

Coperion K-Tron Automation Controls. Engineering comprehensive state-of-the-art process control and management systems.

# Automation Controls Engineering Capabilities.

## Configuring automated systems, from simple component control to complex processes.

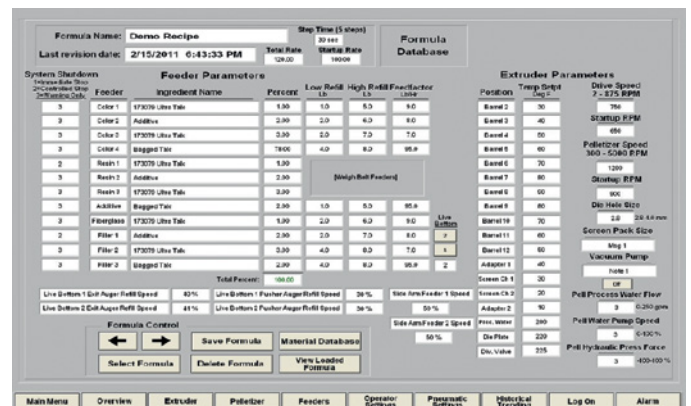
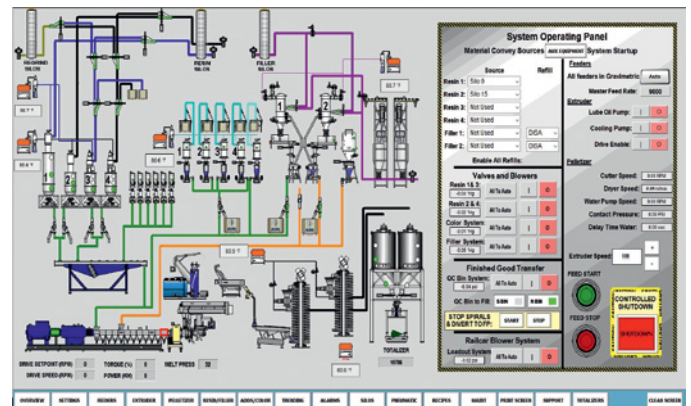
Coperion K-Tron is renowned for the design and production of highly accurate, efficient and reliable feeders, pneumatic conveying components and systems, particularly in applications with hard to handle bulk solid materials. Our extensive application experience in the plastics, chemicals, food, pet food, pharmaceutical, minerals and nonwovens industries has given our specialists the in-depth knowledge and necessary background to design optimized control solutions which work proficiently with any component or system. Our electrical engineers understand each component and how it must function within the system for maximum safety and efficiency.

Coperion K-Tron provides a variety of proven process control options from standard conveying and feeder controls to supervisory control of the entire process, coordinating control of equipment such as feeders, mixers, extruders, pelletizer systems and pneumatic conveying transfer systems as well as a variety of auxiliary components.

**All automated control systems are developed, designed, manufactured and tested in-house** with oversight by our highly trained and skilled electrical engineers.

### PROCESS SYSTEM CONTROL CAPABILITIES

- › System supervisory controls including SCADA, interfacing with DCS (Distributed Control Systems) and MES (Manufacturing Execution System)
- › Alarm monitoring and management
- › Process quality control
- › Recipe management
- › Complete interface between process areas including interlocks
- › Integration support to extract information for process system reports such as inventory management, data historian, data logging
- › Integrated control solutions for existing and future technology needs



### STANDARD CONVEYING AND FEEDER EQUIPMENT CONTROLS

#### Conveying Controls

- › LSR (Loader Single Receiver) Controller
- › 2400 Series Vacuum Sequencing Controllers
- › Rail Unload Panels
- › Truck Unload Alarm Panels

#### Feeder Controls

- › K-Vision Line Controller
- › KCM Control Module
- › KSU-II Single Unit User Interface



# »» Automation Controls Engineering Benefits. Developing process control systems to meet specific requirements.

As we embark on developing a new system or upgrading a current infrastructure, we work closely with the customer to develop a process control system that will meet their specific requirements. Our first goal is to understand the scope of the project. We look at future or current process flows as well as operating procedures. The operating environment, required level of performance and any special requirements are also important factors. With a good grasp of the scope, we begin with the control system design and spec out sensors, actuators and control components. Our control systems are designed to be simple, yet flexible and maintainable.

