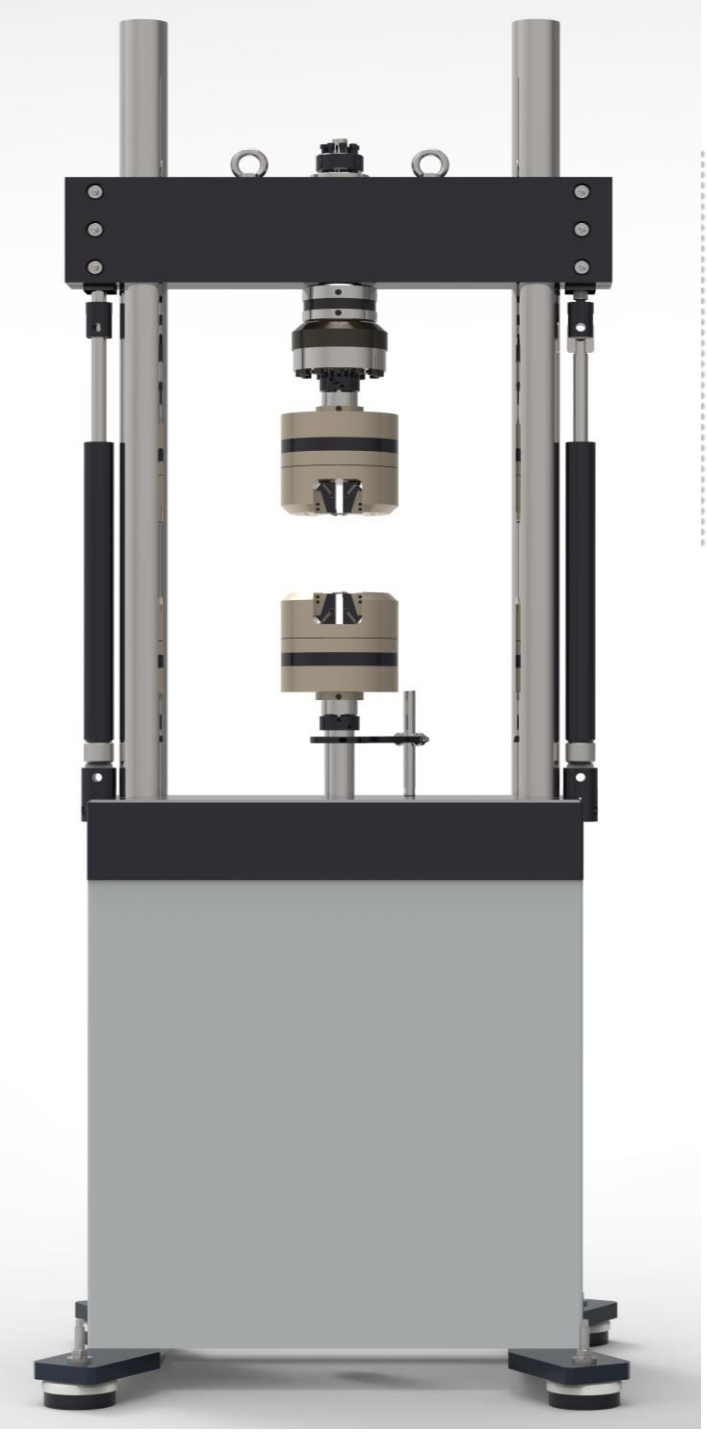
BESMAK BMT-D Series
Servo-Hydraulic Dynamic Fatigue Test Machine



TECHNICAL FEATURES:

