

Chapter 6A NITROGEN SYSTEM AND FUEL TANK PRESSURISATION

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General

1. To accommodate the E.C.M. turbo alternator Type T.G.A.30 on Mk.1A aircraft not fitted with Mod.171 the nitrogen storage cylinders, in the bay rear of the starboard main undercarriage, are re-arranged.

2. Five storage cylinders are mounted in a crate attached to the outboard undercarriage rib and one cylinder is mounted in a crate attached to the rear face of the undercarriage bay rear bulkhead. Pipelines, secured to the outboard under-

carriage rib and the undercarriage bay rear bulkhead connect the cylinders to the charging panel and ON/OFF cock. From the ON/OFF cock the system is as described in Sect.4, Chap.6 of this book.

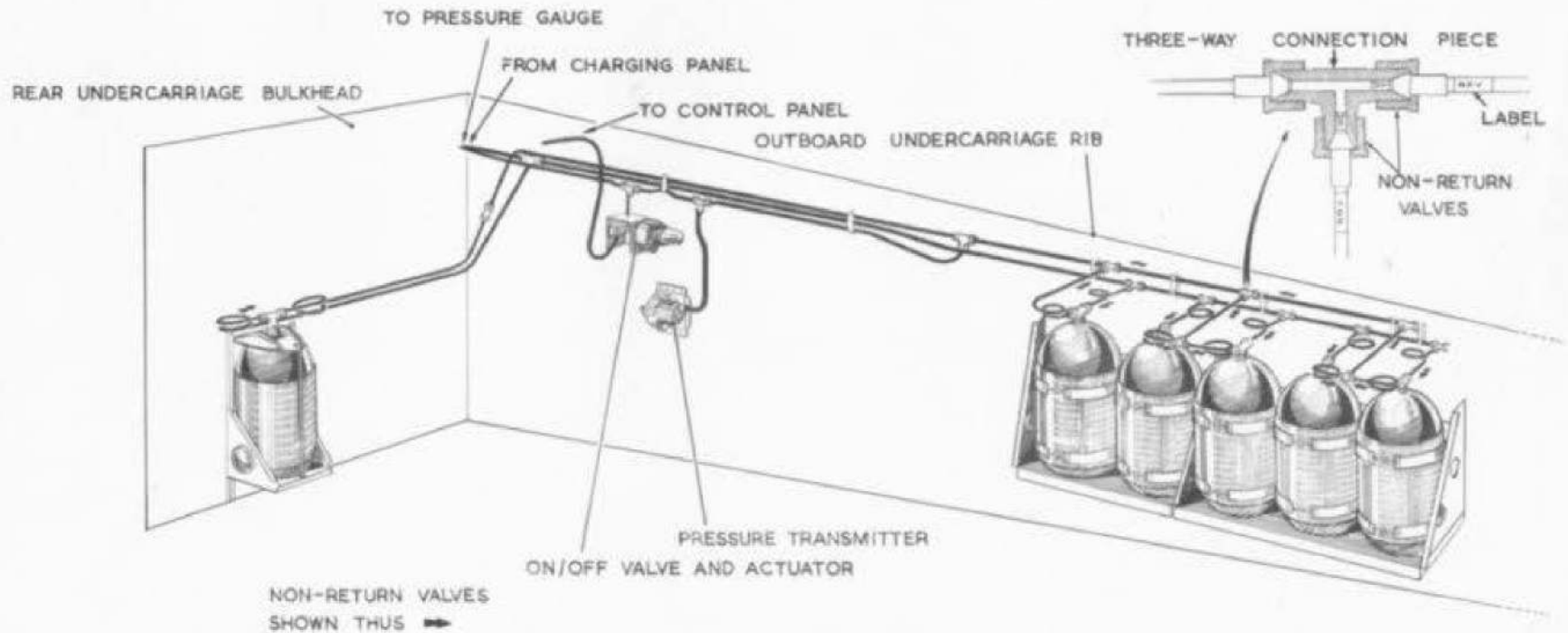


Fig. 1. Nitrogen cylinder installation

Chapter 7

ROCKET ENGINE ASSISTED TAKE-OFF UNIT

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WARNING

PROTECTIVE CLOTHING MUST BE WORN AT ALL TIMES, AND GREAT CARE EXERCISED, WHEN HANDLING HIGH TEST PEROXIDE.

