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HANDBUCH

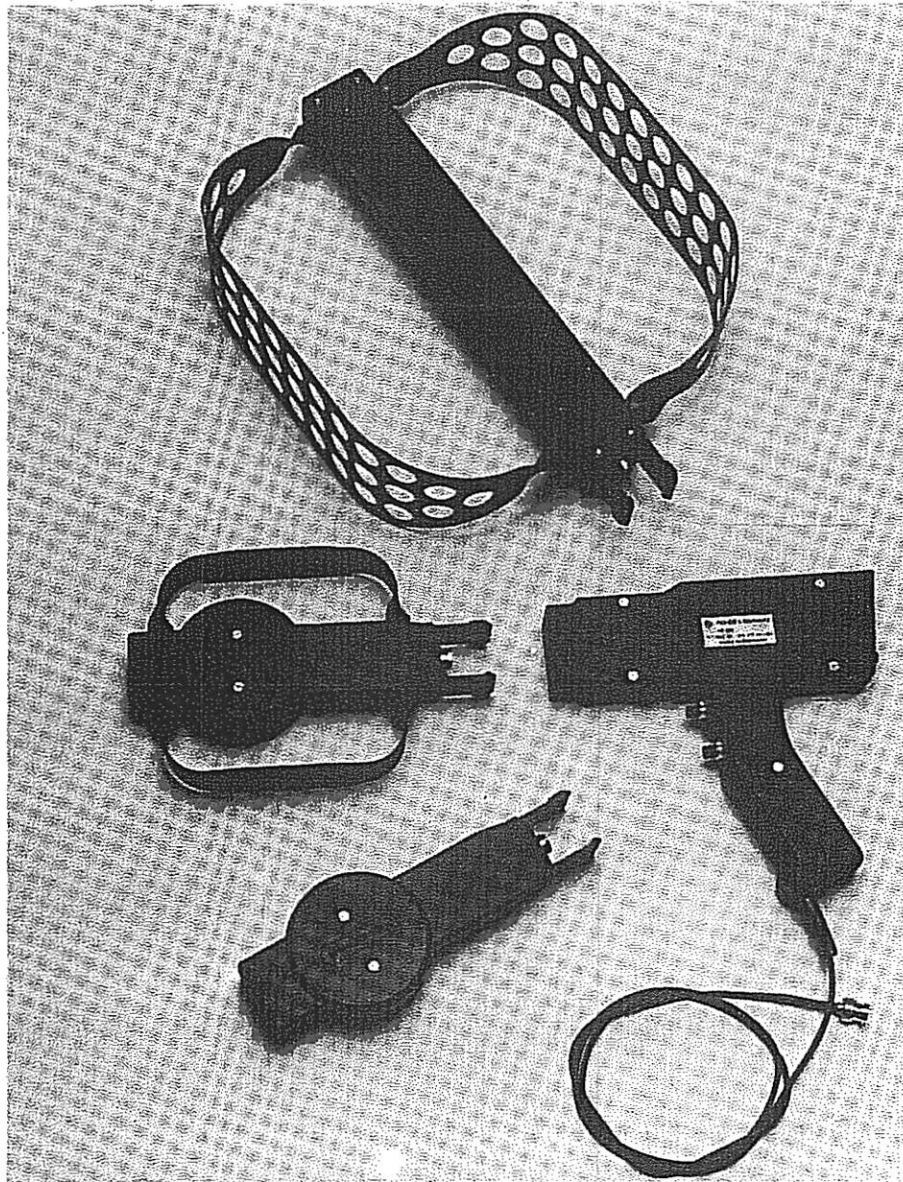
MANUAL

AKTIVE RICHTANTENNE
HE 100

ACTIVE DIRECTIONAL ANTENNA
HE 100

701.5002

701.5002



Bestell-Nr./Order No.: 652.1803.02

The Active Directional Antenna HE 100 from Rohde & Schwarz meets all the requirements a modern, hand-held DF antenna should fulfil:

- Unambiguous determination of direction of incidence, i.e. distinct directional pattern
- Antenna voltage maximum as direction criterion (maximum-signal DF method)
- Handy size, in particular minimum crosswise dimensions, and low weight
- Suitability for vertically and horizontally polarized signals
- Wide dynamic range due to selectable sensitivity permitting use even in extremely intense electromagnetic fields
- Low current drain



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1 Uses

Due to its small size and low weight, the Active Directional Antenna HE 100 in conjunction with a compact, portable receiver (e.g. EB 100) is ideally suited for tracing signal sources and sources of interference.

