SCHMIDT
control instruments

Force-Displacement Measurement Unit
FSA series

A measurement unit to draw force-displacement curves
Ideal for sensation test or material characteristic evaluation
High sampling rate and high data reproducibility

The FSA series is a unit for force-displacement measurement including force gauge, test stand, cable and software.

This unit is easy-handling owing to its compact size (desktop-type), enabling you to simply measure mechanical properties such as tension, compression and peeling force. Also, its high responsivity (2000Hz) offers precise measurement results with a smooth graph of force-displacement.
Graphing is easily done by connecting FSA series and PC via attached USB cable. The graphing software equips useful functions for evaluation or analysis such as overlaying graphs for comparing, displaying statistical data, and leaving comments in a graph.

It handles a wide range of measurement by using various optional attachments.
Since the force gauge is removable, the range of measurement is expanded, and maintenance gets easier.

Features

Precise Measurement
- High sampling rate (2000Hz) accurately follows force changes and draws smooth graph of force-displacement curves in real time.

Outputs reports simply
- Equips functions to overlay up to 5 graphs and leave comments in the graph.
- Easily outputs the graphs and statical data to WORD, EXCEL, PDF, etc.

A wide range of measurements
- It handles a wide range of measurements by combining various optional attachments

[Measuring examples of FSA series]
Comprresion and tension tests of various materials/Simple evaluations of spring characteristics/Elasticity test of various materials/Insertion pressure evaluation of parts/Evaluation of switch characteristics/Peeling test of adhesive tape/Cushioning materials repulsion tests

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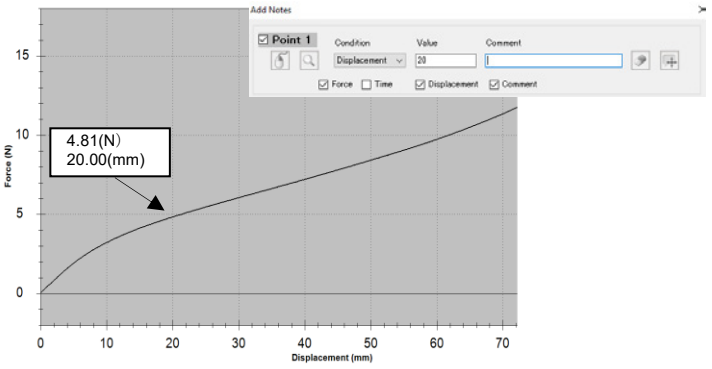
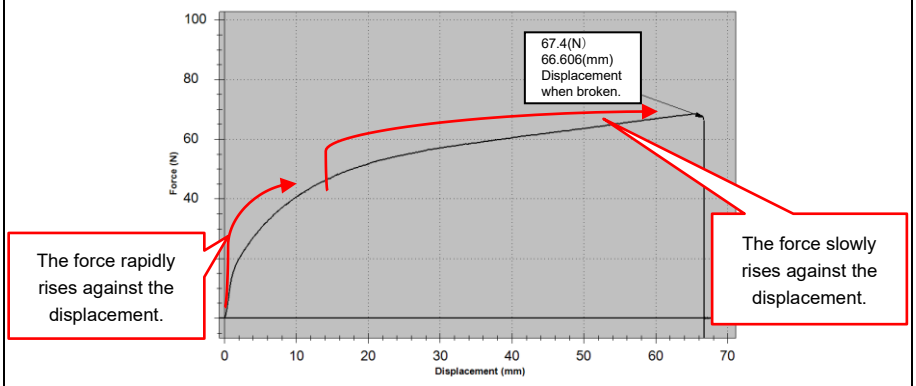
[Available data by FSA series]

Force value when the specified displacement is compressed/pulled (Displacement when compressed/pulled with the specified force value)



