GENERAL CATALOG

BESMAK Servo-hydraulic
Medium-Capacity fatigue test
System with Furnace
General Information:

BESMAK offers advanced solutions for all varieties of materials testing, including monotonic and cyclic testing. Backed by more than 25 years of experience, BESMAK provides the technology and the specialized expertise labs need to perform accurate, repeatable tests that ensure materials and components meet standards. These complete solutions include:

- Highly stiff, floor-standing servo-hydraulic load frames for a range of force requirements
- Intuitive, versatile and user-friendly software with powerful test design capabilities
- Digital controllers with high channel density, high capacity and superior configurability
- Rugged, high-performance grips and fixtures

Overview:

BESMAK Servo-hydraulic systems are the workhorse of any laboratory. They can perform a wide variety of low and high cycle fatigue, crack propagation, fracture toughness and other dynamic tests. Each system can be readily configured with appropriate sized servo valve, manifold and hydraulic power unit to suit the particular application.

All systems are equipped with the advanced features of the “DOLI” (German) digital controller, Console Software and unique fatigue-rated load cells. Test&Motion™ Dynamic Testing Software provides the backbone for running many dynamic tests. Other application specific software module allows other standardized tests to be run.

These dynamic systems, when combined with Test&Motion™ and appropriate accessories, are ideal for running a variety of static tensile, compression, flexure, peel, tear and friction tests.
BESMAK Low-Capacity Servo-hydraulic Systems include:

- Table-Model Axial Systems for up to 25 kN Capacity
- Table/Floor-Model Axial Systems for up to 100 kN Capacity

BESMAK Medium-Capacity Servo-hydraulic Systems include:

- Systems accepting actuators up to 250 kN Capacity
- Systems for 250 or 500 kN Capacity
- Systems for up to 500 kN Capacity

BESMAK High-Capacity Servo-hydraulic Systems include:

- Systems for up to 1000 kN Capacity
- Systems for up to 5000 kN Capacity
APPLICATION AREAS:

BESMAK Servo-hydraulic Dynamic Test Systems can be used for a variety of different material and device tests across many different industries. See some of them below;

- Spinal Implant Constructs
- Stent Materials and Structures
- Dental Implants
- Metallic Angled Orthopedic Fracture Fixation Devices
- Tissues and Biomaterials
- Metallic Bone Plates and Fixation Devices
- Implants for Finger Fractures
- Femoral Nails
- Athletic Footwear
- Elastomeric Materials and Components
- Plastics Under High and Low Temperatures
- Rubber Industry
- Tire Reinforcing Wire
- Recycled Materials
- Sintered Powder Metal Carbides
- Resilient Materials
- Plastics
- Carbon Fiber-Reinforced Polymer
- Medical Device Testing
- Elastomeric Bearings
- Orthopedic Implants
- Olympic Games Equipment
- Cardiovascular
- Various Types of Springs
- Composite Materials
- Biomechanics and Tissue Engineering
- Automotive Industry
- Sports Technology and many more.
Technical Features:

- Double-acting servo-hydraulic actuator with force capacity up to ±250 kN
- High-stiffness, precision-aligned load frame with twin columns and actuator in lower base or upper crosshead
- 150 mm of usable stroke *(Variable according to design and application)*
- Designed for both dynamic and static testing on a variety of materials and components
- Choice of hydraulic configuration and dynamic performance to suit application
- Adjustable upper crosshead with hydraulic lifts and locks fitted as standard for easy adjustment of daylight *(Optional according to design and application)*
- Advanced load cell for faster testing and reduction of inertial errors
- Optional hydrostatic actuators for higher side-load resistance or material critical applications
- Compatible with a large range of grips, fixtures, chambers, video extensometers, protective shields, and other accessories

Software and Controller

The BESMAK Servo-hydraulic Dynamic Test System is supplied with a digital DOLI controller that provides full system control including features such as automatic loop tuning, amplitude control, specimen protect, ±180,000 resolution across the full range of transducers, and adaptive control technology. It also allows access to Test&Motion™ Dynamic Testing Software for dynamic tests, static tests, and other applications. Digital DOLI controller has a data acquisition speed of 5 kHz.

Why DOLI controller?

