Metal Detector

METARIDDER MS Series

User's Manual

MS-J (01) / 202308

SAIKA

Saika Technological Institute Foundation

Introduction

Thank you for purchasing the metal detector METARIDDER MS Series (hereinafter referred to as the machine).
Read this manual before and during the operation to use the machine properly.

■ Symbols used in this manual

Following symbols are used in this manual. Please understand the meaning of each symbol in using the machine.

Indication	Significance
WARNING	Neglect of warnings may result in the death or serious injury of the operator.
CAUTION	Neglect of cautions may result in a minor injury of the operator or a property damage.
Important	Things to be observed and precautions in handling the machine.
	Supplementary information and hints.

■ Safety Precautions

<Warnings>

WARNING

- **Do not disassemble or modify the machine.**
  May result in an injury or a machine failure.
- **Stop the operation if there was a smoke, abnormal odor or abnormal noise.**
  Continued use may cause a fire. Turn OFF the main circuit breaker immediately and then turn OFF the primary power supply as well. If a power plug is provided, pull out the plug from the outlet.
  Contact SAIKA or the place of purchase for assistance.
- **Always use the machine at the rated voltage.**
  Using the machine at an improper voltage may cause a fire or the operator to suffer an electrical shock.
- **Be careful in handling the power cable.**
  Do not pull the cable, put heavy objects on the cable or place heat source near the cable. Doing so may damage the cable, causing a fire or electric shock to the operator.
- **Do not reach into the interiors of machine by opening the maintenance door during cleaning or inspection with the power supplied.**
  Always turn OFF the main circuit breaker.
  If a plug is provided, pull out the plug from the power outlet.
  Unexpected operation of the machine may cause an injury or electric shock.
- **Do not touch the power plug with a wet hand. (For a machine with a plug)**
  Touching it with a wet hand may result in the operator suffering an electric shock.

<Cautions>

CAUTION

- **The machine is assembled with precision. Do not expose it to excessive vibrations and/or mechanical impacts.**
- **Use the machine at a voltage conforming to the power supply specification.**
  Using the machine at a voltage no supported may cause the machine to fail or be damaged.
- **Avoid using the machine under a high temperature and humidity.**
  Operating ambient temperature 5 to 40°C/ Operating ambient humidity 45 to 85 %RH
  * There should be no dew formation.
- **If the machine is not going to be used for a prolonged period, always turn OFF the main circuit breaker and the power supply.**
  If a plug is provided, pull out the plug from the power outlet.

■ Notes on the Operation

[1] This machine has been adjusted to detect and remove metal pieces mixed in virgin plastic pellets and/or pulverized plastic materials. To use the machine for other materials or other purposed, consult us in advance.

[2] Install the machine horizontally so that the materials loaded will fall freely through the metal detector unit (hereinafter referred to as the sensor).

[3] If there is a concern of malfunction due to the influence of vibration and/or noise in the operation site, the user may be requested to change the sensor sensibility as necessary (reduce the sensibility). Please understand that the performance of metal piece detection may not satisfy the specifications in such instances.

[4] Always clean the machine before changing the materials to be loaded. Materials remaining in or adhered to the interiors of machine may be mixed in the material loaded next. However, note that flushing the machine with water is strictly prohibited.

[5] The ceramic materials used within the sensor may break due to an impact. In cleaning the machine, be extra careful not to clean the ceramic materials with a metal rod or metal brush or apply impacts by poking or rubbing them.

[6] Do not disassemble the metal detector under any circumstance since it is enclosed in a metallic housing and assembled with precision, including the countermeasure against noises.
Note that disassembling the metal detector will void the product warranty and will make it difficult for SAIKA to respond to requests for maintenance services thereafter.

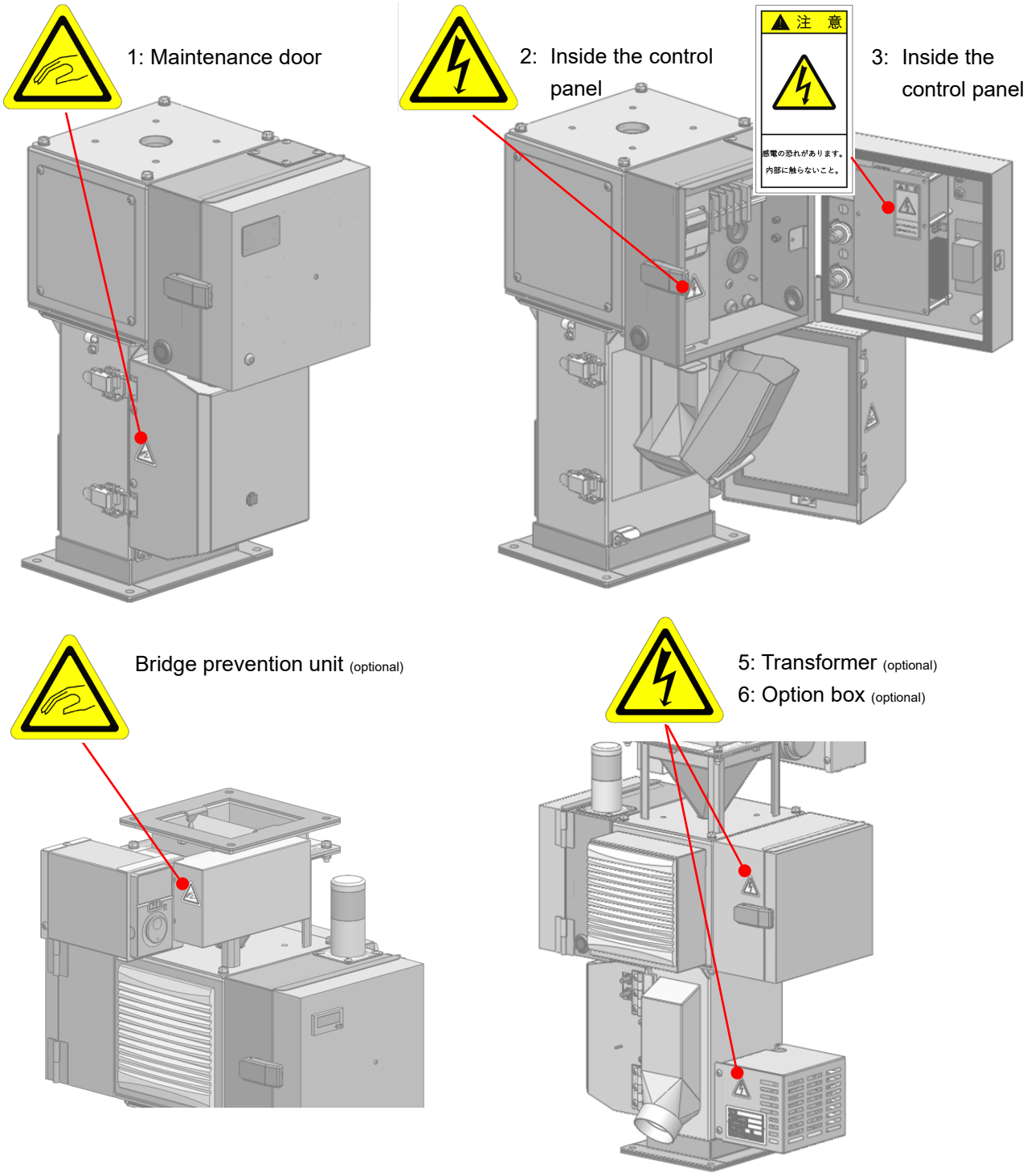
[7] Ensure to supply the power to the machine from a dedicated power supply. Note that supplying the power from other devices (such as a molding machine) may cause malfunctions due to noises.

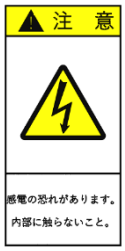
[8] In installing the machine, ensure to provide a grounding (Class D grounding). Otherwise, malfunctions may occur.

Be warned that SAIKA will not be held liable for troubles other than accidents caused directly by this machine.

