engineering adventures

Self-Study Worksheet Demo_Trial
Pressure Relief Valve Basics

Hydraulic Components

Email:	Course:	Provider:

Learning Objectives/Expected Outcomes: (60-140 mins)

1. To appreciate how e4training self-study lesson plans remove the need for teacher guidance.
2. To see the range of knowledge-based information e.g. tutorials, videos, graphics, and text.
3. To experience the e4training, skills-based training by operating a virtual equipment test rig and performing the sample experiments.
4. Use the hydraulic circuit simulator to understand how components work in real systems.

Previous Knowledge Required:

No previous knowledge required or subscription payment.
Caution: This demo worksheet combines sample content from different skill levels.

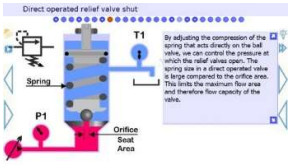
Terminology:

Pressure relief valve, safety valve, thermal relief valve, direct-acting relief, pilot operated (PO) relief.

Record of Achievement:

Click the mail icon to post your results to any free or standard LRS/LMS systems. See www.e4training.com/xapi/ for more details. Complete and keep this training record sheet along with any additional written work or sample calculations.

Interactive presentation and quick quiz



Complete the 'Introduction to Hydraulics' tutorial at
www.e4training.com/hydraulic_courses/intro_to_hyd1.php
Complete the quick quiz at the end to reinforce key points.

Estimated time: 8 minutes, skill level 1
Date complete, score:

Tick when posted ☐

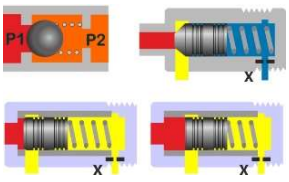
Coursework investigations

Appreciate 'What Pressure Relief Valves are Used For' at
www.e4training.com/hydraulic_valves/relief1.php and identify:

- How often are pressure relief valves used?
- What is the most common reason they are used?
- What other functions might a pressure relief valve perform?
- Why are they more common as pilot pressure control valves than main-line, full flow pressure control?

Estimated time: 20 minutes, skill level 1-3
Date complete:

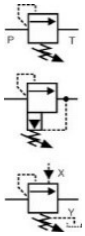
Complete ☐



Appreciate 'How Pressure Relief Valves Work' by reading the explanation and watching the videos at www.e4training.com/hydraulic_valves/relief1.php#box2 & relief2.php
Identify the following key points:

- Is the pressure at P1 equal to the pressure at P2 minus the spring force?
- Will the pressure remain constant as the flow increases?
- Will changes in pressure P2 affect the pressure at P1?

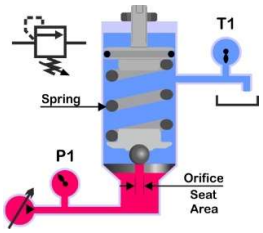
Estimated time: 10 minutes, skill level 1-5
Date complete: Complete ☐



Hydraulic symbols represent the language used to describe how the equipment works. Learn to recognise pressure control valve symbols at www.e4training.com/hyd_princip/symbol_pressure1.php and identify:

- Does the dashed pilot line indicate which line is being controlled?
- How would you tell a pilot operated valve from a direct operated valve symbol?
- What are the X and Y connections used for?

Estimated time: 15 minutes, skill level 2-5
Date complete: Complete ☐

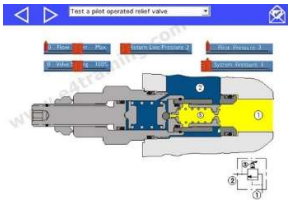


Appreciate 'The Different Types of Pressure Relief Valves' by reading the explanation at www.e4training.com/hydraulic_valves/relief1.php#box3
Identify the following key points:

- The difference between direct and pilot operated valves.
- How will compressing the spring change the pressure setting?
- Consider the different valve construction types and why their performance might vary, e.g. seat hardness, concentricity, nose shape.

Estimated time: 15 minutes, skill level 2-5
Date complete: Complete ☐

Virtual test rig experiment



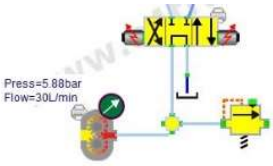
Experiment with the valve fundamentals simulation at www.e4training.com/hydraulic_valves/relief3.php:

- Follow the suggested exercises and observations list below the simulation.
- Run the experiments, answer the questions, and click the buttons to see the answers.

Explore how a pilot operated relief valve works and what happens when you change the settings, flow rate, and backpressure.

Estimated time: 25 minutes, skill level 3-5
Date, score: Tick when posted ☐

Experiment with the hydraulic circuit simulation program



Experiment with the safety relief valve simulation at www.e4training.com/simulate/simulate1.php by opening the 'simple cylinder circuit':

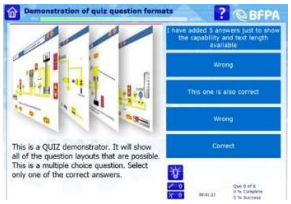
- Operate the cylinder and observe when the relief valve opens.
- Click on the relief valve to change its setting and observe how the power input changes.

Change the pump flow rate and plot how the actual line pressure varies.

Estimated time: 30 minutes, skill level 3-6

Date, score & time: Tick when posted ☐

Interactive quiz to check and reinforce learning



Complete the 'hydraulic valve questions' at www.e4training.com/hydraulic_test1.php? Quiz - Hydraulics part 1
Post result when complete.

Estimated time: 15 minutes, skill level 1-5

Quiz name, date, score: Tick when posted ☐

Key questions / Plenary

Can you describe 3 different applications where pressure relief valves are used and explain why?
Can you explain how pressure relief valves operate?
Can you explain why a pilot operated pressure relief valve might be needed?
Can you draw a direct operated pressure relief valve symbol?

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 supervisor. Export and keep a spreadsheet record of your LRS postings.

Follow-on Course Worksheets:

Potential follow-on worksheets include:
HV07 – Flow control valve operation, use, types (Introductory)
or HV06 – Pressure relief valve features, tips, specification (Advanced).

For specialist course worksheets visit
https://www.e4training.com/hydraulic_courses/worksheets1.php

Notes