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TO: Mr R Stubbington LAS IPT

DATE: 13th August 2008

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CERTIFICATE OF CONFORMANCE

FOR

**CARRIER INSTALLATION FULL TRACKED MK'S 2 & 2/1
(FV439)**

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CARRIER, INSTALLATION, FULL TRACKED, MKs 1 AND 2/1 FV 439

TECHNICAL HANDBOOK - DATA SUMMARY

Note ...

This Issue 3, Pages 1 and 2 supersedes Issue 2, Page 1/2 dated Dec 90. The title has been amended.

DESCRIPTION

- 1 The FV 439 is basically an FV 432 Mk 2/1 modified to either:
 - 1.1 Secondary Access Switch/Message Centre role; or
 - 1.2 Radio Relay Installation role.
- 2 For automotive data refer to EMER Tkd Veh E 100/2.
- 3 The descriptions of the Vehicle Installations and their roles are contained in the following Army Equipment Support Publications (AESPs):
 - 3.1 Secondary Access Switch/Message Centre AESP 5895-H-514-101.
 - 3.2 Radio Relay Installation AESP 5895-H-515-101.

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RADIO STATION, CARRIER MOUNTED, FULL TRACKED, MK 1 AND MK 2/1 (FV 439)

TELEGRAPH STATION, CARRIER MOUNTED, FULL TRACKED, MK 2 AND MK 2/1 (FV 439)

TELEPHONE EXCHANGE, CARRIER MOUNTED, FULL TRACKED, MK 1 AND MK 2/1

(FV 439)

TECHNICAL HANDBOOK - DATA SUMMARY

ASSOCIATED PUBLICATIONS

EMERS:-

Tkd Vehs : E 100/2 - E 109/2
Comm Inst : Q 650 - 659 Radio Station
Comm Inst : R 850 - 859 Telegraph Station
Comm Inst : R 480 - 489 Telephone Exchange

Classification of 'A' vehicles: DCI 41/68

PURPOSE

Royal Signals vehicle for use at Brigade HQ in the BRUIN trunk communication systems.

DATA

Performance:-

Speed and range:-

[REDACTED]

Operational range

[REDACTED]

General:-

Fuel consumption,

[REDACTED]

DESCRIPTION

The FV 439 is basically an FV 432 (see Tkd Veh E 100/2) equipped for three communication roles - radio, telegraph and telephone. Automotively the vehicle is identical to the FV 432 but the hull roof carries additional equipment depending on its role. A 24 volt battery charger is fitted in the vehicle and a 230 volt input socket is fitted on rear of vehicle for external power supply. Mounted externally on the roof of radio station vehicle are two generators covered with a metal box, a fold down jib used to erect the aerial, a stowage for the aerial and a frame carrying cable reels. Mounted externally on the roof of the vehicle in its other roles is a frame carrying cable reels.

Turning radius, min:	17 ft 6 in. (5.33 m)
Gradient, max :	35 deg (622 mils)
Vertical obstacle max:	2 ft (609 mm)
Trench width, max:	6 ft 9 in. (2.06 m)

Capacities:-



Jettison fuel tanks:	Mk 1 only: 50 gal (227 litres)
Cooling system:	Mk 1: 11.1/2 gal (52.2 litres) Mk 2/1: 9.3/4 gal (44.3 litres)
Engine lubrication system:	Mk 1: 5.1/4 gal (23.8 litres) Mk 2/1: 7.1/4 gal (33 litres)
Engine oil filters:	Mk 1: 2 pints (1.15 litres) Mk 2/1: 4 pints (2.3 litres)
Engine governor:	Mk 2/1 only: 2 pints (1.15 litres)
Air cleaners (oil bath type):	Mk 1 only: 4 pints (each) (2.3 litres)
Allison gearbox system:	Mk 1: 3.5/8 gal (16.28 litres) Mk 2/1: 3.1/4 gal (15.6 litres)
Steering unit system:	Mk 1: 5 gal (22.7 litres) Mk 2/1: 5.7/8 gal (26.7 litres)
Hydraulic fan drive:	Mk 1: 3.1/2 gal (15.9 litres) Mk 2/1: 4.7/8 gal (22.4 litres)
Final drives:	7.1/2 pints (each) (4.3 litres)
Road and track adjuster wheel hubs:	3 pints (each) (1.7 litres)

Weights:-

Mk 1:	Laden	Unladen
	Radio: 35,300 lb (16,013 kg)	
	Telegraph: 33,500 lb (15,196 kg)	
	Telephone: 33,900 lb (15,378 kg)	
Mk 2/1:	Radio: 36,120 lb (16,384 kg)	
	Telegraph: 34,320 lb (15,567 kg)	
	Telephone: 34,720 lb (15,740 kg)	

Shipping tonnage:-

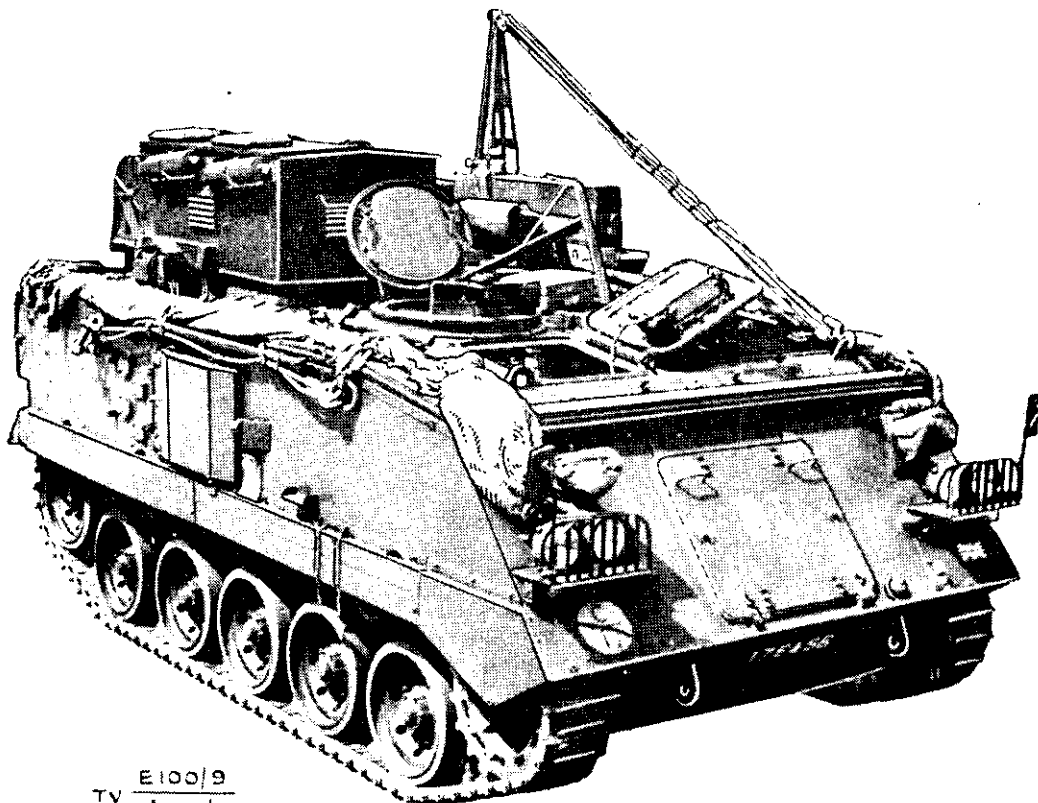
Mk 1:	Radio station role 37 ton (84.4 m ³)	Other roles 35 ton, 29 ft ³ (40 m ³)
Mk 2/1:	Radio station role 36 ton, 7 ft ³ (51.5 m ³)	Other roles 34 ton, 38 ft ³ (39 m ³)

Bridge classification:

Dimensions:-

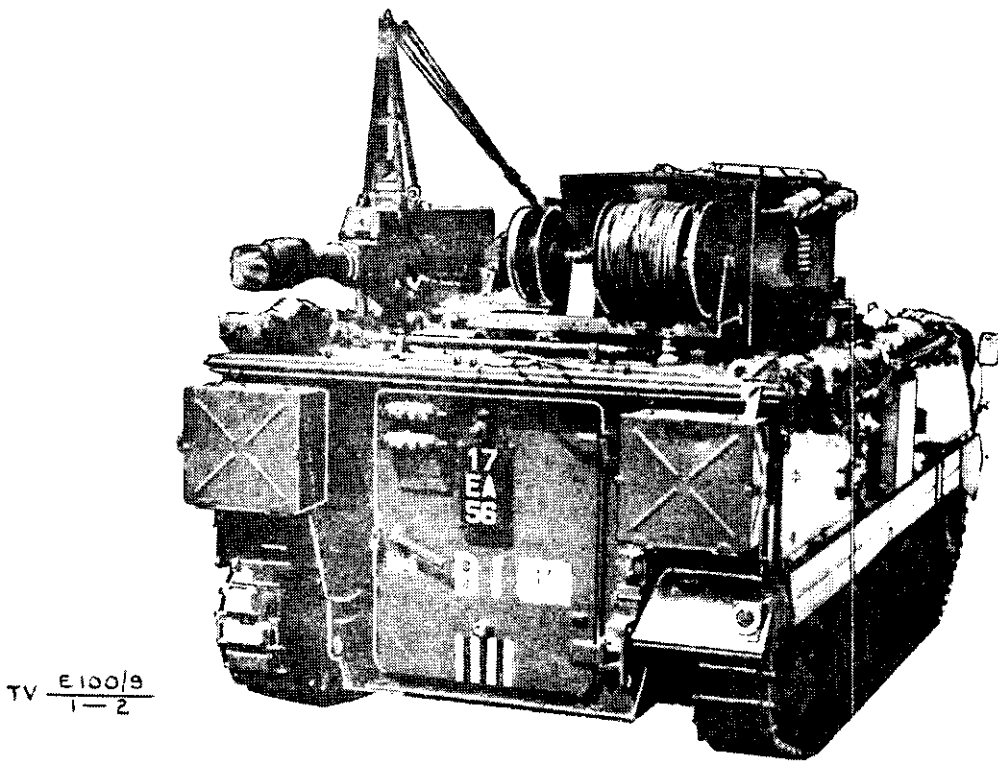
Distance between lifting eyes, front to rear:	13 ft 5 in. (4.089 m)
Overall height:-	
Radio station role:	8 ft 11 1/2 in. (2.743 m)
Other roles:	8 ft 7.1/2 in. (2.62 m)

Road wheel centres, front to rear:	9 ft 3 in. (2.819 m)
Over track guard, front to rear:	16 ft 9 in. (5.105 m)
Length overall:-	
Mk 1:	17 ft 5 in. (5.308 m)
Mk 2/1:	17 ft 1 in. (5.2 m)
Distance between lifting eyes, l.h. to r.h.:-	
Rear:	7 ft 2.1/2 in. (2.197 m)
Front:	6 ft (1.829 m)
Track centres:	7 ft 2 in. (2.184 m)
Over tracks:	8 ft 3.1/2 in. (2.527 m)
Width overall:	9 ft 5 in. (2.870 m)
Tracks:-	
Number of links per track (new):	90
Condemnation limit:	86



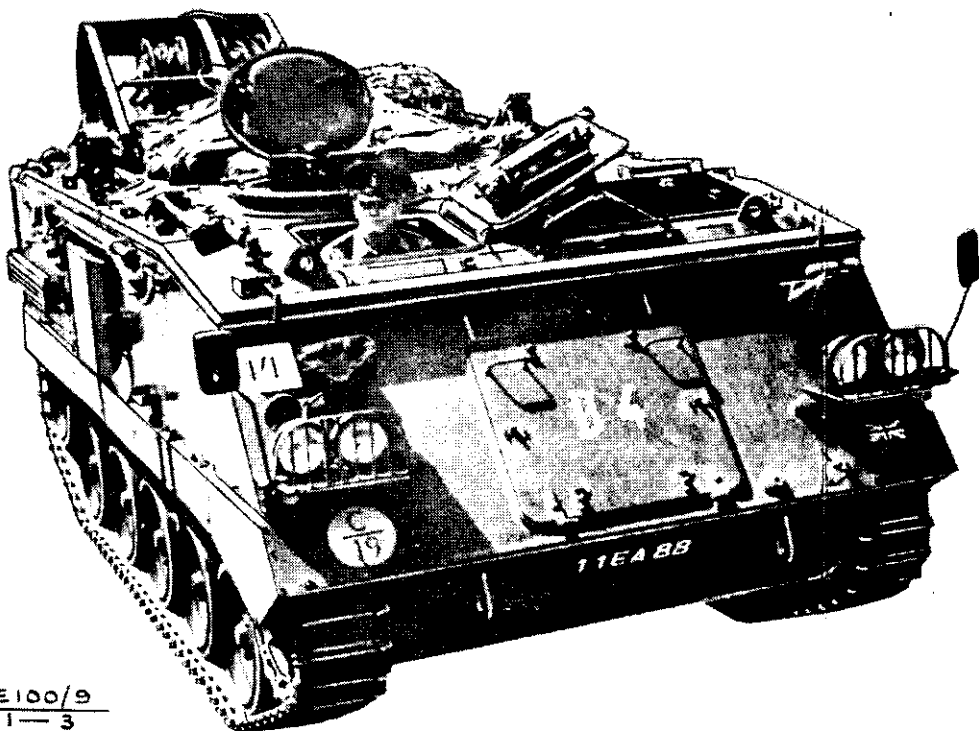
E100/9
TV 1-1

Fig 1 - Three-quarter front view, radio station role



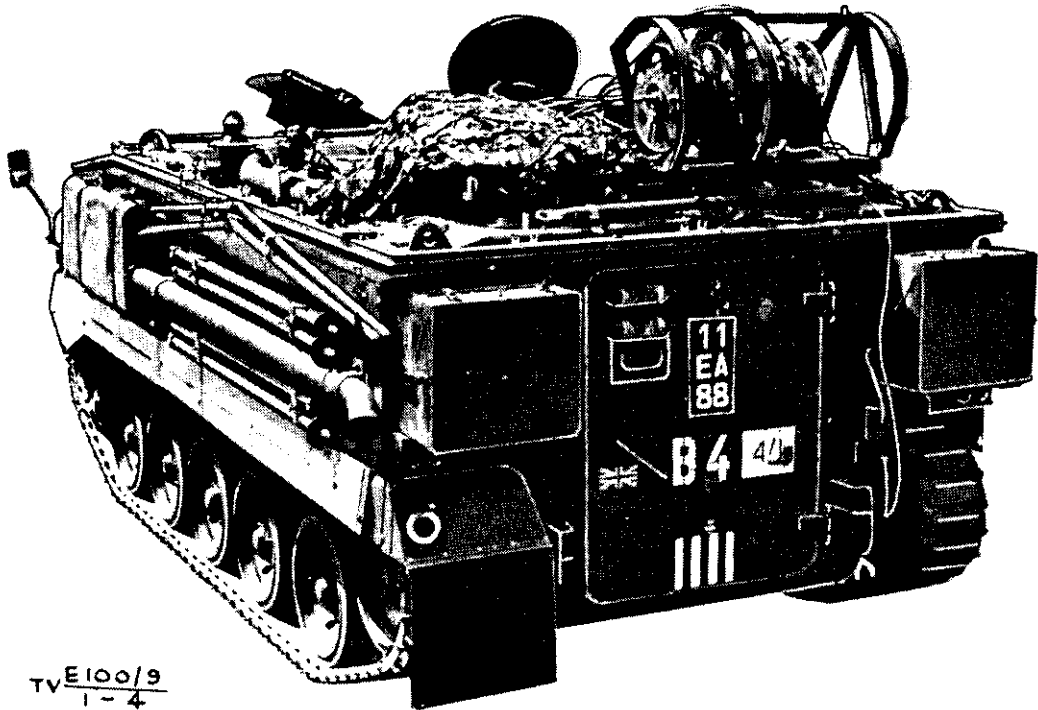
TV $\frac{E100/9}{1-2}$

Fig 2 - Three-quarter rear view, radio station role



TV $\frac{E100/9}{1-3}$

Fig 3 - Three-quarter front view, other roles



TV E100/9
1-4

Fig 4 - Three-quarter rear view, other roles

32501 (A Veh)

