Accessories for Test Receivers and Spectrum Analyzers

Overview of available measuring aids and description of devices without separate data sheets

ROHDE&SCHWARZ

Overview (all accessories)

Reference is made to **associated data sheets** for all accessories that are not described here. Specifications in brief for instruments are given in the Test&Measurement Products Catalog, Order No. PD 0756.3501, and for antennas in the Antennas HF-VHF-UHF-SHF Catalog, Order No. PD 0756.9800.

Abbreviations:

- **E**: E field measurement, **H**: H field measurement, **V**: voltage measurement, **I**: current measurement, **P**: interference measurement
- **ESIBx**: Test Receivers ESIB7/26/40 (applies to the whole data sheet)
- **ESxS**: Test Receivers ESHS, ESVS, ESS, ESPC, ESCS (applies to the whole data sheet)
- **ESPI**: Test Receivers ESPI3, ESPI7 (applies to the whole data sheet)

Designation	Type	Order No.	Frequency		Use					Page or data sheet PD ...
			<30 MHz	>30 MHz	E	H	V	I	P	
RFI voltage measurements										
V-Network, 4 lines, 200 A	ENV4200	1107.2387.02	•				•			0757.3428
4 lines, 25 A	ESH2-Z5	0338.5219.53	•				•			0757.3863
2 lines, 16 A	ESH3-Z5	0831.5518.52	•				•			0756.4895
1 line, 150 A	ESH3-Z6	0836.5016.52	•	•			•			0756.4908
Control Cable										
3 m, ESIBx, ESPIx–ESH3-Z5	EZ-4	0816.0560.03	•				•			5
10 m, ESIBx, ESPIx–ESH2-Z5	EZ-5	0816.0625.03	•				•			5
10 m, ESIBx, ESPIx–ESH3-Z5	EZ-6	0816.0683.03	•				•			5
2 m, ESxS–ESH2-Z5	EZ-13	1026.5293.02	•				•			5
2 m, ESxS–ESH3-Z5	EZ-14	1026.5341.02	•				•			5
3 m, ESxS–ENV4200 (see ENV..)	EZ-21	1107.2087.03	•				•			0757.3428
10 m, ESxS–ENV4200 (see ENV..)	EZ-21	1107.2087.10	•				•			0757.3428
3 m, ESxI–ENV4200 (see ENV..)	EZ-22	1107.2235.03	•				•			0757.3428
Coupling Networks (ISNs)										
2 x 2-wire, 150 kHz to 30 MHz	ENY22	1109.9508.02	•				•			0757.4953
4-wire, 150 kHz to 30 MHz	ENY41	1110.0175.02	•				•			0757.4953
Active Voltage Probe, 9 kHz to 30 MHz	ESH2-Z2	0299.7210.52	•				•			6
Passive Voltage Probe, 9 kHz to 30 MHz	ESH2-Z3	0299.7810.52	•				•			6
Attenuator for ESH2-Z3	ESH2Z31	0827.6513.02	•				•			6
Antenna Impedance Converter	EZ-12	1026.4800.02	•				•			0756.7271
Pulse Limiter, 0 Hz to 30 MHz	ESH3-Z2	0357.8810.54	•				•			7
Attenuator, 0 Hz to 1.5 GHz	ESH2Z11	0349.7518.52	•	•			•	•	•	7
Current measurements										8
VHF Current Probe, 9 kHz to 600 MHz	ESV-Z1	0353.7019.02		•				•		8
Current Probe, 5 Hz to 200 MHz	EZ-17	0816.2063.0x	•	•				•		0756.9539
Calibration Jig for EZ-17	EZ-18	1026.6490.02	•	•				•		0756.9539
RFI power measurements										8
Absorbing Clamp										
0.03 GHz to 1 GHz	MDS-21	0194.0100.50		•					•	0756.5085
0.3 GHz to 2.5 GHz	MDS-22	1052.3507.02		•					•	0756.5085
Field-strength measurements										9
E and H Near-Field Probe Set										
100 kHz to 2 GHz	HZ-11	0816.2770.04	•	•	•	•				0757.0158
9 kHz to 1 GHz	HZ-14	1026.7744.02	•	•	•	•				0757.0164
Inductive Probe, 9 kHz to 30 MHz	HFH2-Z4	0338.3016.52	•			•				9
RF Probe, 20 MHz to 1000 MHz	HFV-Z	0204.1010.02		•	•					9
Rod Antenna, 9 kHz to 30 MHz, active	HFH2-Z1	0335.3215.52	•		•					10
Loop Antenna, 9 kHz to 30 MHz, active	HFH2-Z2	0335.4711.52	•			•				10
Rod Antenna (MIL), 9 kHz to 30 MHz, active	HFH2-Z6	0837.1866.54	•		•					10
Power Supply for active antennas	HZ-9	0816.1015.02	•		•	•				12

Designation	Type	Order No.	Frequency		Use					Page or data sheet PD ...
			<30 MHz	>30 MHz	E	H	V	I	P	
Feeder Cable for active antennas										
3 m	HZ-3	0837.3469.02	•		•	•				12
10 m	HZ-4	0816.0519.02	•		•	•				12
Shielded, Calibrated Pickup Coil (MIL), 5 Hz to 10 MHz	HZ-10	0816.2511.02	•			•				0757.0458
Triple-Loop Antenna, 9 kHz to 30 MHz	HM020	4023.4508.02	•			•				0756.9439
Control Cable 5 m, ESxS–HM020	EZ-14	1026.5341.05	•			•				5
Active H Field Measurement Antenna, 0.1 kHz to 30 MHz	HM525	4031.0508.02	•			•				Techn. Info
Broadband Dipole, 20 MHz to 80 MHz	HUF-Z1	0358.0512.52		•	•					13
Conical Log Spiral Antenna, 0.2 GHz to 1 GHz	HUF-Z4	0837.2210.52		•	•					14
Log Periodic Antenna, 0.08 GHz to 1.3 GHz	HL023A1	0577.8017.02		•	•					0756.6081
Biconical Antenna, 20 MHz to 300 MHz	HK116	4000.7752.02		•	•					0756.9380
Log Periodic Antenna, 0.2 GHz to 1.3 GHz	HL223	4001.5501.02		•	•					0756.9380
ULTRALOG Antenna, 0.3 GHz to 3 GHz	HL562	4041.3000.02		•	•					0757.5743
Log Periodic Antenna										
0.4 GHz to 3 GHz	HL040	4035.8755.02		•	•					0757.1919
1 GHz to 18 GHz	HL025	0671.5317.02		•	•					0756.6081
Double-Ridged Waveguide Horn Antenna, 1 GHz to 18 GHz	HF906	4044.4507.02		•	•					0757.5743
Active Antenna System, 0.1 kHz to 1 GHz	AM524	4015.7001.02	•	•	•					0756.9974
Active Receiving Dipole										
0.2 GHz to 1 GHz	HE202	0630.0310.03		•	•					0757.0429
20 MHz to 500 MHz	HE302	0644.1114.03		•	•					0757.0429
Precision Halfwave Dipole Set										
30 MHz to 300 MHz	HZ-12	0816.2870.02		•	•					0757.0387
0.3 GHz to 1 GHz	HZ-13	0816.2940.02		•	•					0757.0387
RF Connecting Cable										
12 m	HFU2-Z4	0252.0090.56		•	•					15
7 m	HFU2-Z5	0252.0055.56		•	•					15
Tripods and positioning facilities										16
Wooden Tripod for HFH2-Z6, HK116 etc	HZ-1	0837.2310.02	•	•	•					16
Tripod for HFH2-Z2, HUF-Z, etc, and mast	HFU-Z	0100.1114.02	•	•	•	•				16
Mast, manual control, antenna height 1 m to 5 m	HFU-Z	0100.1120.02		•	•					16
Common RF components										17
Preamplifier										
20 MHz to 1000 MHz	ESV-Z3	0397.7014.52		•			•	•	•	17
RF Connecting Cable										
BNC/Twinax (EZ-17, HZ-10)	EZ-19	1052.2630.02	•			•		•		18
DC Block										
5 MHz to 7 GHz	FSE-Z3	4010.3895.00	•	•						18
10 kHz to 18 GHz	FSE-Z4	1084.7443.02	•	•						18
Microwave Meas. Cable/Adapter Set ESIB26, FSP30, FSEM	FS-Z15	1046.2002.02	•	•						19
Harmonic Mixers for FSE, FSIQ, ESIB										
40 GHz to 60 GHz	FS-Z60	1089.0799.02		•	•		•			0757.6310
40 GHz to 75 GHz	FS-Z75	1089.0847.02		•	•		•			0757.6310
40 GHz to 90 GHz	FS-Z90	1089.0899.02		•	•		•			0757.6310
40 GHz to 110 GHz	FS-Z110	1089.0976.02		•	•		•			0757.6310
Matching Pad										
75 Ω, L section	RAM	0358.5414.02	•	•						0756.3860
25 Ω, series resistor	RAZ	0358.5714.02	•	•						0756.3860
SWR Bridge										
40 Hz to 150 MHz	ZRA	1035.1800.52	•	•						0756.9574
5 MHz to 3000 MHz	ZRB2	0373.9017.52	•	•						0756.4395
40 kHz to 4 GHz	ZRC	1039.9492.52	•	•						0757.0064
High-Power Attenuator										
100 W	RBU100	1073.8820.xx	•	•						0756.3860
50 W	RBU50	1073.8895.xx	•	•						0756.3860

