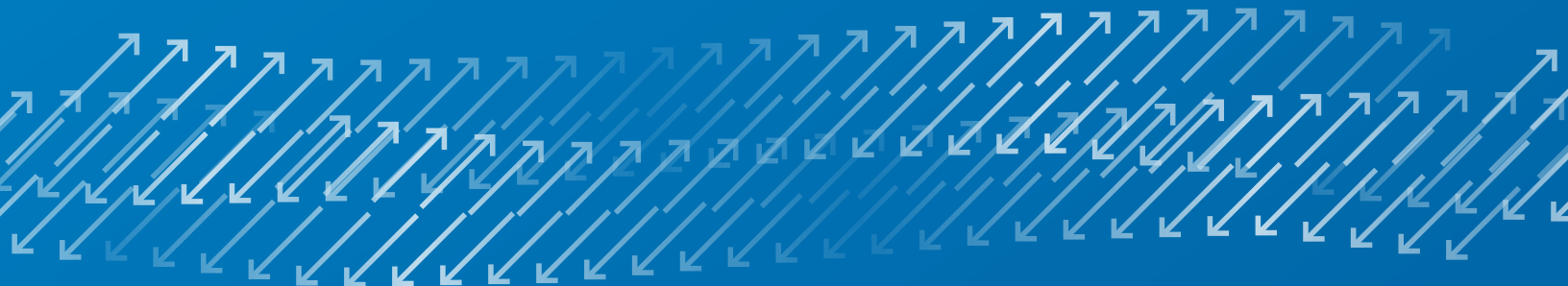




## MTS Series 809 Axial/Torsional Test System

Accurate and versatile biaxial testing solution

THE **MTS SERIES 809 AXIAL/TORSIONAL TEST SYSTEM** CAN APPLY  
SIMULTANEOUS AXIAL AND TORSIONAL LOADS AND DISPLACEMENTS  
TO A WIDE ARRAY OF SPECIMENS. THIS HIGHLY VERSATILE TEST  
SYSTEM IS CAPABLE OF EVERYTHING FROM STATIC TESTING TO  
MULTIAXIAL FATIGUE CHARACTERIZATION AND OFFERS SUPERIOR  
STIFFNESS FOR INCREASED ACCURACY.



## MTS Series 809 Axial/Torsional Test System

Superior biaxial testing solution for a wide range of materials

The MTS Series 809 Axial/Torsional Test System provides exceptional versatility with the capacity to deliver accurate test results for both static and dynamic test applications.



### High Performance

Large diameter hollow columns increase stiffness and resonant frequency offering better performance



### Accurate

Adjustable, widely spaced cam follower bearings minimize backlash and crosstalk between the load and torque axes



### Innovative Technology

Proprietary transducer design provides high stiffness and sensitivity with low crosstalk



### Precise

Patented axial/torsional coupler enables precise concentric and angular alignment

#### TEST APPLICATIONS

- » Tension
- » Compression
- » Bend
- » Stress relaxation
- » Low-cycle fatigue
- » High-cycle fatigue
- » Fatigue crack growth
- » Fracture toughness
- » Thermomechanical fatigue (TMF)
- » Dynamic characterization
- » High temperature
- » Low temperature
- » Corrosive environments
- » More



## MTS Series 809 Test System Components

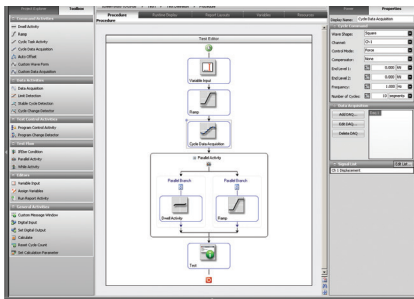
### MTS Series 319 Load Frame

The Series 319 is a highly stiff load frame with a high natural frequency in axial and torsional modes that delivers greater dynamic performance and testing accuracy. The stiff frame construction makes it resistive to side loads and deflections, so it is better able to maintain precision alignment during tests.



### MTS FlexTest® Controller

The MTS Series 809 A/T test system is equipped with the latest FlexTest controllers. Depending on the requirements for stations and channels, the FT40 or FT60 are commonly used with the Series 809 A/T system, but any other model with more channels can be chosen as well. The FlexTest controller delivers reliable high-speed closed-loop control, data acquisition, function generation and sensor regulation for multistation and multichannel tests.



