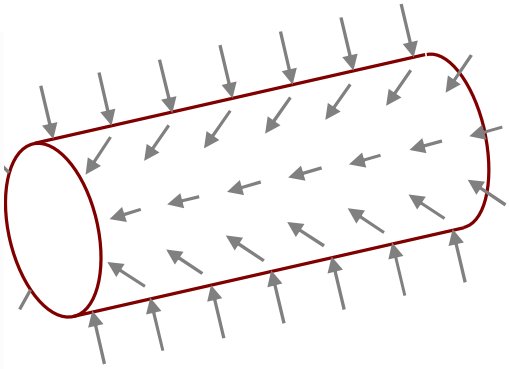
Tensile Testing Machine for Radial Force, Model TTR2

Blockwise Engineering, LLC
http://www.blockwise.com

The **Blockwise Tensile Testing Machine Model TTR2** is a tabletop machine designed to be used together with Blockwise radial compression stations to measure the radially-outward force of a stent or similar device, as a function of its diameter.

TTR2 Tensile Testing Machine shown without a radial compression station



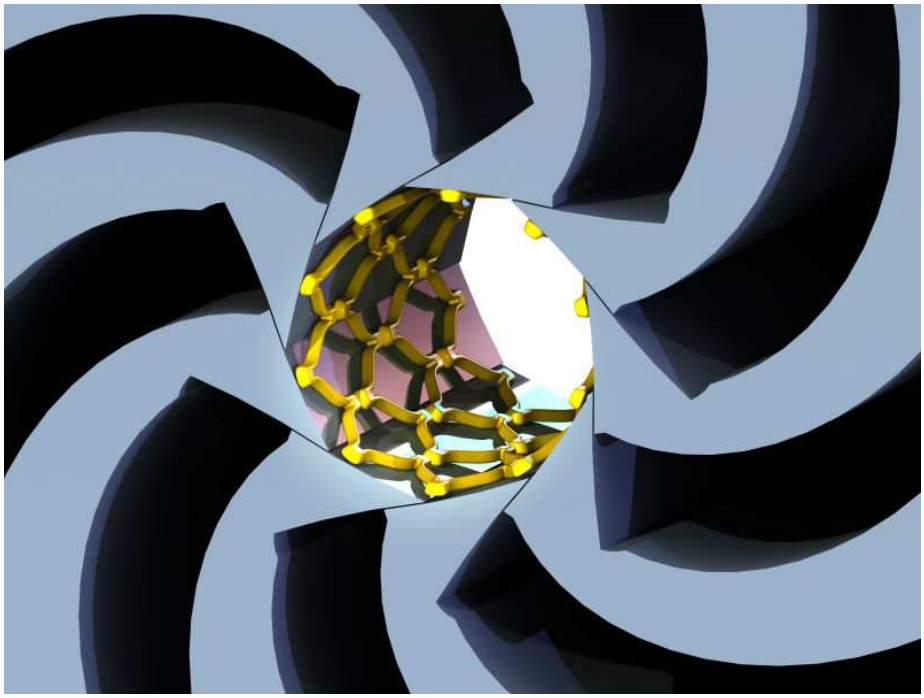
Radial Force is defined as total force transmitted in the radial direction across the (roughly) cylindrical outer surface of the device. It is equal to the average pressure on the surface times the surface area of the cylinder, and is also equal to the sum of the individual forces perpendicular to each of the die faces.

The TTR2 uses a rotating-nut-type stepper motor linear actuator to move the input arm of a low-friction radial compression mechanism. Motion of the input arm causes the opening diameter to change.

The diameter of the opening is measured by an encoder on the stepper motor. The radial force is measured by a precision force transducer.

