AF Power Meter
893B

Code No. 50893-920M
and 50893-321J

MARCONI INSTRUMENTS LIMITED
ST. ALBANS HERTFORDSHIRE ENGLAND

Part no. 46881-349G
Print code : L-5/89, MI 0.75c

CONTENTS

HAZARD WARNING SYMBOLS

The following symbol appears on the equipment

SYMBOL : TYPE OF HAZARD	REFERENCE IN MANUAL
⚠ : Dangerous voltage	Chap. 3 , p. 2

Note ...

Each page bears the date of the original issue or the code number and date of the latest amendment (Am. 1, Am. 2 etc.). New or amended material of technical importance introduced by the latest amendment is indicated by triangles positioned thus ▶ ..... ◀ to show the extent of the change. When a chapter is reissued the triangles do not appear.

Any changes subsequent to the latest amendment state of the manual are included on inserted sheets coded C1, C2 etc.

NOTES AND CAUTIONS

SAFETY PRECAUTIONS

This equipment is protected in accordance with IEC Safety Class 1. It has been designed and tested according to IEC Publication 348, 'Safety Requirements for Electronic Measuring Apparatus', and has been supplied in a safe condition. The following precautions must be observed by the user to ensure safe operation and to retain the equipment in a safe condition. There are no power supplies applied to the instrument and therefore no safety precautions need be observed in relation to electric shock due to the equipment itself. However, the voltage of the measured signal may be significant and therefore care should be taken to avoid contact with the measuring circuit.

Defects and abnormal stresses

Whenever it is likely that protection has been impaired, for example as a result of damage caused by severe conditions of transport or storage, the equipment shall be made inoperative and be secured against any unintended operation.

WARNING : HANDLING HAZARDS

This equipment is formed from metal pressings and although every endeavour has been made to remove sharp points and edges care should be taken, particularly when servicing the equipment, to avoid minor cuts.

WARNING : TOXIC HAZARD

Many of the electronic components used in this equipment employ resins and other chemicals which give off toxic fumes on incineration. Appropriate precautions should therefore be taken in the disposal of these items.

CAUTION : STATIC SENSITIVE COMPONENTS

Components identified with the symbol ⚠ on the circuit diagrams and/or parts lists are static sensitive devices. The presence of such devices is also indicated in the equipment by orange discs, flags or labels bearing the same symbol. Certain handling precautions must be observed to prevent these components being permanently damaged by static charges or fast surges.

(1) If a printed board containing static sensitive components (as indicated by a warning disc or flag) is removed, it must be temporarily stored in a conductive plastic bag.

(2) If a static sensitive component is to be removed or replaced the following anti-static equipment must be used.

A work bench with an earthed conductive surface.

Metallic tools earthed either permanently or by repeated discharges.

A low-voltage earthed soldering iron.

An earthed wrist strap and a conductive earthed seat cover for the operator, whose outer clothing must not be of man-made fibre.

(3) As a general precaution, avoid touching the leads of a static sensitive component. When handling a new one, leave it in its conducting mount until it is required for use.

Chapter 1

GENERAL INFORMATION

CONTENTS

INTRODUCTION

1. AF power meter type 893B measures audio frequency power levels up to 10 watts in 10 ranges. It can be used for both balanced and unbalanced measurements at any one of 48 input impedances, its meter being direct reading in both watts and decibels relative to 1 mW.

2. Power is measured by a temperature compensated multi-range detector circuit feeding the voltmeter, the required input impedance being obtained by the use of a tapped transformer and a switched resistance changing pad.

Fig. 1 AF power meter 893B (version 50893-321J with SINAD FILTER switch)

PERFORMANCE DATA

3. Power range. Ten ranges with full-scale deflections from 300 μW to 10 W in a 1-3-10 sequence. Decibel ranges are provided with a 0 dB reference at 1 mW.

4. Impedance range. 48 impedance settings between 2.5 Ω and 20 kΩ :

2.5	3	4	5	6	8	} with multipliers of
6.25	7.5	10	12.5	15	20	} x1, x10, x100 and x1000

Impedances of one quarter the above - (extending the range down to 0.625 Ω) - can be obtained by using the input centre tap, but with reduced accuracy. The impedance of the power meter falls when it is connected into a circuit carrying d.c. At 50 Hz, a drop of approximately 5% is produced by 60 mA d.c. at the 100 Ω setting and by 4 mA d.c. at the 20 kΩ setting.

5. Accuracy. Power (from 100 Hz to 10 kHz) : ±7% of f.s.d. ±10 μW from 5°C to 35°C.

Impedance (at 1 kHz) : ±7%, 300 μW to 10 W. Below 300 μW impedance increases due to non-linear loading effect of the detector (power accuracy is not affected).

6. Frequency characteristic At 20 kHz, relative to 1 kHz, power level < 3 dB down, typically 0.7 dB.
At 50 Hz, relative to 1 kHz, power level < 1 dB down.

7. Dimensions and weight

Height	Width	Depth	Weight
153 mm (6 in)	246 mm (9 3/4 in)	388 mm (13 3/8 in)	4 kg (8. 82 lb)

8. Environmental

Limit range of operation :

Temperature : 0°C to 55°C

Conditions of storage and transport :

Temperature : -40°C to +70°C

Humidity : Up to 90% r.h.