END

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CARRIER COMMUNICATIONS, FULL TRACKED, FV 439, MK 1 AND MK 2/1

TECHNICAL HANDBOOK - TECHNICAL DESCRIPTION

Chapter 10

ELECTRICAL SYSTEM AND NBC EQUIPMENT

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GENERAL

1. a. Three types of communication installation may be fitted to the vehicle, power supplies required for each are detailed in Table 1.
- b. With the exceptions detailed in this regulation, the AUTOMOTIVE electrical system and N.B.C. equipment are described in Tkd Veh E 102/2, Chap 9 and incorporates MVEE Approval No 21493 and Tkd Veh E 109/2 Misc Inst No 21 (Distribution panel, No 6, Mk 1)
- c. The three types of communication installations are:-
 - (1) Message centre at Brigade HQ in the BRUIN trunk communication system.
 - (2) Automatic telephone exchange at Brigade HQ in the BRUIN trunk communication system.
 - (3) Radio relay station at Brigade HQ in the BRUIN trunk communication system.
- d. It is not proposed to issue separate regulations covering unit and field repairs to the automotive electrical system, therefore sufficient information to enable these repairs to be carried out has been included in this regulation.

Unit and field repairs to the automotive electrical system, with the exceptions detailed in this regulation, are detailed under Tkd Veh E 103/2, Chap 9, E 104/2 Part 1 Chap 9 and E 104/2 Part 1 Chap 9 Supp 1.

e. Any inaccuracies or improved repair techniques from those detailed in this regulation should be reported in accordance with Gen A 045.

f. For description of vehicle see Tkd Veh E 103/2.

ASSOCIATED PUBLICATIONS

2. EMER

Tkd Veh E 100/2 - E 109/2

Inst Z 408

Gen A 045

Pwr C 460/4-C 469/4

Pwr H 180/3- H 189/3

Tels A 779

Tels K 070- K 079

Tels K 080 - K 089

Tels Y 831

Comms Inst Q 650- Q 659

Comms Inst R 480- R 489

Comms Inst R 850- R 859

Comms Inst Z 100- Z 109

Carrier, personnel full tracked, FV 432, Mk 1, 1/1, 2 and 2/1.

Instruments measuring electrical quantities.
Inspection standards.

Procedure for reporting inaccuracies, improved techniques etc. in EMERs.

Generating set a.c. 3.5 kVA, 230 V single phase 50 Hz (Onan),

Shock protection unit No 4

General inspection standard for electronic equipment.

Sine wave static inverter 24 V d.c./ 240 V a.c. 600 VA.

Sine wave static inverter 24 V d.c./ 240 V a.c. 1.25 kVA.

Transistor and diode testing data

Carrier, communication, full tracked, FV 439 (Radio relay).

Carrier communication full tracked FV 439 (Auto exchange)

Carrier communication full tracked FV 439 (Message centre)

BRUIN communication system (when published)

COMMON INSTALLATION ELECTRICAL MODIFICATIONS (all three types)

3. a. Terminal block assembly FV 456950 has been removed from the front l.h. wall.

b. RH rear loud speaker has been removed.

c. Plate mounting rejector unit FV 457052 has been removed from roof above rear door.

d. Two r.h. and two l.h. Bar antennae transmitter units No 2, FV 246357, have been removed from the rear roof.

e. Trailer socket FV 525487 complete with harness has been removed from the right hand rear external position.

f. Batten box assembly 16 point FV 457038 has been removed from the r.h. sloping roof.

g. Junction box J.1. 24 V removed from bulk head above two tier rack.

h. Roof light, No 3, Mk 1, FV 426636 is removed from the rear l.h. position

j. Roof light No 3 Mk 1 FV 426636 complete with attachment bracket FV 426636 and FV 499491 has been removed from the rear r.h. position and refitted in the l.h. position.

- k. Blanking screws at r.h. centre roof have been removed and two additional flame traps have been fitted to provide venting requirements for batteries B3 and B4 (equipment batteries).
- l. Ventilation batteries on l.h. side floor complete with frame and clamps removed.
- m. Radio batteries below driver's seat and vehicle batteries on r.h. sill disconnected,
- n. Cables disconnected from D.P.8 and D.P.15 at FV 534891 Distribution panel, No 6, Mk 1.
- o. Cables reconnected between Heavy duty junction box No 1 Mk 1, FV 159972 Distribution panel, No 6, Mk 1 and vehicle (B1) and ventilation (B2) batteries as shown in Fig 1, 10 and 14.

ELECTRICAL ASSEMBLIES COMMON TO ALL THREE TYPES

Battery charger 24 V

4. This charger is still at the design stage. Full information will be published when available.

Voltmeter

5. The voltmeter assembly FV 625492, consisting of FV 625493 bracket assembly and ZA/6625-99-105-1994 voltmeter 0-30 V d.c. indicates the voltage of batteries B3 and B4 when the battery master switch at the radio distribution box is closed.

Power distribution unit FV 606968

6. a. Is mounted on the rear l.h. wall of the vehicle (see Fig 2) and is designed to perform the following functions:-
- (1) Select supplies
 - (2) Meter supplies
 - (3) Shock protection
- b. Supplies available for selection are:-
- (1) External main supply
 - (2) Internal supply from inverter
 - (3) Engine driven alternator (radio relay station only).
- c. A general arrangement drawing of the unit is included at Fig 3. All the components (see Table 7) are mounted in a metal case. The front panel is designed to hinge forward to permit servicing and inspection. Components housed in the box are shown at Fig 4.
- d. A shock protection circuit is incorporated for use when an external mains supply is connected to the vehicle. The shock protection is accomplished by using the basic circuitry of the shock protection unit No 4. Pwr H 182/3 describes the unit and H 184/3 details field repairs. The warning on page 1 of H 184/3 should be read before commencing any repairs or tests.
- e. The unit is equipped with switch SD (Fig 2(13)) to select method of supply from either PL1, PL2, PL3 or PL4, switch SE (Fig 2 (12)) to

select supply for metering at voltmeter, switches SA, SB and SC (Fig 2 (9)) are incorporated in the shock protection circuitry to test relays, test earth and reset trip. Outputs from the unit to equipments are via sockets SK1 to SK8. SK9 (Fig 2 (11)) provides a method of connecting 240 V a.c. test equipment etc. via two standard 13 A fused plugs. PL1 (Fig 2 (15)) indicates power supply is 'ON' and LP2 (Fig 2 (8)) is the 'Tripped' indicating lamp for the shock protection devices.

f. The insulation resistance of the unit should be measured between the line and neutral pins of each socket and earth and must not be less than 5 M Ω when measured with the megohm meter set to the 500 V position.

g. Operation of relays:-

With a 240V 50 Hz supply connected to PL1, PL2, PL3 and PL4 in turn and operating SD, check with a 240 V test lamp or multimeter that SK1 to SK8 are energised in their correct sequences as indicated in Fig 5.

h. Test parameters for MR1, MR2, MR3 and MR4 will be found in Tels Y 821.

j. Relay data:-

RLA.)	Heavy duty relay. Magnetic devices
AND)	Type 250/700 ZA4/230
R.L.C)	Elkonite contacts.
RLB.	Heavy duty relay. Magnetic devices. Type 250/620. ZA4/ZC4/250 Elkonite contacts.
RLD.	Armature type relay. 2 V. 180 Ω Contacts 1 A at 60 V d.c.

External supply

7. Power input assembly FV 606949 (Fig 6) is provided at the rear of the vehicle, in the position left vacant by the removal of the trailer socket, to enable a 230/240 V a.c. 50 Hz supply to be accepted, and fed to the power distribution unit, from external mains or a generating set (see Fig 1, 10 and 14).

Earthing terminals

8. a. Two earth terminals are provided externally at the rear of the vehicle:-

(1) Safety earth terminal consisting of a bolt and wing nut at the side of the power tool outlet, and connected to the safety earth terminal at the power distribution unit (see Fig 1, 10 and 14).

(2) Chassis earth terminal consisting of a bolt and wing nut at the side of the power input assembly (see Fig 6) and connected to the vehicle chassis.

b. A chassis earth terminal at the power distribution unit, connected to the vehicle chassis.

Static Inverter 600 VA

9. The Transipack type 606 S.T, 600 M sine wave static inverter operates from 24 V d.c. supplied by B3 and B4 and provides an output of 240 V a.c. 50 Hz for use as an alternative supply to an externally connected mains supply. Technical information is detailed at Tels K 070.

The inverter is fitted on the rear l.h.sill for the radio relay and auto exchange roles and the r.h. side of the vehicle is the message centre role.

Interior lighting

10. a. General:-

The normal vehicle interior lighting system has had one roof light, No 3, Mk 1, removed and has been augmented by fluorescent map reading lamps, No 2, Mk 2, FV 562011 as shown in Figs 1, 10 and 14.

b. Fluorescent map reading lamp No.2 Mk 2 FV 562011:-

This is a bulkhead fitting type lamp, a wiring diagram is included at Fig 7. The normal lamp supply voltage is 24 V d.c. at 0.5 A. The lamp fitting consists of two aluminium castings, joined together with hexagonal bolts and captive nuts. The base casting houses the fluorescent 8 W 12 in, tube and the transistorised encapsulated, control circuitry. The top casting houses a perspex window and has a watertight seal attached. PL1 and PL2 are electrical connectors FV 585001 (mating free sockets are FV 585039) fitted at each end of the base casting in order that the d.c. supply can be fed from lamp to lamp in cascade. SW1 is an 'ON', 'OFF', 'ON' switch for local control, and is recessed into the base casting. SW1, PL1, PL2 and all mating surfaces are watertight sealed. C1 and C2 are suppression capacitors and MR1 is a protective diode. Fixing clamps and screws are mounted externally to enable the lamps to be installed without opening the lamp fitting.

N.B.C.system

11. Technical information is detailed in Tkd Veh E 100/2 - E 109/2. The main differences in the system fitted in this vehicle are that the ventilation battery B2 is now situated under the driver's seat and the N.B.C. system supply is routed to DP15 at the distribution panel No 6 Mk 1 via the heavy duty junction box No, 1. Mk 1. (See Fig 1, 10, and 14).

Junction boxes

12. a. FV 645072 Junction box special

Comprises two busbars, each fitted with six terminals, contained in a metal box fitted with a removeable lid. Cable entry is effected through six holes fitted with synthetic rubber grommets. See Fig 8 (4) and Fig 1, 10 and 14.

It is used as the distribution point for the 24 V supply to the static inverters and the r.h. and l.h. radio junction boxes.

b. FV 159972 Heavy duty junction box No 1 Mk 1

Is enclosed in a metal box with a removable lid and fitted with plugs, and sockets as detailed in Table 6, and connected as shown in Fig 9. It is fitted on the forward side of the vehicle. Its purpose is to connect the output of the 24 V battery charger to the vehicle and ventilation batteries. See also Fig 1, 10 and 14.

With the Megohm meter set to the 250 V range the insulation resistance must not be less than 5 MΩ.

MESSAGE CENTRE

Batteries (See Fig 1)

13. a. The vehicle is fitted with eight batteries, secondary, 12 V, 100 Ah, UK 6TN disposed as follows:-

- (1) Two under the driver's seat. Ventilation batteries B.2.
- (2) Two on the r.h. forward sill. Vehicle batteries B.1.
- (3) Four on the floor of crew compartment. Equipment batteries B3 and B4.

b. The ventilation batteries B2 can be charged from either the normal vehicle generating system via the distribution link box, distribution panel and heavy duty junction box or the 24 V battery charger via the heavy duty junction box. B2 provides a 24 V supply for the NBC equipment which is controlled by the battery master switch and fan switch and protected by circuit breaker G at the distribution panel.

c. The vehicle batteries B1 can be charged from either the normal vehicle generating system via the distribution link box, distribution panel and heavy duty junction box or the 24 V battery charger via the heavy duty junction box. B1 provides power for the interior lights which are controlled from the battery master switch on the distribution panel and switch No.2 on the auxiliary junction box in parallel with the interior lights isolation switch. They are protected by circuit breaker A at distribution panel and fuses 2,4 and 5 at auxiliary junction box. B1 also supplies all the normal vehicle electrical system requirements.

d. The equipment batteries B3 and B4 are charged by the normal vehicle generating system via the radio distribution box (see Fig 8 (9)) and distribution link box. B3 and B4 provide a supply for the static inverter, controlled by the switch on the radio distribution box, situated on the rear r.h. sill, and protected by a 100 A fuse in the radio distribution box. A 0-30 V voltmeter situated above the forward l.h. bulkhead indicates the inverter supply voltage.

