MODEL 1030 FORCE TRANSDUCER

UFI
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Introduction

The UFI Model 1030 Force Transducer converts the force of a muscle contraction -- from 1 mg to 1 kg – into an electrical signal to display, record and measure. A stack of one fixed and four movable stainless steel blades provides a wide range of measurement and excellent linearity.

Two silicon semiconductor strain gauges are attached to the top, fixed blade. One gauge changes resistance with applied force; the other compensates for temperature. The bottom four blades may be moved in and out of the stack to vary transducer stiffness (sensitivity).

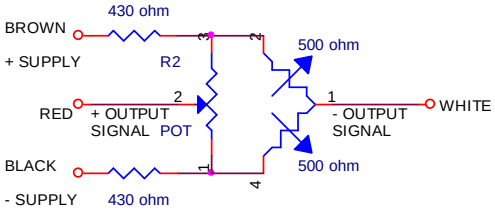
Just the top, most-sensitive blade is used for isolated smooth muscle preparations, such as the rabbit ileum. Rotate all but one or two blades out of the stack for measurements on rats or frogs. Use the entire stack for maximum stiffness in large- animal experiments

Applications for the Model 1030 include:

- measurements on isolated strips of smooth muscle;
- the classical demonstration of Starling's Law using the turtle heart;
- gastrocnemius/sciatic nerve preparation in frogs, rats, cats and dogs; and

Connection considerations

- The Model 1030 may be connected to strain gauge bridge input of any polygraph.
- Contact UFI with your recorder brand and model; we can provide correct input connector.
- To install your own connector, use following:



Signal considerations

- The model 1030 yields an output as high as 150 mV, as shown below for 9-volt excitation:

Blade stack	Output (mV/gram)	Max force (grams)
Gauge blade only	9.0	15
GB + 1 force blade	0.43	300
GB + 2 force blades	0.24	500
GB + 3 force blades	0.18	750
GB + 4 force blades	0.15	1000

- Some recorders still in use today require outputs one or 2 orders of magnitude lower. Model 1030 output can saturate these instruments, resulting in no useful data, but will not damage them.

- Contact UFI for a simple attenuation circuit to trim Model 1030 output to suit your equipment.

Using the Model 1030

Check recorder channel balance (no transducer):

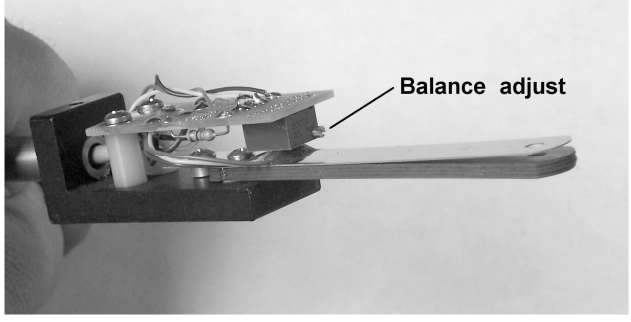
- Turn gain (size) control to minimum setting.
- Turn on recorder, center trace in channel (plot area) with position control.
- Turn gain to half-maximum setting -- trace position should not change.
- If trace position does change, see recorder instructions on channel balancing procedure.

Check transducer balance:

- Connect Model 1030 to recorder, but do not attach yet to physiological preparation.
- Set recorder gain to 25% max, then turn on recorder. If trace position changes, adjust Model 1030 balance control as follows:

Adjust transducer balance:

- Remove Model 1030 cover using medium Phillips screwdriver as shown in photo above.
- Adjust recorder gain to minimum; trace should return to original center position. Now increase gain so trace moves half the distance from channel (plot) center to channel (plot) edge.
- Using small flat-blade (jeweler's) screwdriver, adjust transducer balance control as shown below to move trace back toward center.



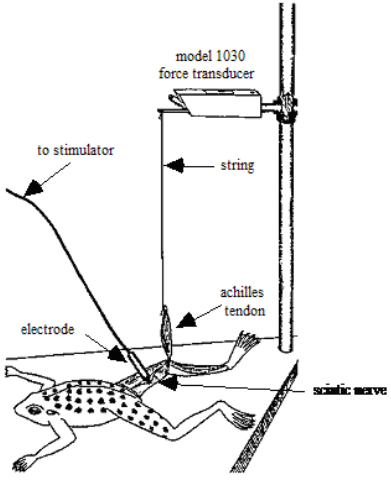
- As trace approaches original center position, increase recorder gain, then readjust transducer balance control to move trace back to center.
- Repeat last step until you can change gain control but trace does not move, or moves only slightly.
- Model 1030 is now balanced; replace cover.
- Adjust only recorder controls from here on.

Test transducer:

- Reduce recorder gain to a low setting.
- *Gently* flex transducer blades up and down; trace should move with force exerted.
- Increase gain for adequate trace deflection.

Attach transducer to your preparation:

- Anchor Model 1030 body securely with weight or other means to prevent transducer body movement. (Diagram below shows typical setup.)
- Anchor physiological preparation so that Model 1030 responds to entire force of muscle contraction. (Specimen weight alone may suffice.)
- Tie cord -- cotton mailing string is good -- between blade hole(s) and muscle insertion tendon. (Ordinary suture breaks: nylon suture stretches.)
- Try to free up enough tendon to tie into a knot with string from blade. (Knot around tendon, without incorporating tendon in knot, always slips eventually. Even string sewn through tendon with needle usually slips.)
- For gastrocnemius muscle, cut off heel bone where tendon inserts to leave a bony knob that cannot slip through a simple knot. (For quadriceps, patellar bone may be used this way.)
- Rebalance transducer as described in "Test transducer" section above to compensate for offsets due to static (initial) forces of setup.
- If signal is inverted, flip transducer so measured force operates on blade in opposite direction.



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.

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

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.

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 1030, 1030C	$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

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