METAL DETECTOR

Metal Detector
AD-4971
Series

Users' Handbook

IP65

A&D
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A&D Company, Limited
http://www.aandd.jp

Metal Detector **AD-4971** Series

Table of contents

1. What is a metal detector?

Metal detectors detect metal contaminants in products and contribute to the improved quality and safety of products.

1.1. AD4971 configuration

Conveyor	Display unit
Photo sensor	Sensor head
Base unit	IO box

AD4971-3510

1.2. Principal use

**Generally, metal detectors are used for security checks,
land mine detection, archaeological digs or wall scanners.**

Industrial metal detectors including the AD4971 are also used on production lines for the products below :
- Food and confectionery
- Agricultural, animal or seafood products
- Medical products
- Clothes
- Shoes
- Cardboards
- Chemical materials

It is commonly said that we don't perceive contaminants in food products if their size is less than 1mm.

Therefore, it is common for food products suppliers to set their inspection standards to detect contaminants larger than 1mm.

On the other hand, inspection standards for chemical materials are set as low as 0.1mm.

Materials for semiconductors are more rigorously checked and requirements in this industry are to detect stainless foil even at 0.02mm size.

(This is a special requirement and cannot be achieved with ordinary metal detectors.)

Needle detection is performed on clothes or shoes production lines,

as small needle-like shards of metal becoming intertwined in these products may cause serious hazard.

Detection sensitivity for detecting needles depends on the orientation of the needles,

so special metal detectors for needles with multiple sensor heads set unevenly have been developed.

1.3.   Types of metal detectors

1.3.1.   Detection method

The main types of metal detectors are as follows :

● Electromagnetic induction type

● X-ray type

● Magnetic sensor type

AD4971 series metal detectors are electromagnetic induction type.

The X-ray type is better in performance, but the electromagnetic induction type

is better in terms of unit price, running cost and ease of maintenance.

1.3.2.   Configuration for metal detectors

The following are the main types of metal detector configurations :

● Hand-held type

● Conveyor type

● Chute type

● Gravity fall type

● Pipeline type

● Gate type

The AD4971 is a conveyor type metal detector.

We manufacture conveyor type, gravity fall type and pipeline type metal detectors.

1.4. Construction of sensor head

**There are 3 types of sensor head construction for electromagnetic induction type metal detectors :**

- Coaxial type
- Opposing type
- Permanent magnet type

1 Coaxial type

Transmitter coil

Receiver coil

Item tested
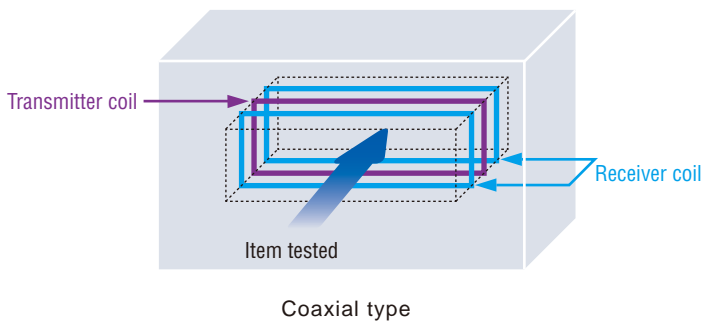
Coaxial type

The AD4971 has adopted the coaxial type which is commonly used nowadays due to its high detection sensitivity and water resistance.

2 Opposing type

Transmitter coil

Receiver coil

Item tested
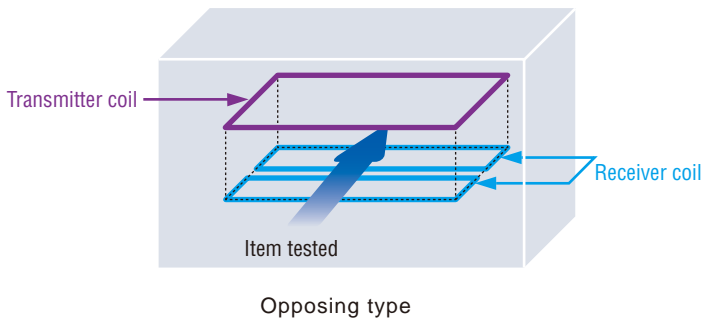
Opposing type

The opposing type metal detector allows for the manufacturing of a large size sensor head or for possible adjustment of the height of the aperture on request.

