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# Force and Torque Measurement Products



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Catalog N° 13

# We make a measurable difference ...

For more than 25 years, Mark-10 has been an innovative designer and manufacturer of force and torque measuring instruments. We produce a wide range of standard equipment and offer full engineering capabilities for customized applications.

We serve a variety of industries around the world, including medical, pharmaceutical, automotive, textile, consumer products, aerospace, food and beverage, and more.

Our products utilize proven sensor, electronics, and material technologies, and all carry a 3-year warranty. All engineering and manufacturing are performed in our Copiague, New York facility. Gauges and sensors are calibrated in our laboratory to NIST standards.



## Automotive

- Ergonomics
- Airbag deployment
- Buttons & switches
- Torque tool calibration
- Switch testing
- Seat belt retractors
- Fastener torque testing
- Windshield wiper arm force

## Medical / Pharmaceutical



- Blade sharpness
- Suture strength
- Catheter torque
- Stent strength
- Syringe insertion and extraction
- Burst testing
- Tube terminal pull strength
- Closure torque



## Electronics

- Crimp pull strength
- Peel strength
- Keypad testing
- Weld strength
- Wire terminal strength
- Component removal force
- Contact activation force
- Connector force

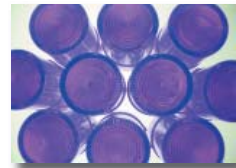


# ... in force and torque measurement



## General Manufacturing

- Spring testing
- Chain tension
- Push-out force in drive shafts
- Wire feed load mechanism



## Plastics & Chemicals

- Film bond strength
- Adhesion testing
- Foam compression
- Elastomer elongation testing
- Ceramics and plastics bending
- Peel testing

## Food & Beverage

- Fruit ripeness testing
- Puncture testing
- Package seal testing
- Package burst testing
- Bottle cap testing
- Food texture testing





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# Building a Mark-10 System



## Force Testing Systems

### Limit switches

Useful in applications where a repeating test requires travel to a set distance. Available on all motorized force test stands. Limit switches offer protection against crashes.

### Digital force gauge

Measures the force being produced on the test sample. Choose from Series BG, CG, EG, and MG gauges. All Mark-10 gauges mount to Mark-10 test stands without the need for any extra adapters.

### 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.



### Test stand

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

### Travel display

Useful in spring testing, elongation testing, and other applications where displacement is a relevant factor. Digital and mechanical models are available, depending on the test stand.

### Accessories (not shown)

Output cables, overload protection module, set point cable, and more.



## Torque Testing Systems

### Digital indicator

Displays the torque being produced on your test sample. Choose from the BGI universal gauge with choice of torque sensor, or the all-in-one MGT. Series STJ sensors and MGT gauges mount to Mark-10 torque test stands without the need for any extra adapters.

### Torque sensor

Measures the torque being produced on the test sample. Choose from a selection of different sensor types and capacities.

### 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.



### 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.

### Digital angle display (not shown)

Useful in spring testing, cap torque testing, and many other applications.

### Accessories (not shown)

Output cables, overload protection module, set point cable, and more.



# Digital Force and Torque Gauges



## Series BG / CG

The advanced Series BG and Series CG force gauges include sophisticated measurement capabilities, data outputs, computer control capabilities, and a long list of features and configurable settings. When used with Mark-10 motorized test stands, the BG or CG can stop test stand travel at operator-selectable set points and prevent force overload (requires optional items). Go / no go type testing can be accomplished with an optional plug-in high / low limits indicator.

### Features:

#### ■ Communication with external devices

RS-232, Mitutoyo, and analog outputs, dual set points with outputs, general purpose I/O for external device control

#### ■ Averaging mode

For obtaining average readings over time, particularly useful for peel testing

#### ■ Gauge Control Language

Full computer control of all gauge functions

#### ■ Customizable default configuration

Set filters, communication settings, measurement settings, mode of operation, and more

## Series EG

Series EG force gauges are ideal for compression and tension applications requiring accuracy and flexibility in the 0.12 lbF to 500 lbF range. Features include selectable units of measurement, automatic peak memory, simple pushbutton calibration, programmable automatic shutoff, initial status of units and mode of operation, permanent configuration memory, and optional outputs (RS-232, Mitutoyo, and analog). Reversible aluminum housing allows for hand-held use or test stand mounting.

### Features:

#### ■ Optional communications package

RS-232, Mitutoyo, analog outputs

#### ■ Push-button calibration

Simple and quick calibration procedure

#### ■ Peak memory recall

For tension and compression

#### ■ Selectable units of measurement

Displays lbF, kgF, or N

#### ■ Customizable default configuration

Set filters, communication settings, measurement settings, mode of operation, and more

# Digital Force and Torque Gauges



## Series MG / MGT

Series MG digital force and torque gauges offer an economical solution for push and pull testing of up to 500 lbf or torque testing up to 100 lbin. Rugged aluminum construction allows Series MG gauges to be hand-held or mounted to a test stand. Three pushbuttons allow the operator to easily select units of measurement, reset zero, and recall peak loads. Compact design makes the MG portable and flexible for a wide range of applications.

### Features:

- **Compact design**

Portable and flexible for a wide range of applications

- **Push-button calibration**

Simple and quick calibration procedure

- **Peak memory recall**

For tension and compression / clockwise and counterclockwise

- **Selectable units of measurement**

- **Reversible housing**

## Series CT

Series CT closure torque testers present a powerful, yet value priced solution for closure manufacturers, bottlers, food and beverage companies, and others. The tester features a solid aluminum housing and rugged construction for many years of service in laboratory or production environments. Adjustable posts effectively grip a broad range of container shapes and sizes, while a set of optional jaws are available as an alternative gripping method. The controls and electronics of the CT are based on Series MG gauges.

### Features:

- **Peak memory recall**

For application and removal measurements

- **Selectable units of measurement**

Displays lbin, kgFmm, or Ncm

- **Movable sample gripping posts**

- **Solid aluminum housing**

- **Push-button calibration**

Simple and quick calibration procedure



# Digital Force Gauges

## Specifications



	BG / BGI	CG	EG	MG / MGT / CT
Accuracy (% of full scale)	±0.2% ± 1 digit		±0.3% ± 1 digit	±0.5% ± 1 digit
Sampling rate (readings/s)	65		30	
Display rate (updates/s)	2.5 / 65 in peak mode		2.5 / 30 in peak mode	
Power	AC or rechargeable battery. Includes Intelligent Power Management System (IPM). IPM warns the user via a "LO BAT" indicator and then will power off the gauge			AC or non-rechargeable battery, includes IPM
Battery life	8-10 hours of continuous use per charge			30 hours of continuous use
Peak capture	Yes, in tension and compression (cw and ccw for torque gauges)			
Units of measurement	lbF, gF / kgF, and N (selectable)			
Outputs	Standard		Optional	N/A
RS-232	Fully configurable up to 9600 baud. Includes Gauge Control Language (GCL).		Fully configurable up to 9600 baud	N/A
Mitutoyo (Digimatic)	Serial BCD suitable for all Mitutoyo SPC-compatible devices			N/A
Analog	±1 VCD, ±0.25% of full scale at capacity. Positive for compression, negative for tension			N/A
General purpose I/O	Three open collector outputs and one input (utilizing Mitutoyo lines)			N/A
Set point	Three open collector lines (utilizing Mitutoyo lines)			N/A
Configurable Settings	Analog filters, digital filters, outputs selection, automatic output (through RS-232), automatic shutoff, initial (default), averaging mode, calibration		Outputs selection, automatic shutoff, initial (default), calibration	N/A
Load cell deflection	0.010 in [0.25 mm] at full capacity			
Safe overload	150% of full scale (display shows "----" at 110% and above)			
Weight (lb [kg])	BG012 - BG200: 0.95 [0.4] BG500: 1.12 [0.5] BGI: 0.9 [0.4]	All capacities: 1.8 [0.8]	EG012 - EG200: 0.95 [0.4] EG500: 1.12 [0.5]	MG025 - MG200: 0.7 [0.3] MG500: 0.87 [0.4] MGT: 1.8 [0.8] CT: 10.0 [4.5]
Included items	Carrying case, AC adapter/charger, rechargeable 7.2V battery, NIST-traceable certificate of calibration, attachments (BG / CG: chisel, cone, V-groove, hook, flat, extension rod, BGI: none)		EG / MG / MGT: Carrying case, AC adapter, non-rechargeable 9V battery, NIST-traceable certificate of calibration, hook, flat CT: AC adapter, non-rechargeable 9V battery, NIST-traceable certificate of calibration	
Environmental requirements	40°F - 100°F [5°C - 45°C], <96% humidity (non-condensating)			
Thermal effects	Zero: 0.03% of full scale/°C, Span: 0.01% of full scale/°C			
Housing construction	6061 aluminum, reversible halves for handheld operation or test stand mounting			

## Ordering Information

Below models use 110V power. For 220V operation, add suffix "E" to model number. Ex: CT50E

Model No.	Capacity				Resolution			
	lbin	ozin	kgFmm	Ncm	lbin	ozin	kgFmm	Ncm
CT12	12	-	140	135	0.01	-	0.1	0.1
CT50	50	-	580	570	0.05	-	0.5	0.5
CT100	100	-	1150	1150	0.1	-	1	1
CT001	Optional sample gripping jaws, pair							





# Digital Force Gauges



## Ordering Information (cont'd)

Model No.	Capacity				Resolution				
	lbF	gF	kgF	N	lbF	gF	kgF	N	
BG	BG012	0.12	50	-	0.5	0.00005	0.02	-	0.0002
	BG025	0.25	100	-	1	0.0001	0.05	-	0.0005
	BG05	0.5	250	-	2.5	0.0002	0.1	-	0.001
	BG2	2	-	1	10	0.001	-	0.0005	0.005
	BG5	5	-	2.5	25	0.002	-	0.001	0.01
	BG10	10	-	5	50	0.005	-	0.002	0.02
	BG20	20	-	10	100	0.01	-	0.005	0.05
	BG50	50	-	25	250	0.02	-	0.01	0.1
	BG100	100	-	50	500	0.05	-	0.02	0.2
	BG200	200	-	100	1000	0.1	-	0.05	0.5
CG	BG500	500	-	250	2500	0.2	-	0.1	1
	CG1000	1000	-	500	5000	0.5	-	0.2	2
EG	EG012	0.12	50	-	0.5	0.0001	0.05	-	0.0005
	EG025	0.25	100	-	1	0.0002	0.1	-	0.001
	EG05	0.5	250	-	2.5	0.0005	0.2	-	0.002
	EG2	2	-	1	10	0.002	-	0.001	0.01
	EG5	5	-	2.5	25	0.005	-	0.002	0.02
	EG10	10	-	5	50	0.01	-	0.005	0.05
	EG20	20	-	10	100	0.02	-	0.01	0.1
	EG50	50	-	25	250	0.05	-	0.02	0.2
	EG100	100	-	50	500	0.1	-	0.05	0.5
	EG200	200	-	100	1000	0.2	-	0.1	1
EG500	500	-	250	2500	0.5	-	0.2	2	
EGRS	Outputs option for any Series EG force gauge. Available at time of order or as a retrofit.								
MG	MG012	0.12	50	-	0.5	0.0001	0.05	-	0.0005
	MG025	0.25	100	-	1	0.0002	0.1	-	0.001
	MG05	0.5	250	-	2.5	0.0005	0.2	-	0.002
	MG2	2	-	1	10	0.002	-	0.001	0.01
	MG5	5	-	2.5	25	0.005	-	0.002	0.02
	MG10	10	-	5	50	0.01	-	0.005	0.05
	MG20	20	-	10	100	0.02	-	0.01	0.2
	MG50	50	-	25	250	0.05	-	0.02	0.1
	MG100	100	-	50	500	0.1	-	0.05	0.5
	MG200	200	-	100	1000	0.2	-	0.1	1
MG500	500	-	250	2500	0.5	-	0.2	2	
	<b>lbin</b>	<b>ozin</b>	<b>kgFmm</b>	<b>Ncm</b>	<b>lbin</b>	<b>ozin</b>	<b>kgFmm</b>	<b>Ncm</b>	
MGT	MGT10Z	-	10	7	7	-	0.01	0.005	0.005
	MGT20Z	-	20	14	14	-	0.02	0.01	0.01
	MGT50Z	-	50	36	35	-	0.05	0.05	0.05
	MGT12	12	-	140	135	0.01	-	0.1	0.1
	MGT50	50	-	580	570	0.05	-	0.5	0.5
	MGT100	100	-	1150	1150	0.1	-	1	1





# Universal Force / Torque Gauge



## Universal Force / Torque Gauge Model BGI

Test up to 10,000 lbF of force and 5,000 lbin of torque with interchangeable remote sensors

The innovative BGI Universal Force / Torque Gauge is the ultimate in force and torque measurement flexibility. With all the features of the Series BG, coupled with compatibility with a wide selection of external force and torque sensors, the BGI is a versatile solution for many force and torque testing applications. All sensors are fully interchangeable with the BGI, with no operator configuration required - simply plug and play.



# Universal Force / Torque Gauge



## BGI Torque Sensors

### 1 Series STJ

#### Universal Torque Sensors, fixed chuck

Measure bi-directional torque for a wide variety of applications. Contains a chuck for up to 1/2" diameter samples. The sensor can be used as a hand held device, or mounted to a torque test stand. Capacities available from 10 ozin to 100 lbin.

### 2 Series STH

#### Universal Torque Sensors, interchangeable chucks

A great solution for general bi-directional torque testing applications with several different sample sizes. Three interchangeable chuck capacities and bit holder are available. The STH has superb overload protection and is available in capacities from 10 ozin to 100 lbin.

