

ITEM# 77402



THE BOSSTM

PAINT THICKNESS GAUGE

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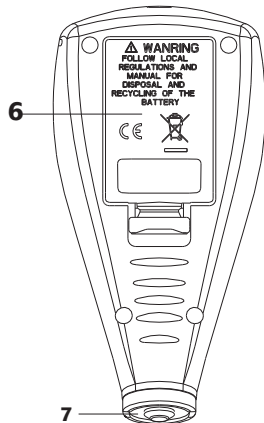
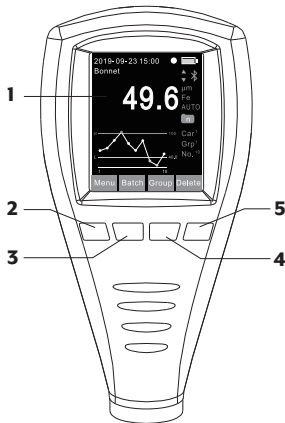
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Introduction

THE BOSS™ Paint Thickness Gauge can non-destructively measure the thickness of non-conductive coatings on metal surfaces and the thickness of non-ferromagnetic coatings on ferromagnetic metal (such as iron, nickel and cobalt). Specific uses of the instrument include measuring the thickness of paint or galvanized layer on iron and stainless steel surfaces as well as measuring the thickness of paint or plastic film on aluminum and copper surfaces.

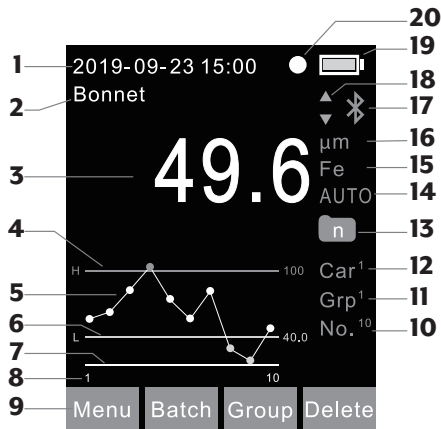
Layout & Buttons

1. Display Zone
2. Multi-Functional Button F1
3. Multi-Functional Button F2
4. Multi-Functional Button F3
5. Multi-Functional Button F4
6. Battery Compartment
7. Probe



LCD Display

1. Status
2. Group Information (Car Mode Only)
3. Data Display
4. Indicator Line for High Limit
5. Graph
6. Indicator Line for Low Limit
7. Baseline on Graph
8. Data Range
9. Multi-Function Button
10. No. of Readings
11. No. of Data Group
12. Car (Batch) Series No.
13. Data Group Mode
14. Probe Mode
15. Substrate Type
16. Unit
17. Bluetooth
18. Alarm Indicator for High & Low Limits
19. Battery Power Indicator
20. Measuring Indicator



Specifications

Probe Type	Standard Probe	
Measuring Principle	Fe: Magnetic Induction; NFe: Eddy Current	
Measuring Range	0~2000 μ m (Microns)	
Accuracy	$\pm (3\%+1\mu\text{m})$	$\pm (2\%+1\mu\text{m})$
Resolution	0.1 μ m (0 μ m~100 μ m); 1 μ m (>100 μ m)	
Calibration	Zero Calibration; Multi-Point Calibration	
Storage	10 X 13 X 10 Measurement Data	
Statistics	Number of Readings, Max, Min, Mean, Sample Standard Deviation, Coefficient of Variation, Number Below Limit, Number Above Limit	
Unit	μ m, mm, mils, inch	
Minimum Curvature Radius	Convex 5mm; Concave 25mm	
Minimum Measuring Area	Diameter 15mm	
Minimum Thickness of Substrate	Fe: 0.30mm; NFe: 0.05mm	Fe: 0.20mm; NFe: 0.03mm
Power Supply	3 Pcs 1.5V AAA Alkaline Batteries; 3 Pcs 1.2V AAA Rechargeable Batteries	
Operation Environment	Temperature: 14 $^{\circ}$ ~122 $^{\circ}$ F; Humidity: 20~90%RH (Non-Condensing)	
Storage Environment	Temperature: -4 $^{\circ}$ ~140 $^{\circ}$ F; Humidity: 20~90%RH (Non-Condensing)	
Size	133 X 68 X 30mm	
Material	ABS	
Weight	About 90g (No battery)	
Warranty	Lifetime Guarantee	

Usage

If it is your first time using a paint gauge, please read section 6 carefully first. (The factors of affecting measurement accuracy)

• Battery Installation

1. Install the battery according to the indications of the positive and negative poles inside the battery compartment.
2. Fasten the battery lid.