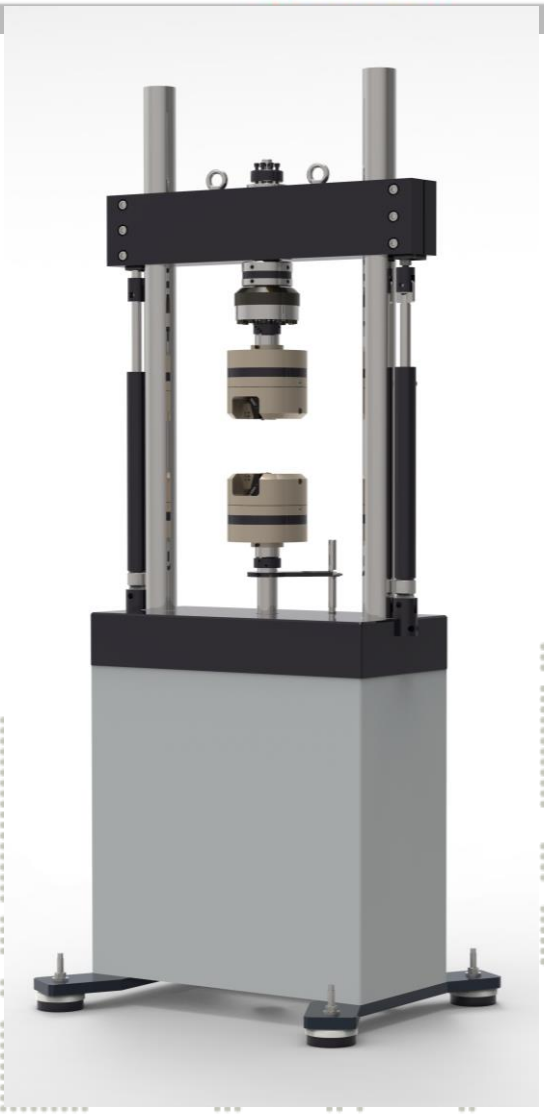
Maximum Load Capacity:	**Up to 1000kN**
Frame Type :	Rigid frame in Column construction.
Electronic Unit:	New generation EDC Electronic Control Unit with 10 kHz (10000 data/sec) data acquisition and control system
Control:	1) Servo Hydraulic 2) EDC Controller 3) RMC Handheld Unit 4) Besmak Universal Testing Software (Load and Deformation/Displacement Control)
Accuracy:	± 1%
Load Measuring and Control:	%1 to %100 with Class 1 according to ISO 7500-1
Resolution:	24 bit
Displacement Resolution:	0,001 mm
Vertical Test Area:	850 mm without accessories *contact us for different test area
Horizontal Test Area :	1000 mm (Horizontal Daylight) *contact us for different test area
Software:	Besmak Universal Testing Software
Power Requirement:	3 phase 380 Volt, 50/60Hz

General Information:

BESMAK offers advanced solutions for all varieties of materials testing, including monotonic and cyclic testing. Backed by more than 27 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**

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:

- High-stiffness, precision-aligned load frame with twin columns and actuator in upper crosshead.
- 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

- Advanced load cell for faster testing and reduction of inertial errors
- 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 EDC controller that provides full system control including features such as automatic loop tuning, amplitude control, specimen protect, 24bit resolution across the full range of transducers, and adaptive control technology. It also allows access to Besmak Universal™ Dynamic Testing software for dynamic tests, static tests, and other applications. Digital EDC controller has a data acquisition speed of 10 kHz.

ELECTRONIC CONTROL SYSTEM:

BESMAK BMT- D Series Dynamic Fatigue Testing Machine is controlled by "**New generation EDC Electronic Control Unit**". EDC electronic control system is world's one of the sensitive electronic control systems and used since 1975. It controls hydraulic and/or electromechanical systems by closed-loop control method.

Test can be done with both load and displacement/deformation control mode with closed loop control technology. With displacement/deformation control, user can obtain much more accurate and sensitive readings. Load of failure, strain of failure, max load, max strain, etc. can be obtained real-time at 10 kHz (10000 data/sec).

Load cell, video extensometer, automatic extensometer, etc. can be connected automatically to electronic control units. Besmak Universal Testing Software and EDC controller can recognize these sensors automatically due to sensor eeprom connectors, and calibration can easily be done with the software.

Controller has the excessive load protection system and can detect the failure automatically. Also, user can reset the load at the beginning of the test which gave easiness in daily tests.
User can control test, can adjust device settings and can control hydraulic grip by PC software and/or Remote control panel. Tests can be carried out by a single button.
Controller can detect indirect loads before the test (these loads can occur because of grips and mechanical system, etc.) and can prevent them affecting the test results. *Sample protection feature. Return of piston can be done automatically by electronic controller unit and Remote control panel. Besmak Universal Testing Software has all SI and metric units of sensors. Electronic control unit can be connected to computer via USB or Ethernet.

