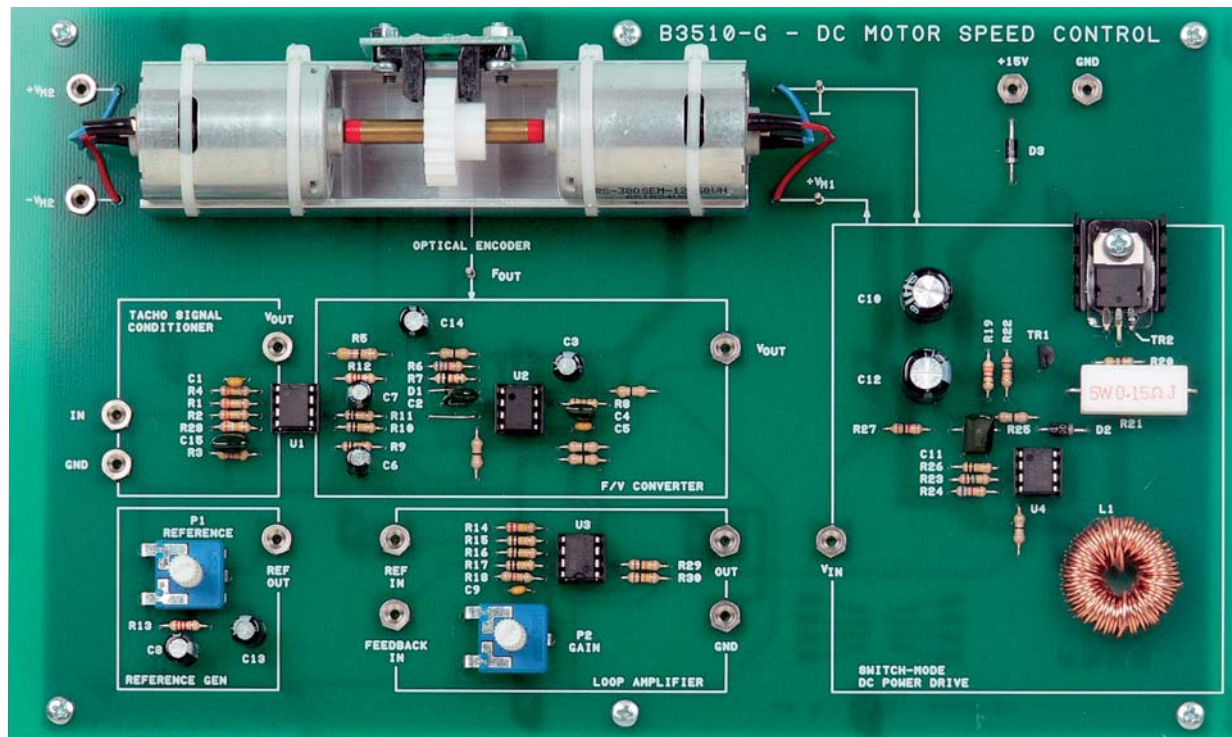




Speed feedback



This model is designed for the simplified study of a speed feedback on a closed loop, with a feedback signal generated either by a tachometric dynamo, or by an optical impulsion encoder. It consists of a direct current motor which drives a second direct current motor, functioning as a generator. The signal issuing from this generator is used as an image of the speed. The shaft assembly also drives a toothed disc, which cuts a luminous barrier, the impulses of which are applied to a frequency voltage converter. A direct current adjustable source integrated in the model is used as the voltage reference level. A switching supply controlled by the error voltage supply the motor.

ACCESSORIES SUPPLIED

1 set of leads Ø2mm : 2 x 100cm / 2 x 30cm / 2 x 15cm

ref. B3510-G

Dim. : 250 x 150 x 30mm. Weight : 900g.