- Bump less transfer, automatic amplitude control
- Fast measured value transfer, variable bus-conception
- EDCs that can be synchronized among themselves
- Fast communication with the PC
Technical Features of DOLI:

- Interface and control processor Vortex 86DX CPU 800MHz
- Control frequency 5kHz
- RS485-Interface for external keyboard/display, supports a maximum of four devices
- Drive Interface ±10V (16Bit) analogue command output, digital command output and safety functions
- PC-communication via USB or Ethernet
- Eight I4-Bus-Extension-Slots
- Internal female plug for serial sensors (COM 1)
- Internal female plug for debug (COM 2)
- Internal female plug for synchronizing several EDCs
- Internal female plug for servo valve amplifier, 160 and 320 Watt DC-drive amplifier

DOLI RMC – X HANDHELD UNIT:

RMC is a handheld unit (cable 3m) connected directly to the DOLI. The RMC has a magnetic foil on its back and therefore can be placed at an ergonomic position. RMC handheld unit has an emergency stop button onto it. In case of an emergency situation, process can be easily stopped. RMC handheld unit provides to control and monitor Test Speed Adjustment, Grips Position Control, Active Crosshead Control (up-down movement speed), Load/Deformation, Extension, Real-Time % Extension. Automatically stops when the piston reaches to maximum displacement point etc.
TEST&MOTION™ Software to Control Dynamic Tests:

The Test&Motion Software module DynPack has been developed to control dynamic testers. It records and evaluates data with a rate of up to 5 kHz via several channels. DynPack is able to communicate simultaneously with several DOLI control units at the same time, which make it possible to control a two or three axis system. DynPack has a function generator, which can generate ramp loading as well as triangular, rectangular and sinusoidal signals.
Features of TEST&MOTION™ DYNPACK:

- 32 bit Windows Program, executable under Windows 7 or advanced
- Oscilloscope-Window for set and actual value
- "bump less transfer" between the three controlling types
- Data acquisition by three channels with 5000Hz, max. eight measuring channels
- Possibilities for setting the function generator
- Cycle preset, cycle counter, end of test criteria, limit value settings
- PID-Action via program, peak value controlling to amplitude maximum
- Graphical on-line-display of the signals
- Data storage according to time, result (Changing an active measuring channel)
- Saving of the envelope curve
- Saving according to a preset amount of vibrations
- Synchronization of several EDCs possible (e.g. Tension-/ Torsion tests)

Some Screenshots of TEST&MOTION™ DYNPACK:
Typical Testing Applications:

A wide range of system options, grips, fixtures, and accessories, allow BESMAK Servo-hydraulic Dynamic Test Systems to be customized for specific applications. Whether the test application demands low or high temperatures, crack measurement, or complex specimen gripping geometry, BESMAK offers a complete tailored package.
Video Extensometer: (Optional)

BESMAK RTSS (Real Time Strain Sensor) video Extensometer is a contactless optical measurement system based on a digital camera and real-time image processing. It measures the longitudinal and transverse strain between two applied lines with a rate of up to 4000 Hz. The strain data is transferred e.g. via an analogue signal or digital interface to the test machines for further processing or controlling.
Features:

- A modern, configurable and intuitive user interface using OpenGL
- The control from the Video extensometer by the connected testing machine allows the fully automatic operation
- Using templates for different measurement tasks
- Many options for the data communication and data export
- Integrated generation of image sequences
- The multithread-analysis-kernel supports multi-core-processors to achieve a low processor load
- System calibration gives measures in [mm]

Product Variants:

Multi-Camera-System

- Simultaneous measurement of different specimen sides (up to 360°)
- Small and large FOV for accurate E-modulus and full stress-strain curve

RTSS_HS

- For dynamic applications measurement rate up to 4 KHz.
Furnace and Climate Chamber: (Optional)

The furnace and climate chamber are especially used for dynamic fatigue testing machine according to the required temperature. Attached with related load frames to test various metallic or/nonmetallic materials.

This unit consists of furnace/chamber body, controller, high temperature grips, pull rod and/or bracket. The temperature can be controlled automatically by PID controller with high accuracy. Also it can communicate with computer and electronic control unit. The temperature range and furnace size can be defined according to the customer’s requirements. It is the ideal material test equipment used for universities, research institutes and enterprise companies.