MD-9500A Panel-Type

Operation Manual

Installation, Operation and Maintenance Guide

(English Edition)

SHANGHAI DINGLI NEEDLE DETECTOR INSTRUMENT CO., LTD.

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Chapter 1 Equipment Overview

Metal Detector for Aluminum-Foil Packaging

(Please be sure to read this before use)

1.1 Features

- Patented core digital detection technology.
- Imported high-precision SMD components reduce the PCB area and thereby improve product reliability.
- U.S. microcomputer chips perform digital signal processing on the signals of every channel, improving detection reliability.
- Proprietary high-sensitivity technology effectively improves immunity to interference and greatly increases sensitivity.
- An intelligent position display system shows the position precisely.
- Chinese-character display and membrane keypad make human-machine interaction more user-friendly.
- Intelligent counting system. Wide-range sensitivity adjustment.
- Photoelectric-switch automatic alarm and automatic stop. A unique safety lock facilitates production control.
- CE-certified, brand-name, reliable switching power supply that effectively counters interference on the power line

1.2 Intended Use

This machine is used to detect needles, broken needles and other ferrous fragments hidden in various sewn products (such as men's wear, women's wear, children's wear, underwear, kimonos, jackets and bed sheets).

The machine can also be used in the rubber industry to detect iron pieces in rubber.

The machine can also be used in food to detect iron pieces in food.

This machine is designed to detect ferromagnetic materials and cannot be used to detect copper, aluminum, stainless steel and similar materials.

1.3 Interface Description

The function and use of each key are described below.

A — Page turning: pressing the key changes the display as follows

Device Info – Count Screen – Mode

B — Sensitivity up: pressing the key raises the sensitivity, and the corresponding sensitivity indicator lights one step higher; the maximum sensitivity is 12.

C — Sensitivity down: pressing the key lowers the sensitivity, and the corresponding sensitivity indicator lights one step lower; the minimum sensitivity is 1.

D — Start/Stop key: a toggle type; start and stop alternate with each press.

E — Mode/Reset key: 1. On the count screen, press and hold this key to reset the accepted count to zero. 2. When the LCD is showing the mode screen, press this key to adjust the mode as follows (mode details in 2.3).

F — Mode/Reset key: 1. On the count screen, press and hold this key to reset the rejected count to zero. 2. When the LCD is showing the mode screen, press this key to adjust the mode as follows (mode details in 2.3).

> Caution: mode settings are valid only in the standby state; with the key locked, the sensitivity cannot be adjusted, the counts cannot be cleared to zero and the mode cannot be changed.

G — Return key: return distance adjustment, see 2.4 for details.

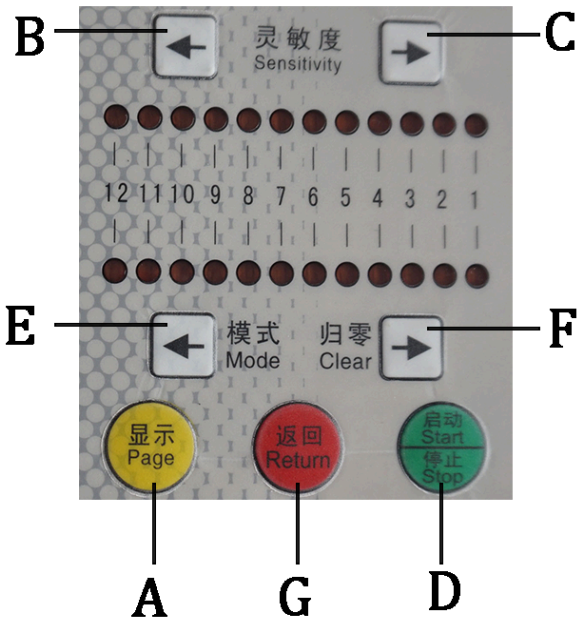


Figure 1-1 Operation Panel

1.4 Standard Accessories and Documents

Name	Description
Operation manual	This booklet
Power cord	To be used with a 220V supply only (see 3.3 Part Description)
Hex wrench	For adjusting the left and right screws (see item 8 in 5.1)
Test piece (also called check piece)	For confirming that an item can be detected (see 2.2 Sensitivity Adjustment)

> The accessories and documents supplied with the machine are subject to the contract and the packing list; if anything is missing or has been damaged in transport, confirm with the carrier before signing and notify our company.

