Chapter 5B
CONVERSION TO AIR MONITORING ROLE

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Introduction

1 This chapter deals with the conversion of the aircraft from the normal bombing role to the air monitoring role. This role provides facilities for airborne radiation detection and sample collection and for cabin air sampling. Fixed and removable fittings are installed on five designated aircraft by Parts A and B, respectively, of Mod.2390 and 2392. Tables 1 and 2 list the fixed and removable fittings.

2. Role conversion of the aircraft consists of the removal of the control unit Type 9422 (A.R.I.18076) and the two Window control boxes, and the installation, internally, of a N.I.S.385 control unit, a N.I.S.385 display unit and a N.I.S.361 filter monitor control unit at the A.E.O.'s position, together with four N.I.S.385 detector units and two air samplers, a Type L60 and a Type SC1 in the crew's compartment. Externally a Mk.10 monitoring duct, fitted underneath the port mainplane, and two pylon mounted pod assemblies, each housing Mk.3 sampling ducts, fitted underneath the port and starboard mainplanes complete the conversion.

Preparation

3. To prepare the aircraft for this role conversion items of equipment detailed in the following paragraphs must first be removed and returned to stores for safe keeping.

WARNING . . .
Before any electrical connectors are disconnected, ensure all electrical supplies in or to the aircraft are switched off and disconnected.

4. Remove fuses No.110 and 114 R.Y.B. in fuse panel 60P, fuses No.463, 464, 465 and 466 in fuse panel 26P fuse No.653 in fuse panel 3P and fuses No.709 and 732 in fuse panel 48P and fit dummy fuses.

5. Remove fuse No.548 in fuse panel 4P. fuse No.655 in fuse panel 3P and fuses No.1112, 1113, 1115, 1116, 1118, 1119 R.Y.B. in fuse panel 14P and fit dummy fuses. At the A.E.O.'s position release the screws securing control unit Type 9422 (A.R.I.18076), partially withdraw unit, disconnect cables and remove unit. Suitably protect and stow disconnected cables.

6. At the A.E.O's position release the Dzus fasteners securing the Nav/Plotter's panel and lower panel. Release the four bolts securing each Window control unit and partially withdraw units. Disconnect cables from each control unit and remove units. Connect the cables to the stowage sockets provided behind the panel. Raise and secure Nav/Plotter's panel.

7. Aircraft in pre-mod 2377 condition only:- Remove fuses No.250 R and B in fuse panel 24P, fuse No.333 in fuse panel 11P and fuses No.666, 667, 668 and 669 in fuse panel 3P and fit dummy fuses. Remove the T4 bombsight head and flexible drive shafts to the computor.

8. For description and servicing of the externally fitted equipment, reference should be made to Sect.3, Chap.19 of this Publication. For description, operation and servicing of the internally fitted equipment reference should be made to Sect.7, Chap.9 of this Publication.

INSTALLATION OF EQUIPMENT

N.I.S.385 control unit

9. At the A.E.O's position release and lower the nav/plotter's panel. Release cables F4205, F4207 and F3125 (plugs B and T and socket V) and co-axial cables F4208 to F4211 (plugs P, M, K and S) from stowage, remove protective coverings and connect to control unit. Secure unit to panel with four 2 B.A. bolts and washers.

N.I.S.361 filter monitor control unit

10. With the nav/plotter's panel lowered, release cable F4206 and co-axial cable F4212 (socket 1 and plug 2) from stowage, remove protective coverings and connect to control unit. Secure unit to panel with four 2 B.A. bolts and washers. Raise and secure nav/plotter's panel.

N.I.S.385 display unit

11. Release other end of cable F4207 (socket U) from stowage, remove protective covering and connect to display unit. Secure unit in position with five 4 B.A. screws and washers.

N.I.S.385 detector units

12. Locate Barrymount fittings Pt. No. B64/CA/10 and B64/CA/20 respectively to the two forward and rear insert positions on the forward end of the bomb aimer's platform and secure each in position with four 2 B.A. bolts and washers. Fit the detector unit (labelled DOWN) with the scintillator section facing forward, to the Barrymount fittings and secure in position with four ¼ in B.S.F. bolts and washers. Wire-lock bolt heads using 22 s.w.g. wire. Release cable 1/F4205 and co-axial cable F4208 from plug break panel stowage (former 372F) and connect to unit.

