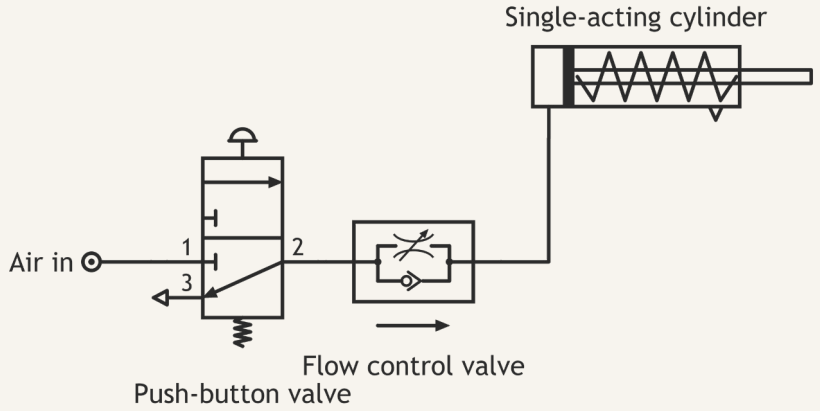
Daily Review

1	**State** what the arrow in a valve box shows.	The air's path
2	**State** what a T in a valve box shows.	Port blocked
3	**State** what moves a lever valve back.	A spring
4	**Name** the rod moving out.	Outstroke
5	**State** the regulator setting while you build.	0

Uni-directional Restrictor

Slow the rod down.



S3 Engineering Science

By the end of this lesson…



1. I can **build** and **test** a circuit with a **uni-directional restrictor**
2. I can **explain** how it slows the air one way
3. I can **draw** its symbol the right way round

