C224-E053B

SHIMADZU
Excellence in Science

Precision Universal Tester

Autograph AG-X plus Series

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Precision Universal Tester

Reliable, stress-free workflow

Power savings (power consumption during standby) 10 to 25% less than for conventional models

The Shimadzu Autograph AG-X plus series delivers high-level control measurement performance utilizing technologies developed from conventional models. In addition, development focused on intuitive operation and convenient support functions.
Furthermore, power savings functionality is provided as standard, as a means of lessening environmental load. As a result, power consumption during standby is 10 to 25% less in comparison to conventional models. The lineup also includes a new short-column (SC) type and high-speed (HS) type. In addition to the very popular Smart Controller featured on conventional models, the controller features a color LCD touch panel screen for PC-free operation. The TRAPEZIUM X computer software has also been newly developed, using cutting edge Microsoft.Net technology to enhance user-friendliness.
Shimadzu's new AG-X plus series advances testing in three areas: performance, operability, and support.

AG-X plus

The door to the future

01 Superior Performance

NEW Short-column (SC) type added to the lineup

This model is suitable for compression and other testing of small electrical and electronic parts. The total height of the testing machine is 1130 mm, which means it can be installed in a room with a low ceiling. The testing space is 700 mm.

NEW Shorter testing cycle time

A high-speed, 5 kN max. table-top design can now be selected, with a return speed of 3300 mm/min, and a crosshead speed of 3000 mm/min. This model can significantly shorten the test cycle time for rubber and other very stretchy specimens.

NEW Up to 25% Environmental load reduced by saving power during standby

Reducing CO_2 emissions is a global necessity. The AG-X plus helps to lessen environmental load by reducing power consumption during standby. Power consumption is reduced by 10 to 25% depending on the frame capacity.

Easy control of stress and strain

Auto tuning of control parameters is now possible in real time, based on measured test force and strain data. Comparisons can be safely made with unknown sample data, without the need for preliminary tests.Strain control, an ISO6892-2009 requirement, is easily performed with the autotuning function.

Iron and steel sector

(1) In addition to conventional stress control, tensile testing with strain control is increasingly in demand.

Resins sector

(2) Measuring the modulus of elasticity in the ultra-small strain domains proscribed by JIS and ISO standards has become a necessity.

Ceramics sector

(3) Many samples are damaged by microscopic displacements, so accurate control is needed, right from the start of testing.

Ultrahigh-speed sampling ensures no missed strength changes

Ultrahigh-speed 0.2 msec. (5 kHz) sampling ensures that sudden test force changes often seen at the start of testing can all be recorded. Easily change sampling condition settings during testing to investigate important regions in detail.

Control resolution has been improved by a factor of 8, enhancing the reliability of test results

Test results are sensitive to speed control resolution, particularly in the low-speed domain. The AG-X plus features unprecedented high resolution and reliable control, improving the reliability of required test results.

Accurate S-S Curves are achieved with highly precise load cells

Improve testing efficiency and ensure that virtually all of your testing can be performed without switching the load cell or jig, as a result of the wide, guaranteed load cell precision range of 1/1000 to 1/1.

Convenient testing of actual objects

Up to 12 channels of data can be simultaneously read by a PC for immediate analysis. Test force readings along with data from multiple strain gauges may be collected during testing of actual objects.

