

Black-White Film Densitometer

Operating Manual

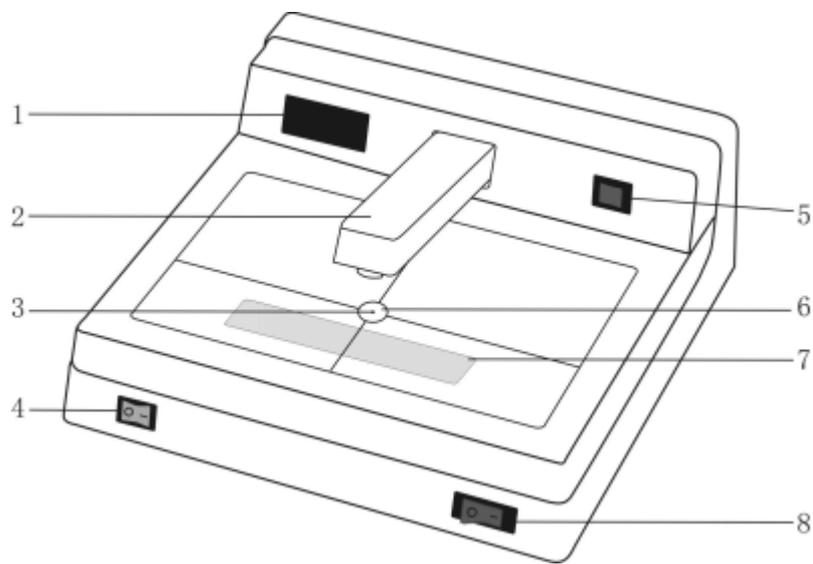
1. General Introduction

The film densitometer developed by our company is a quality product using computer calibration technology. It has advantages of accurate reading, high stability, strong anti-interference capacity, attractive appearance and easy operation. It can be widely applied to the fields such as nondestructive testing, sensitive materials, printing industry and medical industry etc. each unit is equipped with density tablet and calibration software for testing its accuracy.

2. Specifications

Density Range	D=0.00—4.00 (DM3010) D=0.00—4.50 (DM3010A) D=0.00—5.00 (DM3011)
Repeatability	±0.02
Measuring Error	0.00—2.00 0.02 2.00—4.50 0.05 4.50—5.00 0.06
Power	50 ~ 60Hz, 100V-120V or 200V-240V
Power Dissipation	25W
Aperture Size	Dia. 2mm
Display	Three digital display
Light Source	27pcs LED
Sampling Time	0.8 s
Communication Port	RS232 Port, optional USB connection
Working Environment	Temperature 0 °C~40 °C, Relative humidity(RH)≤85%
Dimension	260×265×110 (H×W×L)
Weight	2.1kg

3. Instrument Diagram



1. Display area
2. Measuring arm
3. Aperture
4. LED lighting switch
5. Zero setting button
6. Light source shell
7. LED lamp
8. Power switch

4. Operating Instructions

4.1. Measuring Density Values

- 4.1.1 Press POWER button on the lower right corner of the device, the screen displays “-.-”. The instrument should be preheated for 5 min.
- 4.1.2 Press the measuring arm down without putting any film, the screen displays “E.1”. Keep holding the measuring arm while pressing the red *Zero Setting* button on the upper right corner of the device and the screen displays “0.00”. Releasing the measuring arm, the device will enter the density measuring mode.
- 4.1.3 Put the tested film on aperture point, and press the measuring arm, the density value will be shown on the screen.
- 4.1.4 While using the standard density tablet equipped with the instrument, the zero calibration should be done first, that is, do not put any density film, press the measuring arm and the *Zero Setting* button at the same time, the screen displays “0.00”, Releasing the measuring arm in 2 seconds, the device will enter the density measuring mode.

4.2. Observing Samples

The tested samples can be observed after the light on the lower left corner of the instrument is turned on and the trichromatic fluorescent lights inside the instrument are lit.

5. Calibration Function

The densitometer can be calibrated by calibration software and fit for different density curve. (For details please see the software instruction)

Summarize

the software is used for our black-white densitometer, a standard density tablet is needed in the calibration process.

