

## Chapter 18

## PHOTOGRAPHIC INSTALLATION

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## DESCRIPTION

## Introduction

1. Two cupola shaped retractable camera housings are mounted, one behind the other in separate compartments, between formers 42 and 47 of the rear fuselage floor structure. Each housing, adapted to receive the mountings of various types of cameras and accessories, incorporates a horizontal window for vertical photography, a slanting window for oblique photography, an inspection lamp and switch, a camera heater mat and thermostat and a hot air supply duct. Hot air is necessary for window de-mist-

ing. For details of the cameras and their operation, refer to Book 2 of this A.P. and to A.P.1355C, Vol.1, Book 2.

## General

2. In its compartment, each camera housing is supported by a pneumatic ram which operates to move the housing on two vertical guide rails. The ram retracts to lower the housing so that it protrudes from an aperture in the bottom skin of the fuselage, thereby giving the camera an angle of view which is clear of the aircraft.

3. Two fairing doors, hinged at the periphery of each aperture and attached to the respective camera housing by adjustable rods, open or close as the housings are moved by the pneumatic rams. When the rams are fully extended, the camera housings are stowed and the doors are closed.

4. The air for operating the pneumatic rams is tapped from a point down-stream of the 1,000/350 p.s.i. reducing valve of the pneumatic system. Depending on the position of a switch, on the camera con-

