



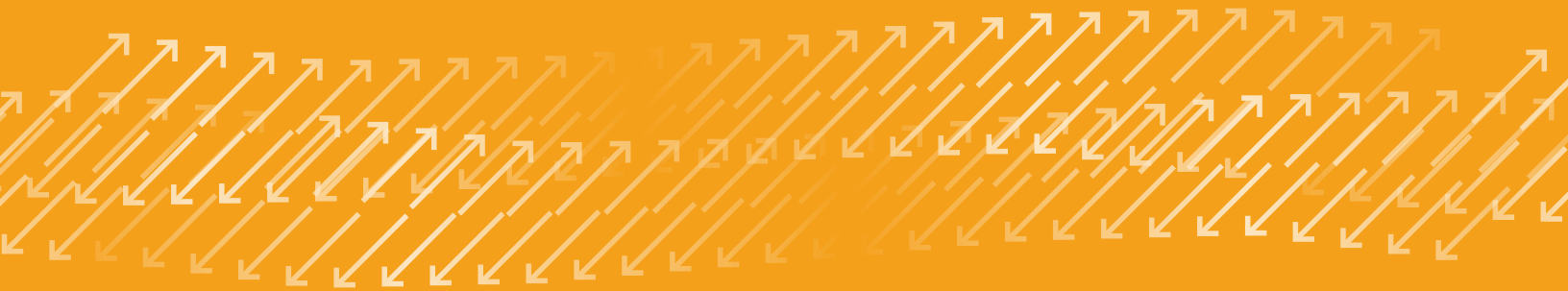
MTS Criterion™ Universal Test Systems

Series 40 Electromechanical Systems

Series 60 Static-Hydraulic Systems

be certain.

MTS CRITERION UNIVERSAL TEST SYSTEMS ARE ENGINEERED TO DELIVER THE HIGHLY RELIABLE, ACCURATE AND REPEATABLE MONOTONIC TESTING CAPABILITIES REQUIRED FOR ACHIEVING ROBUST CONTROL OF HIGH-VOLUME PRODUCTION QUALITY, PERFORMING HIGH-FORCE INDUSTRIAL TESTING, AND ESTABLISHING SCALABLE, INDUSTRY-COMPLIANT TESTING PROCEDURES.



MTS Criterion Universal Test Systems

Extending MTS testing expertise, technology leadership and unmatched global support across a broad spectrum of production testing applications

MTS is the world's leading supplier of mechanical test and simulation solutions. Precision MTS force and motion control technologies and unrivaled testing expertise are integral to the research and development of materials, components and structures across a diversity of industries and fields.

Affordable, new MTS Criterion Systems now extend the testing expertise, technology leadership and unmatched global support that have made MTS solutions a mainstay of R&D testing to a broad spectrum of production testing applications. Integrating high-resolution MTS controls and a complete portfolio universal load frames, MTS Criterion Systems deliver the reliable, repeatable performance needed to meet the robust quality compliance and uptime demands of high-volume production environments, as well as the capacity to perform a full range of high-force industrial testing.

The utility of MTS Criterion Systems spans a wide range of materials test applications. Featuring easy-to-use TestWorks® software, a large and growing library of standards-compliant test methods and a full complement of accessories, these systems accurately and efficiently perform standard tension, compression, flex/bend and shear tests on a wide array of specimens such as:

- » Metals
- » Polymers
- » Construction materials
- » Composites
- » Wood and paper products
- » Biomedical products
- » Fibers and textiles
- » Adhesives and coatings
- » Foam
- » and more

Ease-of-operation, adherence to worldwide safety and ergonomics directives, and a selectable, multi-language testing interface make MTS Criterion Systems an excellent foundation for establishing global, standardized test procedures, and efficiently equipping vocational and academic institutions.

MTS Criterion Systems can be rapidly configured, delivered and set up to quickly meet your specific testing requirements. All systems are backed by the global MTS Service & Support organization, a highly experienced team committed to maintaining the high uptime and operational efficiency of your test system investment.

Contact MTS today and explore how affordable MTS Criterion Systems can enhance the accuracy and efficiency of your production testing program.



Tightly Integrated Testing Solutions for the Most Demanding Production Environments

Combining the latest in MTS hardware and software innovation

MTS Criterion Systems integrate the latest in MTS testing hardware and software to deliver reliable, highly accurate and repeatable monotonic testing in even the most demanding, high-volume production environments.

A Complete Portfolio of Universal Load Frames

The MTS Criterion family includes comprehensive lines of compact Series 40 Electromechanical and robust Series 60 Static-Hydraulic load frames for performing accurate and repeatable monotonic testing on specimens ranging from thin film plastics to high-strength structural steel to reinforced concrete. Available in numerous, high-stiffness configurations, these frames feature

high-resolution MTS digital controls, compact AC servomotor drives, or powerful servocontrolled hydraulic actuation, to provide high-speed, low vibration testing across a very broad range of force capacities. MTS Criterion load frames comply fully with the latest global safety directives, including:

- » MACHINERY 2006/42/EC
- » LOW VOLTAGE 2006/95/EC
- » EMC Directive 2004/108/EC
- » GOST-R



Model 42



Model 44



Model 64

A Full Complement of Test Accessories

MTS Criterion System users can draw upon an extensive offering of grips and fixtures, environmental simulation systems and extensometers to address standard and custom test requirements across a full spectrum of monotonic materials testing applications, including tension, compression, flex/bend and shear, peel, tear creep, stress and more.

Full-featured, Easy-to-use TestWorks Software

TestWorks software delivers the intuitive operator interface, selectable multi-language capabilities, powerful analysis and reporting, and growing host of standard test methods needed to sustain efficient, industry-compliant testing across a full spectrum of materials and applications. A complete package of optional test definition utilities provides the ability to modify test templates and adapt quickly to changing requirements.



