

LEMI-1 CCD Young's Modulus Measuring Instrument

- *Easy operation*
- *Visual result*
- *Ideal for demonstration*
- *Comprehensive Documentation*



When rigid materials are subject to particular stress or forces, deformations (compression, twisting, stretching, etc) may occur. For many materials, after it has suffered from a force or stress, the resisting or restoring force that tends to return the material to its original shape is proportional to the deformation.

Young's Modulus, E , is a constant that describes the material's mechanical property of stiffness and is expressed as the ratio of stress to strain for a material experiencing tensile or compressive stress.

We designed this apparatus to demonstrate that the deformation is proportional to the strain for a metal wire under load which is parallel to the axis of the wire and is applied to one end while the opposite end is

Specifications

Stainless Steel Wire	50 cm long, 0.20 mm in diameter
Molybdenum Wire	50 cm long, 0.1 mm and 0.18 mm in diameter
Upright Column	About 60 cm in height
Reading Microscope	Measuring range: 3 mm, minimum graduation: 0.05 mm, 20×
CCD Camera	Effective pixel: 752(H) × 582(V)
Video Monitor	Black and white, 14 inches, input Impedance: 75 Ω
Operating Temperature	-5°~ 40°
Ambient Humidity	10 ~ 80 %
Relative Uncertainty of Measurement	<5%

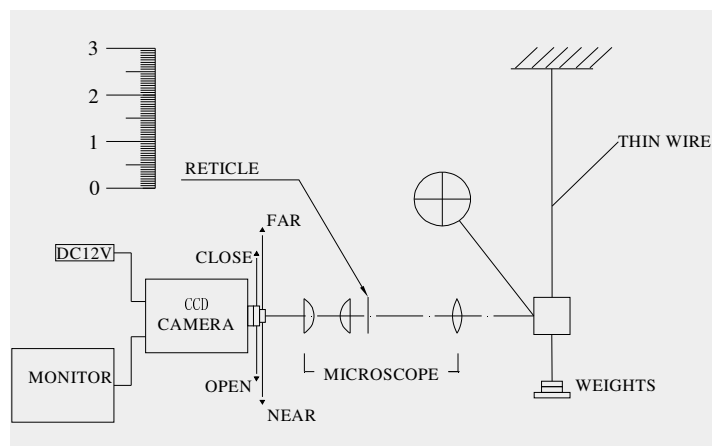
Features

- Easy to operate
- Simple structure and stable performance
- Visual result displayed by a monitor
- Ideal for demonstration purpose
- Comprehensive documentation for principle and usage

Schematic

As shown in the picture, right, a metal wire under load with weights extends a small amount of ΔL . The displacement is imaged and magnified by a microscope. A CCD captures the magnified image and is displayed on a monitor.

Generally, ΔL is a very small for most materials. However, with the help of a CCD and a monitor, the accurate measurement can be achieved with ease.



Parts included

Description	Specifications	Qty
Weight	100g, 200g	1,9
Weight holder		1
3-D adjustment base		1
Screw driver		1
Microscope	Graduation: 0.05 mm, 20×	1
Magnetize base		1
CCD camera	White and black	1
Power supply	AC/DC adaptor	1
Video cable	75Ω impedance	1
Camera lens	$f=16\text{mm}$	1

