

Electric Motor Driven Actuator

NJ-SERVO



Electric Motor Driven Actuator NJ-SERVO

Evaluate Endurance As You Wish
Motorize a Variety of Endurance Testing Systems

- Maximum Speed at Maximum Loading: 72 cm/sec
- Stroke: ± 100 mm

A ball spline is utilized, so a complicated anti-rotation mechanism is not required.
The shape of the loading unit is simple, so positioning during testing is easy.

- Test Force: ± 5 kN and 10 kN
- Accuracy: $\pm 0.5\%$ indicated value

The same test force capacity is guaranteed during static tests and dynamic tests.



The NJ-SERVO electric motor driven actuator utilizes an electric motor drive system. High accuracy test control is enabled by a special servo motor and stroke displacement measurement sensor. In addition, the system configuration is simpler in comparison to hydraulic actuators, so it is easy to maintain, and achieves power savings and space savings.

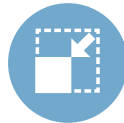
This system accommodates a wide range of tests with a high degree of expandability. This includes everything from endurance evaluations of the main body and assemblies of automobiles, aircrafts, and other transportation equipment to endurance evaluations of stand-alone parts; from multi-axis tests combining multiple actuators to uniaxial tests; and from sine waves to working waveform simulation tests.



