

Chapter 1 POWER UNIT

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Introduction

1. The power unit consists of a single Avon axial flow gas turbine installed centrally within the fuselage with its air intakes in the leading edge of the stub wings and a straight through jet pipe which exhausts at the tail end of the aircraft structure. A liquid fuel starter unit is fitted to the front of the engine, its ancillaries are mounted in the fuselage, adjacent to it. Fuel flow to the engine burners is controlled by a manually-operated throttle valve, the initial opening of which opens the high-pressure fuel

cock. There is no oil tank, all the necessary oil being carried in the engine sump.

DESCRIPTION

Engine bay

2. The engine is located in the fuselage, aft of the main spar frame. The rear fuselage must be removed before the engine can be withdrawn. *Special equipment is provided to facilitate this work.* The accessories gearbox is

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housed in the engine bay, and driven by the engine through two shafts and universal joints and a turret drive arm mounted between them. The twin air intake ducts, in front of the engine, are fed from their respective air intakes in the stub wings. A fire wall at frames 29 and 30, seals the engine bay from the engine starter bay, a similar fire wall at frame 38, isolates the engine from the rear fuel tanks. Air extractors and cooling ducts are provided to maintain the temperature of the engine bay at a permissible value.

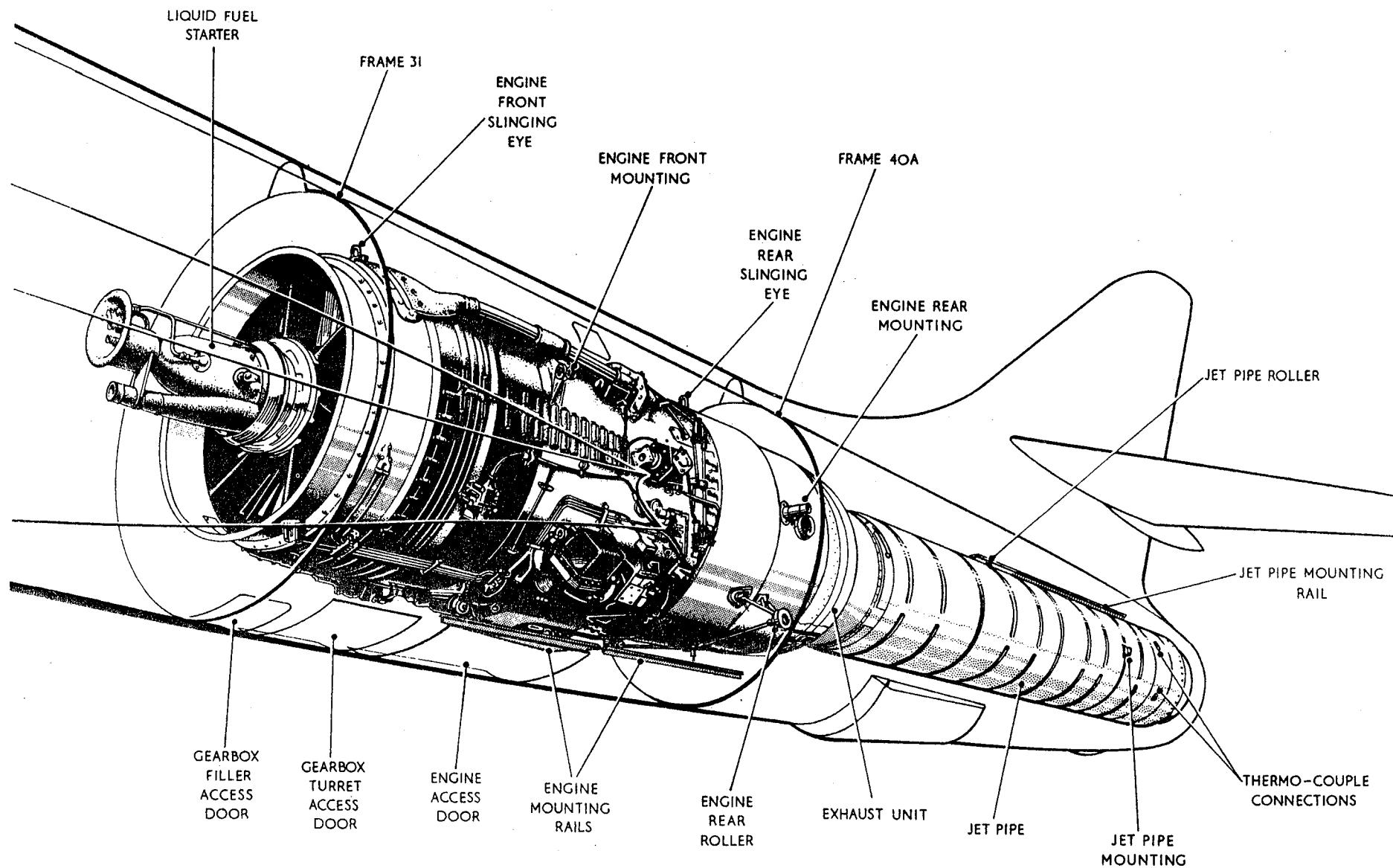


Fig 1 Engine Installation

Engine mounting (fig. 1)

3. The engine is provided with four attachment points which consist of a trunnion on either side of the turbine nozzle box and a front suspension linkage on either side of the engine compressor casing. The trunnion mountings are located on the horizontal centre line of the engine and the front suspension linkages a little above the centre line. The port trunnion is provided with a locating flange.

4. The engine is mounted centrally with its front suspension linkages attached to mountings, on frame 34, by means of universal-joint type turnbuckles. These in conjunction with a special key (*auxiliary lifting key*) which raises or lowers the centre rail, enable the engine to be correctly positioned. *When the engine has been initially centred, the turnbuckles are locked with 20 s.w.g. nickel alloy wire and should not be subsequently disturbed.* The rear mounting trunnions are secured to the structure at frame 40A by hinged fittings, each of which carries a split bearing housing. These bearing housings are provided with steady attachments bolted to thrust members located between frames 38 and 40. The engine is fixed 0.10 in. to port (*when cold*) by the flanged locating trunnion on the port side of the engine. It is free to slide in the starboard trunnion bearing, thus becoming centralised when hot. The split bearing mountings can be swung away from the trunnions when the bearings are dismantled, facilitating engine removal and installation.

Air intakes

5. The two air intakes are situated one in each stub wing leading edge, the entry being at the wing roots adjacent to the fuselage. They are shaped for maximum air intake with the minimum of resistance. In addition, two small spring-loaded air intake slots are incorporated in the leading edge of each stub wing, one being on the underside of the wing and the other on the upper. They open automatically to give increased air flow when starting the engine. Sealing covers (*Sect. 2, Chap. 1*) are provided for the air intakes to prevent the ingress of dirt and moisture when the aircraft is parked on the ground. These covers must be fitted to the air intakes at all times except during engine running and air intake inspection. Safety guards (*Sect. 2, Chap. 1*), which can be fitted in lieu of the sealing covers, are provided for the protection of personnel during ground running.

The slide and plate of the jet pipe mountings are serrated to allow for vertical adjustment. Access to these mountings is provided by adjacent removable panels. Along the top, at the vertical centre line, a guide rail is attached inside the fuselage, and twin rollers attached to the top of the jet pipe, run along this rail to facilitate the assembly of the pipe. No weight is exerted on the rail by the rollers once the jet pipe has been secured in position. A sealing cover is provided for fitting over the jet outlet when the aircraft is on the ground. *This cover must be fitted at all times when the aircraft is on the ground and the engine is not running. It must be removed before starting the engine.*

Jet pipe (fig. 1)

6. The straight through jet pipe is mounted to the engine exhaust unit by a flange which slides over a gas seal fitted in an annular groove around the outer periphery of the exhaust unit. It is secured by a pair of keeper plates, one on each side of the jet pipe. Each keeper plate is provided with its own access panel. The rear end of the jet pipe is steadied by two universal blocks fitted at the horizontal centre line of the pipe. These blocks are free to move in their mountings on the fuselage, to allow for jet pipe expansion.

