AALO BOOK 100

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OVERHAUL MANUAL
FUEL QUANTITY BRIDGE/AMPLIFIER

GB7 GB17 GB22

MAIN GB 17 VENTRAC GBB

STATEMENT OF INITIAL CERTIFICATION

This manual complies with British Civil Airworthiness Requirements, Section A, Chapter A6-2.

Signed [signature] *Date November 1967*

A.R.B. Design Approval No. AD/1091/46

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SMITHS INDUSTRIES LIMITED

AVIATION DIVISION

OVERHAUL MANUAL

OVERHAUL MANUAL 28-46-12

FUEL QUANTITY BRIDGE/AMPLIFIER GB SERIES

LETTER OF TRANSMITTAL

REVISION NO. 1. JUNE 2/75

This permanent revision complies with British Civil Airworthiness Requirements, Section A, Chapter A6-2.

Signed: A R Lamb

C.A.A. Approval No. DAI/1671/41

Date: June 2/75

To all holders of the above manual:

Remove pages as detailed below and insert the revised pages attached to this letter of transmittal.

Remove/Insert	Highlight
1. Title Cover page.	Introduction of legal statement and revised page layout.
2. Page 3.	New revision statement.
3. Page 5.	List of Effective pages up-dated.
4. Page 7.	MODIFICATIONS. Detail added for modification 04 to 08.
5. Pages 15, 16 and 17.	DESCRIPTION, OPERATION AND DATA. Revised circuit component detail.
6. Page 103.	DISASSEMBLY. Correction to fig. 101.
7. Page 201.	CLEANING. Improved cleanser.
8. Pages 303 and 304.	INSPECTION. Additional detail relating to 6140 LMT.
9. Pages 401 and 402.	REPAIR. Correction to fig. 401.
10 Pages 701, 702, 703 and 704.	TESTING. Correction to value of C5 capacitor in test circuit (GB17).

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Remove/Insert	Highlight
11. Pages 901 and 902.	STORAGE INSTRUCTIONS. Deletion of V.P.I paper and introduction of reference to SAV/OH/SPR for storage limiting period.
12. Pages 1001, 1002, 1003 and 1004.	TOOLS, FIXTURES AND EQUIPMENT Improved cleanser and reference to issue 2 of 6140 LMT.
13. Remove pages 1101 to 1105, 1107 to 1129 and 1131 to 1139 inclusive. Insert pages 1101 to 1105, 1107 to 1139 and 1141 to 1150 inclusive.	ILLUSTRATED PARTS LIST. Addition of detail relating to: Mods 04 to 07 (GB7 and GB17) Mods 05 to 08 (GB22).
14. Destroy page 1201.	OVERHAUL PERIOD. Information now contained in Smiths Industries Ltd., Aviation Division manual SAV/OH/SPR.

* * * * * * *

Record the incorporation of this revision on the record of revision page. Retain this transmittal letter as a record that this revision was issued under the Approval Authority stated overleaf.

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RECORD OF REVISIONS

REV. NO.	ISSUE DATE	DATE INSERTED	BY	REV. NO.	ISSUE DATE	DATE INSERTED	BY
1	[illegible]	Dec/76	[illegible]				

The introduction of data by revisions or amendments or temporary revisions or amendments not certified in accordance with British Civil Airworthiness Requirements, Chapter A6-2, will invalidate the initial certification on the title page of the manual relative to the part revised. Revisions or amendments, or temporary revisions or amendments embodied in this manual and certified by an appropriately approved Organisation, other than that applicable to the initial certification, must be recorded on separate record sheets.

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FUEL QUANTITY BRIDGE/AMPLIFIER

List of Effective Pages

Page	Date of latest revision	Page	Date of latest revision	Page	Date of latest revision
1	Jun.75	509	Nov.67	1125	Jun.75
3	Jun.75	510	Nov.67	1126	Jun.75
5	Jun.75	511	Nov.67	1127	Jun.75
7	Jun.75	512	Nov.67	1128	Jun.75
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FUEL QUANTITY BRIDGE/AMPLIFIER

MODIFICATIONS

1. GENERAL

When modifications are introduced on units covered by this manual, the text will be revised to cover the latest modificatien state. The modifications will be listed below together with a statement on whether the overhaul information is affected when any modification is not embodied. When overhaul is affected, the list will cross refer to details.

2. MODIFICATION DETAILS

Modification No.	Service Bulletin or Modification Sheet No.	Codes Affected	Effect on Overhaul
01	28-80	GB7 GB17	None. Component change, all units modified prior to delivery.
02	-	GB7	None. Amplifier change, all units modified prior to delivery.
03	-	GB7 GB17 GB22	None. Capacitor C1 added, all units modified prior to delivery.
04	-	GB22	None. Case sealed with PRC compound, all units modified prior to delivery.
04	-	GB7 GB17	None. Change of Pt. No. for capacitor C.15.
05	-	GB22	
05	28-205	GB7 GB17	None. Change of Pt. No. for capacitors C.10 to C.14
06	28-205	GB22	
06	28-226	GB7 GB17	None. Change of Pt. No. for resistor R.21
07	28-226	GB22	
07	28-236	GB7 GB17	None. Change of Pt. No. for transistor VT.1
08	28-236	GB22	

FUEL QUANTITY BRIDGE/AMPLIFIER

DESCRIPTION, OPERATION AND DATA

1. DESCRIPTION AND OPERATION

A. General

The Smiths GB-type Fuel Quantity Bridge/Amplifier, fig. 1, provides a means of measuring the capacitance of a tank unit system and presenting the measurement in the form of an electrical output signal to a servo-driven indicator displaying fuel quantity.

B. Detail

Each bridge/amplifier is contained in a rectangular alloy case and comprises four assemblies; the bridge assembly, amplifier assembly, relay panel assembly and the transformer assembly. Mounted on the front of the case are the 'E' empty and 'F' full trimmers, the 'TF' test full and the 'TE' test empty trimmers; in addition the GB17 type has a 'P' pressure trimmer mounted on the front case. The trimmers are protected by a plastic cover attached to the front plate by two captive screws. Screened and unscreened connections to each bridge/amplifier are made via Smiths MB-type coaxial connectors and a Plessey 17-way plug respectively mounted on the front case. Mounting brackets, (incorporating captive screws on codes GB7 and GB17), are attached to the base of the front case and the top of the cover to enable the unit to be secured to the aircraft structure.

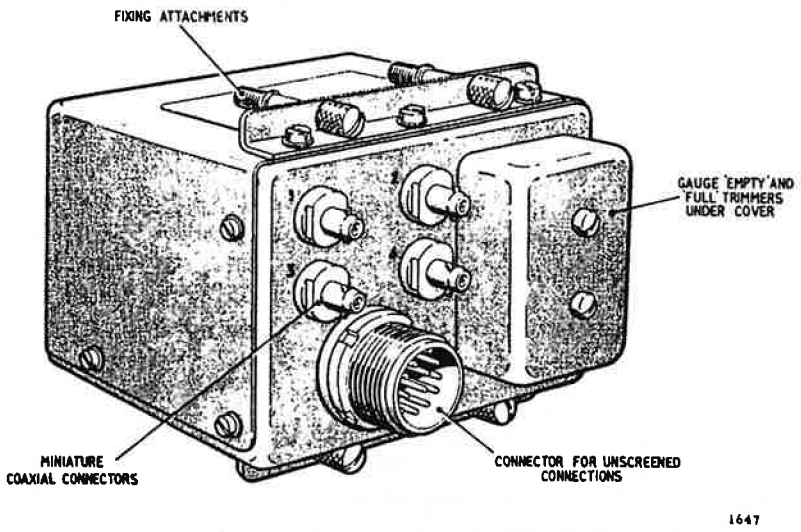
(1) Mechanical Components

(a) Bridge Assembly

The bridge assembly comprises the tank simulator, empty and balance feedback capacitors, phase correcting capacitors, input filter and intrinsic safety resistors. The components are panel mounted; the panel assembly is then located in a rectangular case and sealed. Ceramic to metal seals in the base of the case facilitate electrical connection. The bridge assembly is attached to the alloy chassis located above the transformer casing.

(b) Transformer Assembly

The transformer assembly is located in a sealed cylindrical case and attached by screws to the base of the case. Ceramic to metal seals in the base of the case facilitate electrical connection. The transformer assembly is secured to the unit chassis by means of a retaining strap.



Typical Bridge/Amplifier
Figure 1

(c) Relay Panel Assembly

The relay panel assembly comprises a number of panel mounted Smiths micro relays. Electrical connections are made via turret lugs; the relays are mounted by 'P' clips secured to the panel. The number of relays (either 6 or 4) varies for each bridge/amplifier. The relay panel assembly is secured to the alloy chassis located above the bridge/amplifier.

(d) Amplifier Assembly

The amplifier assembly comprises a four stage high-gain transistor amplifier, with an associated feedback circuit and rectifier circuit. The components are secured to turret lugs and located between two circular panels; the assembly is then located in a cylindrical case and

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sealed. Ceramic to metal seals in the base of the case facilitate electrical connection.

(2) Electrical Components, figs. 2, 3 and 4

The bridge transformer is supplied with 115V, 400 c/s and has a secondary winding, electrostatically screened from the primary winding, the primary is centre tapped and supplies 54V to the reference winding of the associated indicator (GE-Series) motor. The secondary winding has several tappings and acts as the ratio arm of the bridge circuit. In operation, a voltage derived from the transformer, through the associated tank unit system, is balanced by voltages derived from the 'E' (empty) trimmer and the wiper of the rebalance potentiometer of the associated indicator, thus reducing the out-of-balance voltage at the bridge null point to zero. The null point of the bridge is connected to the input of the amplifier assembly, so that any condition causing an out-of-balance state, presents a voltage to the input of the amplifier; the subsequent output from the amplifier, drives the associated indicator motor in such a direction, that the balance condition is restored. Capacitors C1, C2 and resistors R1 are incorporated to eliminate radio interference.

The bridge resistors R1 to R4 inclusive (R1 to R5 on GB17) are intrinsic safety resistors and limit the current drawn from the transformer in the event of bridge capacitors C2 and C4, or the associated tank unit shorting to earth; the resistors also act in conjunction with capacitor C1, C5 and C7 (GB7 and GB22 only) and the capacitance of the connecting coaxial cables, to equalise the phase relationship of the bridge ratio arms. Capacitor C6 removes the high frequency harmonics from the input voltage to the amplifier, and capacitor C3 is used to simulate the tank group capacitance when the tank group is disconnected from the bridge/amplifier.

Voltages to the simulating capacitor C3 are derived from either the 'TE' 'TF' or 'P' trimmer according to the function being simulated.

Capacitor C8 fitted to a separate panel on the front case provides radio interference suppression.

The amplifier assembly is supplied with 115V a.c. at point 1 from tap 12 of transformer TR1, rectified by diode MR1 and the resultant d.c. voltage is limited to the order of -60V by resistor R23 and decoupled by capacitor C15; supplies to the amplifier first and second stages are decoupled by capacitors C13 and C14 respectively, the third and fourth stages are decoupled by capacitor C12.

Transistor VT1 is a P.N.P. type operating in the grounded emitter mode, with collector load resistor R11 and emitter resistor R10 by-passed with capacitor C10; base bias being derived from resistors R13 and R14, the input voltage from the bridge is fed to the base of VT1 at point 4. VT2 is

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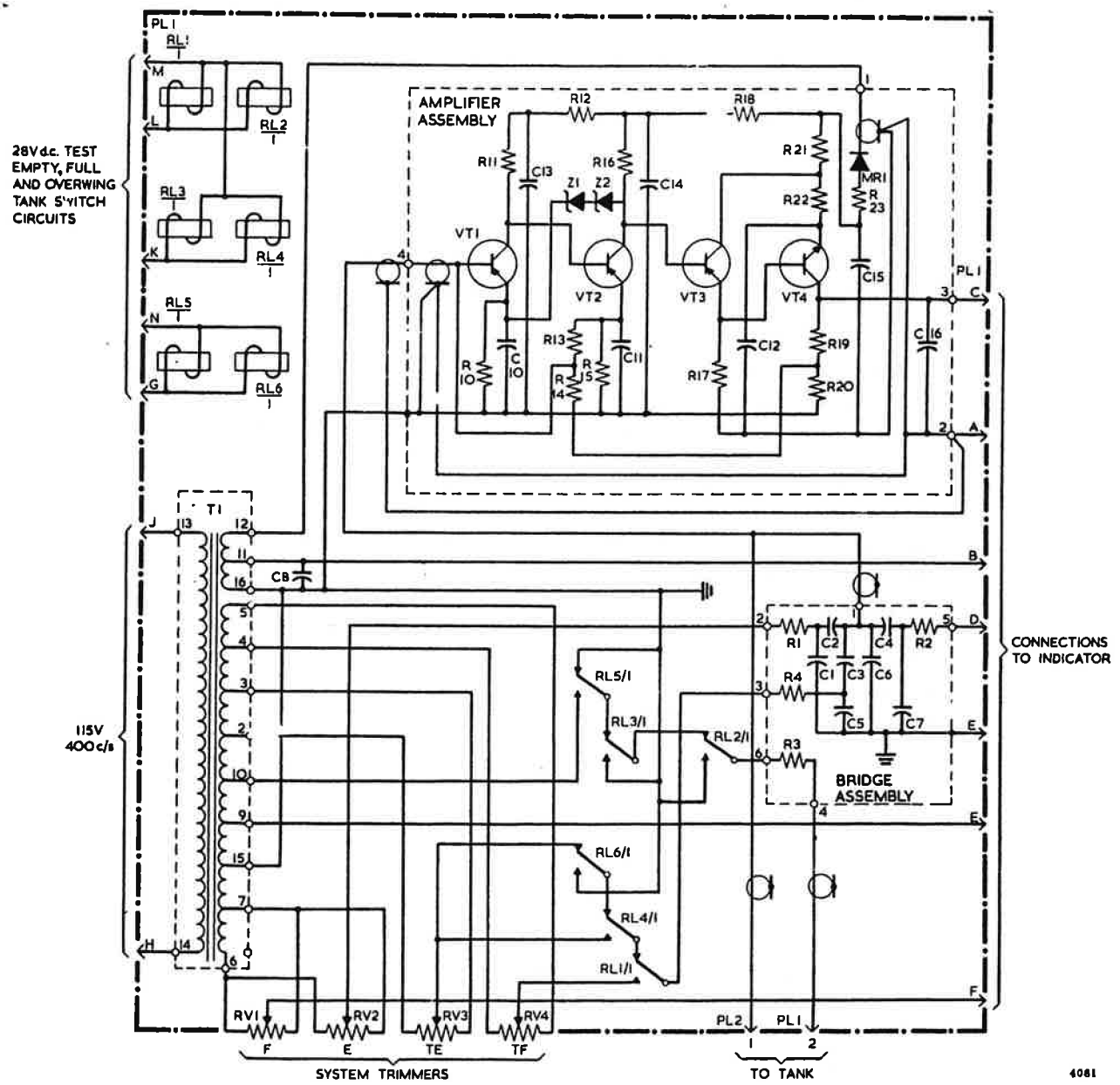

Fig.2 Circuit Diagram - GB7

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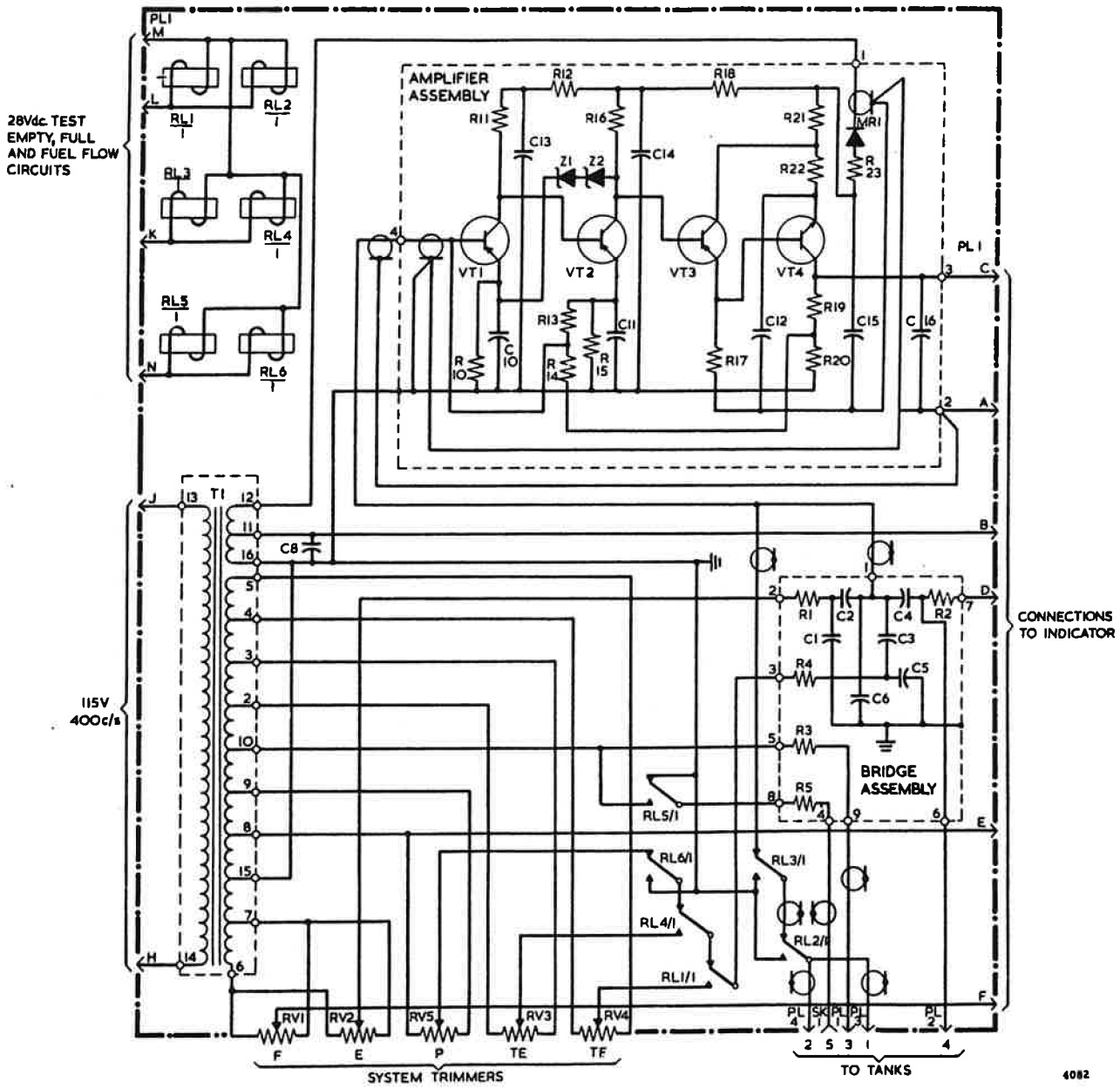