Altitude : Up to 2500 m (pressurized freight at 27 kPa (3.9 lbf/in^2) differential)

9. Safety : Complies with IEC 348

ALTERNATIVE VERSION 50893-321J (with SINAD filter)

10. The SINAD filter characteristics are :

Centre frequency : 1 kHz
Rejection at 1 kHz : ⩾ 20 dB at 1 W input power, ⩾ 30 dB up to 300 mW input power
3 dB bandwidth : ⩽ 480 Hz
20 dB bandwidth : ⩾ 150 Hz

With the SINAD filter in circuit the maximum total input power is 1 W.

ACCESSORIES

11. Supplied accessories

	Part no.
Instruction Manual H 50893-920M	46881-349G

12. Optional accessories

Front panel protective cover	54124-024F
SINAD filter kit (fitting instructions included)	54499-041N

Chapter 2

INSTALLATION

CONTENTS

UNPACKING AND REPACKING

1. Retain the container, packing material and the packing instruction note (if included) in case it is necessary to reship the instrument.

2. If the instrument is to be returned for servicing attach a label indicating the service required, type or model number, serial number and your return address. Pack the instrument in accordance with the general instructions below or with the more detailed information in the packing instruction note.

(1) Place a pad in the bottom of the container.

(2) Place pads in the front and rear ends of the container with the plywood load spreader(s) facing inwards.

(3) Put the polythene cover over the instrument and place it in the container with the front handle and rear projections (where applicable) against the plywood load spreaders.

(4) Place pads in the two sides of the container with cushioning facing inwards.

(5) Place the top pad in position.

(6) Wrap the container in waterproof paper and secure with adhesive tape.

(7) Mark the package FRAGILE to encourage careful handling.

Note ...

If the original container or materials are not available, use a strong double-wall carton packed with a 7 to 10 cm layer of shock absorbing material around all sides of the instrument to hold it firmly. Protect the front panel controls with a plywood or cardboard load spreader.

MOUNTING ARRANGEMENTS

3. Excessive temperatures may affect the instrument's performance; therefore, completely remove the plastic cover, if one is supplied over the case, and avoid standing the instrument on or close to other equipment that is hot.

SAFETY TESTING

4. Where safety tests are required, the following procedure can be applied to ensure that the earthing is safe. This complies with IEC Publication 348. Test the earth lead continuity from

any part of the metal frame to the earth terminal on the front of the instrument. Preferably a heavy current (about 25 A) should be applied for not more than 5 seconds.

Test limit : not greater than 0.5 Ω

SINAD FILTER KIT (fitting instructions)

Fitting instructions for this Optional accessory are as follows :-

(1) Remove the four retaining screws from the two rear feet and slide the instrument forwards to remove from the case.

(2) Attach the four spacers provided, item (a) see Fig. 1, to the right-hand side frame (looking from the front of the instrument) using four M3 x 5 LG pan head screws and crinkle washers, items (b & c), holes are provided in the side frame to accommodate these.

(3) Attach the SINAD filter p.c.b. assy. item (d) to the four spacers with the four remaining screws and crinkle washers. The orientation of the board should be as shown in Fig. 1.

(4) Remove and discard the Link assembly SKA (43129-444V) from PLA and connect the 3-way cable assy. item (e) between SK1 of the instrument p.c.b. and the 3-way plug on the SINAD filter p.c.b.

(5) Remove the blanking plug from the front panel SINAD filter switch and fit the white button item (f) to the switch SB already fitted to the instrument.

(6) Remove the backing paper from the adhesive Model identity label item (g) and place the label on the rear panel of the instrument underneath the existing 50893-920 Type No. label.

(7) Replace cover and resecure the two rear feet to the instrument.