Meet the Parts: the Flow Control Valve

Uni-directional restrictor

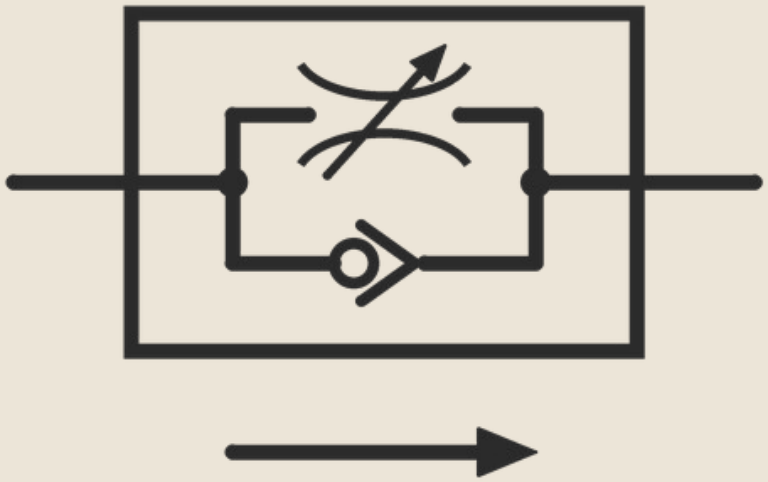
slows the air one way

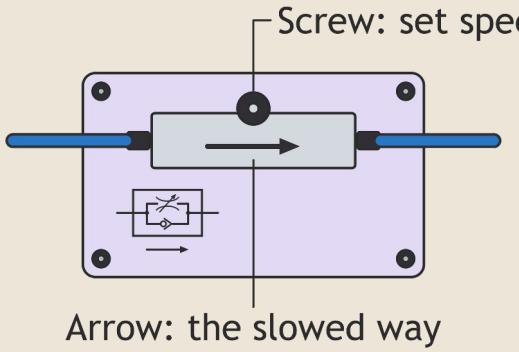
Screw

sets how **slow**

Arrow

the **way** it slows





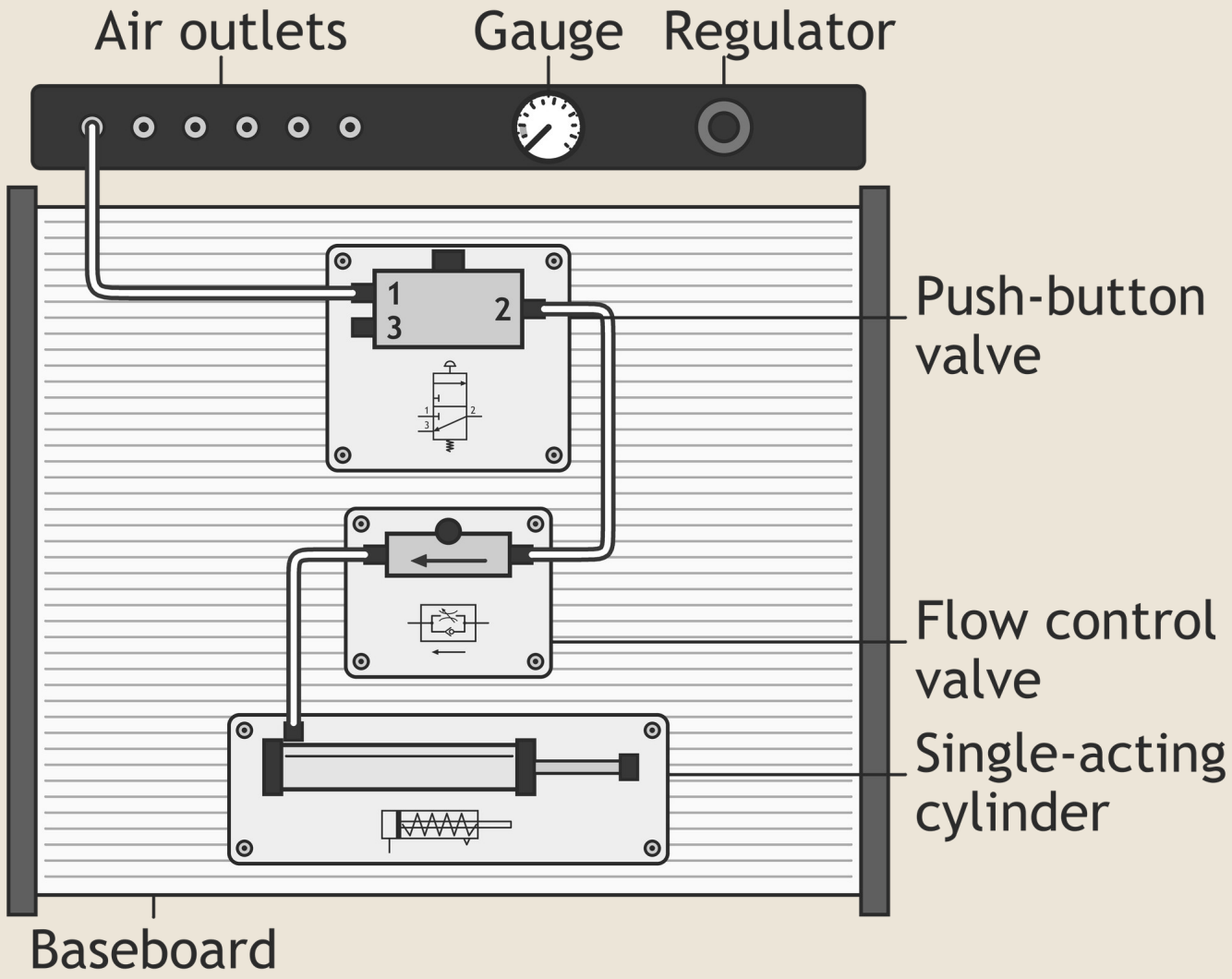
The real valve. Its symbol is on the plate.

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.

Build, hands up, **test**. Air to 0, **turn** the valve round, test again.



What Did You Find?

1. Arrow to the cylinder: **state** how the rod went out.
2. Arrow to the cylinder: **state** how it came back.
3. Turned round: **state** what changed.
4. **State** what turning the screw in did.

Slowly

Fast

Out fast, in slow

Slower

Second Start

1	**Name** the valve that slows the rod.	Flow control valve
2	**State** what the screw sets.	How slow
3	**State** what the arrow on it shows.	The way it slows
4	**State** what a single-acting rod comes back with.	A spring
5	**State** the pressure we test at.	1 to 2 bar

