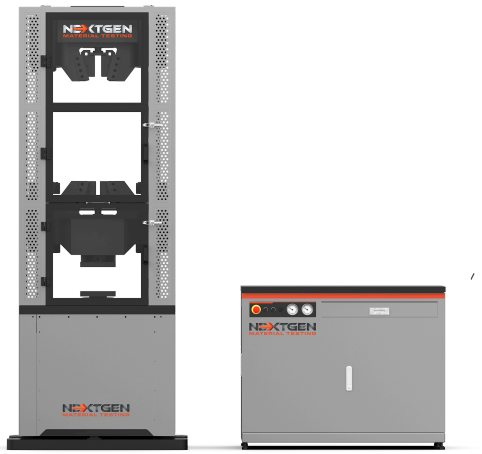
NG-SHM Series A – Servo-Hydraulic Universal Testing Machine (300–3000 kN)

Standards: ASTM A370, ASTM D3039, ASTM E4, ASTM E8, ASTM E21, ASTM E92, ASTM F606, EN 10002-1, EN ISO 15630-1, ISO 527, ISO 6892-1, ISO 6892-2, ISO 7500-1, ISO 9513

- ULTIMATE USER-FRIENDLINESS
- LEADING DEPENDABILITY AND RELIABILITY
- STRICT COMPLIANCE WITH INDUSTRY STANDARDS
- STOCKED CONSUMABLES AND SPARES
- TRUSTED AFTER SALES TECHNICAL SUPPORT
- LIFETIME PRODUCT SUPPORT ADVANTAGE



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Description

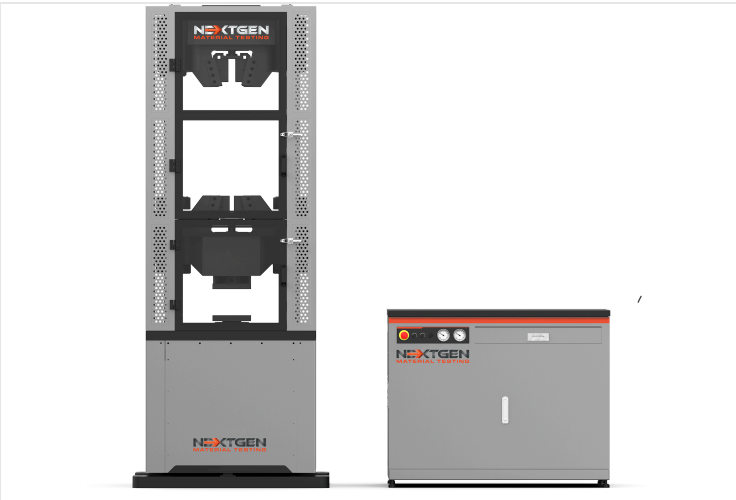
The NG-SHM Series A applies large static forces under control, for laboratories characterising material strength. Capacities run from 300 kN to 3000 kN, which covers the oversized metallic specimens an electromechanical frame cannot reach. A high-stiffness multi-column frame keeps deflection out of the load path, and that deflection is exactly what corrupts a yield or elongation reading on a soft frame.

The dual-zone layout is what changes the working day: tension is pulled in the upper zone while compression fixtures stay mounted on the lower platen, so a laboratory alternating tensile and compression work stops reconfiguring the machine between tests. It suits yield strength determination, proof testing, elongation analysis, fracture observation, modulus evaluation, QC acceptance and research work, with extensometers and hydraulic wedge grips for smooth, ribbed, round or flat samples.

300 - 3000 kN	Five capacities

Dual zone	Tension above, compression below
4 or 6	Columns, by model
Class 0.5	Calibration accuracy, ISO 7500-1
1200 Hz	DTC-500 control rate

The frame is a 4 or 6 column hydraulic structure with servo-controlled actuation for test space adjustment.



Dual-zone frame with the hydraulic power unit alongside.



Guarded frame, tension zone above the compression platen.

NG-SHM Series A in operation.

