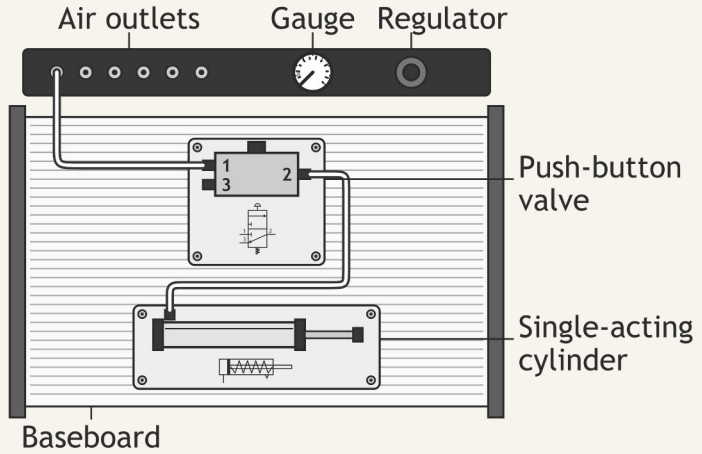
Daily Review



1. **Name** one thing air can move.
2. **State** the three parts of a system.
3. **Name** the engineer for moving parts.
4. **Name** the energy of movement.
5. **State** the unit of energy.

Single-Acting Cylinder

Air can push hard. Use it safely.



S3 Engineering Science

By the end of this lesson...



1. I can **follow** the 5 **safety** rules
2. I can **build** and **test** a push-button circuit
3. I can **explain** where the air goes

Air Can Push Hard

Pneumatics

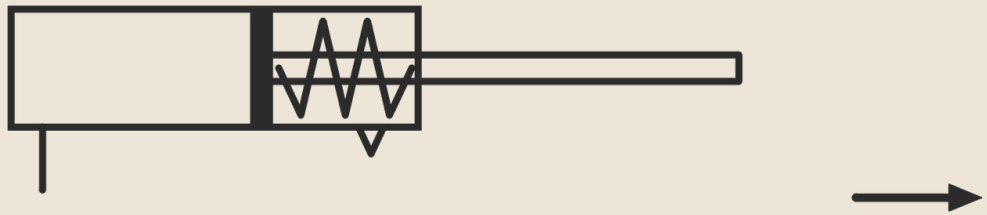
using compressed air to make things move

Compressed air

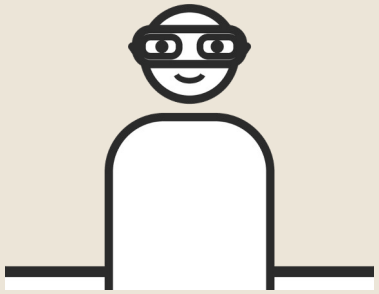
air squashed into a small space

Take care

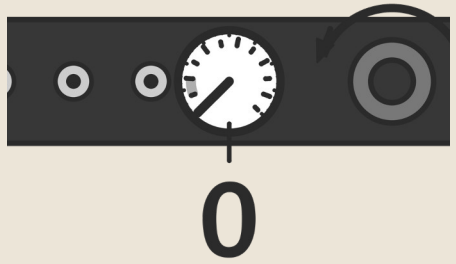
it pushes hard: eyes, ears, skin



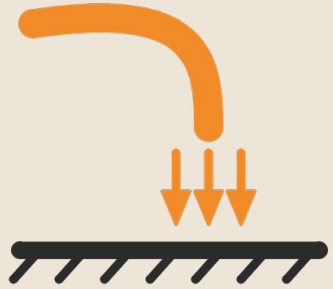
The 5 Safety Rules (1 of 2)



1 **Goggles** on when you build and when you test.



