

Magnetic Levitation System

33-006-PCI



Features

- Well presented Control Experiment manual with progressive exercises
- Non-linear, unstable process
- Analogue and Digital control
- MATLAB® compatible software for real-time control
- Optical sensing with 20mm set-point range
- Closed-loop identification
- Fully assembled plant with integral power supplies
- Lightweight 25mm suspended body
- Open architecture, design-oriented system

Description

This 33-006 Magnetic Levitation System demonstrates a classic magnetic levitation control experiment, that of suspending a body in space. The suspended body is a 25mm diameter sphere. This is a visually appealing system with convenient time constants for both Analogue and Digital control solutions. Convenient sockets on the front panel allow for quick changes of gain and compensation components.

In the Digital mode, the 33-006 operates within a MATLAB®/SIMULINK® environment (using MATLAB® version 7.1 or higher) which allows the system parameters to be determined and the system to be modelled. This simulation phase is used to select the digital controller parameters. Once they have been determined, the designed controller can be used to run the hardware and the actual control performance can be seen and analysed.

The system operates under Windows and provides a graphical interface. It is suitable for directed experimentation for conventional laboratory work, or for design and project oriented studies.

The supplied Feedback Software includes both Simulation and Real-Time MATLAB® models and requires both the Mathworks Real-Time Workshop and Real-Time Windows Target toolboxes.

This 33-006 Magnetic Levitation System consists of an enclosed magnet system, sensors and drivers shown overleaf, with a computer interface card, connecting cables, Feedback operating software (33-942) and a set of laboratory manuals.

It requires a modern PC with full height PCI slot, Windows XP/Vista/**MATLAB**® 7.1 or higher with **SIMULINK**®, RTW, RTWT. **MATLAB**® Control and other Mathworks Toolboxes will be required to design and implement more complex types of controller.

Curriculum Coverage

- **Magnetic Levitation set description**
- **Magnetic Levitation model**
 - Non-linear model testing
 - Model linearisation
 - Linear model
- **Maglev model identification**
- **Maglev setup control**
 - Plant control**
 - PID controller**
 - Maglev position control**
 - PD control of ball position
 - Real time PD control of ball position
 - Real time PID control of ball position
 - Advanced Maglev control**
 - WMV ball position model control
 - WMV ball position Real Time control
- **Additional Experiments**
 - Stand alone controller tracking
 - External set point

Specification

Dimensions & Weight

Dimensions of the Magnetic enclosure:
Height: 370mm x Width: 250mm x Depth: 260mm
Weight: 10kgs.

Services Required

Power Supply included

Options

Not required

Tender Specification

- [1] A self-contained Magnetic Levitation trainer.
- [2] To be used for teaching the principles of magnetic levitation control .
- [3] The system to operate in Real-time when connected to a PC via USB connection.
- [4] 10 exercises to be provided.
- [5] Can be used as a standalone system or within a **MATLAB**® environment.
- [6] System to have dimensions approx. 370mm x 250mm x 260mm and weight approx. 10kgs.
- [7] To be supplied with an experimental manual.
- [8] To be supplied by a company offering a 1 year parts and labour warranty.

Ordering Information

Magnetic Levitation System

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