INTRODUCTION

• ANRITSU INDUSTRIAL SOLUTIONS USA
At Anritsu Industrial Solutions USA it is our goal to be your preferred partner for the latest and best safety and security solutions through offering both precision quality inspection products based on our leading-edge ‘mechatronics’ technologies and responsive flexible service that meets your latest R&D and production needs.

• ANRITSU INDUSTRIAL SOLUTIONS GLOBAL
The largest worldwide manufacturer of inspection systems for the food industry, Anritsu Industrial Solutions Global specializes in high-speed, small format x-ray inspections systems for rejecting contaminated products, checkweighing solutions for detection of under fill and over fill situations and the only metal detector technology with simultaneous dual frequency operation for maximizing the detection of all metal contaminants.
EXPERIENCE

Anritsu Industrial Solutions has over 25 years of metal detection and checkweighing experience. Our focus is to provide reliable, easy to use and ACCURATE food safety solutions.

Our designs are easy to clean, operate and set up for may products as flexibility is built into each model.
ANRITSU INDUSTRIAL SOLUTIONS

OPERATING YOUR METAL DETECTION SYSTEM EFFICIENTLY, ACCURATELY AND EFFECTIVELY
To help you use Anritsu’s Metal Detectors correctly.

We'll answer your questions.
4 Reasons to use a Metal Detector

**What is a Metal Detector?**

**Product Quality Control**
- Social responsibility—Ensuring consumer safety by preventing contaminated food reaching customers
- Product confidence—Maintaining brand reliability image

**Supporting Product Liability Law**
- Those laws and regulations guard public health and safety by compelling manufacturers to accept responsibility for the safety of their manufactured products.

**Uses and Applications**

**A metal detector has an important role in the following applications.**

**Production Process Control**
- Rejecting contaminated products as early as possible ensures high production efficiency.
- Metal detection guards against damage to production machinery caused by contaminants.

**HACCP Compatibility**
- This standard sets the rules for inspecting foodstuffs at every stage from production of raw materials until the final products reach consumers to ensure that they are safe, healthy and of sufficiently good quality.

Yes—a good partner in ensuring product quality!
Applications – Contaminant Detection

Uses and Applications

Metal detectors play an essential role in contaminant detection in a huge number of fields.

- in food processing lines
- in pharmaceutical manufacturing
- in cosmetics manufacturing
- in garment production lines
Applications – Missing Items

Uses and Applications

The special features of metal detectors make them useful in other applications too.

- Detecting missing soup packet, etc., in instant noodles
  Checking aluminum-foil seals on snacks
  Missing components of packaged foods such as foil-packed liquid soup stock or seasonings in instant noodles can be checked. The presence of important metal seals such as clips on sausages can be confirmed.

- Detecting missing caps and documentation in pharmaceutical products
  The presence of a metal cap or seal and important documentation printed with magnetic ink can be checked.

- Detecting presence of packed antioxidants
  The presence of metallic antioxidant packs in pre-packaged foods can be checked.
The Basic Design

Names of Parts

- Photocell (Photosensor) 
- Indicator
- Conveyor belt
- Detection head
- Rejection
- NG Products box

*1 Recognizes presence of product
*2 Rejects metal contaminated products
*3 Flashes when metal-contaminated product detected

<Example of KD80XX Series Operation Panel>

- NG Detection display
- LCD panel
- Key to change product
- Menu key
- Exit key
- Cursor/Page switch keys

Detection level display
Conveyor operation display
Conveyor Run key
Conveyor Stop key
Operation check key
Return key

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Document No. ABD-5DKD81XXS020-00
The Basic Principle

Principle of Metal Detection

Normal condition

- Send coil
- Direction of metal passage
- Magnetic field
- Receive coil

When Fe (magnetic metal) passed through detector

- Send coil
- Fe magnetized and magnetic field deflected by Fe
- Direction of metal passage
- Magnetic field
- Receive coil

When non-magnetic metal passed through detector

- Send coil
- Eddy current generated and dissipated as heat energy
- Direction of metal passage
- Magnetic field
- Receive coil
The Basic Design