Accessories gearbox and drives (fig. 2)

7. The accessories gearbox is located at the bottom of the fuselage between frames 29 and 30, and drives the hydraulic pump and the two electrical generators which provide all the hydraulic and electrical power for the operation of the aircraft's services. The gearbox is sealed off on the aft face of frame 30 to isolate it from the forward fire zone of the engine bay. The gearbox and turret drive are each provided with an independent oil system, including an oil pump, sump filler orifice and dipstick. Both the gearbox and drive are provided with a breather pipe which vents to atmosphere.

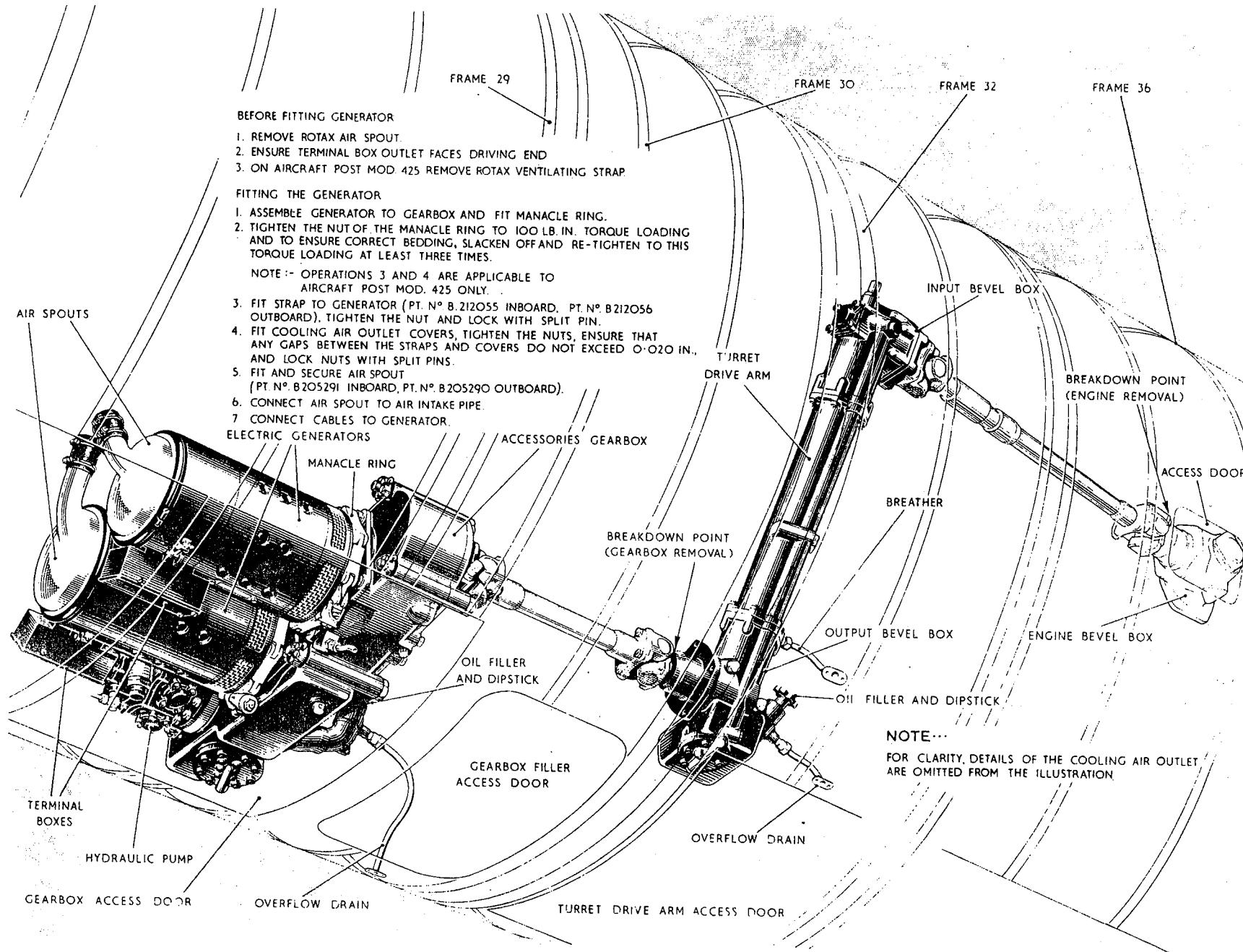


Fig.2 Accessories Gearbox

Position of metal cutting ammuni.

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Engine starter (fig. 3)

8. The engine is started by a Plessey Iso Propyl Nitrate liquid fuel starter unit. The starter motor consists of a single-stage axial flow turbine, fitted with a reduction gear, it is mounted on the front of the engine with its fuel pump and air blower unit adjacent to it

between frames 26 and 27. The starter fuel tank is accommodated further forward on structure just aft of the main spar frame on the port side of the aircraft. The tank is provided with a combined pressure and suction relief valve (fig. 4).

The starting sequence is initiated, by pressing

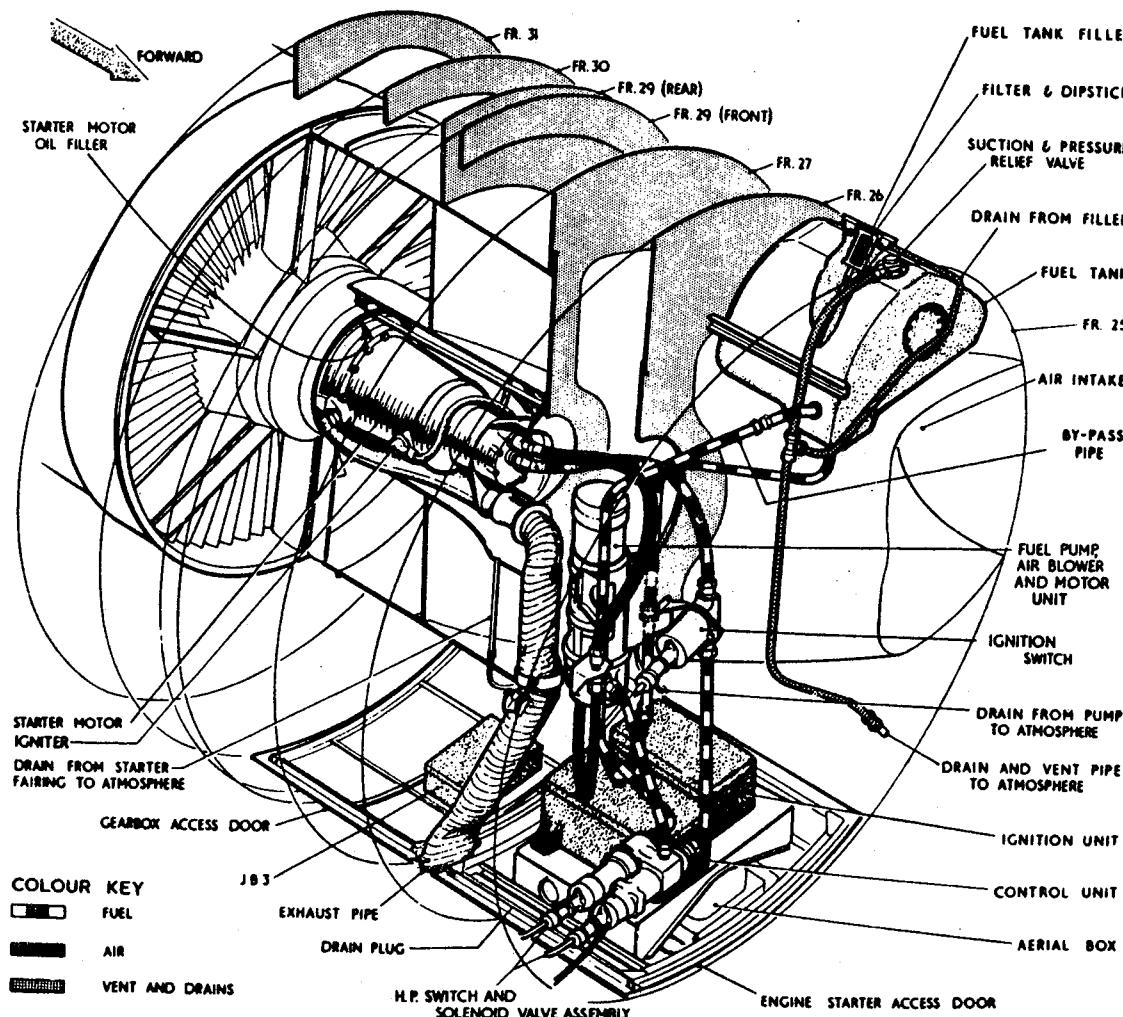
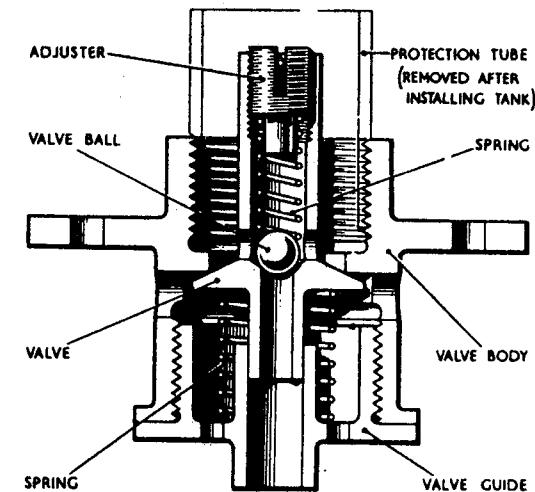