2 Regulator at **0** while you build or change a circuit.

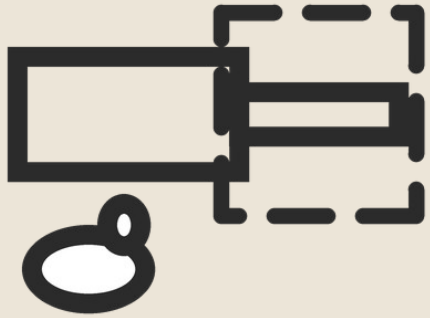


3 Never point **air** at anyone. Tube ends point down.

The 5 Safety Rules (2 of 2)



4 Hear a **hiss**? Regulator to 0 at once.



5 Fingers clear of the piston **rod**.

The Gauge: Between 1 and 2 Bar

Build

regulator at **0**

Hands up

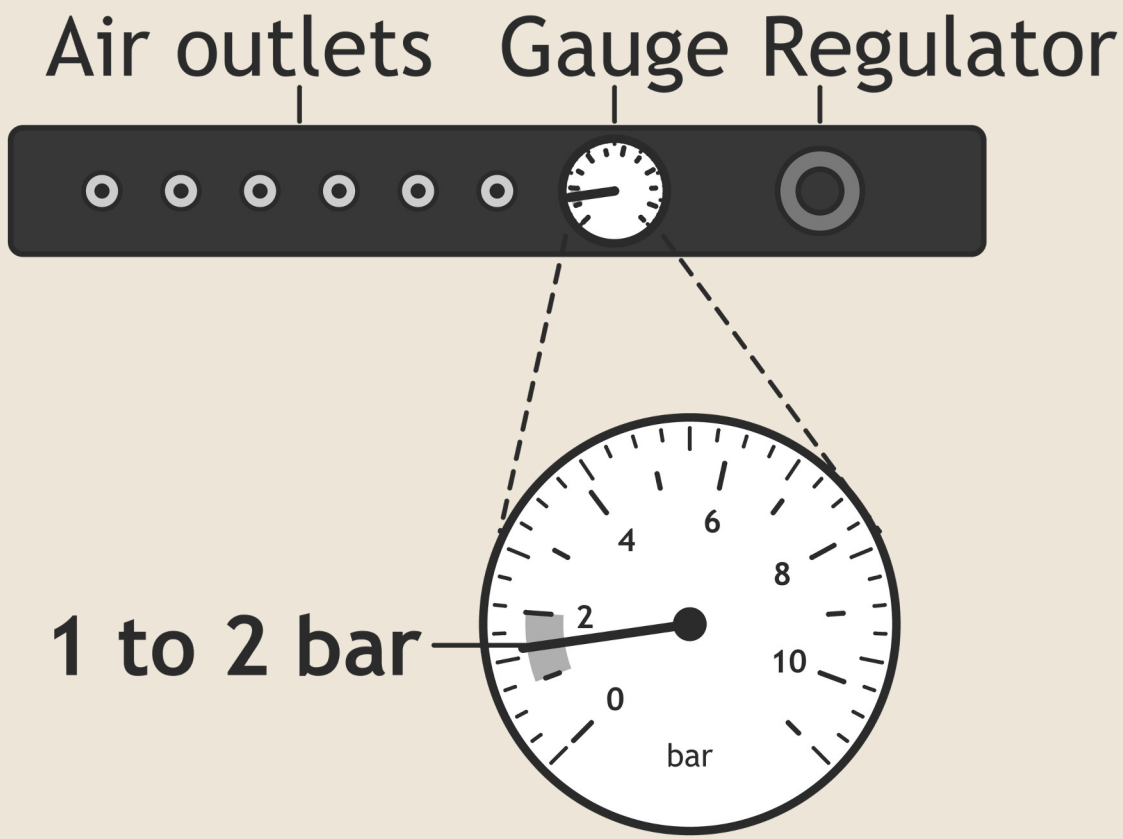
the teacher checks

Test

1 to 2 bar: inner numbers

Finish

back to **0**



Show Me: Safety

1. **State** the regulator setting while you build.
2. You hear a hiss. **State** what you do first.
3. **State** where tube ends point.
4. **State** the pressure we test at.

Meet the Parts: the Push-Button Valve

3/2 valve

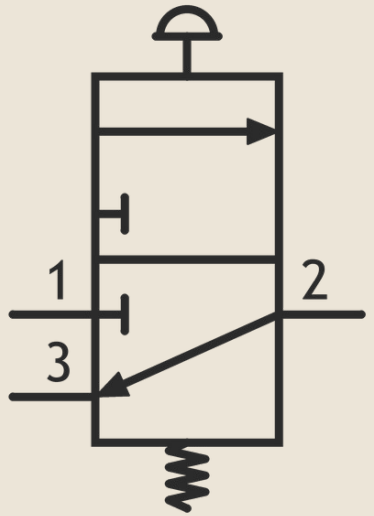
3 ports, **2** states

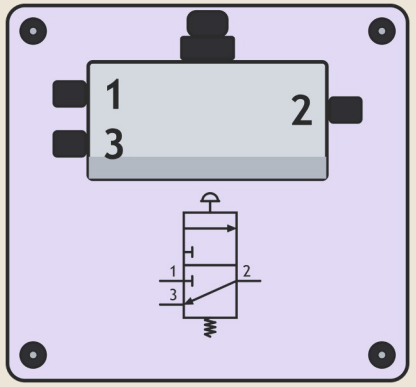
Button

push it to change **state**

Spring

pushes it **back**





The real push-button valve.

