

Automotive Testing Solutions

BISS is a subsidiary of ITW-India and part of the Test and Measurement Business Division of ITW, headquartered in Chicago, IL, USA. BISS Test & Measurement sister companies include Instron, Buehler and Avery Weightronix.

With over 25 years of experience in the development and supply of digitally controlled high-performance test systems, BISS has emerged as the region's leading supplier of both standard as well as highly customized test systems for the automotive industry. These include test systems to characterize performance and durability of automotive suspension components. Such supplies include multi-axial linear and torsional systems allowing highly synchronized dynamic loading of automotive bushings, axles etc. BISS is the acknowledged leader in shock absorber test systems, with over 100 stations across the country, testing over 2 million parts a month.



Steering Gear Durability Test Rig

Multilayer Elastomer Testing

Provider of quality equipment and testing services to global leaders in industry and academia.

ISO 9001:2015

ISO 14001: 2004

BS OHSAS 18001:2007









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BISS IoT (Internet of Things)

In today's testing world, laboratory running time is everything. Any downtime can cause wastage of lab resources, missed deadlines and at the end, monetary loss. BISS IoT keeps you connected with laboratory resources at all times and from anywhere. It enables real-time, remote monitoring from tablet, laptop or smartphone.

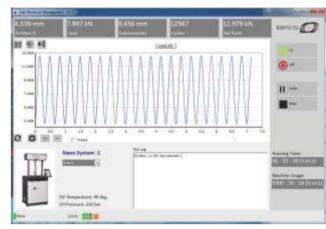
Implementation of virtual presence eliminates the need for physical presence during the test. Provides instantaneous status updates and allows remote corrective action. Enables timely technical support, reduces avoidable downtime.

Upgrade to IoT involves augmentation of hardware and software that is possible without serious modification of existing systems. Augmentation includes provision of web-cams and chat capability for communication between personnel.

Unique Features

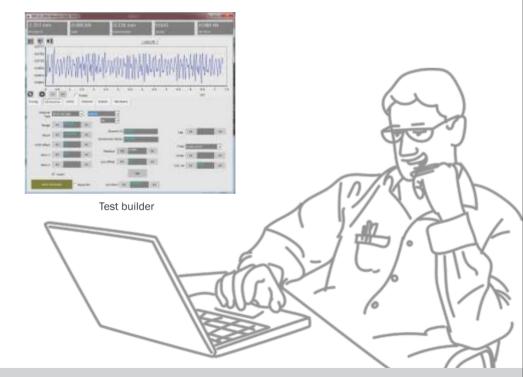
- Remote tracking of laboratory operations (Manager)
- A Remote status monitoring of individual tests (Test engineer)
- 'Walk by' monitoring of individual systems (Operator using portable device tablet/smartphone)
- A Remote health monitoring of test systems (Maintenance engineer)
- Assured security of host computer (no screen sharing)
- Peer-to-peer security
- ▲ Instantaneous, centralized or distributed 24/7 global support
- Specialist consulting support on demanding applications
- Reduced travel to sites
- Periodic health monitoring
- Outsourced testing services





Video and chat

Client main screen





Shock Absorber Test Systems

A wide range of shockabsorber test systems are available from BISS: Production line Single Station, Dual Station with servo hydraulic, electromagnetic or electromechanical drives, Tilting Load frame, and systems for R&D.

Common Features

- A Qualification of shock absorbers by measurement of damping force, seal friction, gas charge, spring stiffness
- Wide choice of parameters to specify tolerance in production testing
- Automatic recording of test results into Microsoft Excel spreadsheet for c.p.k. analysis, etc.
- Fully programmable priming and stroking conditions with up to 10 programmable velocities
- Adaptive control algorithm for stroking accuracy
- Auto calibration of load and stroke, auto-taring of part weight at commencement of test and auto nullification of spring stiffness
- Tooling to test unsealed parts
- Qualification of test parts based on tolerance bandwidth
- Multiple cycle testing up to 10 programmable velocities in single test
- Tolerances in terms of tension/compression damping force, energy, percentage of lag etc.







