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CF-105 SERVICE DATA

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Signature G.W. Parker Rank F/L

ELECTRICAL SYSTEM

ENGINE SERVICES

Section 25.

FILE IN VAULT

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NRC - CISTI
J. H. PARKIN
BRANCH

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ANNEXE
J. H. PARKIN
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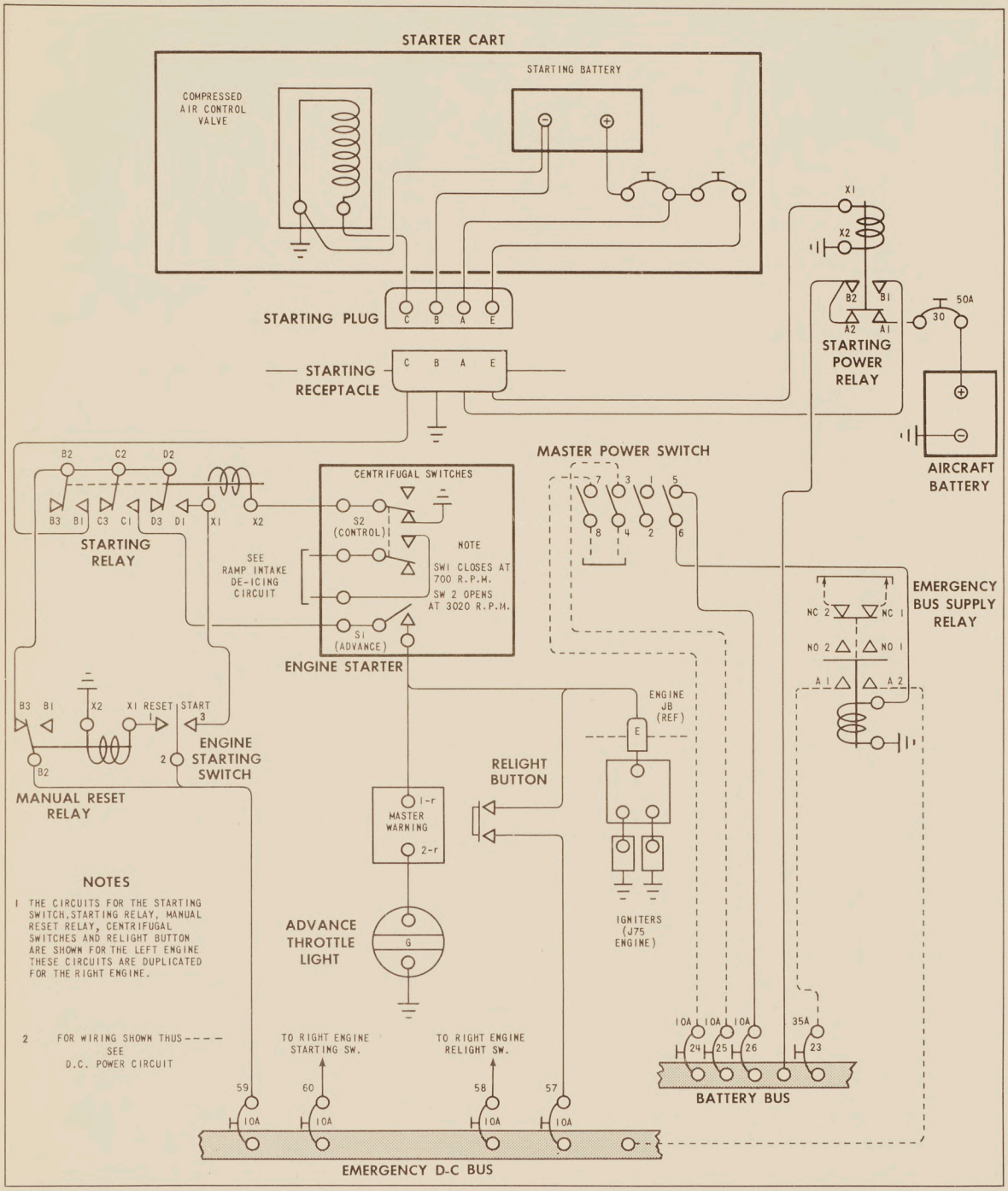
CF-105 SERVICE DATA



7MI-5302-2

FIG. 1 ENGINE STARTING AND IGNITION SCHEMATIC

7MI-3413-2-2

CF-105 SERVICE DATA

SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFF'TY	REF. NO.
ELECTRICAL	ENGINE SERVICES	25201	11-2

DESCRIPTION

General

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

Engine Starting and Ignition

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 a starting receptacle located in the underside of the fuselage between stations 489.90 and 494.80. 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 d-c 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 d-c supply circuits are used to supply power to the battery bus 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 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 engine starting switch to the START position. This completes a supply circuit from the emergency d-c bus 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 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.

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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 advance throttle light and to the engine sparkigniters. The LH and RH advance throttle lights are coloured green and are located on the main instrument panel.

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 reset relay which interrupts the power supply to the starting relay.

Relighting

11. A push-button relight switch is fitted on each power lever. When either switch is depressed, a circuit is completed from the emergency d-c bus to the relevant LH or RH engine sparkigniters.