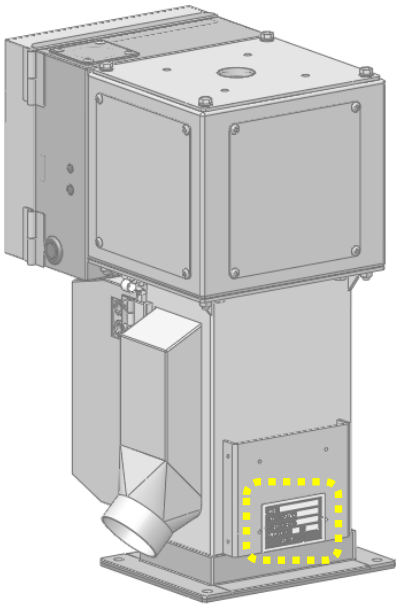
■ Warning labels and product label

Warning labels

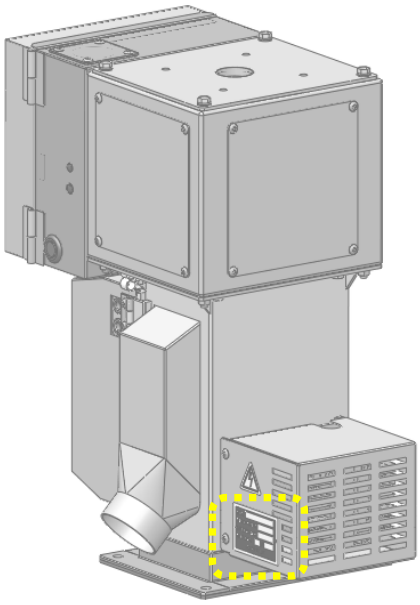


No.	WARNING		
1 4	Pinching fingers		In opening and closing the maintenance door or cleaning the hopper, be extra careful not to have the hand trapped.
2 5 6	Electric shock		Be extra careful not to suffer an electric shock.
3	Electric shock		Be extra careful not to suffer an electric shock.

Product label

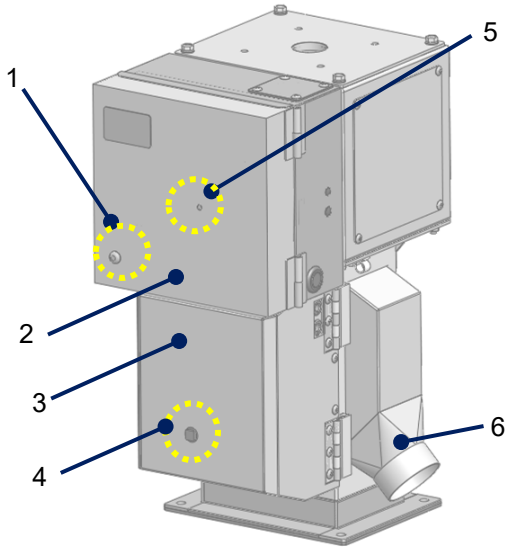


Standard (100 VAC model)

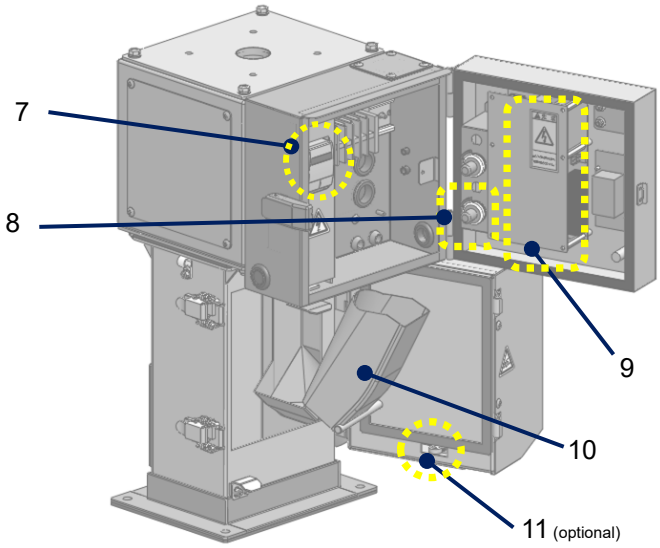


Models for different power supply voltages
(optional)

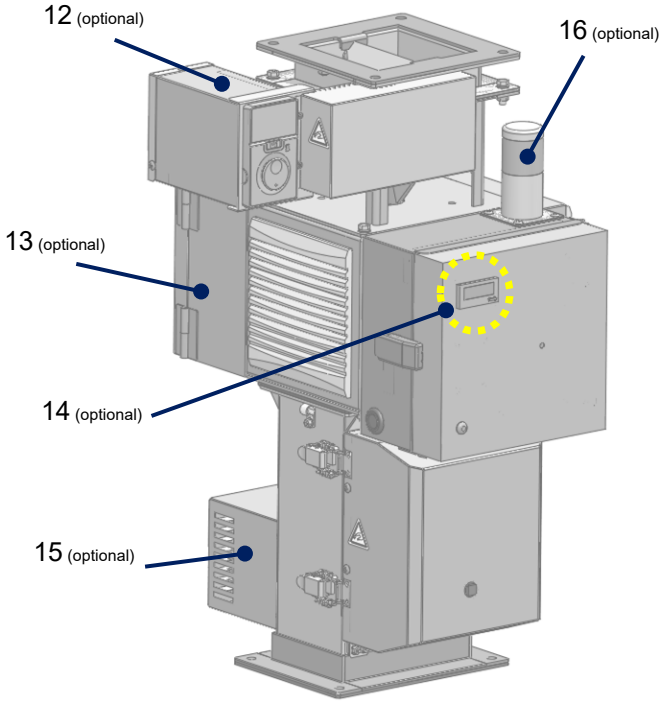
■ Names and functions of various sections of the machine



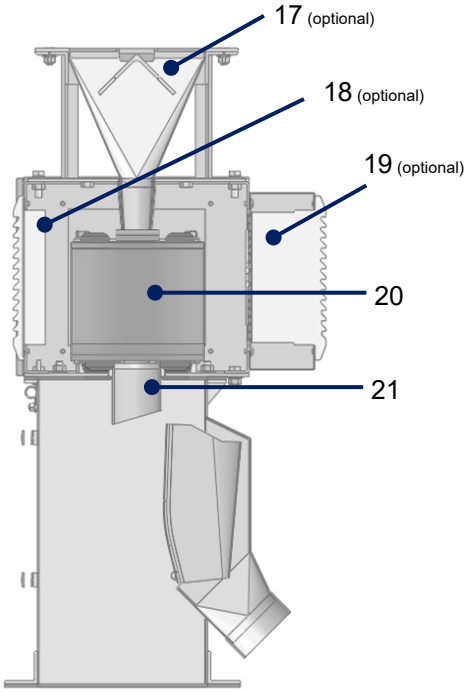
Standard model



Standard model
(With the control unit door/maintenance door open)



Machine with options



Inside the machine
(image of sectional view)

No.	Name	Function
1	Power lamp	The green lamp will illuminate if the circuit is energized.
2	Control unit door	This is a door that is opened and closed in operating the main circuit breaker or performing the sensitivity adjustment.
3	Maintenance door	This is a door that is opened and closed for cleaning the damper and interiors of frame.
4	Circuit protector	Protects against overcurrent on the solenoid for operating the discharge damper. *** For user operation**
5	Sensor lamp	Indicates the sensor condition. (Always ON: Sensor error)
6	Discharge chute	The discharge port for metal pieces.
7	Main circuit breaker	Turns ON and OFF the main power supply for the machine. *** For user operation**
8	Sensitivity control variable resistor	A variable resistor for adjusting the sensor sensitivity (threshold). *** For user operation**
9	Control circuit board	Controls the machine.
10	Discharge damper	Sends metal pieces detected and the material (pellets, etc.) to the discharge chute.
11	Safety switch (optional)	Stops the discharge damper operation if the maintenance door was opened.
12	Bridge prevention unit (optional)	Assists the supply of materials which do not flow easily.
13	Option box (optional)	Contains components of light tower (optional).
14	Counter (optional)	Displays the number of damper activations made by detecting metal pieces.
15	Transformer (optional)	Installed on models operating at different voltages (other than 100 VAC).
16	Light tower (optional)	Indicates the machine status. Green light ON: Normal, Yellow light ON: Metal detected, Red light ON: Error
17	Upper hopper (optional)	The loading port for the material.
18	Cooling unit/air discharge side (optional)	The louver for ventilation.
19	Cooling unit/air intake side (optional)	Cools the interiors of sensor housing with a cooling fan.
20	Sensor unit	A sensor for detecting metals.
21	Lead pipe	The material runs through this pipe.