Single Station Shock Absorber

Dual Station Shock Absorber Shock Absorber Production (CAM Driven)



Shock Absorber Durability



Shock Absorber - Tilting Loadframe



Single Station Shock Absorber Test System

The SP-05-05XX is a production line system specially designed for testing shock absorber/strut/front-fork. This machine ensures the assembled shock absorber meets required performance specification. It is the result of 2 decades of R&D with a focus on harmonizing production line test requirements for 2, 3 and 4-wheeler suspension components.

Individual features of the Single Station have been tested and proven by all major shock absorber manufacturers across the country. Almost every shock and strut manufactured in India are tested on BISS machine, testing over 2 million parts a month.

Standard Features

- ▲ Configurations available from 5 to 35 kN dynamic capacity
- Velocity rating 0.005 to 1.5 m/s
- ▲ Hydraulic movable top crosshead with position control
- ▲ Self aligned top hydraulic and bottom pneumatic grips
- Quick change of jaw faces and spacers to switch between the parts
- Hydraulic side acting grips
- Top and bottom tooling to suit threaded, rod eye mounts and body clamping
- ▲ Tooling suitable for 2, 3 and 4-wheeler parts





Unique Features

- → High precision servo hydraulic actuators
- ▲ Displacement accuracy of 1 micron
- ▲ Computed velocity confirmation
- ▲ Integrated safety interlocks
- ▲ Low maintenance cost
- ▲ Highly reliable contamination insensitive hydraulics
- ▲ Energy efficient low noise pump

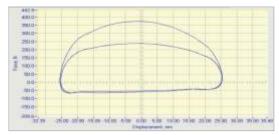
Optional Features

- ▲ Automated:
 - Bar coding device
 - Multi-colour paint coding to identify "hard", "medium" and "soft" parts
 - Punch mark for "OK" parts
- Automatic assembly defect detection
- Remote monitoring of system status
- ▲ Waveform quality confirmation in compliance with accelerometer feedback
- ★ Fully automated robotic line

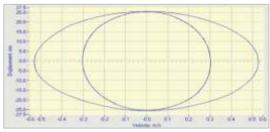
Hardware

Force rating	5/10 /15/25/35 kN dynamic capacity
Actuator stroke	200 mm
Peak velocity	1.5 m/s
Hydraulic power pack	11-65 LPM
Safety interlocks	Light curtain, pressure sensor
Grips	Self-aligning top hydraulic grip and bottom pneumatic grip

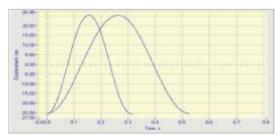
Test Results



Force vs Displacement



Displacement vs Velocity



Displacement vs Time



Force vs Time



Dual Station Shock Absorber Test System

The SP-01-02XX is a high productivity test system specially designed for testing shock absorber/strut/front-fork in the production line. This machine ensures the assembled shock absorber meets required performance specification. It is the result of two decades of R&D with a focus on harmonizing production line test requirements for 2, 3 and 4-wheeler suspension components.

Individual features of the Dual Station have been tested and proven by all major shock absorber manufacturers across the country. Almost every shock and strut manufactured in India are tested on BISS machine, testing over 2 million parts a month.

Standard Features

- ▲ 5 to 15 kN dynamic force rating
- Self aligned top pneumatic and bottom hydraulic grips
- Quick change of jaw faces and spacers to switch between the parts
- ▲ Tooling to test unsealed parts
- ▲ Low-force "bull-dog" top grip to avoid damage
- ▲ Top and bottom tooling to suit threaded, rod eye mounts
- ▲ Tooling suitable for 2, 3 and 4-wheeler parts

Optional Features

- Automated:
 - · Bar coding device
 - Multi-colour paint coding to identify "hard", "medium" and "soft" parts
 - Punch mark for "OK" parts
- Automatic assembly defect detection
- Remote monitoring of system status
- ▲ Waveform quality confirmation in compliance with accelerometer feedback
- ▲ Fully automated robotic line