GENERAL

2. On aircraft fitted with Mods. 1, 2 and 380, two jettisonable, self-contained, "Spectre" rocket motors, one on each side of the aircraft, provide power additional to that of the jet turbine engines during take-off. The motors, enclosed in a light alloy nacelle, are secured by No. 12 bomb slip type release units to the bottom booms of the centre engine ribs just aft of the rear engine doors and are steadied by forward non-adjustable and rear adjustable crutches (part of the nacelle structure) that bear against the reinforced rear engine doors and jet pipe structures.

3. Both the motor and the release unit are controlled from the cockpit through electrical actuators or solenoids.

4. After take-off the nacelles are jettisoned, and nylon chords attached to the jet pipe structures automatically release a parachute in the top of the nacelle and inflate air bags in the bottom of it to prevent damage to the installation on landing. Time delay units in the electrical release circuits jettison the units at intervals to prevent fouling of parachutes.

5. Fuels used are kerosene and high test peroxide.

CONTROLS AND INDICATORS

6. Controls and indicators for the rocket motor are grouped in the middle of the centre

INTRODUCTION

1. This Chapter describes the R.E.A.T.O. unit installation, details certain servicing operations and recommends the methods of assembly and removal of the installation to and from the aircraft. The aircraft equipment is in two parts: removable fittings (Mod. 2) to be installed and removed as

DESCRIPTION

instrument panel. Two filaments at the top of the group illuminate when the motors are running at full thrust and indicators below them show black, white or striped when the motors are OFF, FIRING, or JETTISONED. Directly below the starboard indicators is the ROCKET MASTER SWITCH which must be ON before either the FULL POWER FIRING SWITCH, located between the indicators, and the ROCKET CONTROL SWITCH directly below the FULL POWER FIRING SWITCH are operative. The ROCKET CONTROL SWITCH has four positions: IDLE, OFF, RELEASE and JETTISON (fig. 1).

NACELLE ATTACHMENT

7. Since the port and starboard installations are almost identical only the port is described.

8. A nacelle link and thrust spigot, part of the nacelle, fit into a No. 12 release unit (Mod. 2) and a phosphor bronze bearing, just forward of it, in the bottom boom of the centre engine rib. The bearing rides in a thrust block secured to the engine rib boom and bears all the loads on the nacelle; the release unit enclosed in its own housing (Mod. 2) slides through a cut-out in the engine rib boom and is secured to it by a $\frac{1}{2}$ -in. pip pin and two $\frac{5}{16}$ -in. quick-release pins.

9. When the nacelle is not fitted, the boom cut-out and the bearing are covered by an access panel and a cover plate labelled ACCESS PANEL R.A.T.O. and THRUST BLOCK COVER R.A.T.O., but when the nacelle is installed, the access panel over the boom cut

required; and permanent fittings (Mods. 1 and 380), which are a part of the aircraft structure in the centre section wing stubs. Equipment that is a part of Mod. 2 will be noted in the description. Descriptions and servicing of the electrical equipment and the "Spectre" rocket motor are provided in A.P.4505A, Vol. 1, Book 2, Sect. 5, Chap. 1, Group 10, and A.P.4665A.

out is replaced with an access panel that incorporates doors (Mod. 2). The doors are interconnected by spring-loaded plungers that are compressed when the doors are opened. They are locked in the open position by setting the plunger and door lever link in an off-centre position determined by eccentric pins set below the door lever (fig. 1). When the nacelle link is offered up to the release unit, it bears against a trip lever on the door pivot shaft, breaks the "off-centre" lock, and the spring-loaded plungers close the doors round the link to reduce the amount of disturbance in its vicinity to a minimum.

NACELLE CRUTCHES

10. Forward non-adjustable crutches bear on rubber pads interposed between the crutches and the reinforced rear engine doors. Rear adjustable crutches fit into light alloy castings set into Former 37 of the jet pipe structures. The rear crutch castings are covered by a plate labelled REAR CRUTCH COVER R.A.T.O. when the nacelle is not installed.

