

Portable Electronic Sensors Learning System

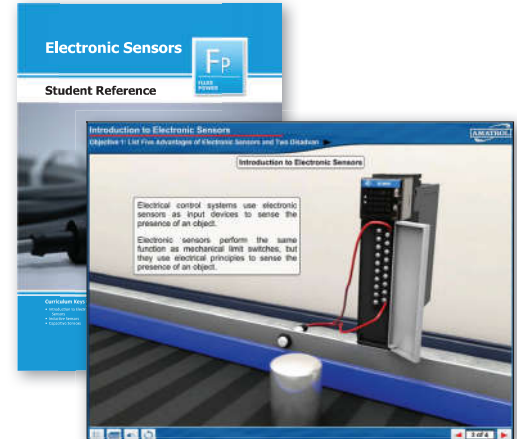
990-SN1

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FLUID
POWER



Student Reference Guide



Interactive Multimedia Curriculum



990-SN1

Learning Topics:

- Electronic Sensor Advantages
- Sensor Components
- Sensor Operation
- Transistors
- Inductive Sensors
- Capacitive Sensors
- Magnetic Reed Sensors
- Hall-Effect Sensors
- Photoelectric Sensors
- Sensor Measurement
- Sensor Applications
- Relay Circuits

Amatrol's Electronic Sensors Learning System (990-SN1) is a portable solution for when there is a need to teach electronic sensors where there is limited space such as in a conference room, LAB area, or even a shop floor desk! Its compact size and durable case also provide for safe storage when your limited space must be used for teaching other subjects or when the system must be transported to a different location in the facility for use.

This portable learning system teaches the operation of electronic non-contact sensors and their applications in industry, such as sensing movement, detecting metal versus non-metal, and determining speed. The 990-SN1 is small and light, yet offers a depth and breadth of knowledge and skills that far exceeds its physical size.

The 990-SN1 includes a variety of electronic sensors, such as capacitive proximity, inductive proximity, magnetic reed, hall-effect, and photoelectric. These sensors are used with a large array of test materials to show how each sensor completes industrial tasks in real-world environments. Combined with Amatrol's world-class curriculum, this innovative product provides learners with a thorough understanding of electronic sensors and their applications.



Technical Data

Complete technical specifications available upon request.

Portable Case

Suitcase: 15" L x 11" W x 5 1/2" D
Durable ABS Plastic

Power Supply Assembly – 12 VDC

Indicator Lamp

Lead Set

Slide Base

Target Holder

Magnetic Reed Switch

Capacitive Proximity Switch

Inductive Proximity Switch

Hall-Effect Switch

Photoelectric Switch

Switch Mount Adapter

Interface Bracket

Interface Cam

Target Set

Multimedia Curriculum (M11142)

Instructors Guide (C11142)

Install Guide (D11142)

Student Reference Guide (H11142)

Additional Requirements

See <http://www.amatrol.com/support/computer-requirements>

Utilities Required:

120/220 VAC, 60 /50 Hz, Power Outlet

Electronic Sensor Training: Anywhere, Anytime!!

Learners only need a small amount of desk space and a computer to study vital sensor-related industry skills. Electronic sensors are used in industrial applications for feedback to systems like electrical relay controls and programmable logic controllers. Learners will practice real-world skills on standard industrial grade components to ensure that they are familiar with actual components when they enter the workforce. The 990-SN1 allows learners to build relay circuits that separate metallic and non-metallic materials, design controls for a stamping machine, and use a sensor as a safety interlock.



World-Class Electronic Sensor Curriculum

Amatrol offers extensive, thorough, interactive curriculum covering electronic sensor advantages, functions, and operation. The 990-SN1 curriculum covers five different electronic sensors and describes the characteristics that affect each sensor's performance. As an example, learners will study a Hall-Effect sensor and understand what the Hall-Effect is and how the sensors are utilized on conveyor belts and in computer keyboards. Learners will then test a Hall-Effect's performance by sensing distance, hysteresis, and the ability to sense through different materials using supplied sensor targets.



Interactive Multimedia

Complimentary Student Reference Guide

A sample copy of the Electronic Sensors Learning System's Student Reference Guide is included with the system for your evaluation. Sourced from the Electronic Sensors multimedia curriculum, the Student Reference Guide takes the entire series' technical content contained in the learning objectives and combines them into one perfect-bound book. Student Reference Guides supplement these courses by providing a condensed, inexpensive reference tool that learners will find invaluable once they finish their training making it the perfect course takeaway.

If you would like to inquire about purchasing additional Student Reference Guides for your program, contact your local Amatrol Representative for more information.



PORTABLE ELECTRONIC SENSORS LEARNING SYSTEM

Shall include: (1) set of electronic sensors and lead/indicator set, (1) set of target materials, (1) positioning and measuring device, (1) power supply, (1) lead set, (1) storage module, (1) student curriculum, and (1) instructor's guide.

