

INSTRUCTION MANUAL

Type BKF5
DISTORTION METER



RADIOMETER

ELECTRONIC MEASURING INSTRUMENTS
FOR SCIENTIFIC AND INDUSTRIAL USE

INSTRUCTION AND OPERATING MANUAL
FOR

Type BKF5
DISTORTION METER

These instructions apply
to model BKF5 only

DISTORTION METER TYPE BKF5

The type BKF5 Distortion Meter measures distortion or hum in audio-frequency circuits.

It is adjustable to any frequency in the range from 20 cycles to 20,000 cycles. Frequencies up to 60,000 cycles are passed unattenuated by the amplifier circuits so that distortion measurements can be made on fundamental frequencies up to 20,000 cycles. The distortion is read directly from the meter, and values as low as 0.1% can be measured, since the lowest range is 0.5% full scale.

The Distortion Meter consists of a three-stage high-gain amplifier with an RC interstage coupling unit which balances to a sharp null, a calibrated attenuator for adjusting the sensitivity followed by a two-stage amplifier with a square law copper-oxide rectifier meter. A high-pass or a low-pass filter can be connected between amplifier and meter. The built-in power supply is voltage regulated. Line surges will have no appreciable effect except when the instrument is operated on the 0.5% scale.

The highest sensitivity of the instrument is about 0.15 volt, and the residual distortion is less than 0.1% (in the greater part of the frequency range it is less than 0.05%).

The input impedance is about 250 kilohms in series with 0.25 μ F.

The Distortion Meter operates as follows:

With the vacuum-tube voltmeter in its least sensitive position (% switch in position C) the input controls are set so that the meter gives full deflection. When the % switch is set to one of the other positions, the balancing RC coupling unit is switched on, and if the RC unit is tuned to the fundamental frequency of the input voltage, this frequency can be completely eliminated when the BALANCE potentiometer is turned to its correct position. The meter then indicates directly the distortion in per cent of the fundamental plus harmonics. When the fundamental frequency is higher than 400 cycles, it is possible to measure the

hum and the harmonics separately by connecting either the low-pass or the high-pass filter between the amplifier and the copper-oxide rectifier meter.

The high-pass filter attenuates 50 cycles by about 50 dB, 100 cycles by about 33 dB, and 150 cycles by about 13 dB. The low-pass filter attenuates 800 cycles by about 28 dB, 1200 cycles by about 39 dB, and 1600 cycles by about 47 dB.

The input voltage of the copper-oxide rectifier meter is present at the jack marked OSCILLOGRAPH and can be used for tracing Lissajous figures on an oscillograph. The input voltage of the Distortion Meter is then fed to the horizontal deflecting plates of the cathode-ray tube, and the harmonics are fed to the vertical plates from the jack OSCILLOGRAPH.

DIRECTIONS

Set the line switch to its correct position before connecting the instrument to the power line. When leaving the factory the line switch is in its 220 volt position, but the following positions are available: 110 - 127 - 150 - 200 - 220 or 240 volts. The switch is accessible when the instrument is removed from its case, and it is located below the line transformer together with a 0,15 amp fuse.

Connect the instrument to be measured to the input jack of the Distortion Meter. If the output impedance of the instrument is high, use a shielded cable so as to avoid hum. A voltage of about 0,15 volt is required. Set the % switch to its right-hand position (C), the filter switch to its mid position, and the frequency range switch so that the fundamental frequency is within the range chosen. Set the meter needle to the last division of the meter scale by means of the knobs OUTPUT COARSE and OUTPUT FINE. Then turn the % switch from position C to position 100 and tune the main dial and the balance potentiometer to minimum deflection. Afterwards repeat the tuning with the % switch set to the lowest position possible. Now the minimum deflection of the meter needle indicates the amount of harmonics plus hum. If the fundamental frequency is higher than 400 cycles, the harmonics and the hum components can be measured separately by switching in either the high-pass or the low-pass filter.

If you want to establish whether one of the harmonics is dominating, this can be done by tracing a Lissajous figure on the screen of a cathode-ray oscillograph. In that case also connect the horizontal amplifier of the oscillograph to the input jack of the Distortion Meter and the vertical amplifier to the jack OSCILLOGRAPH. A figure resembling a U or ∞ will then indicate the second harmonic, while a \sim or ∞ indicates the third harmonic. In general, however, the figures are not so simple.

