

# Force and Torque Measurement Products

Catalog 24



**MARK-10**

Force and Torque Measurement Engineered Better



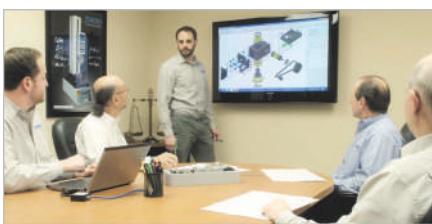
# About Mark-10

**Mark-10 Corporation is a designer and manufacturer of force and torque measurement products. Since our founding in 1979, our products have proven themselves in numerous applications at companies in the automotive, medical device, plastics, textile, pharmaceutical, packaging, food, and virtually every other industry, worldwide.**



## Focus On Engineering

Founded in 1979 as an engineering consultancy, and branching out into contract manufacturing in the 1980s, Mark-10 has focused on better engineering and technical expertise from our very beginning. Having acquired years of expertise in force measurement, we developed our first force gauge in 1990. Our product line has grown significantly since then, including indicators with remote sensors, manual and motorized test stands, a full range of grips and fixtures, along with software and accessories.



## A Culture of Innovation

As an independent, family-run business, we are free to make decisions that best serve our customers' interests. Through frequent collaboration between Engineering, Manufacturing, Marketing, and Sales, we keep a pulse on the market, and address our customers' needs with products which are elegant, easy to use, and cost effective.



## Integrated Manufacturing

Within the walls of our fully integrated Copiague, NY facility, a product often starts out as a chat over a cup of coffee. Utilizing the latest in design technologies, CNC machining, and a talented team of technicians and assemblers, product ideas come to life. Technical support and customer service are just down the hallway. With our team under one roof, customer questions and feedback are addressed quickly and accurately.





# Industries & Applications



## Medical Device & Pharmaceutical

- Needle penetration force
- Tablet crush force
- Suture strength
- Packaging peel force
- Syringe plunger force
- Tubing connector pull-off force
- Dental and bone screw torque
- Stopcock torque
- Catheter torque
- Luer lock torque
- Adhesive strength of bandages
- Latex glove strength
- Mask elastic band strength
- Disinfecting wipes strength



## Automotive

- Switch activation force
- Ergonomics / job task analysis
- Rotary dial torque
- Torque tool calibration
- Seat belt retraction force
- Job task analysis
- Fastener torque testing
- Ignition switch torque measurement
- Turn signal stalk activation testing
- Wire terminal crimp pull testing
- Spring testing
- Bearing torque testing
- Coefficient of friction testing
- Windshield wiper arm force



## Springs

- Extension spring testing
- Compression spring testing
- Torsion spring testing



## Aerospace

- Spring testing
- Wire terminal crimp pull testing
- Force and torque testing of dials and switches
- Passenger control button activation force
- Bearing torque testing
- Cable tension testing
- Tensile strength of materials



## Electronics

- Switch force activation
- PCB bend testing
- Wire crimp pull testing
- Component pull-off testing
- Component shear testing
- Peel strength
- Keypad testing
- Connector insertion/withdrawal force



## Packaging

- 90° peel testing of adhesive tapes
- T-peel tests of flexible packaging materials
- 180° peel testing
- Opening force testing
- Score bend testing
- Bottle cap torque testing
- Coefficient of friction testing
- Top-load testing of bottles and cartons
- Foil seal pull-off testing
- Sterilized packaging testing



## Ergonomics & Job Task Analysis

- Pushing a wheelchair or cart
- Loading and unloading boxes
- Luggage / cargo handling
- Operating heavy machinery
- Muscle strength testing
- Fitness assessment
- Lifting boxes
- Pulling items from racks



## Food and Beverage

- Bottle cap torque testing
- Bottle cap pull-off force testing
- Food texture analysis
- Top load testing
- Burst testing
- Crush testing

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# Configuring a Mark-10 System



## Force Testing Systems

### Test frame

Produces the force needed for the test. A test frame eliminates much of the variability inherent in hand-held testing with a force gauge. Motorized and manual models are available.

### Force sensor / gauge

Measures and displays the force produced on the test sample. Ranges available from 0.12 to 500 lbF [0.5 N to 2.5 kN]. Accurate up to  $\pm 0.1\%$  of full scale.

### Control panel

For motorized test frames, choose from IntelliMESUR® or EasyMESUR® integrated motion control and data collection solutions.

### Grips and attachments

Choose from a wide range of grips and attachments, many designed for specific tests such as peel testing, wire terminal testing, and more.



## Torque Testing Systems

### Test stand

Produces the torque needed for the test. A test stand eliminates much of the variability inherent in hand-held testing with a torque gauge. Motorized and manual models are available.

### Torque indicator / gauge

Measures and displays the torque being produced on the test sample. Choose a force/torque indicator with Series R50 remote sensor, or the basic all-in-one TT03. Several torque capacities are available. All mount to Mark-10 torque test stands without the need for any extra adapters.

### Grips and attachments

Choose from a selection of grips and attachments, designed for such applications as bottle cap torque testing, fastener torque testing, and more.

## Force Gauges

Mark-10 digital force gauges can be used in a virtually limitless number of tension and compression testing applications. All force gauges capture the peak force in both tension and compression, and have selectable units of measurement. Capacities are available from 50 gF full scale to 2,000 lbF. Gauges may be handheld or used with a force test stand and gripping fixtures to create a complete testing solution.



[www.mark-10.com/force-gauges](http://www.mark-10.com/force-gauges)





## Series 7

### Professional Digital Force Gauges

Series 7 professional digital force gauges are designed with a number of sophisticated features for the most demanding tension and compression measurement applications, up to 500 lbF (2,500 N). The gauges feature  $\pm 0.1\%$  accuracy and a blazingly fast, industry-leading sampling rate of 14,000 Hz, producing reliable results for extremely quick-action tests.

#### Features:

##### ■ High speed data capture and storage

Capture and store up to 5,000 continuous data points at a rate of up to 14,000 readings per second. This unique function is ideal for capturing switch activation forces, sharp breaks, and other short-duration applications.

##### ■ Automatic data output / save / zero / I/O pin toggle

Upon peak force detection, I/O pin toggle can stop a Mark-10 motorized test stand.

##### ■ Programmable footswitch command string

Up to 3 functions may be specified, along with delays between each function.

##### ■ Custom unit

A user-defined unit multiplier may be programmed for custom applications.

##### ■ 1st / 2nd peak detection

For tensile testing and other applications.

## Series 5

### Advanced Digital Force Gauges

Series 5 premium digital force gauges feature a fast sampling rate of 7,000 Hz and  $\pm 0.1\%$  accuracy. Additional advanced features such as averaging mode, external trigger mode, password protection, and data memory for 1,000 readings make this flexible gauge series ideal for a wide range of applications. Capacities up to 2,000 lbF [10,000 N].

#### Features:

##### ■ Communication with external devices

Full ASCII command set, allowing for communication with a PC, PLC, or other device through USB or RS-232. Mitutoyo and analog outputs also included.

##### ■ Averaging / external trigger modes

Addresses the need to record the average force over time, useful in applications such as peel testing, while external trigger mode makes switch activation testing simple and accurate.

##### ■ Data memory

1,000-point data memory with statistics (min, max, mean, standard deviation), and outputs.

##### ■ Password protection

Passwords may be set for calibration and for individual keys, designed to protect the gauge against unauthorized changes.



## Force Gauges



### Series 5 COF

#### Coefficient of Friction Gauges

The M5-2-COF coefficient of friction (COF) gauge is an integral part of a COF testing system, typically including a motorized test stand and COF fixture. With a capacity of 2 lbF [10 N], the gauge can be used to measure friction for a wide range of materials, ideal for conformance to ASTM D1894 and other relevant standards. Static and kinetic coefficients are displayed on the backlit LCD, and are calculated from a user-programmable sled weight.

#### Features:

##### ■ Programmable sled weight

The COF is calculated based on the sled weight, adjustable from 100 to 1,000 g, to conform to various standards. A password can be set to protect settings from unauthorized changes.

##### ■ Communication with external devices

Full ASCII command set, allowing for communication with a PC, PLC, or other device through USB or RS-232. Mitutoyo and analog outputs also included.

##### ■ Data memory

1,000-point data memory with statistics (min, max, mean, standard deviation), and outputs.

##### ■ Password protection

Passwords may be set for calibration and for individual keys, designed to protect the gauge against unauthorized changes.



### Series 4

#### Advanced Digital Force Gauges

Series 4 advanced digital force gauges feature a sampling rate of 3,000 Hz and  $\pm 0.2\%$  accuracy, producing reliable, accurate results in a wide range of applications. Set point indicators with outputs are ideal for pass/fail testing, while an analog load bar provides graphical representation of applied load. Data memory for 50 readings is also provided, along with data communication capabilities.

#### Features:

##### ■ Data outputs

USB, RS-232, Mitutoyo, and analog outputs.

##### ■ Data memory

50-point data memory with statistics (min, max, mean, standard deviation), and outputs.

##### ■ Set point indicators with outputs

High, low, and in-range indicators and outputs are activated according to programmed upper and lower set points.

##### ■ Analog load bar

Provides visual representation of applied load, and helps provide feedback for an imminent overload condition.



## Series 3

### Basic Digital Force Gauges

Series 3 basic digital force gauges feature a sampling rate of 2,000 Hz and  $\pm 0.3\%$  accuracy, ideal for numerous applications in virtually every industry. Set point indicators are useful for visual pass/fail testing, while an analog load bar provides graphical representation of applied load. Ultra-compact, reversible housing allows for flexibility in many mounting configurations with space constraints.

#### Features:

##### ■ **USB data output**

Continuous or individual readings may be output to a PC through included USB output.

##### ■ **Set point indicators**

High, low, and in-range indicators are displayed according to programmed upper and lower set points.

##### ■ **Analog load bar**

Provides visual representation of applied load, and helps provide feedback for an imminent overload condition.

##### ■ **Ultra-compact design**

Allows for flexibility in many mounting configurations. Reversible housing allows for hand-held use or test stand mounting.



## Series 2

### Economical Digital Force Gauges

Series 2 digital force gauges are designed for basic tension and compression force testing applications up to 500 lbF (2,250 N). Peak tension and compression readings are reliably captured via the gauges'  $\pm 0.5\%$  accuracy and 500 Hz sampling rate. A backlit graphic LCD displays the current, peak tension, or peak compression reading. Features an ultra-compact, reversible housing.

#### Features:

##### ■ **Peak capture**

For compression and tension measurements.

##### ■ **Selectable units of measurement**

Select lbF, kgF, or N.

##### ■ **Battery or AC powered**

Powered by a rechargeable battery or AC adapter.

##### ■ **Ultra-compact design**

Allows for flexibility in many mounting configurations. Reversible housing allows for hand-held use or test stand mounting.



## Specifications

		Series 7 Professional		Series 5 Advanced		Series 4 Performance
<b>Accuracy (% of full scale)</b>		±0.1%				±0.2%
<b>Sampling rate</b>	14,000 Hz		7,000 Hz			3,000 Hz
<b>Resolution</b>		1/5,000				1/2,000
<b>Outputs</b>		USB, RS-232, Mitutoyo, Analog				
<b>RS-232</b>	Configurable up to 230,400 baud			Configurable up to 115,200 baud		
<b>USB</b>	Configurable up to 230,400 baud			Configurable up to 115,200 baud		
<b>Mitutoyo (Digimatic)</b>		Serial BCD suitable for all Mitutoyo SPC-compatible devices				
<b>Analog</b>		±1 VDC, ±0.25% FS at capacity. Positive for compression, negative for tension				
<b>General purpose I/O</b>		Three open drain outputs, one input				
<b>Set point</b>		Three open drain lines				
<b>MESUR® Lite software included</b>		Yes				
<b>Data output functionality</b>	Automatic output or by pressing DATA button, or requesting from a PC or other device.			By pressing DATA button, or requesting from a PC or other device (currently displayed reading only).		
<b>ASCII command set for external control</b>		Full command set			“?” only (request current reading)	
<b>Interface w/MESUR® gauge and MESUR® Lite</b>		Full communication			Single point or continuous data output only	
<b>Interface w/ESM303 / 750 / 1500 test stands</b>		Full communication, including PC control			Limited to force data, overload protection, and force set points	
<b>Data memory (readings, with output)</b>	5,000		1,000			50
<b>Data memory deletion</b>		Any individual data point, or clear all				
<b>Statistic calculations and output to PC</b>		Max, min, mean, std. dev., number of readings, with output				
<b>Break detection</b>	Yes*				No	
<b>1st / 2nd peak detection</b>	Yes*				No	
<b>Programmable footswitch command string</b>	Yes				No	
<b>Averaging mode</b>	Yes*		Yes			No
<b>External trigger mode</b>	Yes**		Yes			No
<b>Analog load bar graph shown on display</b>		Yes				
<b>Set points (for pass / fail indication)</b>		Yes with high / low indicators, markers on analog bar graph, and outputs				
<b>Password protection</b>		Yes, for calibration and individual keys				No
<b>Peak readings always displayed</b>		Yes				
<b>Programmable audible tones</b>		Yes				
<b>Calibration procedure</b>		Configurable number of data points (up to 10 in each direction)				
<b>Overload outputs</b>		Dedicated pins for tension and compression				
<b>Battery life</b>	Rechargeable. Backlight on: up to 7 hours of continuous use / Backlight off: up to 24 hours of continuous use					
<b>Units of measurement</b>		lbF, ozF, gF, kgF, N, kN, mN (depending on model)				
<b>Safe overload</b>		150% of full scale (display shows warning at 110% and above)				
<b>Weight (lb [kg])</b>	M7-012 - M7-100: 1.0 [0.45] M7-200 - M7-500: 1.2 [0.54]	M5-012 - M5-100: 1.0 [0.45] M5-200 - M5-500: 1.2 [0.54] M5-750 - M5-2000: 1.8 [0.82]			M4-012 - M4-100: 1.0 [0.45] M4-200 - M4-500: 1.2 [0.54]	
<b>Included items</b>	Carrying case, chisel, cone, V-groove, hook, flat, extension rod, universal voltage AC adapter/charger, rechargeable battery, quick-start guide, USB cable, NIST-traceable certificate of calibration with data. Download free MESUR® Lite or MESUR® Gauge demo period at <a href="http://www.mark-10.com/software">www.mark-10.com/software</a> .					

\* With configurable automatic data output, data storage, and zero function upon event completion. Can also stop travel of certain motorized test stands.

\*\* Can stop certain motorized test stands upon event completion.



	Series 3 Basic		Series 2 Economical	
±0.3%			±0.5%	Accuracy (% of full scale)
2,000 Hz			500 Hz	Sampling rate
	1/1,000			Resolution
USB			No	Outputs
No			N/A	RS-232
Configurable up to 115,200 baud			N/A	USB
No			N/A	Mitutoyo (Digimatic)
No			N/A	Analog
No			N/A	General purpose I/O
No			N/A	Set point
Yes			N/A	MESUR® Lite software included
By pressing DATA button, or requesting from a PC or other device (currently displayed reading only).			N/A	Data output functionality
"?" only (request current reading)			N/A	ASCII command set for external control
Single point or continuous data output only			N/A	Interface w/MESUR® gauge and MESUR® Lite
No			N/A	Interface w/ESM303 / 750 / 1500 test stands
	No			Data memory (readings, with output)
	N/A			Data memory deletion
	N/A			Statistic calculations and output to PC
	No			Break detection
	No			1st / 2nd peak detection
	No			Programmable footswitch command string
No			N/A	Averaging mode
No			No	External trigger mode
Yes			No	Analog load bar graph shown on display
Yes with high/low indicators, markers on analog bar graph, no output			No	Set points (for pass / fail indication)
	No			Password protection
Yes			No (Peak mode must be selected)	Peak readings always displayed
Yes			No	Programmable audible tones
Configurable number of data points (up to 10 in each direction)				Calibration procedure
No			N/A	Overload outputs
Rechargeable. Backlight on: up to 7 hours of continuous use / Backlight off: up to 24 hours of continuous use				Battery life
IbF, gF, kgF, N (depending on model)			IbF, kgF, N	Units of measurement
150% of full scale (display shows warning at 110% and above)				Safe overload
M3-012 - M3-100: 0.7 [0.33] M3-200 - M3-500: 0.9 [0.41]		M2-2 - M2-100: 0.7 [0.33] M2-200 - M2-500: 0.9 [0.41]		Weight (lb [kg])
Carrying case, chisel, cone, V-groove, hook, flat, extension rod, universal voltage AC adapter/charger, rechargeable battery, quick-start guide, USB cable, NIST-traceable certificate of calibration without data. Download free MESUR® Lite or MESUR® Gauge demo period at <a href="http://www.mark-10.com/software">www.mark-10.com/software</a> .		Rechargeable battery, quick-start guide, certificate of conformance.		Included items



## Force Gauges

### Ordering Information

Model No.	Capacity x Resolution							
	lbF	ozF	kgF	gF	N	kN	mN	
Series 7	M7-012	0.12 x 0.00002	2 x 0.0005	-	50 x 0.01	0.5 x 0.0001	-	500 x 0.1
	M7-025	0.25 x 0.00005	4 x 0.001	-	100 x 0.02	1 x 0.0002	-	1000 x 0.2
	M7-05	0.5 x 0.0001	8 x 0.002	-	250 x 0.05	2.5 x 0.0005	-	2500 x 0.5
	M7-2	2 x 0.0005	32 x 0.01	1 x 0.0002	1000 x 0.2	10 x 0.002	-	-
	M7-5	5 x 0.001	80 x 0.02	2.5 x 0.0005	2500 x 0.5	25 x 0.005	-	-
	M7-10	10 x 0.002	160 x 0.05	5 x 0.001	5000 x 1	50 x 0.01	-	-
	M7-20	20 x 0.005	320 x 0.1	10 x 0.002	10000 x 2	100 x 0.02	-	-
	M7-50	50 x 0.01	800 x 0.2	25 x 0.005	25000 x 5	250 x 0.05	-	-
	M7-100	100 x 0.02	1600 x 0.5	50 x 0.01	50000 x 10	500 x 0.1	-	-
	M7-200	200 x 0.05	3200 x 1	100 x 0.02	-	1000 x 0.2	1 x 0.0002	-
Series 5	M7-500	500 x 0.1	8000 x 2	250 x 0.05	-	2500 x 0.5	2.5 x 0.0005	-
	M5-012	0.12 x 0.00002	2 x 0.0005	-	50 x 0.01	0.5 x 0.0001	-	500 x 0.1
	M5-025	0.25 x 0.00005	4 x 0.001	-	100 x 0.02	1 x 0.0002	-	1000 x 0.2
	M5-05	0.5 x 0.0001	8 x 0.002	-	250 x 0.05	2.5 x 0.0005	-	2500 x 0.5
	M5-2	2 x 0.0005	32 x 0.01	1 x 0.0002	1000 x 0.2	10 x 0.002	-	-
	M5-5	5 x 0.001	80 x 0.02	2.5 x 0.0005	2500 x 0.5	25 x 0.005	-	-
	M5-10	10 x 0.002	160 x 0.05	5 x 0.001	5000 x 1	50 x 0.01	-	-
	M5-20	20 x 0.005	320 x 0.1	10 x 0.002	10000 x 2	100 x 0.02	-	-
	M5-50	50 x 0.01	800 x 0.2	25 x 0.005	25000 x 5	250 x 0.05	-	-
	M5-100	100 x 0.02	1600 x 0.5	50 x 0.01	50000 x 10	500 x 0.1	-	-
	M5-200	200 x 0.05	3200 x 1	100 x 0.02	-	1000 x 0.2	1 x 0.0002	-
	M5-300	300 x 0.1	4800 x 2	150 x 0.05	-	1500 x 0.5	1.5 x 0.0005	-
	M5-500	500 x 0.1	8000 x 2	250 x 0.2	-	2500 x 0.5	2.5 x 0.0005	-
	M5-750	750 x 0.5	12000 x 10	375 x 0.2	-	3750 x 2	3.75 x 0.002	-
	M5-1000	1000 x 0.5	16000 x 5	500 x 0.2	-	5000 x 2	5 x 0.002	-
	M5-1500	1500 x 1	24000 x 20	750 x 0.5	-	7500 x 5	7.5 x 0.005	-
	M5-2000	2000 x 1	32000 x 20	1000 x 0.5	-	10000 x 5	10 x 0.005	-
Series 4	M4-012	0.12 x 0.00005	2 x 0.001	-	50 x 0.02	0.5 x 0.0002	-	500 x 0.2
	M4-025	0.25 x 0.0001	4 x 0.002	-	100 x 0.05	1 x 0.0005	-	1000 x 0.5
	M4-05	0.5 x 0.0002	8 x 0.005	-	250 x 0.1	2.5 x 0.001	-	2500 x 1
	M4-2	2 x 0.001	32 x 0.02	1 x 0.0005	1000 x 0.5	10 x 0.005	-	-
	M4-5	5 x 0.002	80 x 0.05	2.5 x 0.001	2500 x 1	25 x 0.01	-	-
	M4-10	10 x 0.005	160 x 0.1	5 x 0.002	5000 x 2	50 x 0.02	-	-
	M4-20	20 x 0.01	320 x 0.2	10 x 0.005	10000 x 5	100 x 0.05	-	-
	M4-50	50 x 0.02	800 x 0.5	25 x 0.01	25000 x 10	250 x 0.1	-	-
	M4-100	100 x 0.05	1600 x 1	50 x 0.02	50000 x 20	500 x 0.2	-	-
	M4-200	200 x 0.1	3200 x 2	100 x 0.05	-	1000 x 0.5	1 x 0.0005	-
	M4-500	500 x 0.2	8000 x 5	250 x 0.1	-	2500 x 1	2.5 x 0.001	-





Model No.	Capacity x Resolution				
	IbF	kgF	gf	N	
Series 3	M3-012	0.12 x 0.0001	-	50 x 0.05	0.5 x 0.0005
	M3-025	0.25 x 0.0002	-	100 x 0.1	1 x 0.001
	M3-05	0.5 x 0.0005	-	250 x 0.2	2.5 x 0.002
	M3-2	2 x 0.002	1 x 0.001	-	10 x 0.01
	M3-5	5 x 0.005	2.5 x 0.002	-	25 x 0.02
	M3-10	10 x 0.01	5 x 0.005	-	50 x 0.05
	M3-20	20 x 0.02	10 x 0.01	-	100 x 0.1
	M3-50	50 x 0.05	25 x 0.02	-	250 x 0.2
	M3-100	100 x 0.1	50 x 0.05	-	500 x 0.5
	M3-200	200 x 0.2	100 x 0.1	-	1000 x 1
Series 2	M3-500	500 x 0.5	250 x 0.2	-	2500 x 2
	M2-2	2 x 0.002	1 x 0.001	-	10 x 0.01
	M2-5	5 x 0.005	2.5 x 0.002	-	25 x 0.02
	M2-10	10 x 0.01	5 x 0.005	-	50 x 0.05
	M2-20	20 x 0.02	10 x 0.01	-	100 x 0.1
	M2-50	50 x 0.05	25 x 0.02	-	250 x 0.2
	M2-100	100 x 0.1	50 x 0.05	-	500 x 0.5
	M2-200	200 x 0.2	100 x 0.1	-	1000 x 1
	M2-500	500 x 0.5	250 x 0.2	-	2500 x 2

All models include 110V AC adapters

Add suffix 'E' for euro plug (220V), 'U' for UK plug (220V) or 'A' for Australian plug (220V)

Example: M5-05E, M3-20U, M2-100A





## Torque Gauges

[www.mark-10.com/torque-gauges](http://www.mark-10.com/torque-gauges)



### Series TT01

#### Cap Torque Testers

Series TT01 cap torque testers provide closure manufacturers, bottlers, and food and beverage companies an accurate and simple way to measure application and removal torques. Adjustable posts grip a broad range of container shapes and sizes, while sets of optional jaws are available as an alternative gripping methods. Peak torque readings are always shown on the large, backlit graphic display.

#### Features:

##### ■ USB, RS-232, Mitutoyo, and analog outputs

##### ■ Data memory

1,000-point data memory with statistics (min, max, mean, standard deviation), and outputs.

##### ■ Set point indicators with outputs

Convenient for pass/fail testing.

##### ■ Automatic data output / save / zero

Upon peak torque detection.

##### ■ 1st / 2nd peak detection

For slip and breakaway torques in tamper-evident closures.

### Series TT02

#### Torque Tool Testers

Series TT02 torque tool testers present a simple yet accurate solution for testing torque screwdrivers, wrenches, and other tools. The TT02 features a solid aluminum housing, making it rugged enough for many years of service in production or laboratory use, while a universal receptacle with square drive and grooves accepts common bits and attachments. 1st / 2nd peak detection is provided for click-type tools.

#### Features:

##### ■ USB, RS-232, Mitutoyo, and analog outputs

##### ■ Data memory

1,000-point data memory with statistics (min, max, mean, standard deviation), and outputs.

##### ■ Set point indicators with outputs

Convenient for pass/fail testing.

##### ■ Automatic data output / save / zero

Upon peak torque detection.

##### ■ 1st / 2nd peak detection

For slip and breakaway torques in tamper-evident closures.



## Series TT03

### Torque Gauges

Series TT03 digital torque gauges are designed for clockwise and counter-clockwise torque testing applications in virtually every industry, with capacities from 10 ozFin to 100 lbFin (7 to 1,150 Ncm). A dedicated remote torque sensor with Jacobs chuck can be used to grip a sample, bit, or fixture. The gauges' rugged aluminum housing allows for hand-held use or test stand mounting for more sophisticated testing requirements.

#### Features:

##### ■ Rugged, compact design

Indicator and remote sensor with Jacobs chuck. Can be hand-held or mounted to a test stand.

##### ■ USB data output

Continuous or individual readings may be output to a PC through included USB output.

##### ■ Set point indicators

High, low, and in-range indicators are displayed according to programmed upper and lower set points.

##### ■ Analog load bar

Provides visual representation of applied load, and helps provide feedback for an imminent overload condition.

## Series TT05

### Torque Testers

Series TT05 universal torque testers can be used for a range of applications up to 100 lbFin [11.5 Nm]. The stainless steel loading surface features a matrix of threaded holes, ideal for accommodating specialized fixtures and attachments. The testers' rugged design and simple, intuitive operation allow for use in laboratory and production environments. Technical specifications and functionality are the same as with Series TT01.

#### Features:

##### ■ Stainless steel loading plate with threaded holes

Accommodates specialized fixtures and attachments.

##### ■ USB, RS-232, Mitutoyo, and analog outputs

##### ■ Data memory

1,000-point data memory with statistics (min, max, mean, standard deviation), and outputs.

##### ■ Set point indicators with outputs

Convenient for pass/fail testing.

##### ■ Automatic data output / save / zero

Upon peak torque detection.



## Specifications



	TT01	TT05	TT02	TT03
<b>Accuracy (% of full scale)</b>	±0.3%	±0.3%	±0.3%	±0.5%
<b>Password protection</b>		Yes		No
<b>Sampling rate</b>	7,000 Hz			2,000 Hz
<b>Resolution</b>		1/1,000		
<b>Outputs</b>	USB, RS-232 Mitutoyo, Analog			USB
<b>USB / RS-232</b>		Configurable up to 115,200 baud		
<b>Mitutoyo (Digimatic)</b>	Serial BCD suitable for all Mitutoyo SPC-compatible devices			N/A
<b>Analog</b>	±1 VDC, ±0.25% FS. + for compression / CW, - for tension / CCW			N/A
<b>General purpose I/O</b>	Three open drain outputs, one input			N/A
<b>Set point</b>	Yes, three open drain lines			No
<b>MESUR® Lite software included</b>		Yes		
<b>Communication with MESUR® gauge and MESUR® Lite software</b>	Single point or continuous data, send from gauge or request from software			
<b>Data memory</b>	1,000 readings, with output			No
<b>Data memory deletion</b>	Individual data points, or clear all			N/A
<b>Statistics calculations</b>	Max, min, mean, std. dev., number of readings, with output			N/A
<b>Analog load bar graph shown on display</b>		Yes		
<b>Keypad password protection</b>	Yes, for calibration and keys			No
<b>Peak readings calculated</b>		Yes		
<b>Break detection*</b>	Yes			No
<b>1st / 2nd peak detection*</b>	Yes			No
<b>Programmable audible tones</b>		Yes		
<b>No. of units of measurement</b>	5			3
<b>Battery life (with backlight on/off)</b>	Backlight on: up to 7 hours of continuous use, Backlight off: up to 24 hours of continuous use			
<b>Safe overload</b>	150% of full scale (display shows "OVER" at 110% and above)			
<b>Weight (lb [kg])</b>	8.4 [3.8]	10.9 [4.9]	5.8 [2.6]	1.8 [0.8]
<b>Included items</b>	1/4" hex to 3/8" square adapter (TT02 Only), carrying case (TT03 only) universal voltage AC adapter, battery, quick-start guide, and certificate of calibration. Download free MESUR® Lite or MESUR® Gauge demo period at <a href="http://mark-10.com/software">mark-10.com/software</a> .			

\* With configurable automatic data output, data storage, and zero function upon detection of peak value(s).



## Ordering Information

Model No.		Capacity x Resolution					
		ozFin	lbFin	kgFcm	kgFmm	Ncm	Nm
TT01	MTT01-12	192 x 0.1	12 x 0.005	14 x 0.01	-	135 x 0.1	1.35 x 0.001
	MTT01-25	400 x 0.2	25 x 0.01	28 x 0.02	-	290 x 0.2	2.9 x 0.002
	MTT01-50	800 x 0.5	50 x 0.02	58 x 0.05	-	570 x 0.5	5.7 x 0.005
	MTT01-100	1600 x 1	100 x 0.05	116 x 0.1	-	1150 x 1	11.5 x 0.01
TT02	MTT02-12	192 x 0.1	12 x 0.005	14 x 0.01	-	135 x 0.1	1.35 x 0.001
	MTT02-25	400 x 0.2	25 x 0.01	28 x 0.02	-	290 x 0.2	2.9 x 0.002
	MTT02-50	800 x 0.5	50 x 0.02	58 x 0.05	-	570 x 0.5	5.7 x 0.005
	MTT02-100	1600 x 1	100 x 0.05	116 x 0.1	-	1150 x 1	11.5 x 0.01
TT03	MTT03-10Z	10 x 0.01	-	-	7 x 0.005	7 x 0.005	-
	MTT03-20Z	20 x 0.02	-	-	14 x 0.01	14 x 0.01	-
	MTT03-50Z	50 x 0.05	-	-	36 x 0.05	36 x 0.05	-
	MTT03-12	192 x 0.2	12 x 0.01	-	-	135 x 0.1	-
TT05	MTT05-12	192 x 0.1	12 x 0.005	14 x 0.01	-	135 x 0.1	1.35 x 0.001
	MTT05-25	400 x 0.2	25 x 0.01	28 x 0.02	-	290 x 0.2	2.9 x 0.002
	MTT05-50	800 x 0.5	50 x 0.02	58 x 0.05	-	570 x 0.5	5.7 x 0.005
	MTT05-100	1600 x 1	100 x 0.05	58 x 0.05	-	1150 x 1	11.5 x 0.01



All models include 110V AC adapters

Add suffix 'E' for euro plug (220V), 'U' for UK plug (220V) or 'A' for Australian plug (220V)

Example: MTT01-50E, MTT02-100U, MTT03-50ZA



### Measure force and torque with interchangeable indicators and remote sensors

Models M7I, M5I, and M3I force / torque indicators are designed for use with Mark-10's Plug & Test® remote force and torque sensors. All calibration and configuration data is saved within the sensors' smart connectors - not the indicator - allowing for true interchangeability. Each sensor series is available in a range of capacities, from 0.25 to 10,000 lbF (1 N to 50 kN) full scale and from 10 ozFin to 5,000 lbFin (7 Ncm to 550 Nm) full scale. Sensor details are provided on the following pages.





## Torque Sensors

### 1 Series R50

#### Universal torque sensors, fixed chuck

Measure bidirectional torque for a wide variety of applications. Contain a chuck for up to 1/2" diameter samples. Sensors can be used as hand held devices, or mounted to a torque test stand. Capacities available from 10 ozFin to 100 lbFin [7 to 1,150 Ncm].

### 2 Series R51

#### Universal torque sensors, interchangeable chucks

A great solution for general bidirectional torque testing applications with several different sample sizes. Three interchangeable chuck capacities and bit holder are available. The R51 has super overload protection and is available in capacities from 10 ozFin to 100 lbFin [7 to 1,150 Ncm].

### 3 Series R55

#### Wrench extension torque sensors

Convert any wrench to a torque tool with this sensor series, or use it as a component of a torque testing system. Capacities available from 20 to 5,000 lbFin [220 Ncm to 550 Nm].

### 4 Series R52

#### Static torque sensors

Calibrate torque tools with these sensors, or use them as components of a torque testing system. Tapped holes on every surface allow for easy mounting to a work bench or fixture. Capacities available from 10 ozFin to 100 lbFin [7 to 1,150 Ncm].

## Force Sensors

### 5 Series R01

#### Tension / compression sensors

Rugged sensor series for measuring tensile and compressive force of up to 10,000 lbF [50 kN]. Durable S-beam design with thread on two sides.

### 6 Series R03

#### Inline tension / compression sensors

Measure tensile and compressive loads for a wide variety of applications, available in capacities from 0.25 lbF to 100 lbF [1 to 500 N]. Thread on two sides can accept a variety of hooks and implements, making this sensor series particularly well suited for inline tests.

### 7 Series R04

#### Miniature tension / compression sensors

Extremely compact force measurement sensors for tensile and compressive loads in applications with limited space. Capacities available from 0.25 lbF to 100 lbF. [1 to 500 N] The sensors include threaded holes on two sides for the mounting of attachments.

### 8 Series R02

#### Compact compression sensors

Button type sensors for compressive loads of up to 10,000 lbF [50 kN]. Compact, rugged, and ideal for heavy duty applications with space constraints.

### 9 Series R05

#### Pull / tension sensor

Fully enclosed force sensor for tension and compression testing. Useful in ergonomics testing, workplace safety testing, and general lifting or push/pull requirements. For up to 500 lbF [2,500 N] of force.

### 10 Series R06

#### Wire crimp pull sensor

Hand-operated solution for wire crimp pull-off force measurement. Ergonomic handles and convenient tensioning mechanism ideal for field measurements up to 200 lbF [1 kN].



