Metal Detector

MD-8500

Operation Manual

Installation, Operation and Maintenance

English Edition

SHANGHAI DINGLI NEEDLE DETECTOR INSTRUMENT CO., LTD.

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Chapter 1 Overview

1.1 About the metal detector

A metal detector uses electromagnetic waves to inspect items carried on a conveyor-belt production line. When a metal signal that exceeds the set value is detected, the machine outputs an alarm indicating that metal is present and issues a stop command or a reject command signal.

1.2 Standard scope of supply

Item	Qty	Item	Qty
Metal detector	1 unit	Test cards	as supplied
Operation manual	1 copy	Hex key	1 pc
Electrical box key	1 pc (if a lock is fitted)	Dust-proof packaging	as supplied

1.3 Part names and functions

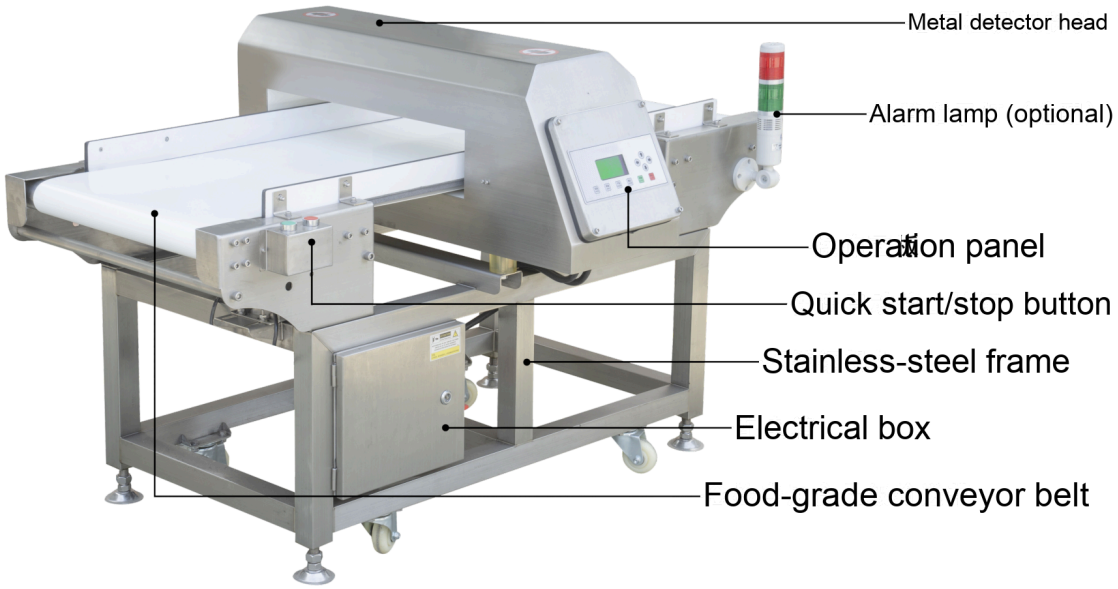


Figure 1-1 Machine layout

1.4 Control panel functions

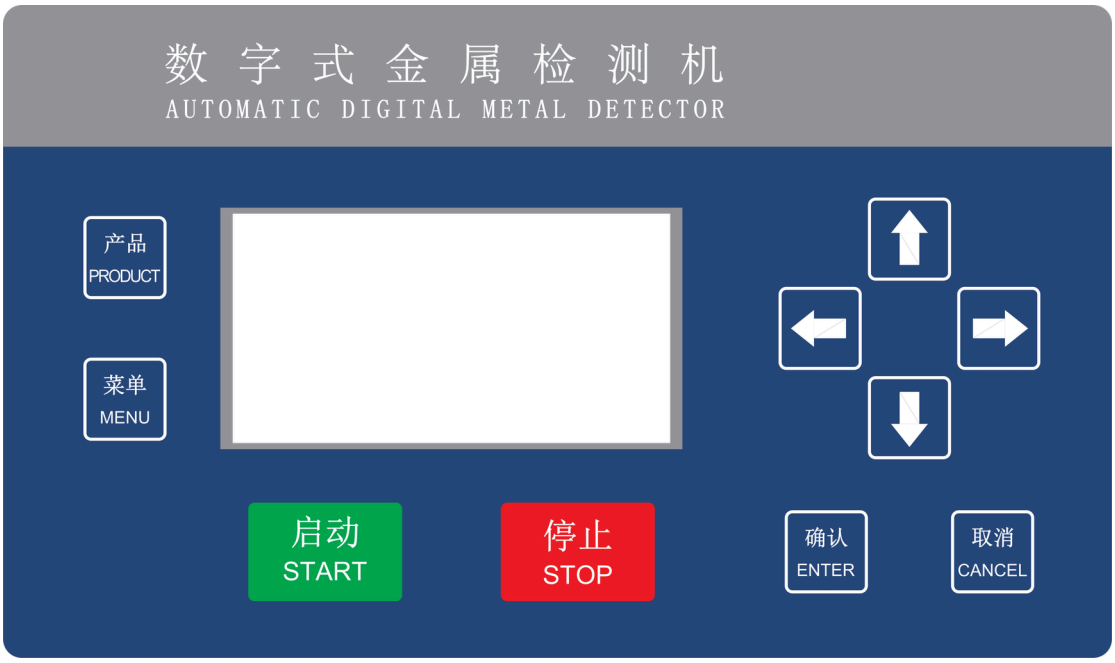


Figure 1-2 Control box panel

> Caution: to avoid damaging the protective film, do not press the keys with a pointed object such as a ballpoint pen.

Control	Function
LCD display	Shows the product No., the product name, the judgement result, the operating mode and so on.
Up/down/left/right arrow keys	Select items and change the screen page.
[Start] key (run)	The conveyor indicator lights and the conveyor belt starts running.
[Stop] key	The conveyor indicator goes out and the conveyor belt stops running.
[Product] key	On the basic screen, opens the product list, where products are set up.
[Menu] key	On the basic screen, opens the menu, where menu items are selected.
[Cancel] key	Closes the present screen and returns to the previous screen.
[Enter] key	Confirms an item or a setting.

Chapter 2 Installation

2.1 Packing list

1 Metal detector × 1
2 Ferrous test card × N, stainless-steel test card × N
3 Documentation bag × 1

2.2 Product installation

Install the machine only in a place that meets all of the following conditions.
1 Ambient temperature not below 0 °C and not above 40 °C.
2 Relative humidity between 30% and 85%, without condensation.
3 No direct sunlight, and no stove, heater or similar heat source nearby.
4 Supply-voltage fluctuation within +10% to –15% of the rated voltage.
5 Away from sources of vibration, in a place where vibration is unlikely.
6 A place with little dust.
7 No volatile flammables, corrosive gases or brine.
8 A place where the hot or cold air of an air conditioner does not blow directly onto the machine.