### MTS TestSuite™ Software

MTS TestSuite test application software enables the complete process from definition to execution, analysis and report generation for a wide array of material tests. Specific modules are available for dozens of static and dynamic tests, including fatigue and fracture modules.



### MTS SilentFlo™ Hydraulic Power Unit

The hydraulic power source for the MTS Series 809 A/T test system is the MTS SilentFlo 515 hydraulic power unit. Available in several sizes and flow capacities, these HPUs maximize electrical efficiency and minimize water consumption for economical operation.

### Grips, Extensometers & Environmental Chambers

MTS offers a range of accessories for the MTS Series 809 A/T test system, featuring grips and fixtures for a wide variety of materials testing applications. Strain measurement tools include contacting and non-contacting extensometers for use in ambient and high-temperature applications. Environmental chambers and furnaces can help replicate real-world conditions as well.





## MTS Series 809 System Features

The MTS 319 Load Frame that is part of the MTS Series 809 Test System incorporates the latest MTS servohydraulic technology, including:

- » A highly rigid, lightweight crosshead with high natural frequency
- » A dedicated centering ring for high-precision tensional-torsional measurement, delivering accurate angle regulation
- » High-precision sensors for measuring the axial force & displacement and torsional angle
- » A hydraulic crosshead lifting and locking bar for easy adjustment of the test space
- » A servovalve block that can accommodate up to three servovalves

### Convenience & Operator Safety

- » Control panel for local operation of crosshead clamping & positioning and emergency stop
- » Handset for test setup & control
- » Open construction allows easy access to all components for maintenance & service

### Flexibility

- » System can be configured to meet static, dynamic & fatigue testing requirements
- » Axial & rotary actuators are controlled through separate single or dual servovalves
- » Valve sizes can be adjusted to match required performance levels.

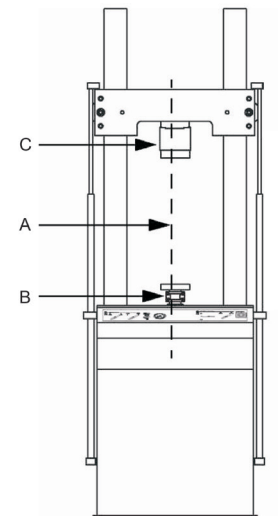


Parameter	Specification
<b>Load frame</b>	MTS 319
<b>Crosshead lifting</b>	Hydraulic
<b>Crosshead locking</b>	Hydraulic
<b>Fixture control</b>	Hydraulic
<b>Servovalve block</b>	MTS 298.12, high-pressure/low-pressure/ON/OFF
<b>Maximum flow</b>	Total tensional-torsional flow 114L/min
<b>Axial actuating rod</b>	MTS 244
<b>Axial displacement</b>	150 mm (6 in)
<b>Torsional actuating rod</b>	MTS 215
<b>Torsional travel</b>	Static +/-50 degrees, Dynamic +/-45 degrees
<b>Tightly coupled accumulator</b>	MTS 111
<b>Weight</b> (excluding the fixtures and accessories)	
319.02	1100 kg (2424 lbs)
319.05	1200 kg (2646 lbs)
319.10	1300 kg (2866 lbs)
319.25	1900 kg (4189 lbs)
319.50	3100 kg (6834 lbs)
319.60	custom

## Specifications

### Load Frame Maximum Rated Force Capacity Specifications

Model	Axial Force	Torsional Force
319.02	25 kN (5.5 kip)	220 N-m (2,000 in-lbf)
319.05	50 kN (11 kip)	550 N-m (5,000 in-lbf)
319.10	100 kN (22 kip)	1100 N-m (10,000 in-lbf)
319.25	250 kN (55 kip)	2200 N-m (20,000 in-lbf)
319.50	500 kN (110 kip)	5500 N-m (50,000 in-lbf)
319.60	1000 kN (220 kip)	11000 N-m (100,000 in-lbf)



