

**CONCEPT** Pneumatic manipulators are devices commonly used in manufacturing, assembly, and packaging operations where repetitive lifting and movement of heavy objects is required. They are powered by compressed air and use a system of pneumatic cylinders and valves to control the movement of arms, grippers, or other tooling attached to the manipulator. This allows for precise and efficient positioning of objects, reducing the risk of worker injury and increasing productivity.



## TERMINOLOGY

**COMPRESSOR** - This is the device that compresses and stores air in a tank or receiver, which can then be used to power other pneumatic components.

**PNEUMATIC CYLINDERS** - These are devices that use compressed air to create linear motion. Pneumatic manipulators often use these cylinders to move arms, grippers, or other tooling attached to the manipulator.

**VALVES** - Valves are used to control the flow of compressed air through the system, allowing the manipulator to move in different directions and at different speeds.

**GRIPPERS** - Grippers are attachments that can be used to hold and manipulate objects. They can be designed to grip objects in different ways, such as by clamping or suction.

**CONTROL SYSTEMS** - Control systems are used to operate the pneumatic manipulator, allowing the operator to control its movements and functions.

**HOSES AND FITTINGS** - Hoses and fittings are used to connect the various components of the pneumatic manipulator, allowing compressed air to flow through the system.

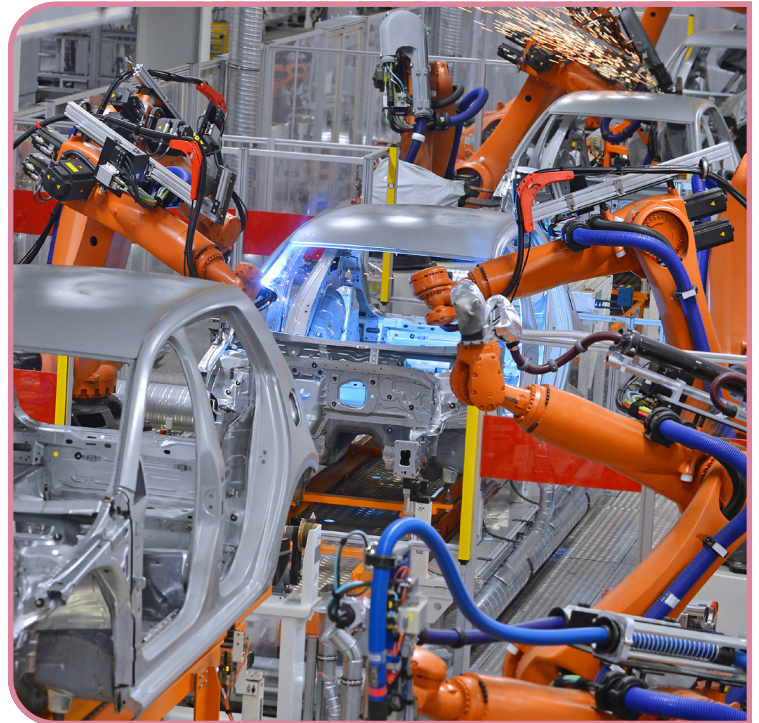
**FRAMES AND SUPPORTS** - Frames and supports provide the structure and stability for the manipulator and its components, ensuring that it can safely handle and move heavy objects.

## BACKGROUND

Pneumatic manipulators have a history dating back to the early 20th century when the technology was first developed for use in the automotive industry. The first pneumatic manipulators were simple devices that used compressed air to move and position parts during assembly. Over time, advances in pneumatic technology and materials led to the development of more sophisticated manipulators capable of handling heavier loads and performing more complex tasks.

Today, pneumatic manipulators are used in a wide range of industries, including automotive, aerospace, food and beverage, and pharmaceuticals. They are valued for their precision, efficiency and ability to reduce the risk of worker injury. As technology continues to evolve, pneumatic manipulators are likely to become even more advanced, offering greater levels of automation and productivity to manufacturers.

*Make sure it measures up*



## REAL WORLD CONNECTIONS

One application that exemplifies the use of pneumatic manipulators is in the automotive industry, particularly in car assembly lines. Pneumatic manipulators are used to lift and position car parts, such as doors, hoods, and trunks, during assembly. These manipulators are also used to position and install smaller parts, such as interior components and wiring harnesses.

At the Ford Motor Company's assembly plant in Flat Rock, Michigan, pneumatic manipulators are used to position and install car doors during assembly. The manipulators are capable of lifting and positioning doors that weigh up to 80 pounds, allowing workers to install the doors with greater speed, safety and accuracy.

Pneumatic manipulators are also used in other areas of the automotive industry, such as in engine assembly and in the manufacturing of tires and other rubber components. In all of these applications, pneumatic manipulators offer an efficient and safe means of lifting and moving heavy objects, improving the overall productivity and safety of the manufacturing process.



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