### 3 Series STE

#### Wrench Extension Torque Sensors

Convert any wrench to a torque tool with this sensor, or use it as a component of a torque testing system. Capacities available from 20 lbin to 5,000 lbin.

### 4 Series STC

#### Static Torque Sensors

Calibrate torque tools, or use it as a component of a torque testing system. Tapped holes on every surface allow for easy mounting to a work bench or fixture. Capacities available from 10 ozin to 100 lbin.

### 5 Series STB

#### Closure Torque Sensors

Ideal for testing torque on bottle caps and containers. Reversible jaws or movable posts, depending on model, effectively accommodate a variety of shapes and sizes. Capacities available from 10 ozin to 100 lbin.

## BGI Force Sensors

### 6 Series SS

#### Tension / Compression Sensors

A rugged sensor for measuring tensile and compressive force of up to 10,000 lbF. Durable S-Beam design with thread on two sides allows for many applications and setups. Solid steel construction ensures many years of use.

### 7 Series SSM

#### Inline Tension / Compression Sensors

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

### 8 Series SJR

#### Miniature Tension / Compression Sensors

Extremely compact force measurement sensor for tensile and compressive loads in applications with limited space. Capacities available from 0.25 lb to 100 lbF. The sensors include threaded holes on two sides for the mounting of attachments or implements.

### 9 Series SBC

#### Compact Compression Sensors

Button type sensor for compressive loads of up to 10,000 lbF. Compact and rugged, the SBC is ideal for heavy duty applications with space constraints.

### 10 Series SHP

#### Pull / Tension Sensors

Fully enclosed type load cell for pull testing. Useful in ergonomics testing, workplace safety testing, and general lifting or push/pull requirements. For up to 500 lbF of force.



# Universal Force / Torque Gauge

## Specifications and Ordering Information - BGI Force Sensors

Model No.	Capacity					Resolution					Accuracy (% of full scale)*	Safe Overload (% of full scale)	
	lbF	gF	kgF	N	kN	lbF	gF	kgF	N	kN			
SS	SS50	50	-	25	250	-	0.02	-	0.01	0.1	-	±0.15	150
	SS100	100	-	50	500	-	0.05	-	0.02	0.2	-		
	SS200	200	-	100	1000	-	0.1	-	0.05	0.5	-		
	SS500	500	-	250	2500	-	0.2	-	0.1	1	-		
	SS1000	1000	-	500	5000	-	0.5	-	0.2	2	-		
	SS2000	2000	-	1000	10000	-	1	-	0.5	5	-		
	SS5000	5000	-	2500	-	25	2	-	1	-	0.01		
SS10000	10000	-	5000	-	50	5	-	2	-	0.02			
SSM	SSM025	0.25	100	-	1	-	0.0001	0.05	-	0.0005	-	±0.15	200
	SSM05	0.5	250	-	2.5	-	0.0002	0.1	-	0.001	-		
	SSM2	2	-	1	10	-	0.001	-	0.0005	0.005	-		
	SSM5	5	-	2.5	25	-	0.002	-	0.001	0.01	-		
	SSM10	10	-	5	50	-	0.005	-	0.002	0.02	-		150
	SSM20	20	-	10	100	-	0.01	-	0.005	0.05	-		
	SSM50	50	-	25	250	-	0.02	-	0.01	0.1	-		
	SSM100	100	-	50	500	-	0.1	-	0.02	0.5	-		
SJR	SJR025	0.25	100	-	1	-	0.0001	0.05	-	0.0005	-	±0.2	1000
	SJR05	0.5	250	-	2.5	-	0.0002	0.1	-	0.001	-		
	SJR2	2	-	1	10	-	0.001	-	0.0005	0.005	-		
	SJR5	5	-	2.5	25	-	0.002	-	0.001	0.01	-		
	SJR10	10	-	5	50	-	0.005	-	0.002	0.02	-		
	SJR20	20	-	10	100	-	0.01	-	0.005	0.05	-		
	SJR50	50	-	25	250	-	0.02	-	0.01	0.1	-		1000 / 200**
	SJR100	100	-	50	500	-	0.1	-	0.05	0.5	-		
SBC	SBC100	100	-	50	500	-	0.05	-	0.02	0.2	-	±0.5	150
	SBC200	200	-	100	1000	-	0.1	-	0.02	0.5	-		
	SBC500	500	-	250	2500	-	0.2	-	0.1	1	-		
	SBC1000	1000	-	500	5000	-	0.5	-	0.2	2	-		
	SBC2000	2000	-	1000	10000	-	1	-	0.5	5	-		
	SBC5000	5000	-	2500	-	25	2	-	1	-	0.01		
	SBC10000	10000	-	5000	-	50	5	-	2	-	0.02		
SHP	SHP500	500	-	250	2500	-	0.2	-	0.1	1	-	±0.15	150

All sensors include a cable and connector for the BGI force / torque gauge and a NIST-traceable certificate of calibration.

\* Accuracy refers to the sensor only. Total accuracy includes BGI (±0.1). For example, the total accuracy of the SS50 sensor equals ±0.15 + ±0.1 = ±0.25.

\*\* 1000 if used in compression and tension, 200 if used in compression only

# Universal Force / Torque Gauge



## Specifications and Ordering Information - BGI Torque Sensors

Model No.	Capacity				Resolution				Accuracy (% of full scale)*	Safe Overload (% of full scale)	
	ozin	lbin	kgFmm	Ncm	ozin	lbin	kgFmm	Ncm			
STJ	STJ10Z	10	-	7	7	0.01	-	0.005	0.005	±0.35	300
	STJ20Z	20	-	14	14	0.02	-	0.01	0.01		
	STJ50Z	50	-	36	35	0.05	-	0.05	0.05		
	STJ12	-	12	140	135	-	0.01	0.1	0.1		150
	STJ50	-	50	580	570	-	0.05	0.5	0.5		
	STJ100	-	100	1150	1150	-	0.1	1	1		
STH	STH10Z	10	-	7	7	0.01	-	0.005	0.005	±0.15	300
	STH20Z	20	-	14	14	0.02	-	0.01	0.01		
	STH50Z	50	-	36	35	0.05	-	0.05	0.05		
	STH12	-	12	140	135	-	0.01	0.1	0.1		200
	STH50	-	50	580	570	-	0.05	0.5	0.5		
	STH100	-	100	1150	1150	-	0.1	1	1		
STE	STE20	-	20	230	220	-	0.02	0.2	0.2	±0.6	150
	STE50	-	50	580	570	-	0.05	0.5	0.5		
	STE100	-	100	1150	1150	-	0.1	1	1		
	STE200	-	200	2300	2200	-	0.2	2	2		
	STE400	-	400	4600	4500	-	0.5	5	5		
	STE1000	-	1000	11500	11000	-	1	10	10		
	STE5000	-	5000	55 kgFm	550 Nm	-	5	0.05 kgFm	0.5 Nm		
STC	STC10Z	10	-	7	7	0.01	-	0.005	0.005	±0.35	300
	STC20Z	20	-	14	14	0.02	-	0.01	0.01		
	STC50Z	50	-	36	35	0.05	-	0.05	0.05		
	STC12	-	12	140	135	-	0.01	0.1	0.1		150
	STC50	-	50	580	570	-	0.05	0.5	0.5		
	STC100	-	100	1150	1150	-	0.1	1	1		
STB	STB10Z	10	-	7	7	0.01	-	0.005	0.005	±0.7	300
	STB20Z	20	-	14	14	0.02	-	0.01	0.01		
	STB50Z	50	-	36	35	0.05	-	0.05	0.05		
	STB12	-	12	140	135	-	0.01	0.1	0.1		150
	STB50	-	50	580	570	-	0.05	0.5	0.5		
	STB100	-	100	1150	1150	-	0.1	1	1		

All sensors include a NIST-traceable certificate of calibration.

\* Accuracy refers to the sensor only. Total accuracy includes the BGI's accuracy ( $\pm 0.1$ ). For example, the total accuracy of the STJ50 sensor is  $\pm 0.35 + \pm 0.1 = \pm 0.45$ .



# Manual Test Stands



ES20

ES10

## 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**

For spring testing, rubber and polymer testing, and more. Digital model displays in and mm.

■ **Compact size**

Portable, small footprint.



## Model ES30

Force, Manual, 200 lbF / 1000 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 operation 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 6" digital travel display**

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

■ **Optional column extensions**

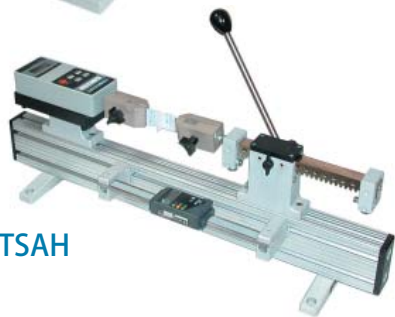
For testing long samples. Available in lengths of 6" [152 mm], 12" [305 mm], and 24" [610 mm]. Custom lengths also available.



# Manual Test Stands



TSA



TSAH

## Model TSA / TSAH

Force, Manual, 750 lbF / 3750 N

The TSA is a rugged stand for heavy duty testing applications requiring quick action. Lever operation allows the operator to produce 750 lb 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" digital travel display**

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

## Model TSB

Force, Manual, 100 lbF / 500 N

The TSB is an economical 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" digital travel display**

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

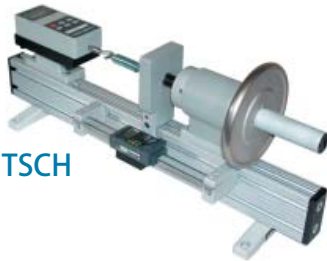




# Manual Test Stands



TSC



TSCH

## Model TSC / TSCH

Force, Manual, 1000 lbf / 5000 N

The TSC is a rugged stand for heavy duty testing requirements requiring precision action and fine control of travel. 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 (TSC) or mounting legs (TSCH) allow for a range of custom mounting configurations.

### Features:

■ **Inline hand wheel operation**

Precision Acme screw and nut provide smooth operation over the entire 1000 lbf range. Inline force minimizes column bending during testing.

■ **Modular design**

Adjustable components accommodate a wide range of testing configurations.

■ **Optional 6" digital travel display**

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

## Model TSF / TSFH

Force, Manual, 1000 lbf / 5000 N

The TSF is a rugged stand with an exceptionally strong and 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 1000 lb range. 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**

Convenient loading method makes testing easier and more efficient.

■ **Exceptionally strong column**

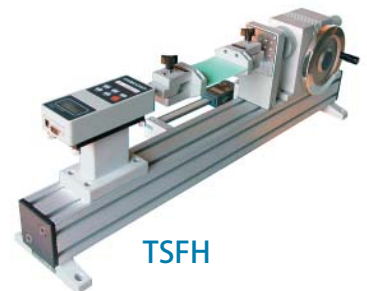
Rugged 3" x 3" column is durable and stiff, ideal for spring testing. Inline force minimizes column bending during testing.

■ **Optional 6" digital travel display**

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



TSF



TSFH



# Manual Test Stands



## Model TST / TSTH

Torque, Manual, 100 lbin / 11.3 Nm

The TST is ideal for a wide variety of torque testing applications up to 100 lbin, including closure torque testing, fastener torque testing, and more. The TST's versatile, modular design allows it to be configured for a variety of torque sensors and gripping fixtures. 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 table with tapped holes for grip and custom fixture mounting and a resettable angle indicator. Available in vertical and horizontal configurations.

The TSTM, a motorized version of the TST, is also available (see following pages).



TST

### Features:

- Smooth hand wheel operation

- Lever operated slider

For simply and quickly engaging and disengaging samples.

- ▶ Fixture mounting table with angle indicator

A steel table with threaded holes is provided for grip or fixture mounting. A resettable analog angle indicator is also provided, with resolution of 2°.

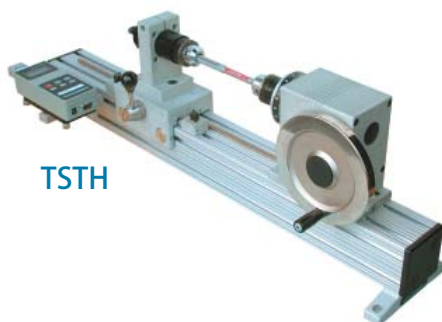


- ▶ Optional digital angle indicator

Useful in torsion spring testing, bottle cap testing, catheter testing, and more.



- Custom column lengths available



TSTH

# Motorized Test Stands



## Model ESM

Force, Motorized, 200 lbF / 1000 N

The ESM motorized test stand is a versatile and precision testing solution for most compression and tensile testing applications up to 200 lb. It can accept a wide variety of sample shapes and sizes and can be configured for many applications due to its modular design.

Speed is adjustable and a remote control unit provides added safety during testing. Other features include a manual fine adjustment knob and a stepper motor that prevents speed variation with load, making testing precise and repeatable.

When used with a Series BG force gauge, the ESM can stop travel at user selectable force set points (requires optional set point cable). The optional overload protection module prevents force gauge overload.



## Features:

### ■ Broad speed range

Set the speed from 0.5 - 13 in [13 - 330 mm]/min. Custom ranges available.

### ■ No speed variation with load

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



### ■ 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" digital travel display

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



### ◀ Optional limit switch kit

Set of upper and lower adjustable solid state limit switches. Repeatable to within 0.001" [0.03 mm].

### ■ Optional column extensions

For testing long samples. Available in lengths of 6" [152 mm], 12" [305 mm], and 24" [610 mm]. Custom lengths also available.

# Motorized Test Stands



## Model ESMH

Force, Motorized, 50 lbf / 250 N



The ESMH is a universal horizontal tester designed for tension, compression, and friction testing.

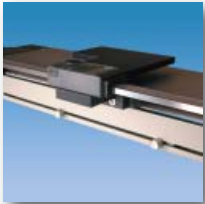
The tester features integrated limit switches for repetitive testing and other requirements. Speed is adjustable and a remote control unit provides added safety during testing. Other features include a stepper motor that prevents speed variation with load, making testing precise and repeatable.

