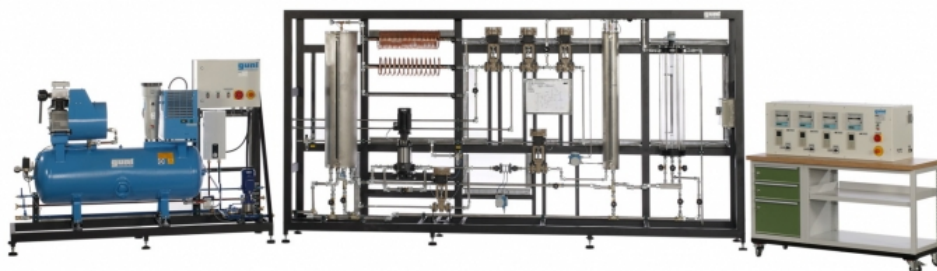


RT 590

Process control engineering experimental plant



From left: supply unit, trainer, control station

Description

- **complete industrial-scale process engineering experimental plant**
- **control of level, flow rate, pressure, temperature and cascade control**
- **simulation of typical faults**

The supply of processes with media such as water and compressed air in industry is usually provided from a separate, centralised supply unit. Control and monitoring of the processes are also centralised from a control station. RT 590 enables familiarisation with a practical scenario of this nature.

The trainer includes a water circuit with a pump, collecting tank and graduated tank. In this circuit, the flow rate and level are controlled by way of pneumatic control valves. The level control can also be executed under counter pressure or as cascade control. An additional tank can be connected to facilitate learning with a second-order level controlled system.

Compressed air is used in the control of pressure. The level of liquid in the tank can be varied to give time-varying response of the controlled system.

The temperature control takes place in the collecting tank. Warm water flows into the tank. Cold water is mixed in using a control valve, thereby regulating the temperature in the tank. Three delay sections are used to set different dead times.

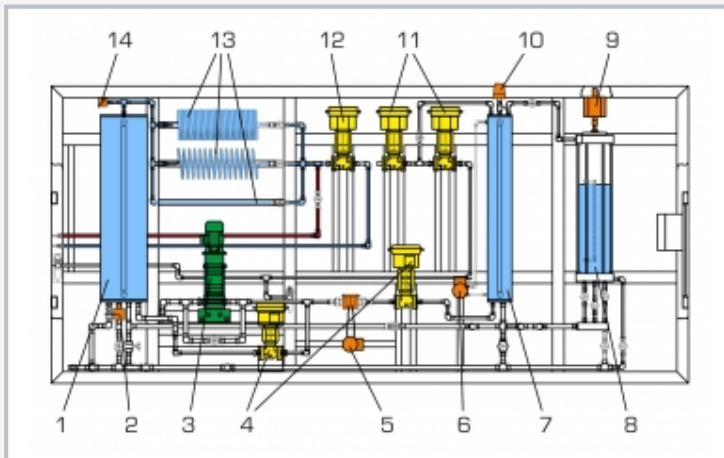
The separate control station includes the controllers and line recorders for monitoring and control of the control processes. The controllers have a Profibus DP interface. This enables the trainer to be controlled by using a process control software. The software also permits recording of the process variables and parameterisation of the controllers using the PC. Pushbuttons on the control station are used to simulate typical faults such as failure of sensors or cable breaks. The separate supply unit supplies compressed air and warm and cold water.

Learning objectives/experiments

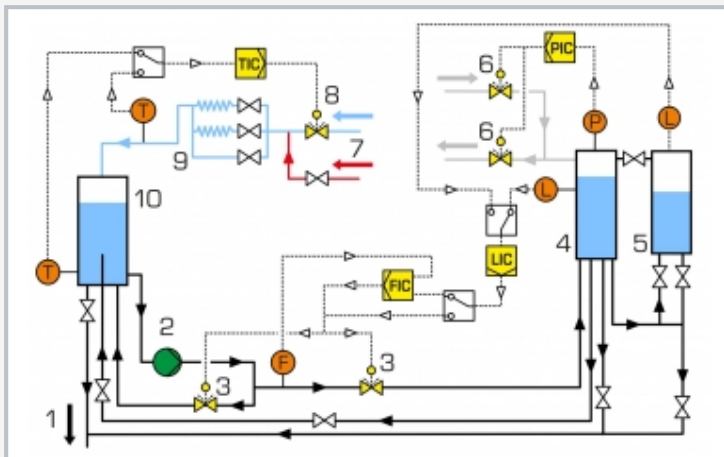
- familiarisation with industrial process engineering plant
- flow rate control
- level control with and without counter pressure
- level control with second-order controlled system
- cascade control of level and flow rate
- pressure control with time-varying response of the controlled system
- temperature control with time-varying response of the controlled system
- fault finding

