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ARROW 1 SERVICE DATA

SECTION 26

FIRE PROTECTION SYSTEM

(This data supersedes previous issue dated 14 June 1957)

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LIST OF REVISIONS

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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.

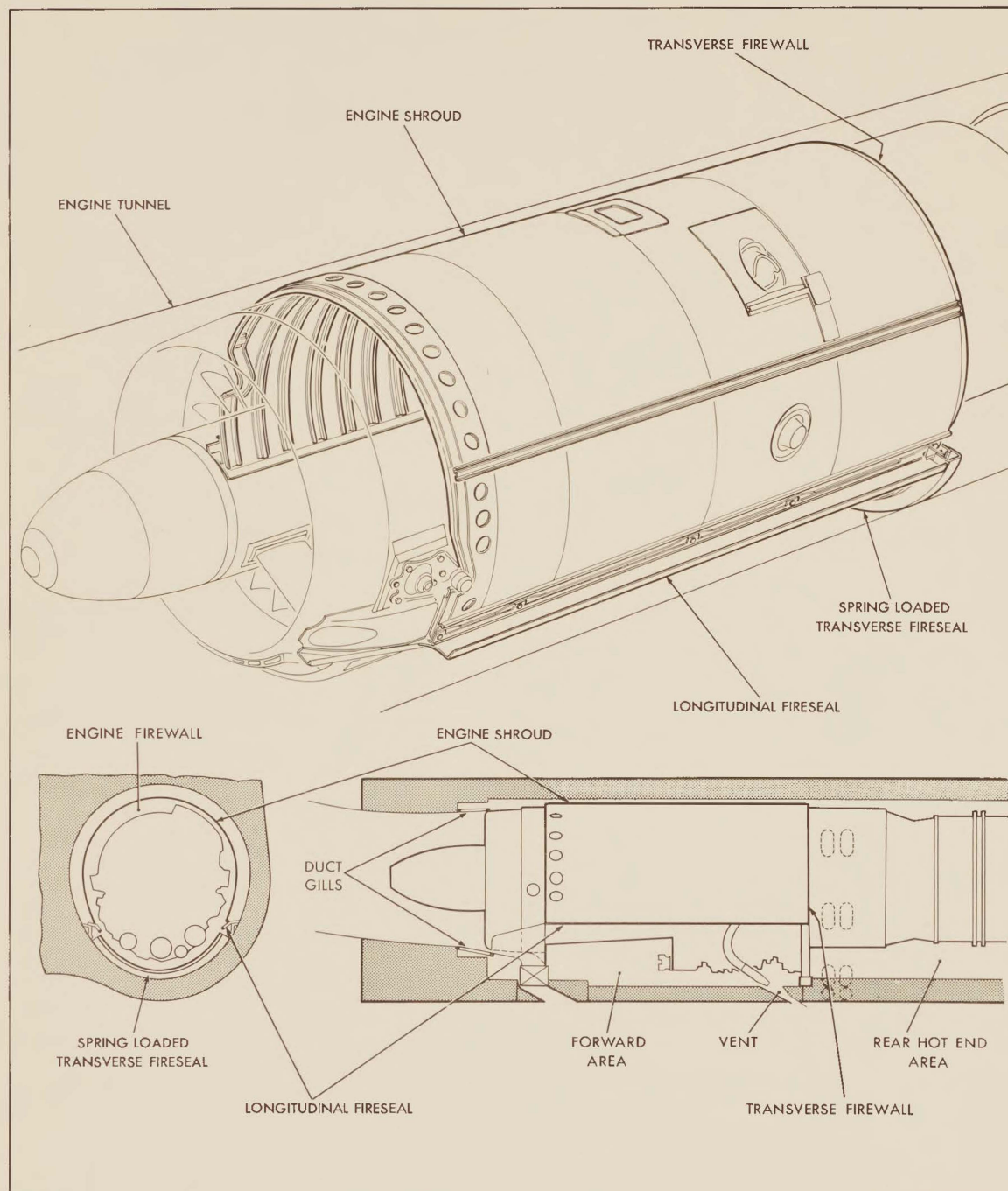
FIRE EXTINGUISHING (Figs 2 and 3)