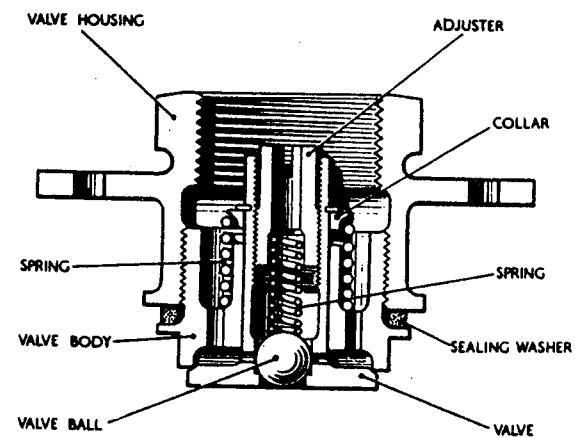
Fig. 3 Liquid fuel starter installation

the starter push-button in the cabin.

◀ 9. The starter is fully described in the relative equipment publication. Details of the electrical components used in the system, together with a description of the cycle of operations of the starter electrical circuit, are given in Sect.5, Chap. 1, Group C1.



(Pre-mod 382)



(Post-mod 382)

Fig. 4 Starter tank relief valve

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SERVICING

General

10. The servicing of the engine should be carried out in accordance with the instructions given in the relative equipment publication. The servicing of the engine ancillary equipment which forms part of the airframe installation, is given in the following paragraphs and servicing the starter motor is given in Appendix 1.

WARNING

Ensure that the instructions detailed on the LETHAL WARNING marker card at the front of the handbook have been complied with.

Precautions

11. The following precautions *must* be taken before any servicing of the engine, or its installation, is commenced:—

- (1) If an electrical supply is required during servicing, use an external supply to prevent running down the aircraft batteries.
- (2) Ensure that the protective covers are in position over the air intakes and jet exhaust, as well as any other covers that will not impede the progress of the work in hand.
- (3) Prior to ground running the engine, ensure that the jet pipe sealing cover is removed and that the air intake safety guards are fitted to the air intakes in lieu of the sealing covers. Remove the remaining covers that concern the engine installation.

(4) Ensure that no personnel are in proximity of the air intakes, the jet exhaust, or starter exhaust and that they are warned to keep clear of these danger zones.

(5) During servicing, particular attention should be given to the engine starter installation to ensure that there are no leaks in the starter fuel system. Leaking starter fuel will cause corrosion of certain metals and components and, in addition, will form a fire hazard if allowed to come into contact with hot pipes, etc. Such leakage must be mopped up immediately and the cause of leakage rectified. Refer to Appendix 1.

(6) Before removing pipes, care must be taken to ensure that all pressure is released, and that precautions are taken to prevent the spillage of fluid.

(7) To prevent the ingress of dirt or moisture, disconnected pipes should be effectively blanked off. Electrical leads should be taped immediately after disconnection to eliminate the possibility of fire due to shorts. *This should be done irrespective of whether the aircraft batteries have been immobilised or not, as there is always a possibility of the batteries being reconnected before the leads.*

(8) During engine starting, ensure that the aircraft is headed into wind and that the starter access panel is open to ventilate the starter bay.

Engine controls (fig. 5 and 5A)

12. The combined throttle and high-pressure cock and the low-pressure cock should be checked to ensure that they come up against their stops before the system is strained. In no circumstances should the throttle and high-pressure cock stops on the engine be interfered with in any way, as these have been set in the correct position by the engine manufacturers. Control settings are given in fig. 5 and 5A.

Throttle lever friction damper

13. The friction damper for the throttle control should be periodically examined for wear. It should be screwed up sufficiently to obtain the maximum friction without undue restriction of the movement of the control. This is most important, as insufficient friction will result in creeping from the selected position which, if undetected, may in certain circumstances be serious.

Re-light button

14. The engine re-light button should be examined periodically to ensure that it functions correctly.

Lubrication

15. Oil specifications and capacities for the engine, accessories gearbox and turret drive arm are listed in the Leading Particulars at the front of this volume. The units should be checked for oil level before flight and topped up as necessary (Sect. 2, Chap. 2). Lubrication of the engine controls is detailed in fig. 5. The gearbox universal drive shaft couplings should be lubricated as described in para. 25.

LUBRICATION
TELEFLEX CABLES AND CONTROL BOXES
WITH GREASE ON ASSEMBLY. GREASE XG-273
ALL LEVER PIVOTS TO BE OILED WITH OIL OX-14

