



# Operating Instructions MA 39

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## WARRANTY

This warranty is extended to the original purchaser of the MA 39 Audiometer by Maico, through the authorized Special Instrument Distributor from whom it was purchased. This warranty covers defects in material and workmanship for a period of one year from date of delivery of the MA 39.

Should the Maico MA 39 require service due to a defect in material or workmanship, Maico, at its option, will repair or replace the instrument at no charge except for transportation to and from the point of service. It is the purchaser's responsibility to return the MA 39 to the Maico Special Instrument Distributor from whom it was purchased or directly to Maico after receiving a return authorization.

This warranty does not cover breakage or failure caused by tampering, misuse, carelessness, accident, or modification. The warranty is void if the instrument is serviced by other than an authorized Maico Special Instrument Service Center.

## NOTE:

Specifications in this manual are in effect at the time of printing. Maico reserves the right to modify or change specifications or design at any time without notice or incurring obligation.

## WARNING:

The Maico MA 39 is designed to be used with a hospital grade outlet. Injury to personnel or damage to equipment can result when a three-prong to two-prong adapter is connected between the power plug and an AC outlet or extension cord.



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## 1.0 SPECIFICATIONS

**Frequency accuracy:**  $\pm 1\%$  maximum of indicated frequency

**Frequency and HL ranges:**

Frequency	Air conduction HL range
125 Hz	-10 to +80 dB <sub>HL</sub>
250 Hz	-10 to +100 dB <sub>HL</sub>
500 Hz	-10 to +110 dB <sub>HL</sub>
750 Hz	-10 to +110 dB <sub>HL</sub>
1000 Hz	-10 to +110 dB <sub>HL</sub>
1500 Hz	-10 to +110 dB <sub>HL</sub>
2000 Hz	-10 to +110 dB <sub>HL</sub>
3000 Hz	-10 to +110 dB <sub>HL</sub>
4000 Hz	-10 to +110 dB <sub>HL</sub>
6000 Hz*	-10 to +110 dB <sub>HL</sub>
8000 Hz*	-10 to +100 dB <sub>HL</sub>

\*Maximum level for insert phones is 10 dB lower at 6000Hz and 8000Hz.

**Attenuator Linearity:**  $\pm 0.5$  dB per 5 dB step,  $\pm 3$  dB overall

**Distortion:** .5% typical, 2% maximum

**Sound pressure level calibration accuracy:**  $\pm 3$  dB

**Pulsed stimulus:** 2.5 pulses/second, 50% duty cycle

**Rise/Fall time:** 35 msec. Typical

**Freq. Mod. rate:**  $\pm 5\%$  sine wave modulation at 5 Hz modulating rate

**Dimensions:** 12.5" W x 6.25" H x 15.5" D  
32cm W x 16cm H x 40cm D

**Weight:** 16.5 lb/7.5 kg

**Case:** Structural foam

**Voltage requirements:** 117/234 volts AC, switchable

Calibrated to ANSI S3.6 1996.



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## 2.0 INTRODUCTION

### 2.1 Instrument Description

The Model MA 39 is a precision instrument designed to permit simple, rapid and reliable hearing tests. Their application ranges from school testing programs, pre-employment examinations and monitoring audiometry for hearing conservation programs. The instrument provides all of the pure tone frequencies and full dynamic range specified by the American National Standards Institute S3.6 1996.

Features include, a full range electronic attenuator (-10 dB<sub>HL</sub> to 110 dB<sub>HL</sub> mid frequencies), with all input/output switching and routing performed electronically. Large LED\* numeric displays show the selected frequency and HL intensity. Small individual LED's are used to show the selected function (See Figure 1). The model MA 39 retains the side mounted controls for frequency and HL setting as well as the dual present/interrupt buttons so familiar to Maico audiometer users. All functions, actuators/push button controls, provide a tactile feedback to the operator whenever a function is selected or operated. In addition a bright LED indicator is associated with the selected function.

Maico audiometers have been designed to meet the most rigorous of electrical safety standards and to provide years of reliable operation with a rugged durability that has become the trademark of Maico portable audiometers.

\*Light emitting Diode



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## 3.0 UNPACKING AND INSPECTION

### 3.1 External Inspection

Your MA 39 was carefully inspected and packed for shipping. However, it is good practice to thoroughly inspect the outside of the shipping container for signs of damage. If any damage is noted, please notify the carrier immediately.

