SANMOTION Application Case

Wafer Inspection Machine

SANYO DENKI

SANMOTION
CLOSEDLOOP STEPPING SYSTEMS

Model No.PB

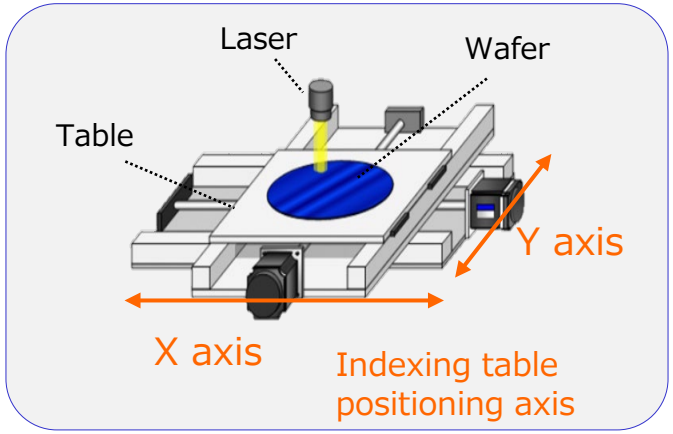
Description

Wafer Inspection Machine detects physical defects or pattern defects on wafers (thin slice of semiconductor), used for the fabrication of integrated circuits (IC).

Wafer is moved on the indexing table and its surface is inspected using the reflection of laser beam or camera.

Structure:
Indexing table positioning axis: X, Y axis

Structure



SANYO DENKI Proposal

Indexing table positioning axis X, Y axis	SANMOTION Model No. PB	Closed loop stepping motor (PB motor)	42 mm sq. / 60 mm sq. 1 each Others: 2 option axes

Driver: DC Input Type E Multi-axis EtherCAT I/F (4-axis)

Features

■PB motor + multi-axis driver

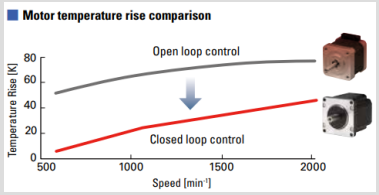
[Indexing table positioning axis: X, Y axis]

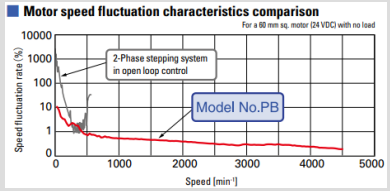
■Stepping system with closed loop control

- Closed loop control based on feedback is made possible by the position-detecting encoder mounted on the stepping motor.

■Low heat generation and low vibration

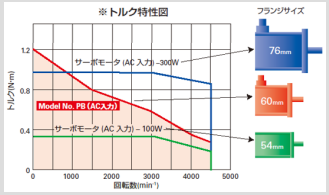
- Current flowing to motor is controlled according to actual motor operation. Higher operation efficiency is made possible by lower heat generation and vibration.
- System stops in a stable manner without hunting (micro vibration).





■High torque in low speed area

- It has higher torque in low speed area than servo motor. It is ideal for applications with short stroke and high hit rate movement.



■EtherCAT multi-axis driver

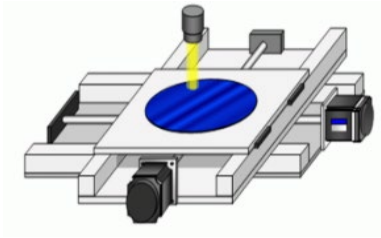
- The 100 Mbps high-speed communication contributes to smooth motion of devices and high synchronization between axes.

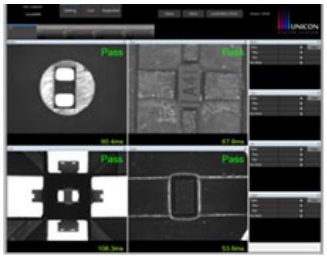
EtherCAT Conformance tested

Merits

■Improved device reliability

- Closed loop control system eliminates step-out (displacement) caused by sudden changes in speed or load, a shortcoming of stepping motors.
- This system stops in a stable manner without the hunting (micro vibration) seen with servo motors. Blurs in camera images could be avoided.





■Energy saving

- High efficiency operation is possible with lower heat generation of motor. It also contributes to lower power consumption.

■Compact and high speed device

- High torque can be obtained in low speed area, which makes this system suitable for applications where moving a short distance with short quick steps is required. This helps customers downsize their devices comparing to servo system.
- Multi-axis driver makes it possible for customers to build device in smaller sizes.
- Wire-saving is possible by ethernet cable.
- Communication cycle time 0.25 ms contributes to better system control and lower takt time.