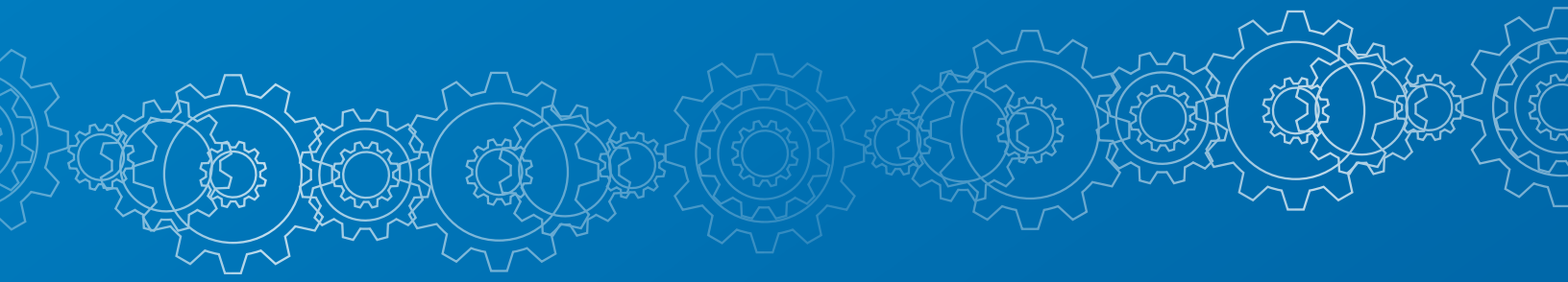
Series 295 Hydraulic Service Manifolds

Flexible, reliable hydraulic pressure and flow regulation

MTS SERIES 295 HYDRAULIC SERVICE MANIFOLDS (HSMs) PROVIDE COMPLETE, INDEPENDENT CONTROL OF THE HYDRAULIC PRESSURE APPLIED TO INDIVIDUAL STATIONS OPERATING FROM A SINGLE HYDRAULIC POWER UNIT (HPU). DESIGNED TO MAKE TEST SYSTEM SETUP, OPERATION AND MAINTENANCE MORE CONVENIENT, THESE HSMs ENABLE OPERATORS TO CONTROL THE FLUID FLOW PATH REDUCING THE RISK OF CROSSTALK.



Safe and Controlled Hydraulic Distribution

Using shared or commoned hydraulics is the most cost-effective way to manage hydraulic distribution, but this type of configuration often introduces potential problems that can interfere with safe operation and testing accuracy. MTS offers a hydraulic distribution solution that addresses these challenges and allows you to protect the safety of operators, specimen and equipment while maintaining the integrity of test results.

The MTS Series 295 Hydraulic Service Manifold (HSM) allows you to take advantage of the cost savings of shared hydraulics by providing a safe, controlled environment that does not jeopardize test system performance or compromise test results.

Safer Operation with Hydraulic Isolation

The MTS Series 295 HSM provides hydraulic isolation between the hydraulic power unit (HPU) and the test system. This HSM enables smooth, controlled transitions of hydraulic pressure to enhance safety and increase predictable control the hydraulic system. In the event of potentially hazardous conditions, the rapid dump feature can quickly and safely remove hydraulic pressure from the system.

Additional Surge Protection

To meet temporary demand for additional hydraulic pressure, many systems rely on large accumulator banks with capacities as large as 100 gpm. The problem with all this stored capacity, is that when multiple systems share the same hydraulics, a surge in the return line is highly undesirable for the other systems that share the hydraulics but not the HSM.

Unlike most HSMs, a Series 295 HSM with the optional MTS Safeguard™ Technology, has a return dump line that allows accumulator pressure to be routed to a surge tank, blast down tank or to the HPU's reservoir, protecting operators, specimen and equipment from unexpected pressure surges. This feature allows dumping of pressure to a single test system without impacting other systems sharing the same hydraulics.

Increased Accuracy with Quieter Operations

One of the reasons labs are hesitant to share hydraulics between test systems is that the changes in system pressure create noise ripple in the hydraulic lines and can skew test results. MTS hydraulic products are known for quiet operation, and the Series 295 HSM has several features that reduce noise in the hydraulic distribution system. The dump isolation feature and soft on/off options minimize the system crosstalk that can produce inaccurate results. By controlling pressure fluctuations it reduces the overall noise ripple that can disrupt accuracy.

