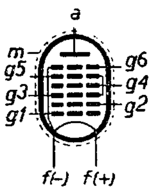
KK 2 Octode



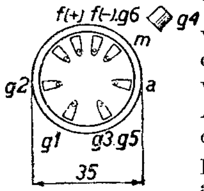


Fig. 2
Arrangement of electrodes and base connections.

The KK 2 is a directly-heated octode that can be used as a frequency-changer in battery superheterodyne receivers for medium and long waves as well as short-wave reception. This combination of oscillator and mixer valve, operating on a common anode current and sharing a single filament, ensures a considerable saving in current, this being an important factor in the design of battery sets. The filament current is only 0.13 A, with a total cathode current of 3.5 mA on medium and long waves and 4.3 mA on the short-wave range.

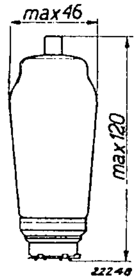


Fig. 1
Dimensions in mm.

A superheterodyne receiver based on the use of the KK 2 will always be a reliable and foolproof proposition. For a battery valve, the conversion conductance and internal resistance are both very high, ensuring a high degree of conversion amplification; further, automatic gain control may be applied with success. A grid voltage variation of only —12 V is sufficient to reduce the conversion conductance from its maximum value to 0.002 mA/V.

FILAMENT RATINGS

Heating: direct by battery; parallel supply.

Filament voltage	. .	$V_f = 2.0$ V
Filament current	. . .	$I_f = 0.13$ A

CAPACITANCES

$C_{g1} = 6.4$ μμF	$C_{g1g4} < 0.2$ μμF
$C_{g4} = 10$ μμF	$C_{g2g4} < 0.4$ μμF
$C_{a} = 14$ μμF	$C_{ag4} < 0.07$ μμF
$C_{g2} = 8$ μμF	

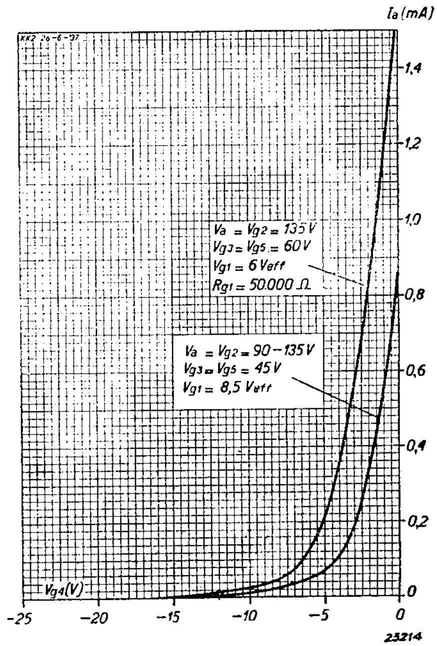


Fig. 3
Anode current as a function of the grid bias, at $V_{g3\cdot5}$ = 45 V and 60 V.

OPERATING DATA

1. FOR MEDIUM AND LONG WAVE RECEPTION

Anode voltage	V_a	= 90	135 V
Oscillator-anode voltage	V_{g2}	= 90	135 V
Screen-grid voltage	$V_{g3,5}$	= 45	45 V
Grid bias (without oscillation)	V_{g1}	= 0	0 V
Oscillator voltage on control grid	V_{osc}	= 8.5	8.5 V_{eff}
Grid leak (control grid)	R_{g1}	= 50,000	50,000 ohms
Bias, grid 4	V_{g4}	= —0.5	—0.5 V
Anode current (V_{g4} = —0.5 V)	I_a	= 0.7	0.7 mA
Oscillator-anode current	I_{g2}	= 1.6	2.2 mA
Screen-grid current	$I_{g3,g5}$	= 1.0	1.0 mA
Conversion conductance (at V_{g4} = —0.5 V)	S_c	= 0.27	0.27 mA/V
Conversion conductance (at V_{g4} = —11 V)	S_c	< 0.0027	0.0027 mA/V
Internal resistance (at V_{g4} = —0.5 V)	R_i	= 2	2.5 M ohms
Internal resistance (at V_{g4} = —11 V)	R_i	> 10	> 10 M ohms