Construction of Detector Head

Coaxial type

Opposing type

Permanent magnet type

Relationship between Coil and Magnetic Field

1. Coaxial type

2. Opposing type

3. Permanent magnet type

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Detection Indication

Contaminant Detection

Detection display

Detection level display

- GREEN LED
- YELLOW LED
- RED LED

Setting start

Evaluation level

Nth time

Detection signal level

Setting end

Automatically sets the setting end level as the evaluation level

Operation start

Evaluates as motal-contaminated product when the level exceeds the evaluation level

Product feeding

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5 Keys to Success with a Metal Detector

Five Basics of Quality Control

1. **Manage correctly**
   Do not allow inappropriate items to be placed on or near the metal detector.

2. **Install correctly**
   Install the metal detector and rejector correctly so the upstream and downstream conveyors are not touching them.

3. **Clean thoroughly**
   To prevent lowered detection sensitivity, clean the conveyor belt and detection head thoroughly each day. Adjust the belt regularly so that there is no mistracking or fraying.

4. **Maintain sanitary conditions**
   Manage products to prevent mixing of contaminated and uncontaminated products:
   - Lock the NG products box so that the contaminated products cannot be taken easily.
   - Use a NG products box with sufficient capacity.

5. **Use good security**
Management – Defining Accuracy of the Product

Detection Sensitivity

Reference Sensitivity for Each Product

It is important to set the sensitivity for each product!

HACCP Requirements
(administration principles)
- Administration level for products
- Registration (equipment list, designated administrator, inspection registration, fault history)
- Complete training plan
- Testpiece management

- The sensitivity of the testpiece described in the catalog (highest detection sensitivity) is different from the sensitivity at actual product detection (actual sensitivity).
  The testpiece sensitivity given in the catalog is the sensitivity when only the testpiece is passed through the metal detector.

- The sensitivity is adjusted at the Auto-setting screen just by passing the product through the metal detector several times. After attaching the testpiece to the product, check the sensitivity.
- The sensitivity should be adjusted according to the actual conditions (product temperature, ambient temperature, installation location) on the production line.
- Be sure to remove any metal rings, jewelry, wristwatches, etc.

Have you determined the reference sensitivity for each product?

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Management – Checking Accuracy of the System

First

Daily inspection is very important.

Securing guaranteed detection sensitivity and accurate rejection!

Check the operation at the start of the work day, when changing products and at regular periods.

1. Checking sensitivity
   Sensitivity varies with the product temperature*1 and materials, and the ambient temperature.

2. Checking rejector operation
   Check that contaminated products are rejected correctly by the rejector.
Check under the most difficult detection conditions.

- Attach the most difficult to detect metal contaminant to a test product and check the rejection. (Usually, check the rejection operation by using the Fe or SUS testpiece.)

- Attach the testpiece to the most difficult to detect position of the product and check the rejection. (The head center is the most difficult to detect position.)

- Sometimes a metal contaminant cannot be detected depending on the shape and orientation of the contaminant. (Remember that not all metals can be detected!)

*See page 14 for a description of detection sensitivity and easy- and difficult-to-detect items.
Understanding the Technology – Metal Principles

Easy- and Difficult-to-Detect Metal Contaminants

- Non-magnetic metals like stainless steel (SUS) with a high intrinsic resistance are difficult to detect.

Detection Sensitivity of Different Metals

- Magnetic Metals: Steel, Nickel, etc.
- Non-magnetic Metals: Silver, Copper, Gold, Aluminum, Brass, Zinc, Tin, Lead, Stainless steel

Intrinsic resistance ↓ Detectability ↑

Change in Detection Sensitivity with Position at Passage through Head

Needle-shaped and cylindrical contaminants can have different detection sensitivities depending on the flow orientation.

- Needle shape
- Cylindrical

Graph:

G H J
D E F
A B C

* Side View of Coaxial Type Detection Head

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Understanding the Technology – Metal Principles

Remarks Differences between Magnetic and Non-magnetic Metals

Simple detection principles

Shape of non-magnetic materials and detection sensitivity

An eddy current is generated in the large circle at a right angle to the magnetic flux, making it easy to detect.

