Engineering College of Technology.

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Become an Automation Engineer from Anywhere in the World

Dr. Abdu Shaalan

UKPRN: 10089771

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Engineering Specialists

ECT - affiliated to the well-established Engineering Institute of Technology (EIT) - is an engineering education specialist. ECT delivers professional certificates, bachelor's and master's degrees.

Industry-Driven Programs

Our programs are designed by industry experts, ensuring you graduate with cutting-edge skills that are valued by employers. Our program content remains current with rapidly changing technology and industry developments.

World-Class Accredited Education

ECT is OfS registered and accredited, meeting the Office for Students' requirements for course quality, academic standards, student support and student protection.

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Our teachers are subject specialists with industry experience and the requisite academic qualifications. The online platform allows ECT to source them from a large, global pool of expertise.

Unique Delivery Model

We deliver our programs via a unique delivery methodology that makes use of live and interactive webinars, an international pool of expert lecturers, dedicated learning support officers, hands-on workshops and state-of-the-art remote labs connected to real equipment, and simulation software.

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Event Conduct

Please keep discussion lawful and respectful; follow the moderator’s directions.
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Breaches may lead to removal and referral under ECT policies.

Introduction – Presenter

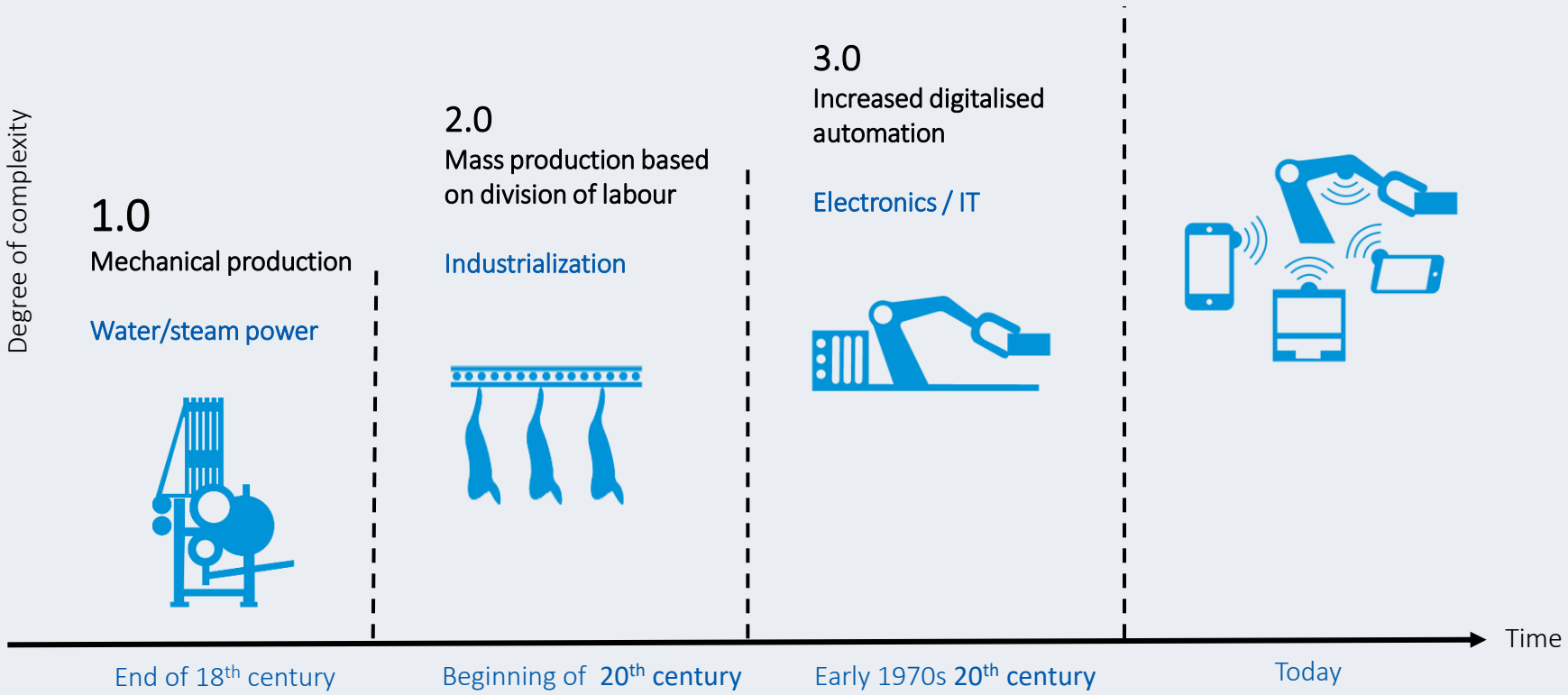
Dr. Abdu Shaalan

- Abdu is a PhD holder in the fields of Industrial Automation and Advanced Maintenance practices from the University of Sunderland.
- He is a research enthusiast and has held multiple research projects over the years, including a research fellowship with the nursing school, several KTP projects with local manufacturers, and was recently awarded a Teaching Fellowship in AI in Education.
- Abdu's research focus is on Industrial Automation and Advanced Maintenance practices in the advances of Industry 4.0 technologies.
- Teaching-wise, Abdu held multiple programme lead positions ranging from Undergraduate and Postgraduate levels.
- Currently a programme leader for Undergraduate and Postgraduate Industrial Automation programmes at ECT.

Agenda

1	Introduction to industrial revolutions.
2	What is Industrial Automation.
3	How PLC works.
4	Pneumatics.
5	ECT teaching methodology.
6	Employment and career opportunities.

Industrial revolutions

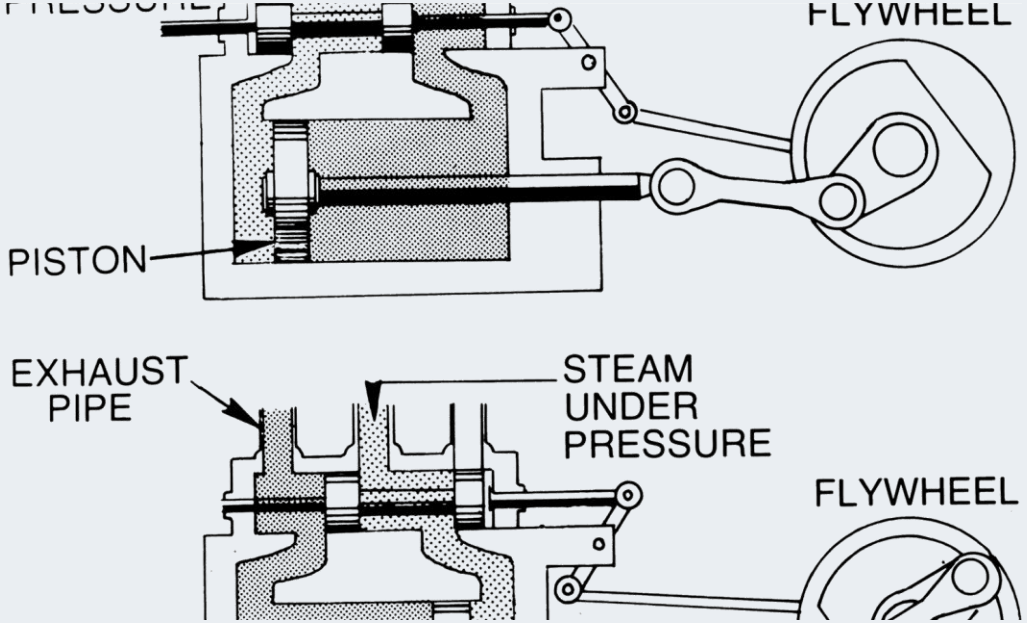


1st Industrial revolution

- The transition from hand production methods to the use of machines started at the 17th century and kept developing till the current time.

