C225-E027

Access to your success
SHIMADZU

Servopulser EMT Series

Shimadzu
Electromagnetic Force
Fatigue and Endurance Testing Systems

Actuated Directly by Electricity

Eco-Friendly Operation

Quiet Operation

No Waste Oil

Allows Long Stroke Lengths and Fast and Highly Precise Testing in a Clean Environment

Offers a Wide Range of Testing, from Static Tests to Dynamic Tests

Environmentally Friendly

- The eco-friendly operation uses electricity efficiently according to the test force.
- Generates no waste oil, which can have a large environmental impact.
- Since the instrument is clean, it does not contaminate the installation site.

Fast, Large Movements

- Capable of sine wave cycle testing at speeds up to 2 m/s(for model EMT-1kNV-50).
- Offers a long 0 mm to 100 mm (±50 mm) stroke length (for model EMT-1kNV-50).
- Allows ±20 µm displacement amplitude at 200 Hz frequencies.

Operating costs are low, providing a system with low overall cost

- Power consumption is minimized to only what is required for the test force.
- Requires no hydraulic oil, filters, or other consumables.

Offers highly precise measurement and control, outstanding operability, and clever functions.

- Allows 24-bit rangeless high-resolution test force measurement and control.
- Offers full digital control for autotuning control parameters and waveform correction*.
- Allows performing offset load tests with high precision (see page 5).
- Also allows contact tests (See page 5. Ideal for switches, pedals and other such specimens).
- Includes a specialized interactive controller that interacts via a color LCD screen and touch panel.
- The testing space (vertical direction) is changed electrically, making operation easy. It also offers many other outstanding features as well.
- The testing space is freely adjustable according to testing applications (crosshead is electrically raised/lowered).

* Using optional computer software

Applications

Automotive / Mechatronics
Plastics and Rubber / Electrical and IT
Universities, Research Labs

Specimens and Applications

Quality Control or Research and Development of Plastics, Rubbers, Biological Materials, Automotive Parts, Electrical Parts, New Materials, etc.