Machine has emergency button which stops the test immediately when activated. User can use the button whenever an unwanted situation occurs.

Remote Control Unit:

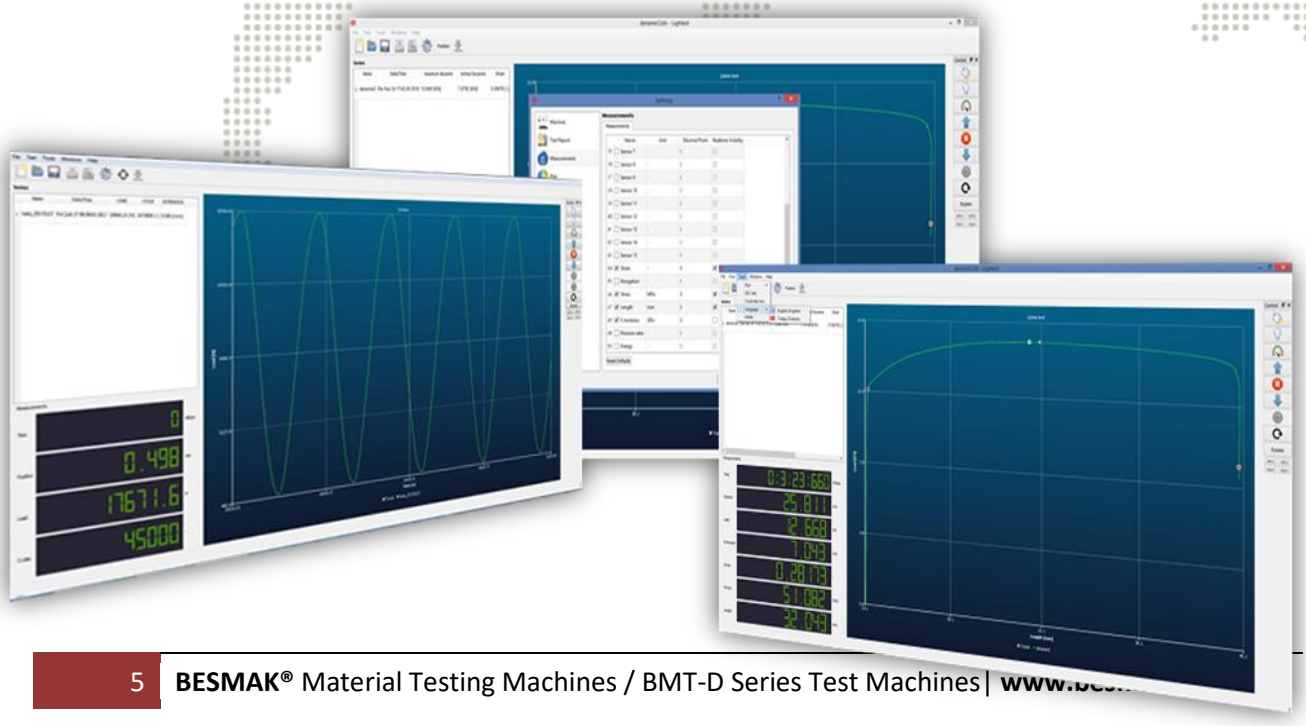
With the help of Remote Control Unit user can perform test, can control speed of actuator for sample adjustment, grips control, load / deformation / displacement and strain values display in real time, adjust and control movement / positioning of grips, assign max.-min. limit etc.
The most important feature provided by Remote Control console unit is the user does not have difficulty when placing the specimen on the grips because of the flexibility / mobility of device.
In an emergency case, test can be stopped immediately by pushing the emergency button on the Remote Control console.

