Out of Round Detection for CD, CIM & TIM

This TNB introduces our new Out of Round Detection Upgrade Kits for CD, CIM & TIM products, which can be retrofitted in the field.

Out of Round Detection Concept

- **Ultra Sonic Sensors**
  - 2 sensors stacked vertically used to detect deviations in container shape as they rotate
  - Photos below show a single sensor setup as proof of concept
  - Prototype for field trial would have two sensors for full coverage of label panel

- **Ultra Sonic Sensor**
  - Sensing Range (Programmable)
    - 1" – 10" away from sensor (1.5" on prototype)
    - Set based on desired sidewall coverage range
  - Acceptance Range (Programmable)
    - .125" on prototype
    - Can be set to whatever range is acceptable for OOR
    - Window edge accuracy = +/- .027"
  - Sonic Cone Angle
    - 10° @ 2.0 inches
  - Maximum Plane-Reflective Surface Angle
    - +/- 10°
Vertical Sidewall Coverage
- Sensors 4" from bottle surface provides a sonic cone of 2" in diameter
  - Acceptance window for OOR is a function of sonic cone size, distance of sensor from bottle, OOR Specification and 10° reflective window
- Typical A-B Budweiser bottle has a 4" label panel
- Two sensors stacked vertically provide 4" of sidewall coverage
  - Keep cone away from edges to prevent false rejects
- OOR defects tend to cover wide areas
  - OOR near bottom or top of label panel will tend to extend into coverage area – reducing the required sonic cone coverage area

Horizontal Sidewall Coverage
- Coverage window decreases due to curvature of reflective surface
- Due to +/- 10° max reflective angle, diameter of area reflected back to sensor = .396"
- Total coverage window
  - 2" high x .396" wide

Ultra Sonic Sensors
- Can be programmed to detect objects within a very tight window
  - Acceptance range is programmed into the sensor
  - Sensors can be pre-programmed from supplier or can be programmed individually with a “configurator”
- 600 Series sensors (Model SC650A-B00)
  - Very sensitive, especially for the range of detection we need
  - Temperature compensating
  - Two sensors can cover entire side panel of bottle
- Supplier is looking into getting sensors in different frequency ranges
  - Eliminate possibility of crosstalk when two sensors are used in close proximity to each other, such as in our application

Information/Process flow for OOR detection system
Product Mounting Configurations

- TIM Mounting Configuration
  - Flat pack sensors mounted on a plate
    - Space considerations on the TIM dictated we use flat packs versus cylinder shaped sensors
  - Two sensors stacked vertically to cover label panel on typical beer bottles
  - Sensors look between uprights of roller holders at side of bottle in the center check station

- Standard 16 MHz Check channel card is slightly modified and used for input to the Host
  - New printing on faceplate of channel card to prevent confusion with standard Check cards
    (Photo shows Prototype)
- Signals for up to 4 sensors are combined (OR-ed) for input into a single channel card
  - Sensor Combiner Box part of the standard OOR kit
CD/CIM Mounting Configuration
- Single barrel sensor looks at clamp wheel rod for movement during inspection window
  - Clamp wheel rod will only move out of range when the surface of bottle is OOR
  - Dual Clamp wheels are recommended for maximum coverage
- Dented Shoulder option same as with TIM
  - Barrel sensor mounts on check ring

Product Configurations - TIM

- Base kit for TIM - 26297A
  - Two flat pack sensors and cables
  - Signal combiner box
  - OOR channel card
  - Hardware
  - Positioning Block
- Base kit for TIM w/o Channel Card – 26297A1
- Additional Label Panel Sensor kit for TIM - 26330A
  - Flat pack sensor and cable
  - Hardware
- Dented Shoulder Sensor kit for TIM - 26331A
  - Cylinder style sensor and cable
  - Mounting bracket, housing and hardware
- Configurator – 13470P (Min. Qty of 1 per plant is recommended)
Product Configurations – CD/CIM

- Base kit for CD/CIM - 26335A
  - OOR Sensor for CD Carriage
  - Signal combiner box
  - OOR channel card
  - Hardware
  - Positioning Block
- Base kit for CD/CIM w/o Channel Card – 26335A1
- Dented Shoulder Sensor kit for CD/CIM - 26331A
  - Cylinder style sensor and cable
  - Mounting bracket, housing and hardware
- Configurator – 13470P (Min. Qty of 1 per plant is recommended)