Typical Test Specimens

The Series A takes medium to large metallic samples, structural components and assemblies. What it is normally asked to break:

- Reinforcing steel rebar, threaded bar, smooth bar, structural rod
- Metal plates, billets, heavy gauge sheet and machined test coupons
- Steel wires, cables, chains, anchoring hardware and lifting connectors
- Welded joints, heat-affected zones and welded plate specimens
- Cast and forged components, brackets, automotive and industrial housings
- Bolts, nuts, fasteners, studs, anchor bolts and mechanical couplings
- Pipe segments, round bar, tubes, hollow cylinders and cross-section samples
- Large compression blocks, load-bearing plates and die-forged elements
- High-strength alloys, carbon steel, stainless steel, tool steels and iron-base materials
- Industrial structural components, fittings, joint parts, rail sections and supports
- Tensile and compressive samples to ISO 6892-1 and ASTM E8 / E8M
- Compression specimens to ASTM E9 and related procedures
- Rebar and construction steel to EN ISO 15630-1 and comparable standards
- General metallic components across R&D, QA and batch-release work

NG-SHM Series A Features

The list below is the short version of what the following sections describe in detail:

Multi-stiffness frame	A high-stiffness multi-column load frame that holds alignment and keeps deflection down under high force.
Servo-hydraulic actuation	Stable loading through tension and compression on metallic specimens.
Dual test zone	Tension in the upper section, compression in the lower, with no fixture removal between them.
Hydraulic wedge grips	Secure clamping of round and flat samples at high load.
High-resolution force	A strain-gauge load cell reading 1/500,000 of full scale in tension and compression.
Intelligent power unit	Pressure-regulated hydraulics with a low-noise screw pump and 5 µm filtration.
Active cooling	The HPU cabinet is air-cooled automatically for continuous operation.
Protection logic	Overload, travel limit, temperature monitoring and emergency stop.
DTC-500 controller	24-bit acquisition at a 1200 Hz control rate, with closed-loop force, displacement and extension control.
Connectivity	Ethernet and USB with TEDS support and a noise-resistant signal architecture.
GenTest™ software	Method templates, real-time graphing, automatic results and export.

Frame, Crosshead and Load Cell

Two things decide whether a high-force frame measures what it claims: how little it flexes, and where the force is read.

Lead-screw crosshead

The crosshead is positioned by a lead-screw drive, so the test space is set accurately for the specimen in hand.

4 or 6 column frame

The column count follows the capacity, and the frame is sized for alignment stability rather than minimum weight.

Reinforced beams

Beam reinforcement keeps deflection out of the measurement.

Load cell at the grip

The strain-gauge cell sits at the lower grip and reads force through the specimen, not through the frame.

1/500,000 resolution

Tensile and compressive load are read at 1/500,000 of full scale.

No range switching

The cell works across the full scale without range changes or step divisions, so a single calibration covers the whole test.

Hydraulic Power Unit and Servo Control

The power unit follows demand instead of running at full pressure: it holds an adjustable differential as the load rises and drops the pump output when the force requirement falls. Less energy circulating means less heat, and less heat is what keeps the oil, and with it the control accuracy, stable through a long test sequence. A cartridge valve architecture carries the pressure transitions without a step at either end of the range.

On the control side a low-hysteresis servo valve responds quickly when the force changes, and the rotor-driven screw pump delivers pulse-free flow up to 27.5 MPa, which is what removes flow fluctuation from the reading. Spool-position feedback is standardised, so the valve state can be monitored and maintenance planned instead of discovered.

Pressure-following logic	Output adjusts dynamically to the cylinder demand, cutting thermal and energy load.
Pulse-free delivery	Up to 27.5 MPa from the screw pump, for a stable control response.
Servo-valve regulation	Low hysteresis with diagnostic feedback on spool position.
Automatic cooling	Fan cooling starts at the oil temperature threshold set on the gauge.
5 µm absolute filtration	Multi-stage high-pressure elements protect the servo valve and the pump internals.
Overpressure protection	A relief valve opens above the rated pressure.
Serviceable enclosure	The semi-open cabinet gives direct access, and the backplate comes off without dismantling the cabinet.
Sealed high-pressure lines	Cone-seal bite-type fittings hold their seal through repeated assembly.

DTC-500 Digital Controller

The controller is the part that decides whether a test transitions cleanly from force control to displacement control mid-run, which is what a ramp-hold-cycle procedure needs. The DTC-500 runs three fully digital closed loops and switches between them without instability at the switching point.