Once the control concept has been determined, we address the power requirements. We look at what power sources are available, plus backup power options, in order to determine how power will be distributed to the system in a safe and reliable manner. With the scope of the project, control system design and load analysis completed the panel layout design begins, while always respecting electric code or safety standards associated to the project. **Coperion K-Tron is committed to 100% customer approval.**

## KEY BENEFITS

- › Custom configured PLC packages using proprietary, industry proven subroutines
- › Trusted partnership with Allen-Bradley and Siemens
- › Expertise in modern Ethernet/IP, PROFIBUS, PROFINET and other communication protocols
- › Commercially available components
- › Multi-lingual HMI's and controls
- › Network solutions that reduce installation and maintenance costs
- › Complete detailed drawing package provided to customer
- › Various categories of compliance (ATEX, UL/CUL, CE and others)
- › Remote access for troubleshooting and monitoring
- › Call in or on-site technical support from our experts
- › FAT and SAT validations
- › Startup and commissioning
- › Functional control documentation



› PVC COMPOUNDING SYSTEM - COMPLETE SYSTEM AND CONTROLS DESIGNED BY COPERION K-TRON IN FULL COOPERATION WITH CUSTOMER TO ENSURE A CONSISTENT AND RELIABLE END PRODUCT.

## »» MOTOR STARTERS AND MOTOR CONTROL

Choose from our wide selection of standard motor starters and variable frequency drives (VFD) or let us design a custom motor control panel to meet your specific needs. When saving energy and extending equipment life are a priority, we offer a full line of soft starts and wye delta motor starters.



# Process System Control Examples. Transfer and Storage.

The processes used to convey material received and the data provided for those materials can require many forms of inventory management. As the in-plant process calls for materials the transfer of these materials can be completed in many ways.

## BULK MATERIAL RECEIVING

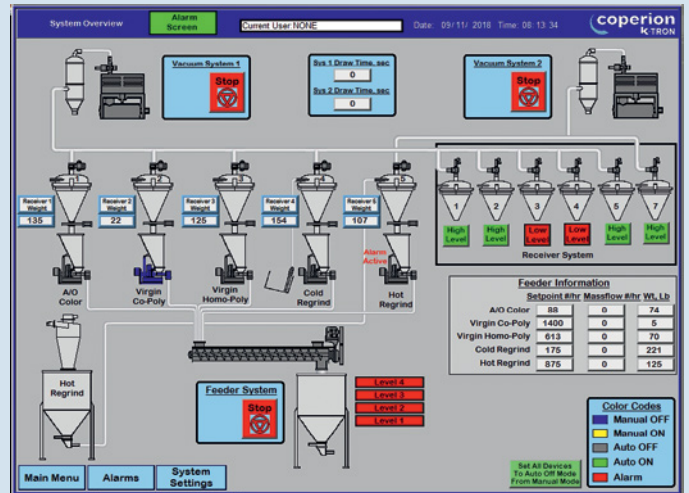
- > Railcar unloading
- > Truck unloading

