from the oil. The purged oil is forced into the reservoir section of the tank and the air-oil accumulation in the upper portion of the centrifuge section bleeds steadily through a bleed hole in the relief valve back through a pipeline to the accessories gearbox reservoir. The relief valve operates at 45 psi to release any excess accumulation of air-oil that is beyond the scope of the normal bleed.

30. Impelled by main pump pressure, oil is forced from the reservoir section of the de-aerator tank to the oil-to-air heat exchanger.

Oil-to-Air Heat Exchanger

31. The oil-to-air heat exchanger is fitted beneath the engine air intake at station 577 and provides the initial oil cooling. A differential pressure relief valve and by-pass passages are incorporated in the component to permit a flow of oil to by-pass the cooling core under low temperature starting conditions or should the core become choked. Under normal operation the relief valve seals the by-pass passages and ensures the flow of oil through the cooling core and on to the oil-to-fuel heat exchanger.

Oil-to-Fuel Heat Exchanger

32. The oil-to-fuel heat exchanger is installed in the equipment bay at station 540. This unit is a section of a multiple heat exchanger and provides the oil system with a secondary oil cooler. Oil from the oil-to-air heat exchanger is received at the inlet of the oil-to-fuel unit and its passage through this unit is regulated by a thermostatically controlled by-pass valve which opens to allow oil through the cooling core when the temperature of the oil is raised beyond the cooling capacity of the oil-to-air unit. From the outlet port of the oil-to-fuel heat exchanger the oil is forced to a filter assembly which removes any foreign particles from the oil prior to its passage to the gearboxes and constant speed unit.

Filter Assembly

33. The filter assembly is installed between the engines forward of the gearbox. The bowl type filter has a 30 micron filter element and is equipped with a cut-off valve which seals off the inlet and outlet ports when the bowl and element are removed. A relief valve is fitted which opens and by-passes the filter element in the event of filter element blockage.

34. The assembly incorporates one inlet port and two outlet ports. Oil from the oil-to-fuel heat exchanger enters the inlet port, traverses the filter element and exits by two outlet ports of different diameters. The pipeline from the larger of the two outlet ports supplies the constant speed unit with oil for the operation of the hydraulic transmission and its self-contained lubrication system. A smaller diameter pipeline is taken from the constant speed unit supply, to lubricate the engine bevel and engine input gearboxes.

35. The smaller of the two filter outlets supplies the pressure oil to the spray jet nozzles of the accessories gearbox and accessories input gearbox. A second take-off from this pipeline supplies the top corner gearbox and the fuel booster pump gearbox.

ARROW 1 SERVICE DATA

Scavenge System (Fig 5)

36. The constant speed unit, engine bevel gearbox, engine input gearbox and the dry section of the accessories gearbox are fitted with individual scavenge pumps. The constant speed unit oil is scavenged back to the centrifuge section of the de-aerator tank by the constant speed unit scavenge pump. After separation it is forced into the reservoir section for recirculation through the circuit. Oil from the fuel booster pump gearbox, top corner gearbox and accessories input gearbox is scavenged by gravity to the dry section of the accessories gearbox, and transferred by a scavenge pump to the reservoir section. Scavenge pumps in the engine bevel and input gearboxes transfer oil from these units direct to the accessories gearbox reservoir section.

Breather System (Fig 5)

37. The accessories oil system is vented through a filter to a pipeline which is tapped into the engine breather system. Breather pipelines are taken from the filter to the accessories gearbox dry section, the engine input gearbox, the engine bevel gearbox, and the constant speed unit. The breather air under a controlled pressure ensures efficient operation of the systems oil pumps throughout the entire altitude range of the aircraft. The fuel booster pump gearbox and top corner gearbox are not fitted with scavenge pumps so are not vented.

38. A relief valve fitted between the reservoir and dry section of the accessories gearbox opens if the pressure in the dry section is 1 psi higher than that in the reservoir. It also acts as a non-return valve to prevent oil from the reservoir flooding the dry section under negative 'g' conditions.

PRIMING AND FILLING THE ACCESSORIES GEARBOX SYSTEM

39. Engine lubricating oil to Spec MIL-L-7808 is required for lubrication of the accessories gearbox system and operation of the alternator constant speed unit.

40. Ground equipment for servicing the system consists of a specialized oil trailer unit. This comprises a two wheel cart with a lug for power towing. The trailer mounts a reservoir, filter, hand pump and return dump valve. The pressure supply hose line incorporates a pressure coupling which couples to the pressure filling connection on the accessories gearbox.

41. On new installations, or whenever removal or replacement of any component in the system is necessary, the units to be installed should be primed to capacity with the specified lubricant before installation. This may be accomplished with the aid of a hand pump or filler can. Components that contain inhibitor fluid should be drained and flushed through with system oil prior to installation. When installed in the aircraft the de-aerator tank may be primed through the main outlet opening prior to connecting the main outlet line.

42. When the procedure described in para 41 has been completed the accessories gearbox oil reservoir should be filled to the correct level prior to motoring the engines. Access to the gearbox reservoir is through No. 2 service door. To fill the accessories gearbox reservoir, proceed as follows:

(a) Remove the protective caps from the gearbox pressure filling valve and trailer hose fitting.

(b) Connect the supply hose to the pressure filling valve.

ARROW 1 SERVICE DATA

(c) Operate the oil trailer hand pump until the correct level in the gearbox is attained. Check the oil level by reference to the gearbox sight level indicator.

(d) Disconnect the oil trailer supply hose line from the gearbox pressure filling valve and fit protective caps to the gearbox and hose connections.

(e) Motor the engine through two starting cycles, check the fluid level in the accessories gearbox by reference to the sight glass indicator and if necessary repeat operations (a) through (d).

43. For normal service requirements top up the system as per para 42 (a) through (d).

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Oil-to-Air Heat Exchanger	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2956-3 and 4			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Cools oil from the accessories gearboxes and constant speed unit.

LOCATION

Beneath the engine air intake adaptor ring station 577-581.

ACCESS

Engine must be removed to service this component. Access for limited visual inspection through cooling air exit.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Place heat exchanger in position and fit three mounting bolts.
Fit the slip joint and install four retaining nuts.
Connect up two oil lines with Wig-O-Flex couplings.
Install the engine.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the heat exchanger core and cooling air exit is unobstructed. Check for oil leaks. Check for security, corrosion and damage.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Engine Installation Equipment.

SPECIAL TOOLS TO REMOVE OR SERVICE

Wig-O-Flex Tools.

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Engine Input Gearbox	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2925-3	Sargeant Engineering	249EA	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

Transmits the drive from the starter to the engine and from the engine to the engine bevel gearbox.

LOCATION

Mounted on the engine accessories gearbox.

ACCESS

Through the engine number 1 access door
22 camloc fasteners and 7 latches.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Prime the engine input gearbox and engine bevel gearbox with lubricating oil.
Position the engine input gearbox on to the engine accessories gearbox power take-off pad and install, 12 locknuts and washers.
Install the engine bevel gearbox using six locknuts and washers.
Connect the accessories gear driveshaft to the engine bevel gearbox and the accessories input gearbox, two couplings.
Connect up three pipelines.
Check the accessories gearbox reservoir oil level and top up as required.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for security and leakage	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hand Oil Dispenser
Oil Trailer Unit

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Engine Bevel Gearbox	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2925-4	Sargeant Engineering	370EA-2	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

Transmits the drive from the engine input gearbox to the driveshaft and accessories input gearbox.

LOCATION

Mounted on the engine input gearbox.

ACCESS

	MEN X MINUTES	
Through the engine number 1 access door 22 camloc fasteners and 7 latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Prime the engine bevel gearbox with lubricating oil. Install the engine bevel gearbox to the engine input gearbox using six locknuts and washers. Connect the two couplings on the accessories driveshaft to the bevel gearbox and the accessories input gearbox. Connect up two pipelines. Check the accessories gearbox oil reservoir level and top up as required.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for security and oil leakage.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hand Oil Dispenser
Oil Trailer Unit

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Alternator Constant Speed Drive Unit	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2995-5	General Electric		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

To drive the alternator at a constant speed of 8000 RPM with an engine input speed range of 2250-7500 RPM.

LOCATION

Mounted on the engine power take-off pad on the forward end of N1 compressor shaft.

ACCESS

With the engine removed, remove the engine nose fairing forward section by releasing four coupling screws and two shear pins.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Prime the constant speed unit.
Install the constant speed unit to the compressor power take-off pad and secure with twelve retaining nuts.
Fit the right hand strut and connect the piping to the constant speed unit and adaptor ring connections.
Connect the electrical lead to the constant speed unit.
Install the alternator and secure with twelve retaining nuts.
Connect the electrical leads to the alternator.
Replace the engine nose fairing.
Proceed with the installation of the engine.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for security, damage, corrosion and signs of oil leaks from the constant speed unit and related piping.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hand Oil Dispenser
Engine Installation Equipment.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		De-aerator Tank	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2956-5 and 6	Dowty	XT-3095-1	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Separates air from the oil in the lubrication system.

LOCATION

On the fuselage floor, between the engines at station 581-586.

ACCESS

Through the hydraulic equipment access panel
52 camloc fasteners
and number 1 service door - 30 camloc fasteners
7 latches.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Install the de-aerator tank to the fuselage floor between the engines and secure with four mounting bolts.
Prime the tank through the main oil outlet boss.
Connect up four oil lines.
Check and top up the accessories gearbox oil reservoir as required.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for security and oil leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hand Oil Dispenser
Workstand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Accessories Input Gearbox	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2958-5	Sargeant Engineering	252EA	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

Transmits the drive from the driveshaft to the accessories gearbox and provides the lubrication system main oil pump and relief valve.

LOCATION

Mounted on the accessories gearbox.

ACCESS

	MEN X MINUTES	
Through the engine number 1 service door 30 camloc fasteners and seven latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Prime the unit. Mount the accessories input gearbox on to the accessories gearbox and secure with six nuts. Fit the driveshaft couplings to the gearbox and the engine bevel gearbox. Connect up the oil and air pipes. Check the accessories gearbox reservoir oil level and top up as required.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Inspect for damage, security and oil leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Hand Oil Dispenser
Oil Trailer Unit.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Accessories Gearbox	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2958-3 and 4	Sargeant Engineering	248EA 1 and 2	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

To transmit the drive from the accessories input gearbox to the hydraulic pumps and fuel booster pump drives.

LOCATION

Centre fuselage station 610-615.

ACCESS

Through the number 1 service door
30 camlocs and seven latches.
Through the number 2 service door
56 camloc fasteners.

MEN X MINUTES

REPLACEMENT PROCEDURE

Right and left hand accessories gearboxes must be assembled on to a pinned panel and installed in the aircraft together.
Position the gearboxes and pinned panel in the aircraft and secure with 46 screws.
Install the two vertical driveshafts.
Fit the accessories input gearboxes.
Fit the hydraulic pumps.
Install and connect the driveshafts from the engine to the accessories input gearbox.
Connect all oil, hydraulic and air pipelines.
Refill the accessories gearboxes with oil.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Inspect gearboxes and mounting for security and damage. Check the system for oil leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Oil Trailer Unit.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Top Corner Gearbox	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2958-6	Sargeant Engineering	251DA	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

Transmits the drive from the accessories gearbox to the fuel booster pump drive, with the required change of speed and direction.

LOCATION

Mounted on the thrust beam of the front inboard engine suspension at station 613.

ACCESS

Limited access through No 2 service door aperture.
56 camloc fasteners.
To remove and inspect it will be necessary to remove the front flying controls compensator, utility hydraulics accumulator and all relative pipe lines.

MEN X MINUTES

REPLACEMENT PROCEDURE

Position the top corner gearbox by matching the splines to the horizontal driveshaft and moving forward until mounting holes of gearbox and mounting bracket align.
Fit the three attachment bolts.
Install the pulley and engine controls at station 617 and tension the controls.
Install the vertical driveshaft and secure the coupling with four bolts.
Prime the unit before connecting the pipelines.
Connect the two oil lines.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Inspect for security of mounting, damage, corrosion and oil leakage.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 Stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Fuel Booster Pump Drive Gearbox	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2958-13 and 14	Sargeant Engineering	250DA 1 and 2	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

Transmits the drive from the horizontal driveshaft to the fuel booster pump.

LOCATION

On the wing undersurface at station 552 and fitted to each fuel booster pump.

ACCESS

Through hydraulic access door
52 camloc fasteners.

MEN X MINUTES

REPLACEMENT PROCEDURE

Install the top corner gearbox to the fuel booster pump and wing undersurface and secure with three retaining bolts.
Install the top corner gearbox, vertical and horizontal driveshafts with the support bearing.
Prime the units.
Connect the oil and air pipelines.
Check the level in the accessories gearbox reservoir and top up as required.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for security, damage, corrosion and oil leakage.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

B4 Stand.
Oil Trailer Unit.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Oil Filter	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2958-17	Parmatic Engineering Ltd.	P-122-4	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

To cleanse foreign particles from the accessories lubrication system.

LOCATION

Duct Bay, fuselage floor station 591-596.

ACCESS

MEN X MINUTES

Through number 1 service door
30 camloc fasteners
7 latches.

REPLACEMENT PROCEDURE

MEN X MINUTES

To replace the filter and bowl to the filter body:
Assemble the filter to the bowl by depressing and turning the element retaining plate until the filter is locked in position.
Position the filter and bowl to the body and turn a quarter of a turn. Engage the lock.
To install the filter complete to the aircraft:
Install the filter to the aircraft and secure with three attachment bolts.
Prime the unit.
Connect three oil lines.
Check the level in the accessories gearbox reservoir and top up as required.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Remove and inspect filter for contamination. Clean and replace filter element. Inspect for security, damage, corrosion and oil leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

Hand Oil Dispenser
Oil Trailer Unit.

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
Accessories Drives and Gearboxes		Driveshaft - Engine to Accessories Input Gearbox	29

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2958-7 and 8	Sargeant Engineering	396DA 1 and 2	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 600 hours

FUNCTION

Transmits the drive from the engine bevel gearbox to the accessories input gearbox.

LOCATION

At station 608 coupled between engine bevel gearbox and accessories input gearbox, LH and RH.

ACCESS

Through number 1 service door
30 camloc fasteners
7 latches.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Align the driveshaft to the flexible couplings of the engine bevel gearbox and the accessories input gearbox and engage the threaded quick connect nut.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Inspect for security and damage. Inspect the flexible couplings for serviceability.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Three inch "C" wrench.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 31

EJECTION SEAT MK C5

Classification cancelled/changed to.....

by authority of.....(date).....

Signature.....Rank.....

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ARROW 1 SERVICE DATA

LIST OF REVISIONS

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UNCLASSIFIED

ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The Martin-Baker Mk C5 ejection seat is an automatic ejection seat which enables the crew members to abandon the aircraft safely at all altitudes within the aircraft range. Ejection at ground level at speeds over 80 knots is possible due to the high ejection velocity and the rapid deployment of the parachute.

2 Each seat is ejected from the aircraft by pulling on a firing handle which pulls a protective face screen over the crew member's face, operates the cartridge operated canopy emergency system and then fires the cartridge operated seat ejection system. An alternative firing handle is located on the seat between the crew member's knees.

3 A barostatic control automatically separates the crew member from the seat and deploys his parachute at an altitude of 5000 metres (16,400 feet).

4 A g-control mechanism operates at all altitudes to delay the separation of the crew member from the seat and the deployment of his parachute until the horizontal velocity of the seat is such that the parachute will not be damaged by the opening shock.

5 Provision is made for automatic emergency operation of the UHF and IFF systems after the seat has been ejected.

6 A leg restraint strap with calf straps is provided to pull the crew member's legs against the front of the seat during the initial upward movement, and to hold them in this position until separation from the seat takes place.

7 A nylon harness retains the crew member in the seat until separation takes place, when it is used as the parachute harness.

8 A duplex drogue system is provided to control, steady and retard the seat after ejection until the crew member is separated from the seat.

9 The crew member's parachute is 24 feet in diameter and is stowed in a horseshoe shaped pack located behind the crew member's shoulders.

STRUCTURE

10 The seat structure consists of a framework of two main side beams bridged by three cross-beams.

11 The seat is mounted on rails on the ejection gun. A set of slipper pads is fitted to the inside of each of the two main side beams. Each set of slipper pads engages in a guide channel rail fitted on each outboard side of the ejection gun cylinder.

12 The top cross-beam is reinforced to receive the full thrust of the ejection gun. A scissor shackle is attached to the upper face of this beam. This shackle is the attachment point of the duplex drogue.

13 The central cross-beam supports a shoulder harness release lock and a harness inertia mechanism. A housing surrounding the lock provides a support for the horseshoe shaped parachute pack. The beam is stressed to prevent the crew member from being thrown forward in the event of a crash landing. Seat adjustment compensating cords are attached to this beam.

14 The lower cross-beam retains a seat securing strut which locks the seat pan in the desired vertical position.

15 The left-hand side beam carries the drogue gun, a seat latch mechanism, an ejection gun firing pin release mechanism and a seat pan raising lever and seat locking mechanism.

16 The right-hand side beam carries the time delay mechanism.

17 Fitted to the outer face of each side beam is a guide channel for the seat pan.

SEAT PAN AND SEAT RAISING MECHANISM

18 The seat pan is a riveted, sheet alloy structure forming a square pan with a sloping

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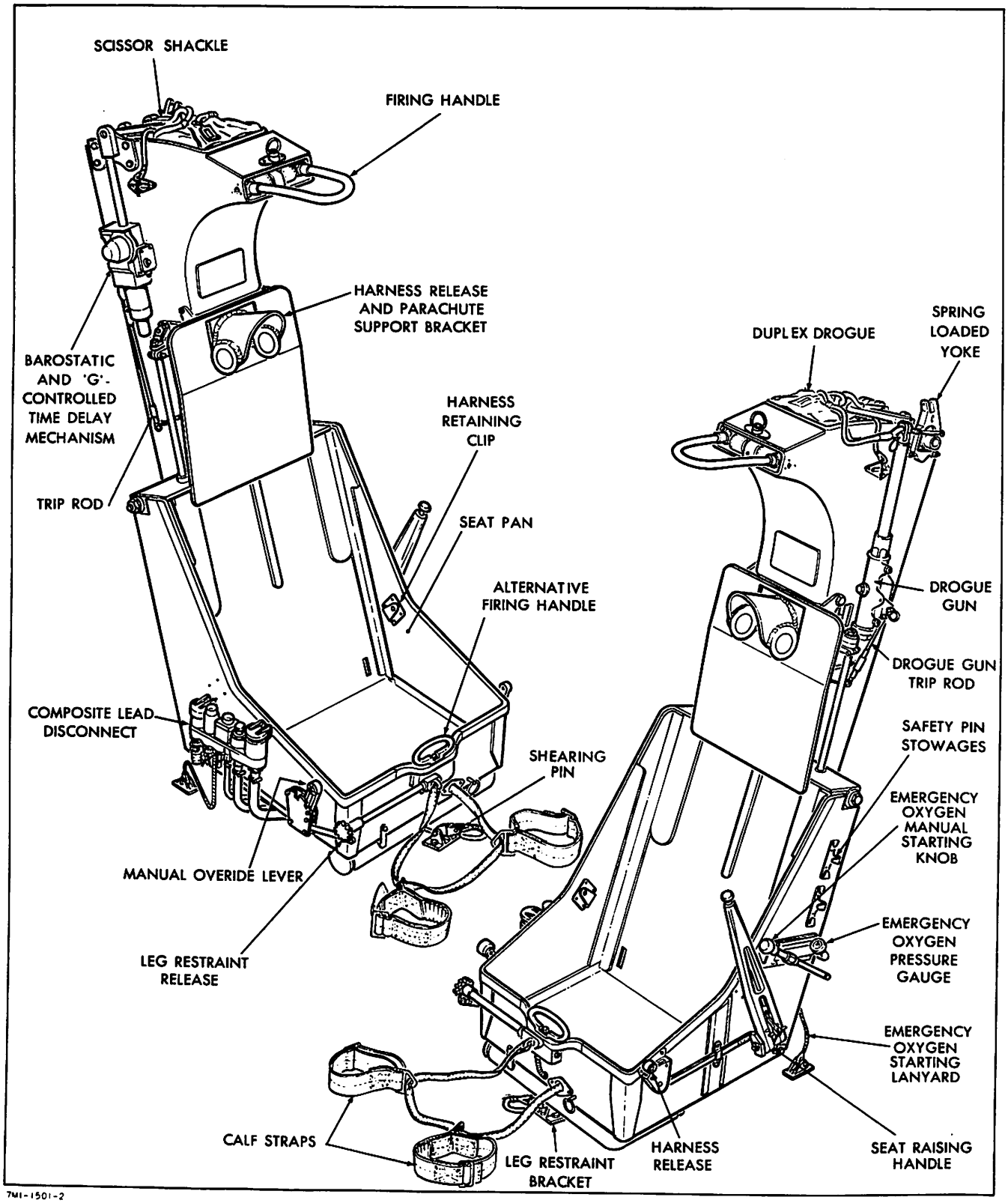

FIG. 1 EJECTION SEAT MK C5

backrest. The pan is supported by four sliding runners, closely fitted in guide channels attached to the main beams. The vertical position of the seat pan in relation to the seat structure can be adjusted and locked in seven positions. The adjustment is made by depressing a plunger on the end of the seat raising lever located on the left-hand side of the seat pan and moving the lever up or down to obtain the desired position. When the seat raising lever plunger is released a spring-loaded stop engages in one of several holes in a securing strip on the lower cross-beam. The weight of the seat pan, the crew member and his equipment is balanced by two rubber bungee cords. The lower ends of these cords are attached to brackets riveted to the back of the seat pan and the upper ends of the cords are attached to brackets on the centre cross-beam. There must be a load on the seat pan before the seat raising lever is operated, otherwise the seat pan may be damaged as it springs up to the top position under the action of the bungee cords.

19 An alternative firing handle is located on the front face of the seat pan.

20 A handwheel, operating a leg restraint release lock, and a manual override control lever, are located on the right-hand side of the seat pan.

21 A composite leads disconnect unit is located on the right-hand side of the seat pan. This unit acts as a junction box to supply the crew member with the following services:

(a) Oxygen supplied from the aircraft to the breathing mask and the partial pressure suit.

(b) Visor demisting.

(c) Tele/mic leads for intercommunication.

(d) Low pressure air to the anti-g suit.

(e) Emergency oxygen after the seat has been ejected.

22 A leg restraint snubbing unit and the emergency oxygen system are located on the underside of the seat pan.

23 A pressure gauge and a starting and charging valve for the emergency oxygen system are located on the rear face of the seat pan backrest.

24 A harness release lever is located on the left-hand side of the seat pan.

SEAT LOCKING MECHANISM

25 The seat locking mechanism is located at the top of the left-hand side beam. The mechanism consists of a spring-loaded locking plunger, passing through the side beam and the top cross-beam, which engages with a latch housing in the ejection gun outer cylinder. A chamfered end of the locking plunger engages in a breech groove on the ejection gun inner piston. A knurled cap unit compresses the plunger spring to maintain a positive engagement of the chamfered end of the locking plunger with the breech groove.

DROGUE GUN

26 A drogue gun is fitted to the top of the left-hand side beam. A trip rod, which has its lower end attached to the ejection gun, withdraws a sear from the gun when the seat is ejected from the aircraft. After a time delay of one half second, a spring-loaded striker is released which detonates a cartridge. The resultant gas pressure projects a steel piston upwards and withdraws a duplex drogue from a compartment in the headrest of the seat.

BAROSTATIC AND G-CONTROLLED TIME DELAY MECHANISM

27 A barostatic and g-controlled time delay mechanism is fitted to the top of the right-hand side beam. This unit automatically controls the following operations after ejection:

(a) The release of the crew member's harness from the seat.

(b) The release of the leg restraint.

(c) The opening of a scissor shackle to release the duplex drogue from the seat.

(d) The appropriately delayed automatic deployment of the crew member's parachute. This delay varies according to the forward speed of the aircraft at the moment of ejection.

28 On ejection from the aircraft, the time delay mechanism delays the deployment of the crew member's parachute until the seat has been stabilized by the two drogues and retarded to a safe speed for the opening of the parachute. The unit incorporates a train of gears regulated by an escapement and star wheel.

29 A barostatic control and a g-control mechanism remain in engagement with the star wheel if the seat is ejected at heights above 5000 metres (16,400 feet). When the seat reaches this height, the barostatic control withdraws a stop from a star wheel which permits the clockwork mechanism to operate for 1.3 seconds, providing the horizontal deceleration on the seat is less than 6g.

30 If ejection occurs at high speed at a height below 5000 metres (16,400 feet), a g-control mechanism imposes a restraint on the star wheel during ejection and horizontal deceleration. When the 'g' loading on the seat falls below 6g a spring-loaded toggle weight removes the restraint from the star wheel, permitting the clockwork mechanism to operate for 1.3 seconds. At the end of this time a spring-loaded shackle release plunger is allowed to descend rapidly under spring pressure.

31 The downward action of the shackle release plunger has the following three results:

(a) It removes the restraint imposed on the scissor shackle by the shackle release plunger, thereby permitting the scissor shackle to open and release the drogues from the seat. The drogues withdraw a pin from brackets on each side of the seat. This action disconnects the parachute restraining straps and the face screen from the seat.

(b) It strikes and depresses the trip lever of the harness release mechanism, which, in turn, releases the parachute harness from the seat and enables the link line to withdraw and deploy the parachute.

(c) It disconnects the seat portion from the crew member portion of the composite leads disconnect.

EJECTION GUN (Fig 2)

32 The ejection gun, which has a stroke of 72 inches, propels the seat upwards with an approximate velocity of 80 feet per second. The gun consists of three telescoping steel tubes as follows:

(a) An outer cylinder which is bolted to and forms part of the aircraft structure.

(b) An inner piston, which is attached to the seat and imparts the upward thrust during ejection.

(c) An intermediate piston, located concentrically between the inner piston and the outer cylinder.

33 Three cartridges are used to generate the gas required to extend the ejection gun, these are:

(a) A primary cartridge, housed in a breech in the upper end of the inner piston and fired by a spring-loaded firing pin in a firing body.

(b) Two secondary cartridges, each located in a housing on the outer cylinder and fired by the flame from the primary cartridge. Ports, uncovered by the upward movement of the inner and intermediate pistons, permit the passage of this flame.

34 The ejection gun is operated by the descent of a spring-loaded firing pin in a firing body. This action detonates the primary cartridge which causes the inner piston, together with the intermediate piston, to rise due to the pressure of the generated gases.

UNLOCKING OF THE EJECTION GUN (Fig 3)

35 The initial movement of the inner piston forces the spring-loaded locking plunger out of the breech groove, back into the latch housing. The inner piston continues to rise, thrusting against the top cross-beam of the

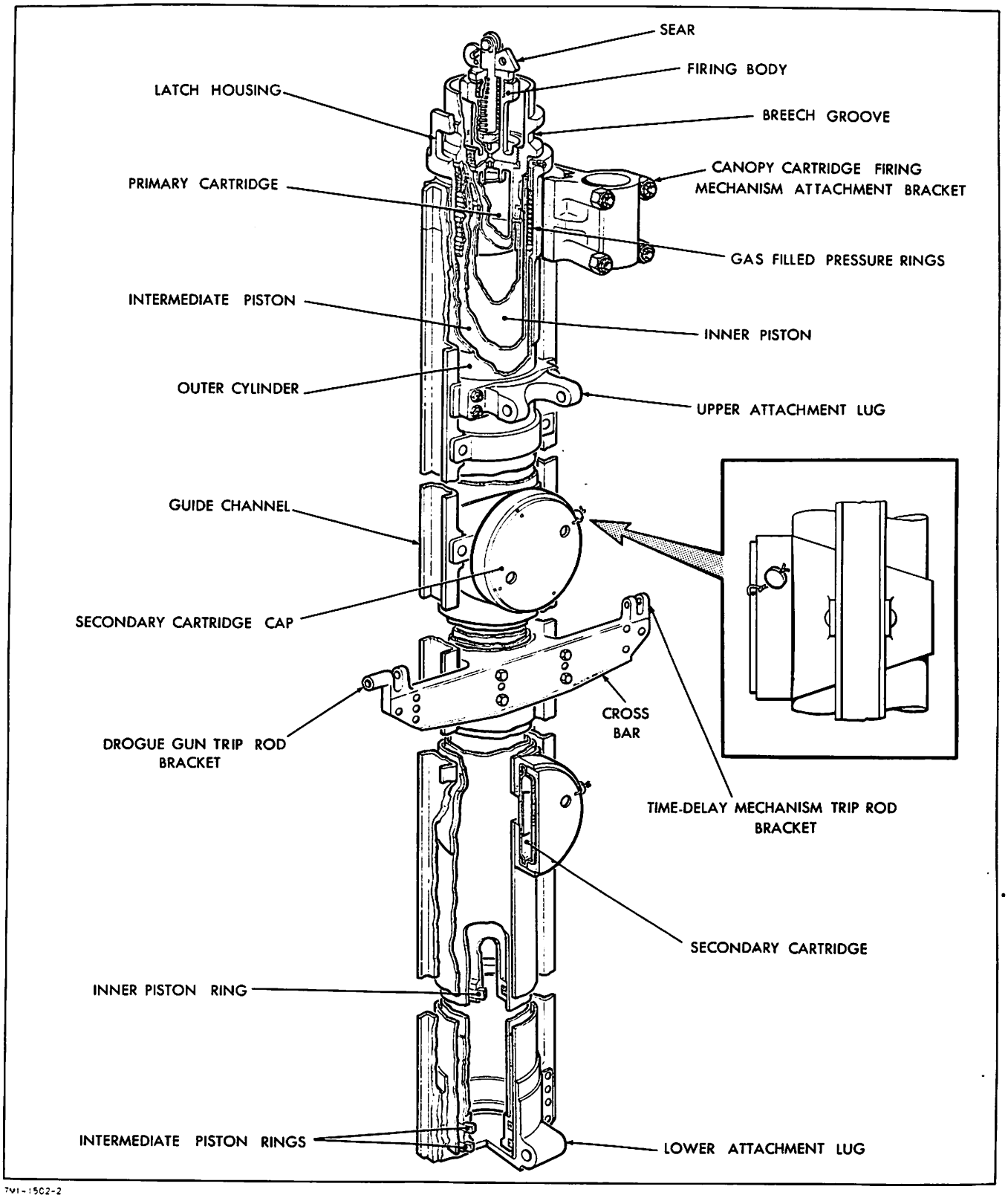

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FIG. 2 EJECTION GUN

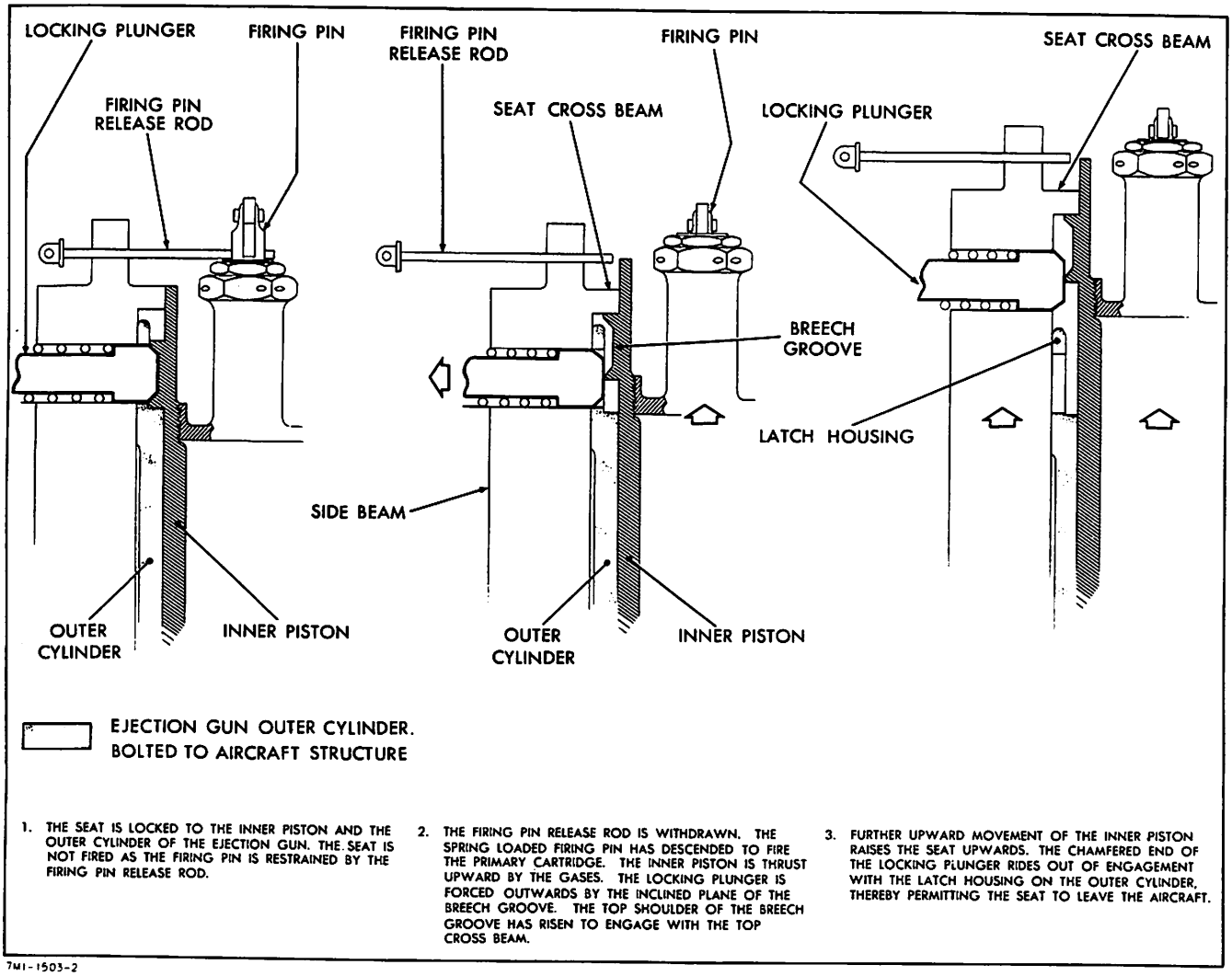

FIG. 3 EJECTION SEAT UNLOCKING MECHANISM

seat and moving it upwards. The upward movement of the seat causes the chamfered end of the spring-loaded locking plunger to move outwards and disengage from the latch housing on the top of the outer cylinder, completely unlocking the seat from the outer cylinder.

36 After 14 inches of movement, a port is uncovered which permits the flame from the primary cartridge to ignite the lower secondary cartridge. A further movement of 17 inches uncovers a second port which enables the flame to ignite the upper secondary cartridge. The inner and intermediate pistons continue to rise until the intermediate piston is stopped by a flange on the outer cylinder. The resultant shock is cushioned by twelve gas-filled pressure rings. The inner piston continues to rise, together with the seat and the crew member, until it parts from the intermediate piston.

DUPLEX DROGUE

37 The duplex drogue system employs a small controller drogue and a larger main stabilizer drogue. The controller drogue, when deployed by the drogue gun piston, tilts the seat into a horizontal attitude and then pulls the main drogue out of its container. This horizontal flight path reduces the height loss to a minimum.

38 Between the controller and the main drogue is a long nylon line which allows the

controller drogue to be fired clear of the seat wake. The nylon line also allows a delayed extraction of the main drogue in order to apply deceleration progressively along the line of the seat axis.

39 The drogues and their shroud and withdrawal lines are packed into a container at the top of the seat.

THE HORSESHOE PARACHUTE PACK

40 The parachute pack is a horseshoe shaped back type pack which is tapered to fit the crew member's shoulders. This shape permits a clean extraction of the canopy, and also permits the seat occupant to sit well back in his seat.

41 Automatic deployment of the canopy is effected by an extension line attached to the main drogue. This drogue withdraws the pack pin and extracts the canopy from the pack. A manual override is provided which is connected to an additional D-ring on the rip-cord assembly. This D-ring, when used in conjunction with the manual override control on the ejection seat, disconnects the automatic attachment and enables the crew member to leave the seat. A normal descent can then be made using a standard D-ring to open the parachute.

42 The parachute used with the horseshoe pack is a standard Irvin 24 foot diameter canopy.

AUTOMATIC LEG RESTRAINT

43 The leg restraining gear consists of a reinforced nylon strap, one end of which is attached to the cockpit floor by a special roller bracket. A light alloy shear pin passes through the centre of the roller and the bracket. The shear pin fails at the load required to hold the legs of the crew member against the forward edge of the seat pan during ejection. The other end of the nylon strap is passed through a snubbing unit attached to the underside of the seat pan and then through metal D-rings fitted to calf straps which are buckled just below the knees of the crew member. The end of the nylon strap is then attached to a release lock located on the front face of the seat pan.

44 The nylon strap is arranged to permit free movement of the crew member's legs while seated in the ejection seat. On ejection, the strap tightens between the snubbing unit and the harness release lock. This action automatically withdraws the crew member's legs to the front face of the seat pan, where they are firmly held until the nylon strap is released by the release lock when the crew member is separated from the seat.

LEG RESTRAINT RELEASE LEVER

45 A manually operated leg restraint release is fitted on the front face of the seat pan. The release is operated by a part turn of a hand wheel, located at the front of the right-hand side of the seat pan.

HARNESS RELEASE MECHANISM

46 A crew member, during normal flight, is able to lean forward by operating a harness release lever, located on the left-hand side of the seat pan. Movement of this lever rotates a snubbing shoe away from a nylon strap at the harness upper release point. Attached to one end of the nylon strap is a spring-loaded harness reel which allows the harness to move forward and away from the seat structure when the harness release lever is operated. There is always a free return movement to the back position, but the snubbing shoe locks the nylon strap against forward movement in any position unless the harness release lever is operated.

MANUAL OVERRIDE CONTROL

47 In the event of a failure in the automatic separation mechanisms on the ejection seat, a manual override lever is provided. When this lever is pulled to the rear it operates, through linkages, the following services:

(a) Releases the parachute harness and parachute from the seat.

(b) Releases the leg restraint strap from the seat.

(c) Disconnects the crew member portion from the seat portion at the composite leads disconnect.

ARROW 1 SERVICE DATA

EMERGENCY OXYGEN SYSTEM

48 An emergency oxygen system is located beneath the seat pan to provide the crew member with oxygen while descending from very high altitudes to the height where separation takes place.

49 The emergency system consists of a storage bottle, an oxygen regulator, a starting and charging valve, and a pressure gauge. The storage bottle is L-shaped and has a capacity of 53 cubic inches. The bottle and the regulator are located beneath the seat pan. The starting and charging valve, and the pressure gauge are located behind the back rest of the seat pan.

50 When the seat is ejected from the aircraft a lanyard attached to the cockpit floor operates a starting valve. This valve permits the oxygen from the cylinder to be fed through a double non-return valve to the oxygen regulator. The regulator regulates the supply pressures for the breathing mask and the partial pressure suit.

51 The emergency oxygen system may be started manually by pulling upwards on a round knob located at waist height on the left-hand side of the seat pan.

OPERATION

52 In an emergency, the crew member grasps the firing handle with both hands and pulls the face screen down over his face. This withdraws the sear from the canopy cartridge firing mechanism firing pin and the sear from the seat ejection gun firing pin. The firing pin in the seat ejection gun is prevented from descending to fire the cartridge at this time by a release rod passing through it.

53 A telescopic link is attached to the LH canopy half shell and to a yoke mounted on the LH side of the ejection seat. This yoke is maintained in position by a cotter pin. When the canopy has passed the normal open position, the telescopic link reaches its full extension, shears the yoke cotter pin and pulls the yoke outwards. The ejection gun firing pin release rod is attached to the yoke and is withdrawn from the firing pin by the movement of the yoke. At approximately 41° of canopy opening the release rod is completely withdrawn, allowing the ejection gun firing pin to descend and detonate the ejection gun primary cartridge.

54 The final movement of the canopy shears a copper washer in the telescopic link, disconnecting it from the seat.

55 One half second after the seat leaves the aircraft, the drogue gun fires, withdrawing the controller drogue from the container. The controller drogue tilts the seat into a horizontal position and withdraws a nylon line attached to the main stabilizer drogue. The main stabilizer drogue stabilizes and decelerates the seat.

56 If ejection has taken place above 5000 metres (16,400 feet) the seat will descend until this height is reached, when the barostat operates, provided the deceleration of the seat has fallen below 6 g. The barostat withdraws a stop from a star wheel in a gear train, permitting a clockwork mechanism to operate for 1.3 seconds. At the end of this time a plunger is released and descends rapidly under spring pressure to perform four functions:

(a) Permits the scissor shackle to open and release the drogues from the seat.

(b) Releases the parachute harness from the seat.

(c) Disconnects the seat portion from the crew member portion of the composite leads disconnect.

(d) Releases the leg restraint straps.

57 If ejection has taken place below 5000 metres (16,400 feet) the barostat stop will be withdrawn and restraint is imposed on the mechanism by a g-controller. When deceleration falls below 6 g, movement of a spring-loaded toggle weight removes restraint from the star wheel, allowing the clockwork mechanism to operate as described in para 56.

58 The result of these actions is that the seat falls away from the crew member and a link line attached to the main stabilizer drogue

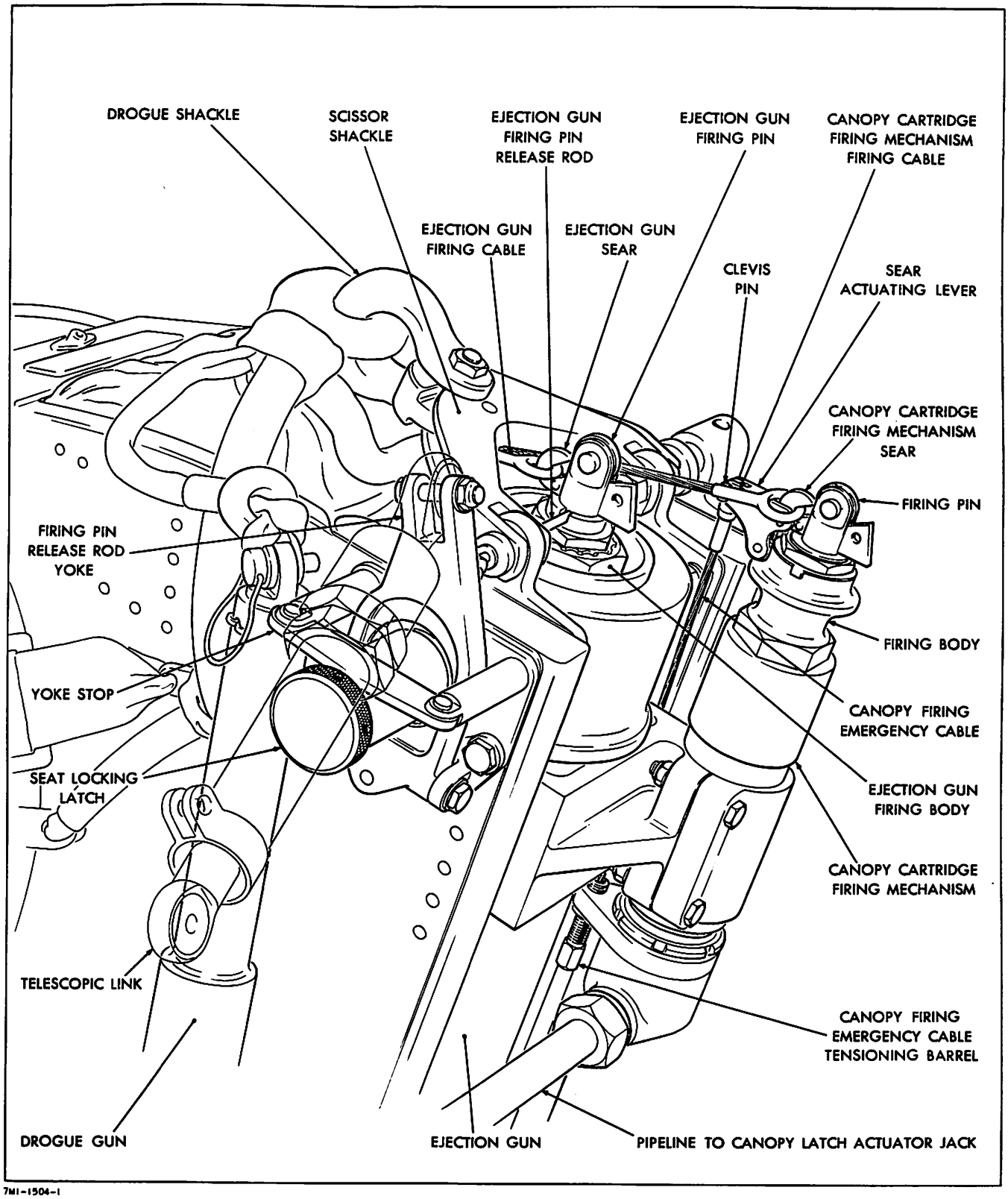

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FIG. 4 EJECTION SEAT AND CANOPY FIRING MECHANISM

shackle withdraws the crew member's parachute from the horseshoe shaped pack, allowing the crew member to make a normal parachute descent.

SAFETY PROCEDURES

59 Each ejection seat is provided with the following safety pin and warning disc assemblies:

(a) A safety pin assembly consisting of:

(1) A quick-release safety pin which is used to lock the face screen firing handle to the front of the face screen container or alternatively, is used to prevent the inadvertent withdrawal of the canopy cartridge firing mechanism sear.

(2) A spring-type safety pin, which is used to prevent the inadvertent withdrawal of the ejection gun firing body sear.

(b) A quick-release safety pin, which is inserted in the safety lock of the drogue gun body.

(c) A quick-release safety pin, which is used to prevent the inadvertent withdrawal of the alternative firing handle.

60 Immediately before flight, the ejection gun firing body sear safety pin and the canopy cartridge firing mechanism sear safety pin must be removed, the drogue gun safety pin must be removed and the alternative firing handle safety pin must be removed.

61 These safety pins should be shown to, and acknowledged by, the crew member. The safety pins should then be stowed in the clips located on the left-hand side of the seat pan.

62 On completion of flying, the safety pins should be inserted in their respective safety positions on the ejection seat.

63 If any work is to be carried out on the ejection seats, they must be disarmed in accordance with the instructions given in para 64.

TESTING AND SERVICING

DISARMING THE EJECTION SEAT AND THE CANOPY

64 To disarm the ejection seat and canopy, proceed as follows:

NOTE

The front seat should be disarmed first and the rear seat should be disarmed last. The operator should not, at any time, position his body above the drogue gun or the ejection seat during the ejection seat disarming procedure.

(a) Ensure that a safety pin is inserted in the sear of the ejection gun firing body, the sear of the canopy cartridge firing mechanism, the safety lock of the drogue gun and the alternative firing handle.

(b) Withdraw the quick-release pin from the drogue gun trip rod bracket located on the cross-beam at the rear of the ejection gun. The trip rod will be swung forward by the bungee cord which is attached to the seat structure. Replace the quick-release pin in the bracket. Disconnect the bungee cord from the trip rod.

(c) Disconnect the controller drogue withdrawal line shackle from the lug at the top of the drogue gun piston by removing the nut and bolt. Replace the nut and bolt in the withdrawal line shackle.

(d) Remove the two self-locking nuts securing the drogue gun to the left-hand side beam.

(e) Remove the drogue gun from the two studs on the side beam. Replace the nuts on the studs.

(f) Remove the bolt and self-locking nut from the firing pin release rod yoke. Permit the telescopic link to move upwards and clear of the yoke mechanism.

(g) With the safety pin in position in the sear of the canopy cartridge firing mechanism,

press the sear forward and remove the eye of the firing cable from the hook of the sear. Allow the sear to return to its normal position.

(h) With the safety pin in position in the ejection gun firing body sear, press the sear forward and disconnect the eye of the firing cable from the hook of the sear. Permit the sear to return to its normal position.

(j) Break and remove the lead-sealed locking wire from the top of the ejection gun and the firing body. Remove the locking wire completely from the aircraft.

(k) Remove the nut and bolt securing the firing pin release rod to the yoke, and withdraw the release rod through the aperture in the yoke.

(m) Carefully remove the safety pin from the sear of the ejection gun firing body and unscrew the firing body from the ejection gun using the special wrench MBEU/6146.

(n) Remove the primary cartridge from the breech of the ejection gun by using the extractor tool MBEU/5826. Replace the firing body in the ejection gun.

(p) Replace the safety pin in the firing body sear.

(q) Break and remove the lead-sealed locking wire from the firing body and the body of the canopy cartridge firing mechanism. Remove the locking wire completely from the aircraft.

(r) Remove the 1/16 inch cotter pin from the clevis pin in the sear actuating lever. Remove the clevis pin to disconnect the canopy emergency firing cable from the sear actuating lever.

(s) Carefully remove the safety pin from the sear of the firing body. Using the special wrench, unscrew the firing body from the breech of the canopy cartridge firing mechanism.

(t) Remove the canopy cartridge using the extractor tool MBEU/5826.

(u) Replace the firing body in the canopy cartridge firing mechanism.

(v) Replace the safety pin in the firing body sear.

(w) Connect the canopy emergency firing cable to the sear actuating lever and insert the clevis pin. Insert a 1/16 inch cotter pin in the clevis pin.

REMOVING THE EJECTION SEAT FROM THE AIRCRAFT

WARNING

The ejection seat must be disarmed before any attempt is made to lift it from the aircraft. See para 64.

65 To remove an ejection seat from an aircraft, proceed as follows:

(a) Remove the survival pack from the seat pan.

(b) Withdraw the quick-release pin that secures the time-release mechanism trip rod to the aircraft structure.

(c) Withdraw the quick-release pin securing the leg restraint strap to the pulley bracket on the cockpit floor.

(d) Disconnect the composite leads disconnect unit and cover the aircraft portion of the unit with a cloth bag to protect it from dirt, swarf, etc.

(e) Disconnect the emergency oxygen starting lanyard from the cockpit floor by removing the quick-release pin from the bracket.

(f) Replace the quick-release pin in the bracket.

(g) Ensure that the UHF and IFF circuit breakers on the circuit breaker console are pulled out.

(h) Withdraw the seat latch by breaking and removing the lead-sealed locking wire and unscrewing the knurled nut as far as possible using the tommy bar provided on the seat for this purpose.

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(j) Lift the seat up until it is clear of the guide rails on the ejection gun, otherwise the rail slippers may be distorted.

NOTE

Do not lift the seat by either of the red firing handles.

(k) Seal all service connections to prevent the ingress of dust and foreign matter.

(m) Place the ejection seat on rubber matting or other suitable material to protect the seat from damage.

REMOVING THE EJECTION GUN FROM THE AIRCRAFT

66 The removal of the ejection gun is only necessary if the cartridges are time expired or the ejection gun requires servicing. To remove the ejection gun from the aircraft, proceed as follows:

(a) Disarm the ejection seat. See para 64.

(b) Remove the seat from the aircraft. See para 65.

(c) Disconnect the canopy cartridge firing unit from the ejection gun, proceeding as follows:

(1) Slacken the canopy emergency firing cable by unscrewing the tensioning barrel located at the base of the canopy cartridge firing unit.

(2) Remove the four bolts connecting the canopy cartridge firing unit to the ejection gun.

(3) Temporarily secure the canopy cartridge firing unit to the cockpit rear bulkhead.

(d) Remove the top pick-up bolt and tilt the ejection gun forward to clear the canopy emergency mechanism.

(e) Remove the lower pick-up bolt and remove the ejection gun from the aircraft.

REMOVING THE SECONDARY CARTRIDGES FROM THE EJECTION GUN

NOTE

The removal of the secondary cartridges is only necessary if the cartridges are time-expired, otherwise they may be left in position in the gun.

67 To remove the secondary cartridges from the ejection gun, proceed as follows:

(a) Place the ejection gun on a clean bench and break the locking wire on the side of the upper secondary cartridge housing.

(b) Unscrew the cartridge cap using the special wrench.

(c) Remove the cartridge and loosely replace the cartridge cap.

(c) Repeat the procedure for the lower secondary cartridge.

NOTE

The bench should be covered with a linoleum or rubber top.

REMOVING THE HORSESHOE PARACHUTE PACK FROM THE SEAT

NOTE

It is not necessary to remove the seat from the aircraft for this operation.

68 To remove the parachute pack from the seat, proceed as follows:

(a) If the seat has not been disarmed, ensure that safety pins are inserted in the ejection gun sear, the canopy cartridge firing mechanism sear and the safety lock of the drogue gun.

(b) Disconnect the two quick-release connections and remove the survival pack from the seat pan.

(c) Disconnect the parachute restraining straps at their adjustment buckles.

(d) Pull out each harness restraining strap from the clip located on the inside of each side panel of the seat pan.

(e) Pull the manual override lever to the rear and remove each harness lug from the lock located at each inside corner of the seat pan.

(f) Lift the parachute pack and harness from the central support bracket.

(g) Remove the parachute from its case and inspect for damage or deterioration.

REPACKING THE DUPLEX DROGUE

69 To repack the duplex drogue into the ejection seat headrest, proceed as follows:

(a) Ensure that the ejection seat has been disarmed. See para 64.

(b) Break the safe-tie thread and withdraw the flap securing pin.

(c) Raise the scissor shackle, untie and remove the tethering cord from the drogue shackle.

(d) Fold back the four flaps and open the protective sleeve and withdraw the controller and main drogues.

(e) Examine the drogues, shroud lines, withdrawal lines and attachments for damage or deterioration.

(f) Clean the inside of the drogue container and check that no burrs are present.

(g) Roll the protective sleeve downwards and outwards to avoid obstructing the packing of the larger main drogue.

(h) Hold the main drogue at its periphery, and extend the shroud lines from the drogue shackle. Ensure that they are not entangled.

(j) Pair off the shroud lines so that the top pair at the periphery are an adjacent pair at the nylon sleeve.

(k) Starting at the top of the periphery of the drogue, fold it into double folds, so that each pair of shroud lines comes between the edges of the folds.

(m) Before stowing the main drogue in the container, insert the main drogue shroud lines into the container, commencing with the nylon sleeved end. Fold in the remaining shroud lines from left to right.

NOTE

The nylon sleeved end of the shroud line should emerge from the rear right-hand corner of the drogue container.

(n) Stow the main drogue, concertina fashion, periphery downwards, well down into the container.

(p) Unroll the protective sleeve and fold it to enclose the main drogue so that the main drogue withdrawal line emerges from the right-hand rear corner of the drogue container.

(q) Hold the controller drogue at its periphery and extend the shroud lines. Ensure that they are not entangled.

(r) Pair off the shroud lines, repeating the procedure carried out for the main drogue and fold the controller drogue into three single folds.

(s) Fold the main drogue withdrawal line into approximately seven folds and place it on top of the protective sleeve, well to the front of the container. Loop the controller drogue shroud lines so that they cover the remaining area of the protective sleeve.

(t) Lay the controller drogue in the container so that the apex of the drogue is towards the left-hand side of the container.

(u) The controller drogue withdrawal line should emerge from the rear of the left-hand side of the drogue container and should extend sufficiently to expose three inches of line on

the drogue side of the flap securing pin. Fold any surplus line under the controller drogue.

(v) Close the four flaps in the order - right, left, rear and front, ensuring that the wire loop engages in each flap eyelet.

(w) Insert the flap securing pin through the wire loop and into the pocket on the front flap.

(x) Push the scissor shackle down on top of the flaps. Tie the scissor shackle to the flap securing pin using a length of tethering cord. Tie the cord with a reef knot.

CAUTION

Ensure that the tethering cord is threaded under the flap securing pin and not through it. When the flap securing pin is withdrawn, the shackle must be free to rotate upwards.

(y) Re-stow the face screen as described in para 70.

(z) Safe-tie the flap securing pin to the fabric loop on the front flap using No. 8 parachute thread. Lead seal the thread.

CAUTION

Ensure that the drogue withdrawal line is looped over the link line and that the withdrawal line is free to extract the drogues without entanglement.

REPACKING THE FACE SCREEN

70 To repack the face screen, proceed as follows:

(a) Ensure that a safety pin is inserted in the ejection gun firing body sear and that a safety pin is inserted in the canopy cartridge firing mechanism sear.

(b) Pull the firing handle outwards to extend the face screen from the face screen housing.

(c) Inspect the canvas and the lining for deterioration and damage, and check the firing cable for security and serviceability.

(d) Fold each side of the face screen downwards and inwards so that the face screen is the same width as the mouth of the face screen housing.

(e) Fold the stitched end of the face screen back and underneath the face screen.

(f) Insert the folded end of the face screen into the mouth of the face screen housing.

(g) Feed the firing cable into the hole located at the back of the face screen housing.

(h) Feed the firing cable through the hole in the front of the front flap and pass the firing cable under the front flap and over the rear flap of the duplex drogue compartment.

(j) Engage the eye of the alternative firing cable in the crotch of the face screen firing cable.

(k) Using the thumbs, stow the remainder of the face screen into the face screen housing, packing the screen well down into the corners of the housing.

(m) Insert the firing handle into the mouth of the housing, ensuring that the spring-loaded plungers are engaged in their locating holes on the inside of the housing mouth. Insert the quick-release safety pin into the hole in the top of the headrest.

INSTALLING A HORSESHOE PARACHUTE PACK ON TO THE EJECTION SEAT

71 To install a parachute pack on to the ejection seat, proceed as follows:

(a) Ensure that the manual override lever is in the forward position.

(b) Lay the harness in the seat pan. Pull back the harness release lever, pull out the loop strap and pass it down through the yoke on the shoulder harness. Pass the lug of the strap through the rings of the parachute restraining straps and plug the lug into the top harness lock. Depress the striker lever and the harness release linkage to assist this operation.

(c) Ensure that none of the straps have become twisted.

(d) Pass the restraint lines through the holes located on each side of the central support bracket.

(e) Place the pack on the central support bracket.

(f) Pass each parachute restraining strap over the parachute pack and secure the restraining straps to their respective adjustment buckles.

(g) Adjust the parachute restraining straps to retain them tightly around the parachute pack.

(h) Insert the harness retaining straps into their clips.

NOTE

The harness retaining straps should pull out from the clips at a withdrawal load of 30-40 pounds.

(j) Insert each harness lug into the lock located at the rear of each inside corner of the seat pan.

(k) Adjust the seat pan to the lowest position and ensure that the straps buckled to the legs of the parachute have a slight amount of slack.

(m) Connect the quick-release coupling on the parachute withdrawal line.

(n) Install the survival pack into the seat pan and connect the two quick-releases.

(p) Ensure that the leg restraint release handwheel is in the forward position.

INSTALLING THE SECONDARY CARTRIDGES INTO THE EJECTION GUN

72 To install the secondary cartridges into the ejection gun, proceed as follows:

(a) Place the ejection gun on a clean bench.

(b) Remove the upper cartridge cap and insert a secondary cartridge, rim inwards, into the cartridge housing.

(c) Replace the upper cartridge cap and tighten using the special wrench.

(d) Lockwire the cartridge cap to the cartridge housing. Lead seal the locking wire.

(e) Repeat the procedure for the lower secondary cartridge.

NOTE

The bench should be covered with a linoleum or rubber top.

INSTALLING THE EJECTION GUN INTO THE AIRCRAFT

73 To install an ejection gun into an aircraft, proceed as follows:

(a) With the ejection gun in a vertical position in the cockpit, align the lower pick-up lug with the forked bracket at the bottom of the cockpit bulkhead.

(b) Insert the lower pick-up bolt and secure with a self-locking nut.

(c) Swing the ejection gun to the rear until the upper pick-up lug is aligned with the upper bracket on the cockpit bulkhead.

(d) Insert the upper pick-up bolt and secure with a self-locking nut.

(e) Attach the canopy cartridge firing unit to the ejection gun, proceeding as follows:

(1) Align the canopy cartridge firing unit with the bracket on the rear of the ejection gun.

(2) Insert the four bolts and secure them with self-locking nuts.

(3) Check the canopy emergency firing cable run for misalignment on the pulleys.

(4) Re-tension the firing cable to remove all slackness by adjusting on the tensioning barrel at the base of the canopy cartridge firing unit. Lockwire the tensioning barrel.

INSTALLING THE EJECTION SEAT INTO THE AIRCRAFT

NOTE

Ensure that the primary and canopy cartridges are not installed and that the drogue gun is not fitted to the ejection seat.

74 To install an ejection seat in the aircraft, proceed as follows:

(a) Ensure that the ejection gun intermediate piston is seated correctly in the outer cylinder.

(b) Ensure that the nut and bolt have been removed from the firing pin release rod and that the release rod has been withdrawn through the slot in the yoke to obtain sufficient clearance for the ejection gun firing body to pass freely through the top cross-beam of the seat.

(c) Ensure that the breech groove on the inner piston of the ejection gun is central within the latch housing.

(d) Ensure that the UHF and IFF circuit breakers on the cockpit circuit breaker console are pulled out.

(e) Guide the seat slipper pads into the ejection gun guide rails and permit the seat to descend slowly.

NOTE

The seat should be kept parallel with the guide rails to prevent the slipper pads from becoming distorted.

(f) Press down on the seat and tighten up the knurled nut of the seat locking plunger using the tommy bar provided on the seat for this purpose.

NOTE

The nut will be stiff to turn owing to the spring-loading of the latch. If the seat is correctly located with the ejection gun, the nut will remain stiff until the final turn, and will then become free.

(g) Ensure that the UHF and IFF switch actuator is correctly compressed by the striker plate.

(h) Lockwire the knurled nut to the side beam of the seat. Lead seal the lockwire.

(j) Align the leg restraint pulley bracket with the bracket on the cockpit floor and insert the quick-release pin.

(k) Remove the cloth bag from the aircraft portion of the composite leads disconnect and connect the aircraft portion to the seat portion.

(m) Remove the quick-release pin from the emergency oxygen starting lanyard bracket on the cockpit floor. Align the eye of the lanyard in the bracket and insert the quick-release pin.

(n) Swing the time delay mechanism trip rod forward and align the trip rod eye in the bracket on the cross-beam. Insert the quick-release pin in the bracket.

(p) Replace the survival pack in the seat pan.

ARMING THE EJECTION SEAT AND THE CANOPY

75 To arm the ejection seat and the canopy, proceed as follows:

NOTE

The rear seat should be armed first and the front seat should be armed last. Before commencing the seat arming procedure, ensure that the secondary cartridges are present in the ejection gun. This condition may be assured by the presence of locking wire and a lead seal on the side of each of the secondary cartridge housings.

(a) Remove the 1/16 inch cotter pin from the clevis pin in the sear actuating lever. Remove the clevis pin to disconnect the canopy emergency firing cable from the sear actuating lever.

(b) Remove the safety pin from the firing pin sear of the canopy cartridge firing mechanism and remove the firing body with the special wrench.

(c) Insert the canopy cartridge and replace the firing body. Tighten with the special wrench and replace the safety pin in the firing pin sear.

(d) Lockwire the firing body to the mechanism body and lead seal the locking wire.

(e) Align the fork end of the canopy emergency firing cable with the sear actuating lever and insert the clevis pin and lock with 1/16 inch cotter pin.

(f) Press the sear of the canopy cartridge firing mechanism forward and engage the eye of the longer firing cable with the hook of the sear. Allow the sear to return to its normal position.

NOTE

The operator should not, at any time, position his body above the drogue gun or the ejection seat during the ejection seat loading procedure.

(g) Remove the safety pin from the sear of the ejection gun firing body.

(h) Remove the firing body from the ejection gun using the special wrench.

(j) Insert the primary cartridge into the breech.

(k) Replace and tighten the firing body by using the special wrench MBEU/6146.

(m) Insert the safety pin into the sear of the ejection gun firing body.

(n) Lockwire the firing body to the breech collar of the ejection gun. Lead seal the lockwire.

(p) Align the vertical slot in the firing pin with the firing pin release rod aperture in the yoke. Insert the firing pin release rod through the aperture in the yoke and the slot in the firing pin, and ensure that the release rod rests in the slots in the firing pin collar. (See fig 4). Using a nut and bolt, secure the firing pin release rod to the yoke.

(q) Press the ejection gun sear forward and engage the eye of the short firing cable with the hook of the sear. Allow the sear to return to its normal position.

(r) Ensure that the sear is correctly located in the locking plunger of the drogue gun and that the safety pin is inserted in the safety lock.

(s) Ensure that the barrel is lockwired to the drogue gun body and that the lockwire is lead-sealed. Ensure that the cotter pin, locking the drogue gun piston to the barrel, is serviceable.

(t) Locate the drogue gun on the two studs on the left-hand side beam of the seat.

(u) Secure the drogue gun to the seat using the two self-locking nuts.

(v) Remove the nut and bolt from the controller drogue withdrawal line shackle and connect the shackle to the lug on the top of the drogue gun piston. Replace the nut and bolt in the shackle.

(w) Withdraw the quick-release pin from the bracket on the cross-beam at the rear of the ejection gun. Align the eye of the trip rod of the drogue gun with the bracket. Replace the quick-release pin in the bracket. Attach the bungee cord to the trip rod.

(x) Remove the quick-release pin from the lug on the yoke. Align the lug end of the telescopic link with the yoke lug and insert the quick-release pin.

(y) After the loading procedure has been completed, hang a "Warning - Seat Loaded" sign on the ejection seat and/or the canopy.

ARROW 1 SERVICE DATA

SECTION 32

CANOPIES

(This data supersedes previous issue dated 17 Oct 57)

ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

CANOPIES

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The front and rear cockpits are enclosed by separate clamshell type canopies. Each canopy consists of two shells hinged to the front fuselage upper longerons.

2 Each canopy is normally opened and closed by an electrically actuated screw jack and is locked mechanically by the crew member when closed. Actuation can be selected by internal or external switches. In an emergency an explosive cartridge system in each cockpit operates the canopy opening linkage. The explosive cartridge is fired either by pulling the ejection seat firing handle or by pulling an emergency canopy opening lever. Both cartridges can be fired simultaneously from outside by pulling an emergency lanyard.

3 Pneumatic seals fitted round each half shell inflate to form a seal for cabin pressurization. A solenoid operated valve controlling the seals is energized when both canopies are locked, and is de-energized when either one of the two canopies is unlocked.

CANOPIES (Fig 1)

4 Both canopies are of similar construction, each half shell consisting of a light alloy frame covered by an inner and an outer skin with insulating material between the two skins. A clear vision panel is incorporated in the forward end of each half shell. The front panels are of larger area than the rear panels and are electrically heated for de-icing purposes. Each canopy half shell is attached to a piano type hinge which in turn is secured to the upper longerons of the front fuselage. Locking latch pins on the left half shells mate with locking latches on the right half shells to lock the canopies.

5 Each canopy is opened and closed independently from inside the cockpit by selection of an OPEN-OFF-CLOSE toggle switch located on the left-hand console. For external control two OPEN-OFF-CLOSE toggle switches are mounted under a latched door in the left side of the arch dividing the two cockpits. Interlocking relays prevent the external switches from operating in opposition to the internal switches. A micro-switch operated by the latch locking handle prevents power being fed to the screw jack before the canopy is unlocked.

6 Each clear vision panel in the front canopy consists of three layers of optically corrected glass. The inner face of the outer layer is coated with a conducting film which is electrically heated. A sensing element mounted between the layers maintains the temperature of the panel at 43°C (110°F). Power is supplied to the panels when the master electrical switch is ON.

7 Air pressure for the canopy seals is supplied by the aircraft low pressure pneumatic system and is controlled by a solenoid operated control valve. The final forward movement of the latch locking handle actuates a micro-switch located on an index plate. When both canopies are locked and both micro-switches actuated, the solenoid operated valve is energized and the seals inflated. When one canopy is unlocked, the solenoid operated valve is de-energized which deflates the seals by venting them to atmosphere. Power for operating the solenoid operated valve is available only when the master electrical switch is ON.

8 The locking handle can be selected and locked in the following two positions, as shown on fig 2:

(a) Handle fully back. In this position the canopy is unlocked and the OPEN-OFF-CLOSE switches are energized.

(b) Handle fully forward. In this position the canopy is locked, the seals inflated, and the locking handle disconnected from the latch linkage in readiness for emergency opening if necessary.

LOCKING MECHANISM (Figs 2 and 3)

9 The pilot's canopy has five trunnion type latch pins on the upper edge of the left-hand half shell and five matching latches on the

ARROW 1 SERVICE DATA

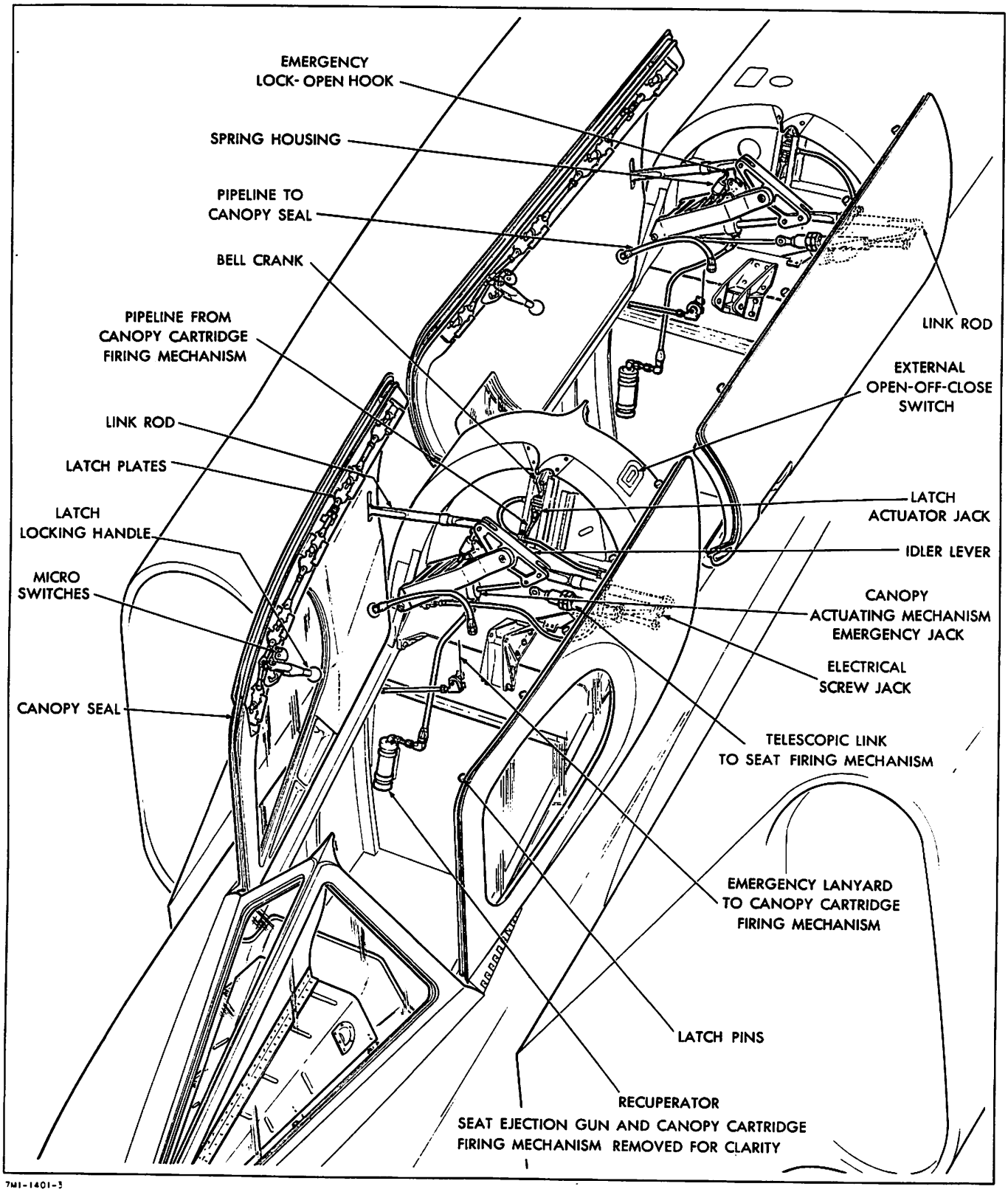

FIG. 1 FRONT AND REAR CANOPIES

right-hand half shell. The navigator's canopy has four latch pins and four latches. The latches consist of latch plates sliding in latch plate guides and interconnected by adjustable connecting rods. Each plate has a keyhole slot, the hole being of sufficient size to permit passage of the head of the latch pin, and the slot being a clearance fit on the shank of the pin. A coil spring fitted over the centre connecting rod of the pilot's canopy and the aft connecting rod of the navigator's canopy moves the latches to the locked position when the locking handle is released from the unlocked position.

10 The forward connecting rod consists of two short rods attached to the upper end of a latch lever. The latch lever pivots on an index plate and is forked at its lower end. This fork engages a spring-loaded plunger in the locking handle. The plunger rides in a contoured slot in the index plate and engages with locking recesses at the front and rear of the slot. The two recesses locate the locking handle in the locked or the unlocked position. Pulling the knob at the end of the locking handle disengages the plunger from the recesses. Due to the shape of the contoured slot the last half of the forward movement of the locking handle disengages the plunger from the fork end of the latch lever. The locking handle is then disconnected from the latch linkage and the latches are held in the locked position by the coil spring. This leaves the linkage disengaged from the locking handle and the latches are free to be unlocked by the emergency system.

NORMAL OPERATION (Figs 2 and 6)

11 The canopy is unlocked by pulling the knob on the latch locking handle and moving the handle rearwards. This movement performs the following functions:

(a) The first part of the handle movement actuates the canopy seal micro-switch and de-energizes the solenoid operated control valve, deflating the seals. It also engages the handle with the latch lever.

(b) The last part of the handle movement unlocks the latches then actuates another micro-switch which supplies power to the OPEN-OFF-CLOSE switches.

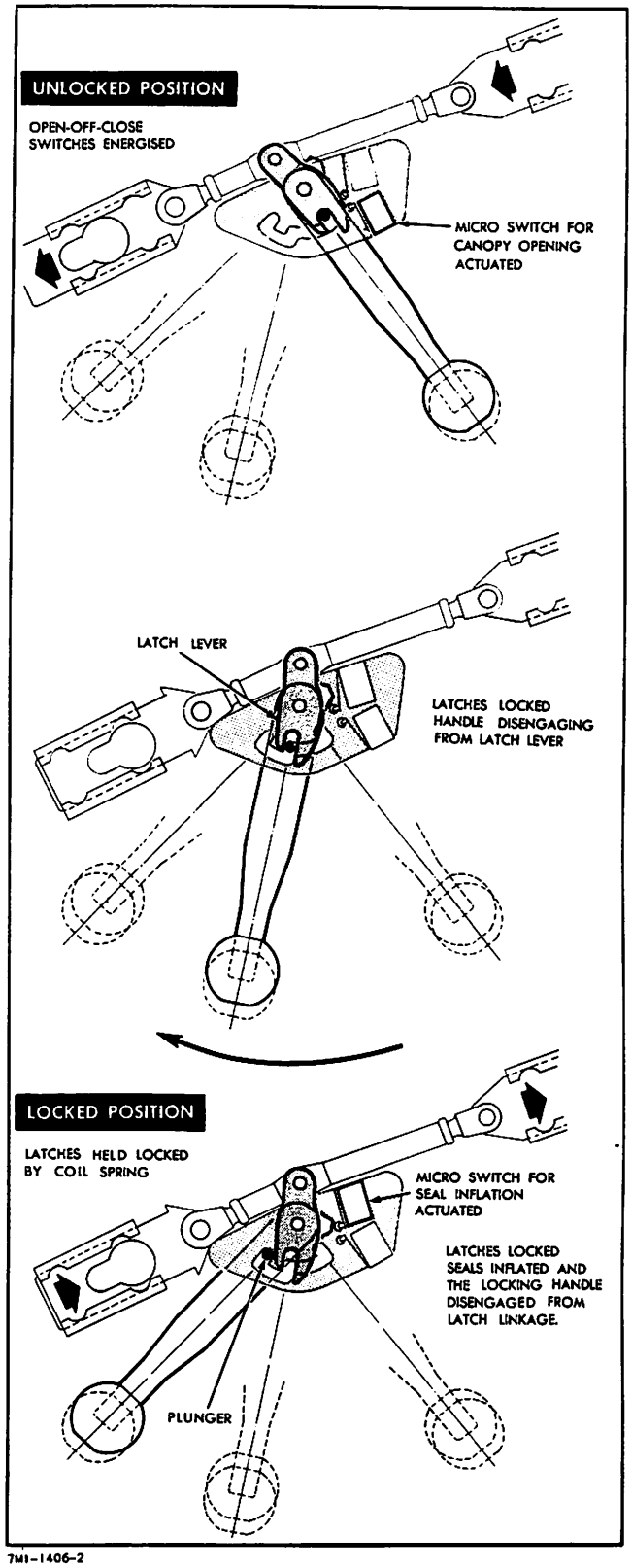

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FIG. 2 LOCKING HANDLE POSITIONS

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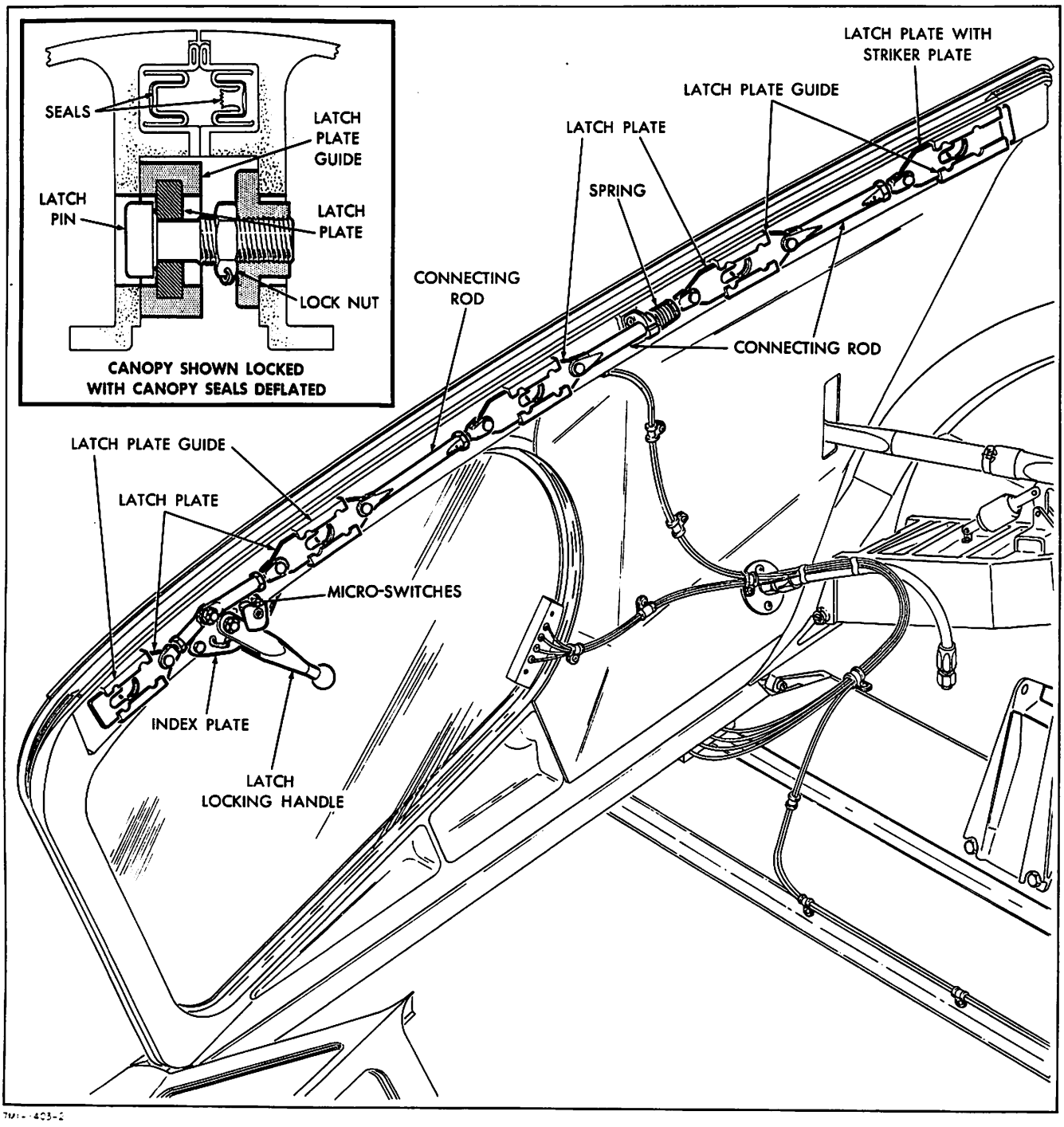
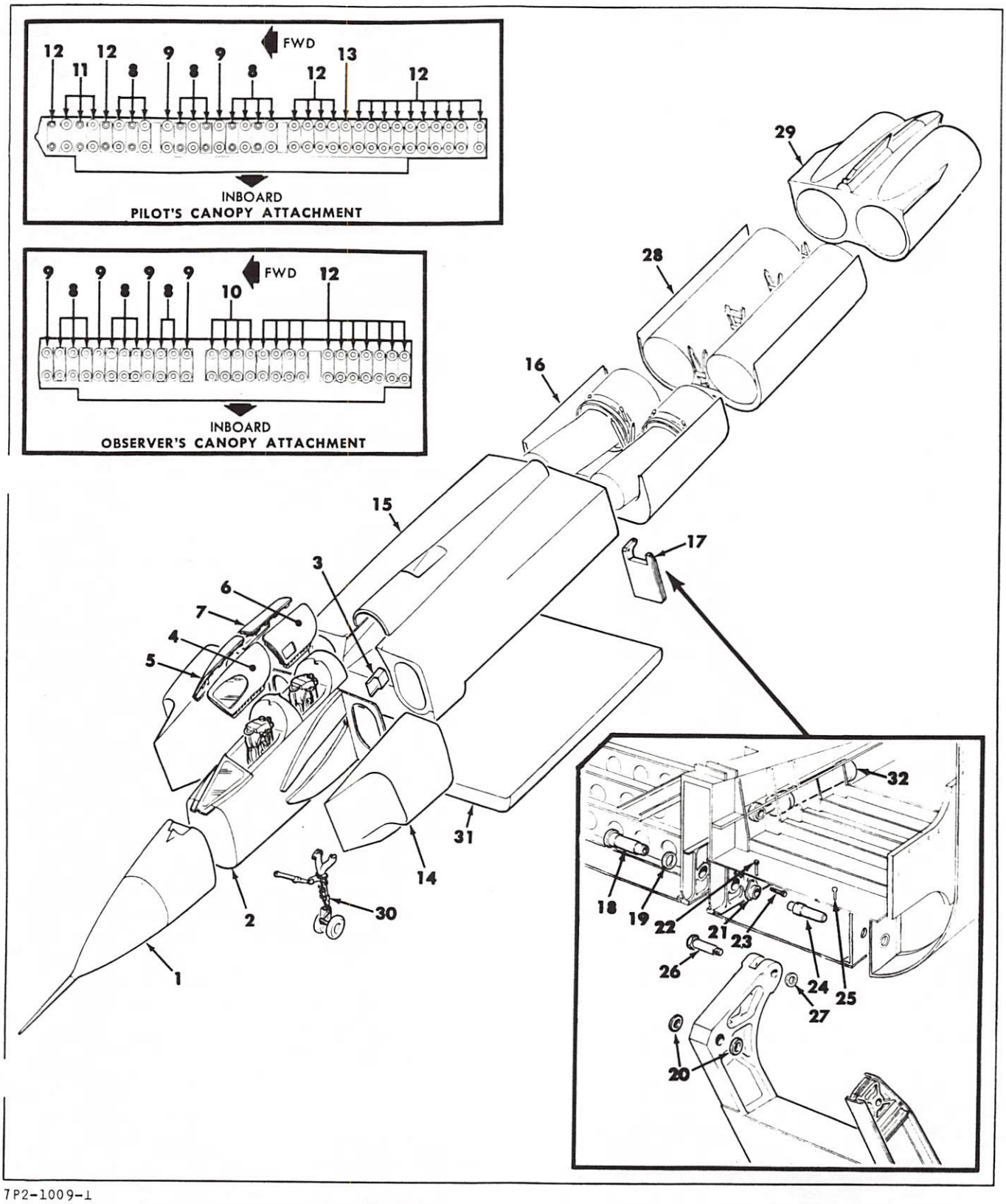


FIG. 3 CANOPY LATCH MECHANISM

12 Selection of the internal or external OPEN-OFF-CLOSE switches to OPEN operates the electrical screw jack which extends and opens the two half shells through an idler and link rods.

13 The canopy is closed by selecting either the internal or external switches to CLOSE, causing the electrical screw jack to retract and close the canopy. When the canopy is fully closed and the latches are engaged, it is locked

ARROW Mk 2



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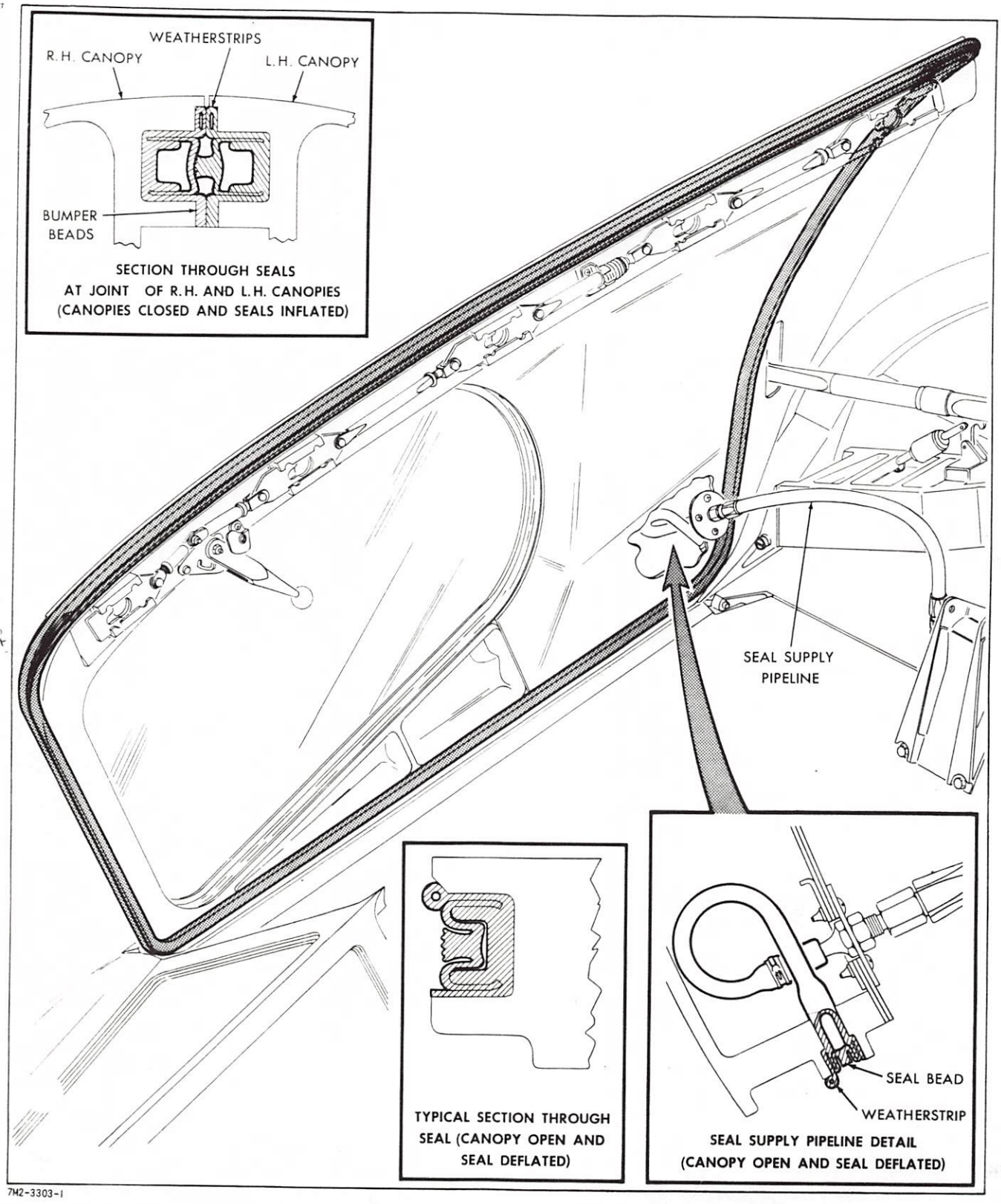
COCKPIT CANOPIES AND DIVE BRAKE HINGES

ARROW Mk 2



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PILOT'S CANOPY SEALING

by pulling out the locking handle and pushing it to the forward position. This movement performs the following functions:

(a) Actuates a micro-switch which isolates the OPEN-OFF-CLOSE switch.

(b) Moves the latch plates rearwards and locks the canopy latches.

(c) Actuates a micro-switch which energizes the canopy seal control valve and inflates the canopy seals.

(d) Disconnects the locking handle from the latch lever.

EMERGENCY SYSTEM (Fig 4)

14 In an emergency, each canopy is individually opened by gas pressure which is generated when a cartridge, located on the rear upper section of the ejection gun, is fired. The gas pressure is sequenced to unlock the canopy latches and then actuate a piston rod which opens the canopy.

15 The emergency canopy opening system is fired by any one of the following methods:

(a) A crew member operates either the face blind handle or the alternative firing handle of his ejection seat. This method opens the crew member's canopy and fires his seat automatically.

(b) A crew member operates a yellow and black striped emergency lever located forward of and above his right knee. This opens the individual canopy only.

(c) After a crash landing, a lanyard stowed behind a latched door located on the right hand side of the fuselage forward of the engine air intake is pulled from outside the aircraft. This method opens both front and rear canopies. The lanyard is out of reach to persons on the ground when the landing gear is down.

WARNING

Ground personnel should stand clear of the aircraft during this operation.

16 The emergency canopy opening system comprises the following components: a Martin Baker cartridge firing mechanism and explosive cartridge; a latch actuation jack and bellcrank lever; a canopy actuating mechanism emergency jack; a spring-loaded hook; an oil filled recuperator. Any of the methods described in para 15 withdraws a wedge shaped sear from a spring-loaded firing pin in the firing mechanism and fires the cartridge. The gas generated by the explosion is piped to the base of the latch actuator jack, forcing the striker rod upwards. See fig 4. The striker rod strikes the lower arm of the bellcrank lever, causing it to rotate. The upper arm of the bellcrank lever strikes the rear face of the rearmost latch plate, forcing all the latch plates forward to the unlocked position. The canopy locking handle remains in the fully forward position during this movement.

17 Full travel of the latch actuator jack striker rod upwards uncovers internal ports and allows the gas to pass through flexible pipes to the actuating mechanism emergency jack. This jack is pivoted on a spindle attached to the cockpit rear bulkhead, and the jack piston is connected to the idler lever, rotating it and forcing the link rods outwards, opening both half shells. The initial movement of the left hand shell shears a separation device in the electrically operated screw jack, disconnecting it from the half shell.

18 In the emergency open position the canopy is opened approximately 14° more than in the normal open position. This permits a spring-loaded hook, mounted on the idler lever support, to engage behind a bushing on the idler lever and lock the canopy in the emergency open position. See fig 6.

19 When the canopy is opened in an emergency by pulling the ejection seat firing handle, a sear is also withdrawn from the seat ejection gun firing pin. At this stage, the firing pin is prevented from operating by a release rod passing through it. The release rod is connected to a spring-loaded yoke hinged on the side of the seat structure. A telescopic link joins the yoke to the left half shell of the canopy. During normal operation the telescopic link extends and retracts without withdrawing the release rod from the ejection gun firing pin.

ARROW 1 SERVICE DATA

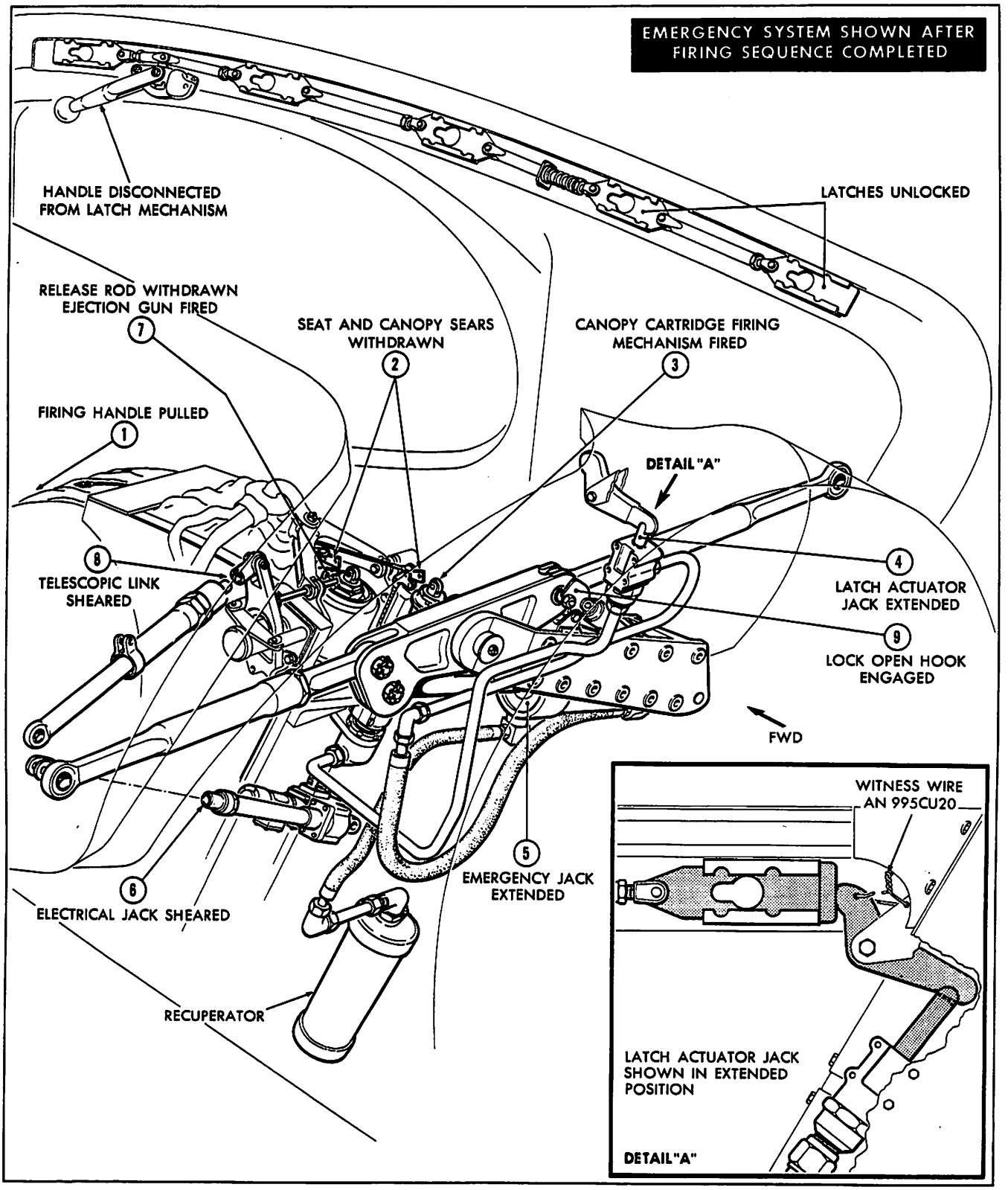

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FIG. 4 CANOPY EMERGENCY MECHANISM

The additional angle of opening of the canopy in emergency operation causes the link to reach the end of its free travel and pull the yoke outwards, withdrawing the release rod. The firing pin is then free to descend and fire the ejection gun at approximately 40° of canopy opening. The additional movement to fully open (45°) severs a shear pin in the link when the seat starts to move upwards.

20 The exhaust side of the emergency jack is oil filled and is connected through a restrictor to a recuperator mounted on the right side of the cockpit bulkhead near the floor. During normal canopy operation, the piston of the emergency jack extends and retracts freely with the idler arm, but in the faster emergency operation the passage of the oil through the restrictor and into the recuperator provides a damping effect.

EMERGENCY CABLE SYSTEM (Fig 5)

21 The emergency cables run from the sear actuating levers, on the front and rear canopy cartridge firing mechanisms, to their respective emergency canopy opening levers. The cables are also connected to the outside emergency lanyard. Each cable operates through a stepped pulley on the crew member's bulkhead to increase the cable travel at the sear actuating levers. Bowden cable adjusters are provided below each canopy cartridge firing mechanism, and an adjustment is provided at the cable connector aft of the front cockpit emergency lever arm.

22 Pulling the rear cockpit emergency lever to the rear causes the outboard end of the lever arm to move forward, carrying with it the ball terminal against its front face, pulling the cables and withdrawing the sear. The cable slackens between the front and rear cockpit levers and does not effect the front cockpit emergency system.

23 Pulling the front cockpit emergency lever to the rear causes the outboard end of the lever arm to move forward pulling on the cable anchored to it and withdrawing the sear. During this movement a slot in the lever arm passes over the rear cockpit cable without pulling the cable.

24 When the outside emergency lanyard is pulled, a stop on the rear cockpit cable bears on the aft face of the front cockpit lever arm, moving it forward. This pulls on the front cockpit operating cable and withdraws the sear. At the same time the cable is pulled through the hole in the rear cockpit lever and withdraws the rear cockpit sear. During this operation only the front cockpit lever arm moves forward, the emergency lever remaining in the forward position. The rear cockpit lever also remains in the forward position. This ensures that operation of the external lanyard is not impeded by the witness wiring on the emergency levers.

TESTING AND SERVICING

GENERAL

25 The procedures for testing and servicing both front and rear canopies are similar. The front canopy is described in this section and any special instructions for the rear canopy are noted.

WARNING

Prior to working on the canopies the ejection seats must be disarmed. The canopy cartridge firing mechanisms should also be disarmed except in the circumstances noted below.

NOTE

In the event of an electrical power failure or malfunction of the electrical actuator, the canopy cannot be opened from either inside or outside of the aircraft except by the emergency operation. For this reason the canopy cartridge firing mechanism should be armed if personnel are required to be in the cockpit when the canopy is closed by the actuator.

26 Procedures for arming and disarming the ejection seats and canopy cartridge firing mechanisms are detailed in Arrow 1 Service Data - Section 31.

ARROW 1 SERVICE DATA

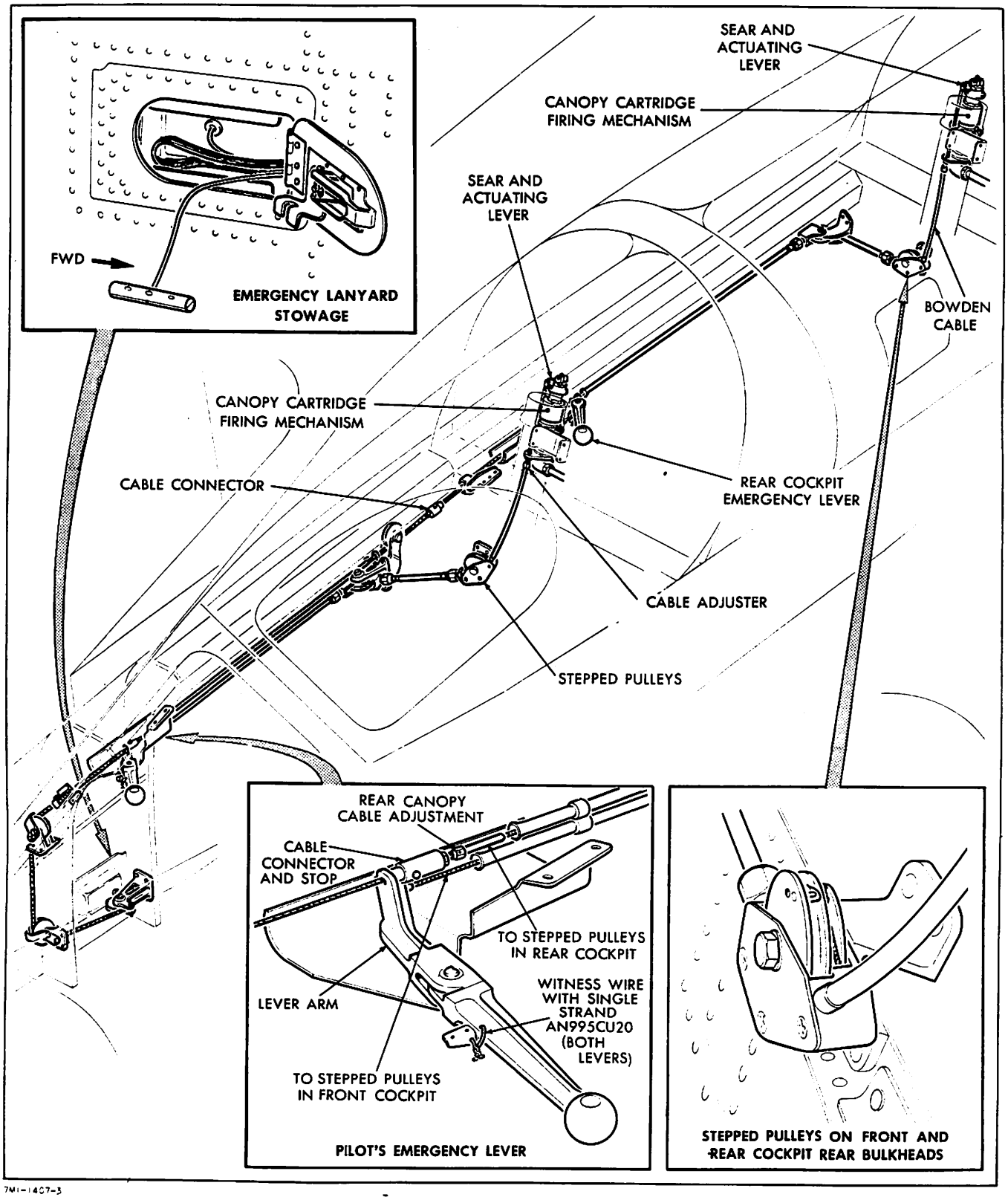

FIG. 5 EMERGENCY CABLE SYSTEM

ARROW 1 SERVICE DATA

ADJUSTING THE LATCH LINKAGE

27 To adjust the latch linkage, proceed as follows:

(a) Place the latch locking handle in the fully back position.

(b) Starting with the front latch plate, adjust each connecting rod so that the latch plate stops are hard up against the latch plate guide. See fig 8. When adjusting the connecting rod on which the spring is mounted, do not detach the rod end from the rod, as this releases the spring.

(c) After the mechanism has been adjusted, ensure that all connecting rods are in safety and tighten the locknuts.

ADJUSTING THE LATCH PINS (Fig 7)

28 To adjust the latch pins, proceed as follows:

(a) Disconnect the electrically actuated screw jack.

(b) Place the locking handle in the fully back position and close both half shells by hand.

(c) Check that the gap between the two half shells, along the top of the canopy, is central about the aircraft centre line.

(d) Place the locking handle in the fully forward position, ensuring that each latch pin is through the hole in the corresponding latch plate.

(e) Adjust each latch pin until the face on the underside of the head bears against the outboard side of the latch plate.

(f) Slacken each latch pin one quarter turn.

(g) Tighten the locknut.

(h) Open the canopy and reconnect the electrically operated screw jack.

(j) Wirelock each latch pin locknut to the bolt head on the latch pin housing.

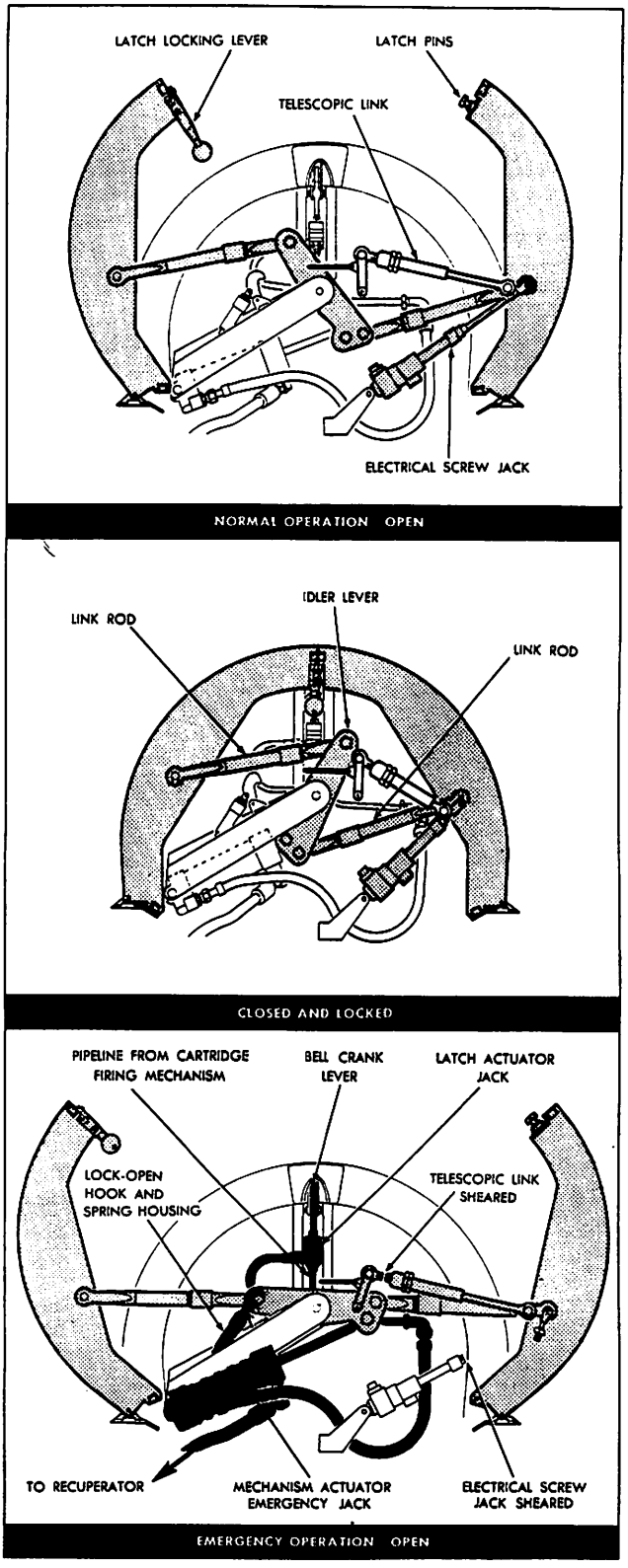

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FIG. 6 CANOPY OPERATION

ARROW 1 SERVICE DATA

(k) Close the canopy and check that the latch mechanism operates smoothly.

(m) Adjust the electrically operated screw jack if necessary.

ADJUSTING THE ELECTRICALLY ACTUATED SCREW JACK AND LINK RODS

29 To adjust the electrically actuated screw jack and link rod on the LH half shell, proceed as follows:

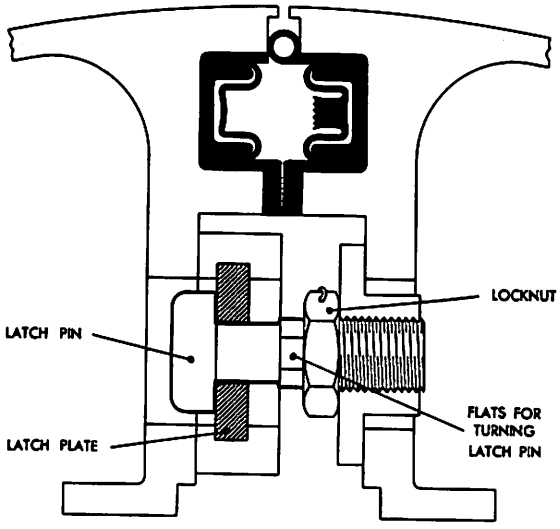

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FIG. 7 LATCH PIN ADJUSTMENT

(a) Connect the external DC power supply.

