

## ● Static maximum torque

This is the maximum torque generated when the rated current is applied in each phase and angular displacement is applied to the motor shaft from its static point. If the external load is lower than this value, when it is removed, the shaft will return to its previous position.

## ● Detent torque

This is the maximum torque that occurs when angular displacement is applied to the rotor of a PM or hybrid type in the deenergized state.

## ● Pull-in torque

This shows the dynamic characteristics stepping motor and is the load torque measured that is required to start up the motor where the number of steps of the stepping motor are exactly equal to the frequency of the input pulse.

## ● Pull-out torque

This is the motor load torque when the motors is started within the range of the pull-in torque characteristics and is rotating synchronously and the input pulse frequency is gradually increased such that the motor rotates synchronously one to one at an input frequency higher than the maximum self starting frequency.

## ● Maximum starting torque

This is the maximum torque that the stepping motor can move, and is the maximum torque that can be moved when the motor is operated at an input signal frequency of less than 10 pps.

## ● Maximum pull-in pulse rate

This is the maximum input signal frequency at which the motor can self start with no load and a one to one correspondence with the input signal.

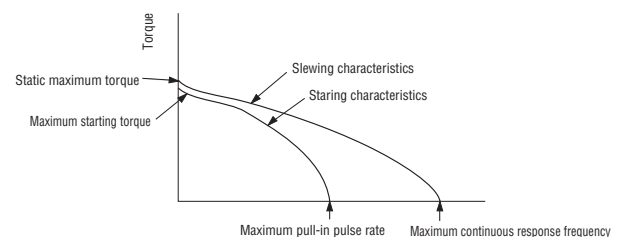
## ● Maximum continuous response frequency

This is the maximum input signal frequency at which synchronous rotation can occur when the motor is started with no load at a frequency less than the maximum self starting frequency and the frequency is gradually increased.

## ● Slewing characteristics

This is the relationship between the maximum generated torque and input pulse such that a one-to-one correlation is maintained at frequencies over the starting characteristic when the motor is started within the starting characteristic range with synchronous rotation and the input pulse is gradually increased.

(Fig. 1)



Characteristics curves (Fig. 1)

# GLOSSARY

## STEPPING MOTORS

### ● Starting characteristics

This is the relationship between the maximum torque generated by the motor and the input pulse such that the number of steps and the input pulse have an exact one to one correlation. (Fig. 1)

### ● The relationship of frequency to rotational speed

Normally the stepping motor rotates one step for each pulse. The number of pulses per second is the frequency, and the unit of measure is PPS. Further, the number of rotations can be derived from the frequency using the following formula:

$$\text{Rotational speed[r/min]} = \text{Frequency[PPS]} \div \left( \frac{360^\circ}{1 \text{ Step angle}} \right) \times 60$$

### ● Angle accuracy

#### 1. Step angle accuracy

This shows the difference between the actual angle and the theoretical angle when the motor rotates one step.

(The base point is random, and measurement is performed for one rotation.) (Refer to Fig. 2)

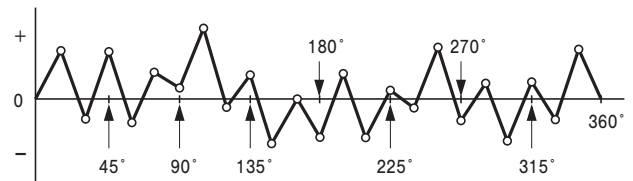


Fig. 2

#### 2. Hysteresis accuracy

This is the angle difference between rotating in the CCW direction.

### ● $\theta$ -T characteristics

This characteristic shows the relationship between the deviation angle of the rotor shaft when external torque is applied to the motor shaft and the torque when the motor is energized at the rated voltage.

(Refer to Fig. 3)

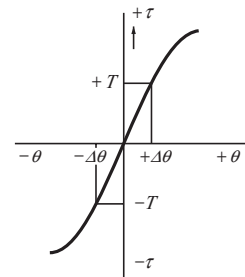


Fig. 3