

# MSR: Machine Stress Rating

	Page
7200 HCLT	19
7100 CLT	24
312 Bending Proof Tester	25



## Let Metriguard bring MSR to you.

A complete Metriguard MSR production plant, on a mobile platform with its own diesel-powered generator, is ready to run at your site. This system includes a Model 7200 HCLT with PCDS2, plus a Model 312 bending proof tester, infeed conveyor, and landing table.

See how easy it is to operate and maintain Metriguard MSR equipment, while testing your own material for MSR potential. With very little time at your site, we can show you how much money MSR can make for your mill.

An on-site evaluation typically takes two days of running material at your mill. A standard sample size for evaluation is 12 units of lumber, provided by you. The evaluation requires four of your personnel to assist with lumber loading and unloading, as well as a visual grader and a forklift.

The evaluation results include a yield study that shows the most profitable grades that could be made from your lumber resource, based on your own lumber prices.

Call Metriguard to schedule your on-site MSR evaluation.



The Metriguard Mobile MSR Unit is ready to roll anywhere in North America.

## We can evaluate your fiber resource for MSR production.

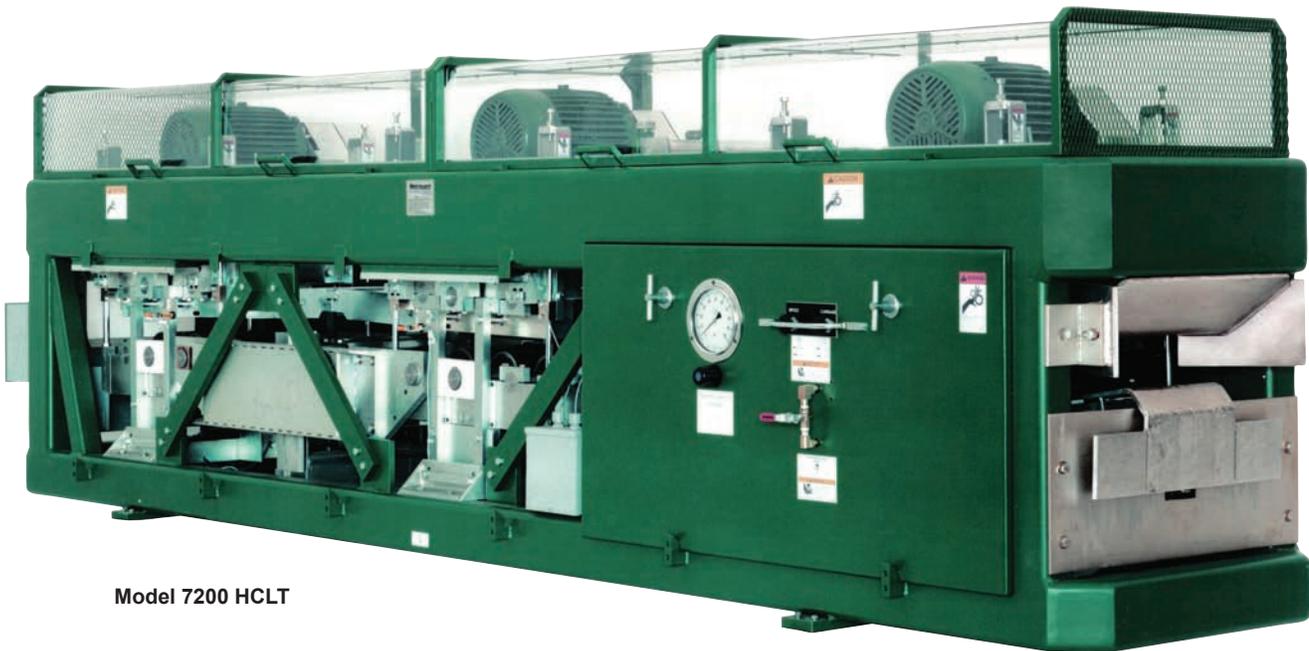


The Metriguard Mobile MSR Unit includes a Model 7200HCLT with PC Data System, plus a Model 312 Bending Proof Tester, infeed conveyor, and landing table. The entire mobile unit is self-contained and powered by its own generator, requiring only a level parking lot area to stage and run.