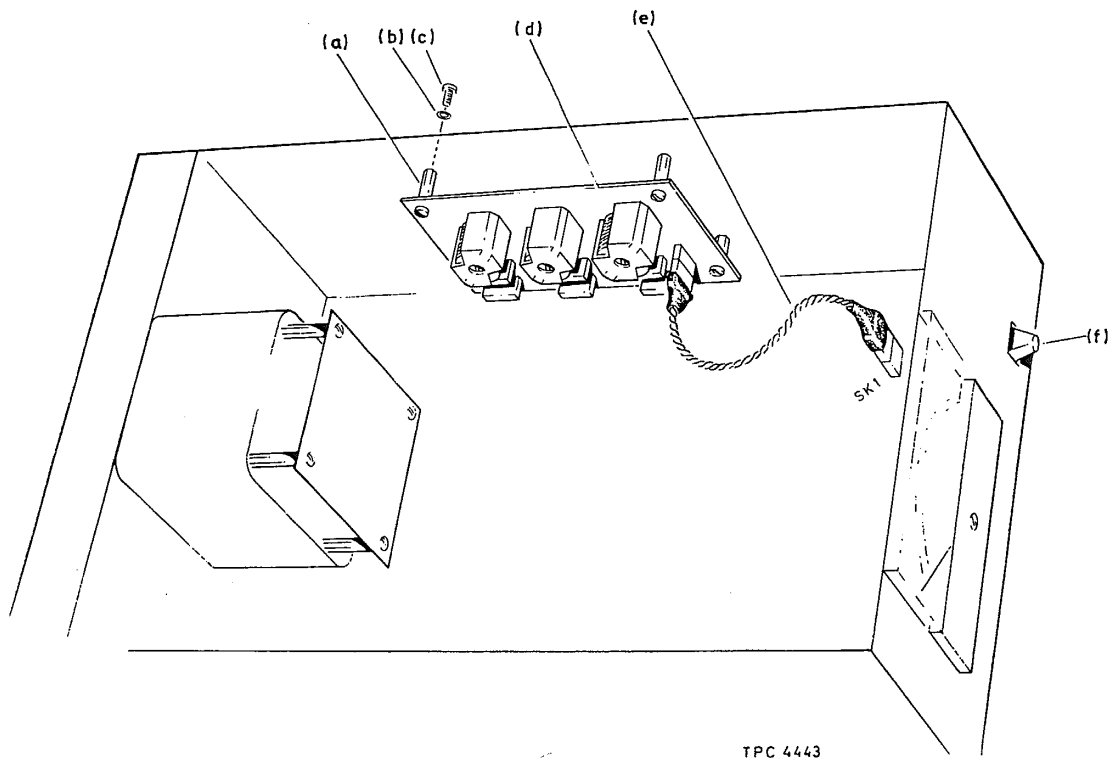

Fig. 1 SINAD filter board assembly details.

Chapter 3

OPERATION

CONTENTS

CONTROLS

Power range control

1. The white mW and W figures above the POWER RANGE select buttons refer to the full-scale deflection of the top two meter scales, 0-10 and 0-3, at each setting except 300 μW for which a separate scale is provided.

2. The alternative figures below the buttons indicate the decibels relative to 1 mW when the meter is reading 0 on its red dB scale. For any other meter reading the negative decibel indication on the meter should be added to the decibels indicated by the select buttons. Note that a separate dB scale is provided for the -5 dBm setting.

Impedance controls

3. Each of the six positions of the IMPEDANCE SELECTOR has two printed values - an orange figure above and a white figure below. The IMPEDANCE RANGE MULTIPLIER has alternate positions marked in white and orange, every multiplication value being repeated in each colour.

4. This system is adopted in order to avoid awkward multiplying factors; the impedance at any setting is given by multiplying together the IMPEDANCE SELECTOR control setting and the similarly-coloured figure at the setting of the IMPEDANCE RANGE MULTIPLIER control. For example, to set the power meter to 600 Ω, the IMPEDANCE SELECTOR should be set to 6.0/15.0 and the IMPEDANCE RANGE MULTIPLIER to x100 (orange). For an input impedance of 1.5 kΩ, the IMPEDANCE SELECTOR should have the same setting i.e. 6.0/15.0 but the IMPEDANCE RANGE MULTIPLIER should be set to x100 (white).

MEASUREMENT PROCEDURE

WARNING ⚠

BEFORE MAKING MEASUREMENTS ON HIGH VOLTAGE SOURCES CONNECT THE CHASSIS TERMINAL (⏚) TO EARTH AND DURING SUCH MEASUREMENTS DO NOT TOUCH THE MEASURING TERMINALS.

CAUTION

Before making connection to the instrument, depress the highest POWER RANGE button, 10 W, to avoid possible damage to the meter.

Unbalanced measurements

5. For normal measurements on unbalanced outputs :-

(1) Connect the audio source under test to the INPUT terminals.

(2) Set the IMPEDANCE controls to give the required load impedance.

(3) Depress the appropriate POWER RANGE button to give a convenient meter deflection and read the power indicated directly on the meter.

(4) To reduce the effects of hum if required, or to reference one side of the input to earth, connect the optional link across the chassis terminal and the lower INPUT terminal and connect the chassis terminal to earth.

Balanced measurements

6. To carry out measurements on balanced outputs :-

(1) Remove the earth link from the lower terminals if fitted.

(2) Connect the centre-tap of the source to the CT terminal on the power meter, and the input across both INPUT terminals. The measurement may then be carried out as for unbalanced outputs.