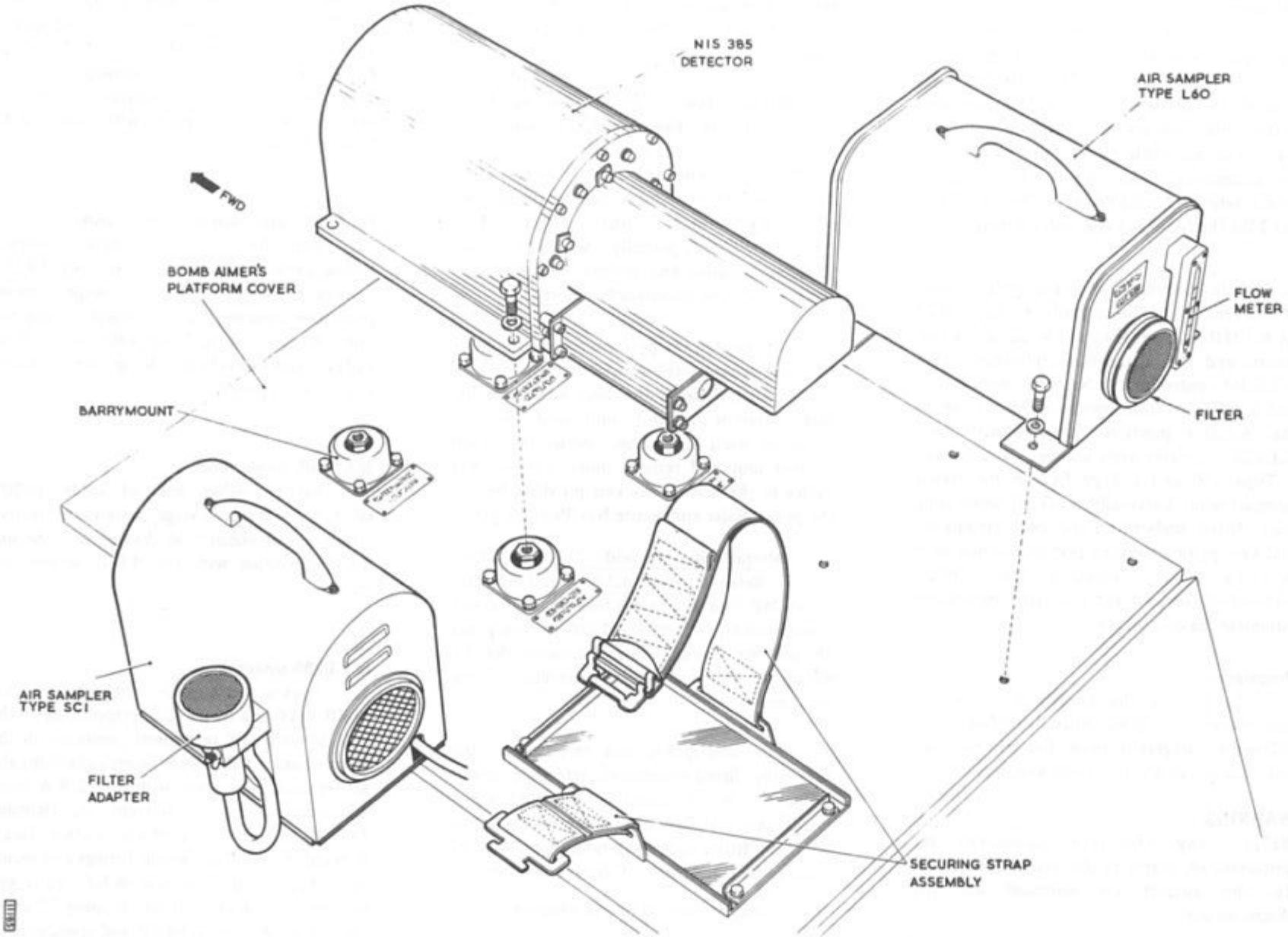

Fig. 1 Assembly of units at the bomb aimer's position

13. Fit the detector unit (labelled PORT), with the scintillator section facing forward, to the four Barrymount fittings located below the first pilot's floor between formers 316F and 330F and secure in position with four ¼ in B.S.F. bolts and washers. Wire-lock bolt heads using 22 s.w.g. wire. Release cable 2/F4205 and co-axial cable F4209 from their adjacent stowage, remove protective coverings and connect to unit.

