Coffee Roast Analyzer

KN-201

User manual

dipper

Made in Taiwan Version 1.2.0

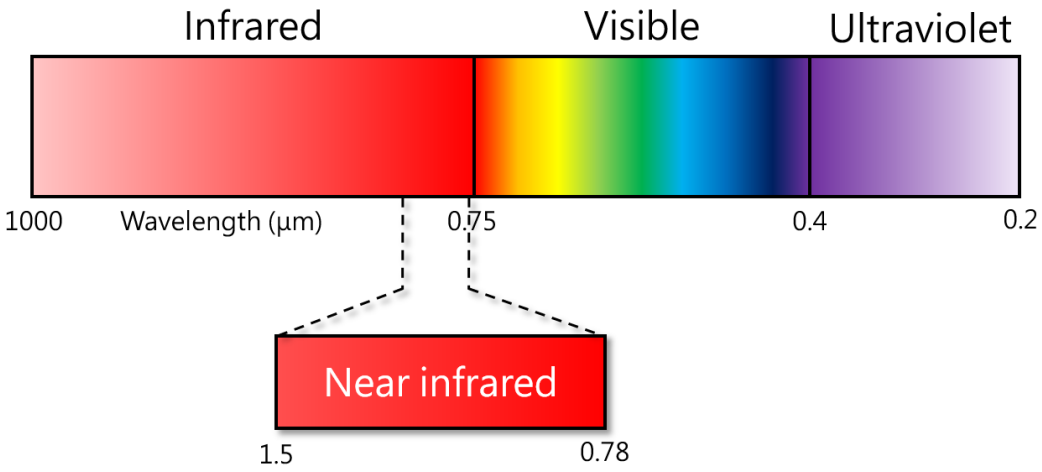
Product description

The Specialty Coffee Association (SCA), a body merged from European Specialty Coffee Association (SCAE) and American Specialty Coffee Association (SCAA), promotes using infrared analysis to assess the degree of coffee roast. The method used is called an Agtron number. A lower Agtron number indicates a higher caramelization and a deeper roasting degree. On the other hand, a higher number would indicate a lower caramelization and a lighter roast degree. This quantitative way can assist roasters in determining the degree of coffee roast more precisely which is a great aid for them in managing the quality and consistency of their products.

This product is a professional precision instrument for measuring the degree of coffee roast. It is suitable for both coffee beans and ground coffee. This product provides a user friendly interface with an excellent quality exterior. The built in optical technology complies with the SCA Roast Color Classification System which enables a coffee roaster accurately measuring the coffee beans Agtron number and the roasting degree name.

Analysis principle

This product uses the same principle of near-infrared sensing as Agtron. When the infrared wavelength is between 780 to 1500nm, it is called a near-infrared due to its proximity to visible wavelengths. Many researches point out that the deeper the coffee roasting degree, the higher the carbonization degree of soluble organic matter in coffee beans, and the higher the absorption of near-infrared light. Therefore, when the measurement instrument emits near-infrared to the coffee to be tested, then measure the reflected energy. The lower the reflection indicates the deeper the roasting degree; the higher the reflective amount indicates a shallower roasting degree. SCA converts this reflection into a numerical value and calls it an Agtron number. 0 means that the soluble organic matter in coffee beans has been 100% carbonized, and 105 represents only 3-5% coffee sucrose.



Agtron numbers are defined as two scale expressions designed to meet the specific needs of different types of coffee roast.

Agtron Commercial Scale:

This was originally defined as a roast scale, developed primarily for large commercial plants, corresponding to the carbide ratio of soluble organic matter, in order to evaluate soluble coffee in the form of dehydration. The measuring values ranging from 0 to 100, indicates deep to shallow degree. However, as the market evolved, this type of measuring method is gradually replaced by other measuring equipment that turned to the primary use of assessing the degree of roasting.

Agtron Gourmet Scale:

To meet the development of better roast machine performance and more extreme market roast demands, this higher resolution scale was born. This scale is typically ranging from 0 to 133, which has a wider measurement ranges than the Commercial Scale.

Most products on the market now are fixed with Gourmet scale. Our product supports both scales and can be selected on demand, in order to meet a wider range of application needs.

