

深达威® 涂层测厚仪

COATING THICKNESS METER

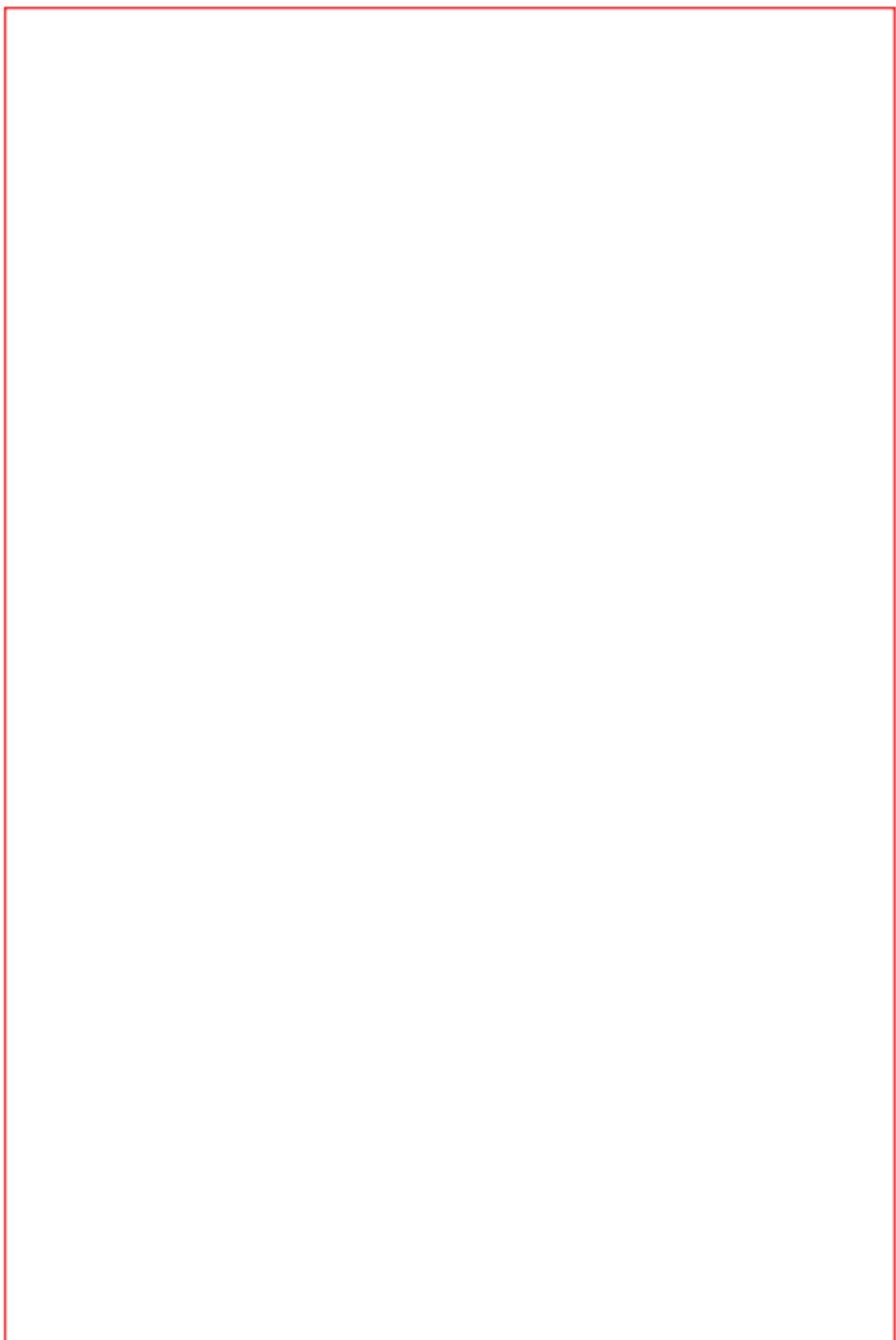


SW-6310A

用户手册

User Manual

 **SNDWAY**



中文 ----- 01-13

English ----- 14-27



产品执行标准: DB44/T 1207-2013 GB/T 4956-2003
GB/T 4957-2003

用户须知

初次使用仪器前, 请先仔细阅读用户须知

- 一、不要用任何方式自行打开或修理仪器, 严禁非法改装仪器。请妥善保管仪器, 不要放在儿童可以接触到的地方, 避免无关人员的使用。
- 二、仪器电磁辐射可能对其它设备和装置造成干扰, 请不要在飞机或医疗设备附近使用本仪器, 不要在易燃、易爆的环境中使用仪器。
- 三、仪器更换的废旧电池和报废的仪器不可与生活垃圾一同处理, 请按国家或者当地的相关法律规定处理废旧电池和报废仪器。
- 四、超过保修期的本公司产品出现故障, 可以交由本公司维修产品, 按公司规定收取维修费用。
- 五、凡因用户自行拆装本公司产品、因运输、保管不当或未按产品说明书正确操作造成产品损坏, 以及私自涂改保修卡, 无购货凭证, 本公司均不能予以保修。
- 六、仪器出现任何的质量问题, 或对使用仪器有任何疑问时请及时联系当地经销商或深达威仪器厂家, 我们将第一时间为您解决。