Chapter 2 Operating Instructions

2.1 Operating Procedure

1. Check that the four feet of the instrument are secured. A spirit level is best: place the machine on a tabletop and adjust the four feet until it is level.
2. Make sure there are no large moving ferromagnetic objects nearby, such as large machines, overhead cranes or electric fans; if the machine is installed upstairs, also consider fans under the ceiling.
3. Switch on the main power switch; the machine starts a self-test and the indicators light up in sequence; check that the indicators work.
4. Confirm the required mode and set the required sensitivity, then press switch D lightly; the belt starts.

5. The 12 signal-amplitude indicators on the left show the signal strength that the instrument can detect; if the lit level is very high, the instrument is being disturbed.
6. When a ferromagnetic object is detected, the instrument works according to the mode, the position indicator shows the position of the detected object, and the corresponding count is made.
7. When the items being inspected are very thin, mode B is recommended; it is not controlled by the photoelectric switch, so there is no correct accepted count either.
8. If the photoelectric switch stays blocked continuously for 1 minute, an audible alarm sounds but the machine can still work. So when the buzzer alarms and the belt does not run back, check the photoelectric switch: if the switch is confirmed not blocked by anything, the switch is faulty; if something is blocking it, the alarm stops by itself once it is cleared.
9. In normal operation, if no item has been inspected for more than 10 minutes (mode other than B), the instrument stops automatically.
10. With the key turned to the green dot, the sensitivity cannot be adjusted, to prevent operator error.
11. In any mode, the instrument cannot be started once something blocks the photoelectric switch.
12. The dual-probe model has two specially positioned probes; the instrument acts as soon as either probe detects. In mode B it acts at once, but in the other modes the item is handled only when it reaches the photoelectric switch under the second probe — one confirmation per item, which improves immunity to interference.
13. If an external mode selector switch is fitted: A, uniform mode, in which the sensitivity above and below the probe is fairly even but the overall sensitivity is lower; B, high-sensitivity mode, the opposite of A.

2.2 Sensitivity Adjustment

1. The machine has 12 sensitivity levels. At the factory they are all set to a high sensitivity, generally at level 9–10. Adjust as required; when adjusting the sensitivity the key must be at the red dot position.
2. First pass auxiliary material that is known to contain no broken needles. If it cannot pass, the material itself contains some ferromagnetic matter; lower the sensitivity until it passes, but make sure that the check piece can still be detected.
3. Judge by the sensing lamps: if many of them light up when the item passes, the item itself contains a high ferromagnetic content and the sensitivity must be lowered.
4. Sensitivity differs with height; adjust the sensitivity precisely.

2.3 Mode Description

The machine has four operating modes; their states are shown in the table below.

Mode	State
Mode A	Stop
Mode B	Thin-material detection
Mode C	Stop – Return – Stop
Mode D	Stop – Return – Stop – Run

2.4 Return Distance Adjustment

G — Return key:

Return distance adjustment: in operation (with the belt running normally), the mode must not be set to mode A. Hold this key down and test with the test piece; as soon as an item is detected the belt runs back. Release the key when the required distance is reached, and the adjustment is complete. Modes B and D have the same distance, so whichever of the two is selected, the adjusted distance applies to both and is the same in both. The return distance of mode C is independent of that of modes B/D, so in mode C this distance must be adjusted again; it can be set so that the item does not drop off at the front,

or so that it does drop off, according to the user's requirements. Once adjusted, these values are stored permanently in the computer, and the instrument works with them until the user changes them again.

In the stopped state (belt not turning), hold this key down and the belt runs in reverse; release the key and the belt stops.

On the dual-probe model, adjustment is not possible in mode B; adjust in mode D.

In normal operation, do not press this key at will: if it is pressed while the belt is running back, the computer takes it as a request to adjust the return distance, and a single accidental press changes the return distance. If it has changed, adjust it again.

2.5 Quick Reference Table

The panel keys and the operating modes are summarized below; for details see 1.3 and 2.3.

Key	Name	Function
A	Page display	Page turning: pressing the key changes the display as follows (Device Info – Count Screen – Mode)
B	Sensitivity up	Pressing the key raises the sensitivity and the corresponding sensitivity indicator lights one step higher; the maximum sensitivity is 12.
C	Sensitivity down	Pressing the key lowers the sensitivity and the corresponding sensitivity indicator lights one step lower; the minimum sensitivity is 1.
D	Start/Stop	A toggle type; start and stop alternate with each press.
E	Mode/Reset	On the count screen, press and hold this key to reset the accepted count to zero. When the LCD is showing the mode screen, press this key to adjust the mode.
F	Mode/Reset	On the count screen, press and hold this key to reset the rejected count to zero. When the LCD is showing the mode screen, press this key to adjust the mode.
G	Return	Return distance adjustment, see 2.4 for details.