Fig. 3 Circuit Diagram - GB17

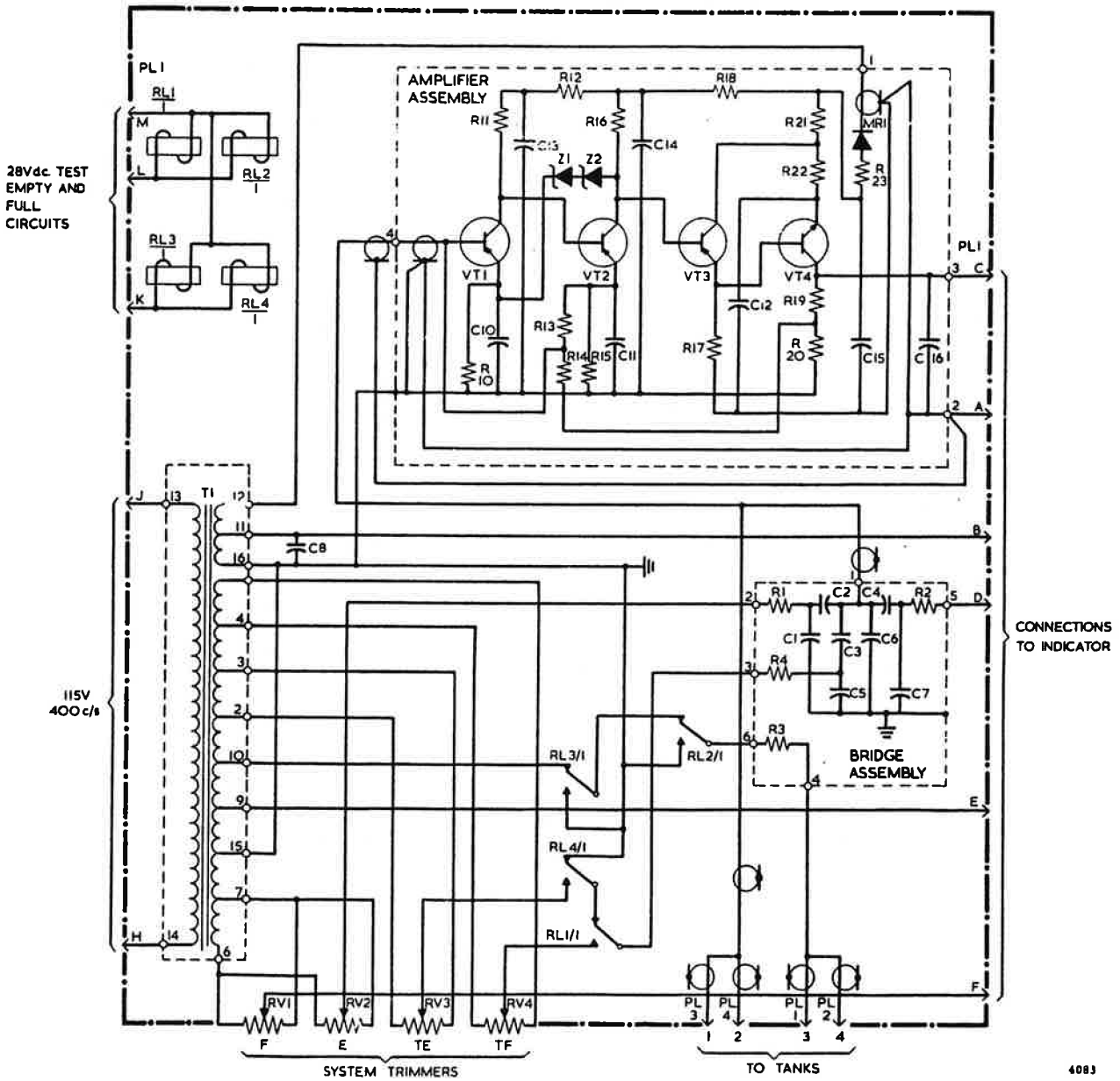

Fig. 4 Circuit Diagram - GB22

P.N.P. transistor also operating in the grounded emitter mode with the base connected directly to VT1, the collector load is resistor R16 and emitter resistor R15 by-passed by capacitor C11, VT3 is a P.N.P. transistor operating as an emitter follower with the base connected directly to VT2, the emitter load resistor is R17, to which the base of VT4 is directly connected. VT4 is a N.P.N. transistor operating in the grounded collector mode, the output voltage is developed across the collector load resistors R19 and R20 and appears at points 2 and 3.

Negative feedback is derived from the junction of resistors R19, R20 and fed back to the input through resistor R15.

Zener diodes Z1 and Z2 prevent the instantaneous collector/emitter voltage of transistor VT2 exceeding the maximum rated value at 'switch-on'.

The micro relays in a bridge/amplifier perform the following functions:

(a) Relays RL1 and RL2

Relay pair RL1 and RL2, when energised manually, disconnects and earths the bridge/amplifier tank unit group, and connects the tank unit group simulating capacitor, C3, simulating a tank 'full' condition.

(b) Relays RL3 and RL4

Relay pair RL3 and RL4, when energised manually, disconnects and earths the bridge/amplifier tank unit group, and connects the tank unit group simulating capacitor C3, simulating a tank 'empty' condition.

(c) Relays RL5 and RL6 (GB17 unit)

Relay pair RL5 and RL6, when de-energised by a flow sensitive valve, disconnects and earths the bridge/amplifier flap tank unit, and connects simulating capacitor C3, simulating a tank 'empty' condition.

(d) Relays RL5 and RL6 (GB7 unit)

Relay pair RL5 and RL6, when de-energised automatically disconnects and earths the bridge/amplifier overwing tank group, and connects simulating capacitor C3 simulating a tank 'empty' condition.

(3) Circuit Components

Table 1

Resistors (Amplifier Assembly)

Key	Resistance (Ohms)	Tolerance	Rating	Type
R10	4.7K	± 5%	¼W	Refer to Illustrated Parts List
R11	15K	± 5%	¼W	
R12	33K	± 5%	¼W	
R13	22K	± 5%	¼W	
R14	27K	± 5%	¼W	
R15	15K	± 5%	¼W	
R16	33K	± 5%	¼W	
R17	10K	± 5%	¼W	
R18	3.3K	± 5%	¼W	
R19	560K	± 5%	¼W	
R20	56	± 5%	¼W	
R21	2.2K	± 2%	½W	
R22	680	± 5%	¼W	
R23	1.8K	± 5%	1.5W	

Table 2

Resistors (Bridge Assembly)

Key	Resistance (Ohms)	Tolerance	Rating	Type
R1(GB7)	1.5K	± 5%	1½W	Refer to Illustrated Parts List
R1(GB17)	1.2K	± 5%	1½W	
R1(GB22)	820	± 5%	1½W	
R2(GB7)	1.5K	± 5%	1½W	
R2(GB17)	1.2K	± 5%	1½W	
R2(GB22)	820	± 5%	1½W	
R3(GB7	390	± 5%	1½W	
R3(GB17)	330	± 5%	1½W	
R3(GB22)	180	± 5%	1½W	
R4(GB7)	1.5K	± 5%	1½W	
R4(GB17)	1.2K	± 5%	1½W	
R4(GB22)	1.8K	± 5%	1½W	
R5(GB17)	330	± 5%	1½W	

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Table 3

Capacitors (Amplifier Assembly)

Key	Capacitance	Tolerance	Rating	Type
C10	68μF	-	15V	Refer to Illustrated Parts List
C11	68μF	-	15V	
C12	39μF	-	30V	
C13	39μF	-	30V	
C14	11μF	-	75V	
C15	2.7μF	-	100V	
C16	0.1μF	±20%	200V	

Table 4

Capacitors (Bridge Assembly)

Key	Capacitance	Tolerance	Rating	Type
C1	0.0005μF	±20%	500V	Refer to Illustrated Parts List
C1(GB17)	0.001μF	±20%	500V	
C2	100pF	± 1%	350V	
C3	100pF	± 1%	350V	
C4	120pF	± 1%	350V	
C4(GB17)	62pF	± 1%	350V	
C5(GB7)	0.005μF	±20%	500V	
C5(GB22)	0.002μF	±20%	750V	
C5(GB17)	0.001μF	±20%	500V	
C6	0.03μF	±20%	250V	
C7	0.0005μF	±20%	500V	
C8	0.022μF	±20%	250V	

2. DATA

(1) Name: Bridge/Amplifier

(2) Code Number: GB7
GB17
GB22

FUEL QUANTITY BRIDGE/AMPLIFIER

DISASSEMBLY

1. CHECKS BEFORE DISASSEMBLY

Before disassembly, a bridge/amplifier must be tested as detailed in TESTING. If, during these tests, a bridge/amplifier becomes suspect, first ascertain which section is faulty, thus saving unnecessary disassembly.

2. PREPARATION AND GENERAL PRECAUTIONS

Observe absolute cleanliness of workbench, tools and parts. Many of the screws, pillars and nuts on the unit are locked with Akard red lacquer, R.433. If necessary, this may be softened with methyl ethyl ketone.

3. EQUIPMENT REQUIRED

Item 1 of the list on page 1001 will be required.

4. PROCEDURE

A. Bridge/Amplifier (fig. 101)

Proceed as follows to remove the bridge/amplifier cover assembly.

(1) Remove ten 6BA screws and plain washers, and three 4BA screws and plain washers securing the cover to the case assembly.

(2) Remove the cover.

The foregoing procedure is the only disassembly necessary for routine inspection. To remove the amplifier, bridge and transformer assemblies from the case assembly for detailed inspection proceed as follows:

(1) Hinge upwards the alloy chassis supporting the bridge assembly and relay panel assembly.

(2) Remove the single 2BA tensioning screw and washer passing through the retaining strap securing the amplifier and bridge assemblies.

(3) Remove the four screws securing the strap and bracket assemblies, lift up the retaining strap and carefully lift out the transformer and amplifier assemblies.

(4) Unsolder fifteen cable form wires (GB17) or fourteen cable form wires (GB7 and GB22) from the terminal spills at the rear of the transformer. Remove the transformer.

(5) Unsolder one screen cable and four wires from the rear of the amplifier. Remove the amplifier.

(6) Unsolder five wires and two screen cables (GB7 and GB22) or seven wires and two screen cables (GB17) from the terminal spills at the base of the bridge assembly.

(7) Remove the four 6BA stiff nuts and plain washers securing the bridge assembly to the alloy chassis. Remove the bridge assembly.

Subject the suspect assembly to the procedure detailed in INSPECTION.

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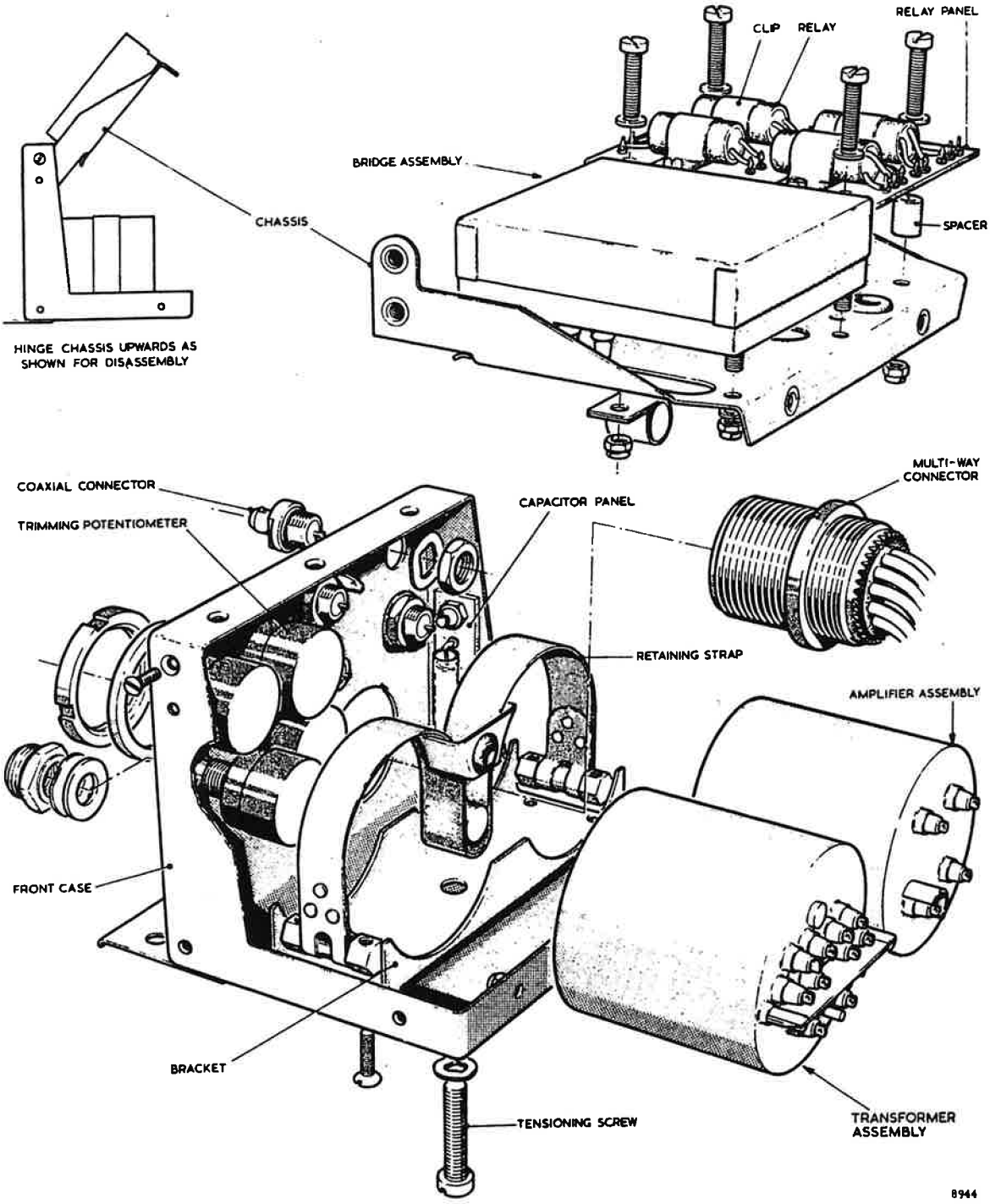

Fig. 101 Exploded View - Bridge/Amplifier

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FUEL QUANTITY BRIDGE/AMPLIFIER

CLEANING

1. PROCEDURE

A. Case and Cover

(1) Wipe over with chamois leather moistened with Genklene (or similar cleanser) and dry with low pressure air jet.

B. Amplifier, Bridge and Transformer Assemblies

(1) Clean with soft brush dipped in trichlorethylene; dry with low pressure air jet.

C. Relay Panel Assembly

(1) Remove any dust with a low pressure air jet.

D. Connectors and Remaining Components

(1) Blow out thoroughly with low pressure air jet to remove any dust etc.

2. CLEANING AGENTS

Cleaning agents are listed in SPECIAL TOOLS, FIXTURES AND EQUIPMENT - page block 1001.

FUEL QUANTITY BRIDGE/AMPLIFIER

INSPECTION

The following inspection procedures also apply to new components. Inspection procedures for parts suspected faulty du ·ing TESTING are given in para. 2.

1. GENERAL PROCEDURE

A. All Components

Examine, as applicable, for:

(1) Cleanliness.

(2) Distortion.

(3) Cracks (visual).

(4) Scores.

(5) Dents.

(6) Evidence of wear (visual).

(7) Corrosion, including deterioration of protective finish.

(8) Serviceability of items not disassembled.

(9) Fatigue or deterioration of replacement sealing rings.

B. Electrical Components

Examine for:

(1) Deterioration of insulation.

(2) Security of pins and tags.

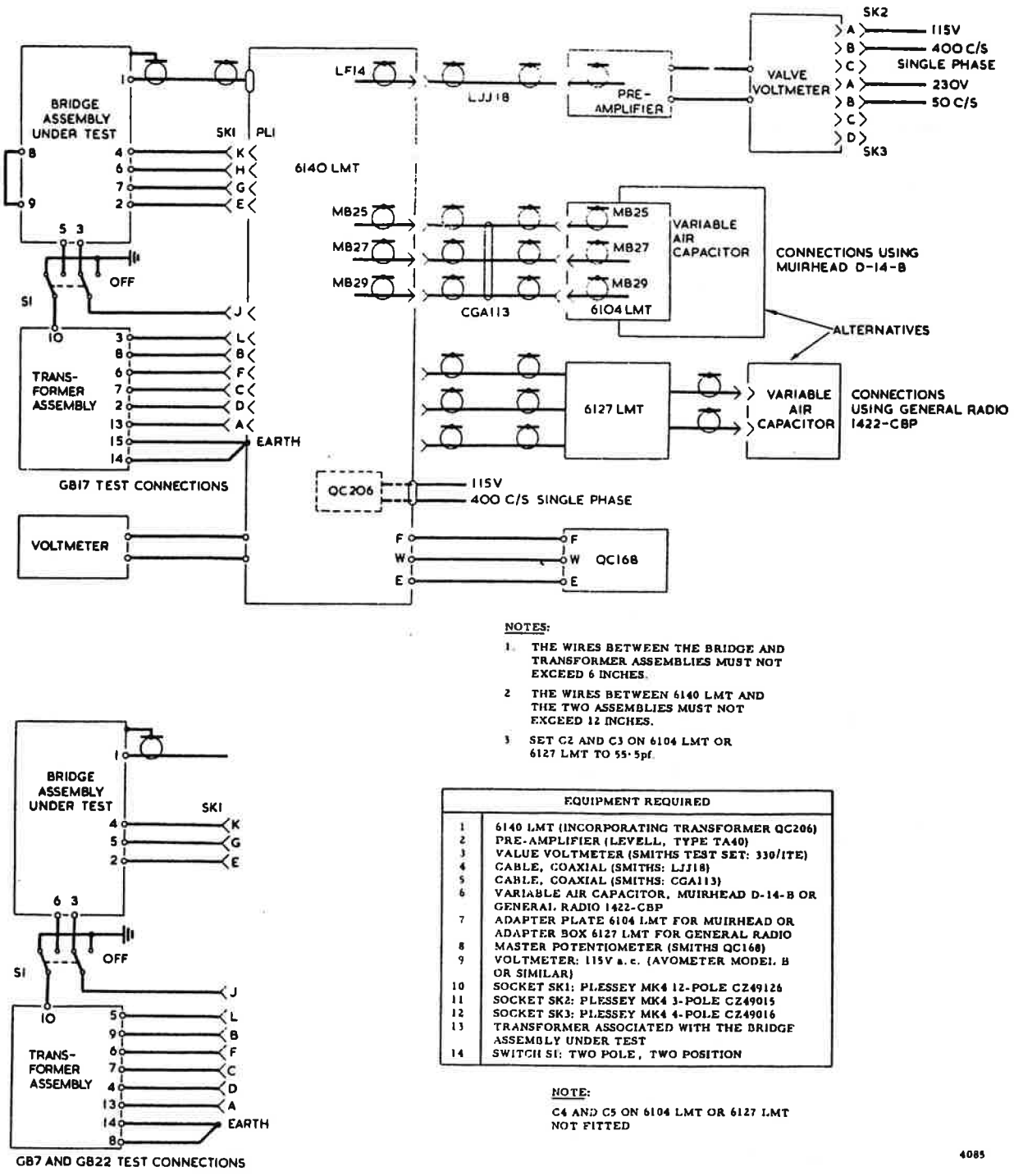
(3) Evidence of overheating.

