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AK-18G
Antenna Kit
Operation Manual

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WARRANTY INFORMATION

A.H. Systems Inc., warrants that our Antennas, Sensors and Probes will be free from defects in materials and workmanship for a period of three (3) years. All other products delivered under contract will be warranted for a period of two (2) years. A.H. Systems' obligation under this warranty shall be limited to repairing or replacing, F.O.B. Chatsworth, California, each part of the product which is defective, provided that the buyer gives A.H. Systems notice of such defect within the warranty period commencing with the delivery of the product by A.H. Systems.

The remedy set forth herein shall be the only remedy available to the buyer, and in no event shall A.H. Systems be liable for direct, indirect, incidental or consequential damages.

This warranty shall not apply to any part of the product which, without fault of A.H. Systems has been subject to alteration, failure caused by a part not supplied by A.H. Systems, accident, fire or other casualty, negligence, misuse or normal wear of materials.

Except for the warranty set forth above, there are no other warranties, expressed or implied, with respect to the condition of the product or it's suitability for the use intended for them by the buyer.

For prompt service, please contact our service department for a Return Material Authorization Number before shipping equipment back to us.

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INTRODUCTION

SPECIFICATIONS

Model Number	Frequency Range	Antenna Factor (dB/m)
SAS-510-2	290 MHz – 2000 MHz	14 to 32
SAS-542	20 MHz – 330 MHz	9 to 23
SAS-550-1B	9 KHz – 60 MHz	-1 to 3
SAS-560	20 Hz – 2 MHz	18 to 15
SAS-571	700 MHz – 18 GHz	22 to 45
		Transfer Impedance
BCP-510	20 Hz – 1 MHz	-40 to –30
BCP-511	20 KHz – 100 MHz	-1 to 1
		Attenuation
SAC-18G-3	Up to 18 GHz	3.5 dB @ 18 GHz
OPTIONAL EQUIPMENT		
		Gain / Attenuation
PAM-0118	20 MHz – 18 GHz	33 dB
SAC-18G-0.5	Up to 18 GHz	1.5 dB @ 18 GHz

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GENERAL INFORMATION

INTENDED PURPOSES

This equipment is intended for general laboratory use in a wide variety of industrial and scientific applications, and designed to be used in the process of generating, controlling and measuring high levels of electromagnetic Radio Frequency (RF) energy. It is the responsibility of the user to assure that the device is operated in a location which will control the radiated energy such that it will not cause injury and will not violate regulatory levels of electromagnetic interference.

GENERAL DESCRIPTION

The A.H. Systems AK-18G antenna kit series consist of five E-field antennas, one magnetic loop antenna, and two current probes. Each of the antennas and probes are provided with calibrations when connected to a 50-ohm input receiver or spectrum analyzer.

Each of the E-field antennas mounts directly to the tripod azimuth and elevation head. The azimuth and elevation head allows the operator to vary the antenna azimuth (direction) and to change the antenna polarity (vertical or horizontal).

Cables and an adapter are provided to connect each antenna and probe to either a BNC or N type connector on the receiver. Cable calibrations are supplied.

To obtain the field strength of the signal being measured, the operator must add the receiver reading in dBuV, the antenna factor in dB, and the cable attenuation in dB. This yields the field strength in dBuV/m. Calibrations for the E-field antennas are supplied at appropriate spacings (1, 3, and 10 meter) to comply with various specification requirements.

E-FIELD ANTENNAS

SAS-510-2 Log Periodic Antenna 290 MHz - 2000 MHz

The log periodic antenna comes assembled and ready to use.

Operation: Attach the antenna to the tripod azimuth and elevation head through the screw hole in the antenna base. Connect a cable between the antenna connector and the receiver. The log periodic beamwidth is 65 degrees and it should be pointed or aimed in the direction that the received signal is coming from.

SAS-530,542 Broadband Dipole Antenna 160 MHz - 500 MHz

The broadband dipole antenna consists of the SAS-530,542 balun assembly and two dipole (2" tubular) elements.

Operation: Attach the balun assembly to the tripod through the screw hole in balun assembly base. Screw the two dipole elements into the 'tee' end of the balun

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assembly. Connect a cable between the antenna connector and the receiver. The broadband dipole beam pattern is similar to a dipole response.

SAS-542 Biconical Antenna 20 MHz - 330 MHz

The biconical antenna consists of the SAS-530,542 balun assembly and two folding biconical elements.

Operation: Attach the balun assembly to the tripod thru the screw hole in the balun assembly base. Screw the two biconical elements into the 'tee' end of the balun assembly. Open the antenna elements completely and secure in open position by tightening the knurled knobs in the element caps. Connect a cable between the antenna connector and the receiver. The biconical beam pattern is similar to a dipole response.

SAS-550-1B Active Monopole Antenna 10kHz - 60 MHz

The active monopole antenna consists of a ground plane upon which are mounted a preamplifier with internal rechargeable battery pack for battery operation, and a telescoping rod antenna.

Operation: Mount the antenna on the tripod. Connect an external ground to the ground plane if called out in test specification. Attach the telescoping rod to the connector on the amplifier top and extend fully. Connect the output on amplifier side to the receiver using a cable. Apply power to antenna (turn battery power 'on'. The active monopole antenna is omni-directional.