Note: Remove the battery when the instrument will not be used for a long time.

• Turn on/off

1. **Turn on:** Press the FI button for 3 seconds.
2. **Turn off:** Press the FI button for 3 seconds, or set automatic shutdown.

Note: *The data is the last reading of the first batch (car), first group when the instrument is turned on.*

• Basic Measuring Steps

Step 1: Prepare the surface to be measured, ensuring it is completely clean and dry

Step 2: Turn on the paint gauge.

Step 3: Gently press the probe end onto the paint surface to be measured. Ensure enough pressure is applied to press the probe tip into the unit. The paint gauge will automatically detect the properties of the substrate and measure the thickness of the coating layer. When the measurement is complete, the gauge will “beep”. At this point you may remove the probe from the surface and begin the next measurement.

Note: When placing the gauge/probe face onto the surface, keep it perpendicular to the surface to maintain accurate readings.

Note:  indicates low battery, and it will effect the accuracy of measurement. Please replace new battery.

Settings

How to set a function: Press “Menu” button to enter into menu page, select the “Option” icon to enter the display setting page, after selecting the target item, press “Enter” button to enter into the settings page of the item and set up accordingly. ● Indicates item selected,  indicates item enabled.

• **Probe Mode**

1. Eddy Current Mode: In eddy mode, the probe can only measure on non-ferrous metal substrates, and when a non-ferrous metal detected, the “NFe” will be shown.

2. Magnetic Mode: In magnetic mode, the probe can only measure on magnetic substrates. When a magnetic substrate detected, the “Fe” will be shown.

3. Auto Mode: The instrument will automatically determine the type of mode measured and show the substrate type.

• **Units**

μm(Micron), mm, mils and inch.

• **Language**

Multiple languages are available to select.

• **Calendar**

1. Display on/off: Set to enable the time display.

2. Display Type: Set the time and date displays separately or at the same time.

3. Date Format: Set the display format of the date.

4. Set Date: Set a specific date. An item with a blue background indicates that the item is editable and can be edited with pressing the multi-function button. Press ◀ button when setting the year or press ▶ button when setting the day, you can save the settings and return to the previous page.

5. Set Time: To set the specific time. An item with a blue background indicates that the item is editable and can be edited with pressing the multi-function button. Press ◀ button when setting the hour or press ▶ button when setting the minute, you can save the settings and return to the previous page.

• **Backlight**

Brightness of the screen backlight can be adjusted manually in the menu screen.

• **Volume**

The volume can be adjusted manually in the menu screen.

- **Bluetooth**

This gauge supports Bluetooth function. After Bluetooth is enabled, the measurement page displays an “orange” Bluetooth icon,  indicating that it is connected. A “grey” icon,  indicates that it is disconnected.

Note: *Only after the Bluetooth is enabled can the ThickCloud App be used for operation. Please use the QR code in this manual or search “ThickCloud” in the IOS app store to download the app. The app is only compatible with iOS devices.*

- **Auto Rotate**

The instrument supports automatic screen rotation function (only measurement page).

- **Auto Shutdown**

The instrument supports automatic shut-down, with options for disabled, 1 minute, 2 minute, 5 minute and 10 minute modes. When the shutdown time is set, the timer will be started immediately. If there is any operation (pressing a button or a measurement) during this period, the timer will be restarted. If the disabled mode is selected, the automatic shutdown function is turned off. There will be a prompt sound 5 seconds before the automatic shutdown. When the timing reaches the set time, the instrument will save the settings and measurement data and then automatically shut down.

