engineering adventures

Self-Study Worksheet HV01
Check Valve Basics

Hydraulic Components

Email:	Course:	Provider:

Learning Objectives/Expected Outcomes: (2 - 3 hours)

1. To appreciate where hydraulic check valves are used.
2. To understand what hydraulic check valves do.
3. To understand how hydraulic check valves work.
4. Be able to recognise typical components and their symbols.

Previous Knowledge Required:

Students should have completed worksheet HI.. 'Introduction to hydraulics' section or have a good knowledge of where hydraulic equipment is use and what it does.

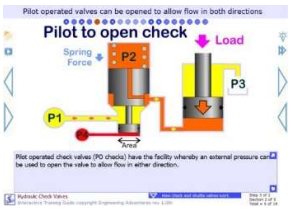
Terminology:

Check valve, non-return valve, bypass valve, one way valve, and shuttle valve.

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 tutorial



Complete the 'check valve training' tutorial at www.e4training.com/hydraulic_courses/microtutor1.php?wtvalvescheck
Complete quick quiz at end and post results.

Estimated time: 10 minutes, skill level 1-4

Date, score:

Tick when posted ☐

Coursework investigations

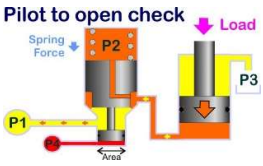
Appreciate 'What Check Valves Do and Where Used' at www.e4training.com/hydraulic_valves/Check1.php#box1 and identify:

- What functions check valves perform?
- Common reason they are used?
- Typical applications where check valve are used?

Estimated time: 20 minutes, skill level 1-4

Date complete:

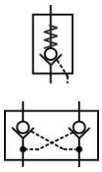
Complete ☐



Appreciate 'How Check Valves Work' by reading the explanation and watching the videos at www.e4training.com/hydraulic_valves/check1.php#box2 & Check2.php
Review all of the key points including:

- How many directions of flow are permitted?
- Will the pressure be the same on both sides?
- How are check valves opened by external pilot pressures?
- How do shuttle valves work?

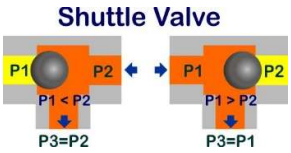
Estimated time: 25 minutes, skill level 1-4
Date complete: Complete ☐



Learn to recognise the different check valve symbols at www.e4training.com/hyd_princip/symbol_checks1.php and identify:

- Do all check valves use the same spring pressure?
- How would you identify the difference between a pilot to open and pilot to close check valve?
- How many valve seats are there in a shuttle valve?

Estimated time: 20 minutes, skill level 2-4
Date complete: Complete ☐



Appreciate 'The Different Types of Check Valve' by reading the explanation at www.e4training.com/hydraulic_valves/check1.php#box6
Review all of the key points including:

- Is 50 bar a typical check valve spring rating?.
- Are check valves sometimes used as pressure relief valves?
- How do non-return, and one way valves differ from check valves.

Estimated time: 15 minutes, skill level 2-4
Date complete: Complete ☐

Virtual test rig experiment

Experiment with the valve fundamentals simulation at www.e4training.com/hydraulic_valves/check3.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 check valves only allow flow in one direction and how they can be used as simple Check or pressure maintaining valves.

Estimated time: 20 minutes, skill level 2-4
Date, score: Tick when posted ☐

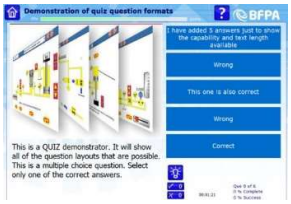
Practical Activities

Experiment with a check valve in a hydraulic car jack. Raise the jack with load on and record how long it takes to lower (1 min, 1 hour, XX?). Make sure the load is not left unsafe or unsupervised when raised. Consider the safety implications of leaving loads supported only by hydraulic valves (It's not acceptable!).

Estimated time: 10 minutes, skill level 2-4

Completed ☐

Interactive quiz to check and reinforce learning



Complete the 'hydraulic valve questions' at
www.e4training.com/hydraulic_test2.php? Quiz - Hydraulics part 1
Post result when complete.

Estimated time: 15 minutes, skill level 2-4

Quiz name, date, score:

Tick when posted ☐

Key questions / Plenary

Can you explain what check valves do?
Can you describe 3 different applications where check valves are used and explain why?
Can you explain why a pilot operated check valve might be needed?
Can you draw a check 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 course provider.

Follow-on Course Worksheets:

Potential follow-on worksheets include:
HV03 – Directional valve operation, use, types (Introductory)
or HV02 - Check valve features, tips, specification (Advanced).

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

Notes