**Metriguard**  
INC

# Model 7200 HCLT: High Capacity Lumber Tester

- Grades dimension lumber at speeds up to and exceeding 3000 ft/minute (914 m/minute)
- Provides best grading accuracy and consistency for the best profit
- Features patented “Stressed in Bending” mechanics: the only technology that responds accurately to grain angle, microfibril angle, and moisture content in lumber
- Certified for MSR, MEL, E-Rated Lumber, MGP, and MSG grades
- Measures stiffness directly to accurately determine modulus of elasticity (E)
- Applies stress over the full length of the lumber
- Modular design simplifies maintenance and repairs



Model 7200 HCLT

## Description

- Processes lumber widths 2.5 to 11.4 in (63.5 to 290 mm) & thicknesses 1.2 to 1.8 in (30.5 to 45.5 mm)
- Produces lumber for structural applications including trusses, joists, purlins, and E-rated laminate stock
- Installs just inches from your planer outfeed so space requirements are reduced
- Shifting base quickly swaps a bypass conveyor for the 7200 in the production line
- Unlimited configuration files for grade combinations and sizes
- Includes performance monitoring & troubleshooting tools for ease of maintenance
- Records production and calibration data automatically
- Built-in diagnostics & self-test features
- PC Data System features a touch screen for quick, easy user interface
- The PC Data System displays real-time grade and E readings
- PC Data System processing eliminates analog system drift and ambiguity, and makes the lumber grading data compatible with other Windows-based data analysis programs
- Production run information tallied for later analysis in an Excel-based utility which generates reports & charts from each shift's data
- PC Data System can network with other computers in the plant to share data & ease its evaluation
- Features enhanced spray marking capabilities
- Bends the lumber in two directions in the machine's two bending sections with the bending forces measured & combined to compute Local E along the piece length
- Average E & Low-Point E values are compared against operator-selected thresholds to determine the MSR grade
- Data for each board can be passed via serial port to optimizing systems downstream

# Model 7200 HCLT

## Specifications

### General

Specifications below are standard. Custom configurations are possible and set at the time of order. Call Metriguard to discuss your specific requirements.

### Dimensions (LxWxH)

7200 HCLT .....	188 x 40 x 58 in (4650 x 1020 x 1520 mm)
PC Data System .....	24 x 24 x 72 in (610 x 610 x 1820 mm)
Shifting Base .....	204 x 40 x 45 in (5180 x 1020 x 1140 mm)
Bypass Conveyor .....	190 x 28 x 34 in (4830 x 710 x 860 mm)

### Weight

7200 HCLT .....	9000 lbs (4100 kg)
PC Data System .....	550 lbs (250 kg)
Shifting Base System .....	2000 lbs (910kg)
Bypass Conveyor .....	700 lbs (320kg)

### Electrical Power

7200 .....	440 to 480 Vac, 3-phase, 60 Hz, 40 A (full-load operating) for three 10-hp (7.5 kW) motors, unless otherwise specified
PC Data System .....	Multi-tap transformer, single phase, 60Hz (50 Hz available)
Bypass Conveyor .....	440 to 480 Vac, 3-phase, 60 Hz for one 10-hp (7.5 kW) motor

### Pneumatic Power

7200.....	90 to 120 psi (620 to 1200 kPa) shop air at 5 cfm (140 l/min)
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### Capacity

Speed .....	Up to 3000 ft/min (to 914 m/min)
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Non-standard speeds are attainable by the use of frequency drive systems and other special equipment. Actual speed is set at the time of ordering.

Planed lumber sizes .....	2x3 to 2x12 (nominal North American sizes)
Lumber Thickness .....	1.2 in to 1.8 in (30.5 mm to 45.5 mm)

For thickness other than 1.5 in (38.1 mm) and/or to run multiple thicknesses, optional two-piece pushrods are required. One-piece pushrods (standard) are recommended for North American applications. Pushrod spacers lengthen the two-piece pushrods so



The PC Data System with new touch screen monitor is mounted in a free-standing industrial cabinet.

lumber of different thicknesses can be graded without resetting stopbolts. Mills producing metric-sized lumber may switch between 35 mm and 45 mm with a 10 mm spacer assembly. (Call for information.)