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

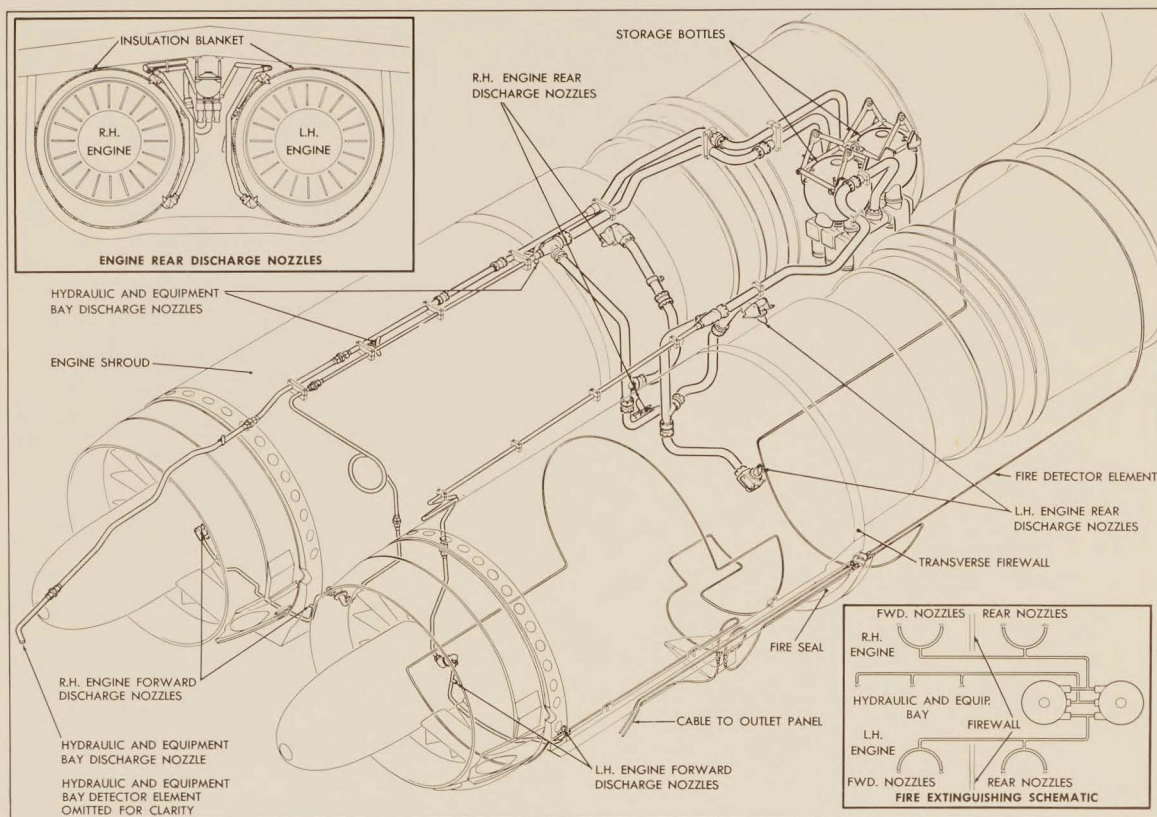
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FIG. 1 FIRE ISOLATION - SCHEMATIC

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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.

