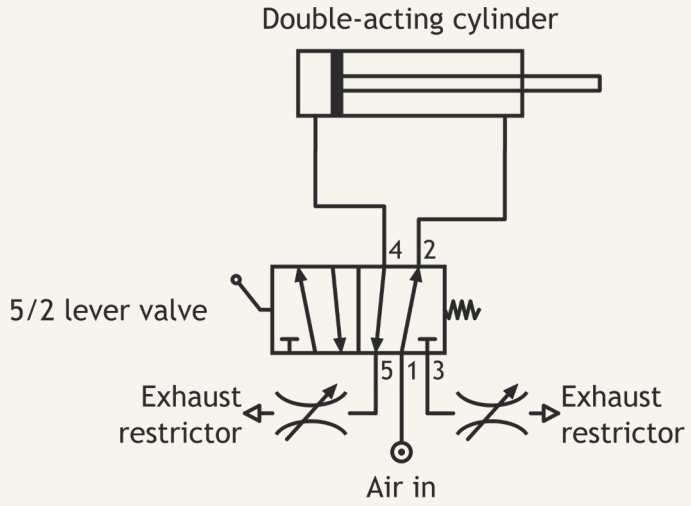
Daily Review

1	**Name** the valve that slows air one way.	Flow control valve
2	Arrow to the cylinder: **state** how the rod goes out.	Slowly
3	**State** what pushes a lever valve back.	Its spring
4	**State** what brings a single-acting rod in.	A spring
5	**Name** a push or a pull.	A force

Double-Acting Cylinder

What if air pushes the rod out AND back in?



S3 Engineering Science

By the end of this lesson…



1. I can **name** a single-acting and a **double-acting** cylinder
2. I can **simulate** and **build** a double-acting circuit
3. I can **describe** the **outstroke** and the **instroke**

Meet the Parts: the Cylinder

Double-acting

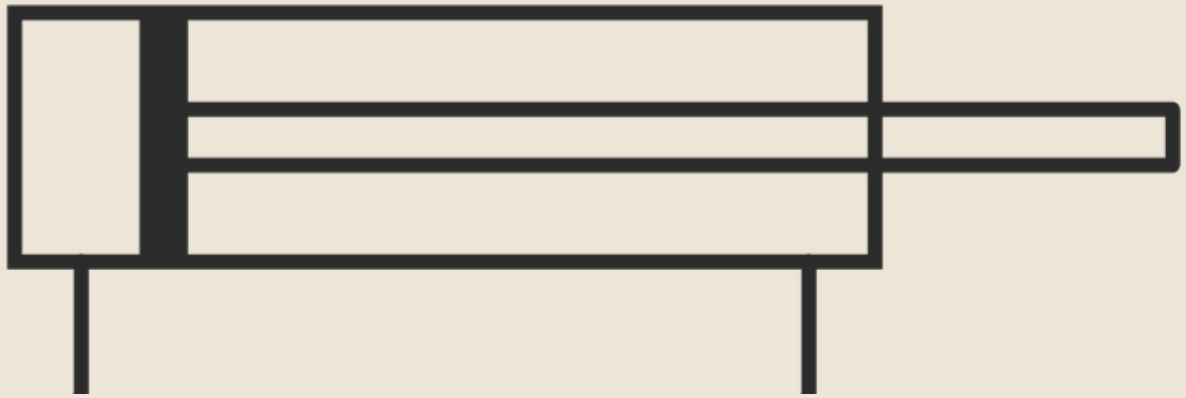
a new cylinder

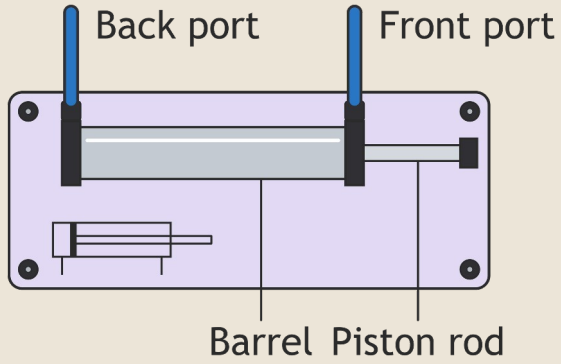
Ports

two

Spring

none inside





The real double-acting cylinder.