ACCURACY

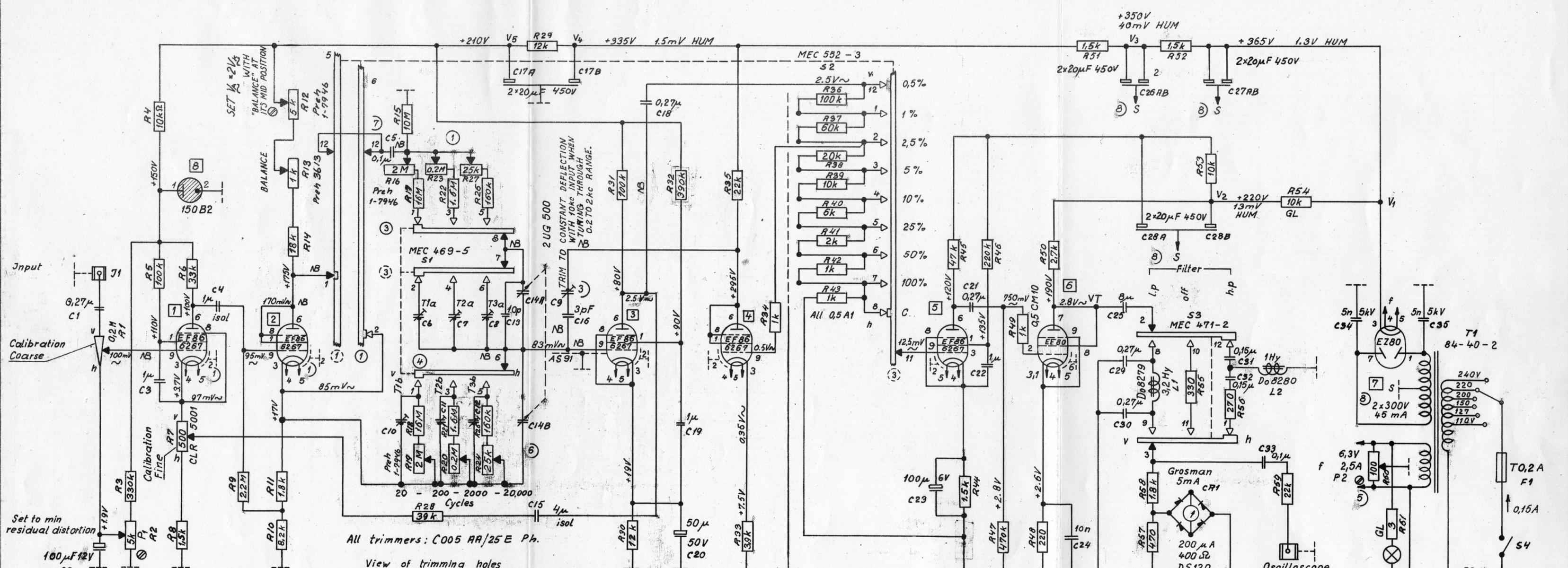
The accuracy is affected by the copper-oxide rectifier meter which does not give the precise rms value under all conditions. In general the accuracy is about 5% of full scale for each range \pm residual distortion.

TUBE REPLACEMENT

Tubes No. 1, 2, 3, 4, and 5 are all of the type EF86 or 6267.

Tubes No. 1 and 2 should preferably be aged specimens in order to avoid temporary resetting of the potentiometer SET TO MIN. OF RESIDUAL DISTORTION (E1 in the diagram). By means of this potentiometer the residual distortion of the Distortion Meter can be set to less than 0.05% with almost all specimens of tubes in positions No. 1 and No. 2.

Tubes No. 3, 4, and 5 can be replaced right away and so can tube No. 6, a type EF80 or 6BX6, tube No. 7, a type EZ80, and tube No. 8, a type 150B2 glow-discharge tube.



All trimmers: C005 AA/25E Ph.

- View of trimming holes
- 20 - 200 c/s ○ C10 - R19
 - 200 - 2000 c/s ○ C11 - R20
 - 2000 - 20000 c/s ○ C12 - R24
 - Compensating trimmer ○ 3) C9
 - 2000 - 20000 c/s ○ C13 - R27
 - 200 - 2000 c/s ○ C7 - R23
 - 20 - 200 c/s ○ C6 - R16

Front Plate —————>

1	21/2-63	EP			
Rt.Nr.	Fro Fab. Nr.	Date	Rt. of	Konf.	Norm.

ALL VOLTAGES ARE MEASURED AT NOMINEL LINE VOLTAGE WITH VACUUM TUBE VOLT-METERS WITH INPUT IMP. $\geq 10M\Omega$.

RADIOMETER
COPENHAGEN

This drawing must not be passed on to any person not authorized by us to receive it, nor be copied or otherwise made use of by such person without our authority

DISTORTION METER
BKF 5 h

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