

Group 1—DESCRIPTION

LIST OF CONTENTS

	<i>Para.</i>
<i>Introduction</i>	1
<i>Description</i>	2
<i>Common equipment</i>	3
<i>Day role equipment</i>	9
<i>Night role equipment</i>	12
<i>Conversion kits</i>	18
<i>Common fixed equipment, day and night roles</i>	23
<i>Common removable equipment, day and night roles</i>	24
<i>Installation of removable equipment</i> ..	25

LIST OF ILLUSTRATIONS

	<i>Fig.</i>
Camera arrangement diagrams	
<i>Day role camera arrangement (36-in. lens)</i>	1
<i>Day role camera arrangement (48-in. lens)</i>	1A
<i>Night role camera arrangement (case 1)</i>	2
<i>Night role camera arrangement (case 2)</i>	3
<i>Night role camera arrangement (case 3)</i>	4

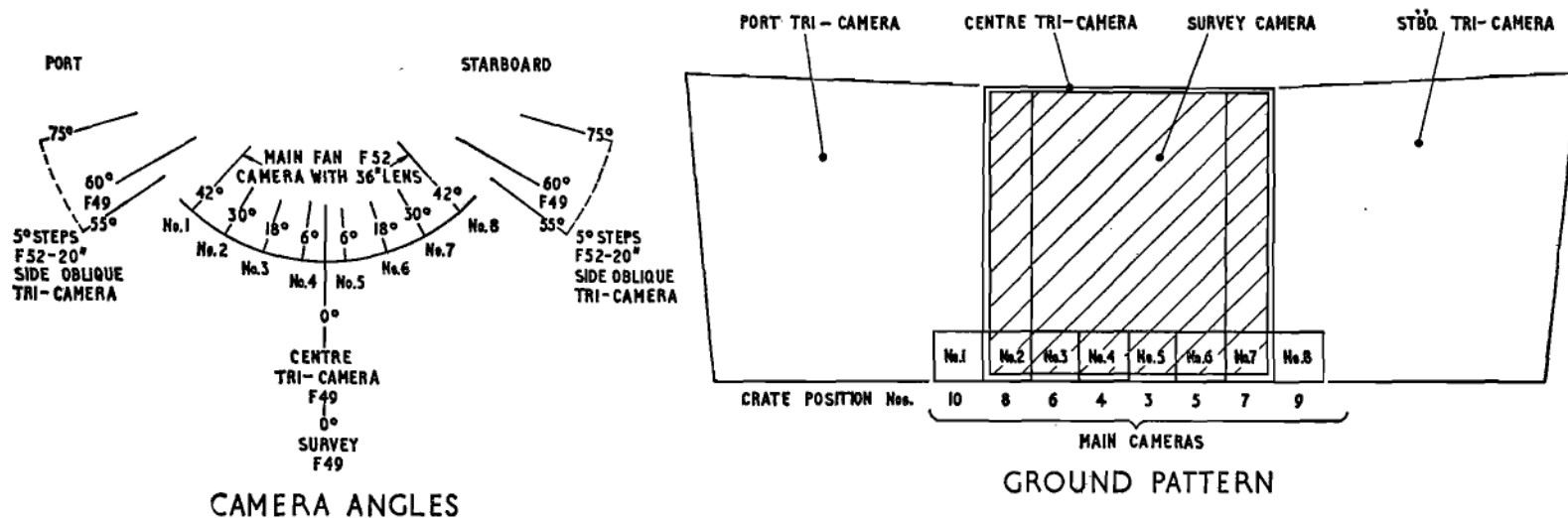
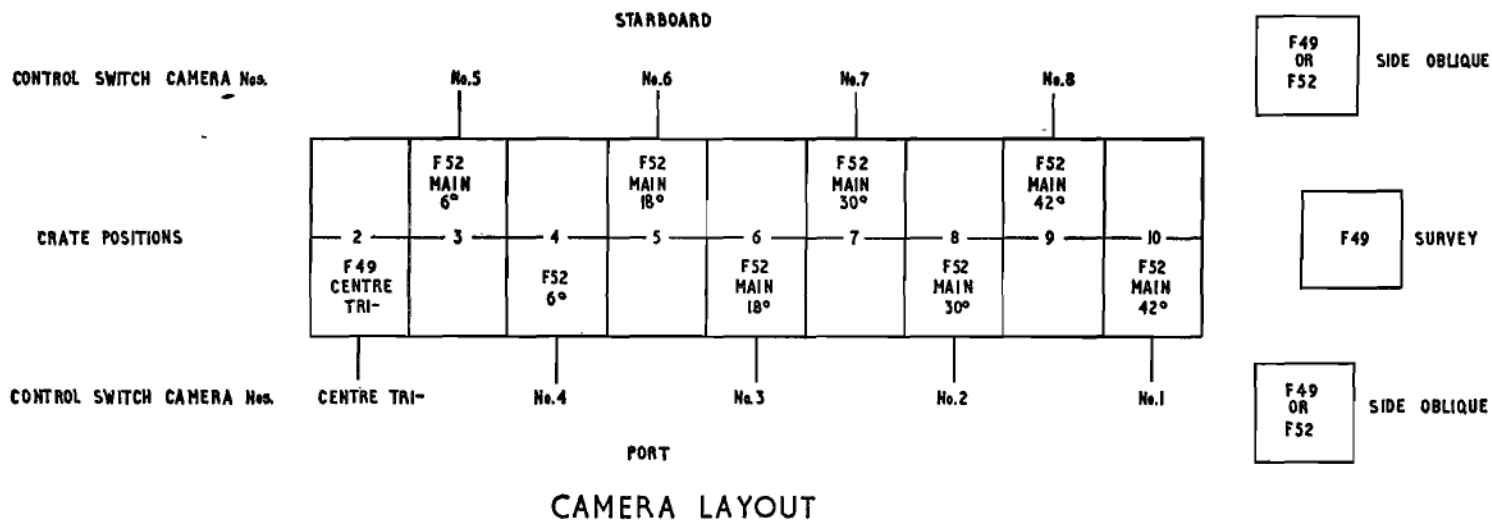


