

Automatic Extensometers

# SIE-560A/560SA



# A single device for all measurements, from elastic modulus to elongation at breaking point



Automatic Extensometers

## SIE-560A/560SA

Measurements of both a sample's elongation and the test force used are central to mechanical testing of materials. Highly accurate elongation measurements are essential for determining the elastic modulus of a material, which is determined through measurements made in the region of low elongation (elastic region), and for determining the elongation of a sample at breaking point through measurements in the region of high elongation (plastic region). The SIE-560A/560SA enables very accurate measurements of both of these pivotal parameters simultaneously.

# Highly Accurate Measurements

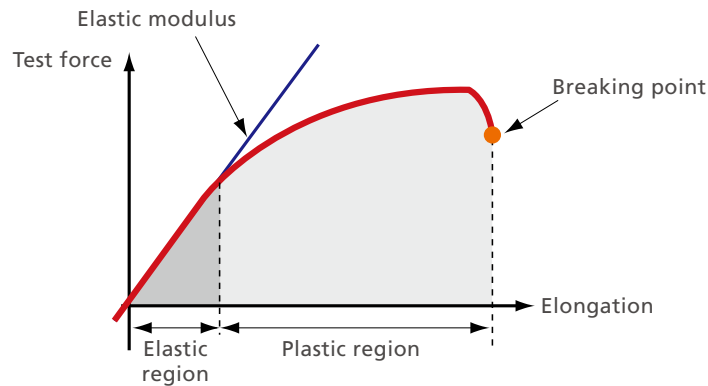
## SIE-560A

- Conforms to ISO 9513 Class 1, JIS B 7741 Class 1, and ASTM E83 Class C (Class B-2 for gauge length of 12.5 mm and above).

## SIE-560SA

- Compatible with ISO 527-1, ISO 527-2, JIS K 7161 and JIS K 7162 elastic modulus measurements for plastics.  
Conforms to ISO 9513 Class 0.5, ASTM E83 Class B-2 and JIS B 7741 standards.

Combining Shimadzu's Digital Strain Processing Engine with high-accuracy magnetic induction linear sensors and ultra-precise strain gauge sensors (SIE-560SA only) ensures high measurement accuracy.



## Comprehensive Automatic Functions

Everyday operations are simplified by automatic functions such as return to the gauge-mark position, mounting and dismounting of test samples, and detection of the gauge-mark position. The operator simply mounts the test specimen into the grips and presses go. There is no need to manually mount extensometers or pause tests to remove the extensometer after yielding.

## Efficient Operating Procedures

All extensometer operations can be carried out with Windows®-based TRAPEZIUM X-V software to improve efficiency. The Smart Controller offers simple, one-touch operation.

# Highly Accurate Measurements

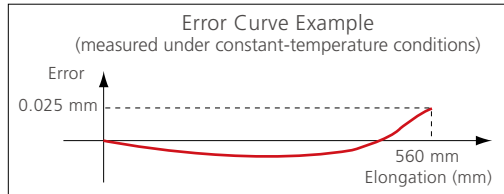
From small to large strokes, the SIE maintains high accuracy over the whole range

## SIE-560A ..... High-Accuracy Magnetic Induction Linear Sensor

### ■ Automatic gauge-length adjustment

Combination with TRAPEZIUM X-V allows free adjustment of the gauge length.

### ■ High-accuracy measurements in the large elongation range

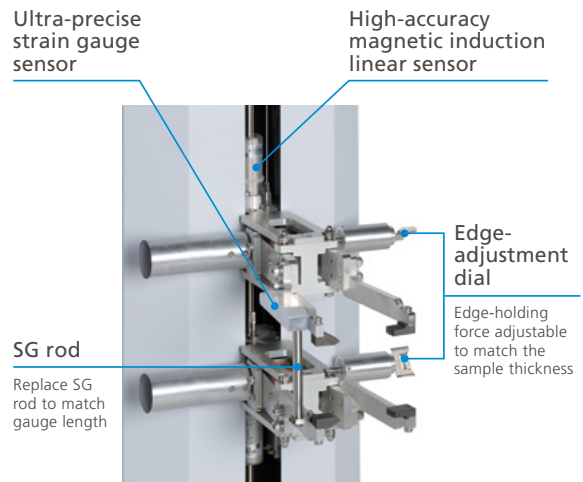
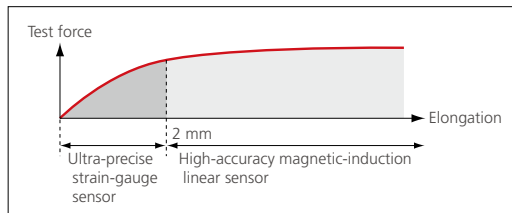


The SIE-560A uses a highly-accurate magnetic induction linear sensor developed for extensometer applications. This light, compact sensor offers high repeatability. It achieves dramatically superior measurement accuracy compared to conventional sensors in both the small and large elongation ranges (up to 560 mm stroke). With just a single test on a single instrument, this sensor offers highly accurate measurements of elastic modulus and elongation at breaking point of metals, plastics, etc.

