



Physical Test Solutions

Innovative Solutions in Material Test Equipment

Dynamic - Static Servo-Hydraulic Universal Testing Machines



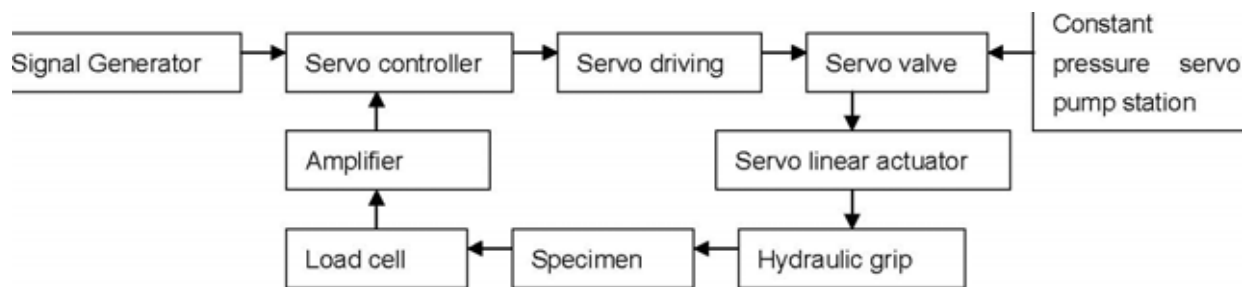
PLS Series Dynamic-Static Servo-Hydraulic Universal Testing Machines

The **Physical Test Solutions (PLS)** series of dynamic and static servo-hydraulic universal testing machines feature modular design that facilitates standardization and enhances the stability and reliability of the system. The **PLS series** performs static tension compression and flex tests in addition low cycle, high cycle, crack propagation tests and other material tests on a variety of materials in the aerospace, automotive, ship-building and defense industries, among others.

Physical Test Solutions (PTS) universal testing machines are manufactured in an ISO 9001 certified facility, and comply with ASTM A730, ASTM E4, ASTM E83, ISO6892, ISO7438, ISO75000-1 and EN 10002-4.

Configuration

The **PLS** servo-hydraulic universal testing machine consists of load frame (linear actuator NCA50 at the bottom), constant pressure servo pump BST36, hydraulic grip HG50, single channel servo controller and correlative test software and other necessary accessories. The working principle of the system is as follows.

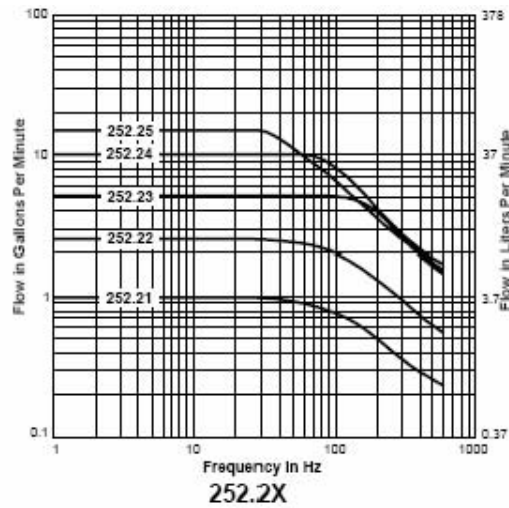


Load frame:

The load frame has a double column structure, or four column structure for high capacity applications and the servo linear actuator is at the bottom. The crosshead is displaced by hydraulic force. Pre-tensile stress clamping and hydraulic loosening guarantee the stability and reliability of the test and meanwhile guarantee the crosshead locked during non-test status.

1. Shape of the crosshead has the feeling of three dimensions and looks terrific.
2. Surface of double columns is plated with chrome, which make it looks good as well as anti-abrasive.
3. Servo linear actuator is at the bottom, in which there is a LVDT displacement transducer, out of which there is a servo valve, and equipped with a precise filter and accumulator to constitute a servo module.

4. Servo valve is the special high response two grades servo valve, and the frequency curve is as follows.
5. Applied NCA series linear actuator with the features of lower damp, high response, long life and big clearance design, the design concept of which is the same with to 244 Series Linear Actuators of MTS;
6. The seal parts of servo linear actuator adopt the special high –speed seal parts.
7. The frequency response of servo linear actuator is not less than 250 Hz
8. Equipped with high precious load cell.