Meet the Parts: the Valve

5/2 lever valve

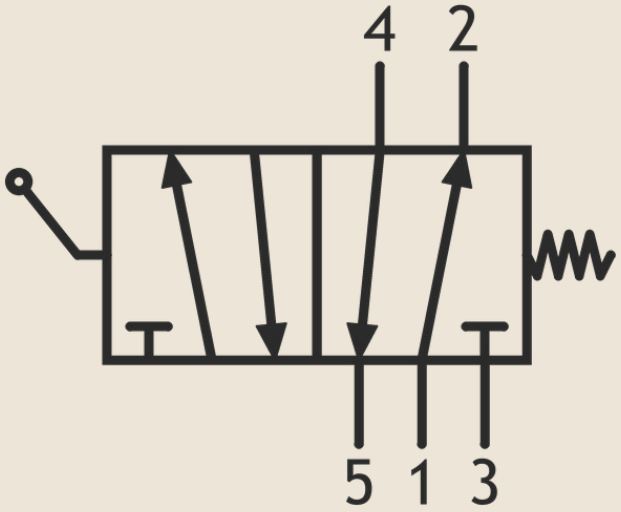
sends the **air**

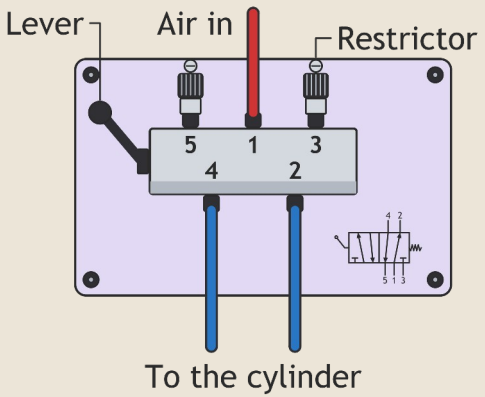
Lever

you **push** it

Spring

pushes the valve **back**





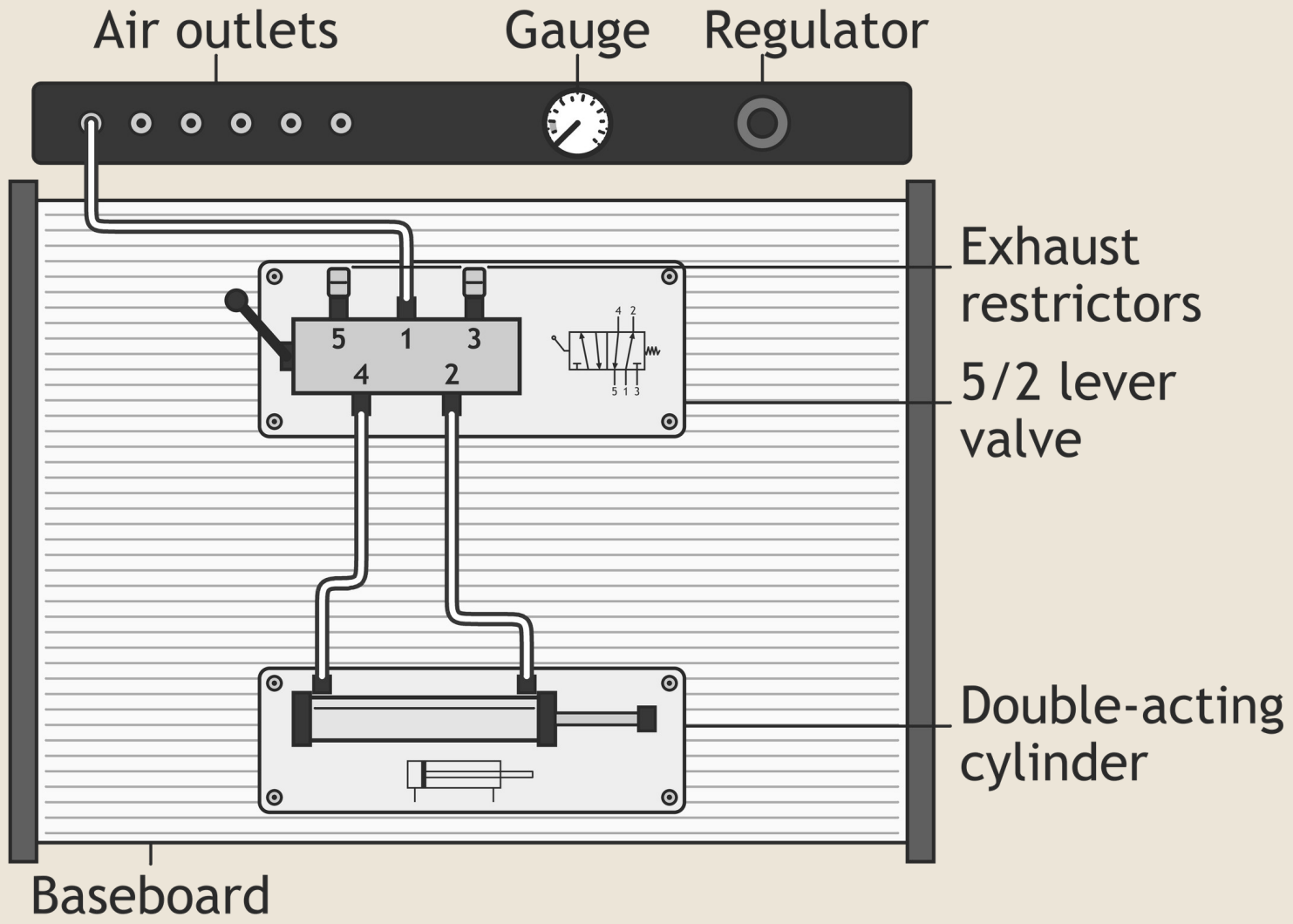
The real 5/2 lever valve.

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**, then **hands up** for the check.



What Did You Find?

1. **State** what the rod did when you pushed the lever.

It went out.

2. **State** what brought the rod back in.

Air, not a spring.

3. **State** how many ports the double-acting cylinder has.

Two.

Second Start

1	**Name** the cylinder with two ports.	Double-acting
2	**State** what brings a double-acting rod in.	Air
3	**State** what brings a single-acting rod in.	A spring
4	**State** the regulator setting while you build.	0 bar
5	**State** the pressure we test at.	1 to 2 bar