Flexible, Modular Design

Engineered to integrate seamlessly in a wide variety of MTS testing solutions. Series 295 HSMs offer many options to optimize operation with any test system. A choice of flow rates up to 946 lpm (250 gpm) and pressure designs up to 280 bar (4,000 psi) make it easy to align hydraulic fluid flow rate with individual system requirements, which helps conserve resources. These systems can also be configured to control up to four test systems independently. Combined with a compact design, this flexibility allows you to save valuable floor space in your lab.

Designed for Predictability

Installing these hydraulic pressure and flow control devices between the HPU and servovalve allows operators to turn each hydraulic circuit on and off, as well as set the low-pressure level. Smooth, controlled transitions enhance safety and make system control more predictable. By minimizing the effects of rapid application and removal of high pressure, Series 295 HSMs reduce unexpected actuator movement that could damage test specimens.

Another way Series 295 HSMs help protect test specimens, test systems and operators is with rapid dump hydraulic pressure unloading. This feature quickly removes hydraulic pressure applied to the system in the event of abnormal or potentially hazardous conditions.

Pressure accumulators provide energy storage for peak performance, mitigating the need for a larger HPU. Accumulators in the pressure and return lines minimize pressure fluctuations, quieting the line and helping ensure reliable performance. Pilot pressure accumulators further enhance performance by reducing pressure flow fluctuations to the servovalve.

ENHANCED PERFORMANCE

Series 295 HSMs also include additional filtration to help keep hydraulic fluid clean. A main filter protects components by minimizing the passage of dirt particles that may enter the system when hydraulic lines are opened or hydraulic fixtures added. Plus, models equipped with pilot pressure contain a 3 µm (absolute) pilot pressure filter to enhance servovalve and system performance.

If you are running multiple test systems with shared hydraulics on multiple branches of hydraulic distribution, then you may want to add an MTS Isolation Service Manifold (ISM). Designed as a companion to the Series 295 family, the ISM is placed between the HPU and HSM to prevent system over-pressurization, provide full system pressure discharge and allow for full hydraulic power isolation downstream of the ISM.

Four Model Choices

SERIES 295.1x

Total maximum flow is 189 lpm (50 gpm). This model is available with 1, 2, 3 or 4 independently controlled stations, each of which can deliver maximum flow. Pilot pressure (for control in advance of a switch to high pressure) is optional.

SERIES 295.2x

Total maximum flow is 378 lpm (100 gpm). This model offers 1, 2, 3 or 4 independently controlled stations. One station can deliver maximum flow. With multiple stations, each one can deliver up to 189 lpm (50 gpm) of flow, not to exceed 378 lpm (100 gpm) total flow. Pilot pressure is optional.

SERIES 295.3x

This model offers maximum flow of 946 lpm (250 gpm). Available only for single-station control, it can be configured with single or dual outlets. Pilot pressure is standard.

SERIES 295.4x

This customizable model is designed for the needs of vehicle test systems such as the Model 329 6 DOF Road Simulator and Model 320 Road Simulator. It features high-flow capacity within a compact footprint allowing the many unique forms of hydraulic control distribution to each pad/corner of these highly engineered sub-systems.

Determining Appropriate Safety Performance Level

Meets safety requirements

The Series 295 HSM meets Performance Level c (PLc) requirements for human safety and is able to incorporate Safeguard™ Technology to upgrade to Performance Level d and Performance Level e.

Although organizations strive to provide a safe working environment, there is still a great deal of confusion about best practices and compliance requirements for safe operation of machinery. ISO 13849 offers clear guidelines to define the potential safety risk to humans and to determine the required Safety Performance Level for each situation. This international standard is a common end-user requirement in the EU and is referenced in many other regional safety standards.

Three factors influence the required Performance Level:

1. Potential severity of injury
2. Frequency of exposure
3. Possibility of avoiding the hazard

SEVERITY OF INJURY – *Slight or Serious*

The two options for classifying equipment in the severity of injury category are: slight, indicating a normally reversible injury; and serious, indicating a normally irreversible injury or death. Due to the potential for irreversible injury or death when operating test equipment, mechanical test systems are considered to be in the serious classification, which requires a minimum of Performance Level c (PLc) for compliance.