High Accuracy Measurement and Control



Minimum Maintenance Required



Space Savings



Power Savings

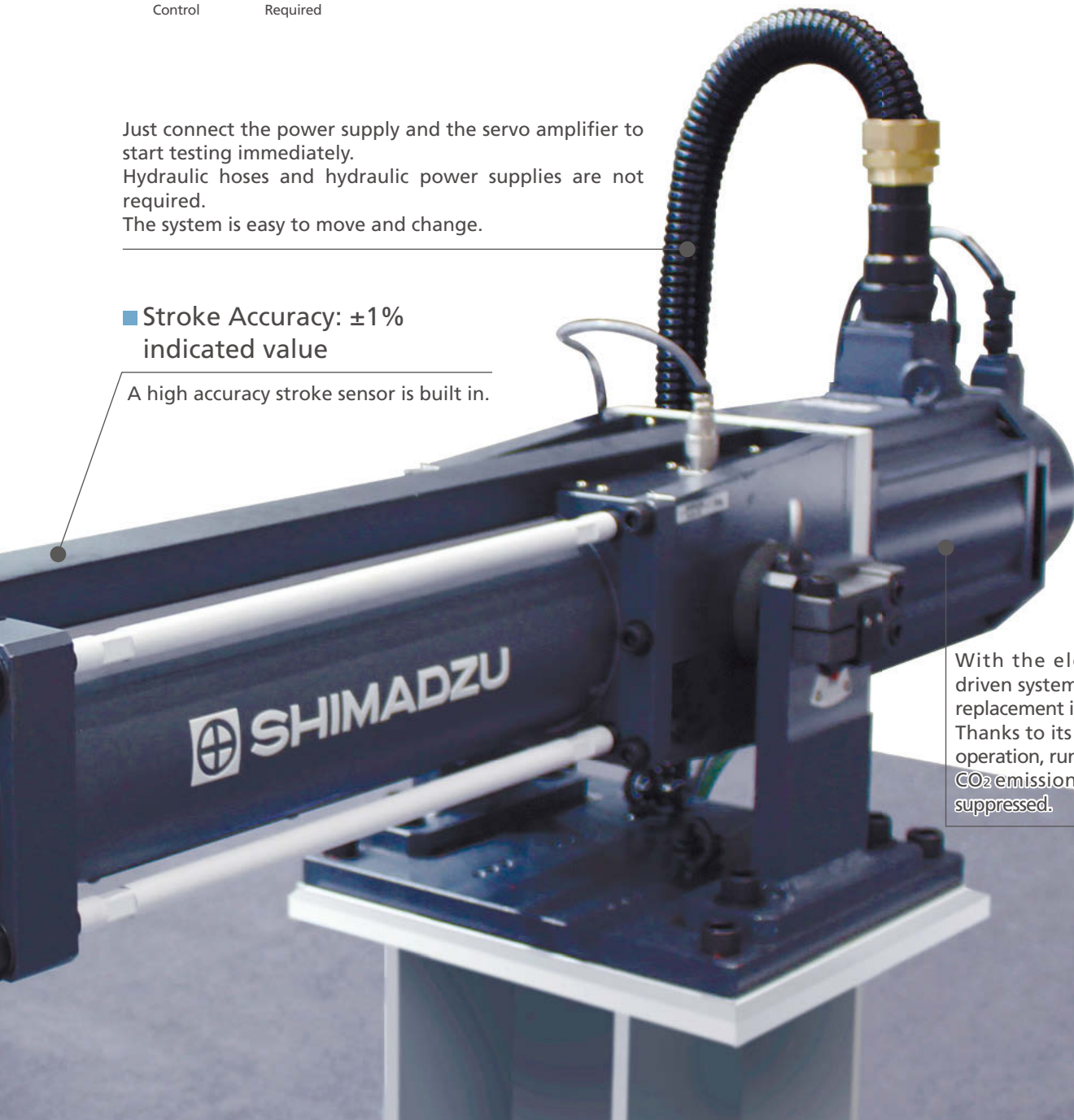


High Expandability

Just connect the power supply and the servo amplifier to start testing immediately. Hydraulic hoses and hydraulic power supplies are not required. The system is easy to move and change.

■ Stroke Accuracy: $\pm 1\%$ indicated value

A high accuracy stroke sensor is built in.



With the electric motor driven system, hydraulic oil replacement is not required. Thanks to its power saving operation, running costs and CO₂ emissions are reliably suppressed.



The Performance Required for Endurance Tests —High Accuracy, High Speed, and Stable Control—

The NJ-SERVO was developed and designed with an emphasis on endurance tests.

■ **The same test force capacity is guaranteed in static tests and dynamic tests.**

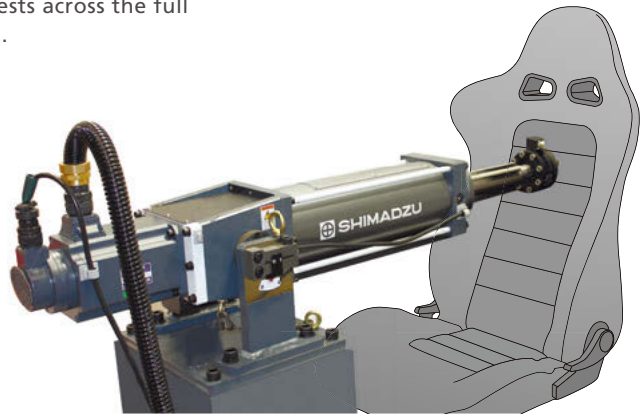
The system accommodates everything from static to dynamic tests across the full actuator capacity range. The test conditions can be set as you wish.

■ **High speed tests at up to 72 cm/sec are supported.**

High speed control is achieved at 72 cm/sec in single wave tests and 50 m/sec in continuous endurance tests. It can be applied to a variety of tests at low to high speeds.

■ **The system achieves high peak reproducibility, and high accuracy measurement and control.**

High accuracy measurements are achieved thanks to the built in stroke sensor and a special load cell for dynamic testing. High stability test peaks are achieved thanks to the high response control of the 4830 controller.

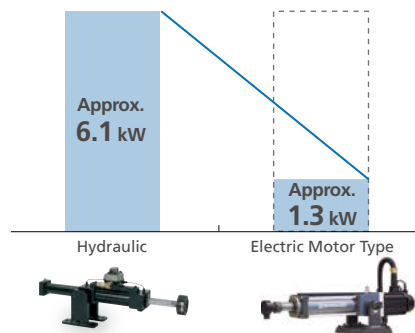


Power Savings of Approximately 75% —Power Savings and Eco-Friendly Operation—

The electric motor driven actuator only uses the power output required for each test, so power consumption is substantially reduced in comparison to hydraulic actuators with similar specifications.

If a 10 kN system is used, power consumption can be reduced approximately 75%, and CO₂ emissions can be reduced approximately 305 kg.

- When implementing 7 day testing with a displacement of ±40 mm and a test force of ±2.3 kN
- Power conversion factor: 0.378 kg-CO₂/kWh
- During actual use, power consumption will differ depending on the installation conditions and the room temperature.



