

MODEL 1010 PIEZOELECTRIC PULSE TRANSDUCER



UFI
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Introduction

Piezo-electric transducers convert physical activity such as changes in force or pressure into an electrical signal. The Model 1010 transducer is a piezo-electric transducer designed for wide ranging applications in the life sciences. These applications include:

- sensing and recording peripheral pulse in the finger;
- measuring carotid pulse;
- recording throat excursions from swallowing;
- monitoring Korotkoff sounds;
- monitoring heart sounds;
- use as a small-animal pulse and respiration transducer;
- monitoring vibrations; and
- counting liquid drops for titrations

Step-by-step instructions are provided below for the first five of these applications.

For any force to be measured, there must be an opposing force against which it acts. For the Model 1010, a VELCRO® strap usually imposes this counter-force. The Model 1010 may also be attached with a rubber chest strap or adhesive tape.

Cautions

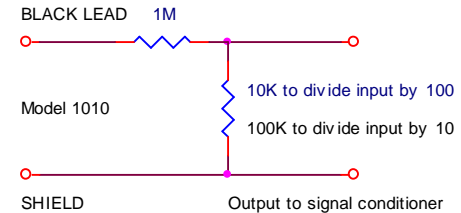
The UFI Model 1010 Pulse Transducer is a rugged instrument. However, ***it may be damaged unless the following cautions are observed:***

- Do *not* expose Model 1010 to temperatures above 50° C (122° F).
- Do *not* use an ohmmeter to measure resistance of Model 1010.
- Do *not* apply DC voltages to Model 1010. These can impose large stresses that can bend diaphragm or fracture piezo element.
- Model 1010 can produce output pulses of several volts during handling and placement. If connected equipment cannot handle such inputs, Model 1010 should be disconnected from downstream equipment until it has been attached to subject.

Connection considerations

- Model 1010 requires that downstream signal conditioners have an input impedance of at least 100 K Ω and a frequency response extending below 1 Hz. A charge amplifier connected between Model 1010 and signal conditioner will extend low response.

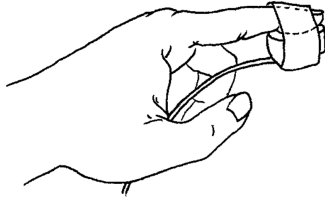
- Signals of just 4-5 mV saturate some amplifiers. If Model 1010 does this, a simple resistive voltage divider (see below) should be inserted between the transducer and instrument input. Circuit should be shielded to prevent pickup of power line noise.



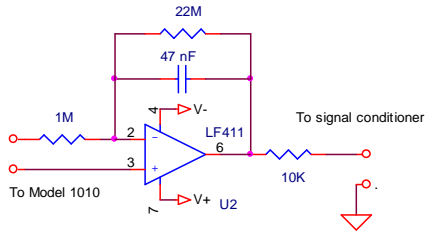
Applications for the Model 1010

To use as a pulse transducer:

- attach Model 1010 to tip of any finger with VELCRO® strap;
- lightly rest finger on transducer surface with edge of finger slightly overlapping edge of transducer as shown in drawing below;
- wrap VELCRO® strap around finger. Model 1010 should fit snugly but not restrict circulation. If finger tip turns white or feels cold, then unit is too tight.



- Experiment to obtain best signal. Transducer output should be at least 100-200 mV.
- Peripheral vasoconstriction, often due to a cold subject or room, can cut the signal greatly. Touch subject's fingers to your cheek -- coldness indicates vasoconstriction.
- Model 1010 finger pulse signal differs from usual pressure pulse signal due to poor low-frequency response of transducer piezoelectric element. Use a charge amplifier circuit (see below) to correct response and obtain a good pressure pulse waveform.



To measure carotid pulse:

- place Model 1010 on one of the carotid arteries, just below hyoid bone, and hold there with VELCRO® strap or elastic webbing 2.5cm (1") wide or more.
- Use minimum tension needed to obtain an adequate signal; expect 40-60 mV.

To monitor swallowing:

- place Model 1010 on throat near base to one side of thyroid cartilage; secure with elastic.
- Properly placed, Model 1010 should produce several hundred millivolts during a swallow.

To monitor Korotkoff sounds:

- place Model 1010 under blood pressure cuff, directly over brachial artery.
- Model 1010 should produce 50 mV or more per pulse.

To monitor heart sounds:

- secure Model 1010 to chest with elastic webbing. You will obtain best results when Model 1010 is in direct contact with skin.
- Connect Model 1010 leads to audio amplifier or chart recorder.

Specifications

- Frequency response 2.5 Hz to 5 KHz
- Signal output Varies with force:
typical finger pulse
yields 20-40 mV, but
can exceed 500 mV
- Weight 14 grams (0.5 ounce)
- Size 23mm dia x 13mm high
(0.9" dia x 0.5" high)
- Cable length 1.8m (6 feet) nominal;
others by special order

Warranty and repair

All UFI instruments are warranted against defects in materials and workmanship to the original purchaser for a period of one year from the date of original purchase. This warranty is void if our inspection shows the equipment has been tampered with; or installed at variance with factory-designated procedures; or has been subjected to negligence, misuse, or accident beyond normal usage; or has had the serial number altered, defaced, or removed.

All questions regarding the warranty should be directed to:
Customer Service Department, UFI
545 Main Street, Suite C-2
Morro Bay, CA 93442
Email: ufi@ufiservingscience.com

When communicating with UFI concerning your equipment, please include the model and serial numbers.

No third party, including any dealer or agent, is authorized to assume any liability for UFI.

UFI instruments and transducers are subject to continuous improvement. We reserve the right to modify any design or specification without notice and without incurring any obligation.

ALL UFI TRANSDUCERS AND ELECTRODES ARE COVERED BY OUR EXCLUSIVE "LIFELINE® WARRANTY" AS OUTLINED BELOW

If your UFI transducer, electrode, or electrode tester ceases to operate--regardless whether the cause is accidental, intentional, or whatever---**return it to us**. We will repair it or replace it with a new one for a minimal handling charge, as listed below:

Model 1010, 1010C	\$25.00
Model 1020, 1020EC, 1020FC, 1110	\$25.00
Model 1030, 1040, 1070, 1081FT	\$50.00
Model 1081 & 1081 SNP	\$11.00
Model 1089 MK II & MK III	\$65.00
Model 1130, 1131, 1132	\$35.00

Prices subject to change

9-30-10