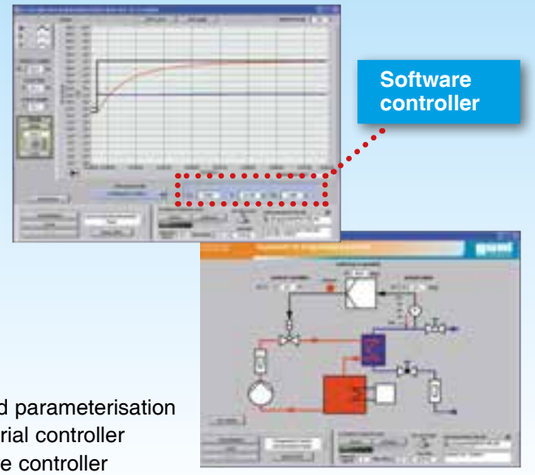
THREE EQUIPMENT SERIES FEATURING SIMPLE CONTROL SYSTEMS

Much emphasis was placed on the use of industrial components in the development of these control systems. This enhances the practical relevance and industrial applicability of these systems. These are simple control loops. The components can be easily identified visually and assigned to their respective functions.

It is revealed that the actual response from the controlled system in many cases differs from that of the theoretical, elementary transfer elements. Training in the operation and parameterisation of industrial controllers and interconnection of the controllers with bus systems is included. These exercises prepare students for the tasks they will typically encounter in their future career.

In this chapter you can choose between three equipment series, each of varying complexity. For each series, software tailored to the relevant experimental units is available. The software handles routine tasks for the students and supports interaction when experimenting with new and differing approaches.

RT 614 - RT 674 INTRODUCTION TO INDUSTRIAL CONTROL ENGINEERING

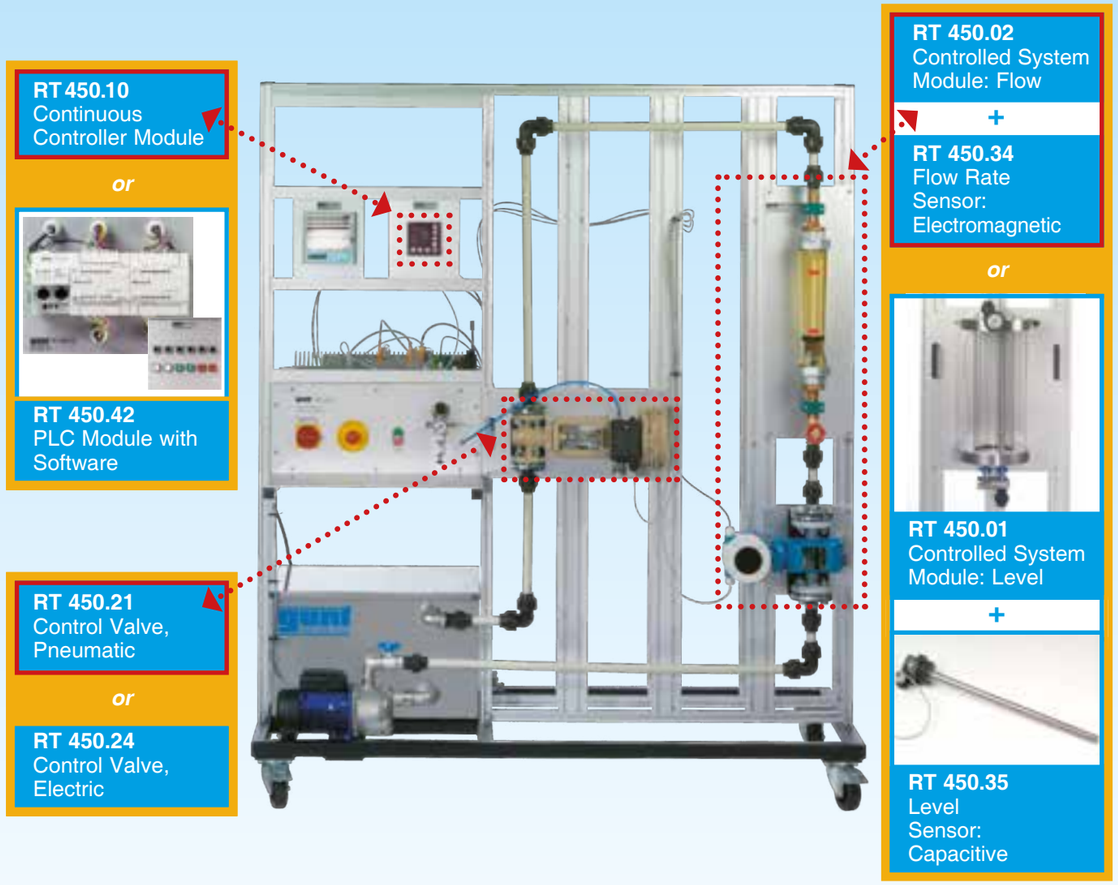


- Operation and parameterisation
  - of an industrial controller
  - of a software controller
- Trainer and PC connected via USB box

RT 512 - RT 552 CONTROL ENGINEERING TRAINERS WITH PROCESS CONTROL SYSTEM

- Construction of a process control system from multiple trainers via Profibus
- Operation and parameterisation of an industrial controller
  - directly on the controller
  - with the process control software

RT 450 MODULAR PROCESS AUTOMATION TRAINING SYSTEM



- Wide-ranging options for combination of various controlled systems, controllers, actuators and sensors
- Use of a PLC
- Interconnection of multiple control engineering components via Profibus
- Operation, parameterisation and configuration of an industrial controller
  - directly on the controller
  - by software

RT 614 – 674 INTRODUCTION TO INDUSTRIAL CONTROL ENGINEERING

RT 614 *Level Control Demonstration Unit*

RT 624 *Flow Control Demonstration Unit*

RT 634 *Pressure Control Demonstration Unit*

RT 674 *Flow / Level Control Demonstration Unit*

The experimental units in this equipment series provide a broad-based introduction to the fundamentals of control engineering. Familiarisation with control engineering components as they currently occur in industrial applications is a further key aspect of the learning. The relevant control loop is displayed clearly on the vertical panel. The student's understanding is further aided by a large-scale process schematic.

Each unit in itself represents a complete course in the fundamentals of control engineering, with differing process behaviour being observed in each. Level, flow and pressure control systems display rapid changes in the process variable, while a temperature control represents a slow control process.

Key process variables are delivered as analogue signals on lab jacks, enabling external recording devices such as a chart recorder or oscilloscope to be connected.

Every experimental unit can be connected with ease to the instrumentation and control software RT 650.40 (accessory), enabling all the advantages of computer-aided data acquisition and processing to be utilised.

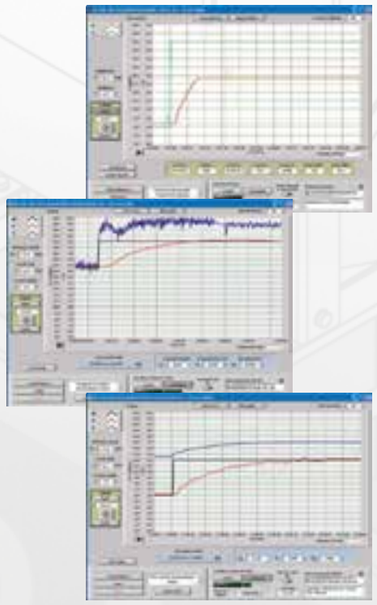
The units are suitable for two learning situations: demonstration by the tutor or independent laboratory experimentation by the students.

RT 644 *Temperature Control Demonstration Unit*

Didactic goals and exercises

- Fundamentals of control engineering based on experimentation
- Familiarisation with different types of controlled system (if multiple experimental units are available)
- Familiarisation with current industrial control engineering components: controllers, transducers, actuators
- Operation and parameterisation of a state-of-the-art digital industrial controller
- Multi-variable control (cascade control with RT 674)
- Downstream processing of process variables with external recording devices: chart recorder, oscilloscope
- Familiarisation with and use of instrumentation and control software (accessory RT 650.40)

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



RT 650.40 Instrumentation and Control Software for RT 614 - RT 674 Series

RT 614	USB	RT 650.40 *I & C Software for RT 614 - RT 674 Series*	PC
...			
...			
RT 674	USB	RT 650.40 *I & C Software for RT 614 - RT 674 Series*	PC

- Chart recorder function with storage of measured data
  – Recording and storage of time functions
  – Evaluation of step responses
- Software controller with PID and 2-step action
- 4 pre-selectable languages and 1 user-defined language possible
- Easy connection to PC via USB port

RT 614 Level Control Demonstration Unit

Technical Description

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

All components are clearly laid out on a vertical panel. The large-format process schematic provides an aid to understanding. A pump delivers water from a storage tank into the transparent level-controlled tank. The level is measured by a pressure sensor installed at the base of the level-controlled tank. The controller used is a state-of-the-art digital industrial controller. The actuator in the control loop is an electromagnetic proportional valve. A ball valve in the outlet 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.