Mode	Working Method
Mode A	Stop
Mode B	Thin-material detection
Mode C	Stop – Return – Stop
Mode D	Stop – Return – Stop – Run

> Mode settings are valid only in the standby state; with the key locked, the sensitivity cannot be adjusted, the counts cannot be cleared to zero and the mode cannot be changed.

Chapter 3 Installation

3.1 Installation Site and Precautions

1. Do not install the machine on a workbench or beside an iron rack.
2. Do not install the instrument near machines that generate magnetic fields — for example motors with electromagnetic clutches, sewing machines, cutting machines, packaging machines and air-conditioning units, or machines fitted with converters — because these all produce electrical and magnetic interference that causes faulty operation of this machine.
3. Install this machine away from large moving iron objects (for example trains, automobiles, etc.).
4. Keep this machine away from large iron objects (iron windows, etc.), or change the orientation of the instrument body.
5. Although this instrument uses proprietary high-sensitivity technology and does not judge detection by signal strength, a useful signal can be swamped by excessive interference, causing missed detection, so strong interference must be avoided. Operators must not wear ferromagnetic articles such as mobile phones, PDAs, keys or pens.
6. Operate the machine in a ventilated, dry environment.

7. The machine has four adjustable foot screws; all four feet must be secured and the machine level for reliable operation.
8. Avoid using welding machines and other high-power, high-interference equipment on the same power line.

3.2 Power Supply and Grounding

This machine uses a 220V AC supply and must be plugged into a socket with a grounding device; do not use any other supply. Ambient temperature: 10 to 40°C.

3.3 Part Description

1. Power cord: to be used with a 220V supply only
2. Belt adjusting screws: used to adjust the curvature of both edges of the belt.
3. Power switch: the power switch must be on for operation; when work is finished, switch the power off.

Chapter 4 Routine Maintenance

4.1 Precautions After Work

1. Check the belt for any remaining broken needles or other metal fragments.
2. Inspect the sensor above the belt. Because the sensor is strongly magnetic, needles or other metal fragments may cling to it, so clean the sensor with adhesive tape or another method, so that the next run is correct.
3. Switch off the power and unplug the plug.

4.2 Cleaning and Wear Parts

1. The power plug must be pulled out before cleaning.
2. Use a soft plastic brush or a cloth; never use a metal brush.
3. Clean with a neutral detergent; never use organic solvents such as thinner or benzene.
4. Rust marks caused by iron powder or salt can be wiped away with a sponge or cloth soaked in neutral detergent or soapy water, then rinsed thoroughly with clean water; cleaning liquid must not be left on the equipment.
5. If stains from fingerprints or touching cannot be removed completely with neutral detergent or soapy water, wipe them with a sponge or cloth containing an organic solvent (alcohol, gasoline, acetone, etc.).
6. This machine must not be washed with water. The conveyor belt, the detection probe and the electrical box must be kept dry.
7. After long periods out of use, or when summer humidity is high, wipe the condensation off the conveyor belt, the support plate and the electrical box before switching the machine on.
8. The belt and the motor both have a limited service life and are wear parts; switch the machine on only when it is to be used. Although the machine has an energy-saving device, it still wastes 10 minutes' worth of power.

Chapter 5 Troubleshooting

5.1 Common Faults and Remedies

Clearing electrical faults must be carried out with the power switched off.

1. No display after power-on

- Check whether the red power lamp on the mainboard is lit. If it is not, check the indicator on the switching power supply, the 220V supply, the main power switch and the fuse, and check that the power connection from the switching power supply to the mainboard is correct.
- Red power lamp on the mainboard lit: the panel cable is not connected correctly or the cable is faulty.

2. The panel lamps pass their test and all light up, but the keys do not respond

- The panel touch switch may be faulty, the panel cable may be faulty, or the panel itself may be faulty.

3. Sensitivity cannot be adjusted

- Check whether the key is at the green dot position; at the red dot the sensitivity can be adjusted.

