

## Rockwell Automation solution brings Godrej Appliances Ltd.'s capacity up to almost 100% and cuts spare parts inventory by 50%

Frequent, costly breakdowns on the refrigerator assembly line and product damage have been eliminated.

### Background

From the lock on the front door to the fruit juice in the refrigerator – and the refrigerator itself – products made by the Godrej Group are a household name in India.

Established in 1897, Godrej Group is one of the largest privately held industrial corporations in India, with combined sales of more than US\$740 million. Products sold by its various subsidiaries include consumer goods, heavy duty durables for the home and heavy engineering goods.

Revenue for fiscal year 2001 was US\$120 million. To boost profitability and retain market share, the company is focused on manufacturing quality products at lower cost, maintaining a technical edge over the competition, and improving project life cycle costs.

### Challenge

Godrej Appliances initiated a green field project in 1995 to assemble refrigerators in a new plant. The primary goal was to eliminate the assembly line problems experienced by its two other plants. Although they used variable speed drives, almost 10% of plant availability was lost because of mismatch in drive speeds between the overhead conveyor and the slat conveyors. The speed mismatch caused refrigerators to fall from the slat conveyor, and it took about four hours – and a lot of manpower – to get the production line back in operation again.



Troubleshooting and preventive maintenance were cumbersome and difficult. Without a common operator interface and network system of drives, they had no way to accurately and reliably monitor operations. System breakdowns were more frequent, and downtime lengthier and more expensive, when emergency repairs had to be carried out to bring the plant back on line. In addition, replacement of a failed drive was a time consuming process, requiring manual drive configuration and loading of parameters. This, too, increased downtime and reduced productivity.

Godrej Appliance's objectives were not only to synchronize the overhead conveyor with the corresponding slat conveyors, but also to match all conveyor speeds on the line to achieve smooth movement throughout the complete assembly process. In

addition, the company requested integration of the complete assembly line to monitor and analyze information, and self-configuration of new drives to reduce downtime and system maintenance. Low cost of ownership was a must.

When Godrej Appliances put the project out for bid, competitors offered only simple stand-alone, variable speed drives. AD Electronics, a Rockwell Automation channel partner from Mumbai, turned to Rockwell Automation for system specifications and technical support, and won the Godrej Appliances contract in July 1995.

"Rockwell Automation and AD Electronics understood the desired application and the customer's objectives and offered a technically superior solution," says Suresh Deshpande, senior manager of Projects at Godrej Appliances. "Rockwell Automation's consultancy approach was particularly



important. Combined with a proven track record for reliable products, outstanding service, and the consistently high performance of the system integrator, it was an easy choice.”

### **Solution**

The project began in January 1996 and was completed by the next month. Rockwell Automation and AD Electronics together designed, engineered, installed and commissioned a fully automated system for the new Godrej Appliances plant — the first of its kind in India.

The completely automated assembly line synchronizes the overhead conveyors with the bottom slat conveyors in the evacuation and testing sections, reducing product damage and line breakdown and maximizing production capacity. The system is so simple that even plant operators can easily fine tune synchronization of conveyors throughout the entire line. Every aspect of the assembly line is integrated and networked to provide comprehensive diagnostics information.

The assembly line in the new plant has 62 conveyors distributed in four sections: assembly, evacuation, testing and packing. The complete line stretches

more than one kilometer. All 62 conveyors are driven by Allen-Bradley variable speed AC drives, networked with an Allen-Bradley PLC on a remote I/O network. An Allen-Bradley PanelView operator panel also communicates to the PLC on remote I/O. All drive parameters now can be monitored and controlled from one location in manual or auto mode. Speed can easily be fine tuned by calculating the slip factor of each motor and changing the ratio multiplier for each drive from the PanelView. A proximity switch detects motor stalled conditions.

The PLC stores and displays diagnostics information and electrical parameters for each motor, thereby reducing troubleshooting time. Resetting of faults of all 62 drives can be achieved from one location. Auto loading of configuration information was built into the PLC software. In case of drive failure, a replacement drive at first power on can self-configure and automatically load the required parameters from the PLC, cutting downtime to a minimum.

### **Results**

All of Godrej Appliances' objectives were achieved, with a total savings of approximately US\$33,000 per year. The company quickly recovered the cost of its

efficient automation system and improved its bottom line, increasing production capacity, reducing waste and downtime, and streamlining system troubleshooting and maintenance.

Godrej Appliances has not had a single breakdown due to speed mismatch since the installation was completed. Based on the frequent shutdowns caused by speed mismatch at the other Godrej Appliances plants, the company estimates the Rockwell Automation and AD Electronics solution saves the 170 employees on the shop floor 10% of their time. This 10% improvement in production capacity saves at least US\$14,000 per year. Godrej Appliances estimates that a minimum of 150 refrigerators previously fell from the conveyor each year and got damaged. The 100% reduction in damage saves the company about US\$9,000 each year.

Downtime is minimized because information related to conveyors, drive parameters, electrical parameters, machine errors and other potential problems can be quickly accessed and analyzed. Built-in drive features like auto-configuration and self-loading further minimize downtime.

