



SHORTWAVE RECEIVER

0.5 to 30.1 MHz



Representante generale per l'Italia:
Ditta Ing. OSCAR ROJE
20123 MILANO - Via T. Tasso, 7
Telefoni 432.241 452.319 483.230
00187 - ROMA - Via di Porta Pinciana, 34 - Tel. 480.079

Uses

The Shortwave Receiver Type EK 07 is suitable as a communication and monitoring receiver in fixed and mobile radio stations, and gives reliable service even under adverse receiving conditions. It is ideal for use in large stations, for monitoring frequency bands and for commercial telegraphy and telephony services. The set receives unmodulated or amplitude-modulated transmitter signals (classes of emission A1 to A4) and, with the aid of accessory units, frequency-modulated signals (F1, F4 and F6) in addition to single-sideband transmissions (A3a and A3b).

Special Features

Exceptionally high setting accuracy – better than 1 kHz

Easy-to-read linear scale (coarse and fine)

Scale discrimination 300 Hz/mm throughout the entire shortwave range

High frequency stability

Single-knob tuning for all tuned circuits with coarse and slow-motion drives

High input selectivity and image rejection due to three tuned input circuits

Great immunity to cross modulation and high discrimination against powerful local transmitters

Adjustable IF bandwidth (± 0.15 to ± 6 kHz), can be locked to six fixed values

Balanced noise limiter (can be switched off)

Carefully thought-out automatic gain control with five control voltages of different amplitude; time constants of 0.1, 1 and 10 seconds, unaffected by the connection of additional receivers for diversity reception; MGC + AGC operation with adjustable response threshold.

Diversity selection is possible by interconnecting the AGC outputs of two equivalent receivers. A transmitter keying relay can be connected for break-in operation. External-oscillator or crystal-controlled standard frequencies may be applied. Outputs for the 1st and 2nd intermediate frequencies are provided as well as a facility permitting very simple frequency measurements. Accessory units, such as a sideband selector, single-sideband demodulator, or telegraphy demodulator, can be connected.

The panel meters give readings of the receiver input voltage, the AF output voltages and the individual operating currents. The intensity of the scale illumination is adjustable in two steps.

ROHDE & SCHWARZ · MÜNCHEN

Data sheet
N 140
E-2

The Shortwave Receiver can be remote-controlled over long distances. Apart from the control units, all that is required for this purpose is an ordinary post-office line, over which the modulation picked up by the receiver is returned at the same time. The scale position is indicated back to the remote control centre.

Description

The Shortwave Receiver Type EK 07 is a double-superheterodyne receiver with crystal-controlled local and master oscillators. It covers the frequency range 0.5 to 30 MHz in twelve subranges; the shortwave range proper, 3 to 30 MHz, is divided into nine ranges each 3 MHz wide.

The excellent setting accuracy and stability, distinguishing features of the EK 07, are determined in the shortwave range by the local oscillator, whose linear frequency response has made it possible to divide the Receiver scale into a coarse- and a fine-adjustment scale. The coarse scale covers bands each 3 MHz wide, and is calibrated at every 100-kHz point. The marks of the fine-adjustment scale are spaced at intervals of 500 Hz. The frequency reading is the sum of the readings on both scales. In the range 3 to 30 MHz, a frequency discrimination of 300 Hz per mm of the scale length and a setting accuracy of ± 1 kHz are obtained. In the range between 500 kHz and 6.1 MHz, the EK 07 operates as a conventional superheterodyne receiver. The coarse scale only is used below 3 MHz, but it can also be interpolated with the fine-adjustment scale.

The RF amplifier section contains three tunable selective circuits, two of which are directly at the input of the Receiver, thus ensuring extremely good discrimination against strong, unwanted signals from local transmitters. The local oscillator operates with an "analysis circuit" Heterodyning with the harmonics of a 3-MHz crystal brings its frequency into the range of a master oscillator. Both frequencies are compared in a phase-sensitive bridge circuit. The output signal of this circuit controls the local oscillator via a reactance stage. The master oscillator, which always operates in the low range of 3.4 to 6.4 MHz, is enclosed in a hermetically sealed, cast-iron case. The circuit design of this set, with its high-stability, variable-frequency local oscillator made it possible to use tuned circuits in the form of four-section filters for the first IF stages.

