

## CENTRIFUGAL COMPRESSOR DEMONSTRATION UNIT



**FM42**  
issue 2

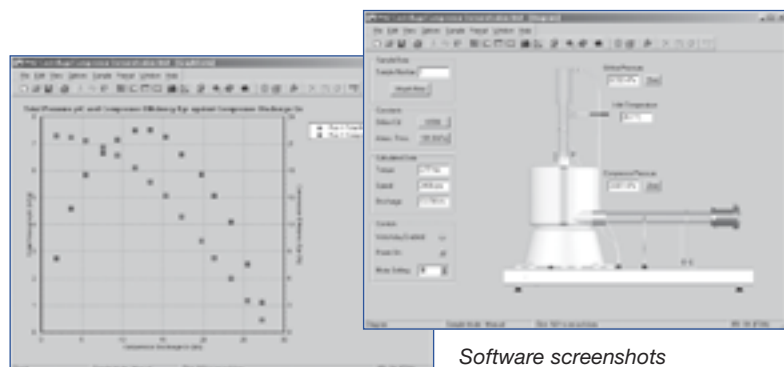
FM42 Centrifugal Compressor Demonstration Unit shown with the IFD7 Interface Unit accessory.

*Multi-stage compressors are used industrially for high pressure deliveries of gas flows or suction duties.*

*The kinetic energy imparted to the gas by the impeller rotation is converted into pressure energy which progressively increases from stage to stage.*

### INSTRUCTIONAL CAPABILITIES

- *Measurement of constant-speed machine performance in terms of static and total pressures, rotor speed and motor shaft power, as a function of inlet flow*
- *Measurement of compressor efficiency and estimation of impeller power efficiency*
- *Measurement of performance at constant speeds*
- *Introduction to similarity laws for scale-up*
- *Comparison of student calculations with computer results*



Software screenshots

## DESCRIPTION

*A motor driven multi-stage centrifugal compressor, mounted on a stainless steel plinth with transparent air inlet and air outlet ducts. A manually operated adjustable aperture allows the air flow rate to be varied at constant fan speed. A calibrated orifice plate is used on the discharge to measure the air flow rate.*

*Electronic sensors measure the pressure head developed across the blower, the pressure across the orifice plate (and hence the flow rate) and the air temperature.*

*The compressor speed is accurately controlled by an advanced electronic inverter within the IFD7 (an essential accessory). This inverter also calculates the torque produced at the motor drive shaft, allowing the power used by the fan to be derived. The IFD7 also provides the conditioning electronics for the sensors and allows their readings to be displayed on the computer software. Connections to the IFD7 are a single multi-way connector for the sensors and a connector for the pump motor drive.*

*The equipment is provided with advanced education and data logging software. See the software section of this datasheet for further details.*

## PERFORMANCE SPECIFICATION

*Max Flow Rate: 20 l/s typical  
Max Head: 6.0KPa  
Max fan speed 3000rpm  
Motor Power rating 250W  
Number of stages 7*

## ORDERING SPECIFICATION

- *A small-scale multi-stage centrifugal compressor demonstration unit, comprising of an inlet duct, the compressor, an outlet duct and an adjustable aperture, all mounted on a stainless steel base.*
- *Seven stages in the compressor.*
- *Equipped with electronic measurement sensors for head pressure, flow-rate (via orifice plate) and air temperature.*
- *Capable of being linked to a PC (not supplied) via a USB interface console (an essential accessory), which does not require internal access to the computer. Also allows interfacing to other software packages.*
- *Supplied with software providing full instructions for setting up, operating, calibrating and performing the teaching exercises. Facilities for logging, processing and displaying data graphically.*
- *Offers a complete teaching package of coursework and laboratory investigation, complete with a student questions and answers session.*

## ESSENTIAL EQUIPMENT

*Armfield IFD7 Interface Unit  
PC with spare USB port*

## OVERALL DIMENSIONS

*Height: 0.945m  
Length: 0.88m  
Width: 0.51m*

## SHIPPING SPECIFICATION

*Gross Weight: 100Kg  
Volume: 0.75m<sup>3</sup>*