When used with a Series BG force gauge, the ESMH can stop travel at user selectable force set points (requires optional set point cable). The optional overload protection module prevents force gauge overload.

## Features:

### ■ Broad speed range

Set the speed from 0.2 - 50" [5 - 1270 mm]/min. Custom ranges available.



### ■ No speed variation with load

Stepper motor control eliminates any speed variation, regardless of the force exerted.

### ◀ Integrated limit switches

Set of adjustable solid state limit switches. Repeatable to within 0.001" [0.03 mm].



### ◀ Optional 12" digital travel display

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

### ■ Fully enclosed design

Protects internal components and allows for friction testing on the aluminum top surface.

### ■ Removable loading plate

A removable aluminum loading table with threaded holes is provided for grip or fixture mounting.



# Motorized Test Stands



TSFM500



## Model TSFM500 / TSFM500H

Force, Motorized, 500 lbF / 2500 N

The TSFM500 is designed for compression and tension testing of springs, packaging, metals, fabrics, and other items requiring up to 500 lb of force. Generous clearance and throat depth accommodate a broad range of sample shapes and sizes. The TSFM500's durable and rigid column minimizes bend, making it particularly well suited for precision spring testing.

Speed is adjustable and a remote control unit provides added safety during testing. Other features include a manual fine adjustment knob and a stepper motor that prevents speed variation with load, making testing precise and repeatable.

When used with a Series BG or CG force gauge, the stand can stop travel at user selectable force set points (requires optional set point cable). The optional overload protection module prevents force gauge overload.

Available in vertical and horizontal configurations.

### Features:

#### ■ Broad speed range

Set the speed from 0.2 - 5.5" [5 - 140 mm]/min. Custom ranges available.

#### ■ No speed variation with load

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

#### ■ Removable base

The entire base may be removed for alternative mounting in a larger testing system.



#### ◀ Optional 6" digital travel display

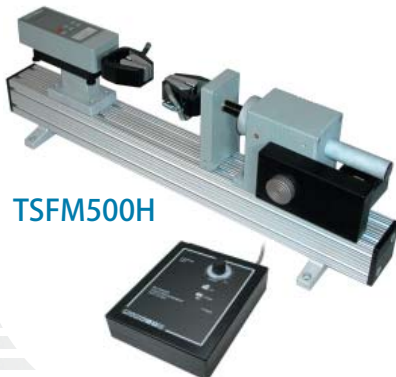
Useful in spring testing, rubber and polymer testing, and more.

#### ◀ Optional limit switch kit

Set of upper and lower adjustable solid state limit switches. Repeatable to within 0.001" [0.03 mm].



#### ■ Custom column lengths available



TSFM500H

# Motorized Test Stands



## Model TSTM / TSTMH

Torque, Motorized, 100 lbin / 11.3 Nm

The TSTM Motorized Torque Measurement Test Stand is ideal for a wide variety of torque testing applications up to 100 lbin, including closure torque testing, fastener torque testing, and more. Motorized clockwise and counterclockwise rotation allows for highly precise and repeatable tests. Versatile modular design allows the stand to be configured for a variety of torque sensors and gripping fixtures while 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 a resettable angle indicator.

When used with a BGI force/torque gauge and sensor, the TSTM can stop rotation at user selectable torque set points (requires optional set point cable). The optional overload protection module prevents force gauge overload.

Available in vertical and horizontal configurations. Manually operated torque stands are also available.

### Features:

#### ■ Broad speed range

Set the rotational speed from 0.3 - 8.6 RPM (4 - 52°/s). Custom ranges available.

#### ■ No speed variation with load

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

#### ▶ Fixture mounting table with angle indicator

A steel table with threaded holes is provided for grip or fixture mounting. A resettable analog angle indicator is also provided, with resolution of 2°.



#### ▶ Optional digital angle indicator

Useful in torsion spring testing, bottle cap testing, catheter testing, and more. The indicator has 0.1° resolution and includes a “zero” button and backlight. Accurate to ±0.7°.

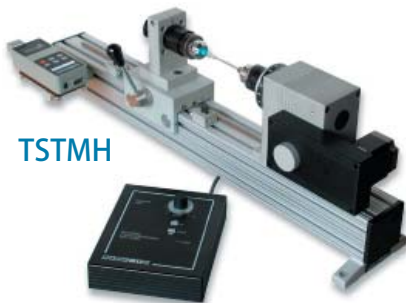


#### ■ Custom column lengths

We can modify the column height for special applications.



TSTM



TSTMH



# Test Stands

## Specifications

Model	Capacity lbF [N]	Maximum travel <sup>1</sup> in [mm]	Loading method	Travel rate in [mm]	Daylight <sup>2</sup> in [mm]	Included accessories
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 [1000]	13 [330]	Side-mounted hand wheel	0.05 [1.3] / wheel rev.	14 [356] <sup>3</sup>	Tool kit <sup>8</sup> , extension rod (G1031-1), small hook (G1028), medium hook (G1038), #10-32 coupler (G1039), 2" compression plate (G1009)
TSA	750 [3750]	w/stops: 2.75 [70]	Rack & pinion, lever can be positioned in 30° increments	3.00 [76.2] / lever rev.	10.5 [267] <sup>3</sup>	Tool kit <sup>8</sup> , medium hook (G1038), large hook (G1035), 2" compression plate (G1009)
TSAH		w/o stops: 6 [152]			14.5 [368] <sup>3</sup>	
TSB	100 [500]				13 [330]	-
TSC	1000 [5000]	3.5 [89]	Inline hand wheel	0.10 [25.4] / wheel rev.	10 [254] <sup>3</sup>	Tool kit <sup>8</sup> , medium hook (G1038), large hook (G1035), 2" compression plate (G1009)
TSCH					13 [330] <sup>3</sup>	
TSF			4 [102]	Side-mounted hand wheel	0.013 [0.34] / wheel rev.	14 [356] <sup>3</sup>
TSFH	16.5 [419] <sup>3</sup>					
TSFM500	500 [2500]	Motorized				0.2 - 5.5 [5 - 140] / min
TSFM500H			16.5 [419] <sup>3</sup>			
ESM	200 [1000]	13 [330]	Motorized	0.5 - 13 [13 - 300] / min	14 [356] <sup>3</sup>	Tool kit <sup>8</sup> , extension rod (G1031-1), small hook (G1028), medium hook (G1038), #10-32 coupler (G1039), 2" compression plate (G1009)
ESMH	50 [250]			0.2 - 50 [5 - 1270] / min	13 [330]	
TST	100 lbin [11.3 Nm]	Angular travel: ∞, at 2° resolution	Side-mounted hand wheel	12° / wheel rev.	15 [381] <sup>3,7</sup>	Tool kit <sup>8</sup>
TSTH					16 [406] <sup>3,7</sup>	
TSTM		Slider travel: 15.5 [394] <sup>6</sup>	Motorized	0.3 - 8.6 RPM [4 - 52° / s]	13 [330] <sup>3,7</sup>	
TSTMH					16 [406] <sup>3,7</sup>	
		Slider rate: 1.047 [26.6] / lever rev. <sup>6</sup>				

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. This distance will be less if grips or fixtures are used. The numbers in this chart are approximate. If your test sample size is very close to the daylight figure above (or daylight less grip(s) or fixture(s)), a column extension may be necessary.

3. Longer columns available.

4. All force test stands include force gauge mounting screws.

5. All torque test stands include an adapter to secure the Series STJ torque sensor during testing. Adapters are also available for other torque sensors.

6. The slider is intended for engaging and disengaging samples. The torque sensor adapter is mounted to the slider.

7. With use of a Series STJ torque sensor.

8. Tool kit consists of a set of Allen keys for test stand adjustments, assembly, and disassembly.



## Ordering Information

Test Stand Model No.	Description
Optional Item Part No.	
ES10	Test stand, lever operated, vertical, 100 lbF
ES20	Test stand, hand wheel operated, vertical, 100 lbF
ES001	Dial indicator kit for ES10 / ES20, 1" x 0.001"
ES002	Digital indicator kit for ES10 / ES20, 1" x 0.0005" / 25 x 0.01 mm
ES30	Test stand, hand wheel operated, 200 lbF
ESM001	Digital travel display for ESM / ES30, 6" x 0.0005" [150 mm x 0.01]
TSA	Test stand, lever operated, vertical, 750 lbF
TSAH	Test stand, lever operated, horizontal, 750 lbF
TSA001	Digital travel display for TSA / TSAH, 6" x 0.0005" [150 mm x 0.01]
TSA002	Horizontal / wall mounting kit for TSA / TSC
TSB	Test stand, lever operated, vertical, 100 lbF
TSB001	Digital travel display for TSB, 6" x 0.0005" [150 mm x 0.01]
TSB002	Horizontal / wall mounting kit for TSB
TSB003	Travel stops kit for TSB
TSC	Test stand, inline hand wheel operated, vertical, 1000 lbF
TSCH	Test stand, inline hand wheel operated, horizontal, 1000 lbF
TSC001	Digital travel display for TSC / TSCH, 6" x 0.0005" [150 mm x 0.01]
TSA002	Horizontal / wall mounting kit for TSA / TSC
TSF	Test stand, side-mounted hand wheel operated, vertical, 1000 lbF
TSFH	Test stand, side-mounted hand wheel operated, horizontal, 1000 lbF
TSFM500*	Test stand, motorized, vertical, 500 lbF, 110V
TSFM500H*	Test stand, motorized, horizontal, 500 lbF, 110V
TSF001	Digital travel display for Series TSF test stands, 6" x 0.0005" [150 mm x 0.01]
TSF002	Horizontal / wall mounting kit for TSF / TST / TSTM
TSFM002	Limit switch kit for TSFM500 / TSFM500H
ESM*	Test stand, motorized, vertical, 200 lbF, 110V
ESM001	Digital travel display for ESM / ES30, 6" x 0.0005" [150 mm x 0.01]
ESM002	Limit switch kit for ESM
ESM003-1	Column extension for ESM/ES30, 6"
ESM003-2	Column extension for ESM/ES30, 12"
ESM003-3	Column extension for ESM/ES30, 24"
ESMH*	Test stand, motorized, horizontal, 50 lbF, 110V
ESMH001	Digital travel display for ESMH, 12" x 0.0005" [330 mm x 0.01]
TST	Test stand, side-mounted hand wheel operated, vertical, 100 lbin
TSTH	Test stand, side-mounted hand wheel operated, horizontal, 100 lbin
TSTM*	Test stand, motorized, vertical, 100 lbin, 110V
TSTMH*	Test stand, motorized, horizontal, 100 lbin, 110V
TST001	Digital angle indicator for Series TST test stands, 0.1° resolution
TSF002	Horizontal / wall mounting kit for TSF / TST / TSTM

\* Add suffix E for 220V operation. Example: ESME



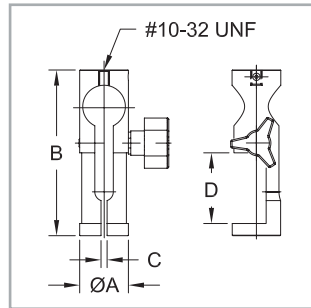
# Grips & Attachments

► All dimensions presented as IN [MM]

## Wire terminal grips

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

Model No.	Capacity lbF [N]	Weight lb [kg]	ØA	B	C	D
G1001					0 - 0.125 [0 - 3.1]	
G1001-1	200 [1000]	0.29 [0.13]	1.00 [25.4]	3.40 [86.4]	0.125 - 0.25 [3.1 - 6.3]	1.45 [36.8]
G1001-2					0.25 - 0.375 [6.3 - 9.5]	

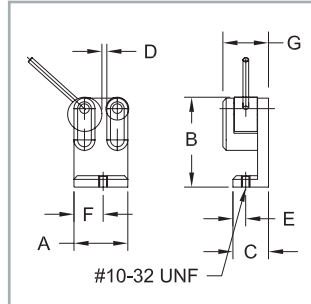


## Dual roller grip

For securing the ends of wire, cable, and tubing samples for pull testing. Engaging and disengaging samples is quick and easy with a an efficient cam design and convenient side slot for sample insertion. Steel rollers are serrated for good grip.

Model No.	Capacity lbF [N]	Weight lb [kg]
G1002	200 [1000]	0.19 [0.09]

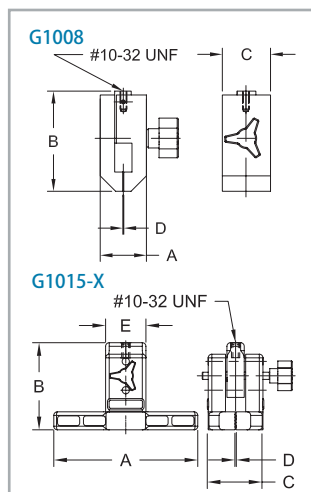
A	B	C	D	E	F	G
1.18 [30.0]	2.00 [50.8]	0.75 [19.1]	0 - 0.25 [0 - 6.3]	0.25 [6.4]	0.64 [16.3]	1.0 [25.4]



## Film and paper grips

For gripping film, paper, labels, packaging, 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		0.31 [0.14]	1.60 [40.6]	2.50 [63.5]	1.00 [25.4]	0 - 0.15 [0 - 3.8]
G1015-1	100 [500]	0.57 [0.26]	3.00 [76.2]			
G1015-2		0.67 [0.30]	5.00 [127.0]	3.00 [76.2]	1.90 [48.3]	0 - 0.50 [0 - 12.7]
G1015-3		0.77 [0.35]	7.00 [177.8]			





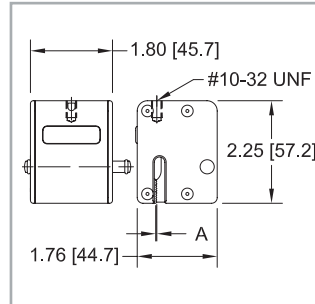
# Grips & Attachments



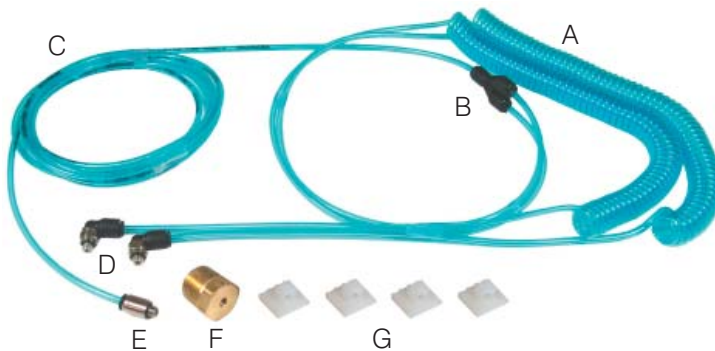
## Pneumatic film and paper grip

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 lb 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.