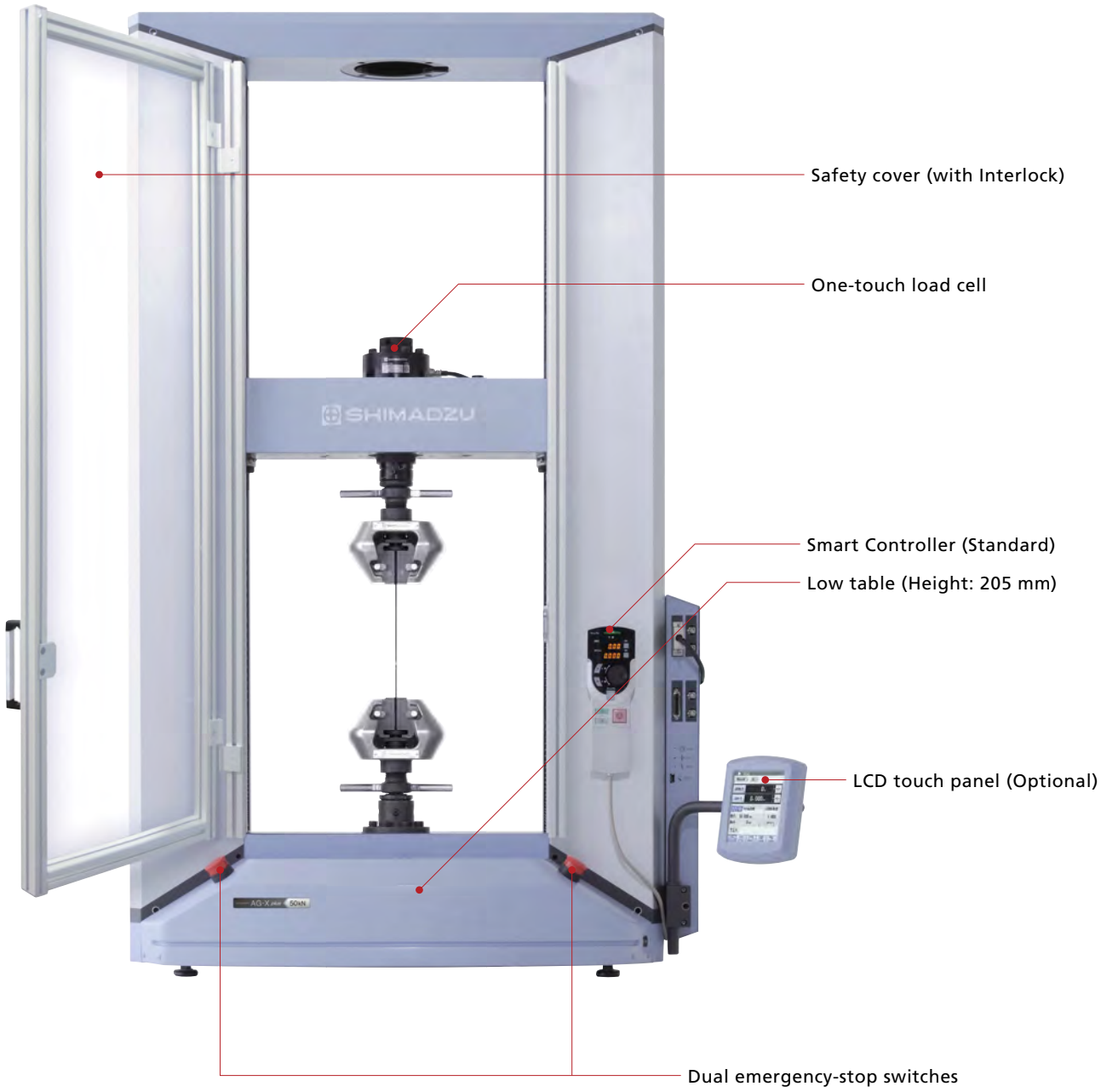
Worry-free and reliable

A highly rigid frame is an indispensable aspect of high-function testing machines. The AG-X plus frame has been redesigned based on the latest design concepts. A crosshead guide has been adopted for all models, whether floor mounted or table top, significantly enhancing torsional rigidity in comparison to conventional models.

JCSS

- Shimadzu is accredited (JIS Q 17025, ISO/IEC 17025), based on JCSS, as a calibration agency for uniaxial testing machines.JCSS cross-certifies with America's NVLAP and other certification standards throughout the world, ensuring world-wide traceability.
- These products are CE compliant.
- AG-X plus units are manufactured by professionals at ISO9001 certified factories, ensuring years of worry-free operation.

02 Worry-Free User-Friendliness

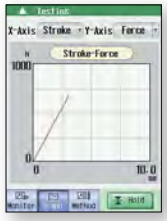


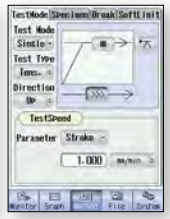
Store test methods in USB memory

After storing testing methods on a USB memory device, simply insert the device into the testing machine to perform testing without a PC. Measurement data can also be automatically saved to USB memory. After testing, bring your USB memory device back to your office PC to analyze data and create reports. (Requires LCD touch panel and TRAPEZIUM X software.)

Perform testing without a PC

An optional LCD touch panel means you can quickly select testing methods without having to connect a PC. Easily view graphs of data directly on the LCD screen.





Control at your fingertips - easy operation and data confirmation

With the Smart Controller, confirmation of test force and position real-time data is at your fingertips. Easily perform Start, Stop and other basic operations via this controller, and use the convenient jog wheel to adjust jig position in fine increments during bending and compression. You can even open or close the air chucks during tensile tests and operate the automatic extensometer.

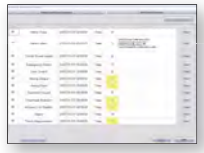
Safety equipment

- **Safety cover**
  This cover is designed to control scattering of the test specimen during testing and the interlock improves operation safety.
- **Safety functions**
  If force changes exceed a certain level during specimen setting or return, the testing machine is stopped by the safety function.
- **Dual emergency-stop switches**
  As a safety measure, emergency-stop switches are provided on both sides.

Safety cover (option) attached

Self-diagnostics help cover all bases

Self-check function (12 items, including motor pulse, sensor amplifier, and board power supply) confirms that the instrument is in perfect working order. If desired, notification of pre-set maintenance periods is also possible. (Some check items require a special jig.)



Simple load cell installation (option)

Use this load cell quick attach/release unit with the table-top type 10 kN capacity AG-X unit, which usually requires frequent load cell changes.
AG-X units with a capacity of 20 kN or more can attach the optional small-capacity load cell attachment plate to the bottom of the crosshead, eliminating the need to detach the original load cell.

Load cell attach/release
(10 kN type)

Floor model
(with small-capacity load cell attached)

03 Quest for Convenience

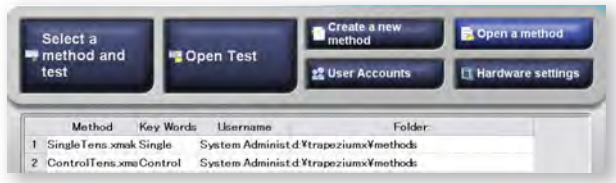
Materials Testing Operation Software

TRAPEZIUM X

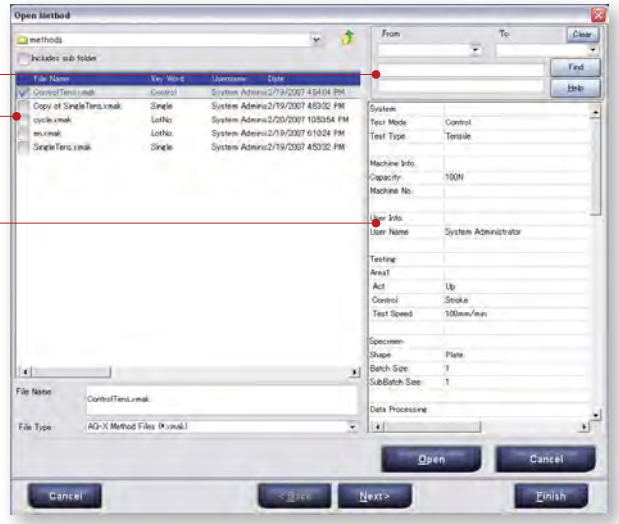
Intuitive machine operation

1. Perform high-efficiency, continuous testing because of fast data searches and one-touch method selection.

- Start testing in just one step after frequently-used methods are recorded in the Quick Method List.