2.3 Installation precautions

1 The supply must form a system of its own and be kept separate from the supply systems of noise-generating equipment and other devices (large motors, packaging machines and so on). Connect the machine to a socket close to the supply.
2 Do not split the power cord into several taps or bend it excessively. A heavy object resting on the cord will crush it and can cause fire or electric shock.
3 Keep the power cord away from heat sources. Before unplugging, switch the power off first and pull the plug while holding it.
4 When this machine is connected to (touches) equipment upstream or downstream, such as a conveyor, interference may cause false operation. In that case, keep the machine clear of other equipment and earth it separately.

2.4 Height adjustment

1 Adjust the machine so that its top surface is level with the conveyor upstream and the conveyor downstream. Adjust the foot bolts until the machine contacts the floor completely and does not rock; after adjustment, lock the lock nuts with a wrench.

2.5 Power connection

1 To avoid danger, fit a circuit breaker in the supply line to this machine. If the machine is used in a damp environment, also fit an earth-leakage circuit breaker.
2 To avoid electric shock and to keep the machine running stably, the power plug must be earthed. (Use 1.6 mm diameter soft copper wire for the earth lead, or a metal wire of equivalent strength that does not corrode easily. Earth impedance must be below 100 Ω.)

Chapter 3 Operation

3.1 Home screen

Open the electrical box at the lower right of the front of the machine and press the power switch to switch the power ON. After the display starts and the machine completes its automatic start-up adjustment, the [Home] screen appears.

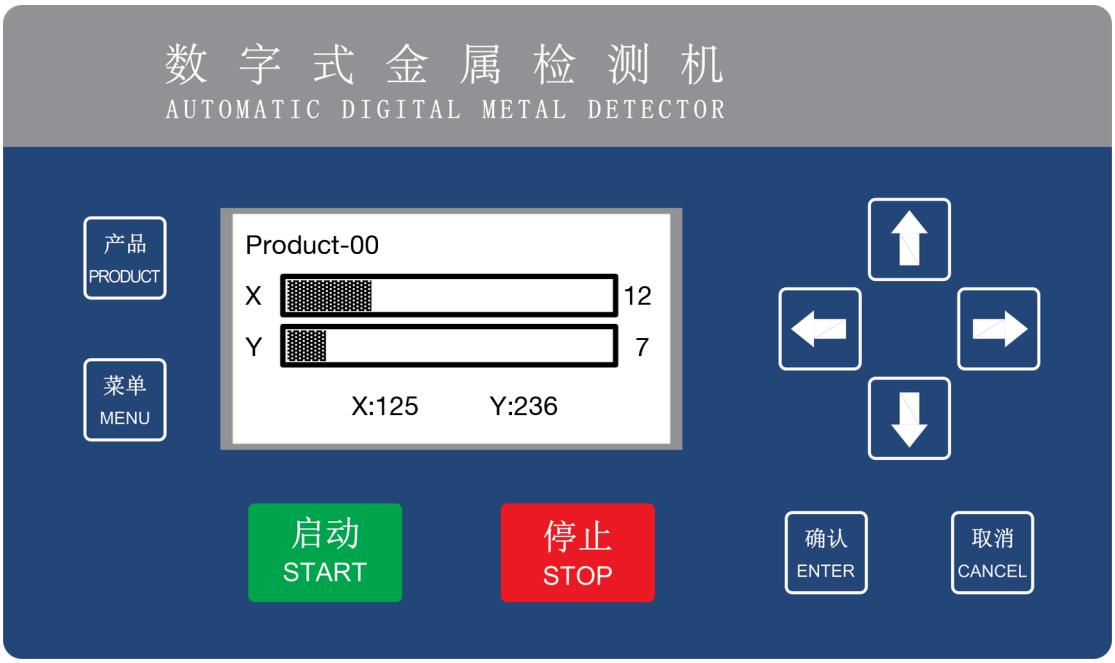


Figure 3-1 Home screen

> Note: the machine uses dual-channel detection. On the [Basic] screen, X and Y represent the two channels, and the cursor bars show the strength of the two signals. The numbers after the cursor bars, such as '12' and '7' in the figure above, are the actual values of the two signal strengths. If either value is greater than 50, an alarm is given and the machine stops.

3.2 Registering a new product

3.2.1 Auto-setup (recommended)

Prepare the sample to be inspected. The sample must represent the average characteristics (size, weight, composition and packaging) of the items carried on the line.