1st Revolution (1780's – 1870's)

- The first use of machines
- Steam as main power source



2nd Revolution (1870's – 1960's)

- Started from Britain- Germany and the US
- The use of Electricity and Fossil fuel in industry
- The beginning of production lines
- Mass production
- Development in Steel and Rail production

How production lines operated

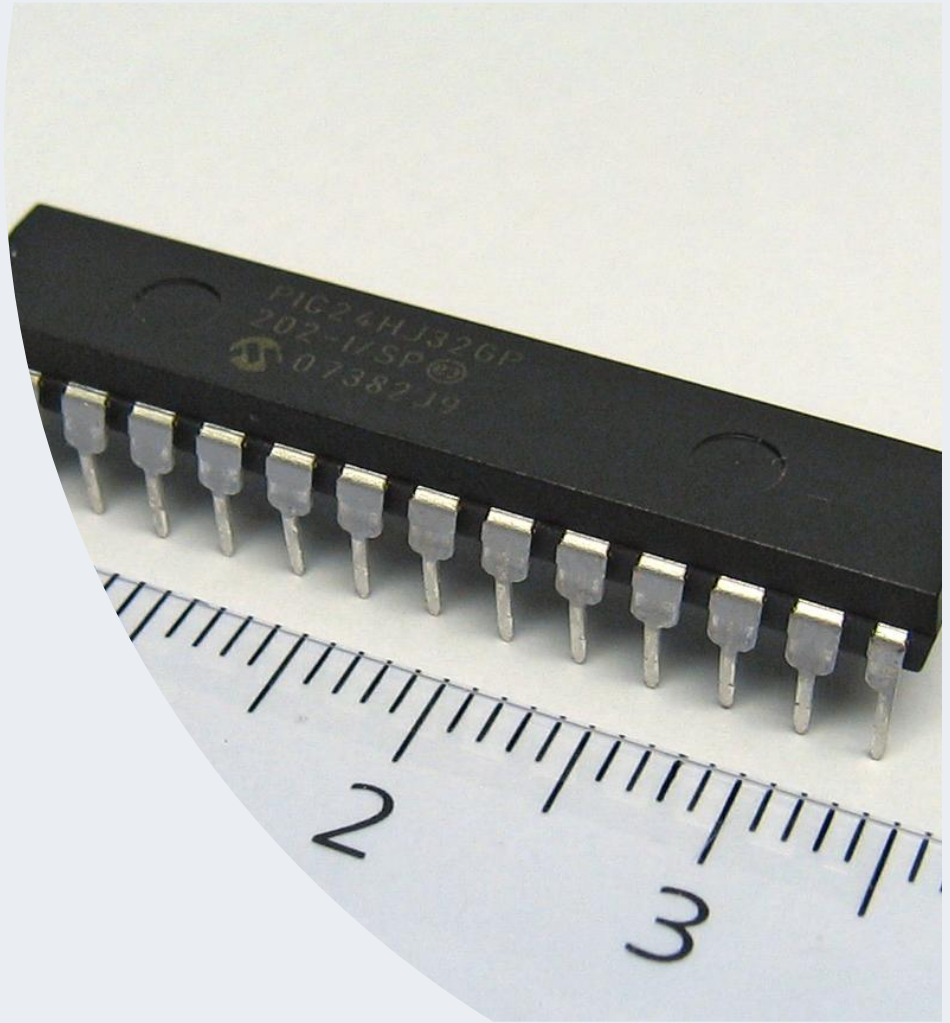
- A typical relay Control Panel could have hundreds of relays

Third Industrial Revolution (1960's – early 2000's)

- The first Introduction of the Automation systems
- The use of computers
- Manipulators and Robotic arms

Introduction to Microcontrollers

- What is a microcontroller?
- A multipurpose, versatile programmable digital processing system
- Generally packaged in a single Integrated Circuit (IC)
- control system is an integration of;
  - Sensors
  - Actuators
  - Intelligence
- With system to produce
  - More capable, versatile, and robust performance



Some history

Various 16-bit designs appeared through the 1970s

- The Intel 8086 arrived on the market in the late 1970s and led to the popular x86 instruction set
- Intel 80386 appears in 1985 – X86 32-bit architecture

History of Automation

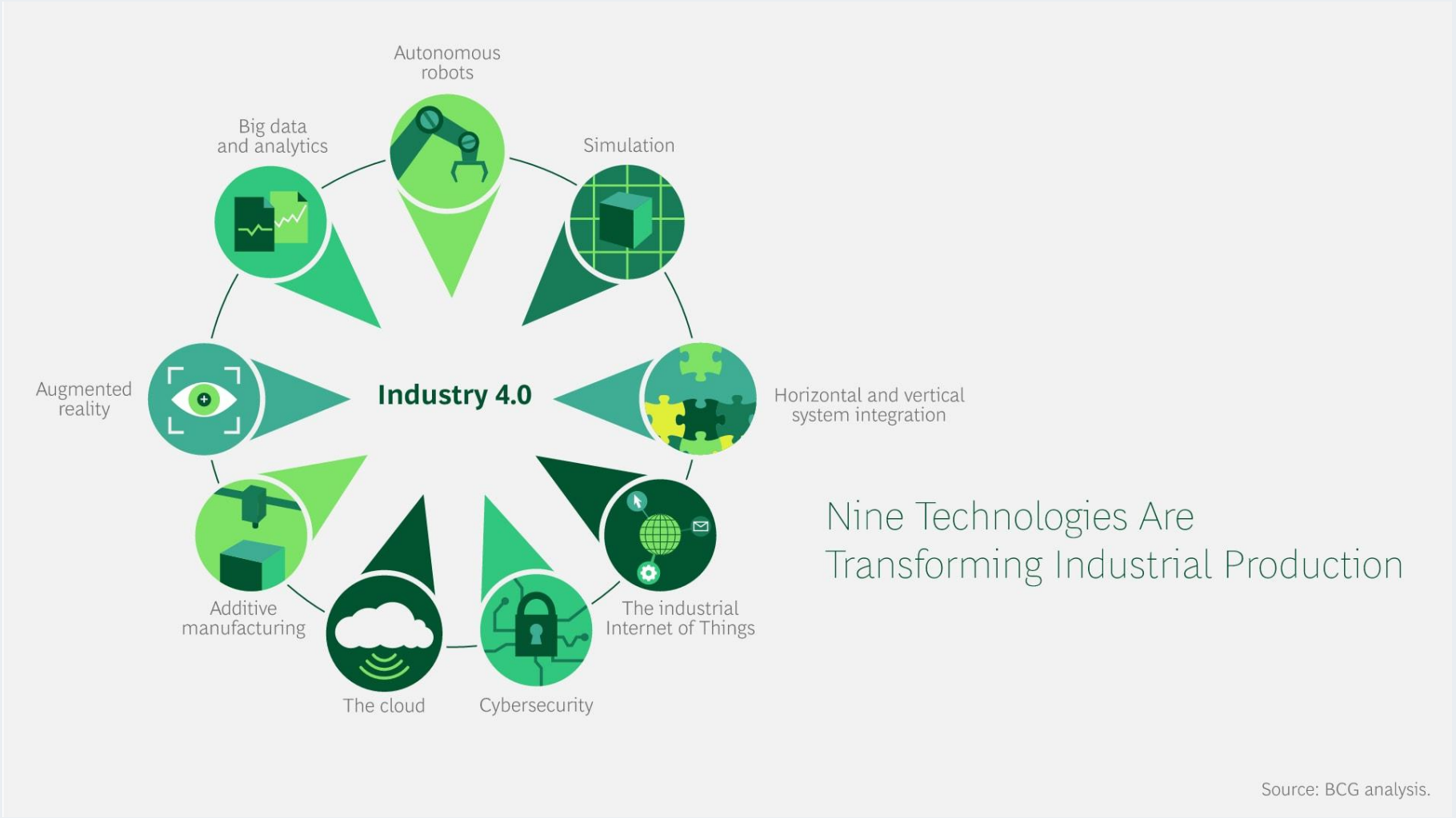
- The first PLC was created by Dick Morley in 1969 (Modicon 084).
- Although it had all of the required features it wasn't commercially successful.
- In 1973 the company developed the Modicon 184 model which is described as the first PLC.