The direction of the signal source is found by pointing the antenna towards the direction of maximum signal voltage. The overall frequency range from 20 to 1000 MHz is covered by three exchangeable antenna modules, which handle both vertically and horizontally polarized signals and have almost identical cardioid radiation patterns in both planes.

In order to increase the sensitivity, a low-noise amplifier can be switched into circuit (active/passive switchover). As this amplifier is bypassed during passive operation, the HE 100 can also be used in the vicinity of powerful transmitters.

Camouflaged use of the antenna, for instance in a suitcase or a travelling bag, is also possible.

2 Description

The broadband, cardioid directional pattern of the HE 100 is obtained by using loaded loop antenna modules of different size for the three subranges of 20 to 200 MHz, 200 to 500 MHz and 500 to 1000 MHz. These RF modules can be plugged on to a handle, which contains the following:

- Power supply, which comes from a set of four round cells R6 (dry or NiCd cells) contained in a removable battery holder.
- Antenna electronics, comprising RF amplifier, active/passive switch and circuitry for the meter.

In the active mode, the RF signal path is taken via an RF relay (when supply voltage is switched on) to the low-noise amplifier, which is bypassed in the passive mode.

- Meter, which indicates the strength of the incoming signal. The pointer deflection is controlled by the receiver via the RF cable. The meter, which can be illuminated, also indicates the state of the batteries at the push of a button.

3 Operation

(see drawing 701.5002.01)

a) Replacing RF modules:

Release catch by pressing two studs (2) and pull out RF module.

Plug in required RF module until it locks in position.

b) Active/passive switchover:

Select the desired mode by means of pushbutton (3).

c) Meter indication of state of battery:

Press pushbutton (8) for the battery test on the meter; red marking: battery discharged.

d) Meter illumination:

The illumination is switched on by pressing pushbutton (4).

e) Replacing battery:

Open the cover (7) of the battery compartment and replace batteries in holder.

4 Practical Hints

In order to obtain optimum results, hold the antenna with the arm fully stretched out to find the signal maximum. The centre of rotation should go through the antenna (see Fig. 1) to make sure that any variations in signal strength caused by disturbances of the electromagnetic field due to local influences do not impair the measurement.

If it is not possible to find a pronounced maximum, the effect of reflections is too great. Such reflections or interference are caused whenever electromagnetic waves hit large objects with a high dielectric constant or good electrical conductivity.

It is advisable to take bearings from several points, gradually coming closer to the transmitter (see Fig. 2).

5 Specifications

5.1 Electrical Specifications

Frequency range	20 to 1000 MHz covered by three RF modules: 20 to 200 MHz with RF module 701.5702 (50) 200 to 500 MHz with RF module 701.5354 (100) 500 to 1000 MHz with RF module 701.5554 The extended frequency ranges specified in parentheses are covered with reduced sensitivity.
Characteristic impedance	50 Ω
RF connector	BNC
Power supply (contained in handle)	four dry cells R6 1.5 V *)
Current drain	Dry cells (6 V)
	Passive operation 0 mA
	Active operation 47 mA
	Meter illumination 30 mA
	Battery test 120 mA
Antenna factor $K = 20 \log E/V_{out}$	see Fig. 3
Field-strength sensitivity (for receiver noise of 10 dB at bandwidth of 7.5 kHz)	see Fig. 4
Radiation patterns	H plane: cardioid E plane: cardioid see Fig. 5

*) The dry cells supplied with the HE 100 can be replaced by ordinary rechargeable NiCd cells (4 x 1.2 V, 0.5 Ah, size R6) with charger.

5.2 Mechanical Specifications

Resistance to vibration (in transport case)	DIN/IEC 68-2-6 (5 to 55 Hz, 0.2 mm amplitude)
Resistance to shock	DIN/IEC 68-2-27 (half sinus, 30 g, 11 ms)
Degree of protection	IP 54 (in position of use)

5.3 General Data

Dimensions	see drawing 701.5002.02
Transport dimensions	470 mm x 360 mm x 180 mm (outer dimensions of transport case)
Length of cable	1.2 m
Weight	handle with RF module 701.5554: approx. 0.8 kg 701.5354: approx. 0.8 kg 701.5702: approx. 1 kg
Total weight including transport case	4,5 kg
Operating temperature range . . .	-30°C to +50°C
Storage temperature range	-30°C to +60°C

6 Equipment Supplied

	Order No.
Handle (containing power supply and display module)	701.5019
3 RF modules	701.5702 701.5354 701.5554
4 dry cells, size R6 (1.5 V)	
1 transport case	701.5860
1 manual	652.1803.02



7 Maintenance

If the batteries used are not leakage-proof, check the battery container at regular intervals.