(b) Disconnect the electrically operated screw jack from the half shell and operate either the internal or external OPEN-OFF-CLOSE switch to CLOSE and support the electrically operated screw jack as it retracts. See fig 10.

(c) With the jack fully retracted, disconnect the electrical connector from the receptacle on the jack.

(d) Slacken the locknut on the eye end of the jack and remove the jack from its bracket on the rear bulkhead.

(e) Remove the LH link rod from the idler lever.

(f) Connect the eye-end of the electrically actuated screw jack and the barrel end of the link rod to the LH half shell, using the special pip-pin.

(g) Close and lock both half shells.

(h) Adjust the electrically actuated screw jack, by turning the body of the jack, until the bushing is aligned with the hole in the bracket on the bulkhead.

(j) Secure the bushing to the bracket with the bolt, nut and cotter pin.

(k) Tighten the locknut on the eye-end.

(m) Push the emergency jack piston fully home, and adjust the link rod until the bushing lines up with the holes in the idler lever.

(n) Insert the bolt and secure with a nut and cotter pin.

(p) Tighten the locknut and wirelock in place.

(q) Connect the electrical connector to the receptacle on the jack and wirelock.

30 To adjust the RH link rod, proceed as follows:

(a) Open the RH half shell.

(b) Disconnect the RH link rod from the idler lever.

(c) Attach the barrel end of the link rod to the half shell, using the special pip-pin.

(d) Close and lock the canopy.

(e) Adjust the link rod until the bushing lines up with the holes in the idler lever.

(f) Insert the bolt and secure with a spacer, nut and cotter pin. The spacer is assembled to the rear of the idler lever.

(g) Tighten the link rod locknut and wire-lock in place.

(h) Function the canopy through several cycles to ensure smooth operation.

FILLING THE RECUPERATOR

31 To fill the recuperator it is necessary to remove the emergency jack, pipeline and recuperator from the cockpit. See para 52.

32 To fill the recuperator proceed as follows:

(a) Assemble the flexible pipeline to the recuperator and support the assembly over a suitable receptacle, so that the pipeline extends vertically above the recuperator.

(b) Fill the pipeline with oil MIL-O-5606.

(c) Hold the emergency jack so that the union at the piston end is uppermost and fill with oil MIL-O-5606 with the piston fully retracted.

(d) Connect the filled pipeline to the emergency jack, losing as little oil as possible.

(e) Install the three components as an assembly, see para 53.

(f) After installing the components, disconnect the electrically actuated screw jack and push the canopy to the emergency open position until the hold-open hook engages. If any difficulty is experienced in obtaining the fully open position, bleed off some oil at the bleed point at the top of the recuperator until the hook engages.

RIGGING THE EMERGENCY CABLES (Fig 5)

33 Before commencing adjustment of the canopy emergency firing cables, ensure that the cartridges have been removed from the canopy cartridge firing mechanisms in both cockpits. See Arrow 1 Service Data - Section 31.

(a) To rig the front canopy emergency cable proceed as follows:

(1) Pull up the front canopy emergency cable below the cartridge firing mechanism to take out all slack and to ensure that the front canopy emergency opening lever is pulled to its forward position.

(2) Adjust on the Bowden cable adjuster until the clevis pin can be inserted through the cable eye end and the hole in the actuating lever with no slack in the cable.

(3) Tighten the lock nut on the Bowden cable adjuster.

(4) Secure and lock the clevis pin with a washer and a cotter pin.

(b) To rig the emergency lanyard cable proceed as follows:

(1) Pull the lanyard end of the cable outboard through the grommet in the emergency lanyard cable stowage, until the cable connector and stop bears against the aft face of the front canopy emergency opening lever arm. During this operation the front canopy emergency opening lever arm must remain in the aft position, see detail of pilot's emergency lever, fig 5.

(2) Coil the spare cable carefully in the external stowage.

(3) Place the emergency lanyard handle under the bracket on the external stowage door and close the door.

(c) To rig the rear canopy emergency cable proceed as follows:

(1) Push the rear canopy emergency opening lever to the forward position.

(2) With light tension applied to the cable at the cartridge firing mechanism, adjust the cable adjuster on the upper cable situated aft of the front canopy emergency opening lever arm (see detail of pilot's emergency lever, fig 5), until the ball terminal on the cable bears against the forward face of the rear canopy emergency opening lever. Tighten the cable adjuster lock nut.

(3) Take out any slack in the cable between the rear canopy emergency opening lever and the cartridge firing mechanism by adjusting on the Bowden cable adjuster below the cartridge firing mechanism until the clevis pin can be inserted through the cable eye end and the hole in the actuating lever.

(4) Tighten the cable adjuster lock nut.

(5) Secure and lock the clevis pin with a washer and a cotter pin.

(d) To complete the rigging, witness wire both canopy emergency opening levers to their respective brackets, using a single strand of locking wire AN995CU20.

REMOVAL AND INSTALLATION

GENERAL

34 The procedures for removal and installation of both front and rear canopies are similar. In this section the removal and installation of the front canopy components are described and any special instructions for the rear canopy are noted.

REMOVING THE LATCH MECHANISM (Fig 8)

35 Removal of the latch mechanism is carried out in the following sequence:

(a) Removing the latch plates.

(b) Removing the latch locking handle and index plate assembly.

(c) Removing the latch plate guides.

36 The procedure is the same for both front and rear canopies except that the rear canopy has only four latches. The latches are numbered from front to rear in both cases.

37 To remove the latch plates proceed as follows:

(a) Place the latch locking handle in the fully forward position.

(b) Remove the cotter pin and clevis pin securing the fifth latch plate to the connecting rod and slide the latch plate rearwards out of its guide.

(c) Remove the cotter pin and clevis pin from the forward end of the connecting rod and remove the connecting rod.

(d) Repeat the procedure for the fourth, third and second latch plates. Remove the roll-pin stop from the second latch plate before removing the latch plate.

(e) Remove the first latch plate with the latch plate guide. See para 39.

38 To remove the latch locking handle, index plate and forward connecting rods, proceed as follows:

(a) Remove the cotter pin securing the nut to the latch locking handle pivot. Remove the nut.

(b) Remove the countersunk screw securing the aft end of the index plate to the canopy. Retain the spacer.

(c) Remove the screw securing the switch cover to the index plate and remove the switch cover.

(d) Remove the screws securing the micro-switches to the index plate and remove the micro-switches. Leave the micro-switches attached to their leads.

(e) Remove the bolt securing the forward end of the index plate.

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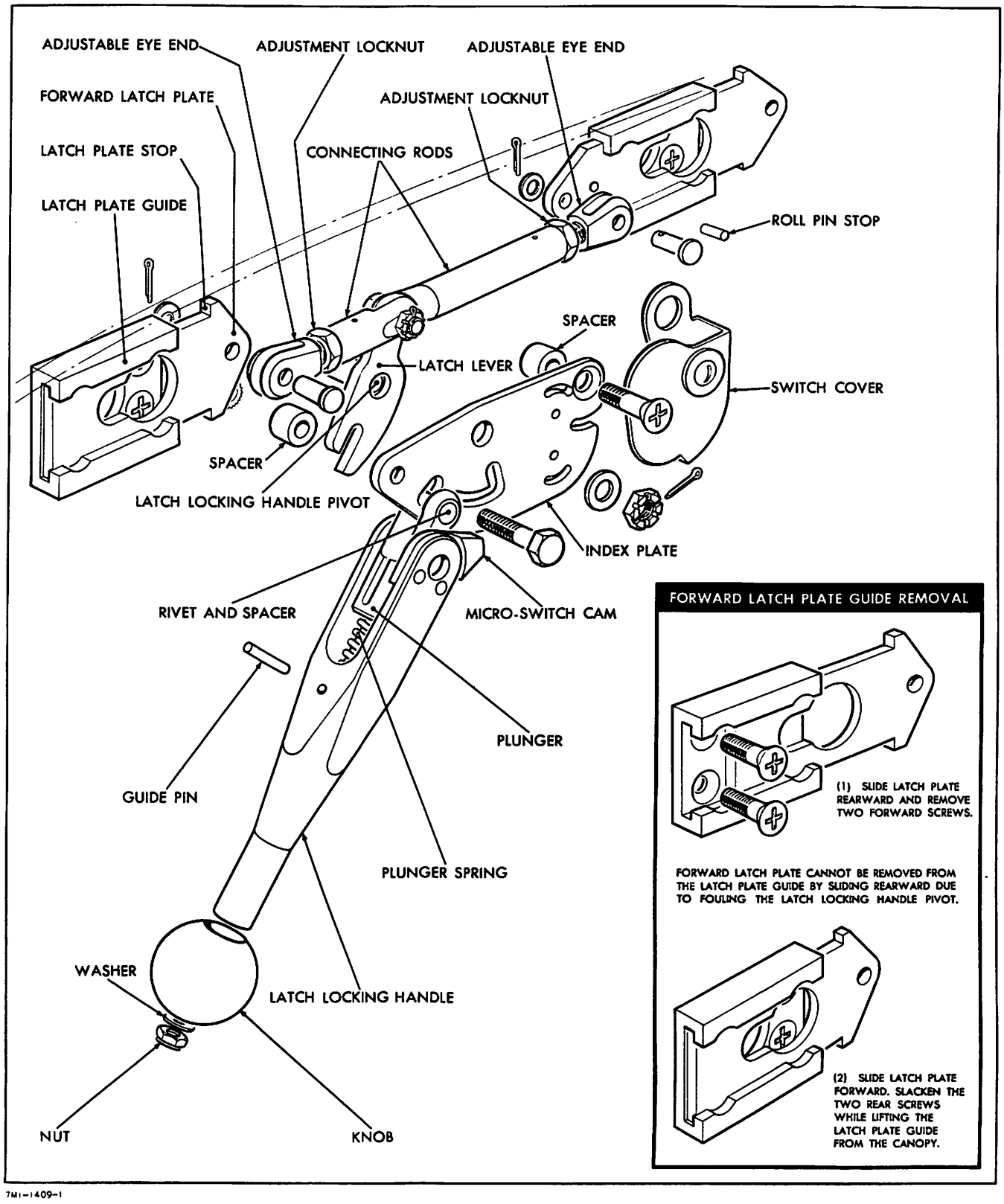

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FIG. 8 LATCH MECHANISM INSTALLATION

(f) Remove the index plate together with the latch locking handle. The latch lever together with the two forward connecting rods will separate from the locking handle assembly. See fig 8.

39 To remove the latch plate guides (see inset fig 8) proceed as follows:

(a) Remove four countersunk screws from the second, third, fourth and fifth latch plate guides and remove the guides.

(b) Slide the first latch plate aft and remove the two forward countersunk screws.

(c) Slide the latch plate forward until the two aft countersunk screws can be reached through the hole in the latch plate.

(d) Remove the two screws while lifting the latch plate guide.

40 To dismantle the latch-locking handle and index plate assembly, proceed as follows:

(a) Remove the self-locking nut securing the knob to the plunger.

(b) Drive out the guide pin from the latch locking handle. This will release the plunger from the handle.

(c) Withdraw the plunger from the handle. Retain the spring.

(d) Drill out the countersunk rivet securing the spacer in the fork end of the plunger. Remove the spacer. The index plate can now be removed from the plunger.

INSTALLING THE LATCH MECHANISM (Fig 8)

41 The sequence of installing the latch mechanism is the reverse of that given for removal. See para 35. Prior to installing the locking handle the index plate and handle are assembled as follows:

(a) Position the spacer in the cam slot in the index plate and attach it in the fork end of the plunger using a rivet, AN427-6-10.

(b) Install the spring on the shaft of the plunger and insert the plunger into the latch locking handle so that the micro-switch cam on the latch locking handle is towards the rear of the index plate.

(c) Push the plunger into the latch locking handle until the hole in the latch locking handle aligns with the slot in the plunger.

(d) Insert the guide pin and stake it in position.

(e) Install the knob on the threaded end of the plunger and secure with a self-locking nut.

42 The installation procedure for the latch plate guides is the reverse of that given for removal in para 37. A coat of barium chromate jointing compound, D.T.D. 369A is to be applied to the canopy mounting pad before installing the latch plate guide.

43 The installation procedure for the latch plates is the reverse of that given for removal in para 37. The following points should be noted:

(a) Install all clevis pins with the head inboard, and secure with cotter pins.

(b) A roll pin stop is installed in the second latch plate.

(c) For adjustment of the latch linkage see para 27.

44 To install the latch locking handle, index plate and forward connecting rods, proceed as follows:

(a) Assemble the two forward connecting rods and the latch lever as shown in fig 8.

(b) Insert the latch lever between the fork ends of the latch locking handle with the latch lever on the outboard side of the index plate.

(c) Align the pivot hole in the latch lever, index plate and latch locking handle and install the assembly on the latch locking handle pivot. Secure with a nut and cotter pin.

(d) Install the bolt and spacer securing the forward end of the index plate.

(e) Install the countersunk screw and spacer securing the rear end of the index plate. The switch cover should be installed on the spacer at this stage.

(f) Operate the latch locking handle throughout its range and check for correct operation.

(g) Install the two micro-switches and adjust as described in Arrow 1 Service Data - Section 33.

LATCH PINS AND HOUSINGS (Fig 7)

45 To remove the latch pins and latch pin housings, proceed as follows:

(a) At each latch pin, break and remove the locking wire.

(b) Slacken the locknut and remove the latch pin.

(c) Remove the three countersunk screws and one bolt securing each latch pin housing. In each case, except for the second latch pin housing in the front cockpit, the screws and bolt screw into Rosan inserts. In the case of the second latch pin housing of the front canopy the screws and bolt are secured by self-locking nuts.

46 The procedure for installing the latch pins and housings is the reverse of that given for removal in para 45. The following points should be noted:

(a) Apply barium chromate jointing compound, D.T.D. 369A to each latch pin housing pad on the canopy before assembly, and assemble while wet.

(b) At the second latch pin housing in the front cockpit install the nuts and washers with wet barium chromate, D.T.D. 369A.

(c) Do not lockwire the locknuts until the latch pins have been adjusted.

(d) For adjustment of latch pins see para 28.

CANOPY HALF SHELLS

47 Each canopy half shell weighs approximately 120 lbs and suitable arrangements for lifting should be provided. To remove the canopy half shells, proceed as follows:

(a) With the canopy open, isolate the aircraft battery and disconnect the external power supplies.

(b) Disconnect the electrical leads from the micro-switches on the RH half shell at terminal strip E32. (E43 in the rear cockpit).

(c) Disconnect the de-icing element and sensing unit leads from the terminal strip on each clear vision panel. (Front cockpit only).

(d) Disconnect the pneumatic seal flexible hoses.

(e) Remove the inside row of attachment bolts on the RH half shell.

(f) Support the RH half shell and remove the pip-pin to disconnect the link rod.

(g) Close the half shell and remove the outside row of attachment bolts.

(h) Remove the half shell.

(j) Repeat the operations in (e), (f), (g) and (h) for the LH half shell. The electrically operated screw jack is attached by the same pip-pin as the link rod.

(k) Separate the hinge by withdrawing the hinge pin.

(m) Remove the upper part of the hinge by removing the countersunk screws.

48 The procedure for installing the half shells is the reverse of that given for removal in para 47. The following points should be noted:

(a) Wet barium chromate primer D.T.D. 369A must be applied to the canopy half shell before installing the upper hinge.

(b) A coat of thinned EC 1291 sealing compound must be applied between the lower hinge and the upper surface of the cockpit edge before installation.

(c) The attachment bolts and washers must be assembled with wet barium chromate primer, D.T.D. 369A.

(d) The latch mechanism and latch pins must be adjusted as in paras 27 - 28.

(e) The electrically operated screw jack must be adjusted as in paras 29 - 30.

(f) After assembly and adjustment, a cabin pressurization test must be carried out. See Arrow 1 Service Data - Section 17.

EMERGENCY MECHANISM (Figs 9 and 10)

49 If the canopy is opened in an emergency by the cartridge operated system, all components affected by the explosion must be removed and exchanged for new parts. The parts affected are: the emergency jack, the latch actuator jack, the canopy cartridge firing mechanism and three pipelines.

50 To remove the latch actuator jack and pipelines, proceed as follows:

(a) Remove the pipeline connecting the latch actuator jack to the canopy cartridge firing mechanism and the pipeline connecting the latch actuator jack to the union on the bulkhead. See fig 4.

(b) Remove three nuts and bolts securing the doubler to the bracket. Remove the doubler.

(c) Remove the four self-locking nuts and the four bolts securing the latch actuator jack to the bracket and remove the latch actuator jack.

51 The procedure for replacing the latch actuator jack is the reverse of that given for removal in para 50. The following points should be noted:

(a) Ensure that the latch actuator jack piston is fully retracted.

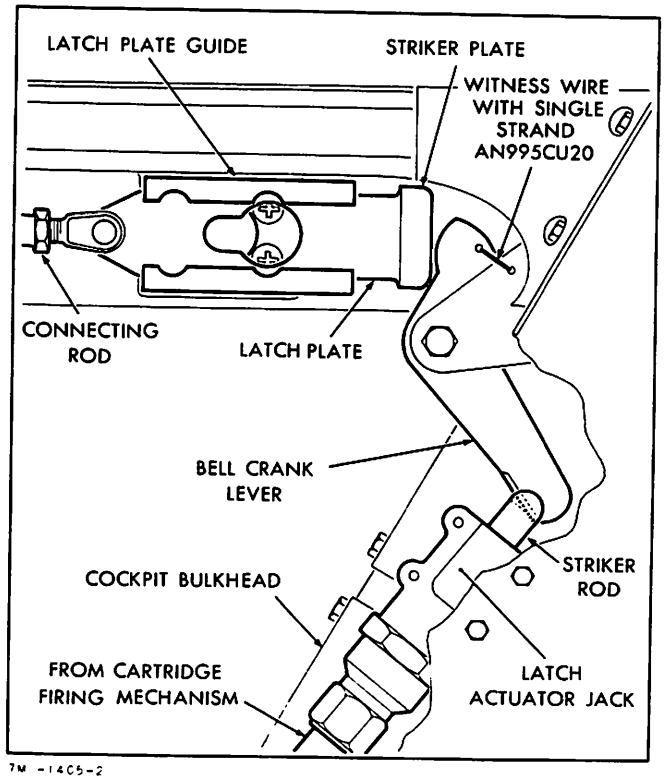

FIG. 9 LATCH ACTUATOR BELLCRANK LEVER

(b) Ensure that the groove in the latch actuator jack piston engages with the arm of the bellcrank.

(c) Witness wire the bellcrank to the bracket with a single strand of copper locking wire AN995CU20.

52 To remove the canopy mechanism emergency jack and the recuperator, proceed as follows:

(a) Remove the flexible high pressure hose connecting the emergency jack to the union on the bulkhead.

(b) Remove the recuperator from its bracket on the bulkhead.

(c) Remove the cotter pin, nut and bolt securing the emergency jack piston to the idler lever.

(d) Remove the cotter pin securing the emergency jack spindle and remove the spindle.

ARROW 1 SERVICE DATA

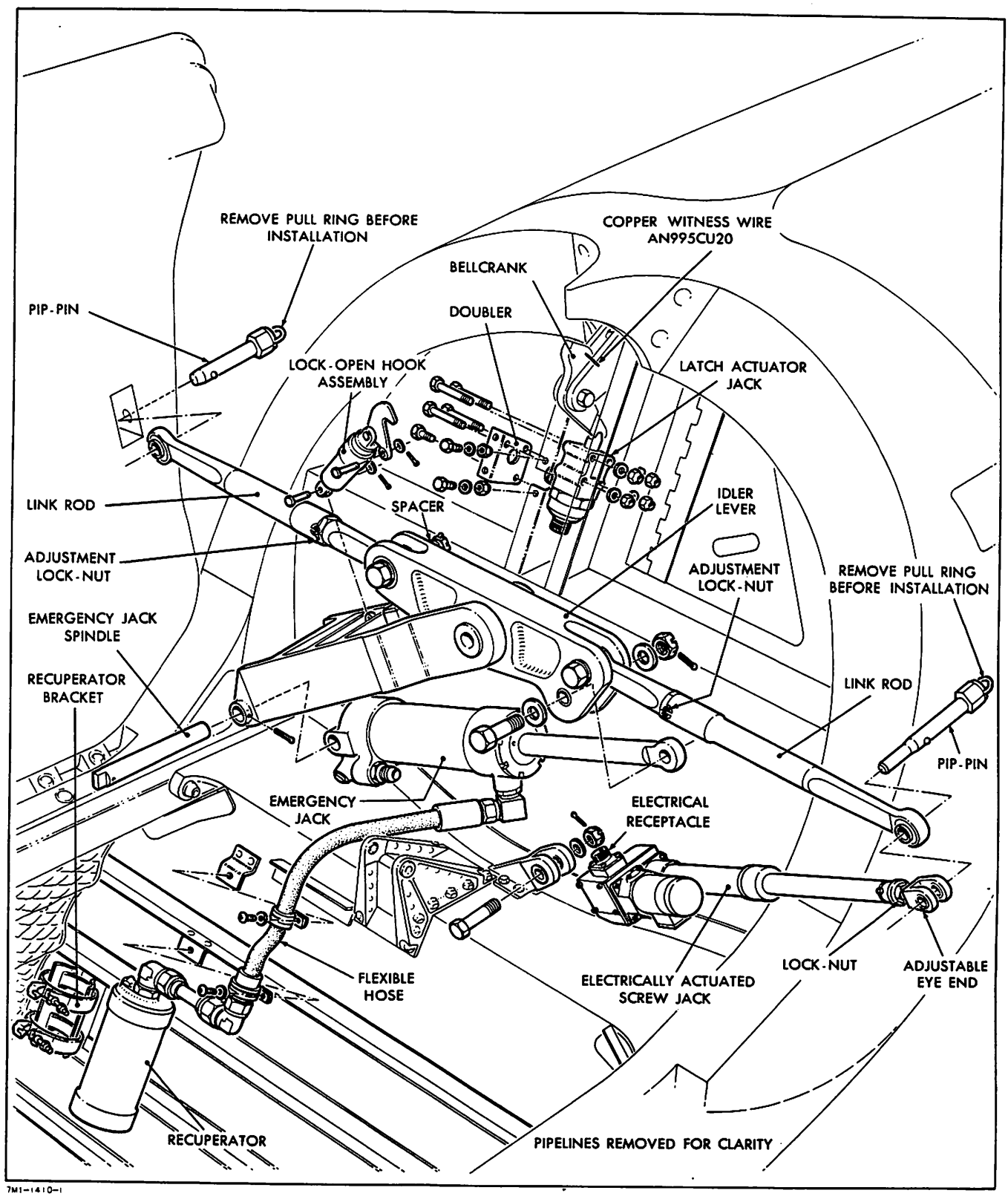

FIG. 10 EMERGENCY MECHANISM INSTALLATION

(e) Remove the emergency jack, flexible hose and recuperator as a complete assembly.

(f) Hold the assembly over a suitable receptacle, remove the flexible hose union at the emergency jack, and drain the oil from jack and recuperator.

53 The procedure for installing the emergency jack and recuperator is the reverse of that given for removal in para 52. The following points should be noted:

(a) Do not overtighten the clamps as excessive pressure on the clamps will restrict piston travel.

(b) Fill the recuperator as in para 31.

54 For details of removal and installation of the canopy cartridge firing mechanism see Arrow 1 Service Data - Section 31.

EMERGENCY CABLES (Fig 5)

55 To remove the rear cockpit rear cable, proceed as follows:

(a) Ensure that the safety pin is installed in the sear of the canopy cartridge firing mechanism.

(b) Disconnect the cable from the cartridge firing mechanism sear by removing the cotter pin and clevis pin.

(c) Unscrew the cable adjuster located below the cartridge firing mechanism.

(d) Remove the nut, bolt and cover plate from the stepped pulley.

(e) Drive out the roll-pins from the pulleys and disconnect the cables.

(f) Remove the upper cable assembly.

(g) Remove the nut and bolt securing the pulley at the RH side of the bulkhead and remove the pulley.

(h) Remove the cotter pin and nut securing the rear cockpit emergency lever. Remove three screws and remove the rear cockpit emergency lever shield.

(j) Break the witness wire and remove the emergency lever.

(k) Remove two self-locking nuts and screws securing the plate on the end of the emergency lever. Remove the plate.

(m) Remove the cotter pin and clevis pin securing the cable connector forward of the rear cockpit emergency lever.

(n) Remove the cable connectors from both cables and withdraw the rear cockpit rear cable.

56 To remove the rear cockpit forward cable proceed as follows:

(a) Slacken the locknut on the upper cable adjuster adjacent to the front canopy emergency lever.

(b) Unscrew the adjuster and withdraw the rear cockpit forward cable from the conduit.

57 To remove the external emergency lanyard, proceed as follows:

(a) Remove the cotter pin and clevis pin securing the cable connector to the external emergency lanyard, adjacent to the front cockpit emergency lever.

(b) Withdraw the cable forward through the hole in the front cockpit emergency lever arm.

(c) Remove the nuts, bolts, cable guards and pulleys from the three brackets on the front face of the frame at station 147.

(d) Pull the cable through the grommets taking care not to damage or dislodge the grommets.

(e) Remove the cable guard from the pulley bracket located inboard of the external lanyard stowage.

(f) Carefully pull the external lanyard out through the grommet in the external lanyard stowage.

58 To remove the front cockpit emergency cable proceed as follows:

ARROW 1 SERVICE DATA

(a) Ensure that the safety pin is installed in the sear of canopy cartridge firing mechanism.

(b) Disconnect the cable from the cartridge firing mechanism sear by removing the cotter pin and clevis pin.

(c) Unscrew the cable adjuster located below the cartridge firing mechanism.

(d) Remove the nut, bolt and cover plate from the stepped pulley.

(e) Drive out the roll-pins from the pulleys and disconnect the cables.

(f) Remove the upper cable assembly.

(g) Remove the nut and bolt securing the pulley to the bracket at the RH side of the bulkhead.

(h) Remove the cotter pin and nut securing the front cockpit emergency lever. Remove three screws and remove the front cockpit emergency lever shield.

(j) Break the witness wire and remove the emergency lever and lever arm.

(k) Remove the cotter pin to disconnect the cable from the lever arm.

(m) Withdraw the cable from the conduit.

59 The procedure for installing the emergency cables is the reverse of that given for removal in paras 55 - 58. The following points should be noted.

(a) When installing the stepped pulleys, ensure that the cable from the emergency lever is connected to the small pulley, and that the cable to the cartridge firing unit is connected to the large pulley.

(b) For adjustment of the cables see para 33.

SEC 32

ARROW 1 SERVICE DATA

EQUIPMENT LIST

AVRO PART NO.	MANUFACTURER AND PART NO.	NOMENCLATURE	QUANTITY IN SYSTEM
7-1052-1037	Martin Baker Ltd MBEU 472-AVR	Jack, Canopy Emergency	2
7-1052-1038	Martin Baker Ltd MBEU 475-AVR/B	Jack, Canopy Actuator	2
7-1052-6589	Martin Baker Ltd MBEU 565-AVR/B	Recuperator	2
7-1152-9	Airborne Accessories R5110	Electrically Actuated Screw Jack	2
7-1053-1, 2	Avro Aircraft Ltd	Pilot's Canopy LH and RH	1
7-1053-3, 4	Avro Aircraft Ltd	Navigator's Canopy LH and RH	1
7-1052-1366	Avro Aircraft Ltd	Idler Lever	2
7-1052-1852	Avro Aircraft Ltd	Support Emergency Jack	2
7-1052-7141	Avro Aircraft Ltd	Hose Assembly H.P. (Front Cockpit)	1
7-1052-7142	Avro Aircraft Ltd	Hose Assembly H.P. (Rear Cockpit)	1
7-1052-5977	Avro Aircraft Ltd	Link Rod	4
7-1052-6451	Avro Aircraft Ltd	Cable Assembly Emergency Lanyard	1
7-1052-6452	Avro Aircraft Ltd	Cable Assembly Front Cockpit Upper	1
7-1052-6453	Avro Aircraft Ltd	Cable Assembly Front Cockpit Lower	1
7-1052-7227	Avro Aircraft Ltd	Cable Assembly Front Cockpit Canopy Firing Mechanism	1
7-1052-6434	Avro Aircraft Ltd	Cable Assembly Rear Cockpit	1
7-1052-7223	Avro Aircraft Ltd	Cable Assembly Rear Cockpit Canopy Firing Mechanism	1

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CONFIDENTIAL

ARROW 1 SERVICE DATA

SECTION 33

CANOPIES

ELECTRICS

(This data supersedes previous issue dated 5 Dec 1956)

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ARROW 1 SERVICE DATA

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1 Mar 58	Title		

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ARROW 1 SERVICE DATA

ELECTRICAL SYSTEM

CANOPIES

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4	Canopy Actuation	5

ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 Each canopy, front and rear, is opened and closed by its respective electric actuator, both actuators deriving their power supply from the battery bus-bar. The inflation and deflation of the canopy seals is controlled by a solenoid valve operated by a power supply taken from the emergency d-c bus-bar. The canopies are mechanically locked when in the closed position.

CANOPY ACTUATION

2 Each canopy is controlled by two double-pole, double-throw switches having OPEN-OFF-CLOSE positions. One switch is mounted in each cockpit, and the other two are mounted externally on the canopy arch for ground operation. Interlocking relays are provided to prevent the external switches from acting in opposition to the internal switches.

3 The canopy actuators are of the linear type and contain load limit switches to cut off the electrical supply when the canopies are in the fully open or fully closed positions.

4 Limit switches actuated by the mechanical lock latches prevent the d-c supply being fed to the actuators before the latches are unlocked.

5 An emergency mechanical release is provided for the mechanical lock latches, as the external switches do not override the latches.

6 The canopies should only be opened and closed once after each flight using the aircraft battery. If further operation is required a ground power supply should be used.

CANOPY SEAL INFLATION

7 The canopy seal inflation valve is solenoid operated by micro-switches actuated by the canopy mechanical latch locking handles. The solenoid is energized and the canopy seals inflated when the second canopy is locked, and is de-energized to deflate the seals when the first canopy is unlocked.

FUNCTION TESTING

CANOPY ACTUATION CIRCUITS TEST

8 Check the operation of the canopy actuation circuits proceeding as follows:

(a) Check that an external source of a-c power supply is connected to the aircraft external supply receptacle and that the MASTER ELECT switch is set to the ON position.

(b) Check that the FRONT and REAR ACT., canopy CONT and SEAL circuit breakers, grouped under the heading CANOPY on circuit breaker panel E1, are switched on.

(c) Hold the front cockpit canopy actuation switch in the CLOSE position until the canopy is fully closed. Note that the operation of the canopy actuator is smooth throughout its travel.

(d) Set the canopy latch locking handle to the canopy locked position. There should be no power on the actuator when the canopy actuation switch is selected to OPEN.

(e) Set the canopy latch locking handle to the canopy unlocked position then hold the canopy actuation switch to OPEN until the canopy is fully open.

(f) With the front canopy ground service switch selected to CLOSE and the canopy in the process of closing, check that the canopy actuation switch will override the ground service switch by selecting the OPEN position.

(g) Repeat operations (c) to (f) inclusive for the rear canopy actuation switch.

CANOPY SEAL VALVE TEST

9 The operation of the canopy seal valve is tested during the canopy seal testing procedure described in Arrow I System Service Data - Low Pressure Air System.

PROCEDURE UPON COMPLETION OF TESTING

10 To conserve the capacity of the storage battery, the following procedure should be followed:

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ARROW 1 SERVICE DATA

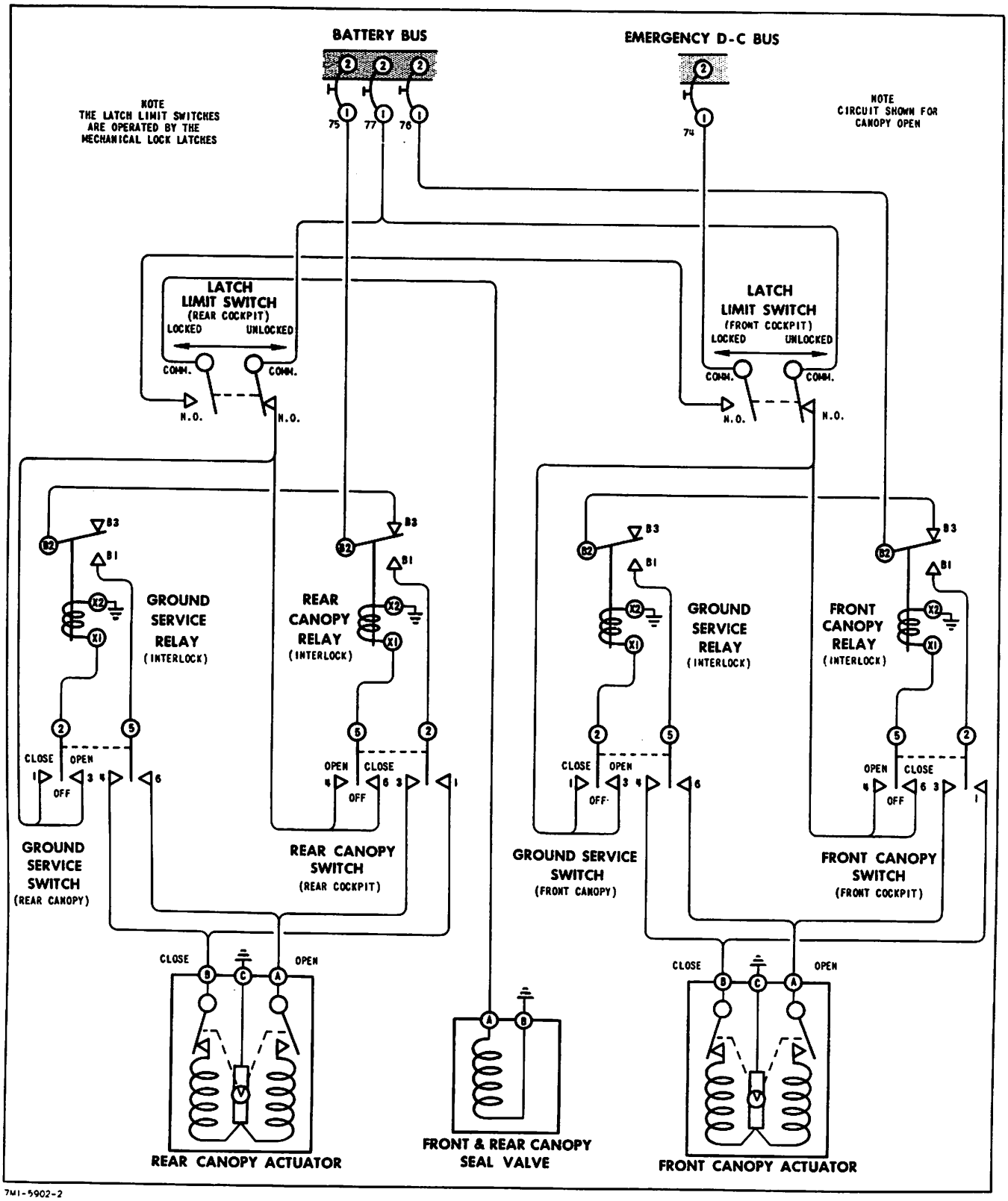


FIG. 1 CANOPY ACTUATION SCHEMATIC

(a) Hold the rear canopy ground service switch in the CLOSE position until the rear canopy is fully closed.

(b) Select the MASTER ELECT switch to the OFF position.

(c) Hold the front canopy ground service switch in the CLOSE position until the front canopy is fully closed.

(d) Disconnect the external source of power from the external supply receptacle.

LATCH LIMIT SWITCHES ADJUSTMENT

11 To adjust the latch limit switches proceed as follows:

(a) Connect a test lamp between ground and the normally-open contact of the relevant limit switch.

(b) Set the latch locking handle to its full travel in the unlocked position if the canopy actuation limit switch is to be adjusted, or to the canopy locked position if the canopy seal limit switch is to be adjusted.

(c) Loosen the limit switch mounting screws and adjust the switch until the test lamp just illuminates. To provide an operating override adjust the switch to increase the depression of the actuating arm by .025 - .075 inch. Tighten the mounting screws when the adjustment is complete. (See fig 2).

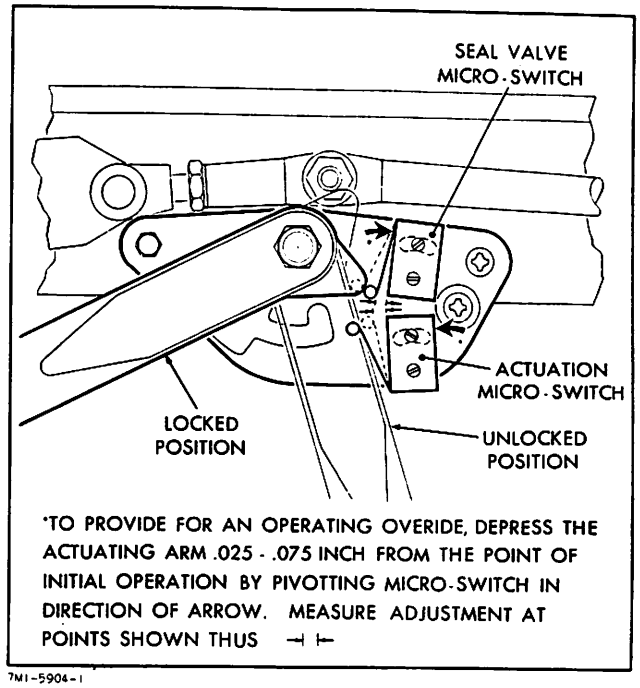
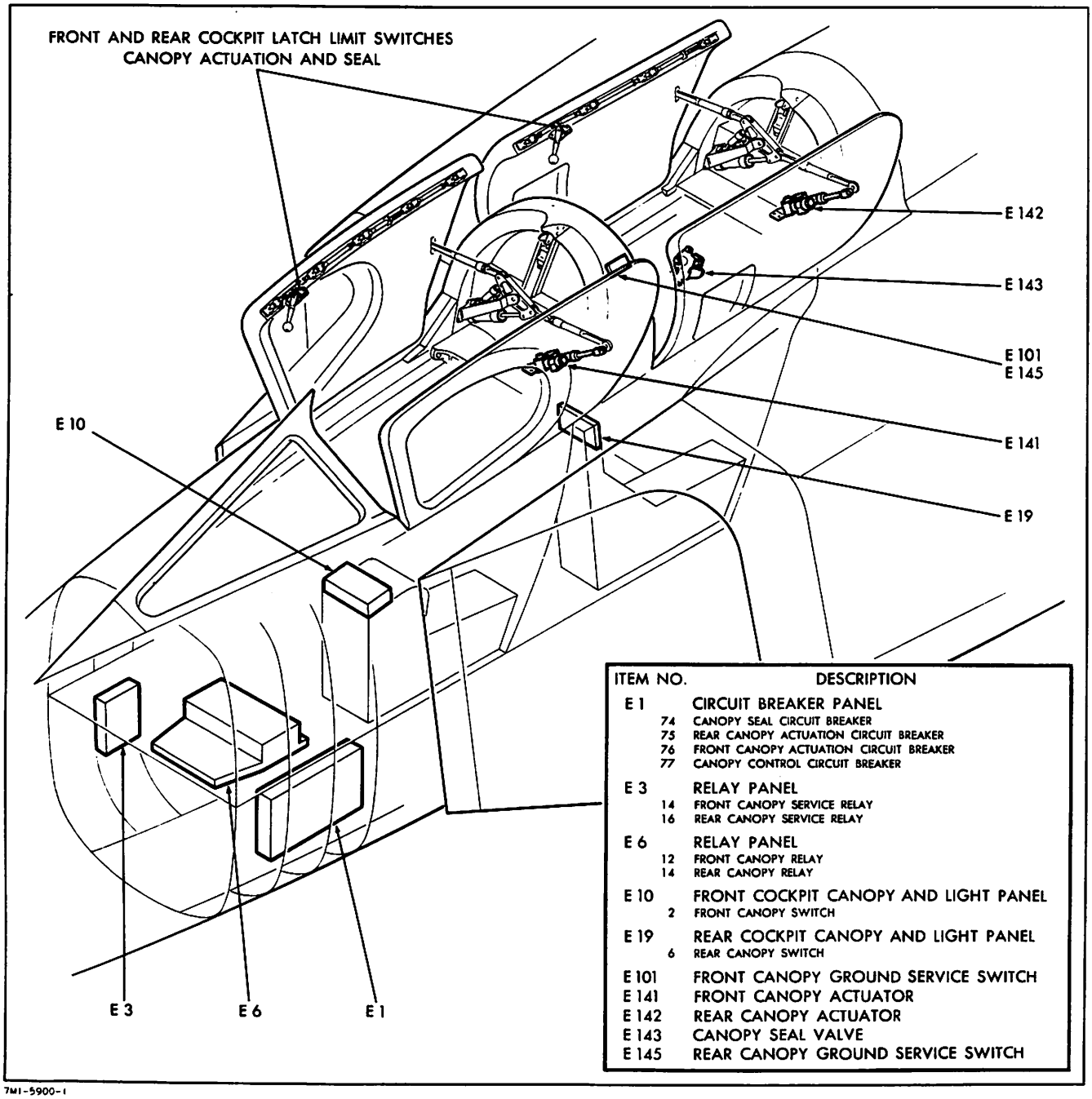


FIG. 2 CANOPY LATCH LIMIT SWITCH ADJUSTMENT

(d) Remove the test lamp and check the operation of the canopy actuation circuits as described in para 8.

ARROW 1 SERVICE DATA



ITEM NO.	DESCRIPTION
E 1	CIRCUIT BREAKER PANEL
74	CANOPY SEAL CIRCUIT BREAKER
75	REAR CANOPY ACTUATION CIRCUIT BREAKER
76	FRONT CANOPY ACTUATION CIRCUIT BREAKER
77	CANOPY CONTROL CIRCUIT BREAKER
E 3	RELAY PANEL
14	FRONT CANOPY SERVICE RELAY
16	REAR CANOPY SERVICE RELAY
E 6	RELAY PANEL
12	FRONT CANOPY RELAY
14	REAR CANOPY RELAY
E 10	FRONT COCKPIT CANOPY AND LIGHT PANEL
2	FRONT CANOPY SWITCH
E 19	REAR COCKPIT CANOPY AND LIGHT PANEL
6	REAR CANOPY SWITCH
E 101	FRONT CANOPY GROUND SERVICE SWITCH
E 141	FRONT CANOPY ACTUATOR
E 142	REAR CANOPY ACTUATOR
E 143	CANOPY SEAL VALVE
E 145	REAR CANOPY GROUND SERVICE SWITCH

FIG. 3 LOCATION OF ELECTRICAL COMPONENTS - CANOPY CIRCUITS

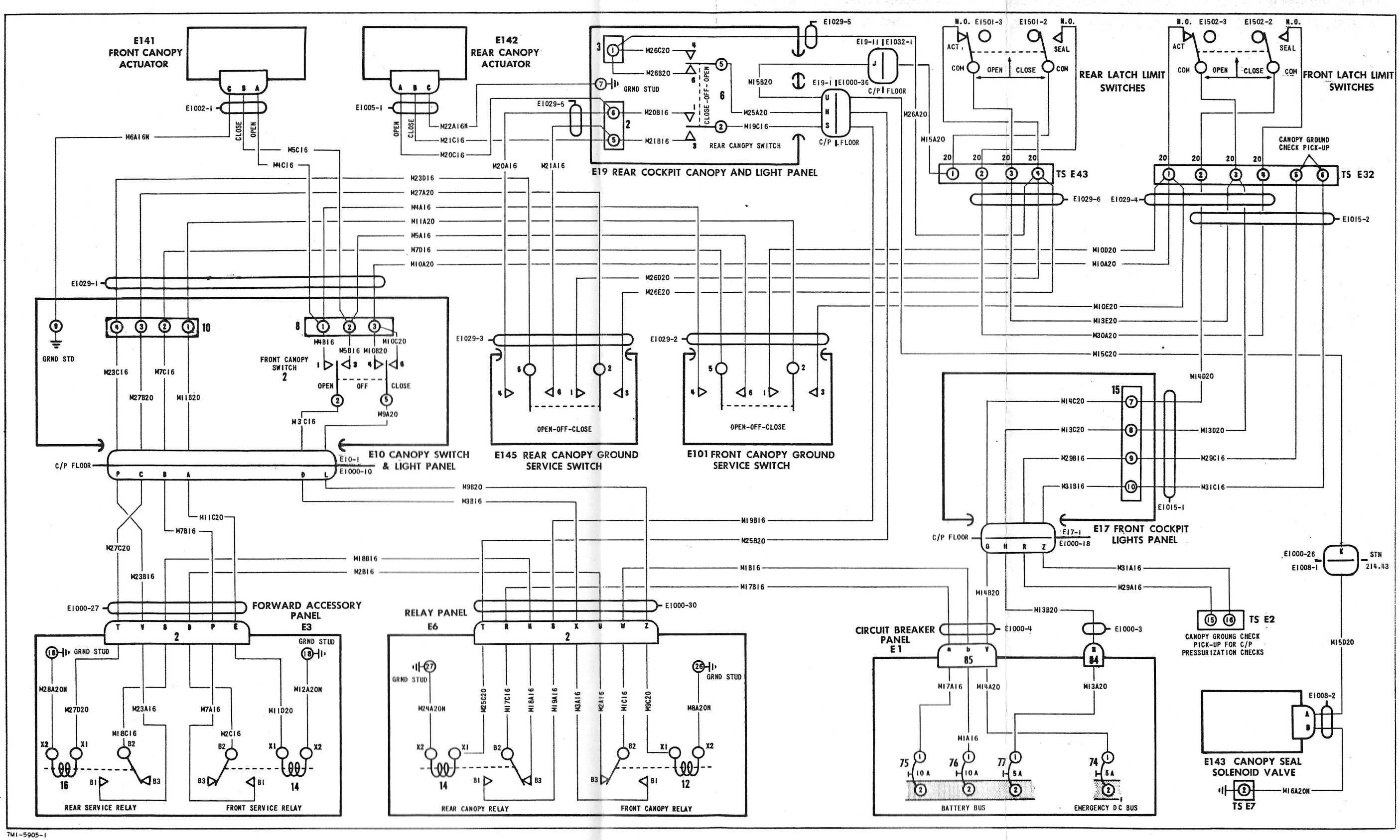


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FIG. 4 CANOPY ACTUATION

187-10

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Front Canopy Actuation Switch	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler-Hammer	8834K4	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To complete the supply circuits for the front canopy actuator.

LOCATION

On panel E10 LH console.

ACCESS

Unobstructed when panel E10 is released from the console - 4 screws.

MEN X MINUTES

REPLACEMENT PROCEDURE

Mount switch on panel E10.
Fit and secure six circuit connections.
Refit panel E10 to LH console - 4 mounting screws.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Operate the switch and check that the lever action is smooth and that the make and break is not sluggish or rough.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA UNCLASSIFIED

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Rear Canopy Actuation Switch	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler-Hammer	8834K4	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To complete the power supply for the rear canopy actuator.

LOCATION

On panel E19 LH console.

ACCESS

MEN X MINUTES

Unobstructed when panel E19 is released from the console - 4 quick fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES

Mount switch on panel E19.
Fit and secure six circuit connections.
Refit panel E19 to LH console - 4 quick fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Operate the switch and check that the lever action is smooth and that the make and break is not sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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ENCLOSURE

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Canopy External Actuation Switches	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-S-159-7			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To facilitate operating the front and rear canopies externally.
The switches complete the supply to the canopy actuators.

LOCATION

On LH side canopy centre arch.

ACCESS — MEN X MINUTES

Via hinged access door on LH side of aircraft between the front cockpit and the rear cockpit.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure switches to mounting plate with mounting nuts supplied.
Fit and secure the circuit wires.
Fit and secure the mounting plate - six screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Clean externally. Operate the switch and check that the lever action is smooth and that the make and break is not sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Latch Limit Switches, (Actuation) Front and Rear	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-S-152			25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

To interrupt the power supply to the canopy actuators when the canopies are locked.

LOCATION

Front cockpit; on index plate aft of the front canopy latch locking handle.
Rear cockpit; on index plate aft of the rear canopy latch locking handle.

ACCESS

MEN X MINUTES

Unobstructed in the front and rear cockpits.

REPLACEMENT PROCEDURE

MEN X MINUTES

Assemble actuation latch limit switches.
Install on index plate aft of latch locking handle, and secure with two mounting screws each.
Connect and secure circuit wires.
Fit and secure switch cover.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for security of mounting and electrical connection. Check switch actuation for distortion.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

CONFIDENTIAL
UNCLASSIFIED

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Interlock Relays, Internal (2)	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To prevent the internal and external canopy actuation switches operating the canopy actuator in opposition.

LOCATION

E6 relay panel on roof of nose wheel well.

ACCESS

MEN X MINUTES

Unobstructed when cover of E6 is removed - four quick fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES

Mount relays in E6 using two mounting screws.
Fit and secure five circuit connections.
Refit cover of E6 - four quick fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check circuit connections for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Interlock Relays, External (2)	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To prevent the external and internal canopy actuation switches operating the canopy actuator in opposition.

LOCATION

E3 in nose wheel well, RH side.

ACCESS

Unobstructed when cover of E3 is removed - four quick fasteners.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Mount relay in E3 using two mounting screws.
Fit and secure four circuit connections.
Refit cover of E3 - four quick fasteners.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check circuit connections for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Front Canopy Actuator	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-9	Winnett-Boyd (Airborne Accessories)	E1600 N48-1	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To open and close the front canopy.

LOCATION

Front cockpit - between the base of the canopy and the seat bulkhead.

ACCESS

Unobstructed when the front canopy is open.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Insert pip-pin holding actuator to canopy.
Refit nut and bolt securing actuator to seat bulkhead.
Fit and secure electrical connector.

MEN X MINUTES	

DECLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check actuator for security. Check that the electrical connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Rear Canopy Actuator	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-9	Winnett-Boyd (Airborne Accessories)	E1600 N48-1	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To open and close the rear canopy.

LOCATION

Rear cockpit - between the base of the canopy and the seat bulkhead.

ACCESS

MEN X MINUTES

Unobstructed when the rear canopy is open.

REPLACEMENT PROCEDURE

MEN X MINUTES

Insert pip-pin holding actuator to canopy.
Refit nut and bolt securing actuator to seat bulkhead.
Fit and secure electrical connector.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the actuator is securely mounted. Check that the electrical connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Canopy Seal Valve	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1852-14	Surface Combustion	30C98	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

Permits entry of air pressure to inflate the canopy seal.

LOCATION

Rear cockpit bulkhead.

ACCESS

	MEN X MINUTES	
Remove panel on underside of the fuselage aft of the rear cockpit bulkhead, between stations 224 and 225 - 76 x 3/16 inch screws. Disconnect antenna attached to panel. Remove HP pneumatics storage bottle.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure valve to structure - 3 x 10/32 inch mounting bolts. Fit and secure two pipelines to valve. Install HP pneumatics storage bottle. Fit and secure 10 bolts in storage bottle cradle and two screws securing bottle straps. Fit and secure one pipeline to bottle. Reconnect antenna. Fit and secure panel on underside of fuselage between stations 224 and 225 - 76 x 3/16 inch screws.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA UNCLASSIFIED

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	CANOPIES	Latch Limit Switches, Front and Rear Canopy Seal	11-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-S-152			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To complete the power supply to the canopy seal valve solenoid when the canopies are locked.

LOCATION

Front cockpit; on index plate aft of the front canopy latch locking handle.
Rear cockpit; on index plate aft of the rear canopy latch locking handle.

ACCESS

MEN X MINUTES

Unobstructed in the front and rear cockpits.

REPLACEMENT PROCEDURE

MEN X MINUTES

Assemble seal latch limit switches.
Install on index plate aft of latch locking handle and secure with two mounting screws each.
Connect and secure circuit wires.
Fit and secure switch cover.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check for security of mounting and electrical connection. Check switch actuation for distortion.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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ARROW 1 SERVICE DATA

SECTION 34

WINDSHIELD AND CANOPY DE-ICING

(This data supersedes previous issue dated 17 Apr 57)

CONFIDENTIAL

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

ELECTRICAL SYSTEM

WINDSHIELD AND CANOPY DE-ICING

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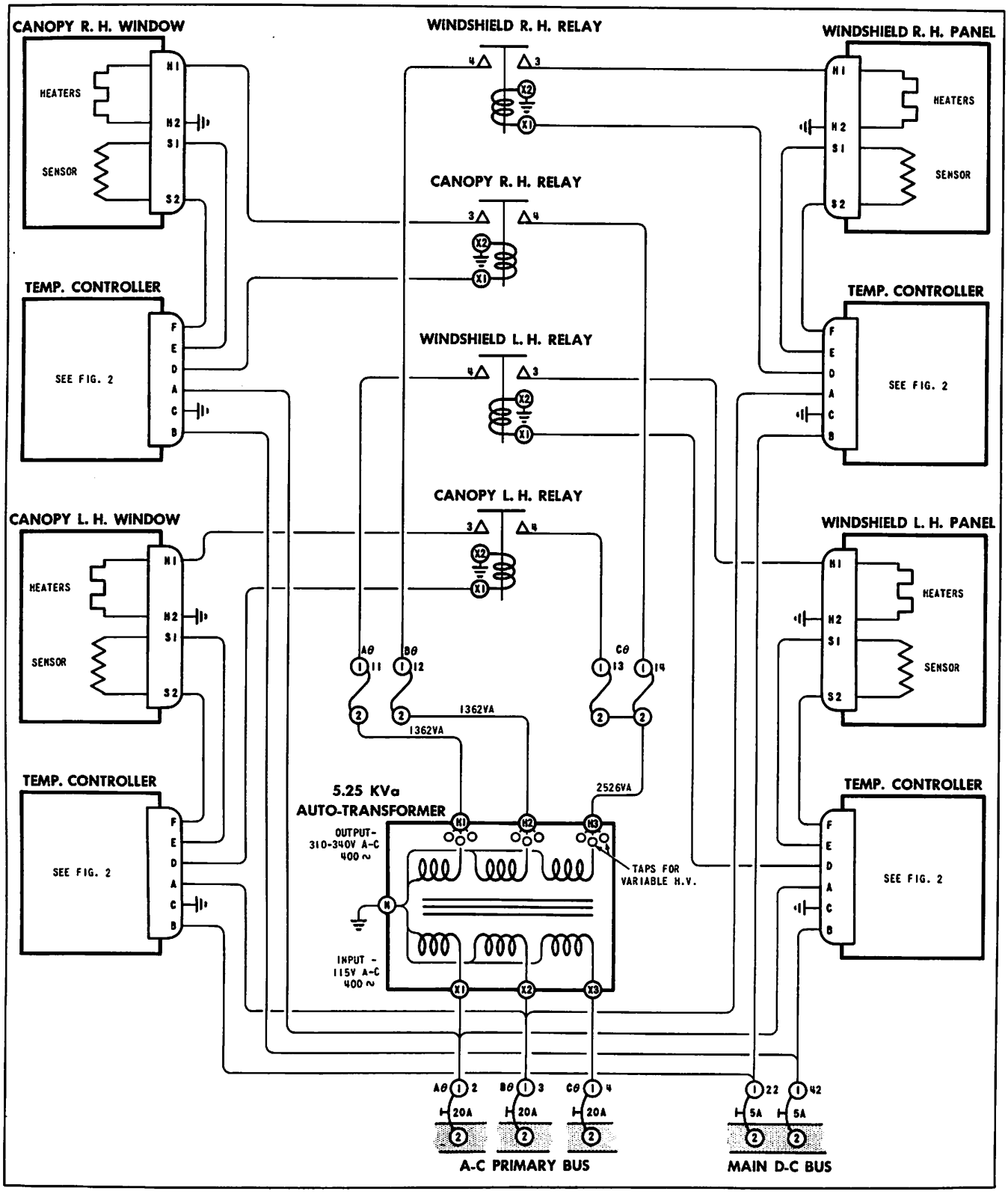

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FIG. 1 WINDSHIELD AND CANOPY DE-ICING SCHEMATIC

DESCRIPTION

GENERAL

1 The two window panels of the pilot's canopy and the two panels of the windshield are electrically heated to prevent misting and icing. An independent heating and temperature control circuit is provided for each panel.

2 The circuit for each panel includes a temperature controller, a sensor and a circuit relay. These components operate in conjunction to restrict the temperature of the heating elements to 43.3°C (110°F).

3 The heating elements operate on 310-340 volts AC which is supplied by a 3-phase 5.25 KVA auto-transformer. The auto-transformer is operative when the AC primary bus-bars are live. The two windshield panels are supplied from separate phases. The two window panels derive their supply from a common phase.

4 There are no control switches for the system, the circuits being automatically operative when the main DC and primary AC bus-bars are live.

HEATING ELEMENTS

5 The windshield and canopy window panels are constructed of a number of plies of glass. The heating element is affixed to the inside of the outer ply and consists of a layer of transparent electrically conductive thermo-plastic.

6 The power supply circuit for each heating element incorporates a circuit relay, the circuit being completed when the relay is energized. The operation of the circuit relay is controlled by the appropriate temperature control circuit.

TEMPERATURE CONTROL CIRCUITS

7 The operating limits of each of the four temperature controllers and their associated temperature sensors are identical.

8 Each temperature controller incorporates a magnetic amplifier, a control relay, a supply relay and three segments of a bridge circuit. The fourth segment of the bridge is the temperature sensor.

9 The temperature sensor is embedded in the panel in contact with the heating element. It is a resistor with a positive co-efficient of temperature characteristic, i.e. as temperature rises, resistance increases; as temperature falls, resistance decreases.

10 Two segments of the bridge circuit are connected to two of the three core windings of the magnetic amplifier. These windings have a control function. The third winding, which has a constant voltage applied, serves as a reference winding.

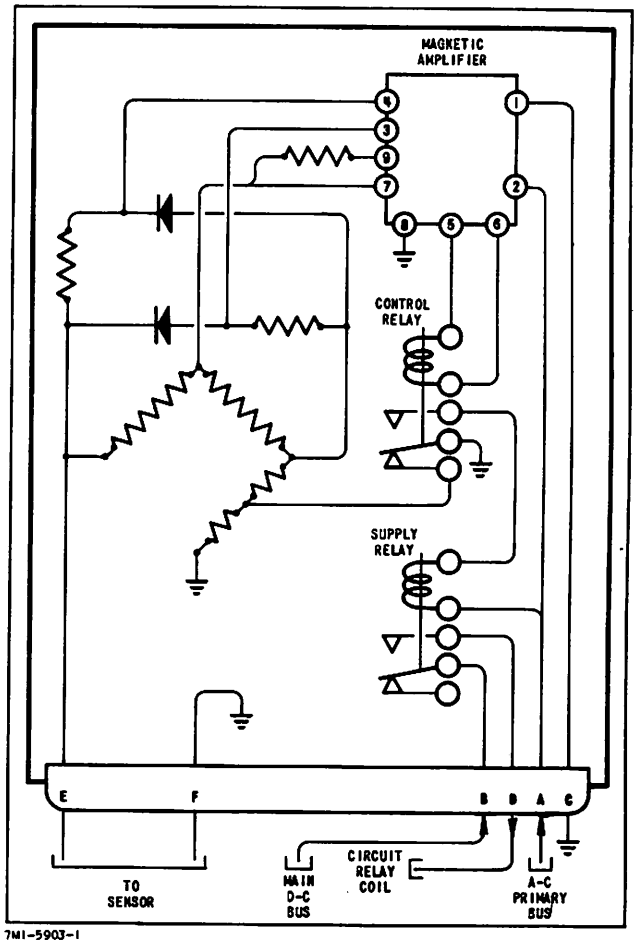

FIG. 2 TEMPERATURE CONTROL UNIT SCHEMATIC

11 The bridge circuit is balanced when the panel temperature is 43.3°C (110°F). Until this temperature is reached, the unbalanced condition of the bridge results in sufficient current flow through the magnetic amplifier to energize the control relay.

12 The control relay, when energized, completes the ground return for the coil of the supply relay. The supply relay then completes the supply circuit to the coil of the circuit relay which in turn closes the supply circuit to the heating element.

13 When the peak temperature is reached, the impedance of the magnetic amplifier will have increased to a point where insufficient current will flow to energize the control relay. In the de-energized condition, the control relay reduces the effective resistance of one segment of the bridge. The sensor must then decrease in resistance by an amount equivalent to that deducted by the action of the control relay before the bridge is again unbalanced.

FUNCTION TESTING

GENERAL

14 A windshield and canopy test panel is provided to facilitate function testing the canopy and windshield de-icing circuits. The test panel indicates the completion of the supply circuit to a selected panel heating element and the current flow in the associated sensing circuit. By correlating the sensing circuit current flow to temperature, a check that the circuit is cutting out at the correct temperature can be obtained.

15 At present, current values for the sensing element are not available. Therefore as an interim test, when checking each circuit note the current indicated at the cut-out point. By comparing the indications so obtained, malfunction of a sensing circuit will be evident.

WINDSHIELD AND CANOPY DE-ICING TEST PANEL (Fig 3)

16 The test panel incorporates an AC voltmeter, an AC milliammeter, a five position wafer selector switch marked NORMAL RUNNING, and two connectors with associated cabling which enable the test panel to be connected into the windshield and canopy de-icing circuits.

17 The AC voltmeter is connected to the normally de-energized side of the circuit relays and will affirm the closing of the appropriate circuit relay by indicating the line to ground voltage (310 ± 10 volts) of the supply transformer secondary winding.

18 The AC milliammeter circuit wiring is arranged to be inserted in series with the selected temperature sensor circuit. The AC milliammeter reading will register a decrease in relation to an increase in windshield or

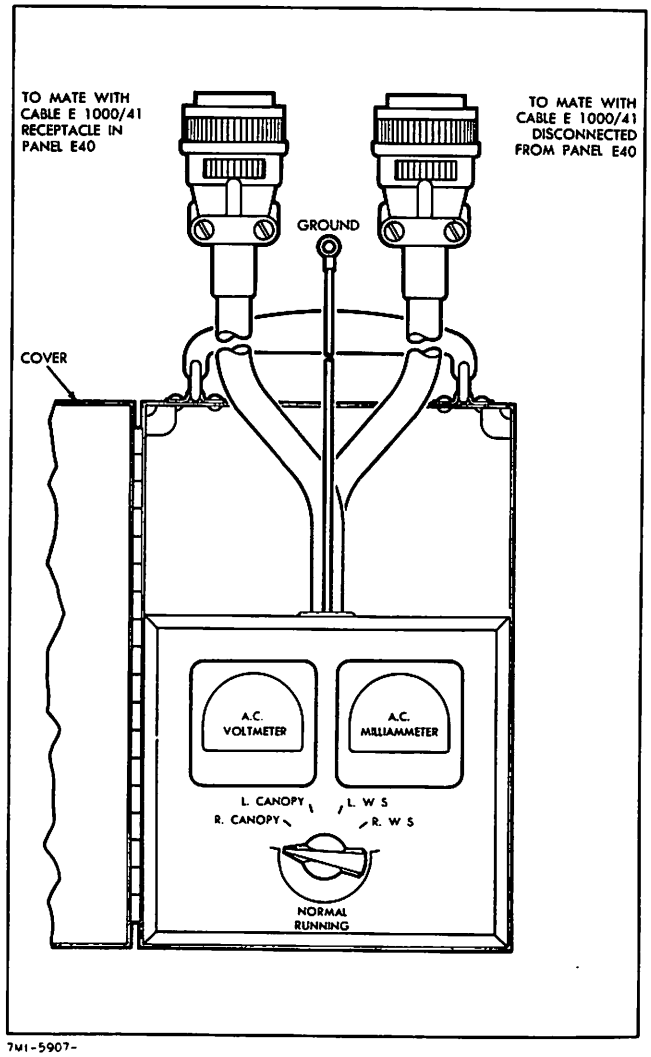

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FIG. 3 WINDSHIELD AND CANOPY DE-ICING TEST PANEL

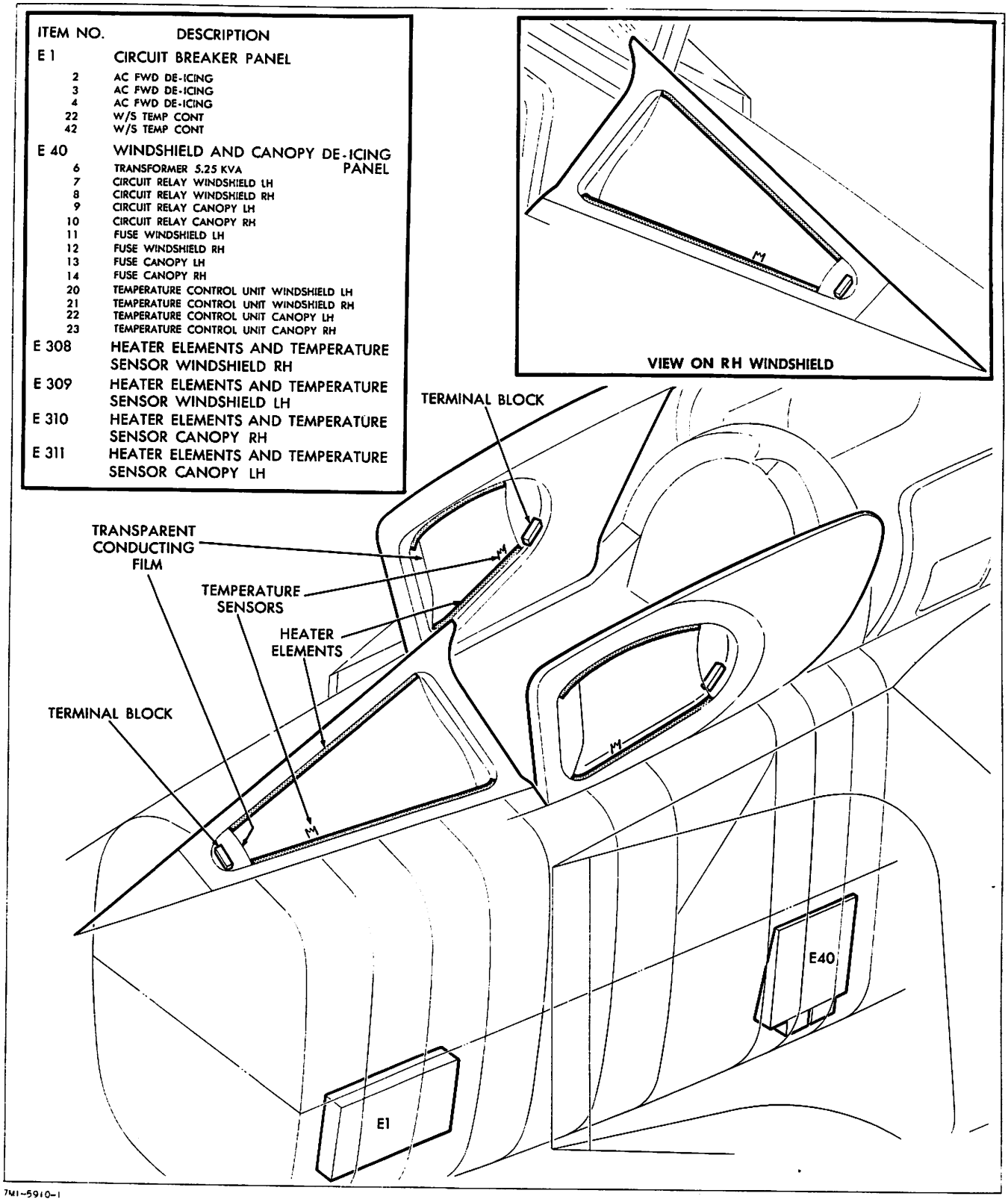

FIG. 4 LOCATION OF WINDSHIELD AND CANOPY DE-ICING ELECTRICAL COMPONENTS

canopy temperature. At the cut-out temperature, the consequent drop out of the circuit relay will be indicated by the voltmeter.

19 To test the windshield and canopy de-icing circuits, the test panel is connected in series with panel E40 as follows:

(a) At panel E40 located on the LH side of the nose wheel well, disconnect cable E1000/41 and connect it to the mating plug of the test panel.

(b) Connect the remaining plug of the test panel to cable E1000/41 receptacle on panel E40.

(c) Connect the ground wire of the test panel to the ground terminal on panel E40.

(d) Ensure that the two W/S TEMP CONT and the three AC FWD DE-ICING circuit breakers on panel E1 located on the LH side of the nose wheel well are closed.

(e) Select the MASTER ELEC switch to the OFF position then withdraw the following fuses from panel E40:

L-R.W. SCREEN #11. #12.
L-R CANOPY #13. #14.

Ensure that they are serviceable, but do not refit them until the circuits are to be tested.

RIGHT CANOPY DE-ICING CIRCUIT

20 Check that an external source of AC power supply is connected to the aircraft external supply receptacle, and that the test panel is interconnected with panel E40 as described in para 5(a) to (e).

(a) Refit the CANOPY-R fuse in panel E40.

(b) Select the NORMAL RUNNING switch on the test panel to the R. CANOPY position.

(c) Select the MASTER ELEC switch to the ON position.

(d) The AC voltmeter should register 310 ± 10 volts.

(e) When the right canopy reaches the cut-out temperature, the voltmeter reading should drop to zero. When this occurs, note the milliammeter reading and compare it with those obtained for the remaining circuits.

(f) Select the MASTER ELEC switch to the OFF position.

(g) Remove the CANOPY-R fuse from panel E40.

LEFT CANOPY DE-ICING CIRCUIT

21 Repeat the procedure outlined in para 20(a) to (g) substituting left canopy for right canopy.

RIGHT WINDSHIELD DE-ICING CIRCUIT

22 Repeat the procedure outlined in para 20(a) to (g) substituting right windshield for right canopy.

LEFT WINDSHIELD DE-ICING CIRCUIT

23 Repeat the procedure outlined in para 20(a) to (g) substituting left windshield for right canopy.

PROCEDURE UPON COMPLETION OF TESTS

24 Upon completion of testing, check the following:

(a) That the test panel is disconnected from the windshield and canopy de-icing system.

(b) That cable E1000/41 is securely and properly connected to its receptacle on panel E40.

(c) That the windshield and canopy fuses have been refitted securely and properly in panel E40.

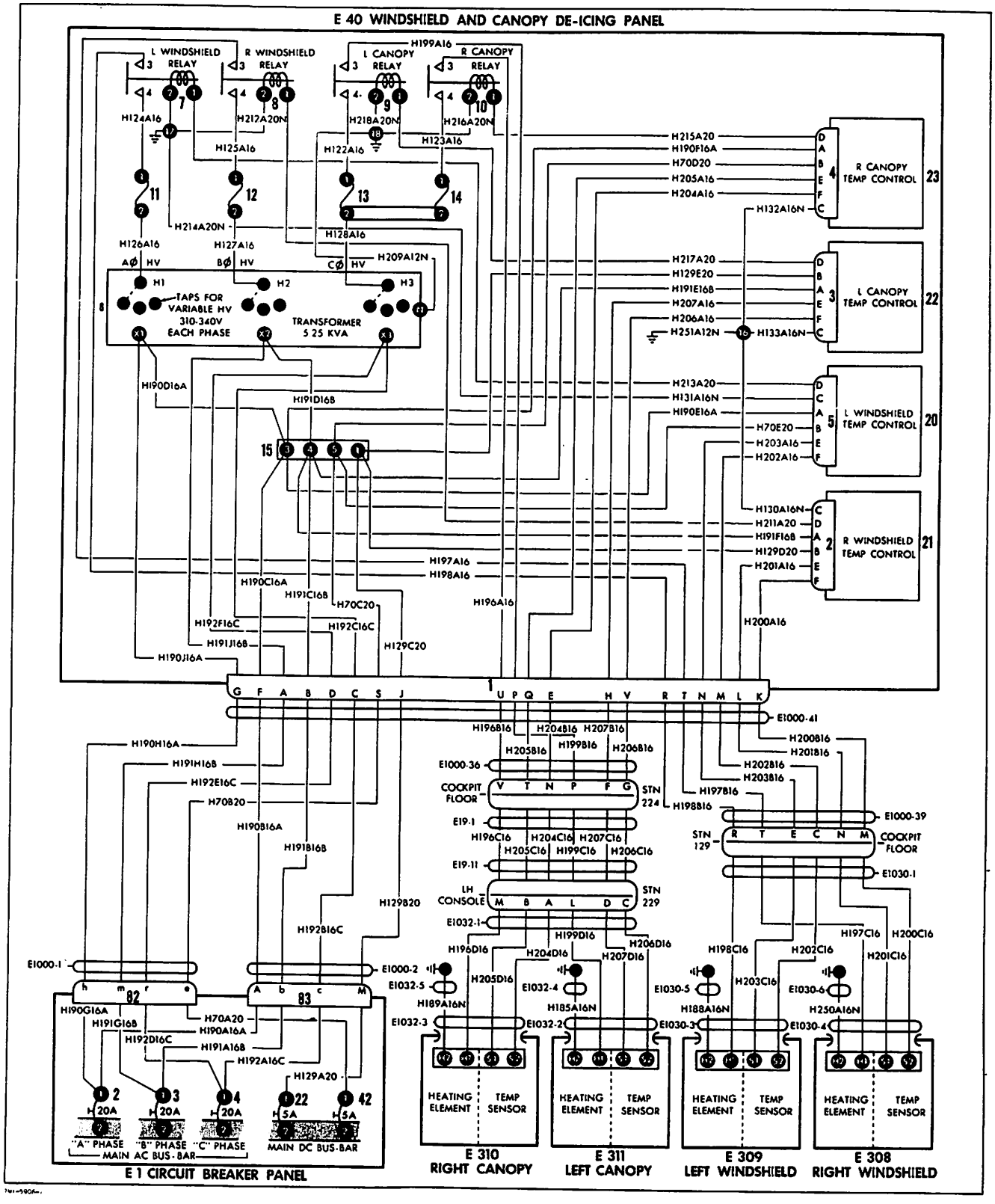

FIG. 5 WINDSHIELD AND CANOPY DE-ICING

UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	WINDSHIELD AND CANOPY DE-ICING	De-icing Panel E40	11-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2052-1	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To house temperature control units, supply transformer, relays and limiters used in the de-icing system.

LOCATION

Nose wheel well between stations 195 to 208 - LH side, aft.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the panel to the structure - five screws.
Connect and secure the air conditioning supply line to the transformer.
Connect and secure one bonding lead.
Connect and secure the circuit wiring to the transformer.
Connect and secure one electrical connector.

MEN X MINUTES

INSPECTION	MEN X MINUTES	
Check that the panel is securely mounted. Check that the units are securely mounted and undamaged. Check that the circuit wiring to the transformer is securely and properly connected. Check that the bonding lead is securely connected. Check that the air conditioning supply line is securely and properly connected. Check that the limiters are not discoloured.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	WINDSHIELD AND CANOPY DE-ICING	Transformer	11-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2052-16	Hammond Transformer Co.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide a power source of 310-340 volts 3-phase a-c at 5.25 KVa.
Derives a 115/200 volt 3-phase supply from the alternators.

LOCATION

Mounted on the de-icing panel E40.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the transformer to the panel - four bolts.
Connect and secure the electrical wiring.
Connect and secure one air conditioning supply line.

MEN X MINUTES

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the transformer is securely mounted. Check that the circuit wiring is securely and properly connected. Check that the air conditioning supply line is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	WINDSHIELD AND CANOPY DE-ICING	Temperature Controllers - 4	11-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	AiResearch	547150	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To control the temperature of the heated panels - one control unit to each panel.

LOCATION

Mounted on the de-icing panel E40.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the unit to the de-icing panel E40 - four 10/32 inch mounting bolts.
Connect and secure one electrical connector.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the electrical connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	WINDSHIELD AND CANOPY DE-ICING	Relays, Canopy De-icing - 2	11-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2052-15	Electronic Specialties		25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To complete the AC supply to the heating elements of the canopy window panels.

LOCATION

Mounted on the de-icing panel E40.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure the unit to the de-icing panel E40 - four screws.
Connect and secure circuit wiring - two connections.
Fit and secure the relay cover plate - four screws.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely and properly mounted. Check that the electrical connections are securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED CONFIDENTIAL

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	WINDSHIELD AND CANOPY DE-ICING	Relays, Windshield De-icing - 2	11-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2052-15	Electronic Specialties		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To complete the AC supply to the heating elements of the windshield panels.

LOCATION

Mounted on the de-icing panel E40.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure the unit to the de-icing panel E40 - four screws.
Connect and secure circuit wiring - two connections.
Fit and secure the relay cover plate - four screws.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely and properly mounted. Check that the electrical connections are securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED
CONFIDENTIAL

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	WINDSHIELD AND CANOPY DE-ICING	Front Canopy Panels - 2	11-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1053-212, 211	Libby-Owens		25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To provide a mist and ice free glass panel in the RH and LH half shells of the front canopy.

LOCATION

In the canopy half shells, LH and RH.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

See Arrow 1 Service Data - Structure.

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the terminal block is securely and properly mounted. Check that the electrical connections are securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

CONFIDENTIAL
UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	WINDSHIELD AND CANOPY DE-ICING	Windshield Panels - 2	11-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1052-1387, 1388			25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

To provide a mist and ice free windshield.

LOCATION

The panels form the windshield.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

See Arrow 1 Service Data - Structure.

MEN X MINUTES	

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the terminal block is securely and properly mounted. Check that the electrical connections are securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 35

INSTRUMENTS

CONFIDENTIAL

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

INSTRUMENTS

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The information and illustrations contained in this section provide a general reference for the controls and instruments in the front and rear cockpits.

FRONT COCKPIT CONTROLS AND INSTRUMENTS (Fig 13)

2 The controls and instruments in the front cockpit are illustrated in fig 13. Flight instruments which are not components of a navigation system are described in the following paragraphs. Those flight instruments which are components of a navigation system are described in the relevant electronic sections of the Arrow 1 Service Data. All other items of front cockpit equipment are covered with their relevant systems in the appropriate sections of the Arrow 1 Service Data.

REAR COCKPIT CONTROLS AND INSTRUMENTS (Fig 14)

3 The equipment in the rear cockpit is illustrated in fig 14. With the exception of the altimeter which is described in this section all other items of equipment in the rear cockpit are covered with their relevant systems in the appropriate sections of the Arrow 1 Service Data.

STANDBY COMPASS (Fig 1)

4 The standby compass which is located on the front cockpit main instrument panel at the upper RH side, indicates continuously the magnetic heading of the aircraft.

5 The heading is displayed on a scale which is read off against a reference or lubber line visible through a glass aperture or lens in the front of the instrument. The lubber line is parallel to the longitudinal axis of the aircraft. Sixty degrees of the scale are exposed by the lens.

6 The compass depends for its operation upon the effect of the earth's magnetic field on a pair of bar magnets, so arranged that their

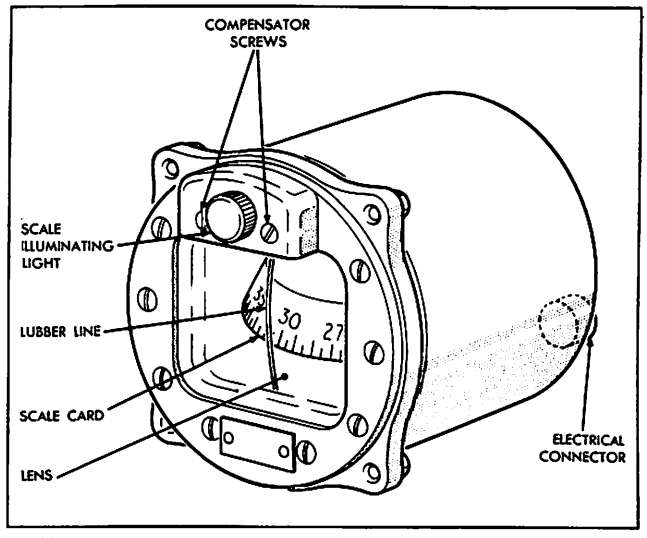


FIG. 1 STANDBY COMPASS

axes are parallel to each other and to the N-S axis of a card to which they are attached. The card is graduated in divisions of five degrees around its perimeter. The numbers are abbreviated by deleting the '0', e.g. 6 represents 60, 19 represents 190 degrees. The cardinal points are marked N, S, E and W.

7 The card and the magnets are attached to a pivot which is free to rotate on a jewel bearing supported on a guide assembly. A guide spring absorbs external vibration. The jewel mounted card assembly is contained in an air-tight case which is filled with damping liquid to stabilize the movement. A filler hole on top of the instrument provides for filling or draining of the liquid. Variations in volume of the liquid due to temperature changes are taken up by a flexible diaphragm which divides an expansion chamber in the rear of the instrument.

8 A poly-plane compensator mounted above the rotating member compensates for errors in indication introduced by local magnetic interference.

9 The instrument face is lighted by a single lamp secured by a holder assembly screwed into the front face of the unit above the lens. Electrical connection to the lamp is made via a connector at the rear of the instrument. Information on the lighting power supply is

contained in Arrow 1 Service Data - Section 39 - Internal and External Lighting.

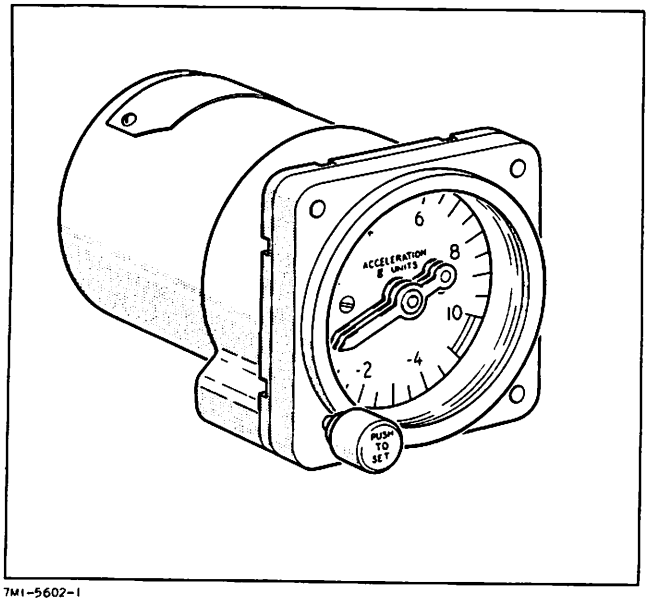
10 For further information on the compass refer to EO 20-25BD-2.

ACCELEROMETER (Fig 2)

11 The accelerometer which is located on the front cockpit main instrument panel at the top LH side, indicates the load on the aircraft structure in terms of gravitational ('g') units.

12 The instrument has three concentric pointers which indicate on a common scale. The main pointer indicates, continuously, the load factor of positive or negative forces imposed on the aircraft structure. The two subsidiary pointers record the greatest positive and the greatest negative load factor encountered in flight. The subsidiary pointers remain fixed at the greatest load factor encountered and may be reset at any time by the operation of a PUSH-TO-RESET button in the lower left side of the instrument bezel.

13 The scale extends from -5 'g' to +10 'g'. Each scale division represents 0.5 'g' and alternate division marks increase in length as a greater value of 'g' is indicated. The division mark at +1 'g' is thicker than the others to accentuate this load factor. Positive values



7MI-5602-1

FIG. 2 ACCELEROMETER

are indicated on the upper portion of the scale, and negative values on the lower portion.

14 Operation of the instrument is based upon the reaction of a suspended mass assembly which is sensitive to changes in load on the aircraft. As the mass responds to changes in load, it moves up or down guides. This action transmits the motion to produce deflection of the main pointer in the appropriate direction, i.e., clockwise for a positive force and counterclockwise for a negative force. The same operation will move the appropriate subsidiary pointer unless the particular load factor encountered has been previously attained.

15 This instrument is self-contained and does not require external connections. A locking device is incorporated to prevent damage to the instrument when it is not installed in the aircraft. A screw in the rear of the case marked LOCK and UNLOCK actuates the device. In the LOCK position the mass assembly is locked rigidly in place.

16 For further information on the accelerometer refer to EO 20-140CAA-2.

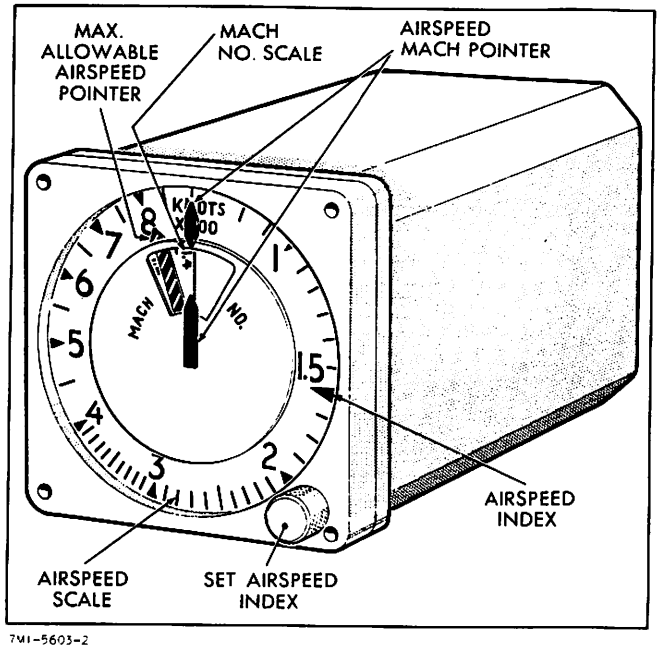
MACH/AIRSPEED INDICATOR (Fig 3)

17 The Mach/Airspeed Indicator located on the main instrument panel in the front cockpit displays indicated airspeed and mach number on a single dial, and the maximum allowable indicated airspeed for all altitudes. A control is provided to adjust an airspeed index which can be set to indicate landing or take-off speed.

18 The instrument consists of the following three independent mechanisms:

(a) A pitot-static operated airspeed mechanism which drives a pointer and a pointer-mask to indicate airspeed on the perimeter of a fixed dial. The dial is graduated from 80 to 850 knots; in 10 knot increments from 80 to 400 knots and in 50 knot increments from 400 to 850 knots.

(b) A static pressure operated altitude mechanism which drives a moving scale graduated to indicate mach numbers from 0.5 to 2.2 mach. The indicated mach number appears



7MI-5603-2

FIG. 3 MACH/AIRSPEED INDICATOR

in a cutaway portion of the airspeed pointer-mask. The airspeed pointer is split to indicate mach number on the inner scale and equivalent indicated airspeed on the outer scale. The mach number scale is graduated in divisions of 0.02 from 0.5 to 1.0 mach, and in divisions of 0.05 from 1.0 to 2.2 mach. The mach number scale rotates as altitude changes so that the mach number corresponds to the indicated airspeed at all altitudes.

(c) A static pressure operated altitude mechanism which drives a red and black striped pointer to indicate maximum allowable airspeed at all altitudes. The pointer is adjusted at standard sea level condition to a preset value by an adjusting screw in the rear of the case. The screw is accessible through the static pressure inlet.

19 A SET INDEX knob located on the lower right hand side of the bezel is used to set the airspeed index which is a white triangular marker on the perimeter of the airspeed scale.

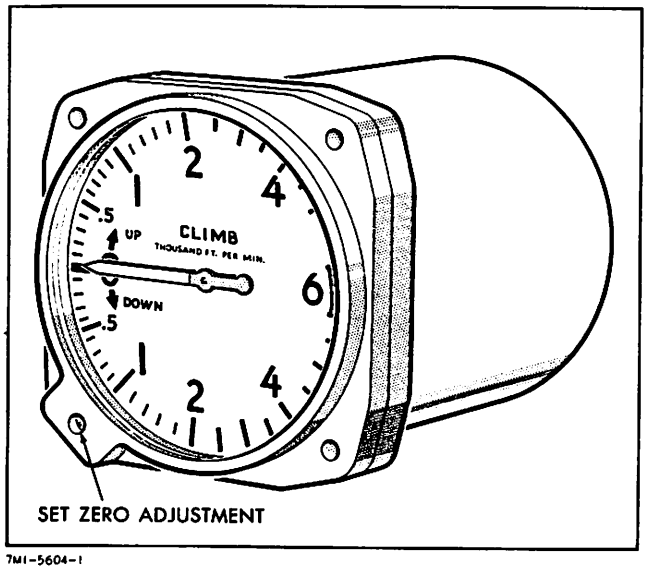
20 The altitude range of the instrument is from minus 1000 to plus 80,000 feet.

RATE OF CLIMB INDICATOR (Fig 4)

21 The rate of climb indicator which is located on the front cockpit main instrument panel at the lower LH side, indicates the rate in feet per minute at which the aircraft is changing altitude.

22 The indicator dial is graduated in thousands of feet per minute from zero to six. The scale on the top half of the dial indicates ascent rate and that on the lower half of the dial indicates descent rate. The zero position is common to both scales and is on the left hand side of the dial. Expanded graduations in the low range ensure greater accuracy in reading. A single pointer pivoted at the centre of the dial rotates in a clockwise direction from the horizontal zero position to indicate rate of ascent and in a counter-clockwise direction to indicate rate of descent. Stops at the ends of the indicating range prevent the needle from overrunning onto the wrong half of the dial during rapid ascent or descent. A zero-set adjustment screw is provided in the lower left hand side of the instrument bezel.

23 The principle of operation is based on measuring the rate of change of atmospheric pressure with changing altitude. This is done by a sensitive bellows type diaphragm unit contained in a chamber and connected to a static air connection via a flexible hose. Static pressure is supplied to the diaphragm and the chamber. Pressure to the diaphragm is unrestricted but that to the chamber is restricted. Thus changes in static pressure will result in the external pressure on the diaphragm changing at a slower rate than the internal pressure of the diaphragm. This pressure differential is utilized to produce movement of the pointer. Movement of the diaphragm produced by varying pressures is mechanically amplified and transmitted to the pointer. At constant altitude the pressures on both sides of the diaphragm are equal and a zero reading will be indicated. When the air pressure on the outside of the diaphragm is greater than that on the inside as would occur in a climb, the diaphragm is compressed causing a clockwise movement of the indicator pointer. When air pressure on the outside of the diaphragm is less than that on the inside as in descent, the diaphragm expands causing a counter-clockwise movement of the indicator pointer.



7MI-5604-1

FIG. 4 RATE OF CLIMB INDICATOR

24 A relief valve incorporated in the instrument prevents damage to the diaphragm at rates of climb in excess of 20,000 feet per minute, or at rates of descent in excess of 60,000 feet per minute. At rates exceeding 6,000 feet per minute the indicator pointer will come up against a stop. By means of a lost-motion mechanism between the diaphragm and the pointer, the diaphragm continues moving until the limits in ascent or descent are exceeded. When this occurs a link operates the relief valve actuator to limit the differential pressure and arrest the movement of the diaphragm.

25 The instrument is contained within a thermally insulated container to minimize error due to temperature change.

26 For further information on the rate of climb indicator refer to EO 20-15CB-2.

TURN AND SLIP INDICATOR (Fig 5)

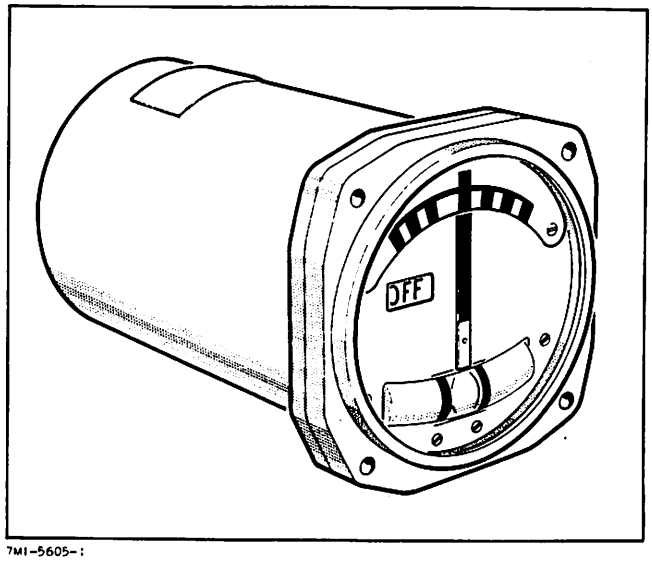
27 The Turn and Slip Indicator which is located on the front cockpit main instrument panel at the lower RH side, consists of two indicators in one case; one to indicate rate of turn and one to provide an indication of slip or skid.

28 Each indicator functions independently of the other. The slip indicator is self-contained. The turn indicator requires a DC supply which is provided via an electrical connector at the rear of the instrument.

29 Turn indication is provided by a gyro having a single degree of freedom. The gyro is mounted in a single gimbal which is pivoted parallel to the longitudinal axis of the aircraft, the gyro axis of rotation being parallel to the lateral axis of the aircraft. When the aircraft is turned, the gyro precesses and pivots the gimbal in the opposite rotation to the direction of turn. The gimbal movement is transferred to an indicator pointer through a gearing which reverses the direction of the gimbal movement to give a direct reading, i.e., the pointer will move over the dial in the direction in which the aircraft is turning. Regulation of the gyro speed is accomplished by a centrifugal switch which introduces a resistor into circuit with the armature, when required, to prevent the gyro from overspeeding.

30 The pointer and scale occupy the upper portion of the instrument face. A window in the face of the instrument displays a flag marked OFF which disappears when the gyro motor attains operating speed which is approximately 40 seconds after power is applied. The scale is marked for three calibrated rates of turn on each side of a centre zero mark.

31 The skid and slip indicator is a ball type inclinometer which occupies the lower portion



7MI-5605-1

FIG. 5 TURN AND SLIP INDICATOR

of the instrument face. It consists of a curved tube filled with a transparent damping fluid in which a dark coloured ball is enclosed.

32 During straight and level flight the ball is held in the centre of the tube by gravitational force. When a turn is made, centrifugal force acts on the ball. In a correctly banked turn, the gravitational and centrifugal forces are equal, and the ball remains in the central position which is marked by two dark vertical lines spaced approximately the width of the ball. In a left turn with excessive left bank, the gravitational force overcomes the centrifugal force and the ball will roll to the left indicating a slip. In a left turn with insufficient bank, centrifugal force will overcome the gravitational force and the ball will roll to the right indicating a skid.

33 For further information on the turn and slip indicator refer to EO 20-20AF-2.

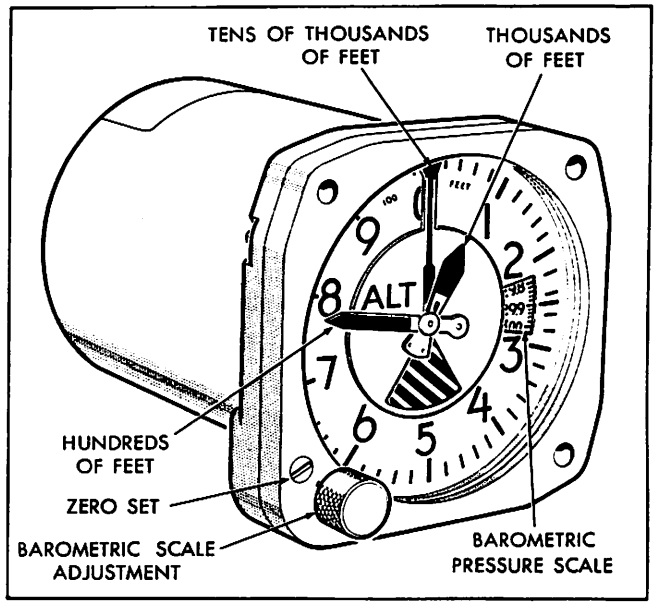
ALTIMETER (Fig 6)

34 The altimeter located on the main instrument panel in the front cockpit indicates the height of the aircraft above a selected reference point which may be mean sea level, the height of the airfield above sea level or any chosen reference point. A second instrument which is identical to that in the front cockpit, is mounted on the main instrument panel in the rear cockpit.

35 The altimeter measures the ambient barometric pressure, and since barometric pressure varies with altitude this provides a means of measuring altitude.

36 The mechanism consists of an evacuated diaphragm arrangement to which is piped static air. The diaphragm responds to changes in pressure by expanding or contracting. Motion of the diaphragm is transmitted to the indicator pointers. Since pressures at higher altitudes are relatively small, two diaphragms are used to provide the necessary force to rotate the pointers.

37 Three concentrically arranged pointers indicate on a common scale. The scale is graduated from 0 to 9 with each main division graduated in fifths. The largest of the three



7M1-5606-2

FIG. 6 ALTIMETER

pointers indicates hundreds of feet, making one revolution for each 1,000 feet. The intermediate pointer indicates thousands of feet, making one revolution for each 10,000 feet. The small pointer is attached to a black disc with an extension marked with a fine fluorescent line terminated by a small arrow head and indicates tens of thousands of feet. A cutout in the black disc and a striped warning area on the main dial are provided to guard against errors in reading the instrument. The striped warning area is fully visible at zero feet, and is then progressively decreased until at an indicated altitude of 16,700 feet it is covered by the black disc.

38 A window, between graduations 2 and 3 on the main scale, displays a scale graduated from 28.1 to 31.0 inches which represents the barometric pressure in inches of mercury. A knob located at the lower left hand side of the bezel provides a means of setting the scale to the ambient barometric pressure. This action automatically effects a compensating movement of the pointers.

39 The operating range of the altimeter is from minus 1,000 feet to plus 80,000 feet.

40 For further information on the altimeter refer to EO 30-10BE-2.

ARROW 1 SERVICE DATA

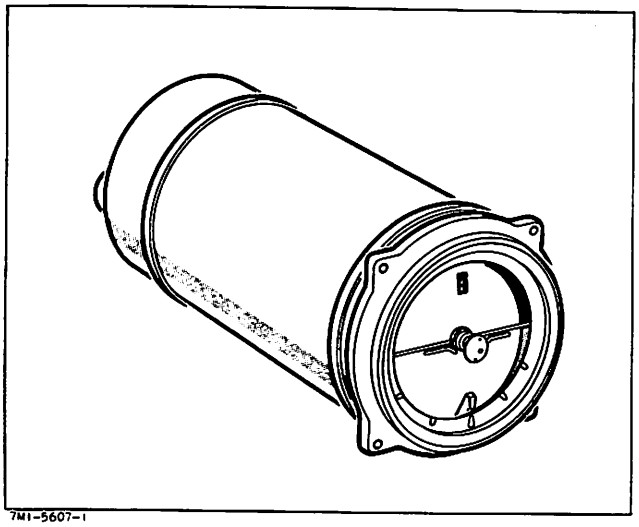


FIG. 7 ATTITUDE GYRO INDICATOR

ATTITUDE GYRO INDICATOR (Fig 7)

41 The attitude gyro indicator located on the front cockpit main instrument panel indicates the flight attitude of the aircraft in pitch and roll relative to the true horizon.

42 The instrument is an electrically driven, vertical seeking gyro which is free to move about its pitch and roll axis. The attitudes of the aircraft in these axes are indicated by the motion of a sphere displayed as the background for a miniature reference aircraft which is fixed. The horizon is represented on the sphere as a split horizontal bar and in straight and level flight the miniature reference aircraft is superimposed on the horizon bar.

43 The horizon bar moves above the miniature reference aircraft when the aircraft is in a nose-down attitude and moves below the reference aircraft when the aircraft is in a nose-up attitude. When the right edge moves above the reference aircraft, the aircraft is in a right bank and in a left bank the left edge moves above the reference aircraft.

44 The degree of bank is determined by comparing a gyro stabilized bank index with fixed markers on the lower portion of the instrument dial. The markers represent 30 degrees and 60 degrees of left and right bank with a central marker for straight and level flight.

45 The gyro is supplied with 115 volts 400 cycle 3-phase AC. A receptacle at the rear of the instrument facilitates electrical connection. A second receptacle is provided for use during bench testing. In the event of power failure or incorrect phase sequence a small flag marked OFF appears in a window in the upper half of the dial. Two torque motors and associated mercury switches are incorporated to permit fast erection of the gyro. This is achieved by depressing a push-button labelled GYRO ERECTION located on the main instrument panel adjacent to the instrument.

46 For further information on the indicator refer to EO 20-20JA-2.

SKIN TEMPERATURE INDICATOR (Fig 8)

47 The skin temperature indicator located on the front cockpit main instrument panel at the lower LH side indicates, continuously, the temperature of the aircraft skin.

48 The skin temperature indicator system comprises a display unit and a thermal sensing element (Sensor).

49 The display unit indicates temperatures from -60 degrees F to +300 degrees F. The

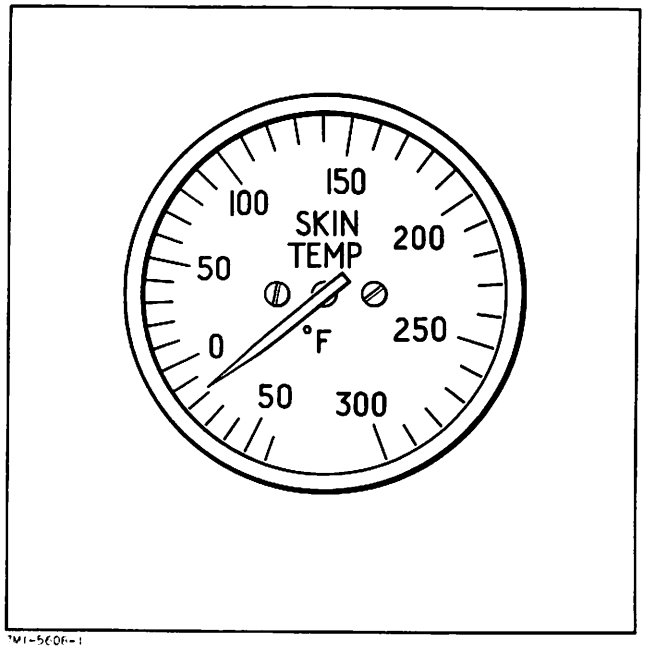


FIG. 8 SKIN TEMPERATURE INDICATOR

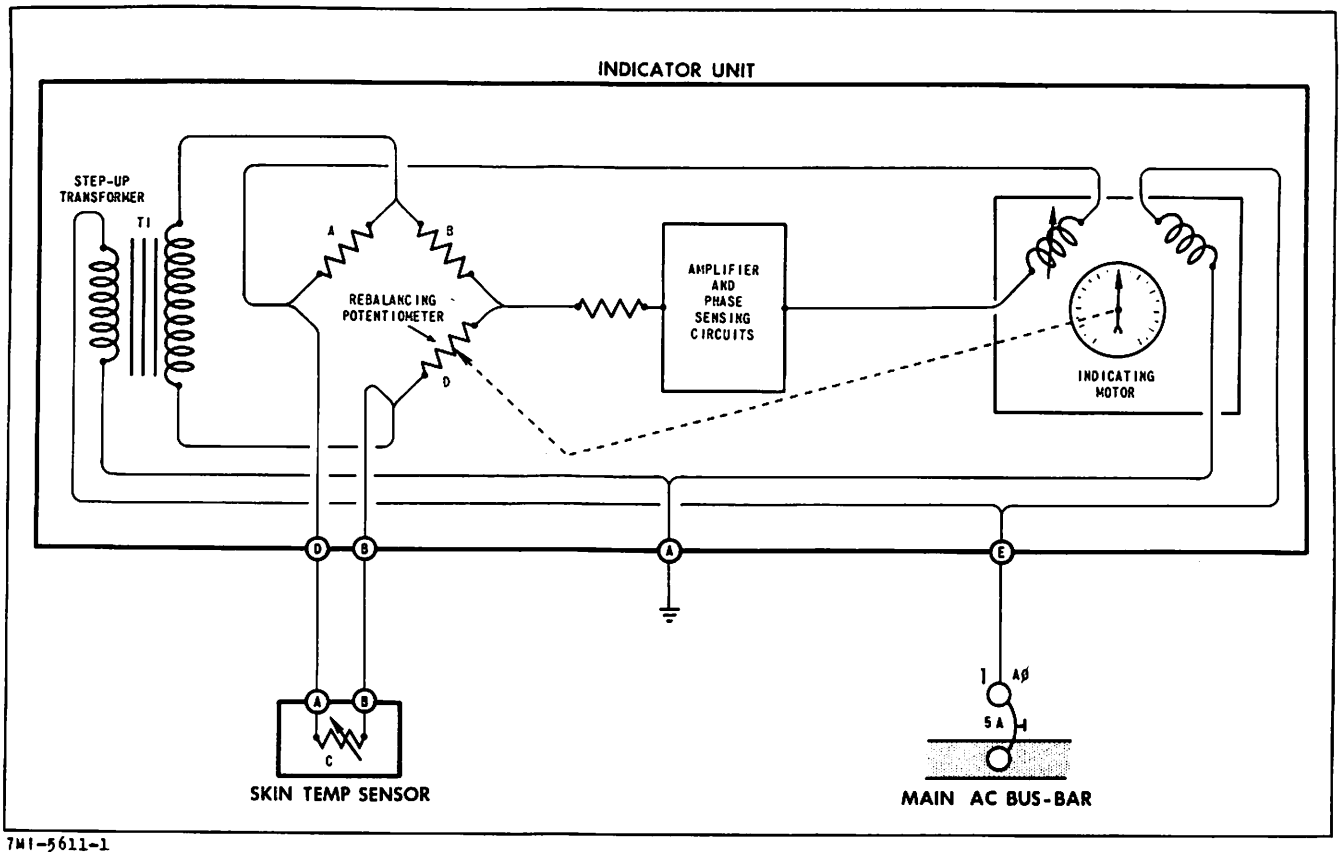


FIG. 9 SIMPLIFIED BRIDGE CIRCUIT - SKIN TEMPERATURE INDICATOR

unit comprises three segments of a resistance bridge circuit, a transistor type amplifier, a miniature two-phase motor connected via a gear train to the pointer and a rebalancing potentiometer which is incorporated in the bridge. An electrical connector at the rear of the instrument facilitates connection of the power supply, sensing element and test circuits. The unit is pressurized and hermetically sealed.

50 The sensor is a temperature sensitive grid of wire and forms the fourth segment of the bridge circuit mounted in the display unit. The grid is bonded between two thin pieces of insulating material and enclosed in a bulb which is mounted flush with the aircraft skin on the underside of the radar nose. An electrical connector fitted to the sensor facilitates interconnection with the display unit.

51 A change in the temperature of the aircraft skin causes a proportional change in the resistance of the sensor. This unbalances the bridge and results in a potential difference between one side of the bridge and the other. See fig 9. This difference is amplified and the correct phase, i.e., positive or negative, is discerned by a discriminator circuit. The discriminator output is fed to one winding of a two phase induction motor, the other winding being constantly energized from the main supply. The motor is thus caused to rotate and deflect the indicator pointer in the appropriate direction. In turning, the motor also drives the control arm of the re-balancing potentiometer to restore the bridge circuit to balance.