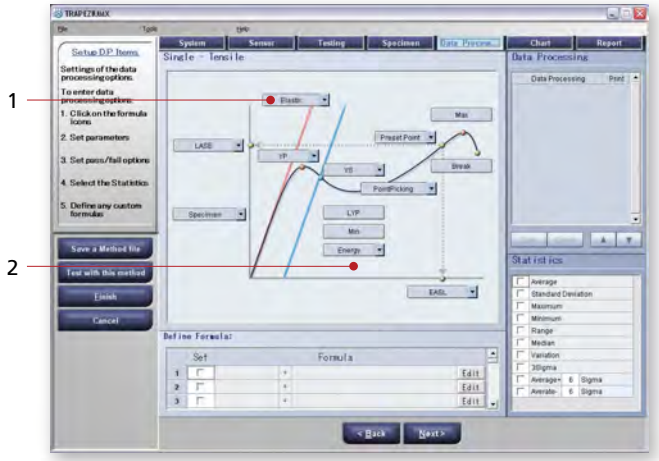


- Use a key word or date to quickly search for saved test results and Method files. Also, easily call up files using previews of reports and lists of settings.



2. Visual wizard guidance ensures trouble-free entry of method settings

- Complicated method settings can be entered using the Method Wizard, which provides an overview of the entire process.
- Setting entry guidance, linked to online help, is available in each window.
- Easy-to-understand illustrations are used in the [Testing], [Specimen] and Data Processing] windows, greatly simplifying the entry of settings.



Data processing settings (single software: plastic material)

1 General data processing items are prepared in advance. Simply press buttons on the figure to select settings.

2 Illustrations change according to the test mode and specimen material. Use a key word or date to quickly search for saved test results and Method files.
Also, easily call up files using previews of reports and lists of settings.

Specimen quantity and size settings window

3 Illustrations are displayed for each specimen shape. A single glance shows which dimensions should be entered.

4 In addition to manual input, dimensions can also be set via [Excel batch reading] or [Automatic input via calipers].

5 Additional, non-dimensional information can also be entered for each specimen.

03 Quest for Convenience

Receive data quickly

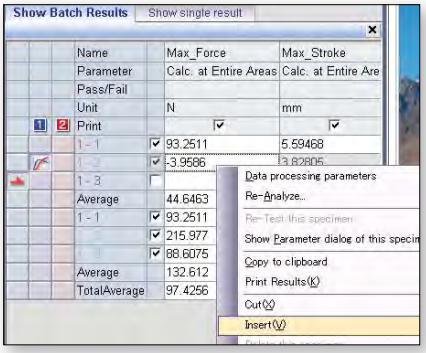
1. Speed, dimension, and report information can be entered quickly and directly from the main window using the [Quick Panel].

2. Advanced navigation system with learning functions

- AG-X is equipped with a Navigation Bar that shows only the functions required for a selected situation. This allows you to efficiently perform continuous testing using simple, straightforward procedures and by pressing large,
  easy-to-read buttons.
  AG-X is also equipped with a "Learning function" that records user actions for each situation and adds
  frequently-used functions to the Navigation Bar. This means that the more you use the machine, the better the "fit" is to your unique operation style, effectively speeding up your workflow.

3. Functions include re-test, file synthesis, as well as specimen insertion, addition and order changes in any position.

- Re-test: A portion of a batch test can be retested, and the prior test results replaced.
- Extra lot tests: batches (lots) can be added, increasing the total number of tests.
- A variety of setting changes are possible before and after testing. Specimens can be inserted in any position or added to only a specific batch, and the specimen order can be changed after testing is completed.



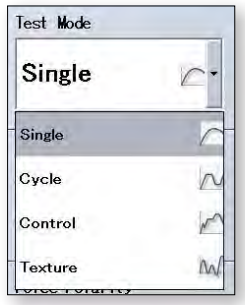
Generate detailed reports

Richly expressive report creation includes free positioning of report elements and a wealth of web-compatible output functions.

- **Report Designer allows flexible layout**
  Create reports that include test data, charts, photographs and logos.
  Freely change report layout and element sizes.
  Use detailed settings for each element's font, color and ruled lines.
- **Reports can be output in PDF, Microsoft Word, Excel and HTML formats.**
  Output reports created with Report Designer in a wide variety of useful formats.
  (Charts and tables with ruled lines cannot be output in Word and HTML.)
  After export, use your everyday software to customize the report.
- **WebPlus function (option)**
  Installing the WebPlus option on your server PC allows reanalysis and printing via Internet Explorer, even on a PC not equipped with TRAPEZIUM X.

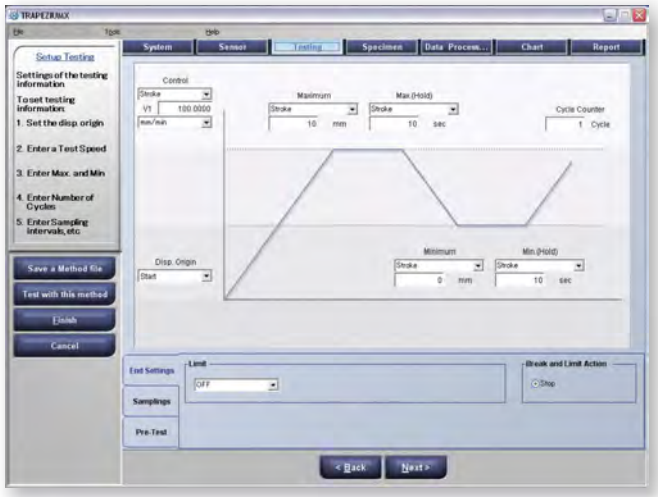
Choose from four software components to fit your specific application

TRAPEZIUM X includes four software components - Single, Cycle, Control and Texture.
This allows you to purchase only the components that meet your specific testing needs. When multiple software components are purchased, easily switch between modes at a single touch, without starting up separate software.