## Specifications - Force and Torque Indicators



	Model M71 Professional	Model M51 Advanced	Model M31 Basic
<b>Accuracy (% of full scale)</b>	±0.1 + sensor		±0.2% + sensor
<b>Sensor password protection</b>	Yes		No
<b>Sampling rate</b>	14,000 Hz	7,000 Hz	2,000 Hz
<b>Resolution</b>	1/2,000 or 1/1,000, depending on sensor		1/1,000
<b>Outputs</b>	USB, RS-232, Mitutoyo, Analog		USB
<b>RS-232</b>	Configurable up to 230,400 baud	Configurable up to 115,200 baud	No
<b>USB</b>	Configurable up to 230,400 baud		Configurable up to 115,200 baud
<b>Mitutoyo (Digimatic)</b>	Serial BCD suitable for all Mitutoyo SPC-compatible devices		No
<b>Analog</b>	±1 VDC, ±2% FS. + for compression / CW, - for tension / CCW		No
<b>General purpose I/O</b>	Three open drain outputs, one input		No
<b>Set point</b>	Three open drain lines		No
<b>MESUR® Lite software included</b>	Yes		
<b>Data output functionality</b>	Automatic output or by pressing DATA button, or requesting from a PC or other device (currently displayed reading only)		By pressing DATA button, or requesting from a PC or other device (currently displayed reading only)
<b>ASCII command set for external control</b>	Full command set		"?" only (request current reading)
<b>Communication with MESUR® gauge and MESUR® Lite software</b>	Full communication		Send single reading from gauge only, cannot request from software
<b>Communication with ESM301 test stand and Series DC test stand controllers</b>	Full communication, including PC control		No
<b>Data memory</b>	5,000 readings, with output	1,000 readings, with output	No
<b>Data memory deletion</b>	Individual data points, or clear all		N/A
<b>Statistics calculations and output to PC</b>	Max, min, mean, std. dev., number of readings, with output		No
<b>Break detection</b>	Yes*		No
<b>1st / 2nd peak detection</b>	Yes*		No
<b>Programmable footswitch command string</b>	Yes*		No
<b>Averaging mode</b>	Yes*	Yes	No
<b>External trigger mode</b>	Yes**	Yes	No
<b>Analog load bar graph shown on display</b>		Yes	
<b>Set points (for pass/fail indication)</b>		Yes, with high/low indicators	
<b>Keypad password protection</b>	Yes, for calibration and keys		No
<b>Peak readings always displayed</b>		Yes	
<b>Programmable audible tones</b>		Yes	
<b>Calibration procedure</b>		Configurable number of data points (up to 10 in each direction)	
<b>Overload outputs</b>	Dedicated pins for tension and compression		No
<b>No. of units of measurement</b>	5		3
<b>Battery life (with backlight on/off)</b>	Up to 7 hours of continuous use / Up to 24 hours of continuous use		
<b>Weight</b>	0.7 lb [0.3 kg]		
<b>Included items</b>	Carrying case, universal voltage AC adapter, battery, quick-start guide, USB cable, and certificate of conformance. Download free MESUR® Lite or MESUR® Gauge demo period at <a href="http://mark-10.com/software">mark-10.com/software</a> .		

\* With configurable automatic data output, data storage, and zero function upon event completion. Can also stop travel of certain motorized test stands.

\*\* Can stop travel of certain motorized test stands upon event completion.



## Ordering Information - Force Sensors

Model No.	Capacity x Resolution - with Model 7I & 5I indicators						Capacity x Resolution - with Model 3I indicator				Accuracy* (±% FS)	Safe Overload	
	lbF	ozF	gF	kgF	N	kN	lbF	kgF	N	kN			
R01**	MR01-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	50 x 0.05	25 x 0.02	250 x 0.2	-	0.15% 150%	
	MR01-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-		
	MR01-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1x 0.0005	200 x 0.2	100 x 0.1	1000 x 1	-		
	MR01-300	300 x 0.2	4800 x 5	-	150 x 0.1	1500 x 1	1.5 x 0.001	300 x 0.5	150 x 0.2	1500 x 2	-		
	MR01-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	500 x 0.5	250 x 0.2	2500 x 2	-		
	MR01-1000	1000 x 0.5	16000 x 10	-	500 x 0.2	5000 x 2	5 x 0.002	1000 x 1	500 x 0.5	5000 x 5	-		
	MR01-1500	1500 x 1	24000 x 20	-	750 x 0.5	7500 x 5	7.5 x 0.005	1500 x 2	750 x 1	7500 x 10	-		
	MR01-2000	2000 x 1	32000 x 20	-	1000 x 0.5	10000 x 5	10 x 0.005	2000 x 2	1000 x 1	10000 x 10	-		
	MR01-5000	5000 x 2	-	-	2500 x 1	25000 x 10	25 x 0.01	5000 x 5	2500 x 2	-	25 x 0.02		
R02	MR02-10000	10000 x 5	-	-	5000 x 2	50000 x 25	50 x 0.02	10000 x 10	5000 x 5	-	50 x 0.05	0.5% 150%	
	MR02-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-		
	MR02-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1x 0.0005	200 x 0.2	100 x 0.1	1000 x 1	-		
	MR02-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	500 x 0.5	250 x 0.2	2500 x 2	-		
	MR02-1000	1000 x 0.5	16000 x 10	-	500 x 0.2	5000 x 2	5 x 0.002	1000 x 1	500 x 0.5	5000 x 5	-		
	MR02-2000	2000 x 1	32000 x 20	-	1000 x 0.5	10000 x 5	10 x 0.005	2000 x 2	1000 x 1	10000 x 10	-		
	MR02-5000	5000 x 2	-	-	2500 x 1	25000 x 10	25 x 0.01	5000 x 5	2500 x 2	-	25 x 0.02		
R03**	MR03-10000	10000 x 5	-	-	5000 x 2	50000 x 25	50 x 0.02	10000 x 10	5000 x 5	-	50 x 0.05	0.15% 150%	
	MR03-025	0.25 x 0.0001	4 x 0.002	100 x 0.05	-	1x 0.0005	1000 x 0.5 mN	0.25 x 0.0002	100 x 0.1 gF	1x 0.001	-		
	MR03-05	0.5 x 0.0002	8 x 0.005	250 x 0.1	-	2.5 x 0.001	2500 x 1 mN	0.5 x 0.0005	250 x 0.2 gF	2.5 x 0.002	-		
	MR03-2	2 x 0.001	32 x 0.02	1000 x 0.5	1x 0.0005	10 x 0.005	-	2 x 0.002	1x 0.001	10 x 0.01	-		
	MR03-5	5 x 0.002	80 x 0.05	2500 x 1	2.5 x 0.001	25 x 0.01	-	5 x 0.005	2.5 x 0.002	25 x 0.02	-		
	MR03-10	10 x 0.005	160 x 0.1	5000 x 2	5 x 0.002	50 x 0.02	-	10 x 0.01	5 x 0.005	50 x 0.05	-		
	MR03-20	20 x 0.01	320 x 0.2	10000 x 5	10 x 0.005	100 x 0.05	-	20 x 0.02	10 x 0.01	100 x 0.1	-		
	MR03-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	50 x 0.05	25 x 0.02	250 x 0.2	-		
	MR03-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-		
R04	MR04-025	0.25 x 0.0001	4 x 0.002	100 x 0.05	-	1x 0.0005	1000 x 0.5 mN	0.25 x 0.0002	100 x 0.1 gF	1x 0.001	-	0.2% 200%	
	MR04-05	0.5 x 0.0002	8 x 0.005	250 x 0.1	-	2.5 x 0.001	2500 x 1 mN	0.5 x 0.0005	250 x 0.2 gF	2.5 x 0.002	-		
	MR04-2	2 x 0.001	32 x 0.02	1000 x 0.5	1x 0.0005	10 x 0.005	-	2 x 0.002	1x 0.001	10 x 0.01	-		
	MR04-5	5 x 0.002	80 x 0.05	1000 x 0.5	2.5 x 0.001	25 x 0.01	-	5 x 0.005	2.5 x 0.002	25 x 0.02	-		
	MR04-10	10 x 0.005	160 x 0.1	5000 x 2	5 x 0.002	50 x 0.02	-	10 x 0.01	5 x 0.005	50 x 0.05	-		
	MR04-20	20 x 0.01	320 x 0.2	10000 x 5	10 x 0.005	100 x 0.05	-	20 x 0.02	10 x 0.01	100 x 0.1	-		
	MR04-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	50 x 0.05	25 x 0.02	250 x 0.2	-		
R05	MR04-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-	0.15% 150%	
	MR05-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	500 x 0.5	250 x 0.2	2500 x 2	-		
R06	MR06-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1x 0.0005	200 x 0.2	100 x 0.1	1000 x 1	-	0.5%	150%

All sensors include a Plug & Test® connector for interfacing directly with an M7I, M5I or M3I indicator. NIST-traceable certificate of calibration with data is also included.

\* Accuracy refers to the sensor only. Total accuracy includes the indicator's accuracy (±0.1% or ±0.2%). For example, the total accuracy of the MR50-50 sensor with M5I indicator equals ±0.35% + ±0.1% = ±0.45% FS.

\*\* Add suffix "-1" for shortened cable, for use on ESM303(H), ESM750, and ESM1500 test stands. Ex: MR01-1000-1. Test stand mounting hardware is included.



## Ordering Information - Torque Sensors

Model No.		Capacity x Resolution with Model M7I & M5I indicators								Capacity x Resolution with Model M3I indicator				Accuracy* (±% FS)	Safe Overload
		ozFin	lbFin	lbFft	gFcm	kgFmm	Nmm	Ncm	Nm	ozFin	lbFin	kgFmm	Ncm		
R50	MR50-10Z	10 x 0.005	-	-	700 x 0.5	7 x 0.005	70 x 0.05	7 x 0.005	-	10 x 0.01	-	7 x 0.005	7 x 0.005	0.35%	300%
	MR50-20Z	20 x 0.01	-	-	1400 x 1	14 x 0.01	140 x 0.1	14 x 0.01	-	20 x 0.02	-	14 x 0.01	14 x 0.01		
	MR50-50Z	50 x 0.02	-	-	3600 x 2	36 x 0.02	350 x 0.2	35 x 0.02	-	50 x 0.05	-	36 x 0.05	35 x 0.05		
	MR50-12	192 x 0.1	12 x 0.005	1 x 0.0005	-	-	-	135 x 0.1	1.35 x 0.001	192 x 0.2	12 x 0.01	-	135 x 0.1	0.15%	150%
	MR50-50	800 x 0.5	50 x 0.02	4 x 0.002	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR50-100	1600 x 1	100 x 0.05	8 x 0.005	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
R51	MR51-10Z	10 x 0.005	-	-	700 x 0.5	7 x 0.005	70 x 0.05	7 x 0.005	-	10 x 0.01	-	7 x 0.005	7 x 0.005	0.15%	300%
	MR51-20Z	20 x 0.01	-	-	1400 x 1	14 x 0.01	140 x 0.1	14 x 0.01	-	20 x 0.02	-	14 x 0.01	14 x 0.01		
	MR51-50Z	50 x 0.02	-	-	3600 x 2	36 x 0.02	350 x 0.2	35 x 0.02	-	50 x 0.05	-	36 x 0.05	35 x 0.05		
	MR51-12	192 x 0.1	12 x 0.005	1 x 0.0005	-	-	-	135 x 0.1	1.35 x 0.001	192 x 0.2	12 x 0.01	-	135 x 0.1	0.15%	150%
	MR51-50	800 x 0.5	50 x 0.02	4 x 0.002	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR51-100	1600 x 1	100 x 0.05	8 x 0.005	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
R52	MR52-10Z	10 x 0.005	-	-	700 x 0.5	7 x 0.005	70 x 0.05	7 x 0.005	-	10 x 0.01	-	7 x 0.005	7 x 0.005	0.35%	300%
	MR52-20Z	20 x 0.01	-	-	1400 x 1	14 x 0.01	140 x 0.1	14 x 0.01	-	20 x 0.02	-	14 x 0.01	14 x 0.01		
	MR52-50Z	50 x 0.02	-	-	3600 x 2	36 x 0.02	350 x 0.2	35 x 0.02	-	50 x 0.05	-	36 x 0.05	35 x 0.05		
	MR52-12	192 x 0.1	12 x 0.005	1 x 0.0005	-	-	-	135 x 0.1	1.35 x 0.001	192 x 0.2	12 x 0.01	-	135 x 0.1	0.15%	150%
	MR52-50	800 x 0.5	50 x 0.02	4 x 0.002	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR52-100	1600 x 1	100 x 0.05	8 x 0.005	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
R55	MR55-20	320 x 0.5	20 x 0.02	1.5 x 0.002	-	-	-	220 x 0.2	2 x 0.002	320 x 0.5	20 x 0.02	-	220 x 0.2	0.6%	150%
	MR55-50	800 x 1	50 x 0.05	4 x 0.005	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR55-100	1600 x 2	100 x 0.1	8 x 0.01	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
	MR55-200	-	200 x 0.2	16 x 0.02	-	2300 x 2	-	2200 x 2	22 x 0.02	-	200 x 0.2	2300 x 2	2200 x 2		
	MR55-400	-	400 x 0.5	32 x 0.05	-	4600 x 5	-	4500 x 5	45 x 0.05	-	400 x 0.5	4600 x 5	4500 x 5		
	MR55-1000	-	1000 x 1	80 x 0.1	-	11500 x 10	-	11000 x 10	110 x 0.1	-	1000 x 1	11500 x 10	11000 x 10		
	MR55-5000	-	5000 x 5	400 x 0.5	-	55 x 0.05 kgFm	-	55000 x 50	550 x 0.5	-	5000 x 5	550 x 0.05 kgFm	550 x 0.5 Nm		

All sensors include a Plug & Test® connector for interfacing directly with an M7I, M5I, or M3I indicator. NIST-traceable certificate of calibration with data is also included.

\* Accuracy refers to the sensor only. Total accuracy includes the indicator's accuracy (±0.1% or ±0.2%).  
Ex: the total accuracy of the MR50-50 sensor with M5I indicator equals  $\pm 0.35\% + \pm 0.1\% = \pm 0.45\% \text{ FS}$ .

\*\* Add suffix "-1" for shortened cable, for use on ESM303(H), ESM750, and ESM1500 test stands.  
Ex: MR01-1000-1. Test stand mounting hardware is included.



## Series F Force Sensors



### Series FS05

#### Tension and compression force sensors

Series FS05 force sensors measure tension and compression forces. They mount directly to the crosshead of models F105, F305, F505, and F505H test frames, for a clean, integrated look.

Compatible with Models F105, F305, F505, and F505H. Adapter part no. AC1083 is required for Models F755, F755S, F1505, and F1505S.



### Series FS06

#### Tension and compression force sensors

Series FS06 force sensors measure tension and compression forces. Designed to accommodate bulkier grips and fixtures, they are compatible with Series F test frame models up to 500 lbF / 2.2 kN.

With Plug & Test® technology, all configuration and calibration data is saved within the sensor, allowing it to be calibrated on the test frame or off-site with a Mark-10 indicator (optional adapter AC1083 required).



### Series R07

#### Tension and compression force sensors

Series MR07 force sensors measure tension and compression forces, and are designed for Series F test frames. With Plug & Test® technology, all configuration and calibration data is saved within the sensor, allowing it to be calibrated on the test frame or off-site with a Mark-10 indicator (optional adapter: AC1083 required).

Compatible with Models F755, F755S, F1505, and F1505S. Cannot be used with Models F105, F305, F505, and F505H.



### Model PTA / PTAF

Connect common strain gage-based load cells, force sensors, and torque sensors to Models M7I, M5I and M3I indicators with this user-configurable adapter and software.

Sensor capacity and resolutions may be programmed via an included software utility, which includes a library of common force capacities from 0.12 to 750,000 lbF (0.5 N to 4,000 kN), and torque capacities from 10 ozFin to 40,000 lbFft (7 Ncm to 57,000 Nm).

An identification number may be programmed, which is displayed upon indicator power-up or the indicator's Information screen. Through Plug & Test® technology, all configuration and calibration information is saved within the adapter. This flexibility allows for interchangeability between multiple sensors with any Mark-10 indicator.

#### Features:

- **Compatible with strain gage-based load cells, force sensors, and torque sensors**
- **Screw terminal block allows for easy connection of sensor wires**
- **Software configuration utility is included, for easy programming of sensor capacity, resolution, and identification number**
- **Program the adapter via USB or RS-232 through the indicator**
- **Mounting holes for bench mounting**

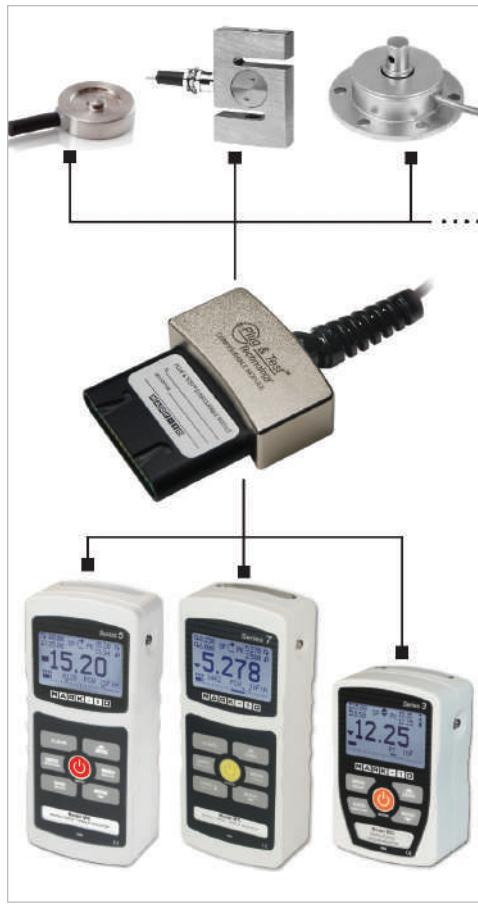
Model No.	Description
PTA	Plug and Test® adapter
PTAF	Adapter, customer-supplied sensor to Models F105 / F305 / F505 / F505H test frames

#### Sensor Requirements:

Type: Full bridge

Resistance: 300 - 1,000 ohms

Sensitivity: 1-3 mV/V



PTA



PTAF



## Ordering Information - Series F Force Sensors

Model No.		Capacity x Resolution							Accuracy* (±% FS)	Safe Overload
		lbF	ozF	gF	kgF	N	kN	mN		
FS05	FS05-012	0.12 x 0.00005	2 x 0.001	50 x 0.02	-	0.5 x 0.0002	-	500 x 0.2	0.1%	150%
	FS05-025	0.25 x 0.0001	4 x 0.002	100 x 0.05	-	1 x 0.0005	-	1000 x 0.5		
	FS05-05	0.5 x 0.0002	8 x 0.005	250 x 0.1	-	2.5 x 0.001	-	2500 x 1		
	FS05-2	2 x 0.001	32 x 0.02	1000 x 0.5	1 x 0.0005	10 x 0.005	-	-		
	FS05-5	5 x 0.002	80 x 0.05	2500 x 1	2.5 x 0.001	25 x 0.01	-	-		
	FS05-10	10 x 0.005	160 x 0.1	5000 x 2	5 x 0.002	50 x 0.02	-	-		
	FS05-20	20 x 0.01	320 x 0.2	10000 x 5	10 x 0.005	100 x 0.05	-	-		
	FS05-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	-		
	FS05-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	-		
	FS05-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1 x 0.0005	-		
	FS05-300	300 x 0.1	4800 x 2	-	150 x 0.05	1500 x 0.5	1.5 x 0.0005	-		
FS06	FS06-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	-	0.15%	150%
	FS06-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	-		
	FS06-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	-		
	FS06-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1 x 0.0005	-		
R07	FS06-300	300 x 0.2	4800 x 5	-	150 x 0.1	1500 x 1	1.5 x 0.001	-	0.15%	150%
	FS06-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	-		
	MR07-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	-		
	MR07-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	-		
	MR07-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1 x 0.0005	-		
	MR07-300	300 x 0.2	4800 x 5	-	150 x 0.1	1500 x 1	1.5 x 0.001	-		
	MR07-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	-		
MR07	MR07-750	750 x 0.5	12000 x 10	-	375 x 0.2	3750 x 2	3.75 x 0.002	-	0.15%	150%
	MR07-1000	1000 x 0.5	16000 x 10	-	500 x 0.2	5000 x 2	5 x 0.002	-		
	MR07-1500	1500 x 1	24000 x 20	-	750 x 0.5	7500 x 5	7.5 x 0.005	-		

All sensors include a NIST-traceable certificate of calibration with data.



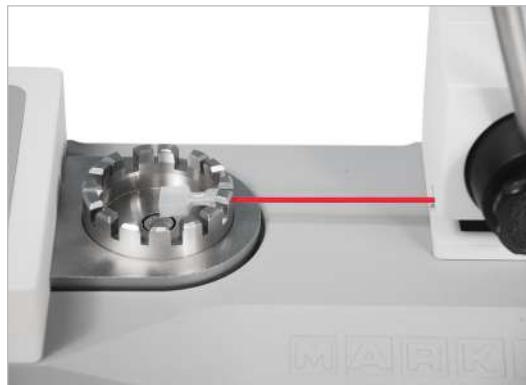
## Wire Crimp Pull Testers

[www.mark-10.com/wire-pull-testers](http://www.mark-10.com/wire-pull-testers)

### Model WT3-201

Manual, 200 lbF / 1,000 N

The WT3-201 is an integrated solution for manual wire crimp pull testing requirements. An ergonomic lever allows for easy application of force. Adjustable terminal fixture contains multiple slots for diameters up to AWG 3 (0.25 in [6.3 mm]). USB output, data memory, and peak force capture are provided.



▲ Adjustable wire terminal fixture accommodates wire diameter sizes up to 0.25 in (6.3 mm).



▲ Unique knurled cam design effectively secures and pulls the loose end of the sample.



▲ Ergonomic lever easily applies force and releases the sample.

### Features

- **Peak force capture**
- **USB, RS-232, Mitutoyo, and analog outputs**
- **Data memory**

1,000-point data memory with statistics (min, max, mean, standard deviation), and outputs.

#### ■ **Password protection**

Passwords may be set for calibration and for individual keys, designed to protect the tester against unauthorized changes.

#### ■ **Automatic output**

Automatic output / data storage / zeroing upon sample break helps automate testing processes

### Ordering Information

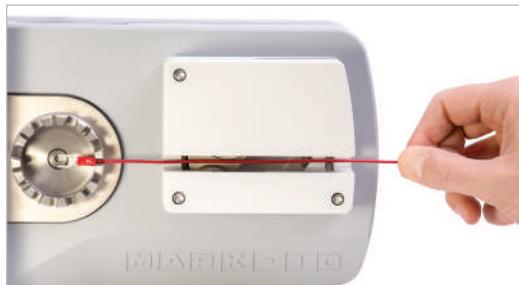
Model No.	Description
WT3-201	Wire terminal tester, 110V
WT3-201E	Wire terminal tester, 220V EUR
WT3-201U	Wire terminal tester, 220V UK
WT3-201A	Wire terminal tester, 220V AUS
WT3001	Carrying case
WT3002	Ring terminal fixture
WT3003	Machinable blank terminal fixture
AC1049	Calibration kit



## Model WT3-201M

Motorized, 200 lbF / 1,000 N

The WT3-201M is an integrated motorized solution for destructive and non-destructive wire crimp pull testing requirements, such as pulling to a load and load holding. Adjustable terminal fixture contains multiple slots for diameters up to AWG 3 (0.25 in [6.3 mm]). USB output, data memory with time stamp, and peak force capture are provided, along with the ability to save up to 500 test profiles.



▲ The tester automatically starts when the sample is loaded, and returns to home when the sample breaks. Adjustable terminal fixture accommodates wire diameters up to 0.25 in (6.3 mm).

▲ As the test begins, serrated cams engage the sample. A pinch guard (red tab shown above) automatically rotates into position, for added safety.

▲ Save and recall multiple profiles, for quick and accurate switchover to different test methods.

### Features

- Measures real-time and peak force values
- Selectable test speed, w/high speed approach and reverse
- Auto-start upon sample insertion
- Auto-reverse at sample break or load
- USB, RS-232, Mitutoyo, and analog outputs
- 2,000-point data memory with statistics, output, and date and time stamp
- Save and recall up to 500 test profiles
- Pull to a specified load or maintain load for a specified period of time, as per UL 486A/B

### Ordering Information

Model No.	Description
Hardware	
WT3-201M	Motorized wire crimp pull tester, 110V
WT3-201ME	Motorized wire crimp pull tester, 220V EUR
WT3-201MU	Motorized wire crimp pull tester, 220V UK
WT3-201MA	Motorized wire crimp pull tester, 220V AUS
WT3002	Ring terminal fixture
WT3003	Machinable blank terminal fixture
WT3004	Carrying case
AC1049	Calibration kit
Optional Functions	
WF010	Profiles
WF011	Pull to load limit
WF012	Load holding
WF013	Date and time stamp
WFCOMP	Complete options package (includes all Controller Options)



### Test push/pull muscle strength and functional task requirements



These force gauge kits are ideal for strength assessment, ergonomic studies, and workplace design. Available in capacities of 100 lbF (500 N), 200 lbF (1,000 N), and 500 lbF (2,500 N).

- **Series EK3** basic kits offer everyday functionality and include a selection of commonly used attachments.
- **Series E** offers increased force gauge performance, with unique Click-Lock® accessory mounting technology. Select pre-configured kits, or pick and choose a gauge and accessories suited to your unique applications.
- **Series EKM5** myometer kits are designed for muscle strength assessments, and include a Series 5 force gauge, strap and hook. A myometer accessory is also available for Series E.

### Comparison Chart

	Series 3 (included w/ Series EK3 kits)	Series E (included w/ Series EKE kits)*
Accuracy	±0.3%	±0.2%
Sampling rate	2,000 Hz	7,000 Hz
Units of measurement	lbF, kgF, N	lbF, ozF, kgF, N, kN
USB data output	✓	✓
Averaging mode	✗	✓
On-board data memory & statistics	✗	✓
Continuous data capture	✗	✓
Accessory mounting	Traditional mounting threads	Click-Lock® Technology
Password protection	✗	✓
Available accessories:		
Single handle grip	✓	✓
Double handle grip	✓	✓
Padded attachment, curved	✓	✓
Padded attachment, flat	✓	✓
Padded attachment, square	✓	✓
Padded attachment, circular	✗	✓
Hook	Clevis grip	Snap hook
Chain / hook assembly	✗	✓
Pistol grip	✗	✓
MESUR® Lite software included	✓	✓



Series 3



Series EK3 kit



Series E



Series EKE kit

\* Refer to the Series E data sheet for information about which accessories are included with each kit level.



## Click-Lock® Technology - Series E



Attachments click and lock into place via innovative Click-Lock® technology, a rugged anti-rotation locking mechanism. The attachments may be clicked into 90° or 180° orientations. No fastening is required, as with conventional force gauges, reducing the risk of damage to the instrument.



### Available Accessories - Series E



- 1** E1010 pistol grip
- 2** E1002 padded attachment, square
- 3** E1003 padded attachment, rectangular
- 4** E1004 padded attachment, curved
- 5** E1005 padded attachment, circular
- 6** E1009 double handle grip
- 7** E1008 single handle grip
- 8** E1007 chain / hook assembly
- 9** E1013 myometer accessory
- 10** E1012 looped cable
- 11** Series E force gauge
- 12** E1006 hook

### Ordering Information - Kits

Model No.	Description
<b>EK3-100</b>	Basic ergonomics testing kit, 100 lbF / 500 N
<b>EK3-200</b>	Basic ergonomics testing kit, 200 lbF / 1,000 N
<b>EK3-500</b>	Basic ergonomics testing kit, 500 lbF / 2,500 N
<b>EKE-100-1</b>	Advanced ergonomics kit, 100 lbF / 500 N
<b>EKE-200-1</b>	Advanced ergonomics kit, 200 lbF / 1,000 N
<b>EKE-500-1</b>	Advanced ergonomics kit, 500 lbF / 2,500 N
<b>EKE-100-2</b>	Professional ergonomics kit, 100 lbF / 500 N
<b>EKE-200-2</b>	Professional ergonomics kit, 200 lbF / 1,000 N
<b>EKE-500-2</b>	Professional ergonomics kit, 500 lbF / 2,500 N
<b>EKM5-200</b>	Myometer, complete kit w/M5-200 force gauge

All models include 110V AC adapters. Add suffix 'E' for euro plug (220V), 'U' for UK plug (220V), or 'A' for Australian plug (220V).

Example: EK3-100E, EKE-200-1U, EKM5-200A



## Model ES05

### Force, Manual, 30 lbF / 150 N

The ES05 test stand is an economical and compact compression-only test stand for various testing applications. A spring-loaded lever allows for repeatable testing with up to 1.5" (38 mm) displacement, and the lever mechanism can be repositioned along the length of the column.

#### Features

- **Spring loaded lever mechanism**  
Convenient for repetitive testing.
- **Repositionable lever mechanism**  
Adds flexibility in test setups.
- **Compact size**  
Portable, small footprint.



## Models ES10 and ES20

### Force, Manual, 100 lbF / 500 N

The ES10 and ES20 test stands are economical and compact push/pull solutions for many testing applications. Available in lever (ES10) or hand wheel (ES20) operation.

#### Features

- **Choice of lever (ES10) or hand wheel (ES20) operation**  
Lever action provides for quick testing at high speeds, while hand wheel action allows for fine positioning and better motion control.
- **Optional 1" dial or digital indicator (ES001, ES002)**  
For spring testing, rubber and polymer testing, and more. Digital model displays in and mm. Also available as brackets only (no indicator).
- **Compact size**  
Portable, small footprint.



## Model ES30

### Force, Manual, 200 lbF / 1,000 N

The ES30 accommodates a wide range of sample shapes and sizes due to generous travel distance, daylight, and throat distance. Convenient side-mounted hand wheel makes testing easier.

#### Features

##### ■ Side mounted hand wheel

Convenient loading method, offers more control over test speed.

##### ■ Removable base

The entire base may be removed for alternative mounting.

##### ■ Optional digital travel displays (ESM001, ESM004)

Useful in spring testing, rubber and polymer testing, and other applications. Select from 6" [152 mm] and 12" [305 mm] lengths.

##### ■ Optional column extensions

For testing long samples. Available in lengths of 6" [152 mm] (ESM003-1), 12" [305 mm] (ESM003-2), and 24" [610 mm] (ESM003-3). Custom lengths also available.



## Model TSA750 / TSA750H

### Force, Manual, 750 lbF / 3,750 N

The TSA750 is a rugged stand for heavy duty testing applications requiring quick action. Lever operation allows the operator to produce 750 lbF with relatively little effort. Modular design allows for the force gauge bracket and lever mechanism to be repositioned along the column. Available in vertical and horizontal configurations.

#### Features

##### ■ Rack and pinion mechanism with lever operation

Allows for quick testing. The lever can be repositioned in 30° increments.

##### ■ Adjustable travel stops

For limiting travel distance. Useful in repetitive testing.

##### ■ Optional 6" [152 mm] digital travel display (TSA001)

Useful in spring testing, rubber and polymer testing, and other applications.





### Model TSB100

Force, Manual, 100 lbF / 500 N

The TSB100 is a lever-operated test stand for many applications requiring quick action. Lightweight and compact design makes this stand portable for field testing. Modular design allows for the force gauge bracket and lever mechanism to be repositioned along the column. Removable base allows for a range of custom mounting configurations. Adjustable travel stops are available.

#### Features:

- **Rack and pinion mechanism with lever operation**

Allows for quick testing. The lever can be repositioned in 30° increments.

- **Removable base with loading table**

A steel loading table with threaded holes is provided for grip or fixture mounting. The entire base may be removed for alternative mounting.

- **Optional 6" [152 mm] digital travel display (TSB001)**

Useful in spring testing, rubber and polymer testing, and more.



### Model TSC1000 / TSC1000H

Force, Manual, 1,000 lbF / 5,000 N

The TSC1000 is a rugged stand for heavy duty testing requirements requiring fine position control without back driving. Hand wheel operation allows the operator to produce gradual and repeatable force during testing. Modular design allows for the gauge mounting plate and housing to be moved along the length of the column. Removable base (TSC1000) or mounting legs (TSC1000H) allow for a range of custom mounting configurations.

#### Features:

- **Inline hand wheel operation**

Precision Acme screw and nut provide smooth operation over the entire 1,000 lbF range. Inline force minimizes column bending during testing.

- **Modular design**

Adjustable components accommodate a wide range of testing configurations.

- **Optional 6" [152 mm] digital travel display (TSC001)**

Useful in spring testing, rubber and polymer testing, and more.





## Model TSF / TSFH

Force, Manual, 1,000 lbF / 5,000 N

The TSF is a rugged stand with a rigid column, making it perfect for spring testing, high force tensile testing, and other applications. Precision side-mounted hand wheel operation is virtually effortless over the entire 1,000 lbF range, without back driving. Modular design allows for the gauge mounting plate and housing to be moved along the length of the column. Removable base (TSF) or mounting legs (TSFH) allow for a range of custom mounting configurations.

### Features:

#### ■ Side-mounted hand wheel operation

Ergonomic loading method reduces operator fatigue.

#### ■ Exceptionally strong column

Rugged 3" x 3" column is durable and stiff, ideal for spring testing. Force is produced in line with the screw actuator, minimizing column deflection.

#### ■ Optional 6" [152 mm] digital travel display (TSF001)

Useful in spring testing, rubber and polymer testing, and other applications.



TSF



TSFH

## Specifications - Manual Force Test Stands

Model No.	Capacity lbF [N]	Maximum travel <sup>1</sup> in [mm]	Loading method	Travel rate in [mm]	Daylight <sup>2</sup> in [mm]			
ES05	30 [150]	1.5 [38]	Spring-loaded lever	-	8 [203]			
ES10	100 [500]	9 [229]	Lever	1.050 [26.7] / lever rev.	9 [229]			
ES20			Top-mounted hand wheel	0.083 [2.1] / wheel rev.				
ES30	200 [1,000]	13 [330]	Side-mounted hand wheel	0.050 [1.3] / wheel rev.	14 [356] <sup>3</sup>			
TSA750	750 [3,750]	with travel stops: 2.75 [70] without travel stops: 6 [152]	Rack & pinion, lever can be positioned in 30° increments	3.00 [76.2] / lever rev.	10.5 [267] <sup>3</sup>			
TSA750H					14.5 [368] <sup>3</sup>			
TSB100	100 [500]	3.5 [89]	Inline hand wheel	0.10 [2.5] / wheel rev.	21 [533] <sup>3</sup>			
TSC1000	1,000 [5,000]				10 [254] <sup>3</sup>			
TSC1000H					13 [330] <sup>3</sup>			
TSF	4 [102]	Side-mounted hand wheel	0.013 [0.34] / wheel rev.	14 [356] <sup>3</sup>	16.5 [419] <sup>3</sup>			
TSFH								

1. Maximum travel depends on the grips or fixtures used during testing. The dimensions indicate distances without the use of grips or fixtures.

2. The clearance between the bottom of a mounted force gauge or sensor and the loading surface of the stand. Daylight will be reduced through the use of grips or fixtures. If the test sample size is close to the daylight specification above (or daylight less grip(s) or fixture(s)), a column extension may be necessary.

3. Column extensions are available.

## Series F Force Testers

Series F Tension / Compression Test Frames are engineered for force testing applications up to 1,500 lbF (6.7 kN). Select from a broad range of force sensor capacities and an expansive array of grips and fixtures.