LIQUID OXYGEN CAPACITANCE SYSTEM (Fig 10)

52 The liquid oxygen quantity gauge located on the oxygen panel on the right hand console in the front cockpit indicates the quantity of liquid oxygen in the liquid oxygen container. The container houses the equipment for converting the liquid oxygen into gaseous form.

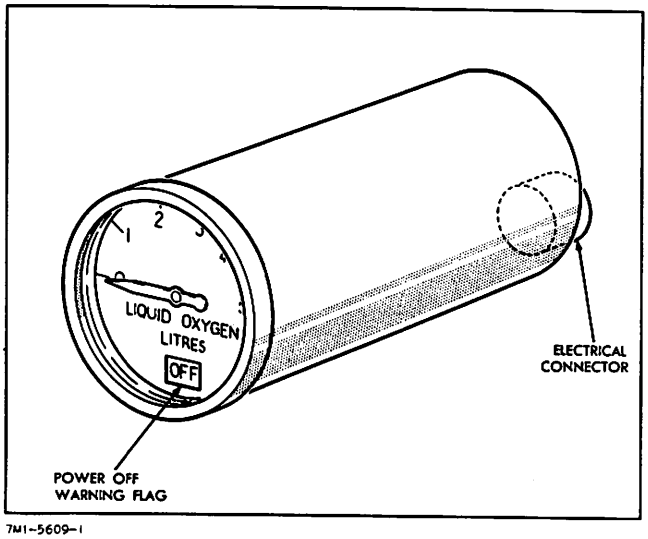


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FIG. 10 LIQUID OXYGEN CAPACITANCE INDICATOR

53 The quantity gauge dial is calibrated in equal divisions from zero to five litres.

54 The capacitance system consists of a tank unit which forms an integral part of the liquid oxygen container, a power unit and an indicating unit which together constitute a null balancing capacitance bridge circuit. See fig 11. The principle on which the system operates is based on the fact that the dielectric constant of liquid oxygen differs from that of air. Therefore, the value of a capacitor will vary in accordance with the quantity of liquid oxygen serving as the dielectric.

55 The tank unit is, essentially, a cylindrical electrostatic capacitor having characteristics which provide for a linear relationship between electrical capacity and volume sensed. The tank unit capacitance is compared continuously with a reference capacitor of known value. The tank unit and the reference capacitor are connected in series across a transformer winding, the centre tap of which is brought out to a point between the tank unit and the reference capacitor. When the tank unit and the reference capacitor values are equal, the current in each leg of the bridge is equal, but opposite, and the bridge is in balance.

56 A change in the liquid oxygen level causes a change in the capacitance of the tank unit which unbalances the bridge circuit. The signal resulting from the bridge unbalance is amplified by a phase sensitive amplifier in the indicator unit. An induction motor positions the indicator pointer to read the quantity of liquid oxygen remaining in the container and simultaneously drives the wiper arm of a potentiometer in the proper direction to restore bridge balance.

57 Adjustment potentiometers provide a means of balancing the voltages at the empty and full capacitance, i.e., the capacitance where air is the dielectric and the capacitance where liquid oxygen is the dielectric, respectively.

58 A second electrostatic capacitance is contained in the liquid oxygen container. This capacitor is connected in parallel with the reference capacitor and functions to compensate for variations in the dielectric constant of liquid oxygen. Thus, variations in the dielectric do not unbalance the bridge since such changes effect equally the tank unit and the reference capacitor, the effect on one being cancelled by the corresponding effect on the other.

59 The system operates on 115 volts 400 cps AC and 28 volts DC. The power consumption is 6 watts AC and 0.42 watts DC.

SIDESLIP INDICATOR (Fig 12)

60 The sideslip indicator located on the front cockpit main instrument panel displays, continuously, the angle between the aircraft heading and airstream, i.e., sideslip or Beta (β) angle.

61 The indicator works in conjunction with an angle of sideslip sensor vane mounted on a boom which extends into the airstream forward of the aircraft.

62 Mechanical movement of the angle-of-sideslip sensor vane by the airstream positions a potentiometer which forms a segment of a bridge circuit. This action unbalances the bridge which is contained in the indicator. The unbalanced condition is detected by a sensor which effects movement of the indicator pointer and re-establishes the balance of the bridge. The indicator scale is calibrated from a centre zero point at the 12 o'clock position to indicate a sideslip angle of up to 11 degrees left and 11 degrees right.

ARROW 1 SERVICE DATA

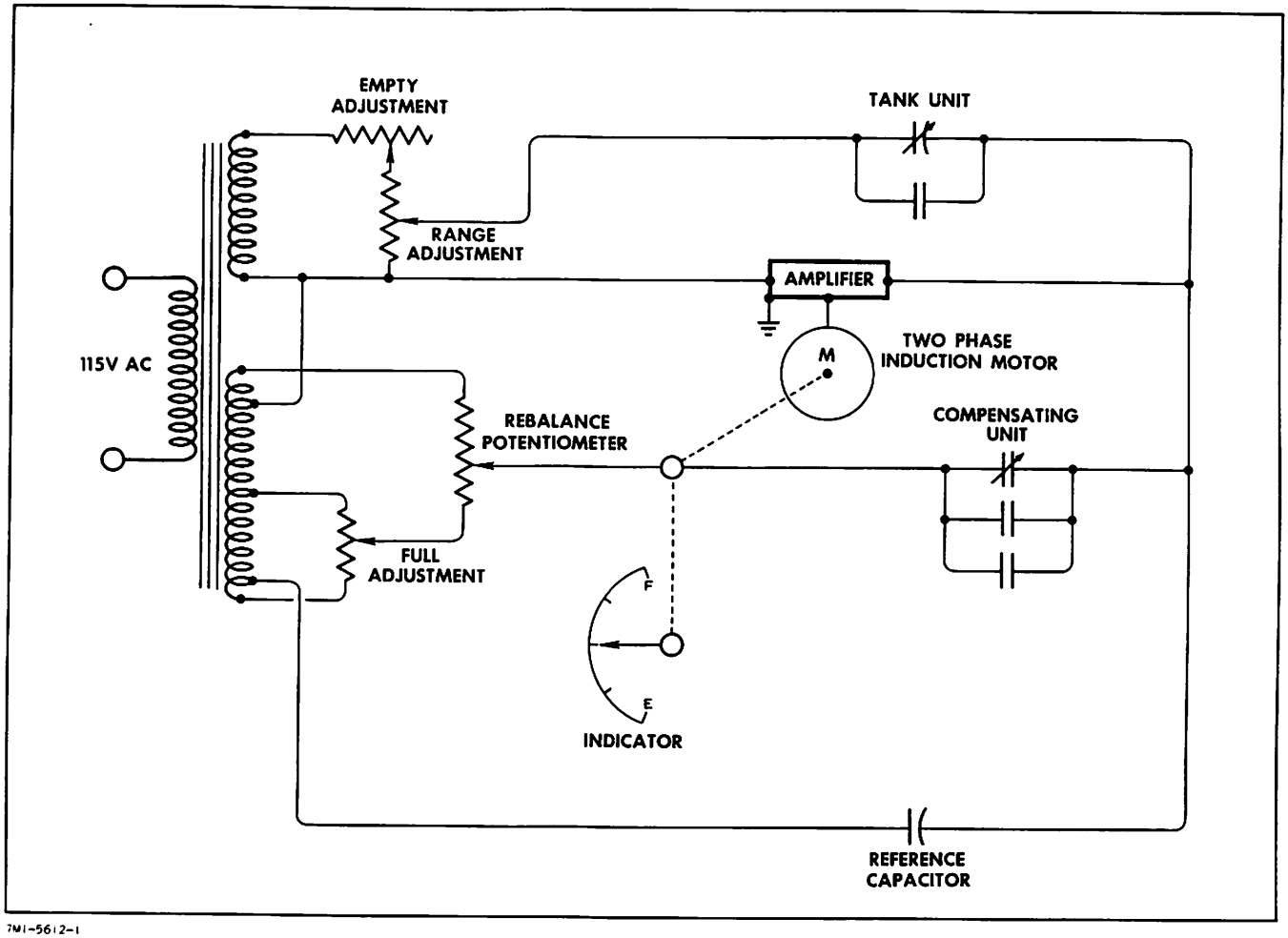

FIG. 11 SIMPLIFIED BRIDGE CIRCUIT - LIQUID OXYGEN CAPACITANCE SYSTEM

63 The synchro unit requires a 36 volts AC 400 cps power supply.

ANGLE OF ATTACK INDICATOR

64 The angle of attack indicator mounted on the front cockpit main instrument panel, displays continuously the aircraft's angle of attack relative to the direction of the airstream, i.e., alpha (α) angle.

65 The indicator works in conjunction with an angle of attack sensor vane mounted on the air data boom.

66 Mechanical movement of the angle of attack sensor vane by the airstream positions a potentiometer which forms a segment of a bridge circuit. This action unbalances the bridge which is contained in the indicator. The unbalanced condition is detected by a sensor which effects movement of the indicator pointer and re-establishes the balance of the bridge. The indicator scale is calibrated in degrees on each side of a zero point on the left hand side of the dial. The dial pointer is pivoted at the centre and moves clockwise to indicate positive angles of attack, i.e., nose-up, and counter-clockwise to indicate negative angles of attack, i.e., nose-down. The indicator is calibrated in one degree divisions from 5 degrees negative angle to 30 degrees positive angle.

67 The synchro unit requires a 26 volts 400 cycles AC supply.

ARROW 1 SERVICE DATA

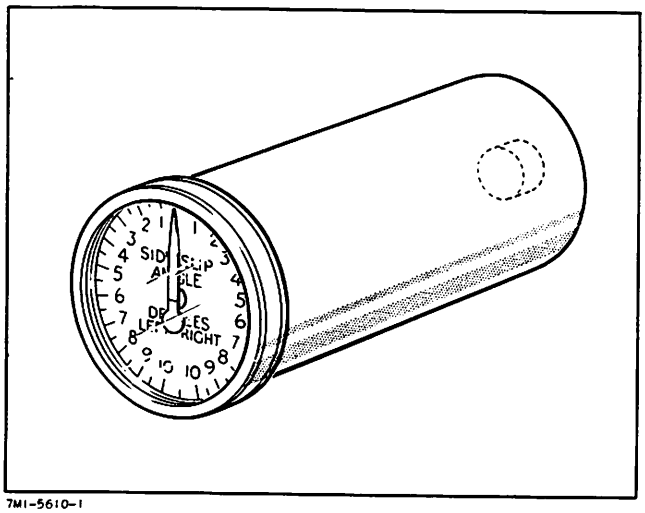

FIG. 12 SIDESLIP INDICATOR

FUNCTION TESTING

GENERAL

68 Function testing of the instruments should be carried out at the periods specified in the Maintenance Schedule. In most cases, adjustments other than zero-setting are not to be carried out on installed instruments. Faulty units must be removed and replaced by serviceable units.

69 The instruments requiring pitot and/or static pressure should be tested in conjunction with the pitot static system testing described in Arrow 1 Service Data, Section 21 - Pitot Static System.

70 When testing instruments requiring electrical power, a power source must be connected to the external supply receptacle on the aircraft.

STANDBY COMPASS CHECK

71 The standby compass is swung and compensated at periods specified in the Maintenance Schedule. Tests outside of these periods are confined to the following checks:

(a) Check that a deviation card is provided and that it is legible and secure.

(b) Check that the date of the next compass swing is not overdue.

(c) Examine the compass fluid for signs of discoloration and for air bubbles.

(d) Deflect the compass card with a small piece of steel. Check that, when the influence of the piece of steel is removed, the card rotates freely and returns to its original position.

(e) Check that the heading indication agrees approximately with the J4 compass heading displayed on the radio magnetic indicator in the front cockpit.

ACCELEROMETER CHECK

72 The accelerometer cannot be function tested when installed in the aircraft. However, if required, the operation of the instrument can be checked as follows:

(a) Remove the accelerometer from the main instrument panel.

(b) If necessary, depress the PUSH-TO-RESET button to release the subsidiary pointers.

(c) Hold the accelerometer with the dial in the normal position in the vertical plane. Check that the main pointer indicates +1 'g' ± 0.2 'g'.

(d) Move the accelerometer up and down and check that the subsidiary pointers move slightly; the positive pointer clockwise and the negative pointer counter-clockwise. If no pointer movement is observed check that the mass assembly locking screw at the rear of the unit is in the UNLOCK position.

(e) Hold the accelerometer with the dial in the inverted position in the vertical plane. Check that the main pointer indicates -1 'g' ± 0.2 'g'.

(f) Hold the accelerometer with the dial in the horizontal plane and check that the pointer indicates zero 'g' ± 0.2 'g'.

(g) Refit the accelerometer to the main instrument panel.

(h) Depress the PUSH-TO-RESET button and check that the subsidiary pointers return to alignment with the main pointer at +1 'g'.

MACH/AIRSPEED INDICATOR CHECK

73 Prior to checking the operation of the mach/airspeed indicator, pressure test the nose pressure head system as described in Arrow 1 Service Data, Section 21 - Pitot Static System. Upon completion of the pressure test, check the operation of the mach/airspeed indicator proceeding as follows:

(a) Check that the maximum allowable airspeed pointer is set to 700 knots. If not, remove the indicator from the aircraft for testing and recalibration.

(b) Apply negative pressure to simulate increasing altitude; check that the mach number dial moves counter-clockwise with increasing altitude.

(c) Check that when the simulated altitude exceeds approximately 32,000 feet, as indicated on the pitot static test set altimeter, the maximum allowable airspeed pointer commences to move counter-clockwise to indicate a decreasing maximum airspeed with increasing altitude.

(d) Reduce the static pressure to zero. Apply pitot pressure to simulate any given mach number on the test set mach meter. Check that the indicated mach number on the mach/airspeed indicator agrees with that indicated on the test set.

(e) Reduce the pitot pressure to zero.

(f) Check that the airspeed index is set to the required airspeed indication.

RATE OF CLIMB INDICATOR CHECK

74 Prior to checking the operation of the rate of climb indicator, pressure test the nose pressure head system as described in Arrow 1 Service Data, Section 21 - Pitot Static System. Upon the completion of the pressure test, check the operation of the rate of climb indicator proceeding as follows:

(a) Check that the pointer reads zero and adjust, if necessary, by means of the adjustment screw on the instrument bezel. The range of movement of the pointer with the adjustment screw is from 400 feet UP to 400 feet DOWN.

(b) Set the altimeter on the pitot static test set to zero.

(c) Apply negative pressure and check that the rate of climb indicator registers a rate of ascent. Note that the pointer movement is smooth and that oscillation is not excessive.

(d) Check that when the application of negative pressure is stopped, the rate of climb indicator registers zero.

(e) Release the negative pressure and check that a rate of descent is indicated. Note that the pointer movement is smooth and that oscillation is not excessive.

TURN AND SLIP INDICATOR CHECK

75 Check the operation of the turn and slip indicator proceeding as follows:

(a) Check that an external supply source is connected to the aircraft and that the master electrical switch in the front cockpit is selected to the on position. Check also that the TURN AND SLIP circuit breaker on panel E1 is switched on.

(b) Check that the OFF warning flag is not visible on the face of the instrument.

(c) Check that the turn indicator pointer reads zero.

(d) Check that the ball in the slip indicator is centred between the two graduation marks.

(e) Select the master electrical switch to the off position and check that the power OFF warning flag appears instantly in the window on the face of the instrument. Re-select the master electrical switch to the on position, if necessary.

ARROW 1 SERVICE DATA

ALTIMETER CHECK

76 The altimeter in the front cockpit and the altimeter in the rear cockpit are adequately checked during the Nose Pressure Head System Pressure Test. Prior to commencing the pressure test, set the barometric pressure scale of the pitot static test set altimeter and the appropriate aircraft altimeter to 29.92 and check that in each case the scale pointer registers zero. If necessary, set the pointers to zero by adjusting the zero set screw in the instrument bezel. During the pressure test, note that the simulated altitude on the aircraft altimeter is in agreement with that indicated on the test set altimeter. Upon completion of the pressure test reset the barometric pressure scale to the ambient pressure.

ATTITUDE GYRO INDICATOR CHECK

77 Check the operation of the attitude gyro indicator proceeding as follows:

(a) Connect a power source to the external supply receptacle on the aircraft and switch ON the master electrical switch in the front cockpit.

(b) Check that power is being supplied to the gyro. This is indicated by the disappearance of the OFF warning flag on the face of the instrument.

(c) Check that the gyro erects within 20 seconds and that the horizon bar settles in a position corresponding to the nose up attitude of the aircraft.

(d) Check that the bank index is on the zero mark, if the aircraft is level.

(e) Depress the GYRO ERECT switch adjacent to the instrument and check that the horizon bar deflects slightly.

(f) Select the master electrical switch to the off position and check that the OFF warning flag is visible on the face of the instrument.

SKIN TEMPERATURE INDICATOR CHECK

78 Except for switching on the circuit and checking that the indicator registers the ambient temperature, function testing is not necessary. Note that when the circuit is switched off, the indicator pointer will remain at the temperature last recorded.

LIQUID OXYGEN CAPACITANCE SYSTEM CHECK

79 Check the operation of the oxygen capacitance system, when a full converter is installed on the aircraft, proceeding as follows:

(a) Ensure that an external source of power is connected to the aircraft and that the master electrical switch is set to the on position.

(b) Check that the OFF flag is not visible on the face of the instrument.

(c) Check that the indicator registers 5 litres.

(d) Select the master electrical switch to the off position. Note that the OFF flag is visible in the indicator and that the pointer settles at the electrical zero, i.e., twelve o' clock position.

SIDESLIP INDICATOR CHECK

80 Check the operation of the angle of sideslip indicator proceeding as follows:

(a) Ensure that an external source of power is connected to the aircraft and that the master electrical switch is set to the on position.

(b) Deflect the angle of sideslip sensor vane to the left and check that the sideslip indicator registers degrees right. Deflect the sensor vane to the right and check that the indicator registers degrees left.

ANGLE OF ATTACK INDICATOR CHECK

81 Check the operation of the angle of attack indicator proceeding as follows:

(a) Ensure that an external source of power is connected to the aircraft and that the master electrical switch is set to the on position.

(b) Deflect the angle of attack sensor vane downwards and check that the angle of attack indicator registers a positive angle of attack. Deflect the sensor vane upwards and check that a negative angle of attack is registered.

ARROW 1 SERVICE DATA

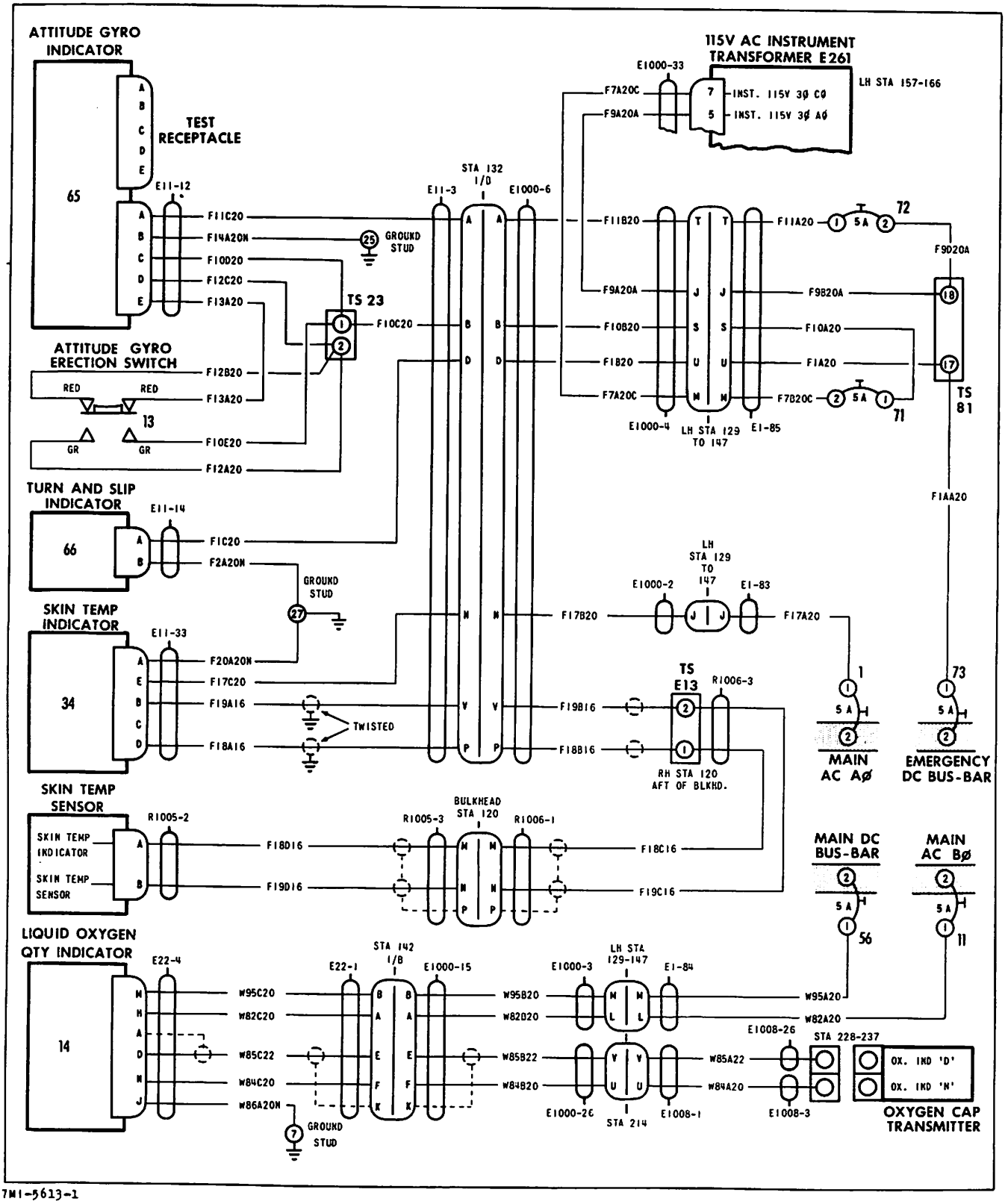

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FIG. 15 INSTRUMENTS

ARROW 1 SERVICE DATA

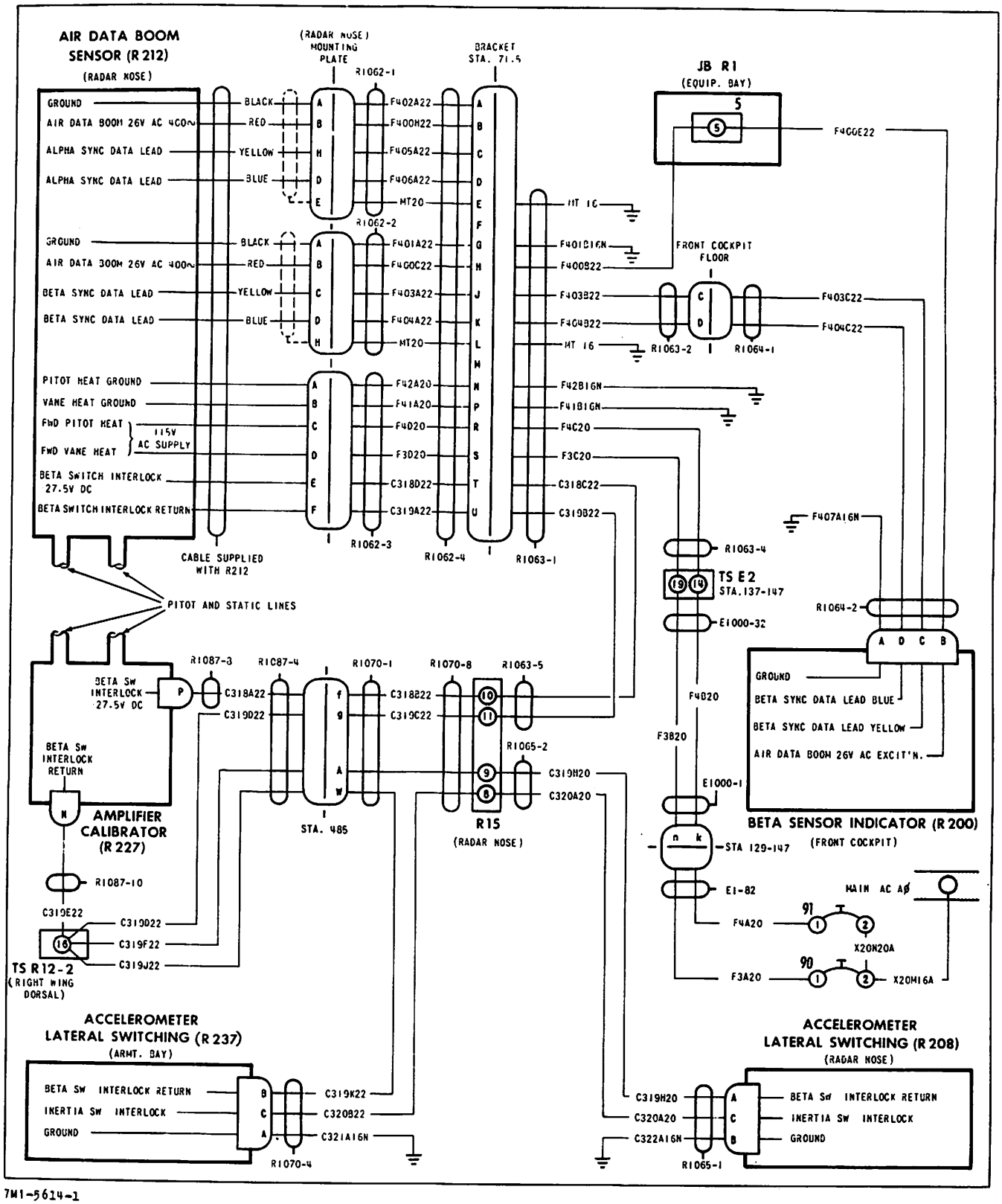

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FIG. 16 AIR DATA BOOM

Part 1

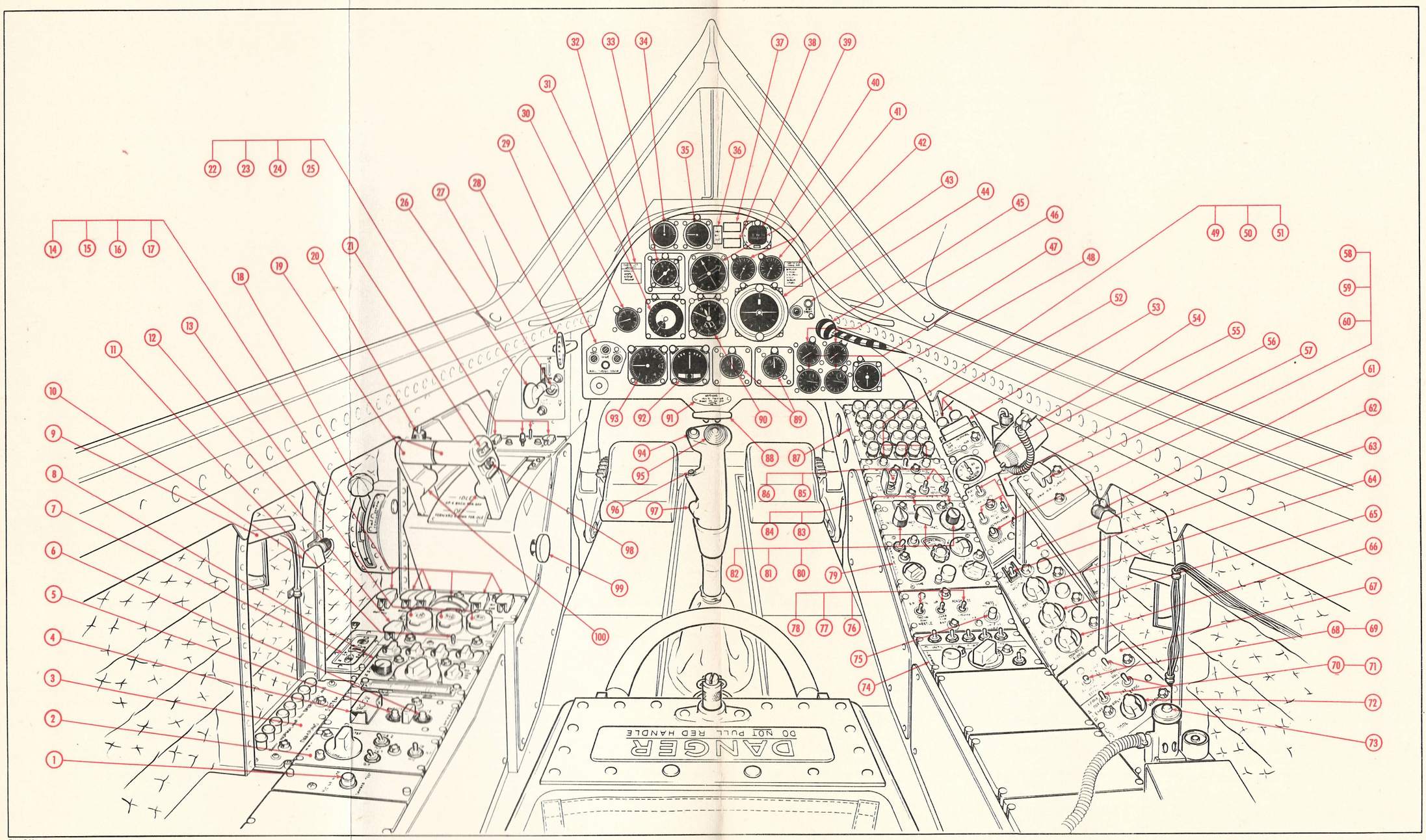

FIG 1-7 PILOT'S COCKPIT LAYOUT

1 U/C UP MODE - DAMPER TEST Switch
2 IFF Control Panel
3 DAMPING SYSTEM Circuit Breaker Panel
4 DAMPER, POWER ON-OFF Switch
5 DAMPER, EMERGENCY Push Button Switch
6 DAMPER, ENGAGE Push Button Switch
7 Control Surface Response Indicator
8 COMM. Radio Control Panel - ARC-34
9 High Altitude Flood Light
10 Console Flood Light
11 RUDDER TRIM, LEFT-RIGHT Switch
12 FIRE Extinguisher SECOND SHOT Switch
13 FIRE-Combined Warning Lights and Selector Switches, LH, HYD, RH
14 NAV BAIL OUT Warning Switch
15 L.P. FUEL COCKS Switches and Guards
16 CROSSFEED, LH ONLY - NORMAL - RH ONLY Switch
17 ENGINE FUEL, EMERG-RESET Switches and Guards
18 Parachute Brake, STREAM - JETTISON Selector Lever
19 Throttle Levers, LH and RH
20 Console Flood Light
21 SPEED BRAKE, IN-OUT Switch
22 ANTI-SKID, NORM-EMERG-OFF Switch
23 LIGHTS LAND-TAXI-OFF Switch
24 CANOPY CLOSE-OFF-OPEN Switch
25 ELEV TRIM DISENGAGE Switch
26 Landing Gear Control Lever, UP-DN
27 Landing Gear EMERGENCY EXTENSION Locking Latch Push-Button
28 Parking Brake Handle
29 LANDING GEAR POSITION Indicator
30 SKIN TEMP Indicator
31 Mach/Airspeed Indicator
32 CHECK LIST, LANDING
33 Accelerometer
34 Sideslip Indicator
35 Angle of Attack Indicator
36 NAV BAIL OUT Indicator
37 Red Master Warning Light
38 Amber Master Warning Light
39 Standby Magnetic Compass
40 RADIO MAGNETIC INDICATOR
41 FUEL QUANTITY Gauges
42 CHECK LIST TAKE OFF
43 Artificial Horizon Indicator
44 GYRO ERECT Push Button
45 EMERGENCY CANOPY OPENING Lever
46 Engine PRESSURE RATIO Gauges LH and RH
47 EXH TEMP Gauges LH and RH
48 CABIN PRESSURE ALTITUDE Gauge
49 PRESS TO RESET Push Button
50 DAY - NIGHT Switch
51 PRESS TO TEST Switch
52 ENG BLEED Air Conditioning Warning Lights
53 ENG BLEED AIR LH OFF-NORMAL - RH OFF Switch
54 Map Light
55 OXYGEN Quantity Gauge
56 Console Flood Lights (2)
57 RAM AIR TURBINE Switch
58 NAV LIGHTS, FLASH-OFF-STEADY Switch
59 ALTERNATORS RESET ON-OFF LH and RH Switches
60 DC RESET Push Button
61 Console Light
62 COCKPIT LIGHTING Panel
63 HIGH ALT LIGHTING ON-OFF Switch
64 MAIN PANEL OFF-BRIGHT Selector
65 CONSOLE PANELS OFF-BRIGHT Selector
66 CONSOLE FLOOD OFF-BRIGHT Selector
67 AIR COND Panel
68 RAIN REPELLENT ON-OFF Switch (TEMP CONTROL/EMERG OFF. First aircraft).
69 CABIN PRESS DUMP Switch
70 AIR SUPPLY NORM-OFF EMERG Switch
71 DEFOG ON-OFF Switch
72 TEMP COOL-WARM Selector
73 Anti-g Valve Manual Override Button
74 INTER Control Panel
75 UHF/IFF EMERG, PRESS TO TEST Button
76 J4 COMP, AEROBATICS - NORMAL Switch
77 UHF ANT, UPPER-LOWER Switch
78 RMI NEEDLE, TACAN-UHF HOMER Switch
79 RADIO COMPASS Panel
80 J4 COMP - LAT Correction Controller
81 J4 COMP - MAG/DG Selector Switch
82 J4 COMP - DECR/INCR/SET Switch
83 J4 COMP - Hemisphere Selector Switch
84 J4 COMP - Synchronizing Indicator (Annunciator)
85 ENGINE START, START-OFF-RESET, LH and RH Switches
86 MASTER ELEC ON-OFF Switch
87 Warning Lights Panel
88 Rudder PEDAL ADJUST Handle
89 RPM Indicators
90 Altimeter
91 Rudder Pedal Adjustment Label
92 Turn and Slip Indicator
93 Rate of Climb Indicator
94 Automatic Mode Disengage Switch
95 Elevator and Aileron Trim Button
96 Emergency Damping Engage Switch
97 Nose Wheel Steering Selector
98 Press-to-transmit Push Button
99 Throttles Friction Damper
100 Engine Relight Switch, LH and RH

PILOT'S COCKPIT LAYOUT

Part 1

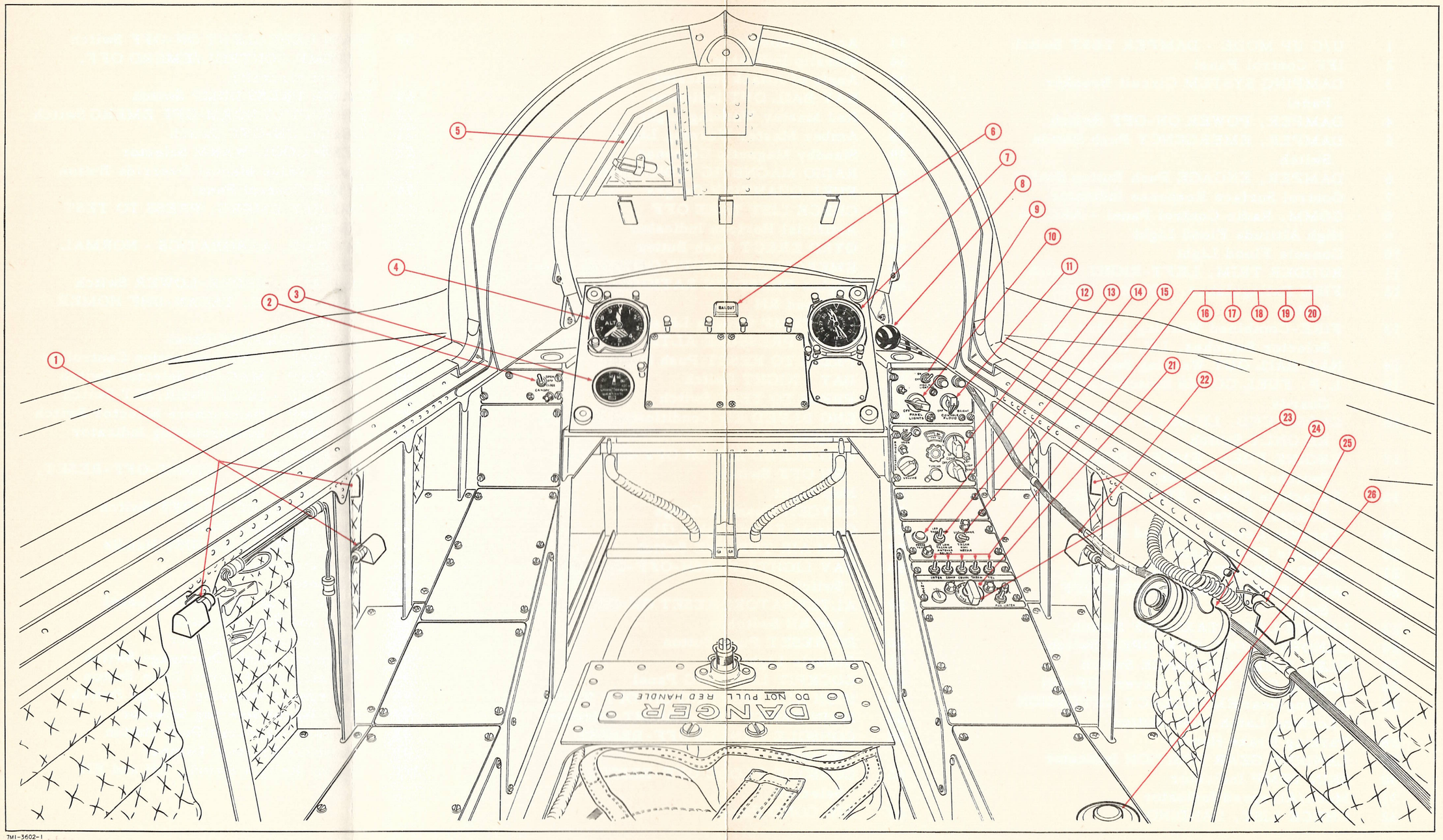

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FIG 1-8 NAVIGATOR'S COCKPIT LAYOUT

NAVIGATOR'S COCKPIT

1 Console Flood Lights (3)
2 CANOPY, OPEN-OFF-CLOSE Switch
3 OXYGEN Quantity Gauge
4 Altimeter
5 Access Panel to Navigator's Canopy Locking Handle from Front Cockpit
6 Navigator's BAIL OUT Warning Light
7 RADIO MAGNETIC INDICATOR
8 EMERGENCY CANOPY OPENING Lever
9 HIGH ALT LIGHTING, ON-OFF Switch (Non-operative)
10 PANEL LIGHTS OFF-BRIGHT Selector Switch
11 CONSOLE FLOOD OFF-BRIGHT Selector Switch
12 RADIO COMPASS Control Panel ARN-6
13 PRESS TO TALK Switch
14 IFF-TACAN ANTENNA SELECT Switch
15 UHF HOMER - TACAN RMI NEEDLE Selector
16 INTER, Interphone Mixing Switch
17 COMP, Radio Compass Mixing Switch
18 COMM, Command Receiver Mixing Switch
19 TACAN Mixing Switch
20 TEL, Telescramble Mixing Switch
21 INTER Control Panel AIC-10
22 Console Flood Lights (2)
23 CALL, INTER, COMM, TEL Rotary Selector
24 Map and Emergency Light
25 Console Flood Light
26 Anti-g Suit Pressure Regulator Manual Override

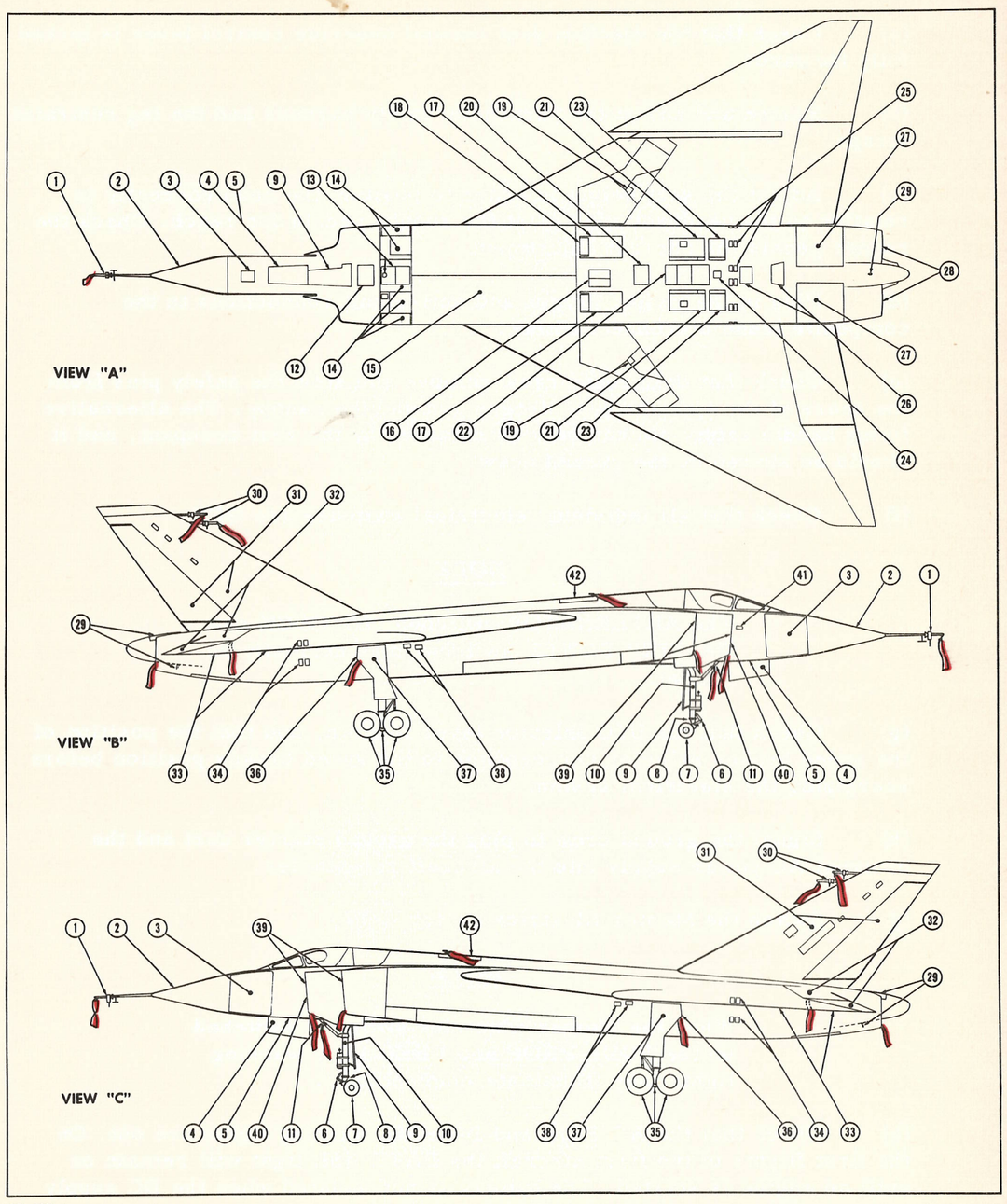

FIG. 2-1 EXTERIOR INSPECTION

Nose (View A-B-C)

(1) Probe secure and cover removed.
(2) Radome secure.
(3) Radar access doors (three) secure.
(4) Nose U/C door undamaged.
(5) Nose wheel well.
  (a) Emergency nitrogen bottle pressure - 5000 psi minimum.
  (b) Circuit breakers set.
(6) Landing and taxi lights undamaged.
(7) Tires for cuts and creep, nose wheel aligned fore and aft.
(8) Shock absorber strut extension normal.
(9) Condition of nose U/C leg door.
(10) No hydraulic leaks.
(11) Nose wheel ground locking pin removed.

Underside of Aircraft (View A)

(12) Air conditioning equipment access panel secure.
(13) (a) Electronic equipment access door secure.
  (b) Circuit breakers set (visual through inspection port).
(14) LH and RH electronic equipment access doors secure.
(15) Instrument pack for damage. Check for security.
(16) Electrical equipment access doors secure.
(17) LH and RH speed brakes for damage.
(18) Master refuelling/test panel door closed.
(19) Pressure refuelling LH and RH access doors secured. (On the first aircraft check the manually operated gate valves are set to FLIGHT POSITION VALVE OPEN).
(20) Hydraulic equipment access panel secure.
(21) LH and RH engine access doors secured.
(22) Service panel No. 1, gearbox panel and service panel No. 2 secured.
(23) Engine access doors secured.
(24) Compensator removal panel secure.
(25) "Blow-in" air inlet doors closed.
(26) Service panels No. 3 and No. 4 secure.
(27) LH and RH engine removal doors secure.

Rear of Aircraft (View A-B-C)

(28) Jet pipe exhaust covers removed, jet pipes undamaged. Check for fuel, oil, water or ice accumulation.
(29) (a) Parabrake doors closed.
  (b) Red indicator NOT protruding. (Denoting 'chute installed).

LH Side of Aircraft (View C)

(30) Pitot covers removed.
(31) Fin and rudder surfaces, navigation lights, access panels for security and damage.
(32) Aileron and elevators for damage and control supports removed.
(33) Underside of skin for fuel leaks or damage. Leading edge undamaged.
(34) "Blow-in" air inlet doors closed.
(35) (a) Check for red crank pointer touching recuperator body. (Nitrogen pressure indicator).
  (b) Check recuperator oil level.
  (c) Leg extension normal.
  (d) Tires for cuts and creep.
  (e) No hydraulic leaks.
(36) Main wheel ground lock on side stay removed.
(37) (a) U/C fairings undamaged.
  (b) Check lower spring housing locking cams on fairings.
(38) Access doors secure.
(39) (a) LH Engine intake cover removed.
  (b) De-icing boots on intake and ramp undamaged.
(40) Air conditioning ram air inlet cover removed.

RH Side of Aircraft (View B)

Check as for LH side, items 31 to 40.

(41) Emergency canopy opening panel secure.

Upper Surfaces of Aircraft

Visually inspect the upper surfaces (including windscreen and canopies) for damage and security of panels prior to entering the cockpit.

(42) Ensure that the air conditioning outlet duct cover is removed.

Part 2

(a) Check that the ejection seat manual override control lever is locked fully forward.

(b) Fasten and adjust the parachute/safety harness and the leg restraint straps.

(c) Adjust the seat height in order to position the head correctly in relation to the headrest and adjust the rudder pedals for reach. Check the rudder pedals for correct adjustment.

(d) Plug in the radio, oxygen and anti-g suit connections to the composite leads disconnect fitting.

(e) Check that the ground crew remove and stow the safety pins from the sears of the ejection gun, drogue gun and the canopy. The alternative firing handle safety pin can only be removed by the seat occupant, and it should be stowed by the ground crew.

(f) Check that all individual electrical switches are OFF.

NOTE

The ALTERNATOR switches, LP COCK and DAMPER POWER switches may normally be left on.

(g) Check that the U/C selector lever is down, and that the position of the speed brakes selector corresponds to the speed brakes position before energizing the electrical system.

(h) Signal the ground crew to plug the ground starter cart and the external AC power supply into the aircraft receptacles.

(j) Switch the Master Electrics switch - ON.

NOTE

When the Master Electrics switch is switched on the FUEL PROP and FUEL LOW warning lights may illuminate momentarily.

(k) Check that the AC FAIL and DC FAIL warning lights are out. On the first flights of the first aircraft the BATT USE light will remain on until an engine is started. The battery is not isolated when the DC supply is plugged in.

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Standby Compass	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Eclipse Pioneer (RCAF Supply 6B/1337)	1841-3-A	25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

To indicate continuously the magnetic heading of the aircraft.

LOCATION

Front cockpit main instrument panel - upper RH side.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure one electrical connector.
Place the unit in position and secure with four mounting screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security. Check for leakage of damping fluid. Check that the electrical connector is secure.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Magnetic Sighting Compass

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Accelerometer	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Eclipse Pioneer (RCAF Supply 6A/1107)	3419-5A-A1	25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

To indicate the factor in gravitational (g) units of structural loads about the lateral axis of the aircraft, i.e. vertical acceleration.

LOCATION

Front cockpit main instrument panel - upper LH side.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Prepare the unit for operation by turning the locking assembly counter-clockwise, viewed from the rear of the unit.
Place the unit in position and secure with three mounting screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security. Check that all three pointers are aligned on the zero mark on depression of the PUSH-TO-RESET switch. Check the scale numerals and markings for legibility.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Mach/Airspeed Indicator	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Kollsman Limited (RCAF Supply 6A/10186)	ME-4	25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

To indicate airspeed, mach number and maximum allowable airspeed at all altitudes. Incorporates a set airspeed index to indicate aircraft landing speed or take-off speed etc.

LOCATION

Front cockpit main instrument panel.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Connect two flexible hoses to the instrument. Place the instrument in position and secure with three mounting screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security of attachment. Check the hose connections for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Rate of Climb Indicator	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Aviation Electric (RCAF Supply 6A/10170)	AE342-2-A	25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To indicate the rate in feet per minute at which the aircraft is changing altitude.

LOCATION

Front cockpit - main instrument panel.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Secure one flexible hose connection.
Place the unit in position and secure with three mounting screws.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security of attachment. Check that the pointer reads zero.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Turn and Slip Indicator	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Aviation Electric (RCAF Supply 6A/1299)	AE355-1-A	25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To indicate, respectively, the rate of turn about the vertical axis and the skid and slip component.

LOCATION

Front cockpit main instrument panel - lower RH side.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure one electrical connector.
Place the unit in position and secure with four mounting screws.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security. Check the electrical connector for security. Check that the pointer and ball are in their respective neutral positions. Check scale markings for legibility.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Altimeter - (Front and Rear Cockpit)	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Kollsman Limited (RCAF Supply 6A/10185)	D22061-04-004	25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To indicate the altitude of the aircraft above a selected reference point.

LOCATION

Main instrument panel front cockpit and rear cockpit.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Secure one flexible hose connection.
Place the unit in position and secure with three holding screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness and damage. Check that the unit is securely mounted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Attitude Gyro Indicator	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Ferranti Electric Ltd (RCAF Supply 6A/1282)	64-30000	25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

To provide data on the attitude of the aircraft in pitch and roll relative to the true horizon.

LOCATION

Front cockpit main instrument panel.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Secure the electrical connector.
Place the unit in position and secure with four mounting screws.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness and damage. Check that the unit is securely mounted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Skin Temperature Indicator	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1252-15	Liquidometer Corpn.	B338-F	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To indicate the temperature of the aircraft skin by acting upon electrical indications received from the skin temperature sensor.

LOCATION

Front cockpit main instrument panel - lower LH side.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure one electrical connector.
Place the unit in position and turn mounting clamp tension adjustment screw clockwise until secure.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security. Check the electrical connector for security. Check the scale numerals markings for legibility.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Skin Temperature Sensor	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-106	Liquidometer Corpn.	B241-F	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To alter in resistance in direct relation to the temperature changes of the aircraft skin, so providing the skin temperature indicator with electrical signals related to temperature.

LOCATION

Underside of the radar nose at station 112.

ACCESS

	MEN X MINUTES	
Remove the access panel located on the undersurface of the radome at station 108 to 114, 16 x 10/32 inch screws.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Locate and secure the unit on the mounting with four 6/32 inch screws. Fit and secure one electrical connector. Refit the access panel at station 108 to 114 - 16 screws.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security. Check that the electrical connector is clean, undamaged and securely fitted. Check that the electrical wiring is clean, undamaged and adequately secured.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Liquid Oxygen Capacitance System	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2152-12	ARO Equipment Corpn.	14745	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To indicate the quantity of liquid oxygen in the liquid oxygen converter/container.

LOCATION

Front cockpit - RH console.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Connect one electrical connector.
Secure the unit to the console with one holding screw.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security of mounting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Sideslip Indicator	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1252-258	Buffalo Instrument Corporation		25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To work in conjunction with a sensing vane to display sideslip angle to the left or to the right.

LOCATION

Front cockpit - main instrument panel.

ACCESS | MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE | MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security of attachment. Check the electrical connector for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
INSTRUMENTS		Angle of Attack Indicator	12

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Buffalo Instrument Corporation		25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To work in conjunction with a sensor vane to display Angle of Attack.

LOCATION

Front Cockpit - Main instrument panel.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for cleanliness, damage and security of attachment. Check the electrical connector for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 36

ELECTRICAL SYSTEM

GENERAL INFORMATION

ARROW 1 SERVICE DATA

LIST OF REVISIONS

DATE	PAGE NO.	DATE	PAGE NO.

ARROW 1 SERVICE DATA

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Circuit Identification Code	1
Circuit Breakers, Fuses and Current Limiters	1
Routing Diagrams	3
Schematic Diagrams	3
Electrical Symbols	3
Equipment Indexing System	3
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2	Circuit Group Identification Table	2
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8	Main Circuit Breaker Panel E1	17
9	Accessory Panel E3	18
10	Distribution Panel E4	19
11	Main Accessory Panel E5	20
12	Relay Panel E6	21
13	Limiter Panel E20	22

ARROW 1 SERVICE DATA

INTRODUCTION

1 The information and illustrations contained in this section provide a general reference for the electrical wiring installation in Arrow 1 aircraft.

WIRING

2 The procedures for the pre-assembly and the installation of electrical wiring conform, in general, to specification MIL-W-5088A.

3 In anticipation of use by future modifications, stub wires are soldered to unused pins of connectors. As a protective measure, insulated caps are staked onto the ends of these stub wires. New wiring introduced by modifications will be spliced to the stub wires using an approved type of permanent splice.

CABLE IDENTIFICATION CODE (Fig 1)

4 Cable assemblies are preformed groups of circuit wires which follow predetermined routes throughout the aircraft. At various points along any specific route, the circuit wires branch from the main assembly to terminate at their destination.

5 A plastic band is fitted at the originating point of a cable assembly and at each branch or 'end'. Stamped on each band is the cable assembly number prefixed by the letter 'E' which denotes that the cable belongs to the electrical group. Cable assembly numbers prefixed by the letter 'R' denote that the cable belongs to the Telecommunications and Electronics groups. Suffixed to the cable assembly number is a hyphenated number which indicates the cable branch or 'end'. The originating point of the assembly is always identified -1. The terminating point(s) or branch(es) are designated -2, -3, -4, etc.

6 Fitted only at the originating point (-1) of the assembly is an additional plastic band on which is stamped the cable assembly part number.

CIRCUIT IDENTIFICATION CODE (Fig 1)

7 The identification of circuit wiring conforms to specification MIL-W-5088A (ASG).

8 The individual circuit wires contained in cable assemblies are identified by code letters and numbers marked at intervals throughout their length. The first letter and the number immediately succeeding it, denote the circuit group to which the wire belongs and its number in the group. The circuit groups are listed in fig 2. The second letter of the identification code is the circuit segment letter which normally commences with the letter 'A' at the power source or a unit. At each break in the circuit wire which may be a junction box or bulkhead the circuit segment letter changes to the adjacent letter of the alphabet. The number succeeding the circuit segment letter indicates the AN size of the wire. All circuit wires which terminate at a ground point have the letter 'N' suffixed to the identification code.

9 Stub wires on unused pins of connectors are identified by the connector pin designation and wire size, e.g. A-16, D-12, etc.

CIRCUIT BREAKERS, FUSES AND CURRENT LIMITERS

10 The types of circuit breakers used in the

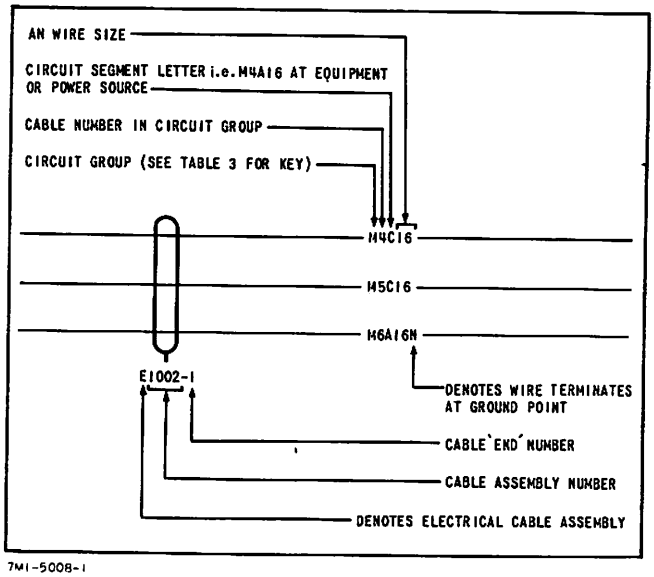

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FIG. 1 CABLE AND CIRCUIT IDENTIFICATION CODE

ARROW 1 SERVICE DATA

DESIGNATING LETTER	CIRCUIT GROUP
A	Armament
C	Flying Controls
D	Instruments (other than engine or flight)
E	Engine Instruments
F	Flight Instruments
G	Landing Gear
H	Air Conditioning and De-icing
J	Ignition
K	Engine Starting
L	Lighting
P	DC Power Supplies & Control
Q	Fuel
R	Radio
S	Radar
T	Special
U	Miscellaneous Electronics
V	AC Power Control
W	Warning & Emergency
X	AC Power Supply
Y	Special Armament
Z	Experimental

FIG. 2 CIRCUIT GROUP IDENTIFICATION TABLE

electrical system are push-to-reset, automatic reset and toggle. Of these, the push-to-reset type is used for the majority of the circuits. All of the circuit breakers incorporate a trip-free action, i.e. they cannot be reset if an overload exists.

11 Current limiters are fitted in circuits where surge overloads may be drawn momentarily. Current limiters are used in preference to fuses because of their characteristic of being unaffected by momentary surge overload by melting under overload after a short duration of time.

12 Power distribution to the electrical sub-systems is made from two centres namely the main circuit breaker panel E1 located in the nose wheel bay, forward, and the limiter panel E20, access to which can be gained via a panel fitted forward of the RH speed brake. Illustrations of both panels are contained in this section and show the item number rating and annotation of the circuit breaker or limiter.

13 Power distribution to the electronic equipment is made from the power junction box R1 located in the electronic equipment bay. The power supply for the electronics is derived from the AC and DC bus-bars of the electrical system. For further information see Arrow 1 Electronics Service Data - Power Distribution.

ROUTING DIAGRAMS

14 Routing diagrams are provided for each of the sub-systems of the electrical system on the aircraft. The relevant diagrams are included in the service data on the electrical sub-systems.

15 Front cockpit and rear cockpit panels referenced on the routing diagrams can be located by referring to the front cockpit illustration fig 3, and the rear cockpit illustrations fig 4. Junction boxes, panels and equipment referenced on the routing diagrams can be located by referring to the equipment location diagram of the relevant system. The location of relays and equipment contained in junction boxes or on panels is depicted in the appropriate illustration contained in this section.

16 Circuits are shown in the 'on ground at rest' position, except when it is desired to present a specific operating condition. In this case the operating condition shown will be clearly marked on the diagram.

SCHEMATIC DIAGRAMS

17 Schematic diagrams to aid in the understanding of the system operation and to facilitate fault tracing are provided for each sub-system of the electrical system or, if required, individual circuits of the sub-system. The schematics are included in the service data on the sub-systems and are located as near as possible to the relevant descriptive text.

ELECTRICAL SYMBOLS (Fig 5)

18 Charts of electrical symbols used in the routing and schematic diagrams are provided to facilitate circuit reading. If a symbol is used on a routing and schematic diagram and it is not shown on the symbol chart, a suitable caption is provided on the routing and schematic diagrams.

EQUIPMENT INDEXING SYSTEM

19 Each component contained in a junction box or located on a panel is given an item number. In the aircraft the item number is painted adjacent to the component. The components are correspondingly identified on the routing diagrams.

20 The equipment location diagram included in the service data for each electrical sub-system has an associated equipment index. Components contained in junction boxes, or located on panels, are listed in the index under the relevant junction box or panel.

BONDING AND INTERFERENCE SUPPRESSION

21 Electrical bonding of the aircraft conforms to bonding specification MIL-B-5087A, and specification AND 10398 which governs contact between dissimilar metals.

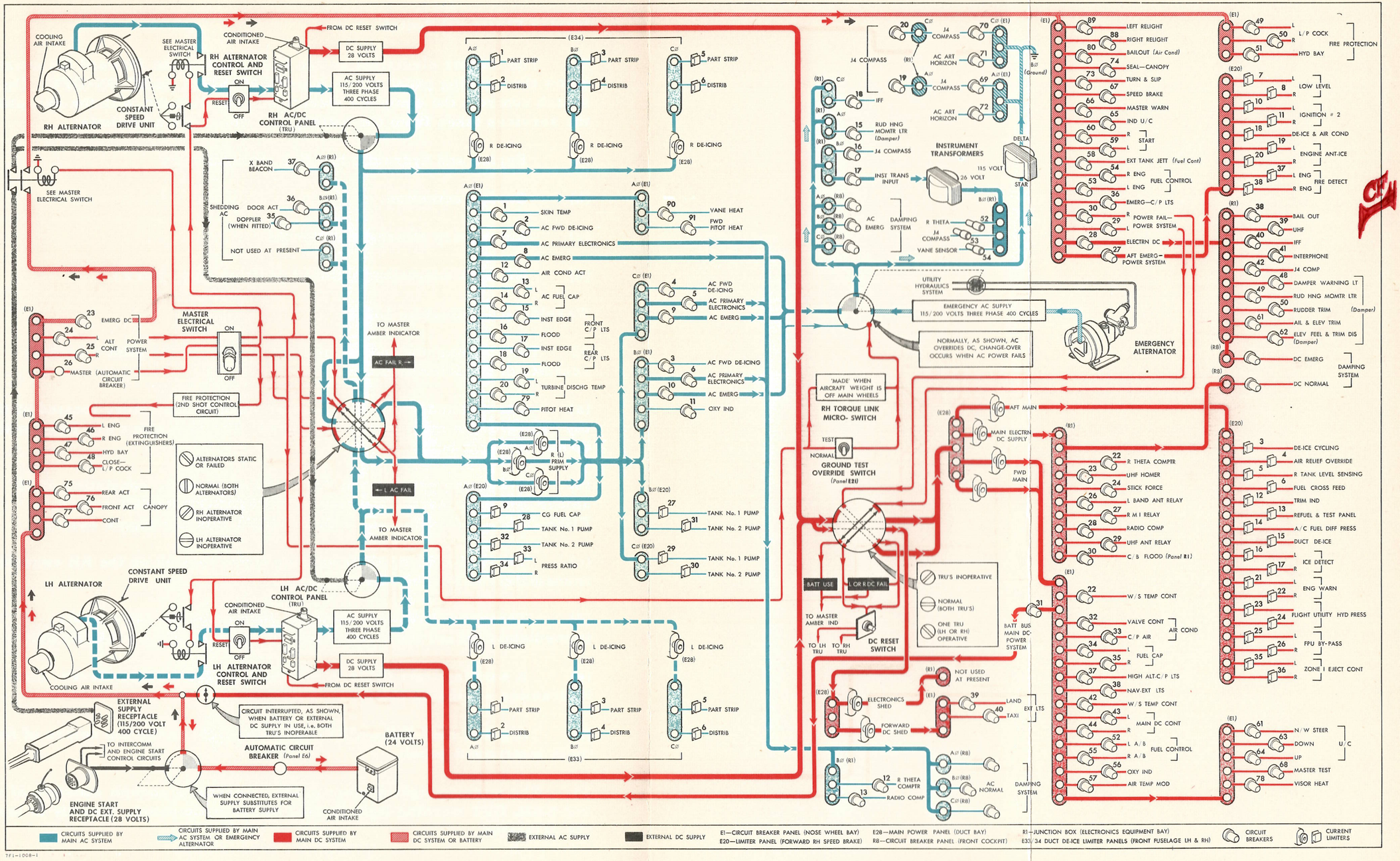

FIG 1-3 ELECTRICAL POWER SUPPLY SYSTEM

Part 1

Master Electrical Switch

31. The master electrical switch is located on the forward RH console below the warning panel and is marked MASTER ELEC ON-OFF. The switch controls the complete electrics of the aircraft with the exception of the services taken from the battery bus which are as follows:

(a) Engine and hydraulic bay fire extinguishers.

(b) Canopy actuation.

(c) Emergency alternator solenoid.

(d) LP cock operation to closed position only. (OFF).

Warning and Indicating Lights

32. The warning and indicating light system in the pilot's cockpit consists of the following:

(a) One red and one amber master warning indicator, located at the top centre of the main instrument panel. The indicators are fitted with double filament bulbs.

(b) A warning panel on the RH forward console, consisting of 25 amber lights, a master warning light PRESS-TO-RESET switch, a PUSH-TO-TEST switch and a DAY/NIGHT dimmer toggle switch.

(c) Two red ENG BLEED warning lights located on the RH console immediately below the warning panel.

(d) Three red fire warning lights located on the LH console immediately behind the throttle levers, marked FIRE - LH/HYD/RH.

(e) A warning light fitted in the landing gear selector lever. (See Hydraulics - Landing Gear).

(f) A green NAV BAIL OUT indicating light on the top centre of the main instrument panel.

33. The warning light system in the navigator's cockpit consists of a red BAIL OUT warning light located on the main panel, directly in front of the navigator.

ARROW 1 SERVICE DATA

LOCATION OF ELECTRICAL AND ELECTRONIC EQUIPMENT - FRONT COCKPIT

ITEM	COMPONENT
1	Undercarriage Up Mode, Damper Test Switch
2	IFF Control Panel, See Electronic Systems Service Data
3	Damper System Circuit Breaker Panel See Electrical Systems Service Data - Flying Controls
4	Damper System Engage Switch
5	Damper System Emergency Switch
6	Damper System Power Switch
7	UHF Control Panel, See Electronic Systems Service Data
8	High Altitude Flood Light
9	Control Surface Response Indicator, See Electrical Systems Service Data - Flying Controls
10	Console Flood Light
11	Rudder Trim Switch
12	Fire Extinguisher Second Shot Switch
13	Fire Warning Indicator and Extinguisher Push Switch, RH Engine
14	Fire Warning Indicator and Extinguisher Push Switch, Hydraulic Bay
15	Fire Warning Indicator and Extinguisher Push Switch, LH Engine
16	Engine Fuel Switch, RH
17	Engine Fuel Switch, LH
18	Fuel Crossfeed Switch
19	Low Pressure Fuel Cock Switch, RH
20	Low Pressure Fuel Cock Switch, LH
21	Navigator Bail-out Warning Switch
22	Parachute Brake Selector Lever
23	Relight Switch, RH Engine
24	Relight Switch, LH Engine
25	Console Flood Light
26	Press-to-Transmit Switch, See Electronic Systems Service Data - UHF
27	Speed Brake Switch
28	Elevator Trim Disengage Switch
29	Canopy Actuation Switch
30	Landing and Taxi Light Switch
31	Anti-skid Switch
32	Landing Gear Selector Lever
33	Landing Gear Position Indicator
34	Turn and Slip Indicator
35	RPM Indicator, LH Engine
36	RPM Indicator, RH Engine
37	Exhaust Gas Temperature Indicator, LH Engine
38	Exhaust Gas Temperature Indicator, RH Engine
39	Pressure Ratio Indicator, RH Engine
40	Pressure Ratio Indicator, LH Engine
41	Attitude Indicator, Gyro Erection Switch
42	Attitude Indicator
43	Skin Temperature Indicator
44	Radio Magnetic Indicator
45	Fuel Quantity Indicator, LH
46	Fuel Quantity Indicator, RH
47	Magnetic Standby Compass
48	Side Slip Indicator (Beta)
49	Angle of Attack Indicator (Alpha)
50	Navigator Bail-out Warning Light, Green
51	Master Warning Light, Amber
52	Master Warning Light, Red
53	Master Warning Panel, See Electrical Systems Service Data - Master Warning
54	Master Warning Press-to-Reset Switch
55	Master Warning Dimming Switch
56	Master Warning Press-to-Test Switch
57	Air Conditioning Engine Bleed Warning Light, LH
58	Air Conditioning Engine Bleed Warning Light, RH
59	Air Conditioning Engine Bleed Switch
60	Master Electrics Switch
61	Starting Switch, LH Engine
62	Starting Switch, RH Engine
63	Oxygen Quantity Indicator
64	Console Flood Light
65	Navigation Lights Switch
66	Map and Emergency Light
67	J4 Compass Control Panel, See Electronic Systems Service Data
68	Console Flood Light
69	Alternator Switch, LH
70	Alternator Switch, RH
71	Ram Air Turbine Switch
72	Radio Compass Control Panel, See Electronic Systems Service Data
73	DC Reset Switch
74	Pilots Switch Panel, See Electronics Systems Service Data
75	High Altitude Lighting Switch
76	Main Instrument Panel Lights Dimming Switch
77	Main Instrument Panel Lights Fuse
78	Console Flood Light
79	Interphone Control Panel, See Electronics System Service Data
80	Console Panel Edge Lights Dimming Switch
81	Console Panel Edge Lights Fuse
82	Console Flood Lights Dimming Switch
83	Console Flood Lights Fuse
84	High Altitude Flood Light
85	Rain Repellant Switch
86	Cabin Pressure Dump Switch
87	Air Conditioning Control Switch
88	Windscreen Defog Switch
89	Cabin Temperature Rheostat
90	Automatic Flight Disengage Switch
91	Elevator and Aileron Trim Selector Switch
92	Emergency Damping Disengage Switch
93	Nose Wheel Steering Control Switch

LOCATION OF ELECTRICAL AND ELECTRONIC PANELS - FRONT COCKPIT

ITEM	COMPONENT
E10	Canopy Actuation Panel
E11	Main Instrument Panel
E12	Landing Gear Selector Panel
E14	Fire and Fuel Panel
E15	Master Warning Panel
E16	Power and Starting Panel
E17	Cockpit Lighting Panel
E18	Air Conditioning Panel
E22	Oxygen Panel
E49	Ram Air Turbine Panel
E1500	Power Lever Assembly
R4	Pilots Switch Panel
R8	Damper System Circuit Breaker Panel
R24	Damper Test Panel
R111	Radio Compass Control Panel
R116	IFF Control Panel
R136	UHF Control Panel
R143	J4 Compass Control Panel
R148	Interphone Control Panel
R174	Pilots Control Column Grip
R211	Damper Control Panel

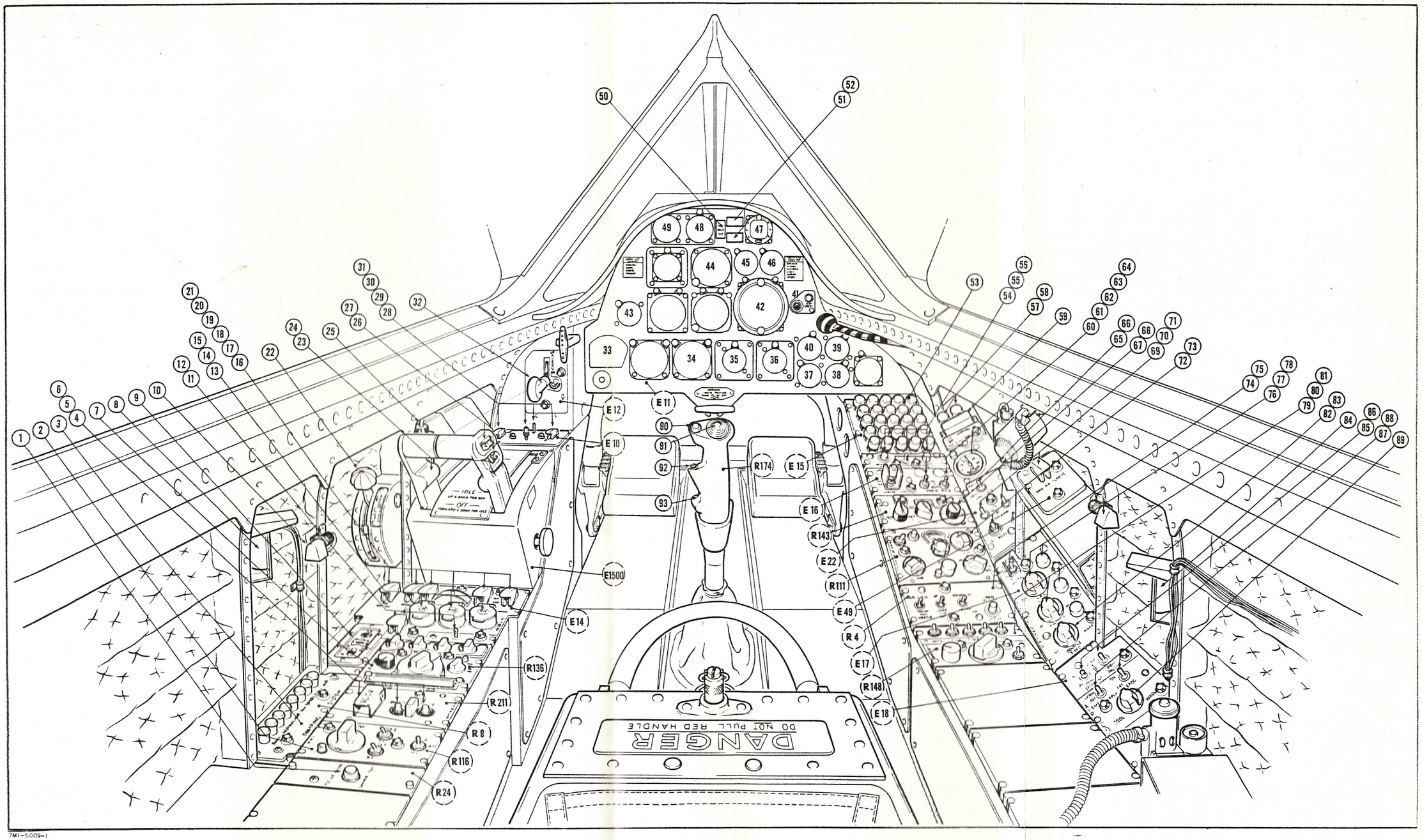

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FIG. 3 LOCATION OF ELECTRICAL AND ELECTRONIC EQUIPMENT - FRONT COCKPIT

ARROW 1 SERVICE DATA

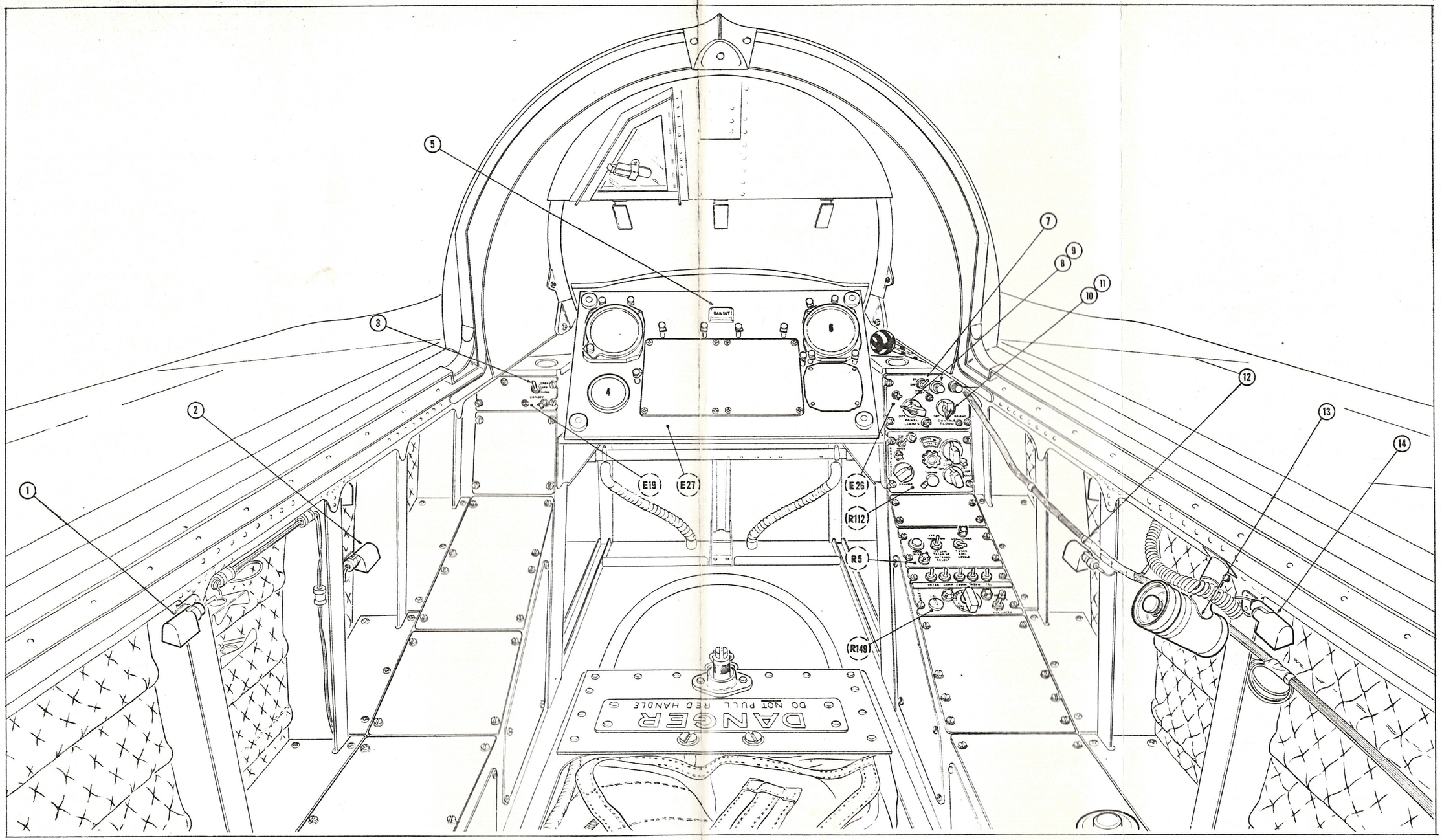

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FIG. 4 LOCATION OF ELECTRICAL AND ELECTRONIC EQUIPMENT - REAR COCKPIT

ARROW 1 SERVICE DATA

LOCATION OF ELECTRICAL AND ELECTRONIC EQUIPMENT REAR COCKPIT

ITEM	COMPONENT
1	Console Flood Light
2	Console Flood Light
3	Canopy Actuation Switch
4	Oxygen Quantity Indicator
5	Navigators Bail-out Warning Lights, Red
6	Radio Magnetic Indicator
7	High Altitude Lighting Switch
8	Instrument Panel Edge Lights Dimming Switch
9	Instrument Panel Edge Lights Fuse
10	Console Flood Lights Dimming Switch
11	Console Flood Lights Fuse
12	Console Flood Light
13	Map and Emergency Light
14	Console Flood Light

LOCATION OF ELECTRICAL AND ELECTRONIC PANELS - REAR COCKPIT

ITEM	COMPONENT
E19	Canopy Actuation Panel
E26	Lighting Panel
E27	Main Instrument Panel
R5	Navigators Switch Panel
R112	Radio Compass Control Panel
R149	Interphone Control Panel

ARROW 1 SERVICE DATA

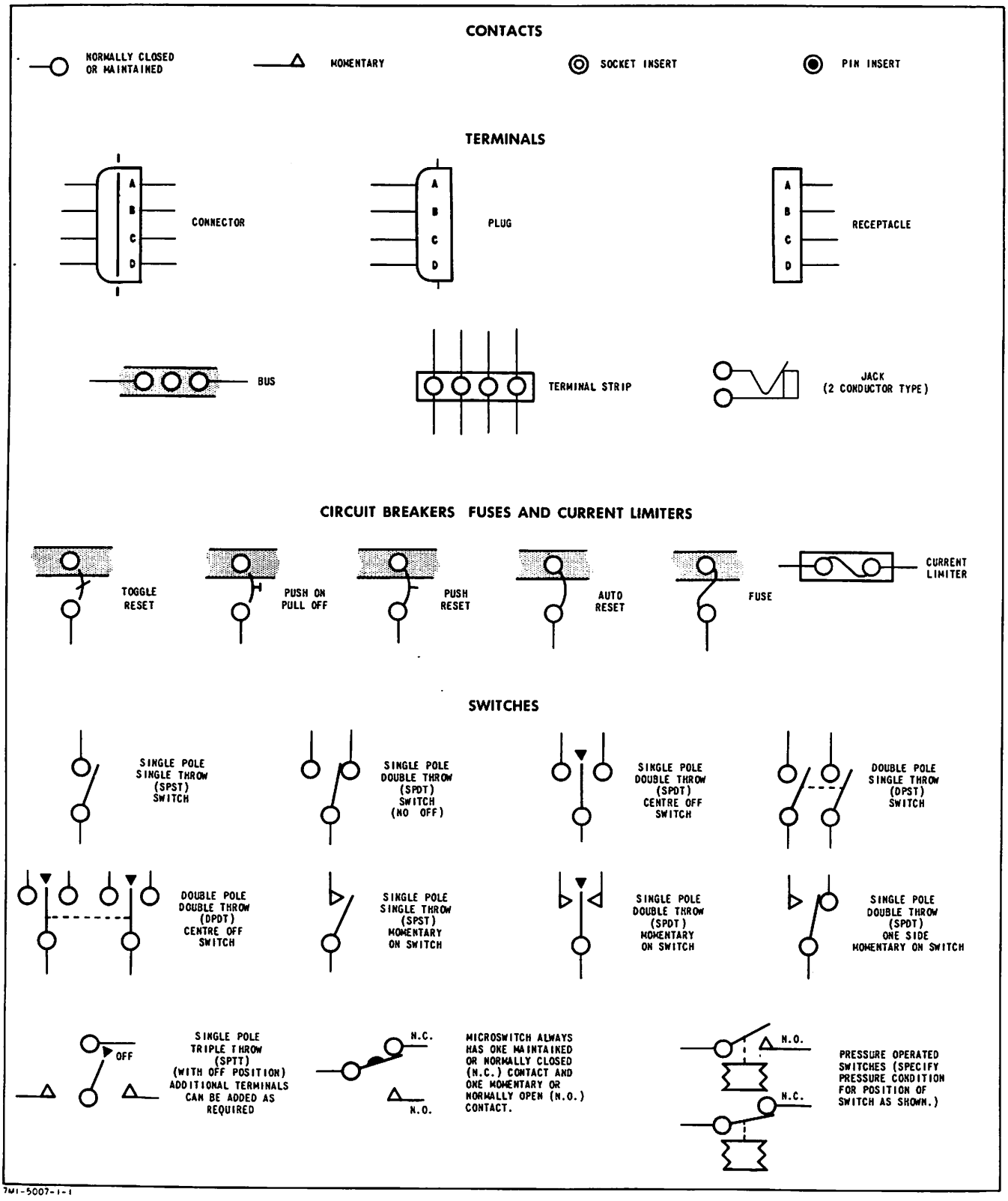

FIG. 5 ELECTRICAL SYMBOLS - SHEET 1 OF 4

ARROW 1 SERVICE DATA

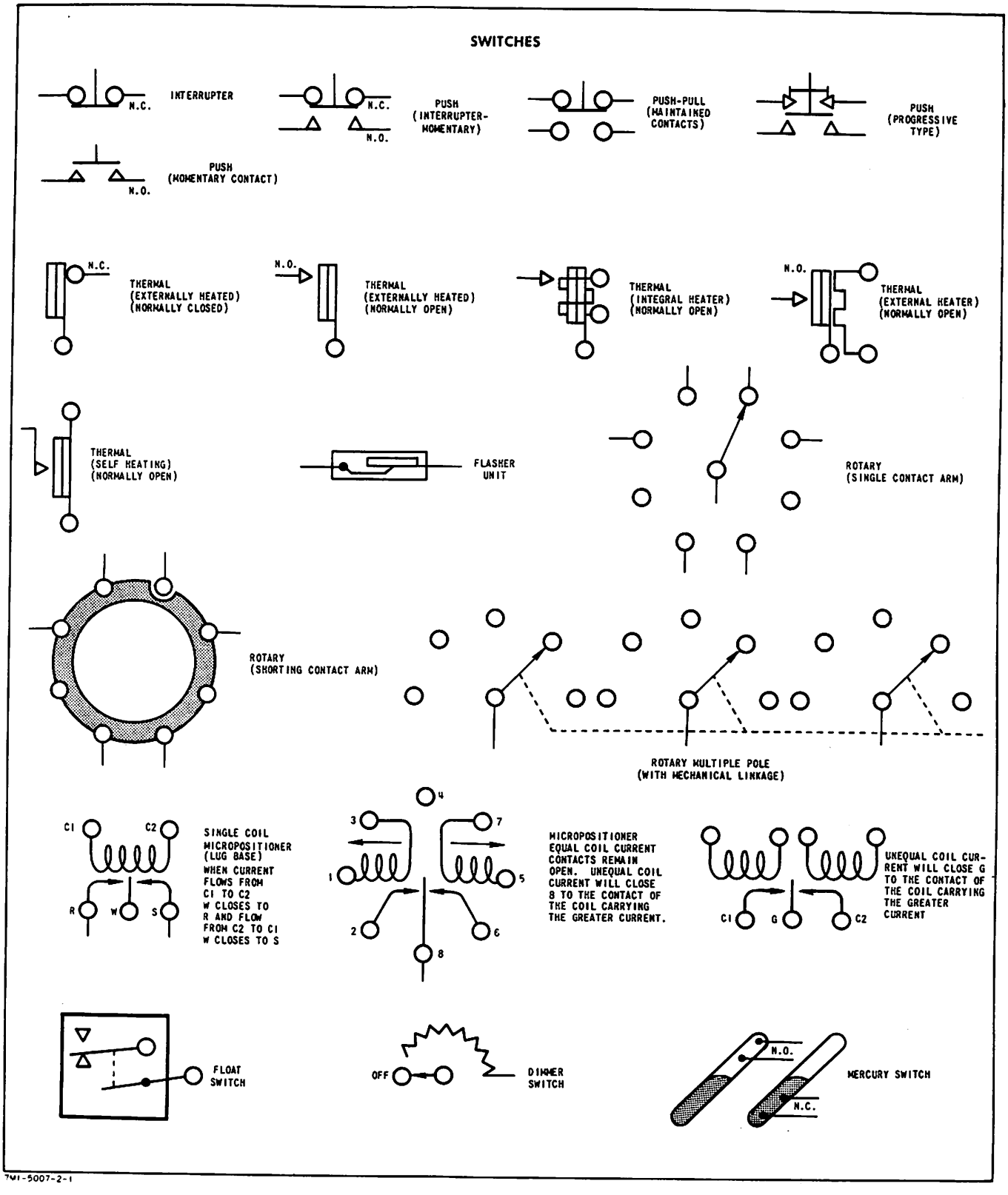

FIG. 5 ELECTRICAL SYMBOLS - SHEET 2 OF 4

ARROW 1 SERVICE DATA

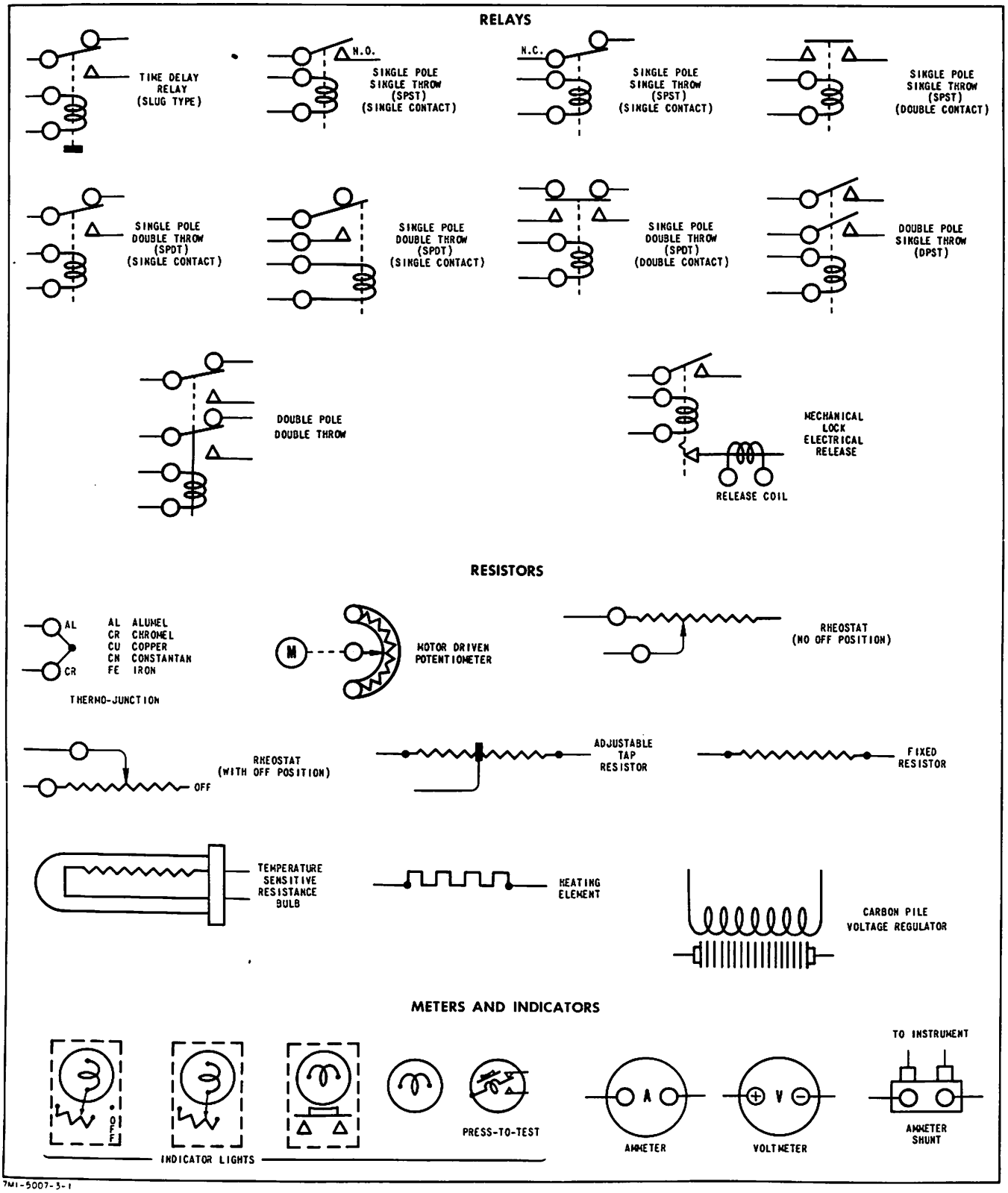

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FIG. 5 ELECTRICAL SYMBOLS - SHEET 3 OF 4

ARROW 1 SERVICE DATA

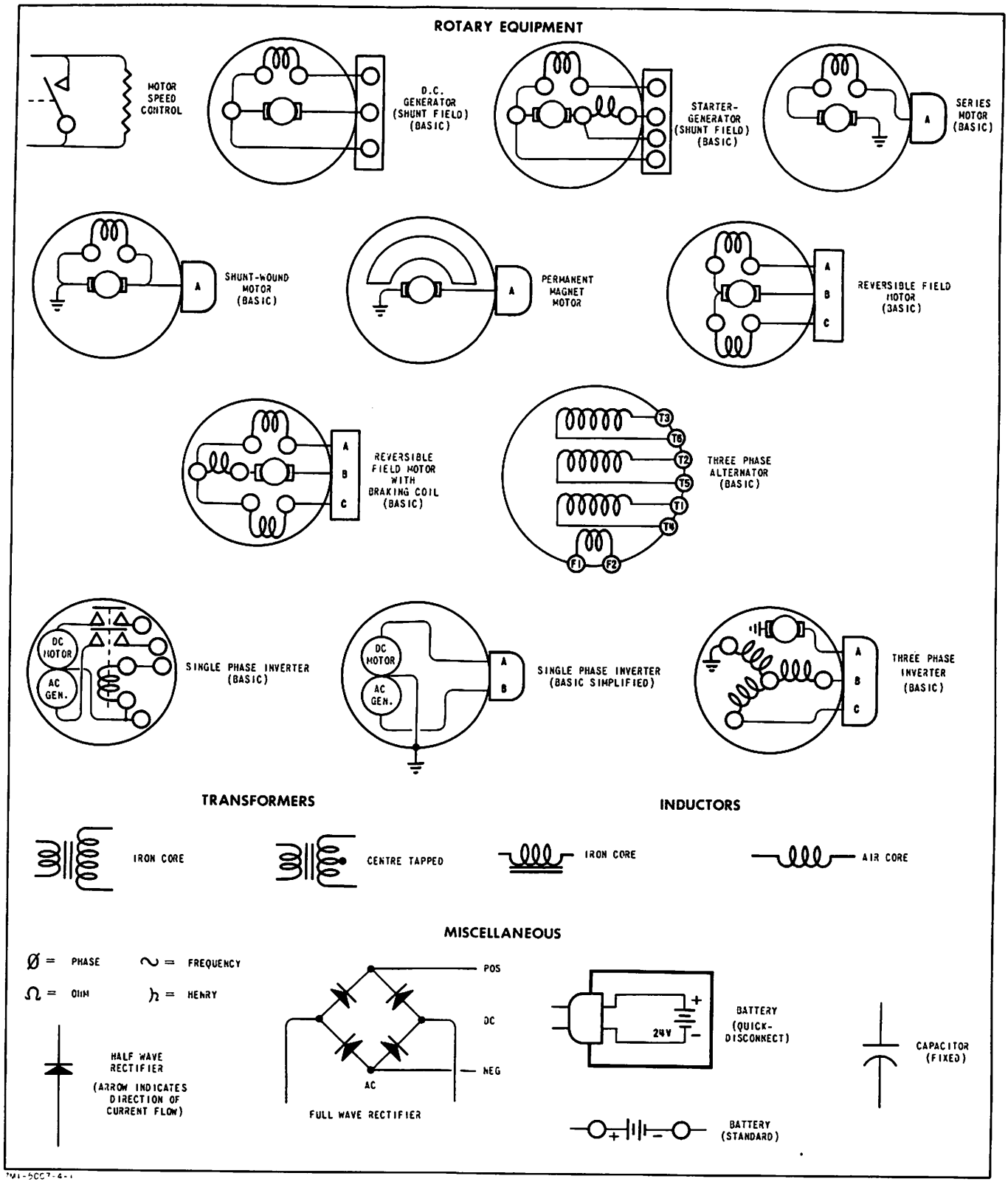


FIG. 5 ELECTRICAL SYMBOLS - SHEET 4 OF 4

22 Bonding entails the electrical interconnection of two or more electrically conducting surfaces not otherwise adequately interconnected. This obviates the possibility of electrical discharge occurring between such surfaces as a result of differences in potentials arising from electrical failure, or from charges induced by friction or static. Specifically, bonding is necessary for the following reasons:

(a) To protect the aircraft and personnel from lightning discharge by equalization of potentials produced which might cause arcs and sparks in the aircraft structure.

(b) To protect personnel from shock hazard which could result from certain power faults in electrical equipment.

(c) To provide power current and, where applicable, fault-current ground return paths.

(d) To provide a counterpoise ground for radio transmission and reception.

(e) To prevent the development of RF potentials on conducting frames and enclosures of electrical and electronic equipment.

(f) To prevent the accumulation of a static charge which would produce radio interference, explosion hazard by periodic spark discharge or constitute a shock hazard.

(g) To prevent interference from being coupled from one item of equipment to another due to the existence of a common impedance.

23 The components and equipment which require bonding are listed in fig 6.

24 Nose filters are fitted in certain circuits, e.g. ice detection, to provide efficient suppression of radio interference as close as possible to its source.

25 Bond testing is normally required only at the periods specified in the Maintenance Schedule, or when electrical or structural changes are made which may affect the properties of the bond. Bond resistance limits are shown on fig 7.

26 With the exception of the check for the prevention of static accumulation, a Shallcross Bond Tester, Evershed and Vignoles Bond Meter or equivalent should be used when testing bond resistance. A Triplett 630A or equivalent multimeter should be used when testing for the prevention of static accumulation.

27 When testing other return paths to ground, the total impedance of cable and ground return path must be such that the potential difference between the point of voltage regulation and the load does not exceed the values listed below. The maximum allowable voltage drops are as follows:

(a) 27.5 volts;
One volt maximum drop for equipment in continuous operation. Two volts maximum drop for equipment intermittent in operation.

(b) 115 volts;
Four volts maximum drop for equipment in continuous operation. Eight volts maximum drop for equipment intermittent in operation.

(c) 200 volts;
Seven volts maximum drop for equipment in continuous operation. 14 volts maximum drop for equipment intermittent in operation.

INSULATION

28 When the insulation of the electrical wiring is checked, a 500 volt insulation tester should be used for 27.5 volt DC system and a 1500 volts insulation tester for the 115/200 volt AC system. The insulation resistance of the main bus-bars to ground should be not less than two megohms for DC circuits and ten megohms for AC circuits. Insulation between the phase lines of the alternators should be not less than ten megohms.

29 The insulation resistance to ground of separately fused circuits should be not less

ARROW 1 SERVICE DATA

REASON FOR BONDING	COMPONENT OR EQUIPMENT BONDED
Lightning Protection	Control surfaces. All electrically isolated conducting objects (except antennas) which protrude above the aircraft surface.
Power Current Return Paths	All components requiring a ground return path.
Counterpoise Ground	Antenna installations.
Prevention of the Development of RF Potential	Equipment containing electrical circuits which may initiate radio frequencies, or generate interference over a wide band of frequencies.
	All conducting items, having linear dimensions greater than 12 inches and within 12 inches of an unshielded lead-in from a transmitting antenna.
Prevention of Shock Hazard	All metallic conduit carrying electrical wiring.
	Exposed conducting frames or components of electrical and electronic equipment.
Prevention of the Accumulation of Static Charge	All isolated conducting objects (except antennas) having any linear dimension greater than three inches which protrude above the aircraft surface.
	Any components carrying fluids in motion or which are otherwise subject to having a charge induced by friction.

FIG. 6 BONDED EQUIPMENT TABLE

ARROW 1 SERVICE DATA

REASON FOR BONDING	MAXIMUM VALUE IN OHMS
Lightning Protection	0.005 (leakage path)
Power Return Path	0.0035 (alternator neutrals or phase return leads)
All Other Return Paths	See para 27.
Antenna Bonds	0.02
Prevention of the Development of RF Potential	0.02
Prevention of Shock Hazard	0.099
Prevention of Static Accumulation	500,000

FIG. 7 BOND RESISTANCE LIMITS TABLE

than two megohms for DC circuits and ten megohms for AC circuits. An exception to the foregoing is the exhaust temperature indication thermocouple circuit which should be checked using a high-range ohmmeter and a maximum of 60 volts. The insulation resistance of this circuit should be not less than 2,000 ohms.

ELECTRICAL LOAD ANALYSIS

30 When further information is available, tables will be compiled to show the power consumed, at the system voltage, by each item of electrical equipment.

CONNECTOR POTTING PROCEDURES

31 Leakage, due to high altitudes, across soldered contacts in connectors is obviated by a potting process. The following materials and equipment are required for potting new connectors or making repairs to the potting of existing connectors:

(a) Potting Compound and Accelerator PK1402; supplier - E.F. Walton Limited, Montreal, P.Q.

(b) Compound Solvent; Toluene(Commercial).

(c) Cleaning Solvent, Inhibisol (GE 18-1); supplier - Penatol Co., U.S.A.

(d) Mould Release Agent; Vaseline or Polyethylene Grease EC776 manufactured by Minnesota Mining and Manufacturing Co.

(e) Ejector Gun, Semco Sealant Model 250-12 (12 fluid ounces capacity, 1/16 inch nozzle); supplier - Pyles Industries Inc., Michigan, U.S.A.

(f) Spatula or putty knife for mixing compound.

32 Prepare the connectors for potting, proceeding as follows:

(a) Inspect and check the connector contacts for soldering and continuity.

(b) Remove grease, oil and wax from the wiring and pins, and from the inside of the connector mould shell using the Inhibisol cleaning solvent. To ensure that a good cure is obtained, rubber gloves should be worn to prevent skin oils forming a film on the prepared surfaces.

33 Mix the potting compound proceeding as follows:

(a) Check that the shelf life of six months from the date of manufacture has not expired.

(b) Check that the base compound (white) and the accelerator (black) are both free from stringiness and lumps then stir each until they are of uniform consistency.

(c) Pour the contents of both containers into a mixing container and blend together for about two minutes, then, to ensure a uniform blend, scrape off the stirer and the sides of the mixing container. Continue mixing for a further three minutes. If a smaller amount of compound is required, the mixing proportions are, by weight, 11 parts of base compound to 1 part of accelerator.

(d) After mixing, spread a thin sample of the compound over a piece of white paper. The compound should be an even grey colour. Specks or streaks indicate improper mixing. Aeration may be present due to chemical action but should not be excessive.

(e) Stamp the time and date on the mixing container. Discard the mix after 60 minutes from this time.

34 Inject the potting compound into the connectors proceeding as follows:

(a) Load the ejector gun with the compound.

(b) Centre the cable conductors in the mould shell.

(c) Inject the compound into the shell at its lowest point and withdraw the nozzle as the shell fills. Do not fill the connector and then withdraw the nozzle as this may result in the formation of voids.

35 The compound can be cured by any one of four curing methods. Dependent upon the method used, the curing time ranges from two days to ten days. However, with the exception of Method 1, the connectors may be used, but subject to certain restrictions, before the fully cured state is reached.

36 Once a particular method is adopted, it should be continued to completion. Note that curing temperatures should not be increased to speed the curing time. This action will probably result in a 'soft' internal cure. If detachable mould shells are used, they should be smeared with vaseline or polyethylene grease to prevent adhesion to the compound. The moulds should be removed immediately the tack-free stage of cure is reached.

37 Using Method 1 the time taken for a complete cure is 48 hours. To cure the compound by this method, proceed as follows:

(a) After injecting the potting compound allow the connector to stand for 60 minutes at room temperature (70°F).

(b) Place the connector in a curing oven controlled at a temperature of 120°F for 24 hours.

(c) Increase the temperature of the curing oven to 185°F for a further 24 hours to complete the cure.

38 Using Method 2 the time taken to reach a fully cured state is seven days. However, subject to certain restrictions, the connector can be used after 24 hours. To cure the compound by this method, proceed as follows:

(a) After injecting the potting compound, allow the connector to stand for 60 minutes at room temperature (70°F).

(b) Place the connector in a curing oven controlled at a temperature of 120°F for 24 hours. At the completion of this stage the connector can be used provided that it is not immersed in fuel or subjected to high temperatures.

(c) To attain a complete cure the connector will require a further six days at 70°F followed by four hours in a curing oven at 185°F.

39 Using Method 3 the time taken for a complete cure is ten days. However, the connector may be used after four days provided that:

(a) It is not subjected to temperatures exceeding 70°F.

(b) It is not immersed in fuel.

(c) It is not subjected to differential pressures.

(d) It is not subjected to electrical pressures.

40 To cure the compound using Method 3, proceed as follows:

(a) After injecting the potting compound allow the connector to stand for four days at room temperature (70°F) to reach a tack-free state. Subject to the restrictions in para 39 the connector can be used at the completion of this time.

(b) To complete the cure the connector will require a further six days at 70°F followed by four hours in a curing oven at 185°F.

41 Using Method 4 the time taken for a complete cure is ten days. However, subject to the restrictions in para 39, the connector can be used after two hours. To cure the compound using this method proceed as follows:

(a) After injecting the potting compound allow the connector to stand for 60 minutes at room temperature (70°F).

(b) Place the connector in a curing oven controlled at a temperature of 120°F for two hours to reach a tack-free state. At the completion of this time the connector can be used subject to the restrictions in para 39.

(c) To complete the cure, the connector will require 10 days at 70°F followed by four hours in a curing oven controlled at 185°F.

42 Should repairs have to be made to a potted connector, cut away the compound by using a knife. Use the compound solvent to smooth the cut surface. When repairs to the potting or soldering have been completed, refit the mould shell and refill with potting compound and cure as described in the preceeding paragraphs. Adhesion between the surfaces is automatic. A primer is not necessary.

ENGINE ELECTRICAL CIRCUITS

43 Certain circuits of the aircraft electrical system are interconnected with the engine electrical system. These circuits are:

(a) Ignition.

(b) Afterburner control circuit.

(c) Normal-Emergency engine fuel control circuits.

(d) Engine anti-icing valve control circuit

(e) Fuel Flowmeter power supply - 26 volts, 400 cycle AC.

(f) Low Compressor rotor overspeed indication circuit.

(g) Engine speed indication.

(h) Oil pressure.

(j) Turbine outlet temperature indication.

44 Circuits (a) to (f) are interconnected via one connector on the engine junction box located on the front compressor rear case.

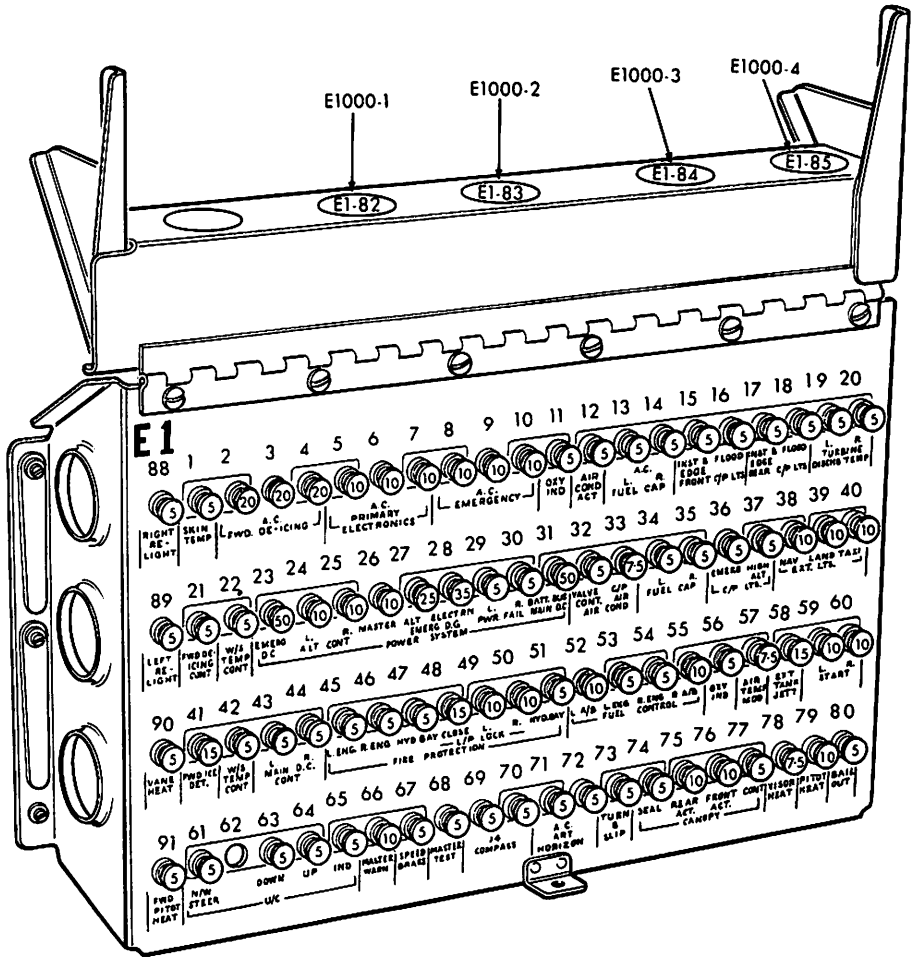
45 Circuits (g) and (h) are interconnected via a connector fitted to a mounting plate attached to the generator mounting pad of the accessories drive.