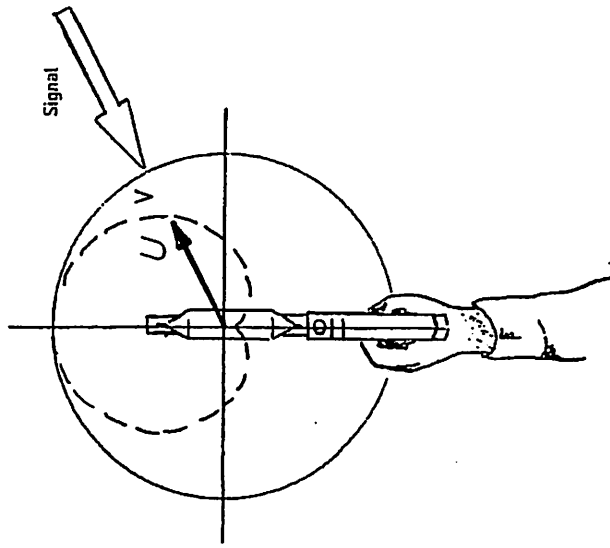


Bild 1 Handpeilung mit HE 100 durch Suchen des Empfangsmaximums

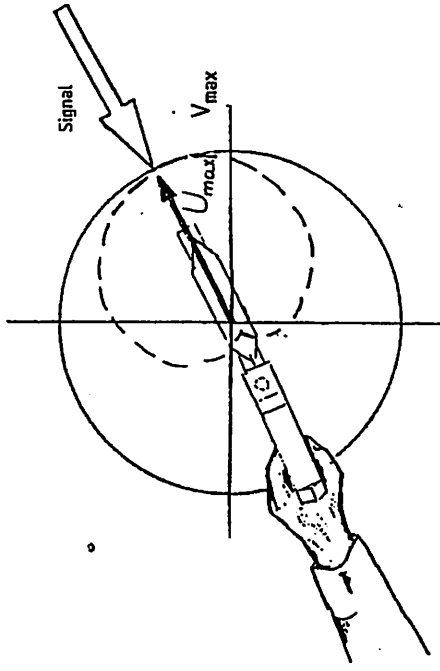


Fig. 1 Manual direction finding with HE 100 by searching for maximum signal strength