1

Basic Information

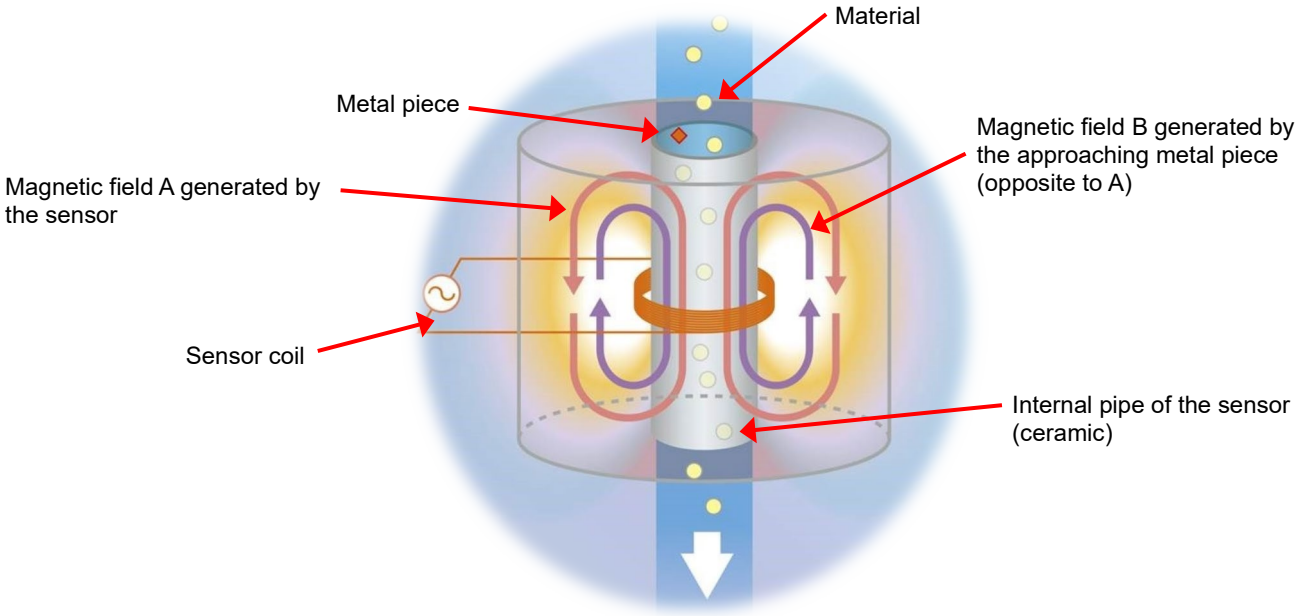
1.1 Detection & Discharge

1.1.1 Detection Principle

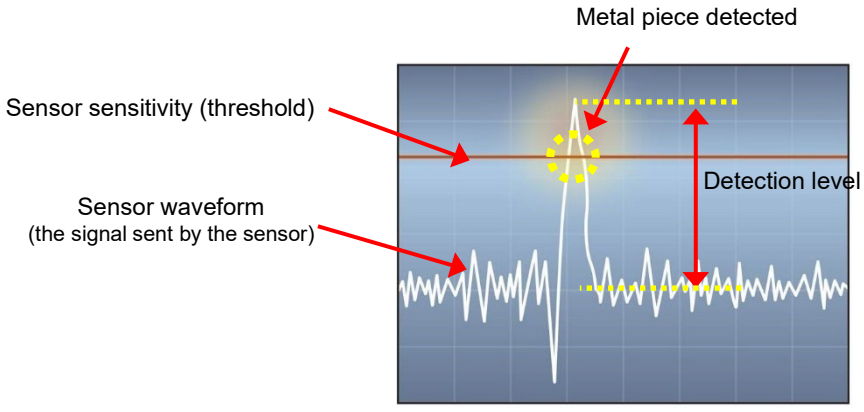
This machine realizes a higher level of metal detection by incorporating a proprietary "**Dielectric Loss Isolated High Frequency Oscillation method sensor.**"

As a metal piece approaches the magnetic field A, which is generated by the sensor, an eddy current runs on the metal surface and the magnetic field B will be generated in the opposite direction to cancel the magnetic field A. The sensor detects the disturbance in the magnetic field (sensor waveform) caused by the magnetic field B, and, if the strength of magnetic field exceeds the predefined detection sensitivity (threshold), it is determined as a metal.

■ Conceptual image: Sensor unit

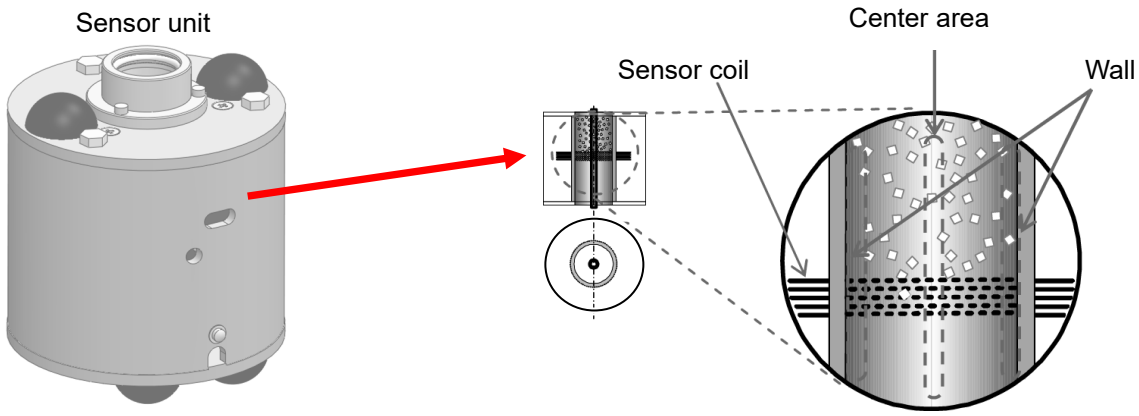


■ Conceptual image: Sensor waveform and sensor sensitivity (threshold)



1.1.2 Detection Sensitivity

Depending on the position in the sensor, the level of sensor waveform varies even if the same metal piece was run.
The sensor waveform level will be higher closer to the sensor coil and the level decreases as the distance from the coil increases. Therefore, the detection sensitivity is the highest on the wall, which is the closest to the sensor coil, and it is weakest at the center, which is farthest from the coil.