Detection Sensitivity Characteristics of Magnetic and Non-magnetic Metals

Magnetic Metals
1. Proportional to volume
2. High sensitivity magnetic directivity
3. Sensitivity to fine powder similar to large lumps
4. Unaffected by send frequency
5. Inversely proportional to square of distance between send and receive coils

Non-magnetic Metals
1. Inversely proportional to intrinsic resistance of metal
2. Proportional to maximum radius (area) at right angle to magnetic flux
3. Sensitive only to largest particles of fine powder
4. Proportional to square of send coil frequency
5. Inversely proportional to square of distance between send and receive coils

Intrinsic Resistance of Non-magnetic Metals and Detection Sensitivity

<table>
<thead>
<tr>
<th>Material</th>
<th>μΩ·cm</th>
<th>Detection Sensitivity</th>
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<tbody>
<tr>
<td>Silver</td>
<td>1.62</td>
<td>High</td>
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<tr>
<td>Copper</td>
<td>1.72</td>
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<tr>
<td>Gold</td>
<td>2.4</td>
<td>High</td>
</tr>
<tr>
<td>Aluminum</td>
<td>2.75</td>
<td>High</td>
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<tr>
<td>Brass</td>
<td>5~7</td>
<td>High</td>
</tr>
<tr>
<td>Zinc</td>
<td>6.1</td>
<td>High</td>
</tr>
<tr>
<td>Tin</td>
<td>11.4</td>
<td>High</td>
</tr>
<tr>
<td>Lead</td>
<td>21</td>
<td>Low</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>55~</td>
<td>Low</td>
</tr>
</tbody>
</table>

*1 Needle-shaped contaminants in stainless steel, etc., have a small eddy current and are difficult to detect.
Understanding the Technology

How to Improve Sensitivity

These few small points can help improve detection sensitivity.

- The detection sensitivity is improved by adjusting the conveyor height so that wet products with a large effect, such as miso and pickles, pass through the center of the detection head opening.

- Detecting small contaminants in products with a small effect

*Effect of feeding orientation*

Coaxial type

Improve the sensitivity by adjusting the conveyor height.

Slightly oblique is best.

Large effect

Medium effect

Small effect
Understanding the Technology – Installation Conditions

Effective Operation Methods

Improving Production Line Efficiency

Setting Up Line with Even Higher Sensitivity Detection

Choice of Two Types to Match Application

1. Dry Products, Wet Products and Aluminum Evaporated Packages
   - Dry products like noodles, candies, and clothing
   - Wet products like meat, pickles, pastes, and fish
   - Aluminum-evaporated package products like frozen foods and snacks

2. Aluminum-foil package product
   - Aluminum-packaged Retort foods and desserts

   - The metal detector passline height must match the product height.

Contaminants become more difficult to detect if the detector size is mismatched.

- High-sensitivity detection
- Install downstream of freezer
- Install upstream of aluminum packager

- Unsuitable for high-sensitivity detection
- For checking contamination with foreign materials from machinery, such as nuts, bolts, etc.
- For checking metal contamination by can;on itself.

*1 The metal detector is best positioned at the last stage before delivery of the product to the consumer.
Understanding the Technology – Installation Conditions

Installation Conditions and Operation Errors

To assure correct operation:

- Recheck the installation environment.
- Check that there is no rusting on the belt surfaces.
- Check that the product spacing, orientation and location are constant.
- Check that there are no sudden changes in product and room temperature.
- Check that there are no changes in the components of each production lot.

Causes of Operation Errors

Changes in detection sensitivity with product components

- Changes in the product water and salt content, weight and thickness change the detection sensitivity.

- Small contaminants can be detected more easily in products with low water and salt content.

- Small contaminants can be detected more easily in products at low temperature. However, surface and internal water have an effect.