3 Permanent magnet type

Permanent magnet
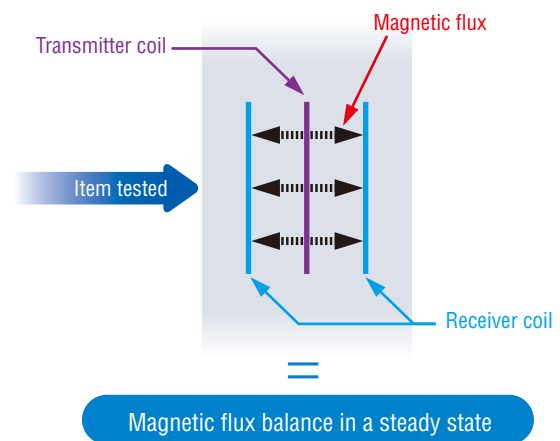
Receiver coil

Item tested

Permanent magnet type
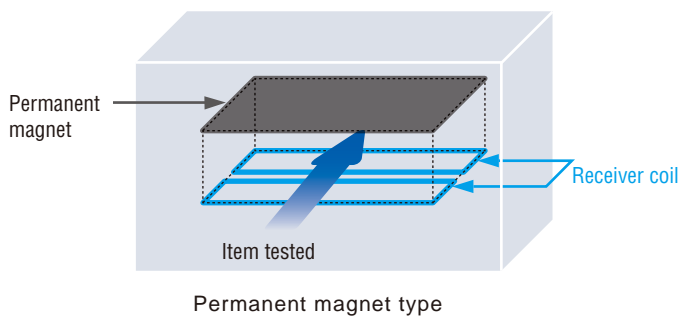
The permanent magnet type which can generate DC magnetic flux is used for detection of metal contaminants in aluminum foil packages.

1.5. Principle of detection

A sensor head of an electromagnetic induction type metal detector consists of a transmitter coil and two receiver coils that are equally spaced and are differentially connected. A transmitter coil broadcasts a radio frequency signal and generates an electromagnetic field between the transmitter coil and the receiver coils.

The magnetic flux balance is disturbed and creates a differential output signal when a contaminant passes through the aperture. Metal detectors detect metal contaminants by processing this differential output signal.

When no contaminant exists, both receiver coils receive an equal amount of magnetic flux and differential signal output is balanced at zero.

Transmitter coil — Magnetic flux

Item tested

Receiver coil

=

Magnetic flux balance in a steady state

When an item contains magnetic metal (iron, Fe), magnetic flux to a receiver coil increase and this makes the differential signal output positive.

Item tested

Fe

>

Magnetic flux balance with a magnetic metal
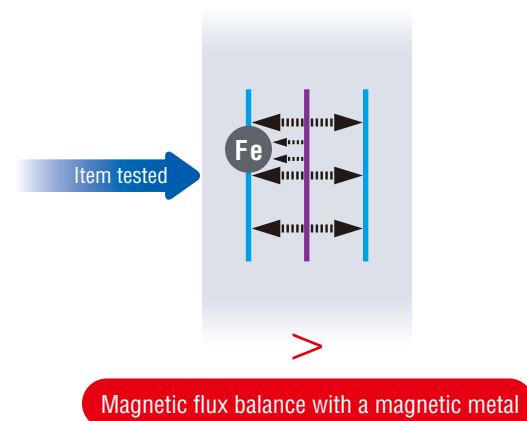
When a product contains a non-magnetic metal (stainless steel, SUS), magnetic flux to a receiver coil decrease due to occurrence of an eddy current and this makes the differential signal output negative.

Eddy current —

SUS

Item tested

<

Magnetic flux balance with a non-magnetic metal
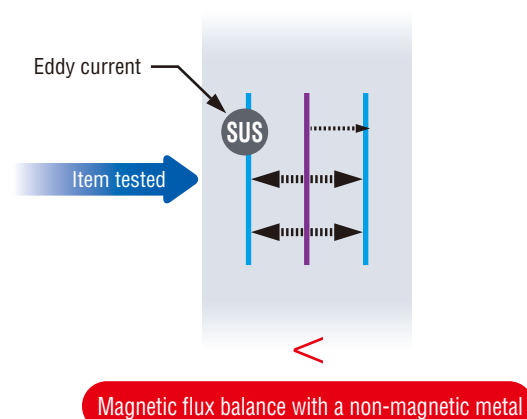
1.6. Detection sensitivity

Detection sensitivity is expressed by the size, shape and material of contaminants that can be detected.
An iron or stainless steel (sometimes brass) ball bearing is used as a test piece
and detection sensitivity is expressed by its diameter. In terms of needle detectors,
detection sensitivity is represented by diameter and length of a wire shaped test piece.

The smaller the sensitivity is, the better the detection performance of a metal detector.

