

Chapter-1

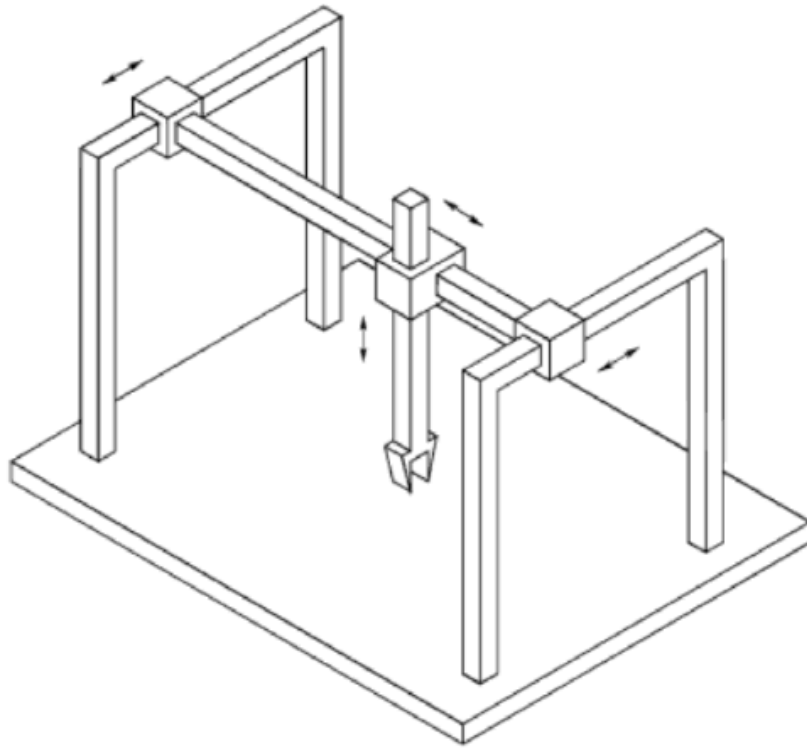
- Chapter-1
 - Joint Type
 - Robot Types
 - Cartesian Robot
 - Cylinder Robot
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 - Scara Robot
 - Articulated Robot
 - Drive System
 - Precision, Repeatability, Accuracy
 - Precision
 - Repeatability
 - Accuracy
 - Degree of Freedoms