Load Frame Specifications:

Model		PLS-20	PLS-50	PLS-100	PLS-250	PLS-500	PLS-1000
Maximum load		20KN	50KN	100KN	250KN	500KN	1000KN
Measuring accuracy	load	Measuring range: 2%-100% FS, $\leq \pm 1\%$ (or $\pm 0.5\%$)					
	Displacement	$\leq \pm 1\%$ FS, (or $\pm 0.5\%$ FS)					
	deformation	$\leq \pm 1\%$, (or $\pm 0.5\%$)					
Frequency		005-50Hz			0.05-30Hz		
Amplitude		$\pm 75\text{mm}$					
Load frame		Double columns with actuator on the top or the bottom.			Four columns with the actuator on the bottom		
Diameter of piston		$\phi 63\text{mm}$	$\phi 105\text{mm}$	$\phi 180\text{mm}$	$\phi 250\text{mm}$	$\phi 300\text{mm}$	
Space between columns		500mm	600mm	715mm	840×500mm	930×590mm	
Test space		650mm	750mm	1200mm	1500mm	1500mm	
Dimensions		850×590×2580mm	900×620×2620mm		1030×747×3127mm	1200×1230×3127mm	1280×1235×3940mm
Weight		1100kg	1400kg	2100kg	3600kg	3900kg	
Gripping System		Hydraulic					
Test space adjusted		Hydraulic grips and crosshead moved by actuators					

Actuator:

- 1) Module unit design. Its feature is low friction, high response, small exposure inside, and strong anti-lateral load capacity.
- 2) It is equipped with universal joint and suitable for several kinds of installation methods (front & back flange, back hinge, foundation installation).
- 3) Double direction piston. Sealing method: guide ring + servo sealing ring.
- 4) LVDT displacement sensor is installed inside actuator and electro-hydraulic servo valve is installed outside actuator. Teflon guide sleeve is installed between LVDT displacement sensor and piston rod, small friction and good guidance can guarantee trouble-free long-time work of sensor.
- 5) Actuator amplitude limit is designed within hydraulic damping area to avoid running out of control.
- 6) Load sensor is set up on the piston rod end.



Constant pressure servo-pump BST36:

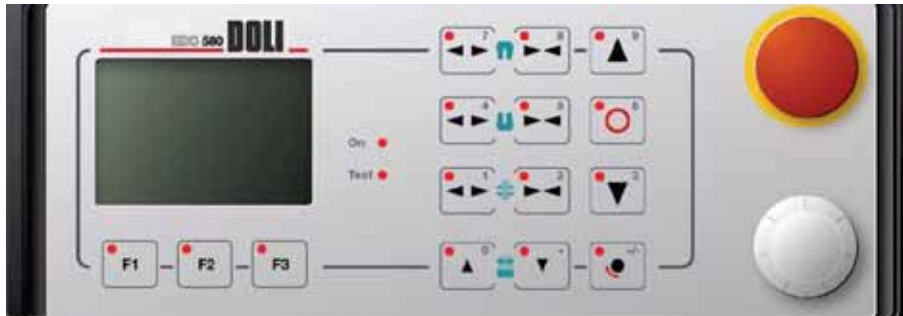
Low noise: Install dual-elastic support between motor pumps to lower the noise of pump station, which is equipped with low noise AC motor and low noise linear conjugate inner engaging gear pumps. Long life: Linear conjugate inner engaging gear pump has the feature of strong anti-abrasion, and in which there is one layer of oil film between parts; Also adopt the principle of dual-grade pressing to bear pressure difference which improve the working of pump; High-low pressure soft switch hydraulic module consists of main overflow valve, accumulator, auxiliary main overflow valve, auxiliary overflow valve, direction-exchanging valve and precious filter; water cooler; Hydraulic pipes and high pressure hoses; Liquid position controller; Temperature control meter; With the alarm function of oil temperature, liquid position and filter obstruction or stop function.



Model specification	BST36	BST45	BST70	BST90	BST110	BST140	BST175	BST230
flux (L/min)	36	45	70	90	110	140	175	230
power	15KW	22KW	30KW	37KW	55KW	75KW	90KW	110KW
System pressure	21MPa	21MPa	21MPa	21MPa	21MPa	21MPa	21MPa	21MPa
Filtering accuracy	3 μ m							
Sealing parts	PARK							
Oil pump	Gear pump produced by NACHI							
motor	ABB							

Servo controller:

The PTS dynamic testing systems feature an Instron 8400 or DOLI Elektronik GmbH controller complete with software. The system has the capability of analyzing and generating numerous waves including sine, square, triangle, ramp, saw and so on. The user friendly design allows the view of real time graphics; data analysis and test report generation according to customer requirements.



- ⇒ Minimal control loop cycle time: 0.4ms
- ⇒ Encoder SSI input channel (on board): max 32 MHz (app. 300 kHz)
- ⇒ Digital inputs with 24 Volt level: 8
- ⇒ Digital outputs with 24 Volt level: 8
- ⇒ Interface to PC: USB and Ethernet
- ⇒ General purpose I4 Option slots: 8
- ⇒ Power supply: 100-250V AC
- ⇒ internal 24 Volt/2A DC power supply for external devices
- ⇒ Drive Interface: ± 10 V command output with ± 15 Bit resolution digital command output I/O's and relays for safety functions

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