UNIVERSAL COUPLING ON GEARBOX
DRIVE SHAFT TO BE GREASED BEFORE
INSTALLATION OF ENGINE. GREASE XG.271

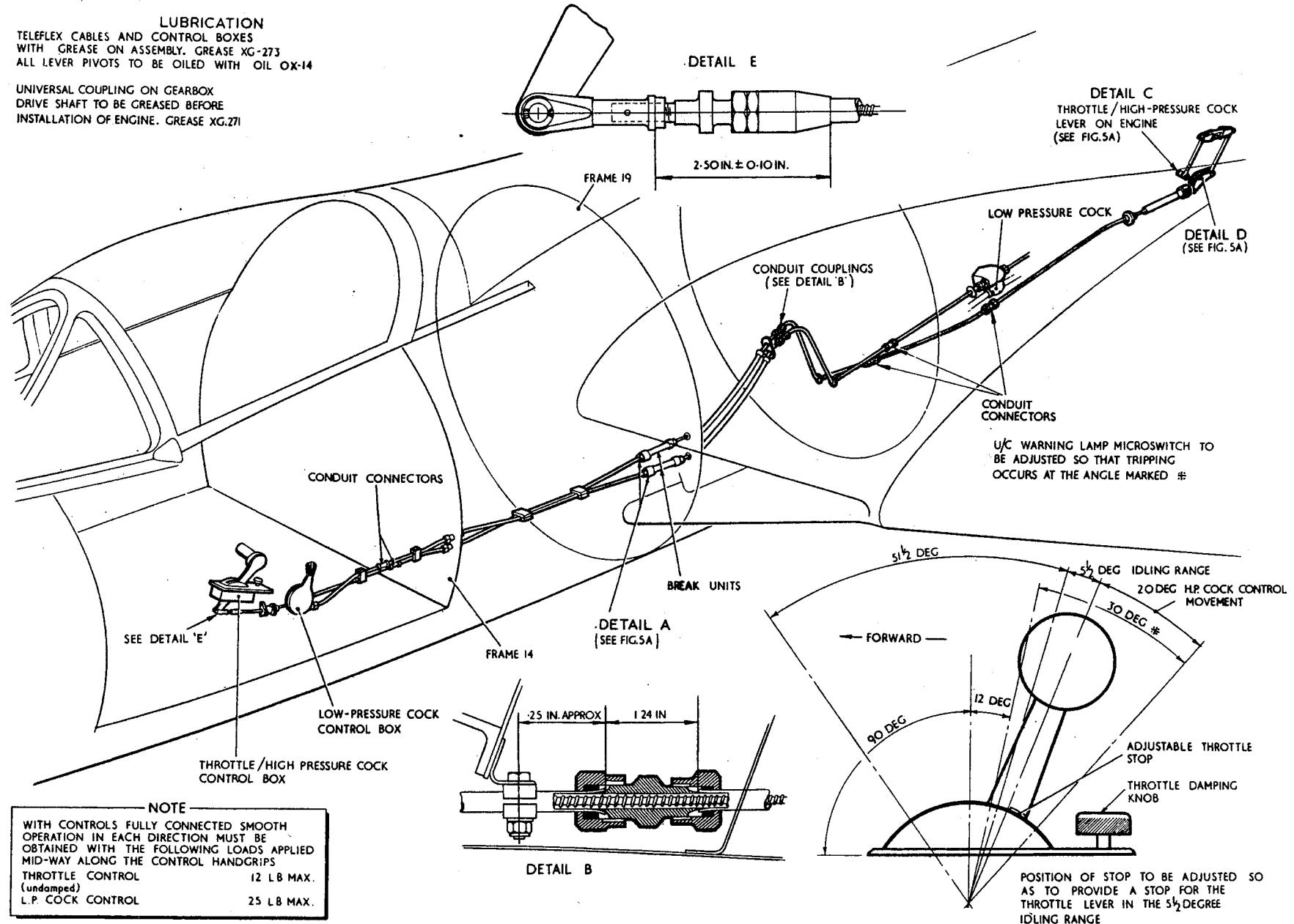


Fig 5 Engine Controls (1)

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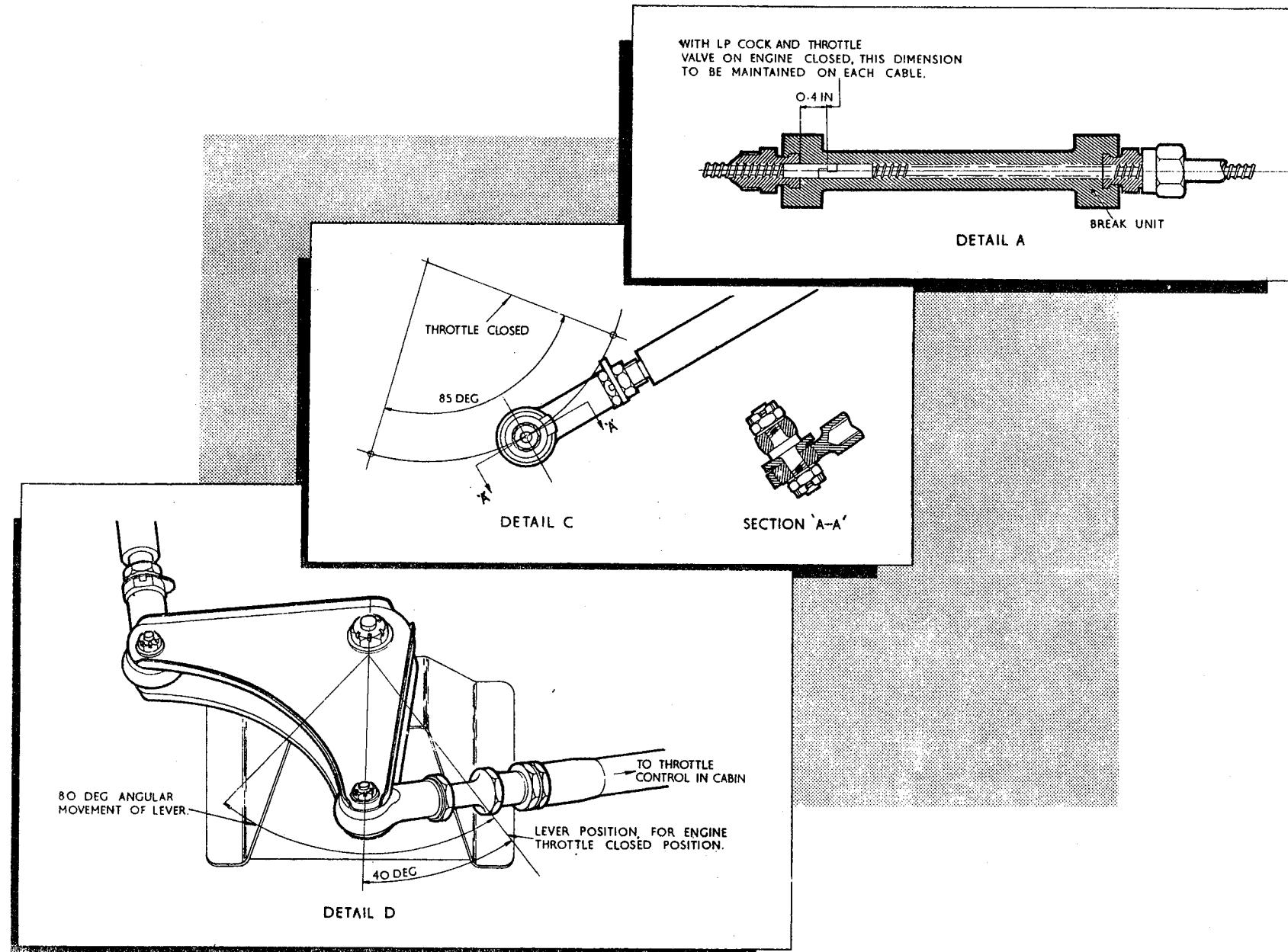


Fig. 5A Engine controls (2)

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Liquid fuel starter—exhaust pipe

15A. The liquid fuel starter exhaust pipe (fig. 3) should be examined at those periods stated in the Aircraft Servicing Schedule as follows :—

- (1) Obtain access to the rear of the starter fairing in the port air intake and remove the access panels for sighting the exhaust pipe and to the starter safety disc. Carry out a thorough visual inspection of the exhaust pipe, especially at the welded-on flange where it passes through frame 27 and at the belled end of the pipe, using a probe light and a mirror.
- (2) Gain access to the forward part of the exhaust pipe through the starter bay access door and carry out a thorough visual inspection of the pipe, especially at the upper end and where the flange is joined to the pipe, using a probe light and mirror. Check also for any severe distortion of the flange. All necessary equipment is listed in sub-para. (9).
- (3) Spray the exterior of the pipe in the vicinity of the welded-on flange and the flange, with Ardrox developer. It will be necessary to obtain access both through the access doors of the starter fairing in the port air intake and the starter bay access door, to completely cover the suspect area.
- (4) Using the internal spray, spray the interior of the pipe in the vicinity of the welded-on flange with Ardrox penetrant. Care must be taken during this operation to ensure that the penetrant is deposited on the required area.
- (5) Repeat operations at sub-para. (1) and (2).
- (6) Where evidence of cracking is found or where the belled end of the pipe over the starter exhaust is distorted or

cracked or where the flange is severely distorted, the exhaust pipe is to be removed and replaced by a new item.