Package contents

- Main unit x 1
- Sample cup / tray x 1
- Flat scraper x 1
- USB cable x 1
- Calibration plate x 1
- User manual x 1
- Carry bag x 1

Precautions

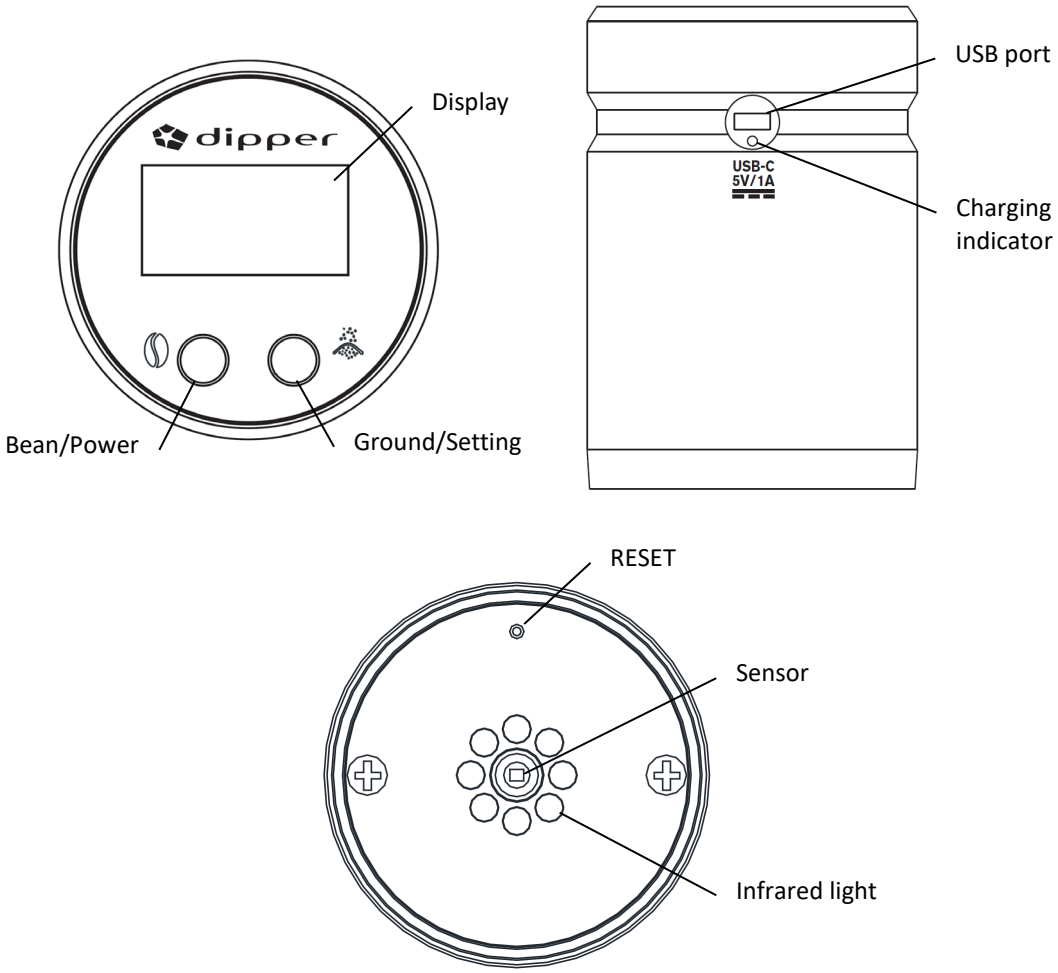
- Please read this manual carefully before using the product.
- If the product is found to be overheated, producing smoke or unpleasant smell, unplug the power cord and turn off the power switch immediately. Continue use may cause fire or electric shock.
- If repair service is required, please contact the dealer from which the product is purchased.
- Do not operate the product when hands are wet and when connecting the charger to the equipment to avoid the risk of electric shock.
- This is not a waterproof and dust-proof product, operating in a temperature between 0~40°C, relative humidity within 80%.
- Do not use a charger exceeding 5 volts, otherwise it will cause damage.
- This product is a precision optical instrument. If the sensor or light source is contaminated, the accuracy of the measurement will be affected. Keep the use and storage place clean.
- When using the equipment, stay away from places where static electricity or magnetic fields might occur, so as not to affect measurement accuracy or increase the risk of failure.
- Do not use on uneven or vibrated work surface, or the product may be fallen or shaken, resulting in injury, product failure or inoperability.
- The product has built-in lithium batteries and precision electronic circuitry. If it encounters fall, heavy hit, collision or other external force injury causing the deformation of the product, stop using the product immediately and place in a safe place.
- Do not use damaged power cords, power plug, or loose connectors. This may result in a short circuit, fire or electric shock to the wires.