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

Learning Objectives / Experiments

- fundamentals of control engineering
- latest industrial control engineering components: controllers, transducers, actuators
- operation and parameter setting of a multi-functional 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

*** Experimental introduction to control engineering using an example of level control**

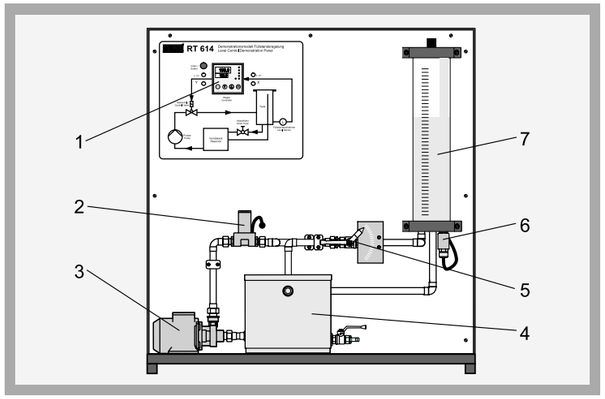
*** Construction of the system with components commonly used in industry**

*** Digital controller with freely selectable parameters: P, I, D and all combinations**

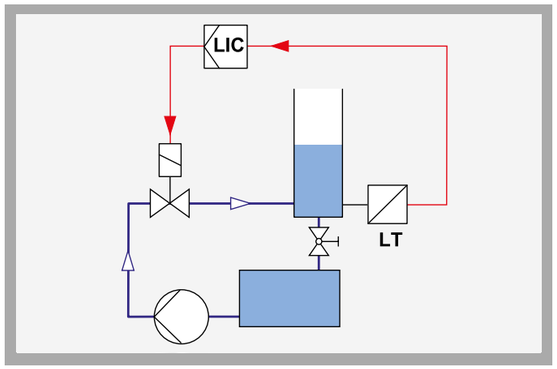
*** Optional I&C software RT 650.40 via USB**

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de

RT 614 Level Control Demonstration Unit



1 controller, 2 control valve, 3 pump, 4 storage tank, 5 ball valve with scale, 6 pressure sensor for level measurement, 7 level-controlled tank



Process schematic

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

Specification

[1] experimental unit for control engineering experiments
[2] level control with transparent tank
[3] level measurement by pressure sensor
[4] generation of disturbance variables by ball valve with scale in outlet
[5] level-controlled tank with overflow and graduated scale
[6] control valve: electromagnetic proportional valve
[7] multi-functional digital industrial 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: 100W
- max. flow rate: 70L/min
- max. head: 5,6m

Pressure sensor: 0...100mbar
Electromagnetic proportional valve: Kvs: 1,1m³/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

Dimensions and Weight

LxWxH: 1000x500x1070mm
Weight: approx. 73kg

Required for Operation

230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase

Scope of Delivery

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

Order Details

080.61400	RT 614	Level Control Demonstration Unit

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RT 624 Flow Control Demonstration Unit

Technical Description

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.

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

Learning Objectives / Experiments

- fundamentals of control engineering
- latest industrial control engineering components: controllers, transducers, actuators
- operation and parameter setting of a multi-functional 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

*** 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**

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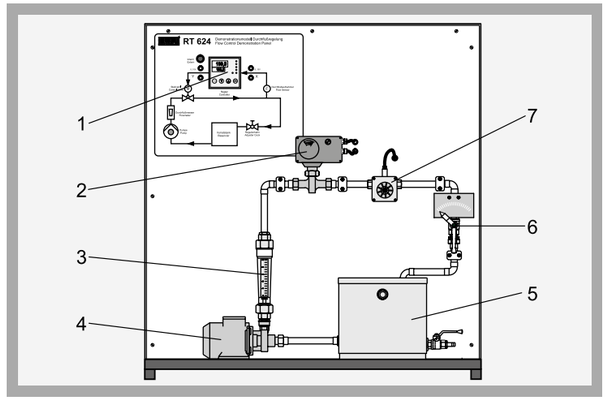
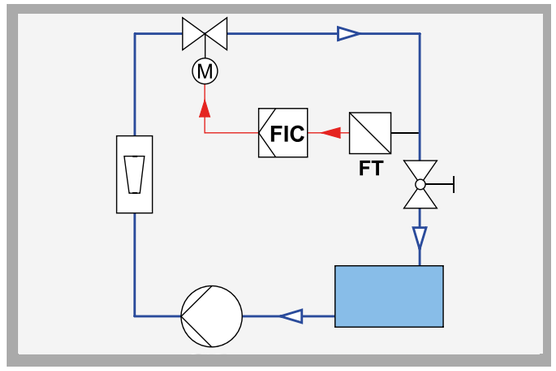
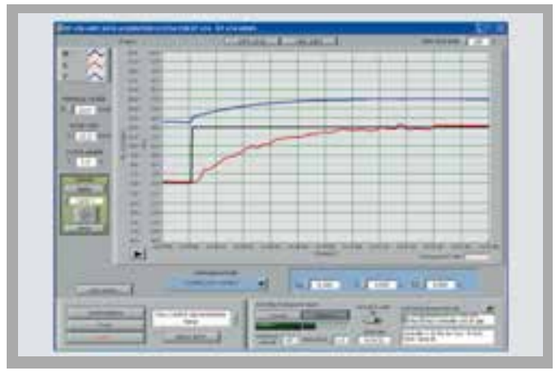
RT 624 Flow Control Demonstration Unit



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
[4] flow 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: 5,7m³/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

Dimensions and Weight

LxWxH: 1000x500x1070mm
Weight: approx. 72kg

Required for Operation

230V, 50Hz, 1 phase

Scope of Delivery

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

Order Details

080.62400	RT 624	Flow Control Demonstration Unit

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RT 634 Pressure Control Demonstration Unit

*** 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**

Technical Description

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 2nd 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.

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

Learning Objectives / Experiments

- fundamentals of control engineering
- latest industrial control engineering components: controllers, transducers, actuators
- operation and parameter setting of a multi-functional 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

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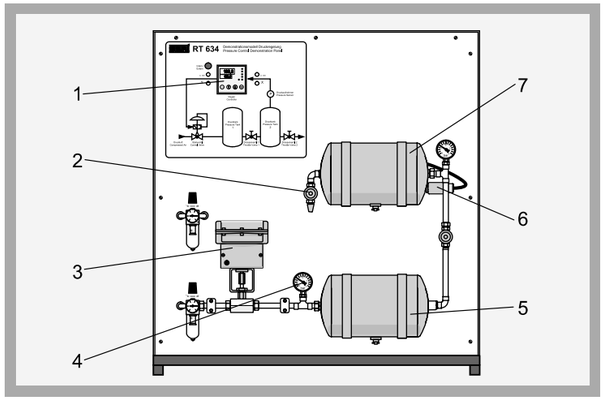
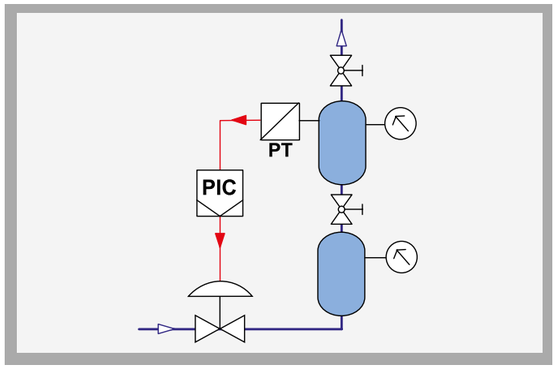
RT 634 Pressure Control Demonstration Unit



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 2nd 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

Dimensions and Weight

LxWxH: 1000x500x1070mm
Weight: approx. 57kg

Required for Operation

230V, 50/60Hz, 1 phase or 120V, 60Hz, 1 phase
Compressed air connection: 7...10bar

Scope of Delivery

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

Order Details

080.63400	RT 634 Pressure Control Demonstration Unit

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RT 644 Temperature Control Demonstration Unit

* **Experimental introduction to control engineering using an example of temperature 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**

Technical Description

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

All components are clearly laid out on a vertical front panel. The large-format process schematic provides an aid to understanding. The system comprises two water circuits. In the secondary circuit fresh water is heated up by a heat exchanger. The temperature is measured by a temperature sensor at the fresh water outlet. The outlet temperature of the fresh water is controlled by the flow rate of warm water in the primary circuit. The primary circuit comprises an electrically heated tank, a pump and an electromagnetic proportional valve as the actuator. Both circuits include rotameters. The controller used is a state-of-the-art digital industrial controller. A ball valve in the secondary circuit 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.