2. FOR SHORT WAVE RECEPTION

Anode voltage	V_a	= 135 V	
Oscillator-anode voltage	V_{g2}	= 135 V	
Screen-grid voltage	$V_{g3,5}$	= 60 V	
Control-grid bias (without oscillation)	V_{g1}	= 0 V	
Oscillator voltage at control grid	V_{osc}	= 6 V_{eff}	
Control grid leak	R_{g1}	= 50,000 ohms	
Bias, grid 4	V_{g4}	= —1.5	—15 V
Anode current	I_a	= 1.0 mA	—
Oscillator-anode current	I_{g2}	= 3.0 mA	—
Screen-grid current	$I_{g3,g5}$	= 1.4 mA	—
Conversion conductance	S_c	= 0.3	0.003 mA/V
Internal resistance	R_i	= 1.7	> 10 M ohms

MAXIMUM RATINGS

V_a	= max. 135 V	W_{g2}	= max. 0.6 W
W_a	= max. 0.5 W	I_k	= max. 10 mA
$V_{g3,5}$	= max. 100 V	V_{g4} (I_{g4} = + 0.3 μA)	= max. —0.2 V
$W_{g3,5}$	= max. 0.4 W	R_{g4k}	= max. 3 M ohms
V_{g2}	= max. 135 V	R_{g1k}	= max. 0.1 M ohm

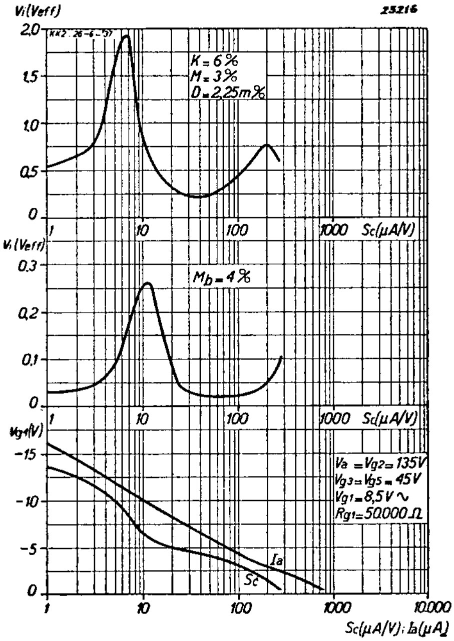


Fig. 4

Upper diagram. Alternating input voltage as a function of the conversion conductance (as controlled by the potential on the 4th grid), with 6 % cross-modulation (0.5 % 3rd harmonic), at $Vg_{3,5}$ = 45 V.
Centre diagram. Alternating input voltage as a function of the conversion conductance (as controlled by the potential on the 4th grid), with 4 % modulation hum, at $Vg_{3,5}$ = 45 V.
Lower diagram. Conversion conductance and anode current as functions of the bias on the 4th grid, at $Vg_{3,5}$ = 45 V

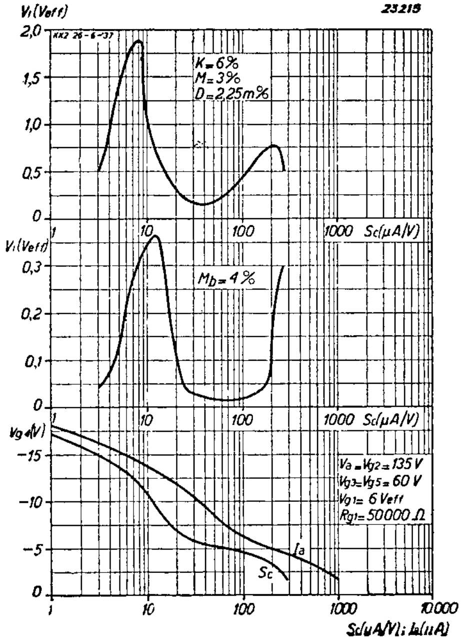


Fig. 5

Upper diagram. Alternating input voltage as a function of the conversion conductance (as controlled by the voltage on grid 4), with 6 % cross-modulation (0.5 % 3rd harmonic), at $Vg_{3,5}$ = 60 V.
Centre diagram. Alternating input voltage as a function of the conversion conductance (as controlled by the voltage on the 4th grid) with 4 % modulation hum, at $Vg_{3,5}$ = 60 V.
Lower diagram. Conversion conductance and anode current as functions of the grid bias (4th grid), at $Vg_{3,5}$ = 60 V.

