X-ray Inspection System
Compact, easy to operate and extremely safe
Assuring safe and secure production lines

High detection sensitivity

Stainless steel wire of 0.28 mm diameter as well as non-metallic contaminants can be detected.

Our advanced sensor technology and unique image processing technology enable extremely small contaminants such as ferrous (Fe), stainless steel (SUS) and others to be detected.

- Ferrous and stainless steel sphere of 0.3 mm diameter are detected.
- Non-metallic contaminants such as bone, shell, stone, glass, rubber, and plastic are detected.
- Stainless steel wire of 0.28 mm diameter is detected.

Masking function

Parts that should not be detected such as metal clips for wrapping or containers are automatically masked, which assures more sensitive detection of contaminants.

Clip check function

Wrapped products sealed with metal clips at both ends (sausage, processed cheese, etc.) can be checked for missing clips simultaneously with contaminant detection.

Missing product detecting function

Missing product can be checked simultaneously with the detection of contaminants in food products, thus greatly improving quality control efficiency.

Multi-line Inspection Function

One X-ray Inspection System can inspect products on two lines if the products are identical. This is useful for saving space (requires optional photocell and product guides).

Comparison between sensitivity of X-ray inspection system and metal detector (In-house comparison)

<table>
<thead>
<tr>
<th>Contaminants only</th>
<th>X-ray Inspection System</th>
<th>Metal Detector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe Sphere 0.3 mm dia.</td>
<td>0.4 mm dia.</td>
<td></td>
</tr>
<tr>
<td>SUS Sphere 0.3 mm dia.</td>
<td>0.7 mm dia.</td>
<td></td>
</tr>
<tr>
<td>Sausage Fe Sphere 0.6 mm dia. 1.0 mm dia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUS Sphere 0.6 mm dia. 2.0 mm dia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUS Wire 0.28 mm dia. x 2-mm long 2.0 mm dia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone chip 1.0 to 2.0-mm thickness Undetectable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Actual detection sensitivity depends on the physical properties of the checked products (such as content and shape).

Principle of detection of contaminants by X-ray

X-rays are radiated from X-ray tube at food and chemical products carried in on the conveyor, and the degree of penetration of the X-rays is measured by a linear array detector placed under the conveyor. Using our exclusive image processing technology, highly sensitive analysis of the measured signal is carried out to detect contaminants included.

![Diagram]
Clear, large 15" LCD screen

Highly improved operability

- Easy-to-operate LCD touch panel
- Enhanced operability with integrated operation screen and X-ray image monitoring screen
- Operation screens for various requirements (Statistics Display Screen, Limit Change Screen, X-ray Image Monitoring Screen)
- Captured-image zoom function

- Color-coded limit settings as well as waveform display of processed image
- Saves up to 100 operating images (option)
- Auto-setting of optimum product limits
- Online screen Help function shows usage
- Troubleshooting functions

HACCP Compliant

Made of clean and hygienic stainless steel for easy cleaning and maintenance

- Highly reliable direct conveyor drive
- The conveyor part is washed down for cleaning (IP66 compatible).
- Front cover, belt and rollers are easily attached or detached.
- Removable shield curtain (option)
### Safety design

**Priority is given to prevention of X-ray leakage.**

**Operator safety is of utmost importance.**

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**Exclusive ANRITSU safety mechanism**

- **Emergency stop switch**
- **X-ray irradiation ON/OFF key**
  - Turning the key to OFF stops X-ray irradiation completely.
- **X-ray shield cover**
  - Can be opened or closed only when irradiation is completely stopped.
- **X-ray irradiation display**
  - The lamp is lit while X-rays are being irradiated.
- **Monitoring sensor for hand insertion**
  - When the sensor is interrupted for a certain period of time, X-ray irradiation is stopped.
- **Leakage prevention curtain**
  - Prevents X-ray leakage.
- **X-ray shield cover open/close sensor**
  - This sensor detects opening and closing of the X-ray shield cover.

