BASIC HYDRAULIC TRAINING COURSE

Objective

To acquaint themselves and create greater confidence in those who maintain and trouble-shoot hydraulic systems. To train those who would like to learn about the fundamental basic principles of hydraulics.

Course duration

3 days

Syllabus

1. BASIC PRINCIPLES

   We explain, discuss and define the terms of hydraulics, hydrostatics, hydrodynamics, weight, force, pressure, force transmission, pressure transmission and flow configurations through pipes.

2. HOW TO READ A HYDRAULIC CIRCUIT

   We cover and explain the entire range of hydraulic symbols as laid down in the ISO standards. We establish the relationship between the symbol and the actual component.

3. HYDRAULIC RESERVOIRS

   The function, sizing and design of hydraulic reservoirs and the auxiliary components fitted to hydraulic reservoirs.

4. HYDRAULIC PIPING AND FITTINGS

   Correct sizing of pressure-, return-, suction and drain lines. Plumbing, clamping, surface, treatment, rated pressure and flushing of pipes. Design, construction and rated pressure of flexible tubing.

5. DIRECTIONAL CONTROL VALVES (SPOOL AND CARTRIIDGE TYPE)

   The types and functions of directional control valves. Method of control, rated flow rates and fault finding on directional control valves.

6. FLOW CONTROL VALVES (SPOOL AND CARTRIDGE TYPE)

   Hand adjustable compensated- and non-compensated type flow control valves and the electrically remote controlled flow control valve (proportional flow control valve). Correct application and selection of flow control valves.

7. PRESSURE CONTROL VALVES (SPOOL AND CARTRIDGE TYPE)

   Relief valve designs and their function in a hydraulic system. The function and application of load holding and unloading valves. Electrically remote controlled pressure control valves. (Proportional pressure valves).

8. LOCK VALVES (SPOOL AND CARTRIDGE TYPE)

   The types, function and application of check valves.

9. HYDRAULIC PUMPS AND MOTORS

   Design function and rated pressures of axial piston-, radial piston-, inside gear-, outside gear-, vane-, and geroller type pumps and motors. Volumetric- and hydraulic-mechanical efficiency.

10. ACCUMULATORS

    Application and function of accumulators in a hydraulic system.

11. ACTUATORS

    Construction, design and mountings of hydraulic cylinders. Seal arrangement on cylinders. Buckling length of cylinder shafts.

12. HYDRAULIC FLUIDS

    Definition of the terms dynamic- and kinematic viscosity. Properties a hydraulic fluid should have. Guidelines as to when fluids should be replaced.

13. THE HYDRAULIC DOCTOR

    We show a variety of means available, to trouble-shoot a hydraulic system efficiently.

14. CONTROL GEAR

This section deals mainly with safety controls available to protect hydraulic systems and those who operate such systems. We also cover the electronic-hydraulic control systems.

15. PRACTICAL FAULT FINDING

With the availability of a hydraulic power pack, participants shall have the opportunity in training trouble-shooting at the actual unit.