## DATA FOR INVENTORY MANAGEMENT

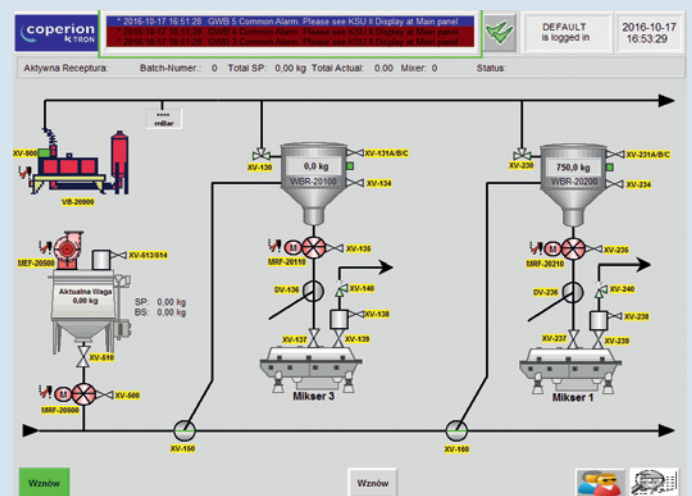
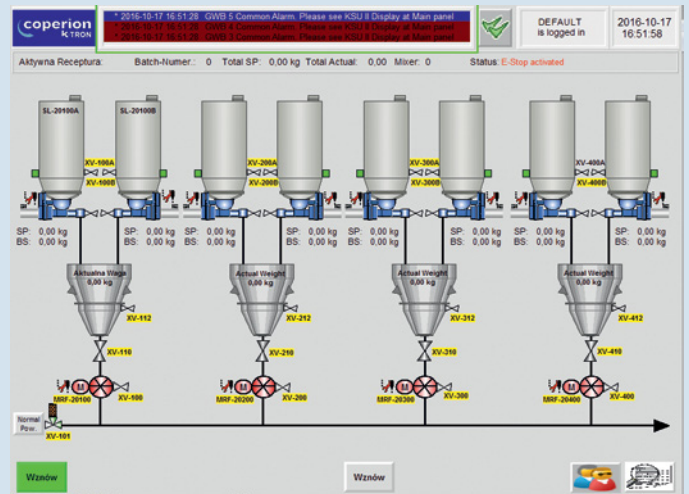
- > Transfer of materials into silos
- > Inventory tracking
- > Silo weight monitoring
- > Automated re-ordering from material supplier

## IN-PLANT MATERIAL TRANSFER

- > Vacuum sequencing systems
- > Dilute phase conveying (vacuum & pressure)
- > Dense phase conveying (vacuum, pressure vessel and high pressure rotary valve)
- > Bulk bag unloading systems
- > Silo unloading systems
- > FBIC unloading systems
- > Inline screener/sifter



> MULTIPLE IN-PLANT VACUUM SEQUENCING SYSTEMS IN A HIGH VOLUME VACUUM FORMING FACILITY



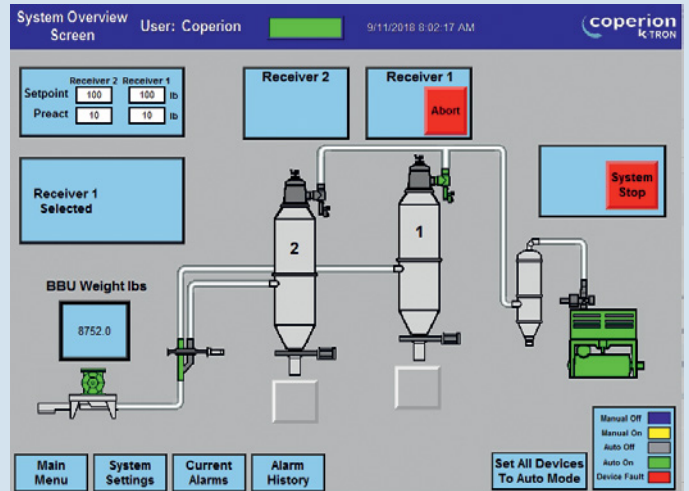
> MULTIPLE KCM GAIN-IN-WEIGHT BATCHING SYSTEMS AND VACUUM SEQUENCING SYSTEM TO FEED MULTIPLE MIXERS IN A PET FOOD FACILITY