Acquisition	6-channel 24-bit A/D, with sampling and control rates up to 1200 Hz.
Digital inputs	Three high-speed channels for encoder or grating ruler feedback up to 4 MHz, at 20-bit input resolution.
Closed loops	Force, displacement and extension, with smooth transitions between modes.
Connectivity	USB and high-speed Ethernet through a dedicated TCP/IP processing chip.
Analog output	Optional dual channels for external force, displacement or extensometer signals.
Transducer recognition	TEDS support identifies the load cell and accessories automatically.
Safety layers	Limit protection, overload protection and emergency stop.
Electronics	A 4-layer PCB for noise immunity, with locking connectors for quick replacement.

GenTest™ Test Software

The machine ships with GenTest™, which holds the method library and turns the run into a report. It covers ASTM, ISO, DIN, EN and BS procedures for tensile, compression, flexural and custom protocols:

- A library of standards-compliant methods for routine and research work
- Modular architecture, expandable with further material or standard packages
- Report templates with export to Excel or Word
- Real-time curves: displacement-load, stress-strain, displacement-time, load-time
- Automatic statistics for Fm, ReL, ReH, Rp and related values
- Unit selection in N, kN, kgf, lbf, MPa, and user-defined units through custom formulas

NG-SHM Series A Technical Specifications

Five models share the architecture and differ in capacity, test space and footprint. Check the column spacing and the tension space against your longest specimen, and the HPU dimensions against the floor plan. The table scrolls sideways on a narrow screen.

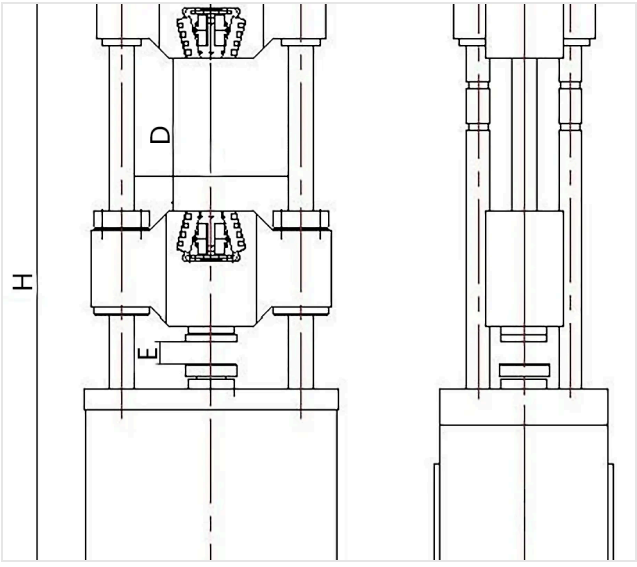
Specification	SHM305	SHM605	SHM106	SHM206	SHM306
Frame Type	Type A				
Capacity	300 kN	600 kN	1000 kN	2000 kN	3000 kN
Calibration Accuracy	Class 0.5				
Force Accuracy	±0.5%				
Force Range	1% to 100% FS				
Force Resolution	1/500000 FS				
Extension Accuracy	±0.5%				
Extension Resolution	1/500000 of max extension				
Position Resolution	0.004 mm				
Position Accuracy	±0.5% of reading				
Actuator Stroke	5.91 in (150 mm)	9.84 in (250 mm)	9.84 in (250 mm)	9.84 in (250 mm)	11.81 in (300 mm)
Actuator Speed	0-180 mm/min	0-140 mm/min	0-90 mm/min	0-70 mm/min	0-100 mm/min
Crosshead Speed (adjustment)	13.78 in/min (350 mm/min)	10.63 in/min (270 mm/min)	12.20 in/min (310 mm/min)	14.17 in/min (360 mm/min)	9.45 in/min (240 mm/min)
Force Loading Speed	0.05%-2% FS/s				
Column Number	4	6	6	6	6
Column Spacing (test width)	16.14 in (410 mm)	17.13 in (435 mm)	17.72 in (450 mm)	28.74 in (730 mm)	20.87 in (530 mm)
Max Tension Space	20.47 in (520 mm)	27.95 in (710 mm)	29.53 in (750 mm)	35.43 in (900 mm)	47.24 in (1200 mm)
Max Compression Space	20.47 in (520 mm)	27.56 in (700 mm)	29.53 in (750 mm)*	29.53 in (750 mm)	39.37 in (1000 mm)
Round Specimen Ø Range	Ø10-Ø20 mm / Ø20-Ø32 mm	Ø10-Ø21 mm / Ø21-Ø31 mm	Ø12-Ø23 mm / Ø23-Ø35 mm	Ø15-Ø30 mm / Ø30-Ø55 mm	Ø30-Ø70 mm / Ø70-Ø110 mm
Flat Specimen Thickness	2-13 mm / 13-25 mm	2-16 mm / 16-30 mm	2-20 mm / 20-40 mm	10-40 mm / 40-70 mm	10-60 mm / 60-100 mm
Compression Platens Ø	Ø4.7" (120 mm)	Ø5.9" (150 mm)	Ø7.9" (200 mm)	Ø9.4" (240 mm)	Ø11" (280 mm)
Frame Dimensions (L×W×H)	32.28 × 22.44 × 76.97 in (32.3 × 22.4 × 77" (820 × 570 × 1955 mm))	37.01 × 25.59 × 94.49 in (37 × 25.6 × 94.5" (940 × 650 × 2400 mm))	40.16 × 26.38 × 102.36 in (40.2 × 26.4 × 102" (1020 × 670 × 2600 mm))	53.94 × 32.28 × 124.02 in (53.9 × 32.3 × 124" (1370 × 820 × 3150 mm))	52.01 × 37.40 × 155.51 in (52 × 37.4 × 156" (1320 × 950 × 3958 mm))