Lumber Width .....	2.5 to 11.4 in (63.5 to 290 mm). Zero to light crook required for widths of 10.25 in (260 mm) or greater.
Lumber Length .....	8 to 30 ft (2.5 to 9 m) (random)

### Lumber Flow

Lumber is fed flatwise and longitudinally into the machine. Bending-E measurements are made while the material flows through the machine. Machine grade is sprayed on each piece with a color ink spray.

## Grading Method

Local flat-wise, bending E measurements are obtained from two 4-ft (1219 mm) bending spans. This double-bend measurement and digital data processing compensate for deviations from straightness in the wood. Average E, Low-point E and Low-point/Average ratio values are determined for each piece from the Local E measurements. Grade thresholds are set by the operator and stored in the PC Data System configuration files.

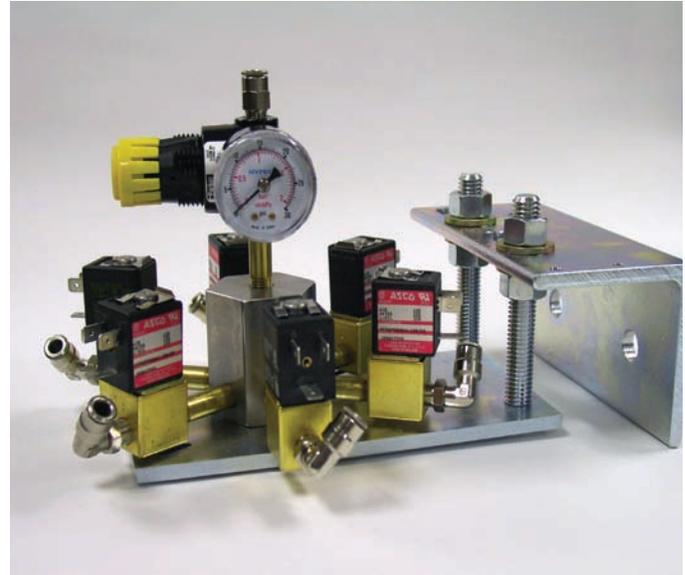
## Data Output

Digital readout shows Average E and Low-point E in Mpsi, GPa, or other units. Piece data, tallies, and shift reports may be displayed and saved to disk for later analysis. Piece grade can be determined from any combination of Average E, Low-point E, and/or Low-point/Average ratio.

## Spray Marking

Operator-set thresholds determine which of eight grades is automatically spray-marked on the end of each piece. Standard 115 Vac spray system, four ink tanks, and a 4-shooter nozzle are included.

An optional high-speed (dc) spray system (4 or 6 channels) is available for marking the lowest Local E or all local E values on each piece.



This six-channel spray marking assembly (SYS-ASM-1008) is available as an option for a Model 7200 HCLT.

## Options

Options are available to customize each Model 7200 HCLT for a mill's operation. If you do not see something you need to make our machine fit your operation, call us.

## Machine 'Hand'

Controls can be located either on the left- or right-hand side of the 7200 frame. 'Hand' is defined as if the observer is standing at the machine infeed, looking downstream along the production line. Typically set at the time of order, machine hand can be changed easily with simple tools. The PC Data System is a stand-alone unit and is not affected by machine hand.



View of a Model 7200 HCLT and bypass conveyor on a shifting base, showing the bypass conveyor in line and the 7200 shifted offline.

# Model 7200 HCLT



A Parts Manual is now available for the Model 7200 HCLT. With over 100 pages of exploded views and parts lists, this book makes parts ordering simpler and more accurate.