RADIO RELAY STATION

Batteries (see Fig 10)

14. a. The vehicle is fitted with twelve batteries, secondary, 12 V, 100 Ah, U.K. 6TN type, disposed as follows:-

- (1) Two under the driver's seat. Ventilation batteries B2.
- (2) Four on the r.h. forward sill. Vehicle batteries B1 and equipment batteries B7.
- (3) Six on the floor of the crew compartment. Equipment batteries B5 and B6 and generator start batteries B3 and B4.

b. The ventilation batteries B2 can be charged from either the normal vehicle generating system via the distribution link box, distribution panel, and heavy duty junction box, or the 24 V battery charger via the heavy duty junction box. B2 provides a 24 V supply for the NBC equipment which is controlled by the battery master switch and fan switch and is protected by circuit breaker G at the distribution panel.

c. The vehicle batteries B1 can be charged from either the normal vehicle generating system via the distribution link box, distribution panel and heavy duty junction box or the 24 V battery charger via the heavy duty junction box. B1 provides a 24 V supply for the interior lights which are controlled from the battery master switch at the distribution panel and switch No 2 at the auxiliary junction box - situated to the left of the ventilating fan - in parallel with the interior lights isolating switch. They are protected by circuit breaker 'A' at the distribution panel, and fuses F2, F4 and F5 at the auxiliary junction box.

d. The generator starter batteries B3 and B4 are charged by a circuit incorporated in the 3.5 kVA generating set. For details see Pwr C 462/4.

Static Inverter 1.25 kVA

15. Provides an alternative 240 V a.c. 50 Hz supply for 'silent operation', and is mounted to the left of the entrance to the driver's compartment and below the 600 VA inverter. Full technical details will be found in Tels K 080.

3.1/2 kVA Generating set

16. Two generating sets, a.c., 3.1/2 kVA, 120/240 V, single phase, 50 hz (Onan) are situated on the vehicle roof enclosed in an armoured box (see Tkd Veh E 100/9.) They are remotely controlled by the generator control unit, which also connects the output from the generators to the power distribution unit. Full technical description and repair data is contained in Pwr C 460/4 to C 469/4.

Generator control unit FV 607095

17. The generator control unit is mounted above the power distribution unit on the rear l.h. wall of the vehicle (see Fig 2). It is equipped with separate generator start switches SW2 and SW3 Fig 2 (6) (11) and indicator lamps LP1 and LP2 Fig 2 (2) (4) for the two 3.1/2 kVA generating sets. A 0-20 A AMMETER AM Fig 2 (3) is provided for indicating the 'On load' current of the working generator selected by switch SW1 Fig 2 (7), positioned below the meter. SW1 is marked GEN No.1 and GEN No.2 which denotes the rear and forward generators respectively. Fixed plugs PL2 and PL4 accept the input from generators No.1 and No.2 respectively. Fixed plugs PL1 and PL3 are used to complete the generator starting circuits and fixed socket SK1 accepts the load supply cable.

A circuit diagram of the assembly is depicted at Fig 11.
Table 5 details the components for the assembly.

With the megohm-meter set to the 500 V range the insulation resistance must not be less than 5 MΩ.

Junction boxes

18. a. Junction box 230 small FV 606954

Fitted on the l.h. side of the compartment, and serves as a distribution point for the 230 V a.c. supply to the equipment mounted on the l.h. side of the vehicle. It comprises a metal box with a removable lid. Inter plug and socket connections are effected in Unipren 6. Circuit detail is given in Fig 12.

b. Junction box 230 V large FV 606950

Fitted on the rear r.h. side of the vehicle, and serves as a distribution point for the 230 V a.c. supply to equipment mounted on the r.h. side of the vehicle. It comprises a metal box with removable lid. Inter plug and socket connections are effected in Unipren 12 and Unipren 6. Circuit details are given in Fig 13.

c. In this type there is a second heavy duty junction box fitted on the r.h. side of the vehicle, below the junction box special. (See Fig 8 (5)). Its purpose is to connect the equipment batteries B5 and B6 in parallel and take a common positive to the radio distribution box. (See Fig 8 (9)).

AUTOMATIC TELEPHONE EXCHANGE

Batteries (See Fig 14)

19. a. The vehicle is fitted with twelve batteries, secondary, 12 V, type UK 6TN disposed as follows:-

- (1) Two under the driver's seat. Ventilation batteries B2.
- (2) Two on the r.h. forward sill. Vehicle batteries B1.
- (3) Two on the r.h. rear sill, Equipment batteries B3.
- (4) Two under crew seat. Equipment batteries B4.
- (5) Four under table at l.h. rear of vehicle. Exchange battery B5. (See Fig 15 (12) (13)).

b. The ventilation batteries B2 can be charged from either the normal vehicle generating system via the distribution link box, distribution panel and heavy duty junction box or the 24 V battery charger via the heavy duty junction box. B2 provides a 24V supply for the NBC equipment which is controlled by the battery master switch and fan switch and protected by circuit breaker G at the distribution panel.

c. The vehicle batteries B1 can be charged from either the normal vehicle generating system via the distribution link box, distribution panel and heavy duty junction box, or the 24 V battery charger via the heavy duty junction box. B1 provides power for the interior lights and also supplies all the normal vehicle electrical system requirements.

d. The equipment batteries B3 and B4 are charged from the normal vehicle generating system and provide a 24 V supply for the 600 VA inverter, the 'I' box and harness equipment via the radio distribution box. These circuits are controlled by the radio distribution box master switch and are protected by a 100 A fuse in the radio distribution box. A 0-30V voltmeter situated above the forward l.h. bulkhead indicates the inverter supply voltage.

e. The exchange battery B5 is charged from the 50 V battery charger via the power control and visual alarm unit, and provides the 48 V d.c. supply for the exchange.

Battery charger 50 V (Fig 15)

20. This unit is used to float charge battery B5. It is situated on the l.h. sill to the right of the 24 V charger. It is a modified Westinghouse type 1667 constant potential rectifier set which provides a smoothed d.c. output

of 54 V at 1.5 A. It can be adjusted in 10 V steps to operate from 50 Hz supplies within the range 200 to 250 V.

The unit has no external controls, and the connecting cables pass through grommets on the side of the case. The controlling switches and fuses for the unit are located on the power control unit.

Full details of the charger will be found in Comms Inst Z 102 BRUIN Communication System (when published).

Power control unit (Fig 15)

21. This unit provides control and alarm facilities for the 50 V battery charger and batteries B5 (12) (13). The upper half of the front panel contains three fuses for the 50 V battery charger, 1 x 1A primary fuse (3) 2 x 3A secondary fuses (4) (5) and a switch for disconnecting the batteries from the charger (7). Three 'press to test' lamps are provided (6) to indicate failure of the charger, the control circuit in the lower half of this unit and the exchange fuses and ringing supply. The lower half of the front panel contains an ON/OFF switch (10) for the a.c. supply to the charger, and two warning lamps, one of which indicates failure of fuses inside the unit (11) and the other a lowering of the battery voltage (8) Full details of the power control unit will be found in Comms Inst Z 102 BRUIN Communication System (when published).

TABLE 1
POWER SUPPLIES

Type of installation	Generating sets	Static inverters	External supply	Batteries	Battery charger
Radio relay station SRC50/R236	Two 3.5 kVA 230 V 1 phase 50 Hz(Onan)	One 240 V a.c. 50 Hz and one 1.2 kVA and one 600 VA	240 V 50 Hz 1 phase	Twelve Secondary Lead acid 12 V 100 Ah	One 24V Still at the design stage.
Telephone central office automatic 20 line HQ	-	One 240 V a.c. 50 Hz 600 VA	240 V 50 Hz 1 phase	Twelve Secondary Lead acid 12 V 100 Ah	One 24 V (as above) One 50 V
Message centre	-	One 240 V a.c. 50 Hz 600 VA	240 V 50 Hz 1 phase	Eight Secondary Lead acid 12 V 100 Ah	One 24 V (as above)

TABLE 2

ADDITIONAL CABLES REQUIRED FOR POWER AND
LIGHTING CIRCUITS MESSAGE CENTRE

NATO Pt No	Designation	Location
A	B	C
5995-99-193-6742	Cable power electrical	Fluorescent light(centre) to terminal block.
5995-99-193-6743	Cable power electrical	Fluorescent light(rear) to terminal block.
5995-99-193-6765	Cable power electrical	Radio junction box left hand to voltmeter.
5995-99-193-6741	Cable power electrical	24V battery charger to distribution link box.
5995-99-193-6601	Cable power electrical	24V battery charger to heavy duty junction box.
5995-99-193-7638	Wiring harness	Junction box special to 600 VA inverter.
5995-99-193-6744	Cable and conduit electrical	Safe earth to power distribution unit.
6145-99-193-7531	Cable and conduit electrical	Radio distribution box to battery B3.
6145-99-193-7532	Lead secondary battery	Radio distribution box to battery B4.
6145-99-193-7530	Lead secondary battery	Battery B3 and B4 to earth.
FV 167663/1	Lead secondary battery	Battery links B3 and B4.
5995-99-193-6766	Lead electrical	Power distribution unit to earth.
5995-99-193-6767	Wiring harness	Junction box special to radio junction boxes l.h. and r.h.
5995-99-193-6768	Wiring harness	Radio distribution box to junction box special.
5995-99-193-6769	Wiring harness	Radio distribution box to junction box special.
5995-99-193-6746	Cable power electrical	Electric lantern to power distribution unit.
5995-99-193-6600	Cable and conduit electrical	Power input plug to power distribution unit.
5995-99-193-6737	Cable power electrical	Fluorescent light(forward) to roof light.
5995-99-193-6606	Cable power electrical	Power distribution unit to inverter 600 VA.
5995-99-193-6607	Cable power electrical	24V battery charger to power distribution unit.

TABLE 3

ADDITIONAL CABLES REQUIRED FOR POWER
AND LIGHTING RADIO RELAY STATION

NATO Pt No	Designation	Location
A	B	C
FV 167810/9	Lead electrical	'Radio' battery B7 -ve to earth.
FV 167663/1	Lead electrical	Connecting link 'radio' battery B7.
5995-99-193-6765	Cable electrical power	LH battery junction box to voltmeter.
5995-99-193-6767	Wiring harness	Junction box special to r.h. and l.h. junction boxes.

A	B	C
5995-99-193-6768	Wiring harness	Junction box special to radio distribution box (2).
5995-99-193-6769	Wiring harness	Junction box special to radio distribution box (3).
5995-99-193-7640	Wiring harness	Junction box special to 600 VA inverter,
SD/B 225391	Cable electrical power	Junction box special to 1.25 kVA inverter.
6145-99-193-7527	Lead secondary battery	'T' junction box to battery B6
6145-99-193-7528	Lead secondary battery	'T' junction box to battery B5.
FV 167810/9	Lead electrical	Battery B6 -ve to earth) Battery B5 -ve to earth)
FV 167663/1	Lead electrical	Connecting link battery B6) Connecting link battery B5)
5995-99-193-6737	Cable electrical power	Roof light to fluorescent light.
5995-99-193-6602	Cable electrical power	24V battery charger to heavy duty junction box.
5995-99-193-6740	Cable electrical power	24V battery charger to distribution link box.
5995-99-193-7643	Lead electrical	'T' junction box terminal 4 to 5.
5995-99-193-6604	Cable electrical power	Power distribution panel to 600VA inverter.
5995-99-193-6582	Cable electrical power	Power distribution panel to 1.25kVA inverter.
6145-99-193-7525	Lead secondary battery	Battery B3 +ve to Generator No.2
6145-99-193-7529	Lead secondary battery	Battery B3 -ve to Generator No.2
6145-99-193-7525	Lead secondary battery	Battery B4 +ve to Generator No.1
6145-99-193-7529	Lead secondary battery	Battery B4 -ve to Generator No.1
5995-99-193-6613	Cable electrical power	Power distribution panel to 24V battery charger.
5995-99-193-7663	Cable electrical power	Power distribution panel to junction box 230V small.
5995-99-193-6766	Lead electrical	Power distribution panel to earth.
5995-99-193-6598	Cable and conduit assy	Power distribution panel to external input plug.
5995-99-193-7645	Lead electrical	Radio distribution box to 'T' junction box.
5995-99-193-6747	Cable electrical power	Power distribution panel to electric lantern.
5995-99-193-6742	Cable electrical power	Terminal block to fluorescent light.
5995-99-193-6738	Cable electrical power	Roof light to fluorescent light.
5995-99-193-6705	Cable electrical power	Generator control panel to generator No 2 (Shell).
5995-99-193-6612	Cable electrical power	Power distribution panel to junction box large.
5995-99-193-6619	Cable electrical power	Power distribution panel to junction box large.
5995-99-193-6703	Cable electrical power	Generator control panel to generator No.2 (Shell).
5995-99-193-6704	Cable electrical power	Generator control panel to generator No.1 (Shell).

A	B	C
5995-99-193-6706	Cable electrical power	Generator control panel to generator No.1 (Shell).
5995-99-193-6620	Cable electrical power	Power distribution panel to generator control panel.
5995-99-193-6744	Cable and conduit assy	Power distribution panel to safe earth terminal.
5995-99-193-6611	Cable electrical power	Generator No.2 to shell) Generator No.1 to shell)
5995-99-193-6711	Cable electrical power	Generator No.2 to shell) Generator No.1 to shell)
5995-99-193-7676	Lead electrical	Generator No.2 to shell) Generator No.1 to shell)
5995-99-193-6777	Lead electrical	Generator No.2 to shell) Generator No.1 to shell)

TABLE 4

ADDITIONAL CABLES REQUIRED FOR POWER AND
LIGHTING CIRCUITS - AUTOMATIC EXCHANGE

NATO Pt No.	Designation	Location
A	B	C
5995-99-193-6766	Lead electrical	Power distribution panel to earth
5995-99-193-6744	Cable and conduit assy	Power distribution panel to safety earth terminal.
5995-99-193-6599	Cable and conduit assy	Power distribution panel to external input.
5995-99-193-6746	Cable power electrical	Power distribution panel to lantern electric.
6145-99-193-7526	Lead secondary battery	Battery B3 and B4 connecting link .
FV 167663/1	Lead secondary battery	Battery B3 and B4 connecting links.
5995-99-193-6609	Cable power electrical	Power distribution panel to power control unit.
5995-99-193-6610	Cable power electrical	Power distribution panel to 24V battery charger.
5995-99-193-6605	Cable power electrical	Power distribution panel to 600 VA inverter.
5995-99-193-6745	Cable power electrical	Power distribution panel to junction box 200/13.
5995-99-193-7637	Wiring harness	Battery B5 to power control unit and charger 50V.
5995-99-193-6697	Cable power electrical	Power control unit to charger 50V.
5995-99-193-7639	Wiring harness	Inverter 600 VA to junction box special.
5995-99-193-6740	Cable power electrical	24V battery charger to distribution link box.
5995-99-193-6602	Cable power electrical	24V battery charger to heavy duty junction box.