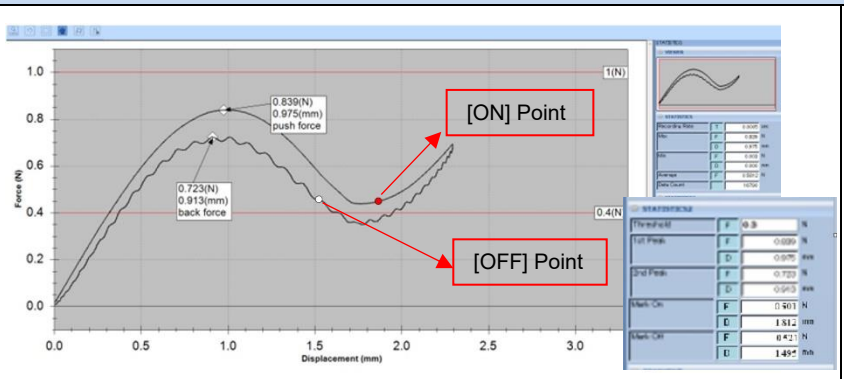
This unit is suitable for characteristic evaluation of such as cushioning-materials or press-fitted parts by compression test since it allows drawing a force-displacement graph and evaluating transition of the force value to the compressed displacement. Also, as you see in the picture above, it enables you to easily search for the force value at a specific displacement value on the graph and leave a comment.

Displacement value when a sample is broken by compressing/pulling



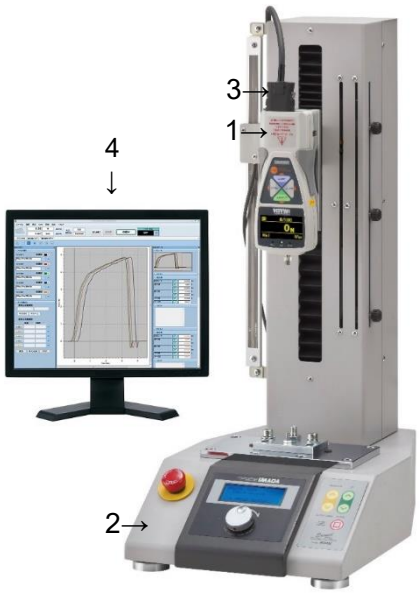
This unit graphs the process and enables you to visually check the force transition until the sample is broken. Also, it helps you to easily find the force/displacement value and peak value when the sample is broken, and leave a comment.

Hysteresis and returning zero



For example, in click sensation test of tactile switch, hysteresis and returning zero is obvious from the graph of a reciprocating motion. It is simple to evaluate the graph by setting threshold value, searching for returning peak values and inserting an arbitrary border line. Moreover, the point of switch ON/OFF can be automatically defined and displayed by using Mark On function.
Note: Custom-made cable is required for Mark-On function.

[FSA series components]

Accessories and description	
	1.Force Gauge Measuring part of force measurement which Indicates force and displacement values. It can be removed from a test stand and used as a handheld instrument. This unit handles a wide force range by replacing force gauges. (Model: ZTA series) 2.Test Stand (*1) Drive unit part of measurement. It moves a force gauge by button operation to perform compression/tension measurement. A linear scale is installed, which allows displacement measurement by connecting with force gauge. (Model: Refer to P6 [Specifications/Individual System Details] for the details) 3. Cable (*2) Connects the force gauge and the test stand for control. (Model: CB-718) 4. Software (*3) Connect the force gauge and a PC by USB cable (included), drawing force-displacement graphs. Only for use on PC. (Model: Force Recorder Professional) Included Attachments (*4) Standard attachments are included for basic compression and pull tests. (Examples of included attachments) 

*1 FSA-MSL is not motorized due to manual type.
*2 FSA-MSL does not include the cable due to manual type.
*3 Monitor (PC) is not included.
*4 The included attachments are different depending on the range of force gauge. Refer to the specification sheet of standard attachment for the details.