46 The turbine outlet temperature indication circuit (j) is interconnected via a connector located in the vicinity of the accessories drive.

47 In addition to the above, a break point for the alternator circuits is located on the front compressor rotor just above the engine junction box.

48 The interconnection points are depicted in the engine disconnect points illustration included in the Arrow 1 Service Data - Engine Installation.

ARROW 1 SERVICE DATA



PANEL LOCATED IN NOSE WHEEL WELL
FORWARD OF STATION 150-00.

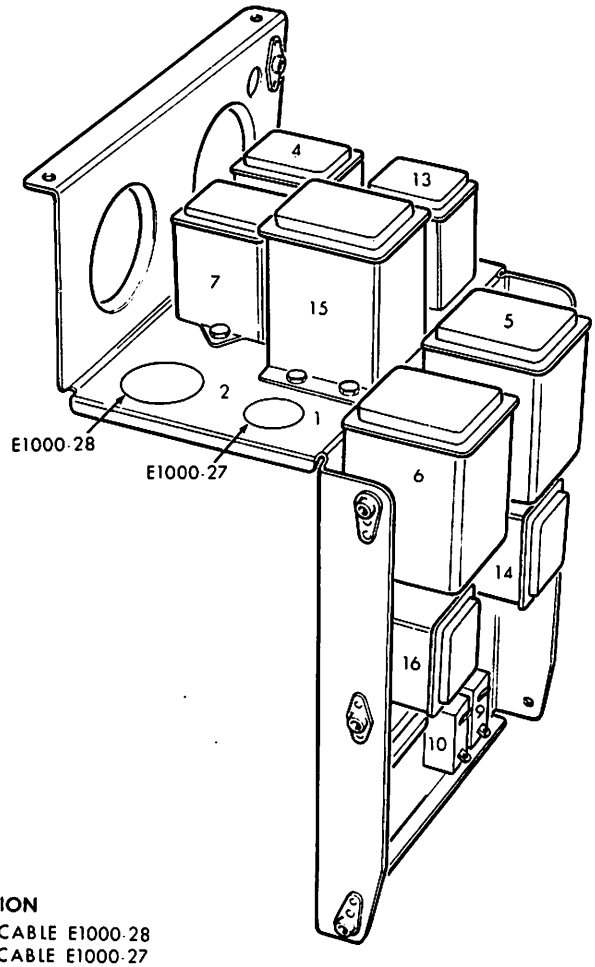
91 - ITEM NUMBER ON REAR FACE OF PANEL

(5) - AMPERAGE

7M1-5001-1

FIG. 8 MAIN CIRCUIT BREAKER PANEL E1

ARROW 1 SERVICE DATA



ITEM	DESCRIPTION
1	RECEPTACLE FOR CABLE E1000-28
2	RECEPTACLE FOR CABLE E1000-27
4	RELAY - AIR CONDITIONING
5	RELAY - FIRE PROTECTION
6	RELAY - FIRE PROTECTION
7	RELAY - AIR CONDITIONING
9	SWITCH - FUEL
10	SWITCH - AIR CONDITIONING
13	RELAY - AIR CONDITIONING
14	RELAY - CANOPY ACTUATION
15	RELAY - POWER SUPPLIES
16	RELAY - CANOPY ACTUATION

PANEL LOCATED IN NOSE WHEEL WELL, RH SIDE BETWEEN STATION 129-137

7V1-5002-1

FIG. 9 ACCESSORY PANEL E3

ARROW 1 SERVICE DATA

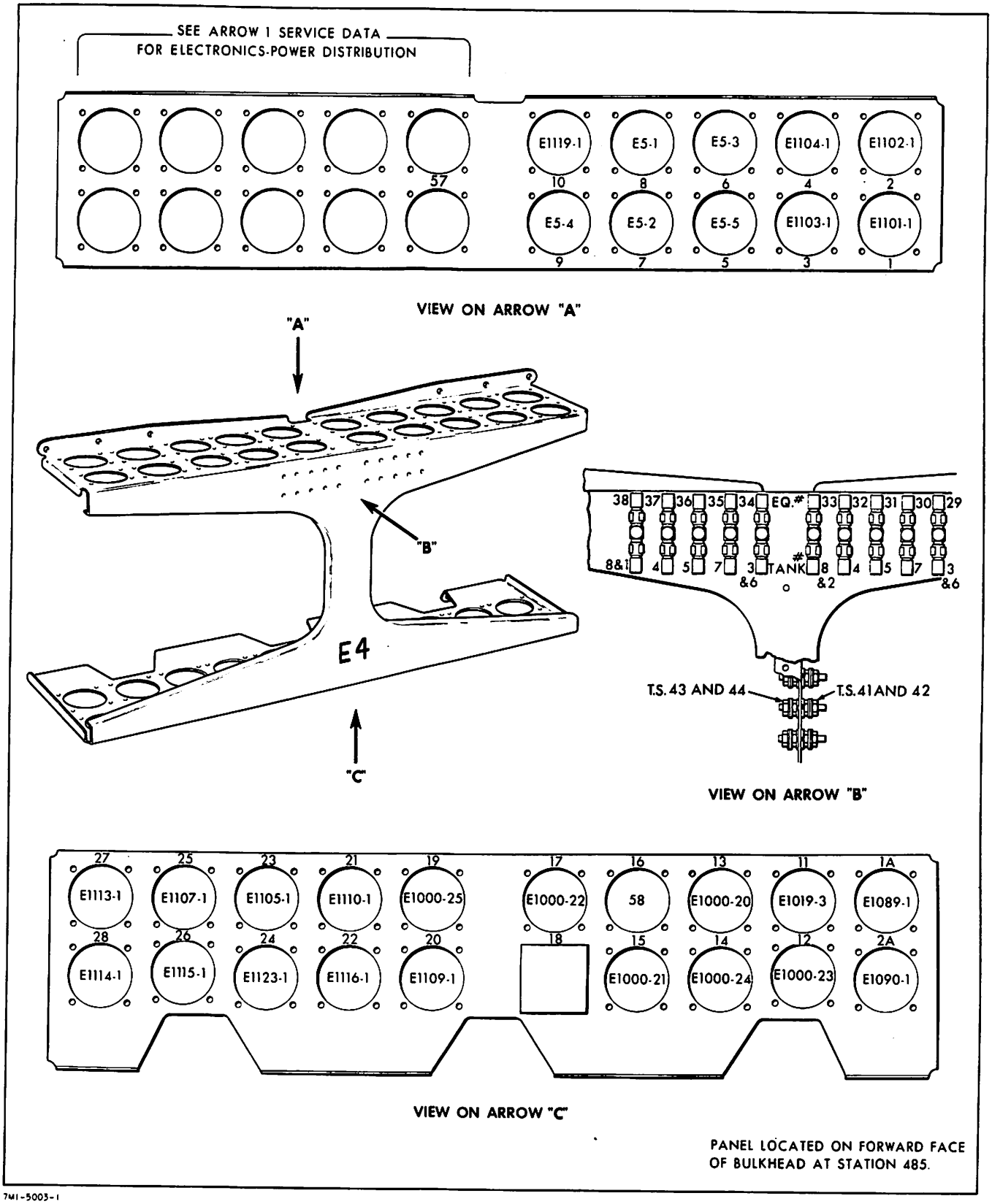


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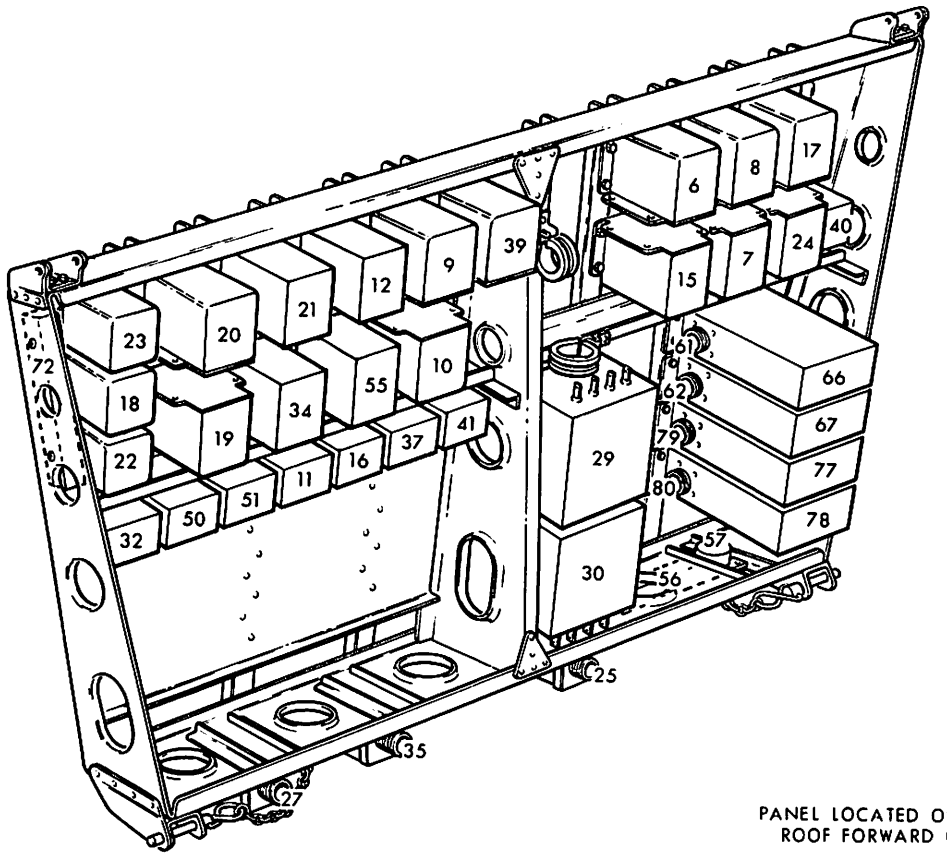
FIG. 10 DISTRIBUTION PANEL E4

ARROW 1 SERVICE DATA



PANEL LOCATED ON ARMAMENT BAY ROOF FORWARD OF STATION 485

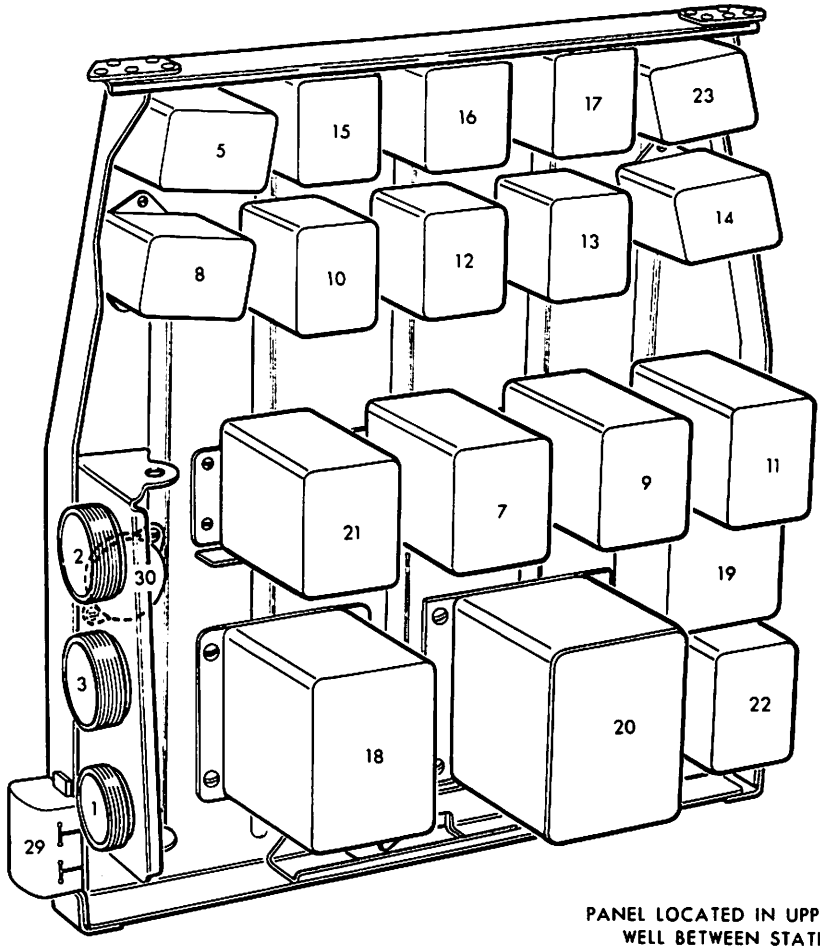
ITEM	DESCRIPTION
6	RELAY - FUEL
7	RELAY - FUEL
8	RELAY - FUEL
9	RELAY - FUEL
10	RELAY - FUEL
11	RELAY - ENGINE SERVICES
12	SPARE
15	RELAY - FUEL
16	RELAY - ENGINE SERVICES
17	RELAY - FUEL
18	RELAY - ENGINE SERVICES
19	RELAY - ENGINE SERVICES
20	RELAY - ENGINE SERVICES
21	RELAY - ENGINE INTAKE DE-ICING
22	RELAY - ENGINE SERVICES
23	RELAY - ENGINE SERVICES
24	RELAY - FUEL
25	CONTROL UNIT - FIRE PROTECTION
27	CONTROL UNIT - FIRE PROTECTION
29	SPARE
30	SPARE
32	RELAY - ENGINE SERVICES

ITEM	DESCRIPTION
34	RELAY - ENGINE INTAKE DE-ICING
35	CONTROL UNIT - FIRE PROTECTION
37	RELAY - FUEL
38	RELAY - SPARE
39	SPARE
40	RELAY - FUEL
41	RELAY - FUEL
50	RELAY - ENGINE SERVICES
51	RELAY - ENGINE SERVICES
55	SPARE
56	TERMINAL STRIP - FIRE PROTECTION
57	RECEPTACLE FOR CABLE END E1115-12
61	CONNECTOR - FUEL LOW LEVEL CONTROL UNIT
62	CONNECTOR - FUEL LOW LEVEL CONTROL UNIT
66	LOW LEVEL CONTROL UNIT - FUEL
67	LOW LEVEL CONTROL UNIT - FUEL
72	TERMINAL STRIP - FUEL
77	LOW LEVEL CONTROL UNIT - FUEL
78	LOW LEVEL CONTROL UNIT - FUEL
79	CONNECTOR - FUEL LOW LEVEL CONTROL UNIT
80	CONNECTOR - FUEL LOW LEVEL CONTROL UNIT

7M1-5004-1

FIG. 11 MAIN ACCESSORY PANEL E5

ARROW 1 SERVICE DATA



PANEL LOCATED IN UPPER NOSE-WHEEL WELL BETWEEN STATIONS 129-149

ITEM	DESCRIPTION
1	RECEPTACLE FOR CABLE END E1-86
2	RECEPTACLE FOR CABLE END E1000-30
3	RECEPTACLE FOR CABLE END E1000-12
5	RELAY - POWER SUPPLIES
7	RELAY - LANDING GEAR
8	RELAY - LANDING GEAR
9	RELAY - FIRE PROTECTION
10	RELAY - LIGHTING
11	RELAY - LANDING GEAR
12	RELAY - CANOPY ACTUATION
13	RELAY - LIGHTING
14	RELAY - CANOPY ACTUATION
15	RELAY - LANDING GEAR
16	RELAY - POWER SUPPLIES
17	RELAY - POWER SUPPLIES
18	RELAY POWER SUPPLIES
19	RELAY - POWER SUPPLIES
20	RELAY - ENGINE SERVICES
21	RELAY - FIRE PROTECTION
22	RELAY - AIR CONDITIONING
23	RELAY - POWER SUPPLIES
29	TERMINAL STRIP FOR CABLES E1014-1 E1000-37
30	CIRCUIT BREAKER - POWER SUPPLIES

7M1-5005-1

FIG. 12 RELAY PANEL E6

ARROW 1 SERVICE DATA

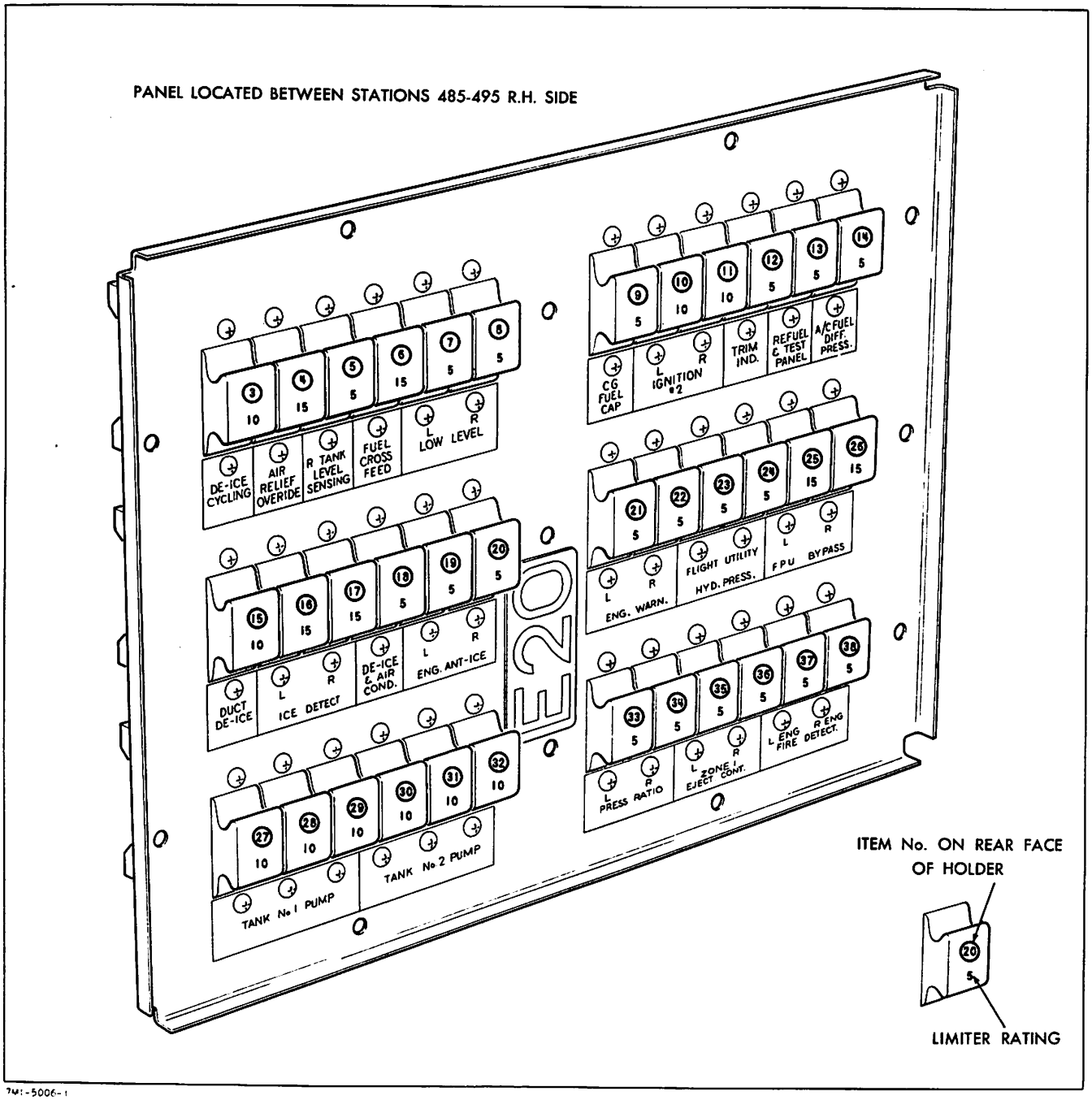


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FIG. 13 LIMITER PANEL E20

ARROW 1 SERVICE DATA

SECTION 37

ELECTRICAL SYSTEM

POWER SUPPLIES

(This data supersedes previous issue dated 28 Nov 1956)

UNCLASSIFIED

ARROW 1 SERVICE DATA

LIST OF REVISIONS

DATE	PAGE NO.	DATE	PAGE NO.

UNCLASSIFIED
CONFIDENTIAL

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DESCRIPTION

GENERAL

1 The prime source of power on the aircraft is two 30 kva, 120/208 volt 3-phase alternators fitted one on the LH engine and the other on the RH engine. The alternators are driven by the engines through constant speed units to produce an output frequency of 400 cps. Each alternator together with voltage regulation, fault detection and distribution control circuits constitutes an AC sub-system.

2 Under the normal conditions, the RH AC sub-system supplies the majority of the AC operated services. The remainder are supplied by the LH AC sub-system.

3 In the event of the RH sub-system failing, the LH sub-system isolates its load and assumes the RH sub-system load. Exceptions to this action are the LH and the RH transformer-rectifier units which satisfy DC power requirements, and the LH and the RH AC circuits of the engine intake de-icing system. These circuits derive their supply from the LH or the RH AC sub-system, as appropriate, and are rendered inoperative if the relevant AC sub-system fails.

4 Should both sub-systems fail, a hydraulically-driven 0.9 kva 3-phase alternator satisfies emergency condition AC power requirements. A constant speed control, integral with the drive motor, maintains the output frequency at approximately 400 cps.

5 The two transformer-rectifier units, one LH and one RH, are operated in parallel. Each unit together with voltage regulation, fault detection and distribution control circuits constitutes a DC sub-system.

6 As the DC sub-systems derive their AC supply from the corresponding LH or RH AC sub-system, failure of an AC sub-system renders its associated DC sub-system inoperative. A failure of either DC sub-system causes certain DC loads to be disconnected. This ensures that the maximum DC load demand cannot exceed the capacity of one sub-system. If both DC sub-systems are inoperative, a 15 ampere-hour nickel-cadmium storage battery satisfies emergency condition DC power requirements.

7 A receptacle is provided to facilitate the connection of an external source of AC power. When this is done, the external supply substitutes for the AC sub-systems which are automatically isolated.

8 The controls for the AC and the DC sub-systems are located in the front cockpit on the RH console. A control switch marked ON-OFF-RESET is provided for each AC sub-system. A single control switch marked RESET is provided for the DC sub-systems. A master switch is provided to isolate the service load from the sub-systems.

9 Indication of an AC or a DC sub-system failure is provided by indicator lights located on the master warning indicator panel. An indicator marked AC FAIL and an arrow to indicate LH or RH is provided for each AC sub-system. A single indicator marked DC L OR R FAIL is provided for the DC sub-systems. When the battery is supplying power, an indicator marked BATT USE is illuminated.

AC SUPPLY

GENERAL

10 The output lines from the alternators are connected to an AC/DC control panel, LH or RH as appropriate. Both panels are contained in an air conditioned cabinet, see fig 1. The AC portion of each control panel incorporates a voltage regulation circuit, an over-voltage detection circuit and a field contactor or shorting circuit. From the control panels, the lines are routed via a ground fault unit to their respective LH or RH line control relays.

11 The supply circuits to energize the line relays are completed when the master electrical switch is set to the ON position and the input speed to the constant speed unit reaches a minimum of 2250 rpm. When energized, the line relays complete the alternator lines to the appropriate LH and RH AC sub-system busbars.

ARROW 1 SERVICE DATA

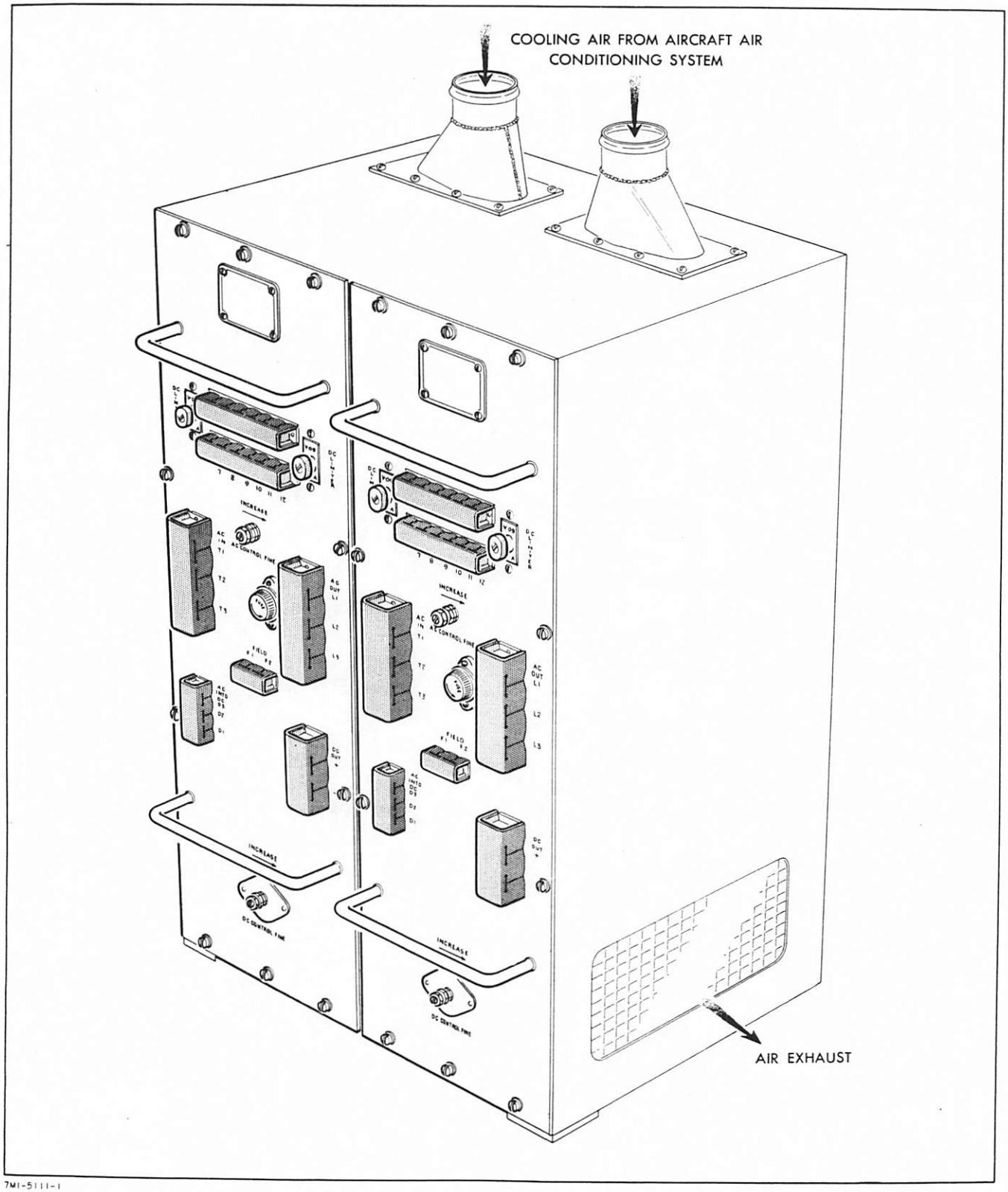

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FIG. 1 AC/DC CONTROL PANELS, LH AND RH

12 The only circuits which derive their supply directly from the sub-system bus-bars are the transformer-rectifier units of the LH and the RH DC sub-systems, the LH and the RH circuits of the engine intake de-icing system, and two power failure detectors, one LH and one RH, of the AC distribution control circuits. Each circuit derives its supply from the LH or the RH AC sub-system bus-bars, as appropriate. From the AC sub-system bus-bars the alternator lines are connected via current limiters to a transfer relay, LH or RH as appropriate. The transfer relays are operated by the distribution control circuits.

13 Normally, the distribution control circuits of the LH AC sub-system are overridden by the distribution control circuits of the RH AC sub-system which energize a transfer control relay to complete a supply circuit to the RH transfer relay and a shedding relay. The transfer relay, when energized, completes the RH alternator lines from the AC sub-system bus-bars to the main AC distribution bus-bars in panels E1 and E20. The shedding relay completes the LH alternator lines to the sheddable load of the electronics group, i.e. the X-Band Beacon and the electronics bay access door actuator.

14 In the event of the RH sub-system failing, the RH control circuits are inoperative. This de-energizes the shedding relay and the RH transfer relay and permits the LH control circuits to be completed. The LH control circuits energize the LH transfer relay which completes the LH alternator lines to the main AC bus-bars.

15 When the RH control circuits are inoperative, a supply circuit is completed to the RH AC FAIL indicator circuit and a preparatory supply circuit is completed to a failure relay. Should the LH sub-system fail also, the LH control circuits energize the failure relay which permits the RH sub-system preparatory supply to initiate the operation of the emergency AC system. The AC circuits supplied by the emergency system are the instruments, J4 compass, IFF installation and the emergency yaw damper system. Note that if the LH sub-system fails first, only the sheddable electronic load is affected. The failure relay will be energized in anticipation of the supply to the emergency AC system being completed due to failure of the RH sub-system.

16 As the component circuits of the LH and the RH sub-systems are identical the following descriptions are equally applicable to both.

ALTERNATORS (Fig 2)

17 The alternators are located in the nose bullet of their respective LH and RH engine and each is mechanically coupled to a constant-speed drive unit.

18 The constant-speed drive unit maintains the alternator at a practically constant 8000 rpm, thus providing a supply frequency of 400 cps. When the alternator speed is less than 7200-7500 rpm, i.e. alternator output of 360-375 cps, a centrifugal switch incorporated in the drive assembly is opened. This action interrupts the supply circuit from the master electrical switch to the line relay so isolating the appropriate AC sub-system. A governor valve, also incorporated in the drive assembly, functions to prevent the drive unit from overspeeding.

19 Further information on the constant speed drive unit is contained in the Arrow Service Data - Accessories Drives and Gearboxes.

20 The alternator is a 3-phase air-cooled machine with a continuous rated output of 30 kva at 120/208 volts. The output voltage is regulated to 115/200 volts, phase-to-neutral and between phases respectively.

21 Connections are made to the stator via six terminals, identified T1 through T6, located in a terminal block mounted on the alternator frame. Terminals T1, T2 and T3 are the power take-off connections; terminals T4, T5 and T6 are connected to a ground stud so forming a star or wye connected stator. A field connection terminal block containing two terminals, identified F1 and F2, is located adjacent to the stator connection terminal block. The field terminals are connected internally to the revolving field winding via slip rings and brushgear, and externally to the voltage regulation circuits.

22 Initially, field excitation is achieved by the magnetic remanance of the field poles. The output from the alternator due to this effect appears in the voltage regulation circuits and is returned to the field as a rectified DC voltage. Consequently, a progressive increase in the alternator output is obtained which is subject to control by the voltage regulation circuits.

VOLTAGE REGULATION CIRCUITS (Fig 3)

23 The voltage regulation circuits which are contained in the AC/DC control panel, provide field excitation in proportion to the line load and maintain the output voltage of the alternator at a practically constant level.

24 Field excitation in proportion to the line load is supplied by a compounding circuit. This circuit comprises a 3-phase transformer-rectifier assembly (TR1, MR2) connected between the alternator output lines and the field circuit. Each primary winding of the transformer (TR1) is connected in series with one of the alternator output lines. Each of the secondary windings is connected to a rectifier (MR2). Therefore, the voltage induced in the secondary windings will be proportional to the current flow in the primary which is in effect the load current. The greater the load current, the greater the induced voltage supplied to the rectifiers. As the rectified DC is supplied to the alternator field, the alternator output is increased in proportion to the load increase, and vice-versa.

25 An average output voltage across the three phases is maintained by a magnetic amplifier assembly. This assembly is, essentially, a variable impedance inserted between the alternator output and the alternator field, and functions to increase or decrease the field voltage when the voltage of one or more of the three phases is above or below a predetermined limit.

26 A magnetic amplifier consists of a coil and one or more control windings wound on a core of special metal which has an extremely low hysteresis loss. The operation of the amplifier is based upon the impedance, i.e. resistance offered to the flow of alternating current, produced in the coil due to inductive reactance. If a DC signal is supplied to the control windings, a field is set up in the core which causes the value of the coil impedance to alter due to the change in the inductive reactance. If the voltage to the control winding is progressively increased until the core is saturated, the impedance of the coil will progressively decrease to a minimum. Thus, as the flow of alternating current in the coil is inversely proportional to impedance, maximum current will flow when the core is saturated and decrease as the control winding voltage is decreased.

27 Regulation of the output can be obtained if the control windings are poled so as to oppose each other. The effect of this is such that when current flows in one winding, the resulting magnetic effect will oppose the magnetic effect of the coil; this results in an increased impedance. The opposite effect is obtained from the other coil. In this case the magnetic effect aids the magnetic effect of the coil and the impedance is decreased.

28 The magnetic amplifier (TD1) comprises three pairs of coils, one pair for each phase, and three control windings, namely a reference winding, a regulation winding and a damping winding. Throughout the descriptions the operation of one of the paired coils is described. The operation of both coils is identical, the second coil serving to provide full wave operation.

29 Each pair of coils is connected between one of the alternator lines and a primary winding of a three-phase transformer (TR2). The secondary windings of the transformer are each connected to a rectifier (MR3) fitted in the field circuit. Therefore, the rectified output to the field is proportional to the current flow in the transformer primaries. The current in the primary windings is determined by the impedance of the coils which is controlled by the reference winding and the regulation winding.

30 The reference winding receives a DC supply via the alternator control and reset switch. This supply is effective only during initial build-up of the alternator output and its effect is to reduce to a minimum the impedance of the coils. Due to this, the initial line

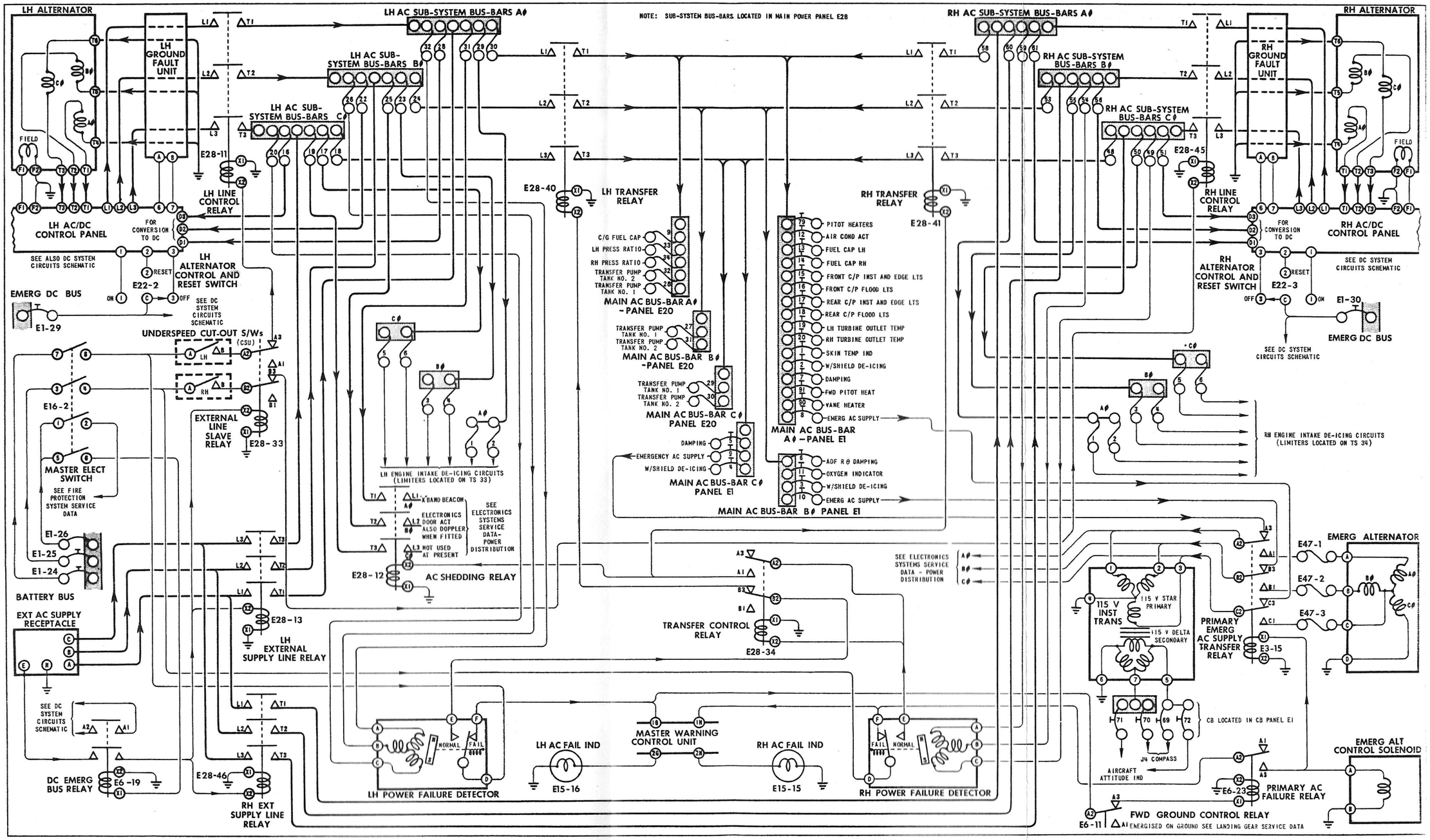

FIG. 2 A C POWER SUPPLY SCHEMATIC

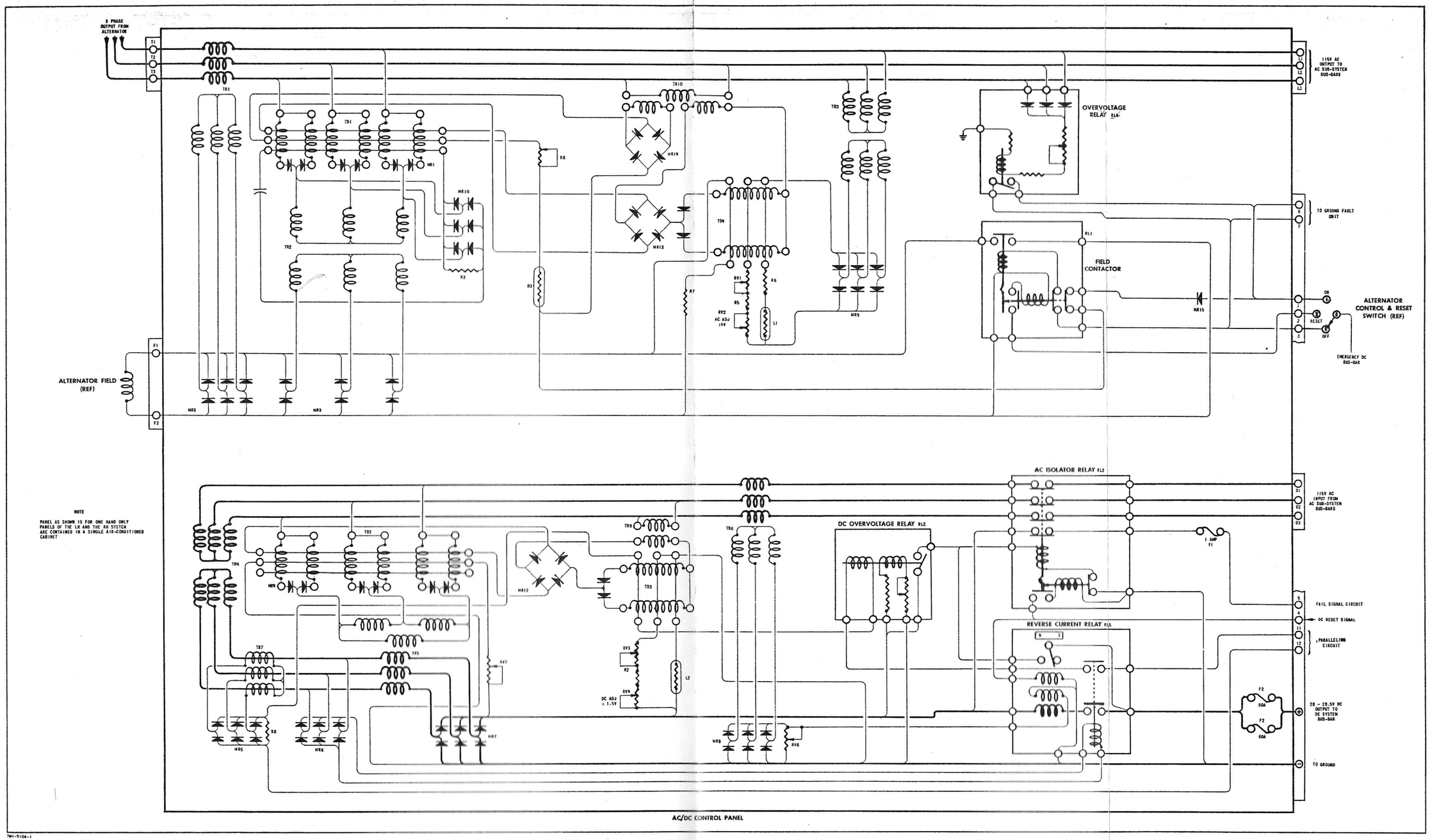

FIG. 3 AC/DC CONTROL PANEL SCHEMATIC

current will appear in the primary windings of the transformer (TR2). The resulting induced voltage in the secondary windings is rectified and supplied to the field circuit. This action has a cumulative effect as increasing output will result in increasing field voltage which further increases the output.

31 As the alternator output increases, the voltage appearing in the magnetic amplifier coil will also increase. This reduces the effectiveness of the initial current in the regulation winding and would result in an increasing impedance of the coil but for a voltage supplied by a transformer-rectifier assembly (TR10, MR14) connected across two of the alternator lines. This voltage holds the impedance at a given value dependant upon the alternator output and also serves as a reference. When the voltage applied to the regulation winding results in a greater current than that in the reference winding, the impedance of the coil will be increased, and vice-versa.

32 The regulation winding of the magnetic amplifier derives its DC control voltage from a pre-amplifier or sensing assembly. This assembly consists of a magnetic amplifier (TD4) and a full wave rectifier circuit (MR13). The coils of the pre-amplifier are in series with the full wave rectifier circuit and both are connected across the secondary of a transformer (TR10), the primary of which is tapped across two of the alternator lines. Thus the load on the transformer secondary will be proportional to the impedance of the pre-amplifier coils, i.e. an increasing impedance resulting in a decreasing current flow so decreasing the load.

33 The impedance of the pre-amplifier is controlled by three windings, namely a regulation control winding, a reference control winding and a balance control winding.

34 The reference winding and the regulation winding of the pre-amplifier derive their supply from a three-phase transformer-rectifier assembly (TR3, MR4) connected across the alternator lines. The rectified DC is supplied to the reference winding via a barretter (L1) which provides a constant current in the reference winding regardless of the voltage. The regulation winding is supplied via three resistors (RV1, RV5 and RV2) two of which are adjustable to permit the operating point to be preset. One resistor permits a coarse adjustment and the other a fine adjustment. Initially, the circuit is adjusted to provide 200 volts between phases at no-load. In this condition the current flow in the regulation and reference windings will be equal.

35 If the voltage of any line increases above the preset limit, the output of the transformer-rectifier assembly (TR3, MR9) is proportionately increased. Consequently, the current flow in the regulation winding will be greater than that in the reference winding. As the field set up in the core by the regulation winding is of the same polarity as that set up by the coil current, the impedance of the coil is decreased. The resulting increase in current flow through the coil loads the transformer secondary, so effecting a decrease in the voltage across the coil and the rectifiers (MR13). This, in turn, decreases the output from the rectifiers (MR13) and consequently the current in the regulation winding of the magnetic amplifier (TD1). Due to this, the current in the reference winding of the magnetic amplifier will be greater than that in the regulation winding. As the field produced by the regulation winding is of the opposite polarity to that produced by the coil current, the impedance of the coil is increased. The resulting decrease in current through the coil is reflected in the secondary of the transformer (TR2) as a reduction in the induced voltage. Consequently, the output of the rectifiers (MR3) is decreased with the accompanying decrease in field voltage and the alternator line voltage.

36 If the voltage of any line decreases below the preset limit, the current in the regulation control winding of the pre-amplifier is less than that of the reference control winding. As the reference winding polarity is such that it opposes the coil current, the impedance of the coil increases. Increasing impedance results in a decrease in current flow through the coil and a decrease in load on the secondary of the transformer (TR10). This results in an increase in voltage across the rectifiers and a proportional increase in output to the regulation winding of the magnetic amplifier (TD1). The current flow in the regulation winding being

greater than that of the reference winding will decrease the coil impedance. The increase in current through the coil increases the induced voltage to the rectifiers (MR3) so increasing the field voltage thus the alternator output voltage.

37 When the alternator output has been increased or decreased to the preset value by the action of the amplifier circuits, the current flow in the regulation winding and the reference winding will again be equal. But for the action of the balance winding, this would permit the alternator output to again increase or decrease. The balance control winding of the pre-amplifier is connected directly across the field and so the current flow in the winding is directly related to the field voltage. The action of the winding is such that it increases or decreases the impedance of the coil by an amount equivalent to that produced by the action of the regulation or reference control winding. The purpose of this being to maintain the field at the value required to produce the regulated output from the alternator, compatible with changing load conditions.

38 Should a failure occur in the voltage regulation circuits which results in an overvoltage condition or excessive current drain, these faults will be detected by, respectively, the overvoltage relay or the ground fault unit.

OVERVOLTAGE RELAY (Fig 3)

39 The overvoltage relay (RL4) incorporated in the AC/DC control panel effects the isolation of the relevant sub-system if the voltage of any output line exceeds a preset limit.

40 The relay derives its supply from a rectifier assembly connected across the alternator output lines. Thus the line having the greatest output voltage determines the value of the rectified DC supply to the relay. If the voltage of any line exceeds a limit preset by an adjustable resistor fitted in the circuit, sufficient current will flow to energize the relay. This results in the completion of a supply to trip the field contactor so ceasing alternator generation. The supply to the field contactor is derived from the emergency DC bus-bar in panel E1 via the ON position of the appropriate LH or RH alternator control and reset switch.

GROUND FAULT UNIT (Fig 4)

41 The ground fault unit detects current leakage from any phase wire in the alternator and in part of the output lines. The unit is effective only from the alternator to the point of the circuit in which it is fitted, see fig 2. Leakage in lines succeeding the unit will not be detected.

42 The ground fault unit consists of three independent and identical circuits each of which incorporates a circuit relay connected across a sensing coil via a rectification circuit. One phase line and its associated neutral line are routed through the sensing coil; thus the sensing coil will be influenced by the magnetic field set up by these lines. Normally, the current in a phase line and its neutral line are equal but of opposite direction of flow. Due to this, the field set up by the lines cancel each other. However, if a leakage occurs in any line, it will effect a change in the strength of the field compared with its associated neutral. If the leakage rate exceeds 30 amperes, sufficient voltage is induced in the sensing coil and rectified to effect the energizing of the circuit relay. When energized, the circuit relay completes a supply circuit to operate the field contactor and cease alternator generation. The supply circuit is derived from the emergency DC bus-bar in panel E1 via the ON position of the appropriate LH or RH alternator control and reset switch.

FIELD CONTACTOR (Fig 3)

43 The field contactor (RL1) operates and shorts the alternator field to ground so ceasing generation, if a supply is received from any one of three circuits. These circuits and the condition under which they provide a supply are as follows:

(a) The alternator control and reset switch when selected to the OFF position.

(b) The overvoltage relay when tripped.

(c) The ground fault unit when tripped.

ARROW 1 SERVICE DATA

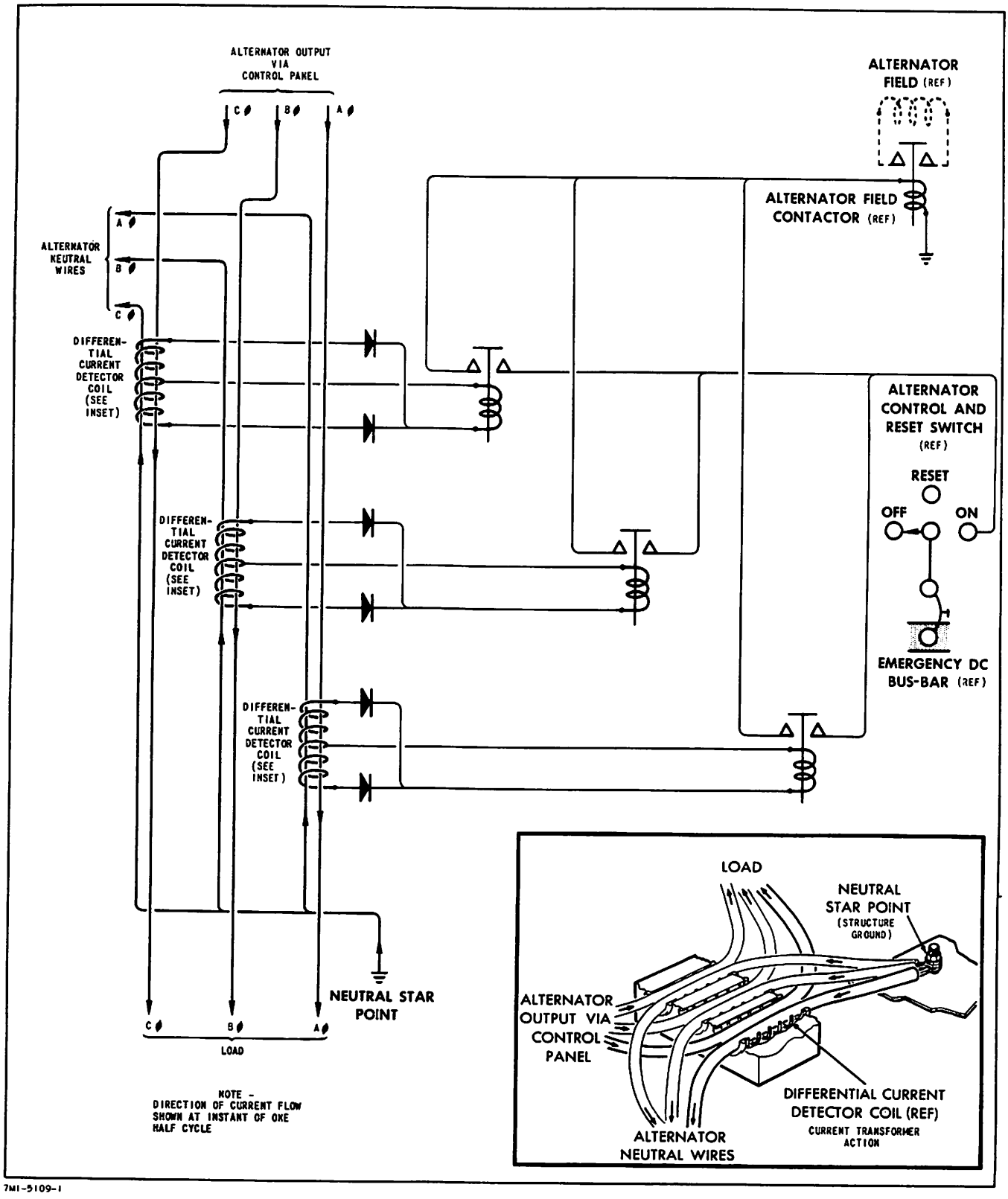

FIG. 4 GROUND FAULT UNIT

44 The field contactor consists of two relays, one being the field relay and the other the reset relay. Under normal operating conditions, the field relay is open and by means of a latching mechanism holds the reset relay in the closed position. In this position, the reset relay closes two sets of contacts. One set of contacts complete a preparatory circuit to the field relay coil. The other set of contacts complete the initial excitation circuit of the alternator field. A third set of contacts which serve the reset circuit are held open. If the alternator switch is selected to OFF, or a ground fault or overvoltage condition is detected, the field relay is energized so shorting the field to ground.

45 When the field relay is in the energized position, the latching mechanism permits the reset relay to return to the open position and in doing so the reset relay mechanically locks the field relay in the energized position to prevent the alternator attempting to generate. The reset relay when open, interrupts the field relay circuit and the initial excitation circuit, and closes the reset circuit.

46 The field contactor is restored to normal operating condition by selecting the alternator control and reset switch to the RESET position. This action energizes, i.e. closes, the reset relay and releases the latching mechanism holding the field relay locked. In doing this the latching mechanism will now hold the reset relay in the energized or closed position. The overvoltage and/or ground fault relay will not be operative until the alternator control and reset switch is set to the ON position.

DISTRIBUTION CONTROL CIRCUITS (Fig 2)

47 The distribution control circuits connect the sub-systems to their appropriate distribution bus-bars. Normally, the RH sub-system is connected to the main AC services load and the LH sub-system is connected to certain sheddable electronic services load. At present, the sheddable load consists of the X-Band Beacon and the electronics bay access door actuator.

48 In the event of the RH sub-system failing, the distribution control circuits isolate the sheddable load and transfer the main AC services load onto the LH sub-system. In the event of both sub-systems failing, the distribution control circuits complete a supply circuit which initiates the operation of the emergency AC system.

49 The operation of the circuits is controlled by two power failure detectors or phase failure indicators, one LH and one RH. The detectors are connected across the relevant LH and RH sub-system bus-bars. When the bus-bars are live, the supply operates a synchro-motor which holds a contact arm in the 'normal' position. This action is resisted by a spring. When the sub-system bus-bars are dead, or if one or more phases fail, the spring returns the contact arm to the 'fail' position.

50 The contact arm of each detector derives a supply from the battery bus via the ON position of the master electrical switch. When the contact arm of the RH power failure detector is in the 'normal' position, the supply is completed to the coil and a normally-open contact of a transfer control relay. This energizes the relay and completes a circuit to energize a RH transfer relay and a shedding relay. The transfer relay completes the RH alternator lines from the sub-system bus-bars to the main AC bus-bars in panels E1 and E20. The shedding relay completes the LH alternator lines to the sheddable electronic services. The supply from the 'normal' position of the LH sub-system detector is completed to a normally-closed contact of the transfer control relay.

51 Should the RH sub-system fail, the contact arm of the detector reverts to the 'fail' position so interrupting the supply to the transfer control relay and the shedding relay. This action permits the supply from the LH sub-system detector to be completed via the normally-closed contacts of the transfer control relay to the LH transfer relay. This connects the LH alternator lines from the sub-system bus-bars to the main AC bus-bars in panels E1 and E20.

52 In the 'fail' position, the RH sub-system power failure detector completes two supply circuits. One supply initiates the operation of the appropriate AC FAIL indicator circuit of the master warning system. The other

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supply is maintained on the contact of a primary AC failure relay of the emergency AC system.

53 Should the LH sub-system fail, the operation of the power failure detector interrupts the supply to the transfer control relay. In the 'fail' position the detector completes a supply circuit to initiate the operation of the appropriate AC FAIL indicator circuit and to energize the primary AC failure relay of the emergency AC system. If the RH sub-system failed previous to the LH sub-system, the standing supply on the contact of the relay will initiate the operation of the emergency AC system.

EMERGENCY AC SYSTEM (Fig 2)

54 The emergency AC system comprises a hydraulically-driven 0.9 kva 3-phase alternator, a control solenoid, a transfer relay and a failure relay. The system is automatically operative should the LH and the RH AC sub-system fail.

55 The operation of the emergency AC system is initiated when a supply from the power failure detector of both AC sub-systems appears on the primary AC failure relay. The supply from the RH sub-system appears on the failure relay contact and that from the LH sub-system energizes the relay. In the energized condition, the supply from the RH power failure detector is completed to energize the control solenoid and the transfer relay. The control solenoid completes the hydraulic supply line to the alternator drive motor. The transfer relay transfers certain circuits from the main AC distribution bus-bars in panel E1 to the emergency alternator output lines.

56 The services supplied by the emergency AC system are:

(a) The 115 volts Star/Delta instrument transformer to provide supplies for the J4 compass and the attitude indicator.

(b) The 115/26 volt instrument transformer of the electronics group. The transformer provides 26 volts AC required by the J4 compass.

(c) The J4 Compass 115 volt AC supply.

(d) The IFF Installation.

(e) The Emergency Yaw Damper System.

EXTERNAL SUPPLY (Fig 2)

57 A receptacle is provided on the undersurface of the duct bay to facilitate the connection of an external source of 115/200 volts 3-phase AC power and, for control purposes, a 28 volts DC supply.

58 The external supply circuits are completed when the master electrical switch is selected to the ON position. This action energizes an emergency bus-bar relay, the function of which is to interconnect the battery bus-bar and the emergency bus-bar, see DC Supply: Emergency Distribution Circuits. When an external supply is connected, the control DC supply circuit will be completed by the emergency bus-bar relay to an external supply slave relay and a LH and a RH external supply line relay. The slave relay, via its normally-closed contacts, completes the supply circuits from the master electrical switch to the LH and the RH AC sub-system line relays. Energizing the slave relay isolates the line relays, thus eliminating the possibility of connecting the aircraft supply and the external AC supply to the sub-system bus-bars. The external supply line relays complete the external AC supply to the appropriate LH or RH sub-system bus-bars.

DC SUPPLY

GENERAL

59 DC power is supplied by two transformer-rectifier units one of which is incorporated in the LH AC/DC control panel and the other in the RH AC/DC control panel. Each transformer-rectifier unit constitutes a DC sub-system. In addition to the rectification circuits, the units incorporate circuits for voltage regulation, isolation, overvoltage and reverse current.

60 The DC sub-systems are operated in parallel, their respective output being supplied to the DC system bus-bar in the main power panel E28.

61 From the DC system bus-bar, distribution is made to four main DC bus-bars from which distribution is made to the majority of the DC services. The remaining DC services are connected to a battery bus-bar and emergency bus-bars. These bus-bars derive their supply from the battery unless the DC system voltage exceeds the battery voltage by at least 0.5 volt. In this condition the bus-bars are connected via a relay to the DC system bus-bars. Note that when this occurs the battery is charging from the DC system.

62 Certain of the main DC bus-bars are supplied via relays. These relays are operated by the distribution control circuits and are energized if both sub-systems are operating. If one sub-system fails, the relays are de-energized so isolating certain services. This ensures that the total possible DC load demand cannot exceed the capacity of one sub-system. In the event that both sub-systems fail, the only operative services are those connected to the battery and the emergency bus-bars.

63 As the component circuits of the LH and RH transformer-rectifier units are identical, the following descriptions are equally applicable to both.

RECTIFICATION AND REGULATION CIRCUITS (Fig 3)

64 The transformer-rectifier draws its AC input from the appropriate LH or RH AC sub-system bus-bars. The maximum 3-phase line current is 14 amperes. The maximum DC line load is 110 amperes, at 28 volts.

65 Prior to rectification the AC input is stepped-down by a three-phase transformer (TR4) to a value which would provide a rectified DC output of less than 28 volts. This permits voltage regulation to be obtained by inserting a three-phase booster transformer (TR5) in series with the stepped-down AC and controlling the degree of boost. This is accomplished by a magnetic amplifier circuit (TD2) fitted in the primary side of the boost transformer.

66 The magnetic amplifier is, essentially, a controllable impedance inserted between the primary windings of the boost transformer and the AC input lines. The effect of the amplifier is to increase or decrease the current flow in the booster transformer primary, so increasing or decreasing the voltage induced in the secondary. Therefore, the degree of boost to the stepped-down AC is determined by the current flow through the magnetic amplifier.

67 The magnetic amplifier is similar in construction and principle of operation to those of the AC regulation circuits described in paras 26 and 27. The operation of the amplifier in the DC circuits is described in the following paragraphs.

68 The magnetic amplifier comprises three pairs of coils, one pair for each input line, and three control windings. Only two of the control windings are used, namely a reference winding and a regulation winding. As the reference winding and the regulation winding oppose each other, there will be magnetic effect in the amplifier core unless the current in each coil is equal. In this instance the magnetic effect of one coil cancels that of the other.

69 The reference winding is connected across the DC output and its initial reference value is set by an adjustable resistor fitted in the circuit. The regulation winding derives its signal from a pre-amplifier or sensing assembly.

70 The pre-amplifier or sensing assembly consists of a magnetic amplifier (TD3) and a full wave rectifier circuit (MR12). The coils of the pre-amplifier are in series with the full wave rectifier circuit and both are connected across the secondary of a transformer (TR9) the primary of which is tapped across two of the AC input lines. Thus the load on the transformer secondary will be proportional to the impedance of the pre-amplifier coils, i.e. an increasing impedance results in a decreased current flow so decreasing the load. The output of the rectifiers is connected across the regulation winding of the magnetic amplifier.

71 The impedance of the pre-amplifier is controlled by three windings, namely a reference control winding, a regulation control winding and a paralleling control winding.

72 The reference winding and the regulation winding of the pre-amplifier derive their supply from the DC line. The DC is supplied to the reference winding via a barretter which provides a constant current in the winding regardless of the voltage. The regulation winding is supplied via three resistors, two of which are adjustable to permit the operating point to be preset. One resistor permits a coarse adjustment and the other a fine adjustment. Initially, the circuit is adjusted to provide 28.5 volts at no-load. In this condition the current flow in the regulation and reference windings will be equal.

73 An increase in the line voltage above the preset reference will increase the current flow in the regulation winding to a value greater than that in the reference winding. As the field set up in the core by the regulation winding is of the same polarity as that set up by the coil current, the impedance is decreased. The resulting increase in current flow through the coil loads the transformer secondary, so effecting a decrease in the voltage across the coil and the rectifiers (TD3, MR12). This, in turn, decreases the output from the rectifiers and consequently the current in the regulation winding of the magnetic amplifier. Due to this, the current in the reference winding of the magnetic amplifier will be greater than that in the regulation winding. As the field set up in the core by the reference winding is of the opposite polarity to that set up by the coil current the impedance of the coil is increased. The resulting decrease in current through the coil is reflected in the secondary of the transformer as a reduction in the induced voltage. Consequently, the degree of boost to the stepped-down AC will be decreased.

74 The paralleling control winding of one pre-amplifier is interconnected with the paralleling winding of the pre-amplifier of the opposite panel. The circuit of each panel is interconnected via the discriminator coil of the overvoltage relay and a normally-closed contact of the reverse current relay of their respective sub-systems.

75 Each paralleling control winding derives its supply from an induction transformer-rectifier assembly which is influenced by the stepped-down AC. Thus the rectified output to the paralleling winding in each panel will be dependent upon the load supplied by the particular sub-system.

76 When both units are sharing the load within 10-12 amperes the voltages developed in the paralleling circuits will be equal and they will balance out. Should the load become unbalanced, the sub-system carrying the greater load will develop a proportionately greater output from the induction transformer-rectifier circuit. The current flow in the paralleling circuit of the unit carrying the greater load will be such that the impedance of the pre-amplifier will decrease so reducing the signal voltage to the magnetic amplifier regulation winding with the resulting decrease in boost. The direction of current flow in the paralleling winding of the opposite panel will be such that the impedance of the pre-amplifier will increase so increasing the signal voltage to the magnetic amplifier regulation winding. This results in a decrease in the impedance of the coil which is accompanied by an increase in current flow in the boost transformer primary, and in turn, an increase in boost with the accompanying increase in output.

77 A resistor is fitted across the rectifier circuit. The value of this resistor decides the load spread difference at which the paralleling circuits operate. The resistor is not adjustable.

78 In the event of a fault in the voltage regulation or rectification circuits which results in a reversal of current, or high input current in relation to output current, this condition will be detected by the reverse current circuit. If the fault results in an output voltage in excess of a preset limit this will be detected by the overvoltage circuit. The operation of the overvoltage or reverse current circuits will trip the isolating circuit relay so disconnecting the AC input.

REVERSE CURRENT CIRCUIT (Fig 3)

79 The reverse current circuit (RL5) incorporates a polarized relay and a main contactor. The polarized relay incorporates three coils, namely a reverse current coil, a differential coil and a reset coil; either one of the three coils can operate the relay.

ARROW 1 SERVICE DATA

80 The reverse current coil is fitted in series with the DC output line and current flow in the proper direction holds the relay open. Should a fault occur which causes a drain from the main DC bus-bar, the direction of flow of current through the reverse current coil will be reversed. This action closes the relay which completes a supply to trip the isolating relay so disconnecting the AC input.

81 The differential coil is supplied from a transformer-rectifier assembly (TR6, MR8) connected across the AC input, but the direction of current flow is opposite to that of the reverse current coil. Therefore, unless it is counteracted by a corresponding increase in current flow through the reverse current coil, increasing current flow through the differential coil will correspondingly decrease the effectiveness of the reverse current coil. Should a fault develop which causes an increase in the input current and there is not a corresponding increase in the output current, the increased flow of current through the differential coil will reduce the effectiveness of the reverse current coil to the extent that the relay closes and so trips the isolating relay.

82 Due to the fact that the relay is polarized, it will remain in the position to which it is driven. Therefore, once tripped, the relay must be re-energized to the 'open' position. This is done by the reset coil which receives a DC supply when the DC reset switch is depressed.

83 The main contactor of the reverse current circuit derives its supply from a rectifier assembly connected across the stepped-down AC. When the AC output is at the correct level the rectified DC output will be sufficient to energize the relay, so completing the DC supply to the DC system bus-bar. A second set of contacts complete the paralleling circuit. See para 74.

OVERVOLTAGE CIRCUIT (Fig 3)

84 The overvoltage circuit (RL2) consists of a relay incorporating two coils, namely a voltage coil and a discriminator coil. The voltage coil is connected across the DC output and an adjustable resistor is fitted in the negative side to permit the trip voltage to be preset. If the output voltage exceeds the preset limit, the current flow is sufficient to energize the relay. This action completes a supply circuit to the isolating relay which disconnects the AC input.

85 The function of the discriminator coil is to prevent the overvoltage relay operating if the overvoltage condition is caused by the opposite sub-system. The coil is connected in series with the paralleling circuit, in effect the coil of LH and RH overvoltage circuits are in series. When an overvoltage condition occurs in a unit, there will be an increased flow of current in the paralleling circuit of the panel operating normally. The direction of current flow in the discriminator coils will be such that it will aid the voltage coil of the panel producing the overvoltage and oppose the voltage coil of the panel operating normally.

ISOLATING RELAY ASSEMBLY (Fig 3)

86 The isolating relay assembly (RL3) is energized by the operation of the overvoltage circuit or the reverse current circuit. When energized, the relay assembly interrupts the three-phase input and a shedding circuit of the distribution circuits, see para 91.

87 The assembly consists of two relays, one is the interrupter relay and the other the reset relay. Under normal conditions the interrupter relay is closed and by means of a latching mechanism holds the reset relay open. In this position the reset relay completes a preparatory circuit to the coil of the interrupter relay. If the overvoltage circuit or the reverse current circuit operate, the interrupter relay is energized so interrupting the AC input and the shedding circuit supply.

88 When the interrupter relay is in the energized position, the latching mechanism permits the reset relay to close and in doing so the reset relay mechanically locks the interrupter relay in the energized position. The reset relay in the closed position interrupts the energizing circuit of the interrupter relay and completes a reset circuit.

89 The isolating relay is restored to normal operating condition by depressing the DC reset switch in the front cockpit. This action energizes, i.e. opens, the reset relay which releases the latching mechanism. In doing this the latching mechanism will hold the reset relay in the open position which breaks the reset circuit and completes the preparatory circuit to the coil of the interrupter relay.

MAIN DISTRIBUTION AND CONTROL CIRCUITS (Fig 5)

90 Four main distribution bus-bars derive a supply from the DC system bus-bar in the main power panel E28. They are as follows:

(a) The main DC bus-bar in panel E1.

(b) The main DC bus-bar in panel E20.

(c) The electronics main DC bus-bar in JB R1.

(d) The main DC shedding bus-bar in the main power panel E28. This bus-bar supplies the following subsidiary shedding bus-bars:

(1) The DC shedding bus-bar in panel E1.

(2) The electronics DC shedding bus-bar in JB R1.

91 The supply to the main DC shedding bus-bar is controlled by two relays namely, a shedding cut-out relay and a shedding control relay. The LH sub-system is connected to the coil of the cut-out relay and the RH sub-system is connected to the contact of the cut-out relay. The supply in both cases is derived from the relevant LH or RH transformer-rectifier unit via the normally-closed contact of the isolating relay. When both units are operating, the LH sub-system energizes the cut-out relay so completing the supply from the RH sub-system to the coil of the shedding control relay. The control relay completes the supply from the DC system bus-bar to the main DC shedding bus-bar.

92 In the event of one unit failing the supply to the coil or the contact of the cut-out relay will be interrupted. Either condition will effect the de-energizing of the shedding control relay; this action isolates the DC services connected to the shedding bus-bars. At present these services consist of the landing light and the taxi light. No electronic DC services are shed.

93 The supply to the shedding cut-out relay from each transformer-rectifier unit is also supplied to a corresponding LH or RH signal relay. When energized, these relays complete parallel circuits to a battery reverse current relay assembly. In the de-energized condition, the signal relays complete a supply circuit to the L or R DC FAIL indicator circuit of the master warning system.

94 The battery reverse current relay assembly, see fig 6, completes a supply line from the DC system bus-bar to the battery bus-bar. The assembly consists of three relays namely, a pilot control relay, a main control relay and a main contactor.

95 When one or both sub-systems are operating a supply circuit is completed to the bias coil of the main control relay and to the pilot control relay. The pilot control relay when energized completes a supply circuit to the differential voltage coil of the main control relay. This coil is connected, in effect, across the DC system bus-bar and the battery bus-bar. If the system bus-bar voltage exceeds the battery bus-bar voltage by at least 0.5 volt, the combined effect of the bias coil and the differential coil will close the main control relay. This action completes a supply circuit to energize the main contactor which completes a supply line from the DC system bus-bar to the battery bus-bar. In addition to completing the main supply line, the main contactor completes a supply to energize the battery use indicator relay which interrupts the supply to the battery use indicator light circuit of the master warning system.

96 Should the differential voltage between the DC system bus-bar and the battery bus-bar decrease below 0.5 volt the effect on the circuit will be such that power will be demanded from the battery. In this condition the reversed flow of current through the current coil combined with that through the differential coil opposes

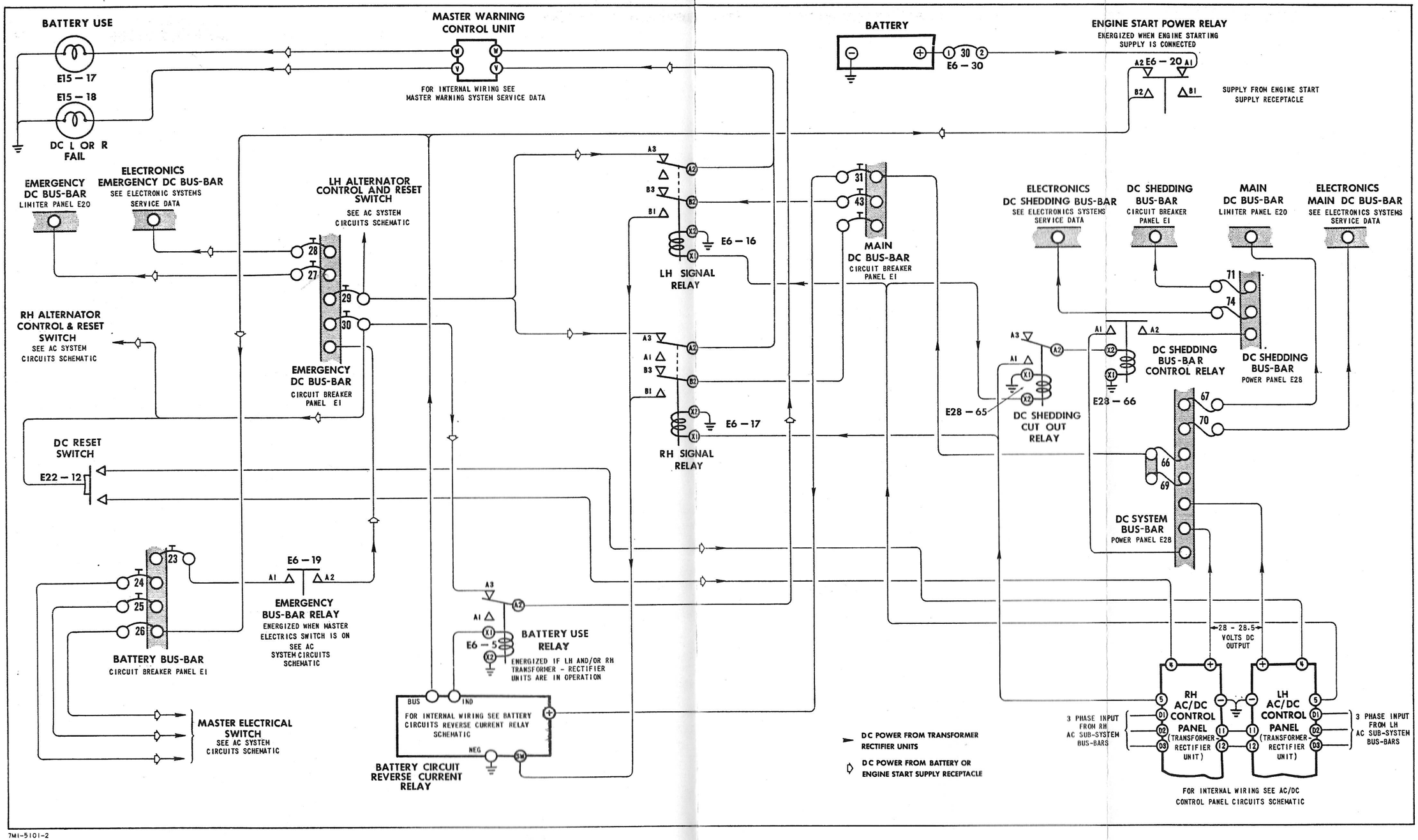

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FIG. 5 DC POWER SUPPLY SCHEMATIC

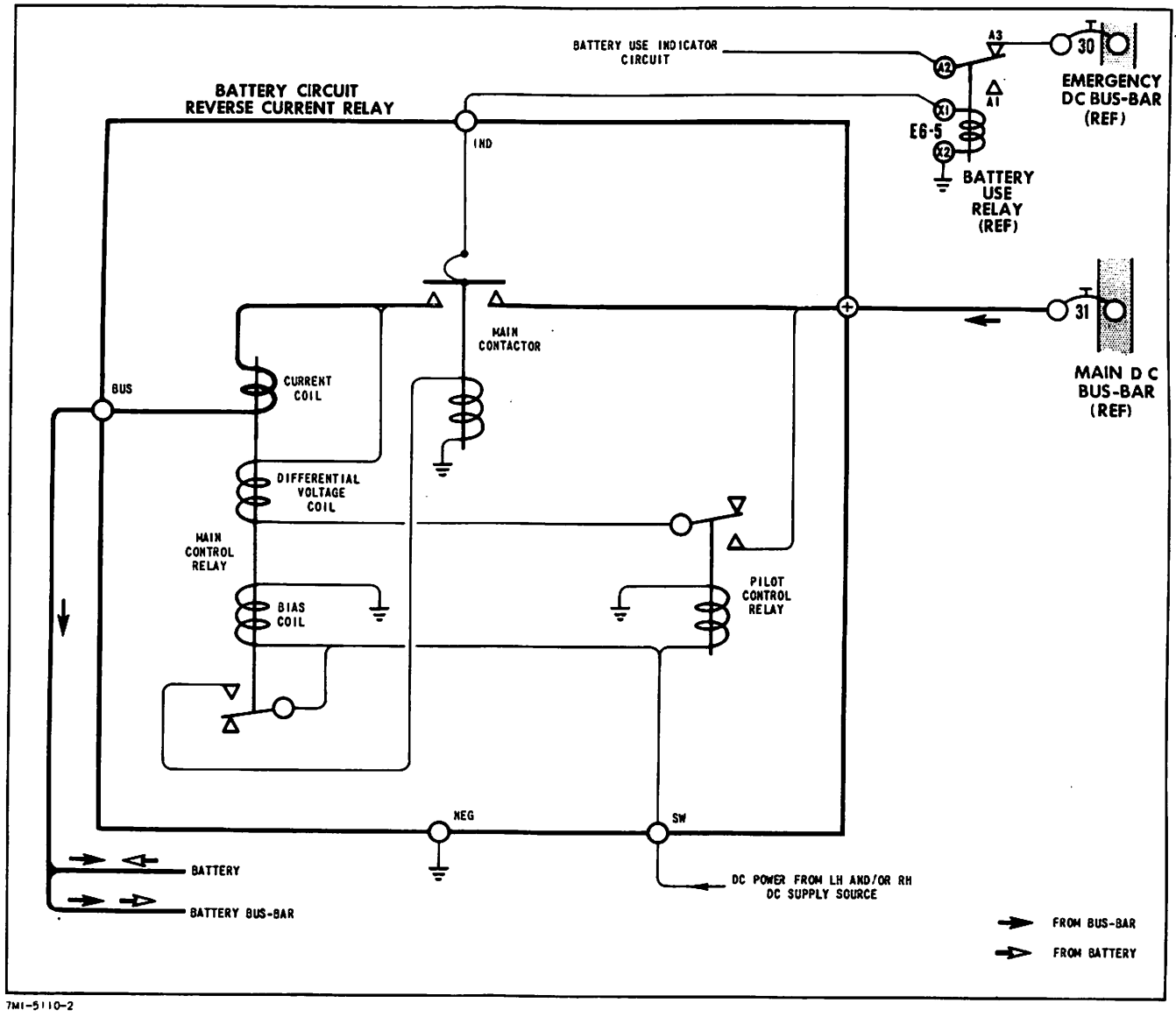

FIG. 6 BATTERY CIRCUIT REVERSE CURRENT RELAY

the action of the bias coil and permits the main control relay to open. If both DC sub-systems fail, the bias coil and the differential coil are de-energized and the main control relay opens, since the effect of current in the reverse coil alone is not sufficient to hold the relay closed. When the main control relay is open the supply to the main contactor is interrupted which, in turn, interrupts the supply line from the main DC bus-bar to the battery bus-bar and also the supply to the battery use relay. This action permits the relay to complete the supply to the battery use indicator circuit.

EMERGENCY DISTRIBUTION AND CONTROL CIRCUITS (Fig 5)

97 DC services which are to be operative in the event of both DC sub-systems failing are connected to the battery bus-bar or the emergency bus-bars. The emergency bus-bars are located in panels E1, E20 and JB R1. The bus-bars in panels E20 and JB R1 derive their supply from the emergency bus-bar in panel E1. The emergency bus-bar in panel E1 is interconnected with the battery bus-bar via a relay which is energized when the master electrical switch is selected to the ON position.

98 The battery is connected to the battery bus-bar via the normally-closed contacts of a starting power relay. The function of this relay is to isolate the battery during engine starting. The relay is energized by a power supply from the starter cart and, when energized, isolates the battery and completes the supply from the starter cart to the battery bus-bar.

99 The following circuits derive their supply from the emergency bus-bars. Circuits (a) to (k) are connected to the emergency bus-bar in panel E1. The remainder are connected to the emergency bus-bar in panel E20:

(a) Engine starting and control circuits

(b) Relight circuits

(c) Fuel crossfeed circuit

(d) Emergency fuel control circuits

(e) Landing gear indication circuits

(f) Turn and slip indicator

(g) Speed brake solenoid

(h) Front and rear cockpit emergency lighting circuits

(j) Air conditioning dump switch and warning circuit

(k) Master warning system

(m) Ignition circuits (No. 2 igniters)

(n) Engine intake de-icing control circuits

(p) Fire detection circuits

100 At present, the bail-out circuit is the only service connected to the emergency bus-bar in JB R3.

101 The following services demand power from both the emergency bus-bar in panel E1 and the battery bus-bar.

(a) Fire protection system

(b) Canopy actuation

(c) Low pressure cocks circuits

102 The circuits routed via the master electrical switch derive their supply from the battery bus-bar, see fig 2.

FUNCTION TESTING

GENERAL

103 With the exception of the system function test, the aid of an Electrical Power Test Panel is required to test the power supply circuits. The test panel (see fig 7) incorporates components which facilitate checking the AC line voltage, line current and output frequency, and DC line voltage and current.

FUNCTION TEST

104 The engines must be running to function test the system. Check the operation of the AC sub-system proceeding as follows:

(a) Select the LH and the RH alternator control and reset switches to the OFF position. Check that the LH and the RH AC FAIL indicators on the master warning system indicator panel are illuminated. Check also that the master warning indicators on the main instrument panel are illuminated.

(b) Select both switches to the ON position. Note that the AC FAIL and master warning indicators are extinguished.

(c) Isolate the RH sub-system by selecting the RH alternator control and reset switch to the OFF position. Ensure that the transfer circuits have operated by checking that AC power is available, e.g. operate the cockpit flood lights. Check that sheddable loads are disconnected, e.g. it should not be possible to operate the electronics equipment bay centre access door actuator.

(d) Reset the RH alternator control and reset switch to the ON position.

105 Check the operation of the emergency AC system proceeding as follows:

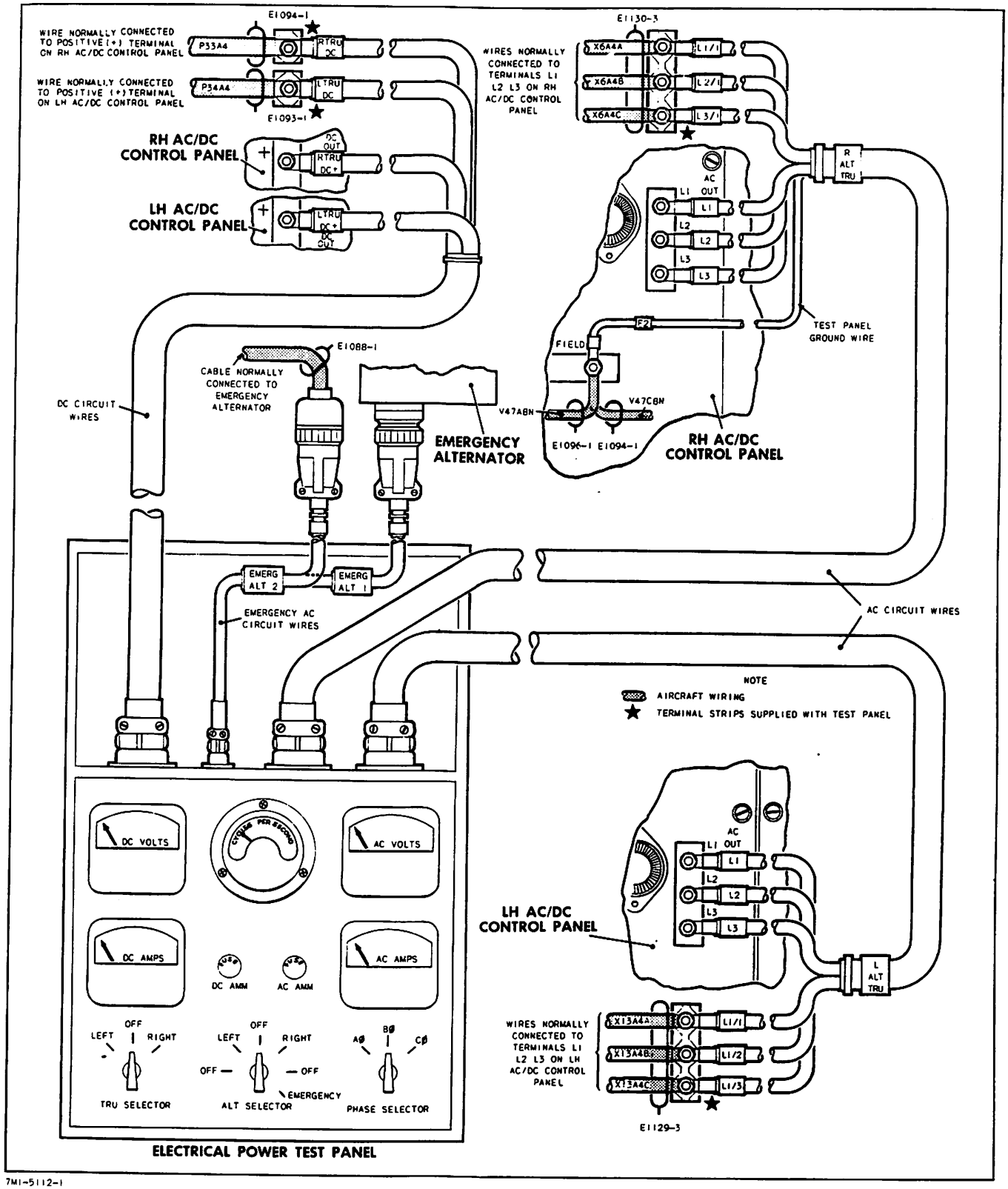

FIG. 7 ELECTRICAL POWER TEST PANEL

(a) Select the LH and the RH alternator control and reset switches to the OFF position.

NOTE

With both AC sub-systems inoperative, DC power is supplied by the battery. Therefore, reduce DC power demand to a minimum, or connect a DC source to the engine starting receptacle on the nose gear leg.

(b) On panel E21 which is fitted just aft of the bulkhead at station 485 LH side, select and hold in the test position, the ground test override switch. This action overrides the ground control relay (see fig 2).

(c) Check that the emergency alternator is operative by noting that the OFF flag of the attitude gyro indicator on the main instrument panel is not visible.

(d) Release the ground test override switch to the NORMAL position.

(e) Re-select the alternator control and reset switches to the ON position.

106 Check the operation of the DC sub-systems proceeding as follows:

(a) Select either the LH or the RH alternator control and reset switch to the OFF position and check that the L OR R DC FAIL indicator on the master warning system indicator panel and the master warning indicators on the main instrument panel are illuminated.

(b) Ensure that the sheddable DC load has been shed by checking that the landing and taxi lights do not illuminate when selected on.

(c) Select the remaining alternator control and reset switch to the OFF position then check that the BATT USE indicator on the master warning indicator panel is illuminated.

(d) Check that power is available from the emergency DC bus-bar by operating the map and emergency flood light. To ensure that the main DC bus-bars are isolated, check that the high altitude flood lights are inoperative when selected ON.

(e) Re-select the LH and the RH alternator control and reset switches to the ON position. Note that the LH and the RH AC FAIL indicator, the DC L OR R FAIL indicator and the BATT USE indicator are extinguished.

PROCEDURE PRIOR TO SYSTEM TESTING AND ADJUSTMENT

107 Prior to commencing the following tests, connect the Electrical Power Test Panel, see fig 7, into the electrical system proceeding as follows:

(a) Select the master electrical switch to the OFF position.

(b) On the RH AC/DC control panel, disconnect the circuit wires from the AC output terminals L1, L2 and L3, and the circuit wire from the DC output + (positive) terminal. Connect these wires to the appropriate R ALT TRU and R TRU DC terminals of the electrical power test panel.

(c) In lieu of the circuit wires removed from the RH panel, connect the circuit wires in the cable assemblies identified R ALT TRU and R TRU DC of the test panel. An additional wire identified F2 is contained in the cable. Connect this wire to F2 of the RH panel or a suitable ground point. This wire is contained only in the RH cable assembly.

(d) On the LH AC/DC control panel, disconnect the circuit wires from the AC output terminals L1, L2 and L3, and the circuit wires from the DC output + (positive) terminal. Connect these wires to the appropriate L ALT TRU and L TRU DC terminals of the electrical power test panel.

(e) In lieu of the circuit wires removed from the LH panel, connect the circuit wires in the cable assemblies identified L ALT TRU and L TRU DC of the test panel.

SYSTEM TESTING AND ADJUSTMENT

108 Check the output of the AC sub-systems and the DC sub-systems proceeding as follows:

(a) Connect a DC supply to the engine starting receptacle on the nose gear leg. This will prevent discharge from the battery during the tests.

(b) Have the engines running at idling speed.

(c) Select the LH and the RH alternator control and reset switch to the ON position. Note that the master electrical switch is in the ON position.

(d) Select the ALT SELECTOR switch on the test panel to LEFT and RIGHT in turn; the output frequency indicated on the frequency meter when each position is selected should be 400 cps ± 4 cps.

(e) Select the master electrical switch to the OFF position to obtain voltage readings with the system off-load.

(f) Select the ALT SELECTOR to the LEFT position. Select the PHASE SELECTOR to positions A Ø, B Ø and C Ø. For each selection the indicated voltage should be 115 volts ± .5 volt. If necessary, obtain this figure by adjusting the control marked AC CONTROL FINE on the LH AC/DC control panel.

(g) Select the ALT SELECTOR to the RIGHT position. Select the PHASE SELECTOR to positions A Ø, B Ø and C Ø. For each selection the indicated voltage should be 115 volts ± .5 volt. If necessary, obtain this figure by adjusting the control marked AC CONTROL FINE on the RH AC/DC control panel.

(h) Select the master electrical switch to the ON position. Select the ALT SELECTOR to the LEFT and then to the RIGHT. In each position select the PHASE SELECTOR to A Ø, B Ø and C Ø. Note that in each position the indicated current is not excessive in any line. To provide a more complete test, definite figures for line current will be included when available.

(j) Select the TRU SELECTOR on the test panel to the RIGHT position and check that the indicated DC voltage is 28-28.5 volts. If necessary, obtain this figure by adjusting the control marked DC CONTROL FINE on the RH AC/DC control panel.

(k) Select the TRU SELECTOR to the LEFT position and check that the indicated DC voltage is 28-28.5 volts. If necessary, obtain this figure by adjusting the control marked DC CONTROL FINE on the LH AC/DC control panel. If adjustment was necessary, re-select the RIGHT position on the TRU SELECTOR and check the indicated voltage; adjust the DC CONTROL FINE of the LH and the RH panel in conjunction until a balance between the indicated voltages is obtained.

(m) Select the LEFT position and then the RIGHT position. Note the indicated current for each selection; the difference in load spread should not exceed 11 amps. If this figure is exceeded, re-check the DC voltages and adjust if required. If the difference still exceeds 11 amps remove the units for bench testing.

PROCEDURE UPON COMPLETION OF SYSTEM TESTS

109 Upon completion of system tests proceed as follows:

(a) Select the ALT SELECTOR to the RIGHT position.

(b) Have the RH engine shut down. During the run down note that when the output frequency decreases to 360-375 cps the indicated voltage drops to zero.

(c) Select the ALT SELECTOR to the LEFT position.

(d) Have the LH engine shut down. During the run down note that when the output frequency decreases to 360-375 cps the indicated voltage drops to zero.

(e) Disconnect and remove the test panel then reconnect the system wiring to their appropriate terminals.

(f) Connect an external source of AC supply to the external supply receptacle.

(g) Remove the DC supply source from the engine starting receptacle.

ARROW 1 SERVICE DATA

EMERGENCY AC SYSTEM TEST

110 Check the output of the emergency AC system using the electrical power test panel proceeding as follows:

(a) If the engines are not to be run, have a hydraulic test machine trailer connected to the aircraft.

(b) Connect the electrical power test panel into the emergency alternator output circuit proceeding as follows:

(1) Disconnect the electrical plug from the emergency alternator and connect it to the test panel cable receptacle marked EMERG ALT 2.

(2) Secure the test panel cable marked EMERG ALT 1 to the emergency alternator receptacle.

(c) To prevent discharge from the battery, connect a source of DC supply to the engine starting receptacle.

(d) If the engines are running, select the LH and the RH alternator control and reset switch to the OFF position. If an external source of AC supply is connected, switch it off or disconnect it.

(e) Select and hold the ground test override switch on panel E21 to the TEST position. This action overrides the ground control relay.

(f) Check that the alternator output frequency indicated on the test panel frequency meter is 400 ± 20 cps.

(g) Select the PHASE SELECTOR to positions A Ø, B Ø and C Ø, in each position check that the indicated AC voltage is 115 ± 5 volts.

(h) Check that the attitude gyro indicator on the main instrument panel is operative by noting that the OFF flag is not visible.

(j) Release the ground test override switch. Note that the alternator is inoperative.

(k) Re-select the alternator control and reset switches to the ON position or re-connect the external source of AC. Then disconnect the DC source from the engine starting receptacle.

(m) Disconnect and remove the test panel and reconnect the electrical cable to the alternator receptacle.

