Dual Energy HR Type

X-ray Inspection System
Spot fine contaminants with the sharpest eyes ever.

New Dual Energy Sensor That Breaks Through the Limits of Conventional Detection Performance

The standard dual energy model could not fully utilize its superiority of the dual energy inspection when it comes to thicker products or products with highly uneven surfaces. By introducing a new dual energy sensor, we have succeeded in making X-ray transmission images significantly sharper. It is now possible to clearly display the shadows of contaminants on these targets. In addition, the dedicated detection algorithms have improved the sensitivity to detect fine metals and small bones, which had been hard to detect.
Dual Energy Sensor Technology

1. Detecting even thin bones (contaminants) and low-density bones
2. High sensitivity detection of products with overlaps, and rough surfaces.
3. Reduce false rejects on bulk flow product lines.

Detection Algorithm

The raw signals obtained from the transmission image created by irradiating X-rays are significantly affected by each product, which cannot be used for evaluation. To cope with this, advanced image processing is applied to reduce product effect and noise from the transmission image, leaving only contaminant signals. The Anritsu X-ray inspection systems can perform several parts of image processing simultaneously at high speed according to the characteristics of the product and type of contaminant. This optimum combination of image processing is called a “detection algorithm,” which is one of the keys for achieving high-sensitivity and highly stable inspection.
Evolution with the New Dual Energy Sensor

The new sensor has enabled high-resolution images to be obtained and improved the detection performance of fine metals and small bones. The dual energy system also significantly reduces the effects of products with rough surfaces, detecting even low-density contaminants. Especially for meat applications thicker than 40 mm, there is a noticeable difference compared to the conventional dual energy model.

Dedicated Detection Algorithm

The detection algorithms are tuned and optimized for high-resolution images obtained from the new sensor. Each algorithm has been developed and installed for different characteristics of product and target contaminants, which results in improved detection sensitivity and reduced false rejections.

The 0.2 mm metal test piece was prepared in-house for performance evaluation purpose (not for sale).
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<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Standard model</th>
<th>HR model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum disk (1.0 mm, 1.2 mm, 1.5 mm thick)</td>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
</tr>
<tr>
<td>Chicken bone (approx. 1 to 2 mm thick)</td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
</tr>
<tr>
<td>Aluminum disk (1.0 mm, 1.2 mm, 1.5 mm thick)</td>
<td><img src="image5" alt="Image" /></td>
<td><img src="image6" alt="Image" /></td>
</tr>
<tr>
<td>Pork bone (approx. 1 to 2.5 mm thick)</td>
<td><img src="image7" alt="Image" /></td>
<td><img src="image8" alt="Image" /></td>
</tr>
<tr>
<td>SUS sphere</td>
<td><img src="image9" alt="Image" /></td>
<td><img src="image10" alt="Image" /></td>
</tr>
<tr>
<td>Chicken bone (approx. 1 to 2 mm thick)</td>
<td><img src="image11" alt="Image" /></td>
<td><img src="image12" alt="Image" /></td>
</tr>
<tr>
<td>SUS sphere</td>
<td><img src="image13" alt="Image" /></td>
<td><img src="image14" alt="Image" /></td>
</tr>
<tr>
<td>Pork bone (approx. 1 to 2.5 mm thick)</td>
<td><img src="image15" alt="Image" /></td>
<td><img src="image16" alt="Image" /></td>
</tr>
<tr>
<td>SUS sphere, SUS wire (L = 5 mm), Ceramics sphere</td>
<td><img src="image17" alt="Image" /></td>
<td><img src="image18" alt="Image" /></td>
</tr>
<tr>
<td>Rubber sphere, Quartz glass sphere, SUS wire (L = 2 mm)</td>
<td><img src="image19" alt="Image" /></td>
<td><img src="image20" alt="Image" /></td>
</tr>
</tbody>
</table>

The 0.2 mm metal test piece was prepared in-house for performance evaluation purpose (not for sale).

*Standard model: KXE7534AWHE
Anritsu believes customer safety is of utmost importance.