TestWorks software includes a Web browser-style launch screen to enhance ease of use

State-of-the-art MTS Testing Technology

MTS Criterion Systems integrate numerous MTS testing innovations to maximize test fidelity, operational efficiency, ease-of-use, safety and maintainability:

- » High-resolution MTS digital controllers deliver high-speed, closed-loop control and data acquisition for higher fidelity test data and more meaningful analysis.
- » Precision MTS load cells offer high stiffness, overload and side load protection, and TEDS self-identification capabilities.
- » Convenient, ergonomic handsets provide full system control at the test space for streamlined setup.
- » The innovative Integrated Operations Platform (Series 60 Static-Hydraulic only) combines an operator interface, system electronics and controls, and hydraulic power unit into a compact, ergonomic and easy-to-maintain module that is ideal for demanding industrial environments.
- » Full-featured test area enclosures with Integrated Control Pods and automated safety features help ensure operator well-being and full compliance with the latest international safety directives.
- » Durable, easy-to-maintain protective rubber matting extends the life and enhances the maintainability and utility of system test spaces.



Model 45



Model 43

Expertise Across the Production Testing Spectrum

A wide variety of configurations for performing reliable monotonic testing of metals, polymers, construction materials, and more

MTS understands the challenges of high-volume production testing. MTS Criterion Systems are engineered to fully meet these challenges across a broad spectrum of production testing applications. Robust Series 40 and Series 60 systems are available in a range of configurations to provide accurate and repeatable monotonic testing at forces ranging from 5 N to 1,000 kN. Combined with easy-to-use TestWorks software, a large and growing library of standards-compliant methods, and a

full complement of test accessories, they are ideal for performing accurate and repeatable tension, compression, flex/bend and shear tests on metals, polymers, construction materials, and more. Designed for easy maintenance and backed by the global MTS Service & Support organization, MTS Criterion Systems are well-suited for meeting the rigorous, high-uptime demands of production environments.



Metals Testing

Manufacturers of low-strength metal products demand highly efficient test solutions that minimize cost per test while maximizing throughput and operator safety. MTS Criterion Series 40 Systems deliver the reliability and high-speed control technology required to meet the demanding throughput and efficiency requirements typical for lower force specimens such as thin metals and fine wires. Easy-to-use TestWorks software and ergonomic test spaces maximize operator efficiency and facilitate quick test setup and runtime. Integrated test space enclosures help ensure operator well-being and full compliance with the latest international safety directives.

Producers of high-strength metal products want durable, turnkey testing solutions and a readily available arsenal of basic test methods to adapt easily to changing requirements. MTS Criterion Series 40 and Series 60 Systems feature a complete selection of grips, fixtures, environmental chambers, furnaces, and standards-compliant test methods to perform a broad range of higher-force, proof load testing of metal specimens such as castings, fasteners, threaded specimens and forgings.

Below is just a sample of the many Metals test standards that can be addressed using MTS Criterion test solutions:

Standard	Description
ASTM E8M	Standard Test Methods for Tension Testing of Metallic Materials
ISO 6892-1	Metallic Materials – Tensile testing at ambient temperature
EN 10002-1	Tensile Testing of Metallic Materials
ASTM E9	Standard Test Methods of Compression Testing of Metallic Materials at Room Temperature
ASTM E290	Standard Test Methods for Bend Testing of Material for Ductility
ISO 7438	Metallic Materials – Bend Test
ASTM E21	Standard Test Methods for Elevated Temperature Tension Tests of Metallic Materials
ISO 783	Metallic Materials – Tensile testing at elevated temperature
ASTM E517	Standard Test Method for Plastic Strain Ratio for Sheet Metal
ASTM E646	Standard Test Method for Tensile Strain-Hardening Exponents (n -Values) of Metallic Sheet Materials

Polymers Testing

Consumer goods manufacturers require easy-to-use test solutions that can maximize throughput and serve as a foundation for repeatable, standard testing methodologies. MTS Criterion Series 40 Systems feature a diverse array of standards-compliant test methods and compact, universal load frames to efficiently perform a full spectrum of lower force, peak load testing of polymer-based specimens such as consumer products, thin films, biomaterials and packaging. Combined with TestWorks software's intuitive, multi-language testing interface and powerful analysis and reporting capabilities, these systems provide an excellent means for establishing and sustaining a truly global, standardized testing program.

The production of high-strength polymers and composites necessitates solutions that can safely test strong, brittle specimens at high speeds under extreme environmental conditions. MTS Criterion Series 40 Systems include medium to higher-force universal load frames and a full complement of grips, fixtures and environmental simulation systems to perform fast, high-elongation testing of the high-strength polymers and composites commonly used in the aerospace and automotive industries. The easy-to-maintain MTS Criterion test space and selection of optional integrated safety enclosures are of particular value in this test environment.

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Below is just a sample of the many Polymer test standards that can be addressed using MTS Criterion test solutions:

Standard	Description
ASTM D790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
ASTM D624	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D638	Standard Test Method for Tensile Properties of Plastics
ASTM D695	Standard Test Method for Compressive Properties of Rigid Plastics
ISO 178	Plastics – Determination of flexural properties
ISO 1798	Flexible cellular polymeric materials – Determination of tensile strength and elongation at break
ISO 527	Plastics – Determination of tensile properties
ISO 604	Plastics – Determination of compressive properties
ASTM D882	Standard Test Method for Tensile Properties of Thin Plastic Sheeting

Construction Materials Testing

Construction materials manufacturers need highly robust test solutions that keep costs low while maximizing testing flexibility and operator safety. Featuring the easy-to-maintain MTS Criterion test space and a selection of optional integrated or isolated safety enclosures, high-capacity MTS Criterion Series 60 Systems are well-suited for demanding construction materials

testing environments. These affordable systems combine a complete selection of accessories, standards-compliant methods and TestWorks software test-definition capabilities to accommodate a full range of medium to very high-force testing of construction materials, including building materials, wood products, concrete, rock, rebar and structural steel.

