



Linear servo motor:

It is similar to the positional rotational servo motor and has extra gear to allow the o/p from circular to back and forth. Though these servo motor are not likely to be found, but sometimes used as actuators for highway model aeroplane.

Principle of couplings:

Servo motor works on the PWM principle which means its angle of rotation is controlled by the duration of pulse applied to its control pin. It can also be controlled by a variable resistor (potentiometer) and some gears.

Mechanism of servomotors:

Basically a servo motor is a closed loop servomechanism that uses position feedback to control its motion and final position. The input applied to its control input command the ~~o/p~~ rotation of output shaft.

This motor incorporates some type of encoder to provide position and speed feedback. In it we measure the position, then the measured position of the o/p is compared with the command position, Now, if the o/p position differs from that of the expected output, an error signal is generated, which then cause the motor to rotate in either direction as per need to bring the o/p shaft to appropriate position.



As the position approaches, the error signal reduces to 0 and finally the motor stops.

Working of servomotor:

Servomotor controls position and speed very precisely. Nowadays a potentiometer is used to sense the mechanical position of the shaft that couples with motor shaft through gears. The current position of the shaft is converted into electrical signal by a potentiometer and is compared with command input signal. In modern servomotors, electronic encoders or sensors sense the position of the shaft.

When we give command input according to position of shaft, and compare this signal with feedback signal an error signal is generated. Further this signal is amplified and apply to the motor input that rotate the motor. When the shaft reaches the required position, error signal becomes 0 and hence the motor stay stands still holding the position.

Controlling of servomotor:

Usually a servomotor turn 90° degree in either direction hence maximum movement can be 180° degree.

They controlling operation can take three wires +ve, -ve and ground wire.



A through which we send control signal (pulse width modulated signal) PWM through the control wire. The duration of pulse duty defines the position of the shaft.

For example,

A pulse of 1ms will move the shaft anticlockwise at 90° , a pulse of 1.5ms will move the shaft at the neutral position i.e. 0° and a pulse of 2ms will move the shaft clockwise at 90° .

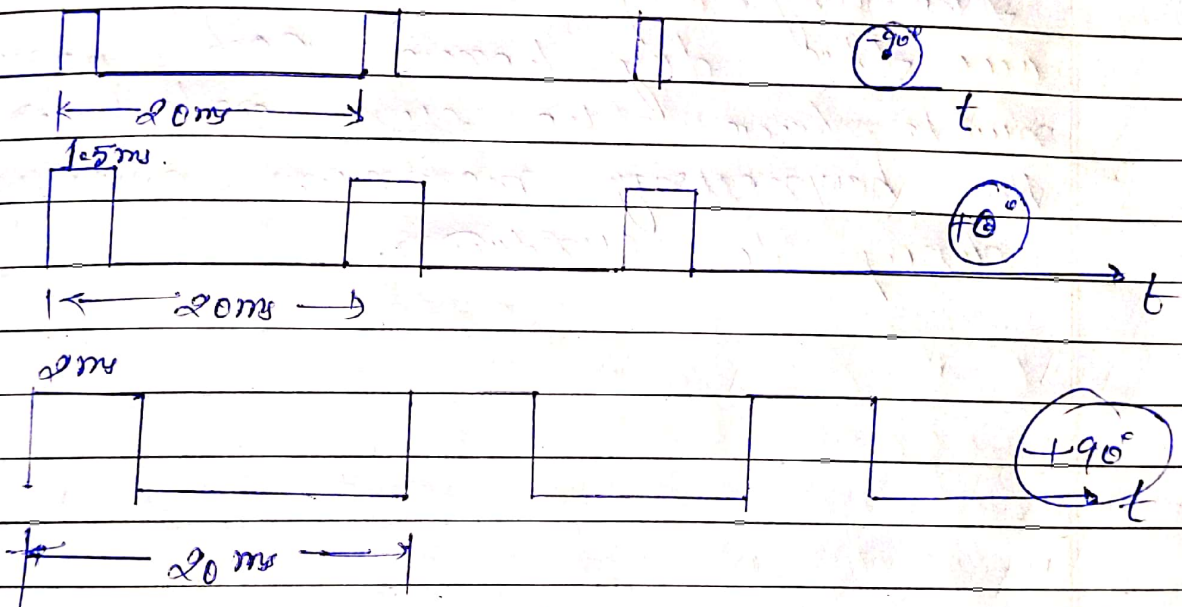


Fig: Variable pulse width for servo motor

When we command a servo motor to move by applying pulse of appropriate width, the shaft moves to and holds the required position of the shaft.

Application

Robotics: A every joint of the robot are connect a servomotor, that gives the robot arm its precise angle.

Date ___/___/___



ii) Conveyer belts - Servo motors move, stop and start conveyer belt carrying product along to various stages, for example in product packaging, bottling and labelling.

iii) Camera autofocus - A highly precise servo motor is built into the camera controls a camera lens to sharpen out of focus images.

iv) Solar tracking systems - Servo motor adjust the angle of the solar panels throughout the day hence each panel continues to face the sun which results in harnessing maximum energy from sunrise to sundown.