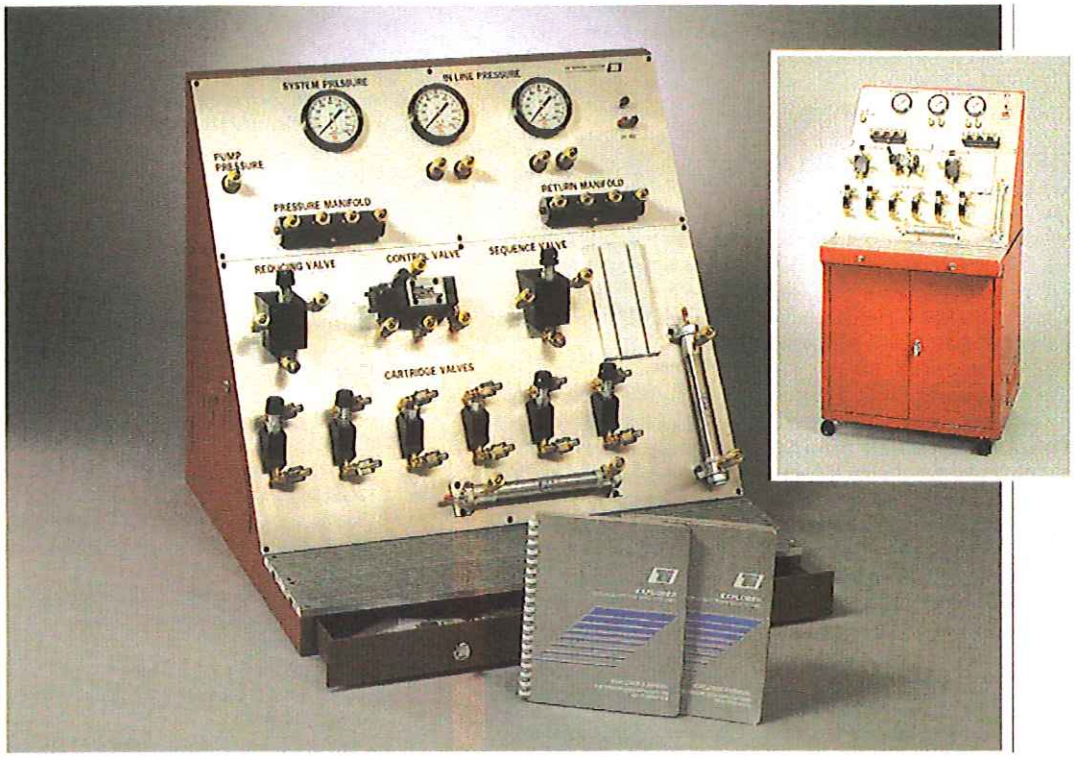
EXPLORER SERIES

EXPLORER II INDUSTRIAL HYDRAULICS



A Comprehensive Maintenance Training System For Industrial Hydraulics

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

The curriculum begins with the fundamentals of hydraulics, 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 hydraulic devices like hydraulic jacks and regenerative circuits.

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

The Explorer II 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 pneumatics, electro-mechanics and programmable logic controllers. They are designed to interface with the Explorer IT, 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

The Explorer II is a complete education/training system

that covers hydraulic technology in its four areas of instruction: Fundamentals, Applications, Physical Properties and Maintenance. It is constructed of an extruded and welded aluminum "U" channel frame with a formed sheet steel shell. The system is modular in design so that it may be used as a stand-alone table, on a counter-top or integrated into a bench configuration with other TII trainers. The panel includes two sections:

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 system pressure gauge, two in-line pressure testing gauges, a four-port pressure manifold, a four-port return manifold, 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. 'Hie component panel includes: a 4-way, 2-position solenoid directional control valve; a relief valve; a sequence valve; a pressure reducing valve; a compensated flow contro[1]_ valve; an uncompensated flow control valve; a needle valve; a check valve; a double acting cylinder (5" stroke, 1-1 / 16" bore); and a double acting cylinder (5" stroke, 1-1 /2" bore). The **Work Surface** at the bottom of the component panel is used for conducting experiments and building circuits.

Additional Components include a 4-way, 3-position lever-operated directional control valve, a tandem center spool, a viscometer, a thermometer, a flowmeter, a piloted check valve cartridge, a power cord for the solenoid valve, a load spring kit, two T-fittings, two hose couplings, eight 24" hydraulic hoses, four 48" hydraulic hoses, and a 7/8" open-ended wrench.

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 II-HSP** is a mobile training system which includes the Explorer II, a mobile bench, and a hydraulic power system.

CURRICULUM

The Explorer II curriculum was designed and reviewed by a panel of experienced high school and community college teachers, as well as industrial trainers. Courseware includes a shtdent manual and instructor's guide with 42 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 II System Familiarization
2 Principles of Hydraulic Systems
3 Hydraulic Fluids
4 Graphic Communication Symbols
5 Instrumentation: Theory and Purpose
6 Pressure Gauges
Flow Meters
8 Pumps
9 Pressure Controls: Theory and Purpose
10 Relief Valves
11 Reducing Valves
12 Sequence Valves
13 Directional Control Valves: Theory and Purpose
14 Manual Directional Control Valves: Closed and Tandem Centers
16 Solenoid Directional Control Valves
17 Check Valves: Theory and Purpose
18 Check Valves
19 Pilot Operated Check Valves
20 Flow Control Valves: Theory and Purpose
21 Needle Valves
22 Pressure Compensated Flow Control Valves
23 Non-Compensated Flow Control Valves
24 Linear Actuators: Theory and Purpose
25 Double Acting Cylinders
26 Speed/Area Relationship of a Cylinder
27 Force/Area Relationship of a Cylinder
28 Rotary Actuators
29 Fluid Filters
30 Piping Considerations and Components
31 Maintenance and Troubleshooting
32 Cylinders in Series
33 Hydraulic Lock Out
34 Dual Speed Control
35 Pump Unloading
36 Cylinders in Parallel
37 Hydraulic Jack
38 Regenerative Circuit
39 Dual Pressure Control
40 Sequenced Cylinders
41 Meter-in Speed Control
42 Meter-out Speed Control
43 Bleed-off Circuit Speed Control
Appendix

For more information, customer service and technical assistance,

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