- An example of 1980 cars production line https://www.youtube.com/watch?v=BJ_y2GMrYSo

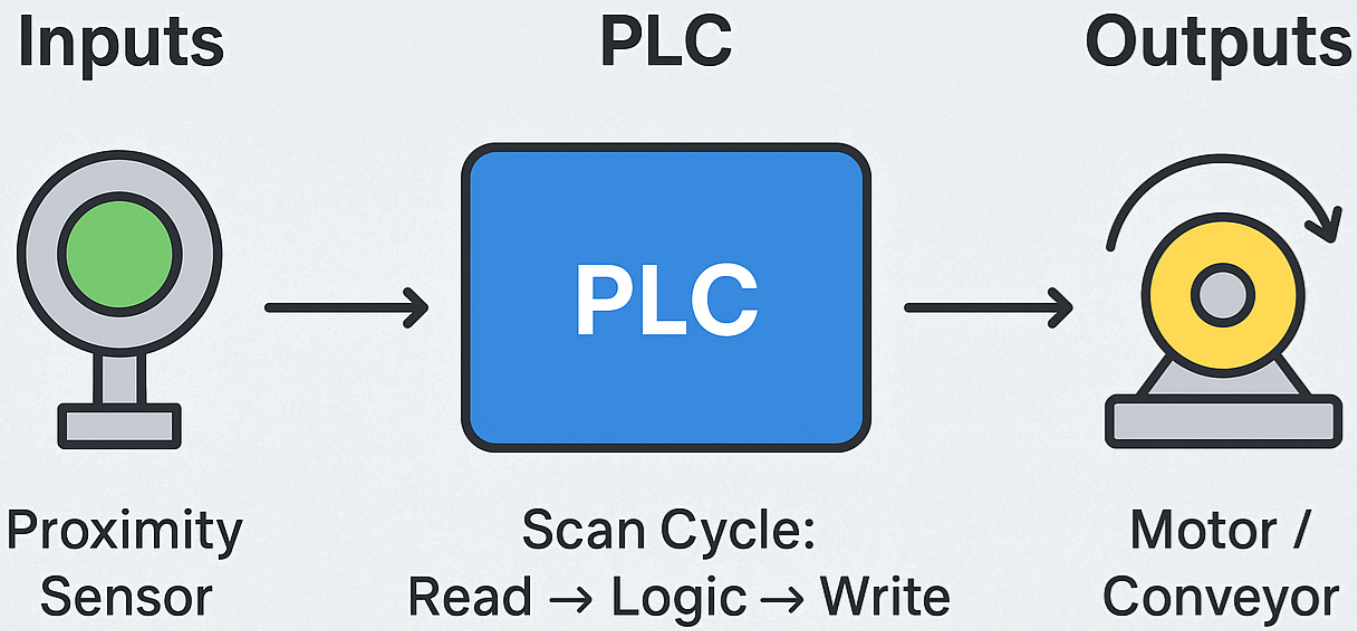
Forth Industrial Revolution I4.0 (2000's – Current)

- The Internet Use in manufacturing for connecting all machines and their different components together
- The use of Cyber Physical system (CPS) that monitors and control all connected all machines using computer algorithms.
- Augmented Reality