### 3.2 Unpacking

Remove the upper layer of packing material from the top of the instrument. Carefully lift the instrument from the shipping carton and remove the plastic bag. Inspect the case for sign of any damage. Notify the carrier immediately if any signs of mechanical or physical damage are noted. This will ensure that a proper claim is made. Save all packing material so that the claim adjuster can inspect it as well. When the adjuster has completed the inspection, notify the Maico Special Instrument Distributor you purchased this unit from.

**Save all the original packing material and the shipping carton so the instrument can be properly packaged if it needs to be returned for service or calibration.**

### 3.3 Accessories Supplied

Standard accessories are packaged and shipped inside the MA 39. Please check that all accessories listed below are received in good condition. If any accessories are missing or damaged, notify your Maico Special Instrument Distributor immediately.

#### **Standard Accessories**

	<b>Part</b>
TDH 39 headset	4687
Audiogram pad	1162-417
Operator's Manual	1162-9917

#### **Optional Accessories:**

Patch cords	1025-352
Audiocup headset	4695
Patient response switch	2169
Insert Phones	4790



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## 4.0 FRONT AND REAR PANEL CONTROLS AND DESCRIPTIONS

### 4.1 Front Panel Controls

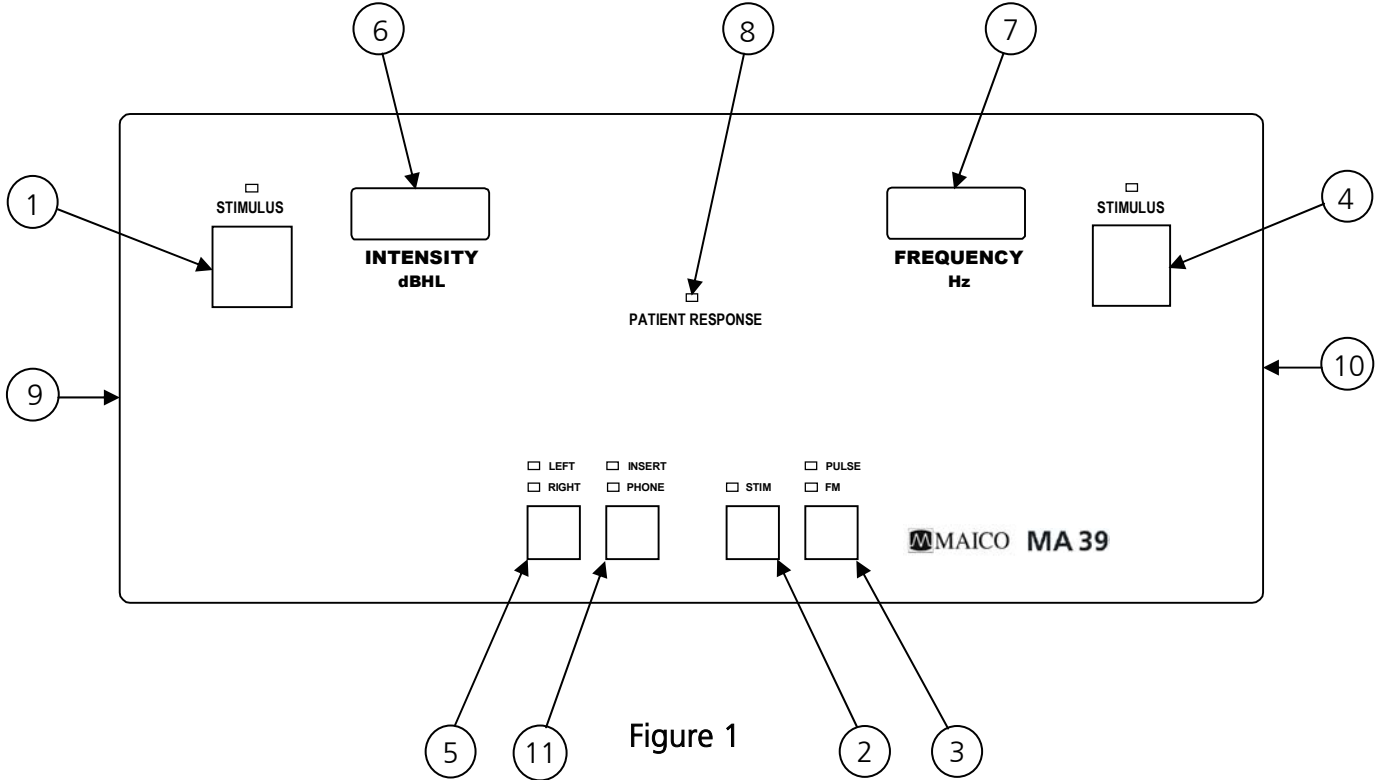


Figure 1

- 1 STIMULUS. Stimulus present/interrupt switch. Stimulus is present when the LED is lit.
- 2 STIM. Changes function of STIMULUS key from "present" to "interrupt", i.e., stimulus always on unless STIMULUS key is pressed.
- 3 PULSE/FM. Enables PULSE and/or FM stimulus.