Principle: according to the standard values on the density tablet and the original measured values of densitometer, fitting out a calibration curve to compensate the nonlinearing of silicon photocell, and transmit the characteristic values of the curve to the densitometer.

Select the Serial Port

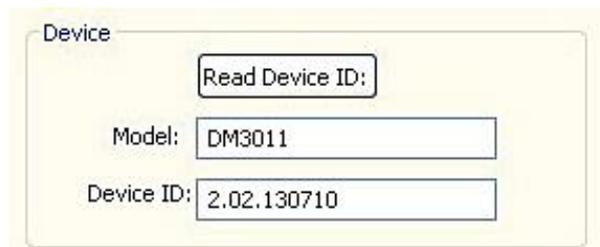
Select the default serial port 1 if using standard communication line, or install the drive of the connection line first if using USB connection line, then open the "COM PORT" in the device manager to view the serial port numbers in use.

Choose the Density Tablet Point

According to the standard density tablet which actually in use to choose the number of points, support 5 points, 7 points, 8 points, 10 points, 12 points, 14 points, 16 points, 18 points and 21 points.

Read the device version number

Press this button to read the device version number after selected the port, also it can detect whether pc communicate good or not with the densitometer, at the same time, the window displays 'E.5'.



Device

Read Device ID:

Model: DM3011

Device ID: 2.02.130710

Delete the Calibration Value

There are calibration curves in the densitometer, so the original calibration values must be deleted before collect the calibration measurements. Press this button to delete the original calibration curve, and the window displays "E.4" after deleted.

The densitometer displays "nnn" after power off then power on, means there's no calibration curve in the densitometer, the measurement value is the original measured value.

If the densitometer displays "---" after power off and power on, it means there is still calibration curve in the densitometer, the measurements are compensated correction.

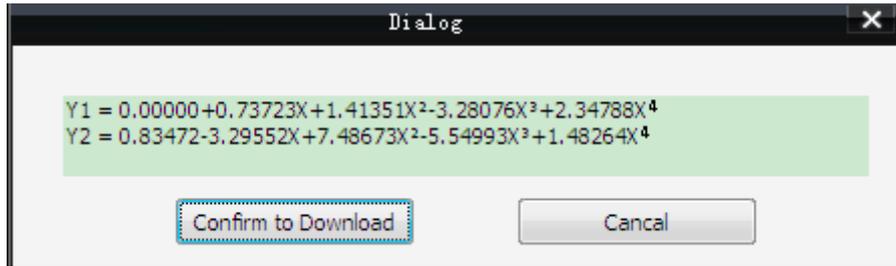
Calibration

- Prepare a regular standard density tablet.
- Type the standard values of density tablet and original measured values of densitometer in the corresponding textbox in ascending order.

Steps:	1	2	3	4	5	6	7	8
Standard value:	0.46	1.12	1.85	2.53	3.15	3.76	4.37	4.86
Measured value:	0.48	1.15	1.88	2.58	3.18	3.81	4.40	4.97

Pay Attention to Delete the original calibration before collect the calibration value!

- c) Press calibration button to pop up the dialog box of calibration curve equation, the calibration parameter which need to download to the instrument can be check here.



- d) Press the confirm button to transmit calibration datas from software to densitometer, the windows displays “E.3” when completed.

Note: The calibration is effectively only after restart the densitometer when “E3” appears.

The meaning of densitometer window shows

E.1	Zero prompt
E.2	Exceed the measurements limit prompt
E.3	Calibration download success prompt
E.4	Delete calibration data success prompt
E.5	Read the device version number success prompt

6. Attention

- Black-white densitometer is a precision measuring instrument. It should be keep away from dusts, humidity, alkaline and acid objects, and magnetic fields.
- The dust is easy to fall in to the light aperture, so after a period of time, if the instrument donot display 0.00 when calibrating, please open the light source shell with tape, then gently wipe the dust on the light-emitting diode with a cotton swab dipped in alcohol to ensure the normal use of the instrument.
- Please keep the density tablet clean. Use it only when you are not sure about the accurate of the measured values. If the value is not accurate, you can use calibrated step film and densitometer calibration software to calibrate the instrument.
- When the density values are out of the prescribed range, the measurement data are still has reference value. Please contact the manufacture if there are quality problems.