Unique Features

- ▲ Asynchronous dual-station operation
- Doubles productivity
- ▲ Highly reliable contamination insensitive servo valve
- ▲ Energy efficient Low noise servo-controlled pumps
- Velocity measurement through digital stroke measurement with 1micron accuracy
- Accelerometer based velocity measurement
- ▲ Sensors to detect part presence and part removal to avoid duplicate test and rejected parts
- ▲ Easy five button operation to avoid use of keyboard mouse in production environment
- ▲ Auto nullification of spring stiffness
- Auto calibration of load and stroke
- Qualification of test parts based on tolerance bandwidth
- ▲ Anti-tie interlock for go button
- ▲ Designed for 24/7 industrial operations

Hardware

Force rating	5/10 /15 kN dynamic capacity
Actuator stroke	200 mm
Peak velocity	1.5 m/s
Hydraulic power pack	11-65 LPM
Safety interlocks	Light curtain, pressure sensor, part presence sensor
Grips	Self-aligning top pneumatic and bottom hydraulic grip

Test Results





Shock Absorber Production Test System (CAM Driven)

The SP-01-35XX is built to evaluate the performance of shock absorbers. These machines are typically used in Shock Absorber Production industries. This machine ensures assembled parts meet the specified performance for which shocks are designed. Customized accessories can be engineered to meet customer requirement to differentiate the passed and failed samples.

Standard Features

- ▲ Electrically movable top crosshead
- Fixtures & tooling suitable for 2, 3 and 4 wheeler parts
- ▲ Force rating: 5 to 10 kN
- Pneumatic grips easily adaptable to various parts
- ▲ Evaluation of seal friction, gas charge, static and dynamic response

Optional Features

- ▲ Automated:
 - · Bar coding device
 - Multi-colour paint coding to identify "hard", "medium" and "soft" parts
 - Punch mark for "OK" parts
- ▲ Automatic assembly defect detection
- Remote monitoring of system status
- ▲ Waveform quality confirmation in compliance with accelerometer feedback
- ▲ Fully automated robotic line





Unique Features

- → High precision, crank-based servo electric driven actuators
- ▲ Displacement resolution 1 micron
- ▲ Single footprint
- ▲ Low maintenance
- Single and dual station variants
- ▲ Doubles productivity

Hardware

Force rating	5/10 kN dynamic capacity
Actuator stroke	200 mm
Peak velocity	1.5 m/s
Safety interlocks	Light curtain, pressure sensor, part presence sensor
Grips	Self-aligning pneumatic top and bottom grips

Test Results





Shock Absorber Test System - Tilting Loadframe

The SP-01-06XX is built to test shock absorbers used in the tilting position, as used on coaches and locomotives. The machine is used to ensure that assembled parts meet defined performance specifications. It is the result of over seven years of R&D with a focus on harmonizing tilt test requirements.

Standard Features

- ▲ 5 to 50 kN dynamic force rating
- ▲ Two column load frame with bottom mount actuator with 150 to 250 mm stroke
- Cross-head with hydraulic lifts and clamps
- ▲ Hydraulic tilting of load frame to user defined angle
- ▲ Evaluation of seal friction, gas charge, static and dynamic response
- Clevis grips for interchange of parts
- ▲ Side load up to 200 kg

Optional Features

- Automatic assembly defect detection for missing part
- Remote monitoring of system status
- ▲ Waveform quality confirmation in compliance with accelerometer feedback
- Fully automated robotic line to check quality of shocks
- Qualification of parts based on tolerance bandwidth





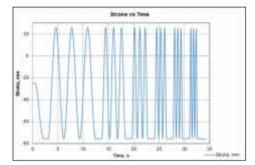
Unique Features

- ★ Energy efficient Low noise servo-controlle pumps
- → Highly reliable, virtually contamination insensitive servo valve
- → Dust proof air conditioned enclosures for electrical and electronics

