

Fruit Quality Detector

ATZW300

Features

- Near-infrared spectroscopy technology with high sampling coverage and higher detection accuracy;
- Online non-destructive testing, no pollution, fast testing speed;
- Modular design, simple installation, Can be connected to the fruit online intelligent sorting system;

Application

- Detect sugar content, acidity and mold core;
- Detect spherical fruits between 50mm-110mm in diameter;
- Customized for different fruits

Description

The ATZEW300 fruit acidity and sweetness measuring instrument uses near-infrared light to illuminate fruits. Different internal components of fruits absorb different wavelengths to different degrees. Based on the near-infrared spectral characteristics, a chemometrics method is used to establish an analysis model, which can achieve non-destructive analysis of the internal quality of fruits. Without destroying the sample, it can quickly analyze fruit sugar content, acidity and other indicators, and can analyze internal lesions and defects by establishing a discriminant model for specific fruits.

ATZW300 is composed of a collection module and a test host. It can conduct real-time and rapid analysis of the content content of fruits of different sizes such as large, medium and small, and can cooperate with the fruit sorting system for fast and accurate online sorting.





Sugar degree



acidity



mouldy core



1. parameter

Product Features	Detectable varieties	Citrus, oranges, apples, pears, peaches and other fruits with a diameter of 50-110mm (based on fruit shape)
	Detectable indicators	Sugar content, acidity, mold heart disease
	sugar&acidity	Saccharide detection: 75% or more defects are $\leq \pm 0.5\%$, 90% or more defects are $\pm 1\%$ Acidity detection above 90% defects are $\leq \pm 0.1$ Acid
	mold heart disease	Accuracy rate > 95%
Product parameters	Detection speed	About 3/second
	Sorting level	The hardware supports 12-channel result classification, and the sorting level can be customized according to the sorting software.
	power	1KW
	Product Size	Acquisition module 450mm*540mm*350mm Test host 270mm*378mm*170mm
	Material	Sheet metal + aluminum alloy
	product weight	Host test + acquisition module is about 45KG
IO function	communication method	RS232, network port
	Trigger mode	Supports soft trigger and hard trigger methods
	graded output	4 channels of IO, output 12 categories of classification information, configurable by the host computer, and the signals are directly connected to the PLC
	Alarm Output	4 types of signal alarm outputs
	button	4 buttons enable real-time setting of integration time

2. ATZW300 detection principle

When near-infrared light is irradiated, light and groups with the same frequency will resonate, and the energy of light is transferred to the molecules through changes in the dipole moment of the molecules; while the frequency of near-infrared light is different from the vibration frequency of the sample, the infrared at this frequency Light will not be absorbed. Therefore, when a fruit is irradiated with near-infrared light that continuously changes the frequency, due to the fruit's selective absorption of near-infrared light of different frequencies, the near-infrared light that passes through the sample will become weaker in certain wavelength ranges, and the transmitted infrared light will become weaker in certain wavelength ranges. Light carries information about the composition and structure of organic matter. By analyzing the optical density of transmitted or reflected light with a detector, the content of the component can be determined.

The light source effectively illuminates the fruit to be measured, passes it to the optical fiber probe after diffuse transmission, and passes it through the optical fiber to the spectrometer responsible for the data processing module. The microprocessor performs processing, calculation and analysis to complete the detection of the acidity and sugar content of the fruit to be tested, and obtains the results on the display screen to achieve non-destructive testing of the fruit sugar content and acidity.