Fig. 1. Day role camera arrangement (36-in. lens)

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Introduction

1. This chapter gives brief notes on the conversion of the B/PR Mk. 1 and B/K/PR Mk. 1 aircraft to the P.R. role (day and night) and gives circuit operation and servicing details for the converted aircraft. Lists of fuses and circuit-breakers, together with details of additional power supplies, are given in Chapter 1. Details of fusing circuits for the photo-flashes are given in Chapter 3 and details of the additional fuel systems (bomb bay and underwing tanks) are given in Chapter 4 and 9. Full details of items of equipment are given in the relevant Air Publications. This chapter assumes that the following mods. have been incorporated (the mods. will be fitted before any conversion to the P.R. role is made) :—

Mod. 1805—To introduce main camera supply contactor in battery bay.

Mod. 1818—To introduce compass repeater at bomb aimer's visual position.

Mod. 1837—To introduce wiring for window door position indicators.

Mod. 1845—To introduce duplicate Type 35 controller and duplicate day role camera pulsing indicators at bomb aimer's visual position.

Mod. 1882—To introduce a Mk. 4 plug and socket coupler at rear bomb bay starboard side wall for cables to day role rear fairing.

Mod. 2042—To introduce wiring on aircraft and relays on crate to enable individual cameras to be isolated in case of runaway.

Mod. 2043—To introduce duplicate ratio selector reset switch and warning lamp at bomb aimer's visual position and to revise engraving of camera door selector switches and selected open indicators to incorporate “. . . AND POWER ON”.

Mod. 2048—To alter wiring at P.R. change-of-role plug and socket and to alter fixed wiring to prevent feedback between the night role flash crate door indicator circuit and bomb bay door indicator circuit.

Mod. 2096 and 2097—To provide tilt angle indicator at visual bomb aimer's position and stowages for camera sight covers pre. and post Mod.-1673 respectively.

Mod. 2098—To revise ratio selection from 1-1, 1-3, 1-6, to 1-1, 1-4, 1-8.

Mod. 2099, 2122 and 2906—To provide a pre-pulse signal to the pilot for the survey camera 3.