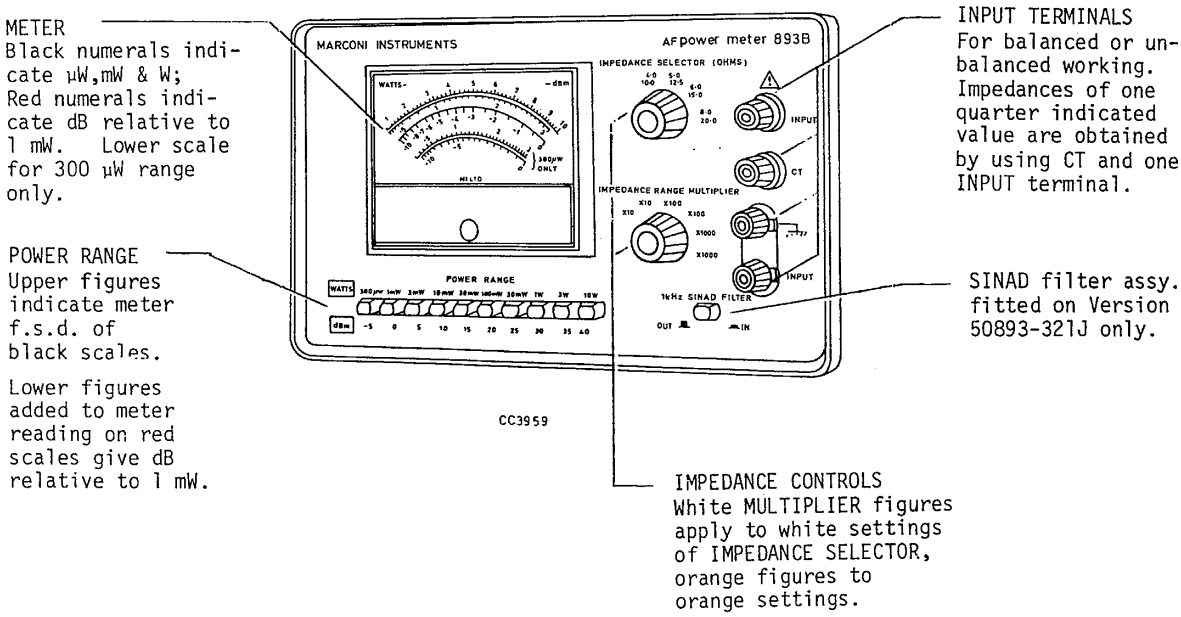

Fig. 1 Controls and operating facilities.

Measurement at low impedance

7. To obtain impedances of one-quarter the value indicated at any setting of the IMPEDANCE controls, again remove the earth link from the lower terminals if fitted. Connect the source between the CT terminal and either of the INPUT terminals. Loss of accuracy inevitably arises from this procedure as the input transformer is being operated in an out-of-balance condition. Some degree of improvement may be obtained by making two measurements - applying the power between the CT terminal and each of the INPUT terminals in turn and taking the average.

Measurement of source impedance

8. To measure the internal impedance of an audio source, connect as for a normal power measurement and adjust the two IMPEDANCE controls for maximum indication. The impedance of the source is then approximately the same as that indicated by the settings of the IMPEDANCE controls.

VARIATION OF IMPEDANCE WITH DC

9. The 893B is designed to measure a simple a.f. power and not a complex power which includes a d.c. component as well as the a.f. component under investigation. The effect of any d.c. component is to polarize the core of the transformer and reduce the effective input impedance of the power meter.

10. It is therefore recommended that the power meter should not be used where it is desired to simulate a high-impedance, unbalanced load if the d.c. component exceeds 5 to 10 mA. Such a case occurs when it is desired to use the power meter in place of the output transformer of a single-ended output stage. The power meter can however, be used for such a measurement on a push-pull stage; in this case, the only d.c. current that need be considered is the out-of-balance current.

VERSION 50893-321J (SINAD filter)

11. With the inclusion of the 1 kHz SINAD FILTER option the 893B can be used to make a signal-to-noise measurement. This is achieved by comparison of two power level readings taken at a frequency of 1 kHz. The initial reading is taken with the SINAD filter switched out and represents the fundamental 1 kHz with its noise and distortion. A second reading is taken with the SINAD filter in. This removes the 1 kHz fundamental from the input signal and the difference between the readings on the dB scales gives the SINAD ratio.

Chapter 4

TECHNICAL DESCRIPTION

CONTENTS

CIRCUIT SUMMARY

1. The meter measures the power delivered by an audio-frequency source into a load provided by the instrument itself. The wide power, impedance and frequency ranges of the instrument are due primarily to two important features of design. These are :-

(a) The use of switched resistive matching pads for selection of the significant figures of the input impedance value, and

(b) decade multiplication of the input impedance value by means of a transformer having a tapped primary winding.

2. There are three front panel controls - POWER RANGE, IMPEDANCE SELECTOR, and IMPEDANCE RANGE MULTIPLIER. The 10 power ranges are 0-300 μW, 1 mW, 3 mW, 10 mW, 30 mW, 100 mW, 300 mW, 1 W, 3 W and 10 W. A scale of decibels relative to 1 mW is also provided.

3. The overall impedance range of 2.5 Ω to 20 kΩ is covered in 48 steps arranged in two groups identified by the use of contrasting colours. The primary winding of the input (impedance-matching) transformer, which is of low d.c. resistance and is isolated from the case, is provided with a centre tap for balanced measurements; this centre tap also allows impedances down to 0.625 Ω to be obtained, but with some falling off in performance, see Chap. 3. Overload protection is provided by diodes D5, D6, D7 and D8 - D5 and D6 protecting the precision attenuator resistors and D7 and D8 protecting the meter movement.

VERSION 50893-321J (SINAD filter)

4. With the inclusion of the 1 kHz SINAD FILTER option the 893B can be used to make a signal-to-noise measurement. The word SINAD is an acronym for Signal plus Noise And Distortion and the SINAD ratio is a measure of the difference between a signal with all its inherent noise and distortion and that noise and distortion alone. In practice SINAD measurements are made by comparing the power level of a 1 kHz signal including noise and distortion with the power level of the same signal with the fundamental of 1 kHz removed.

