

## RT 634

### Pressure control demonstration unit



#### Learning objectives/experiments

- fundamentals of control engineering
- latest industrial control engineering components: controllers, transducers, actuators
- operation and parameter setting of a multifunctional state-of-the-art digital controller: e.g. parameter setting as P, PI and PID controller
- investigation of disturbance and control response
- influence of different controller parameters on stability and control quality
- investigation of the properties of the open and closed control loop
- processing of process variables using external equipment, e.g. plotter or oscilloscope
  
- together with accessory RT 650.40: familiarisation with and use of I&C software

#### Description

- **experimental introduction to control engineering using an example of pressure control**
- **construction of the system with components commonly used in industry**
- **digital controller with freely selectable parameters: P, I, D and all combinations**
- **Optional I&C software RT 650.40 via USB**

This experimental unit provides a comprehensive experimental introduction to the fundamentals of control engineering using an example of pressure control.

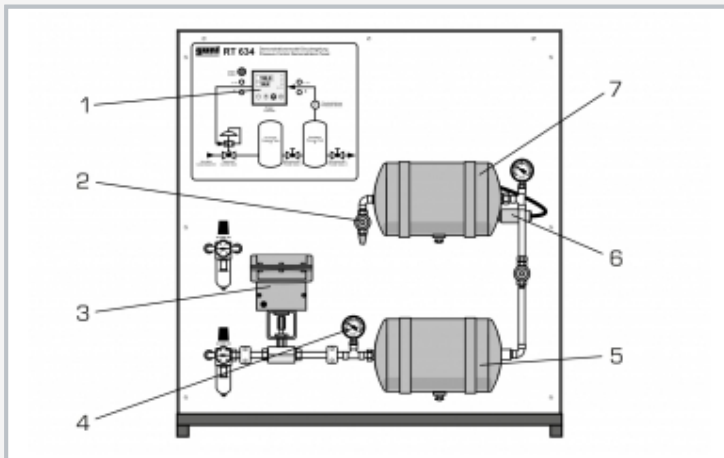
All components are clearly laid out on a vertical front panel. The large-format process schematic provides an aid to understanding.

The controlled system is operated by compressed air, which must be provided by the laboratory. The use of two in-line pressure tanks permits a 2<sup>nd</sup> order controlled system to be constructed. Disturbances can be generated by alternate air tapping by way of a hand-operated valve. Both pressure tanks are fitted with manometers. A pressure sensor measures the pressure. The controller used is a state-of-the-art digital industrial controller. The actuator in the control loop is an electro-pneumatic control valve. The controlled variable X and the manipulating variable Y can be tapped as analogue signals at lab jacks. This enables external recording equipment, such as a plotter or an oscilloscope, to be connected.

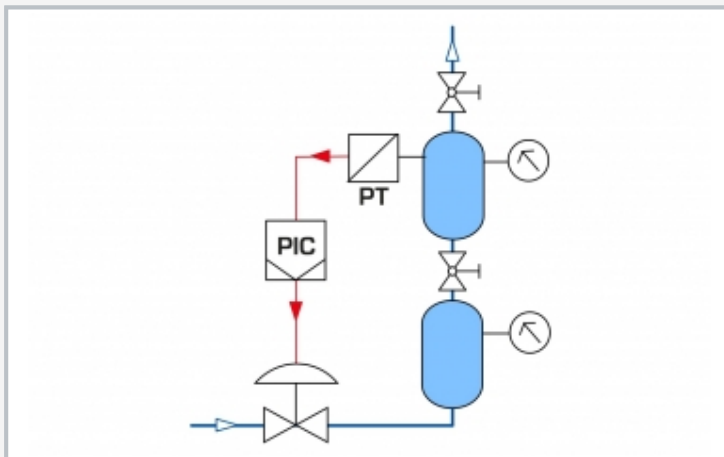
An instrumentation and control software (RT 650.40) with interface module (USB) is available as an accessory. This enables the key process variables to be represented, and control functions executed.

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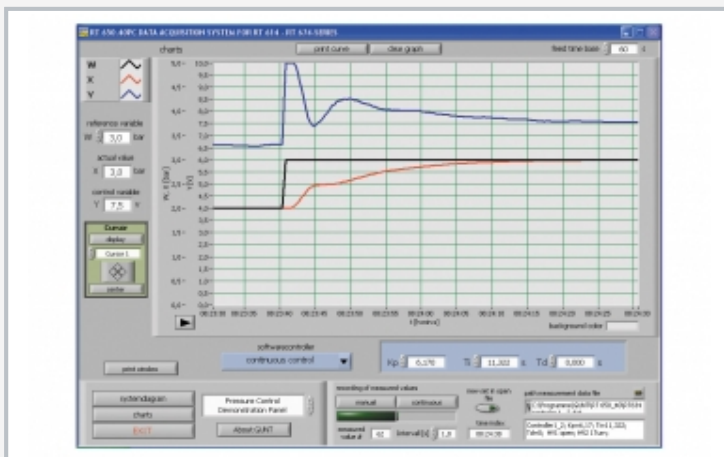
## Pressure control demonstration unit



1 controller, 2 needle valve with sound absorber for air tapping, 3 control valve, 4 manometer, 5 pressure tank, 6 pressure sensor, 7 pressure tank



Process schematic



Screenshot of optional I&C software RT 650.40: step response to change in reference variable with PI controller

### Specification

- [1] experimental unit for control engineering experiments
- [2] pressure control of a 2<sup>nd</sup> order controlled system with 2 pressure tanks
- [3] pressure measurement by pressure sensor
- [4] generation of disturbance variables by needle valve
- [5] 2 Manometers
- [6] control valve: electro-pneumatic control valve
- [7] digital industrial controller, parameterisable as a P, PI or PID controller
- [8] large process schematic on front panel
- [9] process variables X and Y accessible as analogue signals via lab jacks

### Technical data

Operating pressure: 6bar

Pressure tanks

- capacity: 10L
- pressure: max. 10bar

Pressure sensor: 0...6bar

Manometers: 0...10bar

Electro-pneumatic control valve

- reference variable: 4...20mA
- nominal valve stroke: 6mm

Controller: parameterisable as P, PI or PID controller

Process variables as analogue signals: 0...10V

Connection of external recording devices (e.g. oscilloscope, line recorder) via lab jacks

230V, 50Hz, 1 phase  
 230V, 60Hz, 1 phase  
 120V, 60Hz, 1 phase  
 LxWxH: 1000x500x1070mm  
 Weight: approx. 57kg

### Required for operation

Compressed air connection: 7...10bar

### Scope of delivery

- 1 experimental unit
- 1 set of laboratory cables
- 1 set of instructional material

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## Pressure control demonstration unit

### Optional accessories

020.30009	WP 300.09	Laboratory trolley
080.65040	RT 650.40	I&C Software for RT 614 - RT 674 Series