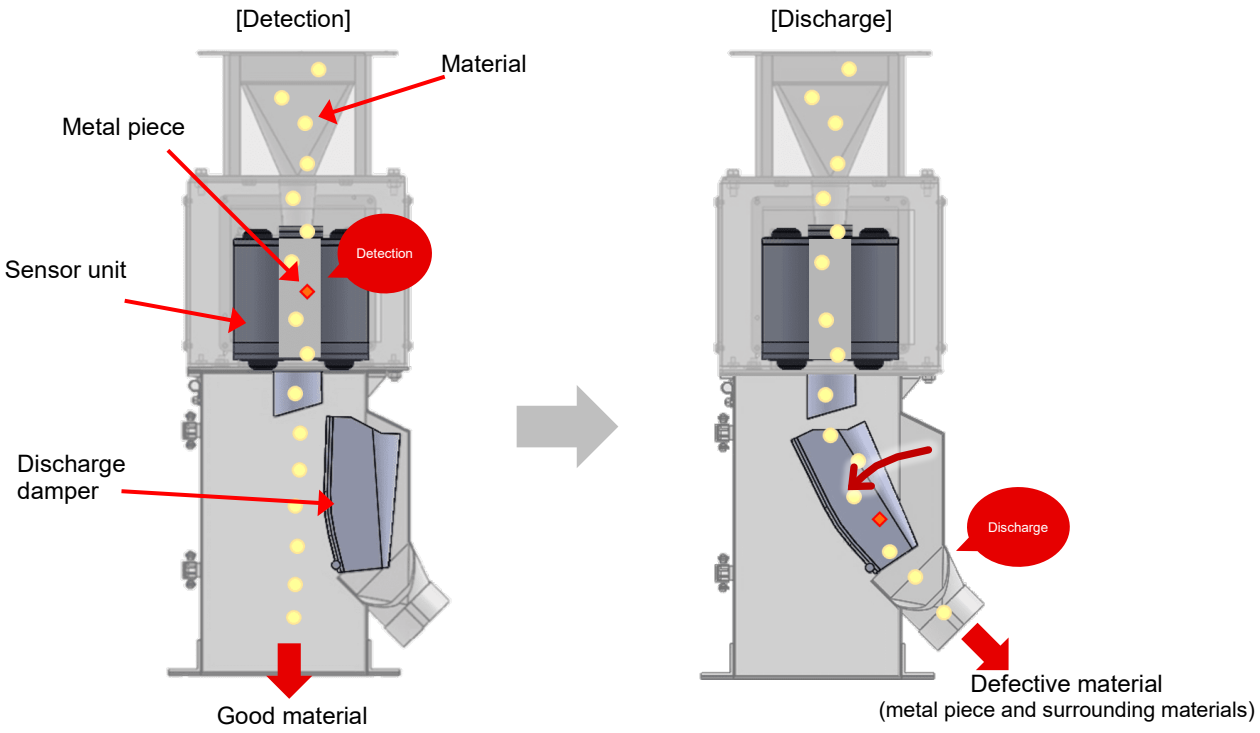
Sensor wall (close to the sensor coil)	The level of sensor waveform is highest. (The detection sensitivity is the highest.)
Center of sensor (far from the sensor coil)	The level of sensor waveform is lowest. (The detection sensitivity is the lowest.)

Important

The detection performance indicated in the machine specifications is determined by using the center of sensor (the area in which the detection sensitivity is the lowest) as a reference.

1.1.3 Discharge

The discharge damper will be activated if the sensor detects a metal piece.
The metal piece detected by the sensor will be discharged by the discharge damper together with the materials surrounding it.



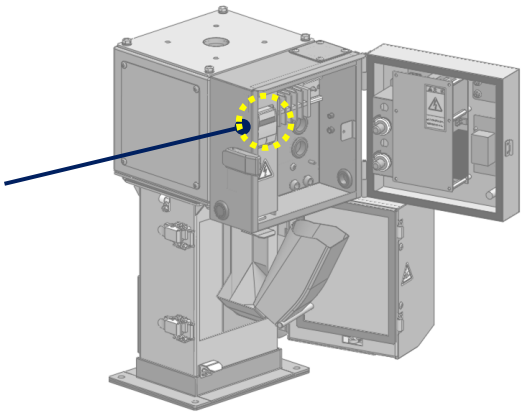
2

Using the Machine

2.1 Running & Stopping

2.1.1 Running

[Operation]
Turn ON the main circuit breaker.

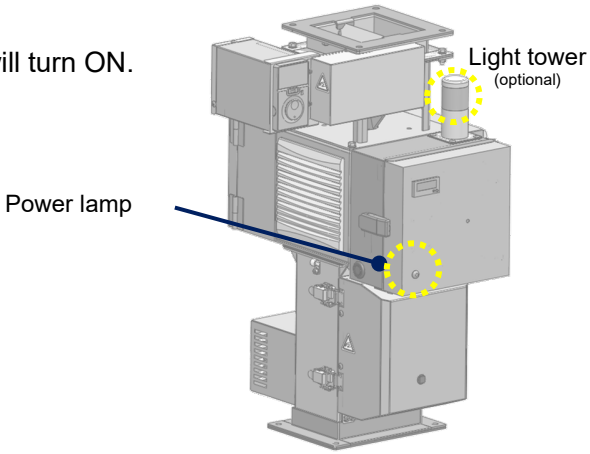


Important

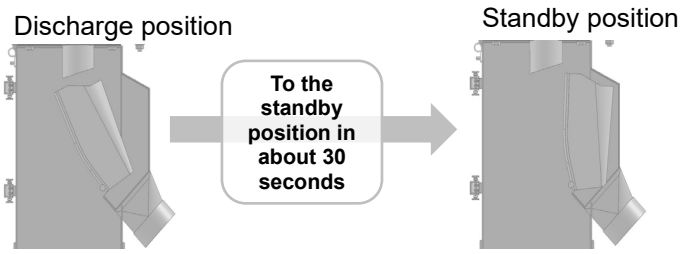
In about 60 seconds after turning ON the main circuit breaker, the sensor will be stable.
Ensure to wait for at least 60 seconds before loading the material.

[Condition]

- The power lamp will illuminate in green.
  If the light tower (optional) is provided, the green light will turn ON.



- In about 30 seconds after turning ON the main circuit breaker, the discharge damper will move to the standby position.
  In addition, the discharge damper will be retained at (returned to) the standby position every 30 seconds during the operation. (The buzzer will beep.)



- Once the sensor detects a metal piece, following operations will be performed.
  - The discharge damper starts the discharging operation.
  - If a counter (optional) is provided, the number of discharge damper activation will be incremented.
  - If a light tower (optional) is provided, the yellow light will turn ON.

2.1.2 Stopping

[Operation]
Turn OFF the main circuit breaker.

[Condition]
- The power lamp will turn OFF.
  If the light tower (optional) is provided, the light will go OFF.
- The discharge damper will move to the discharge position.

3

Maintenance

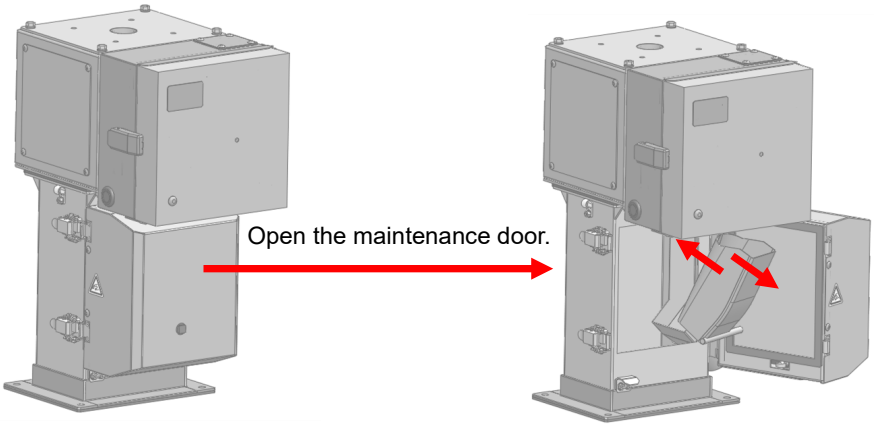
3.1 Routine Inspection

In order to use the machine in an optimum condition, it is recommended to perform inspections routinely before loading the material or switching the material.

3.1.1 Functional Check of Discharge Damper

WARNING Perform this check after turning OFF the main circuit breaker.

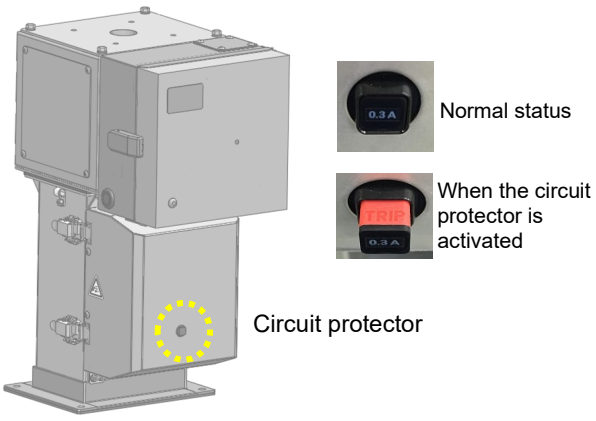
Move the discharge damper in the direction of arrow and confirm that it moves smoothly without any hitch.