- When disposing this product, please follow the local legal rules.

Features

- Super quality aluminum alloy body.
- Intuitive operation interface.
- Clear, easy-to-read OLED display.
- Quick warm-up and measurement process.
- Requires fewer samples and less wastes.
- Separate buttons for bean and ground measurements.
- Self-adaptability design, error automatic compensation.
- Comply with standard SCA Agtron scales (Gourmet and Commercial).
- Display Roast degree name (SCA and Common support).
- 200 data logs of history.
- Built-in high-capacity lithium battery for 8 hours battery life.
- Support plugged in to charge and use at the same time.
- Attached proprietary calibration plate that can do calibrate by yourself.
- Auto screen power save.
- Auto sleep shutdown.

Exterior description



⚠**Do not look directly at the infrared light while power on to avoid injury.**

[Bean/Power]	Press and hold to switch on/off the power supply. Short press to start measurement for coffee bean.
[Ground/Setting]	Press and hold to enter the set mode, short press to start measurement for ground coffee.
[USB port]	To connect the USB charger.
[Charging indicator]	Orange light indicates charging is in progress, and green light indicates charging is complete.
[RESET]	If the system crashes, restart by inserting a pin to push the switch.
[Sensor]	Optical sensor, please keep clean.
[Infrared light]	Near-infrared light source, please keep clean.

Operation method

- **Charging**

The new machine is not fully charged after it left the factory. The input voltage is DC5V, do not exceed to avoid damage. A full charge is recommended before first use. Connect USB charging cable to the USB port of KN-201. When orange light shows up, indicates charging is in progress; and green light indicates charging is complete. If there is no light it may be under or over voltage, please remove the charging cable immediately and check. It takes about 3 hours to get fully charged when the battery is completely discharged. It can be powered on continuously for 8 hours after a fully charge.

When charging in the power-on state, a plug symbol with the word C appears on the upper right hand corner of the display screen. The C word will be replaced with a simple plug symbol when fully charged. When the equipment is turned off, tap on any key to wake up the display. If the screen displays "Battery Charging", indicates that charging is in progress. When showing "Full Charged", means the battery is fully charged and the charging will automatically stop. This product supports charging and operating the measurement work at the same time.

⚠ **When the battery is completely discharged, "battery Empty" is displayed and the equipment will shut down automatically. It is recommended to plug in the charger to charge the battery before using the equipment to avoid damaging the battery.**

⚠ **If the product is not frequently used, we recommend charging the battery at least once a month, to avoid damaging the lithium battery due to low battery voltage.**