Effect of temperature

- Hot products
- Frozen products
- Unfrozen products
- Room temperature products

Product effect

Large

Small

No rust on conveyor belt

No overlapping products that hit detection head
Understanding the Technology – Installation Conditions

Installation Conditions and Usage

Note the following to prevent operation errors:

- Do not install metal detectors near a vibration source.
- Do not share the power outlet with another machine and do not use power strips, etc.
- Do not supply the power via a power cord wound on a drum.
- Check that the feet locknuts are tight to prevent vibration.
- Leave 2 to 5 meters between adjacent metal detectors to prevent electromagnetic interference. If this is not possible, consult Anritsu Industrial Solutions.

- Oversensitive
  - Touching upstream or downstream conveyors or NG product box

- Noise in power line (voltage fluctuation or momentary power loss)
  - Electronic equipment close to detection head. Do not put electronic equipment on metal detectors.
  - EMI radiated by nearby equipment (especially inverters) or conducted through power line

- Effect of nearby moving metal machinery (rollers and packers)
**FAQs**

**Q1.** How can we best determine the basic sensitivity?

**A1.**
- Check the sensitivity by detecting an Fe and SUS testpiece attached to the product. When the product effect is large, it is necessary to measure the basic sensitivity that takes the product temperature and shape randomness into consideration as well as low basic sensitivity.
- Register the basic sensitivity as shown in the Basic Sensitivity Management Table at the end of this booklet (page 29).

**Q2.** Can you explain the classification of wet and dry products?

**A2.**
- There is no clear division point but water content is a practical method.
- Dry products are items like snacks, foods, candies, wheat flour, and completely frozen items.
- Wet products are items like vegetables, ham, sausage, pickles, and raw meats.

**Q3.** How can we best avoid operation errors caused by floor vibration?

**A3.**
- It is best to install metal detectors in locations with no floor vibration but if this is not possible, use the metal detector with lower basic sensitivity.

**Q4.** How can we prevent mis-detection of metal contaminants?

**A4.**
- You can reduce the misdetection rate by managing the basic sensitivity for each product and by performing careful operation checks at the daily inspection.
**FAQs**

**Q5.** At shipping inspection we get OK but then at acceptance inspection we get NG!
**A5.**
- The basic reason is the difference in detection sensitivity with a larger detection head. The shipper often performs inspection with a large detection head while the buyer splits the delivered product into smaller parts and inspects with a smaller detection head. It is very important to use a metal detector with the smallest possible entrance (opening) matching the size of the product.

**Q6.** We want to be able to detect lead shot, bullets, and hypodermic needles in lumps of meat!
**A6.**
- A block of meat is very wide and thick and detection may not be possible even with a large detection head. In this case, to detect small metal contaminants, it would be best to cut the meat into smaller pieces and then perform detection with a smaller head.

**Q7.** We want to be able to detect pieces of metal brushes and metal mesh!
**A7.**
- It can be very difficult to detect needle-like metal contaminants from metal brushes and metal mesh. Even if the pieces are long, if they are very small diameter, they may not be detected (see page 14).
FAQs

Q8. Why does detection sensitivity change with temperature in frozen products?
A8. Compared to a perfectly frozen product, the effect of water and salt content on detection sensitivity is larger in thawing or defrosted products, so the detection sensitivity is lower.

Q9. Can you detect burned and rusted metals?
A9. Yes. However, the detection sensitivity varies according to the shape and orientation of the contaminant. In addition, very small particles may not be detected.

Or use Xray

Q10. Why does the bar graph display continue to move even when products are not being fed through the detector?
A10. A metal detector detects metal contaminants by detecting very small changes in the magnetic field. Consequently, if there are moving metal objects or machinery that generates a strong magnetic field nearby, they may cause changes in the magnetic field and be detected. In addition, a dirty conveyor belt can also cause field fluctuations.

Q11. Can operators wear rings and wristwatches, etc., while working?
A11. Metal rings and wristwatches, etc., can have an effect on magnetic fields and be detected by a metal detector. Operators should remove rings and wristwatches before starting work.
FAQs

Q12. Can products in transparent bottles be detected?
A12. • In the case of completely transparent bottles, the photocell may miss the product. In this case, consult Anritsu Industrial Solutions for possible solutions.