Joint Type

- Prismatic
- Revolve

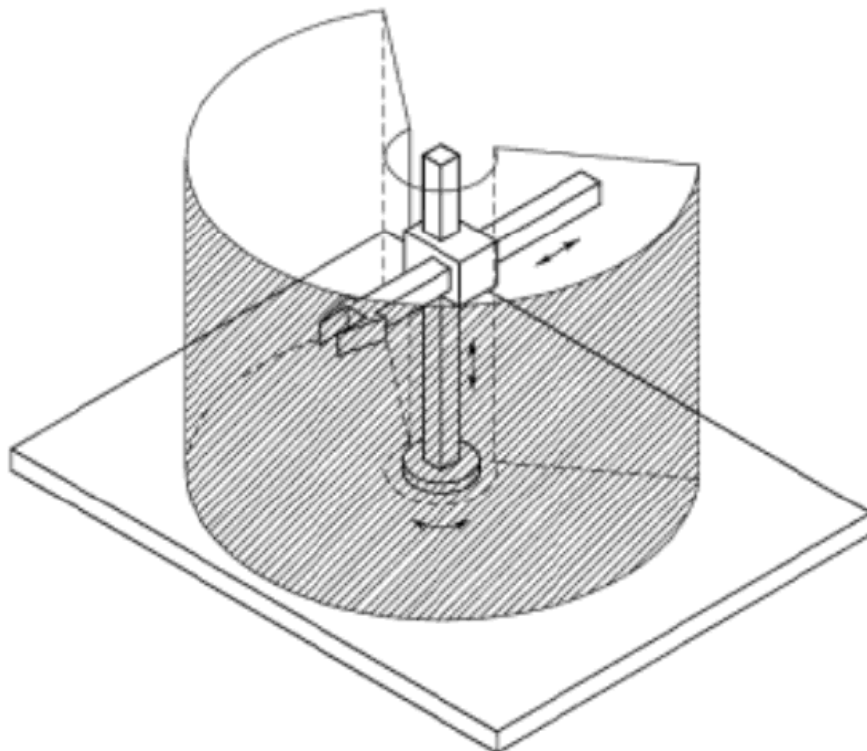
Robot Types

Cartesian Robot



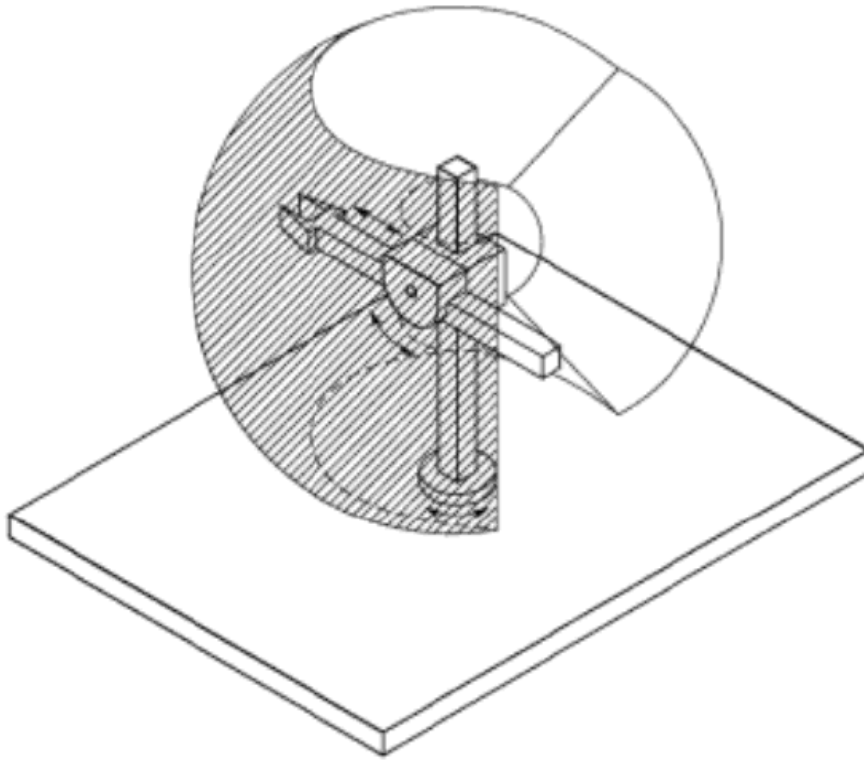
- Major axis: PPP
- Work envelope: rectangular box
- Gantry robot
- Easy to control

Cylinder Robot



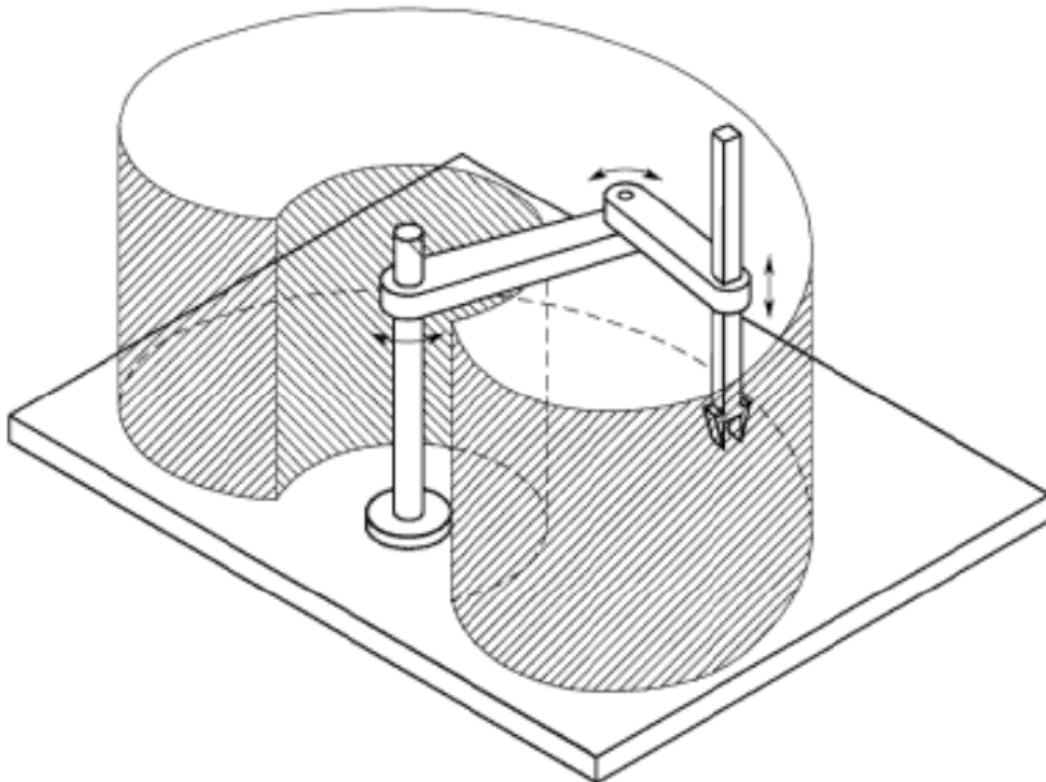
- Major axis: RPP
- Work envelope: cylinder