Below is just a sample of the many Construction Materials test standards that can be addressed using MTS Criterion test solutions:

Standard	Description
ASTM C1609 / C1609M	Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading)
ASTM A370	Tensile Testing & Bend Testing Steel Rebar
ISO 15630	Steel for the reinforcement and pre-stressing of concrete – Test methods – Part 1: Reinforcing bars, wire rod and wire
ISO 1920-4	Testing of concrete – Part 4: Determination of flexural strength; Determination of tensile splitting strength
ASTM A185/ A185M	Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A615M	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A82/ A82M	Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
EN 10080	Steel for the reinforcement of concrete. Weldable reinforcing steel
ISO 15630-2	Steel for the reinforcement and pre-stressing of concrete – Test methods-Part 2: Welded fabric
ASTM F606	Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets

Series 40 Electromechanical Universal Test Systems

A comprehensive line of compact and reliable electromechanical systems for meeting a full spectrum of low to medium force monotonic testing requirements

MTS Criterion Series 40 systems feature a complete selection of universal test systems for meeting a wide range of monotonic production testing requirements. Highly reliable and easy-to-operate, these test systems employ high-speed, low vibration MTS electromechanical drives and integrated, digital closed-loop controls to test in load and position control at force capacities ranging from 5 N to 100 kN. Series 40 systems are available in a

variety of compact, high stiffness 1 and 2 column table-top configurations for low to medium force testing, or robust 2 column floor-standing configurations for medium to high force testing. Easy-to-use TestWorks software, a large and growing library of standards-compliant test methods, and a full complement of accessories extend the utility of these systems across a very broad spectrum of materials, including:

- » Plastics
- » Thin films
- » Fibers and threads
- » Adhesives
- » Foam
- » Elastomers
- » Biomaterials
- » Wood & paper products
- » Thin metals
- » Wire
- » High-strength metals
- » Components
- » Fasteners
- » Composites

SERIES 40 SYSTEM KEY FEATURES

- » Complete selection of compact, high stiffness 1 and 2 column load frame configurations
- » High-speed, low vibration MTS electromechanical drives
 - World-class, maintenance-free AC servomotor and amp
 - Precision, pre-loaded ballscrews
 - Non-clutched drives, rated for full speed at maximum force
- » High-resolution, digital closed loop controls (integrated into load frame)
- » Convenient test setup and control handset
- » Versatile, easy-to-use TestWorks software with standards-compliant method library (ASTM, ISO, DIN, EN, BS, and more)
- » MTS load cells with TEDS self-identification capabilities
- » Complete selection of grips, fixtures, environmental systems and extensometers
- » Optional Dual Zone test space (Models 44 and 45) for reducing setup time
- » Anti-rotation grip/fixture mounting
- » Optional T-Slot table
- » Linear motion guides for superior alignment
- » Automatic limit checking of crosshead position, overload, over temperature, over voltage, etc.
- » Optional EU-compliant Integrated Safety Enclosures
- » Fully compliant with MACHINERY 2006/42/EC, LOW VOLTAGE 2006/95/EC, EMC Directive 2004/108/EC, and GOST-R
- » Durable test space protection



Model 42

LOAD FRAME CONFIGURATION: 1 column, Table-top, Electromechanical

RATED FORCE CAPABILITIES: 1 N, 5 N, 10 N, 25 N, 50 N, 100 N, 250 N, 500 N, 1 k N, 2 k N, 5 k N

TEST SPACE: single zone

ENVIRONMENTAL SIMULATION: small fluid baths

TYPICAL SPECIMENS: plastics, fine wire, fibers and threads, biomaterials, thin films, adhesives, foam, packaging, paper products, consumer products



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Model 43

LOAD FRAME CONFIGURATION: 2 column, Table-top (integrated), Electromechanical

RATED FORCE CAPABILITIES: 100 N, 250 N, 500 N, 1 k N, 2.5 k N, 5 k N, 10 k N, 20 k N, 30 k N, 50 k N

TEST SPACE: single zone

ENVIRONMENTAL SIMULATION: full range of fluid baths

TYPICAL SPECIMENS: small components, reinforced plastics, metals, wire, composites, elastomers, wood products, textiles, biomaterials, paper products, adhesives, foam, consumer products



Model 44

LOAD FRAME CONFIGURATION: 2 column, Floor-standing, Electromechanical

RATED FORCE CAPABILITIES: 100 N, 250 N, 500 N, 1 k N, 2.5 k N, 5 k N, 10 k N, 20 k N, 30 k N

TEST SPACE: single or dual zone

ENVIRONMENTAL SIMULATION: full range of fluid baths, high-temperature furnace, environmental chamber

TYPICAL SPECIMENS: small components, reinforced plastics, metals, wire, composites, elastomers, wood products, textiles, paper products, adhesives, foam, consumer products



Model 45

LOAD FRAME CONFIGURATION: 2 column, Floor-standing, Electromechanical

RATED FORCE CAPABILITIES: 1 k N, 2.5 k N, 5.0 k N, 10 k N, 20 k N, 30 k N, 50 k N, 100 k N

TEST SPACE: single or dual zone

ENVIRONMENTAL SIMULATION: full range of fluid baths, high-temperature furnace, environmental chamber

TYPICAL SPECIMENS: metals, building components, large fasteners, composites, wood products



