

DIGITAL FORCE TESTERS

FMM DIGITAL FORCE TESTERS

FMM Digital Force Testers may be used with L1 software or with a Starrett DFC or DFG digital force gage. FMM digital force testers are compact and ideal for high-volume, lean manufacturing production.

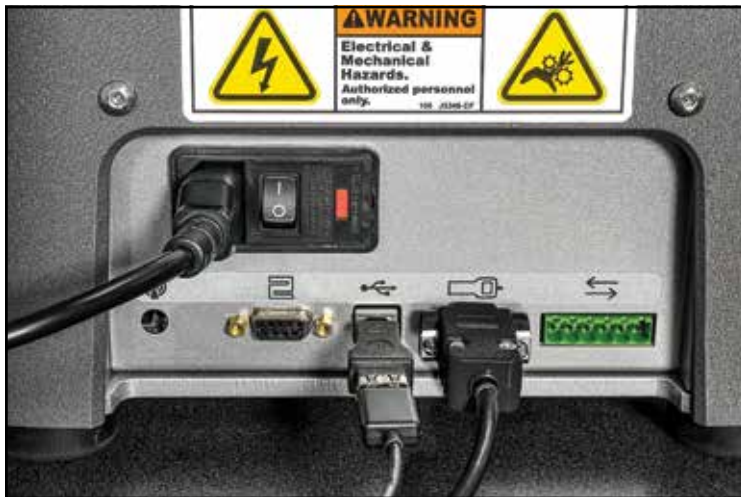
FMM testers are available in three capacities: 110lbf (500N), 330lbf (1500N) and 550lbf (2500N). Two travel lengths are available for all capacities: standard travel at 20" (508mm) and extended travel at 30" (762mm). Crosshead speeds are controlled locally and can be set from 0.002 to 40 inch/min (0.05 to 1016mm/min). A high-resolution OLED display shows distance measurements with accuracy better than 20µm (0.0008 inch). Travel limits help prevent load sensor overloading.

The FMM force tester can be controlled using L1 software for limit, cycling, hold and coefficient of friction testing.

The FMM force tester can also be controlled using a DFC digital force gage. The DFC force gage serves as a universal controller where it is used to setup the force tester's distance limits, crosshead direction and crosshead velocity for a test.