Slight	Serious
» Normally reversible injury » May require up to PLc	» Normally irreversible injury or death » Most mechanical test systems would be classified in this category » Requires minimum of PLc

FREQUENCY AND/OR DURATION OF EXPOSURE – *Seldom or Frequent*

For test equipment, the frequency of exposure is defined as access to the specimen area. Access typically occurs in specimen loading/unloading, alignment etc. The two options for classifying equipment in the frequency of exposure category are seldom and frequent. With respect to exposure time, "seldom" is defined as accessing the specimen area no more than once in 15 minute intervals and the accumulated exposure time does not exceed 1/20 of the overall operating time. Per this definition, the rating would be "F1" for exposure. If the test operator is accessing the specimen more than once every 15 minutes or this exposure exceeds 1/20 of the overall operating time, it is considered frequent exposure. This would be an "F2" rating for exposure. Frequent exposure of an "F2" rating requires a minimum Performance Level d (PLd) for compliance. Seldom exposure could require a Performance Level of c or d, depending on the possibility of avoiding or limiting the hazard.

Seldom	Frequent
» Access to the test specimen area once in fifteen minute or greater intervals AND exposure less than 1/20 total time	» Access to the test specimen area more than once every fifteen minutes OR exposure more than 1/20 total time
» Requires minimum of PLc if severity = S2	» Requires a minimum of PLd if severity = S2

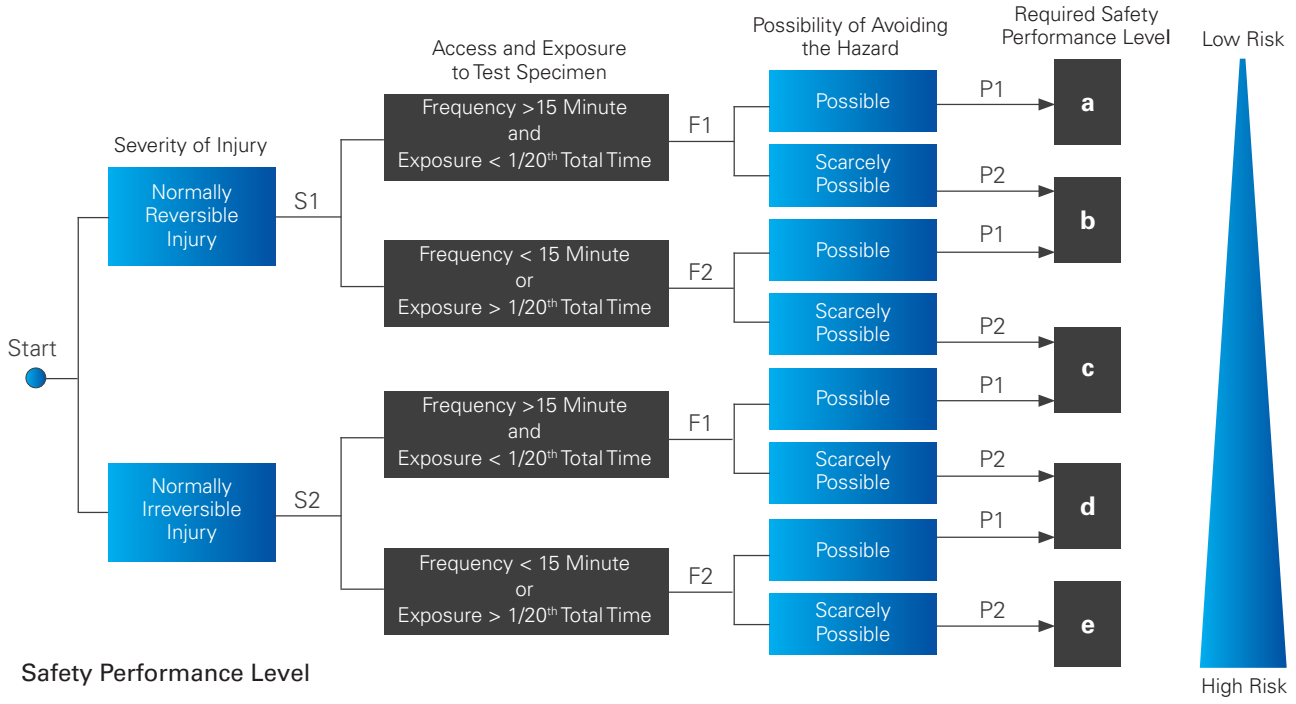
POSSIBILITY OF AVOIDING THE HAZARD – *Possible or Scarcely Possible*