Mod. 2229—To obviate feedback into bomb gear from camera control.

◀ Mod. 2917—To prevent fuzing relay being energized before selection when aircraft is operating in the bomber role. ▶

Description

2. The B/PR Mk. 1 aircraft is a standard B Mk. 1 and the B/K/PR Mk. 1 is a standard B/K Mk. 1 aircraft provided with certain fixed fittings enabling it to be converted to a photo-reconnaissance aircraft for day or night roles. Provision is made for a single survey camera in the interim day role installation.

Note . . .

Originally a revised day role installation, known as the Final Day Role, was to have been introduced and the current Day Role installation was known as the Interim Day Role. The requirement has, however, been cancelled and the current day role will now be known as the Day Role. Wiring and a fuse panel will be found fitted in the battery bay for the final day role although this will not now be used.

Common equipment

3. The aircraft has a control panel at the bomb aimer's visual position with controls for the sighting head, camera window doors, and day and night role camera. Provision is made on the starboard wall of the crew cabin with mountings for the individual day and night role main control panels.

4. A camera supply contactor supplying the change-of-role bus-bar and mounted in the battery bay ensures that no cameras can operate until the window doors are open.

5. The P.R. bomb bay doors, fitted with windows, are used for access to the bomb bay only and therefore control of them is no longer from the control pedestal but from a switch at the electrical external supply point. Mountings and windows are provided for two oblique cameras at the rear end of the bomb bay.

6. The window doors in the bomb bay doors for the oblique cameras are controlled from the control panels in the cabin and are interlocked with the camera and photoflash release circuits, so that no cameras can operate until the window doors have been opened.

7. A P.R. camera sight may be fitted at the bomb aimer's visual position. The sight is gyro stabilized and enables the aircraft to be kept on track during photography under conditions of clear visibility. A compass repeater is also fitted at this position.

8. Increased fuel capacity is provided by fitting a tank at the forward end of the bomb bay and by using the standard underwing fuel tanks for the long-range requirement.

Day role equipment (fig. 1 and 1A)

9. The day role has eight main fan cameras with 36-in. lens, or four with 48-in. lens (Mod. 2722), three cameras in the tri-installation for wide angle cover and one survey camera. The main cameras and the centre tri-installation camera are fitted to the day role camera crate in the bomb bay, the port and starboard tri-installation cameras are fitted to the oblique mountings at the rear end of the bomb bay and the survey camera is fitted to a mounting, adjustable for aircraft drift and tilt, in the rear fairing between the P.R. bomb doors and the P.R. deflector.

10. All cameras are controlled by either one of two Type 35 controllers, one on each panel. Ratio selectors on the control panel, one for each tri-installation camera and one for the survey camera, provide a means of pulsing these cameras at a ratio of 1 to 1,