Spherical Robot



- Major axis: RRP
- Work envelope: sphere

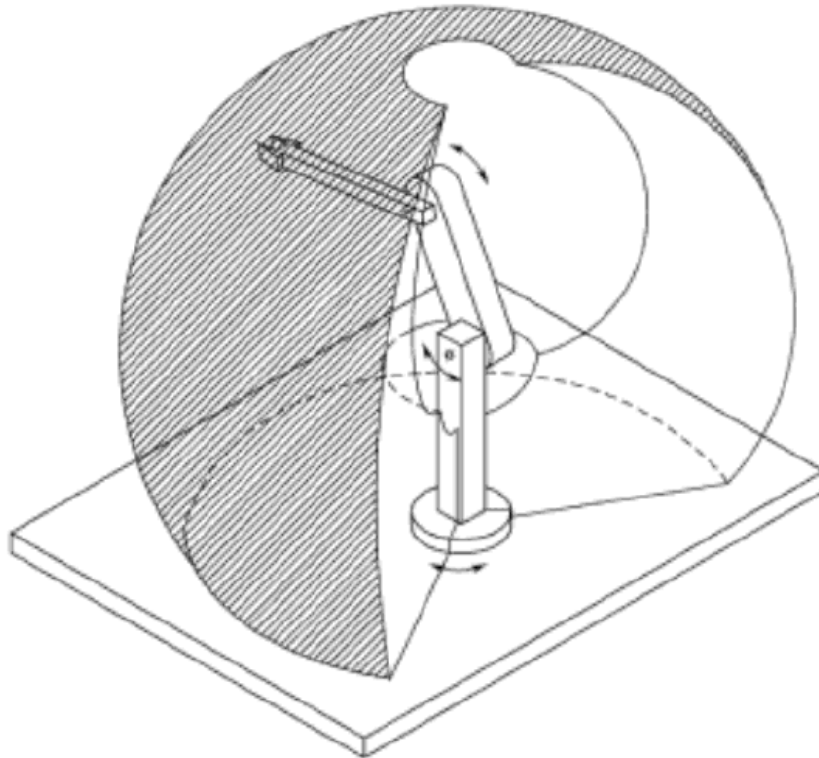
Scara Robot



- Major axis: RRP
- All three joints are vertical
- Work envelope: complex

- Selective Compliance Assembly Robot Arm
- Applications: assembly

Articulated Robot



- Major Axis: RRR
- Most popular, largest workspace
- Work envelope: very complex
- Applications: various

Drive System

- Electrical
 - Most popular
- Chain drive
 - Educational
- Hydraulic
 - Most powerful
- Direct drive
 - No transmission
 - Easier to control
 - Adept one

Precision, Repeatability, Accuracy

Precision

Resolution, smallest move robot can make

Repeatability

A measure of the ability of the robot to position the tool tip in the same place repeatedly

Accuracy

A measure of the ability of the robot to place the tool tip at an arbitrarily prescribed location

Degree of Freedoms

position could be changed by prismatic joints and revolute joints

but the orientation could only be changed by revolute joint

For a structure with n joints to have n DOF, these n joints must be linear independent

In 3D space, the maximal number of linear independent direction is 6