1.7. Oscillating frequency and detection sensitivity

Oscillating frequency and detection sensitivity
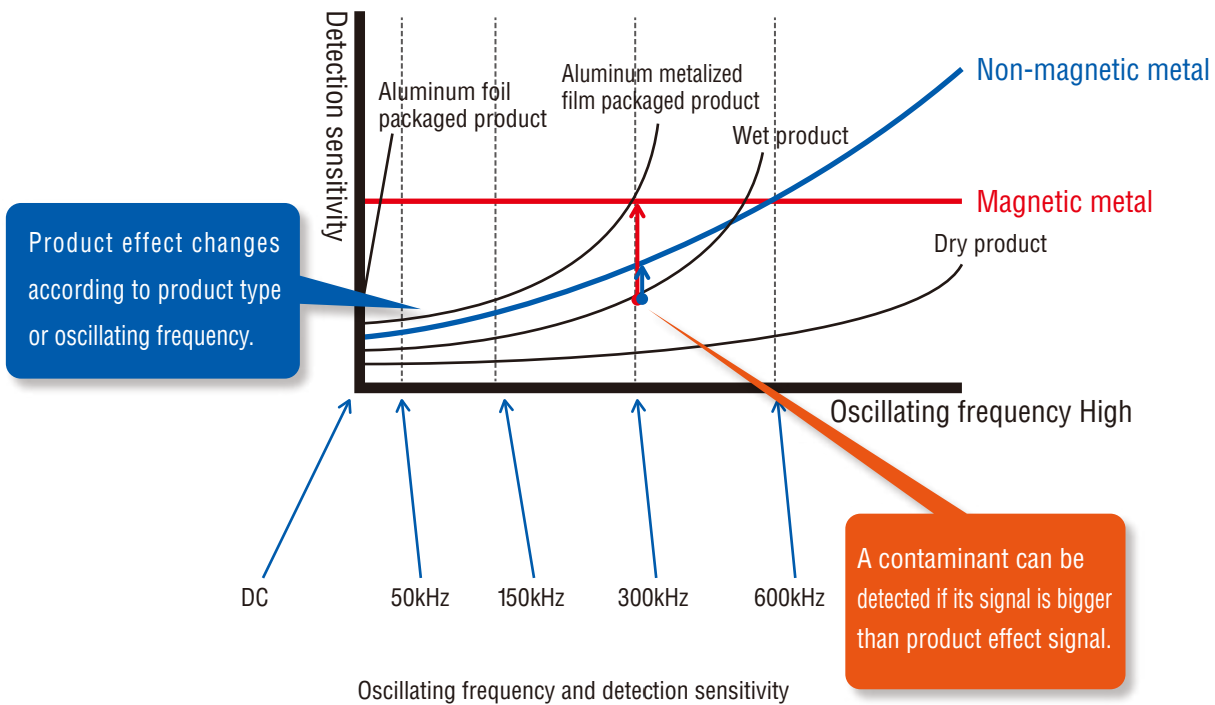
Dry products : The higher the oscillating frequency is, the better for detecting non-magnetic metals.
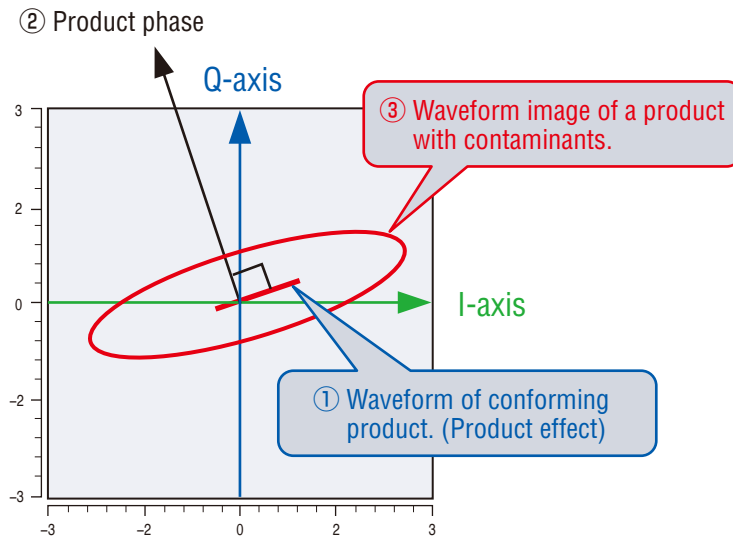**Wet products :** The lower the oscillating frequency is, the better for detecting magnetic metals.
Products packaged in aluminum metalized film or aluminum foil : The lower the oscillating
frequency is, the better for detecting magnetic metal. It is difficult to detect non-magnetic
metal in aluminum metalized film or aluminum foil packaged products.

**The oscillating frequency of AD4971 is 300 KHz,
which responds to both dry and wet products.**

1.8. Product phase

Product phase is a phase of a vector normal to the detection signal shown on the Lissajous display.

② Product phase

Q-axis

③ Waveform image of a product with contaminants.