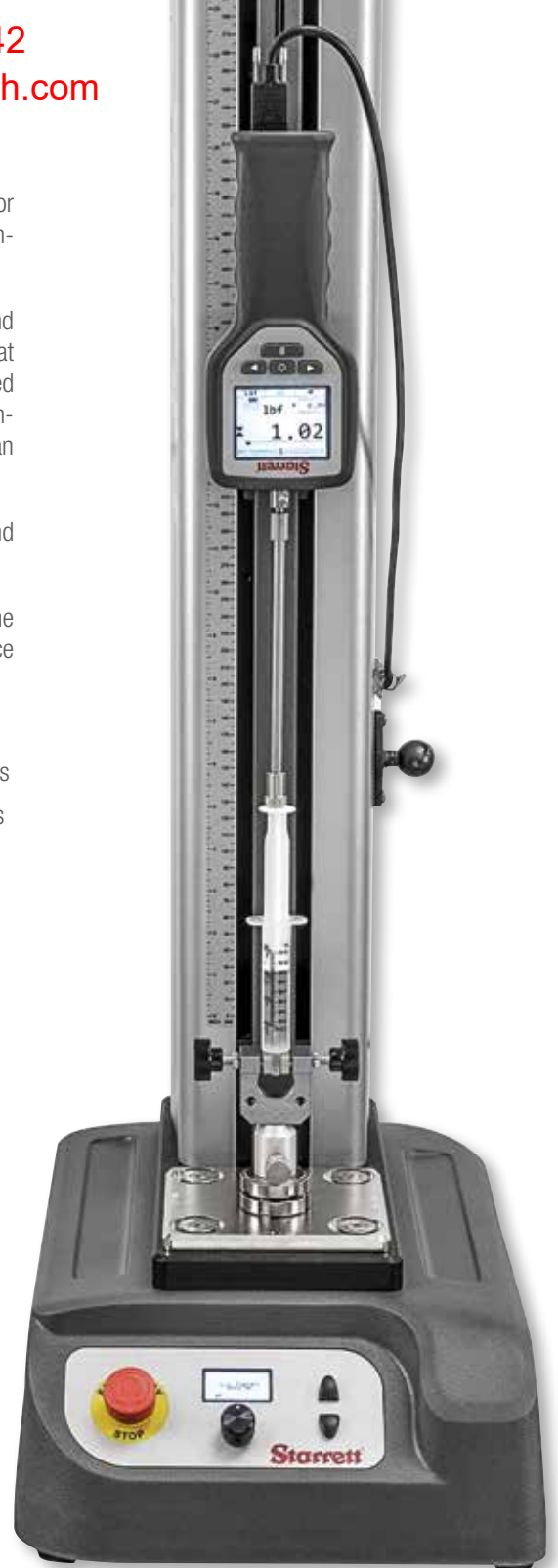
FEATURES

- Ideal for tension, compression, flexural, cyclic, shear, and friction applications
- Use with L1 software and 2-in-1 tablet PC or with DFC and DFG force gages
- Multiple, Easy-to-Use Operating Modes
 - Manual
 - Automatic
 - Continuous
 - Gage Control (DFC force gage controls FMM tester)
 - Software Control (L1 system control)



Interface connections and communications are clearly shown on the back panel.

Source power may be 100-240V- no jumpers required or configuration needed.





FEATURES

- Crosshead position accuracy is better than 20µm (0.0008 in)
- Two column heights and travels:
 - Standard Travel 20" (508mm)
 - Extended Travel 30" (762mm)
- Three force capacities:
 - 110 lbf (500N)
 - 330 lbf (1500N)
 - 550 lbf (2500N)
- Reference distance travel ruler
- Cycle for 99,999 counts or seconds (72 hours)
- Hold at load or duration for up to seconds (72 hours)
- Compact design is ideal for small work space and for lean manufacturing environments
- Adjustable base adapter ensure correct sample alignment
- Standard metric base with M4, M6, M10 and M12 threads
- Optional imperial base with #10-32, 5/16-18, 1/4-28 and 1/2-20 threads
- USB 2.0 and RS-232 Communications
- Configurable crosshead speeds from:
 - 0.002 to 40 in/min
 - 0.05 to 1000 mm/min
- Crosshead speed accuracy is better than 0.1% at full speed, full load
- Adjustable, magnetic travel limits
- Quiet operating even at full speed, full load
- Easily upgrade from force gage control to computer-based operation using L1 software and 2-in-1 tablet PC
- Two mounting blocks for:
 - Force gage mounting
 - BLC load cell mounting
- Four configurable 0-24Vdc digital I/O channels for switch testing or use with annunciators and status lamps
- Base clevis adapter kit supplied standard
- Cast-aluminum base with bench clips to secure to work space if needed
- Easy-to-use jog keys with excellent tactile feedback
- Speed selection dial with high resolution display

DIGITAL FORCE TESTERS

SPECIFICATIONS

FMM Series - Digital Force Testers

Models		Standard Travel			Extended Travel		
		FMM-110	FMM-330	FMM-550	FMM-110X	FMM-330X	FMM-550X
Load Capacity, Full Scale	Lbf	110	330	550	110	330	550
	N	500	1500	2500	500	1500	2500
	Kgf	50	150	250	50	150	250
Crosshead Speed, Minimum	inch/min	0.002					
	mm/min	0.05					
Crosshead Speed, Maximum	inch/min	40					
	mm/min	1000					
Maximum Speed, Full Load	inch/min	40					
	mm/min	1000					
Accuracy- Speed		Better than 0.1% of test speed					
Accuracy- Crosshead Position	inch	Better than 0.0008					
	mm	Better than 0.02mm					
Travel Resolution	inch	0.001					
	mm	0.025					
Axial Frame Stiffness	lbf/in	13,750	17,368	17,742	12,222	13,750	14,865
	kN/mm	2.5	3.1	3.1	2.2	2.5	2.5
Cycling, Maximum	Counts	99,999					
	Duration	27 hours					
Constant Hold, Maximum	Duration	27 hours					
Vertical Test Space¹	inch	22			32		
	mm	559			813		
Crosshead Travel	inch	20			30		
	mm	508			762		
Communication		USB 2.0, RS-232,					
Input/Output Channels		0 - 24Vdc (independent, configurable)					
Power		Single Phase Voltage (Vac) +10% 110, 120, 220, 230, 240 50/60 Hz					
Using 117V Mains at Full Scale Load		0.09A Holding	0.11A Holding	0.18A Holding	0.09A Holding	0.11A Holding	0.18A Holding
		10.5 Watts	12.9 Watts	21.1 Watts	10.5 Watts	12.9 Watts	21.1 Watts
Operating Temperature	°F	+40 to +110					
	°C	+5 to +43					
Humidity		10 to 90%, non-condensing					
Throat	inch	3.9					
	mm	100					
Height	inch	37			47		
	mm	940			1194		
Width	inch	11.5					
	mm	292					
Depth	inch	16.5					
	mm	419					
Base Plate Threads	inch	#10-32, 5/16-18, 1/4-28, 1/2-20 (optional)					
	mm	M4, M6, M10, M12 (standard)					
Weight (approx.)	lbs	80			95		
	kgs	36.3			43		
CE Compliance		Meets all relevant CE standards for safety, immunity, noise					

NOTES

Total vertical space is the distance from the top surface of the base plate to the bottom surface of the crosshead.



