

Automating Quality: Multi-pole speed sensor

Background:

The multi pole speed sensor magnet chosen for this automation project was a 24-pole ceramic ring. The magnet requires clearly defined, tightly controlled, and symmetric pole segments to work correctly at high speeds.

Initial Manual Process and areas of improvement:

The initial process consisted of:

1. Manually loading material into a magnetizing fixture
2. Manual Removal of magnetized speed sensor from fixture
3. 100% visual check utilizing magnetic viewing paper
4. Random sampling for magnetic strength
5. Manual stacking and packaging of product.

The manual process had three key places where time or quality concerns could arise; the visual check, the packaging, and the magnetic strength. The visual pole check created a bottleneck in the assembly process as 100% of magnets were staged and checked using viewing paper. Magnetic strength testing was only performed on a sampling of the magnets, creating the possibility for low strength magnets to reach the customer. Manual packaging was slow and allowed for packaging errors.

Automation implementation:

The automation project was targeted towards removing the manufacturing bottleneck in the quality testing and increasing packaging reliability. To accomplish these goals the manufacturing line was fully automated from beginning to end, consisting of:

1. Manual loading parts into feeder station
2. Mechanical arm moving parts to magnetization station.
3. Mechanical arm moves parts from magnetization station to packaging station while checking magnetic strength in transit.
4. Unqualified products disposed of; qualified products packaged for shipment.

Improvements from automation:

The automation improvements allowed for 100% magnetic inspection of each magnet without slowing down the production process; preventing unqualified material from ever reaching our customers. The automation improved the efficiency of the process; reducing cycle times by 20% and removing the quality related bottlenecks. Automation also improved our packaging procedures, eliminating packaging errors.