Chapter 5

MAINTENANCE

CONTENTS

INTRODUCTION

1. This chapter contains information for keeping the equipment in good working order and for checking its overall performance. Before attempting any maintenance on the equipment you are advised to read Chap. 4, Technical Description.

PERFORMANCE TESTS

2. Test procedures described in this chapter may be simplified and of restricted range compared with those that relate to the generally more comprehensive factory test facilities which are necessary to demonstrate complete compliance with the specifications.

3. Performance limits quoted are for guidance and should not be taken as guaranteed performance specifications unless they are also quoted in the Performance Data in Chap. 1.

4. When making tests to verify that the instrument meets the stated performance limits, allowance must always be made for the uncertainty of the test equipment used.

5. In case of difficulties which cannot be resolved with the aid of this book, please contact our Service Division at the address given on the rear cover, or your nearest Marconi Instruments representative. Always quote the type and serial number found on the data plate at the rear of the instrument.

Insulation

Test equipment : item a.

6. Connect the insulation tester between either of the INPUT terminals and the earth terminal TP3 and measure the insulation resistance. About 50 MΩ or greater can be expected.

TABLE 1 TEST EQUIPMENT

Item	Description	Minimum use specifications	Recommended model
a	Insulation tester	500 V	
b	Oscillator a.f.	1 kHz ±2%	TF 2102M
c	Attenuator	Attenuation 0-111 dB in 0.1 dB steps accuracy ±1% of dB setting	TF 2162
d	Amplifier a.f.	Impedance from 12.5 Ω to 200 Ω	QUAD 50E
e	Digital multimeter	True r.m.s. voltage 40 Hz - 3 kHz ±0.1%	DATRON 1057A
f	Decade resistance box	6 Ω to 6 kΩ ±0.1%	

Adjustment of R57 for power accuracy

Test equipment : items b, c, d, e, f

7. This is the only pre-set adjustment required and should be carried out before further tests are carried out. Connect the test equipment as shown in Fig. 1.

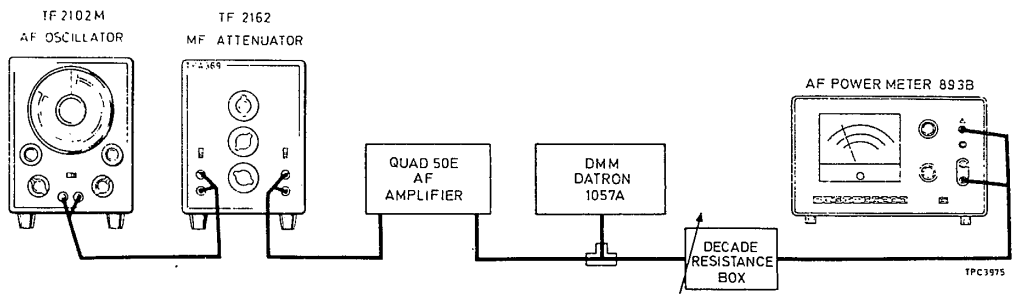

Fig. 1 Adjustment of R57 - test gear arrangement

8. Set the controls of the test equipment as follows :

TF 2102M

Coarse output	5 V
Coarse frequency	x100
Frequency dial	10 Hz
Coupling switch	Unbalanced

TF 2162

Attenuation	100 dB
Input	Front and rear
Output	Loaded

Decade resistance box — 600 Ω

Quad 50 E amplifier — For nominal load of 200 Ω

Multimeter — 10 V a.c. range

893B

Impedance selector	6 Ω
Impedance range multiplier	x100 orange
Power range	10 mW

9. Switch on all the equipment and decrease the TF 2162 attenuator setting and the TF 2102M fine output control to obtain a reading on the multimeter of 4.85 V. Adjust R57 on 893B to give f.s.d., i.e. 10 mW, on the meter in order to optimize the meter readings over the full range of the instrument.

Input impedance accuracy (at 1 kHz)

Test equipment : items b, c, d, e, f.

10. Connect the test equipment as shown in Fig. 1 and set it as for adjustment of R57. To evaluate the input impedance accuracy two further voltage measurements are to be made with the multimeter at a number of impedance settings. The first measurement, Vr, is taken across the decade resistance and the second, Vm, is taken across the 893B input terminals. The impedance can then be calculated in each case from the following formula :

$$Rm = Rr \left(\frac{Vm}{Vr}\right)$$

where Rm is the input impedance of the 893B
and Rr is the resistance of the decade resistance box.

Check each of the impedance settings shown in Table 2 and ensure that the impedance is within ±7% at 1 kHz.

TABLE 2 INPUT IMPEDANCE SETTINGS

893B settings		Decade resistance box settings	Quad amp 50E output connections
Impedance range multiplier	Impedance selector		
x1000 orange	6.0	6000 Ω	200 Ω
x100 orange	6.0	600 Ω	200 Ω
x10 orange	6.0	60 Ω	50 Ω
x1 orange	6.0	6 Ω	12.5 Ω

11. The above test does not include all possible combinations of the two IMPEDANCE controls but it is sufficient to ensure that the steps are functioning correctly and that the actual impedance at the settings in Table 2 are within limits.

SINAD filter (Version 50893-321J)

Test equipment : items b, c, d, e, f.

