Bulletin
125B

Tinius Olsen

High Force Electromechanical
Materials Testing Machines

Model H100kS

Fig 1. Model H100kS shown with model HW14 wedge grips.

The H100kS Materials Testing Machine is designed to test a wide spectrum of materials including: metals, composites, plastics, rubber, textiles, wire, timber, adhesives, finished components, etc., in tension, compression, flexure or shear.

With advanced technology and quality engineering, Tinius Olsen has produced a machine that is accurate and extremely easy to use. Powerful as a stand alone unit, the machine has capabilities that are enhanced by direct connection of a printer to produce a high resolution graph and a comprehensive test report.

S series testers incorporate a robust control and backlit LCD that can be tilted and positioned for optimum visibility. Test parameters are set on this control unit. Crosshead positioning, return and test start are also set here.

Once the test is underway, a real time graph is displayed on the controller. The resultant graph and the fundamental test results can be sent directly to a printer and any unreport-

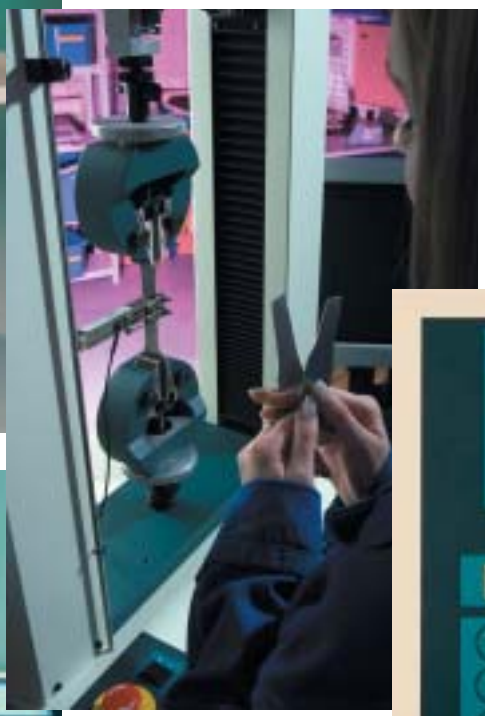


Fig 2. Dumbbell samples of sheet steel being tested on H100kS.

Fig 3. Console of H100kS machine in numerical display mode. Connection to a pc and / or printer is made through the console.

Fig 4. Direct compression test to determine the strength of cardboard packaging.

ed results may be measured and calculated from the printed graph.

Alternatively, the H100kS can be connected via RS232 to a pc running Tinius Olsen's Windows based software. In this manner, the most complex tests are made simple and access to comprehensive data analysis, including statistical process control, is available.

S series testers are also designed for users all over the world— an optional language chip can be plugged into the control panel and all data on the backlit LCD will be shown in the selected language. Language options include: English, French, German, Portuguese, Italian, Spanish and Polish.

Key Features

- Easy to read backlit LCD display
- Graphic or Numerical display mode
- Alpha Numeric data entry
- Speed range 500,000:1
- Robust load frame with tilt and swivel control unit
- Test report of results with mean, median and standard deviation directly from machine onto printer
- Comprehensive range of Windows test software
- Dedicated keys for rapid sequence testing

Fig 5. Tests involving the extraction of new corks from wine bottles. This application is testing new "cork" material.

Technical Specifications

MODEL		H100kS
CAPACITY	lbf kN kg	20,000 100 10,000
CLEARANCE BETWEEN COLUMNS	in mm	16 405
LOAD CELLS		Rapid change, Z beam, load cells with digital encoding for automatic recognition and scaling available — 100kN, 50kN, 25kN, 10kN, 5kN, 2.5kN, 1kN, 500N, 250N, 100N, 50N, 10N, 5N
MAXIMUM CROSSHEAD TRAVEL	 in mm	Measurement direct from ballscrew — fully auto scaling of single measurement range. 35.5 930
JOG SPEED	in/min mm/min	0.001 to 20 0.001 to 500
RETURN SPEED	in/min mm/min	0.001 to 30 0.001 to 750
TESTING SPEED RANGE	in/min mm/min	0.001 to 20 (up to 11,000 lbf), 0.001 to 10 (up to 22,000 lbf) 0.001 to 500 (up to 50kN), 0.001 to 250 (up to 100kN)
DIMENSIONS H x W x D	in mm	65 x 28 x 20 bench mounted, 91 x 28 x 20 floor standing 1657 x 720 x 502 bench mounted, 2318 x 720 x 502 floor standing
WEIGHT	lb kg	583 lb floor standing, 528 bench mounted 265 floor standing, 240 bench mounted