2. DETAILED PROCEDURE

A. Bridge Assembly

Items 1 to 12 inclusive and Item 25 of the list on page 100. will be required.

(1) When testing a bridge assembly the can must be bonded to the earth terminal on 6140 LMT.



NOTES:

1. THE WIRES BETWEEN THE BRIDGE AND TRANSFORMER ASSEMBLIES MUST NOT EXCEED 6 INCHES.
2. THE WIRES BETWEEN 6140 LMT AND THE TWO ASSEMBLIES MUST NOT EXCEED 12 INCHES.
3. SET C2 AND C3 ON 6104 LMT OR 6127 LMT TO 55·5pf.

EQUIPMENT REQUIRED	
1	6140 LMT (INCORPORATING TRANSFORMER QC206)
2	PRE-AMPLIFIER (LEVELL, TYPE TA40)
3	VALUE VOLTMETER (SMITHS TEST SET: 330/ITE)
4	CABLE, COAXIAL (SMITHS: LJJ18)
5	CABLE, COAXIAL (SMITHS: CGA113)
6	VARIABLE AIR CAPACITOR, MUIRHEAD D-14-B OR GENERAL RADIO 1422-CBP
7	ADAPTER PLATE 6104 LMT FOR MUIRHEAD OR ADAPTER BOX 6127 LMT FOR GENERAL RADIO
8	MASTER POTENTIOMETER (SMITHS QC168)
9	VOLTMETER: 115V a.c. (AVOMETER MODEL 8 OR SIMILAR)
10	SOCKET SK1: PLESSEY MK4 12-POLE CZ49126
11	SOCKET SK2: PLESSEY MK4 3-POLE CZ49015
12	SOCKET SK3: PLESSEY MK4 4-POLE CZ49016
13	TRANSFORMER ASSOCIATED WITH THE BRIDGE ASSEMBLY UNDER TEST
14	SWITCH SI: TWO POLE, TWO POSITION

NOTE:

C4 AND C5 ON 6104 LMT OR 6127 LMT NOT FITTED

4085

Fig.301 Bridge Assembly - Test Connections

(2) With reference to fig. 301, the test circuit 6140 LMT incorporating QC206, must be enclosed in a metal box of suitable dimensions.

(3) The electrical connections to the bridge assembly under test may be made either by a Plessey Mk. 4, 12-way plug, or a group of wires passing out through a grommet.

(4) The open-ended coaxial cable, and the twin cable to QC206 must pass out through grommets.

(5) All coaxial connections must be made using MB-Series connectors and P.T.F.E. insulated miniature coaxial cable.

(6) A suggested panel layout is given on drawing 6140 LMT. Switch 1 on 6140 LMT should be set to position 1 for GB7, position 2 for GB22 or position 3 for GB17.

(7) Assemble the test circuit and equipment as shown in fig. 301.

(8) Using a miniature soldering iron, connect the bridge assembly to the test circuit.

(9) Connect the test circuit and the phase sensitive voltmeter 330/1TE to the 115V 400 Hz and 230V 50 Hz electrical supplies.

(10) Set up the 330/1TE as detailed in the manual for the Phase Sensitive Voltmeter 330/1TE.

(11) 'Empty' Balance Test

(a) Set S1 to OFF.

(b) Adjust the QC168 to 0% and the variable air capacitor to 373.4pF for GB7, 185.3pF for GB17, or 733pF for GB22.

(c) By means of the 'E' control obtain a zero reading on the 330/1TE REFERENCE METER, the reading on the QUADRATURE meter should be less than 0.5mV.

(12) 'Full' Balance Test

(a) Adjust the QC168 to 100% and the variable air capacitor to 831.2pF for GB7, 423.2pF for GB17, or 1614pF for GB22.

(b) By means of the 'F' control obtain a zero reading on the 330/1TE REFERENCE METER, the reading on the QUADRATURE meter should be less than 0.5mV.

(13) 'Empty' Trimmer Swing

(a) Adjust the QC168 to 50%; by means of the variable air capacitor

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obtain a zero reading on the 330/1TE REFERENCE meter.

(b) Rotate the 'E' control fully counter-clockwise; by means of the QC168 obtain a zero reading on the 330/1TE REFERENCE meter; the reading of the QC168 must be not more than 45%.

(c) Rotate the 'E' control fully clockwise; by means of the QC168 obtain a zero reading on the 330/1TE REFERENCE meter; the reading of the QC168 must be not less than 55%.

(d) Adjust the QC168 to 50%; by means of the 'E' control obtain a zero reading on the 330/1TE REFERENCE meter.

(14) 'Full' Trimmer Swing

(a) Adjust the QC168 to 80%; by means of the variable air capacitor obtain a zero reading on the 330/1TE REFERENCE meter.

(b) Rotate the 'F' control fully counter-clockwise; by means of the QC168 obtain a zero reading on the 330/1TE REFERENCE meter; the reading of the QC168 must be not more than 76%.

(c) Rotate the 'F' control fully clockwise; by means of the QC168 obtain a zero reading on the 330/1TE REFERENCE meter; the reading of the QC168 must be not less than 84%.

(d) Adjust the QC168 to 80%; by means of the variable air capacitor obtain a zero reading on the 330/1TE REFERENCE meter.

(15) 'Test Empty' Balance

(a) Set S1 to ON.

(b) Adjust the QC168 to 0% and the variable air capacitor to 373.4 pF for GB7, 185.3 pF for GB17, and 733.3 pF for GB22.

(c) By means of the 'TE' control obtain a zero reading on the 330/1TE REFERENCE meter, the reading on the QUADRATURE meter should be less than 0.5mV.

(16) 'Test Empty' Trimmer Swing

(a) Adjust the QC168 to 50%; by means of the variable air capacitor obtain a zero reading on the 330/1TE REFERENCE meter.

(b) Rotate the 'TE' control fully counter clockwise; by means of the QC168 obtain a zero reading on the 330/1TE REFERENCE meter; the reading of the QC168 must not be more than 45%.

(c) Rotate the 'TE' control fully clockwise; by means of the QC168 obtain a zero reading on the 330/1TE REFERENCE meter; the reading of the QC168 must be less than 55%.

(d) Adjust the QC168 to 50%; by means of the 'TE' control obtain a zero reading on the 330/1TE REFERENCE meter.

(17) Sensitivity Test

(a) Adjust the QC168 to 0% and the variable air capacitor to 373.4pF for GB7, 185.3pF for GB17 or 733.3 pF for GB22.

(b) By means of the 'E' control obtain a zero reading on the 330/1TE REFERENCE meter, the reading on the QUADRATURE meter should be less than 0.5mV.

(c) Confirm that when the setting of the QC168 is adjusted by 1% the 330/1TE REFERENCE meter reading is between 0.7mV and 1.3mV.

(d) Adjust the QC168 to 100% and the variable air capacitor to 832.1pF for GB7, 423.2pF for GB17 or 1614pF for GB22.

(e) By means of the 'F' control obtain a zero reading on the 330/1TE REFERENCE meter, the reading on the QUADRATURE meter should be less than 0.5mV.

(f) Confirm that when the setting of the QC168 is adjusted by 1% the 330/1TE REFERENCE meter reading is between 0.7mV and 1.3mV.

If during the foregoing tests the bridge assembly becomes suspect, remove suspect component(s) as detailed in REPAIR.

B. Amplifier Assembly

Items 5 and 13 of the list of page 1001 will be required.

(1) Connect the QC132 and 330/1TE to the 115V 400 c/s supply; also connect the 330/1TE to the 250V 50 c/s supply. Connect a suitable length of co-axial cable between the QC132 PHASE SENSITIVE VOLTMETER terminals and the 330/1TE RC terminals (the outer braid connecting to the QC132 black terminal).

(2) Switch on the 50 c/s and 400 c/s supplies on the 330/1TE; adjust the 400 c/s supply to 115V $\pm$ 1V, then set up the voltmeter as detailed in the test set manual for 330/1TE.

(3) Initial Adjustments

(a) Select 330/1TE switch positions as follows:

METER DAMPING	to	OFF
BACKING-OFF controls	to	OFF
SENSITIVITY	to	50V
EARTH	to	RESISTANCE
TR-RC	to	RC (short together the TR terminals)
REF.PHASE	to	A.B.

(b) Select QC132 switch positions as follows:

S1 to OFF

S2 to 0

S3 to 0.35 μF

S4 to CLOCKWISE

S5 to DUMMY 'S'

Locate the amplifier assembly into the appropriate socket on the test set.

(c) Select QC132 switch S1 to ON and 330/1TE SENSITIVITY to 5V, then adjust QC132 SET ZERO 'IN PHASE' and QUAD controls to give zero deflection on the 330/1TE REFERENCE and QUADRATURE meters.

NOTE: The SET ZERO controls are not to be adjusted during the following tests.

(4) Sensitivity Test

(a) Select QC132 switch S3 to 0.1%; confirm that the 330/1TE QUADRATURE meter reading is not less than -2.0V, and that the REFERENCE meter reading is not greater than ± 1.0V.

(5) Output Test

(a) Select 330/1TE SENSITIVITY to 50V, QC132 switches S3 to 3% and S4 to DUMMY 'F'; confirm that the 330/1TE QUADRATURE meter reading is not less than -22V, and that the REFERENCE meter reading is not greater than ± 7.0V.

(b) Select QC132 switch S3 to 10%; confirm that the 330/1TE QUADRATURE meter reading is not less than -21V, and that the REFERENCE

meter reading is not greater than ± 7.0V.

(c) Select QC132 switch S4 to INDICATOR; confirm that the 330/1TE QUADRATURE meter reading is not less than -19V, and that the REFERENCE meter reading is not greater than ± 6.0V.

(d) Select QC132 switch S2 to COUNTER CLOCKWISE; confirm that the 330/1TE QUADRATURE meter reading is not less than +24V, and that the REFERENCE meter is not greater than ± 6.0V.

If during the foregoing tests the amplifier assembly becomes suspect, remove the suspect component(s) as detailed in REPAIR.

C. Transformer Assembly

Items 14, 15 and 21 of the list on page 1001 will be required.

(1) D.C. Resistance Test

The D.C. resistance of each winding must be within the limits given in Table 301. Refer to fig. 501, 502 or 503 in ASSEMBLY for terminal seal identification.

Table 301 D.C. Resistance Test

TERMINAL SEALS	RESISTANCE (OHMS)	
	MINIMUM	MAXIMUM
14 to 13	31	45
12 to 16	40	60
5 to 6	47	71

(2) Turns Ratio Test

The turns ratio of each winding must be checked by applying an alternating voltage of 115 volts 400 c/s between terminal seals 13 and 14 and measuring the output voltage between the terminal seals which must be within the limits given in Table 302.

Table 302 - Turns Ratio Test

TERMINAL SEALS	OUTPUT VOLTAGE					
	GB7		GB17		GB22	
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
12 to 16	118.5	111.5	118.5	111.5	118.5	111.5
11 to 16	55.6	52.4	55.6	52.4	55.6	52.4
5 to 15	64.2	60.4	48.4	45.6	64.8	61.0
4 to 15	52.6	49.4	39.6	37.2	53.0	49.8
3 to 15	26.3	28.6	24.3	23.0	29.6	27.8
2 to 15	23.6	22.2	24.6	23.2	23.9	22.5
10 to 15	7.0	6.6	13.2	12.4	3.6	3.4
9 to 15	1.5	1.3	4.8	4.4	1.5	1.3
7 to 15	23.0	21.6	24.6	23.3	23.9	22.5
6 to 15	31.2	29.2	31.2	29.2	31.2	29.2
8 to 15	-	-	1.5	1.3	-	-

(3) Insulation Resistance Test

Using a 500V d.c. insulation resistance tester check the insulation resistance between the following terminal seals.

(a) Terminal seal 13 to terminal seal 16.

(b) Terminal seal 13 to terminal seal 15.

(c) Terminal seal 13 to transformer chassis.

(d) Terminal seal 16 to transformer chassis.

(e) Terminal seal 15 to transformer chassis.

In each case the insulation resistance must not be less than 20 megohms. Replace a transformer which fails to pass the test detailed in C.(1), (2) and (3).

D. Coaxial Connectors and Multi-way Plug

(1) Check for continuity between the centre pins of the coaxial connectors and the spills at the rear. Examine the connector bodies and insulation for

possible damage.

(2) Check for continuity between the pins of the 17-pin plug and the associated spills at the rear. Examine the pins, connector body and insulation for possible damage.

E. Trimmers

(1) Remove the wires from the trimmer where necessary, using a soldering iron.

(2) Using an ohmmeter measure the overall trimmer resistance; the resistance must be 330 ohms $\pm$ 10%.

(3) Using an ohmmeter, with a 10 ohm ± 5% 1 watt resistor in series with one lead, check the wiper for continuity over the full travel between end stops.

CAUTION: A 10 ohm ±5% 1 WATT CURRENT LIMITING RESISTOR MUST BE USED.

F. Micro-Relays

(1) Using a low resistance ohmmeter measure the resistance between the green and blue (NC) lead at one end of the relay (relay unenergised) at the panel turret lugs. The measured resistance must be less than 0.1 ohm.

(2) Connect the pair of black leads at the other end of the relay to a variable 28V d.c. supply; connect the low resistance ohmeter between the adjacent green and black (NO) lead. Slowly increase the voltage from zero until the relay armature 'pulls in'. The 'pull in' voltage must be not greater than 20V, and the measured resistance between the green and black lead must be not more than 0.1 ohm.

(3) Slowly decrease the voltage to the relay coil until the armature 'drops out'; the 'drop out' voltage must be not less than 1.5V below the 'pull in' voltage.

G. Continuity of Wiring

(1) If suspect, check wiring for evidence of overheating and damage, renew as required in ASSEMBLY.

(2) If suspect, check wiring using a suitable ohmmeter, in accordance with the wiring diagram and running list for the appropriate bridge/amplifier. given under ASSEMBLY.

FUEL QUANTITY BRIDGE/AMPLIFIER

REPAIR

1. GENERAL

Faulty parts should be replaced by approved spares only. After any component has been renewed or repaired carry out the full procedures detailed in TESTING.

2. PROCEDURE (refer to fig. 401)

A. Case Front Including Connectors and Trimmers

(1) Coaxial Connectors

To renew a coaxial connector, item 1 of the list on page 1001 will be required.

(a) Unsolder the cable form wire from the spill at the rear of the connector. Unsolder the coaxial braid from the large solder tag (if applicable).

(b) Using a 0.531 in/13.5 mm A/F spanner, remove the nut, crinkle washer, (and large solder tag if applicable), securing the connector body to the case assembly. Discard the connector, nut and crinkle washer.

(c) Remove the nut and crinkle washer from the replacement coaxial connector.

(d) Locate the connector in the case assembly; fit the crinkle washer on the connector body, (fit the large solder tag before the crinkle washer if applicable), and secure with the nut. Fully tighten the nut using a 0.531 in/13.5 mm A/F spanner.

(e) Solder the relevant cable form wire to the terminal spill at the rear of the connector.

(2) Trimming Potentiometers

To renew an 'E', 'F', 'TE', 'TF' or 'P' trimmer, item 1 of the list on page 1001 will be required.

(a) Using a 0.6 in/13 mm A/F spanner, remove the nut and washer securing the potentiometer to the case assembly, then carefully unsolder the three potentiometer wires and remove the potentiometer.

(b) Check new trimmers as detailed in INSPECTION.

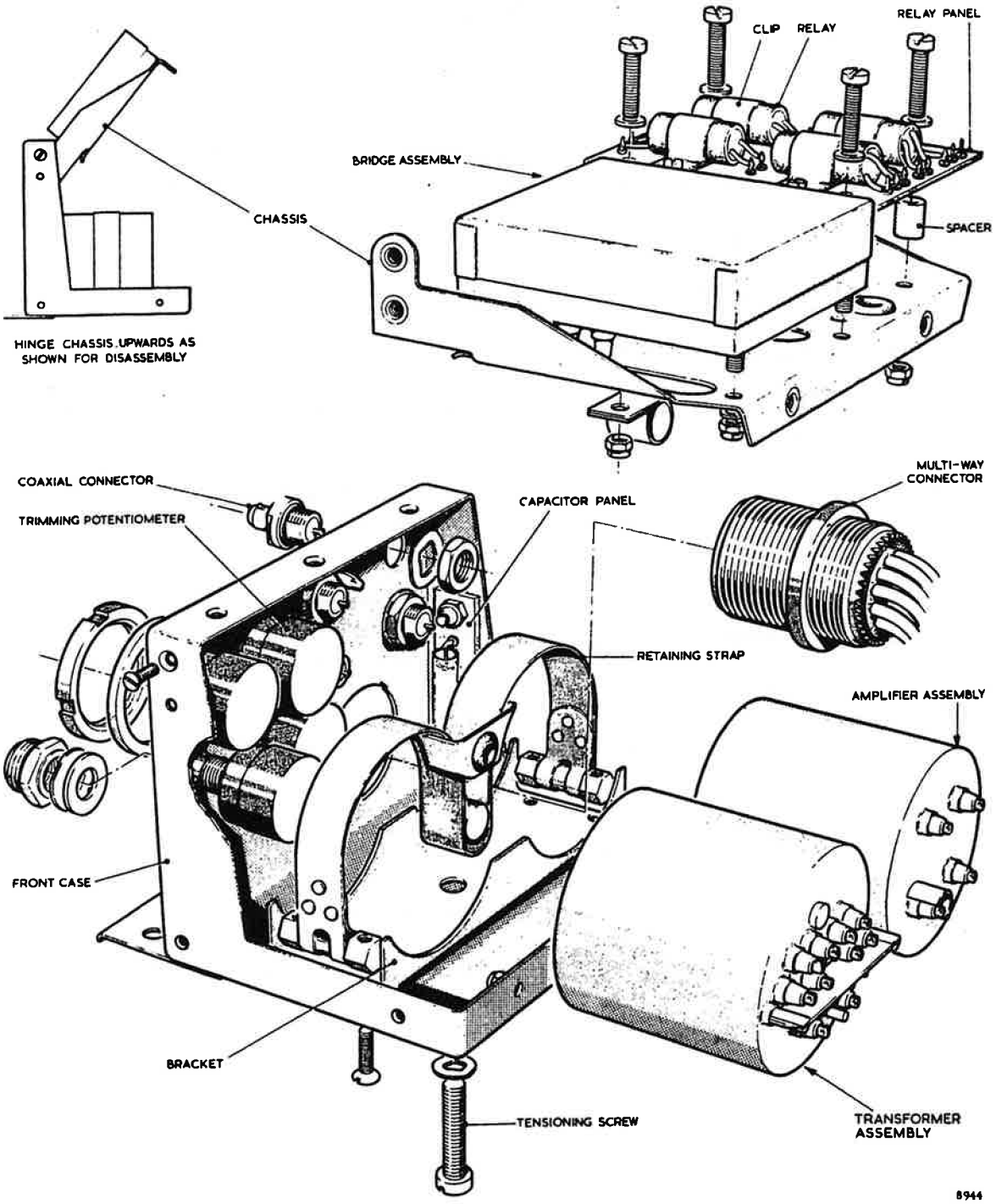

Fig. 401 - Exploded View - Bridge/Amplifier

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(c) Remove the nut and washer from the new potentiometer; locate the potentiometer in the front case assembly such that the slotted heads line up and secure with the washer and nut, using an 0.6 in/13 mm A/F spanner.