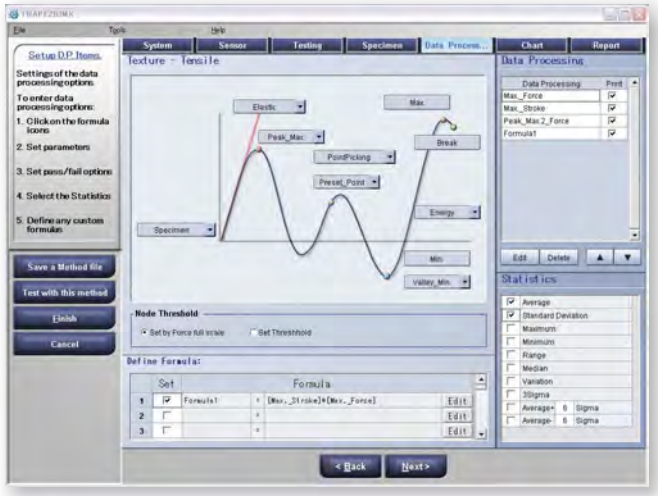
- **Single software**
  Performs general single-direction testing.
  Examples include tensile, compression, bending and peeling tests.

- **Cycle software**
  Similar to endurance testing, this software is used for testing where force is repeatedly applied and then released.



- **Control software**
  Create any testing machine operation pattern. Perform foam rubber compression and holding cycle tests.

- **Texture software**
  Measures the features (texture) of foods and pharmaceuticals. Produce special data processing results, including mastication, jelly strength and adhesion.



Accessories

[Experience the range of possibilities available with this full-featured system]

Accessories Lineup

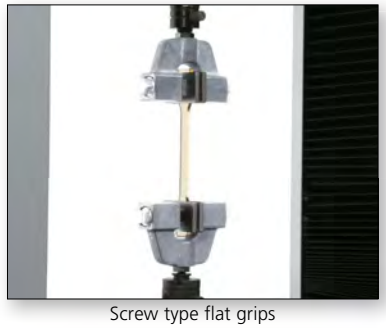
Tensile tests

Combine grips and extensometers with the testing machine.

- **Grips**

  Used to grip the sample, a wide variety is available to accommodate different specimen types and test force amounts.

Non-shift wedge type grips



Screw type flat grips

Pneumatic flat grips

Non-shift wedge type grips <MWG> Applications: Plastics, Metals, Wood

Grip capacity	Standard grip face				Upper grip capacity (kg)
	Grip face	Clearance (mm)	Grip width (mm)	Grip length (mm)	
300 kN	File teeth for flat specimens	0 to 8.5	50	75	33
250 kN		0 to 8.5	50	75	33
100 kN		0 to 7	40	55	10
50kN		0 to 7	40	55	9.5
20 kN		0 to 7	25	55	3.6
5 kN		0 to 7	25	55	3.6

Screw type flat grips <SCG> Applications: Rubber, Plastics, Textiles, Cloth, Paper

Grip capacity	Standard grip face				Upper grip capacity (kg)
	Grip face	Clearance (mm)	Grip width (mm)	Grip length (mm)	
5 kN	File teeth	0 to 16	60	50	2
1 kN		0 to 15	50	30	0.7
50 N	Flat	0 to 14	35	25	0.3

Pneumatic flat grips <PFG> Applications: Rubber, Plastics, Textiles, Cloth, Paper

Grip capacity	External dimensions (mm)		Grip width (mm)	Clearance (mm)	Upper grip capacity (kg)
	W	L (upper/lower)			
10 kN	154	268.5 / 278.5	60	0 to 10	—
5 kN	154	224 / 235	60	0 to 6	5.7
1 kN	102	163 / 174	50	0 to 6	1.7
50 N	64	118 / 135	35	0 to 6	0.4

*1 Grips with foot-valve units and crosshead–linked control functions are also available.
*2 Grips can be opened and closed via the Smart Controller when using the crosshead-linked control kit.

NEW
Class 0.5

- **Extensometers**

  Extensometers improve elongation measurement accuracy.

Shimadzu TRViewX Non-Contact Digital Video Extensometer

	Model	Camera Field-of-View (GL + elongation)
Single camera (TRViewX S Series)	TRViewX55S	55 mm*1
	TRViewX120S	120 mm*1
	TRViewX240S	240 mm*1
	TRViewX500S	500 mm
	TRViewX800S	800 mm

	Model	Camera Field-of-View (GL + elongation)
Double camera *2 (TRViewX D Series)	TRViewX500D	Camera 1: 120 mm *1 Camera 2: 500 mm
	TRViewX800D	Camera 1: 120 mm *1 Camera 2: 800 mm

*1. Elongation accuracy at normal temperatures is JISO Class 0.5 compliant.
*2. With the double camera model, camera 1 takes measurements with a field of view up to 120 mm, beyond which the system switches to camera 2. Select models 500D/800D if you require a wide field of view (500 mm/800 mm) and Class 0.5 compliance up to a 120 mm field of view.

Strain gauge type one-touch extensometer <SSG-H Series>

SSG-H series extensometers conform to JIS B7741 Class 0.5 and JIS K7161 (SSG 50-10SH only).
They can be attached using just one touch.

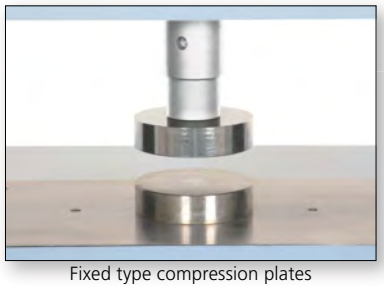
Model	Gauge length (mm)	Measuring range (mm)
SSG25-50H	25	12.5 5.25 2.5 1.24
SSG25-100H	25	25 12.5 5 2.5
SSG50-10H	50	5 2.5 1 0.5
SSG50-10SH	50	5 2.5 1 0.5

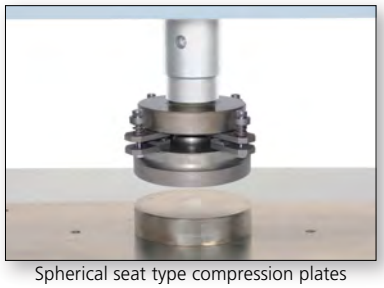
* Calibration cables (for SGI) are included with each kit.
* Precision is JIS B7741 Class 0.5 or Class 1, depending on the conditions.

Compression tests

Simply attach the compression plate kit to the main unit to perform compression testing.