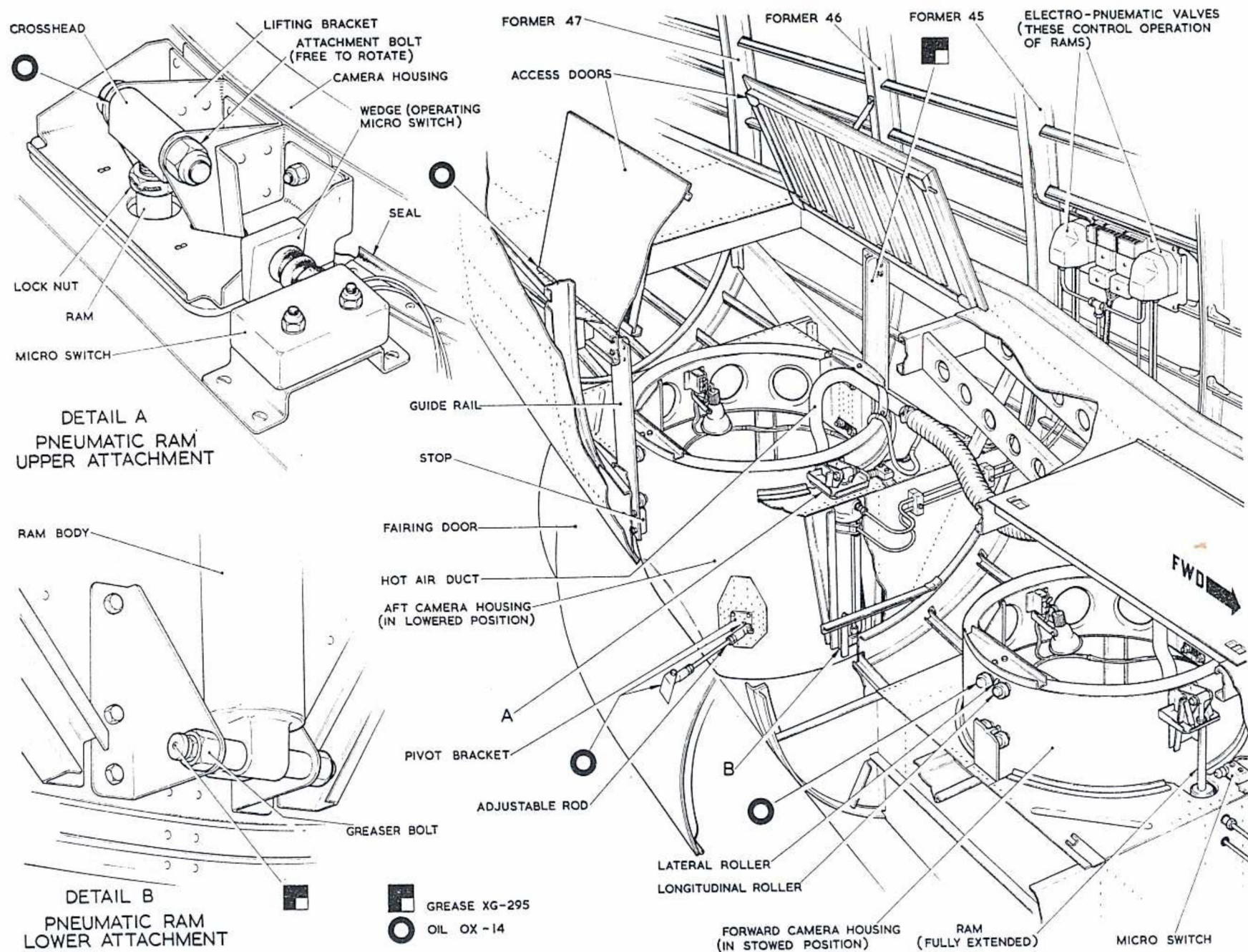


Fig. 1. Camera housing installation.

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trol panel at the navigator's station, the air is directed, by two electro-pneumatic valves, to the retracting or extending sides of the rams. Both pneumatic valves are located on a panel in the rear fuselage.

5. The switch, labelled CAMERA DOORS - FORWARD - AFT, is selected according to whether the forward or aft

#### General

8. Servicing of the camera installation consists of:-

Examining the housings, rams, doors and heating pipes for security and damage.

Checking and, if necessary, adjusting the rollers on the guide rails (para.10).

Checking the retracting and extending times of the housings (para.13, (20)).

Periodic lubrication, (fig.1).

#### SETTING THE INDICATOR MICRO SWITCH

9. With the housing in the fully low-

#### REMOVAL OF CAMERA HOUSING

12. Ensure the electrical supplies are 'off'. If the camera is fitted: remove it, together with its accessories. Refer to fig.2 and proceed as follows:-

(1) Remove access doors.

camera housing is to be used. Although only one housing at a time can be selected to the lowered position, both housings are stowed when the switch is in the centre/off position.

6. When either camera housing is in the fully lowered position, a micro switch is depressed by a wedge to operate an indicator, on the camera control panel,

#### SERVICING

ered position, adjust the micro switch up to the wedge, until the indicator, on the camera control panel, changes from a black to a black and white striped presentation.

#### ROLLER ADJUSTMENT

10. To enable adjustment of the lateral rollers to be carried out, the riveted access panels, over the eccentric bolts on which the rollers rotate, must be removed. The lateral rollers on the starboard side of the camera housing are adjusted first, before the housing is installed in its compartment. Adjustment is effected by turning the eccentric bolts until a straight-edge, placed on the rollers, becomes parallel to the housing skin. With the starboard side lateral rollers set correctly, and with the housing

#### REMOVAL AND ASSEMBLY

(2) Remove the door stop from the forward end of the access door frame.

(3) Disconnect the flexible heater pipe.

(4) Disconnect the electrical leads from the terminal blocks.

to present a black and white striped face. When both housings are stowed, the indicator presents a black face.

7. Access to the camera housing, for servicing purposes, is provided by two pairs of doors which open up into the fuselage. Straps, on formers 43 and 46 make provision for retaining these access doors in the open position.

installed in its compartment, the port side lateral rollers are adjusted to take up excess side play on the guide rails. The adjustment must be such that the rollers are free to rotate. When the port lateral rollers have been adjusted to suit the correctly set starboard lateral rollers, the housing will be laterally accurate in its guide rails.

11. Longitudinal adjustment is effected by turning an eccentric bolt which is fitted through one of each pair of longitudinal rollers. These eccentric adjuster bolts have hexagon heads stamped with the part number 43/Z6841. The plain bolts, through the non-adjustable longitudinal rollers, have rounded heads with two flats. The longitudinal rollers are adjusted until their clearance on the guide rails is at the minimum consistent with their free rotation.

5 Release the air pressure from the pneumatic system (Sect.3, Chap.7).

#### NOTE...

*With the system at ambient pressure, both camera housings will be in the lowered position.*

(6) Remove the bolt from the ram's upper attachment.