PRACTICAL WORK DESCRIBED IN THE USER'S MANUAL

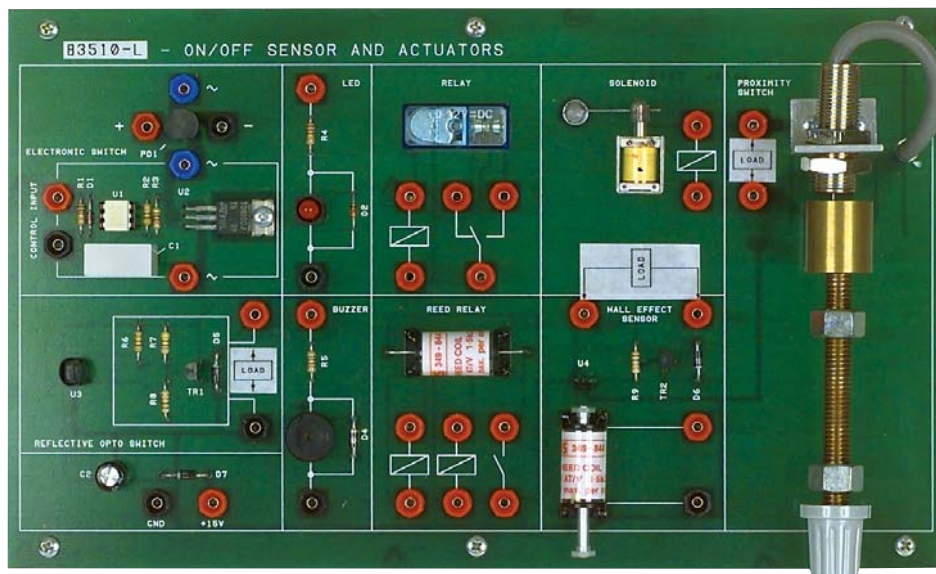
- Study of the luminous barrier/frequency voltage converter.
- Study of the tachometric filter.
- Study of the loop amplifier and of the controlled switching power supply.
- Comparison of tachometric voltages and optical encoder + converter.
- Comparison of low rotation frequencies with and without feedback loop.
- Study of the feedback response for different values of loop gain.



**COMPLETE RANGE
SENSORS**



All or nothing sensors and actuators



**COMPLETE RANGE
SENSORS**

ref. B3510-L

Dim. : 250 x 150 x 30mm. Weight : 900g.

This model includes sensors currently used in industry:

- an optoelectro-reflection barrier, with its output amplifier
- a Hall effect sensor with its output amplifier
- an inductive proximity sensor with its output amplifier
- facing a metallic mass which the operator progressively displaces using a worm screw.

The model also includes:

- an electronic switch consisting of a triac and its electronic control
- a dry relay and a reed relay with two coils
- two solenoids
- one facing the Hall sensor
- a visual LED display and a piezoceramic type buzzer with integral micro-oscillator.

PRACTICAL WORK DESCRIBED IN THE USER'S MANUAL

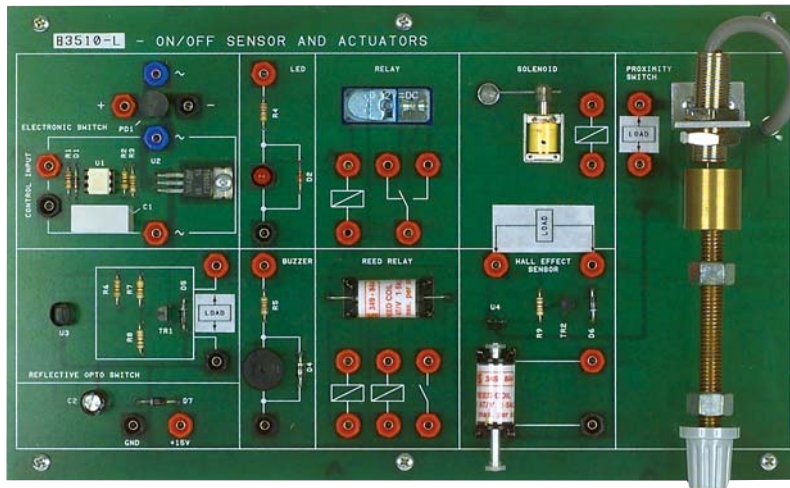
- Description of the different components and their usage.
- Functioning of the amplifiers.
- Measurement of the detection distance of the inductive sensor.
- Analysis of the electronic switch, controlled by direct or alternating current.
- Study of a line consisting of an optoelectro-barrier, a switch and a solenoid.
- Possibility of making other lines: optoelectro-barrier - reed relay - Hall sensor - electronic switch - buzzer

