

# **Manual Of Chlorophyll Meter**

**MC-100**

The instructions

Installation and use

## I. Purpose:

Chlorophyll meter can real-time measure plant chlorophyll relative content (SPAD) or 'green degree, nitrogen content, moisture on the leaf, leaf temperature, thus can know true demand for nitrocellulose plant and help you understand lack of soil nitrate levels or put too much nitrogen fertilizer. You can use this instrument to increase utilization rate of nitrogen fertilizer, and protect environment (prevents excessive nitrogen fertilizer and make the environment especially the pollution of water source).

## II. Working Principle

The working principle of chlorophyll analyzer

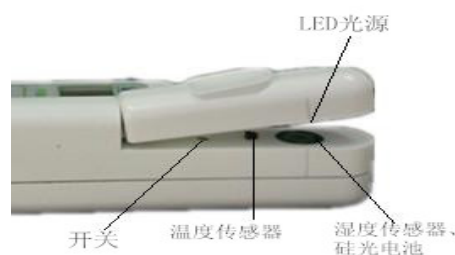
1. Two LED light sources emit two kinds of light, one is red (peak wavelength 650nm), one is infrared (940nm), two kinds of light through the blade, hit the receiver, the optical signal into analog signals, The analog signal is amplified by the amplifier, converted by the analog / digital converter into a digital signal, the digital signal is processed by the microprocessor, the SPAD value is calculated and displayed on the display.

2. Calibration and calculation of chlorophyll analyzer measurements

(1) During the calibration process, the indenter is not clamped, the two LEDs are illuminated in turn, and the received light is converted into an electrical signal. The ratio of the light intensity is used to calculate.

(2) After the sample is clamped on the indenter, the two LEDs are illuminated again, and the light transmitted through the blade is hit on the receiver and converted into an electrical signal. The intensity ratio of the transmitted light is calculated.

The values of steps 1 and 2 are used to calculate the SPAD measurements, which represent the relative chlorophyll content of the sandwiched sample leaves.



## III. Technical Specifications:

1. Measurement range:

- 1) Chlorophyll: 0.0-99.9SPAD
- 2) Nitrogen content: 0.0-99.9mg/g
- 3) Foliar humidity: 0.0-99.9RH%
- 4) Foliar temperature: -10 ~ 99.9°C

2. Measuring area: 2mm \* 2mm
3. Measurement accuracy:
  - 1) Chlorophyll:  $\pm 1.0$  SPAD units (room temperature and SPAD value between 0-50)
  - 2) Nitrogen content:  $\pm 5\%$
  - 3) Leaf moisture:  $\pm 5\%$
  - 4) Leaf temperature:  $\pm 0.5^\circ\text{C}$
4. Repeatability:
  - 1) Chlorophyll: Within  $\pm 0.3$  SPAD (SPAD value between 0-50)
  - 2) Nitrogen content:  $\pm 0.5$  unit
  - 3) Leaf moisture:  $\pm 0.5$  unit
  - 4) Leaf temperature:  $\pm 0.2^\circ\text{C}$
5. The measurement interval is less than 3 seconds
6. Data storage capacity: 32KB
7. Power supply: 4.2V rechargeable lithium battery
8. Battery capacity: 2000mah
9. Weight 200g
10. Working and storage environment:  $-10 \sim 50^\circ\text{C}$ ;  $\leq 85\%$  relative humidity.

## IV. Operation Instructions

### A. Calibration

1. Turn on the meter by power switch, into the main interface as follows:  
Date + Time  
WELCOME TO USE  
LEAF METER
2. Press the measurement indenter to calibrate (at this time not allowed to place any objects in the measurement position), LCD will display "BEGIN TO VERIFY", press until the display shows "VERIFY SUCCESS", and the buzzer will be issued beep sound, indicating that the instrument has been calibrated.

### B. Measurement

When measuring plant leaves into the measurement position, and press the measurement pressure head for about three seconds, the display will automatically show measured leaf chlorophyll value, nitrogen value, leaf moisture value and leaf temperature value. It will show as below:

|                |     |           |
|----------------|-----|-----------|
|                | CHL | 42.6SPAD  |
|                | N   | 20.7 mg/g |
| BEGIN TO CHECK | HUM | 0.0%RH    |
|                | TEM | 21.93°C   |

Press the measuring head again, can be directly measured to the next. After the measurement can be directly through shutdown button to turn it off. Meter will auto off after about 90 seconds without any operation (default value), you can change the auto off time.

**\*Note:** For leaf moisture RH, because RH is moisture in the air value, leaf surface RH value most time is same as air RH, so RH value hard to test, you can test a wet cloth to check it.

### C. Average Value

Under the main interface, long press ok key till beep sound, the recent average data will be showed.

If no new measurement data, the average value will appear below:

CHL    --.--SPAD  
N        --.-- mg/g  
HUM    --.--%RH  
TEM    --.--°C

## **D. Settings Menu**

Under the "main screen" press "MANU" key to enter "system setting" interface as follows:

SETUP; READ DATA; DELETE DATA; ABOUT US

## **E. SETUP Setting:**

In "SETUP" interface, can be set "TIME", "POWERSAVE", "LANGUAGE" and "BACKLED".

### **1. Time Setting**

"MENU interface" press "ok" button to enter "TIME SETUP" interface, by the "MANU" key to move the cursor, press the "direction" key to adjust number, press "ok" key to exit, set up the success.

### **2 Power Save Setting**

"Menu interface" press "ok" button to enter the "POWERSAVE" interface, press the "direction" key to adjust number, press "ok" key to exit, set up the success.

### **3 Language Settings**

Under "menu interface" press "ok" button to enter "Language Settings" interface, press the "MANU" key to switch, press "ok" key to exit, set up the success, now only support Chinese and English.

### **4 Backlight Settings**

Under "menu interface" press "ok" button to enter "BACKLED" interface, press the "direction" key to adjust value, press "ok" key to exit, set up the success. Note: the time set to 00 seconds, no backlight.

## **F. Read Data**

Inside has 2 selection, SEQUENCE and JUMP. SEQUENCE means read by order, JUMP means ready by jump order.

### **1. Order View**

Press the "OK" button to enter the "view data" interface, press the "direction" button to view the number of groups, press the "OK" button to exit.

### **2. Jump to View**

"Menu interface" press "ok" button to enter "see" the data interface, by the "MANU" key to move the cursor, press the "direction" key adjustment need to check the number of groups, press "ok" button to view, press the "ok" key to exit the again.

## **G. Delete Data**

### **1. Delete All Data**

Press "ok" button to enter the menu interface "data delete" interface, select "delete all", remove all data (note: careful operation).

## **2. Delete Single Data**

"Menu interface" press "ok" button to enter "delete data interface, choose "DELETE SINGEL", by the "MANU" key to move the cursor, press the "direction" key to adjust to the need to delete the group number, press the "ok" key to delete is successful, press the "ok" key to exit.

**Note: to delete a single, only delete data, group number remains the same.**

## **V. Precautions**

1. Keep the measurement position clean, so as not to affect the measurement results.
2. Always check the battery charge and charge it when the battery is low.
3. Because this instrument is through the infrared light to measure the relative content of chlorophyll, so the measurement should try to avoid direct sunlight, you can use the body and so a little block.
4. If the instrument is not used for a long time, charge the instrument every two weeks.

## **VI. Troubleshooting**

1. If it not calibration success, clean with alcohol the monitoring site, if still not ok, try again after 1 hour recharge the MC-100.
2. If the calibration success, but every time the measured results are a great deviation, first check the battery, if battery no problem, power off it wait for 5 minutes, then calibration again and measured.