

KCL - 08**DC MOTOR SPEED CONTROL TRAINER**

DC Speed control is a requirement in many industrial and process control systems. The main characteristics of such a system are its steady state error and disturbance rejection properties. Speed control of a DC motor is also one of the basic systems covered in a first course on automatic control system. The present unit, built around a small permanent magnet DC motor, is designed to bring out the salient features of such a system. Facilities are available to directly measure the principal performance factors of the speed control system, viz., steady state error and load disturbance rejection, as a function of the forward path gain. In addition, the experimental work involves the determination of the motor transfer function and the characteristics of the tachogenerator.

An important feature of the unit is the built-in absolute speed measurement through optical pick-up from a slotted disk followed by a frequency counter. The 4-digit speed display is therefore completely independent of the tachogenerator characteristics. The high accuracy of speed reading is due to a built-in crystal oscillator. Another interesting design feature is the use of an electronic tachogenerator - a frequency to voltage converter, for the generation of speed feedback signal. This highly linear, non-contact transducer is ideally suited for the small DC motor being used in the unit.

Variable loading of the motor is achieved by a built-in eddy current brake. This brake has superior characteristics compared to friction brake especially for a small motor. The motor unit, housed in a cabinet with transparent panels, provides a good view of the mechanical arrangements.

Features

- Speed control of a 12V, 4W permanent magnet D.C. Motor
- Speed range: 0 to 3000 rpm (typical)
- Opto-interrupter based speed sensing.
- 4-digit speed display in rpm.
- Electronic tachogenerator for feedback.
- Separate unit for motor in a see-through cabinet.
- Smooth, non-contact eddy current brake for loading.
- Built-in 3 ½ digit DVM for signal measurements.
- **Interconnections**
 - All interconnections are made using 2mm banana Patch cords.
- Test points are provided to analyze signals at various points.
- All ICS are mounted on IC Sockets.
- Bare board Tested Glass Epoxy SMOBC PCB is used.
- In-Built Power Supply with Power ON indication
- Attractive ABS Plastic enclosures.
- Set of 2mm Patch cords for interconnections
- User's Manual.

List of Experiments

- Effect of loading on the speed of motor in the open loop.
- Steady state error variable with forward gain
- System time constant variable with forward gain.
- Effect of forward gain on disturbance rejection.
- Determination of the motor transfer function and tachometer characteristics.

Note : Specifications can be altered without notice in our constant efforts for improvement.