Features of Remote Console:

- Remote Control console for machine controlling via keys and DigiPoti (Smart Key)
- OLED monochrome display to show real time values and status LEDs
- Magnetic rear for clipping to testing machine chassis
- Connecting cable length 3 m for easy and flexible use

BESMAK UNIVERSAL TESTING SOFTWARE:

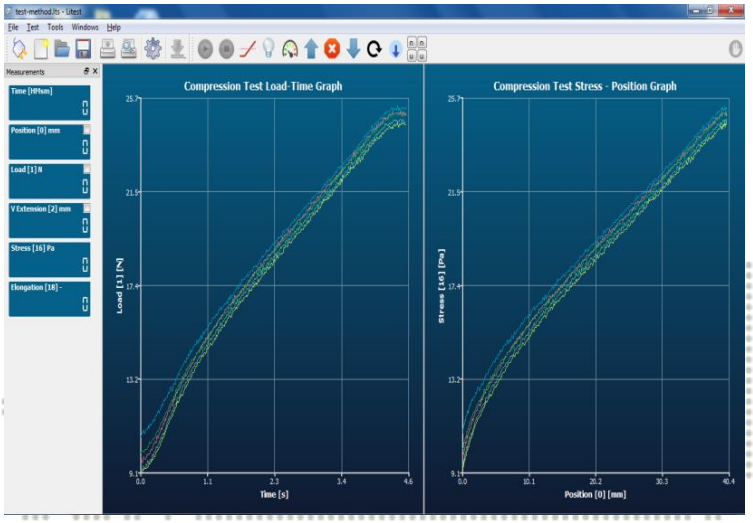
Tests can be carried out on computer by Besmak Universal Testing Software. Real time data, test graphs and results can be observed on software. Results and graphs can be saved on computer and printed. User can personalize the software and report format according to company/corporation etc. Besmak Universal Testing Software is compatible with Windows7 and higher operating systems. Universal Testing Software provides solutions to all type of test

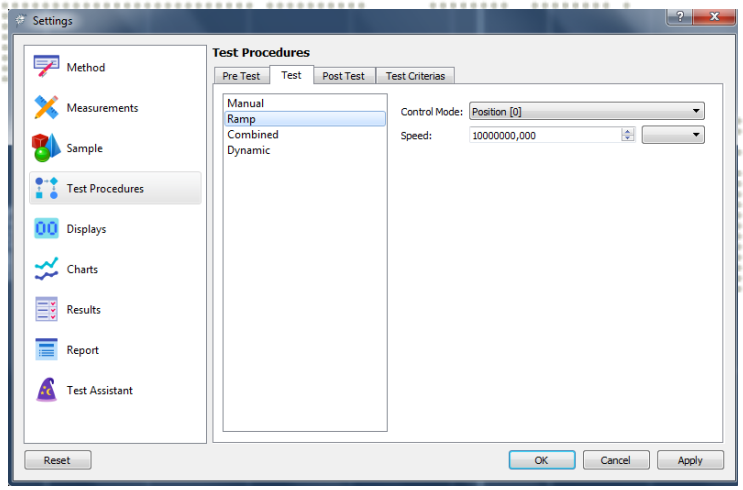


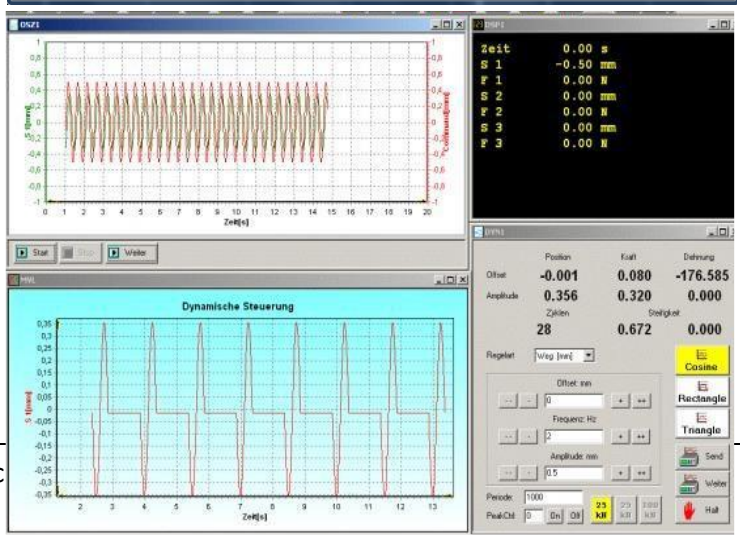
applications.