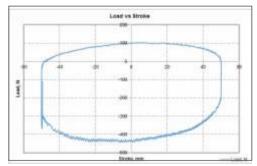
Hardware

Force rating	5/10 /15/35 kN dynamic capacity
Actuator stroke	200 mm
Peak velocity	1.5 m/s
Hydraulic power pack	11-65 LPM
Safety interlocks	Pressure sensor
Grips	Mechanical R&D and clevis grips

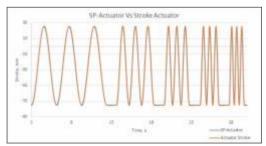
Test Results



Friction Measurement



Variable Freq Constant Amplitude



Variable Freq Constant Amplitude Verification



Shock Absorber Durability Test System

The SP-01-04XX is intended to test multiple shock absorbers in combination with side load application and temperature monitoring.

Standard Features

- ▲ Two column load frame with actuator mounted on bottom crosshead, or,
- Four column load frame with T-slotted base for specimen mounting and actuator mounted on top crosshead
- ▲ Force rating: 15 to 35 kN dynamic capacity
- ▲ Peak velocity up to 7 m/s
- ▲ Hydrostatic actuators with anti-rotation assembly
- Clevis grips for simultaneously testing multiple specimens
- ▲ Temperature measurement of shox using thermocouples with optional test hold or slow cycling for cooling
- ▲ Side load actuators up to 700 kg mounted between specimens
- ▲ Air cooling facility for specimens during durability cycle up to 2 m/s
- ▲ Closed loop water cooling facility for specimens during durability cycle up to 7 m/s

Unique Features

- ▲ Ability to test multiple parts
- Ability to independently track damping force on individual parts
- ▲ Energy efficient low noise level servo controlled pump
- Unique firmware to enforce required velocity waveform
- Dust proof air conditioned enclosures for controller





Specifications

Hardware

Force rating	15 /15/35 kN dynamic capacity
Actuator stroke	200 mm
Peak velocity	up to 7 m/s
Hydraulic power pack	65-250 LPM
Safety interlocks	Pressure & temperature sensor, Safety cage (optional)
Grips	Multi-sample grip with clevis assembly

Software

Fully programmable priming and stroking conditions including number of cycles

High accuracy displacement measurement

Block cycle testing, Multi step programming and Repeat block options

Qualification of shock absorbers by measurement of damping force, seal friction, gas charge, spring stiffness

Auto nullification of spring stiffness

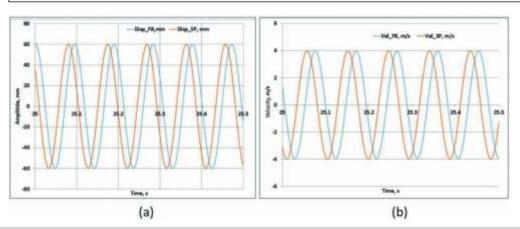
Tolerances in terms of tension/compression damping force, energy, percentage of lag

Adaptive control algorithm for stroking accuracy

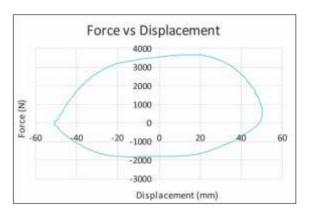
Auto-calibration of stroke and load

Auto-taring of part weight at commencement of test

Automatic recording of test results into Microsoft Excel spreadsheet



Test Results







Elastomer Test System UT-02-XXXX

These systems are used for developmental testing and quality assurance of elastomers including engine and transmission mounts, bushings and other rubberized components, used to suppress noise and vibration. They assess vibration response at frequencies ranging from 0 to 200 Hz, displacements ranging from 0.05 to 15 mm and forces ranging from 0 to 25 kN. Production test systems automatically test parts for damping response over a specified amplitude and frequency.