Meet the Parts: the Single-Acting Cylinder

Single-acting

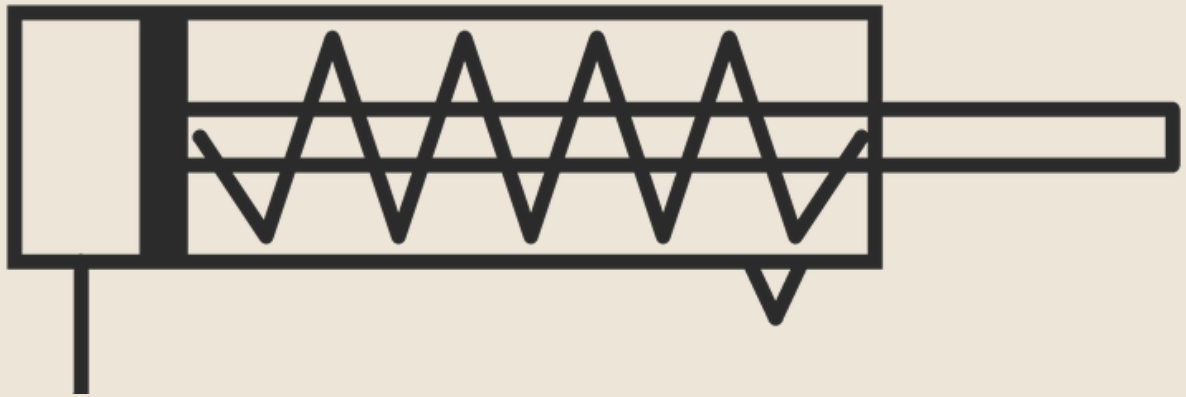
air pushes **one** way

Outstroke

air pushes the rod **out**

Instroke

a **spring** pushes it in

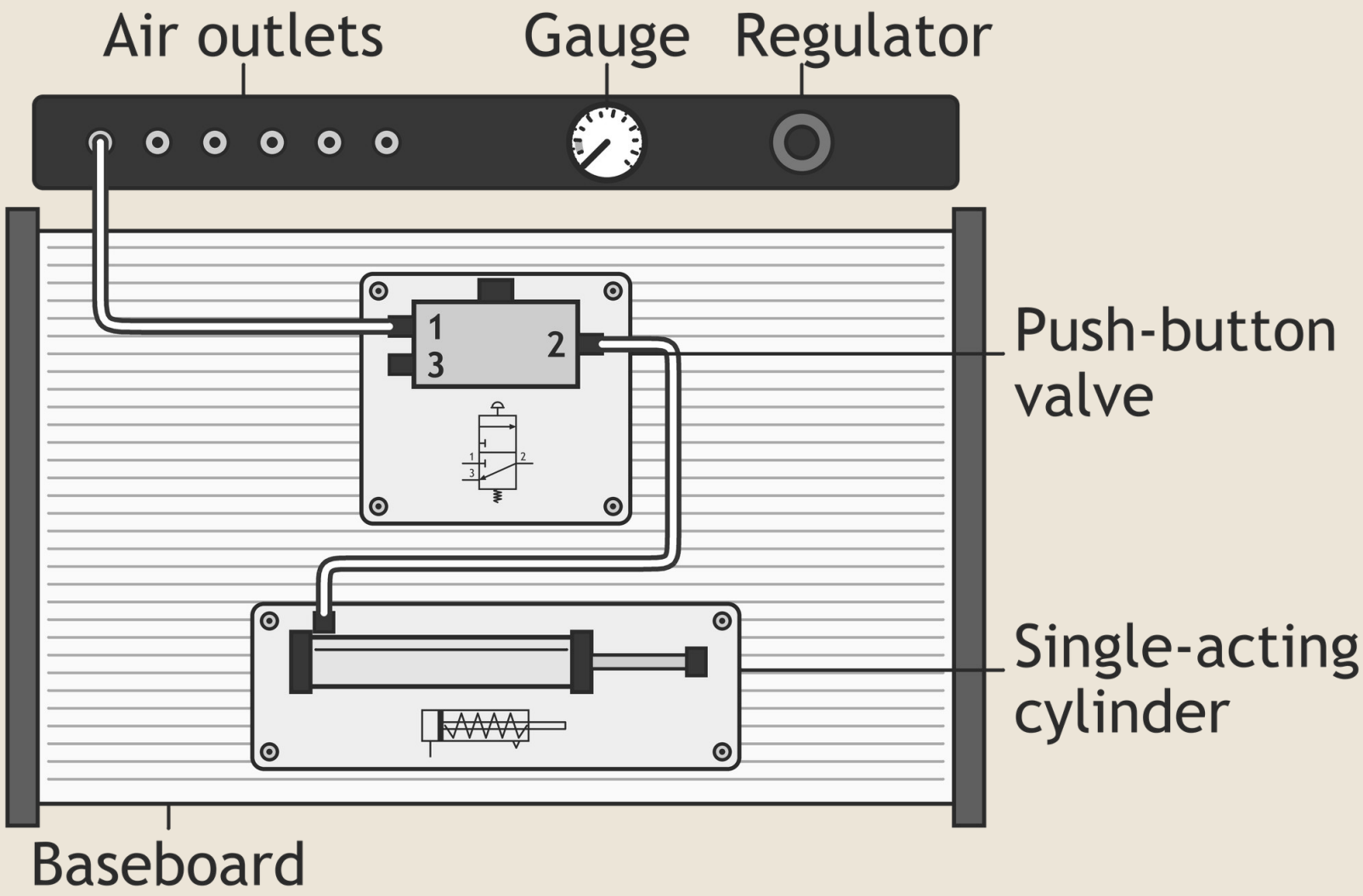


Collect, Simulate and Build

Collect the parts on the layout, tubing and goggles.

SAFETY Regulator at 0 to build. 1 to 2 bar to test.

Simulate, **build**, hands up. **Press** the button, then **let go**.



What Did You Find?

