

Force and Compliance Control in Cobots

What is force & compliance control and why is it an important capability for cobots?

To best understand force & compliance control it helps to understand the other alternative which is position control. Typically when programming a robot or cobot the programmer teaches a set of waypoints that the robot will follow to execute a task. With force & compliance control you are able to set a path and program the robot to be compliant to a particular force in a determined axis. For instance, a cobot can be programmed to follow a specific trajectory in a plane while maintaining a constant force normal to that plane despite irregularities on the surface of the piece the robot is working on.

A great example application is a cobot sanding a guitar. Programming a cobot for this application using waypoints would be tedious, impractical, and unreliable. Alternatively, if you use force & compliance control you can make the robot follow the guitar's contour by selecting the appropriate axis to be compliant. This way it follows the shape while maintaining a set amount of force all the way through.

Certain applications can also benefit from compliance control. Such is the case of inserting objects. Assume the case where a tapered surface like a cone is loosely located, and a ring has to be inserted around the cone. The robot can be programmed to reach a certain height in the Z axis while being compliant in the X and Y coordinates. This will allow the robot to adjust to the location of the cone, much in the same way a human operator would place a fastener.

This is accomplished through force sensors in the cobot arm. Doosan's M-Series and H-Series cobots are particularly adept at force & compliance control because they have force sensors in all six joints of the arm. This allows them to sense force as low as 5N making them excellent for delicate tasks like polishing, sanding and deburring.

Cross Automation is proud to offer Doosan Robotics. If you are interested in automating a manual material removal process, contact us today. We have a team of automation engineers ready to help you find the perfect solution for your application.