Thanks for your purchase of OS-270 Cooking Oil Tester. Please carefully read the operations before first use:

Dear Users:

Our measuring instrument shall be checked before delivery to ensure the accuracy. In order to guarantee the high measurement accuracy of instrument, we suggest making the regular calibration of instrument.

For the calibration of OS-270, you can make the following selections:

1. Return to Jinan Hanon Instruments Co., Ltd. for calibration.

We will follow the enterprise standards of Jinan Hanon Instruments Co., Ltd. to calibrate your OS-270 instrument. In the process of calibration, we can make calibration for two points (about 5% and 27% of TPM points) of OS-270 instrument in the precision laboratory.

2. The user can independently conduct the calibration in the frying oil.

We suggest that when starting new instrument, you can firstly heat the used but not fried edible oil to 50℃ for measurement. You'd better

implement the measurement for many times continuously and repeatedly, and record the TPM value of each measurement. The average value of these readings will be for reference of further calibration. In the process of instrument calibration in the future, firstly heat the edible oil that has been not fried to 50℃ and make the calibration by using the previously recorded reference value of calibration.

Please note that when replacing other types of edible oil or changing the supplier of edible oil, the above-mentioned reference value will be recorded again.

The following contents are used for recording the calibration value:

Measuring oil type is: _____

Calibration reference value is: _____

Contents

I. Safety and Environment

1. Use for Document

> Please carefully read the product instructions before use, and guarantee that you have been familiar with the use of product, especially safety guidance and warning prompt, to prevent the operation personnel from injury and damage of instrument during use.

> Please properly keep the product instructions to guarantee that you can find it at any time when necessary.

> Please hand the product over other users together with product instructions.

Warning: Please note the following information marked with the warning sign at any time and take the preventive measures as prepared.

Indication	Instruction	
	Warning!	May cause the severe personal injury.
Note	Caution!	May cause the personal injury or damage the instrument.

2. Safety instructions

>  Please correctly use the instrument according to the parameters specified in the use purpose and technical data.

> Please do not use the instrument at places where the shell, power supply or wire of instrument may be damaged.

> Please pay attention to the safety regulations of measuring environment before measurement because the measuring object or environment may cause the harm.

> Please do not expose hands to places with the temperature of higher than 70℃.

> Please do not conduct the contact measurement for uninsulated components.

> Please transport and store the instrument in the special packing container for instrument, and be equipped with the protective cover of probe, in particular, to keep the probe from damage.

> Please do not wipe and clean the probe and sensor when they are still in the high-temperature state after the completion of testing. After the temperature is decreased to 40℃ or below, wipe and clean up probe and sensor.

> Please do not store the instrument together with oil fluid. After using the instrument for one time, clean the probe and keep dry. Please do not apply any drying agent.

>Only use the instrument in the dry and closed room, and make the moisture-proof measures.

> Abide by the method described in this manual to maintain and repair the instrument and strictly follow the prescribed steps. Please do use the original accessories of Jinan Hanon Instruments Co., Ltd. only.

3. Environmental protection

> Upon the expiration of service life, deliver the product to the special collection place for electric and electronic devices (established based on the local regulations) or send back to Jinan Hanon Instruments Co., Ltd. for disposal.

II. Instructions for Specifications

1. Concept

As a portable measuring instrument, the OS-270 Cooking Oil Tester of Jinan Hanon Instruments Co., Ltd. is specifically used for rapidly detecting the ageing state of used frying oil.

The TPM (Total Polar Materials) value reflects the deterioration of edible oil caused by the high temperature in the process of frying.

The content of TPM can be determined by the sensor according to the trend of changes for capacitance value, in %.

The following measurement tasks can be accomplished by the

OS-270 Cooking Oil Tester:

> Display the temperature value of frying oil: Accurately indicate the actual temperature of frying oil and calibrate the accuracy of built-in thermometer of fryer.

> Display the TPM value: Indicate the degree of aging and deterioration of frying oil.

The acid value can be used for evaluating the quality of oil not fried; therefore, the OS-270 Cooking Oil Tester of Jinan Hanon Instruments Co., Ltd. cannot be used for detection of acid value. The measured temperature of frying oil shall be 10 ℃ (the frying oil is in the liquid and non-crystallizable state) and 200℃ as the minimum value and maximum value, respectively. The accuracy of common frying oil measured by the instrument shall be about 3%, therefore, the error will be slightly larger during testing under the temperature of 40℃ below due to the different freezing point for all kinds of oil.

The probe shall be installed on the position for 1cm from the top end of measurement to probe handle, or plastic shell, therefore, please properly operate according to the immersion depth as specified in the

operation instructions or sign on the probe.