1 Set the LCD display to the home screen, press [Menu] to enter the menu (Figure 3-2) and select Auto-setup.



Figure 3-2 Menu screen

2 The LCD display prompts for waiting (Figure 3-3); wait.

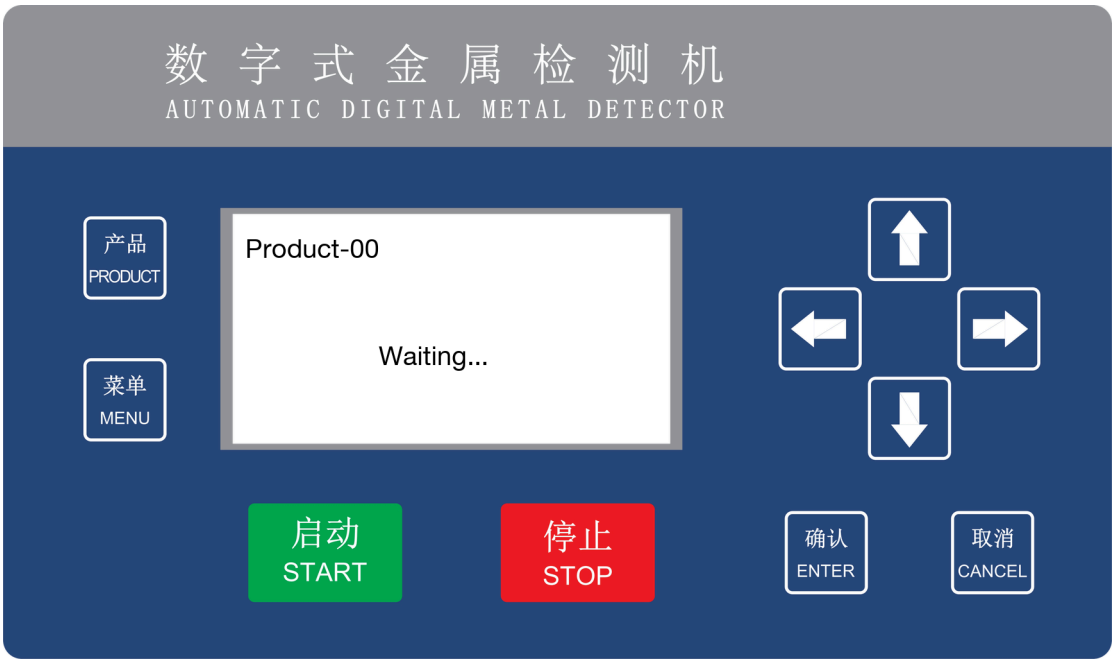


Figure 3-3 Waiting

3 After a few seconds the display shows product flow (Figure 3-4). Place the item to be inspected on the conveyor belt.

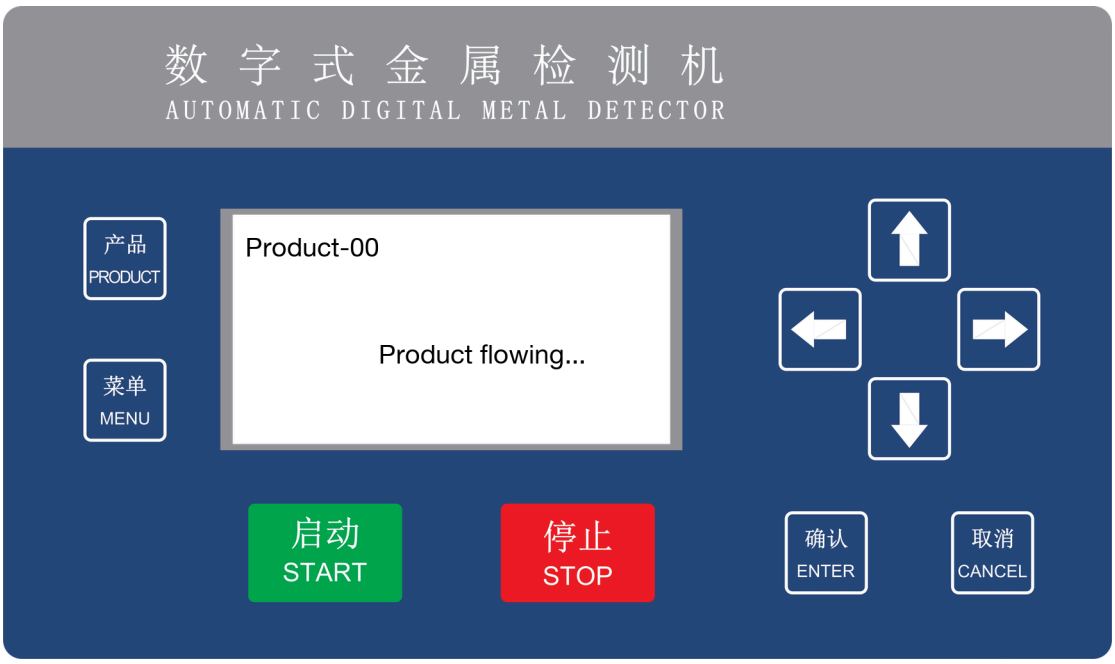


Figure 3-4 Product flow

4 (Second pass) The LCD display prompts for waiting (Figure 3-5); wait.

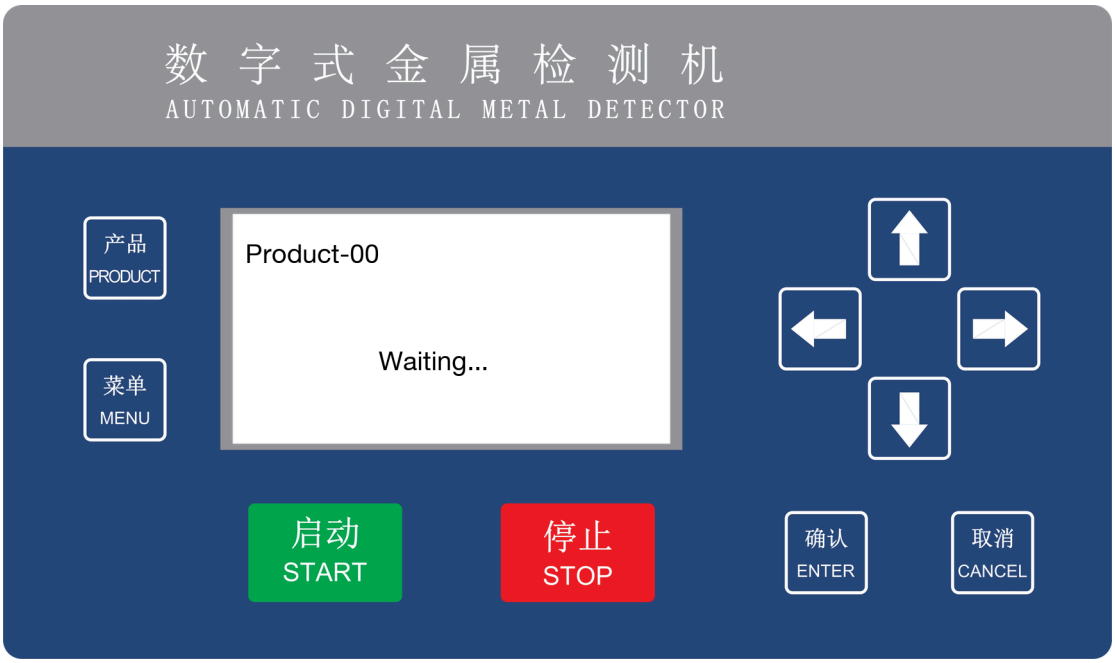


Figure 3-5 Waiting, second pass

5 (Second pass) After a few seconds the display shows product flow (Figure 3-6). Place the item to be inspected on the conveyor belt.