### Load Frame Stiffness Specifications (SI Metric)

Model	A-Load Unit		B-Piston Rod		C-Load Transducer	
	Axial (N/m)	Torsional (N-m/radian)	Axial (N/m)	Torsional (N-m/radian)	Axial (N/m)	Torsional (N-m/radian)
319.02	$2.6 \times 10^8$	$7.9 \times 10^6$	$1.1 \times 10^9$	$4.3 \times 10^4$	$2.6 \times 10^9$	$6.8 \times 10^5$
319.05	$2.6 \times 10^8$	$7.9 \times 10^6$	$2.6 \times 10^9$	$1.9 \times 10^5$	$4.7 \times 10^9$	$1.4 \times 10^6$
319.10	$2.6 \times 10^8$	$7.9 \times 10^6$	$2.6 \times 10^9$	$1.9 \times 10^5$	$3.3 \times 10^9$	$1.1 \times 10^6$
319.25	$5.6 \times 10^8$	$1.3 \times 10^7$	$4.3 \times 10^9$	$3.5 \times 10^5$	$8.2 \times 10^9$	$4.3 \times 10^6$
319.50	$8.8 \times 10^8$	$2.6 \times 10^7$	$6.4 \times 10^9$	$1.6 \times 10^6$	$1.2 \times 10^{10}$	$9.0 \times 10^6$
319.60	$1.2 \times 10^9$	$4.5 \times 10^7$	$6.6 \times 10^9$	$1.7 \times 10^6$	$1.9 \times 10^{10}$	$2.5 \times 10^7$

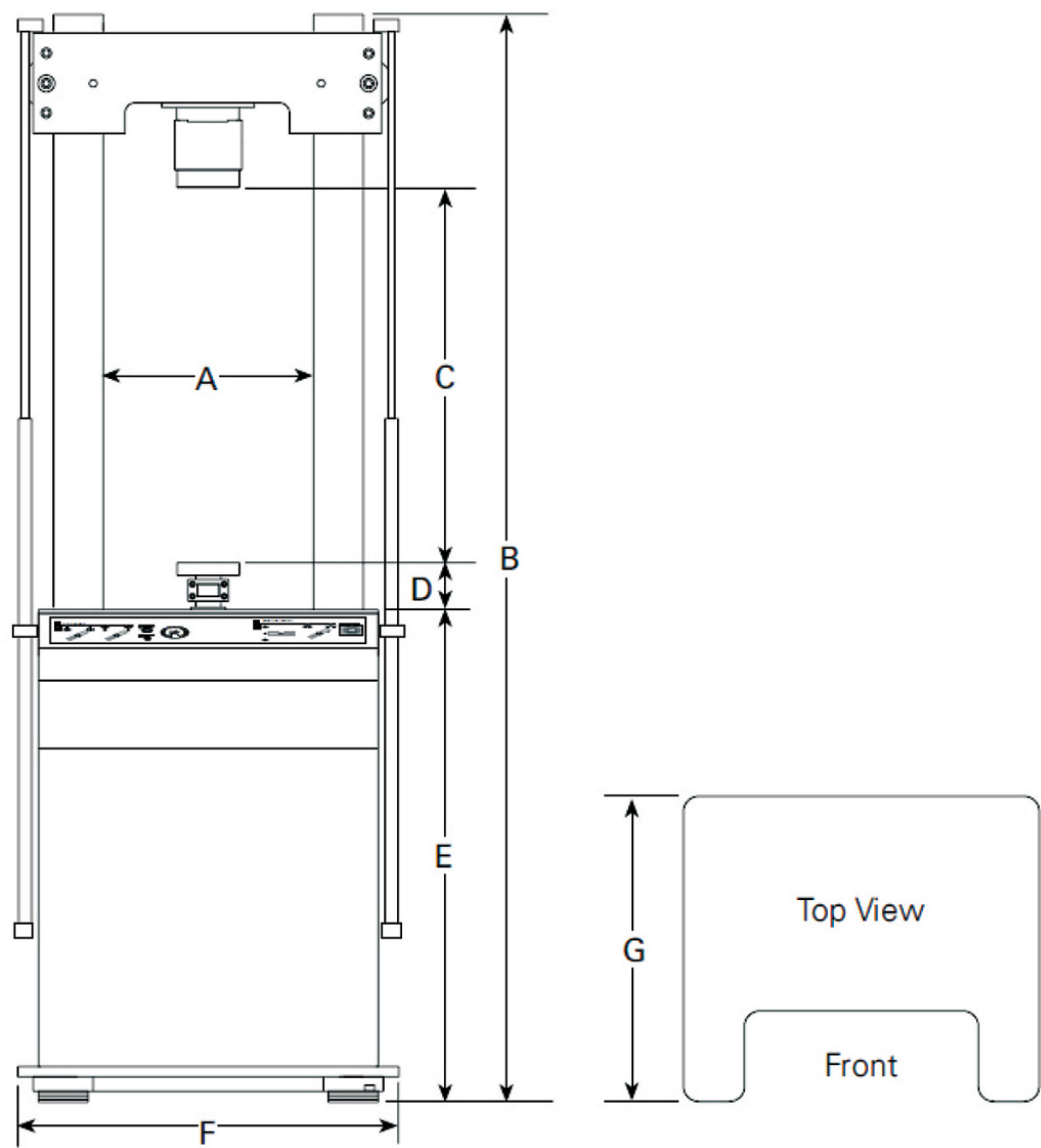
### Load Frame Stiffness Specifications (US Customary)