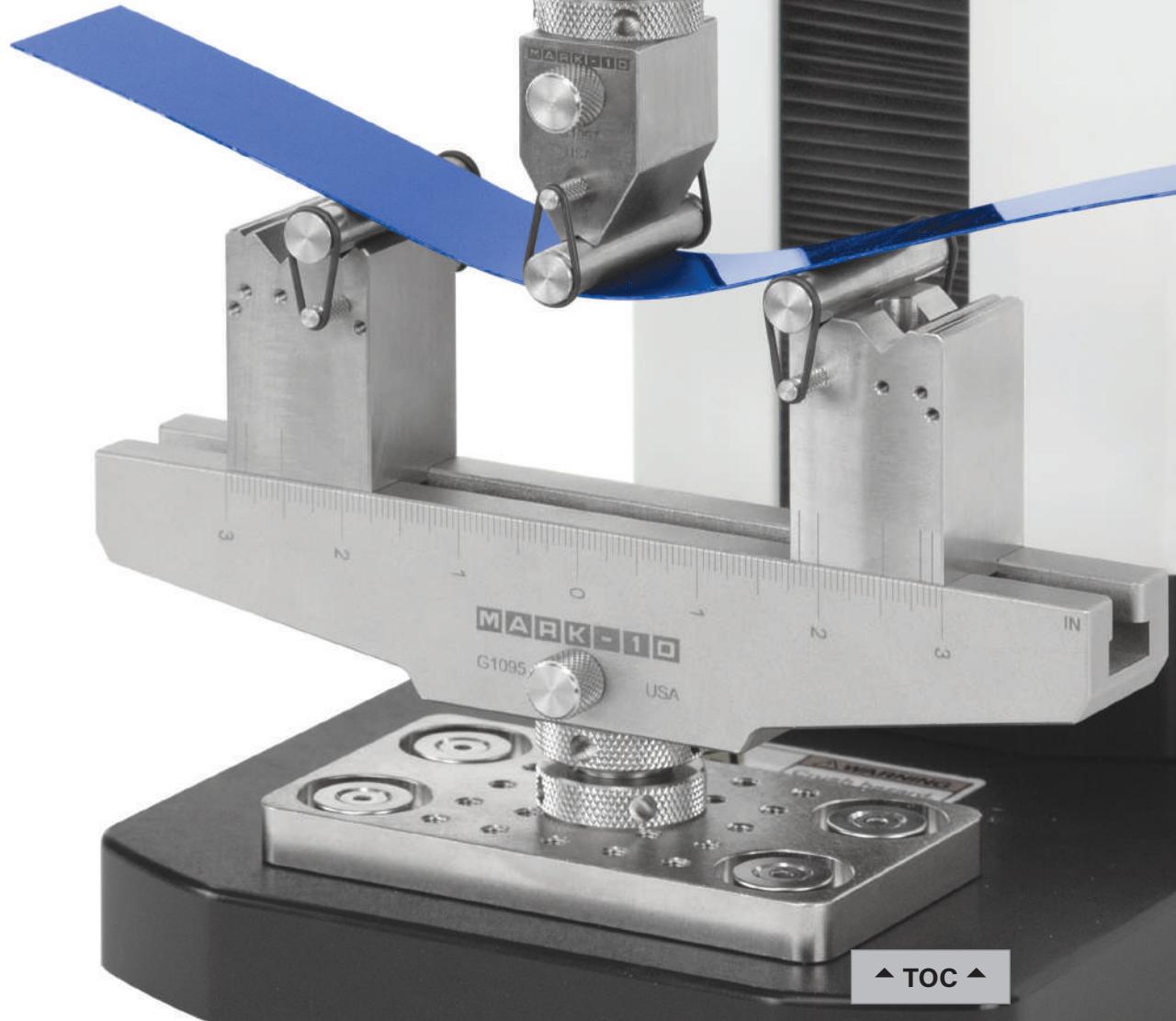
Series F is offered with two controller options. EasyMESUR® testers are basic and configurable for everyday testing needs. IntelliMESUR® systems address more complex, multi-step applications demanding more customization, greater selection of results, and advanced analytical tools.

 **EasyMESUR®**

 **IntelliMESUR®**



[www.mark-10.com/seriesf](http://www.mark-10.com/seriesf)





## Meet the frames

There's a Series F test frame for every need and budget. Select from a wide range of force capacities, heights, and form factors.



F105 / F305 / F505

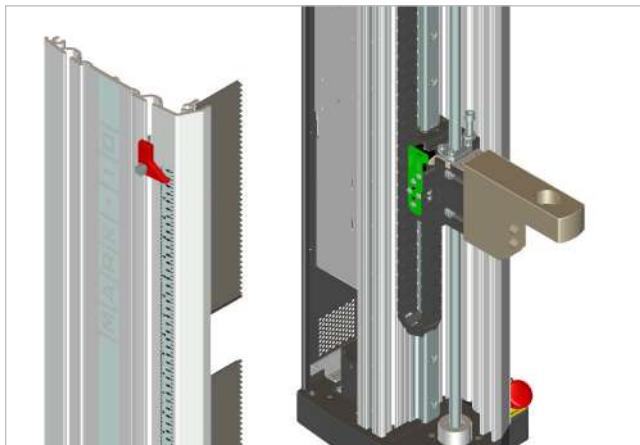
F755 / F1505

F755S / F1505S

F505H

	F105	F305	F505	F505H	F755	F755S	F1505	F1505S
<b>Force capacity:</b>	100 lbF [0.5 kN]	300 lbF [1.3 kN]	500 lbF [2.2 kN]	500 lbF [2.2 kN]	750 lbF [3.4 kN]	750 lbF [3.4 kN]	1,500 lbF [6.7 kN]	1,500 lbF [6.7 kN]
<b>Travel distance:</b>	18.0 in [457 mm]	18.0 in [457 mm]	18.0 in [457 mm]	18.0 in [457 mm]	32.0 in [813 mm]	14.2 in [360 mm]	32.0 in [813 mm]	14.2 in [360 mm]

### Engineered for performance



#### Rigid and precise mechanical design

Exceptionally rigid extrusion-based frames are engineered for stiffness. Factory compensation of test frames and force sensors ensure **position accuracy of up to  $\pm 0.002$  in / 0.05 mm under any load, at any position.**

Stepper motors and controllers drive a ballscrew and linear guideway for smooth, quiet operation, with virtually no speed variation under load.



#### Seamless force sensor interface

Ideal for most applications, Series FS05 smart force sensors mount directly to the crosshead of models F105, F305, F505, and F505H, without any connecting cables. Ranges available from 0.12 to 500 lbF [0.5 N to 2.5 kN]. Accurate to  $\pm 0.1\%$  of full scale.



#### Modular design

Frame bases can be removed to accommodate column extensions and alternative mounting configurations. Most electronics are housed in a self-contained enclosure, easily accessed and replaced if needed.



#### Limit switches

Solid-state upper and lower limit switches may be used as test limits or as test exceptions. Dual-graduated rulers aid in switch placement.



## EasyMESUR®

The EasyMESUR® integrated control panel centralizes test setup, test frame control, and data collection into one convenient place. Use the 7" [177 mm] touchscreen to create and run a wide range of tests, including:

- Test to a load
- Test to a sample break
- Test to a distance
- Load holding
- Cycle testing
- Average load testing

View data in graphical format or results tables. Save or export data as needed, or generate a report.



## Key features

### What's your point of view?

Run a test from any of the following views:

#### Standard view

View load and distance values with clear, simple controls.



#### Graph view

View a graph of load vs. distance or time, with pass/fail status.



#### Results view

View results for each run, with corresponding statistics for the results.

Peel Test - 1 in. Sample  
10:51 AM  
Sep 20, 2022

Ready

Load  
MAX 0.02  
0.00 lbF

Distance  
0.957 in

Run Number Status Max Load [lbF]

1	Pass	6.68
2	Pass	7.50
3	Pass	7.16
4	Fail	4.90

Maximum Minimum Mean Standard Deviation Variance Area (Last Run)

7.60 4.90 6.68 0.936 0.876 1.14

Run Results Last Run Report Save Clear

Back Manual Control Home Return Home Results

Force Sensor: 50 lbF | Cal Due Date: Oct 24, 2023

### Secure user access

Control user access to sensitive areas, such as test editing and calibration, via password.



### Easy test access

Open and edit tests saved within the control panel or external USB drive.

Tests

Averaging Test	02/08/2022 1:03 PM
Break Test	05/09/2022 11:38 AM
Compression Test	04/13/2022 10:21 AM
Cycle Test	03/03/2022 5:20 PM

Search

Back Manual Control Home Return Home Results



## Control panel features



Rugged aluminum housing

7" touch display

USB-C port for connection to a PC

Import and export results, reports, and test files to a PC.

USB-C port for an external flash drive

Import and export results, reports, and test files to a USB flash drive.



## Intelligent manual control

Manually control the test frame to obtain quick load and distance results, or position the crosshead prior to a test. Select from several actuation methods, including momentary (button-hold), maintained (button release) motion, jog mode with three incremental distance presets.

With Mark-10's innovative **FollowMe®** function, push and pull on the force sensor to move the crosshead. Apply greater force to achieve faster motion. FollowMe® is responsive enough for quick positioning as well as fine adjustments.



FollowMe®



Manual Control view



## Test setup is easy as 1-2-3

Select a test type, and EasyMESUR® will guide you through the setup.



Load Limit



Distance Limit



Break Limit



Load Hold



Cycle



Averaging

### 1. Basic Test Settings

- Test direction
- Speed
- Test-specific parameters
- Data storage preferences

### 2. Results Settings

- Select results
- Configure pass/fail limits
- Set data collection rate
- Set auto-return to home

### 3. Graph Settings

- Single-point or continuous graphing
- Select load vs. time or vs. distance
- Graphing start threshold

**M** Create Break Test 15:35 Jul 14, 2022

**Basic**

Test Direction Tension Compression

Zero Load (i)

Preload (i)

Load Threshold 0.100 lbF

Test Speed 10.00 in/min

Break % Drop 50

**Data Collection & Results**

**Graphing**

**Back** **Home** **Save As** **Save**

Force Sensor: 2 lbF | Cal Due Date: Apr 27, 2023

**M** Create Break Test 15:31 Jul 14, 2022

**Basic**

Test Result Max Load

Pass Fail Limits (i)

Data Collection Rate 100 Hz

Stop Button Exception (i)

**Data Collection & Results**

**Graphing**

**Back** **Home** **Save As** **Save**

Force Sensor: 2 lbF | Cal Due Date: Apr 27, 2023

**M** Create Break Test 15:32 Jul 14, 2022

Show Graph (i)

Graph Type Continuous Single

X Axis Time Distance

Start Plotting At Time Load Distance

Time Delay 0 hr  
0 min  
0.00 s

**Basic**

**Data Collection & Results**

**Graphing**

**Back** **Home** **Save As** **Save**

Force Sensor: 2 lbF | Cal Due Date: Apr 27, 2023



## Robust data acquisition and management

### Blazingly fast

Force sensor sampling rate of **5,000 Hz** yields accurate peak measurements even in quick-duration events. EasyMESUR® collects load and travel data at up to **100 Hz**, and saves up to **100,000** data points per run.

### Customizable reporting

Create a PDF report, including results, statistics, graph, system and user information, and comments. Create report templates to save with future reports.

### Save, export, and recall data

Save individual run data or results files to a USB drive or internal storage accessible from a PC.

Data and results may also be exported as .csv files.

	A	B	C	D	E	F	G
1	Peel Test - 1 in. Sample						
2							
3	System Information:						
4	EasyMESUR Version: 1.0.0						
5	Test Frame Model: F305						
6	Test Frame Serial Number: 4144714						
7	Test Frame Capacity: 300 lbf / 4800 ozF / 150 kgF / 1500 N / 1.5 kN						
8	Test Frame Firmware Version: 1.09.09						
9	Force Sensor Model: FS05-50						
10	Force Sensor Serial Number: 4081158						
11	Force Sensor Capacity: 50 lbf / 800 ozF / 25 kgF / 25000 gF / 250 N						
12	Force Sensor Calibration Date: Dec 30, 2021						
13	Force Sensor Calibration Due Date: Dec 30, 2022						
14							
15	Run Num	Status	Max Load [lbf]				
16	1	Pass	6.68				
17	2	Pass	7.6				
18	3	Pass	7.16				
19	4	Fail	4.9				

Results .csv output

ABC Manufacturing Company  
123 Industrial Drive  
Anytown, NY 54321

### Peel Test Sample Report

Peel Test - 1 in. Sample

1" wide samples are loaded into G1008 grips. Max load values are recorded for each sample.

#### System Information:

EasyMESUR Version: 1.00.00  
Test Frame Model: F305  
Test Frame Serial Number: 4144714  
Test Frame Capacity: 300 lbf / 4800 ozF / 150 kgF / 1500 N / 1.5 kN  
Test Frame Firmware Version: 1.09.09  
Force Sensor Model: FS05-50  
Force Sensor Serial Number: 4081158  
Force Sensor Capacity: 50 lbf / 800 ozF / 25 kgF / 25000 gF / 250 N  
Force Sensor Calibration Date: Dec 30, 2021  
Force Sensor Calibration Due Date: Dec 30, 2022

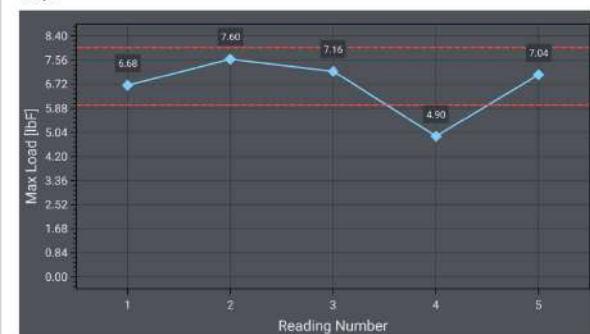
#### Results

Run Number	Data Context	Status	Max Load [lbf]
1	Load	Pass	6.68
2	Load	Pass	7.6
3	Load	Pass	7.16
4	Load	Fail	4.9
5	Load	Pass	7.04

#### Statistics

Maximum	Minimum	Mean	Standard Deviation	Variance	Area Under Curve
7.60	4.90	6.68	0.936	0.876	33.38

#### Graph



The tests were completed successfully.

PDF report



## Tailored to your needs and budget

From basic tests to more advanced needs, EasyMESUR®'s unique optional function platform allows you to select the functions that best suit your requirements.

Any functions not purchased at time of order can be easily enabled in the field via activation codes.

EasyMESUR® systems are shipped in Evaluation Mode, in which all functions are enabled for 160 hours of operation.



### Optional Functions

Function	Description	Co-requirements
<b>Distance Measurement</b>	Measure distance, with the ability to zero the reading.	-
<b>Distance Limits</b>	Stop at user-defined upper and lower distance limits.	- Distance Measurement
<b>Preload</b>	Zero the travel position automatically at a user-defined preload value.	- Distance Measurement
<b>High Speed Extension</b>	Extend the high end of the speed range, dependent upon test frame model.	-
<b>Low Speed Extension</b>	Extend the low end of the speed range, dependent upon test frame model.	-
<b>Cycling</b>	Set up to 100,000 cycles, with user-defined upper and lower dwell times. Cycle between any combination of limit switches, travel limits, breaks, and load limits.	- If cycling to distance limits, add Distance Measurement and Distance Limits - If cycling to a break point, add Break Detection
<b>Break Detection</b>	Stop when a user-defined drop in load occurs.	-
<b>Load Holding</b>	Stop at, and maintain, a user-defined load for a specified period of time. For best performance, use a force sensor with a capacity as close as possible to the target load.	-
<b>FollowMe®</b>	Push and pull on the sensor's loading shaft to jog the crosshead up and down, ideal for manual positioning prior to a test. Speed increases with applied force.	-
<b>Graphing &amp; Reporting</b>	Graph load vs. time or distance, view statistics, and generate a report, including graph, results, run data, and other information.	- If graphing load vs. distance, add Distance Measurement
<b>PC Control</b>	Control the test frame with your own application using a supplied library of motion control and data collection serial commands. While PC control is active, the control panel becomes a pendant, limited to basic, manual controls.	- AC1107 cable, test frame to PC

### Optional Function Packages

Related functions are combined into available packages. A complete options package is also offered.

Package	Included Functions
<b>Distance Measurement Package</b>	- Distance Measurement - Distance Limits - Preload
<b>Speed Extension Package</b>	- High Speed Extension - Low Speed Extension
<b>Advanced Functionality Package</b>	- Cycling - Break Detection - Load Holding - FollowMe®
<b>Complete Options Package</b>	- All functions



## Uniquely serviceable

### Calibrate force sensors on the test frame or off-site

Calibrate force sensors in one of two ways:

#### Test frame

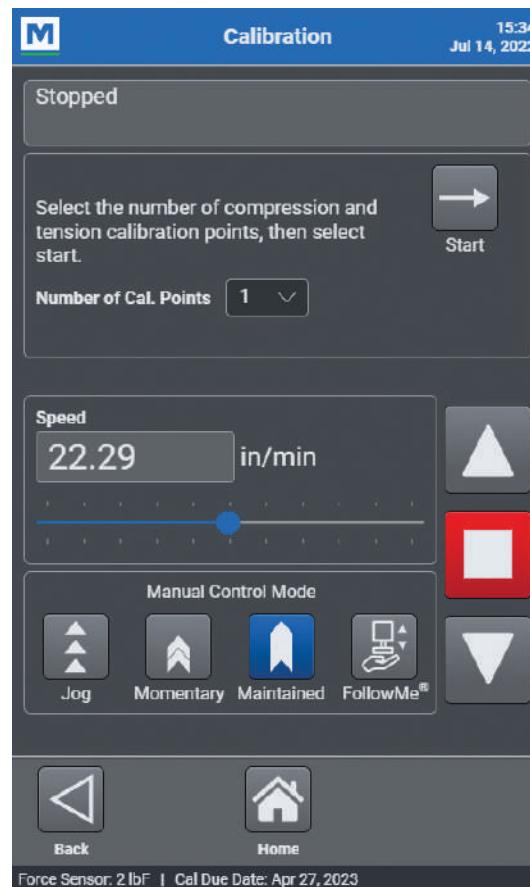
EasyMESUR® provides an integrated utility, with an intuitive step-by-step wizard. Manual controls allow the technician to use the test frame to apply tension and compression forces.

#### Off-site

Conveniently remove the force sensors for off-site calibration with a Mark-10 Model M7I or M5I indicator.

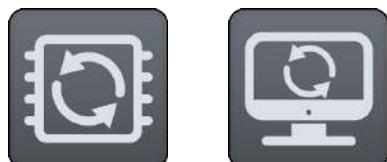


FS05 force sensor connected to an M5I indicator via AC1083 adapter for off-site calibration



## Field-upgradeable

Update the test frame's firmware and EasyMESUR® software in the field via a simple user interface. No need to schedule a service call or to ship hardware to the factory.



## Easy-to-service electronics

Most electronics are housed in an integrated module, easily replaced without special tools or processes.



Removing the electronics module

## In The Box



### **F105 / F305 / F505 / F505H**

- Control panel with mounting hardware
- #10-32M medium hook
- 5/16-18M large hook
- #10-32F 2" diameter compression plate
- #10-32 F/F coupler
- Adapter, 5/16-18M to #10-32F
- Set screw, #10-32 x 3/4"
- Hex nut, #10-32 (2)
- Power cord
- Allen wrench set



### **F755 / F755S / F1505 / F1505S**

- Control panel with mounting hardware
- Eye end kit for base
- Lock ring for eye end (2)
- Spanner wrench (2)
- Power cord
- Allen wrench set



## Specifications

	F105-EM	F305-EM	F505-EM	F505H-EM	F755-EM	F755S-EM	F1505-EM	F1505S-EM
<b>Load capacity*:</b>	100 lbF [0.5 kN]	300 lbF [1.3 kN]	500 lbF [2.2 kN]		750 lbF [3.4 kN]		1,500 lbF [6.7 kN]	
<b>Maximum travel:</b>		18.0 in [457 mm]		32.0 in [813 mm]	14.2 in [360 mm]	32.0 in [813 mm]	14.2 in [360 mm]	
<b>Standard speed range:</b>		0.5 - 13 in/min [13 - 330 mm/min]			0.5 - 24 in/min [10 - 600 mm/min]			
<b>Optional speed range:</b>		0.02 - 45 in/min [0.5 - 1,100 mm/min]		0.001 - 60 in/min [0.02 - 1,525 mm/min]	0.001 - 70 in/min [0.02 - 1,800 mm/min]			
<b>Load accuracy (% of full scale):</b>			Test frame: ±0.1% Force sensor: Series FS05: ±0.1%   Series FS06: ±0.15%   Series R07: ±0.15%					
<b>Peak sampling rate:</b>				5,000 Hz				
<b>Data acquisition rate:</b>					100 Hz			
<b>Speed accuracy:</b>				±0.2% of setting, virtually no variation with load				
<b>Position accuracy:</b>				±0.006 in [0.15 mm], at any load or position, factory-compensated				
<b>Distance resolution:</b>					0.001 in [0.02 mm]			
<b>Limit switch repeatability:</b>						±0.001 in [0.03 mm]		
<b>Power:</b>		Universal input 100-240 VAC, 50/60 Hz, 120W		Universal input 100-240 VAC, 50/60 Hz, 300W		Universal input 100-240 VAC, 50/60 Hz, 450W		
<b>Fuse type:</b>		1.2 A, 250V, 3AG, SLO BLO				4A, 3AG, SLO BLO		
<b>Weight:</b>	60 lb [27 kg]	70 lb [32 kg]	184 lb [83 kg]	149 lb [68 kg]	197 lb [89 kg]	157 lb [71 kg]		
<b>Shipping weight:</b>	75 lb [34 kg]	85 lb [39 kg]	235 lb [107 kg]	195 lb [88 kg]	247 lb [112 kg]	205 lb [93 kg]		
<b>Environmental conditions:</b>	Indoor use only, up to 6,500 ft [2,000 m] above sea level Environmental conditions: 40 - 95°F [5 - 35°C], to 80% relative humidity at 31°C, decreasing linearly to 50% relative humidity at 40°C, non condensing Mains supply voltage fluctuations up to ±10 % of the nominal voltage Transient overvoltages up to the levels of Overvoltage Category II Use in environments up to Pollution Degree 2							
<b>Conformance:</b>	CE, UKCA							
<b>Warranty:</b>	3 years [see individual statement for further details]							

\* Load capacity is reduced at higher speeds, as follows:

- F305-EM: limited to 200 lbF [1 kN] above 24 in [610 mm]/min
- F505-EM / F505H-EM: limited to 300 lbF [1.3 kN] above 24 in [610 mm]/min
- F755-EM / F755S-EM: limited to 500 lbF [2.3 kN] above 35 in [900 mm]/min
- F1505-EM / F1505S-EM: limited to 1,000 lbF [4.5 kN] above 60 in [1,525 mm]/min



## Ordering Information

Model No. <sup>1</sup>	Description
<b>F105-EM</b>	Test frame with EasyMESUR® control panel, vertical, 100 lbF / 0.5 kN
<b>F305-EM</b>	Test frame with EasyMESUR® control panel, vertical, 300 lbF / 1.3 kN
<b>F505-EM</b>	Test frame with EasyMESUR® control panel, vertical, 500 lbF / 2.2 kN
<b>F505H-EM</b>	Test frame with EasyMESUR® control panel, horizontal, 500 lbF / 2.2 kN
<b>F755-EM</b>	Test frame with EasyMESUR® control panel, vertical, 750 lbF / 3.4 kN
<b>F755S-EM</b>	Test frame with EasyMESUR® control panel, vertical, short, 750 lbF / 3.4 kN
<b>F1505-EM</b>	Test frame with EasyMESUR® control panel, vertical, 1,500 lbF / 6.7 kN
<b>F1505S-EM</b>	Test frame with EasyMESUR® control panel, vertical, short, 1,500 lbF / 6.7 kN
Optional Functions <sup>2</sup>	
<b>EMF001-1 / EMF001-2</b>	Distance Measurement
<b>EMF002-1 / EMF002-2</b>	Distance Limits
<b>EMF003-1 / EMF003-2</b>	Preload
<b>EMF004-1 / EMF004-2</b>	High Speed Extension
<b>EMF005-1 / EMF005-2</b>	Low Speed Extension
<b>EMF006-1 / EMF006-2</b>	Cycling
<b>EMF007-1 / EMF007-2</b>	Break Detection
<b>EMF008-1 / EMF008-2</b>	Load Holding
<b>EMF009-1 / EMF009-2</b>	FollowMe®
<b>EMF010-1 / EMF010-2</b>	Graphing & Reporting
<b>EMF011-1 / EMF011-2</b>	PC Control
Optional Function Packages <sup>2</sup>	
<b>EMP001-1 / EMP001-2</b>	Distance Measurement Package
<b>EMP002-1 / EMP002-2</b>	Speed Extension Package
<b>EMP003-1 / EMP003-2</b>	Advanced Functionality Package
<b>EMP-COMP-1 / EMP-COMP-2</b>	Complete Options Package

1. All test frame models contain a universal power supply (80 - 240V) and power cord with 110V US prong style. Add suffix 'E' for 220V European prong, 'U' for 220V UK prong, or 'A' for 220V Australian prong. Ex: F505-EME.
2. Use suffix -1 for models F105/F305/F505/F505H -EM, and -2 for models F755/F755S/F1505/F1505S -EM



Model No.	Description
Optional Equipment	
<b>CERT-DS</b>	Certificate of calibration, distance and speed
<b>AC1116</b>	USB cable, control panel to PC
<b>AC1107</b>	USB cable, test frame to PC
<b>AC1094-1</b>	Single column extension, 6 in / 150 mm, F105 / F305 / F505
<b>AC1094-2</b>	Single column extension, 12 in / 300 mm, F105 / F305 / F505
<b>AC1094-3</b>	Single column extension, 24 in / 600 mm, F105 / F305 / F505
<b>AC1094-4</b>	Single column extension, 6 in / 150 mm, F505H
<b>AC1094-5</b>	Single column extension, 12 in / 300 mm, F505H
<b>AC1094-6</b>	Single column extension, 24 in / 600 mm, F505H
<b>AC1095-1</b>	Double column extension, 6 in / 150 mm, F105 / F305 / F505
<b>AC1095-2</b>	Double column extension, 12 in / 300 mm, F105 / F305 / F505
<b>AC1095-3</b>	Double column extension, 24 in / 600 mm, F105 / F305 / F505
<b>AC1092-1</b>	Shield, F755S / F1505S
<b>AC1092-2</b>	Shield, F755 / F1505
<b>AC1083</b>	Adapter, FS05 sensor / PTAF adapter, to Plug & Test® connector / F755, F755S, F1505, F1505S test frames, 10 in / 250 mm cable
<b>AC1084</b>	Extension cable, 24 in / 610 mm, Plug & Test®, male/female
<b>PTAF</b>	Adapter, Plug & Test®, customer-supplied force sensor to Series F test frames



## **IntelliMESUR®**

IntelliMESUR® is an advanced, integrated force measurement system. Select a pre-loaded 10.1" tablet with mounting bracket or use your own Windows device. With IntelliMESUR®, you can create and run a wide range of basic and multi-step tests, including:

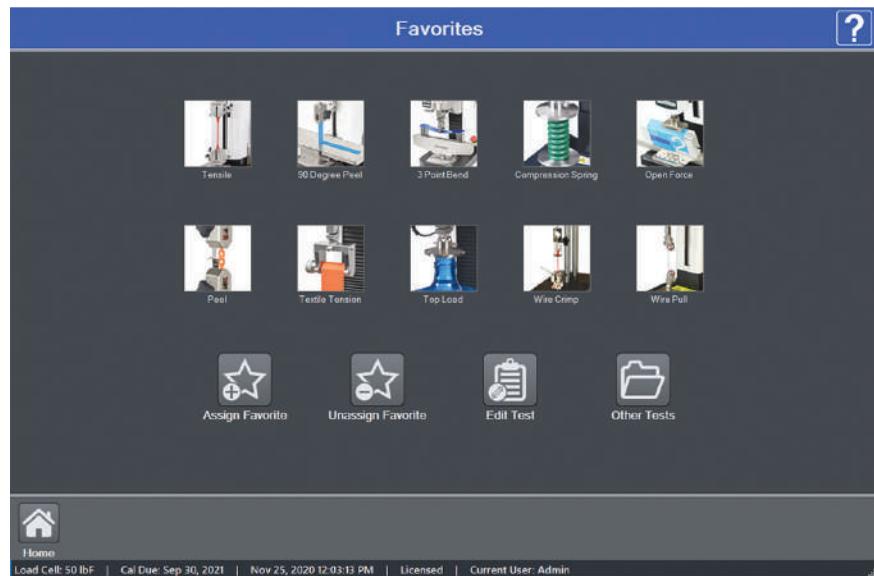
- Limit testing to a load, break, or distance
- Height measurement
- Load holding
- Cycle testing
- Multi-step testing, utilizing any combination of motion control and data collection functions
- Coefficient of friction (COF) testing (optional)

Perform individual runs or batches, and view data in graphical format or results tables. Save or export data as needed, or generate a report.

For best performance with the load holding function, use a force sensor with a capacity as close as possible to the target load.



## Key Features



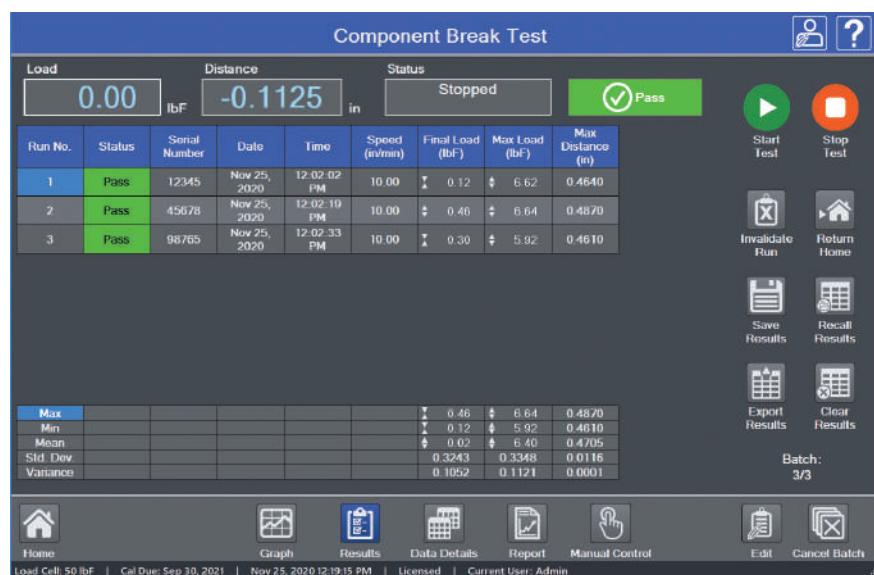
### Ready. Set. Go.

Quickly access up to 10 favorite tests. Associate an image with each favorite for easy identification.



### ► Graph view

The Graph view plots load vs. distance or force vs. time. Overlay up to 10 runs for visual comparisons.



### ► Results view

The Results view displays user-selected results for each run. Statistics may be applied to selected results.



### Multi-step tests

Building upon basic test wizards, easily incorporate any combination of steps, with the ability to loop a sequence of steps. Select from:

- Move to load
- Move to distance
- Move to break
- Hold a load or position
- Loop / cycle
- Datum
- Prompts
- Save current load or position
- Zero load or position
- Return to Home position



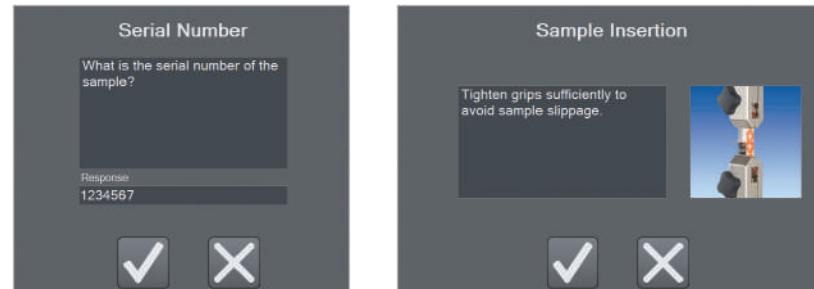
Insert and re-order steps as necessary

### Operator prompting

Prompts can appear at the beginning of each test, batch, or run.

**Ask** prompts ask the operator for information which is saved in the results table - for example, a lot number. Type the response or use a barcode scanner.

**Tell** prompts provide instructions to the operator, and can include an image.



Tell Prompt

### Take your measurements to new heights

Use **Height Mode** to determine height at a specific load, commonly used in spring testing. A datum may be set to define the reference point.



### Deflection compensation

Series F test frames and force sensors are deflection-compensated at the factory, resulting in system distance measurement accuracy of **±0.002 in / 0.05 mm** at any load and at any position along the frame.

To further compensate grips and attachments, use IntelliMESUR®'s deflection compensation utility. The deflection offset file can be associated with the test setup file.





## Test Setup

### Basic tests

Select a test type, and IntelliMESUR® will guide you through the setup.



Load Limit



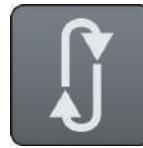
Distance Limit



Break Limit



Load Hold



Cycle

#### 1. Pre-Test Settings

- Units of measurement
- Batch size
- Display preferences
- Preload
- Operator prompts

#### 2. Test Settings

- Test objective
- Speed
- Pass / fail limits
- Exception limits

#### 3. Results & Statistics Selection

- Final load
- Maximum load
- Minimum load
- Load at max. distance
- Load at min. distance
- Average load
- Delta load
- Maximum distance
- Final distance
- Minimum distance
- Height
- Distance at max. load
- Distance at min. load
- Distance at break
- Delta distance
- Area under the curve

**Basic Test Wizard**

Pre-Test Setup > Break Limit Setup > Results Setup > Post-Test Setup

**Pre-Test Settings**

**Test Settings**

**Results & Statistics Selection**



## Robust data acquisition and management

### Blazingly fast

Force sensor sampling rate of **20,000 Hz** yields accurate peak measurements even in quick-duration events. IntelliMESUR® collects load and travel data at up to **1,000 Hz**, and allows up to **1 million data points** per run.

### Customizable reporting

Print or create a PDF report, including results, statistics, graph, system and user information, and comments. Personalize the report with your company logo and an additional image.

Create report templates to save with future reports.

### Save or export data

Automatically or manually save individual runs and results to a USB drive or file location of your choice. File names are automatically generated with the test name and time stamp, for quick searchability. Results sets and data from individual runs may also be exported as .csv files.

A	B	C	D	E	F	G	H	I
1	Component Break Test							
2								
3	System Information:							
4	IntelliMESUR Version: 1.0							
5	Test Frame Model: F305							
6	Test Frame Serial Number: 1234567							
7	Test Frame Capacity: 300 lbF / 1.5 kN							
8	Test Frame Firmware Version: 1.00.00							
9	Load Cell Model: FS05-100							
10	Load Cell Capacity: 100 lbF							
11	Load Cell Serial Number: 7777777							
12	Calibration Date: 9/30/2020							
13	Calibration Due Date: 09/30/2021							
14								
15	Run No.	Status	Serial Number	Date	Time	Speed (in/min)	Max Load (lbF)	Max Distance (in)
16	1	Pass	12345	11-Dec-20	12:43:37 PM	10	-4.74	0.3805
17	2	Pass	98765	11-Dec-20	12:43:48 PM	10	-4.54	0.365
18	3	Pass	02468	11-Dec-20	12:43:58 PM	10	-5.16	0.375
19								
20	Statistics							
21	Maximum					-5.16	0.3805	
22	Minimum					-4.54	0.365	
23	Mean					-4.82	0.3735	
24	Std. Dev.					0.2584	0.0064	
25	Variance					0.0668	0	
26								
27								
28								
29								

Results .csv output

**MARK-10**

Mark-10 Corporation  
11 Dixon Ave  
Copiague, NY 11726 USA

**Peel Test**

Peel Test.tst

A batch of T-peel tests were performed on 1" samples, at a rate of 6 in/min. Peak results were obtained and compared against pass/fail criteria.

