Hydraulics Technology 3: Advanced Hydraulics and Electro-Hydraulics

SKILL 6A: EXPLORING THE PRESSURE RELIEF VALVE

Name	Class/Period	Date

1. Overview

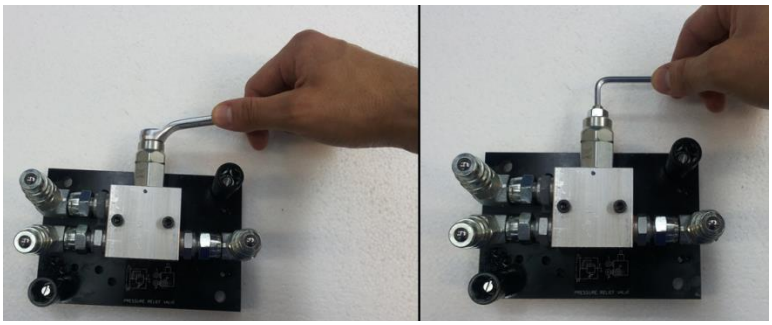
In this Skill Drill, you will implement a pressure relief valve into a hydraulic circuit and observe the behavior of the system when you adjust the valve setting.

2. Performance Objective

- Adjust a relief valve.
- Adjust relief valve set point pressure.

3. Required Materials

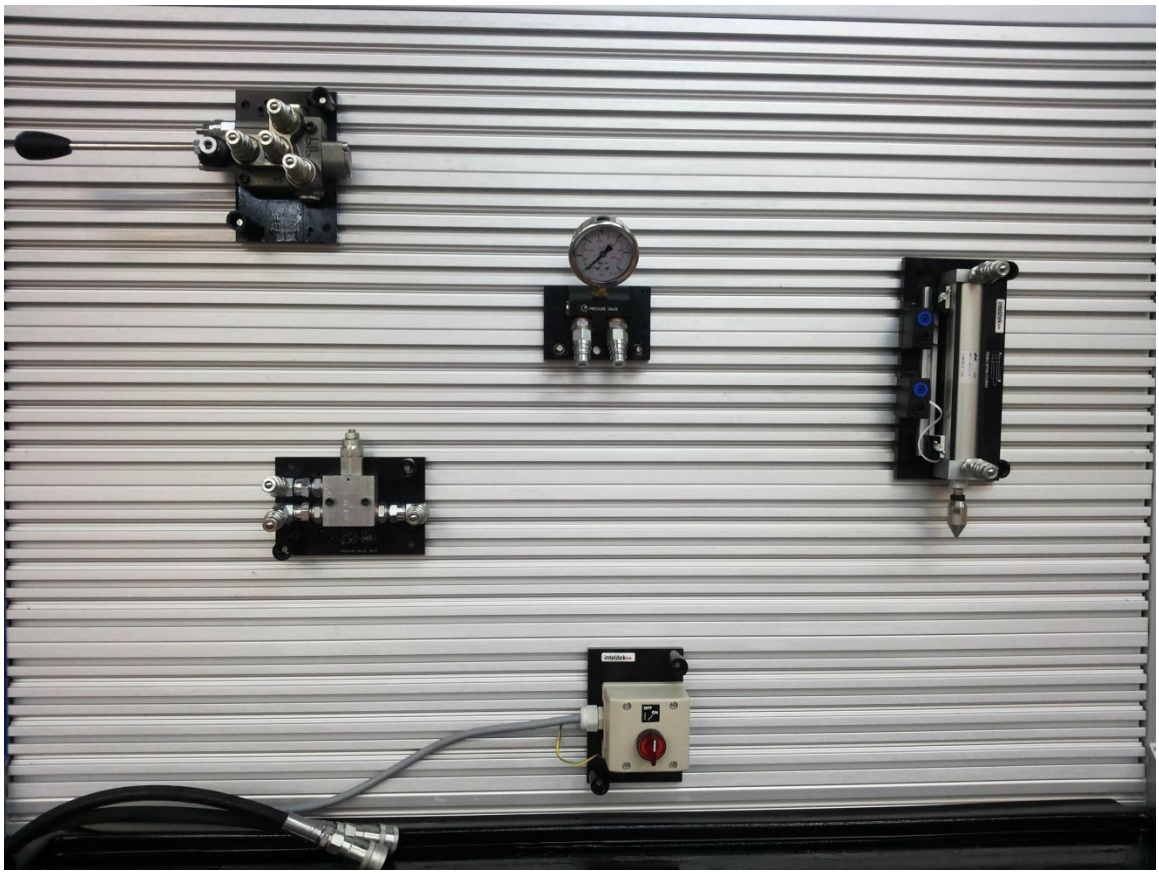
- JMTS panel
- Hex driver for mounting components
- Two T-connectors
- Oil tray
- Hydraulic power pack
- Hoses of different lengths
- 4/3 closed-center valve
- Pressure gauge
- Pressure relief valve
- Double-acting cylinder(s)
- Rags or paper towels
- Hex key set
- Wrench set
- Safety glasses