Specification	SHM305	SHM605	SHM106	SHM206	SHM306
HPU Dimensions (L×W×H)	45.28 × 23.62 × 35.43 in (1150 × 600 × 900 mm) | larger models: 45.28 × 24.80 × 39.37 in (1150 × 630 × 1000 mm)				
HPU Weight	661 lb (300 kg) | larger models: 882 lb (400 kg)				
HPU Flow Rate	1.32 gal (5 L)/min	1.32 gal (5 L)/min	1.32 gal (5 L)/min	1.9 gal (7.2 L)/min	3.17 gal (12 L)/min
Power Consumption	2.5 kW	3.5 kW	4 kW	6 kW	6 kW
Power Supply	220 V AC, 50/60 Hz				
Frame Weight	3307 lb (1500 kg)	5512 lb (2500 kg)	7716 lb (3500 kg)	14991 lb (6800 kg)	22513 lb (10220 kg)

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Frame Dimensions

The letters in the table match the dimension drawing: D is the tensile space, E the compression space and F the test width.



Frame dimension drawing: D tensile space, E compression space, F test width, H overall height.

Model by model, the same dimensions in figures:

Model	Outside dimensions (L × W × H)	Tensile space (D)	Compression space (E)	Test width (F)	Piston travel
SHM305	32.28 × 22.44 × 76.97 in (32.3 × 22.4 × 77″ (820 × 570 × 1955 mm))	20.47 in (520 mm)	20.47 in (520 mm)	16.14 in (410 mm)	5.91 in (150 mm)
SHM605	37.01 × 25.59 × 94.49 in (37 × 25.6 × 94.5″ (940 × 650 × 2400 mm))	27.95 in (710 mm)	27.56 in (700 mm)	17.13 in (435 mm)	9.84 in (250 mm)
SHM106	40.16 × 26.38 × 102.36 in (40.2 × 26.4 × 102″ (1020 × 670 × 2600 mm))	29.53 in (750 mm)	25.98 in (660 mm)*	17.72 in (450 mm)	9.84 in (250 mm)
SHM206	53.94 × 32.28 × 124.02 in (53.9 × 32.3 × 124″ (1370 × 820 × 3150 mm))	35.43 in (900 mm)	29.53 in (750 mm)	28.74 in (730 mm)	9.84 in (250 mm)
SHM306	52.01 × 37.40 × 155.51 in (52 × 37.4 × 156″ (1320 × 950 × 3958 mm))	47.24 in (1200 mm)	39.37 in (1000 mm)	20.87 in (530 mm)	11.81 in (300 mm)

Note: the compression space for the SHM106 is given as 29.53 in (750 mm) in the specification table and as 25.98 in (660 mm) in the frame dimension table. Both values are marked * above; confirm the figure at the time of order.

Send us the specimen, its size and the standard you test to, and we will confirm which capacity, which grips and which extensometer your work needs.

For Laboratories

Need Additional Quality Control Equipment to Build Your Laboratory?

Servo-hydraulic universal testing is only one part of a complete quality control laboratory. NextGen can help you equip your entire lab with impact testers, notching and broaching

systems, cooling chambers, tensile testers, hardness testers, specimen preparation equipment, and other supporting solutions, all coordinated as one complete project.

- One partner to equip your complete laboratory
- Installation, training, calibration
- Support for the life of the equipment