Why: One Port or Two

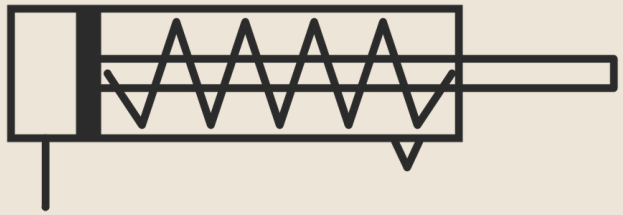
Single-acting

one port and a **spring**

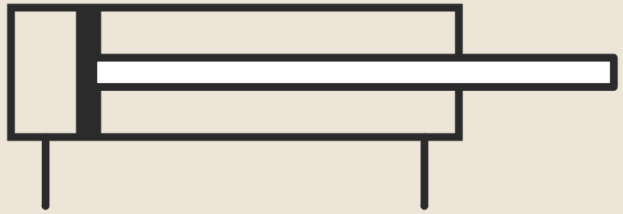
Double-acting

two ports: air both ways

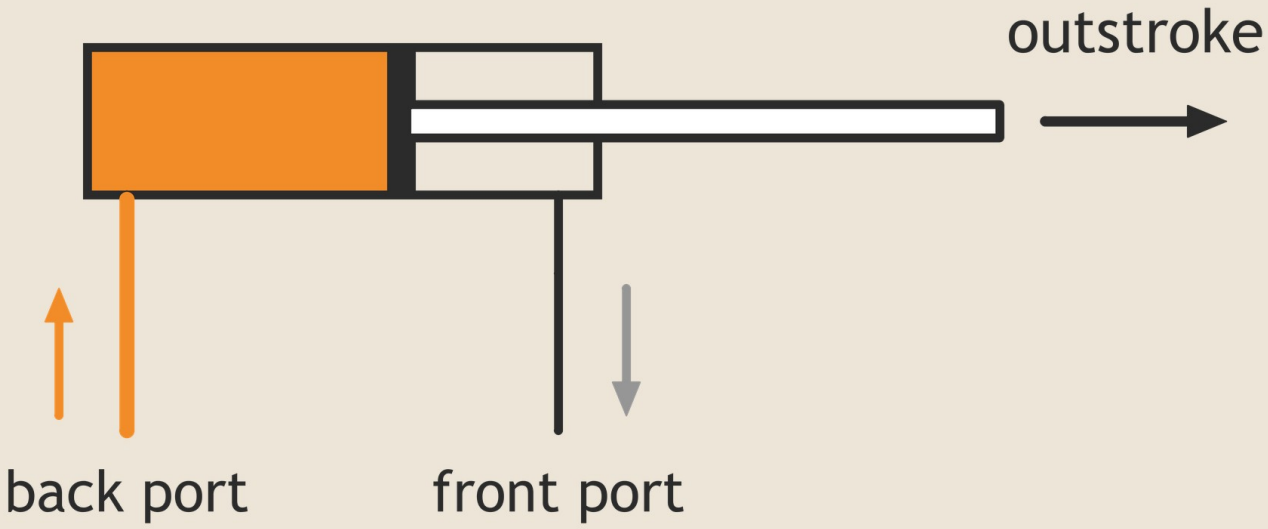
Single-acting: one port, a spring pushes it back