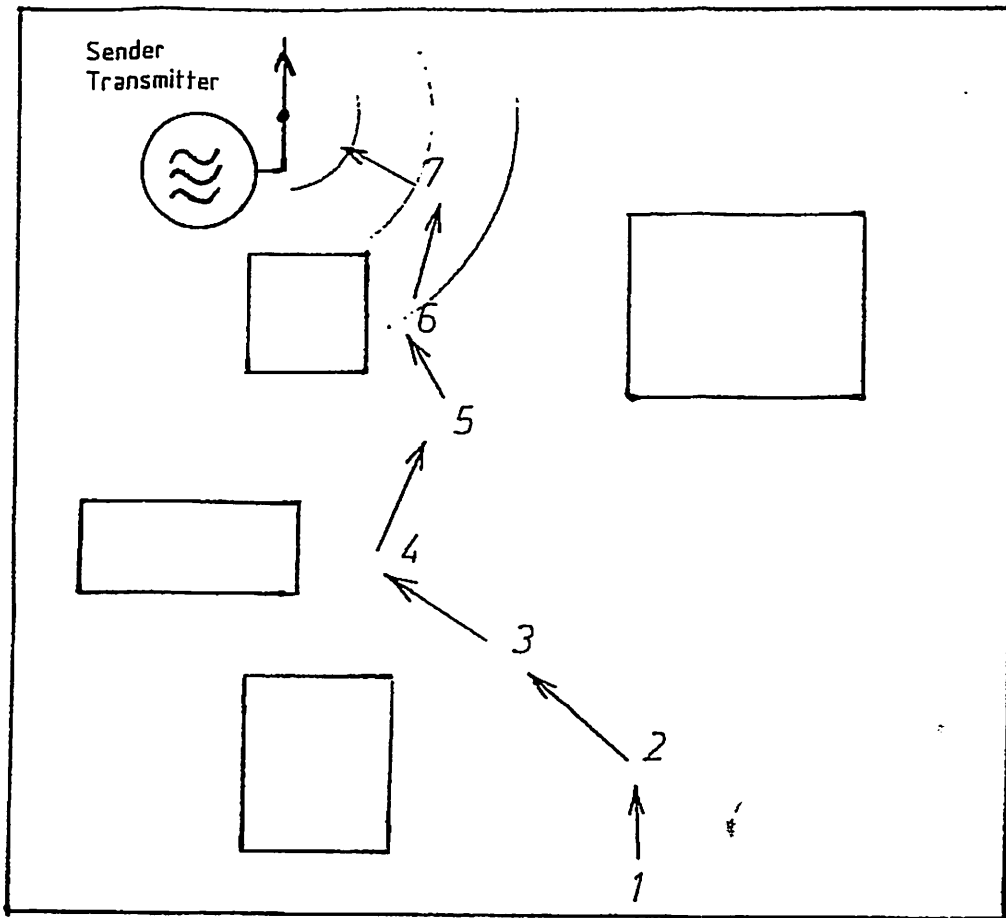
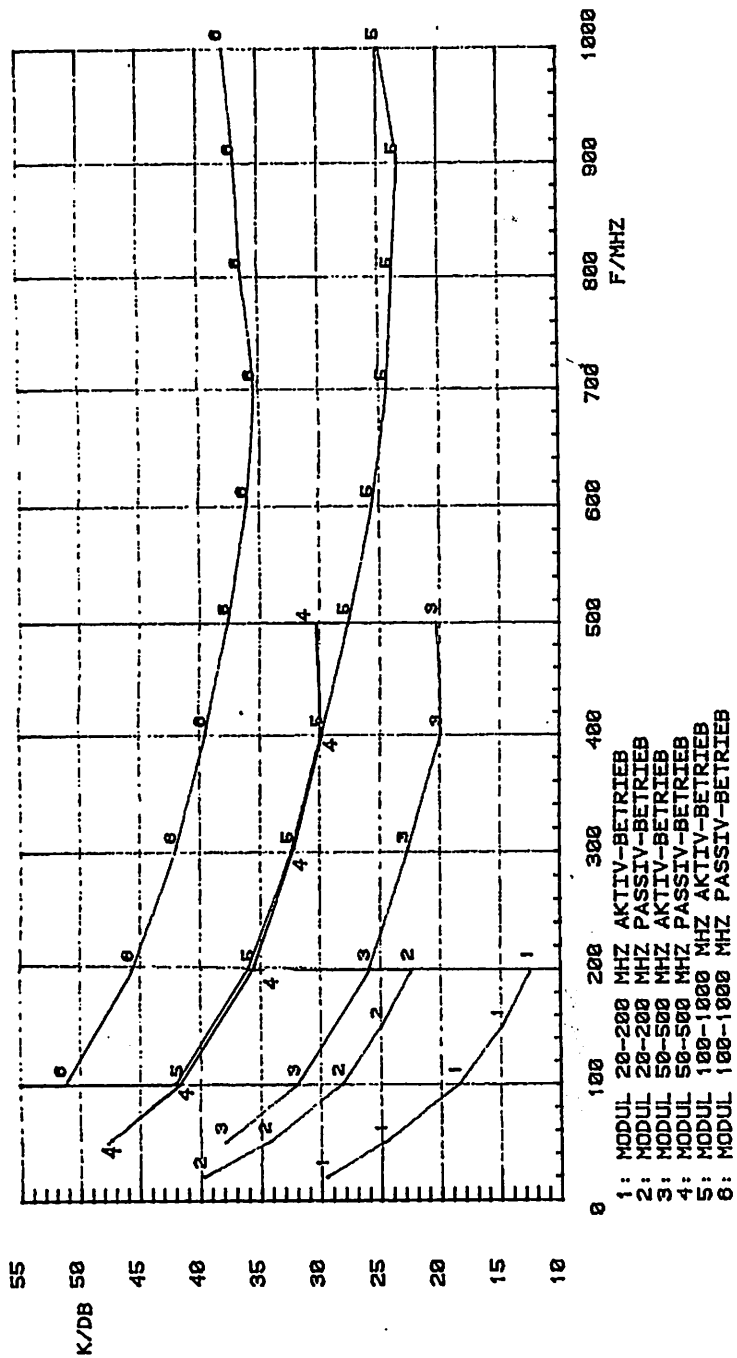


Bild 2 Sendersuche in einem geschlossenen Raum mit starken Störungen des elektromagnetischen Feldes

Fig. 2 Tracing a transmitter in a room with heavily disturbed electromagnetic field