[FSA Series Models]

<table>
<tr><th colspan="2">Vertical Type (Standard)</th><th colspan="2">Vertical Type (Precise/Multiple functions)</th></tr>
<tr><td>Models</td><td>FSA-0.5K2-__N
FSA-1K2-__N
FSA-2.5K2-__N
FSA-5K2-__N</td><td>Models</td><td>FSA-0.5KE-__N
FSA-1KE-__N</td></tr>
<tr><td colspan="2">- Standard model with high-cost performance
- Lineup in capacity from 500 to 5000N
- Digital setting of speed, repetition number and compression (tension) time, etc.</td><td colspan="2">- Advanced model suitable for precise measurement with high rigidity
- Lineup in capacity from 500N and 1000N
- Available for wide range of speed setting
- Equipped with many functions to enhance convenience such as digital setting of compression (tension) distance, contact detection, and more</td></tr>
<tr><td colspan="2"> 
FSA-0.5K2-__N FSA-2.5K2-__N FSA-5K2-__N</td><td colspan="2"> 
FSA-0.5KE-__N FSA-1KE-__N</td></tr>
<tr><th colspan="2">Horizontal Type</th><th colspan="2">Portable</th></tr>
<tr><td>Models</td><td>FSA-0.5HK2-__N
FSA-2.5HK2-__N</td><td>Model</td><td>FSA-MSL-__N</td></tr>
<tr><td colspan="2">- Horizontal model with high-cost performance
- Lineup with Max. force value of 500 to 5000N
- Digital setting of speed, repetition number and compression (tension) time, etc.</td><td colspan="2">- Small manual model with knob adjustment
- Max. force 50N
- Suitable for measurement at narrow spaces</td></tr>
<tr><td colspan="2"> 
FSA-0.5HK2-__N FSA-2.5HK2-__N</td><td colspan="2"> 
FSA-MSL-__N</td></tr>
</table>

[Selecting Model]

FSA-0.5K2-__N-__

Add the required optional code from P5-7 [Specifications (General)] and [Specifications/Individual System Details].
E.g. -L, -CN, -V45, -NEXT

Select the force range from P6 [Specifications/Individual System Details].
E.g. 5N, 200N and 5000N

Select from above [FSA Series Models]
E.g. FSA-1KE and FSA-MSL

[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
Various function of force gauge		Customized display (header and footer), Peak hold (tension and compression), Internal 1000 points data memory, Comparator (judgment of OK or NG), Reversible display, Sign inversion, Zero clear timer, +NG alarm, Off timer (auto power off), Dumping, Time display, 1st/2nd peak,Displacement detection at force peak value, Displacement zero reset at selected force, setting lock
Output function		USB, Serial(RS232C), +/-2VDC analog output (D/A), Comparator, Overload, 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 (*3)
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 8.1/10/11
Hardware	CPU: 1GHz or more is recommended
	Memory: 2GB or more is recommended
	Hard Disk: 10GB (data storage area) or more
Platform	NET Framework 4.8 or more

[Downloadable Graphing Software Option]

Downloadable Force-Displacement (Torque-Angle) Graphing Software	
-NEXT	Downloadable Graphing Software Force Recorder Next Professional is included instead of CD version Graphing Software Force Recorder Next Professional.*1 * Please add the code to the end of model. Example: FSA-0.5KE-500N-NEXT

*1 When -NEXT option is applied, the dedicated download card providing the redemption code is included. To use the software, downloading the software from IMADA Connected is required.
* To download Force Recorder Next Professional, user & product registration on IMADA Connected is required.
* An Internet connection is required in process of user & product registration and downloading the software.
* Some specification such as operating environment is different from the CD version. Please refer to the specification sheet of the Force Recorder Next series for details.