Model	A-Load Unit		B-Piston Rod		C-Load Transducer	
	Axial (lbf/in)	Torsional (lbf/in/radian)	Axial (lbf/in)	Torsional (lbf/in/radian)	Axial (lbf/in)	Torsional (lbf/in/radian)
319.02	$1.5 \times 10^6$	$7.0 \times 10^7$	$6.3 \times 10^6$	$3.8 \times 10^5$	$1.5 \times 10^7$	$6 \times 10^6$
319.05	$1.5 \times 10^6$	$7.0 \times 10^7$	$1.5 \times 10^7$	$1.7 \times 10^6$	$2.7 \times 10^7$	$1.3 \times 10^7$
319.10	$1.5 \times 10^6$	$7.0 \times 10^7$	$1.5 \times 10^7$	$1.7 \times 10^6$	$1.9 \times 10^7$	$1.2 \times 10^6$
319.25	$3.2 \times 10^6$	$1.2 \times 10^8$	$2.5 \times 10^7$	$3.1 \times 10^6$	$4.7 \times 10^7$	$3.8 \times 10^7$
319.50	$5.0 \times 10^6$	$2.3 \times 10^8$	$3.7 \times 10^7$	$1.4 \times 10^7$	$7 \times 10^7$	$8.0 \times 10^7$
319.60	$7.0 \times 10^6$	$4.0 \times 10^8$	$3.8 \times 10^7$	$1.5 \times 10^7$	$1.1 \times 10^8$	$2.2 \times 10^8$

### MTS Service & Support

Our global team of experienced, dedicated field service engineers can help optimize system performance, enhance productivity, and protect data integrity to extend equipment life and maximize uptime. Our global team of experienced, dedicated field service engineers can help optimize system performance, enhance productivity, and protect data integrity to extend equipment life and maximize uptime.

Dimensions



Load Frame Dimensions

Model	A	B	C*	D*	E	F	G
319.02	533 mm (21 in)	2891 mm (114 in)	1155 mm (45 in)	130 mm (5 in)	1240 mm (49 in)	1000 mm (39 in)	762 mm (30 in)
319.05	533 mm (21 in)	2891 mm (114 in)	1155 mm (45 in)	130 mm (5 in)	1240 mm (49 in)	1000 mm (39 in)	762 mm (30 in)
319.10	533 mm (21 in)	2891 mm (114 in)	1155 mm (45 in)	130 mm (5 in)	1240 mm (49 in)	1000 mm (39 in)	762 mm (30 in)
319.25	635 mm (25 in)	3412 mm (134 in)	1464 mm (57 in)	193 mm (8 in)	1278 mm (50 in)	1238 mm (49 in)	838 mm (33 in)
319.50	762 mm (30 in)	4020 mm (158 in)	1638 mm (64 in)	298 mm (12 in)	1403 mm (55 in)	1416 mm (56 in)	940 mm (37 in)

\*Actuator fully retracted and crosshead in max position

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