Designation	Type	Order No.	Frequency		Use					Page or data sheet PD ...
			<30 MHz	>30 MHz	E	H	V	I	P	
Software										**20**
EMI Software (automatic interference measurements)	ES-K1	1026.6790.02	•	•	•	•	•	•	•	0757.0406
EMI Software (semi-autom. interference measurements)	ESxS-K1	1082.9678.02	•	•	•	•	•	•	•	0757.1848
EMI Software for ESCS30, ESIBx, ESPIx	EMC32-E	1119.4621.02			•	•	•	•	•	0757.6779
EMI and EMS Software for ESCS30, ESIBx, ESPIx	EMC32-C	1119.4644.02			•	•	•	•	•	0757.6779
EMI Measurement Software for ESPIx	EMC32-L	1106.4286.02			•	•	•	•	•	0757.7223
Noise (Gain) Measurement Software for FSEx	FSE-K3	1057.2996.02	•	•						0757.2380
Accessories										**20**
Service Kit for ESxS	EZ-8	0816.1067.02								**20**
Service Kit for FSEx, ESIBx	FSE-Z1	1066.3862.02								**20**
Service Kit for FSPx, ESPIx	FSP-Z1	1129.8242.02								
Printer Cable for ESxS (excluding ESCS)	EZ-11	0816.1767.02								**20**
with extra shielding, for ESCS	EZ-23	1106.3638.02								**20**
IEC/IEEE-Bus Cable 1 m	PCK	0292.2013.10								**20**
2 m	PCK	0292.2013.20								**20**
Keyboard German, for ESxS	PSA-Z1	1009.5001.31								**20**
English, for ESxS	PSA-Z1	1009.5001.32								**20**
German, for FSEx, ESIBx	PSA-Z2	1007.3001.31								**20**
English, for FSEx, ESIBx	PSA-Z2	1007.3001.32								**20**
PS/2 Mouse for FSEx	FSE-Z2	1084.7043.02								**20**
Headphones for ESxS	–	0110.2959.00								**20**
FSEx, ESIBx	–	0708.9010.00								**20**

RFI Voltage Measurements ...

RFI voltage measurements

V-Network	ENV4200	4 lines, 200 A, 150 kHz to 30 MHz	see data sheet PD 0757.3428
	ESH2-Z5	4 lines, 25 A, 9 kHz to 30 MHz	see data sheet PD 0757.3863
	ESH3-Z5	2 lines, 16 A, 9 kHz to 30 MHz	see data sheet PD 0756.4895
	ESH3-Z6	1 line, 150 A, 0.1 MHz to 200 MHz	see data sheet PD 0756.4908

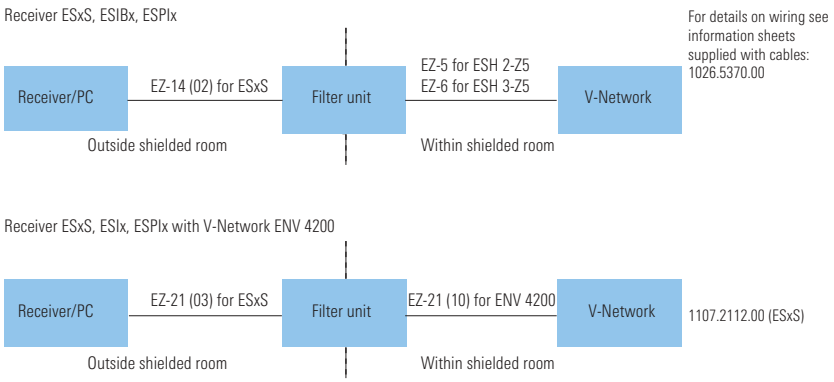
Control Cables

- Cables for direct control of accessories: The cables permit (automatic) phase selection of V-networks and loop switching of HM020 using Test Receivers ESxI and ESxS (control cables for older test receiver models on request)
- Cables for control of detached accessories in a shielded room: In the case of PC-controlled artificial mains networks, the network should be installed in a shielded room with the PC and test receiver outside. Control lines are fed into the shielded room via a filter unit

All cables are supplied with the mating connectors for the filter unit.

Control of	with Receiver	via Cable	Length	Cable Order No.
ESH2-Z5	ESIBx, ESPIx	EZ-5 (model 03)	10 m	0816.0625.03
ESH3-Z5	ESIBx, ESPIx	EZ-6 (model 03)	10 m	0816.0683.03
ESH2-Z5	ESxS, ESIBx, ESPIx	EZ-13 (model 02)	2 m	1026.5293.02
ESH3-Z5	ESxS, ESIBx, ESPIx	EZ-14 (model 02)	2 m	1026.5341.02
HM020	ESxS	EZ-14 (model 05)	5 m	1026.5341.05[1)]
ENV4200	ESxS, ESIBx, ESPIx	EZ-21 (model 03)	3 m	1107.2087.03

[1)] Accessory supplied with HM020.



