Chapter 2 ARMAMENT AND PHOTOGRAPHIC

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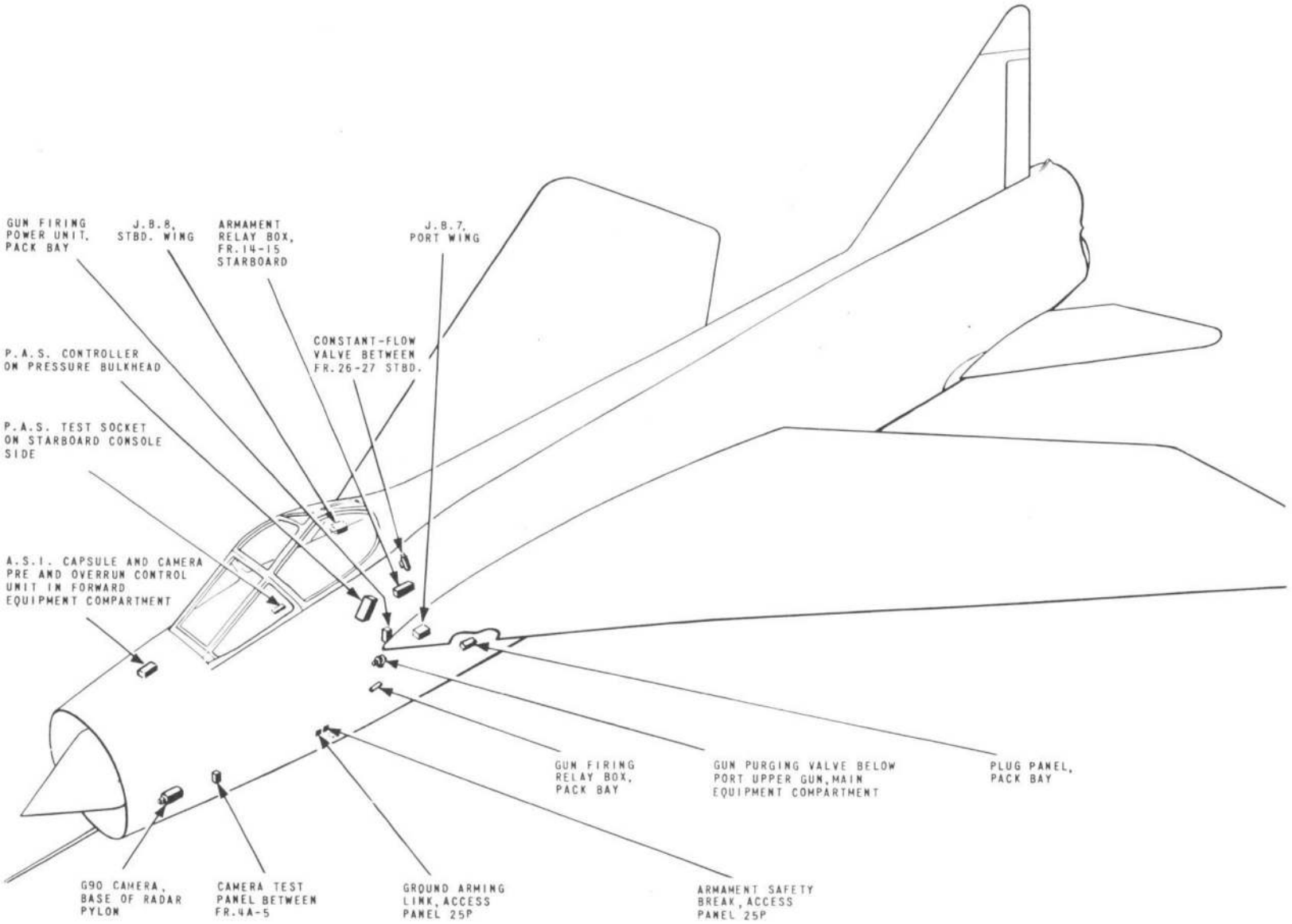

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FIG. 1. ARMAMENT AND PHOTOGRAPHIC EQUIPMENT

◀ MINOR AMENDMENTS ▶

DESCRIPTION

General

1. The circuits described and illustrated in this chapter carry the necessary power supplies and provide control and protective facilities for the weapons systems, the pilot's attack sight, and the camera equipment. The weapon packs, viz. guns, guided missiles, and rockets, and their ancillary and control equipment, are fully described in A.P.101B-1001-1A, Sect.5, Chap.3, whilst details of the pilot's attack sight and camera installation appear in Sect.7, Chap.2. The chapter has been amended to include the following modification:-

Mod.4617 To enable the pylon safety relays to be energized by the arming switch instead of the firing trigger.

Controls

Armament master selector

2. Control of all weapon systems is by means of a rotary ARMAMENT MASTER SELECTOR switch, Type Santon 7470, fitted on the starboard console. The switch positions are marked, OFF-GUNS-G.W.-R.B. Selection to any of these positions will energize the circuits associated with the relevant weapon system.

Firing trigger

3. The firing trigger located in the control column handle is used in all roles to initiate the firing sequence via the various relays and control units. It is operated by releasing the safety catch and then gently squeezing the trigger. To prevent engine flame out during weapon discharge, operation of the firing trigger automatically energizes the relight system *(Chap.7)*.

Safety devices

Armament safety break

4. To prevent the guns or rockets being fired or any loaded armament stores being released while the aircraft is on the ground, provision is made to break the armament power supply circuits by a plug and socket coupling located behind access panel 25P. When disconnected, a red warning pennant hangs down through the panel aperture. To avoid the necessity of personnel leaning over the missile to insert the plug before flight, Mod.1927 and 2370 were introduced to transfer the break, by an extension cable and plug, to the rear compartment of the missile pack, the break-operating lever being accessible through an aperture in the underside of the pack. The break takes the form of an inner and outer tube assembly, the outer tube housing the break socket and the inner tube mounting the plug. From the break, an extension cable and plug assembly is led upwards through a split rubber seal covering an access hole in the lower shear web between frames 21 and 22. The plug replaces the normal plug and is inserted in the break socket on the panel, stowage being provided for the normal plug and pennant which are stowed whilst the missile pack is fitted. Indication that the pack safety break is disconnected is given by the projection of the inner tube from the bottom of the pack, the tube being painted red; there is no warning pennant.

Alighting gear interlock

5. The supply to the armament safety relays is routed via the terminals of the alighting gear UP push-button, so that the weapon systems are inoperative until the alighting gear has been retracted. This safety restriction may be overcome when ground servicing by operating the GROUND ARMING LINK, accessible through panel 25P. The link is operated by the insertion of a special key, Ref. No.1E/5245.

Power supplies

6. The supplies for the armament circuits are mainly 28-volts d.c. taken from the busbar PL in the d.c. feeder fusebox. The gun firing system is d.c. controlled but requires an a.c. supply to operate the guns, this being taken from busbars XA, XB, XC, in the a.c. fuse and relay box. A supply of a.c. is also required to operate the P.A.S. Mk. 1 and is fed to its controller via the P.A.S. supply relay, Type S3, when the armament master selector is operated. The Firestreak emergency jettison circuits are supplied from the battery busbar via the emergency services fusebox.

Guns

General

7. Provision is made for the installation of four 30-mm. Aden Mk.4 guns, two in the upper nose position of the fuselage, along with their associated ammunition tanks, and two at the weapon

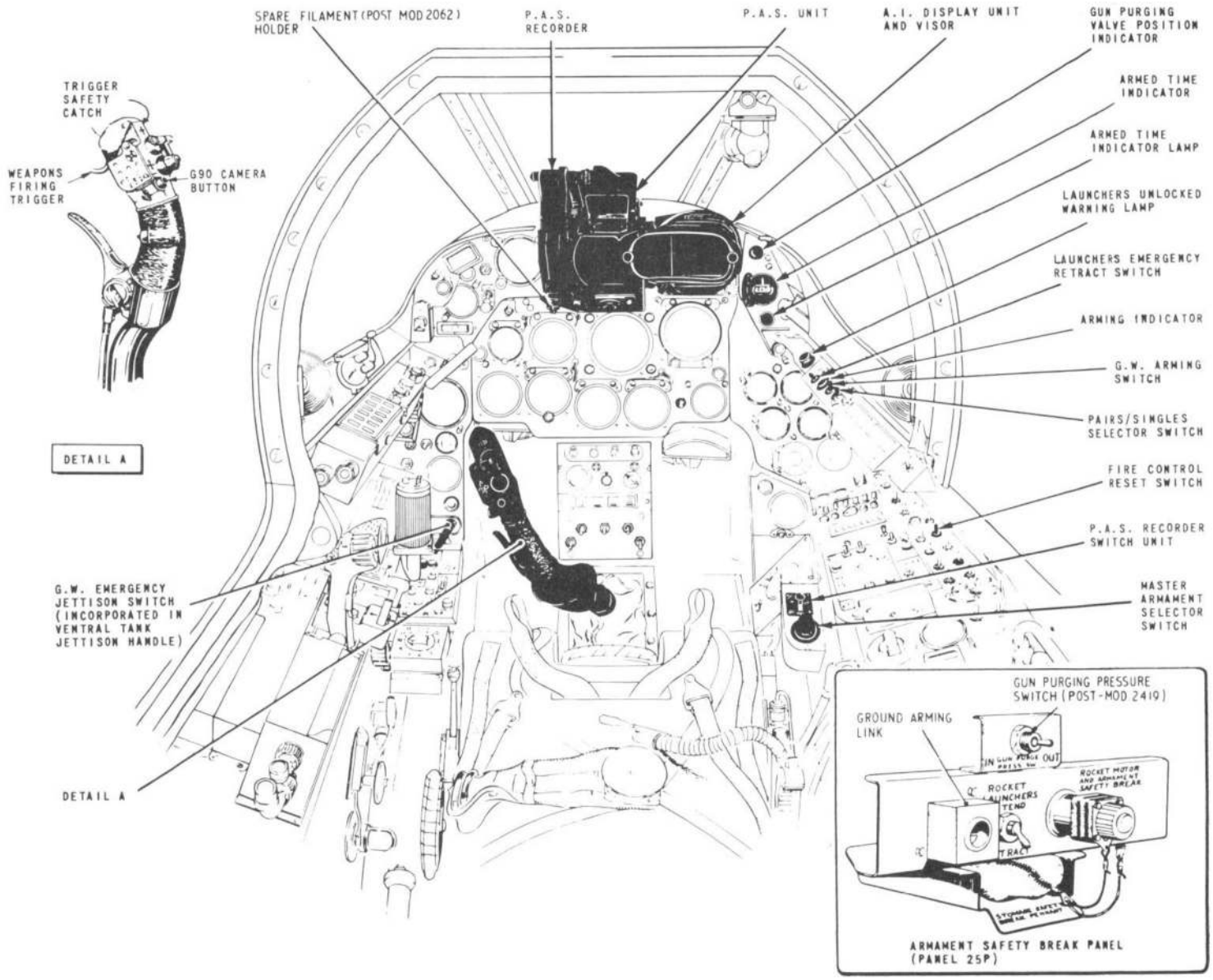

FIG.2. ARMAMENT AND PHOTOGRAPHIC CONTROLS

◀ MINOR AMENDMENTS ▶

pack position on the underside of the fuselage. The guns are electrically-operated and the firing sequence is fully described in A.P.1641S, Vol.1, Part 1, Chap.3. Control of the firing circuit is through a system of relays operated by the armament master selector, when switched to the GUNS position, and by the firing trigger in the control column handle. A solenoid-operated constant flow valve and a gun-purging valve are connected with the firing circuit and operate automatically to clear the explosive gases from the gun bays. The P.A.S. Mk.1 system is energized whenever the GUNS selection is made, and providing that the CAMERA MASTER switch is ON, the G90 camera will operate when the firing trigger is pressed.

Operation

8. With the alighting gear retracted, the safety relay is energized and closed, and positive supplies are connected to the armament master selector and the firing trigger. When GUNS setting is selected, the camera and gun-purging circuits become partially completed by operation of the selector relay, and the P.A.S. supply relay closes and connects a.c. and d.c. supplies to the controller. Operation of the firing trigger energizes the relevant camera relay which, on closing, completes the camera circuit *(Sect.7, Chap.2)*, and connects a supply to the over-run control unit associated with gun purging. The circuit to the gun-purging solenoid valve is then completed via the over-run control unit and the selector relay. After a brief period the gun-purging pressure switch and interlock relay close *(A.P.101B-1001-1A, Sect.5, Chap.3)* to energize the gun-purging indicator and the gun power unit relay. Operation of the latter connects a 200-volt a.c. supply to the power unit and a d.c. supply to the solenoids of the firing relays which control the circuits from the power unit to the gun packs. When the firing trigger is released, the power unit relay, firing relays, and camera relay become de-energized, but the supply to the gun-purging valve is maintained, via the over-run control unit, for a further period of 2 seconds. A constant flow valve in the purging air system *(A.P.101B-1001-1A, Sect.3, Chap.8E)* has an integral solenoid-operated device which automatically increases the delivery rate of the valve when the lower gun pack is fitted. The solenoid is connected in series with a limit switch, Type C, Mk.18, mounted on the port lower longeron of the pack bay and actuated by engagement of the pack spigot with the aircraft mounting.

Gun purging pressure switch cut-out (post Mod.2419)

General

9. A switch annotated GUN PURGE PRESS. SW. -IN-OUT, located on the safety break panel, provides the facility to switch the gun purging pressure switch in or out of circuit, as required, when servicing on the ground.

Operation

10. With the ground arming link operated and the GUN PURGE PRESS. SW. selected to OUT, a supply is drawn from fuse 139, in the d.c. feeder fuse box, to energize the gun purging interlock relay via AD2, A2A and A21, therefore shunting the gun purging pressure switch out of circuit. With the switch selected to IN, this circuit is broken, and the interlock relay can only be energized by a supply fed via the gun purging pressure switch.

Guided weapons

General

11. A description of the guided weapon installation and the associated operating instructions will be found in A.P.101B-1001-1A, Sect.5, Chap.7, which should be read in conjunction with the information and diagrams included in this chapter. The G.W. pack is interchangeable with the gun pack and the rocket pack. It carries two Firestreak missiles mounted one on each side of the pack. They are fitted horizontally on pylons at the aft end, and are provided with electrical supplies through butt-type connectors attached to the pylon and launching shoe. Each missile can be jettisoned during an emergency through the operation of a No.1 Mk.1 ejection unit which secures the missile launching shoe to the pylon. The weapon fire control equipment operates in conjunction with AI23 and P.A.S. Mk.1. Details of the guided weapons, their component parts and the units of the weapon pack, along with installation instructions and servicing and operational data, are given in the Firestreak publications.

Operation

12. With the alighting gear retracted

and the armament master selector set to G.W., operations of the firing trigger on the control column handle will feed a supply via the contacts of the selector relay and the R.B. master relay to energize the firing relay and thus initiate the firing cycle of the weapons.

Pairs/singles selector switch

13. The setting of the pairs/singles switch, located forward of the auxiliary warnings panel, determines whether one or both missiles are to be fired. If the singles position is selected, the missile which senses the greater amount of infra-red radiation will be released.

Arming switch

14. This switch is fitted adjacent to the pairs/singles switch on the auxiliary warnings panel. When moved to the ARMED position, it directs a supply to the hydraulically-driven alternator which supplies power for the fire control units in the missile pack. It also provides power for the missiles electronic control equipment, and energizes an electro-pneumatic tap in the missile cooling air system during the arming period.

Arming indicator

15. The arming indicator, located forward of the arming switch, will light when the arming switch is moved to ARMED, and will remain lit for two minutes, during which period the missiles cannot be fired. This interval is required to allow the missile electronic equipment and gyros to warm up and become stabilized. The indicator fulfils a secondary purpose in that when the arming switch is set to armed, intermittent operation gives warning of alternator failure, or that the last missile has been fired.

Armed time indicator

16. This indicator registers the elapsed armed time from the moment the arming switch is moved to ARMED. The functioning of the indicator is described in Sect.7, Chap.2.

