

Force-Displacement measuring System FSA series

A Complete test system to draw force-displacement curves
Ideal for feeling testing or material characteristic evaluation
High Sampling Rate and High Data reproducibility



The FSA series is complete test system which can be configured for a wide array of applications requiring both force and displacement measurement. This series draws force-displacement graphs in real time at a high-speed 2000Hz data sampling and it achieves comparing multiple graphs on the screen. The FSA series takes statistical data and contribute to evaluation and analysis. With our wide range of attachments, other measurements such as tension, compression, peeling tests are also possible, with test stands variations available: Hand Operated-Manual type, High Load / Higher accuracy types, are available for requirements. The force gauge can be removed for separate uses and calibration. It makes maintenance easily, maintains high-precision measurement and gives a wide range of measurements.



| Features | |
|---|--|
| System to achieve real-time the force-displacement curves | High repeatability with motorized test stand |
| 2000Hz High-speed data sampling follows rapid force change, capturing measurement values accurately | Variety of force testing are possible with optional attachment combinations |
| Maximum of 5 graphs with visible graph comparing functions | Simple connections to PC with USB cable and allow quick data export to Word, Excel, PDF. |

| Components of FSA series | |
|--------------------------|---|
| | <ol style="list-style-type: none"> 1. Force gauge Indicates force and displacement values. Can be removed from a test stand and use individually or be calibrated separately. 2. Test Stand Provides stable test speed and angle, high repeatability. 3. Cable* Connects the force gauge and the test stand for control. 4. Software Draw force-displacement graphs. Captures force and displacement values at Max. 2000/sec. 5. Attachments Standard attachments are included for basic compression and pull tests. <div style="text-align: center; margin: 10px 0;"> (excerpted) </div> <ol style="list-style-type: none"> 6. Additional Attachments (sold separately) Wide choices of optional attachments are available for your measurement requirements (please contact us for details). <p style="text-align: center; margin-top: 20px;">This package System allows your force-displacement measurements with a single system</p> |

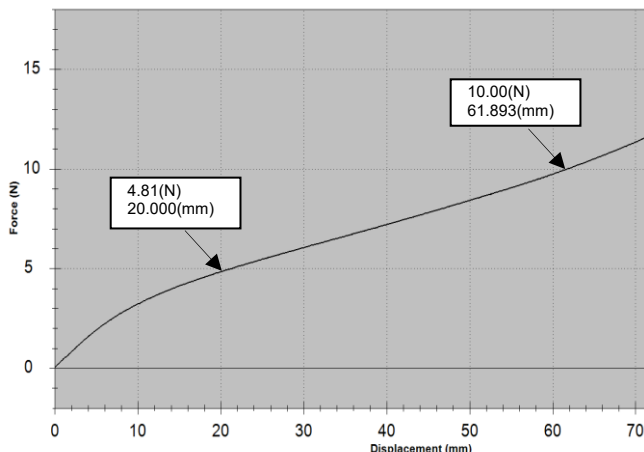
*FSA-MSL model is for manual operation, hence no cable connections required. Please refer to P3 to check each model.

[Test Examples]

- Cushion materials repulsion tests
- Bending and Tensile tests of various materials
- Simple evaluations of spring characteristics
- Car cushions hardness tests
- Repulsion tests for sport equipment
- Cushioning materials repulsion tests
- LCD panels strength tests

| Switch Pressing Force Test Image: Measurement and Analysis | |
|---|--|
| | |
| <p>Curves on Force-Time graphs continually show from left to the right, and never returns to the left. On the other hand, curves on the force-displacement graph return back to the left due to base on displacement. The force-displacement analysis helps to provide statistics on hysteresis identification.</p> | |

Tensile Test Image: Measurement and Analysis



Measuring displacement can help identify relation of the amount of deformation and the force required for the test sample transformation.

[FSA series Models] Various models are available for your testing requirements.

| Vertical type | | | | |
|--|------------------------------------|--|--|---------------------------------|
| Compact FSA-0.5K2-__N | Up to 1000N FSA-1K2-__N | High capacity FSA-2.5K2-__N | High capacity FSA-5K2-__N | |
| Capacity:500N | Capacity:1000N | Capacity:2500N | Capacity:5000N | |
| Motorized version to set testing speeds, testing and stopping times. Recommended for Repeat tests and Durability tests with counter functions. | | | | |
| | | | | |
| Vertical & High Accuracy type | | Horizontal type | | Portable type |
| Compact and Professional FSA-0.5KE-__N | Professional FSA-1KE-__N | Compact FSA-0.5HK2-__N | High capacity FSA-2.5HK2-__N | Carriable FSA-MSL-__N |
| Capacity:500N | Capacity:1000N | Capacity:500N | Capacity:2500N | Capacity:50N |
| High rigidity / functional. Memories with 5 measuring conditions, Travel settings. | | Motorized version to set testing speeds, testing and stopping times. Recommended for Repeat tests and Durability tests with counter functions. | | Lightweight Handheld operation |
| | | | | |

* Refer to the next page for selecting model.