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

Learning Objectives / Experiments

- fundamentals of control engineering
- latest industrial control engineering components: controllers, transducers, actuators
- operation and parameter setting of a multi-functional 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

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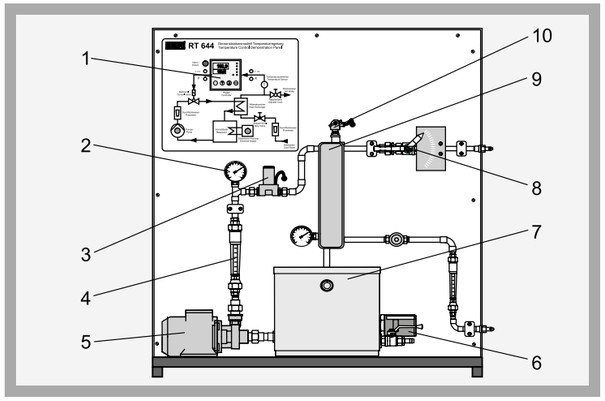
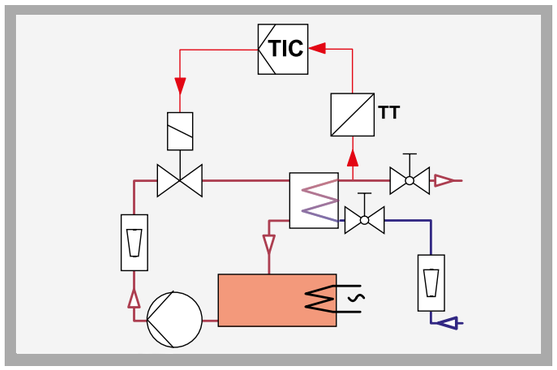
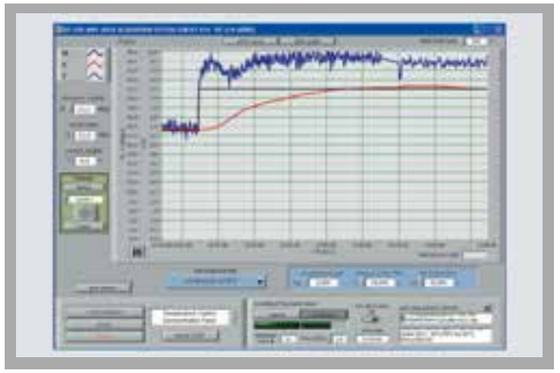
RT 644 Temperature Control Demonstration Unit



1 controller, 2 thermometer, 3 control valve, 4 rotameter, 5 pump, 6 heater with thermostat, 7 tank, 8 ball valve with scale, 9 plate heat exchanger, 10 temperature sensor at fresh water outlet



Process schematic



Screenshot of optional I&C software RT 650.40: step response to change in reference variable with PID controller (acceptable control quality)

Specification

[1] experimental unit for control engineering experiments
[2] temperature control with plate heat exchanger and 2 water circuits
[3] primary circuit with electrically heated tank, pump control valve, rotameter
[4] secondary circuit with fresh water connection, temperature transducer, rotameter
[5] ball valve to generate disturbance variables in fresh water circuit
[6] plate heat exchanger, 30 plates
[7] control valve: electromagnetic proportional valve
[8] digital industrial controller, freely parameterisable
[9] large process schematic on front panel
[10] process variables X and Y accessible as analogue signals via lab jacks

Technical Data

Tank
- stainless steel
- capacity: 15L

Heater
- power output: 2kW
- thermostat: 20...80°C

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

Temperature sensor: Pt100: -50...400°C
2x dial-gauge thermometers (bimetal type): 0...80°C
2x rotameters: 30...320L/h
Electromagnetic proportional valve: Kvs: 0,8m³/h
Digital controller, can be parameterised 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

Dimensions and Weight

LxWxH: 1000x500x1070mm
Weight: approx. 85kg

Required for Operation

230V, 50/60Hz, 1 phase
Fresh water connection approx. 100L/h

Scope of Delivery

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

Order Details

080.64400	RT 644	Temperature Control Demonstration Unit

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RT 674 Flow / Level Control Demonstration Unit

*** Experimental introduction to control engineering using an example of flow and / or level control**

*** Two controllers permit control in cascade mode**

*** Construction of the system with components commonly used in industry**

*** Digital controllers with freely selectable parameters: P, I, D and all combinations**

*** Optional I&C software RT 650.40 via USB**

Technical Description

The experimental unit provides a comprehensive experimental introduction to the fundamentals of control engineering using an example of combined flow and level control. The level and flow rate can be controlled individually and as a cascade. In cascade mode the level is the primary controlled variable. The flow control then provides optimum adjustment of the controlled variable to the reference variable (setpoint).

All components are clearly laid out on a vertical panel. The large-format process scheme provides an aid to understanding. A pump delivers water from a storage tank into a piping system which contains a rotameter. From there the water passes into the transparent level-controlled tank. The level is measured by a pressure sensor installed at the base of the level-controlled tank. The controllers used are two state-of-the-art digital industrial controller. The actuator in the control loop is an electromagnetic proportional valve. Ball valves in the tank outlet and in the pipe system enable 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.

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

Learning Objectives / Experiments

- fundamentals of control engineering
- latest industrial control engineering components: controllers, transducers, actuators
- operation and parameter setting of a multi-functional 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
- investigating the response of the various controlled systems
- control of
  * flow
  * level
  * level via flow (cascade)
- together with accessory RT 650.40: familiarisation with and use of I&C software

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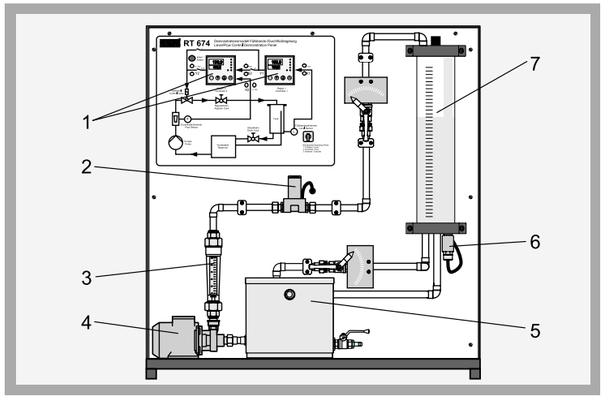
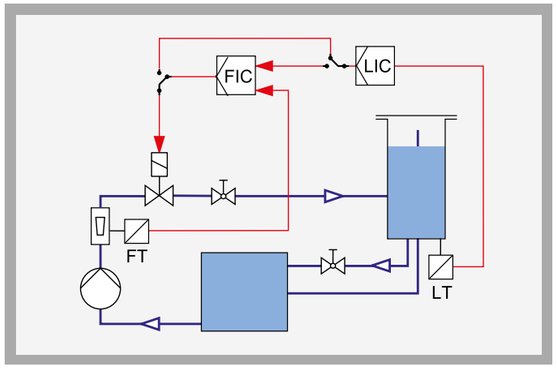
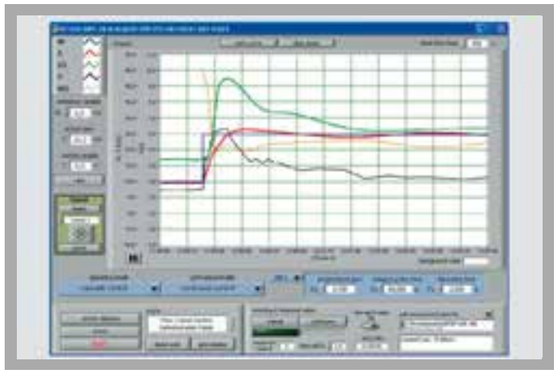
RT 674 Flow / Level Control Demonstration Unit



1 controller, 2 control valve, 3 rotameter with electrical output, 4 pump, 5 storage tank, 6 pressure sensor for level measurement, 7 level-controlled tank with overflow



Process schematic



Screenshot of optional I&C software RT 650.40: step response to change in level reference variable with PID controller (acceptable control quality)

Specification

[1] experimental unit for control engineering experiments
[2] level and flow control individually, and cascaded
[3] level measurement by pressure sensor
[4] flow measurement by rotameter with electrical output
[5] generation of disturbance variables by ball valves with scale
[6] tank with overflow and scale
[7] control valve: electromagnetic proportional valve
[8] 2 digital industrial controllers, parameterisable as P, PI or PID controllers, cascade
[9] large process schematic on front panel
[10] key process variables accessible as analogue signals at lab jacks

