

MTS Passive Load Abort System

Safe, reliable energy removal

Trusted design

- » Modular construction
- » Hardened steel cartridge valve design
- » Independently adjustable tension and compression bleed-down rates
- » Easy integration with MTS actuators and servovalves
- » One-piece, split and remote manifold configurations
- » Stable, high-response, two-stage load limiter valve

The MTS passive load abort system provides a proven, time-tested means of rapidly removing energy from test systems. Ideal for a variety of structural testing applications, this simple yet effective constant-velocity manifold protects valuable test articles from damage by automatically unloading hydraulic pressure in case of power failure, hydraulic failure or system command.

The system includes two components: the MTS Series 297 Overload Protection Module and the MTS Model 289.11 Load Limiter Valve. Together, these durable

components create a highly stable two-stage valve system that responds quickly to unexpected pressure changes, protecting the test article from uncontrolled or excessive forces that could damage the specimen.

The MTS passive load abort system works with single- and multi-channel test systems and can be mounted remotely or directly on an actuator. Its bolt-on design fits MTS actuators with force ratings from 15 to 445 kN (3.3 to 100 kip) and works with MTS Series 252.2x Servovalves. Configurations for other actuators and non-MTS servovalves are also available.

be certain.

Smooth, precise operation

During normal operation, hydraulic fluid displaces the load abort valve spools in the Overload Protection Module and connects the servovalve ports to the Load Limiter Valve and actuator. The Load Limiter Valve limits the output forces of the actuator, while the (optional) Overload Detector indicates when the Load Limiter Valve is limiting actuator output force.

To limit actuator output force, the Load Limiter Valve monitors pressure directed to the compression and tension ports of each actuator. When output force is less than the desired maximum level, the pilot and main stage relief valves remain closed. If force exceeds the desired maximum, hydraulic fluid flows through an orifice in the main stage and displaces (“cracks”) the poppet in the pilot stage. When the main stage orifice cannot accommodate the flow of fluid, the pressure differential opens the main stage poppet, porting fluid to the return line.

If a power failure or system command de-energizes the solenoid valve of the Overload Protection Module, or a hydraulic failure removes pressure from the module’s load abort valves, the load abort valves block the servovalve ports and connect the actuator ports to the metering valves, causing bleed-down to occur. Because the metering valves are independently adjustable, they can provide separate tension and compression bleed-down rates from 0 to 189 lpm at 6.7 MPa (0 to 50 gpm at 1000 psi).



SERIES 297 OVERLOAD PROTECTION MODULE

- » Protects test specimens during electrical or hydraulic failure
- » Provides independently adjustable tension and compression load abort bleed-down rates
- » Simplifies maintenance with modular construction and hardened steel cartridge valve design
- » Accommodates MTS Series 252.2x Servovalves with standard 94.6 lpm (25 gpm) flow rating
- » Offers one-piece, split and remote manifold configurations
- » Indicates presence of overload conditions with Overload Detector (optional)
- » Defends components against fluid contamination with 15-micron absolute filter (optional)

