

## 5948 MicroTester | Ultra-High Precision System for Mechanical Testing

### Engineered for Small-Scale Testing

The Model 5948 MicroTester provides solutions to the challenges of testing small assemblies or miniature specimens. It combines an ultra-high precision drive system with high-accuracy load measurement to perform tension, compression, and low-cycle fatigue tests with the utmost control and data collection performance.

To meet the needs for micro-position displacement control associated with testing microelectronic, biomedical, or subminiature specimens, the preloaded ballscrew drive system is equipped with both a rotary encoder and a 20 nm resolution linear glass-scale encoder. The combination of these provide unparalleled displacement control performance in a mechanical testing system for displacement-sensitive tests.

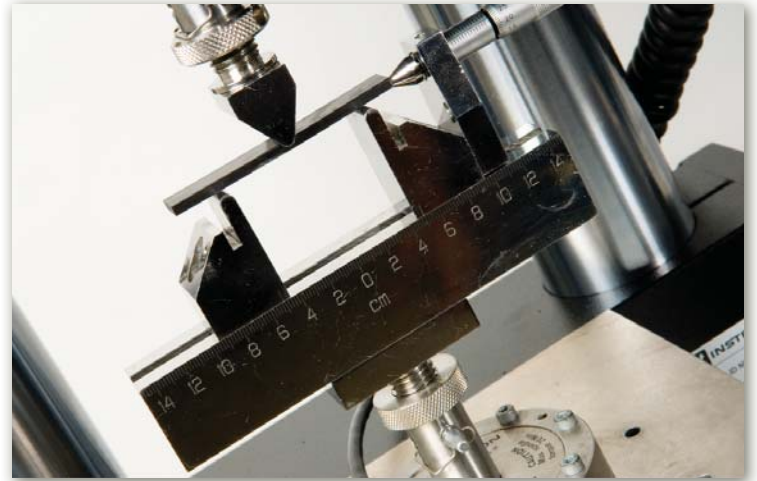
The 2580 Series load cells available with the MicroTester complement the displacement performance with equally accurate force measurement and control, from the 2 kN maximum capacity of the system down to grams.

The combination of precision drive, world-class force measurement, and a load frame designed for easy access and flexibility, create a testing environment ideal for research and testing on small scale components, materials, and systems.



## General Purpose Research

The Instron® Model 5948 MicroTester provides researchers with a precision instrument capable of performing numerous mechanical tests. For applications requiring precision control, high-load frame stiffness, high-drive system stiffness, and sensitive load measurement, the 5948 provides a superior platform for generating quality, reliable force-displacement data. Combined with Bluehill® Software, the possibilities are limitless.



## Microelectronics Application

Many features of the Model 5948 MicroTester were created specifically to meet the needs of microelectronics applications: small-scale displacements for die shear testing of chips and IC's, solder ball adhesion and shear testing, peel testing of thin films and substrates, or lap shear testing of bonded interfaces. A variety of tests, either in air or non-ambient conditions, are possible due to the flexibility of the load frame and base platen, the precision of the actuator, and the accuracy of the load measurement.



## Biomedical Applications

The increasing use of implantable devices, engineered tissues, and small-scale devices have generated a need for an entirely new range of small-scale testing. Furthermore, the addition of baths, fixturing, and specialty grips may call for testing in vertical or horizontal modes. To this end, the Model 5948 MicroTester can be used to test everything from sutures to tissues to stents and implantable devices – vertically or horizontally. Additionally, non-contacting Advanced Video Extensometry (AVE) makes it possible to measure strain directly on the specimen when contact extensometry is not suitable. A host of standard and custom fixturing are available for testing specimens of all shapes and sizes.



## Key Features

- Force range for various specimen sizes:  
<math>< 20 \text{ mN}</math> (2 grams, 0.004 lbf) to 2 kN (200 kgf, 450 lbf)
- Open and unobstructed workspace accommodates odd-shaped components
- High-stiffness load frame for accurate and repeatable test conditions
- Vertical or horizontal load frame positioning for flexible testing configurations
- Position resolution for ultra-precise displacement control: 20 nm (0.8  $\mu\text{m}$ )
- Electromechanical (non-hydraulic) drive system is clean and quiet, and is vastly stiffer than electrodynamic systems providing greater control and resolution during sensitive tests
- Optional chamber for non-ambient testing





# Specifications

5948

Load Capacity (Static)	kN	2
	kgf	200
	lbf	450
Maximum Speed	mm/min	1,500
	in/min	59
Return Speed	mm/min	600
	in/min	23.6
Position Control Resolution	nm	20
	$\mu$ in	0.8
Load Measurement Accuracy <sup>1</sup>		$\pm 0.5\%$ of reading down to 1/500 of load cell capacity with 2580 series load cells
Total Actuator Travel	mm	110
	in	4.3
Frame Axial Stiffness <sup>2</sup>	kN/mm	8.3
	lb/in	47,500
Maximum Vertical Test Space <sup>3</sup>	mm	680
	in	26.8
Horizontal Space Between Columns	mm	190
	in	7.5
Weight	kg	80
	lb	176