Double-acting: two ports, air pushes both ways



Why: the Outstroke

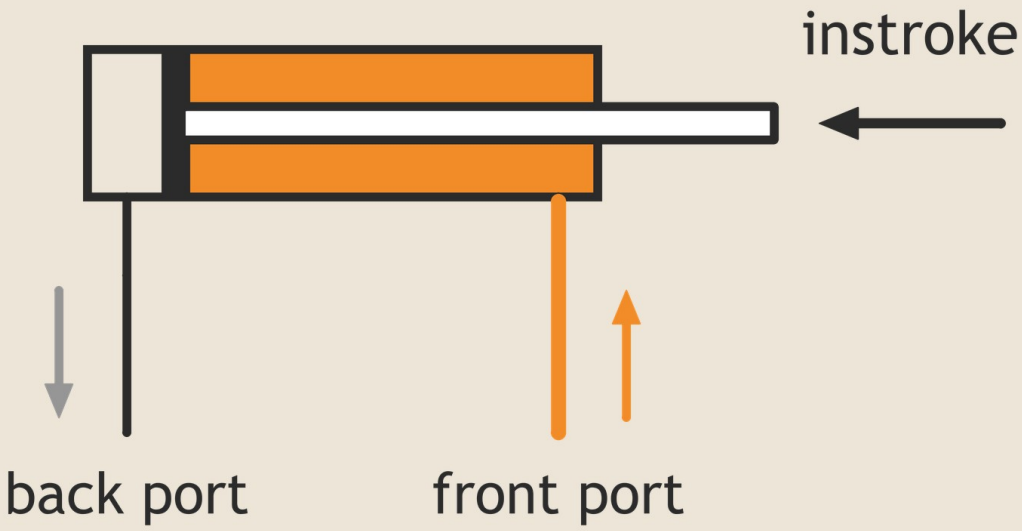


1 Air goes in at the **back** port.

2 The back fills; the front air **leaves**.

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

We Do: the Instroke

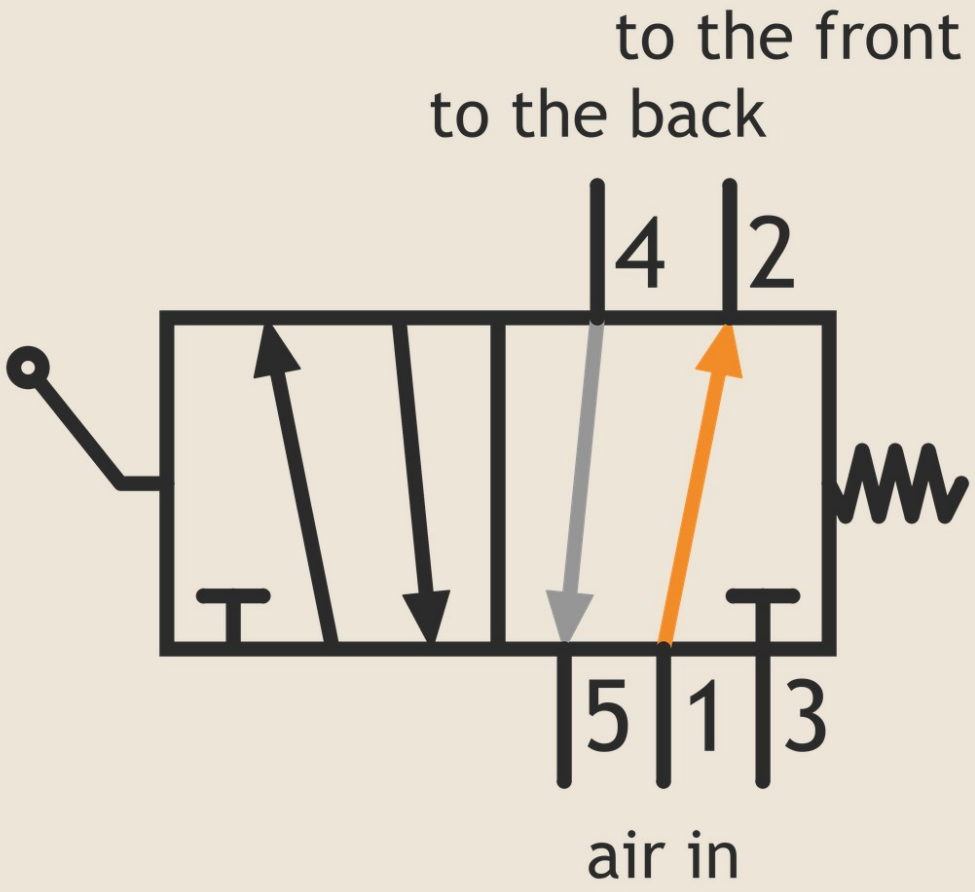


1 Air goes in at the **front** port.

2 The front fills; the back air **leaves**.

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

Why: How the Valve Works



1 Push the lever: air goes 1 to **4**, to the **back**.

2 Let go: the **spring**. Air goes 1 to **2**, to the **front**.

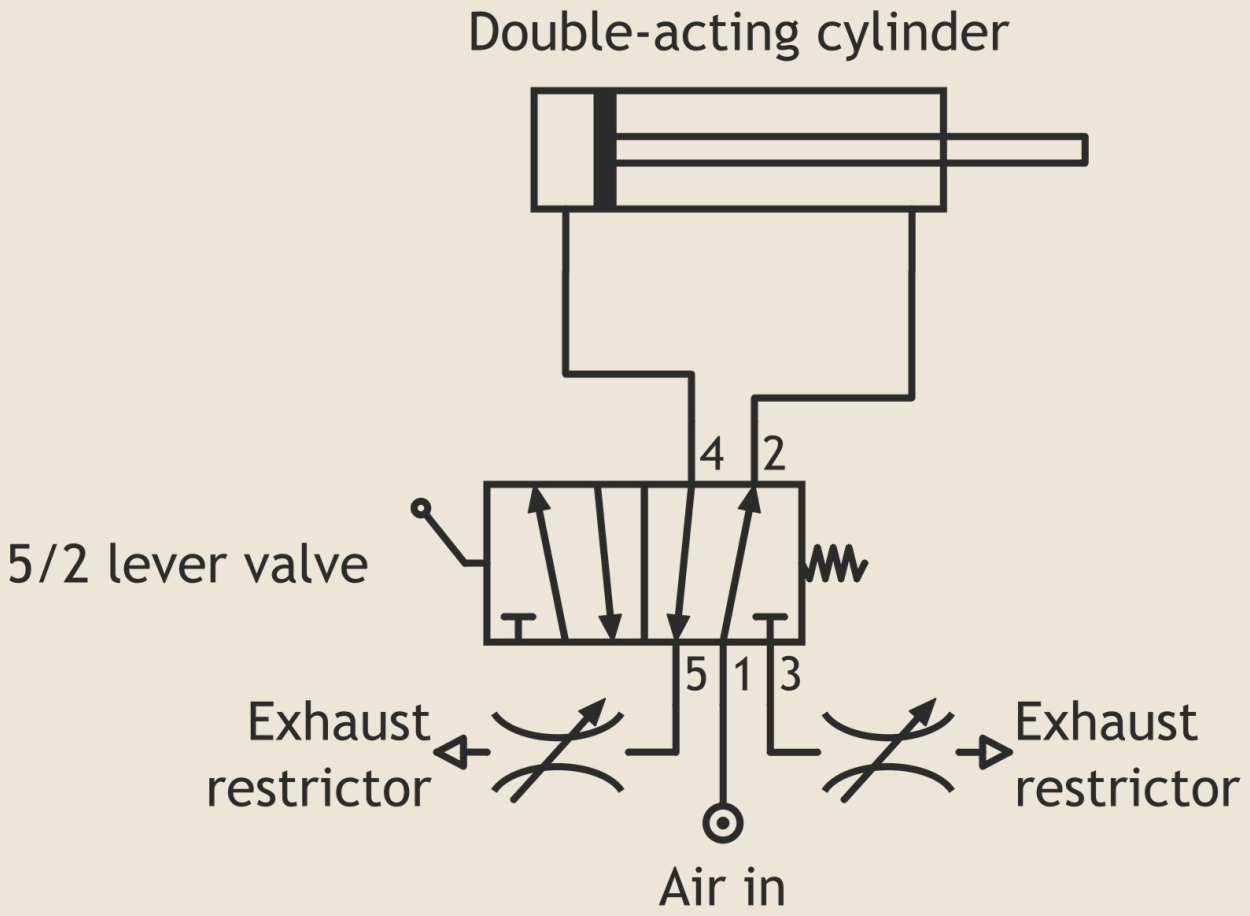
Why: the Circuit You Built