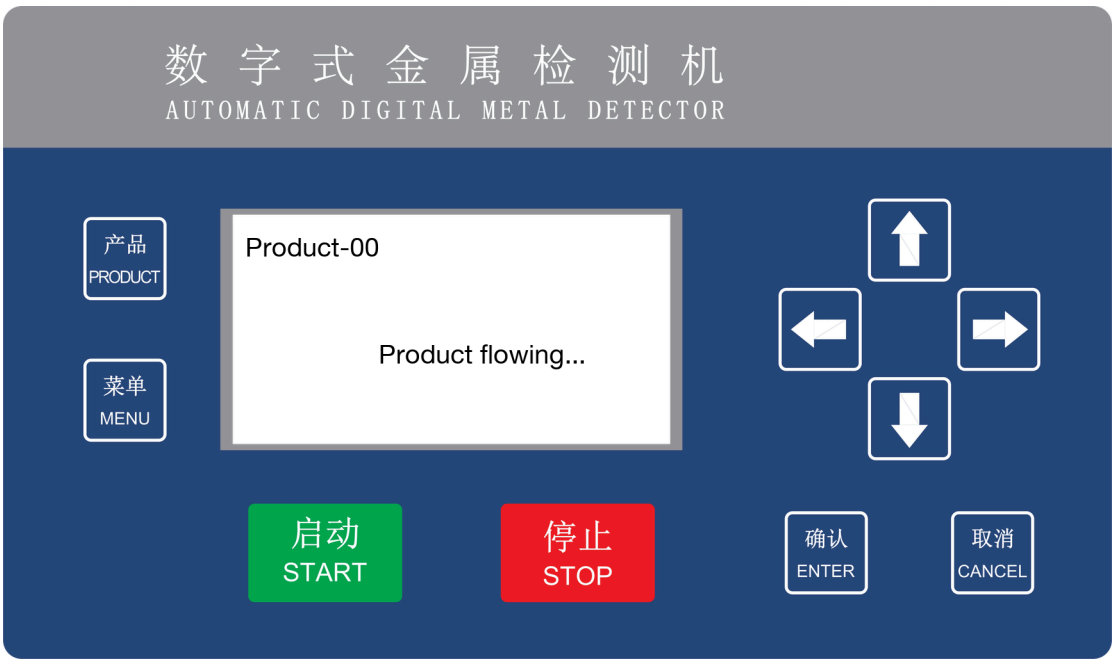


Figure 3-6 Product flow, second pass

6 Auto-setup ends; press [Enter] to return to the menu.

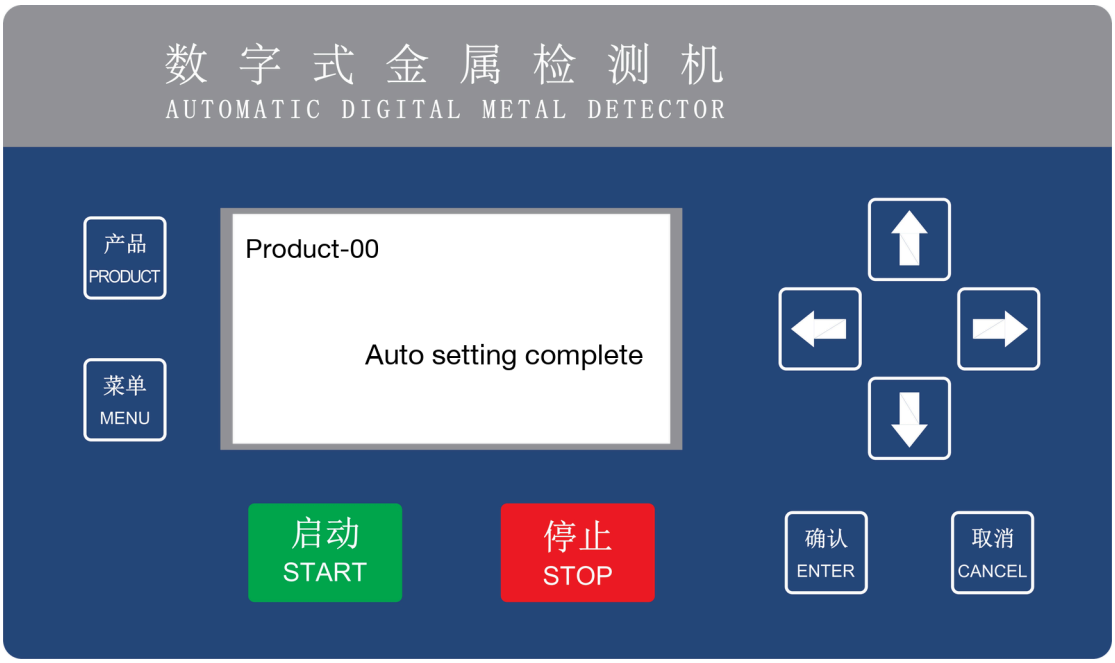


Figure 3-7 Auto-setup complete

7 After auto-setup, confirm the sensitivity of the current product with the test card supplied with the machine.

3.2.2 Product parameters

Set the LCD display to the home screen, press [Menu] to enter the menu (Figure 3-8) and select Product parameters.

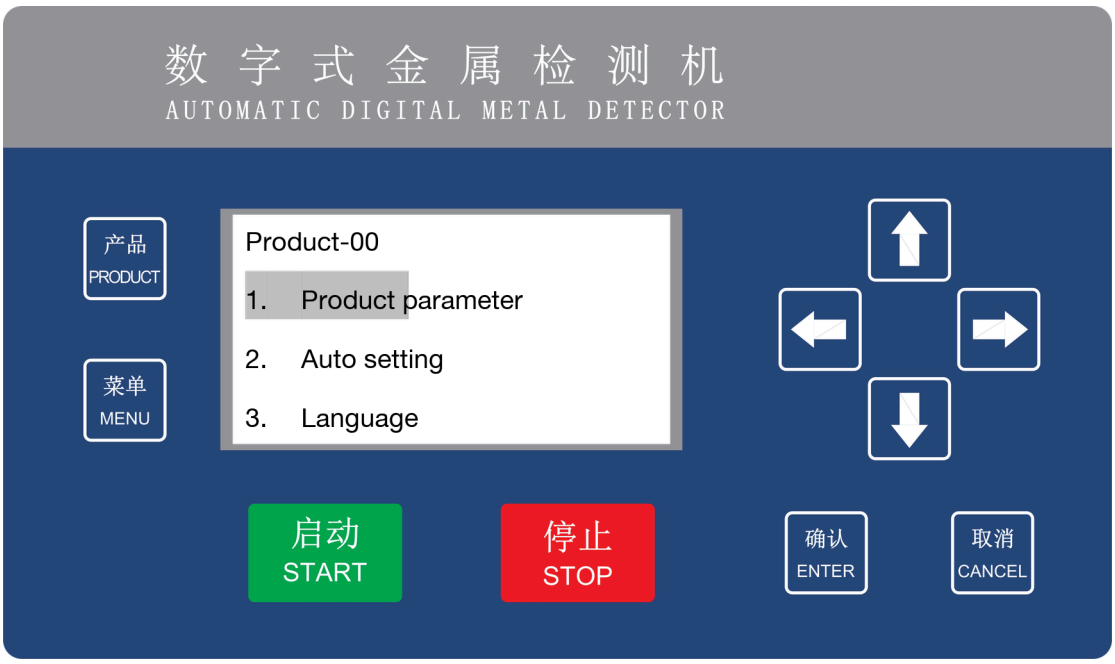


Figure 3-8 Menu screen

The product parameter screen appears (Figure 3-9). Three parameters are shown on each page. Select Name.