14. Fit mounting assembly Pt. No. 22/Z12726 to the forward edge of the rear crew members' floor adjacent to the sixth crew member's seat and secure in position with five 2 B.A. bolts and washers. Fit adjustable strut Pt. No. 211/Z12726 to mounting assembly, adjust strut to correct length and lock in position with locknut. Fit other end of strut to attachment bracket on aircraft structure and secure each end in position with shear pin, collar and split pin.

15. Fit the detector unit (labelled STARBOARD), to the mounting assembly and secure in position with four ¼ in B.S.F. bolts and washers. Wire-lock bolt heads using 22 s.w.g. wire. Release cable 3/F4205 and co-axial cable F4210 from their adjacent stowage, remove protective coverings and connect to unit.

16. Locate Barrymount fittings Pt. No. B64/CA/20 and B64/CA/10 respectively to the two forward and two rear anchor nut positions in the roof of the crew's compartment between formers 260F and 274F and secure each in position with four 2 B.A. bolts and washers. Fit the detector unit (labelled UP), with the scintillator section facing aft, to the Barrymount fittings, and secure in position with four ¼ in B.S.F. bolts and washers. Wire-lock bolt heads using 22 s.w.g. wire. Release cable 4/F4205 and co-axial cable F4211 from their adjacent stowage, remove protective coverings and connect to unit.

Air sampler, Type L60

17. Align the unit,with the connector facing forward, with the threaded inserts fitted to the starboard rear corner of the bomb aimer's platform and secure in position with four ¼ in bolts and washers. Release cable F4220 from its stowage on the plug break panel, adjacent to former 372F, and connect to sampler unit.

Air sampler, Type SC1

18. Align the mounting tray Pt. No. 1/Z12757 with the threaded inserts fitted to the port rear corner of the bomb aimer's platform and secure in position with four 2 B.A. bolts and washers. Mount the sampler unit on the tray, with the flying lead facing the rear, and secure in position with the strap assembly. Connect the flying lead to the appropriate connector on the plug break panel adjacent to former 372F.

Pylon

19.

(1) Remove the two main suspension link covers, together with associated items, from mainplane undersurface and return to stores for safe keeping.

(2) Remove plug break cover from mainplane undersurface, return to stores for safe keeping and refit cover attachment bolts and washers.

(3) Remove locating spigot and rear suspension eyebolt hole expansion bungs from mainplane undersurface and return to stores for safe keeping.

(4) Fit and align rear suspension eyebolt as follows:-

(a) Fit washer Pt. No. 200/Z12726 to eyebolt Pt. No. 202/Z12726, ensuring hole chamfer is adjacent to eye end, followed by laminated washer Pt. No. 196/Z12726 and two washers Pt. No. 197/Z12726.

(b) Screw eyebolt into mainplane undersurface and align eye end with markings on skin at torque loading of 20 - 43 lb ft.

(c) If alignment is not achieved, torque load to 20 lb ft and note clockwise rotation required to obtain correct alignment.

(d) Repeat operation (c) at 43 lb ft.

(e) Dependent upon the results of operation (d) final alignment can be achieved as follows:-

(i) Remove one or more of the 0.002 in thick laminates from washer Pt. No. 196/Z12726