4. The position lamp still flashes with the on-board sensitivity set to minimum

- First unplug the motor control cable (the motor control socket on the board) and press the start key to see whether the symptom persists. If it does, unplug the probe cables on the board (all of them if two sets are used); if the fault persists, the mainboard is at fault. If not, the probe or the probe wiring is at fault. If the motor does not run and very few sensing lamps light, the frame or the belt is at fault. One way to tell whether the probe cable is connected wrongly: every output on the board has a 10K resistor to ground, so 10K should be measured from the output line to ground; an open circuit or a short circuit both indicate a problem.
- If the interference lamps stay very low with the motor off but flash red frequently once the motor is on, the frame or the belt is at fault. Check the belt: if the position lamp flashes at a fixed point, it is definitely a belt problem.

5. In modes A, C and D the position lamp lights but detection is missed

- The photoelectric switch is faulty. Check it like this: with the photoelectric switch blocked, the lamp on the mainboard lights; unblocked, the lamp goes out.
- Adjust the photoelectric switch so that with nothing present the relevant indicator on the mainboard is just off. Once an object blocks it, the photoelectric-switch indicator on the board lights. If the lamp is lit while nothing is present, the photoelectric switch is faulty.

6. The motor does not respond when the start key is pressed

- If holding the return key makes the motor run backward, the photoelectric switch is already active and the photoelectric-active lamp on the mainboard must be lit. If it is not lit, the keypad is faulty.
- This shows that the photoelectric switch is active; there are two possibilities — the photoelectric switch is blocked by an object, or it is already damaged.
- If all the above is in order, check the mainboard near the motor output lines: beside each of them there is a red indicator lamp — the one nearer the middle is for forward rotation and the one nearer the outside for reverse. A lit lamp means the function is active and the motor turns, but both lamps cannot be lit at the same time. If a lamp is lit but the motor does not turn, check the fuse on the mainboard and check the relays. The two relays are interlinked: unplug one and the other stops working too, so check both at the same time.

7. The accepted count is incorrect

- The sensitivity of the photoelectric switch is too low; lower the sensitivity of the photoelectric switch.

8. The belt runs to one side

- Use the hex wrench supplied with the machine to adjust the left and right screws.

9. Other problems

· Please contact our company.

5.2 Mainboard and Wiring Reference

During servicing, use the two figures below to check the mainboard connectors and the motor wiring. The criteria for judging are given in items 4 and 6 of 5.1.

> Note: the area marked HIGH VOLTAGE! DANGER in the wiring diagram is live; the power must be switched off before servicing.

