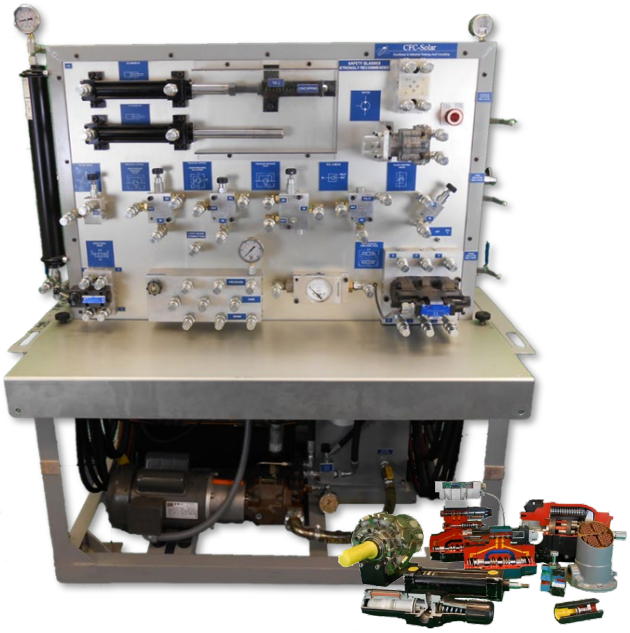
HYDRAULIC PRINCIPLES

HYDRAULIC

Our most popular class. The foundations of hydraulics in a powerful course to improve on-the-job capabilities with safe and effective skills. formerly: Level I Industrial/Mobile Hydraulics, Principles of Industrial Hydraulics (PIH)

WHO WILL BENEFIT?

Any and all newcomers will benefit from this course. Fluid power industry professionals, maintenance technicians, machine operators, and sales representatives will be empowered with foundational knowledge. Even seasoned personnel will likely experience increased understanding of their core competencies. No prerequisites.



WHAT IS IT ABOUT?

This course correlates core hydraulic principles with practical machine operation and maintenance duties. Procedures to ensure the safety of personnel and to prevent damage to machinery will be discussed. Introductory physics and fluid mechanics will be explained. Fluid power symbols appearing in schematics will be correlated to real-world componentry to develop print reading skills. The location of components in a hydraulic system will be identified and proper adjustment procedures demonstrated. Hands-on lab exercises will reinforce fluid power concepts, component locations, proper connections, and the effects of adjustments on system operations.

WHAT IS INCLUDED?

Course Length: 2, 3, 4, or 5 days of training depending on format and schedules. 3-days is our recommended length.
Written Materials: Fluid Power Textbook, Hands-On Hydraulic Lab Manual, Fluid Power Data Booklet, handouts, and printed client schematics and documents whenever provided for review.
Equipment: Hydraulic Double Sided Trainer, take-apart/cut-away demo hydraulic components
+ All other needed materials to execute the training such as PPE, notepads, toolboxes, pens, extension cords, etc.

TOPICS

Hydraulic System Overview
General & Hydraulic Safety
Basic Fluid Mechanics
Hydraulic Schematic Reading
Pumps
Pressure Controls
Reducing Pressure
Relieving Pressure
Sequence
Counterbalance
Directional Controls
Flow Controls
Flow Dividers
Valve Actuation
Cylinders
Rotary Actuators
Hydraulic Motors
Reservoirs & Conductors
Fluids, Contamination, & Filtration
Accumulators
Maintenance & Troubleshooting
Fluid Power Applications

OBJECTIVES

- Practice safe procedures to ensure power is removed, trapped fluids have been relieved, and loads have been lowered or properly blocked to permit safe maintenance operations.
- Understand hydraulic pressure-force and flow-speed relationships.
- Identify and correlate schematic symbols to the hydraulic components and typical locations in a hydraulic system.
- Understand actuator force and speed for given pressure and flow.
- Understand typical cylinder construction and utilize diagnostic procedures.
- Identify/classify relief, sequence, unloading, reducing, and counterbalance valves.
- Distinguish between meter-in vs. meter-out flow control
- Identify schematic symbol and operational differences of directional control valves
- Identify/classify the different types of hydraulic pumps
- Proper installation of hydraulic components with respect to alignment, connections, and pre-filling with fluids
- Identify and work with the fluid conductors used to carry hydraulic fluid to ensure proper pressure ratings, routing, and to reduce failures
- Implement leak prevention using proper fittings, assembly techniques, and seal materials
- Understand different types of filtration, best practices, and identify contamination sources and levels

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