EPCOS offers filters for telecommunication and control lines (B 84312-C30-B3 or B 84312-F30-B3; one filter for two lines)

RFI voltage measurements on interfaces with balanced lines

Coupling Networks (ISNs)	ENY22	2 x 2-wire, 150 kHz to 30 MHz	see data sheet PD 0757.4953
	ENY41	4-wire, 150 kHz to 30 MHz	see data sheet PD 0757.4953

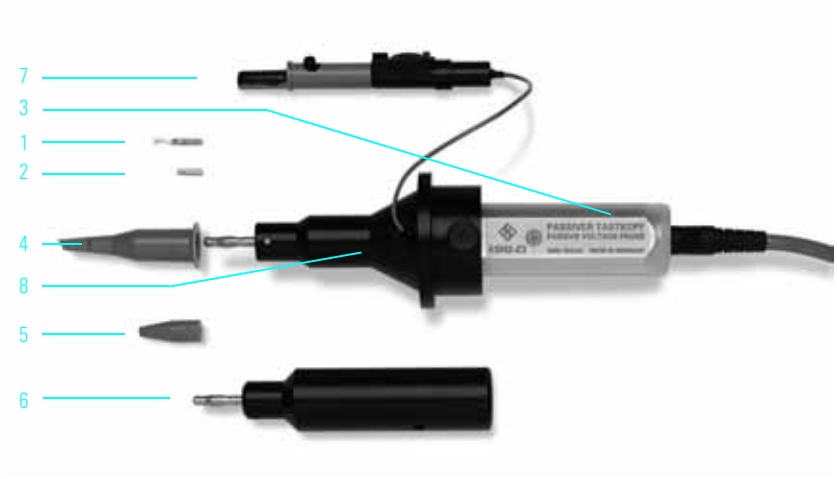
High-impedance voltage measurements

Active Voltage Probe ESH2-Z2, Passive Voltage Probe ESH2-Z3, Attenuator ESH2Z31
Shielded probes are used for high-impedance measurements of signals and interference on lines. They comprise highpass elements for decoupling low-frequency AC voltages.

Active Voltage Probe ESH2-Z2 is intended for RFI voltage measurements on lines **not** carrying AC supply voltage.

Passive Voltage Probe ESH2-Z3 (to CISPR16-1 and VDE0876) is particularly suitable for measuring RFI voltages on high-level lines, e.g. lines carrying AC supply voltage.

Attenuator ESH2Z31 is used for determining the source impedance (to CISPR16-2 and VDE0877 part 1/11.81) during measurements with ESH2-Z3.



Passive Voltage Probe ESH2-Z3 (3), hook tip (1), solder tip (2), spring tip (4), probe tip (5), Attenuator ESH2Z31 (recommended extra for ESH2-Z3 only) (6), earth cable (7) and AC voltage tip (for ESH2-Z3 only) (8) correspond to the accessories of Active Voltage Probe ESH2-Z2

Active Voltage Probe ESH2-Z2 with hook tip (1)

Specifications

	ESH2-Z2	ESH2-Z3
Frequency range	9 kHz to 30 MHz	9 kHz to 30 MHz
Voltage division ratio[1)]	10 dB	30 dB
Deviation of voltage division ratio from nominal value (Z_{out} of source 50 Ω; for typical frequency responses see manual)	<1 dB	<–1 dB to +5 dB
Measurement range with Rohde&Schwarz test receivers and spectrum analyzers (average value indication, frequency-dependent, IF bandwidth 200 Hz)	–20 dB(µV) to +120 dB(µV)	0 dB(µV) to +150 dB(µV)
Input impedance	118 kΩ ±5% ||8 pF	1.5 kΩ ±2% ||9 pF (termin. into 50 Ω)
Max. input voltage (V_{rms}) f ≤63 Hz 63 Hz to 30 MHz	 100 V 3 V	 250 V 30 V

General data

Nominal temperature range	–10°C to +45°C
Storage temperature range	–25°C to +70°C
Power supply for ESH2-Z2	±10 V ±1 V (≈±15 mA)
Length of connecting cable	1.5 m
RF connector	BNC
Termination	50 Ω
Supply and coding (voltage division ratio)	12-contact Tuchel connector, male
Weight	200 g

Ordering information

Active Voltage Probe	ESH2-Z2	0299.7210.52
Passive Voltage Probe	ESH2-Z3	0299.7810.54
Accessories supplied		
Set of accessories		0241.0613.02
Probe tip		0241.0913.02
Recommended extras		
BNC Adapter	URV-Z	0241.1110.02
Attenuator (for ESH2-Z3)	ESH2Z31	0827.6513.02

[1)] Automatically considered in the display of Rohde&Schwarz test receivers and spectrum analyzers.

... RFI Voltage Measurements

RFI suppression in vehicles

Antenna Impedance Converter	EZ-12	9 kHz to 30 MHz	see data sheet PD 0756.7271

Measuring aids

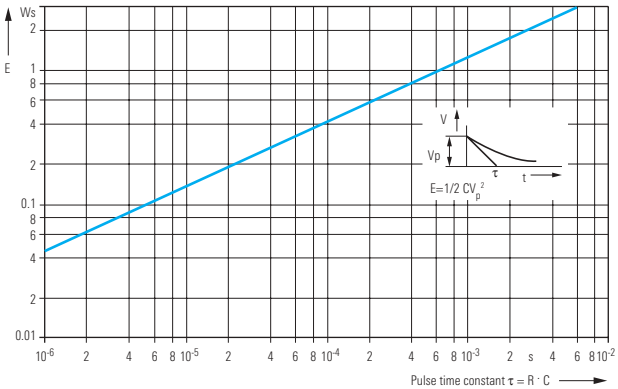
Pulse Limiter ESH3-Z2, Attenuator ESH2Z11
High RF input levels and high-energy interfering pulses generated on artificial mains networks when the DUT is switched on and off can damage the RF input circuits of test receivers.

Pulse Limiter ESH3-Z2 limits and **Attenuator ESH2Z11** reduces the interference level.

ESH3-Z2 *ESH2Z11*

Specifications

	ESH3-Z2	ESH2Z11
Frequency range	0 Hz to 30 MHz	0 Hz to 1500 MHz
Insertion loss f ≤500 MHz f ≤1000 MHz f ≤1500 MHz	10 dB ±0.3 dB – – –	– 20 dB ±0.25 dB 20 dB ±0.5 dB 20 dB ±1.5 dB
Frequency response	≤±0.3 dB	–
Characteristic impedance	50 Ω	
SWR with 50 Ω termination, input/output	≤1.06/≤1.25	–
Power-handling capacity in continuous mode	1 W	10 W
Pulse power-handling capacity	E = 0.1 Ws (6 µs), see diagram	P = 750 W (3 µs)
General data		
Nominal temperature range	–10 °C to +45 °C	–55 °C to +125 °C
Storage temperature range of ESH3-Z2	–25 °C to +70 °C	–
RF connectors	N (female/male)	N (female/male)
Dimensions (L x W x H or L x dia.)	94 mm x 25 mm x 25 mm	97 mm x 42 mm
Weight	120 g	150 g



Pulse power-handling capacity of Pulse Limiter ESH 3-Z2 (pulse energy = f (t))

Ordering information

Pulse Limiter	ESH3-Z2	0357.8810.54
Attenuator	ESH2Z11	0349.7518.52

Current and RFI Power Measurement

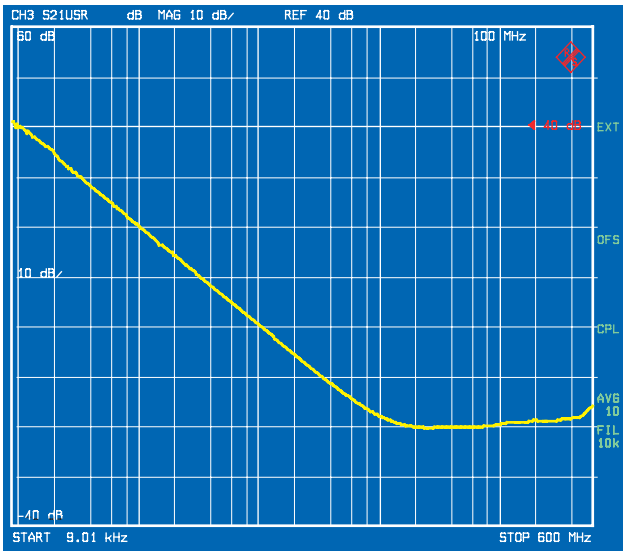
RF current measurement

VHF Current Probe ESV-Z1

The current probe is used for selective or broadband measurement of very small and very large RF currents in electric lines in the frequency range 9 kHz to 600 MHz. It is shielded against electrostatic effects and complies with CISPR 16-1 and VDE 0876 part 1.