2. Specification

Performance	
Temperature range	0 - 200.0°C
TPM range	0 - 50%
Temperature accuracy	±1.5°C
TPM accuracy	±1.5%
Temperature resolution	0.1°C
TPM	0.1%
Hardware	
Power supply	Lithium battery(3.7V) in-built
Charging	Water-proof Micro usb port
Communication interface	Wi-Fi and Bluetooth

Data storage	10000 measurement
Operating environment	
Operating temperature	0 - 50 °C
Relative humidity	30% - 80% (Non- condensation)
Storage temperature	-20 -- +35 °C
Display	1.8" TFT LCD with the resolution of 220*176 pixel
Weight	185g (including protective cover of probe)
Shell material	ABS materials
measurement time	<15s

III. Product Description

1. Main parts of instrument

Main parts of instrument are shown in the figure 1 below

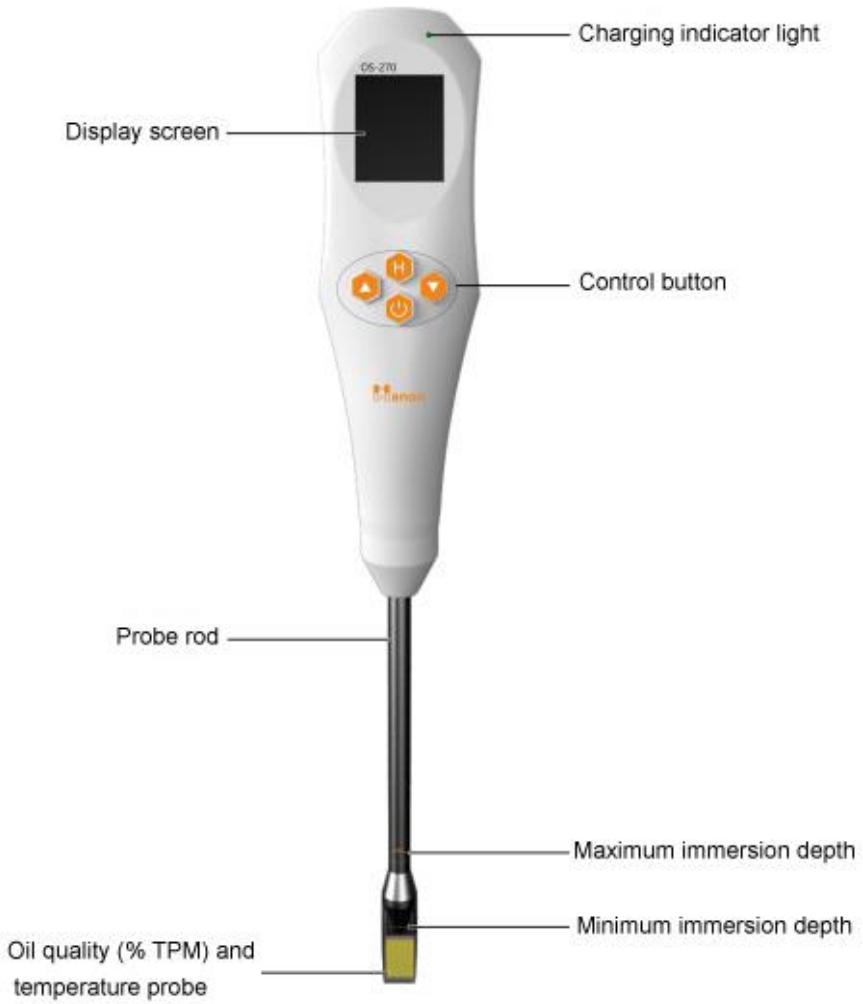

Figure 1 Front View of Cooking Oil Tester

Functions and performances of control button

• [power key] instrument power on/off

• [Holding key] manually save readings/ configuration

• [Up key] adjustment value and options on the setting menu

• [Down key] adjustment value and options on the setting menu

2. Introduction for functions of instrument

Instrument on/off:

Under the shutdown state, when pressing [power key] (< 1s), the instrument is opened and the display screen is on, and at this time, appear the initialization interface, and then automatically enter into the measurement interface, for starting the measurement operation.

Under the start up state, when pressing [power key] (< 1s), the instrument is closed.