[Selecting Model]

You can select a range(____N) according to your testing needs.

FSA-0.5K2-200N

Force Range(capacity) choices
2N, 5N, 20N, 50N, 100N, **200N**, 500N, 1000N, 2500N, 5000N

Please select appropriate range for your test requirement.

The force range selection must be lower than the capacity of this model.

[Specifications (General)]

| FSA series | | |
|----------------------------|---------------|--|
| Measurement Unit | Force* | N, kgf, lbf |
| | Displacement* | mm, inch |
| Resolution | Force | 4 digits (e.g. Resolution of 5N force gauge is 0.001N) |
| | Displacement | 0.001mm (on software Force Recorder Professional) 0.01mm (on force gauge display) |
| Accuracy | Force | +/- 0.2%F.S. +/-1 digit |
| | Displacement | +/- 0.1mm +/- 1digit(with no load) *1 |
| Sampling cycle | | 2000 data/sec |
| Display update cycle | | 16 data/sec |
| Output function | | USB, Serial(RS232C), Analog(Approx. +/- 2V), Comparator, Over load, Sub comparator, USB flash drive *2 |
| Motorized Stand Function | | Stroke limit, Overload Prevention, Force control*3、Emergency Stop |
| Motorized Test Stand Power | | AC100V-240V Free input *4 |
| Operating Environment | | Temperature:0 - 40°C Humidity:20 -80%RH |
| Accessories | | Instruction Manual, Inspection Certificate, Warranty Certificate, Power cable, Spare hues, USB cable, Driver CD-ROM(including software for data log "Force Logger"), Graphing software "Force Recorder Professional." |

*1 When maximum force is applied, the stand may be deformed vertically as below.

FSA-0.5 to 5K2: less than 0.5mm, FSA-0.5/1KE: less than 0.25mm, FSA-0.5/2.5HK2 : less than 0.5mm

*2 USB flash drive is not included.

*3 The value of Force control is specified with the absolute value

*4 Power supply units are required individually for Motorized Test Stand and the Force gauge.

[Software specifications (General)]





| | |
|-----------------------|---|
| Operating environment | OS: Windows 7/8/8.1/10 |
| Hardware | CPU: Pentium4 (1GH more) or more is recommended |
| | Memory: 2GB more recommended |
| | Hard Disk: 10GB (data storage area) or more |
| Platform | NET Framework or more |
| Execution environment | Microsoft Internet Explorer 6.0 or later |
| | Windows Installer 3.1 or later |
| Connecting Port | USB1.1 and USB2.0 * connector |

* We do not guarantee the operation with USB 3.0.

[Specifications • Individual System Details]

| FSA Series | | | | | | | | | | |
|----------------------------------|------------------------------|------------------------------------|--|--|--|------------------------------------|------------------------------|--|--|---------------|
| Spec/Model | FSA-0.5K2 | FSA-1K2 | FSA-2.5K2 | FSA-5K2 | FSA-0.5KE | FSA-1KE | FSA-0.5HK2 | FSA-2.5HK2 | FSA-MSL | |
| Range | 2N,5N,20N,50N,100N,200N,500N | 2N,5N,20N,50N,100N,200N,500N,1000N | 2N,5N,20N,50N,100N,200N,500N,1000N,2500N | 2N,5N,20N,50N,100N,200N,500N,1000N,2500N,5000N | 2N,5N,20N,50N,100N,200N,500N,1000N,200N,50N,100N,200N,500N,1000N | 2N,5N,20N,50N,100N,200N,500N,1000N | 2N,5N,20N,50N,100N,200N,500N | 2N,5N,20N,50N,100N,200N,500N,1000N,2500N | 2N,5N,20N,50N,100N,200N,500N,1000N,2500N | 2N,5N,20N,50N |
| Maximum capacity | 500N | 1000N | 2500N | 5000N | 500N | 1000N | 500N | 2500N | 50N | |
| Included Motorized Test Stand *1 | MX2-500N | MX2-1000N | MX2-2500N | MX2-5000N | EMX-500N | EMX-1000N | MH2-500N | MH2-2500N | MSL-50N | |
| Stroke (mm) *2 | 230 | 290 | 290 | 295 | 265 | 290 | 230 | 265 | 80 | |
| Stroke Limit Setting | Manual | Manual | Manual | Manual | Digital or Manual | Digital or Manual | Manual | Manual | | |
| Speed (mm/min) *3 | 10-300 | 10-300 | 10-300 | 0.5-300 | 0.5-600 | 0.5-600 | 10-300 | 10-300 | 10-300 | |
| Max. Sample Height(mm) *4 | Height 235 | Height 300 | Height 320 | Height 380 | Height 295 | Height 320 | Length 245 | Length 340 | Height 44 | |