Approx.
75%
reduction in
power
consumption

Approx.
305 kg
reduction in
CO₂ emissions



Labor-Saving System Changes —Space Savings and Minimum Maintenance Required—

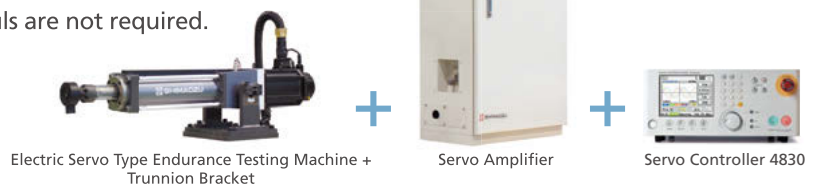
The electric motor driven actuator can be driven solely by a servo amplifier and a controller.

In contrast to a hydraulic type testing system, thick hydraulic hoses and a hydraulic power supply are not necessary. This saves on space, makes the system easy to move, and simplifies testing system changes.

Naturally, it is motor driven, so there is no need for periodic replacement of hydraulic oil, and hydraulic servo valve overhauls are not required.

Basic System

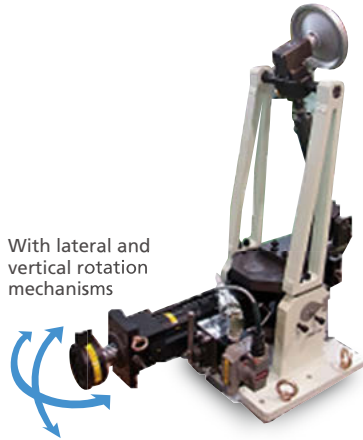
- Electric jack unit (Option: Bracket mount and frame)
- + Servo amplifier
- + 4830 controller (Option: Software)



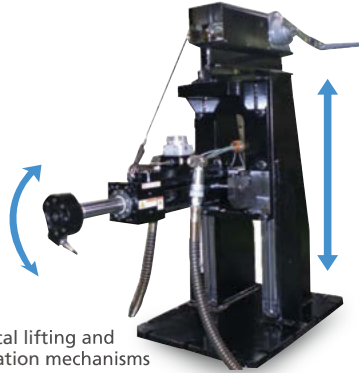


A System That Expands to Suit Your Tests

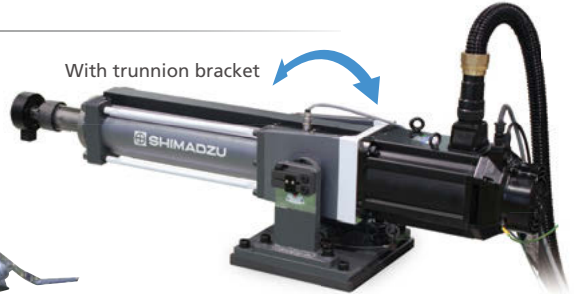
○ Bracket and Lifting Stand Equipped Type



With lateral and vertical rotation mechanisms



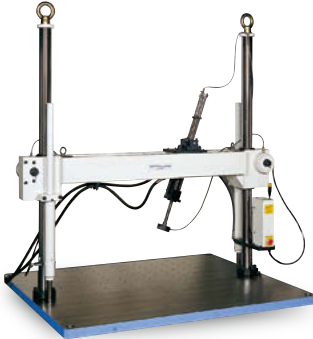
With vertical lifting and lateral rotation mechanisms



With trunnion bracket



○ Frame Mounted Type



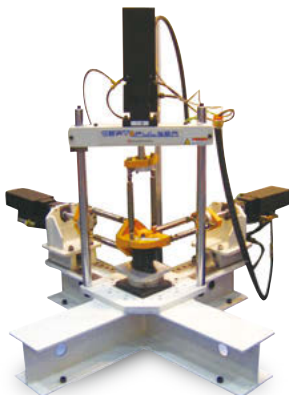
Variable Angle Top-Mounted Actuator Type

This testing machine, specialized for parts and assemblies, uses a large platen. Swinging the angle of the actuator enables dynamic loading from any angle.

Bottom-Mounted Actuator Type

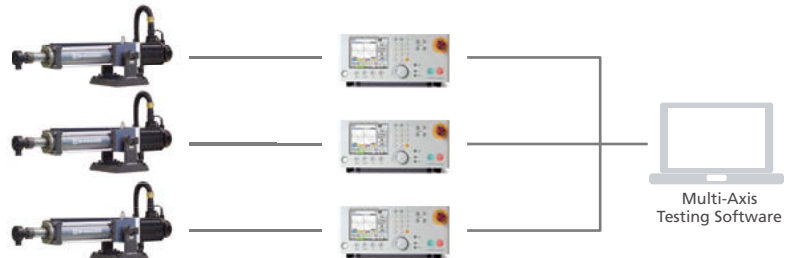
This is for endurance and performance evaluations with respect to small assembly parts such as shock absorbers.