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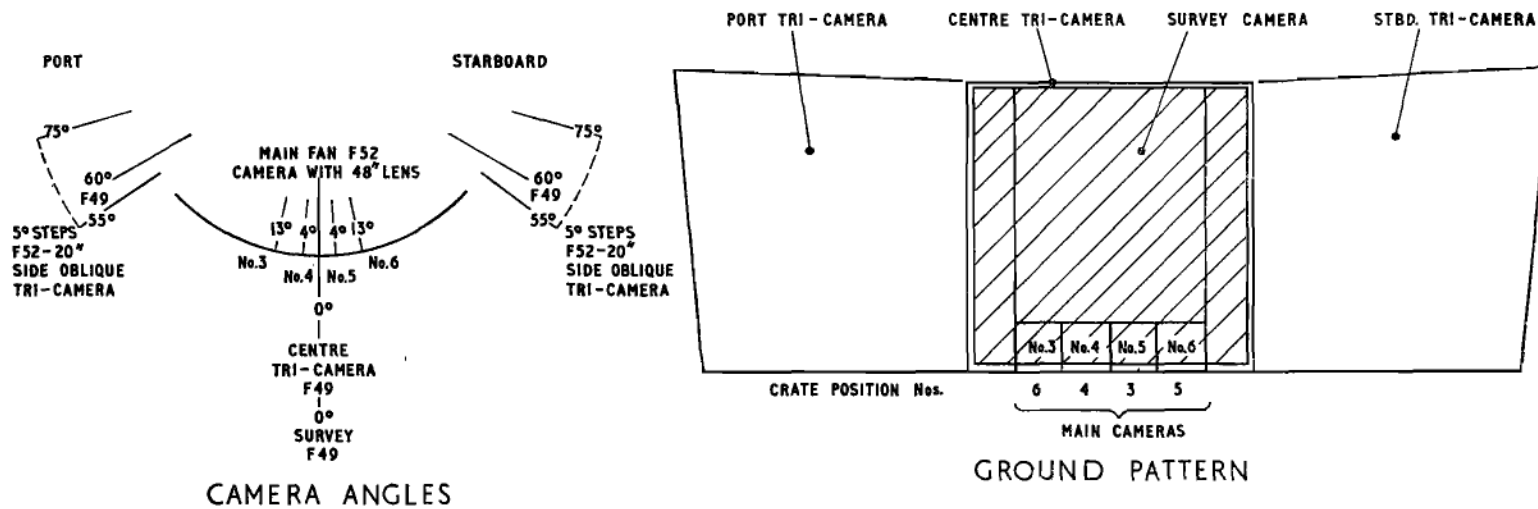
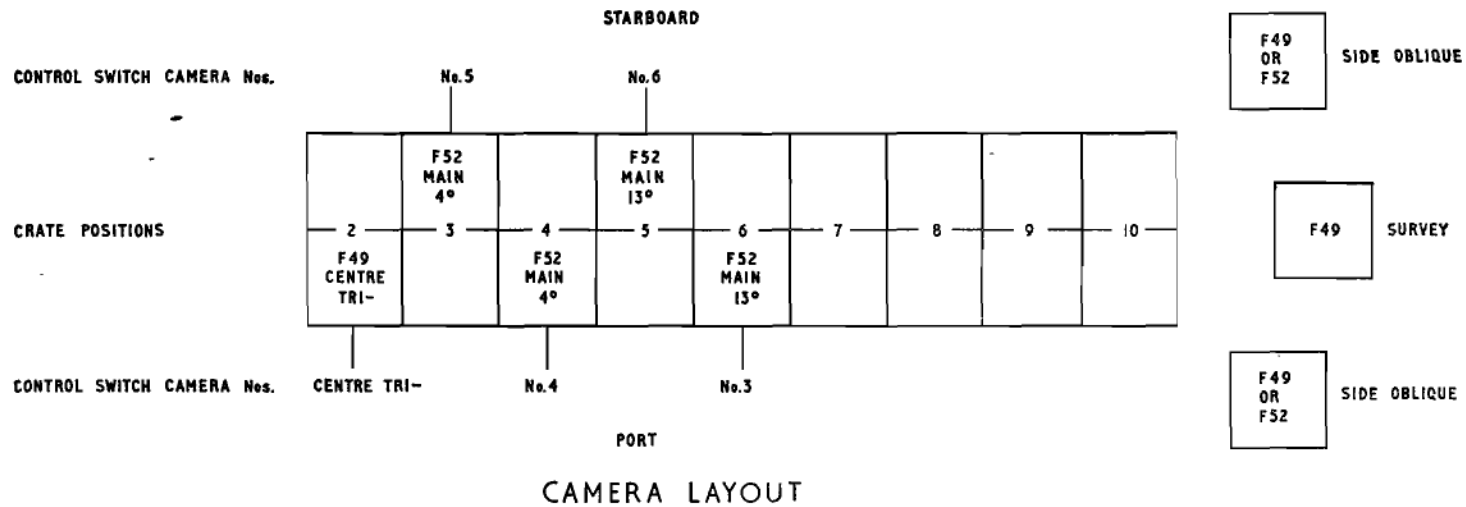


Fig. 1A. Day role camera arrangement (48-in. lens)

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1 to 4 or 1 to 8 exposures of the main cameras. A reset switch is provided on each control panel to enable the ratio unselector to be set up. The main fan camera master switches on the control panel and the wide angle and survey camera ratio selector switches control relays in the motor supply line to each camera so that individual cameras can be isolated in case of runaway.