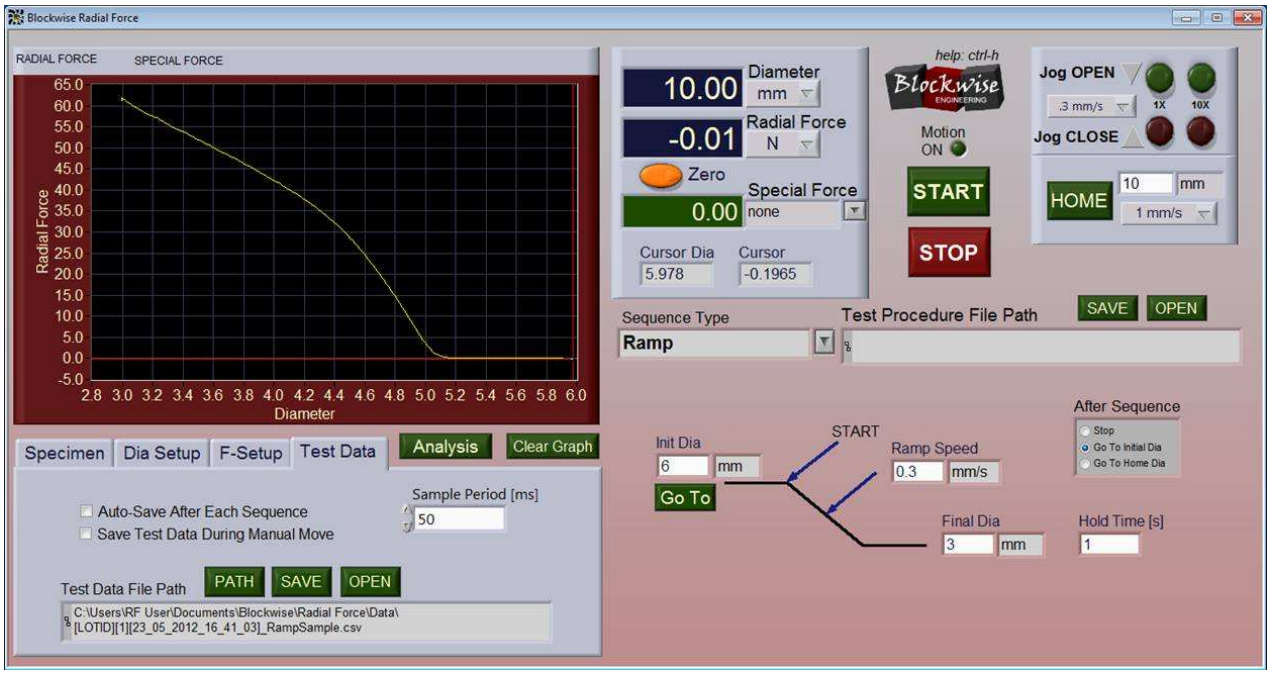
Various sizes of Blockwise metal-jaw compression stations may be attached to the machine.

Compression stations can be quickly removed and replaced on the TTR2. Temperature control systems are optional, and are sold as part of the compression stations. Some compression stations use heaters embedded in the dies, while others use



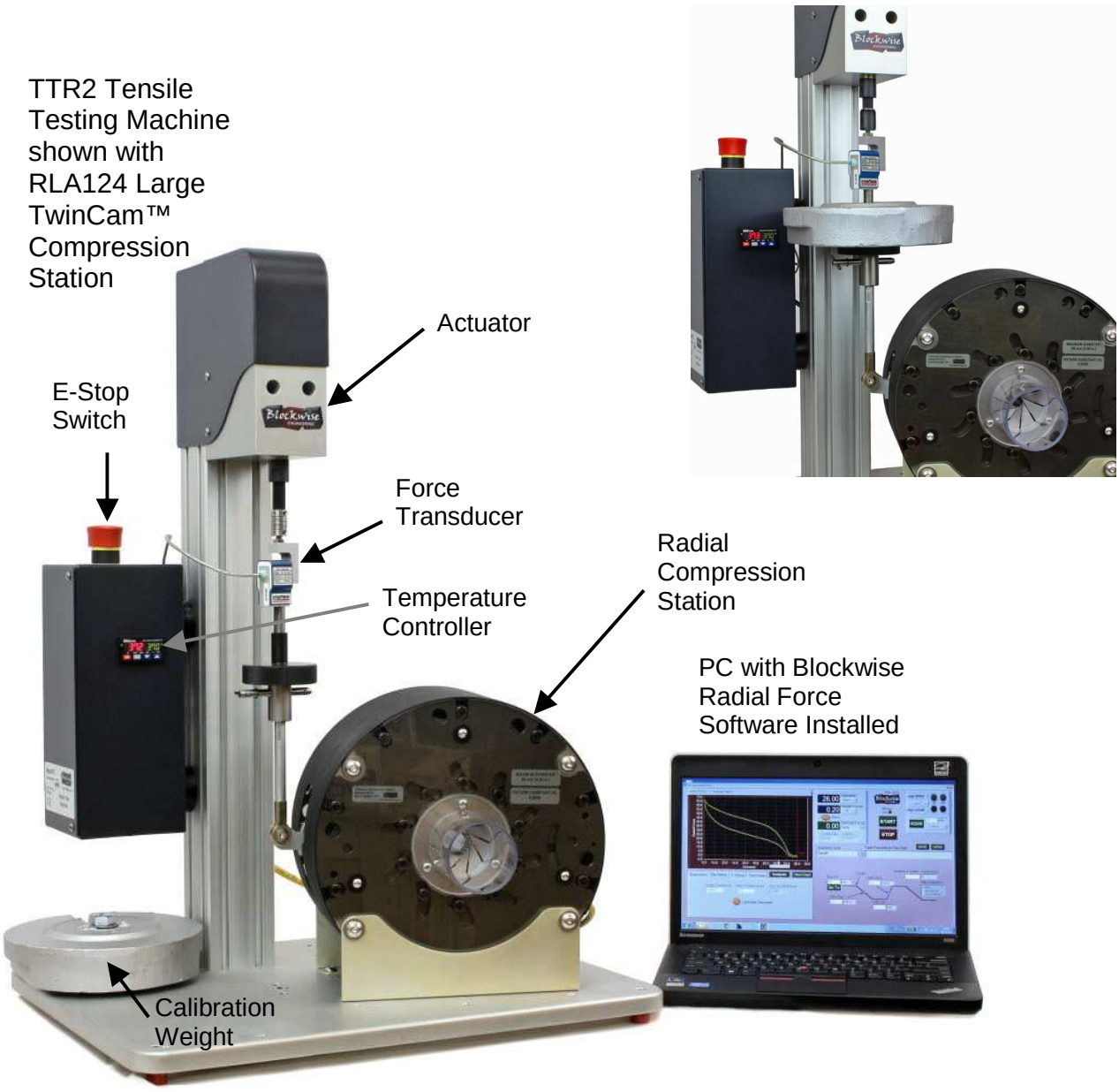
an overall oven-type enclosure over the compression station.

