



Mitsubishi Electric Robot Connectivity to PLC, HMI and VFD with Collision Detection Function Reduces Total Cost of Ownership

Case Study

Solution

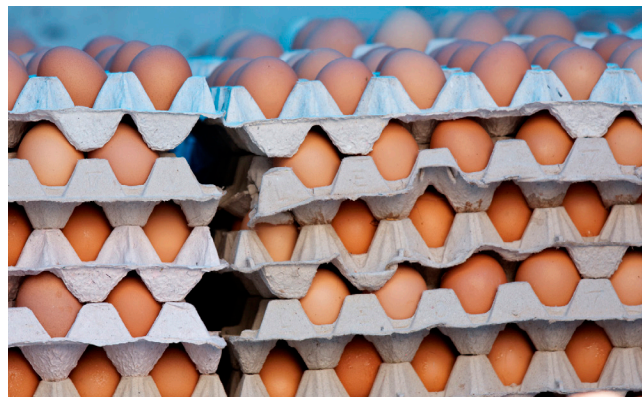
- RV-12SQ 6-axis Robot
- iQ Platform Programmable Logic Controller
- GT16 Series Touch Terminal
- D700 Variable Frequency Drives

T.O.P. Inc. Benefits

- Shortened line stop times
- Lower total cost of ownership
- Reduced downtime

Mitsubishi Electric Value-added Advantages

- No damaged products
- Flexible machine control
- Easier troubleshooting



“We’ve automated the challenging process of inserting egg cartons into metal wire crates. Nobody else does this. Mitsubishi Electric’s robots are helping to make this possible.”
– Dirk Doerr, Total Operations Performance, Inc.

BACKGROUND

Egg grading plants utilize a wide variety of control equipment to wash, weigh and separate chicken eggs before sending them off to distributors or supermarkets. Certain parts of the process, however, still rely on manual operations. For example, loading eggs into wire crates and boxes where human operators intuitively and naturally insert egg cartons at an angle. While this provides an efficient and reliable technique, it became clear that if a solution could be implemented to automate the mundane task, the payback would be 2 years or less. The main question was whether or not the job could be reliably accomplished using robotics.

CHALLENGE

Total Operations Performance Inc. (T.O.P. Inc.) employs years of experience and creativity offering solutions for clients in the food production industry. When a unique pick and place application was presented to load trays of fragile eggs into two types of containers, large boxes and reusable wire crates, T.O.P. became interested in creating a reliable

robot solution. The biggest challenge would be the loading process to repeatedly place cartons of eggs into the metal crates since they can easily get damaged or deformed over time. This makes it difficult for a robot arm to maneuver safely into the wire baskets without colliding into the wire frame. Some of the metal crates also have wire handles, which can cause additional interference, depending on the orientation of the handles. With all of these challenges, nobody has ever attempted to automate the process.

SOLUTION

T.O.P. approached the challenge in search of a powerful and flexible industrial robot that included a collision detection function to prevent damaging eggs with defective crates. It was also important for the robot to have connectivity options to equipment such as Human Machine Interfaces (HMIs), Programmable Logic Controllers (PLCs), and Variable Frequency Drives (VFDs). Compared to other vendors, Mitsubishi Electric’s iQ Platform robots offer outstanding integration for direct control from an HMI, along with fast memory sharing with QnUDE PLCs. The RV-12SQ

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robot comes with a 2 year warranty and includes a collision detection function. The GT16 Series HMI provides multi-driver communication support to the PLC and robot with pre-configured screens to monitor VFDs. Operators can use the HMI to jog the robot, monitor errors, backup and restore program data, and read joint axis positions.



RESULTS

As a completely integrated solution, the iQ Platform robot from Mitsubishi Electric supplies reliable and repeatable results at 23 different locations across Canada. To date, the impact detection function has resulted in zero instances of broken eggs caused by deformed baskets. The RV-12SQ robot offers egg grading plants a payback period of just 1.5 years for end-of-line operations including a design that is built to last. Dirk Doerr, Director of Engineering at Total Operations Performance commented that “Mitsubishi Electric’s robot technology lowers the total cost of ownership for customers by detecting collisions and providing direct communication to the iQ Platform PLC.

HMI screens also make it easier to operate the robot without using a teach pendant.” Egg grading plants are confident using the solution from T.O.P. for unattended operations. It is the implementation of creative solutions from innovative companies like T.O.P. combined with control equipment from Mitsubishi Electric that drives success.



Mitsubishi Electric’s RV-12SQ robot includes a collision detection function along with communication to an iQ Platform PLC for complete system control.

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