Equipment used:  
- F305 test frame  
- FS05-20 load cell  
- G1008 grips

**System Information:**  
IntelliMESUR Version: 1.0.0  
Frame Model: F305  
Test Frame Serial Number: 1234567  
Test Frame Capacity: 300 lbF / 1.5 kN  
Test Frame Firmware Version: 1.00.00  
Load Cell Model: RM105-0  
Load Cell Serial Number: 9876543  
Calibration Date: Sep 30, 2020  
Calibration Due Date: Sep 30, 2021

**Results**

Run No.	Status	Date	Time	Speed (in/min)	Max Load (lbF)
1	Pass	Dec 22, 2020	04:22:45 PM	10.00	◆ 5.60
2	Pass	Dec 22, 2020	04:22:51 PM	10.00	◆ 5.20
3	Pass	Dec 22, 2020	04:22:57 PM	10.00	◆ 5.02

**Statistics**

Statistics	Status	Date	Time	Speed (in/min)	Max Load (lbF)
Maximum					◆ 5.60
Minimum					◆ 5.02
Mean					◆ 5.28
Std. Dev.					0.2424
Variance					0.0588

**Graph**

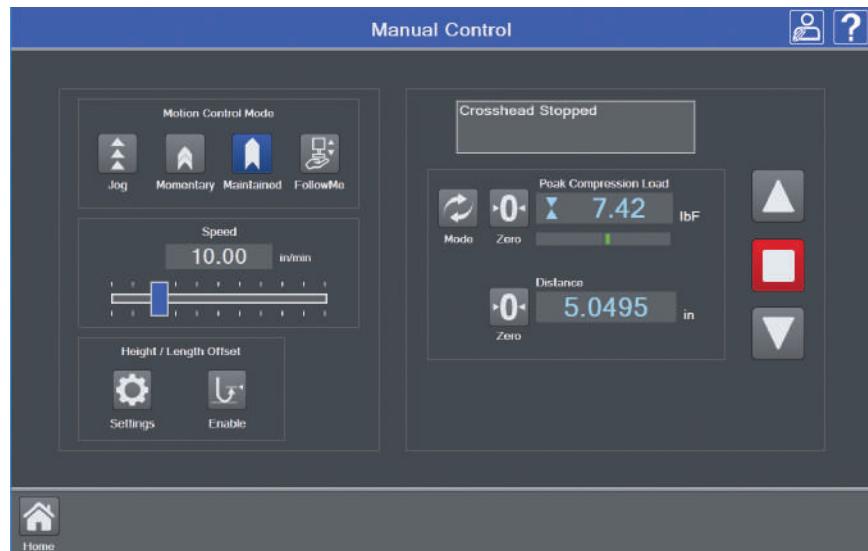
All samples passed.

PDF report



## Intelligent manual control

Manually control the test frame to obtain quick force and distance results, or manually position the crosshead prior to a test. Select from several actuation methods, including momentary (button-hold), maintained (button release) motion, jog mode with three distance presets.



With Mark-10's innovative **FollowMe®** function, push and pull on the force sensor to move the crosshead. Apply greater force to achieve faster motion. FollowMe® is responsive enough for quick positioning as well as fine adjustments.



FollowMe®

The **Height / Length Offset** utility in Manual Control defines a reference point to accommodate applications in which grips cannot directly touch one another.





## Uniquely serviceable

### Calibrate force sensors on the test frame or off-site

Calibrate Series FS05, FS06 and R07 force sensors in one of two ways:

#### Test frame

IntelliMESUR® provides an integrated utility, with an intuitive step-by-step wizard. Manual controls allow the technician to use the test frame to apply tension and compression forces.

#### Off-site

Conveniently remove the force sensors for off-site calibration with a Mark-10 Model M7I or M5I indicator.



### Field-upgradeable

Test frame firmware and IntelliMESUR® software can be updated in the field via a simple user interface. No need to schedule a service call or to ship hardware to the factory.



### Easy-to-service electronics

Most electronics are housed in an integrated module, easily replaced without special tools or processes.



Removing the electronics module



FS05 force sensor connected to an M5I indicator via AC1083 adapter for off-site calibration



## In The Box



### F105 / F305 / F505 / F505H

- Control panel, mounting bracket, and hardware (-IMT models only)
- Mounting bracket, column end (F505H only)
- USB flash drive containing software installation files (-IM models only)
- USB dongle (-IM models only)
- USB cable
- #10-32M medium hook
- 5/16-18M large hook
- #10-32F 2" diameter compression plate
- #10-32 F/F coupler
- Adapter, 5/16-18M to #10-32F
- Set screw, #10-32 x 3/4"
- Hex nut, #10-32 (2)
- Power cord
- Allen wrench set

### F755 / F755S / F1505 / F1505S

- Control panel, mounting bracket, and hardware (-IMT models only)
- USB flash drive containing software installation files (-IM models only)
- USB dongle (-IM models only)
- USB cable
- Eye end kit for base
- Lock ring for eye end (2)
- Spanner wrench (2)
- Power cord
- Allen wrench set

## Specifications

	<b>F105</b>	<b>F305</b>	<b>F505</b>	<b>F505H</b>	<b>F755</b>	<b>F755S</b>	<b>F1505</b>	<b>F1505S</b>
<b>Load capacity*:</b>	100 lbF [0.5 kN]	300 lbF [1.3 kN]	500 lbF [2.2 kN]		750 lbF [3.4 kN]		1,500 lbF [6.7 kN]	
<b>Maximum travel:</b>		18.0 in [457 mm]			32.0 in [813 mm]	14.2 in [360 mm]	32.0 in [813 mm]	14.2 in [360 mm]
<b>Speed range:</b>		0.02 - 45 in/min [0.5 - 1,100 mm/min]			0.001 - 60 in/min [0.02 - 1,525 mm/min]		0.001 - 70 in/min [0.02 - 1,800 mm/min]	
<b>Load accuracy (% of full scale):</b>					Test frame: ±0.1% Force sensor: Series FS05: ±0.1%   Series R06: ±0.15%   Series R07: ±0.15%			
<b>Peak sampling rate:</b>					20,000 Hz			
<b>Data acquisition rate:</b>					1,000 Hz			
<b>Speed accuracy:</b>					±0.2% of setting, virtually no variation with load			
<b>Distance accuracy:</b>					±0.002 in [0.05 mm], at any load or position, factory-compensated			
<b>Distance resolution:</b>					0.0005 in / 0.01 mm			
<b>Limit switch repeatability:</b>					±0.001 in / 0.03 mm			
<b>Power:</b>		Universal input 100-240 VAC, 50/60 Hz, 120W			Universal input 100-240 VAC, 50/60 Hz, 300W		Universal input 100-240 VAC, 50/60 Hz, 450W	
<b>Fuse type:</b>		1.2 A, 250V, 3AG, SLO BLO			4A, 3AG, SLO BLO			
<b>Weight:</b>	60 lb [27 kg]	70 lb [32 kg]	184 lb [83 kg]	149 lb [68 kg]	197 lb [89 kg]	157 lb [71 kg]		
<b>Shipping weight:</b>	75 lb [34 kg]	85 lb [39 kg]	235 lb [107 kg]	195 lb [88 kg]	247 lb [112 kg]	205 lb [93 kg]		
<b>Environmental conditions:</b>	Indoor use only Up to 6,500 ft [2,000 m] above sea level Temperature range: 40 - 95°F [5 - 35°C] Humidity range: up to 80% relative humidity at 31°C, decreasing linearly to 50% relative humidity at 40°C, non condensing Mains supply voltage fluctuations up to ±10 % of the nominal voltage Transient overvoltages up to the levels of Overvoltage Category II Use in environments up to Pollution Degree 2							
<b>Conformance:</b>	CE, UKCA							
<b>Warranty:</b>	3 years [see individual statement for further details]							

\* Load capacity is reduced at higher speeds in the following models:

- F305: limited to 200 lbF [1 kN] above 24 in [610 mm]/min
- F505 / F505H: limited to 300 lbF [1.3 kN] above 24 in [610 mm]/min
- F755 / F755S: limited to 500 lbF [2.3 kN] above 35 in [900 mm]/min
- F1505 / F1505S: limited to 1,000 lbF [4.5 kN] above 60 in [1,525 mm]/min



## Ordering Information

Model No.	Description
<b>Test Frame + Pre-Configured Tablet Control Panel</b>	
<b>F105-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, vertical, 100 lbF / 0.5 kN, 110V*
<b>F305-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, vertical, 300 lbF / 1.3 kN, 110V*
<b>F505-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, vertical, 500 lbF / 2.2 kN, 110V*
<b>F505H-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, horizontal, 500 lbF / 2.2 kN, 110V*
<b>F755-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, vertical, 750 lbF / 3.4 kN, 110V*
<b>F755S-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, vertical, short, 750 lbF / 3.4 kN, 110V*
<b>F1505-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, vertical, 1,500 lbF / 6.7 kN, 110V*
<b>F1505S-IMT</b>	Test frame with IntelliMESUR® pre-loaded tablet control panel, vertical, short, 1,500 lbF / 6.7 kN, 110V*
<b>Test Frame + Standalone Software (for customer installation on a Windows device)</b>	
<b>F105-IM</b>	Test frame with IntelliMESUR® software, single license, vertical, 100 lbF / 0.5 kN, 110V*
<b>F305-IM</b>	Test frame with IntelliMESUR® software, single license, vertical, 300 lbF / 1.3 kN, 110V*
<b>F505-IM</b>	Test frame with IntelliMESUR® software, single license, vertical, 500 lbF / 2.2 kN, 110V*
<b>F505H-IM</b>	Test frame with IntelliMESUR® software, single license, horizontal, 500 lbF / 2.2 kN, 110V*
<b>F755-IM</b>	Test frame with IntelliMESUR® software, single license, vertical, 750 lbF / 3.4 kN, 110V*
<b>F755S-IM</b>	Test frame with IntelliMESUR® software, single license, vertical, short, 750 lbF / 3.4 kN, 110V*
<b>F1505-IM</b>	Test frame with IntelliMESUR® software, single license, vertical, 1,500 lbF / 6.7 kN, 110V*
<b>F1505S-IM</b>	Test frame with IntelliMESUR® software, single license, vertical, short, 1,500 lbF / 6.7 kN, 110V*

\* All test frame models contain a universal power supply (80 - 240V) and power cord with US prong style. Add suffix 'E' for European prong, 'U' for UK prong, or 'A' for Australian prong. Ex: F505-IMTE.



Model No.	Description
	Optional Equipment
IMF001	COF testing module for IntelliMESUR®
CERT-DS	Certificate of calibration, distance and speed
AC1094-1	Single column extension, 6 in / 150 mm, F105 / F305 / F505
AC1094-2	Single column extension, 12 in / 300 mm, F105 / F305 / F505
AC1094-3	Single column extension, 24 in / 600 mm, F105 / F305 / F505
AC1094-4	Single column extension, 6 in / 150 mm, F505H
AC1094-5	Single column extension, 12 in / 300 mm, F505H
AC1094-6	Single column extension, 24 in / 600 mm, F505H
AC1095-1	Double column extension, 6 in / 150 mm, F105 / F305 / F505
AC1095-2	Double column extension, 12 in / 300 mm, F105 / F305 / F505
AC1095-3	Double column extension, 24 in / 600 mm, F105 / F305 / F505
AC1092-1	Shield, 51.9" height
AC1092-2	Shield, 34.4" height
AC1085	Control panel tabletop mounting kit
AC1093	USB hub
AC1083	Adapter, FS05 sensor / PTAF adapter, to Plug & Test® connector / F755, F755S, F1505, F1505S test frames, 10 in / 250 mm cable
AC1084	Extension cable for AC1083, 24 in / 610 mm, Plug & Test®, male/female
PTAF	Adapter, Plug & Test®, customer-supplied force sensor to Series F test frames
DC5000	Spare tablet control panel, pre-installed with IntelliMESUR®, with test frame mounting hardware
15-1019	IntelliMESUR® software, customer installation on a Windows device, additional seat



## IntelliMESUR® / EasyMESUR® Comparison Chart

✓ = included   ○ = optional   ✗ = not available

Feature / Specification	IntelliMESUR®	EasyMESUR®
Basic test wizards	✓	✓
Multi-step tests	✓	✗
Extended speed ranges	✓	○
Distance measurement, distance limits, and preload	✓	○
Auto-return and cycling	✓	○
Break detection	✓	○
Load holding	✓	○
FollowMe® crosshead positioning	✓	○
Batch testing	✓	✗
Operator prompting	✓	✗
Pass / fail limits	✓	✓
Report creator	✓	○
Results	Large selection	1 per test
Graphing and statistics	✓	○
Overlay previous runs on graph	✓	✗
PC control via third-party application	✗	○
Coefficient of friction (COF) measurement	○	✗
Overload protection	✓	✓
Accuracy - force sensor	±0.1% or ±0.15% of sensor full scale	
Accuracy - test frame	±0.1% of sensor full scale	
Distance resolution	0.0005 in [0.01 mm]	0.001 in [0.02 mm]
System deflection compensation	✓	✓
Accuracy - distance	±0.002 in [0.05 mm], at any load or position	±0.006 in [0.15 mm], at any load or position
Accuracy - speed	0.2% of setting	
Peak load capture rate	20,000 Hz	5,000 Hz
Data acquisition rate	1,000 Hz	100 Hz
Number of data points per run	1,000,000	100,000
Users and permissions	3 permission tiers, unlimited users	
Runs on	Windows tablet or PC	
	Control panel only	

IntelliMESUR®

EasyMESUR®

▲ TOC ▲

www.mark-10.com

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## Torque Testers

[www.mark-10.com/torque-testers](http://www.mark-10.com/torque-testers)



TSTM-DC



TSTMH-DC

## Series TSTM-DC / TSTMH-DC

Torque, Motorized, 200 lbFin / 22 Nm

Series TSTM-DC advanced motorized torque test stands are designed for a wide variety of applications, including closure torque testing, fastener torque testing, and more. Two torque capacities are available, 100 lbFin (11.5 Nm) and 200 lbFin (22 Nm).

The stands include a torque loading plate with tapped holes for grip and fixture mounting. Stepper motor design eliminates speed variation with load. A lever-operated slider with travel stops makes engaging and disengaging samples quick and efficient. A modular mechanical design allows the stand to be configured for a variety of applications.

The controller features an integrated angle display and output, programmable angle travel limits, PC control capability, programmable cycling, auto return, overload protection, password protection, and more.

### Features

#### ■ Broad speed range

Set the rotational speed from 0.01 to 60 RPM (0.05 - 360°/s).

#### ■ No speed variation with load

Stepper motor control eliminates any speed variation, regardless of the torque produced.



#### ◀ Fixture mounting table with angle indicator

Rotating torque plate includes a matrix of tapped holes for grip or fixture mounting.

#### ■ Integrated digital angle indicator

Measures in degrees or revolutions, with RS-232 output. USB converter available.

#### ■ Cycle between angle or torque limits

#### ■ PC control via 3<sup>rd</sup> party applications

#### ■ Custom column lengths



## Specifications

<b>Maximum torque:</b>	TSTM-DC / TSTMH-DC: 100 lbFin [11.5 Nm] TSTM-DC-1 / TSTMH-DC-1: 200 lbFin [22.0 Nm]
<b>Speed range:</b>	TSTM-DC / TSTMH-DC: 0.01 - 15 RPM [0.05 - 90°/s] TSTM-DC-2 / TSTMH-DC-2: 0.04 - 60 RPM [0.2 - 360°/s] *
<b>Speed accuracy:</b>	±0.2% of setting, ±0% variation with load
<b>Rotational travel accuracy:</b>	±0.7° [0.002 rev.]
<b>Rotational travel resolution:</b>	0.1° [0.01 rev.]
<b>Rotational travel repeatability:</b>	0.1° [0.0003 revolutions]
<b>Throat:</b>	4.10" [104 mm]
<b>Manual adjustment:</b>	12° / adjustment knob revolution
<b>Maximum slider travel:</b>	15.5" [394 mm]
<b>Slider travel rate:</b>	1.047" [26.6 mm] / lever revolution
<b>Universal power supply:</b>	80-250 VAC

\* Maximum torque decreases proportionately with speed, as follows:

- Maximum torque at 30 RPM = 50 lbFin [5.6 Nm]
- Maximum torque at 60 RPM = 25 lbFin [2.8 Nm]

## Ordering Information

Model No.	Description
<b>TSTM-DC</b>	Torque stand, motorized, vertical, 110 V*
<b>TSTMH-DC</b>	Torque stand, motorized, horizontal, 110V*
<b>TSTM-DC-1</b>	Torque stand, motorized, vertical, 200 lbFin, 110V *
<b>TSTMH-DC-1</b>	Torque stand, motorized, horizontal, 200 lbFin, 110V *
<b>TSTM-DC-2</b>	Torque stand, motorized, vertical, 60 RPM max, 100 lbFin, 110V *
<b>TSTMH-DC-2</b>	Torque stand, motorized, horizontal, 60 RPM max, 100 lbFin, 110V *
Additional Items To Consider	
<b>AC1108</b>	Multi-function cable, M7l/M5l indicator to test stand
<b>AC1104</b>	Serial cable, test stand to PC
<b>RSU100</b>	Communication adapter, RS-232 to USB
<b>TSF002</b>	Horizontal / wall mounting kit
<b>AC1016</b>	Mounting adapter, MR55-200 to test stand
<b>SP-2736-12</b>	Column extension, 12 in. / 305 mm
<b>SP-2736-24</b>	Column extension, 24 in. / 610 mm
<b>SP-2736-42</b>	Column extension, 42 in. / 1065 mm
<b>SP-2496</b>	Upgrade to 200 lbFin, factory retrofit
<b>SP-2624</b>	Upgrade to 60 RPM, factory retrofit



TST



TSTH

### Model TST / TSTH

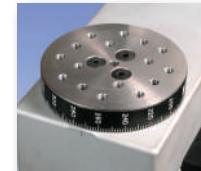
Torque, Manual, 100 lbFin / 11.3 Nm

These manually operated torque test stands are ideal for a wide variety of applications requiring up to 100 lbFin (11.3 Nm) of torque, including closure torque testing, fastener torque testing, and more. Smooth hand wheel operation ensures ease of use and a lever-operated slider with travel stops makes engaging and disengaging samples quick and efficient. The stand includes a torque loading plate with tapped holes for grip and custom fixture mounting and an angle dial indicator with 2° resolution and unlimited angular travel. Modular mechanical design allows the stand to be configured for a variety of applications.

#### Features:

##### ■ Lever operated slider

For simply and quickly engaging and disengaging samples.



##### ◀ Fixture mounting table with angle indicator

Rotating torque plate includes a matrix of tapped holes for grip or fixture mounting



##### ◀ Optional digital angle indicator (TST001)

Useful in torsion spring testing, bottle cap testing, catheter testing, and other applications.

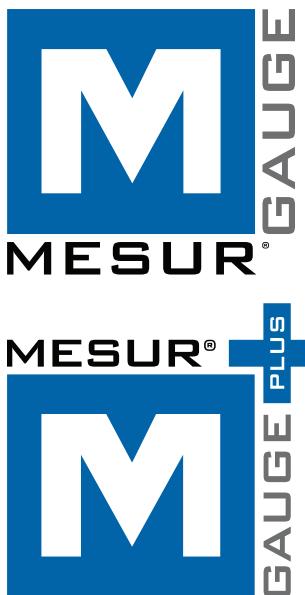


## Specifications

<b>Torque capacity:</b>	100 lbFin [11.3 Nm]
<b>Maximum angular travel:</b>	No limit
<b>Angular rate:</b>	12° per hand wheel revolution
<b>Angle indicator resolution:</b>	2°
<b>Maximum slider travel:</b>	15.5 in [394 mm] (column extensions available)
<b>Slider travel rate:</b>	1.047 in [26.6 mm] / lever revolution
<b>Weight (without optional equipment):</b>	TST: 33 lb [15 kg] / TSTH: 27 lb [12.3 kg]
<b>Warranty:</b>	3 years (see individual statement for further details)

## Ordering Information

Model No.	Description
<b>TST</b>	Torque test stand, vertical, lever-operated, 100 lbFin
<b>TSTH</b>	Torque test stand, horizontal, lever-operated, 100 lbFin
<b>TST001</b>	Digital angle display for TST/TSTH, 110V
<b>TST001E</b>	Digital angle display for TST/TSTH, 220V Euro
<b>SP-2736-12</b>	Column extension, 12 in. / 305 mm
<b>SP-2736-24</b>	Column extension, 24 in. / 610 mm
<b>SP-2736-42</b>	Column extension, 42 in. / 1065 mm



## MESUR®gauge / MESUR®gauge Plus Software

MESUR®gauge and MESUR®gauge Plus expand the functionality of force and torque measuring instruments and test stands. Both programs share the ability to capture and display data in graphical format for load vs. time or load vs. travel vs. time. MESUR®gauge Plus adds the ability to control the motion of certain Mark-10 Series ESM motorized test stands, coordinating motion control and data acquisition.

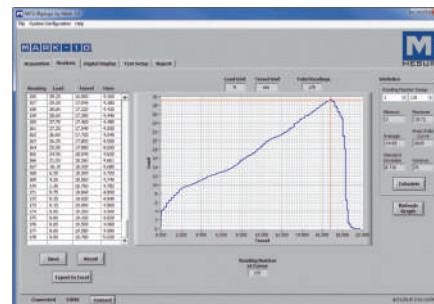
Free 90-day demo download available at [mark-10.com/mesurgauge](http://mark-10.com/mesurgauge)

### Features:

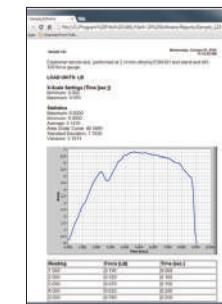
- Tabulate and plot continuous or single-point data
- MESUR®gauge Plus starts and stops certain model motorized test stands, coordinating motion control and data collection with just one click
- Real time tabular and graphical data acquisition of load vs. time or load vs. travel vs. time
- Configurable start and stop test triggers (time, load, number of samples, or distance)
- Statistical calculations of acquired data. Automatically recalculates for custom ranges.
- One-click export to Excel
- Customize test setups for future recall
- Customize reports and templates
- Configure certain Mark-10 gauges and indicators through a simple interface
- View real time data on a large simulated instrument display



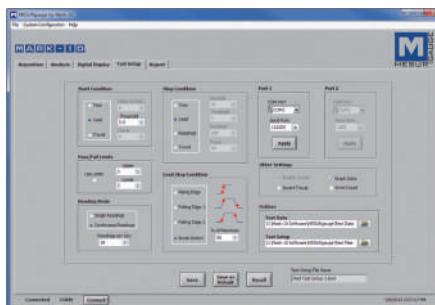
▲ View real time data in graphical and tabular formats. Also, remotely zero the force gauge or test stand travel display.



▲ Analyze test data via x-y cursor and statistical calculations for specified regions. Tests may be saved and recalled, and data may be exported to Excel with one click.



▲ Generate reports, including test data, graph, statistics, date and time, and user-configurable fields.



▲ Configure start and stop conditions, such as load, break, time, or distance. Select either discrete data point collection or continuous data collection at up to 50 Hz.

### Ordering Information:

Model No.	Description
15-1004	MESUR®gauge software
15-1004-5	MESUR®gauge software, 5 licenses
15-1005	MESUR®gauge Plus software*
15-1005-5	MESUR®gauge Plus software, 5 licenses*
15-1006	Upgrade, MESUR®gauge to MESUR®gauge Plus*

\* Minimum required test stand controller firmware versions for motion control:

ESM303 / ESM303H: Front: 2.02.04, Main: 2.02.04

ESM1500: Front: 2.02.02, Main: 2.02.02



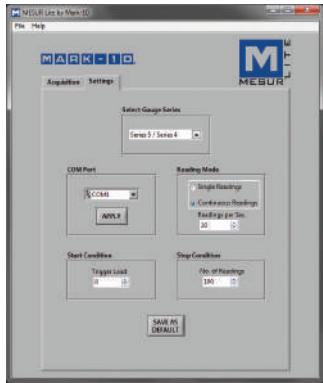
## MESUR® Lite Software

MESUR® Lite is a basic data collection program for gauges, indicators, and testers. MESUR® Lite tabulates continuous or single point data from a gauge. Data saved in the gauge's memory can also be downloaded in bulk. One-click export to Excel allows for further data manipulation.

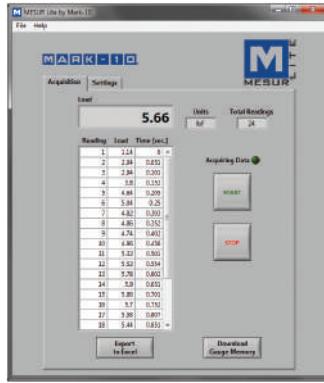
Free download from [mark-10.com/mesurlite](http://mark-10.com/mesurlite)

### Features:

- Tabulates continuous, single-point, or saved data from a gauge
- One-click export to Excel
- Configurable start and stop test triggers



◀ The Settings tab allows the user to select gauge series, COM port, reading mode (discrete or continuous data collection), and start and stop conditions.



◀ The Acquisition tab displays the current reading and tabulates data. Also provides a means of downloading saved data from a Mark-10 instrument and one-click export to Excel.

## Software Comparison Chart

	MESUR®gauge	MESUR®gauge Plus	MESUR® Lite
<b>Compatible equipment</b>	Instruments, test stands, travel displays		Instruments only
<b>Type of data</b>	Load vs. time / load vs. travel / custom		Load vs. time only
<b>Motion control of motorized stands</b>	✗	✓	✗
<b>Data tabulation</b>	✓		✓
<b>Export to Excel</b>	✓		✓
<b>Graphing and analysis tools</b>	✓		✗
<b>Max. number of data points</b>	Unlimited		5,000
<b>Data sampling rate</b>	0.000001 - 50/sec.		0.1 - 10/sec.
<b>Statistical calculations</b>	✓		✗
<b>Available start conditions</b>	Time, load, travel distance		Load only
<b>Available stop conditions</b>	Time, load, sample break, travel distance, number of readings		Number of data points only
<b>Configurable pass / fail limits</b>	✓		✗
<b>Reporting</b>	Yes, with customizable fields and templates		✗
<b>Save and recall test data</b>	✓		✗
<b>Save and recall multiple test setups</b>	✓		✗
<b>Gauge configuration utility</b>	✓		✗
<b>Large digital display</b>	✓		✗

## Grips & Attachments

Mark-10 grips and attachments are integral components of testing systems, designed for a wide range of tension, compression, and torque applications. Eye end adapters may be used with some gauges and sensors for quick-change convenience and compatibility with third party equipment.



[www.mark-10.com/grips](http://www.mark-10.com/grips)





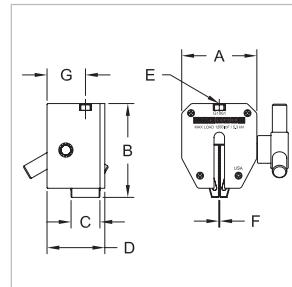
All dimensions shown as in [mm]

## Tensile / Pull

### Wedge grips

Heavy-duty grips designed for a range of tensile testing requirements up to 2,000 lbF [10 kN]. Self-tightening stainless steel serrated or rubber jaw faces engage the sample through a spring loaded knob and rack and pinion type mechanism. The jaws ride on rollers, eliminating jamming common in conventional wedge grips.

Model No.	A	B	C	D	E	F	G
G1061-1			0.375 [9.5]	0.95 [24.1]	5/16-18 UNC		0.62 [15.7]
G1061	1.95 [49.5]	2.45 [62.2]	0.75 [19.1]	1.50 [38.1]	5/16-18 UNC	0 - 0.25 [0 - 6.4]	1.00 [25.4]
G1061-2			1.00 [25.4]	1.75 [44.5]	1/2-20 UNC		1.13 [28.7]
G1061-3						0 - 0.20 [0 - 5.1]	



Model No.	Capacity lbF [N]	Weight lb [kg]	Jaw Material / Hardness	Included Adapters
G1061-1	200 [900]	0.50 [0.23]		5/16-18M to #10-32F, #10-32 M/M stud*, 5/16-18 M/M stud*
G1061	1200 [5,300]	0.80 [0.36]	416 SS / 55 RC	
G1061-2	2,000 [9,000]	0.90 [0.41]		1/2-20M to 5/16-18F, 1/2-20 M/M stud*, 5/16-18 stud*
G1061-3	50 [250]		Neoprene rubber Durometer = 70	

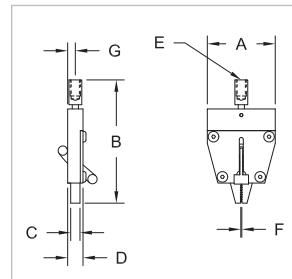


\* Includes jam nuts

### Miniature wedge grip

For general low force pull testing applications. The serrated, self tightening steel jaws are easily opened with a spring-loaded lever.

Model No.	A	B	C	D	E	F	G
G1062	1.37 [34.8]	2.49 [63.1]	0.19 [4.8]	0.32 [8.1]	#10-32 UNF	0 - 0.09 [0 - 2.3]	0.15 [3.9]



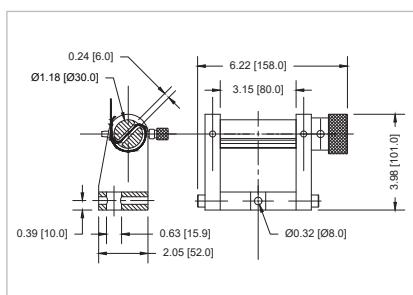
Model No.	Capacity lbF [N]	Weight lb [kg]
G1062	100 [500]	0.08 [0.04]

Includes a #10-32 M/M stud with jam nuts.

### Ribbon wrap grip

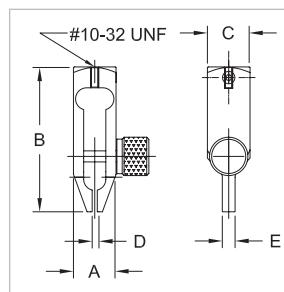
Secures textile webbing, tape, and braided materials typically used in construction, shipping, and other industrial uses. Integrated eye end.

Model No.	Capacity lbF [kN]	Weight lb [kg]
G1111	2,000 [10]	5.2 [2.4]





## Miniature component grip

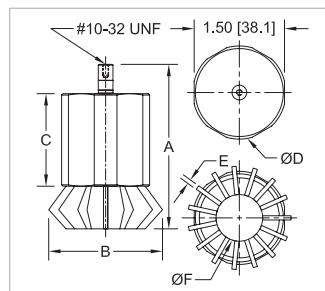


For testing small and hard-to-reach electronic and mechanical components. Slender profile allows this grip to be used in a wide range of applications.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D	E
G1003	30 [150]	0.05 [0.02]	0.5 [12.7]	1.7 [43.2]	0.5 [12.7]	0 - 0.07 [0 - 1.8]	0.15 [3.8]

Includes a #10-32 M/M stud with jam nuts.

## Multi-jaw grip

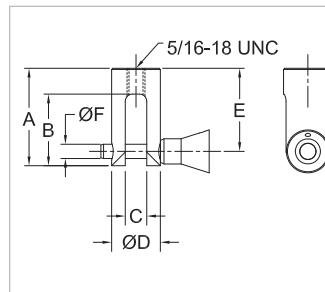


For gripping round or odd shaped items. Jaws expand and retract by rotating the housing.

Model No.	Capacity lbF [N]	Weight lb [kg]	ØA	B	C	ØD	E	ØF
G1056	100 [500]	0.30 [0.14]	3.50 [88.9]	2.30 [58.4] MAX	1.63 [41.4]	1.55 [39.4]	0.075 [1.91]	0.40 - 1.25 [10.2 - 31.7]

Includes a #10-32 M/M stud with jam nuts.

## Clevis grip

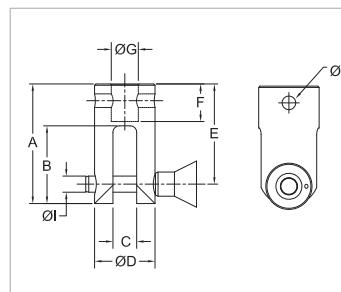


For ergonomic assessment, spring testing, and other pull testing applications.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D	E	ØF
G1077	500 [2,500]	0.29 [0.13]	1.70 [43.2]	1.25 [31.8]	0.38 [9.7]	0.85 [21.6]	1.45 [36.8]	0.25 [6.3]

Includes a 5/16-18M to #10-32F thread adapter, 5/16-18 M/M stud with jam nuts, and #10-32 M/M stud with jam nuts.

## High capacity clevis grip



High capacity grip for spring testing and pulling testing applications. Integrated eye end.

Model No.	Capacity lbF [kN]	Weight lb [kg]
G1090	2,000 [9]	0.78 [0.35]
A	B	C
2.77 [70.4]	1.80 [45.7]	0.55 [14.0]
ØD	E	F
1.40 [35.6]	2.32 [58.9]	0.87 [22.1]
ØG	ØH	ØI
0.63 [15.9]	0.32 [8.0]	0.38 [9.7]



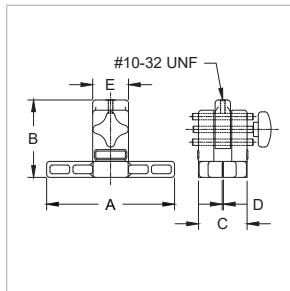
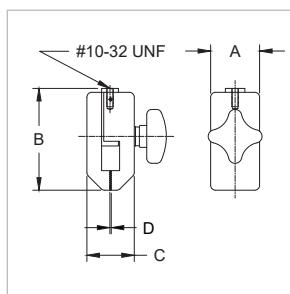
## Packaging / Peel / Friction

### Film and paper grips

For gripping film, paper, and other thin materials for tensile and peel testing. Adjustable serrated interlocking jaws grip the sample securely.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D
G1008	100 [500]	0.39 [0.18]	1.25 [31.8]	2.50 [63.5]	1.2 [30.5]	0 - 0.15 [0 - 3.8]
G1015-1		0.65 [0.29]	3.00 [76.2]			
G1015-2		0.80 [0.36]	5.00 [127.0]	3.00 [76.2]	1.90 [48.3]	0 - 0.50 [0 - 12.7]
G1015-3		0.90 [0.41]	7.00 [177.8]			

Includes a #10-32 M/M stud with jam nuts.

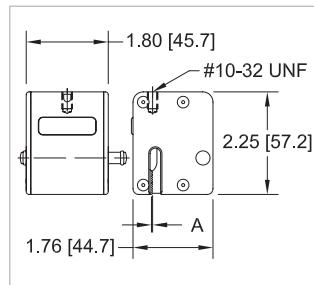


### Pneumatic film and paper grip

Fully enclosed, air-powered grip for seal strength testing of packaging, elongation testing of various materials, and other tensile testing requirements. Serrated interlocking jaws effectively grip samples for up to 100 lbF of force. The grip features a unique integrated open/close valve for quick sample engagement and disengagement. An air connection kit, consisting of tubing and fittings needed to connect two grips, is available separately. A membrane repair kit is also available.

Model No.	Capacity	Weight lb [kg]	Max. pressure PSI (MPa)	Air input thread	A
G1046	100 lbF [500 N] at 100 PSI [0.86 MPa]	0.58 [0.26]	125 [0.86]	#10-32 UNF	0 - 0.13 [0 - 3.3]

Includes a #10-32 M/M stud with jam nuts, one spare rubber membrane\*, one alcohol wipe, and two cotton swabs.



#### The optional air connection kit includes:

- Coiled tubing, 1/8" OD, 1/16" ID, 8" retracted length (qty. 2)
- Y-splitter (qty. 1)
- Straight tubing, 1/8" OD, 1/16" ID, 5' length (qty. 1)
- Elbow fitting, tubing termination (qty. 2)
- Elbow fitting, tubing to #10-32M (qty. 1)
- Thread adapter, #10-32F to 1/4" NPT M (qty. 1)
- Adhesive-backed guide (qty. 4)

Model No.	Description
AC1019	Air connection kit for G1046
AC1044*	Maintenance kit for G1046*

#### The optional maintenance kit\* includes:

- 1. Rubber membrane (qty. 5)
- 2. Alcohol wipe (qty. 5)
- 3. Cotton swab (qty. 12)
- 4. Wrench set

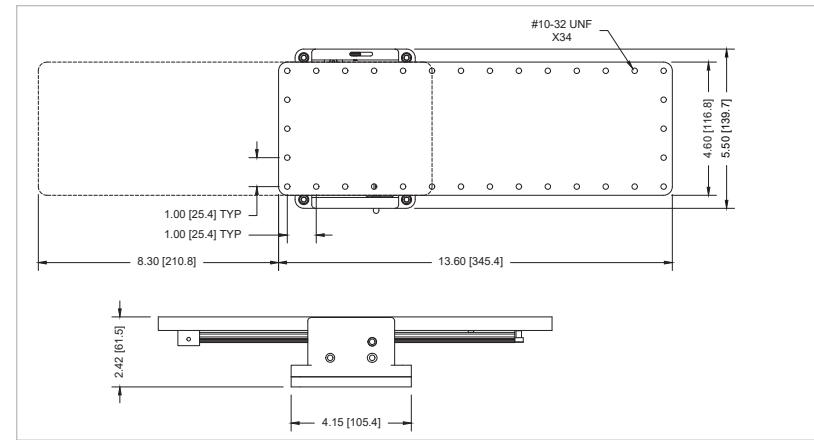


\* The flexible internal membrane actuating the movable jaw has a variable life expectancy dependent upon the maximum air pressure used and the quality of the compressed air. It should be free from impurities, solvents and oils. Since field conditions are outside of Mark-10's control, the standard 3-year warranty does not apply to the flexible membrane. For convenience, a spare membrane and alcohol wipe is included with every new grip.