MTS Criterion Series 40 Specifications - Comparative

		Model 42	Model 43			Model 44		Model 45
Maximum Rated Force Capacity	kN lbf	5 1100	10 2200	30 6600	50 11000	10 2200	30 6600	100 22500
Force Capacity Options	N, kN lbf	1 N, 5 N, 10 N, 25 N, 50 N, 100 N, 250 N, 500 N, 1 kN, 2 kN, 5 kN 0.2, 1, 2, 5, 10, 20, 50, 110, 220, 450, 1100	100 N, 250 N, 500 N, 1 kN, 2.5 kN, 5 kN, 10 kN 20, 50, 110, 220, 500, 1100, 2200	100 N, 250 N, 500 N, 1 kN, 2.5 kN, 5 kN, 10 kN, 20 kN, 30 kN, 50 kN 20, 50, 110, 220, 500, 1100, 2200 4400, 6600	100 N, 250 N, 500 N, 1 kN, 2.5 kN, 5 kN, 10 kN, 20 kN, 30 kN, 50 kN 20, 50, 110, 220, 500, 1100, 2200 4400, 6600, 11000	100 N, 250 N, 500 N, 1 kN, 2.5 kN, 5 kN, 10 kN 20, 50, 110, 220, 500, 1100, 2200	100 N, 250 N, 500 N, 1 kN, 2.5 kN, 5 kN, 10 kN, 20 kN, 30 kN, 20, 50, 110, 220, 500, 1100, 2200 4400, 6600	1 kN, 2.5 kN, 5 kN, 10 kN, 20 kN, 30 kN, 50 kN, 100 kN, 220, 500N, 1100, 2200, 4400, 6600, 11,000, 22,500
Frame Type	Guide Columns Floor-standing/ Table-top	1 Table-top	2 Table-top	2 Table-top	2 Table-top	2 Floor-standing	2 Floor-standing	2 Floor-standing
Test Zones	Single/Dual	Single	Single	Single	Single	Single or Dual	Single or Dual	Single or Dual
Maximum Test Speed	mm/min in/min	2000 78.7	2000 78.7	1020 40.16	750 30	2000 78.7	1020 40.1	750 30
Minimum Test Speed	mm/min in/min	0.005 0.0002	0.005 0.0002	0.005 0.0002	0.005 0.0002	0.005 0.0002	0.005 0.0002	0.005 0.0002
Position Resolution	mm in	0.00005 0.000002	0.00004 0.0000016	0.00004 0.0000016	0.00004 0.0000016	0.00003 0.0000012	0.00003 0.0000012	0.000025 0.00000098
Maximum Length for Maximum Position Resolution	mm in	800 31.50	1000 39.37	1100 43.31	1100 43.31	1150 45.28	1150 45.28	1220 48.03
Power Requirements	V AC phase	200 - 230 V AC, 5 Amps, 50 / 60 Hz, 1000 W 1	200 - 230 V AC, 10 Amps, 50 / 60 Hz, 2000 W 1	200 - 230 V AC, 12 Amps, 50 / 60 Hz, 2400 W 1	200 - 230 V AC, 12 Amps, 50 / 60 Hz, 2400 W 1	200 - 230 V AC, 10 Amps, 50 / 60 Hz, 2000 W 1	200 - 230 V AC, 12 Amps, 50 / 60 Hz, 2400 W 1	200 - 230 V AC, 22 Amps, 50 / 60 Hz, 4400 W 1
Space Between Columns	mm in	100* 3.94*	425 16.73	420 16.54	420 16.54	400 15.75	400 15.75	600 23.62
Vertical Test Space								
Crosshead Travel								
<i>Standard Length</i>	mm in	800 31.5	1000 39.4	1100 43.4	1100 43.4	1150 45.3	1150 45.3	1220 48.1
<i>Extended Length</i>	mm in	1100 43.4	1300 51.2	1400 55.2	1400 55.2	1450 57.1	1450 57.1	1520 59.9
Frame Height								
<i>Standard Length</i>	mm in	1300 51.2	1571 61.9	1796 70.8	1796 70.8	1940 76.4	1940 76.4	2220 87.5
<i>Extended Length</i>	mm in	1600 63	1871 73.7	2096 82.6	2096 82.6	2240 88.2	2240 88.2	2520 99.3
Frame Width	mm in	490 19.3	766 30.2	748 29.5	748 29.5	754 29.7	754 29.7	1134 44.7
Frame Depth	mm in	485 19.1	535 21.1	540 21.3	540 21.3	580 22.9	580 22.9	762 30
Frame Weight								
<i>Standard Length</i>	kg lb	129 284	184 405	330 728	330 728	399 879	409 902	1350 2977
<i>Extended Length</i>	kg lb	143 315	196 432	345 760	345 760	415 915	425 937	1380 3043

* For single-column load frames this measurement denotes the distance between grip center and column cover

MTS Criterion Series 40 Specifications - Common

Calibration Standard	ISO 7500 Class 0.5 or ASTM E4	ISO 7500 Class 1
Force Range*	1 - 100% of rated force capacity	0.5% to 1% of force rated capacity
Rated Force Capacity at Max Test Speed	100%	
Maximum Test Speed at Rated Force Capacity	100%	
Speed Accuracy	Set speed < 0.01mm/min: speed accuracy is within $\pm 1.0\%$ of set speed Set speed ≥ 0.01 mm/min: speed accuracy is within $\pm 0.2\%$ of set speed	
Position Accuracy	within $\pm 0.5\%$	
Strain Accuracy	ASTM E83 or ISO 8513	
Security Protection	Over-force, travel limits, over-voltage and others	
Over Force Protection	10%	
Data Acquisition Rate	1000 Hz	
Control Loop Rate	1000 Hz	
Environmental Requirements		
<i>Operating Temperature</i>	5 to 40°C 41 to 104°F	
<i>Operating Humidity</i>	5 - 85% Non-condensing	
<i>Storage Temperature</i>	-18 to 49°C 0 to 120°F	
<i>Maximum Storage Humidity</i>	90% Non-condensing	
<i>Maximum Altitude</i>	2000 Meters	
Motor & Drive System	AC Servo Motor	
Ballscrews	Pre-Forced	
Position Measurement	Encoder	
Additional DC Conditioning Channels	2 channels (<i>Examples: resistive extensometers and force cells</i>)	
Additional Digital Conditioning Channels	1 channel (<i>Examples: long travel extensometer and quadrature encoders</i>)	

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* Exceptions apply. See your local MTS contact.

Shipping Information

		Model 42	Model 43		Model 44		Model 45	
Standard Length Frame (estimated)								
<i>Dimensions - Crated</i>	mm	1020 x 800 x 1500	876 x 1020 x 1835	2100 x 900 x 780	2100 x 900 x 780	2100 x 900 x 780	2100 x 900 x 780	2764 x 1520 x 1360
	in	40.2 x 31.5 x 59.1	34.5 x 40.2 x 72.3	82.7 x 35.5 x 30.8	82.7 x 35.5 x 30.8	82.7 x 35.5 x 30.8	82.7 x 35.5 x 30.8	108.9 x 59.9 x 53.6
<i>Weight - Crated</i>	kg	300	450	550	550	650	650	1600
	lb	650	1000	1200	1200	1400	1400	3500
Extended Length Frame (estimated)								
<i>Dimensions - Crated</i>	mm	1020 x 800 x 1800	876 x 1020 x 2135	2400 x 900 x 780	2400 x 900 x 780	2400 x 900 x 780	2400 x 900 x 780	3100 x 1520 x 1360
	in	40 x 32 x 71	35 x 40 x 84	95 x 36 x 31	95 x 36 x 31	95 x 36 x 31	95 x 36 x 31	122 x 60 x 54
<i>Weight - Crated</i>	kg	325	475	575	575	675	675	1700
	lb	725	1050	1250	1250	1500	1500	3800