(d) Solder the three cableform wires to the potentiometer with reference to the wiring diagram, fig. 501, 502 or 503.

(3) Multi-way Connector

The procedure for removing a damaged multi-way connector is as follows, items 1 and 16 of the list on page 1001 will be required.

(a) Cut the cable form lacing sufficient to slide back the protective sleeves, unsolder the connections and identify each disconnected wire.

(b) Using a 'C' spanner unscrew the plug collar and remove the connector.

(c) Locate the replacement connector and secure with the collar.

(d) Remake the connections to the spills at the rear with reference to the wiring diagram, fig. 501, 502 or 503.

(e) Slide the protective sleeves over the soldered connections and re-tie the cableform lacing.

B. Bridge Assembly

Items 1 and 17 of the list on page 1001 will be required.

(1) Using a large soldering iron carefully melt the solder joining the lid to the base and remove the lid.

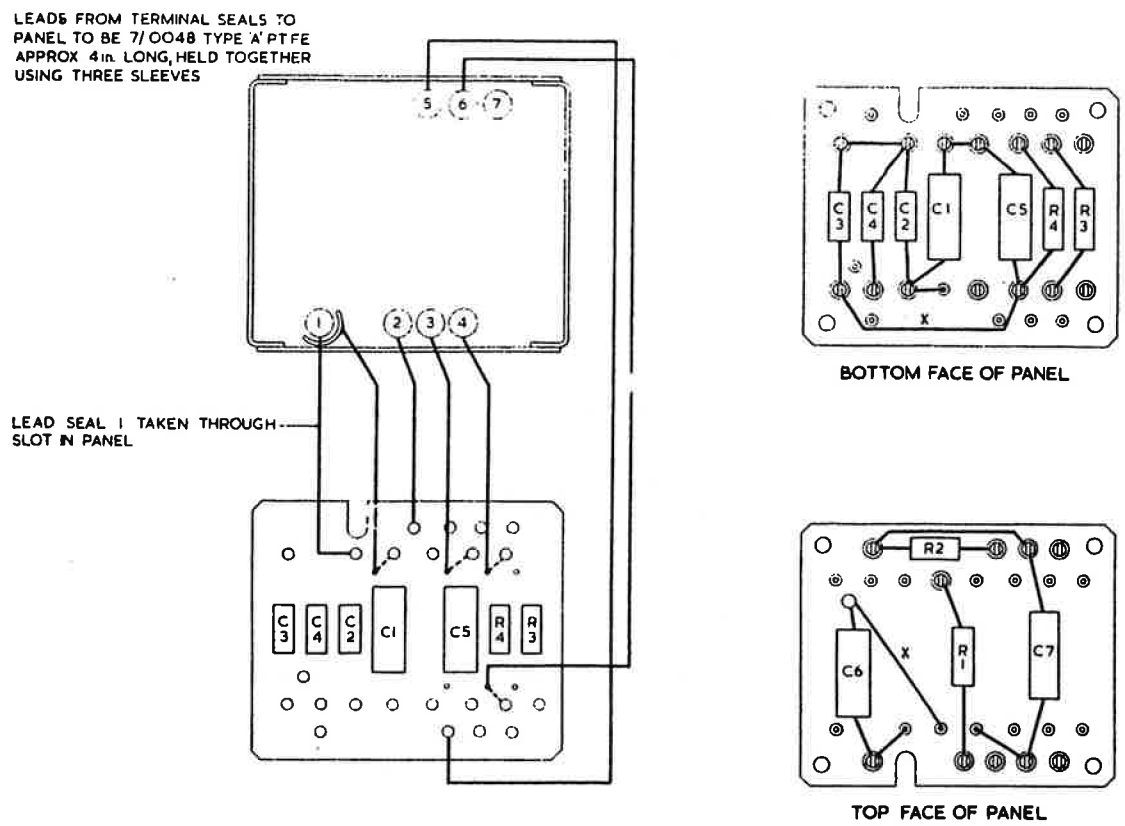
(2) Clean off both mating surfaces using a soft cloth.

(3) Remove the four 6BA screws and plain washers securing the panel assembly to the base.

(4) Gently lift the panel assembly from the base.

(5) To renew any capacitor or resistor, no further disassembly is necessary. The suspect component(s) should be carefully removed for checking, using a miniature soldering iron. Connect replacement component(s) in accordance with the bridge assembly wiring diagram, fig. 402 or 403.

CAUTION: TO AVOID DAMAGE TO THE TURRET LUGS, REPLACEMENT COMPONENT WIRES MUST BE PREFORMED, AND SOLDERED CONNECTIONS MADE AS NEAR TO THE PANEL AS POSSIBLE.



NOTE :-

1. WIRES TO BE TAKEN THROUGH HOLE IN TURRET LUGS AND TERMINAL SEALS AND TAKEN ROUND 1/2 TURN BEFORE SOLDERING
2. THE WIRING TO LUGS FACING INTO CAN TO BE TAKEN UP THROUGH ADJACENT HOLES AND DOWN THROUGH CENTRE HOLE IN LUG
3. LEADS MARKED THUS X ARE 26 S.W.G (45mm) TINNED COPPER WIRE, SLEEVED WITH PTFE SLEEVING (POLYPENCO TW 24)
4. ALL STRAPS ON PANEL TO BE 26 S.W.G TINNED COPPER WIRE

4086

Fig. 402 - Wiring Diagram - Bridge Assembly - GB7 and GB22

Assemble a bridge assembly as follows:-

(1) Carefully locate the panel assembly in the base and secure with four 6BA screws and plain washers.

(2) Locate the lid on the base and using a large soldering iron solder the joint with 60/40 solder using 'Telecene' resin based flux or similar. Remove any flux with ethyl alcohol.

(3) Apply a coat of matt black cellulose lacquer over the soldered joint and allow one hour to dry, then apply a second coat of lacquer.

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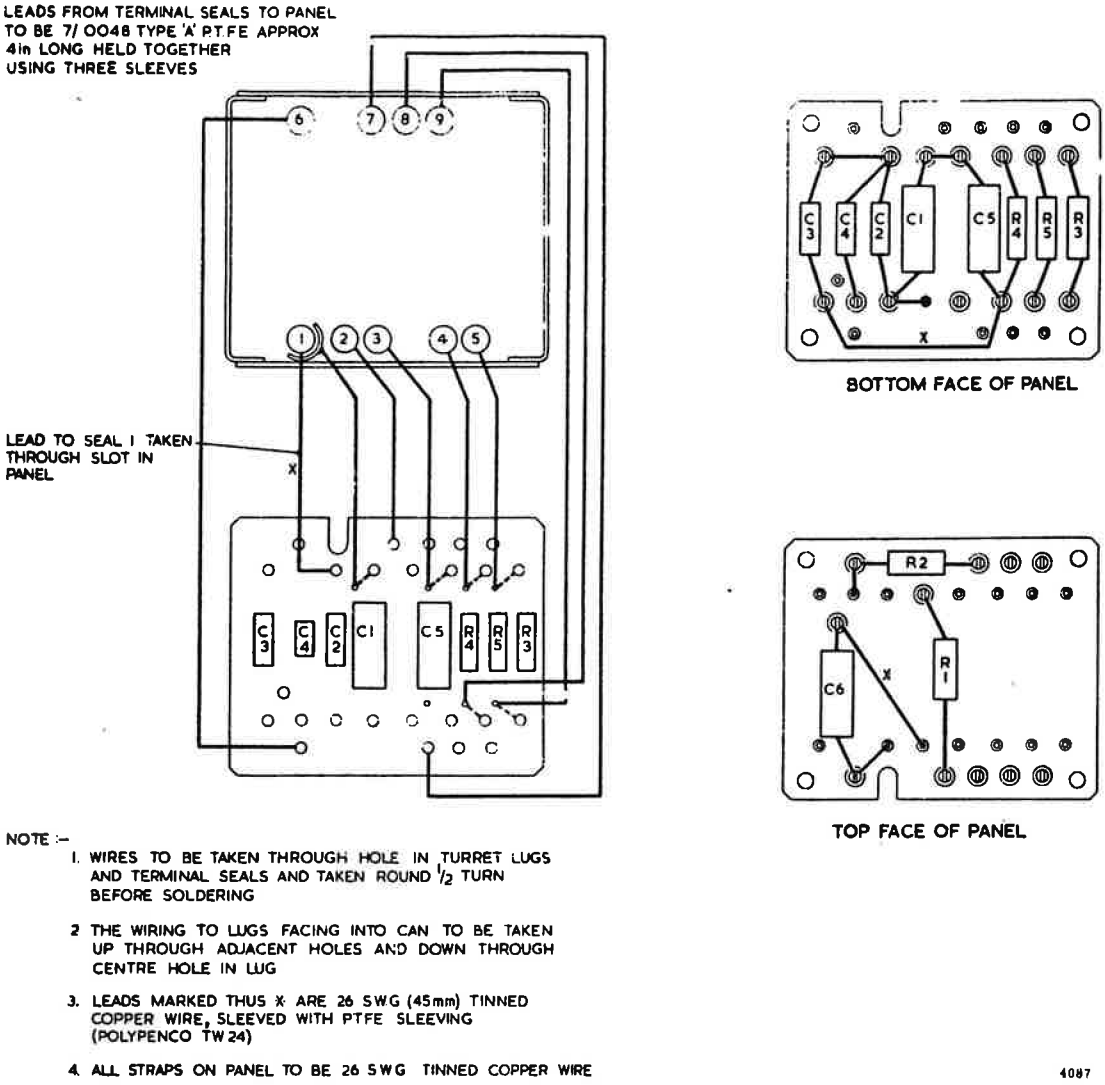


NOTE :-

1. WIRES TO BE TAKEN THROUGH HOLE IN TURRET LUGS AND TERMINAL SEALS AND TAKEN ROUND ½ TURN BEFORE SOLDERING
2. THE WIRING TO LUGS FACING INTO CAN TO BE TAKEN UP THROUGH ADJACENT HOLES AND DOWN THROUGH CENTRE HOLE IN LUG
3. LEADS MARKED THUS X ARE 26 SWG (45mm) TINNED COPPER WIRE, SLEEVED WITH PTFE SLEEVING (POLYPENCO TW 24)
4. ALL STRAPS ON PANEL TO BE 26 SWG TINNED COPPER WIRE

4087

Fig. 403 - Wiring Diagram - Bridge Assembly - GB17

(4) Subject the bridge assembly to the test procedure detailed in INSPECTION.

C. Amplifier Assembly

Items 1, 17, 19 and 20 of the list on page 1001 will be required.

(1) Using a large soldering iron and pair of pliers, untack the free end of the strip wire; remove the wire by progressively heating the base of the case and solder and pulling out the wire.

(2) Run off as much surplus solder as possible, then remove the rubber string

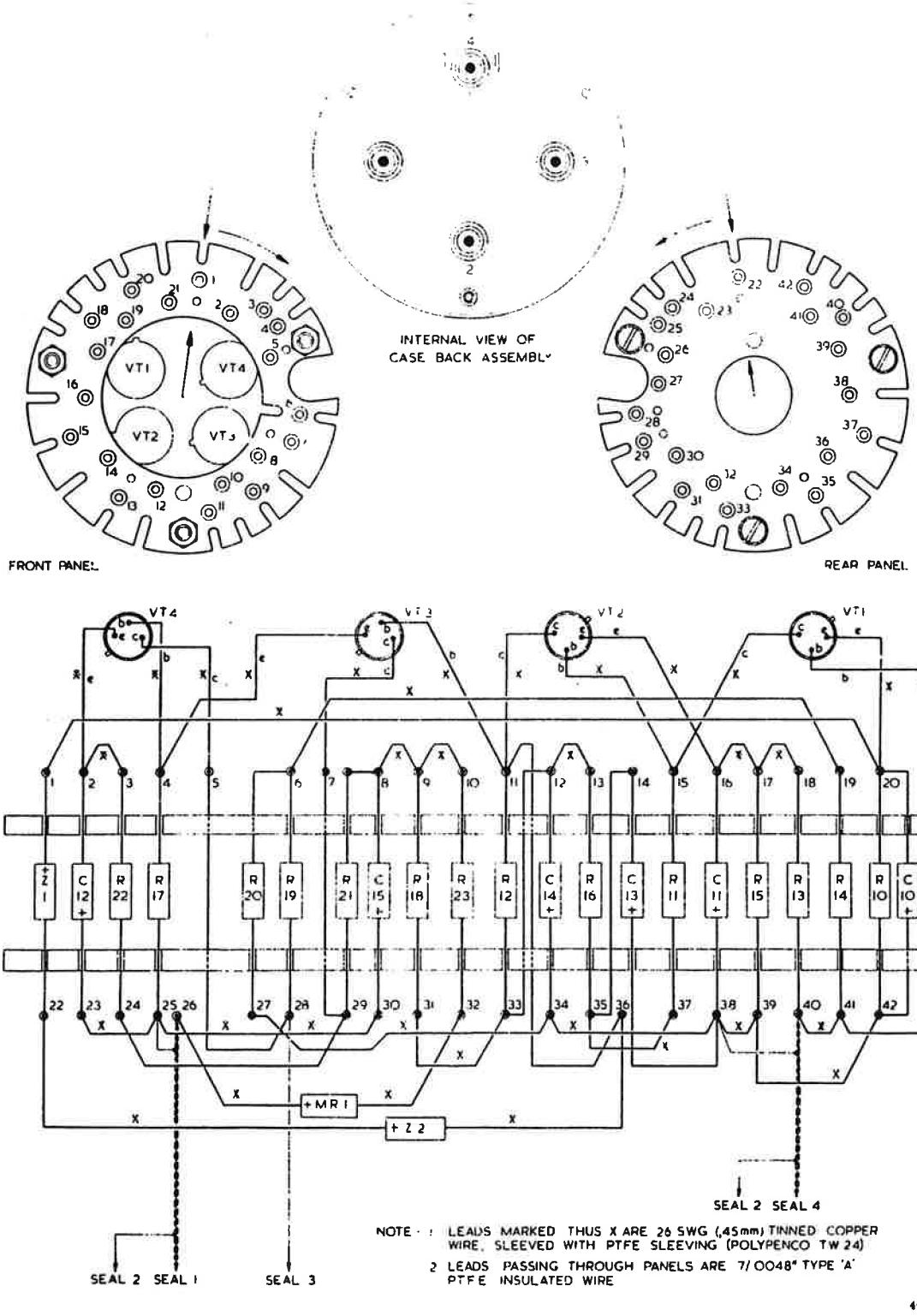


Fig. 404 - Wiring Diagram - Amplifier Assembly

from the bottom of the groove, and discard.

(3) Withdraw the amplifier assembly and case back assembly from the case. Clean off both mating surfaces, using a soldering iron and soft cloth, also open the vent hole adjacent to the screened terminal seal.

(4) Fully unscrew, but do not remove, the three special screws securing the amplifier assembly to the case back assembly. Temporarily secure the three special screws with three 8BA nuts.

NOTE: The two sub-assemblies must be adequately supported during any subsequent repair, to prevent damage to the connecting wires.

(5) Remove the insulating tape from around the amplifier assembly and discard.

CAUTION: 1. IT IS IMPERATIVE THAT THERMAL SHUNTS ARE USED WHEN RENEWING TRANSISTORS. DIODES OR ELECTROLYTIC CAPACITORS.

2. TO AVOID DAMAGE TO THE TURRET LUGS, REPLACEMENT COMPONENT WIRES MUST BE PREFORMED, AND SOLDERED CONNECTIONS MADE AS NEAR TO THE PANEL AS POSSIBLE.

(6) To renew components, no further disassembly is necessary. The suspect component(s) should be carefully removed for checking, using a miniature soldering iron, and thermal shunts, where necessary.

(7) Connect the replacement component(s) to the amplifier front and rear panel terminations, in accordance with the amplifier wiring diagram, fig. 404.

(8) On completion of component renewal, examine the interconnecting wires, between the case back assembly seals and the amplifier assembly terminations, for security and fractured wire strands. Renew faulty wires in accordance with the wiring diagram, fig. 404.

(9) Remove the three 8BA nuts temporarily securing the three special screws to the amplifier assembly.

(10) Locate the amplifier assembly on the case back assembly studs and secure with the three special screws.

(11) Wrap a piece of 'Scotchboy 56' tape round the amplifier assembly, to cover the components.

(12) Preform a length of 22 SWG (0.028 in/0.71 mm dia) tinned iron wire, by

winding three turns round the amplifier case, cut the wire at this length.

(13) Slide the case over the amplifier assembly, until the end of the case bears against the amplifier assembly special screws. Insert two turns of 0.040 in/1.0 mm dia silicone rubber st.ing into the groove between the case and case back assembly, press the string to the base of the groove.

(14) Locate the preformed wire over the string and bend the last half turn of wire at right angles to the case.

(15) Using a large soldering iron (65 watts), make a neat fillet of solder over the wire, when sealing is complete, fold down the last half turn of wire and solder tack the end.

(16) Place the amplifier assembly into a heating cabinet, maintain a temperature of 55°C for a period of 30 minutes.