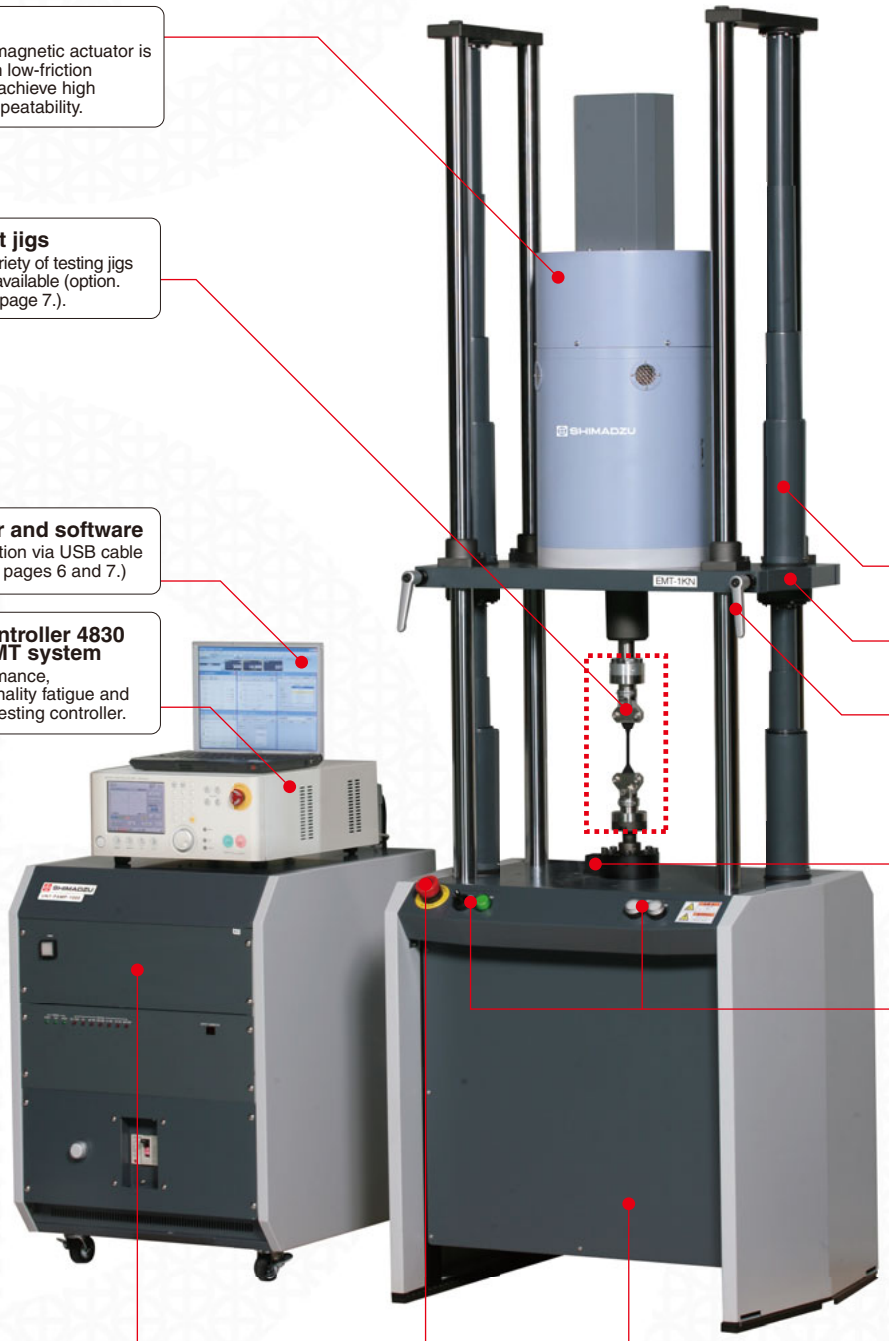
Type of Testing (small capacity tests)

Fatigue and Endurance Tests
Static Tests
Various Types of Atmosphere Tests

Contents

Basic Components

■ The EMT system comprises the main unit, actuator, air cooler, load cell, controller, and power amplifier.



● **Actuator**
The electromagnetic actuator is coupled with low-friction bearings to achieve high waveform repeatability.

● **Test jigs**
A variety of testing jigs are available (option. See page 7.).

● **Computer and software**
Communication via USB cable (option. See pages 6 and 7.)

● **Servo Controller 4830 for the EMT system**
High-performance, high-functionality fatigue and endurance testing controller.

● **Main unit**
- The main unit is stand-alone, and is constructed with four columns and an upper actuator to avoid resonance.
- A large testing space is provided to accommodate a thermostatic chamber.

● **Electric up/down screw and protective cover**

● **Crosshead**
The testing space is freely adjustable.

● **Manual clamp levers for securing crosshead**

● **Load cell**
This detects the test force.

● **Up/down buttons**
For safety, operation requires using both hands.

● **Power amplifier**
Power electronic circuits drive the actuator using a 3-phase 200 VAC primary supply.

● **Emergency stop button**

● **Air cooler**
(built in to main unit)

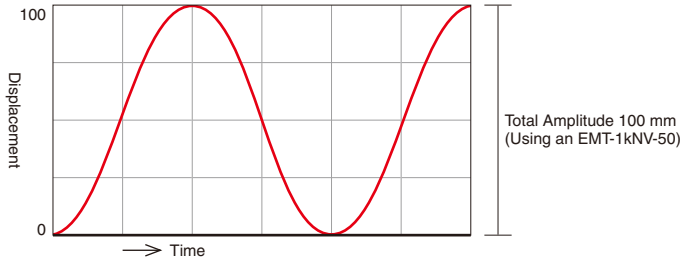
* An optional safety guard is also available.