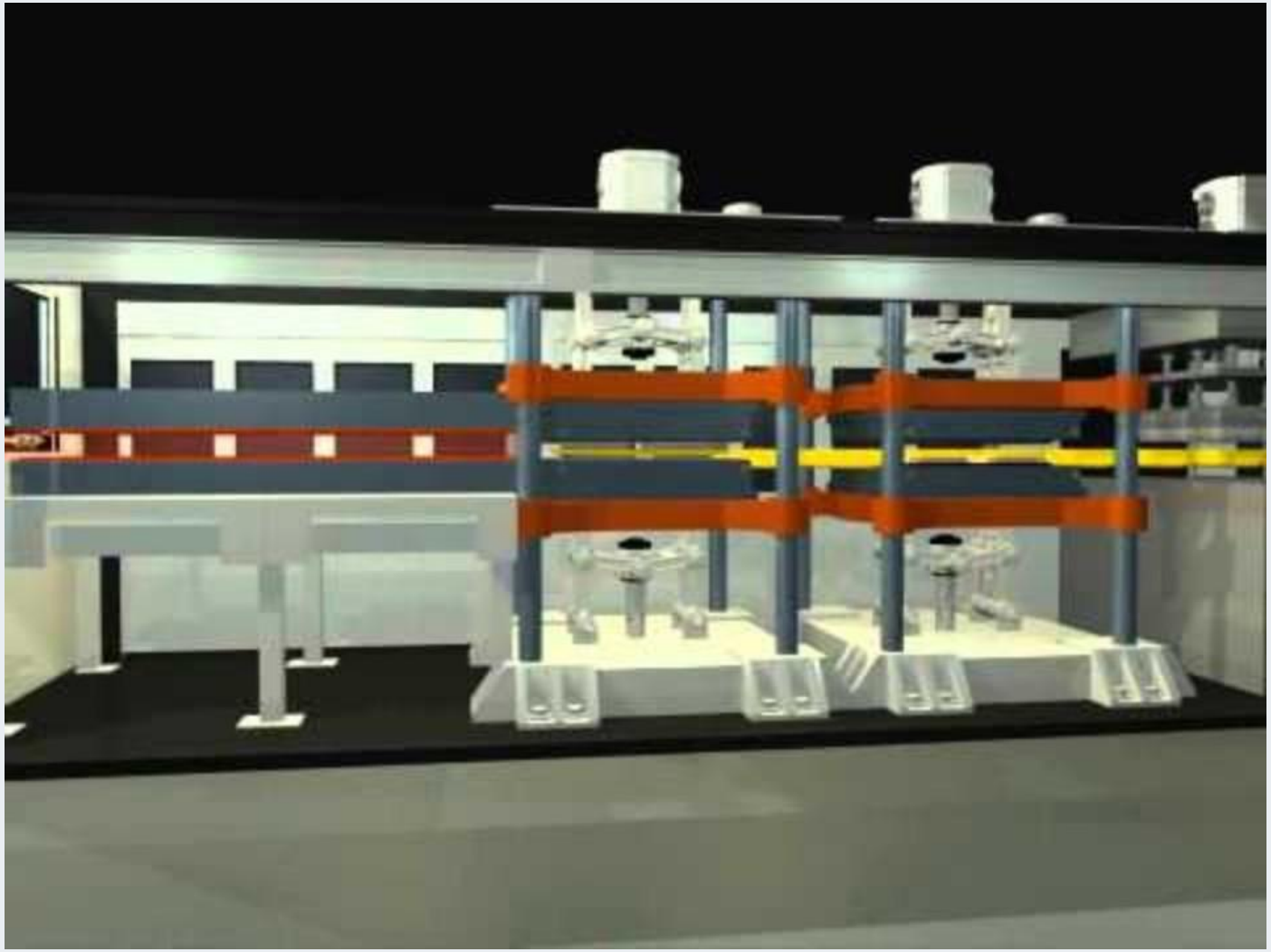
Industry 4.0 Pillars



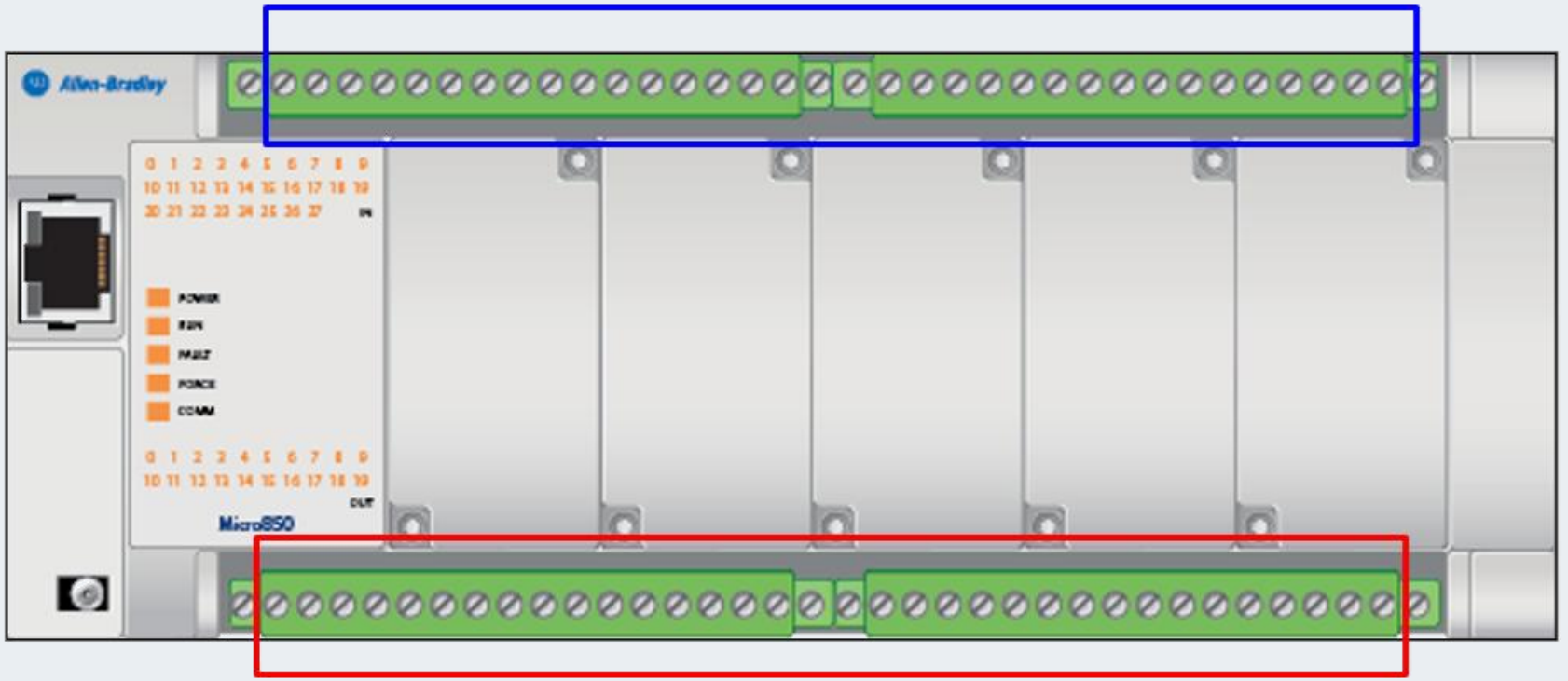
Basic Automation process



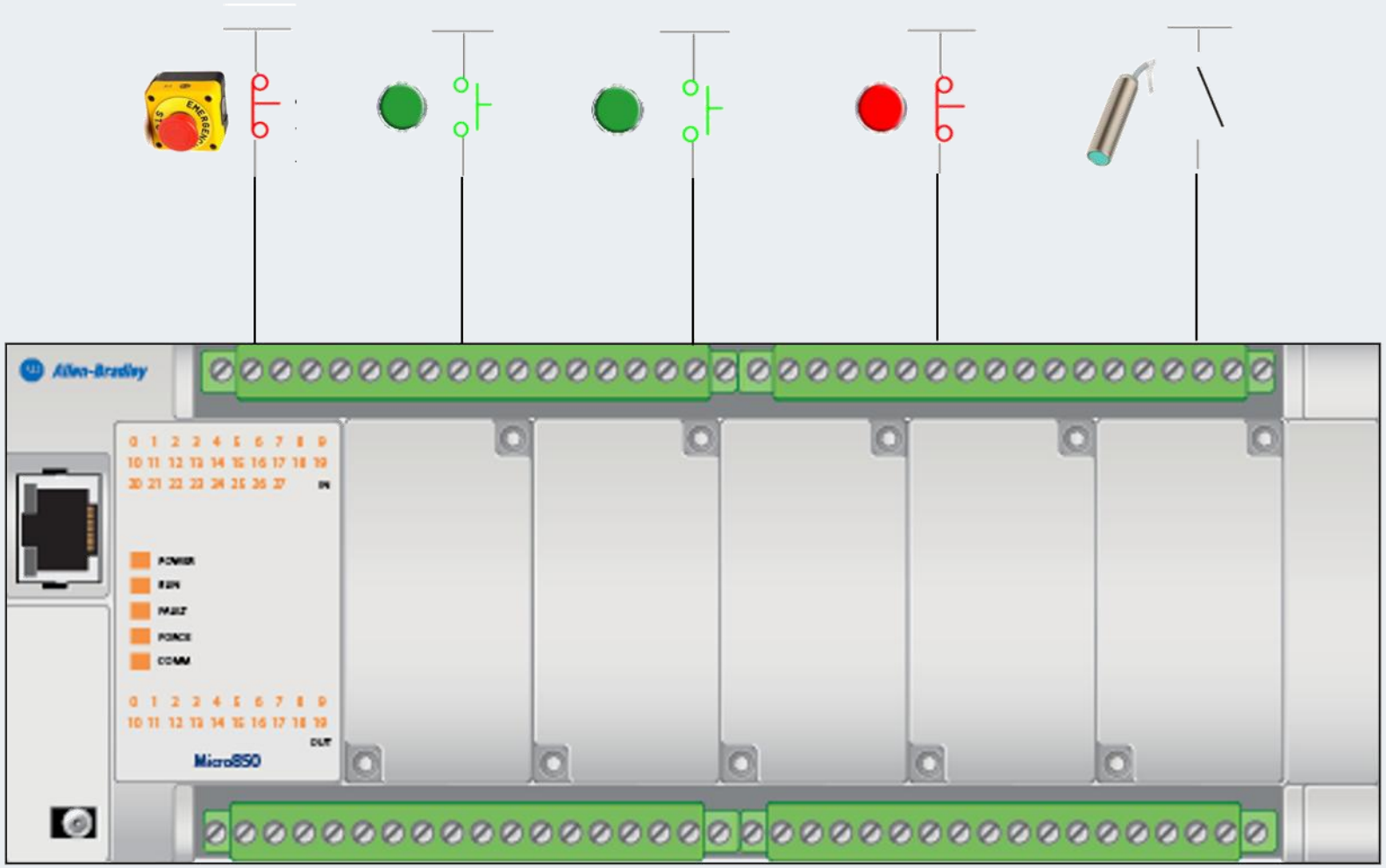
Thermoforming process



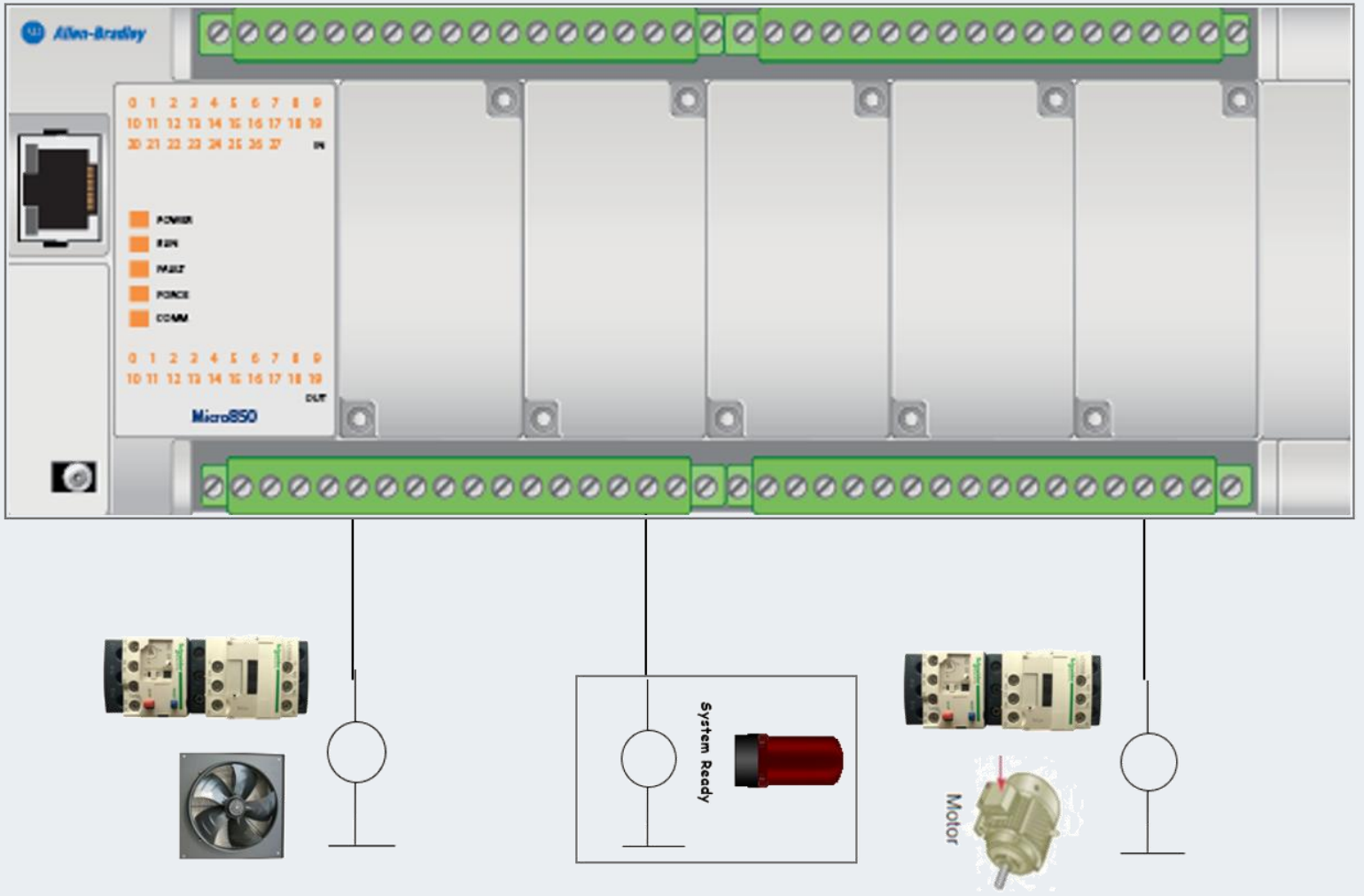
PLC wiring



PLC input devices



