



## **A Comprehensive Application-Oriented Industrial Sensors Training System**

The EM-600 Series Advanced Electronic Sensors Training System is designed for hands-on study of industrial sensor technology and control in a user-friendly application-oriented setting. It includes a student manual and instructor's guide, which focus on the background, use and applications of sensors commonly used in industry.

Electronic control is done through use of a Programmable "Smart Relay" Controller with system components and hardware mounted in a configuration to replicate manufacturing operations.

Like a PLC, the "Smart Relay" allows the user to program and control up to eight inputs and four outputs simultaneously. However, unlike a PLC, the simplified logic programming software that is included with the "Smart Relay" requires no previous PLC programming knowledge. This enables the student to focus his/her efforts on controlling the various sensors and applications without having to study PLC programming first.

Users select from a variety of sensor categories and application types to configure the EM-600 Series Training System specific to their needs. Major sensor categories include photoelectric, proximity, specialty, and transducer. Basic application types include conveyor, linear slide, drill press, stamp/ clamp operation, and custom.

Sensors are connected to the built-in sensor receptacles located on a stainless steel mounting panel and frame with built-in 24 VDC power. The sensor bodies are attached and positioned to the application equipment.

With the EM-600's flexible system design, choice of sensor types and applications, interfacing to Programmable Logic Controllers (PLCs) and other external devices whether as part of an FMS system or stand-alone operation on a table or bench is as easy as "Plug and Play".

## SPECIFICATIONS

The EM-600 Series Electronic Sensors Training System consists of three parts: a base station, which is common to all sensor and application choices; a sensors package (photoelectric, proximity, specialty or transducer); and application package (conveyor, robotics, drill press, stamp/clamp, or custom). The user selects a sensors package and complementary application for use with the EM-600 base unit.

### BASE STATION

The EM-600 Series Sensors Training System is mounted upright on a stainless steel panel for convenient interfacing with other TII trainers. All features are silkscreened for easy identification. A series of jacks are located throughout the panel for easy electrical connecting and interfacing using banana jack patchcords. A programmable "Smart Relay" controller is imbedded into the top center of the steel panel. There is a large (20.5" x 10.0") work space in front of the 20.5" x 14.5" x 4" panel frame making the EM-600 system configuration "L-shaped". Various application-oriented hardware can be attached to this work space.

The programmable "Smart Relay" controller has a built-in display and keypad with simultaneous control for up to six digital 24 VDC inputs, two analog 0 - 10 VDC inputs and four relay outputs. Line power is 110/220 VAC with fuse protection. This controller can perform simple logic, timing, counting, and real-time clock operations. The "Smart Relay" controller provides the flexibility for programmable control of inputs/outputs with the ease of relay logic functionality.

Other key items included in the Base Unit are:

- Built-in 2.4 amp 24 VDC power supply for stand alone operation or interface to other 24 VDC enabled external devices or PLC.
- Series of banana jacks and twelve patchcords for easy electrical interconnecting of various system elements.
- Eight switches (four toggle, four illuminated - two momentary and two latching) for interface to "Smart Relay" controller inputs.

- Secondary timer, potentiometer, and plug-in relay with socket.
- Ten pre-configured panel mounted sensor stations - two each for 2-wire, 3-wire PNP, 3-wire NPN, 3-wire ANALOG, and 4-wire sensor types. This sensor station flexibility gives the user the ability to easily perform a variety of sensing activities.

### SENSOR PACKAGES

All sensors are industrial grade with cable/wire receptacles for easy insertion and connection to panel jacks. Sensors include mounting brackets and hardware for easy attachment and positioning to application devices.

1. Photoelectric: Retro-Reflective, Polarized Retro-Reflective, Fixed Focus, Standard Diffuse, Background Suppression, and Transmitted Beam - light source and receivers.
2. Proximity: Inductive (2 sizes), Capacitive, Hall-Effect, Magnetic Reed Switch, and Ultrasonic.
3. Process: Temperature, Noise, Flow, Color.
4. Transducers: Linear Positional, Linear Velocity, Pressure, Torque, Load and Force

### APPLICATION PACKAGES

1. Conveyor: Motor-driven, 2-inch wide belt conveyor with 24-inch travel.
2. Linear Slide: Single-axis ball screw track with motor and encoder.
3. Drill Press: Miniature drill press operation with motorized spindle and controllable motion.
4. Stamp/Clamp: Pneumatic press and vise with electrical solenoid control valves.

### DIMENSIONS

29 in. L x 17 in. H x 15 in. D with Conveyor

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