

Digital coating thickness tester

DPM-816

R2.1

USER MANUAL

UPDATED in March 2018



Car-Sys.com

Introduction

Dear owner of thickness meter, thank you for purchasing the device designed and developed in Russian Federation.

We are confident that you will find it useful in and it will serve you for many years.

We kindly ask you to go through this user manual to make get the most out of your device.

The device has the following features:

- Precise measurements
- Wide operating temperature range
- Large FSTN display with backlight
- Pressure stabilization of the probe
- Automatic metal type detection
- Powered by 1.5V AAA battery
- Small and ergonomic body
- Automatic power and backlight off switch

Purpose

The device is used to measure thickness of various non-metallic coatings (paint, primer etc) over metallic base (steel, iron, alloys, copper, aluminum etc).

An example of case for use would be to measure paint layer thickness of car body panels.

Device care information

Please keep in mind that the device is a high precision measuring instrument. Avoid dropping or hitting the device. Handle it with care.

The device is not waterproof. It cannot be submerged in water or even be used under rain.

In case the surface of the device accidentally gets wet, wipe it off immediately with soft and dry piece of cloth.

Do not use the device near strong magnetic fields or radio waves emitting devices. It may influence the reading and accuracy.

Do not subject the device to extreme heat conditions for long period of time. For example, do not leave it in a car under direct sunlight.

Water condensation may form on the surface and inside the device if it is brought from cold weather to warm room.

To prevent condensation, first place device inside a plastic bag and wait for it to warm up to room temperature.

If you noticed that condensation has formed, do not use the device. Let it all evaporate first.

Cleaning Instructions

Only use dry, soft piece of cloth to wipe any dust or dirt off the device. Do not use any detergents containing organic solvents.

Storage Information

Store the device in a warm and dry place away from direct sunlight. Take out the power element for long term storage.

Do not store the device in the range of strong magnetic fields or near devices able to generate strong magnetic fields, such as electric motors, power supplies or magnets.

Do not store the device in hot, dusty or humid places or near corrosive chemicals.