Why: Inside the Valve

1 Screw

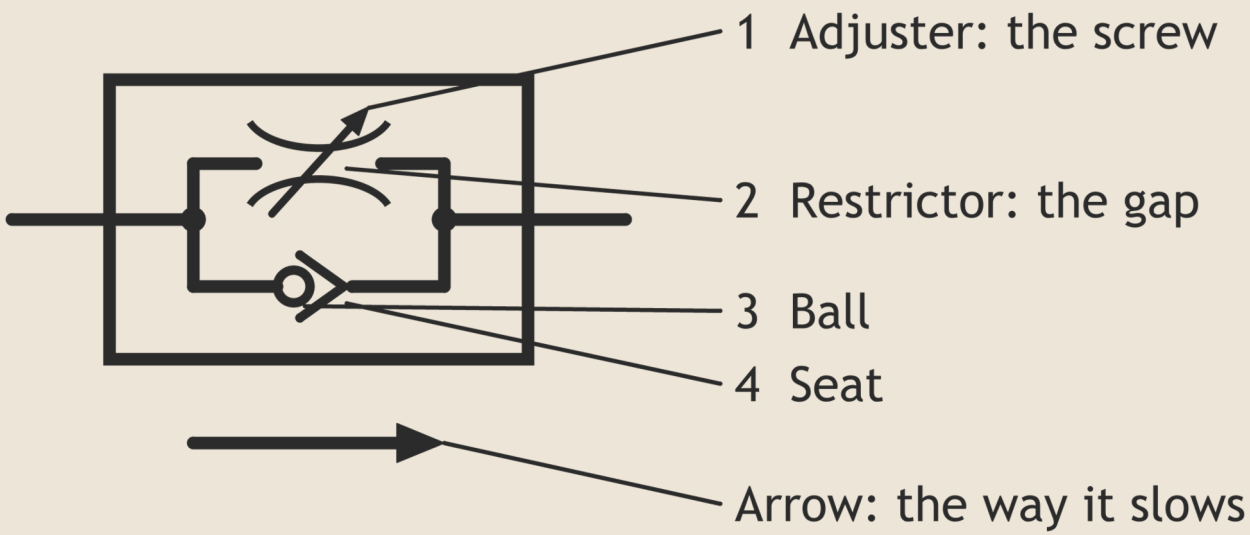
sets the **gap**

2 Gap

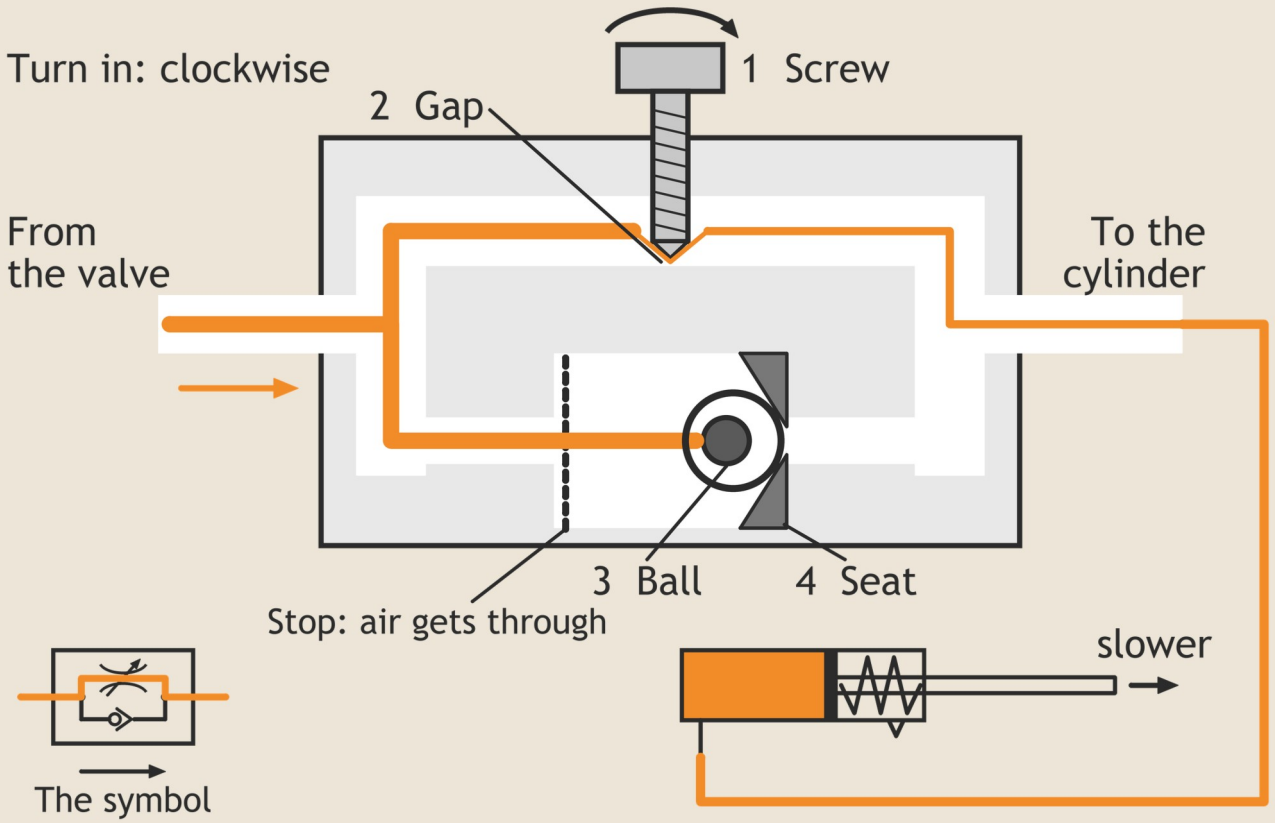
