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In the most basic terms, motion control is a process that comes under the purview of automation. As part of this process, the positioning and velocity of machines are controlled using devices such as an electric motor, servo motor, linear actuator or a hydraulic pump. This technology forms an integral component of robotics where pick-and-place or positioning tasks need to be executed. Depending on the complexity of the requirement, this technology can be designed for use with specialized machines. Motion controllers are devices that find multiple uses in varied applications such as advanced microscopy, biotechnology, assembly, and packaging etc.

There are a number of motion control devices that can be used for precise positioning and placing tasks. Such devices include fast voice-coil-driven scanners, ultrasonic piezo linear motor, and PiezoWalk drives to complex six-axis parallel-kinematics micro-robots. Since devices need to have the ability to move in several different directions, one can opt for single as well as multi-axis controllers that offer movement up to 300 axes.

Such controllers are used for numerous applications that could range from very basic pick-place-assembly tasks to complex multi-axis movement operations. These movements are often controlled with the help of pre-programmed positioning. Alternatively, motion can also be continuously controlled by humans or computers, especially for difficult applications such as welding or PCB printing.

In several applications precision motion control is of utmost importance, especially in situations that cannot be continuously controlled by humans. Applications such as photonics, bio-nanotechnology, medical device and semiconductor rely heavily on such controllers. The devices used for this usually comprise piezo-ceramic and electromagnetic drives. They are most commonly used by OEMs as well as research firms. There are several advantages offered by motion controllers, such as:

They play a significant role in simplifying system design and also in reducing costs.

In most standard controllers, as many as 30 axes can be networked. However, opting for custom designs helps in achieving control for hundreds of axes.

Positioning stages and devices can be integrated with controllers and amplifiers, and these in turn can be directly connected to the host computer.

Image focus and processing applications also make use of control devices. For instance, cameras extensively rely on this technology. Besides, software support can be provided for various functions, ranging from autofocus to edge alignment.

By using controllers such as a linear motor, it is possible to utilize energy more efficiently and to also synchronize several different tasks at once. These devices also help you simplify your circuits, thus enabling greater transparency in the overall process.

There are several devices such as the DC motor controller, ultrasonic controller, hybrid controller, PCI board, stepper controller, and many others that can be implemented for motion control applications.

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motion control, microscope stage, linear actuator, linear slide, linear motor, linear stage

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