A	B	C
FV 167810/9 FV 167663/1 6145-99-193-7532	Lead electrical Lead secondary battery Lead secondary battery	Battery B3 and B4 -ve to earth. Battery link B5. Radio distribution box to battery B3.
5995-99-193-6768	Wiring harness	Radio distribution box to junction box special.
5995-99-193-6769	Wiring harness	Radio distribution box to junction box special.
5995-99-193-6767	Wiring harness	Junction box special to connector.
5995-99-193-6765	Cable power electrical	Radio junction box l.h. to voltmeter.
5995-99-193-6738	Cable power electrical	Fluorescent light (rear) to roof light.
5995-99-193-6739	Cable power electrical	Fluorescent light (forward) to roof light.

TABLE 5
FV 607095 - GENERATOR CONTROL UNIT
COMPONENT LIST

Circuit reference	Component	NATO Pt No
A	B	C
PL1 and PL3	Plug electrical M4	5935-99-013-1244
PL2 and PL4	Plug electrical Plessey 508/1/07265/200	5935-99-911-4462
LP1 and LP2	Light indicator Lens indicator light Lamp glow	6210-99-012-0906 6210-99-012-2858 6240-99-996-2117
SW1	Switch rotary Arrow electric switches Ltd P3P1/0354B or equivalent	5930-99-198-2946
SW2 and SW3	Switch toggle	5930-99-956-1438
AM	Ammeter 0-20 A	6625-99-900-1889
SK1	Socket electrical Plessey No. 508/1/07245/220	5935-99-940-8629
R1 and R2	Resistor wire wound Ceramic 100 k Ω 1/2 W	

Note: These Pages 15-16, Issue 2, supersede Pages 15-16, Issue 1, dated Jun 71. Table 7 has been amended, see ●

TABLE 6
FV 159972. HEAVY DUTY JUNCTION BOX NO.1 MK 1
COMPONENT LIST

Circuit reference	Component	NATO Pt No
A	B	C
PL1	Plug fixed C.Z. 63919 MK 4. 2-60 A) 3-19 A)	5935-99-940-9989
PL5 and PL6	Plug heavy duty. V.5658/216P. FV 39348	
SK2, SK3, SK4 and SK7	Socket heavy duty V5658A/216.S.	

TABLE 7
FV 606968 POWER DISTRIBUTION UNIT
COMPONENT LIST

Circuit reference	Component	NATO Pt No
A	B	C
RLA and RLC	Relay heavy duty magnetic devices 250/700 ZA4/230	5945-99-198-2936
RLB	Relay heavy duty magnetic devices 250/620 ZA4-ZC4/250	5945-99-198-2935
RLD	Relay armature	5945-99-053-0011
FS1 and FS2	Fuse holder and fuse link electrical 10A	5920-99-932-1236 5920-99-059-0146
LP1 and LP2	Light indicator Lens indicator light Lamp glow	6210-99-012-0906 6210-99-012-2858 6240-99-996-2117
PL1, PL2 and PL3	Plug electrical Plessey 508/1/07265/220	5925-99-911-4462
PL4	Plug electrical	5935-99-013-1244

A	B	C
R1 and R2	Resistor fixed wire wound 1k Ω 3W	5905-99-011-3320
R3 and R4	Resistor fixed wire wound 2.2k Ω 6W	5905-99-011-3405
R5	Resistor fixed wire wound 3k Ω 6W	5905-99-011-3408
R6	Resistor fixed wire wound 270 Ω 3W	5905-99-011-3306
R7, R8 and R9	Resistor fixed wire wound 200 Ω 3W	5905-99-011-3303
R10 and R13	Resistor fixed wire wound 33k Ω	5905-99-014-0376
R11 and R12	Resistor fixed wire wound 820 Ω	5905-99-014-0338
R14 and R15	Resistor fixed wire wound Ceramic 100k Ω 1/2W	
VM	Voltmeter 0-30V a.c.	6625-99-077-1197
SA, SB and SC.	Switch toggle 2 pole 3A 250 V a.c./d.c.	5930-99-051-0555
DS	Switch rotary wafer type DH-3 section 3 pole, 4 position HD indexing 60 $^{\circ}$ M.A.B.	5930-99-198-2950
SE	Switch rotary wafer type DH-1 section, 2 Pole, 4 position 30 $^{\circ}$ M.A.B.	5930-99-198-2955
SK1	Socket electrical Plessey 508/1/07245/220	5935-99-932-2646
SK2, SK3, SK4, SK5, SK6, SK7, and SK8	Socket electrical	5935-99-013-1448
SK9	Socket electrical MK Electric Ltd. No.7333.	5935-99-198-2951
MR1, MR2, MR3 and MR4	Silicon diode CV 7024	5960-99-037-2044
TM1 and TM2	Chassis earth terminal Safe earth terminal	5940-99-012-0234

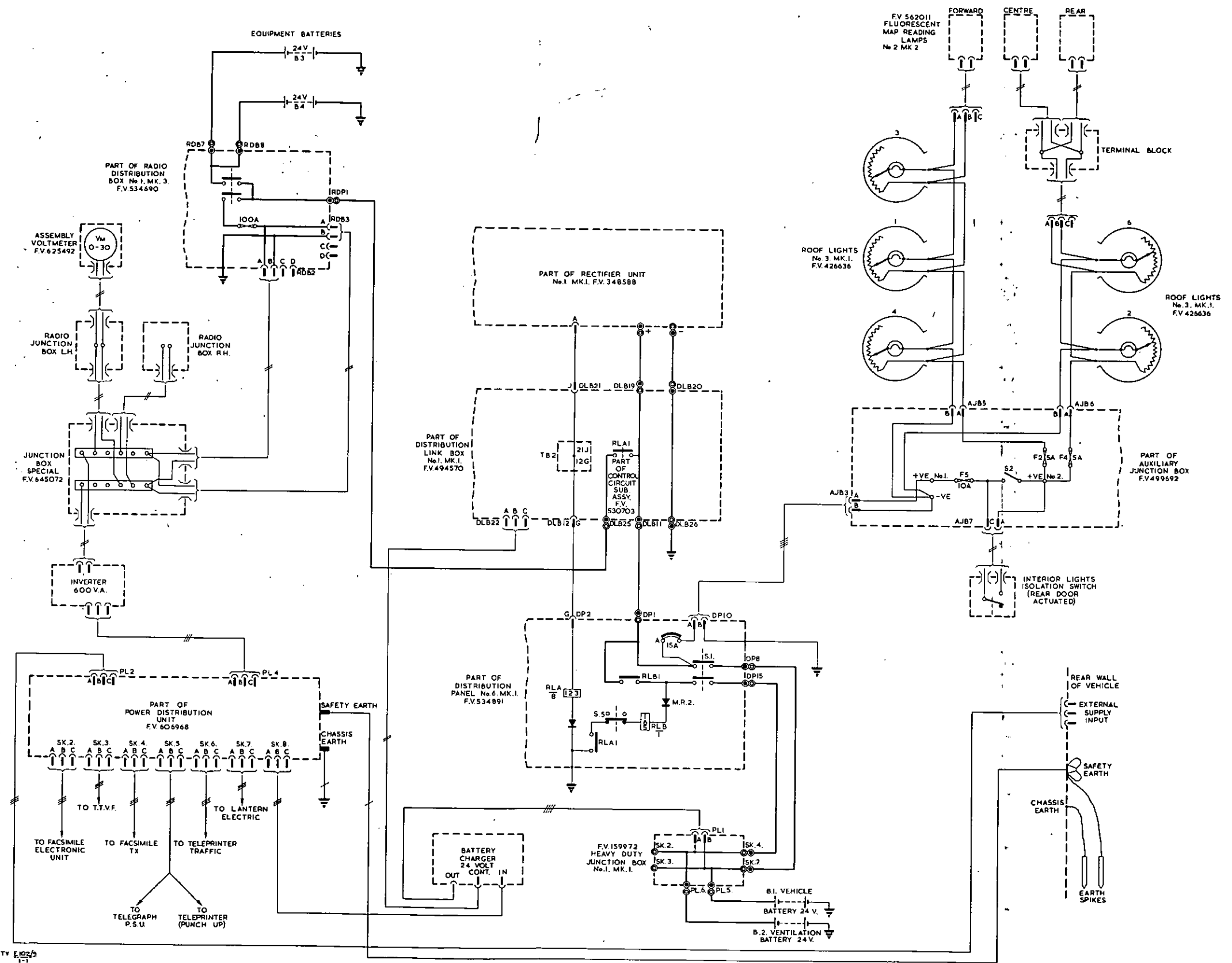
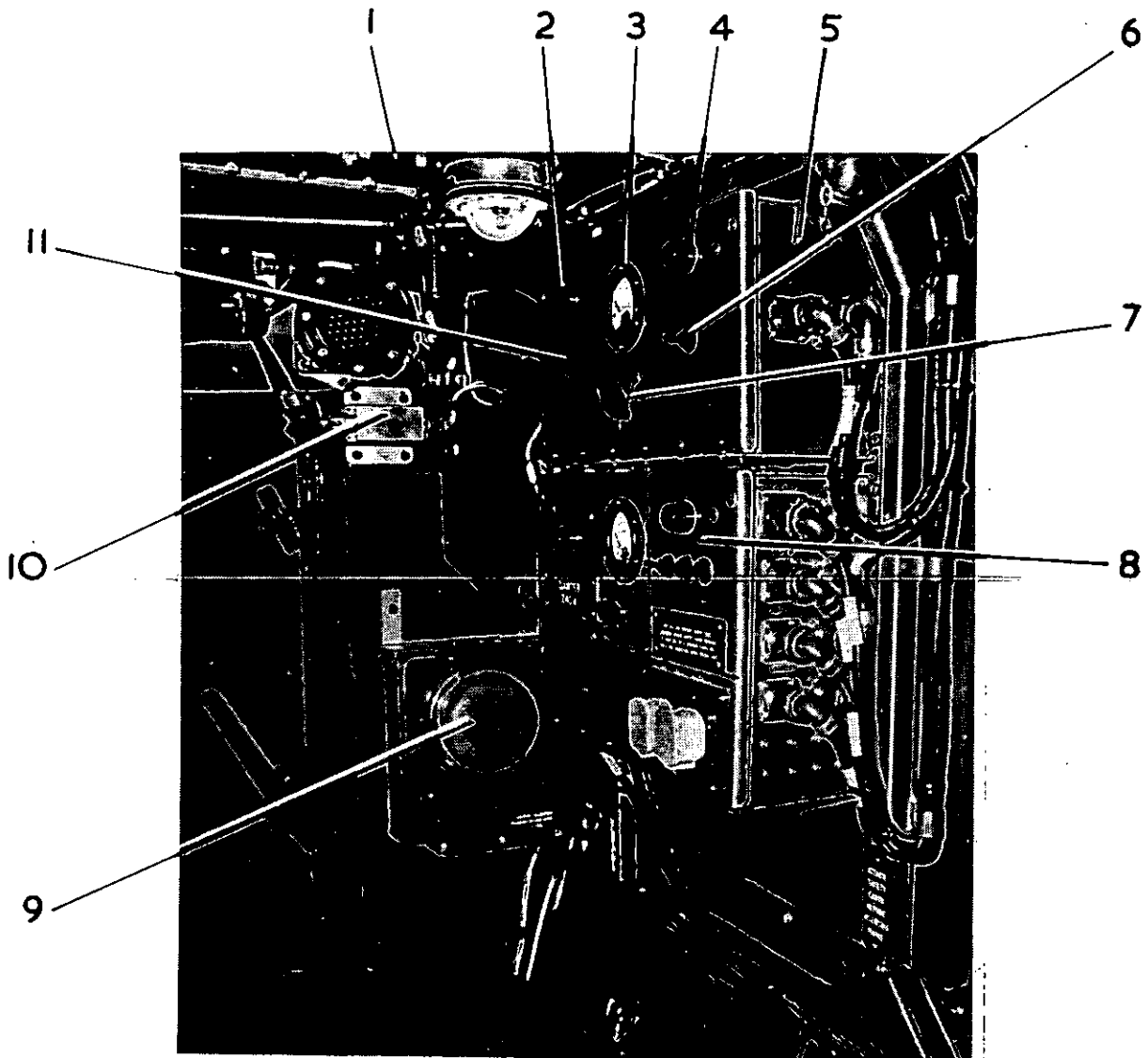


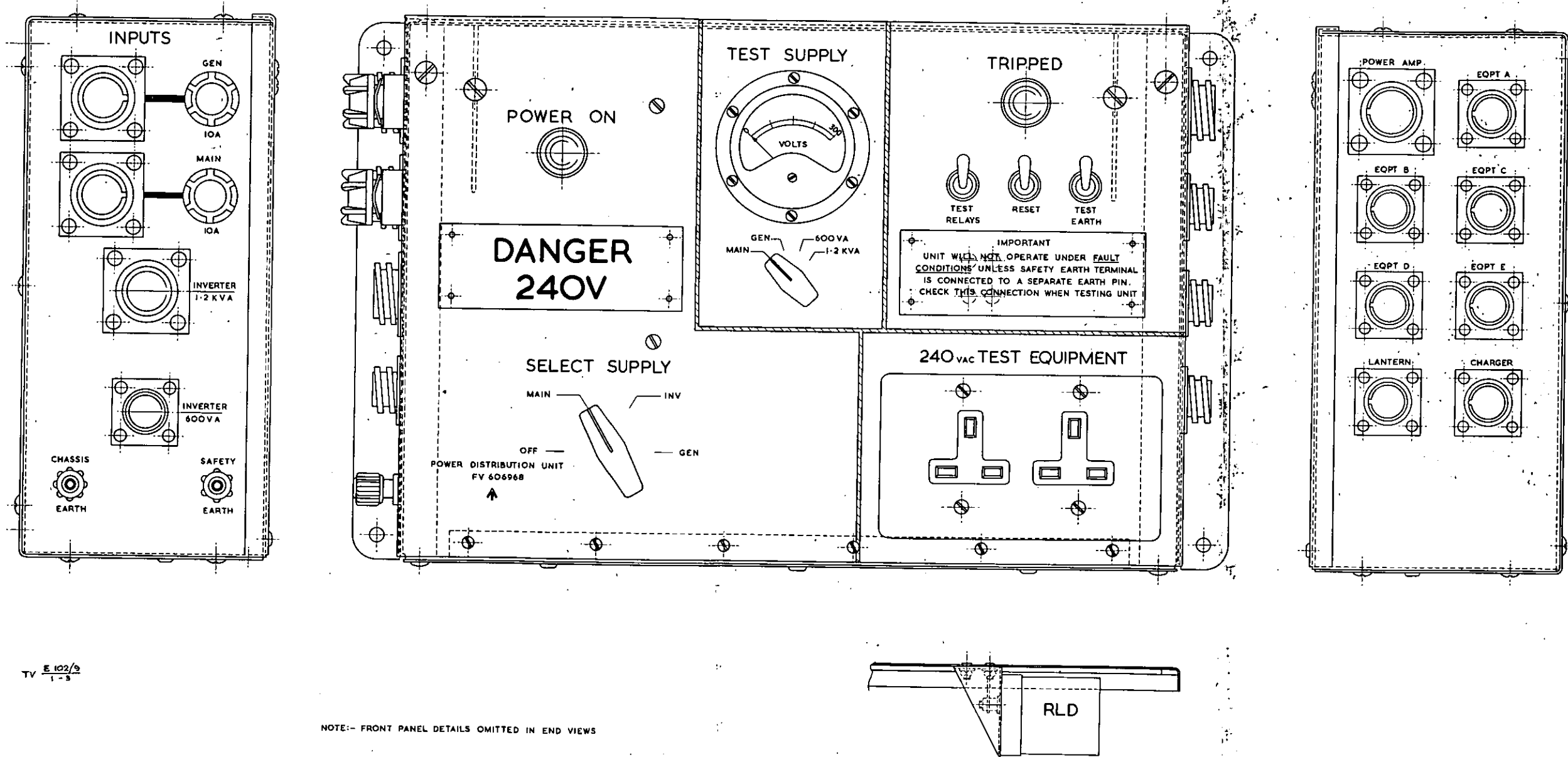
Fig 1 - Power supply and lighting circuits. Message centre



TV E 102/9
1-2

Fig 2 - Generator control and power distribution units. Radio relay station.

