

## Explorer I Industrial Pneumatics



### A Comprehensive Maintenance Training System For Industrial Pneumatics

The Explorer I Industrial Pneumatic Training System provides the components and hands-on training required to effectively troubleshoot and repair pneumatic systems used in modern industry. It includes a student manual and instructor's guide which focus on the background, applications and maintenance of pneumatic equipment.

The curriculum begins with the fundamentals of pneumatics, which can be used as either an introduction to the technology or as a review of key principles. Additional sections focus on different types of valves, cylinders and pneumatic devices like vacuum Venturi generators, air motors and rotary actuators.

A complete industrial component panel with eye-level gauges is mounted on a slanted stainless steel

surface for easy access when conducting experiments. A lockable storage area behind the panel provides space for manuals and for additional components. Removable components on the panel and specialty

components from TII that expand the capabilities of the system can be mounted on the T-slot surface in front of the panel. Mounting hardware is included.

Explorer I can be mounted on a mobile training bench that has cabinet space for a compressor and allows the system to be wheeled between classrooms. The portability and rugged design of the training system allow it to meet demanding training schedules.

The Explorer I is one of four building blocks in the advanced Explorer Series of technology systems. The other advanced modules address the principles and applications of industrial hydraulics, electromechanics and programmable logic controllers. They are designed to interface with the Explorer I, and can be brought together using mobile benches available from TII. A major advantage of the TII system over traditional training programs is that each segment can also be operated separately, giving students more space and teachers greater flexibility.

## SPECIFICATIONS

1. The Instrumentation Section of the panel is mounted at eye level for easy reading of gauges. The panel is constructed of 16-gauge chrome plated and brushed steel. All gauges, cylinders and other instruments have been identified in large lettering on the panel. The Instrumentation Section includes a filter/regulator, a lubricator, a system pressure gauge, two in-line pressure testing gauges, a four-port manifold, a manometer, a flowmeter, a 24-volt DC power supply and a momentary switch with output jacks.

2. The Component panel is mounted at an angle for ease of use when building circuits. It is constructed of 16-gauge chrome plated and brushed steel and all instruments are clearly identified. The component panel includes: a 5-way, 3-position closed center lever-operated directional control valve; a 5-way, 2-position double-piloted directional control valve; a 3-way, 2-position

Additional Components include a push-button actuator to fit all directional control valve bodies, two flow control valves, a needle valve, a shuttle valve; a check valve, two T-fittings, 16 pneumatic hoses with quick connect/disconnect couplers color-coded by length, a Venturi assembly, manometer accessories, one air supply hose, and one solenoid valve cable.

The Storage Compartment is behind the component panel and accessed through a hinged door with a lock. It has been designed for storing hoses and extra components. All components, hoses, instruments and fittings are industrial grade design. All directional control valves are removable and dissectible. The actuators and spools on the directional control valves are interchangeable. All fittings are ball-check quick connect/disconnect.

Options to expand the capabilities of the system include a wide range of specialty components which can be purchased for mounting on the system's T-slot experiment surface. Each component comes complete with mounting hardware, instructions and an application lesson.

Also, the EXPLORER I-PSP is a mobile training system which includes the Explorer I, a mobile bench, and a compressor.

## CURRICULUM

The Explorer I curriculum was designed and reviewed by a panel of experienced high school and community college teachers, as well as industrial trainers. Courseware includes a student manual and instructor's guide with 40 units of activities and instructional support. Each of the four necessary levels of instruction includes background study of the topic, observational and hands-on experiments, application exercises, and mathematical formulas for proving results.

### Unit Title

1	Explorer I System Familiarization
2	History and Applications of Pneumatics
3	Fundamentals and Characteristics of Compressed Air
4	Graphic Communication Symbols
5	Air Compressors: Theory and Purpose
6	Air Filters: Theory and Purpose
7	Pressure Regulators: Theory and Purpose
8	Lubricators: Theory and Purpose
9	Instrumentation: Theory and Purpose
10	Flow Meters
11	Pressure Gauges
12	Manometers
13	Directional Control Valves: Theory and Purpose
14	Manual Spool-Type Directional Control Valves
15	Solenoid Actuated Spool-Type Directional Control Valves
16	Air Pilot Type Directional Control Valves
17	Pneumatic Actuators: Theory and Purpose
18	Single Acting Cylinders
19	Double Acting Cylinders
20	Force/Area Relationship of a Cylinder
21	Rotary Actuators: Theory and Purpose
22	Rack and Pinion Rotary Actuators
23	Air Motors
24	Flow Controls: Theory and Purpose
25	Flow Control Valves
26	Needle Valves
27	Check Valves: Theory and Purpose
28	Simple Check Valves
29	Shuttle Valves
30	Venturi Vacuum Generators
31	Maintenance and Troubleshooting
32	Meter Out Cylinder Speed Control
33	Control of an Air Motor
34	Sequenced, Paired Cylinders in a Circuit
35	Cylinders in Parallel
36	Cylinders in Series
37	Two-Step Speed Control of a Double Acting Cylinder
38	Differential Pressure Circuit
39	Clamp-Press Circuit
40	Air Piloted Control of a Double Acting Cylinder

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