Chapter 4

Industrial Applications

Objectives

By the end of this lesson the learner should be able to:

- Discuss how robots are integrated into manufacturing
- Name three methods of preventing unauthorized entry to the robot work area
- Name and explain the operation of five different industrial robot applications
- Name two peripheral devices that might be found in a robot work cell

Key Technical Terms

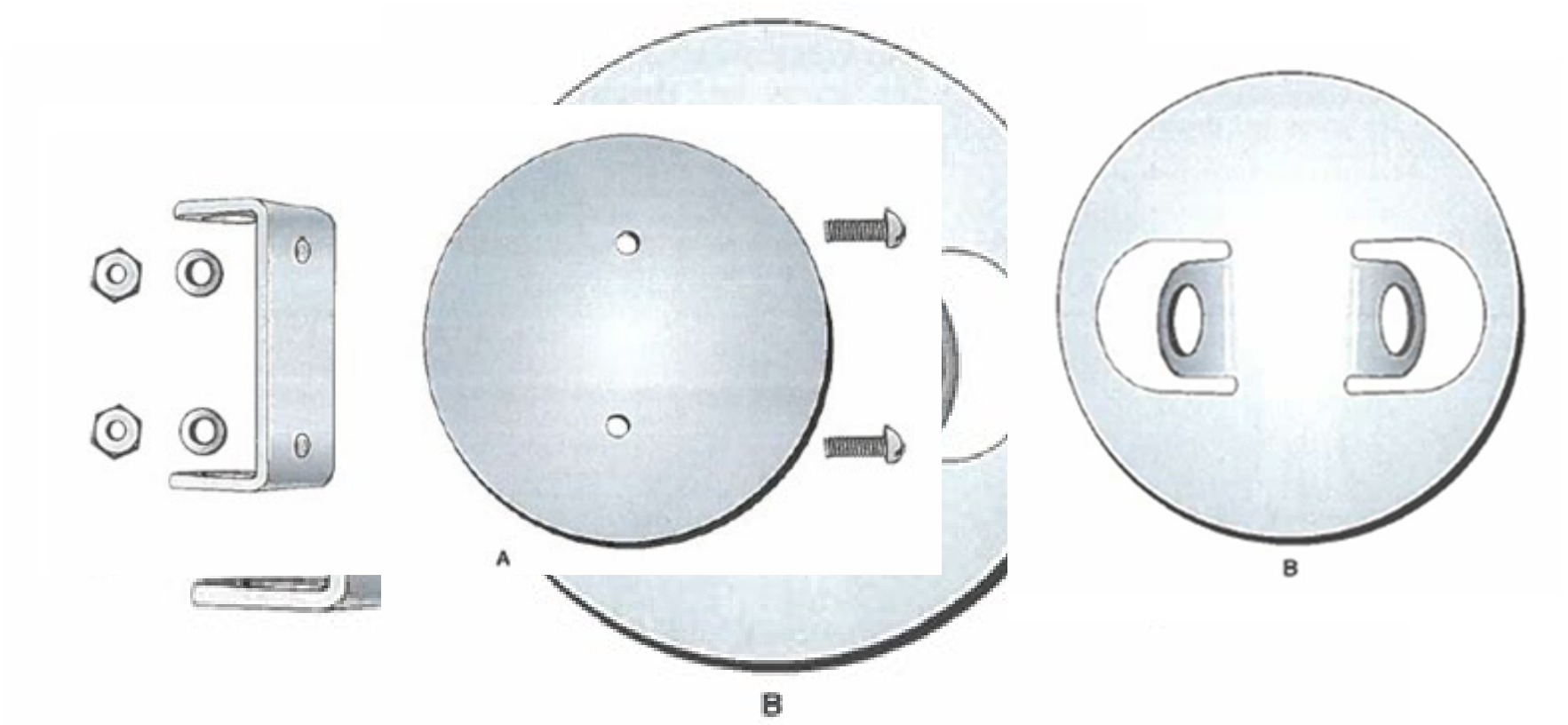
Accuracy	Command Resolution	Dynamic Performance	Interlocks
Light Curtain	Operational Speed	Payload	Pressure Sensitive Safety Mat
Repeatability	Resolution	Spatial Resolution	

By the end of this lesson the learner should be able to define and explain characteristics / actions related to these technical terms

Design for Manufacturability

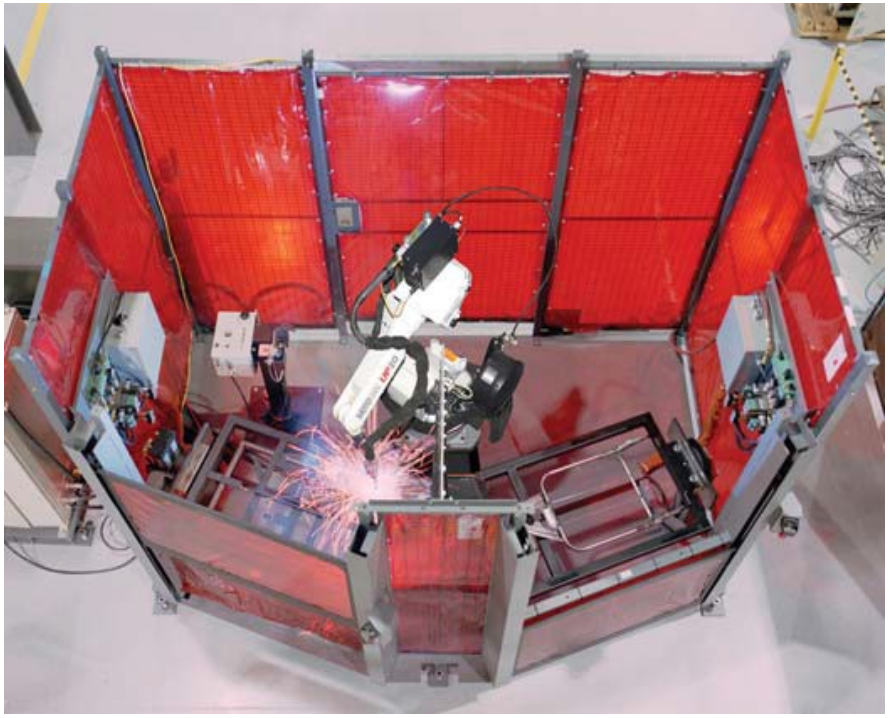
- Figure ‘A’ - Eight parts to subassembly
  - Difficult for robot to assemble