12. With the 1 kHz SINAD FILTER button OUT inject a 1 kHz signal into the 893B with a level of 100 mW 7.746 V r.m.s. into 600 Ω. Press the 1 kHz SINAD FILTER button IN and check that the power reading decreases by more than 35 dB. Repeat the procedure at 3 kHz and check that the power reading does not change by more than 0.5 dB.

Chapter 6

REPLACEABLE PARTS

CONTENTS

INTRODUCTION

1. When ordering replaceable parts address the order to our Service Division (address on rear cover) or nearest agent and specify the following for each component required.

(1) Type* and serial number of instrument

(2) Complete circuit reference

(3) Description

(4) Marconi Instruments part number.

* As given on the serial number label at the rear of the instrument; if this is superseded by a model number label, quote the model number instead of the type number.

ABBREVIATIONS

2. The components are listed in alphanumerical order of the circuit reference and the following abbreviations are used:

C : capacitor
Carb : carbon
D : semiconductor diode
Max : maximum
M : meter
Met : metal
Min : minimum
Ox : oxide
Plas : plastic
PL : plug
R : resistor
S : switch
SK : socket
T : transformer
† : value selected during test; nominal value listed

Tant : tantalum
TH : thermistor
TP : terminal post
Var : variable
W : watts at 70°C
WW : wirewound
⚠ : static sensitive device

COMPONENT VALUES

3. One or more of the components fitted in this instrument may differ from those listed in this chapter for any of the following reasons :

(a) Owing to supply difficulties, components of different value or type may be substituted provided the overall performance of the instrument is maintained.

(b) As part of a policy of continuous development, components may be changed in value or type to obtain detail improvements in performance.

4. When there is a difference between the component fitted and the one listed, always use a replacement the same type and value as found in the instrument.

Circuit reference	Description	Part no.
	Complete board	44828-368K
C1	Tant 47μF ±20% 6V	26486-232A
C2	Tant 47μF ±20% 6V	26486-232A
C3 †	Plas 0.005μF ±2% 160V	26516-652N
C4	Plas 0.68μF ±10% 100V	26582-216E
D1 ⚠	5082-2835	28349-006H
D2 ⚠	5082-2835	28349-006H
D3 ⚠	5082-2835	28349-006H
D4 ⚠	5082-2835	28349-006H
D5	BZX 85C39V	28374-132P
D6	BZX 85C39V	28374-132P
D7	1N4148	28336-676J
D8	1N4148	28336-676J
M1	Meter	44559-025S
PLA	SINAD filter terminal post (3-way)	23435-121J
	Connector link for PLA if SINAD filter assy is not fitted	43129-444V
R1 to R8	Selected in test to suit transformer	
R9	WW 200.65Ω 0.1%	44359-005L
R10	WW 200.65Ω 0.1%	44359-005L
R11	WW 423.75Ω 0.1%	44359-013S
R12	WW 423.75Ω 0.1%	44359-013S
R13	WW 449.0Ω 0.1%	44359-006J
R14	WW 449.0Ω 0.1%	44359-006J
R15	WW 472.5Ω 0.1%	44359-007F
R16	WW 472.5Ω 0.1%	44359-007F

Circuit reference	Description	Part no.
R17	WW 1009.5Ω 0.1%	44359-014W
R18	WW 1009.5Ω 0.1%	44359-014W
R19	Met ox 22kΩ 2% ½W	24573-105G
R20	WW 1327.0Ω 0.1%	44359-015D
R21	WW 1327.0Ω 0.1%	44359-015D
R22	WW 624.0Ω 0.1%	44359-008G
R23	WW 1665.0Ω 0.1%	44359-009V
R24	WW 2726.0Ω 0.1%	44359-011G
R25	WW 5284.0Ω 0.1%	44359-012V
R26	Met ox 6280.0Ω 0.25% ¼W	24732-299N
R27	Met ox 1386.0Ω 0.25% ¼W	24732-290R
R28	Met ox 176.0Ω 0.25% ¼W	24732-386X
R29	Met ox 1470.0Ω 0.25% ¼W	24732-291B
R30	Met ox 1654.0Ω 0.25% ¼W	24732-292K
R31	Met ox 662.0Ω 0.25% ¼W	24732-389R
R32	Met ox 766.0Ω 0.25% ¼W	24732-282T
R33	Met ox 1846Ω 0.25% ¼W	24732-293A
R34	Met ox 945.0Ω 0.25% ¼W	24732-283P
R35	Met ox 421.0Ω 0.25% ¼W	24732-388C
R36	Met ox 2044.0Ω 0.25% ¼W	24732-294Z
R37	Met ox 1112.0Ω 0.25% ¼W	24732-284X
R38	Met ox 235.2Ω 0.25% ¼W	24732-387M
R39	Met ox 2185.0Ω 0.25% ¼W	24732-295H
R40	Met ox 1210.0Ω 0.25% ¼W	24732-285M
R41	Met ox 132.0Ω 0.25% ¼W	24732-385P
R42	Met ox 2275.0Ω 0.25% ¼W	24732-296E
R43	Met ox 1265.0Ω 0.25% ¼W	24732-286C
R44	Met ox 74.16Ω 0.25% ¼W	24732-384T