# Process System Control Examples. Ingredient Handling.

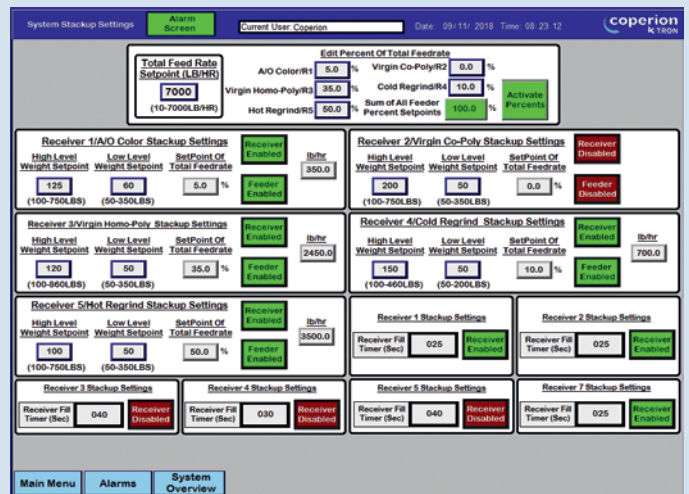
Ingredients can be dispensed into a system either by moving the material in a continuous manner or via a batch process that consists of a sequence of one or more steps performed in a defined order.

## CONTROL OF INGREDIENTS INTO PROCESS

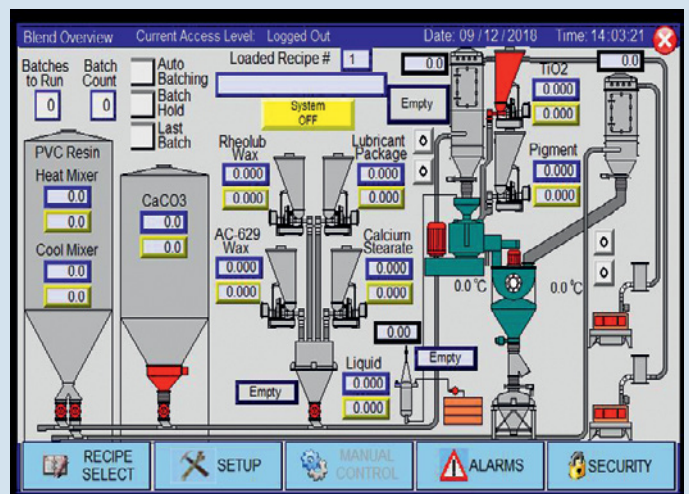
- Continuous systems
  - Loss-in-weight feeding
  - Weigh belt feeding
  - Smart flow metering
- Batching systems
  - Loss-in-weight feeding
  - Weigh belt feeding
  - Smart flow metering
  - Batch weigh receiver
  - Aeropass™ weigh hopper
  - Gain-in-weight batching
  - Drying and preheating of plastics prior to molding or extrusion
  - Blending of plastics prior to molding or extrusion
  - Integration with scale instruments