PULSE LED on	Pure tone stimulus will be pulsed.
FM LED on	Pure tone stimulus will warble.
Both PULSE and FM LEDs on	Pure tone will pulse and warble.
Both LEDs off	Pure tone stimulus only.

- 4 STIMULUS. Stimulus present/interrupt switch. Stimulus is present when the LED is lit.
- 5 EAR SELECT. Press and release to select either the left or right ear. LED of selected ear will light.



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- 6 INTENSITY. Displays intensity of selected earphone.
- 7 FREQUENCY. Displays frequency setting.
- 8 PATIENT RESPONSE. LED lights when test subject presses optional patient response switch.
- 9 INTENSITY CONTROL DIAL. Adjusts test signal intensity.
- 10 FREQUENCY CONTROL DIAL. Adjusts test signal frequency.
- 11 OUTPUT SELECT. Press and release to cycle between the available transducers. LED of selected transducer will light

INSERT	Insert Phones
PHONE	TDH-39 Headphones



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## 4.2 Rear Panel Controls

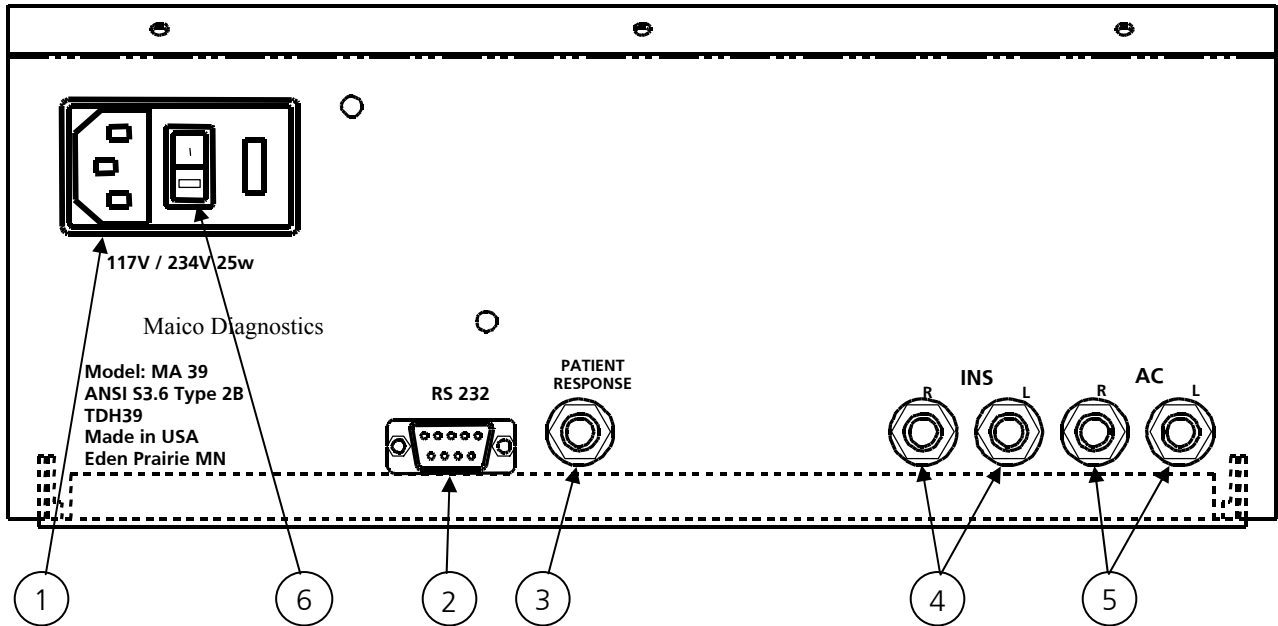


Figure 2

- 1 POWER ENTRY MODULE. Power input connector, switch and fuseholder.
- 2 RS 232. DB-9 female RS 232 port connector.
- 3 PATIENT RESPONSE. Input for optional patient response switch.
- 4 INS. Right and left jacks for optional insert phones.
- 5 AC. Right and left jacks for air conduction TDH 39 earphones.
- 6 POWER SWITCH. On/Off power switch.