LOCATION OF POWER SUPPLIES ELECTRICAL EQUIPMENT

IDENT NO.	ITEM NO.	DESCRIPTION
1		CONSTANT SPEED UNIT-LH
2		ALTERNATOR-LH
3		GROUND FAULT UNIT-LH
4		ELECTRICAL POWER PACK (EMERGENCY ALTERNATOR AND CONTROL SOLENOID)
5	E47	EMERGENCY ALTERNATOR LIMITER PANEL
6		EXTERNAL POWER RECEPTACLE - SEE DETAIL "A"
7	E21	REFUEL AND TEST PANEL
	-7	GROUND TEST OVERRIDE SWITCH
8	E28	MAIN POWER PANEL - SEE MAIN POWER PANEL E28 ILLUSTRATIONS PARTS 1 AND 2
9	E4	DISTRIBUTION PANEL ★
10	E9-2	TERMINAL STRIP
11	E9-3	TERMINAL STRIP
12		ENGINE STARTING AND EXTERNAL D C SUPPLY RECEPTACLE
13		MASTER WARNING CONTROL UNIT
14		115V INSTRUMENT TRANSFORMER
15		BATTERY
16	E1	CIRCUIT BREAKER PANEL ★
17	E3	ACCESSORY PANEL ★
	-15	PRIMARY EMERGENCY A C SUPPLY TRANSFER RELAY
18	E6	RELAY PANEL ★
	-5	RELAY—BATTERY USE
	-16	RELAY—L H SIGNAL
	-17	RELAY—R H SIGNAL
	-18	RELAY—REVERSE CURRENT
	-19	RELAY—EMERGENCY DC BUS-BAR
	-20	RELAY—STARTING POWER
	-23	RELAY—PRIMARY AC FAILURE
19	E2	TERMINAL STRIP
20	E15	MASTER WARNING INDICATOR PANEL - SEE DETAIL "B"
	-15	AC FAIL INDICATOR R H
	-16	AC FAIL INDICATOR L H
	-17	BATTERY USE INDICATOR
	-18	DC L OR R FAIL INDICATOR
21	E16	POWER AND STARTING PANEL - SEE DETAIL "B"
	-2	MASTER ELECTRICS SWITCH
22	E22	OXYGEN PANEL - SEE DETAIL "B"
	-2	ALTERNATOR CONTROL & RESET SWITCH L H
	-3	ALTERNATOR CONTROL & RESET SWITCH R H
	-12	D C RESET SWITCH
23	E20	LIMITER PANEL ★
24		GROUND FAULT UNIT-RH
25		CABINET CONTAINING LH AND RH A C/D C CONTROL PANELS
26		ALTERNATOR-RH
27		CONSTANT SPEED UNIT-RH

★ SEE ELECTRICAL SYSTEM, GENERAL INFORMATION - SECT 36 FOR ILLUSTRATION OF PANELS E1 E3 E4 E6 AND E20

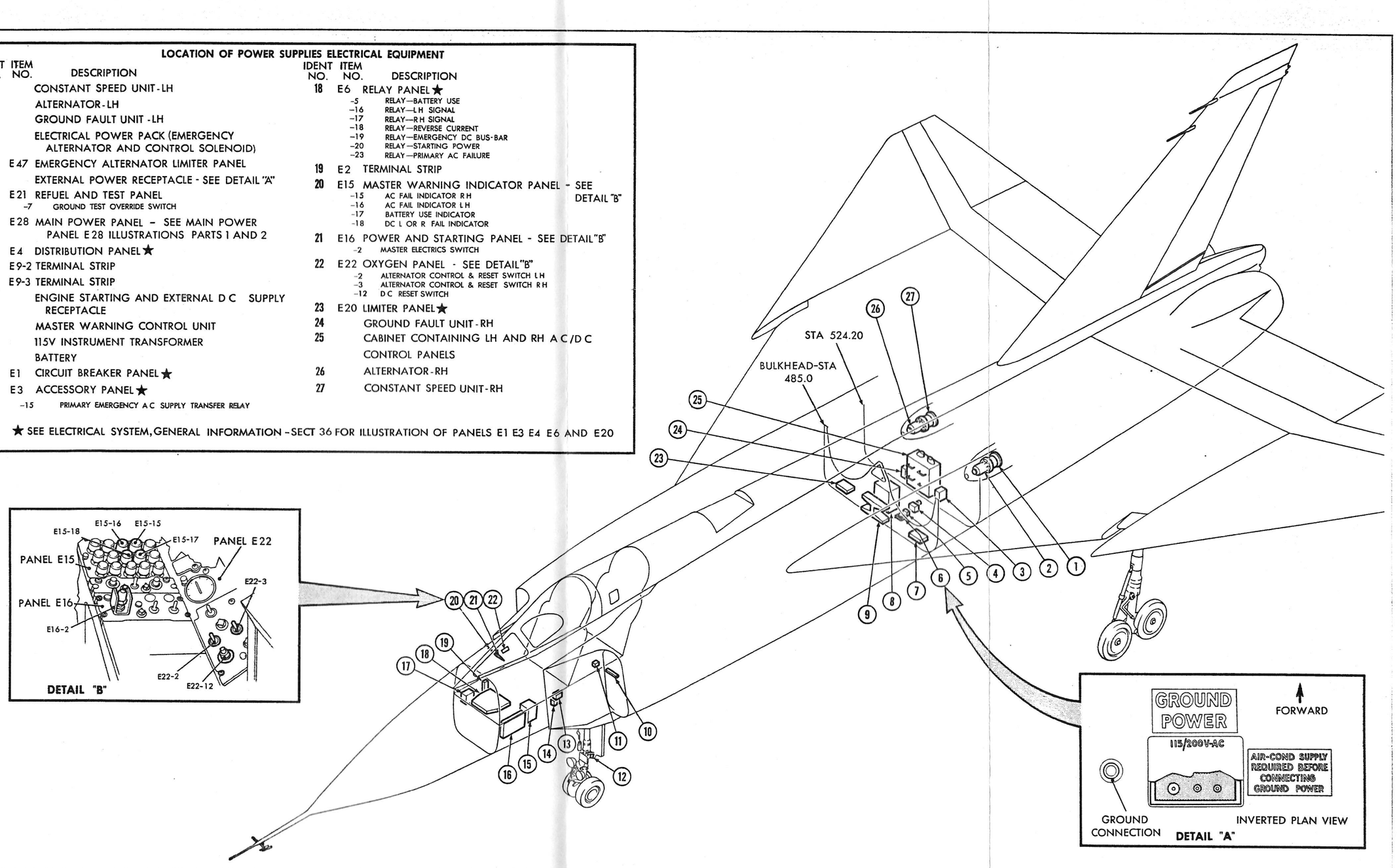

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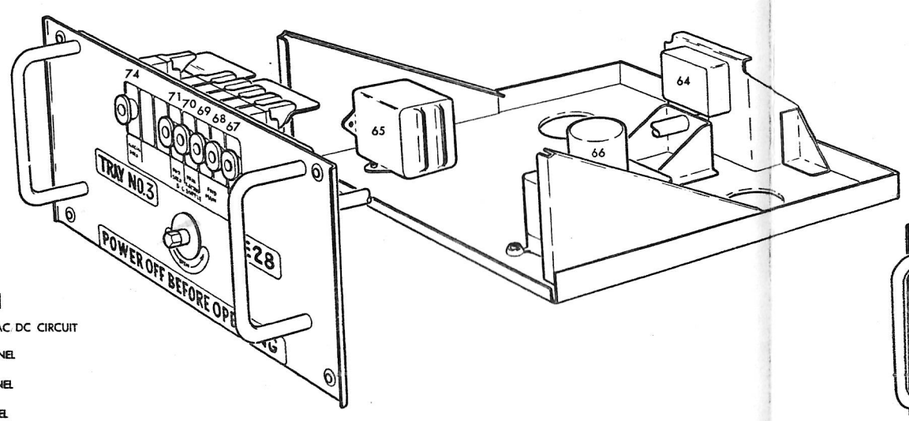
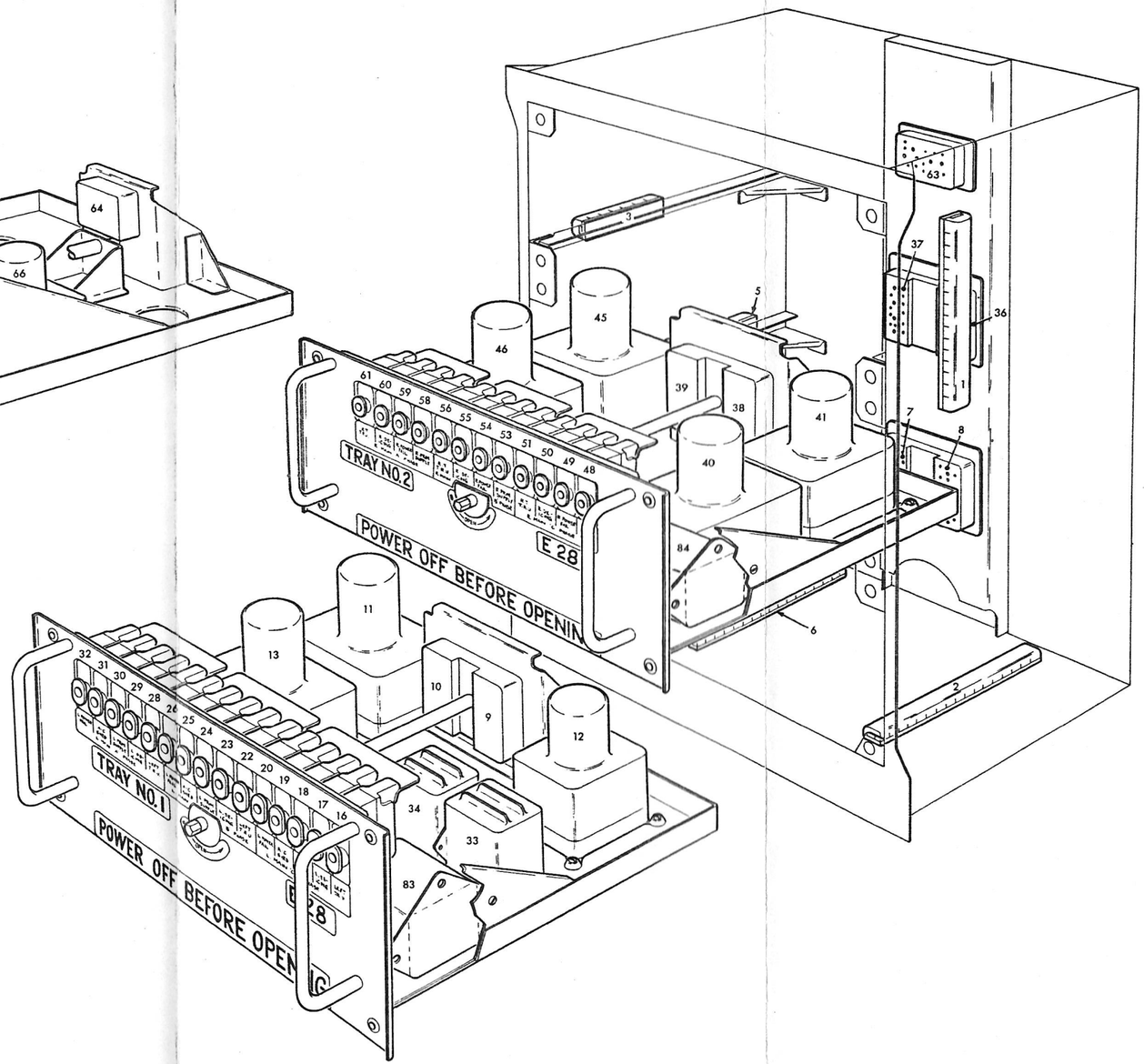
FIG. 8 LOCATION OF EQUIPMENT - POWER SUPPLIES

ARROW 1 SERVICE DATA





IDENT NO.	DESCRIPTION
1 2 3 5 6	TERMINAL STRIPS—AC DC CIRCUIT
7 8	CONNECTORS—PANEL
CABINET	
36 37	CONNECTORS—PANEL
63	CONNECTOR—PANEL
9 10	CONNECTORS—TRAY
11	RELAY—LH AC LINE
12	RELAY—AC SHEDDING
TRAY NO. 1	
13	RELAY—LH EXTERNAL SUPPLY LINE
16 17 18 19 20 22 23 24 25 26 28 29 30 31 32	LIMITERS—AC POWER SUPPLY (ANNOTATION SHOWN ON PART 2)
33	RELAY—EXTERNAL LINE SLAVE
34	RELAY—TRANSFER CONTROL
83	POWER FAILURE DETECTOR—AC LH
38 39	CONNECTORS—TRAY
40	RELAY—RH TRANSFER
41	RELAY—LH TRANSFER
TRAY NO. 2	
45	RELAY—RH AC LINE
46	RELAY RH EXTERNAL SUPPLY LINE
48 49 50 51 53 54 55 56 58 59 60 61	LIMITERS—AC POWER SUPPLY (ANNOTATION SHOWN ON PART 2)
84	POWER FAILURE DETECTOR—AC RH
64	CONNECTOR—TRAY
65	RELAY—DC SHEDDING CUT OUT
TRAY NO. 3	
66	RELAY—DC BUS-BAR SHEDDING CONTROL
67 68 69 70 71 74	LIMITERS—DC POWER SUPPLY (ANNOTATION SHOWN ON PART 2)

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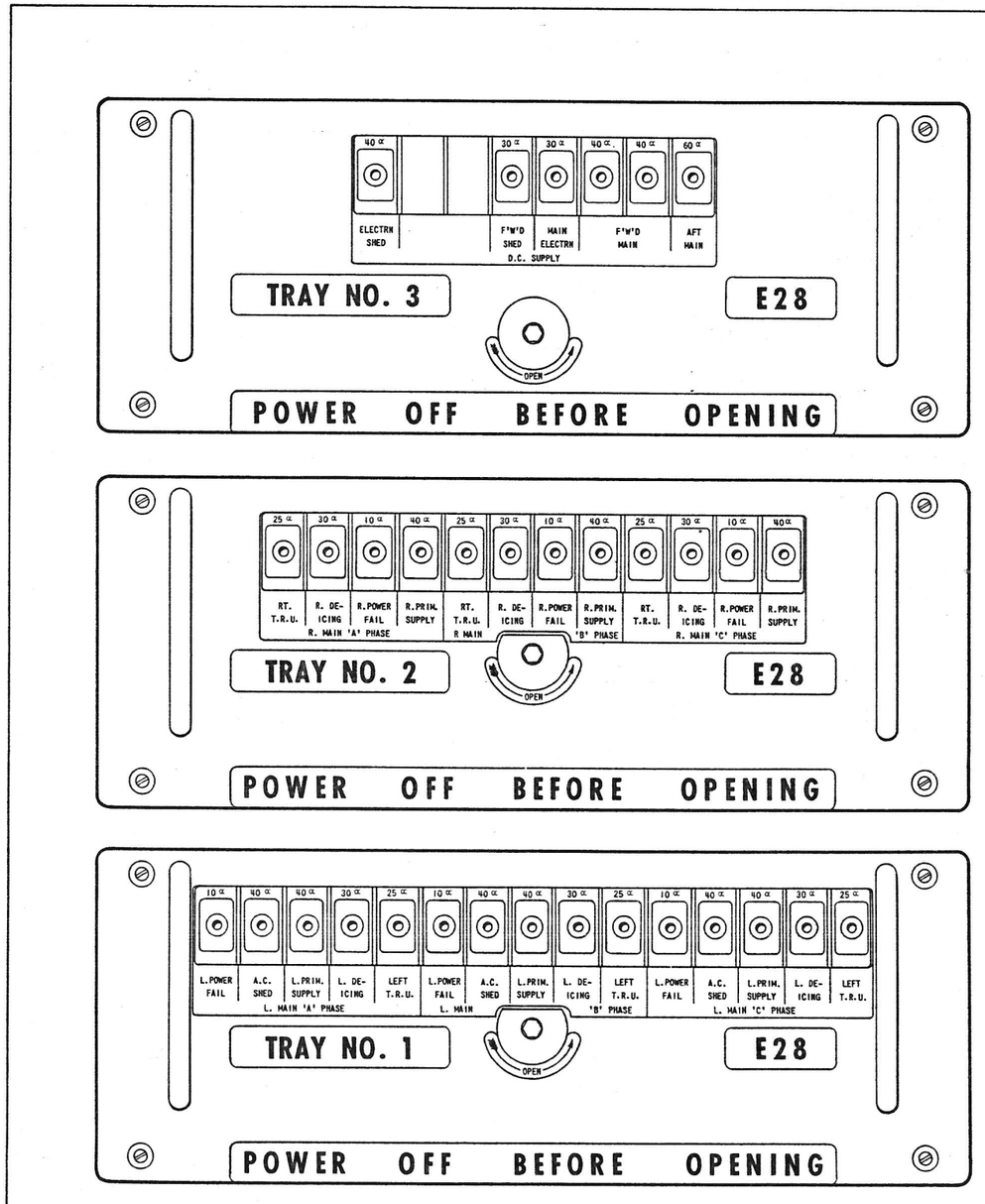
FIG. 9 LOCATION OF EQUIPMENT - MAIN POWER PANEL E28 (SHEET 1 OF 2)



NOTE—LIMITER IDENT NOS. LOCATED INSIDE TRAY ON ADJACENT STRUCTURE OR BUS-BAR
(FOR IDENT NOS. SEE PART 1)

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FIG. 9 LOCATION OF EQUIPMENT - MAIN POWER PANEL E28 (SHEET 2 OF 2)

ARROW 1 SERVICE DATA

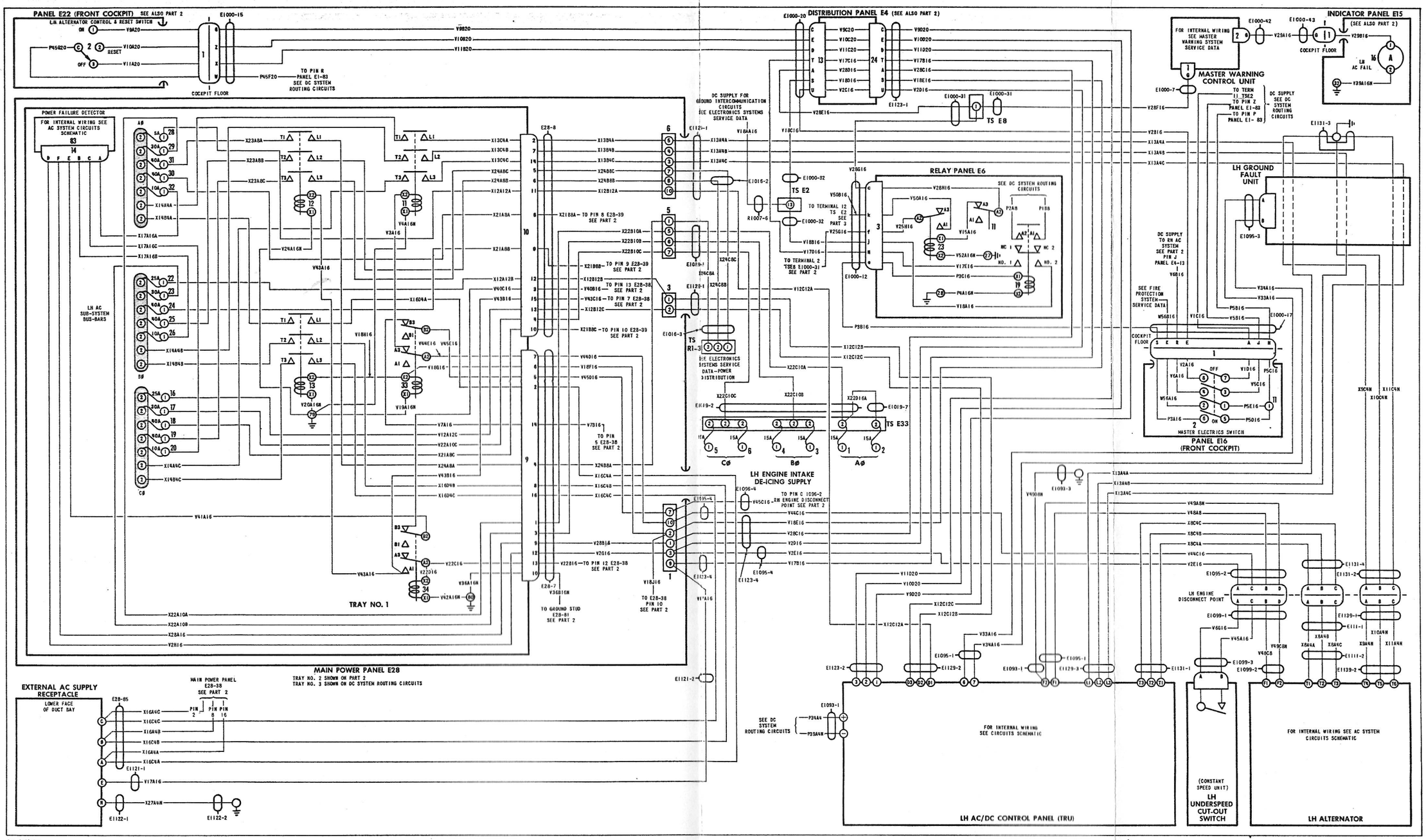

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FIG. 10 AC POWER SUPPLY (SHEET 1 OF 3)

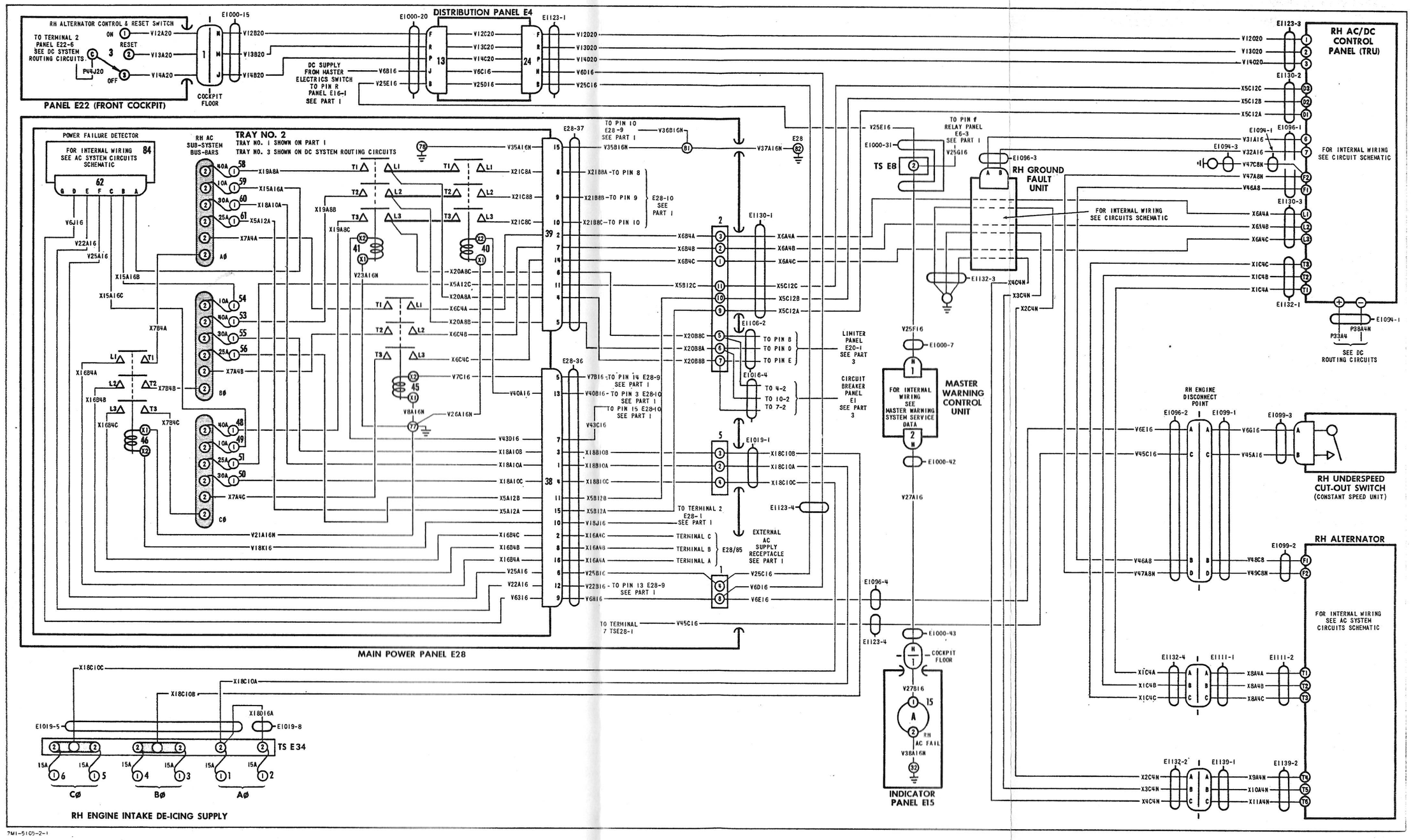

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FIG. 10 AC POWER SUPPLY (SHEET 2 OF 3)

ARROW 1 SERVICE DATA

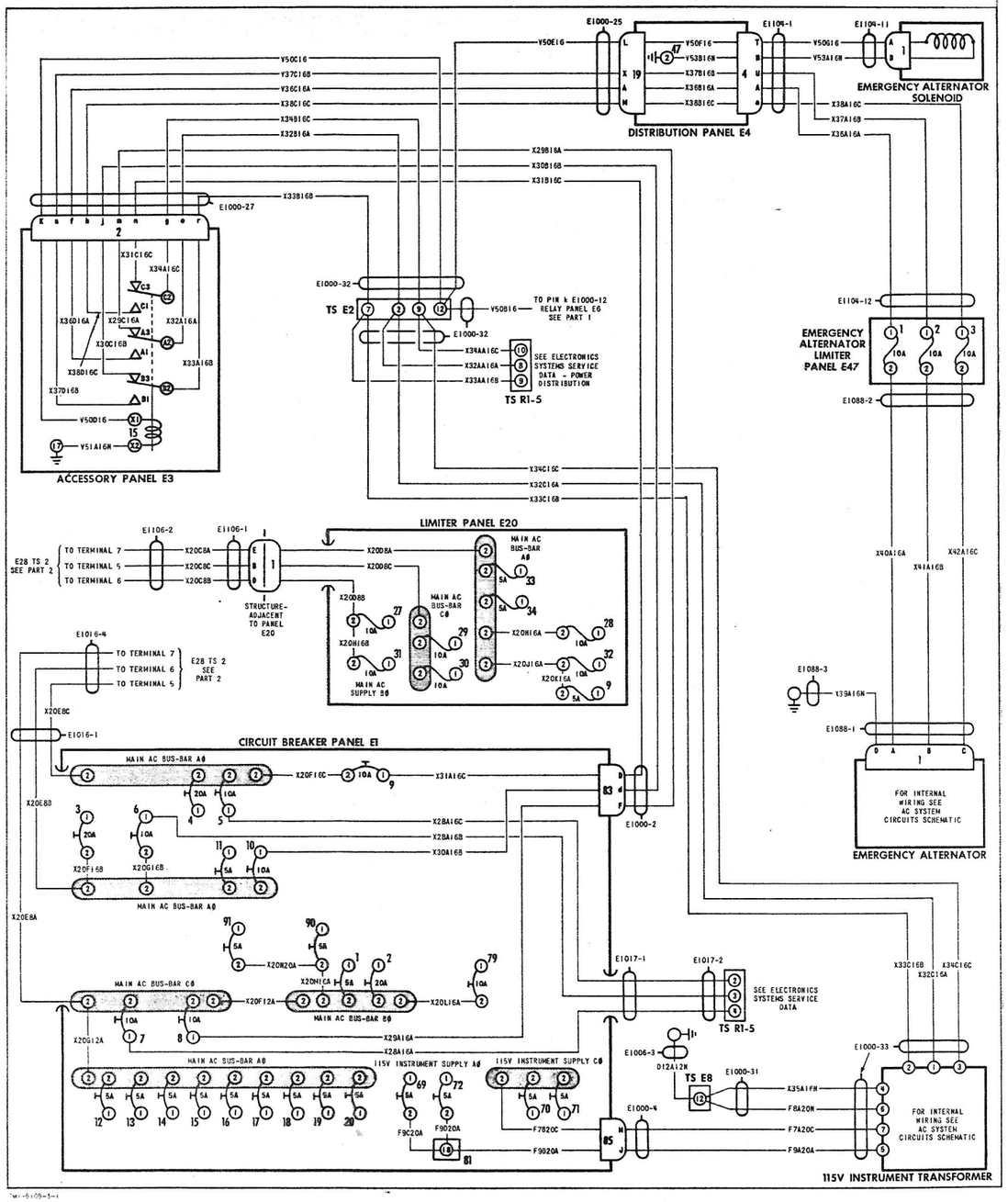

FIG. 10 AC POWER SUPPLY (SHEET 3 OF 3)

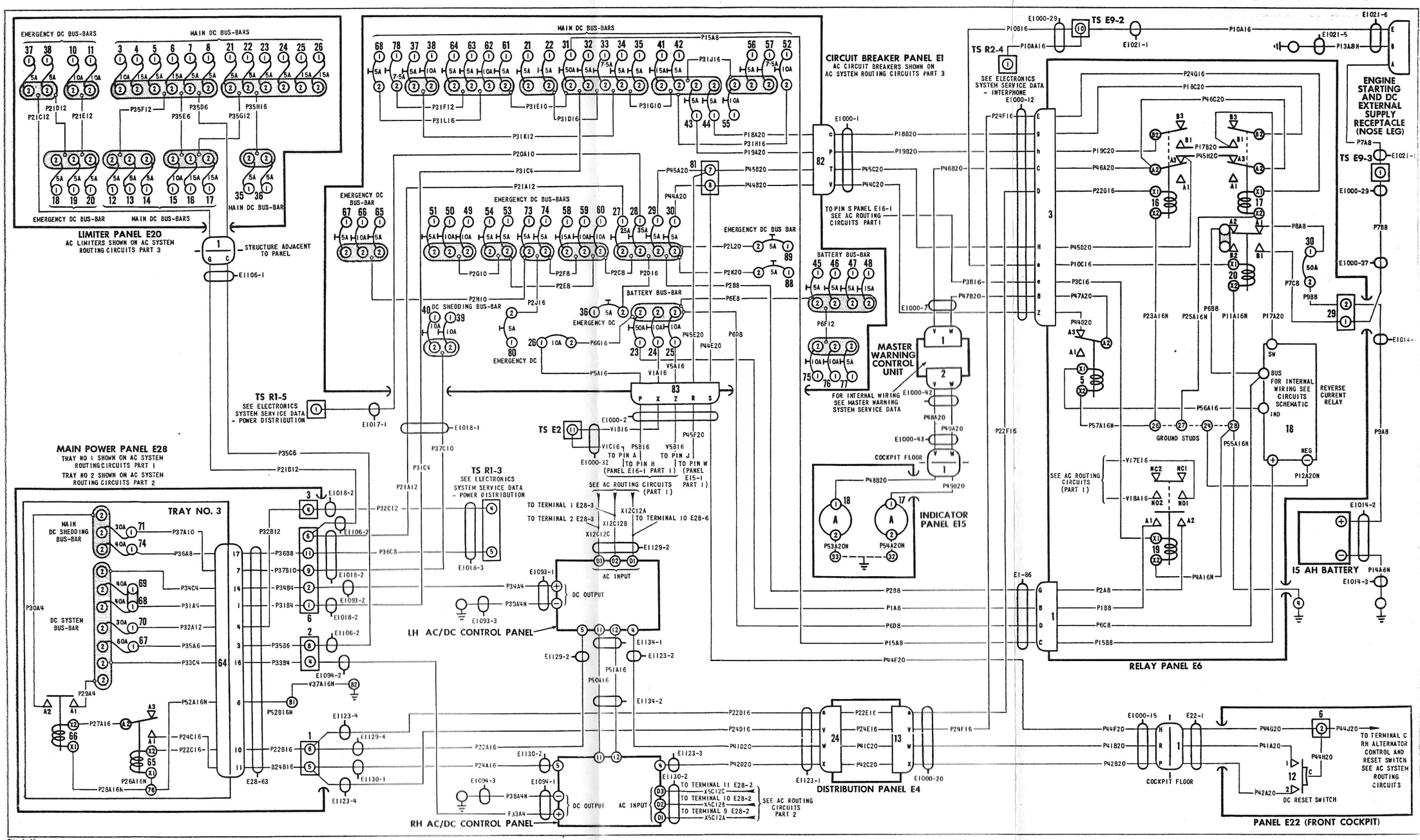

FIG. 11 DC POWER SUPPLY

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Master Electrics Switch	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler-Hammer	7660-K9	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To permit the simultaneous interruption of the power supply to all the electrical circuits with the exception of those circuits which are connected to the battery bus-bar. Controls the line relays of the internal and external AC power supply.

LOCATION

Front cockpit - RH console, Power and Starting Panel E16.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate the switch in the keyway in panel E16.
Secure the switch to the panel with the lock-washer, securing nut and lock-nut supplied. Connect and secure circuit wiring.
Fit and secure panel E16 to the console four quick-fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Operate the switch, check that the lever action is smooth and that the make and break is not sluggish or rough.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	AC/DC Control Panel - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-17	Lucas Rotax Ltd	60900	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 350 hours

FUNCTION

To regulate and control AC and DC power, and rectify 3 Ø AC to 28 - 28.5 volts DC.

LOCATION

Duct bay, forward of Sta. 538.4. Both the LH and the RH control panels are contained in one air conditioned cabinet.

ACCESS

MEN X MINUTES	

Accessible for inspection by releasing the RH electrical equipment access panel - 44 fasteners. To remove unit release left and right access panels - 77 fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES	

To install single panel:
Slide panel into cabinet and secure - ten screws.
Connect and secure external circuit wiring.
Refit access panels - 74 fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Remove panels, check security of equipment and wiring. Check for signs of overheating. Check that the external circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED CONFIDENTIAL

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Main Power Panel E28 - Cabinet	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-36	Avro Aircraft		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Houses three trays which distribute AC and DC power to subsidiary centres of circuit supply. Also, facilitates the interconnection between the tray wiring and the aircraft wiring which is completed only when the relevant tray is inserted properly and securely.

LOCATION

Duct bay aft of bulkhead at station 485.

ACCESS

	MEN X MINUTES	
Inspection: Remove electrical equipment access panel RH - 44 fasteners.		
Removal: Remove electrical equipment access panels, RH and LH - 74 fasteners.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Locate and secure unit to structure - four bolts. Connect external wiring to panel. Install trays 1, 2 and 3. Refit access panels - 74 fasteners.		

UNCLASSIFIED

1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the panel and associated wiring is secure and undamaged. Check that the trays are securely fitted.		

UNCTIONAL CHECKS	MEN X MINUTES	

ROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Main Power Panel E28 - Tray 1	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-37	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

Distribution of AC power from left hand alternator.

LOCATION

In main power panel E28 which is located in the duct bay aft of bulkhead at station 485.

ACCESS

	MEN X MINUTES	
Remove electrical equipment access panel, RH - 44 camloc fasteners.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Slide tray into panel E28. Turn the locking device, located on front face of tray, in clockwise direction until tray is locked. Secure with four fasteners. Refit access panel - 44 fasteners.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Remove tray and check that the equipment and wiring is secure. Inspect receptacle at rear of tray for signs of arcing. Refit tray and note that it slides into position easily and is rigid and secure when locked.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Main Power Panel E28 - Tray 2	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-38	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Distribution of AC power from RH alternator.

LOCATION

In main power panel E28 which is located in the duct bay aft of bulkhead at station 485.

ACCESS

	MEN X MINUTES	
Remove electrical equipment access panel RH - 44 fasteners.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Slide tray into panel E28. Turn locking device located on front face of tray in clockwise direction until tray is locked. Secure with four fasteners. Refit access panel - 44 fasteners.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Remove tray, and check that the equipment and wiring is secure. Inspect receptacle at rear of tray for signs of arcing. Refit tray and note that it slides into position easily and is rigid and secure when locked.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

CONFIDENTIAL
UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Main Power Panel E28 - Tray 3	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-39	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

Distribution of DC power from transformer-rectifier units.

LOCATION

In the main power panel E28 which is located in the duct bay aft of bulkhead at station 485.

ACCESS

MEN X MINUTES	

Remove electrical equipment access panel RH - 44 fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES	

Slide tray into panel E28.
Turn locking device located on front face of tray, in clockwise direction until tray is locked.
Secure with four fasteners.
Refit access panel - 44 fasteners.

CONFIDENTIAL
UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Remove tray and check that the equipment and wiring is secure. Inspect receptacle at rear of tray for signs of arcing. Refit tray and note that it slides into position easily and is rigid and secure when locked.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Circuit Breaker Panel E1	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-45	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN- ESTIMATED-500 hours

FUNCTION

To house AC and DC circuit control breakers and distribution bus-bars.

LOCATION

Nose wheel bay, LH side between stations 129-140.

ACCESS

MEN X MINUTES	

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES	

Connect and secure power wiring to bus-bars.
Locate and secure the panel to the structure - six fasteners.
Secure panel hinge - six screws.
Fit and secure four connectors.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Open panel and check that the internal wiring connections to circuits breakers and bus-bars are securely and correctly connected. Check for chafing of cables. Check that the circuit breaker identification is legible.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Limiter Panel E20	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-18	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To house current limiters for certain AC and DC circuits.

LOCATION

Forward of RH speed brake, between stations 485-495.

ACCESS

MEN X MINUTES

Release hinged access panel - 13 quick-release fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES

Secure the panel to the structure - 11 fasteners.
Fit and secure two connectors.
Close hinged access panel - 13 quick release fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Remove panel and check that the connections are securely and correctly connected. Check limiters for signs of oxydization (yellow-green colour). Check that the limiters are securely held in their mounting.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Forward Accessory Panel E3	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-94	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN- ESTIMATED-500 hours

FUNCTION

Houses primary emergency AC supply transfer relay also relays and ground test switches of other systems.

LOCATION

Nose wheel bay between stations 129-137.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Secure panel to structure - eight bolts.
Connect the ground wire.
Fit and secure two electrical connectors.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the connection and ground wire are securely and properly connected. Inspect wiring for cleanliness, physical strain and signs of chafing.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Distribution Panel E4	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1154-13	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN- ESTIMATED-500 hours

FUNCTION

To facilitate interconnection between circuits.

LOCATION

Forward face of bulkhead at station 485.

ACCESS

MEN X MINUTES

Unobstructed, after missile package has been removed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the panel to the structure - 16 bolts.
Fit and secure fuel contents circuit wiring to T-connectors.
Connect ground circuits.
Install four 12-way terminal blocks in their respective clips.
Fit and secure 50 electrical connectors.

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the terminal blocks and fuel contents system T-connectors are secure. Check that the electrical connectors are securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Relay Panel E6	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-78	Avro Aircraft Ltd		25201

OVERHAUL LIFE: KNOWN– ESTIMATED–500 hours

FUNCTION

To house relays of certain circuits and mount the battery circuit control breaker.

LOCATION

Roof of nose wheel bay, stations 129-149.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate and secure the panel to the structure - eight bolts.
Fit three AN connectors.
Connect and secure external battery circuit and ground circuit wiring.
Fit and secure three electrical connections.

INSPECTION	MEN X MINUTES
Check that circuit wiring is securely and properly connected. Check that the electrical connectors are securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Alternator 30kva - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1125-11	Lucas Rotax Ltd	60601	25201

OVERHAUL LIFE: KNOWN– ESTIMATED–350 hours

FUNCTION

To provide 120/208 volts 3-phase AC at 400 cps.

LOCATION

Engine nose bullet, LH and RH.

ACCESS | MEN X MINUTES

Remove engine from aircraft.

REPLACEMENT PROCEDURE | MEN X MINUTES

Locate and fit the alternator on the drive pad of the constant speed unit.
Secure the nuts removed from the constant speed unit pad-attachment studs.
Reconnect the circuit wiring to the alternator terminal strips - see routing diagram.
Fit and secure the nose bullet fairing with six clips.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
At each normal engine change - Check that the electrical connections are secure. Remove slip ring end covers: Inspect brushes for wear. Inspect slip rings for eccentricity and scoring. Check for dust, dirt, grime and grease. Check the insulation of the windings.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Alternator Control and Reset Switch - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-S-154			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To switch the alternator on and off, and provide a supply to reset the isolating circuit.

LOCATION

Front cockpit RH console on the oxygen Panel E22.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate the switch in the keyway in panel E22.
Secure the switch to the panel with the lock-washer, securing nut and lock-nut supplied.
Connect and secure the circuit wiring.
Fit and secure panel E22 to the console - four quick-fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Operate the switches, check that the lever action is smooth and that the make and break is not sluggish or rough.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	AC Line Relay - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS-24168-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED-500 hours

FUNCTION

To connect the output of the appropriate alternator to the AC sub-system bus-bars provided that:
(a) The master electrical switch is ON.
(b) The alternator is operating at the correct speed.
(c) An external power supply is not connected to the aircraft.

LOCATION

RH relay is located in tray No. 2 of the main power panel E28, located in the duct bay aft of station 485.
The LH relay is located in tray No. 1 of the same panel.

ACCESS

MEN X MINUTES

Unobstructed when appropriate tray is removed from panel E28.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure relay to the appropriate tray of panel E28 - four screws.
Connect and secure the circuit wiring - eight connections.

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the unit is mounted securely. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Instrument Transformer - Star-Delta Conversion	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-31	Canadian Atlas Transformer Co		25201

OVERHAUL LIFE: KNOWN- ESTIMATED-500 hours

FUNCTION

Converts the supply from the alternator which is star wound to a delta winding supply. This is necessary for certain aircraft instruments.

LOCATION

LH side of nose wheel bay on forward face of station 166.66

ACCESS — MEN X MINUTES

Nose wheel bay, unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure unit to structure - four bolts.
Remove terminal cover.
Connect and secure circuit wiring - seven connections.
Refit terminal cover.

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Examine the unit and connections for cleanliness, damage and security. Check insulation of windings.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

1500 Volt Insulation Tester.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Transfer Control Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To complete a supply circuit to the RH transfer relay of the distribution control circuits and, in the event of the RH system failing, to transfer the supply circuit to the LH transfer relay.

LOCATION

Tray No. 1 of main power panel E28 located in the duct bay aft of station 485.

ACCESS

MEN X MINUTES	

Unobstructed, when tray No. 1 of panel E28 is removed.

REPLACEMENT PROCEDURE

MEN X MINUTES	

Fit and secure the relay to the tray - two screws.
Connect and secure the circuit wiring - eight connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is mounted securely. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Transfer Relay - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS-24144-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

If the RH alternator is in operation the RH relay connects the RH AC sub-system bus-bars to the main AC bus-bars. If only the LH alternator is in operation the LH relay connects the LH AC sub-system bus-bars to the main AC bus-bars. To prevent the paralleling of the supply from each alternator it is arranged that when one relay is closed the other is open.

LOCATION

Both units are mounted in tray No. 2 of the main power panel E28 located in the duct bay aft of station 485.

ACCESS

MEN X MINUTES

Unobstructed when the tray No. 2 is removed from panel E28.

REPLACEMENT PROCEDURE

MEN X MINUTES

Attach the relay to the tray - four screws.
Connect and secure circuit wiring - eight connections.

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is secured, and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Ground Fault Unit - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-123	Lucas Rotax Ltd	GS-13010-1	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To trip the appropriate LH or RH alternator field contactor if a fault current leakage rate to ground in any one of the three phases exceeds 30 amperes.
Note that the relay is effective only for faults in the circuit preceding its point of installation.

LOCATION

Located in duct bay at station 532, RH and LH.

ACCESS — MEN X MINUTES

Remove the RH electrical equipment - access panel - 44 fasteners.

REPLACEMENT PROCEDURE — MEN X MINUTES

To install one unit:
Fit and secure the unit to the structure - four bolts.
Insert each pair of phase wires into the appropriate hole in the cores.
Connect and secure the neutral wires to the ground stud.
Connect and secure the phase wires to the AC/DC control unit.
Fit and secure one electrical connector to the unit.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the electrical connector is fitted properly and securely. Examine the phase wiring for physical strain and signs of chafing.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Power Failure Detector - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-11	Canadian Diaphlex		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Trips the relevant alternator isolating circuit if a phase failure occurs or any of the phases are reversed.

LOCATION

Main power panel E28 which is in the duct bay on the aft face of bulkhead 485.
LH power failure detector - Tray No. 1
RH power failure detector - Tray No. 2

ACCESS

	MEN	MINUTES

Remove electrical equipment access panel, RH - 44 fasteners.
Withdraw, partially, the appropriate tray from panel E28.

REPLACEMENT PROCEDURE

	MEN	MINUTES

Fit and secure the unit to the tray - four screws.
Fit and secure one connector to the unit.
Close and lock the tray in panel E28.
Refit the access panel - 44 fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is mounted securely. Examine the electrical connector for cleanliness, damage and security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	AC Shedding Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS 24144-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To isolate certain electronic loads from the LH AC sub-system bus-bars if the LH alternator only is supplying power.

LOCATION

Mounted on tray No. 1 of the main power panel E28 located in the duct bay aft of station 485.

ACCESS

MEN X MINUTES

Unobstructed when the tray No. 1 is removed from panel E28.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the relay to the tray - four screws.
Connect and secure the circuit wiring - eight connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the circuit wiring is securely and correctly connected.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	DC Reset Switch	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS-25089-4D			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To complete a supply circuit to reset the fault protection circuits.
Switch is common to the LH and the RH DC sub-systems.

LOCATION

Front cockpit RH console on the Oxygen Panel E22.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the switch to panel E22 with the lock-washer and nut supplied.
Connect and secure circuit wiring - three connections.
Fit and secure panel E22 to the console - six screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the circuit wiring is securely and properly connected. Operate the switch and check that the action is smooth and positive.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Emergency DC Bus-Bar Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS-24140-2			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To interconnect the main emergency DC bus-bar with the battery bus-bars and, when required, to complete supply circuits to the RH external supply relay and external line slave relay.

LOCATION

Relay panel E6, located on the roof of the nose wheel bay between stations 129-147.

ACCESS — MEN X MINUTES

Unobstructed when rudder quadrant guard and panel E6 is released.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure relay to panel E6 - two screws.
Connect and secure circuit wiring - six connections.

UNCLASSIFIED

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Signal Relay - LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To complete a supply circuit to the DC L OR R FAIL indicator in the event of the DC output from one transformer-rectifier failing and, provided that one transformer-rectifier is in operation, the relay completes the circuit for the battery circuit reverse current relay.

LOCATION

Relay panel E6, located on the roof of the nose wheel bay between stations 129-147.

ACCESS

MEN X MINUTES

Unobstructed when rudder quadrant guard and panel E6 is released.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure relay to panel - two screws.
Connect and secure circuit wiring - eight connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	DC Shedding Cut-out Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To operate in the event of a failure of either transformer-rectifier unit and shed a portion of the DC load.

LOCATION

Mounted on Tray No. 3 of the main power panel E28 located in the duct bay aft of station 485.

ACCESS — MEN X MINUTES

Unobstructed when the tray is removed from panel E28.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the relay to the tray - two screws.
Connect and secure circuit wiring - four connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	DC Shedding Control Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS 24141-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To complete the power supply circuit from the main DC bus-bars to the main DC shedding bus-bar provided that both transformer-rectifier units are in operation,

LOCATION

Tray No. 3 of the main power panel E28 located in the duct bay aft of station 485.

ACCESS

MEN X MINUTES	

Unobstructed when tray No. 3 is removed from panel E28.

REPLACEMENT PROCEDURE

MEN X MINUTES	

Fit and secure the relay to the tray - two screws.
Connect and secure the circuit wiring - four connections,

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the circuit wiring is securely and correctly connected.		
FUNCTIONAL CHECKS	**MEN X MINUTES**	
GROUND HANDLING AND GROUND TEST EQUIPMENT		
SPECIAL TOOLS TO REMOVE OR SERVICE		
REMARKS		

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Battery Circuit Reverse Current Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-135			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

To isolate the main DC bus-bar from the battery, in the event of the failure of both transformer-rectifier units, thus preventing excessive load demand on the battery.
The reverse current relay also controls the operation of the battery use indicator light.

LOCATION

Nose wheel bay on panel E6, between stations 129-147.

ACCESS

MEN X MINUTES

Unobstructed, when the rudder quadrant guard is removed and panel E6 released.

REPLACEMENT PROCEDURE

MEN X MINUTES

Secure relay to panel E6 with four mounting screws.
Secure panel E6 to the roof of the nose wheel bay.
Connect the electrical wiring.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Examine the unit and electrical connections for cleanliness, damage, and security. Inspect the wiring for physical strain and signs of chafing.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICS	POWER SUPPLIES	Battery Use Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To complete a supply circuit to the BATTERY USE Indicator in the event of a DC power supply failure.

LOCATION

Relay panel E6 located in the nose wheel bay between stations 129-147.

ACCESS

MEN X MINUTES	

Unobstructed when rudder quadrant guard and panel E6 is released.

REPLACEMENT PROCEDURE

MEN X MINUTES	

Fit and secure the relay to the panel - two screws.
Connect and secure circuit wiring - four connections.
Secure panel E6 to its mounting.
Refit and secure the rudder quadrant guard.

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the relay is securely mounted. Check that the circuit wiring is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Nickel-Cadmium Storage Battery, 15 Ampere-Hour	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-11	Societe Des Accumulateurs Fixes et de Traction (SAFT)	20-VO 15	25201

OVERHAUL LIFE: KNOWN– ESTIMATED–500 hours

FUNCTION

Supplies 24V DC power for certain services in the event of both transformer-rectifier units failing. Also provides power to initiate the operation of the LH and RH alternators and to open the canopy.

LOCATION

LH side of nose wheel bay.

ACCESS

MEN X MINUTES

Nose wheel bay, unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Lift battery into receptacle and slide to the rear.
Refit bolt in angle bracket at bottom forward face of battery.
Refit nut on stud at the rear of the battery.
Refit two bolts on the angle plate, at the top of the battery.
Refit air connections.
Connect supply circuit wiring.
Reset battery supply circuit breaker located on Relay Panel E6.

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the battery is secure in its mounting. Check the voltage of each cell. Ensure that the battery connections are free from corrosion.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Starting Power Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-128			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To permit the use of an external DC supply in preference to the aircraft battery for engine starting control circuits and the ground operation of load supplied from the battery and emergency DC bus-bars.

LOCATION

Relay panel E6 located in the nose wheel bay between stations 129 and 147.

ACCESS

	MEN X MINUTES	
Unobstructed when the rudder quadrant guard and panel E6 is released.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure the relay to the panel using four mounting screws. Connect and secure the circuit wiring - four connections.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Alternator (Emergency AC System)	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1956-567	Vickers Inc.	EA 50209	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 100 hours (running time)

FUNCTION

To supply AC power for AC operated equipment considered essential for flight in the event of a failure of both the LH and the RH AC power source.

LOCATION

Mounted on the LH side of the duct bay at station 500, approximately.

ACCESS — MEN X MINUTES

Remove RH electrical equipment access panel - 44 fasteners.

REPLACEMENT PROCEDURE — MEN X MINUTES

Airframe;

Secure to mounting using four bolts.
Connect three hydraulic lines.

Electrics;

Fit and secure one electrical connector.

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Examine the unit for cleanliness, damage, and security. Inspect for signs of oil leaks. Check the electrical connector for security and damage. Ensure that the wiring is free from physical strain and signs of chafing.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Limiter Panel - Emergency Alternator Power	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1156-485			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To mount limiters for the emergency alternator output lines.

LOCATION

LH side of duct bay between stations 494 - 499.

ACCESS

MEN X MINUTES

Remove RH electrical equipment access panel - 44 fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure panel on mounting - four screws.
Connect and secure circuit wiring - six connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the panel is securely mounted. Check that the circuit wiring is securely and properly connected. Check that the limiters do not show signs of oxydization (yellow-green colour).	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Primary AC Failure Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To initiate the operation of the emergency alternator in the event of the LH and RH AC power supplies failing.

LOCATION

Relay panel E6, located on the roof of the nose wheel bay between stations 129-147.

ACCESS

	MEN X MINUTES
Unobstructed when the rudder quadrant guard and panel E6 is released.	

REPLACEMENT PROCEDURE

	MEN X MINUTES
Fit and secure relay to panel E6 - two screws. Connect and secure circuit wiring - four connections.	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	Primary-Emergency AC Supply Transfer Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS-25024-1			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Normally completes the three-phase supply circuits between the main AC bus-bars and services to be supplied by the emergency AC system. If the LH and the RH AC supplies fail during flight, the transfer relay isolates the main AC bus-bars and permits power to be drawn from the emergency alternator.

LOCATION

Accessory panel E3, located in nose wheel bay between stations 129 - 137.

ACCESS

MEN X MINUTES

Unobstructed, when panel E3 is released.

REPLACEMENT PROCEDURE

MEN X MINUTES

Mount relay on panel E3 - four screws.
Connect and secure circuit wiring - seven connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	External Supply Receptacle	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-127	Powerlite Devices Ltd		25201

OVERHAUL LIFE: KNOWN– ESTIMATED–500 hours

FUNCTION

Facilitates connection of an external source of AC power supply to aircraft.

LOCATION

Underside of duct bay at station 495.

ACCESS

MEN X MINUTES	

Remove electrical equipment access panel RH - 44 fasteners.

REPLACEMENT PROCEDURE

MEN X MINUTES	

Fit and secure the receptacle to the structure - four bolts.
Remove terminal cover.
Connect and secure circuit wiring.

Refit terminal cover - four nuts.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check contacts for signs of arcing and pitting. Check for security of mounting and dust, dirt, grime and grease. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	External Supply Line Relay LH and RH	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
MS 4168-1			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

When closed completes the three-phase AC supply circuits between the external supply receptacle and the LH and RH AC sub-system bus-bars.

LOCATION

LH relay is mounted on tray No. 1 of the main power panel E28 located in the duct bay aft of station 485. The RH relay is mounted in tray No. 2 of the same panel.

ACCESS

	MEN X MINUTES	
Unobstructed when the appropriate tray is removed from panel E28.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure the relay to the appropriate tray - four screws. Connect and secure the circuit wiring - eight connections.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and correctly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	POWER SUPPLIES	External Supply Slave Relay	11-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Prevents the connection of the output from the alternators to the AC sub-system bus-bars if they are energized from the AC external supply source.

LOCATION

Mounted on tray No. 1 of the main power panel E28 located in the duct bay aft of station 485.

ACCESS — MEN X MINUTES

Unobstructed when the tray is removed from panel E28.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the relay to the tray - two screws.
Connect and secure the circuit wiring - seven connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the circuit wiring is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

CEPE Systems
S/C Armstrong

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ARROW 1 SERVICE DATA

SECTION 38

ELECTRICAL SYSTEM

MASTER WARNING

(This data supersedes previous issue dated 15 Jan 58)

CONFIDENTIAL

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

MASTER WARNING SYSTEM

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 Warning of malfunction of certain systems is given by the illumination of either a red or an amber master warning light fitted on the main instrument panel. The specific system or component affected by malfunction is identified by the illumination of an indicator light, one such light being provided for each system or component. The indicator lights, with the exception of the fire warning and the air conditioning engine bleed indicator lights, are located on a panel fitted in the RH console. The fire warning indicator lights are located on the LH console, and the air conditioning engine bleed indicator lights are located on the RH console.

2 The circuits to the master warning lights and the indicator lights are completed through a control unit.

INDICATOR LIGHT PANEL (Fig 1)

3 Twenty-six indicator lights, a PRESS-TO-RESET switch, a DAY-NIGHT switch and a PRESS-TO-TEST switch are located on the indicator light panel.

4 The PRESS-TO-RESET switch is used to switch off the master light after the illumination of an indicator light. The indicator light remains operative until the system fault is cleared.

5 The DAY-NIGHT switch, when selected to NIGHT, introduces a resistor into the return circuit of the indicator lights to reduce the brilliance of illumination. An exception to this is the fire warning lights which are not dimmed.

6 The PRESS-TO-TEST switch operates the master test circuit which facilitates checking the filaments of all the indicator lights associated with the warning system. These are as follows:

(a) Master warning lights.

(b) Indicator lights located on the indicator panel.

(c) Fire warning indicator lights.

(d) Warning circuits indicator light fitted in the knob of the landing gear selector lever.

(e) Pilot's indicator light of the bail-out indicator circuit.

7 With the exception of the master test circuit, the master warning system derives its supply from the emergency DC bus-bar via the MASTER WARNING circuit breaker on panel E1. The master test circuit derives its supply from the main DC bus-bar via the MASTER TEST circuit breaker on panel E1.

8 An identification plate, upon which is inscribed the system or function served, is provided for each indicator. The inscription on the plate is translucent white against a black background. If an indicator is handed, this is indicated by the letter L or R and an arrow pointing in the appropriate direction. At present, one indicator is not used; the function of the remaining 25 indicators and the master warning given are as follows:

(a) FUEL LOW, L and R. If the fuel in the LH or the RH fuel collector tank falls below 65% capacity (approximately 720 lbs), the appropriate L or R FUEL LOW indicator light and the amber coloured master light will illuminate. Note that, when this condition exists, the FUEL PROP indicator light will also illuminate.

(b) FUEL PROP. The FUEL PROP indicator light and the amber coloured master light will illuminate if any of the following four conditions exist:

(1) The level of the fuel in the LH or the RH fuel collector tank falls below 65% capacity (approximately 720 lbs).

(2) The LH or the RH fuel transfer pump has failed. When this condition exists, the circuit to the indicator light is completed by differential pressure switches fitted in the LH and the RH fuel transfer lines.

(3) Either or both refuelling adaptor doors are open.

ARROW 1 SERVICE DATA

(4) The master refuelling switch is selected on.

(c) ENG EMER FUEL ON. This indicator light illuminates when the LH or the RH ENGINE FUEL switch is set to EMERG and the selector valve in the appropriate engine fuel control unit is in the emergency position. A master indication is not given when this circuit is operative.

(d) FUEL PRESS L and R. If the fuel delivery pressure to the LH or the RH engine drops below 15.9 - 16.9 psia, the appropriate L or R FUEL PRESS indicator light and the amber coloured master light illuminate. On pressure rising, the indicator light is extinguished when the pressure exceeds 18.3 psia.

(e) OIL PRESS, L and R. The appropriate L or R OIL PRESS indicator light and the amber coloured master light will illuminate if the differential oil pressure between the LH or the RH engine oil pump and oil sump is less than 25 psi.

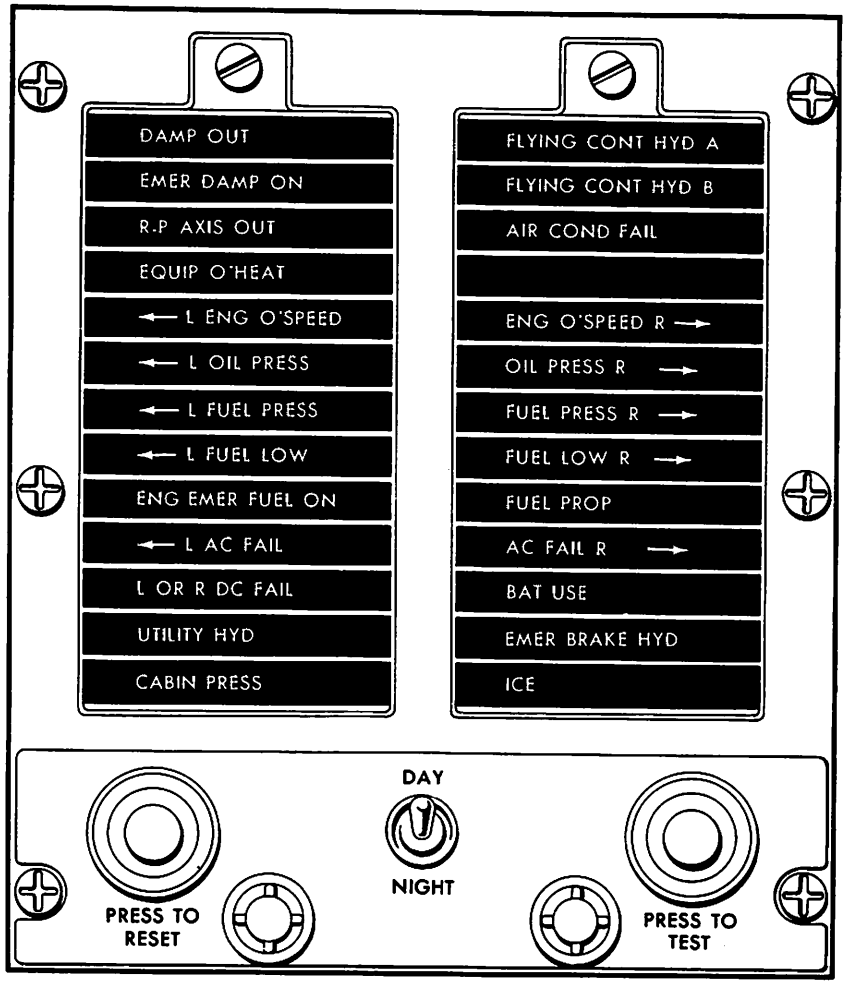

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FIG. 1 INDICATOR LIGHT PANEL

ARROW 1 SERVICE DATA

(f) FLYING CONT HYD A and B. If the pressure in either system A or system B of the flying control hydraulics is less than 600 - 1400 psi, the appropriate FLYING CONT HYD A or B indicator light and the amber coloured master light illuminate. If the pressure in both systems is less than 600 - 1400 psi the red coloured and the amber coloured master lights illuminate. The indicator lights are extinguished when the pressure increases to 2800 - 3600 psi.

(g) UTILITY HYD. If the utility hydraulic system pressure is less than 600 - 1400 psi, the UTILITY HYD indicator light and the amber coloured master light illuminate. The indicator light is extinguished when the pressure increases to 2800 - 3600 psi.

(h) EMER BRAKE HYD. If the emergency brake hydraulic system pressure is less than 1400 - 1800 psi, the EMER BRAKE HYD indicator light and the amber coloured master light illuminate. The indicator light is extinguished when the pressure increases to 2600 - 3400 psi.

(j) AC FAIL, L and R. If a phase failure occurs in the LH or the RH AC system, the appropriate L or R AC FAIL indicator light and the amber coloured master light illuminate. Illumination of the L or the R AC FAIL indicator light is accompanied by the illumination of the indicator light for L or R DC FAIL. The illumination of an AC FAIL indicator light provides an indication that the total possible AC and DC load demand has been reduced to a value compatible with the capacity of one supply source.

(k) L or R DC FAIL. If the LH or the RH transformer-rectifier unit DC output fails, the L or R DC FAIL indicator light and the amber coloured master light illuminate. The illumination of the L or R DC FAIL indicator light provides an indication that the total possible DC load demand has been reduced to a value compatible with the capacity of one supply source.

(m) BAT USE. This indicator light and the amber coloured master light illuminate when DC power is being supplied by the battery.

(n) ENG O'SPEED L and R. If the LH or the RH engine low pressure compressor rotor speed increases to between 7260 and 7330 rpm, the appropriate L or R ENG O'SPEED indicator light and the amber coloured master light illuminate.

(p) CABIN PRESS. This indicator light and the amber coloured master light illuminate if the cabin pressure is equivalent to a pressure altitude of 31,000 feet.

(q) AIR COND FAIL. This indicator light and the amber coloured master indicator light illuminate when the air conditioning cooling turbine outlet temperature exceeds 80°F. The indicator light is extinguished when the temperature drops to 60°F.

(r) EQUIP O'HEAT. This indicator light and the amber coloured master light illuminate when the equipment air supply temperature increases to 95 - 105°F. The indicator light is extinguished when the temperature decreases to 55 - 65°F.

(s) ICE. This indicator light and the amber coloured master light illuminate when icing conditions in the engine air intakes are detected. Note that the operation of the indicator light is cycled by the action of the ice detector, but, by the action of the master warning circuit, the master light will remain illuminated until reset.

(t) EMER DAMP ON. This indicator light and the amber coloured master light illuminate when the rudder is being operated by the emergency damping. When this condition exists the R-P AXIS OUT indicator light is also illuminated.

(u) DAMP OUT. This indicator light and the amber coloured master light illuminate when the damper system is inoperative.

(v) R-P AXIS OUT. This indicator light and the amber coloured master light illuminate when the roll and/or pitch axis damping is out.

9 The master control unit effects the illumination of the red coloured master light if a fire warning light circuit is operative.

10 The appropriate LH or RH ENG BLEED indicator light illuminates if the air pressure

in the LH or the RH air conditioning engine bleed duct exceeds 120 psi, or due to leakage, the temperature within the ducting insulation increases to 350 - 400°F.

MASTER CONTROL UNIT (Fig 2)

11 The function of the master control unit is to complete a supply circuit to the appropriate master light and indicator light on receipt of a signal from the system or component affected by malfunction. Circuits are included in the unit to facilitate testing the filaments of the warning system indicator lights and reduce the brilliance of illumination of certain of these lights. The appropriate master light is extinguished and its circuits reset to receive further warning signals by a circuit incorporated in the unit.

12 Two master light control circuits are included in the control unit and serve to complete a supply circuit to the red or the amber coloured master light, as appropriate, when a malfunction occurs in a system or component. Each master light control circuit consists of two transistors, a resistance network and a circuit relay. The master light control circuits are operated by a signal input circuit comprising a capacitor and crystal diode. The action of the capacitor is used to trigger the operation of the master light control circuits. The function of the diode is to prevent feedback to the signal input circuits when a master circuit is operative. Each of the warning circuits requiring master indication incorporates a signal input circuit. See fig 3.

13 A master light control circuit is basically an electronic switch which controls the operation of the circuit relay. The relay, when energized, completes the master light supply circuit. The operation of a master light control circuit is described briefly in the following paragraphs.

14 In normal operation, i.e. under 'standby' conditions, the voltage dividing resistors R1 and R2 in combination with resistor R6 establish a potential difference between the base (B1) and emitter (E1) of the first stage transistor TR1. The potential difference is such that the base is negative with respect to the emitter and the transistor conducts. When transistor TR1 conducts, current flow through resistors R3 and R6 cause the voltage appearing at the collector (C1) to increase and the voltage appearing at the emitter (E1) to decrease. These voltage changes, which are applied to the base (B2) and emitter (E2) of the second stage transistor TR2 through resistor R4 and the common line, bias transistor TR2 to cut-off.

15 When a positive warning signal is applied to a signal input capacitor (C1), a pulse voltage caused by the capacitor charging current is developed across the input capacitor (C1). This action drives the base (B1) of transistor TR1 highly positive thereby biasing the transistor to cut-off. With current flow through transistor TR1 interrupted, the potential difference between the base (B2) and emitter (E2) of the second stage transistor TR2 is such that the transistor conducts. This potential difference is established by voltage dividing resistors R3, R4 and R5 in combination with resistor R6. When transistor TR2 conducts, current flow through resistors R7 and R6 bias transistor TR1 to cut-off. When current flows in the collector (C2) circuit of transistor TR2 the series connected circuit relay is energized. The relay, when energized, completes a supply circuit to the master light. The control circuit is maintained in this operating condition until manually reset.

16 The control circuit is prepared for receipt of further warning signals by depressing the PRESS-TO-RESET switch, located on the master warning panel. This action introduces a resistor into the base circuit of transistor TR1 causing a decrease in voltage at the base (B1) sufficient to permit the transistor to conduct and return the circuit to 'standby' conditions.

17 The master test circuit is operative when the PRESS-TO-TEST switch, located on the master warning panel, is depressed. This action completes a supply to the indicator lights associated with the system. (See para 6). The supply to each light is completed via a crystal diode each of which function to isolate the indicator circuits from each other, so preventing erroneous indications when a signal is supplied by a warning device. An additional diode is fitted in each of the input circuits to prevent feedback to the warning devices when the master test circuit is operative.

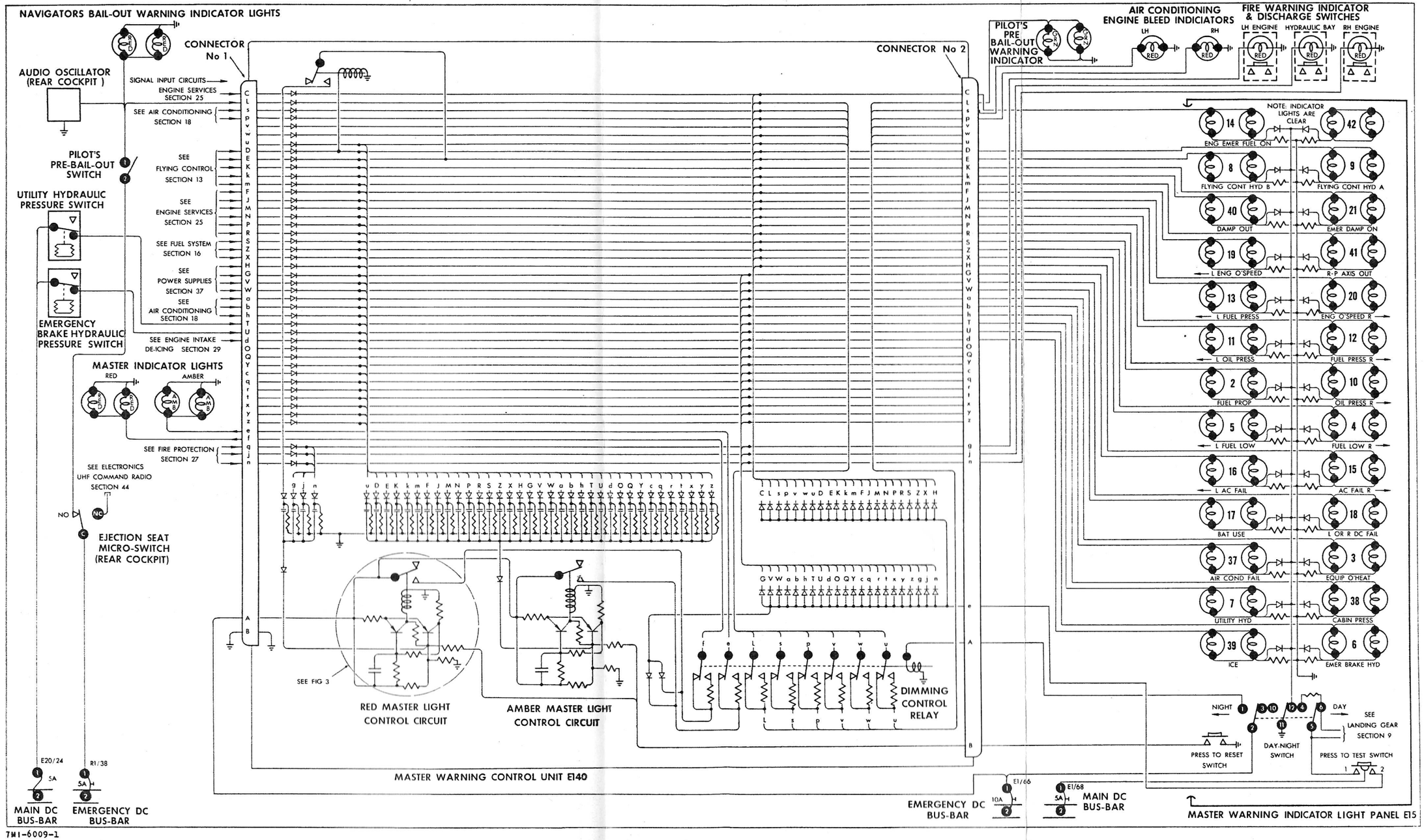

FIG. 2 MASTER WARNING SYSTEM SCHEMATIC

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ARROW 1 SERVICE DATA

18 The brilliance of illumination of those indicator lights not fitted on the master warning panel is reduced by a circuit included in the unit. An exception to this action is the fire warning lights which cannot be dimmed. The circuit is operative when the DAY-NIGHT switch, located on the master warning panel, is selected to NIGHT. This action completes a supply circuit to energize the dimming control relay. This relay, when energized, introduces a resistor into the supply circuit of the following indicator lights:

(a) Air conditioning engine bleed indicator lights, LH and RH.

(b) Pilot's bail-out indicator light.

(c) Red and amber master lights.

BAIL-OUT INDICATOR CIRCUIT

19 The bail-out indicator circuit provides a visual and an aural bail-out signal in the rear cockpit and also provides an indication in the front cockpit when the rear seat is ejected.

20 The circuit consists of a bail-out switch and a green coloured indicator light in the front cockpit and, in the rear cockpit, a red coloured indicator light and a buzzer unit. The supply for the circuit is derived from the emergency DC bus via the BAIL-OUT circuit breaker located in JB R1 and the normally-open contacts of a micro-switch fitted on the rear cockpit ejection seat rails. The normally-open contacts of the micro-switch are retained in the closed position by the ejector seat. When the bail-out

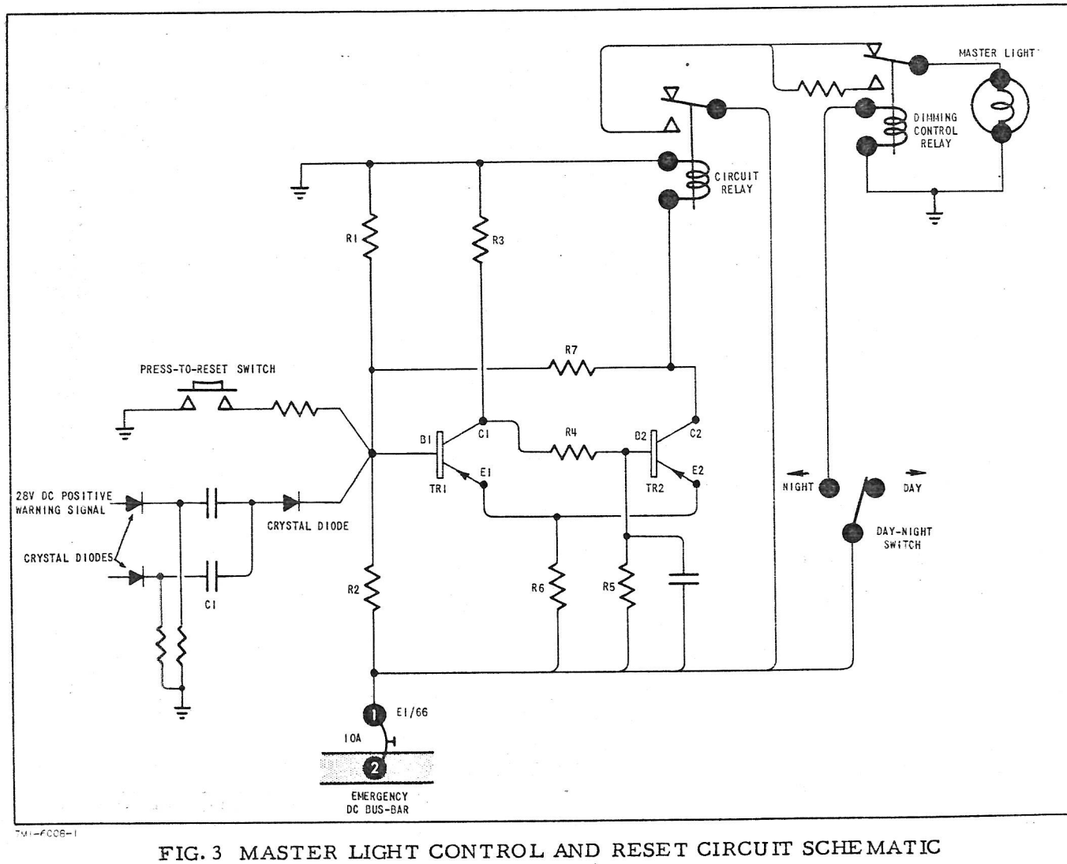

FIG. 3 MASTER LIGHT CONTROL AND RESET CIRCUIT SCHEMATIC

switch is closed, a supply circuit is completed via the micro-switch contacts to the front cockpit indicator and to the rear cockpit indicator and buzzer unit. The ejection of the rear cockpit seat permits the micro-switch to open, which interrupts the supply circuit.

FUNCTION TESTING

SYSTEM FUNCTION TEST

21 Check the serviceability of the indicators associated with the master warning system proceeding as follows:

(a) Ensure that a source of AC power is connected to the external supply receptacle.

(b) Depress the PRESS-TO-TEST switch and note that the indicator lights listed below are illuminated:

(1) The red and the amber master warning lights located on the main instrument panel.

(2) All indicator lights located on the indicator light panel fitted in the RH console.

(3) The air conditioning engine bleed indicator lights located on the RH console.

(4) The fire warning indicator lights located on the LH console.

(5) The warning circuits indicator light fitted in the knob of the landing gear selector lever.

(6) The bail-out circuit indicator light fitted on the main instrument panel in the front cockpit. See also para 24.

(c) With the PRESS-TO-TEST switch depressed, select the DAY-NIGHT switch to the NIGHT position. With the exception of the fire warning indicator lights which should remain unchanged in brilliance, check that the brilliance of illumination of the remaining indicator lights listed in operation (b) is reduced.

22 Check the operation of the reset circuit for the amber and the red master light proceeding as follows:

(a) Switch off the AC control switches or the external supply. The BAT USE indicator light and the amber master light should illuminate.

NOTE

Do not use the battery longer than necessary.

(b) Depress the PRESS-TO-RESET switch and check that the amber master light is extinguished. Reset the AC control or switch on the external supply.

23 Check the red master light reset circuit proceeding as follows:

(a) Hold the FIRE DETECTION switch, located on the refuelling and test panel E21, to the TEST position. Check that the fire warning lights and the red master light are illuminated.

(b) Depress the PRESS-TO-RESET switch and check that the red master light is extinguished.

24 The bail-out indicator and buzzer unit in the rear cockpit can be checked by raising the guard and operating the NAV BAIL-OUT switch located on the LH console in the front cockpit. When the switch is operated, the BAIL-OUT indicator light and buzzer unit in the rear cockpit should be operative. Note that when the switch is operated the NAV BAIL-OUT indicator light on the main instrument panel in the front cockpit will illuminate.

25 The functioning of the operating circuits of indicator lights is covered during function testing of their relevant systems.

ARROW 1 SERVICE DATA

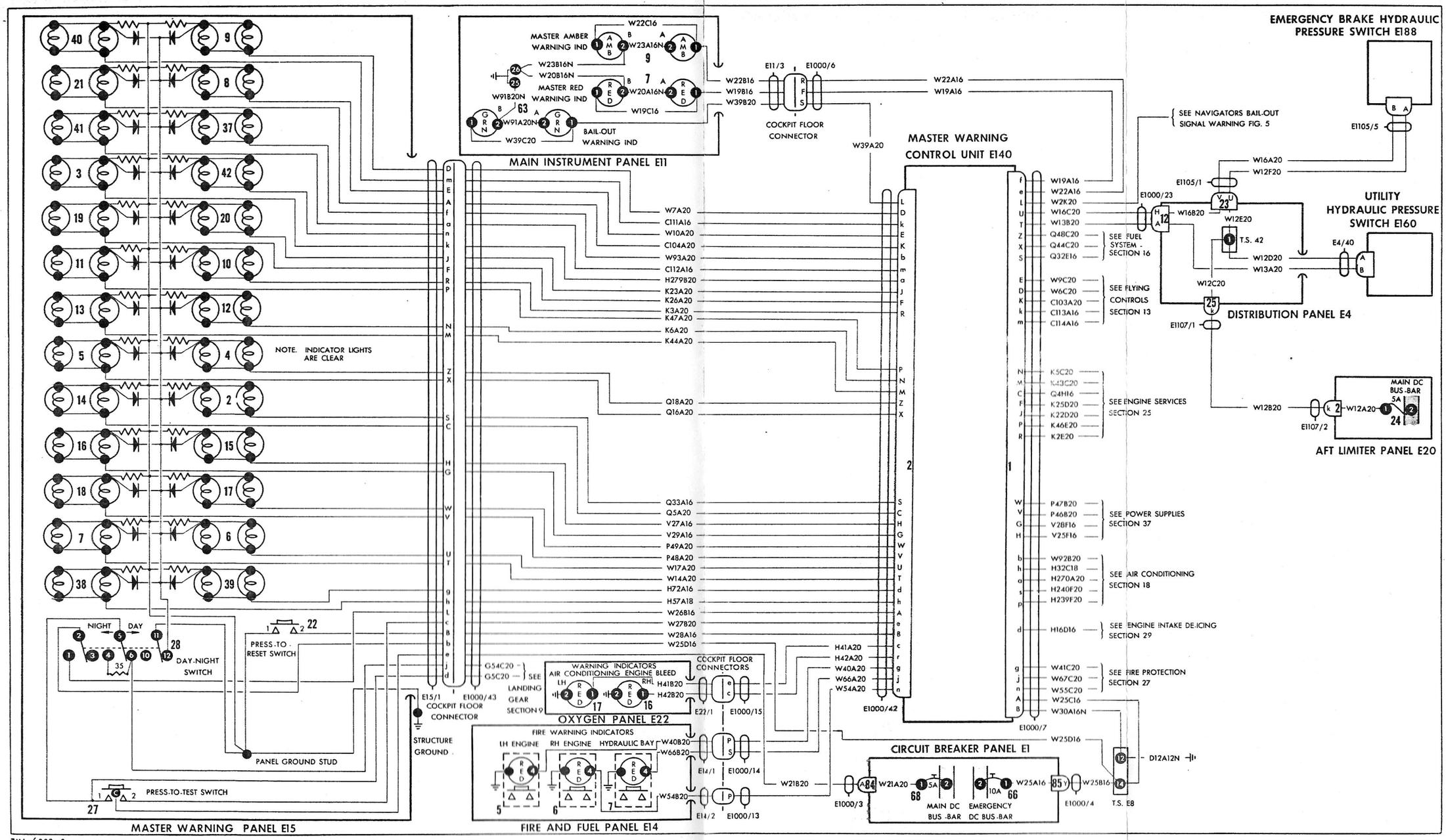

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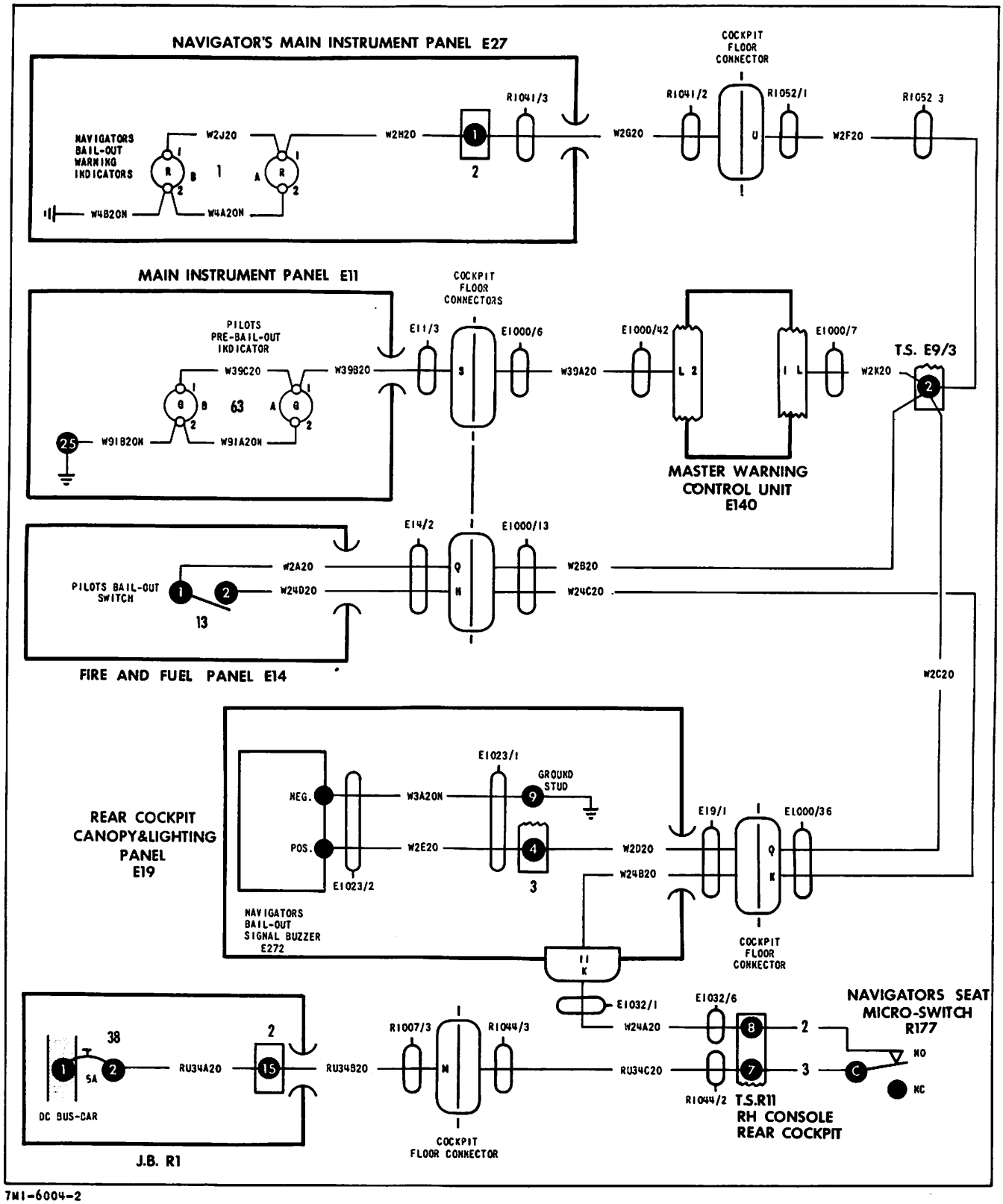
FIG. 4 MASTER WARNING SYSTEM



7M1-6004-2

FIG. 5 BAIL-OUT INDICATOR CIRCUIT

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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	MASTER WARNING	Indicator Light Panel - E15	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1252-344	Grimes Manufacturing Company	41255	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 500 hours

FUNCTION

Houses: Warning Indicator Lights
Night and Day Switch)
Press-to-test Switch) For warning lights.
Press-to-reset Switch)

LOCATION

Front cockpit - RH console, forward.

ACCESS — MEN X MINUTES

Incorporated in the RH console as a detachable panel.

REPLACEMENT PROCEDURE — MEN X MINUTES

Connect one connector.
Secure six quick fasteners.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Release inner panels and check contacts for security and damage. Check switches for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	MASTER WARNING	Control Unit - E140	

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1152-15043	Grimes Manufacturing Company	40935	25201

OVERHAUL LIFE: KNOWN– . ESTIMATED– 500 hours

FUNCTION

Incorporates circuits which operate master warning lights in cockpit.

LOCATION

Nosewheel Bay. LH side. Station 166.66 - 176.00.

ACCESS

Nosewheel well, unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit four AN520-10-R screws.
Connect two connectors.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check security of mounting. Check that connectors are secure and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 39

ELECTRICAL SYSTEM

INTERNAL AND EXTERNAL LIGHTING

(This data supersedes previous issue dated 12 Mar 1957)

CONFIDENTIAL

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

ELECTRICAL SYSTEM

INTERNAL AND EXTERNAL LIGHTING

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ARROW 1 SERVICE DATA

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9	Rear Cockpit Console Flood Lights Circuit Components	9
10	Rear Cockpit High Altitude Flood Lights Circuit Components	10
11	Rear Cockpit Map and Emergency Flood Light Circuit Components	10
12	Navigation Lights Circuit Components	10
13	Landing and Taxi Lights Circuit Components	11
ROUTING DIAGRAMS		
14	Front Cockpit Internal Lighting Circuits	12
15	Rear Cockpit Internal Lighting Circuits	13
16	External Lights Circuits	14

ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The internal lighting system consists of lighting circuits for the illumination of the front and the rear cockpit instruments, switches and controls. The external lighting system consists of a navigation light circuit and a landing and taxying lights circuit.

FRONT COCKPIT LIGHTING

2 The following five circuits comprise the front cockpit lighting:

(a) A circuit for the instrument lights and the edge lights of the main instrument panel and undercarriage actuation panel. The instrument lights and the edge lights are red coloured.

(b) A circuit for console panel edge lights which are red lights.

(c) A circuit for the console flood lights which are red lights.

(d) A circuit for the console high altitude flood lights which are amber lights.

(e) A circuit for the map and emergency flood light which is a red or clear light, as selected.

3 The instrument lights, edge lights, and console flood lights circuits each incorporate a dimming control. The controls are marked MAIN PANEL, CONSOLE PANELS and CONSOLE FLOOD. The dimming is controlled by switching the tapping points of three variable transformers fitted one in each circuit. The transformers and their controls are located on panel E17 in the RH console and they derive a power supply from 'A' phase of the main AC bus-bars via circuit breakers on the main circuit breaker panel E1.

4 A dimming control is not provided for the console high altitude flood lights. The control switch for the lights is marked HIGH ALT LIGHTING and is located on panel E17. The circuit derives a power supply from the main DC bus via a circuit breaker located on the main circuit breaker panel E1.

5 The map and emergency flood light, located above the RH console, is provided with a rheostat dimming control incorporated with the on and off switch housing which is an integral part of the case. The circuit is supplied from the emergency DC bus via a circuit breaker on the main circuit breaker panel E1.

6 A table listing the circuit breaker, fuse (if fitted), operating controls and associated lights, is provided for each of the five lighting circuits in the front cockpit. These tables, figs 3 to 7, will facilitate operating and servicing the circuits.

REAR COCKPIT LIGHTING

7 The following four circuits comprise the rear cockpit lighting:

(a) A circuit for the instrument lights and the console panel edge lights. The instrument lights and the edge lights are red coloured.

(b) A circuit for the console flood lights which are red lights.

(c) A circuit for the console high altitude flood lights which are amber lights. (Not fitted at present).

(d) A circuit for the map and emergency flood light which is a red or clear light, as selected.

8 Dimming controls are provided for the instrument lights, edge lights and console lights circuits. A common dimming control is provided for the instrument lights and the instrument edge lights. A separate dimming control is provided for the console flood lights. The controls are marked PANEL LIGHTS and CONSOLE FLOOD and they control the dimming by switching the tapping points of two variable transformers. The transformers and their controls are located on panel E26 in the RH console and they derive a supply from 'A' phase of the main AC bus-bars via circuit breakers mounted on panel E1 located in the nose-wheel well.

9 A dimming control is not provided for the console high altitude flood lights. The

ARROW 1 SERVICE DATA

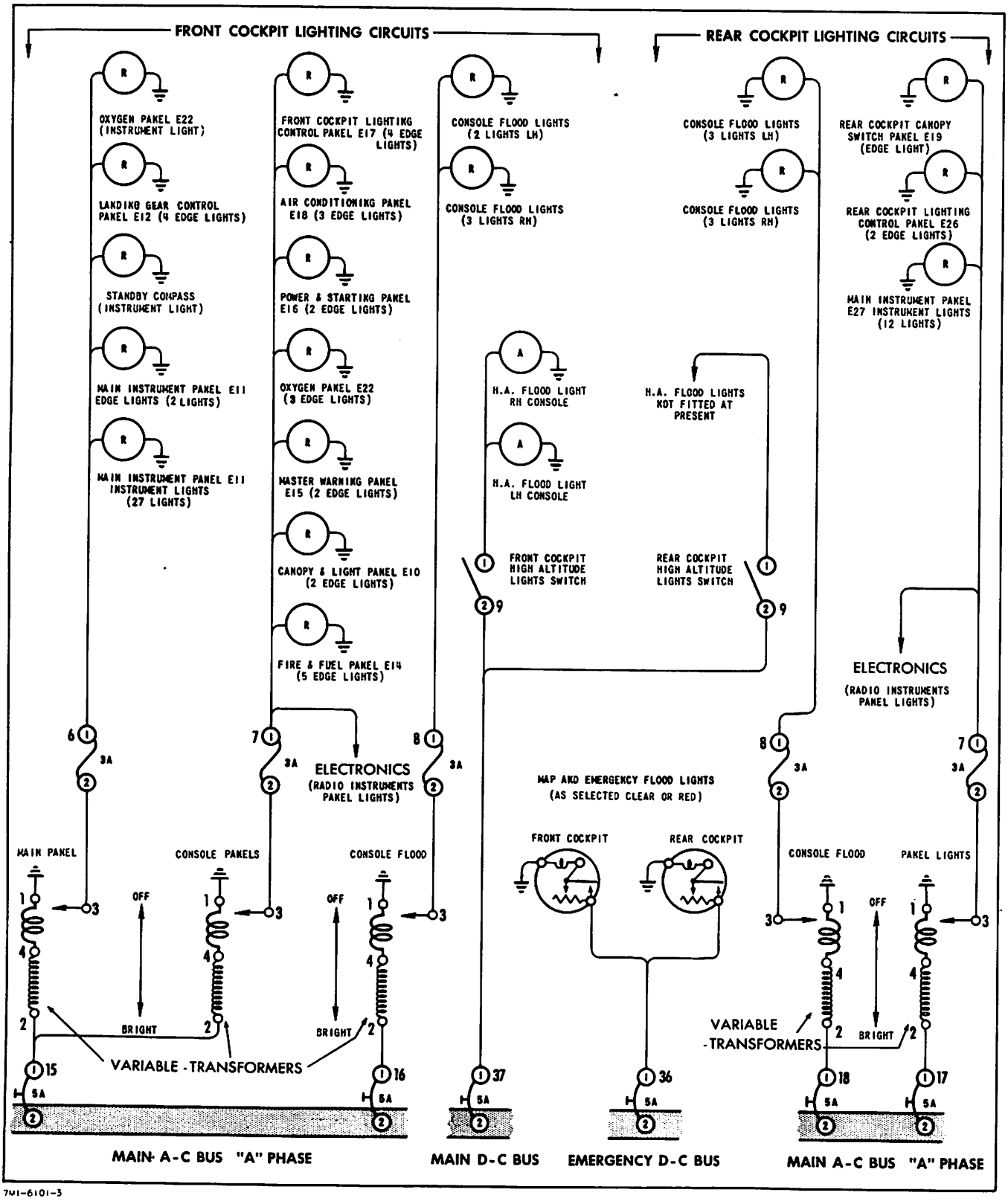

FIG. 1 INTERNAL LIGHTING CIRCUITS SCHEMATIC

ARROW 1 SERVICE DATA

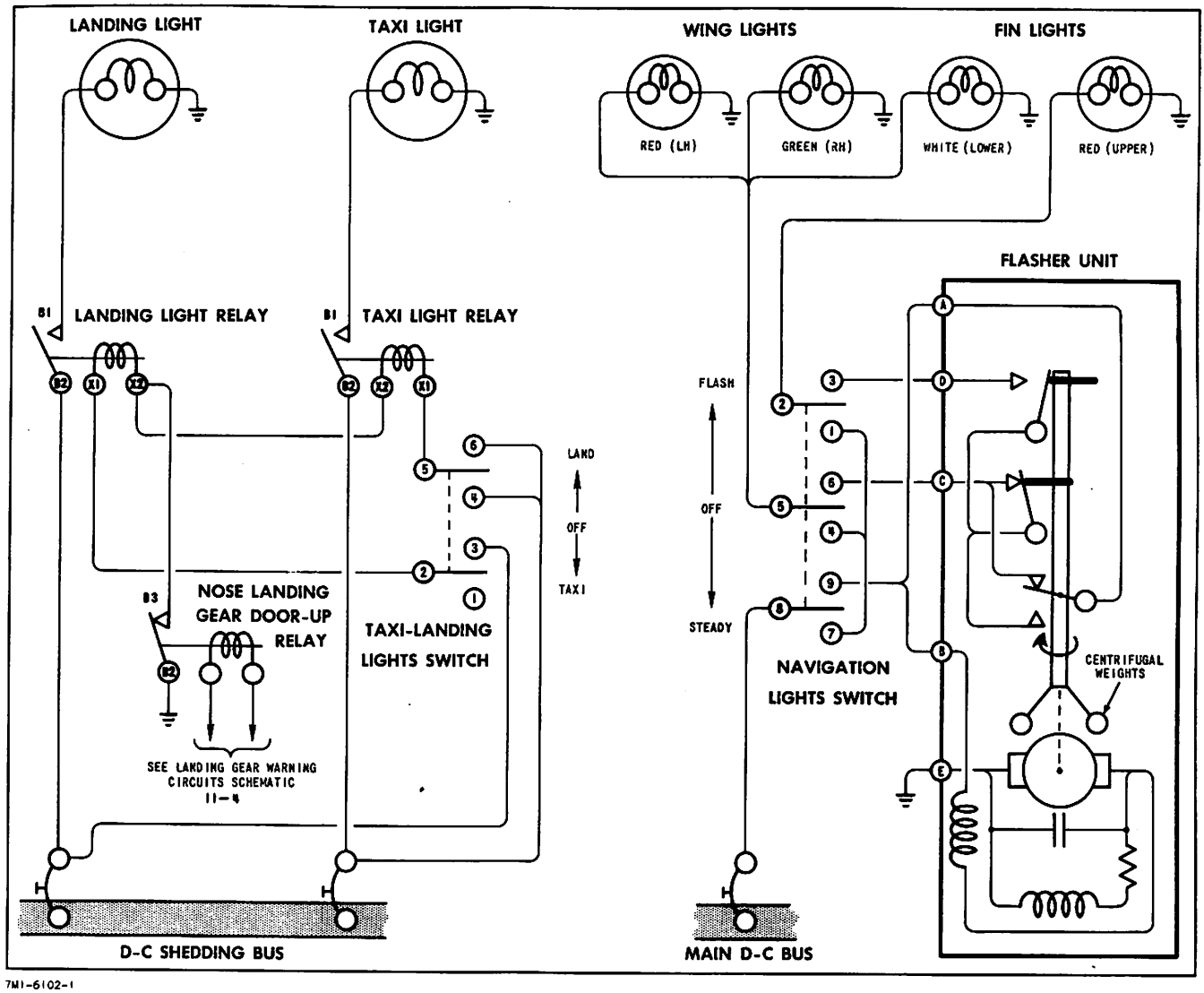

FIG. 2 EXTERNAL LIGHTING CIRCUITS SCHEMATIC

control switch for the lights is marked HIGH ALT LIGHTING and is located on panel E26. The circuit derives a power supply from the main DC bus via a circuit breaker on the main circuit breaker panel E1.

10 The map and emergency flood light, located above the RH console, is provided with a rheostat dimming control incorporated with the on and off switch housing which is an integral part of the case. The circuit is supplied from the emergency DC bus via a circuit breaker on the main circuit breaker panel E1.

11 Tables similar to those provided for the front cockpit lighting circuits are provided for the rear cockpit lighting circuits. See figs 8 to 11.

NAVIGATION LIGHTS

12 The navigation lights circuit comprises a red (LH) and a green (RH) wing tip light, a red (upper) and a white (lower) fin tip light, a flasher unit and a selector switch marked NAV LIGHTS, FLASH-OFF-STEADY. When the selector switch is set to the STEADY position, a power supply circuit derived from the main DC bus is completed through the selector switch contacts to the four navigation lights.

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When the switch is selected to FLASH, the flasher unit located on the RH side of the nose-wheel well adjacent to panel E3 is operative. The flasher unit will illuminate the wing tip lights and fin tip white light alternately with the fin tip red light. If the flasher unit fails, it will automatically revert the lights to a steady indication with the exception that, dependent upon the position in which the flasher halts, the fin tip red light may not illuminate.

13 Fig 12, which is similar to those tables for the front cockpit and the rear cockpit lighting circuits, is provided for the navigation lights circuit.

LANDING AND TAXYING LIGHTS

14 Two lights are fitted on the nose landing gear leg; one on the steering portion of the leg for taxying, and the other on the fixed portion of the leg for landing. The selection and operation of the lights is controlled by a double pole double throw switch marked TAXI-OFF-LAND located on the LH console in the front cockpit.

15 Two single pole single throw relays control the supply circuit to the landing light and taxi light respectively. Selecting the control switch to the LAND position will energize both relays. Selecting the switch to the TAXI position will energize only the taxi light control relay. The circuits derive their power supply from the DC shedding bus.

16 Fig 13 is provided for the landing lights and taxi lights circuit and is similar to those of the front cockpit, rear cockpit and navigation lights circuits.

FUNCTION TESTING

FRONT COCKPIT LIGHTING CIRCUITS TEST

17 To check the operation of the front cockpit lighting circuits proceed as follows:

(a) Ensure that the following circuit breakers on panel E1 are switched on:

(1) INST & EDGE - FRONT C/P LTS.

(2) FLOOD - FRONT C/P LTS.

(3) HIGH ALT. - C/P LTS.

(4) EMERG - C/P LTS.

(b) Check that the three fuses in the lighting control panel E17 are serviceable.

(c) On panel E17, set the MAIN PANEL control to BRIGHT and check that the lights listed in fig 3 are lit.

(d) Rotate the MAIN PANEL control toward OFF and note that the brilliance of the lights is progressively reduced.

(e) On panel E17, set the CONSOLE PANELS control to BRIGHT and check that the lights listed in fig 4 are lit.

(f) Rotate the CONSOLE PANELS control toward OFF and note that the brilliance of the lights is progressively reduced.

(g) On panel E17, set the CONSOLE FLOOD control to BRIGHT and check that the lights listed in fig 5 are lit.

(h) Rotate the CONSOLE FLOOD control to OFF and check that the brilliance of the lights is progressively reduced.

(j) On panel E17, select the HIGH ALT LIGHTING switch to ON. Check that the high altitude light on the RH console and the high altitude light on the LH console are lit.

(k) Select the HIGH ALT LIGHTING switch to OFF.

(m) Release the map and emergency flood light from its stowage clip on the RH console. Operate the integrally mounted rheostat control and note that the brilliance of the light increases as the control is rotated. Rotate the bezel ring and check that the light is red or clear, as selected.

(n) Select the control to the off position and note that the switch action is positive.

REAR COCKPIT LIGHTING CIRCUITS TEST

18 To check the operation of the rear cockpit lighting circuits proceed as follows:

(a) Ensure that the following circuit breakers on panel E1 are switched on:

(1) INST & EDGE - REAR C/P LTS.

(2) FLOOD - REAR C/P LTS.

(3) EMERG - C/P LTS.

(4) HIGH ALT - C/P LTS.

(b) Check that the two fuses in the lighting control panel E26 are serviceable.

(c) On panel E26, set the PANEL LIGHTS control to BRIGHT and check that the lights listed in Fig 8 are lit.

(d) Rotate the PANEL LIGHTS control to OFF and note that the brilliance of the lights is progressively reduced.

(e) On panel E26, set the CONSOLE FLOOD control to BRIGHT and check that the lights listed in fig 9 are lit.

(f) Rotate the CONSOLE FLOOD control to OFF and note that the brilliance of the lights is progressively reduced.

(g) On panel E26, select the HIGH ALT LIGHTING switch to ON. Check that the high altitude light on the LH console and the high altitude light on the RH console are lit.

(h) Release the map and emergency flood light from its stowage clip on the RH console. Operate the integrally mounted rheostat control and note that the brilliance of the light increases as the control is rotated. Rotate the bezel ring and check that the light is red or clear as selected.

(j) Select the control to the off position and note that the switch action is positive.

NAVIGATION LIGHTS CIRCUIT TEST

19 To check the operation of the navigation lights proceed as follows:

(a) Ensure that the NAV-EXT. LTS circuit breaker on panel E1 is switched on.

(b) On panel E22, select the NAV LIGHTS switch to the STEADY position and check that the LH wing tip light and the RH wing tip light and both lights in the fin tip are lit.

(c) Select the NAV LIGHTS switch to the FLASH position and check that both wing tip lights and the white light in the fin tip flash alternately with the red light in the fin tip.

(d) Select the NAV LIGHTS switch to OFF.

LANDING AND TAXYING LIGHTS CIRCUIT TEST

20 To check the operation of the landing and taxying lights proceed as follows:

(a) Examine the lens of both lights for chips or cracks. Clean the lenses, if necessary. Check the bulbs visually and replace if they appear to be 'black'.

(b) Ensure that the LAND-EXT LTS circuit breaker and the TAXI-EXT LTS circuit breaker both located on panel E1 are switched on.

(c) On panel E10, select the LIGHTS switch to the LAND position and check that the landing light and the taxi light are lit.

(d) Select the LIGHTS switch to the TAXI position and check that the TAXI light only is lit.

(e) Select the LIGHTS switch to OFF.

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; INST. & EDGE - FRONT C/P LTS.	Panel E1-15
Fuse; forward one of three	Panel E17-6
Control; MAIN PANEL	Panel E17-3
Oxygen Panel, Instrument Light	Panel E22-8
Main Instrument Panel, Edge Light	Panel E11-21
Main Instrument Panel, Edge Light	Panel E11-22
Standby Compass, Instrument Light	Panel E11-31
Main Instrument Panel, Instrument Lights (27)	Panel E11-35 to 61 (incl)
Undercarriage Actuation Panel, Edge Light	Panel E12-7
Undercarriage Actuation Panel, Edge Light	Panel E12-8
Undercarriage Actuating Lever, Edge Lights (two)	Panel E12-3

FIG. 3 FRONT COCKPIT INSTRUMENT AND EDGE LIGHTS CIRCUIT COMPONENTS

ARROW 1 SERVICE DATA

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; INST & EDGE - FRONT C/P LTS.	Panel E1-15
Fuse; centre one of three	Panel E17-7
Control; CONSOLE PANELS	Panel E17-4
Lighting Control Panel, Edge Light	Panel E17-10
Lighting Control Panel, Edge Light	Panel E17-11
Lighting Control Panel, Edge Light	Panel E17-16
Lighting Control Panel, Edge Light	Panel E17-17
Air Conditioning Panel, Edge Light	Panel E18-6
Air Conditioning Panel, Edge Light	Panel E18-7
Air Conditioning Panel, Edge Light	Panel E18-11
Power and Starting Panel, Edge Light	Panel E16-5
Power and Starting Panel, Edge Light	Panel E16-8
Oxygen Panel, Edge Light	Panel E22-10
Oxygen Panel, Edge Light	Panel E22-11
Oxygen Panel, Edge Light	Panel E22-18
Warning Lights Panel, Edge Light	Panel E15-25
Warning Lights Panel, Edge Light	Panel E15-26
Canopy and Lights Panel, Edge Light	Panel E10-4
Canopy and Lights Panel, Edge Light	Panel E10-5
Fire and Fuel Panel, Edge Light	Panel E14-14
Fire and Fuel Panel, Edge Light	Panel E14-15
Fire and Fuel Panel, Edge Light	Panel E14-16
Fire and Fuel Panel, Edge Light	Panel E14-17
Fire and Fuel Panel, Edge Light	Panel E14-21
TELECOMMUNICATIONS SYSTEM PANELS	
Pilot's Switch Panel R4; Edge Lights (two)	Panel R4 -6 and -7
Pilot's Radio Compass Control Panel C-1513A; Edge Lights (two)	Panel R111
IFF Control Panel C-1158/APX; Edge Lights (two)	Panel R116
UHF Control Panel C-1057/ARC-34; Edge Lights (two)	Panel R136
J4 Compass Control Panel; Edge Lights (two)	Panel R143
Pilot's Interphone Control Panel C-824/AIC-10; Edge Lights (two)	Panel R148
Damper Circuit Breaker Panel R8; Edge Lights (two)	Panel R8 -21 and 22
Damper Function Selector; Edge Light (one)	Panel R211

FIG. 4 FRONT COCKPIT CONSOLE PANEL EDGE LIGHTS CIRCUIT COMPONENTS

ARROW 1 SERVICE DATA

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; FLOOD - FRONT C/P LTS.	Panel E1-16
Fuse; aft one of three	Panel E17-8
Control; CONSOLE FLOOD	Panel E17-5
Console Flood Light, Forward	RH Console, E1004-2 (cable)
Console Flood Light, Centre	RH Console, E1004-3 (cable)
Console Flood Light, Rear	RH Console, E1004-5 (cable)
Console Flood Light, Forward	LH Console, E1003-2 (cable)
Console Flood Light, Centre	LH Console, E1003-3 (cable)
Console Flood Light, Rear	LH Console, E1003-5 (cable)

FIG. 5 FRONT COCKPIT CONSOLE FLOOD LIGHTS CIRCUIT COMPONENTS

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; HIGH ALT. - C/P LIGHTS	Panel E1-37
Switch; HIGH ALT LIGHTING	Panel E17-9
High Altitude Flood Light	RH Console, E1004-4 (cable)
High Altitude Flood Light	LH Console, E1003-4 (cable)

FIG. 6 FRONT COCKPIT HIGH ALTITUDE FLOOD LIGHTS CIRCUIT COMPONENTS

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; EMERG - C/P LIGHTS	Panel E1-36
Map and Emergency Flood Light (Switch and dimmer combined)	RH Console, E1503-1 (cable)

FIG. 7 FRONT COCKPIT MAP AND EMERGENCY FLOOD LIGHT CIRCUIT COMPONENTS

ARROW 1 SERVICE DATA

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; INST. & EDGE - REAR C/P LTS.	Panel E1-17
Fuse; aft one of two	Panel E26-7
Control; PANEL LIGHTS	Panel E26-5
Canopy and Light Panel, Edge Light	Panel E19-4
Lighting Control Panel, Edge Light	Panel E26-10
Lighting Control Panel, Edge Light	Panel E26-11
TELECOMMUNICATIONS SYSTEM PANELS	
R.O. Switch Panel R5; Edge Lights (two)	Panel R5-7 and -8
R.O. Radio Compass Control Panel C-1513A; Edge Lights (two)	Panel R112
R.O. Interphone Control Panel C-824/AIC-10; Edge Lights (two)	Panel R149
Rear Cockpit Instrument Panel - 12 instrument lights	Panel E27 -5 to 16 inclusive

FIG. 8 REAR COCKPIT INSTRUMENT AND CONSOLE PANEL EDGE LIGHTS CIRCUIT COMPONENTS

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; FLOOD - REAR C/P LTS	Panel E1-18
Fuse - forward one of two	Panel E26-8
Control; CONSOLE FLOOD	Panel E26-4
Console Flood Light, Forward	RH Console, E1010-2 (cable)
Console Flood Light, Centre	RH Console, E1010-3 (cable)
Console Flood Light, Rear	RH Console, E1010-4 (cable)
Console Flood Light, Forward	LH Console, E1013-3 (cable)
Console Flood Light, Centre	LH Console, E1013-5 (cable)
Console Flood Light, Rear	LH Console, E1013-6 (cable)

FIG. 9 REAR COCKPIT CONSOLE FLOOD LIGHTS CIRCUIT COMPONENTS

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; HIGH ALT. - C/P LTS Switch; HIGH ALT LIGHTING High Altitude Flood Light)) Not fitted. High Altitude Flood Light)	Panel E1-37 Panel E26-9 RH Console, E1010-5 (cable) LH Console, E1013-4 (cable)

FIG. 10 REAR COCKPIT HIGH ALTITUDE FLOOD LIGHTS CIRCUIT COMPONENTS

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; EMERG - C/P LTS Map and Emergency Flood Light (Switch and dimmer combined)	Panel E1-36 RH Console, E1504-1 (cable)

FIG. 11 REAR COCKPIT MAP AND EMERGENCY FLOOD LIGHT CIRCUIT COMPONENTS

CIRCUIT COMPONENT	LOCATION
Circuit Breaker; NAV - EXT. LTS Switch; NAV LIGHTS, STEADY-OFF-FLASH Navigation Lights Flasher Wing Light - Red Wing Light - Green Fin Light - White Fin Light - Red	Panel E1-38 Panel E22-5 Nose Wheel Well, E102 (EQ No.) Left Wing Tip, E1155-2 (cable) Right Wing Tip, E1156-2 (cable) Fin Tip, Lower, E158-2 (cable) Fin Tip, Upper, E1046-2 (cable)

FIG. 12 NAVIGATION LIGHTS CIRCUIT COMPONENTS

ARROW 1 SERVICE DATA

CIRCUIT COMPONENTS	LOCATION
Circuit Breaker; LAND - EXT. LTS	Panel E1-39
Circuit Breaker; TAXI - EXT. LTS	Panel E1-40
Switch; LIGHTS, LAND-OFF-TAXI	Panel E10-3
Landing Light Relay	Panel E6-13
Taxi and Landing Lights Relay	Panel E6-10
Landing Light	Nose Undercarriage; E201 (EQ No.)
Taxi Light	Nose Undercarriage; E202 (EQ No.)

FIG. 13 LANDING AND TAXI LIGHTS CIRCUIT COMPONENTS

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ARROW 1 SERVICE DATA

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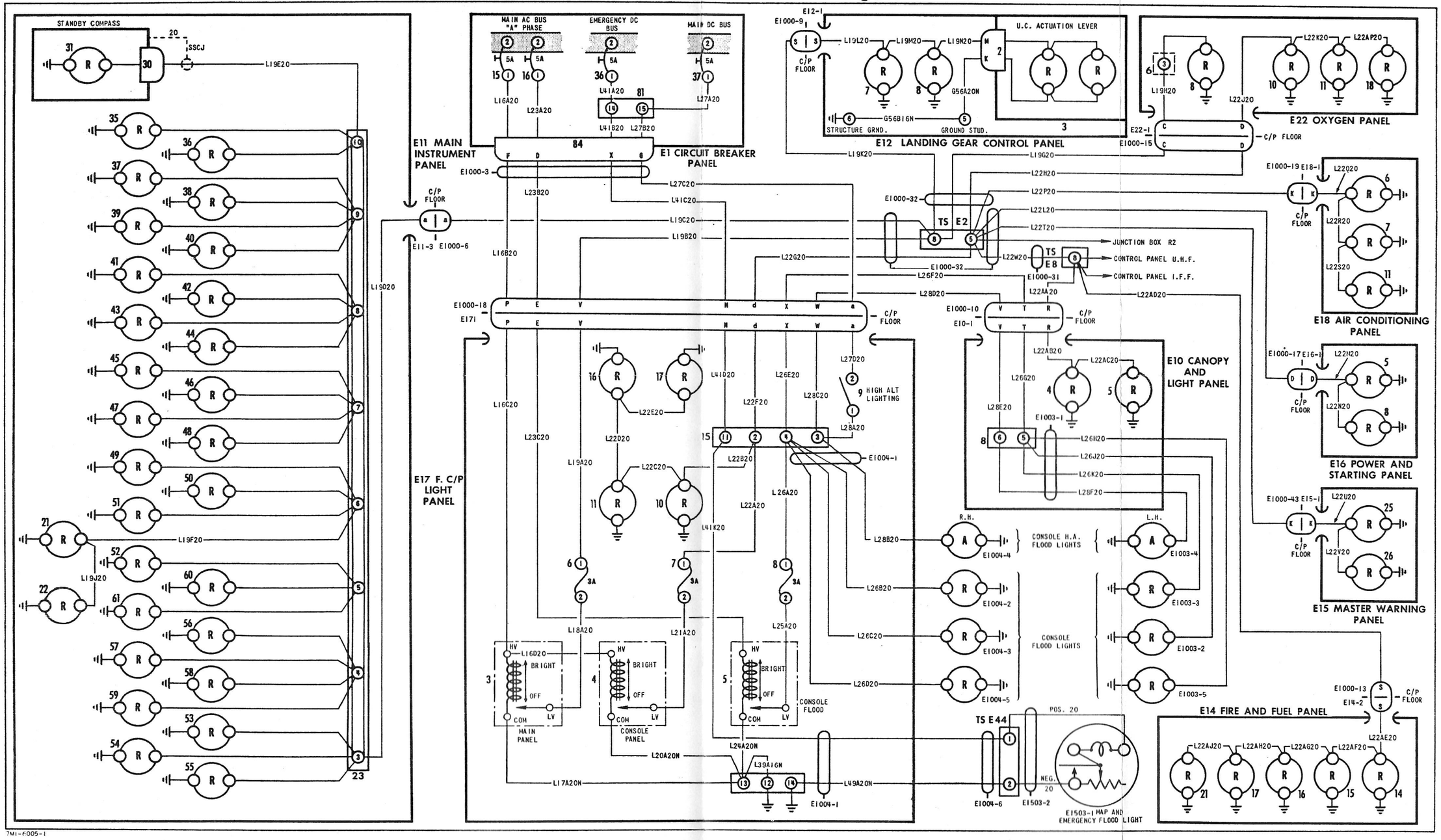

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FIG. 14 FRONT COCKPIT INTERNAL LIGHTING CIRCUITS

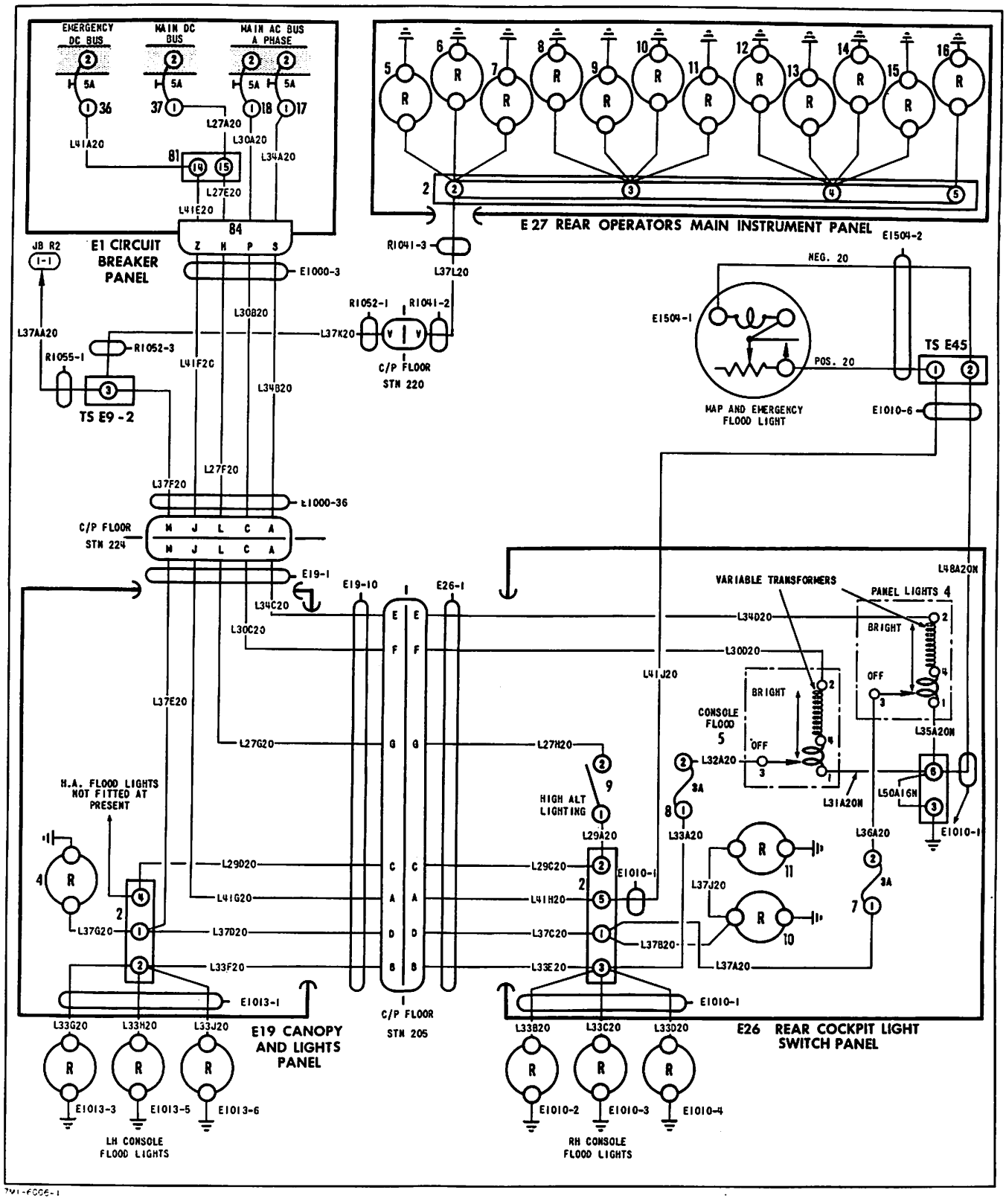

FIG. 15 REAR COCKPIT INTERNAL LIGHTING CIRCUITS

ARROW 1 SERVICE DATA

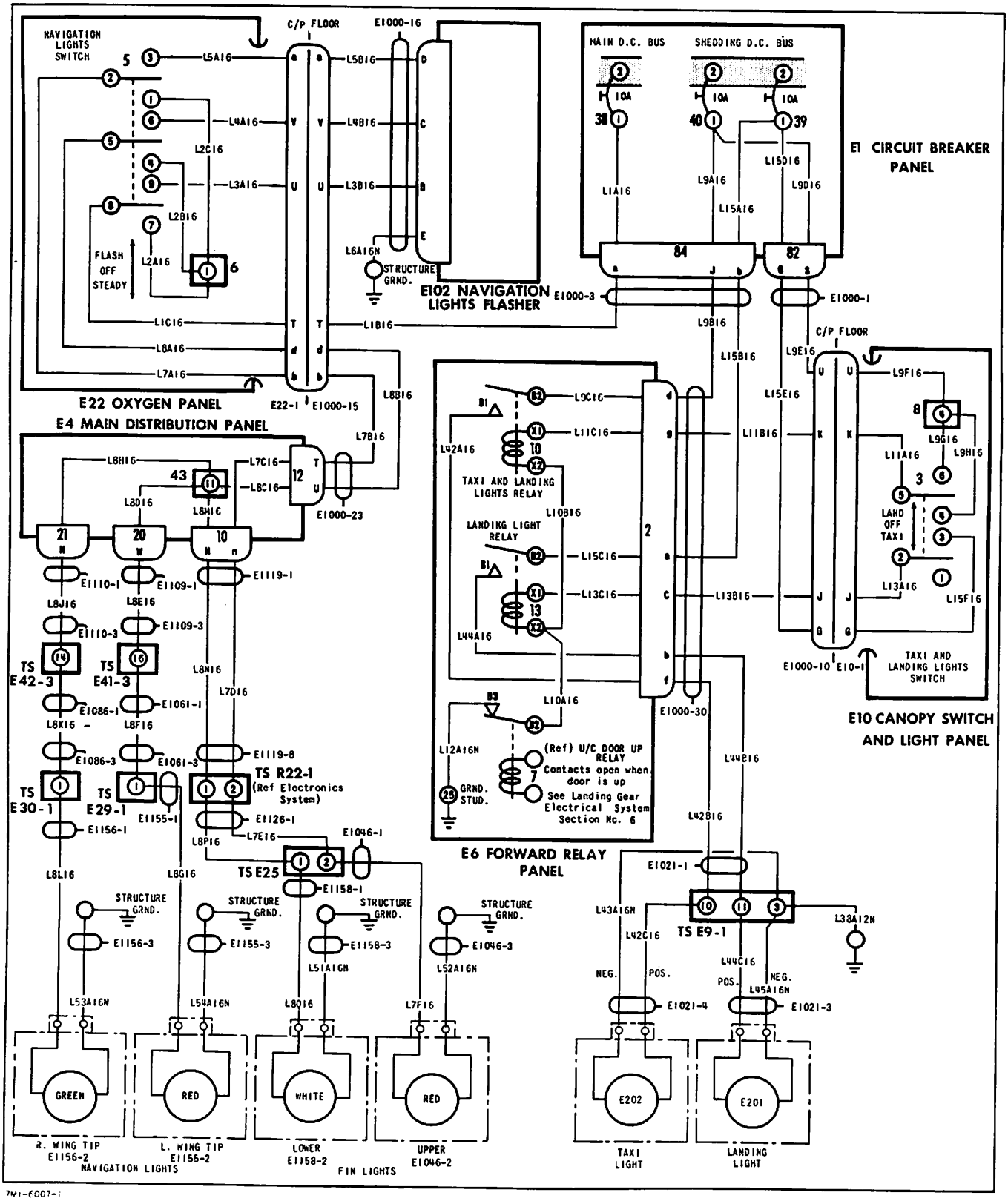

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FIG. 16 EXTERNAL LIGHTS CIRCUITS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Front Cockpit Light Panel - E17	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
17-1252-77	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To house three variable transformers, three fuses and a switch used for the front cockpit lights illumination and control.