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



The optional air connection kit consists of the following:



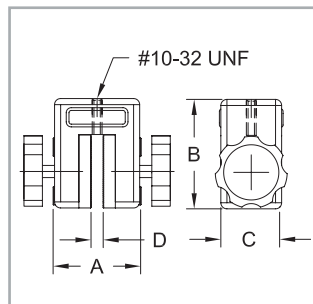
- A. Coiled tubing, 1/8" OD, 1/16" ID, 8" retracted length (qty. 2)
- B. Y-splitter (qty. 1)
- C. Straight tubing, 1/8" OD, 1/16" ID, 5' length (qty. 1)
- D. Elbow fitting, tubing to #10-32M (qty. 1)
- E. Straight fitting, tubing to #10-32M (qty. 1)
- F. Thread adapter, #10-32F to 1/4" NPT M (qty. 1)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

Model No.	Description
AC1019	Air connection kit for G1046

## Parallel jaw grip

For general pull testing applications. Manually tightened serrated jaws may be individually adjusted.

Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D
G1013	200 [1000]	0.65 [0.29]	1.75 [44.5]	2.25 [57.2]	1.25 [31.8]	0 - 0.25 [0 - 6.3]





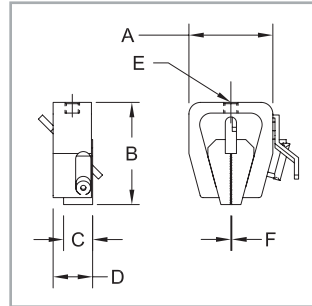
# Grips & Attachments

## Wedge grips

For a variety of tensile testing requirements. These heavy duty self-tightening grips can accept various sample thicknesses. Serrated jaws are easily opened by a spring loaded lever.

Model No.	Capacity lbF [kN]	Weight lb [kg]
G1012	200 [1]	0.30 [0.14]
G1012-1	2000 [10]	0.90 [0.41]

Model No.	A	B	C	D	E	F
G1012	1.65 [41.9]	2.02 [51.3]	0.6 [15.2]	0.83 [21.1]	#10-32 UNF	0 - 0.17 [0 - 4.3]
G1012-1	2.75 [69.9]	3.27 [83.1]	1.0 [25.4]	1.38 [35.1]	5/16-18 UNC	0 - 0.39 [0 - 9.9]



## Padded attachments

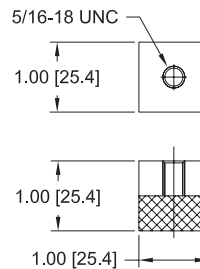
For applications in physical therapy and ergonomics, including muscle strength testing, job task requirements, and more.

Model No.	Capacity lbF [kN]	Weight lb [kg]
G1019	500 [2.5]	0.03 [0.01]
G1020	500 [2.5]	0.13 [0.06]
G1021	500 [2.5]	0.25 [0.11]



◀ Supplied with a 5/16-18M to #10-32F adapter

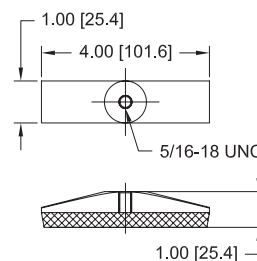
### G1019



### G1019



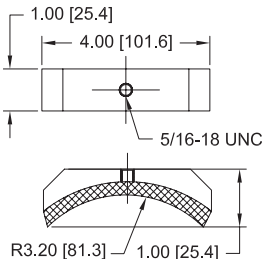
### G1020



### G1020



### G1021



### G1021



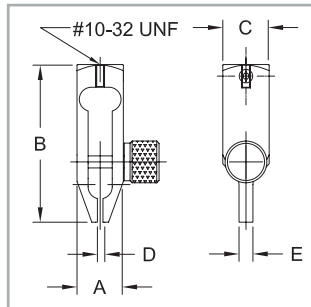
# Grips & Attachments



## 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.

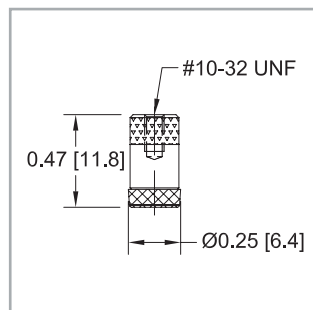
Model No.	Capacity lbF [N]	Weight lb [kg]	A	B	C	D
G1003	30 [150]	0.05 [0.02]	0.5 [12.7]	1.7 [43.2]	0.5 [12.7]	0 - 0.07 [0 - 1.8]



## Rubber tip

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

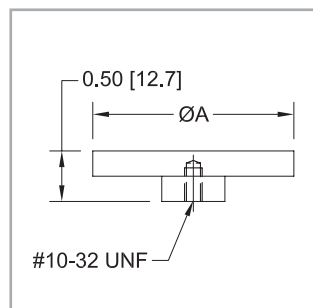
Model No.	Capacity lbF [N]	Weight lb [kg]
G1011	50 [250]	0.01 [0.004]



## Compression plates

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

Model No.	Capacity lbF [N]	Weight lb [kg]	ØA
G1009	200 [1000]	0.08 [0.04]	2.0 [51.0]
G1009-1	500 [2500]	0.27 [0.12]	3.0 [76.2]



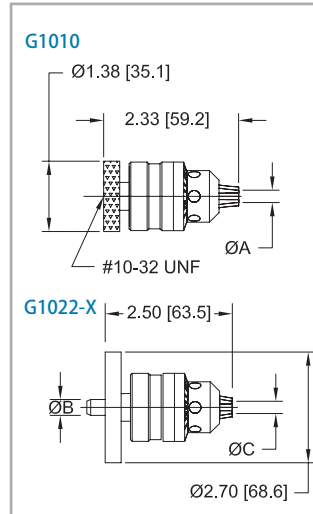


# Grips & Attachments

## Chuck grips

For securing round samples, fixtures, or bits. Although both models may be used in force and torque applications, the G1010 is typically used in force measurement applications, while the G1022 is typically mounted to Series TST torque test stands for torque measurement applications.

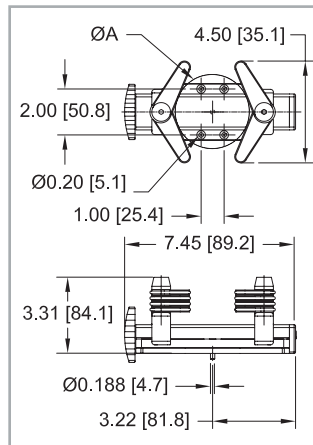
Model No.	Capacity	Weight lb [kg]	ØA	ØB	ØC
G1010	30 lb [150 N]	0.35 [0.16]	0.062 - 0.375 [1.6 - 9.5]	N/A	N/A
G1022-1	100 lbin [11.3 Nm]	0.50 [0.23]	N/A	0.188 [4.7]	0.028 - 0.250 [0.7 - 6.3]
G1022-2					0.062 - 0.375 [1.6 - 9.5]
G1022-3					0.078 - 0.500 [2 - 12.7]



## Universal bottle grip

For gripping bottles and containers for closure torque testing. Eight rubber edged gripping arms secure a wide range of sample shapes and sizes and can be individually positioned at angles of up to 180°. Mounts directly to Series TST torque test stands or force test stands (for such applications as top load testing).

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

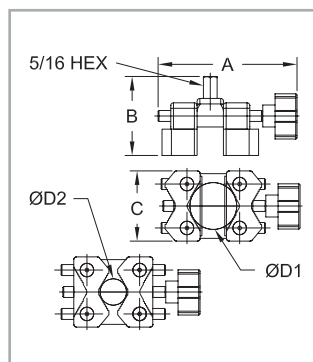


## Universal cap grip

For gripping bottle and container caps in closure torque testing. Serrated, reversible aluminum jaws effectively grip a wide range of sample shapes and sizes. Mounts directly to Series STH and STJ torque sensors, and Mark-10 force test stands.

Model No.	Capacity lbin [Nm]	Weight lb [kg]
G1053	100 [11.3]	0.39 [0.18]

A	B	C	ØD1*	ØD2*
3.1 [78.7]	2.0 [50.8]	1.6 [40.6]	1.16 - 1.80 [29.5 - 45.7]	0.65 - 1.29 [16.5 - 32.8]



\* Jaws must be reversed to switch from ØD1 to ØD2

# Grips & Attachments



## Series STH attachments

Jacobs chucks and bit holder mount to the STH to secure a fixture, bit, or sample during torque testing.

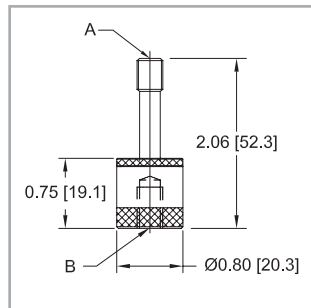
Model No.	Capacity lb <sub>in</sub> [Nm]	Weight lb [kg]	A	ØB	ØC
G1016-1	100 [11.3]	0.26 [0.12]	2.90 [73.7]	0.188 [4.7]	0.028 - 0.250 [0.7 - 6.3]
G1016-2		0.36 [0.16]	3.16 [80.3]		0.062 - 0.375 [1.6 - 9.5]
G1016-3		0.67 [0.30]	3.73 [94.7]		0.078 - 0.500 [2 - 12.7]
G1017		0.11 [0.05]	2.33 [59.2]		1/4" hex



## Swivel adapters

For use between any grip and force gauge to provide a swiveling action for proper sample alignment.

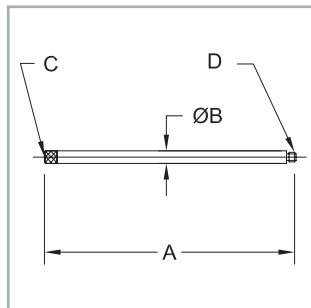
Model No.	Capacity lb <sub>F</sub> [N]	Weight lb [kg]	A	B
G1018-1	200 [1000]	0.12 [0.05]	#10-32M	#10-32F
G1018-2	500 [2500]	0.27 [0.12]	5/16-18M	5/16-18F



## Extension rods

For use between a force gauge and another attachment, such as a hook or compression plate.

Model No.	Capacity lb <sub>F</sub> [N]	Weight lb [kg]	A	ØB	C	D
G1024	200 [1000]	0.01 [0.005]	5.0 [127.0]	0.25 [6.4]	#10-32F	#10-32M
G1024-1		0.02 [0.009]	2.0 [50.8]			
G1024-2		0.05 [0.023]	1.0 [25.4]			
G1031	500 [2500]	0.05 [0.023]	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]			



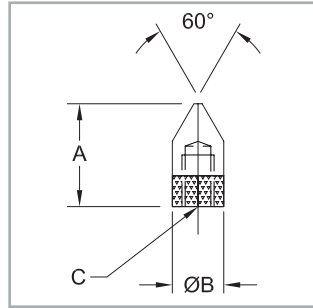


# Grips & Attachments

## Chisel points

For compressing or puncturing a variety of samples.

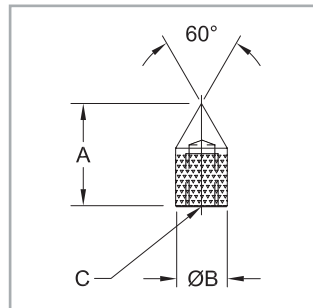
Model No.	Capacity lbF [N]	Weight lb [kg]	A	ØB	C
G1025	200 [1000]	0.003 [0.001]	0.50 [12.7]	0.25 [6.4]	#10-32F
G1032	500 [2500]	0.040 [0.018]	1.00 [25.4]	0.50 [12.7]	5/16-18F



## Cone points

For various compression tests.

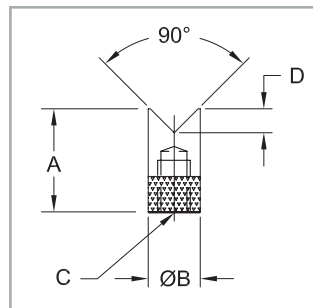
Model No.	Capacity lbF [N]	Weight lb [kg]	A	ØB	C
G1026	200 [1000]	0.003 [0.001]	0.50 [12.7]	0.25 [6.4]	#10-32F
G1033	500 [2500]	0.030 [0.014]	1.00 [25.4]	0.50 [12.7]	5/16-18F



## 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 [1000]	0.004 [0.002]	0.50 [12.7]	0.25 [6.4]	#10-32F	0.08 [2.0]
G1034	500 [2500]	0.040 [0.018]	1.00 [25.4]	0.50 [12.7]	5/16-18F	0.25 [6.4]



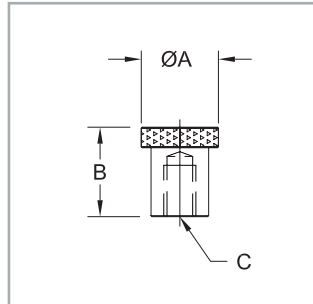
# Grips & Attachments



## Flat heads

For compression testing of buttons, membrane switches, etc.