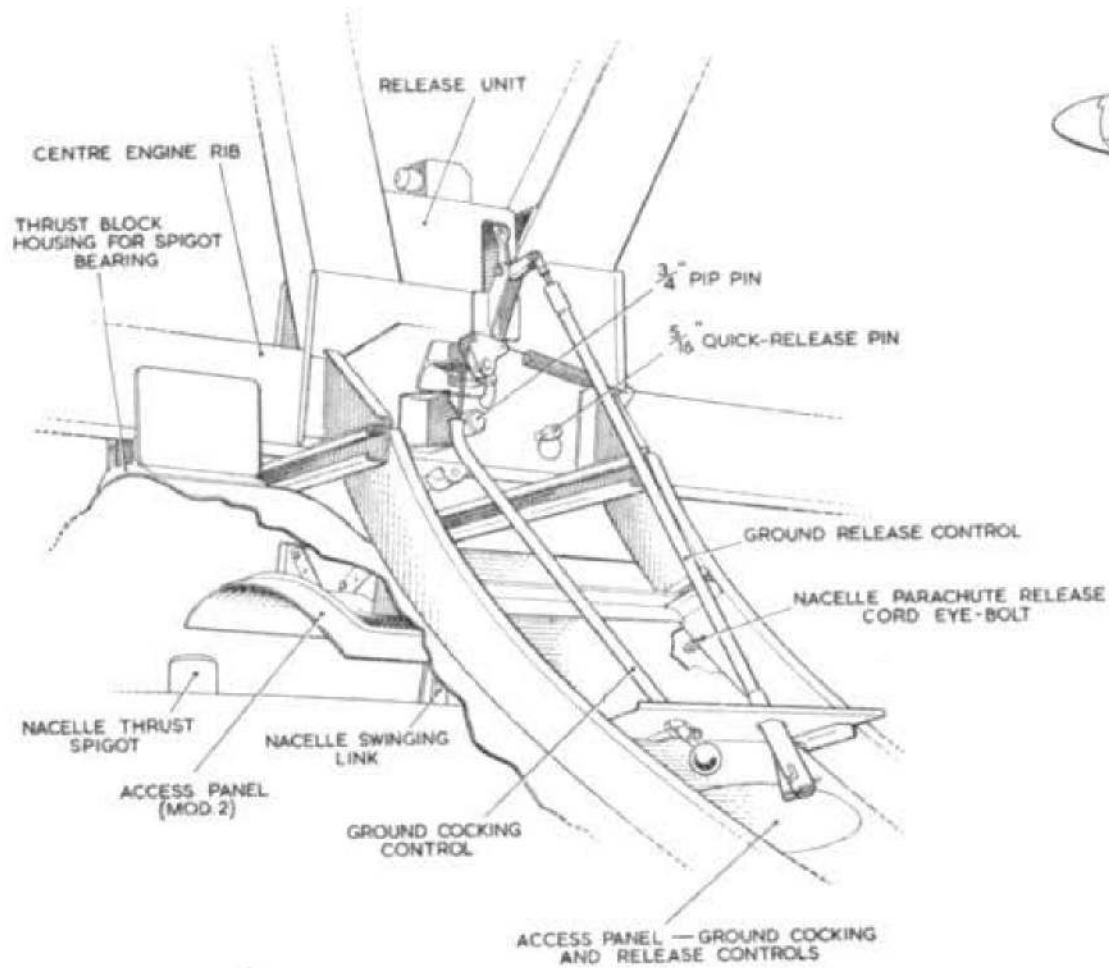
LIFTING POINTS

11. Lifting blocks are set into the lower booms of the centre engine ribs, fore and aft of the release unit panels. When not in use, a plug is screwed into the threaded portions of the blocks.

GROUND COCKING AND RELEASE CONTROLS

12. Ground test cocking and release controls are accessible through an access panel labelled ROCKET RELEASE UNIT CONTROLS in the outboard jet pipe tunnel surface skinning.