The standard base plate features four hole patterns for mounting fixtures; M4, M6, M10 and M12. An optional imperial base plate features #10-32, 5/16-18, 1/4-28, and 1/2-20. The base plate can be easily positioned to ensure correct sample alignment.



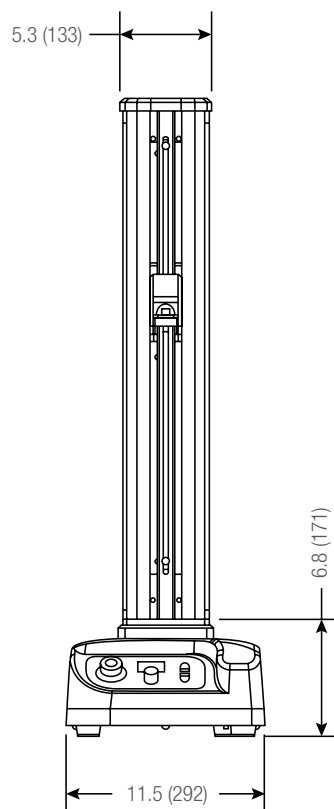
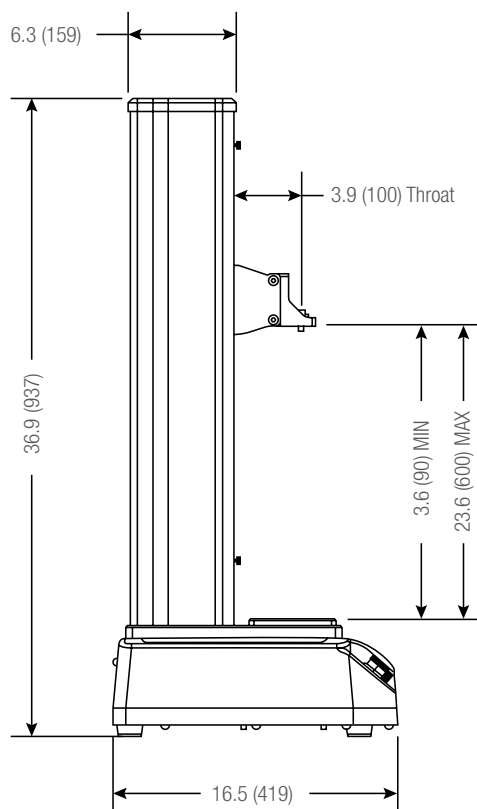
Two mounting blocks are available for attaching a Starrett force gage or the BLC Series load cell. The blocks attach easily and securely to the crosshead and ensure correct center line alignment.



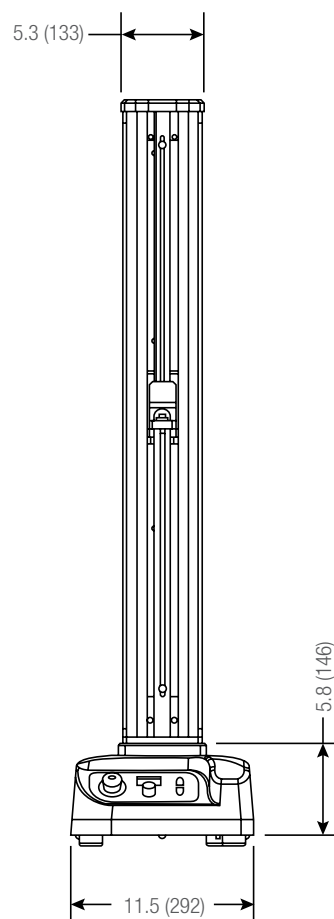
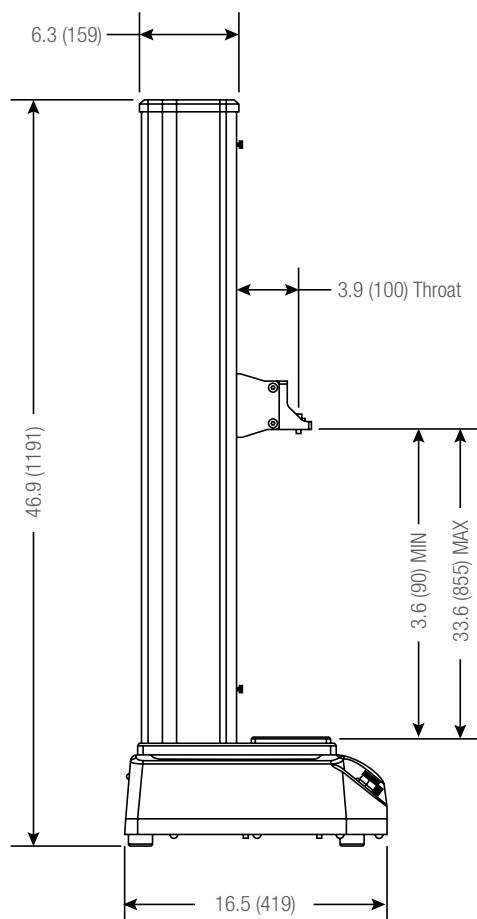
A stainless steel clevis set is included with the FMM test frame base. The clevis will accept 15.9mm diameter test fixtures. The clevis set includes the clevis, locking rings, grip pin and a spanner wrench.

