

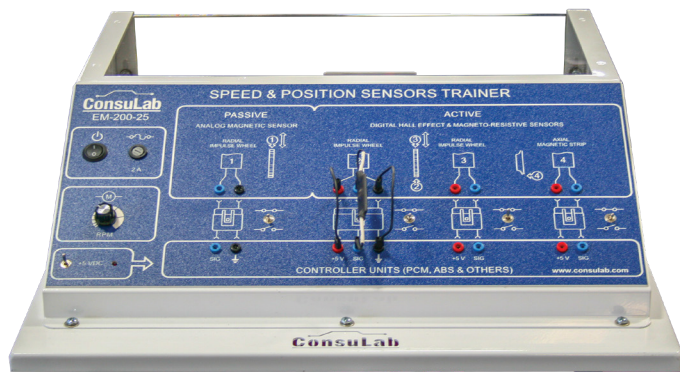
## SPEED AND POSITION SENSORS TRAINER



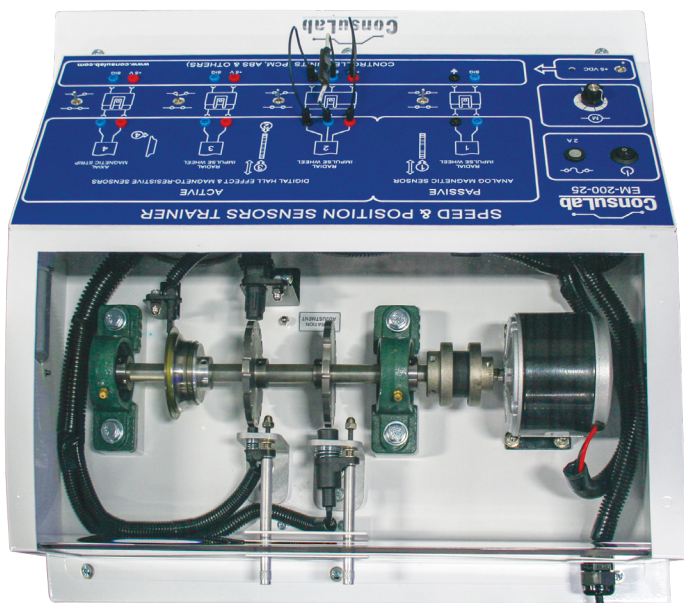
The EM-200-25 Speed and Position Sensors trainer is used to demonstrate the operation, diagnosis and testing of common types of analog and digital speed and position sensors as they operate on a real vehicle all in one place. The trainer provides a safe and effective method of demonstrating the operating principles of different types of speed and position sensors that are common on today's cars and trucks normally used for wheel speed, engine speed and vehicle speed.

### MAIN FEATURES

- Complete curriculum and courseware.
- Analog (passive) inductive sensor with adjustable air gap to show effects on operation.
- Digital Hall-Effect sensor.
- Radial and axial digital (active) magneto-resistive sensors (adjustable radial sensor to show effect on operation).
- 2mm sensor test receptacles for hookup of DVOM and Oscilloscope.
- Equipped with sensor disconnect switches for separate testing of both harness side and/or component side of sensor.
- Trainer features a bench top design that allows clear student visualization of sensor operation, adjustment, diagnosis and testing.
- Electronically controlled variable speed electric drive motor.
- 120V AC/DC & 5V power supply included.



## SPEED AND POSITION SENSORS TRAINER



### EDUCATIONAL ADVANTAGES

- Demonstrates full functionality of both analog (passive) and digital (active) speed and position sensors.
- Electronically controlled variable speed drive motor allows sensor operation from zero RPM through steady and variable speeds.
- Magneto-resistive magnetic strip sensor can detect instant movement of rotation or 0 kph/mph.
- Allows student demonstrations of the diagnosis and testing of:
  - CKP (Crankshaft Position Sensors)
  - CMP (Camshaft Position Sensors)
  - VVT (Variable Valve Timing) sensors
  - ABS Wheel speed sensors (all types)
  - RPM and Vehicle Speed sensors
  - Steering Wheel sensors and Hill Assist sensors

### TECHNICAL SPECIFICATIONS

- **Dimensions :** 22 x 22 x 6.75 inch (55.8 x 55.8 x 17.1 cm) / 24 x 24 x 13 inch (60.9 x 60.9 x 30 cm) with packaging.
- **Weight :** 41 lb (18.6 kg) / 46 lb (20.9 kg) with packaging.
- **Power Requirements :** 120VAC 15A circuit.

## SPEED AND POSITION SENSORS TRAINER

Speed and Position Sensors Trainer: Hall sensor

**Introduction**

The Hall sensor is an active sensor. This means that it needs a power supply to generate a signal.

The sensor is made up of:

- a housing
- an electronic circuit
- a Hall element
- a magnet
- electrical connections

In vehicle technology, the Hall sensor is used, among other things, to determine the:

- Speed and position of the crankshaft.
- Speed and position of the camshaft.
- Speed of a drive shaft.

To perform this assignment correctly, you'll need the following items.

Click on the items that are present.

If items are missing, please see your instructor.

- speed and position sensors trainer
- multimeter
- oscilloscope

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Speed and Position Sensors Trainer: Hall sensor

**Measuring with the multimeter**

In this part of the assignment you perform measurements on the Hall sensor with a multimeter. You learn which measurements are useful and which measurements are not.

Set the multimeter for measuring DC voltage (VDC).

Connect the COM terminal of the multimeter to a ground connection.  
Connect the other measuring connection to the signal connection of the Hall sensor on the control unit.

Measure the signal voltage (VDC) and fill in your measured value (mV).

0 mV

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Speed and Position Sensors Trainer: MRE sensor with external magnet

**Measuring with the multimeter**

In this part of the assignment you perform measurements with a multimeter on the MRE sensor with external magnet. You learn which measurements are useful and which are not.

What conclusion can you draw from your measurements?

By measuring the signal voltage with a multimeter (VDC), you can see whether the pulse ring is rotating slowly or quickly.

The higher the speed, the higher the signal voltage measured by the multimeter (VDC).

The speed has no influence on the signal voltage that you measure with the multimeter (VDC).

By measuring the signal voltage with a multimeter (VDC), you cannot see the difference between slow or fast rotating.

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# ELECTUDE

## THE CONSULAB EM-200-25 SPEED AND POSITION SENSORS TRAINER IS NOW AVAILABLE WITH ELECTUDE COURSEWARE (SOLD SEPARATELY).

The EM-200-25 trainer has a complete set of student-led learning modules integrated into the Electude LMS (learning management system) complete with student tracking, grading and assessments. Designed to match the visual and kinesthetic learning styles of today's students, these modules have been designed to cover NATEF tasks and Red Seal program objectives. With a ConsuLab/ Electude integrated product, you can set the student up with the training aid, assign the module to them in Electude and be liberated to do what you do best!

With this practical set-up, the participant can supplement previously acquired knowledge of sensors with practical skills. The practical set-up contains four sensors for determining speed and position; inductive, Hall, MRE with internal and MRE with external magnet.

Through the preparatory theory and practical assignments the student learns:

- How to manage the multimeter and oscilloscope.
- Concepts such as amplitude, frequency and pulse width modulation.
- Which checks apply to the relevant sensor with multimeter and oscilloscope.
- To recognize and analyze voltages and signals.
- What effect speed, sensor wheel shape, air gap, resistance in cabling have on the signal.
- What this effect on the signal can mean for the functioning of the vehicle and therefore for the customer.

**Includes 8 practical assignment modules for a total of 9.5 hours of instruction.**