3. Measuring interface symbol and implication

After the start up of instrument, automatically enter into the measurement interface, on which the display contents and its implication description are as follows:

12:00	System time, indicating the current time
	Bluetooth function, displaying that such function is opened
	Wi-Fi function, displaying that such function is opened

	Battery capacity indication, indicating the currently residual battery capacity in the right number
20.0%	TPM value, displaying the currently measured TPM value of edible oil
Auto	Automatic holding function, displaying that the results can be automatically locked after stable measurement of data, for convenient of observing and recording data
Hold	Data locking function, displaying that the data can be locked and be no longer changed
TPM	TPM data indicator
25.0℃	Temperature value, displaying the current temperature under the measuring environment, divided into two modes, namely, ℃ mode and ℉ mode. The temperature display scope is 0-200℃ and value keeps unchanged when exceeding such scope
Jun. 1, 2017	System date, displaying the current date and time

Background color	displaying the interval of scope of TPM value: Green: 0%-20% (lower limit of TPM) Orange: 20% (lower limit of TPM) - 24% (upper limit of TPM) Red: 24% (upper limit of TPM) - 99%

4. Instructions for setting of menu interface

Under the measurement interface, long press [H] (> 3s), to enter into the menu setting interface, and adjust the setting contents by pressing [up key] and [down key] and then press [H] (< 1s) to select the menu mode. After adjusting the contents to be modified on the menu by pressing [up key] and [down key], press [H] (< 1s) to save and exit the menu.

Return	Select "return" to save the menu setting and exit, and then return to the measurement interface
Auto	Automatic holding setting, [ON] for start up and [OFF] for shutdown

Wi-Fi	Wi-Fi setting, [ON] for start up and [OFF] for shutdown
Bluetooth	Bluetooth setting, [ON] for startup and [OFF] for shutdown
Data storage	Measured data storage function, [ON] for startup and [OFF] for shutdown. When starting up, the data will be held and stored in the instrument.
Brightness	Screen brightness setting, divided into 1-5 grades, among which the brightest and most energy-saving grades are 5 and 1, respectively
Temperature unit	Temperature unit setting, [℃] for Celsius degree mode and [华氏 F] for Fahrenheit degree mode
T Adjust value	Used for the temperature calibration. After the known standard temperature is measured by the instrument, modify this value to calibrate the temperature sensor and then adjust the value by pressing [up key] and [down key]

TPM Adjust value	Used for the TPM calibration. After the known TPM value of edible oil is measured by the instrument, modify this value to calibrate the temperature sensor and then adjust the value by pressing [up key] and [down key]
TPM Upper limit	Upper limit value of TPM alarm. When the TPM value reaches to and is lower than this value, the background color of screen turns red and orange, respectively
TPM Lower limit	Lower limit value of TPM alarm. When the TPM value reaches to and is lower than this value, the background color of screen turns orange and green, respectively
Set time	Separately set the year, month, day, minute and second to accomplish the time setting of instrument. After the completion of each item, press [H] (< 1s) to enter into the next item of setting
Calibration	Such item is used for ex-factory calibration of

	instrument, therefore, the user does not need setting
Reset	When selecting the factory reset, erase the setting of user and then restore the factory parameter setting of instrument

IV. Measurement

1. Measurement knowledge

The OS-270 detector of Jinan Hanon Instruments Co., Ltd. can achieve the rapid and continuous measurement, and even immediately conduct the next measurement after completing the measurement for one time, without any waiting.

What kind of oil/oil and fat can be detected applicable for the instrument? In principle, all the frying oils and lipids can be measured. The vegetable oils, such as colza oil, soybean oil, sesame oil, palm oil, olive oil and peanut oil, as well as animal oil and fat can be

measured. According to the different kinds of oils and fats, the TPM value of fresh oil can be floated among several percentages and the maximum service time of frying oil is very different.

E.g. The TPM initial value of fresh palm oil is higher than that of other oil types, however, its aging speed is largely slower than that of other oils.

The OS-270 detector of Jinan Hanon Instruments Co., Ltd. is designed for measuring the pure oil/oil and fat products, therefore, the measured results may be deviated if the additives are applied.

The frying oil is a mixture of different polar materials. In the aging process of frying oil, the quantity of highly polar materials can be increased. In the laboratory, the chromatographic column method can be adopted to distinguish polar materials from non-polar materials, among which the content of polar materials accounting for total polar materials of frying oil is defined as TPM value in % (Total Polar Materials).

The TPM value measured with the chromatographic column method may be slightly changed due to the judgment for boundary of polar

materials and non-polar materials. Pursuant to the different types of oils and fats, the polarity of polar materials and non-polar materials may be slightly changed. However, for this change, the chromatographic column method is unrecognizable. On the other hand, the OS-270 detector can measure the overall polarity of frying oil, thus acquiring the actual polar materials and non-polar materials. Therefore, the measured value by using the OS-270 detector may be higher or lower than the measured results by using the chromatographic column method for several items of measurement.