Armed indicator lamp

17. Fitted just under the armed time indicator is a small blue shrouded lamp which is lit throughout the period of armed time. When this has elapsed, the indication will change from a steady light to a flashing one. The arming switch should then be set to the OFF position.

Fire control reset switch

18. Whenever a period of armed time has elapsed, either on the ground during servicing, or during flying operations, the system may be returned to normal by operation of the fire control reset switch on the starboard console panel.

Emergency jettison

19. Each missile launching shoe is secured to the pylon by a No.4, Mk.1 ejector release unit which is actuated by an integral electrically-fired cartridge. The circuit is controlled by a ◀ push switch, Type 2PBN6T, incorporated in the ventral tank jettison handle. ▶

Rocket projectiles

General

20. The rocket pack is provided as an alternative to either the guided missile pack or the gun pack, and is interchangeable as a complete unit. The pack provides for the loading of forty-five 2-inch rockets *(Re-arming instructions - A.P.101B-1001-1A, Sect.5, Chap.2)* grouped in two banks and arranged in multi-cell launchers which are extended or retracted hydraulically. Firing of the rockets takes place through ripple firing units, which are located along with their associated fuse and resistance units, on a shelf platform in the top side of the pack. The rocket circuit is arranged to operate in conjunction with the G90 camera, P.A.S., and camera recorder circuits. The rocket projectiles are described in A.P.2802A, and their installation on the aircraft in Book 1, Sect.5.

Operation

21. With the alighting gear retracted and the armament master selector at R.B., operation of the firing trigger connects a supply, via the contacts of the selector and R.B. master relays, to the firing relay. Operation of the firing relay energizes a hydraulic selector valve in the rocket pack ◀ through the extend/retract relays. As ▶ the multi-cell launchers commence to extend, two microswitches attached to the launcher door jacks close to complete the circuit to the launchers not locked up warning lamp on the auxiliary warnings panel. On reaching the fully-extended position, the launchers operate

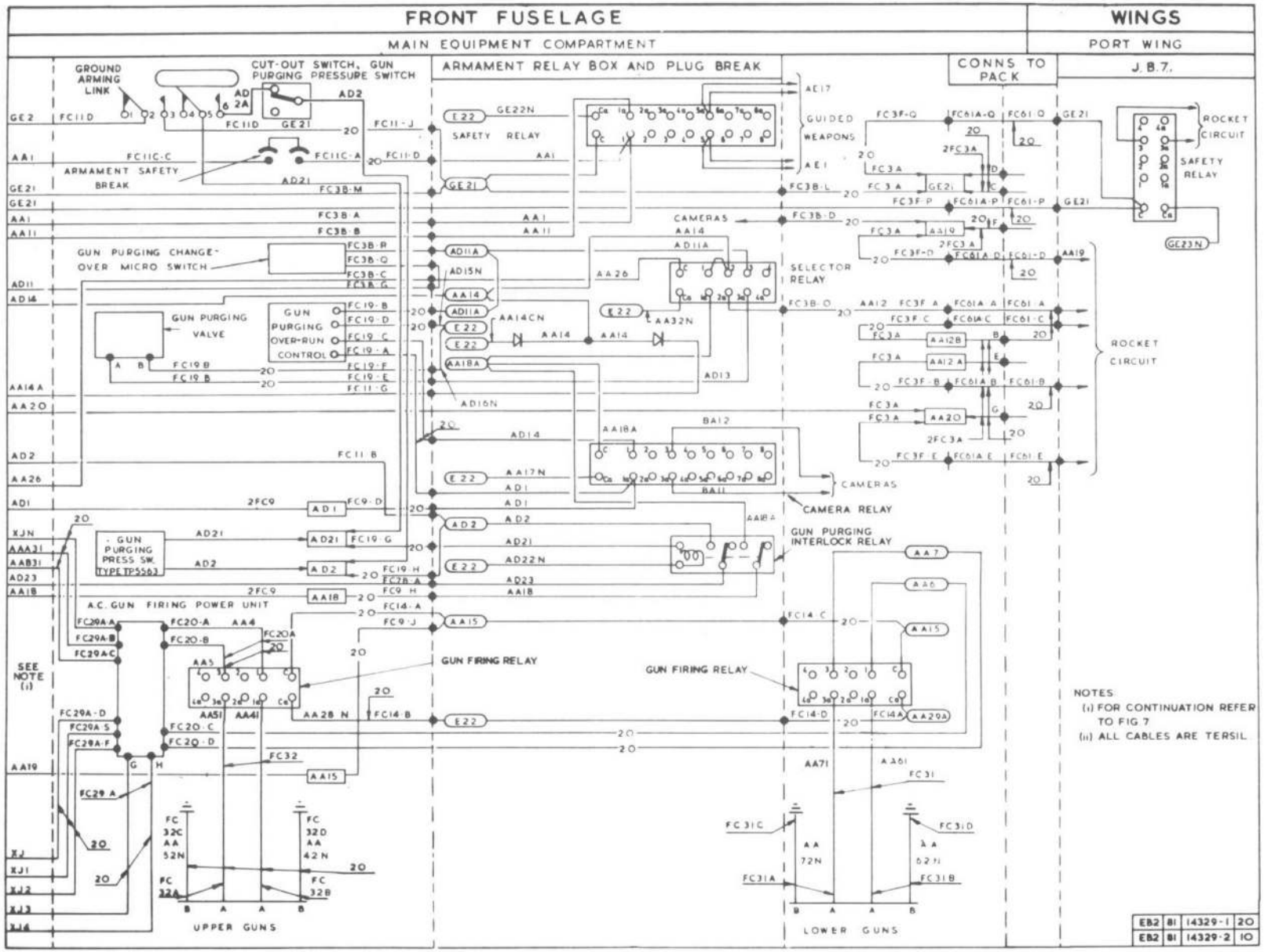

FIG. 7B. GUN FIRING (POST MOD. 2419)

