



DC Servo Motor Control Trainer (SMT-1200)

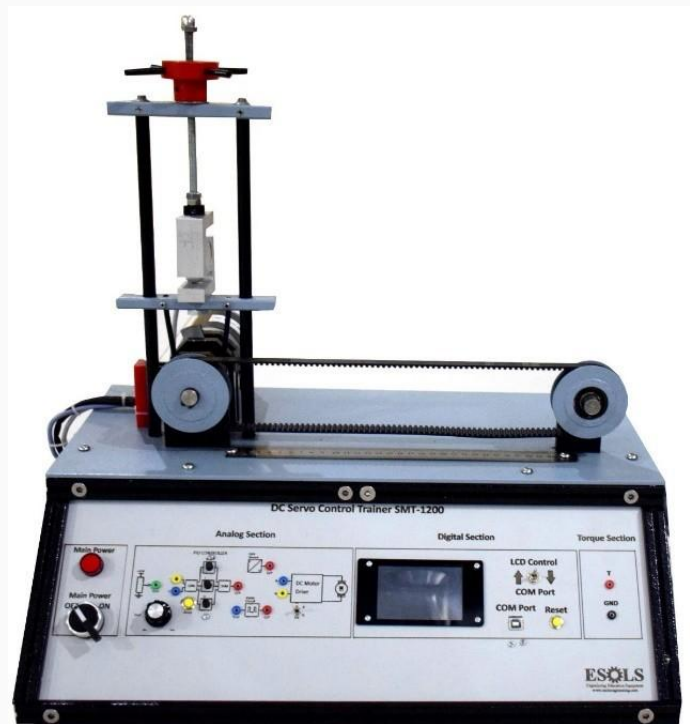
Servo motors play a crucial role in industrial processes, offering precise control over motion and positioning. These motors can be either AC or DC, depending on the specific application requirements. The trainer includes a high-speed, high-functionality DC servo driver and motor, designed to enhance performance and efficiency in various automation systems.

This advanced driver provides excellent velocity response frequency, contributing to the development of high-speed machinery. It features a standard lineup that includes full-closed control, an auto-gain tuning function, and motors equipped with absolute or incremental encoders. These capabilities ensure accurate motion control, making the system suitable for high-precision applications.

TECHNICAL SPECIFICATIONS

Specifications:

- One 12V/24V PMDC Motor with gear box Mounted on open frame
- optical Encoder based speed sensor
- Control circuit with opto-coupler Isolation
- 2-Quadrant Operation
- Auto current Limit from 1.0 ~ 3.0 Amps Peak
- TTL-CMOS Compatible Inputs
- Position control, speed control and torque control of PMDC Motor
- Speed Controller consists of P, PI, PID Controller
- Check Terminal: Measures Input current and voltage, Output speed and Torque, Duty cycle of MOSFET using RISC microcontroller-based Data Acquisition (DAQ) card.
- Touch LCD Display and Control using DAQ Card.



Technical Data:

12V/24V PMDC Motor with Gearbox (Mounted on Open Frame)

- Permanent Magnet DC (PMDC) motor operating at 12V or 24V.
- Integrated gearbox for torque enhancement and speed reduction.
- Mounted on an open frame for easy accessibility and observation.

Optical Encoder-Based Speed Sensor

- High-precision optical encoder for real-time speed measurement.
- Converts rotational motion into electrical signals for accurate speed feedback.
- Used for closed-loop control applications.

Control Circuit with Opto-Coupler Isolation

- Electrical isolation between control and power circuits for safety.
- Opto-couplers protect sensitive control components from voltage spikes.

2-Quadrant Operation

- Allows motor operation in forward and braking modes.
- Enables controlled acceleration and deceleration.

Auto Current Limit (1.0 ~ 3.0 Amps Peak)

- Automatic current limiting to prevent damage due to overcurrent conditions.
- Ensures motor protection and enhances longevity.

TTL-CMOS Compatible Inputs

- Digital logic level compatibility for seamless integration with microcontrollers and logic circuits.
- Enables easy interfacing with automation and embedded systems.

Position Control, Speed Control, and Torque Control

- Supports multiple control modes:
 - **Position Control:** Precise control of motor shaft position.
 - **Speed Control:** Maintains a constant speed under varying loads.
 - **Torque Control:** Regulates torque for efficient operation.

Speed Controller with P, PI, PID Control

- **P (Proportional):** Basic error correction for immediate response.
- **PI (Proportional-Integral):** Eliminates steady-state error.
- **PID (Proportional-Integral-Derivative):** Enhances stability and performance.

Check Terminal for Measurement & Data Acquisition (DAQ)

- Monitors key parameters:
 - Input current and voltage.
 - Output speed and torque.
 - Duty cycle of MOSFETs for power control.
- Utilizes a RISC microcontroller-based DAQ card for real-time data logging.

Touch LCD Display and Control via DAQ Card

- Interactive touch screen for real-time monitoring and control.
- DAQ card enables user-friendly interface and data visualization.
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Experimental Data:

- DC Servo Motor Modeling and Identification.
- Intelligent Servo Controller.
- Sensor Measurement and Position Control in LabView.
- DC Servo Velocity Adjustment.
- Signal following and filter design.
- Operational amplifier usage experiment using Analog Control
- Typical step response experiment.
- P, PD, PID controller experiment.