- Figure ‘B’ – redesigned to accommodate easier robotic assembly



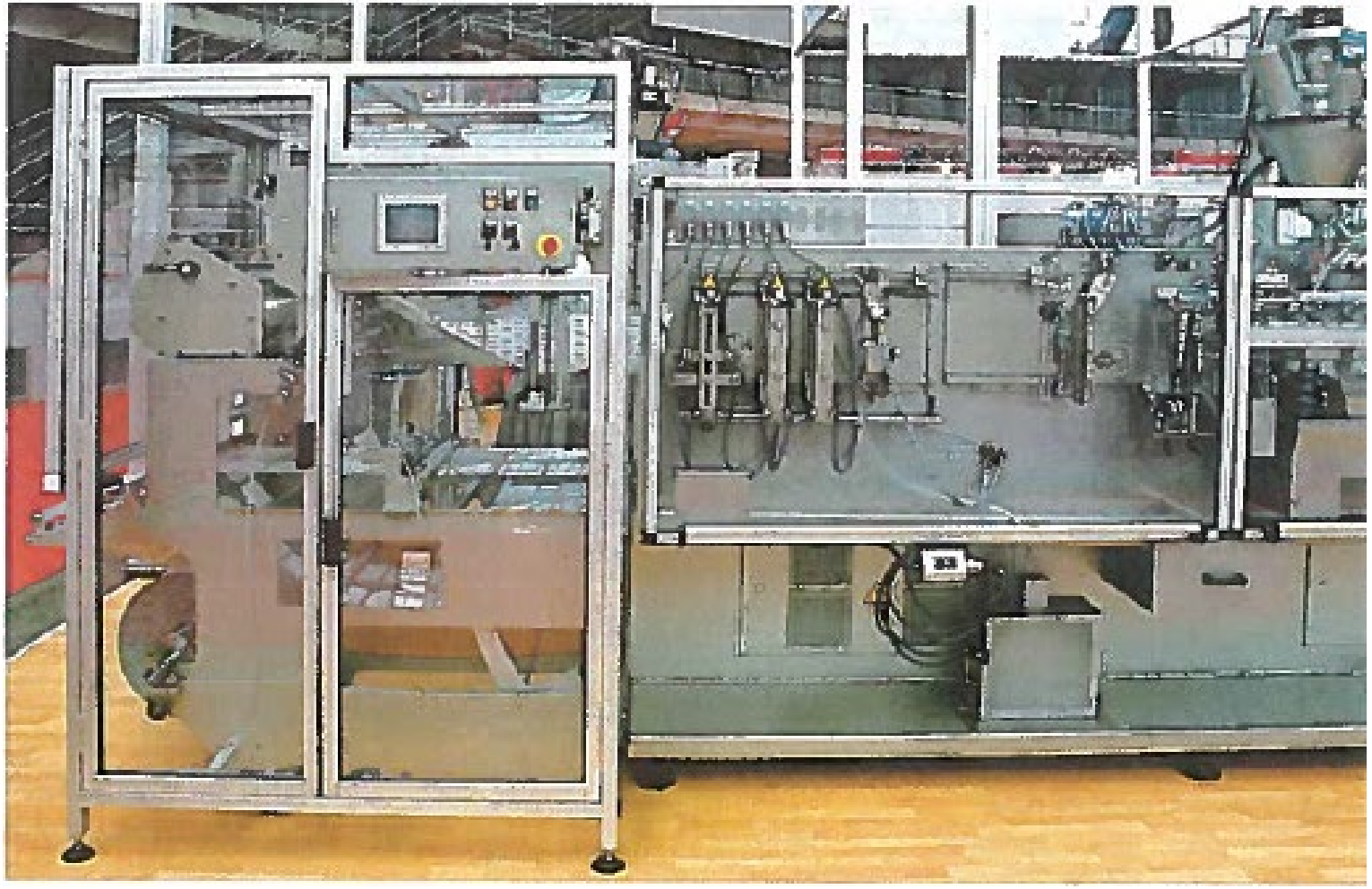
Robotic Safety

Safety Barriers



Robotic Safety

Robot Enclosures



Robotic Safety

Safety Sensors

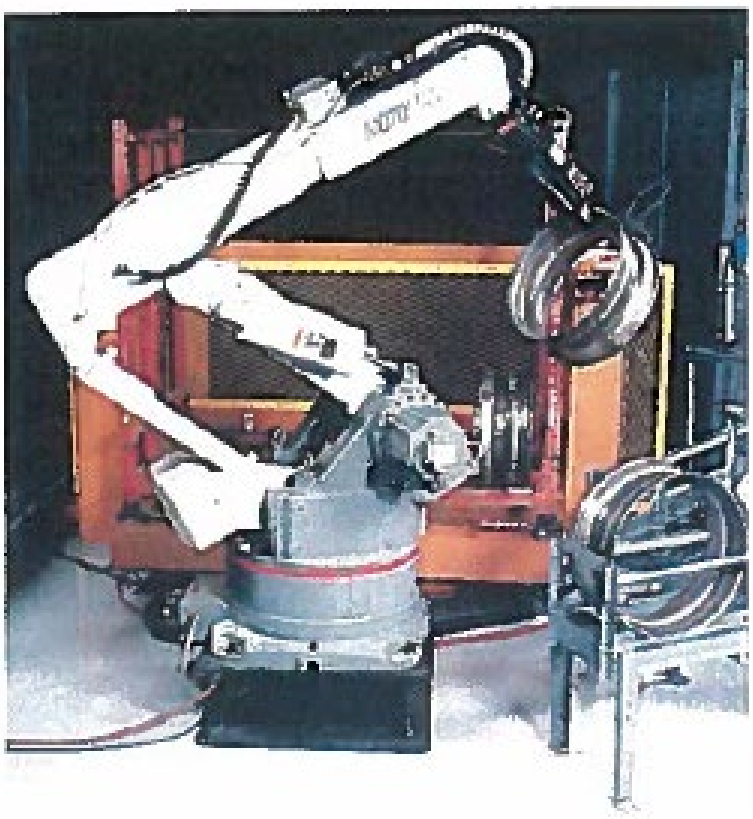
- Light curtains
- Pressure Sensitive Safety Mats

