

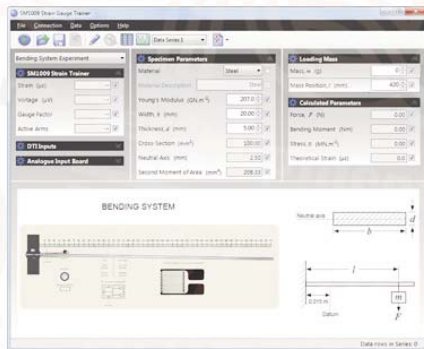


# SM1009

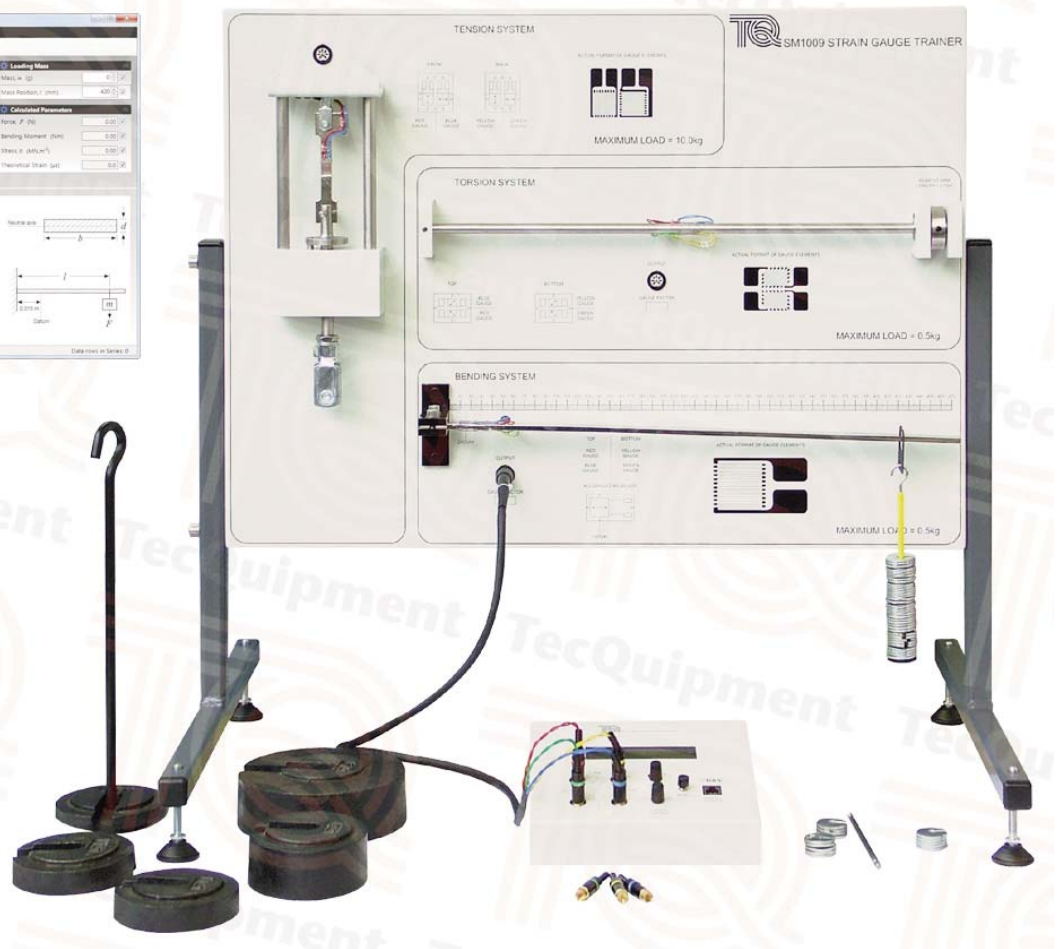
## Strain Gauge Trainer

**Shows and compares how resistance strain gauges work, and how they measure strains in different structures**

Works with  
**VDAS®**



Screenshot of the optional VDAS® software



- Compact, self-contained, desk-mounting trainer that shows students the use of resistance strain gauges
- Clear layout with printed graphics to help students understand how strain gauges work
- Includes electronic strain display to show all readings, and automatically calculates strain
- Fully open bridge connection with dummy resistors to allow quarter, half and full-bridge connection to show students how strain bridge connections work
- Uses strain gauges on three different and popular structures for realistic experiments
- Includes two sets of masses to give each structure a range of stresses
- Extra (optional) specimens are available for more tests in stress and strain of different materials

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- An ISO 9001 certified company
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# SM1009

## Strain Gauge Trainer

### Description

The compact Strain Gauge Trainer fits on a bench or desktop. It contains everything needed to show students how resistance strain gauges work on three different structures. It is ideal for groups of two or more students to do experiments and for classroom demonstrations.