Specifications:

Load measurement accuracy:
+/- 0.5% of indicated load from 2% to 100% capacity; extended range down to 1% capacity with accuracy of 1% of indicated load

Position measurement accuracy:
+/- 0.01% of reading or 0.001mm, whichever is greater

Speed accuracy: +/- 0.005% of set speed

Operating temperature range: 32 to 100 degrees F (0 to 38 degrees C)

Storage temperature range: 14 to 115 degrees F (-10 to 45 degrees C)

Humidity range: 10% to 90% non-condensing, web bulb method

Power: Standard optional voltages 220/240VAC, 50-60 Hz, 2000W; power must be free of spikes and surges exceeding 10% of the nominal voltage

Notes: 1. Load weighing system meets or exceeds the requirements of the following standards: ASTM E4, EN 10002-2, BS 1610, DIN 51221, ISO 7500-1. Tinius Olsen recommends that systems are verified at installation in accordance with ASTM E4 and ISO 75001. **2.** Strain measurement system meets or exceeds the requirements of the following standards: ASTM E83, EN 10002-4, BS 3846 and ISO 9513. **3.** The model H100kS conforms to all relevant European CE Health and Safety Directives EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1. **4.** Specifications are subject to change without notice.

Fig 6. Claw adaptors being used to test the strength of adhesive/sealants.

Fig 7. Puncture jig being used to determine the puncture resistance of work gloves.

Model H100kT

Fig 8. Model H100kT shown with R type balanced grips and interlocked safety shield.

Fig 9. Test of a butt-welded part using threaded grips.

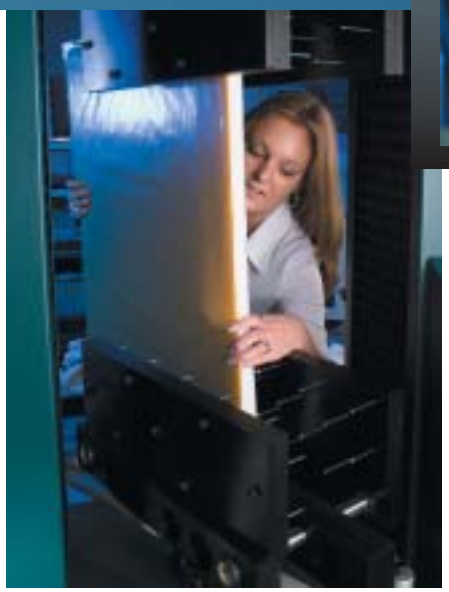


Fig 11. Model H100kT being used to test large sections of insulation board.

The H100kT is designed for use in laboratory and factory environments for research and/or quality control. Using the H100kT, it is possible to perform mechanical and physical tests quickly and easily on materials such as metals, composites, wire, rods, geotextiles, tapes, belts, fixings, timber, plyboard, electronic components, packaging systems, boxes, laminates, handles, pipes and tubes, glass tiles, springs and finished components — Tinius Olsen has experience in testing all these products, and more, in accordance with relevant international and industrial testing standards.

With the H100kT, it is possible to perform tests in tension, shear, compression, peel (delamination), tear, elastic stretch, puncture, burst, insertion, extraction, pull-off, cyclic and friction.

The T series is compatible with hundreds of test specimen holders and attachments, all designed and built by Tinius Olsen engineers to support and hold an infinite range of raw materials, finished products and components.

Every T Series testing machine is the product of expert design by engineers specializing in materials testing and leading edge technology. The result is an exceptional testing machine.

The investment in a Tinius Olsen frame is just the beginning of a long term relationship. The care and attention offered by Tinius Olsen's after sales technical and customer care team matches the high quality of the machines themselves.

Fig 10. Steel dumbbell samples being tested with one of Tinius Olsen's popular model LS, LVDT type, extensometers.

