

Product Code

UTSP-0102 Concrete Railway Sleepers and Bearers Dynamic Testing Machine

UTSP-0102 Concrete Railway Sleepers and Bearers Dynamic Testing Machine, has been designed basically to perform dynamic and fatigue tests of railway applications according to EN 13230-2, EN 13230-3 and EN 13230-4 (Prestressed monoblock and twinblock reinforced sleepers and bearers tests) and Low vibrating track system (LVT-System) tests. The test system is also able to perform static and quasi-static loading of test samples in technically specified range.

The test system consists of digital control system, software, high force capacity floor-standing frame, servo-hydraulic actuator and hydraulic power pack. The system can be supplied with just standard fatigue and dynamic testing capability, also can be modified with appropriate sized servo valve, manifold and hydraulic power unit to suit the particular application.

Floor model standard frames are robust, heavy duty frames with the axial static capacity of 600kN and dynamic capacity of 500kN (@280bar system pressure and maximum piston speed). Frames are also available in varying load capacities and also in different variations to meet the requirements for both extra wide test space and extended travel. The load frames are rigid 4 column units for superior axial and lateral stiffness, precision aligned. Columns are chrome plated and hardened for easy cleaning and longer life.

The frames are supplied complete with test sample carrying and holding apparatus for easy test setup, upper and lower articulated supports for dynamic tests. Moreover this testing system may perform three and four point flexure test on concrete beams.

The machine is equipped with doubled ended, equal area linear actuators to generate equal force in both tension and compression. Actuator is mounted on upper crosshead with 300 mm usable stroke length and mounted with manifold attached on it. Servo-valve and accumulators are close coupled in order to improve performance with highest possible response and minimum pressure losses where most accurate test control is achieved. Maximum allowable piston speed is 40 mm/sec. SSI type displacement sensor with 5 µm resolution is integrated in the actuators. All dynamic testing systems are equipped with precision fatigue rated load cells where they are mounted on piston's rod end for accurate force measurement and control.

UTEST uses fully digital servo-hydraulic motion controller for displacement and/or force closed loop control of static and dynamic tests. Control loop time is 1 kHz as standard, but can be adjusted to 4 kHz according to application. Data acquisition rate of the controller is standard 100Hz but can be adjusted to 4 kHz if the application's control algorithm can run in this loop time. Effective resolution of analogue channels 19 bit over full ± 10 V range (18 bit for 0- 10V and ± 5 V, 17 bit for 0-5 V, 16 bit for 4-20 mA).

The hydraulic power units are specially designed for dynamic loading of concrete sleepers and bearers for railway, which is governed by oil flow



CONCRETE RAILWAY SLEEPERS & BEARERS DYNAMIC TESTING MACHINE

and pressure. The series have standard 500kN dynamic force capability at 280 bar (3000 psi on servovalve) system pressure with standard ratings up to 100 l/min oil flow. For larger oil flows, the unit can be modified to suit customers' requirements. Electrical parts as indicators, system management buttons and controller is involved in the power pack. Bladder type accumulators are supplied with the pack in order to compensate pressure drops while actuator is operating and any pressure losses between the HPU and test station, in order to smooth pump ripples. Oil level, oil temperature, filter's condition and motor temperature are continuously checked by controller and system has necessary interlocks for fault conditions. Factory –set pressure relief valve prevents excessive increases in pressure. Variable-capacity pump ensure maximum electrical efficiency, consuming only sufficient electrical power to maintain the required flow, even during times of reduced flow demand. Compact designed hydraulic power units allow systems configured to control up four systems independently, this means saving valuable floor space in your lab. Installed isolation manifold lets hydraulic power system running multiple test stations, preventing over pressurization, discharging system pressure separately and power isolation of the stations. According to the environment where system is going to be built, air/oil cooler and water/oil cooler is supplied as standard. However alternative closed loop cooler systems can be adapted to unit if customer requests.

PC SOFTWARE

Concrete Railway sleepers and bearers testing machine is controlled by a computer with the free of charge software uDyna. uDyna is flexible and user-friendly windows based application software for both static and dynamic testing. In the software user can create either test methods (dynamic, fatigue or static) in accordance with EN 13230 or custom test sequences where you can manage to run simple ramp to cyclic waveforms, even arbitrary custom motion profiles. Synchronized 100 Hz data transfer from feedback signals supplies detailed recording of running tests. This rate is flexible up to 4 kHz if the application is applicable. Graphical and numeric monitoring is displayed real time in the user interface. Data reduction and peak values recording are running in cyclic tests. Safety limits (pressure and displacement limits) and internal algorithm protect the machine against any fault condition occurred in the system. uDyna always optimizes the control parameters (PID and feed forward terms) during test in order to adapt actuator control to the changing stiffness characteristic of the specimen. The software also includes an easy calibration check facility. The machine gives some constant load values and waits there for easy check mechanism. Furthermore uData is also delivered to customer freely, where data analyzing and reporting operations will be handled.

Technical Specifications

Control	Standard: Closed loop force and displacement control Option : External analogue channel closed loop control
Actuator	Standard: 0.01 to 10 Hz. Frequency , 600 kN static 500 kN dynamic force capacity, 300 mm stroke (±150mm) Option : Different frequencies (up to 50 Hz.), force capacities, shorter or longer stroke
Hydraulic Power Pack	Standard: Free standing with air cooling unit, one output channel Option : water/oil cooler, four test station cap
Power Requirements	400 V/AC/50 Hz/ 3 Ph + N + E 65 kVA current ratings