◀ MINOR AMENDMENTS ▶

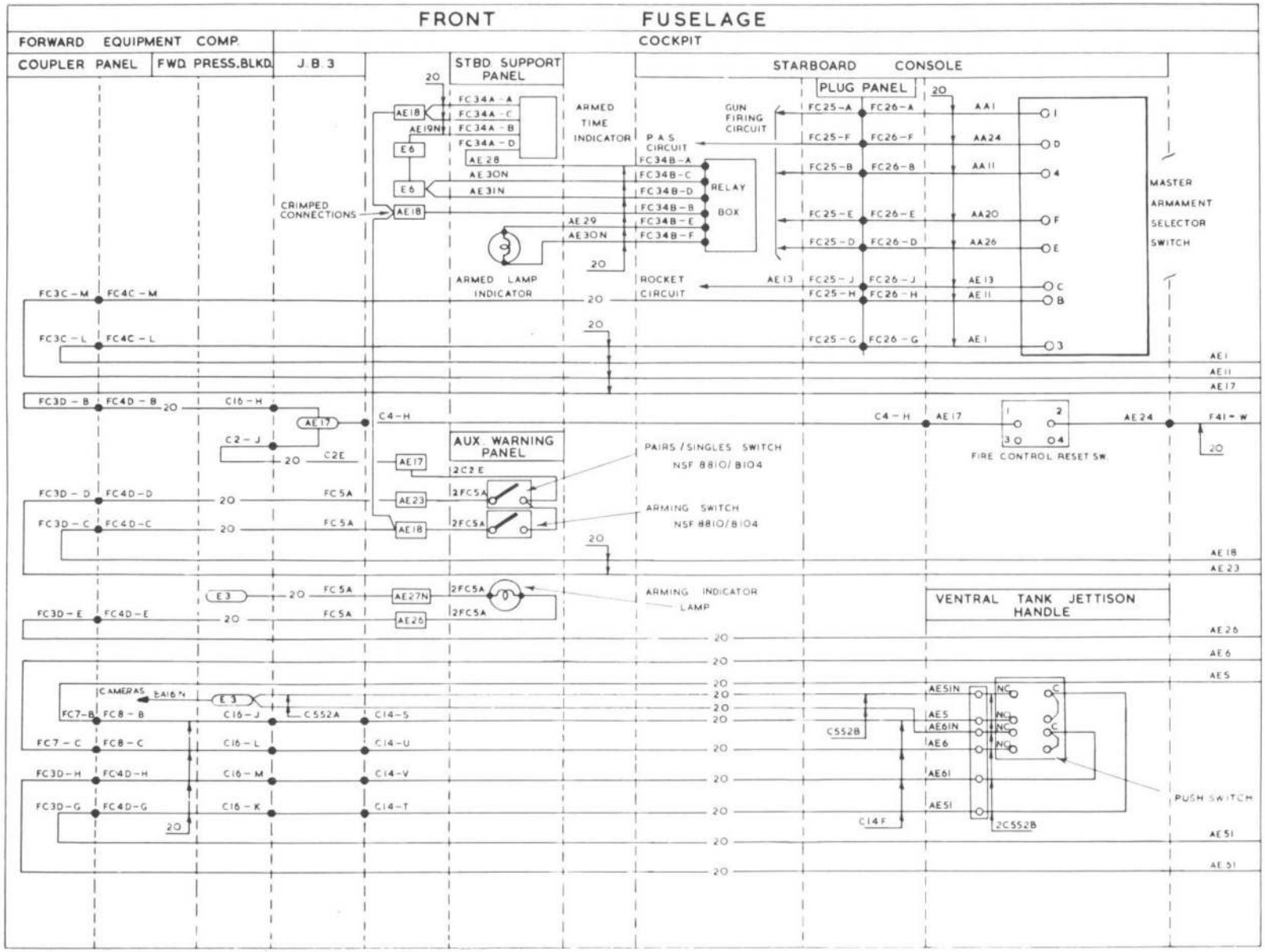

FIG. 8. GUIDED WEAPONS

◄ MINOR AMENDMENTS ►

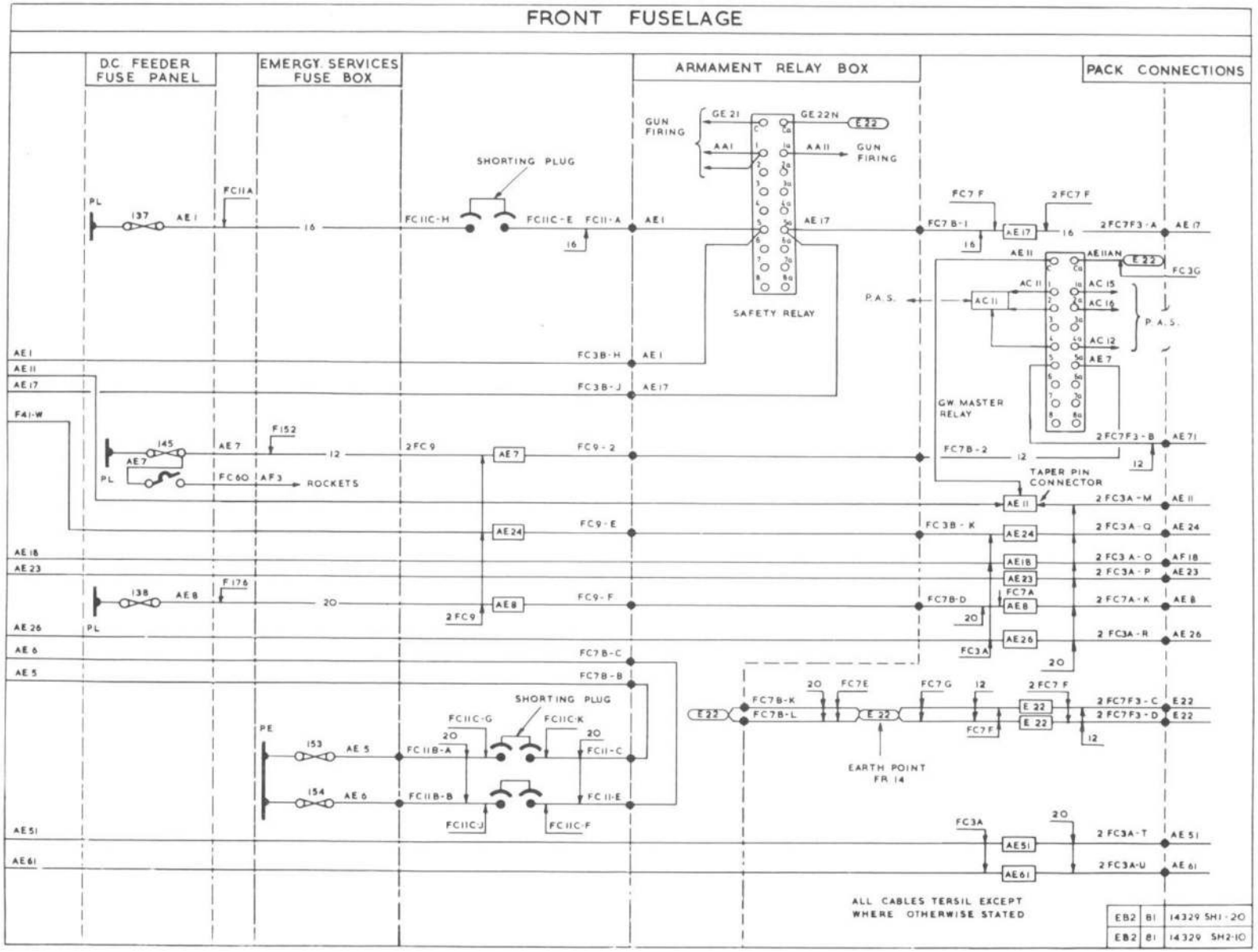

FIG. 8A. GUIDED WEAPONS

◀ MINOR AMENDMENTS ▶

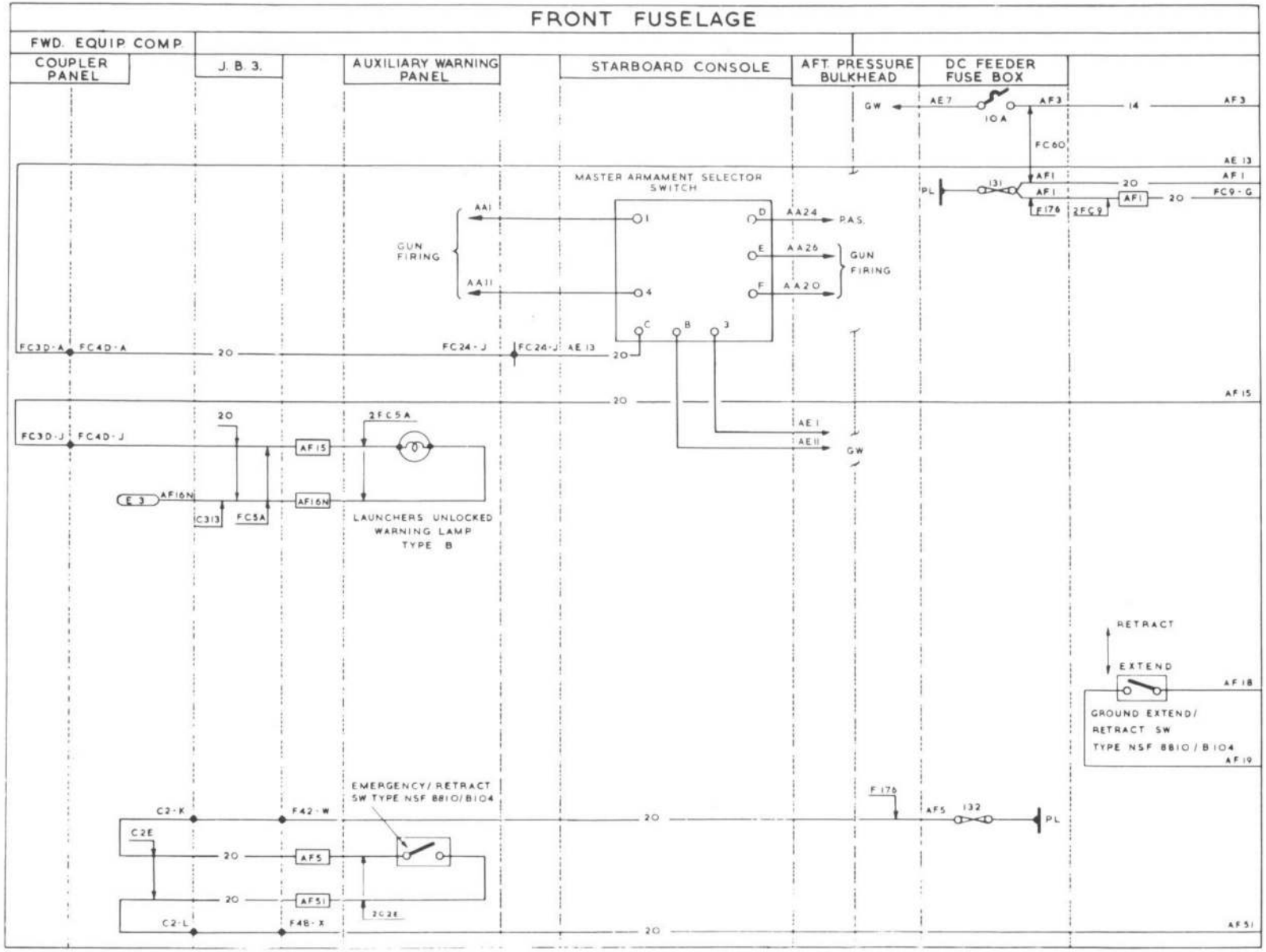

FIG. 9. ROCKET FIRING

◄ MINOR AMENDMENTS ►

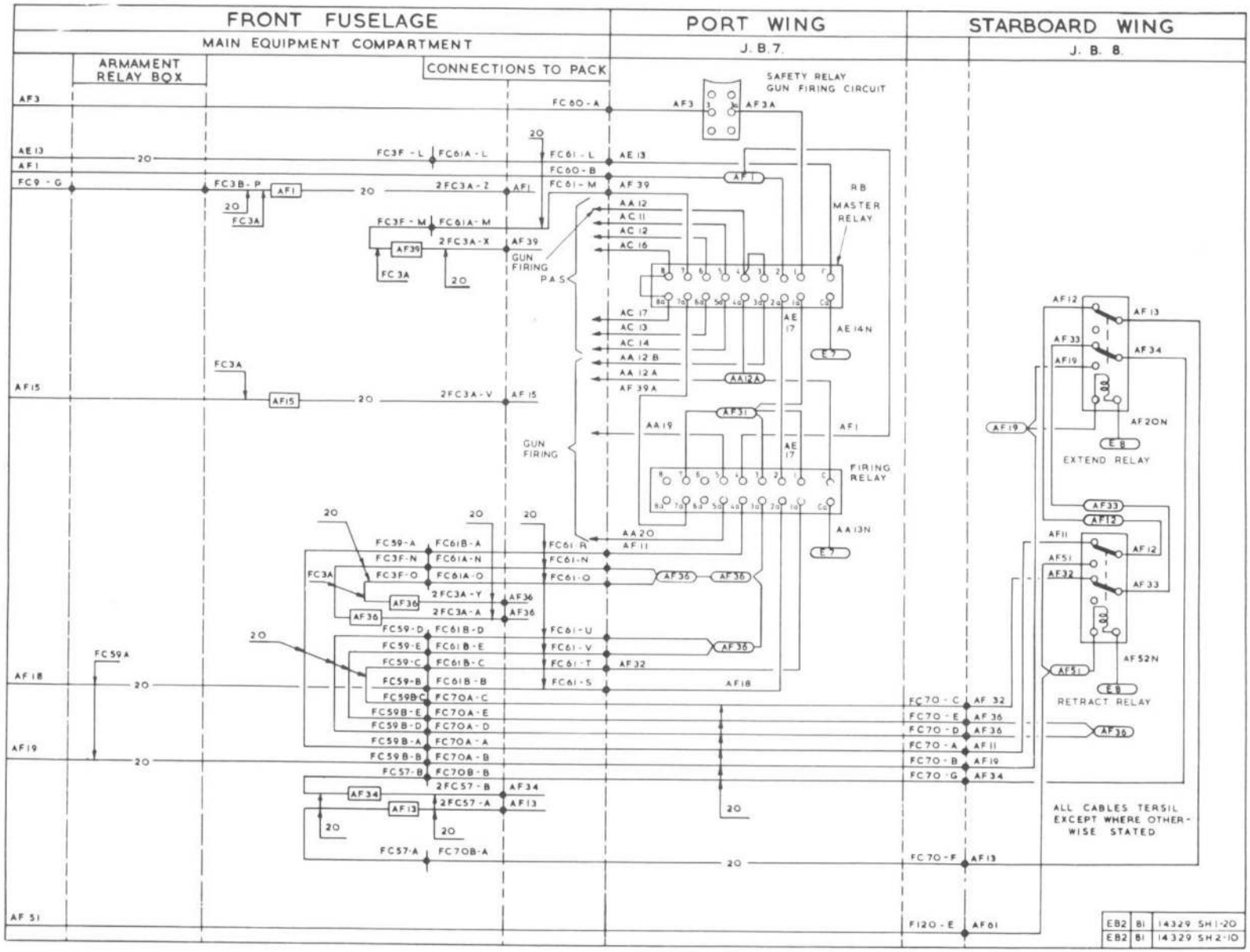

FIG. 9A. ROCKET FIRING

◀ MINOR AMENDMENTS ▶

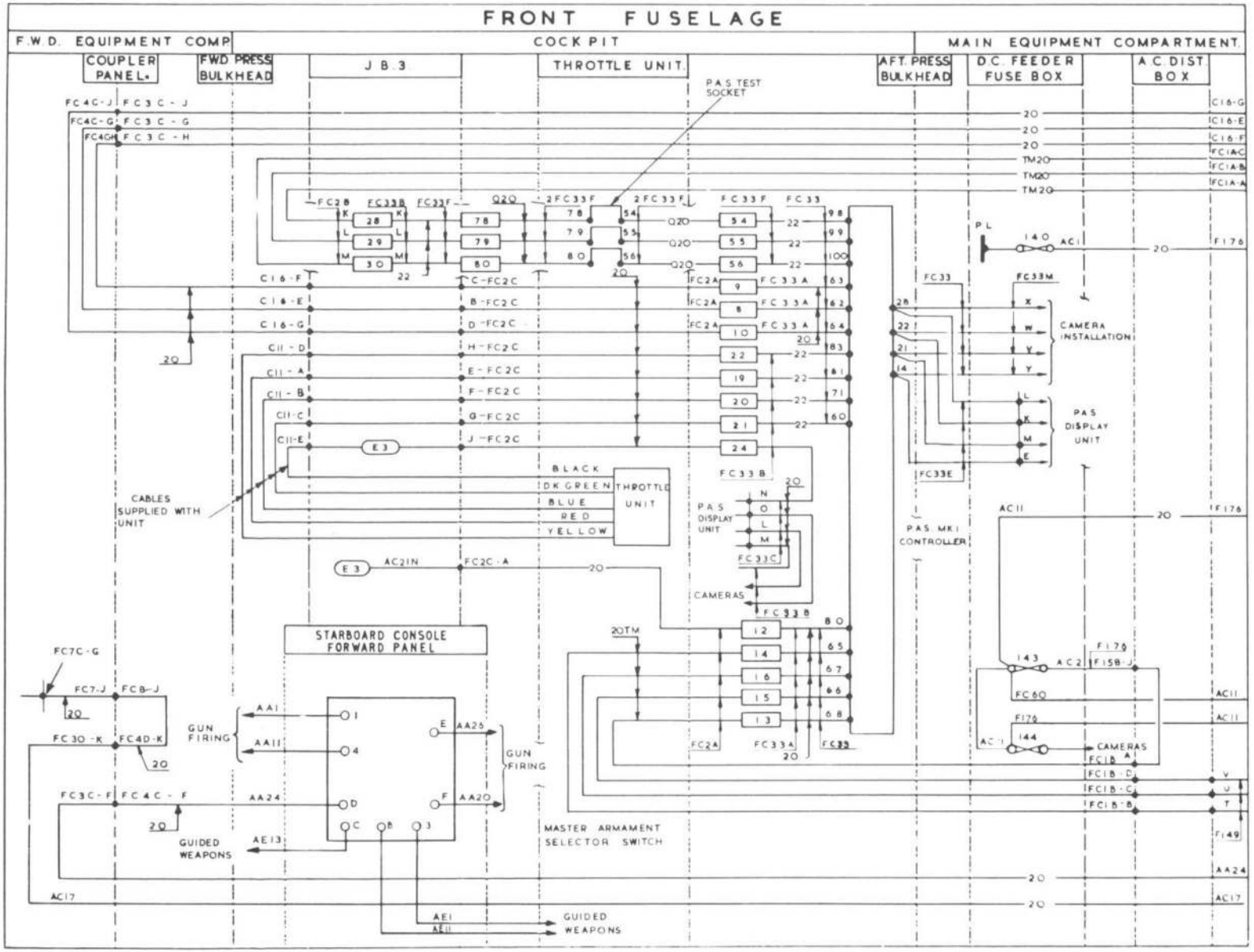

FIG.10. P.A.S.

◄ MINOR AMENDMENTS ►

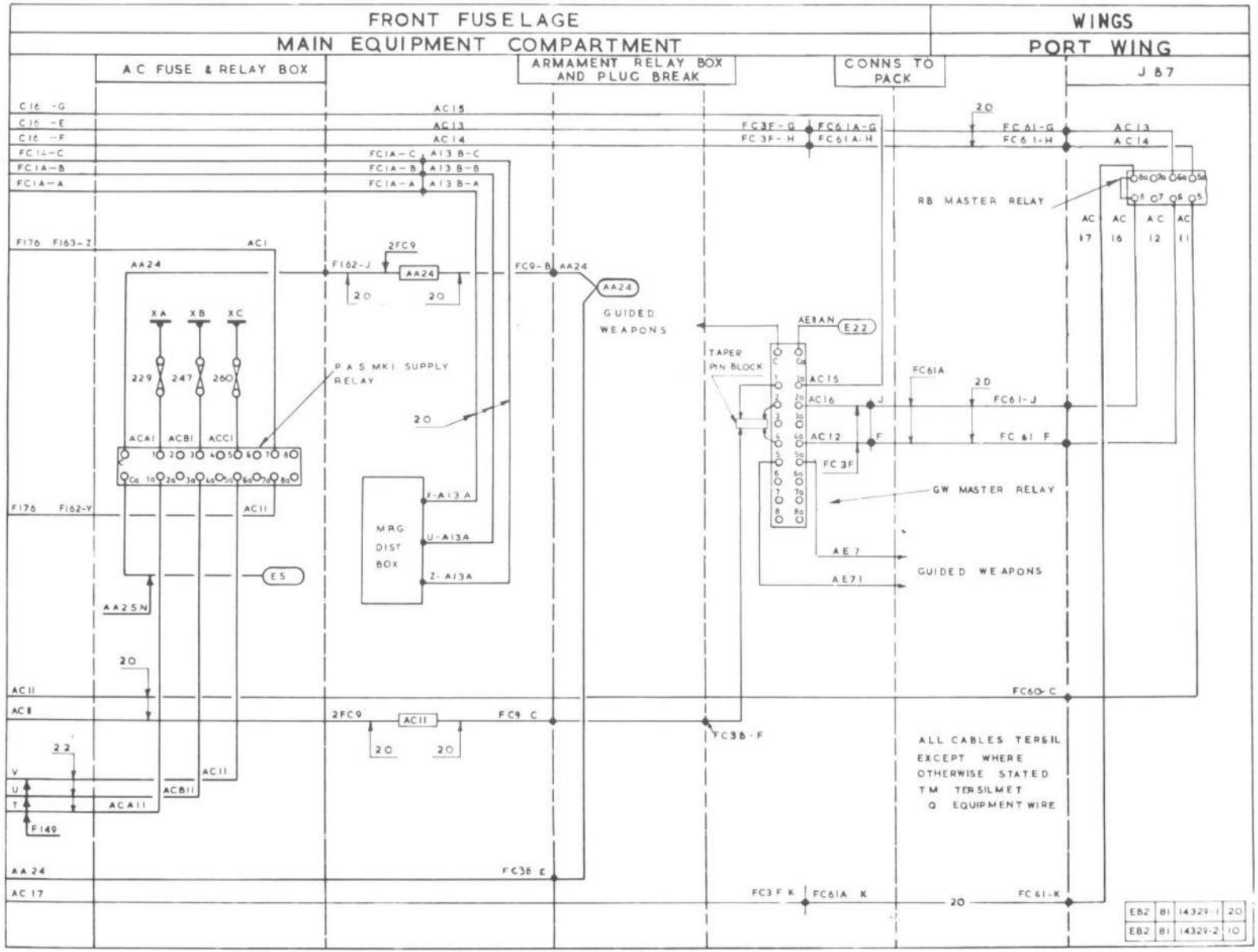

FIG. 10A. P.A.S.