- *1 Please refer to the specification of each Motorized Test Stands for further operation details.
- *2 Stroke means movable capacity. Stroke range varies depending on the force gauge and the attachments combined. Long Stroke option is available. Please refer to page6 [Available Stand Options] for details.
- *3 Speed Range Change options are available. Please refer to page6 [Available Stand Options].
- *4 For maximum sample height, please refer to the distance between table and the tip of the measuring shaft of the force gauge When the head is at the top with no attachments.(FSA-0.5K2/FSA-1K2: up to 1000N model of ZTA series, FSA-2.5K2/FSA-5K2: With over 2500N model of ZTA series is mounted.)
Maximum sample length of FSA-0.5HK2 applies to the distance between the tip of the fixed axle of the table and the tip of the force gauge measuring shaft (With up to 1000N model ZTA series, FSA-2.5HK2: With over 2500N model of ZTA series is mounted.)

| Related Accessories and Jigs | | | |
|---|---|--|---|
| Compression Test Accessory UR series | Pantograph Grip PGC series | Film Grip FC series | 90-degree peel test Fixture P90-200N |
| Hemispherical polyurethane Jig | Easy gripping for deformable samples | Suitable for gripping thin film forms | Recommended for adhesive tape, tests |
|  |  |  |  |

- * Multiple choices of accessories and jigs are available for various measurement needs.
- * Original jigs can be made to order based on your measurement requirements.
- * Please refer to the specification of each accessory details for more information

| Available Stand Options | | | | | | | | | |
|--|--|---|----------------------------|------------------------|---------------|---------------|--|----------------------------|---------|
| Long Stroke (-L, -2L): for long stretch samples and long distance compression tests | | | | | | | | | |
| Extended column (-EXT): for large samples | | | | | | | | | |
| Model | FSA-0.5K2 | FSA-1K2 | FSA-2.5K2 | FSA-5K2 | FSA-0.5KE | FSA-1KE | FSA-0.5HK2 | FSA-2.5HK2 | FSA-MSL |
| Long Stroke(-L) | ✓ | | | ✓ | | | | | |
| Extended column (-EXT) (mm) | +200(-L) +400 (-2L) | ✓ +300(-L) | ✓ +300(-L) | +200 (-EXT) (*1) | ✓ +300(-L) | ✓ +300(-L) | | | |
| (-V●●) Speed Range Changing Option: for changing measurement speed for individual requirements | | | | | | | | | |
| Model | FSA-0.5K2 | FSA-1K2 | FSA-2.5K2 | FSA-5K2 | FSA-0.5KE | FSA-1KE | FSA-0.5HK2 | FSA-2.5HK2 | FSA-MSL |
| Speed Range (mm/min) | ✓ 1.5 to 45 3 to 90 15 to 450 20 to 600 30 to 900 | ✓ 2.5 to 75 5 to 150 25 to 750 35 to 1000 | ✓ 2.5 to 75 5 to 150 | | | | ✓ 1.5 to 45 3 to 90 15 to 450 20 to 600 30 to 900 | ✓ 2.5 to 75 5 to 150 | |
| (-CN) External Signals Options for Operation improvements on measurement site | | | | | | | | | |
| Model | FSA-0.5K2 | FSA-1K2 | FSA-2.5K2 | FSA-5K2 | FSA-0.5KE | FSA-1KE | FSA-0.5HK2 | FSA-2.5HK2 | FSA-MSL |
| -CN | ✓ | ✓ | ✓ | ✓ | Standard | Standard | ✓ | ✓ | |

* If you change the stroke or speed, the capacity may decrease. Please contact us for further information.

*1 The long stroke option is not available for FSA-5K2. Extended column option is available only for FSA-5K2.

*1 The stroke does not extend. It extends the column of test stand so the max. sample height changes from 380mm to 580mm.

The min. sample height also changes from 95mm to 295mm therefore it is not suitable for measuring small samples.

[Examples of The Systems with selected combinations of individual options]

e.g.1) FSA-0.5K2-200N→ For Long Stroke option(-L) is selected

Select System "FSA-0.5K2-200N-L"

e.g.2) FSA-0.5K2-200N→ For Speed Range option (-V●●) is selected

Select System "FSA-0.5K2-200N-V●●"

*Values is in ●●. If speed range "20 to 600" is selected, -V●● is -V600.

e.g.3) FSA-0.5K2-200N for both Long stroke option(-L) and Speed range option(-V600)

Select System "FSA-0.5K2-200N-L-V600"

[Cautions]

- Information in this document is subject to change without prior notice.
- This document is product descriptions and handling precautions, and do not guarantee various characteristics or safety.
- This product is designed for force measurement purpose only.
- Do not copy and use this content without authorization.
- Some sample cannot be measured depending on their materials or shapes.
- Please do not add load over capacity of a force gauge to prevent sensor break-down.
- Displacement reading error can occur due to deflection of a sensor or test stand when load is added.
- Optional attachment and PC are Not included in this unit
- Software could not work in some operating environment

IMADA CO., LTD.

99 Jinnoshinden-cho aza Kanowari Toyohashi
Aichi 441-8077, JAPAN
Tel: +81-(0)532-33-3288
Fax: +81-(0)532-33-3866
E-mail: info@forcegauge.net
Website: <http://www.forcegauge.net/en/>



Visit our website for more information on a wide range of product specifications, measurement applications and videos.