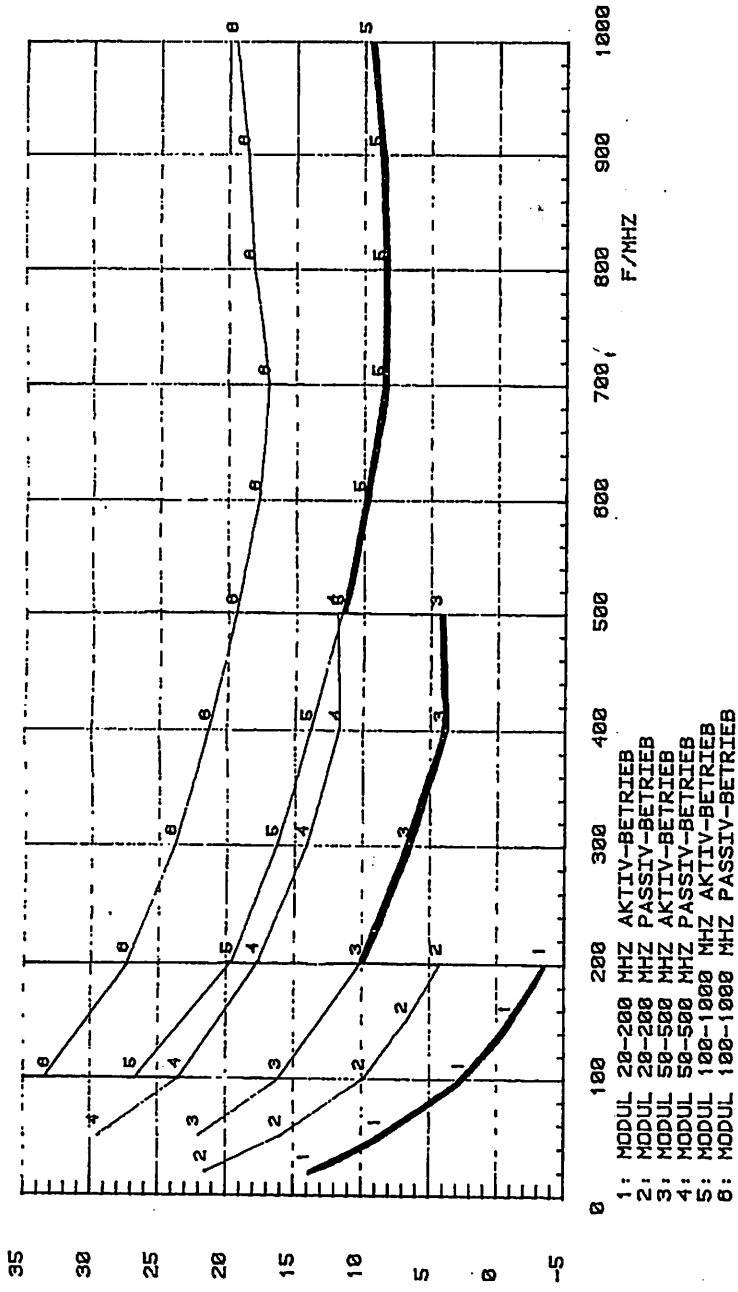


MODUL = Module
 AKTIV-BETRIEB = Active operation
 PASSIV-BETRIEB = Passive operation

Bild 3 Antennenfaktor $k = 20 \log E/U_A$

Fig. 3 Antenna factor $K = 20 \log E/V_{out}$

EG: DB/ μ V/M



MODUL = Module
 AKTIV-BETRIEB = Active operation
 PASSIV-BETRIEB = Passive operation

Bild 4 Grenzfeldstärke
 Empfängerrauschzahl 10 dB
 Bandbreite 7,5 kHz
 für S/N = 1

Fig. 4 Field-strength sensitivity
 (receiver noise figure 10 dB,
 bandwidth 7.5 kHz
 for S/N = 1)