Standard Features

- ▲ Fully integrated system
- ▲ Interchangeable tooling to accommodate wide variety of elastomers
- ▲ Multifunction operator controls to enable part selection
- ▲ Air conditioned enclosure for controls, electronics and computer*
- ▲ Fully digital control
- ▲ 10 and 25kN force rating actuators
- ▲ Up to 200 Hz cyclic frequency*



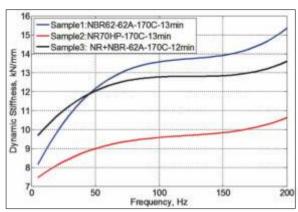
*Optional feature



Specifications

Hardware

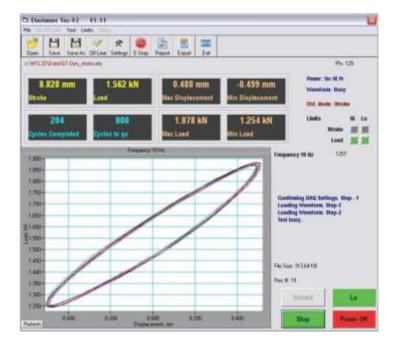
Force rating	10 / 25 kN
Actuator stroke	25/50/100 mm optional
Frequency swipe	0.1 to 100 Hz
Displacement sensor	0.1 microns resolution
DAQ rate	up to 32 kHz
Testing Modes	Displacement, Load and/or mixed
Time swipe	From 0.1 sec onwards



Dynamic stiffness vs Frequency

Applications

- ▲ Dynamic Stiffness
- ▲ Hysteresis loop
- ▲ Damping Co-efficient
- ▲ Tan delta
- ▲ Minimum Load
- Max Load
- Minimum displacement
- Maximum displacement
- ▲ Test Frequency
- ▲ Sine wave graph with min/max load/displacement
- ▲ Time domain based and frequency domain based testing
- ▲ Block cycles, e.g., different load/ displacement blocks with different frequencies
- Preload setting
- ▲ Resolution: 0.01% of full range
- ▲ Testing as per RLD (Road Load Data) in time domain





BiSS Multi Axial Bush/Elastomer Testing System is designed to test bushes of large automotive/railway shock absorbers. These test systems validate the performance and durability of subframe bushings, suspension bushings, and engine mounts. The system performs simultaneous axial, radial, conical and torsional test on silent bush.

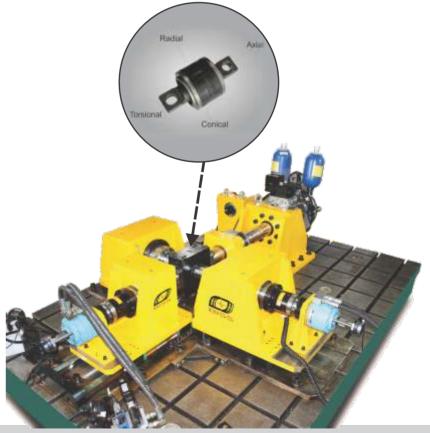
Standard features

- ▲ Servo Controlled Hydraulic Actuators
- ▲ Digital stroke measurements for Axial and Rotary Actuators
- ▲ Green and efficient hydraulic power pack
- → BiSS 2370 Series versatile multi station digital controller for synchronous control and data acquisition
- Application software for multi axis bush testing

Applications

- ▲ Static and Dynamic testing
- Single Axis Test: Axial, Radial, Conical and Torsional testing
- Multi Axial Test: Radial-Conical, Torsional-Radial and Radial-TorsionalConical simultaneously
- Axial and Roll Stiffness, Tan δ and Damping coefficient testing

