

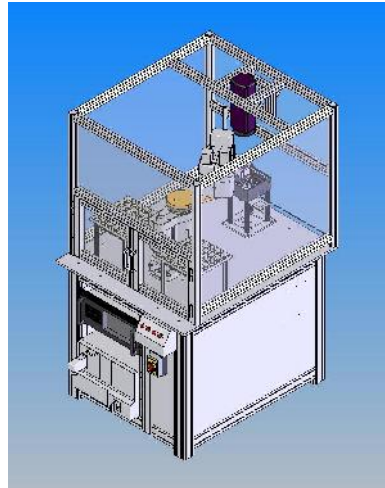


Automated Robotic PV Cell Test Machine

Description

The customer required a machine to perform optical performance tests on an innovative design for a concentrated photovoltaic (PV) cell receiver system, aimed at the mass generation of low cost solar energy.

These tests established the dark and light iv curve characteristics and were achieved on the machine using a Staubli SCARA robot operating between two product carriers and a test station.



CAD Model



Robotic PV Cell Machine

A 6 x 6 array tray was manually located at the input station. A vacuum based pick & place system then transferred a single product to the test station. Electrical connection to the PV cell was then made and the dark iv curve was produced, using a high current source meter, under blacked out conditions. The next test was to produce the light iv curve using a 10 ms flash test from a high intensity flash unit that was calibrated, each use, by a standard reference cell. The current generated by the PV cell was then measured using a 0.01 Ohm resistor. Data generated was acquired by a high speed NI DAQ card. Passed components were transferred to the tray at the output station and reject components back to the input tray and marked as reject.

Disciplines Used

- Electro-mechanical, electronics & pneumatic design, robotic control, PLC DAQ & machine control, project management, manufacture, assembly, test & commissioning.

Specification Summary

- SCARA robot with vacuum gripper
- Sprung test pin arrangement for electrical contact
- Overall PLC machine control
- NI LabVIEW data acquisition
- Average cycle time = 30 sec's
- Aluminium extrusion framework