Series 60 Static-Hydraulic Universal Test Systems

A complete selection of robust static-hydraulic systems for meeting higher force monotonic testing requirements

MTS Criterion Series 60 systems perform accurate and reliable tension and compression tests of high-strength specimens in a wide range of shapes and sizes. These robust test systems employ reliable MTS servocontrolled hydraulic actuation and high-speed, digital closed loop controls to test in load, displacement or strain control at force capacities ranging from 300 kN to 1000 kN. Series 60 systems are available in a variety of high-stiffness

6 column load configurations, all supported by a compact and ergonomic Integrated Operations Platform. Easy-to-use TestWorks software, a large and growing library of standards-compliant test methods, and full complement of accessories extend the utility of these systems across a full spectrum of high-strength metals and construction materials, including:

- » Sheet metal
- » Plate metal
- » Bar metal
- » Fasteners
- » Wire and cable
- » Chain
- » Piping and tubing
- » Structural steel
- » Rebar
- » Welds
- » Castings
- » Forgings
- » Structural components
- » Rock and concrete
- » Pavement
- » Fasteners (non-metal)
- » Wire and cable (non-metal)
- » Rebar (non-metal)

SERIES 60 SYSTEM KEY FEATURES

- » High-stiffness 6 column load frame configurations
- » Reliable MTS servocontrolled hydraulic actuation
- » High-resolution, digital closed loop controls
- » Convenient, test setup and control handsets
- » Versatile, easy-to-use TestWorks software with standards-compliant method library (ASTM, ISO, DIN, EN, BS, and more)
- » Complete selection of grips, fixtures, environmental systems and extensometers
- » Compact and ergonomic Integrated Operations Platform
- » Standard Dual Zone Test Space for reducing setup time
 - Tension on top
 - Compression on bottom
- » Non-step loading
- » "Quick Return" hydraulic valve for higher throughput
- » Automatic limit checking of crosshead position, overload, over temperature, over voltage, etc.
- » Optional EU-compliant Isolated Safety Enclosure
- » Fully compliant with MACHINERY 2006/42/EC, LOW VOLTAGE 2006/95/EC, EMC Directive 2004/108/EC, and GOST-R
- » Durable test space protection
- » Easy-to-access maintenance panels



Model 64.305

LOAD FRAME CONFIGURATION: 6 column, servocontrolled hydraulic

RATED FORCE CAPACITY: 300 kN

TEST SPACE: dual zone (tension on top, compression on bottom)

TYPICAL SPECIMENS: sheet metal, composites, fasteners (non-metal), wire and cable (non-metal), rebar (non-metal)



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Model 64.605

LOAD FRAME CONFIGURATION: 6 column, servocontrolled hydraulic

RATED FORCE CAPACITY: 600 kN

TEST SPACE: dual zone (tension on top, compression on bottom)

TYPICAL SPECIMENS: sheet metal, composites, piping and tubing, rebar, welds, castings, pavement



Model 64.106

LOAD FRAME CONFIGURATION: 6 column, servocontrolled hydraulic

RATED FORCE CAPACITY: 1000 kN

TEST SPACE: dual zone (tension on top, compression on bottom)

TYPICAL SPECIMENS: piping and tubing, wire and cable, chain, rebar, welds, castings, composites, pavement



MTS Criterion Series 60 Specifications - Comparative

		Model 64.305	Model 64.605	Model 64.106
Rated Force Capacity	kN	300	600	1000
	lbf	67,500	135,000	220,000
Column Configuration	Column Number	6	6	6
Test Zones	Single/Dual	Dual	Dual	Dual
Actuator (Piston) Stroke	mm	150	200	250
	in	5.91	7.87	9.84
Actuator (Piston) Speed	mm/min	0.01 - 180	0.01 - 140	0.01 - 90
	in/min	0.0004 - 7.09	0.0004 - 5.51	0.0004 - 3.54
Crosshead Speed	mm/min	220	210	200
	in/min	8.66	8.27	7.87
Column Spacing (test space width)	mm	405	430	520
	in	15.94	16.92	20.47
Maximum Tension Space				
	<i>Standard Length</i>			
	mm	550	750	800
	in	21.65	29.53	31.5
	<i>Extended Length</i>			
	mm	900	1100	1150
	in	35.43	43.31	45.28
Maximum Compression Space				
	<i>Standard Length</i>			
	mm	410	650	700
	in	16.14	25.59	27.56
	<i>Extended Length</i>			
	mm	760	1000	1050
	in	29.92	39.37	41.34
Diameter of Round Specimens	mm	10 - 32	10 - 40	15 - 55
	in	0.39 - 1.26	0.39 - 1.57	0.59 - 2.17
Thickness of Flat Specimens	mm	2 - 25	2 - 30	2 - 40
	in	.07 - .98	.07 - 1.18	0.08 - 1.57
Compression Platens	mm	150 x 150 (square)	150 x 150 (square)	220 x 220 (square)
	in	5.91 x 5.91 (square)	5.91 x 5.91 (square)	8.66 x 8.66 (square)
Frame Height				
	<i>Standard Length</i>			
	mm	2074	2390	2720
	in	82	94	107
	<i>Extended Length</i>			
	mm	2424	2740	3070
	in	96	108	121
Frame Width	mm	870	1170	1310
	in	34.25	46.06	51.57
Frame Depth	mm	725	800	910
	in	28.54	31.50	35.83
Frame Weight				
	<i>Standard Length</i>			
	kg	1950	3150	5250
	lb	4300	6945	11575
	<i>Extended Length</i>			
	kg	2070	3270	5370
	lb	4564	7209	11839

MTS Criterion Series 60 Specifications - Common for 300 kN to 1000 kN

Calibration Standard	ISO 7500 Class 0.5 or ASTM E4	ISO 7500 Class 1
Force Range*	1% - 100% of rated force capacity	0.5% to 1% of rated force capacity
Displacement Resolution	0.2 um (0.00000787 in)	
Displacement Accuracy	+/- 1% of indicating	
Strain Accuracy	ASTM E83 or ISO 8513	
Security Protection	Over-force, travel limits, oil pressure, over-temperature, over-voltage and others	
Over Force Protection	10%	
Data Acquisition Rate	1000 Hz	
Control Loop Rate	1000 Hz	
Environmental Requirements		
<i>Operating Temperature Range</i>	5 to 40°C 41 to 104°F	
<i>Operating Humidity</i>	5 - 85% Non-condensing	
<i>Storage Temperature Range</i>	-18 to 49°C 0 to 120°F	
<i>Maximum Storage Humidity</i>	90% Non-condensing	
<i>Maximum Altitude</i>	2000 Meters	
Integrated Operations Platform (IOP) Power Requirements	400 V 50 Hz / 480 V 60 Hz V AC (3 phase)	
IOP Dimensions		
	mm	1040 x 720 x 1900
	in	38.58 x 28.35 x 74.8
IOP Weight		
	kg	400
	lb	881.85

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* Exceptions apply. See your local MTS contact.