Check the quality behind the name:

- Each machine is a sealed unit to protect the control and drive systems from the most hostile factory environments.
- Interchangeable load cells allow operation from full capacity to 0.00 5kg (0.01 lbf).
- Software is compatible with regular industry standard locally supplied pc's.
- On-board machine diagnostics built in for effective calibration, servicing and repair.
- Guaranteed accuracy and traceability — every machine is supplied with a traceable calibration certificate

Key Features

- PC control via high speed RS232 using ASCII mode and super high speed binary mode
- Force accuracy of 0.5% of applied load across the load cell display range
- Displacement resolution of 0.0001 mm
- Speed resolution of 0.001 mm/min
- Built-in intelligent active force and displacement alarm system
- 32 bit precision motor controller
- 150% mechanical overload capacity
- 20% digital load tare while maintaining full load cell capacity
- Automatic motor drive alarms that monitor over/under voltage, current and temperature.

Fig 12: Model H100kT shown with interlocking safety door.

Technical Specification

MODEL		H100kT
CAPACITY	lbf kN kg	20,000 100 10,000
CLEARANCE BETWEEN COLUMNS	in mm	20 510
LOAD CELLS		Rapid change, low profile '8 gauge', load cells with digital encoding for automatic recognition and scaling available — 100kN, 50kN, 25kN, 10kN, 5kN, 2.5kN, 1kN, 500N, 250N, 100N, 50N, 10N, 5N
MAXIMUM CROSSHEAD TRAVEL	 in mm	Measurement direct from ballscrew — fully auto scaling of single measurement range. 47 1200
JOG SPEED	 in/min mm/min	Incremental position control 0.00004 to 20 programmable in 0.00004 steps 0.001 to 500 programmable in 0.001 steps
RETURN SPEED	in/min mm/min	0.00004 to 30 0.001 to 750
TESTING SPEED RANGE	in/min mm/min	0.00004 to 20 programmable in 0.00004 steps 0.001 to 500 programmable in 0.001 steps
DIMENSIONS H x W x D	in mm	98 x 41 x 29 2500 x 1056 x 750
WEIGHT	lb kg	1540 700

Specifications:

Load measurement accuracy: +/- 0.5% of indicated load from 2% to 100% capacity; extended range down to 1% capacity with accuracy of 1% of indicated load

Position measurement accuracy: +/- 0.01% of reading or 0.001 mm, whichever is greater

Speed accuracy: +/- 0.005% of set speed

Operating temperature range: 32 to 100 degrees F (0 to 38 degrees C)

Storage temperature range: 14 to 115 degrees F (-10 to 45 degrees C)

Humidity range: 10% to 90% non-condensing, web bulb method

Power: Standard optional voltages 220/240VAC, 50-60 Hz, 2000W; power must be free of spikes and surges exceeding 10% of the nominal voltage

Notes: 1. Load weighing system meets or exceeds the requirements of the following standards: ASTM E4, EN 10002-2, BS 1610, DIN 51221, ISO 7500-1. Tinius Olsen recommends that systems are verified at installation in accordance with ASTM E4 and ISO 75001. **2.** Strain measurement system meets or exceeds the requirements of the following standards: ASTM E83, EN 10002-4, BS 3846 and ISO 9513. **3.** The model H100kT conforms to all relevant European CE Health and Safety Directives. EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1. **4.** Specifications are subject to change without notice.

Fig 13. Close-up of HW21 grips being used on H100kT machine.

Fig 14. Model H100kT performing a compression test.

LoCap Series

The Tinius Olsen LoCap gives you the ultimate in durability, speed, convenience, accuracy and ease-of-use. Its precision interchangeable strain-gage load cells let you quickly change the machine capability from as little as 0.02 lbf up to the maximum of the frame capacity.

The heavy duty, rugged structure of the LoCap load frame and screws make it unlike any comparable capacity testing machine. Even at full capacity, the LoCap frame provides excellent rigidity, with minimal frame deflection. What's more, a durable movable crosshead is designed with built-in backlash eliminators.

For optimum testing convenience, tension tests are conducted in the upper test area, compression and transverse tests in the lower area — without the need to change tooling.

For added safety, an adjustable mechanism protects the testing machine against crosshead overtravel. This feature allows the operator to quickly set upper and lower crosshead travel limits at any point within the frame's vertical clearance using built-in electromechanical limit switches.

Two speed ranges are available within the 15 in (of horizontal clearance) frame: 0.005 to 5 in/min (0.125 to 125 mm/min) for loads up to full capacity; and 5 to 20 in/min (125 to 500 mm/min) for fast crosshead positioning and loads up to 3,000 lbf. A larger selection of speeds is provided with the wider 22 in load frame; 0.002 to 2 in/min (0.05 to 50 mm/min) for loads up to full capacity; and 2 to 20 in/min (50 to 500 mm/min) for crosshead positioning and loads up to 3,000 lbf or more, depending on machine capacity.