- **Compression plate kit** Applications: Plastics, Metals, Rubber, Wood, Cement
  Used to compress the specimen, several types are available to accommodate different specimen types and test force amounts.


Fixed type compression plates


Spherical seat type compression plates

Fixed type

Maximum capacity	Upper plate dimensions (mm) diameter by thickness	Upper plate mass (kg)	Operational temperature (C)
250 kN	ø100 × 25	1.6	0 to 40
	ø50 × 25	0.5	
	ø200 × 40	6.3	

Spherical seat type

Maximum capacity	Upper plate dimensions (mm)	Upper plate mass (kg)	Operational temperature (C)
250 kN	ø100	3.8	0 to 40

* With spherical compression plates, only the upper plate is spherical.
  Spherical seat-type compression plates provide contact flexibility for uniform load application.
* Select the kit number that corresponds to the load cell used.

Bending tests

Simply attach the bending test jig kit to the main unit to perform bending testing.

- **Bending test kit**
  Select the kit number appropriate for the load cell used.

Max. test force	Punch tip radius x width (mm)	Support tip radius x width (mm)	Support spacing (mm)	Operational temperature (C)	Applicable test standards
10 kN	R5 × 34	R2 × 34	20 to 200	0 to 40	JIS K6911, JIS K6902*1, JIS C6481*2, JIS K7171, ISO 178, Specimens with thickness of 3 mm or less
		R5 × 34			JIS K7171, ISO 178, Specimens with thickness above 3 mm
	R1/8" × 72	R1/8" × 110	0.8 to 8"		ASTM D790 (Test method 1)
100 kN	R5 × 72	R2 × 110	50 to 500		JIS K6911, JIS K6902*1, JIS C6481*2, JIS K7171, ISO 178, Specimens with thickness of 3 mm or less
		R5 × 110			JIS K7171, ISO 178, Specimens with thickness above 3 mm
	R1/8" × 72	R1/8" × 110	2 to 20"		ASTM D790 (Test method 1*3)


3-point bending test of plastic specimen

*1 Corresponds to bending strength. Compatible with support spacing from 20 mm to 200 mm.
*2 Corresponds to bending strength.
*3 Compatible with support spacing from 2 inches to 20 inches.

When the SIE or SES extensometer is used, the following adaptor is required.
346-55658-XX

Adhesion test

- **Adhesive tape peeling test device** Applications: Plastics, Rubber
  Specimen table slides in accordance with upper grip movement to maintain a 90 degree peeling angle.

Upper grip: 1 kN Flat screw type, 1 unit

Capacity	Applicable specimen (width × thickness mm)	Operational temperature (C)	Applicable test standards
1 kN	50 × 5 to 2	-10 to +60	JIS Z0237 Adhesive tape Adhesive tape test method (90° peeling test) JIS Z1528 Double-sided adhesive tape adhesion

Mechanism differs from JIS example.
Select the kit number appropriate for the load cell used.
For details on test jigs not listed in this catalog, please refer to the separate Accessories catalog.

Accessories

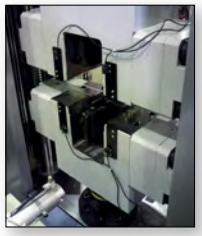
Accessories Lineup

- Various grips
- Adhesion test devices
- Shearing test devices
- Tear test devices
- Devices for needle insertion resistance
- measurement
- Flow test devices
- Friction coefficient measuring devices
- Plastic bearing strength test devices
- Deep-drawing test devices
- Nail withdrawal resistance test devices (from wood)

Grips and devices for testing actual objects

NEW

- **Hydraulic parallel tightening grips**
  - ・Reduces the initial testing force when the specimen is mounted.
  - ・Thanks to the strong hydraulic gripping force, specimens are held firmly, even during high tensile materials tests.
  - ・100 kN and 300 kN models are available.



- **Spring tensile test jig**
  Efficiently evaluates mechanical characteristics of tensile coil springs.

- **Pneumatic capstan type grips**
  Specimens such as threads and cords are held by the capstan. Initial tensile force can be maintained.

- **Printed Circuit Board 45-degree peeling test jig**
  Used for peeling tests of electronic parts on a printed circuit board.

Auto Extensometer

- **SIE-560S**
  This extensometer uses a high-precision strain-gauge sensor and magnetic induction sensor to automatically set the gauge marker positions. The extensometer can be automatically attached/removed.

  When used with bending test jigs, the following adaptor is required.
  346-55658-XX

- **Compression plate displacement measurement device**
  Measures displacement of compression plates during compression tests.

- **Soft material extensometer SES-1000**
  Easily and accurately measures large elongation amounts.
  (PAT No. 3724136)

  When used with bending test jigs, the following adaptor is required.
  346-55658-XX

- **Strain gauge type width sensor**
  Measures changes in specimen width.

- Lumber hardness test devices
- Lumber cleavage test devices
- Powder molding properties test devices
- Controlled atmosphere test devices
- Displacement measuring devices
- Test force measuring devices

Others

- **Jigs for cyclic bending tests of printed circuit boards**

  Allows cyclic bending testing of printed circuit boards containing parts. Combining this jig with the optional resistance meter increases test efficiency by quickly detecting internal damage and stopping the test.

- **Long-span 4-point bending test device for wooden specimens**

  Capacity: 100 kN
  Punch: width 1320 mm
  Punch distance: 100 mm to 1350 mm
  Support: width 1320 mm
  Support distance: 100 mm to 4000 mm

- **Silicon chip (die) 3-point bending test jig**

  Max. capacity: 500 N
  Punch dimensions: tip R0.3 × 20 mm
  Support dimensions: tip R0.3 × 20 mm
  Span: 1 mm to 20 mm

  Conforms to SEMI G86-0303
  * SEMI: Semiconductor Equipment and * Materials International

- **PC card insertion and removal test jig**

  Allows repeated insertion and removal of PC cards (memory cards) and PC card adaptors.

Controlled atmosphere test device

NEW
Extension Type

- **Thermostatic chamber TCE series**

  This compact chamber enables testing across a wide temperature range of -70°C to +280°C.
  +125 mm and +250 mm extension types have been added.