11. A green indicator lamp on the centre instrument provides a warning to the pilot 3 seconds before each pulse to the survey camera so that the aircraft can be corrected for bank before the exposure. The green lamp stays on for the 3 seconds and goes out as the exposure is made. This indication is necessary since the survey camera mounting does not provide a correction for bank angle, and the aircraft may be photographing on a 'Gee' path.

Night role equipment (fig. 2, 3 and 4)

12. The night role has six cameras fitted to the night role camera crate in the bomb bay. There are no wide angle cover cameras.

13. A photo-flash crate containing twenty-eight 8-in. photo-flashes is fitted between the P.R. bomb doors and the P.R. deflector. Extra 8-in. and/or 16½-in. photo-flashes were to have been carried in underwing nacelles, but the requirement for the nacelles has been cancelled. Controls, indicators and wiring will be found on the aircraft for the nacelles. Release is controlled by the distributor on the flash crate, and cannot commence until the flash crate doors are open.

14. The rate of release of the flashes is controlled by either one of two cameras, known as master cameras, as selected by the master camera switch. These provide pulses according to flight adjustments on the I.M.C. controller for speed and altitude.

15. The camera shutters operate on the open-close-open sequence, the shutters being operated remotely by photo-electric cells. The night role control panel has a common I.M.C. controller with a master switch for each camera. The master switches provide

positive supplies for the film moving motor and photo-cell.

16. Once the necessary adjustments have been made on the controller and the photo-cells have warmed up, the photographic sequence is started by using the START switch. This switch is electrically interlocked with the camera window doors so that there is no supply to the switch until the camera window doors have been opened.

17. For certain conditions (*case 1*), a group of three cameras fitted with 24-in. lens and another group of three with 36-in. lens can be fitted to the crate, either group being used as necessary over the target; one of the master cameras is in each group. Under other conditions five cameras are used in the main fan. Fitted with either 36-in. (*case 2*) or 24-in. (*case 3*) lens for different altitudes, they operate as a complete group.

Conversion kits

18. The B/PR Mk. 1 aircraft is a standard B.Mk. 1 fitted with Mod. 25 providing fixed fittings which enable the aircraft to receive the P.R. equipment.

19. When converting to the day role, the following conversion kits have to be fitted:—

Mod. 26—Common removable equipment (bomb bay doors, deflector, etc.).

Mod. 72—Day role camera crate and control panel.

Mod. 1514—Bomb bay fuel tank.

20. When converting to the night role, the following conversion kits have to be fitted:—

Mod. 26—Common removable equipment (bomb bay doors, deflector).

Mod. 73—Night role camera crate and photo-flash crate and control panel.

Mod. 1514—Bomb bay fuel tank.

21. For long-range operation, the following conversion kits have to be fitted to either role:—

Mod. 1345—Underwing stalk.

Mod. 1512—Underwing fuel tank.

Mod. 1513—Suspension links for underwing tank.

22. The fitting of the above conversion kits is described in Book 1, Sect. 2, Chap. 5, and Appendices 1 and 2. The electrical description of the fuel system complete with bomb bay tank and underwing tank will be found in Sect. 5, Chap. 4, or Chap. 9. When converting to the night role, remove the 2-pin socket from the 12/24-way bomb control box and fit into the adjacent stowage panel. The refuelling circuit for the rear transfer tank has to be disconnected at the plug and socket break point provided by Mod. 2297, as when carrying the flash crate in the night role, fuel must not be carried in this tank.

Common fixed equipment, day and night roles

23. Apart from the fuel system, Mod. 25 introduces the following electrical equipment with associated wiring:—

- (1) Plug panel in the cabin to which the different role control panels are to be connected.
- (2) Plug and socket break points in the battery bay.
- (3) Bomb bay camera plug panel on the starboard side of the bomb bay roof.
- (4) Rear cameras junction box at the aft end of the bomb bay to the starboard side.
- (5) Change-of-role circuit-breaker and fuse panels on the starboard side of the battery bay.
- (6) Plugs and sockets for the camera doors on the front bomb door radius rods.
- (7) Extra fuses on panel Z for the camera windows.
- (8) Mountings for oblique cameras.
- (9) Additional heavy duty connector blocks in battery bay.
- (10) Relays for cameras and camera window control.
- (11) Bomb bay door control switch at external supply point.