○ Multi-Axis Frame Mounted Type



XYZ 3 Axis Testing System

Synchronized loads can be applied from 3 axes in the X, Y, and Z directions. It is also possible to accurately reproduce loads applied during vehicle running conditions as actual working waveforms.





High Reliability and Ease of Use. Supporting Multiple and Synchronized Tests —Expanded Testing via a High Performance Controller—

Easier, More Convenient, and More Sophisticated

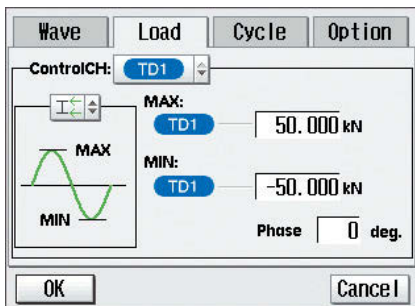
Thanks to highly responsive control and accurate waveform reproducibility, loads can be applied to products with high accuracy input waveforms.

Thanks to stable waveform input, the system is capable of endurance testing with high accuracy and high reproducibility, and the evaluation of slight differences in product performance.

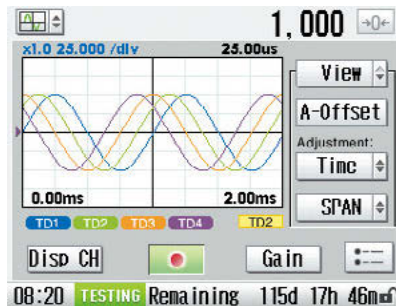
Through a combination of LCD touch panel and physical keys, test settings and fine adjustments to pistons are easy, enabling more intuitive performance.



Controller for Dynamic and Fatigue Testing Machines
Servo Controller 4830



Loading Condition Settings
Settings can be configured via touch panel operations.



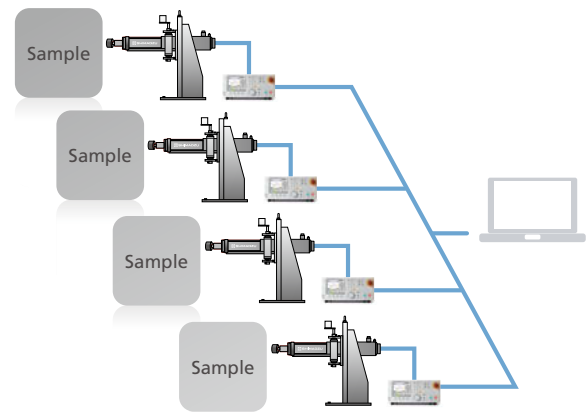
Waveform Display During Tests
A variety of waveform displays with Y-T, X-Y, and peak charts



Jog Dial Operation
Intuitive adjustments of frequency and stroke are achieved.

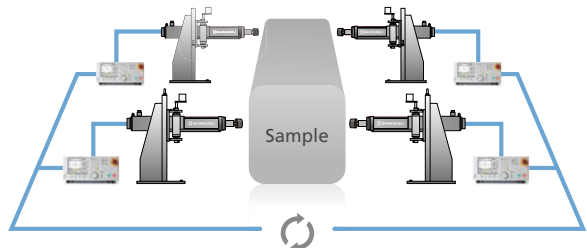
○ Multiple Tests —Capable of Four Tests Simultaneously—

A single computer can be used to simultaneously perform up to four different tests using different test parameters. For example, four endurance tests can be performed in parallel to acquire peak values and cycle data.



○ Synchronized Tests

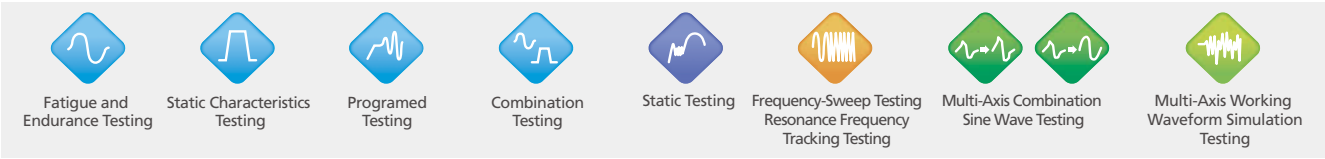
With synchronous controller connections, synchronized control and measurement can be performed with up to four units. The phase can also be freely set for each actuator.