Key Features of Software:

- User Friendly, easy to use interface
- Easy-to-understand icons and workflows make it easy to train new or experienced users, simplifying operator training, and allowing you to start testing even faster
- meticulously crafted visual design, gives the most comprehensive view of the test workspace
- User can make and save test templates with specific name / test standard etc.
- Automatic Save option for test report and/or raw values
- User defined graph axis to get real time vales of desired sensor
- User defined report setup and results definition
- High speed data display with 10 kHz data acquisition speed
- Automatic sensor and setup identification
- Series test option to combine test graphs and results of multiple samples
- Real time graphic analyzing feature to see graph data point to point
- User can perform tensile, compression, bending, shear and special test easily
- Test settings, test templates, loading sequences and device settings can be easily done by the software
- Besmak Universal Testing software supports multi languages which make it attractive for international users
- Besmak provides 24/7 online support to our customers.
- Over load detection and sample protection features for advance testing applications to protect sensitive samples
- Auto tare option for each connected sensor
- Auto positioning and return after test feature for actuator
- Software supports All SI and Matric units for sensors and



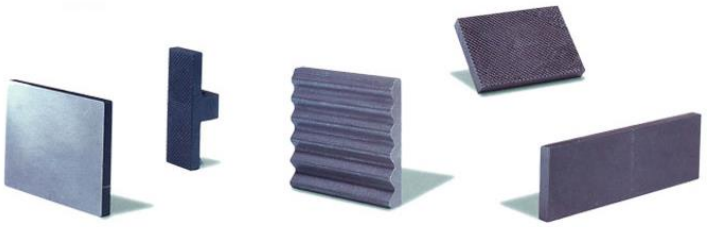




measurements
- PC connection with LAN and USB cable (both available)

Typical Testing Applications: (optional not included the price)

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.



Hydraulic Grips:

Machine comes with standard hydraulic grips 500kN capacity with complete set of jaw inserts and hydraulic control system for increased productivity.

- Suitable for gripping flat or round specimens
- Features side-entry design with full access for easy specimen insertion from the side without actuator movement
- Adjustable specimen stops on flat faces provide accurate specimen centering
- Suitable for tension and compression including full reverse-stress dynamic testing capability
- Load Capacity 500kN
- Comes with full set of jaw inserts for flat samples between 0 – 30 mm

- Comes with full set of jaw inserts for round samples between 4 – 30 mm diameter

Hydraulic Unit:

System comes with 160l/min advanced hydraulic Power Unit with hydraulic pump driven by electrical motor, smooth and high flow rate, with manifold and pressure limit and actuator safety valve, oil tank with 1000 lt volume, comes with necessary joints and hose. Hydraulic power unit is equipped with high response and accurate 2 pieces servo valve. Hydraulic power unit also equipped with heat exchanger(Chiller Unit). The system is suitable for operation with 3 phase 380 V, 50 Hz.

Chiller Unit:

System comes with special chiller system and heat exchanger unit to keep hydraulic oil temperature normal during test.

Linear Displacement Transducer :

Measurement Length: ±25 mm(50 mm),
Resolution: 0,001 mm,
Slim Frame Structure,
Linear Incremental Measurement System and
Digital output.

Environment Chamber:

Temperature Chamber for tensile and fatigue tester, Stainless Steel

Temperature range -80°C to 250° C

1 x mixing fan with ring heating rod. 2300Watt 220Volt

Door with 4-fold glazing with door heating, Magnetic valve for nitrogen cooling

Temperature Regulator Box 19" Rack Omron 0.1° RS-485 incl Software to regulate in steps up and down

Inclusive guide rails to move chamber back, Inside Dimensions: 220x220x580 mm;

Thickness: 70 mm top bottom right left, Door 90 mm, back side 160 mm

Video Extensometer:

Type : non-contact type transverse strain extensometer.
During the test, the screen should be synchronized with the extensometer in real time R-value and Poisson's ratio must be able to read in channel form.
Determination of R-value according to ISO 10113
No specimen marking is required for test.
Field of View - 260mm
Class 1

Clip-On Extensometer:

Gauge Length LO :50 mm
Measurement Length Lg :25 mm
Sensitivity :0,01 mm

CMOD:

- Gauge Length: 5.0 mm, (optional)
- Measuring Range :+7.0 mm/-1.0 mm, (optional)
- Temperature Range :-40 °C to 100 °C(optional)