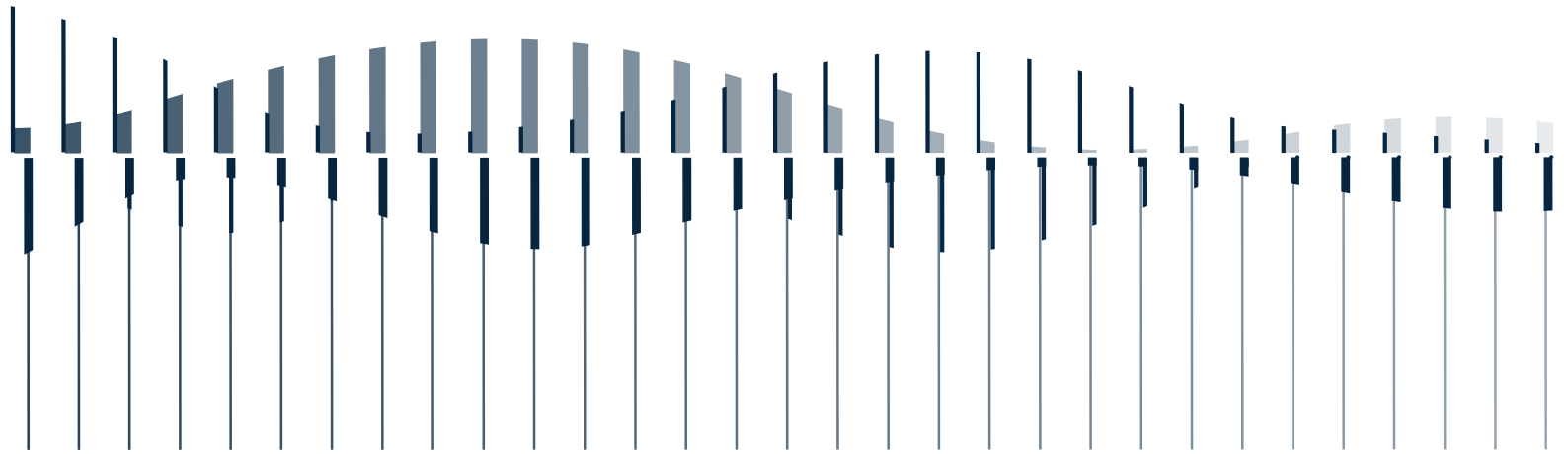
Instruction Manual

GRAS 47HC 1/2” CCP Low-noise Microphone System



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GRAS Sound & vibration

Revision History

Revision	Date	Description
1	5 February 2018	First publication

Any feedback or questions about this document are welcome at **gras@gras.dk**.

www.gras.dk

Trademarks

Contents

Introduction

The GRAS 47HC ½" CCP Low-noise Microphone System measures sound pressure levels down close to the threshold of human hearing.

With a sensitivity of 450 mV/pa and a noise floor at 6.5 dB(A) or lower, it opens up for measurement levels down to about 10 dB(A). Its upper dynamic limit is 100 dB below 8 kHz, 85dB from 8 kHz to 20 kHz.

It is thus generally suitable for sound-power measurements on even very quiet products.

The 47HC comprises:

- a special high-sensitive ½" free-field microphone with a specially reduced inherent noise floor in order to achieve a high dynamic range and wide frequency range. Its diaphragm is specially tuned to yield high sensitivity coupled with low internal-noise generation.
- a dedicated ½" low-noise preamplifier with built-in amplifier and compensation filter for free-field microphones

47HC connects to most standard CCP modules with BNC connector. It is crucial that the input module has a low noise floor.

The microphone set has the same form factor as standard GRAS ½" microphone sets, and therefore it can be used with standard mounting accessories.

The 47HC is delivered with Generation II TEDS. The calibration data is programmed into the built-in TEDS according to IEEE 1451.4 using UDID I27-0-0-0U. If your measurement platform supports Transducer Electronic Data Sheets you will be able to read and write data like properties and calibration data.

Generation II TEDS chip (DS2431) may require updated system software.

For holding the microphone, you can order Tripod AL0006 and Tripod Adapter RA0093.

IMORTANT. The preamplifier and microphone are an individually matched combination that is assembled and sealed under clean-room conditions.. For it to retain optimal performance, do not separate the microphone from the preamplifer .

Verification

The 47HC comes fully calibrated when leaving the factory. If you need a recalbration, you must send it to GRAS as a proper calibration requires the use of a laboratory standard setup.