I-axis

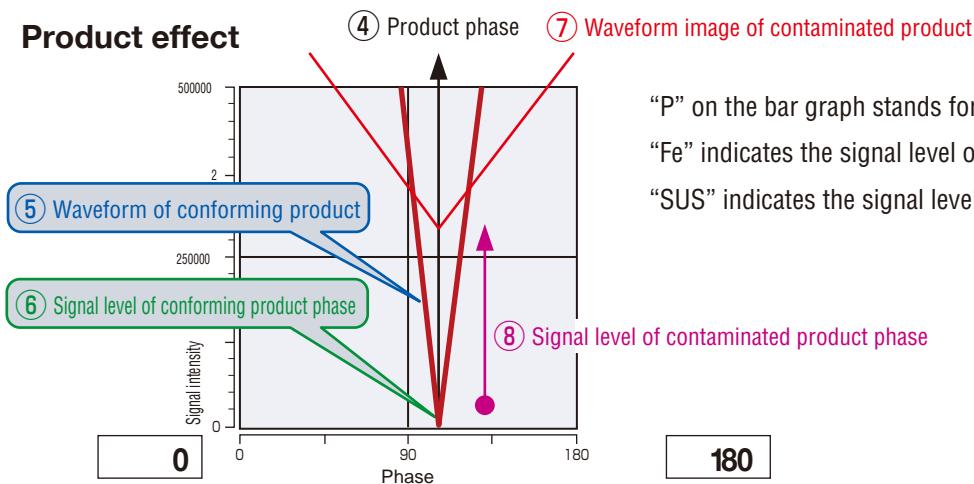① Waveform of conforming product. (Product effect)

On the product effect graph, product phase is represented by the phase at the point of the V-shaped waveform.
(See ④ and ⑤ on the diagram below.)

The signal level of this phase is used for contaminant judgments, as it significantly increases when a contaminant is detected.

Product effect

④ Product phase   ⑦ Waveform image of contaminated product

⑤ Waveform of conforming product

⑥ Signal level of conforming product phase

⑧ Signal level of contaminated product phase

"P" on the bar graph stands for the signal level of product phase.

"Fe" indicates the signal level of the Q-axis.

"SUS" indicates the signal level of the I-axis.

Signal intensity

Phase

0

180

2. Typical detection sensitivity

Figures in this chapter are actual measurements results obtained by us.

The figures represent the diameters of ball bearings.

The figures are not guaranteed as they may change by shape, size, weight and packaging of products or change in environment.

2.1. Dry products

	Inspected product	Package	Dimension(mm)	Weight (g)	Fe ϕ(mm)		SUS ϕ(mm)		Product Phase(°)
					Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
1	Dry noodles	Bag	95x240x30	320	1.0	0.9	1.5	1.5	166.5
2	Dry pasta	Bag	275x80x30	507	0.5	0.5	0.8	0.8	14.0
3	Dry lasagna	Paper package	190x95x45	300	0.5	0.5	1.0	0.8	14.2
4	Sugar 1kg	Bag	170x230x30	1000	0.6	0.6	1.0	1.0	167.0
5	Seaweed（with an antioxidant with no iron-reponse）	Bag	150x250x20	68	0.5	0.5	0.8	0.8	167.3

2.1. Dry products

	Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
					Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
6	Seaweed（with an antioxidant with no iron-response）	Bag	200x260x10	58	0.6	0.6	1.0	1.0	167.8
7	Rice cracker with peanuts	Bag	130x210x20	155	1.0	0.9	1.5	1.5	166.8
8	Sweets	Bag	—	—	0.5	0.5	0.8	0.8	166.8
9	Rice crackers	Bag	200x260x60	150	0.6	0.5	1.0	0.8	167.7
10	Chocolate	Bag	240x75x35	210	0.5	0.5	0.7	0.7	15.2
11	Chocolate	Bag	210x105x10	203	0.5	0.5	0.7	0.7	14.2
12	Green tea	Bag	260x80x50	260	0.4	0.4	0.8	0.7	14.0

2.1. Dry products

	Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
					Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
13	Tea	In a box	125x95x60	76	0.5	0.5	0.8	0.8	19.5
14	Coffee	Bag	160x90x55	205	0.5	0.5	0.8	0.8	13.7
15	Nuts	Bag	200x130x25	96	0.5	0.5	0.8	0.7	14.0
16	Cereal	In a box	230x140x60	509	0.5	0.4	0.8	0.7	14.0

2.2. Wet products

Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
				Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
1001 Bananas	Bag	130x200x75	590	1.0	1.0	2.0	2.0	42.0
1002 Kiwis	Plastic package	170x140x60	433	1.0	1.0	2.38	2.38	78.7
1003 Pineapple	Plastic package	145x120x55	223.4	0.8	0.8	2.38	2.38	111.0
1004 Tomatoes	Plastic package	210x165x50	210	0.5	0.4	1.5	1.5	94.0
1005 Olives	Plastic package	110x110x60	108	0.7	0.7	2.0	2.0	108.5
1006 Bean sprouts	Bag	200x175x50	264	1.0	1.0	2.0	2.0	64.8
1007 Vegetables	Bag	190x240x45	342	0.9	0.8	2.38	2.38	84.2