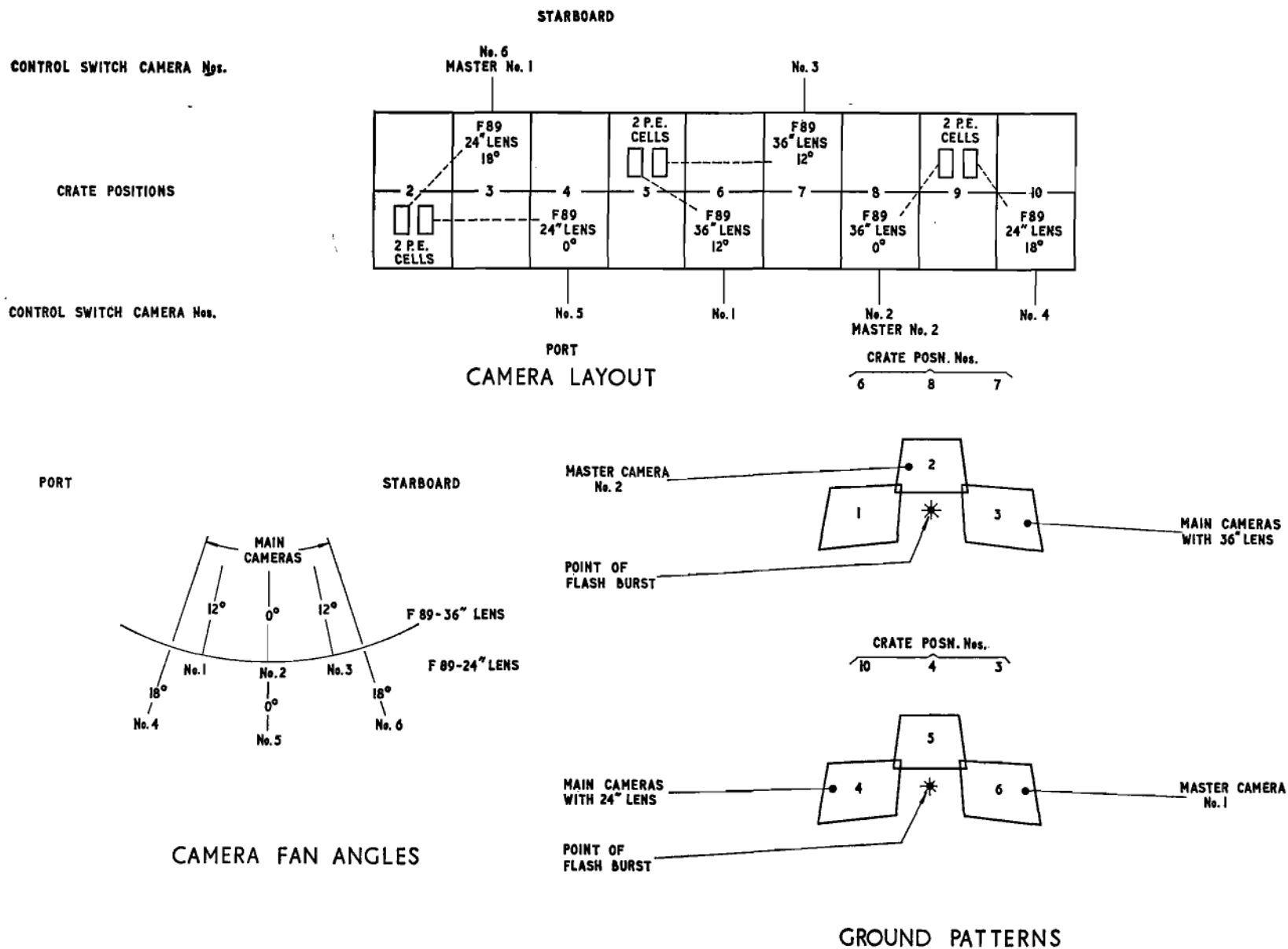


Fig. 2. Night role camera arrangement (case 1)

