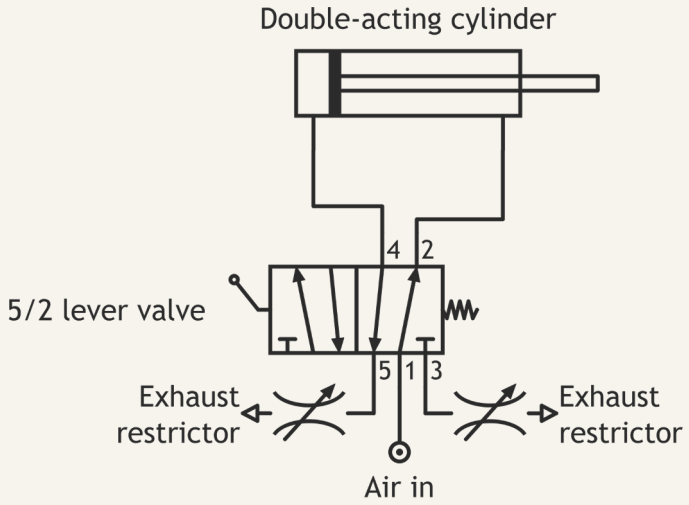
Daily Review

1	**State** how many ports a double-acting cylinder has.	Two
2	**Name** the rod moving out.	The outstroke
3	**State** what pushes a double-acting rod back.	Air
4	**State** the regulator setting while you build.	0 bar
5	**Name** the output in a pneumatic system.	The cylinder

Fault-Finding

Hide a fault. Swap benches. Find theirs.



S3 Engineering Science

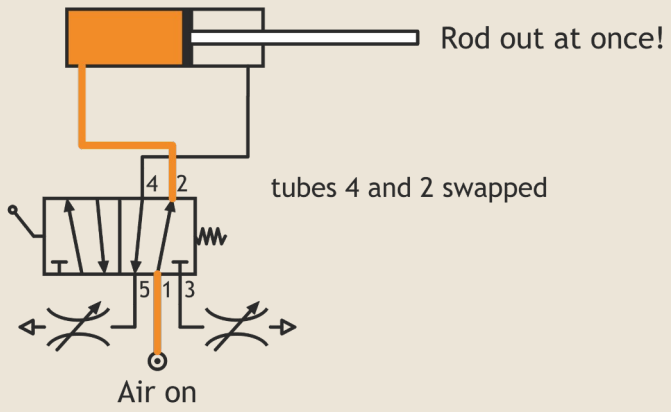
By the end of this lesson…



1. I can **find** a fault by **checking in order**
2. I can **describe** a fault, its **cause** and its **fix**
3. I can **hide** a fault safely, with the **air off**

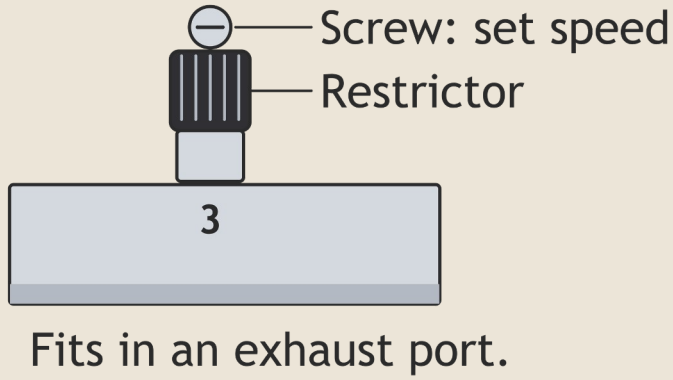
The Only Faults You May Hide

Regulator at 0. One fault. Never damage a part.



Swap 4 and 2

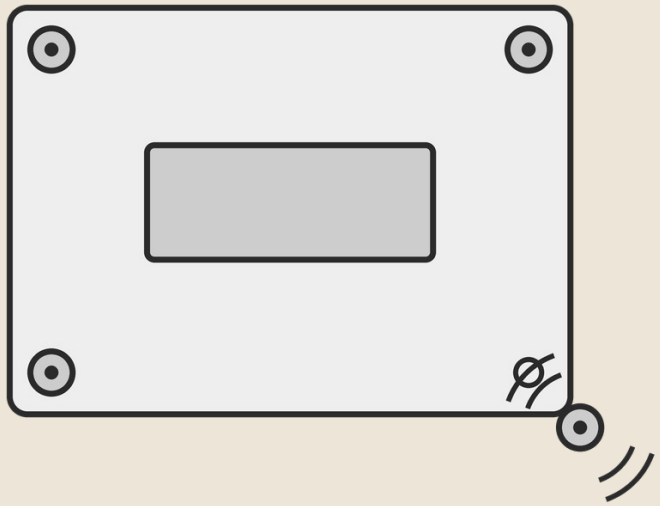
a **tube**



Fits in an exhaust port.