◄ MINOR AMENDMENTS ►

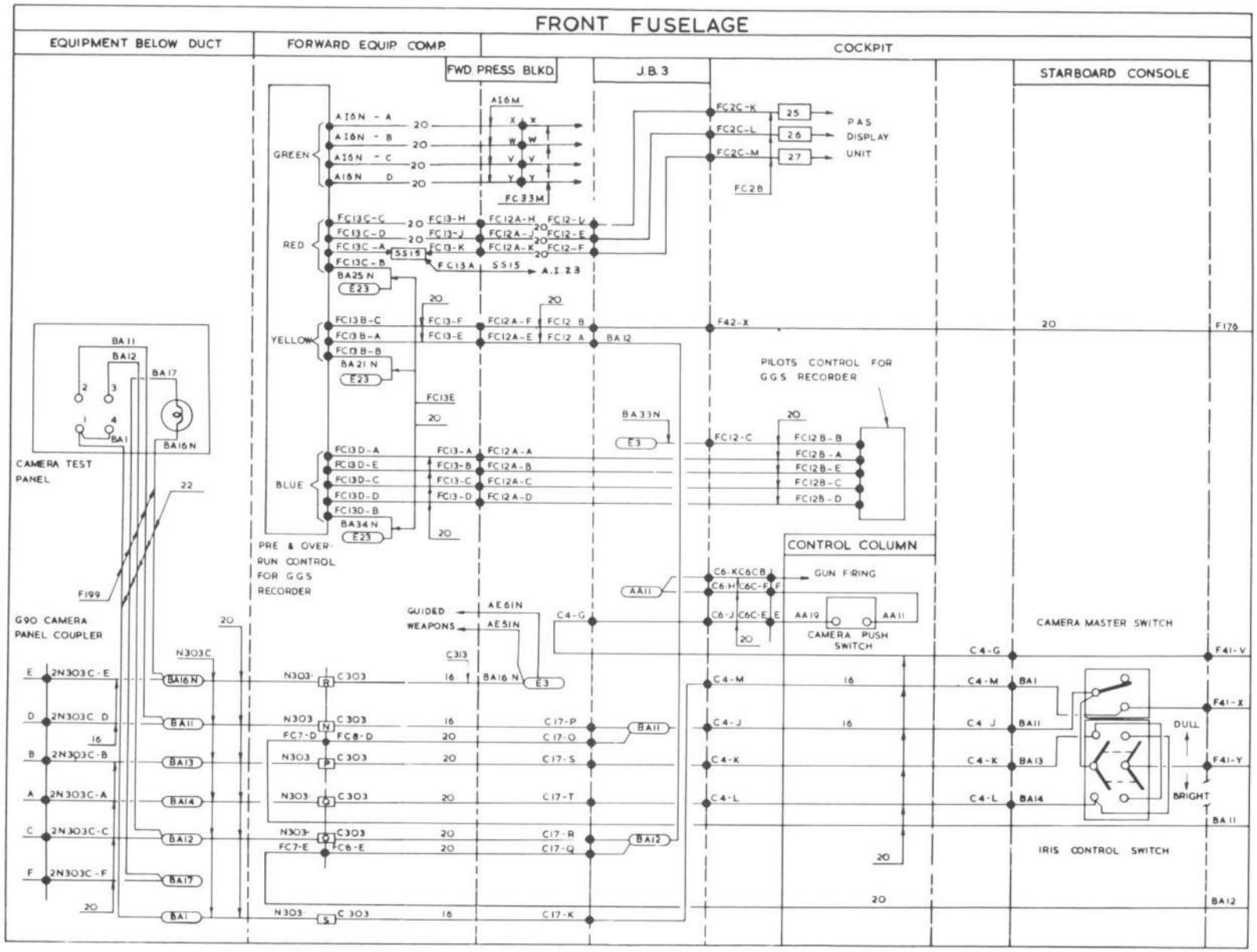

FIG. 11. CAMERA INSTALLATION

◀ MINOR AMENDMENTS ▶

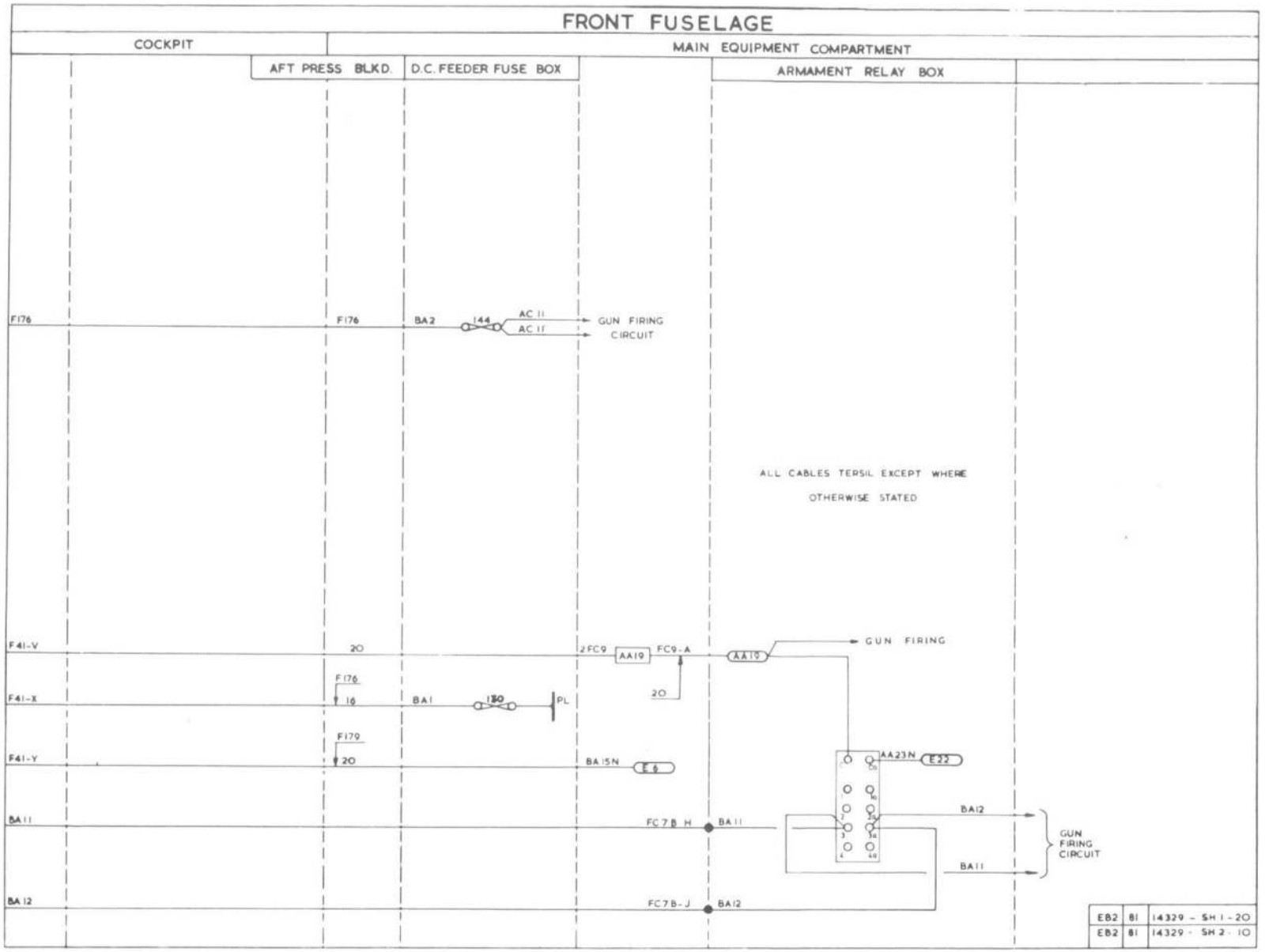

FIG. 11A. CAMERA INSTALLATION

◀ MINOR AMENDMENTS ▶

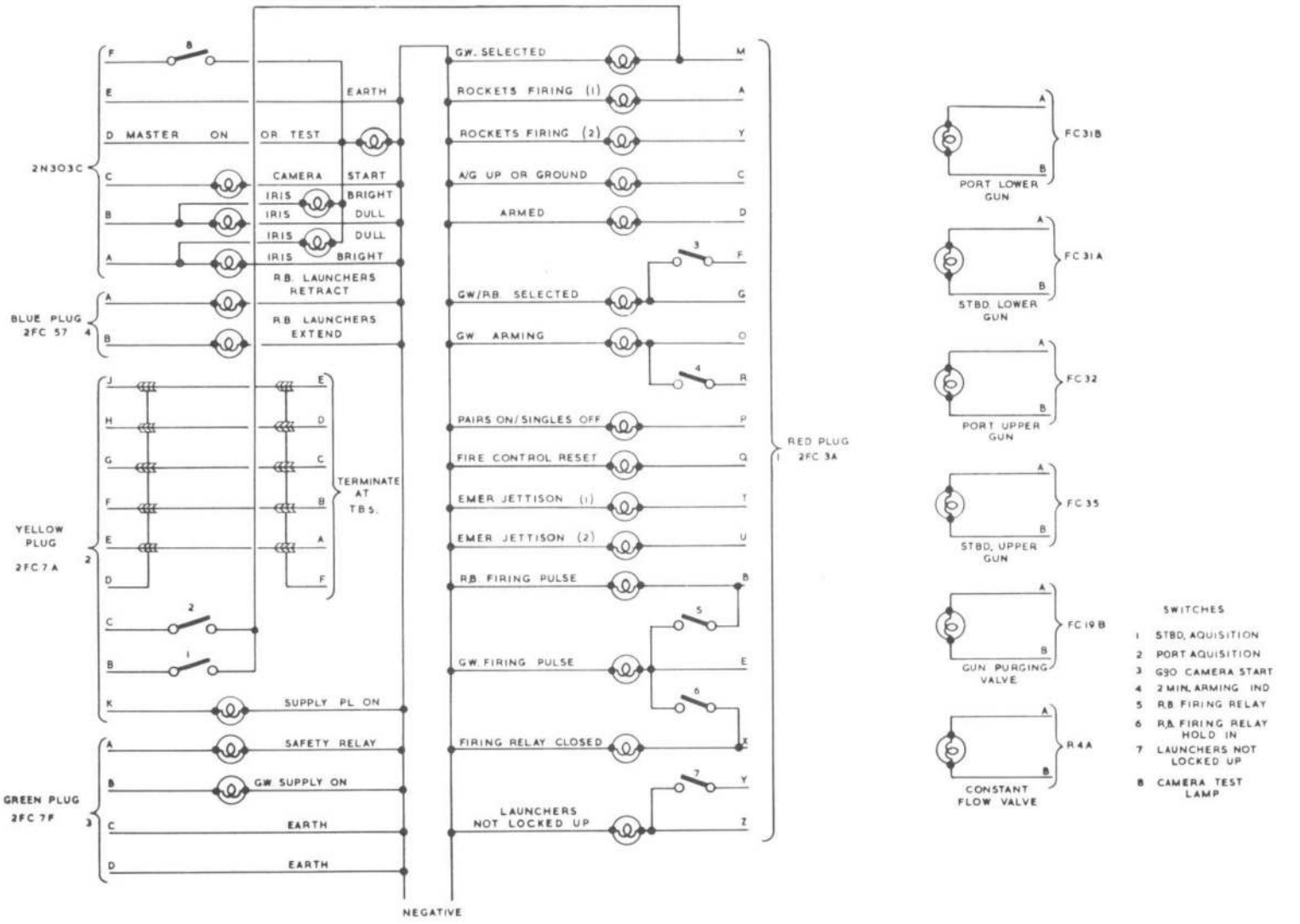

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FIG.12. PACKS SIMULATOR-TEST RIG

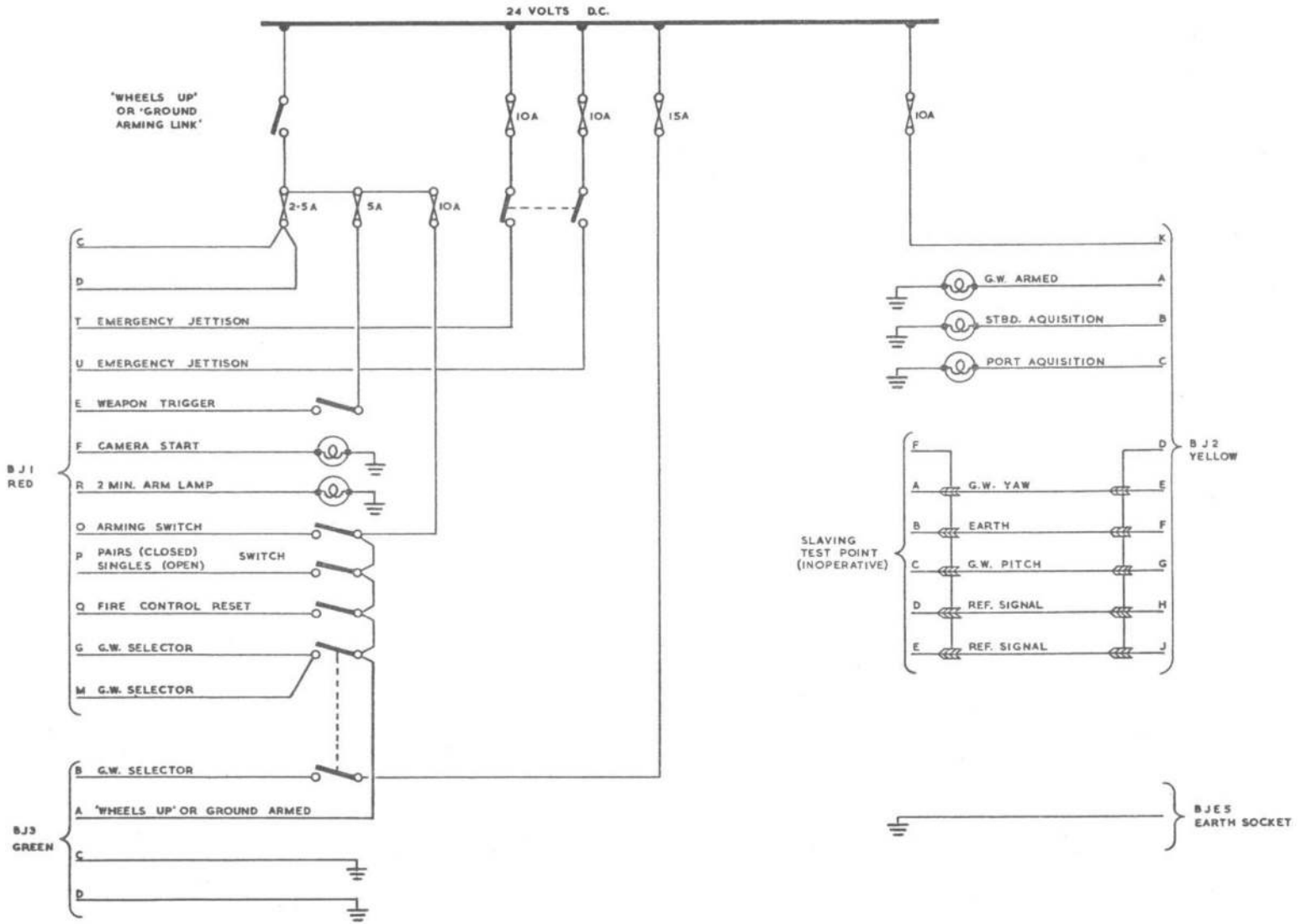

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FIG.13. GUIDED WEAPONS PACK – TEST RIG

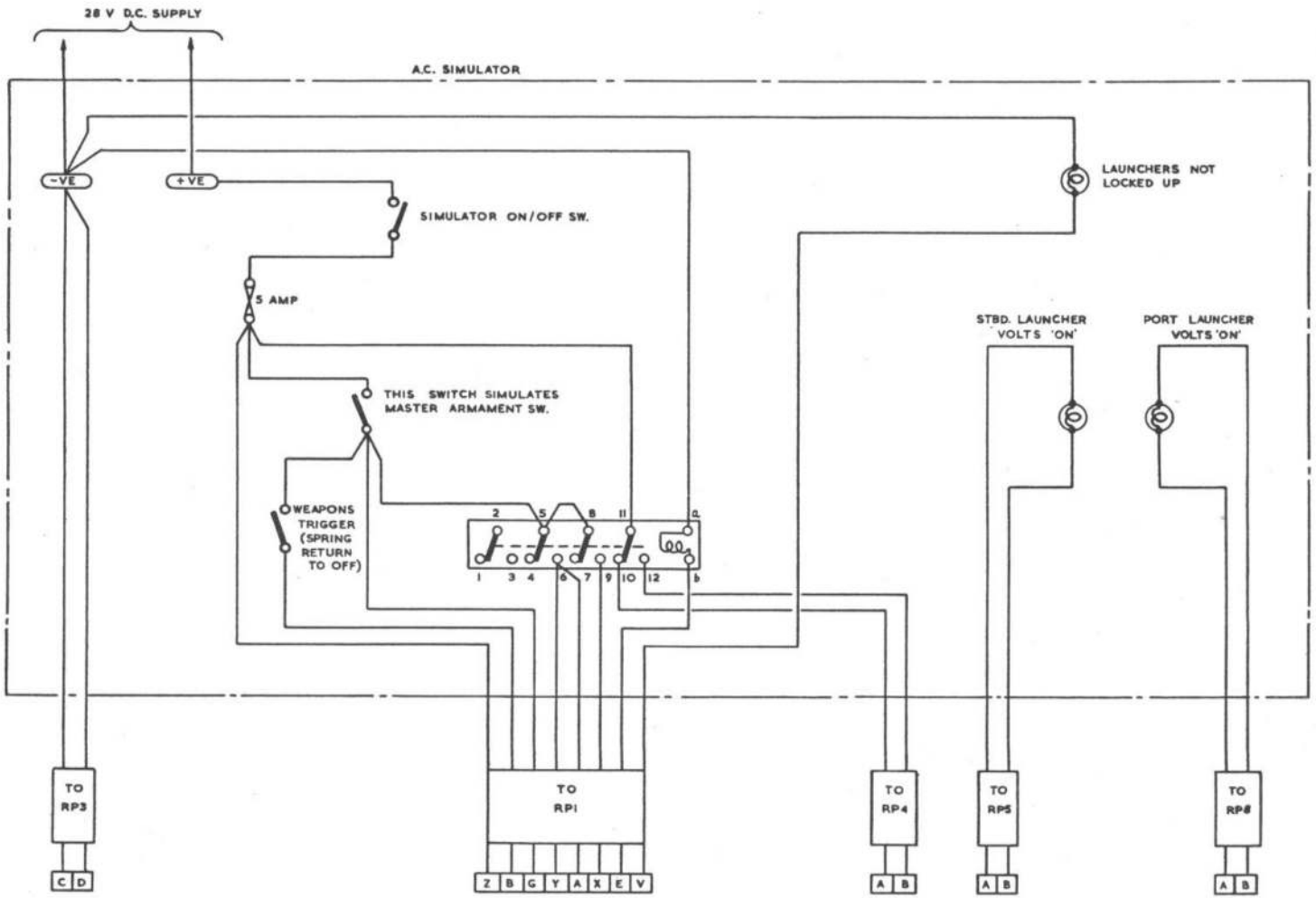

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FIG.14. ROCKET PACK - TEST RIG

two additional microswitches which are connected in series. Contacts 2-3 close to supply both ripple firing units to initiate the firing of the rocket salvoes, whilst contacts 5-6 close to supply the motor of the time delay unit, which ensures that the launchers remain open for two seconds after the last salvo has been fired. Contacts CC1 in the time delay unit will then open, to break the hold-in circuit to the firing relay. A Type 2 relay is included in the pack circuit to ensure unicyclic operation of the time delay system. Opening of the firing relay energizes the relevant winding of the hydraulic selector valve via the extend/retract relays. As the launchers are retracted, the time delay switch and Type 2 relay are de-energized, and the control system is reset.