The LoCap series of machines and the Electomatic series of machines share the same handheld display and controller as well as the same control electronics.

Fig 16. Close-up of handheld display and controller supplied with every Electomatic and LoCap.

Fig 15. For testing high elongation materials or unusually long test specimens, Tinius Olsen can provide LoCaps with extended vertical clearances. This unit features an 8 ft vertical clearance (less tooling).

Fig 17. Left to right, typical 15 in and 22 in LoCap load frames.

MODEL		12	30	60
CAPACITY	lbf kN kg	12,000 60 6000	30,000 150 15,000	60,000 300 30,000
CLEARANCE BETWEEN COLUMNS	in mm	15 380	22 560	22 560
MAXIMUM TENSION CLEARANCE	in mm	40 1016	50 1270	50 1270
MAXIMUM COMPRESSION CLEARANCE	in mm	40 1016	50 1270	50 1270
TESTING SPEED RANGE	in/min mm/min	0.005 to 20 0.125 to 500	0.002 to 20 0.05 to 500	0.002 to 20 0.05 to 500
DIMENSIONS H x W x D	in mm	74 x 30 x 21 1880 x 762 x 546	88 x 42 x 38 2235 x 1067 x 978	93 x 42 x 47 2375 x 1067 x 1194
WEIGHT	lb kg	1150 525	3100 1410	3580 1625

Common Specifications:

Load measurement accuracy: +/- 0.5% of indicated load from 0.2% to 100% capacity

Position measurement accuracy: +/- 0.1% of reading

Speed accuracy: +/- 0.1% of set speed

Operating temperature range: 50 to 100 degrees F (10 to 40 degrees C)

Power: Power must be free of spikes and surges exceeding 10% of the nominal voltage

Humidity range: 10% to 90% non-condensing

Notes: 1. Load weighing system meets or exceeds the requirements of the following standards: ASTM E4, EN 10002-2, BS 1610, DIN 51221, ISO 7500-1. Tinius Olsen recommends that systems are verified at installation in accordance with ASTM E4 and ISO 75001. 2. Strain measurement system meets or exceeds the requirements of the following standards: ASTM E83, EN 10002-4, BS 3846 and ISO 9513. 3. Extra wide and/or extra height frames are available. Contact your representative for details. 4. The LoCap series of machines conform to all relevant European CE Health and Safety Directives, EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1. 5. Specifications are subject to change without notice.

Electomatic IV Series

Unlike conventional testing machines that provide maximum weighing and indicating accuracy only when loads are centrally applied, the Electomatic IV series provides exceptional accuracy even with eccentric loading. One of the keys to its unique off-center loading is Tinius Olsen's exclusive QuadraSensor weighing system. It incorporates four Olsen strain gage force columns—one at each corner of the load frame table — whose combined signals produce an extremely accurate indication of the load being applied to the specimen. Electomatic IV machines will accurately indicate off-center loads applied within the loading area of the screws and rated capacity of the bearing points at the four corners of the weighing table.

These rugged electromechanical test machines are available in two screw or four screw load frame designs. As standard, all new Electomatic IV machines include a four quadrant motor drive for closed-loop control and can be linked with Tinius Olsen's Windows-based Test Navigator software for complete data acquisition, data analysis and sophisticated machine control from a pc.

Fig 19. Proving ring and height indicator verify the off-center accuracy of four screw Electomatic with no appreciable eccentric movement of cross-head. Shown with optional tee slotted table.

Fig 18. Typical 30,000 lbf (150 kN) two-screw Electomatic load frame.

MODEL		30	60	120	200	300
CAPACITY	lbf kN kg	30,000 150 15,000	60,000 300 30,000	120,000 600 60,000	200,000 1000 100,000	300,000 1500 150,000
NO. OF LOADING SCREWS		2	4	4	4	4
CLEARANCE BETWEEN COLUMNS	in mm	20 520	30 780	30 780	30 775	30 775
MAXIMUM TENSION SPECIMEN LENGTH	in mm	48 1220	48 1220	48 1220	48 1220	72 1830
MAXIMUM COMPRESSION HEIGHT	in mm	48 1220	48 1220	48 1220	52 1320	76 1930
TESTING SPEED RANGE	in/min mm/min	0.002 to 20 0.05 to 500	0.002 to 20 0.05 to 500	0.002 to 10 0.05 to 250	0.002 to 10 0.05 to 250	0.002 to 10 0.05 to 250
DIMENSIONS W x D x H	in mm	101 x 41 x 93 2565 x 1040 x 2360	113 x 45 x 100 2870 x 1145 x 2540	115 x 54 x 107 2920 x 1370 x 2720	114 x 64 x 116 2895 x 1625 x 2495	117 x 106 x 142 2970 x 2690 x 3605
WEIGHT	lb kg	3600 1635	8000 3630	12,000 5440	17,000 7710	22,000 9975