Technical Data

Storage tank
- stainless steel
- capacity: 15L

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

Pressure sensor: 0...100mbar
Rotameter with electrical output: 0...600L/h
Electromagnetic proportional valve: Kvs: 1,1m³/h
2x controllers: 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

Dimensions and Weight

LxWxH: 1000x500x1080mm
Weight: approx. 73kg

Required for Operation

230V, 50/60Hz, 1 phase or 120V, 60Hz, 1 phase

Scope of Delivery

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

Order Details

080.67400	RT 674	Flow / Level Control Demonstration Unit

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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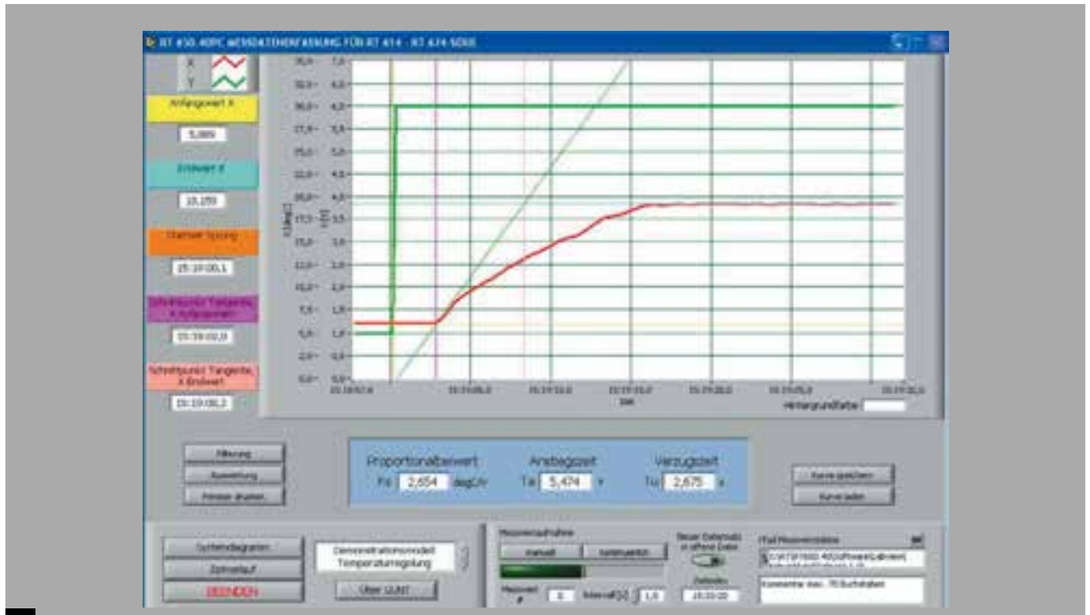
RT 650.40 I&C Software for RT 614 - RT 674 Series



*** Software controller with freely settable parameters**

*** Continuous and switching controller selectable**

*** Language freely selectable**

*** Process schematic with display of real-time data**

*** Recorder functions**

Technical Description

The software ideally supports the experimentation and learning process of demonstration models RT 614 - RT 674. Its key features are the software controller and the recorder function. The controller can operate as a configurable PID controller and as a 2-point controller. In the latter case, as well as the setting of the reference variable, the hysteresis can also be pre-set. The recorder function provides continuous recording of controlled, manipulating and reference variables. It plots responses to changes in the reference (e.g. step input) and disturbance variables. Measured values can be printed out and saved to data media. Connection to a PC is by a USB port. The supplied USB interface module provides an adequate number of analogue inputs and outputs, enabling even complex circuits, such as a cascade (RT 674), to be controlled.

The controller included with each demonstration unit can also be used instead of the software controller. In this case, controlled, manipulating and reference variables can be plotted, displayed and saved by the program's recorder function.

Choosing different program windows makes it possible to display the relevant process schematic with locally assigned real-time data and the time functions of these parameters.

The learning process is assisted by the well structured manual, with its description of the software functions and instructions for use with the control engineering demonstration models RT 614 - RT 674.

Learning Objectives / Experiments

- familiarisation with and use of software-aided control systems
- connection of a PC to the port and correct interfacing to different control processes
- saving data
- different control methods: switching or continuous
- configuring a continuous controller
- recording and evaluating step responses
- Investigation of disturbance and control response

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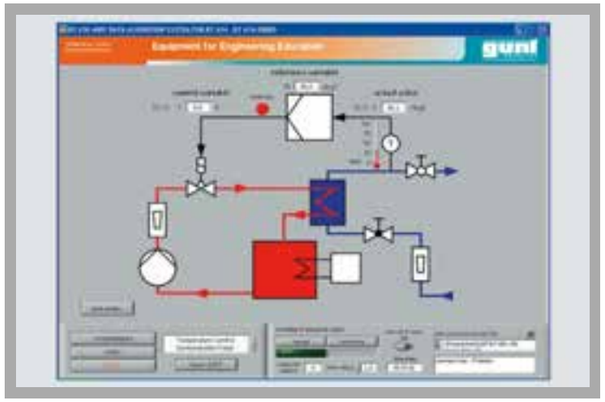
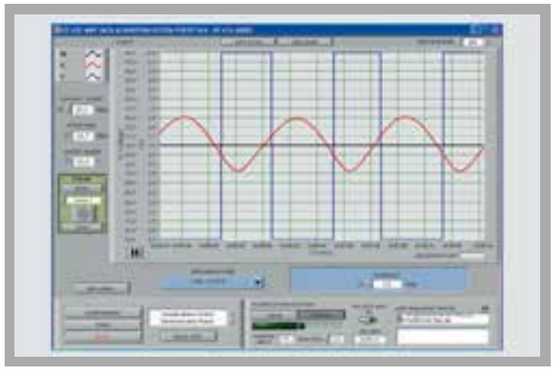
RT 650.40 I&C Software for RT 614 - RT 674 Series



Screenshot: process schematic window of temperature control demonstration model (RT 644)



Screenshot: 2-point temperature control

USB interface module

Specification

[1] instrumentation and control software to present relevant data on a PC
[2] selectable continuous or switching software controller mode
[3] continuous controller parameters settable
[4] the controller included in the demonstration model can be replaced by a software controller
[5] the controller included in the demonstration model can also be used with the software recorder function
[6] real-time data can be displayed in different windows
[7] language freely selectable
[8] easy connection to PC via USB port with 4 analogue inputs and 2 analogue outputs

Technical Data

Software controller (continuous mode)
- configurable as P, PI or PID controller
- cascade control

Software controller (switching mode)
- 2-point response
- input of reference variable and hysteresis

Recorder function with data saving
- recording and saving of time functions
- evaluation of step responses with automatically generated inflectional tangent

Language selection
- 4 pre-selectable languages
- 1 user-defined language possible

Software basis
- LabVIEW
- system requirements: Windows Vista or Windows 7, USB port

Scope of Delivery

1 GUNT software CD
1 USB interface module
1 set of cables
1 manual with description of software functions and instructions for use with demonstration models RT 614 - RT 674

Order Details

080.65040 RT 650.40 I&C Software for RT 614 - RT 674 Series

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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RT 512 – RT 552 CONTROL ENGINEERING TRAINERS WITH PROCESS CONTROL SYSTEM

RT 512 *Level Control Trainer*

RT 522 *Flow Control Trainer*

RT 532 *Pressure Control Trainer*

Didactic goals and exercises

Comprehensive programme of experiments with each trainer:

- introduction to the fundamentals of control engineering based on experimentation
- familiarisation with real industrial components such as controllers, chart recorders, actuators and sensors
- demonstration of a wide variety of types of control systems (e.g. temperature, pressure)
- familiarisation with different controlled system characteristics
- investigation of disturbance and control response
- controller optimisation
- parameterisation of the local industrial controller
  – manually
  – automatically
  – via process control software
- downstream processing of process variables with external recording devices: chart recorder, oscilloscope
- familiarisation with and use of a process control software (with accessory RT 650.50)

RT 542 *Temperature Control Trainer*

RT 552 *pH Value Control Trainer*

The trainers in this equipment series provide a comprehensive and practical introduction to the fundamentals of control engineering. The trainers are fully practice-based in design: only controls and process components currently deployed in industrial applications are used.

Each trainer in itself represents a complete course in the fundamentals of control engineering. The special feature of these units is that two or more trainers can be interconnected via a Profibus interface to a state-of-the-art process control software to form a networked complete system.

The trainers are suitable for two learning situations: demonstration by the tutor or independent laboratory experimentation by the students.