LOCATION

Front cockpit, RH console.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Connect and secure circuit wiring to the components of the panel.
Locate the panel in the console and secure - five screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the panel is securely fitted. Operate the dimming controls and switches; check that the action is not rough or sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Light Controls (3) - Front Cockpit	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-T-134			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To control the brilliance of the cockpit lighting. One light control is provided for each of the following groups of lights:
(a) Instrument lights.
(b) Console flood lights.
(c) Console edge lights.

LOCATION

Mounted on the front cockpit light panel E17 - RH console.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Locate and secure the control to the panel - one nut.
Connect the circuit wiring - four connections.

MEN X MINUTES

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the control is securely and properly fitted. Check that the circuit wiring is securely and properly connected. Operate the control and check that the action is not rough or sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Switch - Front Cockpit High Altitude Lighting	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler-Hammer	8801K16	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To provide on-off switching for the front cockpit high altitude flood lights.

LOCATION

Mounted on the front cockpit light panel E17 - RH console.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Locate and secure the switch to the panel - one nut.
Connect the circuit wiring - two connections.

MEN X MINUTES

ARROW 1 SERVICE DATA

UNCLASSIFIE

INSPECTION	MEN X MINUTES
Check that the switch is securely and properly fitted. Check that the circuit wiring is securely and properly connected. Operate the switch and check that the action is not rough or sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Map and Emergency Flood Light Assembly	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Grimes	D-7825	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide a source of illumination which can be moved within a radius of approximately 30 inches.

LOCATION

Front cockpit, RH side.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Locate and secure the assembly stowage clip to the structure- two mounting bolts.
Connect the light assembly circuit wiring - two electrical connections.
Fit the light assembly in the stowage clip.

MEN X MINUTES

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES	
Check that the filament is not blackened and examine the lens and the casing for signs of crazing or cracks. Check that the stowage clip is securely and properly fitted and that the light assembly circuit connections are securely connected. Operate the switch and check that the action is not rough or sluggish.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Rear Cockpit Light Panel - E26	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1252-123	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To house two variable transformer, two fuses and a switch used for the rear cockpit lights illumination and control.

LOCATION

Rear cockpit, RH console.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate the panel in the console and secure - four quick-fasteners.
Connect and secure the circuit wiring supplied with the panel to the terminal strip located on the aft face of the pilot's seat bulkhead.

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the panel is securely fitted. Operate the dimming controls and switches, check that the action is not rough or sluggish. Check that the circuit wiring to the terminal strip is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Light Controls (2) - Rear Cockpit	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-T-134			25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To control the brilliance of the cockpit lighting. One light control is provided for the console flood lights and one control for the console edge lights and instrument panel lights.

LOCATION

Mounted on the rear cockpit light panel E26 - RH console.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Locate and secure the control to the panel - one nut.
Connect the circuit wiring - three connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the circuit wiring is securely and properly connected. Check that the control is securely and properly fitted. Operate the control and check that the action is not rough or sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Switch - Rear Cockpit High Altitude Lighting	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
8801-K16	Cutler-Hammer	8801-K16	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide on-off switching for the rear cockpit high altitude flood lights.

LOCATION

Mounted on the rear cockpit light panel E26 - RH console.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate and secure the switch to the panel - one nut.
Connect the circuit wiring - two connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the circuit wiring is securely and properly connected. Check that the switch is securely and properly fitted. Operate the switch and check that the action is not rough or sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Map and Emergency Flood Light Assembly	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Grimes	D-7825	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide a source of illumination which can be moved within a radius of approximately 30 inches.

LOCATION

Rear cockpit, RH side.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Locate and secure the assembly stowage clip on the structure - two mounting bolts.
Connect the light assembly circuit wiring - two electrical connections.
Fit the light assembly in the stowage clip.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the filament is not blackened and examine the lens and the casing for signs of crazing or cracks. Check that the stowage clip is securely and properly fitted and that the light assembly circuit connections are securely connected. Operate the switch and check that the action is not rough or sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Navigation Lights Control Switch	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler-Hammer	7662K5	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide off control of the navigation lights and facilitate selection of steady or flashing illumination.

LOCATION

Front cockpit, RH console panel E22.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the switch to the panel using the lockwasher and nut provided.
Connect and secure the circuit wiring to the switch.
Locate the panel in the console and secure - six screws.
Reconnect one pipeline to the oxygen gauge.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the panel is securely fitted. Operate the switch and check that the action is not rough or sluggish. Check that the oxygen pipeline is correctly and securely fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Flasher Unit - Navigation Lights	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-F-106	Lucas-Rotax	61370	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To illuminate the wing tip lights and the fin tip white light alternately with the fin tip red light.

LOCATION

Nose wheel well, RH side at station 120.00.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the unit to the structure - four bolts.
Connect and secure one electrical connector.

MEN X MINUTES

UNCLASSIFIED

SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely fitted. Check that the electrical connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Navigation Light, RH Wing Tip (Green)	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
2-CS-L-129-1	Aviation Electric (Grimes)	B8020G	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To indicate the position and the direction of motion of the aircraft.

LOCATION

RH wing tip.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Connect and secure one electrical connector.
Fit and secure the light to the wing tip - three screws.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the light is securely and properly fitted. Check that the bulb is not blackened. Check the lens for crazing or cracks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Navigation Light, LH Wing Tip (Red)	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
1-CS-L-129-1	Aviation Electric (Grimes)	B8020R	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To indicate the position and the direction of motion of the aircraft.

LOCATION

LH wing tip.

ACCESS | MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE | MEN X MINUTES

Connect and secure one electrical connector.
Fit and secure the light to the wing tip - three screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the light is securely and properly fitted. Check that the bulb is not blackened. Check the lens for crazing or cracks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Navigation Light, Fin Tip (Red)	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1183-11	Soderberg		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To indicate the position and the direction of motion of the aircraft.

LOCATION

Trailing edge of fin tip.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure one connector.
Locate the light in the fairing.
Fit and clamp the lens.
Fit and secure the light to fin structure - two screws.

MEN X MINUTES	

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the light is securely and properly fitted. Check that the bulb is not blackened. Check the lens for crazing and cracks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Navigation Light, Fin Tip (White)	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1183-11	Soderberg		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To indicate the position and the direction of motion of the aircraft.

LOCATION

Trailing edge of fin tip.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure one connector.
Locate the light in the fairing.
Fit and clamp the lens.
Fit and secure the light to the fin structure - two screws.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the light is securely and properly fitted. Check that the bulb is not blackened. Check the lens for crazing and cracks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Landing and Taxi Lights Control Switch	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Cutler-Hammer	8820K10	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To permit the selection of the landing light and the taxi light or the taxi light only.

LOCATION

Front cockpit, LH console panel E10.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the switch to the panel using the lockwasher and locknut supplied.
Connect and secure the circuit wiring to the switch - five electrical connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the switch is securely fitted and that the circuit wiring is correctly and securely connected. Operate the switch and check that the action is not rough or sluggish.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Relay - Interlock, Landing and Taxi Lights	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To complete the electrical circuit to the taxi light when energized by the selection of the landing and taxi light switch to the taxi or land position.

LOCATION

Mounted on panel E6 located on roof of nose wheel well.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Locate and secure the relay to the panel - one mounting nut.
Connect the circuit wiring - four connections.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the relay is securely fitted to the panel. Check that the circuit wiring is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Relay - Interlock, Landing Light	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
CS-R-122			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To complete the electrical circuit to the landing light when energized by the selection of the landing and taxi light switch to the land position.

LOCATION

Mounted on panel E6 located on roof of nose wheel well.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Locate and secure the relay to the panel - four bolts.
Connect circuit wiring - five connections.

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the relay is securely fitted to the panel. Check that the circuit wiring is securely and properly connected.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Landing Light	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
AN-3129-4523	Jarry Hydraulics		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To illuminate the foreground while landing the aircraft.

LOCATION

Bottom of the nose leg.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

MEN X MINUTES

UNIT REPLACEMENT

Connect the circuit wiring to the lamp - two connections.
Locate and secure the cable-retaining ferrule nut in position.
Secure the lens in position - seven screws.
Position the unit correctly - one positioning bolt.
Secure the unit in the correct position - one bolt and nut.

LAMP REPLACEMENT

Fit the lamp retaining ring and rubber gasket.
Connect the circuit wiring to the lamp - two connections.
Locate and secure the cable-retaining ferrule nut.
Secure the lens in position - six screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely fitted to the nose leg assembly. Check the unit for corrosion and damage. Check that the lens is not cracked or chipped. Check that the cable-retaining ferrule nut is secured firmly.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	INTERNAL AND EXTERNAL LIGHTING	Taxi Light	11-13

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
G.E. 4523	Jarry Hydraulics		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To illuminate the foreground when landing or taxying the aircraft.

LOCATION

Bottom of the nose leg.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

UNIT REPLACEMENT

Connect the circuit wiring to the lamp - two connections.
Locate and secure the cable-retaining ferrule nut.
Secure lens in position - six screws.
Position the unit correctly - one positioning bolt.
Secure unit in the correct position - one bolt and nut.

LAMP REPLACEMENT

Fit the lamp retaining ring and rubber gasket.
Connect the circuit wiring to the lamp - two connections.
Locate and secure the cable-retaining ferrule nut.
Secure the lens in position - six screws.

MEN X MINUTES	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely fitted to the nose leg assembly. Check the unit for corrosion and damage. Check that the lens is not cracked or chipped. Check the electrical connections for security. Check that the cable-retaining ferrule nut is secured firmly.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 40

ELECTRONICS

POWER DISTRIBUTION

(This data supersedes previous issue dated 27 May 57)

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

ELECTRONICS

POWER DISTRIBUTION

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 Two main junction boxes, R1 and R2, are provided for the electronics equipment. JB R1 is a power distribution junction box and JB R2 is a circuit interconnection junction box. The information contained in this section provides a general reference for the circuits of these boxes.

JUNCTION BOX R1

2 Junction box R1 is located in the electronics equipment bay on the bulkhead at station 255 and contains the circuit breakers and fuses of the supply circuits for the electronic sub-systems. DC power at 28 volts and AC power at 115 volts and 26 volts is distributed from the box. The 28 volts DC and the 115 volts AC power is derived from E28 which is the main power panel of the electrical system. The 26 volts AC is derived from a 115/26 volt step-down transformer mounted on the outside of the box.

3 The electronic system DC and the 115 volts AC loads are divided into three groups. One group constitutes the main load, a second group constitutes the emergency load, and a third group constitutes the sheddable load. Under normal operating conditions, the main AC load requirements are supplied by the RH alternator as is also the emergency AC load. The sheddable AC load requirements are supplied by the LH alternator. In the event of the RH alternator failing, the supply line from the electrical system to the sheddable AC load is automatically disconnected and the LH alternator assumes the main AC load and the emergency AC load. If the LH alternator fails while supplying the main AC load and the emergency AC load, an emergency AC system assumes the emergency AC load. Note that if, when operating under normal conditions, the LH alternator fails, the sheddable load only is disconnected.

4 DC load requirements are supplied by two transformer-rectifier units, one LH and one RH, each of which rectifies a portion of the AC output of the appropriate LH or RH alternator. In the event of the LH or the RH alternator or transformer-rectifier unit failing, the sheddable DC load is disconnected to ensure that the total possible DC load demand cannot exceed the capacity of one transformer-rectifier unit. In the event of both alternators or transformer-rectifier units failing, the emergency DC load requirements are supplied by the battery.

5 The circuit breakers are grouped on the front panel of the junction box and each group is identified according to whether it constitutes the main, emergency or sheddable load. Individual circuit breakers are identified with the circuit they serve. All circuit breakers are the push-to-reset type and have their trip rating marked on the push button and also between the circuit terminals.

6 The step-down transformer of the 26 volts AC circuits derives its input from the 115 volts AC emergency line. Therefore, the transformer constitutes an emergency load and, under normal conditions, its input is derived from the RH or the LH alternator. In the event that both alternators fail, the input is derived from the emergency AC system. The 26 volt AC circuits are protected by fuses which are located in the lower edge of the junction box. The marking adjacent to each fuse identifies the system it serves.

7 The circuit breaker panel is illuminated by a flood light mounted on the forward face of the bulkhead at station 292. The associated light switch is located on the electronic equipment bay centre access door.

JUNCTION BOX R2 (Fig 2)

8 JB R2 is located on the forward face of the bulkhead at station 255 in the air conditioning bay and serves as the interconnecting point for the circuit wiring of the electronics sub-systems. It also serves as a relay panel.

9 Twelve terminal strips mounted inside the box, and thirteen AN type receptacles mounted on the sides, facilitate interconnection between electronics sub-system components. Where the number of connections to a single junction point exceeds four, two or more

terminal posts are connected together to form a bus-bar. Each terminal strip is numbered and the terminals in each strip are numbered. This method of identification enables terminals referenced on the routing diagrams to be easily located by giving the strip number and the number of the terminal as a two-figure reference e.g. 2-13 denotes terminal strip 2 terminal 13.

10 Mounted externally on the junction box are six relays type CS-R-1. These relays control the operation of the following circuits:

(a) Tow vehicle interphone - Item 41

(b) Starting vehicle interphone - Item 42

(c) UHF transmit control - Item 43

(d) Front cockpit RMI needle selector - Item 44

(e) Rear cockpit RMI needle selector - Item 45

(f) Ground interphone - Item 46

11 Relay identification numbers are marked both outside and inside the box.

DAMPER CIRCUIT BREAKER PANEL R8 (Fig 3)

12 The power supply for the damper system is distributed from panel R8 which derives AC and DC power supplies from the electronics system power distribution junction box R1.

13 Eight circuit breakers are mounted on the panel, of which four serve the normal damping system and four serve the emergency damping system. Each group of four circuit breakers is marked A, B, C and DC representing 115 volts AC 'A' phase, 'B' phase and 'C' phase supplies and DC supply. The normal damping DC supply is 28 volts, the emergency damping DC supply may be 28 volts or the battery voltage. The power circuits from the panel are connected to the function selector unit of the damper system. See Arrow 1 Service Data, Section 13, Flying Controls - Electrics.

14 The circuit breaker panel is illuminated by two panel lights which are operated by the front cockpit lights dimmer control.

TESTING AND SERVICING

GENERAL

15 Function testing of the circuits contained in the junction boxes is adequately covered during function testing of the electronics subsystems and the damping system. However, at the periods specified in the maintenance schedule, check the action of each circuit breaker and inspect the casing for signs of cracks and ruptures. In addition, check the fuses for signs of oxidization.

REMOVAL AND INSTALLATION

GENERAL

16 Removal of the units comprising the power distribution system is straightforward, consisting of disconnection of cables and removal of mounting or securing bolts. Where it is considered necessary, the procedure for removal and installation of various units is described in more detail.

17 As the equipment dealt with in this section contains electrical power supply wiring, the master electrical switch in the front cockpit must be switched off before removal and installation operations are carried out. Where the removal operation entails disconnection of circuit wiring, the bare ends of the wires must be taped when disconnected to avoid accidental short circuits between wires or between wires and ground.

18 Access to junction box R1 is gained by lowering the electronic equipment bay centre access door which is hinged at the aft end to open outwards and secured by 33 camloc fasteners. One fastener, clearly marked, must be released last and secured first. The door is lowered and raised by means of an electric motor actuator which is controlled by a switch located adjacent to the door. Access to the switch is gained by releasing two camloc fasteners securing an access flap.

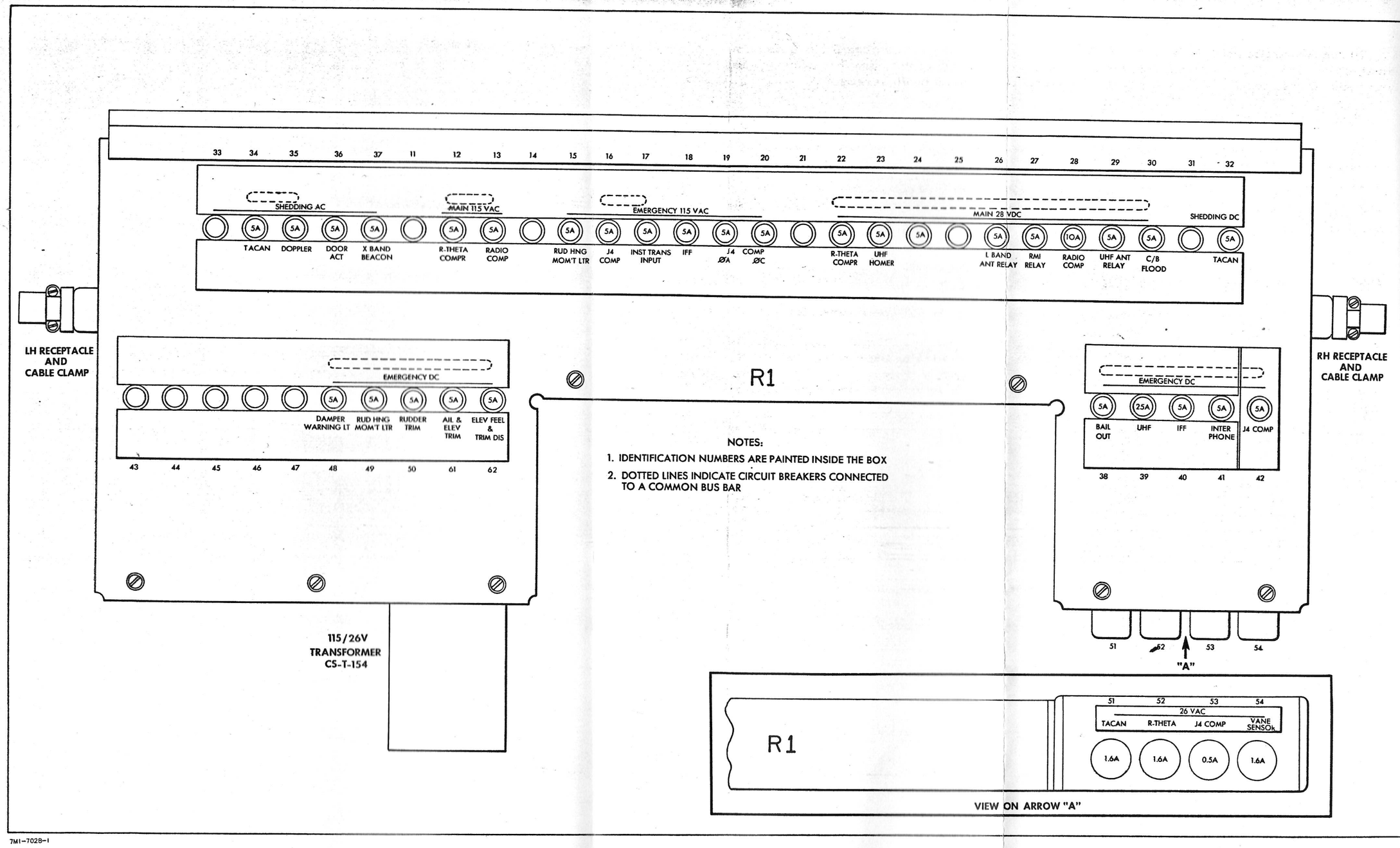

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FIG. 1 JUNCTION BOX R1

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JUNCTION BOX R1 - REMOVAL

19 To remove junction box R1 from the bulkhead at station 255 in the electronic equipment bay proceed as follows:

(a) Open the lid of the junction box.

(b) Release the cable clamps holding the cables at the two AN type receptacles on the sides of the box.

(c) Disconnect the circuit wiring from the terminal strips inside the box.

(d) Carefully withdraw the wires through the receptacles and tape the bare ends.

(e) Remove six mounting screws and detach the junction box from the bulkhead.

JUNCTION BOX R1 - INSTALLATION

20 The procedure for installing junction box R1 is the reverse to that given for removal.

JUNCTION BOX R2 - REMOVAL

21 Access to junction box R2 is gained by releasing the air conditioning bay access panel which is secured by 76 screws.

22 To remove junction box R2 from the forward face of the bulkhead at station 255 in the air conditioning bay proceed as follows:

(a) Disconnect the antenna cable assembly R1102-2 at the L-Band antenna.

(b) Remove the lid of the junction box by releasing 12 camloc fasteners.

(c) Disconnect 13 AN type connectors.

(d) Release the cable clamps holding the cables at the two AN type receptacles.

(e) Disconnect the circuit wiring from the terminal strips inside the box.

(f) Carefully withdraw the wires through the AN type receptacles and tape the bare ends.

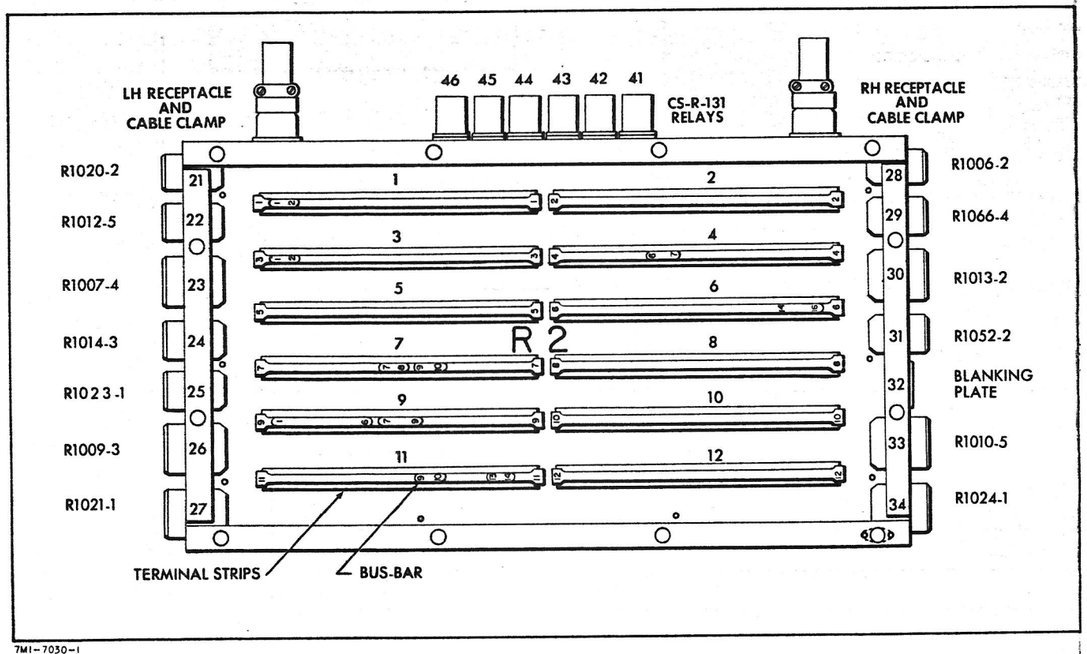

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FIG. 2 JUNCTION BOX R2

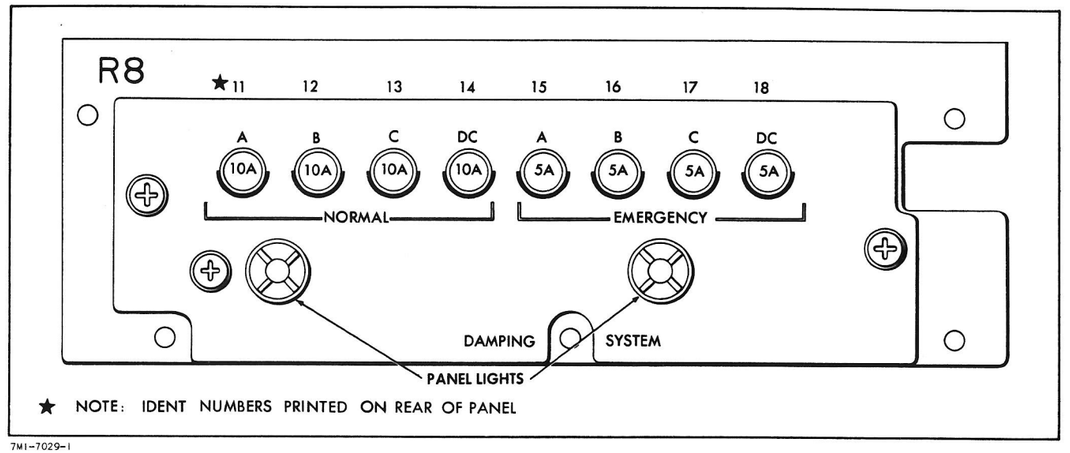

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FIG. 3 DAMPER CIRCUIT BREAKER PANEL R8

(g) Remove 12 mounting screws and detach the junction box from the bulkhead.

JUNCTION BOX R2 - INSTALLATION

23 The procedure for installing junction box R2 is the reverse to that given for removal.

DAMPER CIRCUIT BREAKER PANEL R8 - REMOVAL

24 Access to the damper circuit breaker panel R8 on the left hand console in the front cockpit is unobstructed.

25 To remove the damper circuit breaker panel proceed as follows:

(a) Remove three mounting screws and detach the panel from the console.

(b) Disconnect the connector R1068-1 from the receptacle on the panel.

(c) Disconnect the connector R8-1 from the receptacle on the cockpit floor.

(d) Remove the panel from the console.

DAMPER CIRCUIT BREAKER PANEL R8 - INSTALLATION

26 The procedure for installing the damper circuit breaker panel is the reverse to that given for removal.

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ARROW 1 SERVICE DATA

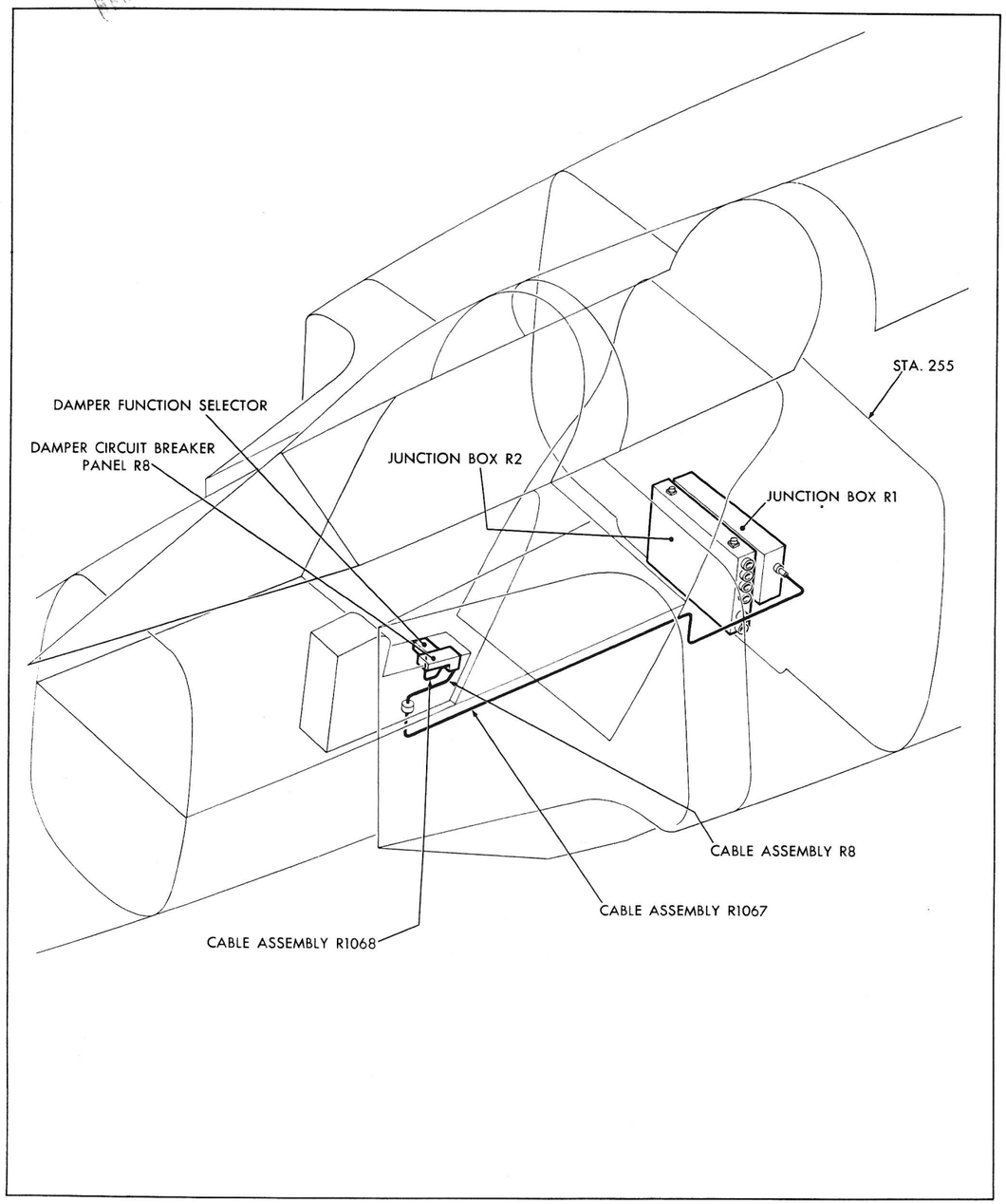

FIG. 4 LOCATION OF EQUIPMENT POWER DISTRIBUTION

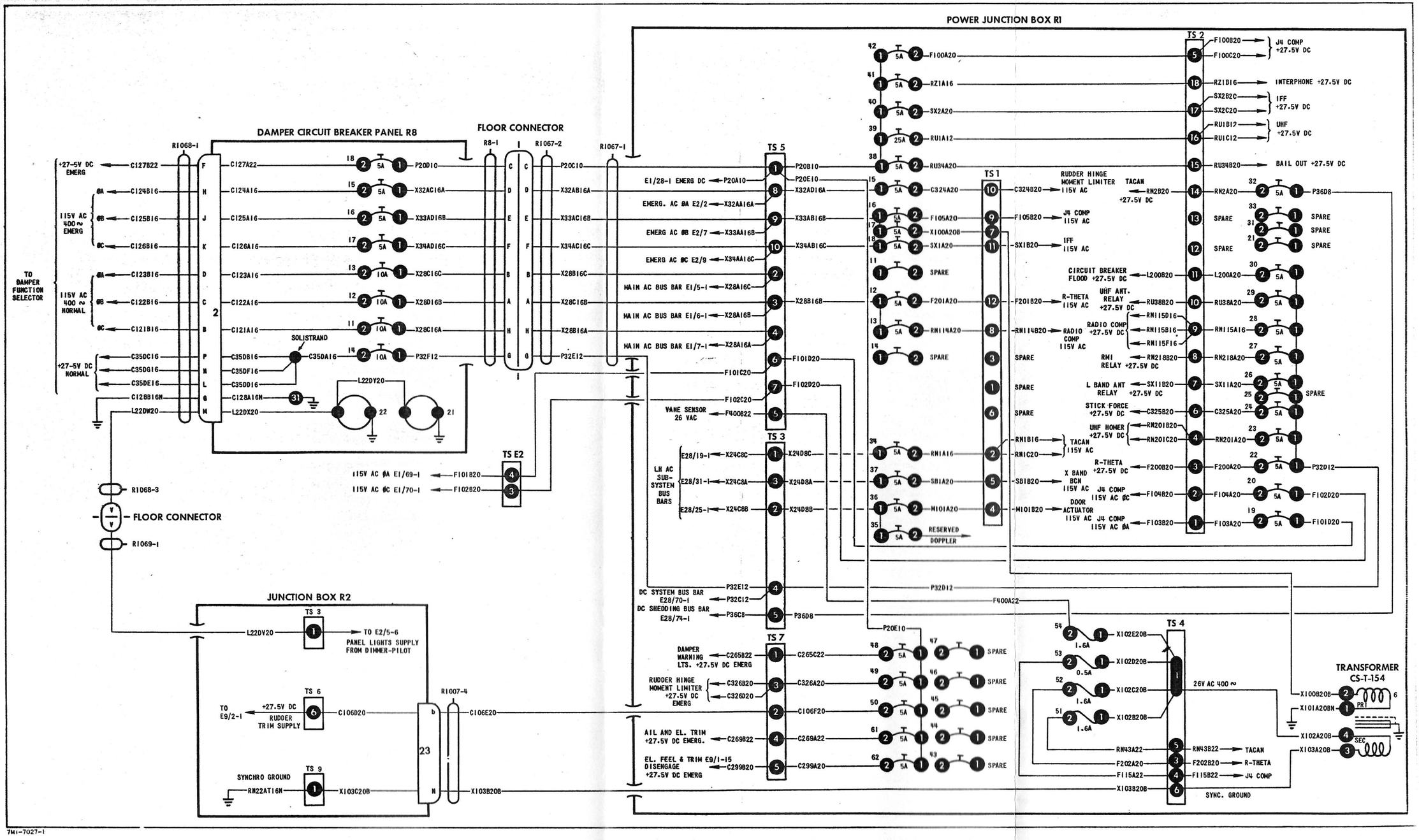

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FIG. 5 POWER DISTRIBUTION

ARROW 1 SERVICE DATA

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EQUIPMENT LIST

COMPONENTS

PART NO.	MANUFACTURER	NOMENCLATURE	UNITS PER ASSEMBLY
7-1354-43	Avro Aircraft Ltd.	Junction Box R1 - Complete	1
AN3436-2-12		Terminal Strip	1
AN3436-2-18		Terminal Strip	1
AN3436-4-5		Terminal Strip	1
AN3436-2-6		Terminal Strip	1
AN3436-4-10		Terminal Strip	1
AN3436-2-10		Terminal Strip	1
MS25017-5		Circuit Breaker 5 amp	29
MS25017-10		Circuit Breaker 10 amp	2
MS25017-25		Circuit Breaker 25 amp	1
CS-T-154		Transformer 115/26V	1
442006	Littelfuse	Fuse Holder	4
41301-6	Littelfuse	Fuse 1.6 amp	3
413-500	Littelfuse	Fuse 0.5 amp	1
7-1352-11	Avro Aircraft Ltd.	Junction Box R2 - Complete	1
AN3436-2-15		Terminal Strip	12
CS-R-131		Relay	6
CS-C-3102E 22-14S		Connector	1
CS-C-3102E 22-14SW		Connector	1
CS-C-3102E 28-15P		Connector	1

ARROW 1 SERVICE DATA

UNCLASSIFIED

COMPONENTS (Cont'd)

PART NO.	MANUFACTURER	NOMENCLATURE	UNITS PER ASSEMBLY
CS-C-3102E 22-19P		Connector	1
CS-C-3102E 22-19SW		Connector	1
CS-C-3102E 28-21S		Connector	1
CS-C-3102E 28-12S		Connector	1
CS-C-3102E 22-14SX		Connector	1
CS-C-3102E 22-14SY		Connector	1
CS-C-3102 28-21SW		Connector	1
CS-C-3102E 22-14SZ		Connector	1
CS-C-3102E 28-21PX		Connector	1
CS-C-3102E 28-15PW		Connector	1
7-1252-259	Avro Aircraft Ltd.	Damper Circuit Breaker Panel R8 - Complete	1
CS-C-3106E 2-8-1S		Connector	1
CS-C-3102E 22-19S		Connector	1
MP-703C	Littelfuse	Circuit Breaker	4
MP-701C	Littelfuse	Circuit Breaker	4
MS 25010-3A		Light	2
CS-T-137-11		Ground Stud	1

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LIST OF CABLE ASSEMBLIES

CABLE ASSEMBLY	PART NO.	LOCATION REFERENCE	
		SUB-SYSTEM	SECTION
R173	CG-131/ARN-6	Radio Compass AN/ARN-6	41
R1005	7-1350-15	UHF Homer Adaptor AN/ARA-25	43
R1006	7-1350-16	UHF Homer Adaptor AN/ARA-25	43
R1007	7-1350-17	UHF Homer Adaptor AN/ARA-25	43
		UHF Command Radio AN/ARC-34	44
		IFF AN/APX-6A	45
		Interphone AN/AIC-10	46
		J4 Gyrosyn Compass	47
R1008	7-1350-18	J4 Gyrosyn Compass	47
R1009	7-1350-19	J4 Gyrosyn Compass	47
		Radio Compass AN/ARN-6	41
		UHF Homer Adaptor AN/ARA-25	43
R1010	7-1350-21	UHF Homer Adaptor AN/ARA-25	43
		UHF Command Radio AN/ARC-34	44
		Interphone System AN/AIC-10	46
R1011	7-1350-22	Interphone System AN/AIC-10	46
R1012	7-1350-23	Radio Compass AN/ARN-6	41
R1013	7-1350-24	Radio Compass AN/ARN-6	41
		X-Band Beacon	42
		J4 Gyrosyn Compass	47
R1014	7-1350-25	Provision for Tacan AN/ARN-21	
R1015	7-1350-26	Provision for Tacan AN/ARN-21	
R1016	7-1350-27	Electronic equipment bay door actuator	

ARROW 1 SERVICE DATA

LIST OF CABLE ASSEMBLIES (Cont'd)

CABLE ASSEMBLY	PART NO.	LOCATION REFERENCE	
		SUB-SYSTEM	SECTION
R1017	7-1350-28	Interphone AN/AIC-10	46
R1018	7-1350-29	UHF Command Radio AN/ARC-34	44
R1019	7-1350-31	Interphone AN/AIC-10	46
R1020	7-1350-32	Interphone AN/AIC-10	46
R1021	7-1350-33	Provision for Tacan AN/ARN-21	
R1022	7-1350-34	Electronic equipment bay door actuator	
R1023	7-1350-35	Provision for Tacan AN/ARN-21	
R1024	7-1350-36	J4 Gyrosyn Compass	47
R1025	7-1350-37	UHF Command Radio AN/ARC-34	44
R1026	7-1350-38	Electronic equipment bay door actuator	
R1027	7-1350-123	Radio Compass AN/ARN-6	41
R1028	7-1350-41	J4 Gyrosyn Compass	47
R1029	7-1350-42	Radio Compass AN/ARN-6	41
R1030	7-1352-49	Provision for R-Theta	
R1031	7-1352-51	Provision for R-Theta	
R1032	7-1352-52	Provision for Tacan AN/ARN-21	
R1033	7-1352-53	Radio Compass AN/ARN-6	41
		UHF Homer Adaptor AN/ARA-25	43
R1034	7-1352-54	UHF Command Radio AN/ARC-34	44
R1035	7-1352-55	UHF Command Radio AN/ARC-34	44
		UHF Homer Adaptor AN/ARA-25	43
		J4 Gyrosyn Compass	47
R1036	7-1352-56	Interphone AN/AIC-10	46

ARROW 1 SERVICE DATA

LIST OF CABLE ASSEMBLIES (Cont'd)

CABLE ASSEMBLY	PART NO.	LOCATION REFERENCE	
		SUB-SYSTEM	SECTION
R1037	7-1352-57	Interphone AN/AIC-10	46
R1038	7-1352-58	Radio Compass AN/ARN-6	41
R1039	7-1352-59	J4 Gyrosyn Compass	47
R1040	7-1352-61	IFF AN/APX-6A	45
R1041	7-1352-62	Radio Compass AN/ARN-6	41
		UHF Homer Adaptor AN/ARA-25	43
R1042	7-1352-63	Provision for Tacan AN/ARN-21	
R1043	7-1352-64	Provision for Tacan AN/ARN-21	
R1044	7-1352-65	UHF Homer Adaptor AN/ARA-25	43
		IFF AN/APX-6A	45
		Interphone AN/AIC-10	46
R1045	7-1352-66	Radio Compass AN/ARN-6	41
R1046	7-1352-67	Provision for R-Theta	
R1047	7-1352-68	Provision for R-Theta	
R1048	7-1352-69	Interphone AN/AIC-10	46
R1049	7-1352-71	Interphone AN/AIC-10	46
R1050	7-1360-11	Radio Compass AN/ARN-6	41
		X-Band Beacon	42
		J4 Gyrosyn Compass	47
R1052	7-1350-45	J4 Gyrosyn Compass	47
		UHF Homer Adaptor AN/ARA-25	43
		Radio Compass AN/ARN-6	41
R1053	7-1360-12	X-Band Beacon	42

ARROW 1 SERVICE DATA

LIST OF CABLE ASSEMBLIES (Cont'd)

CABLE ASSEMBLY	PART NO.	LOCATION REFERENCE	
		SUB-SYSTEM	SECTION
R1054	7-1360-46	IFF AN/APX-6A	45
R1055	7-1350-47	Interphone AN/AIC-10	46
R1056	7-1350-48	IFF AN/APX-6A	45
R1101	7-1350-51	Provision for Tacan AN/ARN-21	
R1102	7-1350-52	IFF AN/APX-6A	45
R1103	7-1350-53	IFF AN/APX-6A	45
R1104	7-1350-54	IFF AN/APX-6A	45
R1105	7-1350-55	IFF AN/APX-6A	45
R1106	7-1360-13	IFF AN/APX-6A	45
		UHF Command Radio AN/ARC-34	44
R1107	7-1383-83	UHF Command Radio AN/ARC-34	44
		IFF AN/APX-6A	45
R1108	7-1350-128	Radio Compass AN/ARN-6	41
R1109	7-1350-129	Radio Compass AN/ARN-6	41
R1110	7-1350-46	Radio Compass AN/ARN-6	41
R1111	7-1360-15	Radio Compass AN/ARN-6	41
R1112	7-1350-58	UHF Homer Adaptor AN/ARA-25	43
R1113	7-1350-59	UHF Homer Adaptor AN/ARA-25	43
		UHF Command Radio AN/ARC-34	44
R1114	7-1350-61	UHF Homer Adaptor AN/ARA-25	43
		UHF Command Radio AN/ARC-34	44
R1115	7-1350-62	UHF Command Radio AN/ARC-34	44
R1116	7-1350-63	UHF Command Radio AN/ARC-34	44

ARROW 1 SERVICE DATA

LIST OF CABLE ASSEMBLIES (Cont'd)

CABLE ASSEMBLY	PART NO.	LOCATION REFERENCE	
		SUB-SYSTEM	SECTION
R1117	7-1350-64	UHF Command Radio AN/ARC-34	44
R1118	7-1360-16	UHF Command Radio AN/ARC-34	44
R1119	7-1383-81	UHF Command Radio AN/ARC-34	44
R1120	7-1360-17	X-Band Beacon	42
R1122	7-1350-66	UHF Homer Adaptor AN/ARA-25	43

ARROW 1 SERVICE DATA

SECTION 41

ELECTRONICS

RADIO COMPASS AN/ARN-6

(This data supersedes previous issue dated 28 May 57)

CONFIDENTIAL

ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

ELECTRONICS

RADIO COMPASS AN/ARN-6

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The Radio Compass System AN/ARN-6 automatically, or manually, determines the bearing, relative to the aircraft, of radio broadcast and radio range stations. The bearing information can be used as a navigational aid or for homing purposes. In addition, the system can be used as a radio communications receiver for the reception of weather reports or other flight information.

2 The system consists of the following component units:

(a) Receiver R-101A/ARN-6 (Modified to Avro Dwg. 7-1354-162).

(b) Receiver Mounting MT273E/ARN-6 (Modified to Avro Dwg. 7-1354-105).

(c) Control Panel Type C1513/A (2).

(d) Loop Antenna Bendix No. LPA-6A.

(e) Sense Antenna.

(f) Sense Antenna Susceptiformer (Avro Part No. 7-1362-47).

(g) Course Indicator (DUAL) RMI Type ID-250/ARN (2).

(h) Tuning Drive and Amplifier ED400A.

3 The frequency range of the system is 100 Kc/s to 1750 Kc/s, covered in four bands as follows:

Band 1,	100-200 Kc/s
Band 2,	200-410 Kc/s
Band 3,	410-850 Kc/s
Band 4,	850-1750 Kc/s

RECEIVER R-101A/ARN-6

4 The radio compass receiver, located on the electronic equipment bay centre access door, is a conventional superheterodyne receiver with additional circuit elements which permit the reception of CW transmissions. The input coil (L103) of the receiver is modified to facilitate sense antenna impedance matching. Circuitry is incorporated in the receiver to orient the loop antenna during automatic compass operation. A recess in the front panel houses receptacles for the loop and sense antennas, a ground connector and the tuning drive coupling. The circuit wiring is brought out to the contacts of a male connector strip fitted to a recess in the rear panel. Plate voltage is provided by a vibrator circuit and a spare vibrator is attached to the top cover of the receiver.

RECEIVER MOUNTING MT273E/ARN-6

5 The receiver is mounted on a shock absorbing mounting which serves also as a junction box. A female connector strip fitted at the rear of the mounting mates with the male connector on the receiver when the receiver is installed. Terminal strips in the base of the mounting facilitate the interconnection of the receiver with the other components of the system. The mounting is modified to facilitate sense antenna impedance matching on all frequency bands. Wiring alterations introduced by the modification are shown on a label located under the terminal strips. A relay incorporated in the mounting permits control of the system to be transferred from one to the other of two control panels, one of which is located in each cockpit.

CONTROL PANELS C1513/A (Fig 2)

6 Each control panel incorporates a five-position function selector switch, a loop switch, a CW/VOICE switch, a waveband switch, a tuning control and a volume control.

7 The function selector switch is marked OFF-COMP-ANT-LOOP-CONT. Control of the system is gained by selecting the switch to the spring-loaded CONT (control) position. This energizes the transfer relay in the receiver mounting which transfers the control circuits onto the selected panel. The illumination of the control panel dial light indicates that the panel is operative.

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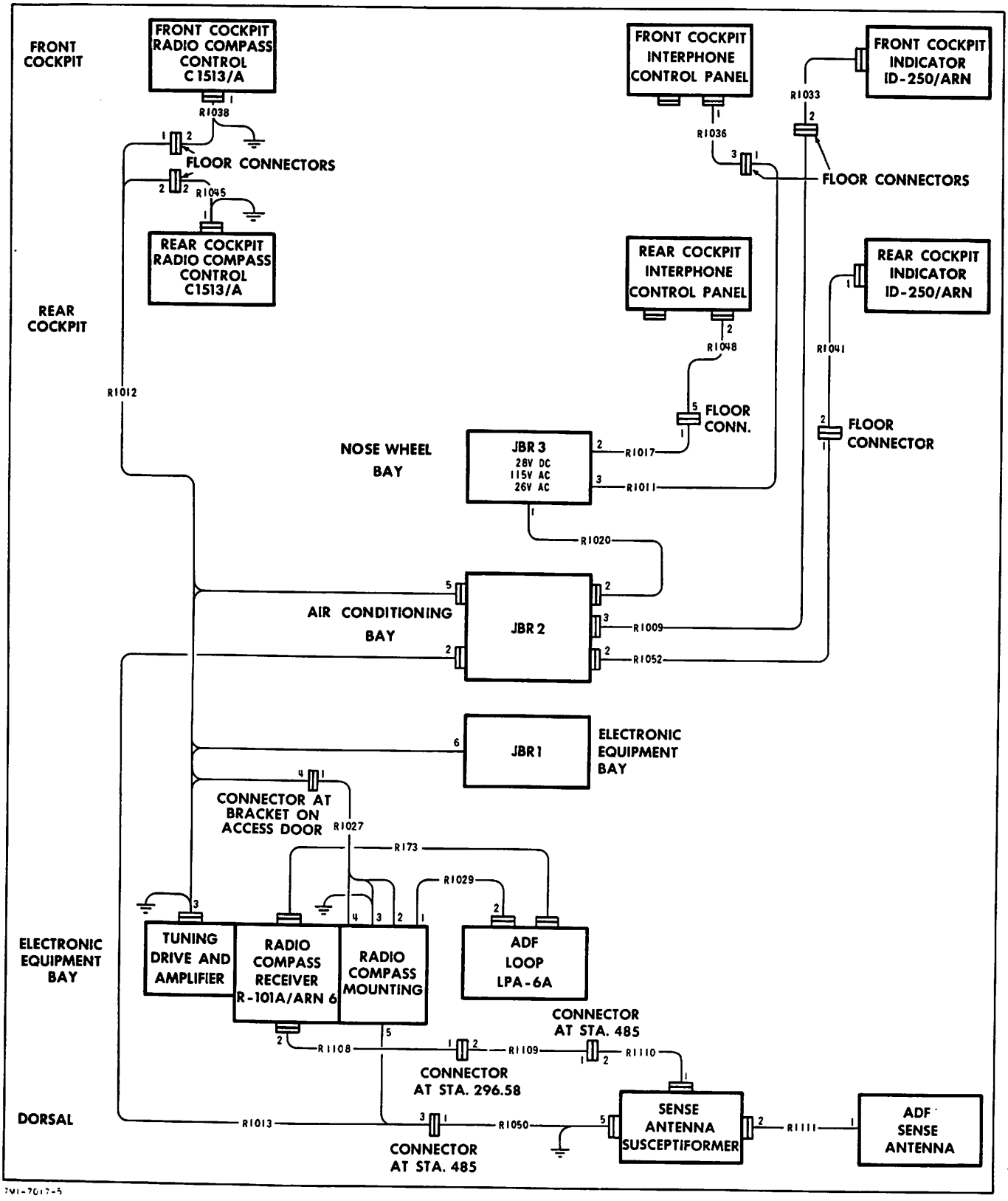

FIG. 1 RADIO COMPASS SYSTEM AN/ARN-6 - GENERAL ARRANGEMENT

ARROW 1 SERVICE DATA

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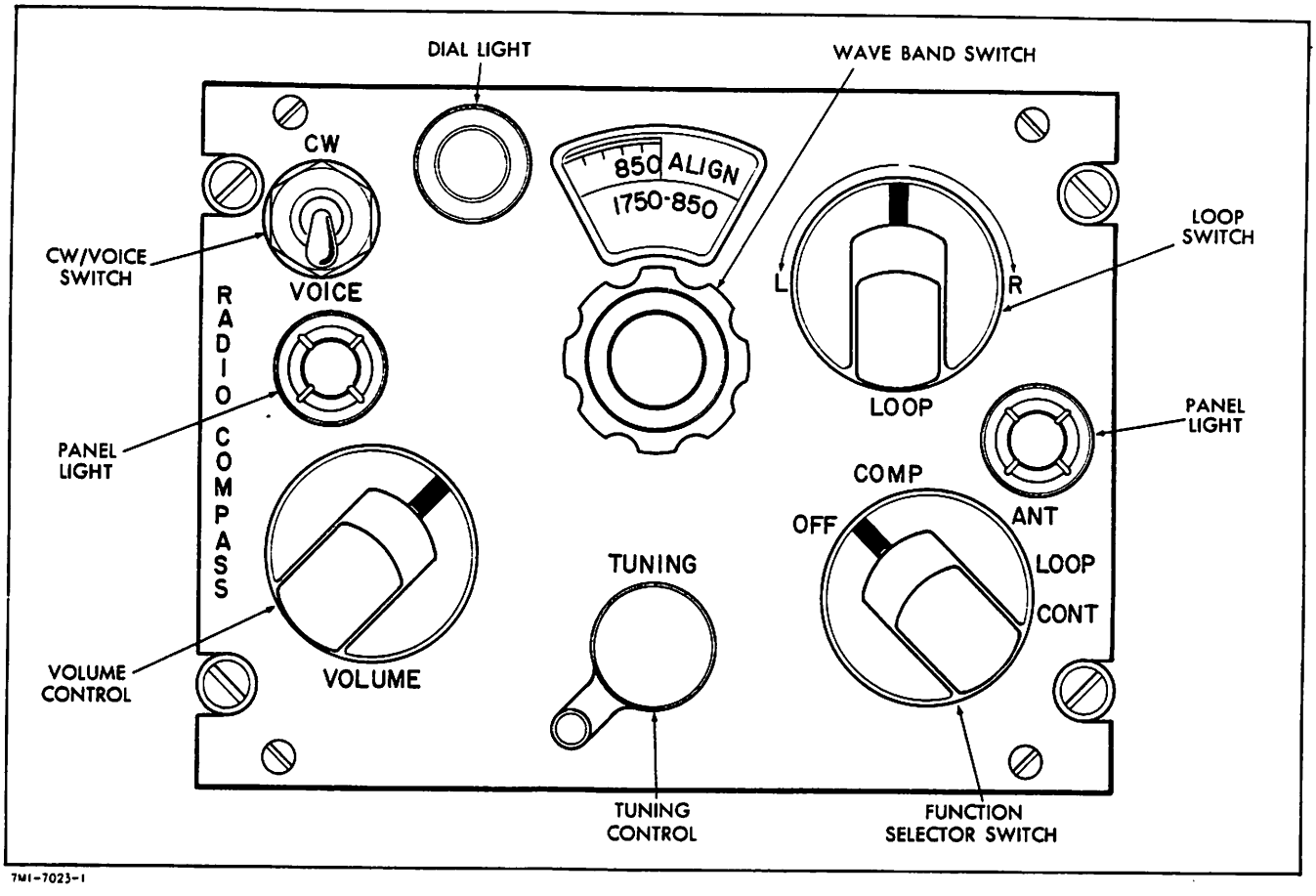

FIG. 2 CONTROL PANEL C1513/A

8 When the function selector switch is selected to the COMP (compass) position the bearing, relative to the aircraft, of the selected transmission point is indicated automatically and continuously on two course indicators, one of which is located in each cockpit. When the ANT (antenna) position is selected, broadcast transmissions can be received in the headsets provided that the COMP mixing switch on the interphone control panel is selected on. Selecting the LOOP position permits the orientation of the loop antenna using the loop switch which is marked L-R (left-right). This enables bearings to be determined aurally. The orientation of the loop is indicated on the course indicators.

9 The CW/VOICE switch when selected to CW completes circuitry which permits the reception of CW transmissions.

10 The four-position waveband switch, when operated, energizes a motor in the receiver which positions a bandswitch mechanism to the selected frequency band. Remote tuning of the receiver is accomplished electrically by means of a tuning drive and amplifier type ED400A fitted on the receiver.

TUNING DRIVE AND AMPLIFIER ED400A (Fig 3)

11 The tuning drive and amplifier unit consists of an electromechanical servo system which positions the receiver tuning capacitor to correspond with the dial position set manually by means of the tuning control on the radio compass control panel.

12 The unit consists of a DC motor with split field control, a potentiometer balancing network and an electronic amplifier.

13 The DC motor rotates the radio compass receiver tuning capacitor and, via a

UNCLASSIFIED

reduction gearing, the wiper arm of a potentiometer in the tuning drive. The potentiometer forms one segment of a balancing network and a similar potentiometer in the control panel forms the other segment of the balancing network. The wiper arm of the control panel potentiometer is mechanically coupled through gearing to the tuning control crank, and electrically connected to the input of the first amplifier circuit in the tuning drive amplifier. When the wiper arms of both potentiometers are in the same angular position, the balancing network will be in balance.

14 Operating the tuning control crank upsets the balance of the network. This results in a signal appearing at the input to the first amplifier circuit. The signal is amplified and passes through a phase sensitive demodulator circuit to a power amplifier circuit, the output of which is fed to the field windings of the tuning motor. The resultant differential field current causes the motor to rotate in a direction corresponding with the phase of the input signal so driving the wiper arm of the potentiometer at the receiver. This action restores the balance of the circuit and the motor ceases to rotate, at which point the tuning capacitor is aligned with the tuning point set manually on the control panel.

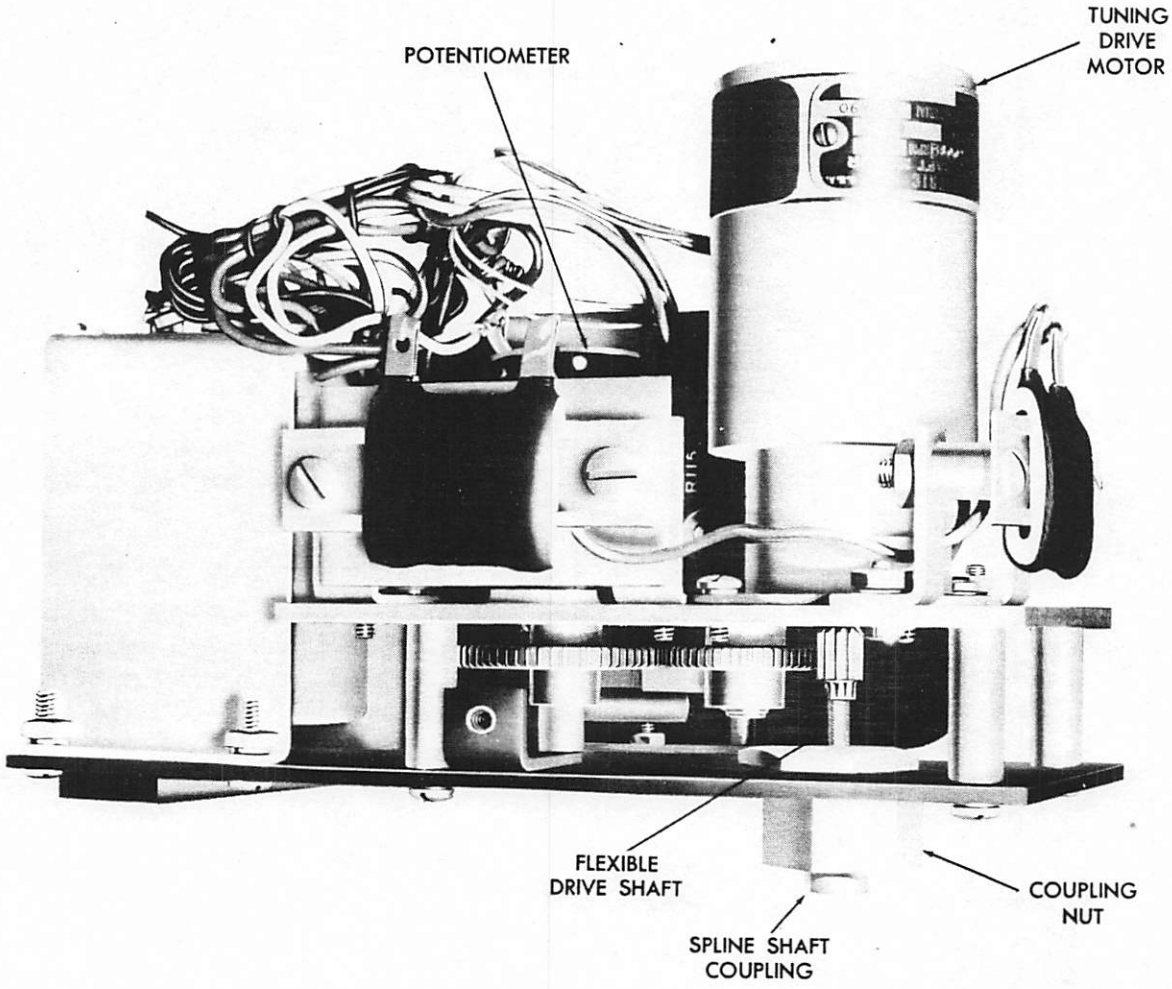

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FIG. 3 TUNING DRIVE AND AMPLIFIER ED400A

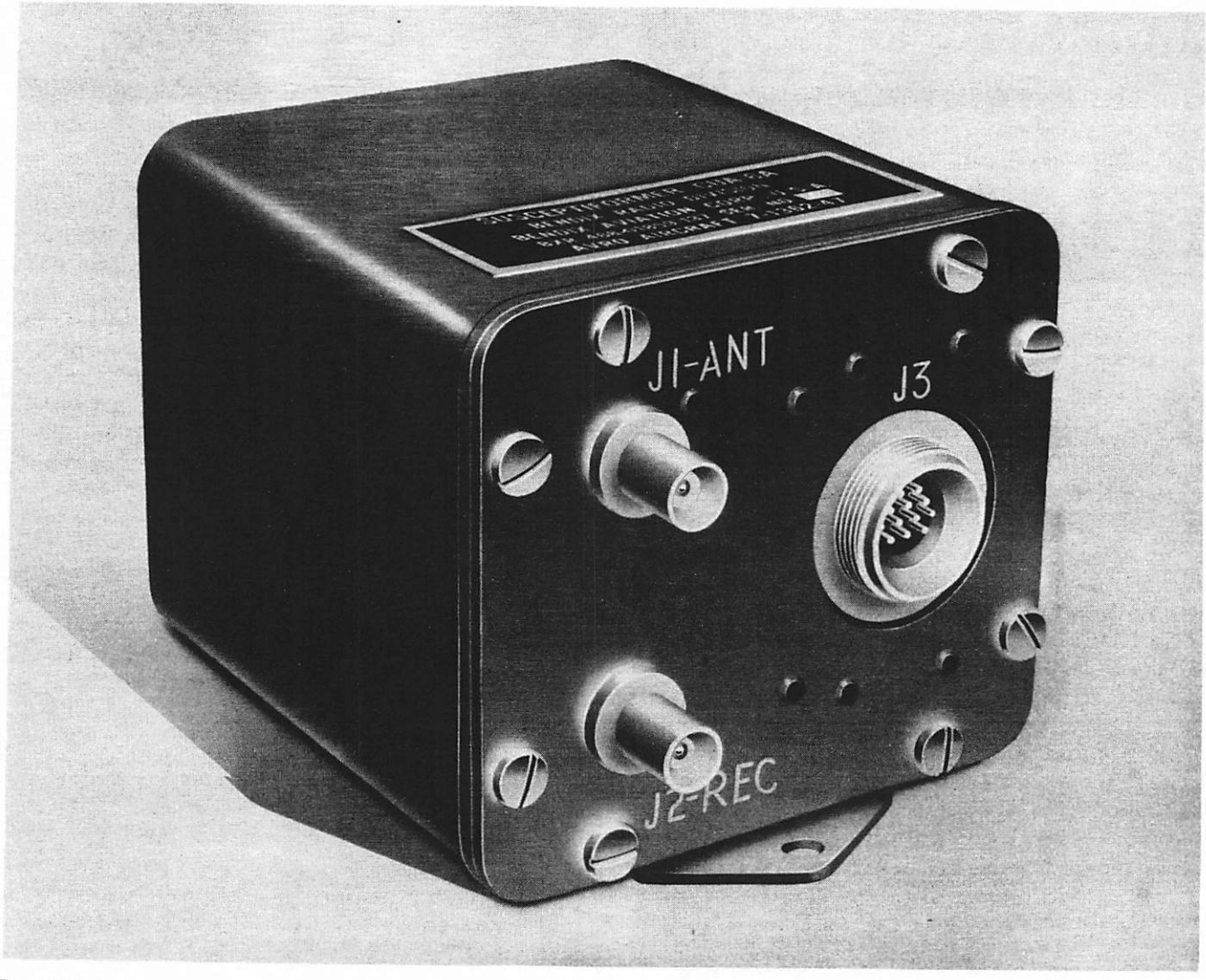

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FIG. 4 SENSE ANTENNA SUSCEPTIFORMER

LOOP ANTENNA LPA-6A AND
SENSE ANTENNA

15 Two antennas are provided for the system, a loop antenna which is directional and a sense antenna which is non-directional. The antennas are used separately or in conjunction with each other depending upon the type of operation selected.

16 The loop antenna, flush mounted in the electronic equipment bay centre access door, is used for aural directional reception i.e. LOOP operation. The sense antenna which is a flat plate type antenna located in the aft dorsal fairing, is used for normal radio communications reception i.e. ANT operation. Both antennas are used for automatic compass (COMP) operation i.e. continuous bearing indication of a selected transmission point.

17 Correction for quadrantal error, i.e. errors which could be introduced due to the distortion of the radio waves by the metallic structure of the aircraft, is achieved by adjusting the length of ferrite bars in the loop assembly. The correct length of the bars is determined experimentally and once set should not require further adjustment.

18 Due to the greater than normal length of cable necessary to connect the sense antenna

to the receiver input, a sense antenna susceptiformer which is effective on all frequency bands, is provided to match the sense antenna to the input impedance of the radio compass receiver.

19 The susceptiformer consists of four impedance matching transformers one of which is provided for each waveband, a bandswitching relay, a dummy sense antenna and a dummy sense antenna switching relay. The radio compass receiver and mounting are modified to provide proper termination for the matching transformer secondaries and to incorporate the components into the bandswitching circuit. The modification to the receiver also disconnects the existing dummy sense antenna and IF trap from the receiver sense antenna channel. The dummy sense antenna in the susceptiformer unit is brought into circuit by the dummy sense antenna switching relay which is actuated when the function selector switch on the control panel is selected to LOOP.

AUTOMATIC COMPASS OPERATION

20 Continuous bearing indication of a selected transmission point is obtained by selecting the COMP position on the function selector switch of the control panel in use. This results in signal voltages from the transmission point being induced in the sense antenna, and the loop if it is not orientated to the transmission point. The voltage induced in the loop will, in that event, be out of phase with the voltage induced in the sense antenna and will lead or lag according to which side of the loop is nearer to the transmission point. This effect is used to activate the loop drive motor which will rotate the loop until it is orientated to the transmission point. In this position, the voltage induced in the loop is zero, and the drive motor becomes inactive.

21 The orientation of the loop coil is relayed to course indicators by an autosyn transmitter connected to the loop coil. The radio magnetic course indicators type ID-250/ARN, one of which is provided in each cockpit, are dual reading instruments with two indicating needles. The narrow needle operates in conjunction with the Radio Compass system and the broad needle operates in conjunction with the UHF Homer system.

LOOP OPERATION

22 The bearing of the transmission point can be determined aurally, by selecting the LOOP position on the function selector switch and rotating the loop by means of the spring-loaded LOOP L/R switch to a null point, i.e. a position where minimum signals are received. If the loop is rotated through 360 degrees, minimum signals will be received at two positions 180 degrees apart. Selecting the system to automatic compass operation will determine which of these is the true null point as opposed to the reciprocal. Re-selecting the function selector switch to LOOP and rotating the loop enables a more accurate bearing to be determined. The orientation of the loop is transmitted continuously to the remote indicators.

23 Selecting the function selector switch to LOOP prevents operation of the automatic compass and cuts out the sense antenna signals. The COMP mixing switch on the interphone system AN/AIC-10 control panel must be selected on for aural reception.

ANTENNA OPERATION

24 Antenna operation provides for the reception of radio communication signals. Selecting the function selector switch to ANT prevents operation of the automatic compass and cuts out the loop circuits. Signals are received by the sense antenna and fed to a superheterodyne circuit. The COMP mixing switch on the interphone system AN/AIC-10 control panel must be switched on for aural reception.

SYSTEM POWER REQUIREMENTS

25 The radio compass system operates on 27.5 volts DC with an input current of 4 amps, and 115 volts 400 cps AC at 0.5 amps. The course indicators and the loop antenna require a 26 volts 400 cps AC supply.

TESTING AND SERVICING

GENERAL

26 Function testing of the AN/ARN-6 radio compass system should be carried out at the periods specified in the Maintenance Schedule, and after replacing or repairing any part of the system.

27 Special items of test equipment are not required to carry out the function test.

28 To provide data for assessing the performance of the equipment, a log should be kept of frequencies, signal strength and time of receipt, and the identity of transmitting stations on which bearings are taken during function testing.

ALIGNMENT OF RADIO COMPASS RECEIVER AND TUNING DRIVE

29 The radio compass receiver tuning mechanism is aligned prior to installing the equipment in the aircraft. If the system requires re-alignment, the receiver and tuning drive must be removed from the aircraft. The alignment procedure following is provided for reference:

(a) Detach the tuning drive amplifier from the radio compass receiver.

(b) Remove the cover from the receiver.

(c) Manually rotate the receiver tuning capacitor fully counterclockwise and check that the capacitor vanes are fully meshed.

(d) Refit the cover to the receiver.

(e) Connect the electrical cable assembly between a spare control panel and the tuning drive amplifier.

(f) Switch on the power supply and set the tuning dial on the control panel to the ALIGN mark on the 850 Kc/s to 1750 Kc/s (band 4) tuning scale. The shaft of the tuning drive motor will correctly position itself with respect to the ALIGN mark during this operation.

(g) Switch off the power supply.

(h) Remove the cover of the tuning drive amplifier.

(j) Attach the tuning drive amplifier to the receiver, coupling the shaft of the tuning drive motor to the tuning capacitor drive spindle.

(k) Refit the cover to the tuning drive amplifier.

(m) Switch on the power supplies.

(n) Tune in a station of known frequency, approaching the known frequency from both the right and the left side of the dial, and compare the dial reading with the frequency of the known station.

(p) Check dial alignment by tuning-in two other stations of known frequency. Repeat this check on more than one waveband.

(q) Refit the equipment in the aircraft.

PREPARATION FOR TESTING

30 Prior to carrying out function tests proceed as follows:

(a) Position the aircraft at a distance of at least 500 feet from buildings, power lines, railroad tracks and other sources of interference or distortion.

(b) Connect an external 115V AC three phase power supply to the aircraft.

FUNCTION TESTING PROCEDURE

31 As the system is a dual installation, two operators, one in each cockpit, will facilitate testing. The procedure is as follows:

(a) Select to ON the master electrical switch in the front cockpit.

(b) Plug a headset type H-70/AIC and a microphone M-33/AIC-10, or equivalents, into the quick-release connector on each cockpit seat.

(c) Switch on the COMP mixing switch on the interphone control panel in each cockpit and set the volume control on each panel to the 12 o'clock position.

(d) Select the function selector switch on the radio compass control panel in the rear cockpit to COMP.

(e) Check that control of the system is on this panel by observing that the dial light is illuminated. If the dial light is not illuminated

select the function selector switch to the CONT position to gain control of the system. The dial light should illuminate.

(f) Allow at least two minutes for the equipment to warm up.

(g) Select the function selector switch to ANT, the CW/VOICE switch to VOICE and turn the volume control fully clockwise.

(h) Tune in a station of known frequency, approaching the known frequency from both the right and the left side of the dial; compare the dial reading with the frequency of the known station.

(j) Check dial alignment by tuning-in two other stations of known frequency. Repeat this check on more than one waveband.

(k) Transfer control to the radio compass control panel in the front cockpit and repeat operations (g), (h) and (j). Check that both tuning dials agree.

(m) Transfer control to the radio compass control panel in the rear cockpit.

(n) Tune in at least two stations on each waveband, in turn. Check the operation of the waveband switch, volume control and tuning crank.

(p) Select the CW/VOICE switch to CW and check that an audio tone is heard which varies in frequency as a station is tuned in. Check the operation of the CW/VOICE switch several times.

(q) Select the function selector switch to COMP, and check that the narrow needle of the indicator type ID-250 in each cockpit indicates a definite bearing when two or three stations are tuned in. Check that the indicator in the front cockpit agrees within ± 2-1/2 degrees with the indicator in the rear cockpit.

(r) Select the CW/VOICE switch to CW and check that a 900 cps tone is heard which does not vary with tuning.

(s) Tune in a station of known bearing relative to the aircraft and check that the indicators register the direction of the transmission point within ± 2-1/2 degrees. Check that the indicator needle does not oscillate more than 4 degrees about the bearing position.

(t) Select the function selector switch to LOOP and tune in at least two stations on each waveband in turn. Operate the LOOP L/R switch to turn the loop for aural directional reception. Check that minimum signals are heard when the indicator is on the bearing of the transmission point. Rotate the loop using the LOOP L/R switch and check that the indicator in each cockpit follows the movement of the loop smoothly.

(u) Check that the LOOP L/R switch rotates the loop through 175 degrees in less than seven seconds with the switch held fully over to one side, and in approximately one minute with a small movement of the switch.

(v) Rotate the loop to the loop scale bearings shown in the deviation correction calibration chart for the aircraft and check that for each bearing the rear cockpit indicator agrees within ± 2-1/2 degrees with the compensator corrected bearing shown in the chart.

(w) Check that the indicator in the front cockpit agrees with the indicator in the rear cockpit within ± 2-1/2 degrees at each bearing.

(x) Transfer control to the radio compass control panel in the front cockpit and repeat operations (n) through (w).

(y) Switch off the equipment.

REMOVAL AND INSTALLATION

GENERAL

32 The majority of the units comprising the Radio Compass System AN/ARN-6 are removed by disconnecting cables and unscrewing mounting or securing bolts. Where it is considered necessary, the procedure for removal and installation of various units is described in more detail.

33 The radio compass receiver is mounted on the electronic equipment bay centre access door which is hinged at the aft end to open outwards and is secured by 33 camloc fasteners. One fastener, clearly marked, must be released last and secured first. The door is raised and lowered by means of an electric motor actuator which is controlled by a switch located adjacent to the door. Access to the switch is gained by releasing two camloc fasteners securing an access flap.

RADIO COMPASS RECEIVER AND TUNING DRIVE - REMOVAL

34 Note that neither the radio compass receiver nor the tuning drive should be removed from the aircraft individually, but they must be removed and installed together. To remove the radio compass receiver and tuning drive proceed as follows:

(a) Disconnect the loop antenna cable assembly R173 and the sense antenna cable assembly R1108-2 from the receiver.

(b) Disconnect the ground wire from the receiver.

(c) Disconnect cable assembly R1012-3 from the tuning drive and amplifier unit.

(d) Slacken off and release the two knurled fasteners which secure the receiver to the mounting.

(e) Carefully pull the receiver forward on its mounting until it is free of the connector strip at the rear of the mounting and lift the receiver complete with tuning drive and amplifier from the mounting.

RADIO COMPASS RECEIVER AND TUNING DRIVE - INSTALLATION

35 Prior to installation, the radio compass receiver and tuning drive must be aligned. See alignment procedure described in Testing and Servicing paragraph 29. The procedure for installing the radio compass receiver and tuning drive is the reverse of that given for removal.

RADIO COMPASS RECEIVER MOUNTING - REMOVAL

36 To remove the radio compass receiver mounting from the electronic equipment bay access door proceed as follows:

(a) Disconnect cable assembly R1027-1 from the receptacle on the bracket on the access door.

(b) Disconnect the ground wire from the airframe.

(c) Loosen the cable clamps holding cable assemblies R1027-2, R1027-3 and R1027-4 adjacent to the mounting.

(d) Disconnect the circuit wiring in the cable assemblies R1013-5 and R1029-1 from the connector strip on the mounting.

(e) Remove 16 screws securing the mounting to the access door and lift the mounting and attached wiring clear of the door.

RADIO COMPASS RECEIVER MOUNTING - INSTALLATION

37 The procedure for installing the radio compass receiver mounting is the reverse of that given for removal.

LOOP ANTENNA - REMOVAL

38 The radio compass loop antenna is mounted on the electronic equipment bay centre access door, flush with the skin. Access to the unit is gained by removing a fibreglas panel secured to the outside of the door by 76 screws.

39 To remove the loop antenna proceed as follows:

(a) Remove the loop antenna fibreglas access panel from the electronic equipment bay centre access door by removing 76 attachment screws.

(b) Disconnect cable assemblies R1029-2 and R173 from the loop antenna.

(c) Remove eight mounting screws and detach the loop antenna from the access panel.

LOOP ANTENNA - INSTALLATION

40 The procedure for installing the loop antenna is the reverse of that given for removal.

SENSE ANTENNA - REMOVAL

41 Access to the sense antenna attached to the aft dorsal fibreglas fairing is gained by removing six latches which secure the fairing in position.

42 To remove the sense antenna proceed as follows:

(a) Remove the sense antenna connector access panel in the aft dorsal fairing by releasing six camloc fasteners.

(b) Disconnect the sense antenna cable assembly R1111-2 at the susceptiformer.

(c) Remove the aft dorsal fairing complete with sense antenna by unfastening six latches.

SENSE ANTENNA - INSTALLATION

43 The procedure for installing the sense antenna is the reverse of that given for removal.

SENSE ANTENNA SUSCEPTIFORMER - REMOVAL

44 Access to the sense antenna susceptiformer mounted on the dorsal electronic equipment area, is gained by removing the aft dorsal fairing.

45 To remove the sense antenna susceptiformer proceed as follows:

(a) Remove the sense antenna connector access panel in the aft dorsal fairing by releasing six camloc fasteners.

(b) Disconnect the sense antenna cable assembly R1111-2 at the susceptiformer.

(c) Remove the aft dorsal fairing by releasing six latches.

(d) Disconnect cable assembly R1050-5 and the sense antenna cable assembly R1110-1 from the susceptiformer.

(e) Remove three mounting bolts and lift the susceptiformer clear.

SENSE ANTENNA SUSCEPTIFORMER - INSTALLATION

46 The procedure for installing the sense antenna susceptiformer is the reverse of that given for removal.

CONTROL PANEL (FRONT COCKPIT AND REAR COCKPIT) - REMOVAL

47 Access to the radio compass control panel in the front cockpit and in the rear cockpit is unobstructed.

48 To remove the control panel from the RH console in the front cockpit or the RH console in the rear cockpit proceed as follows:

(a) Release four dzus fasteners holding the panel to the console.

(b) Withdraw the panel from the console and disconnect cable assembly R1038-1 in the front cockpit or R1045-1 in the rear cockpit from the rear of the control panel.

CONTROL PANEL (FRONT COCKPIT AND REAR COCKPIT) - INSTALLATION

49 The procedure for installing the control panels is the reverse of that given for removal.

COURSE INDICATOR (FRONT COCKPIT AND REAR COCKPIT) - REMOVAL

50 To remove the course indicator from the main instrument panel in the front cockpit or from the main instrument panel in the rear cockpit proceed as follows:

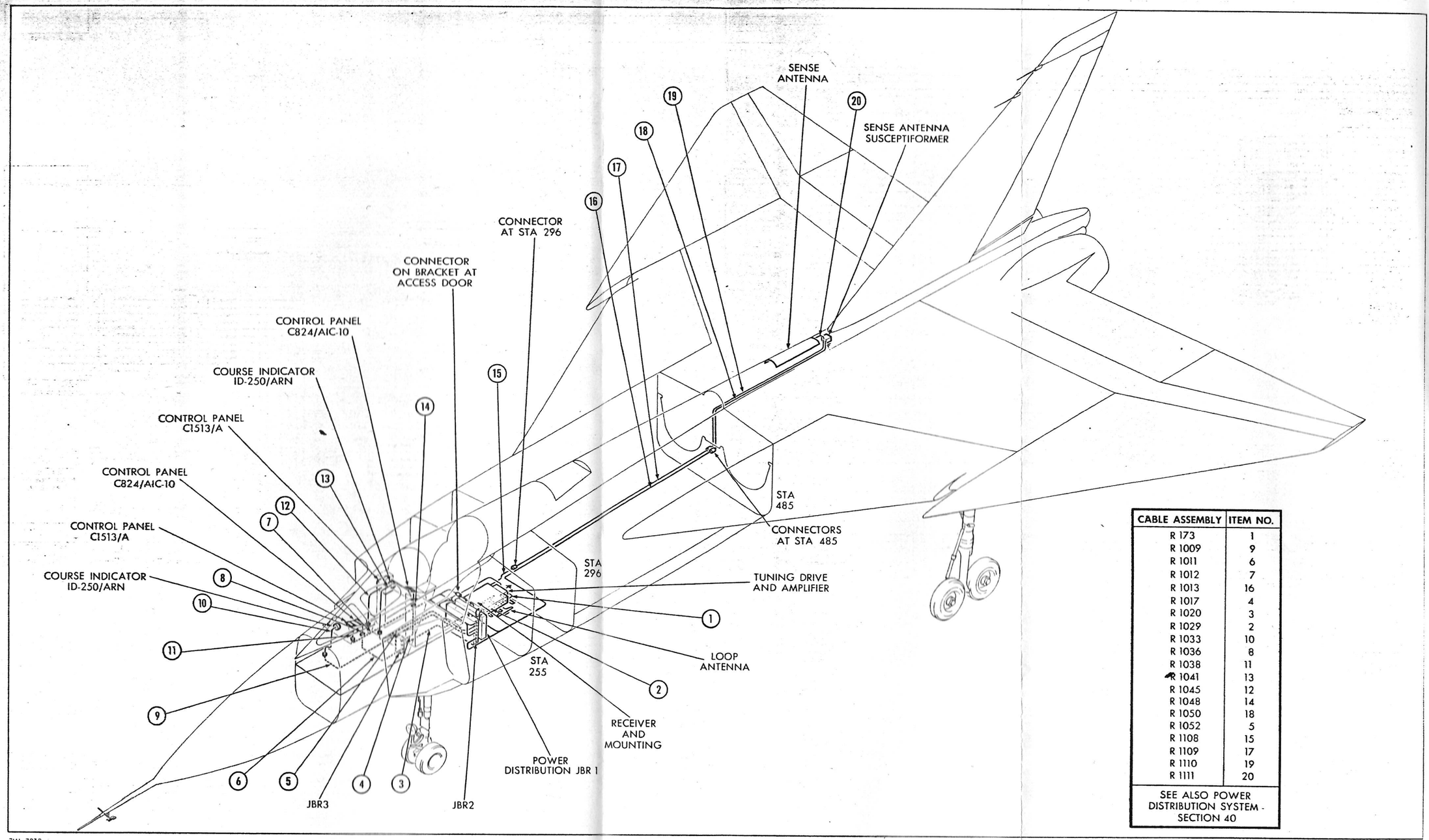
(a) Remove four mounting screws and withdraw the indicator from the instrument panel.

(b) Disconnect the cable assembly at the rear of the indicator, R1033-1 in the front cockpit or R1041-1 in the rear cockpit.

COURSE INDICATOR (FRONT COCKPIT AND REAR COCKPIT) - INSTALLATION

51 The procedure for installing the course indicators is the reverse of that given for removal.

ARROW 1 SERVICE DATA



CABLE ASSEMBLY	ITEM NO.
R 173	1
R 1009	9
R 1011	6
R 1012	7
R 1013	16
R 1017	4
R 1020	3
R 1029	2
R 1033	10
R 1036	8
R 1038	11
R 1041	13
R 1045	12
R 1048	14
R 1050	18
R 1052	5
R 1108	15
R 1109	17
R 1110	19
R 1111	20

SEE ALSO POWER DISTRIBUTION SYSTEM - SECTION 40

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187 38

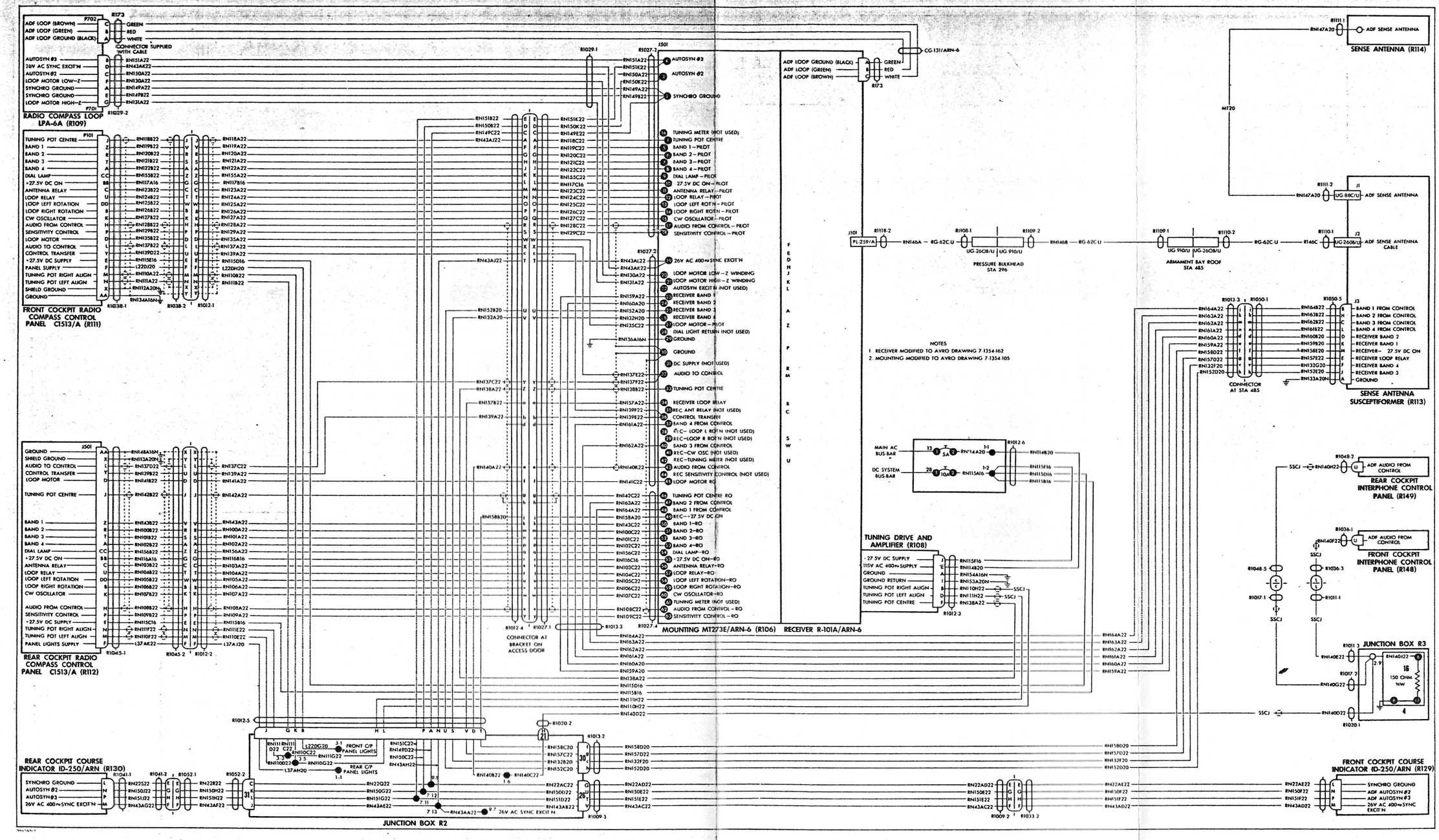

FIG. 6 RADIO COMPASS SYSTEM AN/ARN-6

UNCLASSIFIED

ARROW 1 SERVICE DATA

EQUIPMENT LIST

PART NO.	MANUFACTURER	NOMENCLATURE	UNITS PER ASSEMBLY
MT273E/ARN-6	GFE	Mounting, Radio Compass Receiver	1
R-101A/ARN-6	GFE	Radio Compass Receiver	1
ED400A	GFE	Tuning Drive and Amplifier	1
LPA-6A	GFE	Loop Antenna	1
C1513/A	GFE	Control Panel	2
7-1362-47	Aviation Electric	Sense Antenna Susceptiformer	1
	Avro Aircraft Limited	Sense Antenna	1
CG-131/ARN-6		Loop Antenna Cable	1
ID-250/ARN	GFE	Course Indicator (See also section 43)	2

UNCLASSIFIED

ARROW 1 SERVICE DATA

SECTION 42

ELECTRONICS

"X" BAND BEACON

(This data supersedes the previous issue dated 15 Jan 57)

UNCLASSIFIED

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The X-Band Beacon system is installed to evaluate the centimetre waveband antenna which will be required for the air-to-air X-Band IFF system fitted to later aircraft. The beacon transmits a pulsed reply when interrogated by signals from an X-Band pulsed radar set. The system increases the operating range of the interrogating radar by reinforcing the normal echo with a re-transmitted signal. The frequency range of the system is 9200 mc/s to 10,500 mc/s.

2 The system comprises the following main component units:

(a) Receiver-Transmitter RBX-1

(b) Power Supply RPX-1

(c) Antenna

(d) Waveguide Assembly

(e) Waveguide Dehydrator

RECEIVER-TRANSMITTER

3 The X-Band Beacon receiver-transmitter consists of a crystal video type receiver, a hard tube modulator and a transmitter.

4 Interrogation signals from a pulsed radar set are received by the X-Band antenna and controlled by a flap attenuator to reject signals other than those occurring witnin a narrow band about the frequency of the interrogating radar. The accepted signals are applied to a crystal detector type 1N23C fitted in a crystal mount housed in the flap attenuator. The crystal passes positive video pulses to the receiver where they are amplified. The receiver output triggers a blocking oscillator which in turn triggers the hard tube modulator circuit, so enabling the unit to transmit closely spaced pulses such as are required for coding. The modulator output is fed to a co-axial (dual cavity) klystron which generates the transmitted signal. The transmitted signal is controlled by a flap attenuator and transferred via the waveguide for radiation at the antenna. A tee section and dummy load mounted between the two attenuators and the waveguide permits the antenna to be used for both transmission and reception.

5 The receiver-transmitter unit is enclosed in a pressurized cylindrical case approximately 12-1/4 inches long and 3-1/2 inches in diameter. A control, accessible through the end of the case, permits adjustment of the receiver sensitivity to prevent the beacon from triggering on noise voltage.

WAVEGUIDE PRESSURIZATION

6 The waveguide system is pressurized to prevent arcing. Pressurizing air is fed to the system via a non-return valve and a waveguide dehydrator which filters out any moisture. The antenna incorporates a pressure relief valve which opens at a nominal value of 16 psig to prevent over-pressurization. A pressurized mica window fitted between the waveguide and the tee section and dummy load isolates the receiver-transmitter from the waveguide pressurizing system. A charging valve is fitted in the air pressure line to facilitate ground testing.

POWER SUPPLY

7 The receiver-transmitter derives 6.3 volts AC for filament supply, and 300 volts DC for the plate supply which is regulated for stability, from a power unit provided with the system. The power unit operates on an input of 115 volts 400 cps AC at a nominal current of 0.9 amps. A control, accessible through the end case of the power unit, permits the pre-adjustment of the output voltage. The unit is enclosed in a pressurized cylindrical case similar to that provided for the receiver-transmitter.

FUNCTION TESTING

GENERAL

8 Prior to installation in the aircraft, the system is tested and adjusted to operate in conjunction with a particular radar interrogator.

ARROW 1 SERVICE DATA

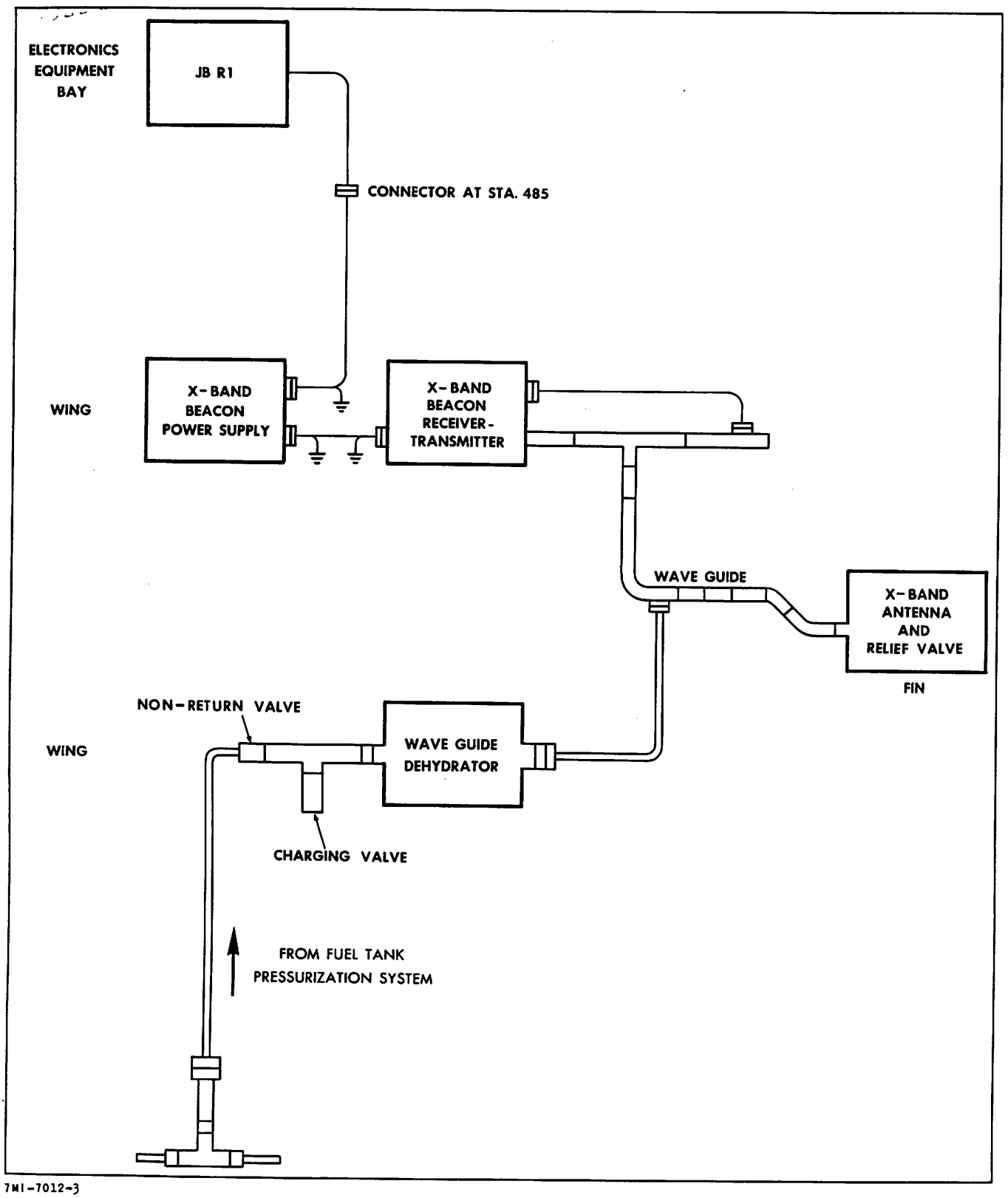

FIG. 1 X-BAND BEACON - GENERAL ARRANGEMENT

ARROW 1 SERVICE DATA

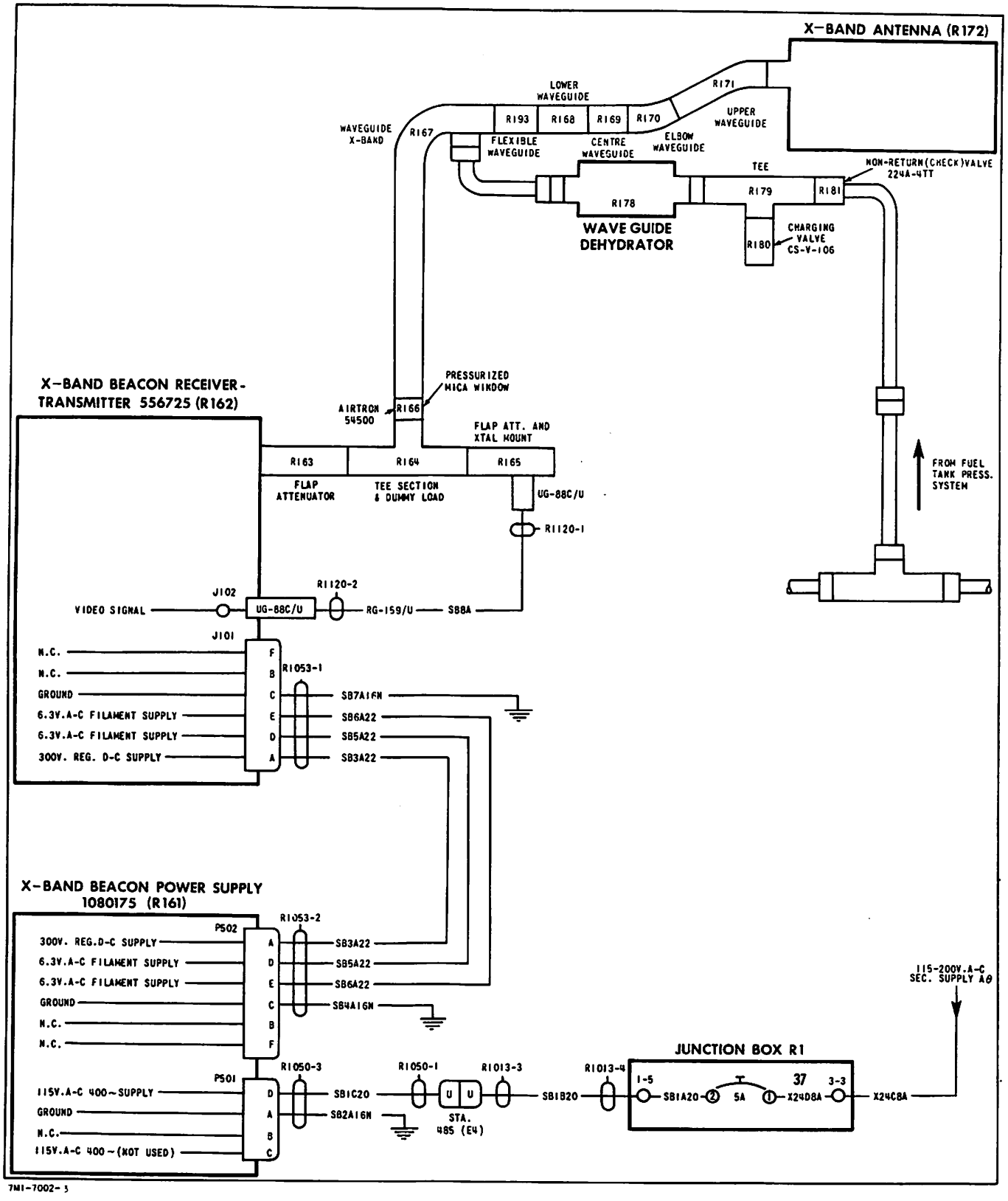

FIG. 2 X-BAND BEACON - CABLE ROUTING

ARROW 1 SERVICE DATA

UNCLASSIFIED

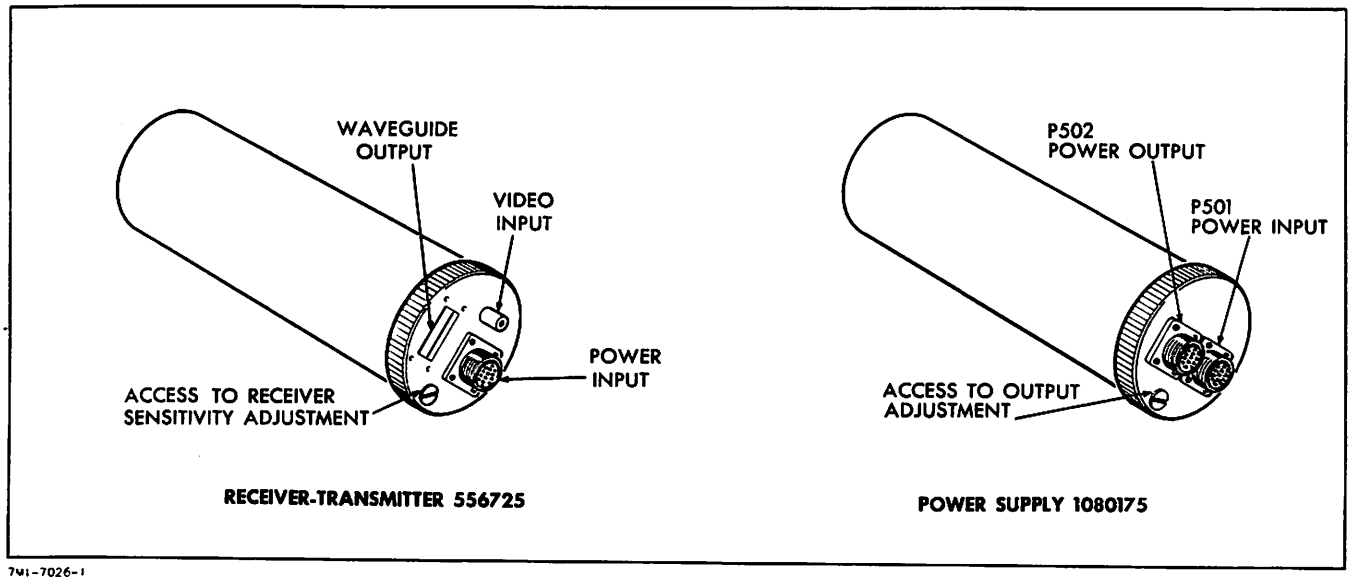

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FIG. 3 X-BAND BEACON RECEIVER-TRANSMITTER AND POWER SUPPLY

9 The only control accessible from outside the beacon case is the receiver sensitivity control. This is set during testing and should not require further attention.

10 If, after installation, the response of the beacon to noise signals requires a decrease in receiver sensitivity the following procedure should be adopted:

(a) With no input signal, advance the sensitivity control clockwise until the beacon first triggers on noise voltage.

(b) Turn the control counterclockwise until the beacon just stops triggering.

11 The only control accessible outside the power supply unit case is the output voltage adjustment. This is adjusted during testing and should not require further adjustment.

12 The system operates automatically upon receipt of interrogation signals when the X-BAND BEACON circuit breaker in junction box R1 is switched ON.

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Receiver-Transmitter RBX-1	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Bendix (Supplier, Aviation Electric)	556725	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 200 hours

FUNCTION

Receives signals in the 9200 Mc/s to 10,500 Mc/s frequency range from a tracking radar and transmits an amplified signal.

LOCATION

Dorsal electronic equipment area between stations 540 and 550.

ACCESS

	MEN X MINUTES	
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit the unit into its mounting. Secure the mounting clamp with six screws. Connect and secure the waveguide. Fit and secure one connector (R1053-1), and one coaxial connector (R1120-2). Refit the aft dorsal fairing - six latches. Reconnect the sense antenna to the susceptiformer. Refit the sense antenna access panel - six screws.		

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION

MEN X MINUTES

Check that the unit is securely mounted.
Check that the cables and connectors are securely and properly fitted.

FUNCTIONAL CHECKS

MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External Power Source.
Source of Air Pressure.
Pressure Gauge.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Power Supply RPX-1	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Bendix (Supplier, Aviation Electric)	1080175	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 200 hours

FUNCTION

Supplies 300 volts DC and 6.3 volts AC to the X-Band Receiver-Transmitter 556725.

LOCATION

Dorsal electronic equipment area between stations 540 and 550.

ACCESS

	MEN X MINUTES	
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit the unit into its mounting. Secure the mounting clamp with six screws. Fit and secure two connectors. Refit the aft dorsal fairing - six latches. Reconnect the sense antenna to the susceptiformer. Refit the sense antenna access panel - six screws.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the connectors are securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External Power Source.
Source of Air Pressure.
Pressure Gauge.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Antenna and Relief Valve	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1383-57			25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To transmit and receive signals in the X-Band.
The assembly includes a CS-V-105 pressure relief valve which opens at 16 psig to prevent over-pressurization of the waveguide.

LOCATION

Upper end of rear spar of fin.

ACCESS

MEN X MINUTES

Remove eight screws attaching the antenna to one access door.
Remove one access door - 22 screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Attach the antenna to one access door - eight screws.
Place the access door in position and secure with 22 screws.
Attach the antenna to the waveguide - four screws.
Attach the antenna to the other access door - eight screws.
Secure the second access door - 22 screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the antenna is securely mounted. Inspect the antenna for cracks and corrosion. Check the connection to the waveguide for security and leakage.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Waveguide Dehydrator	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Eastern Industries Ltd	DP1050 - Type 201A	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To remove any moisture present in the pressurization air supplied to the waveguide.

LOCATION

Dorsal electronic equipment area.

ACCESS

	MEN	MINUTES
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN	MINUTES
Fit and secure the dehydrator with four mounting screws. Attach the input and the output pipe lines. Refit the aft dorsal fairing - six latches. Reconnect the sense antenna at the susceptiformer. Refit the sense antenna access panel - six screws.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the colour of crystals and replace if they are pink. Check the dehydrator for security and damage. Check the piping for damage.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Tee	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1362-35	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To provide an entry into the waveguide air pressure line for charging valve CS-V-106, to facilitate ground testing.

LOCATION

Aft dorsal area at station 505 between dehydrator and non-return valve.

ACCESS | MEN X MINUTES

Remove the forward section of the electronic equipment dorsal fairing - six latches.

REPLACEMENT PROCEDURE | MEN X MINUTES

Screw the tee section to the dehydrator union.
Screw the non-return valve to the tee section.
Clamp the non-return valve to the valve mounting.
Fit and secure the charging valve CS-V-106.
Refit the forward section of the electronic equipment dorsal fairing - six latches.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely fitted. Check for the proper value of air pressure. Check for pressure leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

[illegible]

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Charging Valve	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Schrader	CS-V-106	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To facilitate ground checking of the waveguide pressurizing system.

LOCATION

Mounted in the air piping tee section -
Dorsal electronic equipment area at station 505.

ACCESS

Remove the forward section of the electronic equipment dorsal fairing - six latches.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Screw the charging valve to the tee section.
Refit the forward section of the aft dorsal fairing.

MEN X MINUTES	

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the proper pressure is being supplied. Check for pressure leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Non-return Valve	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	James-Pond-Clark	224A-4TT	25201

OVERHAUL LIFE: KNOWN– ESTIMATED–

FUNCTION

To prevent the loss of waveguide pressure in the event of the pressure source failing.

LOCATION

Fitted to the waveguide in the radar area of the dorsal.

ACCESS

	MEN	X MINUTES
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN	X MINUTES
Connect the air lines. Secure the clamp retaining screw. Refit the aft dorsal fairing - six latches. Reconnect the sense antenna at the susceptiformer. Refit the sense antenna access panel - six screws.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the leakage rate during waveguide pressure tests.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of air pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Flap Attenuator	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1362-21	Sinclair Radio Lab.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To control the transmission signals radiated by the X-Band Beacon.

LOCATION

Centre line of the aft dorsal section at station 580.

ACCESS

	MEN X MINUTES	
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Remove the cap from waveguide openings on the transmitter and tee section (if fitted). Connect the component at the transmitter and at the hybrid tee connection. Refit the aft dorsal fairing - six latches. Reconnect the sense antenna at the susceptiformer. Refit the sense antenna access panel - six screws.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check for security, damage and proper setting.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Tee Section and Dummy Load	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1362-25	Sinclair Radio Lab.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To permit the use of one antenna for both the transmission and reception of RF energy.

LOCATION

Dorsal electronic equipment area.

ACCESS

	MEN X MINUTES	
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Remove the caps from the ends of the flap attenuator (if fitted). Secure the tee to its mounting with mounting bolts. Connect the tee to the antenna waveguide. Fit four bolts securing the mica window to the waveguide. Connect the tee section to the two flap attenuators. Refit the aft dorsal fairing - six latches. Reconnect the sense antenna at the susceptiformer. Refit the sense antenna access panel - six screws.		