Q13. What cautions should be noted when feeding bulk products?
A13. • When a rejector is connected, it is necessary to set a sufficient rejector hold time (rejector operation time).
• When the metal detector operation is set to stop at metal detection, remove all the bulk product from the conveyor belt before restarting.

Q14. What is the warm-up time after power-on?
A14. • To ensure accurate detection, the metal detector should be allowed to warm-up for 30 minutes or more after power-on. The metal detector should be reset when the room temperature changes markedly, especially in the morning.

Warm-up for 30 minutes or more after power-on.
Q15. What precautions are needed at cleaning?

A15. Any dirt and product particles must be cleaned off frequently from the detector head opening and conveyor belt gaps using a neutral detergent and a soft plastic brush and cloth. Do not use thinners, toluene or metal brushes, etc. In addition, clean the main unit with hot water at less than 40 degrees Centigrade (in accordance with waterproofing specifications).

Q16. We want to keep a record of the detection operation.

A16. Use the optional printer.

Q17. We want to install a metal detector and checkweigher but the space is too small.

A17. Anritsu Industrial Solutions also has spacesaving checkweigher models with an integrated metal detector.

Or use Xray
FAQs

Q18. Can the metal detector detect non-metallic contaminants?
A18. No. To detect non-metallic contaminants like bone, shell, stones, glass, etc., you should use Anritsu's X-ray Inspection System.

Features
- High-sensitivity detection
  Detects metals, bone, shell, stones, glass, etc., at high sensitivity
- Compact size at just 800-mm long
  Can be installed simply without changing existing line structure
- Safe for operators and products
  Low-energy X-rays and leakage countermeasures guarantee absolutely safe operation
- Excellent waterproofing standards and HACCP compatible
  All SUS external construction and conveyor part supporting IP66 standard
- One touch removal and fitting of conveyor belt
- Simple operation at large (10.4") color touch panel
<table>
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<th>Date and Time</th>
<th>Product No./Name</th>
<th>Basic Sensitivity Check</th>
<th>Daily Inspection</th>
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### Metal Detector Basic Sensitivity Management Table

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# Example Report

## Metal Detector Check sheet

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<tr>
<th>Inspection Item</th>
<th>No.</th>
<th>Inspection Contents</th>
<th>Inspection Frequency</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation</strong></td>
<td>1</td>
<td>All screws tight on each part</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>All connectors to indicator and detection head connected tightly</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>No vibration in detector main unit</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Rail line secure and no other parts touching</td>
<td>6 months</td>
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<tr>
<td><strong>Product Characteristics</strong></td>
<td>5</td>
<td>No change in product characteristics (product character, product temperature, size, packaging)</td>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Product matches set Prod No.</td>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td><strong>Conveyor Parts</strong></td>
<td>7</td>
<td>Conveyor and drive belt tension correct and no belt slip</td>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>No conveyor belt mistracking, damage or slippage</td>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>No abnormal noise from rollers and motors</td>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td><strong>Photocell</strong></td>
<td>10</td>
<td>Photocell surfaces clean</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>No misalignment in photocell axis and accurate product detection</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>No double recognition of single products</td>
<td>6 months</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inspection Item</th>
<th>No.</th>
<th>Inspection Contents</th>
<th>Inspection Frequency</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicator</strong></td>
<td>13</td>
<td>Each key operates correctly</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td><strong>Detector head</strong></td>
<td>14</td>
<td>No error displays</td>
<td>Any time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>No tripped fuses and breakers and no abnormalities</td>
<td>Any time</td>
<td></td>
</tr>
<tr>
<td><strong>Operating environment</strong></td>
<td>16</td>
<td>No abnormalities in rubber packings and mounting bolts</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td><strong>Rejection operation</strong></td>
<td>17</td>
<td>No effect from external noise, interference and moving metal objects</td>
<td>Any time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Correct and stable power supply voltage</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>No operation errors due to vibration and mechanical shock</td>
<td>Any time</td>
<td></td>
</tr>
<tr>
<td><strong>Defector characteristics</strong></td>
<td>20</td>
<td>Normal rejection operation</td>
<td>Any time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Correct rejection operation timing</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>No detection of uncontaminated products and accurate detection of product with testpiece</td>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>No error when running conveyor belt with no products</td>
<td>Any time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Products fed at consistent interval and orientation on conveyor belt</td>
<td>Any time</td>
<td></td>
</tr>
</tbody>
</table>