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

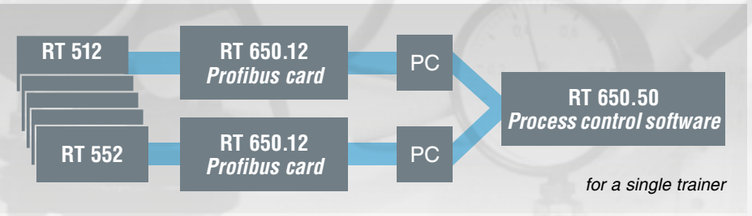
Process Control Software

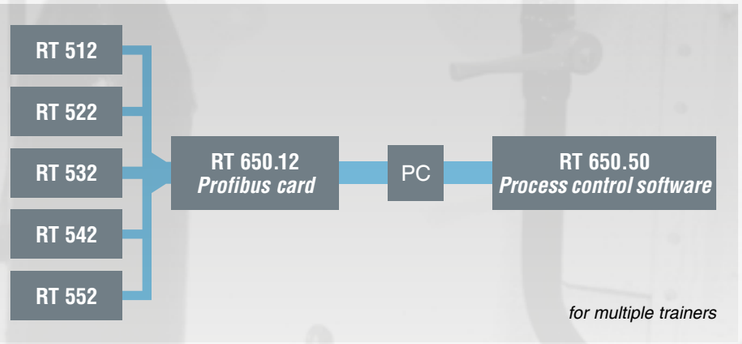
State-of-the-art LabVIEW-based process control software for Windows, featuring extensive monitoring and visualisation functionality:

- for stand-alone trainers or networking of multiple trainers
- network capability
- process schematics with online display of all process variables
- parameterisation of the individual controllers
- control station function for multiple training rig configurations
- chart recorder function with storage of measured data
- alarm function with logging
- 4 pre-selectable languages and 1 user-defined language possible

Communication between PC and local controllers and networking of the individual trainers via field bus system (Profibus DP):

- Profibus interface card for PC with driver software (RT 650.12)
- Profibus interface for controllers provided as standard





RT 512 Level Control Trainer

*** Experimental introduction to control engineering using an example of level control**

*** Construction of the system with components commonly used in industry**

*** Digital controller with freely selectable parameters: P, I, D and all combinations**

*** Integrated 2-channel line recorder**

*** Optional process control software RT 650.50 available**

*** Construction of a complete networked system via Profibus interface possible**

Technical Description

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

A pump delivers water from a storage tank to the transparent level-controlled tank. The liquid level is measured by a pressure transducer installed at the base of the level-controlled tank. The controller used is a state-of-the-art digital industrial controller. The actuator in the control loop is a pneumatically operated control valve with an electro-pneumatic positioner. 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.

A process control software (RT 650.50) is optionally available. The software permits the construction of a complete networked system comprising multiple trainers from the RT 512 - RT 552 series. 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.

Learning Objectives / Experiments

- fundamentals of control engineering
- real industrial control engineering components: controllers, transducers, actuators
- operation and parameterisation of the local industrial controller
  * manually (by keyboard)
  * using the RT 650.50 process control software
- investigation of disturbance and control response
- controller optimisation
- investigation of the properties of the open and closed control loops
- processing of process variables using external equipment, e.g. oscilloscope or plotter
- together with accessory RT 650.50 and other trainers (RT 522 - RT 552): familiarisation with and use of process control software (SCADA)

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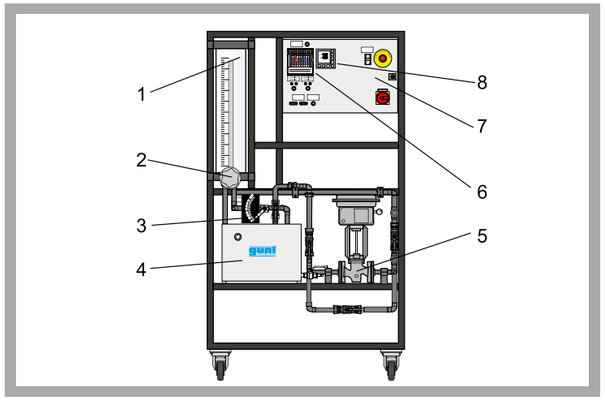
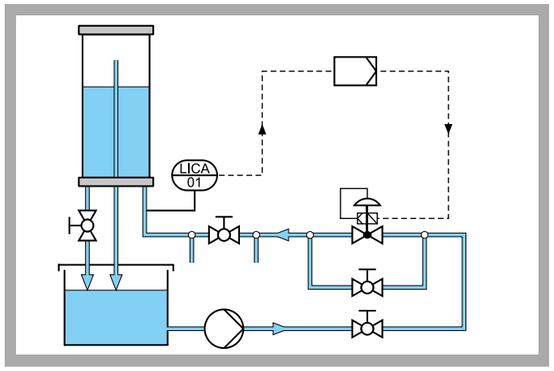
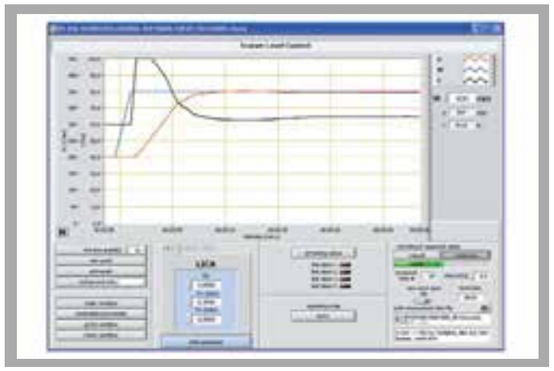
RT 512 Level Control Trainer



1 transparent level-controlled tank, 2 pressure sensor, 3 ball valve with scale, 4 storage tank with pump, 5 pneumatic control valve, 6 line recorder, 7 switch cabinet, 8 controller



Process schematic



Screenshot of optional process control software RT 650.50: step response to change in reference variable, PI controller

Specification

[1] trainer for control engineering experiments
[2] level control process, equipped with standard industrial components
[3] level measurement by pressure sensor
[4] generation of disturbance variables by ball valve with scale in outlet
[5] transparent level-controlled tank with overflow and graduated scale
[6] pneumatically operated control valve with electro-pneumatic positioner
[7] digital controller, parameterisable as a P, PI or PID controller
[8] 2-channel line recorder
[9] process variables X and Y accessible as analogue signals via lab jacks

Technical Data

Storage tank: 30L
Centrifugal pump
- power consumption: 250W
- max. flow rate: 150L/min
- max. head: 7m
- speed: 2800min^{-1}

Level-controlled tank
- max. 7L
- level: 0...0,6m

Pressure sensor: 0...100mbar
Pneumatically operated control valve DN 20
- Kvs: 4,0m³/h
- reference variable: 4...20mA
- nominal stroke: 15mm
- characteristic curve equal-percentage

Line recorder
- 2x 4...20mA
- feed rate 0...7200mm/h, stepped

Controller
- process variables X, Y as analogue signals: 4...20mA

Dimensions and Weight

LxWxH: 1000x700x1750mm
Weight: approx. 124kg

Required for Operation

230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase
Compressed air: 3...8bar

Scope of Delivery

1 trainer
1 set of cables
1 set of hoses
1 set of instructional material

Order Details

080.51200 RT 512 Level Control Trainer

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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RT 522 Flow Control Trainer

Technical 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 standardised 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.

A process control software (RT 650.50) is optionally available. The software permits the construction of a complete networked system comprising multiple trainers from the RT 512 - RT 552 series. 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.

Learning Objectives / Experiments

- fundamentals of control engineering
- real industrial control engineering components: controllers, transducers, actuators
- operation and parameterisation of the local industrial controller
  * manually (by keyboard)
  * using the RT 650.50 process control software
- investigation of disturbance and control response
- controller optimisation
- investigation of the properties of the open and closed control loops
- processing of process variables using external equipment, e.g. oscilloscope or plotter
- together with accessory RT 650.50 and other trainers (RT 512, RT 532 - RT 552): familiarisation with and use of process control software (SCADA)