In this Skill Drill, you will use the pressure relief valve for the first time. Its pressure limit setting is adjusted by first unlocking the nut using a wrench (left), adjusting the setting knob using a hex key (right), and then locking the nut again with the wrench.

4. Panel Setup

Secure the components to the panel as shown:



5. Inventory and Safety

Before beginning the Skill Drill, review this checklist and mark off each item as you complete it.

- ☐ All hardware components required for this Skill Drill are mounted on the panel.
- ☐ The hardware is mounted securely to the panel.
- ☐ The power pack is off, and the pressure gauge reads zero.
- ☐ You are wearing safety glasses.
- ☐ Hands, hair, and clothing are securely away from the work area of any moving parts.
- ☐ You are standing an arm's length away from the panel.
- ☐ The work area is clean and devoid of food or drink.

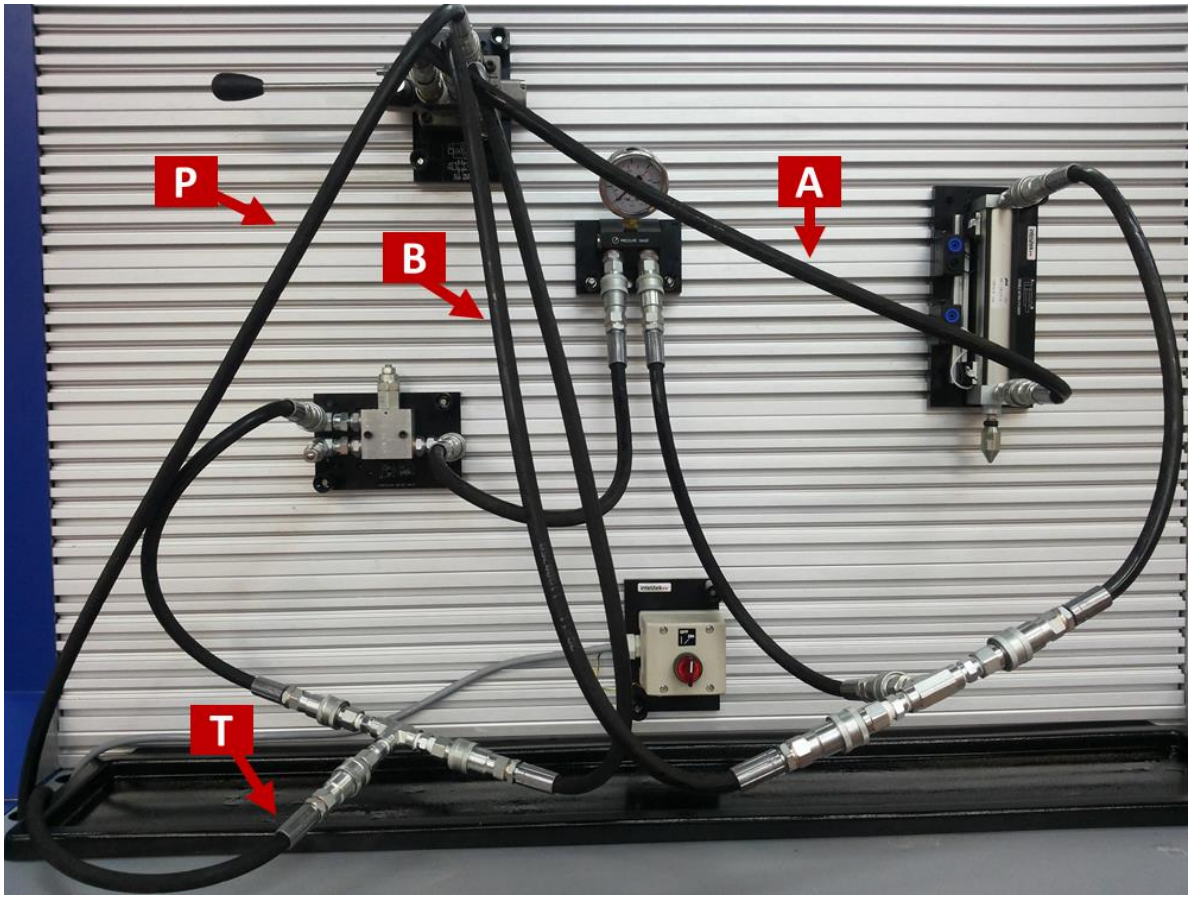
⃠ *Warning: Oil may leak from components and hoses. Be aware of oil leaking after disconnecting hoses from components. Do not get oil on your clothing!*