2.2. Wet products

Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
				Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
1008 Salad	Plastic package	210x210x40	235	0.9	0.8	2.0	2.0	117.0
1009 Seasoning	Plastic package	110x180x35	118	0.8	0.7	2.0	2.0	140.8
1010 Miso paste 1kg	Bag	150x210x40	1000	1.5	1.5	3.0	3.0	77.2
1011 Packed lunch	Plastic package	195x235x60	569	1.2	1.2	3.0	2.5	78.0
1012 Pickles	Plastic package	155x155x60	682	2.5	2.5	4.0	4.0	74.0
1013 Kimchi (Korean pickles)	Plastic package	155x155x50	356	2.0	2.0	3.18	3.18	74.8
1014 Natto (fermented soybeans)	Plastic package	100x100x60	142	1.0	1.0	2.5	2.5	126.0

2.2. Wet products

	Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
					Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
1015	Tofu (soft)	Plastic package	95x130x40	325	0.6	0.6	2.38	2.0	84.5
1016	Tofu (hard)	Plastic package	140x110x40	430	0.6	0.6	2.0	2.0	110.0
1017	Deep fried tofu	Plastic package	120x185x35	295	0.9	0.8	2.5	2.5	88.8
1018	Pudding	Plastic package	φ71x45	120	0.5	0.5	1.5	1.5	94.5
1019	Dumplings	Paper package	135x170x30	178	0.9	0.9	2.38	2.38	92.2
1020	Pizza without antioxidant	Bag	280x260x30	400	1.5	1.2	2.5	2.38	106.7
1021	Pizza with antioxidant	Bag	280x260x30	400	×	×	×	×	17.5

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2.2. Wet products

Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
				Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
1022 Fresh pasta	Bag	215x135x20	142	2.5	2.5	3.0	3.0	16.5
1023 Sausage	Bag	250x120x30	206	0.5	0.4	2.0	2.0	109.0
1024 Parma ham	Bag	190x250x30	120	0.7	0.7	2.0	2.0	104.0
1025 Cheese	Bag	130x130x40	320	0.8	0.7	2.38	2.38	111.0
1026 Bun	Bag	130x130x35	116	1.0	1.0	2.5	2.5	174.3
1027 Puddings	Plastic package	φ71x205x60	241	1.5	1.5	2.5	2.5	78.0

2.3. Aluminum metalized film packaged products

	Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
					Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
2001	Potato chips	Bag	200x220x60	68	×	×	7.18	7.18	71.0
2002	Biscuits	in a box	85x135x30	80	3.0	2.5	4.0	3.5	80.0
2003	Cheese	Bag	110x110x25	150	3.0	2.5	4.0	3.5	—
2004	Chocolate	in a box	130x80x40	90	5.0	5.0	5.0	5.0	102.7

2.4. Aluminum foil packaged products

	Inspected product	Package	Dimension(mm)	Weight (g)	Fe φ(mm)		SUS φ(mm)		Product Phase(°)
					Test piece on a product	Test piece on a conveyor belt	Test piece on a product	Test piece on a conveyor belt	
3001	A bowl of rice topped with chicken and eggs	Retort pouch	125x170x30	190	×	×	×	×	—

3. FAQ

3.1. Features of AD4971

3.1.1. What are the features of AD4971?

- IP65 compliant dust and waterproof
- Adjustable conveyor belt speed from 10m/min to 60m/min
- 7inch color touch panel
- Stores up to 1000 products with product images
- Equipped with Modbus RTU/TCP as standard
- Supports USB memory. Inspection and operation history can be recorded
- Accessibility to the IO box
- 230mm pass height model available
- Aperture width 350mm and conveyor belt width 250m

3.1.2. Is the AD4971 X-ray inspection equipment?

No. The AD4971 is an electromagnetic induction type metal detector.

3.1.3. Is auto sensitivity setting function available?

Yes. Sensitivity setting can be done by sending a product without metal contaminants through 3 times.
The threshold level can be adjusted manually after auto sensitivity setting.

3.1.4. Is phase tracking function available?

Yes. In terms of wet products, changes of environment temperature or product temperature affect the phase of product effect. With the phase tracking function, the AD4971 automatically tracks the phase change caused by change of temperature.

The phase tracking function is to track continuous change. It may not track sudden temperature change.
Please change the threshold manually or conduct an auto sensitivity setting when there was a big temperature change between the last inspection and the new inspection.

3.1.5. What is product phase?

Product phase is a phase which is unlikely affected by product effect. Please refer to the chapter "Product phase" for more information. "P" on the bar graph display indicates the signal level of product phase.

3.1.6. What does the "P" on the bar graph display?

"P" stands for "Product phase" and indicates the signal level which is not likely to be affected by product effect.

3.1.7. What is the oscillating frequency of AD4971?

The oscillating frequency of AD4971 is 300 kHz.

3.1.8. Can conveyor belt speed be adjusted?

Yes. It can be adjusted from 10m/min to 60m/min.

3.1.9. Are multiple languages available?

Japanese and English are available.
More languages will be added in the future.