RESTRICTED



RELEASE UNIT ASSEMBLY

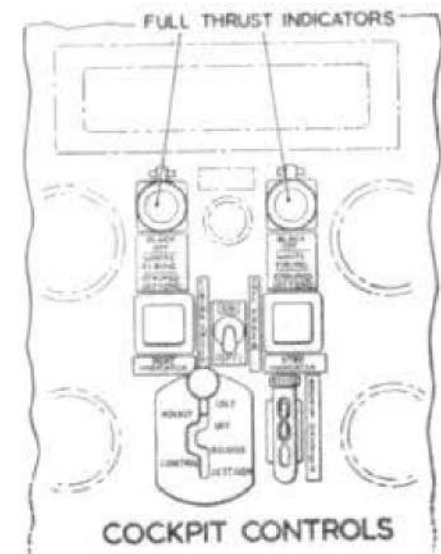
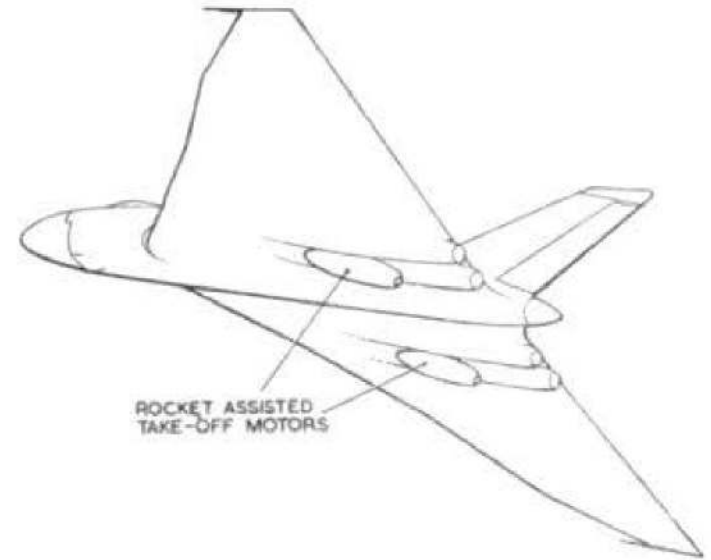
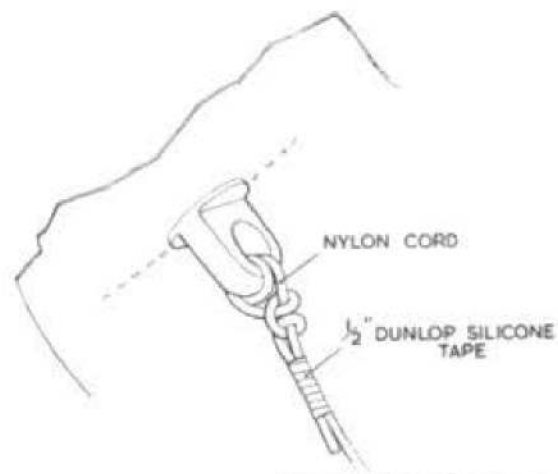
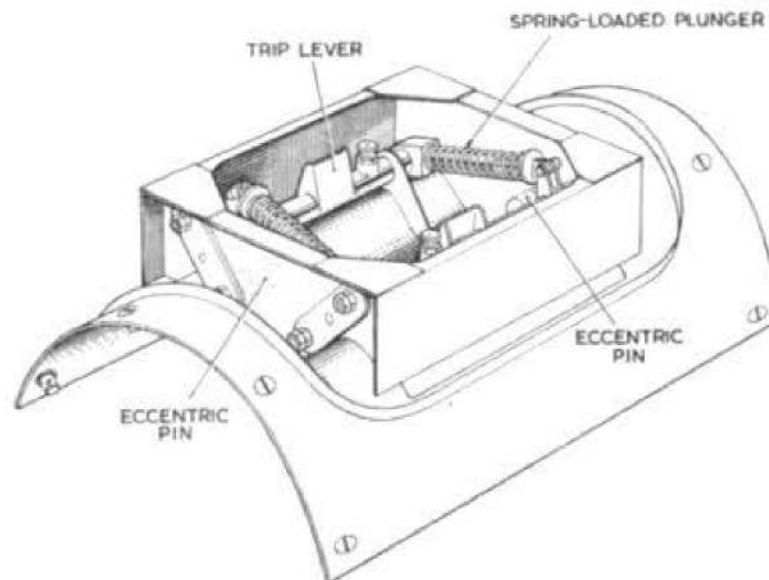