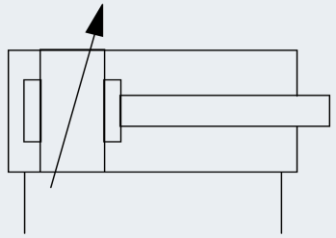
PLC output devices



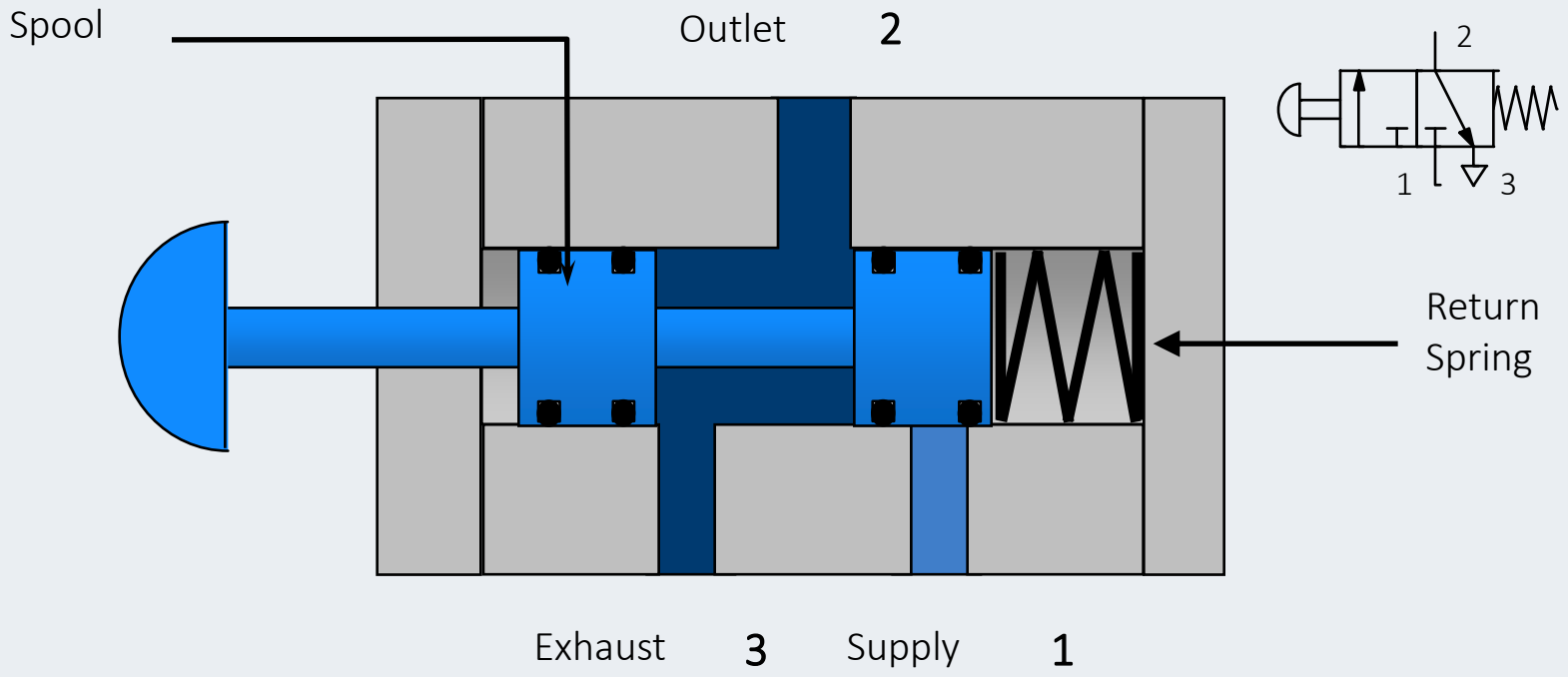
Pneumatics

The pneumatic cylinder has the following general characteristics:

- Diameters 2.5 to 320 mm
- Stroke lengths 1 to 2000 mm
- Available forces 2 to 45000 N at 6 bar
- Piston speed 0.1 to 1.5 m/s