Shipping Information

		Model 64.305	Model 64.605	Model 64.106
Standard Length Frame (estimated)				
<i>Dimensions - Crated</i>	mm	2700 x 1500 x 1350	3000 x 1800 x 1450	3350 x 2000 x 1550
	in	106 x 59 x 53	118 x 71 x 57	132 x 79 x 61
<i>Weight - Crated</i>	kg	2100	3350	5500
	lb	4630	7385	12125
Extended Length Frame (estimated)				
<i>Dimensions - Crated</i>	mm	3050 x 1500 x 1350	3350 x 1800 x 1450	3700 x 2000 x 1550
	in	120 x 59 x 53	132 x 71 x 57	146 x 79 x 61
<i>Weight - Crated</i>	kg	2250	3500	5650
	lb	4960	7716	12456
Integrated Operations Platform				
<i>Dimensions - Crated</i>	mm	1200 x 900 x 2150		
	in	47.24 x 35.43 x 84.65		
<i>Weight - Crated</i>	kg	480		
	lb	1058.22		

Full-featured, Easy-to-use TestWorks Software

The industry's most comprehensive package of test-ready methods, analysis and reporting features, and test definition capabilities

The world's most full-featured universal testing package, TestWorks software is designed to enhance your ability to perform accurate and repeatable mechanical testing of materials, components and finished goods across a full spectrum of applications.

TestWorks software provides the simplicity and ease-of-operation needed for quick and efficient quality assurance and quality control testing, the flexibility to adapt readily to changing requirements, and the sophistication to address unique or complex demands. The software's intuitive operator interface, selectable multi-language capabilities, powerful analysis and reporting, and growing host of test methods make it an excellent foundation for establishing and sustaining a truly global standardized testing methodology.

TestWorks software is fully compatible with all MTS Criterion Series 40 Electromechanical and Series 60 Static-Hydraulic test systems. It can be readily configured to perform monotonic and quasi-cyclic testing, meet most ASTM, ISO, and DIN specifications, and fulfill a broad host of other standard and custom testing needs.

The TestWorks software offering comprises three distinct packages, which can be bundled to match your specific testing needs:

- » The **TESTWORKS ESSENTIALS** package runs a variety of preset testing methods, including peel, tear, shear, tensile, compression, creep, stress, cyclic and strain at low- to high-force capacities. Recognized as an industry leader, the Essentials package is the base product for both the Advanced and Creator packages.
- » The **TESTWORKS ADVANCED** package runs preset testing methods with the ability to add non-motion control test segments and additional calculations.
- » The **TESTWORKS CREATOR** package is designed for the knowledgeable user who wants to create or modify test methods by adding and sequencing motion or control segments.

User-friendly Runtime Operation

TestWorks software greatly simplifies test selection, initiation and real-time monitoring with an intuitive, push-button environment and easy-to-understand displays. Additionally, a large set of selectable languages extends the utility of this interface to a truly global population of operators. To initiate a test sequence, operators simply select and run a pre-packaged standard or custom test method and then follow the intuitive, user-definable prompts. Once started, operators then monitor the test using the real-time, auto scaling graphics and digital displays of the TestWorks Virtual Control Panel. This panel can be configured for real-time monitoring of multiple graph/data segments, including load, crosshead, stress and strain.

Large, Growing Test Method Library

TestWorks software features a large, growing host of pre-packaged test methods to help you quickly and efficiently meet the requirements of global test standards such as ASTM, ISO, DIN, EN, BS, and more. Selected by an operator at runtime, these methods are crafted to meet the specific test flow, analysis and reporting requirements of industry standards across a range of specimen and test types. Pre-packaged test methods are available in a wide selection of bundled sets, including:

- » Polymers & Plastics
- » Metals
- » Construction Materials
- » Biomedical Products
- » Paper Products
- » Adhesives
- » Foam
- » Textiles
- » and more



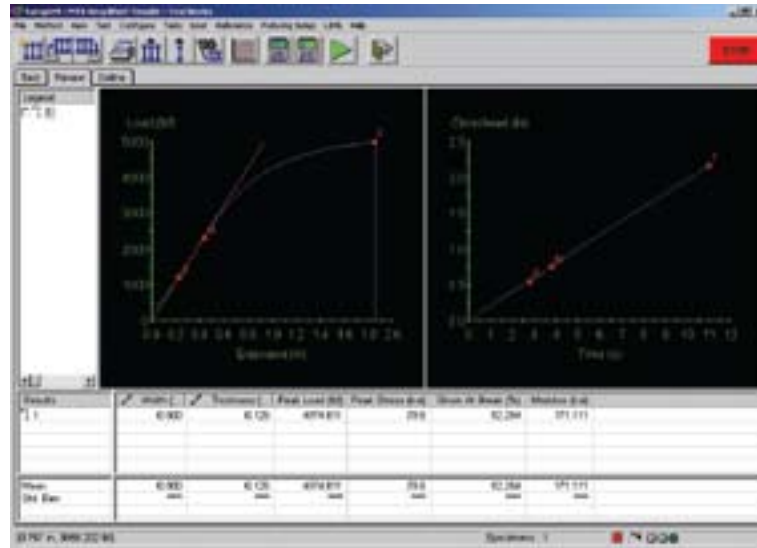
Runtime Screen

Robust Analysis & Reporting

TestWorks software facilitates the flexible display, handling and sharing of test data to meet a full range of industry-standard analysis and reporting requirements.