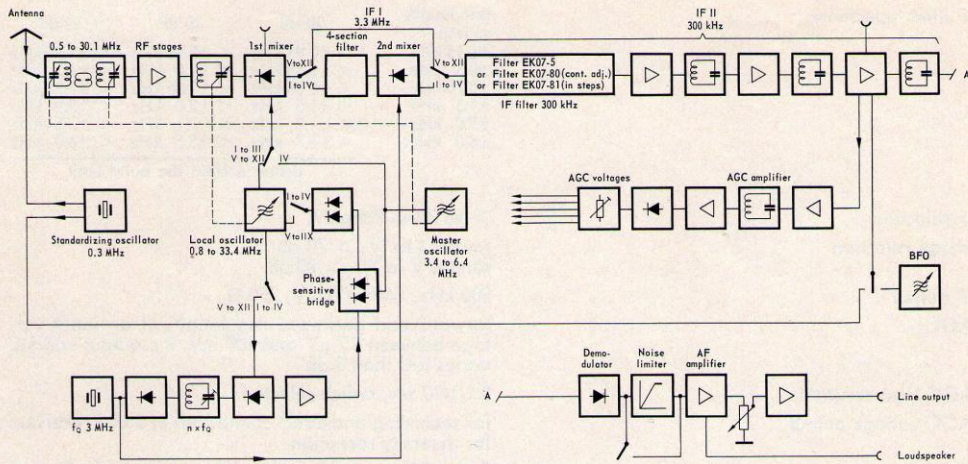
In the stage for the second intermediate frequency, Type EK 07 can be fitted with a newly developed filter which comes in two versions. The Filter Type EK 07-80 has a bandwidth which is continuously variable between ± 0.15 and ± 6 kHz and can be mechanically locked in six positions. The Filter Type EK 07-81 permits the bandwidth to be switched in six fixed steps between ± 0.15 and ± 6 kHz. The very sharp cutoff is maintained in every position—even with a continuously varied bandwidth—and ensures optimum reception. The standard model of the EK 07 contains the IF Filter Type EK 07-5. The second intermediate frequency 300 kHz, is brought out for the connection of accessory units. Highly effective automatic gain control is provided by AGC amplifiers. It is possible to select any of the three time constants, 0.1, 1 and 10 seconds, so that AGC operation is guaranteed for all classes of telegraphy reception. Provision has been made not only for AGC and MGC operation, but also for MGC + AGC. Here, the sensitivity of the set is reduced, while signals stronger than the adjusted response threshold are automatically levelled in the normal way. This type of operation is particularly useful for monitoring frequency bands, when the operator is disturbed by strong atmospheric in the total or almost total absence of a useful signal. By reducing the response threshold, the disturbance can be cut down to a tolerable level. The AF section contains a balanced noise limiter with an adjustable response threshold.

A standardizing oscillator controlled by a 300 kHz crystal permits the calibration to be checked against harmonics. Moreover, it is possible to apply the fundamental of this crystal to the last IF amplifier by turning the TUNING CHECK knob, thus providing a simple and accurate check of the calibration by zero beat.

www.radiopharos.it

The meter for checking the performance of the set can be switched over for measurement of the AF level and the currents of the amplifier valves.

Type EK 07 is available as a cabinet model and as a 19" or DIN standard rack-mounting model.



Block diagram of Shortwave Receiver Type EK 07

Specifications

Total frequency range	0.5 to 30.1 MHz
Range A	3.1 to 30.1 MHz, divided into the ranges IV to XII each 3 MHz wide
Scale discrimination	300 Hz per mm throughout Range A
Setting accuracy	better than 1000 Hz after 45-min operation at an ambient temperature of 15 to 25°C
Range B	0.5 to 3.1 MHz, divided into the ranges I to III (0.5 to 1.1 to 2.1 to 3.1 MHz)
Data common to Ranges A and B:	
Classes of emission with accessory units	A1, A2, A3, A4 F1, F4, F6; A3a, A3b
Noise figure	10 dB
S/N ratio	
with A1 reception (bandwidth ± 300 Hz) for input voltages 0.4/1.3/5.5 μ V	20/30/40 dB
with A3 reception (bandwidth ± 6000 Hz) for input voltages 4/15/100 μ V	20/30/40 dB
Reradiation	5 μ V with 60- Ω termination of antenna input
Cross modulation	an interfering transmitter modulated 50% and 20 kHz off-tune from a station operating on IF mid-band frequency, causes less than 10% cross modulation with a ratio of interfering-signal amplitude to desired-signal amplitude < 60 dB and an interfering input signal < 50 mV
Standardizing oscillator	controlled by 300-kHz crystal
Antenna connector	RF Socket FD/UG-568/U for 50 to 75- Ω feeders or telephone jack for high-impedance feeders (balanced, high-impedance feeders with connected transformer)