Ripple firing units

22. The ripple firing unit provides a method of controlling the firing of up to twelve rocket salvoes and is fitted to the aircraft just prior to take-off. It is to be removed as soon as possible after an aircraft lands with a loaded launcher. The unit acts as an additional circuit safety break, and full advantage must be taken of this aspect of the device.

Emergency retract switch

23. The EMERGENCY/RETRACT switch located on the auxiliary warnings panel is for use when the rocket launchers fail to retract in a normal manner during the firing cycle. Indication of this condition is by the launchers not locked up warning lamp remaining lit.

Ground extend/retract switch

24. Normally the rocket firing circuit is inoperative with the alighting gear DOWN push-switch depressed. During servicing, this safety measure can be over-ridden by operating the ground EXTEND/RETRACT switch located on the armament safety-break panel at the port side of the fuselage (25P).

P.A.S. supplies

25. Both the a.c. and the d.c. supplies required for the operation of the attack sight are taken from the aircraft's normal systems via the contacts of a P.A.S. supply relay, Type S3, housed in the a.c. fuse and relay box. Control of the relay is through the ARMAMENT MASTER SELECTOR switch in any of its weapon positions. The attached camera recorder receives its supply through the attack sight unit. Details of the P.A.S. installation are given in Sect.7, Chap.2.

Camera supply

26. The G90 camera housed in a compartment at the base of the radar bullet pylon, recieves its supply via a six-pole socket which mates with a coupler plug fitted on a bracket on the aft face of frame 3 in the nose wheel bay. The circuit is primarily controlled by a CAMERA MASTER switch on the starboard console. Two camera relays, Type 20B housed in the armament relay box are included in the circuit, one being energized from the guns circuit, and the other from the R.B. or G.W. circuits. Selection of the camera master switch provides a d.c. supply to pin D of the camera, and the operation of either of the two relays, starts up the camera motor. The camera may also be operated from the camera push-button on the control column handle. The camera installation is described in Sect.7, Chap.2.

SERVICING

◀ **WARNING**

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cockpit or performing any operations upon the aircraft. ▶

General

27. Equipment units and cables should be inspected periodically for signs of damage, overheating, and insecurity.

FUNCTIONAL TESTS

Note...

In addition to the normal operational and continuity checks, the following tests should be made at the intervals laid down in Vol.5 of this publication, or whenever any major component of the system has been repaired or renewed.

Aircraft wiring and controls

Equipment

28. Packs simulator test rig.

Ground supply trolley (a.c. and d.c.)

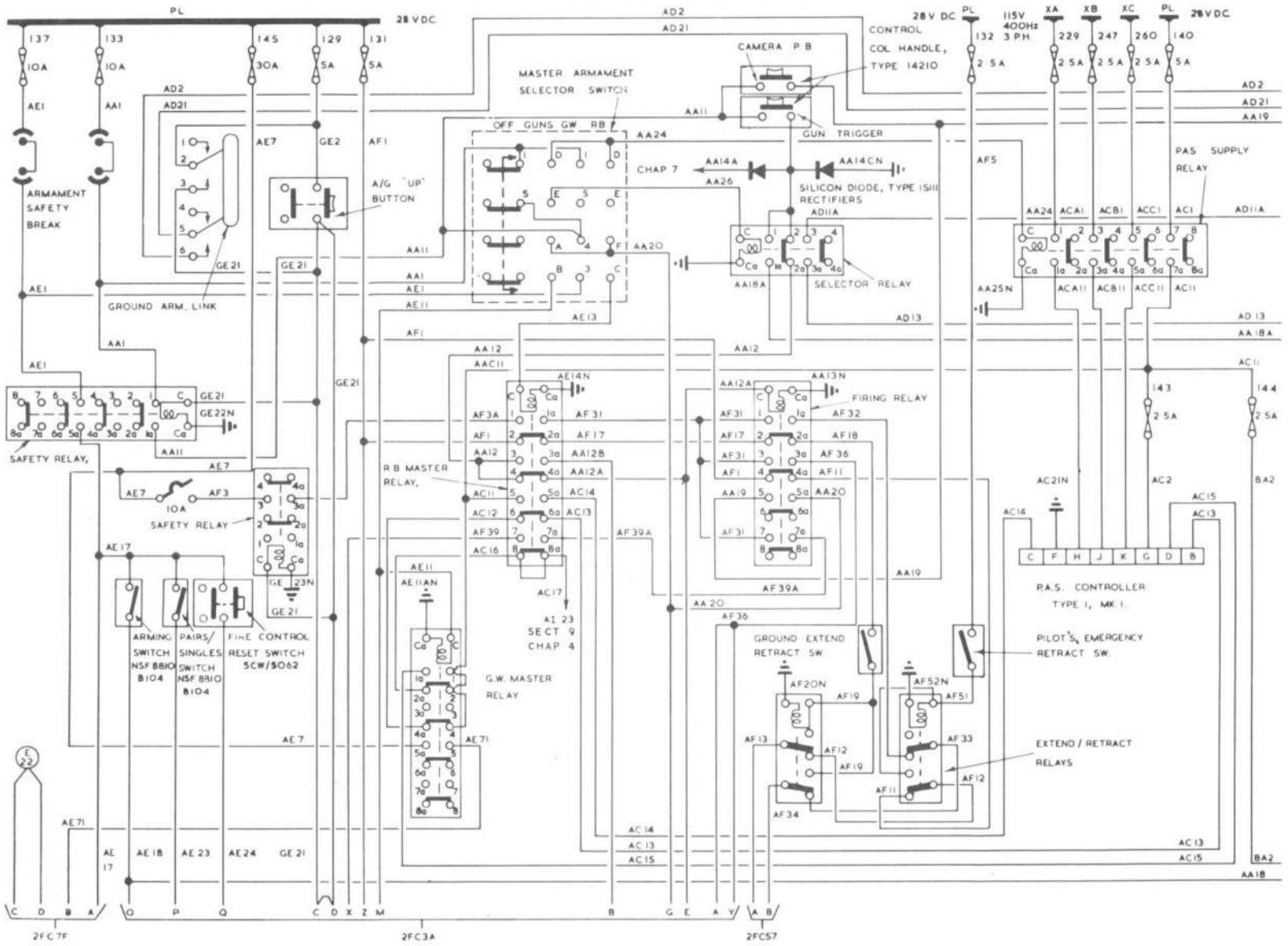


FIG. 3. ARMAMENT INSTALLATION (PRE. MOD. 2419)

◀ MINOR AMENDMENTS ▶

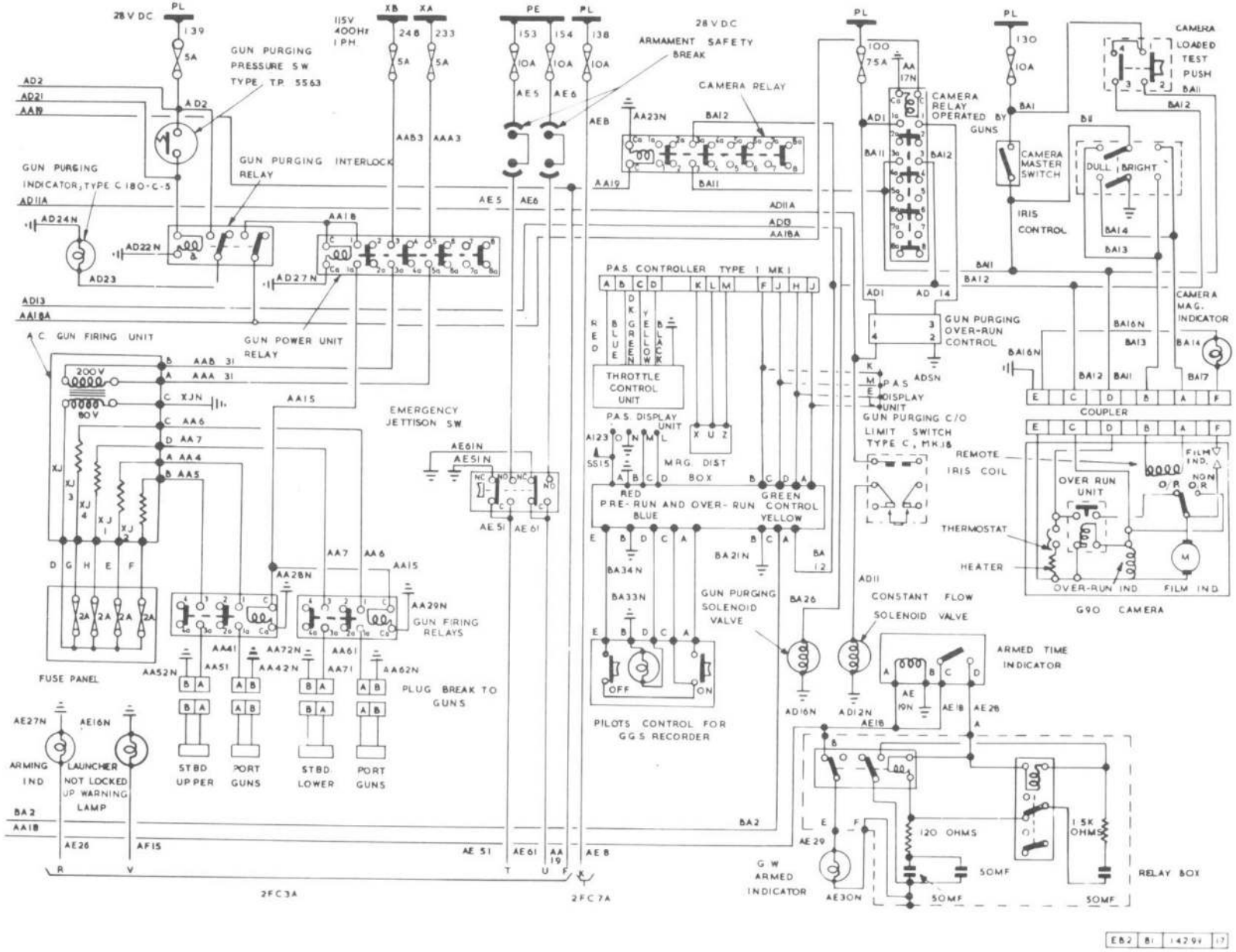


FIG.3A. ARMAMENT INSTALLATION (PRE. MOD. 2419)

◀ MINOR AMENDMENTS ▶

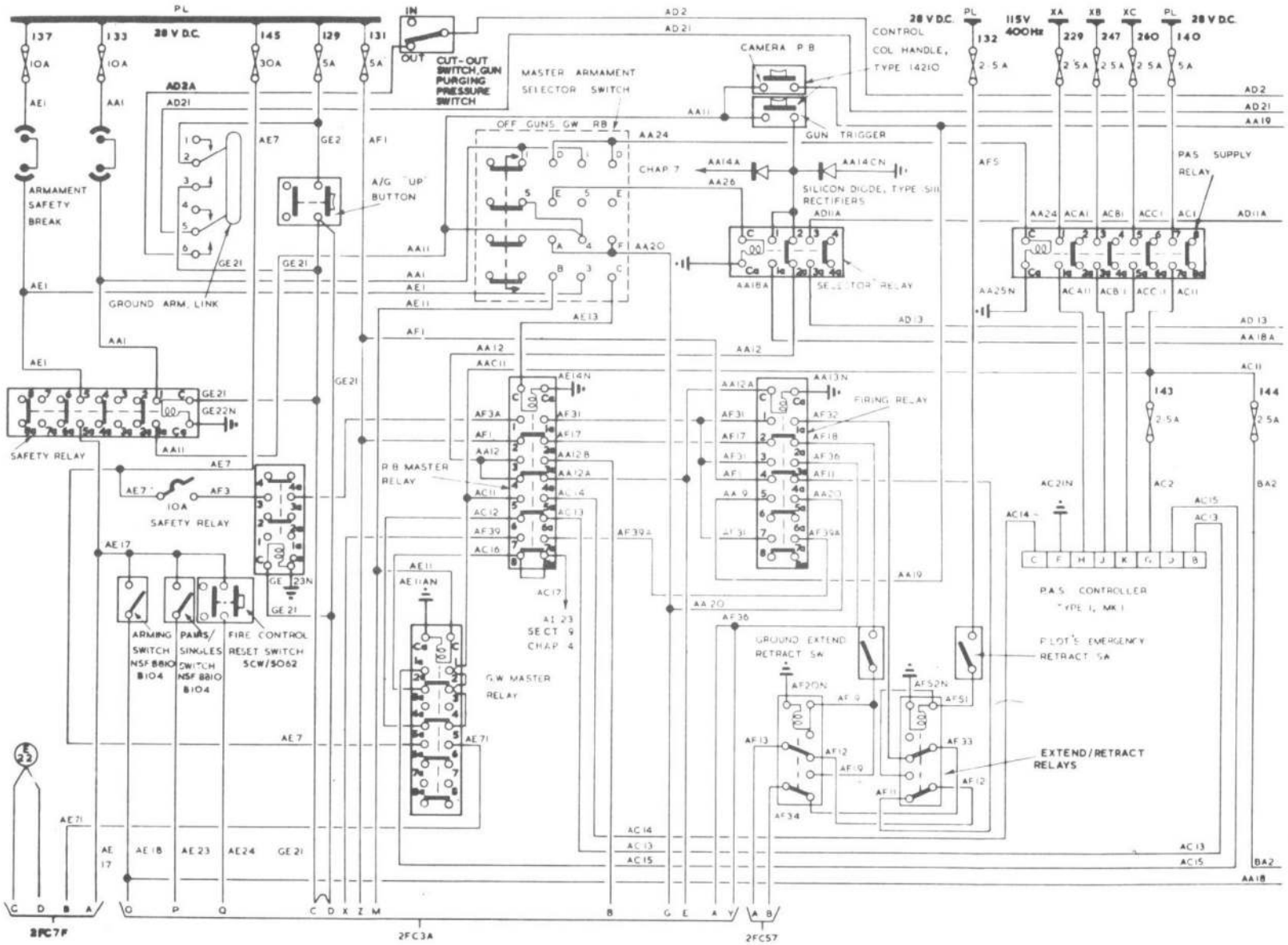


FIG. 3B. ARMAMENT INSTALLATION (POST MOD. 2419)