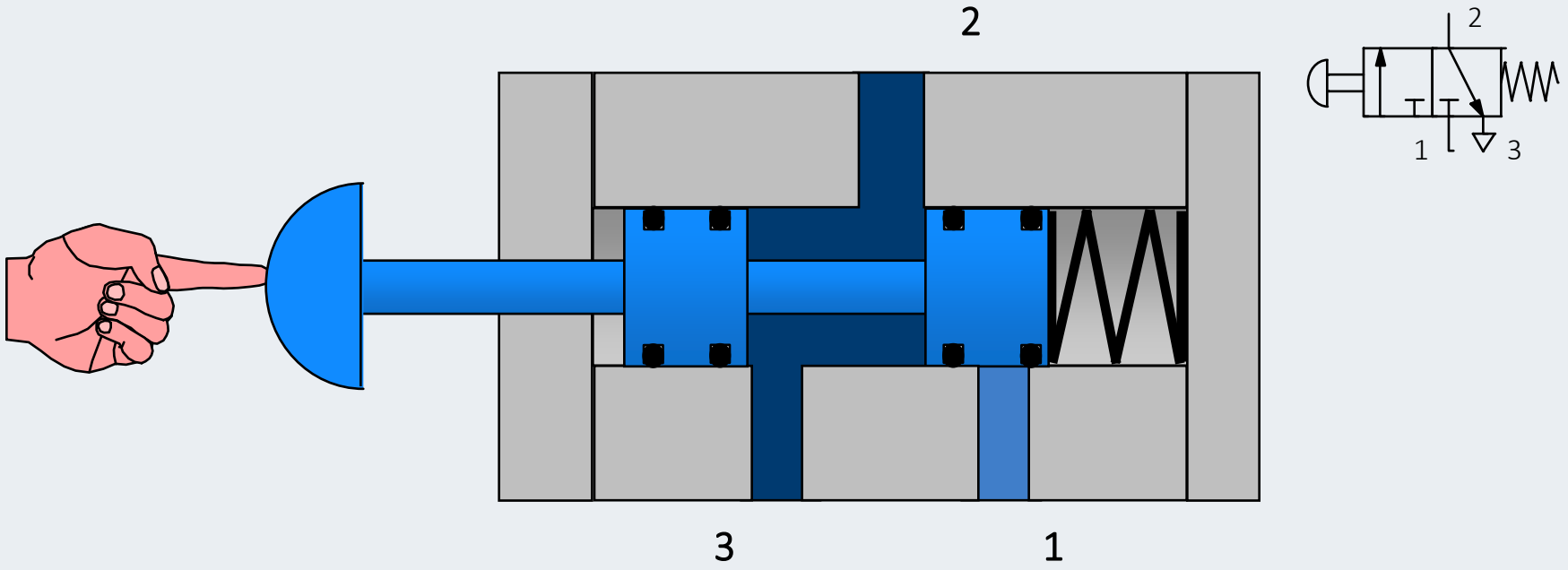


Valve Construction



3 / 2 way valve, slide (spool) valve

Valve Construction



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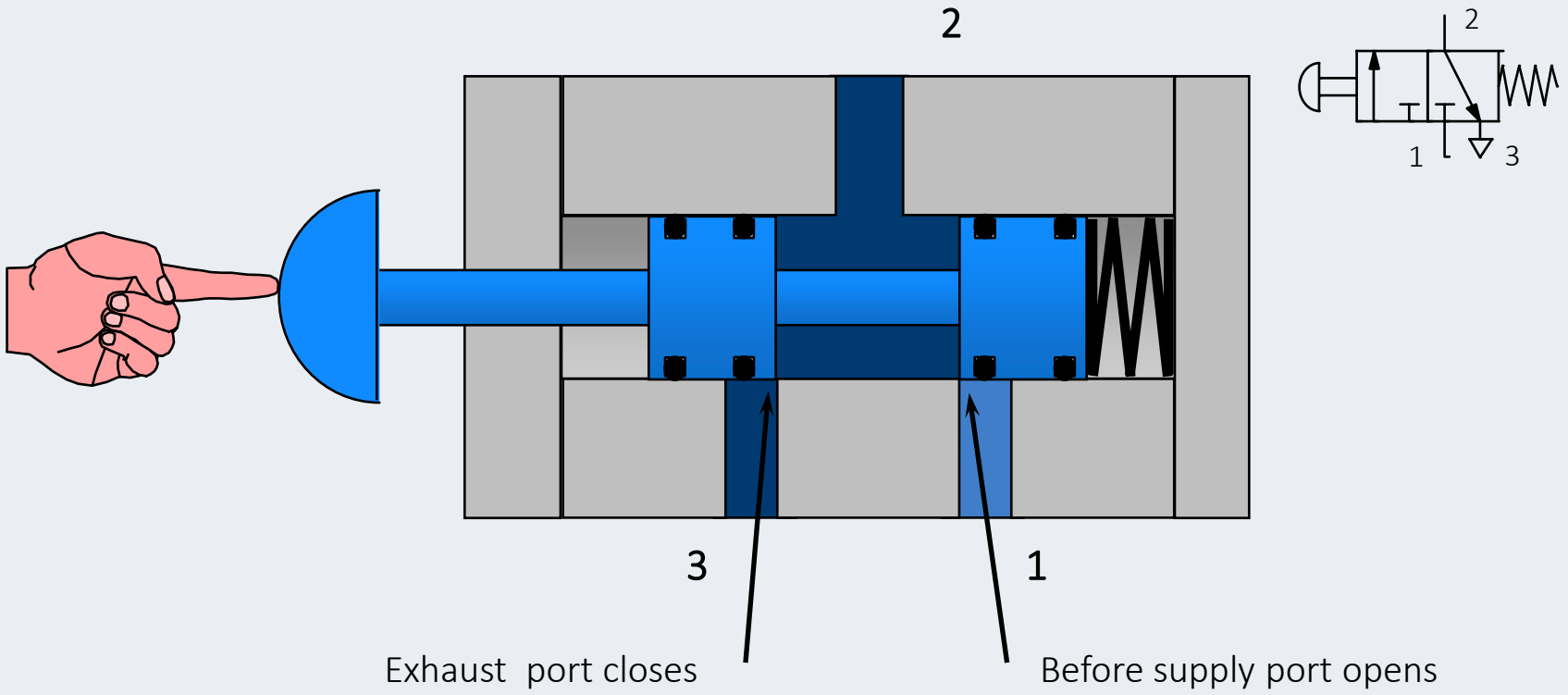

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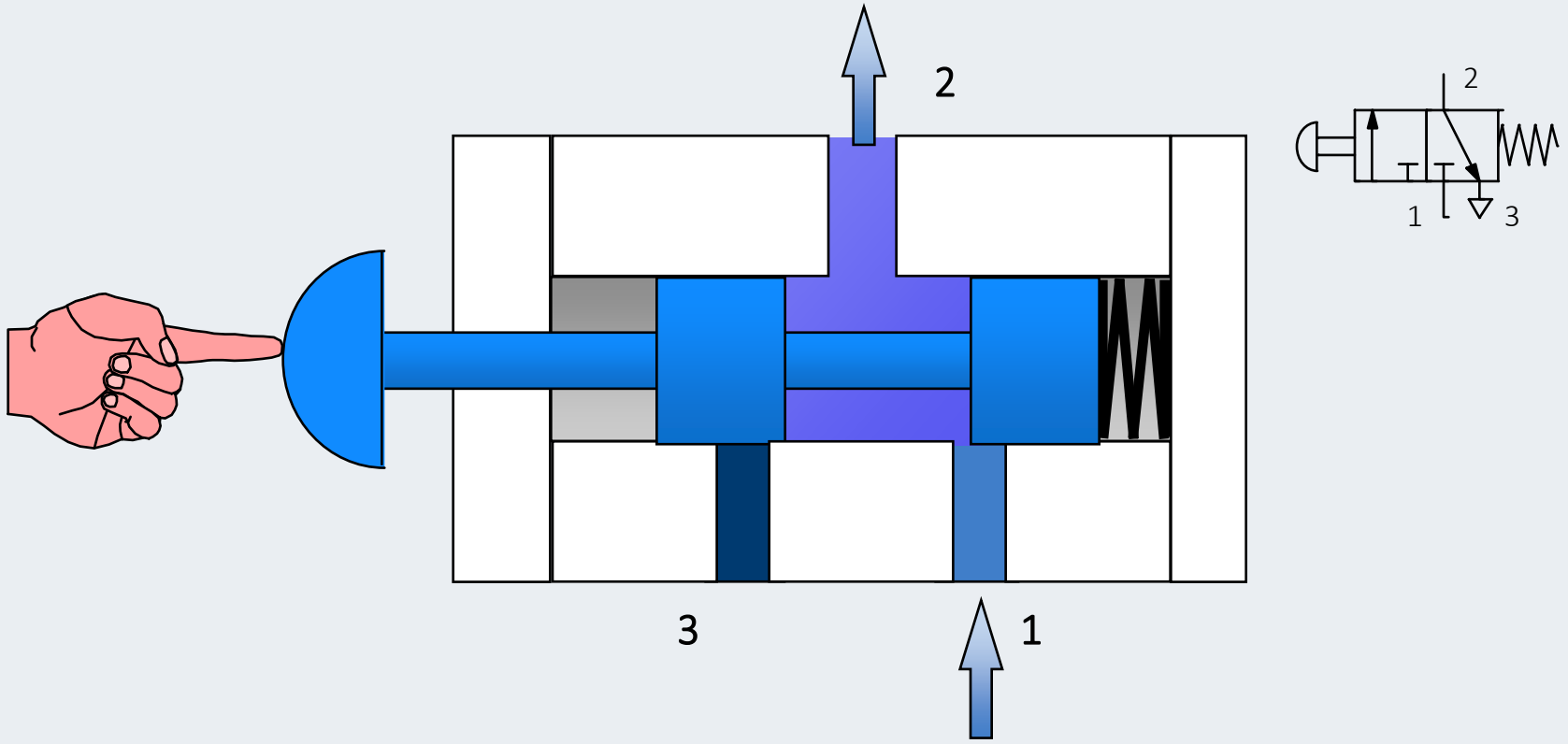