Circuit reference	Description	Part no.
R45	Met ox 2330.0Ω 0.25% ¼W	24732-297U
R46	Met ox 1297.0Ω 0.25% ¼W	24732-287R
R47	Met ox 41.70Ω 0.25% ¼W	24732-383D
R48	Met ox 2360.0Ω 0.25% ¼W	24732-298Y
R49	Met ox 1315.0Ω 0.25% ¼W	24732-288B
R50	Met ox 23.44Ω 0.25% ¼W	24732-382W
R51	WW 2376.76Ω	44359-010F
R52	Met ox 1325.0Ω 0.25% ¼W	24732-289K
R53	Met ox 13.18Ω 0.25% ¼W	24732-381S
R54	WW 2386.98Ω	44359-016T
R55	Thermistor 15kΩ	25685-417P
R56	Met ox 22Ω 2% ½W	24573-033J
R57	Var cermet 1kΩ 10% 0.3W	25748-504L
SA	Power range	44338-106X
SB	See para. 5	
SC	Impedance range multiplier	44340-142J
SD	Impedance selector	44340-141L
TP1	Terminal (Red)	23235-207L
TP2	Terminal (Red)	23235-207L
TP3	Terminal (Black)	23235-208J
TP4	Terminal (Green)	23235-210L
T1	Transformer	43590-079W

Circuit reference	Description	Part no.
	SINAD FILTER KIT (Version 50893-321J only)	
5.	Complete kit (p.c.b. button cable assy and terminal post)	54499-041N
	Comprising :	
	Complete board	44828-367B
	Button (white)	37590-268N
	Cable assembly	43129-397Y
C1	Plas 0.033μF 2% 160V	26582-298T
C2	Plas 0.033μF 2% 160V	26582-298T
C3	Plas 0.033μF 2% 160V	26582-298T
C4	Plas 0.01μF 2% 160V	26582-297D
C5	Plas 0.1μF 2% 160V	26582-296W
C6	Plas 0.1μF 2% 160V	26582-296W
L1	Inductor	44290-742X
L2	Inductor	44290-742X
L3	Inductor	44290-743M
PLB	Terminal post (3-way)	23435-121J
SB	SINAD filter	44338-107M

Fig. 1 Item	Description	Part no.
	MECHANICAL PARTS	
6.	Item nos. refer to Fig. 1. Screws, nuts and washers shown in Fig. 1 are not normally supplied with their associated components; where such fasteners are of a special type these are listed and may be ordered separately.	
1	Knob cap	37590-281W
2	Knob assy	41149-056V
3	Top cover	35902-308Y
4	Rear frame	35890-046C
5	Rear foot	37590-225B
6	Plate rear fixing	35902-234Z
8	Flange	37590-221X
9	Arm	37590-222M
10	Washer spring	31119-045W
11	Boss	37590-220P
12	Cap	37590-219M
13	Handle	35902-220W
14	Handle moulding	37590-226K
15	Side rail	34900-423X
16	Lower cover	35902-309N
17	Shorting link	35902-612A
18	Terminal bush	37590-297E
19	Plug (normally fitted in lieu of SINAD FILTER button)	37590-296H
20	Front panel assy and marking	41700-240V
21	Foot	37590-224R
22	Stud	37590-223C
23	Front frame	35890-045M
	Front panel protective cover (not illustrated)	54124-024F
	Strip-RF seal (not illustrated)	35902-969W