SAS-571 Double Ridge Guide Horn Antenna 700MHz - 18 GHz

The horn antenna comes assembled and ready to use. The antenna mounting bracket is attached to the antenna backwards in order to fit in the carrying case. The bracket must be removed from the antenna, turned over (so that the bracket leg faces away from the antenna), and re-attached to the antenna. (The bracket is not needed for mounting if the tripod being used has an Azimuth/Elevation Head.)

Operation: Attach the antenna to the tripod azimuth and elevation head through the hole on the antenna bottom or the hole in the mounting bracket. The ridge guides determine the antenna polarity: for horizontal polarity they should be parallel to the ground, for vertical polarity they should be perpendicular to the ground. Connect a cable between the antenna connector and the receiver. NOTE: BE SURE TO USE A CABLE RATED FOR HIGH FREQUENCY WHEN OPERATING ABOVE 5 GHz (for example, the SAC-18G-3).

MAGNETIC LOOP ANTENNA

SAS-560 Magnetic Loop Antenna 20 Hz - 2 MHz

The loop antenna does not require any assembly.

Operation: The loop antenna is designed to be held by hand and moved around each surface if the EUT to measure magnetic radiation. Connect the antenna via a cable to a receiver with either a 50 ohm input or high impedance (10 K ohm or greater) input. Calibrations for both inputs are provided.

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CURRENT PROBES

BCP-510 LF Current Probe 20 Hz - 1 MHz
BCP-511 HF/VHF Current Probe 100 kHz - 100 MHz

The current probes come ready for use.

Operation: The two current probes measure conducted emissions when clamped around a single conductor, cable or a bundle of conductors. Disconnect the probe latch Position the probe around the conductor and close the probe. Reconnect the probe latch to ensure that the probe is tightly closed. Connect the probe connector to the receiver with a cable. The probe calibrations supplied are into a 50-ohm receiver.

TRIPOD AND MOUNTING ADPTERS

ATU-510 Tripod
AEH-510 Azimuth and Elevation Head

The azimuth and elevation head (AEH-510) mounts to the tripod (ATU-510) top and allows the antennas to be rotated 360 degrees and tilted between horizontal and vertical polarization. The tripod and azimuth and elevation head come in their own carrying case. Each tripod leg is independently adjustable in angle and length to facilitate antenna height setting. The tripod legs have a rubber tip on one end for indoor or hard surface use, and a metal spike on the other end for outdoor soft surface (such as dirt) use.

TRANSIT STORAGE CASES

TCC-510 Tripod Carrying Case
TSC-542 Transit Storage Case

The antenna carrying case (TSC-542) prevents damage and loss of antennas when storing or transporting the antenna kit. The case is constructed of lightweight and durable polyethylene. Two case keys are provided with the case.

OPTIONAL EQUIPMENT

The AK-40G case comes with three additional cutouts for optional preamplifiers. In order to improve overall system sensitivity, the following equipment will be required:

- PAM-0118 with an SAC-18G-0.5
- PAM-1840 with an SAC-40G-0.5

PAM-0118 Preamplifier 20 MHz – 18 GHz

The preamplifier will increase the system sensitivity 33 dB and is recommend for the SAS-510-2, SAS-530,542 and SAS-571. An optional short length cable (SAC-

18G-0.5), is required to connect the preamplifier to any 50-ohm receiver or spectrum analyzer.

SAC-18G-0.5 Low-Loss Cable up to 18 GHz

The Low-Loss, High Frequency cable is recommend for connecting the optional preamplifier to any 50-ohm receiver or spectrum analyzer. Our Low-Loss High-Frequency flexible cables are the preferred choice over standard cable types. With improved power handling, low VSWR, and high frequency capabilities, the Low-Loss cables can be made to your specified length and delivered in two days. The 1/2 meter SAC-18G-0.5 has a typical attenuation of 1.0 dB at 18GHz.

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ANTENNA FORMULAS AND CALCULATIONS

E-FIELD ANTENNAS

Add antenna factor plus cable loss to receiver reading in dBuV to convert to field strength in dBuV/meter.

Field Strength(dBuV/m) = SA(dBuV) + AF(dB) + cable loss (dB)

LOOP ANTENNA

dBpT = dBuV + dBpT/uV + Cable Loss
dBuV/m = dBpT + 49.5 dB

BROADBAND CURRENT PROBES

A specific Transfer Impedance Factor is associated with each frequency. This number is to be subtracted from the receiver reading in order to convert to dBuA

dBμA = dBμV (from Receiver) - Transfer Impedance (dBΩ) - cable Loss (dB)

EXAMPLE:
Assume that the frequency of interest is 80 KHz and we need to find the current at this frequency. Connect the probe per figure 1

Frequency: 80 KHz
Transfer Impedance: -2.76 dB ohms
Cable Loss: 0.1dB
Receiver Reading: -33.0dBuV

dBμA = dBμV (from Receiver) - Transfer Impedance (dBΩ) - cable Loss (dB)
dBμA = -33.0 - (-2.76) - - 0.1
dBμA = -30.14

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MAINTENANCE

To ensure reliable and repeatable long-term performance, annual re-calibration of your antennas, preamplifiers and current probes by A.H. Systems experienced technicians is recommended. Our staff can calibrate almost any type or brand of antenna.

For more information about our calibration services or to place an order for antenna calibration visit our website at http://www.AHSystems.com or call 1(818) 998-0223.

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