Sensors and Lead/Indicator Set

All electrical connections shall be plug-in and all sensors shall be mounted on individual bases. These connectors and bases shall be compatible with those used on various other Amatrol learning systems. The sensors shall be designed with mounting devices that allow them to quickly mount to the target presentation base. This mounting position shall be adjustable by sliding the position of the sensor. The components shall include at a minimum:

- (1)-Capacitive Proximity Sensor with universal mount
- (1)-Hall-Effect Sensor with universal mount
- (1)-Inductive Proximity Sensor with universal mount
- (1)-Magnetic Reed Sensor with universal mount
- (1)-Photoelectric Switch
- (1)-14 V Indicator Lamp (LED with Internal Resistor)
- (1)-Lead Set

Target Set

Shall include: 2-inch square targets, 0.25 in thick, for use with sensors. These targets shall be made of the following materials:

- (1)-Large Steel
- (1)-Small Steel
- (1)-Plastic, opaque
- (1)-Glass
- (1)-Ring Magnet, Small
- (1)-Ring Magnet, Large
- (1)-Aluminum
- (1)-Wood

Power Supply

Shall be a transformer type, which plugs into an AC wall outlet. To provide 12 VDC, 1A.

Positioning and Measuring Device

To provide target presentation to enable testing of sensor operation characteristics. Minimum features shall include:

- (1)-Slide Base Assembly
- (1)-Target Holder Assembly
- (2)-Interface Brackets
- (1)-Interface Cam
- (1)-Switch Mount Adapter

Storage Module

Shall provide cushioned storage of all components in the system. Made from durable ABS plastic, the case measures 15" x 11" x 5 1/2" and features a carrying handle.

Student Curriculum

The student curriculum shall consist of (1) set of 2 multimedia modules with at least 15 industry skills covering sensor operation, installation, application, and troubleshooting. Sensors covered shall be inductive, capacitive, hall-effect, and magnetic reed.

The student curriculum shall be designed in a skill-based format that focuses on teaching industry-relevant tasks. The objectives shall be accomplished by organizing the learning material into two multimedia courses, which are further subdivided into three or more segments per module. All learning material needed shall be contained in the modules including text material,

laboratory equipment activities, and multimedia directions. No external text sources shall be required. The specific cognitive skills taught by each text passage shall be identified next to the passage. Each lab activity shall be identified by the industrial task taught. All activities shall be highly detailed with step-by-step instructions to facilitate a self-directed learning environment. A combination of step-by-step enabling activities and creative, problem-solving activities shall be provided. A self-review of five to ten questions shall be provided after each segment. The curriculum must be capable of both self-directed and instructor directed study. All activities must correlate directly to the hardware supplied, with detailed illustrations and diagrams.

Teacher's Assessment/ Portfolio Guides

A teacher's guide shall be provided. It shall contain student data sheets, data sheet solutions, self-review answers, quizzes, quiz answers, student skill record sheets, and authentic assessment. A quiz shall be provided for each packet. A question shall be provided in each quiz for each cognitive objective taught. All tasks listed in the packet shall be listed on personalized student record sheets. The Instructor's Package shall include directions for authentic skill assessment.

Amatrol Model No. 990-SN1 or equal

990-SN1
PORTABLE ELECTRONIC SENSORS LEARNING SYSTEM

MODULE 1 INTRODUCTION TO ELECTRONIC SENSORS

SEGMENT 1 INTRODUCTION TO ELECTRONIC SENSORS

- OBJECTIVE 1 List five advantages of electronic sensors and two disadvantages
- OBJECTIVE 2 List five types of electronic sensors
- OBJECTIVE 3 Describe the function of the two parts of an electronic sensor
- OBJECTIVE 4 Describe the operation of two types of transistors used in electronic sensors

SEGMENT 2 INDUCTIVE SENSORS

- OBJECTIVE 5 Describe the operation of an inductive proximity sensor and give an application
- SKILL 1 Connect and operate an inductive proximity sensor
- OBJECTIVE 6 Describe five characteristics that affect inductive proximity sensor operation
- SKILL 2 Measure and analyze inductive proximity sensor performance

SEGMENT 3 CAPACITIVE SENSORS

- OBJECTIVE 7 Describe the operation of a capacitive proximity sensor and give an application
- SKILL 3 Connect and operate a capacitive proximity sensor
- OBJECTIVE 8 Describe five characteristics that affect capacitive proximity sensor operation
- SKILL 4 Measure and analyze the performance of a capacitive proximity sensor

MODULE 2 ELECTRONIC SENSOR APPLICATIONS

SEGMENT 1 MAGNETIC REED SWITCH

- OBJECTIVE 1 Describe the operation of a magnetic reed switch and give an application
- SKILL 1 Connect and operate a magnetic reed switch
- OBJECTIVE 2 Describe six characteristics that affect magnetic reed switch operation
- SKILL 2 Measure and analyze the performance of a magnetic reed switch

SEGMENT 2 HALL EFFECT SENSORS

- OBJECTIVE 3 Describe the operation of a Hall effect sensor and give an application
- SKILL 3 Connect and operate a Hall effect sensor
- OBJECTIVE 4 Describe three characteristics that affect Hall effect sensor operation
- SKILL 4 Measure and analyze the performance of a Hall effect sensor

SEGMENT 3 PHOTOELECTRIC SENSORS

- OBJECTIVE 5 Describe the operation of a photoelectric sensor and give an application
- SKILL 5 Connect and operate a photoelectric sensor
- OBJECTIVE 6 Describe five characteristics that affect photoelectric sensor operation
- SKILL 6 Measure and analyze the performance of a photoelectric sensor
- SKILL 7 Select an electronic sensor and design a circuit given an application