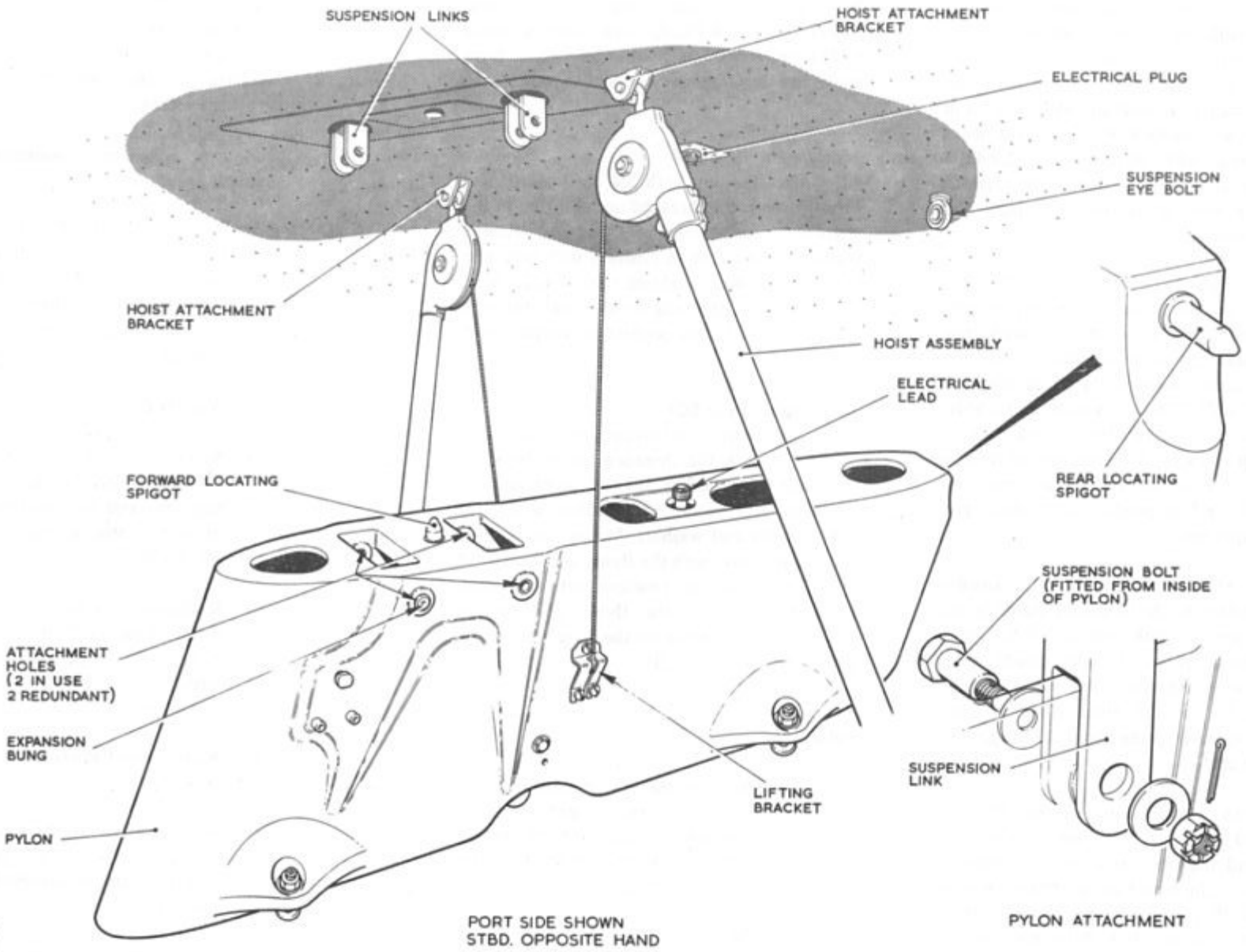

Fig. 2 Installation of pylon

(each laminate removed will give an additional 11½ deg rotation) or

(ii) Remove one washer Pt. No 197/Z12726 to give an additional 85 deg rotation with laminate removal as required, or:-

(iii) Remove both washers Pt. No. 197/Z12726 to give an additional 170 deg rotation with laminate removal as required.

NOTE . . .

(1) Laminate removal from washer Pt. No. 196/Z12726 must be kept to a minimum. The washer may be used several times but must be replaced when its thickness has been reduced to 0.02 ± 0.002 in.

(2) Washers Pt. No. 197/Z12726 removed in operation (e) (ii) or (iii) should be returned to stores for safe keeping.

(5) Remove and retain the two mushroom-headed bolts and associated washers from mainplane undersurface adjacent to both inboard and outboard main suspension links.

(6) Fit mini hoist attachment bracket Pt. No 1/U2278 to above positions and secure each bracket with two bolts Pt. No. A25/4E.