slows the air

3, 4 Ball, seat

one way only



Why: The Arrow's Way



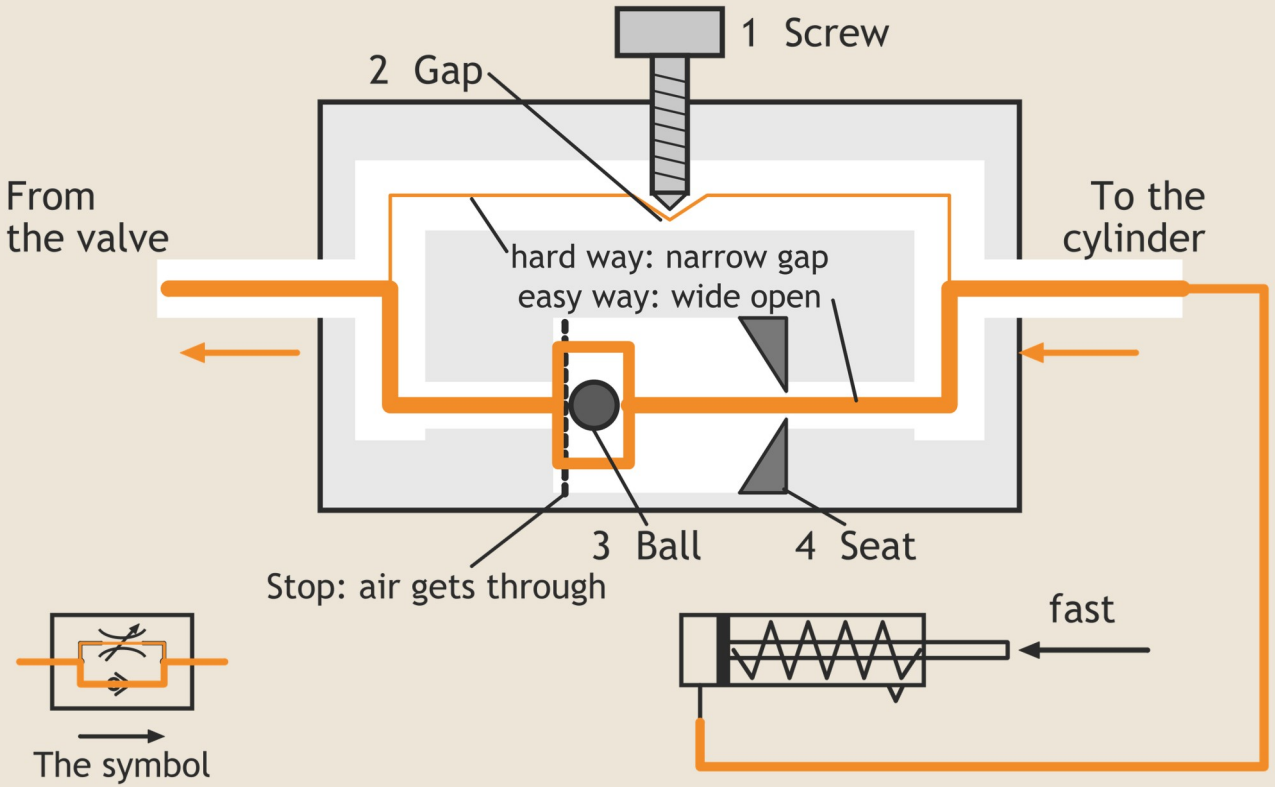
1 Air arrives from the valve.