MODEL 289.11 LOAD LIMITER VALVE

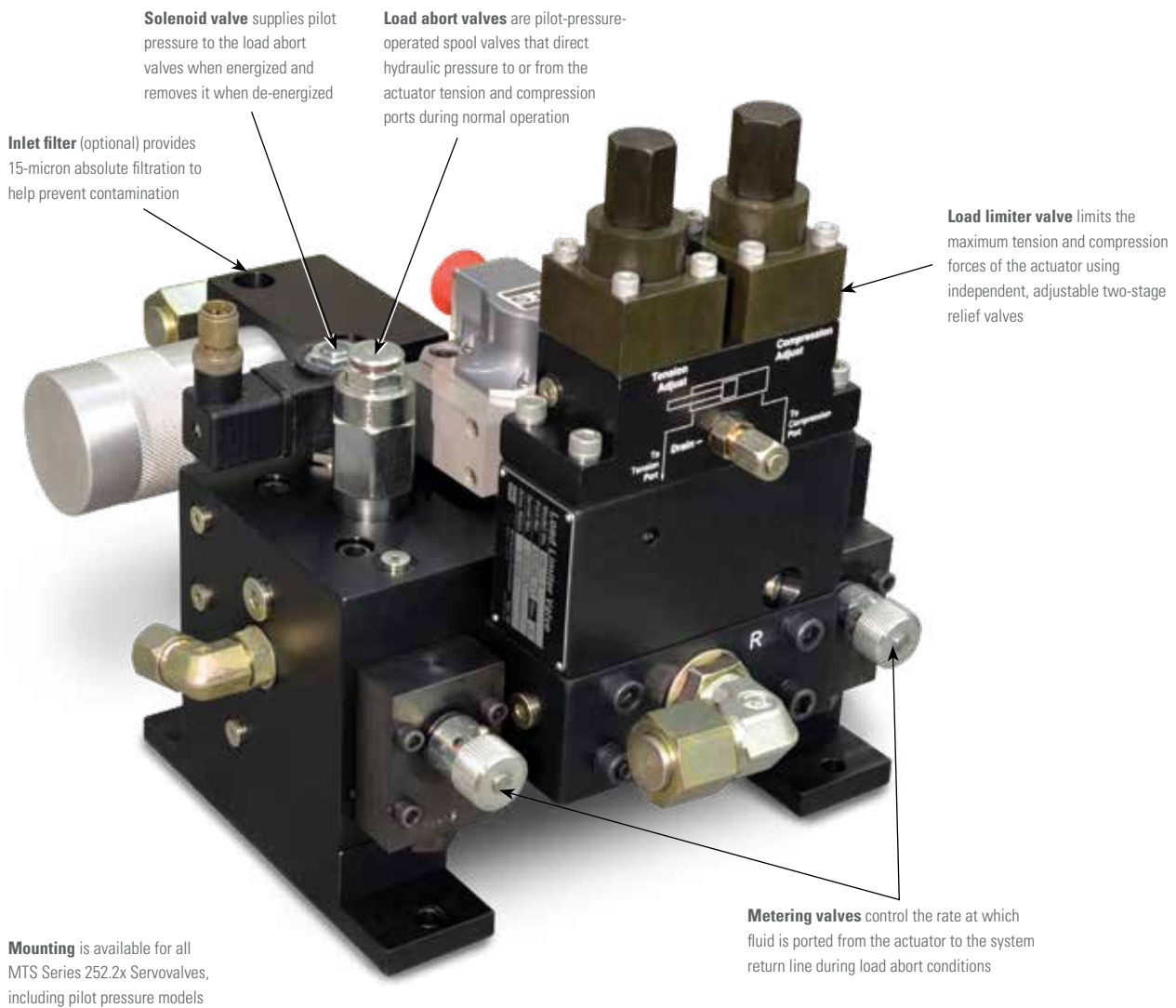
- » Limits output forces of actuators with unequal tension and compression piston areas
- » Senses actuator force changes quickly with a stable, high-response, two-stage design
- » Offers independent controls for adjusting tension and compression force limits
- » Operates without electrical, interlock or additional mechanical components
- » Provides load limiting for actuators with compression/tension area ratios from 1.00:1 to 3.23:1
- » Ensures stable operation at low pressure and prevents excessive fluid flow prior to pressure relief
- » Remains unaffected by pressure fluctuations in system return line

MTS ACTIVE LOAD ABORT SYSTEM

The MTS Active Load Abort System offers another alternative for rapid energy removal, achieving coordinated load levels for all actuators across the test article simultaneously. It is designed to ensure the safety of valuable test articles by providing complete control over both planned loading and unintended unloading of multi-channel structural test systems.

Integrating advanced FlexTest® controls, AeroPro™ software and a unique hydraulic manifold design, this system can reduce all actuator loads to a neutral state at precisely the same time, regardless of varying pressures and positions of individual actuators.

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Solenoid valve supplies pilot pressure to the load abort valves when energized and removes it when de-energized

Load abort valves are pilot-pressure-operated spool valves that direct hydraulic pressure to or from the actuator tension and compression ports during normal operation

Inlet filter (optional) provides 15-micron absolute filtration to help prevent contamination

Load limiter valve limits the maximum tension and compression forces of the actuator using independent, adjustable two-stage relief valves

Metering valves control the rate at which fluid is ported from the actuator to the system return line during load abort conditions

Mounting is available for all MTS Series 252.2x Servovalves, including pilot pressure models

Specifications

SERIES 297 OVERLOAD PROTECTION MODULE

Height	302.26 mm (11.90 in)
Width (without filter)	288.29 mm (11.35 in)
Width (with filter)	413.77 mm (16.29 in)
Length	Dependent on actuator type and stroke length
Temperature range	-54 to 135°C (-65 to 275°F)
Operating pressure range (recommended)	10.3 to 20.7 MPa (1500 to 3000 psi)
Operating pressure range (stable)	3.4 to 27.6 MPa (500 to 4000 psi)
Voltage requirements	24 V DC (standard)*
Filtration (optional)	15-micron absolute
Maximum flow	94.6 lpm (25 gpm)**
Internal leakage (typical)	0.02 lpm (0.005 gpm)
Time to initiate load abort	60 milliseconds
Adjustable bleed-down rate	0 to 189 lpm at 6.7 MPa (0 to 50 gpm at 1000 psi)

MODEL 289.11 LOAD LIMITER VALVE

Height	196.85 mm (7.750 in)
Width	49.23 mm (1.938 in)
Length	133.35 mm (5.250 in)
Temperature range	-54 to 135°C (-65 to 275°F)
Recommended operating range	10.3 to 20.7 MPa (1500 to 3000 psi)
Stable operating range	3.4 to 27.6 MPa (500 to 4000 psi)
Maximum drain line flow	1.29 lpm (0.34 gpm)
Flow at cracking pressure	0.37 lpm (0.1 gpm)
Cracking pressure repeatability	0.3 MPa (±50 psi)
Maximum pressure rise at 94.6 lpm (25 gpm)	1.0 MPa (150 psi)
Accuracy over recommended operating range	Dependent on actuator and required force limits

Footnotes:

*120 or 220 V AC solenoid valves are also available.

**Greater flow ratings are also available.

Specifications subject to change without notice.



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