Compatible with ISO and JIS Standards for Elastic Modulus Measurements on Plastics

## SIE-560SA ..... Ultra-Precise Strain Gauge Sensor & High-Accuracy Magnetic Induction Linear Sensor

- The SIE-560SA incorporates an ultra-precise strain gauge sensor at the tip of the specimen mounting arms to enhance measurement accuracy in the small-elongation region.
- Change the gauge length by replacing the SG rod.
- Automatic switching between strain gauge and magnetic induction linear sensors during measurement.



## Digital Strain Processing Engine makes full use of the excellent sensor performance

Sensor performance alone cannot guarantee high-accuracy measurements. Advanced digital technology is applied to export the sensor outputs as strain values. Shimadzu has developed the Digital Strain Processing Engine, which uses a high-speed CPU to measure the sensor outputs at high resolution and rapidly process the large volume of data. The engine employs real-time digital calibration to achieve highly repeatable data output that contributes to improved accuracy.

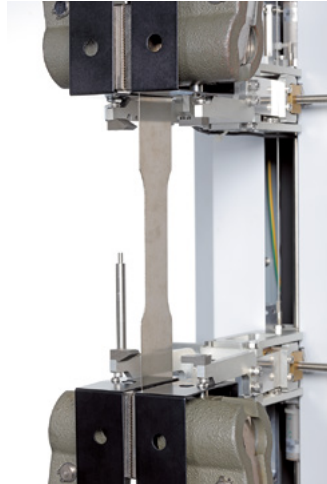


# Comprehensive Automatic Functions

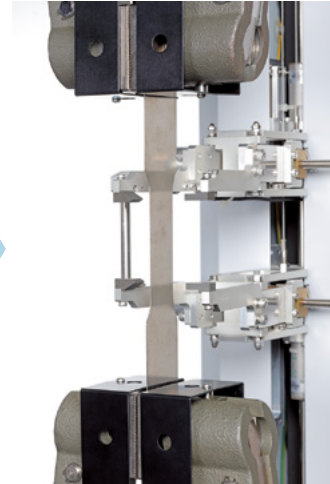
SIE-560A and SIE-560SA extensometers are perfect for high-throughput environments and repetitive testing. No effort has been spared in improving their ease of operation. Comprehensive automatic functions simplify the tasks of mounting and dismounting the extensometer to ensure easy, error-free daily operation.

## Automatic Gauge-Mark Detection Function

Automatically detects and records the upper and lower grip position and moves the extensometer to the mid-point.



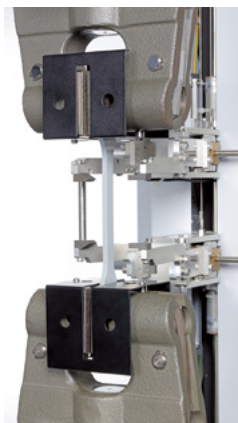
- Detects the upper and lower grip position  
Extensometer arms move vertically to detect the grip positions.



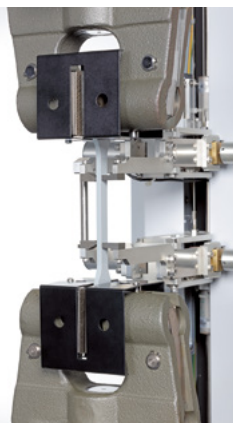
- Moves the extensometer to the mid-point  
Automatically calculates and moves to the gauge-mark position.

## Automatic Return and Mounting Functions

Press the TRAPEZIUM X-V Test Start button to automatically return the extensometer to a preset point (GL set) and automatically mount the extensometer onto the specimen.



- Automatic return to gauge-mark position (GL set)

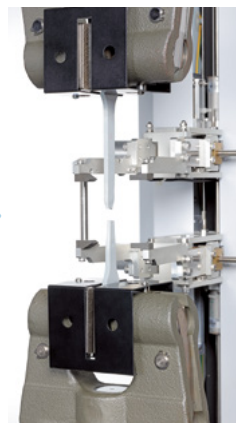


- Arms close to mount the extensometer to the specimen

Testing



- Test complete  
Automatically detects the sample breaking. Rigid construction resists break shocks.