Even More Expandability Thanks to the Software

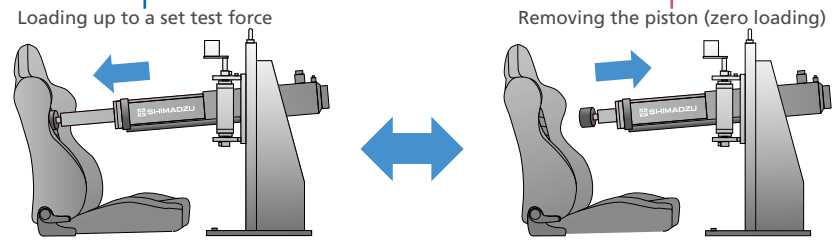
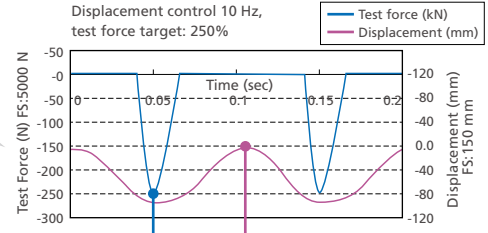
—Capable of More Complicated Control and Storage of Test Results Thanks to a Variety of Software Programs—



Fatigue and Endurance Tests and Static Characteristics Tests (Standard Software)

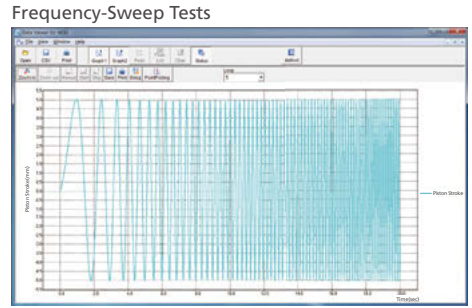
The standard software provides support for general-purpose endurance tests, including routine endurance tests with peak values specified, as well as tests of rubber and springs combining static characteristics tests and endurance tests. The system enables testing in which loads (test force targets) and zero loads are repeatedly impressed on a test sample, which was difficult to date.

■ Push Tests
You can apply a constant load to the test object regardless of its degree of wear.



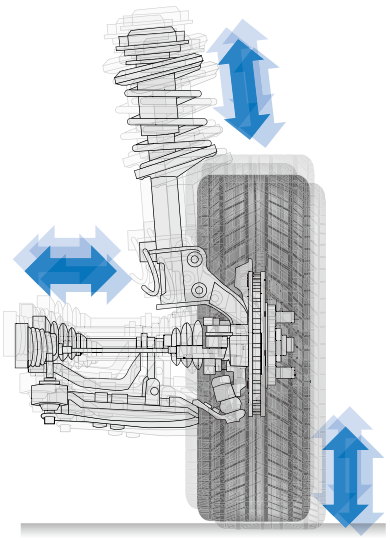
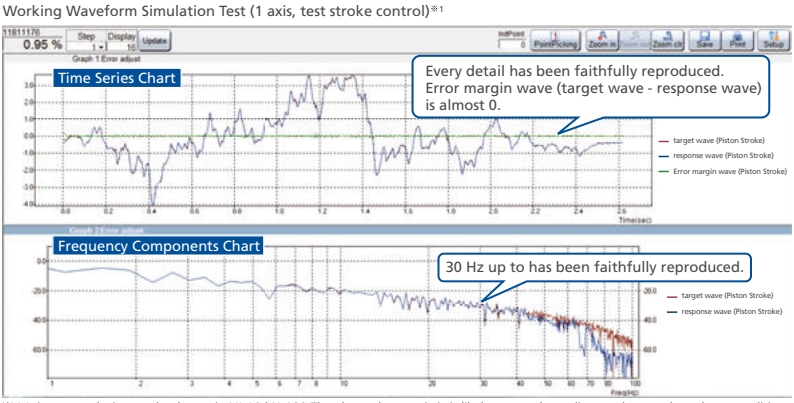
Frequency-Sweep Tests and Resonant Frequency Tracking Tests

Resonant frequency endurance tests, in which particularly harsh vibrations are applied to the sample, and frequency-sweep tests, which evaluate frequency characteristics, are indispensable tests for product warranties and product performance evaluations. Using the 4830 software, resonant frequency transitions during testing are detected in just a few seconds. The frequency is corrected to the resonant frequency to match the state of the test sample.