Meets a Variety of Testing Needs

Applications

Long Stroke Testing

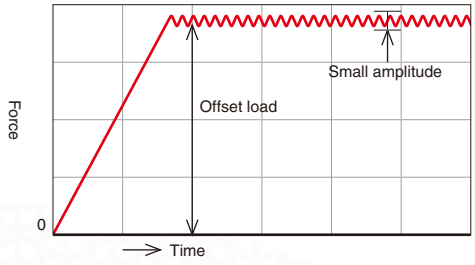
Capable of large displacements and high speeds for rubber fatigue and endurance tests.
Tensile and compression tests are also possible. (Requires optional static testing software.)

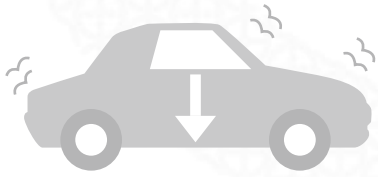


Rubber, plastics, etc.

Offset Load Testing

Small amplitude tests can be performed while applying a large offset load.

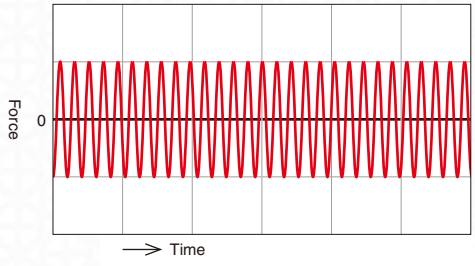




Simulates the vibrations that vehicles receive as they travel over road surfaces.

High Cycle Testing

High frequency fatigue and endurance tests reduce testing times.

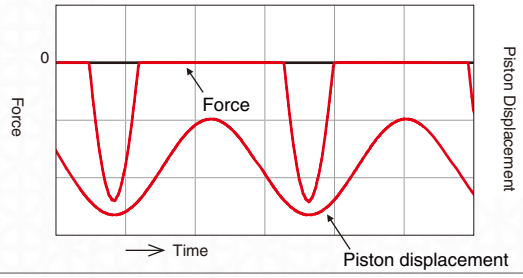


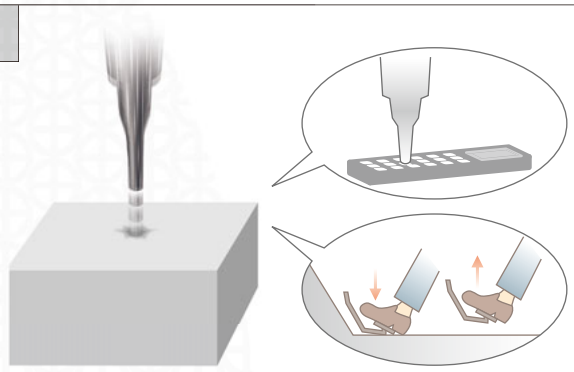
Frequency vs. Testing Time

Frequency	Cycles	Testing Time
20Hz	10^7cycles	5.8days
100Hz	10^7cycles	1.2days
200Hz	10^7cycles	0.6days

Contact Testing

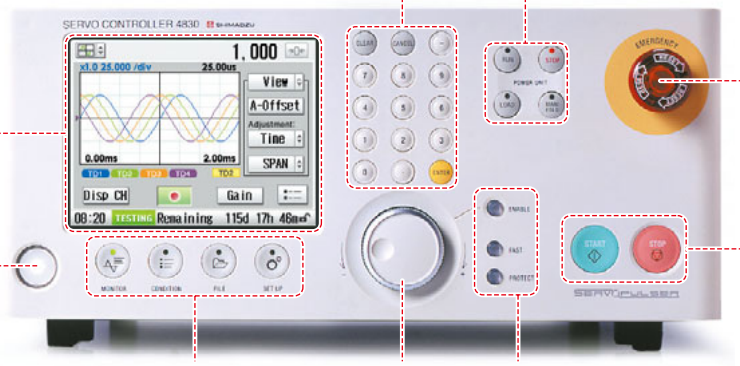
Capable of repeatedly approaching and pressing buttons or other surfaces.