*** 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**

*** Integrated 2-channel line recorder**

*** Optional process control software RT 650.50 available**

*** Construction of a complete networked system via Profibus interface possible**

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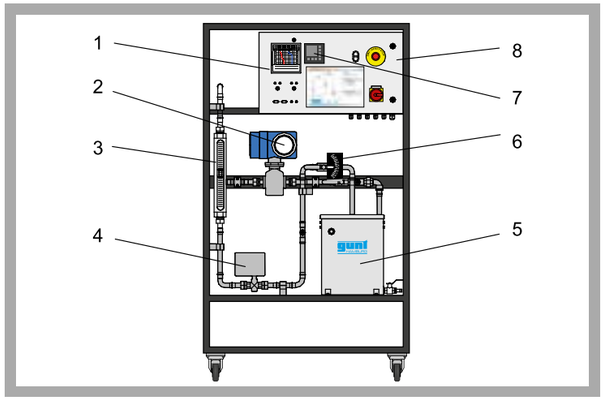
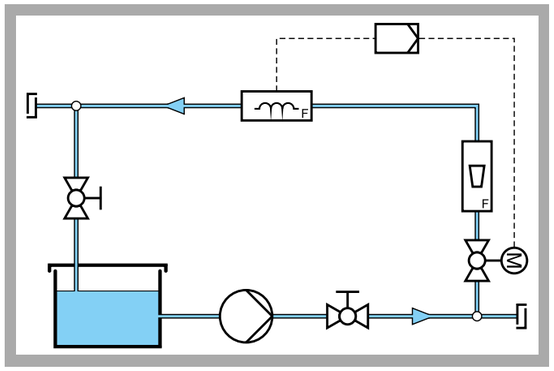
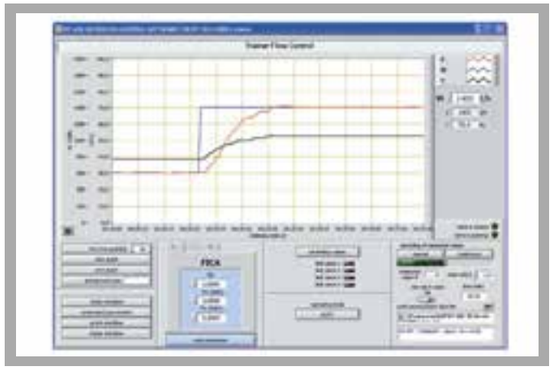
RT 522 Flow Control Trainer



1 line recorder, 2 electromagnetic flow rate sensor, 3 rotameter, 4 control valve, 5 storage tank with pump, 6 ball valve with scale, 7 controller, 8 switch cabinet



Process schematic



Screenshot of optional process control software RT 650.50: step response to change in reference variable, PI controller

Specification

[1] trainer for control engineering experiments
[2] flow control process, equipped with standard industrial components
[3] flow rate measurement by electromagnetic sensor
[4] rotameter for direct observation of the flow
[5] generation of disturbance variables by ball valve with scale in outlet line
[6] control valve with electric motor
[7] digital controller, parameterisable as a P, PI or PID controller
[8] 2-channel line recorder
[9] process variables X and Y accessible as analogue signals via lab jacks

Technical Data

Storage tank: 30L
Centrifugal pump
- power consumption: 250W
- max. flow rate: 150L/min
- max. head: 7m
- speed: 2800min^{-1}

Rotameter: 0...1960L/h
Electromagnetic flow rate sensor: 0...6000L/h
Control valve with electric motor
- Kvs: 5,7m³/h
- stroke: 5mm
- characteristic curve equal-percentage
- valve-opening position sensor: 0...1000 Ohm

Line recorder
- 2x 4...20mA
- feed rate 0...7200mm/h, stepped

Controller
- process variables X, Y as analogue signals: 4...20mA

Dimensions and Weight

LxWxH: 1000x700x1750mm
Weight: approx. 110kg

Required for Operation

230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase

Scope of Delivery

1 trainer
1 set of cables
1 hose
1 set of instructional material

Order Details

080.52200 RT 522 Flow Control Trainer

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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RT 532 *Pressure Control Trainer*

*** 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**

*** Integrated 2-channel line recorder**

*** Optional process control software RT 650.50 available**

*** Construction of a complete networked system via Profibus interface possible**

Technical Description

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

The air pressure control system is a 2nd order system. It comprises two in-line pressure tanks interconnected by a flow control valve. An additional valve on the second tank makes air tapping possible and so can be used to simulate a disturbance variable. A pressure sensor measures the pressure in the second vessel. The controller used is a state-of-the-art digital industrial controller. The actuator in the loop is a pneumatically operated control valve with a standardised current signal input. 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.

A process control software (RT 650.50) is optionally available. The software permits the construction of a complete networked system comprising multiple trainers from the RT 512 - RT 552 series. 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.

Learning Objectives / Experiments

- fundamentals of control engineering
- real industrial control engineering components: controllers, transducers, actuators
- operation and parameterisation of the local industrial controller
  * manually (by keyboard)
  * using the RT 650.50 process control software
- control response to
  * 1st order controlled system
  * 2nd order controlled system
- investigation of disturbance and control response
- controller optimisation
- investigation of the properties of the open and closed control loops
- processing of process variables using external equipment, e.g. oscilloscope or plotter
- together with accessory RT 650.50 and other trainers (RT 512, RT 522, RT 542, RT 552): familiarisation with and use of process control software (SCADA)

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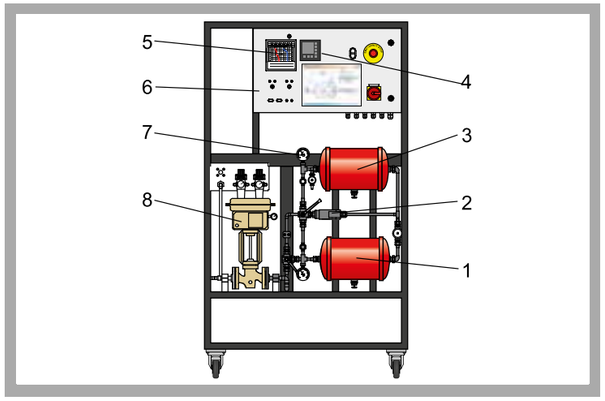
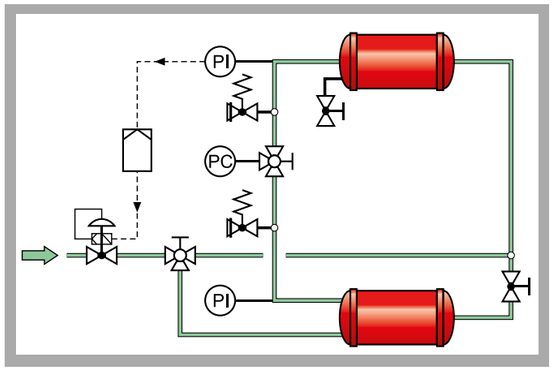
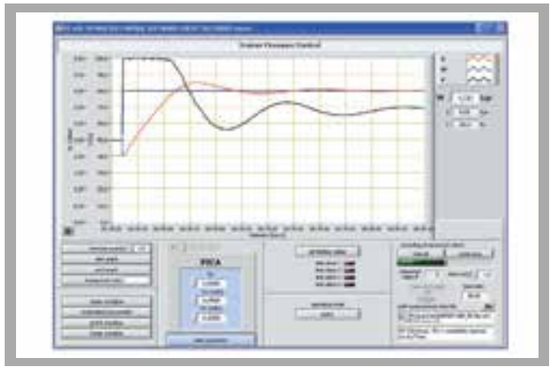
RT 532 *Pressure Control Trainer*



1 pressure tank, 2 pressure sensor, 3 pressure tank, 4 digital controller, 5 line recorder, 6 switch cabinet, 7 manometer, 8 pneumatically operated control valve



Process schematic



Screenshot of optional process control software RT 650.50: step response to change in reference variable, PI controller

Specification

[1] trainer for control engineering experiments
[2] pressure control process, equipped with standard industrial components
[3] pressure measurement by pressure sensor
[4] generation of disturbance variables by drain valve
[5] 2 pressure tanks with pressure relief valve and manometer for direct observation of the tank pressure
[6] valves permit investigation of a 1st order controlled system (1 tank) or 2nd order controlled system (2 in-line tanks)
[7] pneumatically operated control valve with electro-pneumatic positioner
[8] digital controller, parameterisable as a P, PI or PID controller
[9] 2-channel line recorder
[10] process variables X and Y accessible as analogue signals via lab jacks

Technical Data

2 pressure tanks
- capacity: each 10L
- max. pressure: 10bar
- operating pressure: 6bar

Pressure sensor: 0...6bar
Pneumatically operated control valve
- connecting flanges: DN15
- Kvs: 0,1m³/h
- reference variable: 4...20mA
- stroke: 15mm
- characteristic curve equal-percentage

Line recorder
- 2x 4...20mA
- feed rate 0...7200mm/h, stepped

Controller
- process variables X, Y as analogue signals: 4...20mA

Dimensions and Weight

LxWxH: 1000x700x1750mm
Weight: approx. 110kg

Required for Operation

230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase
Compressed air: 3...8bar

Scope of Delivery

1 trainer
1 set of cables
1 hose
1 set of instructional material

Order Details

080.53200 RT 532 Pressure Control Trainer

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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RT 542 Temperature Control Trainer

*** Experimental introduction to control engineering using an example of temperature control**

*** Construction of the system with components commonly used in industry**

*** Digital controller with freely selectable parameters: P, I, D and all combinations**

*** Controllers configurable: Continuous controller, 2-point or 3-point controller**

*** Integrated 2-channel line recorder**

*** Optional process control software RT 650.50 available**

*** A complete networked system can be constructed with Profibus interface**

Technical Description

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

A circulating pump delivers water within a closed circuit. The flow rate of water can be adjusted by a hand-operated valve. The loop also contains a screw-in heater, a heat exchanger with fan, and three integrated thermocouples for temperature measurement. Dead times can be represented by the use of different lengths of process delay. A thyristor power controller is used as the actuator. The controller used is a state-of-the-art digital industrial controller. It can be configured as a continuous or a switching device, and can activate the heater via the actuator and / or the fan. 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.