The applications range from measurement of RFI currents on supply, control and telecommunication lines for RFI suppression in instruments and systems through to measurement of the shielding effectiveness of cable shields.

ESV-Z1



Transducer factor of ESV-Z1

Specifications

Frequency range	9 kHz to 600 MHz
Measurement range with Rohde&Schwarz test receivers and spectrum analyzers (average indication, frequency-dependent)	–38 dB(µA) to +117 dB(µA) (IF bandwidth 10 kHz, with preamplifier)
Transfer admittance[1] $Y_t = I_{in}/V_{out}$	0.1 S
Transducer factor $k = 20 \cdot \log (Y_t/s)$ dB	–20 dB
Deviation	<1 dB in nominal temperature range
Max. current (superimposed on RF current or peak AC current)	50 A
Max. diameter of conductor	13.5 mm

General data

Nominal temperature range	–10 °C to +55 °C
Storage temperature range	–25 °C to +70 °C
RF connector	N male, 50 Ω
Length of connecting cable	1 m
Coding (transducer factor)	12-contact Tuchel connector
Dimensions (diameter x height)	55 mm x 20 mm
Weight	130 g
Connecting cable	130 g

[1] Transfer admittance and transducer factor have an almost flat characteristic in the range 20 MHz to 300 MHz. A trace fir the entire range from 9 kHz to 600 MHz is supplied with the probe.

Ordering information

VHF Current Probe	ESV-Z1	0353.7019.02
Accessories supplied		
Test report (transducer factor)		

Current Probe	EZ-17	5 Hz to 200 MHz with three models	see data sheet PD 0756.9539

RFI power and shielding effectiveness measurements

Absorbing Clamp	MDS-21	30 MHz to 1000 MHz	see data sheet PD 0756.5085
	MDS-22	300 MHz to 2500 MHz	see data sheet PD 0756.5085

Field-Strength Measurements ...

Signal and interference field-strength measurements: near-field probes

E and H Near-Field Probe Set	HZ-11	100 kHz to 2 GHz	see data sheet PD 0757.0158
	HZ-14	9 kHz to 1 GHz	see data sheet PD 0757.0164

HFH2-Z4

HFV-Z

Inductive Probe HFH2-Z4

The inductive probe is easy to handle and used for locating interference sources and assessing magnetic field-strength components.

RF Probe HFV-Z

This inductive near-field probe is used for locating RFI sources and for detecting of voltage and emission maxima of high-voltage carrying parts in vehicles (ignition systems), transmitters and other interference sources. The transducer factor k is approx. 50 dB to 70 dB. Since the probe is mostly used in strongly inhomogeneous fields, a more exact value for the factor is not required.

Specifications

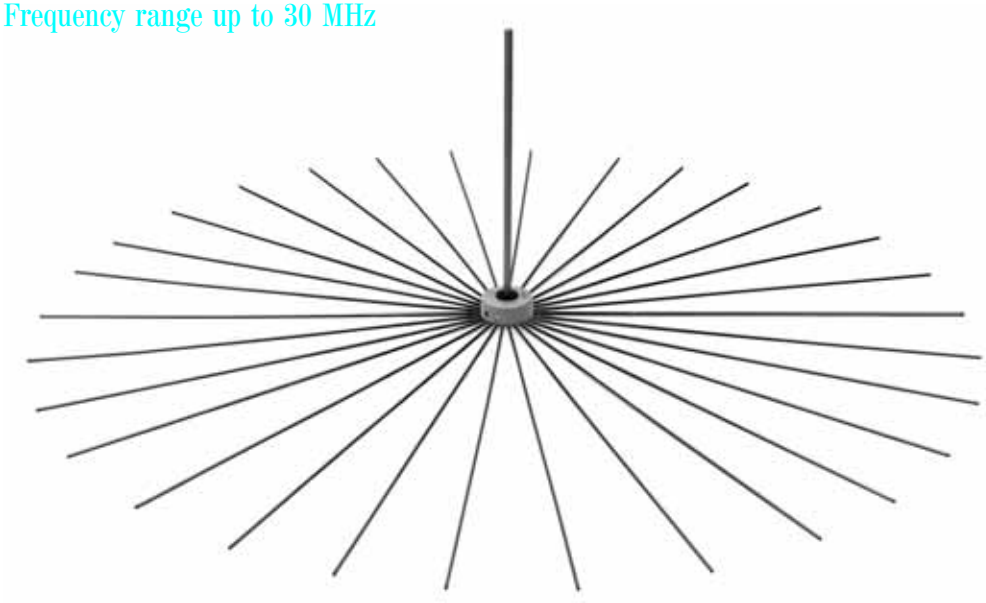
	HFH2-Z4	**HFV-Z**
Frequency range	100 kHz to 30 MHz	20 MHz to 1000 MHz
Transducer factor[1] k Accuracy	30 dB(1/Ω x m) H field 6 dB	58 ±10 dB(1/m) E field
Measurement range (IF bandwidth 200 Hz, average indication) Lower range limit, frequency-dependent Upper range limit	 50 dB(µV/m) (approx. 0 dB(µA/m)) >190 dB(µV/m) (approx. 140 dB(µA/m))	
Source impedance	50 Ω	50 Ω
General data		
Nominal temperature range	–10 °C to +55 °C	
Storage temperature range	–25 °C to +70 °C	
Connectors RF Supply and coding (antenna factor) Length of connecting cable	 BNC male 12-contact Tuchel male 1 m	 BNC female
Dimensions (diameter x height)	50 mm x 20 mm	
Weight with cable	300 g	120 g

Ordering information

Inductive Probe	HFH2-Z4	0338.3016.52
RF Probe	HFV-Z	0204.1010.02
Accessories supplied for HFV-Z Connecting cable 0204.1090.02 (1.5 m) with BNC connectors		
Recommended extra for HFV-Z Connecting cable 0118.2812.00 with BNC connectors		

[1] The transducer factor in dB (= log of antenna factor) is automatically considered in the display of Rohde&Schwarz test receivers and spectrum analyzers.