Exhaust Gas Temperature Indication

12. Exhaust gas temperature indication for each engine is provided by two separate self-exciting chromel-alumel thermo-couple circuits. Each circuit consists of a transistorized indicator actuated by four parallel-connected thermo-couples located on the turbine discharge shroud ring of the engine. The indicators derive a 115 volts a-c supply from "A" phase of the primary bus bars and incorporate a red warning flag which is 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 systems to provide a measure of thrust being developed by each engine. Each system consists of a ratio indicator, or ratiometer, located on the main instrument panel in the front cockpit, and a pressure ratio transducer located on the engine. Pressure indications, taken from the engine air intake and the turbine discharge outlet, are transformed into an electrical signal by the pressure ratio transducer and transmitted to the ratio indicator. The system derives a 115 volts a-c supply from "A" phase of the primary bus bars.

Oil Pressure Warning

14. An OIL PRESS warning light for each engine is fitted on the master warning system indicator panel. The lights illuminate if the relevant LH or RH engine oil pressure drops below 25 psi. 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 emergency d-c bus via the master warning control unit.

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SYSTEM DATA SHEET

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Engine Inlet Fuel Pressure Warning

15. An ENGINE FUEL PRESS warning light for each engine is fitted on the master warning system indicator panel. The lights illuminate if the relevant LH or RH engine inlet fuel pressure drops below 18 psia. Each warning light is controlled by a pressure switch tapped into the corresponding engine fuel inlet line at station 589 of the fuselage which is downstream from the low pressure cock. Both circuits derive their power supply from the emergency d-c bus via the master warning control unit.

Afterburner Operation

16. The afterburner is brought into operation by advancing the power lever to the afterburner range and then depressing the lever. This action energizes the afterburner relay which completes circuits to initiate the operation of the afterburner hydro-mechanical unit and open the fuel-to-oil heat exchanger 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 valve, when open, permits engine oil to pass through the heat exchanger. A power supply for both circuits is derived from the main d-c bus.

Zone 1 Ejector

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 is acted upon by the engine air intake pressure and atmospheric pressure. When the air intake pressure decreases to a certain limit below atmospheric pressure, the pressure switch closes. This action completes a supply circuit to the ejector valve actuator which opens 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 d-c bus.

Low Pressure Compressor Overapeed Indicator

19. A LOW ROTOR OVERSPEED warning light for each engine is fitted on the master warning system indicator panel. Illumination of a light denotes failure of the corresponding engine low pressure compressor speed limiter. Both circuits derive their power supply from the main d-c bus via the master warning control unit.

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Engine Starting Switches - LH and RH	11-2-1

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

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

MEN X MINUTES

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.

TM1-3913-2-5

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

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

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

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, forward.

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

TMI-3913-2-5

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

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Manual Reaet Relays - LH and RH	11-2-3

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, interrupta the corresponding LH engine or RH engine starting cycle.

LOCATION

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

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 aecure 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.

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

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Starting Power Relay	11-2-4

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 well.

ACCESS

MEN X MINUTES

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

REPLACEMENT PROCEDURE

MEN X MINUTES

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

TM1-3413-2-5

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

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Relight Switch - LH and RH	11-2-5

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.

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

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	External Starting Receptacle	11-2-6

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 starter cart and the aircraft. Interconnected circuits include battery supply, starting control and intercommunication.

LOCATION

Underside of the fuselage between stations 489.90 and 494.80.

ACCESS — MEN X MINUTES

Face of receptacle unobstructed, circuit connections to receptacle are accessible when the access panel is removed - 44 camlocs.

REPLACEMENT PROCEDURE — MEN X MINUTES

Fit and secure the receptacle to its mounting bracket - four screws.
Fit and secure circuit wiring to the terminal connections.
Fit the terminal cover - four nuts.
Refit the access panel - 44 camlocs.

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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

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Exhaust Gas Temperature Indicator	11-2-7

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

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

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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

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Ratiometer, Engine Pressure - LH and RH	11-2-8

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 | 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.

7MI-3413-2-5

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

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Pressure Ratio Transducer LH and RH	11-2-9

AVRO PART NO.	MANUFACTURER	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY
7-0325-22	AiResearch	37655	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.

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

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Pressure Switch, Engine Oil - LH and RH	11-2-10

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

MEN X MINUTES

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

REPLACEMENT PROCEDURE

MEN X MINUTES

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.

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	

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

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 18 psia.

LOCATION

Inside the fuselage at station 589, 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.

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

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Afterburner Micro-switches, LH and RH	11-2-12

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.

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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

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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

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CF-105 SERVICE DATA

COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Zone 1 Ejector Valve - LH	11-2-13

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. 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.		

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COMPONENT DATA SHEET

SYSTEM	SUB-SYSTEM	COMPONENT	REF. NO.
ELECTRICAL	ENGINE SERVICES	Differential Pressure Switch, Zone 1 Ejector - LH and RH	11-2-14

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 senaing 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 acceas door - 52 camlocs.

REPLACEMENT PROCEDURE

MEN X MINUTES

Locate the pressure switch on its mounting bracket between atations 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 washera.
Fit and secure the presaure line.
Fit and secure the electrical connector.

TM1-3413-2-5

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

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