TTR2 includes a laptop PC with “Blockwise Radial Force” application software preinstalled. The software is intuitive and powerful; new users can get meaningful results within a few minutes. Context-sensitive help concisely describes all controls and displays.



Several types of test sequence are available, including manual settings of diameter or radial force, ramp, cycle, or arbitrary user-defined diameter sequences. Test data can be written to .csv files for analysis by a spreadsheet program. Special force parameters can be displayed, such as hoop force, pressure, and pressure per unit length. An analysis tool helps the user quickly estimate radial stiffness and radial strength.

Calibration is very quick and easy, for both diameter and force. Calibration standards (pin gage for diameter and weight for force) are supplied with the machine, or you can use your own. The machine can be calibrated without removing the compression station. Calibrating the diameter does not necessitate a force recalibration, or vice-versa.



TTR2 Machine Specifications:

Service Connections:	AC Power: 120 v or 240 v, 3A (air not required)
PC Requirements (PC is included):	Windows 7 or XP, 2 USB ports
Overall Machine Dimensions (Including Compression Station, Not Including PC)	22.5 wide x 17.5 deep x 30 tall (inches)
Force Tranducer Capacity (Linear, Not Radial Force)	100 lbf
Diameter Display Resolution (If Unit Selection is mm)	0.01 mm
Radial Force Display Resolution (If Unit Selection is N)	0.01 N
Temperature Control Range	Room Temp to 50 C

J-Crimp™ Compression Station Specifications:

Diameter	0 – 16 mm
Available Lengths	62 mm, 124 mm
Radial Force Maximum Rating	660 N
Radial Force Typical Friction Level	+-0.4 N
Basic Diameter Resolution When Used With TTR2	.00074 mm
Basic Radial Force Resolution When Used With TTR2	.006 N

Twin-Cam™ Compression Station Specifications:

Diameter	0 – 30 mm
Available Lengths	124 mm, 310 mm
Radial Force Maximum Rating	980 N
Radial Force Typical Friction Level	+-0.8N
Basic Diameter Resolution When Used With TTR2	.00091 mm
Basic Radial Force Resolution When Used With TTR2	.005 N

Large Twin-Cam™ Compression Station Specifications:

Diameter	0 – 60 mm
Available Lengths	124 mm, 310 mm
Radial Force Maximum Rating	930 N
Radial Force Typical Friction Level	+-1.5 N
Basic Diameter Resolution When Used With TTR2	.00095 mm
Basic Radial Force Resolution When Used With TTR2	.005 N

TTR2 Tensile Testing Machine shown with RJA62 J-Crimp™ compression station and temperature-controlled chamber