Frequency range up to 30 MHz



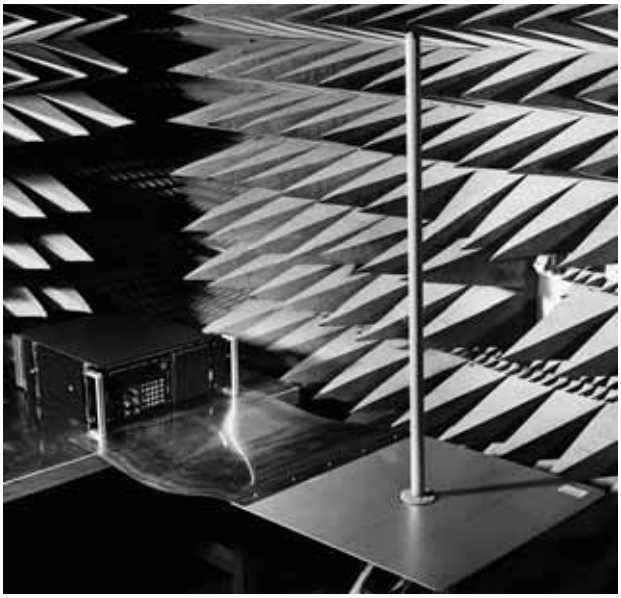
HFH2-Z1

HFH2-Z2 on Tripod HFU-Z

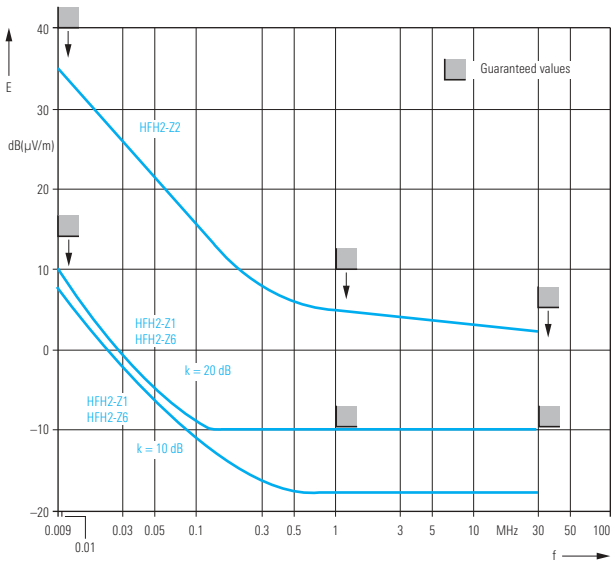
Rod Antenna HFH2-Z1
Broadband active rod antenna for use as a general-purpose receiving antenna and for measuring the electrical field-strength components, preferably in open-area measurements.

Loop Antenna HFH2-Z2
Broadband active loop antenna for measuring the magnetic field-strength components.

Rod Antenna HFH2-Z6
Broadband active rod antenna for measuring the electrical component of radiated EMI in test setups to MIL-STD-461/462 and similar MIL standards.



HFH2-Z6



Smallest detectable field-strength level (for S/N=1) of HFH2-Z1, -Z2 and -Z6 (frequency-dependent, average indication, IF bandwidth 200 Hz); with quasi-peak indication the level in the range 9 kHz to 149.9 kHz (band A) increases by approx. 3 dB, in the range 150 kHz to 30 MHz (band B) by approx. 23 dB.

Specifications

	Rod Antenna HFH2-Z1	Loop Antenna HFH2-Z2	Rod Antenna HFH2-Z6
Frequency range	9 kHz to 30 MHz	9 kHz to 30 MHz	9 kHz to 30 MHz
Transducer factor [1] k (referred to 1/m) Accuracy	10/20 dB, selectable 1 dB	20 dB (E field)[2] 1 dB	10/20 dB, selectable 1 dB
Measurement range (IF bandwidth 200 Hz, AV ind.) Lower limit, frequency-dependent (see also diagram on page 10)	+15 dB(µV/m) to –10 dB(µV/m)	9 kHz dB(µV/m) to 1 MHz: +40 dB(µV/m) to +10 dB(µV/m) 1 MHz to 30 MHz: +10 dB(µV/m) to +5 dB(µV/m)	+15 dB(µV/m) to –18 dB(µV/m)
Upper limit at k = 20 dB Upper limit at k =10 dB	140 dB(µV/m) 130 dB(µV/m)	140 dB(µV/m) –	140 dB(µV/m) 130 dB(µV/m)
Source impedance	50 Ω	50 Ω	50 Ω
Max. output voltage into 50 Ω	1 V	1 V	1 V
General Data			
Nominal temperature range	–10 °C to +55 °C	–10 °C to +55 °C	–10 °C to +55 °C
Storage temperature range	–25 °C to +70 °C	–25 °C to +70 °C	–25 °C to +70 °C
Connectors RF Supply and coding (antenna factor) Length of connecting cable	 BNC female 12-contact Tuchel female 10 m		
Current drain (±10 V, dep. on drive level)	<40 mA	<40 mA	<45 mA
Dimensions (see also drawing below)	ground net dia: 2510 mm, rod height: 1092 mm	loop dia: 590 mm	base: 60 mm x 60 mm, rod height: 1000 mm
Weight without cable	8 kg (in transit case)	12 kg (in transit case)	5 kg

[1] The transducer factor (= log of antenna factor) is automatically considered in the display of Rohde&Schwarz test receivers and spectrum analyzers.

[2] 20 dB (1/m) applies to the far field; in the near field the transducer factor $k_h = -31.5$ dB(1/Ω x m) is used for the magnetic field strength.

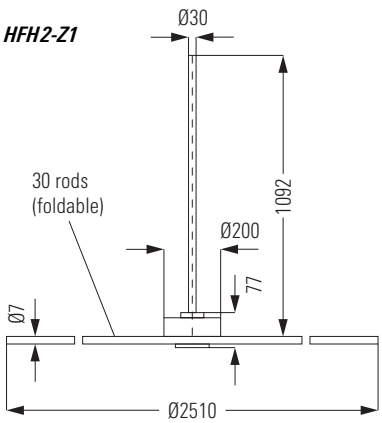
Ordering information

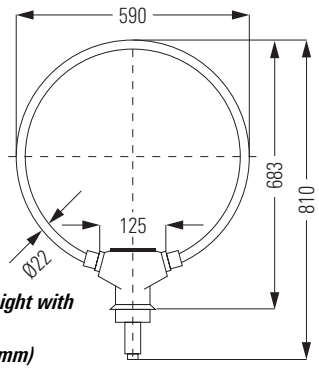
Order No.	0335.3215.52	0335.4711.52	0837.1866.54
Accessories supplied Coaxial cable (10 m) (0335.3609.00) Supply and coding cable (10 m) (0335.3596.00) 12-contact Tuchel female (0018.5079.00)			
Recommended extras Power Supply HZ-9 (page 12) Wooden Tripod HZ-1 (page 16) (only for HFH 2-Z6) Tripod HFU-Z (page 16) (only for HFH 2-Z2) For shielded rooms see [1] (only for HFH 2-Z2)			

[1] For use in shielded rooms: Feeder Cable HZ-3 or HZ-4 (page 12) and Coaxial Cable HZ-5, 0816.0819.02 (3 m) or HZ-6, 0816.0860.02 (10 m).

Antenna dimensions (in mm)

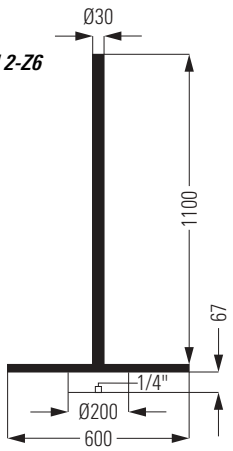
HFH2-Z1





HFH 2-Z2 (total height with Tripod HFU-Z: 1480 mm to 2180 mm)

HFH 2-Z6



Power Supply HZ-9

Power supply for feeding the active antennas HFH2-Z1, HFH2-Z2 and HFH2-Z6 from Rohde & Schwarz if powering from the test receiver is not possible. The HZ-9 can also be used for powering the Antenna Impedance Converter EZ-12 (see data sheet PD 0756.7271).