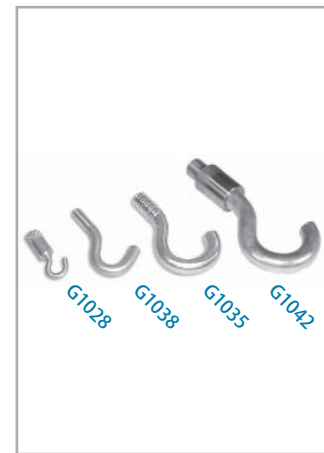
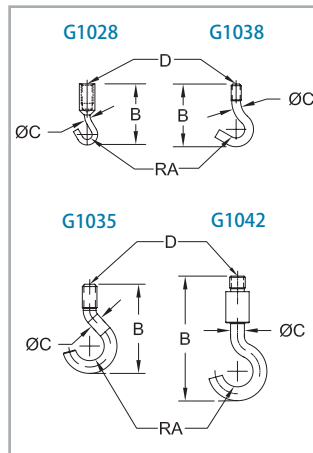
Model No.	Capacity lbF [N]	Weight lb [kg]	ØA	B	C
G1029	200 [1000]	0.01 [0.005]	0.5 [12.7]	0.5 [12.7]	#10-32F
G1036	500 [2500]	0.06 [0.027]	0.75 [19.1]	0.87 [22.1]	5/16-18F



## Hooks

For tensile testing of various samples.

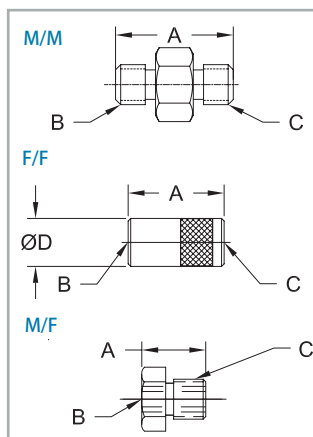
Model No.	Capacity lbF [N]	Weight	RA	B	ØC	D
G1028	20 [100]	0.010 [0.005]	0.05 [1.3]	1.00 [25.4]	0.10 [2.5]	#10-32F
G1038	200 [1000]	0.020 [0.009]	0.20 [5.1]	1.50 [38.1]	0.19 [4.8]	#10-32M
G1035	500 [2500]	0.050 [0.023]	0.30 [7.6]	1.90 [48.3]	0.28 [7.1]	5/16-18M
G1042	1000 [4500]	0.320 [0.145]	0.5 [12.7]	4.10 [104.1]	0.45 [11.4]	1/2-20M



## Thread adapters & couplings

For use between force gauge shafts, grips, and/or attachments.

Model No.	Capacity lbF [N]	A	B	C
G1050	100 [500]	0.75 [19.1]	#4-40M	#10-32F
G1051		0.60 [15.2]	#4-40M	#10-32M
G1039	200 [1000]	0.75 [19.1]	#10-32F	#10-32F
G1030		0.50 [12.7]	5/16-18M	#10-32F
G1047		0.75 [19.1]	#10-32M	M4F
G1048		0.75 [19.1]	M4M	#10-32F
G1040	500 [2500]	1.00 [25.4]	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
G1041	1000 [5000] or 500 [2500]*	1.00 [25.4]	1/2-20M	5/16-18M



\*1000 [5000] when used in compression, 500 [2500] when used in tension



# Accessories

## 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 BG/EG gauges
AC1003	Double handle grip for Series MG 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 BG/EG gauges
AC1003-1	Single handle grip for Series MG gauges

## Hi / Lo Limits Indicator

Displays limit conditions for a test - red lights for high and low limits, green light to indicate passing. Compatible with Series BG/BGI and CG gauges.



Model No.	Description
11-1022	Hi/Lo limits indicator for BG/BGI/CG

## Replacement Battery

Rechargeable 7.2V NiMH battery, for use with Series BG/BGI, EG, and CG gauges.



Model No.	Description
08-1006	Battery, rechargeable, 7.2V

## AC adapter/chargers

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



Model No.	Description
08-1007	AC adapter/charger, 110V
08-1008	AC adapter/charger, 220V

## Tabletop stand for BGI force/torque gauge

Features an angle adjustment and thru holes for work-bench mounting. Includes four gauge mounting screws.



Model No.	Description
AC1008	Stand, BGI, tabletop





## Tabletop mounting kit for Series STC sensors

Consists of a plate with thru holes for workbench mounting, along with four sensor mounting screws.



Model No.	Description
AC1006	Mounting kit, STC, tabletop

## Tabletop mounting kit for Series STJ sensors

Consists of a plate with thru holes for workbench mounting, vertical sensor bracket, and a tool kit for tightening the bracket.



Model No.	Description
AC1007	Mounting kit, STJ, tabletop

## Tabletop mounting kit for Series STE sensors

Consists of a plate with thru holes for workbench mounting, vertical sensor bracket, and a tool kit for tightening the bracket.



Model No.	Description
AC1010	Mounting kit, tabletop, STE200/400

## Test stand mounting kit for Series SS & SSM force sensors

For securing any Series SS or SSM force sensor to any Mark-10 test stand. The kit consists of brackets and hardware.



Model No.	Description
AC1018	Mounting kit, SS/SSM to test stand

## Test stand mounting kit for BGI & MGT

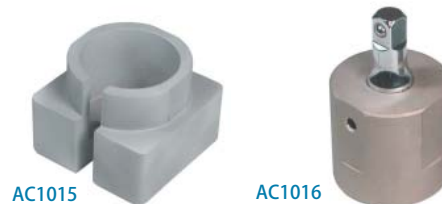
For mounting the BGI or MGT to any TS-Series test stand.



Model No.	Description
AC1004	Mounting kit, BGI / MGT to TS-Series test stands

## Test stand mounting kits for torque sensors

For securing models STE200, STE400, and any Series STH torque sensor to TST-Series torque test stands.



Model No.	Description
AC1015	Mounting kit, STH to TST-Series stands
AC1016	Mounting kit, STE200/400 to TST-Series stands



# Accessories

## Statistical Printer



The DP-1VR statistical printer collects measurements from Series BG/BGI, CG, and EG\* gauges using the Mitutoyo BCD output. It produces a number of charts, histograms, and statistical reports. The printer can be operated on battery power or with the included AC adapter.

### Features:

- Portable operation
- Small size
- GO / NO GO Indication
- Prints statistical reports and charts
- Automatic date and time
- Thermal paper for quiet operation

### Specifications:

Voltage	120V	Printing data	Measurement data, GO/±NG judgement, number of data, max/min value, range, average, standard deviation, number of defective, fraction defective, process capability index, histogram, D-chart, control chart generation for Xd-bar and control limit data, date and time
Printing method	Thermal line printer	Power	AC adapter (6V, not interchangeable with DP-1HS), electric battery LR6 (alkaline) and Ni-Mh (AA size)
Printing dot	384 dot (8 dot/mm <sup>2</sup> )		
Printing speed	6.5 mm/s (using AC adapter)	Battery life	10 years (clock battery), 10000 lines (1600 mA 1 time/5 s using the nickel hydrofluoric battery)
Printing paper	48 m	Operating temp.	0°C to 45°C using AC adapter, 10°C to 45°C using battery
Printing line	Approx. 6500 lines for large characters, approx. 12000 lines for normal characters	Storage temp.	-10°C to 50°C
Processing capacity	Mode 1/2/3: 9999 data, Mode 0: 100000 data		
Input timer	0.25 s, 1 s, 5 s, 30 s, 1 min, 30 min, 60 min		
Output function	Output the measuring data (RS-232C) or GO/±NG judgement		

### Ordering Information:

Model No.	Description
DP-1VR	Mitutoyo SPC statistical printer / processor

\*when equipped with EGRS optional outputs package



## WinWedge Software



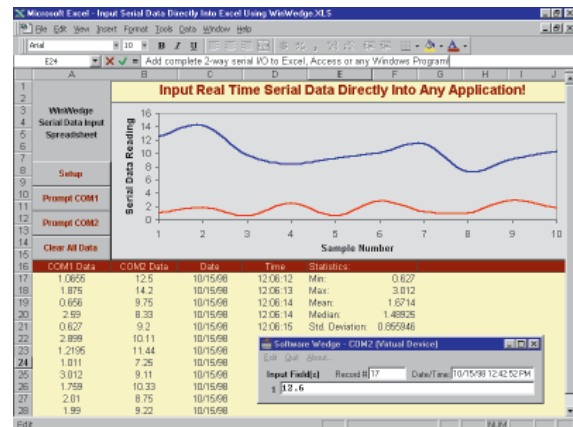
### Easily transfer data from your Mark-10 gauge to common Windows applications for further analysis

WinWedge captures serial data, custom tailors it to meet your needs, then transfers it to any Windows application - either by sending keystrokes to the application's window or by passing the data through Dynamic Data Exchange (DDE) conversions. WinWedge also transmits prompts or commands through the serial port to control or query your Mark-10 or other instruments from within other Windows applications or directly from WinWedge. Think of WinWedge as a fully customizable serial I/O device driver that will save time while eliminating data entry errors.

WinWedge 32 Pro is a true 32-bit version with advanced parsing, filtering, and formatting of text, binary, hex, octal, and ASCII data. Expanding DDE support allows other applications to completely control WinWedge and all serial I/O. This lets you create extremely powerful data acquisition and device control interfaces from within any Windows application that supports DDE (including Excel, Access, MMIs and LIMS). It also supports TCP/IP communications and is 30% faster. Two additional programs - TCPWedge and FileWedge - are included free with WinWedge 32 Pro.

### Features:

- Transfers data to any Windows program
- Provides full two-way I/O for data collection and instrument control
- Collects real-time data on multiple serial ports simultaneously
- Powerful DDE support in Windows
- Easy to set up and use, no programming required
- Unlimited free technical support by the developer



An Excel spreadsheet created with data transferred from an instrument through WinWedge

### Ordering Information:

Model No.	Description
15-1002	WinWedge 32 Std
15-1003	WinWedge 32 Pro

\*when equipped with EGRS optional outputs package



# Accessories

## Cables

For transferring data to a PC, printer, chart recorder, or other devices from Series BG, BGI, EG\* and CG gauges.

Model No.	Description
09-1040	Cable, RSM100/RSM100A to Mitutoyo (Digimatic) SPC
09-1047	Cable, gauge to Mitutoyo (Digimatic) SPC
09-1048	Cable, gauge to RS-232, 25-pin
09-1048A	Cable, gauge to RS-232, 9-pin
09-1049	Cable, gauge to analog, dual banana plug
09-1066	Cable, digital travel display to Mitutoyo (Digimatic) SPC
09-1090	Cable, set point, gauge to motorized test stand

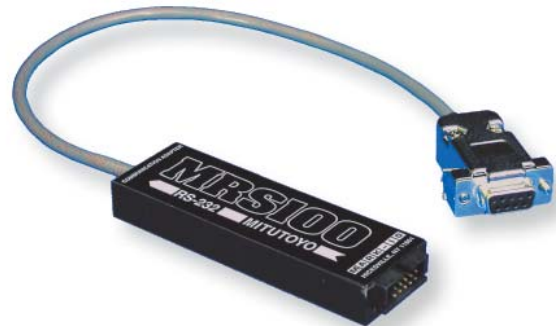


\*when equipped with EGRS optional outputs package

## Mitutoyo / RS-232 Communication Adapters

Converts Mitutoyo output to RS-232 and vice versa.

Model No.	Description
MRS100	Adapter, Mitutoyo to RS-232, 25-pin
MRS100A	Adapter, Mitutoyo to RS-232, 9-pin
RSM100	Adapter, RS-232 to Mitutoyo, 25-pin
RSM100A	Adapter, RS-232 to Mitutoyo, 9-pin
09-1040	Cable, RSM100/RSM100A to Mitutoyo SPC
FTSW	Foot switch port option for MRS/RSM



## Overload Protection Module

Protects the force gauge against accidental overloads during motorized tests. Adjustable from 20 - 110% of gauge's capacity. Compatible with Series BG, BGI, EG\* and CG gauges.

Model No.	Description
11-1042	Overload protection module, gauge to motorized test stand



\*when equipped with EGRS optional outputs package

# Ergonomics Testing Kits



## Series MK

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

These testing kits make job task analysis and ergonomic testing analysis simple and accurate, ideal for ADA compliance, workplace design, and ergonomic studies. These kits present the ergonomist and other professionals with a simple and economical testing solution.

The kits are available in capacities of 200 lbF and 500 lbF.

The kits consists of the following items:

- **Series MG digital force gauge**

- **Double- and single-handle cradles**

Contain non-slip rubber handles for good grip and consistent test results. The force gauge easily mounts into both cradles.

- **Padded attachments**

Flat, curved, and square padded attachments mount directly to the force gauge for conducting strength analysis.

- **Implements**

Rugged hook and flat adapter attach directly to the force gauge for conducting job task analysis and ergonomic analysis in push, pull, and lift efforts.