◄ MINOR AMENDMENTS ►

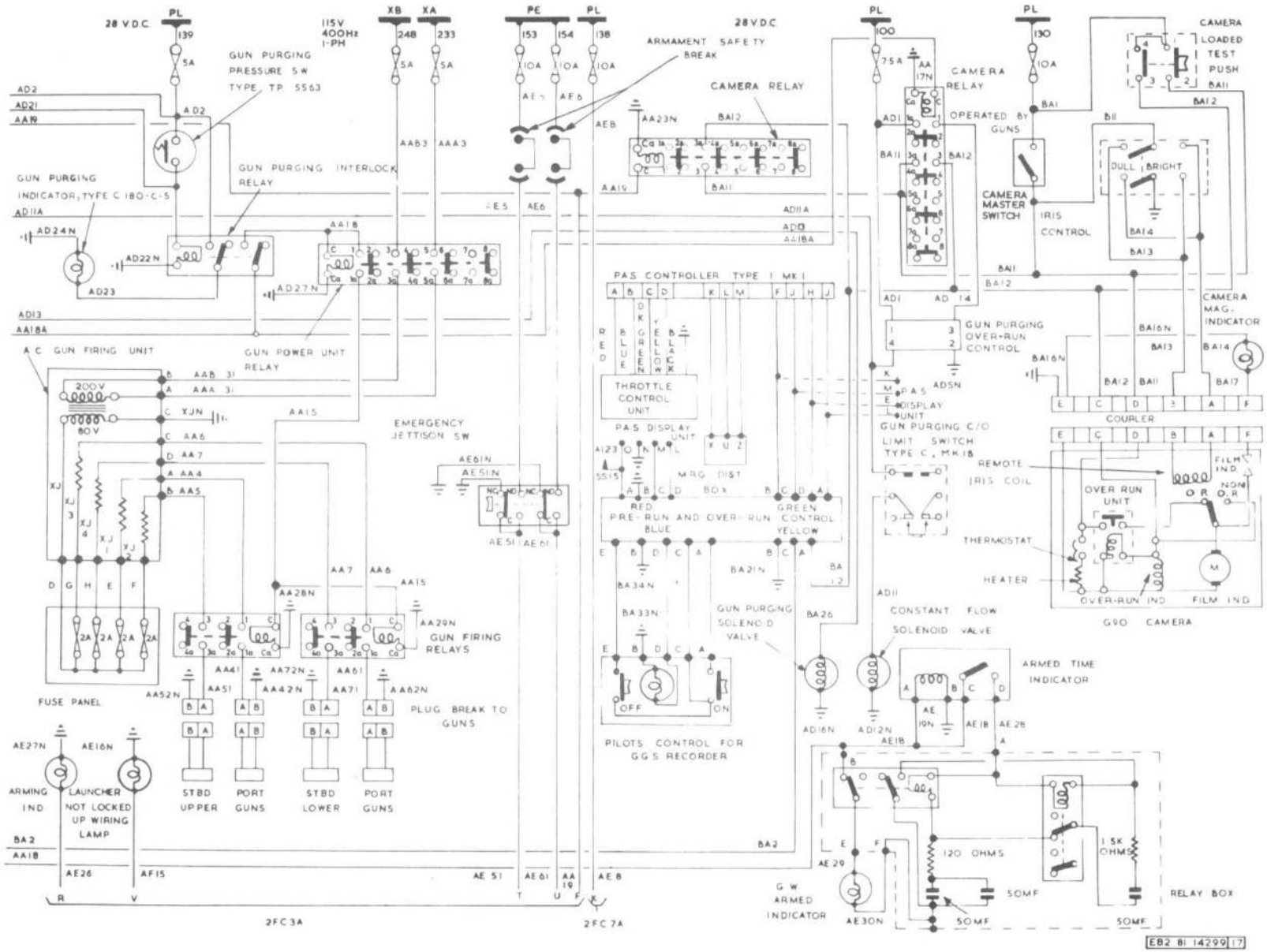


FIG. 3C. ARMAMENT INSTALLATION (POST MOD. 2419)

◄ MINOR AMENDMENTS ►

Preparation

29.

(1) Aircraft should have no ventral tank fitted and should be jacked clear of the ground.

(2) Connect the pack simulator test rig to the aircraft as indicated on fig. 12.

(3) Ensure that the armament safety-break is DISCONNECTED.

(4) Ensure that the ground arming link is NOT fitted.

(5) Ensure that the switches in the aircraft are set as follows:-

Group A	Alighting gear selector	- DOWN
	Ground extend/retract switch	- RETRACT
	Engine start master switch	- OFF
Group B	Camera master switch	- OFF
	Camera magazine test button	- OFF (spring bias)
Group C	Armament master selector	- OFF
	Emergency jettison	- OFF (spring bias)
Group D	G.W. arming switch	- OFF
	Pair/singles switch	- SINGLES
	Fire control reset switch	- OFF (spring bias)
	Emergency retract switch	- OFF
	Camera start button	- OFF (spring bias)
	Firing trigger (spring bias & safety catch)	- OFF
	Armed time indicator	- ZERO
	Camera iris control	- BRIGHT

(6) Ensure that all switches on the test rig are selected OFF.

(7) Check all armament circuit fuses for correct rating and serviceability.

(8) Connect the a.c./d.c. ground supply trolley and observe that the relevant warning lamps in the cockpit light, and that the following lamps on the test rig (and no others) are lit:-

(a) R.B. launchers retract - (fuse 131)

(b) Launchers not locked up - (fuse 131)

(c) Supply P.L. on - (fuse 138)

Note...

Whenever a fuse number appears after a lamp, the fuse should be removed to check that it breaks the circuit to the associated lamp.

Safety checks

30. The following safety checks should be carried out before commencing the functioning tests:-

(1) Check that the aircraft armament circuit is in the all safe condition.

(2) Operation of all switches in Group C and D *(para. 27 (5))* should produce no results, (except emergency retract).

(3) Operation of all switches on the test rig, except LAUNCHER NOT LOCKED UP switch, should produce no results.

(4) Connect the armament safety-break. Operation of all switches in Group D *(para. 27 (5))*, and operation to the ventral tank jettison handle, should produce no results, (except emergency retract).

(5) Repeat operation (3).

(6) Disconnect the armament safety-break and insert the ground arming link. The U/C up or ground armed lamps (fuse 129) on the test rig should light. Gun purging pressure indicator lamp on aircraft should light (fuse 139).

(7) Repeat operations (2) and (3).

(8) Select alighting gear DOWN. The U/C up or ground armed lamp on the test rig should go out.

Procedure

31.

(1) Ensure that all switches are in the positions stated in para. 27 (5) and (6).

(2) Connect the armament safety-break and insert the ground arming link. The safety-break lamp (fuse 137) and the U/C up or ground armed lamp (fuse 129) on the test rig, and the gun purging pressure warning lamp (fuse 139) in the aircraft should light.

Cameras

(1) Set the camera master switch to ON. The camera master on or test lamp

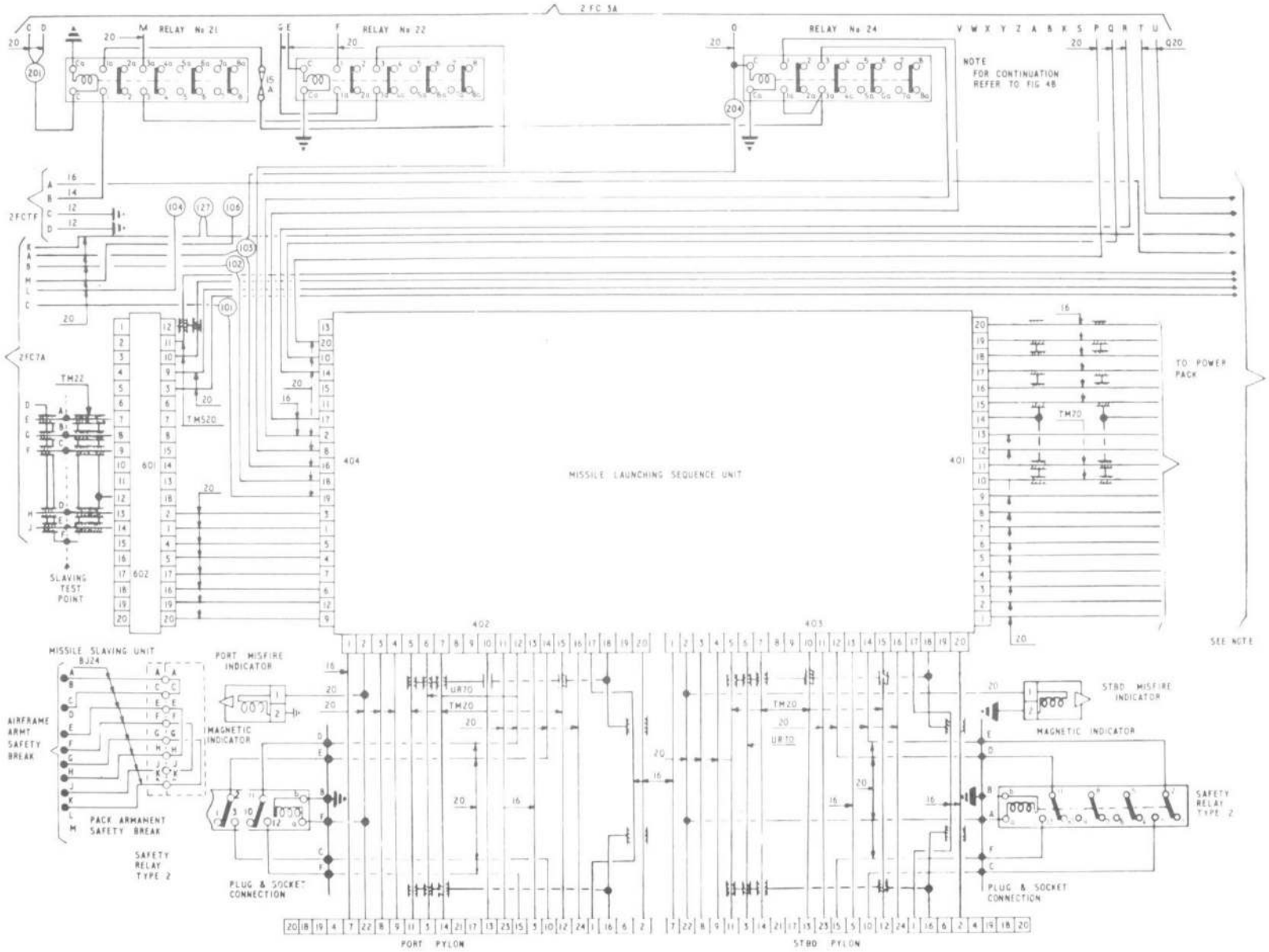


FIG. 4. GUIDED WEAPONS - PACK WIRING (PRE. MOD. 4617)

◀ MINOR AMENDMENTS ▶

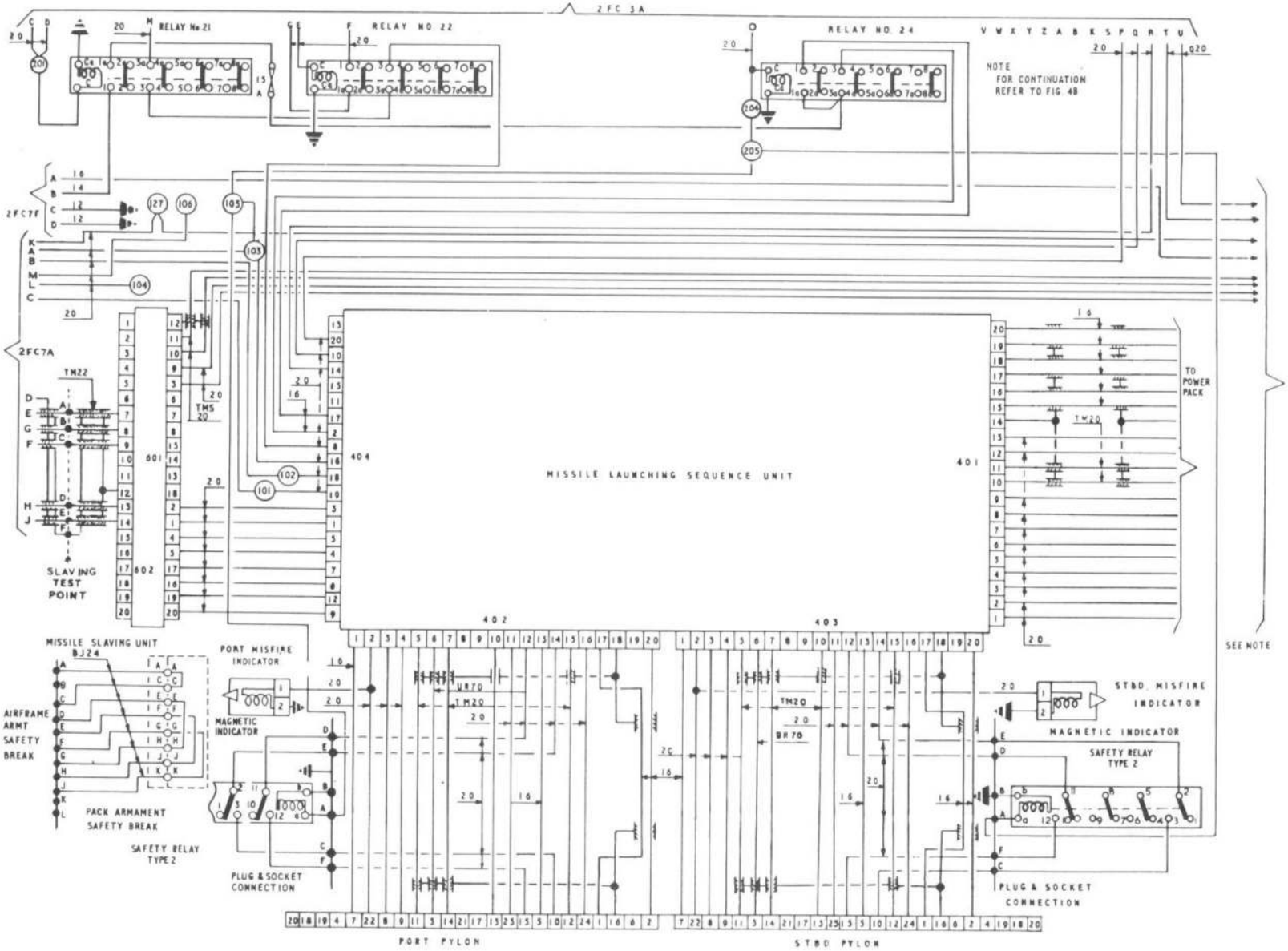


FIG. 4A. GUIDED WEAPONS - PACK WIRING (POST MOD. 4617)

◀ MINOR AMENDMENTS ▶

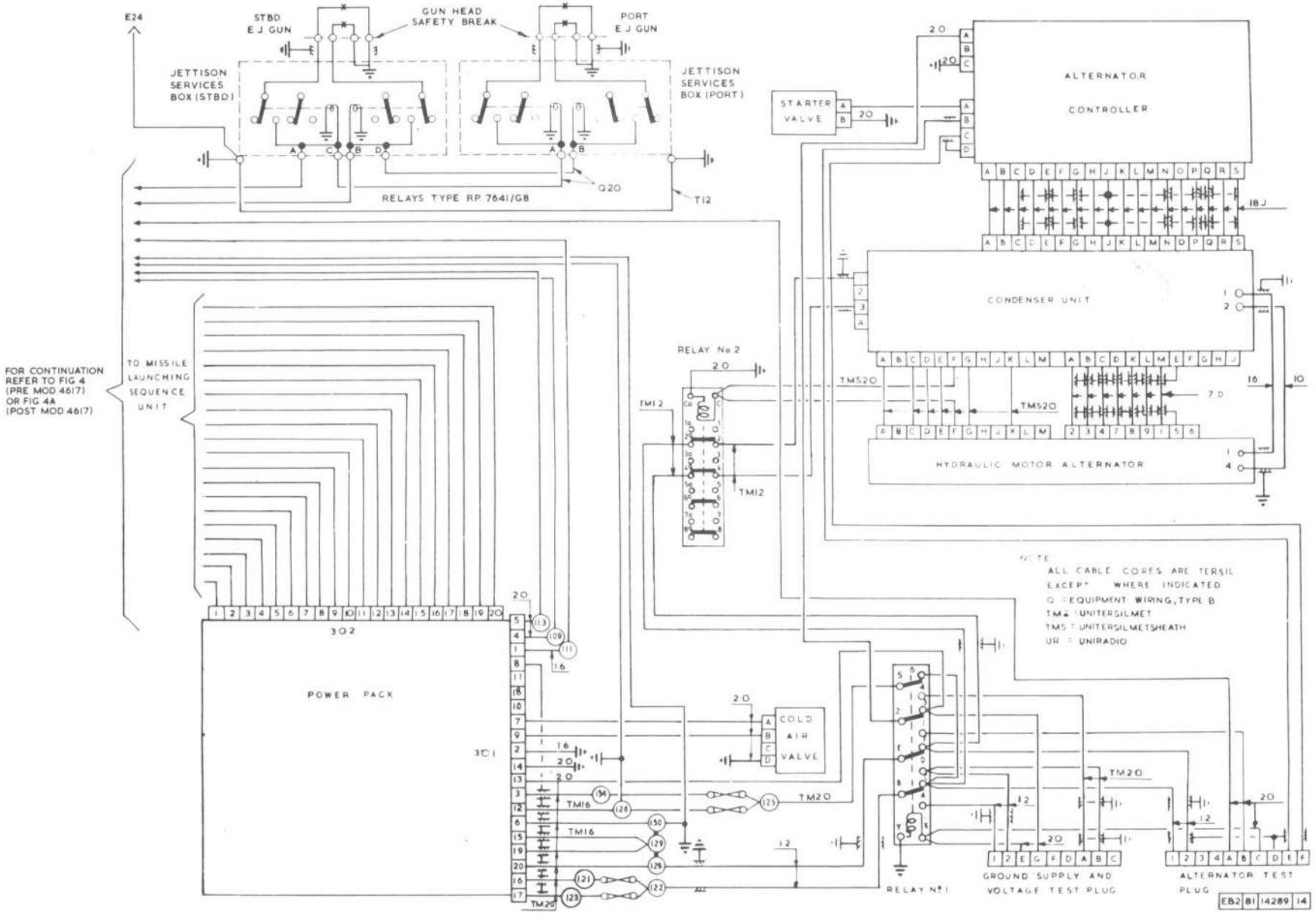


FIG. 4B. GUIDED WEAPONS-PACK WIRING

◄ MINOR AMENDMENTS ►

(fuse 130) and iris bright lamp (fuse 130) on the test rig should light.