*** For operations in the following sections, turn ON the main circuit breaker in advance.**

3.1.2 Checking the Circuit Protector

Ensure that the circuit protector has not been activated.
If it has been activated, the discharge operation will not take place.



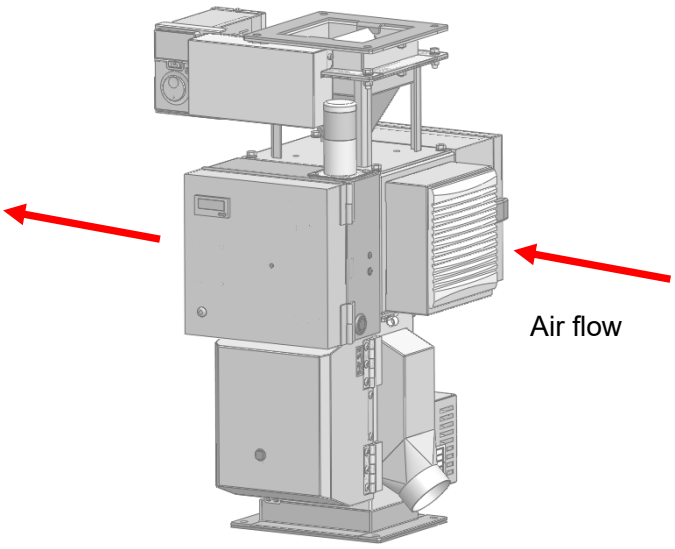
3.1.3 Functional Check Using a Test Piece (Optional)

Important Be extra careful not to let the test piece being fed to the following process or being lost. Perform this task after providing protections.

To check the detection sensitivity, drop the test piece straight down and ensure that it is detected and discharged properly. If it is not detected and discharged properly, contact us.

3.1.4 Functional Check of Cooling Unit (Optional) Cooling Fan

Ensure that the air flows out of the cooling fan.
If the air has stopped or an abnormal noise was heard, it needs to be replaced. Contact us.



Note that the service life of cooling fan is about 4 years and 6 months (approx. 40,000 hours).
* With 24 hour operation under the ambient temperature of 25°C. Note that the life will be reduced in half to 20,000 hours at 35°C.

3.2 Routine Cleaning

In order to use the machine in an optimum condition, it is recommended to clean the machine routinely before loading the material or switching the material.
In cleaning the machine, pay attention to the followings.

WARNING Turn OFF the main circuit breaker before the work.

CAUTION The ceramic materials used within the sensor may break due to an impact. In cleaning the machine, be extra careful not to clean the ceramic materials with a metal rod or metal brush or apply impacts by poking or rubbing them.

CAUTION Do not wash with water.

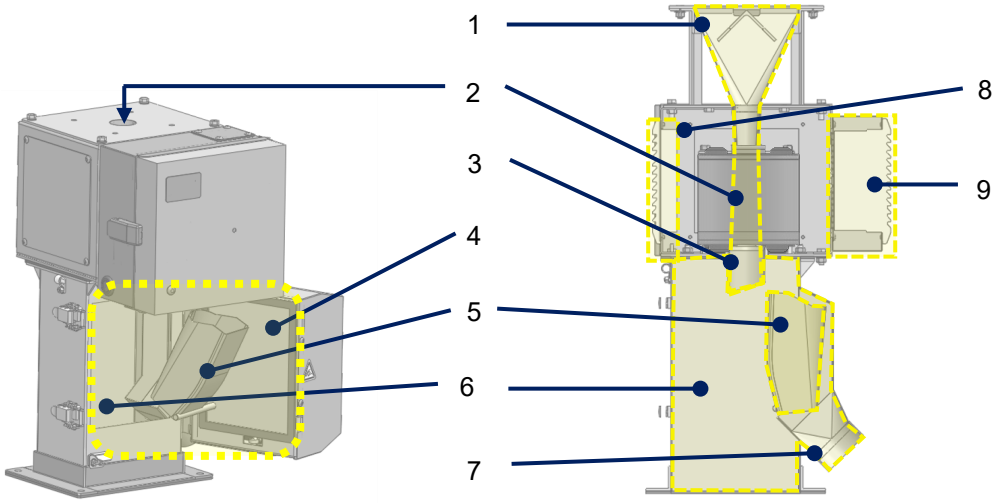
CAUTION The machine is assembled with precision.
Do not remove parts that are not required to be removed (such as the metal detector or discharge damper).

Important Be extra careful not to allow foreign matters or rubbish adhered to the machine to be mixed in the following process. Clean the machine after providing protections.

Items to be prepared:

- Vacuum cleaner
- Dry rag
- Air blowing device

Clean the materials adhered to the machine (especially in the areas in the frame of yellow dotted line) by vacuuming, blowing air or wiping off with a rag.



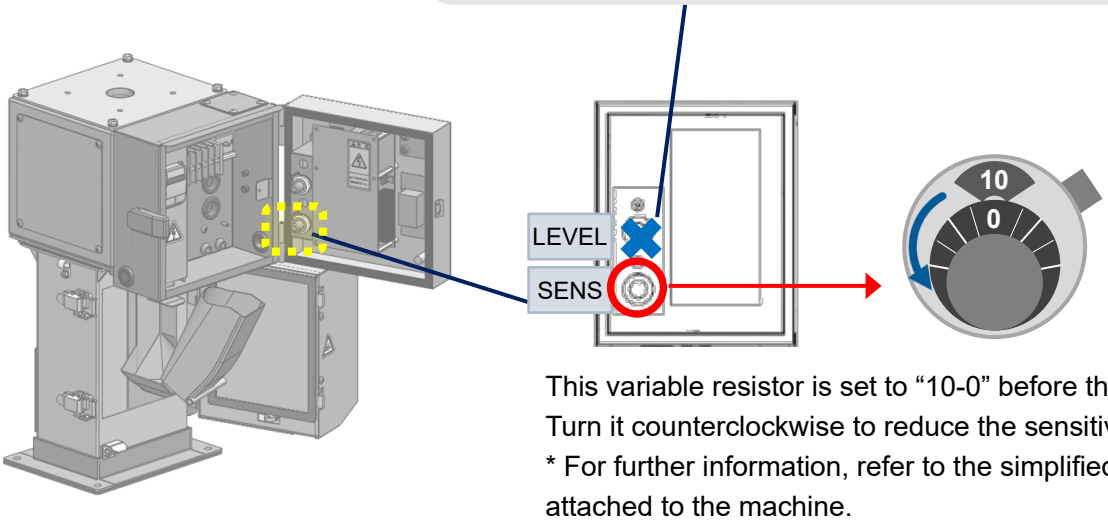
No.	Name	Cleaning Method
1	Upper hopper (optional)	Clean them by vacuuming, using a dry rag or blowing air. * Check wears on the packing as well.
2	Sensor (inside)	
3	Lead pipe	
4	Maintenance door	
5	Discharge damper	
6	Interiors of frame	
7	Discharge chute	
8	Cooling unit/air discharge side (optional)	Remove the cover and clean the air filter by vacuuming or blowing air. If the area around the metal detector is dirty, clean the area by vacuuming or blowing air.
9	Cooling unit/air intake side (optional)	Remove the cover and clean the cooling fan by vacuuming or blowing air. If the area around the metal detector is dirty, clean the area by vacuuming or blowing air.

3.3 Adjusting the Sensor Sensitivity (Threshold)

The sensor sensitivity (threshold) of this machine is set up before the shipment in accordance with the detection performance given in the machine specifications unless there are special requirements. Although it is recommended to use the machine as it is, it is also possible to reduce the sensitivity as required. Note that it may not be possible to perform metal piece detection as specified if the sensitivity was modified.

