

PID System Simulation Trainer

Category: Pneumatic, Hydraulic & Fluid Mechanics · Model reference: MZM-6008



SPECIFICATIONS

DESCRIPTION:

This trainer provides a comprehensive experimental introduction to the fundamentals of control engineering using an example of flow control. A pump delivers water from a storage tank through a piping system. The flow rate is measured by an electromagnetic sensor, which permits further processing of the measured value by outputting a standardized current signal. A rotameter indicates the flow. The controller used is a state-of-the-art digital industrial controller. The actuator in the control loop is a control valve with electric motor operation. A ball valve in the outlet line enables defined disturbance variables to be generated. The controlled variable X and the manipulating variable Y are plotted directly on an integrated 2-channel line recorder. Alternatively, the variables can be tapped as analogue signals at lab jacks on the switch cabinet. This enables external recording equipment, such as an oscilloscope or a flatbed plotter, to be connected.

Process control software (MZ 650.50) is optionally available. The software permits the construction of a complete networked. The key process variables can also be represented, and control functions executed.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Featured :

- Experimental introduction to control engineering using an example of flow control₁
- Construction of the system with components commonly used in industry₁
- Digital controller with freely selectable parameters: P, I, D and all combinations₁
- Integrated 2-channel line recorder₁
- Construction of a complete networked system via Profibus interface possible

Specification :

- Trainer for control engineering experiments
- Flow control process, equipped with standard industrial components
- Flow rate measurement by electromagnetic sensor
- Rota meter for direct observation of the flow
- Generation of disturbance variables by ball valve with scale in outlet line
- Control valve with electric motor
- Digital controller, parameter sable as a P, PI or PID controller
- 2-channel line recorder
- Process variables X and Y accessible as analogue signals via lab jacks

Learning Objectives / Experiments

- fundamentals of control engineering
- real industrial control engineering components: controllers, transducers, actuators
- operation and parameterization of the local industrial controller
 1. Manually (by keyboard)
 2. Using the process control software
- investigation of disturbance and control response
- controller optimization
- investigation of the properties of the open and closed control loops
- processing of process variables using external equipment, e.g. oscilloscope or plotter

Technical Data

1. Storage tank : 30L
 - Centrifugal pump
 - power consumption: 550W
 - max. flow rate: 230L/min
 - max. head: 11m
 - speed: 2.850min⁻¹
 - Rota meter: 0...1.960L/h
 - Electromagnetic flow rate sensor: 0...6.000L/h
 - Control valve with electric motor
 - Kvs: 5,7m³/h
 - stroke: 5mm
 - characteristic curve equal-percentage
2. Valve-opening position sensor: 0...1.000 Ohm
 - Line recorder
 - 2x 4...20mA
 - feed rate 0...3.600mm/h, stepped
 - Controller
 - process variables X, Y as analogue signals: 4...20mA

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