Restrictor in

a **setting**

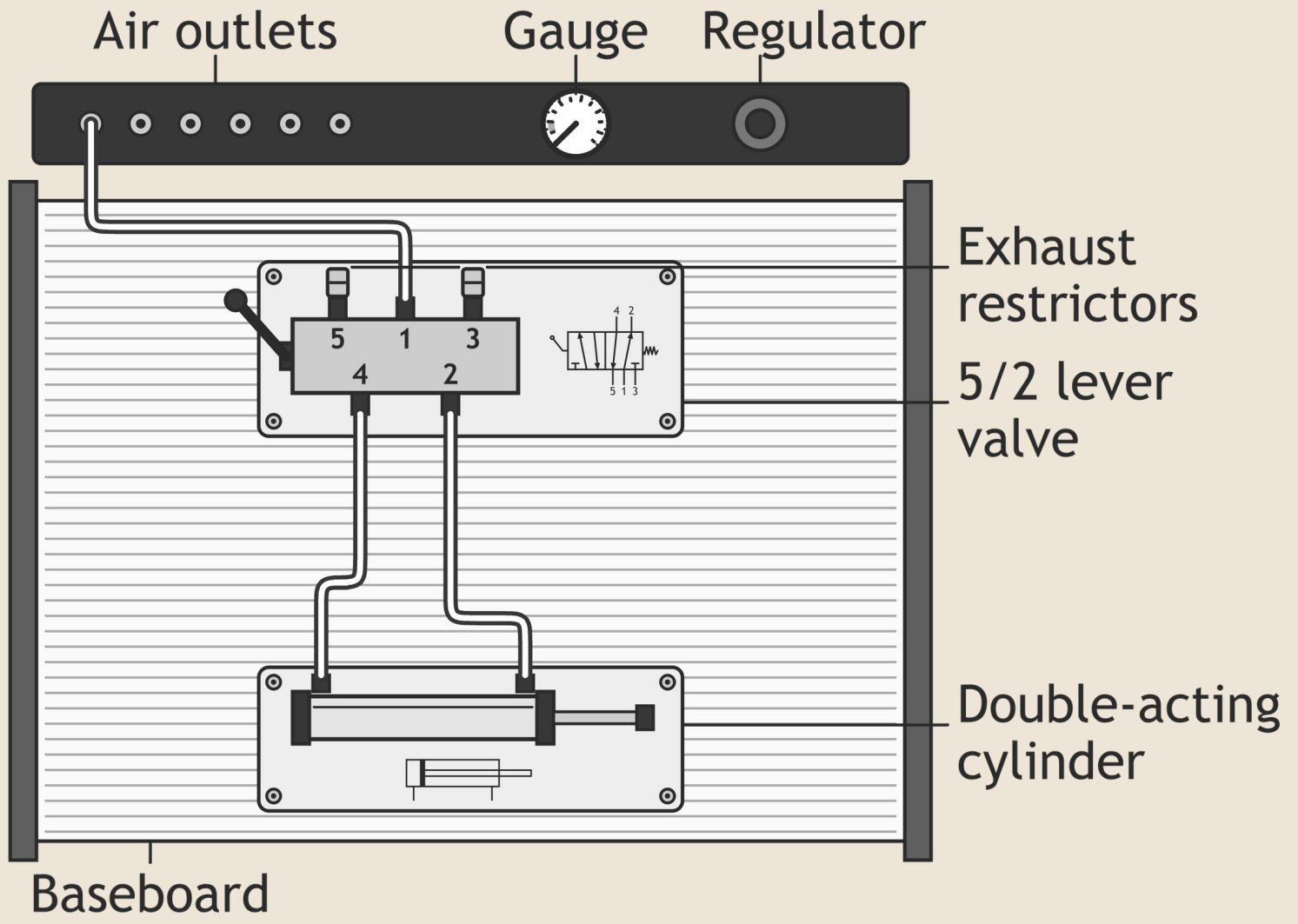


Loose bolt

a **part**

Build It, Then Hide One Fault

Build the Lesson 4 circuit again.



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

Test it. Regulator to 0. **Hide** ONE fault. Move on one bench.

Find It: Check in Order

Check: yes, go on down	If no: fix it
1 Regulator at **0**? Hands clear?	Stop. Do this first.
2 Every tube pushed in **fully**?	Push it in.
3 Every tube on the right **port**?	Move it.
4 Both **restrictors** open?	Open it.
5 Every part **bolted** down tight?	Tighten the bolt.
6 **Teacher** checks. Does it work?	Air off. Back to 1.

What Did You Find?