A process control software (RT 650.50) is optionally available. The software permits the construction of a complete networked system comprising multiple trainers from the RT 512 - RT 552 series. 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.

Learning Objectives / Experiments

- fundamentals of control engineering
- real industrial control engineering components: controllers, transducers, actuators
- operation, configuration and parameterisation of the local industrial controller
  * manually (by keyboard / controller software RT 450.14)
  * using the RT 650.50 process control software
- control response to
  * switching control (2-point / 3-point controller)
  * continuous control
  * dead times
- investigation of disturbance and control response
- controller optimisation
- investigation of the properties of the open and closed control loops
- processing of process variables using external equipment, e.g. oscilloscope or plotter
- together with accessory RT 650.50 and other trainers (RT 512 - RT 532, RT 552): familiarisation with and use of process control software (SCADA)

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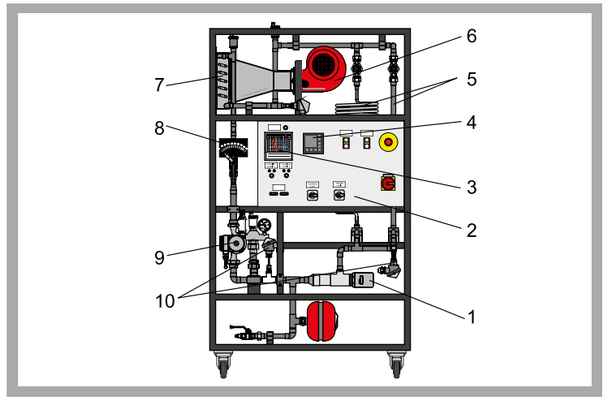
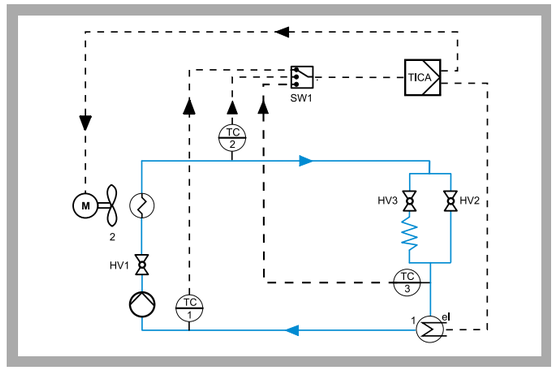
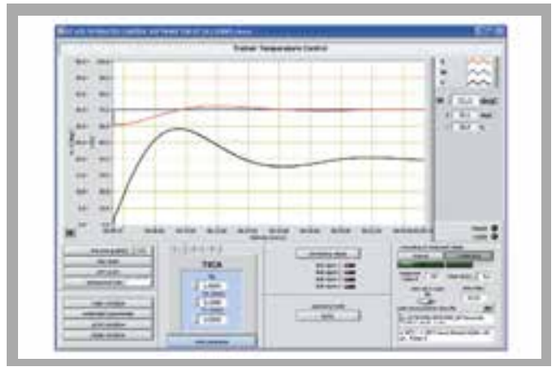
RT 542 Temperature Control Trainer



1 screw-in heater, 2 switch cabinet, 3 line recorder, 4 controller, 5 process delays, 6 fan, 7 heat exchanger, 8 ball valve with scale, 9 pump, 10 thermocouples



Process schematic: controller can activate heater power controller (continuous or switching) and/or fan (switching) according to mode



Screenshot of optional process control software RT 650.50: step response to change in reference variable, PI controller

Specification

[1] trainer for control engineering experiments
[2] temperature control process, equipped with standard industrial components
[3] water circuit with pump, heater and 2 different lengths of process delay
[4] screw-in heater with dry-running protection and temperature limiter
[5] air/water heat exchanger with fan
[6] temperature measurement with thermocouples at multiple points
[7] generation of disturbance variables by ball valve with scale in water circuit
[8] thyristor power controller as actuator
[9] digital controller, configurable as switching or continuous controller
[10] 2-channel line recorder
[11] process variables X and Y accessible as analogue signals via lab jacks

Technical Data

Pump, 3-stage
- max. power consumption: 70W
- max. flow rate: 3,6m³/h
- max. head: 4m

Screw-in heater: 2kW
Heat exchanger: approx. surface area 2,8m²
Fan
- power output: 250W
- max. flow rate: 780m³/h
- max. differential pressure: 430Pa
- speed: 2880min^{-1}

Thermocouple: type J: 0...200°C
Thyristor power controller max. load current: 25A
Line recorder
- 1x 4...20mA, 1x 0...20mA
- feed rate 0...7200mm/h, stepped

Controller
- process variables X, Y as analogue signals: 4...20mA

Dimensions and Weight

LxWxH: 1000x700x1750mm
Weight: approx. 120kg

Required for Operation

230V, 50/60Hz, 1 phase or 230V, 60Hz/CSA, 3 phases

Scope of Delivery

1 trainer
1 set of cables
1 hose
1 set of instructional material

Order Details

080.54200 RT 542 Temperature Control Trainer

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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RT 552 pH Value Control Trainer

The illustration shows a similar unit.

*** Experimental introduction to control engineering using an example of continuous pH value control**

*** Construction of the system with components commonly used in industry**

*** Digital controller with freely selectable parameters: P, I, D and all combinations**

*** Integrated 2-channel line recorder**

*** Optional process control software RT 650.50 available**

*** Construction of a complete networked system via Profibus interface possible**

Technical Description

This trainer provides a comprehensive experimental introduction to the fundamentals of control engineering using an example of continuous pH control.

A caustic solution is added to fresh water by way of a metering pump. The pH value of this solution is measured. The acid is then added to the solution as a neutralising reagent by way of a second metering pump. The chemical reaction occurs in a pipeline system. The pH value is then remeasured. A state-of-the-art digital industrial controller controls the second metering pump with reference to this pH value. The neutralised solution flows into the product tank. A third manual measurement of the pH value in the product tank permits disposal of solution with a neutral pH value. The pH value of the input solution can be varied by manually adjusting the metering pump or by varying the quantity of fresh water. This enables disturbances to be simulated. 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.

A process control software (RT 650.50) is optionally available. The software permits the construction of a complete networked system comprising multiple trainers from the RT 512 - RT 552 series. 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.

Learning Objectives / Experiments

- fundamentals of control engineering
- real industrial control engineering components
- operation and parameterisation of the local controller
  * manually
  * using the RT 650.50 process control software
- pH value control
  * influence of dead time
- ratio control
- investigation of disturbance and control response
- controller optimisation
- properties of the open and closed control loops
- processing of process variables using external equipment, e.g. oscilloscope or plotter
- together with accessory RT 650.50 and other trainers (RT 512 - RT 542): familiarisation with and use of process control software (SCADA)

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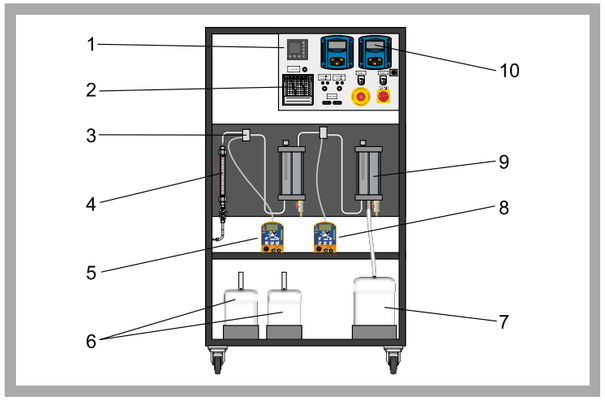
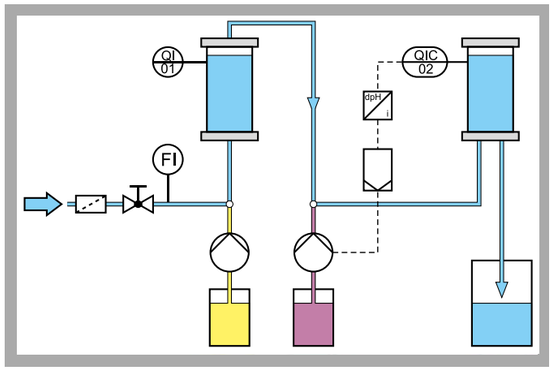
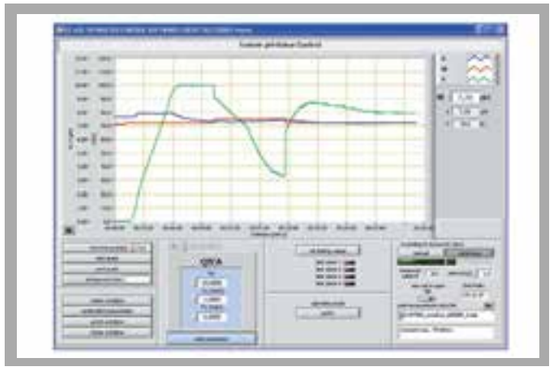
RT 552 pH Value Control Trainer