3.2. Detection performance

3.2.1. What is the detection method for AD4971?

AD4971 is an electromagnetic induction type coaxial sensor head metal detector.

3.2.2. Can the AD4971 detect metal contaminants besides iron or stainless steel?

Both magnetic and non-magnetic metals can be detected.
Not only Fe or SUS, but also other magnetic metals like nickel or non-magnetic metals like aluminum or brass can also be detected.
Detection sensitivity varies by the properties of the metal.

3.2.3. What does the figure for detection sensitivity mean?

The size of detectable contaminant is represented by the diameter of a ball bearing.
The smaller the ball bearing diameter is, the better the detection performance of the metal detector.

Actual detection sensitivities differ from the ones on the catalog due to product effect.
Please refer to "Typical Detection Sensitivity" for actual performances.

3.2.4. What is a dry product?

Products that contain low water or salt content and have a small product effect are called dry products.
Frozen meat or seafood has less product effect, so they are equivalent to dry products.

Ex. Frozen meat, clothes, cartons, plastic pellets

3.2.5. What is a wet product?

Products that contain water or salt content and have a large product effect are called wet products.

Ex. Meat stored at room temperature, fresh fruits and vegetables, miso (bean paste), soy sauce, pickles.

3.2.6. Can metal contaminants in aluminum metalized film packaged products be detected?

It is difficult to detect contaminants in aluminum metalized film packaged products.
Big iron contaminants such as M4-M5 nuts can be detected.
It is difficult to detect non-magnetic metals inside aluminum metalized film packaged products.

The thickness of aluminum metalized film is less than 0.1 micro meters.
Aluminum metalized film packaging is used for potato chips packages.

3.2.7. Can metal contaminants in aluminum foil packaged products be detected?

It is difficult to detect metal contaminants in aluminum foil packages.
The AD4971 cannot detect a contaminant in aluminum foil packages.

Please contact an A&D sales representative.

According to the JIS standard, thickness of aluminum foil is 6 - 200 micro meters.
Thermostabilized foods are packed in aluminum foil packages.

3.2.8. Can metal contaminants in cans be detected?

In principle, electromagnetic induction type metal detectors, including AD4971,
cannot detect metal contaminants in cans.
Please consider X-ray detectors as they may detect contaminants in cans.

It is said that magnetic sensor type metal detectors can detect magnetic metal
or magnetized stainless steel in cans.

3.2.9. What shall I do when a metal detector reacts to products without metal contaminants by mistake?

In terms of wet products, the phase of product effect changes when either the temperature of the environment or product changes.
The phase tracking function is to track continuous change, but it may not track sudden temperature change.
Please change the threshold manually or conduct auto sensitivity setting when there is a big temperature change.

3.2.10. What shall I do when environmental disturbance is significant?

External electromagnetic waves are disturbances to the detection signal and affect detection sensitivity.
With a large aperture size model, detection sensitivity may be improved by putting eaves or an external electromagnetic shield around the apertures.

Unnecessary vibration to a metal detector unit may increase the noise floor.
Please install the device in a stable environment and adjust the length of the feet with the adjusting bolt for proper installation.

3.2.11. What can be the source of external noise?

Big motors, switched-mode power supply or fluorescent lights can be noise sources.
Other metal detector units may also cause interference.
Please pay attention to the installation environment or use an electromagnetic shield or eaves to reduce noise effects.

A conveyor roller including ball bearing may form a one-turn coil and become a noise source.
Please pay close attention to conveyor lines installed before and after the metal detector.

If a frequency of a noise has a peak, protection against noise may be taken by adjusting the oscillating frequency.
Please consult with a sales representative.

When an arm, watches, buckles or coin purses move near a sensor head (metal free zone),
they become a noise source and may be detected as contaminants.

3.2.12. What is the metal free zone (MFZ)?

The area approximately twice the opening aperture height around the aperture is called the Metal Free Zone (MFZ).
Metal or people entering the MFZ may affect detection performance and these may be detected as metal contaminants.
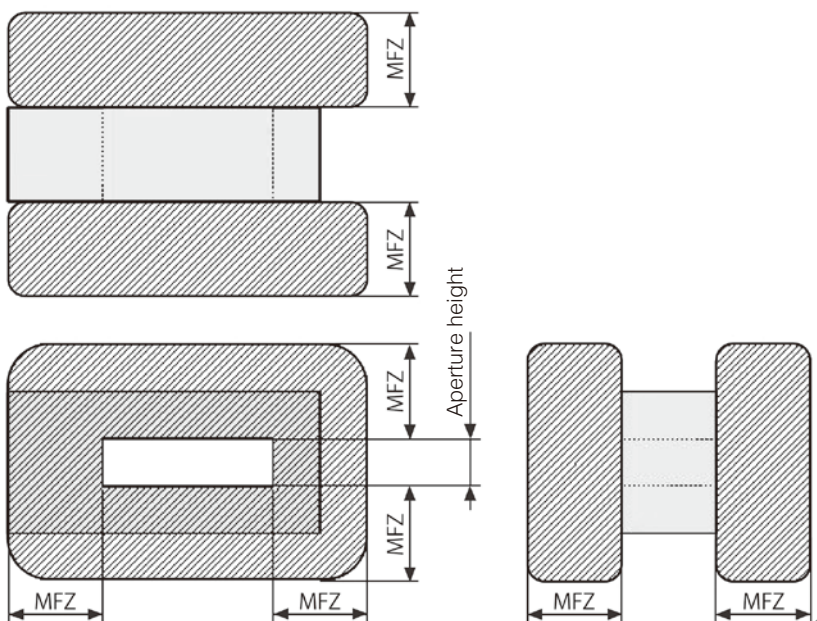
Please install metal detectors where the MFZ is free from metals.
Please make sure not to put your arm in the MFZ when you place a product on the conveyor manually.