DIMENSIONS

STANDARD TRAVEL



EXTENDED TRAVEL



LOAD CELL SENSORS

Starrett offers a full range of precision load cell sensors for material testing, force analysis and force measurement applications. Starrett load cells are compliant with IEEE 1451.4 and meet or exceed ASTM E4, BS 1610, ISO 7500-1 and EN 10002-2.

Measurement accuracies of $\pm 0.05\%$ of reading down to 1/100 of sensor capacity may be achieved. Sensors are supplied with a NIST-traceable Certificate of Calibration.

BLC LOAD CELL SENSORS

Starrett BLC load cell sensors are full-bridge, temperature compensated, strain gage instruments designed and optimized for basic force testing applications. These S-beam sensors feature high axial stiffness and minimal deflection at full capacity which leads to improved measurement accuracy.

The BLC sensors are general purpose sensors available in capacities from 2lbf to 500lbf (10 to 2500N). These sensors are used exclusively with L1 Systems.



BLC Series - Basic Force Measurement S-beam Sensors

Model Number	Load Capacity			Safe Overload % Full Scale	Full Scale Deflection		Height		Width		Thread mm
	N	KGF	LBF		in	mm	in	mm	in	mm	
BLC-2	10	1	2	150	0.009	0.22	3.0	76.2	3.0	76.2	M6 x 1-6H
BLC-5	20	2	5	150	0.008	0.21	3.0	76.2	3.0	76.2	M6 x 1-6H
BLC-10	50	5	10	150	0.007	0.18	3.0	76.2	3.0	76.2	M6 x 1-6H
BLC-20	100	10	20	150	0.007	0.18	2.0	50.8	2.0	50.8	M6 x 1-6H
BLC-50	250	25	50	150	0.006	0.15	2.0	50.8	2.0	50.8	M6 x 1-6H
BLC-100	500	50	110	150	0.003	0.08	2.0	50.8	2.0	50.8	M6 x 1-6H
BLC-200	1000	100	225	150	0.003	0.08	2.0	50.8	2.0	50.8	M6 x 1-6H
BLC-500	2500	250	550	150	0.005	0.13	2.0	50.8	2.0	50.8	M12 x 1.75-5H

NOTES

Load measurement accuracy is $\pm 0.1\%$ of load cell capacity. Display resolution is 10,000:1.

Starrett recommends on-site verification of accuracy during installation. Sensor calibration should be performed at least annually.

SERVICES

CALIBRATION, FIELD SERVICE, FACTORY SERVICE

Starrett can provide all levels of service for your material test and force measurement systems. We can supply a comprehensive range of calibration and verification services to ensure that your testing meets the requirements of international testing standards. Calibrations can be performed to ASTM E4 for load and ASTM E2658 for displacement or to equivalent standards from ISO, BS, DIN and more. Speed, stress and strain verifications can be performed on-site by technicians accredited to ISO 17025.

Preventative maintenance programs, field and factory repair services are available to ensure that your systems perform to their published specifications.

Starrett can provide factory services including load cell calibrations, test frame repair and reconditioning. All Starrett load cell sensors are supplied with a NIST-traceable Certificate of Calibration.

Your Starrett representative can provide on-site training to your personnel to help ensure that your system operates to its published specification. Our training also provides your operators with the knowledge needed to perform your testing in a safe and efficient manner. Our objectives are to help you make your products better through improved resource utilization, increased throughput and optimized efficiency.