1. **State** what the rod did with tubes 4 and 2 swapped.
2. **State** what the rod did with a restrictor right in.
3. **State** which check found a loose bolt.
4. **State** check 1, every time.

Shot out at air on

Very slow, or stuck

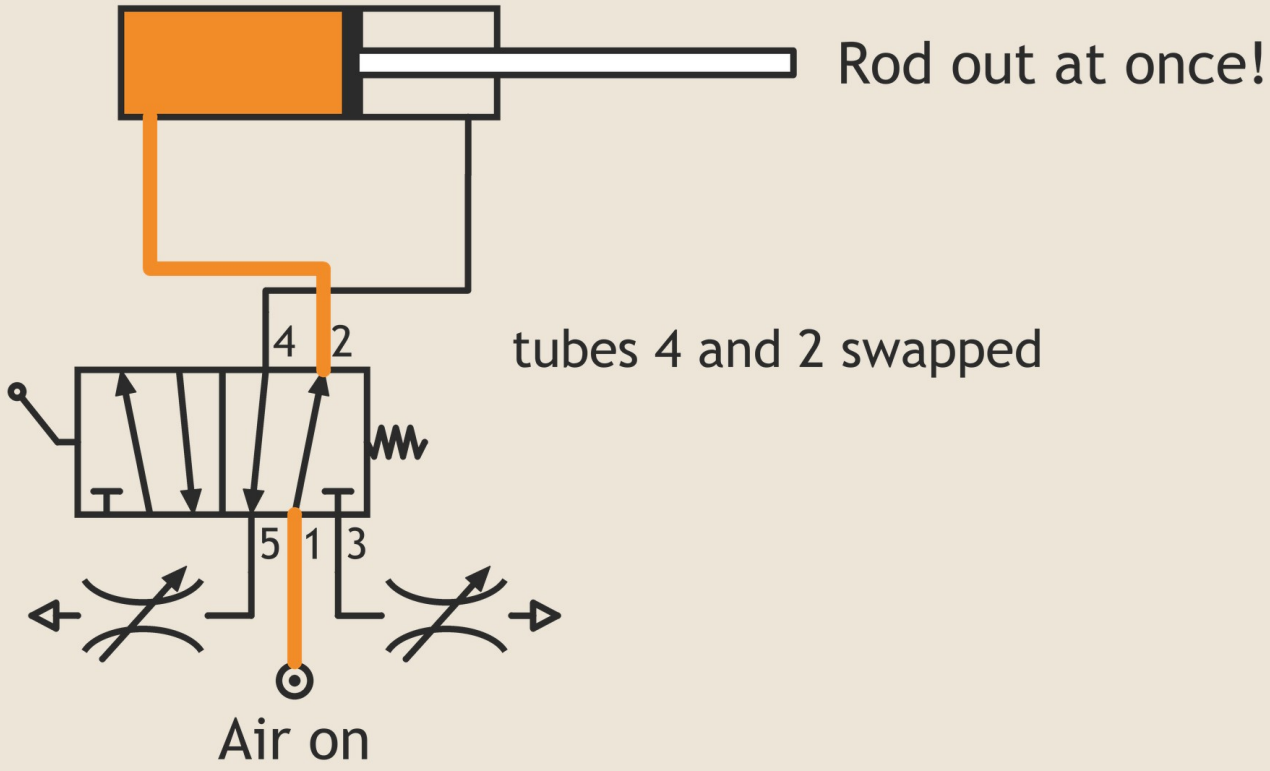
Check 5

Regulator at 0

Second Start

1	**State** the regulator setting to hide a fault.	0 bar
2	**Name** the 3 faults you may hide.	Tube, setting, part
3	**State** what the rod does with 4 and 2 swapped.	Goes out at once
4	**State** who checks before the air goes on.	The teacher
5	**State** the pressure we test at.	1 to 2 bar