The TestWorks Review Screen augments post-test analysis with easy-to-understand displays and highly flexible, interactive data plots. Features include movable markers, text, and construction lines, and the ability to define a region of interest and easily zoom in for closer inspection. The review screen also allows post-test data to be displayed across multiple graphs, simultaneously.

Test results can be output to standard, presentation-quality reports and plots, or a format customized to meet your particular data sharing needs. Easy-to-create formulas efficiently export test results to intuitive TestWorks reports, as well as other formats, such as Excel, Word, HTML, Laboratory Information Management System (LIMS), PowerPoint, e-mail and text.

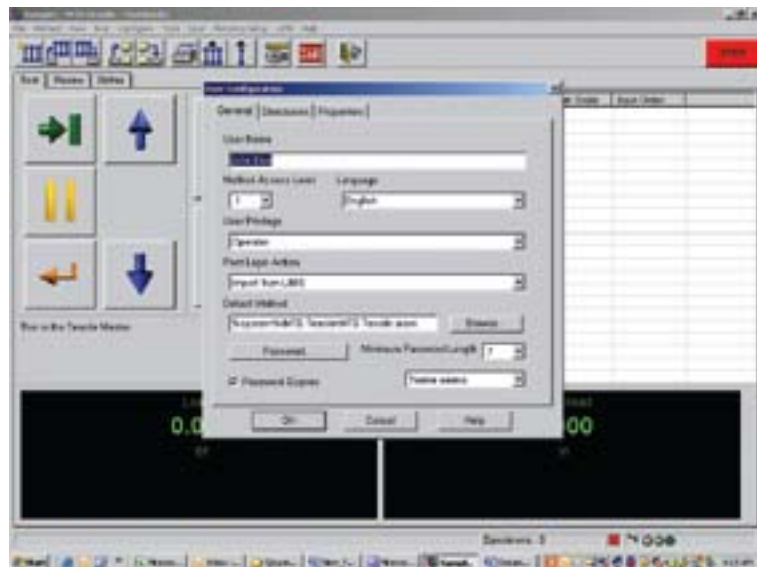


Review Screen

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Full-featured Test Definition

For unique, non-standard test applications TestWorks software provides all the test definition capacity and flexibility you'll need to create custom test sequences while accommodating the specific runtime needs of your lab personnel. For the most complex or challenging test applications, users can turn to MTS experts for custom test template development, saving valuable test engineering time and resources.



Test Definition Window

A Full Complement of Test Accessories

The right grips and fixtures, environmental simulation solutions, and extensometers to meet your specific production testing needs

MTS complements its MTS Criterion Systems with the test accessories required to meet a full spectrum of material and small component testing — from basic quality control to complex biomedical simulations. This array comprises the world's highest-performing selection of extensometers, a variety of environmental simulation solutions, and a complete range of grips and fixtures to accommodate your specific testing needs. Contact MTS for a complete catalog of our accessories offerings.

Grips & Fixtures

The MTS Fundamental™ family includes basic, affordable accessories for standard monotonic testing of metals, polymers, construction materials, composites, wood and paper products, fibers and textiles, adhesives and coatings, foam and more. These accessories feature a universal adapter design and optional threaded frame adapters to facilitate quick and easy installation onto both

electromechanical and static-hydraulic systems. Anti-rotation features and integrated alignment pins enhance test accuracy and repeatability.

The Bionix® Accessories family includes affordable and extremely durable grips, fixtures, platens and environmental simulation systems for monotonic testing of biomedical materials and components in fluids heated to body temperatures.



Side-action tensile grips



Tensile grips for metal & plastic



Compression platens



Pneumatic grips



Tensile grips for metal & plastic



Winding tensile grips



Shear fixture



Special purpose grips



Wide belt tensile grips



Shoulder tensile grips



Punch fixture



Peel fixture

Environmental Simulation Systems

MTS environmental simulation systems enable the testing of materials and components under a wide variety of real world conditions. Available systems include high temperature furnaces, environmental chambers and liquid baths.

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FLUID BATHS

Versatile and easy-to-use, the Bionix EnviroBath facilitates efficient and accurate mechanical testing of biomedical and general material specimens in fluids heated to body temperatures. The EnviroBath is available in a variety of volume configurations to accommodate a wide range of test requirements. A universal adapter design ensures full compatibility with MTS electromechanical and servohydraulic load frames, and a wide variety of Bionix grips and fixtures.



FURNACES

MTS furnaces are ideal for conducting tension, compression, bend and cyclic fatigue testing of metals, composites and ceramics at high temperatures. A center-split design facilitates easy specimen and fixture access, and mounting brackets are available for a variety of MTS and non-MTS load frames.



CHAMBERS

MTS environmental chambers enable the testing of materials and components across a range of controlled temperature, humidity or caustic conditions. Typical uses include elastomer, plastics and composite tests, body and engine mount tests, shock absorber tests, tire cord tests, laminate tests, and vibration isolator tests.

Precision Extensometers

MTS offers the world's most comprehensive and highest-performing selection of extensometers for monotonic material and component testing. This includes extended length, laser, axial, and high temperature extensometers, as well as a variety of non-contacting laser or video applications.



Axial Extensometer



Extended Length Extensometer

State-of-the-art MTS Testing Technology

Optimizing test fidelity, operational efficiency, ease-of-use, safety and maintainability

MTS Criterion Systems integrate precision MTS control technologies and numerous design innovations to optimize test fidelity, operational efficiency, ease-of-use, safety and maintainability.

High-Resolution Digital Controllers

MTS digital controllers deliver high-speed, closed loop control and an industry-leading 1,000 Hz data acquisition rate. This capacity allows you to generate higher resolution test data for more meaningful analysis, achieve higher fidelity across test runs, and gain statistically significant test samples more quickly and efficiently. MTS digital controllers integrate seamlessly into Series 40 electromechanical load frames and Series 60 Integrated Operations Platforms.