## 90° peel fixture

For testing adhesive strength of tapes, films, and packaging. Maintains a 90° angle between the table and direction of pull. An integrated limit switch automatically stops the motion of most motorized test frames when the working table has reached its end of travel. Optional adjustable angle accessories allow for testing between 0° and 90°.



Model No.	Description	Capacity lbF [N]	Weight lb [kg]
<b>G1109</b>	90° peel fixture	100 [500]	6.0 [2.7]
<b>AC1078</b>	Adjustable angle pulley adapter, 0-90°	30 [150]	1.4 [0.6]
<b>AC1079</b>	Adjustable angle mount, ±30%	100 [500]	1.7 [0.8]
<b>AC1080</b>	Adapter, G1023 / G1058 grip to G1109	100 [500]	0.4 [0.2]
<b>AC1087</b>	Adapter, G1109	-	-



AC1078



AC1079



AC1080

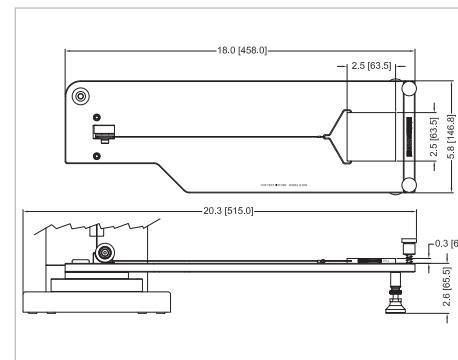
G1109 is compatible with the following test stands and frames:

F105, F305, F505, F755\*, F755S\*, F1505\*, F1505S\*, ESM303, ESM750LC\*, ESM750SLC\*, ESM1500LC\*, ESM1500SLC\*

\* AC1087 adapter required.

## Coefficient of friction fixture

For determining friction properties of paper, film, and other thin flexible materials. Conforms to ASTM D1894 and other relevant standards. Includes work table, 200 g sled, cable, and low-friction pulley. Static and kinetic coefficients can be measured using the M5-2-COF gauge.



Model No.	Description
<b>G1086</b>	Coefficient of friction fixture
<b>COF-K1</b>	Kit - G1086 COF fixture + M5-2-COF force gauge
<b>AC1076-1</b>	Pair of mounting posts for F1505, F1505S, ESM750, and ESM750S (AC1055 mounting plate required for ESM750 / ESM750S)
<b>AC1076-2</b>	Pair of mounting posts for ESM1500 and ESM1500S (AC1055 mounting plate required)

Compatible with the following test frame models:  
F105, F305, F505, F755, F755S, ESM303.



## Score bending fixture

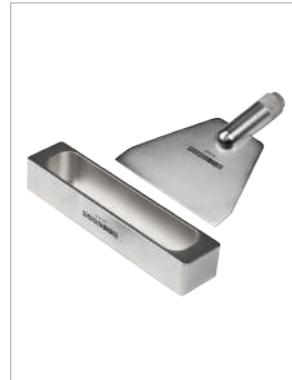
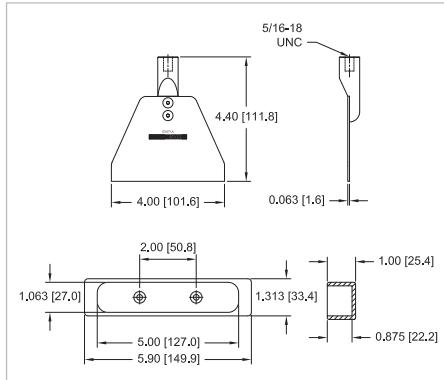
Produces a 90° bend in fiber board materials and plastics to conform to TAPPI standard T829. Set of upper and lower dies.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1071	50 [250]	Upper die: 0.15 [0.67] Lower die: 0.30 [0.14]

Upper die includes a 5/16-18M to #10-32F thread adapter and #10-32 M/M stud with jam nuts.

Mounts directly to the following test frames (motorized test frames recommended):

- F105, F305, F505, F755, and F1505 test frames.
- ESM303, ESM750, ESM1500, ES30, TSC1000, and TSF test stands.
- Also compatible with models ES10/ES20 test stands when ordered with optional AC1060 mounting plate.

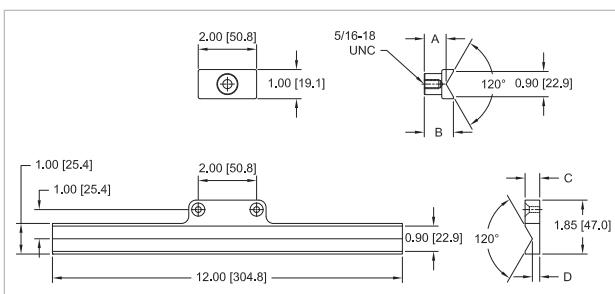


## Opening force fixture

For determining the opening force of flat folded cartons along score lines. Set of upper and lower dies.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1072	50 [250]	Upper die: 0.06 [0.03] Lower die: 0.10 [0.05]

A	B	C	D
0.75 [19.1]	1.00 [25.4]	0.50 [12.7]	0.25 [6.4]



Upper die includes a 5/16-18M to #10-32F thread adapter and #10-32 M/M stud with jam nuts.

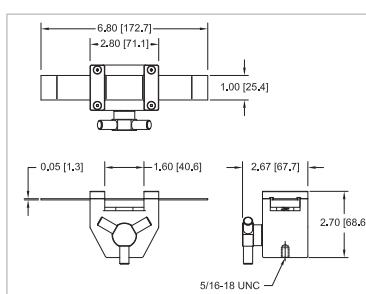
Mounts directly to the following test frames (motorized test frames recommended):

- F105, F305, F505, F755, and F1505 test frames.
- ESM303, ESM750, ESM1500, ES30, TSC1000, and TSF test stands.
- Also compatible with models ES10/ES20 test stands when ordered with optional AC1060 mounting plate.

## Loop tack fixture

For tack force testing of pressure-sensitive adhesives, in conformance with ASTM D6195 and related standards. A looped sample is loaded onto the test strip, and the closed end of the loop is secured by an upper grip (not included - suggested model: G1008, pictured below). The test strip may be indexed in three positions, allowing for three tests to be performed between cleaning cycles.

Model No.	Capacity lbF [N]	Weight* lb [kg]	Test strip material
G1098	100 [500]	1.10 [0.5]	T304 SS, per ASTM A666

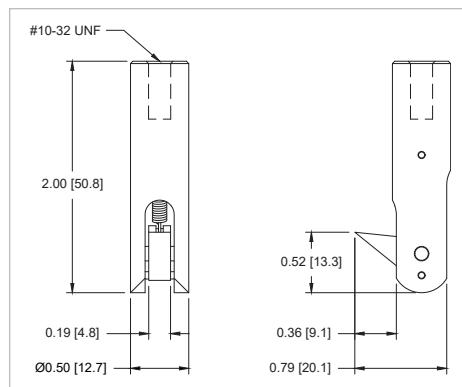


\* Including one test strip.

Includes a 5/16-18 M/M stud with jam nuts.



## Flip cap pull grip

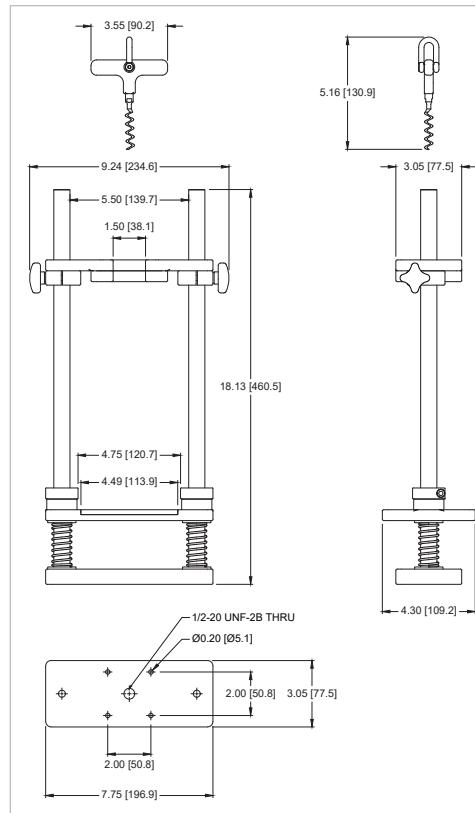


Engages the tab on a flip cap for pull-off force measurements. A spring-loaded hook retracts as it is lowered into the starting position, then snaps into place below the tab.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1104	20 lbF [100 N]	0.10 lb [0.04 kg]

Includes a #10-32 M/M stud with jam nuts.

## Cork pull fixture



Extracts a cork stopper from a bottle for pull force measurements, in conformance with ISO 9727.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1105	200 lbF [1000 N]	9.5 lb [4.3 kg]

Includes a G1035 large hook, G1018-2 swivel adapter, and test stand mounting hardware. Recommended for use with a motorized test frame.



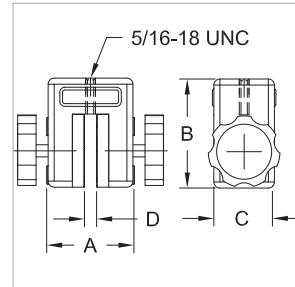
## Vise / Parallel Jaw

### Parallel jaw / vise-action grip, small

For general tensile and pull testing applications.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D
G1013	200 [1,000]	0.65 [0.29]	1.75 [44.5]	2.25 [57.2]	1.25 [31.8]	0 - 0.25 [0 - 6.3]

Includes a 5/16-18M to #10-32F adapter and #10-32 M/M stud with jam nuts.

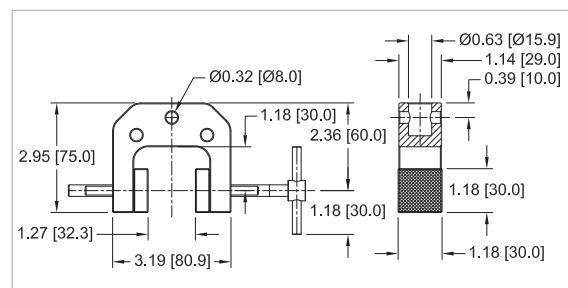


### Parallel jaw / vise-action grip, medium

For general tensile and pull testing applications. Integrated eye end.

Model No.	Capacity lbF [N]	Weight lb [kg]	Housing Material	Jaw Material
G1101	200 [1,000]	1.0 [0.5]	Aluminum	Hardened steel, 58 RC

Extended length jaws are available: 1.97 in [50.0 mm], 3.15 in [80.0 mm], 3.94 in [100.0 mm]. See website for details.

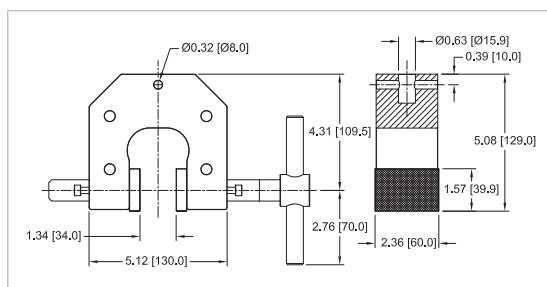


### Parallel jaw / vise-action grip, large

For general tensile and pull testing applications. Includes an adjustable stop to ensure consistent sample placement. Integrated eye end.

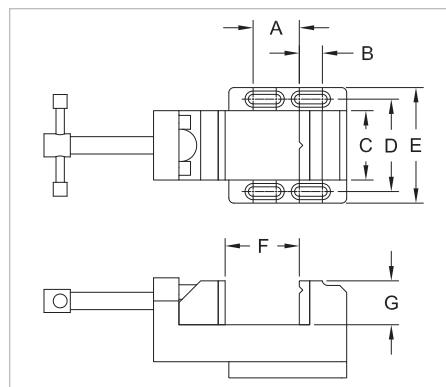
Model No.	Capacity lbF [kN]	Weight lb [kg]	Housing Material	Jaw Material
G1100	2,000 [9]	5.9 [2.7]	Aluminum	Hardened steel, 58 RC

3.94 in [100.0 mm] extended length jaws are available. See website for details.





## Vise grip, standard



General purpose vise for a wide range of tension and compression testing applications.

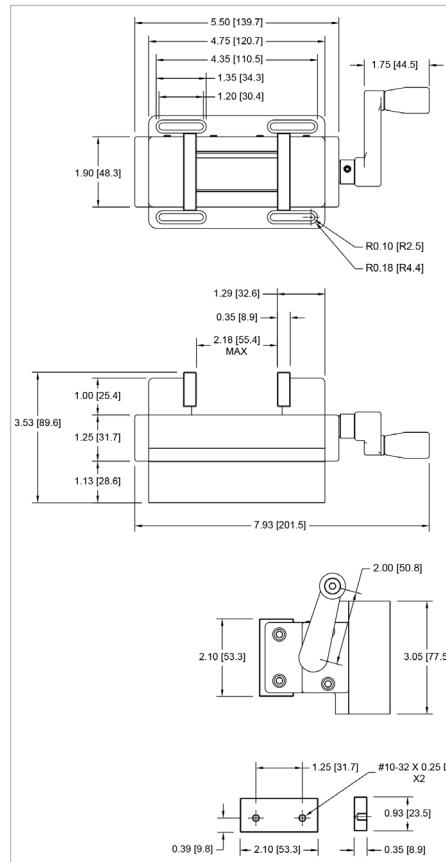
Model No.	Capacity lbF [N]	Weight lb [kg]
G1074	500 [2,500]	2.0 [0.9]

A	B	C	D	E	F	G
1.00 [25.4]	0.50 [12.7]	1.50 [38.1]	2.00 [50.8]	2.50 [63.5]	0 - 1.50 [0 - 38.1]	1.00 [25.4]

Mounts directly to the following test frames:

- F105, F305, F505, F755, and F1505.
- ESM303, ESM750, ESM1500, ES30, TSC1000, and TSF.
- Also compatible with models ES10/ES20 when ordered with optional AC1060 mounting plate. A motorized test stand is recommended.

## Vise grip, self-centering



General purpose vise, for a wide range of tension and compression testing applications. Self-centering, replaceable jaws can be field-modified to improve sample gripping characteristics.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1106	500 [2,500]	3.00 [1.36]

Mounts directly to the following test frames (motorized test frames recommended):

- F105, F305, F505, F755, and F1505.
- ESM303, ESM750, ESM1500, ES30, TSC1000, and TSF.
- Also compatible with models ES10/ES20 test stands when ordered with optional AC1060 mounting plate.

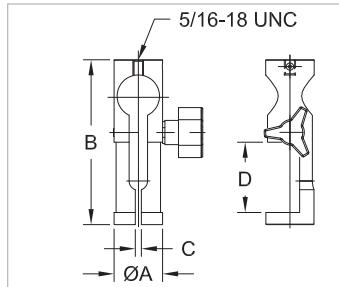


## Wire / Rope / Yarn / Tubing

### Wire terminal grips

Secures wire terminals, cables, connectors, and other samples for pull testing.

Model No.	Capacity lbF [N]	Weight lb [kg]	ØA	B	C	D
G1001	200 [1,000]	0.29 [0.13]	1.00 [25.4]	3.40 [86.4]	0 - 0.125 [0 - 3.1]	
G1001-1					0.125 - 0.25 [3.1 - 6.3]	1.45 [36.8]
G1001-2					0.25 - 0.375 [6.3 - 9.5]	

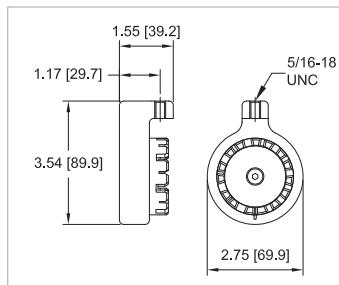


Includes a 5/16-18M to #10-32F adapter and #10-32 M/M stud with jam nuts.

### Wire terminal grip, turret style

Secures wire terminals, cables, connectors, and other samples for pull testing. Indexing wheel contains slots of varying widths to accommodate a wide range of sample shapes and sizes.

Model No.	Capacity lbF [N]	Slot Widths	Weight lb [kg]
G1076	500 [2,500]	0.03 [0.7], 0.04 [1.0], 0.06 [1.5], 0.08 [2.0], 0.09 [2.3], 0.11 [2.8], 0.12 [3.0], 0.14 [3.5], 0.15 [3.8], 0.17 [4.3], 0.18 [4.5], 0.20 [5.1], 0.21 [5.3], 0.23 [5.8], 0.25 [6.3]	1.00 [0.45]

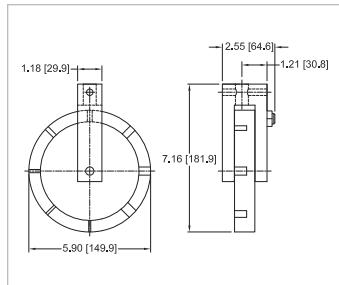


Includes a 5/16-18M to #10-32F adapter and #10-32 M/M stud with jam nuts.

### High capacity wire terminal grip

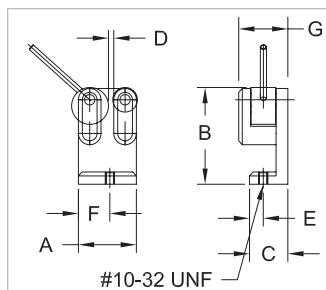
Secures wire terminals, cables, connectors, and other samples for pull testing. Indexing wheel contains slots of varying widths to accommodate a wide range of sample shapes and sizes. Integrated eye end.

Model No.	Capacity lbF [kN]	Slot Widths	Weight lb [kg]
G1093	2,000 [9]	0.08 [2.0], 0.12 [3.0], 0.16 [4.0], 0.20 [5.0], 0.24 [6.0], 0.31 [8.0], 0.39 [10.0], 0.46 [11.8]	6.4 [2.9]





## Dual roller grips

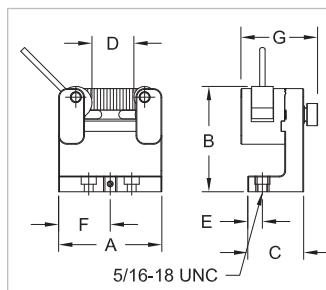


Secures the ends of wire, cable, and tubing samples for pull testing. Engaging and disengaging samples is quick and easy via an efficient cam design and convenient side slot for sample insertion. Serrated steel rollers produce effective gripping characteristics.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D	E	F	G
<b>G1002</b>	200 [1,000]	0.19 [0.09]	1.18 [30.0]	2.00 [50.8]	0.75 [19.1]	0 - 0.25 [0 - 6.3]	0.22 [5.6]	0.64 [16.5]	1.0 [25.4]

Includes a #10-32 M/M stud with jam nuts.

## Adjustable dual roller grip

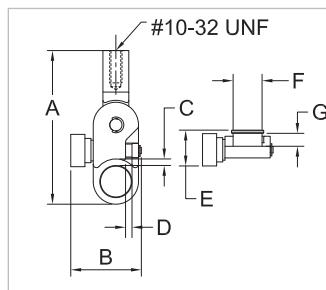


Secures tubing, cables, and odd shaped samples for pull testing applications. Engaging and disengaging samples is quick and easy, with a side slot for sample insertion and serrated steel rollers. Rollers can be repositioned as required for the application.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D	E	F	G
<b>G1085</b>	500 [2,500]	0.51 [0.23]	2.40 [61.0]	2.45 [62.2]	1.30 [33.0]	0 - 1.00 [0 - 25.4]	0.34 [8.6]	1.20 [30.5]	1.78 [45.3]

Includes a 5/16-18 M/M stud with jam nuts.

## Miniature filament grip



Secures small diameter wires and filaments. The sample wraps around the bollard and the loose end is secured by the adjustable jaw. Integrated swivel ensures sample alignment under load.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D	E	F	G
<b>G1078</b>	50 [250]	0.06 [0.03]	2.38 [60.4]	1.09 [27.7]	0.10 [2.5]	0.10 [2.5]	0.55 [14.1]	0.045 [11.4]	0.20 [5.1]

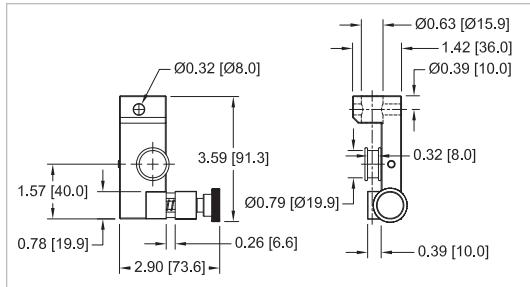
Includes #10-32 M/M stud with jam nuts.



## Wire / rope grip, medium

Secures wire and rope. The sample wraps around the bollard and the loose end is secured by the adjustable rubber-faced jaw. Integrated eye end.

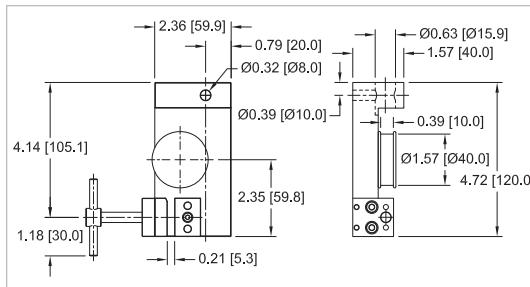
Model No.	Capacity lbF [N]	Weight lb [kg]
G1103	200 [1,000]	0.6 [0.6]



## Wire / rope grip, large

Secures wire and rope. The sample wraps around the bollard and the loose end is secured by an adjustable jaw. Integrated eye end.

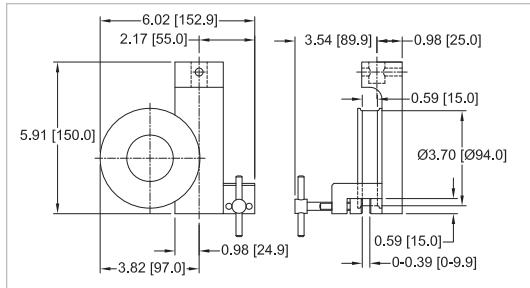
Model No.	Capacity lbF [N]	Weight lb [kg]
G1102	1,000 [5,000]	1.8 [0.8]



## Wire / rope grip, high capacity

For high capacity wire and rope pull testing applications. Secures the free end of the sample via a bollard and vise. Integrated eye end.

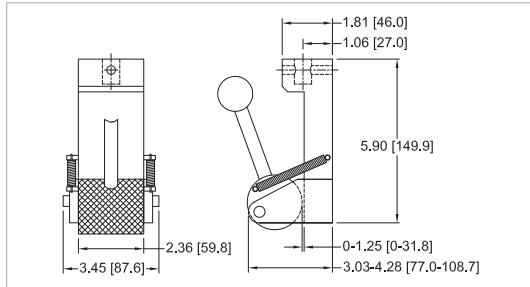
Model No.	Capacity lbF [kN]	Weight lb [kg]
G1092	2,000 [9]	6.0 [2.7]



## High capacity eccentric roller grip

Features a serrated cam for effectively securing wires, plastics, textiles, and other materials in pull testing applications. Integrated eye end.

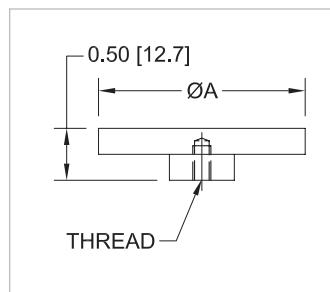
Model No.	Capacity lbF [kN]	Weight lb [kg]
G1094	2,000 [9]	74 [3.4]





## Compression / Bend / Push

### Compression plates



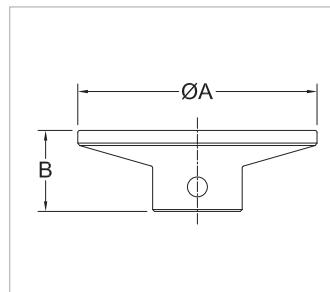
For compressing springs, foams, cartons, aerosol cans, and many other products and materials.

Model No.	Capacity lbF [N]	Weight lb [kg]	ØA	Thread	Material
G1009	200 [1,000]	0.08 [0.04]	2.0 [51.0]	#10-32 UNF	Alumi- num
G1009-1	500 [2,500]	0.27 [0.12]	3.0 [76.2]	5/16-18 UNC	

G1009 includes a #10-32 M/M stud with jam nuts.

G1009-1 includes a 5/16-18M/M stud with jam nuts.

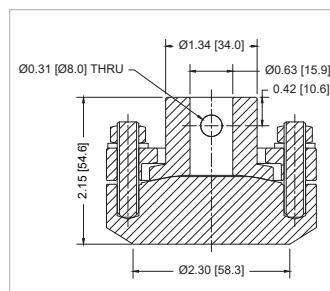
### High capacity compression plates



For compression spring testing, top load testing, and other applications. Integrated eye end.

Model No.	Capacity lbF [kN]	Weight lb [kg]	ØA	B	Material
G1087	2,000 [9]	1.50 [55.9]	3.78 [96.0]	1.28 [32.5]	303 SS
G1087-1	2,000 [9]	0.63 [0.29]	2.20 [55.9]	1.18 [30.0]	

### Self-aligning compression plate



This self-aligning compression plate adjusts to the angle of the sample via four adjustable screws and nuts. Ideal for ensuring parallelism and complete sample engagement, particularly for low-deflection springs and other materials with high spring rates. Integrated eye end.

Model No.	Capacity lbF [kN]	Weight lb [kg]	Material
G1123	2.80 [1.27]	2.80 [1.27]	Steel 58 HRC, nickel-plated



## Bend fixtures

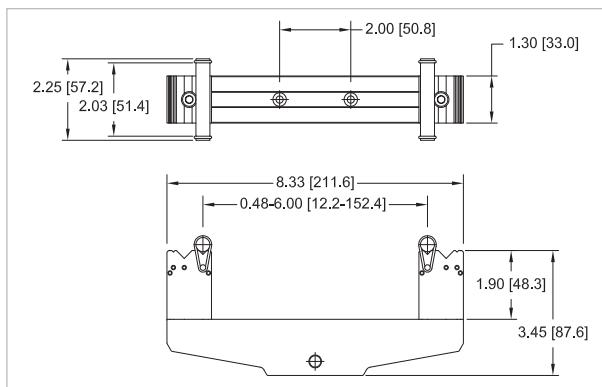
Family of fixtures for 3-point and 4-point bend testing of plastics, metals, ceramics, tubing, and many other materials. Two base sizes are available, along with an upper anvil, and optional support diameters. Use a base-anvil combination for 3-point bend testing or two bases for 4-point bend testing.



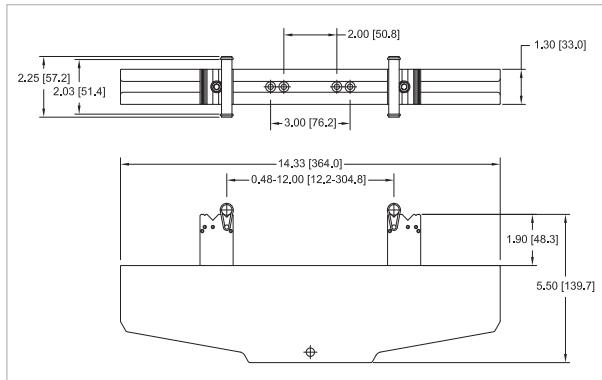
3-point bend



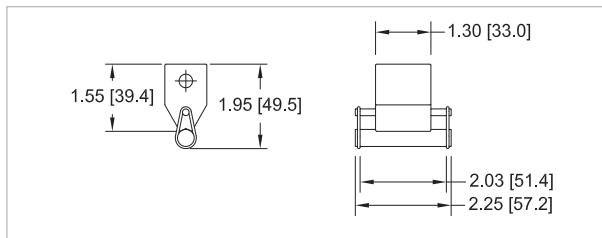
4-point bend



G1095



G1096



G1097



Model No.	Capacity lbf [kN]	Weight lb [kg]	Housing material	Block material	Support material	Includes
G1095	500 [2.5]	3.0 [1.3]	2024 Al	303 SS	416 SS, hardened	Two 10 mm dia. supports and o-rings
G1096	2,000 [10]	71 [3.2]	2024 Al	303 SS	416 SS, hardened	Two 10 mm dia. supports and o-rings
G1097	2,000 [10]	0.5 [0.2]	303 SS	-	416 SS, hardened	10 mm. dia. supports and o-rings

Includes mounting hardware for motorized test frames and most manual test stands, except TSA750 and TSB100. May also be mounted via integrated eye end.

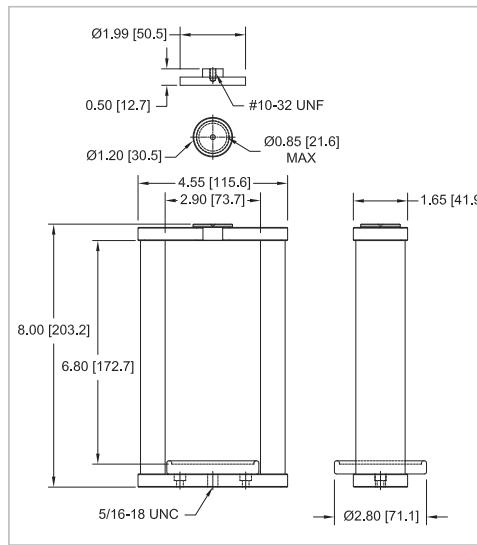
## Optional Items

Model No.	Description
AC1067	Supports for bend fixtures, 1 mm dia, set of 4
AC1067-1	Supports for bend fixtures, 2 mm dia, set of 4
AC1067-2	Supports for bend fixtures, 5 mm dia, set of 4





## Syringe compression fixture



For testing compression force of a syringe plunger, as per ISO 7886-1 and other relevant standards.

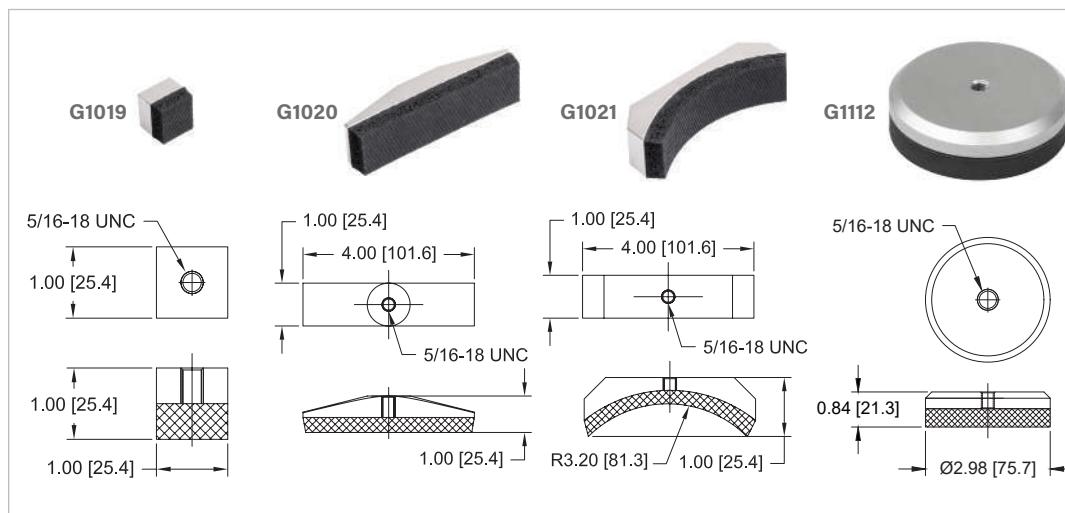
Model No.	Capacity lbF [N]	Weight lb [kg]
G1089	100 [500]	1.89 [0.86]

Consists of:

1. Frame
2. Replaceable blank inserts (4)
3. Cup tray
4. G1009 compression plate
5. 5/16-18mm stud with jam nuts

## Padded attachments

For applications in physical therapy and ergonomics, including muscle strength testing, job task requirements, and more.



Model No.	Capacity lbF [N]	Weight lb [kg]
G1019	500 [2,500]	0.03 [0.01]
G1020	500 [2,500]	0.13 [0.06]
G1021	500 [2,500]	0.25 [0.11]
G1112	500 [2,500]	0.28 [0.13]

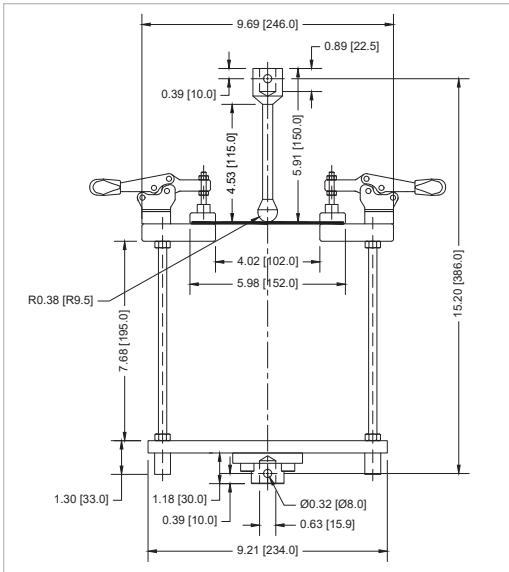
Includes a 5/16-18M to #10-32F thread adapter, 5/16-18 jam nut, and #10-32 jam nut.



## Puncture fixture

For determining puncture resistance of plastic films and other thin materials. Includes fixture and probe. Integrated eye end.

Model No.	Capacity lbF [kN]	Weight lb [kg]
G1110	1,000 [5]	Fixture: 19.0 [8.6] Probe: 0.4 [0.2]

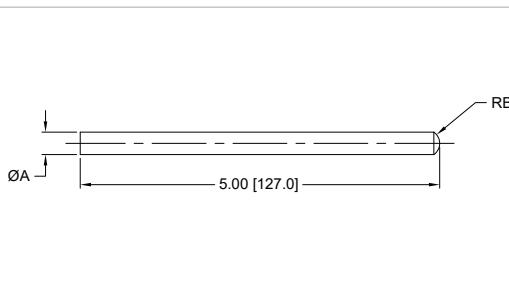


## Magness Taylor Food Texture Probes

For penetrating fruits, vegetables, and other foods, for determining puncture resistance and ripeness.

Select from standard Magness Taylor diameter sizes of 5/16" and 7/16", each with a flat and rounded end.

A G1010-2 Jacobs chuck grip is required to mount a probe to a Mark-10 force sensor or force gauge.