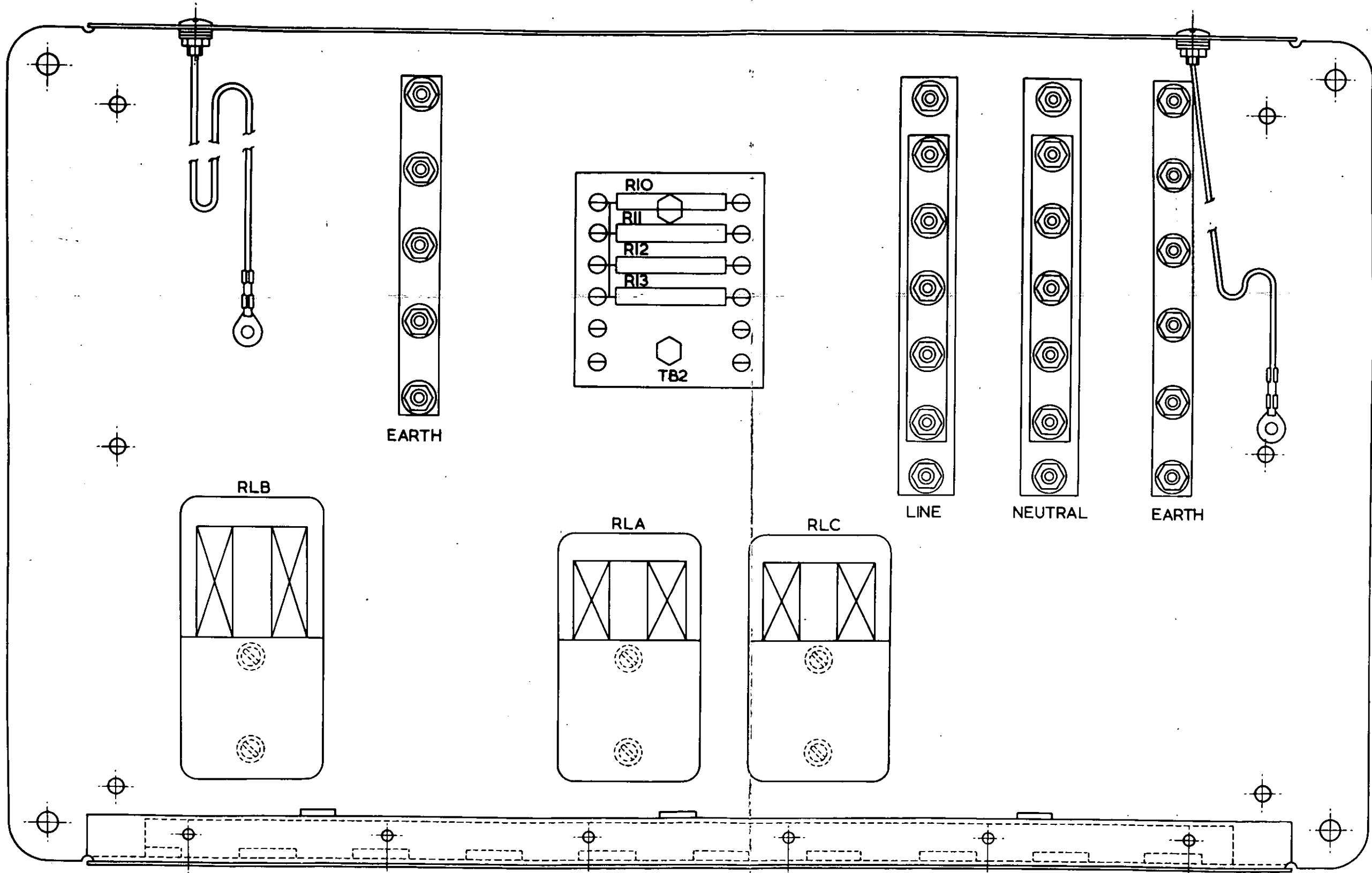
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|-------------------------------|--------------------------------------|
| 1. NBC pressure release valve | 7. Generator selection switch SW1 |
| 2. Indicating lamp LP1 | 8. Power distribution unit |
| 3. Ammeter AM | 9. Electric lantern |
| 4. Indicating lamp LP2 | 10. Interior lights isolating switch |
| 5. Generator control panel. | 11. Stop/start switch SW2 |
| 6. Stop/start switch SW3 | |



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1-3

NOTE:- FRONT PANEL DETAILS OMITTED IN END VIEWS

Fig 3 - General arrangement, Power distribution unit.



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1-4

Fig 4 - Power distribution unit. Sub-assembly box.

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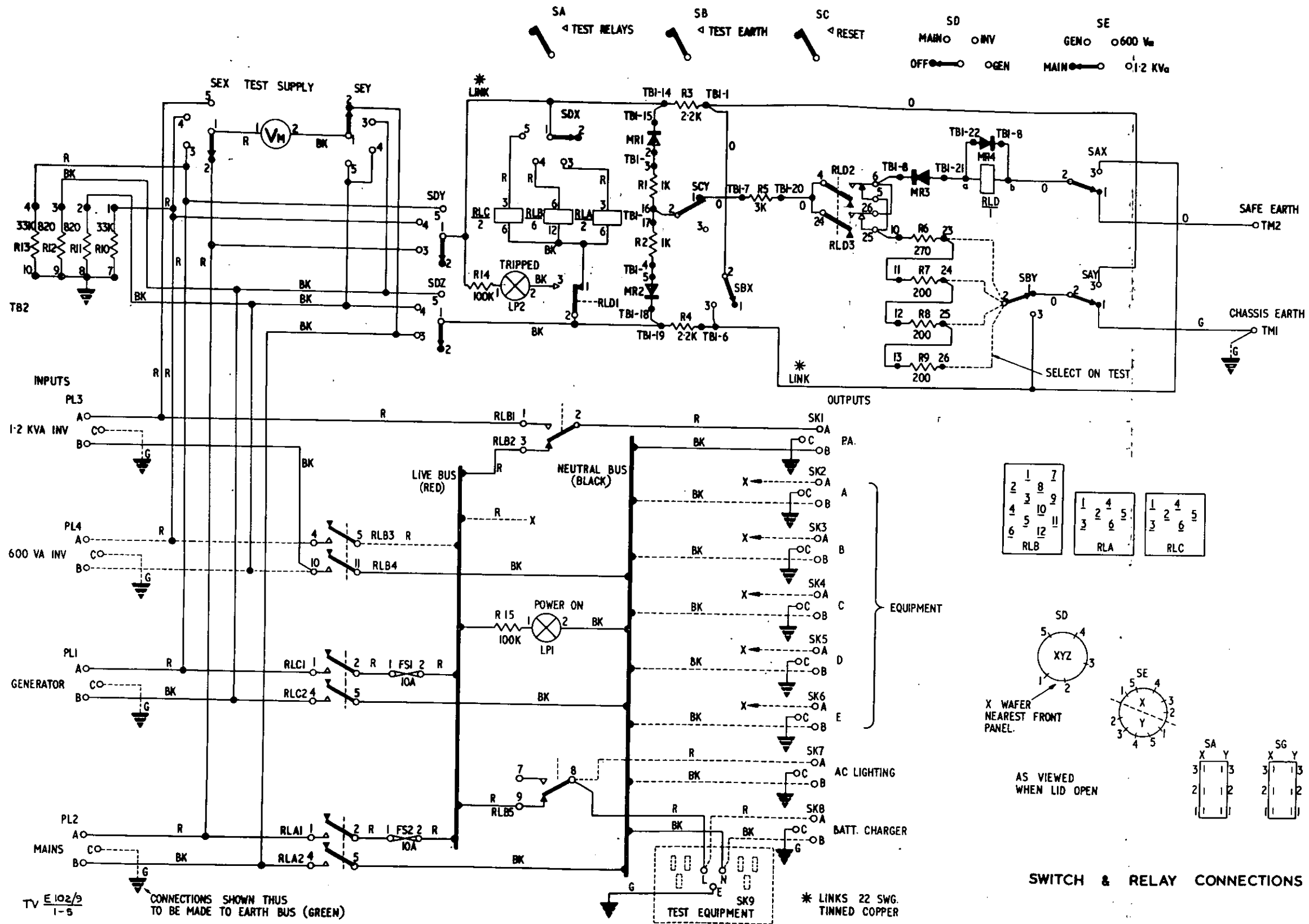
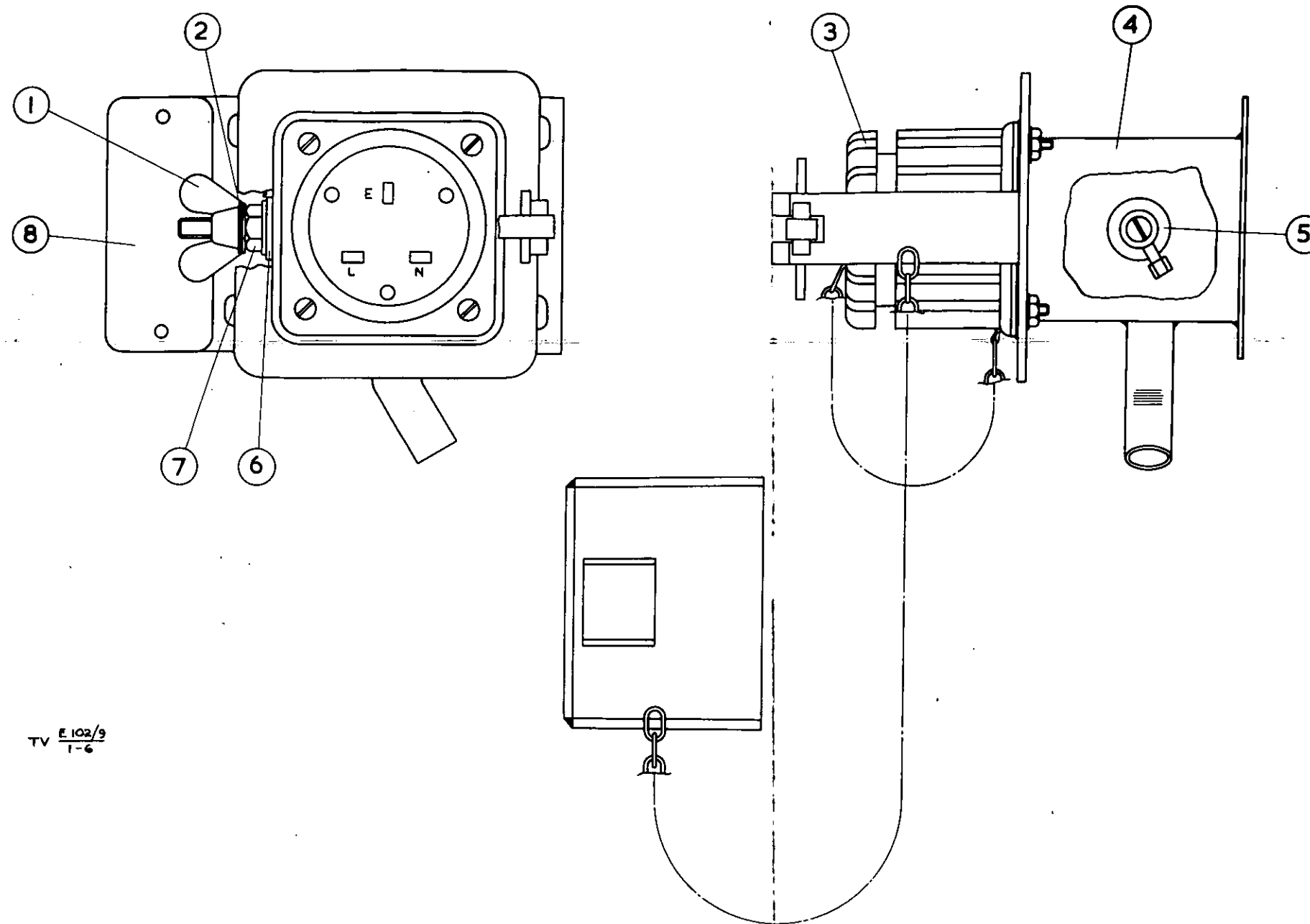