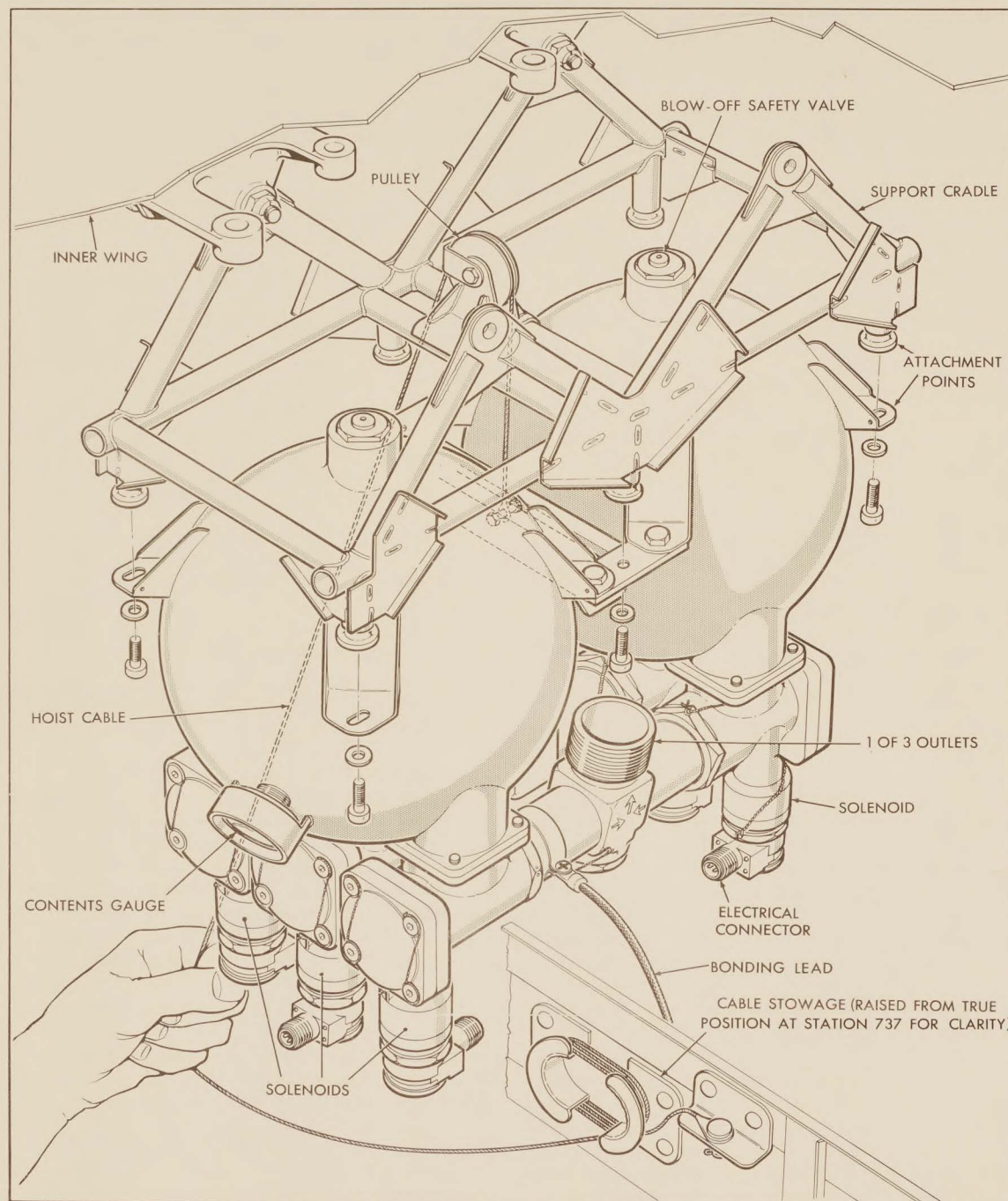
TESTING AND SERVICING

REMOVING THE SUPPLY UNIT (Fig 3)

12 Access to the fire extinguisher bottle

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FIG. 3 FIRE EXTINGUISHER BOTTLE INSTALLATION

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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 pipe-lines 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.



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.

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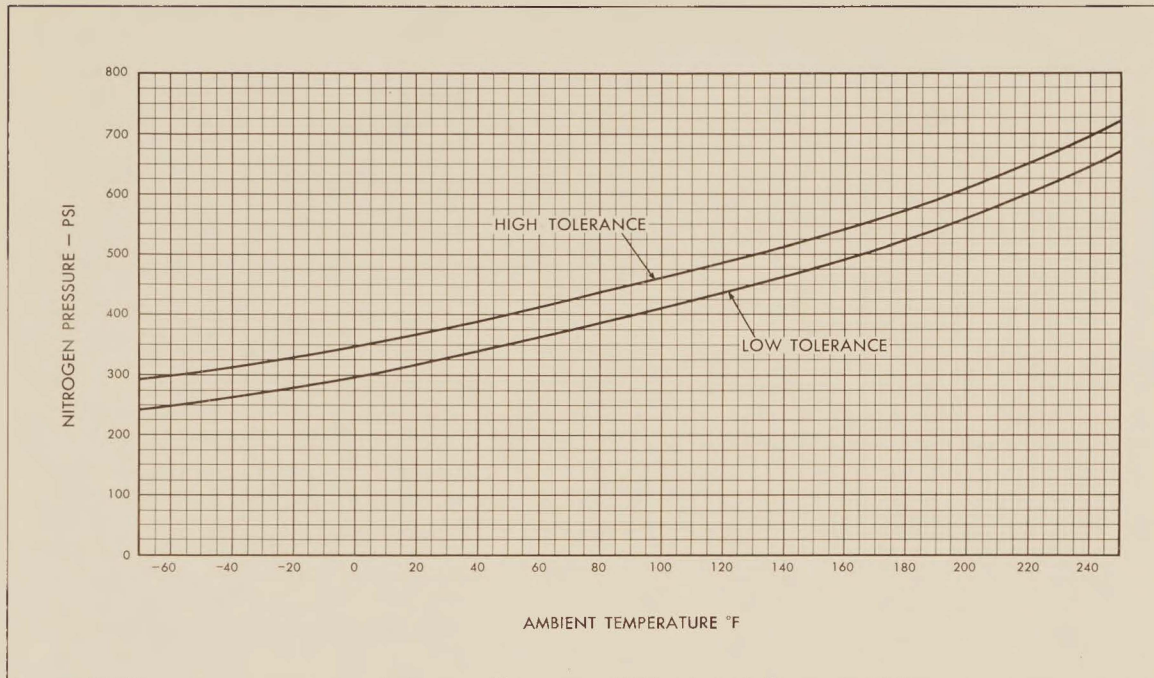


FIG. 4 AMBIENT TEMPERATURE AND NITROGEN PRESSURE CHART

(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.

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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.

ARROW 1 SERVICE DATA
COMPONENT DATA SHEET

SYSTEM FIRE PROTECTION		SUB-SYSTEM		COMPONENT Supply Unit		REF. NO. 23	
AVRO PART NO. 7-2558-21		MANUFACTURER Walter Kidde		MAN'FR'S PART NO.		AIRCRAFT EFFECTIVITY 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 Release 28 Camloc fasteners and lower engine service door number four.						MEN X MINUTES	
REPLACEMENT PROCEDURE See Testing and Servicing.						MEN X MINUTES	

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<p>INSPECTION</p> <p>Check pressure contents at the gauges. Check the blow off safety valve. Check discharge ports and control valves. Check electrical connectors for security.</p>	MEN X MINUTES	
<p>FUNCTIONAL CHECKS</p>	MEN X MINUTES	
<p>GROUND HANDLING AND GROUND TEST EQUIPMENT</p> <p>B4 access stand.</p>		
<p>SPECIAL TOOLS TO REMOVE OR SERVICE</p>		
<p>REMARKS</p>		