- **Car or General**

Switching from specific car mode to general mode is available.

- **Reset**

Restoring factory defaults is high risk operation, once confirmed to execute, the gauge will immediately return to factory state and all measurement data in the instrument will be cleared. Before this operation, please confirm again whether it is necessary to perform this operation. The gauge needs to restart after factory defaults restored.

- **Device**

Available to view the device information of the instrument.

Display

How to enter a certain item: Press the “Menu” button to enter menu page, select the “Display” icon to enter the display setting page, select the corresponding data display mode and statistics options. ● indicates that the item is selected, ○ indicates item enabled.

• Settings for How Data is Displayed

There are various versions of data display, such as statistical values, trend graphs, curve graphs and histogram for users to choose.

• Settings and Viewing of Statistical Options

1. Select Statistics

In the selecting statistics, you can select the data to be displayed.

2. View Statistics

The measurement interface can not fully display all statistics. All statistics could be completely viewed in browsing statistics.

Note: When the NDFT value (see point 5.6.2, point 3) is off, the four items which are “NDFT Value”, “%>=NDFT”, “90%-100% NDFT ” and “IMO 90:10 pass/fail” in PSPC will display “***”.

Data

To enter an item: Press the “Menu” button to enter the menu page, select the “Data” icon to enter the data selection page. After selecting the target option, press the “Enter” button to enter the item’s settings/viewing page and perform the corresponding operation. ● Indicates item selected, ○ indicates item enabled.

• Review

The instrument display page can record up to 10 data points. If there are more than 10, the instrument will automatically update the latest data and discard the oldest data. The recorded data can be deleted by pressing the “Delete” button.

Note: *The deletion can only be saved when the instrument is turned off normally. If the instrument is accidentally powered off, the deleted data will still be saved in the instrument.*

• Setting Limits

1. High Limit

The high limit can be turned on or off, and also can be set to a certain point.

Note: *When the high limit is off, in the browsing statistics, the items related to high limit will display “***”.*

2. Low Limit

The low limit can be turned on or off, and also can be set to a certain point.

Note: *When the low limit is off, in the browsing statistics, the items related to low limit will display “***”.*

3. NDFT (Non Drift Failure Tarp)

The NDFT value can be turned on or off, and the specific NDFT value can be set to a certain point.

• Group Type

This gauge provides a variety of data pick sets or types for users to select. On the measurement page,  indicates normal mode,  indicates average mode,  indicates PSPC mode.

Note: *While using the average mode for measurement, the measured data can be saved in the measurement statistics after calculating the average value only when measurement points are equal to the set average. “1” in the icon  indicates the measurement times of the current buffered average mode, and “5” indicates the set average number of times. When “IMO PSPC” is selected, it will automatically enter the NDFT setting page.*

- **Clear Current Group**

Clear all data in the current data set.

Note: This operation can only be saved when the gauge is turned off normally. If the gauge is accidentally powered off, the deleted data will still be saved in the gauge.

- **Clear Current Batch (Car)**

Clear all data of the current batch (Car).

- **Clear All Batches (Cars)**

Clear data of the all batches (Cars).

Calibration

How to enter an item: Press the “Menu” button to menu page, select the “Calibration” icon to enter the calibration selection page and select the corresponding calibration operation.

Note: *When calibrating, the operation can only be saved when the instrument is turned off normally. If the instrument is accidentally powered off, the deleted data will still be saved in the instrument.*

- **Zero Calibration**

Zero calibration is recommended before use. First prepare an uncoated substrate consistent with the part to be tested.

1. Enter Calibration

Zero calibration operational steps: Enter the zero calibration page and follow the instructions to measure one or more times on the calibration substrate (multiple calibration measurements are better). At this time, the screen displays a value of 0. After completing the calibration, press the “Finish” button to return to the previous page.

Note: *Users are advised to set probe mode to auto mode before performing zero calibration.*

2. **Clear Magnetic Mode**

Clear zero calibration data of magnetic mode.

3. **Clear Eddy Mode**

Clear zero calibration data of eddy current mode.