6. Skill Drill

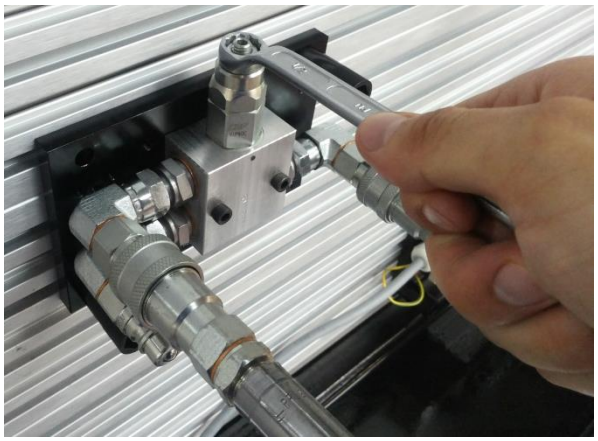
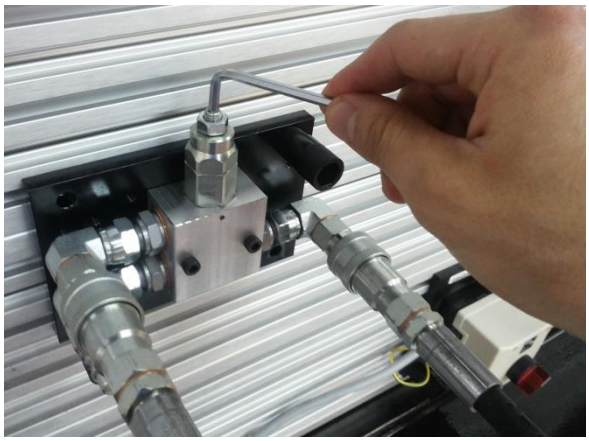
Procedure

Perform the following steps:

1. Complete the circuit's hydraulic connections. The order of connection is, as usual, not important.
    - Connect the pressure-out port of the hydraulic power pack to port P of the 4/3 closed-center valve.
    - Connect port A of the 4/3 valve to the forward port of the cylinder.
    - Using a T-connector, connect port B of the 4/3 valve to both the rear port of the cylinder and the right-side port of the pressure gauge.
    - Connect the left port of the pressure gauge to the right-side port P of the pressure relief valve.
    - Using a T-connector, connect port T of the 4/3 valve to port T of the pressure relief valve and to the power pack's tank inlet port.



2. Turn the power pack on.
3. Shift the lever of the 4/3 valve back and forth through all three positions to extend and retract the cylinder. Keep your eye on the pressure gauge throughout and note the values.
4. Unlock the pressure gauge adjustment knob's nut with a wrench. Adjust the relief setting using a hex key. Lock the knob with the wrench after you have made the adjustment.

5. Shift the lever of the 4/3 valve back and forth through all three positions to extend and retract the cylinder and note the values on the pressure gauge. Note your observations.

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_____
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6. Repeat the above two steps for different relief valve settings. Can you experimentally determine the pressure required to extend the cylinder? Note your observations.

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7. Demonstrate your circuit's operation to your teacher and share your observations.
8. Return the pressure relief valve's adjustment knob to its most-closed position.
9. Turn the power pack off.
10. Optional: Disconnect the cylinder with the larger diameter and replace it with the cylinder that has the smaller diameter. Repeat the above procedure.

7. Authentic Skill Assessment

Have your instructor verify that your work meets the requirements in the Performance Objectives and sign below. Place this Skill Drill Sheet in your Skills binder.

Instructor Signature	Date

8. Shutdown

Unless instructed otherwise by your teacher, review and complete each of the items of the checklist below.

- ☐ Switch off the power pump.
- ☐ Clean any oil spills using rags or paper towels.
- ☐ Disconnect all hoses and put them away.
- ☐ Remove the components mounted on the JMTS panel and store them securely unless instructed otherwise by your teacher.
- ☐ Check whether all materials required for this activity have been returned to their proper place at your lab station.