Servo Controller 4830 for the EMT System

High-performance, easy-to-use controller for fatigue and endurance testing



*Basic specifications are the same as indicated in the Servo Controller 4830 catalog.

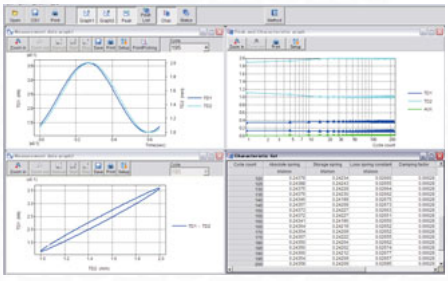
Basic Software for Windows (Option)

Basic Software (Windows software for 4830 controller)
(includes four types of software)

P/N 347-39703 (basic software)

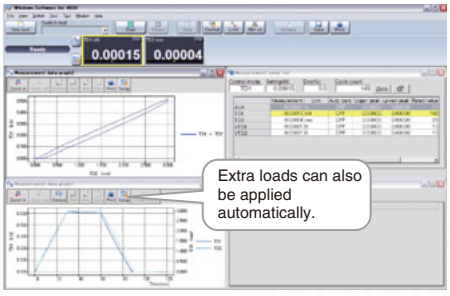
Fatigue and Endurance Testing

Capable of calculating dynamic characteristics during fatigue and endurance testing. Can also plot S-N curves.



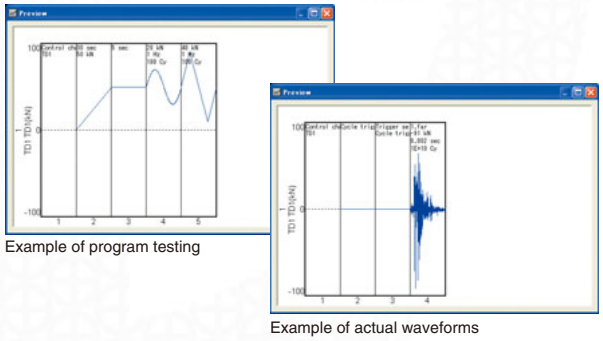
Static Characteristics Testing

Enables tests to determine static characteristic values (such as the elastic modulus) of rubber.



Program Function Testing

Capable of tests combining static and cycled loads.

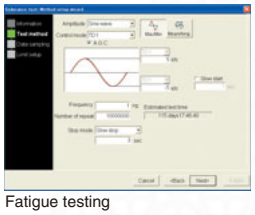


Example of program testing

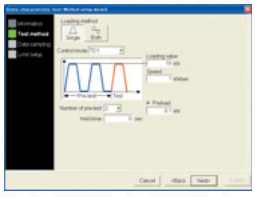
Example of actual waveforms

Combination Testing

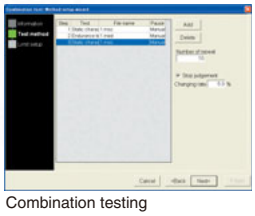
Static testing parameters and fatigue testing parameters can be combined to automatically measure static characteristic values after finishing endurance tests.



Fatigue testing



Static characteristics testing



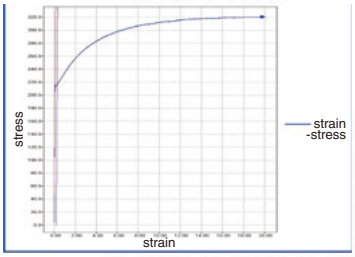
Combination testing

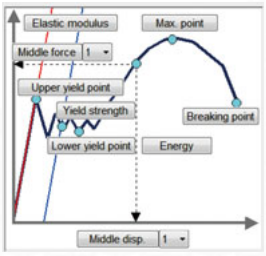
Additional Software for Windows (Option)

Static Testing Software (requires basic software, available separately) P/N 347-39717

Static Testing

Static testing includes tensile, compression, and 3- and 4-point bending. Capable of displaying elastic modulus, upper yield point, lower yield point, yield strength, intermediate test force, intermediate displacement, maximum test force, break point, energy, and other data.