(2) Set iris control switch to DULL. The iris dull lamps (fuse 130) on the test rig should light, and the iris bright lamps should go out.

(3) Operate the camera push-switch on the control column. The camera start lamp (fuse 133) on the test rig should light and remain lit as long as the button is depressed.

(4) Set the CAMERA TEST LAMP switch on the test rig to the ON position. The lamp in the forward wheel compartment should light.

(5) Operate the camera magazine loaded test button on the aircraft. The following lamps on the test rig should light, and remain lit while the test button is depressed - camera master on or test; iris bright; or iris dull.

Guns

(1) Set the armament master selector to GUNS.

(2) Select the gun purging switch to OUT - the gun purging indicator lamp should light. Select the switch to IN - the indicator should go out. Reselect the switch to OUT.

(3) Operate the firing trigger on the control column. All the gun lamps (fuses 133, 139, 233, 248) and the gun purging valve lamp (fuse 100) on the test rig should light.

(4) Operate the microswitch in the pack bay, frame 13-14 port side, using a suitable spigot, and repeat operation (3). The constant flow valve lamp on the test rig should also light.

(5) Release the firing trigger, all gun lamps should go out. The gun purging valve lamp and the constant flow valve lamp should remain lit for 2 seconds.

(6) Repeat operation (4). Release the firing trigger and immediately set the armament master selector to OFF. All gun lamps and the gun purging valve lamp should go out. The constant flow valve lamp should remain lit for 2 seconds.

(7) Set the armament master selector to GUNS, the camera master switch to ON, and repeat operation (3). The camera start lamp on the test rig should also light, and remain lit whilst the firing trigger is held.

(8) Set the camera master switch to OFF.

Guided weapons

(1) Set the armament master selector to G.W.

(2) Observe that the G.W. supply (fuse 145); G.W. selected (fuse 137); G.W./R.B. selected (fuse 133); and the R.B. launchers retract lamps on the test rig are lit.

(3) Operate the firing trigger, the G.W. firing pulse lamp should light while the trigger is held on, and the R.B. launchers retract lamp should go out during this period.

(4) Set the camera master switch to ON. The camera master on or test lamp on the test rig should light. Repeat operation (3). The camera start lamp should light, and remain lit while the firing trigger is held.

(5) Set the camera master switch to OFF.

(6) Set the PORT ACQUISITION switch on the test rig to ON. The port acquisition lamp in the pilot's attack sight should light.

(7) Set the STARBOARD ACQUISITION switch on the test rig to ON. The starboard acquisition lamp in the pilot's attack sight should light.

(8) Set the above switches to OFF. The associated lamps should go out.

Rockets

(1) Set the armament master selector to R.B. the G.W./R.B. selected lamp on the test rig should light.

(2) Operate the firing trigger on the control column handle. The R.B. firing pulse lamp on the test rig should light, and remain lit while the trigger is held.

(3) Set the R.B. FIRING RELAY switch on the test rig to ON, and operate the firing

trigger. The following lamps on the test rig should light:-

(a) R.B. firing pulse

(b) G.W. firing pulse

(c) R.B. launchers extend (fuse 145 and circuit breaker)

(d) R.B. firing relay closed (fuse 145 and circuit breaker)

(e) Rockets firing 1 (fuse 145 and circuit breaker)

(f) Rockets firing 2 (fuse 145 and circuit breaker)

and the R.B. launchers retract lamp should go out. The above conditions should prevail while the firing trigger is held.

(4) Set the R.B. FIRING RELAY HOLD-IN switch on the test rig to ON, and repeat operation (3). The lamps should remain lit when the firing trigger is released.

(5) Set the R.B. FIRING RELAY HOLD-IN switch to OFF. The lamps should go out.

(6) Repeat operation (4) and then set the armament master selector to OFF. The lamps should go out.

(7) Operate the firing trigger. The R.B. launchers retract lamp on the test rig should go out, and the R.B. firing pulse, G.W. firing pulse and the R.B. firing relay closed lamps should light. The R.B. launchers extend and rockets firing 1 and 2 lamps should remain out. Release the firing trigger. The R.B. launchers retract lamp should light.

(8) Repeat operation (4), and then set the pilot's emergency retract switch to RETRACT. The launchers extend lamps on the test rig should go out, and the launchers retract lamp should light (fuse 132).

(9) Set the armament master selector and the pilot's emergency retract switches in the cockpit to OFF. Set the R.B. FIRING RELAY HOLD-IN switch and the R.B. FIRING RELAY switch on the test rig to OFF. Set the ground extend/retract switch to EXTEND. The R.B. launchers extend lamp on the test rig should light, and the R.B. launchers retract lamp should go out (fuse 131).

(10) Set the switch to RETRACT. The retract lamp should light, and the extend lamps should go out.

(11) Set the LAUNCHERS NOT LOCKED switch on the test rig to ON. The launchers not locked up warning lamp in the aircraft should light. Set the switch to OFF. The lamp should go out.

(12) Set the pairs/singles switch in the aircraft to PAIRS, the pairs lamp on the test rig should light (fuse 137). Return the switch to SINGLES, and the lamp should go out.

G.W. Arming circuit

(1) Set the fire control reset switch to RESET. The reset lamp (fuse 137) on the test rig should light, and remain lit while the switch is held at RESET.

(2) Set the G.W. arming switch to ARM. The G.W. arming lamp (fuse 137), on the test rig should light, the armed time indicator should start, and the armed lamp in the aircraft should light.

Note...
After 17 minutes the lamp should begin to flash.

(3) Set the 2-MIN ARMING INDICATOR switch on the test rig to ON. The arming indicator in the aircraft should appear white. Return the switch to OFF. The indicator should appear black.

(4) When the armed lamp starts to flash, set the G.W. arming switch to OFF. The G.W. arming lamp on the test rig should go out, the armed time indicator in the aircraft should stop, and the armed lamp should go out.

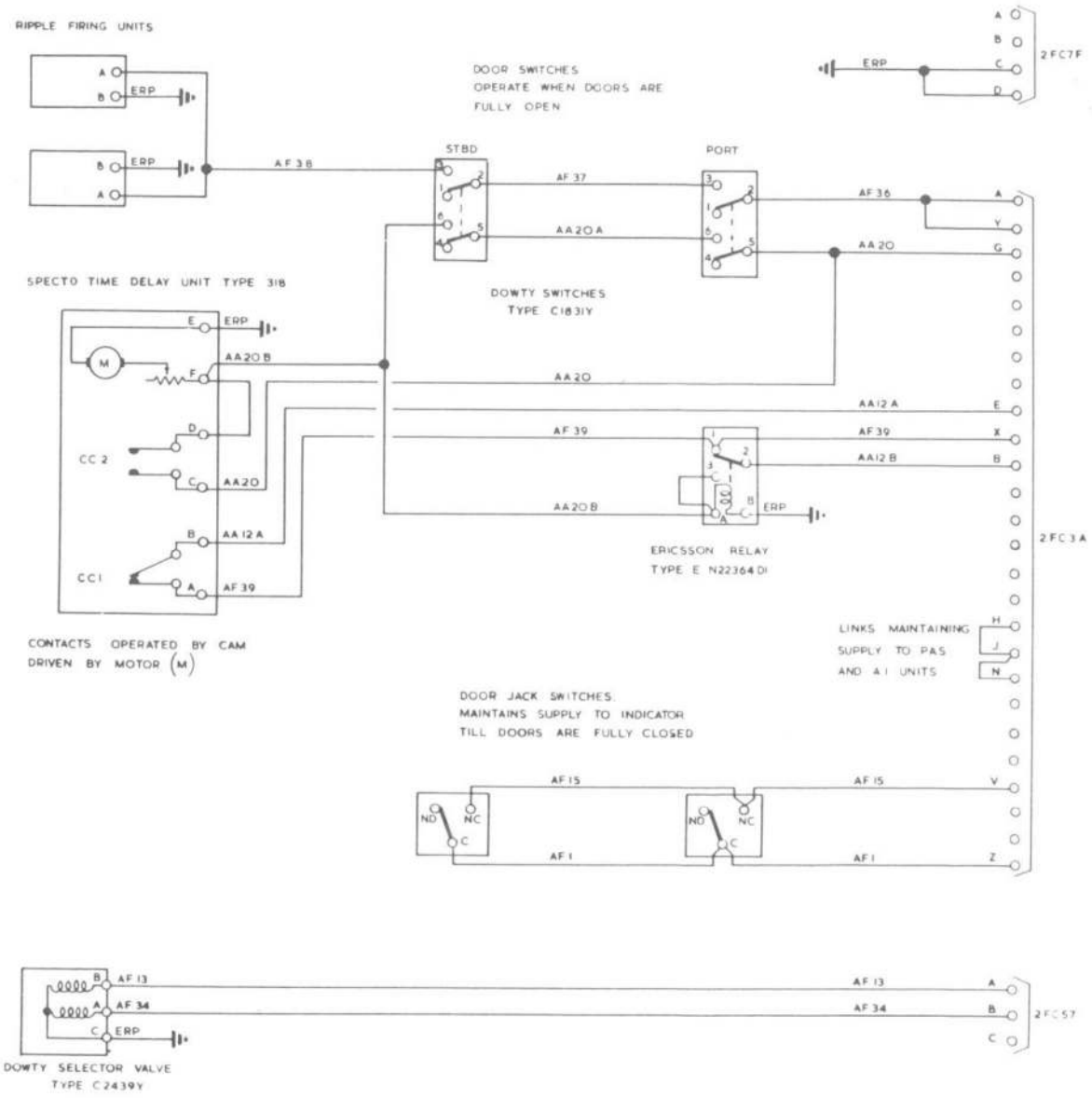
Jettison circuit

(1) Operate the emergency jettison switch in the cockpit, jettison lamps 1 (fuse 153) and 2 (fuse 154) should light, and remain lit until the switch is released.

Final tests

(1) Repeat the preparation and safety check operations detailed in para. 27 and 28.

(2) Remove the ground arming link, disconnect the armament safety-break, and remove the test equipment from the aircraft.



OPERATION OF SPECTO TIME DELAY UNIT

1 WHEN DOORS MICRO SWITCHES CLOSE MOTOR STARTS TO RUN AND CONTACTS CC2 CLOSE

2 AFTER A PRESET TIME CONTACTS CC1 OPEN AND CLOSE

3 MOTOR WILL STOP WHEN CONTACTS CC2 ARE OPEN THE DOOR SWITCHES ARE BACK IN THE NORMAL POSITION, AND THE TIME DELAY UNIT IS AUTOMATICALLY RESET

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FIG. 5. ROCKET PACK WIRING

◀ MINOR AMENDMENTS ▶

Guided weapons pack

Equipment

32. The following test equipment is required:-

Alternator test set, Type BT139
Aircraft test set, Type Mk.2
Aircraft unit test set, Type Mk.2
Boost line leak tester, Type 1491/2
Adapter for item 4
◀ Hydraulic test bench ▶
Hydraulic reservoir for item 6
Ground power unit
Air blower trolley, Type Mk.2
Airframe electrics simulator test rig
24-volt battery.

Preparation

33. Before commencing the functioning tests ensure that the cold air system has been checked in accordance with the relevant instructions. Prepare for testing as follows:-

(1) Connect cable assemblies BJ1, BJ2, BJ3, and BJE5 to the airframe electrics simulator test rig *(fig.13)*.

(2) Connect test lamps to the ejector release unit breech caps.

(3) Connect a 28-volt d.c. supply to the test rig.

Procedure

34. Emergency jettison

(1) Operate the emergency jettison switch. The lamps on the breech caps should light.

Note...

The switch should not be held on for more than 5 seconds.

(2) Return switch to OFF position. Lamps should go out.

Alternator

Connect the alternator test rig to the alternator test plug, and the hydraulic trolley (with reservoir) to the Avery couplings. Carry out testing in accordance with the instructions for use of alternator 1st. line test sets contained in the Firestreak publication.

Electronic equipment

Connect the aircraft installation test set to the pack, connect the boost line leak tester to the ground power unit, and carry out testing in accordance with the manufacturer's operating instructions in the Firestreak publication.

Note...

During the above testing of alternator and electronic equipment, ensure that the lamps attached to the breech caps do not light.

Units tests

To test any particular unit, first remove the unit from the pack and bench test it, using a unit test set in accordance with the manufacturer's instructions in the Firestreak publication.

Rocket pack

DANGER

WITH THE HYDRAULIC SUPPLY ON, CARE SHOULD BE TAKEN BY ALL PERSONNEL WORKING ON THE ROCKET PACK, TO AVOID BEING TRAPPED BY THE LAUNCHERS (DOORS) AS THEY CLOSE. USE THE SAFETY BAR.

Equipment

35.

Airframe electrics simulator test rig
24-volt battery
◀ Hydraulic test bench ▶
Hydraulic accumulator for item 3
Structural rig on which to mount rocket pack while under test
Rocket launchers (2 in. rockets) 1 set, No.4, Mk.1

Preparation

36. Before commencing the functioning tests it is necessary to carry out the following operations:-

(1) Ensure that the normal insulation and continuity tests have taken place.

(2) Operate the microswitch mechanism manually (normally operated by launcher jacks). When the striker arms are pressed against their stops, the microswitches should be operated. There should be no tendency for the striker arms to pass beyond the operating buttons of the microswitches. When striker arms are released they should spring back to their normal positions.

(3) Ensure that the pack hydraulic tests have been done.

(4) Mount the rocket pack on the structural rig and attach the launchers to the hinge pins. Connect the jacks to the launchers and fit the safety bar.

◀ (5) Connect to the hydraulic test bench and ancillary equipment. ▶

Note...