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**Safety of X-rays and regulatory constraints**

1. **Safety of checked products**
   - WHO concluded in 1980 that "food products irradiated with 10 kGy or lower level of X-rays present no problem in terms of toxic level, nutritional value, and microbiological aspects".
   - The maximum X-ray irradiation level by our X-ray inspection system to the checked product is 0.001 Gy or less, which is much lower than the value designated by WHO standard.
   - If the product being checked happens to stop moving during X-ray irradiation, X-ray irradiation is stopped to keep the irradiation level to 0.1 Gy or below.

2. **Safety for humans**
   - We are always exposed to radiation: In the natural world, we receive irradiation of 1100 μSv a year on average, and in the case of a chest X-ray, 300 μSv in just one time. (the unit μSv [micro Sievert] indicates the radiation level of X-rays)
   - The X-ray leakage level of our X-ray inspection system is 1 μSv/h or lower (1.3 μSv/3 months or lower)
   - Note: 3 months = 13 weeks (52 weeks is one year)
     
     1 μSv/h x 16 hours x 6 days x 13 weeks = 1.25 μSv/3 months

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**Safety management**

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

1. **Periodical measurement and record storage of X-ray leakage dose of X-ray Inspection System.**
2. **Manage and record the working hours of X-ray Inspection System operators.**
3. **X-ray Safety Measures**
   - Depending on the product shape, weight and packaging, it may be necessary to fit X-ray leakage prevention covers to the upstream and downstream conveyors, instead of using X-ray leak prevention curtains.
4. **Never disassemble or modify the X-ray Inspection System or the upstream and downstream equipment.**
   - NEVER modify or disassemble the main unit, covers, X-ray leak prevention curtains, safety covers, safety interlocks, etc., otherwise the X-ray leak-proof design may no longer be satisfied.
Stainless steel wire of 0.28 mm diameter x 2-mm long can be detected. Contaminants in single packages and contaminants in tall products up to 120-mm pass height can be detected at high sensitivity.

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>KD7305AW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection sensitivity</td>
<td>Fe sphere and SUS sphere 0.3 mm dia., SUS wire 0.28 mm dia. x 2 mm long</td>
</tr>
<tr>
<td>X-ray output</td>
<td>Max. 60 kV, 210 W (variable voltage and current)</td>
</tr>
<tr>
<td>Safety</td>
<td>X-ray leakage dose: Max. 1 µSv/h or less, Prevention of X-ray leakage by safety device</td>
</tr>
<tr>
<td>Display</td>
<td>15-inch Color TFT LCD (unified image monitoring screen and operation screen)</td>
</tr>
<tr>
<td>Operation method</td>
<td>Touch panel</td>
</tr>
<tr>
<td>Product size</td>
<td>Max.width: 240 mm, Max. height: 120 mm</td>
</tr>
<tr>
<td>Belt width</td>
<td>270 mm</td>
</tr>
<tr>
<td>Masking function</td>
<td>Equipped as standard</td>
</tr>
<tr>
<td>Missing product detection function</td>
<td>Equipped as standard</td>
</tr>
<tr>
<td>Clip check function</td>
<td>Equipped as standard</td>
</tr>
<tr>
<td>Preset memory</td>
<td>Max. 100 products</td>
</tr>
<tr>
<td>Belt speed</td>
<td>5 to 90 m/min (variable speed depending on Product No.)</td>
</tr>
<tr>
<td>Max. product weight</td>
<td>5 kg (2 kg when belt speed exceeds 60 m/min), [Option: 10 kg at 5 to 40 m/min]</td>
</tr>
<tr>
<td>Power requirements</td>
<td>200 to 240 Vac ±10%, single phase, 50/60 Hz, 1 kVA, rush current 80 A (typ.) (5 ms or less)</td>
</tr>
<tr>
<td>Mass</td>
<td>230 kg</td>
</tr>
<tr>
<td>Environmental conditions</td>
<td>Temperature 0° to 35°C, 0° to 40°C (with optional air conditioner), relative humidity 30% to 85%, no condensation</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP66 Compliance (for conveyor), IP42 Compliance (for other parts), one-touch removal belt</td>
</tr>
<tr>
<td>Casing material</td>
<td>Stainless steel (SUS304)</td>
</tr>
</tbody>
</table>

Note 1: Actual sensitivity depends on the physical properties of checked products (contents and shape) and on the environmental conditions.
Note 2: The inlet and outlet may require covers, depending on the length and weight of checked products.
Note 3: Sum total of checked product weight on the conveyor.
Contaminants in large and wide products and products in bulk can be detected.