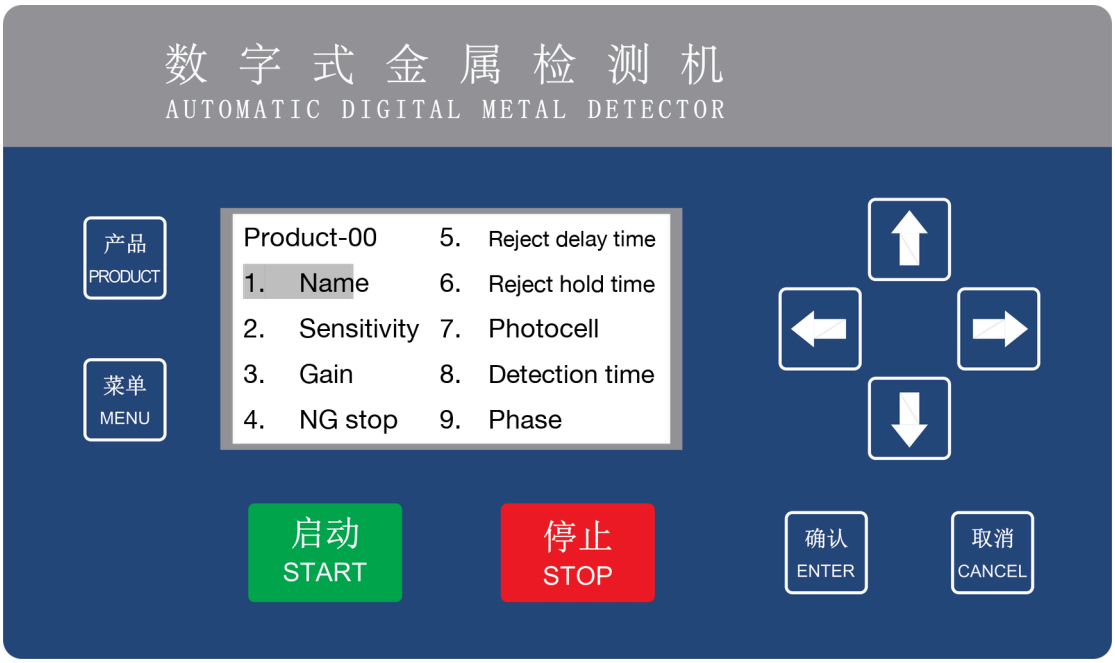


Figure 3-9 Product parameters

3.2.3 Name setting



Figure 3-10 Name setting

Use the up/down/left/right [arrow keys] to select a character, and [Enter] to enter the selected character. Cancel on the LCD display deletes characters already entered. When entry is complete, select Confirm on the LCD display to finish setting the product name.

3.2.4 Sensitivity setting

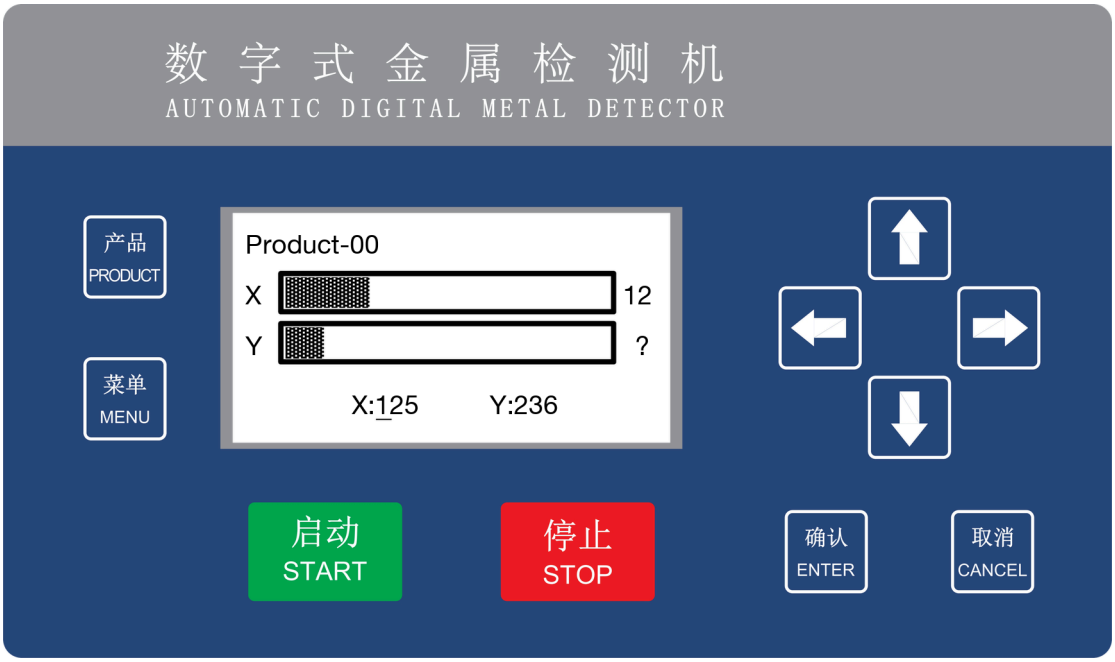


Figure 3-11 Sensitivity setting

Use the [arrow keys] to adjust the sensitivity value. The larger the value, the smaller the metal diameter that can be detected; take the test card as the standard. When the value has been adjusted, press [Enter] to save the parameter and return to the [Product parameters] screen.

3.2.5 Gain setting

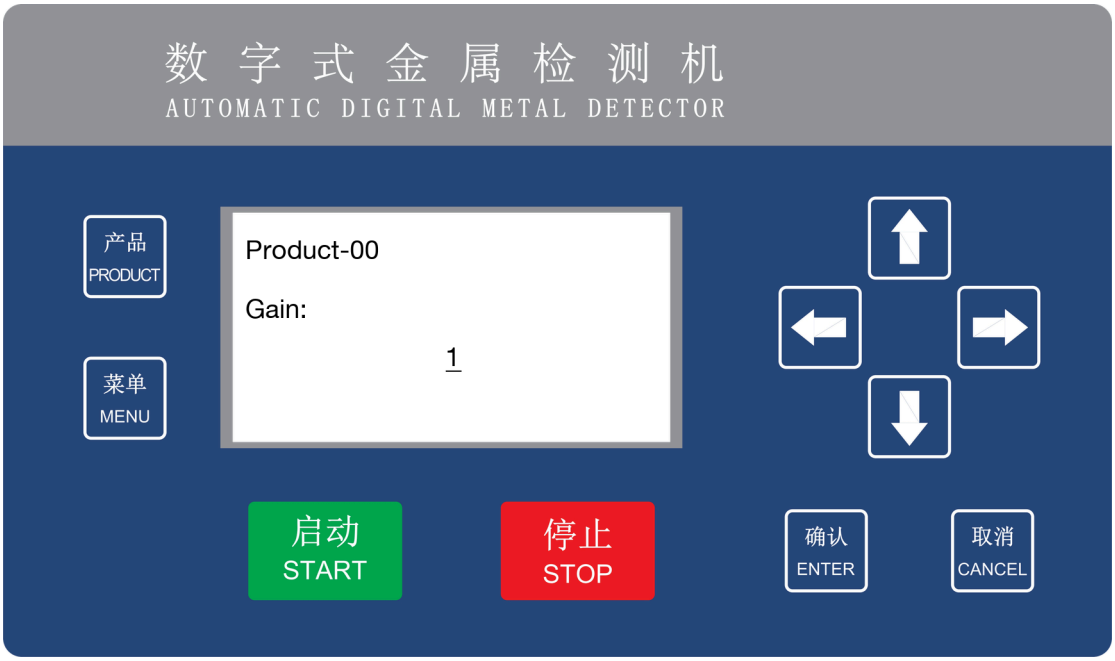


Figure 3-12 Gain setting

Use the [arrow keys] to adjust the gain value from 1 to 4. The larger the value, the smaller the metal diameter that can be detected; take the test card as the standard.