Important Prior to adjusting the sensor sensitivity (threshold), perform necessary actions by referring to Section 4.2.4 “The discharge damper is activated frequently or there is too much material discharged improperly” in Troubleshooting.

CAUTION Do not touch the variable resistor labeled LEVEL. (Used for adjustment during the maintenance.)



This variable resistor is set to “10-0” before the shipment. Turn it counterclockwise to reduce the sensitivity.
* For further information, refer to the simplified manual attached to the machine.

Important After the adjustment of sensor sensitivity (threshold), perform a detection test using a test piece (optional).

4

Troubleshooting

4.1 Major Symptoms

■ Major symptoms

1 The power cannot be turned ON. (Section 4.2.1)
2 The sensor lamp is always ON. (Section 4.2.2)
3 The discharge damper is not activated even if a test piece (optional) is fed. (Section 4.2.3)
4 The discharge damper is activated frequently or there is too much material discharged improperly. (Section 4.2.4)

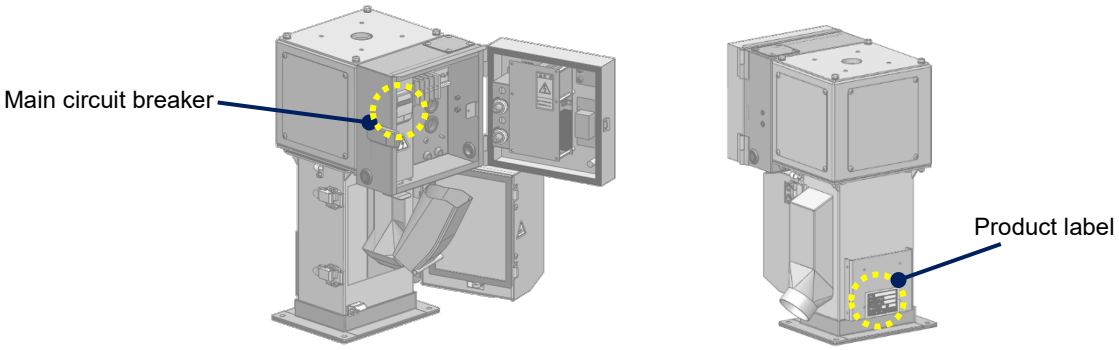
Important If any of above symptoms or a symptom considered a malfunction was found, pay special attention to prevent contaminations, such as situations in which a metal piece or uninspected materials being fed to the following process.

Important If the problem persists after taking actions listed in the following section or if the symptom is not listed, contact us.

4.2 Troubleshooting

4.2.1 The power is not supplied even if the main circuit breaker is switched ON

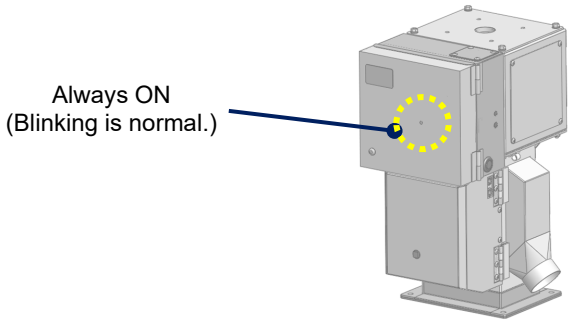
Assumed Cause	Troubleshooting
The power cable is unplugged.	Plug in the power cable.
The machine is used at a voltage other than the one specified.	Check the power supply specifications for the machine. Use the power supply voltage (*** VAC) listed in the product label.
If the problem persists even if above actions were taken, contact us.	



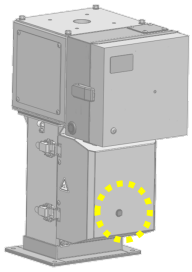
4.2.2 The sensor lamp is always ON

*** Note: Blinking is normal.**

Assumed Cause	Troubleshooting
The sensor has failed.	Stop the material supply and turn OFF the main circuit breaker. If the problem persists after turning ON the main circuit breaker, contact us.



4.2.3 The discharge damper is not activated even if a test piece (optional) is fed

Assumed Cause	Troubleshooting
The circuit protector has been activated.	If the circuit protector has been activated, push the tip of the circuit protector inward. * If the discharge damper operates continuously for 30 seconds or longer, the circuit protector is activated in order to protect the solenoid.   Normal status  When the circuit protector is activated Circuit protector
The sensor sensitivity (threshold) is not set appropriately.	Refer to Section 3.3 Adjusting the Sensor Sensitivity (Threshold) and set it to an appropriate level.
Metal pieces outside the specification are targeted.	Target metal pieces suitable for the detection capability of machine.
The machine is used outside the ambient temperature specified.	The sensor waveform* may become smaller due to the influence of a drop in the operating ambient temperature*. Use the machine at an ambient temperature within the specification. * Operating ambient temperature: 5 to 40°C * Without dew formation * Sensor waveform: The signal sent from the sensor.
If the problem persists even if above actions were taken, contact us.	

CAUTION If the sensor sensitivity (threshold) was set low, it may not be possible to detect metal pieces as specified.

4.2.4 The discharge damper is activated frequently or there is too much material discharged improperly

Assumed Cause	Troubleshooting
A metal piece is adhered to the inner wall of sensor.	Clean the interiors of sensor (the material path). [Reference: Section 3.2 Routine Cleaning]

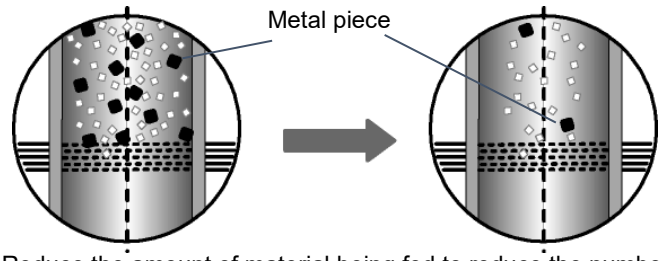
CAUTION The ceramic materials used within the sensor may break due to an impact. In cleaning the machine, be extra careful not to clean the ceramic materials with a metal rod or metal brush or apply impacts by poking or rubbing them.

Important Be extra careful not to allow foreign matters or rubbish adhered to the machine to be mixed in the following process.

Too many metal pieces are mixed in the material.	If there is a high level of metal piece mixture, the sensor keeps on detecting them, causing the discharge damper to remain in the position of discharging defective materials and the majority of the materials to be discharged. If such an instance, take following actions.

If there are too many metal pieces mixed in the material, performing a pre-processing of reducing metal pieces with a magnet will help increasing the effectiveness of the machine.

[1] Reduce the amount of material fed to the machine
In order to reduce the number of detections, reduce the amount of material to be fed to the machine. The optimum amount to be loaded depends on the level of metal pieces in the material. Try reducing the amount of the material little by little to find the optimum amount.
[Reference: Section 1.1.2 Detection Sensitivity]

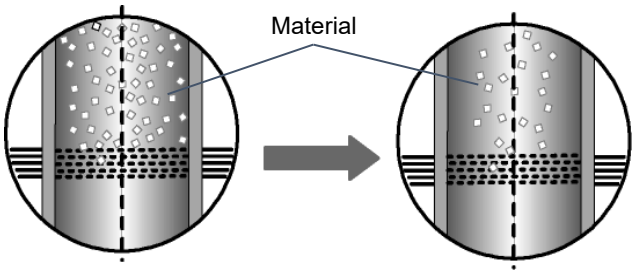


Reduce the amount of material being fed to reduce the number of metal pieces passing through the sensor.

<table>
<tr><th>Assumed Cause</th><th>Troubleshooting</th></tr>
<tr><td></td><td>[2] Change the sensor sensitivity (threshold) setting.
(Drop the sensitivity.)
By referring to [Section 3.3 Adjusting the Sensor Sensitivity (Threshold)], set up the sensitivity to an appropriate level.

⚠ CAUTION
Reducing the sensitivity by changing the sensor sensitivity (threshold) setting may make it difficult to perform the metal piece detection as described in the specification. Please understand this and use the machine by setting the sensor sensitivity to a level suitable for the material to be fed.</td></tr>
<tr><td>The metal detection response is caused by a constituent of the material.</td><td>If frequent detection responses are observed without the presence of metal pieces, it is possible that the machine is responding to some component contained in the material. If this was the case, take following actions.

