

Robot Applications

Robot Applications

- Welding
- Spray painting
- Grinding
- Drilling holes
- Polishing
- Nut running
- Driving screws
- Parts handling/transfer
- Assembly operations
- Parts sorting
- Part inspection

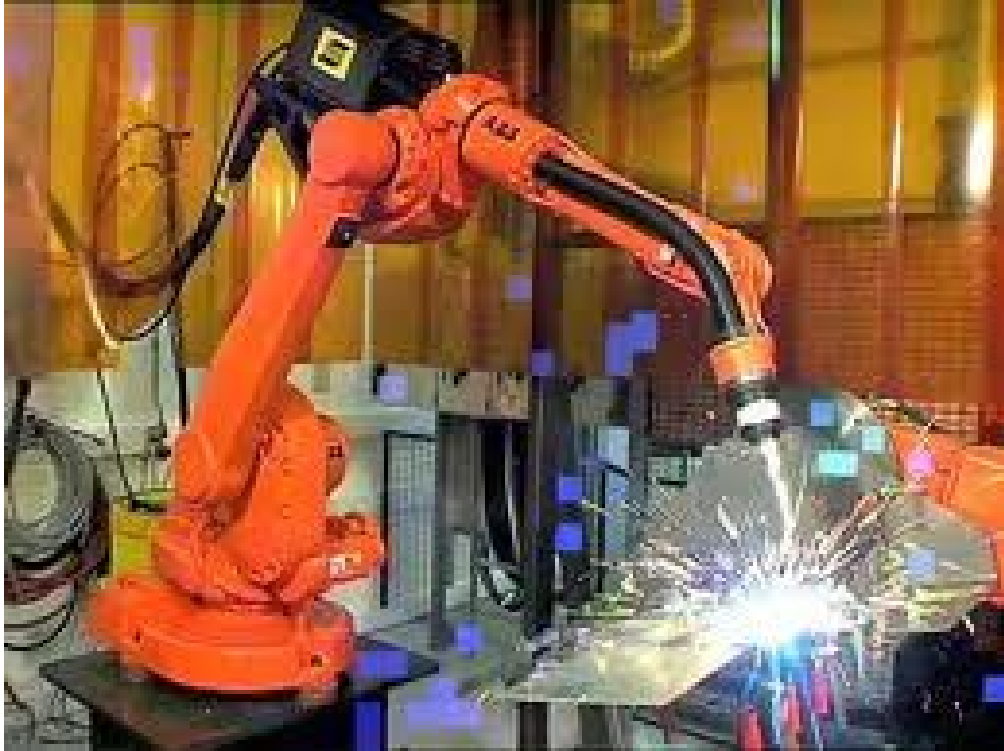
Welding

- Two types of welding operations
- Spot welding
 - Robot is taught a series of distinct joints
 - Should have long reach
 - Uses point-to-point servo controlled robots
 - Since weld points are pretaught, sensory networks are not required.
- Arc welding
 - Irregular shaped joint or a wide joint can be made.
 - Uses continuous path servo controlled robot.
 - Path can be pretaught, so sensors are not required.

Spot welding



Arc welding



Spray painting

- Human should not perform spray painting because
 - Potential fire hazard
 - Fine mist of paint is carcinogenic.
- Advantages
 - Uniform coating
 - Less paint being used
 - Less reworking of parts
- Capable of both straight line and continuous paths.
- Does not require external sensors but part to be painted must be accurately presented to the manipulator.



Grinding

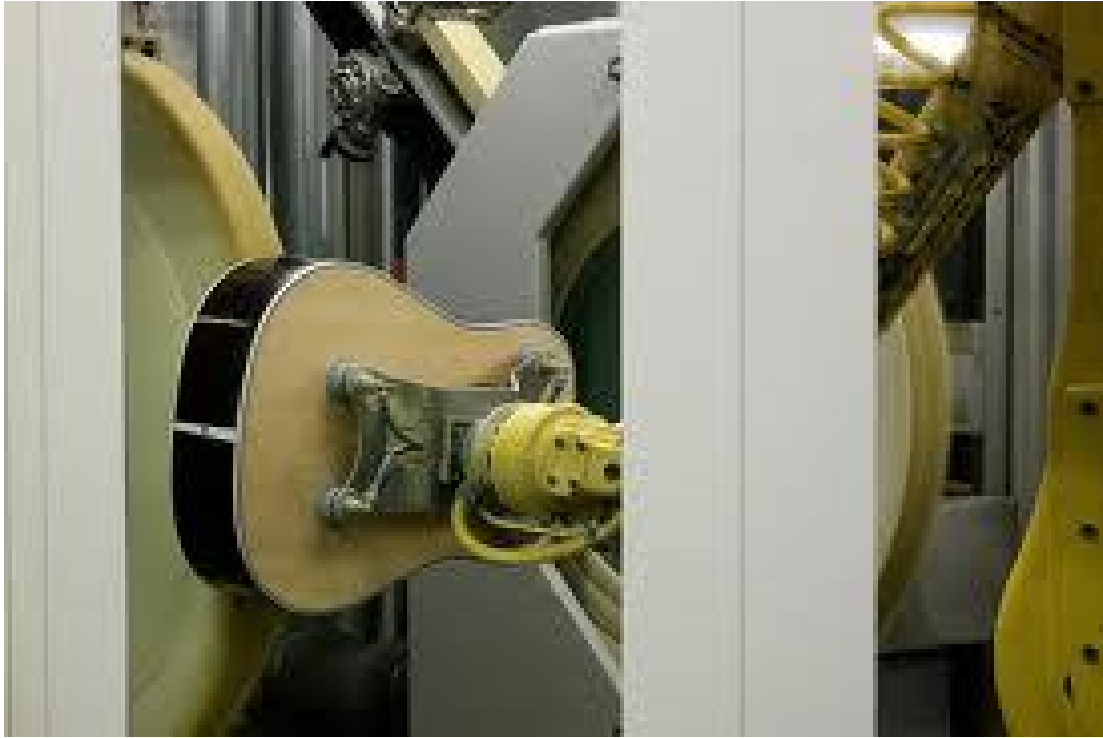
- Required on
 - arc welded joints
 - casting products
 - backside of a drilled hole
- Grinding is done
 - to remove undesired high spots
 - to give good appearance
 - for functionality
- The same arc welding robot is employed by changing the tool and replacing it with rotary grinder.
- Uncertainty in the dimensions of the part makes sensory information important.
- Touch sensors are usually employed.



