

DC SERVO TRAINER

ED-4400B

- Analog Feedback Loop & DC servo system
- Modularized by the function of servo circuits
- Overload protection for the Servo Amp's and power supply's output
- Servo Motor with Tacho Generator and Speed Reduction Gear
- PID Control Exercise [option : PID Control Module U-165]



> EXPERIMENTS

- Transient Characteristics of Servo Motor
- Response Characteristics
- Speed Detection and Closed Circuit's Composition
- Steady Speed Control
- Load Characteristics
- Position Detection and Operational Amplification
- Error Signal Detection and Closed Circuit's Composition
- Position Control
- Closed Circuit's Gain and Response Speed
- Servo Circuit Applications
- PID Control(Optional)

> SPECIFICATIONS

- **Servo System Method** : Analog Feed-back Loop, DC Servo
- **Circuit Composition** : Modular System(10 Modules and Motor, Electronic Brake)
- **Speed Control Range** : 0.01 RPM~60 RPM
(Reduction Ratio 60:1)
- **Position Resolution** : Less than $\pm 3^\circ$
- **Operating Temperature** : 0~45°C, Below 85% R.H.
- **Input Voltage**
 - » Modules : $\pm 15V$, 0.6A Max.(by DC Power Supply)
 - » System : AC 220V, 50~60Hz
- **Dimension**
 - » Modules : 110(W) x 55(H) x 110(D)mm
 - » System case : 615(W x 175(H) x 470(D)mm
- **System Weight** : 18.2kg

AUXILIARY MODULES

- Function Generator U-162 : 1ea
- RPM Meter U-159 : 1ea
- Magnet Brake U-163 : 1ea

ACCESSORIES

- Aluminum Brake Disk : 1ea
- Inertia Flywheel Disc : 2ea
- Patch Cord($\phi 4$ Plug) : 1set
- AC Power Cord : 1ea
- Experimental Manual : 1ea

OPTION

- PID Control Module U-165

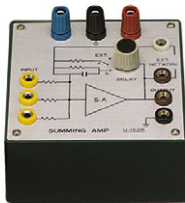
Experiments Module



U-151 Attenuator

The dual rotary type attenuator consists of 10 steps and each step reduces by 10%.

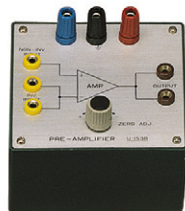
- **Input Resistance** : $10k\Omega \times 10=100k\Omega$
- **Attenuation** : $10\% \times 10=100\%$



U-152 Summing Amp

Performs add-up operations for the current of three circuits and experiments on the gain and transfer characteristics.

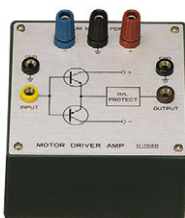
- **Input Circuit** : 3-input analog summing
- **Delay** : Int./Ext.



U-153 Pre-Amp

Designed to control DC offset voltage; and can control DC zero offset coming from the DC Amplifier.

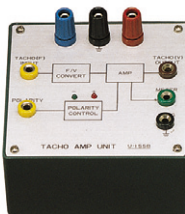
- **Offset Range** : Approx. $\pm 5V$
- **Gain** : 20dB



U-154 Motor Drive-Amp

This 10W DC differential amplifier has overload protection circuits and drives the Servo Motor.

- **Output Power** : 15V 700mA Max.
- **Gain** : 34dB Current Amp.



U-155 Tacho Detector

Changes the tacho generator's output in frequency-to-conversion and makes the RPM proportional DC voltage polarized in (+) or (-) output along the motor's rotational direction.

- **Input** : AC 1~1200Hz, 0~3V
- **Output** : DC $\pm 0\sim 15V$
- **Polarity Sensitivity** : Less than 0.1V



U-156 Power Supply

Supplies power to the Servo Motor and other systems with overprotected DC outputs. The mounted ammeter shows current status of the motor's load.

- **Output**
 - » $\pm 15V$ 0.2A(for modules)
 - » $\pm 15V$ 0.5A(for motor)
- **Protection** : Overload and short circuit protection
- **Input Voltage** : AC 220V, 50/60Hz



U-157/U-158 Potentiometer

The 360° rotary scales are mounted on this precision potentiometer for position setup and detection.

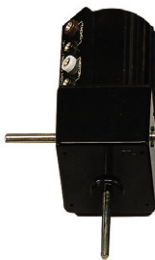
- **Input Resistance** : 1/10k Ω
- **Input Voltage** : 30V Max.
- **Resolution** : Less than 1/1000 Division
- **Power Dissipation** : 2W at 25°C



U-159 RPM Meter

This RPM Meter is used together with U-155 Tacho Detector, and it indicates the Servo Motor's RPM along the output of Tacho Detector.

- **Max. Indication** : 4000 RPM
- **Input Impedance** : Approx. 150k Ω



U-161 DC Servo Motor

Consists of the speed reduction gear and the tacho generator.

- **Input Voltage** : DC 12V, 4.5W Max.
- **Tacho Output** : about 3Vp-p(at 4000RPM)
- **RPM** : 5000 Max.
- **Gear Ratio** : 60:1 Down Speed



U-162 Function Generator

Generates Square Wave for experiments on the motor's response speed and transient characteristics. Also, it provides Ramp outputs for timing axis.

- **Frequency Range** : 0.1~1Hz, 1~10Hz
- **Output** : DC 15Vp-p



U-163 Magnet Brake

The Magnet Brake has rotational load by eddy currents presented to the aluminum rotational disk which is mounted on the motor's high speed axis.

- **Magnet Power** : 5~500AT variable
- **Magnet Air-gap** : 4mm
- **Input Voltage** : AC 220V, 50/60Hz