When the gain value has been adjusted, press [Enter] to save the parameter and return to the [Product parameters] screen.

3.2.6 NG stop setting

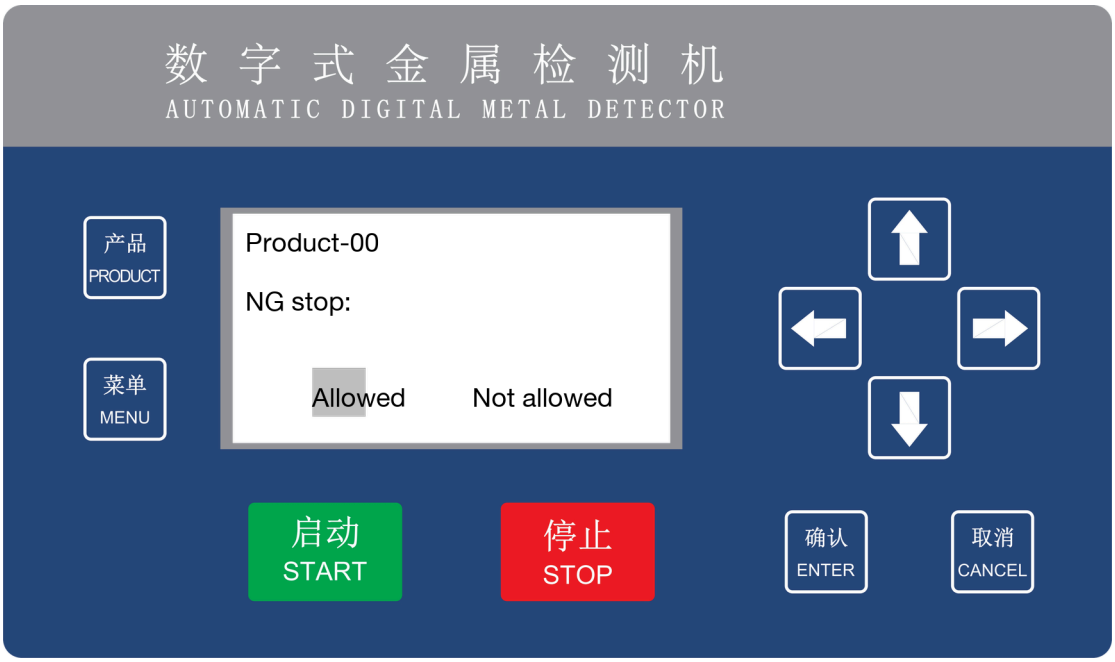


Figure 3-13 NG stop setting

This setting determines whether the conveyor belt may continue to run after metal contamination has been detected. Use the left/right [arrow keys] to select Allowed or Not allowed.

3.2.7 Reject delay time setting

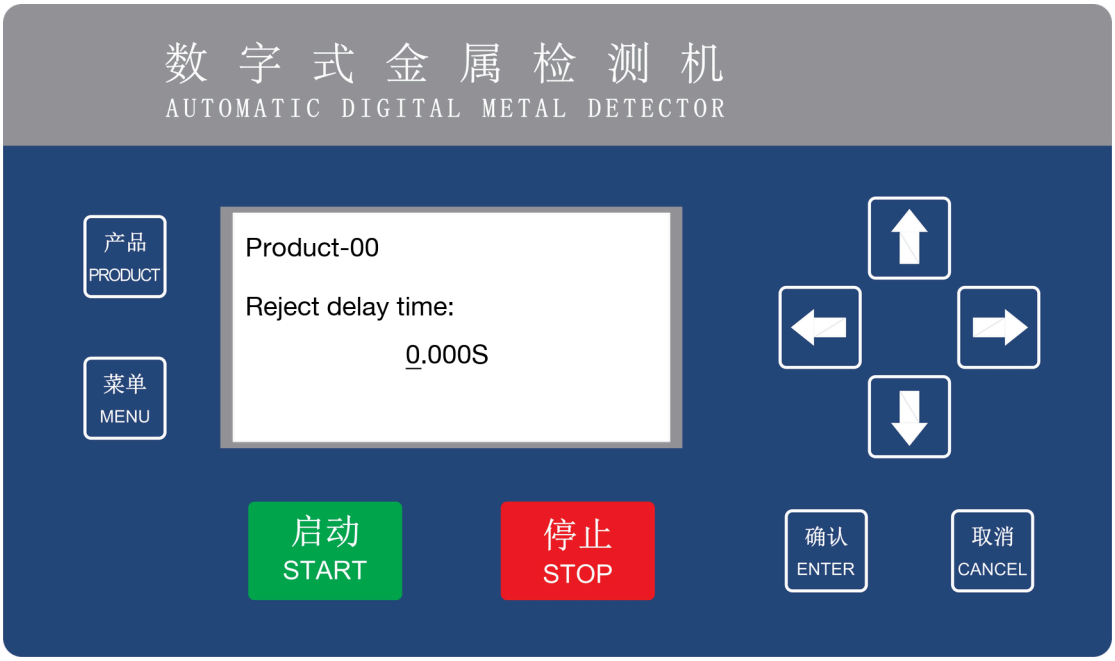


Figure 3-14 Reject delay time setting

Use the up/down/left/right [arrow keys] to adjust the time. When the reject delay time has been adjusted, press [Enter] to save it and return to the [Product parameters] screen.

> Note: the reject delay time is the interval between the moment the detection head detects a metal contaminant and the moment the reject device starts to act.