[Specifications (Individual Model 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**
Force Range	2N,5N,20N,50N 100N,200N,500N	1000N	1000N 2500N	1000N 2500N 5000N		1000N		1000N 2500N	
Test Stand Capacity	500N	1000N	2500N	5000N	500N	1000N	500N	2500N	50N
Stroke (*1)	230mm	290mm	290mm	295mm	265mm	290mm	230mm	265mm	80mm
Max. sample height (*2)	235mm	300mm	320mm	380mm	295mm	320mm	245mm	340mm	44mm
Speed	10 to 300 mm/min			0.5 to 300 mm/min	0.5 to 600 mm/min		10 to 300 mm/min		
Stroke limit setting	Manual				Digital/Manual		Manual		
Functions of test stand (*3)	3 types measuring modes (JOG/Manual/Cycle), Counter/Timer, Force Control, Overload Prevention, Emergency Stop				Contact Detection Break Detection Copy Menu Lock Easy Setup				
Included test stand	MX2-500N-FA	MX2-1000N-FA	MX2-2500N-FA	MX2-5000N-FA	EMX-500N-FA	EMX-1000N-FA	MH2-500N-FA	MH2-2500N-FA	MSL-50N
Option of extended stroke (*4)	-L (+200mm) -2L (+400mm)	-L (+300mm)	-L (+300mm)	-EXT (+200mm) (*5)	-L (+300mm)	-L (+300mm)			
Option of different speed	-V45 (1.5 to 45) -V90 (3 to 90) -V450 (15 to 450) -V600 (20 to 600) -V900 (30 to 900)	-V75 (2.5 to 75) -V150 (5 to 150) -V750 (25 to 750) -V1000 (35 to 1000)	-V75 (2.5 to 75) -V150 (5 to 150)				-V45 (1.5 to 45) -V90 (3 to 90) -V450 (15 to 450) -V600 (20 to 600) -V900 (30 to 900)	-V75 (2.5 to 75) -V150 (5 to 150)	
Option of output (*6)	-CN				Equipped		-CN		

*1 Stroke means movable capacity. Stroke range varies depending on the force gauge and the attachments combined. Long Stroke option is available. Refer to [option of extended stroke] of the above table for details.

*2 [Max. sample height] means the distance between table and the tip of the measuring shaft of the force gauge (1000N or less) when the head is at the top without any attachments. The values of FSA-2.5K2/FSA-5K2 are when over 2500N models of ZTA series are attached. The value of FSA-0.5HK2 is the distance between the tip of the fixed axle of the table and the tip of the measuring shaft of force gauge (1000N or less). The value of FSA-2.5HK2 is when high capacity model of force gauge (2500N or more) is attached.

*3 Refer to the individual specification for the details of the motorized test stands.

*4 When change the speed and stroke, the capacity may decrease. Contact us for the details.

*5 For FSA-5K2, it raises and extends the post of the stand. The Max. Sample height is extended but the stroke does not change. Not suitable for measurement of small sample.

*6 [Option of output] means the function allows to interface with external devices such as interlocking shield.

[RS232C Sprit Cable and RS232C Printer Options]

RS232C Sprit Cable *1	
-RS	- The RS232C Sprit Cable CB-718-RS is included instead of the standard cable CB-718. - By using the RS232C Sprit Cable, ZTA can be connected simultaneously to the motorized test stand and the external devices (RS232C communication). * Please add the code to the end of model. Example: FSA-0.5KE-500N-RS
RS232C Printer Package with a Dedicated Cable *1 *2	
-PRT	- The RS232C Sprit Cable CB-718-RS is included instead of the standard cable CB-718. - RS232C Printer BL2-58 series (Sanei Electric Inc.) is additionally included. - By using the RS232C Sprit Cable, ZTA can be connected simultaneously to the motorized test stand and BL2-58 series. * Please add the code to the end of model. Example: FSA-1K2-1000N-L-PRT

* For details on the RS232C printer and connection cable, please refer to the individual specification sheets.

*1 FSA-MSL is not eligible to this option. The stand for the model, MSL-50N requires customization of its cable to add RS232C split cable. Please contact us for details.

*2 This product can be sold to customers in Japan and EU markets only. Please contact us if you would like to purchase the product in other regions. Data output from ZTA to RS232C printer is supported only for products with firmware Ver. 3.10 or later; For Next Series products, "RS232C Print Function" must be installed via network.

Related Products (attachments)			
Compression Test Accessory **UR series**	Pantograph Grip **PGC series**	Film Grip **FC series**	90-degree peel test Fixture **P90-200N**
Hemispherical polyurethane Jig	Easy griping 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. Custom-made jigs can be made to order based on your measurement requirements.

* Refer to the specification of each attachment for more detail.