However, to verify that the 47HC's sensitivity is stable, regularly checking with a sound calibratior is sufficient as this will allow you to verify that the sensitivity is stable.

System Sensitivity

The microphone signal is amplified by 15 dB in the preamplifier. Therefore, when the measured output voltage from the preamplifier is 0.45 V RMS, the microphone is being subjected to 94 dB re. 20 µPa.

The actual system sensitivity is given on the individual calibration chart supplied with each 47HC Low-noise Microphone System.

Verification with 42AG Multifunction Sound Calibrator

To avoid overload of the highly sensitive 47HC it is crucial that the calibration signal does not exceed 94 dB re. 20 µPa.

The GRAS 42AG Multifunction Sound Calibrator is ideal for daily verification of the 47HC because the 42AG can produce a calibration signal of 94 dB re. 20 µPa.

Based on this, proceed as follows:

1. Connect 47HC to the input socket of the analyzer.
2. Adjust the analyzer to indicate 94 dB re. 20 µPa for an RMS input of S volts; where S is the system sensitivity of 47HC as quoted on the calibration chart.

Refer to the manual for 42AG for further instructions. It can be downloaded from gras.dk/42ag

Frequency Response Calibration

The frequency response of the microphone has been factory-calibrated in a free field (anechoic chamber) by comparison with a reference microphone.

Ordering Information

3 m BNC - BNC Cable	AA0035
Tripod	AL0006
Adjustable, high quality, stainless steel tripod adapter	RA0093
Windscreen for 1/2" Microphones	AM0069
2-Channel Universal Power Module with signal conditioning and PC interface	12AQ
4-Channel CCP Power Module with Gain	12AX
Multifunction Sound Calibrator	42AG

Specifications

Frequency range (±1 dB)	Hz	12,5 to 10 k
Frequency range (±2 dB)	Hz	10 to 16k
Frequency range (±3 dB)	Hz	6 to 20k
Dynamic range lower limit (microphone thermal noise)	dB(A)	6.5
Dynamic range upper limit (20 Hz - 8 kHz)	dB	100
Dynamic range upper limit (8 kHz - 20 kHz)	dB	85
Set sensitivity @ 250 Hz (±2 dB)	mV/Pa	450
Polarization voltage	V	0 V
Power supply (Constant Current Power)	mA	4-20
Microphone venting		Rear
IEC 60672 Compliance		Yes
Output impedance	Ω	47
Temperature range, operation	°C / °F	-20 to 60 / -4 to 140
Temperature range, storage	°C / °F	-40 to 85 / -40 to 185
Temperature coefficient @250 Hz	dB/°C / dB/°F	-0.01 / -0.006
Static pressure coefficient @250 Hz	dB/kPa	-0.01
Humidity range non condensing	% RH	0 to 95
Humidity coefficient @250 Hz	dB/% RH	0,001
Influence of axial vibration @1 m/s²	dB re 20 µPa	63
TEDS		
Connector type		BNC
CE/RoHS compliant/WEEE registered		Yes / Yes / Yes

Warranty, Service and Repair

Calibration

Before leaving the factory, all G.R.A.S. products are calibrated in a controlled laboratory environment using traceable calibration equipment.

We recommend a yearly recalibration at minimum, depending on the use, measurement environment, and internal quality control programs.

We recommend calibration prior to each use to ensure the accuracy of your measurements.

Warranty

Damaged diaphragms in microphones can be replaced. The microphone diaphragm, body, and improved protection grid are made of high-grade stainless steel, which makes the microphone resistant to physical damage, as well as corrosion caused by aggressive air or gasses. This, combined with the reinforced gold-plated microphone terminal which guarantees a highly reliable connection,enables G.R.A.S. to offer 5 years warranty against defective materials and workmanship.

The warranty does not cover products that are damaged due to negligent use, an incorrect power supply, or an incorrect connection to the equipment.

Service and Repairs

All repairs are made at G.R.A.S. International Support Center located in Denmark. Our Support Center is equipped with the newest test equipment and staffed with dedicated and highly skilled engineers. Upon request, we make cost estimates based on fixed repair categories. If a product covered by warranty is sent for service, it is repaired free of charge, unless the damage is the result of negligent use or other violations of the warranty. All repairs are delivered with a service report, as well as an updated calibration chart.

Manufactured to conform with:

CE marking directive: 93/68/EEC

WEEE directive: 2002/96/EC

RoHS directive: 2002/95/EC

GRAS Sound & Vibration reserves the right to change specifications and accessories without notice.