Push the lever

air to the **back: out**

Let go

air to the **front: in**



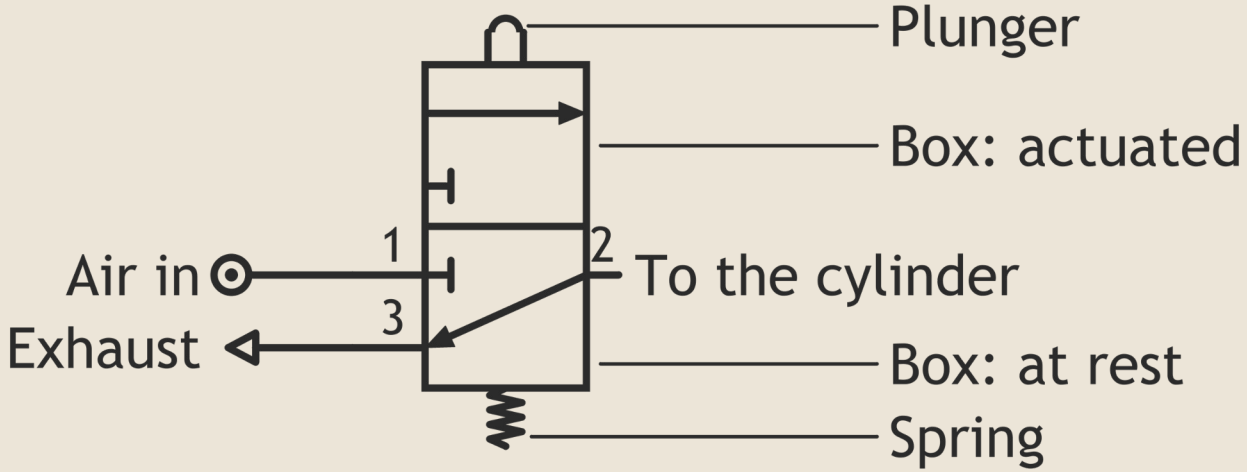
One More Symbol: the Plunger

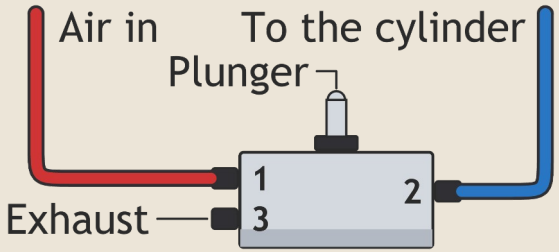
Plunger

a short **rod** on the valve

Pressed by

a **moving** part





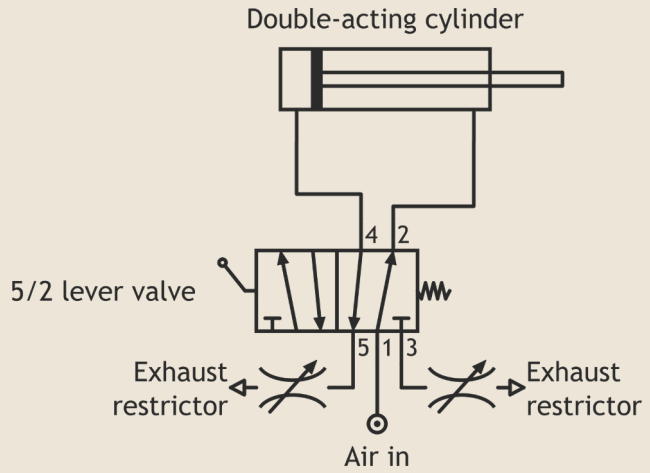
The real plunger valve.

Review Questions

Booklet page 9

Answer Questions 1 to 5 on your own.

Finished? Try the Challenge.



Answers: Review Questions

Question	Answer
1	A single-acting; B double-acting
2	two ports; air pushes it in
3	outstroke; instroke
4	A spring is too weak; air pushes it back
5	Plunger
Challenge	Push: air to the back, rod out. Let go: front, in

Look back — by the end of this lesson…



1. I can **name** a single-acting and a **double-acting** cylinder
2. I can **simulate** and **build** a double-acting circuit
3. I can **describe** the **outstroke** and the **instroke**

Credits

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

Kit layout: The Lesson 4 circuit adapted from the Matrix CP2080 Pneumatics Essentials Worksheet 4 (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Lesson 4 circuit: The Lesson 4 circuit adapted from the Matrix CP2080 Pneumatics Essentials Worksheet 4 (© Matrix Technology Solutions Limited). Drawings by R Stewart.

R Stewart - October 2026