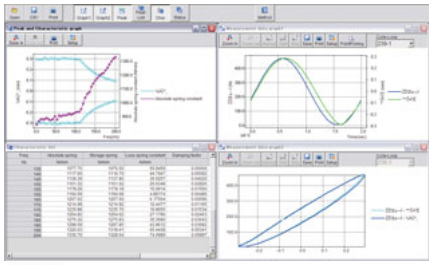




Frequency Sweep / Resonant Frequency Tracking Software (requires basic software, available separately) P/N 347-39720-04
(includes two types of software)

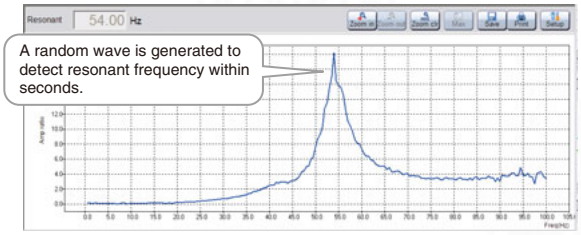
Frequency Sweep Testing

Frequency can be varied incrementally to measure dynamic characteristic values. Sweep endurance testing is also possible.



Resonant Frequency Tracking Testing

Resonant frequencies can be detected within seconds. Resonant frequencies can also be tracked during tests.



Test Jigs (Option)

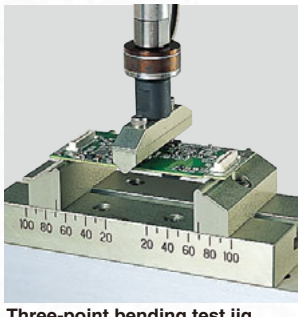
* For information about testing jigs not shown below, contact your Shimadzu representative.


Pin type grip for flat specimens

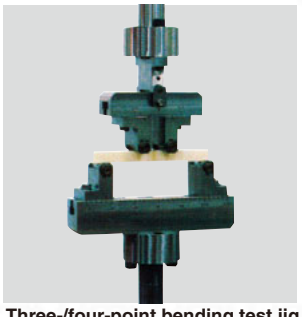

Manual non-shift grip for flat specimens

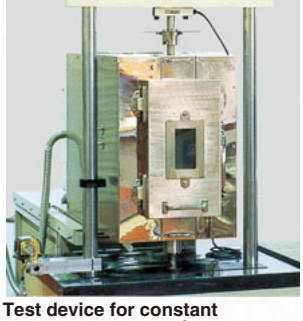

Compression plates


Drill grip



Three-point bending test jig (for printed circuit boards)