- **Power switch**

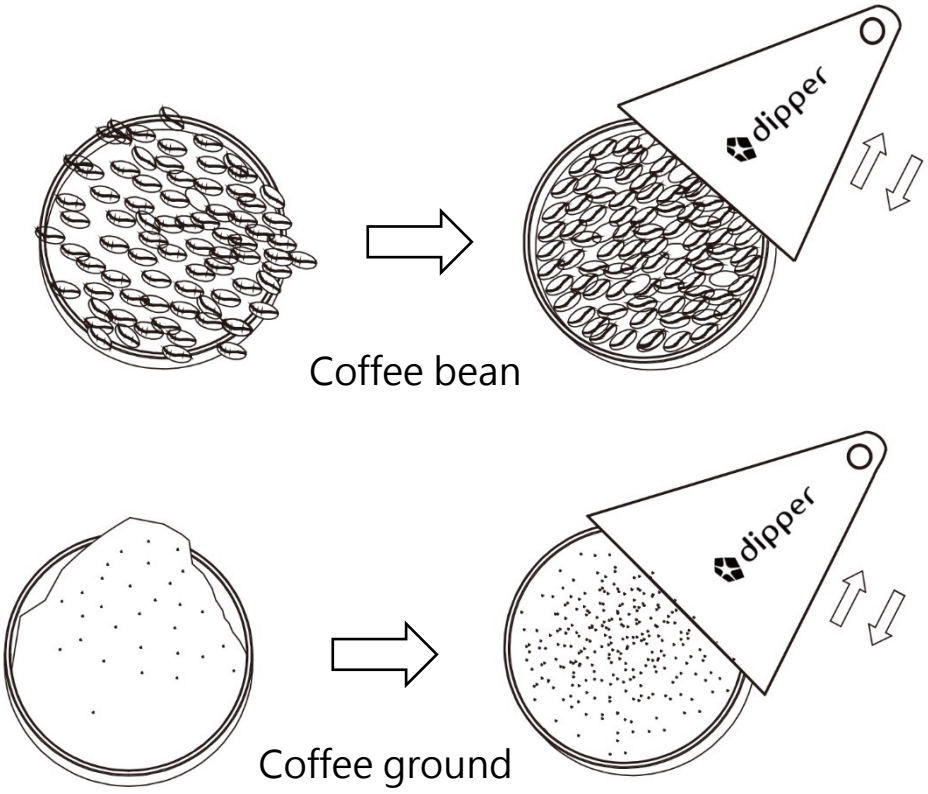
Press and hold **[Bean/Power]** button for 1 second, the screen will first show the product logo. Then it will enter into the 30 seconds warm-up screen. To ensure measurement accuracy, it is recommended to wait for the warm-up process to complete before starting a measurement operation. If skipping the warm-up process is really necessary, press the two keys on the panel **[Bean/Power]**, **[Ground/Setting]** simultaneously, "Quit" will show on the screen.

Press and hold **[Bean/Power]** button for 3 seconds in the power-on state, "PowerOff" will show on the screen. The equipment will enter into shutdown state.

- **Coffee sample placement**

Since coffee samples that have just been roasted or are still temperature-charged will release infrared light. This may interfere with the sensor resulting in inaccurate measurement. Make sure the coffee sample has cooled down to room temperature before using.

When the sample coffee is not properly placed, the measurement result can become inaccurate. The placement density of the sample and whether or not it levels with the edge of the cup when filling and flattening the sample cup are the two most important points that will affect the measurement accuracy. When placing coffee in the sample cup, fill as much as possible to reduce any gap in the content. Then use a scraping tool to flatten the top to the height of the cup edge level without special weighing.



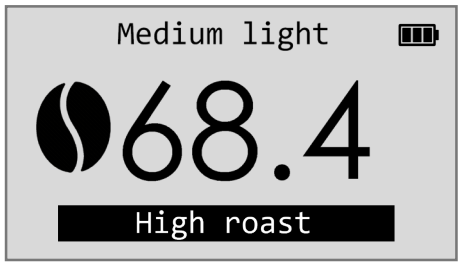
The degree of coffee grinding will also affect the measurement result. The SCA cupping standards requires 70 to 75% of ground must pass through 20 mesh sieve. The ground is then flattened to fill the sample cup. Make sure there is no gap in the content and is level with the cup edge. If there is no correct sieve available, you can fix each grinding scale for comparison. This will

give you a relevant reference between different measurement values.

⚠ **The coffee bean's silver skin might also interfere with the measurement result. You can reduce the interference by taking the average value after multiple fill measurements.**

- **Measurement operation**

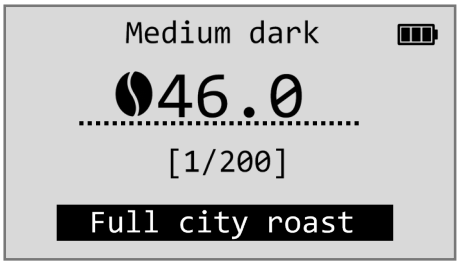
  First, make sure that the sample cup edge is clean and does not have any foreign objects such as coffee powder. Put KN-201 over the top of the sample cup, then press the corresponding button. For coffee bean, press **[Bean/Power]** button. For ground coffee, press **[Ground/Setting]** button. After a few seconds, the screen will display the measured result. At the center, it is the Agtron number and the corresponding two roasting degree names. The name of the SCA definition shows above the Agtron number, the common name shows under.



