# Pumps in Series and Parallel Apparatus (EDC-FM-133SP)

## EXPERIMENTAL DATA:

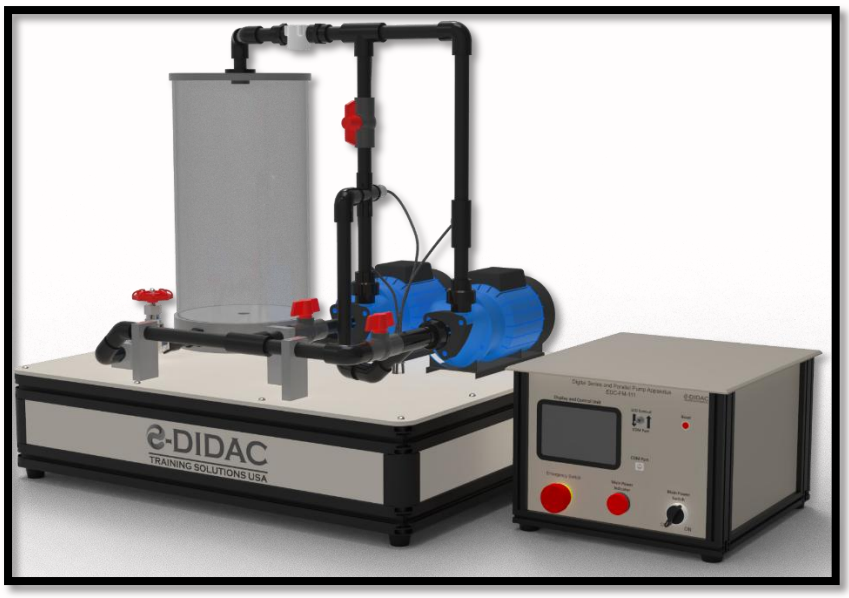
- Working performance of centrifugal pumps
  - Single pump
  - Series formation
  - Parallel formation
- Determination of pump efficiencies
- Recording of system characteristic


## DESCRIPTION:

In compound systems, pumps can be linked in series or in parallel. In serial operation the heads of the pumps are added and in parallel operation the flow rates of the pumps are added. The tentative unit provides the fortitude of the characteristic behavior for single operation and interface of two pumps. The flow and pressure values displayed at the LCD. The flow can be changed by using manual operated valves. Series and parallel of pump changed by the combination of open close position of different valves present in the path of pumps. Flow visualization using prepared CFD simulations, Digital multimedia teaching material online in the Media Center: E Learning course, prepared CFD.

There are three other different options in this apparatus:

- Variable speed of the pumps.
- Transparent head of the pumps.
- Pumps with both variable speed and transparent head.



## SPECIFICATIONS:

- Examination and functioning behaviour of pumps in various operating modes.
- Single pump, series or parallel pump operation, configurable via valves.
- Manometers at inlet and outlet of each pump.
- Closed water circuit contains centrifugal pumps.
- Overflow in the tank ensures constant suction head.
- Adjustment of flow resistance by a valve at outlet of the pump.
- Sensors for pressure at inlet and outlet of the pumps and flow rate.
- Display and evaluation of the measured values as well as operation of the unit.
- Optional software with control functions and data acquisition via USB under Windows 8.1, 10.

## TECHNICAL DATA:

**Centrifugal Pump Test Set:**

- **Pumps:**
  - **Quantity:** 2x identical centrifugal pumps
  - **Power Consumption:** 370W
  - **Maximum Flow Rate:** 21L/min
  - **Maximum Head:** 12m
- **Tank:**
  - **Capacity:** 13L
  - **Material:** Transparent
- **Pipes and Pipe Connections:**
  - **Material:** PVC
- **Measuring Ranges:**
  - **Inlet Pressure:** 2x -1...1.5 bar
  - **Outlet Pressure:** 3x 0...2.5 bar
- **Power Supply:**
  - **Voltage:** 230V
  - **Frequency:** 50Hz
  - **Phase:** Single-phase

## SCOPE OF DELIVERY:

- 1 Experimental unit
- 1 Set of instructional material
- 1 Online access to the Media Center

## DIMENSIONS AND WEIGHT:

- **Dimensions:** 1110x650x500mm (LxWxH)
- **Weight:** Approx. 62kg