3.2.13. Effect of touch panel and button operation

Pressing the touch panel or the START/STOP button too hard transmits vibrations to the sensor head.
This may increase noise level and cause false detection.

3.2.14. Effect of human body (arms)

The human body contains blood which can affect the detection signal.
Arms in the MFZ may affect detection performance.

Please try to avoid the MFZ when you place and receive a product or a test piece on a conveyor manually.

3.3. Connectivity to external devices

3.3.1. Can a rejector be connected?

A rejector can be connected to a metal detector and controlled via DO (Digital Output).
We supply AD4980 series rejectors.

3.3.2. Can a comparator light be connected?

A comparator light can be connected to a metal detector and controlled via DO (Digital Output).
We supply AD4971-02 comparator lights.

3.3.3. Can the lighting condition of the comparator light be customized?

Lighting condition or time can be configured.

3.3.4. Does the metal detector operate simultaneously with a checkweigher?

They operate simultaneously via DIO (Digital Input Output).
The metal detector can also be connected to the AD4961 checkweigher via serial interface.

3.3.5. Does the metal detector operate with PLC?

Supports DIO, ModbusRTU and Modbus TCP as standard.

3.4. Performance verification

Because of the product effect or installation environment, actual detection sensitivity is not always same as the one on the catalog.
It is important to conduct performance verification with the actual products to be inspected.
Please contact your local sales representative for verification.

3.5. Model selection

3.5.1. Is it better to choose a bigger aperture size?

The bigger the aperture size, the worse the detection sensitivity.
Please choose an appropriate model considering the maximum size of the products.

3.5.2. What is the maximum carrier weight?

The maximum carrier weight is 3kg at 10 – 30m/min belt speed or 2kg at 30 – 60m/min belt speed.
If a product is heavier than 3kg, please consult with our sales representative.

3.5.3. Are wheels available?

Wheels are a factory installation option. Please consult with our sales representative.

3.6. Installation

3.6.1. Where should a metal detector be installed?

Unnecessary vibration to a metal detector may increase the noise floor of the detection signal.
Please install it in a stable environment, adjust the adjusting bolt and tighten nuts properly.

A big motor, switched-mode power supply or fluorescent lights can become noise sources.
An environment far away from such noise sources is ideal.

Please avoid installing metal detectors where there are big temperature changes,
direct sunlight or in windy places.

3.6.2. Is a ground connection necessary?
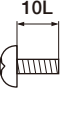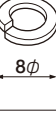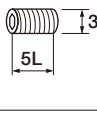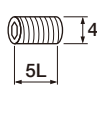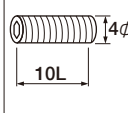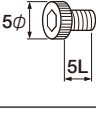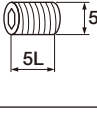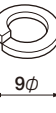
Ground connection is necessary. Please make sure to ground from both safety and noise perspectives.

3.7. Maintenance

3.7.1. Are there any replaceable items?

The conveyor belt, plastic gears, motor unit, conveyor deck, drive pulley, driven pulley, return roller,
photo sensor, fuse, backup battery, water proof packing and rubber damper are all replaceable item
and need to be replaced periodically.