There are two categories for possibility of avoiding the hazard or limiting the harm: possible under specific conditions or scarcely possible. A risk assessment can help determine the appropriate category. If there is a use case in which the possibility of avoiding the hazard is considered scarcely possible and severity = S2, then this case would require a minimum of Performance Level d. If in this same case, the frequency of exposure = F2, then it would require a Performance Level e solution.

Possible	Scarcely Possible
» Possible to avoid the hazard » Most mechanical test systems would be classified in this category » Requires minimum of PLc if severity = S2	» Severe obstacles to avoiding the hazard » Requires a minimum of PLd if severity = S2

FREQUENCY OF TEST SPECIMEN AREA ACCESS IS A CRITICAL FACTOR

In summary, a Performance Level rating of c, d or e is required to meet certain safety standards for most test equipment. Frequency of access and exposure to the test specimen area are the primary factors in determining the required safety performance level.



MTS SafeGuard 273 Processor

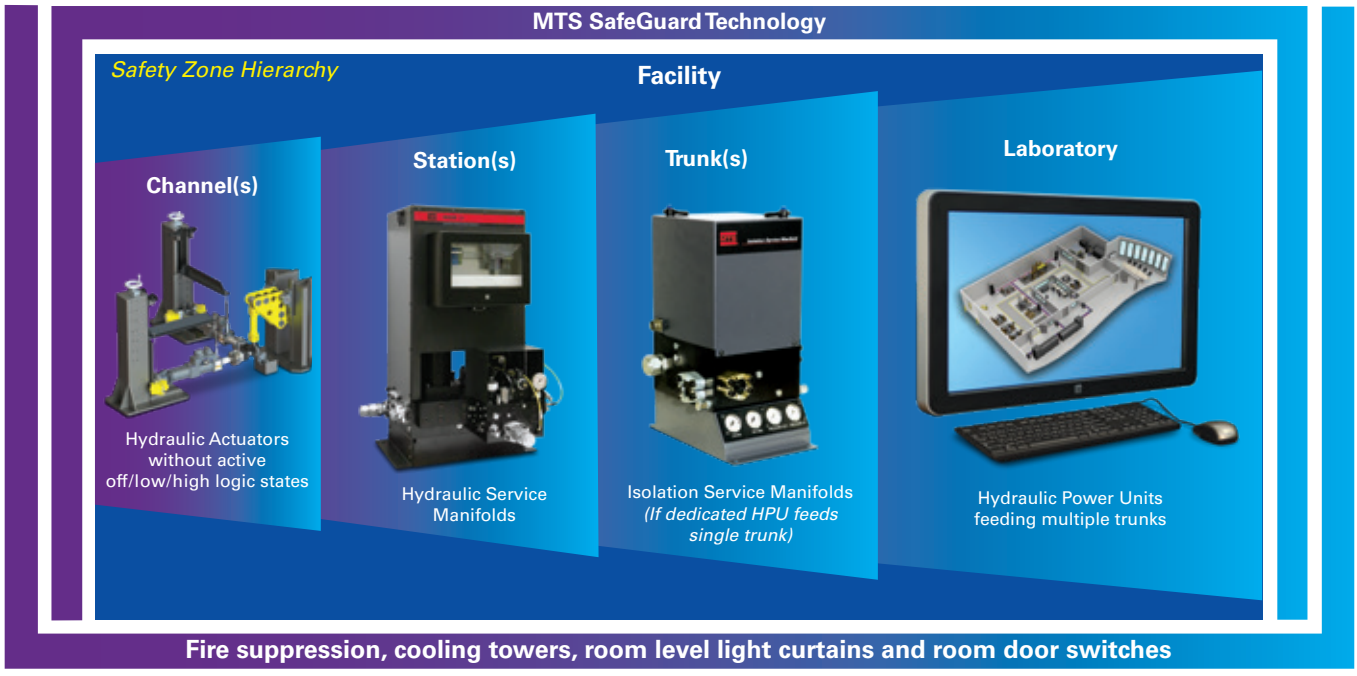
- Manages safety and specimen protection
- Scalable up to 4 stations
- Configures to each safety system
- 4 mounting configuration options
- Can integrate with facility safety systems