HZ-9

Specifications

Circuit	linear regulator
Output voltages	±10 V ±0.5 %
Min. current drain	100 mA
Short-circuit limit	≤70 mA
Deviation of output voltage due to AC supply variations –15/+10% Temperature effects Load variations 10% to 90% Hum (rms value) Interfering voltage (9 kHz to 30 MHz)	 ≤10 mV ≤0.05%/K ≤0.2% ≤2 mV ≤20 dBmV
Nominal temperature range	–10 °C to +50 °C
Storage temperature range	–40 °C to +70 °C
DC connector	12-contact Tuchel female (suitable for antennas)
AC supply	100 V to 240 V, –15/+10%
Dimensions (W x H x D)	125 mm x 70 mm x 188 mm
Weight	1.5 kg

Ordering information

Power Supply for active antennas	HZ-9	0816.1015.02

Shielded, Calibrated Magnetic Field Pickup Coil	HZ-10	5 Hz to 10 MHz, to MIL standard	see data sheet PD 0757.0458
Triple-Loop Antenna	HM020	9 kHz to 30 MHz	see data sheet PD 0756.9439
with: Control Cable	EZ-14 (.05)	for loop switching	see page 5
Active H Field Measurement Antenna	HM525	100 Hz to 30 MHz	see Technical Information

Feeder Cables

Feeder cables for the active antennas HFH2-Z1, HFH2-Z2, HFH2-Z6 and for the EZ-12 for connection to the test receiver when the antenna is set up in shielded rooms, and for feeding the antennas from the Power Supply HZ-9.

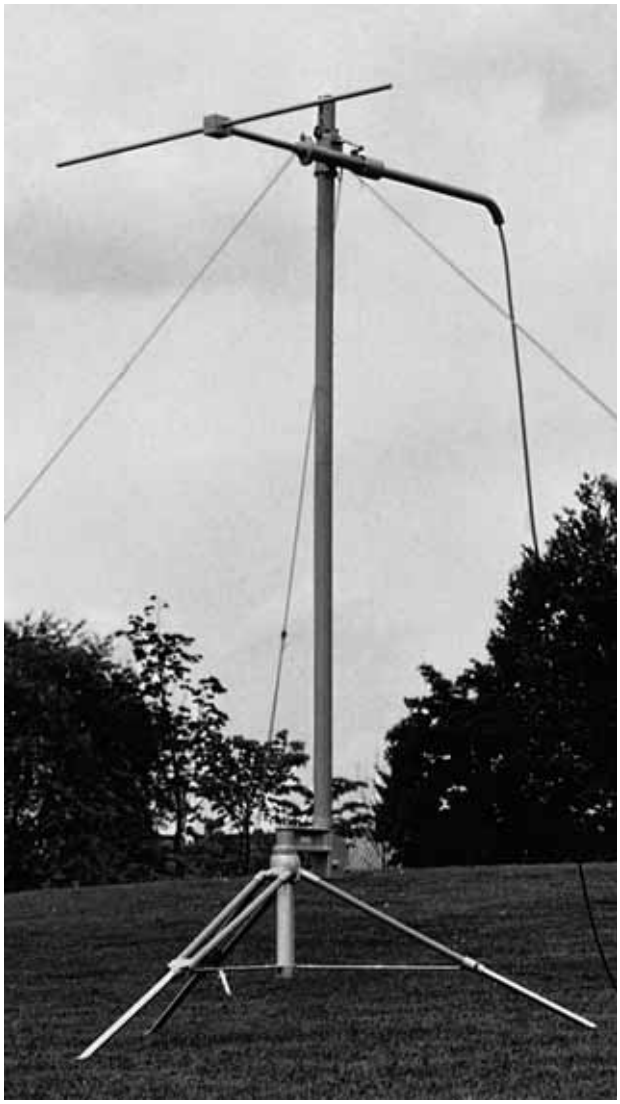
Cable	Length	Cable Order No.
HZ-3	3 m	0837.3469.02
HZ-4	10 m	0816.0519.02

Frequency range above 30 MHz: passive antennas

Broadband Dipole HUF-Z1

The Dipole HUF-Z1 meets the requirements of CISPR-Publ. 16-1 and VDE0876 on a shortened dipole for the frequency range 30 MHz to 80 MHz. It complements the frequency range of the Log-Periodic Antenna HL023A1. The frequency-dependent antenna impedance is compensated for. In contrast to the biconical antennas, its SWR is always <2. To simplify field-strength measurements, antenna factor variations in the range 25 MHz to 80 MHz are flattened to below 3 dB. The dipole is supplied with a factory-set value of 15 dB (1/m).

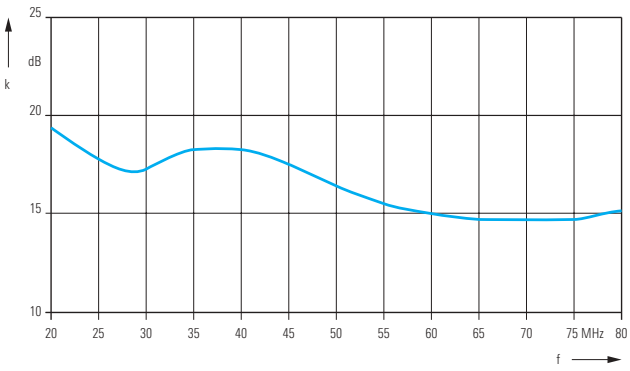
To obtain optimum matching, the antenna factor can be set to 20 dB in the range 25 MHz to 80 MHz by means of two solder links.



HUF-Z1 with Mast and Tripod HFU-Z

Specifications

Frequency range	20 MHz to 80 MHz
Connector	N female
Source impedance	50 Ω
SWR for k = 15 dB for k = 20 dB	 <2 <1.3
Antenna factor k for k = 15 dB (20 MHz to 25 MHz) for k = 15 dB (25 MHz to 80 MHz) for k = 20 dB (20 MHz to 25 MHz) for k = 20 dB (25 MHz to 80 MHz)	 19.5 dB(1/m) to 18 dB(1/m) 18 dB(1/m) to 15 dB(1/m) 24.5 dB(1/m) to 23 dB(1/m) 23 dB(1/m) to 20 dB(1/m)
Dipole length	1.77 m
Folded size	0.9 m x 0.13 m dia.
Weight	2.5 kg



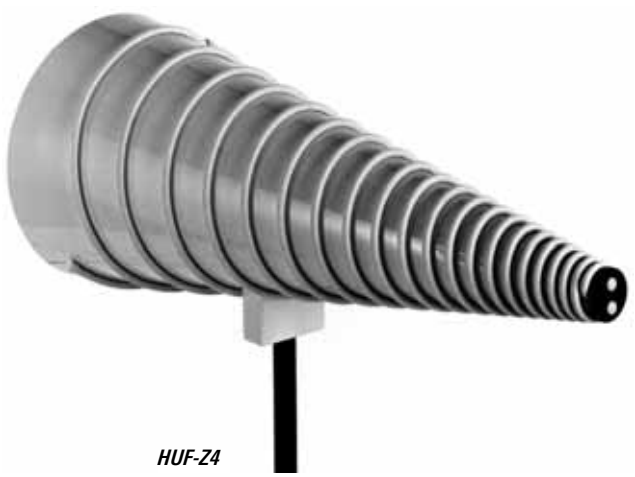
Antenna factor of HUF-Z1

Ordering information

Broadband Dipole	HUF-Z1	0358.0512.52

Conical Log Spiral Antenna HUF-Z4

This conical log spiral antenna is used for EMI and EMS measurements in line with MIL-STD-461A to C. When used as transmitting antenna, maximum field-strength values between 10 V/m to 50 V/m (frequency-dependent) can be achieved.