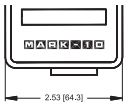


Conveniently stow all items in the included cushioned carrying case

## Ordering Information:

Model No.	Description
MK200	Ergonomics testing kit, 200 lbF capacity
MK500	Ergonomics testing kit, 500 lbF capacity

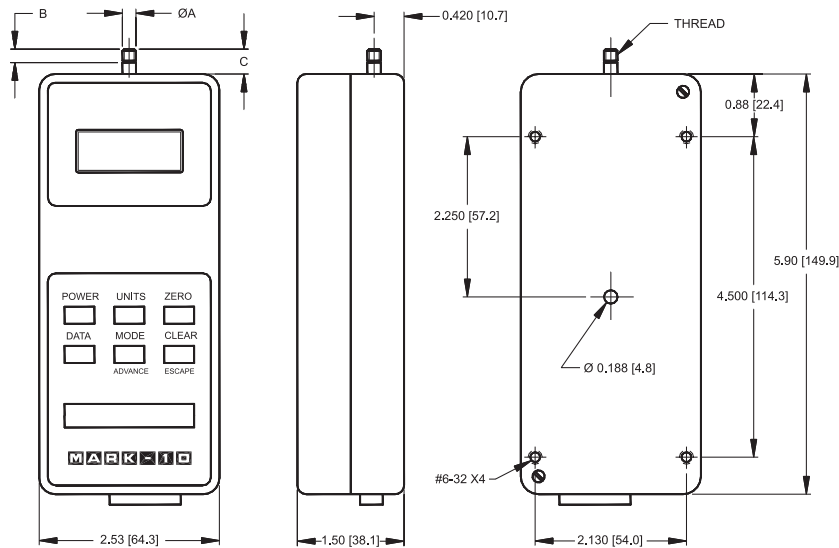
\* Add suffix E for 220V operation. Example: MK200E



# Dimensional Drawings IN [MM]

## Force and torque gauges

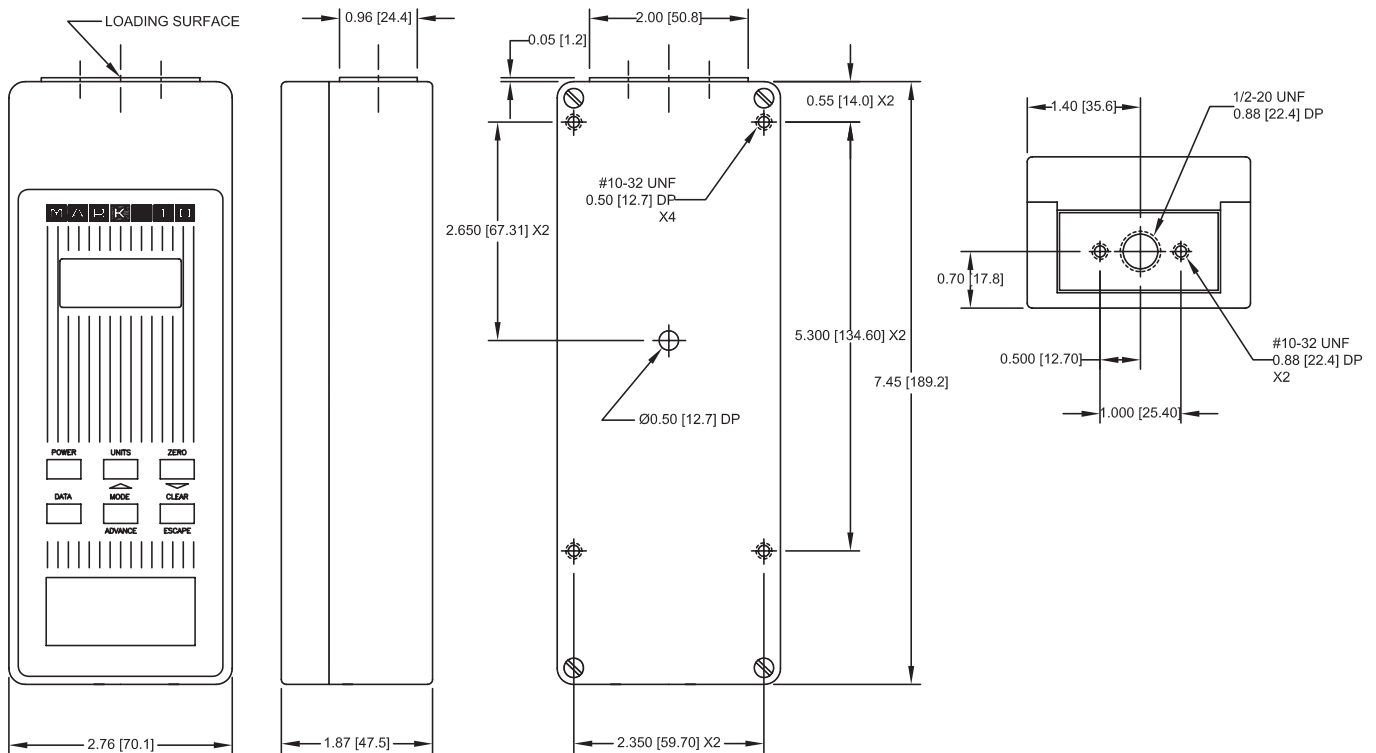
### Series BG / BGI\* / EG

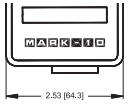


	Model	
	XX012 - XX200	XX500
ØA	0.200 [5.8]	0.312 [7.9]
B	0.19 [4.8]	0.44 [11.2]
C	0.35 [8.9]	0.60 [15.2]
Thread	#10-32 UNF	5/16-18

\*Load cell shaft dimensions do not apply for the BGI. A remote sensor connector is provided in place of the load cell shaft.

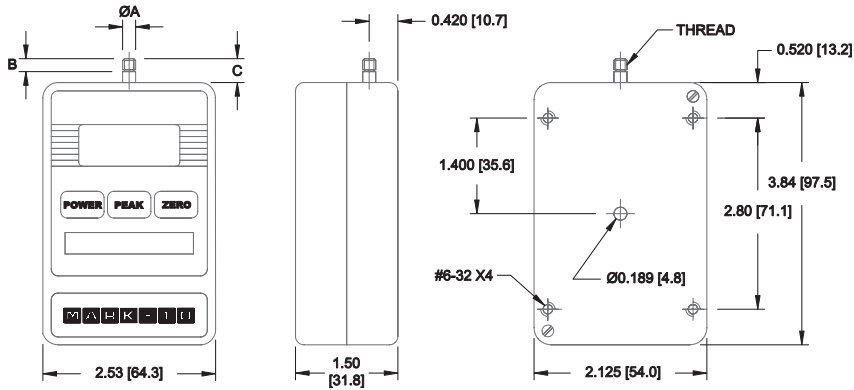
### Series CG





## Force and torque gauges

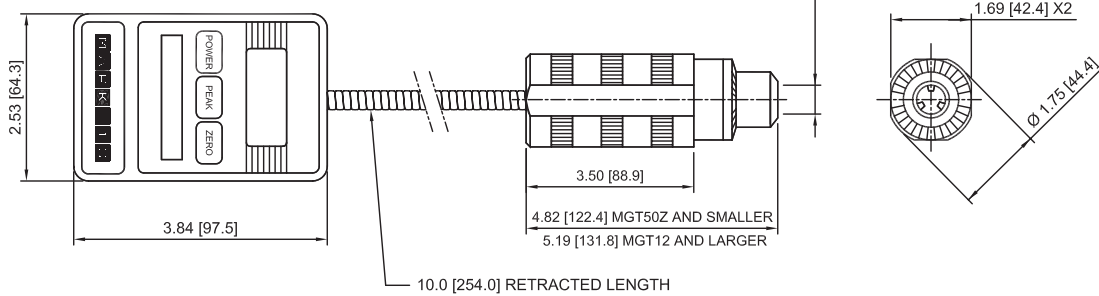
### Series MG



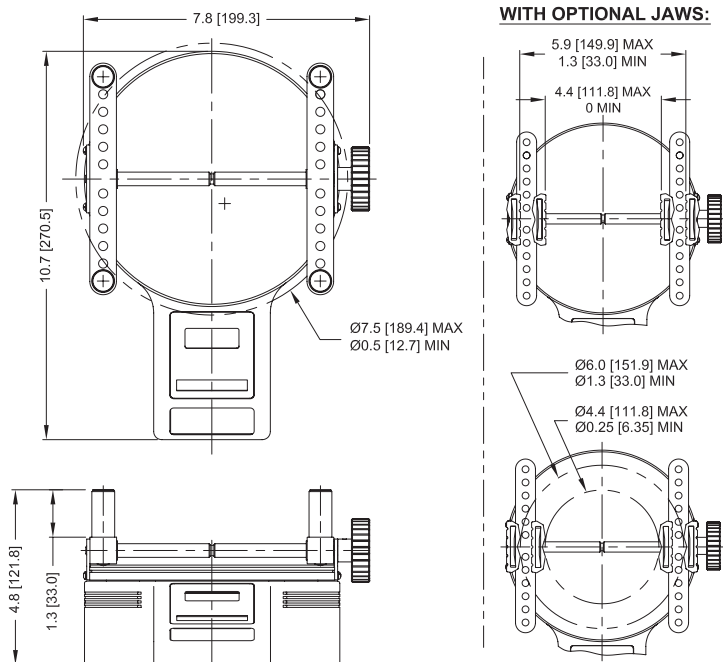
	Model	
	MG012 - MG200	MG500
ØA	0.200 [5.8]	0.312 [7.9]
B	0.19 [4.8]	0.44 [11.2]
C	0.35 [8.9]	0.60 [15.2]
Thread	#10-32 UNF	5/16-18

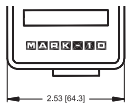
### Series MGT

CHUCK CAPACITY: Ø 0.38 [9.5] MAX MGT50Z AND SMALLER  
 Ø 0.50 [12.7] MAX MGT12 AND LARGER



### Series CT

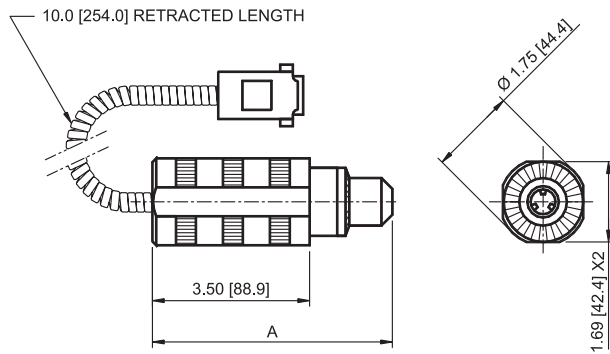




# Dimensional Drawings IN [MM]

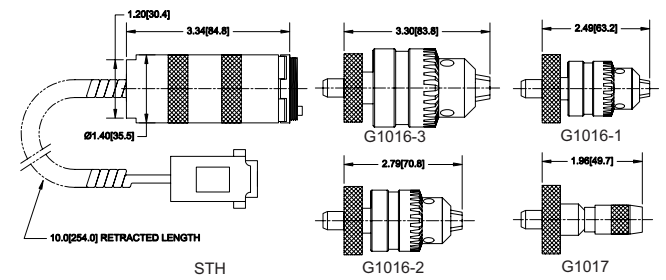
## BGI force and torque remote sensors

### Series STJ

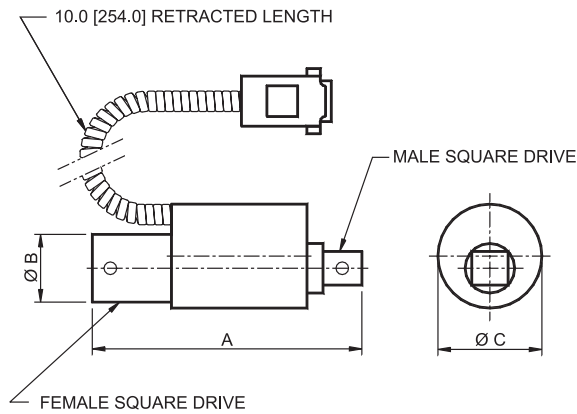


Model	A	Chuck Capacity
STJ10Z - STJ50Z	4.82 [122.4]	0.38 [9.5]
STJ12 - STJ100	5.19 [131.8]	0.5 [12.7]

### Series STH

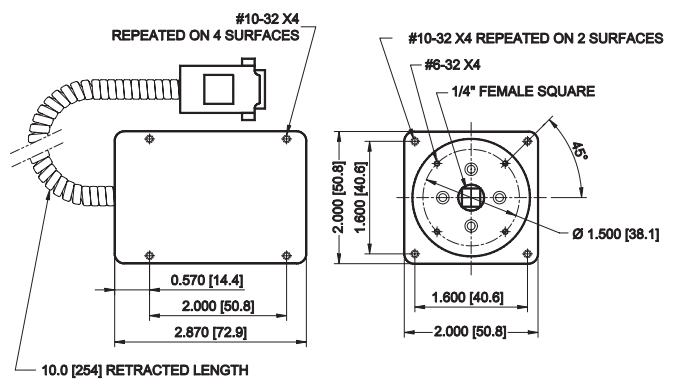


### Series STE

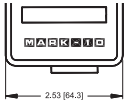


Model	A	ØB	ØC	Drive Size
STE20 - STE100	1.88 [47.8]	0.56 [14.2]	1.00 [25.4]	1/4"
STE200 - STE400	3.00 [76.2]	0.73 [18.5]	1.12 [28.6]	3/8"
STE1000	3.50 [88.9]	0.98 [24.9]	1.25 [31.8]	1/2"
STE5000	5.00 [127.0]	1.48 [37.6]	2.0 [50.8]	3/4"