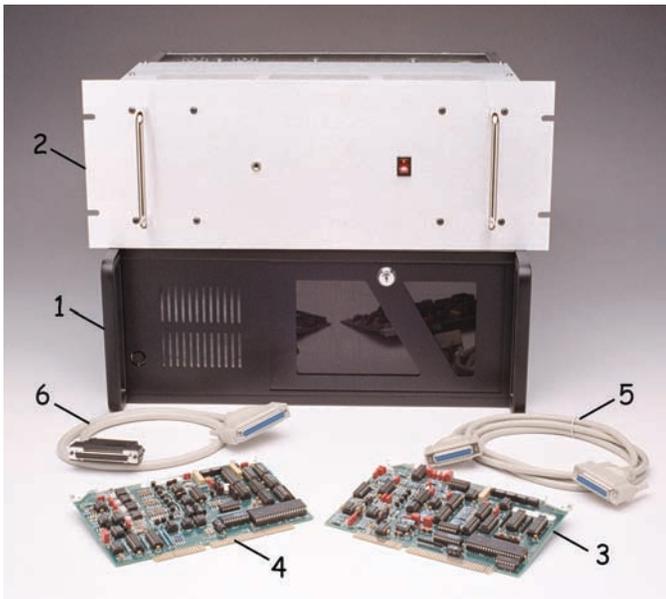
The manual can be ordered as an online pdf download, a pdf on CD, or as a spiral-bound booklet. Call or email Metriguard for details.



Stop using your calibration tools as pry bars! New Locking Load Cell Pliers are available to make servicing load cells in a Model 7200 safer, faster and easier. (720-ASM-0050)

MSR EQUIPMENT

## Spare Parts



PCDS Spares with PC (020-KIT-1004), shown at left. Actual kit contents may vary from depiction.

Item	Description	Part Number	Qty
1	PCDS rack-mount computer	020-ASM-1002	1
2	PCDS Power Interface Box assembly	020-CHA-1010	1
3	Load cell amplifier board	PRN-P0LA	1
4	I/O multiplexer board, standard	PRN-P0MX	1
5	Cable, DB25, F/F, 2m	WIR-MUL-1033	1
6	Cable, DB-37, F/F, 3ft	WIR-MUL-1042	1

Item	Description	Part Number	Qty
1	Shim kit for LC preload (12 shims)	720-KIT-1007	1
2	Connector for load cell, 6-pin socket	CON-PLU-1030	1
3	Connector for speed sensor, w/ clamp	CON-PLU-1043	1
4	Ink solenoid valve, 120 Vac	PNE-VAL-1001	1
5	Photo sensor, receiver	SEN-OPT-1010	1
6	Photo sensor, transmitter	SEN-OPT-1011	1
7	Magnetic speed sensor	SEN-OTH-1001	1
8	Accelerometer with BNC connector	SEN-PIE-1002	1
9	Load cell, 5k universal	SEN-STR-1007	1
10	Cable, BNC/BNC, 10' RG58C/U	WIR-MUL-1001	1

Example of a sensors spares kit (720-KIT-1004) for a Model 7200 shown below. Actual contents of kit may vary from depiction.



Pictured here is a typical mechanical spares kit for a Model 7200 (Part # 720-KIT-1003), along with a list of those parts and their part numbers. These parts are also available for purchase separately as needed. Actual contents of a spares kit may vary from the illustration.



Item	Description	Part Number	Qty
1	Short Shaft Kit (shaft, snap rings, & spring washers)	720-KIT-11211	1
2	Long Shaft Kit (shaft, snap rings, & spring washers)	720-KIT-11321	1
3	Load Roller Shaft Kit (shaft, snap rings, & spring washers)	720-KIT-1441	1
4	Roller shell, non-driven	720-MEC-1002	1
5	Roller shell, double-drive	720-MEC-1003	1
6	Sprocket, 63T drive roll	720-MEC-1007	1
7	Carriage bearing block	720-MEC-1008	2
8	Carriage bearing plate	720-MEC-1009	4
9	Bearing slide, bridge outfeed	720-MEC-1011	2