- **Device for torsion test in thermostatic chamber**

  Temperature range: -60°C to +250°C
  Torsion capacity: 300 N-m
  Torsion speed: 1 rpm to 0.01 rev/min

- **Bellows-type long stroke thermostatic chamber**

  Bellows design is well-suited to testing of highly elastic materials.

- **In-chamber tensile test device**

  This specially-designed device passes the crosshead through a thermostatic chamber to assure a long effective stroke.

Specifications

[Table-Top Type AG-X plus]

1. Model Name		AG-Xplus	AG-Xplus HS	AG-Xplus SC	AG-XDplus
2. Max. Load Capacity		10 kN	5 kN	10 kN	20 kN / 50 kN
3. Loading Method		Direct, high-precision, constant-rate strain control using non-backlash precision ball-screw drive			
4. Test Force Measurement	High-precision unit 1/1000 Precision	Within ± 0.5% of displayed test force (for 1/100 to 1/1000 of load cell rated capacity) Within ± 0.3% of displayed test force (for 1/1 to 1/100 of load cell rated capacity) Conforms to JIS B7721 Class 0.5, EN 10002-2 Grade 0.5, ISO 7500-1 Class 0.5, BS1610 Class 0.5, DIN51221 Class 1, and ASTM E4*3			
	Standard-precision unit 1/1000	Within ± 1% of displayed test force (for 1/1 to 1/1000 of the load cell rated capacity) Conforms to JIS B7721 Class 1, EN 10002-2 Grade 1, ISO 7500-1 Class 1, BS1610 Class 1, DIN51221 Class 1, and ASTM E4*3			
	Standard-precision unit 1/500	Within ± 1% of displayed test force (for 1/1 to 1/500 of load cell rated capacity) Conforms to JIS B7721 Class 1, EN 10002-2 Grade 1, ISO 7500-1 Class 1, BS1610 Class 1, DIN51221 Class 1, and ASTM E4*3			
	Test force calibration	Automatic calibration Standard-precision type: Tensile and compression forces calibration High-precision type : Choose from calibration of tensile force, compression force, or both tensile and compression forces			
5. Crosshead Speed Range (mm/min)		Free step-less setting			
		0.0005 to 1500 mm/min	0.001 to 3000 mm/min	0.0005 to 1500 mm/min	0.0005 to 1000 mm/min
	Maximum Return Speed	1650 mm/min	3300 mm/min	1650 mm/min	1200 mm/min
6. Crosshead Speed Precision*1		±0.1%			
7. Crosshead Speed and Allowed Test Force		Maximum load capacity for all speeds			
8. Crosshead-Table Clearance (mm) (Tensile stroke) *2		Max. 1150 mm (MWG 600 mm)	Max. 1150 mm (SCG 780 mm)	Max. 700 mm (MWG 150 mm)	Max. 1060 mm (MWG 655 mm): 20 kN (MWG 605 mm): 50 kN
9. Effective Test Width (mm)		420 mm			500 mm
10. Crosshead Position Detection	Measurement and display methods	Optical encoder measurement, digital display			
	Precision	Within ±0.1% of indicated value, however, ±0.01 mm when indicated value is below 10 mm			
11. Data Capture Rate		5000 Hz			
12. Data Sampling Rate		300k Hz			
13. Frame Rigidity (kN/mm)		42 kN/mm			120 kN/mm
14. Standard Functions		• Lineup of Models Differing by Load Cell Capacity NEW • Automatic reading of load cell properties • Fine adjustment of crosshead position • Test force and stroke display • External analog output (2 channels) • External analog input (2 channels) • External digital input (2 channels) • Internal amps - 4 ports (one is used for test force and another for analog input) • USB interface (for PC) / Host interface (for USB memory) • Recorder output (optional) • Dataletty output (optional) • Pneumatic grip interlock operation (optional)		• Automatic test force and strain control (with auto tuning) • Test force auto zero / auto calibration • Break detection / auto return • Crosshead speed free setting / cycle count display • Stress value display / extensometer value display • Soft limit detection / self diagnostics If only optional LCD touch panel is used: • Single testing control / Cycle testing control / Control of testing conforming to standards • PEAK and BREAK values display / Crosshead speed pre-setting • Method internal memory file (20 files) • Japanese/English switchover / S-S curve display	
15. Standard Accessories		1 load cell, 1 CAL cable, tool set, and instruction manuals			
16. Lineup of Models Differing by Load Cell Capacity		10 N / 20 N / 50 N 100 N / 500 N / 1 kN 2 kN / 5 kN / 10 kN	50N / 100N / 500N 1kN / 2kN / 5kN	10 N / 20 N / 50 N 100 N / 500 N / 1 kN 2 kN / 5 kN / 10 kN	20 kN / 50 kN
17. Dimensions (approx.) W × D × H (mm)	Main frame	777 × 510 × 1580 mm	777 × 510 × 1580 mm	777 × 510 × 1130 mm	955 × 579 × 1606 mm
	Measurement controller	Housed in main frame			
	Smart Controller	80 × 50 × 250 (attached on right side of main unit - detachable)			

*1: Crosshead speed precision is calculated using crosshead transfer amount within a specified period of time for the crosshead speed of 0.5 mm/min to 500 mm/min under normal conditions.

*2: Tensile stroke is the value used when attaching the MWG (non-shift wedge type) grips.
Stroke can be extended.
Values under 5 kN are with SCG (screw type flat) grips attached.

*3: JIS B7721, EN 10002-2, ISO 7500-1, and ASTM E4 standards recommend re-verification after installation of testing machine.

*4: The LCD touch panel (optional) is required for Dataletty (optional).

*5: Dateletty (optional) and TRAPEZIUM X operational software cannot be used together.

* Values in this catalog have been measured based on separately-approved test standards.