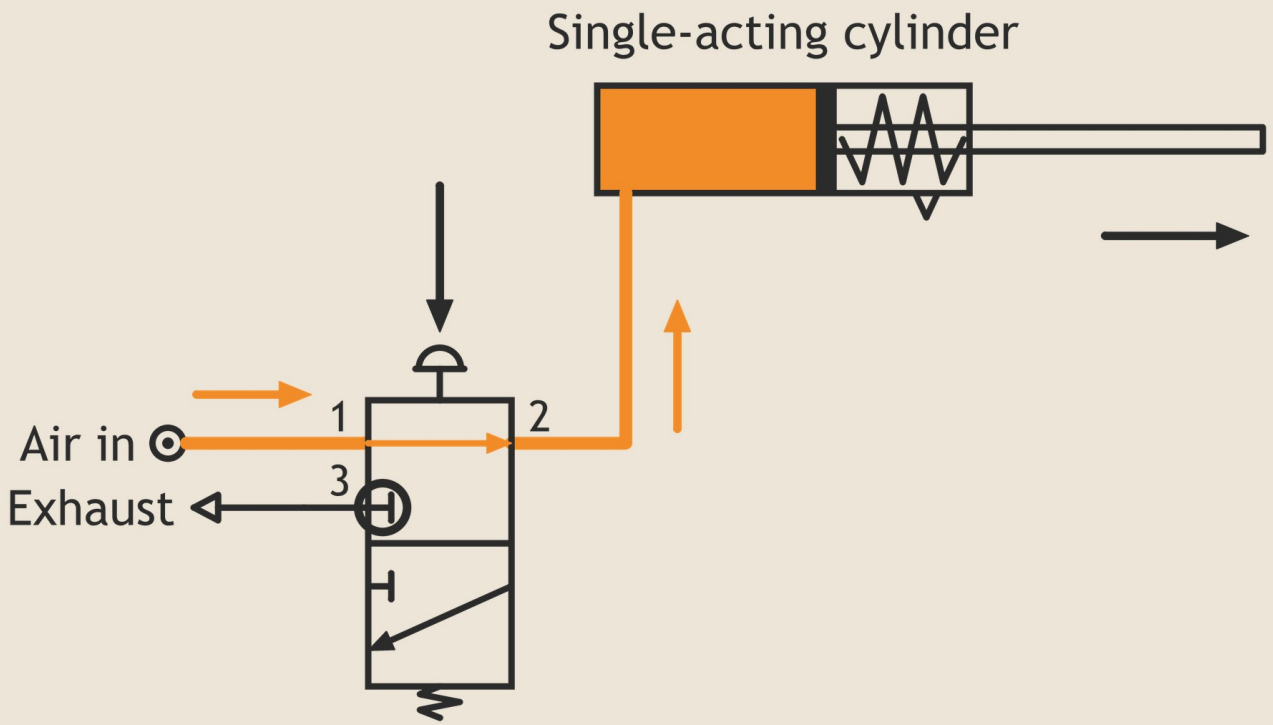


1. **State** what the rod did when you pressed.
2. **State** what the rod did when you let go.
3. **State** where you heard air when you let go.
4. **State** what pushed the rod back in.

Second Start

1. **State** what 3/2 means.
2. **Name** the rod moving out.
3. **Name** the rod moving in.
4. **State** the regulator setting to build.
5. **State** the pressure we test at.

Why: Press the Button



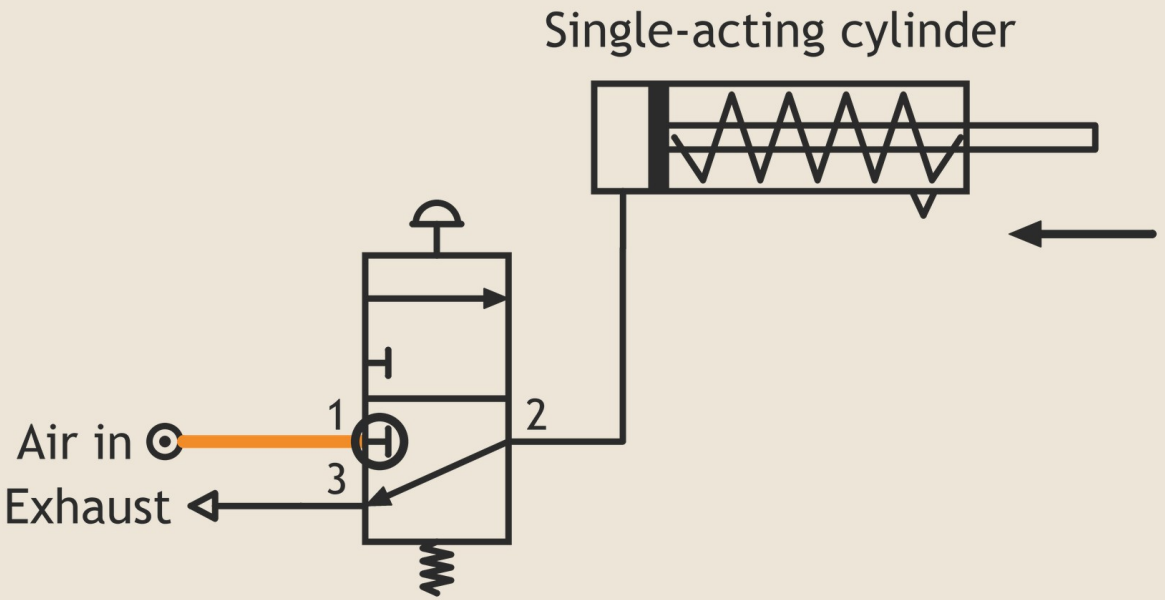
1 Push the button: both boxes slide **down**.