3.2.8 Reject hold time setting

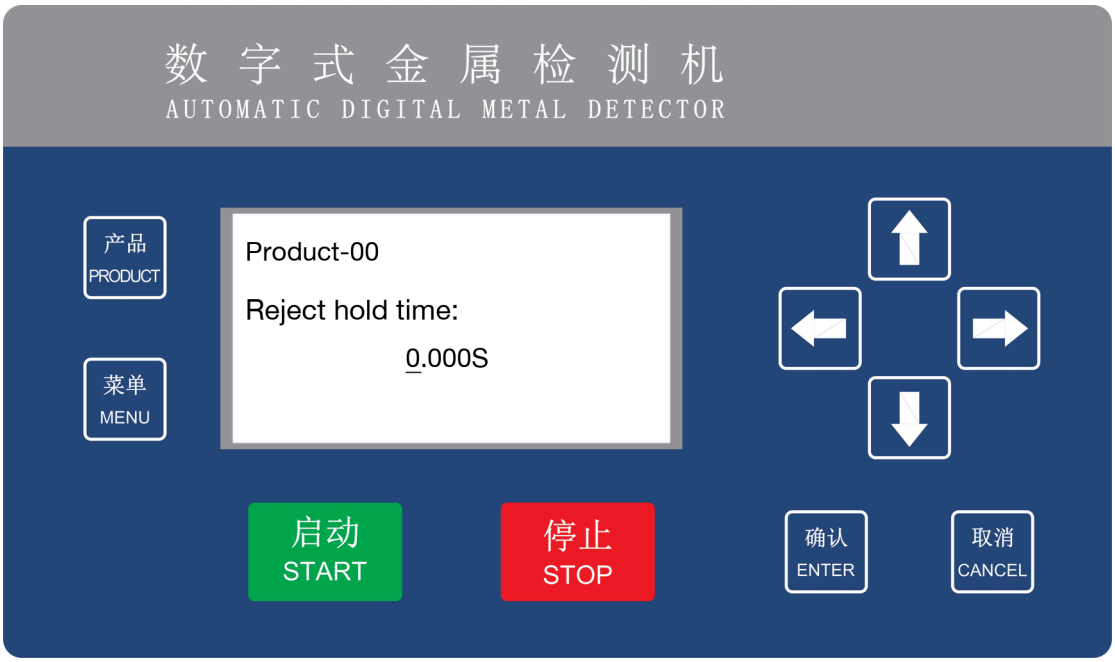


Figure 3-15 Reject hold time setting

Use the up/down/left/right [arrow keys] to adjust the time. When the reject hold time has been adjusted, press [Enter] to save it and return to the [Product parameters] screen.

Note: the reject hold time is the interval between the moment the reject device starts to act and the moment it finishes acting.

3.2.9 Photoelectric sensor setting

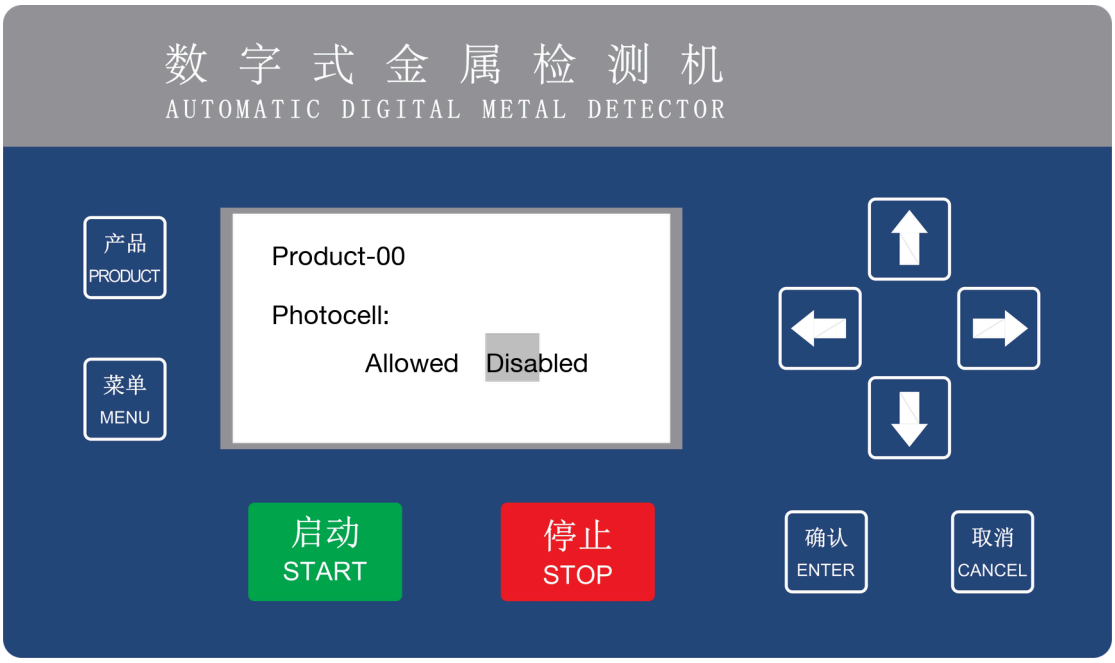


Figure 3-16 Photoelectric sensor setting

The photoelectric sensor detects whether a product is present and supplies the system with a trigger signal. It also gives the reject mechanism a reference for the exact position of the product, so that an alarm is given and a rejection is made only when a product is present and metal contamination has been detected. If the photoelectric sensor is switched off, the whole system loses its 'product position sensing' capability and the accuracy of rejection falls markedly.

Setting for machines fitted with photoelectric sensing. Use the left/right [arrow keys] to select Allowed or Prohibited.

3.2.10 Detection time setting

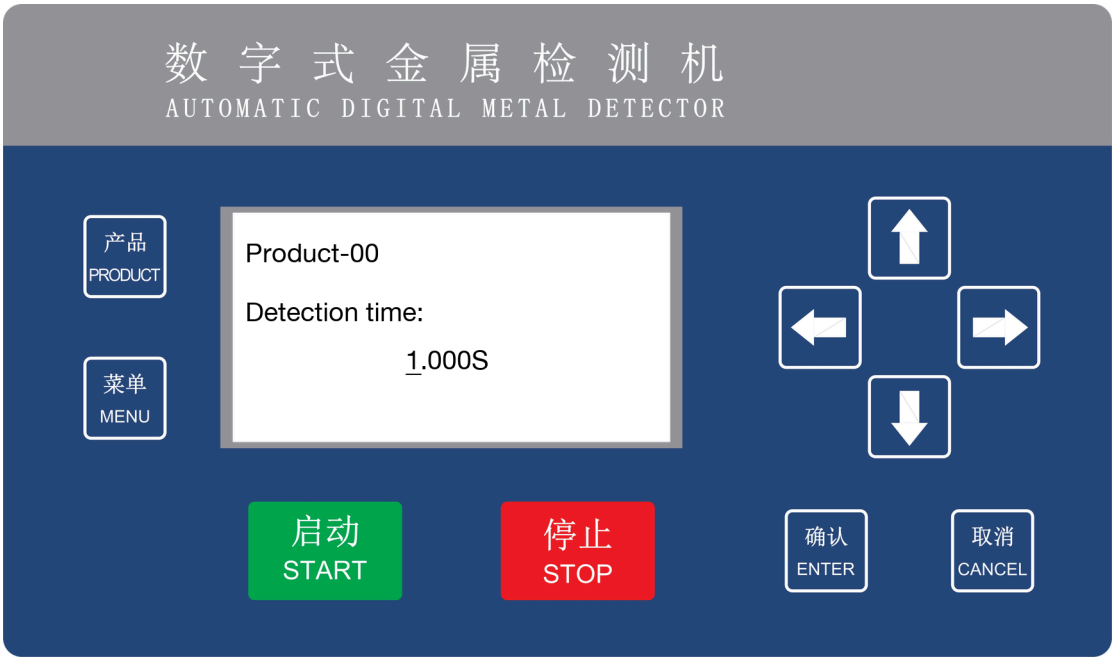


Figure 3-17 Detection time setting

Use the up/down/left/right [arrow keys] to adjust the time. When the detection time has been adjusted, press [Enter] to save it and return to the [Product parameters] screen.

> Note: the detection time is the time a product takes to pass the detection head after it has triggered the photoelectric sensor.