Fig 5 - Power distribution unit. Wiring diagram

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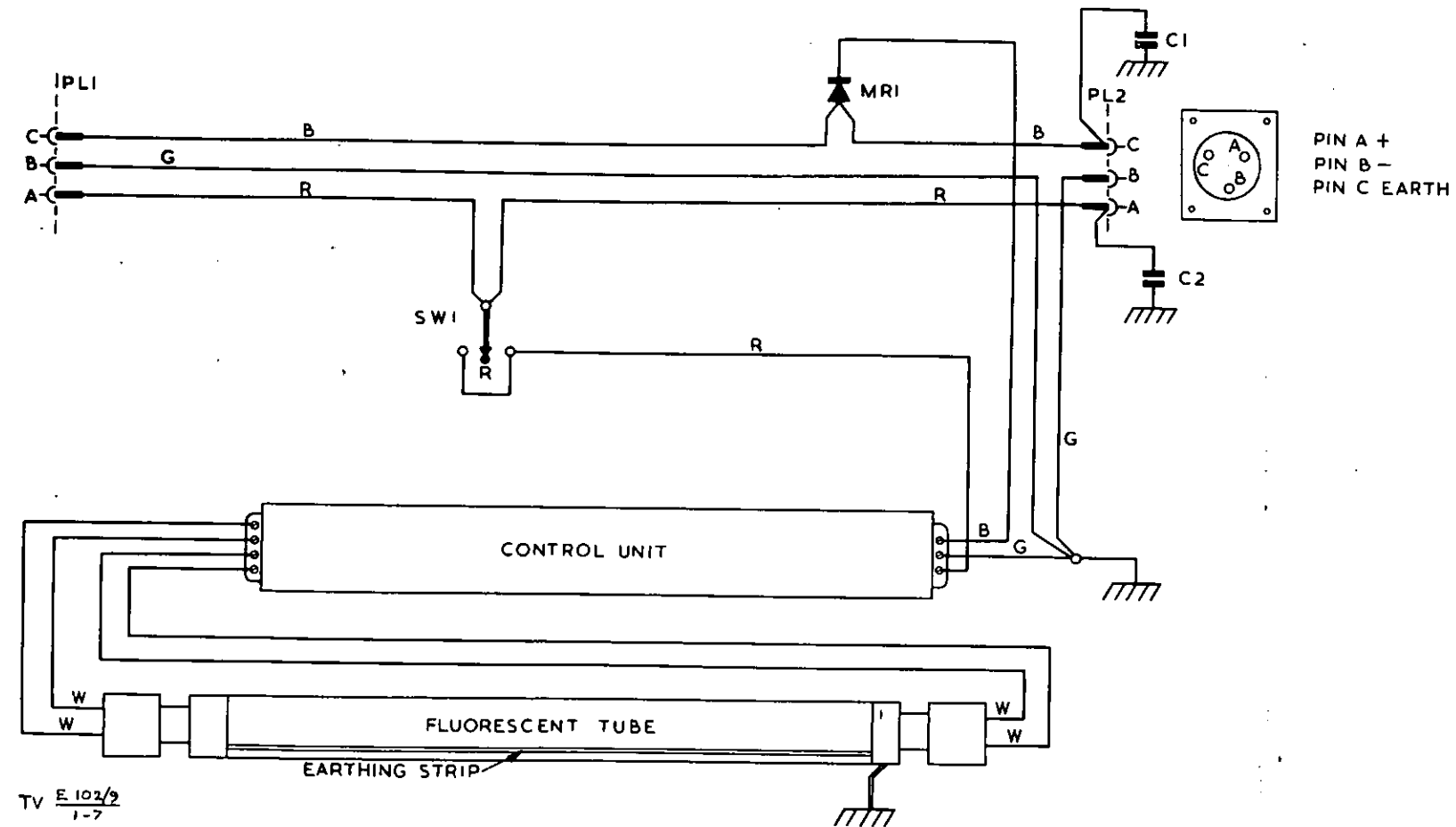


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Fig 6 - Power input assembly

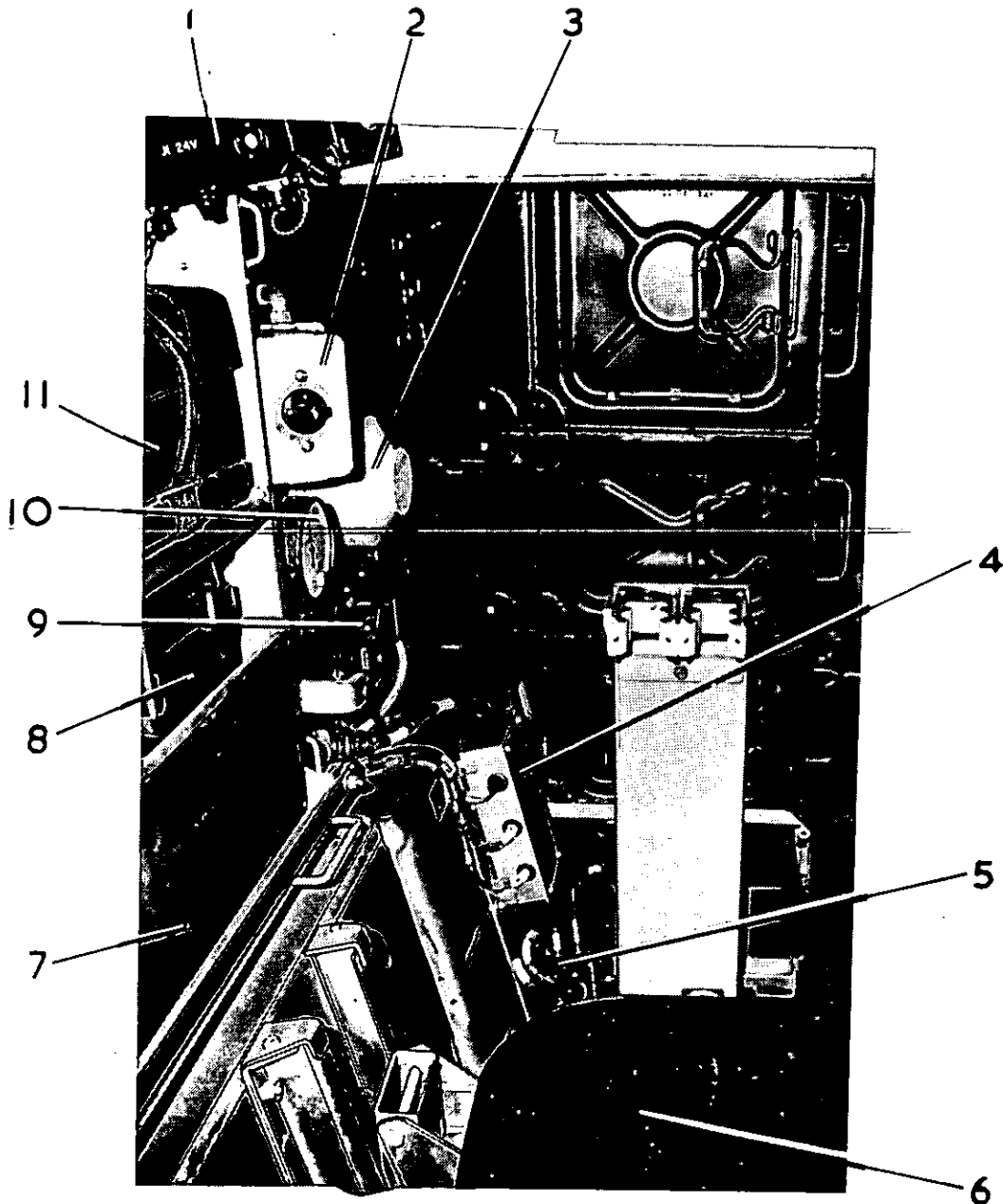
- 1. 5/16 in. UNC wing nut
- 2. 5/16 in. plain brass washer
- 3. Fixed sealed 13 A plug
- 4. Welded casing

- 5. Insulated bush
- 6. Collar
- 7. 5/16 in. brass nut
- 8. Safety plate



COLOUR CODE
W WHITE
G GREEN
R RED
B BLACK

Fig 7 - Wiring diagram. Fluorescent map reading
lamp No.2 Mk 2.

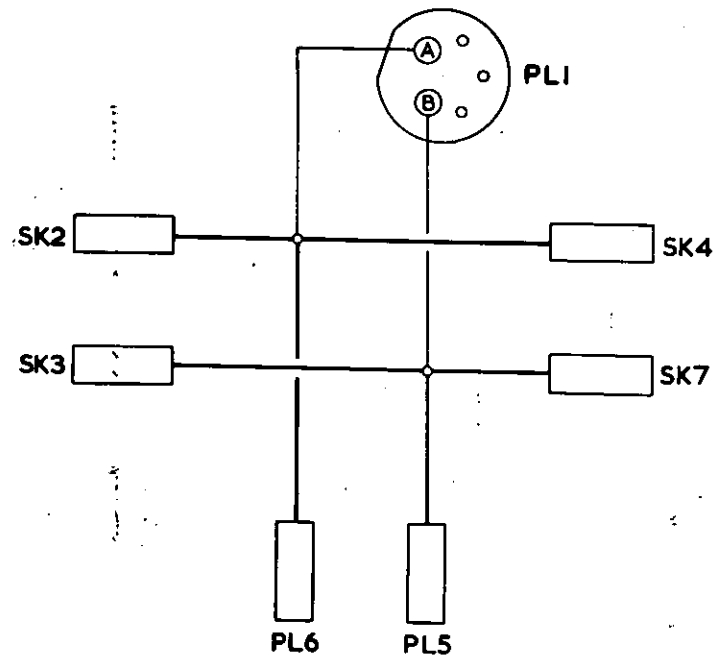
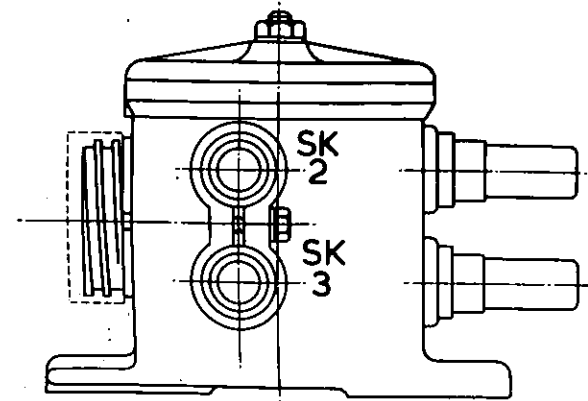
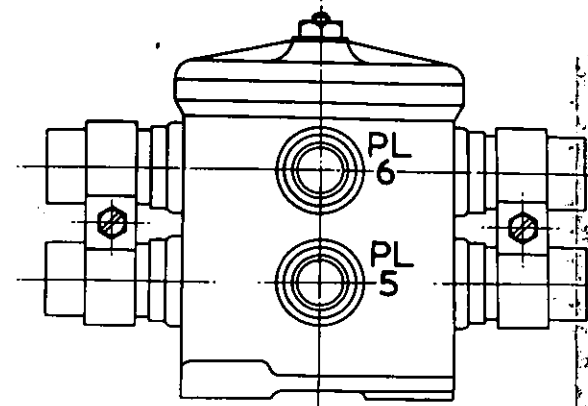
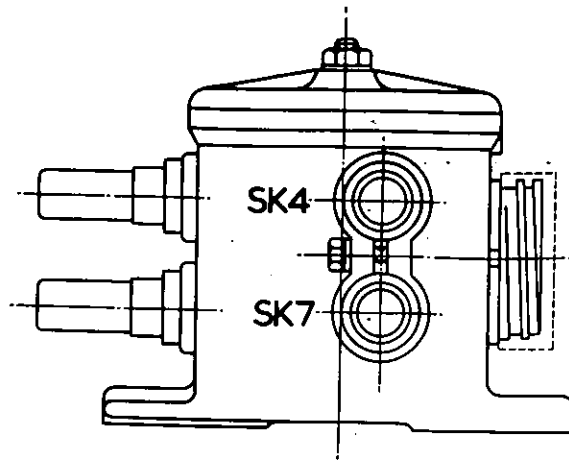
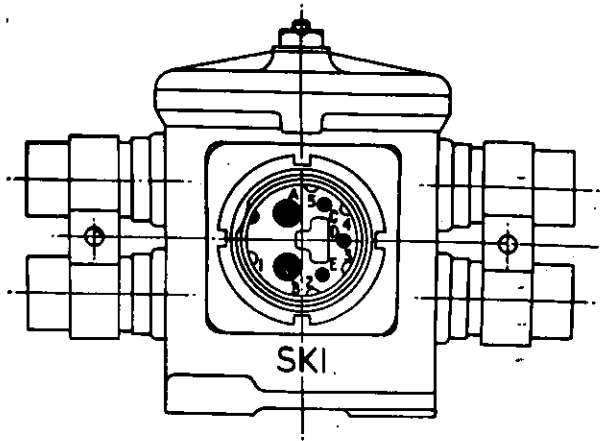


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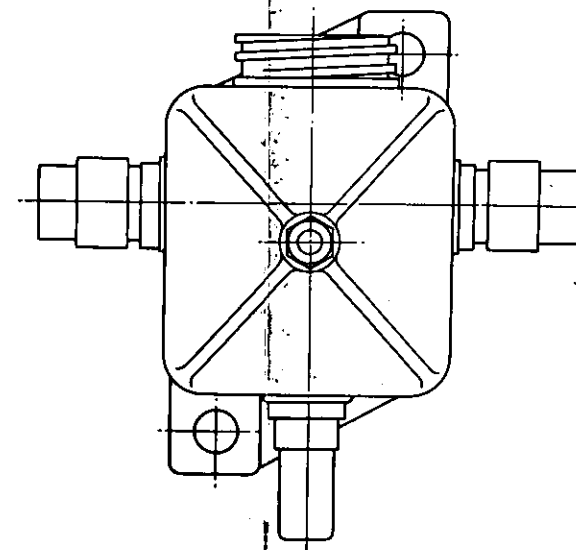
Fig 8 - Right hand view from driver' seat,
radio relay station.

