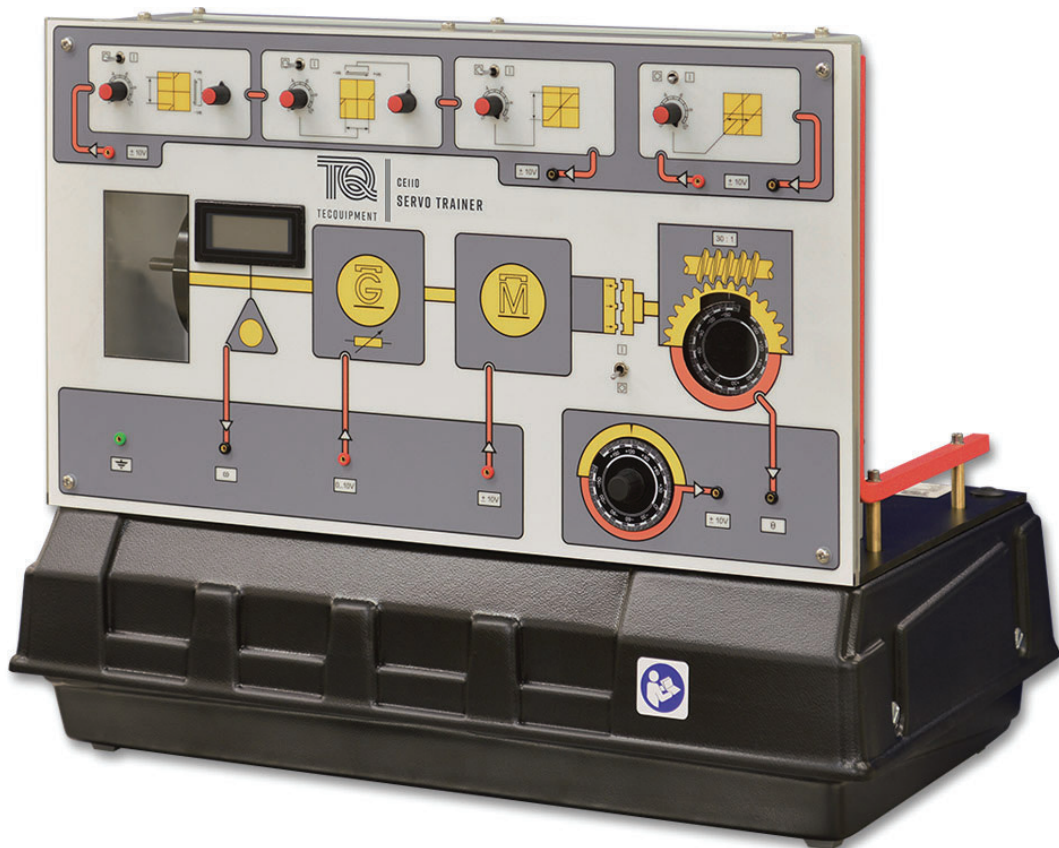




≡ SERVO TRAINER

CE110

A self-contained, benchtop DC servo apparatus to study basic control of speed of a servomotor, through to more advanced studies of non-linear effects of hysteresis, deadzone and saturation.



KEY FEATURES

- Self-contained and compact benchtop unit for basic control of speed, with advanced studies of non-linear effects of hysteresis, deadzone and saturation
- Demonstrates the problems of speed and position control of a servomotor under different loads
- Mimics industrial, transport and aeronautical problems, with realistic results
- All inputs and outputs buffered for connection to TecQuipment's optional controllers or other suitable controllers
- Front panel includes a mimic diagram of the process so that students can see what they are controlling



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CE110

DESCRIPTION

The CE110 Servo Trainer shows DC servo position and speed control systems using typical industrial techniques. It has a DC servomotor, a DC generator and a flywheel mounted on a common shaft.

Analogue 0 to ± 10 V control signals vary the servomotor shaft speed in either direction. An optical sensor measures the speed and shows it on a panel-mounted digital meter. The DC generator statically or dynamically loads the servomotor. An electric clutch connects or disconnects the shaft to a 30:1 reduction gearbox for position control studies. A manual control allows the user to set a position control setpoint.

To adjust the shaft inertia, the CE110 comes with two extra interchangeable inertia discs (flywheels).

For advanced experiments, the Servo Trainer includes extra 'block'-type circuits that can add non-linear and fully adjustable effects of:

- Deadzone or 'deadband'
- Anti-deadzone
- Hysteresis
- Saturation

These blocks are important in studies of servo systems because they mimic problems that happen in real applications.

ESSENTIAL BASE UNIT

- Controller (CE120) – A controller with analogue and digital controls and instruments or
- Digital Interface (CE122) – An interface which connects between most products in the Control Engineering range and a suitable computer (not included) or
- Other suitable controller with ± 10 V inputs and outputs

Both the CE120 and the CE122 include TecQuipment's CE2000 Control Software (see separate datasheet) with editable, pre-made control experiments for use with the CE110.

STANDARD FEATURES

- Supplied with comprehensive user guide
- Five-year warranty
- Made in accordance with the latest European Union directives
- ISO9001 certified manufacturer

LEARNING OUTCOMES

- Basic tests and transducer calibration
- Response calculation and measurement
- Proportional and proportional plus integral control of servo-system speed
- Disturbance cancelling and feedforward control
- Angular position control: proportional control and velocity feedback
- Angular position control and the influence of non-linearities
- Non-linear system characteristics

The flexible design of the equipment allows the user to develop many other analysis and control exercises to suit their needs. It is good for extended or advanced control experiments, and is ideal for student project work.

ESSENTIAL SERVICES

ELECTRICAL SUPPLY:

50/60 Hz, with earth

220 VAC to 240 VAC, 0.5 A

and 110 VAC to 120 VAC, 1 A

Other voltages and frequencies available to special order

BENCH SPACE NEEDED:

1 m x 750 mm

OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

STORAGE TEMPERATURE RANGE:

-25°C to $+55^{\circ}\text{C}$ (packed)

OPERATING TEMPERATURE RANGE:

$+5^{\circ}\text{C}$ to $+40^{\circ}\text{C}$

OPERATING RELATIVE HUMIDITY RANGE:

80% at temperatures $< 31^{\circ}\text{C}$ decreasing linearly to 50% at 40°C

≡ SERVO TRAINER

GE110

SPECIFICATIONS

TecQuipment is committed to a programme of continuous improvement; hence we reserve the right to alter the design and product specification without prior notice.

NETT DIMENSIONS AND WEIGHT:

540 mm x 330 mm x 420 mm; 18.7 kg

PACKED DIMENSIONS AND WEIGHT:

0.3 m³, 41 kg (approx – packed for export)

INPUTS (0-10 VDC):

- Motor control signal: 0 to +/- 10 VDC
- Generator load control
- Signal conditioning blocks – deadzone, anti-deadzone and saturation: 0 to +/- 10 VDC
- Hysteresis block: 0 to +/- 10 VDC

OUTPUTS (0-10 VDC):

- Reference Set Point – 0 to +/- 10 VDC
- Servomotor shaft speed
- Gearbox position (angle)
- Signal conditioning blocks – deadzone, anti-deadzone and saturation: 0 to +/- 10 VDC
- Hysteresis block

OTHER CONNECTIONS: 0 TO 10 VDC

User-adjustable position (angle) setpoint

OTHER PARTS INCLUDED:

Connecting cables

SOUND LEVELS

Less than 70 dB(A)