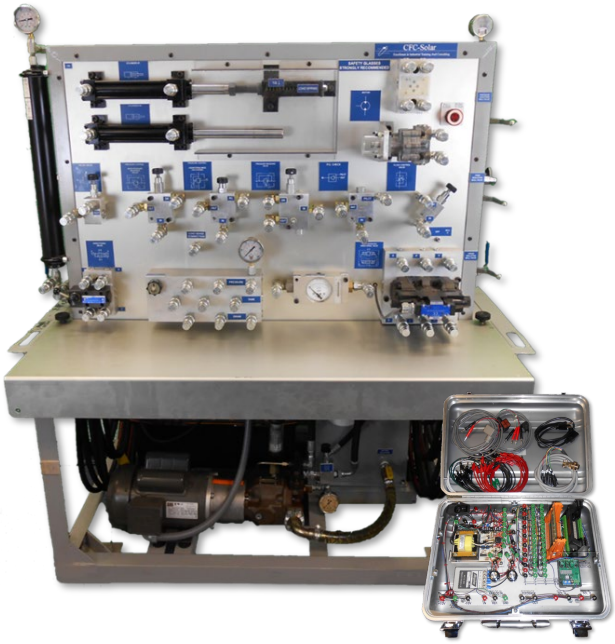
ADVANCED HYDRAULIC MAINTENANCE & TROUBLESHOOTING

HYDRAULIC

This advanced course delves into more complex circuits/componentry and builds proper maintenance and troubleshooting techniques. formerly: Level 2 Industrial Hydraulics, Hydraulic Reliability & Troubleshooting (HRT)

WHO WILL BENEFIT?

Any and all fluid power industry professionals, maintenance technicians and managers, machine operators, sales representatives, and other associates invested in the proper operation, productivity, and longevity of hydraulic systems. Prerequisites: Hydraulic Principles.



WHAT IS IT ABO UT?

This course builds on foundational hydraulic knowledge to improve diagnostic and maintenance skills. Key topics include load-sensing and pressure-compensated systems, flow sharing, regenerative circuits, slip-in cartridge valves, proportional and electronically controlled valves, hydrostatic drives, and accumulators. Hands-on labs connect theory to real-world circuits, while coverage of test equipment and systematic troubleshooting principles prepare participants to confidently analyze, adjust, and repair modern hydraulic systems. Client schematics and documentation are requested for review of machine-specific circuits and componentry. Analysis of site maintenance practices and potential improvements will be reviewed.

WHAT IS INCLUDED?

Course Length : 3, 4, or 5 days of training depending on format and schedules.
Written Materials : Fluid Power Textbook/ Training Manual, Hands-On Hydraulic Lab Manual, handouts, and printed client schematics and documents whenever provided for review.
Equipment : Hydraulic Double Sided Trainer, Proportional/Servo Valve Trainer, logic cartridge valve assemblies, 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
- Fluid Mechanics
- Hydraulic Schematic Reading
- Hydraulic Testing Equipment
- Flow Meters
- Pressure Testing Equipment
- Hydraulic Troubleshooting Process
- Troubleshooting Principles
- Motion
- Force
- Overheating
- Excessive Noise/Vibration
- Pressure Spike/Shock
- Fluid Contamination
- Cavitation/Aeration
- External Leakage
- Internal Leakage
- Initial Troubleshooting Checklist
- Use of a Multimeter
- Maintenance & Repair Best Practices

OBJECTIVES

- Analyze open-center and closed-center systems based on pump type and valve center function
- Evaluate vertical, horizontal, and multiple cylinder and motor circuits
- Compare meter-in and meter-out circuits, including counterbalance and pressure reducing valve variations
- Compare regenerative circuits, with and without unloading valves, for speed and force output
- Explain accumulator use for intermittent high flow, with and without speed drop
- Use cartridge valves for relief, remote control, sequencing, and speed control
- Describe pressure, flow, position, velocity, and rotation transducers and their uses
- Compare open-loop and closed-loop proportional systems, including amplifier setup and analog vs. digital control
- Set up and adjust proportional valves, with and without on-board electronics
- Explain how variable frequency drives control pump flow and pressure
- Use hydraulic test equipment to gather diagnostic data
- Diagnose motion problems, force problems, overheating, noise, pressure spikes, and leakage
- Identify causes and effects of fluid contamination, cavitation, and aeration
- Apply schematics and systematic troubleshooting principles to diagnose circuit faults

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