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

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

DECLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Flap Attenuator and Crystal Mount	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1362-23	Sinclair Radio Lab.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To restrict the signals applied to the crystal detector to a narrow band around the interrogating radar frequency.

LOCATION

Aft dorsal section - station 590 at centre line.

ACCESS

	MEN X MINUTES	
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Remove the caps from waveguide (if fitted). Fit the clamp to the crystal mount. Fit and secure the RF connection to the crystal mount. Connect the flap attenuator at the hybrid tee. Refit the aft dorsal fairing - six latches. Reconnect the sense antenna at the susceptiformer. Refit the sense antenna access panel - six screws.		

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check for security, damage and proper setting of attenuator.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Waveguide - X-Band	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1362-191	Sinclair Radio Lab.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To transfer X-Band RF energy between the receiver-transmitter unit and the antenna. Includes a pressurization fitting.

LOCATION

Dorsal electronic equipment area.

ACCESS

	MEN X MINUTES	
Remove the radio compass sense antenna access panel - six screws. Disconnect the sense antenna at the susceptiformer. Remove the aft dorsal fairing - six latches.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Remove the cap from the waveguide at the tee end at the base of the fin. Securely clamp the waveguide to its mounting. Connect the waveguide to the tee at the base of the fin. Connect the air pressure input conduit. Refit the aft dorsal fairing - six latches. Reconnect the sense antenna at the susceptiformer. Refit the sense antenna access panel - six screws.		

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check for pressure leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Waveguide - Lower Portion	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1383-65	Sinclair Radio Lab.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To transfer RF energy between the receiver-transmitter and the antenna.

LOCATION

In the leading edge of the fin.

ACCESS

Installed for the life of the fin.
Joints are accessible for leak checks.

MEN X MINUTES

REPLACEMENT PROCEDURE

Installed for the life of the fin.
Inspection panel for joints provided on leading edge of fin between ribs 6 and 7 - 16 screws.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check joints for leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	X-BAND BEACON	Waveguide - Centre Portion	13-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1383-63	Sinclair Radio Lab.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To transfer X-Band RF energy between the receiver-transmitter and the antenna.

LOCATION

Between ribs six and seven of fin.

ACCESS

	MEN	X MINUTES
Access panels on the left hand side of the leading edge of the fin at station 195 and on the left hand side of the upper fin at spar three, station 105.		

REPLACEMENT PROCEDURE

	MEN	X MINUTES
Remove the caps from the waveguide lower portion and the waveguide elbow. Remove the waveguide elbow. Connect the centre portion to the lower portion. Connect the waveguide elbow to the centre portion and the upper portion. Refit the access panel on the left hand side of the leading edge of the fin at station 195. Refit the access panel on the left hand side of the upper fin at spar three station 105.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the unit for security and damage. Check for pressure leaks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Source of Air Pressure.
Pressure Gauge.
External Power Source.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED CONFIDENTIAL

ARROW 1 SERVICE DATA

SECTION 43

ELECTRONICS

UHF HOMER ADAPTOR

AN/ARA-25

(This data supersedes previous issue dated 25 June 57)

ARROW 1 SERVICE DATA

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UHF HOMER ADAPTOR AN/ARA-25

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The UHF Homer Adaptor AN/ARA-25 is used in conjunction with the UHF Radio System AN/ARC-34 to obtain, for homing purposes, the bearing of the radio station to which the main receiver of the UHF Radio System is tuned. The bearing indication is displayed on Course Indicators (Dual) RMI Type ID-250/ARN. The operation of the adaptor is controlled from the UHF radio set control.

2 The UHF Homer Adaptor comprises the following main component units:

(a) Solenoid Relay RE-120/ARA-25.

(b) Solenoid Relay Mounting MT-1042/ARA-25.

(c) UHF Homer Antenna AS-578A/ARA-25.

(d) Electronic Control Amplifier AM-608/ARA-25.

(e) Electronic Control Amplifier Mounting MT-1043/ARA-25.

(f) Course Indicators (Dual) RMI Type ID-250/ARN (2).

SOLENOID RELAY RE-120/ARA-25

3 Selecting the ADF position on the function switch, marked OFF-MAIN-BOTH-ADF, located on the UHF radio set control, energizes the solenoid relay. This action connects the UHF homer antenna to the UHF Radio Set AN/ARC-34 in lieu of the UHF antenna. A further action of the function switch in the ADF position is to energize a relay in the electronic control amplifier to complete the plate supply to this unit.

UHF HOMER ANTENNA AS-578A/ARA-25

4 The UHF homer antenna receives signals in the 225 Mc/s to 399.9 Mc/s range and is automatically positioned by the electronic control amplifier to indicate the direction of the transmitting point.

5 The antenna comprises a directional receiving element, a 100 cps antenna switch, an antenna drive motor, a synchro generator and a rate generator.

6 The receiving element is rhombic shaped and, to obtain a cardioid field pattern and attain unidirectional properties, each end is grounded alternately through a terminating resistor. The termination, and consequently the field pattern, is switched from one end of the antenna to the other 100 times per second by the antenna switch. The antenna switch operates in synchronism with a vibrator circuit in the electronic control amplifier. The antenna is orientated by the antenna drive motor which is controlled by the electronic control amplifier.

ELECTRONIC CONTROL AMPLIFIER AM-608/ARA-25

7 The electronic control amplifier functions by positioning the UHF homer antenna correctly to indicate accurately the bearing of the transmitting point. The unit incorporates amplifier and filter circuits, a vibrator type synchronous rectifier circuit and a phase detecting motor control circuit.

8 When the UHF homer antenna is off bearing, the amplitude of signals appearing at opposite ends of the antenna will be unequal. The greater signal amplitude will appear at the end of the antenna nearer to the transmitting point. The difference in signal amplitudes will vary in relation to the angle by which the antenna is off bearing. The action of antenna switching will result in the received signals being modulated in the antenna with a 100 cps square waveform proportional in amplitude to the angle by which the antenna is off bearing.

9 The square wave modulated signals are fed into the main receiver of the UHF Radio System. The signals are demodulated in the receiver and the 100 cps square wave containing audio components appears at the receiver output. These signals are fed to the electronic control amplifier where the audio components are filtered out. The resultant square wave is amplified and fed into the vibrator type synchronous rectifier circuit, where the square-wave voltage is rectified. The resultant voltage is fed through the phase sensitive motor control circuit to the field of the antenna drive motor.

ARROW 1 SERVICE DATA

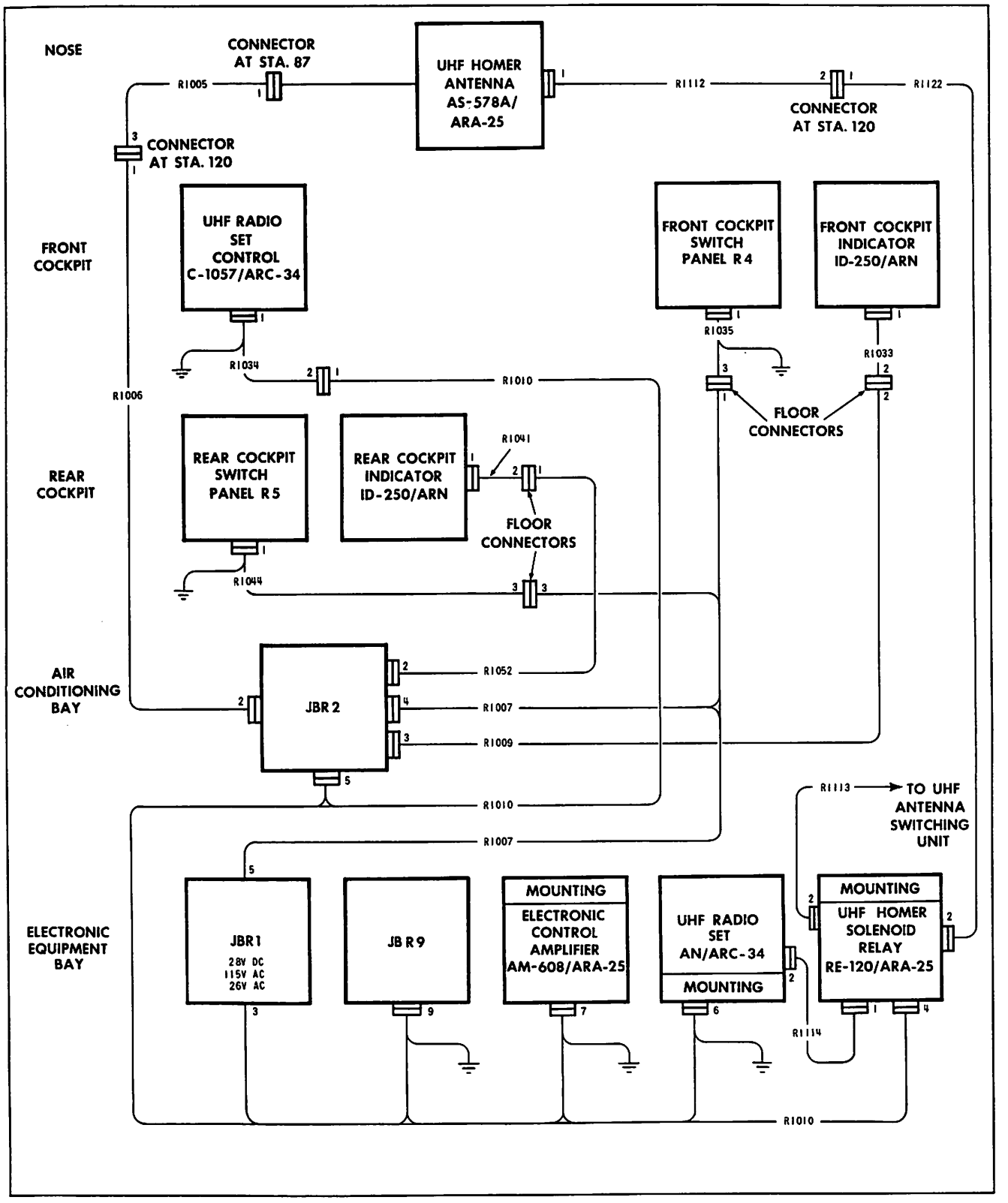

FIG. 1 UHF HOMER ADAPTOR AN/ARA-25 - GENERAL ARRANGEMENT

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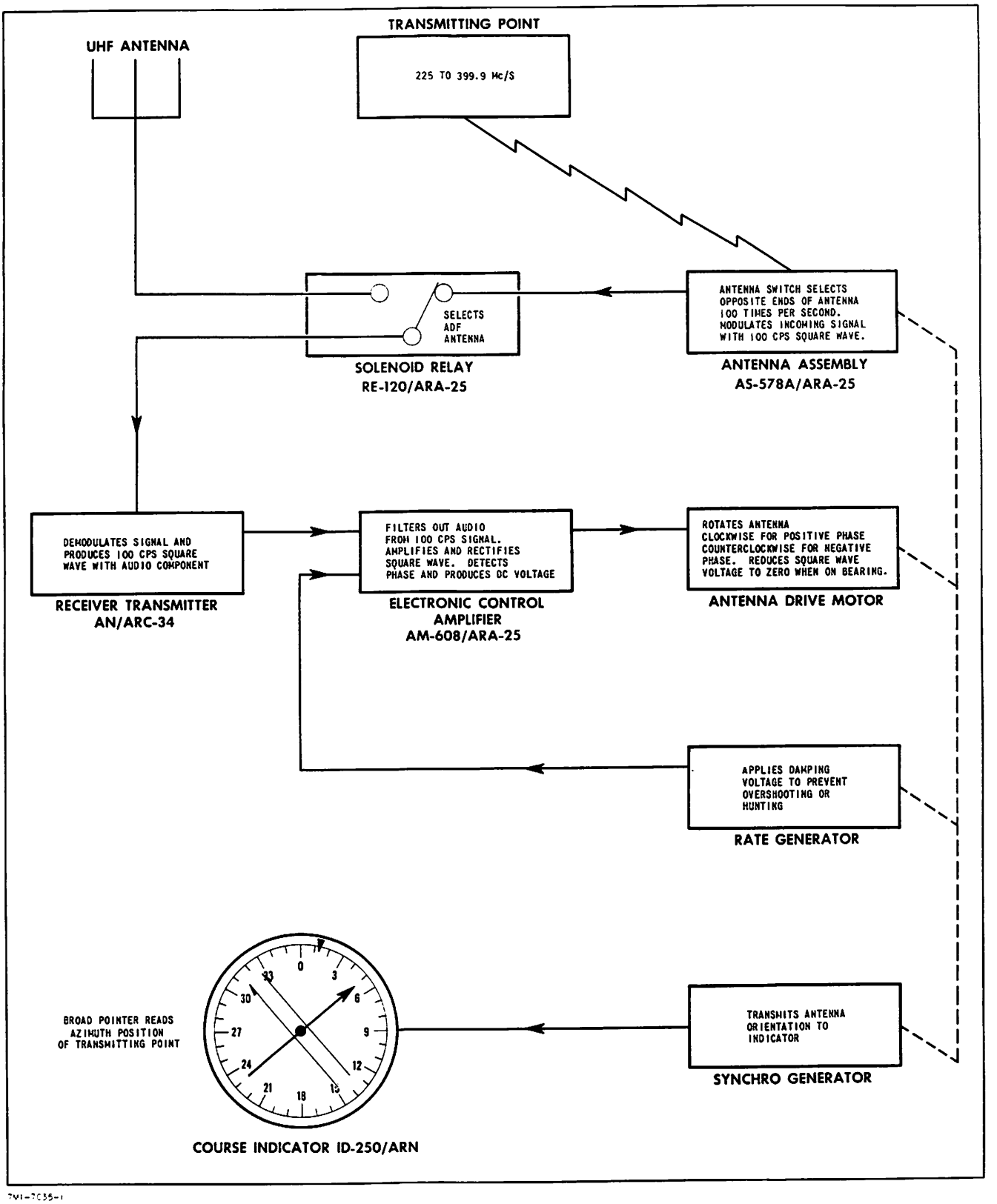

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FIG. 2 UHF HOMER ADAPTOR AN/ARA-25 - FUNCTIONAL BLOCK DIAGRAM

10 A positively phased voltage will cause the antenna motor to rotate in a clockwise direction, and a negatively phased voltage will cause counter-clockwise rotation. The motor will rotate the antenna until the cross-over point of the two cardioid field patterns of the antenna is in line with the transmitting point. In this position, the level of signal voltage at each end of the antenna is equal and the square-wave control voltage in the system will be reduced to zero. In this condition, the antenna is on bearing and the drive motor ceases to rotate.

11 The synchro generator, geared to the antenna drive motor, transmits the antenna orientation to the radio magnetic indicators. The rate generator provides damping for the system to prevent the antenna overshooting or fluctuating about the bearing position.

12 Two screwdriver adjustment controls, marked GAIN and DAMPING respectively, are provided on the front face of the amplifier. Both controls are preset and locked during bench testing. The GAIN control is adjusted so that the speed of response of the indicator needle to direction change is not less than 30 degrees per second. The DAMPING control is adjusted so that the indicator needle does not fluctuate (hunt) more than 3 degrees about the bearing position.

13 Mounted in the front face of the amplifier are two fuses, F101 current rating 1 amp, and F102 current rating 1/16 (0.0625) amp. Fuse F101 is in series with the amplifier heater circuit and fuse F102 is in series with the plate supply circuit.

COURSE INDICATORS (DUAL) RMI TYPE ID-250/ARN

14 Homing bearings are registered by two radio magnetic indicators, one in each cockpit. The indicators are dual reading instruments with two indicating needles, one broad and one narrow. The narrow needle operates with the Radio Compass System AN/ARN-6. The broad needle operates with either the UHF Homer System or, if fitted, the TACAN system. RMI Needle Selector switches, located one on the front cockpit switch panel R4 and one on the rear cockpit switch panel R5, are provided to select the broad needle for operation with the system required.

SYSTEM POWER REQUIREMENTS

15 The system operates on 27.5 volts DC with an input current of 2.85 amps, and 26 volts AC at 6VA.

FUNCTION TESTING

GENERAL

16 Function testing of the AN/ARA-25 UHF Homer system should be carried out periodically as laid down in the servicing schedule, and after overhaul or replacement of associated items of equipment.

17 The following test can be carried out quickly in the hangar. The screening afforded by the building will prevent signals from interfering with communication channels.

18 A UHF signal generator type TS-497/URR or equivalent and a portable 0.25 metre rod antenna are required to carry out the test.

PREPARATION FOR TESTING

19 Prepare to carry out function testing proceeding as follows:

(a) Connect an external power supply to the aircraft.

(b) Connect a 0.25 metre portable antenna to a UHF signal generator type TS-497/URR or equivalent, using a length of coaxial cable. Connect a power supply to the signal generator.

FUNCTION TESTING PROCEDURE

20 Two operators are required to carry out function testing, one to operate the cockpit controls and one to operate the signal generator and position the portable antenna. The procedure is as follows:

(a) Select to ON the master electrical switch in the front cockpit.

(b) Select the controls on the radio set control C1057/ARC-34 in the front cockpit as follows:

(1) Function selector switch to ADF.

(2) Operational mode selector switch to MANUAL.

(3) VOLUME control fully clockwise.

(c) Select the controls on the interphone control panel in the front cockpit as follows:

(1) COMM mixing switch on.

(2) Rotary selector switch to COMM.

(3) VOL control to the 12 o'clock position.

(d) Select the RMI needle selector switches on the front cockpit switch panel R4 and the rear cockpit switch panel R5 to UHF HOMER.

(e) Set the UHF signal generator to 226.8 Mc/s unmodulated and position the portable antenna at a distance of 10 to 20 feet dead ahead of the aircraft.

(f) Plug a headset type H-70/AIC and a microphone M33/AIC-10 or equivalents into the quick-release connector on the front cockpit seat.

(g) Set up the frequency 226.8 Mc/s manually on the UHF radio set control.

(h) Allow five minutes for the equipment to warm up.

(j) Listen for a 100 cps tone in the headset, varying the frequency of the signal generator, if necessary, to tune the signal generator to the same frequency as the UHF receiver.

(k) Check that the radio magnetic indicators ID-250/ARN in the front cockpit and in the rear cockpit indicate the approximate bearing of the portable antenna relative to the aircraft. Bearing accuracy of better than 15 degrees cannot be expected on ground checks.

(m) Move the portable antenna to several positions around the aircraft and check that the radio magnetic indicators respond to the direction changes rapidly and definitely.

(n) Repeat operations (e) through (m) using frequencies 324.3 Mc/s and 384.5 Mc/s.

(p) Switch off the equipment.

REMOVAL AND INSTALLATION

GENERAL

21 The majority of the units comprising the UHF Homer Adaptor System AN/ARA-25 are removed by disconnecting cables and unscrewing mounting or securing bolts. Where it is considered necessary, the procedure for removal and installation of various units is described in more detail.

22 The electronic control amplifier and solenoid relay are mounted in the electronic equipment bay. Access is gained by lowering the electronic equipment bay centre access door which is hinged at the aft end to open outwards and is secured by 33 camloc fasteners. One fastener, clearly marked, must be released last and secured first. The door is raised and lowered by means of an electric motor actuator controlled by a switch located adjacent to the door. Access to the switch is gained by releasing two camlocs securing an access flap.

ELECTRONIC CONTROL AMPLIFIER - REMOVAL

23 To remove the electronic control amplifier proceed as follows:

(a) Release the two quick-release fasteners holding the unit to its mounting.

(b) Disconnect the ground wire.

(c) Disconnect cable assembly R1010-7.

(d) Lift the unit out of the mounting.

ELECTRONIC CONTROL AMPLIFIER - INSTALLATION

24 The procedure for installing the electronic control amplifier is the reverse of that given for removal.

SOLENOID RELAY - REMOVAL

25 To remove the solenoid relay proceed as follows:

(a) Release the two quick-release fasteners holding the unit to its mounting.

(b) Disconnect cable assemblies, R1113-2, R1114-1, R1010-4 and R1122-2.

(c) Lift the unit from its mounting.

SOLENOID RELAY - INSTALLATION

26 The procedure for installing the solenoid relay is the reverse of that given for removal.

UHF HOMER ANTENNA - REMOVAL

27 Access to the UHF Homer Antenna is gained by removing the access panel from the underside of the nose section of the aircraft at station 100.

28 To remove the UHF homer antenna proceed as follows:

(a) Remove two clamps holding the antenna power cable assembly to the aircraft structure.

(b) Disconnect the antenna power cable from the connector at station 87.

(c) Disconnect cable assembly R1112-1 from the antenna.

(d) Remove six screws holding the antenna to the aircraft structure.

(e) Carefully detach the antenna from the aircraft structure to avoid damage to the receptacle protruding from the antenna.

UHF HOMER ANTENNA - INSTALLATION

29 The procedure for installing the UHF homer antenna is the reverse of that given for removal.

COURSE INDICATOR (FRONT COCKPIT AND REAR COCKPIT) - REMOVAL

30 To remove the course indicator from the main instrument panel in the front cockpit or the main instrument panel in the rear cockpit proceed as follows:

(a) Remove four mounting screws and withdraw the indicator from the panel.

(b) Disconnect cable assembly R1033-1 in the front cockpit or R1041-1 in the rear cockpit, from the receptacle on the rear of the instrument.

COURSE INDICATOR (FRONT COCKPIT AND REAR COCKPIT) - INSTALLATION

31 The procedure for installing the course indicators is the reverse of that given for removal.

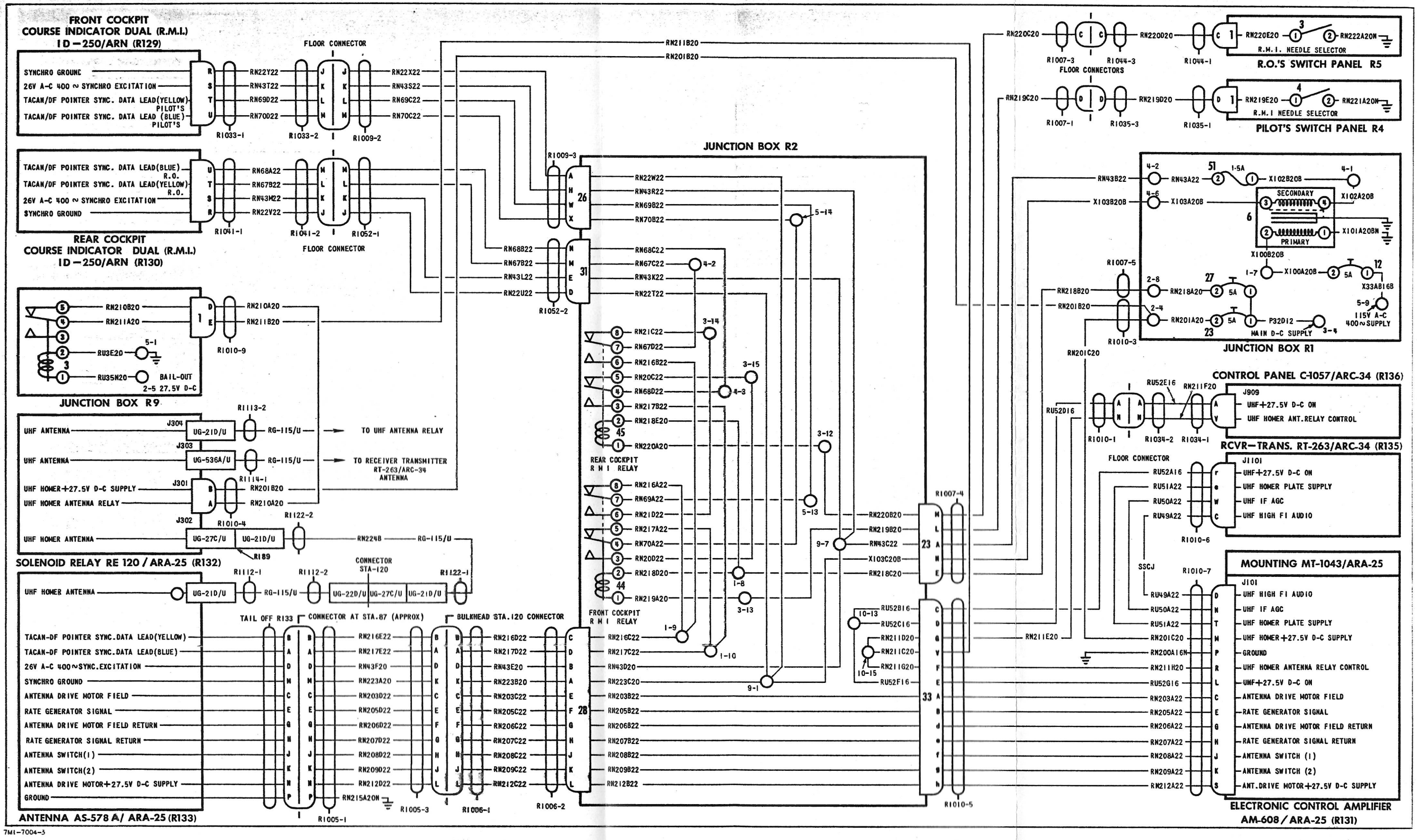

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FIG. 3 UHF HOMER ADAPTOR AN/ARA-25

ARROW 1 SERVICE DATA

EQUIPMENT LIST

PART NO.	MANUFACTURER	NOMENCLATURE	UNITS PER ASSEMBLY
AM-608/ARA-25	GFE	Electronic Control Amplifier	1
RE-120/ARA-25	GFE	Solenoid Relay	1
AS-578A/ARA-25	GFE	Antenna	1
MT-1042/ARA-25	GFE	Mounting, Solenoid Relay	1
MT-1043/ARA-25	GFE	Mounting, Electronic Control Amplifier	1
ID-250/ARN	GFE	Course Indicator - (See also Section 41)	2

ARROW 1 SERVICE DATA

SECTION 44

ELECTRONICS

UHF COMMAND RADIO

AN/ARC-34

(This data supersedes previous issue dated 25 Jun 57)

ARROW 1 SERVICE DATA

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ARROW 1 SERVICE DATA

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ELECTRONICS

UHF COMMAND RADIO AN/ARC-34

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ARROW 1 SERVICE DATA

UNCLASSIFIED

DESCRIPTION

GENERAL

1 The UHF Radio System AN/ARC-34 provides voice and MCW communication within the 225.0 Mc/s to 399.9 Mc/s frequency range. In addition to the main receiver-transmitter, a second receiver, designated the GUARD receiver, is incorporated in the system. The GUARD receiver operates on a predetermined distress frequency between 238.0 Mc/s and 248.0 Mc/s. Provision is made to permit operation of the main receiver-transmitter on the distress frequency.

2 Homing facilities can be obtained by using the main receiver of the system in conjunction with the UHF Homer Adaptor AN/ARA-25.

3 The UHF Radio System comprises the following main component units:

(a) Receiver-Transmitter RT-263/ARC-34.

(b) Receiver-Transmitter Mounting MT-1099/U.

(c) Radio Set Control C1057/ARC-34.

(d) UHF Antenna System.

RECEIVER-TRANSMITTER RT-263/ARC-34

4 The receiver-transmitter incorporates two receivers and a transmitter. A common audio amplifier circuit handles the output of both receivers. The audio output and input circuits are connected to the Interphone System AN/AIC-10. An additional audio output circuit, which is not required for the normal functioning of the system, supplies a 100 cycle signal to the UHF Homer Adaptor AN/ARA-25 when the ADF function is used.

5 The transmitter and main receiver can be tuned in steps of one tenth of a megacycle over the frequency range of 225.0 to 399.9 Mc/s. Twenty of the 1750 available frequencies can be preset and, in addition, any frequency within the range can be selected without disturbing the preset frequencies.

6 Four crystal controlled oscillators and a tenth harmonic multiplier are used to determine the selected frequency. The first digit of the operating frequency, which must be either 2 or 3, is selected by a relay operated by the preset frequency selector on the radio set control. This relay selects 2 when energized and 3 when de-energized. The second, third and fourth digits are selected by three ratchet motors which are operated by an equalizing circuit controlled by the preset frequency selector on the radio set control.

7 The GUARD receiver operates on a single fixed frequency in the 238.0 Mc/s to 248.0 Mc/s range. A crystal controlled oscillator fixes the operating frequency and to change the frequency it is necessary to change the crystal.

RADIO SET CONTROL C1057/ARC-34

8 The radio set control incorporates a function selector switch, an operational mode selector switch with associated manual and preset frequency selector controls, a volume control and an MCW tone button-switch. In addition, the panel incorporates the transmitter and main receiver frequency-presetting controls.

9 The function selector switch is marked OFF-MAIN-BOTH-ADF. When the switch is selected to the MAIN position, the transmitter and main receiver are operative. Selecting the switch to the BOTH position renders the transmitter, the main receiver and the guard receiver operative. When the ADF position is selected, the main receiver operates in conjunction with the UHF homer adaptor. In this position the transmitter and the guard receiver are inoperative.

10 The operational mode selector switch is marked MANUAL-PRESET-GUARD. When the PRESET position is selected, any preset channel selected on the frequency selector switch will be operative. The channel selected is shown in a window located directly above the control switch.

11 When the operational mode selector switch is selected to MANUAL, four windows across the top of the control panel are opened, exposing the four digits of a manually-set frequency.

ARROW 1 SERVICE DATA

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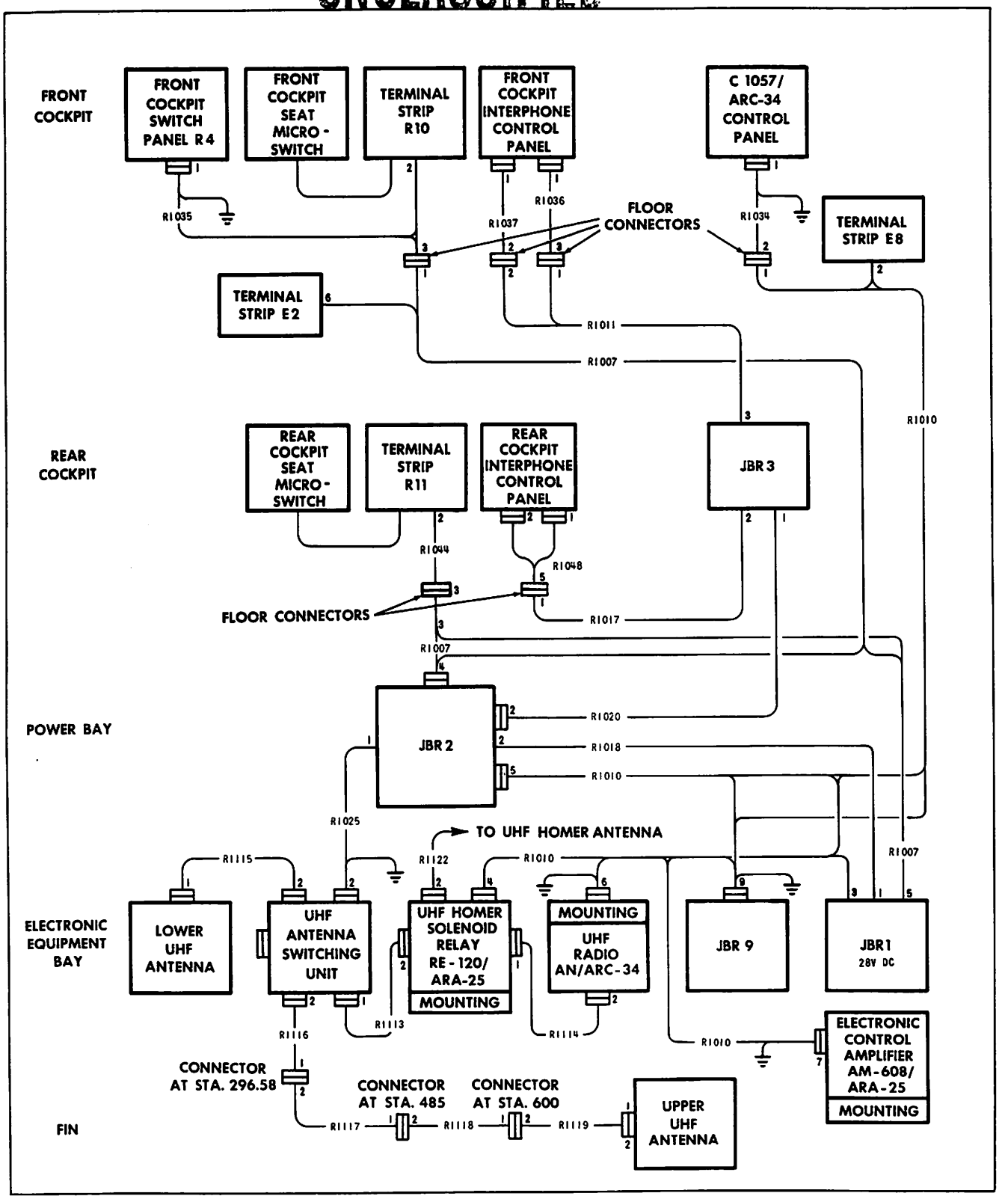

FIG. 1 UHF COMMAND RADIO AN/ARC-34 - GENERAL ARRANGEMENT

The operating frequency is indicated directly by the digits which are selected by four controls located directly below the windows.

12 When the operational mode selector switch is selected to GUARD, the transmitter and the main receiver are selected to operate on the guard frequency. Consequently, when the function switch is selected to the BOTH position and the operational mode selector switch set to the GUARD position, the transmitter and both receivers will be operative on the guard frequency.

13 The TONE button on the radio set control provides MCW transmission when depressed. This facility is used to enable ground stations to fix the position of the aircraft. The TONE button may also be used to transmit in international morse code.

14 The control marked VOL, on the radio set control, permits adjustment of the audio output level of the receivers. The circuit arrangement is such that the audio output cannot be reduced to zero.

15 The frequency presetting control buttons for the transmitter and the main receiver are located in a horizontal slot under a cover on the front panel. The channel to be preset is selected by rotating the preset frequency control in the centre of the control panel, until the channel number appears in the slot just above the arrow labelled CHANNEL BEING PRESET. This will bring into view the presetting control buttons for that particular channel. Engraved above the slot are four sets of digits, one set for each presetting button. The first set comprises digits 2 and 3, while the digits of the second and third

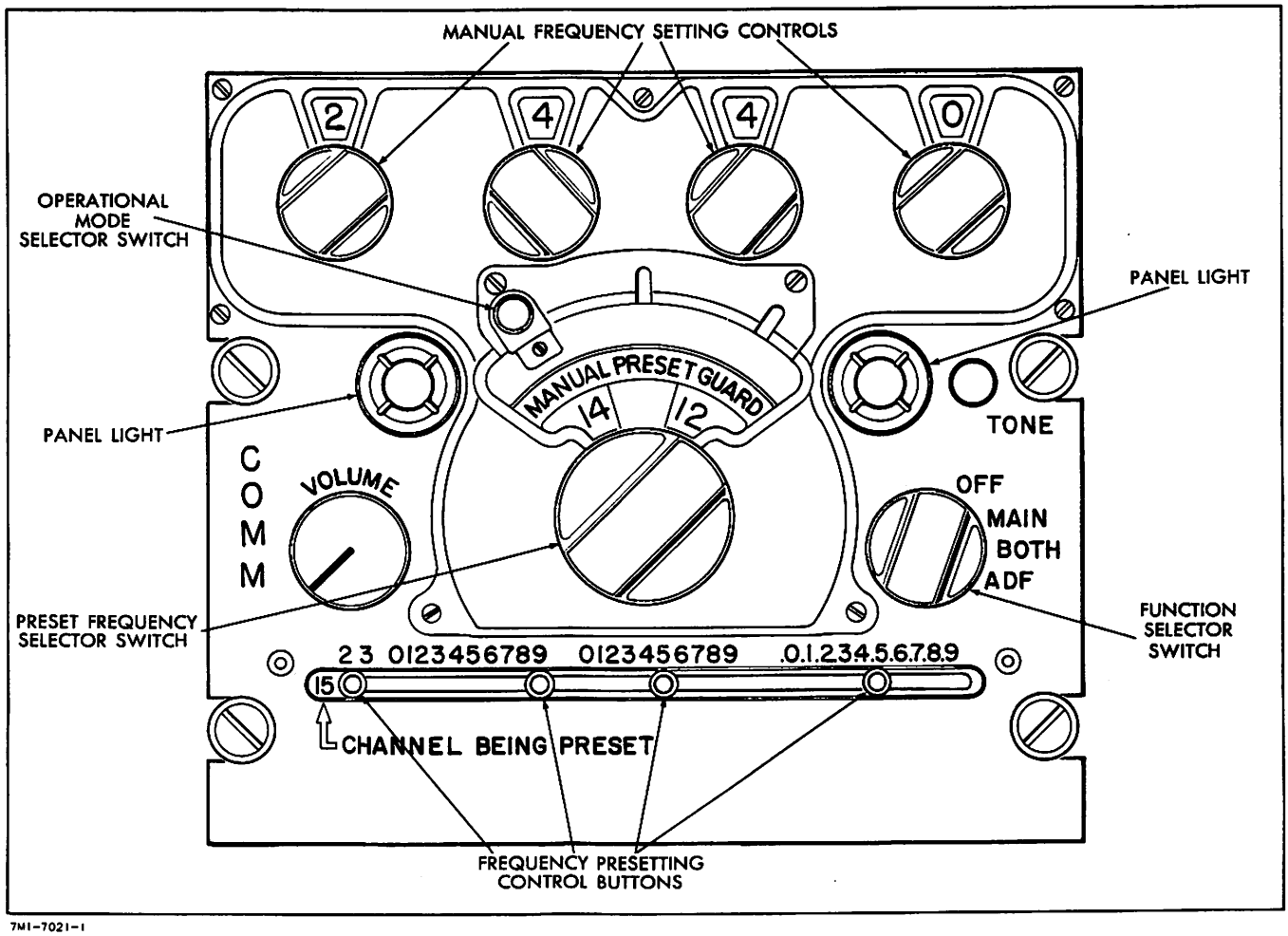

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FIG. 2 RADIO SET CONTROL C1057/ARC-34

sets range in each case from 0 through 9, and of the fourth set from .0 to .9. The left hand button is set to 2 or 3 to correspond with the first digit of the frequency being preset and the remaining buttons are set to correspond with the second, third and fourth digits respectively.

16 The GUARD frequency is preset on the main receiver-transmitter by plugging three leads into pin sockets located in the radio set control. The first digit of the guard frequency is always 2 and is permanently set up in the control. The three leads are plugged into pin sockets corresponding to the second, third and fourth digits of the guard frequency.

UHF ANTENNA SYSTEM

17 Two antennas, designated the upper UHF antenna and lower UHF antenna, are provided to give satisfactory coverage over the operating frequency range of the UHF radio system. A switch located on the front cockpit switch panel R4 energizes the antenna transfer relay. This enables the operator to switch from one antenna to the other to obtain best results for the frequency in use.

18 The upper UHF antenna is a fan shaped vertical radiator, located in the fin tip. The lower UHF antenna is a downward facing slot type radiator, mounted on the electronic equipment bay door.

EMERGENCY OPERATION

19 MCW transmission on the distress frequency is obtained automatically upon ejection of either the front cockpit seat or the rear cockpit seat. A micro-switch is mounted on the bulkhead behind each cockpit seat. The two micro-switches are wired in parallel and, upon ejection of either seat, operate to energize two relays in junction box R9. One relay connects a distress frequency network, also located in junction box R9, to the transmitter-receiver circuits, causing the set to tune to the distress frequency. The second relay energizes control circuits to initiate MCW transmission, irrespective of the setting of the function switch on the radio set control, provided that the equipment is switched on.

20 A UHF/IFF emergency press-to-test switch, located on the front cockpit switch panel R4, overrides the micro-switches to facilitate testing the distress function of the system.

SYSTEM POWER REQUIREMENTS

21 The system operates on 27.5 volts DC. The current consumption for reception is 13.5 amps and for transmission is 18 amps. A dynamotor in the receiver-transmitter assembly provides 320 volts DC for the plate supply to the transmitter and 120 volts DC for the receiver plate supply. The tube heaters are connected in a series-parallel arrangement across the aircraft 27.5 volts DC supply. The power output of the transmitter is approximately 10 watts.

TESTING AND SERVICING

GENERAL

22 Function testing of the AN/ARC-34 UHF radio system should be carried out at the periods specified in the Maintenance Schedule and after replacing or repairing any part of the system.

23 Periodically the transmitted output should be checked with a field strength meter and the readings noted. If, during successive checks over a period of time, a noticeable reduction in field strength is observed, the transmitter should be removed for bench testing.

24 A Termaline Wattmeter Model 6154, or equivalent, and a Field Strength meter (TD drawing 13-74) are required to carry out function tests.

25 The Main and Guard receiver squelch controls located on the front panel of the receiver-transmitter are adjusted before the equipment is installed in the aircraft. Final adjustment is performed when the aircraft engines are running at cruising speed and all electrical and electronic equipment operating normally. (The procedure for performing this adjustment will be issued later).

ARROW 1 SERVICE DATA

FREQUENCY PRESETTING

26 The procedure for setting up the preset frequencies on the transmitter and main receiver is as follows:

(a) Open the cover on the front panel of the radio set control by unscrewing two knurled screws, to expose the frequency presetting buttons. Unclip the presetting tool from inside the cover.

(b) Turn the function selector switch to OFF and the operational mode selector switch to MANUAL or GUARD.

(c) Turn the preset frequency selector switch until the desired channel number appears in the slot just above the arrow marked CHANNEL BEING PRESET.

(d) Using the presetting tool, position the four buttons so that the numbers under which they are located indicate, reading from left to right, the required frequency. For example, to set up a frequency of 369.5 Mc/s proceed as follows:

(1) Set the extreme left hand button under 3.

(2) Set the second button from the left under 6.

(3) Set the third button from the left under 9.

(4) Set the right hand button under .5.

(e) Select the preset frequency selector switch to the next channel to be preset and repeat the procedure given in step (d).

(f) Repeat this procedure for all channels.

(g) Refit the presetting tool and secure the cover.

27 To set up the GUARD frequency on the transmitter and main receiver proceed as follows:

(a) Remove the rear cover of the radio set control by turning the knurled screw in the centre of the cover.

(b) Locate three leads clipped to pin sockets mounted under the frequency setting resistors. Each pin socket is engraved with the frequency digit it represents.

(c) Plug the three leads into the appropriate pin sockets to correspond with the second, third and fourth digits respectively of the guard frequency, reading from left to right. The first digit is always 2 and is permanently set up in the radio set control.

(d) Refit the rear cover.

PREPARATION FOR TESTING

28 Prior to carrying out function tests proceed as follows:

(a) Position the aircraft in an area sufficiently clear of screening to permit communication with the local control tower or other stations.

(b) Connect an external 115V AC three phase power supply to the aircraft.

FUNCTION TESTING PROCEDURE

29 Two operators are required to carry out function testing of the system, one to operate the controls in the cockpit and one to observe external meter readings. Testing is carried out from controls in the front cockpit, the rear cockpit controls being adequately covered during function testing of the interphone system. The testing procedure is as follows:

(a) Open the electronic equipment bay centre access door to gain access to the AN/ARC-34 radio set.

(b) Disconnect the antenna from the radio set and substitute an RF output meter, Termaline Wattmeter Model 6154 or equivalent, as a dummy load to avoid antenna radiation.

(c) Select to ON the master electrical switch in the front cockpit.

(d) Select the controls on the radio set control C1057/ARC-34 as follows:

(1) Function selector switch to MAIN.

(2) Operational mode selector switch to PRESET.

(3) VOLUME control fully clockwise.

(e) Select the controls on the interphone control panel as follows:

(1) COMM mixing switch on (up).

(2) Rotary selector switch to COMM.

(3) VOL control to the 12 o'clock position.

(f) Plug a headset type H-70/AIC and microphone type M-33/AIC, or equivalent, into the quick release connector on the front cockpit seat.

(g) Allow not less than three minutes for the equipment to warm up.

(h) Set the preset frequency selector switch on the radio set control to each preset frequency channel in turn and at each selection depress the press-to-transmit (PTT) switch on the throttle box. Check that the wattmeter indicates a reading of 10 $\pm$ 2 watts output for each channel.

(j) Select the operational mode control to MANUAL.

(k) Set up a manual frequency at the lower end of the frequency range and depress the PTT switch. Check that the wattmeter indicates a reading of 10 $\pm$ 2 watts output.

(m) Repeat operation (k) selecting a frequency about the middle and then at the upper end of the frequency range.

(n) Select the operational mode selector to GUARD, depress the PTT switch and check that the wattmeter indicates a reading of 10 $\pm$ 2 watts output.

30 Check the distress function of the equipment proceeding as follows:

(a) Ensure that the IFF system is inoperative by selecting to OFF the selector switch on the IFF control panel in the front cockpit.

(b) Depress the UHF/IFF emergency press-to-test switch on switch panel R4 in the front cockpit and check that the wattmeter indicates a reading of 10 $\pm$ 2 watts output. Check also that a 1000 cps note is heard in the headset.

(c) Check operation (b) with the function selector switch selected to each position in turn, excepting the OFF position.

(d) Check that when the UHF/IFF emergency press-to-test switch is released, the system returns to the normal operating condition.

NOTE

To check the distress function by operating the ejection seat micro-switches it is necessary to remove the ejection seats from the aircraft.

31 Switch off the equipment, disconnect the wattmeter and reconnect the UHF antenna to the radio set, then carry out communication tests proceeding as follows:

(a) Select the controls on the radio set control panel as follows:

(1) Function selector switch to MAIN.

(2) Operational mode selector switch to PRESET.

(3) Preset frequency selector switch to the channel number of the local control tower.

(4) VOLUME control fully clockwise.

(b) Select the controls on the interphone control panel as follows:

(1) Rotary selector switch to COMM.

(2) COMM mixing switch on (up).

(3) VOL control to the 12 o'clock position.

(c) Allow not less than three minutes for the equipment to warm up.

(d) Select the UHF antenna selector switch on switch panel R4 in the front cockpit to UPPER UHF ANTENNA.

(e) Establish two way voice communication with the local control tower using the PTT switch on the throttle box.

(f) Check that sidetone is heard in the headset and that strong and undistorted signals are received.

(g) Check that manipulation of the interphone volume control produces variation of the signal level.

(h) Check that manipulation of the volume control on the radio set control panel produces variation of the signal level.

NOTE

Manipulation of the volume control on the radio set control panel must not at any point render the signal inaudible.

(j) Select the UHF antenna selector switch to LOWER UHF ANTENNA and repeat operation (e).

(k) Depress the TONE button on the radio set control and check that an MCW tone is transmitted and a 1000 cps note is heard in the headset as sidetone.

(m) Check the transmitted output from each antenna with a field strength meter.

(n) Select the operational mode selector switch to GUARD and establish two-way communication on the GUARD frequency.

(p) Select the function selector switch to BOTH and the operational mode selector switch to PRESET.

(q) Establish communication with the local tower and arrange for a simultaneous transmission on the GUARD frequency.

(r) Check that both GUARD frequency and preset frequency signals are received.

(s) Select the operational mode selector switch to MANUAL and manually set up the frequency of the local control tower or other convenient frequency.

(t) Establish two-way voice communication on this manually set frequency.

(u) Switch off the equipment.

UNCLASSIFIED

FIG. 3 UHF COMMAND RADIO AN/ARC-34

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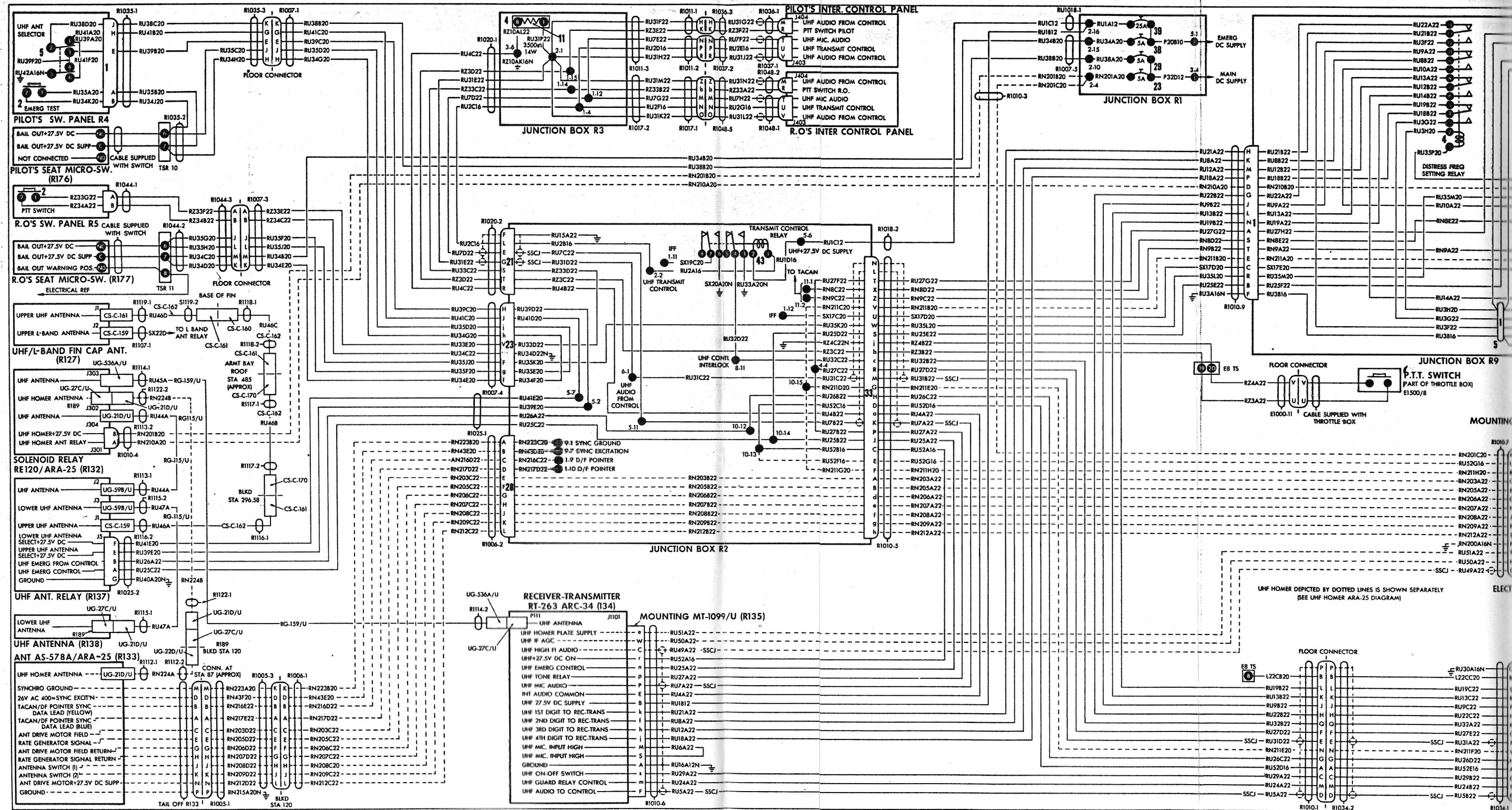

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FIG. 3 UHF COMMAND RADIO AN/ARC-34

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Radio Set Control	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EA/44178)	C1057/ARC-34	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Houses the operating controls for the UHF radio system. Also houses the frequency presetting controls for the transmitter and main receiver.

LOCATION

Mounted on the LH console - Front cockpit.

ACCESS

MEN X MINUTES

Unobstructed when the unit is released from the console.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure cable assembly R1034-1.
Secure the ground lead.
Fit and secure the control box to the console - four quick-release fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the connector is securely and properly fitted. Check that the ground lead is secure and making good electrical contact. Check switches and controls for smooth operation.		

FUNCTIONAL CHECKS	MEN X MINUTES	
Check the panel light filaments for serviceability.		

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
Field strength meter (TD Dwg. 13-74).
RF output meter, Termaline Wattmeter Model 6154 or equivalent.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Receiver-Transmitter	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EU/44176)	RT-263/ARC-34	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

Voice or MCW communication in the 225.0 to 399.9 Mc/s frequency range.
Signals to the UHF Homer Adaptor AN/ARA-25 for automatic direction finding purposes.
By means of an additional receiver, monitoring of a distress frequency.
Automatic transmission of MCW signals on the distress frequency upon the ejection of either cockpit seat.

LOCATION

Mounted on the LH side of the electronic equipment bay centre access door.

ACCESS

	MEN X MINUTES
Release the electronics equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronic equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay centre access door.	

REPLACEMENT PROCEDURE

	MEN X MINUTES
Fit and secure the Receiver-Transmitter to its mounting - two quick-release fasteners. Fit and secure the antenna cable assembly (R1114-2). Secure the ground lead. Select the motor actuator switch UP and raise the electronic equipment bay centre access door. Secure the access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check the cables and connectors for damage and security of attachment. Check that the ground lead is secure and making good electrical contact.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
Field strength meter (TD Dwg. 13-74).
RF output meter, Termaline Wattmeter Model 6154 or equivalent.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Receiver-Transmitter Mounting	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EP/44177)	MT-1099/U	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To support and cushion the AN/ARC-34 Receiver-Transmitter and to facilitate interconnection between Receiver-Transmitter and aircraft cabling.

LOCATION

Mounted on the LH side of the electronic equipment bay centre access door.

ACCESS

	MEN X MINUTES	
Release the electronics equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronic equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay centre access door.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure the mounting to the access door - 16 screws. Fit and secure cable assembly R1010-6. Secure the ground lead. Select the motor actuator switch UP and raise the electronic equipment bay centre access door. Secure the access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check for security of attachment. Check plugs and cabling for damage. Check that the ground lead is secure and making good electrical contact. Check shockmounts for damage.		

UNCLASSIFIED

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
RF output meter, Termaline Wattmeter Model 6154 or equivalent.
Field strength meter (TD Dwg. 13-74).

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Upper UHF Antenna	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1383-55	Sinclair Radio Lab.	308-UL	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To transmit and receive signals in the UHF band.

LOCATION

Fin tip - Combined with upper L-Band Antenna.

ACCESS

	MEN X MINUTES	
Remove fin tip - 56 screws.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure the antenna to the fin tip - 12 screws. Fit and secure the antenna coaxial connectors. Lift fin tip on to structure. Secure fin tip to fin - 56 screws.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check antenna for security, damage, cracks and corrosion. Check connectors for security and corrosion.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
Field strength meter (TD Dwg. 13-74).

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Lower UHF Antenna	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-11	Sinclair Radio Lab.	U-ASA-236	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To transmit and receive signals in the UHF Band.

LOCATION

RH side lower fuselage between stations 265 and 292.

ACCESS

	MEN X MINUTES	
Release the electronics equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronic equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay centre access door.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure one coaxial connector. Fit and secure the antenna to the fuselage - 64 screws. Select the motor actuator switch UP and raise and secure the electronic equipment bay centre access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check antenna for security of mounting. Check connector for security. Check external surface of antenna for cracks.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
Field strength meter (TD Dwg. 13-74).

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Antenna Switching Unit	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-13	Aircraft Appliances and Equipment	CS-115-A	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 200 hours

FUNCTION

To facilitate switching the upper or lower UHF antenna to operate with the UHF Radio system as selected by the antenna selector switch.

LOCATION

On the roof of the electronic equipment bay at station 282 RH side.

ACCESS

	MEN X MINUTES	
Release the electronic equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronic equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay centre access door.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure the unit to the electronic equipment bay roof - four screws. Fit and secure four cable assemblies (R1025-2, R1115-2, R1116-2, R1113-1). Select the motor actuator switch UP and raise the electronic equipment bay centre access door. Secure the access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the connectors are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
Field strength meter (TD Dwg. 13-74).

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Junction Box R9	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-61	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

Houses two relays and a resistor network which initiate automatically, the operation of the UHF radio system and the IFF system in their respective distress functions upon the ejection of either cockpit seat.

LOCATION

Electronic equipment bay centre access door.

ACCESS — MEN X MINUTES

Remove access panel on outer face of electronic equipment bay access door - 64 screws.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the junction box to the access door - four screws.
Refit the access panel on the outer face of the electronic equipment bay access door - 64 screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check wiring and connectors for security of attachment.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
RF output meter, Termaline Wattmeter Model 6154 or equivalent.
Field strength meter (TD Dwg. 13-74).

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Micro-switch; front cockpit seat	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1352-88	Minneapolis-Honeywell	9AC4	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Operates upon ejection of the front cockpit seat to initiate the automatic operation of the UHF radio system on the distress frequency. Also switches the IFF system to transmit the Emergency reply, when interrogated

LOCATION

Front cockpit bulkhead at station 176.

ACCESS

Accessible on the bulkhead at station 176 when the front cockpit ejection seat is removed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Have the ejection seat removed.
Fit the micro-switch to the mounting bracket.
Connect the circuit wiring to terminal strip R10.
Have the ejection seat refitted.

MEN X MINUTES

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check the wiring for security of attachment.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
RF output meter, Termaline Wattmeter Model 6154 or equivalent.
Field strength meter (TD Dwg. 13-74).

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	UHF COMMAND RADIO AN/ARC-34	Micro-switch; rear cockpit seat	44

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1352-89	Minneapolis-Honeywell	9AC4	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Operates upon ejection of the rear cockpit seat to intiate the automatic operation of the UHF radio system on the distress frequency.
Also switches the IFF system to transmit the Emergency reply, when interrogated.

LOCATION

Rear cockpit bulkhead at station 288.

ACCESS

MEN X MINUTES

Accessible on the bulkhead at station 288 when the rear cockpit ejection seat is removed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Have the ejection seat removed.
Fit the micro-switch to the mounting bracket.
Connect the circuit wiring to terminal strip R11.
Have the ejection seat refitted.

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check the wiring for security of attachment.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
RF output meter, Termaline Wattmeter Model 6154 or equivalent.
Field strength meter (TD Dwg. 13-74)

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASSIFIED

ARROW 1 SERVICE DATA

SECTION 45

ELECTRONICS

IFF AN/APX-6A

(This data supersedes previous issue dated 24 Sep 57)

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ELECTRONICS

IFF AN/APX-6A

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The purpose of the IFF System is to enable the aircraft in which it is installed to identify itself when interrogated by coded transmissions from ground or airborne radar sets. The coded interrogation transmissions can be transmitted in any one of three modes classified as Mode 1, Mode 2 and Mode 3. Each mode of interrogation initiates the transmission of a corresponding mode of reply from the IFF transmitter-receiver (transponder). The reply is presented on the interrogator's radar display adjacent to the target pip.

2 Mode 1 interrogation serves for general identification of any aircraft detected by a ground or airborne radar set. Modes 2 and 3 permit specific aircraft to be identified and distinguished from other aircraft. Normally, modes 2 and 3 are used only when requested by radio or prior to take-off.

3 An emergency reply, which overrides the three normal modes, can be selected. This reply will be transmitted when the aircraft is interrogated irrespective of the mode of interrogation.

4 The system installation comprises the following main component units:

(a) Receiver-Transmitter (Transponder) RT-279/APX.

(b) Receiver-Transmitter Mounting MT-362A/A.

(c) Radar Set Control C-1158/APX.

(d) Antenna Assembly.

RECEIVER-TRANSMITTER (TRANSPONDER) RT-279/APX

5 The transponder is essentially a receiver-decoder transmitter. Interrogation signals, consisting of pairs of radio-frequency pulses with a definite time interval between the two pulses of each pair, are mixed, detected and amplified by the receiver. The resulting pairs of video pulses are then passed to the decoder stage. Three decoder stages are provided, one each for modes 1, 2 and 3. The decoders are receptive only to their respective modes as determined by the time interval between the pulses of each pair. Acceptance of a signal by any of the decoders results in a signal to a corresponding mode 1, 2 or 3 pulse generator. The pulse generators produce the reply pulses which are transmitted to the interrogator.

6 In normal operation, a single pulse is transmitted in response to mode 1 or 3 interrogation. Mode 2 interrogation is answered with paired pulses. If the transponder is switched for the emergency reply, all interrogations, irrespective of the mode, are answered with groups of four pulses.

7 The transponder operates within the frequency band 950-1150 Mc/s on two spot frequencies, one for reception and one for transmission. These frequencies are pretuned by three controls on the front panel marked TRANS-FREQ, RECR-FREQ and LO-FREQ. Each control actuates a three-digit drum-type counter mechanism connected with the tuning linkage to the transmitter, receiver and local oscillator. A calibration chart is provided on the front panel for recording the settings.

8 A NORM-MOD switch located in a recessed position at the back of the transponder provides for normal operation of the system when selected to the NORM position. The MOD position provides for operation of the system with a Selective Identification Feature (SIF) system not fitted to this aircraft.

9 The control and selection switches for the operation of the transponder are grouped on a Radar Set Control unit. This permits the transponder to be remotely controlled.

RADAR SET CONTROL UNIT C-1158/APX

10 The radar set control unit C-1158/APX incorporates a five-position master selector switch, two switches for mode selection and a switch for special operation of the system.

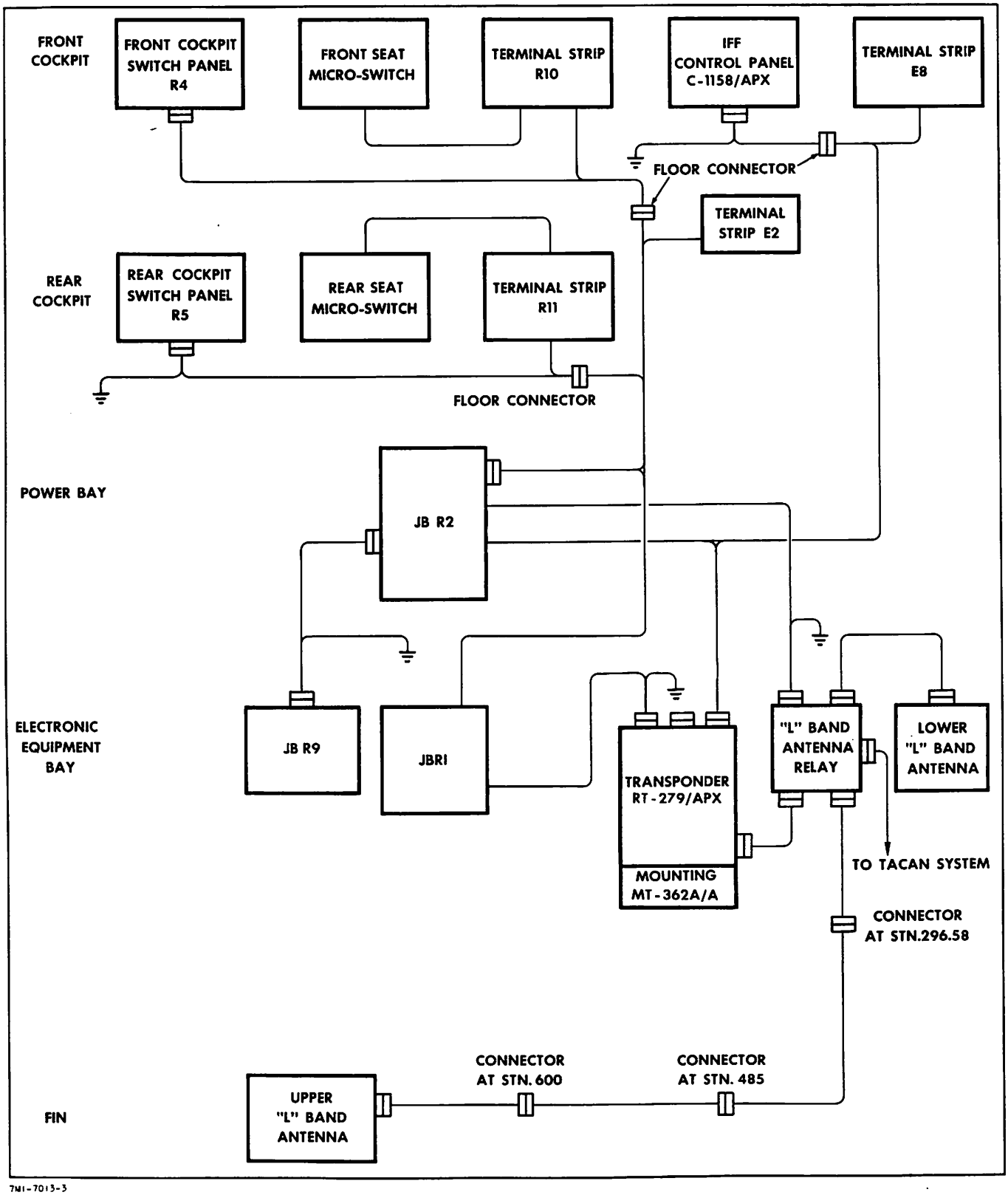

FIG. 1 IFF AN/APX-6A - GENERAL ARRANGEMENT

UNCLASSIFIED

11 The master selector switch is marked OFF - STDBY - LOW - NORM - EMERGENCY. When STDBY is selected, all primary power is switched ON and the tubes are heated in readiness for immediate operation. In the LOW position, the sensitivity of the receiver is reduced and replies will be transmitted only upon the receipt of strong interrogation signals. This position is used, primarily, to limit the operating range of the transponder. In the NORM position, the receiver operates at maximum sensitivity.

12 When the EMERGENCY position is selected, the receiver operates at maximum sensitivity and, irrespective of the mode of interrogation or the mode selected on the transponder, the emergency reply is transmitted. A mechanical stop prevents the selection of the EMERGENCY position until a release button located adjacent to the position is depressed.

13 The mode selection switches provide for the manual selection of mode 2 and mode 3. The transponder is automatically receptive to mode 1 interrogation when the selector switch is set to the Low and Normal positions and regardless of whether mode 2 and mode 3 are selected.

14 The MODE 2 switch is marked MODE 2 - OUT. When the switch is selected to MODE 2 the system will respond to MODE 1 and MODE 2 interrogations.

15 The MODE 3 switch is marked MODE 3 - OUT. When the switch is selected to MODE 3 the system will respond to MODE 1 and MODE 3 interrogations.

16 The I/P - OUT - MIC switch is a three position switch for special operation of the system on MODE 2. The switch functions are as follows:

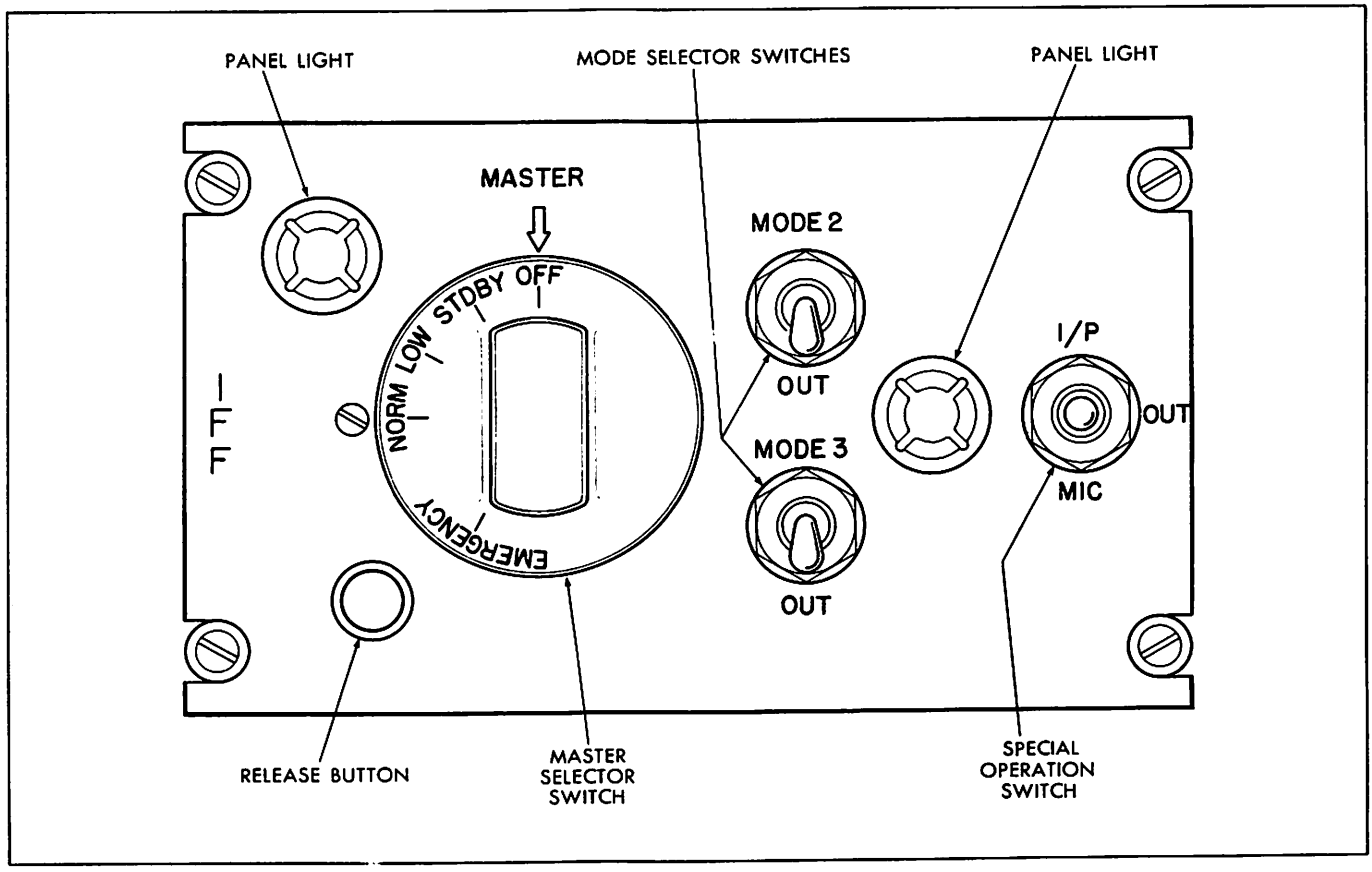

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FIG. 2 RADAR SET CONTROL UNIT C-1158/APX

UNCLASSIFIED

(a) When the switch is held at the spring-loaded I/P (Identification of Position) position, the system will respond to MODE 2 interrogations. This position is inoperative in this aircraft.

(b) When the switch is selected to the OUT position the system will respond to interrogations normally.

(c) When the switch is selected to the MIC position the system will respond to MODE 2 interrogations whenever the UHF transmitter is energized.

DISTRESS OPERATION

17 Emergency operation of the IFF system is obtained automatically upon ejection of either the front or the rear cockpit seat. Micro-switches located on the bulkhead behind each seat are operated upon seat ejection to energize an IFF distress relay. The transponder will then transmit the EMERGENCY reply when interrogated. A UHF/IFF Emergency Press-to-Test switch mounted on panel R4 in the front cockpit is wired in parallel with the micro-switches. This switch is used to check the circuit.

ANTENNA SYSTEM

18 Two antennas designated the upper L-Band antenna and the lower L-Band antenna, are provided to give satisfactory coverage over the operating frequency range of the IFF system. The upper L-Band antenna is a fan shaped vertical radiator located in the fin tip. The lower L-Band antenna is an annular slot type radiator, mounted flush with the aircraft skin forward of the electronics equipment bay access door. Provision is made to use the L-Band antennas with TACAN if this system is fitted. A two position switch on switch panel R5 in the rear cockpit marked IFF UP/TACAN LOW and IFF LOW/TACAN UP enables the operator to transfer from one L-Band antenna to the other as required.

SYSTEM POWER REQUIREMENTS

19 The IFF system operates on 115 volts AC at 2 amps and 27.5 volts DC at 1.5 amps.

FUNCTION TESTING

GENERAL

20 Function testing of the IFF AN/APX-6A system should be carried out as laid down in the servicing schedule and after overhaul or replacement of associated items of equipment.

21 A calibrated Test Set AN/UPM-8 is required to carry out the function tests described below.

PREPARATION FOR TESTING

22 Prepare to carry out function testing proceeding as follows:

(a) Connect an external 115V AC three phase power supply to the aircraft.

(b) Lower the electronic equipment bay centre access door to gain access to the receiver-transmitter RT-279/APX and disconnect the antenna. Check also that the NORM-MOD switch is set to NORM.

(c) Set up a Test Set AN/UPM-8, connecting up power supply and ground cables.

(d) Check the test set to see that the correct crystals are fitted i.e. 42.9166 Mc/s TRANSPONDER REC and 41.8462 Mc/s TRANSPONDER TRANS.

(e) Select to ON the power ON-OFF switch and check that the pilot light on the test set is illuminated.

(f) Select the mode switch to CHECK, depress the press-to-test switch and check that the meter indicates ACCEPT.

(g) Switch OFF the power supply.

FUNCTION TESTING PROCEDURE

23 Carry out transponder tests proceeding as follows:

(a) Connect the TRANSPONDER jack on the test set AN/UPM-8 to the coaxial attenuator CN-180/UPM-8 supplied with the test set.

(b) Connect the attenuator to the transponder ANTENNA terminal by means of RG-58/U cable.

(c) Check that the Transponder RECR FREQ and LOW FREQ dials are set to 1030 Mc/s and the TRANS FREQ dial to 1090 Mc/s by reference to the calibration chart on the front panel of the transponder.

(d) Select to ON the power ON-OFF switch and allow the test set 10 minutes to warm up.

(e) Select to ON the master electrical switch in the front cockpit.

(f) Select the master selector switch on the control unit C-1158/APX in the front cockpit to STDBY and allow 10 minutes to warm up.

(g) Check the operation of the transponder against the results shown in Fig 3.

24 Check the IFF distress function proceeding as follows:

(a) Ensure that the UHF radio system is switched off.

(b) Select the master selector switch on the radar set control to NORM, and the mode switches to any position.

(c) Select the mode switch on the test set to EMERGENCY.

(d) Depress the UHF/IFF emergency PTT switch on panel R4 in the front cockpit.

(e) Depress the press-to-test switch on the test set and check that the meter indicates ACCEPT.

25 Switch off the equipment and the test set. Disconnect the test set, reconnect the transponder antenna and raise the electronic equipment bay access door.

ARROW 1 SERVICE DATA

TRANSPONDER SWITCH SETTINGS				TEST SET AN/UPM-8	
MASTER SWITCH	I/P SWITCH	MODE 2 SWITCH	MODE 3 SWITCH	MODE SWITCH SETTINGS	METER READING when press-to-test switch is depressed
NORM	OUT	OUT	OUT	1 2 3 EMERGENCY	ACCEPT REJECT REJECT REJECT
NORM	OUT	MODE 2	OUT	1 2 3 EMERGENCY	ACCEPT ACCEPT REJECT REJECT
NORM	OUT	MODE 2	MODE 3	1 2 3 EMERGENCY	ACCEPT ACCEPT ACCEPT REJECT
NORM	MIC	OUT	OUT	1 2 3 EMERGENCY	ACCEPT ACCEPT when UHF PTT switch is depressed. REJECT when UHF PTT switch is released. REJECT REJECT
NORM	I/P	OUT	OUT	1 2 3 EMERGENCY	ACCEPT REJECT REJECT REJECT
EMERGENCY	OUT	MODE 2	MODE 3	1 2 3 EMERGENCY	REJECT REJECT REJECT ACCEPT

FIG. 3 IFF AN/APX-6A - TEST CHART

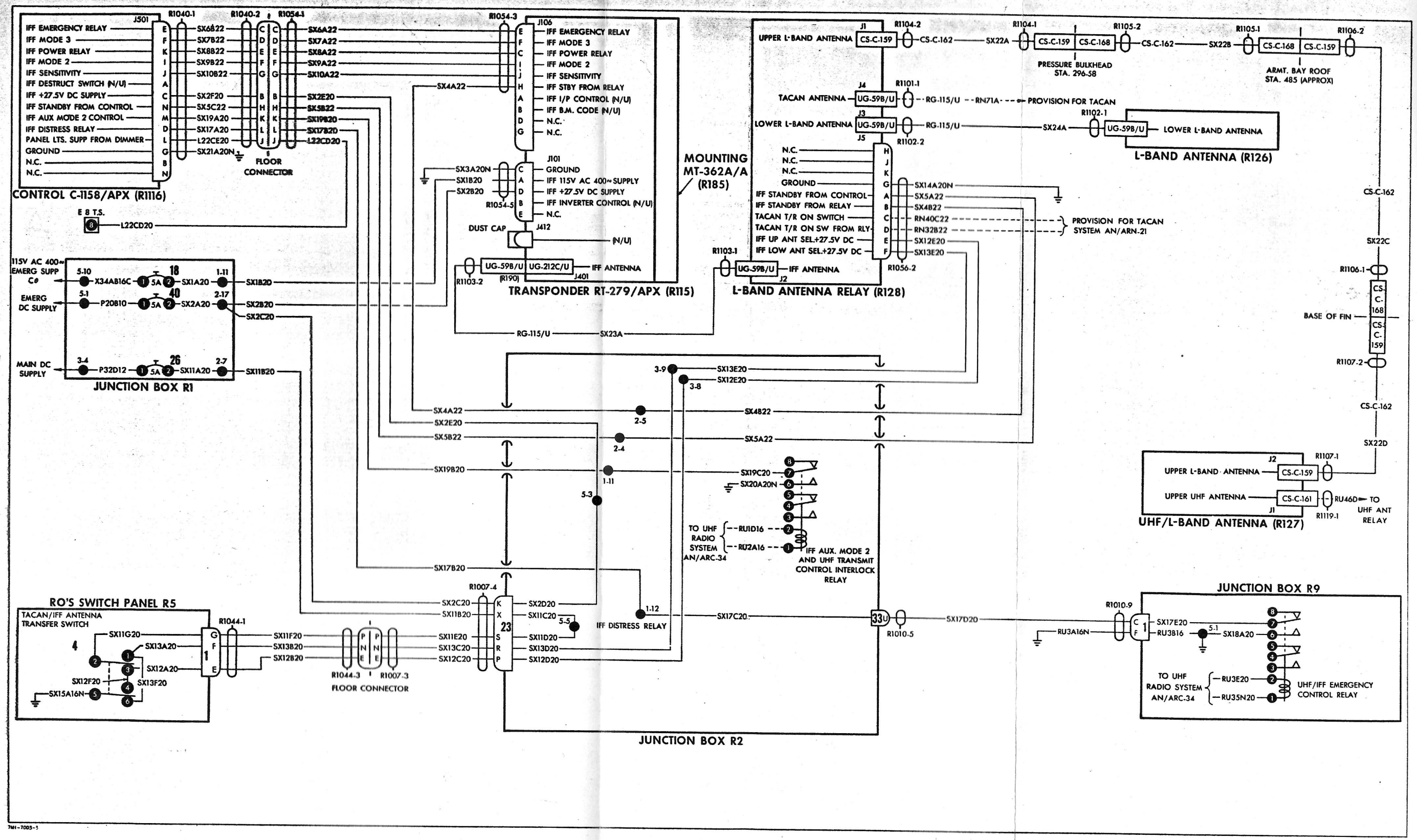

FIG. 4 IFF AN/APX-6A

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	IFF AN/APX-6A	Control Unit	45

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EA/44242)	C1158/APX	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To house a Master selector switch, two mode selection switches and a special operation switch.

LOCATION

Mounted on the LH console in the front cockpit.

ACCESS — MEN X MINUTES

Unobstructed when released from the console.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure cable assembly R1040-1.
Secure the ground lead.
Secure the unit to the console with four quick fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the panel and switches are securely mounted. Operate the switches and check that the lever action is not sluggish or rough and that the make and break is quick. Check that the ground lead is secure and making good electrical contact.		

FUNCTIONAL CHECKS	MEN X MINUTES	
Check the panel light filaments for serviceability.		

GROUND HANDLING AND GROUND TEST EQUIPMENT

Test Set AN/UPM-8
External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA UNCLASSIFIED

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	IFF AN/APX-6A	Receiver-Transmitter (Transponder)	45

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EI/44240)	RT-279/APX	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To receive interrogation signals and transmit signals for aircraft identification purposes.

LOCATION

On the RH side of the electronic equipment bay at station 270.

ACCESS

	MEN X MINUTES	
Release the electronics equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronic equipment bay - two camlocs Select the motor actuator switch DOWN and lower the electronic equipment bay centre access door.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Slide the unit into the shockmount and secure with two knurled locknuts. Fit and secure three cable assemblies (R1103-2, R1054-3, R1054-5). Secure the ground lead. Select the motor actuator switch UP and raise the electronic equipment bay centre access door. Secure the equipment bay door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.		

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the connectors are securely and properly fitted and are not damaged. Check that the ground lead is secure and making good electrical contact.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Test Set AN/UPM-8.
External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	IFF AN/APX-6A	Transponder Mounting	45

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EP/29536)	MT-362A/A	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

Shockmounts the RT-279/APX Receiver-Transmitter.

LOCATION

Electronic equipment bay RH side.

ACCESS

	MEN X MINUTES	
Release the electronic equipment bay centre access door - 33 camlocs Release the motor actuator switch access flap on the RH underside of the electronics equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay access door.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure mounting to airframe with sixteen mounting screws. Select the motor actuator switch UP and raise and secure the electronic equipment bay centre access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the mounting is securely fitted. Check that the mounting is neither damaged nor distorted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	IFF AN/APX-6A	L-Band Antenna - Upper	45

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1383-55	Sinclair Radio Lab.	308-UL	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To transmit and receive signals in the L-Band.
Operates with IFF system or TACAN system as selected by the L-Band antenna selector switch.

LOCATION

Mounted inside the fin tip - combined with the upper UHF Antenna.

ACCESS

MEN X MINUTES	

Remove the fin tip - 56 screws.

REPLACEMENT PROCEDURE

MEN X MINUTES	

Fit and secure the antenna to the fin tip - 12 screws.
Fit and secure cable assemblies R1107-1 and R1119-1.
Refit and secure the fin tip to the fin - 56 screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the antenna is securely mounted. Check the antenna for damage, cracks and corrosion. Check that the connectors are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	IFF AN/APX-6A	L-Band Antenna - Lower	45

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-39	Aircraft Appliances and Equipment		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To transmit and receive signals in the L-Band.
Operates with IFF system or TACAN system as selected by the L-Band Antenna selector switch.

LOCATION

Mounted on the air conditioning equipment bay access panel at station 237 lower fuselage.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure connector UG-496/U.
Fit and secure the unit to the air conditioning bay access panel - 16 screws.

ARROW 1 SERVICE DATA

DECLASSIFIED

INSPECTION	MEN X MINUTES
Check that the antenna is securely mounted. Check the antenna for damage and cracks. Check that the connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	IFF AN/APX-6A	Antenna Switching Relay	45

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-13	Aircraft Appliances and Equipment		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To connect the upper and lower L-Band antennas for operation with the IFF and the TACAN systems as selected by the L-Band antenna selector switch.

LOCATION

On the roof of the electronic equipment bay at station 282 RH side.

ACCESS

	MEN X MINUTES	
Release the electronic equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronics equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay access door.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure unit to airframe using four mounting screws. Fit and secure four connectors (R1056-2, R1101-1, R1102-2, R1104-2). Select the motor actuator switch UP and raise and secure the electronic equipment bay centre access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the relay is securely mounted. Check that the connectors are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	IFF AN/APX-6A	Junction Box - R9	45

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-61	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To house the relay for switching the IFF to give the EMERGENCY reply when interrogated in distress.
Also houses the relays and resistance network for emergency operation of the UHF equipment.

LOCATION

On the outer face of the electronics equipment bay centre access door.

ACCESS

MEN X MINUTES

Remove access panel on outer face of electronic equipment bay access door - 64 screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit the junction box to the airframe - four screws.
Fit and secure cable assembly R1010-9.
Refit the access panel on the outer face of the electronic equipment bay access door - 64 screws.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the junction box for security of mounting and damage. Check that the connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Test Set AN/UPM-8
External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

UNCLASS...ED

ARROW 1 SERVICE DATA

SECTION 46

ELECTRONICS

INTERPHONE AN/AIC-10

(This data supersedes previous issue dated 23 Sep 57)

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ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

ELECTRONICS

INTERPHONE AN/AIC-10

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The Interphone System facilitates the following intercommunication links:

(a) Intercommunication between the aircrew.

(b) Intercommunication between the aircrew and the ground crew.

(c) Reception and transmission on the UHF command radio set.

(d) Reception of aural signals on the radio compass.

(e) Telescramble communication between the operations control centre and the aircraft. This is used when the aircraft is in the "Alert" condition.

2 Provision is made for the reception of the identification code of TACAN ground beacons, if the TACAN system is fitted to the aircraft.

3 Two alternative interphone systems may be fitted in the aircraft, the conventional AN/AIC-10 system, or the transistorized version designated AN/AIC-10A. The AN/AIC-10 system consists of the following components:

(a) Two Control Panels C-824/AIC-10 each fitted with an AF Amplifier AM476/AIC-10.

(b) Relay Assembly RE-94/AIC-10 fitted with an AF Amplifier AM476/AIC-10.

(c) Dynamotor DY-77/AIC-10 and Mounting MT-1060/U.

(d) Two AN/AIC-10 type Headset and Microphone Assemblies.

4 The AN/AIC-10A system consists of the following components:

(a) Two Control Panels C-824A/AIC-10, each fitted with an AF Amplifier AM-476B/AIC-10.

(b) Relay Assembly RE-94A/AIC-10 fitted with an AF Amplifier AM-476B/AIC-10.

(c) Two AN/AIC-10 type Headset and Microphone Assemblies.

5 In the Interphone System AN/AIC-10A the AF Amplifier AM-476/AIC-10 are replaced by transistor versions AM-476B/AIC-10. The two versions of the amplifier are mechanically and electrically interchangeable. When equipped with a transistor type amplifier, Control Panel C-824/AIC-10 is identified as C-824A/AIC-10, and Relay Assembly RE-94/AIC-10 is identified as RE-94A/AIC-10. If one or more units type AM-476/AIC-10 are fitted in the aircraft, the dynamotor is required.

6 The control and selection switches for the system are located on two control panels, one in each cockpit. Interconnection between the interphone system and the pilot's headset and microphone assembly is made via an interphone jack. This jack plugs into the composite quick disconnect unit mounted on the RH side of the ejection seat pan and permits the wiring to break freely when the seat is ejected. The navigator's headset is connected to the interphone system in an identical manner. An extension of the interphone line to the engine starter electrical connector facilitates intercommunication between the ground crew stations and the aircrew stations.

CONTROL PANELS

7 In addition to the AF amplifier, the control panels each contain five mixing switches, a rotary selector switch, a volume control and a NORMAL/AUX LISTEN switch.

8 The mixing switches enable up to five audio input circuits to be monitored simultaneously or individually. The switches and their functions are as follows:

(a) INTER - Provides interphone reception between aircrew stations and between aircrew and ground crew stations.

(b) COMP - Provides reception of aural signals from the radio compass system.

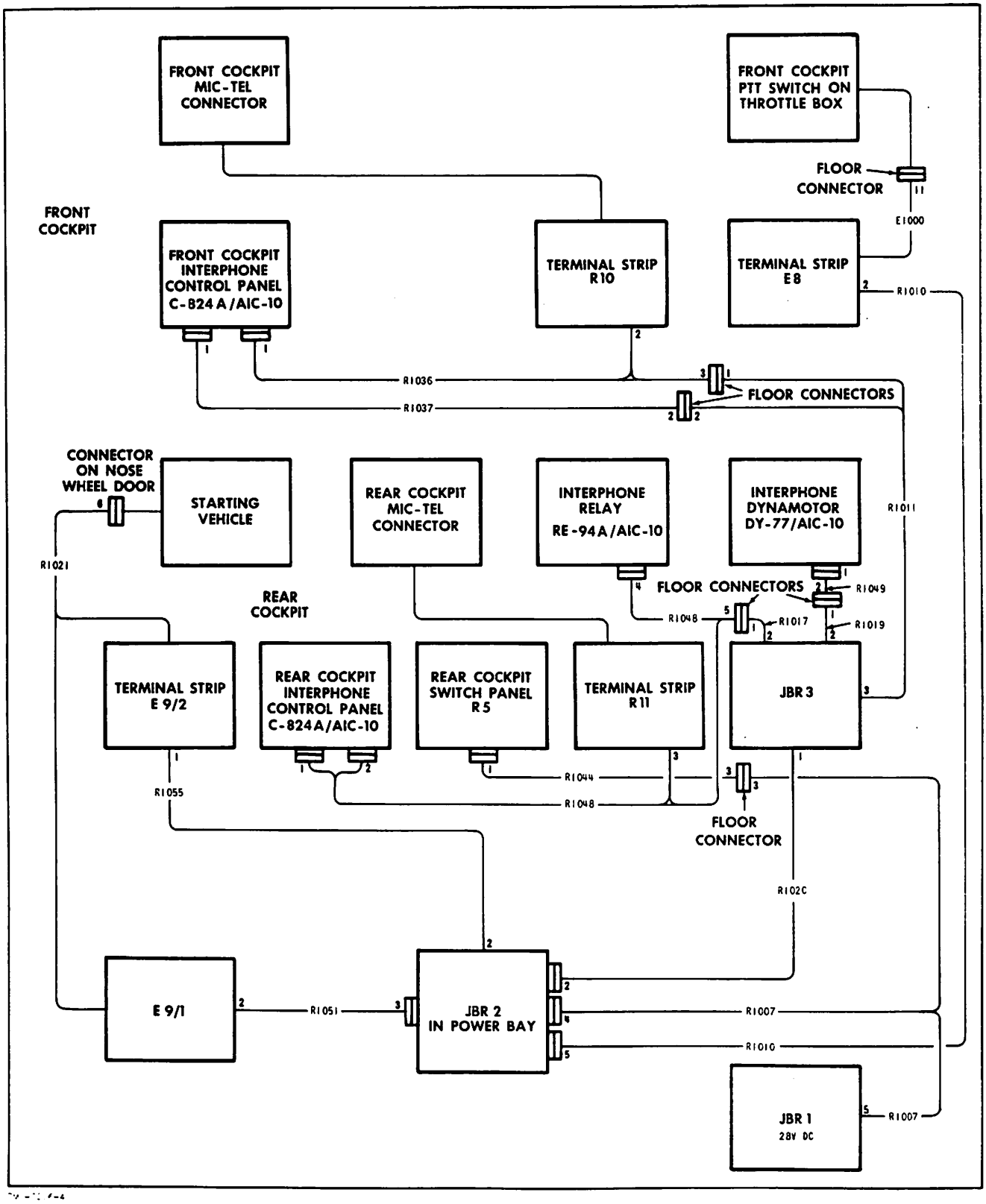

FIG. 1 AN/AIC-10 INTERPHONE SYSTEM - GENERAL ARRANGEMENT

(c) COMM - Provides reception of signals from the UHF command radio receiver and UHF transmission sidetone signals.

(d) TACAN - Provides for the reception of TACAN ground beacon identification signals if the TACAN system is fitted to the aircraft.

(e) TEL - Provides reception of telescramble signals from the operations centre through the telescramble line.

9 The rotary selector switch has six positions of which four are used. The selector switch is used in conjunction with a press-to-transmit (PTT) switch to enable the operator to transmit on the position selected. Two PTT switches are provided, one in each cockpit. The selector switch positions and their function are as follows:

(a) CALL - This position interrupts the listening and/or transmission function which may be in use, to permit "Hot mic" interphone communication between aircrew stations.

(b) INTER - Provides for transmission over the interphone line between aircrew stations and between aircrew and ground crew stations.

(c) COMM - Provides for transmission over the UHF command radio transmitter.

(d) TEL - Provides for transmission over the telescramble line, for communication with the operations centre. This position is used when the aircraft is in the "Alert" condition.

10 The NORMAL/AUX LISTEN switch is wirelocked in the NORMAL position. In the event of a control panel amplifier failure, emergency listening and interphone may be obtained by breaking the wirelocking and switching to AUX LISTEN. In this position the amplifier is by-passed and the headset is connected via a call relay, located in the relay assembly, to any one channel selected by a mixing switch. The mixing switches to the left of the channel in use must be switched off to complete the

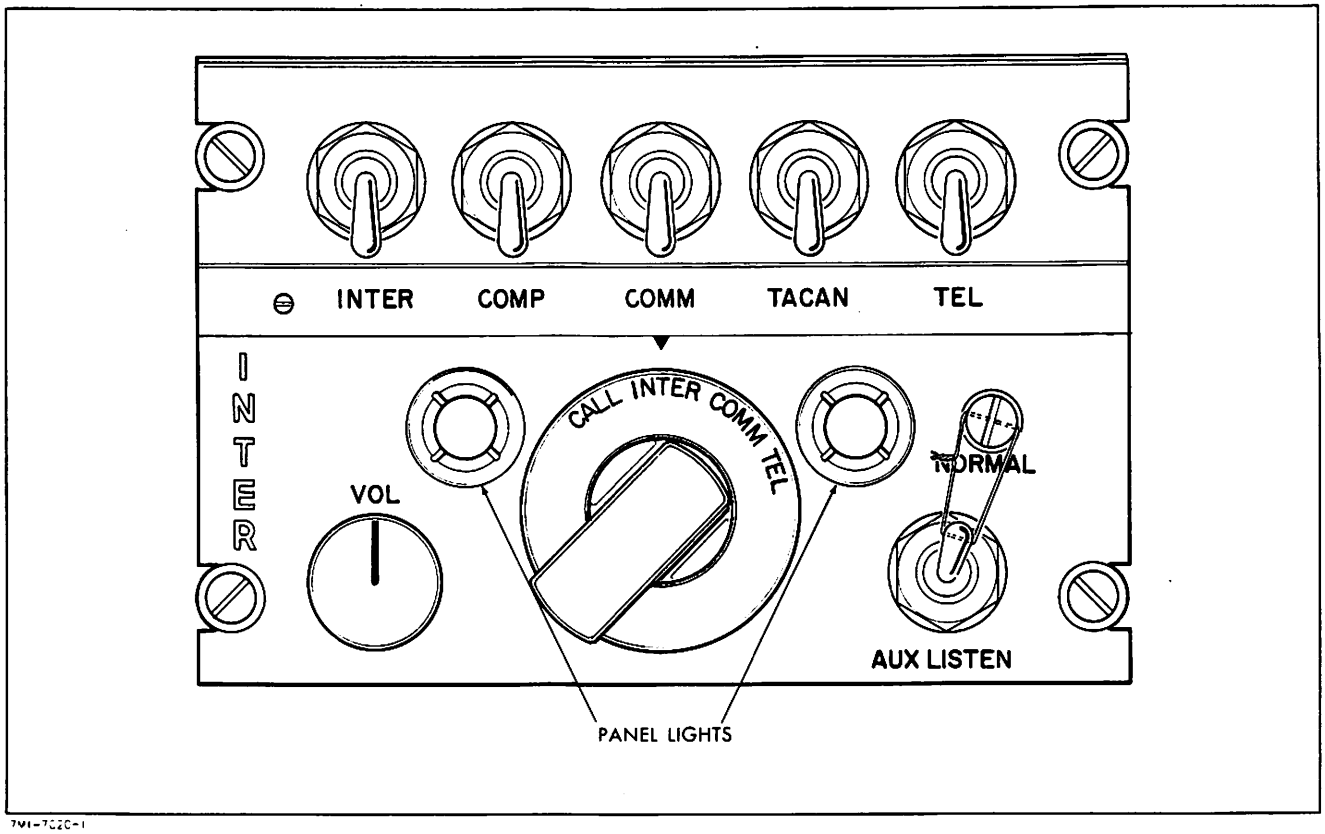

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FIG. 2 INTERPHONE CONTROL PANEL - C-824A/AIC-10

circuit to the selected channel. If all mixing switches are off, the listening channel is the one to which the rotary selector switch is set. When the call relay is energized, the headset is connected to the interphone line permitting interphone between aircrew stations.

11 The volume control, marked VOL varies the level of the audio input to the headset. This control is inoperative in the AUX LISTEN and CALL positions of the relevant switches.

AUDIO FREQUENCY AMPLIFIERS

12 The AF amplifiers are plug-in assemblies fitted one on each control panel and one on the relay assembly. To preserve a high signal to noise ratio, peak clipping and automatic gain control circuits are incorporated. The peak clipping circuit eliminates loud blasts in the headphones caused by speech peaks, and it is normally set to operate when the volume control is rotated beyond the mid-point.

RELAY ASSEMBLY

13 The relay assembly provides for "Hot mic" operation of the equipment. The term "hot mic" is used to describe continuous intercommunication facilities without the necessity of operating the PTT switches. The microphone is always "hot" (in circuit) and the user merely speaks into it.

14 The automatic gain control circuit of the plug-in amplifier fitted to the relay assembly is grounded and inoperative, gain being controlled by two barometric switches. These switches, when closed, short-out limiting resistors in the microphone circuit. The first switch closes at 20,000 feet and the second switch closes at 30,000 feet. This compensates for the decreasing input from the microphones. As the barometric switches are fitted in the pressurized area, the altitudes quoted are cockpit altitudes.

15 "Hot mic" interphone operation is obtained when, on both panels, the rotary selector switch is selected to the COMM position and the INTER mixing switch to the ON position. This provides continuous reception on the COMM channel and permits interphone communication without depression of the PTT switches or interruption of UHF communications reception. Two relays in the relay assembly operate in conjunction with the PTT switches. When a PTT switch is depressed the relevant relay transfers the line to the transmission circuit and the operator is disconnected from the interphone line and transmits and receives on the COMM channel.

DYNAMOTOR

16 The dynamotor operates on 27.5 volts DC with a nominal input current of 1.6 amps. It is equipped with radio frequency and audio frequency filters and high altitude brushes. A 3,500 ohms 14 watt resistor, located in junction box R3, is connected across the 170 volts DC output of the power unit to provide a partial load to maintain a stable output voltage. The dynamotor is not required when all three of the AF amplifiers are the transistorized type; the power supply in this case is derived from the 27.5 volts DC system.

AN/AIC-10 TYPE HEADSET AND MICROPHONE ASSEMBLIES

17 Special type telephone headset H-75/AIC and microphone M-32/AIC assemblies are used with the system. They are designed to provide maximum noise exclusion and high intelligibility at all altitudes.

18 The telephone headset automatically compensates for changes in atmospheric pressure, giving substantially the same response from sea level to a pressure altitude of 60,000 feet. The impedance of the headset is approximately eight ohms and is matched to the 150 ohms impedance of the audio common line by a transformer located in the control panel. The five audio inputs to the audio common line are matched by 150 ohm load-terminating resistors located in JB R3. Resistors are incorporated in the Radio Compass, UHF system, Telescramble and Interphone lines and, if fitted, the TACAN system.

19 The microphone assembly is a moving coil type with noise cancelling characteristics.

Sound is admitted on both sides of the microphone diaphragm. This provides high output for sounds of close origin and weak output for sounds of distant origin. A moisture barrier is fitted over the mouthpiece to afford protection against moisture or dirt.

FUNCTION TESTING

GENERAL

20 Function testing of the interphone system should be carried out periodically as laid down in the servicing schedule, and after overhaul or replacement of associated items of equipment.

21 Special test equipment is not required to carry out the tests, but the correct type of headset and microphone must be used.

22 Arrangements should be made with the local control tower and operations centre for test transmissions.

PREPARATION FOR TESTING

23 Prior to carrying out function tests proceed as follows:

(a) Position the aircraft in an area sufficiently clear of screening to permit signal reception.

(b) Connect an external power supply to the aircraft.

(c) Connect the external interphone connector to the receptacle on the nosewheel door.

FUNCTION TESTING PROCEDURE

24 Two operators, one in each cockpit, are necessary to carry out function testing of the interphone system. The procedure is as follows:

(a) Plug headsets type H-70/AIC and microphones M-33/AIC, or equivalents, into the quick-release connector of the front seat and that of the rear seat.

(b) Select to ON the master electrical switch in the front cockpit.

(c) Select the UHF function selector switch on the UHF radio control panel C1057/ARC-34 in the front cockpit to MAIN, the operational mode selector to PRESET and the preset frequency selector switch to the channel number of the local control tower.

(d) Select the radio compass function selector switch on the radio compass control panel C1513A/ARN-6 in the front cockpit and in the rear cockpit to ANT or LOOP and tune in a radio broadcast or radio range station.

(e) Allow at least three minutes for the equipment to warm up.

25 Check the functioning of the rotary selector switches and press-to-transmit (PTT) switches proceeding as follows:

(a) Switch off (down) all mixing switches on the interphone control panels in the front cockpit and in the rear cockpit.

(b) Select the rotary selector switches on the interphone control panels to INTER and set the VOL controls to the mid point.

(c) Check that interphone between aircrew is available using the PTT switches on the throttle box in the front cockpit and on switch panel R5 in the rear cockpit.

(d) Cover the microphone, press each PTT switch in turn and check that the noise level has the following characteristics:

(1) Dynamotor whine just perceptible (if applicable)

(2) Tube hiss just perceptible(if applicable)

(3) No high level "frying" noises

(4) No "motorboating"

(5) No oscillation

(6) Little or no pick-up from local radio stations or cross-talk from other channels.

(e) Operate the PTT switches and check that an audible click is heard.

(f) Uncover the microphone and bring it close to the headset with the PTT switch depressed and check that oscillation occurs.

(g) Maintain a moderate speech level and close the PTT switch. Check that speech in the talker's headset comes in at a low level and gradually rises to a fixed level in approximately ten seconds.

(h) Check AGC action after the PTT switch has been closed one minute by shouting "ah-h-h" into the microphone following immediately with speech at a moderate level. The speech after shouting should come in at a very low level and gradually build up to a fixed level in approximately ten seconds.

(j) Check that speech clipping (slightly higher pitched and harsher speech) does not occur in the talker's headset when a moderate speech level is used.

(k) Check that clockwise rotation of the volume control increases the speech level and introduces speech clipping.

(m) Select the rotary selector switches in both cockpits to COMM,depress the PTT switch in each cockpit in turn and call the local UHF radio station. Check that clear sidetone is heard in both cockpits when either PTT switch is depressed.

(n) Select on the INTER mixing switch in both cockpits and check that interphone without operation of the PTT switches (i.e. "hot mic" interphone) is possible.

(p) Operate the rotary selector switch to the spring-loaded CALL position at both stations in turn and check that interphone is available regardless of the setting of the other rotary selector switch. Check that the switch returns to the INTER position when released.

26 Check the functioning of the mixing switches proceeding as follows:

(a) Select a spare (unused) position on the rotary selector switch on both control panels and switch off all mixing switches.

(b) Switch on (UP) the INTER mixing switch in the front cockpit only. Check that the front operator is able to hear the rear operator talking when the rear operator selects INTER on his rotary selector switch and depresses his PTT switch.

(c) Switch on the INTER mixing switch in the rear cockpit only. Check that the rear operator is able to hear the front operator talking when he selects his rotary selector switch to INTER and depresses his PTT switch.

(d) Switch on the COMP mixing switch only in each cockpit in turn and check that radio compass signals are heard.

(e) Switch on the COMM mixing switch only in each cockpit in turn and check that UHF radio signals are heard.

(f) Switch on the TEL mixing switch only in each cockpit in turn and check that telescramble signals are heard.

(g) Switch on the INTER and COMP mixing switches together in each cockpit in turn, and check that mixed interphone speech and radio compass signals are heard. Check that the volume of interphone speech may be controlled by the VOL control on the interphone control panel and the volume of radio compass reception by the VOL control on the radio compass control panel.

(h) Switch on the INTER, COMP and COMM mixing switches together in each cockpit in turn and check that mixed interphone speech, radio compass signals and UHF radio signals are heard. Check that signal levels are adjustable by the individual volume controls.

(j) Switch on the INTER, COMP, COMM and TEL mixing switches together in each cockpit in turn and check that mixed interphone speech, radio compass signals, UHF radio signals and telescramble signals are heard. Check tnat signal levels are adjustable by individual volume controls.

27 Check the external interphone function proceeding as follows:

(a) Select ON the interphone switch on the starting vehicle interphone panel.

(b) Select the rotary selector switches on both control panels to INTER.

(c) Check that interphone is available between aircrew and ground crew when the PTT switches are depressed.

28 Check the auxiliary listen function proceeding as follows:

(a) Remove the lockwire from the NORMAL/AUX LISTEN switch on the interphone control panel in the front cockpit and select the AUX LISTEN position.

(b) Switch on each mixing switch in turn on the control panel in the front cockpit and check that listening facilities are available on any one channel at a time with the mixing switches to the left of the selected channel switched off.

(c) Check that with all mixing switches off, listening facilities are available on the channel selected on the rotary selector switch.

(d) Check that the signal level in the AUX LISTEN position is lower than in the NORMAL position.

(e) Wirelock the switch in the NORMAL position.

(f) Repeat operations (a) through (e) for the rear cockpit control panel.

(g) Switch off the equipment.

