



## ASTR8 Pin-Jointed Frameworks

### 樞軸接合結構



- Optional ASTR2000 unit with All Structures Software package for automatic data acquisition and virtual experiments

#### Features:

- For study of the strains, stresses, forces and deflections in various pin jointed frameworks
- High-quality structures teaching module for students of mechanical, civil and structural engineering
- Allows safe and practical experiments into pin-jointed frameworks
- Realistic and verifiable experiments results
- Optional All Structures Software package for extra 'virtual' experiments that simulate and confirm the results from your hardware and allow extended experiments
- One of many interchangeable experiment modules from All modern, flexible and cost-effective structures teaching system
- Ideal for classroom demonstrations, or students working in pairs or small groups

### Description:

The experiment hardware fits onto a Structures Test Frame (ASTR1, available separately). Students use stainless-steel members to build different pin-jointed frameworks. The members join by slotting the ends into bosses.

The equipment includes two framework supports: a pivoting support, and a pivoting and rolling support. Each member has a strain gauge attached that connects to a digital strain bridge. A load cell applies loads to the structure at various angles. When connected to the optional Digital Force Display (ASTR1a), the load cell measures the applied load. To apply loads simultaneously, extra load cells are available (ASTR8a).

A digital deflection indicator measures the deflection and the digital strain bridge shows the strains in the members. From this, students can calculate the forces in the members.

All supplies the members in a custom-made storage tray to avoid accidental damage. A second tray stores the joint bosses and other loose items.

Included is a lead to connect the load cell to a Digital Force Display (ASTR1a, available separately). The lecturer guide provides details of the equipment including sample experiment results. The student guide describes how to use the equipment and gives experiment procedures.

For extra 'virtual' experiments, All can supply the optional All Structures Software (ASTRS), for use on a suitable computer. The virtual experiments simulate the tests you can perform with the hardware. They also extend the choice of tests beyond that available using only the hardware, for example: higher loads, uniform loads or different test specimens. This extends the student's learning experience.

For automatic data acquisition of your experiment results, All can supply the optional Automatic Data Acquisition Unit (ASTR2000). Supplied as standard with the ASTR2000 is All Structures Software that displays and logs your experiment results and gives the extra virtual experiments.



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#### Specification:

- Standard Features
  - Supplied with lecturer guide and student guide
  - Two-year warranty
  - Made in accordance with the latest European Union directives
- Experiments
  - Study of Bow's Notation, strains, stresses, forces and deflections in various frameworks, including a Warren girder and roof truss
  - Comparison of different frameworks
- Essential Ancillaries
  - Structures Test Frame (ASTR1)
  - Digital Force Display (ASTR1a)
- Recommended Ancillaries
  - Additional Load Cells (ASTR8a)
  - Structures Software (ASTRS) for virtual experiments **or**
  - Automatic Data Acquisition Unit (ASTR2000) for automatic data acquisition and virtual experiments
- Operating Conditions
  - Operating environment: Laboratory environment
  - 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
- Specifications
  - Nett dimensions and weight:  
550 x 370 x 150 mm, 8 kg
  - Packed dimensions and weight:  
Approximately 0.078 m<sup>3</sup>, 10 kg
  - Load:  
0 to 500 N load cell with electronic load sensor (extra load cells are available)
  - Bosses:  
9 universal bosses, each connect members at 30, 45 or 60 degrees
  - Members:  
15 stainless steel, various lengths with strain gauges attached
  - Strain measurement: 16-way digital strain bridge
  - Deflection measurement: Digital deflection indicator