Robot Applications in Industry

Palletizing

Robot Applications in Industry

Pick and Place

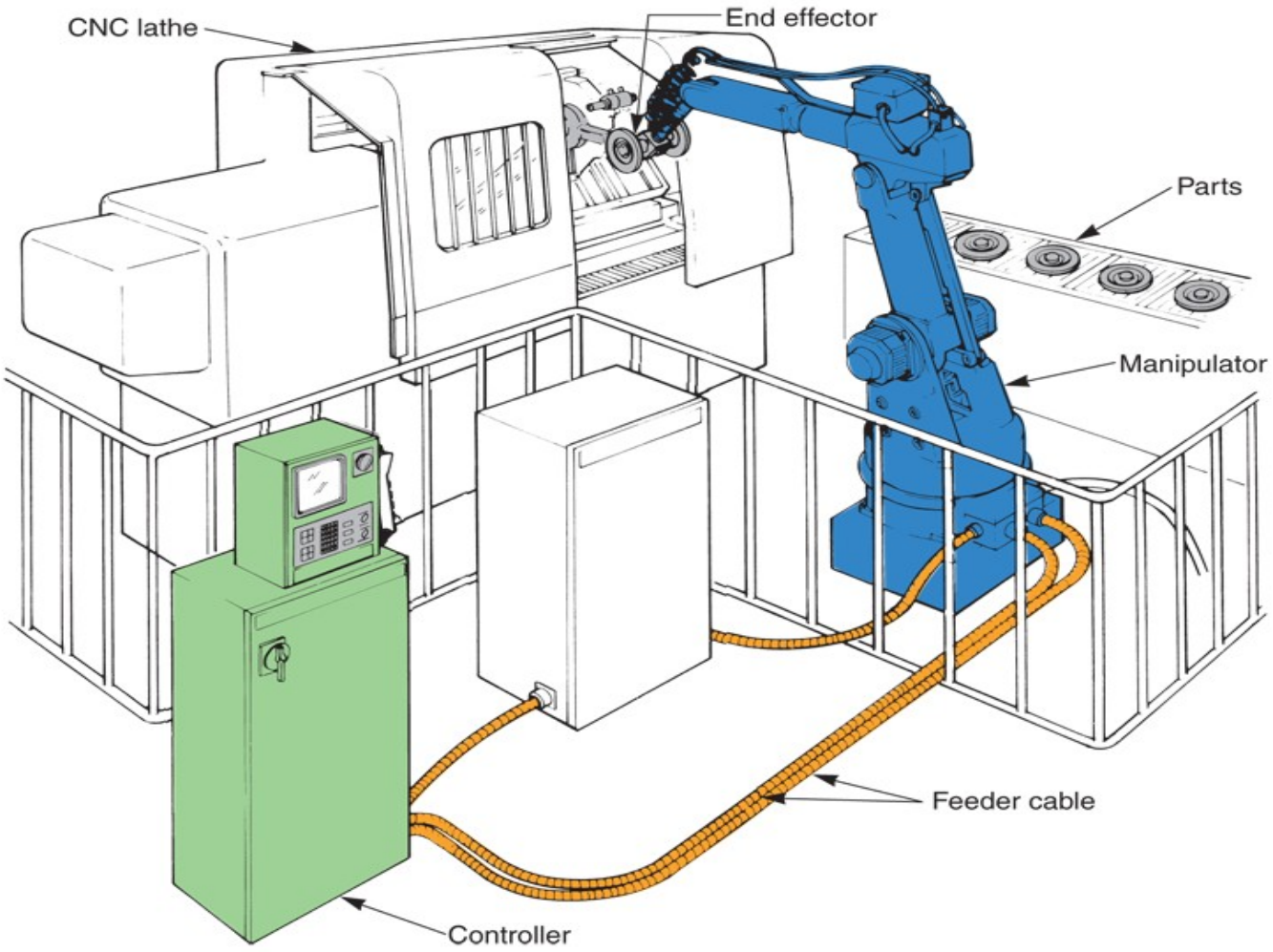


A

B

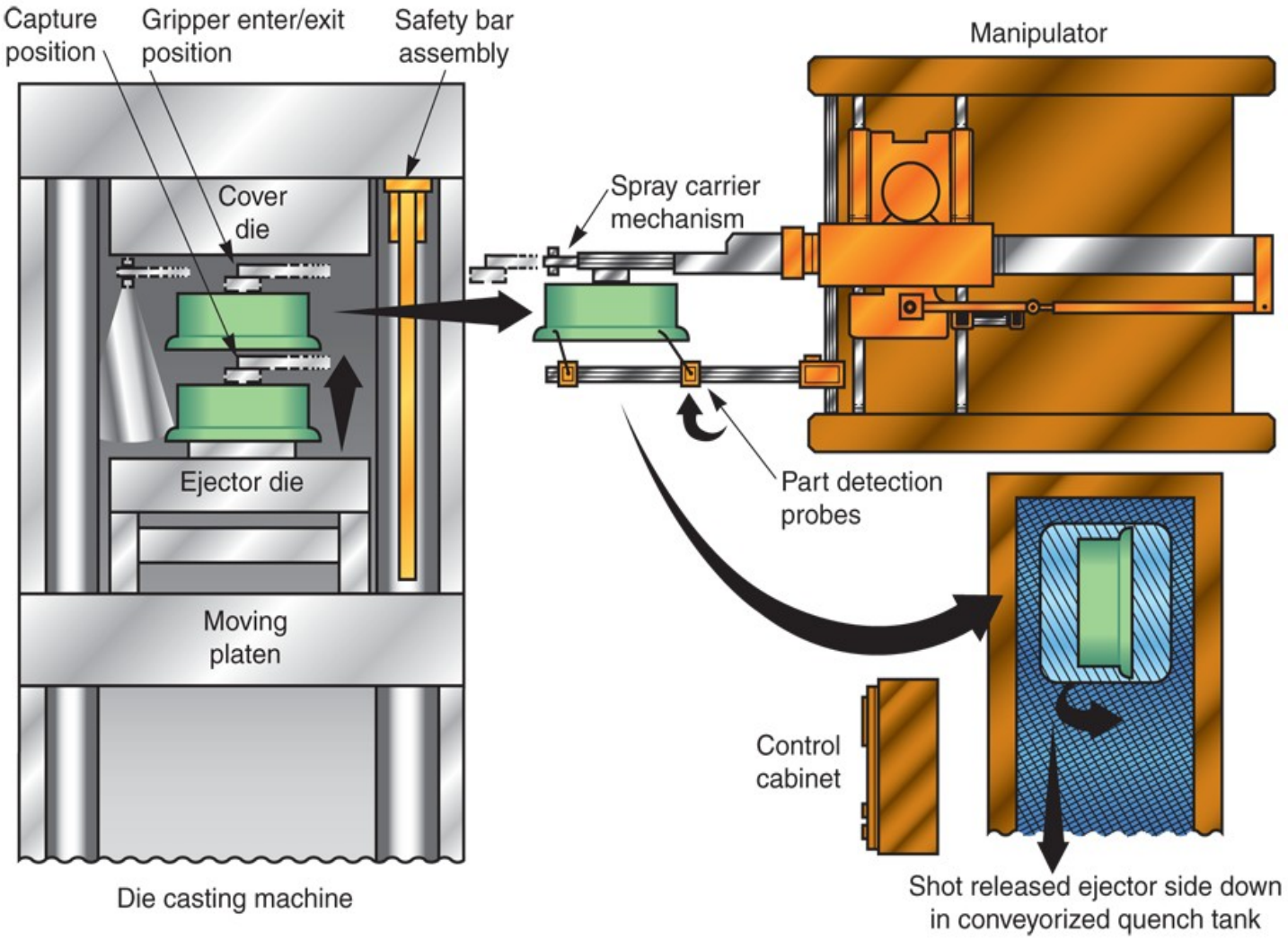
Robot Applications in Industry