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## 5.0 INSTALLATION AND SETUP

### 5.1 Headset/Insert Phones

Place the MA 39 on a stable counter or table. Open the side latches and fold the lid back. Fold the lid back one more time to reveal the accessories that are packaged within the rear storage compartment. If you haven't already done so, unpack and inspect the accessories.

The TDH 39 headphones are serialized and should match the serial number on the instrument. Check to see that the numbers match, as this will confirm that the headphones and MA 39 were calibrated together. The optional insert phones do not have a serial number, but if they were ordered at the same time as the MA 39 they were calibrated to that particular instrument and should not be used on another without recalibration.

Turn the MA 39 around so that you can view the rear jacks. Insert the RED (right) plug of the TDH 39 headset into the right air conduction earphone jack labeled **R**, under **AC (Air Conduction)**. Insert the BLUE (left) plug into the left **AC** earphone jack labeled **L**.

The insert phones are installed in the same manner. Insert the RED (right) plug of the insert phone cord into the insert phone jack labeled **R**, under **INS (INSert phones)**. The BLUE (left) plug is inserted into the jack labeled **L**.

### 5.2 Patient Response Switch - Optional

Locate the **PATIENT RESPONSE** jack on the rear panel and insert the plug end of the switch.

### 5.3 Sound Room Patch Cords - Optional

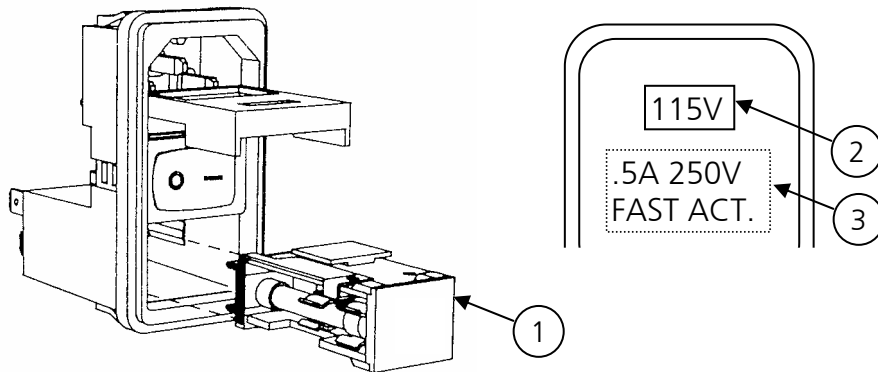
When using the MA 39 in a sound room, connect the patch cords from the sound room to the proper right and left earphone/insert phone jacks, patient response jack.



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## 6.0 VOLTAGE AND POWER REQUIREMENTS

The input power rating for this family of audiometers is 117/234 volts AC, 50/60 Hz, 25 W. This product is equipped with a universal power entry module to change the power/mains input voltage from 115 VAC to 230 VAC.



**Figure 3. Power entry module (115v shown)**

To change the power/mains input voltage for 230 volt operation (Figure 3):

1. Unplug the power/mains cord from the unit.
2. Pry open fuse cover and remove fuseholder ( 1 ).
3. Replace fuses with provided .25 amp fuses.
4. Reinstall fuseholder with 230V displayed in window ( 2 ).
5. Apply .25A label to the closed cover ( 3 ).

Insert the cord set into the recessed socket, then into a three-conductor 117 volt electrical outlet (or the appropriate outlet for your country).

### **WARNING**

This Maico instrument has been designed to meet the most exacting electrical safety requirements for patient care equipment.

The hospital grade, 117 volt alternating current, three-prong plug (or the appropriate plug for your country) should be inserted into a mating three-prong hospital grade receptacle that is properly grounded. This will ensure reliable and safe operation of this precision instrument. Injury to personnel or damage to equipment can result when a three-prong to two-prong adapter is connected between the power plug and an AC outlet or extension cord. If you have any questions, check with your Maico Special Instrument Distributor.