HUF-Z4

Specifications

Frequency range	0.2 GHz to 1 GHz
Polarization	circular
Transducer factor[1] k (frequency-dependent) Uncertainty	17.5 dB(1/m) to 27 dB(1/m) ≤2 dB
Power-handling capacity	5 W
Max. input power when used as transmitting antenna	100 W
Source impedance	50 Ω
Max. field strength	10 V/m to 50 V/m
SWR	<2.5

[1] Transducer factor in dB = log of antenna factor; individual calibration values are supplied with each antenna.

General data

Nominal temperature range	–10 °C to +55 °C
Storage temperature range	–25 °C to +55 °C
Connector	N female
Dimensions (length x diameter)	780 mm x 308 mm
Weight	7.7 kg

Ordering information

Conical Log Spiral Antenna	HUF-Z4	0807.2210.02

Log Periodic Antenna	HL023A1	80 MHz to 1.3 GHz	see data sheet PD 0756.6081
Biconical Antenna	HK116	20 MHz to 300 MHz	see data sheet PD 0756.9380
Log Periodic Antenna	HL223	0.2 GHz to 1.3 GHz	see data sheet PD 0756.9380
ULTRALOG Antenna	HL562	0.03 GHz to 3 GHz	see data sheet PD 0757.5743
Log Periodic Antenna	HL040	0.4 GHz to 3 GHz	see data sheet PD 0757.1919
Double-Ridged Waveguide Horn Antenna	HF906	1 GHz to 18 GHz	see data sheet PD 0757.5743
Log Periodic Antenna	HL025	1 GHz to 18 GHz	see data sheet PD 0756.6081

... Field-Strength Measurements

Frequency range above 30 MHz: active antennas and halfwave dipole sets

Active antennas

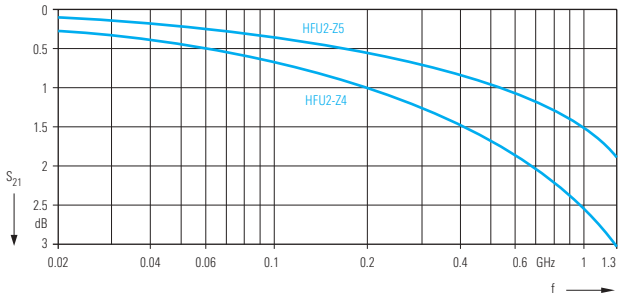
Active Antenna System	AM524	100 Hz to 1 GHz	see data sheet PD 0756.9974
Active Receiving Dipole	HE202 HE302	200 MHz to 1000 MHz 20 MHz to 500 MHz	see data sheet PD 0757.0429 see data sheet PD 0757.0429

Halfwave dipole sets

Precision Halfwave Dipole Set	HZ-12 HZ-13	30 MHz to 300 MHz 300 MHz to 1000 MHz	see data sheet PD 0757.0387 see data sheet PD 0757.0387

RF Connecting Cables HFU2-Z4 and HFU2-Z5

Cables for connecting the antenna on the mast to the test receiver. The low-loss cables are equipped with ferrite absorbers for reflection suppression in the case of vertical polarization.



Typical attenuation of HFU2-Z4 and HFU2-Z5

Cable	Length	Cable Order No.
HFU2-Z4	12 m	0252.0090.56
HFU2-Z5	7 m	0252.0055.56

Tripods and Positioning Facilities

Mast and tripods

Mast HFU-Z and Tripod HFU-Z

For measuring the maximum field strength, the antenna height can be adjusted on the mast by means of a crank handle. The elevation angle, azimuth and polarization plane can also be varied.

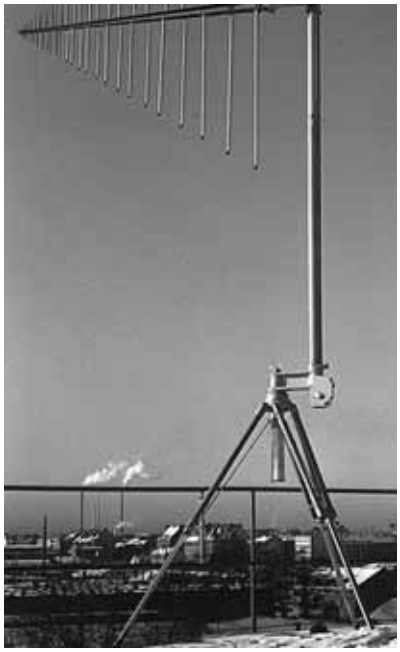
The mast consists of three epoxy glass laminate tubes, a swivel arm holder and an antenna carrier. Guy ropes and pegs for stabilizing the mast and antennas are supplied with the mast.

Mast and tripod can be used with the combinations HUF-Z1 and HL023A1, HK116 and HL223, as well as with the HL562 for radiomonitoring and EMI measurements. The mast is not required for field-strength measurements with the HFH2-Z2.

Wooden Tripod HZ-1

The tripod supports the antennas HK116, HL223 or HUF-Z4 for measurements in shielded rooms at a distance of 1 m (e.g. to MIL, VG, CISPR25 or SAE J1113/41). HFH2-Z6 is directly fitted to the tripod.

- Light-metal universal ball joint tiltable all round up to 25°; lockable in any position
- Antenna holder with captive ¼" screw



Mast HFU-Z and Tripod HFU-Z with Log Periodic Antenna HL023A1

HZ-1

Specifications

Mast HFU-Z

Material	epoxy glass laminate
Antenna height	1 m to 5 m, adjustable
Polarization	adjustable, as required
Azimuth	adjustable, as required
Elevation	±30° from horizontal position
Dimensions (folded)	length: 1.65 m
Transport weight with case	36 kg

Tripod HFU-Z

Leg length, adjustable	840 mm to 1440 mm
Dimensions (folded) Length Diameter	 0.9 m 0.22 m
Transport weight	9 kg

Tripod HZ-1

Leg length, adjustable	830 mm to 1360 mm
Dimensions (folded) Length Diameter	 0.91 m 0.23 m
Transport weight	6.5 kg

Ordering information

Mast	HFU-Z
Tripod	HFU-Z
Wooden Tripod	HZ-1

Common RF Components ...

Preamplifier (HF to SHF)

Preamplifier ESV-Z3

Through the use of a preamplifier the noise figure of test receivers and spectrum analyzers can be reduced: with the ESV-Z3 by up to 8 dB giving an average noise indication of typically –20 dBµV at 10 kHz IF bandwidth. The ESV-Z3 is screwed to the RF input of the measuring instrument.

The preamplifier is powered from the measuring instrument via the power and coding connector which is also used for correcting the level indication. Feeding from the Power Supply HZ-9 is also possible.

