Outbound Technologies

# PROJECT SUMMARY

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| **Project Name:** | Carton Packaging Line |
| **Total Value:** | $782,922 |
| **Hours:** | Over 12,200 |
| **Engineers:** | One (1) – Electrical Design<br>Five (5) – Software Design<br>Five (5) – Commissioning |
| **Market:** | Food and Beverage |
| **Manufacturing/Process:** | Process Automation |
| **PLC:** | Siemens Simotion, Step 7 |
| **HMI:** | Siemens – WinCC Flexible |
| **Motion:** | Siemens Scout, Simotion, Sinamics |

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| **Introduction:** | The purpose of this project was to provide the electrical drawings in EPLAN, electrical design support, controls programming, and commissioning for a packaging machine upgrade that included migrating from Mitsubishi to Siemens architecture. |
| **Objectives:** | The objective was to assist customer in upgrading machine technology to Siemens newest suite of control hardware and software solutions for packaging industry as well as making the mechanical design of the machine more versatile. |
| **Solution:** | OTI provided the customer with a dedicated team of controls engineers to work on-site with their engineering team. OTI's staff included a project manager, E-PLAN design engineer, and multiple controls engineers for the software programming. The customer, Outbound engineers, and Siemens engineers all worked together to implement the solution. Emphasis was placed on using standard hardware, software, network topology, and programming practices as well as modularity. |

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| | PackML compliance was a focus. Siemens Scout was utilized as the primary integration platform. Siemens Step 7 and Simotion was utilized for the PLC programming, with Siemens WinCC Flexible utilized for the HMI programming. Motion on this system was accomplished with the Sinamics line from Siemens.<br><br>The packaging line is an ultra-clean, industry-leading hygienic filling machine which comprises design features such as HEPA clean air system, automatic machine disinfection, carton decontamination, double diaphragm filler, dedicated CIP unit, and a sterile filling station.<br><br>At maximum speed the machine produces 14,000 cartons/hour. The machine is designed as a double line, so a single line is required to produce 7,000 cartons/hour. In every machine cycle the turret delivers two (2) cartons, requiring the machine to operate at 58.3 cycles/minute (1.29 seconds/cycle.) At this speed the main drive velocity is 350°/second. Twelve (12) servos were electronically coupled from a main drive encoder in place of mechanically driven cams. All other functions stay coupled with the main drive over mechanical cams. The Simotion controller operates these axes and its coupling with the main drive, which is represented as an external encoder in Simotion.<br><br>A function block was created for every mechanical function on the machine which could be realized with a servo motor, cylinders, or valves. The required function blocks were programmed in structured text or ladder logic. |
| **Process Documentation:** | The following is a list of documentation provided by Outbound Technologies in order to exceed the required industry standards:<br>• Electrical drawings<br>• Software (PLC, HMI, Profibus) |
| **Industry Standards:** | • NEC<br>• IEC 61131-3 |
| **Project Outcome:** | All systems controls performed as designed. The customer was satisfied with all work performed, and OTI's engineering support was extended**.** OTI engineers received positive feedback from the customer on the post-project survey. |