Multi-Axis Working Waveform Simulation Tests

Synchronized actuator control is enabled for up to four units. To start the test, just read in vibration waveforms, obtained from actual work, in CSV format. Difficult parameter settings are configured automatically.

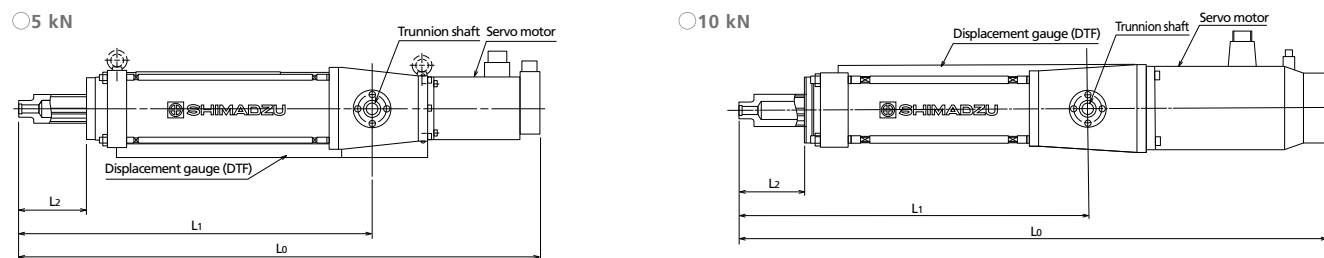


*1 It is test results in a no-load state in NJ-10 kN-100. The above characteristic is likely to vary depending on the sample and test conditions.

Specifications

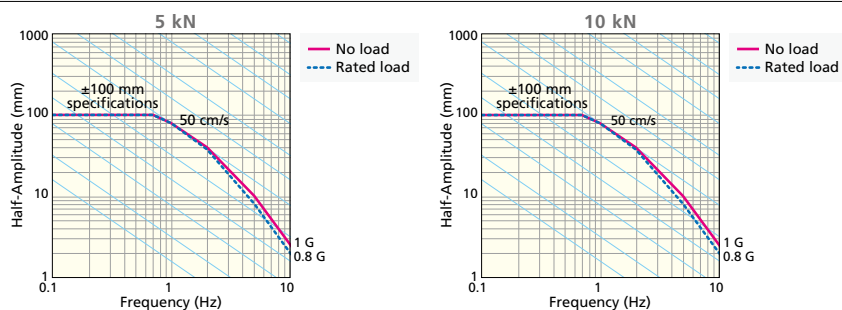
Model		NJ-5kNV-100	NJ-10kNV-100
Test Force	Dynamic	±5 kN	±10 kN
	Static	±5 kN	±10 kN
Stroke (Full stroke)		±100 mm (200 mm)	±100 mm (200 mm)
Max. Speed		Single wave: 72 cm/sec (loaded); Continuous: 50 cm/sec (loaded, sine wave)	
Sensor Indicator Accuracy	Test Force	±0.5% indicated value, or ±0.02% of the load cell rating, whichever is larger	
	Stroke	±1% indicated value, or ±0.1% of the rating, whichever is larger	
Actuator Unit Size	L ₀	1080 mm	1260 mm
	L ₁	730 mm	750 mm
	L ₂ (Center Location)	140 mm	140 mm
Servo Amplifier Size	W×H×D	700×715×552 mm	700×1250×350 mm
Weight		Approx. 70 kg	Approx. 110 kg
Power Requirements		3-phase 200 V, 7 kVA	3-phase 200 V, 12 kVA
Compatible Controllers		Servo Controller 4830	
Amplitude Characteristics		See amplitude characteristics diagrams.	

Appearance of the Unit



Amplitude Characteristics Diagram

- The figure at right shows calculated values found from the characteristics of the motor.
- If there is a resonance point for the system including the sample, avoid this frequency during use.
- The jig weight is calculated at 5 kg.



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