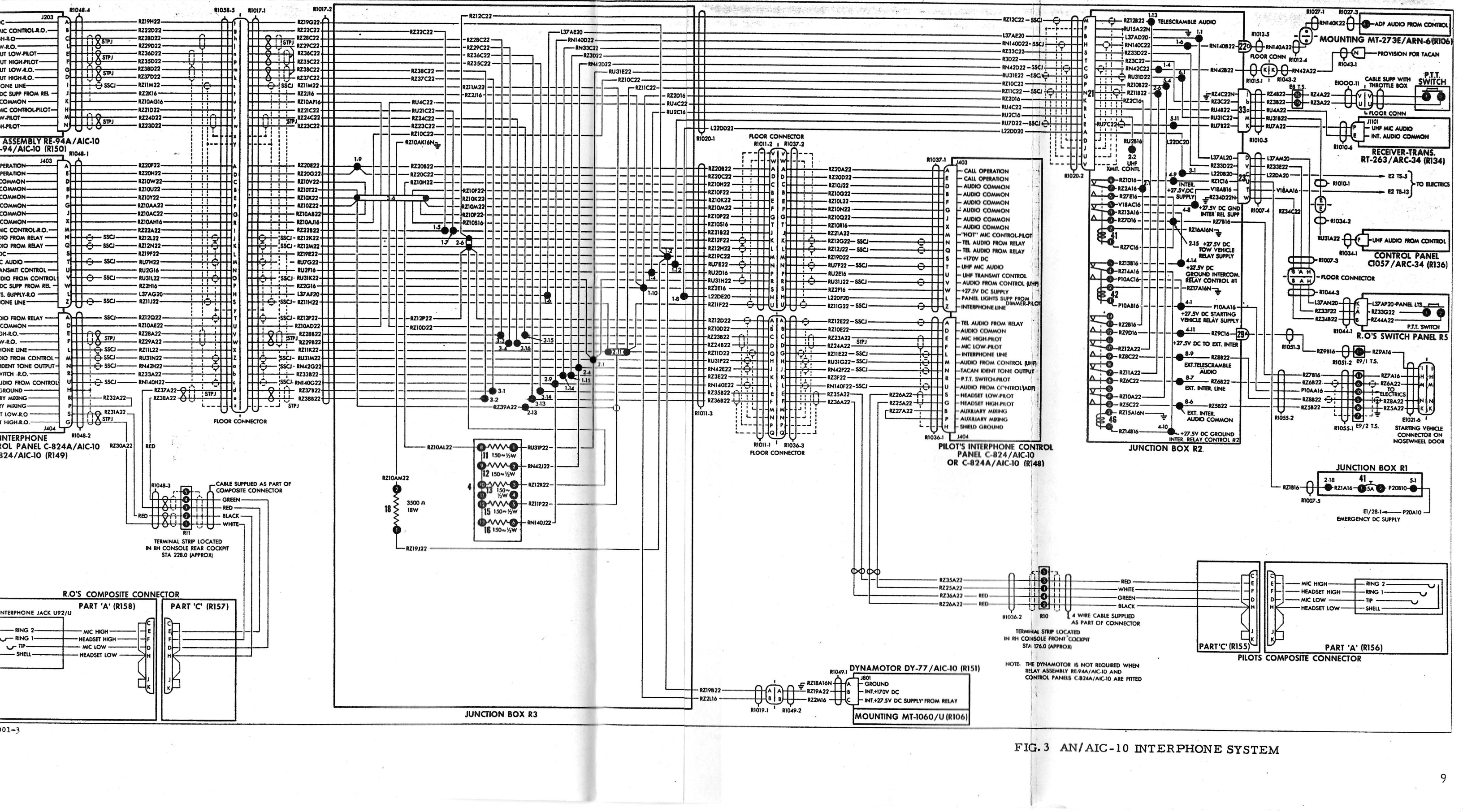

FIG. 3 AN/AIC-10 INTERPHONE SYSTEM

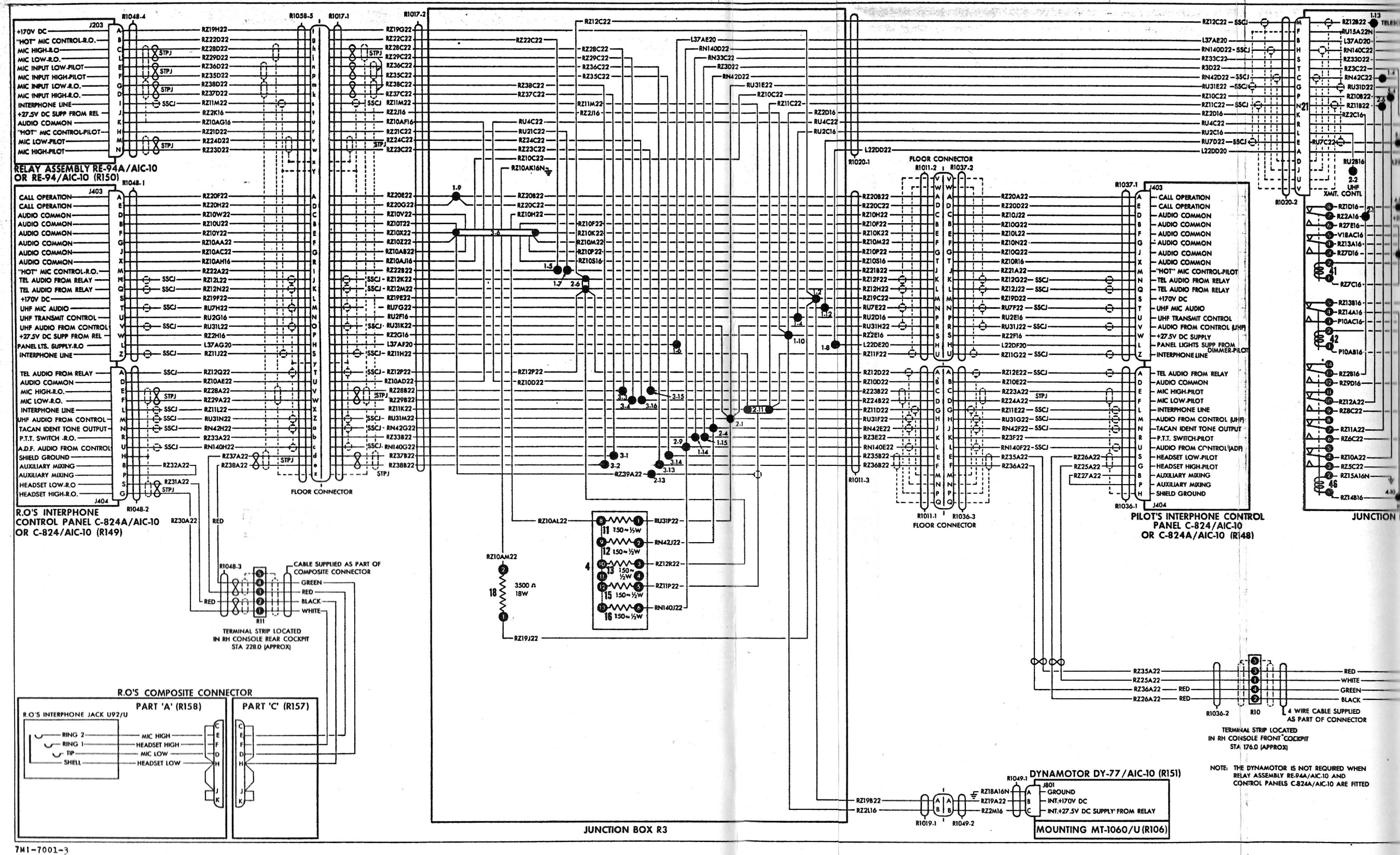

FIG. 3 AN/AIC-10 INTE

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	INTERPHONE AN/AIC-10	Control Panel (Front and Rear Cockpit)	46

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1352-21	RCAF Supply	C-824A/AIC-10 (Modified to Avro 7-1352-21)	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To house the control and function selection switches of the interphone system. Contains AF Amplifier type AM-476B/AIC-10 which is transistorized. Alternative control panel C-824/AIC-10 contains AF Amplifier type AM-476/AIC-10.

LOCATION

Mounted on the RH console - Front cockpit and Rear cockpit.

ACCESS

Unobstructed when released from the console - four quick fasteners.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit and secure two cable assemblies
(R1036-1 and R1037-1 front cockpit),
(R1048-1 and R1048-2 rear cockpit).
Fasten the unit to the console with four quick fasteners.

MEN X MINUTES	

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the connectors are securely and properly fitted. Check that the unit is securely mounted. Operate the controls and switches and check that the action is not rough or loose. Check that the AUX-NORMAL switch is wirelocked in the NORMAL position.	

FUNCTIONAL CHECKS	MEN X MINUTES
Check the panel light filaments for serviceability.	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	INTERPHONE AN/AIC-10	Relay Assembly	46

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply	RE-94A/AIC-10	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To provide "hot mic" interphone communication between crew members. Also incorporates two barometric pressure switches which operate automatically and maintain constant gain with increasing altitude. Contains AF Amplifier type AM-476B/AIC-10 which is transistorized. Alternative Relay Assembly RE-94/AIC-10 contains AF Amplifier type AM-476/AIC-10.

LOCATION

Rear cockpit, between stations 193 and 198 RH side.

ACCESS — MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the relay assembly to the bulkhead with four bolts.

Fit and secure cable assembly R1048-4.

UNCLASSIFIED

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	INTERPHONE AN/AIC-10	Junction Box R3	46

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1352-16	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To facilitate interconnection of the interphone circuitry.

LOCATION

Mounted on the RH side of the nose wheel bay at station 200.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Remove the cover of the junction box - six camlocs.
Connect the circuit wiring associated with cable assembly R1020-1.
Fit and secure cable assemblies R1017-1 and R1019-1 to the receptacles on the roof of the nose wheel bay.
Fit and secure cable assemblies R1011-1 and R1011-2 to the receptacles on the roof of the nose wheel bay forward of station 187.
Secure the junction box to the RH side of the nose wheel bay - six screws.
Refit the cover of the junction box - six camlocs.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the junction box is securely mounted. Check that the circuit wiring is securely connected to the terminal strips. Check that the connectors are securely and properly fitted. Check that the cable clamps are secure.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	INTERPHONE AN/AIC-10	Terminal Strip R10	46

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
AN3436-2-10	Railway Power and Engineering	AN3436-2-10	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To facilitate interconnection between the interphone system and the front cockpit ejection seat wiring.

LOCATION

Front cockpit on the floor under the RH console.

ACCESS

MEN X MINUTES

Remove the rear panel of the RH console - six airlock fasteners.
The terminal strip is mounted on the floor under the console.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the terminal strip to the floor with two screws.
Fit the identification strip.
Connect and secure the circuit wiring.
Refit the rear panel of the RH console - six airlock fasteners.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the terminal strip is securely mounted. Check that the circuit connections are secure and that the wiring is undamaged.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	INTERPHONE AN/AIC-10	Terminal Strip R11	46

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
AN3436-2-10	Railway Power and Engineering	AN3436-2-10	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1500 hours

FUNCTION

To facilitate interconnection between the interphone system and the rear cockpit ejection seat wiring.

LOCATION

Rear cockpit on the floor under the RH console at station 225.

ACCESS

Remove the rear panel of the RH console - six airlock fasteners.
Terminal strip is mounted on the floor under the console.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the terminal strip to the floor with two screws.
Fit the identification strip.
Connect the circuit wiring.
Refit the rear panel of the RH console - six airlock fasteners.

MEN X MINUTES

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the terminal strip is securely mounted. Check that the circuit connections are secure and that the wiring is undamaged.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	INTERPHONE AN/AIC-10	Dynamotor	46

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EA/35081)	DY-77/AIC-10	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

Supplies power to interphone equipment when one or more non-transistorized AF Amplifiers type AM-476/AIC-10 are fitted. Not used when all fitted amplifiers are transistor types.

LOCATION

RH side of the rear cockpit at station 190.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit the unit to the mounting MT 1060/U with four screws.
Secure the mounting screws with locking wire.
Fit and secure cable assembly R1049-1.

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	INTERPHONE AN/AIC-10	Dynamotor Mounting	46

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EP/40255)	MT-1060/U	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

Shockmounts the Dynamotor DY-77/AIC-10.

LOCATION

RH side of the rear cockpit at station 190.

ACCESS

Unobstructed.

MEN X MINUTES	

REPLACEMENT PROCEDURE

Fit the unit to the bulkhead with four mounting bolts.

MEN X MINUTES	

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

SECTION 47

ELECTRONICS

J4 GYROSYN COMPASS

(This data supersedes previous issue dated 24 June 57)

ARROW 1 SERVICE DATA

LIST OF REVISIONS

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ARROW 1 SERVICE DATA

ELECTRONICS

J4 GYROSYN COMPASS

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ARROW 1 SERVICE DATA

DESCRIPTION

GENERAL

1 The J4 Gyrosyn Compass System provides continuously corrected magnetic north heading information which is supplied to two Course Indicators Type ID-250/ARN. Provision is made for supplying this information to indicators of a R-Theta system and a TACAN system.

2 The system may also be used as a directional gyro corrected for apparent drift due to the rotation of the earth.

3 The system comprises the following main component units:

(a) Control Panel - Kearfott No. 423050-3

(b) Directional Control - Kearfott No. 423040-2

(c) Flux Valve (Transmitter) - Sperry No. 620359 - USAF Type C-2

(d) Compensator - Sperry No. 620783

(e) Servo-amplifier - Kearfott No. 423060-2

(f) Servo-amplifier Mounting - Kearfott No. 323478

CONTROL PANEL

4 The control panel incorporates a function selector switch, indicator setting switch, hemisphere selector switch, latitude correction controller and a synchronizing indicator (annunciator).

5 The function selector switch provides for 'MAG' (Magnetic Compass) or 'DG' (Directional Gyro) modes of operation. When selected to the MAG position the synchronizing indicator is uncovered to show when the system is synchronized to the remote compass flux valve. When selected to the DG position the synchronizing indicator is covered and the letters DG appear in its place. The latitude correction controller and hemisphere selector switch are disconnected when the function selector switch is in the MAG position.

6 The indicator setting switch provides for manual synchronization of the repeater indicators. The proper direction of rotation for the switch is indicated by the synchronizing indicator. When the indicator needle is in the "+" region the setting switch must be turned to "+ INCR" i.e. clockwise, to the appropriate position for either a fast (7-9 rpm) or slow (1/2 rpm) slewing rate as desired, and when the indicator is in the "-" region the setting switch must be turned to "DECR -" i.e. counterclockwise to the position appropriate to the slewing rate desired. Synchronization must be obtained only by turning the setting switch in the direction appropriate for the symbol shown on the indicator.

7 The hemisphere selector switch and latitude correction controller are used in 'DG' operation. They are adjusted for the local latitude by setting the latitude dial to the required degree of latitude and the hemisphere selector switch to expose N for northern and S for southern latitudes.

DIRECTIONAL CONTROL

8 The directional control gyro is the stabilizing component of the J4 compass when the system is used as a slaved directional gyro system. It also provides reference signals for repeater indicators and dependent equipment when the system is operating as a latitude-corrected free directional gyro. The directional control contains a gyro motor levelling torquer, azimuth torquer, azimuth servo transmitter, electro-magnetic brake, levelling switch and associated circuitry.

FLUX VALVE AND COMPENSATOR

9 The remote compass flux valve controls the gyro precession for magnetic compass operation and slaves the system to the earth's magnetic meridian. The flux valve is fitted with a compensator which is set during compass swinging to correct compass deviation due to permanent magnetism in the aircraft.

SERVO AMPLIFIER

10 The servo amplifier is the receiving and distribution centre of the system. It contains the azimuth and slaving channels required for system operation. The assembly comprises the compass amplifier and its power supply,

ARROW 1 SERVICE DATA

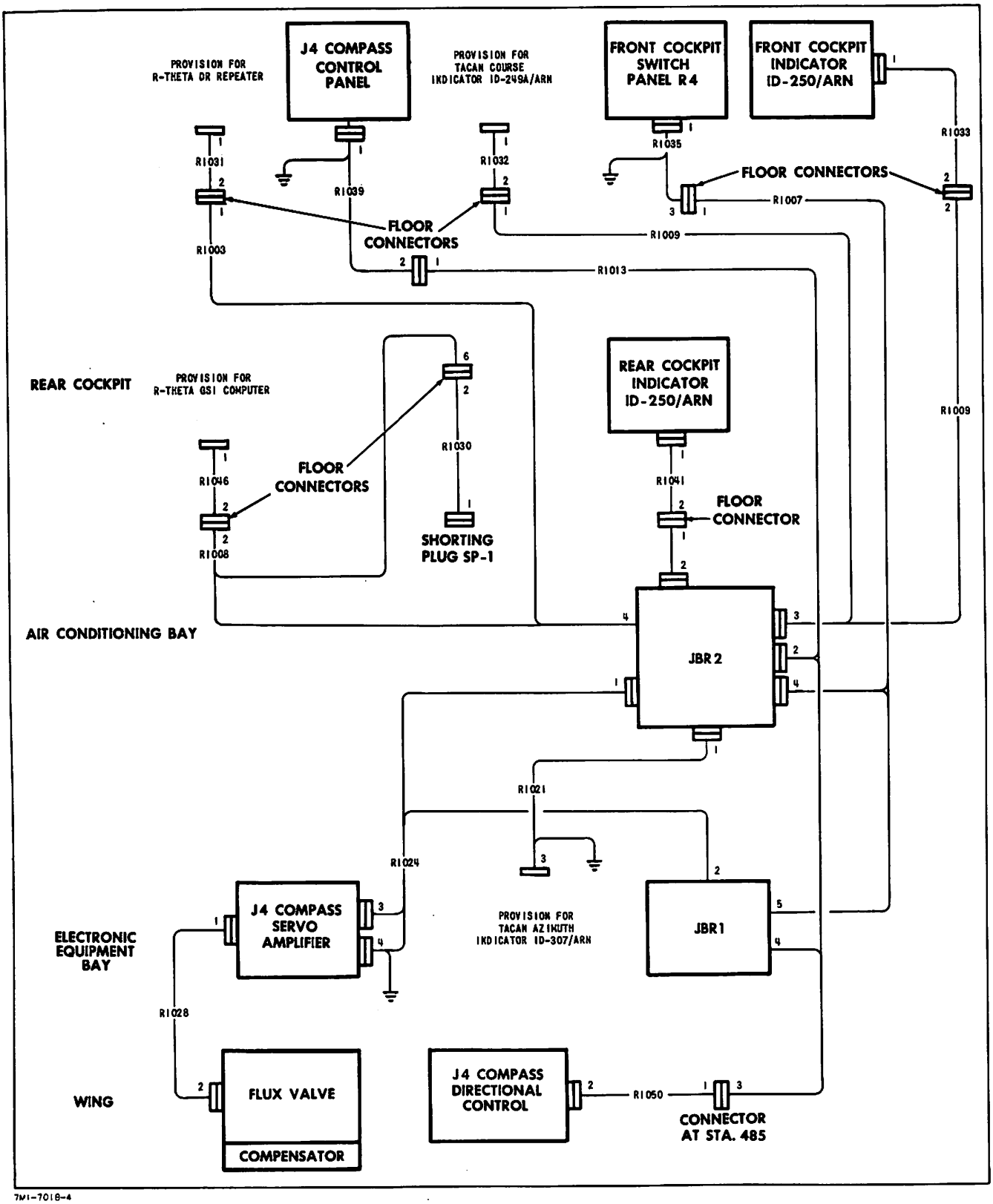

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FIG. 1 J4 GYROSYN COMPASS - GENERAL ARRANGEMENT

azimuth servo magnetic amplifier, the azimuth servo, the slaving cut-off relay and the necessary relays for automatic synchronization.

OPERATION

11 When the system is initially energized and the function selector switch is selected to the MAG position, or when switching, during operation, from the DG to MAG position, an error may exist between the remote compass flux valve and its synchro control transformer in the servo amplifier. This error is amplified and rectified in a phase sensitive rectifier circuit in the servo amplifier. The output of the phase sensitive rectifier actuates a magnetic amplifier which applies power to a slewing servo motor to drive an azimuth control transformer at a fast slewing rate of 5 degrees per minute in the proper direction to minimize the error. This automatic synchronization operation will continue for a 10 second period after which time the system will return to the normal magnetic mode and approach a null at the normal slewing rate of 2 degrees per minute. When the system is synchronized the synchronizing indicator needle on the control panel will remain on the synchronization index and the compass indicators will show magnetic heading.

12 Selecting the function selector switch to the DG position causes the gyro to precess in the direction selected on the hemisphere selector switch and at a rate determined by the setting of the latitude correction controller. When the indicators are synchronized manually, as described in para 6, the servo motor follows the gyro. This mode of operation is used in certain areas such as polar regions where rapid magnetic deviation changes cause corrections from the flux valve to become erratic.

13 The compass system needs at least two minutes warm-up time in the MAG mode of operation. This allows the gyro to attain operating speed. To achieve rated accuracy in the DG mode the system requires 12 minutes warm-up time. The gyro base should be approximately in the horizontal plane just prior to and for about 10 seconds after the application of power.

14 After the gyro motor is up to speed, manipulating the compass controls cannot cause

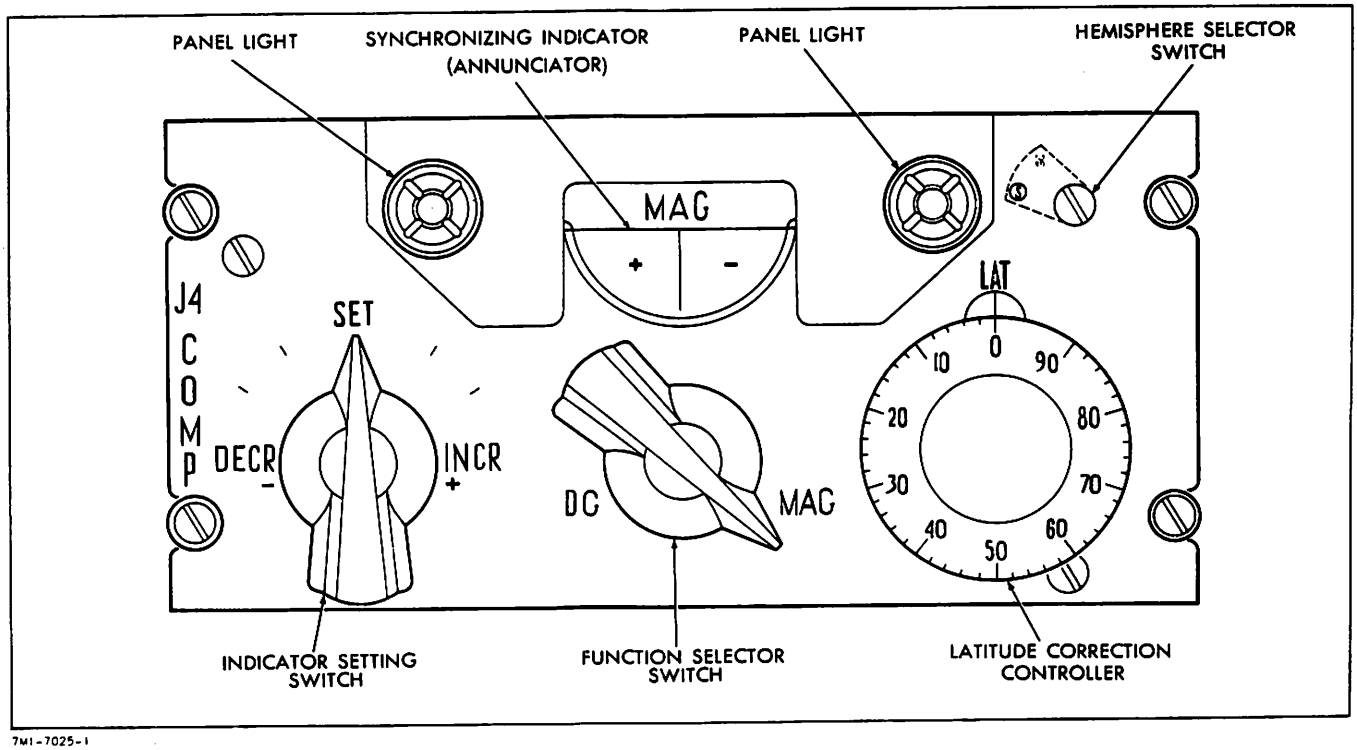

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FIG. 2 J4 GYROSYN COMPASS - CONTROL PANEL

damage to the system, so particular precautions need not be exercised while making adjustments.

15 To prevent damage to the gyro during violent aircraft manoeuvres, a caging switch marked NORMAL/AEROBATICS is provided on the front cockpit switch panel R4. The gyro is caged when the switch is selected to the AEROBATICS position.

SYSTEM POWER REQUIREMENTS

16 The J4 compass system operates on 27.5 volts DC at 1 amp; 115 volts AC, 400 cps, single phase at 54VA; and 115 volts AC, 400 cps, three phase at 16 VA.

TESTING AND SERVICING

GENERAL

17 Function testing should be carried out at the periods specified in the Maintenance Schedule and after replacing or repairing any part of the system.

18 A high impedance AC Voltmeter, 0-100V scale, is required to carry out the tests described below.

PREPARATION FOR TESTING

19 Prepare to carry out function testing, proceeding as follows:

(a) Remove all loose magnetic objects from the aircraft and from the person.

(b) Remove all objects such as the tow bar and towing vehicle out of interference range of the aircraft.

(c) Connect an external 115V AC three phase power supply to the aircraft, ensuring that the source of supply is out of interference range.

FUNCTION TESTING PROCEDURE

20 Two operators are required to carry out function testing. The procedure is as follows:

(a) Select to ON the master electrical switch located in the front cockpit.

(b) Remove the dorsal electronics access panel and plug a high impedance 0-100V AC Voltmeter into the receptacle in the base of the directional control.

(c) Close the J4 Compass DC supply circuit breaker located on JBR1.

(d) Close the J4 Compass AC supply ØB, ØA, ØC, and the instrument transformer input circuit breakers located on JBR1.

CAUTION

The DC circuit breaker must be closed first, and, if the system is shut down by opening the circuit breakers, it must be opened last.

(e) Note that a distinct click is heard in the directional control as soon as the system is energized, indicating that the electromagnetic brake is operating.

(f) Check that the gyro motor is running, by listening or placing the fingers on the case.

(g) Check that the AC Voltmeter reads less than 15 volts while the gyro is levelling.

(h) Observe the operation of the gyro through the window in the side of the case. Check that the gimbal oscillation damps out in under 30 seconds.

(j) Allow two minutes for the equipment to warm up.

(k) Select the function selector switch to MAG, move the synchronizer SET control to the decrease or increase position and check that the annunciator pointer takes up its position and remains at the synchronization index.

(m) Set the hemisphere switch to 'N', the latitude control to the local latitude and the function selector switch to DG.

(n) Rotate the indicator setting control clockwise two scale divisions and check that the cards on the two radio magnetic indicators ID-250 in the front and rear cockpits rotate smoothly to show increased reading.

(p) Repeat operation (n) with a counter-clockwise rotation of the indicator setting control to show decreased reading.

(q) Select the function selector switch to MAG and check that the radio magnetic indicators take up the aircraft magnetic heading and that the annunciator pointer comes to rest on the centre index, showing that the system is synchronized.

(r) Check that manual synchronization can be carried out whenever the function selector switch is in the MAG position.

(s) Check that automatic synchronization takes place when the function selector switch is selected momentarily to DG and then back to MAG.

COMPASS SWINGING PROCEDURE

21 The gyrosyn compass error must be determined and compensated while the aircraft is at the compass swinging area. The various compass deviation factors are as follows:

Coefficient A - This signifies a constant deviation on all headings and is calculated by taking the mean value of all deviations recorded during the swing. Compensation is achieved by rotating the flux valve bodily in relation to the aircraft.

Coefficient B - This signifies a deviation caused by longitudinal permanent magnetism in the aircraft and is rectified by the compensator longitudinal magnets. This error is maximum East to West and zero North to South.

Coefficient C - This signifies a deviation caused by lateral permanent magnetism and is rectified by lateral compensator magnets.

Coefficients D and E - These signify deviations resulting from a "soft iron" effect in the aircraft and cannot be compensated for. Such errors are plotted on the compass deviation card.

22 The following measures must be taken when the aircraft is at the compass swinging area.

(a) Remove all loose magnetic objects from the aircraft and from the person.

(b) Remove the tractor, tow bar and other such objects out of interference range. (To determine whether such objects interfere or not, it is necessary to wait at least four minutes for their effects to appear on the indicator).

(c) Check that the external power supply is out of interference range.

(d) Check that all flying controls are in the neutral position.

23 Using a sighting compass corrected to $\pm$ 1/4 degree and accurately rigged sighting points, compensate for coefficient A errors proceeding as follows:

(a) Set the aircraft heading magnetic East.

(b) Switch on the gyrosyn compass and allow four minutes warm up time.

(c) Tap the remote flux valve and the indicator lightly with a non-magnetic object before reading and record the difference between the indicated heading and the true heading. If the indicated heading is greater than the true heading, record as "plus", and, if less, record as "minus".

(d) Repeat operation (c) with the aircraft heading magnetic South, West and North in that order.

(e) Add the differences and divide by four, and rotate the flux valve bodily the required number of degrees in the appropriate direction to compensate for this average error. To correct positive error, rotate the flux valve counter-clockwise viewed from above, and to correct negative error, rotate clockwise.

24 Compensate for errors due to coefficients B and C proceeding as follows:

(a) Place the aircraft on a North heading (0 degrees).

ARROW 1 SERVICE DATA

(b) Correct for all error at this heading by turning the N-S adjusting shaft on the compensator, through the hole in the flange, until the indicated reading corresponds to the aircraft heading within ± 0.5 degrees.

(c) Place the aircraft on an East (90 degrees) heading and correct for the error to within ± 0.5 degrees by adjusting the E-W shaft on the compensator.

(d) Place the aircraft on a South (180 degrees) heading and note the error. Correct for half the error by rotating the N-S adjusting shaft. This must produce a reading within ± 0.5 degrees of the aircraft heading.

(e) Place the aircraft on a West (270 degrees) heading and note the error. Correct one half the error by rotating the E-W adjusting shaft. This must produce a reading within ± 0.5 degrees of the aircraft heading.

25 Enter the remaining errors (coefficients D and E) on the compass deviation card, noting the error every 30 degrees. Ensure that at each of the four cardinal points, the residual error does not exceed ± 0.5 degrees.

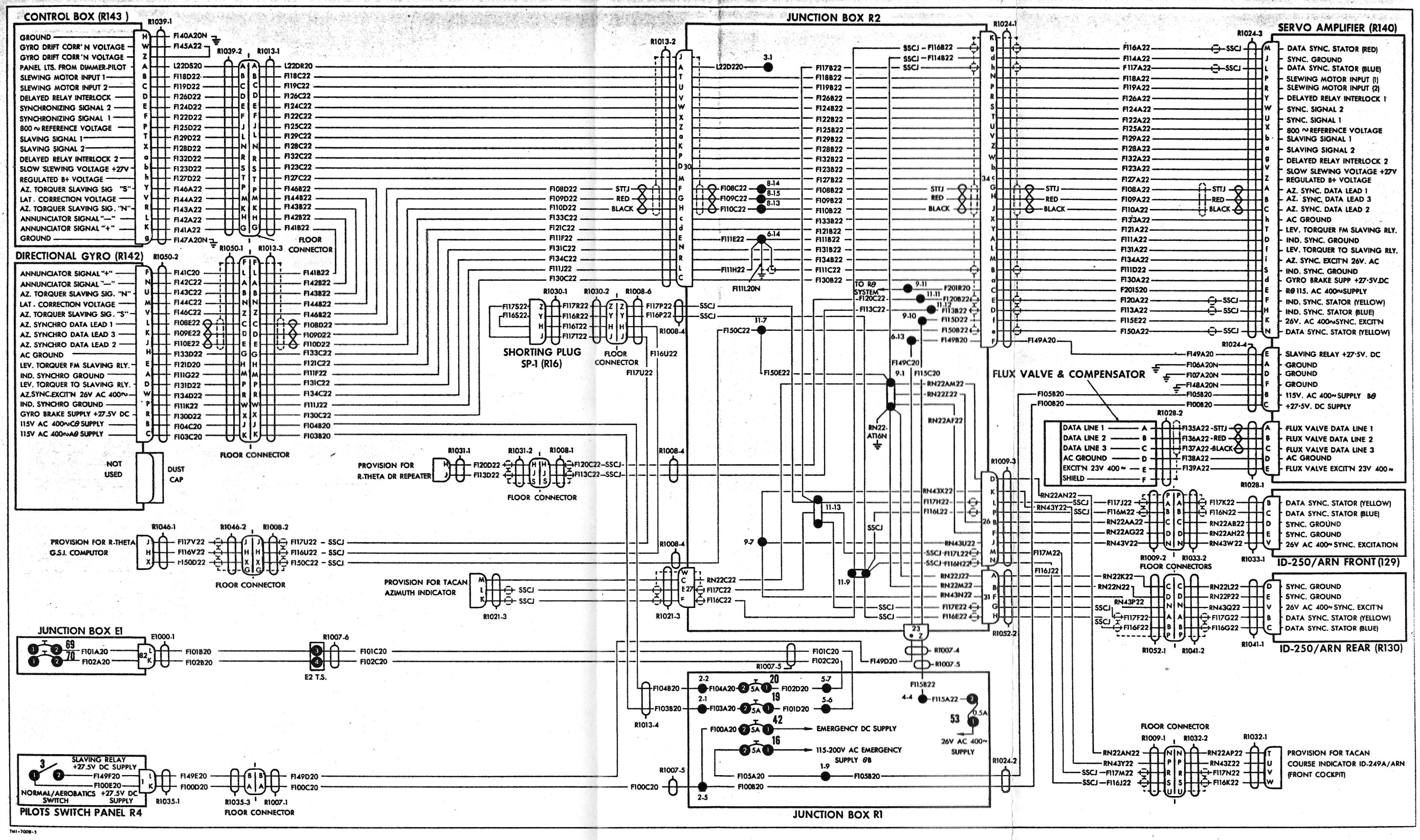

FIG. 3 J4 GYROSYN COMPASS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	J 4 GYROSYN COMPASS	Control Panel	47

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Kearfott Co.	423050-3	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Houses the J4 Compass System function selector switch, hemisphere selector switch, latitude correction controller, indicator setting switch and synchronizing indicator.

LOCATION

Front cockpit - RH console.

ACCESS — MEN X MINUTES

Remove the unit from the console by releasing four Dzus fasteners.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure cable assembly R1039-1.
Secure the ground lead.
Secure the panel to the console with four quick-release fasteners.

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ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check the panel for security and cleanliness. Check that the connector is securely and properly fitted. Check that the ground lead is secure and making good electrical contact.	

FUNCTIONAL CHECKS	MEN X MINUTES
Check the panel light filaments for serviceability.	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
0-100V AC voltmeter.
Magnetic sighting compass.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	J 4 GYROSYN COMPASS	Directional Control	47

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Kearfott Co.	423040-2	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

Stabilizing component of the J4 compass system when used as a slaved directional gyro system. Provides reference signals available for repeater indicators and dependent equipments when the system is operating as a latitude-corrected free directional gyro.

LOCATION

Dorsal at station 505.

ACCESS

MEN X MINUTES

Remove dorsal electronics access panel - six latches.

REPLACEMENT PROCEDURE

MEN X MINUTES

Keep the unit upright.
Fit and secure the unit to its shockmount with two mounting screws and two wing nuts.
Fit and secure cable assembly R1050-2.
Refit the dorsal electronics access panel - six latches.

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the electrical connector is securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
0-100V AC voltmeter.
Magnetic sighting compass.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

UNCLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	J 4 GYROSYN COMPASS	Flux Valve	47

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Sperry Gyroscope Co.	Sperry No. 620539 USAF Type C-2	25201

OVERHAUL LIFE: KNOWN– ESTIMATED– 1000 hours

FUNCTION

To sense, in the form of an electrical indication, deviation from magnetic north. These indications are transmitted to the J4 compass servo-amplifier.

LOCATION

Leading edge of right inner wing.

ACCESS

	MEN X MINUTES	
Remove the access panel located in the leading edge of the RH wing - 54 screws.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Secure the unit to its mounting with three mounting screws. Connect the electrical wiring. Refit the access panel located in the leading edge of the RH wing - 54 screws.		

ARROW 1 SERVICE DATA

UNCLASSIFIED

INSPECTION	MEN X MINUTES
Check the flux valve for security of mounting. Check that the unit is undamaged.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
0-100V AC voltmeter.
Magnetic sighting compass.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

DECLASSIFIED

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	J 4 GYROSYN COMPASS	Compensator	47

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Sperry Gyroscope Co.	620783	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To compensate the flux valve for constant magnetic distortion introduced by the aircraft structure or electrical equipment.

LOCATION

Leading edge of RH inner wing, mounted on the flux valve.

ACCESS

MEN X MINUTES

Remove the access panel located in the leading edge of the RH wing - 54 screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the compensator to the flux valve with six mounting screws.
Refit the access panel located in the leading edge of the RH wing - 54 screws.

ARROW 1 SERVICE DATA

DECLASSIFIED

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
0-100V AC voltmeter.
Magnetic sighting compass.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	J4 GYROSYN COMPASS	Servo-amplifier	47

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Kearfott Co.	423060-2	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Amplifies electrical indications received from the J4 compass flux valve. Houses the compass amplifier and its power supply, the azimuth servo-amplifier, the azimuth servo magnetic amplifier, azimuth servo, the slaving cutoff relay and relays for automatic synchronization.

LOCATION

Electronics equipment bay - LH side.

ACCESS

	MEN X MINUTES
Release the electronics equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronic equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay centre access door.	

REPLACEMENT PROCEDURE

	MEN X MINUTES
Clamp the amplifier to its mounting by securing one wing-nut. Fit and secure cable assemblies (R1028-1, R1024-4, R1024-3). Select the motor actuator switch UP and raise and secure the electronic equipment bay centre access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.	

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the electrical connectors are securely and properly fitted. Check that the ground leads are secure and making good electrical contact.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

External power supply.
0-100V AC voltmeter.
Magnetic sighting compass.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

ARROW 1 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	J4 GYROSYN COMPASS	Servo-amplifier Mounting	47

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	Kearfott Co.	323478	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

Shockmounts the J4 compass Servo-amplifier.

LOCATION

Electronics equipment bay - LH side.

ACCESS

	MEN X MINUTES	
Release the electronics equipment bay centre access door - 33 camlocs. Release the motor actuator switch access flap on the RH underside of the electronic equipment bay - two camlocs. Select the motor actuator switch DOWN and lower the electronic equipment bay centre access door.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit the mounting to the airframe with four mounting bolts. Select the motor actuator switch UP and raise and secure the electronic equipment bay centre access door - 33 camlocs. Secure the motor actuator switch access flap - two camlocs.		

ARROW 1 SERVICE DATA

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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ARROW 1 SERVICE DATA

SECTION 48

INSTRUMENT PACK

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ARROW 1 SERVICE DATA

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INSTRUMENT PACK

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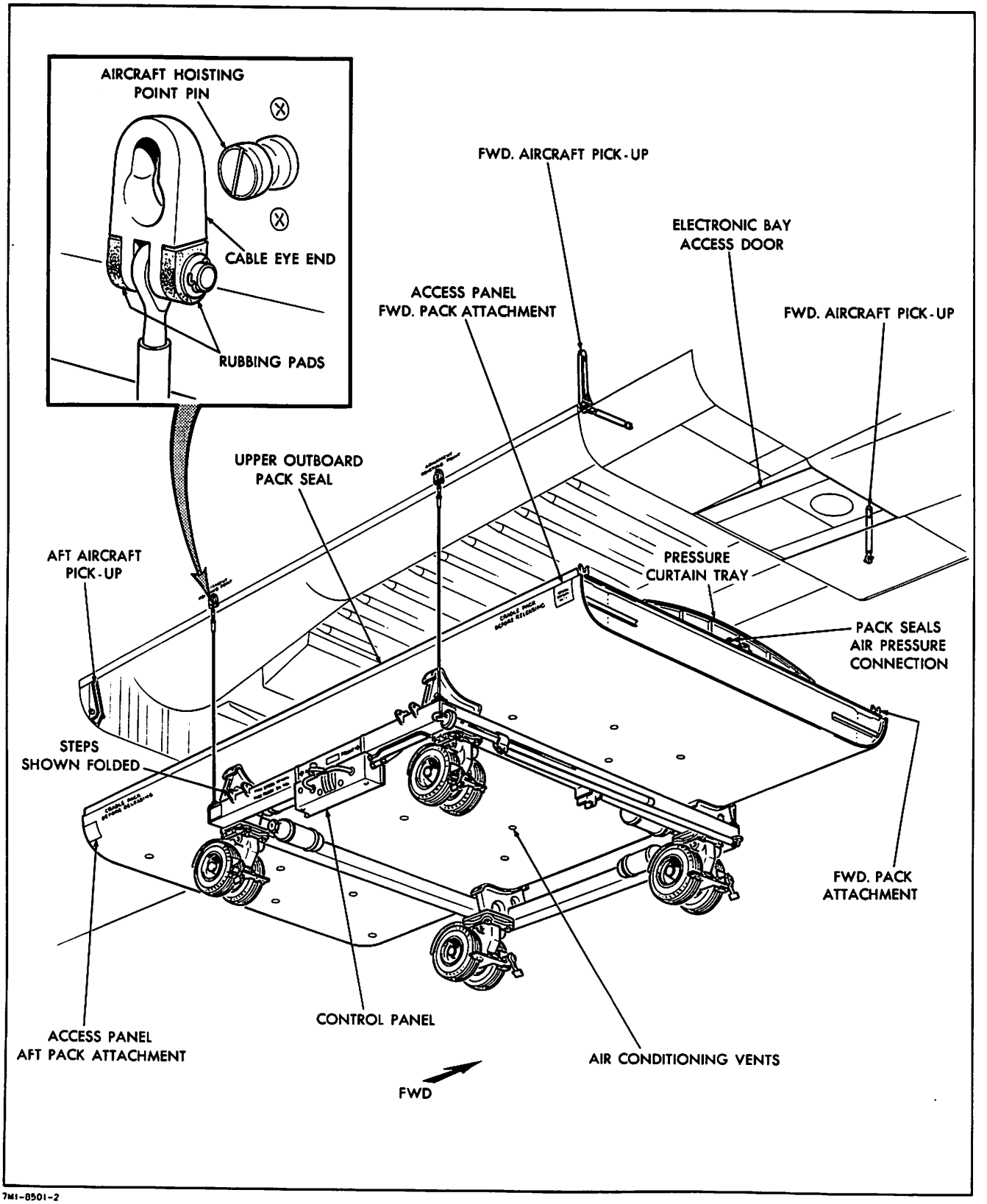

FIG. 1 INSTALLATION OF INSTRUMENT PACK

ARROW 1 SERVICE DATA

DESCRIPTION

General

1. The Arrow 1 aircraft utilizes the armament bay for carrying a flight test instrumentation pack. The method of attachment of this pack to the aircraft is similar to that employed for the missile pack which will be used in later aircraft.

2. The instrument pack consists structurally of a box beam frame strengthened by lateral beams and longitudinal stringers. It is enclosed on the underside by a light alloy skin. Four attachment assemblies mounted at the upper four corners of the pack lock onto four pick-ups in the centre fuselage of the aircraft.

3. The four aircraft pick-ups are attached to the centre fuselage, two front pick-ups at station 294 and two aft pick-ups at station 482. The left-hand front pick-up pin is mounted on a link which is free to move fore and aft and laterally, and takes vertical loads only. The right-hand front pick-up is free to move fore and aft and takes side and vertical loads. Both front links are spring loaded to the installed position. The two aft pick-ups are rigidly attached to take loads in all directions.

4. Two ducts in the armament bay roof carry temperature controlled air, exhausted from the cabin, to the armament bay and instrument pack. The pack is sealed in flight by seals on all four sides, and vents in the bottom skin of the pack provide an exhaust for the air.

5. Up to fifteen access panels may be installed in the bottom skin of the instrument pack for easy access to various instruments.

6. The instrument pack is installed in the aircraft by means of a pneumatic hoist which attaches by four cables to hoisting pins located, two on each side of the aircraft fuselage, above the armament bay. See Fig 1.

7. Four ground handling brackets are bolted to the upper surface of the pack, for attachment of a ground handling sling.

Forward Pack Attachments (Figs 2 and 3)

8. The two forward pack attachment assemblies are similar and each consists of two fixed V-shaped guide brackets which engage with the aircraft pick-up pin, and a double latch which locks over the pin. The latches are retained in the open position by a hold-open spring. After the brackets are engaged the latches are moved to the fully locked position by turning a hexagon headed pin with a socket wrench. Stops are provided to prevent the linkage turning past the locked position. A pip-pin is then inserted in a hole provided in the frame of the assembly to lock the linkage. The pip-pin can only be inserted when the latches are in the fully locked position. The mechanism is unlocked by removing the pip-pin and turning the hexagon headed pin in the direction indicated.

Aft Pack Attachments (Fig 4)

9. The two aft attachment assemblies are similar, each consisting of a fixed double hook and a latch assembly. The hook engages with the aircraft pick-up pin and the latch locks over the pin. The latch is held in the open position by a spring, and is turned to the fully locked position by turning a hexagon headed pin, which is connected to the latch by a linkage. A roll-pin

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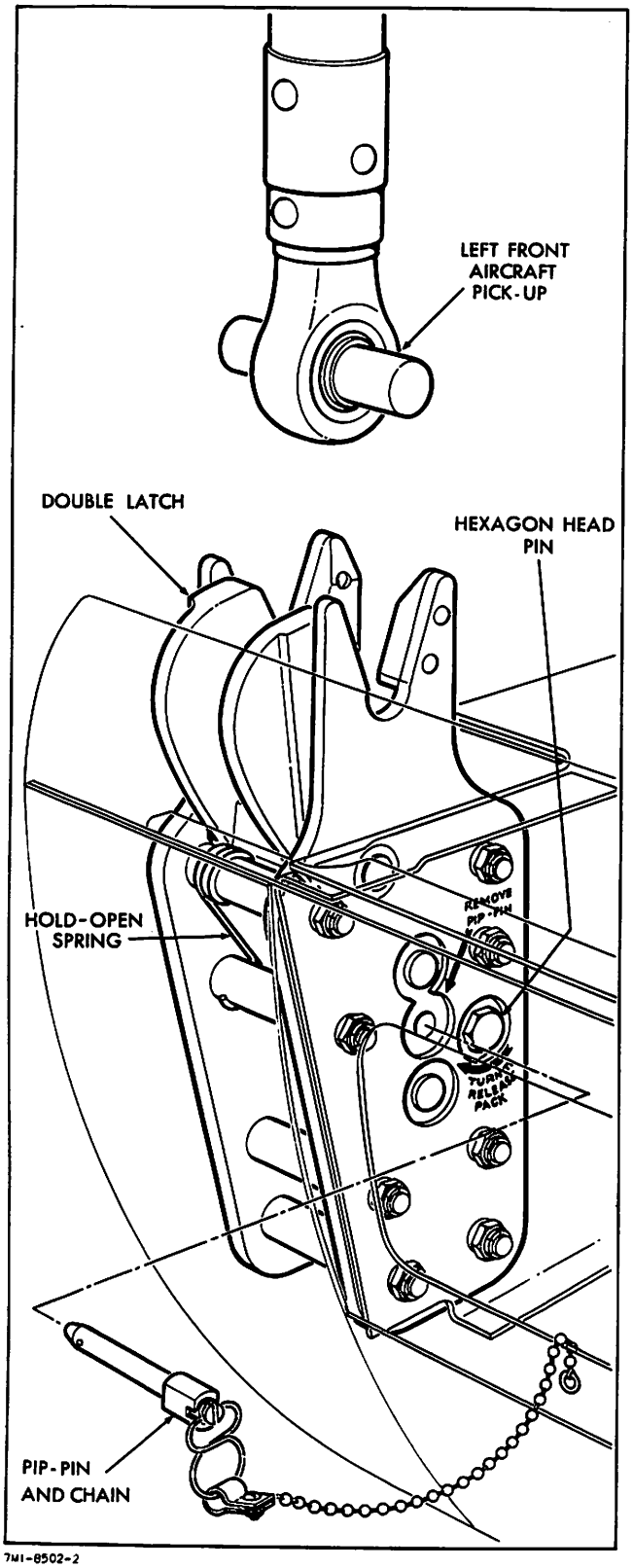

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FIG. 2 L.H. FORWARD PACK ATTACHMENT

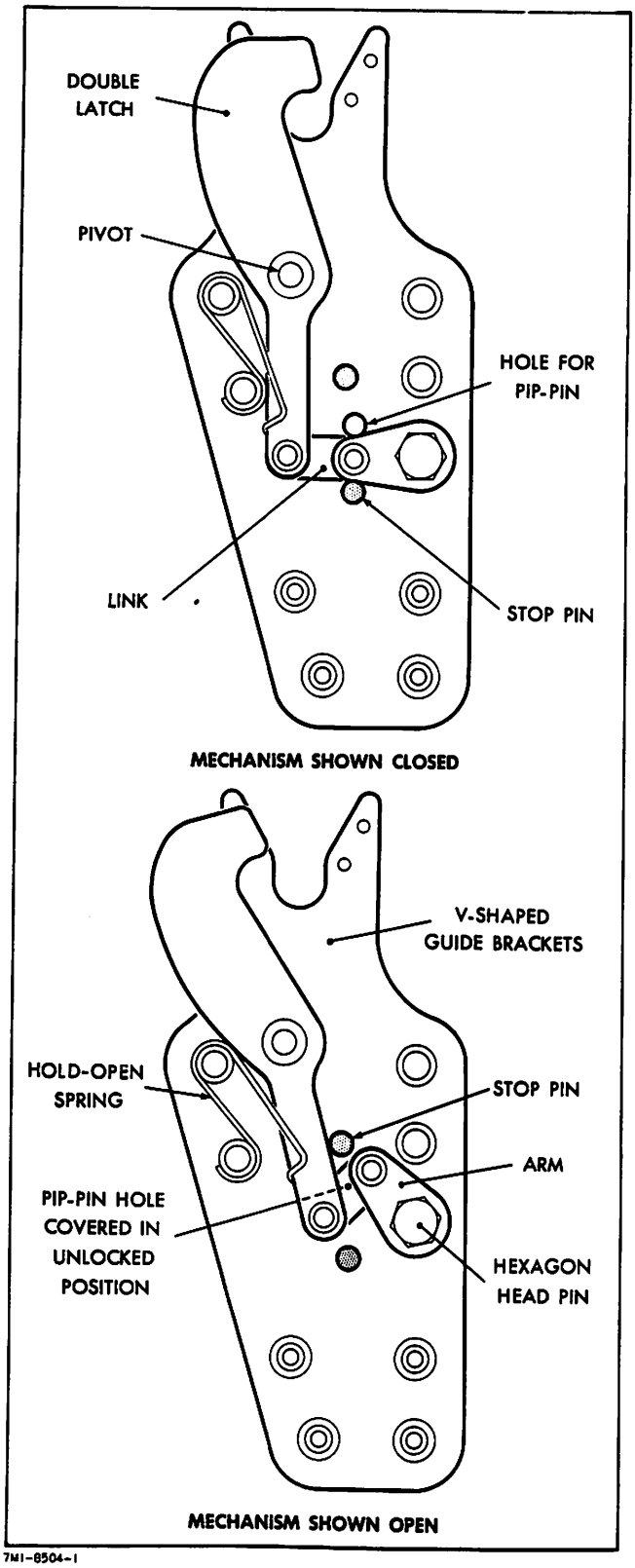

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FIG. 3 OPERATION OF FORWARD PACK ATTACHMENT

prevents the linkage turning past the locked position. A pip-pin is then inserted in the hole provided to lock the linkage in position. The mechanism is unlocked by removing the pip-pin and turning the hexagon headed pin with a socket wrench.

10. Guides mounted on the aft attachment assemblies locate on rollers on the outboard sides of the aircraft pick-ups and align the pack for installation.

Sealing

11. The instrument pack is sealed by five seals, three pneumatic and two static. The upper forward pack seal is static and consists of a pressure curtain in the armament bay pressing against a curtain tray at the forward end of the pack. The lower forward pack seal is pneumatically operated and consists of a teflon-covered, rubber-padded alloy spring projecting aft from the bulkhead at station 292 and following the lateral contour of the armament bay. When the pack is installed this spring contacts a contoured channel at the forward edge of the pack. A pneumatic tube mounted above the spring inflates in flight and maintains close contact between the spring and the contoured channel.

12. The upper outboard seals run the length of the pack on the outer edges. Each consists of a teflon-covered, rubber-padded, alloy spring, which projects upwards from the edge of the pack and presses against a contoured channel at the lower outboard edge of the armament bay. A tube mounted inboard of the spring inflates when the aircraft leaves the ground and maintains close contact between the spring and the contoured channel. The aft seal is static and consists of a V-shaped rubber seal attached to the bulkhead at station 482 which makes a contact with a shaped extrusion on the aft edge of the pack when the pack is installed.

13. A solenoid operated control valve on the bulkhead at station 296 supplies low pressure air through a flexible hose to the pneumatic seals on the pack. The flexible hose connects with a union at the front end of the pack. Access to the connection is from the electronics bay forward of the armament bay.

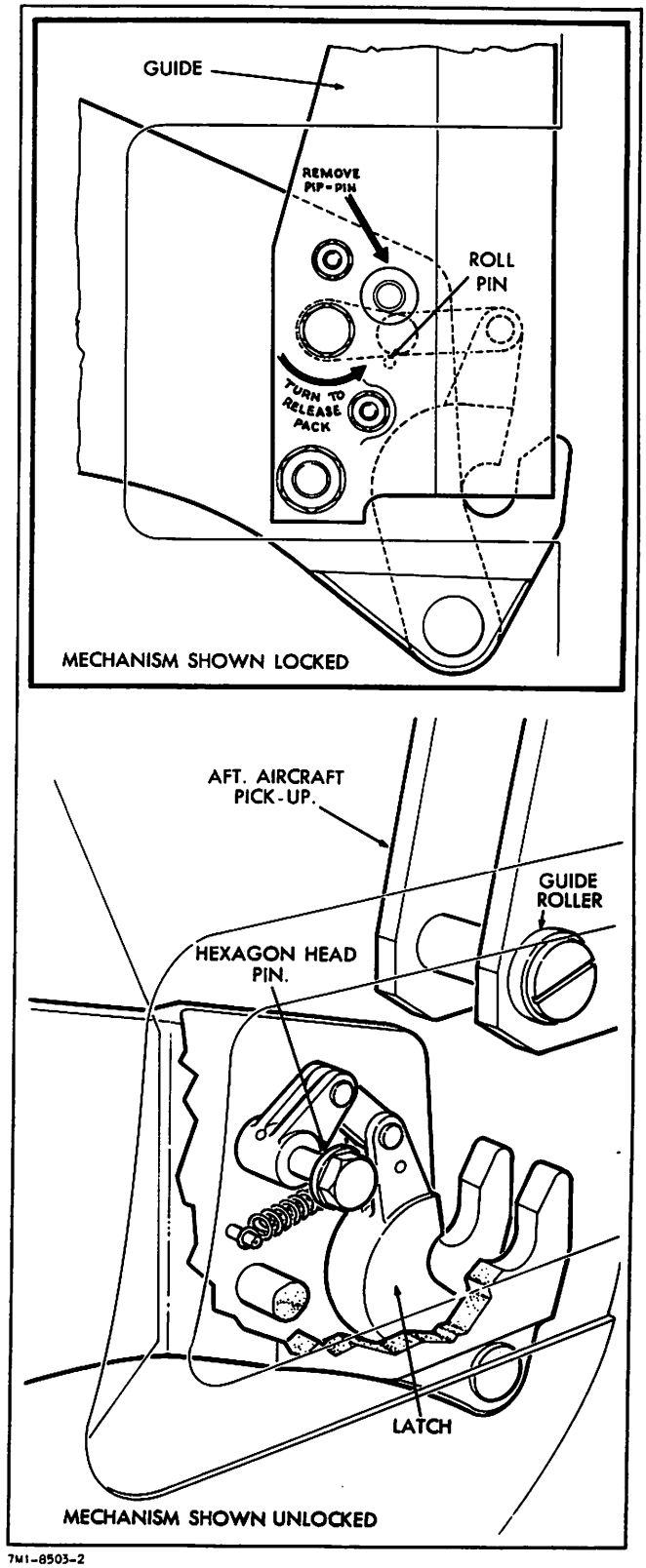

FIG. 4 AFT PACK ATTACHMENT

14. The control valve is actuated by a micro-switch on the right-hand main landing gear leg torque link. Air is supplied to the pneumatic pack seals when the weight of the aircraft is removed from the landing gear. For description and operation of the pneumatic seals see Arrow I Service Data - Low Pressure Air System.

TESTING AND SERVICING

Installing the Pack (Fig 1)

15. Before placing the pack on the armament hoist, check the hoist as follows:

(a) Ensure that the stop cock is closed and that the control handle is in the STOP position.

(b) Examine the hoist externally for serviceability.

(c) Ensure that the rubber pads and contoured boxes are secure and serviceable.

(d) Examine the four cables, cable eye-end fittings and turnbuckles for security and serviceability.

(e) Ensure that the hoist pneumatic system contains sufficient air pressure. The minimum pressure required for installation is 1200 psi.

16. Position the instrument pack correctly on the hoist and proceed as follows:

(a) Remove the four access panels covering the attachment assemblies.

(b) Manoeuvre the hoist and pack in position below the armament bay.

(c) Stow the hoist tow bar in the tow bar stowage hook provided.

(d) Open the hoist stop cock.

(e) Release the hoisting pins located in the fuselage above the armament bay. The pins are of the spring loaded bayonet catch type.

(f) Connect the cable eye-ends to the hoisting pins. Steps are provided on the hoist to facilitate access to the hoisting points.

NOTE

If it is necessary to extend the cables to reach the hoisting points, slowly move the control handle to DOWN and maintain cable tension by pulling on all four cables.

(g) Ensure that the front pick-up pins are correctly aligned.

(h) Ensure that all four pack attachment locks are open.

17. To raise the pack into the aircraft, proceed as follows:

(a) Slowly move the control handle to UP and allow the cables to tighten.

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NOTE

After making the initial UP selection apply tension to the four cables to prevent the cable eye-ends becoming disengaged from the hoisting pins. This function may be performed by personnel pulling downwards on the cables until the slack has been taken up.

(b) Continue to raise the hoist. Trim the fore-and-aft level of the pack by rotating the control handle until the pack is aligned in the armament bay.

(c) Engage the rear guides with the rollers on the aircraft pick-ups and allow the pack to go fully home until the attachment hooks engage.

(d) Return the control handle to the STOP position.

(e) Lock each latch by fitting a socket wrench on the hexagon headed pin and turning the latch to the locked position. Insert the pip-pin to lock the latch.

(f) Replace the access panels over the attachment assemblies.

(g) Connect the flexible hose from the control valve on the bulkhead at station 292 to the pack connection at the front of the pack. Access to the connection is through the electronics bay forward of the armament bay.

18. To remove the hoist from the aircraft proceed as follows:

(a) Move the mechanical lock release lever down and hold it down.

(b) Slowly move the control handle to DOWN and lower the hoist, trimming as necessary.

(c) When the hoist is fully down pull up on the cables to provide sufficient slack for disconnection. Return the control handle to STOP and release the mechanical lock release lever.

(d) Close the stop cock.

(e) Disconnect and stow the hoist cables.

(f) Lock the hoisting pins in the retracted position.

Removing the Pack (Fig 1)

19. Check the hoist as detailed in para 15, then proceed as follows:

(a) Position the hoist below the aircraft and stow the tow bar.

(b) Release the four hoisting pins on the side of the aircraft.

(c) Open the pneumatic stop cock on the hoist.

(d) Attach the cable eye-ends to the hoisting pins. See para 16 (f).

(e) Move the control handle slowly to UP, maintaining tension on the cables as detailed in para 17.

ARROW 1 SERVICE DATA

(f) Allow the hoist to rise and cradle the pack.

(g) Stabilize pressures on gauges B and C at 900 psi by rotating the control handle as necessary and return the control handle to STOP.

WARNING

The pack must not be unlocked when pressures shown on gauges B and C, on the hoist control panel, are below 900 psi.

(h) Disconnect the air supply flexible hose at the forward end of the pack.

(j) Remove the four access panels covering the attachment assemblies.

(k) Unlock the latches by removing the pip-pins and turning the hexagon headed pins in the direction indicated.

20. To lower the pack proceed as follows:

(a) Move the mechanical lock release lever down and hold it down.

(b) Slowly move the control handle to DOWN and allow the pack to descend, trimming as necessary by rotating the control handle.

(c) When the hoist reaches the ground pull up on the cables to provide sufficient slack for disconnection and return the control handle to STOP. Release the mechanical lock release lever.

(d) Close the stop cock.

(e) Remove the cable eye-ends from the hoisting pins, and stow the cables.

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RADOME DE-ICING SYSTEM

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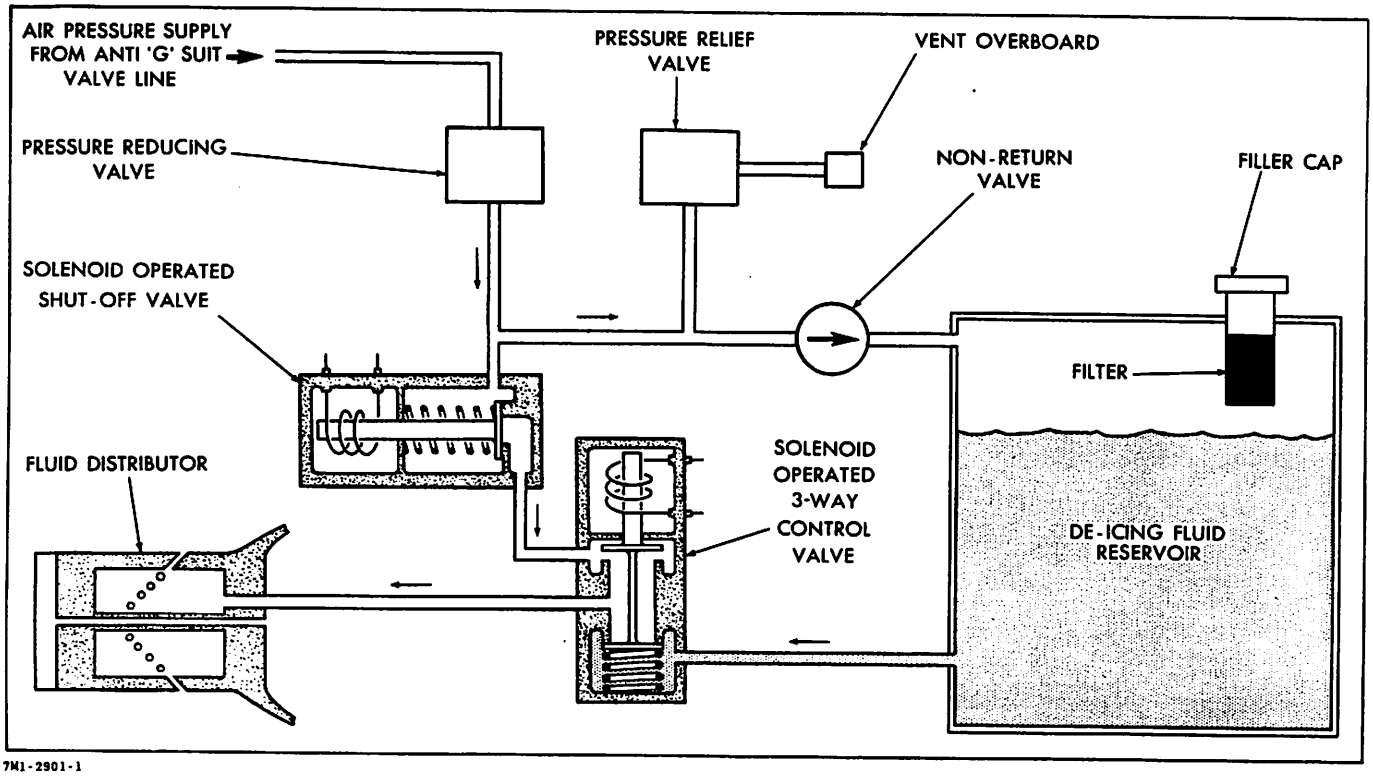

FIG. 1 RADOME DE-ICING SYSTEM - SCHEMATIC

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CF-105 SERVICE DATA

SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFFTY	REF. NO.
DE-ICING	RADOME DE-ICING	25201	20-1

DESCRIPTION

General.

1. A de-icing system, using an alcohol based fluid is provided for the radome. The system is electrically operated and is entirely automatic.

Pressure Reducing Valve.

2. Air taken from the anti-g suit valve line in the L.P. Air System at 18-90 psi is reduced to 10-12 psi by a pressure reducing valve. From the pressure reducing valve the air is supplied to a fluid reservoir and to a shut-off valve.

Pressure Relief Valve.

3. A pressure relief valve is fitted downstream of the pressure reducing valve and relieves pressure in excess of 14 psi.

Non-return Valve.

4. A non-return valve is fitted in the air supply line to the reservoir to prevent de-icing fluid from backing up into the low pressure air system.

Reservoir.

5. The de-icing fluid reservoir has a capacity of 2.75 Imp.gallons (3.3 U.S.). A gauze filter in the filler adaptor removes impurities from the fluid when filling, and also gives an indication of the correct filling level. The gauze filter element can be removed for cleaning. The fluid from the reservoir is led to a 3-way control valve.

3-Way Control Valve.

6. The 3-way control valve is solenoid operated and controls the flow of fluid and air to a fluid distributor.

Fluid Distributor.

7. The fluid distributor distributes the fluid evenly over the radome.

Shut-off Valve.

8. The shut-off valve, fitted in the air line between the pressure reducing valve and the 3-way control valve is solenoid operated and shuts off the air supply when the solenoid is de-energized.

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Operation.

9. The system is controlled electrically and details of the electrical components are described under Electrical System - De-Icing. The following is a brief description of the operation.

10. Icing conditions are detected by an ice detector located forward of the nose wheel well. The detector feeds signals to a de-icing intervalometer. The intervalometer controls the shut-off valve and the 3-way control valve to give a timed period of fluid flow to the distributor followed by a timed period of air pressure to force the fluid from the distributor to the surface of the radome. This sequence is maintained for the duration of icing conditions.

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	RADOME DE-ICING	Valve - 3 Way Control	20-1-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2052-14	Eckel Valve Co.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED-

FUNCTION

Control of air and fluid to radome distributor.

LOCATION

Radar nose, Stn. 70.0 to 74.0

ACCESS — MEN X MINUTES

Through radome de-icing equipment access door
at Stn. 68.5 - 78.95

REPLACEMENT PROCEDURE — MEN X MINUTES

Place in position.
Insert two attachment bolts.
Connect three pipe connections.
Connect one electrical connection

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INSPECTION	MEN X MINUTES	
Check for cleanliness, security of attachment and connections.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Electrical ground power unit.
Compressed air unit.
Cockpit access stand.
B4 access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
DE-ICING	RADOME DE-ICING	Valve - Pressure Reducing	20-1-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-0120-8 7-2000-11	Surface Combustion Corp.	27034	25201-25205

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To reduce pressure of air supplied from the low pressure air system to 10-12 psi before delivering it to the de-icing fluid tank and shut-off valve.

LOCATION

Radar nose, station 80 - top.

ACCESS | MEN X MINUTES

Through radome de-icing equipment panel at station 78.95 - 84.25 - top of radar nose.

REPLACEMENT PROCEDURE | MEN X MINUTES

Place in position.
Insert two mounting bolts.
Connect three pipe lines.

TM1-3413-2-5

INSPECTION	MEN X MINUTES
Check valve for security.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Compressed air unit.
Electrical ground power unit.
Cockpit access stand.
B5 access stand.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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Section 49

ELECTRICAL SYSTEM

RADOME DE-ICING

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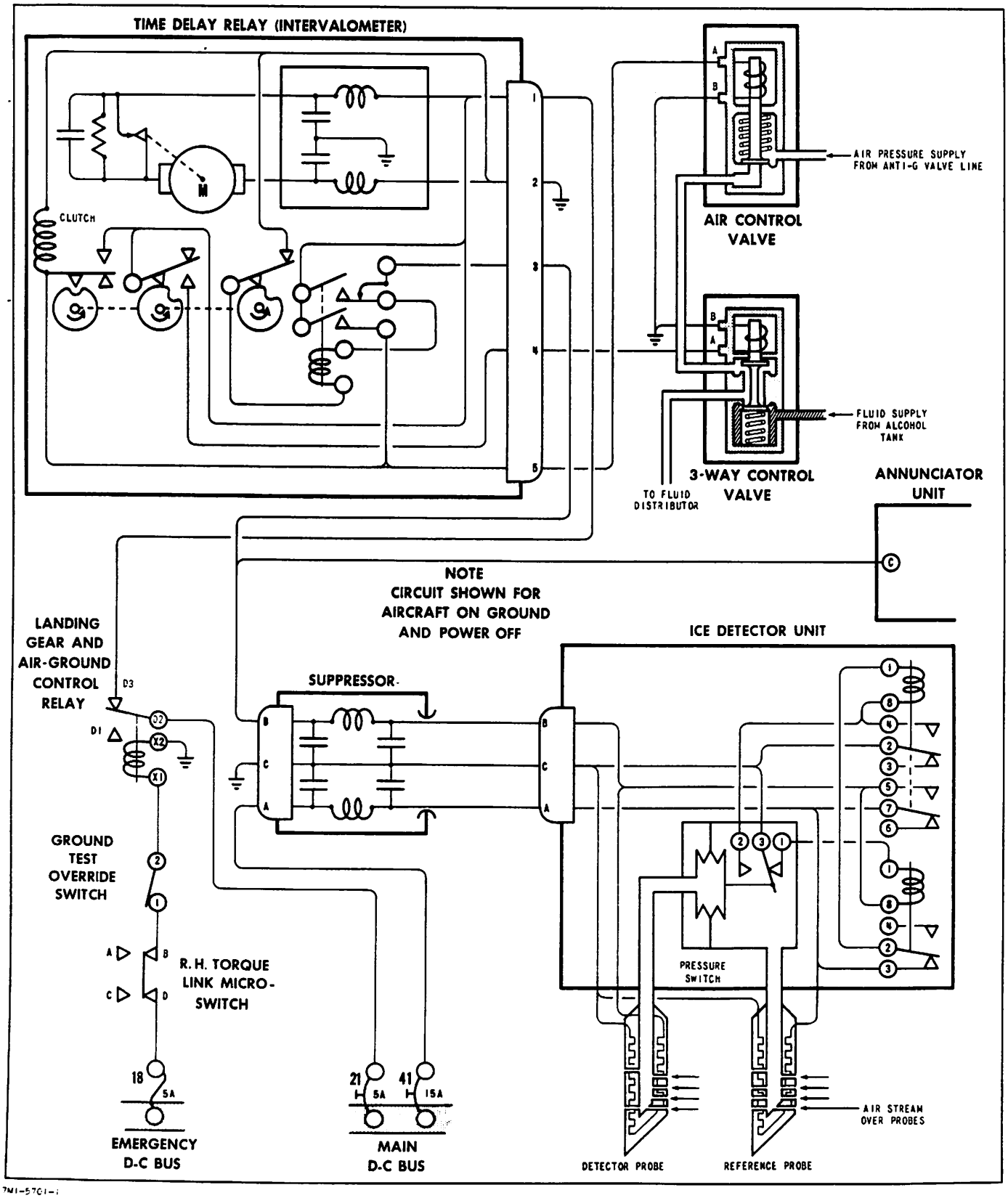

FIG. 1 RADOME DE-ICING SCHEMATIC

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CF-105 SERVICE DATA

SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFFTY	REF. NO.
ELECTRICAL	RADOME DE-ICING	25201	11-7

DESCRIPTION

General

1. An ice detection system and an alcohol de-icing system are fitted to prevent icing of the radome.

2. Icing conditions are detected by an ice detector fitted on the underside of the radar nose. The detector transmits a signal to a time delay relay which energizes the system, and alcohol is then fed via a system of valves and tubes to a distributor nozzle ring around the nose boom.

3. If the system has been in operation during flight, an annunciator indicates to the ground crew that the alcohol should be replenished.

4. A noise suppressor is fitted in the circuit to prevent interference with the radio systems.

Ice Detection

5. The ice detector is fitted with a control probe and a reference probe each of which has a number of holes in its forward and aft faces. The reference probe is continuously heated from the main d-c bus, and the control probe is heated intermittently during icing conditions.

6. The control and reference probes are connected to opposite sides of a pressure switch. During ice free conditions the airflow through the holes of both probes creates a pressure on both sides of the pressure switch which keeps the switch contacts open.

7. When icing conditions are encountered, formation of ice on the forward holes of the control probe decreases the pressure on the control probe side of the pressure switch and the switch contacts close. This sends a signal impulse to the time delay relay and also completes a 28V d-c supply to the heating element in the control probe.

8. When the heating element has melted the ice on the control probe the pressure switch contacts open and cut off the supply to the heating element and to the time delay relay.

9. This cycle is repeated until icing conditions cease.

Time Delay Relay

10. When the time delay relay receives a signal pulse from the ice detector, it supplies 28V d-c from the main bus to the solenoids of a shut-off valve and a 3-way control valve. The shut-off valve opens the L.P. air line to the 3-way control valve.

The 3-way control valve opens the alcohol line to a fluid distributor in the radome, which fills with alcohol. After a timed interval, the time delay relay de-energizes the solenoid of the 3-way control valve which then feeds the L.P. air supply to the distributor to spray the alcohol over the radome.

11. One pulse from the detector motors the time delay relay for 25 seconds. The shut-off valve is energized to open, for the full 25 seconds. The 3-way control valve is energized for one second for the alcohol feed and de-energized for 24 seconds for the air supply.

12. This cycle is repeated until icing conditions cease.

13. The alcohol and pneumatic components of the system are described in the service data for Radome De-icing - Ref. 20-1.

UNCLASSIFIED

CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	RADOME DE-ICING	Ice Detector	11-7-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-27	PSC Applied Research		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To detect icing conditions.
To signal the presence of icing conditions in the form of electrical impulses to a time delay relay.

LOCATION

Underside of the radar nose at station 116.10.

ACCESS

MEN X MINUTES

Remove the access panel on the underside of the radar nose at station 108.45 to 114.24 - 16 x 10/32 inch screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the ice detector to the structure - four screws.
Connect and secure the electrical connector from the noise filter.

UNCLASSIFIED

INSPECTION	MEN X MINUTES	
Check that the holes on the leading and sheltered sides of the probes are clear. Check that the unit is securely mounted. Check that the electrical connector is properly and securely fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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UNCLASSIFIED

CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	RADOME DE-ICING	Noise Filter	11-7-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-2055-105	PSC Applied Research		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To filter electrical interference originated by the ice detector.

LOCATION

Underside of the radar nose at station 111.96, adjacent to the ice detector.

ACCESS

MEN X MINUTES

Remove the access panel on the underside of the radar nose at station 108.45 to 114.24 - 16 x 10/32 inch screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the noise filter to the structure - four bolts.
Re-connect the circuit connector to the ice detector.
Fit and secure the circuit wiring to the suppressor.

UNCLASSIFIED

INSPECTION	MEN X MINUTES	
Check the panel for security and cleanliness. Check the warning lights by operating the "Press-to-Test" switch and the DAY/NIGHT switch. Function test by a test box installed at the Master Warning Control Box. Lift the panel and check the wiring and hardware for security and damage.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Test Box to introduce signals into the master warning control box.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	RADOME DE-ICING	Time Delay Relay	11-7-3

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1151-13	A.W. Haydon Company	B-7839	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

When operated by a signal from the ice detector, controls the position of the 3-way solenoid valve and the shut-off valve, and supplies a signal to the annunciator unit.

LOCATION

Topside of the radar nose at station 72.0.

ACCESS

Remove the de-icing equipment access panel on the topside of the radar nose at station 68.5 to 84.25.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure the unit to its mounting - four bolts.
Fit and secure the circuit wiring to the unit.

MEN X MINUTES

INSPECTION	MEN X MINUTES	
Check that the circuit wiring is securely and properly fitted. Check that the unit is securely mounted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

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CF-105 SERVICE DATA

SECTION 51
ELECTRONICS

TACAN AN/ARN-21

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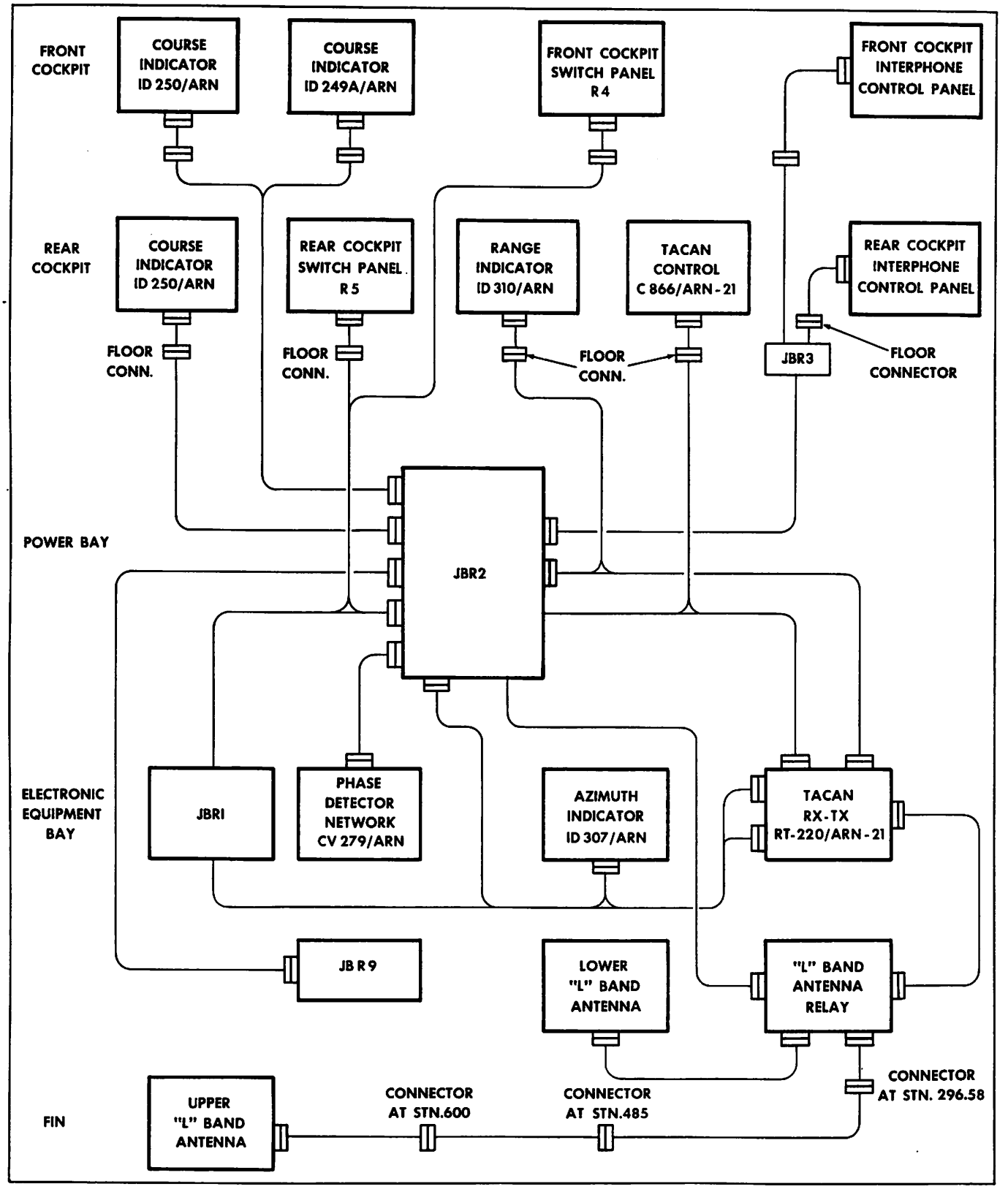

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FIG. 1 TACAN AN/ARN-21-GENERAL ARRANGEMENT

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CF-105 SERVICE DATA

SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFF'TY	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	25201	13-2

DESCRIPTION

General

1. The Tactical Air Navigation (TACAN) Radio system AN/ARN-21 indicates continuously, the bearing of, and distance to, a selected ground navigation beacon located within a line of sight distance from the aircraft. The indicated distance information is limited to 195 nautical miles. Bearing information and distance information are displayed on separate indicators. A third indicator enables the pilot to determine whether the aircraft is headed toward the beacon or away from it.

2. The system comprises the following component units:

(a) Radio Set Control C866/ARN-21

(b) Receiver-Transmitter RT220/ARN-21 and Mounting.

(c) 'L' Band Antenna System.

(d) Azimuth Indicator ID307/ARN.

(e) Phase Detecting Network CV279/ARN.

(f) Course Indicator ID249/ARN.

(g) Range Indicator ID310/ARN.

(h) Course Indicator (Dual) RMI Type ID250/ARN (2).

Radio Set Control C866/ARN-21.

3. The radio set control incorporates two channel selector controls marked CHAN, an identity tone signal level control marked VOL and an OFF-REC-T/R switch.

4. Channel selection is accomplished by turning the two controls marked CHAN. The right hand control determines the unit figure, and the left hand control the tens and hundreds figure of the channel number. The number of the selected channel appears in a cut out window between the controls. Dial numbers up to 129 can be selected but only channels 001 to 126 are usable. The OFF-REC-T/R switch energizes the equipment when selected to REC or T/R. In the REC position only bearing information is displayed and in the T/R position both bearing and distance information are displayed.

Receiver-Transmitter RT220/ARN-21

5. The receiver-transmitter transmits distance interrogation pulses. It receives from the ground beacon, distance reply signals, variable bearing signals,

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reference bearing signals and audio tone signals.

6. Distance interrogation pulses transmitted by the Tacan transmitter trigger the ground beacon which then transmits a reply pulse. When a reply pulse is received by the Tacan receiver, range circuits measure the time elapsed between transmission of the interrogation pulse and reception of the reply pulse. The range circuits operate to display this difference on a range indicator, located in the rear cockpit, as the distance to the beacon in nautical miles.

7. Variable bearing signals and reference bearing signals are transmitted continuously by the ground beacon. When these signals are received by the Tacan receiver, azimuth circuits measure the phase difference between the reference bearing signals and the variable bearing signals. The resulting phase difference is displayed on an azimuth indicator located in the electronic equipment bay, as the bearing of the aircraft relative to the ground beacon. The bearing indication is relayed from the azimuth indicator to remote radio magnetic indicators located one in each cockpit.

8. Audio tone signals keyed in international morse code are transmitted at regular intervals by the ground beacon. These audio tone signals which serve to identify the ground beacon, are received in the headsets when the TACAN mixing switches on the appropriate interphone system control panels are selected ON.

9. The transmitter has 126 assigned frequency channels, spaced one megacycle apart. Channel 1 has a frequency of 1025 Mc/s and channel 126 has a frequency of 1150 Mc/s. The receiver frequency for channels 1 to 63 is always 63 megacycles below the transmitter frequency, i.e. 962 to 1024 Mc/s, and for channels 64 to 126 the receiver frequency is always 63 megacycles above the transmitter frequency, i.e. 1151 to 1213 Mc/s.

Range Indicator ID210/ARN

10. The range indicator indicates continuously, up to 195 nautical miles, the distance between the aircraft and the ground beacon. The numerals are partially covered by a red strip when the indicator is not computing. This warns the operator against reading incorrect distance indications. The indicator is operative when the OFF-REC-T/R switch on the set control unit is selected to T/R.

Course Indicator ID249A/ARN

11. The course indicator, located in the front cockpit, will indicate deviation to the left or to the right when the aircraft is being steered on a ground beacon bearing. In addition, the indicator will determine whether the aircraft is headed toward the ground beacon or away from it.

12. The course being flown is indicated by numerals in a cut-out window on the indicator. Deviation to the left or to the right of this course is indicated by a pointer pivoted at the centre of the dial which is controlled by signals from the azimuth indicator operating in conjunction with a phase detecting network.

13. Signals from the azimuth indicator and the phase detecting network are also resolved in the course indicator to indicate whether the aircraft is headed toward the

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SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFF'TY	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	25201	13-2

ground beacon or away from it. When the aircraft is headed toward the ground beacon a flag marked TO appears in a cut-out window on the course indicator and when the aircraft is headed away from the beacon a flag marked FROM appears in the window.

Course Indicator (Dual) RMI ID250/ARN

14. The bearing of the aircraft from the ground beacon is displayed on the radio magnetic indicators. Two indicators are provided, one in each cockpit. The indicators are dual reading instruments with two indicating needles, one broad and one narrow. The broad needle operates with the radio compass system. The narrow needle operates with either the TACAN system or the UHF homer system. RMI needle selector switches, located one on the front cockpit switch panel R4 and one on the rear cockpit switch panel R5, facilitate selection of the narrow needle for operation with the system required.

'L' Band Antenna System

15. The TACAN system shares the upper and lower 'L' band antennas with the IFF system. A two-position 'L' band antenna transfer switch is mounted on switch panel R5 which is located in the rear cockpit. The switch is marked IFF UP/TACAN LOW and IFF LOW/TACAN UP, and energizes an 'L' band antenna relay which connects the antennas to the systems as selected.

Power Requirements.

16. The system operates using 27.5 volts d-c at 0.75 amps, 115 volts a-c 400 cps at 480 VA.

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Radio Set Control	13-2-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply	C866/ARN-21	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To house controls necessary for the operation of the system.

LOCATION

Mounted on the RH console in the rear cockpit.

ACCESS

Unobstructed, when the unit is released from the console.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure connector J1801 (AN 3102-20-27S). Secure the unit to the console with four Dzus fasteners.

MEN X MINUTES

INSPECTION	MEN X MINUTES	
Check that the panel is securely mounted. Check that the controls are securely mounted. Check that the connector is securely and properly fitted. Operate the controls and check that the action is not rough or sluggish.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Beacon station if within range or radio test set TS 823/ARM.
Radio test set AN/ARM-17.
Test equipment listed in EO 35AA-10ARN21-2.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Receiver-Transmitter	13-2-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EU/44474)	RT 220/ARN-21	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Receives bearing signals which are resolved to furnish azimuth indication and audio code signals which serve to identify the ground beacon. In addition, transmits interrogation pulses to a ground beacon and receives, in return, reply pulses which are resolved to furnish range indication.

LOCATION

Electronics Equipment Bay - RH side.

ACCESS | MEN X MINUTES

Open the electronic equipment bay RH access door - 46 camlocs.

REPLACEMENT PROCEDURE | MEN X MINUTES

Fit the unit into its mounting and secure with two wing nuts.

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the connectors are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Beacon station if within range or radio test set TS 823/ARM and signal generator TS497/VRR.
Radio test set AN/ARM-22.
Test equipment listed in EO 35AA-10ARN21-2.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Receiver-Transmitter Mounting	13-2-3

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EP/36243)	MT 928/ARN-21	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

To shockmount the RT 220/ARN-21 receiver-transmitter and, by means of a push-to-connect receptacle, to ensure that a positive connection is made to the circuit wiring. Also mounts the power control relays.

LOCATION

Electronic Equipment Bay - RH side.

ACCESS | MEN X MINUTES

Open the electronic equipment bay RH access door - 46 camlocs.

REPLACEMENT PROCEDURE | MEN X MINUTES

Fit shockmounts to structure - 16 screws.
Secure mounting tray to shockmounts - four screws.
Fit and secure four connectors (R1021-4, R1021-5, R1014-2, R1015-2).

INSPECTION	MEN X MINUTES
Check that the unit is securely mounted. Check that the relays and connectors are securely and properly fitted.	

FUNCTIONAL CHECKS	MEN X MINUTES

GROUND HANDLING AND GROUND TEST EQUIPMENT

Beacon station if within range or electric ground power unit AN/ARN-21 field tester.
Test set radio AN/ARM-22.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Range Indicator	13-2-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply	ID 310/ARN	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Displays the distance from the aircraft to the TACAN ground beacon in nautical miles, up to a line of sight distance of 195 nautical miles.

LOCATION

Mounted on the rear cockpit Instrument Panel.

ACCESS

MEN X MINUTES

Unobstructed when the unit is released from the instrument panel.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure connector P1601.
Fit and secure the unit to the instrument panel with four mounting screws.

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check for cracks and cleanliness. Check that the connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Beacon station if within range or radio test set TS 823/ARM.
Radio test set AN/ARM-17.

SPECIAL TOOLS TO REMOVE OR SERVICE

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	'L' Band Antenna - Lower	13-2-5

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
17-1354-39	Aircraft Appliances		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To transmit and receive signals in the 'L' Band. Operates with the TACAN system or the IFF system as selected by the 'L' Band antenna selector switch.

LOCATION

Mounted on the Electronic Equipment Bay centre access door.

ACCESS

	MEN X MINUTES	
Release and lower the electronic equipment bay centre access door - 33 camloc fasteners.		

REPLACEMENT PROCEDURE

	MEN X MINUTES	
Fit and secure unit to access door using 16 screws (AN509-8R6). Fit and secure centre access door - 33 camloc fasteners.		

7M1-3413-2-5

INSPECTION	MEN X MINUTES	
Check that the antenna is securely mounted. Check the antenna for damage and cracks. Check that the connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	'L' Band Antenna - Upper	13-2-6

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1383-3	Sinclair Radio		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To transmit and receive signals in the 'L' Band.
Operates with the TACAN system or the IFF system
as selected by the 'L' Band antenna selector switch.

LOCATION

Fin tip - combined with the upper UHF antenna.

ACCESS

MEN X MINUTES

Remove the fin tip - 56 screws.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the antenna to the fin tip - 12 screws.
Fit and secure two connectors.
Refit and secure the fin tip to the fin - 56 screws.

7M1-3913-2-5

INSPECTION	MEN X MINUTES	
Check that the antenna is securely mounted. Check the antenna for damage, cracks and corrosion. Check that the connectors are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	'L' Band Antenna Relay	13-2-7

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-13	Aircraft Appliances and Equipment		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

To connect the upper and lower 'L' Band antenna for operation with the TACAN and the IFF system as selected by the 'L' Band antenna selector switch.

LOCATION

Electronic Equipment Bay - RH side Sta. 282.

ACCESS

MEN X MINUTES

Release and lower the electronic equipment bay centre access door - 33 camlocs.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure unit to airframe using four mounting screws.
Fit and secure four connectors (R1056-2, R1101-1, R1102-2, R1104-2).
Refit the access door - 33 camloc fasteners.

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INSPECTION	MEN X MINUTES	
Check that the relay is securely mounted. Check that the connectors are securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Azimuth Indicator	13-2-8

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply	ID 307/ARN	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Works in conjunction with the phase detecting network to relay bearing signals to the course indicator ID 249A/ARN.
Displays bearing signals received by Receiver-Transmitter RT 220/ARN-21.

LOCATION

Electronic Equipment Bay - RH side.

ACCESS | MEN X MINUTES

Release and lower the electronic equipment bay centre access door - 33 camlocs.

REPLACEMENT PROCEDURE | MEN X MINUTES

Fit and secure connector P1701.
Fit unit to airframe with four mounting bolts.

TM1-3413-2-5

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check for cracks and cleanliness. Check that the connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Beacon station if within range or radio test set TS 823/ARM.
Radio test set AN/ARM-17.

SPECIAL TOOLS TO REMOVE OR SERVICE

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Azimuth Indicator Mounting	13-2-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1354-86	Avro Aircraft Ltd.		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1500 hours

FUNCTION

Shockmounts Azimuth Indicator ID 307/ARN.

LOCATION

Electronic Equipment Bay - RH side.

ACCESS

MEN X MINUTES

Open the RH side electronic equipment bay access door - 19 camlocs.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure the bonding lead.
Fit the mounting to the airframe with six mounting screws.

7M1-3413-2-5

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check the bonding lead for signs of fraying and corrosion.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Phase Detecting Network	13-2-10

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply	CV 279/ARN	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Works in conjunction with Azimuth Indicator ID 307/ARN to relay bearings to the Course Indicator ID 249A/ARN.

LOCATION

Electronic Equipment Bay - RH side.

ACCESS — MEN X MINUTES

Open the RH access door of the electronic equipment bay - 46 camlocs.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure one connector (AN-3106-18-1P).
Fit two mounting screws (NAS-221-9) securing unit to airframe.

7M1-3413-2-5

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Beacon station if within range or radio test set TS 823/ARM.
Test set radio AN/ARM-17.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	TACAN AN/ARN-21	Course Indicator	13-2-11

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	RCAF Supply (10EA/39340)	ID 249A/ARN	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 1000 hours

FUNCTION

Displays deviation of the aircraft course to left or right of the TACAN ground beacon.
Provides for radial course selection.
Enables pilot to determine whether he is flying toward or away from the Tacan beacon.

LOCATION

Mounted on the Main Instrument Panel - front cockpit.

ACCESS

MEN X MINUTES

Unobstructed when released from the instrument panel.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure connector R1032-1.
Fit unit to main instrument panel - four screws.

TM1-3413-2-5

INSPECTION	MEN X MINUTES	
Check that the unit is securely mounted. Check that the connector is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Beacon station if within range or field test set.
Test set radio AN/ARM-22.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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ELECTRONICS

R-THETA NAVIGATION COMPUTER

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by authority of (date)
Signature Rank

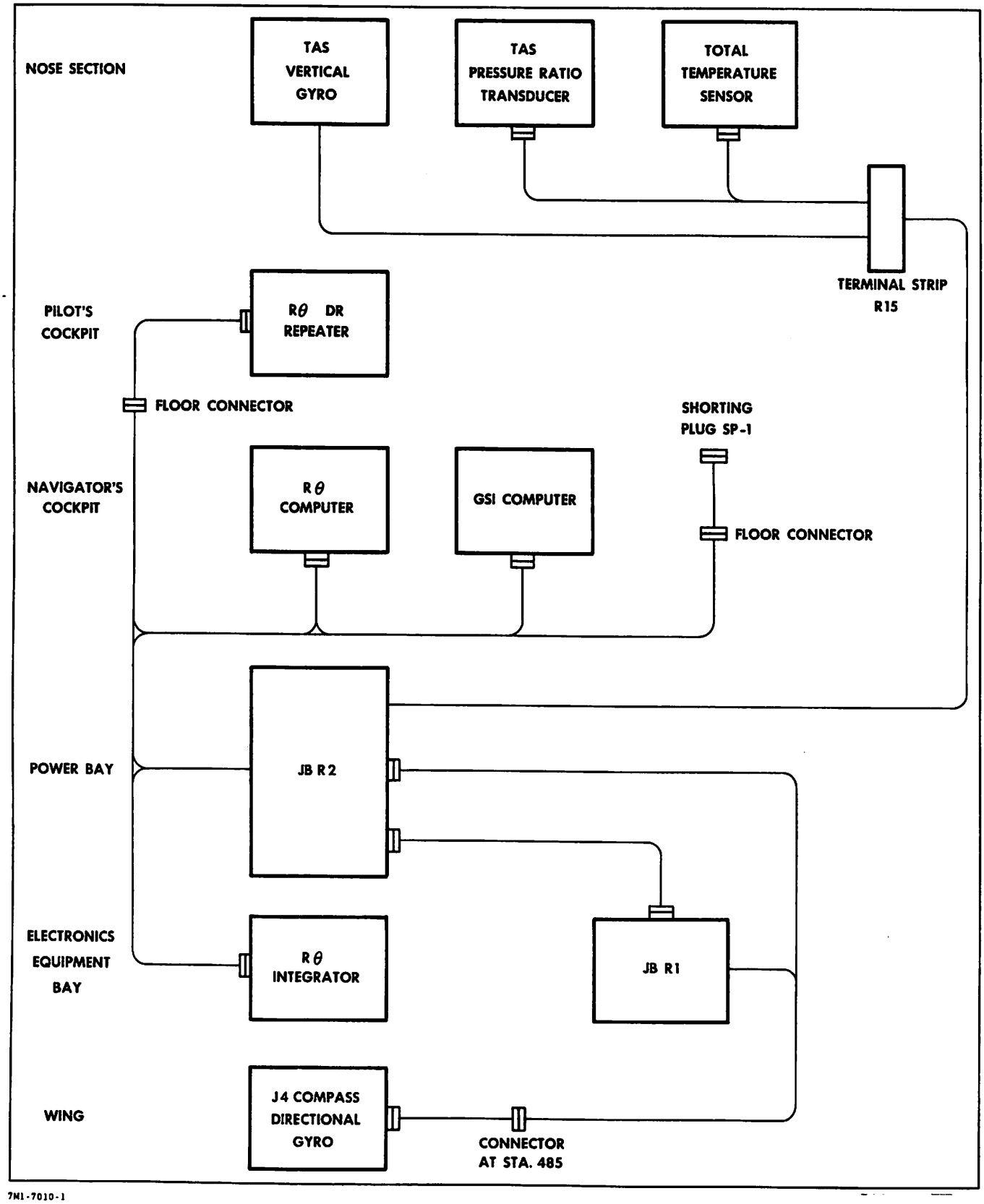

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FIG. 1 R-THETA NAVIGATION COMPUTER - GENERAL ARRANGEMENT

CF-105 SERVICE DATA

SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFFTY	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	25201	13-3

DESCRIPTION

General

1. The R-Theta (R - range, Theta - bearing) Navigation Computer System indicates continuously, irrespective of the aircraft track, the true bearing of and the direct distance in nautical miles to a reference point. The indicated distance is limited to 999 miles after which the system must be reset to a new reference point. In addition, during flight any point can be selected as an alternative reference, in which case the system will indicate the true bearing of, and direct distance to, the alternative reference point.

2. The system utilizes heading information supplied by the J4 Compass System but is otherwise independent of radio or other aids. However, provision is made to utilize such aids if required. In addition to the heading information supplied by the J4 Compass System, the computer requires the following information to compute the position of the aircraft:

(a) True Airspeed (supplied by TAS sensing components).

(b) Magnetic or Grid Variation (Applied manually).

(c) Wind Speed and Direction (Applied manually).

3. The system consists of the following component units:

(a) R-Theta Integrator Type 269 MK 1.

(b) Ground Speed and Interceptor (GSI) Computer Type 269 MK 4D.

(c) R-Theta (R-θ) Computer Type 269 MK 2.

(d) R-Theta (R-θ) DR Repeater Type 269 MK 2.

(e) The following TAS components which are not supplied as part of the system: Vertical gyro, pressure ratio transducer, total temperature sensor.

Integrator - Amplifier

4. The integrator serves as the power distributing point and interconnecting link between the component units of the R-Theta Navigation System.

5. Magnetic heading information from the J4 Compass and true airspeed from the pressure ratio transducer are received by the unit. The heading information and true airspeed are supplied to the GSI Computer. The heading information only is supplied to the R-Theta DR Repeater.

6. True heading, true track and ground speed data are received from the GSI Computer. The true heading information is supplied to the R-Theta DR Repeater. The true track and ground speed data are supplied to the R-Theta Computer.

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7. The unit incorporates three positional servo-amplifiers which are used in the true heading, true track and true airspeed data circuits. Also incorporated is a servo-amplifier and servo-motor unit used in the ground miles data circuit.

8. The integrator incorporates provision for future connection of a Radar Doppler System which automatically provides ground speed and wind drift data.

Ground Speed and Interceptor Computer

9. The Ground Speed and Interceptor (GSI) Computer deducts the variation correction from a magnetic heading and resolves the resultant true heading with true airspeed, wind speed and wind direction into true track and ground miles data. The magnetic heading information is received from the J4 Compass via the Integrator unit and true airspeed is received from the pressure ratio-transducer via the Integrator unit. Variation, wind speed and wind direction are applied manually by means of controls on the GSI Computer.

10. Magnetic heading information and the true heading are supplied via the Integrator unit to the R-Theta DR Repeater. True track and ground speed are supplied to the R-Theta Computer, via the Integrator unit.

R-Theta DR Computer

11. The R-Theta Computer indicates the true track of the aircraft and the true bearing of, and distance to, any selected reference point. Incorporated on the unit are the controls necessary to manipulate the system.

12. The bearing selected for reference can be the take-off point or a destination point. In either case a bearing pointer will indicate the selected bearing continuously, irrespective of the track of the aircraft. The bearing pointer is formed with two spaced index marks at one end and one index mark at the other. The single index mark points to the reciprocal of the bearing selected for reference. The track of the aircraft is indicated by a track pointer which is driven by tracking data received from the GSI Computer. As the track pointer and the bearing pointer are mounted on concentric shafts, aligning the track pointer between the two index marks of the bearing pointer will track the aircraft on the reference bearing to the reference point.

13. Due primarily to the fact that the reference bearing changes rapidly as the aircraft approaches close to the reference point, the bearing pointer is automatically rendered inoperative when the aircraft is inside a radius of two miles from the reference point. In this state an automatic reciprocal circuit becomes operative and the bearing pointer commences to fluctuate about the track indication. When the range counter reaches zero, the bearing pointer rotates through 180 degrees to the reciprocal of the track indication and fluctuates about this indication. The range counter will commence to add mileage and when the radius of two miles is passed, the bearing pointer will operate normally but will maintain the 180 degree reciprocal.

14. The distance to the reference point is indicated on a counter which can be set up in one of two ways. The counter can be set to zero prior to take-off in which case the counter will indicate, continuously, the direct distance in nautical miles to the take-off point. Alternatively, if the bearing pointer is preset to the destination point the counter can be preset to the mileage of the destination point

SYSTEM	SUB-SYSTEM	AIRCRAFT EFFTY	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	25201	13-3

relative to the take-off point in which case the counter will indicate a decreasing mileage during flight. If an alternative reference point is selected during flight, the counter will automatically indicate the distance to the alternative reference.

15. The computer is set for the required bearing and range by means of a SET RΘ switch, two range (R) switches and two bearing (Θ) switches. When the SET RΘ switch is pulled out, the range counter can be adjusted by depressing the R increase or decrease switch. Similarly, the bearing can be increased or decreased by depressing the appropriate Θ switch. The selected range and bearing is locked as a reference for the computer when the SET RΘ switch is depressed.

16. Confirmation that ground speed data is being received from the GSI Computer is provided by a green coloured indicator light which blinks continuously during computation.

17. Computation of an alternative reference is accomplished by inserting into the computer, as a vector, the bearing of and distance to the alternative reference from the original reference. The vector length is set up on the computer by means of a VECTOR LENGTH control and the vector bearing by means of a VECTOR BRG control. The vector can be inserted, when desired, by means of a VECTOR ADD switch. When the vector is inserted, the bearing pointer and the range counter will automatically indicate the bearing of and distance to the new reference point. It should be noted that deviation from the true track, during the time the computer is computing the alternative reference, will introduce errors into the range and bearing indications.

18. The vector can be cancelled at any time by pulling out the VECTOR ADD switch or, alternatively, an additional vector may be inserted. If the first vector is cancelled, the bearing pointer reverts to the original reference bearing and the range counter will be adjusted for the number of miles flown on the alternative reference. If a second vector is inserted, the first vector cancels and takes the place of the original reference. It should be noted that bearing and range will be computed from the first vector.

19. A counter marked VEC RECORD indicates, for reference, the vector length inserted into the computer. The counter clears when the vector is cancelled.

20. A memory circuit is incorporated in the computer to store ground miles information under certain conditions. The circuit is operative automatically when an alternative reference point is selected during flight, or the indicated range exceeds 999 miles. The circuit can be selected manually by means of a HOLD switch mounted on the R-Theta Computer.

21. The circuit is necessary due to the fact that when an alternative reference point is set up on the computer there is an indeterminate time, in which the computer is computing the new range data, when the miles flown is not counted. The memory circuit records this mileage and applies them to the counter upon the completion of the new computation. The operation of the memory circuit when 999 miles is indicated on the range counter serves to provide a warning that the original computation will be lost if a new reference point is not selected.

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22. Selecting the HOLD switch to the Hold position renders the range counter stationary and the memory circuit operative. This facilitates comparing computed and observed positions.

23. When 120 miles has been accumulated by the memory circuit, a red coloured indicator light on the computer starts to blink. When 150 miles has been accumulated, the indicator light remains on continuously denoting that the original computation has been lost.

24. During the time the memory circuit is operative, deviation from the indicated track will introduce errors into the computed indications.

R-Theta DR Repeater

25. The R-Theta DR Repeater is slaved to the R-Theta Computer to indicate the true track, reference bearing and range. A range counter reset control is provided to preset the range counter in agreement with the R-Theta Computer range counter. In addition, a selector switch is provided which permits magnetic heading or true heading, in lieu of true track, to be indicated by the track pointer. The magnetic heading and the true heading are received directly from the integrator unit.

CF-105 SERVICE DATA

COMPONENT DATA SHEET

CLASSIFIED

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	Integrator - Amplifier Type 269 MK 1	13-3-1

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	PSC Applied Research (RCAF Supply)	101-05387	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To house a servo-motor and a servo-amplifier used in the ground miles data circuit and three servo-amplifiers used in the true heading, true track and true airspeed circuits. In addition the integrator serves as the interconnecting link between the component units of the system.

LOCATION

Electronics Equipment Bay - LH side.

ACCESS

	MEN X MINUTES
Release and lower the Electronics Equipment Bay centre access door - 33 camlocs.	

REPLACEMENT PROCEDURE

	MEN X MINUTES
Fit and secure connector R1008/5-(K03-21-20SN). Fit unit to mounting and secure with two lock nuts.	

781-3013-2-5

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INSPECTION	MEN X MINUTES	
Check that the connector is securely and properly connected. Check that the unit is securely mounted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Pitot and Static pressures simulator.
Navigation System Test Set - Type T601, RCAF Ref. 6C/970
Stop Watch.

SPECIAL TOOLS TO REMOVE OR SERVICE

REMARKS

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	Integrator Mounting	13-3-2

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	PSC Applied Research (RCAF Supply)		25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Mounts the Integrator Unit of the system.

LOCATION

Electronics Equipment Bay - LH side.

ACCESS

Release and lower the Electronics Equipment Bay, centre access door - 33 camlocs.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit mounting to airframe with four mounting bolts.

MEN X MINUTES

701-3013-2-5

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INSPECTION	MEN X MINUTES	
Check that the mounting is securely fitted and is not distorted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	Ground Speed and Interceptor Computer Type 269 MK 4D	13-3-3

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	PSC Applied Research (RCAF Supply)	101-02731	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To deduct a variation correction from a magnetic heading and resolve the resultant true heading with true airspped, wind speed and direction into true track and ground miles data which is required by the R-Theta Computer.

LOCATION

Instrument panel - Rear cockpit.

ACCESS

Unobstructed.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fit and secure connector R1046/1-(K03-21-30SN).
Fit unit to instrument panel with four mounting screws.

MEN X MINUTES

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INSPECTION	MEN X MINUTES	
Check that the connector is securely and properly fitted. Check that the unit is securely mounted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Pitot and Static pressures simulator.
Navigation System Test Set, Type 601 RCAF Ref. 6C/970
Stop Watch.

SPECIAL TOOLS TO REMOVE OR SERVICE

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	R-Theta Computer - Type 269 MK 2	13-3-4

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	PSC Applied Research (RCAF Supply)	101-02730	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Indicates the true track of the aircraft and computes and indicates the true bearing of, and distance to, any selected reference point. Mounts the controls necessary to manipulate the system.

LOCATION

Instrument panel - Rear cockpit.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure connector R1047/1 (K03-21-30SV).
Fit and secure unit to instrument panel with four mounting bolts.

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INSPECTION	MEN X MINUTES	
Check that the connector is securely and properly fitted. Check that the unit is securely mounted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Pitot and Static pressures simulater.
Navigation System Test Set Type 601-RCAF Ref 6C/970.

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	DR Repeater Type 269 MK 2	13-3-5

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
	PSC Applied Research (RCAF Supply)	101-02624	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

To slave to the R-Theta Computer and provide true track and the true bearing of and distance to a selected reference point. In addition a switch is provided which permits magnetic heading or true heading, in lieu of true track, to be indicated by the track pointer.

LOCATION

Instrument Panel - Front Cockpit.

ACCESS

MEN X MINUTES

Unobstructed.

REPLACEMENT PROCEDURE

MEN X MINUTES

Fit and secure connector R1031/1 (K03-21-30SN).
Fit unit to instrument panel with four mounting screws.

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INSPECTION	MEN X MINUTES	
Check that the connector is securely and properly fitted. Check that the unit is securely mounted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

Pitot and Static pressures simulator.
Navigation System Test Set, Type 601-RCAF Ref. 6C/970.

SPECIAL TOOLS TO REMOVE OR SERVICE

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRONICS	R-THETA NAVIGATION COMPUTER	Shorting Plug SP-1	13-3-6

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-1352-85	Cannon Electric Canada Ltd.	K02-21-30SN	25201

OVERHAUL LIFE: KNOWN- ESTIMATED- 500 hours

FUNCTION

Completes the computer circuits connected to a receptacle which facilitates the connection of ground test equipment.

LOCATION

RH Console in Rear Cockpit.

ACCESS

Mounted in rear cockpit on RH console.

MEN X MINUTES

REPLACEMENT PROCEDURE

Fill plug with potting compound.
Connect and secure plug to receptacle on RH console.

MEN X MINUTES

7MI-3913-2-5

INSPECTION	MEN X MINUTES	
Check that the plug is securely and properly fitted.		

FUNCTIONAL CHECKS	MEN X MINUTES	

GROUND HANDLING AND GROUND TEST EQUIPMENT

SPECIAL TOOLS TO REMOVE OR SERVICE

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