➤ BASIC LOSS-IN-WEIGHT BATCHING OF MINERAL PRODUCTS



➤ CONTROL OF INGREDIENTS INTO LOSS-IN-WEIGHT FEEDERS FOR A PLASTIC FILM EXTRUSION SYSTEM



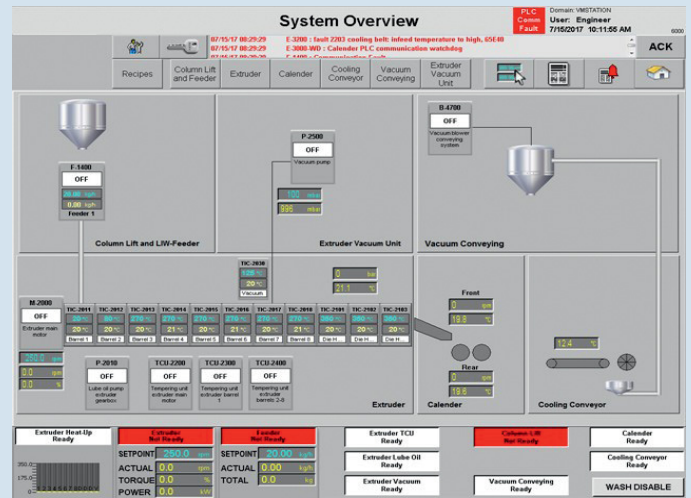
➤ BASIC LOSS-IN-WEIGHT BATCHING IN PVC COMPOUNDING

# Process System Control Examples. Conversion.

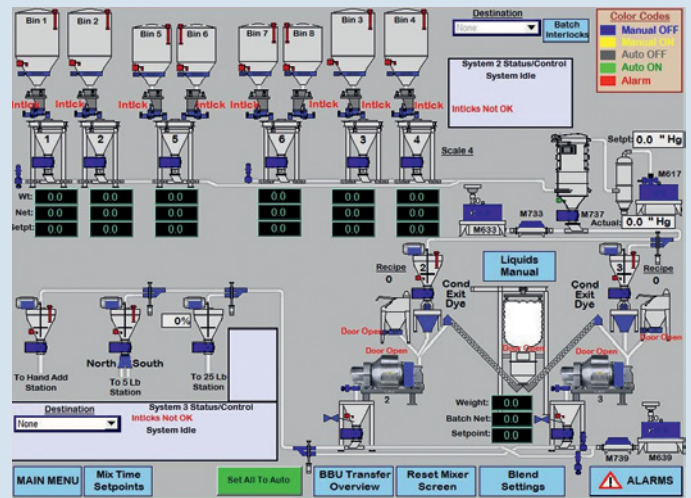
Our control system will support or provide supervisory management of the processes used to convert raw materials into finished products.

## CONVERSION STEP

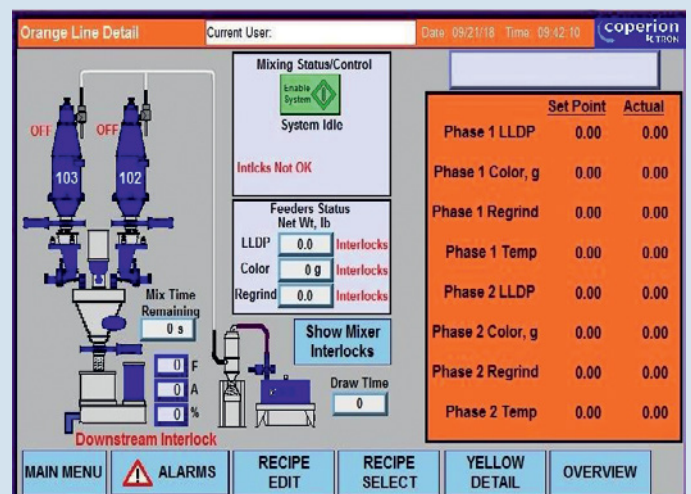
- Continuous process systems
  - Continuous mixing
  - Continuous compounding extrusion
    - Color monitoring/closed-loop control
  - Continuous extrusion of end products
    - Color monitoring/closed-loop control
    - Weight/length control
    - Thickness control
    - Gravimetric extrusion control
- Batching process systems
  - Batch mixing
  - Forming
  - High intensity and cooling mixers for PVC