Note:

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Inspector

---

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METAL DETECTION SYSTEMS

Anritsu is the only metal detector manufacturer in the World to offer Dual Wave (DuW) technology.
Dual Wave (DuW) Technology Introduction

Anritsu is the only metal detector manufacturer in the World to offer Dual Wave (DuW) technology. Other metal detector brands provide multi-frequency or dual frequency metal detectors yet all others do not …

- Automatically choose from pre-installed frequencies
- Run two frequencies simultaneously
- Maximize detection of both ferrous and stainless contaminants.

Dual Wave technology offered exclusively by Anritsu was developed on the principle that two metal detectors at two independent frequencies are required to maximize detection of both the ferrous and stainless metals contaminants. Having two metal detectors to achieve this goal requires extra cost, maintenance and operator knowledge.

Multi-frequency metal detectors, a technology offered by Anritsu as standard, provides flexibility in the metal detector itself. Most manufacturers provide single frequency heads designed to the specific application. In some cases, this may provide good results on that product but other products may not be maximized. In essence, the single frequency metal detector can become obsolete for a new product introduction because the installed frequency is no longer ideal for the application.
Anritsu Metal Detection Technology

- Dust and waterproof protection class (only W type)
- Interactive guidance
- Printer (option)
- Statistical functions
- NG History
- Operation history
- Online interface
- Supports flow direction change
- Variable belt speed
- Variable passline height
- Simple cleaning
- Rejection confirmation function
- DSP
- Automatic power switching
- HACCP Support (only W type)
- CE Marking (option)
- MD with coaxial detection coils
- Dual frequency
- Estimated sensitivity display

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Document No. ABD-5DKD81XXS020-00
Dual Wave Metal Detection

External Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>H1</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>KD8113A</td>
<td>80</td>
<td>1100</td>
</tr>
<tr>
<td>KD8115A</td>
<td>120</td>
<td>1140</td>
</tr>
<tr>
<td>KD8116A</td>
<td>180</td>
<td>1200</td>
</tr>
</tbody>
</table>

Units: mm
Why is it called "duw"?

duw = Dual Wave

Uses *Simultaneous* dual wave magnetization detection technology.
Dual Wave Technology

- Sensitivity realized is No1 in the world per our competitive testing.

- Designed to achieve high sensitivity and stability that any operator can easily achieve via a product learn setup procedure on any customer’s production line!

- New duw Series
  - KD811X/812X series
  - 12 models total

- Previous Model still available
  - Larger systems only
In order to detect Fe and SUS with high sensitivity, two sets of metal detectors are required because both Fe and SUS cannot be set at the optimal sensitivity with only a single magnetic field frequency.

Fe and SUS are detectable only by one DUW series metal detector with high sensitivity because “Duw” is using dual magnetic field frequencies.
Dual Wave Technology

Development Concept
High Sensitivity and stability
anyone can achieve
in customer’s production line

Dual Wave & Easy Setting

First in the world!
Simultaneous
Dual Wave (frequency)
magnetization detection method
(dual wave)

First in the world!
Auto Setting algorithm
based on the Estimated
detection sensitivity
SINGLE FREQUENCY Metal Detection

It uses magnetic field frequency with the larger signal of Fe(1) and SUS(2) than product effect.

The frequency is different when the Fe and SUS metal detection signal is largest.
Metal detection using two frequencies simultaneously

The best frequency for detecting Fe and SUS is different, so detection sensitivity is improved by selecting the best frequency for each metal.
In head to head testing, the Anritsu DUAL WAVE technology was more stable when product temperature rises.

