PART 1

GENERAL INFORMATION

This apparatus has been designed according to Class 1 of IEC Publication 348 Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. The present instruction manual contains information and warnings which shall be followed by the user to ensure safe operation and to retain the apparatus in safe condition.

1.1 INTRODUCTION

The AWA Distortion & Noise Meter F242A is suitable for the measurement of total harmonic distortion on balanced or unbalanced audio circuits including tape recorders. It features fully automatic fundamental rejection frequency tuning over the range 20 Hz to 20 kHz. The F242A will also measure both absolute and relative level, noise and hum-plus-noise in audio circuits in the frequency range 10 Hz to 100 kHz and sinad receiver sensitivity.

1.2 BRIEF DESCRIPTION

The F242A is a sensitive distortion and level meter which can be used to determine the performance of all types of audio amplifiers, oscillators, tape recorders, line equalizers and filters. Parameters which can be readily measured are: gain, frequency response, signal-to-noise ratio (weighted and unweighted) sinad receiver sensitivity and the distortion factor over a wide range of input levels.

Distortion measurements are referred to the incoming signal level and the meter is calibrated to indicate distortion factor either in dB or as a percentage. The fundamental rejection frequency is automatically tuned over the entire 20 Hz to 20 kHz operating frequency range, no manual selection or tuning being necessary. Residual distortion is typically less than -90 dB. An out of frequency range warning lamp indicates a frequency outside the operating range.

A simplified distortion calibrate control, independent of attenuator setting, enables easier calibration and rapid checking of calibration during measurements.

For level measurements, including noise, the meter is calibrated in dBm in 600 ohms (0 dBm = 1 mW) and V r.m.s. The meter circuit is true r.m.s. responding, necessary to produce accurate readings of the complex distortion waveforms and noise. The residual noise of the F242A is very low, being less than -110 dBm on full bandwidth.

Low-cut and high-cut filters are provided, and by the appropriate selection of these filters, noise above 20 kHz and mains hum-plus-noise below 400 Hz may be excluded. An optional programme weighting network complying with C.C.I.T.T. Recommendation J16 Annex, Geneva 1972, is available for weighted noise measurements.

1.3 PERFORMANCE

1.3.1 Environmental

Operating Temperature Range	: 0 °C to 50 °C
Storage Temperature Range	: -10 °C to 60 °C

1.3.2 Distortion Factor Measurement

Fundamental Frequency Range:

Balanced	: 20 Hz to 20 kHz
Unbalanced	: 20 Hz to 20 kHz
Harmonic Measurement Range	: 100 kHz
Distortion Factor Range	: Maximum -10 dB Minimum determined by residual distortion of -84 dB balanced or unbalanced, but increasing to -60 dB at 30 Hz on balanced input. Typically better than -90 dB unbalanced. For inputs below -10 dB ref. 0.775 V, minimum determined by residual noise of less than -74 dB. (100 kHz bandwidth), -84 dB (20 kHz bandwidth).
Accuracy of 2nd Harmonic Indication	: +0, -0.5 dB
Input Level Range	: -30 dB to +30 dB reference 0.775 V r.m.s. 2.5 mV to 30 V.

1.3.3 Level or Noise Measurement

Meter Ranges (For 0 dB Meter Indication)	: -90 dBm to +30 dBm in 10 dB steps (0.1 mV to 30 V FSD)
Level Accuracy at 1 kHz and 0 dB on meter	: ±0.2 dB (for any attenuator setting)
Absolute Level Accuracy 0 dBm at 25 °C and 1 kHz	: ±0.05 dB
Meter Indication	: True r.m.s. responding
Meter Calibration	: -30 dB to +2 dB, 0 to 3.2 and 0 to 10 for Volts or Percent
Meter Response	: Response time to 99% of FSD in 250 ±50 mS
Meter Accuracy	: ±1% of f.s.d.
RESIDUAL NOISE : Unbalanced	: Less than -110 dBm (less than 2.5 μV)

1.3.3.1 Relative Level Facility

Variable Gain	: +22 dB to -38 dB

1.3.4 Input Impedance

Balanced and unbalanced	: 600 Ω
Balanced Bridging	: 50 kΩ (0.1 dB bridging loss) 10 Hz to 30 kHz
Unbalanced Bridging	: 100 kΩ (10 Hz to 100 kHz)

RETURN LOSS OF TERMINATED INPUT

Balanced	: 30 dB (10 Hz to 30 kHz)
Unbalanced	: 40 dB (10 Hz to 30 kHz)
	: 34 dB at 100 kHz

LONGITUDINAL SUPPRESSION OF BALANCED INPUT	: At least 40 dB with respect to transverse voltage (10 Hz to 30 kHz)

1.3.5 Frequency Response

Balanced Input	: 10 Hz to 30 kHz ±0.2 dB (typically less than ±0.3 dB to 100 kHz)
Unbalanced Input	: 10 Hz to 100 kHz ±0.2 dB
A.C. OUTPUT	: 2 Volts r.m.s. for FSD on meter 1 kΩ output impedance

1.3.6 Standard Filters

LOW CUT FILTER	: ±0.2 dB at 400 Hz -45 dB at 50 Hz
HIGH CUT FILTER	: Meets high frequency roll off requirements of IEC Noise Filter 1 dB at 19 kHz -18 dB at 32 kHz -40 dB at 63 kHz

1.4 GENERAL INFORMATION

CONNECTORS

Standard Input Connector	: Siemens Type 9, Relkli 6a 3-way balanced or similar

POWER SUPPLY

Mains operation	: 110 V - 120 V and 220 V - 240 V nominal, ±10% 50 - 60 Hz

1.5 MECHANICAL DETAILS

Height	: 146 mm (including feet) 133 mm (with feet removed for rack mounting)
Width	: 430 mm
Depth	: 397 mm (including handles & rear feet) 345 (behind mounting face, when rack mounted)
Weight	: 7.1 kg.

1.6 ACCESSORIES PROVIDED

1 x Mains Cable

1 x Instruction Manual

1 x Mating Input Connector
(Siemens type Rel stp 6ac or similar)

1 x Spare Fuse

1.7 OPTIONAL ACCESSORIES

Option 001	CCITT PROGRAM WEIGHTING NETWORK complying with CCITT Recommendation J16 Annex, Geneva, 1972.
Option 002	CCITT TELEPHONE WEIGHTING NETWORK complying with CCITT Green Book (1972) Vol V, Recommendation P53
Option 003	Alternative input connectors consisting of twin jacks for carrier or tip ring and sleeve plus an alternative rear panel connector. A mating connector for the latter is supplied.
Option 004	Alternative input connector, 3 binding posts.
Option 005	Rack mounting kit enabling the unit to be mounted in a standard 483mm rack, occupying 3 vertical units - 133mm total height.
Option 006	Adaptor 3 pin male to BNC Female.
Option 007	Adaptor 3 pin male to 3 binding posts.
Option 008	A.M. Detector. Distortion, less than 0.3% 500 kHz to 1.7 MHz less than 1% 1.7 MHz to 36 MHz for 2-10 Volt carriers at 30% modulation. R.F. input connector, BNC female. Plugs into standard 3 pin balanced input socket of F242A.
Option 009	A.M. Detector Specification as for Option 008 Mates with alternative input connector Option 004, 3 Binding Posts.