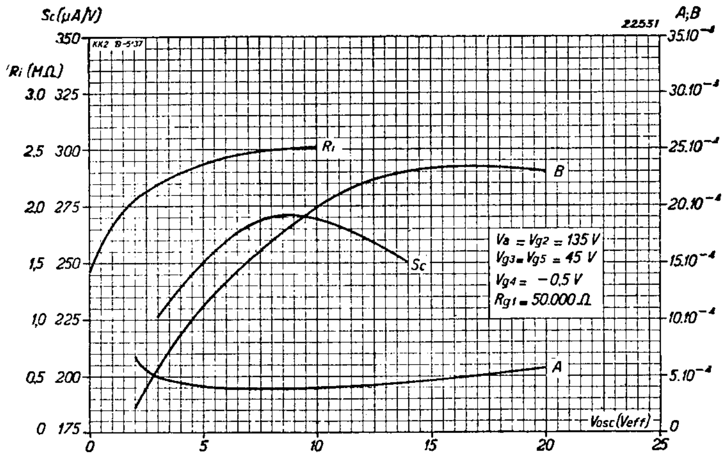


Fig. 6

Conversion conductance, internal resistance, factor A (governing the strength of the background noise) and factor B (strength of whistles) as functions of the oscillator voltage of the KK 2 when used on medium and long waves.

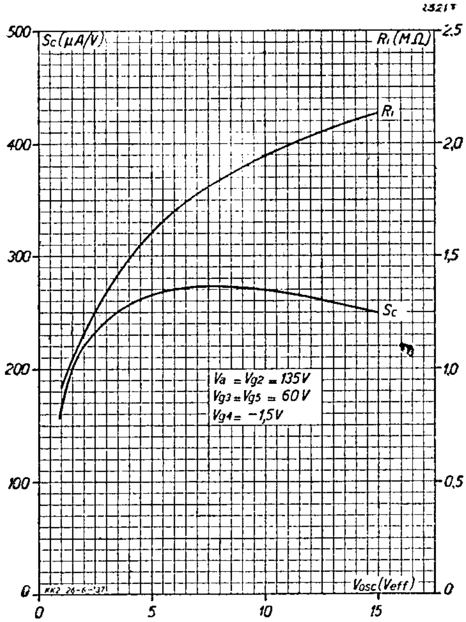


Fig. 7
Conversion conductance and internal resistance as functions of the oscillator voltage of the KK 2 when used on short waves.

APPLICATIONS

In connection with the applications of the valve, the following points should be taken into consideration. The coupling of the oscillator circuit must be tighter than is normally the case with A.C. valves, and should be so adjusted that the current passing through the grid leak R_2 is about 100 μA (see Fig. 8); in the short-wave range the average grid current is approximately 60 μA.

For the last-mentioned wave-range tighter coupling may be obtained by employing the circuit shown in Fig. 9 in which the inductive coupling is enhanced by capacitive coupling. The value of capacitor C_3 should be about 2,500 $\mu\mu$F.

Again, for short-wave work, improved results may be obtained in certain circumstances by selecting an oscillator frequency which is lower than that of the input. The conductance in the medium and long wave ranges may be varied by applying the control voltage to the 4th grid, but on short waves frequency drift precludes any alteration in the voltage on the 4th grid.

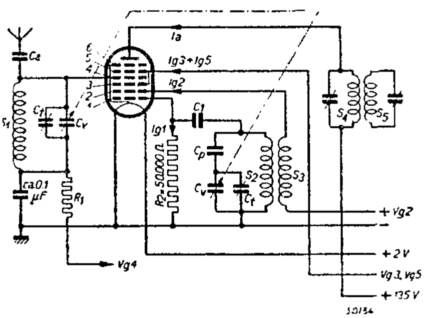


Fig. 8
Theoretical circuit of the KK 2 as used on medium and long waves.

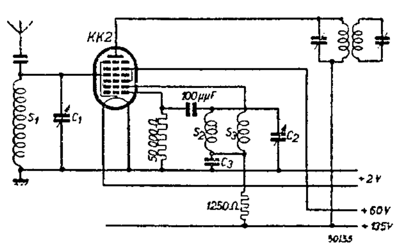


Fig. 9
The KK 2 in a short-wave circuit.