[1] Reduce the amount of material fed to the machine
In order to reduce the number of responses to the contents of material, reduce the amount of material to be fed to the machine. The optimum amount to be fed depends on the component of the material. Try reducing the amount of the material little by little to find the optimum amount.
[Reference: Section 1.1.2 Detection Sensitivity]

Adjust the amount of material so that the material passes closer to the center of the sensor.
(Reduce the amount of material passing along the sensor wall where the detection response is stronger.)</td></tr>
</table>

Assumed Cause	Troubleshooting
	[2] Change the sensor sensitivity (threshold) setting. (Drop the sensitivity.) By referring to [Section 3.3 Adjusting the Sensor Sensitivity (Threshold)], set up the sensitivity to an appropriate level.
	CAUTION Reducing the sensitivity by changing the sensor sensitivity (threshold) setting may make it difficult to perform the metal piece detection as described in the specification. Please understand this and use the machine by setting the sensor sensitivity to a level suitable for the material to be fed.
If the problem persists even if above actions were taken, contact us.	

5

Specifications

5.1 Product Specifications

5.1.1 Machine Specifications

Model		MS-24	MS-30	MS-42
Sensor Diameter		ϕ24 mm	ϕ 30 mm	ϕ42 mm
Detection Performance*1	Fe	Sϕ0.2 mm	Sϕ0.3 mm	Sϕ0.5 mm
	SUS304	Sϕ0.3 mm	Sϕ 0.4 mm	Sϕ 0.6 mm
Processing capacity*2		340 kg/h	630 kg/h	1770 kg/h
Metal detection method		Dielectric loss isolated high frequency oscillation method		
Foreign substance removal mechanism		Solenoid drive type damper		
Target material		Plastic pellets * For applications for other materials, consult us in advance.		
External dimensions		Refer to the external view of the machine.		
Product weight		Approx. 17 kg (for the main unit only)		
Discharge port diameter		O.D. 60.5 mm		
Rated voltage		100 VAC (50/60 Hz) * Primary power supply voltage modifiable (optional)		
Power consumption		70 W		
Insulation resistance		1 MΩ or higher		
Withstand voltage		1000 V for one minute		
Operating conditions	Operating ambient temperature	5 to 40°C * Dew formation is not allowed.		
	Storage temperature	-25 to 60°C * Dew formation is not allowed.		
	Operating ambient humidity	45 to 85%RH * Dew formation is not allowed.		
	Operating ambient atmosphere	There should be no oil mist, corrosive gas or flammable gas.		
	Material transfer method	Free-fall		
	Material loading height	Within 20 cm above the top surface of machine frame (standard) Within 100 cm above the top surface of upper hopper (with upper hopper installed) * Drop the material onto the protector at the top of hopper.		
	Loaded material temperature	5 to 40°C (standard) * Dew formation is not allowed. 5 to 70°C (high temperature model ... optional) * Dew formation is not allowed.		
	Machine installation condition	Install the machine so that its bottom surface (mounting frame) will be level.		
Main components materials		Major sections of the body & surfaces in contact with the material ... Stainless steel plate (SUS304) Interiors of sensor coming in contact with the material ... Ceramics Packing ... CR (black), CR sponge (black), PTFE V-ring ... NBR (black)		
External output signal terminals		Normal output relay (NC/NO) Metal detection signal (NO) Discharge damper circuit protector trip signal (NO)		

*1 Using a test piece prepared by SAIKA.
*2 The processing capacity varies depending on the shape and specific gravity of material loaded. Shown above is the processing capacity obtained by loading a certain amount of polypropylene (PP/virgin plastic pellets/bulk specific gravity 0.54). Use this value as a reference and it is recommended to perform a sample test to obtain actual processing capacity.

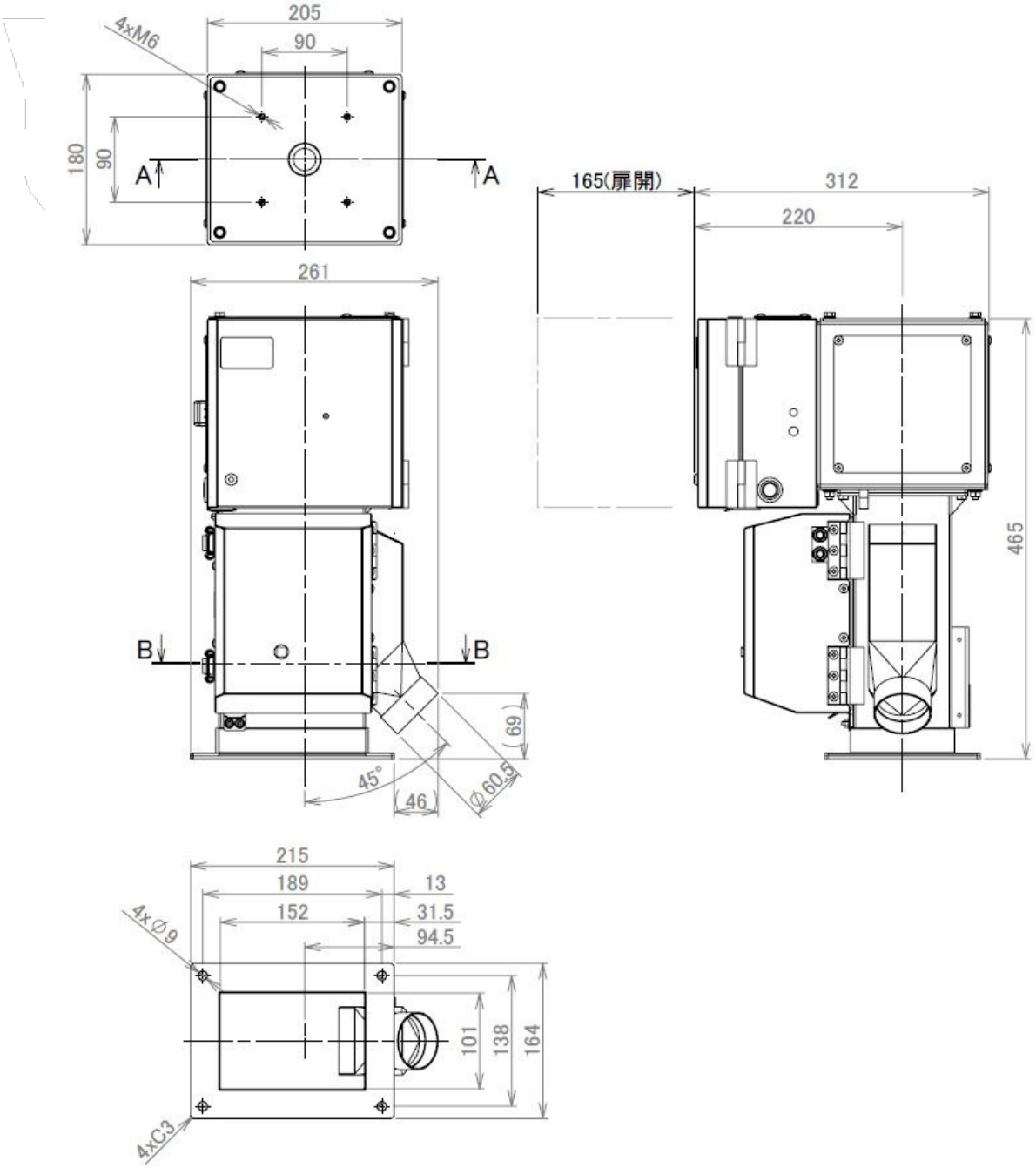
Note that the design and specifications may change without prior notice for the purpose of improving the product.