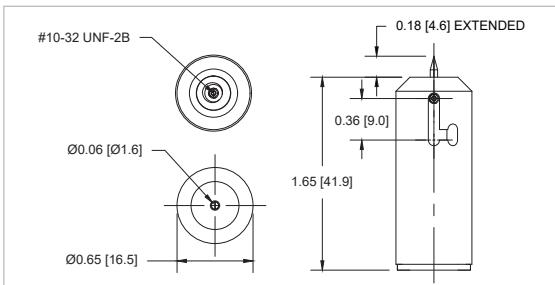


Model No.	Capacity lbF [N]	Material	ØA	RB
G1122-1	100 [500]	303 SS	0.31 [7.9]	0.19 [4.8]
G1122-2			0.44 [11.1]	0.35 [8.9]

## Puncture Fixture

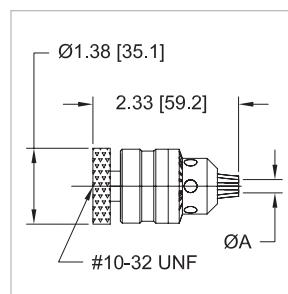
For puncturing gypsum board and other materials to determine puncture resistance. Compatible with all current Mark-10 force gauges. For added safety, the spring-loaded needle retracts when not actively pushed into a material.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1099	20 [100]	0.04 [0.02]





## Jacobs chuck pin vises

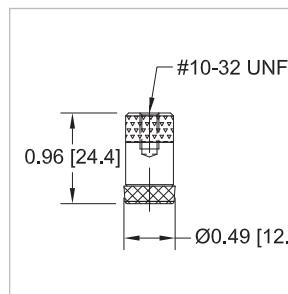


For securing pins, round samples, and fixtures.

Model No.	Capacity lbF [N]	Weight lb [kg]	ØA
G1010	30 [150]	0.35 [0.16]	0.062 - 0.375 [1.6 - 9.5]
G1010-1		0.25 [0.11]	0.028 - 0.25 [0.7 - 6.3]
G1010-2		0.66 [0.30]	0.078 - 0.5 [2.0 - 12.7]

Includes a #10-32 M/M stud with jam nuts.

## Rubber tip



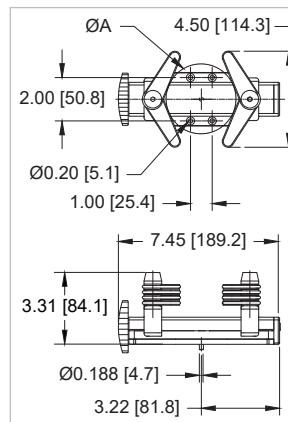
Simulates a finger for testing pushbuttons, membrane switches, touch-screen panels, keyboards, etc.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1011	50 [250]	0.01 [0.004]

Includes a #10-32 M/M stud with jam nuts.

## Torque / Force

### Universal bottle grip



For gripping bottles and containers in closure torque testing applications. Eight rubber edged gripping arms secure a wide range of sample shapes and sizes and may be individually positioned at angles up to 180°. Mounts directly to Series TST torque test stands, most force test stands, and G1109 90° peel fixture for applications such as top load testing and 90° peel testing.

Model No.	Capacity lbFin [Nm]	Weight lb [kg]	ØA
G1023	100 [11.3]	1.50 [0.7]	4.80 [122.0] MAX

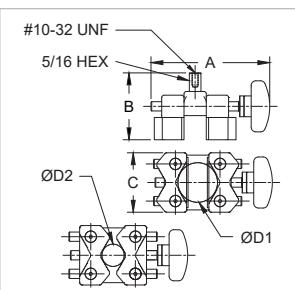
Model No.	Description
AC1080	Adapter, G1023 to G1109 peel fixture

G1023 includes mounting hardware for Series TST test stands or G1068 adapter.

G1068 includes mounting hardware for the G1023 fixture and the following test stands: ESM303, ESM1500/750 (w/AC1055 plate), ES30, TSC1000, TSF, ES10/ES20 (w/AC1060 plate)



## Universal V-jaw grip



\* Reverse the jaws to switch between ØD1 and ØD2.

Includes a #10-32 M/M stud with jam nuts.

For gripping round objects. Serrated, reversible aluminum jaws effectively grip a wide range of sample shapes and sizes. Mounts directly to Jacobs chucks, force gauges, and test stands.

Model No.	Torque Capacity lbFin [Nm]	Force Capacity lbF [N]	Weight lb [kg]
G1053	100 [11.3]	100 [500]	0.40 [0.18]

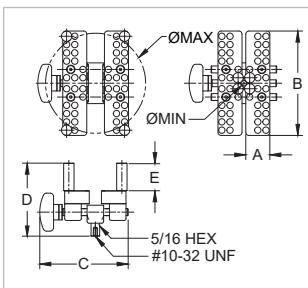
A	B	C	ØD1*	ØD2*
3.1 [78.7]	1.77 [45.0]	1.6 [40.6]	1.10 - 1.55 [27.9 - 39.4]	0.65 - 1.10 [16.5 - 27.9]

## Universal cap grip

For securing caps, lids, and other similar items for torque and pull testing. Accommodates a wide range of sample sizes, and can be used manually with a torque gauge or mounted to a test stand.

Model No.	Capacity	Weight lb [kg]
G1058	100 lbFin [11.3 Nm] or 50 lbF [250 N]	0.65 [0.29]
A	B	C
0.9 [22.9]	3.8 [96.5]	3.2 [81.3]
D	E	ØMIN - ØMAX
2.8 [71.1]	1.0 [25.4]	0.20 - 3.50 [5.1 - 89.0]

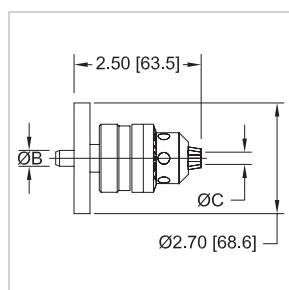
Includes #10-32 M/M stud with jam nuts.



## Jacobs chuck grips

For securing round samples, fixtures, or bits in torque applications. Mounts directly to series TST torque test stands.

Model No.	Capacity	Weight lb [kg]	ØA	ØB	ØC
G1022-1					0.028 - 0.250 [0.7 - 6.3]
G1022-2	100 lbFin [11.3 Nm]	0.50 [0.23]	N/A	0.188 [4.7]	0.062 - 0.375 [1.6 - 9.5]
G1022-3					0.078 - 0.500 [2.0 - 12.7]

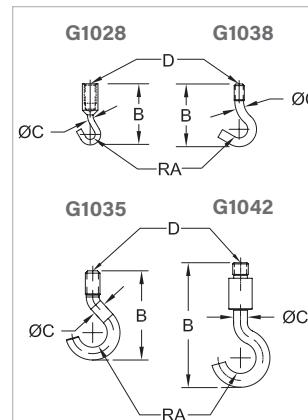


Includes mounting hardware for Series TST torque test stands.



## Basic Attachments & Adapters

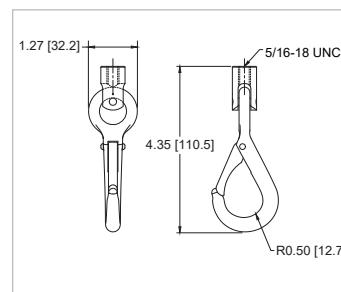
### Hooks



For general pull testing applications.

Model No.	Capacity lbF [N]	Weight lb [kg]	RA	B	ØC	D
G1028	20 [100]	0.010 [0.005]	0.05 [1.3]	1.00 [25.4]	0.10 [2.5]	#10-32F
G1038	200 [1,000]	0.020 [0.009]	0.20 [5.1]	1.50 [38.1]	0.19 [4.8]	#10-32M
G1035	500 [2,500]	0.050 [0.023]	0.30 [7.6]	1.90 [48.3]	0.28 [7.1]	5/16-18M
G1042	1,000 [4,500]	0.320 [0.145]	0.5 [12.7]	4.10 [104.1]	0.45 [11.4]	1/2-20M

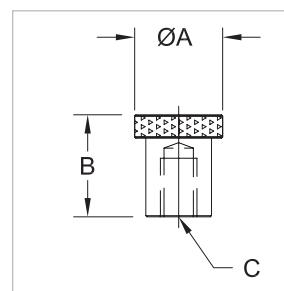
### Snap hook



For general pull testing applications. Features a snap clasp, for added safety. Swiveling action ensures proper alignment.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1107	500 [2,500]	0.3 [0.14]

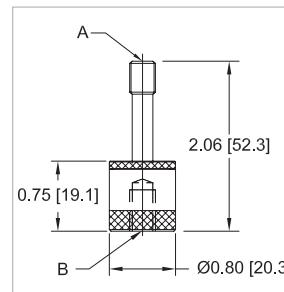
### Flat heads



For compression testing of buttons, small springs, membrane switches, etc.

Model No.	Capacity lbF [N]	Weight lb [kg]	ØA	B	C
G1029	200 [1,000]	0.01 [0.005]	0.5 [12.7]	0.5 [12.7]	#10-32F
G1036	500 [2,500]	0.06 [0.027]	0.75 [19.1]	0.87 [22.1]	5/16-18F

### Swivel adapters



For use between grips and force gauges and sensors, to provide a swiveling action for proper sample alignment.

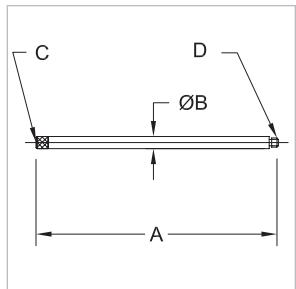
Model No.	Capacity lbF [N]	Weight lb [kg]	A	B
G1018-1	200 [1,000]	0.12 [0.05]	#10-32M	#10-32F
G1018-2	500 [2,500]	0.27 [0.12]	5/16-18M	5/16-18F



## Extension rods

For use between force gauges, sensors, grips, and attachments.  
Not recommended for compression applications.

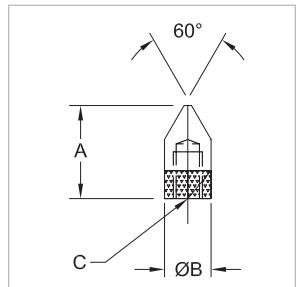
Model No.	Capacity lbF [N]	Weight lb [kg]	A	ØB	C	D
G1024	200 [1,000]	0.05 [0.023]	5.0 [127.0]	0.25 [6.4]	#10-32F	#10-32M
G1024-1		0.02 [0.009]	2.0 [50.8]			
G1024-2		0.01 [0.005]	1.0 [25.4]			
G1031	500 [2,500]	0.25 [0.113]	5.0 [127.0]	0.50 [12.7]	5/16-18F	5/16-18M
G1031-1		0.10 [0.045]	2.0 [50.8]			
G1031-2		0.25 [0.113]	1.0 [25.4]			



## Chisel points

For compression testing applications.

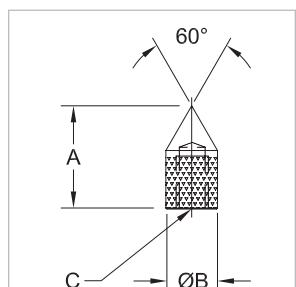
Model No.	Capacity lbF [N]	Weight lb [kg]	A	ØB	C
G1025	200 [1,000]	0.003 [0.001]	0.50 [12.7]	0.25 [6.4]	#10-32F
G1032	500 [2,500]	0.040 [0.018]	1.00 [25.4]	0.50 [12.7]	5/16-18F



## Cone points

For various compression and puncture testing applications.

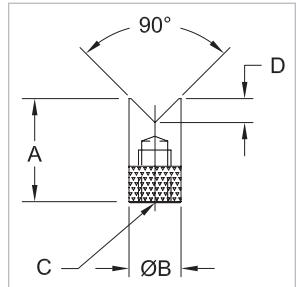
Model No.	Capacity lbF [N]	Weight lb [kg]	A	ØB	C
G1026	200 [1,000]	0.003 [0.001]	0.50 [12.7]	0.25 [6.4]	#10-32F
G1033	500 [2,500]	0.030 [0.014]	1.00 [25.4]	0.50 [12.7]	5/16-18F



## V-grooves

For compression testing of round or odd-shaped samples.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	ØB	C	D
G1027	200 [1,000]	0.004 [0.002]	0.50 [12.7]	0.25 [6.4]	#10-32F	0.08 [2.0]
G1034	500 [2,500]	0.040 [0.018]	1.00 [25.4]	0.50 [12.7]	5/16-18F	0.25 [6.4]





### Thread adapters & couplings

For use between gauges, sensors, test stands grips, and attachments. Suitable for tension and compression applications.

Model No.	Capacity lbF [N]	Length in [mm]	Thread A	Thread B
G1050	100 [500]	0.75 [19.1]	#4-40M	#10-32F
G1051		0.55 [14.0]	#4-40M	#10-32M
G1113		0.75 [19.1]	M3M	#4-40F
G1039		0.75 [19.1]	#10-32F	#10-32F
G1030		0.50 [12.7]	5/16-18M	#10-32F
G1057		1.00 [25.4]	#10-32F	M6F
G1060		0.50 [12.7]	#10-32M	#10-32M
G1047		0.75 [19.1]	#10-32M	M4F
G1048		0.75 [19.1]	M4M	#10-32F
G1054		0.75 [19.1]	M6M	#10-32F
G1063	200 [1,000]	1.30 [33.0]	#10-32M	5/16-18F
G1040		0.92 [23.4]	5/16-18M	5/16-18M
G1037		1.00 [25.4]	5/16-18F	5/16-18F
G1049		1.25 [31.8]	M6M	5/16-18F
G1059		1.13 [28.7]	5/16-18F	1/2-20F
G1041		1.06 [26.9]	1/2-20M	5/16-18M
G1066		0.75 [19.1]	5/16-18F	1/2-20M
G1067		0.75 [19.1]	1/2-20M	10-32F
G1069		1.25 [31.8]	5/16-18F	1/4-28M
G1091		1.30 [33.0]	1/2-20F	1/2-20F
G1044	1,000 [5,000]	Adapter plate, 1/2-20F. Compatible with many test stands. Mounting hardware included.		

### Studs & jam nuts

For use between test stands, grips, and attachments.

Model No.	Capacity lbF [N]	Thread	Length
AC 1082	100 [500]	#10-32M	0.75 [19.1]
AC 1082-1	500 [2,500]	5/16-18M	1.00 [25.4]
AC 1082-2	2,000 [9,000]	1/2-20M	1.50 [38.1]



## Eye end adapters

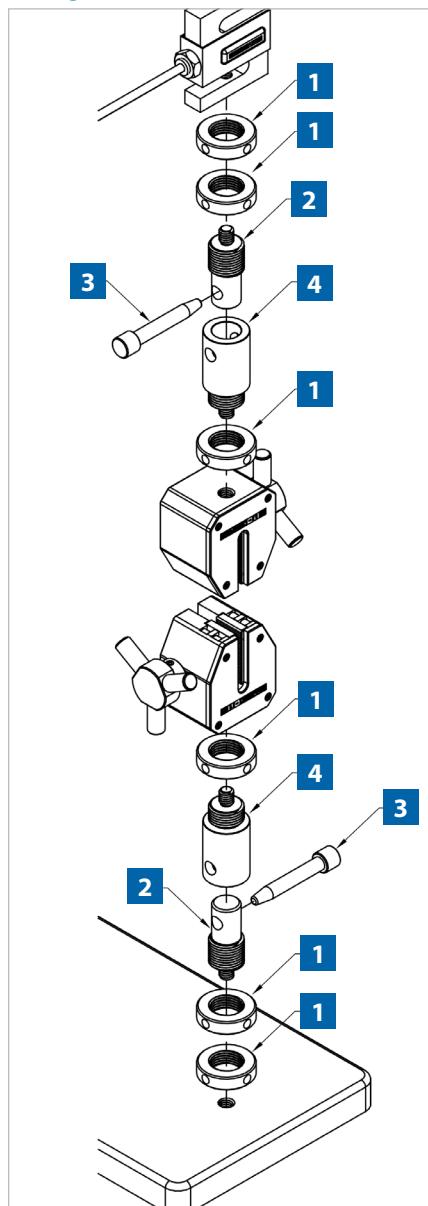
These adapters provide a commonly accepted industry method of attaching fixtures to force sensors and test frames. They prevent grip rotation and allow for quick removal and installation.

Several thread sizes and variations are available to suit most common test frames, force sensors, grips, and force gauges. Eye ends and adapters are available individually or as kits.

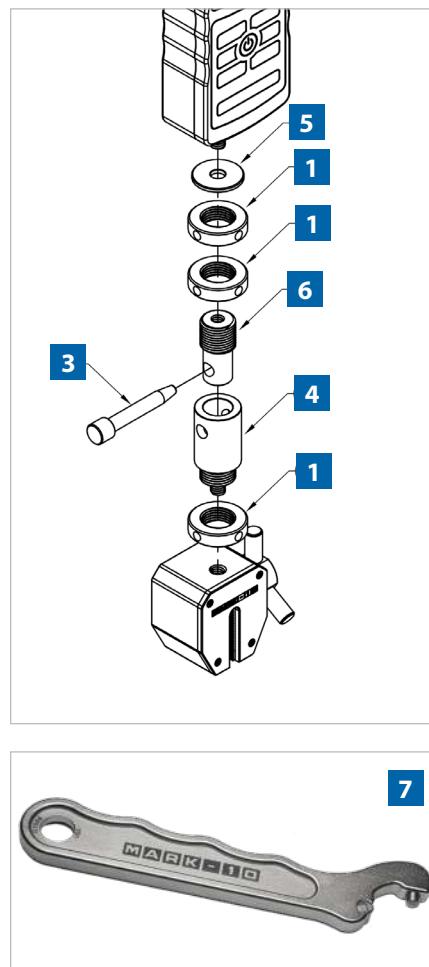
◀ Eye end adapter is shown with a Mark-10 wedge grip and test frame.

Item No.	Model No.	Description
1	G1079	Lock ring, 3/4-16
2	G1081 G1081-1 G1081-2 G1081-3	Eye end, #10-32M Eye end, 5/16-18M Eye end, 1/2-20M Eye end, 1/4-28M
3	G1080	Anchor pin
4	G1083 G1083-1 G1083-2	Eye end adapter, #10-32M Eye end adapter, 5/16-18M Eye end adapter, 1/2-20M
5	G1084 G1084-1 G1084-2	Washer, 0.20 ID Washer, 0.32 ID Washer, 0.51 ID
6	G1082 G1082-1	Eye end, #10-32F Eye end, 5/16-18F
7	G1088	Spanner wrench

### Force sensor / test frame configuration



### Force gauge configuration





### Eye end adapters - kits

#### Test Frame Base / Force Sensor Adapter Kits

Model No.	Description	Compatibility	Includes
AC1047	Test frame base adapter kit, #10-32M	Test frame bases w/ #10-32 mounting	1x G1081 eye end 1x G1080 anchor pin 2x G1079 lock ring
AC1047-1	Test frame base adapter kit, 5/16-18M	Test frame bases w/ 5/16-18 mounting	1x G1081-1 eye end 1x G1080 anchor pin 2x G1079 lock ring
AC1047-2	Test frame base / force sensor adapter kit, 1/2-20M	Test frame bases w/ 1/2-20 mounting Models MR01-300 / -500 / -750 / -1000 / -1500 / -2000 force sensors Models MR07-300 / -500 / -750 / -1000 / -1500 / -2000 force sensors Models FS06-300 / -500 force sensors	1x G1081-2 eye end 1x G1080 anchor pin 2x G1079 lock ring
AC1047-3	Force sensor adapter kit, 1/4-28M	Models MR01-50 / -100 / -200 force sensors Models MR07-50 / -100 / -200 force sensors Models FS06-50 / -100 / -200 force sensors	1x G1081-3 eye end 1x G1080 anchor pin 2x G1079 lock ring
AC1047-4	Force sensor adapter, Series R03, #10-32M	Series R03 force sensors	1x G1081 eye end 1x G1080 anchor pin 2x G1079 lock ring 1x G1084 washer



AC1047      AC1047-1

AC1047-2      AC1047-3

AC1047-4

#### Grip Adapter Kits

Model No.	Description	Compatibility	Includes
AC1046	Grip adapter kit, #10-32M	Grips with #10-32 mounting	1x G1083 eye end adapter 1x G1079 lock ring
AC1046-1	Grip adapter kit, 5/16-18M	Grips with 5/16-18 mounting	1x G1083-1 eye end adapter 1x G1079 lock ring
AC1046-2	Grip adapter kit, 1/2-20M	Grips with 1/2-20 mounting	1x G1083-2 eye end adapter 1x G1079 lock ring



AC1046      AC1046-1

AC1046-2

#### Force Gauge / Force Sensor Adapter Kits

Model No.	Description	Compatibility	Includes
AC1045	Force gauge adapter kit, #10-32F	Force gauges up to 100 lbF capacity Series FS05 force sensors up to 100 lbF load cells	1x G1082 eye end 1x G1084 washer 2x G1079 lock ring 1x G1080 anchor pin
AC1045-1	Force gauge adapter kit, 5/16-18F	Force gauges with 200, 300, and 500 lbF capacities Models FS05-200/-300/-500 force sensors	1x G1082-1 eye end 1x G1084-1 washer 2x G1079 lock ring 1x G1080 anchor pin
AC1045-2	Force gauge adapter kit, 1/2-20M	Models M5-750 - M5-2000 force gauges	1x G1081-2 eye end 1x G1084-2 washer 2x G1079 lock ring 1x G1080 anchor pin



AC1045      AC1045-1

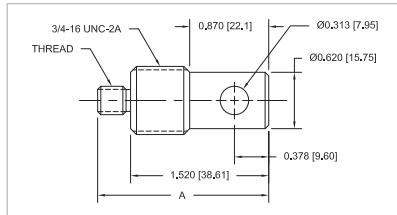
AC1045-2



## Eye end adapters - individual attachments

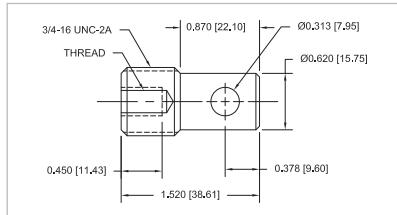
### G1081-X eye ends

Model No.	A	Thread	Weight lb [kg]	Capacity lbF [kN]
G1081	1.82 [46.2]	#10-32	0.13 [0.06]	200 [1]
G1081-1	1.88 [47.8]	5/16-18	0.14 [0.06]	500 [2.5]
G1081-2	2.02 [51.3]	1/2-20	0.15 [0.07]	2,000 [10]
G1081-3	1.87 [47.5]	1/4-28	0.13 [0.06]	200 [1]



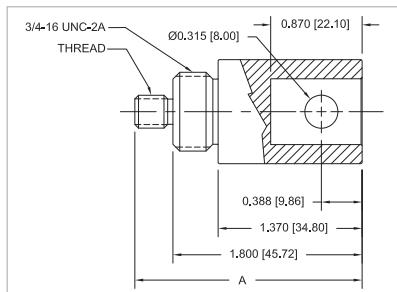
### G1082-X eye ends

Model No.	Thread	Weight lb [kg]	Capacity lbF [kN]
G1082	#10-32	0.13 [0.06]	200 [1]
G1082-1	5/16-18	0.14 [0.05]	500 [2.5]



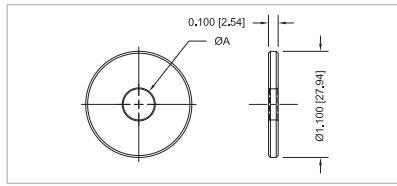
### G1083-X eye ends

Model No.	A	Thread	Weight lb [kg]	Capacity lbF [kN]
G1083	2.10 [53.3]	#10-32	0.26 [0.12]	200 [1]
G1083-1	2.16 [54.9]	5/16-18	0.26 [0.12]	500 [2.5]
G1083-2	2.30 [58.4]	1/2-20	0.28 [0.13]	2,000 [10]



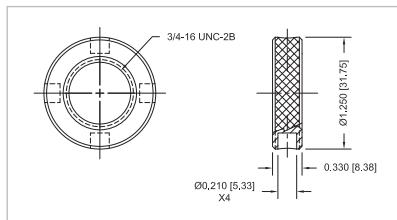
### G1084-X jam washers

Model No.	ØA	Weight lb [kg]
G1084	0.20 [5.1]	0.03 [0.01]
G1084-1	0.32 [8.2]	0.03 [0.01]
G1084-2	0.51 [12.9]	0.03 [0.01]



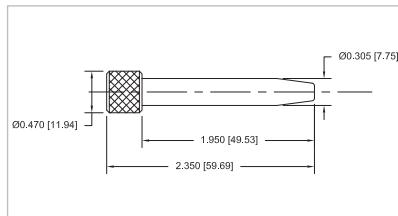
### G1079 lock ring

Model No.	Weight lb [kg]
G1079	0.07 [0.03]



### G1080 anchor pin

Model No.	Weight lb [kg]
G1080	0.06 [0.03]



### G1088 spanner wrench





## Hardware

### Double handle grips

For use in ergonomics testing, job task analysis, and physical therapy. Includes four gauge mounting screws.



Model No.	Description
AC1002	Double handle grip for Series 7/5/4 gauges
AC1003	Double handle grip for Series 3/2 gauges

### Single handle grips

For use in ergonomics testing, job task analysis, and physical therapy. Includes four gauge mounting screws.



Model No.	Description
AC1002-1	Single handle grip for Series 7/5/4 gauges
AC1003-1	Single handle grip for Series 3/2 gauges

### Inline adapters for force gauges

These adapters allow a force gauge to be used in inline pull testing or weighing applications. A 5/16-18 threaded hole at each end is axially aligned with the load cell shaft in the force gauge, for mounting hooks or other attachments. Three adapters are offered, accommodating Mark-10 force gauges with capacities up to 500 lbF (2.5 kN). Includes four gauge mounting screws and one 5/16-18 male/male stud with jam nuts. 500 lbF (2.5 kN) capacity.



Model No.	Description
AC1073-1	Inline adapter, Series 3/2 force gauges
AC1073-2	Inline adapter, Series 7/5*/4 force gauges
AC1073-3	Inline adapter, Series E force gauges

\* Up to 500 lbF (2,500 N) capacities



## Tabletop stand for indicators and torque gauges

Features an angle adjustment and thru holes for workbench mounting. Includes four gauge mounting screws. Compatible with Mark-10 indicators and Series TT03 torque gauges.



Model No.	Description
AC1100	Stand, tabletop, indicator/torque gauge

## Force gauge mounting plate kits

Universal kits suitable for all Mark-10 force gauges in OEM and custom mounting applications. Includes gauge mounting screws and plate mounting screws.



AC1052



AC1058

Model No.	Description
AC1052	Mounting plate kit, 0.12 - 500 lbF [0.5 - 2,500 N] Mark-10 force gauges
AC1007	Mounting plate kit, 0.12 - 2,000 lbF [0.5 N - 10 kN] Mark-10 force gauges

## Tabletop mounting kits for torque sensors

For securing Series R50, R52, and Models MR55-200/400 torque sensors to a workbench.



AC1006



AC1007



AC1010

Model No.	Description
AC1006	Mounting kit, R52, tabletop
AC1007	Mounting kit, R50, tabletop
AC1010	Mounting kit, MR55-200/MR55-400, tabletop

## Competitor gauge mounting kits

Model No.	Description	Compatible Test Stands
AC1020	Gauge mounting kit, Chatillon DFE/DFS/DFX/LG	
AC1021	Gauge mounting kit, Chatillon DFM	
AC1022	Gauge mounting kit, Chatillon DFIS	ES10, ES20, ES30, ESM303
AC1023	Gauge mounting kit, Mecmesin AFG/BFG	
AC1024	Gauge mounting kit, Imada	
AC1025	Gauge mounting kit, Shimpo FGV/FGE	
AC1037	Gauge mounting kit, Chatillon DFE/DFS/DFX/LG	
AC1038	Gauge mounting kit, Chatillon DFM	
AC1039	Gauge mounting kit, Chatillon DFIS	TSA750(H), TSC1000(H), TSF(H)
AC1040	Gauge mounting kit, Mecmesin AFG/BFG	
AC1041	Gauge mounting kit, Imada ZT/DS2/DPZ/DPS	
AC1042	Gauge mounting kit, Shimpo FGV/FGE	
AC1061	Mark-10 force gauges to 500 lbF / 2,500 N	Chatillon TCD200, TCM201, LTCM series
AC1069	Mark-10 force gauges to 500 lbF / 2,500 N	Mecmesin test stands

## Axial compensator

Compensates for axial movement in torque tests of threaded fasteners, bottle caps, etc. The axial compensator has a hex tail which fits into the chuck of a Series R50 or TT03 torque gauge, and includes mounting hardware to mount to a G1053 or G1058 grip.



Model No.	Description
AC1029	Axial compensator

## Test stand mounting kits for remote sensors

Refer to the compatibility table below:

Model No.	Sensors	Test Stands
AC1015	Series R51	Series TST torque test stands
AC1016	Models MR55-200 - MR55-400	Series TST torque test stands
AC1016-1	Models MR55-20 - MR55-100	Series TST torque test stands
AC1018	Series R01, Series R03	All force test stands, except ESM303(H), ESM750/ESM1500, and TSB100. Not compatible with Series F.
AC1062	Series R01, Series R03	ESM303



## Calibration Kits

### Cap torque tester calibration kit

For calibrating Series TT01 cap torque tester. The kit contains a complete set of attachments required to mount the tester to a bench, as well as the necessary brackets and cable to mount weights (weights not included).



Model No.	Description
AC1036	Calibration kit for cap torque testers

### Wire pull tester calibration kit

For calibrating a WT3-200, WT3-201, or WT3-201M wire crimp pull tester. The kit contains a complete set of attachments required to mount the tester to a bench, as well as the necessary brackets to mount weights (weights not included).



Model No.	Description
AC1049	Calibration kit for wire crimp pull testers

## Power & Communication

### Communication adapters



Model No.	Description
RSU100	Adapter, RS-232 to USB
MU100	Adapter, Mitutoyo to USB, 6' cable length

### Footswitch for Series 7 instruments

Automates common force gauge functions for improved testing ergonomics and efficiency, eliminating the need for multiple key presses. Up to three functions may be programmed for a single footswitch activation, such as request reading, zero the display, etc.



Model No.	Description
AC1051	Footswitch for Series 7 instruments

### AC adapter/chargers

110V and 220V models available, for use with all Mark-10 gauges, indicators, and testers.\*

Model No.	Description
AC1030	AC adapter / charger, 110V
AC1031	AC adapter / charger, 220V EUR
AC1032	AC adapter / charger, 220V UK
AC1035	AC adapter / charger, 220V AUS



\* Except legacy series MG and MGT gauges manufactured prior to September, 2010.

### Replacement battery

Rechargeable 8.4V NiMH battery, for use with Mark-10 gauges, indicators, and testers.



Model No.	Description
AC1118	Battery, rechargeable, 8.4V



## Communication cables

Various cables are available for communicating between Mark-10 gauges, indicators, test stands, PCs, printers, PLCs, and other devices.

Model No.	Description	Compatible Instruments
 <b>AC1116 (09-1349)</b>	USB cable, type C to A	Series F test frames with EasyMESUR® to PC
 <b>AC1114 (09-1214)</b>	Interface cable, gauge to test stand crosshead	Series 7, 5, 4 instruments to ESM303, ESM1500 test stands
 <b>AC1115 (09-1252)</b>	Interface cable, indicator to test stand crosshead	Model M7I and M5I indicators to ESM303H test stand
 <b>AC1111 (09-1165)</b>	USB cable, type micro B to A	Series 7, 5, 4, 3, TT01, TT02, TT03, TT05, WT3-201(M) instruments to PC
 <b>AC1107 (09-1158)</b>	USB cable, type B to A	Series F test frames, ESM303, ESM750, ESM1500 test stands to PC
 <b>AC1109 (09-1163)</b>	Serial cable, gauge to RS-232, DB-9	Series 7, 5, 4, TT01, TT02, TT05, WT3-201(M) instruments
 <b>AC1110 (09-1164)</b>	Cable, gauge to Mitutoyo SPC	Series 7, 5, 4, TT01, TT02, TT05, WT3-201(M) instruments
 <b>AC1112 (09-1166)</b>	Analog cable, gauge to dual banana plug	Series 7, 5, 4, TT01, TT02, TT05, WT3-201(M) instruments
 <b>AC1105 (09-1066)</b>	Cable, travel display to Mitutoyo SPC	Mitutoyo travel display mounted to ES30, TSA750(H), TSB100, TSC1000(H), and TSF(H) test stands

Cables for legacy products are also available. See website for details.



### Test Frame Accessories



#### Double column extension

Accommodate up to a 20 in. [508 mm] wide sample, or  $\varnothing$ 21.5 in [ $\varnothing$ 546 mm] round sample. Three heights are available – 6, 12 and 24 in [150, 300, and 600 mm]. Base contains rows of T-slots, with available fixture mounting plates.

Compatible with:

Models F105 / F305 / F505 test frames - these test frames include a base plate with matrix of threaded holes, which may be mounted to the column extension's base.

Model ESM303 test stand - if a base plate with matrix of threaded holes is needed, add part no. AC1096.

Model No.	Description
AC1095-1	Double column extension for F105, F305, F505, and ESM303, 6"
AC1095-2	Double column extension for F105, F305, F505, and ESM303, 12"
AC1095-3	Double column extension for F105, F305, F505, and ESM303, 24"
AC1096	Mounting plate kit, matrix of threaded holes (suggested for ESM303; included with F105/F305/F505)



#### Shields for test frames

Provide pinch and sample debris protection for the operator. An electrical interlock prevents test frame operation while the door is open. The test frame's control panel and remote emergency stop (applicable models, only) mount to the shield's extruded frame.

Model No.	Description
AC1092-1	Shield, 51.9" height
AC1092-2	Shield, 34.4" height
AC1092-3	Shield, 51.9" height, ESM303 with column extension up to 24"
AC1092-4	Shield, 34.4" height, ESM303



### USB hub

Test frame-mounted 4-port USB hub improves cable management and conveniently accommodates peripherals, such as a flash drive, barcode scanner, etc. Compatible with Series F + IntelliMESUR® test frames.



Model No.	Description
AC1093	USB hub

### Force sensor - test stand mounting kit

For securing any Series R01 or R03 force sensor to any of the following Mark-10 force test stands:

- ES10 / ES20
- ES30
- TSA750 / TSA750H
- TSC1000 / TSC1000H
- TSF / TSFH



Model No.	Description
AC1018	Mounting kit, R01/R03 to test stand

The kit contains brackets and screws with the following thread sizes: #10-32, 1/4-28, 5/16-18, and 1/2-20.

### Adapter for Series FS Force Sensors

Adapts a Series FS force sensor or PTAF sensor adapter to Plug & Test® type interface, for ease of external calibration via a Mark-10 indicator. Also permits mounting of a Series FS05 sensor to Models F755, F755S, F1505, and F1505S test frames.



