RT 370

Setup of field bus systems

Description

- **Profibus DP field bus system**
- **networking of field bus modules**
- **communication protocols**
- **recording digital and analogue signals**

Field bus technology plays a key role in modern-day process automation. The field bus permits networking of terminal devices such as controllers, sensors or actuators in the plant system (field level) with the higher-level control room (control level). A network of this kind can be quite extensive; line lengths of as much as 1000 metres and more are possible.

This experimental unit is used to teach the initial basic steps in field bus technology based on the example of Profibus DP. Various terminal devices (slaves) are activated and read by a PC with a Profibus DP interface (master). The required hardware is largely pre-configured. Students are able to concentrate on the software programming of the field bus system. The following specific topics can be covered: System configurator with DMF (**D** evice **M** aster **F** ile), bus topology, communication protocols, tags, OPC (**O** LE for **P** rocess **C** ontrol) server, input and output of process data, and much more.

The experimental unit includes a digital controller as well as analogue and digital input and output modules with a Profibus DP interface. Two potentiometers permit the simulation of input signals for the controllers. A digital voltmeter displays the output signals. Digital signals are generated by switches and displayed by LEDs. The controlled variable, manipulating variable and reference variable data are delivered as standard signals at lab jacks, enabling the controllers to be incorporated into real processes at any time.

Learning objectives/experiments

- function and programming of a field bus system
  - ▸ defining the bus topology with the stations
  - ▸ writing the communication protocols
  - ▸ familiarisation with the device master file
  - ▸ familiarisation with the OPC server
  - ▸ defining tags
  - ▸ accessing the OPC database from a process control program
- familiarisation with the field bus stations
  - ▸ function of a digital process controller
  - ▸ function of an analogue input / output module
  - ▸ function of a digital input / output module

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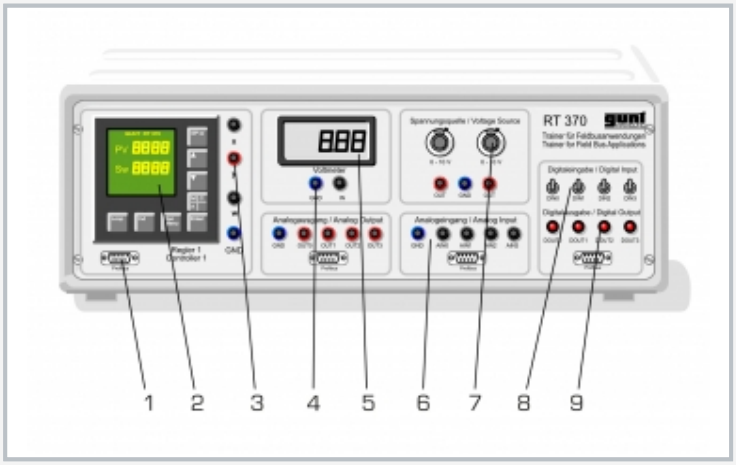
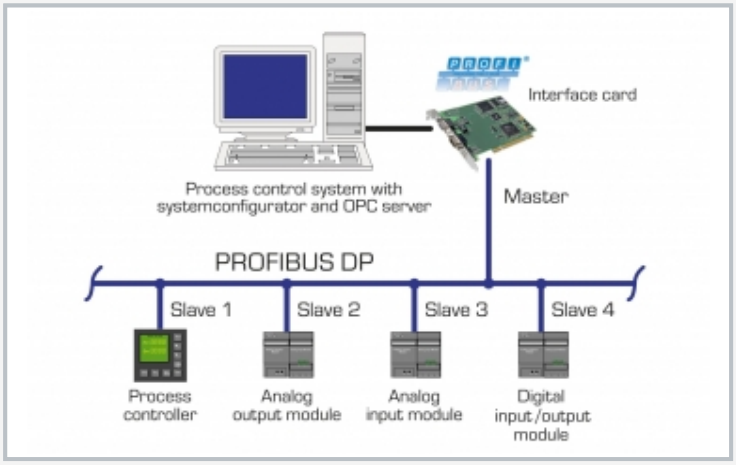
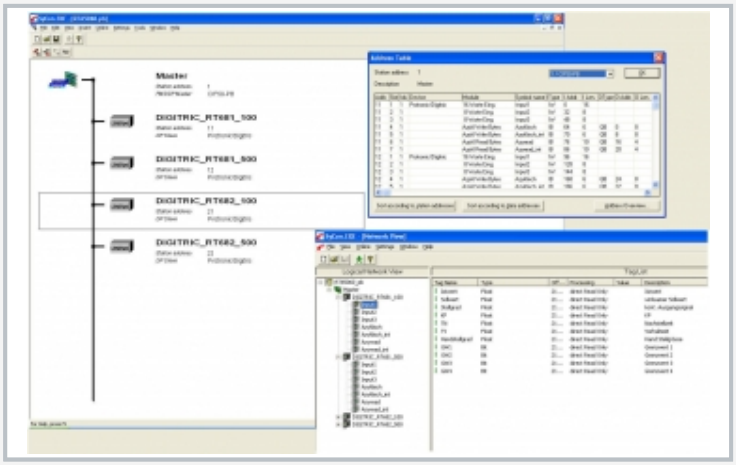


1 interface, 2 controller, 3 Lab jacks for process variables, 4 analogue output module, 5 voltmeter, 6 analogue input module, 7 signal generator, 8 digital input, 9 digital output



Topology of the field bus used, with master and slaves



Sycon system configuration program with topology manager, variables and tags list

Specification

[1] experimental unit for field bus systems
[2] digital controller, configurable as a P, PI or PID controller with Profibus DP interface
[3] analogue Profibus DP I module
[4] analogue Profibus DP O module
[5] digital Profibus DP IO module
[6] signal generator
[7] digital voltmeter
[8] Profibus DP interface card for PC
[9] OPC server under Windows
[10] GUNT process control software via PCI under Windows 7, 8.1, 10
[11] all process variables accessible as analogue signals at lab jacks 0...10V

Technical data

Controller
- configurable as P, PI or PID controller
- proportional gain X_p: 0...999,9%
- integral action time T_n: 0...3600s
- derivative time T_v: 0...1200s

Signal generator: 0...10V
Digital voltmeter: 0...20V
Process variables as analogue signals: 0...10V
4 analogue inputs: 0...10V
2 analogue outputs: 0...10V
4 digital inputs, 4 digital outputs
Connection of external instruments (e.g. oscilloscope, line recorder) via lab jacks

230V, 50Hz, 1 phase
230V, 60Hz, 1 phase
120V, 60Hz, 1 phase
UL/CSA optional
LxWxH: 480x450x150mm
Weight: approx. 10kg

Required for operation

PC with Windows

Scope of delivery

1 experimental unit
1 Profibus card
1 set of cables
1 software CD with driver software, system configuration program, OPC server and GUNT process control software
1 set of instructional material