TQC Automation & Test Solutions

Case Studies: Automation

Automated Rotary Assembly & Test System for Oil Pump Lever Assemblies

Client: Leading Power Transmission Component Manufacturer.

Part: Oil Pump Lever Assembly

Machine supplied: Fully Automated Assembly Solution

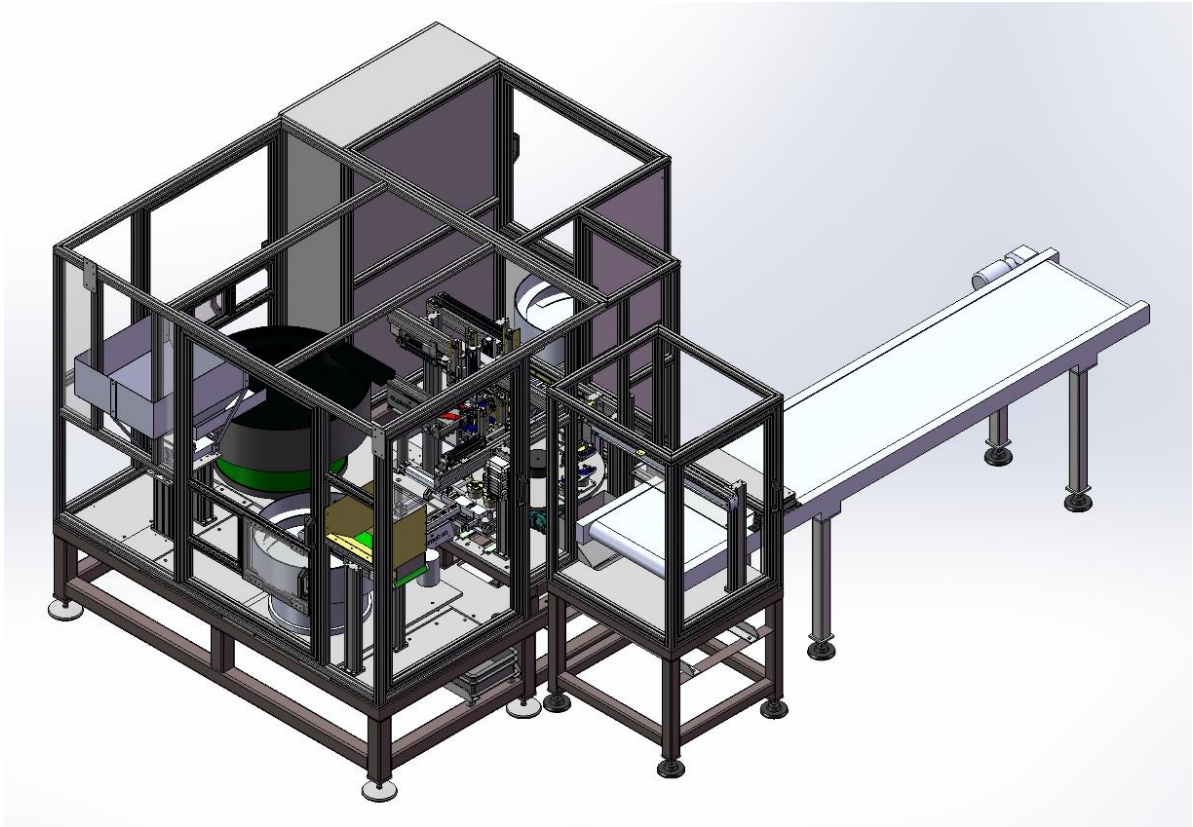
Throughput: 720 assemblies per hour (2 per 10-second cycle)

The Challenge

A leading power transmission component manufacturer needed to scale production of oil pump lever assemblies while maintaining consistent quality. Manual assembly couldn't meet the required throughput of 720 units per hour, and they needed built-in quality verification at each assembly stage.

The Solution

TQC designed and built an automated rotary assembly system with a 4-station indexing rotary table that assembles two complete units simultaneously. The system integrates automated part feeding, in-process verification, and automatic sorting to ensure only conforming assemblies reach the customer.

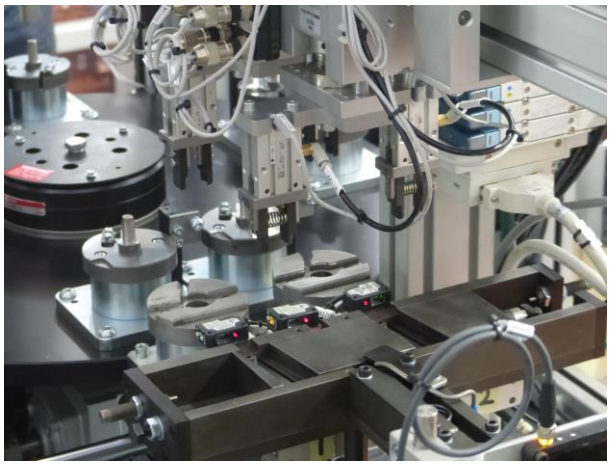


Technical Overview

The automated rotary assembly system uses a 4-station indexing table to build assemblies in parallel. Each station performs specific operations with integrated quality checks:

Station 1

Springs are bulk-fed through a linear conveyor and vibratory bowl feeder system. The feeder presents springs in pairs to the rotary table nests. Vision systems verify spring presence and orientation before the table indexes. Rejected springs are automatically removed via a dedicated chute.

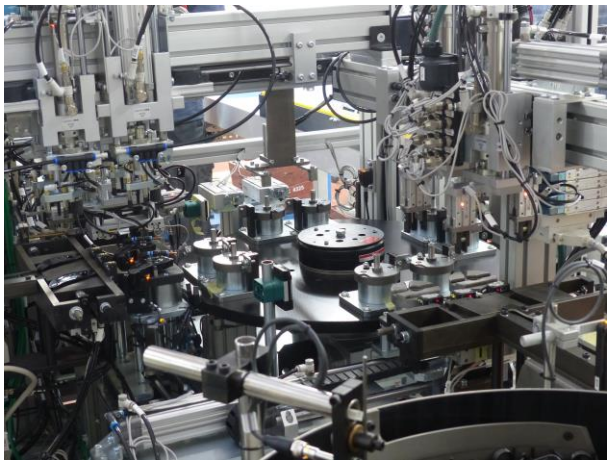


Station 2

Lever shoes arrive in pairs from bulk storage through a second vibratory bowl feeder. Automated pick-and-place units transfer verified parts to the rotary table nests, positioning them over the previously loaded springs. Reject parts are diverted automatically.

Station 3

A twin-track vibratory bowl feeder presents stopper pins in pairs. Each pin's length is measured before installation—only pins within specification proceed. The system clamps the lever/spring subassembly and cycles it to align the pin hole. Pneumatic insertion units press-fit the pins. If any assembly operation fails, the system flags that nest for rejection at the unload station.



Station 4

A twin-head gripper on a programmable gantry removes both assemblies from the rotary table. The system automatically routes passed assemblies to a conveyor (arranged in two rows of eight) and diverts failed assemblies to a reject chute. The conveyor indexes after each complete set and provides approximately 20 minutes of buffer capacity. When full, the system holds, and a jog function allows operators to clear remaining parts.

Control System

The system runs on an Omron PLC with touchscreen HMI interface, providing real-time production monitoring, fault diagnostics, and cycle count tracking.

If you have an application that could benefit from TQC's expertise in automation please contact us by email or phone via the contact details

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