MTS SafeGuard 274 User Interface

- Displays input for system configuration, system status & fault diagnostics
- Includes system reset function
- Includes system e-stop function
- 3 mounting configuration options

MTS SafeGuard 275.295 Machine Interface for the MTS Series 295 HSM

- Mounts to Series 295 HSM
- Provides safety isolation at the HSM
- 11 configurations to match Series 295 HSM configurations



Specifications

		295.1XA-XX3X	295.2XA-XX3X	295.2XA-XX4X	295.3XA-XX3X	295.3XA-XX4X
Operating Pressure		21 MPa (3000 psi)	21 MPa (3000 psi)	28 MPa (4000 psi)	21 MPa (3000 psi)	28 MPa (4000 psi)
Nominal flow		189 lpm (50 gpm)	378 lpm (100 gpm)*	378 lpm (100 gpm)*	946 lpm (250 gpm)	946 lpm (250 gpm)
Variable low pressure		1 - 21 MPa (150 - 3000 psi)	1 - 21 MPa (150 - 3000 psi)	1 - 28 MPa (150 - 4000 psi)	1 - 21 MPa (150 - 3000 psi)	1 - 28 MPa (150 - 4000 psi)
Slow on/off ramp time		5.0 - 9.0 seconds	5.0 - 9.0 seconds	5.0 - 9.0 seconds	5.0 - 9.0 seconds	5.0 - 9.0 seconds
Maximum current to solenoid valves		0.3 A at 115 V AC or 1.5 A at 24 V DC	0.3 A at 115 V AC or 1.5 A at 24 V DC	0.3 A at 115 V AC or 1.5 A at 24 V DC	0.3 A at 115 V AC or 1.5 A at 24 V DC	0.3 A at 115 V AC or 1.5 A at 24 V DC
ACCUMULATORS						
Pressure	min	0.94 L (0.25 gal)	3.8 L (1 gal)	3.8 L (1 gal)	3.8 L (1 gal)	3.8 L (1 gal)
	max	3.8 L (1 gal)	7.6 L (2 gal)	7.6 L (2 gal)	19.0 L (5 gal)	19.0 L (5 gal)
Return	min	0.45 L (0.12 gal)	1.9 L (0.5 gal)	1.9 L (0.5 gal)	0.94 L (0.25 gal)	0.94 L (0.25 gal)
	max	0.94 L (0.25 gal)	3.8 L (1 gal)	3.8 L (1 gal)	7.6 L (2 gal)	7.6 L (2 gal)
Pilot pressure	min	0.45 L (0.12 gal)	0.45 L (0.12 gal)	0.45 L (0.12 gal)	0.45 L (0.12 gal)	0.45 L (0.12 gal)
	max	0.94 L (0.25 gal)	–	–	0.9 L (0.25 gal)	0.94 L (0.25 gal)
FLUID FILTRATION						
Main supply		10 µm	25 µm	25 µm	25 µm	25 µm
Pilot pressure supply		3 µm	3 µm	3 µm	3 µm	3 µm
FLUID HOSE CONNECTIONS						
Pressure		-16	1½ Code 61 or -20 JIC	1½ Code 62	-32 SAE Code 61	-32 SAE Code 62
Return		-16	1½ Code 61 or -20JIC	1½ Code 61	-32 SAE Code 61	-32 SAE Code 61
Pilot pressure		-6	-06/-08 JIC	-06/-08 JIC	-6	-6
Pilot return		-6	-06/-08 JIC	-06/-08 JIC	-6	-6
Drain		-6	-08/-12 JIC IN, -12 OUT	-08/-12 JIC IN, -12 OUT	-06 IN, -08 OUT	-06 IN, -08 OUT
Hydrostatic bearing		-6	-06 JIC	-06 JIC	-6	-6
Maximum number of stations/channels		4	4	4	1	1
DIMENSIONS AND WEIGHTS						
Weight		70 kg (155 lb)	159 kg (600 lb)[1]	182 kg (600 lb)[1]	181 kg (550 lb)[2]	227 kg (550 lb)
Height		806 mm (31.75 in)	1067 mm (43 in)[3]	1067 mm (43 in)[3]	1092 mm (43.5 in)[3]	1229 mm (43.5 in)[3]
Width (base)		363 mm (14.3 in)	362 mm (25.75 in)	362 mm (25.75 in)	403 mm (15.9 in) max	387 mm (15.9 in)
Depth (base)		359 mm (14.1 in)	394 mm (15.5 in)	400 mm (15.75 in)	394 mm (15.5 in) max	530 mm (15.5 in)