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## 7.0 OPERATION

### 7.1 Preliminary

1. Power Connections - Before starting any testing, ensure that the power cord is properly routed through the notch in the side of the carrying case. The power plug must be inserted into a compatible power receptacle that has proper grounding.
2. Accessory Connections - Check for correct connection of test headphones and other accessories to the audiometer.
3. Sound Room - When a sound room is used with the audiometer, check the patch cord connections to the outside jack panel. Check to see that the headphones, response switch and other accessories are properly connected to the inside jack panel.
4. Care of Accessories - Always handle earphones and other accessories with care. Never drop them or permit them to be knocked together. Mechanical shock may change their electrical and operating characteristics such that the instrument may need to be calibrated or the parts may need to be replaced.
5. Instruction to the Person Being Tested - The operator should place the person to be tested at ease concerning the test. The operator should explain the purpose of the test and what kind of sound or sounds will be heard. An unvarying and uniform explanation to the person being tested will provide test results that are consistently high in reliability. An explanation for pure tone or baseline audiometry might be expressed as follows: "I am going to place these headphones on your ears. You will hear a whistle or beeping sound that may be loud or soft. Whenever you hear or think you hear one of these sounds, raise your hand (or press the response switch button) and lower your hand (or release the button) when you do not."
6. Preparing for the Test - Remember to check the following before placing the earphones on the person to be tested. Proper placement of the headphones on the ears to be tested is essential to achieving good test results.
  - a) Eliminate any obstructions which will interfere with placement of the earphone cushion on the ear (i.e., hair, earrings, eyeglasses, hearing aids etc.)
  - b) Adjust the headband so that the earphone cushions are centered over the ears and the headband rests firmly over the center of the head. The earphone cushions will put a firm pressure on both ears.



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7. Test Environment and Ambient Noise - Excessive sounds or noise in the chosen test environment can produce a masking effect and therefore affect the test results. The selected site should be away from conversations, noisy business equipment, hallway traffic and other noise producing environments. The lower test frequencies are most affected by these types of noises.

In some instances it may be necessary to acoustically treat the test site in order to achieve the necessary quietness for testing purposes. Commercially available "sound rooms," which are designed to provide an acoustically treated testing environment, are recommended where baseline or threshold audiometry is required. These rooms are available in a variety of sizes and isolation capabilities. Consult your Maico Hearing Instrument Distributor for the type of testing you will need.

Requirements for Industrial Baseline Audiometric Test Environment.

Octave Band Center Frequency	500	1000	2000	3000	4000
SPL dB	40	40	47	57	62

Maximum allowable octave band sound pressure level for Audiometric Test Rooms.  
OSHA August 21, 1981.

8. Hearing Test Administration - The MA 39 audiometer does not require special operating techniques. The test should be presented as described in "Introduction to Audiometry" by R.F. Naunton, MD or in several good textbooks on the subject (or as described in a number of standards published by various organizations, i.e. ANSI, IEC, ISO, etc.).



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## 7.2 Air Conduction Testing

Air conduction testing is used to measure the patient's hearing threshold levels. The test is usually started on the ear with better hearing.

1. Turn the MA 39 on and let it warm up for 10 minutes before using. Upon power-up the initial setting will be in audiometric testing mode, right phone, 1 KHz, 30 dB intensity.
2. Seat the patient so that he/she is facing away from the instrument at a 90° angle and cannot see what the operator is doing. Give a brief description of what the patient can expect to hear. Using a consistent explanation will help provide more reliable results. Instructions may be expressed as follows: "I am going to place these headphones on your ears. You will hear a tone or beeping sound, which may be loud or soft. Whenever you hear, or think you hear one of these tones, raise your hand. Lower it when you no longer hear the tone. Listen carefully because some tones are very soft."
3. Eliminate any obstructions that could interfere with placement of the earphone cushion on the ear (i.e. hair, earring, eyeglasses, hearing aids, etc.). Adjust the headband so that the earphone cushions are centered over the ears (RED on the right ear, BLUE on the left) and the receivers line up with the ear canals. The headband should rest firmly over the center of the head and place firm pressure on both ears.
4. Choose PULSE and/or FM if you wish. Set the INTENSITY and FREQUENCY to the desired level.
5. Press STIMULUS to present the test tone. The STIM LED should light. If the patient hears the tone he/she will raise their hand or press the patient response switch, indicated by the patient response LED.

The most commonly used hearing threshold procedure is called a modified Hughson-Westlake procedure.

1. Start at 1000 Hz with a level of 0 dB and present a signal for at least 1 second. If no response, increase in 10 dB steps until the patient responds.
2. Increase another 10 dB for a confirmation and orientation. If the patient responds again, decrease the presentations in 10dB steps until the patient no longer responds.
3. Increase in 5 dB steps until the patient responds. Once the patient responds, descend 10 dB until there is no response. Increase again in 5 dB steps.
4. Repeat until you have 2 out of 3 ascending responses at the same level. Change the frequency and repeat above procedure until you have thresholds for the number of frequencies that you wish to test.