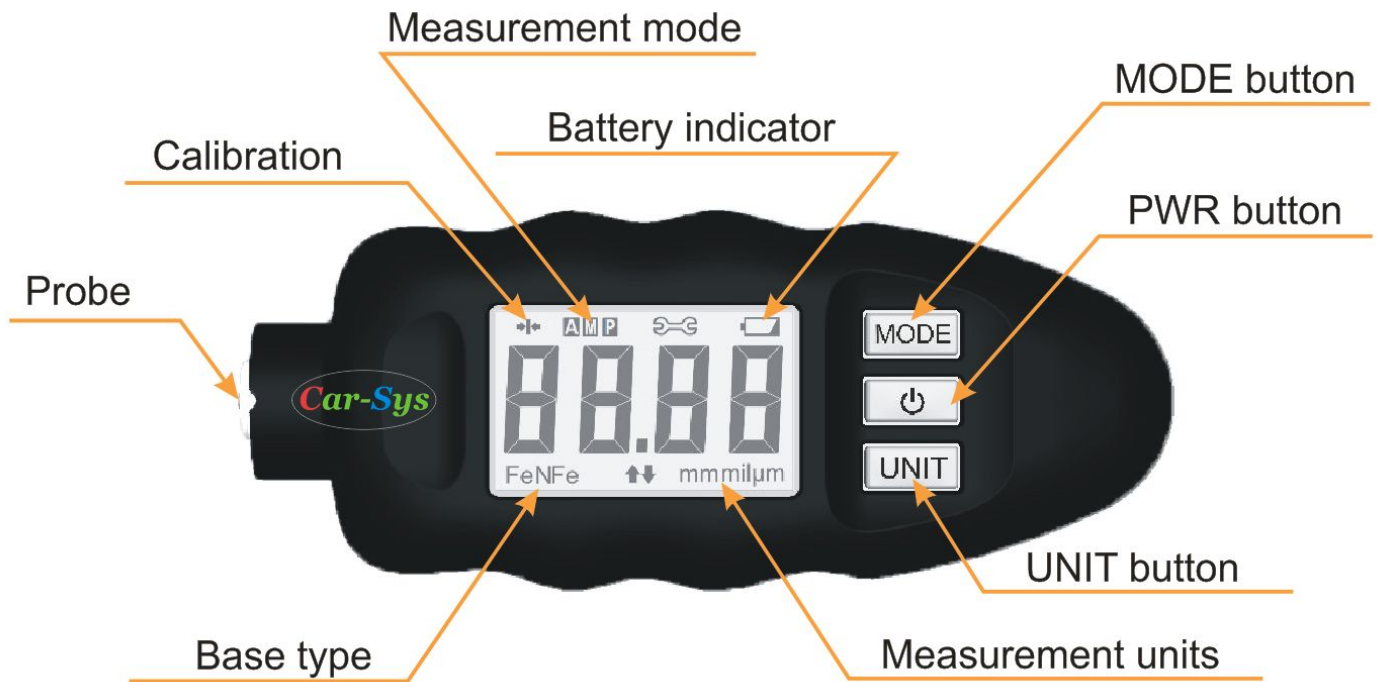
Display

Even though FSTN type display used in the device has wide operating temperature range, you may experience image refresh lag at extreme low and high temperatures.

The probe

Do not attempt to remove the probe from the device and do not distort it mechanically in any way. This may lead to faulty operation of the device.

Device Controls



“MODE” Button:

- Measurement mode change
- Thickness increase during calibration
- Two-point calibration on-off
- 6-point calibration for ferrous metals

“PWR” Button:

- Device on-off
- Backlight on-off
- Next calibration point
- Save calibration

“UNIT” Button:

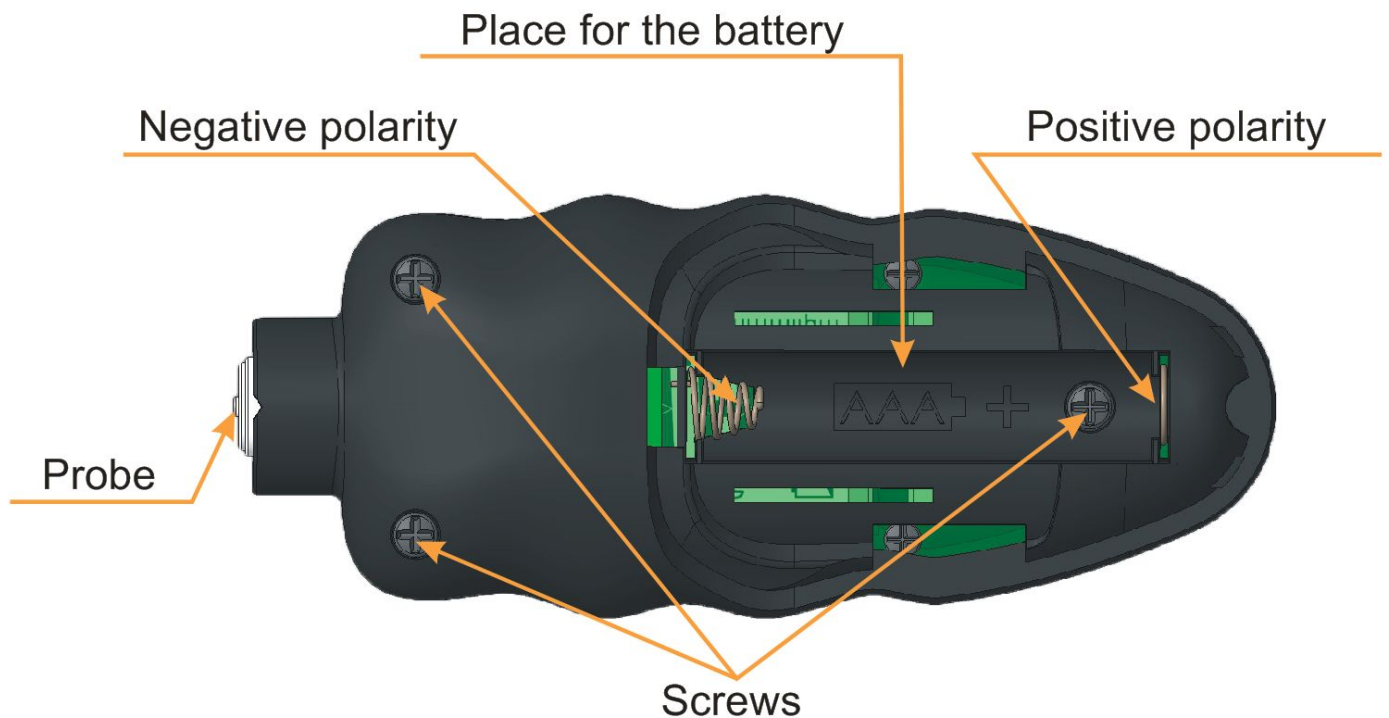
- Change of display units
- Thickness decrease during calibration
- Activation of zero correction
- Zero and two-point calibration reset
- 6-point calibration for non-ferrous metals