Standard/Table-top Model (Up to 10 kN)

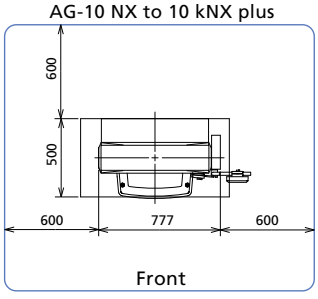
Table-top Model (20 kN)

- The LCD touch panel, laptop PC, and table are optional.
- Table used in image (for up to 10 kN table-top model) is not a Shimadzu product.

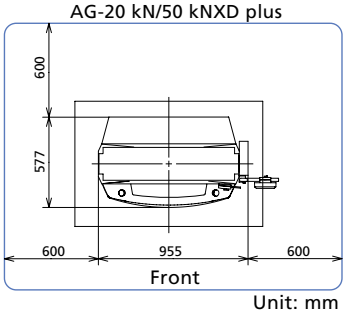
Installation Space

(Dimensions given for left, right, and back of the main unit are the space required for maintenance.)

AG-10 NX to 10 kNX plus



AG-20 kN/50 kNXD plus



Unit: mm

Model	Mass (approx. kg)	Power Requirement (Figures in parentheses are power consumption.)	Installation Environment
AG-10 N to 10 kNXplus	153	Single phase 100 to 110/115 to 130/ 220 to 230/240V (switching system) 50 to 60 Hz 1.5 kVA (450 W)	Temp.: 5 to 40°C Humidity: 20 to 80% (no condensation) Voltage fluctuation: ±10% max. Vibration: Frequency 10 Hz max. Amplitude: 5 mm max.
AG-20 / 50 kNX	261	Single phase 200 to 230 V 50 to 60 Hz 5 kVA (1.2 kW)	

(Note) Grounding of 100 W or less is required.

LCD Touch Panel Unit (table-top model)

Load cell one-touch attachment unit (for 10kN or less table-top models)

The Load cell one-touch attachment unit includes a load cell attachment. One load cell attachment is required for each load cell attached.

Specifications

[Floor Type AG-X plus]

<table>
<tr><td rowspan="2">1. Model Name</td><td colspan="4">Floor Type</td></tr>
<tr><td>AG-20 kN / 50 kNXplus</td><td>AG-100 kNXplus</td><td>AG-250 kN / 300 kNXplus</td><td>AG-600 kNXplus</td></tr>
<tr><td>2. Max. Load Capacity</td><td>20 kN / 50 kN</td><td>100 kN</td><td>250 kN / 300 kN</td><td>600 kN</td></tr>
<tr><td>3. Loading Method</td><td colspan="4">Direct, high-precision, constant-rate strain control using non-backlash precision ball-screw drive</td></tr>
<tr><td rowspan="3">4. Test Force Measurement
Standard-precision unit
High-precision unit 1/1000
(1/250 for 250 kN and 300 kN models)
Precision</td><td colspan="2">Within ± 0.5% of displayed test force (for 1/100 to 1/1000 of load cell rated capacity)
Within ± 0.3% of displayed test force (for 1/1 to 1/100 of load cell rated capacity)</td><td>Within ±0.5% of displayed test force
(for 1/1 to 1/250 of load cell rated capacity)</td><td rowspan="2">Within ±1% of displayed test force
(for 1/1 to 1/100 of load cell rated capacity)
Within ±2% of displayed test force
(for 1/100 to 1/250 of load cell rated capacity)</td></tr>
<tr><td colspan="3">Conforms to JIS B7721 Class 0.5, EN 10002-2 Grade 0.5, ISO 7500-1 Class 0.5,
BS1610 Class 0.5, DIN51221 Class 1, and ASTM E4*3</td></tr>
<tr><td>1/1000</td><td colspan="4">Within ± 1% of displayed test force (for 1/1 to 1/1000 of load cell rated capacity)
Conforms to JIS B7721 Class 1, JIS B7733 Class 1, EN 10002-2 Grade 1, ISO 7500-1 Class 1, BS1610 Class 1,
DIN51221 Class 1, and ASTM E4*4</td></tr>
<tr><td>1/500</td><td colspan="4">Within ± 1% of displayed test force (for 1/1 to 1/500 of the load cell rated capacity)
Conforms to JIS B7721 Class 1, EN 10002-2 Grade 1, ISO 7500-1 Class 1, BS1610 Class 1, DIN51221 Class 1,
and ASTM E4*3</td></tr>
<tr><td>Test force calibration</td><td colspan="4">Automatic calibration Standard-precision type: Tensile and compression forces calibration
High-precision type : Choose from calibration of tensile force, compression force, or both tensile and compression forces</td></tr>
<tr><td rowspan="3">5. Crosshead Speed Range (mm/min)</td><td colspan="4">Free step-less setting</td></tr>
<tr><td colspan="2">0.0005 to 1000 mm/min</td><td>0.0005 to 500 mm/min</td><td>0.0005 to 250 mm/min</td></tr>
<tr><td>Maximum Return Speed</td><td colspan="2">1200 mm/min</td><td>600 mm/min</td><td>500 mm/min</td></tr>
<tr><td>6. Crosshead Speed Precision*1</td><td colspan="4">±0.1%</td></tr>
<tr><td>7. Crosshead Speed and Allowed Test Force</td><td colspan="2">Maximum load capacity for all speeds</td><td>0.0005 ~ 250mm/min : 300kN
250 ~ 500mm/min : 250kN</td><td>0.0005 ~ 50mm/min : 600kN
50 ~ 250mm/min : 100kN</td></tr>
<tr><td>8. Crosshead-Table Clearance (mm)
(Tensile stroke) *2</td><td>Max. 1265 mm
(850 mm): 20 kN
(800 mm): 50 kN</td><td>Max. 1250 mm (750 mm)</td><td>Max. 1440 mm (600 mm)</td><td>Max. 1600 mm (330 mm)</td></tr>
<tr><td>9. Effective Test Width (mm)</td><td colspan="3">600 mm</td><td>750 mm</td></tr>
<tr><td rowspan="2">10. Crosshead Position Detection</td><td>Measurement and display methods</td><td colspan="4">Optical encoder measurement, digital display</td></tr>
<tr><td>Precision</td><td colspan="4">Within ±0.1% of indicated value, but ±0.01 mm when the indicated value is below 10 mm</td></tr>
<tr><td>11. Data Capture Rate</td><td colspan="4">5000 Hz</td></tr>
<tr><td>12. Data Sampling Rate</td><td colspan="4">300 kHz</td></tr>
<tr><td>13. Frame Rigidity (kN/mm)</td><td>Min. 175 kN/mm</td><td>Min. 300 kN/mm</td><td>Min. 400 kN/mm</td><td>Min. 700 kN/mm</td></tr>
<tr><td>14. Standard Functions</td><td colspan="4">• Power savings functionality during standby NEW
• Automatic reading of load cell properties
• Fine adjustment of crosshead position
• Test force and stroke display
• External analog output (2 channels)
• External analog input (2 channels)
• External digital input (2 channels)
• Internal amps - 4 ports
(one is used for test force and another for analog input)
• USB interface (for PC) / Host interface (for USB memory)
• Recorder output (optional)
• Dataletty output (optional)
• Pneumatic grip interlock operation (optional)
• Automatic test force and strain control (with auto tuning)
• Test force auto zero / auto calibration
• Break detection / auto return
• Crosshead speed free setting / cycle count display
• Stress value display / extensometer value display
• Soft limit detection / self diagnostics
If only optional LCD touch panel is used:
• Single testing control / Cycle testing control /
Control of testing conforming to standards
• PEAK and BREAK values display / Crosshead speed pre-setting
• Method internal memory file (20 files)
• Japanese/English switchover / S-S curve display</td></tr>
<tr><td>15. Standard Accessories</td><td colspan="4">1 load cell, 1 CAL cable, tool set, and instruction manuals</td></tr>
<tr><td>16. Lineup of Models Differing by Load Cell Capacity</td><td>20 kN/50 kNX</td><td>100 kNX</td><td>250 kN/300 kN</td><td>600 kN</td></tr>
<tr><td rowspan="3">17. Dimensions (approx.) W × D × H (mm)</td><td>Main frame</td><td colspan="2">1186 × 752 × 2173 mm</td><td>1186 × 752 × 2423 mm</td><td>1544 × 990 × 2911 mm</td></tr>
<tr><td>Measurement controller</td><td colspan="3">Housed in main frame</td><td>Separated placement</td></tr>
<tr><td>Smart Controller</td><td colspan="4">80 × 50 × 250 mm (attached on right side of main unit - detachable)</td></tr>
</table>