Appropriate test piece for common risks

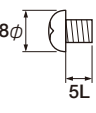| Size	Name	Shape	Flow direction	Test piece	Notes
M3 (SUS)	Spring washer			Equivalent to SUS2.2Φ	
				Equivalent to SUS1.8Φ	
				Equivalent to SUS2.0Φ	
	Flat washer			Equivalent to SUS5.0Φ	
				Equivalent to SUS4.2Φ	
				Equivalent to SUS1.8Φ	
	Nut			Equivalent to SUS5.0Φ	Equivalent to Fe2.0Φ
				Equivalent to SUS4.3Φ	
				Equivalent to SUS4.0Φ	
	Round head screw 5L	5L		Equivalent to SUS4.76Φ	
				Equivalent to SUS4.0Φ	
				Equivalent to SUS4.3Φ	
M4 (SUS)	Spring washer	8φ		Equivalent to SUS3.0Φ	
				Equivalent to SUS2.8Φ	
				Equivalent to SUS2.5Φ	
	Flat washer	9.5φ		Equivalent to SUS7.0Φ	
				Equivalent to SUS5.5Φ	
				Equivalent to SUS2.6Φ	
	Nut	6		Equivalent to SUS6.5Φ	Equivalent to Fe5.0Φ
				Equivalent to SUS6.5Φ	
				Equivalent to SUS5.5Φ	
	Cap screw	5φ 5L		Equivalent to SUS7.0Φ	
				Equivalent to SUS7.0Φ	
				Equivalent to SUS7.0Φ	
M5 (SUS)	Spring washer	9φ		Equivalent to SUS3.9Φ	
				Equivalent to SUS3.5Φ	
				Equivalent to SUS3.2Φ	
	Flat washer			Equivalent to SUS1.0Φ	
				Equivalent to SUS8.0Φ	
				Equivalent to SUS3.5Φ	
	Nut	8		Equivalent to SUS8.0Φ	Equivalent to Fe6.5Φ
				Equivalent to SUS8.0Φ	
				Equivalent to SUS7.0Φ	
	Round head screw 5L	8φ 5L		Equivalent to SUS10Φ	
				Equivalent to SUS8.0Φ	
				Equivalent to SUS8.0Φ	

Size	Name	Shape	Flow direction	Test piece	Notes
M6 (SUS)	Spring washer	12φ		Equivalent to SUS5.5Φ	
				Equivalent to SUS5.5Φ	
				Equivalent to SUS4.5Φ	
	Flat washer	13φ		Equivalent to SUS10Φ or larger	
				Equivalent to SUS10Φ or larger	
				Equivalent to SUS3.5Φ	
	Nut			Equivalent to SUS10Φ or larger	Equivalent to Fe8.5Φ
				Equivalent to SUS10Φ or larger	
				Equivalent to SUS10Φ or larger	
	Round head screw 10L	10L		Equivalent to SUS10Φ or larger	
				Equivalent to SUS10Φ or larger	
				Equivalent to SUS10Φ or larger	
M3×5L Set screw (SUS)		3φ 5L		Equivalent to SUS2.9Φ	
				Equivalent to SUS2.2Φ	
				Equivalent to SUS2.8Φ	
M4×5L Set screw (SUS)		4φ 5L		Equivalent to SUS4.0Φ	
				Equivalent to SUS3.5Φ	
				Equivalent to SUS3.8Φ	
M4×10L Set screw (SUS)		4φ 10L		Equivalent to SUS4.76Φ	
				Equivalent to SUS4.76Φ	
				Equivalent to SUS4.76Φ	
M5×5L Set screw (SUS)		5φ 5L		Equivalent to SUS5.0Φ	
				Equivalent to SUS5.0Φ	
				Equivalent to SUS5.0Φ	

*Unit : mm

*Please use this table only as a guide.

A&D Checkweigher and Metal Detector Questionnaire

■ Customer Contact Information :

Date :			
Company Name :		Contact Name:	
Company Address :			
Tel :		Fax:	
E-mail :			

■ Product Information :

Product Name :	
Product Condition :	☐ Packed ☐ Unpacked ☐ Dry ☐ Wet
Packaging Type :	☐ Carton ☐ Bag ☐ Bottle ☐ Other ( )
Packaging Material :	☐ Paper ☐ Plastic ☐ Aluminum Metalized Film ☐ Aluminum Foil ☐ Other ( )
Dimensions (mm) :	Max. Length x Width x Height Min. Length x Width x Height
Weight (g) :	g
Product Temperature :	( ) ☐ Celsius ☐ Fahrenheit

■ General Information Details :

Purchase Quantity :	☐ Checkweigher: sets / ☐ Metal Detector: sets
Conveyor Width (mm) :	Pass Line Height (mm):
Conveyor Speed :	m/min
Throughput :	A vg. pcs/min. Max. pcs/min.
Flow Direction (Facing the display unit):	☐ From left to right ☐ From right to left
Desired Accuracy (For Checkweigher):	± g (3σ)
Desired Sensitivity:(For Metal Detector)	Feφ mm / SUSφ mm Other (Specify material and size :)
Reject Module :	☐ Conveyor Stop ☐ Flipper ☐ Conveyor Drop ☐ Others ( )
Ambient Temperature :	( ) ☐ Celsius ☐ Fahrenheit Humidity: %
Waterproofness	☐ Non-waterproof ☐ Waterproof (IP65) ☐ Other ( )

■ Options and Accessories :

For Checkweighers
☐ Display Stand   ☐ Tower Light   ☐ Upper Breeze Break   ☐ Lower Breeze Break   ☐ Cross Plate   ☐ Product Guide

For Metal Detectors
☐ Tower Light