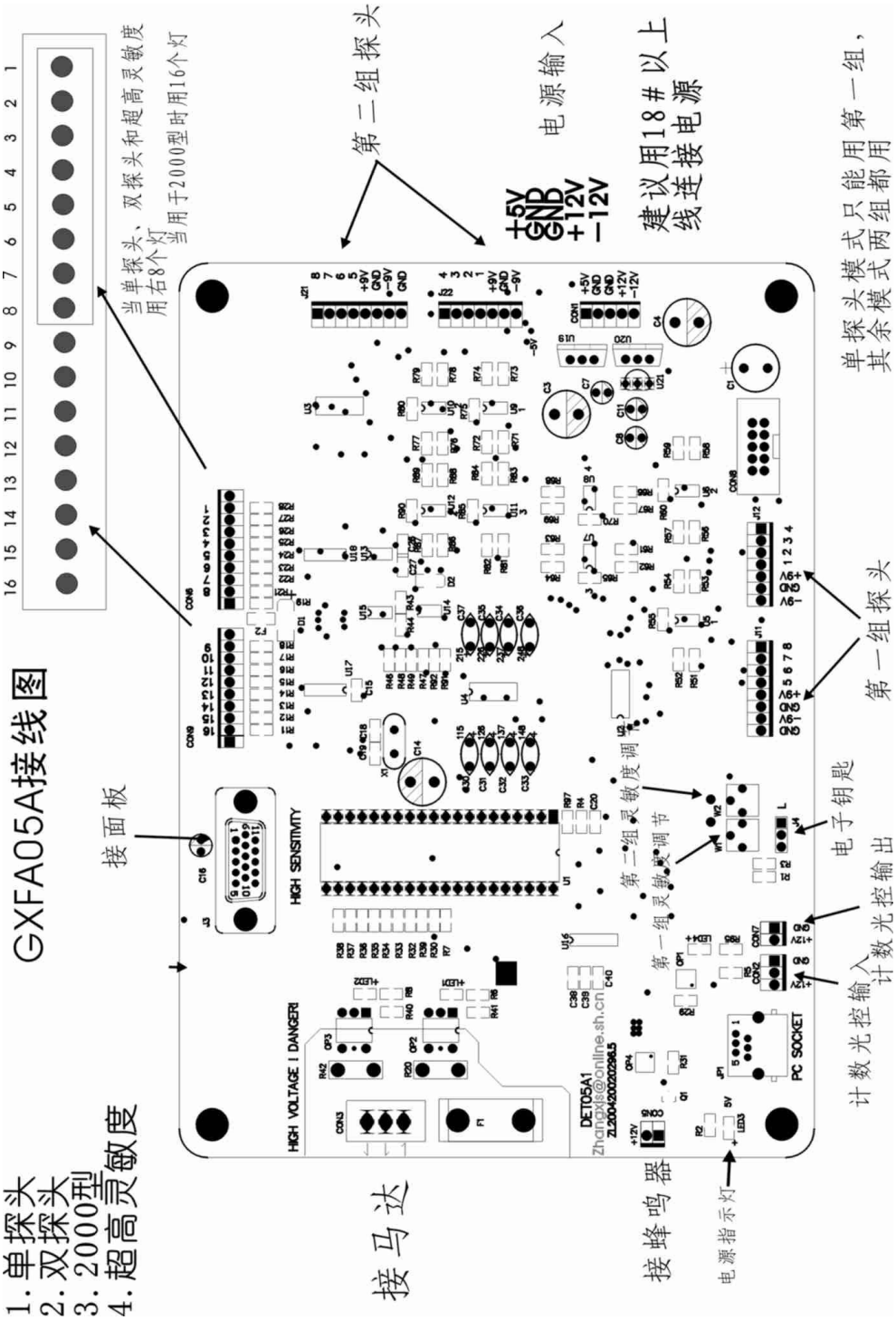


Figure 5-1 GXFA05A Mainboard Wiring Diagram

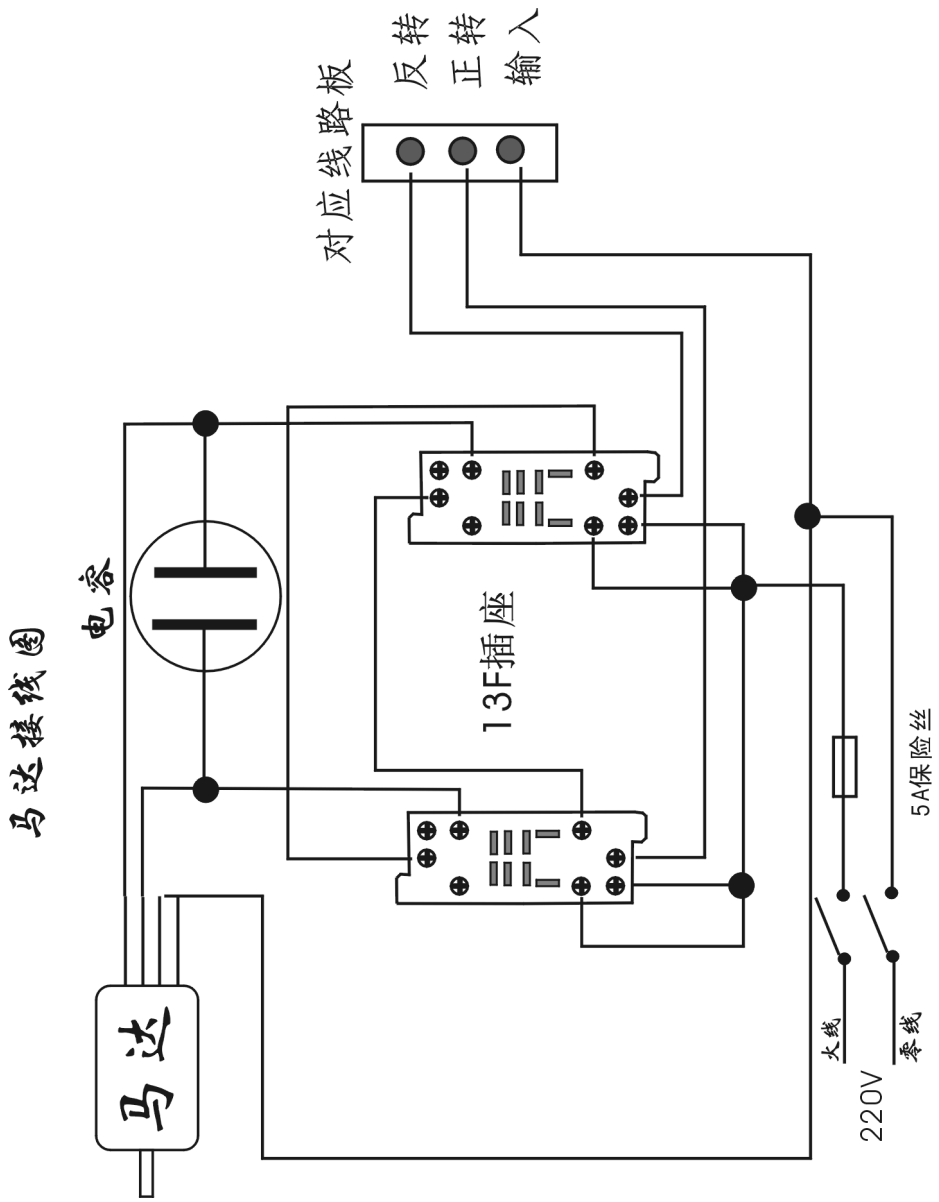


Figure 5-2 Motor Wiring Diagram

5.3 Inspection Practice and Re-inspection Rules

The following items are quality control requirements for metal detection work; they bear directly on the risk of missed detection and must be carried out.

1. Before every inspection, first calibrate the sensitivity once, and start inspecting only after confirming that the equipment is normal.
2. During inspection, calibrate the sensitivity once every hour. If the equipment is found to be malfunctioning, stop inspecting immediately; after clearing the fault, recalibrate the sensitivity and continue only after confirming that it is normal. All products already inspected during the fault must be re-inspected.
3. Place and remove items gently; do not throw or drop them, to avoid false alarms caused by vibration.
4. Any product that triggers an alarm must be re-inspected once; if it still alarms, it is judged to contain metal foreign matter, which must be identified and removed, and re-inspection continues until no alarm occurs.
5. The products being inspected must not extend beyond the detection channel; striking the detection probe will cause false alarms.
6. If an abnormal noise occurs during operation, stop the machine and inspect it immediately, and resume inspection only after the fault is cleared.

7. The detection probe must be kept stable: do not stack anything on the probe and do not lean on it while working.
8. An occasional single alarm caused by vibration or power fluctuation is normal and is not treated as a fault; if it occurs frequently, troubleshoot according to 5.1.
9. After every inspection, stop the machine, switch off the main power and pull out the power plug.

Chapter 6 Safety Instructions

1. The machine is precisely built; do not strike the probe or the table plate at will.
2. The machine has a strong magnetic field, which can damage certain items such as computer disks, watches and magnetic cards.
3. Any drive part can injure people; keep hands and clothing out of the rollers.