(7) Attach a 2½ cwt mini hoist Pt. No. A41/5, complete with 9 in winding handle Pt. No. 41/163, 5 ft extension tube Pt. No. 41/103, top sheath hook Pt. No. 42/50 and ball end attachment Pt. No. 41/136 to each attachment bracket.

(8) Remove top bolt securing each lifting bracket to pylon, slacken each pair of lower bolts and remove brackets from pylon. Engage mini hoist ball end attachment in each lifting bracket and secure brackets to pylon.

(9) Remove and retain the appropriate inboard and outboard suspension hole expansion bungs.

(10) Raise pylon and engage rear spigot with suspension eyebolt spherical bearing.

(11) Rotate pylon approximately 6 deg by winding up on outboard hoist only.

(12) Operate both hoists slowly and, adjusting as necessary, engage pylon sides in suspension link fork ends and locating spigot in hole in mainplane undersurface.

(13) Fit bullet Pt. No. 1/U2279 to each suspension bolt Pt. No. 203/Z12726 and insert one bolt through suspension link and pylon from outside face of pylon.

(14) Fit washer Pt. No. SS.4667/7 to remaining bolt, with radius adjacent to bolt head, and insert through opposite side suspension link and pylon from inside of pylon.

(15) Remove bullet from bolt fitted in operation (14) and fit washer Pt. No. SP.18/J, slotted nut Pt. No. A27/JS and lock with split pin Pt. No. SP.90/C7.

(16) Remove bolt fitted in operation (13), fit washer Pt. No. SS.4667/7 and insert through suspension link and pylon from inside of pylon. Remove bullet and fit washer, slotted nut and split pin as in operation (15).

NOTE . . .

A drift may be used through opposite side 'redundant' pylon attachment hole to remove bolt in operation (16).

(17) Remove lifting brackets from pylon, release mini hoist ball end attachments and refit lifting brackets to pylon.

(18) Remove hoists from mainplane attachment brackets, remove attachment brackets and fit mushroom-headed bolts and

