SaveCoat 7®

www.savecoat.com

Thickness gauge for powder coatings

INNO TEST AG

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1 Important

Take time to read this user manual before you use your SaveCoat 7. It contains important information and notes regarding your SaveCoat 7.

Notice This product meets the applicable Industry technical specifications CE. The equipment must be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.
Repairs to certified equipment should be made by an authorized Innotest AG maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the Innotest AG cause to dissolve the guarantee.

Power requirements

The Gauge requires an external electrical supply of 15 to 24 V DC (min 18 W). Therefore a universal power supply for operation on 110-240 VAC (50-60 Hz) is included in the delivery package. To avoid damages of the unit itself it is highly recommended to use the original power supply unit.

To avoid damage or malfunction

⚠ • Do not allow the charging contacts or the battery to come into contact with metal objects.

- Do not open it as you could be exposed to high voltages.
- Do not allow the charger to come in to contact with liquids.
- Never use any other battery than the one delivered with the product or recommended by Innotest AG: risk of explosion.
- Always use the cables provided with the product.
- Do not expose the device to excessive heat caused by heating equipment or direct sunlight.
- Do not drop your device or allow objects to fall on your device.
- Do not use any cleaning agents containing alcohol, ammonia, benzene, or abrasives as these may harm the set.
- Do not use the product in places where there are explosive hazards.
- In case of powder inside the sensor gun only use air at normal or highly reduced pressure to blow out – use of pressurized air might destroy the sensor itself.

About operating and storage temperatures

• Operate in a place where temperature is always between 10° and 35° C (50° to 95° F).
• Store in a place where temperature is always between -20 and 45° C (-4 to 113° F).
• Battery life may be shortened in low temperature conditions.

Conformity

This product meets the Electromagnetic Compatibility Directive 2014/30/EU.

The product is Class A, Group 1 ISM equipment according to CISPR 11.

Recycle your batteries

Please dispose of the battery packs professionally and not in household waste.

Disposal options

Dispose of the complete product (including cable, plugs and accessories) in the designated WEEE collection facilities.

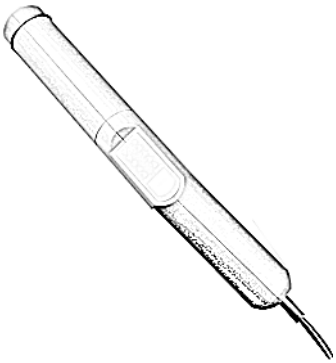
2 Your SaveCoat 7 Gauge

Congratulations on your purchase and welcome to SaveCoat 7!

To get latest product information as well as actual version of this manual visit the web page www.savecoat.com .

Packaging Contents

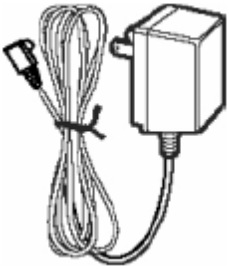
Gauge



Sensor Pistol

Reference Block

Manual

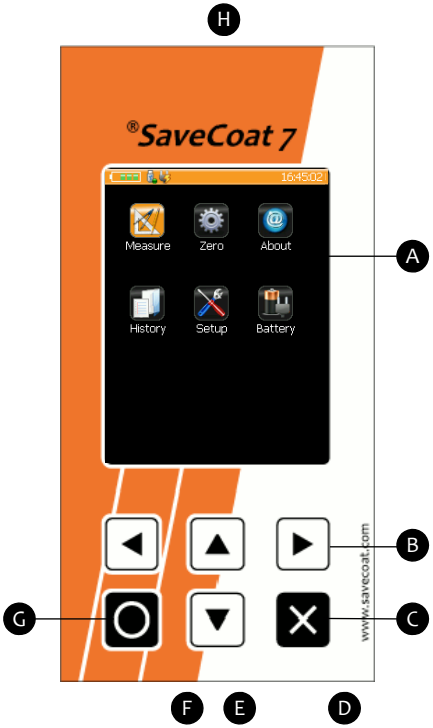


Power supply

Case

USB Cable

3 Overview SaveCoat 7



A **Display**
Information on the individual symbols on the display, see page 7 of this manual.