RT 590

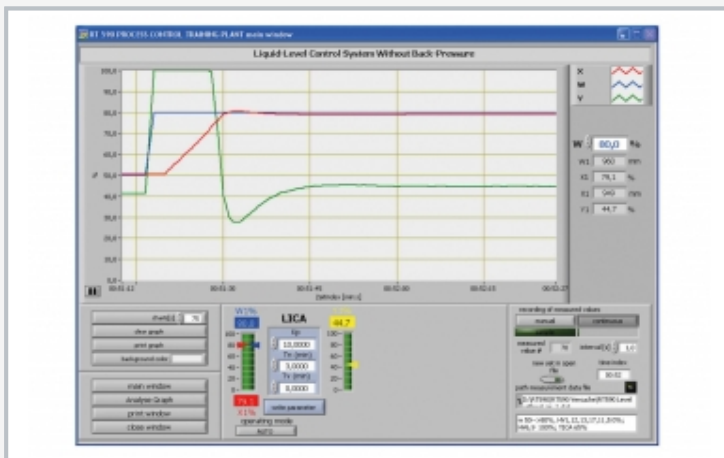
Process control engineering experimental plant



1 collecting tank, 2 temperature sensor in collecting tank, 3 pump, 4 flow control valves, 5 flow rate sensor, 6 level sensor, 7 tank for level and pressure control, 8 tank for second-order system, 9 level sensor, 10 pressure sensor, 11 compressed air control valve, 12 cold water control valve, 13 delay section, 14 temperature sensor in inlet



1 outlet, 2 pump, 3 flow control valve, 4 tank for level and pressure control, 5 tank for second-order system, 6 compressed air control valve, 7 warm water inlet, 8 cold water control valve, 9 delay sections, 10 collecting tank



Software screenshot

Specification

- [1] control of level, flow rate, pressure, temperature and cascade control
- [2] trainer with pump, collecting tank and two tanks for level and pressure control
- [3] supply unit with compressor, pressure vessel, pump and heater
- [4] control station with 4 industrial controllers, 4 3-channel line recorders and fault simulation
- [5] level control with or without counter pressure, or second order system analysis
- [6] temperature control with three delay sections
- [7] pressure control via compressed air
- [8] control of level, flow rate, temperature with water
- [9] 5 pneumatic control valves as actuators
- [10] GUNT process control software via PCle under Windows 7, 8.1, 10

Technical data

Tanks

- collecting tank: 100L
- level / pressure: 25L
- level, second order: 25L

Pump

- max. flow rate: approx. 55L/min
- max. head: approx. 60m

Compressor

- max. pressure: 10bar
- pressure vessel: 270L

Heater power output: 18kW

Controller parameterisable: P, PI or PID controller

Measuring ranges

- flow rate: 0...40L/min
- level: 1x 0...1,2m; 1x 0...0,5m
- temperature: 1x 0...200°C; 1x 0...100°C
- pressure: 0...6bar

400V, 50Hz, 3 phases

400V, 60Hz, 3 phases; 230V, 60Hz, 3 phases

UL/CSA optional

LxWxH: 4400x600x2100mm (trainer)

LxWxH: 2400x730x1620mm (supply unit)

LxWxH: 1350x750x1350mm (control station)

Total weight: approx. 1500kg

Required for operation

cold water connection: 30L/min

PC with Windows recommended

Scope of delivery

- 1 trainer
- 1 supply unit
- 1 control station
- 1 set of cables
- 1 set of hoses
- 1 Profibus card
- 1 GUNT process control software CD
- 1 set of instructional material