- (7) Refit all access doors.
- (8) Remove all equipment and thoroughly examine the air intake to ensure that no loose items have been left in the air intake.
- (9) The following equipment is required :—

Ref.	Item	No. off
3A/2308	Inhibitor gun	1
5A/4310	Probe light kit	1
1C/2433	Syringe c/w spout short (Ref. 1C/5103)	1
64AE/36	R.R. clear tubing 3½ ft. approx. Ardrox crack detection kit consisting of :—	
4A/2420	Developer {	1 tin per
4A/2421	Penetrant {	4 aircraft
	External spray	1
	Internal spray	1

Manufacture the sprays as follows :—

External spray

- (a) Cut a length of clear tubing approximately 9 in. long.
- (b) Attach tubing to syringe spout and secure with locking wire.
- (c) Seal the open end of the tube with a bolt secured with locking wire.
- (d) Drill four $\frac{1}{16}$ in. drain holes at 90 deg. to each other, as near as possible to the end of the tubing.

Internal spray

- (e) Remove the revolving spray from the end of the inhibitor gun.
- (f) Cut a length of clear tubing, approximately 2 ft. 3 in. long.
- (g) Attach tubing to inhibitor gun and secure with locking wire.

- (h) Fit the revolving spray to the open end of the tubing and secure with locking wire.

Note . . .

The Ardrox developer and penetrant are available only in spray cans. It will, therefore, be necessary to spray the contents of the cans into the syringe and inhibitor gun.

Liquid starter fuel tank

15B. The tank is made of 16 s.w.g. aluminium L.59 and is impervious to pure AVPIN. However, AVPIN is hygroscopic and, if contaminated with water, sets up corrosion. It is therefore of the utmost importance that AVPIN stocks and the containers used to dispense AVPIN should be kept free from contamination. Where AVPIN has been contaminated by water, corrosion pitting of the tank, particularly on the bottom of the tank shell, may occur. The tank should therefore be removed and examined at those periods stated in the Aircraft Servicing Schedule. After removal (para. 27) the tank should be examined as follows :—

- (1) Remove the cover plate from the side of the tank.
- (2) Ensure that the tank is completely dry internally.
- (3) Examine the inside of the tank shell paying particular attention to the tank bottom.
- (4) Where the original anodic finish, recognizable by a clean bright and semi-reflective surface, is apparent and there is no evidence of small round patches of discolouration the tank is serviceable and can be replaced.

- (5) Where the inside of the tank is found to have a dull, powdery finish, possibly accompanied by small round patches of discolouration, this is evidence of corrosion attack, under which may be corrosion pitting of various depths and the tank should be replaced by a new or serviced tank.
- (6) If the tank is found to be serviceable, refit the cover plate with a new sealing ring (Part No. A.154109) using bolts (Part No. Hawker Std. 1639-2CX-11 off and Part No. Hawker Std. 1639-3CX-1 off) and Dowty seals (Part No. A.G.S. 1186/3). Use the long bolt at the bottom with washer (Part No. SP.16.C) to secure the drain pipe clip (Part No. Hawker Std. 841-22). Tighten the bolts evenly and lock with 20 s.w.g. stainless steel locking wire.
- (7) Remove, clean and replace filter.
- (8) Pressure test the tank to 2 lb/in².
- (9) Tanks found to be unserviceable should be repaired in accordance with Vol. 6, Chap. 7.

REMOVAL AND ASSEMBLY

WARNING

The safety precautions in paragraph 11 must be complied with.

General

16. The removal of the engine entails jacking up the aircraft at the specially prepared positions as shown in Sect. 2, Chap. 4 (*with the exception of the rear fuselage*). When jacked up, the alighting gear should be in the fully extended position with the wheels two or three inches off the ground; the aircraft must be level fore-and-aft and laterally.

17. Access to the engine for removal purposes can only be obtained after the rear fuselage has been removed from the remaining structure. To facilitate this operation, a rear fuselage removal trolley is provided and another trolley is provided to accommodate the engine. These and other special equipment referred to in this chapter are listed in Sect. 2, Chap. 4.

18. A tethering strap is provided for use with the rear fuselage trolley, which, in conjunction with a bumper pad fitted in a specially arranged cut-out in the trolley former, prevents any tendency of the rear fuselage to roll during removal. When the fuselage is in position on the trolley, the tethering strap bolt should be screwed into frame 52, beneath the fuselage. The engine trolley is fitted with rails which, in conjunction with rails provided in and for fitment to the centre fuselage, facilitate withdrawal and installation of the engine.

Unpacking and slinging

19. The procedure for unpacking the engine, the use of the transit stand and sling is described in A.P.4481C, Vol. 1.

Removal of accessories gearbox

20. To remove the accessories gearbox the seal, at frame 30, is first removed, then the drive is broken down at the splined connection on the bevel box at the bottom of the turret drive arm on the forward face of the rear spar frame. When the engine is also being removed, the drive is broken down at the splined connection at the engine bevel box. Before removing the gearbox, the hydraulic pump and the two electrical generators must be removed from their mountings on the gearbox. Where difficulty is encountered in manoeuvring the gearbox out of the airframe, the starter exhaust pipe and any other pipes in the way may be removed to facilitate the operation. If the engine is to be removed, the difficulty will not arise providing the engine is withdrawn before attempting to remove the gearbox.

Removal of engine

21. To remove the engine proceed as follows:—

Jack up and trestle the aircraft as described in para. 16.

Note . . .

Under no circumstances may the engine-airframe joint pins or bolts be used to mount the engine on the transit stand. Special bolts are provided for mounting the engine on the stand; these must not be used in the airframe installation.

Ensure that the low pressure fuel cock control in the cabin is set to OFF.

Remove the rear fuselage (Sect. 3, Chap. 1).

Remove the following access doors and panels and carry out the operations as detailed:—

Engine starter bay access door (fig. 6)

(1) Disconnect the starter ignition cables, and overspeed relay cable from their respective brackets, on the forward face of frame 26. Disconnect the starter fuel pipe from the starter ignition switch, and the starter air hose from the bracket on the forward face of frame 26. Tape the fuel pipe and air hose together with the starter electrical cables to facilitate withdrawal. Slacken off the clamp securing the lower end of the starter exhaust pipe at frame 27.

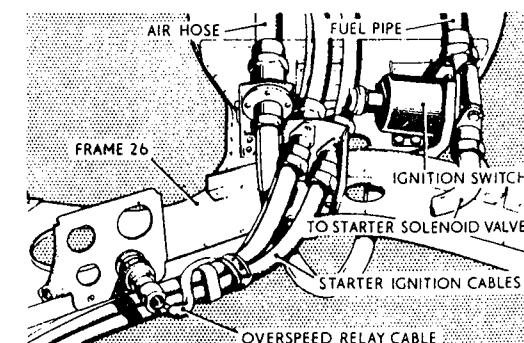


Fig. 6. Engine starter bay access door

Gearbox turret access door (fig. 7)

(2) Disconnect and stow the cable assemblies C.3 and C.6. Disconnect the fuel delivery pipe between, and including, the universal couplings. Remove the pipe from the aircraft.

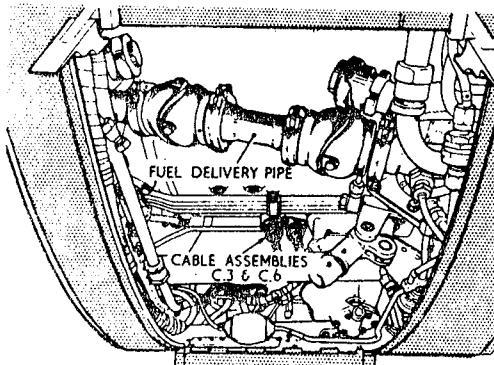


Fig. 7. Gearbox turret access door

Igniter plugs access panels—port and starboard [figs. 8 (a) and 8 (b)]

(3) Having taken the precautions set out in the LETHAL WARNING at the front of this handbook, disconnect the high energy igniter plugs. Disconnect the throttle control rod from the throttle control lever on the port side of the fuselage. Disconnect the breather pipe from the starboard side and pull outwards to clear the engine.