Loading and Unloading



Robot Applications in Industry

Die Casting

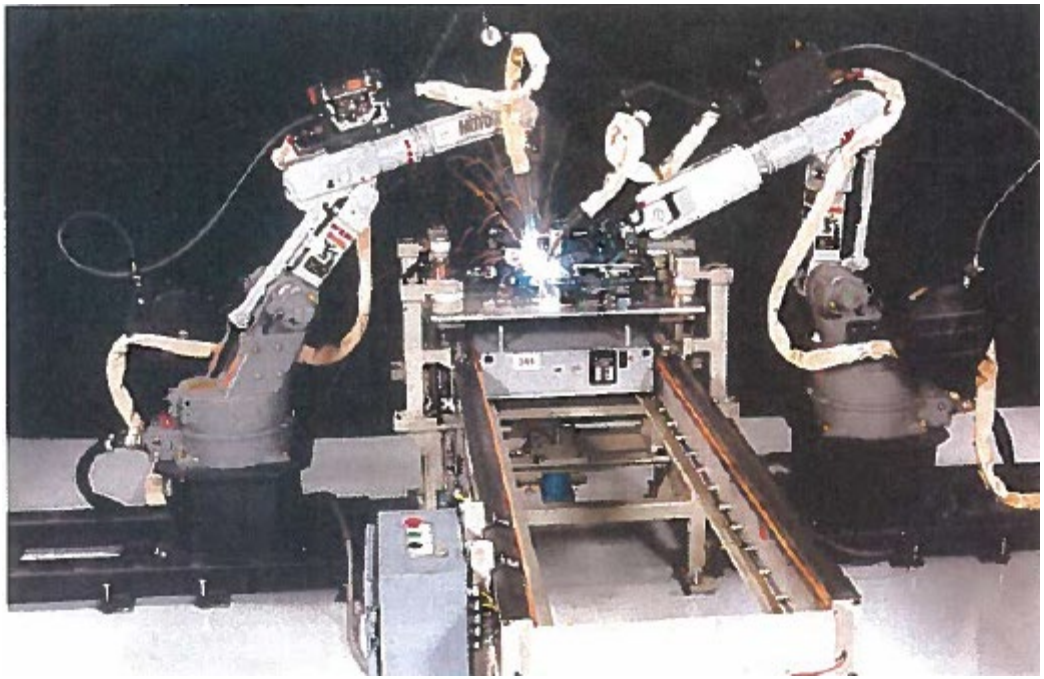


Robot Applications in Industry

Welding

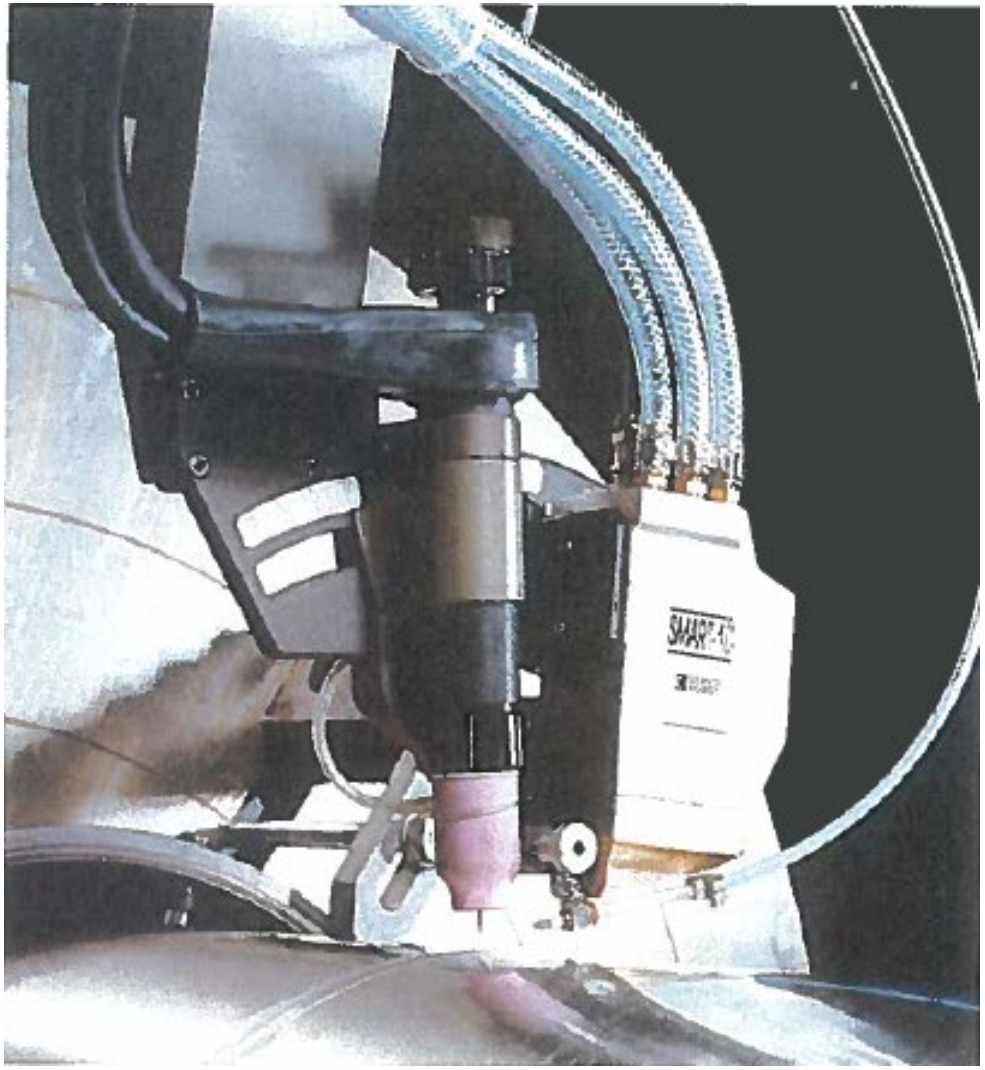