Included in the set

Please make sure the following items are all included in your set:

- Digital coating thickness gauge (the device)
- Aluminum calibration base
- Steel calibration base
- Calibration plate - 700 μm (27,5 mil) thick
- Calibration plate - 1000 μm (39,4 mil) thick
- User Manual

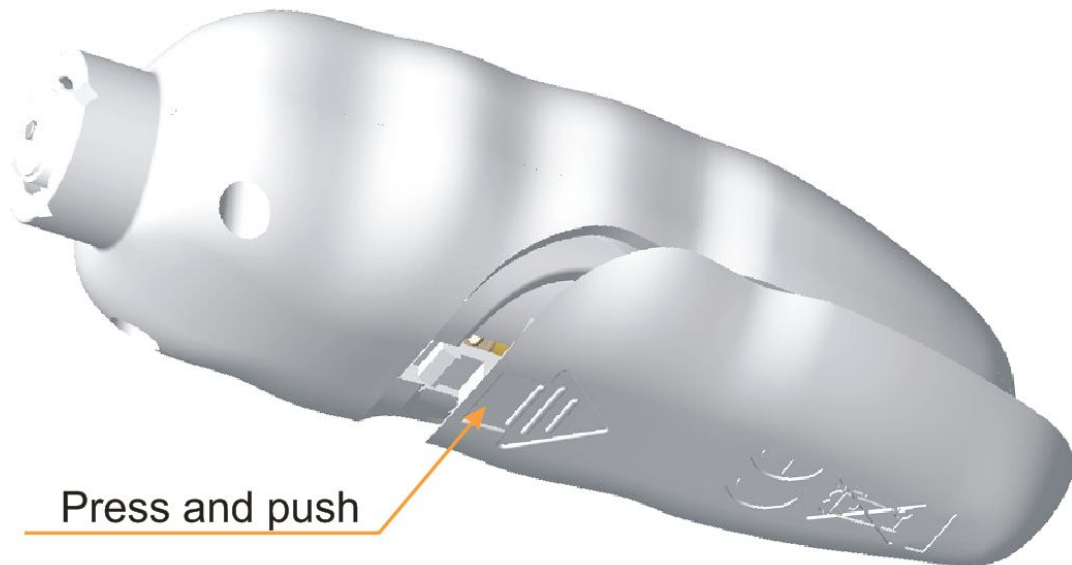
Getting started



One power element (battery) of type “AAA” 1.5V is required to power the device.

Battery installation

Open the battery cover by pressing with your thumb and pushing towards the direction of the arrow. Insert the battery respecting the polarity (according to +/- contacts). Close the battery cover. You will hear a click when the cover is fully closed.



Battery indicator

The device does not require much current and one battery will be able to power the device for quite a long time.

Once the battery is actually drained and is not able to power the device you will see an empty battery icon in the top right corner of the display. Do not use the device when battery is drained.

Power element disposal

Power element contains corrosive chemicals inside. Do not try to open the power element. Dispose it according to the procedures of your country. When not properly disposed, the power element is harmful to the environment.