(17) Remove the amplifier assembly from the heating cabinet and seal the vent hole adjacent to seal 4.

(18) Subject the amplifier assembly to the test procedure detailed in INSPECTION.

(19) After satisfactory completion of the tests and before making good the paint finish, remove any flux with ethyl alcohol.

(20) Apply a coat of matt black cellulose lacquer over the soldered joint and allow one hour to dry out, then apply a second coat of lacquer.

D. Transformer Assembly

A faulty transformer assembly should be discarded. Test a replacement transformer assembly in accordance with the procedures given in INSPECTION.

E. Relay Panel Assembly

To renew a micro-relay item 1 of the list on page 1001 will be required. Proceed as follows:-

(1) Unsolder the five micro-relay leads connecting the relay to the panel turret lugs.

(2) Remove the 6BA screw, plain washer and bolt securing the 'P' clip to the panel.

(3) Remove the 'P' clip and relay.

Replace a micro-relay as follows:

(1) Insert the relay into the 'P' clip ensuring that the relay leads are adjacent to the relevant turret lugs.

(2) Solder the relay leads to the panel turret lugs in accordance with the relay panel wiring diagram, fig.405, 406 or 407.

To remove a relay panel assembly proceed as follows:

(1) Remove the five 6BA nuts, plain washers and screws securing the relay panel assembly to the alloy panel.

(2) Gently hinge the panel upwards and unsolder the cableform wires from the panel turret lugs.

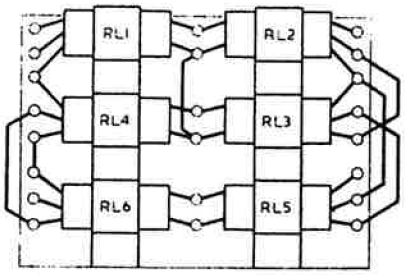


Fig.405 - Wiring Diagram
Relay Panel Assembly GB7

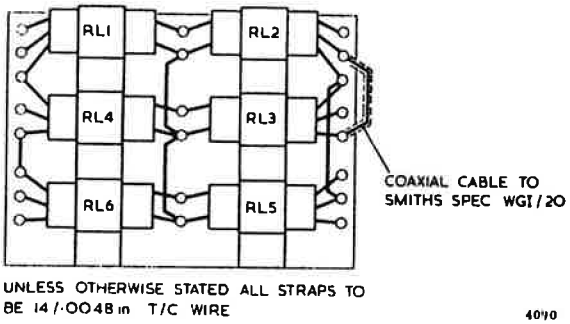


Fig.406 - Wiring Diagram
Relay Panel Assembly GB17

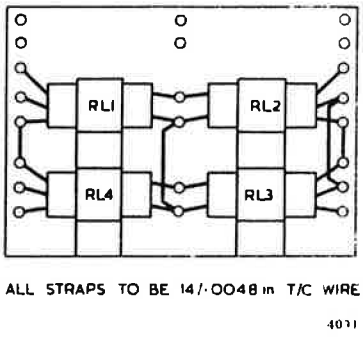


Fig.407 - Wiring Diagram
Relay Panel Assembly GB22

CAUTION: TO AVOID DAMAGE TO THE TURRET LUGS, REPLACEMENT COMPONENT WIRES MUST BE PREFORMED, AND SOLDERED CONNECTIONS MADE AS NEAR TO THE PANEL AS POSSIBLE.

FUEL QUANTITY BRIDGE/AMPLIFIER ASSEMBLY

1. GENERAL

Faulty parts should be replaced by approved spares only, after inspection for serviceability. Electrical connections should be made with multicore cored solder to BS441.

2. PROCEDURE

A. Bridge/Amplifier

(1) Secure the strap and bracket assembly to the case assembly with four screws.

(2) Locate the amplifier and transformer assemblies in the retaining strap; ensure that the terminal spills are correctly located (fig. 401).

(3) Secure the amplifier and transformer assemblies by tightening the single 2BA screw passing through the centre of the strap as the base of the bridge/amplifier.

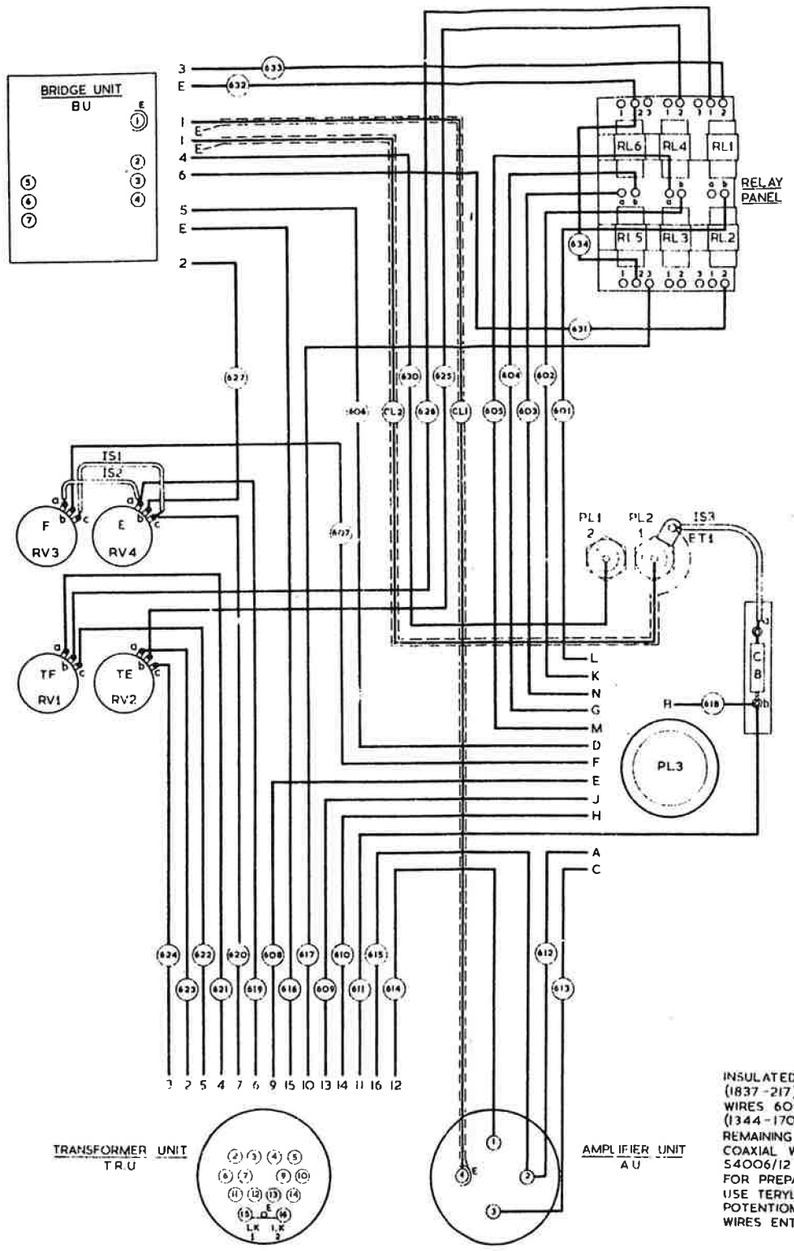
(4) Locate the bridge assembly on the alloy panel ensuring that the terminal seals are in the correct position. Secure with four 6BA clinch nuts and plain washers.

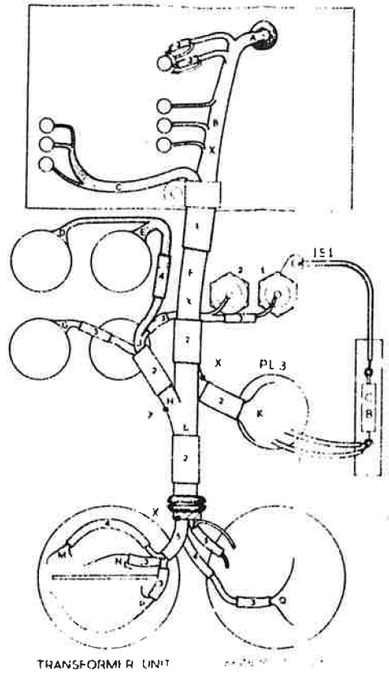
(5) Complete wiring information is given in figs. 501, 502 and 503 and the running list in Tables 501, 502 and 503. Preparation of coaxial cable connections is given in fig. 504. Connect the relevant cable form wires to the bridge transformer and amplifier assembly termination seals. Ensure that the two leads from the single capacitor panel assembly containing capacitor C8 are connected to their relevant terminations.

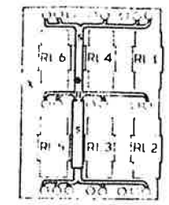
NOTE: The cable harness is secured to the lower face of the alloy panel with a 'P' clip, and 1 6BA screw, plain washer and clinch nut.

(6) Using a low pressure dry air supply, remove any traces of dust from the assembled components.

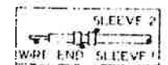
(7) Locate the cover on the case assembly and secure with ten 6BA screws and plain washers and three 4BA screws and plain washers.







BINDING SLEEVES	
REF	CODE
1	30-784-129
2	30-784-122
3	30-784-117
4	30-784-114
5	30-784-124



L = TOTAL LENGTH INCHES
T TWISTED

0	Bk	BLACK
1	Br	BROWN
2	R	RED
3	O	ORANGE
4	Y	YELLOW
5	G	GREEN
6	B	BLUE
7	V	VIOLET
8	S	SLATE
9	W	WHITE

LIMB	WIRES	LIMB	WIRES
A	601, 602, 603, 604, 605, 617, 625, 626, 631, 632, 633.	K	601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611
B	601, 602, 603, 604, 605, 616, 617, 625, 626, 627, 630, 631, 632, 633, 634, CL2.	L	608, 609, 610, 611, 612, 613, 616, 617, 619, 620, 621, 622, 623, 624, CL1.
C	606, CL1	M	619, 620, 623, 624.
D	607, IS1, IS2.	N	608, 617, 621, 622
E	607, 619, 620, 627.	P	609, 610, 611, 614, 615, 616.
F	601, 602, 603, 604, 605, 606, 616, 617, 625, 626, 630, CL1, CL2.	Q	612, 613, 614, 615.
G	621, 622, 626	R	601, 602, 603, 604, 605, 625, 626, 632, 633, 634.
H	607, 619, 620, 621, 622, 623, 624, 625, 626, 627, 630, CL2.	S	625, 626, 632, 633, 634
J	607, 619, 620, 627, 630, CL2.	T	611, 618.

INSULATED STRAPS (IS1-IS3) 1/0.022" T/C WIRE (1341-408) INSULATE WITH PVC SLEEVING BLUE (1837-217) BARE STRAPS (LK1 AND LK2) 1/0.022" T/C WIRE
WIRES 609 610 611 614 630 7/0.0076" SILVER PLATED COPPER WIRE PTFE INSULATED (1344-1706-12)
REMAINING WIRES 7/0.0076" PVC INSULATED TO SMITHS SPEC 1340.051 (1344.305.12).
COAXIAL WIRES TO BE SPCCS WIRES PTFE DIELECTRIC SPC BRAIDED PTFE LAPPED TO S4006/12
FOR PREPARATION OF COAXIAL CABLE ENDS REFER TO FIG 501
USE TERYLENE TAPE 1/4" WIDE (1665-421) TO TIE CABLEFORM WHERE INDICATED THUS x
POTENTIOMETER CONNECTIONS TO BE FITTED WITH BINDING SLEEVES SMITHS PT No 30-784-117
WIRES ENTERING CONNECTOR PL 3 TO BE FITTED WITH SLEEVES SMITHS PT No 30-783-729-05.

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Fig. 501 - Wiring Diagram - GB7

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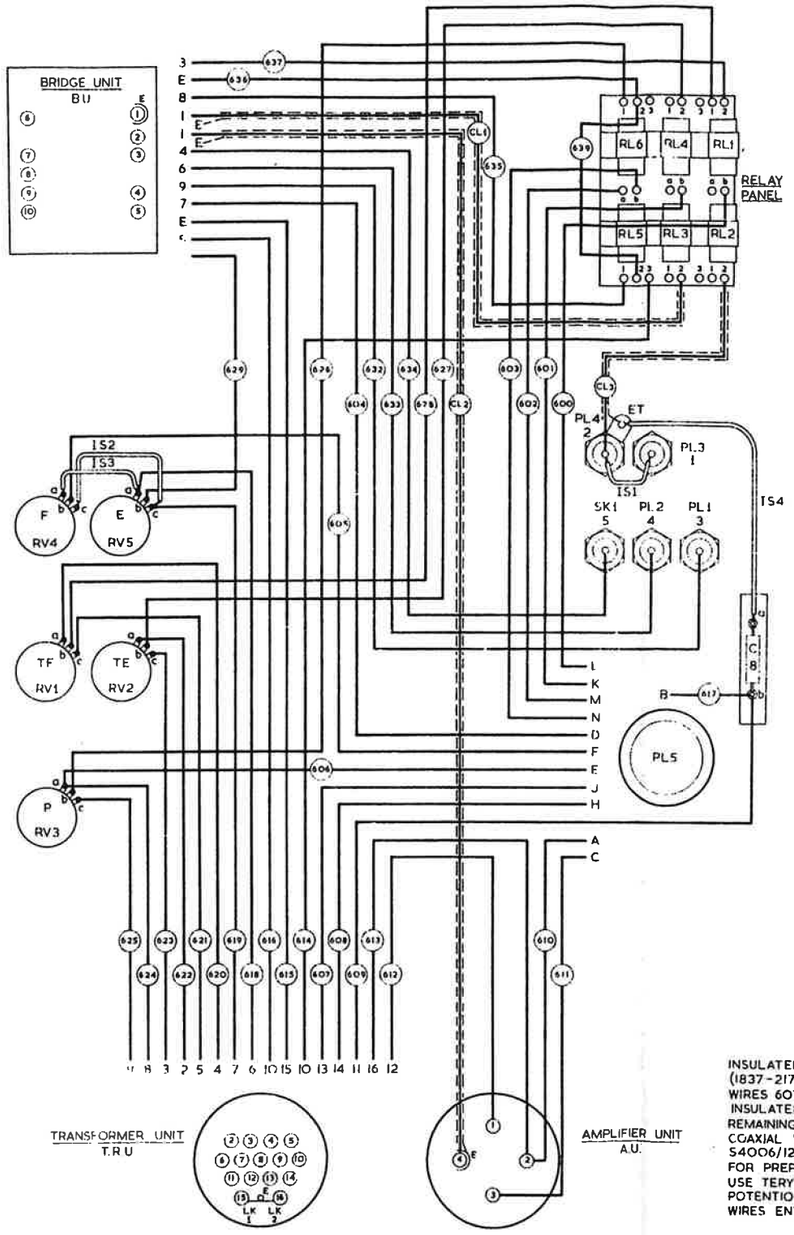
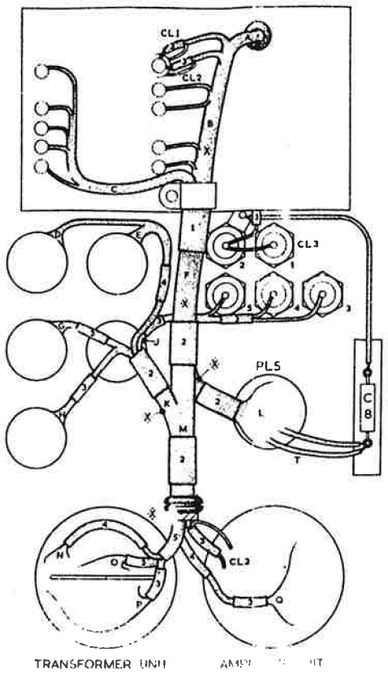
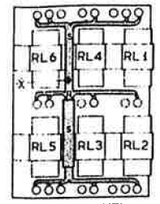
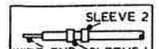






RELAY PANEL

BINDING SLEEVES	
REF.	CODE
1	30-784-129
2	30-784-122
3	30-784-117
4	30-784-114
5	30-784-124



L = TOTAL LENGTH INCHES
T = TWISTED

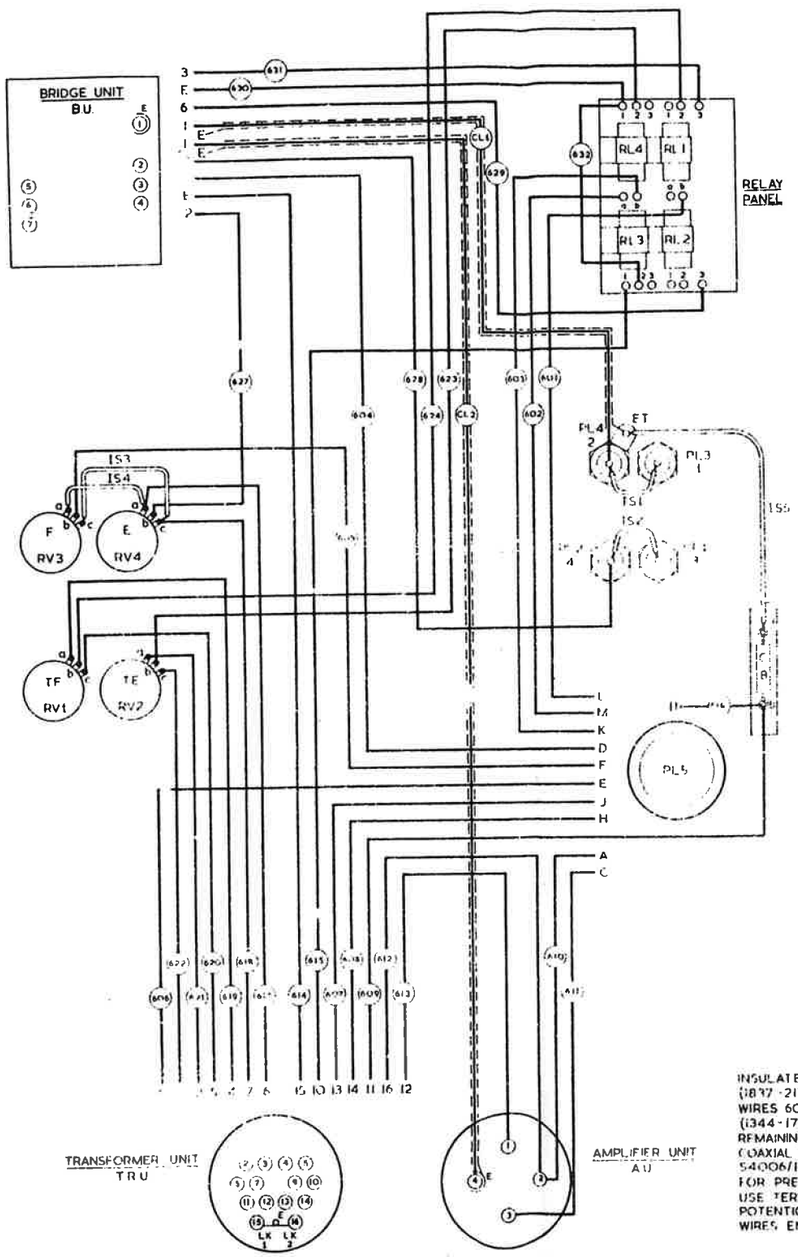
0	Bk	BLACK
1	Bn	BROWN
2	R	RED
3	O	ORANGE
4	Y	YELLOW
5	G	GREEN
6	B	BLUE
7	V	VIOLET
8	S	SLATE
9	W	WHITE

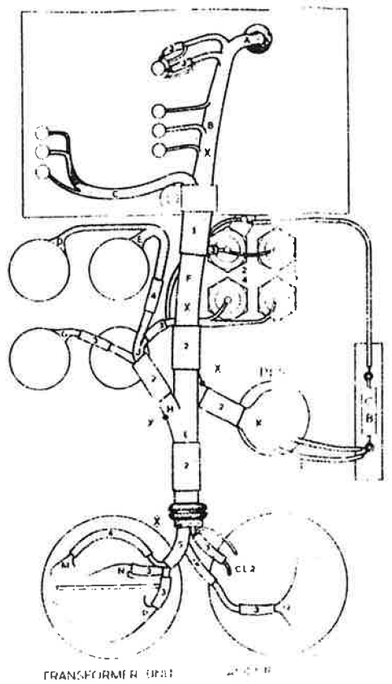
LIMB	WIRES	LIMB	WIRES
A	CL1, 635, 614, 600, 601, 602, 603, 636, 637, 626, 627, 628.	K	605, 618, 629, 619, 620, 621, 628, 622, 627, 623, 626, 606, 625, 632, 633, 634.
B	CL2, 626, 629, 637, 634, 616, 600, 601, 602, 603, 627, 628, 636, 615.	L	600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611.
C	633, 604, 635, 632.	M	607, 608, 609, 610, 611, 612, 613, 614, 615, 616, CL2, 618, 619, 620, 621, 622, 623, 624, 625.
D	IS2, IS3, 605.	N	622, 623, 618, 624.
E	605, 618, 629, 619.	O	620, 621, 625, 616, 614.
F	629, 620, 601, 602, 603, CL2, 627, 616, 628, 621, 633, 632, 604, 626, 614, 615	P	609, 612, 607, 608, 615, 613.
G	620, 621, 628.	Q	612, 610, 611, 613.
H	626, 606, 625.	R	600, 601, 602, 603, 639.
J	632, 633, 634.	S	639, 636, 637, 626, 627, 628.
		T	609, 617.

