



Myofibril Test System

1700A



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The first of its kind – a turnkey system for measuring nano-Newton forces arising from activation of single myofibrils.

The 1700A Myofibril Test System is a complete system that includes all that is required to characterize myofibril contraction: the 470B Myofibril Atomic Force Microscopy (AFM) Transducer, 340A Piezo Length Controller, temperature controlled bath, 820A Dual XYZ Motion Controller and 821A motorized translation stages for computer control of both AFM cantilever and glass needle positioning, 828A Fast-Step Perfusion System, and our real-time Linux 600A Data Acquisition System.

The 470B Myofibril AFM Transducer utilizes atomic force microscopy and the optical beam deflection method to measure the nano Newton forces that arise from single myofibril activation. The myofibril is held between an AFM cantilever, which acts as a highly sensitive force transducer, and a glass needle connected to the Aurora Scientific 340A Piezo Length Controller.

Controlling length and measuring force conveniently permits complete mechanical characterization of the myofibril. Depending on the cantilever used, the fullscale force realized is 1-10 μ N with an astounding resolution of 1nN. In addition, the 1700A contains a temperature regulated tissue bath as well as controls for a buffer exchange system, crucial components for quick activation of any myofibril. The apparatus can easily be mounted on an inverted microscope, providing easy and clear access to both the bath and sample being studied.

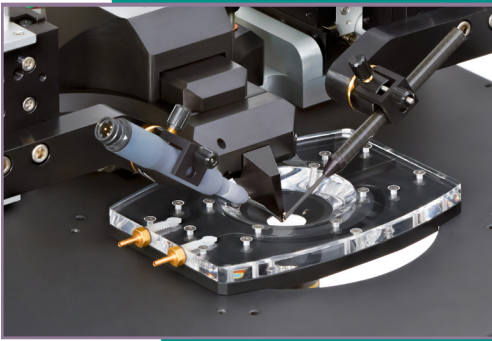
Customizable protocols for mechanical characterization of myofibrils can be performed using our 600A Data Acquisition System. When combined with our 901D High-Speed Video Sarcomere Length (HVSL) Software, the researcher can control and measure length, force and sarcomere length.

System Components

- 340A** Piezo Length Controller
- 470B** Myofibril Atomic Force Microscopy (AFM) Transducer
- 600A** Complete Data Acquisition and Digital Controller System
- 820A** Dual XYZ Motion Controller
- 821A** Motorized XYZ Translation Stages
- 828A** Fast-Step Perfusion System

Features

- Complete test system for permeabilized myofibrils
- Simple mounting on an inverted microscope
- Computer controlled, motorized XYZ micro-positioning stages
- Temperature regulated bath along with controls for buffer valve and solution switcher
- Control and measure force, length, and sarcomere spacing
- Measure force-pCA, kTR, stiffness, length-tension and force-velocity relationships
- Seamlessly interfaces with high speed video sarcomere length system (HVSL)



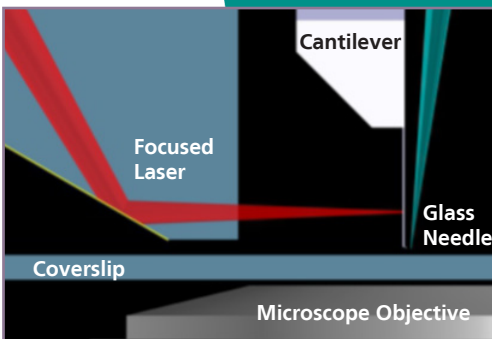
Complete Myofibril Test System

The Penguin myofibril test system is the first commercially available system specifically designed to measure the nanoNewton forces arising from activation of single myofibrils. The 1700A is a complete test system including all hardware required to characterize myofibril contraction.



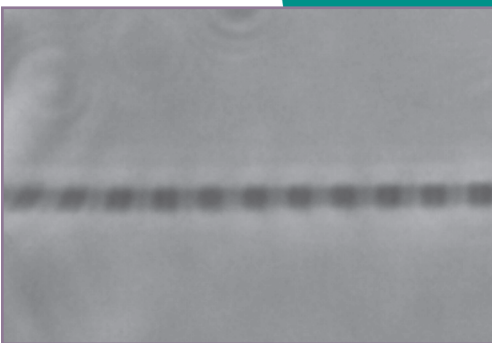
Powerful Software with Standard Protocols

The software's protocol library includes a variety of experiments for myofibril studies with simple applets for adjusting system settings. Pre-written functions allow you to add your own custom protocols and to streamline system operation with multiple lab members. Includes dedicated software module designed to simplify and automate Penguin calibration and control.



Amazing 1 nN Force Resolution

The Penguin works by employing atomic force microscopy (AFM) and the optical beam deflection (OBD) method. Laser light is used to measure cantilever deflection resulting from forces generated while a myofibril is held between the AFM cantilever and a glass needle. The glass needle is also connected to a length controller thus providing control of myofibril length.



Integrate With Sarcomere Length

Setting your resting sarcomere length accurately becomes trivial when pairing the 1700A with our 901D High-Speed Video Sarcomere Length Software. The high frame rate camera synchronizes with the data acquisition software enabling force, fiber length and SL to be collected in real time in a single, time-synchronized file.



Friendly and Reliable Support

We stand by our products and by our customers. We can provide complete onsite installation, full service training and detailed instruction regarding software controls. As your partner in research we do all we can to ensure your studies stay on track and deliver the data you need.

Select Publications

Assessing Cardiac Contractility From Single Molecules to Whole Hearts.

Garg Ankit et al. JACC Basic Transl Sci. (2023) 9.3:414-439. PMID: 38559627

Human myocytes are protected from titin aggregation-induced stiffening by small heat shock proteins.

Kötter, Sebastian, et al. The Journal of Cell Biology 204.2 (2014): 187-202. PMID: 24421331

S-glutathionylation of cryptic cysteines enhances titin elasticity by blocking protein folding.

Alegre-Cebollada, Jorge, et al. Cell 156.6 (2014): 1235-1246. PMID: 24630725

Deranged myofilament phosphorylation and function in experimental heart failure with preserved ejection fraction.

Hamdani, Nazha, et al. Cardiovascular Research 97.3 (2013): 464-471. PMID: 23213108

Fabrication and evaluation of reconstructed cardiac tissue and its application to bio-actuated microdevices.

Horiguchi, Hiroshi, et al. NanoBioscience, IEEE Transactions on 8.4 (2009): 349-355. PMID: 20142148

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