



### Features

- Practical multivariable control of level and pressure in a vacuum tank
- Model of "degassing of fluids" application from process engineering
- 2 configurable industrial controllers
- Optional process control software available

Multi-variable Control: Vacuum Degassing Apparatus 32376 the complexities of a multivariable control system can be learned in a practical manner. The model for the controlled process is a typical application from process engineering: separation of gas dissolved in liquid. The pressure falls below the vapour pressure of the dissolved gas in a vacuum tank, so that it passes into the gas phase and can be removed (desorption).

The liquid used in RT 681 is water, and the gas is ambient air. A water jet pump generates the negative pressure in the vacuum tank. The negative pressure firstly draws water from a collecting tank into the vacuum tank. Secondly, ambient air is drawn in and mixed with the water before entering the vacuum tank. The water/air mixing ratio can be adjusted by way of rotameters and valves. The negative pressure in the vacuum tank degasses the water again. A pump transports the water out of the vacuum tank back into the collecting tank. A control valve is used to influence the flow rate and thus the level in the vacuum tank. Another pump circulates water from the collecting tank to operate the water jet pump. A control valve adjusts the flow rate in this circuit. In this way the negative pressure in the vacuum tank is adjusted. The negative pressure and level are mutually dependent variables. It is this dependence that makes this multivariable control system so complex.

Two industrial controllers are provided as level and pressure controllers. Optionally they can be configured and para-meterised using a supplied software. The controllers have a Profibus DP interface. The interface permits monitoring of the trainer via an optionally available software. The software also permits recording of the process variables and para-meterisation of the controllers using the PC. It is also possible to interconnect multiple trainers from this series through the Profibus DP interface.

### Specifications

- Coupled level and pressure control in one vacuum tank
- Water circuit with vacuum tank, collecting tank, pump and ambient air input device
- Water jet pump to generate a negative pressure in the vacuum tank

Note: Specifications are subject to change.

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- Circuit with pump for operation of the water jet pump
- Level control with pneumatic control valve as actuator
- Pressure control with pneumatic control valve in the circuit for operation of the water jet pump
- Level controller and pressure controller configurable and parameterisable with software
- Optional process control software via Profibus DP interface

#### Technical Specifications

- Tanks
  - Vacuum tank: 19L
  - Collecting tank: 100L
- 2 centrifugal pumps
  - Max. flow rate: approx. 50L/min
  - Max. head: approx. 30m
- Water jet pump: final vacuum: approx. 0,3bar
- Pressure and level controller parameterisable as
  - P, PI or PID controller
  - Switching controller
- Measuring ranges
  - Pressure: -1...0,6bar
  - Level: 30...480mm
  - Flow rate: 1x 200...2500L/h, 1x 0...360L/h

#### Experiments

- Coupled level and pressure control
- Level control with various controller types
- Pressure control with various controller types
- Plotting step responses

#### Requirements

- Mains Power 220 – 240V @ 50Hz, 1Ph

Note: Specifications are subject to change.

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