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- (12) Interlocked change-of-role switch and plug and socket on port side of battery bay.
- (13) Modified instrument inverter torque switch box to provide the supply to the camera sight.
- (14) Control panel to port of the visual bomb aimer's position and provision for the camera sight and controller. Post Mod. 2573 this panel is at the front of the bomb aimer's compartment.
- (15) Oblique camera windows and doors.
- (16) Spirit levels for tilt angle at 2nd navigator's and bomb aimer's visual position.

Later modifications to the fixed wiring are as follows:—

- (1) Change-of-role bus-bar supply contactor in battery bay (Mod. 1805).
- (2) Break plug and socket at rear bomb bay starboard side wall for cables to day role rear fairing (Mod. 1882).
- (3) Compass repeater at bomb aimer's visual position (Mod. 1818).
- (4) Duplicate Type 35 controller on bomb aimer's P.R. panel (Mod. 1845).
- (5) Duplicate set of day role camera pulsing indicators at bomb aimer's visual position (Mod. 1845).
- (6) Duplicate day role ratio selector reset switch and lamp on bomb aimer's P.R. panel (Mod. 2043).
- (7) Extra fixed wiring for camera window door position indicators (Mod. 1837)

and for camera supply relays for camera isolation (Mod. 2042).

- (8) Extra fixed wiring for the survey camera pre-pulse indicator (Mod. 2099).

Common removable equipment, day and night roles

24. Apart from the fuel system, Mod. 26 includes the following equipment:—

- (1) Shortened bomb bay doors incorporating windows with electrically controlled doors and lock, with built-in lock switch.
- (2) Shortened deflector.

Installation of removable equipment

25. The fitting of removable equipment is described in Book 1, but before operation of the camera bay doors after fitting, the change-of-role plug must be fitted to the P.R. socket in the battery bay after the change-of-role selector switch has been placed to P.R. Cameras should be connected to the camera plug panel on the starboard side of the bomb bay roof, using the colour code. The appropriate control panel should be fitted and connected according to the colour coding to the P.R. plug panel on the cabin wall. The appropriate controllers should be fitted to their wedge plate mountings on the control panel and the bomb aimer's control panel and connected up.

Note . . .

When converting from bomber to P.R. roles, the 3-pin plug (which contains a shorting link

between pins B and C) has to be removed from the 3-pin socket on the starboard forward radius rod and connected to the stowage provided on the radius rod bracket. When converting back to a bomber, it is important that this plug is refitted to the wired 3-pin socket.

26. The bomb aimer's panel post Mod. 2573 is at the forward end of the compartment. The wedge plates for the day role controllers are mounted on a panel which is hinged at its bottom edge. If the radar equipment introduced by Bomber Command Modification is installed, it will be found necessary to remove the retaining fasteners at either side of the panel and to hinge the panel aft before these controllers can be fitted or removed, otherwise they foul the radar equipment.

27. The post Mod. 2573 bomb aimer's panel incorporates one of two smaller panels mounting the camera pulsing lamps for day or night roles. At all times, whether operating as a bomber or a day role P.R., the day role lamp panel must be fitted. When converting to the night role, the day role panel is removed and the night role (Mod. 2702) panel fitted in its place. The panels are retained by the six buried edge-lighting lamps and the pulsing lamp circuits are made or broken at the plug and socket break point mounted on a bracket behind the main panel. When converting back from the night role to day or bomber roles, the night role panel must be replaced by the day role panel.

