RT 624
Flow control demonstration unit

- 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 loops
- 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 flow 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 flow control.
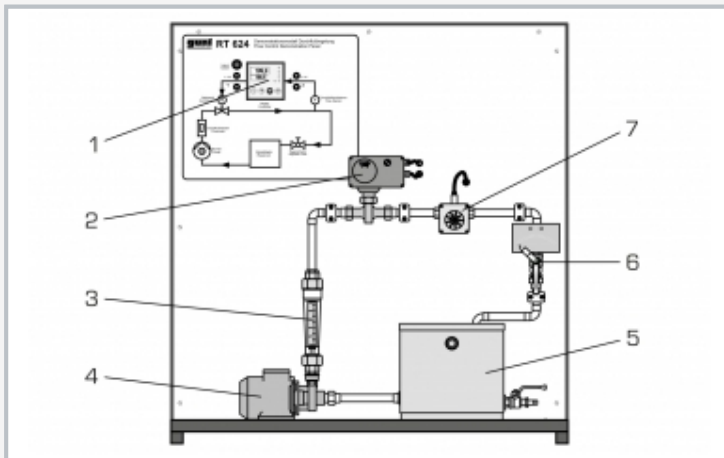
All components are clearly laid out on a vertical front panel. The large-format process schematic provides an aid to understanding. A pump delivers water from a storage tank into the pipe section.

The flow rate is measured by a paddle-wheel sensor. The transparent rotameter enables the control process to be observed very clearly. The controller used is a state-of-the-art digital industrial controller. The actuator in the control loop is an electric control valve. A ball valve in the pipe section enables defined disturbance variables to be generated. 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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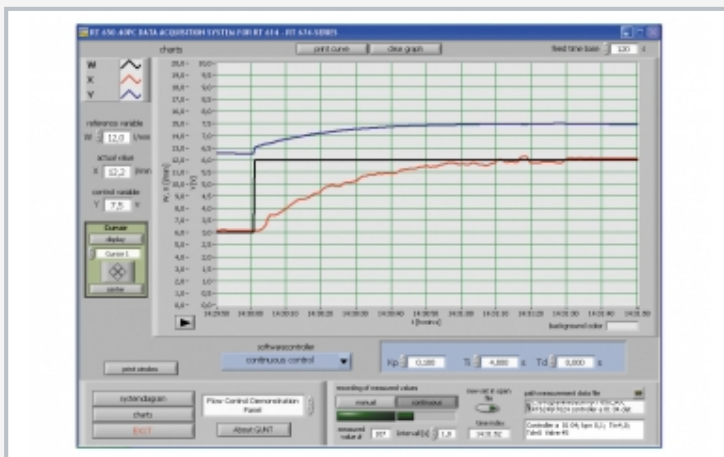Page 1/3 - 03.2017

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1 controller, 2 control valve, 3 rotameter, 4 pump, 5 storage tank, 6 ball valve with scale, 7 paddle-wheel sensor
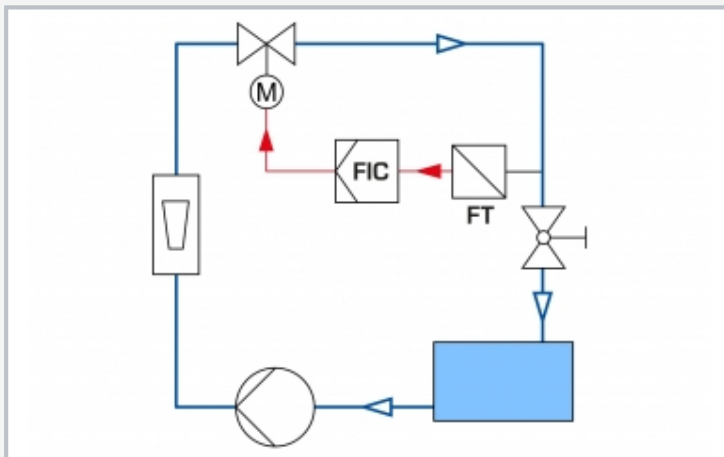
Process schematic

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

Specification

[1]	experimental unit for control engineering experiments
[2]	flow control in a pipe section
[3]	rotameter to visualise the flow rate
[4]	flow rate measurement by paddle-wheel sensor
[5]	generation of disturbance variables by ball valve with scale in pipe section outlet
[6]	control valve: electric 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

Storage tank
■ stainless steel
■ capacity: 15L

Pump, 3-stage
■ power consumption: 90W
■ max. flow rate: 83L/min
■ max. head: 6m

Paddle-wheel sensor: 3...50L/min
Electric control valve: Kvs: 5,7m^3/h
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
LxWxH: 1000x500x1070mm
Weight: approx. 72kg

Scope of delivery

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

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Optional accessories

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

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