Footnotes:

** 378 lpm (100 gpm) total, 189 lpm (50 gpm) per station maximum for multi-station flow, 295.2X station is 100 gpm*

1 Standard size for single-station configuration; 227 kg (600 lb)

2 Standard size; with optional accumulator capacity the weight is 454 kg (650 lb) maximum

3 Standard size; with optional accumulator capacity the height is 2134 mm (55.3 in) maximum

Specifications are subject to change without notice. Contact MTS for verification of any critical specifications.

Note: Accumulator may extend beyond HSM height.

Regional Business Centers

THE AMERICAS

MTS Systems Corporation
14000 Technology Drive
Eden Prairie, MN 55344-2290
USA
Telephone: 952-937-4000
Toll Free: 800-328-2255
E-mail: info@mts.com
Internet: www.mts.com

EUROPE

MTS Systems France
BAT EXA 16
16/18 rue Eugène Dupuis
94046 Créteil Cedex
France
Telephone: +33-(0)1-58 43 90 00
E-mail: contact.france@mts.com

MTS Systems (Germany) GmbH
Hohentwielsteig 3
14163 Berlin
Germany
Telephone: +49-(0)30 81002-0
E-mail: euroinfo@mts.com

MTS Systems S.R.L. a socio unico
Strada Pianezza 289
10151 Torino
Italy
Telephone: +39-(0)11 45175 11 sel. pass.
E-mail: mtstorino@mts.com

MTS Systems Norden AB
Datavägen 37b
SE-436 32 Askim
Sweden
Telephone: +46-(0)31-68 69 99
E-mail: norden@mts.com

MTS Systems Limited
98 Church Street,
Hunslet,
Leeds
LS102AZ
United Kingdom
Telephone: +44 (0) 113 270 8011
E-mail: mtsuksales@mts.com

ASIA/PACIFIC

MTS Japan Ltd.
Raiden Bldg. 3F 3-22-6,
Ryogoku, Sumida-ku,
Tokyo 130- 0026
Japan
Telephone: +81 3 5638 0850
E-mail: mtsj-info@mts.com

MTS Korea, Inc.
2nd F, Bundang Yemiji Building, 31,
Hwangsaeul-ro 258beon-gil,
Bundang-gu, Seongnam-si,
Gyeonggi-do, 13595
Korea
Telephone: +82-31-728-1600
E-mail: mtsk-info@mts.com

MTS Systems (China) Co., Ltd.
Floor 34, Building B,
New Caohejing International
Business Center,
No.391, Guiping Road,
Xuhui District
Shanghai 200233
P.R.China
Telephone: +021-24151000
Market: +021-24151111
Sales: +021-24151188
Service: +021-24151198
E-mail: MTSC-Info@mts.com

MTS Testing Solutions India Pvt Ltd.
No. 38, Ground Floor, Donata Radiance,
1st Cross, Tavarekere Main Road,
DRC Post, Krishna Nagar Industrial Layout,
Kormangala, Bangalore – 560 029
India
Telephone: + 91 80 46254100
Email: mts.india@mts.com

MTS Systems Corporation
14000 Technology Drive
Eden Prairie, MN 55344-2290 USA

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

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