1 controller, 2 line recorder, 3 mixing nozzle, 4 rotameter (fresh water), 5 manually adjustable caustic metering pump, 6 chemicals tank, 7 product tank, 8 controller-adjusted acid metering pump, 9 product tank, 10 pH value display



Process schematic



Screenshot of optional process control software RT 650.50: step response to change in reference variable, PI controller

Specification

[1] trainer for control engineering experiments
[2] pH value control process, equipped with standard industrial components
[3] neutralisation of a caustic solution with an acid
[4] 2 pH value sensors in transparent measuring tanks with overflow
[5] digital controller, parameterisable as a P, PI or PID controller
[6] product tank and 2 chemicals tanks
[7] 2 metering pumps: adjustable manually or via controller
[8] water connection with control valve and rotameter
[9] corrosion-resistant piping system
[10] hand-held pH-meter for product control
[11] 2-channel line recorder
[12] process variables X and Y accessible as analogue signals via lab jacks

Technical Data

Product tank: 20L
Chemicals tank: 2x 5L
Metering pumps
- max. flow rate: each 2,1L/h
- max. head: each 160m

pH value sensor
- filled with solid electrolyte
- with glass shaft and PTFE diaphragm

Line recorder
- 2x 4...20mA
- feed rate 0...7200mm/h, stepped

Controller
- process variables X, Y as analogue signals: 4...20mA

Measuring ranges
- pH value: 1...12
- temperature: 0...80°C

Dimensions and Weight

LxWxH: 1000x700x1750mm
Weight: approx. 105kg

Required for Operation

230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase
Water connection
Caustic soda NaOH 45%; hydrochloric acid HCl 30%, technically pure; buffer solution pH 4,0 (red), buffer solution pH 7,0 (green), buffer solution pH 10,0 (blue)

Scope of Delivery

1 trainer
1 hand-held pH-meter
3 measuring cups
1 set of cables
1 hose
1 set of instructional material

Order Details

080.55200 RT 552 pH Value Control Trainer

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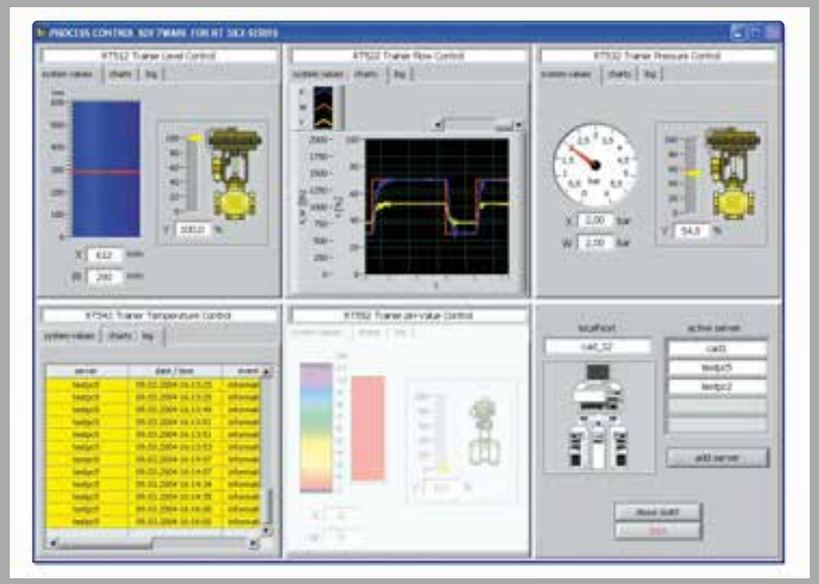
RT 650.50 *Process Control Software for RT 512 - RT 552 Series*



- *** Control station for up to 5 trainers working simultaneously**
- *** Autonomous detection of connected units**
- *** Programmer**
- *** Alarm function with four limit values for triggering an alarm or message**

Technical Description

The RT 650.50 process control software (SCADA) was developed specially for the RT 512 - RT 552 series of trainers. It can automatically detect which units are connected for operation. Up to five units can be connected simultaneously. The program and the trainers communicate via Profibus DP modules. Changes to the software are transmitted to the controller of the relevant trainer.

Alongside the process schematic, controller configuration and recorder functions, the software also provides programmer, messaging and control station functions. The process schematics display the process variables and the reference, controlled and manipulating variables in real time. They also allow the reference variable, the controller parameters and controller mode to be changed. There are also status displays for the alarms.

The "Charts" menu item offers features including controller parameter setting and mode selection, setting of the reference variable and limit values for the alarm function, as well as display of the controlled and manipulating variables. The characteristic of the reference variable over time (e.g. step input, ramp etc.) is specified in the programmer. A total of three programs are available, each with 15 software modules, and each including their own custom controller parameters. The messages are divided into alarms (status indicators, over/under limit) and information (status monitoring, approaching the limit). The message status is colour-coded. The control room function permits simultaneous monitoring and, where appropriate, accessing of all connected trainers.

Learning Objectives / Experiments

- familiarisation with and use of a process control system

Stand-alone operation with a single trainer
- process schematics with online display of all process variables
- alarm function with logging
- parameterisation for the individual controllers
- manual or automatic controller mode
- controller configuration for temperature control (continuous / 2-point / 3-point controller)
- software system allows multiple trainers to be controlled/monitored from one PC
- mode of operation of a programmer

additionally in combinations of multiple trainers on one PC
- control station function
- autonomous detection of the connected units

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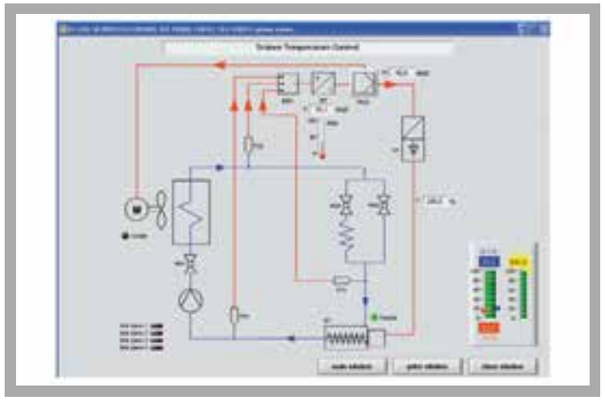
RT 650.50 *Process Control Software for RT 512 - RT 552 Series*



Process schematic for temperature control: reference variable W (setpoint) is settable directly; manipulating variable Y and controlled variable X (actual value) are displayed directly; controller can be accessed to change the parameters

Controller operation via process schematic: reference variable, controller parameters and controller mode (manual or automatic) selectable

Programming the notifications and alarms for temperature control

Specification

[1] interactive, menu-driven process control software (SCADA) for operation and monitoring of control processes
[2] control station function for simultaneous operation of multiple trainers
[3] alarm function
[4] programmer
[5] display of relevant data on PC
[6] data communication via Profibus DP
[7] use together with Profibus card RT 650.12; one Profibus card RT 650.12 per PC workstation required

Technical Data

Operation and parameterisation of hardware controllers
Recorder function with data saving
- recording and saving of time functions
- evaluation of step responses with automatically generated inflectional tangent

Language selection
- 4 pre-selectable languages
- 1 user-defined language possible

Programmer
- up to 3 programs with 15 values in each
- custom controller parameters for each program
- looping possible

Alarm function with 4 programmable values
- upper and lower alarm limit
- upper and lower message limit
- comments about alarms/messages can be entered

Software basis: LabVIEW
System requirements: Windows Vista or Windows 7

Scope of Delivery

1 CD with LabVIEW process control software
1 manual with description of software functions and instructions for use with control engineering trainers RT 512 - RT 552

Order Details

080.65050 RT 650.50 Process Control Software for RT 512 - RT 552 Series

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