The hearing threshold is defined as the lowest hearing level at which the patient responds to *two out of three ascending stimuli at the same level*.



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## 8.0 MAINTENANCE

### 8.1 Preventive Maintenance

To maximize the service life of your audiometer and accessory equipment, we suggest the following:

1. Turn off the instrument overnight.
2. Wipe the headset cords, ear cushions and casing occasionally with a cloth dampened (not dripping wet) with warm water. Dry with a soft cloth.
3. Leave the accessories such as the headset, permanently connected to the audiometer to minimize strain on the connections. It is not necessary to disconnect accessories not in use while performing other tests. Should it be necessary to disconnect cords, always grasp the barrel of the plug — never pull the cords. Never drop or snap the headphones together. Mechanical shock may change the earphone's electrical and operational characteristics and require calibration of the MA 39.
4. Close the audiometer cover at the end of each day to minimize dust collection.
5. Avoid sharply bending or twisting any of the cords. Although they are designed to be highly flexible, rough treatment may cause damage. Broken or defective cords can cause crackling noise and intermittent or weak operation in the headset. Headset cords may be replaced without re-calibrating the audiometer.
6. This Maico audiometer has been designed to meet the most exacting electrical safety requirements for patient care equipment. The hospital grade 117 volt AC three prong plug should be inserted into a mating three prong hospital grade receptacle that is properly grounded. This will ensure reliable and safe operation of this instrument. The use of a three prong to two prong adapter should be avoided, and is not recommended.

### 8.2 Cleaning the MA 39

First, disconnect the power cord **before** cleaning. Clean the instrument, headphones, and other accessories with a soft cloth dampened with a little warm, soapy water. Do not use alcohol to clean.

The ear cushions of the headphones can be detached for cleaning. To remove, gently pull the cushion away from the headphone. To re-assemble, press it back onto the headphone. Make sure that the sound outlet hole sits exactly in the middle of the earphone.



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## 8.3 Calibration

The optimum length of time between calibrations for audiometers varies, depending upon the treatment given the instrument and the headphones. It is recommended that the instrument have a laboratory calibration at least once every year. Since rough handling, such as dropping the headphones, can easily cause calibration errors it is advisable to establish a biological calibration check as soon as you receive the instrument.

Should you feel at a later date that the audiometer's calibration might be in error, perform a biological check on a known ear. If all re-tests show major changes, calibration is probably in error.

All repair and calibration should be done at an authorized Maico Special Instruments Distributor service center. This assures the use of quality materials by trained and experienced technicians using the proper, accurate equipment.

Maico Special Instruments Distributors are located in major cities throughout the world. To minimize costs and time delays, contact the Distributor that you purchased the instrument from. If you don't know who that is, or need to find the Distributor closest to you, contact the factory at:

Maico Diagnostics  
7625 Golden Triangle Drive  
Eden Prairie, MN 55344  
Toll free 888-941-4201  
Phone 952-941-4200  
Fax 952-903-4200

Customers outside of North America and South America may contact:

Maico Diagnostic GmbH  
Salzuffer 13/14  
10587 Berlin, Germany  
phone +49 030 70 71 46 50  
fax +49 030 70 71 46 99



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## 8.4 Shipping Instructions for Calibration and Repair

In the event it becomes necessary to return the instrument for calibration or repair, please follow these instructions:

1. Place the instrument in the original shipping carton, using the packaging provided. Be sure to include all accessories, as they are required for proper calibration. If more than one audiometer is in use, see that the serial number on the back panel of the audiometer and the serial number on the headset cord are identical.

**NOTE:** The audiometer is always calibrated with its headset after repair, to ensure correct system operation.

2. Enclose an explanatory letter describing the service you require, carefully detailing any operational problems. Be sure to include your name, phone number, the serial number, and your full return address for return shipping.
3. Ship, prepaid, to your Maico Special Instrument service center.

**NOTE:** Warranty service is provided by your authorized Maico Special Instruments Distributor.

**DO NOT ATTEMPT TO REMOVE THE INSTRUMENT CASE YOURSELF.  
THIS SHOULD BE DONE ONLY BY AN AUTHORIZED  
MAICO SERVICE TECHNICIAN.**