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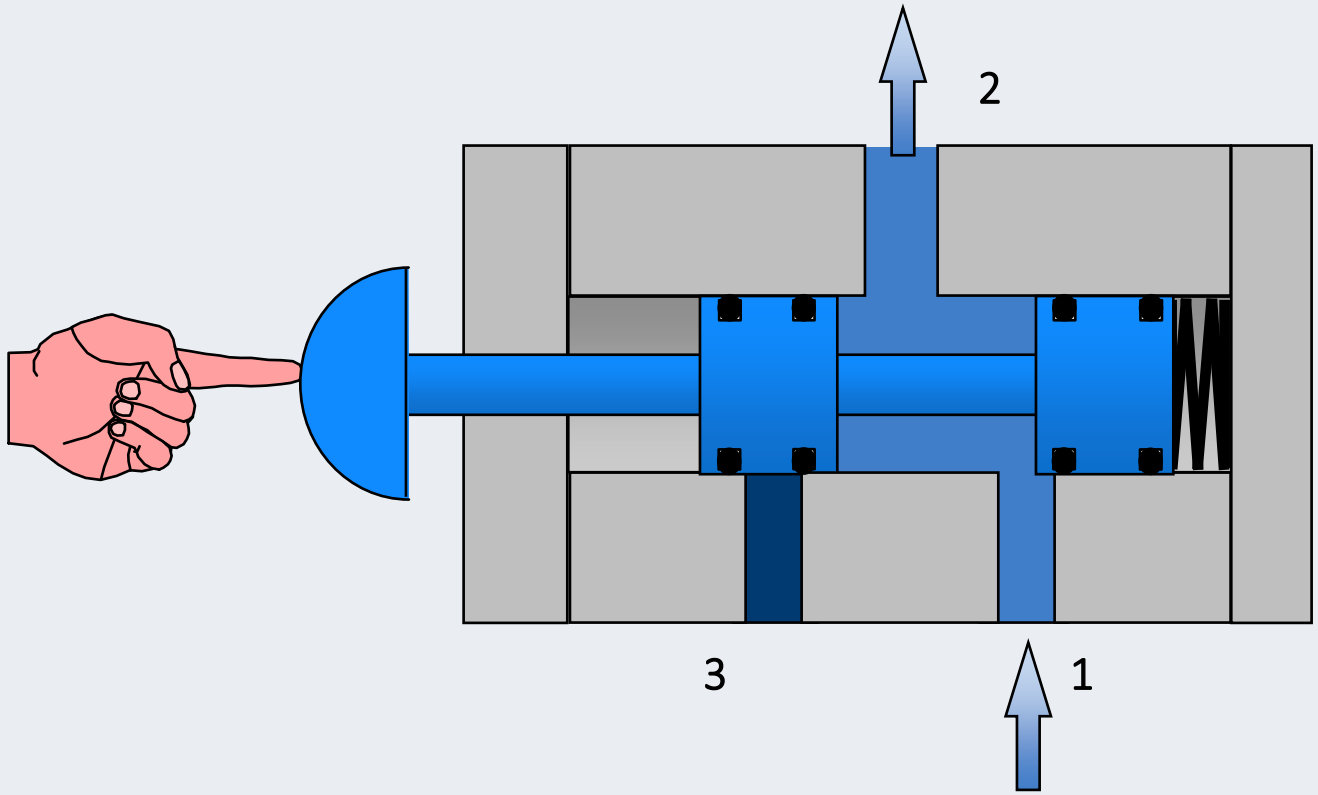

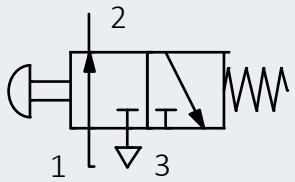

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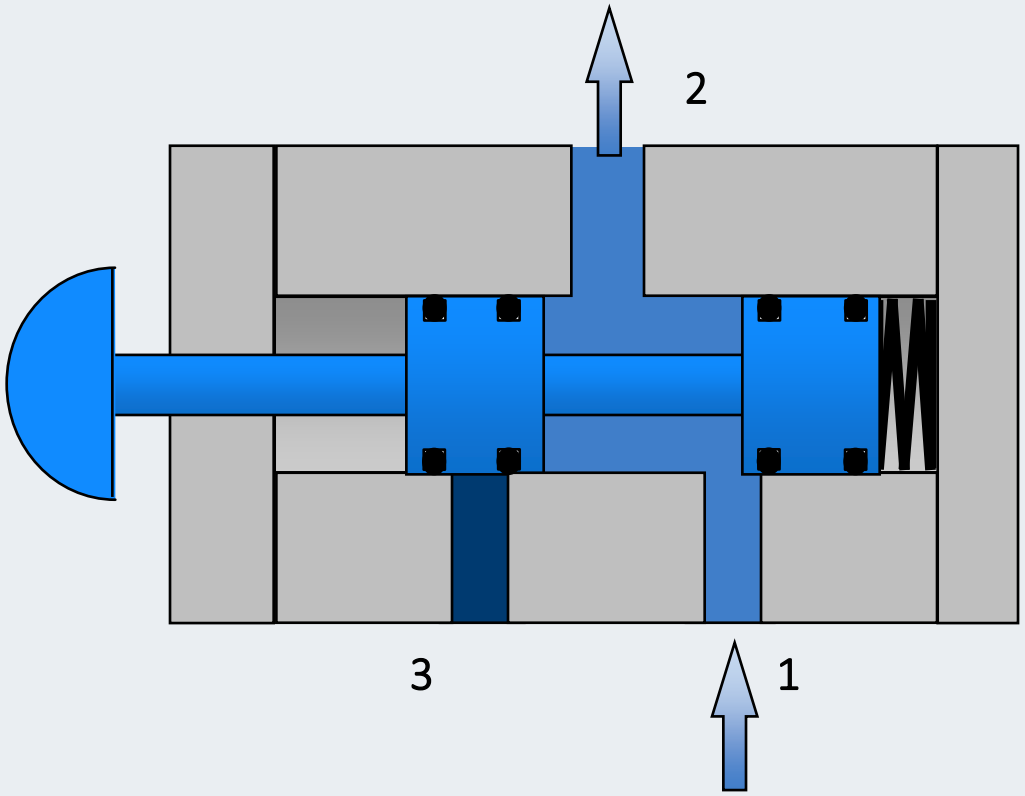