Switching the device on

Press and hold “PWR” button for 2 seconds. Once on, you will see “8888” on the screen and the device will begin the procedures of auto-test and auto-calibration.

After 2-3 seconds, the display will show “----” which means that the device is ready for use.

Switching the device off

To power off the device, press and hold “PWR” button for 2 seconds. There is also an auto power off feature. The device will turn off automatically after 2 minutes of idle.

Backlight On/Off

The device comes with a backlight feature. To turn the backlight on or off, press and quickly release the “PWR” button.

Operating modes

For your convenience, the device has 3 operating modes: “A”, “M”, “P”. To switch between the modes press and quickly release “MODE” button, this will let you circulate between the modes. Current mode is displayed in the top part of the screen.

“A” - Adaptive mode. Normalizes the measurement results for easier understanding (used in most cases)

“M” - Displays more detailed and more precise results of measurement.

“P” - Display the result table of user calibration.

Units of measurement

For convenience of the end users from various countries, the device is able to display the measurement results in few units.

To choose the units, press “UNIT” button once. This will switch the displayed units and the current choice will be shown in the bottom left corner of the screen. “mm”, “mil”, “ μm ” units are available.

Measurement

Turn on the device and wait until auto-calibration is completed (2-3 seconds). Once done, the will be “----” displayed on the screen. Select required measurement mode and display units.

Firmly place the device so that the probe flat against the measured surface. Do not move the device.

Once the measurement is done, you will be notified by a sound and the device will display the result of the measurement.

Accuracy of the measurement depends on firm and flat contact between the probe of the device and the surface.

For more precise measurement the device is equipped with pressure stabilization sensor.

The probe has the sensitive part of just 2 mm in diameter. Therefore, in order to get precise measurement, it's required to have only small area of the surface cleaned from dust and dirt. This will allow you to make measurements of the body panels of the car without washing the whole vehicle.

Please note that when you're performing measurement or calibration on the base metal included in the set, the measurement must be performed in the center of the base plate.

Car body panel check

You can use the device to find car body parts that undergone repair and repainting.

At manufacturing facilities of all car makers, each car is painted by advanced automatic machines, which allows for paint layer thickness to be quite uniform across the whole body of the car.

Though paint layer thickness may vary from manufacturer to manufacturer, normally the coating thickness will be from 60 to 250 μms .

On 1 given vehicle, the paint layer thickness variation should not exceed 20%.

If one or few body parts of a car have a paint thickness measurement exceeding the average value times 2 that means

that there was a second layer of paint and lacquer applied to this given part.

However, if the measurement is more than 2 times the average value, it means that there is also a layer of putty filler underneath. The higher is the thickness, the less quality repair job was performed.

Calibration of zero deviation

The device zero reading can be calibrated for various base metal. This is required when, for example, the device reads coating thickness over zero for uncoated, bare metal. Calibration of zero deviation will solve this issue.

To calibrate zero reading, do the measurement on the uncoated, bare metal base. When the result is displayed, press and hold “UNIT” button for 2 seconds. Once the screen displays “CAL”, the calibration of zero deviation is complete.

Calibration reset

This function will reset the zero calibration and 2-point calibration to factory default values.

To perform calibration reset in measurement ready state (screen displaying “----”) press and hold “UNIT” button for 2 seconds. Once the screen displays “-CL-” and you hear a beep, the calibration reset is complete.

Two-point calibration

In measurement mode (screen displaying “----”) press and hold “MODE” button for 2 second until “F-0” in displayed.

This is zero point of calibration.

Perform a measurement on uncoated bare metal plate for which you’re calibrating. While the result of the measurement is displayed, quickly press and release “PWR” button.

The screen will now display “F-1” - second point of calibration.

Perform another measurement on the same base metal plate, now with the sample coating of known thickness.

While the measurement is displayed, select the right coating thickness by pressing “MODE” and “UNIT” buttons and press and release “PWR” button once done.

The screen will now display “8888” and 2-point calibration is complete.