Item	Description	Part Number	Qty
10	Load roller spring, 4.5 x 0.094 in	720-MEC-1014	4
11	Cushion, kickplate infeed	720-MEC-1302	2
12	Cushion, kickplate outfeed	720-MEC-1303	2
13	Conrad bearing, 120 x 55 x 29	DRI-BEA-1030	2
14	Bearing, DU thrust washer	DRI-BEA-1086	2
15	Timing Belt, 8mm x 36 x 1792	DRI-BEL-1102	1
16	Timing Belt, 8mm x 36 x 1000	DRI-BEL-1104	1
17	Idler Sprocket, 36-tooth Polychain	DRI-SPR-1111	1
18	Air spring, 4.6 OD x 7.1 ext	PNE-CYL-1022	1
19	Air spring, 7200 carriage	PNE-CYL-1027	1
20	Hand valve, 4-way	PNE-VAL-1020	1

# Model 7100 CLT



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March 3, 2006

Re: 7100 CLT parts and service availability

Dear Model 7100 CLT Owner:

The Model 7100 CLT has been a workhorse for machine rating lumber for over 30 years. The last production unit was manufactured by Irvington-Moore, with Metriguard electronics, in the early 1990's. Now this equipment is nearing the end of its practical support life. We plan to provide complete technical support for the foreseeable future but we are being forced into reduced parts support as replacement parts become unavailable. The purpose of this letter is to inform all CLT owners about this situation so they can plan appropriately.

CLT parts can be loosely grouped into three categories: machined castings, machined parts and electronic components. Machined castings include carriage side plates, carriage cross members, load roller single trees and trunions, fence hangers, etc. There are no more new castings available. We have a limited number of used castings we can remanufacture but beyond that things are uncertain. Trade-ins could allow us to remanufacture a few more. Machined parts such as rolls and shafts are not a problem as we can continue to manufacture these items. Bearings and locking collars are expected to remain available as well.

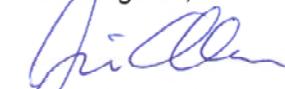
Metriguard has just one machine set of complete, assembled, remanufactured carriages (with rolls, shafts, etc.). We don't expect to stock or replace these when they are gone as demand is so uncertain.

We will continue to maintain expertise in repair of analog electronic components and systems but we are limited by the availability of specific components from our vendors. The critical part here is the digital panel meter. The vendor discontinued manufacturing this part many years ago and there is no suitable substitute. We can still get some repair parts and have some used, repaired meters in stock but when these are gone there will be no more. We will also attempt to maintain a limited stock of used circuit cards as only a few new ones are available.

This is not an exact science as we cannot predict demand but we do want to make sure everyone is as informed as possible. We do not expect to send any additional notices on parts availability since exact inventories are dependent on other vendors/manufacturers and on the supply of used parts for remanufacture.

There are upgrade paths available for both the CLT machine and the analog data system. Please contact our sales and service staff if you would like a quotation or have any questions.

Best regards,

  
James R. Allen  
General Manager



Model 7100 CLT



# Model 312 Bending Proof Tester

- Industry-standard Bending Proof Tester for quality control testing of structural dimension lumber
- Rigid mechanical design provides for accurate measurement over a full range of dimension lumber sizes and grades
- Tests North American or metric size lumber
- Easy to use



The Model 312 Bending Proof Tester  
(shown with backload feature)

## Description

- Measures bending modulus of elasticity (E) and ultimate bending strength of dimension lumber
- Designed to measure bending strength and stiffness of the full range of dimension lumber sizes
- Operator-selectable ranges are zero to 1,000 pounds or zero to 10,000 pounds (0-10 kN or 0-25 kN) (Metric readout is optional)
- A four-point loading system applies a specified load at 1/3- and 2/3-span locations which allows the bending moment and the extreme fiber stress to essentially be constant between the inboard loading heads
- E calculated from the deflection and force measurements
- Deflection of strong-back: less than 1% of test-piece deflection, at worst case
- Electronic load cell measures the total applied force
- Peak track-and-hold circuit stores the maximum force reading, allowing the operator to stress a piece to failure without watching the digital readout during the test
- Digital display indicates E for standard cross-sections at a predetermined deflection and span
- Lumber normally tested on-edge; flatwise testing is optional
- The back-load feature allows lumber to be loaded from the back
- Results provide for direct comparison with the Model 7100 CLT and Model 7200 HCLT.
- Model 312 system includes an electronics unit, a dial indicator, hand-operated hydraulic pump, force calibration ring, and an aluminum test bar