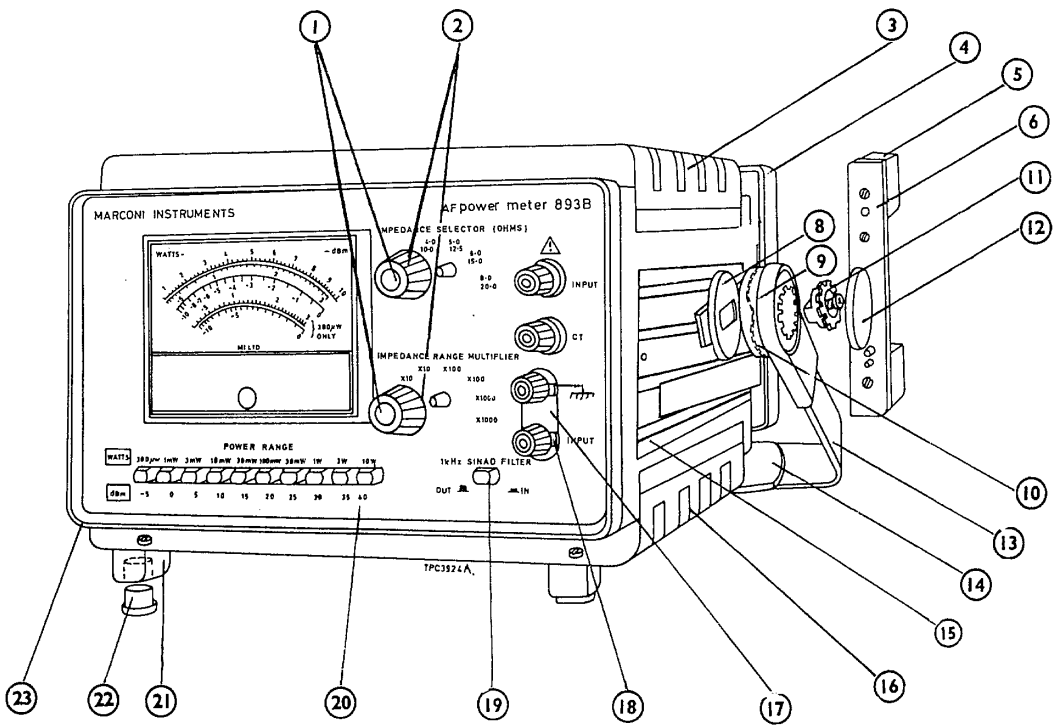

Fig. 1 Mechanical parts

Chapter 7

SERVICING DIAGRAMS

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CIRCUIT NOTES

Component values

1. Resistors : No suffix = ohms, k = kilohms, M = megohms.
Capacitors : No suffix = microfarads, p = picofarads.
Inductors : No suffix = henrys, m = millihenrys, μ = microhenrys.

Symbols

Symbols conform to BS 3939, with the following additional items :

INPUT — Panel marking.


Direction of clockwise rotation of switch.


Push-button switch (in non-depressed condition).


Static sensitive device

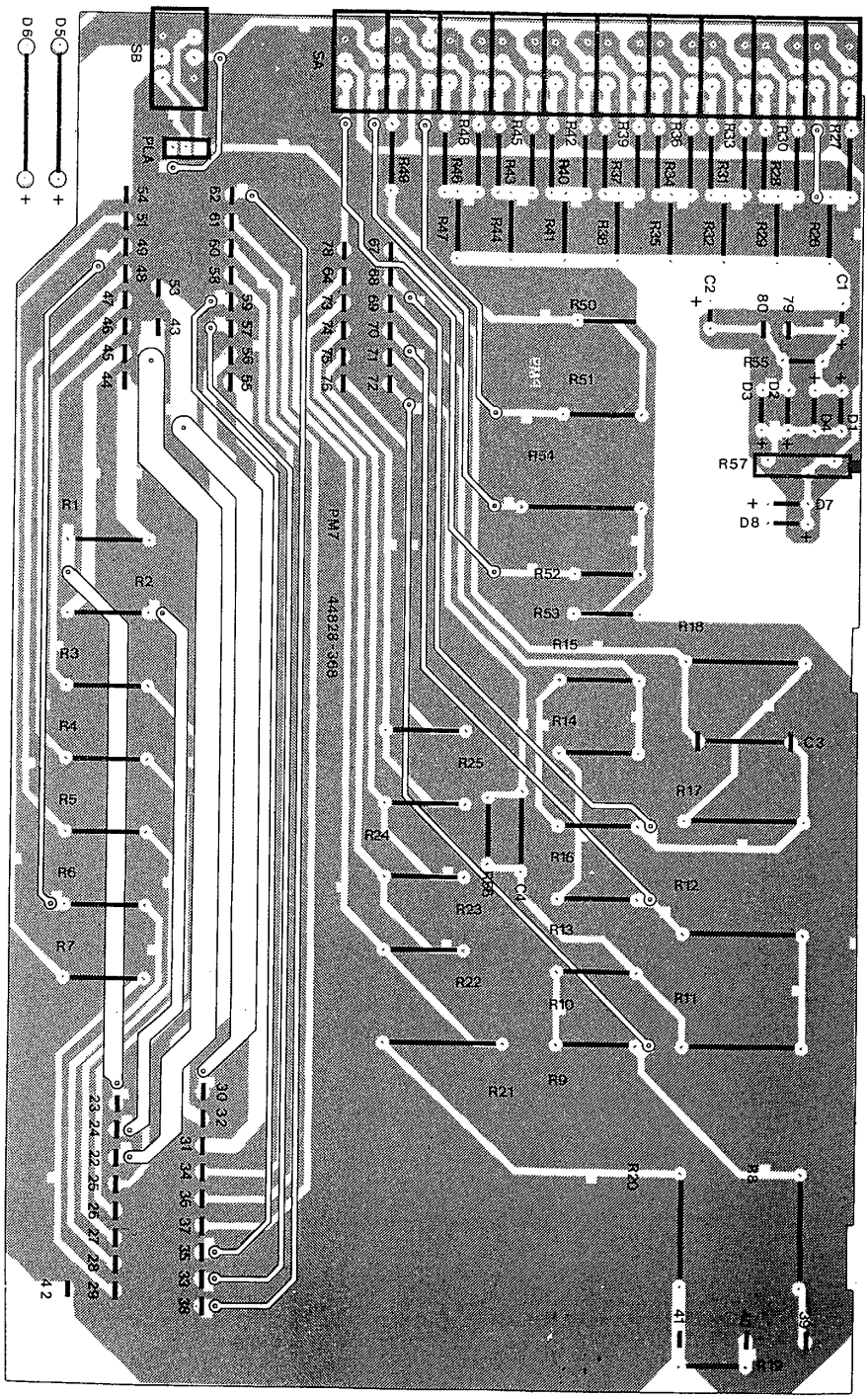

Fig. 1a

Component layout

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Fig. 1a

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