⚠ **"Over Range" is shown when the measured value is outside the range of 0 to 150.**

- **Read historical data**

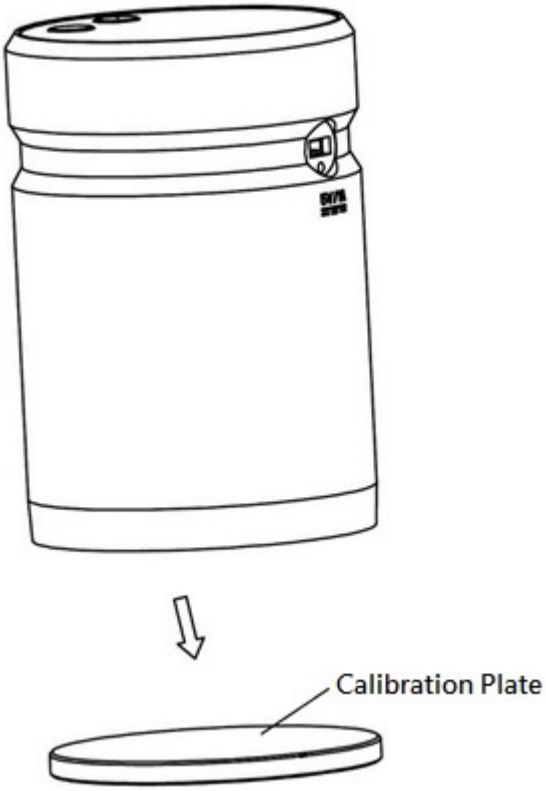
  When each measurement is completed, the result will automatically store in the 200-historical database. Press both **[Bean/Power] and [Ground/Setting]** buttons at the same time to enter into the read mode. The screen will show the latest test data. Press the **[Ground/Setting]** button (right) will show the next data and increase the data sequence number. Press the **[Bean/Power]** button (left) will show previous data and decrease the data sequence number. A larger sequence number represents an older data log. Data recording adopts a circular method. After the read is complete, press both buttons again to leave this mode.



- **Calibrate the equipment**

  Before calibration operation, it is recommended to wear white cotton gloves when handling the calibration plate. Avoid touching the surface to prevent contamination. Make sure the calibration plate is complete and clean, and the device is powered on for more than 10 minutes. Check that the sensor and NIR light LED are clean without any pollutant to ensure accuracy after calibration.

  Place the light side of the calibration plate on a flat surface, then place the KN-201 on the calibration plate. Make sure there is a solid fit all around. Press and hold **[Ground/Setting]** button for more than 3 seconds to enter into system setup mode (please refer to the corresponding chapter for details). Select "Calibration" Entry and select "Yes". The screen will show "Calibrate" and "Wait...". This means that calibration procedure is being performed. Do not move until "OK" is shown. Repeat the above action if "Fail" occurs. If "Fail" continues to occur, it may be because the sensor, light source LED or calibration plate is dirty. Try cleaning them before performing the calibration again (please refer to the cleaning method chapter for details).



⚠ **It is recommended to conduct calibration every 3 to 6 months. This product has a self-adaptability design. Frequent calibration does not help to increase accuracy.**

⚠ **When carrying out calibration, the ambient temperature should be kept in the range of 25±5°C otherwise it will affect the accuracy. If the "Out Temp" message appears, it means that the calibration environment temperature is too high or too low. Please move to a suitable environment at least half an hour and re-calibrate.**

⚠ **After the calibration plate is used, please keep it properly. Do not use organic solvents such as alcohol to wipe the surface. Avoid direct sunlight to prevent color loss.**

Setup mode

In the power-on state, press and hold **[Ground/Setting]** button for more than three seconds will enter into System Setup mode. In this mode, the left and right key functions are displayed in the table below:

Key	Short press	Hold & press
Left button **[Bean/Power]**	Last	Return
Right button **[Ground/Setting]**	Next	Confirm

