

MODULE TPS-3011

PROCESS CONTROL

TRAINING SYSTEM



Objectives

This course introduces the student to process control and cover topics like: Sensors and consumers, open and closed loop system control, regulation and PID control.

The system is built as a modular analog controller.

Description

The system is stand-alone, containing all the necessary electronics components needed to perform the experiments.

The experiment area is in the central part of the trainer including circuit drawing, test points and peripheral outlets and inlets.

The circuit board upper side includes visible component circuits protected by a sturdy transparent cover.

The system includes a built in power supply with -5V, +5V and 2 variable DC reference voltages. The system includes the SES Lab unit with a two-channel oscilloscope and a function generator, which communicates with a PC for controlling the function generator and oscilloscope display, including spectrum analysis.

The built in function generator also can be operated manually, controlled by the embedded micro-controller for Sine/Triangle, Sweep/Constant signals.



M O D U L E

TPS-3011

Process Control Training System

Technical characteristics

The trainer is in a metal case with a wide experiment platform printed circuit board (22X36 cm), which ensures easy handling and good visibility of the components.

The components are located on the board with silk screen print of the analytical circuit and component symbols. The central part of the experimenting board includes all the circuit block drawings and the all the hands on components, test points and banana sockets.

The protected components are located on the circuit board upper side, clearly visible to the student and protected by a sturdy transparent cover.

The system includes a built in power supply with -5V, +5V and 2 variable DC reference voltages outlets. An included low voltage external AC power adapter feeds the system.

The system includes:

- 2 voltage reference sources
- A voltmeter
- Power amplifier
- 2 Feedback amplifiers
- Adder
- PI amplifier
- PD amplifier
- Bi-stage amplifier
- Dynamo-Motor speed control module
- Lamp-thermistor temperature control module
- Lamp-phototransistor light control module
- Level control module
- SES Lab unit with two-channel scope and variable voltage reference, which communicates with a PC for controlling the voltage reference and oscilloscope display, including spectrum analysis.
- SESCOPE PC software

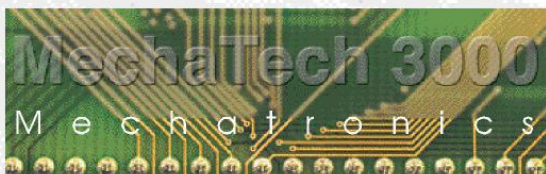
Experiments

A kit of modules, which enables to study process control.

The course covers:

- Operational amplifiers & NTC thermistor study.
- Operational amplifiers & photoresistor LDR study.
- DC motor rotation direction control study.
- P controller study.
- PI controller study.
- Construction of Proportional Integrated Differential PID controller.
- Study and drawing of the rotational speed characteristic response of a DC motor in terms of time.
- Study and drawing of the rotational speed characteristic response of a DC motor in terms of load.
- Study and control of a DC motor status.
- Generation and control of open and close loop with P controller.
- Generation and control of open and close loop with PI controller.
- Area temperature control with 2-position controller.
- Fluid level control with PI controller.
- Two position and three range controllers.
- Combination of various controller types such as PI, PID.
- Loop control, settings (dynamic - static method).
- Open/close loop temperature control.
- Open loop motor speed control.
- Open loop light control and closed loop light control.
- Closed loop level control.
- Bi-stage motor speed control / light control / temperature control.

A teacher guide, a student experiment manual and an evaluation manual accompany the system.



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