- Arms open to dismount the extensometer from the specimen

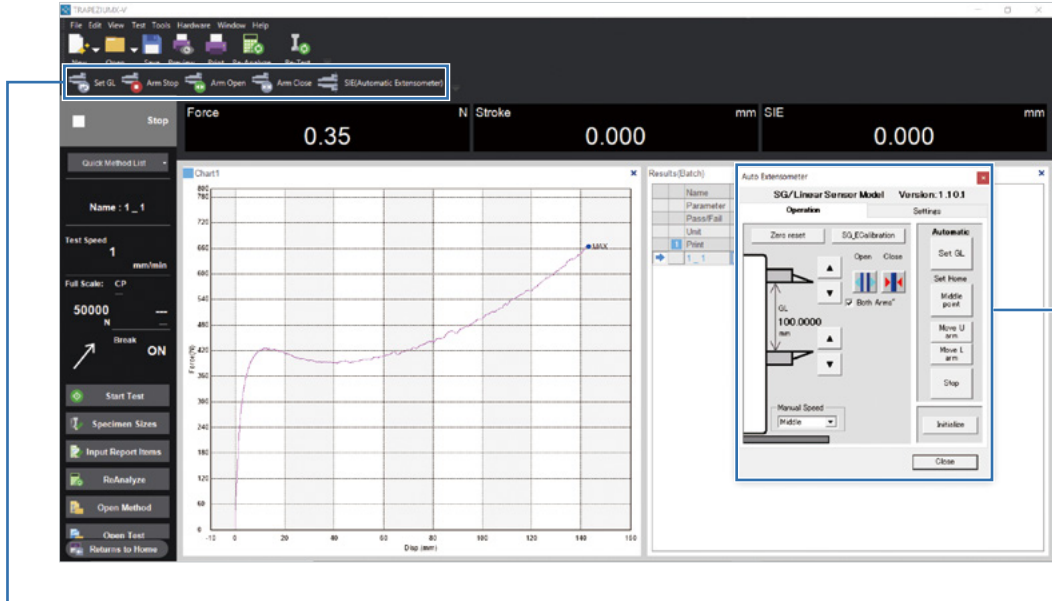
## Automatic Extensometer Dismount Function

To facilitate smooth, continuous testing, the extensometer can dismount automatically once the sample has broken.

# Efficient Operating Procedures

## All operations controlled by PC

All SIE-560A/560SA extensometer operations are carried out with Windows®-based TRAPEZIUM X-V software.



**Automatic Extensometer Toolbar**

The main movements such as GL set (automatic return to gauge-mark position) and opening/closing the arms can be conducted from the toolbar with simple, one-touch operations.

**Automatic Gauge-Length Setting**

The gauge-length and full-scale values determined by the testing method are automatically set for the extensometer.

**Graphical Interface**

The extensometer is controlled from purpose-built screens. The simple buttons and graphical interface make for faster testing procedures.

## Handy One-Touch Operation

The Autograph (AGX™-V series) is supplied with a Smart Controller, which includes buttons for extensometer operation such as automatic arm return, manual movements and opening/closing.

**Smart Controller**

**Arm manual movement buttons**



**GL set button**

(automatic return to gauge-mark position)