Robot Applications in Industry

Unison Welding Operations



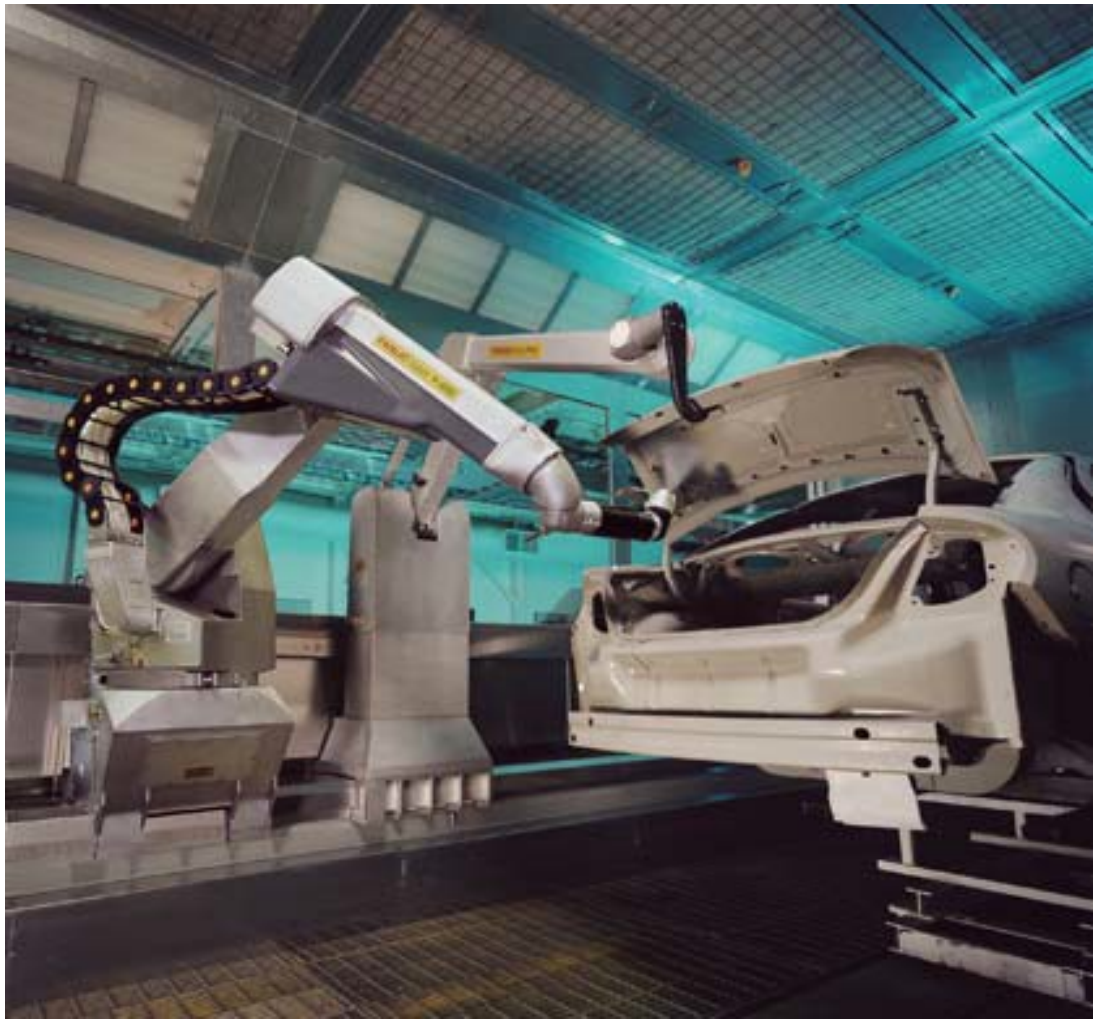
Robot Applications in Industry

Laser Guided Welding Operations



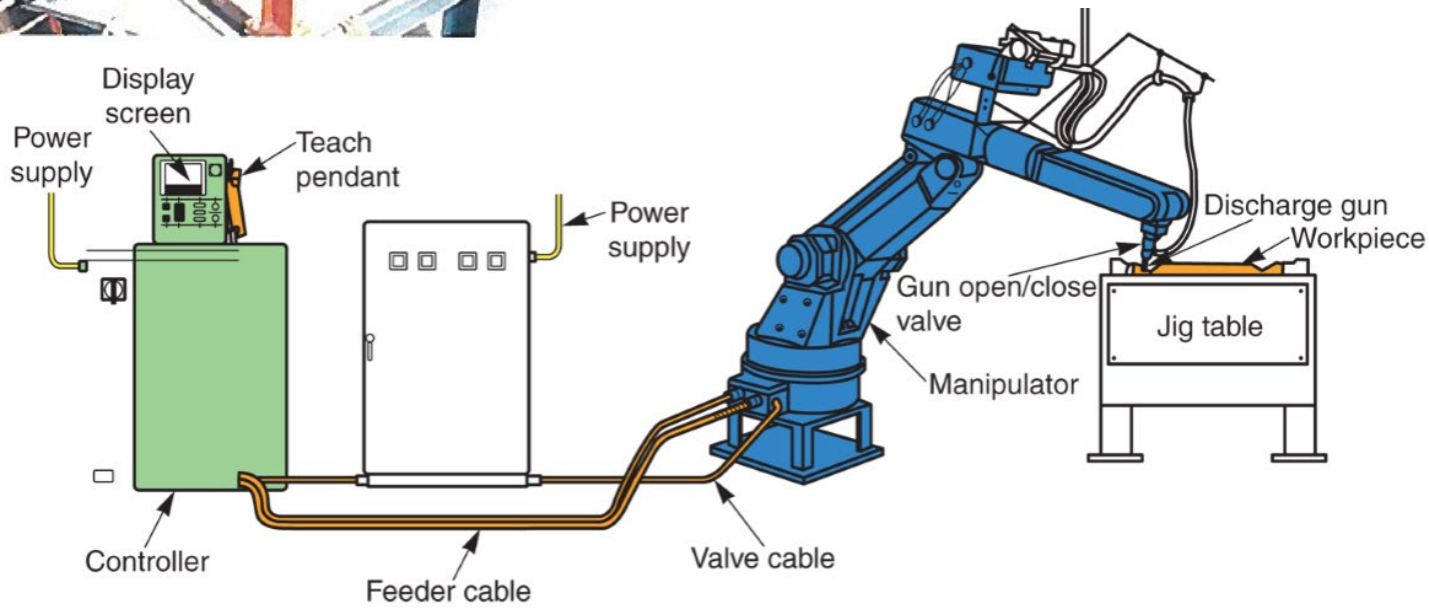