AC1084



AC1083

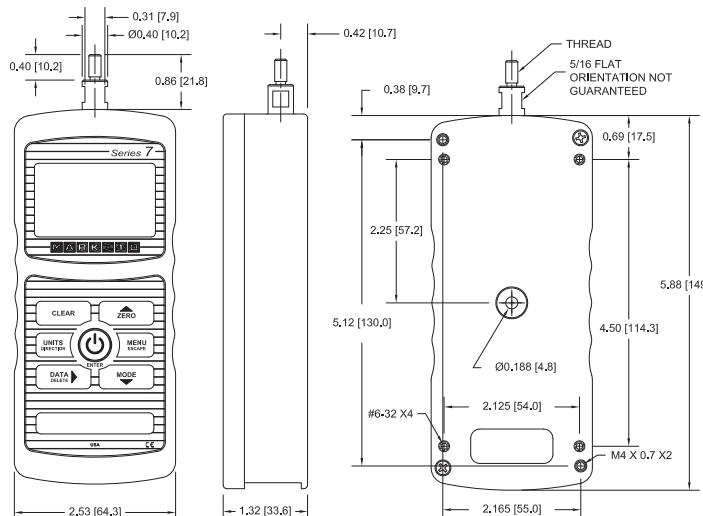
Model No.	Description
AC1083	Adapter, FS05 sensor / PTAF adapter, to Plug & Test® connector / F755, F755S, F1505, F1505S test frames, 10 in / 250 mm cable
AC1084	Extension cable, 12 in / 305 mm, Plug & Test®, male/female



Dimensional Drawings ▶ Force Gauges

## Force Gauges

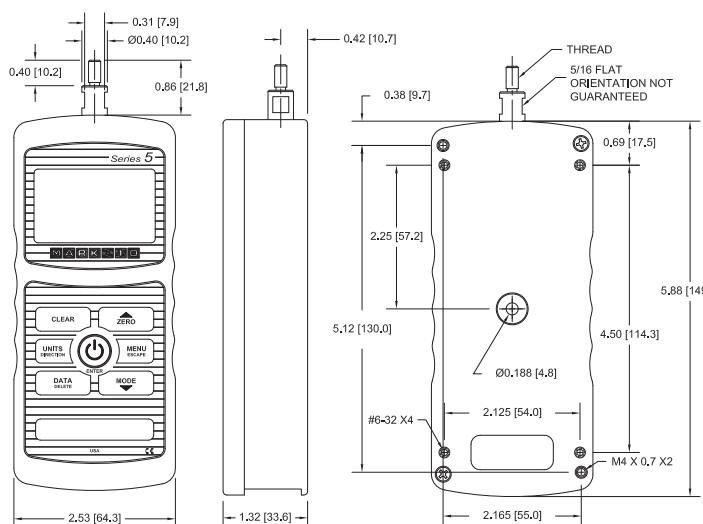
## Series 7



Model No.	Thread
<b>M7-012 - M7-100</b>	#10-32M UNF
<b>M7-200 - M7-500</b>	5/16-18M UNC

## Series 5

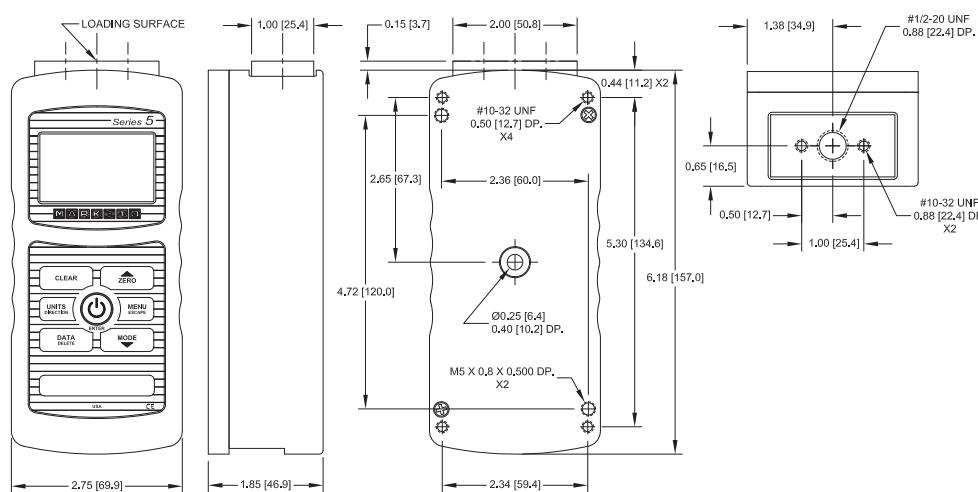
Models  
M5-012 -  
M5-500

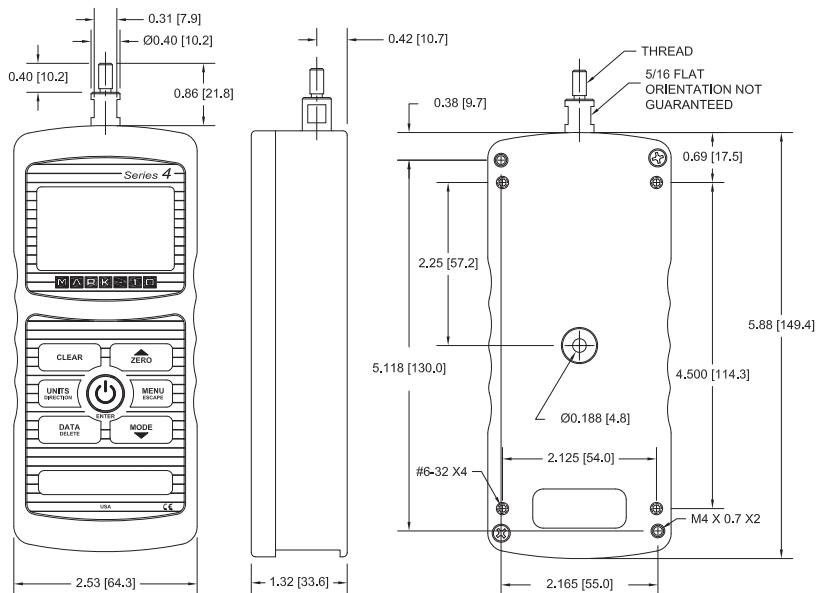


Model No.	Thread
M5-012 - M5-100	#10-32 UNF
M5-200 - M5- 500	5/16-18 UNC

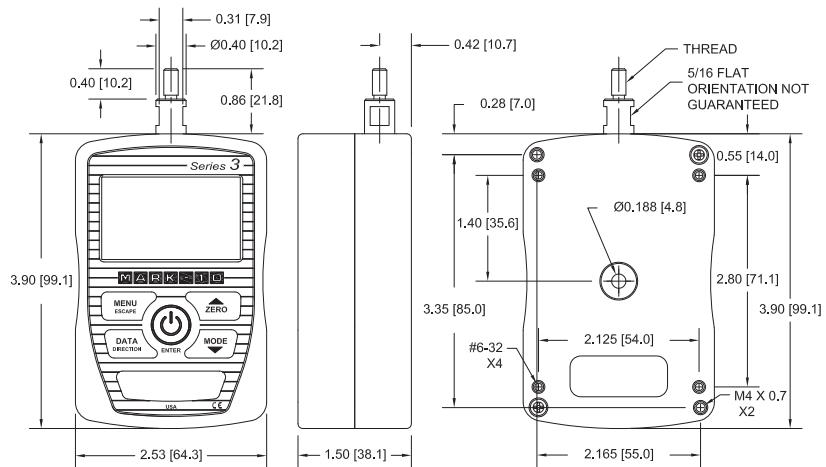
## Series 5

Models  
M5-750 -  
M5-2000

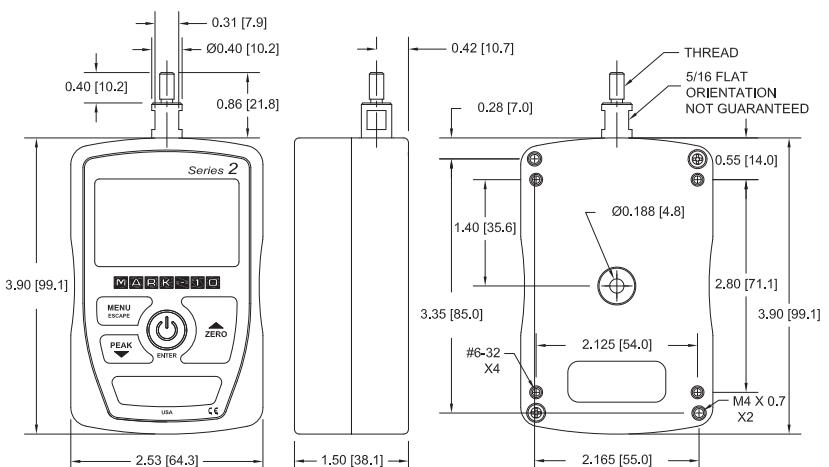


**Series 4**

Model No.	Thread
M4-012 - M4-100	#10-32 UNF
M4-200 - M4-500	5/16-18 UNC

**Series 3**

Model No.	Thread
M3-012 - M3-100	#10-32 UNF
M3-200 - M3-500	5/16-18 UNC

**Series 2**

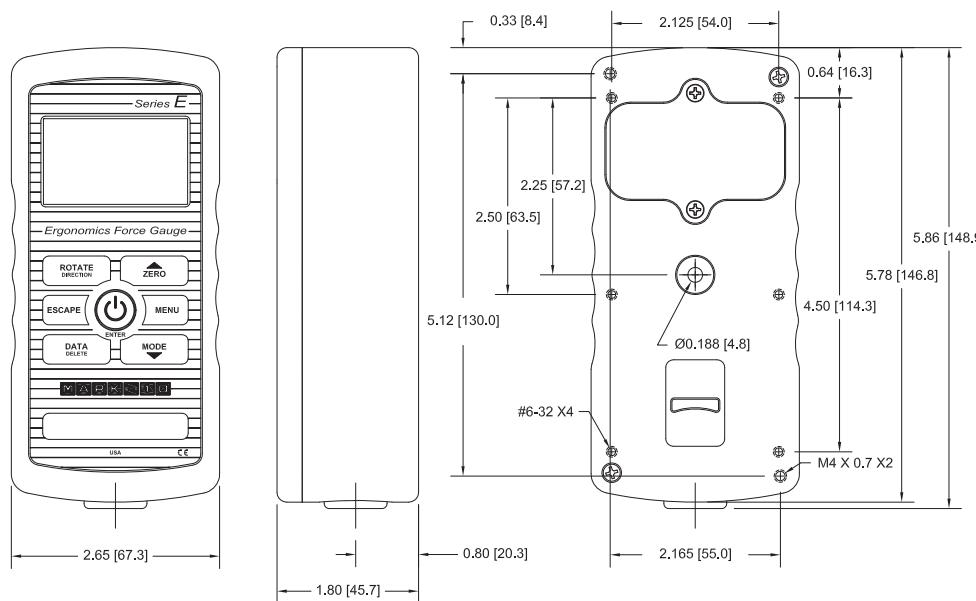
Model No.	Thread
M2-2 - M2-100	#10-32 UNF
M2-200 - M2-500	5/16-18 UNC



## Dimensional Drawings

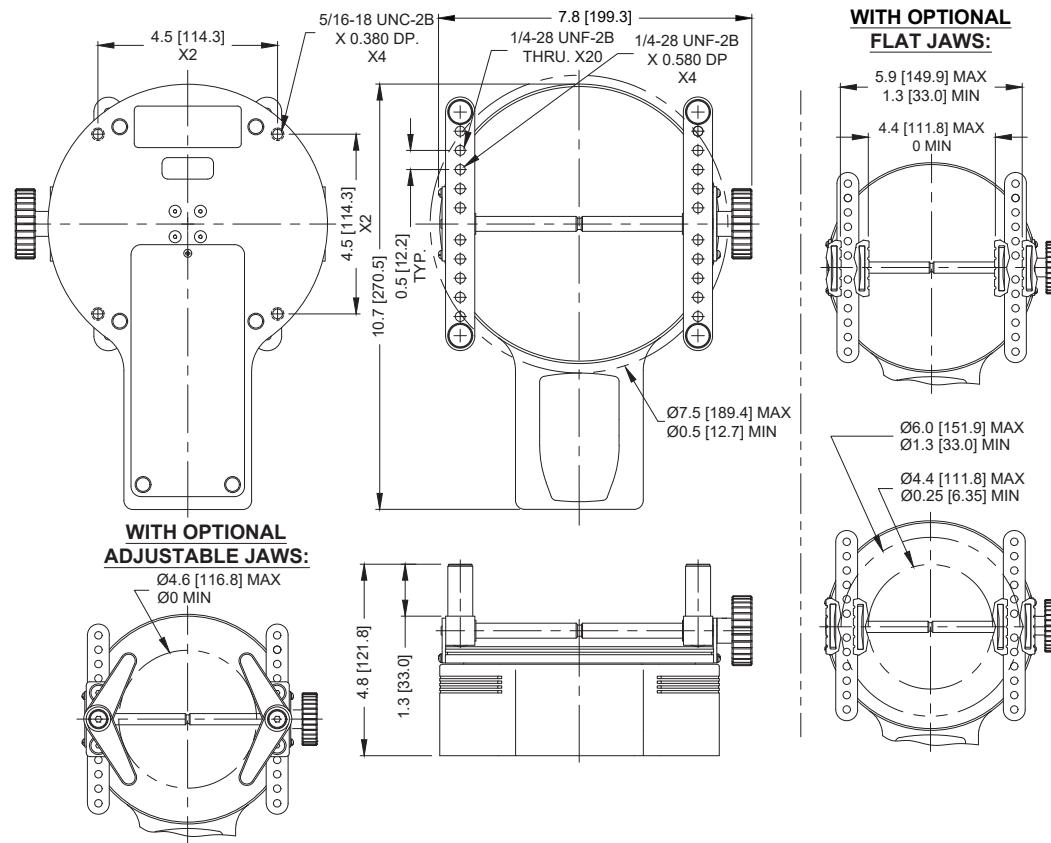
### Ergonomics Force Gauges

Series E



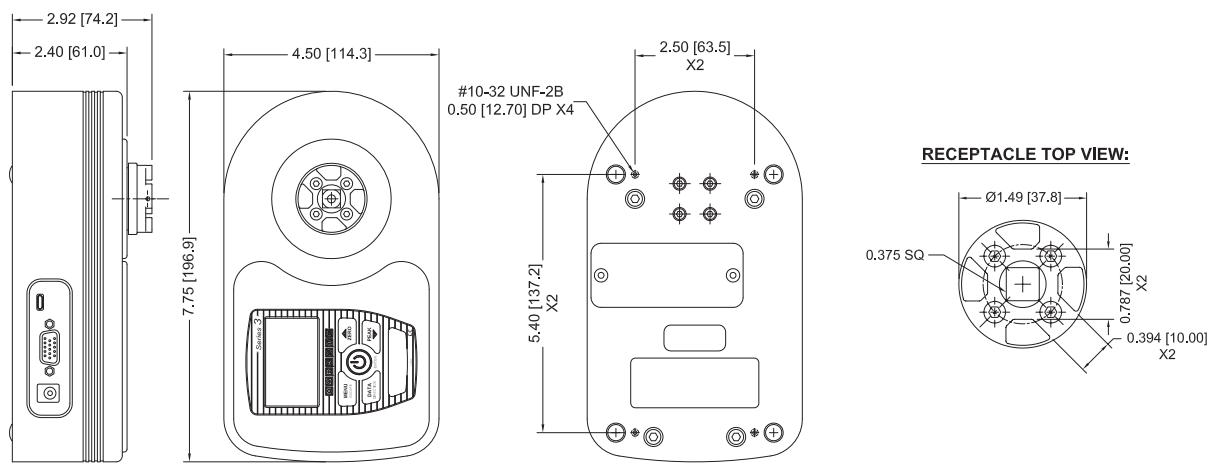
### Torque Gauges

Series TT01

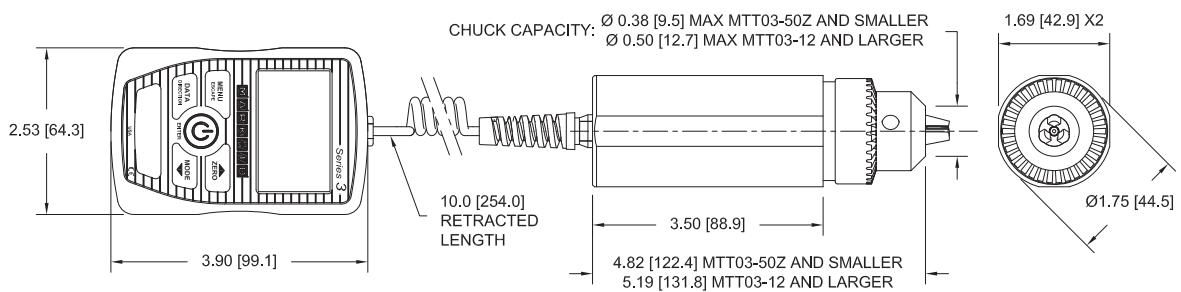




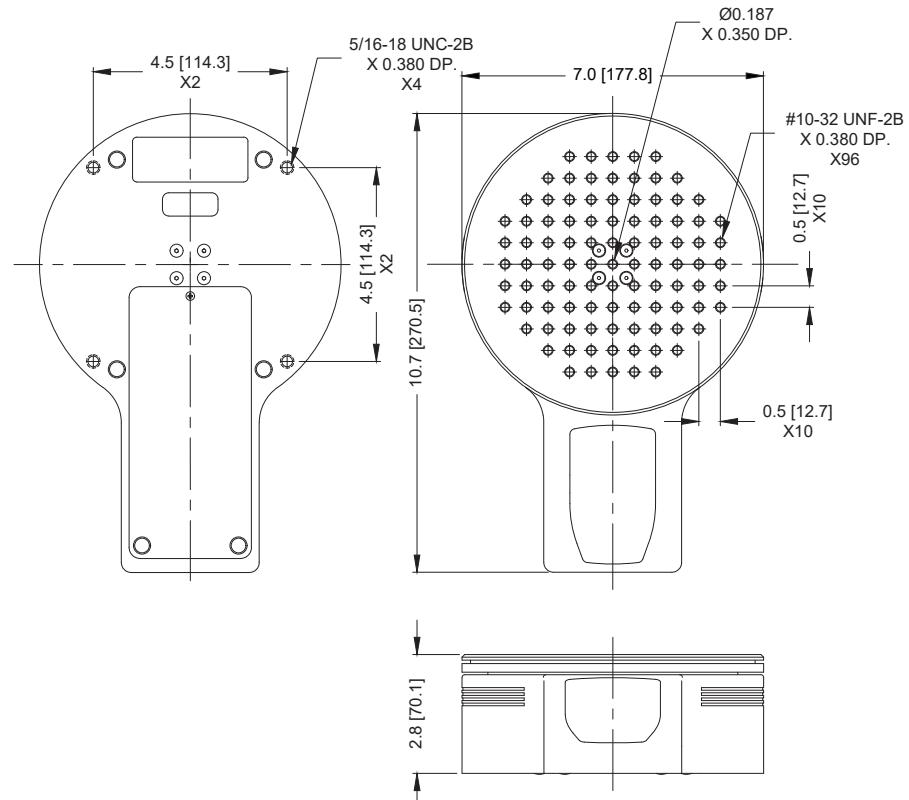
Series TT02



Series TT03



Series TT05

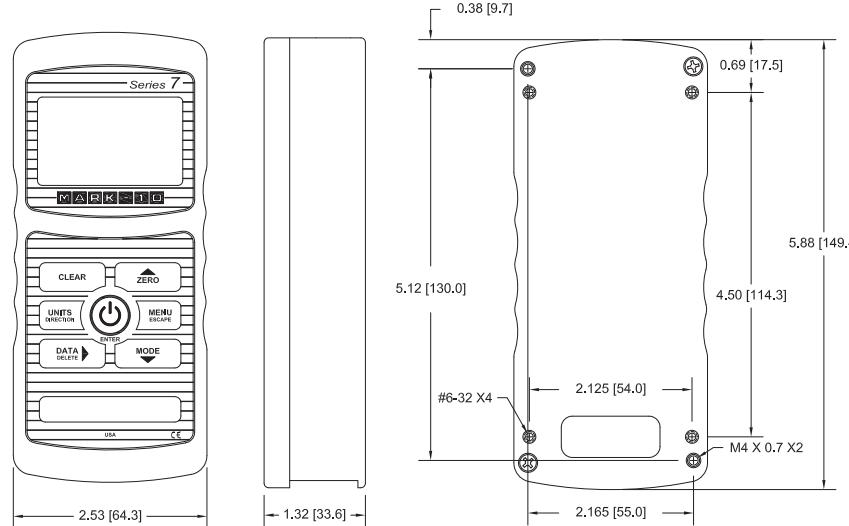




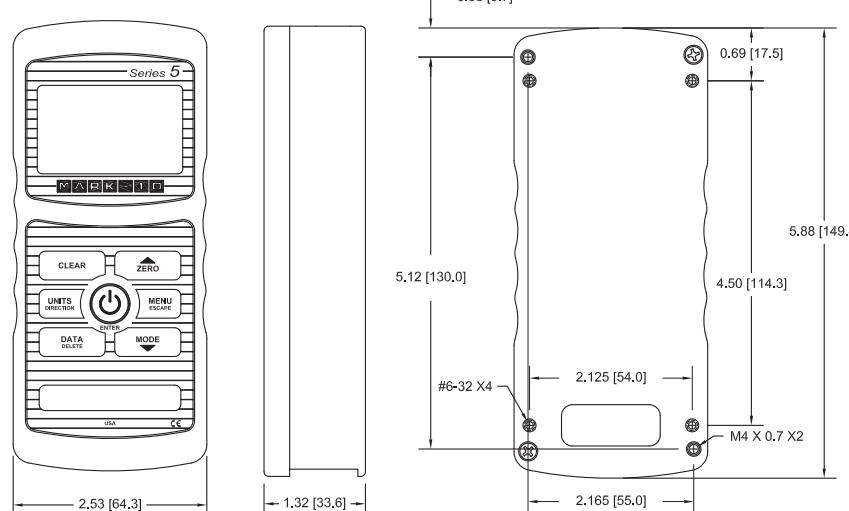
### Plug & Test® Indicators & Sensors

#### Indicators

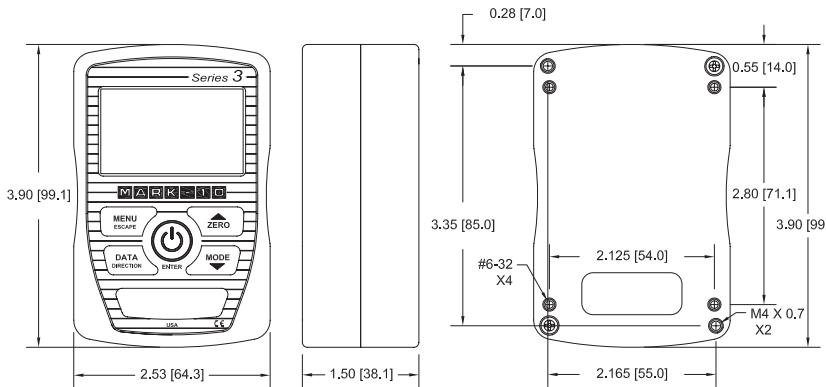
**Model M7I**



**Model M5I**



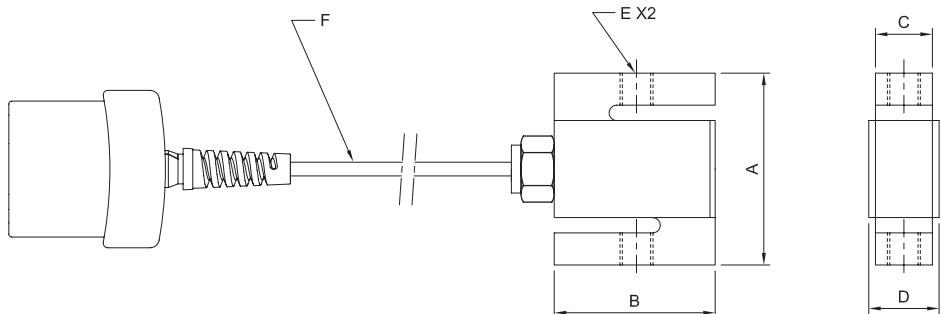
**Model M3I**





## Force Sensors

### Series R01

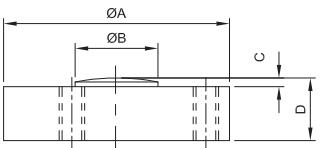


Model No.	A	B	C	D	E	F
MR01-50						
MR01-100			0.46 [11.7]	0.90 [22.9]	1/4-28 UNF	
MR01-200						
MR01-300	2.40 [61.0]	2.00 [50.8]				MR01-XXXX: 20 ft [6 m]
MR01-500			0.71 [18.0]	1.10 [27.9]	1/2-20 UNF	MR01-XXXX-1* 10 in [254 mm]*
MR01-750						
MR01-1000						
MR01-2000			0.96 [24.4]	1.40 [35.6]		
MR01-5000	3.90 [99.1]	3.00 [76.2]	1.21 [30.7]	1.63 [41.4]	3/4-16 UNF	
MR01-10000						

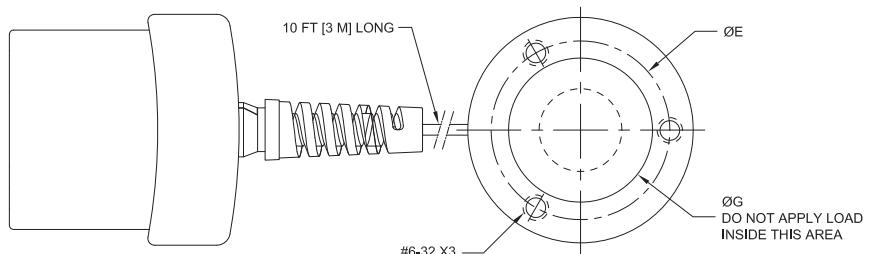
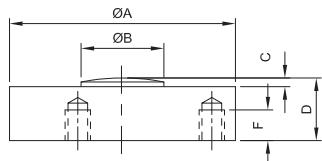
\* Add suffix "-1" for shortened cable, for use on ESM1500, ESM750, ESM303, and ESM303H test stands. Ex: MR01-1000-1. Test stand mounting hardware is included.

### Series R02

MR02-100 - MR02-2000:



MR02-5000 - MR02-10000:

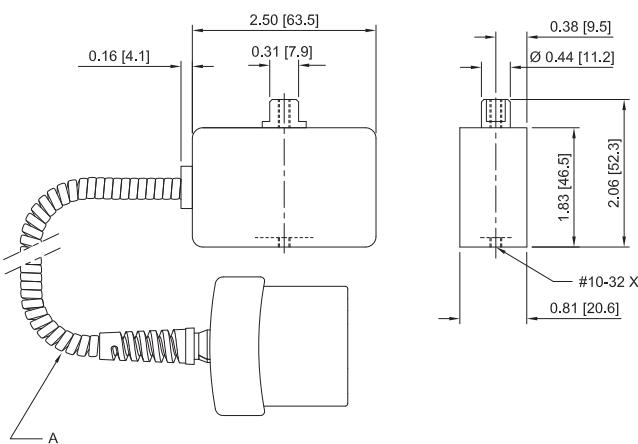


Model No.	ØA	ØB	C	D	ØE	F	ØG
MR02-100 - MR02-2000	1.23 [31.3]	0.32 [8.1]	0.05 [1.3]	0.39 [9.9]	1.0 [25.4]	THRU	0.83 [21.1]
MR02-5000 - MR02-10000	1.48 [37.6]	0.43 [10.9]	0.07 [1.8]	0.62 [15.8]	1.25 [31.8]	0.25 [6.4]	1.08 [27.4]



## Dimensional Drawings ▶ Plug & Test® Indicators & Sensors

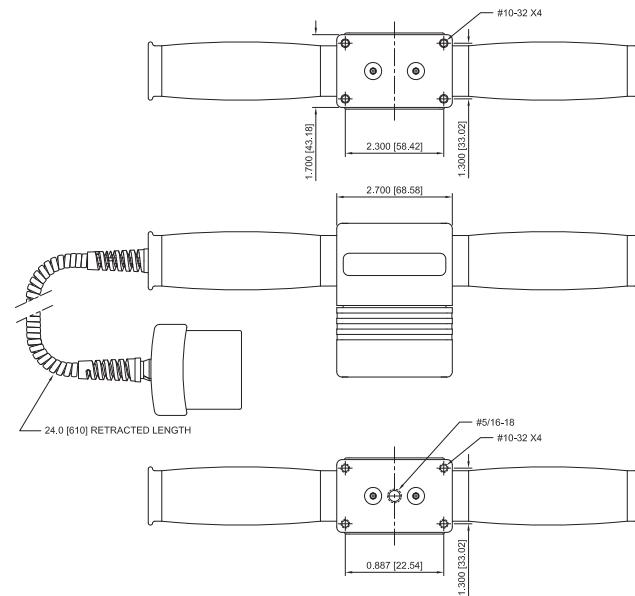
### Series R03



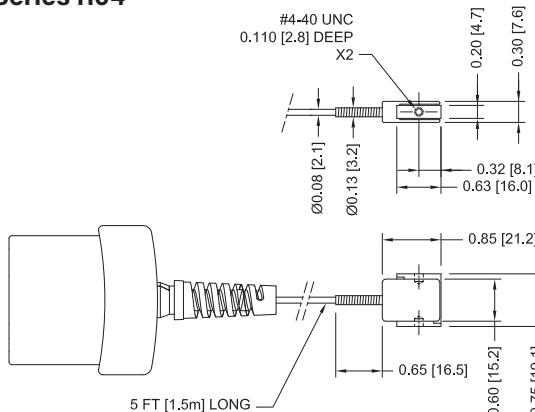
Model No.	A
MR03-XXX	24 in [609 mm] retracted, 10 ft [3 m] stretched
MR03-XXX-1*	10 in [254 mm], straight*

\* Add suffix "-1" for shortened cable, for use on ESM1500, ESM750, ESM303, and ESM303H test stands. Ex: MR03-100-1. Test stand mounting hardware is included.

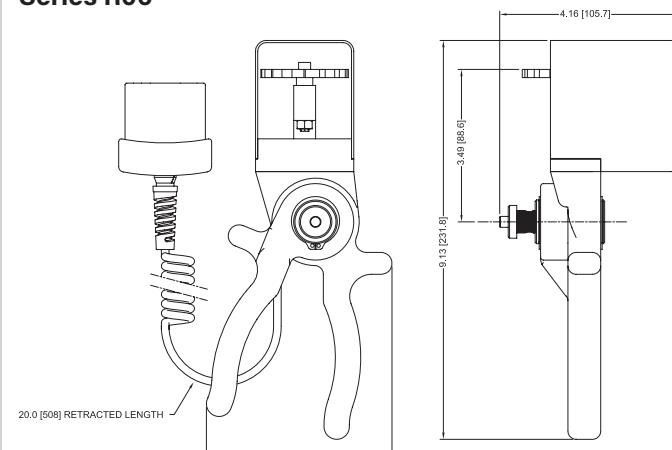
### Series R05



### Series R04



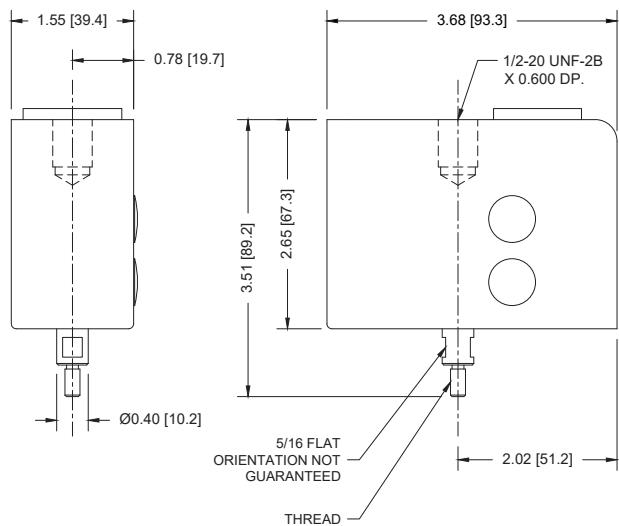
### Series R06





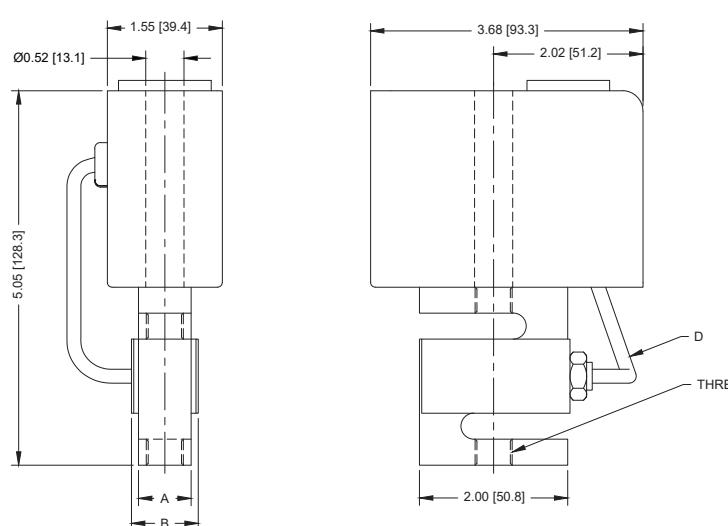
## Series F Force Sensors

### Series FS05 Force Sensors



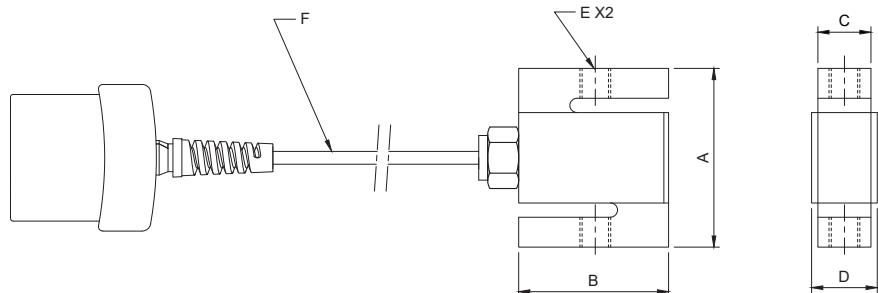
Model No.	Thread
FS05-012 - FS05-100	#10-32 UNF
FS05-200 - FS05-500	5/16-18 UNC

### Series FS06 Force Sensors



Model No.	A	B	C	D
FS05-012 - FS05-100	0.46 [11.7]	0.71 [18.0]	1/4-28 UNF	6.00 [152.4]
FS05-200 - FS05-500	0.90 [22.6]	1.10 [27.9]	1/2-20 UNF	

### Series R07 Force Sensors



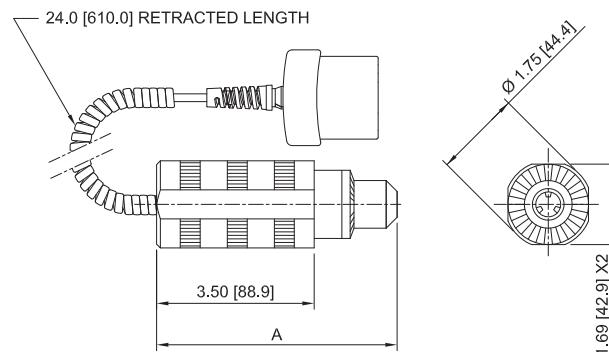
Model No.	A	B	C	D	E	F
MR07-50						
MR07-100			0.46 [11.7]	0.90 [22.9]	1/4-28 UNF	
MR07-200						
MR07-300	2.40 [61.0]	2.00 [50.8]				
MR07-500			0.71 [18.0]	1.10 [27.9]		10.00 [254.0]
MR07-750					1/2-20 UNF	
MR07-1000						
MR07-1500			0.96 [24.4]	1.40 [35.6]		