B **Buttons**
left/right up/down arrows

C **Off/Escape Button**
Off -> Press button for 1 second

D **Power supply**

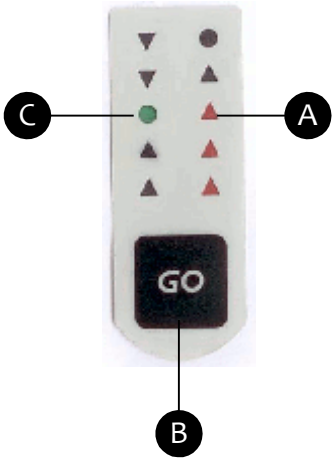
E **Reset button**

F **USB connection**

G **ON/Enter Button**
ON-> Press button 1 second

H **Sensor-gauge connection**

Sensor gun

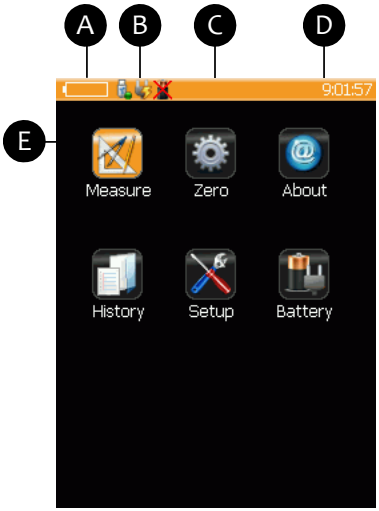


A **Energy LEDs**
Energy LEDs indicate the energy level of the measured echo.
While device is off, energy led will show battery charge status

B **On/Enter Button**
ON-> Press button 1 second

C **Distance**
Distance LEDs indicates the distance from the sensor to the surface. The optimal measuring distance is reached and the measurements can be registered as soon as the green light on the probe comes on (in the middle)

4 Display SaveCoat 7



A **Battery Level**
B **USB Connection Active**
Power supply
Battery fault
C **Menu Indicator**
D **Time**
E **Menu Icons**
Press ○ to enter menu.
Press ✕ to leave menu.

Measure Menu

With highlighted Measure icon press ○ to start measurement gathering ultrasonic echoes. To get meaningful reflected echoes hold the probe in about 18 mm distance perpendicular to the surface area under concern.

Evaluating and ranking ultrasonic echo signals by distance and reflected energy the SaveCoat7 selects the optimal echo signals offered to process the final powder coating thickness (cured).

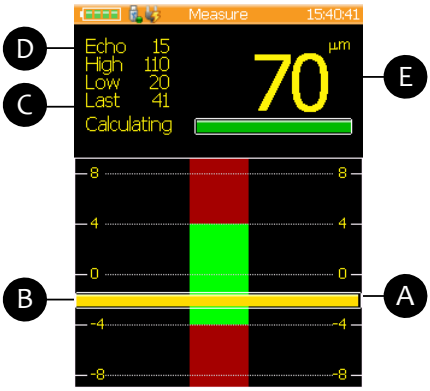
⚠ **To improve the ultrasonic echoes and therefore the final reading, you need to slightly vary distance and incidence angle.**

A loud sound system, the on-screen guidance graph as well as handle LEDs gives an intuitive real time feedback on distance and reflected ultrasonic energy.

Each time an improved echo signal is evaluated the corresponding index is incremented. Incrementing counter index means improving at an unknown grade:

- there is no number you have to have
- you will notice coming to the top
- exercise will speed you up

To stop echo gathering and start final signal processing press ○ again. Final coating thickness Reading (cured) will be displayed in the selected units.
Press ✕ to abort and to leave menu.



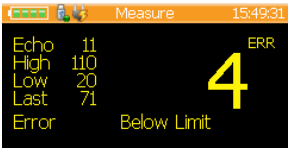
A **Energy level**
(width of yellow bar)
relative level of reflected energy

B **Distance**
(vert. position of yellow bar)
measurement distance has to be in the specified green range

C **High- / Low- Limit**
of thickness range; last measured coating thickness
(cured coating)

D **Index of echo signals (hits)**
you need at least 5 signals

E **Coating thickness or error code**



List of error codes
(Measure Menu)

1	**Above Limit**
4	**Below Limit**
10	**Echoes varying**
20	**Too few echoes**
255	**No echoes found**

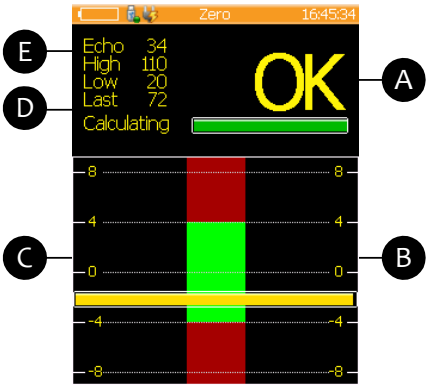
Zero Menu

⚠ **The bottom of the reference block has to be clean and free from grease or powder dust.**

For zeroing the reference block must be placed on the top of the sensor gun with the opening against the ultrasonic probe. To make sure the reference block sits correctly on the gun it is easiest to hold the gun, with the reference block on top, vertically aligned in the air.