Robot Applications in Industry

Spray Painting



Robot Applications in Industry

Gluing

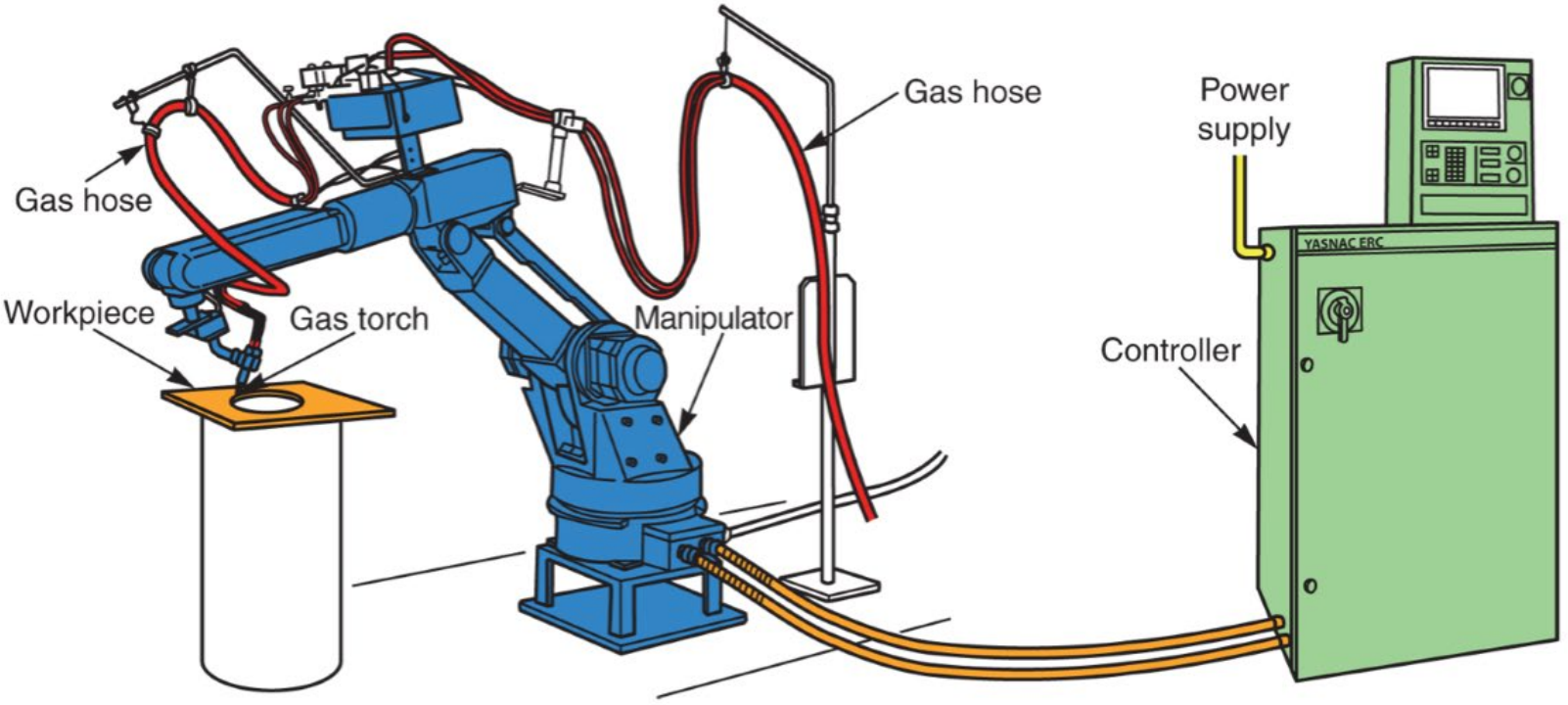


Robot Applications in Industry

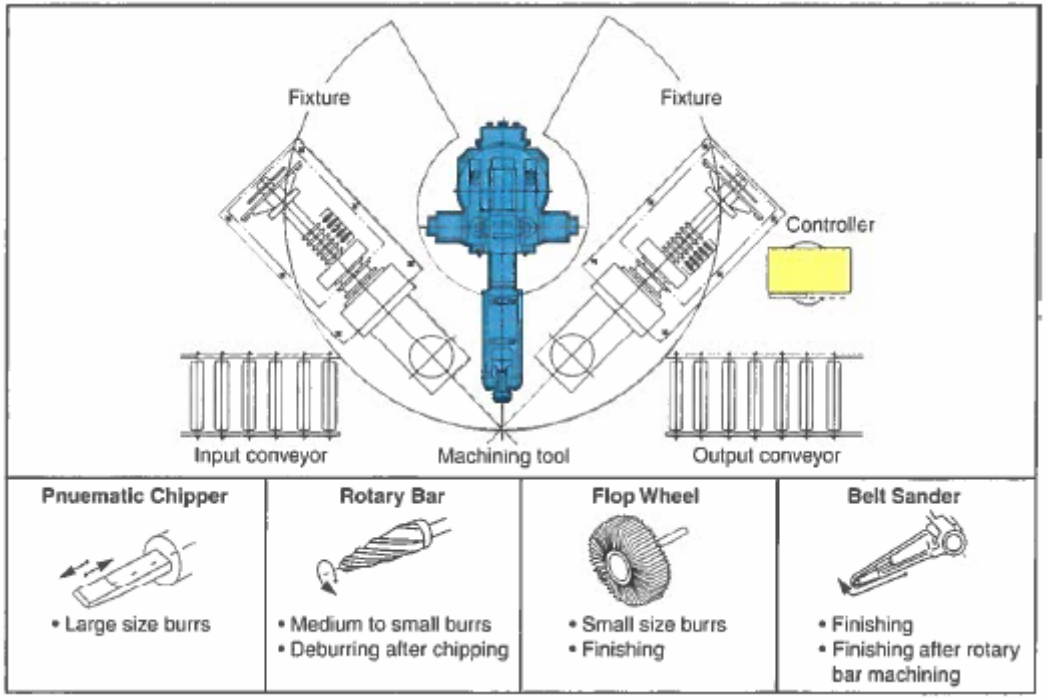
Laser or Plasma Cutting

