



## TR-89B Series

### Types: 23 and 40

The MassaSonic™ TR-89B Series Transducers are rugged electroacoustic devices designed for the efficient generation of ultrasonic energy in air. They are ideally suited for a wide variety of low power, general purpose applications such as ultrasonic intrusion alarms, proximity detection devices, remote control devices, and energy management systems.

The Transducers consist of a one piece housing with an integral diaphragm. This provides a moisture-proof unit, suitable for both indoor and outdoor use when mounted so that the rear terminals are protected from exposure to the direct outdoor environment. The units operate at resonance on the first harmonic overtone. This affords greater efficiency (higher transmitting and receiving response) than an equivalent size device operating at its fundamental.

The TR-89B Transducers can be manufactured under special order to resonate at any specified frequency between 23kHz and 40kHz. Massa stocks two standard versions. The TR-89B Type 23 provides peak untuned receiving response at 23kHz +/-2kHz, and the TR-89B Type 40 provides peak untuned receiving response at 40kHz +/-2kHz. The beam patterns of the transducers change at different frequencies, and greater detection range is obtained with lower frequency transducers due to the attenuation characteristics of sound in air. Thus, the TR-89B Family offers the user a choice of transducers that have characteristics that will meet most requirements. Special frequencies, matched transmitting and receiving pairs, and other custom features are available on special order (consult factory). There are several million TR-89B Transducers in use in many different applications throughout the world.

Massa Products Corporation is a leading designer and manufacturer of a wide variety of electroacoustic transducers and systems for use in air and under water. Massa has over 70 years of specialized experience in this field.



*GENERATIONS AHEAD IN SONAR & ULTRASONIC TECHNOLOGY*

### MASSA PRODUCTS CORPORATION

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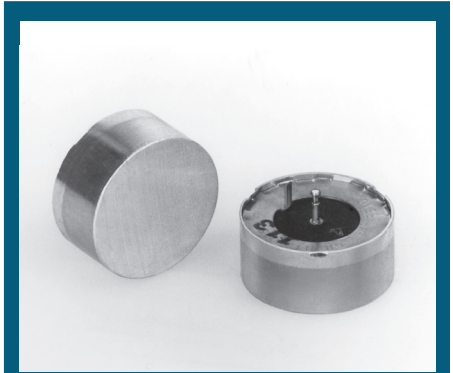
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## FEATURES

- Low Cost
- Long Sensing Range
- Rugged Packaging
- Moisture-Proof
- High Sensitivity

## APPLICATIONS

- Proximity Detection
- Solid Level Measurement
- Liquid Level Control
- Animal Deterent
- Intrusion Alarms
- Remote Controls
- Energy Managing Systems

# TR-89B Series

## SPECIFICATIONS

	Type 23	Type 40
Frequency at Maximum Impedance (+/- 2 kHz)	23 kHz	40 kHz
Bandwidth Transmitting* Tuned	5 kHz	10 kHz
Untuned	3 kHz	5 kHz
Transmitting Sensitivity* dB vs 1 $\mu$ bar per volt at 1 foot (untuned)	+25	+22
Receiving Sensitivity* dB vs 1 volt per $\mu$ bar (untuned)	-41	-50
Rated Power	200mW	200mW
Maximum Rated Power	35 Vp-p (Sq. Wave) Input 45 Vp-p (Sine Wave Input)	
Total Beam Angle* (-3 dB Points)	35°	20°
Operating Temperature	-40° to 85°C	
Weight	0.2 oz	

\* See Performance Characteristics

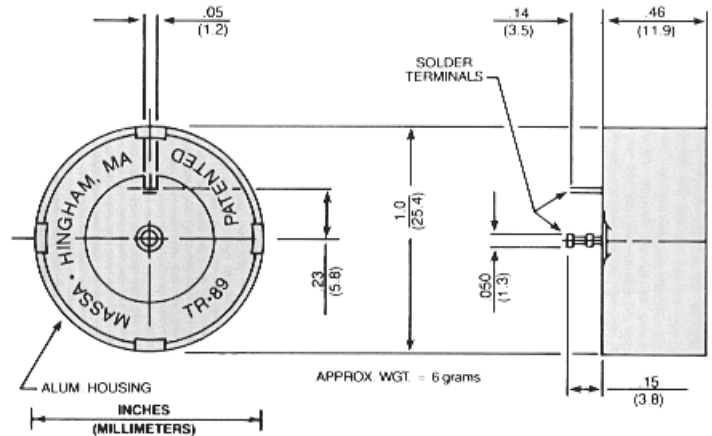
*All specifications typical at 20°C, and subject to change without notice.*

