

DC to AC Drives Conversion



Overview

The leading kitchen components supplier MFI Manufacturing Ltd approached ZLT Automation to provide a turnkey solution to upgrade their front line, board lamination process machine. Degradation over a period of time in the speed holding capability and problems of torque mismatch on the original DC drives systems continued to cause quality and downtime problems. The decision was taken by MFI management and senior engineers to replace all existing DC controls, motors and gearboxes with AC drive systems capable of providing reliability, speed holding and dynamic speed control performance.

ZLT Automation, a technical partner for the award nominated range of SIEI inverter drives provided their own state of the art Avy closed loop, field orientated vector inverter drives to meet the customers stringent performance demands. In addition to the performance requirements demanded from the new drives, the project necessitated detailed ZLT project management control to complete the machine strip down, drives installation, re wiring and on site commissioning of the machine to be carried out during a finite shutdown period of only seventeen days.



Scope of Supply

Main items: a) 5 off closed loop field orientated vector inverters. b) 5 off AC drive motors and gearboxes with encoders. c) New AC drives panel integrated into existing control panel suite to replace existing DC drives cabinet. d) 5 off HMI operator display units and mimic diagram incorporated into existing operator control console. e) Electrical refurbishment and rewiring of the complete machine to MFI standards. f) Provision of new electrical documentation including Autocad drawings of complete machine

Technical

Dynamic speed control and speed matching of each of the five drive systems was necessary to keep the boards at the same constant separation distance and at the synchronised speed when being processed through each of the cleaning, glueing, drying, chemical catalyst and lamination stations. From the control position a "master" speed reference signal was provided to each drive. To achieve the close speed matching characteristic required to be maintained during dynamic load torque changes imposed by some of the treatment stations, each drive motor was fitted with absolute encoder feedback which combined with the performance characteristic of the Avy vector drives provided speed regulation performance of 10,000:1

Each drive system was fed with the digital master speed reference signal from the master HMI with individual HMI speed adjustment of each drive available to the operator for start up and trimming adjustments from the control console.

Additional benefits to operational and maintenance personnel were provided by utilising the full digital capability of each drive in the provision of a data link between each drive and its associated HMI display. Motor data and drive status information was made available from each inverter to each drive HMI through standard software links providing full operational drive status information at the operator position.

Summary

Previous quality and downtime issues have been resolved. The performance and reliability of the drives has provided MFI with full operational capacity for their lamination process. The project was successfully completed and commissioned on time during the specified shutdown period.