Robot Applications in Industry

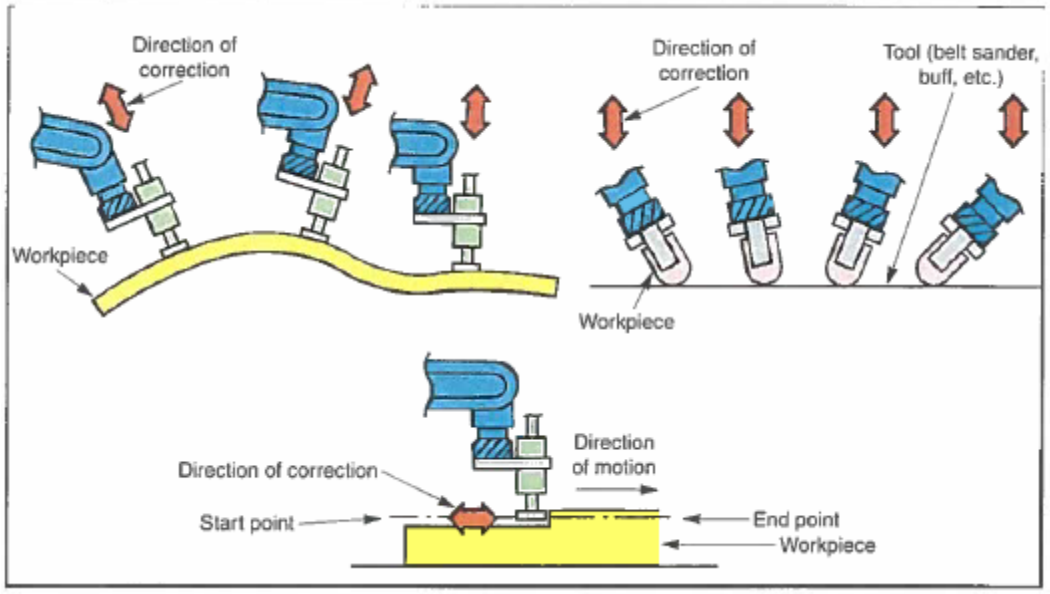
Gas Torch Cutting / Brazing



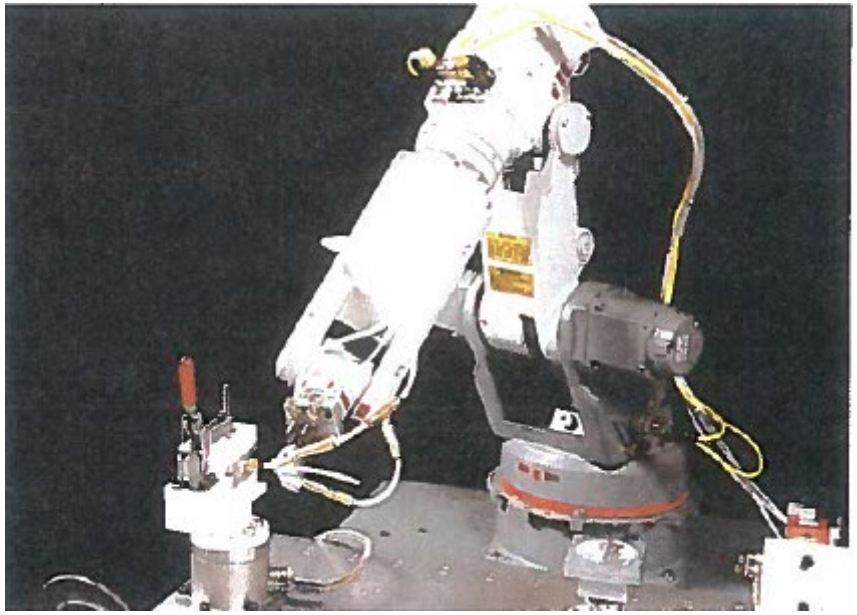
Robot Applications in Industry
Robot Machine Processing