- | | |
|----------------------------|-----------------------------------|
| 1. J1 Box | 7. Battery container |
| 2. Fan controller | 8. Equipment battery B3 |
| 3. Fan pressurising | 9. Radio distribution box |
| 4. Junction box special | 10. NBC pressure gauge |
| 5. Heavy duty junction box | 11. Engineering circuit telephone |
| 6. Driver's seat | |

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WIRING DIAGRAM



TV E102/9
1-9

Fig 9 - Heavy duty junction box

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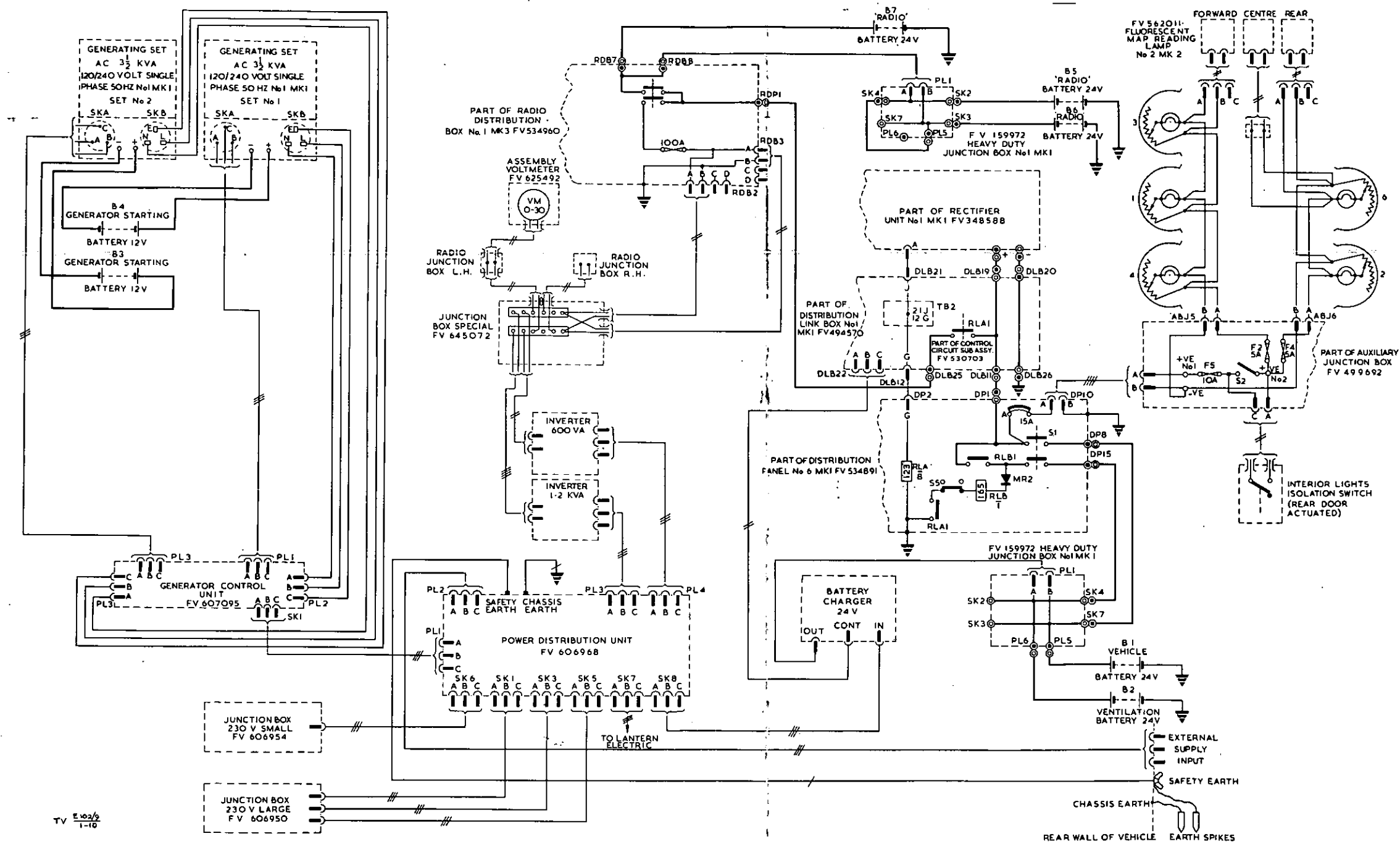
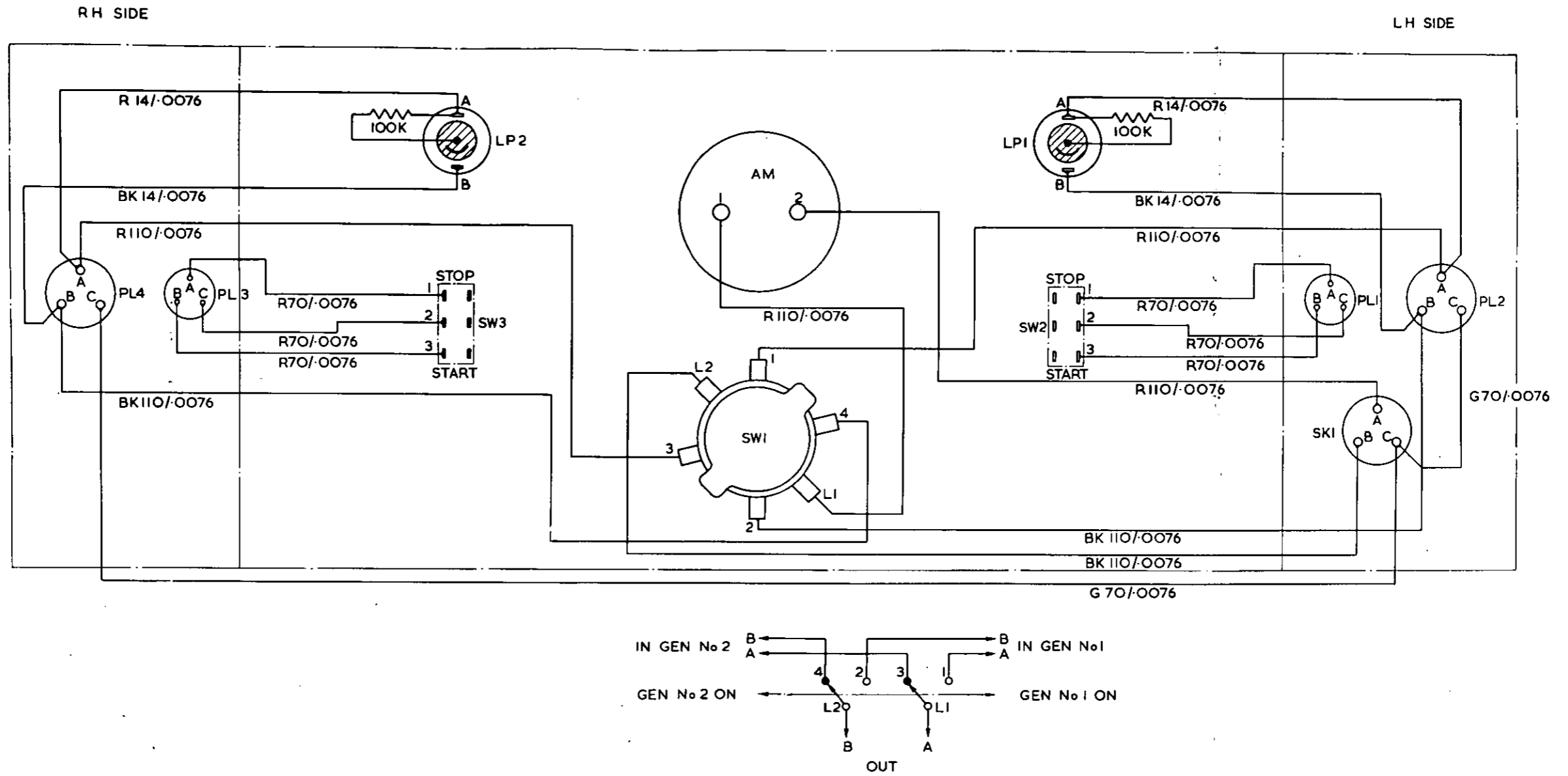


Fig 10 - Power supply and lighting circuits,
radio relay station.