➤ CONTINUOUS EXTRUSION OF END PRODUCTS IN A PHARMACEUTICAL APPLICATION



➤ BATCH MIXING IN A CHEMICAL PLANT



➤ BATCH MIXING COLORED POWDERS IN A PLASTIC FORMING FACILITY SHOWING CUSTOMIZED SCREEN PER CUSTOMER SPEC



# Process System Control Examples.

## Final Product.

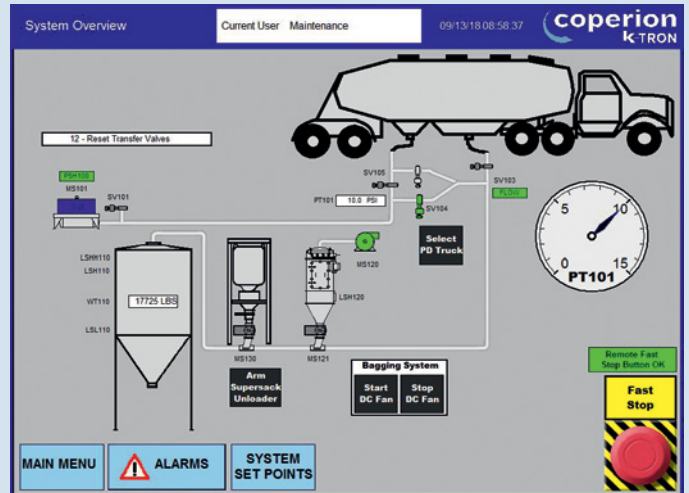
Our control system will support or provide supervisory management of the processes to change material properties using heat, pressure or chemical action as the final stage of producing the end product. When all processes are complete the material will be conveyed either to storage, packaging lines or shipped out by railcar or truck.

### CONDITIONING OF END PRODUCT

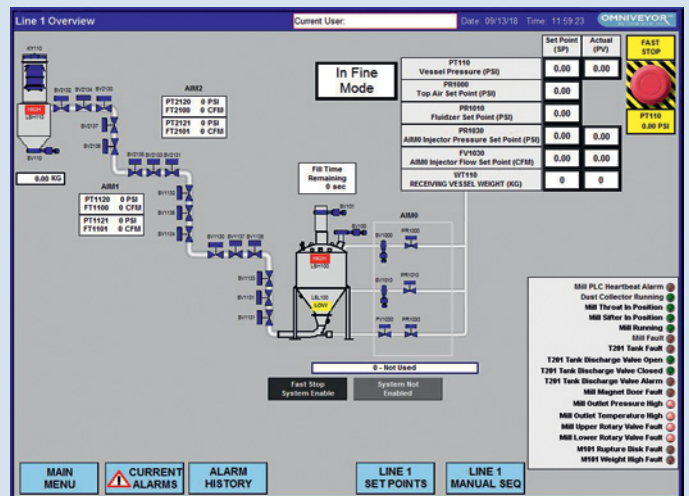
- › Pelletizing
- › Separation/screener
- › Drying
- › Coating
  - Feeding of ingredients
  - Measurement
  - Control of coating materials

### TRANSFER TO STORAGE/PACKAGING/SHIPMENT

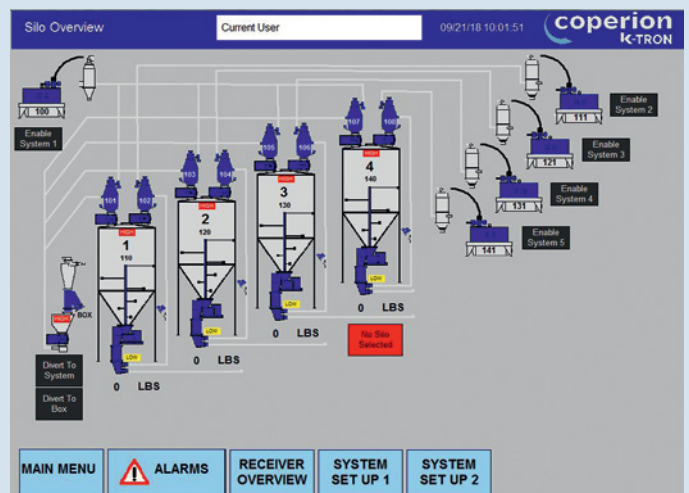
- › Vacuum sequencing systems
- › Dilute phase conveying
- › Dense phase conveying
- › Silo/inventory management
- › Silo blending
- › Railcar/truck/container loading



› AUTOMATED SYSTEM FOR UNLOADING AND PACKAGING OF ALUMINA PRODUCTS



› DENSE PHASE CONVEYING IN FOOD ADDITIVE PLANT



› CONTINUOUS SILO FILLING, BLENDING AND RECIRCULATION SYSTEM FOR A MATERIAL THAT INTERLOCKS AND COMPACTS EASILY

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We have a network of over 80 manufacturer representatives around the globe. Visit [www.coperion.com](http://www.coperion.com) for a location near you.