Three-/four-point bending test jig for plastics


Test device for constant temperature atmosphere tests


Safety guard

Specifications

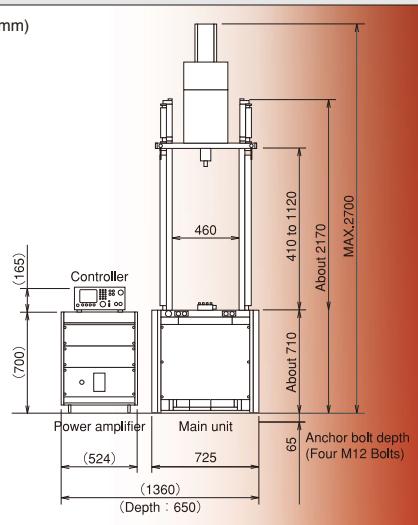
Main Specifications

Model	EMT-1kNV-30	EMT-1kNV-50
P/N	346-73408-11	346-73408-12
Max. test force	±1 kN (dynamic/static)	
Stroke	±30mm	±50mm
Cycle speed and amplitude	See amplitude characteristics (shown below)	
Max. speed	1m/s	2m/s
Max. frequency	200Hz	
Controller	Servo Controller 4830	
Controlled items	Test force, piston stroke	
Force Range Static indication accuracy	Rangeless: Within ±0.5% of indicated value or within ±0.02% of max. dynamic force	
Stroke Range Static indication accuracy	Rangeless: Within ±1% of indicated value or within ±0.1% of rated value	
Frame up/down system	Electric motor	
Test space	Distance between columns: 460 mm, Distance between installed jigs: 0 mm to 700 mm	
Weight	Main unit: 510 kg, Power amplifier: 60 kg, Controller: 8 kg	
Operating noise	62 dB (measured 1 m from front of main unit and 1 m from floor)	
Power supply requirement	50/60 Hz, 3-phase 200 V, 4 kVA	50/60 Hz, 3-phase 200 V, 5 kVA
Power consumption at max. load	4 kW	5 kW

Installation Requirements: No special foundation work is required, but the floor must be sufficiently strong.
Instrument must be installed with anchor bolts to prevent tipping.

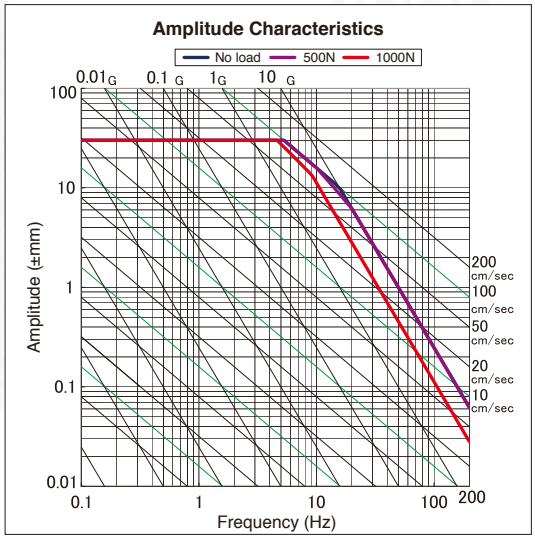
Exterior Dimensions

(units: mm)

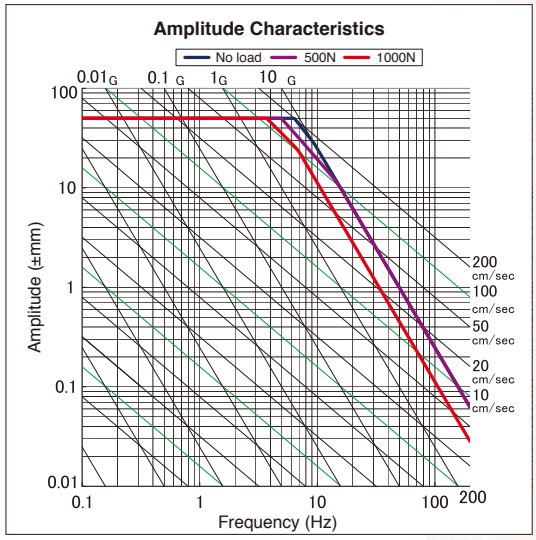


Amplitude Characteristics

EMT-1kNV-30



EMT-1kNV-50



- The characteristic curves shown indicate the relationship between specimen amplitude and cycle speed when sinusoidally driven.
- The frame, load cell, and specimen characteristics are not included. These must also be considered in order to obtain the actual amplitude characteristics.

ISO 9001
JQA-0376

Founded in 1875, Shimadzu Corporation, a leader in the development of advanced technologies, has a distinguished history of innovation built on the foundation of contributing to society through science and technology. We maintain a global network of sales, service, technical support and applications centers on six continents, and have established long-term relationships with a host of highly trained distributors located in over 100 countries. For information about Shimadzu, and to contact your local office, please visit our Web site at **www.shimadzu.com**

SHIMADZU

SHIMADZU CORPORATION. International Marketing Division
3. Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101-8448, Japan
Phone: 81(3)3219-5641 Fax. 81(3)3219-5710
URL http://www.shimadzu.com

Printed in Japan 4199-06903-30ANS