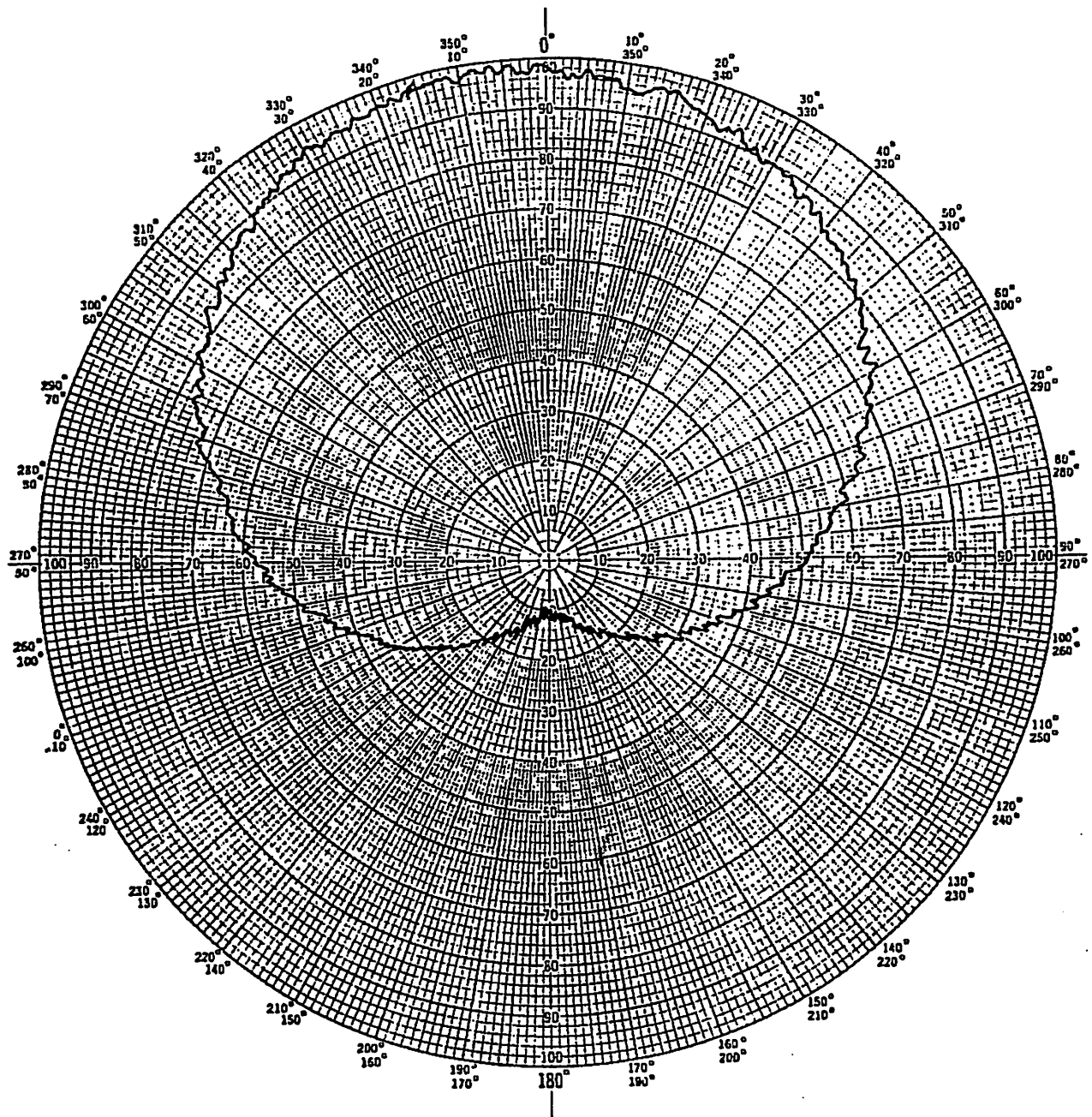


Bild 5 Typisches Richtdiagramm der Aktiven Richtantenne HE100

Fig. 5 Typical directional pattern of HE 100

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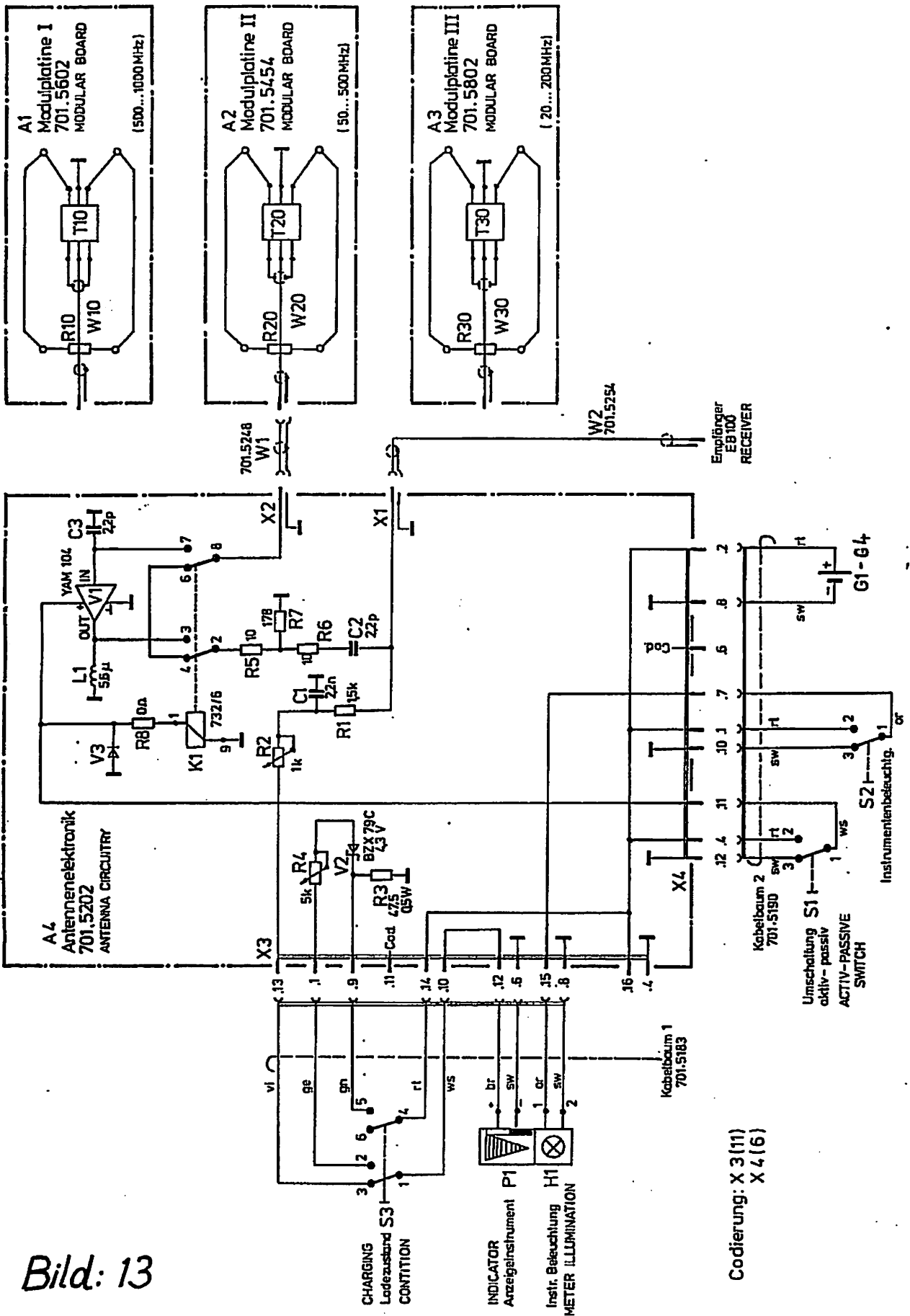


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Codierung: X 3 (11)
X 4 (6)

A	33139	02.86	HU	Tag	Name	Benennung Aktive Richtantenne HE 100	
				Bearb.	02.86 HU		
				Gepr.			
				Norm			
				Zeichn.-Nr.		Blatt-Nr. 15	
				701.5002 T			
Änd. Zust.	Änderungs-Mitteilung	Tag	Name	zu Gerät:	HE 100	reg. i. V. 701.5002 V	
						erste Z. -	

**ROHDE & SCHWARZ**AZ Datum
Date
08 0386Schaltteilliste für
Parts list for
HE100 AKTIVE RICHTANTENNE
HE100 ACT.DIR.ANTENNASachnummer
Stock No.
701.5002.01 SABlatt
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
.	ZUGEH.STROML./CIRC.DIAGR. 701.5002 S		
A1	ED MODULPLATINE I HIERZU STROML. 701.5002 S	701.5602.02	701.5554
A2	ED MODULPLATINE II HIERZU STROML. 701.5002 S	701.5454.02	701.5354
A3	ED MODULPLATTE III HIERZU STROML. 701.5002 S	701.5802.02	701.5702