# Model 312 Bending Proof Tester

## Specifications

### General

The Model 312 Bending Proof Tester provides edgewise bending tests on dimension lumber in sizes from 2x3 to 2x12. Load is applied with a hand-pump hydraulic system and measured with an electronic load cell system which also measures the maximum load applied prior to failure of the specimen.

Force measurement .....	Electronic load cell force measurement system. Ranges are 0–1000 lb (4.45 kN) & 0–10,000 lb (44.5 kN), includes peak force tracking
Deflection measurement.....	Dial indicator gauge measures deflection at span center, referenced to strong-back
E measurement .....	Direct reading with digital panel meter
Loading method.....	Hydraulic cylinder applies force to an adjustable cross-head which loads the specimen

### Material Size Capacity

Planned lumber sizes .....	2x3, 2x4, 2x5, 2x6, 2x8, 2x10, and 2x12 (nominal North American sizes)
Span lengths (inches).....	52.50, 73.50, 94.50, 115.50, 152.25 (l/d = 21), 185.00 (l/d=20), 185.00 (l/d=16.44), 90.42 (2x6-8' with l/d=16.44)
Thickness .....	1.5 inch
Metric sizes.....	requires metric option; contact Metriguard, Inc. for details.

Other sizes available via special order.

Schematic of the third-point loading configuration used by the Model 312 system.

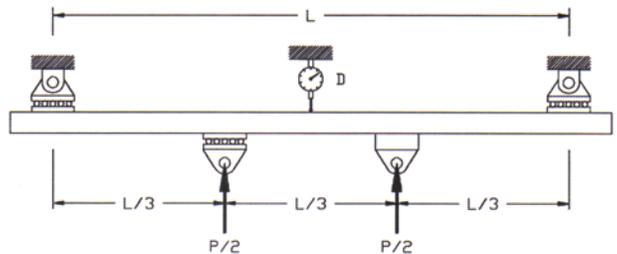
### Mechanical

Deflection of strong-back.....	less than 1% of test-piece deflection, at worst case
Calibration test bar .....	1.5 in x 3 in x 10 ft (38.1 x 76.2 x 3050 mm) 6061-T5 aluminum (included)
Ring force gauge .....	0 – 2000 lb (889 kN) ring force gauge included for calibration.
Electronic calibration .....	A shunt calibration feature is provided for quick verification of load cell amplifier gain setting
Power requirements .....	115 Vac 60 Hz (50 Hz) 2 amp.
Hydraulic pump.....	Manually operated, single-stage

### Shipping Dimensions

(Unit is shipped in two packages.)

Length.....	16 ft (4880 mm)
Width .....	24 in (609 mm) base
Height .....	5 ft 6 in (1680 mm)
Shipping weight .....	2700 lb (1225 kg) machine frame; 300 lb (136 kg) electronics & accessories