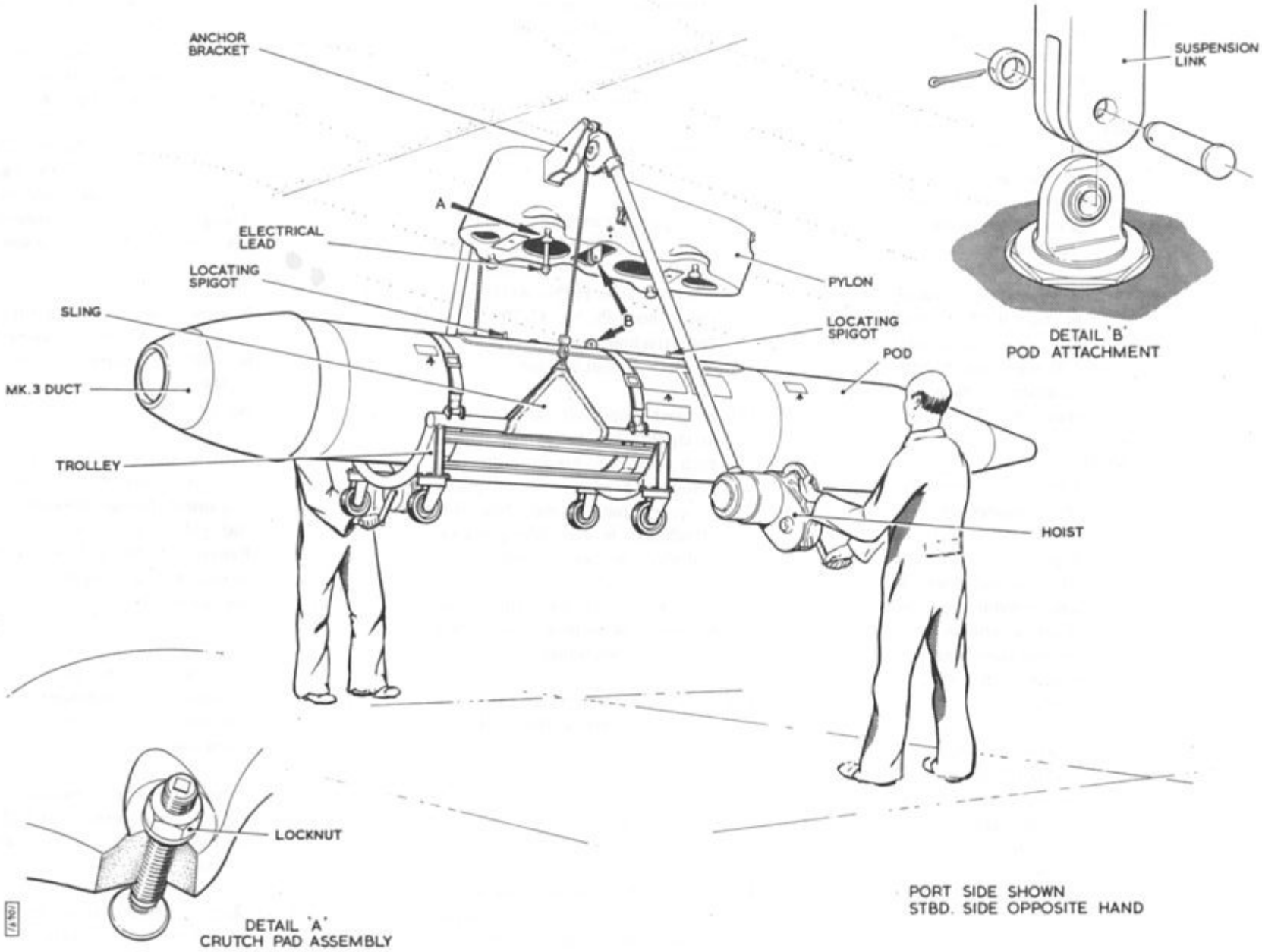

Fig.3 Installation of pod

associated washers removed in operation (5).

(19) Connect pylon attached electrical lead to mainplane mounted plug.

(20) Ensure expansion bungs are fitted in 'redundant' pylon attachment holes.

Pod

20.

(1) Position trolley Pt. No. 6805423 below pylon with pod correctly located at the 'COMPLETE POD TRESTLING AREA' positions and secured to the trolley.

(2) Ensure the four crutching pad assemblies on the pylon are fully slackened off and held in the withdrawn position by the locknuts.

(3) Screw attachment lug Pt. No. 2/Z12740 fully home into the housing in the top of the pod and back off not more than 1 ± ¼ turn to ensure lug is aligned parallel with centre-line of pod.

NOTE . . .
When the pod is fitted to the pylon a clearance must exist between the pylon and the pod sole plate.

(4) Fit sling Pt. No. 6805217 to top tubular member on each side of trolley.

(5) Fit anchor bracket Pt. No. 1U/1220 to each side of pylon.

(6) Attach a 2½ cwt mini hoist Pt. No. A41/5, complete with 9 in winding handle Pt. No. 41/163, 5 ft extension tube Pt. No. 41/103, top sheath hook Pt. No. 42/50 and cable hook Pt. No. 41/76 to each anchor bracket.

(7) Connect cable hooks to sling shackles. Ensure slings are centrally located between the pod trestling area markings.

(8) Swing pod suspension link to the rear and retain in this position by inserting a ¼ in dia. bar through hole in side of pylon just below the suspension link attachment pin.

(9) Slowly raise trolley, complete with pod, until pod spigots are just clear of pylon base. Connect pylon attached electrical lead to pod.

(10) Rotate pod approximately 6 deg by winding up on outboard hoist only. Release and remove pod-to-trolley retaining straps.

(11) Operate both hoists slowly and, adjusting as necessary, raise pod and engage forward and rear spigots with holes in base of pylon.

(12) Remove ¼ in dia. bar fitted in op.(8) and align suspension link with attachment lug. Adjust height of pod as necessary.

(13) Fit suspension link attachment pin and secure with collar and split pin.

(14) Lower trolley to ground. Disconnect cable hooks from sling shackles and remove hoists and anchor brackets from pylon.

(15) Screw down, finger-tight only, rear inboard crutch pad assembly ensuring full pad contact is achieved with pod sole plate.

(16) Check pod sole plate is parallel to pylon base. Achieve by adjusting rear inboard crutch pad as necessary.