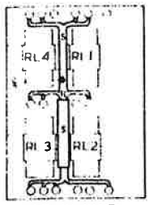
INSULATED STRAPS (IS1-IS4) 1/0.022" T/C WIRE (1341-408) INSULATE WITH PVC. SLEEVING BLUE (1837-217). BARE STRAPS (LK1 AND LK2) 1/0.022" T/C WIRE.
WIRES 607, 608, 609, 612, 632, 633, 634 7/0.0076" SILVER PLATED COPPER WIRE PTFE INSULATED (1344-1706-12).
REMAINING WIRES 7/0.0076" PVC INSULATED TO SMITHS SPEC. 1340-051 (1344-305-12).
COAXIAL WIRES TO BE S.P.C.C.S WIRES PTFE DIELECTRIC S.P.C. BRAIDED PTFE LAPPED TO S4006/12
FOR PREPARATION OF COAXIAL CABLE ENDS REFER TO FIG 501
USE TERYLENE TAPE 1/4" WIDE (1665-421) TO TIE CABLEFORM WHERE INDICATED THUS X.
POTENTIOMETER CONNECTIONS TO BE FITTED WITH BINDING SLEEVES SMITHS PT No. 30-784-117
WIRES ENTERING CONNECTOR PL5 TO BE FITTED WITH SLEEVES SMITHS PT No 30-783-729-05.

4093

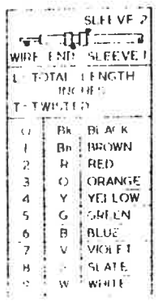
Fig. 502 - Wiring Diagram - GB17







BINDING SLEEVES	
REF	CODE
1	30-784-129
2	30-784-122
3	30-784-117
4	30-784-114
5	30-784-104



0	Bk	BLACK
1	Bn	BROWN
2	R	RED
3	O	ORANGE
4	Y	YELLOW
5	G	GREEN
6	B	BLUE
7	V	VIOLET
8	S	SLATE
9	W	WHITE

LIMB	WIRES
A	601, 602, 603, 615, 623, 624, 629, 630, 631
B	601, 602, 603, 615, 623, 624, 627, 628, 629, 630, 631, CL1, CL2.
C	604, 629
D	605, 153, 154
E	605, 617, 618, 627
F	601, 602, 603, 604, 615, 623, 624, 627, 628, 629, 630, 631, CL1, CL2
G	619, 620, 624
H	605, 617, 618, 619, 620, 621, 622, 623, 624, 627, 628

LIMB	WIRES
J	605, 617, 618, 627, 628
K	601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611
L	606, 607, 608, 609, 610, 611, 614, 615, 617, 618, 619, 620, 621, 622, CL2
M	617, 618, 621, 622
N	606, 615, 619, 620
P	607, 608, 609, 612, 613, 614
Q	610, 611, 612, 613
R	601, 602, 603
S	623, 624, 630, 631, 632
T	609, 610

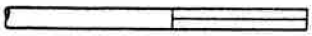
INSULATED STRAPS (151-155) 1/0.022" T/C WIRE (1341-408) INSULATE WITH PVC SLEEVING BLUE (1837-217). BARE STRAPS (LK1 AND LK2) 1/0.022" T/C WIRE.
WIRES 607, 608, 609, 613, 628, 7/0.0076" SILVER PLATED COPPER WIRE PTFE INSULATED (1344-1706-12)
REMAINING WIRES 7/0.0076" PVC INSULATED TO SMITHS SPEC 1340-051 (1344-305-12).
COAXIAL WIRES TO BE SPEC 5 WIRES PTFE DIELECTRIC SPEC BRAIDED PTFE LAPPED TO 54006/12
FOR PREPARATION OF COAXIAL CABLE ENDS REFER TO FIG 501
USE TERYLENE TAPE 1/4" WIDE (1665-421) TO TIE CABLEFORM WHERE INDICATED THUS ✕
POTENTIOMETER CONNECTIONS TO BE FITTED WITH ENDING SLEEVES SMITHS PT No 30-784-117
WIRES ENTERING CONNECTOR PL5 TO BE FITTED WITH SLEEVES SMITHS PT No 30-783-729-05

4m14

Fig. 503 - Wiring Diagram. - GB22

METHOD 1

1



TO REMOVE OUTER COVERING OF CO-AXIAL CABLE, MAKE A CUT AROUND THE CIRCUMFERENCE. BE CAREFUL NOT TO CUT SO DEEPLY THAT THE CABLE SHIELD IS DAMAGED. A LATERAL CUT TO THE END OF THE CABLE WILL THEN MAKE IT EASY TO REMOVE THE OUTER COVERING.

2.

TO REMOVE THE METAL BRAID, PUSH BACK TO CREATE A BULGE SO THAT AN ENTRANCE FOR A FINE PAIR OF SCISSORS, OR HOOKED TOOL CAN BE MADE. REMOVE BRAID SO AS TO LEAVE ABOUT $\frac{1}{8}$" PROTRUDING FROM OUTER COVERING.

3.

TO REMOVE THE DIELECTRIC, CUT AS SHOWN IN No. 2 ALMOST TO THE CONDUCTOR. PLIERS CAN BE USED TO PULL OFF THE DIELECTRIC. A KNIFE, RAZOR OR A PAIR OF WIRE STRIPPERS CAN BE USED FOR THIS OPERATION.

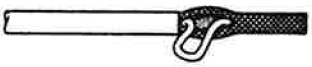
4.

3 TURNS OF 24 S.W.G. TINNED COPPER WIRE SHOULD BE SECURELY SOLDERED TO BRAID, CUT TO LENGTH AS REQUIRED. ASSEMBLE POLYPENCO No. 24 AS SHOWN.

5.

ASSEMBLE INSULATING SLEEVE AS SHOWN AND BEND WIRE ROUND TO REQUIRED ANGLE.

METHOD 2



PREPARE CABLE AS 1 OF METHOD 1. PUSH BACK BRAID TO CREATE A BULGE. OPEN BRAID AND DRAW DIELECTRIC THROUGH

DECREASE DIAMETER OF BRAID. BY STRETCHING BRAID OUT.

METHOD 3

AS 1,2&3 OF METHOD 1. PREPARE CABLE AS ABOVE. CUT OFF BRAID CLOSE TO OUTER COVERING.

ASSEMBLE INSULATING SLEEVE AS SHOWN

3168

Fig. 504 - Preparation of Coaxial Cable Connections

TABLE 501

RUNNING LIST (GB7)

WIRE No.	COLOURS				FROM	TO	CABLEFORM ROUTE		
	WIRE	L	SLEEVES 1	SLEEVES 2			IN	VIA	OUT
1S1					RV3/c	RV4/c	D		E
1S2					RV3/a	RV4/a	D		E
1S3					C8/a	PL2/ET.1			
LK1					TR.U/15	TR.U/E			
LK2					TR.U/E	TR.U/16			
601	B		BK	BN	PL3/L	RL1/b	K	F.B.A	R
602	B		BK	R	PL3/K	RL3/b	K	F.B.A.	R
603	B		BK	O	PL3/N	RL5/a	K	F.B.A	R
604	B		BK	Y	PL3/G	RL5/b	K	F.B.A	R
605	B		BK	G	PL3/M	RL3/a	K	F.B.A	R
606	B		BK	B	PL3/D	B.U/5	K	F	C
607	B		BK	V	PL3/F	RV3/b	K	H.E.	D
608	B		BK	S	PL3/E	TR.U/9	K	L	N
609	B		BK	W	PL3/J	TR.U/13	K	L	P
610	B		BN	BK	PL3/H	TR.U/14	K	L	P
611	B		BN	BN	C1/b	TR.U/11	T	K.L	P
612	B		BN	R	PL3/A	A.U/2	K	L	Q
613	B		BN	O	PL3/C	A.U/3	K	L	Q
614	B		BN	Y	TR.U/12	A.U/1	P	L	Q
615	B		BN	G	TR.U/16	A.U/2	P	L	Q
616	B		BN	B	TR.U/15	B.U/E	P	L.F.	B
617	B		BN	V	TR.U/10	RL5/3	N	L.F.B	A
618	B		BN	S	PL3/B	C1/b	T		T
619	B		BN	W	TR.U/6	RV4/a	M	L.H.	E
620	B		R	BK	TR.U/7	RV4/c	M	L.H.	E
621	B		R	BN	TR.U/4	RV1/a	N	L.H.	G
622	B		R	R	TR.U/5	RV1/c	N	L.H.	G
623	B		R	O	TR.U/2	RV2/a	M	L	H
624	B		R	Y	TR.U/3	RV2/c	M	L	H
625	B		R	G	RV2/b	RL4/2			
626	B		R	B	RV1/b	RL1/1			
627	B		R	V	RV4/b	B.U/2	E	H.F.	B
628	B		R	S					
629	B		R	W					
630	B		O	BK	PL1	B.U/4	J	H.F.	B
631	B		O	BN	RL2/2	B.U/6	A		B
632	B		O	R	RL6/2	B.U/E	S	R.A.	B
633	B		O	O	RL1/2	B.U/3	S	R.A.	B
634	B		O	Y	RL5/2	RL6/2	A		B

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TABLE 501 (cont'd)

RUNNING LIST (GB7)

WIRE No.	COLOURS				FROM	TO	CABLEFORM ROUTE		
	WIRE	L	SLEEVES 1	SLEEVES 2			IN	VIA	OUT
CL1	C				A.U/4	B.U/1	L	L.F.	C
	S				A.U/E	B.U/E			
CL2	C				PL2	B.U/1	J	H.F.	B
	S				PL2/ET	B.U/E			

TABLE 502

RUNNING LIST (GB17)

WIRE No.	COLOURS				FROM	TO	CABLEFORM ROUTE		
	WIRE	L	SLEEVES 1	SLEEVES 2			IN	VIA	OUT
1S1					PL3	PL4			
1S2					RV4/c	RV5/c	D		E
1S3					RV4/a	RV5/a	D		E
1S4					C7/a	PL4/ET			
LK1					TR.U/15	TR.U/E			
LK2					TR.U/E	TR.U/16			
600	B		BK	BK	PL5/L	RL1/b	L	F.B.A.	R
601	B		BK	B	PL5/K	RL3/b	L	F.B.A.	R
602	B		BK	R	PL5/M	RL5/a	L	F.B.A.	R
603	B		BK	O	PL5/N	RL5/b	L	F.B.A.	R
604	B		BK	Y	PL5/D	B.U/7	L	F	C
605	B		BK	G	PL5/F	RV4/b	L	K	G
606	B		BK	B	PL5/E	RV3/a	L	K	H
607	B		BK	V	PL5/J	TR U/13	L	M	P
608	B		BK	S	PL5/H	TR.U/14	L	M	P
609	B		BK	W	C1/b	TR.U/11	T	L.M	P
610	B		BN	BK	PL5/A	A.U/2	L	M	N
611	B		BN	BN	PL5/C	A.U/3	L	M	Q
612	B		BN	R	TR.U/12	A.U/1	P		Q
613	B		BN	O	TR.U/16	A.U/2	P		Q
614	B		BN	Y	TR.U/10	RL5/3	O	M.F.B	A
615	B		BN	G	TR.U/15	B.U/E	P	M.F	B
616	B		BN	B	TR.U/10	B.U/5	O	M.F	B
617	B		BN	V	PL5/B	C1/b	T		T

TABLE 502 (cont'd)

RUNNING LIST (GB17)

WIRE No.	COLOURS				FROM	TO	CABLEFORM ROUTE		
	WIRE	L	SLEEVES 1	SLEEVES 2			IN	VIA	
618	B		BN	S	TR.U/6	RV5/a	N	M.K	E
619	B		BN	W	TR.U/7	RV5/c	N	M.K	E
620	B		R	BK	TR.U/4	RV1/a	O	M.K	G
621	B		R	BN	TR.U/5	RV1/c	O	M.K	G
622	B		R	R	TR.U/2	RV2/a	N	M	K
623	B		R	O	TR.U/3	RV2/c	N	M	K
624	B		R	Y	TR.U/8	RV3/a	N	M.K	H
625	B		R	G	TR.U/9	RV3/c	O	M.K	H
626	B		R	B	RV3/b	RL6/1	H	KFBAR	S
627	B		R	V	RV2/b	RL4/2	K	FBAR	S
628	B		R	S	RV1/b	RL1/1	G	KFBAR	S
629	B		R	W	RV5/b	B.U/2	E	K.F	B
632	B		O	R	PL1	B.U/9	J	K.F	C
633	B		O	O	PL2	B.U/6	J	K.F	C
634	B		O	Y	SK1	B.U/4	J	K.F	B
635	B		O	G	RL5/1	B.U/8	A	B	C
636	B		O	B	RL 6/2	B.U/E	S	R.A	B
637	B		O	V	RL1/2	B.U/3	S	R.A	B
639	B		O	W	RL5/2	RL6/2	R		S
CL1	C				RL3/2	B.U/1	A		B
	S					B.U/E	A		B
CL2	C				A.U/4	B.U/1	M	F	B
	S				A.U/E	B.U/E	M	F	B
CL3	C				PL4	RL2/2			
	S				PL4/ET				

TABLE 503

RUNNING LIST (GB22)

WIRE No.	COLOURS				FROM	TO	CABLEFORM ROUTE		
	WIRE	L	SLEEVES 1	SLEEVES 2			IN	VIA	OUT
1S1					PL3	PL4			
1S2					PL1	PL2			
1S3					RV3/c	RV4/c			
1S4					RV3/a	RV4/a			
1S5					C8/a	PL4/ET			

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TABLE 503 (cont'd)

RUNNING LIST (GB22)

WIRE No.	COLOURS				FROM	TO	CABLEFORM ROUTE		
	WIRE	L	SLEEVES 1	SLEEVES 2			IN	VIA	
LK1					TR.U/15	TR.U/E			
LK2					TR.U/E	TR.U/16			
601	B		BK	BN	PL5/L	RL2/b	K	F.B.A	R
602	B		BK	R	PL5/M	RL3/a	K	F.B.A	R
603	B		BK	O	PL5/K	RL3/b	K	F.B.A	R
604	B		BK	Y	PL5/D	B.U/5	K	F	C
605	B		BK	G	PL5/F	RV3/b	K	H.E	D
606	B		BK	B	PL5/E	TR.U/9	K	L	M
607	B		BK	V	PL5/J	TR.U/13	K	L	P
608	B		BK	S	PL5/H	TR.U/14	K	L	P
609	B		BK	W	C1/b	TR.U/11	T	K, L	P
610	B		BN	BK	PL5/A	A.U/2	K	L	Q
611	B		BN	BN	PL5/C	A.U/3	K	L	Q
612	B		BN	R	TR.U/16	A.U/2	P	L	Q
613	B		BN	O	TR.U/12	A.U/1	P	L	Q
614	B		BN	Y	TR.U/15	B.U/E	P	L.F	B
615	B		BN	G	TR.U/10	RL3/1	N	L.F.B.A	R
616	B		BN	B	PL5/B	C1/b	T		T
617	B		BN	V	TR.U/6	RV4/a	M	L.H	E
618	B		BN	S	TR.U/7	RV4/c	M	L.H	E
619	B		BN	W	TR.U/4	RV1/a	N	L.H	G
620	B		R	BK	TR.U/5	RV1/c	N	L.H	G
621	B		R	BN	TR.U/2	RV2/a	M	L	H
622	B		R	R	TR.U/3	RV2/c	M	L	H
623	B		R	O	RV2/b	RL4/2	H	F.B.A	S
624	B		R	Y	RV1/b	RL1/2	G	F.B.A	
625	B		R	G					
626	B		R	B					
627	B		R	V	RV4/b	B.U/2	E	H.F	B
628	B		R	S	PL2	B.U/4	J	H	B
629	B		R	W	RL2/3	B.U/6	A	B	C
630	B		O	BK	RL4/1	B.U/E	S	R.A	B
631	B		O	BN	RL1/3	B.U/3	S	R.A	B
632	B		O	R	RL3/2	RL4/1	R		S
CL1	C				PL4	B.U/1			
	S				PL4/E.T.	B.U/E			
CL2	C				A.U/4	B.U/1			
	S				A.U/E	B.U/E			

FUEL QUANTITY BRIDGE/AMPLIFIER

TESTING

1. GENERAL

The following tests are those which must be carried out after overhaul or whenever any component has been renewed or repaired. The tests are also the only tests necessary to establish the serviceability of a bridge/amplifier.