## Options

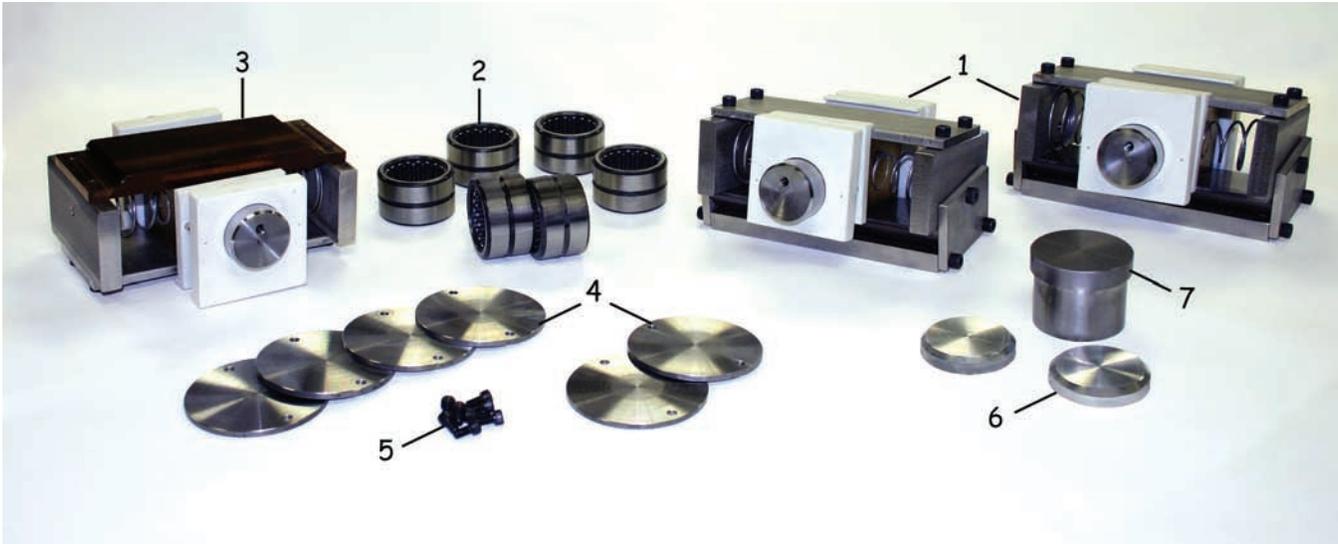
Endload Model 312..... With this version of the Model 312, test samples are loaded from either end of the machine. Lumber *cannot* be loaded from the back. 312-BAS-1001

Metric Model 312..... Handles metric dimension lumber and displays results in metric units. This machine differs significantly from a standard machine. Please specify this option when ordering. 312-BAS-2002

# Model 312 Bending Proof Tester

Through Metriguard's product improvement program, new reaction slide assemblies have been developed for the loading heads of the Model 312 Bending Proof Tester. These improved assemblies better handle the stress of bending proof testing, including taking the test to failure.

Standard on new Model 312 systems, these assemblies are also available in a retrofit kit for systems already in use.



New Reaction Slide Assembly retrofit kit for a Model 312. This kit contains parts to retrofit a Model 312 manufactured after 1982. Contact Metriguard for details. (Kit number 312-KIT-1002)

312-KIT-1002 Retrofit Kit for New Reaction Slide Assemblies

Item	Description	Part Number	Qty
1	Outer Reaction Slide Assembly	312-ASM-0850	2
2	Needle Bearing	DRI-BEA-1057	6
3	Inner Reaction Slide Assembly	312-ASM-0550	1
4	Face plate	312-MEC-0606	6
5	Face plate bolts, 1/2 - 20	FEB-SOC-1009	12
6	Bearing stop	312-MEC-0802	2
7	Bearing stop jig	312-MEC-0801	1