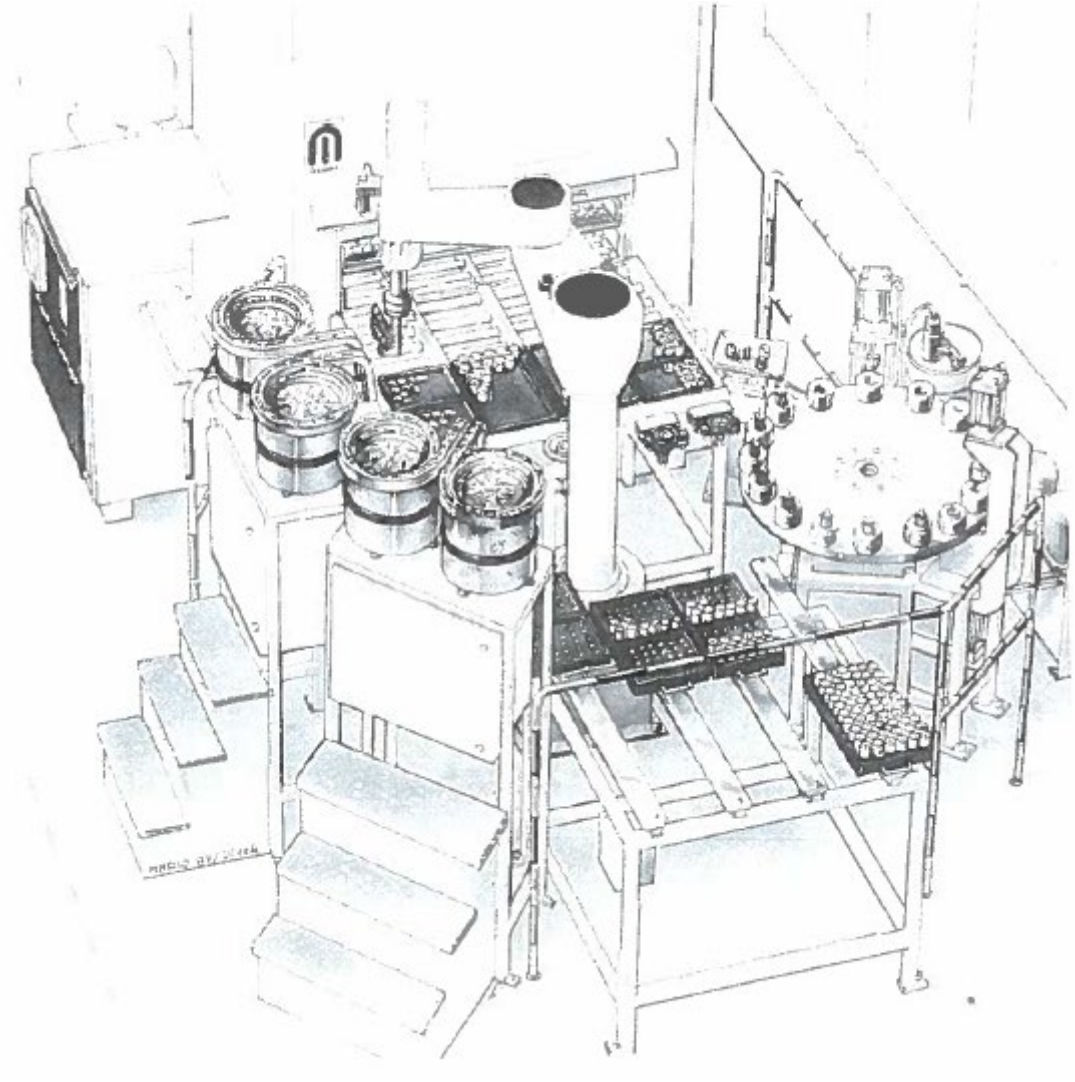
Force Sensor Correction



Robot Applications in Industry
Robot Assembly Operation



Robot Applications in Industry
Work Cell with Camera Vision Systems



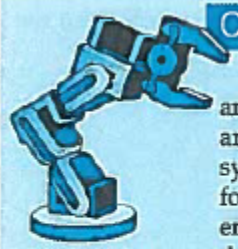
Robot Applications in Industry

Inspection

Electronic Sensor Technology Inspects for Defects.

Palletizing Robot

Careers in Robotics: Robotics Engineer



Careers in Robotics: Robotics Engineer

A robotics engineer designs and maintains robotic systems, and is most often employed in the manufacturing industry. In the area of manufacturing, a robotics engineer may design new robotic systems for a production or assembly line and is likely responsible for maintaining existing robotic systems. Outside manufacturing, employment opportunities include research and robotic system development for military use, mobile exploration, medical applications, solutions for consumers, and many others.

Because robotics engineering relies heavily on computer capabilities and programming, advances in these fields create new opportunities for robotic systems and their applications. From medicine to the military, robots that were once a conceptual design are now reality due to advances in technology and the creativity of robotics engineers.

Typical education for a robotics engineer includes a graduate degree specializing in electrical or mechanical engineering and knowledge of computer science, applied science, and 3D modeling applications. To work in the manufacturing sector, education in or experience with manufacturing processes is also critical for developing and maintaining the robotics systems in a plant. A doctorate degree opens career opportunities in research and highly-specialized system development.

Robots for Service and Consumer Use