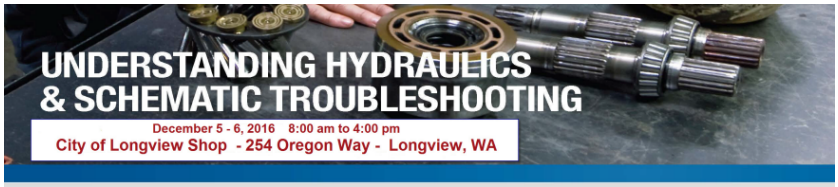

UNDERSTANDING HYDRAULICS & SCHEMATIC TROUBLESHOOTING

December 5 - 6, 2016 8:00 am to 4:00 pm
City of Longview Shop - 254 Oregon Way - Longview, WA

Understanding Hydraulics and Schematics is the key to preventing un-necessary removal of components due to poor diagnoses. Most companies spend hundreds or thousands of dollars on repairs or replacement parts.

Class Breakdown:

A. We introduce them to most all of the components used in most hydraulic systems, we discuss the differences and similarities of each as they apply.

B. Next we move onto the ISO symbols. (ISO is a Greek term for same as) We discuss the symbols and spend some time understanding each. Using an interactive lab has been successful in helping even the least knowledgeable of hydraulics to become confident in recognizing ISO symbols and how they relate to the components.

C. The shotgun approach is used way too often in troubleshooting, mostly because the mechanics are under tremendous time constraints to identify and fix problems. We teach how to look at a schematic and the understanding of the best approach to troubleshooting, before components are replaced. My system works well with hydraulic, pneumatic, and electrical schematics and has been proven to work every time.

J. Eric Freimuth - Instructor

COST: $525 PER PERSON (INCLUDES BOOK)

NAME_____

COMPANY_____

ADDRESS_____

Cancellations received up to 7 workdays before the course are refundable minus a $50.00 registration fee. After that, course fees are not refundable, but can be credited to future courses. If you must cancel, be sure to request a cancellation number. Fees will not be re-funded for no-shows.
Please send registration to:

Hydraulic Training Associates
33016 N.W. Sandberg Rd.
Scappoose, OR 97056

DAY 1

- **Fluid Power Physics:** Energy, Work, Power, Horsepower, Heat, Torque, Flow, Pressure, Fluids, Velocity, Viscosity
- **Pumps:** Gear, Un-balanced and balanced vane, Piston, Fixed vs. Variable, Pressure Compensated and Flow Compensated
- **Hydrostatic Pumps and Motors:** Understanding, proper installation of gauges, troubleshooting tips
- **Actuators:** Cylinders, Design, Motors, Application
- **Pressure Control:** Direct Acting Relief, Pilot Operated Relief, Poppet Relief, Pressure Sequence, Pressure Reducing, Unloading, Counterbalance, Brake. Proper use of each
- **Directional Control Valve:** Direct Acting, Pilot Operated, Open vs. Closed Center
- **Flow Control Valves:** Throttling vs. Pressure Compensating (Needle Valves), Meter-In / Meter-Out
- **Modular Control Valves:** Stack, Cartridge.

DAY 2

- **Fluid Conductors:** Hoses, Tubes, Steel Pipe, Proper selection, Safety, installation, and fittings
- **Fluid Conditioning:** Filtration, Micron, Beta Ratio, ISO Code, Filter Placement, Heat Exchangers, Reservoirs.
- **Check Valves:** In-Line, Pilot Operated
- **Accessory Components:** Accumulators, Pressure Switches, Pressure Gauges, Flow Meters, Manifolds
- **Understanding Schematics:** ISO Symbols, Completing 4 Schematics, Proper placement of symbols
- **System Design:** Using animated schematics
- **Troubleshooting:** Using a schematics to troubleshoot systems before removing components

Old Dominion University 1.4 Continuing Education Credits Certified

Registrations must be received no later then 2 weeks before the class. If less then minimum sign up, the class will be cancelled and checks will be returned. No charges on credit cards will be made until the day before the class.