The pressure line goes to the Avery

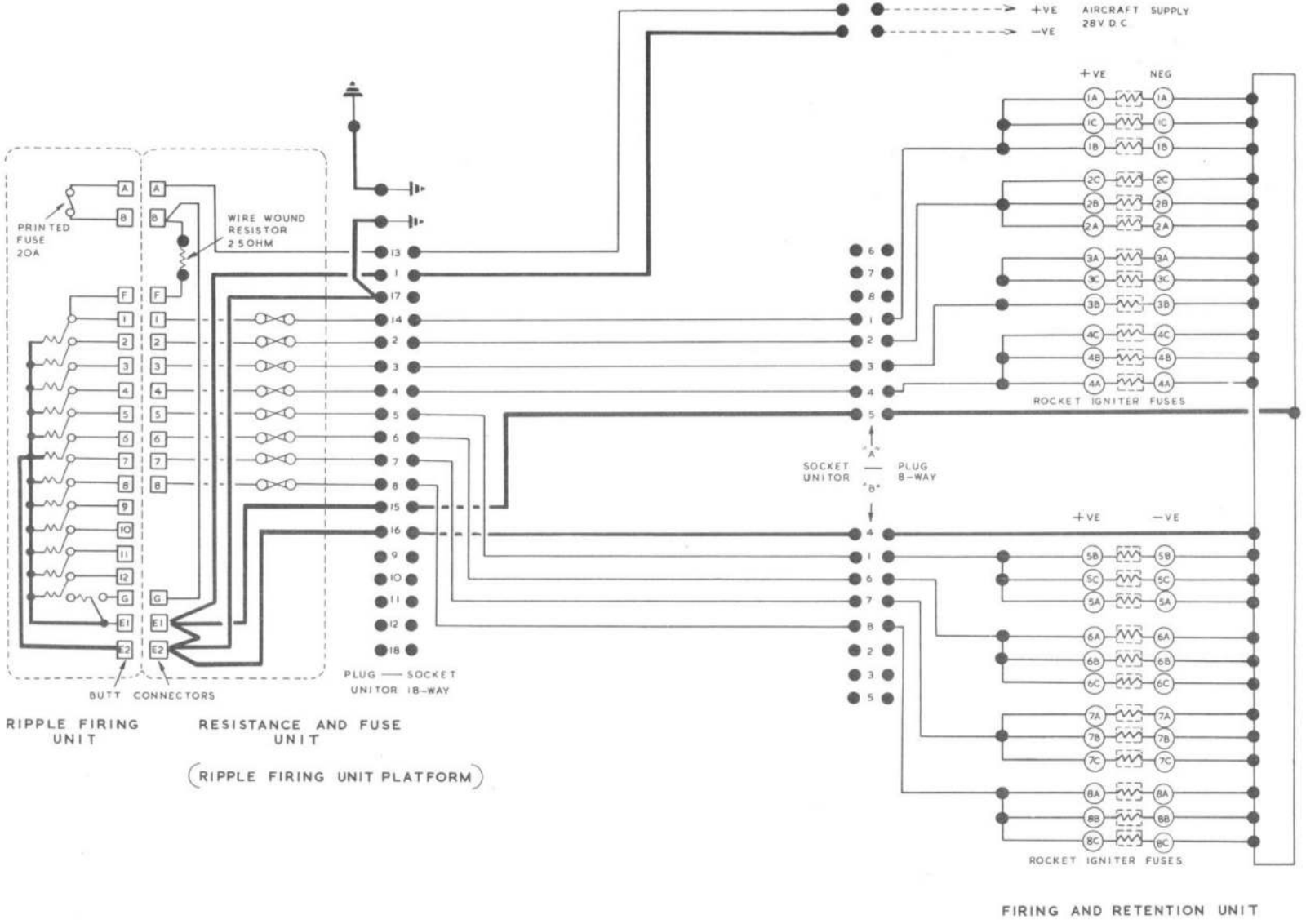

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FIG. 6. ROCKET LAUNCHERS

◀ REDRAWN ▶

coupling aft of the pack, starboard side. The return line connects to the Avery coupling aft of the pack, port side.

(6) Set all switches on the aircraft electrics simulator to OFF and connect it to the pack *(fig.14)*. Care should be taken to ensure that cables RP5 and RP8 will not be trapped when launchers retract.

(7) Connect the electrical supply to the simulator.

(8) Remove the safety bar.

WARNING

BEFORE PROCEEDING WITH THE NEXT TWO OPERATIONS, ENSURE THAT ALL PERSONNEL ARE CLEAR OF LAUNCHERS.

(9) Start compressor, and bring the hydraulic system to a working pressure of 3000 lb/in^2.

(10) Switch ON aircraft electrics simulator.

WARNING

THE LAUNCHERS WILL SLAM CLOSED IMMEDIATELY.

Procedure

37.

(1) Set armament master selector to ON.

(2) Operate the firing trigger viz:-

(a) Press and release immediately

(b) Press and hold on

The following sequence of events should occur in both cases:-

(3) Launchers will commence to open - launchers not locked up indicator will light.

(4) When the launchers are fully open (approximately 1 sec after pressing firing trigger), the volts on indicators will light.

(5) Launcher will remain open, and the volts on indicators will remain lit for a preset time (6 sec); at the end of the time-delay, the launchers

WILL START TO CLOSE

and the volts on indicators will go out.

(6) With the launchers closed (closing time approx.1 sec), the not locked up indicator will go out.

(7) Set all switches on the simulator to OFF, exhaust hydraulic pressure, and disconnect all hydraulic pipes and cables from the rocket pack.

TABLE 1

Location of equipment

General		
Armament master selector switch	-	Starboard console
Armament safety-break	-	Access panel 25P
Ground arming link	-	Access panel 25P
Firing trigger	-	Control column handle
Alighting gear UP push	-	Alighting gear panel (port cockpit)
Power supplies d.c.	-	D.C. feeder fuse box
Power supplies a.c.	-	A.C. fuse and relay box
Gun firing		
Safety relays No. 1	-	Armament relay box, pack bay
Safety relay No. 2	-	J.B. 7
Selector relay	-	Armament relay box, pack bay
A.C. gun firing unit	-	Pack bay
Gun firing relays	-	Pack bay
Gun firing fuse panel	-	Spine floor, frame 17
Gun purging pressure switch	-	Main equip. comp. below purging valve
◀ Gun purging pressure switch cut-out switch (post Mod. 2419)	-	Access panel 25P ▶
Gun purging over-run control	-	Aft face fr. 21, under the Tacan receiver
Gun purging C/O microswitch	-	Lower longeron of the pack bay (port)
Gun purging valve	-	Main equip. comp. beneath port upper gun
Constant flow solenoid valve	-	Frame 26-27 starboard
Gun purging interlock relay	-	Armament relay box
Gun purging indicator	-	Starboard support panel
Guided weapons		
Arming switch	-	Auxiliary warnings panel
Arming indicator	-	Auxiliary warnings panel
Armed time indicator	-	Starboard support panel
Armed lamp indicator	-	Starboard support panel
Fire control reset switch	-	Starboard console
Emergency jettison switch	-	Contained in the ventral tank jettison handle
Guided weapons - *continued*		
Pairs/singles switch	-	Starboard console
Armed time relay box	-	Fwd. of starboard console
R.B. master relay	-	J.B. 7
Firing relay	-	J.B. 7
Rocket projectiles		
Extend/retract relays	-	J.B. 8
Ground extend/retract switch	-	Access panel 25P
Ripple firing unit	-	On shelf bracket top side of pack
Fuse and resistor unit	-	On shelf bracket top side of pack
R.B. master relay	-	J.B. 7
Firing relay	-	J.B. 7
Launchers not locked up lamp	-	Starboard support panel
Microswitches	-	In the launcher doors
Specto time delay unit	-	In pack
Erricsson relay	-	In pack
Emergency retract switch	-	Auxiliary warnings panel
P.A.S. system		
Attack sight	-	Cockpit
P.A.S. control	-	No. 2 engine throttle lever
P.A.S. pre-run and over-run control	-	Fwd. equip. compartment
P.A.S. controller	-	Aft pressure bulkhead
Gunsight power relay	-	A.C. fuse and relay box
M.R.G. distribution box	-	Main equip. compartment
Camera installation		
G90 camera	-	Base of radar bullet pylon
Camera master switch	-	Starboard console
Camera iris dull/bright control	-	Starboard console
Camera magazine loaded test push	-	Test panel of frame 4A-5 in the nose wheel comp.
Camera magazine indicator	-	
Camera relays	-	Armament relay box
GGS recorder camera	-	Attached to the gunsight
Recorder control unit	-	Starboard console

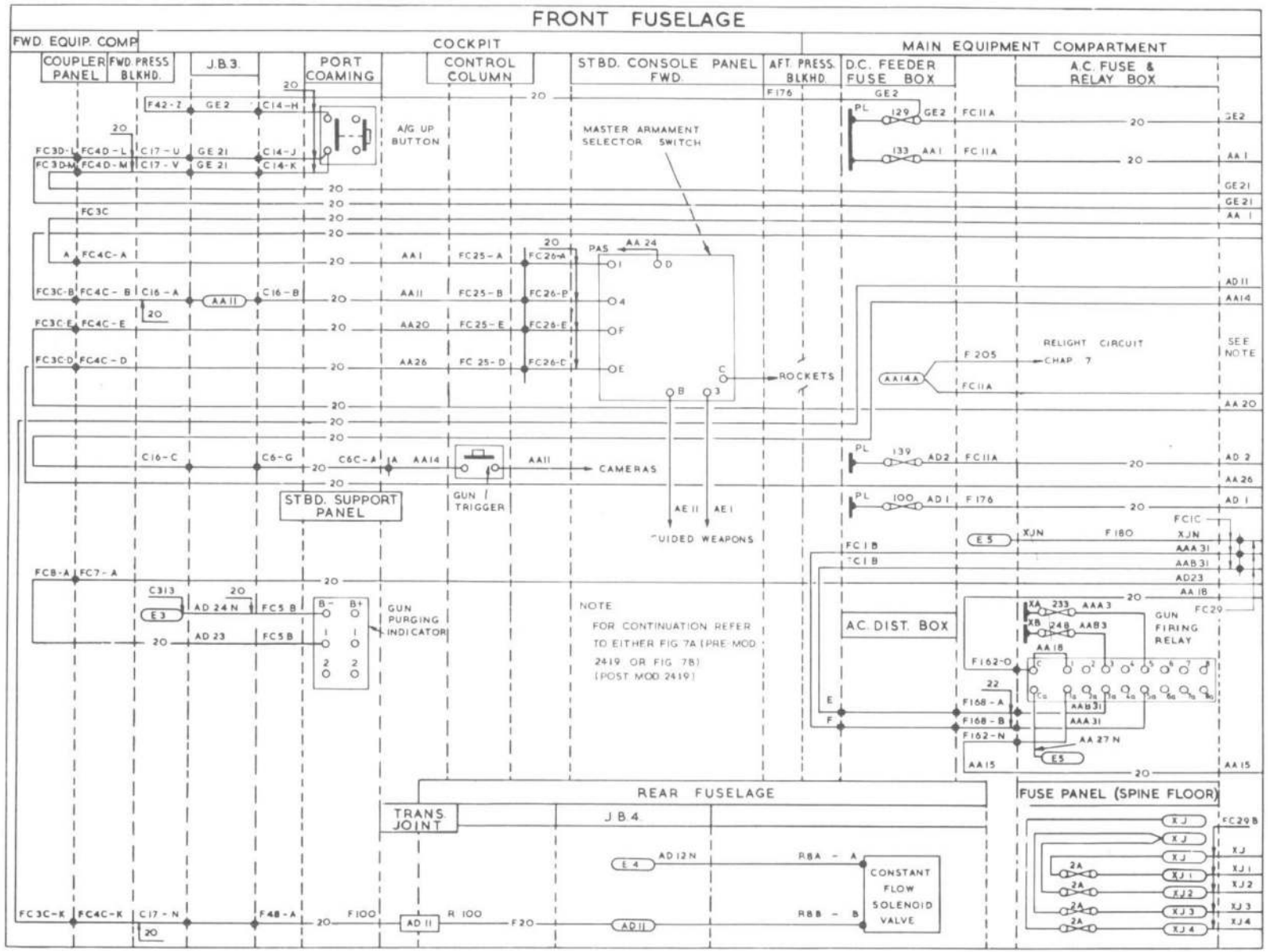

FIG. 7. GUN FIRING

◀ MINOR AMENDMENTS ▶

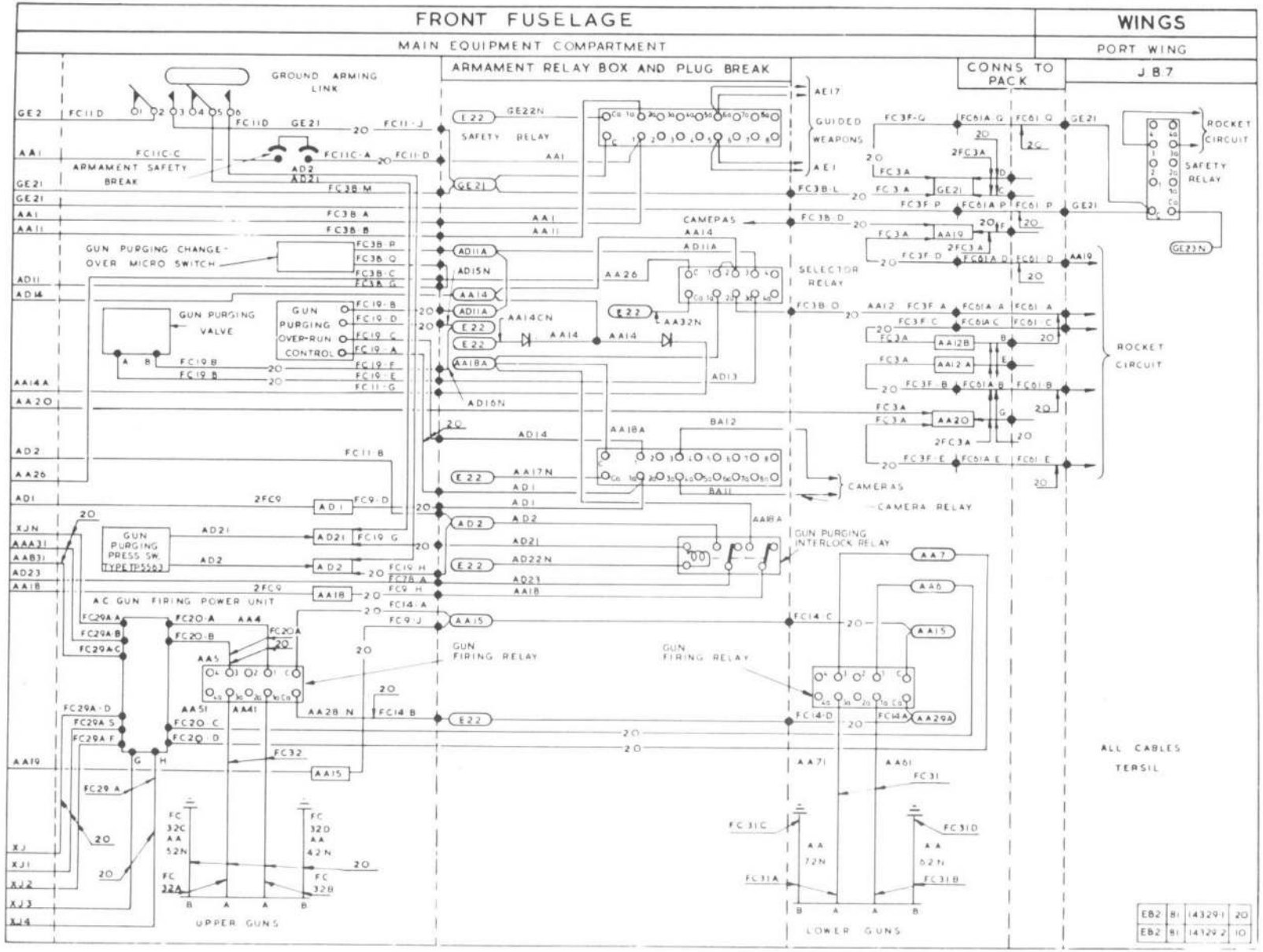

FIG. 7A. GUN FIRING (PRE. MOD. 2419)

◄ MINOR AMENDMENTS ►