



Worksheet HI05 & Training Record Hydraulic Circuit Basics

Explore Hydraulics

Email:

Course:

Provider:

Learning Objectives/Expected Outcomes: (60-120mins)

1. Appreciate how a range of hydraulic components are arranged to complete a circuit.
2. Recognise how symbols are used to represent the components in the circuit.
3. Appreciate which valves are used to control the direction, flow rate, and leak-free, load holding in a hydraulic circuit.

Previous Knowledge Required:

Students should have completed worksheet HI04 'Basic hydraulic components' or have a good knowledge of what different components are used for. Students already working with hydraulic equipment that controls direction, flow, and pressure, etc. may not require this worksheet.

Terminology:

Hydraulic symbols, directional valve, spool valves, poppet valves, flow control, valve leakage.

Record of Achievement:

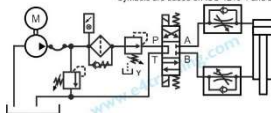


Click the email icon to post your results, once training is complete. Enter an LRS username and endpoint details or see www.e4training.com/xapi/ for free examples. Keep a record of any written work or worked calculations etc.

Coursework investigation and instructional video

Hydraulic Circuit Symbols

Symbols are based on ISO 1219-1 and 2



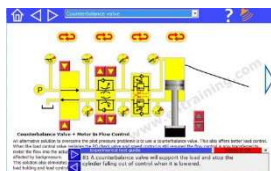
Study the 'Basic hydraulic circuit' section at

www.e4training.com/hyd_newbie/basic_circ1.php and 2.php

- Learn to recognise simple hydraulic symbols.
- Appreciate the wide range of valve options available.
- Learn what is meant by a flow control valve.
- Understand which valves hold loads with virtually zero leakage.

Complete

Virtual test rig experiments



Experiment with the 'basic hydraulic control circuit' simulation at www.e4training.com/hyd_newbie/basic_circ3.php

- Follow the suggested exercises and observations list below the simulation.

Date, score & time:

Tick when posted



Pressure generates a higher force on a larger cylinder.

Load Force: 1000 N

Force: 4000 N

Dia B = 22.4 mm

Pressure = 100 bar

Area A = πD²/4 = 400 mm²

Force = Pressure * Area = 4000 N

The FORCE of the second cylinder is equal to the PRESSURE applied to the cylinder multiplied by its effective area (πD²/4). Although the input force is higher than the input force, the cylinder displacement is lower as the overall energy transfer is the same. The major advantage from hydraulic fluid power systems is that they can give power densities capabilities that are superior with great flexibility throughout compact environments.

Complete the 'Introduction to hydraulics' tutorial at www.e4training.com/hydraulic_courses/intro_to_hyd1.php

Complete quick quiz at the end and post results via LRS/LMS.

Date, score & time:
Tick when posted

Interactive quiz to check and reinforce learning

Demonstration of quiz question formats

I have added 5 answers just to show the capability and just for fun.

Wrong

This one is also correct

Wrong

Correct

This is a QUIZ demonstrator. It will show all of the question layouts that are possible. This is a multiple choice question. Select only one of the correct answers.

Complete the 'Introduction to hydraulics' questions at www.e4training.com/hydraulic_test1.php?Quiz - Hydraulics Fee

Post result via LRS/LMS when complete.

Quiz name, date, score
Tick when posted

Key questions / Plenary

What valve would you use to raise and lower a cylinder?

What valve would you use to control the speed of a cylinder?

What would happen to the cylinder if the check valve was not pilot-operated?

Are all hydraulic circuits the same?

Repeat above if the answer is no

And Finally:

Complete this worksheet and keep for your records. Submit any written coursework etc. to your training course provider.

Follow-on Course Worksheets:

Suggested follow-on worksheet:

- HS01 – Safe Operation of Hydraulic Equipment
- HF01 – General Theories and Formulas
- HV01 – Hydraulic check valves

For more specialist course worksheets visit

www.e4training.com/hydraulic_courses/worksheets1.php