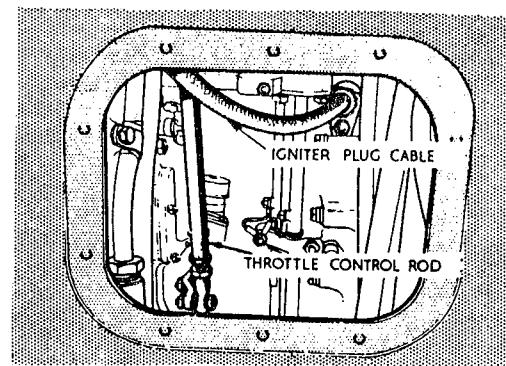


Fig. 8(a). Igniter plug access panel—port

Engine access door (fig. 9)

(4) Disconnect the fuel pressure switch pipe from the pressure switch mounted on the bottom aft face of frame 34. Disconnect the other end of this pipe from the fuel delivery pipe and remove complete with banjo coupling and bolt. Disconnect and remove the oil cooler drain pipe and the combined overboard fuel drain pipe. Remove the three bolts securing the zone 1 ventilation duct branch pipe flange to the engine and remove the duct. (Duct

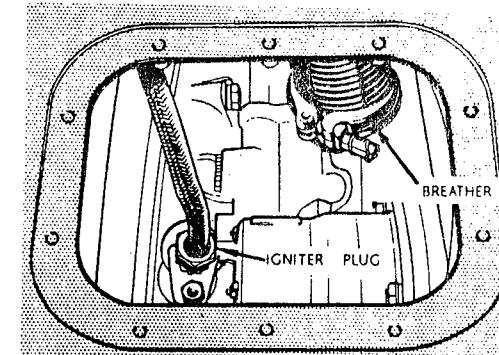


Fig. 8(b). Igniter plug access panel—starboard

removal is facilitated if the starboard portion of the branch pipe is pushed outboard into the side duct as far as it will go, the port branch will then swing clear.) Place the removable rail between frames 34 and 37 and lock in the bracket on the forward face of frame 37 by inserting the pin. Screw up the adjustment bolt through the bottom of frame 34 to bring the rail into contact with the engine front roller.

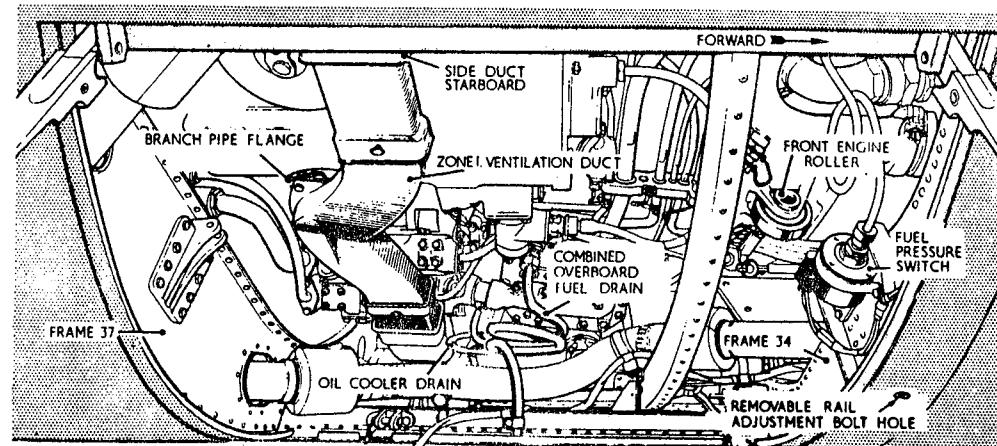
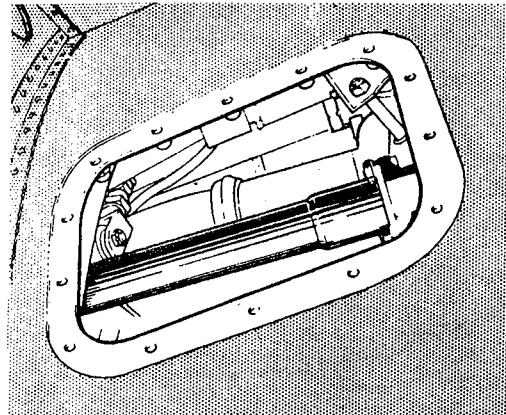


Fig. 9. Engine access door

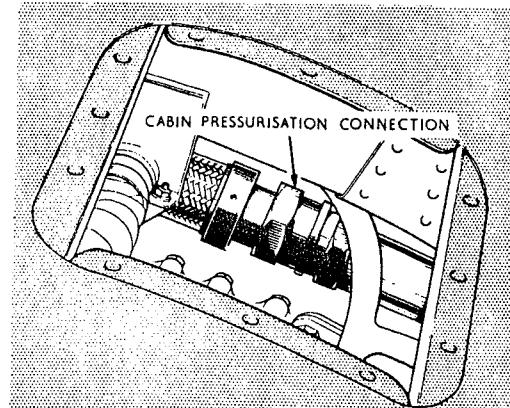
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Gearbox drive access panel (fig. 10)

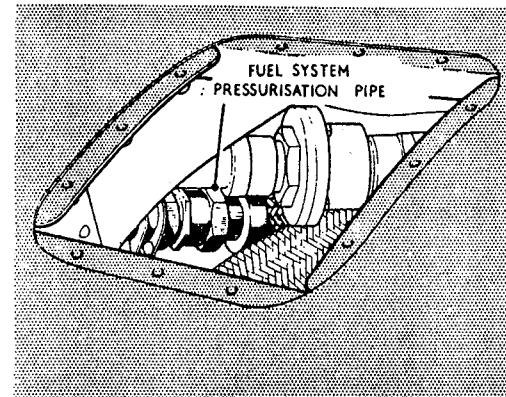
(5) Disconnect the gearbox drive at the bevel box on the engine and support the shaft to eliminate the possibility of damage.

**Fig. 10. Gearbox drive access panel****Air supply access panel, port and starboard [figs. 11 (a) and 11 (b)]**

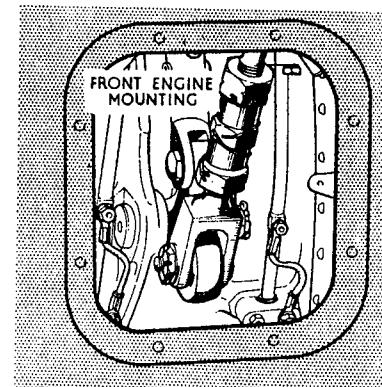
(6) Disconnect the cabin pressurisation pipe at the port side of the fuselage.

**Fig. 11(a). Air supply access panel—port**

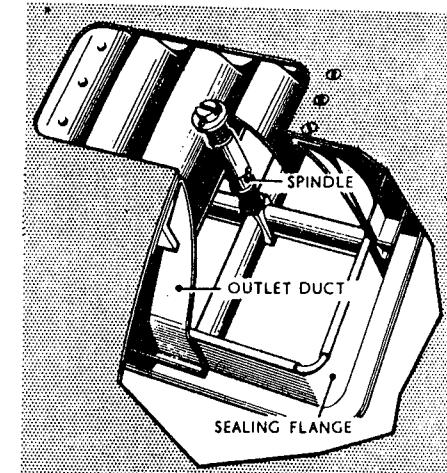
Disconnect the fuel system pressurisation pipe from the starboard side.

**Fig. 11(b). Air supply access panel—starboard****Front engine mounting access panels, port and starboard (fig. 12)**

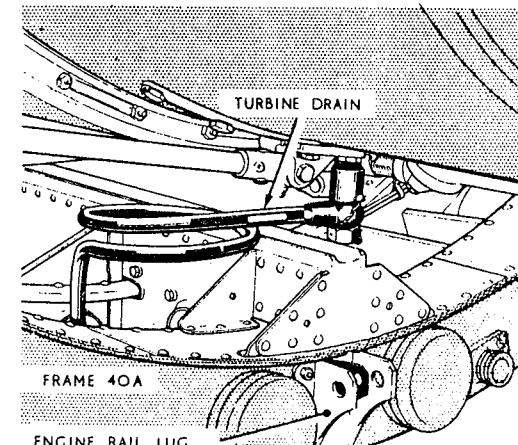
(7) Remove the split-pinned nut and bolt from the engine mounting turnbuckle fork end and swing the turnbuckle clear of the engine.