2. EQUIPMENT REQUIRED

To carry out the testing of a bridge/amplifier items 1, 3 or 4, 8, 10, 22, 23, 24 and 25 of the list on page 1001 will be required.

3. PROCEDURE

A. Connections

(1) Connect the bridge/amplifier to the test circuit and equipment as shown in fig. 701.

(2) Switch on the electrical supply and ensure that the reading of meter M1 does not exceed 80mA.

B. 'E' and 'F' Trimmer Test

(1) Set S1 and S2 to OFF; set S3 to OFF

(2) Rotate the 'F' trimmer to the mid position and the 'E' trimmer fully counter-clockwise.

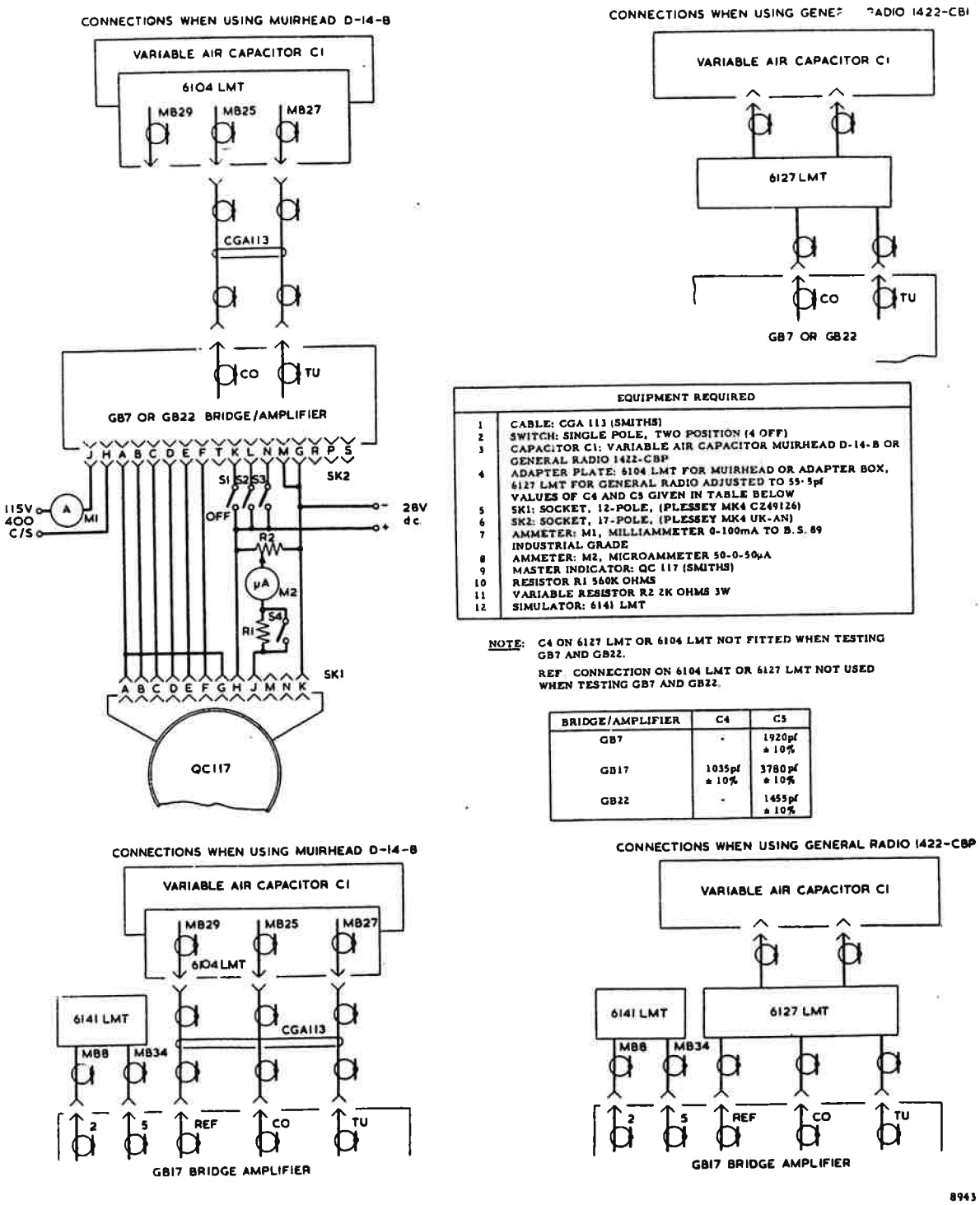
(3) By means of the variable air capacitor C1 set the pointer of indicator QC117 to the zero mark, note the reading of C1 which must be not less than that given in Table 701 for the appropriate code of bridge/amplifier.

(4) Rotate the 'E' trimmer fully clockwise.

(5) By means of the variable air capacitor C1, set the pointer of indicator QC117 to the zero mark, note the reading of C1 which must be not more than that given in Table 701 for the appropriate code of bridge/amplifier.

(6) Set the variable air capacitor C1 to the value given in Table 701 (set C1) for the appropriate code of bridge/amplifier.

(7) By means of the 'E' trimmer, set the pointer of indicator QC117 to the zero mark.



EQUIPMENT REQUIRED	
1	CABLE: CGA 113 (SMITHS)
2	SWITCH: SINGLE POLE, TWO POSITION (4 OFF)
3	CAPACITOR C1: VARIABLE AIR CAPACITOR MUIRHEAD D-14-B OR GENERAL RADIO 1422-CBP
4	ADAPTER PLATE: 6104 LMT FOR MUIRHEAD OR ADAPTER BOX, 6127 LMT FOR GENERAL RADIO ADJUSTED TO 55·5pf VALUES OF C4 AND C5 GIVEN IN TABLE BELOW
5	SK1: SOCKET, 12-POLE, (PLESSEY MK4 CZ49126)
6	SK2: SOCKET, 17-POLE, (PLESSEY MK4 UK-AN)
7	AMMETER: M1, MILLIAMMETER 0-100mA TO B.S. 89 INDUSTRIAL GRADE
8	AMMETER: M2, MICROAMMETER 50-0-50μA
9	MASTER INDICATOR: QC 117 (SMITHS)
10	RESISTOR R1 560K OHMS
11	VARIABLE RESISTOR R2 2K OHMS 3W
12	SIMULATOR: 6141 LMT

NOTE: C4 ON 6127 LMT OR 6104 LMT NOT FITTED WHEN TESTING GB7 AND GB22.

REF CONNECTION ON 6104 LMT OR 6127 LMT NOT USED WHEN TESTING GB7 AND GB22.

BRIDGE/AMPLIFIER	C4	C5
GB7	-	1920pf ± 10%
GB17	1035pf ± 10%	3780pf ± 10%
GB22	-	1455pf ± 10%

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Fig. 701 - Bridge/Amplifier - Test Connections

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(8) Rotate the 'F' trimmer fully clockwise.

(9) Set S3 to ON.

(10) By means of the variable air capacitor C1, set the pointer of indicator QC117 to the 100% mark, note reading of C1 which must be not more than that given in Table 701 for the appropriate code of bridge/amplifier.

(11) Rotate the 'F' trimmer fully counter-clockwise.

(12) By means of the variable air capacitor C1, set the pointer of indicator QC117 to the 100% mark, note reading of C1 which must be not less than that given in Table 701 for the appropriate code of bridge/amplifier.

(13) Set the variable air capacitor C1 to the value given in Table 701 (set C1) for the appropriate code of bridge/amplifier.

(14) By means of the 'F' trimmer, set the pointer of indicator QC117 to the 100% mark.

B. 'TE', 'TF' and 'P' Trimmer Test

(1) 'TE' Trimmer

(a) Set S2 and S3 to OFF; set S1 to ON.

(b) Set the variable air capacitor to the value given in Table 702.

(c) Set the 'TE' trimmer counter clockwise, note the reading of indicator QC117 which should be not less than -4%.

(d) Set the 'TE' trimmer clockwise, note the reading of indicator QC117 which should be not less than +4%.

(e) By means of the 'TE' trimmer set the indicator QC117 pointer on the zero mark.

(2) 'TF' Trimmer

(a) Set S2 and S3 to ON; Set S1 to OFF.

(b) Set the variable air capacitor to the value given in Table 702.

(c) Set the 'TF' trimmer counter clockwise, note the reading of indicator QC117 which should be not less than 96%.

(d) Set the 'TF' trimmer fully clockwise, note the reading of indicator QC117 which should be not less than 104%.

(e) By means of the 'TF' trimmer set the indicator QC117 pointer on the zero mark.

(3) 'P' Trimmer (GB17 only)

(a) Set S1, S2 and S3 to OFF.

(b) Set the variable air capacitor to 185.3pF.

(c) Set the 'P' trimmer clockwise and note the reading of indicator QC117 which should be not less than +4.5%.

(d) Set the 'P' trimmer fully counter clockwise and note the reading of indicator QC117 which should be not less than -4%.

(e) By means of the 'P' trimmer set the indicator QC117 pointer to the zero mark.

C. Response Time Test

(1) Set the pointer of indicator QC117 to the 100% mark by means of the variable air capacitor C1.

(2) Rapidly decrease the setting of C1 by the amount given in Table 702 for the appropriate code of bridge/amplifier.

(3) Using a stopwatch, check the time taken for the pointer of indicator QC117 to rotate from the 100% mark to the zero mark; the time of rotation must be not more than 30 secs.

(4) Set the pointer of indicator QC117 to zero by means of the variable air capacitor.

(5) Rapidly increase the setting of C1 by the amount given in Table 702 for the appropriate code of bridge/amplifier.

(6) The time taken for the pointer to rotate from zero to the 100% mark must not be more than 40 secs.

D. Sensitivity Test

(1) Set the pointer of indicator QC117 to the 50% mark.

(2) Adjust the 2000 ohm potentiometer to bring the reading of the d.c. micro-ammeter to zero, achieve fine setting by closing switch S4.

(3) Increase the setting of C1 by the amount given in Table 702 for the appropriate code of bridge/amplifier, close switch S4.

(4) Confirm that the reading of the d.c. microammeter changes by not less than 5 μA in a period of not more than one minute.

(5) When the pointer of the d.c. microammeter has ceased to move, reset it to zero by means of the 2000 ohm potentiometer.

(6) Decrease the setting of C1 by the amount given in Table 702 for the appropriate code of bridge/amplifier.

(7) Confirm that the reading of the d.c. microammeter changes by not less than 5 μA in a period of not more than one minute.

Table 701

	'E' Trimmer			'F' Trimmer		
Bridge/ Amplifier	Counter-Clockwise (pF)	Clockwise (pF)	Set C1 (pF)	Counter Clockwise (pF)	Clockwise (pF)	Set C1 (pF)
GB7	391.7	355.1	373.4	849.5	812.9	831.2
GB17	194.8	175.8	185.3	432.7	413.7	423.2
GB22	768	698	733	1649	1579	1614

Table 702

Bridge/ Amplifier	'TE' Trimmer (pF)	'TF' Trimmer (pF)	Response Time Test (pF)	Sensitivity Test (pF)
GB7	373.4	831.2	500	0.9
GB17	185.3	423.2	250	0.5
GB22	733	1614	900	1.7

FUEL QUANTITY BRIDGE/ AMPLIFIER

STORAGE INSTRUCTIONS

1. GENERAL

These instructions are applicable to all climates and the packaging is adequate for storage and transit purposes.

A. Packaging Procedure

(1) Wrap the unit in waxed paper or PVC film, taking care that coverage is complete and that sharp corners do not pierce the wrapping material.

(2) Prepare two labels giving the following information.

(a) Code and serial number of the unit.

(b) Modification state.

(c) Date of last overhaul.

(d) Note and date of any component change.

(e) Reason for return, if applicable.

Attach the label to the wrapped unit with transparent adhesive tape, in such a manner that all the information on the label is visible.

(3) Insert the package in a polythene bag and partially heat seal the end, leaving an opening of approximately 1 in. Ensure that the information label is visible.

(4) Squeeze as much air as possible from the bag and complete the seal.

(5) Place the package in the appropriate shock-resistant moulds in the storage container.

(6) Close and secure the container lid with PVC tape.

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(7) Attach to the container a label on which to record details of the unit.

B. Storage Conditions

The unit should be stored in conditions which are clean, dry, of even temperature, well ventilated and free from corrosive fumes. It should not be removed from its packing, described in A, above.

C. Storage Limiting Period

For information relating to recommended storage limiting period refer to Smiths Industries Limited, Aviation Division manual SAV/OH/SPR. Re-certification and re-storage after this period is dependent upon satisfactory completion of the following procedure.

(1) Remove the unit from its packing.

(2) Examine the unit visually for signs of corrosion, damage, or broken seals.

(3) Carry out the complete procedure described in TESTING.

(4) Repack the unit in accordance with A, above.

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FUEL QUANTITY BRIDGE/AMPLIFIER

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

1. GENERAL

Items with an LMT part number are for local manufacture. Full manufacturing information for these items may be obtained from Smiths Industries Limited, Aviation Division. When ordering please quote part numbers.

2. ELECTRICAL SUPPLIES

115V $\pm$ 2V 400 Hz $\pm$ 10 Hz. single phase a.c.

230V 50 Hz single phase a.c.

28V d.c. $\pm$ 1V d.c.

3. TOOLS, FIXTURES AND EQUIPMENT

Item	Description	Part No. or Ref.	Vendor
1	Soldering iron, miniature, 230V, 15W	Cat.No. C240 or similar	Antex
2	Bridge Assembly Test Set	6140 LMT (Issue 2)	Smiths Industries
3	Adapter Bc , for connection to Model 1422-CBP adjusted to 55.5pF $\pm$1%.	6127 LMT	Smiths Industries
4	Adapter Plate, for connection to Model D-14-B adjusted to 55.5pF $\pm$ 1%.	6104 LMT	Smiths Industries
5	Phase Sensitive Voltmeter	330/ITE or equivalent	Smiths Industries
6	Test Set	QC168	Smiths Industries
7	Isolating Transformer	QC206	Smiths Industries
8	Voltmeter	Avometer Model 8 or similar.	Avo
9	Preamplifier	Type TA40	Levell
10	Coaxial Cable Assembly (3 off)	CGA113	Smiths Industries
11	Coaxial Cable Assembly	LJJ118	Smiths Industries

Item	Description	Part No. or Ref.	Vendor
12	Test Circuit, fig. 301		
	SK1 - 12 pole socket Mk. 4	CZ49126	Plessey
	SK2 - 3 pole socket Mk. 4	CZ49015	Plessey
	SK3 - 4 pole socket Mk. 4	CZ49016	Plessey
	S1 - Switch, 2 pole, 2 position	Z510504	N.S.F.
13	Amplifier Assembly Test Set	QC132	Smiths Industries
14	Low Resistance Ohmmeter	RM155-B Mk. II	B.P.L.
15	Insulation Resistance Tester 500 Volt d.c.	As available	-
16	Special 'C' spanner		Plessey
17	Soldering iron, large. 125W	Solon	A.E.I.
18	Soldering iron, 230V, 65W	Solon No. 964	A.E.I.
19	Thermal Shunts (heat sinks)	Cat. No. 'X-ACTO' or similar	Antex
20	Heating Cabinet, capable to maintaining 60°C.	Local manufacture or purchase.	
21	Valve Voltmeter	V252 or similar	Solartron
22	Test Circuit, fig. 701		
	S1 - Single pole Two position	Z510501	N.S.F.
	S2 - Single pole Two position	Z510501	N.S.F.
	S3 - Single Pole Two position	Z510501	N.S.F.
	S4 - Single Pole Two position	Z510501	N.S.F.
	SK1 - 12 pole socket Mk. 4	CZ49126	Plessey
	SK2 - 17 pole socket	UK-AN	Plessey
	M1 - Milliammeter 0 - 100 mA	Model 8	Avo
	M2 - Milliammeter 50-0-50 μA	Model 8	Avo
	C4 - Capacitor, for value refer to table in fig. 701.	S635	Dubilier
	C5 - Capacitor, for value refer to table in fig. 701.	S635	Dubilier
	R1 - 560 K ohms 1/8 W	Type 16	Erie
	R2 - 2K ohms 3W potentiometer	CLR 4001	Colvern
23	Simulator Adjusted to 22.8pF ± 1%	6141 LMT	Smiths Industries
24	Master Indicator	QC117	Smiths Industries
25	Variable Air Capacitor range 100-1000pF with calibration chart of measured capacitance to an accuracy of ± 0.1pF.	Model D-14-B* or Model 1422-CBP	Muirhead or General Radio

* Not available as a new item.

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4. CLEANING AGENTS

Category	Nomenclature and British Specification or Vendor's Trade Name	Alternative Specification	Vendor
Solvent	Methyl ethyl ketone (commercial grade)	-	May & Baker
Cleanser	Trichlorethylene to BS.580, Type C	-	Albright & Wilson
Cleanser	Genklene (Trichloroethane) BS.4487	-	I.C.I

5. MATERIALS

Category	Nomenclature and British Specification or Vendor's Trade Name	Alternative Specification	Vendor
Solder	To BS.441 grade K	-	Multicore
Locking Lacquer	Akard, red, R.433. MOS Spec. CS2465A, Type B	-	Llewellyn Ryland

6. VENDOR'S ADDRESSES

Vendor	Full Name and Address
A.E.I.	Associated Electrical Industries Limited, 145, Charing Cross Road, London, W.C.2., U.K.
Antex	Antex Limited, Grosvenor House, Croydon, Surrey, U.K.
Avo	Avo Limited, Avocet House, Dover, Kent, U.K.
B.P.L.	British Physical Laboratories, Radlett, Herts., U.K.

Vendor	Full Name and Address
Dubilier	Dubilier Electronics Limited, Chaucer Trading Estate, Launton Road, Bicester, Oxon. OX6 0TU. U.K.
Erie	Erie Resistors Limited, Millora Works, Beevor Road, South Denes, Great Yarmouth, U.K.
General Radio	General Radio Co. (U.K.) Limited, Bourne End, Bucks., U.K.
I.C.I.	Imperial Chemical Industries Limited, Mond Division, The Heath, Runcorn, Cheshire. U.K.
Llewellyn Ryland	Llewellyn Ryland Limited, Balsall Heath Works, Birmingham, 12. U.K.
May & Baker	May and Baker Limited, Dagenham, Essex. U.K.
Muirhead	Muirhead Limited, Beckenham, Kent. U.K.
Multicore	Multicore Solders Limited, Multicore Works, Hemel Hempstead, Herts., U.K.
N.S.F.	N.S.F. Limited, Keighley, Yorks, U.K.
Painton	Painton Limited, Kingsthorpe, Northampton, U.K.
Plessey	Plessey Co. (U.K.) Limited, Cheyney Manor, Swindon, Wilts., U.K.
Smiths	Smiths Industries Limited, Aviation Division, Product Support Centre, Northolt Road, Heathrow Airport London, Hounslow, Middlesex. U.K.

