



**VDAS® MFP104**

## RECIPROCATING COMPRESSOR MODULE

Allows students to study and perform tests on a reciprocating compressor: to understand how it works and calculate its performance



SCREENSHOT OF THE OPTIONAL VDAS® SOFTWARE



- Reciprocating compressor and air receiver mounted in a mobile frame with full instrumentation
- Part of TecQuipment's Modular Fluid Power range which connects with the Universal Dynamometer (MFP100) as a common motive power source for a cost-effective solution
- Allows students to study and test a popular fluid power machine
- Temperature and pressure measurements at key points in the system
- Connection plate with schematic diagram clearly shows how parts of the module connect together
- Fully variable speed, for range of test results
- Includes digital displays of temperature and pressure
- Can connect to TecQuipment's Versatile Data Acquisition System (VDAS®) and software



# RECIPROCATING COMPRESSOR MODULE

## DESCRIPTION

For use with and driven by the Universal Dynamometer (MFP100, available separately), the Reciprocating Compressor Module is part of TecQuipment's Modular Fluid Power range. It is ideal for student experiments, demonstrations and projects.

Reciprocating compressors are common machines that provide compressed air for machines and tools. These can be air tools (saws, sanders and screwdrivers), paint spray equipment, pneumatic actuators and control systems.

The module includes a small compressor with an air receiver and instrumentation, all mounted on a robust, mobile trolley for ease of use. The separate Universal Dynamometer (MFP100) measures the speed, torque and power absorbed by the compressor. Speed is fully variable up to the maximum allowable for the compressor. Air enters the compressor, which then delivers it under pressure to the receiver. A valve releases pressure from the receiver to atmosphere through an orifice. The valve sets the pressure in the receiver and hence the flow rate; the orifice allows an accurate measurement of the mass flow rate of the outlet air. These values help students to discover how the compressor flow rate relates to the pressure delivered by the compressor.

Thermocouples measure temperatures at the inlet and delivery of the compressor, and upstream of the orifice. Electronic transducers measure the delivery pressure, nozzle differential pressure (flow rate) and the atmospheric (barometric) pressure. Also, for safety and good engineering standards, a Bourdon gauge shows the vessel pressure, even if the mains electricity fails. Digital displays show all the important pressures and temperatures.

For quick and reliable tests, TecQuipment can supply its optional Versatile Data Acquisition System (VDAS®). This gives accurate real-time data capture, monitoring and display, calculation and charting of all the important readings on a computer (computer not included).

## STANDARD FEATURES

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

## LEARNING OUTCOMES

- Energy balance for a compressor
- Variation of compressor performance with pressure
- Variation of compressor performance with speed
- Mechanical, volumetric and isothermal efficiencies
- Thermodynamics of a compressor

## ESSENTIAL BASE UNIT

- Universal Dynamometer (MFP100)

## RECOMMENDED ANCILLARIES

- VDAS-F (frame-mounted version of the Versatile Data Acquisition System)

## ESSENTIAL SERVICES

### ELECTRICAL SUPPLY (FOR THE UNIVERSAL DYNAMOMETER):

Single-phase 230 VAC, 50 Hz at 20 A

Two-phase 220 VAC, 60 Hz at 20 A

### FLOOR SPACE NEEDED:

2 m x 1.5 m



SHOWN FITTED WITH THE UNIVERSAL DYNAMOMETER

# RECIPROCATING COMPRESSOR MODULE

## 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

## SPECIFICATION

**NETT DIMENSIONS (ASSEMBLED):**

1400 mm (length) x 1700 mm (height) x 750mm (depth)

Nett weight (without the Universal Dynamometer): 175 kg

**PACKED DIMENSIONS:**

1.26 m<sup>3</sup>

**PACKED WEIGHT:**

Approximately 250 kg

**POWER:**

1.5 kW (from Universal Dynamometer)

**FREE AIR DELIVERY:**

Approximately 200 L.min<sup>-1</sup> at 1000 rev.min<sup>-1</sup>

**NUMBER OF CYLINDERS:**

Two

**MAXIMUM PRESSURE:**

6 bar (controlled by pressure-relief valve)

**PRESSURE RATING OF VESSEL:**

10 bar

**INSTRUMENTS AND MEASUREMENTS:**

- Temperatures: Thermocouples and digital display
- Pressures: Piezoelectric transducers and digital display (plus Bourdon gauge of vessel pressure for reference)  
Note: Both the digital display units are electrically powered from outlets on the motor drive and display unit of the Universal Dynamometer
- Flow rate: orifice and differential pressure transducer
- Torque, speed and power: shown by the digital display of the Universal Dynamometer (MFP100)