## Common Specifications

### Position Measurement Accuracy:

- $\pm 0.5 \mu\text{m}$  over 250  $\mu\text{m}$  of travel
- $\pm 2.5 \mu\text{m}$  over 10 mm of travel
- $\pm 6 \mu\text{m}$  over 100 mm of travel

### Actuator Speed Accuracy:

- .05% of set speed
- (measured over 100 mm or 30 s, whichever is greater)

### Effective Test Space With Load Cell Installed (Includes the "O" adapter on the load cell only):

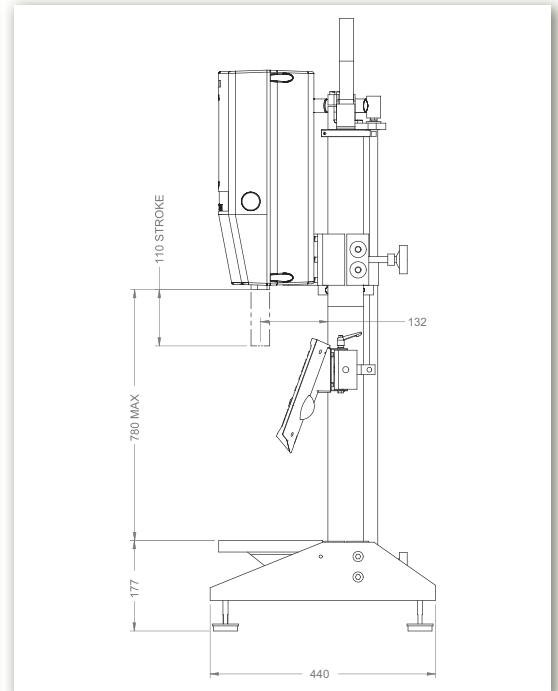
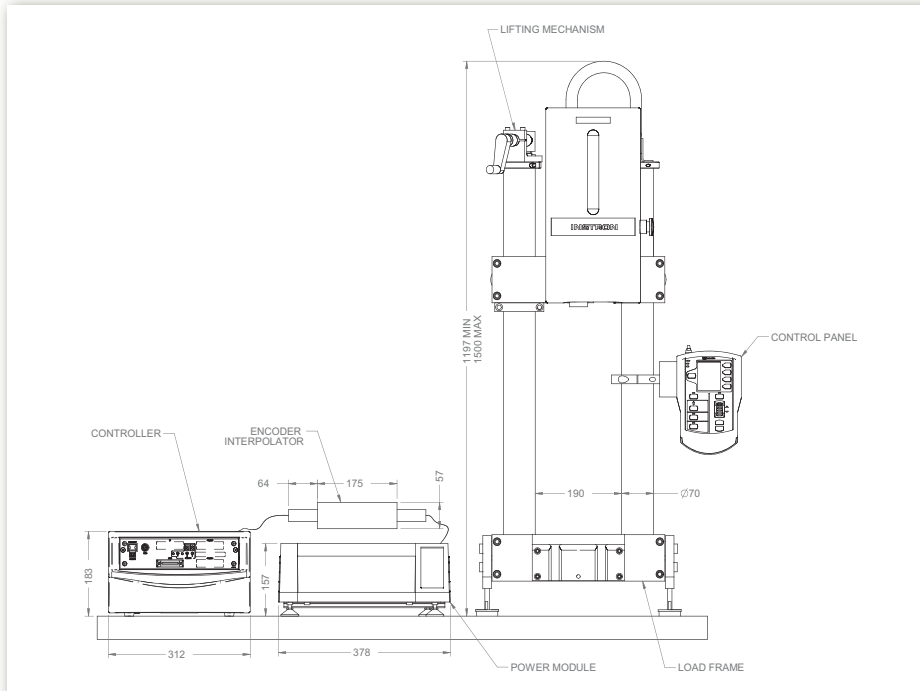
		2580 (up to 2 kN)	2530 (up to 100 N)
Cell on Piston	mm	626	669
	in	24.64	26.33
Cell on Base	mm	689	732
	in	27.13	28.82

### "O" Coupling Effective Length

On the Piston	mm	25
	in	0.98
On the Base	mm	31
	in	1.22

### Notes:

- Load weighing system meets or surpasses: ASTM E4, ISO 7500-1, EN10002-2.
- Crosshead at midpoint position. Does not include load cell deflection.
- Crosshead at furthestmost position, base to end of actuator, actuator fully retracted.  
See tables: Effective Test Space with Cells Installed and "O" Coupling Effective Length



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