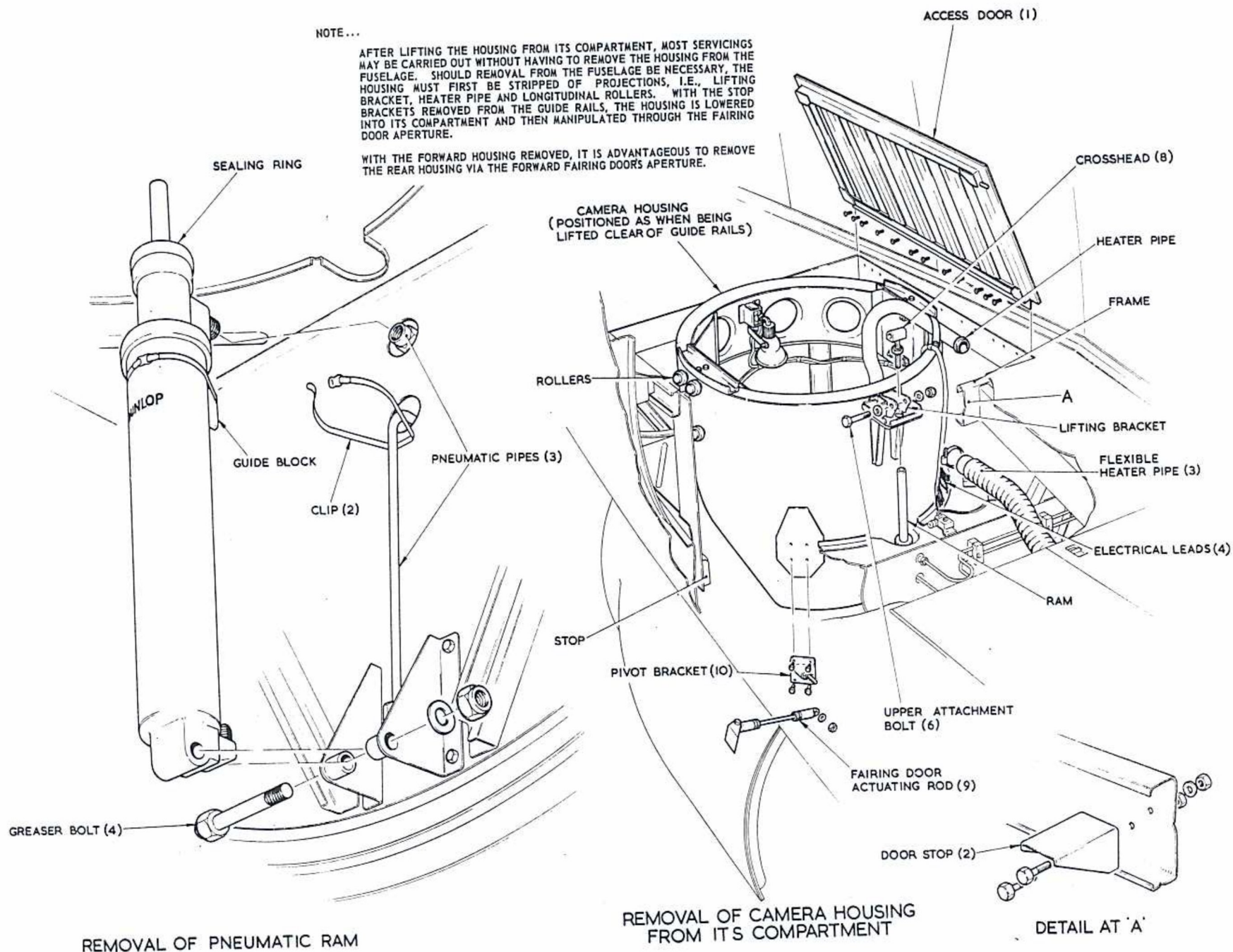


Fig.2., Removal of camera installation components

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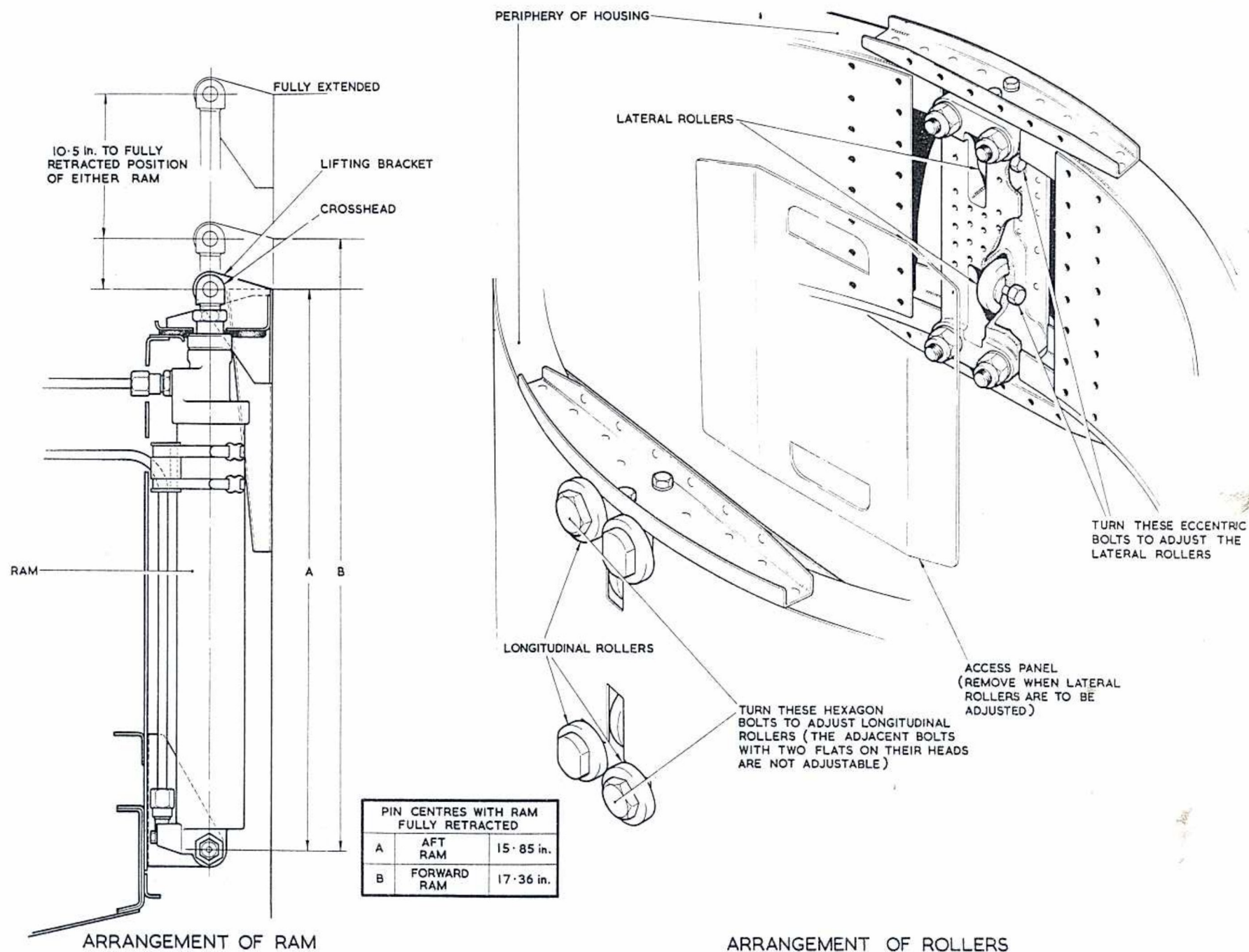


Fig. 3. Installation details—camera housing.

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- 7 Slacken the crosshead lock nut.
- (8) Extend the ram, manually, until the crosshead is clear of the lifting bracket, then unscrew and remove the crosshead.
- (9) Disconnect the fairing door actuating rods from the pivot bracket on the housing.
- (10) Remove the pivot bracket attachment bolts and detach both pivot brackets.
- 11 Lift the housing from its compartment.