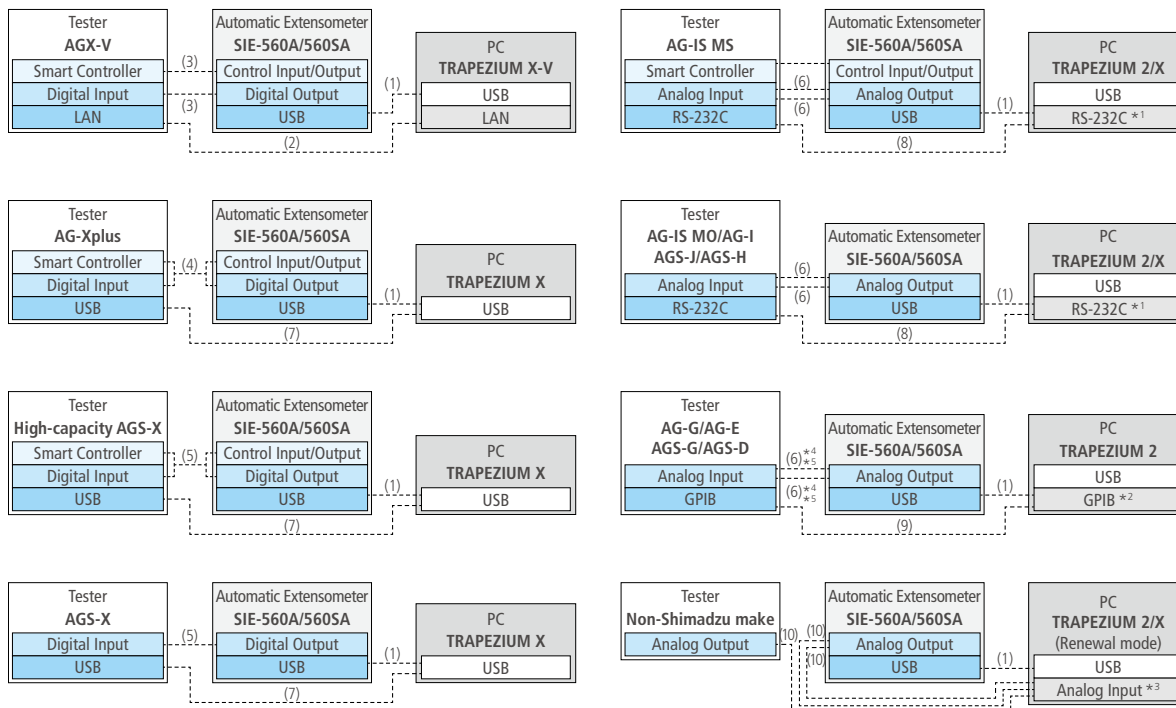
**Arm open/close button**

## ■ Specifications

Product name	<b>SIE-560A</b>	<b>SIE-560SA</b>
Measurement range	560 mm max.	Small range: 2 mm max Large range: 560 mm max.
Measurement principle	High-accuracy magnetic induction linear sensor	Large range: Ultra-precise strain gauge sensor Small range: High-accuracy magnetic induction linear sensor
Measurement accuracy	0.5% max. of indicated value or $\pm 2.5 \mu\text{m}$ , whichever is greater	0.5% max. of indicated value or $\pm 1 \mu\text{m}$ , whichever is greater
Temperature range for guaranteed accuracy	18°C to +28°C ( $\pm 2^\circ\text{C}$ max. deviation during testing)	
Gauge length	10 mm to 550 mm	50 mm (optionally variable from 10 to 40 mm)
Gauge length accuracy	0.5% max. of set value	
Digital pulse output	1 port	
Analog output voltage	0 V to 5 V (2 ports)	0 V to 5 V (1 port each for small and large ranges)
Edge holding force	0 N to 7 N	
Installation environment	Temperature: +5°C to +40°C; RH: 20% to 80% (no condensation); Vibrations: 10 Hz max. frequency, 5 $\mu\text{m}$ max. amplitude	
Power supply	Supply voltage: 100 V to 230 V, single-phase Supply capacity: 50 VA Permitted voltage fluctuations: $\pm 10\%$ (with respect to rated voltage)	

Applicable test samples	Steel	0.5 mm to 4.0 mm (flat)	Some combinations of testers and grips may result in discrepancies in measured values for high-elasticity samples, such as steel.
	Aluminum	1 mm to 3 mm (flat)	
	Plastic	1 mm to 4 mm (flat)	

## ■ System Maps



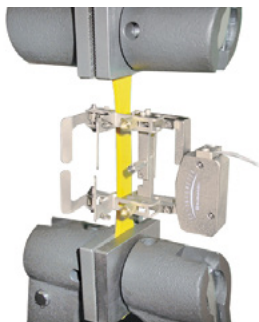
- (1) USB cable, (2) LAN cable, (3) digital cable (AGX-V), (4) digital cable (AG-X), (5) digital cable (AGS-X), and (6) analog cable are automatic extensometer accessories (included accessories depend on the system configuration)
- (7) USB cable and (8) RS-232C cable are Trapezium X or Trapezium 2 accessories (included accessories depend on the system configuration)
- (9) A GPIB cable is required
- (10) A cable appropriate for the tester is required

- \*1 If there is no RS-232C port on the PC, an expansion card or USB-RS-232C cable is required.
- \*2 An expansion card or USB-GPIB is necessary for the PC
- \*3 An expansion card is necessary for the PC
- \*4 When connecting to the AG-G or AGS-G, an analog I/O box is required.
- \*5 AG-E and AGS-D only have 1 port for analog input.

## Extensometer Lineup

### Strain-Gauge Type One-Touch Extensometer SSG-H Series

Compatible with JIS B 7741 Class 0.5 and JIS K 7161 (SSG 50-10SH only). Allows one-touch mounting and dismounting.



### Video-Type Non-Contact Extensometer TRView X Series

Two cameras ensure high measurement accuracy across a wide measurement range.



### Extensometer for Soft Samples DSES-1000

Allows highly accurate displacement measurements on highly ductile materials.



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