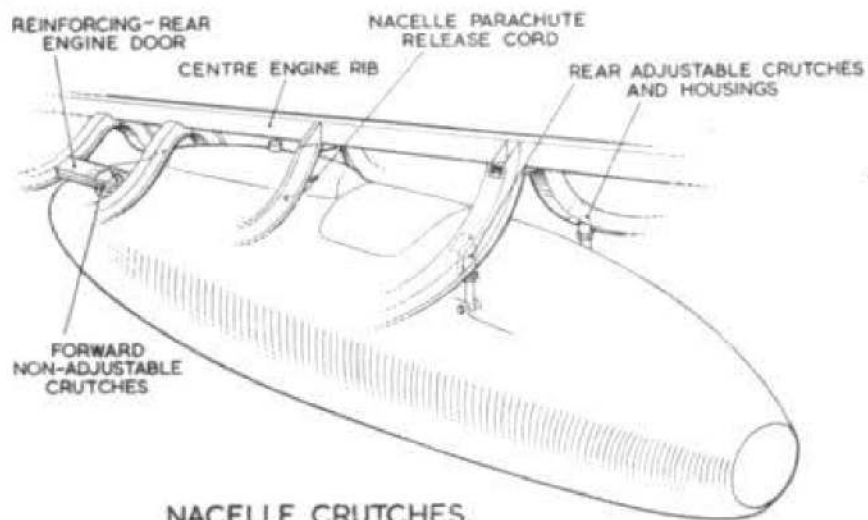
Fig. 1. Rocket assisted take-off installation (1)



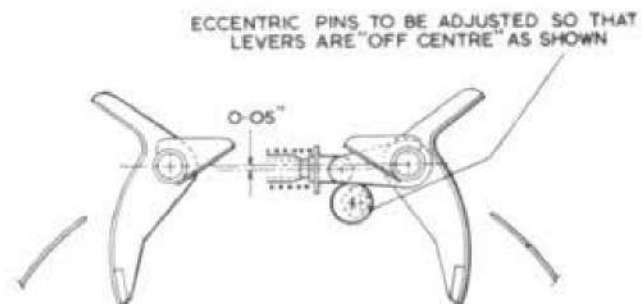
NACELLE PARACHUTE RELEASE CORD - METHOD OF ATTACHMENT TO AIRCRAFT EYEBOLT



ACCESS PANEL (MOD. 2)



NACELLE CRUTCHES



ACCESS PANEL DOOR (MOD. 2) - METHOD OF SETTING IN THE OPEN POSITION

Fig. 2. Rocket assisted take-off installation (2)

13. The cocking mechanism consists of a key that engages with the cocking button in the release unit, revolving inside a bearing secured to the centre engine rib and actuated through a lever at one end of the key by a cable and a handgrip adjacent to a label **ROCKET COCKING TEST**. The release unit is cocked by pulling the handgrip and then releasing it. A spring, extended when the handgrip is pulled, returns it to its original position.

14. Adjacent to the cocking mechanism is the ground release control. A double-pronged bellcrank lever pivoting in a bracket secured to the centre engine rib is operated by a rod, one end of which is fitted with a plunger head that slides inside a guide tube

compressing a spring that returns the rod to its original position when hand pressure has been removed. To prevent inadvertent release of the nacelle, a parallel pin passes through the plunger head which has to be turned through an angle of 90 deg. before the plunger can be depressed. When the plunger is depressed the pronged bellcrank lever moves through an arc into a cut-out in the release housing (Mod. 2) so that the prongs bear on a collar on the plunger rod to depress it and operate the release button in the top of the release unit.

DROGUE LINE PICK-UP

15. A drogue line from the parachute in the top of the nacelle is secured by a round turn and two half hitches to an eyebolt threaded

into a block in the jet pipe structure. The drogue line is nylon cord with a break of 100 lb. When the drogue line is in place a plug is screwed into the block which will be located by the markings on the skinning **DROGUE LINE PICK-UP**.

ELECTRICAL CONNECTIONS

16. A panel labelled **R.A.T.O. POWER SUPPLY**, **PUSH TO OPEN** is located between the rear engine bulkhead and the ground test control access panel. This provides access to the R.A.T.O. power socket. A plug from the nacelle is pulled from the socket when the installation is jettisoned and the panel is automatically shut by springs between the panel and the aircraft structure.

SERVICING

To be issued later

REMOVAL AND ASSEMBLY

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