4. This machine uses a 220V AC supply and must be plugged into a socket with a grounding device; do not use any other supply.
5. Electrical repairs must be carried out by suitably qualified professionals; non-professionals must not open the electrical box.

Appendix 1 Daily Verification Record

Before every start of work and during inspection, verify the sensitivity with the test piece as required in 5.3, and record the results in this table.

Date	Sensitivity Setting	Test Piece Result (Normal/Alarm)	Equipment Status	Checked By	Remarks

> This table is completed and kept by the user as the quality record of the inspection process.

Appendix 2 Product Warranty

Dear user: First of all, thank you for choosing our product. To make our service more satisfactory to you, and in your own interest, please fill in this form carefully after purchase and keep it in a safe place.

> The product name, model specification, product serial number and date of manufacture are as marked on the machine nameplate.

Customer name	Date of purchase
Contact person	Telephone
Address	Product name
Model specification	Product serial number
Dealer name	Dealer stamp

Warranty Terms

1. Warranty period: one year (from the date of purchase).
2. The conveyor belt is a wear part and is not covered by the free warranty; users may contact the dealer to purchase a replacement.
3. In any of the following cases the free warranty does not apply, and our company is entitled to charge repair costs:

· beyond the valid warranty period;
· damage caused by force majeure (flood, fire, earthquake, lightning, typhoon, etc.) or by improper operation or use;
· inspection, repair, modification, component change or circuit alteration carried out by the user or by a third party without authorization;
· the warranty form has been altered, or does not correspond to the product.

4. Products exported to overseas regions are not entitled to free warranty service; please consult the dealer about paid repair service.
5. Users should read this manual thoroughly and operate as specified. After purchase, please return this form to our company (or send a photo of it) for our records as soon as possible.

Manufacturer Information

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