Anritsu Industrial Solutions

Competitor
### Estimated Detection Accuracies

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[A-A] Feφ 3.5 / SUSφ 8.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2★</td>
<td>[B-B] Feφ 1.2★ / SUSφ 1.5★</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>[C-C] Feφ 1.4 / SUSφ 7.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>[D-D] Feφ 2.4 / SUSφ 1.5★</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Even without experience or know-how, anyone can create the optimum product settings for all types of products including dry, wet and aluminum-evaporated film products by using Easy Settings automatic setting function.
DUAL WAVE Metal Detection

Product Set Up WIZARD

Choose check conditions.
1 Use wizard. (Recommend)
2 Specify evaluation mode.

Choose product type.
Pack / Bulk
Products in carton or tray aligned and fed

Mode determined
Metal Check 1
Press ← to set

Adoption of interactive menu screen system allows simple and easy operation, using wizard system.

- Product type registration
- Auto setting
- Rejecting setting

Very easy for any new operator to successfully create a new product menu or update and existing menu.
Once auto setting is complete, an estimated sensitivity of Fe and SUS test piece size are displayed.

(Example: estimated sensitivity display)

Settings determined
→ Feφ 1.0/SUSφ 2.0 [A-A]
Press \(→\) to save.
\(→\) to quit, \(\rightarrow\) for details

Note: The estimated detection sensitivity display does not assure the size of a test piece that can be detected. Check the detection sensitivity with the test piece.
DUAL WAVE Metal Detection

Product Effect Monitoring and Password Protection

Product effect monitoring function

The product effect is graphically displayed with a continuous time scale.

Access level control function (HACCP compliance)

Access level controlled with a password to prevent unwanted setting changes.
DUAL WAVE Metal Detection

HACCP Maintenance and Sanitation

The system is designed to be easily maintained and CLEAN.

- Simple Frame Structure
- Conveyor table and belt can be removed in 30 seconds – no tools
- All ‘AW’ models are IP66 rated and all stainless steel
- Very easy access to conveyor components for proper sanitation
- Conveyor parts can be sterilized in hot water
- Utilizes a water and heat resistant belting
- Bearings are water, heat and dust resistant designs
DUAL WAVE Metal Detection

HACCP Maintenance and Sanitation

Durable, Proven and Simple Conveyor Mechanism Design for easy maintenance and system longevity

• One touch belt removal – NO TOOLS
• No drive belts that can wear
  – Utilizes a direct drive system
• No belt tracking adjustments required
• No belt tension adjustment required
  – Coils springs with an auto-tension mechanism
HACCP Data Recording Function

- **Operation History Log**
  - Power ON, Start, Stop, Product Change, Error and Alarm

- **Statistical Data**
  - Operation Start Stop Time
  - Each product totals
  - Number of PASS products
  - Number of NG products
  - NG Rate
  - NG History

- **Parameter List**

```
  = = = NG History = = =
  PRINT          98.05.07 06:33
  98.05.06  20:35:44  NG(2.1/2.0)
  98.05.06  20:37:00  NG(2.2/2.0)
  98.05.06  22:16:29  NG(2.1/2.0)
  98.05.06  23:51:17  NG(2.6/2.0)
```

```
  = = = Operation History = = =
  PRINT          98.05.07 06:35
  98.05.06  20:35:00
  START 01
  98.05.06  23:55:31
  STOP
  98.05.07  00:16:59
  PRCHG 01>05
  98.05.07  00:17:24
  START 05
  98.05.07  02:32:19
  SNS CHG 2.0>2.2
```
DUAL WAVE Metal Detection

Options

KD81XX Series Metal Detector Options

- Printer
- Tower light
- Guide banks
- Buzzer
- Cross roller
- Scraper
- Cross plate
- CE marking
- Emergency switch
- Passline height change (900 to 950mm)
- Plate for anchor
- Caster wheels
- Anti-tip plate

* For details, consult your sales representative.