### OPTIONS:

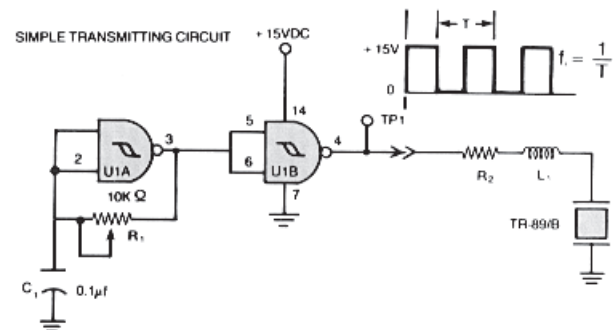
1. Closer Frequency Tolerances
2. Different Operating Frequencies
3. Matched Transmitting and Receiving Pairs
4. Watertight Unit with Integral Cable

Custom configurations available for OEM quantities.

## Outline Dimensions



## Applications Circuit



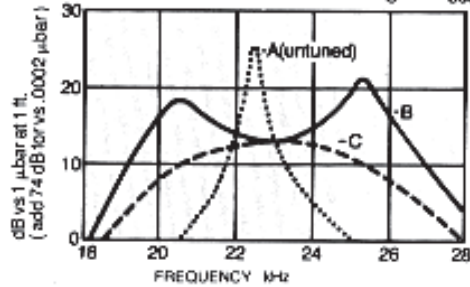
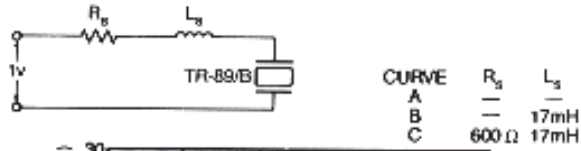
Transmitting Frequency	Transducer	R <sub>2</sub>	L <sub>1</sub>
23 kHz ± 2 kHz	TR-89B Type 23	620 Ω	17 mH
40 kHz ± 2 kHz	TR-89B Type 40	620 Ω	6.5 mH

### NOTES:

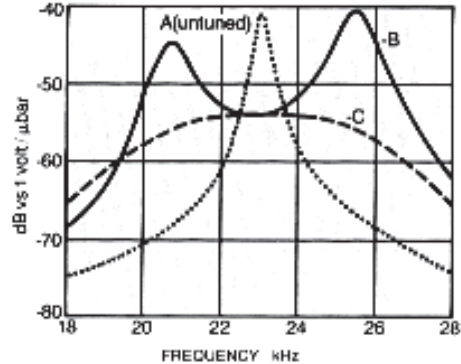
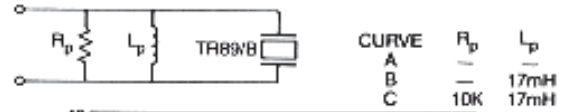
1. U1 is a National Semiconductor CD 4093B Quad 2 input NAND Schmitt Trigger or equivalent.
2. R1 must be a 10 turn wire wound precision potentiometer.
3. Adjust R1 for correct frequency (f<sub>i</sub>) at TP1.

# TR-89B, Type 23

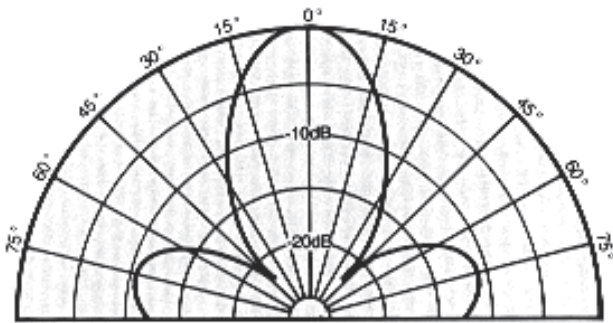
## Nominal Performance Characteristics



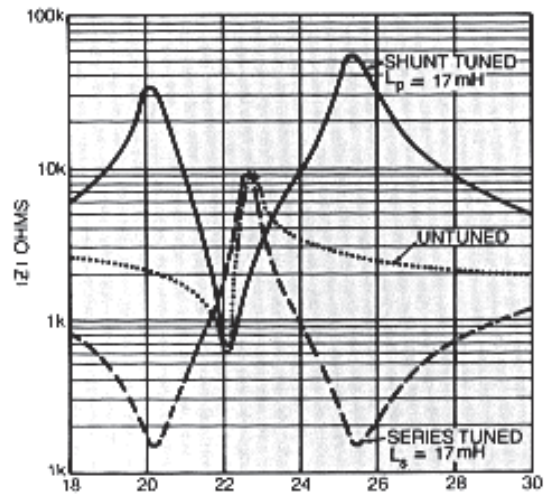
TRANSMITTING RESPONSE  
(1 volt RMS constant)  
TR-89/B TYPE 23