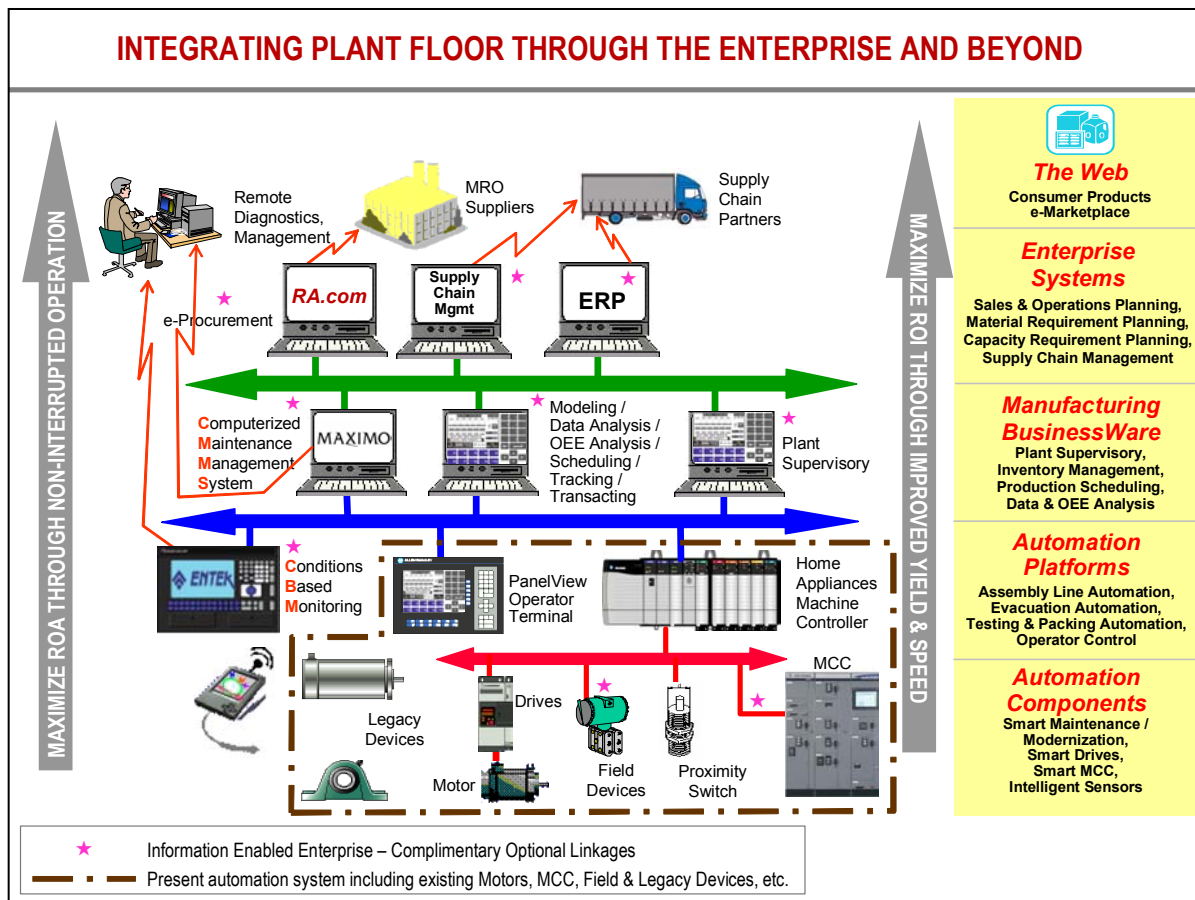
The user-friendly system is simple to maintain. From one location, Godrej Appliances management, engineers and maintenance crew have ready access to reliable information on plant status. The monitoring system enables plant operators to be proactive instead of reactive. They can now make accurate diagnostic predictions and set up a cost-effective schedule for preventive maintenance so the plant does not experience unplanned, and more expensive, shutdowns. This reduces its spare parts inventory by 50% for an annual savings of US\$10,000.

Based on the tremendous success of this solution, Godrej Appliances contracted with Rockwell Automation to implement a similar system in its two other plants. Additionally, Godrej Appliances involved Rockwell Automation in an energy-saving solution in its injection molding machines. The US\$100,000 order

reaped a US\$200,000 return on investment in its first year alone.

“Rockwell Automation has exceeded our expectations in all respects. Not only are their products reliable and user-friendly, but also their people spent days and nights in the plant to make this project a success,” says Deshpande. “Today our business relations are at a peak.”

The architecture below depicts Rockwell Automation’s concept of an Information Enabled Enterprise. The area outlined with a brown dash line represents the present automation level in the facility under discussion in this document. The remaining portion illustrates a host of solutions that Rockwell Automation can provide today to integrate the plant floor to the enterprise and beyond.



Allen-Bradley®, PLC® and PanelView™ are trademarks of Rockwell Automation.

[www.rockwellautomation.com](http://www.rockwellautomation.com)

**Corporate Headquarters**

Rockwell Automation, 777 East Wisconsin Avenue, Suite 1400, Milwaukee, WI, 53202-5302 USA, Tel: (1) 414.212.5200, Fax: (1) 414.212.5201

**Headquarters for Allen-Bradley Products, Rockwell Software Products and Global Manufacturing Solutions**

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation SA/NV, Vorstlaan/Boulevard du Souverain 36-BP 3A/B, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

**Headquarters for Dodge and Reliance Electric Products**

Americas: Rockwell Automation, 6040 Ponders Court, Greenville, SC 29615-4617 USA, Tel: (1) 864.297.4800, Fax: (1) 864.281.2433

Europe/Middle East/Africa: Rockwell Automation, Brühlstraße 22, D-74834 Elztal-Dallau, Germany, Tel: (49) 6261 9410, Fax: (49) 6261 17741

Asia Pacific: Rockwell Automation, 55 Newton Road, #11-01/02 Revenue House, Singapore 307987, Tel: (65) 6356-9077, Fax: (65) 6356-9011