Hydraulic Pumps and Controls

I. Program Description

In Hydraulic Pumps and Controls, the students learn a logical procedure for designing circuits. The course material concentrates on designing efficient hydraulic circuits through the utilization of pressure compensated variable volume pumps and the numerous pump controls that are available.

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A. Aims/Objectives

In this course we:

- present fundamental of power transmission
- explain in detail how pressure compensated variable volume pumps operate as well as how the controls function
- teach the proper use of performance and engineering data of components
- apply a logical circuit design procedure to any hydraulic application

B. Major Topics Covered

- basic control theory
- pressure compensation
- load sensing
- horsepower limiting
- electrohydraulics

II. Who Should Participate

Maintenance personnel, engineers and anyone who desires to increase their knowledge and understanding of pressure compensated variable volume pumps and the various controls available with them.

III. Session Information

Classes are conducted several times per year. For scheduled dates, contact our offices.

SNO-Motion Solutions
41 West Guest Avenue
Salt Lake City, UT 84115
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Fax: 801.263.6404

To Apply forTraining Class on Line:
http:www.sno-motion/trainingsignup.html
and choose the appropriate class title.

Hydraulic Pumps and Controls Course Outline

A. First Day of Class

A. General Introduction
1. Discussion of the latest developments in fluid power

B. Pressure compensation
C. Two-stage pilot controlled compensation
D. Concept of remote control compensation
E. Styles of remote control
F. Applying remote control
G. Installation and troubleshooting
H. Hands-on lab

B. Second Day of Class

A. Lab review
B. "Real world" design problem and review of design problem
Flow into a Cylinder, Rod End Areas, Cylinder Forces, Flow Force Acting to Close a Spool Valve,
Useful Relationships
C. Load sensing
1. Description-theory of operation
2. Operation of piston pumps and vane pumps
3. Considerations
a) orificing
b) check valves and relief valves
4. Circuit comparisons (heat calculations)
a) open center, constant pressure, load sensing
5. Troubleshooting
D. Hands-on Lab

C. Third Day of Class

A. Lab review
B. "Real world" design problem and review of design problem
C. Mechanical control
1. Maximum and minimum volume stop
2. Horsepower limiter control
D. Hands-on lab and review of lab

D. Fourth Day of Class

A. "Real world" design problem -- injection molding machine retrofit and review of design problem
B. Electrohydraulic pump control
1. Electrohydraulic pressure control
2. Electrohydraulic flow control
3. Electrohydraulic flow and pressure control
a) electronic driver boards
4. Checking pump operation
5. Additional valving
6. Control input signals
7. Feedback system
8. Pumps installation and application
9. Troubleshooting
10. Electronic feedback cards
11. Hands-on lab and review of lab

E. Fifth Day of Class

A. Circuit energy analysis
B. Heat (wasted energy) calculations
C. Energy savings through pump controls
1. Circuit comparisons
a) fixed displacement and variable displacement
2. Molding machine examples
D. Fluid system filtration
1. Past practices
2. "kidney-loop" filtration circuits
a) contaminant and water removal