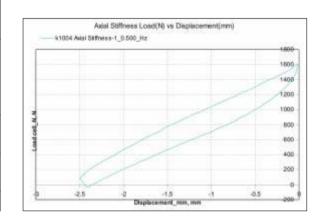


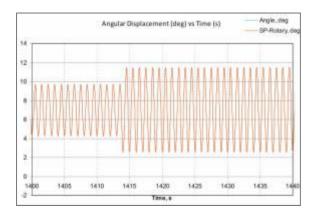


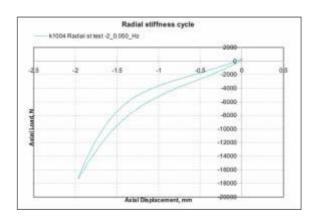


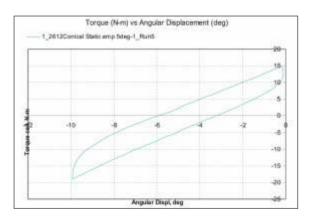
Specifications

Hydraulic Actuators	Torsion: up to 2 kN.m Radial: up to 150 kN Conical: up to 2 kN.m Axial: up to 300 kN includes torque cell and digital position encoder
Servo Controller	Stroke channels: 4 Load channels: 4 High level channels: 4 Performance: 0 to 100 Hz with servo-loop update and DAQ frequency 6 kHz
Hydraulic power pack	up to 250 LPM Operating pressure: 210 bar
Test Bed	High stiffness T-Slotted bed with 3m x 3m dimension along with a portable frame (optional)
Custom options are available	











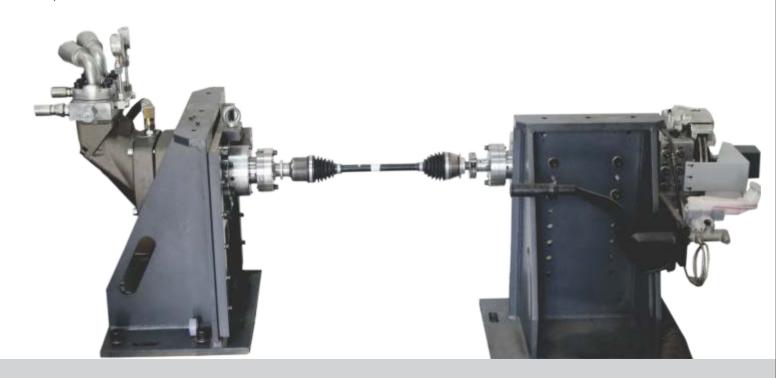
CV Joint Test System SP-00-603

BISS CV JointTestSystem for constant velocity testing as perSAEJ 2028. The test setup evaluates the quality of CV joints by simulating the actual movements as in automobiles.

The two mounting brackets bolted on the frame support a hydraulic motor and a torque cell coupled with transducers for precision measurement and customized grips to hold the test specimen. The mounting brackets rotate (\pm -45°) and can accommodate varying lengths of specimen.

Standard features

- A Hydraulic torque motor up to 1000 N.m.
- ▲ Torque load cell
- Suitable for static and dynamic testing
- ★ Energy efficient low noise servo-controlled pumps
- ▲ Digital servo controller for synchronous control and data acquisition





Applications

- Articulation torque test to measure the torque required to rotate the shaft, when articulated at any point between 0 to 45°
- $\,\,$ Measures backlash of the joint, maximum articulation angle 45 $^\circ$
- △ Optional temperature testing-40 to 120°c
- ▲ Optional radial expansion and temperature measurement test

Specifications

	Torque: 1 kN.m
Hydraulic motor	Speed: 1000 rpm
	Includes digital displacements transducer
	Control channels: 1 channel of servo control
Samue Cambraller	Input channels: 2
Servo Controller	Performance: Typical servo-loop update and DAQ frequency up to
	6 kHz
Uvergulia navvar nask	Digital servo-control with flow of up to 200 LPM
Hydraulic power pack	Operating pressure: Up to 210 bar.
	Size: 1000 mm x 500 mm x 500 mm (Internal)
Environmental Chamber	Temperature range: -40 °C to 200 °C
(Optional)	Accuracy: +/- 1 °C
	Average rate of rise / fall with load: 1 °C /min over entire range
Total weight of rig	1.5 Ton
Foot print:	LXWXH= 2.5 x 1 x 1.2 m
Custom options are available	



Ball Joint Durability Test System

BISS offersSP-00-604 Ball JointTestSystem for durability and performance evaluation of ball joint system by subjecting the specimen to tilt, rotation and axial loads. Servo torque motor, servo hydraulic linear actuators, customized grips, fixtures, and transducers simulate the real test conditions.