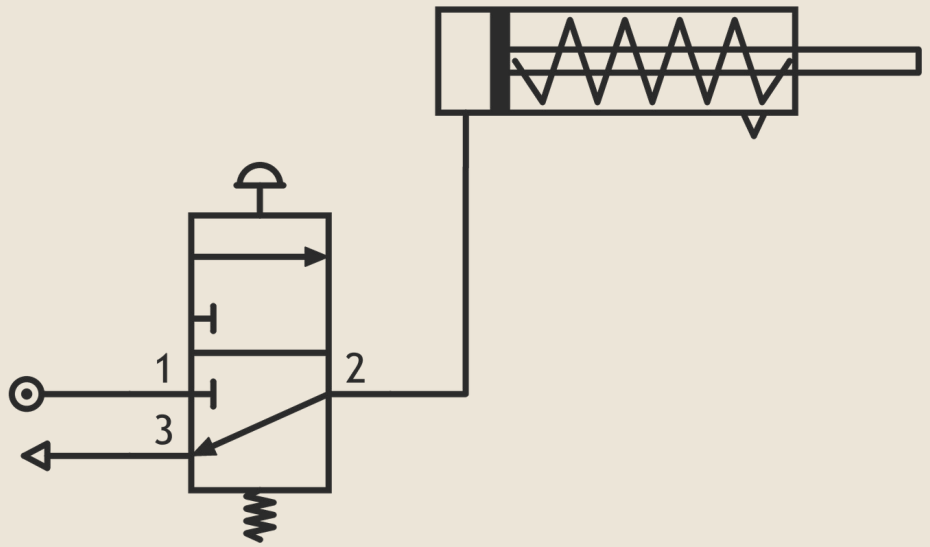
Why the Air Must Be Off



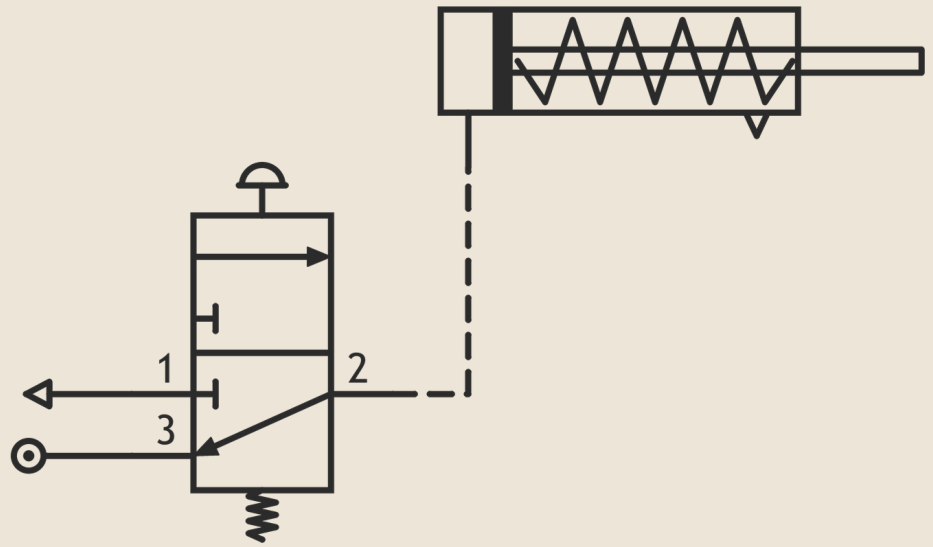
1 Right tubes, air on: the **front** fills. The rod stays **in**.

2 Tubes 4 and 2 swapped, air on: the **back** fills. The rod shoots **out** at once.

Spot the Mistakes



Right



Two mistakes: what?

Air in and exhaust are on the wrong ports

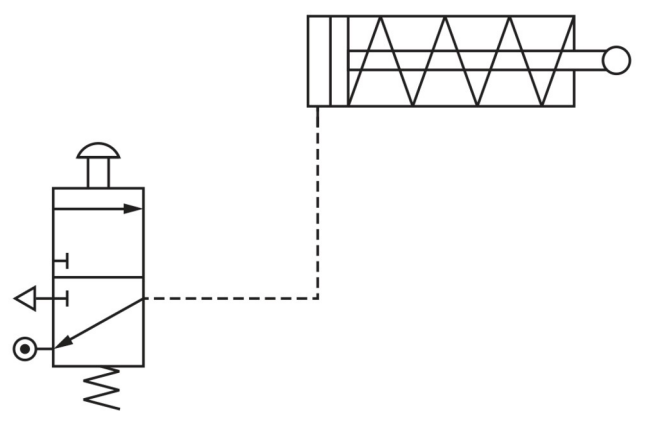
The main pipe is dashed: it should be solid

Review Questions

Booklet page 11

Answer Questions 1 to 5 on your own.

Finished? Try the Challenge.



Answers: Review Questions

Question	Answer
1	0 (zero)
2	out; on
3	suddenly; fingers
4	in; open
5	solid
Challenge	Air in and exhaust swapped (1); line should be solid (1)

Look back — by the end of this lesson…



1. I can **find** a fault by **checking in order**
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3. I can **hide** a fault safely, with the **air off**

Credits

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

Kit layout: The Lesson 4 circuit from the Matrix CP2080 Pneumatics Essentials Worksheet 4; the checks adapted from Worksheet 8 (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Circuit, kit and checks: The Lesson 4 circuit from the Matrix CP2080 Pneumatics Essentials Worksheet 4; the checks adapted from Worksheet 8 (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Challenge: 2024 Q3(a): © Qualifications Scotland (SQA). N5 Engineering Science 2024, Question 3(a) and its marking instructions (sheet Challenge).

R Stewart - October 2026