

RT 060

Training system: position control, HSI



Description

- experimental unit with clear linear position control system
- extensive range of experiments on fundamentals of control engineering
- state-of-the-art software for all experimental units of the RT 010 – RT 060 series, with extensive controller and recorder functions
- software-based simulation of the controlled system

This compact experimental unit offers every opportunity to learn the fundamentals of control engineering through experimentation on a linear position control system.

The experimental setup is mounted on a housing which accommodates all the electronics. A transparent protective cover permits safe observation of the

experiments. A carriage can be moved by a DC motor via a toothed belt. The linear positioning is measured by a rotary encoder and delivered as a voltage signal. The output signal from the sensor is sent to the software controller. The output signal from the controller influences the motor current. The motor is automatically shut down if the carriage reaches one of the two end positions.

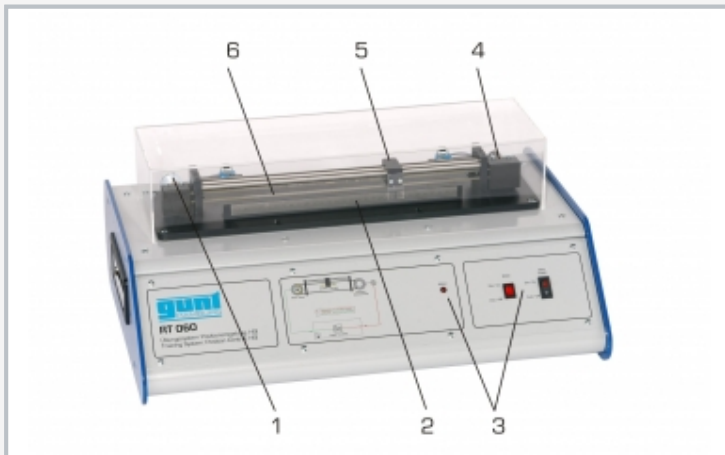
The powerful state-of-the-art software is an integral part of the training system, embodying the principle of hardware/software integration (HSI). It enables the experiments to be conducted and evaluated in a user-friendly manner. The software has network capability. The link between the experimental unit and the PC is made via a USB port.

Learning objectives/experiments

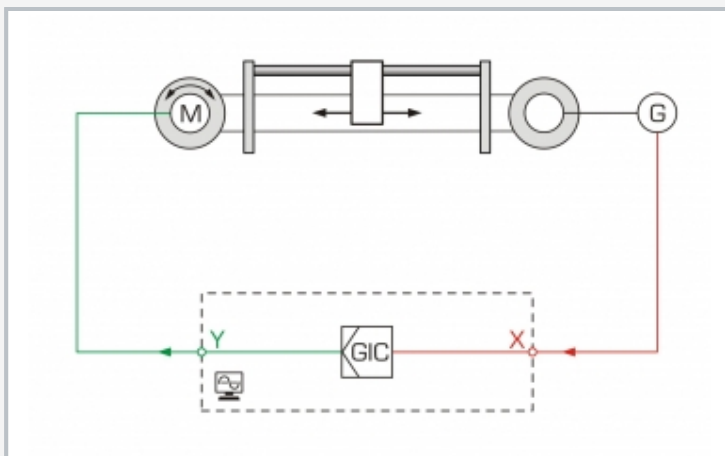
- fundamentals of control engineering based on the example of a linear position control system with integral control action
- open loop control response
- effects of different controller parameters and methods on the response of the closed loop system
- recording of step responses
 - ▶ reference variable
- controller optimisation
- software-based controlled system simulation
 - ▶ comparison of different controlled system parameters

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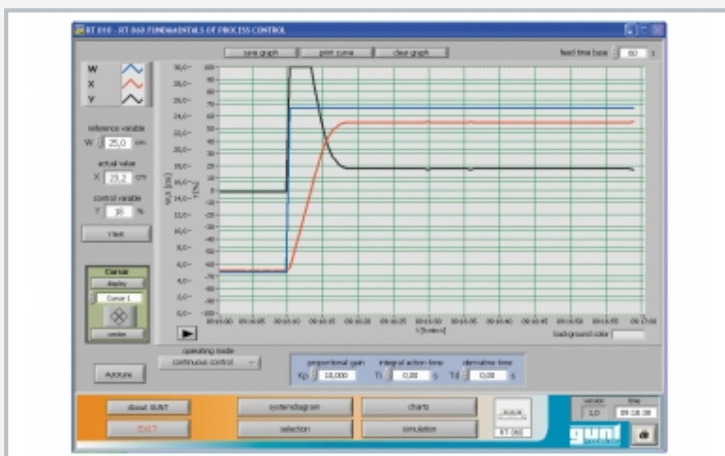
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1 motor, 2 scale, 3 displays and controls, 4 rotary encoder, 5 carriage, 6 toothed belt



Process schematic



Software screenshot: step response to change in reference variable with P controller (permanent control deviation)

Specification

- [1] experimental unit for control engineering experiments
- [2] linear position control of carriage with linear drive and gear motor
- [3] rotary encoder as displacement sensor
- [4] transparent protective cover
- [5] 2 microswitches to shut down at end positions
- [6] software-based controlled system simulation
- [7] process schematic on front panel
- [8] networkable GUNT software
- [9] GUNT software with control functions and data acquisition via USB under Windows 7, 8.1, 10

Technical data

DC motor

■ transmission ratio: $i=50$

■ speed: 85min^{-1}

■ torque: 200Nmm

Travel: max. 300mm

Max. traverse rate: 45mm/s

Scale: $0\text{...}300\text{mm}$

Software controller configurable as P, PI, PID

Software

■ process schematic with controller type selection (manual, continuous controller, programmer)

■ time functions

■ simulation function

230V, 50Hz, 1 phase

230V, 60Hz, 1 phase

120V, 60Hz, 1 phase

UL/CSA optional

LxWxH: $600\times 450\times 280\text{mm}$

Weight: approx. 20kg

Scope of delivery

- 1 experimental unit
- 1 GUNT software CD + USB cable
- 1 handbook: fundamentals of control engineering (RT 010 - RT 060)
- 1 manual for RT 060

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Optional accessories

020.30009

WP 300.09

Laboratory trolley