Students use the small set of masses to load the bending and torsion systems, and the large set of masses to load the tension system. They use theory and known dimensions to calculate the stresses and strains and compare them with the strains measured by the strain gauges. Students can also connect and compare the performance of quarter, half and full-bridge strain gauge connections for each structure.

The bending system uses gauges to measure direct tensile and compression strain. The torsion system shows the use of shear/torque strain gauges. The tension system shows the use of two gauges at right angles in a 'Tee' rosette.

For more tests with the tension system, TecEquipment can supply optional tension test specimens made of different metals. Students then use their experience from other experiments to calculate and test strains in the different metals and find their values of Young's modulus. The tension system also finds and proves Poisson's ratio for tensile and compressive strains in metals.

The strain display includes a set of high-accuracy dummy strain gauge resistors (plugs) and controls. These allow the student to connect the strain gauges on the structures as quarter, half or full-bridge networks. The strain display works with and gives correct readings for all bridge connections and different gauge factors. An extra setting on the strain display works with the tension system to prove Poisson's ratio. The strain display has a socket for connection to TecEquipment's optional Versatile Data Acquisition System (VDAS®).

The trainer shows students different types of strain gauges. A clear, hard-wearing coating protects each gauge from accidental damage and the environment. Enlarged mimic diagrams on the back plate of the trainer show students what each gauge looks like, how it connects and how it fits on each structure. This helps to show students how it works.

For quick and reliable experiment results, TecEquipment's optional VDAS® gives accurate real-time data capture, monitoring and display, calculation and charting of all the important readings on a computer (computer not included).

The user guide (supplied) shows how to use the equipment and includes theory and experiments.

### Standard Features

- Supplied with comprehensive user guide
- Five-year warranty
- Manufactured in accordance with the latest European Union directives

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### Experiments

- Introduction to the equipment and the different bridge connections (quarter, half and full-bridge)
- Strains and stresses in a bending system
- Strains and stresses in a torsion system
- Strains and stresses in a tension system, Poisson's ratio and Young's modulus
- Tensile strains and stresses in different materials (needs optional tensile specimens) and comparison of Poisson's ratio and Young's modulus
- Comparison of different strain measurement systems and how they could measure force

### Recommended Ancillaries

- Bench-mounted version of the Versatile Data Acquisition System (VDAS-B)
- Optional Tension Specimens (SM1009a) – Aluminium, brass and copper



Optional Tension Specimens (SM1009a)

# SM1009

## Strain Gauge Trainer

### Essential Services

*Electrical supply:*

100 VAC to 240 VAC, 50 Hz to 60 Hz with earth

*Bench space needed:*

760 mm x 520 mm (plus additional space for a computer if using VDAS®)

### Operating Conditions

*Operating environment:*

Laboratory

*Storage temperature range:*

-25°C to +55°C (when packed for transport)

*Operating temperature range:*

+5°C to +40°C

*Operating relative humidity range:*

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

### Sound Levels

Less than 70 dB(A)

### Specifications

*Nett dimensions (assembled):*

720 mm high x 760 mm wide x 520 mm front to back

*Nett weight (including Strain Display and Weight Sets):*

27.5 kg

*Packed weight:*

41.5 kg

*Packed volume:*

0.16 m<sup>3</sup>

*Sets of masses:*

The large mass set gives weights from 0.5 kg to 10 kg in a range of units. The small mass set gives weights from 10 g to 500 g in 10 g units.

*Dummy resistors:*

Set of three plugs fitted with high accuracy resistors that match the strain gauges

*Strain display:*

Multiline display that shows:

- Bridge output voltage (micro-volt)
- Strain reading in micro-strain (me)
- Active arms (gauges)
- Gauge factor

*Strain systems:*

- Bending system: Four standard gauges fitted to a given datum on a steel beam, fixed as a cantilever. Nominal beam cross-section is 5 mm x 20 mm.
- Torsion system: Two sets of identical 45-degree shear/torque strain gauge rosettes fitted to a torsion bar. Nominal bar diameter is 10 mm.
- Tension system: Two sets of identical 90-degree 'Tee' strain gauge rosettes fitted to a tensile test specimen. Steel specimen supplied as standard. Nominal tension specimen cross-section is 2 mm x 10 mm.

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*tradition.*

*innovation.*

*integration.*

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