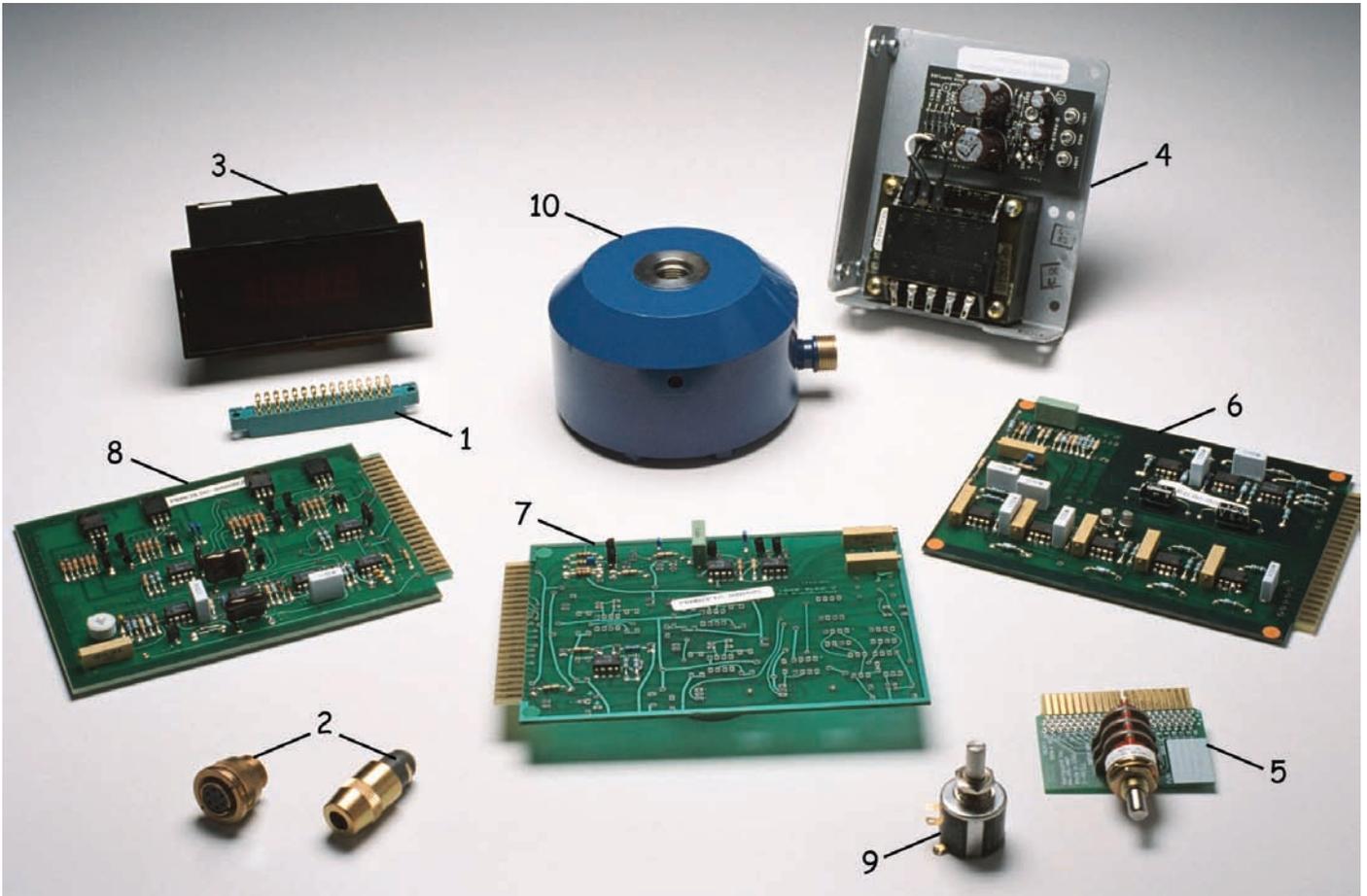


Model 312 Bending Proof Tester shown here measuring modulus of rupture (MOR) by taking a 2x4 to failure.

# Model 312 Bending Proof Tester

## Spare Parts

MSR EQUIPMENT



312-KIT-1001 - Electrical Spares (English units)

Pictured here is a typical electrical spares kit for a Model 312 (312-KIT-1001), along with a list of the parts included and their individual part numbers. These parts are available for purchase separately as needed.

An equivalent spares kit is available for a metric Model 312.

Item	Description	Part Number	Qty
1	Panel meter connector, 15-pin (included on Item 3)		1
2	Load cell connector, 6-pin socket	CON-PLU-1030	1
3	Panel meter, 3.5 digit LED, 1/8 DIN	DIS-PAN-1004	1
4	Power supply +15/-15	POW-DCO-1003	1
5	Switch, 12-position with stops	PRN-A1MF	1
6	312 LC amplifier board, 3-12, English	PRN-B1LA	1
7	Peak track board	PRN-B2PT	1
8	Load cell oscillator board	PRN-C2LO	1
9	Potentiometer, 10k, 10t, 3/8 bushing mount	RES-POT-1005	1
10	Load cell, 10k, universal	SEN-STR-1002	1