**Fig. 12. Front engine mounting access panels—port and starboard****Bleed valve sealing flange (fig. 13)**

(8) Withdraw the bleed valve sealing flange between frames 33 and 34 and lock in the withdrawn position.

**Fig. 13. Bleed valve sealing flange****Frame 40A (fig. 14)**

(9) Disconnect and remove the turbine drain pipe from the combustion chamber.

**Fig. 14. Combustion chamber drain**

(10) After disconnecting the items detailed in sub-paras. (1) to (9), centralise the lateral adjustment handles, on the cross members above the axles, of the engine removal trolley. Wheel the trolley up to the aircraft so that the boss on the centre rail web is adjacent to the engine rail lug on the rear face of frame 40A. Screw down the built-in jack at each corner of the trolley and using the lateral adjustment, line up the centre rail web boss on the trolley with the engine rail lug on the aircraft (fig. 15).

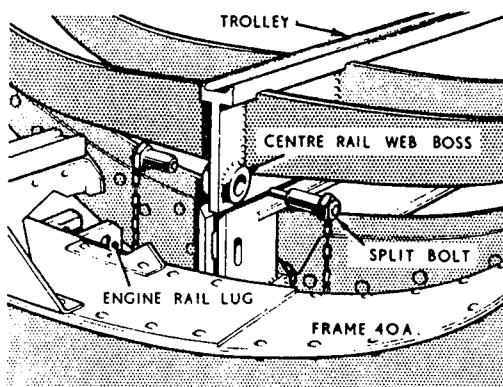


Fig. 15. Engine trolley connection

(11) Lower the trolley on to its wheels, roll it forward, and jack it again, so that the centre rail web boss engages with the engine rail lug on the aircraft. Align the engine rear roller rails with the engine rear rollers, ensuring that the trolley is level fore and aft. Lock the trolley to frame 40A by inserting the split bolt in the engine rail lug. Unlock and remove the four bolts securing the engine mounting trunnion caps. Remove the trunnion caps and the locating nuts and bolts (fig. 16), enabling the hinge fittings to swing clear as the engine is withdrawn.

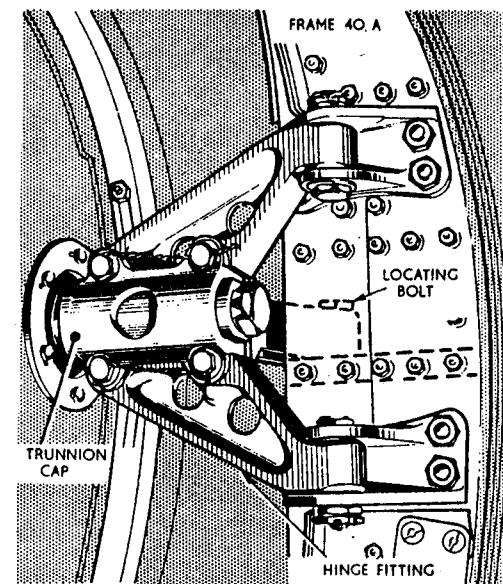


Fig. 16. Rear Engine Mounting

(12) Withdraw the engine from the aircraft on to the trolley, and secure by placing the retaining bolts in front of the engine rear rollers at the end of the roller rails (fig. 17). Withdraw the split bolt to disengage the trolley from frame 40A. Lower the trolley on to its wheels and tow away.

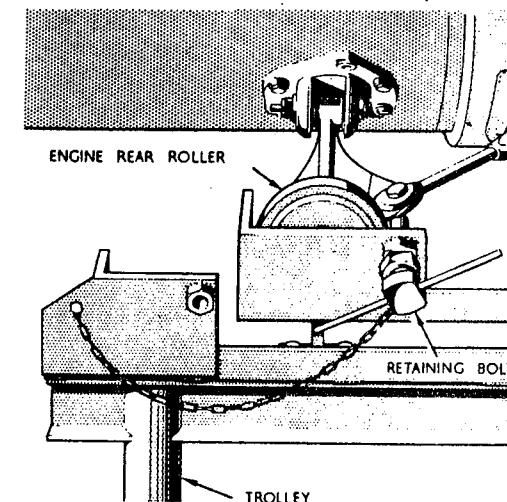


Fig. 17. Securing engine rear roller on trolley

jet pipe removal (fig. 18)

22. To remove the jet pipe proceed as follows:—

- (1) Ensure that the aircraft is chocked fore and aft and that the undercarriage safety locks are fitted.
- (2) Remove the braking parachute (*detailed in Sect. 3*).
- (3) Render the aircraft electrically safe (*Sect. 5, Chap. 1*).
- (4) Remove the access door on the port side of the tail cone and unscrew the electrical connection (6).
- (5) Take the weight of the tail cone, release the four toggle fasteners (5) and remove the tailcone.
- (6) Remove the jet pipe access panels (1) port and starboard in the rear fuselage.
- (7) Dismantle the jet pipe coupling through the access doors in the engine casing (*as detailed in Sect. 3*).
- (8) Uncouple the eight thermocouple connections (3) at rear of jet pipe.
- (9) Pull the jet pipe (4) rearward until it is out of the rear mountings. Carefully manhandle the pipe (*approximately 196 lb. in weight*) until it is clear of the jet pipe mounting rail (2) and the aircraft and place on a felt padded surface.