2 It pushes the ball onto its **seat**: shut.

3 It squeezes through the **gap**: slow.

4 Screw in: smaller gap, **slower**.

We Do: Coming Back



1 Air comes back from the cylinder.

2 It pushes the ball **off** its seat.

3 Most air takes the easy way: **fast**.

Why: The Circuit You Built

Input

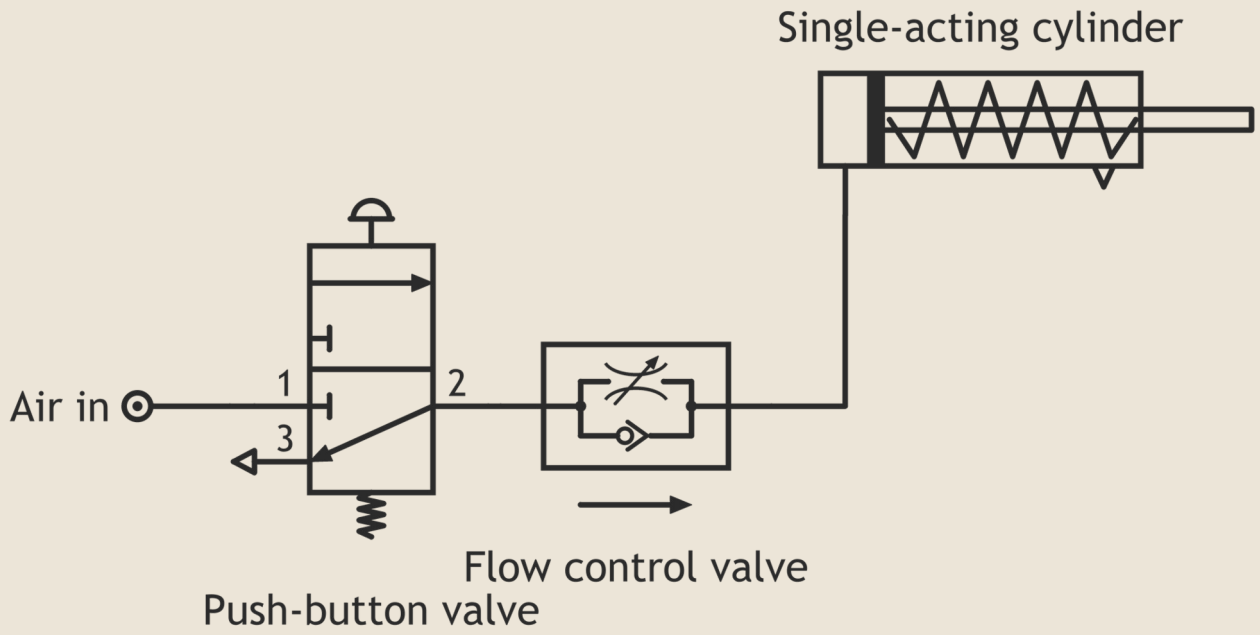
push-button valve

Control

flow control valve

Arrow

to the cylinder

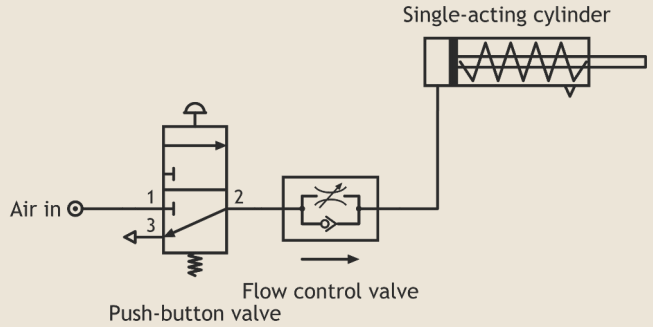


Review Questions

Booklet page 7

Answer Questions 1 to 5 on your own.

Finished? Try the Challenge.



Answers: Review Questions

Question	Answer
1	flow control valve
2	slowly; fast
3	gap; slows
4	off; freely
5	to the cylinder
Challenge	Restrictor + by-pass; V the same way as the arrow

Look back — by the end of this lesson…



1. I can **build** and **test** a circuit with a **uni-directional restrictor**
2. I can **explain** how it slows the air one way
3. I can **draw** its symbol the right way round

Credits

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

Kit layout: The Lesson 3 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Flow control valve: The Lesson 3 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Circuit: The Lesson 3 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

R Stewart - October 2026