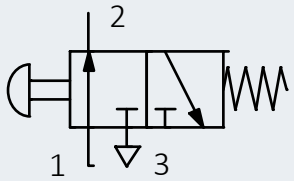

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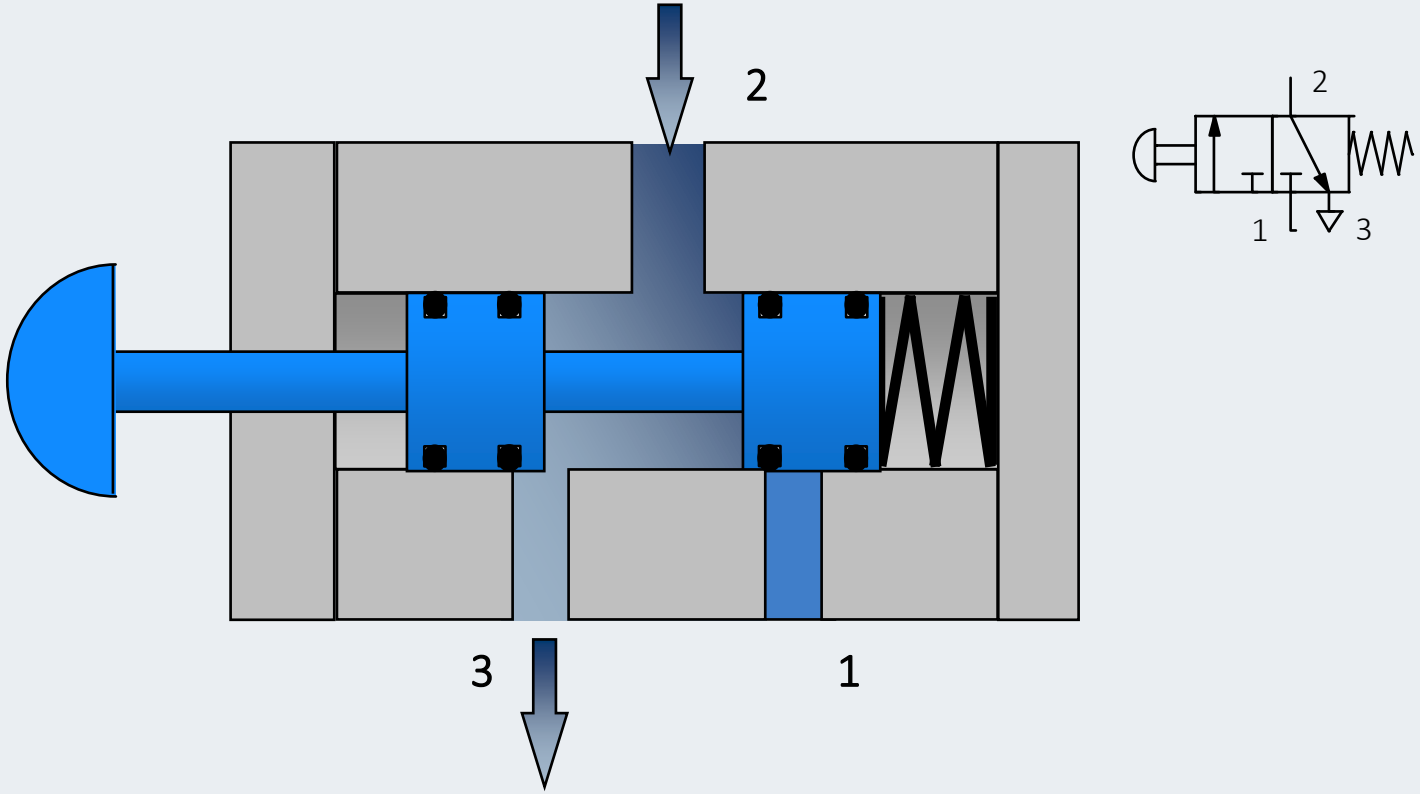

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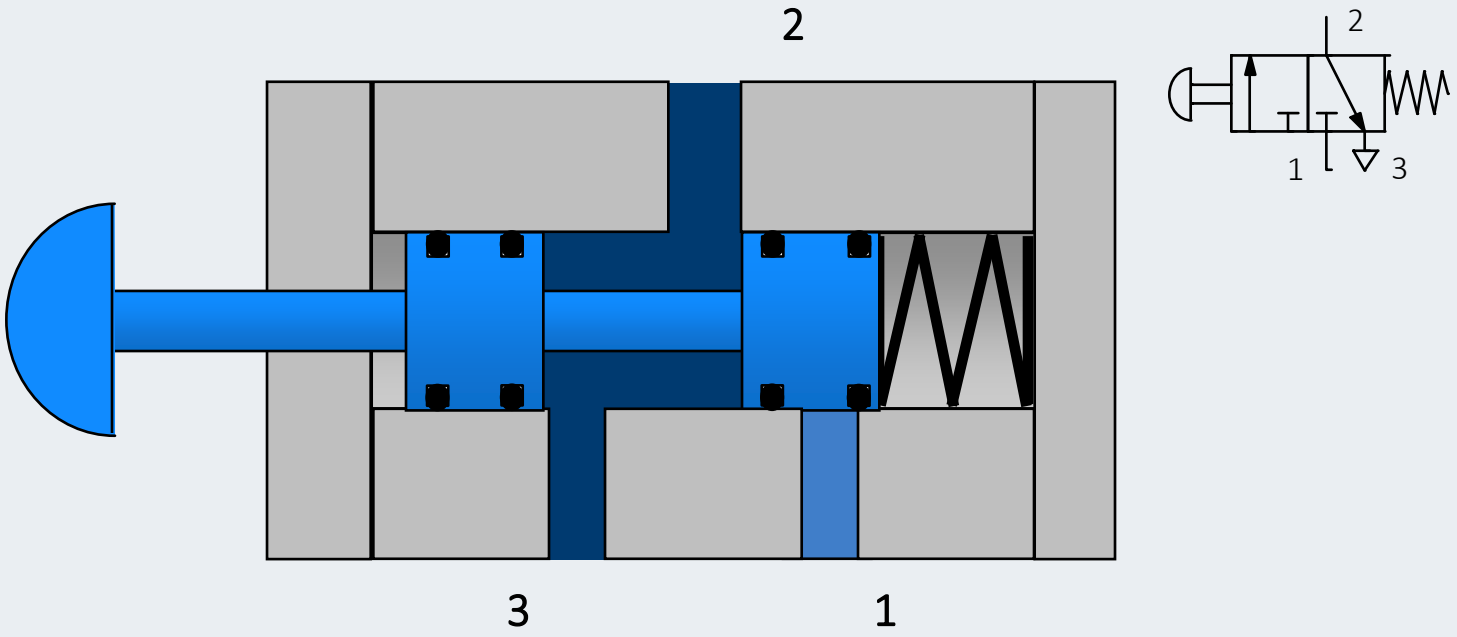

3 / 2 way valve, slide (spool) valve

Thank You!

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Online Delivery

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Our lab hosting platform connects students to remote and virtual labs for their applied learning. To enable online experimentation and the completion of practical assessments, they access real equipment and a wide range of engineering software via their browsers.

Interactive Learning

- Video lectures
- Case studies
- Discussion forums
- Real-world engineering applications

Assessment for the Master of Science Degrees

Assessments range from

- Practical tasks
- Group work
- Technical reports
- Exams

Which help you build both your technical ability and your confidence in communicating your ideas.

Careers opportunity

- The entire manufacturing industry with its sectors.
- Hospitality Industry.
- Entertainment industry.
- Oil and Gas.

- **Areas of employment as:**
- PLC and HMI programmer.
- Control systems design and integration.
- Commissioning and testing of automated systems.
- Automation systems maintenance Engineer.

Upcoming Courses

Engineering College of Technology (ECT) *UK-Recognised Qualifications*	Start Date
Bachelor of Engineering (Honours) in Industrial Automation	16 February 2026
Bachelor of Engineering (Honours) in Electrical Engineering	16 February 2026
Master of Science (Power System Analysis and Renewable Integration)	9 February 2026
Master of Science (Industrial Automation and Instrumentation Control)	9 February 2026

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Q & A

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