A4	ED ANTENNENELEKTRONIK HIERZU STROML. 701.5002 S	701.5202.02	701.5019
C1	CC 2,2NF+-10%5X6R2000 CAPACITOR VALVO 2222 63051 222	CC 087.7060	701.5202.01
C2	CC 2,2NF+-10%50VX7R 1206 CERAMIC CHIP CAPACITOR VITRAMON VJ1206Y222KFA	CC 099.8444	701.5202.01
C3	CC 2,2PF+-0,25PF3X4NPO CAPACITOR VALVO 2222 678 09228	CC 087.6341	701.5202.01
G1	EB 1,5V RUNDZELLE R6 MIGN BATTERY DURACELL MN1500	EB 017.0109	
BIS/TO G4			
H1	EF W2X4,6D 6-7V 30 MA I INCANDESCENT LAMP ALBA A-812-3K-2 MIT SOCK. ENTHALTEN IN 701.5177	EF 019.2644	701.5019
K1	SN T05 6V 2XUM RELAY TELEDYNE-R 732-6	549.2447	701.5202.01
L1	LD 5,60UH10X1,80OHMO,195A CHOKE DELEVAN DROSSEL1025-38	LD 067.2957	701.5202.01
P1	JK 1MA 39X14U 350 OHM INSTRUMENT AMS N.R&S-ZCHNG.701.5177	701.5177	701.5019
R1	RL 0,35W 1,50KOHM+-1%TK50 RESISTOR DRALORIC SMA0207/1,50K-F-D	RL 083.0732	701.5202.01
R2	RS 0,5W 1KOHM+-20%KURVE1 DEPOS.-CARBON POTENTIOMET BOURNS 3329H-1-102	RS 069.8030	701.5202.01
R3	RL 0,65W 47,5 OHM+-1%TK50 METAL FILM RESISTOR RESISTA MK4 47,5 OHM 1% TK50	006.1867	701.5202.01
		701.5002.01 SA	BL 1+