TV E 102/2
1-11

VIEW FROM INSIDE BOX

Fig 11 - Generator control panel circuit

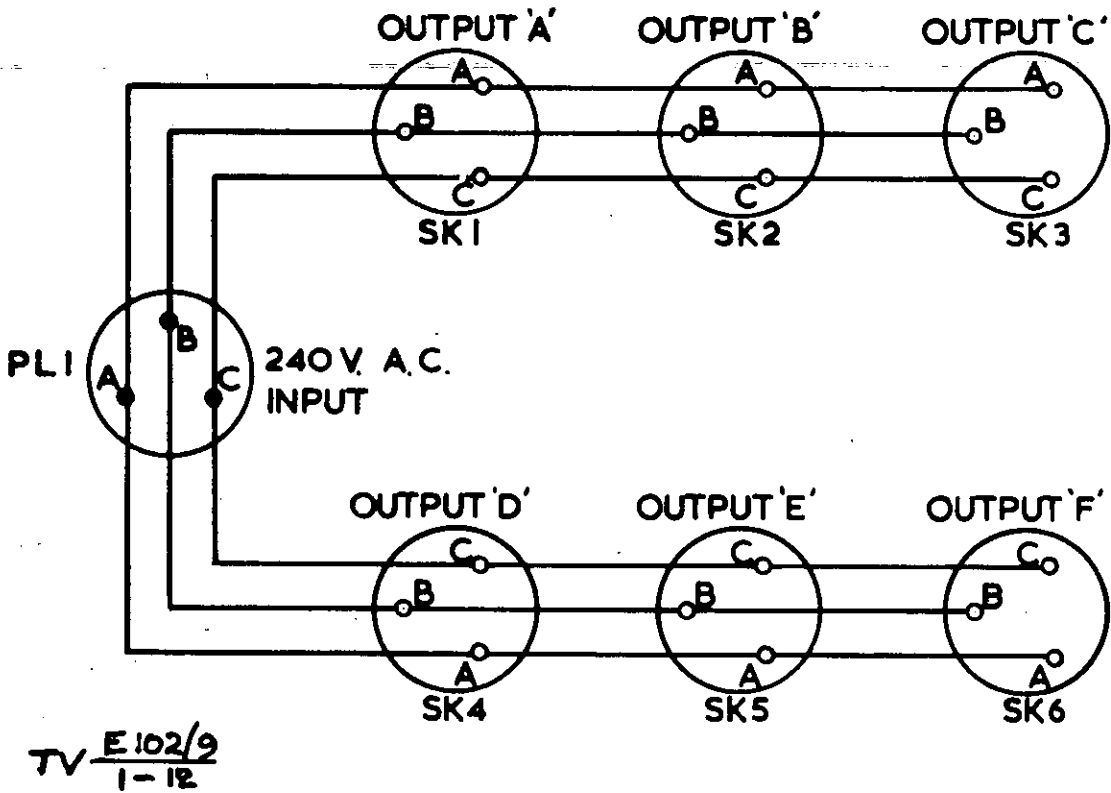


Fig 12 - Junction box small

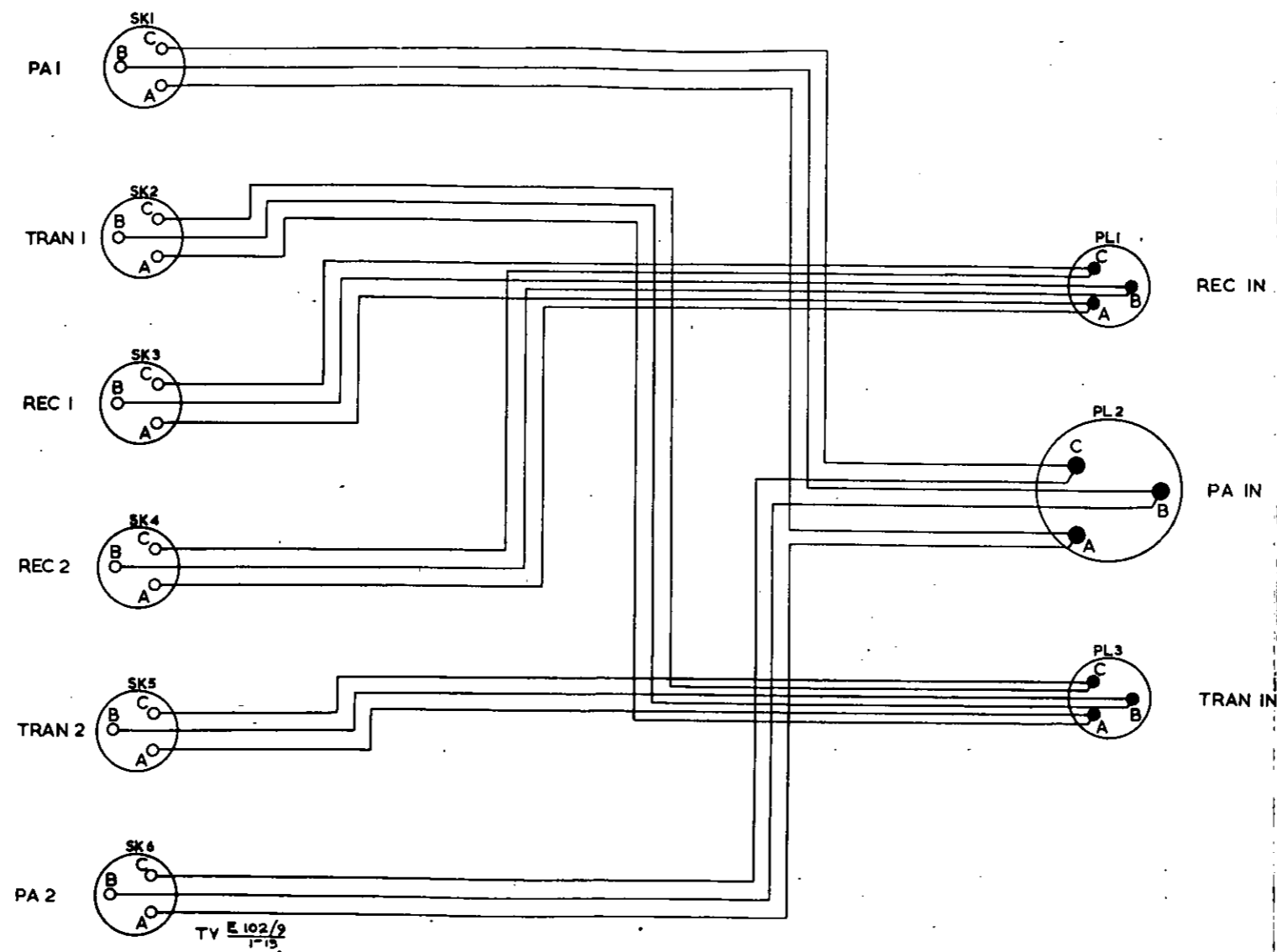


Fig 13 - Junction box large

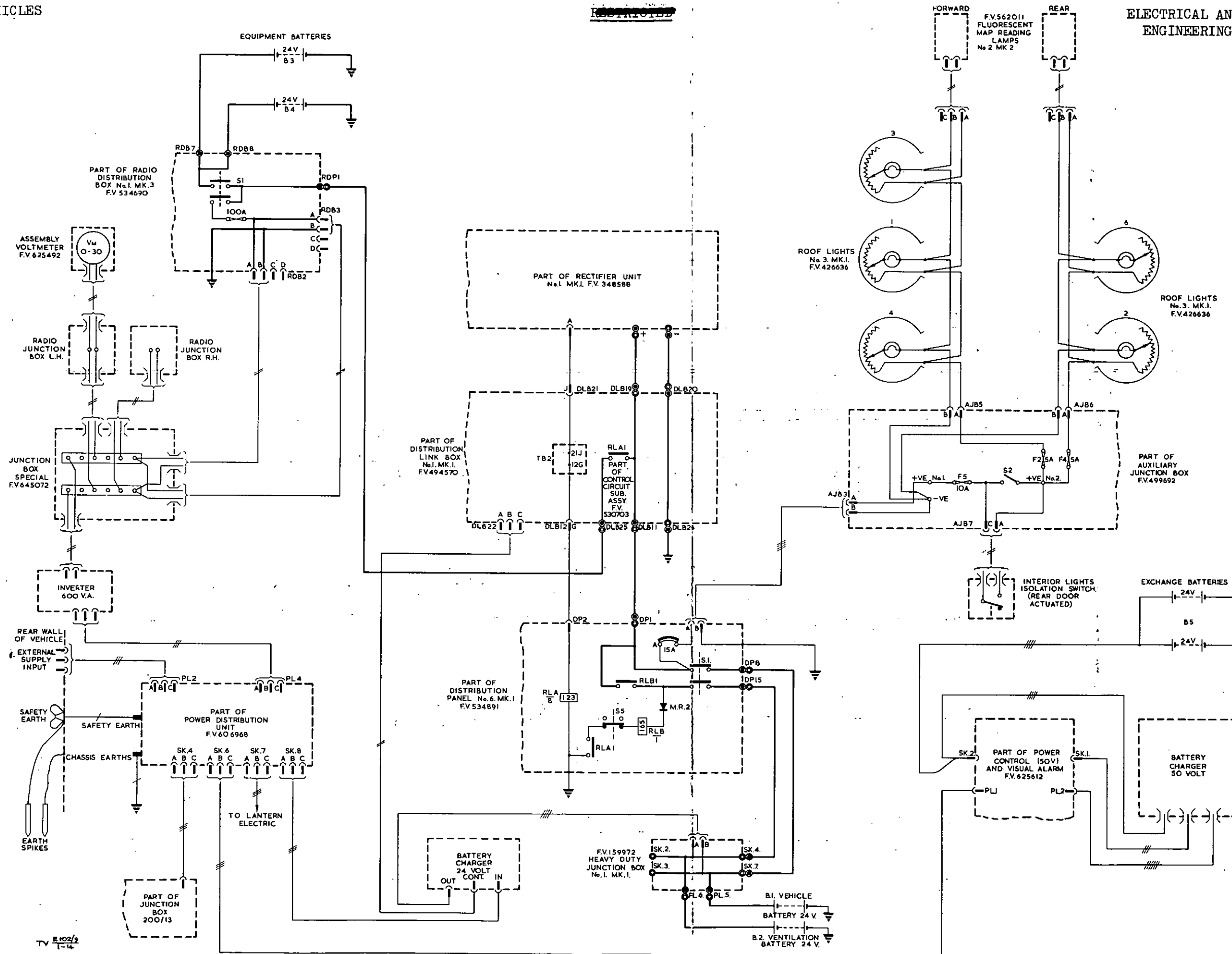


Fig 14 - Power supply and lighting circuits,
automatic exchange.

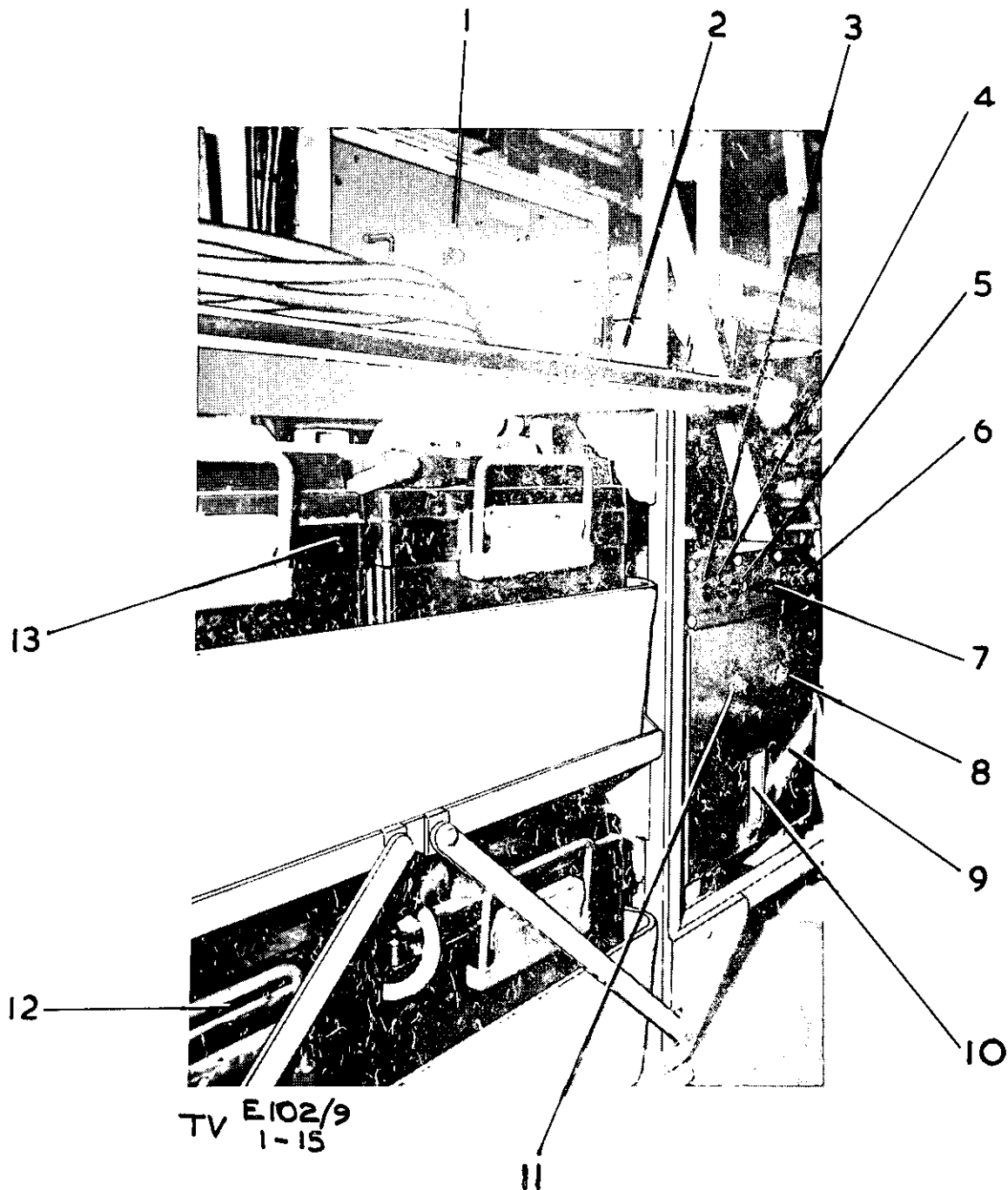


Fig 15 - Automatic exchange l.h.side

- | | |
|----------------------------|--|
| 1. Static Inverter | 7. Battery 'ON' 'OFF' switch |
| 2. 50.volt battery charger | 8. Low volts indicating lamp |
| 3. Primary fuse | 9. Power control unit 50 volt. |
| 4 & 5. Secondary fuses | 10. AC mains to 50 volt charge 'ON''OFF'
switch |
| 6. 'Press to test' lamps | 11. Fuse alarm lamp |
| | 12 & 13. Exchange batteries B5 |

7A/10098
32501 Veh Branch

END of Chapter 10

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CARRIER, INSTALLATION, FULL TRACKED, MKs 1 AND 2/1 FV 439

TECHNICAL HANDBOOK - UNIT REPAIRS

Note ...

This Issue 4, Pages 1 and 2 supersedes Issue 3, Pages 1 and 2 dated Apr 91. Paragraphs 3 and 4 have been added.

DESCRIPTION

- 1 For details of unit repairs to Vehicle see Tkd Veh E 103/2.
- 2 For details of unit repairs to installations refer to Army Equipment Support Publications (AESPs) as follows:
 - 2.1 AESP 5895-H-514-522 for Secondary Access Switch/Message Centre.
 - 2.2 AESP 5895-H-515-522 for Radio Relay Installation.
- 3 Suspension torsion bar settings are to be set using Axle Arm Setting Gauges as follows:
 - 3.1 Axle Arm Setting Gauge FV 952509 for Secondary Access Switch/Message Centre role vehicles.
 - 3.2 Axle Arm Setting Gauge FV 952510 for Radio Relay role vehicles.
- 4 FV drawings detailing manufacture are available from:

EMS (Ord)
Drawing Issuing Authority
Building 9
Woolwich Arsenal
London

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TECHNICAL HANDBOOK - UNIT REPAIRS

Note ...

This Issue 3, Pages 1 and 2 supersedes Issue 2, Page 1/2 dated Dec 90. The title has been amended.

DESCRIPTION

- 1 For details of unit repairs to Vehicle see Tkd Veh E 103/2.
- 2 For details of unit repairs to installations refer to Army Equipment Support Publications (AESPs) as follows:
 - 2.1 AESP 5895-H-514-522 for Secondary Access Switch/Message Centre.
 - 2.2 AESP 5895-H-515-522 for Radio Relay Installation.

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RADIO STATION, CARRIER MOUNTED, FULL TRACKED, MK1 AND 2/1 (FV 439)

TELEGRAPH STATION, CARRIER MOUNTED, FULL TRACKED, MK1 AND 2/1 (FV 439)

TELEPHONE EXCHANGE, CARRIER MOUNTED, FULL TRACKED, MK1 AND 2/1 (FV 439)

TECHNICAL HANDBOOK - UNIT REPAIRS

General

1. For details of unit repairs to vehicle see Tkd Veh E 103/2. Repair to auxiliary generators mounted on vehicle will be detailed in their appropriate EMERs.

END

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CARRIER, INSTALLATION, FULL TRACKED, MKs 1 AND 2/1 FV 439

TECHNICAL HANDBOOK - FIELD REPAIRS

Note ...

This Issue 5, Pages 1 and 2 supersedes Issue 4, Page 1/2 dated Dec 90. The title has been amended.

DESCRIPTION

- 1 For details of field repairs to Vehicle see EMER Tkd Veh E 104/2.
- 2 For details of field repairs to installations see Army Equipment Support Publications (AESPs) 5895-H-514-522 and 5895-H-515-522.

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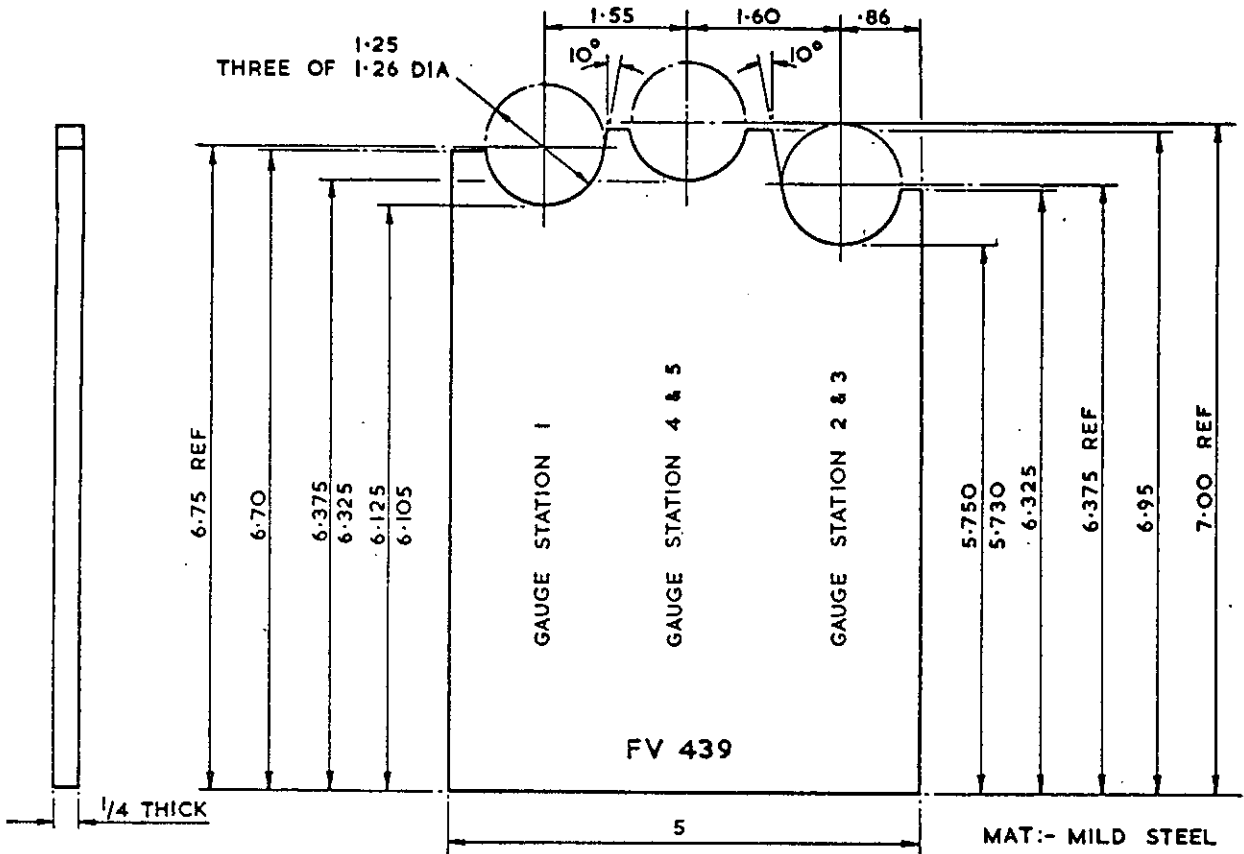
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TECHNICAL HANDBOOK - FIELD REPAIRS

Note: This Issue 3, Pages 1-2, supersedes Issue 2, Pages 1-2, dated Oct 72. Fig 1 has been amended.

General

1. For details of field repairs to vehicle, see Tkd Veh E 104/2. For repairs to auxiliary generators on the vehicle, see Pwr C 464/4.
2. Suspension torsion bar settings are to be set using the gauge shown in Fig 1.



TV $\frac{E 104/9 P 1}{3 - 1}$

DIMENSIONS IN INCHES

Fig 1 - Axle arm torsion bar setting gauge details

M60151(16)
Vehs Br.
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END

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TECHNICAL HANDBOOK - BASE STANDARD

Note ...

This Issue 3, Page 1 and 2 supersedes Issue 2, Page 1/2 dated Dec 90. The title has been amended.

GENERAL

1 For details of base standard to be applied to vehicle, see EMER Tkd Veh E 108/2 Part 2 Section 1 and 2.

2 For details of base standard to be applied to vehicle installations see Army Equipment Publications (AESP) 5895-H-514-304 and 5895-H-515-304.