• Point Calibration

1. Select Calibration (up to 4 points, for professional users' reference only)

Multi-point calibration operational steps: After entering the corresponding type of point calibration operation, press the “Add” button to add a new calibration point. As instructed, measure once or more times on a calibration substrate covered with a standard calibration diaphragm (multiple calibrations are better). The “Source” displayed on the screen is the current measurement value, and the “Target” is the expected standard diaphragm value. The user can modify the “Target” to the standard diaphragm value. After completing the calibration operation, press “Save” button to save the calibration data and return to the previous page. If the user has done zero calibration of this type before, the first value in point calibration is 0. The zero calibration value can not be edited or deleted on the point calibration page. For the calibrated point, the user can choose to “Edit” or “Delete”. User selects “Edit” to recalibrate the calibration point.

Note: Users are advised to set probe mode to automatic mode before performing point calibration. Zero calibration is not recommended after performing point calibration.

2. Clear Magnetic Mode

Clear zero calibration data of magnetic mode.

3. Clear Eddy Mode

Clear zero calibration data of eddy current mode.

• Clear All

Clear all calibration (including zero calibration and point calibration) data.

Batch (Car) Switch

On the measurement page, short press the batch (car) switch button once and the batch (ar) number increases one to switch to the next batch (ar). Long press the batch (ar) switch button and batch (ar) number decreases one to switch to the previous batch (ar).

Group Switch

On the measurement page, short press the group switch button once and the group number increases one to switch to the next group. Long press the group switch button and the group number decreases one to switch to the previous group.

Delete Measurements Directly

On the measurement page, long press the “Delete” button to delete the last measurement data of the current group directly.

Note: *This operation can only be saved when the instrument is turned off normally. If the instrument accidentally powered off, the deleted measurements are still saved in the instrument.*

Measurement Error

There are many factors that could cause the measurement error. Please refer to section 6 for details.

Using the gauge normally, the error will be kept within certain indicators (refer to section 4). The user can make multiple measurements and delete the suspicious value at the same time, and finally use the statistical function of the gauge in order to measure the coating thickness more accurately.

Factors of Affecting Measurement Accuracy

Principle \ Affecting	Magnetic Induction	Eddy Current Effect	Improvement Suggestions
Substrate Magnetic Properties	✓		Zero calibration, Multi-point calibration
Substrate Electrical Properties		✓	
Radius of Curvature of Substrate	✓	✓	Please read section 4 carefully to decide if you need to calibrate
Substrate thickness	✓	✓	
Substrate Area	✓	✓	
Roughness of Substrate Surface	✓	✓	Multiple measurements according to the method in section 5.11
Substrate Edge Effect, Shape Change	✓	✓	Avoid measuring at the edge of the panel, where the surface shape changes abruptly
Deformation of Substrate or Coating	✓	✓	
Attached Substances	✓	✓	Clean probe and test piece surfaces
Strong Magnetic Field	✓		Far away from strong magnetic field
Environment Temperature and Humidity	✓	✓	Perform instrument calibration in the same environment as the operating site
Method of Operation	✓	✓	Please read section 5.3 carefully
Low Battery	✓	✓	Replace battery
Probe Wear	✓	✓	

For a more accurate measurement, it is recommended to carefully understand the factors that affect the measurement error before performing the measurement. The main influencing factors listed in the table are briefly described below:

1). Magnetic Properties of Substrate

The thickness of the coating is measured by the principle of magnetic induction, which will be affected by the magnetic properties of the base metal. Different types of metals have different magnetic properties. Heat treatment and cold working will also affect the magnetic properties of the metal. In order to avoid such effects, it is recommended that before starting the measurement, the corresponding calibration operation described in section 5.7 should be performed using the substrate with the same properties as the test piece.

2. Electrical Properties of Substrate

Using the eddy current principle to measure the thickness of the coating will be affected by the metal conductivity of the substrate, which is related to its material and heat treatment. Therefore, before starting the measurement, the corresponding calibration operation described in section 5.7 should be performed using the substrate with the same properties as the test piece.