As for the coconut oil, its TPM value measured with the OS-270 detector is higher than that measured with the chromatographic column method, because such kind of oil is unsuitable for the deep frying, instead of short-time frying in the pan.

Free fatty acid (FFA):

The OS-270 detector can measure the total content of polar materials in the deep frying oil/oil and fat, in order to evaluate the deterioration after the deep frying. However, the free fatty acid is used for judging the degree of aging of oil and fat under the normal temperature for

long-term storage, therefore, such index is unsuitable for judging the deterioration of frying of oil and fat. The OS-270 detector cannot be used for measuring the free fatty acid.

Polymer triglyceride (PTG):

The PTG has been gradually applied for evaluating the quality of frying oil, and the measured results by using such method can be proportional to TPM value in most cases.

PTG ≈ TPM/2

2. Measurement execution

⚠ May cause the scalding danger (on the position of probe and probe rod) in case of overheating of instrument!

> Please do not touch the hot parts of instrument.

> In case of any scalding, immediately wash the scalding position with the cold water, and see a doctor if necessary.

Please follow the following key points, to obtain the most correct results in the measurement:

• Please turn off induced electric frying pan in the measurement, because the electromagnetic field can influence the measured results.

• Please move the fried stuff from the frying oil in the measurement and then wait for 5 minutes.

• Please clean the probe before each measurement or next continuous measurement, of which details are shown in the part of instructions for cleaning of probe.

• Avoid to make the probe touch metal objects as much as possible. For example, frying basket and pan wall. These objects may influence the measured results, therefore, the minimum interval with metal objects shall be 1cm at least.

• The non-uniform temperature of frying oil can cause the error of measurement, therefore, please quickly stir the instrument in the frying oil.

• If the measured results are suspected to have any error due to water inclusion: please make the repeated measurement after 5 minutes (please do not conduct the frying operation in this period,

and keep the high temperature of oil and fat). If the new reading is decreased, conduct the re-measurement for one time after 5 minutes, until that the reading is stable.

• Please replace the frying oil when reaching to 27% of TPM. Because there are different limit values in different countries, please replace the frying oil before reaching to the limit value.

• When opening the automatic holding function, immerse the probe into the frying oil, and simultaneously, pay attention to the immersion depth! If the temperature is within the allowable measurement scope (10℃- 200℃), wait for a period of time, until that the screen appears the character of Auto Hold. After stable reading, take the instrument out from frying oil, automatically hold the measured data, so as to observe and record data.

IV. Instrument Maintenance

1. Probe cleaning

Warning: May cause the scalding danger (on the position of probe and probe rod) in case of overheating of instrument!

> Please do not touch the hot parts of instrument.

> Fully cool the instrument before cleaning.

> In case of any scalding, immediately wash the scalding position with the cold water, and timely see a doctor if necessary.

> Use the weak cleanser, clear water or soap water for cleaning.

> Use the soft tissue to gently clean the probe, or use the clear water for washing.

> Use the soft tissue to carefully wipe and dry the probe.

For the cold oil residue on the probe

> Insert the probe into the hot oil.

> Cool the probe and probe rod, until that there is no scalding danger.

> Clean the probe before cooling the oil residue.

2. Shell cleaning

Requirements: The instrument is in the off state.

Notes: May damage the shell!

> Please do not use the sharp objects.

> Please do not use strong corrosive cleanser and solvent.

> Use the weak cleanser, clear water or soap water for cleaning.

> Use the wet cloth to clean the shell.

> Dry the shell.

3. Instrument calibration

First of all, we suggest that you can purchase the calibration oil of OS-270 from Jinan Hanon Instruments Co., Ltd. You also can use the unused and new edible oil for calibration.

Regularly calibrate the OS-270 with the calibration oil. For this, we suggest that you can conduct the calibration once every 3 months, to ensure the detection accuracy and guarantee the quality.

The calibration steps are as follows:

> Clean the probe before calibration, as shown in the part of instructions for cleaning of probe.

> Heat the calibration oil used for the calibration in the water, until that temperature reaches to about 50℃, to stop heating.

> Place the calibration oil in the environment of room temperature for calibration.

> After start up, immerse the probe into the calibration oil and focus on the immersion depth!

> For the purpose of more quickly obtaining readings, stir the probe in the oil and after the stable temperature, read the displayed data and make records. Compared with the previously recorded calibration value, calculate the TPM adjustment value.

> Modify the TPM value to be adjusted by pressing "TPM adjustment value" in the setting menu and then press [H] (< 1s) to save and exit the menu.

> Close the instrument and complete the calibration. It is valid after the instrument is restarted.