(17) Screw down, finger-tight only, rear outboard and forward inboard and outboard crutch pad assemblies, ensuring full pad contact is achieved with pod sole plate.

(18) Using a torque wrench screw down forward inboard crutch pad a quarter turn followed by a quarter turn on forward outboard pad. Repeat sequence until a torque load of $10 \pm \frac{1}{0}$ lb/ft is achieved on both forward pads.

(19) Check that a torque load of not less than $10 \pm \frac{1}{0}$ lb/ft has been achieved on the rear crutch pads. Do not back off these two pads.

(20) Hold crutch pad adjusting screw to prevent rotation and tighten lock nut on each assembly.

Mk.10 filter monitoring duct

21.

(1) Remove four bolts and associated

washers securing blanking plate to mainplane undersurface. Withdraw plate and disconnect electrical lead from plug blank

(2) Support duct connect electrical lead to duct and secure duct to mainplane undersurface with four attachment bolts Pt. No. S21/A25/7G and washers Pt. No. SP.10/G. Wire-lock attachment bolts.

(3) Return blanking plate together with securing bolts and associated washers to stores for safe keeping.

Fitment of fuses

22. Fit fuses No.937 and 664 to port fuse and relay panel 3P and fuses No.1313, 1400, 1401 and 1402 to starboard fuse and relay panel 4P. Refer to '28 - volt d.c. supply - distribution fuses', Sect.6, Chap.6 of this Publication.

System check

WARNING . . .
VOLTAGES IN EXCESS OF 100–VOLT, A.C. OR D.C., CAN BE LETHAL.

23. Check the serviceability of the complete system following the current service procedures. Refer to Sect.7, Chap.9 of this Publication.

REMOVAL OF EQUIPMENT

General

24. Removal of control, display and detection units, air samplers, fuses and Mk.10 duct is the reversal of the installation procedures detailed in para.9 to 18, 21 and 22. Ensure the detector units are protected from damage by shock or jarring and are correctly stored in their transit cases. Protect and stow all disconnected cables. Removal procedures for the pod and pylon are detailed in para.25 and 26 respectively. For removal of the Mk.3 duct actuator refer to Sect.7, Chap.9 of this Publication.

Pod

25.

(1) Slacken locknuts and back off the four crutch pad assemblies.

(2) Position trolley Pt. No. 6805423 below pylon and fit sling Pt. No. 6805217 to top tubular member on each side of trolley.

(3) Fit anchor bracket Pt. No. 1U/1220 to each side of pylon.

(4) Attach a mini hoist, complete, to each anchor bracket as in para.20 op. (6).

(5) Ensure trolley slings are located centrally between the pod trestling area markings and connect mini hoist cable hooks to sling shackles.

(6) Operate hoists and raise trolley until trolley support beams are just clear of pod. Ensure trolley support beams align with pod trestling markings and rotate trolley approximately 6 deg by winding up on appropriate hoist until electrical trough on the lower side of pod aligns with clearance cut-out on trolley support beam Raise trolley until contact with pod is made. Ensure retaining straps hang freely

(7) Remove suspension link attachment pin, collar and split pin.

(8) Slowly lower trolley, complete with pod, until locating spigots are just clear of pylon base. Disconnect pylon attached electrical lead from pod.

(9) Secure pod to trolley with retaining straps and lower trolley to ground.

(10) Disconnect cable hooks from sling shackles and remove winches and anchor brackets from pylon.

Pylon

26.

(1) Remove and retain the two mushroom-headed bolts and associated washers from mainplane undersurface adjacent to both inboard and outboard main suspension links.

(2) Fit mini hoist attachment bracket Pt. No. 1/U2278 to above positions and secure each bracket with two bolts Pt. No. A25/4E.

(3) Attach a mini hoist, complete, to each attachment bracket as in para.19 op.(7).

(4) Remove top bolt securing each lifting bracket to pylon, slacken each pair of lower bolts and remove brackets from pylon. Engage mini hoist ball end attachment in each lifting bracket and secure brackets to pylon.

(5) Disconnect pylon attached electrical lead from mainplane mounted plug.

(6) Remove split pin, slotted nut and washer from each suspension bolt and remove each bolt and underhead washer.