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FUEL QUANTITY BRIDGE/AMPLIFIER

ILLUSTRATED PARTS LIST

Introduction

A. General

The Illustrated Parts List contains a Detailed Parts List which will enable the operator to easily identify a component part. The Detailed Parts List gives an illustrated breakdown of spare parts together with the manufacturers part number and a description of the part. For convenience the first three digits of the figure number have been omitted in the Fig. & Index No. column, thus fig. 1101 item 1 is printed as 1-1.

WARNING: ONLY SPARES AND COMPONENTS SPECIFIED BY SMITHS INDUSTRIES SHOULD BE USED.

B. Ordering

Certain spare parts listed in the IPL are manufactured by other contractors and have the manufacturer's part number or British Standards reference quoted in addition to the part number under which Smiths Industries - Aviation Division supply.

When ordering from Smiths Industries please quote the Smiths Industries part number, the other manufacturer's part number or British Standards reference and the Code Number of the Line Replacement Unit, on all orders or enquiries.

When ordering from other manufacturers please quote the manufacturer's number and/or British Standards reference only.

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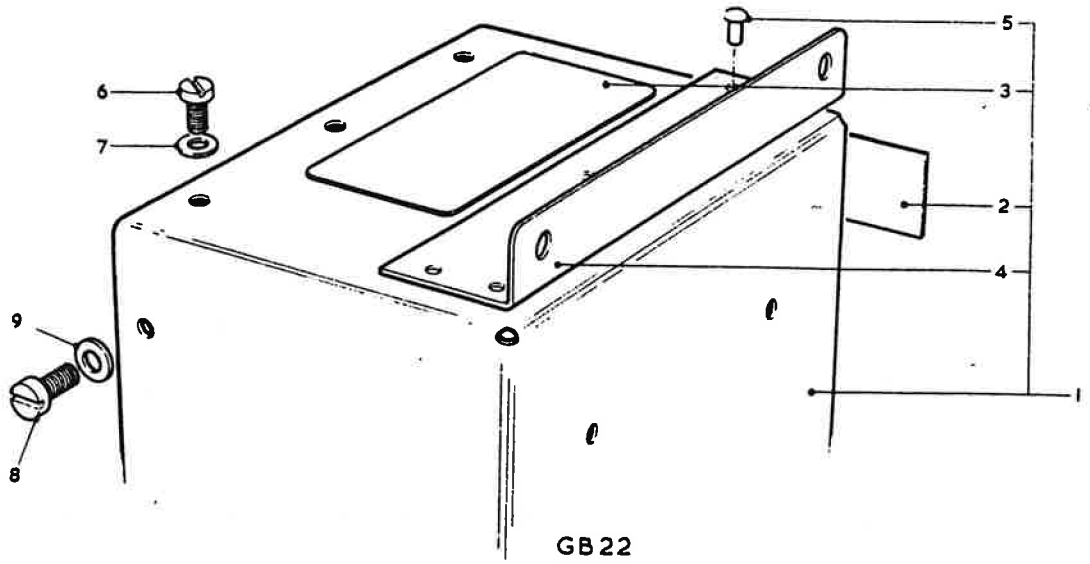
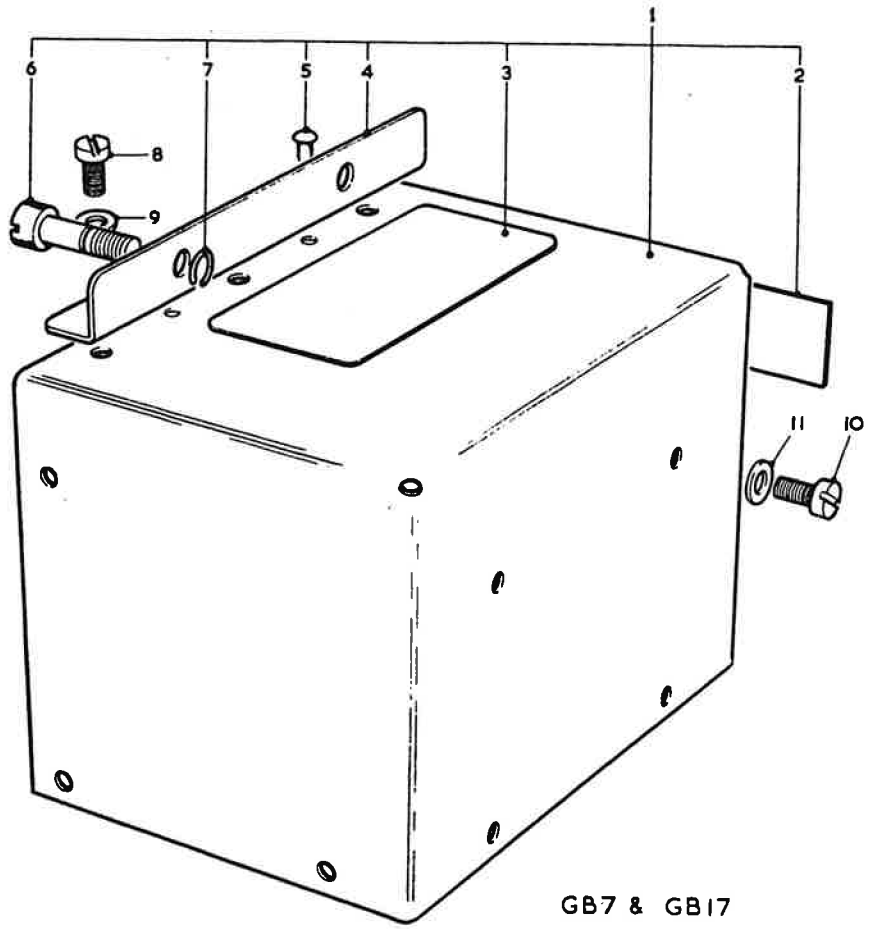


GB22



GB7 & GB17

4097

Fig. 1101

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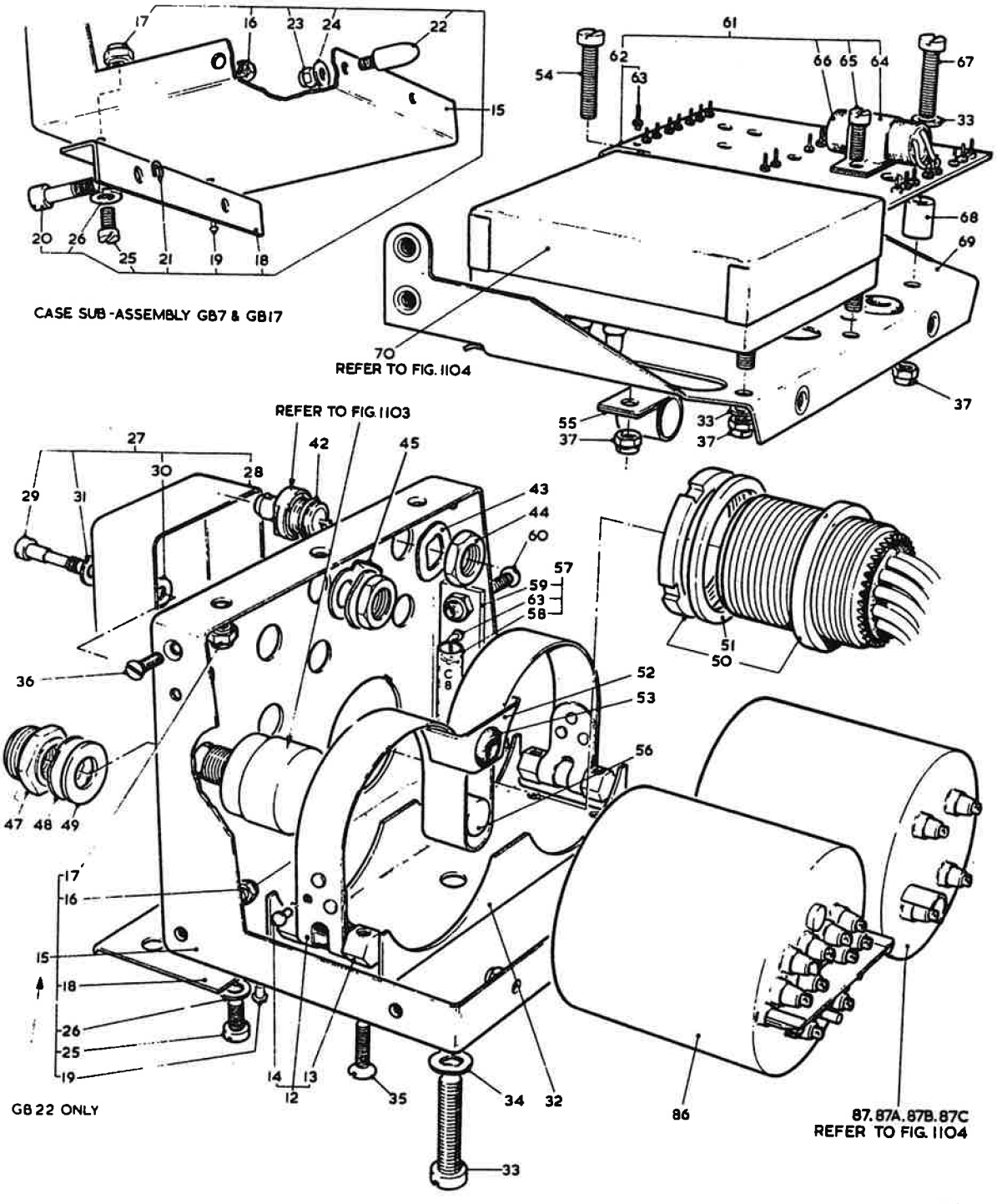
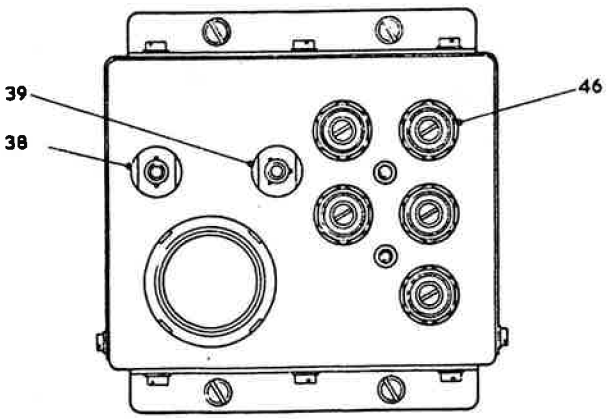
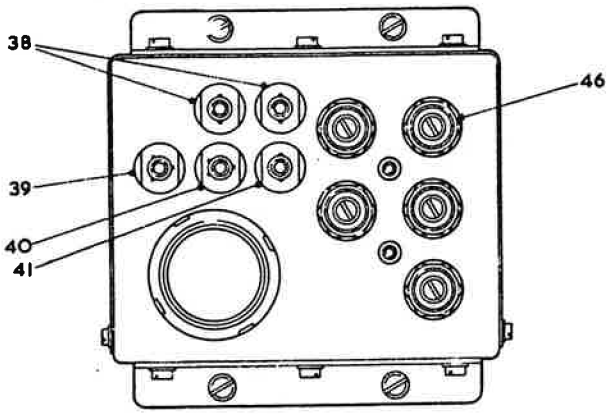

CASE SUB-ASSEMBLY GB7 & GB17
REFER TO FIG. 1104
REFER TO FIG. 1103
GB 22 ONLY
87, 87A, 87B, 87C
REFER TO FIG. 1104
8942

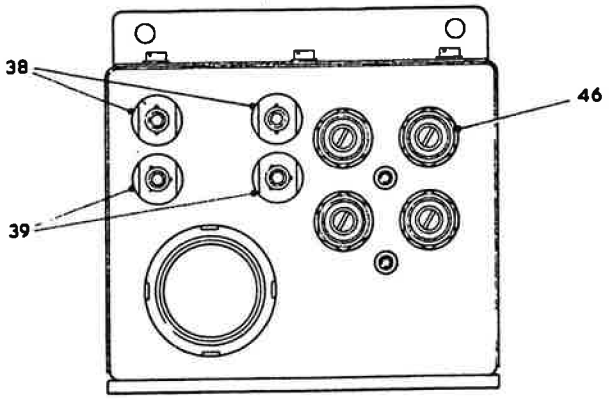
Fig. 1102



GB7



GB17



GB22

4096

Fig. 1103

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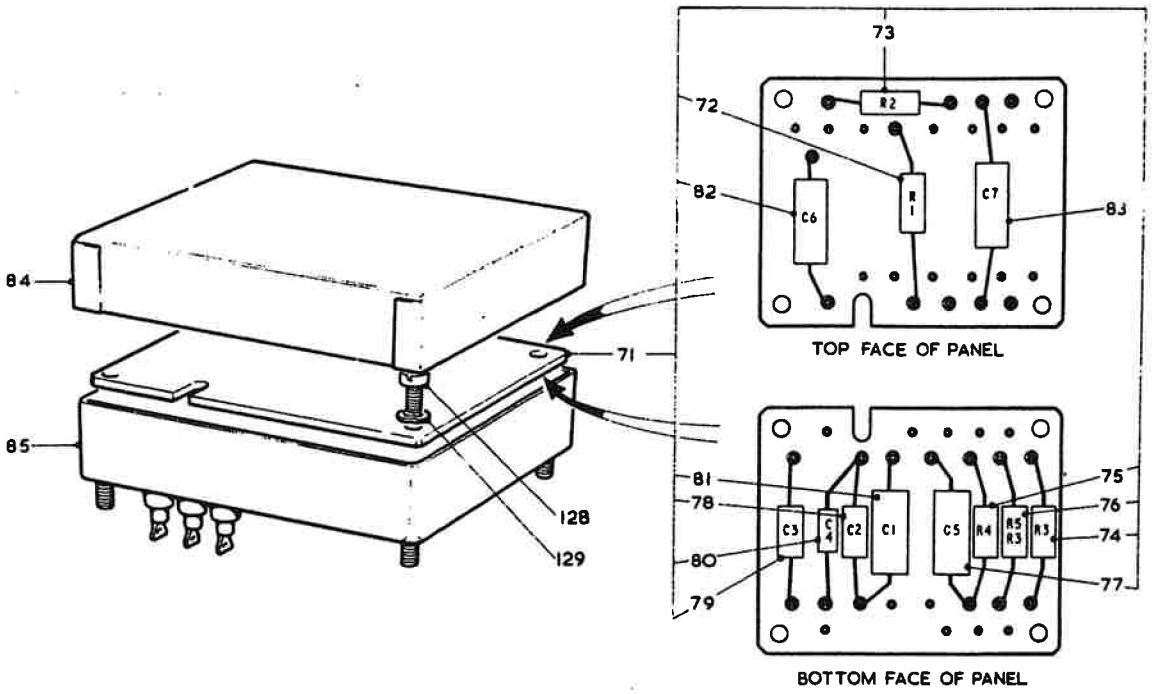
73
72
82
83
R2
R1
C7
C6
TOP FACE OF PANEL
84
71
85
128
129
81
78
80
79
75
76
74
77
C3
C4
C2
C1
C5
R4
R5
R3
R3
BOTTOM FACE OF PANEL

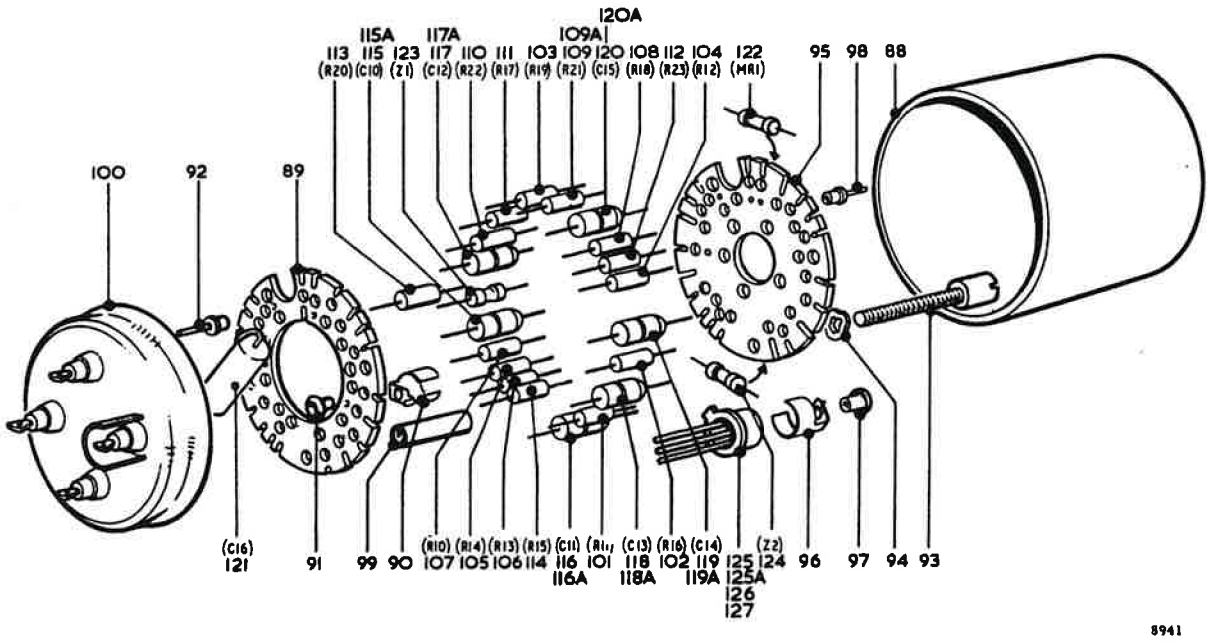
120A
115A
117A
109A
113 115 123 117 110 111 103 109 120 108 112 104 122
(R20) (C10) (Z1) (C12) (R22) (R17) (R19) (R21) (C15) (R18) (R23) (R12) (MR1)
95 98 88
100 92 89
(C16) 121
91
99 90
(R10) 107
(R14) 105
(R13) 106
(R15) 114
(C11) 116 116A
(R11) 101
(C13) 118 118A
(R16) 102
(C14) 119 119A
125 125A 126 127
(Z2) 124
96 97 94 93
8941

Fig. 1104