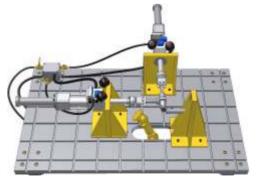
Standard features

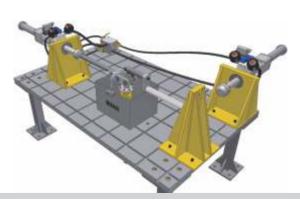
- ▲ Two 10 kN, ±50 mm linear actuators
- ♣ 500 N.m servo hydraulic rotary actuator
- Suitable for static and dynamic testing
- Energy efficient low noise servo-controlled pumps
- ▲ Digital servo controller for synchronous multi-axis control and data acquisition

Applications

- Oscillation angle test
- ▲ Torque test
- Rigidity test
- Extrusion and drawing strength test
- Ball stud static strength test
- ▲ Fatigue strength test
- ▲ Service temperature abrasive durability test from -40 and 120°c
- Muddy water durability test



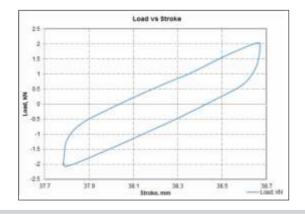


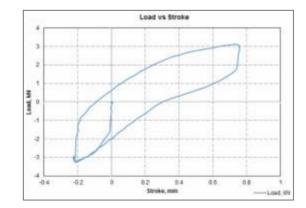


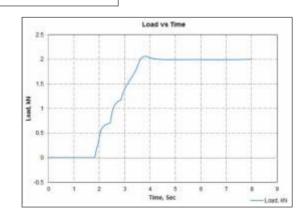


Specifications

Rotary actuator (1 No)	Torque: 1 kN.m Angular displacement: +/- 50° Includes digital displacements transducer
Linear actuators (2 Nos)	Double acting double ended ±10 kN force rating and ±50 mm stroke Includes axial load cell of 10 kN and suitable position measurement LVDT
Servo Controller	Control channels: 3 Input channels: 9 Performance: Typical servo-loop update and DAQ frequency up to 6 kHz
Hydraulic power pack	up to 200 LPM Operating pressure: 210 bar
Environmental Chamber (Optional)	Size: 1000 mm x 500 mm x 500 mm (Internal) Temperature range: -40 °C to 120 °C Accuracy: +/- 3 °C Average rate of rise / fall with load: 5 °C /min over entire range
Muddy water (Optional)	Rate of spray: 4 LPM Tank capacity: 100 L
Total weight of rig	2.5 Ton
Foot print:	L X W X H = 2.5 x 1.5 x 1.5 m
Custom options are available	









Poster Test Rigs

Poster test rig is designed to test durability of shock absorber assembly. The testing rig combined with multi channel control system and user friendly application software simulates real time effects and performs durability, performance or vibration testing in a controlled laboratory environment.

- Suspension/Quarter Poster Test Rig

- Four Poster Test Rig

- Two Poster Test Rig

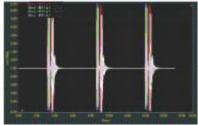
- Eight Poster Test Rig

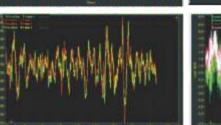
Standard Features

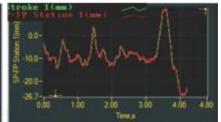
- Pedestal mount actuators
- ▲ Acceleration up to 5g
- Digital displacement measurement transducer
- A Simulation of road-load data including displacement, strain, velocity, acceleration, load etc. at desired locations on the test object
- Advanced data analysis software to capture significant part of the measured time histories of the road-load data and infer the quality, performance and durability of the test specimen from the measured responses in the laboratory

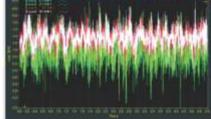
Applications

- Assembly line Squeak & Rattle testing.
- ♣ R & D testing for handling and ride comfort.
- Remote parameter control
- ♣ Road simulation based on deterministic road obstacles, PSD of road profiles of different grades
- ▲ Sub-structuring













Tyre Test Rig SP-02-01XX

BISS Tyre Test System evaluates both static and dynamic properties of tyres, including durability under constant as well as road simulation loading. The test system features two carriages with spindle assemblies and can test two tyres simultaneously. The wheel load is adjustable with maximum load of 100 kN applied through two servo hydraulic actuators.

