EtherNet/IP in Packaging

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General Session and 16th Annual Meeting of Members

www.odva.org
Industry leader in primary and secondary packaging machines

- Sleevers
- Cartoners
- Case Packers
- Combination Systems

Leverage automation to create innovative solutions

- Electrical savings
- Operational savings
- Increase overall line efficiencies
Packaging Industry

Aagard’s Purpose and Values:

• Aagard will enhance people’s lives while providing unique packaging solutions that help our customers win.
• WINNING TOGETHER HONORABLY

Aagard is laser focused on maintaining a culture that fosters creativity through collaboration. We strive to bring excitement and innovative thinking to every project we work on. And we’re dedicated to forming true collaborative partnerships with our customers, which allows us to design unique, industry-leading solutions that give them a competitive advantage.
Equipment Overview

Custom Machinery

- Up to 40 or 50 axes of motion (typically 20 – 30)
- Motion coordination via CIP Sync and CIP Motion

Maksimal Pouching System

- Form, fill & seal 200 pouches/min
- Pouch film speed: >600 mm/sec
- 1 automation controller
- 17+ servos dependent on requirements
**Film Registration**

**Task: Identify correct cutting & sealing positions on the film**

- **Challenge:** Film speed ≈ 666mm/second but fluctuates slightly due to the nature of film
- Trending is necessary for precise cutting & sealing
- **Sensor** detects the registration mark & triggers the SOE module 200 times per minute
- **Servo drive position** is correlated with the registration mark & film feed velocity is adjusted for precise speed control
Cartoner Application:

Random Timing Infeed
Task: Adjust random product timing to match continuous machine timing

- Sensor is connected to the SOE module
- Rising edge trigger initiates timestamp
- Extrapolate actual and desired position
- Adjust the speed of product
- EtherNet/IP & CIP Sync eliminate variances of previous system
  - Product travels 1.5” in 10 ms
Cartoner Application:

Carton Sealing
Task: Control Glue Gun

- Challenge: Carton Velocity
  - 105 inches / second
  - Product travels 1” in 9.5 ms
- Sensor is connected to the SOE module
- Rising edge trigger initiates timestamp
- Allows glue gun on/off timestamps to be calculated and written to a scheduled module
- Scheduled module turns glue gun on and off at required times
Network Design

Simplification:

- Electrical panels distributed throughout machine
- Capable of one network
  - Previously 3 separate networks
  - I/O, motion, safety

With EtherNet/IP:

- Everything combined into one
Common Network Topology
Additional Benefits

Design Modularity
- Simplified design
- Faster installation
- Operational savings and line efficiencies

3rd Party Device Integration
- Barcode scanners
- Cameras
- Laser printers
- Gluing systems
Troubleshooting

Challenges:
- Intermittent communication loss
- Tracing network problems could take days
- No indication of failure point
- Often difficult to repeat the problem

With EtherNet/IP:
- Problem can usually be identified within minutes
- Ring topology means built in redundancy
Better monitoring, reduced downtime

- EtherNet/IP allows more data to be extracted from drives
- Continuous monitoring of status & fault information

Simplified data collection

- Data collection and performance tracking now standard
- Seamless transfer to enterprise systems
  - Machine Mode & State
  - Product counts
Conclusion

EtherNet/IP with CIP Motion & CIP Sync

- Simplified design
- Greater flexibility
- Easier integration with 3rd party devices
- Better system monitoring
- Reduced downtime
- Simplified data collection and enterprise integration