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**ROHDE & SCHWARZ**AZ Datum
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08 0386Schaltteilliste für
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HE100 ACT. DIR. ANTENNASachnummer
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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
R4	RS 0,5W 5KOHM+-20%KURVE1 DEPOS.-CARBON POTENTIOMET BOURNS 3329H-1-502	RS 069.8052	701.5202.01
R5	RG 10,0 OHM+-2%TK200 1206 CHIP -RESISTOR DRALORIC CGB3216 100HM2%TK200	RG 006.8649	701.5202.01
R6	RG 10,0 OHM+-2%TK200 1206 CHIP -RESISTOR DRALORIC CGB3216 100HM2%TK200	RG 006.8649	701.5202.01
R7	RG 178 OHM+-2%TK200 1206 CHIP RESISTOR DRALORIC CGB3216 178OHM2% TK	RG 006.8949	701.5202.01
R8	RL 0-WIDERSTAND DIN 0204 0-OHM RESISTOR DRALORIC OMA 0204	RL 069.0000	701.5202.01
R10	RL 0,21W 220 OHM2% UNGEW. RESISTOR RESISTA MK1 220OHM 2% UNGEW.	RL 092.5991	701.5602.01
R20	RL 0,21W 301 OHM+-1%TK50 RESISTOR RESISTA MK1 301OHM 1% TK50	092.0183	701.5454.01
R30	RL 0,21W 301 OHM+-1%TK50 RESISTOR RESISTA MK1 301OHM 1% TK50	092.0183	701.5802.01
S1	SB DRUCKTASTE 1XU LOETANS PUSH-BUTTON SWITCH APR R&S-ZCHNG.701.5960	701.5960	701.5019
S2	SB DRUCKTASTE 1XU LOETANS PUSH-BUTTON SWITCH APR R&S-ZCHNG.701.5960	701.5960	701.5019
S3	SB DRUCKTASTE 2XU LOETANS PUSH-BUTTON SWITCH APR R&S-ZCHNG.7015977	701.5977	701.5019
T10	LU UEBERTRAG. 500-1000MHZ	701.5790	701.5602.01
T20	LU UEBERTRAGER 200-500MHZ	701.5783	701.5454.01
T30	LU UEBERTRAG. 20-200MHZ	701.5777	701.5802.01
V1	BD YAM-104 10DB/0,02-1,36	914.3605.02	701.5202.01
V2	AE BZX79/C3V9 0,5W Z-DI ZENER DIODE VALVO BZX79/C3V9	AE 086.8234	701.5202.01
V3	AE 5082-2800 SCHOTTKYDI DIODE HEWLETT-P. 5082-2800	AE 012.9066	701.5202.01
W1	DX HF-KABEL (W1)	701.5248	701.5019
W2	DX HF-KABEL (W2)	701.5254	701.5019
W10	DX HF-KABEL (W10)	701.5625	701.5602.01
W20	DX HF-KABEL (W20)	701.5477	701.5454.01
W30	DX HF-KABEL (W30)	701.5825	701.5802.01
X1	FJ EINBAUSTECKER SYST.SMB PLUG SOCAPEX SX 02B.2005	FJ 063.5168	701.5202.01



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Schaltteilliste für
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HE 100 AKTIVE RICHTANTENNE
HE 100 ACT.DIR.ANTENNA

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Stock No.
701.5002.01 SA

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Kennzeichen Component No.	Benennung/Beschreibung Designation	Sachnummer Stock No.	enthalten in contained in
X2	FJ EINBAUSTECKER SYST.SMB PLUG	FJ 063.5168	701.5202.01
X3	SO CAPEX SX 02B.2005 FP STECKERLEISTE 16POL CONNECTOR 16POL	FP 701.5225	701.5202.01
X4	BERG 75844-102-16 FP STECKERLEISTE 12POL CONNECTOR 12P	FP 701.5231	701.5202.01
	BERG 75844-102-12		- ENDE -

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