**NOTE...**

*Ensure that equipment will not impede the ram should it be inadvertently extended by pneumatic pressure which may be introduced into the pneumatic system while the camera housing is not installed. Should it be necessary to remove the housing from the fuselage refer to the 'NOTE' on fig.2.*

**INSTALLING THE CAMERA HOUSING**

13. If the housing has to be passed into the aircraft before it can be installed in its compartment, lift it, in its normal attitude, through the camera fairing doors aperture. A new housing must first have the lifting bracket, heater pipe and longitudinal rollers, removed. Once the housing is inside the fuselage, refit the lifting bracket, heater pipe and rollers; fit the stops to the guide rails in the compartment, release any air pressure from the aircraft pneumatic system, then proceed as follows:-

- (1) Check that the ram is in the fully retracted position and that its sealing ring is fitted.

- (2) Lower the housing into its compartment and check for play on the rollers and ease of movement on the guide rails (refer to para.10 for roller adjustment).
- (3) Allow housing to rest on its bottom stops.
- (4) Measure the distance from the end of the ram to the centre of the attachment bolt hole in the lifting bracket.
- (5) Fit the crosshead and screw it a few turns into the ram.
- (6) Extend the ram by lifting the crosshead.
- (7) Screw the crosshead into the ram until the distance between the end of the ram and the horizontal centre line of the crosshead attachment hole is the same as that obtained in op. (4).
- (8) Push the ram down to its fully retracted position, then check the alignment of the crosshead with the lifting bracket. The alignment must be such that the upper attachment bolt can be easily inserted without moving the ram from its fully retracted position, or without lifting the housing. If necessary, adjust the crosshead until correct alignment is obtained.
- (9) Fit the upper attachment bolt and secure it with a washer and nut so that the bolt is just free to rotate.
- (10) Tighten the crosshead locknut against the end of the ram. Secure the locknut with 18 gauge stainless steel locking wire.
- (11) Fit the pivot brackets.
- (12) Remove any loose equipment, tools,

etc., from the housing compartment.

- (13) Check for obstruction by manually moving the housing up and down, to the limits of its travel.
- (14) Retain the housing in the fully up position, then close and open the fairing doors, one at a time. In the closed position, check that the clearance between the bottom of the housing and each door is at least 0.125 in.
- (15) Allow housing to rest on its bottom stops, then connect the fairing door actuating rods. Lift the housing to the fully up position and check for snug fit of the doors. Adjust rods as necessary.
- (16) Connect the electrical leads to the terminal block.
- (17) Connect the heater pipe.
- (18) Fit the door stop to the forward end of the access door frame.
- (19) Ensure equipment is clear of both pairs of fairing doors, then fully charge the pneumatic system (Sect. 3, Chap.7).

**NOTE...**

*Depending on the position of the electro-pneumatic valves controlling the operation of the rams, one or both camera housings will retract while the pneumatic system is being charged.*

- (20) Using the selector switch, operate the housing several times, checking for smooth operation and times of operation. With the camera and its accessories installed, the maximum operating times are - up in 4 seconds, down in 7 seconds.
- (21) Fit the access doors.

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## REMOVAL OF PNEUMATIC RAM (fig.2)

14. To remove the pneumatic ram when the camera housing is in position, proceed as follows:-

- (1) Refer to para.12 and carry out op. (5), (6), (7), (8) and (9).
- (2) Release the lower of the two clips which secure the pneumatic pipe guide block to the ram body.
- (3) Disconnect the two pneumatic pipes from the ram.

- (4) Remove the greaser bolt from the ram's lower attachment.
- (5) Lift the camera housing and remove the ram together with its sealing ring.

## INSTALLING THE PNEUMATIC RAM

15. To install the pneumatic ram proceed as follows:-

- (1) Lift the camera housing and place the ram, complete with its sealing ring, into position.

- (2) Fit the bottom attachment greaser bolt.
- (3) Connect the pneumatic pipes to the ram.
- (4) Secure the guide block clip.
- (5) Refer to para.13 and carry out op. (4) to (10), (12) to (15), (19) and (20).
- (6) Check the ram's pneumatic connections for leaks, using soapy water.