ACCESSORIES SUPPLIED

1 set of leads Ø2mm :
2 x 100cm / 2 x 50cm / 3 x 30cm / 3 x 15cm



All or not sensors and actuators



This model includes sensors currently used in industry: an optoelectro-reflection barrier, with its output amplifier, a Hall effect sensor with its output amplifier, an inductive proximity sensor with its output amplifier, facing a metallic mass which the operator progressively displaces using a worm screw.

The model also includes: an electronic switch consisting of a triac and its electronic control, a dry relay and a reed relay with two coils, two solenoids, one facing the Hall sensor, a visual LED display and a piezoceramic type buzzer with integral micro-oscillator.

ref. B3510-L

Dim. : 250 x 150 x 30mm.
Weight : 900g.

PRACTICAL WORK DESCRIBED IN THE USER'S MANUAL

- Description of the different components and their usage.
- Functioning of the amplifiers.
- Measurement of the detection distance of the inductive sensor.
- Analysis of the electronic switch, controlled by direct or alternating current.
- Study of a line consisting of an optoelectro-barrier, a switch and a solenoid.
- Possibility of making other lines: optoelectro-barrier - reed relay - Hall sensor - electronic switch - buzzer



Position feedback

ref. B3510-J

This model is designed for the simplified study of a closed position feedback loop. It is composed of a direct current motor, the rotation of which drives a worm-screw. The screw cursor is integrally attached to a copying potentiometer which supplies an electrical image of its position. The potentiometer operated manually determines the basic position.

TUTORIALS DESCRIBED IN THE INSTRUCTIONS

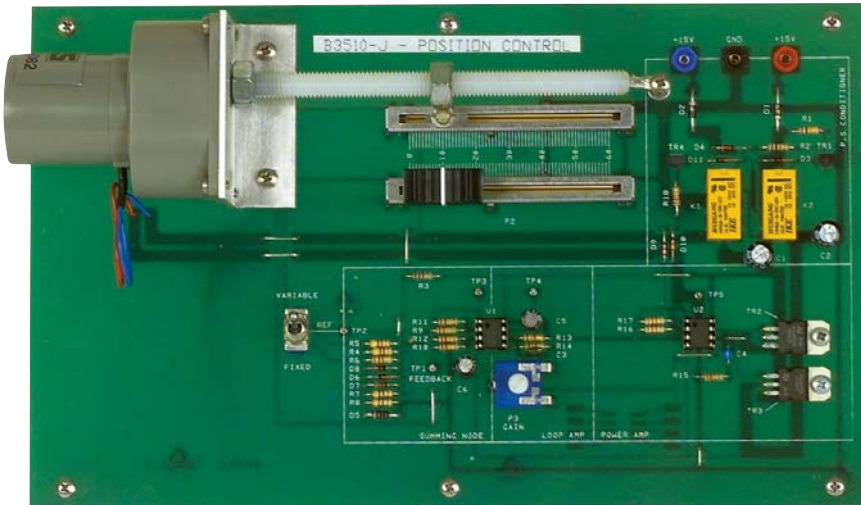
- Study of the principle of a closed feedback loop: error voltage, pre-amplification, driver stage, push-pull.
- Study of limitation of movements circuits.
- Anti-jamming system.
- Study of the feedback response to a voltage step for different values of loop gain.