With highlighted Zero icon press ◘ to start zeroing. Please make sure you do a proper zeroing (Index of echo signals should increment to 20 to 40).

⚠ **A no optimal zeroing will affect the measurement accuracy. Therefore a check called "smart zeroing" is available and refuses most but not all kind of improper zeroing.**



A Indicates if the zeroing was OK or shows an error code

B **Distance**
A successful referencing must take place in the green area.

C **Energy level**
the energy level should be as high as possible.

D **High- / Low- Limit of thickness range; last measured coating thickness**
(cured coating)

E **Number of Hits**
You need at least 5 Hits for a successful zeroing

List of error codes (Zero Menu)

20 **Too few echoes**
30 **Too few energy**
255 **No echoes found**

About Menu

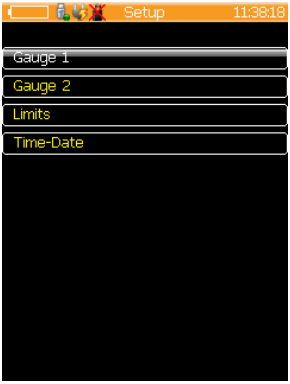
The About menu shows the device serial number and the associated sensor and software versions.

History Menu

The History menu shows the last 200 readings with the affiliated timestamp and the average of the dis-played 10 readings. Press ▼▲ button to go through the measurements.

The history can be deleted pressing the ◄ button.

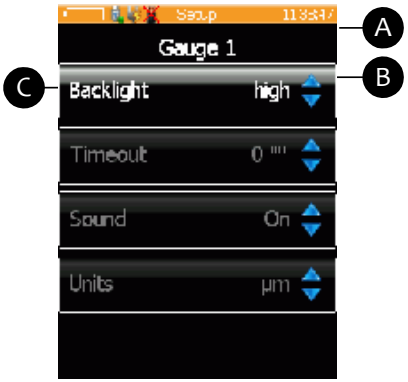
Setup Menu



In the Setup Menu the desired submenu can be select

with ◄ the ◄► or ▼▲ and the ● buttons.

Gauge 1 Submenu



A **Setup Title**
B **Up/down arrows**
C **Selected item**

The desired item can be selected with the ◄► buttons. The selected item can be changed with the ▼▲ buttons.

Backlight	Adjust display brightness
Timeout	Automatic shut down after x minutes
Sound	Sound on/off
Unit	Choose between inch and metric system.

Gauge 2 Submenu

Adjust the Language, LGTS and USB-Mode of the device.

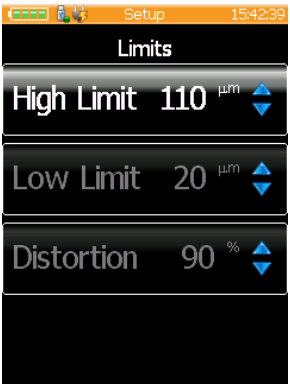
Language	Set the language of your device
LGTS	Laser Guiding and Targeting system on/off

⚠ **The Mass-Mode is available from version 2.3 and above!**

USB Mode	Gauge/Mass Mode
Gauge-Mode	the Device can be controlled with a special software. (Need of a device driver)
Mass-Mode	the Device behaves like a mass storage device (standard, all new operating systems)

⚠ **To become active the change of the USB mode requires a new start of the gauge (switch off and on again)!**

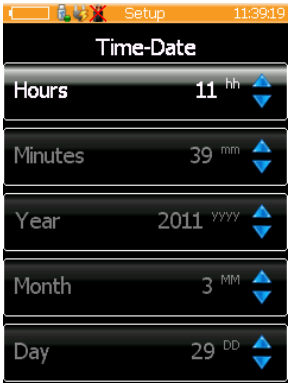
Limits Submenu



High Limit	Upper limit of cured coating thickness
Low Limit	Lower limit of cured coating thickness
Distortion	Adjustable Scaling

⚠ **In regard to useful scaling, limits can be set between 25 and 125 microns (ca. 1.0 and 5.0 mils). It is recommended to have limits inside the calibrated measurement range (see Chapter 6).**

Time-Date Submenu



Adjust the Time-Date of the device.

Batt. state Item

This menu item is only shown after a hardware reset (e.g. after pressing the reset button with a paperclip) or after a battery pack replacement.

The item settings allows the implemented self-learning energy management and lifetime estimation tool to start with best available estimation of the condition /capacity of the battery pack.

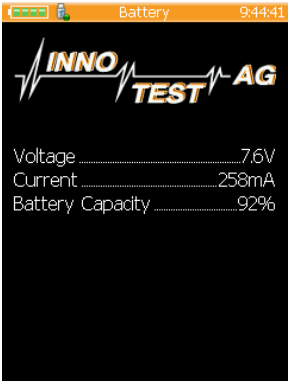
Bad means 25%, middle means 50% and high means 75% of the maximum battery capacity of a best conditioned new battery pack.