Common Specifications:

Load measurement accuracy:
+/- 0.5% of indicated load from 0.2% to 100% capacity

Position measurement accuracy: +/- 0.1% of reading

Speed accuracy: +/- 0.1% of set speed

Operating temperature range: 50 to 100 degrees F (10 to 40 degrees C)

Power: Power must be free of spikes and surges exceeding 10% of the nominal voltage

Humidity range: 10% to 90% non-condensing

Notes 1. Load weighing system meets or exceeds the requirements of the following standards: ASTM E4, EN 10002-2, BS 1610, DIN 51221, ISO 7500-1. Tinius Olsen recommends that systems are verified at installation in accordance with ASTM E4 and ISO 75001. **2.** Strain measurement system meets or exceeds the requirements of the following standards: ASTM E83, EN 10002-4, BS 3846 and ISO 9513. **3.** Extra wide and/or extra height frames are available. Contact your representative for details. **4.** The Electomatic series of machines conform to all relevant European CE Health and Safety Directives, EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1. **5.**Specifications are subject to change without notice.

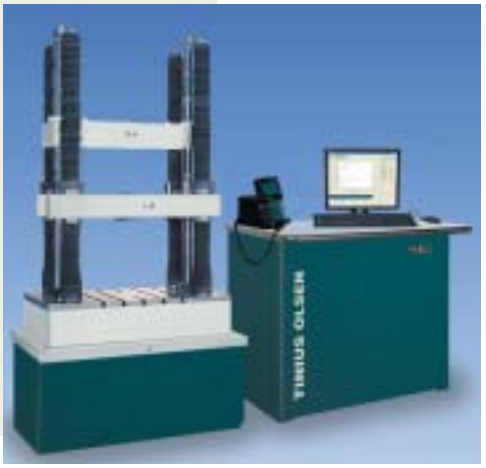


Fig 20. Typical 120,000 lbf (600 kN) capacity four screw Electomatic system, shown with optional tee slotted table.

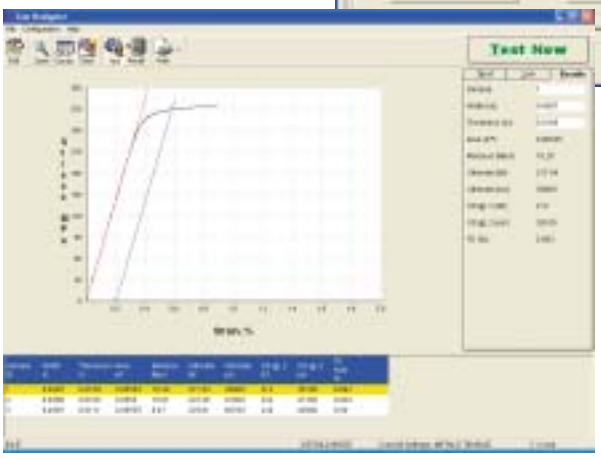
Software

Building on our long history of providing solutions to an enormous variety of testing problems, Tinius Olsen offers a comprehensive range of software products, each designed to make testing simple, precise and efficient, no matter whether the material is metal, paper, composite, polymer, rubber, textile or micro components. Tinius Olsen software goes far beyond basic module changes for unique applications; instead, specific and focused application software products have been developed in close cooperation with our customers around the world.

There are several valuable features that are common to all, perhaps the most important is the ability to further customize the testing parameters that are used to collect and document testing data, as well as control the testing machine. Specifically, our range of application software is for data acquisition, data analysis and also closed loop control of Tinius Olsen testing machines that have a compatible servo system or four-quadrant drive.

All versions of our focused application software are rich with standard features that improve productivity and enable you to build, access and use a powerful materials testing database:

- Use of modern databases.
- Generation of user customized reports.
- Standard SPC programs for X-bar, R and frequency distributions/histograms.
- Ability to recall, replot and rescale curves.
- Recall of data that spans different test modules.
- User-configurable machine parameter and control settings.



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