RECEIVING RESPONSE  
TR-89/B TYPE 23



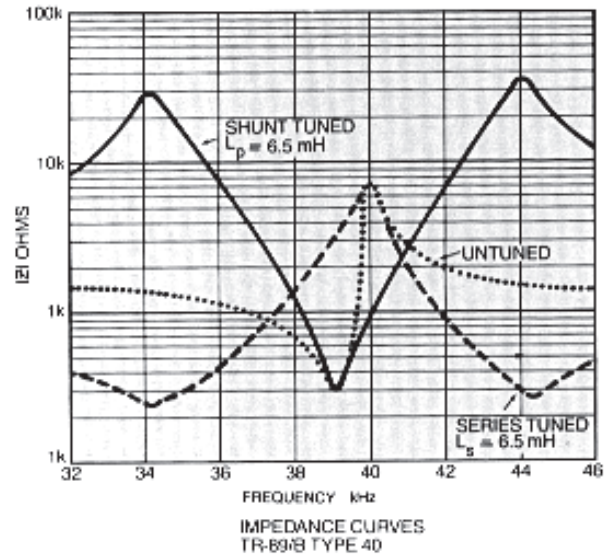
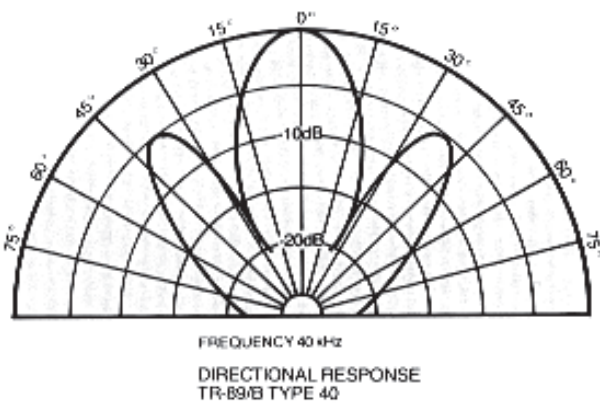
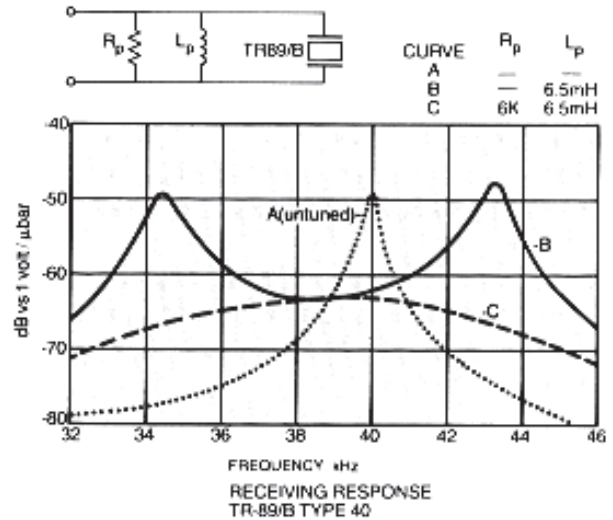
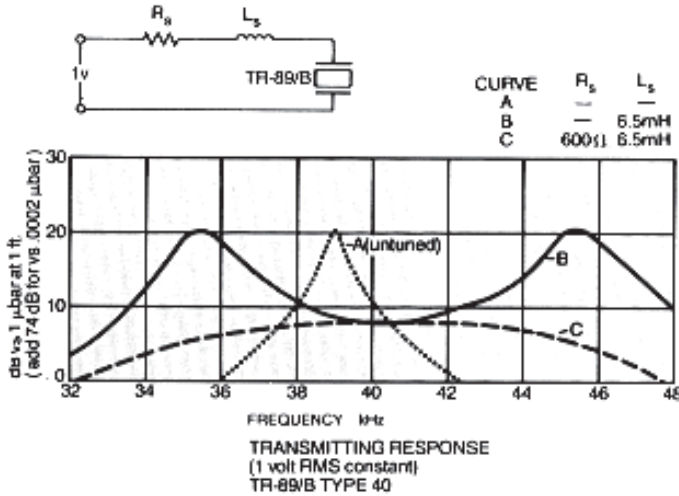
DIRECTIONAL RESPONSE  
TR-89/B TYPE 23



IMPEDANCE CURVES  
TR-89/B TYPE 23

# TR-89B, Type 40

## Nominal Performance Characteristics



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