Once you have selected the item you want to set, hold the right button **[Ground/Setting]** to select the item options. The options are displayed in the table below:

Item	Option	Description
(1) Auto Power Off	(1) Always ON (2) 5 mins (3) 10 mins (4) 30 mins (5) 60 mins	The default is 30 minutes. When the equipment is idle over the set time, it will automatically shut down to save power.
(2) Sound	(1) ON (2) OFF	Default is ON. You can choose to turn it OFF.
(3) Calibration	(1) Yes (2) No	Select Yes to carry out a calibration process. Please refer to the "Calibration operation" section above for details.
(4) Scale Mode	(1) Gourmet (2) Commercial	Default is Gourmet. It can be set to Commercial if needed.

(5) Reset Factory	(1) Yes (2) No	Select Yes the device will return to the factory set default parameters. The historical data will be emptied, and the calibration data will also return to the factory set value. It is recommended to carry out a calibration process after reset.
(6)About	None	Record the firmware version, serial number and other relevant information of this device.

⚠ **Change settings could cause unexpected instability. Make sure you understand the meaning of each setting before making changes.**

Cleaning method

CAUTION! Shut down the equipment and remove the charging cable before cleaning.

- **Exterior cleaning**

  The body shell and sample cup/plate can be wiped with a micro-wet fine fiber cloth, and then with a dry cloth to remove the surface moisture. Please avoid exposing to direct sunlight to dry. The screen panel is made of acrylic. Remove the dust on the surface and wipe it lightly with lens cleaning paper/cloth. Excessive force may cause scratches, please handle it carefully.

- **Sense cabin cleaning**

  After long-term use, the cabin may collect dirt due to coffee powder and grease residue. The cabin wall can be wiped with micro-wet fine fiber cloth, and then remove surface moisture with a dry cloth. Please operate gently to avoid scratching the black paint inside the cabin wall.

- **Calibration plate cleaning**

  Calibration plate surface might be stained with grease or dust due to finger or other items touched it. Contamination will cause calibration bias. To clean it, use a small amount of soft dishwashing liquid, and then rinse with water, dry quickly with soft paper towels or cloth. The process must be gentle to avoid surface scratches.

  ⚠ **Do not clean light sources and sensors with water or other organic solvents.**

  ⚠ **It is recommended that the calibration be carried out after the sense cabin has been cleaned to ensure the accuracy of the measurement.**

  ⚠ **Do not soak the calibration plate in water. After cleaning, it must be completely dried before use.**

Specifications

Size	Diameter 65mm, height 100mm
Material	Aerospace aluminum alloy with hard anode treatment
Weight	280g (not include accessories)
Display	128x64 monochrome OLED
Light source	NIR solid-state LED
Sensor	Multi-point phototransistors
Warm-up time	30 seconds
Measure range	0~150 Agtron Gourmet number
Accuracy	>99%
Data records	200 records
Battery	High-capacity rechargeable polymer lithium battery
Battery life	Work continuously up to 8 hours
Charger	USB 5V/1A
Charging time	0~100% about 3 hours
Operating temperature	0~40°C
Storage temperature	-10~70°C
Certifications	CE, FCC

Warranty policy

1. Warranty term: 1 year
2. Non-Warranty

Dipper reserves the right to inspect products returned from its customers in order to determine the cause of the problem. Dipper shall return defective products that could not be repaired at no-charge, except for shipping costs. This warranty does not cover expendable or consumable parts and product problems related to the following:

(1) Products damaged during shipping due to insufficient or improper packaging.
(2) Damage caused by force majeure (such as fire, flood, war, earthquake, snowstorm, etc.)
(3) Damage caused by normal wear of parts, scratches, surface rust or deterioration, improper use, improper storage, improper testing, negligent use of improper voltage or current, accidental damage, abnormal or unusual use, use of unauthorized accessories or modules, use contrary to the operating instructions, improper operating temperature/environment, or lack of regular maintenance.
(4) Non-consumable accessories (sample cup/tray, flat scraper, calibration plate, protective bag, USB cable).
(5) Product repaired, dismantled, or altered by unauthorized technical personnel.
(6) Removed warranty seals or serial number stickers which void our warranty.