SHORTWAVE RECEIVER EK 07

IF frequencies	ranges I to IV: 300 kHz; ranges V to XII: 1st IF 3.3 MHz, 2nd IF 300 kHz																												
IF bandwidths, selected in steps ¹	±0.15; ±0.3; ±0.75; ±1.5; ±3.0; ±6.0 kHz																												
IF filter selectivity	<table border="1"> <thead> <tr> <th>Bandwidth setting</th> <th>20 dB</th> <th>40 dB</th> <th>60 dB</th> </tr> </thead> <tbody> <tr> <td>±0.15 kHz</td> <td>< ±0.45 kHz</td> <td>< ±0.95 kHz</td> <td>< ±1.35 kHz</td> </tr> <tr> <td>±0.3 kHz</td> <td>< ±0.55 kHz</td> <td>< ±1.0 kHz</td> <td>< ±1.5 kHz</td> </tr> <tr> <td>±0.75 kHz</td> <td>< ±0.85 kHz</td> <td>< ±1.05 kHz</td> <td>< ±3.25 kHz</td> </tr> <tr> <td>±1.5 kHz</td> <td>< ±1.0 kHz</td> <td>< ±2.0 kHz</td> <td>< ±2.9 kHz</td> </tr> <tr> <td>±3.0 kHz</td> <td>< ±1.0 kHz</td> <td>< ±2.1 kHz</td> <td>< ±3.5 kHz</td> </tr> <tr> <td>±6.0 kHz</td> <td>< ±1.7 kHz</td> <td>< ±3.5 kHz</td> <td>< ±6.0 kHz</td> </tr> </tbody> </table> <p style="text-align: center;">distance from the band limit</p>	Bandwidth setting	20 dB	40 dB	60 dB	±0.15 kHz	< ±0.45 kHz	< ±0.95 kHz	< ±1.35 kHz	±0.3 kHz	< ±0.55 kHz	< ±1.0 kHz	< ±1.5 kHz	±0.75 kHz	< ±0.85 kHz	< ±1.05 kHz	< ±3.25 kHz	±1.5 kHz	< ±1.0 kHz	< ±2.0 kHz	< ±2.9 kHz	±3.0 kHz	< ±1.0 kHz	< ±2.1 kHz	< ±3.5 kHz	±6.0 kHz	< ±1.7 kHz	< ±3.5 kHz	< ±6.0 kHz
Bandwidth setting	20 dB	40 dB	60 dB																										
±0.15 kHz	< ±0.45 kHz	< ±0.95 kHz	< ±1.35 kHz																										
±0.3 kHz	< ±0.55 kHz	< ±1.0 kHz	< ±1.5 kHz																										
±0.75 kHz	< ±0.85 kHz	< ±1.05 kHz	< ±3.25 kHz																										
±1.5 kHz	< ±1.0 kHz	< ±2.0 kHz	< ±2.9 kHz																										
±3.0 kHz	< ±1.0 kHz	< ±2.1 kHz	< ±3.5 kHz																										
±6.0 kHz	< ±1.7 kHz	< ±3.5 kHz	< ±6.0 kHz																										
IF rejection	> 90 dB in Range A																												
Image rejection	ranges I to IV: > 70 dB; ranges V to XII: > 80 dB																												
IF output	300 kHz; EMF 100 mV; 250 Ω																												
AGC	forward and backward regulation: at an input voltage between 0.7 μV and 100 mV, the output voltage varies less than 3 dB																												
AGC time constants	0.1/1/10 sec, switch-selected																												
AGC voltage output	for recording and direct connection of 2 or 3 receivers for diversity reception																												
BFO	0 to ±3000 Hz, adjustable, can be switched off																												
Monitoring of antenna voltage	by meter																												
AF frequency response between 40 and 6000 Hz	±3 dB																												
Noise limiter	threshold adjustable, can be switched off																												
Line output	level 0 dB into 600 Ω (with A3 and 30% mod.), distortion < 1.5%																												
Power output	2 W into 15 Ω, distortion approx. 1.5% for 1 W																												
Phones output I (wideband)	frequency response 40 to 6000 Hz: ±3 dB; 2 kΩ; EMF 8 V max.																												
Phones output II (narrow-band)	pass band 800 to 1100 Hz; 4 kΩ; EMF 20 V max.																												
Monitoring of output level	by meter																												
Valve check	by meter																												
Power switch positions	OFF/STANDBY/ON (ILLUMINATION BRIGHT)/ON (ILLUMINATION DIMMED)																												
AC supply	115 V/125 V/220 V/235 V, 47 to 63 Hz (130 VA)																												
Overall dimensions (W x H x D)																													
Cabinet with cover	540 x 325 x 552 mm																												
Rack-mounting model acc. to DIN standard 41 490	520 x 304 x 514 mm																												
19" rack-mounting unit	483 x 310 x 514 mm standard depth t ₄ : 430 mm																												
Weight (cabinet model)	65 kg																												



Order designations

- Rack-mounting model acc. to DIN 41 490 ▶ Shortwave Receiver Type EK 07 D
- Rack-mounting model acc. to DIN 41 490 with steel cabinet ▶ Shortwave Receiver Type EK 07 D/2
- 19" rack-mounting model ▶ Shortwave Receiver Type EK 07 DZ

Recommended extras

- Single-Sideband Demodulator Type NZ 10
- Telegraphy Demodulator Type NZ 07

¹⁾ IF Filters Type EK 07-80 or EK 07-81 also available on request. For more details, see Technical Information R 10963.