⚠ **Once a new SaveCoat 7 device is set into operation for the first time it is recommended to fully charge the new battery and to set the Batt. State to high.**

After some days of use and some recharging of the new battery one should run a full battery cycle (see below) to get best use of the self-adaption tool and best reliable relative battery capacity info in the Battery Menu (see below) and the battery icon on the top of the display.

Please note that without any reset or exchange of the battery pack (standard use) the device further on self-adapts the real battery capacity integrating the energy used over each full battery cycle starting after completed battery charge and ending with the automated switch off by a voltage underflow (6.5V).

Battery Menu



The battery menu shows the actual voltage, the current of the battery and the remaining battery capacity relative to the full charged battery as it is in use.

⚠ **Device switches off when voltage is below 6.5 Volt.**

Please note that the absolute battery capacity degrades while the battery gets older. Once you notice a very short lifetime under operation you should check if you probably have to get a new battery pack to get initial lifetime of about 7 hours!

⚠ **To get a good estimation on the relative Battery Capacity info and lifetime, you should run a full battery cycle from time to time.**

5 Error Handling and Trouble Shooting

The device does not start when pressing the ○ button:

- press ✕ button for 10 seconds and press ○ to turn the device on.

The device does not start or turns off while measuring:

- Battery is low, recharge battery

The device hangs:

- press ✕ button for 10 seconds until the device turns off, press ○ to turn the device on.

The device still hangs:

- press reset button with a paperclip (see Chapter 3).
- press ○ to turn the device on.

Distance display is not in the green area while measuring:

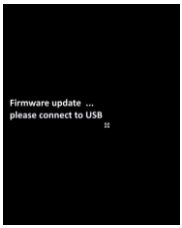
- hold sensor vertical to the surface
- Distance to the surface is not correct (18 mm)

Distance display is not in the green area while zeroing:

- displacement of sensor in the sensor tube (equipment check and readjustment by authorized persons)

Unit requires a firmware update:

- By accidentally pressing a defined combination of buttons the unit can be set in a minimalist update mode:



to leave and restart the unit without downloading a new firmware just press ✕ for 10 seconds.

6 Measurement specifications

Measurement method
airborne ultrasonic
Measurement units
metric / USCS selectable
Resolution
1 micron (ca. 0.04 mils)
Calibrated measurement range
30 microns (ca. 1.1 mils)
to
105 microns (ca. 4.2 mils)
Accuracy
±5 microns (±0.25mils)

7 Device specifications

Data Storage
non-volatile memory storage of all data, storage of ~200 measurements.
Power
7.2V Ni-MH rechargeable battery, 7 hours on battery, 2.5 hour recharge time, 100-240V AC; 50-60Hz power supply included.
Dimensions
115mmx185mmx35mm (4.6”x7.4”xx1.4”)
Weight: 0.9kg (1.9 lbs) with battery pack
Environmental
Operation temp: 10° C to 35°C (50-95°F)
Humidity: <85% at all times
Case
extruded aluminium (IP 54)

8 Enhanced Functionality

Compared to earlier generations (Powdersave Gauges) the SaveCoat7 provides some enhanced functionality.

Remote control

For automatic measurement with a robot or another manipulator, the SaveCoat7 has the capability to be fully remote controlled over the USB interface.

The following commands are available:

1. Start acquiring signals
2. Stop acquiring signals
3. Calculate the thickness of the cured powder coating

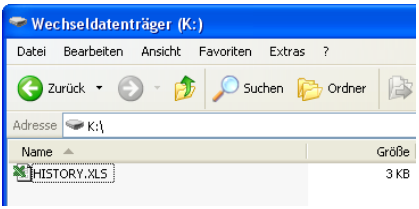
A WinXP, Win7 driver (DLL) is available, other systems may also be supported.

History / Documentation (V2.3 and above)

In USB Mass-Mode the History (last 200 readings with time stamp) can be seen like a normal file on a memory stick.

Just connecting the unit to a PC using an USB cable and copy/paste the history to a folder of your choice.

The 200 readings in the tab separated file (*.xls) can be analysed and processed straight forward using standard programs (e.g. EXCEL) or customized documentation tools.



Firmware update (V2.3 and above)

To get the latest improvements of the SaveCoat 7 an update mode is available. For that you need to copy (copy/paste) the latest "SAVECOAT.LDR" file on the mass storage (check USB Mode Setting!) device of the SaveCoat 7. Disconnect the USB and SaveCoat 7 will now update and restart automatically.