**Anritsu safety mechanism**

- **Emergency stop switch**
  Cuts power to x-ray and drive circuits, stops the conveyor and x-ray radiation.

- **X-ray ON/OFF key**
  Turning the key to OFF stops x-ray radiation completely.

- **X-ray shield cover open/close sensor**
  Opening the cover stops x-ray radiation.

- **X-ray shield cover**
  Opened/Closed using x-ray Irradiation ON/OFF Key. Opening the cover stops x-ray radiation due to the x-ray Shield Cover Open/Close Sensor.

- **X-ray irradiation display**
  The lamp is lit during x-ray radiation.

- **Leakage prevention curtain**
  Prevents x-ray leakage. For unpackaged or bulk products, the standard lead impregnated curtains are replaced with SUS covers - preventing direct food contact with the curtains.

- **Hand insertion sensor**
  Interrupting the sensor for a certain period of time stops x-ray radiation.

**Safety management**

X-ray inspection system has been designed to fully satisfy the safe operation. However, to ensure even higher safety, use the safety procedures outlined below.

1. **Periodic measurement and recording of x-ray leakage data**
   Covers may need to be mounted on upstream and downstream conveyors instead of the shield curtains, depending on the shape, weight, and package of products.

2. **Management of operator working hours**
   NEVER modify or disassemble the main unit, covers, x-ray leakage prevention curtains, safety covers, safety interlocks, etc., otherwise the x-ray leak-proof design may no longer be functional.

**Safety of inspected products**

WHO concluded in 1980 that the “irradiation of any food commodity up to an overall average dose of 10 kGy presents no toxicological hazard and introduces no special nutritional or microbiological problems.” The maximum dose of x-ray irradiation to the products to be inspected by our x-ray inspection systems is 0.002 Gy, which is much lower than the value described above. Even if a product stops inside, the x-ray dose is always kept to 0.1 Gy or less.

Note: Follow the local laws and regulations regarding the installation and use of the x-ray inspection systems.
Major specifications

For Packaged Products

*For unpackaged products (optional), please contact our sales representative for details.

External Dimensions

KXH7534ASGCD

Detection area

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>KXH7534ASGCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray output</td>
<td>Tube voltage 30 to 80 kV, Tube current 0.4 to 10.0 mA, Maximum output 300 W</td>
</tr>
<tr>
<td>Safety</td>
<td>X-ray leakage maximum 1.0 μSv/h or less, prevention of x-ray leakage by safety devices</td>
</tr>
<tr>
<td>Display</td>
<td>15-inch color TFT LCD</td>
</tr>
<tr>
<td>Operation method</td>
<td>Touch panel (with touch buzzer)</td>
</tr>
<tr>
<td>Detection area 1, 2</td>
<td>Maximum width 370 mm, Maximum height 220 mm</td>
</tr>
<tr>
<td>Belt width</td>
<td>420 mm</td>
</tr>
<tr>
<td>Preset memory</td>
<td>200</td>
</tr>
<tr>
<td>Belt speed 1, Maximum product weight 1</td>
<td>10 to 45 m/min, maximum 5 kg</td>
</tr>
<tr>
<td>Power requirements 2</td>
<td>200 Vac to 240 Vac, Single phase, 47 Hz to 63 Hz, 1800 VA or less</td>
</tr>
<tr>
<td>Mass</td>
<td>350 kg</td>
</tr>
<tr>
<td>Environmental conditions</td>
<td>Temperature: 0°C to 35°C, Relative humidity: 30% to 85%, non-condensing</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP66 (air conditioner: IP54)</td>
</tr>
<tr>
<td>Exterior</td>
<td>Stainless steel (SUS304)</td>
</tr>
</tbody>
</table>

1: The product size should fall below the detection area.
2: The entrance and exit may require covers depending on the length of a product.
3: Variable depending on Product No.
4: Sum total of product weight on the conveyor.
5: Allowable power fluctuation range is ±10%.
Specifications are subject to change without notice.

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Some products shown in this catalog may not be available in your country or region. Contact our sales representatives for details.

To ensure proper operation, read the Operation Manual before using the machine.

In addition to daily inspection, a full maintenance inspection should be completed annually.

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