



# FLUID MECHANICS

## CENTRIFUGAL FAN



### DL DKL072

This system has been designed to grant an easy and effective study of a centrifugal fan and its characteristics, conducting a wide range of experiments.

The trainer is supplied with two different impellers (forward and backward inclined blades) that can be easily exchanged. It is possible to control the motor rotation using a 3-positions knob.

#### TRAINING OBJECTIVES

- Study and obtaining the characteristic curves of a centrifugal fan with straight vanes.
  - Static pressure – flow rate (DPs-Q)
  - Total pressure – flow rate (DPt-Q)
  - Power – flow rate (P-Q)
  - Performance – flow rate ( $\eta$ -Q)
- Study and obtaining the characteristic curves of a centrifugal fan with inclined forward vanes.
  - Static pressure – flow rate (DPs-Q)
  - Total pressure – flow rate (DPt-Q)
  - Power – flow rate (P-Q)
  - Performance – flow rate ( $\eta$ -Q)
- Study the regulation of a centrifugal fan by varying its rotational speed and obtaining new characteristic curves according to speed.
- Pitot tube usage. Difference between static, dynamic and total pressure.
- Obtaining the flow speed profile in the suction pipe.
- Flow measure by the Pitot tube usage.

#### TECHNICAL DESCRIPTION

A Pitot tube can measure the air velocity at any point of the tube showing its values on a digital display. Vertical and inclined gauges allow a correct reading of the pressures.

The inverter allows the speed variation and, at the same time, it is possible to observe the electric power consumption by means of a power meter.

Through a conical cap placed in the air outlet, it is possible also to induce an adjustable load loss and study the fan operating points.

#### Requirements:

Power supply: single phase 230V/50Hz.



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## TECHNICAL DATA

### Inner diameters:

- Suction and discharge piping
  - Inner  $\varnothing = 114\text{mm}$
  - Outer  $\varnothing = 120\text{mm}$

### Fan features:

- Pressure increase: 700Pa
- Maximum flow volume: 1,000m<sup>3</sup>/h
- Power consumption: 250W
- Motor speed: 2.810rpm at 50Hz

### Manometers:

- Vertical manometer 100 mm WC
- Pressure transducer 50mm WC

### Other elements:

- Variable frequency drive
  - Motor rated power: 0.37kW
  - Input fuse maximum current capacity: 10A
  - Input current draw (full load): 5.8A
  - Output current RMS 100%: 2.2A
  - Overload current at 150% (during 60s): 3.3A
  - Minimum brake resistance value: 68  $\Omega$
- Power indicator: 0-400W
- Pitot tube  $\varnothing 3\text{mm}$  and 200mm length.
- Supplied impellers:
  - forward inclined blades
  - backward inclined blades