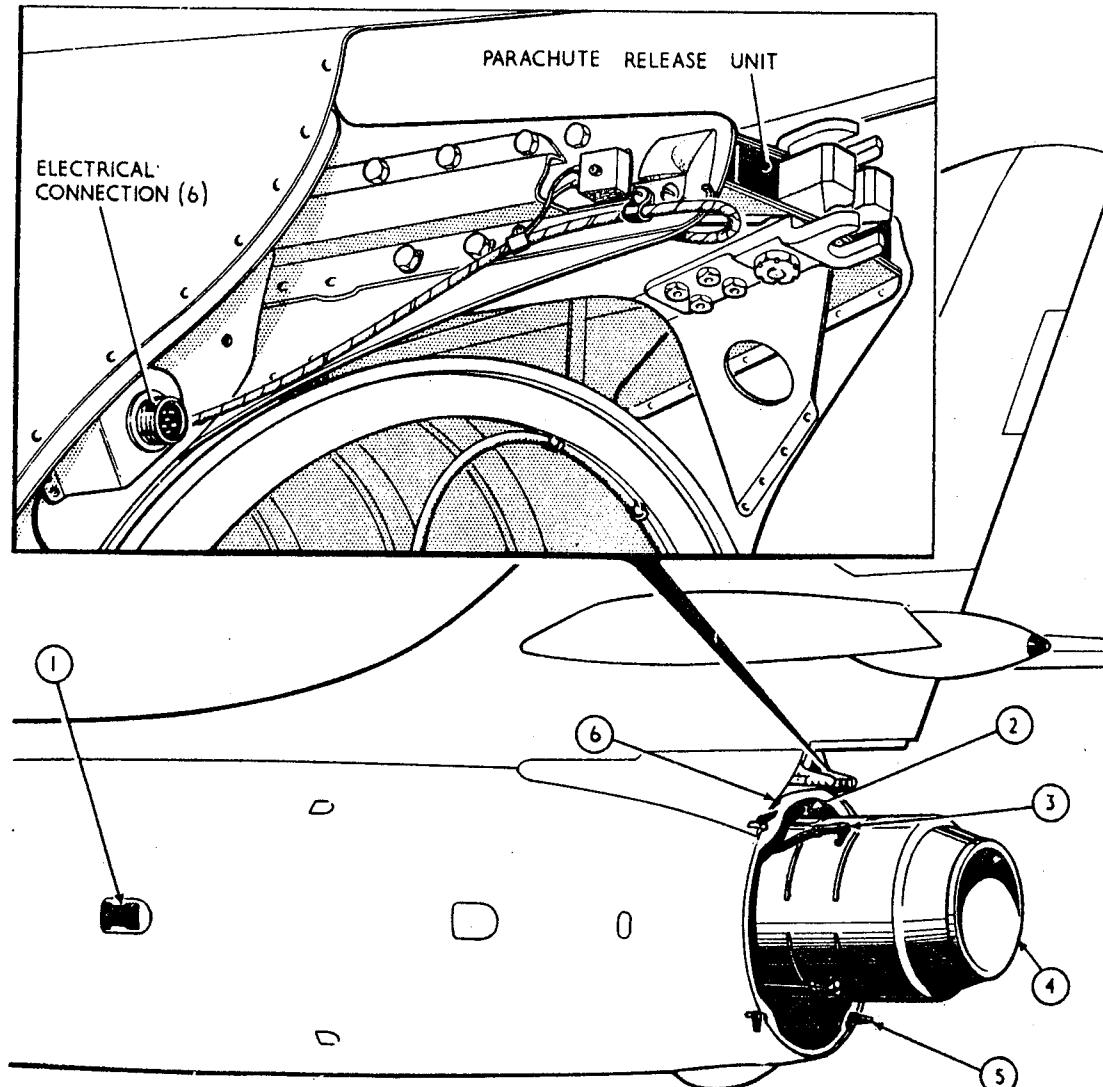


Fig. 18 Jet pipe removal

RESTRICTED

ASSEMBLY

General

23. In general, the re-installation of the engine and its ancillaries is a reversal of the removal procedure, but the following precautions must be taken:—

- (1) If a new engine is being installed as a result of compressor failure, or engine seizure, the pipe lines of the cabin pressurisation system and the air pressure pipes of the fuel system, must be examined to ensure that they are free from foreign matter.
- (2) Before installing the engine examine the port and starboard side ventilating ducts, Pt. No. D.202818-9. Only ducts with the perforated end caps flanged over the sides of the ducts are to be fitted. Examine the rivets securing the attachment bracket, if the rivets are found to be loose a replacement duct must be fitted.
- (3) The clamp on the lower end of the engine starter exhaust pipe at frame 27 (fig. 3), must be slackened off when the engine is being installed in order to enable the upper end of the pipe to be aligned with the starter exhaust. A sighting door in the port side of the air intake inner skin, is provided to facilitate the alignment of the pipe with the starter exhaust connection.
- (4) The pipe to the fuel pressure switch (fig. 9), must be examined and refitted as described in para.28.
- (5) It is essential that "Priming the fuel system" and "Fuel drainage check" (*fail-safe*) checks described in Appendix 1, be carried out after each engine removal, whenever the starter is changed, or where there has been any disturbance of the components of the starter fuel system.
- (6) Before attempting to start the engine, check that the following pipe connections are tight:—

- (a) Two connections on the starter ignition switch.
- (b) Three connections on the combined solenoid valve and H.P. switch unit.
- (c) The lower connection on the pump.

Ensure that the above connections are securely wire-locked, using 22 s.w.g. locking wire.

Accessories gearbox

24. If the engine is already out of the airframe, the accessories gearbox should be installed first. Prior to, or immediately after installation, the drive arm and gearbox should be filled with oil up to the full mark on the dipstick. After the initial engine run, the oil level should be checked and, if necessary, the level topped up. The oil level should also be periodically checked in accordance with maintenance instructions. When installing the gearbox and drive shafts, care must be taken to ensure that the splines on the drive shafts are lightly smeared with grease to specification XG-271 and that the upper (*forward*) shaft is assembled with the master spline at both ends of the shaft correctly mated. A thin red line is painted on the master splines to facilitate this operation. When the gearbox is installed, a check should be made to ensure that the seal at frame 30 is correctly fitted. When new generators are to be fitted, reference should be made to the assembly Note contained in fig. 2.

Accessories gearbox universal drive shaft couplings

25. The universal drive couplings in the drives between the engine and gearbox must be lubricated, through the grease nipples provided, and in addition, the internal spaces in the joints, including the holes through the spider arms, should be filled with grease, leaving no air pockets. The grease to be used for both operations must be to specification XG-271, and greasing is

to be effected prior to assembly and thereafter on every occasion when the engine is removed.

Engine controls—Teleflex cables and conduits

26. The control conduits should be formed to the same shape and cut to the same length as the items being replaced, and the Teleflex cables cut to the same length as the items being replaced. A.P.1464D, Vol. 1 describes the Teleflex components.

Liquid starter fuel tank (fig. 3)

27. The procedure for the removal of the tank is as follows:—

- (1) Defuel the aircraft (*Sect. 2, Chap. 2*).
- (2) Render the aircraft electrically safe (*Sect. 5, Chap. 1*).
- (3) Drain the tank via the drain plug.
- (4) Gaining access through the fuel tank vent connection access panels on the top of the fuselage in addition to the starter bay access panel from between frames 25 and 26 remove the following:—

Fuel tank vents.

Fuel pipes.

Liquid starter fuel and drain pipes.

Ignition switch and bracket.

Fire extinguishers and pipes.

Junction box No. 1.

- (5) Free and stow clear any electrical cables.
- (6) Remove the bolts etc., securing the tank beam to frames 25 and 26, remove the nuts etc. securing the beam to the tank and remove the tank.

The assembly of the tank is the reverse of operations (1) to (6). Prior to assembly fit two new rubber washers (*Part No. F.202606*) on the tank support spigots. As assembly proceeds, the systems disturbed during removal must be tested for serviceability.

Pipe to the fuel pressure switch (fig.9)

28. Whenever this pipe is removed or when the engine is removed, examine the pipe as follows:

(1) Remove the pipe by disconnecting the pipe union at the banjo connection on the fuel pipe and the union at the pressure switch.

(2) Expose both ends of the pipe by sliding the union and split collett of either end away from the belling. With the aid of a magnifying glass examine for any evidence of cracking or for evidence that the split collett has dug into the pipe.

(3) Where cracking or 'digging in' is evident, replace with a serviceable pipe.

Fit the pipe as follows:

(4) Leave the belling exposed at either end and offer the pipe up to meet the banjo integral nipple and the pressure switch connections.

Note ...

It is essential that the pipe fits the aircraft configuration without straining the pipe or without the need to pull the pipe into position by use of the unions. Care must also be taken to ensure that the pipe is parallel to the centre-line of the nipple at both connections.

(5) Where correct fit or alignment is not met, re-manipulate the pipe to ensure that subsequent assembly does not

impose any strain. The banjo may be re-orientated to facilitate correct positioning.

(6) Fit the pipe, ensuring that the unions are not over-tightened.

(7) Turn the LP cock 'ON' and run the booster pumps to ascertain a leak proof assembly.

(8) Where satisfactory, wire lock the unions on the pipe and replace the access panel.

Fuel transfer pipes centre fuselage at frame 37 (SI/Hunter/120)

29. Whenever the engine is removed examine these pipes as described in Sect.4, Chap.2.

Starter fuel and air pipes (STI/Hunter/380A)

30. When the engine is removed examine these pipes for security of protective sleeving and ensure that the fuel vent pipe adjacent to them is serviceable as described in Appendix 1 to this chapter. On installing the engine ensure that the sleeving safeguards the vent pipe (Pt. No. C.501525/25) at frame 26 from chafing.

◀ Jet pipe installation

31. The jet pipe guide rails are described in para. 6. The installation procedure is a reversal of the operations given in para. 22. Immediately before installing the jet pipe, examine all electrical cables and connectors in the rear fuselage jet pipe bay for general condition and serviceability.

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