## Dimensional Drawings ▶ Plug & Test® Indicators & Sensors

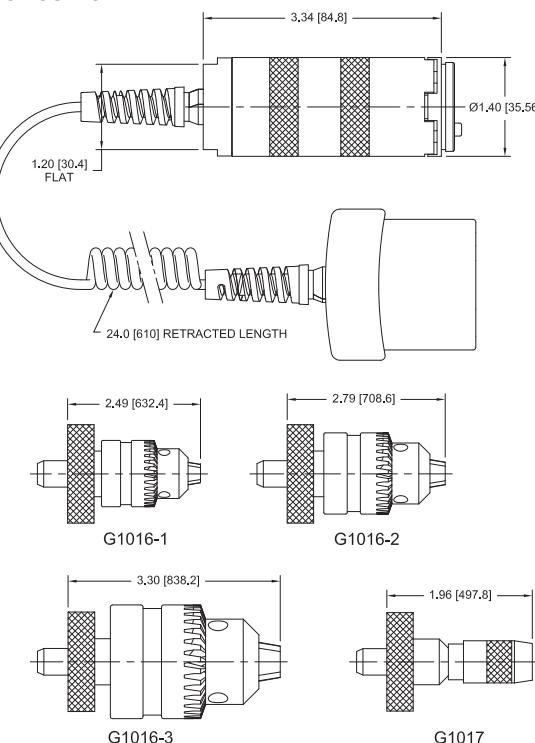
### Torque Sensors

#### Series R50

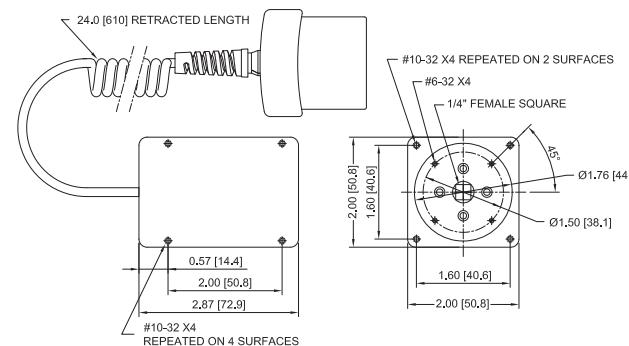


Model No.	A	Chuck Capacity
MR50-10Z - MR50-50Z	4.82 [122.4]	0.375 [9.5]
MR50-12 - MR50-100	5.19 [131.8]	0.5 [12.7]

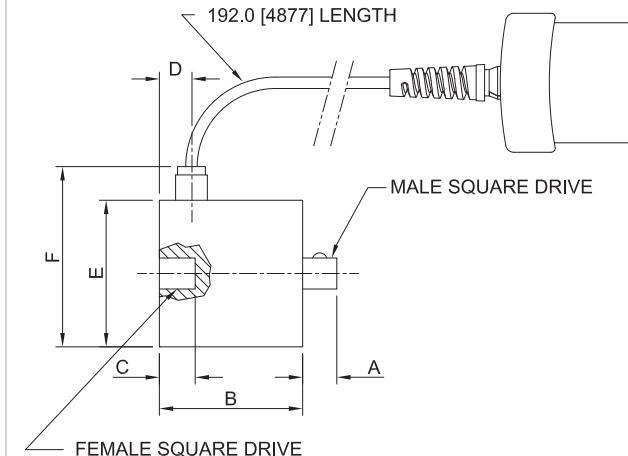
#### Series R51



#### Series R52



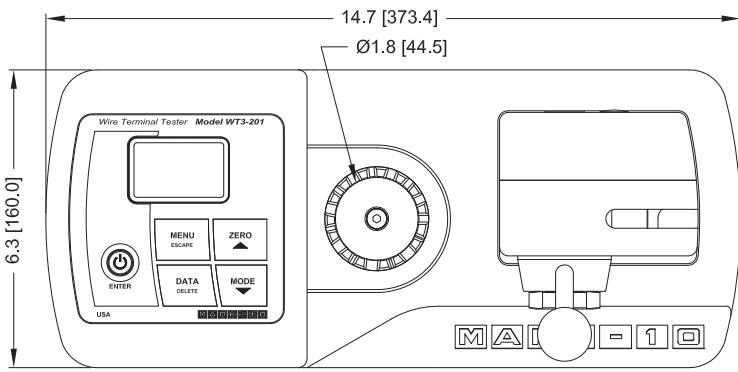
#### Series R55



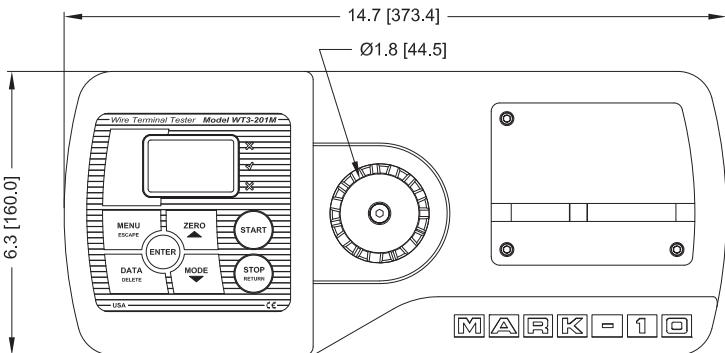
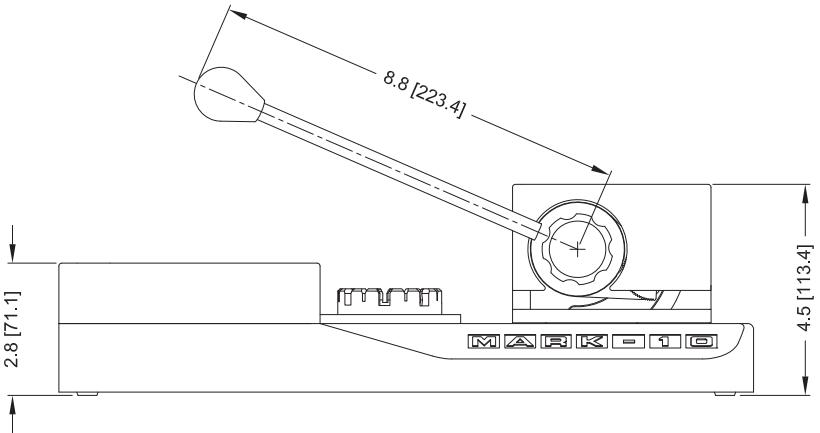
Model No.	Drive Size	A	B	C	D	ØE	F
MR55-20 - MR55-100	1/4"	0.30 [7.5]	1.73 [44.0]	0.32 [8.0]			
MR55-200 - MR55-400	3/8"	0.41 [10.5]		0.43 [11.0]	0.39 [10.0]	1.77 [45.0]	2.32 [59.0]
MR55-1000	1/2"	0.59 [15.0]		0.63 [16.0]			
MR55-5000	3/4"	0.89 [22.5]	2.11 [53.5]	0.94 [24.0]	0.77 [19.5]	2.01 [51.0]	2.56 [65.0]



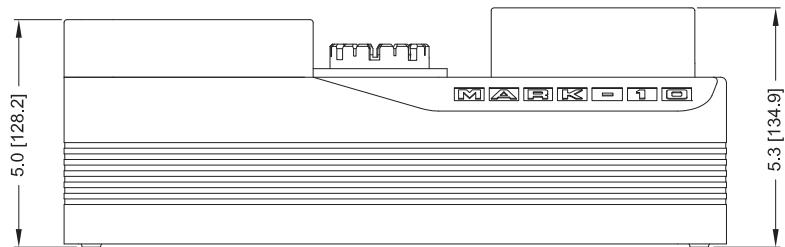
## Wire Crimp Pull Testers



Model WT3-201



Model WT3-201M

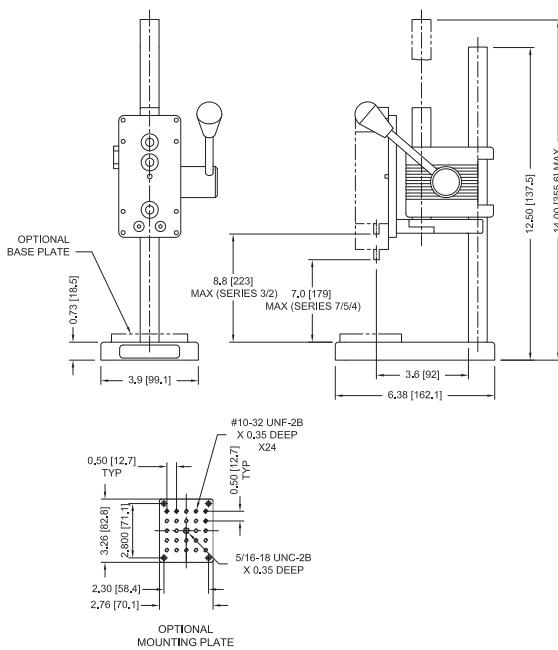




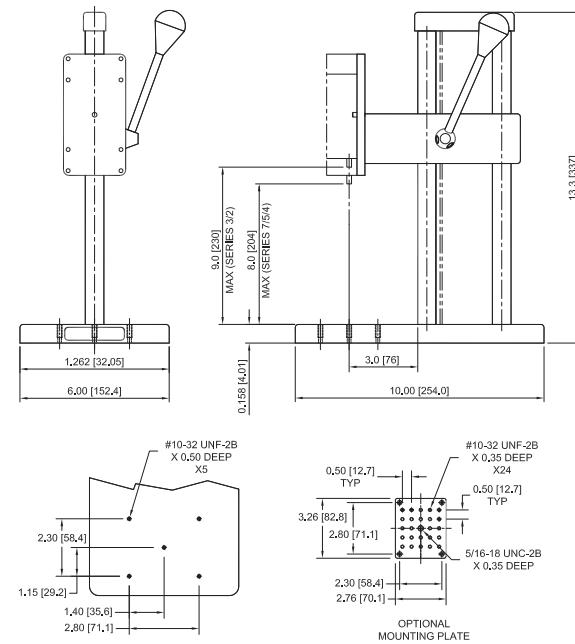
## Dimensional Drawings ▶ Manual Test Stands

### Manual Test Stands

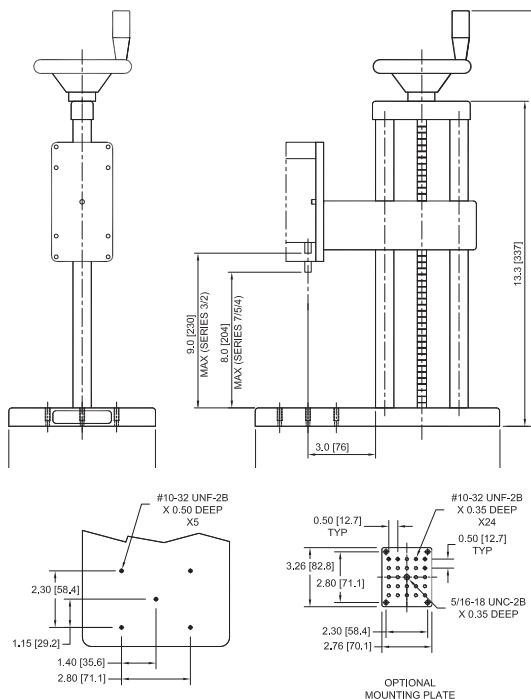
#### Model ES05



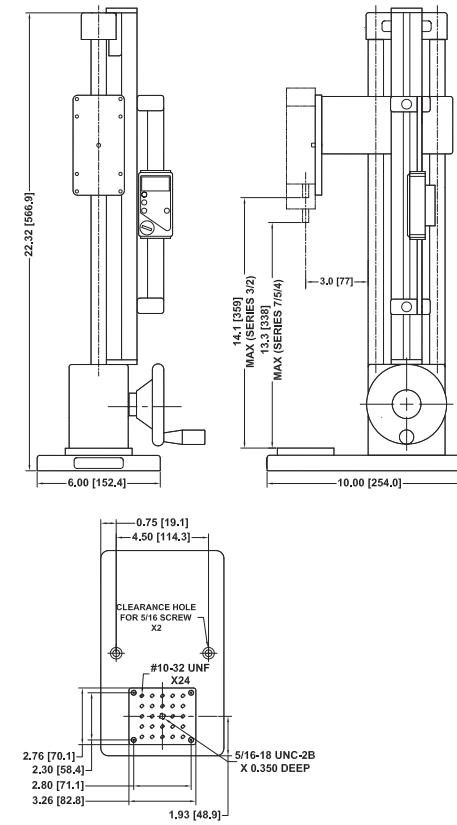
#### Model ES10

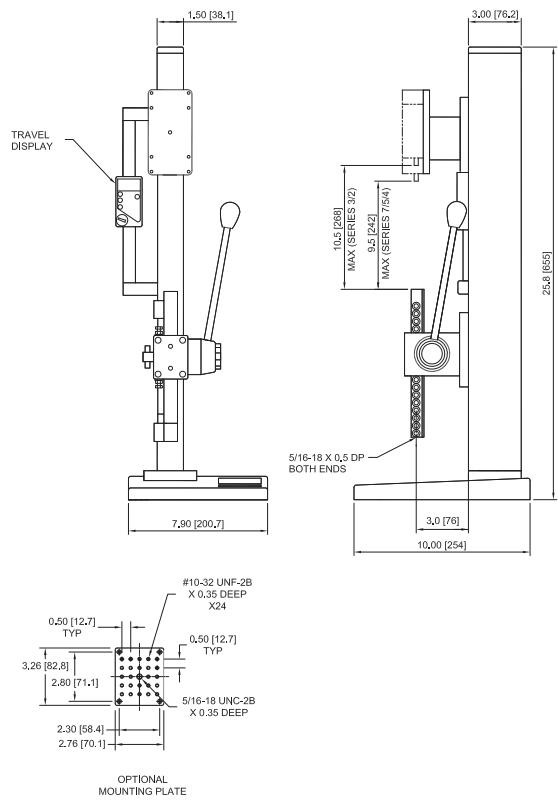
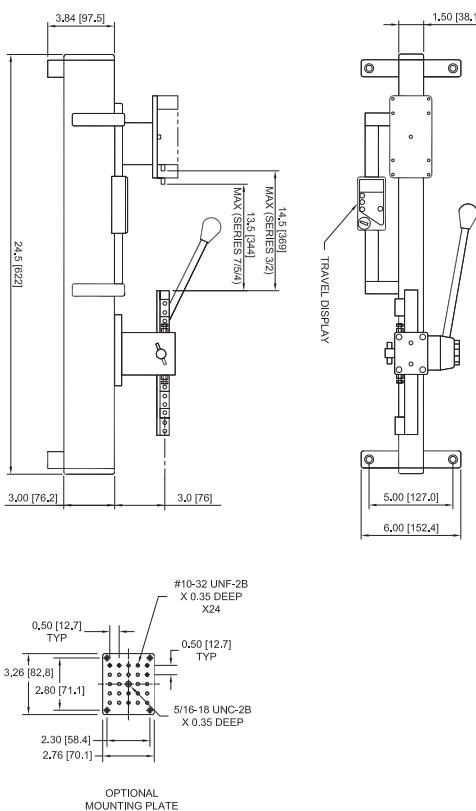
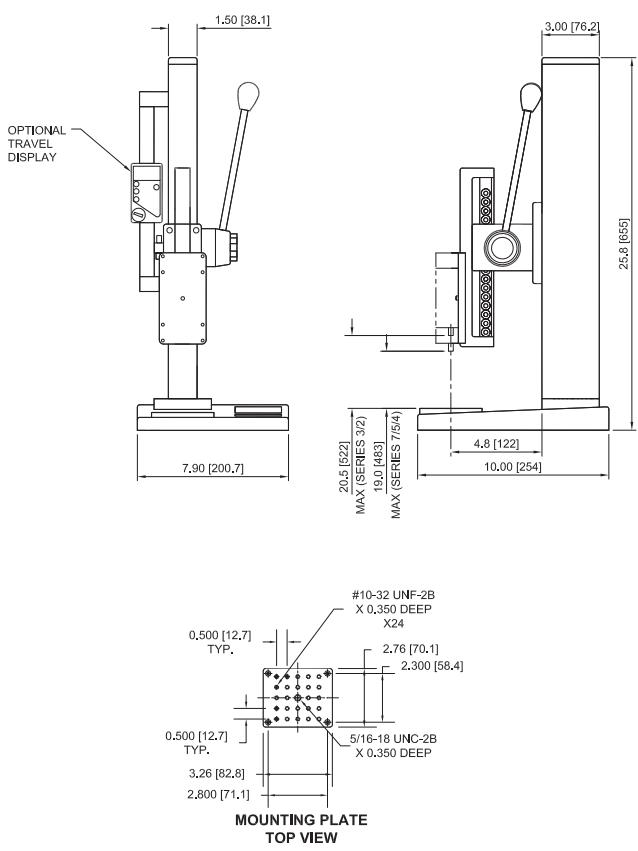
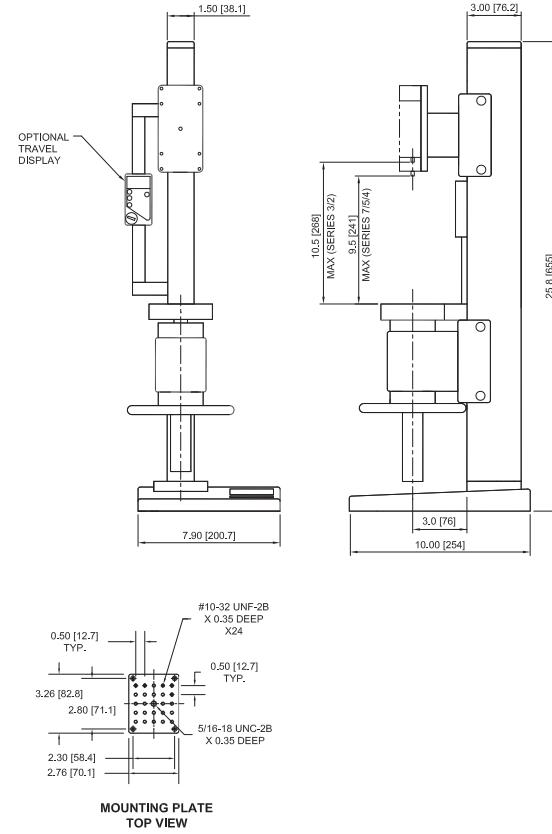


#### Model ES20



#### Model ES30

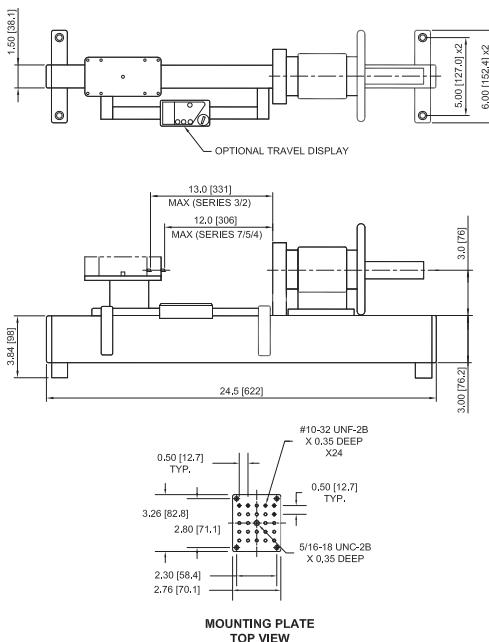


**Model TSA750****Model TSA750H****Model TSB100****Model TSC1000**

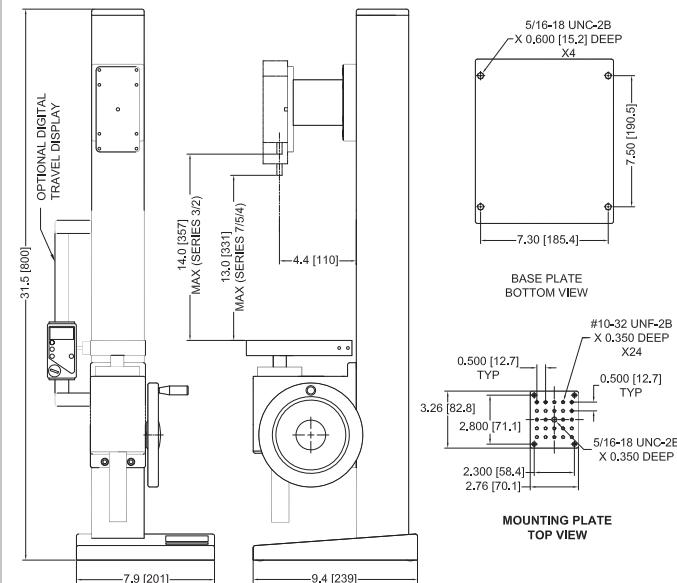


## Dimensional Drawings ▶ Manual Test Stands

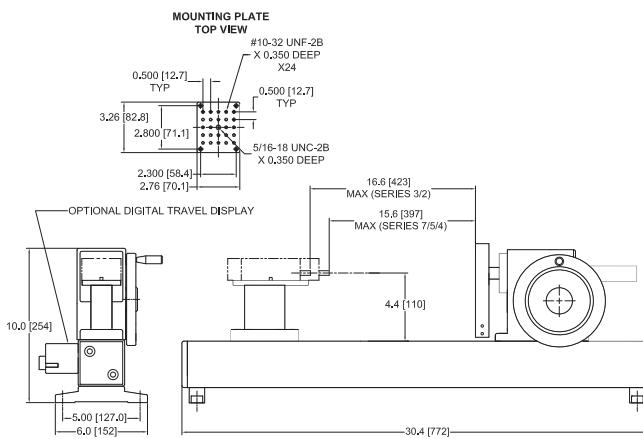
### Model TSC1000H



### Model TSF



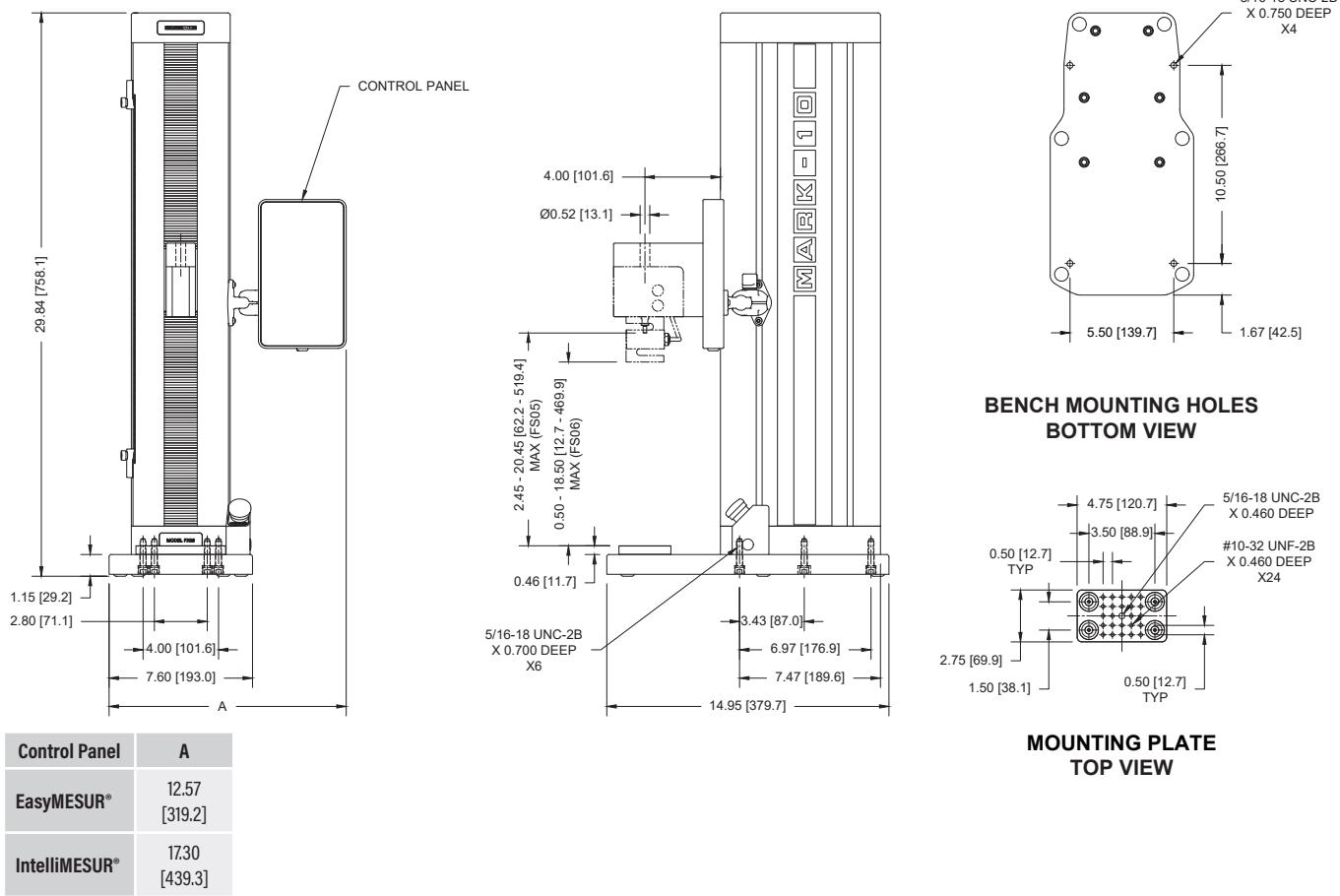
### Model TSFH



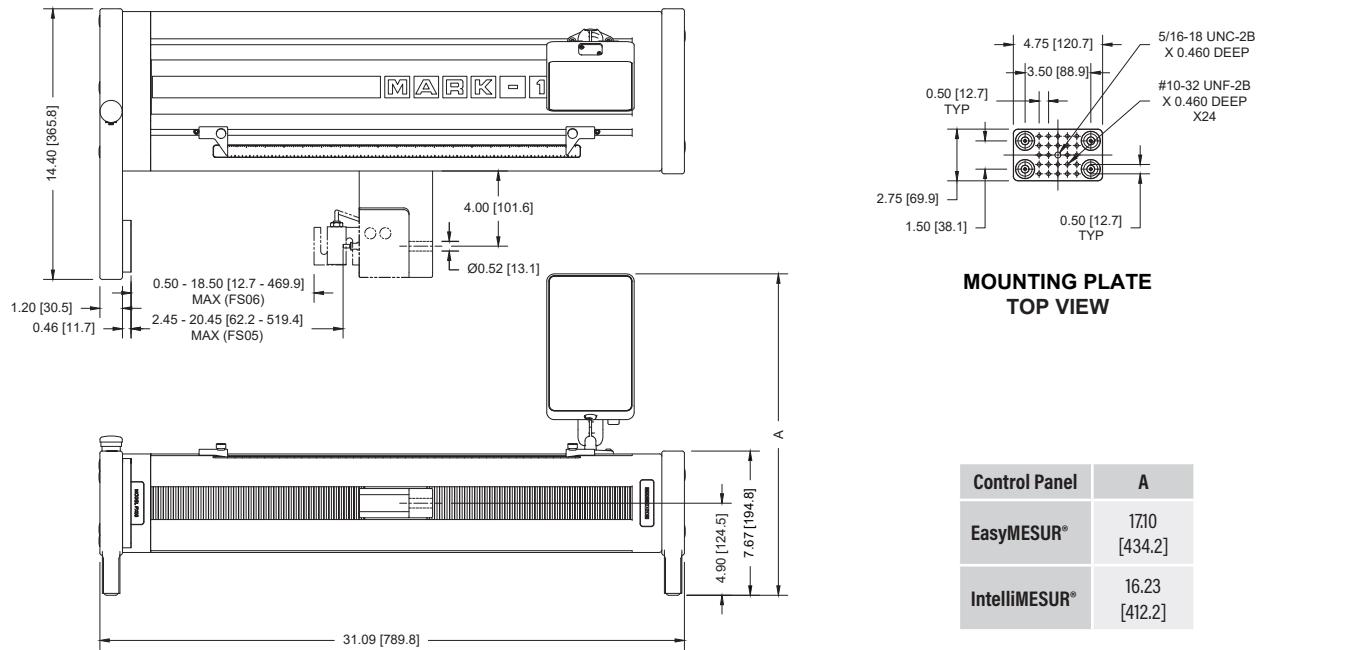


## Motorized Force Testers

### F105 / F305 / F505



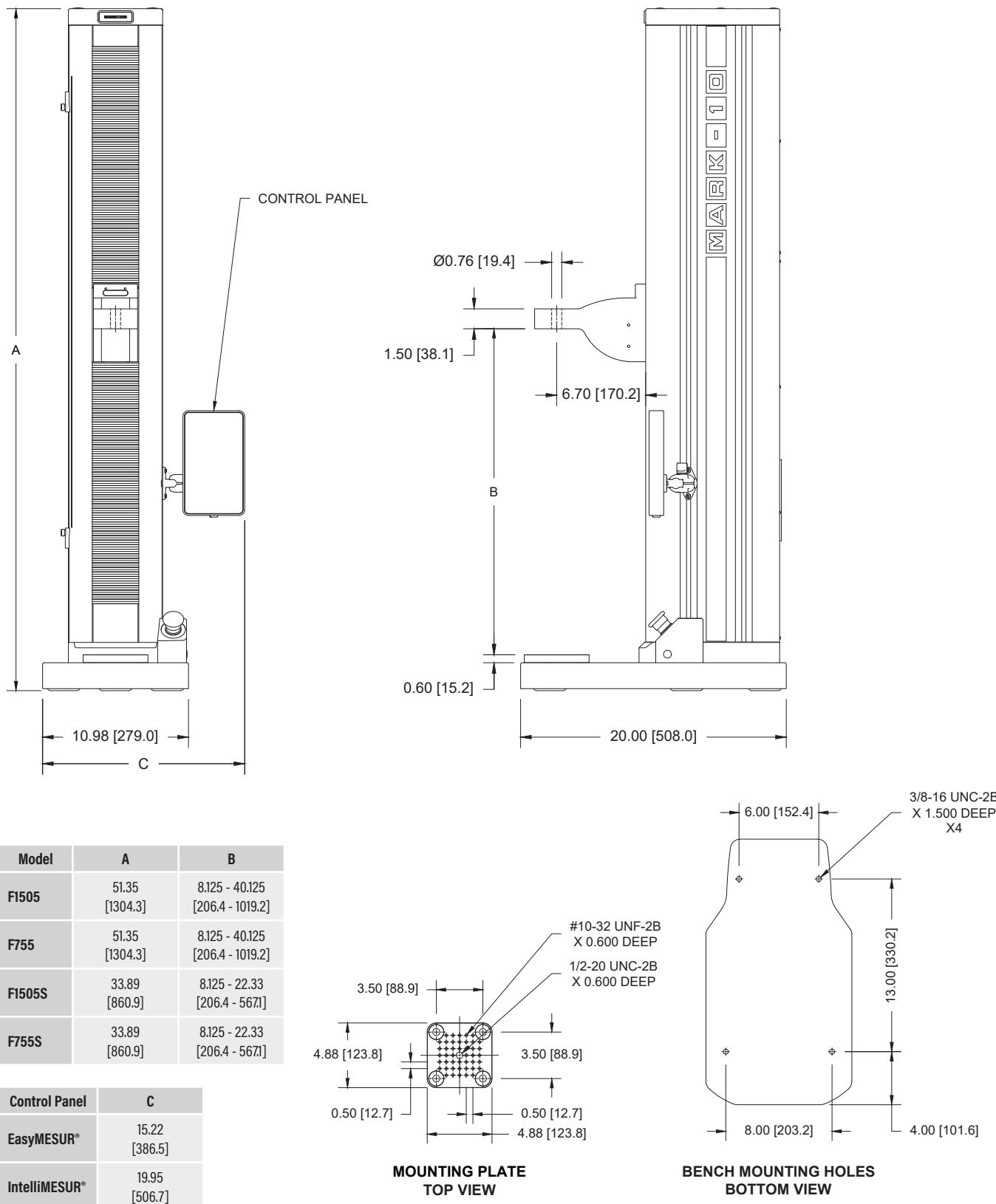
### F505H





## Dimensional Drawings ▶ Motorized Force Testers

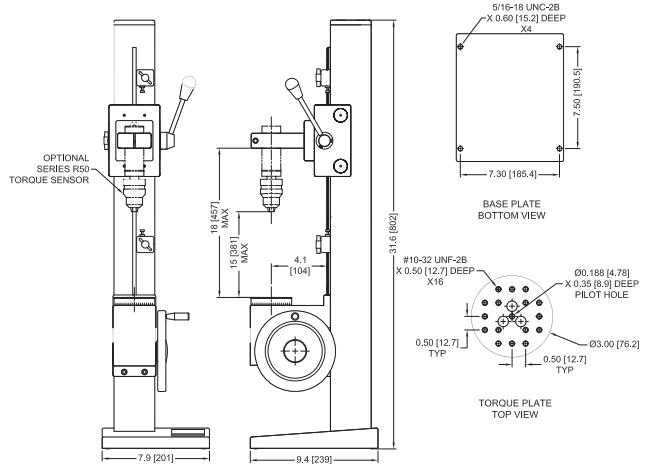
### F755 / F755S / F1505 / F1505S



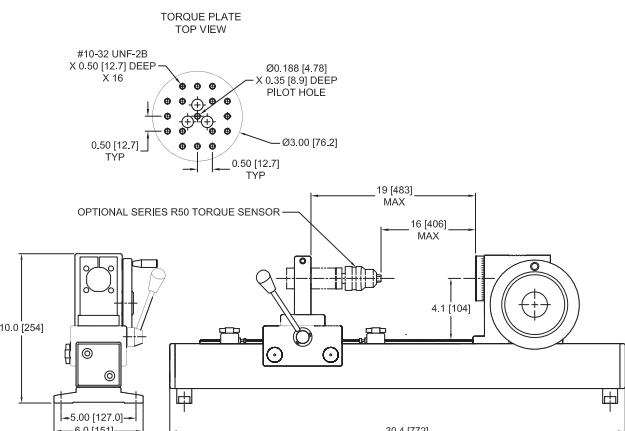


## Torque Testers

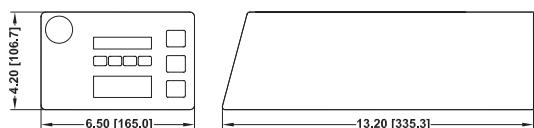
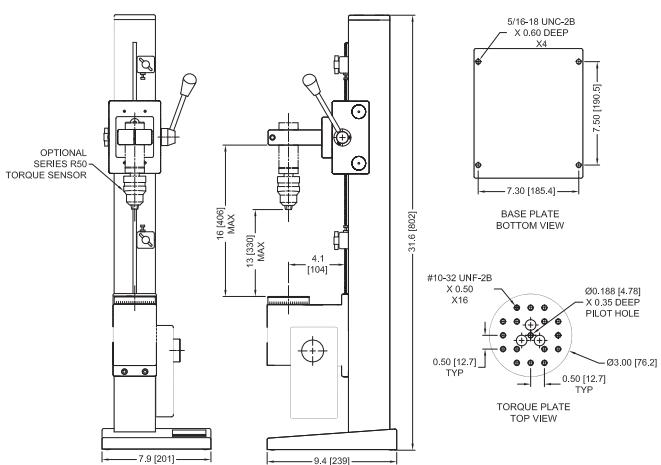
### Model TST



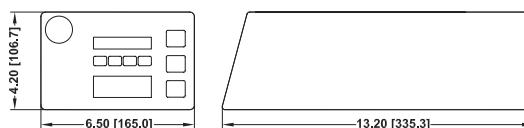
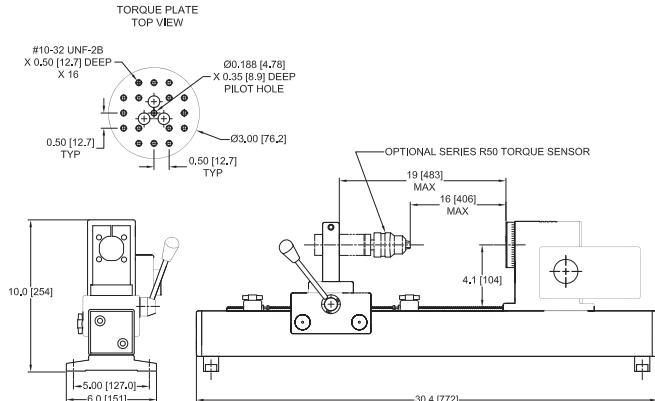
### Model TSTH



### Model TSTM-DC



### Model TSTMH-DC









## Applications are virtually limitless...

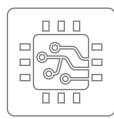
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Aerospace



Electronics



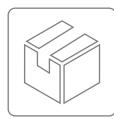
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Springs



Medical Device



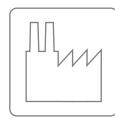
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