Tyres varying from 400 mm in diameter to a maximum of 1700 mm in diameter can be tested against a steel drum rotating at a speed of up to 300 kmph.

System measures all forces and moments acting between the tyre and drum with tests in line with ECE, DOT and SAE standard practices. The mechanical stoppers, proximity sensors and software limits incorporated prevent the wheel rim from coming in contact with the high speed rotating drum if the tyre bursts. Additional safety features include a meshed door around the testing area and an enclosure surrounding the belt running on the motor.

Standard features

- ▲ Load range 100 kN
- ▲ Maximum speed 300 kmph
- ▲ Tyre sizes 400 mm in diameter to 1700 mm
- Carriages on linear motion guides
- Dual carriage capability
- Energy efficient low noise servo-controlled pumps
- ▲ Digital servo controller for synchronous multi-axis control and data acquisition
- ▲ Laser based optical system for measuring dynamic growth of tire
- ▲ Rolling resistance measurement
- ▲ Safety cage with limit switch
- ▲ Software, electrical and mechanical limit to prevent rim hitting road wheel
- ▲ Thread separation detection switch

Applications (as per ECE, DOT and SAE standard practices)

- Durability test
- Performance evaluation test
- ▲ Measurement of dynamic growth of rotating tire as per ECE R75
- Radial load test





Automotive Component Test Rigs

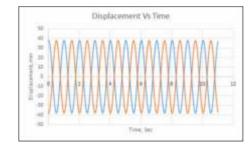
BISS Automotive Component Test Rigs meets practically all the requirements of automotive component testing for strength, durability and performance. Structural actuators in the test rig are with low friction, wear resistance, and hydrostatic bearing seals on head to provide long life and stick slip free operation. Rod end and base ends swivels help to reduce side loads, force alignment problems and eliminate backlash in test setups.

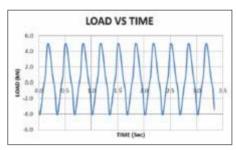
Standard Features

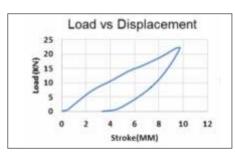
- ▲ Fatigue rated actuators up to 100 kN
- Hydraulic cushions at either end
- ▲ Single ended and double ended options
- Operating frequency up to 50Hz
- ▲ Operating pressure 210 bar
- ▲ Force rating up to 100kN
- ▲ Stroke range 50-500mm
- ▲ Co-axial LVDT mounting

Applications

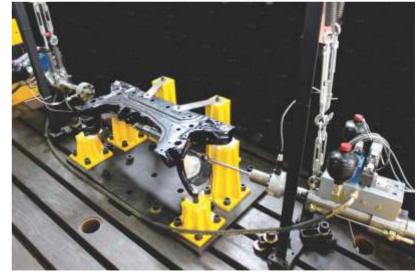
- ▲ Anti-Roll Bar Durability
- ▲ Rear Twist Beam Durability
- Front Cross Member Durability
- ▲ Lower Arm Durability













Test-By-Wire/WiFi/Wireless

Test-By-Wire technology transforms the testing experience. It renders test equipment operation as easy and as intuitive as using your smartphone! What it means to the user: Absolutely all operator controls concentrated onto a single device with context sensitive touchscreen display. Conventional test systems have their controls scattered all over the system, requiring intimate knowledge of individual system components, distracting physical movement away from the 'point of action'. For example, pump controls may be located separate from crosshead controls that are separate from grip controls and all of these may not be together with the E-Stop, not to mention the operator console itself. With all these integrated into a single 'cockpit' style panel, it is intuitive and easy-to-use for even a less experienced operator.



Touchscreen interface for crosshead control



Touchscreen interface for actuator selection





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