*1: Crosshead speed precision is calculated using crosshead transfer amount within a specified period of time for the crosshead speed of 0.5 mm/min to 500 mm/min under normal conditions.

*2: Tensile stroke is the value used when attaching the MWG (non-shift wedge type) grips. (600kN : Hydraulic grips)
Stroke can be extended.
Values under 5 kN are with SCG (screw type flat) grips attached.

*3: JIS B7721, EN 10002-2, ISO 7500-1, and ASTM E4 standards recommend re-verification after installation of testing machine.

*4: The LCD touch panel (optional) is required for Dataletty (optional).

*5: Dateletty (optional) and TRAPEZIUM X operational software cannot be used together.

* Values in this catalog have been measured based on separately-approved test standards.

Floor Model (20 kN/50 kN/100 kN)

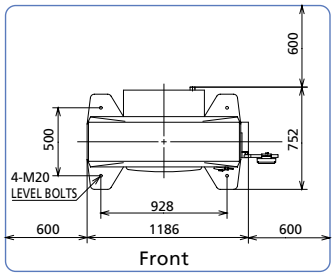
Floor Model (250 kN/300 kN)

- Laptop PC and table are optional.
- The LCD touch panel, laptop PC, and table are optional.

Installation Space

(Dimensions given for left, right, and back of the main unit are the space required for maintenance.)

AG-20 kNX to 300 kNX plus



Unit: mm

LCD Touch Panel Unit

[floor model]

Model	Mass (approx. kg)	Power requirement - consumed power is in ( )	Installation Environment
AG-20 kN / 50 kNXplus	654	Three phase 200 to 230 V 50 to 60 Hz 5 kVA (1.2 kW)	Temp.: 5°C to 40°C Humidity: 20% to 80% (no condensation) Voltage fluctuation: ±10% max. Vibration: Frequency 10 Hz max. Amplitude 5 µm max.
AG-100 kNXplus	834	Three phase 200 to 230 V 50 to 60 Hz 7 kVA (2.0 kW)	
AG-250 kN / 300 kNXplus	960	Three phase 200 to 230 V 50 to 60 Hz 7.5 kVA (2.5 kW)	

(Note) Grounding of 100 W or less is required.

Extensions to the Main Unit [Table-Top Models and Floor Models]

• Wide frame series
Models with wider effective test widths (975 mm, 1100 mm and 1375 mm) than the standard type (600 mm) are also available for testing large-size, actual object specimens.

• Reinforced yoke series
Use this series when conducting tests between the crosshead and yoke.

• Ultralow-speed crosshead model
The crosshead speed range can be widened to include extremely low speeds.

	Ultralow-speed models
Speed Range (mm/min)	0.00005 mm/min to 1000 mm/min (250 kN and 300 kN models are limited to 500 mm/min.)

• Large capacity series
With maximum capacities of 500 kN, 600 kN, 1000 kN, and 2000 kN, these models are used for large-capacity testing in heavy-industry fields such as steel, construction, and shipbuilding. They can be customized upon request.

• Extended column models
Models with extended columns are useful for testing materials requiring long tensile strokes. (Clearance between the yoke and table is extended 250 mm, 500 mm, or 750 mm.)

• High-speed models capable of at least 6000 mm/min
Instruments with a crosshead speed exceeding 6000 mm/min can be specially ordered.

Testing and Evaluation Machines

Table-top type
precision universal tester

AGS-X

Small table-top tester

EZ-Test

Dynamic ultra micro hardness tester

DUH-211 / 211S

Micro hardness tester

HMV-2

Capillary rheometer
Shimadzu flowtester

CFT-500/100D

Automatic mooney viscometer

SMV-300

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www.shimadzu.com/an/

Printed in Japan 3655-07219-30AIT