ACCESSORIES SUPPLIED

1 set of leads Ø2mm : 3 x 100cm / 2 x 30cm



**COMPLETE RANGE
SENSORS**





Incremental & absolute encoder



ref. B3510-R

This model illustrates how an incremental encoder and an absolute encoder work. They work in exactly the same way as commercial encoders. However, since resolution is not important in our application, the number of sensors is limited to 5.

The model has two interchangeable encoder discs, with the sectors representing DCB encoding and Gray encoding.

When the operator turns the disc by hand, the phototransistors underneath send their signals to the decoding logic and the display (4 line x 20 character LCD screen) and to 4mm-diameter terminals, in order to control all of the control or decoding logics performed by the operator. The sensitivity of the phototransistors can be adjusted depending on the ambient light.

TUTORIALS DESCRIBED IN THE INSTRUCTIONS

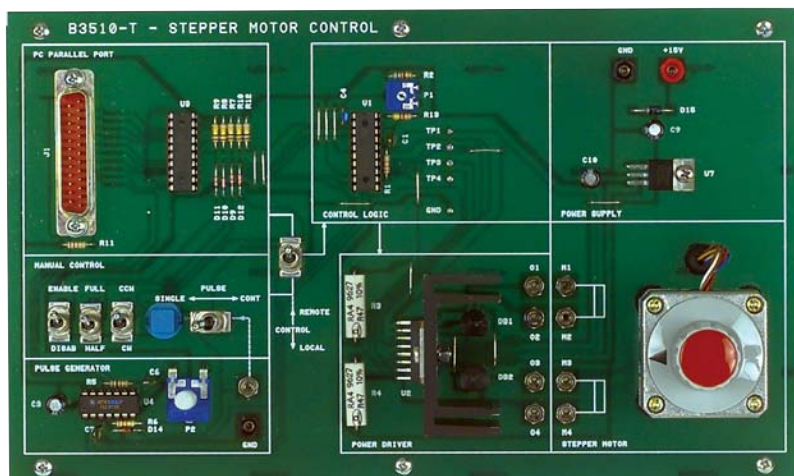
- 3-BIT ABSOLUTE DCB ENCODER correspondence between the position of the disc, the status of the sensors and the display. Transition codes and synchronisation sensor.
- INCREMENTAL DCB ENCODER use of the encoder in counter and count-down mode. Detection of the direction of rotation, improvement of accuracy using an angle sensor.
- 4 BIT GRAY ENCODER GRAY/DCB code comparison. A synchro. sensor is required.



**COMPLETE RANGE
SENSORS**



Stepping motor



SOFTWARE SUPPLIED



**COMPLETE RANGE
SENSORS**

ref. B3510-T

Dim.: 250 x 150 x 30mm. Weight: 900g.

Includes a stepping motor with 2 separate coils, the motor driver and the specialised logic test circuit. The latter can be accessed either by a PC via a 25 pin parallel port, or by a manual control logic system integrated. This logic comprises a controlled impulse generator by push button for the step by step lead and a variable frequency generator for the continuous working.

ACCESSORIES SUPPLIED

1 set of leads Ø2mm : 2 x 100cm / 4 x 30cm / 3 x 15cm
1 lead DB25 SERIE
1 software on CD

PRACTICAL WORK DESCRIBED IN THE USER'S MANUAL

- Study of the principle of a stepping motor and its different ways of functioning by step and half-step.
- Vibrations seen at low frequency, loss of steps at high frequency.
- Determination of the take-in resonance frequency and of the rotation limit frequency
- Observation of signals delivered by the driver to the motor windings.
- Inversion of currents in the motor coils.
- Observation of 4 signals applied by the control logic to the driver out of phase with one another.

PRACTICAL WORK WITH COMPUTER

A program in basic and working in DOS is supplied. This completely listed program can be freely copied and if necessary modified by the user. In particular, it allows control of the speed and direction of rotation.