### Series STC

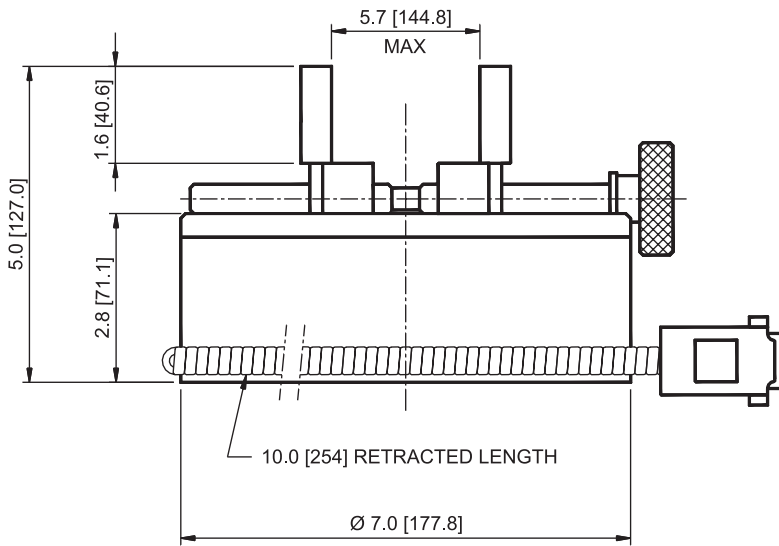




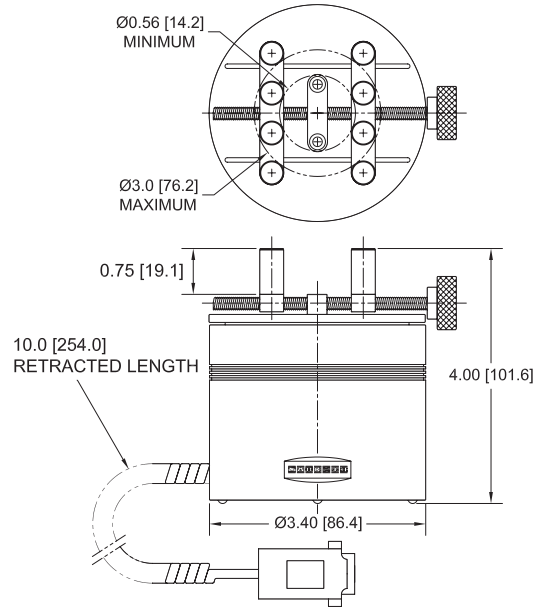


## BGI force and torque remote sensors

### Series STB

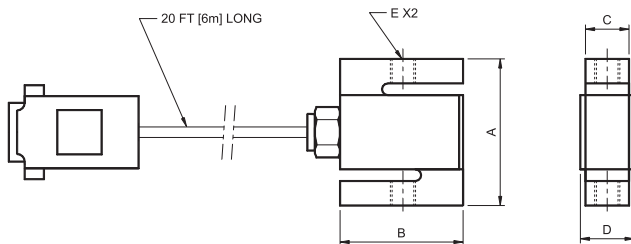


STB12 - STB100



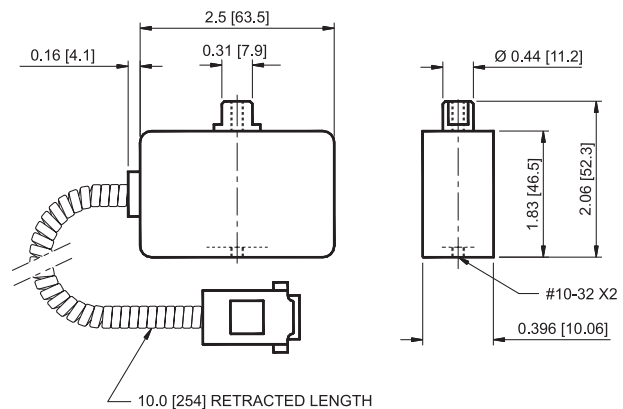
STB10Z - STB50Z

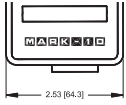
### Series SS



Model	A	B	C	D	E
SS50			0.46	0.65	1/4-28 UNF
SS100			[11.7]	[16.5]	
SS200	2.40	2.00			
SS500	[61.0]	[50.8]	0.71	0.90	1/2-20 UNF
SS1000			[18.0]	[22.9]	
SS2000					
SS5000	3.90	3.00	0.96	1.15	3/4-16 UNF
SS10000	[99.1]	[76.2]	[24.4]	[29.2]	

### Series SSM

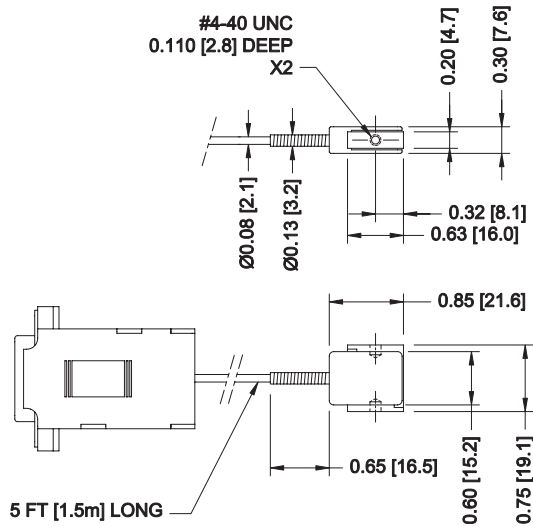




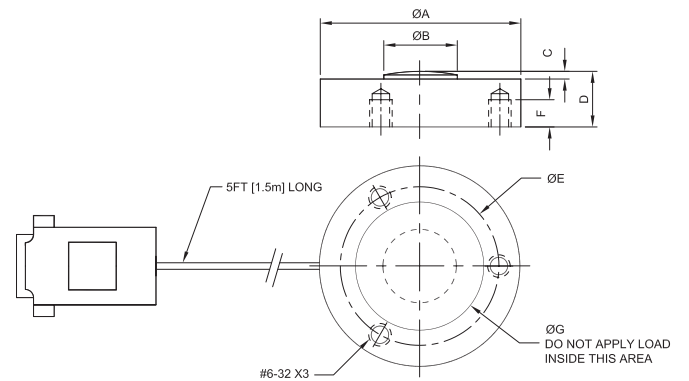
# Dimensional Drawings IN [MM]

## BGI force and torque remote sensors

### Series SJR

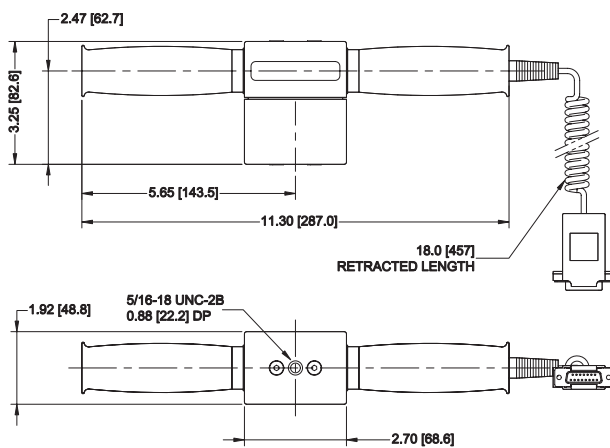


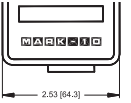
### Series SBC



Model	ØA	ØB	C	D	ØE	F	ØG
SBC100 - SBC2000	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]
SBC5000 - SBC10000	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]

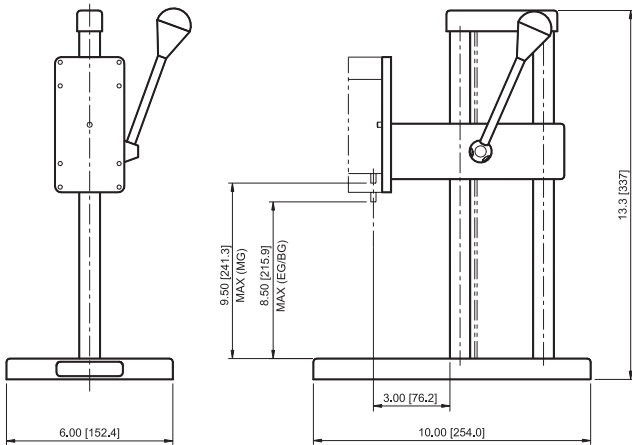
### Series SHP



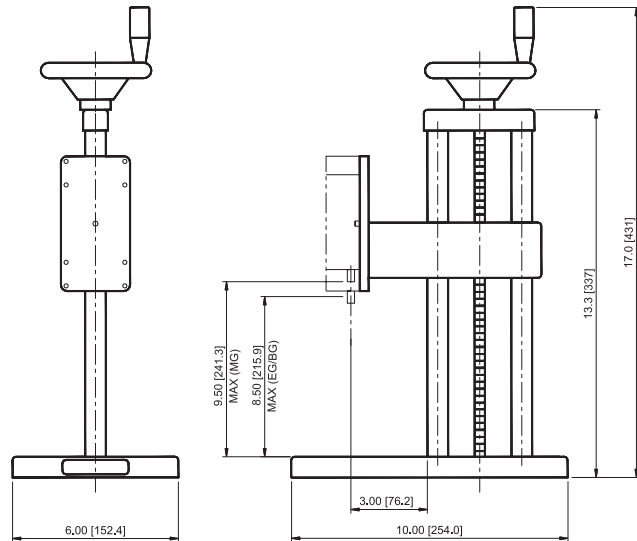


## Test stands

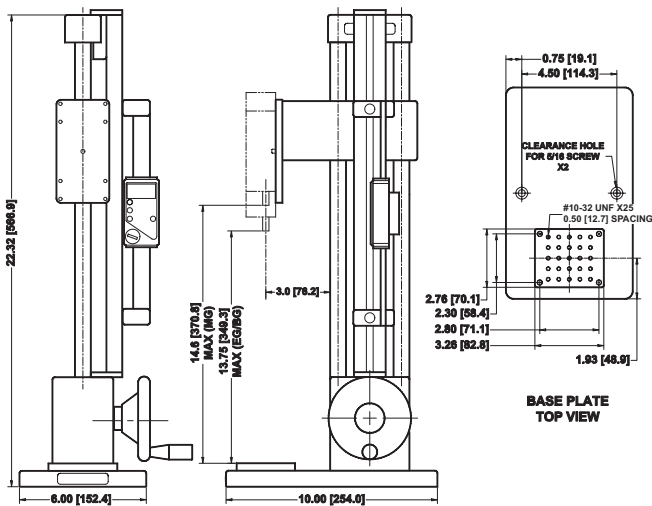
### Models ES10



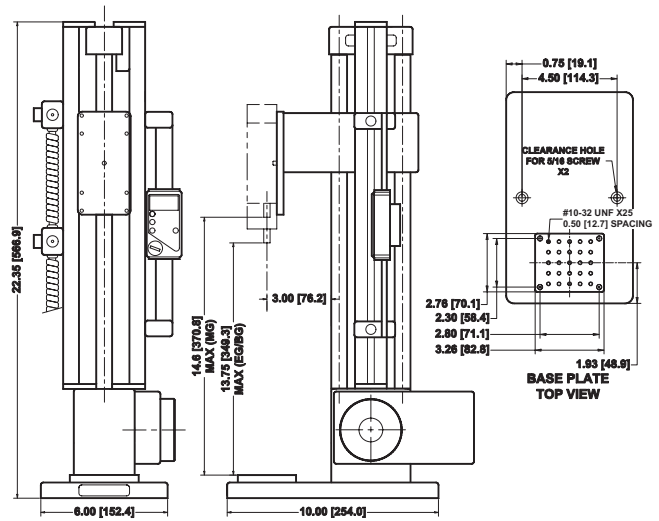
### Model ES20



### Model ES30



### Model ESM

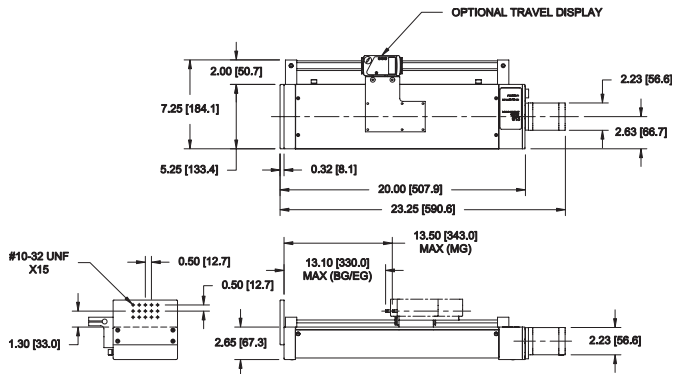




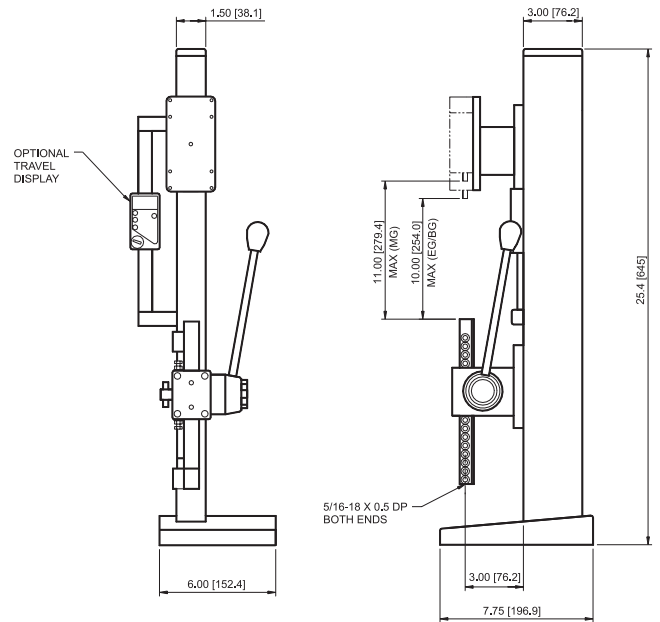
# Dimensional Drawings IN [MM]

