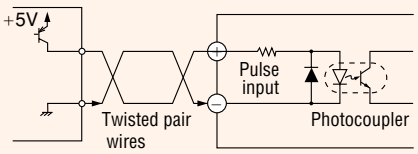
Glossary

Stepping Motors

■ Photocoupler
Photocouplers are electronic components that relay electrical signals as light. They are electronically insulated on the input and output sides, so noise has little effect on them.

■ Open Collector
Open collectors are a type of signal circuit output. They can be connected even when the power supply voltage differs on the input and output sides.

■ Twisted Pair Wires
Twisted pair wires entwine two wires as shown in the figure below. They are used to reduce noise in signal wires. Because the wires face in opposite directions from each other and carry the same current, noise from the ambient surroundings is canceled out and noise effects reduced.



Twisted pair wires

■ Overhung Load (Refer to page B-43)
The load on the motor shaft in the vertical direction.

■ Angle-Torque Characteristics (Refer to page B-12)

■ Current Cutback
This function automatically lowers the current supplied to the motor to a pre-set value after stopping. It serves to reduce the heat generated by the motor while stopped.

■ Inertial Load
This refers to the total inertia of the drive mechanism that works on the motor's output shaft.

■ Inertial Load-Starting Frequency Characteristics (Refer to page B-11)

■ Resonance
This refers to the phenomenon in which vibration becomes larger at specific speeds. For 2-phase stepping motors, the area between 100-200 Hz is a resonance area; for 5-phase stepping motors, have lower levels of resonance in their resonance area.

■ Permissible Torque
The permissible torque is the maximum torque that can be applied to the gear's output shaft.

■ Controller
The controller is a circuit that outputs pulse signals for controlling the motor.

■ Maximum Permissible Speed
This refers to the maximum speed (in r/min) of the gear output shaft.

■ Maximum Response Frequency (Refer to Page B-10)

■ Maximum Starting Frequency (Refer to Page B-10)

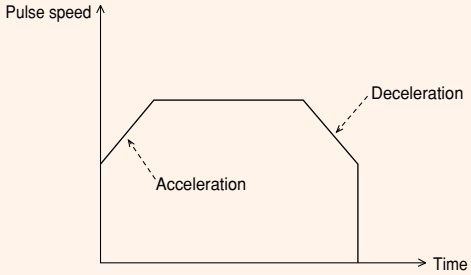
■ CW, CCW
The direction of motor rotation is expressed as CW (clockwise) or CCW (counterclockwise). These directions are as seen from the output shaft.

■ Vibration Characteristics (Refer to Page B-11)

■ Step Angle
The step angle is the angular distance (in degrees) that the motor moves at the input of one pulse from the driver. It differs depending on the motor structure and excitation system.

■ Thrust Load (Refer to Page B-43)
The thrust load is the load in the direction of the motor axis.

■ Acceleration, Deceleration
During motor startup and stopping, the pulse speed can be changed gradually.



■ Stopping Angle Accuracy (Refer to Page B-12)

■ Insulation Class
The insulation class is a UL grade that rates the heat resistance of the motor coils. Stepping motors use Grade B coils, so their permissible coil temperature is 130˚C. The surface of the motor will be about 100˚C when this temperature is reached at the coils.
Class A insulation (105˚C) is a UL/CSA certification condition. When applying for UL/CSA certification as a set, use with a motor case surface temperature no higher than 75˚C.

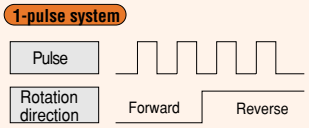
■ Insulation Resistance
A value reflecting the extent of the insulation properties.

■ Withstand Voltage
The maximum voltage that the insulation can hold.

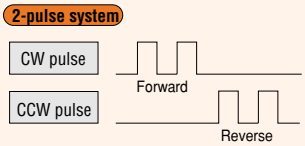
■ **Speed-Torque Characteristics (Refer to Page B-10)**
This is a chart showing changes in torque caused by speed. It is needed when selecting a motor.

■ **Loss of Synchronism (No Missed Step)**
Stepping motors are synchronized by pulses. They can lose their synchronization when speed changes rapidly or an overload occurs. Loss of synchronism is the term for losing synchronization with the input pulse.

■ **1-Pulse Input**
This system uses a pulse signal and a rotational direction (CW/CCW) signal.



■ **2-Pulse Input**
This system uses two types of pulses, a CW pulse and a CCW pulse.



■ **Rated Current**
The rated current is determined by motor temperature rise. It is the current value that can flow to the motor coils continuously when stopped.

■ **Driver (Refer to Page B-13)**
A control circuit that sends current to the stepping motor coils.

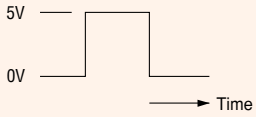
■ **Backlash**
This refers to the play in the gear output shaft when the motor shaft is fixed. It affects positioning precision when positioning occurs from both directions. The term originally referred to looseness between gear teeth.

■ **No Backlash**
The absolute absence of backlash.

■ **Low Backlash**
Backlash is minimized. This can be achieved using special mechanisms.

■ **Half Step**
Refers to half of the basic step. It is used to increase resolution and promote smoother motion.

■ **Pulse Signals**
Pulse signals are rectangular electric signals as shown below.



■ **Number of Pulses**
The number of pulse signals.

■ **Pulse Speed**
The number of pulses input in one second.

■ **Full Step**
The step angle determined by the motor structure. The basic step angle is 0.72˚ for a 5-phase stepping motor.

■ **Pullout Torque (Refer to Page B-10)**

■ **Positive Logic Circuit**
An input circuit that engages when in the "Photocoupler ON" state is applied.

■ **Frictional Load**
The total frictional torque of the drive mechanism that works on the motor output shaft.

■ **Excitation**
Refers to sending current to the motor coils.

■ **Maximum Holding Torque (Refer to Page B-10)**
This refers to the holding power of the stepping motor at rest (when excited at rated current).

■ **Excitation Sequence**
The excitation sequence is the order in which current is sent to the motor coils. It varies with the type of motor and excitation system.

■ **Excitation Timing Output**
This is a signal that indicates that the excitation sequence is initialized; it is output every 7.2˚. (2-phase **CSK** series High-Resolution Type : 3.6˚)

■ **Inertia of Rotor**
The value that indicates the size of the inertia of the rotor itself.

■ **Single Step Response (Refer to Page B-11)**