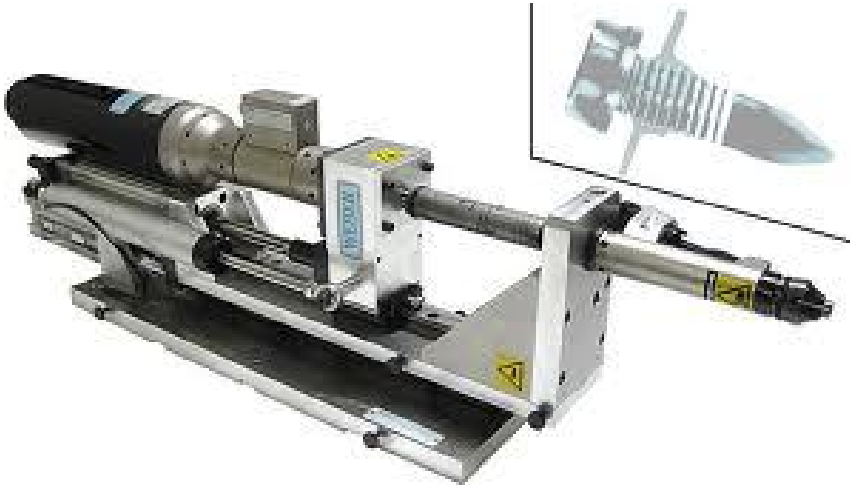
Applications involving rotary tool

- Rotary operations include
 - Drilling holes
 - Routing
 - Polishing
 - Nut running
 - Driving of screws
- Programming of either points or paths can be performed for less accurate operations.



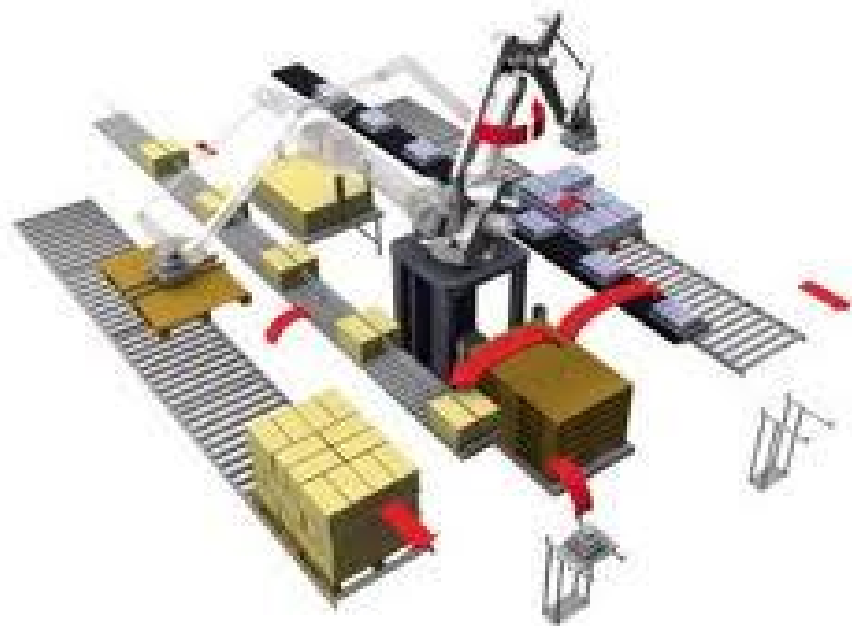






Parts handling/transfer

- Used in Palletization and Depalletization
- Acquiring unfinished parts and feeding them into machining
- Used in hot furnaces and in forging processes.



Assembly operations

- Assembling a group of parts to produce either finished product or a sub assembly.
- Jobs become tedious because of their repetitive nature.
- So robots are employed to perform this process in order to increase the productivity.
- Robot is taught about the desired points and the sequence of operations.
- Remote controlled compliance(RCC) is used between the end effector and robot wrist.
- Force and tactile sensors are used to get the necessary feedback.



Parts sorting

- Sorting objects based on their type.(Eg. Washer)
- Due to the tedious nature of the job, humans make mistakes so can be replaced by robots.
- Also involves vision system to capture (eg. Different Casting products)



Part Inspection

- To inspect finished parts or subassemblies.
- Aims at
 - Increasing the productivity
 - Decreasing the potential problems before they become serious.
 - Increasing the quality.
- Inspected for
 - Dimensional accuracy (eg. Casting)
 - Missing or improperly drilled holes (eg. PCB), etc.,