## Test stands

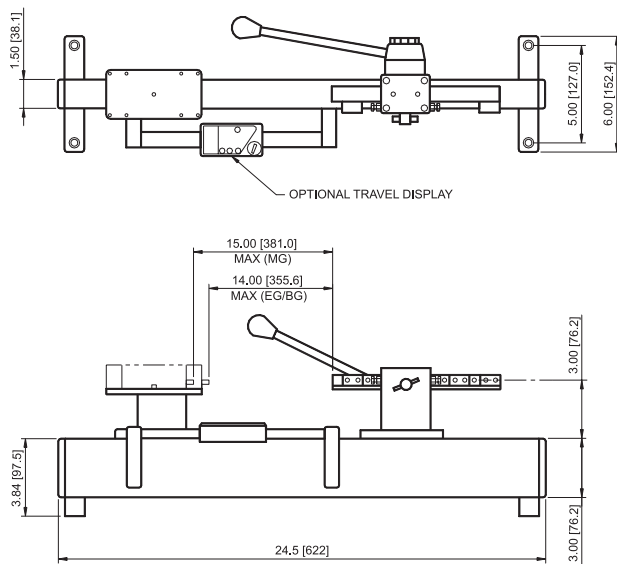
### Model ESMH



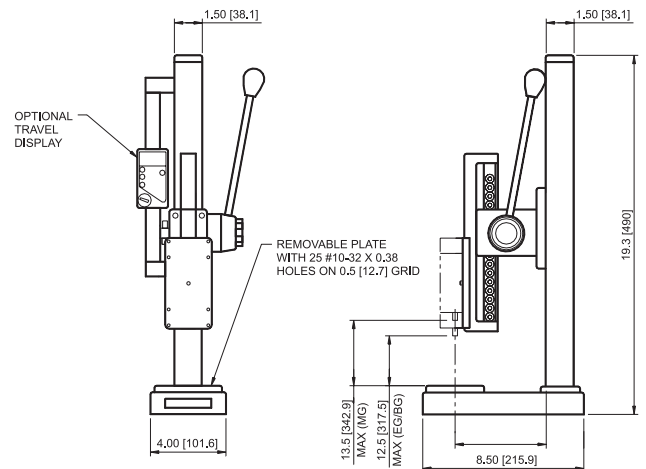
### Model TSA



### Model TSAH



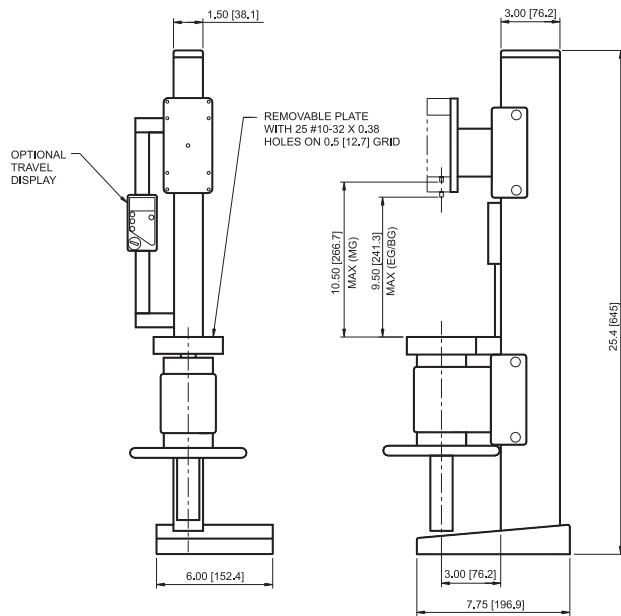
### Model TSB



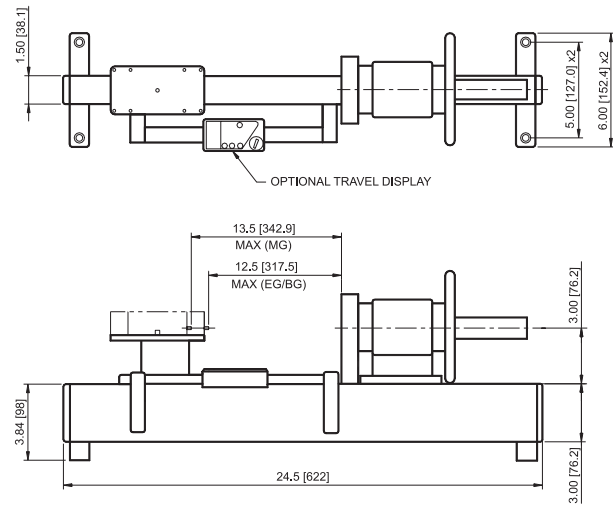


## Test stands

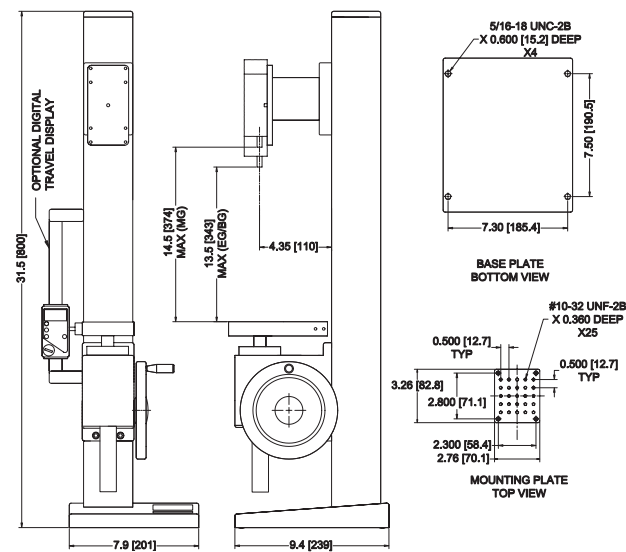
### Model TSC



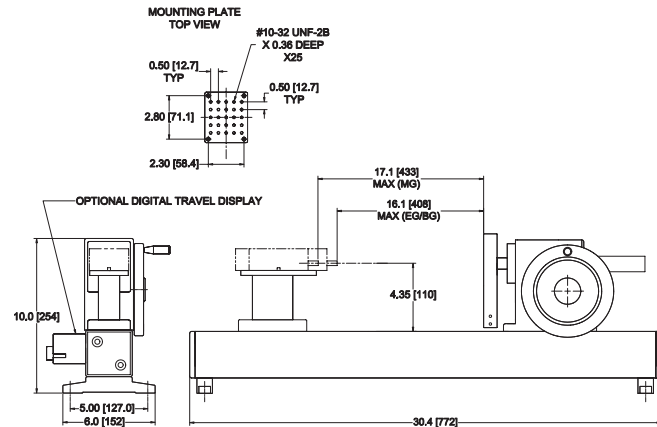
### Model TSCH

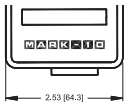


### Model TSF



### Model TSFH

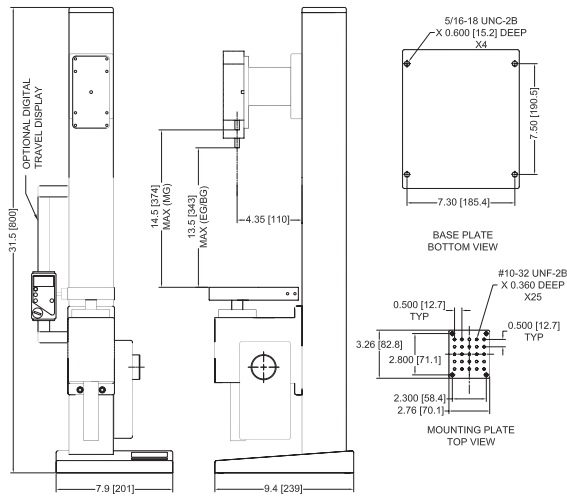




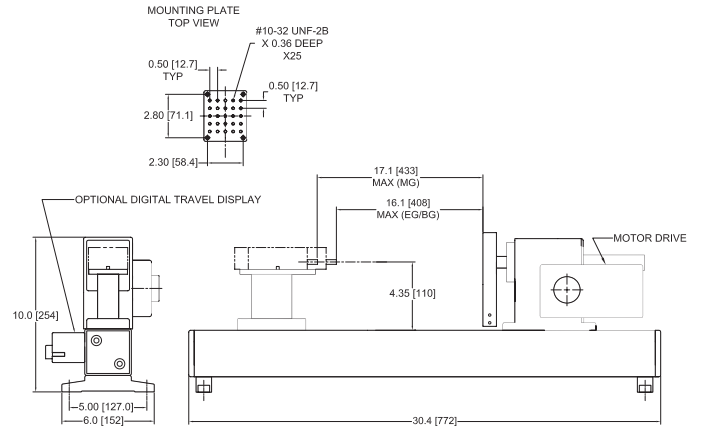
# Dimensional Drawings IN [MM]

## Test stands

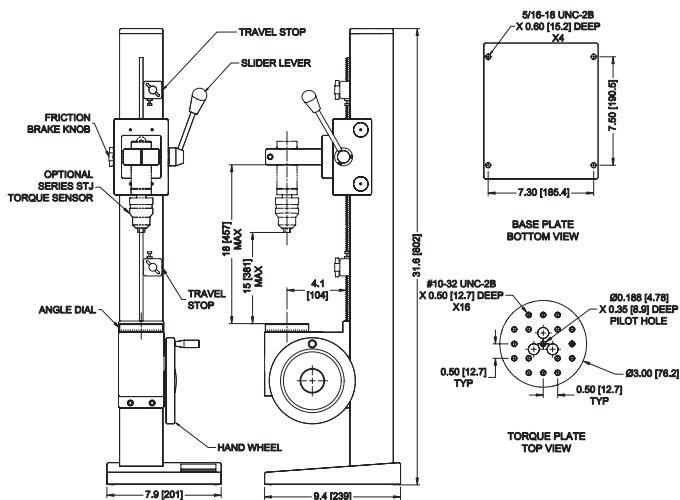
### Model TSFM500



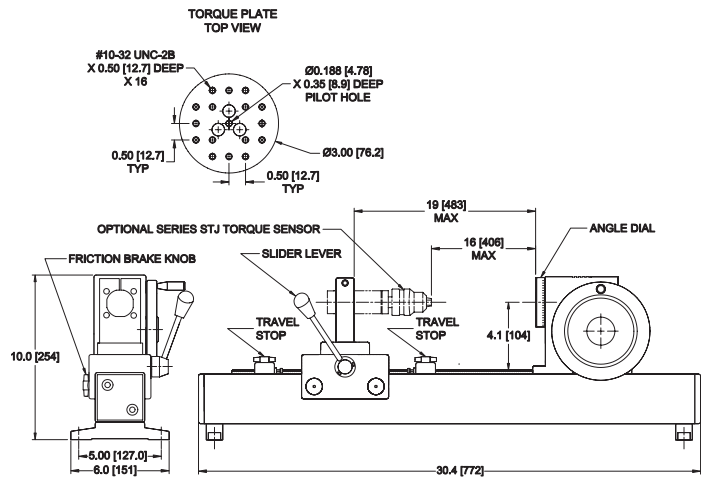
### Model TSFM500H

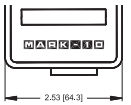


### Model TST



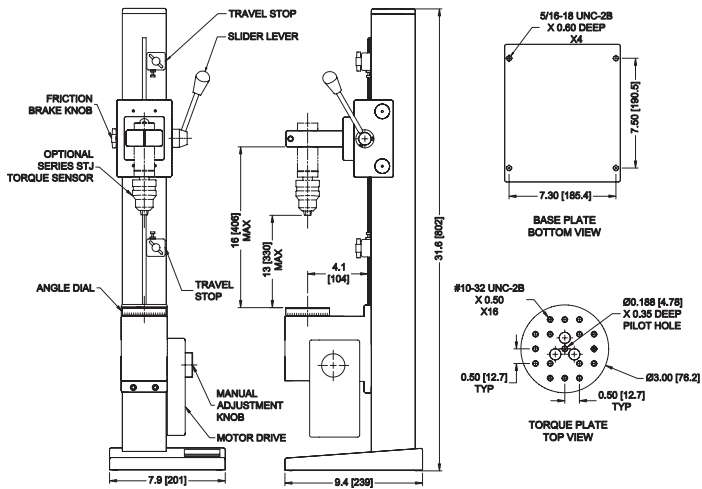
### Model TSTH



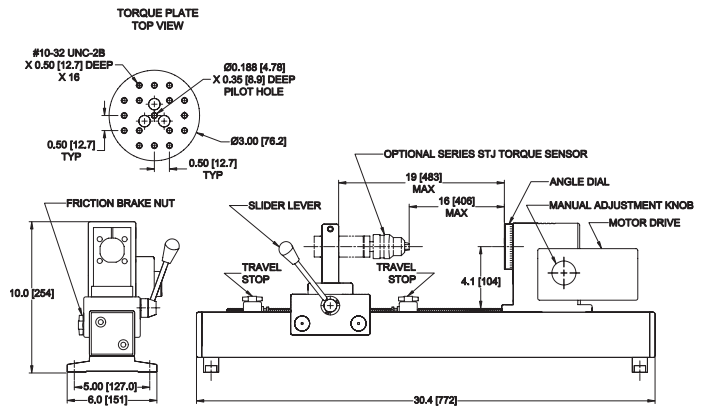


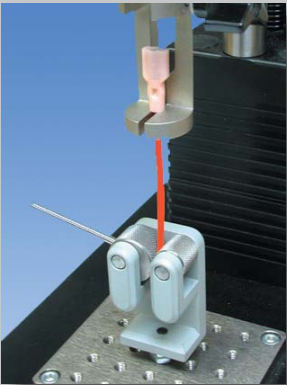
## Test stands

### Model TSTM



### Model TSTMH





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