**External Dimensions**

**Model**: KD7316AW

**Detection sensitivity**¹
- Fe sphere and SUS sphere 0.4 mm dia., SUS wire 0.28 mm dia. x 2 mm long

**X-ray output**
- Max. 60 kV, 210 W (variable voltage and current)

**Safety**
- X-ray leakage dose: Max. 1 µSv/h or less, Prevention of X-ray leakage by safety device

**Display**
- 15-inch Color TFT LCD (unified image monitoring screen and operation screen)

**Operation method**
- Touch panel

**Product size**¹
- Max. width: 390 mm, Max. height: 150 mm

**Belt width**
- 420 mm

**Masking function**
- Equipped as standard

**Missing product detection function**
- Equipped as standard

**Clip check function**
- Equipped as standard

**Preset memory**
- Max. 100 products

**Belt speed**
- 5 to 60 m/min (variable speed depending on Product No.)

**Max. product weight**¹
- 5 kg [Option: 10 kg at 5 to 30 m/min]

**Power requirements**
- 200 to 240 Vac ±10%, single phase, 50/60 Hz, 1 kVA, rush current 80 A (typ.) (5 ms or less)

**Mass**
- 290 kg

**Environmental conditions**
- Temperature 0° to 35°C (0° to 40°C with optional air conditioner), relative humidity 30% to 85%, no condensation

**Protection class**
- IP66 Compliance (for conveyor), IP42 Compliance (for other parts), one-touch removal belt

**Casing material**
- Stainless steel (SUS304)

**Note 1**: Actual sensitivity depends on the physical properties of checked products (contents and shape) and on the environmental conditions.

**Note 2**: The inlet and outlet may require covers, depending on the length and weight of checked products.

**Note 3**: Sum total of checked product weight on the conveyor.
Applied X-ray inspection systems for various products

**KD7305ABW/ KD7316ABW for bulk products**

The KD7305ABW/ KD7316ABW are used to detect contaminants in unpackaged bulk products, such as meat, fish, etc., when X-ray leakage prevention curtains cannot be used.

**Features:**
1. Short length (1570 mm)
2. Less than 1 µSv/h X-ray leakage (without X-ray leakage prevention curtains)
3. IP66-compliant conveyor
4. 50-mm detection height and 240-mm detection width (KD7305ABW)
   For wide products, use the KD7316ABW (390-mm detection width).

Note: Optional work tray

**KD7305ACW/ KD7316ACW for lightweight and small packages**

The KD7305ACW/ KD7316ACW are used to detect contaminants in lightweight and small packaged products that can be caught easily in X-ray leakage prevention curtains.

**Features:**
1. Short length (1340 mm)
2. Less than 1 µSv/h X-ray leakage (without X-ray leakage prevention curtains)
3. IP66-compliant conveyor
4. 50-mm detection height and 240-mm detection width (KD7305ACW)
   For wide products, use the KD7316ACW (390-mm detection width).

Note: Optional tower light

**For products packed in cup**

This example is used to detect contaminants in tall products, such as pot noodles, etc., that are easily toppled over by the X-ray leakage prevention curtains.

**Features:**
1. IP66-compliant conveyor
2. 120-mm detection height and 240-mm detection width
Rejectors

- Flipper type
  - KW4103AW
  - KW4104AW

- Air Jet type
  - KW4822BW

- Dropout type
  - KW4672DW
  - KW4673DW

Option

KW2002AW Printer

- KD7305AW-85 Data storage unit
  - Compact flash memory

Printing Example

History printing

Individual printing

• In addition to daily inspection, an annual maintenance check should be carried out.

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