Double check the accuracy of calibration by performing measurements on base metal plate with and without the coating.

If the calibration was unsuccessful, reset previous calibration results by pressing and holding “UNIT” button for 2 seconds, while the screen is displaying “----”.

6-point calibration

This calibration is available in “P” measurement mode and is required to be able to perform measurements on metals different from supplied base metal plates.

In the new device, it's equivalent to factory calibration.

For this type of calibration, base metal plate and 5 calibration plates with known coating thickness are needed.

F-0 (Point 0) - Metal base with no coating.

F-1 (Point 1) - 80-300 μm (3-12 mil) calibration plate.

F-2 (Point 2) - 400-800 μm (15-31 mil) calibration plate.

F-3 (Point 3) - 900-1800 μm (35-70 mil) calibration plate.

F-4 (Point 4) - 1900-2500 μm (75-98 mil) calibration plate.

F-5 (Point 5) - 2600-3750 μm (102-147 mil) calibration plate.

Entering into calibration state

Switch off the device. Press and hold “MODE” for ferrous metal calibration state or “UNIT” for non-ferrous metal calibration state.

The screen will display either “FCAL” or “ACAL” (depends on type of metal) once in calibration state.

Wait until the screen displays “0”. You may begin the calibration process now.

Calibration

First calibration is “0”. Perform a measurement on uncoated metal for which you’re doing the calibration.

Wait for stable readings and put the base away from the device. If needed, repeat the measurement.

Press and release “PWR” to save the result and go to the next measuring point.

The screen will now display “F-1” and the device will also show recommended calibration plate thickness for this point.

Perform the measurement on the base metal together with recommended calibration plate on top.

Select (by pressing “MODE” and “UNIT”) the thickness of measured calibration plate and press “PWR” to go to the next calibration point.

Repeat the same procedure for each calibration point to follow. Once the complete, the screen will display “8888” and the device will go into “P” mode.

Repeat the whole process for the second base metal type.

Please note that if calibration was not performed properly for one type of the base metal, the device will not be able to automatically detect the base type.

Please note that the calibration is not required for normal use with standard base metals.

Device Specifications (updated in March 2018)

Measurement range	0-99 mil / 0-3000 μm / 0-3 mm
Resolution	0.1 mil / 1 μm / 0.01 mm
Maximum measurable thickness	99.9 mil / 3500 μm / 3.5 mm
Measurement deviation (0 - 700 μm)	$\pm 1\% + 0.04$ mil (1 μm)
Measurement deviation (700 - 3000 μm)	$\pm 1\% + 0.4$ mil (10 μm)
Operating temperature	-13 to 104°F (-25 to 40°C) humidity less than 70%
Measurement units	Micrometre / Millimetre / Mil
Time for 1 measurement	1 sec
Display size	0,78 x 1,3 in (20 x 33 mm)
Weight (without power element)	1.76 oz (50 g)
Size	4,1 x 1,7 x 1,2 in (104x43x29 mm)
Body material	ABS+PC
Button material	Silicone
Power element	type AAA, 1.5V
Standby power consumption	60 μA
Measurement power consumption	16 mA/40 mA with backlight
Power element lifespan (AAA 1.2A/h measurement)	up to 75 hours (without backlight)
Power element lifespan in standby	up to 2 years
Device useful lifespan	7 years from manufacturing date

Base metals	Ferrous metals, steel, iron Non ferrous metals, aluminum alloys, zinc, copper
Coating materials	Any non metal and non magnetic coatings

The device is calibrated by manufacturer for steel and aluminum bases. The specifications presented above are general specifications and may vary for some devices. The specifications can be changed by the manufacturer without any notice.

Warranty

The device is guaranteed against manufacturing defects for 2 full years since the day of purchase. For the warranty to apply, the device must be stored, handled according to the guidelines described in this user manual.

Repair and replacement will be performed according to the policies of the service centers.

The warranty does not apply to the devices with defects caused by physical damage, liquid damage or by improper usage, handling, storage or transportation of the device.

The device is designed and manufactured by:

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