(7) Operate both hoists slowly until pylon withdraws from suspension link fork ends and forward spigot from hole in mainplane undersurface. Withdraw rear spigot from suspension eyebolt and lower pylon to ground.

(8) Remove lifting brackets from pylon, release mini hoist ball end attachments and refit lifting brackets to pylon.

(9) Remove hoists from mainplane attachment brackets, remove attachment brackets and fit mushroom-headed bolts and associated washers removed in operation (1).

(10) Fit expansion bung in each pylon attachment hole.

If the pylon is not required to be refitted to the aircraft proceed as follows:-

(11) Remove rear suspension eyebolt and associated washers and return to stores for safe keeping.

(12) Fit expansion bungs to rear suspension eyebolt and forward locating spigot holes.

(13) Fit plug break attachment cover to mainplane undersurface ensuring plug blank is connected.

(14) Fit main suspension link covers and associated items to mainplane undersurface.

TABLE 1

Equipment - Mod.2390 (Air Monitoring)

Part No.	Item	No. off
	Part A - fixed fittings	
206/207/Z12726	Plug break	2
AS.1248/4C	Bolt	8
SP.13/C	Washer	8
221/Z12726	Cover (for pylon suspension links)	4
224/Z12726	Pin	4
225/Z12726	Screwed bar	4
226/Z12726	Plate	4
AS.1903/E7	Saddle washer	4
A27/EP	Nut	4
AGS.2002/E/1	Nut	4
SP.13/C	Washer	4
56/Z12726	Blanking plate (Mk.10 duct)	1
AS.1248/6G	Bolt	4
SP.13/G	Washer	4
1SS/5206	Bung (for pylon locating spigot and suspension eyebolt holes)	2
B64/CA/10	Barrymount (for port detector)	2
B64/CA/20	Barrymount (for port detector)	2
2/V18358	Stowage panel	1
	Part B - removable fittings	
1/Z12743	Pylon	2
202/Z12726	Eyebolt (pylon rear attachment)	2
196/Z12726	Washer (laminated)	2
197/Z12726	Washer	4
200/Z12726	Washer	2
203/Z12726	Bolt (pylon suspension)	4
7SS4667	Washer	4
SP.18/J	Washer	4
A27/JS	Nut	4
SP.90/C7	Split pin	4

TABLE 1 (continued)

Part No.	Item	No. off
1/Z12740	Pod	2
2/Z12740	Attachment lug	2
SP.4Y/P19 or P18	Attachment pin	2
A.G.S.899 14	Collar	2
SP.90/H11	Split pin	2
806234H or 1/Z12762	Mk.3 duct (Air sampler installation)	2
HR/1/598048	Mk.10 duct (filter monitor detector)	1
S21 A25 7G	Bolt	4
SP.10/G	Washer	4
HR/0/57264/1-2-3-4	Detector (ADAM NIS 385)	4
B64/CA/10	Barrymount	4
B64/CA/20	Barrymount	4
A25/3C	Bolt	16
SP.13/C	Washer	16
A25/1C	Bolt	16
SP.10/C	Washer	16
S21/6E/SS4751	Bolt	12
SP.10/E	Washer	12
22/Z12726	Mounting platform	1
A25/13C	Bolt	5
SP.13/C	Washer	5
211/Z12726	Adjustable strut	1
SP.113/E7	Shear pin	2
SP.121/E	Collar	2
SP.90/C5	Split pin	2
HR/1/598046	Control unit (ADAM NIS 385)	1
HR/1/598049	Control unit (ADAM NIS 361) (filter monitor Mk.10)	1
AS.1248/47C	Bolt	8
SP.10/C	Washer	8
HR/1/598047	Display unit (ADAM NIS 385)	1
A32/B12	Screw	5
AGS.2035/B	Washer	5

TABLE 2

Equipment - Mod.2392 (Cabin air sampling)

Part No.	Item	No.off
	Part B - removable fittings	
Type L60	Air sampler (Rotheroe Mitchell)	1
A25/6E	Bolt	4
SP.10/E	Washer	4
Type SC1	Air sampler (Vacanair)	1
SLPT/06F/10/6P	Free plug	1
1/Z12757	Mounting tray	1
A25/1C	Bolt	4
SP.10/C	Washer	4