2 Port **3** is now blocked.

3 Air flows in port **1**, out of port **2**.

4 The rod moves **out**: the outstroke.

We Do: Let Go



1 Let go: the **spring** pushes the boxes up.

2 Port **1** is now blocked.

3 Air leaves: in port 2, out of port **3**.

4 The rod moves **in**: the instroke.

Why: The Circuit You Built

Input

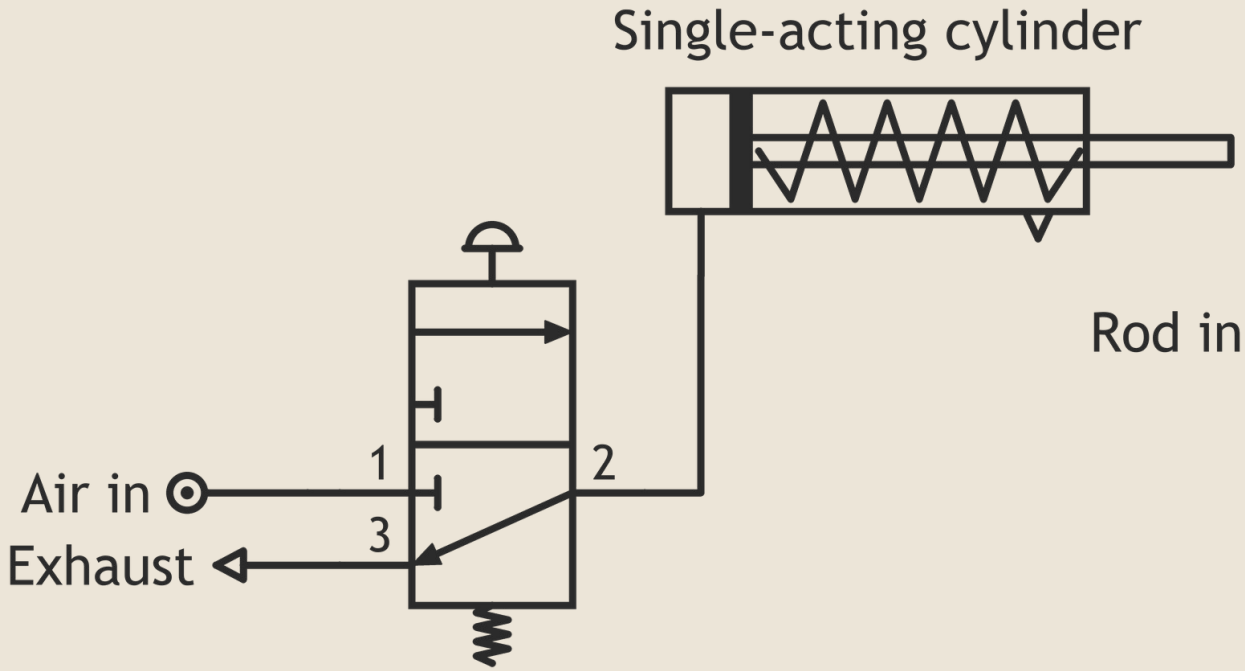
push-button valve

Output

single-acting cylinder

Pipe

port 2 to the cylinder



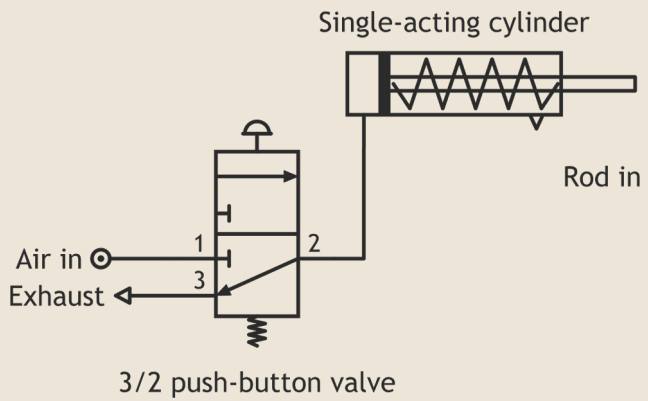
3/2 push-button valve

Review Questions

Booklet page 3

Answer Questions 1 to 5 on your own.

Finished? Try the Challenge.



Answers: Review Questions



Question	Answer
1	
2	
3	
4	
5	
Challenge	

Look back — by the end of this lesson…



1. I can **follow** the 5 **safety** rules
2. I can **build** and **test** a push-button circuit
3. I can **explain** where the air goes

Credits (1 of 2)

Cylinder: The Lesson 1 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

The 5 Safety Rules: Sources: safety rules adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Poster drawings by R Stewart.

Air unit: Sources: safety rules adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Poster drawings by R Stewart.

Real part drawings: Sources: kit drawings by R Stewart, from the Matrix CP2080 kit.

Kit layout: The Lesson 1 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Credits (2 of 2)

Circuit: The Lesson 1 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

R Stewart - October 2026