- » 1000 Hz control loop rate
- » Up to 1000 Hz data acquisition rate
- » 20-bit resolution
- » Built-in USB 2.0 for PC communication
- » Self-ID capability for calibration and auto-ranging
- » Two optional strain inputs in addition to the system load cell
- » Three optically isolated digital inputs and outputs
- » Two BNC monitor connectors
- » A test area enclosure interlock connector



Convenient, Ergonomic Handsets

MTS handsets facilitate streamlined test setup by enabling operators to perform standard system control functions such as start, stop, pause, and crosshead positioning while standing close to the test specimen. The handset can display test status messages, system performance messages, and test results. Two programmable function keys are set up in the software as digital inputs, allowing users to define test functions such as start test, pause and hold position. The handset features a compact, ergonomic design for both right-handed and left-handed operators and a large text display that provides information at a glance.



Precision, TEDS-enabled Loads Cells

Highly accurate MTS load cells are designed to offer high stiffness and stability with low non-linearity. They provide overload and side load protection and are designed with built-in shunt resistors to facilitate regular verification of accuracy using calibration routines featured in MTS software. To increase efficiency and reduce potential operator error, they feature TEDS (Transducer Electronic Data Sheets) self-identification capabilities that follow the recently adopted IEEE 1451.4 standard. This enables an MTS Criterion System to automatically detect installed load cells and download specific calibration information.



Integrated Operations Platform

Unique to Series 60 Static-Hydraulic Systems, the new Integrated Operations Platform consolidates the operator interface, system electronics and controls, and hydraulic power supply into a single compact, mobile unit. Ideal for demanding industrial environments, this unit includes a conditioned internal environment to protect components and enhance system maintainability. Ergonomic, centralized controls, a noise-dampening enclosure, and a tidy cabling/hose management system help ensure operator safety and well-being.

- » High-resolution, closed loop digital controls
- » Ergonomic Operator Interface
- » System Computer
- » Hydraulic power supply
- » Compact and mobile
- » Internal environmental conditioning
- » Noise damping enclosure
- » Managed cabling/hose system



Globally-compliant System Safety Features

To help ensure operator well-being and full compliance with the latest international safety directives, MTS Criterion Systems are designed to accommodate a variety of safety features, including:

- » A full complement of integrated and isolated test space enclosures
 - Automatic, low-velocity travel when the enclosure door is open
 - Integrated test space enclosure interlocks
 - Integrated Control Pod
 - System Status Light - indicates whether the load frame drive is energized and ready for testing
 - E-Stop
 - Test Control Handset
 - Specimen Setup Handset (Series 60 Static-Hydraulic)
- » Mechanically adjustable limits to stop the crosshead predetermined points
- » Motor overheat device to automatically turn off the motor power supply
- » Ability to set limits for load, extension, strain, or any other data channel



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Durable, Easy-to-maintain Test Space

MTS Criterion Systems feature durable, protective rubber matting to extend the life and enhance the maintainability and utility of the system test space. Both Series 40 and Series 60 systems feature heavy work surface mats, which are designed to protect the load frame base and facilitate easy test space cleanup and maintenance. Work surface mats feature molded edges to prevent tools from rolling off and an integrated groove pattern to channel away spills and debris. Series 60 systems feature grip cavity mats and wedge covers to protect grip/fixture interfaces.



Unmatched MTS Service & Support

Committed to maximizing test system uptime and operational efficiency

MTS Criterion Systems are backed by the global MTS Service & Support organization. This highly experienced team offers lifecycle management services for all your test systems and is committed to maximizing the uptime and operational efficiency of your test system. With the expertise to support your test equipment from pre-installation to decommission and at every point in between, MTS has the service solutions to meet your needs for test schedule predictability, data integrity, system performance optimization and budget management.

Onsite Services

MTS builds the most rugged test solutions available, but constant motions and forces applied to test specimens ultimately take their toll. Our field service engineers have a worldwide reputation for applications expertise, and will respond to your request for support or repair quickly and efficiently. MTS can also assist with installation or movement of lab equipment. Our service team can help you properly disassemble the equipment, pack it for transportation and install it at a new location. In addition, we offer consumables and spare parts for new-generation MTS equipment and most of our legacy systems.

Engineering Services

MTS offers a complete set of professional engineering services, including systems engineering, test consulting and facilities design services. MTS experts will listen to your test objectives, analyze your situation, and translate your desires to specific system requirements. Leveraging years of application expertise, MTS will engineer the right solution that meets your testing needs and business conditions. We can provide test designs, fixture engineering, control system evaluation, data collection and results analysis. By referencing the best practices of test labs worldwide, MTS can help you design test facilities, including hydraulic distribution systems, and recommend long-range lab investment plans that support your business growth strategies or research plans.



Extensometer Calibration



Load Frame Alignment

Training

MTS training programs are designed to improve operator efficiency and optimize system performance. Expertly led and completely customizable, the courses provide hands-on learning to make sure your staff is thoroughly familiar with your test systems and know how to operate them effectively. In addition to a broad selection of standard courses, MTS can customize courses to meet your specific lab needs and deliver the training at our Training Center or your workplace.

Calibration & Alignment

All test labs must calibrate their testing equipment to help ensure data accuracy, and MTS provides top-quality, accredited calibration services. We can complete calibration at your location, or in our factory metrology labs. We also offer a range of services, including load frame alignment services, designed to help minimize data variance.

Maintenance & Monitoring

Making sure that equipment is operating at full capacity and test projects are completed on time without interruption are important aspects of test lab management. Based on service experiences accumulated over decades, MTS has a set of well-defined routine maintenance offerings tailored for specific systems and components, to help extend equipment life and provide you with confidence in

your equipment operation. We also offer sophisticated assessment tools to better understand equipment condition and anticipate potential issues before they become larger problems.

Upgrade Solutions

As technology improves, an upgrade is often the most economical way of expanding your lab capabilities and extending the life of existing test equipment. MTS offers upgrades and replacements for all areas of your test system: mechanical components, controllers and software. Our Software Maintenance Enhancement and Support (ME&S) agreements make it easy to stay current with rapidly changing software technology. Within your contract period, you will automatically receive updates to all software covered in your contract.



TestWorks Software Training



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ISO 9001 Certified QMS
<http://www.mts.com>

To locate an MTS representative near you, visit
www.mts.com/mtscriterion

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100-221-113 Criterion Universal System Printed in U.S.A. 7/10