3. Radius of Curvature of Substrate

The influence of the radius of curvature of the substrate on the measurement is not negligible. The smaller the radius of curvature of the substrate, the more obvious the influence on the measurement. Please refer to the allowable range of radius of curvature in the technical parameter table of section 4 and then perform the corresponding calibration operation described in section 5.7.

4. Surface Roughness of Substrate

The influence of the surface roughness of the substrate on the measurement is also not negligible. The greater the surface roughness of the substrate, the greater the influence on the measurement results. For the coating, multiple locations can be selected for multiple measurements, and finally the thickness of the coating can be measured by statistical methods. If the roughness of the substrate to be tested is relatively high, it can also be calibrated by multiple measurements during calibration.

5. Deformation of Substrate or Coating

If the material of the base coating is soft, the probe may cause deformation of the base material or coating during the measurement, so the measured data will be unreliable. This is not an issue on cured automotive paint surfaces.

6. Ambient Temperature and Humidity

The temperature and humidity of the working environment of the gauge have an impact on the measurement results, and the gauge should be calibrated in the same environment as the operating site.

7. Operating Method, Probe Pressure and Orientation

The probe should be vertical and quickly depressed in a stable manner. The probe must not be skewed, shaken, or dragged. When operating the gauge, it is recommended to delete the suspicious value if one occurs, before continuing the measurement.

Regulation for Usage

1. Specimen to Test

The magnetic properties, electrical properties and surface roughness of the test piece should be as similar as possible to the calibration test piece.

The area and thickness of the substrate to be tested shall meet the measurement area and thickness range specified in the technical parameter table in section 4.

Calibration specimens with a radius of curvature close to the test piece should be used for calibration.

2. Reading

Random errors and local differences in coating thickness exist objectively. The reading of each measurement of the gauge is not exactly the same, so multiple measurements should be made in the adjacent measurement area. This is especially true for specimens with rough surfaces. In addition, when suspicious values are encountered, it is recommended to delete and then perform the next measurement.

3. Surface Cleaning

Before measuring, ensure that the surface of the object to be measured and the surface of the gauge probe are clean of dirt, dust, debris, or residue.

Maintenance

- Users should avoid using the gauge under excessively harsh conditions such as heavy dust, high temperatures, humidity, strong magnetic fields, oil pollution, etc., otherwise, the gauge will be damaged under the above circumstances, and will not be covered under our guarantee.
- During the use of the instrument, if there are serious abnormalities such as repeated measurement values, no response on the screen, no response to the buttons, and no shutdown, please try to restart the machine.
- If the fault still does not disappear, please remove the battery, wait for a few minutes before inserting the battery to turn on, press and hold the power button and the F4 key at the same time when the power is turned on, and after the reboot interface is completed, a beep sounds, indicating that the forced reset was successful.
- After a successful reset, all settings are restored to the factory defaults, and the gauge will automatically restart.
- If the above method still won't eliminate the fault, please contact Griot's Garage customer service.

Warranty

PRODUCT USE All statements, usage recommendations, and technical information contained in this manual are based on tests or development that Griot's Garage has deemed reliable. However, many factors beyond Griot's Garage's control can affect the use and performance of this Griot's Garage product in a certain application, including conditions under which the Griot's Garage product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely in the user's knowledge and control, it is the responsibility of the user to evaluate the Griot's Garage product to determine whether it is suitable for a particular purpose and the user's method of application.

WARRANTY Griot's Garage Lifetime Guarantee: Griot's Garage will repair or replace any defective tool, without charge, due to faulty materials or workmanship for the working life of the tool, subject to certain exclusions below. **Six Month Satisfaction Guarantee:** We want you to enjoy our quality product and have fun with it! If you're not 100% satisfied for any reason within six months of purchase, return it to point of sale with proof of purchase for a full refund or credit.

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SCAN TO VIEW THE APP



ThickCloud

Compatibility

iPhone

Requires iOS 9.0 or later

iPod touch

Requires iOS 9.0 or later

Mac

Requires macOS 11.0 or later and
a Mac with Apple M1 chip or later

Have fun in your garage!®

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