The Preamplifier ESV-Z3 is provided with an input with coding logic. The preamplifier is therefore automatically considered in the level and unit display of the measuring instrument in setups with probes (e.g. current probes, passive probes or broadband dipoles).

ESV-Z3

Specifications

Frequency range	20 MHz to 1000 MHz
Gain/frequency response	10 dB/marked
Input and output impedance	50 Ω
Input SWR with test receiver	<2.5, 1.5 typ.
Noise figure	<6 dB, 4 dB typ.
1 dB compression point	+13 dBm typ. (output level)
Intercept point d3	+27 dBm typ. (output level)
Connectors	
RF input/output	N female
Coding	
Receiver/power supply	12-contact Tuchel male
Amplifier input	12-contact Tuchel female

General data

Nominal temperature range	–10 °C to +45 °C
Storage temperature range	–25 °C to +70 °C
Dimensions (W x H x D)	160 mm x 29 mm x 110 mm
Weight	0.4 kg

Ordering information

Preamplifier	ESV-Z3	0397.7014.52

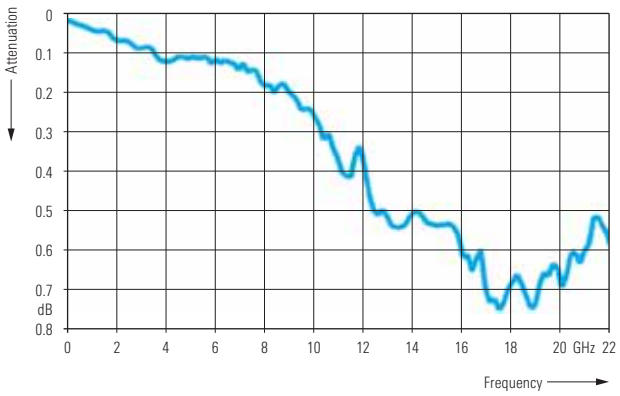
RF Connecting Cables EZ-15 (balanced) and EZ-19 (balanced/unbalanced)

The Cable EZ-15 is used to connect the Magnetic Field Pickup Coil HZ-10 or the Current Probe EZ-17 (model 04) to the balanced input of a test receiver. When a receiver with unbalanced RF input is used, the RF Connecting Cable EZ-19 is employed for matching.

Connection of	to Receiver	via Cable	Connectors	Length	Weight	Cable Order No.
HZ-10 or	balanced input	EZ-15	Twinax male	1.5 m	100 g	1052.2500.02
EZ-17 (model 04)	with unbalanced input	EZ-19	Twinax/BNC female	0.2 m	40 g	1052.2630.02

DC Blocks FSE-Z3 and FSE-Z4

The DC Blocks FSE-Z3 and FSE-Z4 are used for DC decoupling of test receiver and spectrum analyzer inputs.



Typical attenuation characteristic of FSE-Z4

Specifications

	FSE-Z3	FSE-Z4
Frequency range	5 MHz to 7 GHz	10 kHz to 18 GHz (usable up to 22 GHz)
Dielectric strength	250 V (50 Hz)	50 V (DC)
Connectors	N male, N female	N male, N female
Attenuation		
AF range	1 kHz: 55 dB 10 kHz: 35 dB 100 kHz: 15 dB	–
RF range	1 GHz: <0.1 dB 2 GHz: <0.2 dB 5 GHz: <0.5 dB 7 GHz: ≤1.0 dB	–
10 kHz to 18 GHz	–	≤0.8 dB
SWR		
1 GHz	≤1.1	–
2 GHz	≤1.15	
5 GHz	≤1.2	
7 GHz	≤1.5	
10 kHz...18 GHz	–	≤1.35

Ordering information

DC Block	FSE-Z3	4010.3895.00
DC Block	FSE-Z4	1084.7443.02

... Common RF Components

Microwave Measurement Cable and Adapter Set FS-Z15

Cable and adapter set are extras for the ESIB26, FSEM and FSP30 and consist of a Flexwell cable (1 m) for extending the test port and an adapter each for test port/SMA and test port/N male for the range DC to 26.5 GHz in a plastic case; Order No. 1046.2002.02.

Matching Pad		
RAM	50 Ω/75 Ω, 0 Hz to 2,7 GHz, L section	see data sheet PD 0756.3860
RAZ	25 Ω, 0 Hz to 2,7 GHz, series resistor	see data sheet PD 0756.3860
SWR Bridge		
ZRA	40 kHz to 150 MHz	see data sheet PD 0756.9574
ZRB 2	5 MHz to 3 GHz	see data sheet PD 0756.4395
ZRC	40 kHz to 4 GHz	see data sheet PD 0757.0064
High-Power Attenuators		
RB.., RD.., RN..	50 W to 1000 W, 0 Hz to 6 GHz	see data sheet PD 0756.3860

Certified Environmental System
ISO 14001
REG. NO 1954

Certified Quality System
ISO 9001
DQS REG. NO 1954

Software

EMI Software	ES-K1	Compliance measurements and control of peripherals (e.g. artificial mains networks, antenna masts, turntables)	see data sheet PD 0757.0406
EMI Software	ESxS-K1	Compliance measurements and control of artificial mains networks	see data sheet PD 0757.1848
EMI Software	EMC32-E	Compliance measurements and control of artificial mains networks and limited control of antenna masts and turntables for Test Receivers ESCS30, ESIBx and ESPIx	see data sheet PD 0757.6779
EMI Software	EMC32-C	Compliance measurements same as EMC32-E, combined with EMS measurements	see data sheet PD 0757.6779
EMI Software	EMC32-L	Compliance measurements and control of artificial mains networks for Test Receivers ESPIx	see data sheet PD 0757.7223
Application Software	FSE-K3	Noise/gain measurements	see data sheet PD 0757.2380

Accessories

Service Kit EZ-8 for ESxS	The service kit for Test Receivers ESHS, ESVS, ESVB, ESVD, ESVN, ESS, ESPC and ESCS includes adapter board, picture tube adapter and cable set. Order No. 0816.1067.02
Service Kit FS-Z1 for FSEx and ESIBx	The service kit for Spectrum Analyzers FSEx and Test Receiver ESPIx consists of adapter board and cable set. Order No. 1066.3862.02
Cable Set EZ-11 and EZ-23 for ESxS	The Printer Cables EZ-11 for all test receivers except ESCS and EZ-23 for ESCS are for the connection of software-supported standard printers, e.g. Rohde&Schwarz Pinwriter PDN. Order No. EZ-11: 0816.1767.02; EZ-23: 1106.3638.02
IEC/IEEE-Bus Cables PCK	The cables are highly screened for low radiated interference. Order No.: 0292.2013.05 (0,5 m), .10 (1 m), .20 (2 m), .40 (4 m)
Keyborads PSA-Z1 for ESxS and PSA-Z2 for FSEx and ESIBx	PSA-Z1, special keyboard, rackable, with rollkey, extra screening. Order No.: 1009.5001.31 (German), .32 (English) PSA-Z2, standard keyboard Order No. : 1009.3001.31 (German), .32 (English)
PS/2-Mouse FSE-Z2 for FSEx	Order No. 1084.7043.02
Headphones for ESxS, FSEx and ESIBx	Headphones with 6.3 mm jack plug for ESxS Order No. 0110.2959.00 Headphones with 3.5 mm jack plug for FSEx, ESIBx and FSPx, ESPIx Order No. 0708.9010.00

ROHDE&SCHWARZ

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