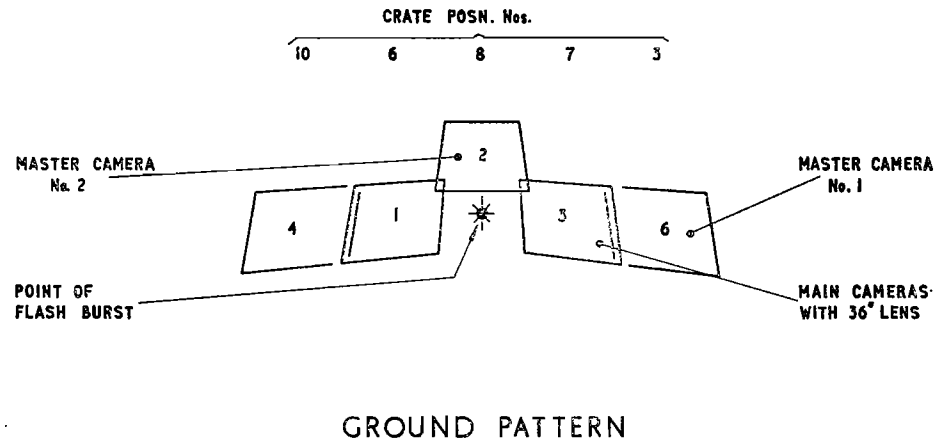
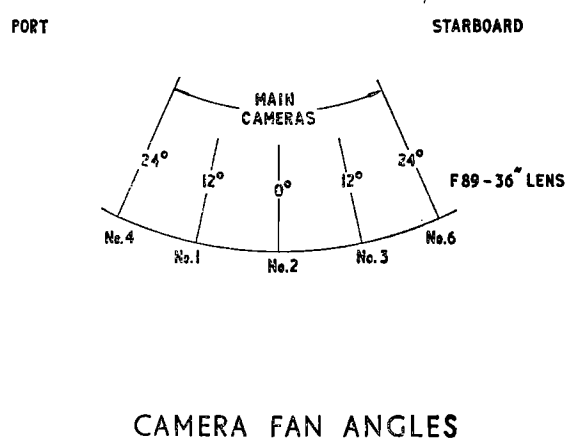
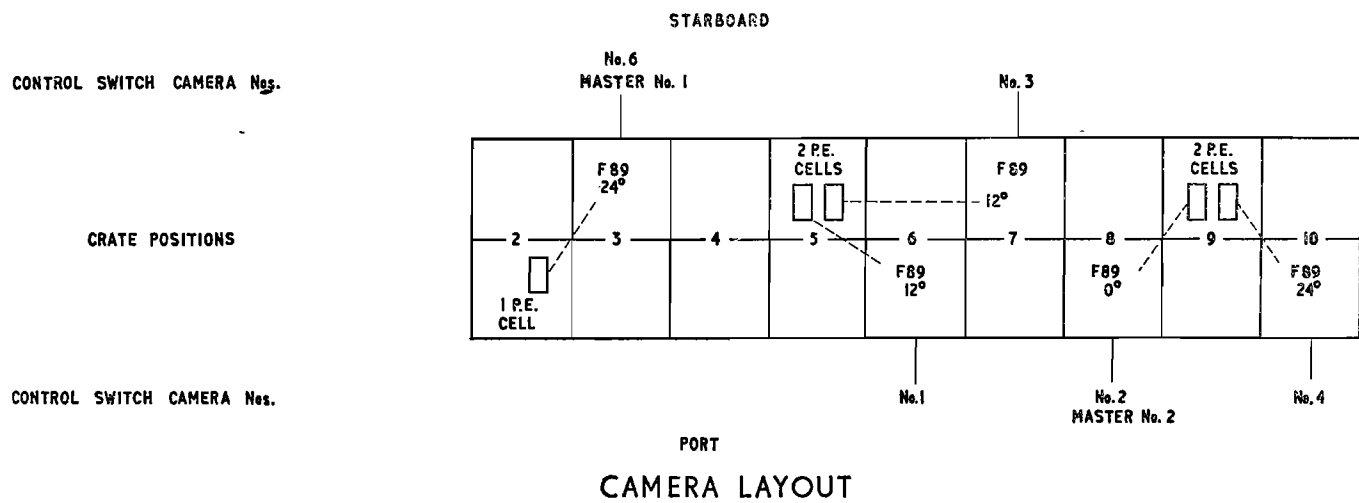


Fig. 3. Night role camera arrangement (case 2)

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