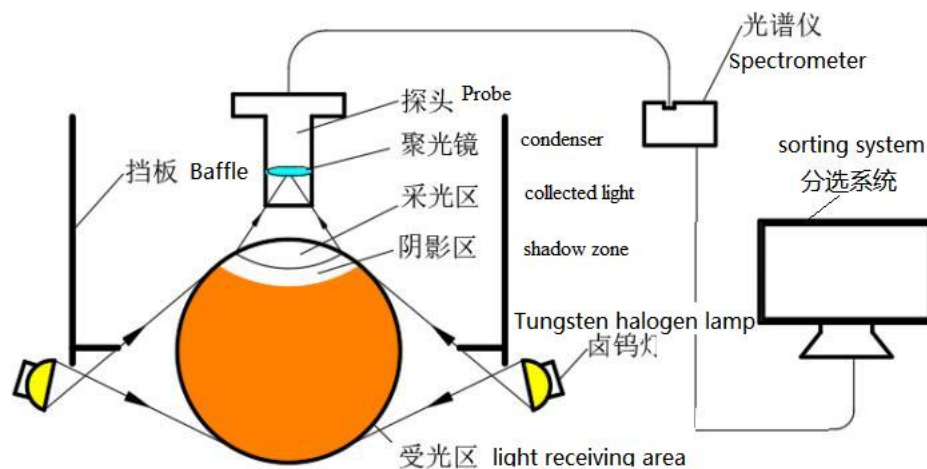


Figure 1. Detection principle

3. Product advantages

3.1 Unfixed fruit plate

Customize fruit platters based on fruit varieties.

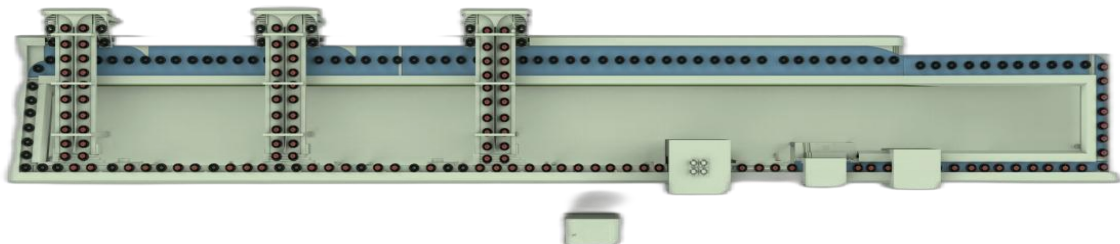


3.2 Support docking with fruit online sorting production line

ATZW300 can be customized according to the actual situation of the production line, and there is no hardware installation station.

For automotive production sites, ATZW300 has the following functions:

- (1) The sugar value can be output to the host computer or PLC through the network port and serial port.
- (2) Hardware IO supports up to 12 categories of hierarchical direct output, which can be flexibly configured on the host computer.
- (3) Supports hardware triggered measurement, making the measurement position more accurate
- (4) The algorithm runs in the embedded system, and measurements can be completed without a PC, saving costs for customers.



3.3 Self-developed algorithm

Collect the near-infrared spectrum of the target fruit, select the full-band data matrix of a

specific band, use the training set to establish a partial least squares model, and predict the model effect is evaluated collectively, and the error can reach $\pm 0.5\%$.

3.4 Personalized modeling software, easy to use

The self-developed simple modeling program can conduct personalized modeling for different varieties of fruits, effectively ensuring measurement accuracy.

3.5 Detection terminal display results

After simple configuration, the instrument can directly display the test results on the digital screen of the test host without the need to view it through a computer.

The accessory software interface is as follows:



Communication setting interface

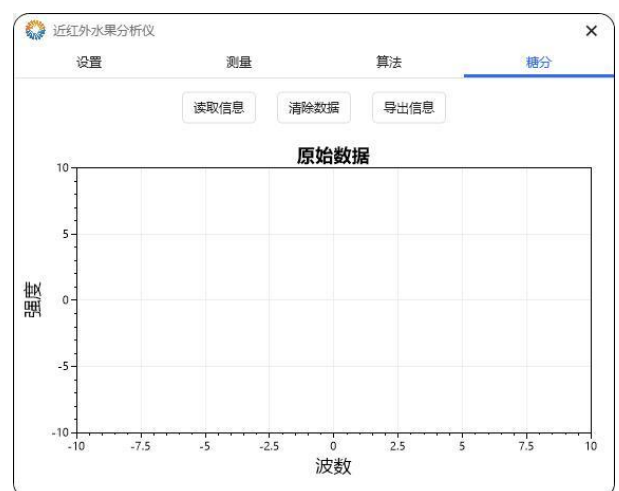


Sugar content display

(check whether the lower computer calculates correctly)



Write algorithm parameters to the slave computer



Read raw data for modeling