5.1.2 Specifications of Options

<table>
<tr><th>Option name</th><th>Description</th></tr>
<tr><td>Upper hopper</td><td>Hopper for loading the material. * Consult us if particular shape or capacity is desired.</td></tr>
<tr><td>Test piece</td><td>A metal ball is sealed in a plastic housing.
Use it for routine inspections and checking the machine performance.
<table>
<tr><th></th><th>0.2</th><th>0.3</th><th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.5</th></tr>
<tr><td>Fe</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>–</td></tr>
<tr><td>SUS</td><td>–</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>–</td><td>○</td></tr>
</table></td></tr>
<tr><td>Anti Wear processing</td><td>Wear-resistant finish is applied for components coming in contact with the material.
[Type of finish] New KANUC finish
[Components processed] Upper hopper (optional), main body hopper, lead pipe, discharge damper</td></tr>
<tr><td>High temperature processing</td><td>Applied if the temperature of loaded material exceeds 40°C.
A cooler is provided to reduce the influence of heat to the sensor.
[Operating ambient temperature] 5 to 40°C * Dew formation is not allowed.
[Loaded material temperature] 5 to 70°C</td></tr>
<tr><td>Safety switch</td><td>A safety feature to stop the operation of discharge damper when the maintenance door was opened.</td></tr>
<tr><td>Discharge counter</td><td>Displays the number of discharge damper operations.
(In the discharge operation triggered by the detection of a metal, the count is incremented as the power is turned OFF.)</td></tr>
<tr><td>Light tower</td><td>The machine status, such as a detection of metal, is indicated by light towers.
[Statuses notified by the light tower] Green/Normal operation, Yellow/Metal detection, Red/Error
[Type of errors] Sensor error, circuit protector activation, safety switch activation (optional)</td></tr>
<tr><td>Bridge prevention unit</td><td>Connected to the upper hopper to resolve clogging (bridging) of pulverized materials.
* It is necessary to perform a sample test.</td></tr>
<tr><td>Vibration feeder system</td><td>Feeds a constant amount of material. It is ideal for feeding materials that are difficult to run constantly.
* It is necessary to perform a sample test.</td></tr>
<tr><td>Voltage options</td><td>Specify the voltage.
* For a voltage other than 200/210/220/380/400/440 VAC, consult us in advance.</td></tr>
</table>

5.2 Machine Dimensions

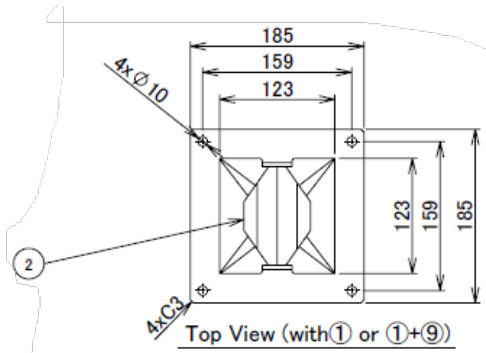
5.2.1 Standard Model



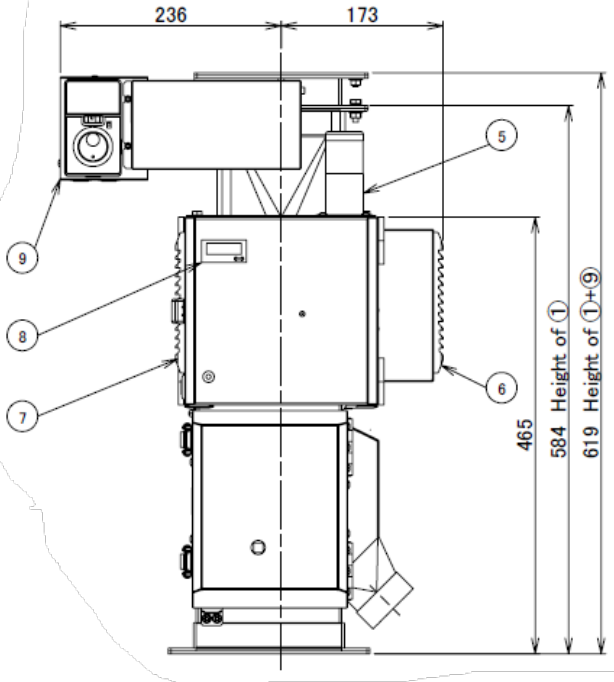
5.2.2 Machine with Options

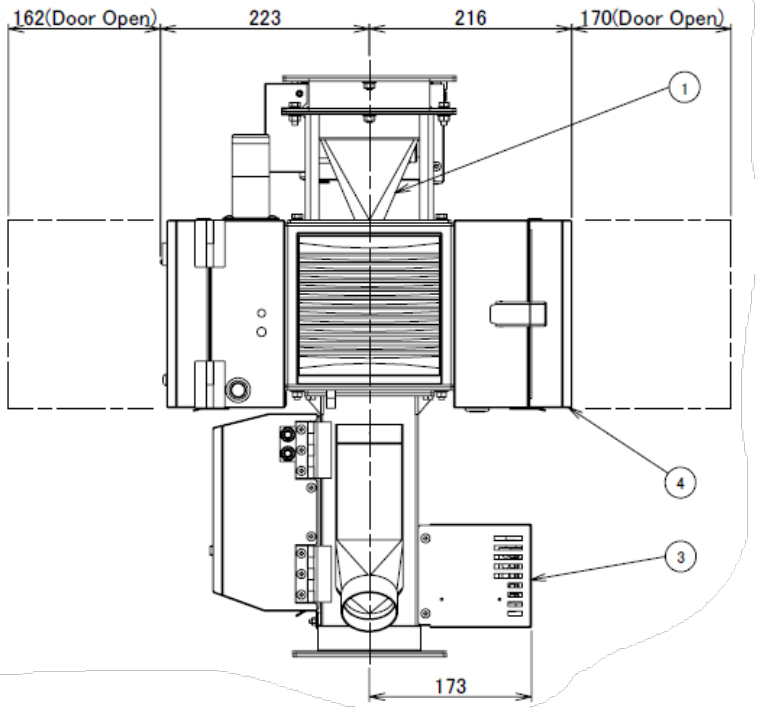
No.	Option/Parts	Materials	Anti-Wear Processing (*1)	Option
①	Upper Hopper	SUS304	○	
②	Protector (①accessory)	SUS304	○	
③	Source Voltage (AC200～220V/ AC380～440V)	–	–	
④	Option Box (Light Tower)	–	–	
⑤	Light Tower	–	–	
⑥	Cooling Unit (Fan)	–	–	
⑦	Cooling Unit (Louver)	–	–	
⑧	Discharge Counter	–	–	
⑨	Bridge Prevention Unit	SUS304	○	

*1. In case of Anti-Wear Processing,
it performs the processing to the appropriate parts.



Top View (with① or ①+⑨)





6

Warranty and Customer Support

6.1 Product Warranty

SAIKA warrants that the product will be repaired with no cost to the customer is it fails due to manufacturing defects within the period of one year from the date of acceptance (or, if there is no explicit acceptance date, the delivery date).
The warranty will be void and the product will not be repaired free of charge if any of the followings apply.

- Failures caused by erroneous wiring and/or erroneous operation.
- A repair and/or a modification has been done by a third party.
- The product used under improper conditions.
- Failures caused by an accident or act of God.
- Damage caused by the customer's willful negligence such as dropping the product.
- Demand for the detection performance or specifications exceeding the performance accepted at the time of ordering.
- If any of the repair parts is unavailable due to discontinuation of production.
- Excessive damages beyond repair.

For repairs after the expiration of the warranty period, consult the place of purchase or SAIKA. Repairs shall be made on the customer's request for a fee provided that the product can be repaired and the proper function of the machine is deemed to be restored by the repair.

Note that the warranty is valid only for the original purchaser and does not apply to the product transferred after the delivery.
SAIKA shall not be held liable for any damage caused by a defect in the product resulting from special circumstances, which cannot be foreseen at the time of manufacture, as well as any loss in the customer's business.

6.2 Inquiries & Consultations on the Product

Saika Technological Institute Foundation
2-1-20 Kuroda, Wakayama 640-8341
TEL: 073-474-0860 FAX: 073-474-0862
URL: https://www.saika.or.jp