3.2.11 Phase setting

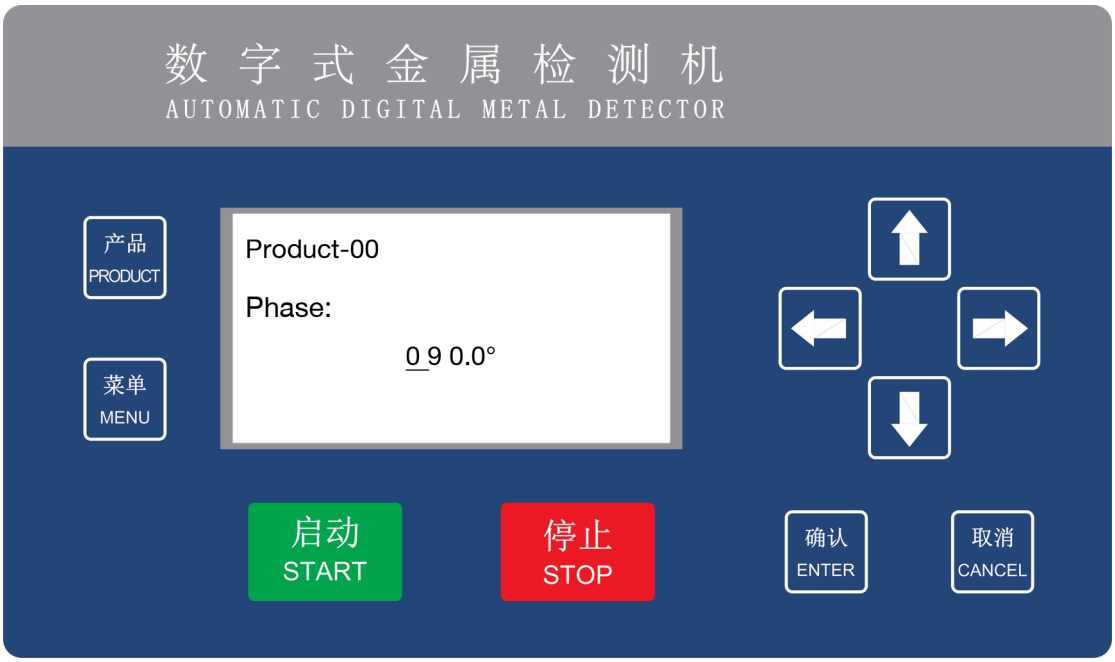


Figure 3-18 Phase setting

Manual adjustment can distort the detection signal. Change this setting only under the guidance of qualified technical personnel.

3.3 Language setting

Set the LCD display to the home screen, press [Menu] to enter the menu (Figure 3-19) and select Language.



Figure 3-19 Menu screen

Use the up/down/left/right [arrow keys] to select a language and confirm.

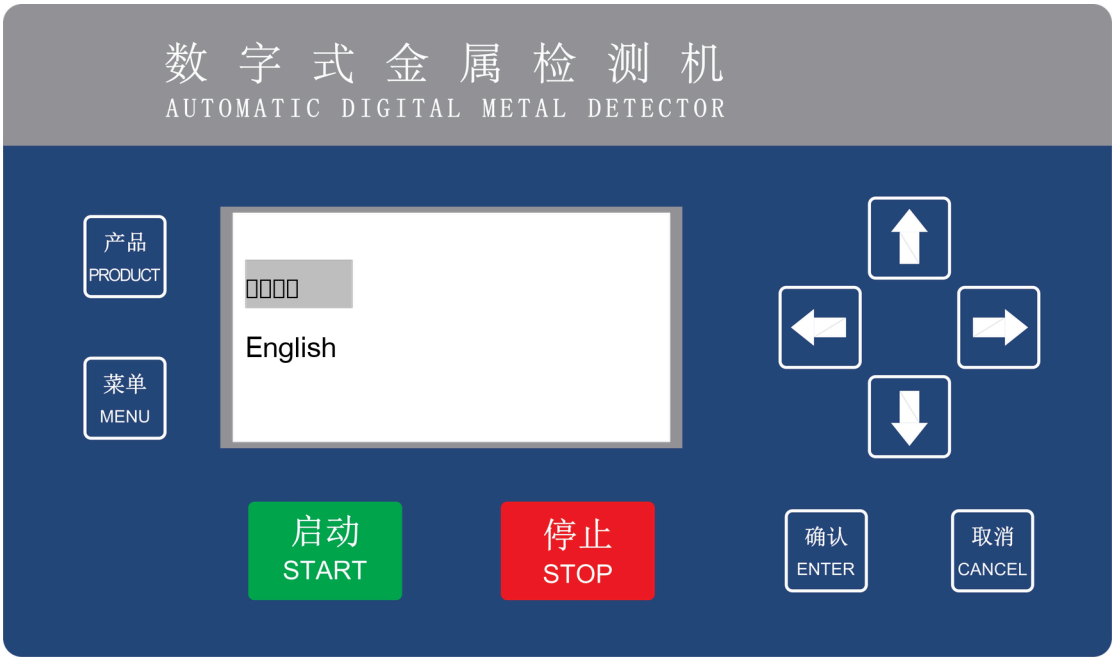


Figure 3-20 Language selection

Chapter 4 Routine Maintenance

Routine maintenance

When	Check
Before work	Confirm the detection sensitivity.
After work	Remove the conveyor belt and clean both faces of the belt.
Weekly	1. Remove the conveyor belt and check the end faces for cracks. 2. Check the running condition of the belt: no abnormal noise and no creeping.

Cleaning precautions

1 Unplug the machine before cleaning.
2 Use a soft plastic brush or a cloth. Never use a wire brush or similar tool.
3 Clean with a neutral detergent. Never use thinners, benzene or other organic solvents.
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. Rinse thoroughly with clean water afterwards and do not leave detergent on the machine.
5 Where contamination from touching or from fingerprints cannot be removed completely with neutral detergent and soap, wipe it with a sponge or cloth containing an organic solvent (alcohol, petrol, acetone and so on).

Warranty Card

Dear Customer,

Thank you for choosing our product. To make our service more satisfactory to you, and in your own interest, please complete this card carefully after purchase and keep it safe.

Warranty notes:

If our company judges that any of the following applies, the case is not covered by free warranty service and our company is entitled to charge for the repair:

1 the warranty period offered by our company has expired;
2 the damage is caused by force majeure (flood, fire, earthquake, lightning, typhoon and so on) or by improper operation or use;
3 the user, or a third party engaged by the user, has inspected, repaired, modified or altered components or wiring without authorisation;
4 the warranty card has been altered, or does not match the product.

※ The conveyor belt is a wear part and is not covered by free warranty service; a replacement can be purchased from the dealer.

※ Products exported outside China are not covered by free warranty service; paid repair service can be obtained through the dealer.

Warranty period: one year

Customer details

User name	Date of purchase
Contact person	Telephone
Address	
Dealer name	Product name
Model	Serial No.

Dealer stamp