专业铸造品质 品质成就品牌

概述

本仪器通过金属底材磁性和涡流特性，能够准确分辨出底材的属性。本仪器采用高精密探头，能精准地测量出磁性底材表面的非磁性覆盖层厚度（如油漆，橡胶，珐琅等），以及非磁性金属底材表面的非导电覆盖层（如油漆，橡胶等）的厚度。

本仪器通过不断的测试和改善，以各大工业复杂环境为标准，研发出来的涂层测厚仪，能准确，快速，无损伤地测量出覆盖层的厚度，适用于各大工业车间，实验室和户外环境。

特点

- 2.0寸大显示段码屏
- 转屏显示，方便用户不同视角工作
- 操作简单，接触覆盖层直接显示材质和厚度
- 提供零点和多点校准，能可靠快速地进行校准
- 测量数据可保存最大30笔，关机不丢失数据
- 上下限报警测量功能
- 触按开机，60秒无操作自动关机
- 低电提示

功能说明与按键



其中Fe为磁性材质，NFe为非磁性材质

单位转换/

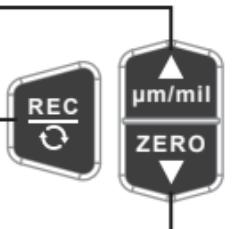
上翻键

存储/

转屏键

零点校准/

下翻键



设置/
校准键

主界面

主界面时，左上角无显示

	短按进入设置上限 " <i>UP</i> " 或下限 " <i>dn</i> " 的报警数值 长按进入校准模式 测量状态下，短按切换单次测量模式或连续测量模式
	短按浏览此前的存储记录 长按转换单位 μm 或 mil
	短按浏览此前的存储记录 长按校准零点，把当前测量值作为零点保存
	短按存储当前测量的数据 长按转屏

查看记录模式

在主界面下，短按 键或 键进入查看记录模式，左上角显示 "REC"

	短按删除当前一笔数据 长按删除全部记录，并发出“滴滴滴”三声
	短按向前翻页
	短按向后翻页
	短按退出查看记录模式 长按转屏

设置上限或下限报警值

在主界面下，短按 键进入设置上限或下限报警值，左上角显示 "*UP*" 或 "*dn*"

	短按保存并进入下一项
	短按报警值加1 长按报警值连续加
	短按报警值减1 长按报警值连续减
	短按退出设置，不保存 长按转屏

校准模式

在主界面下，长按  键进入校准模式，左上角显示 "CAL"

	短按切换校准点，1 (0 μ m) 、2 (50 μ m) 、3 (100 μ m) 、4 (250 μ m) 、5 (500 μ m) 、6 (1000 μ m) 共6个点循环切换
	短按厚度值加1
	短按厚度值减1
	短按退出校准模式 长按转屏

安装更换电池

- 打开仪器背部的电池门，按照极性指示正确放入电池，并关闭电池门
- 仪器只能使用1.5V AAA碱性电池
- 长时间不使用仪器时，请取出电池，以避免电池腐蚀仪器主机

注： * 如果仪器电池符号显示 ，表示为满电状态，仪器能够正常准确测量。如果电池符号显示 ，表示为低电状态，请及时更换电池。
** 低电状态下，测量的数据可能不准确。

仪器启动和关闭



图示1 靠近金属底材开机是不正确的



图示2 远离金属底材开机是正确的

用户需在远离金属材质至少5cm的地方触按探头开机，或开机后迅速提升仪器离开底材。靠近金属材质开机，仪器会“嘀…嘀…嘀…”连续报警。因仪器在开机瞬间会进行校准平衡，靠近金属开机，可能影响仪器正常使用。

校准

本仪器出厂时根据标准底材(随机的铁块和铝块)，已校准好基准数据。用户如需对特定材料进行测量，请对需要测量的底材进行零点校准和校准片校准，以保证数据的准确性。

● 零点校准

零点校准是对底材零点进行零校准，零点校准操作只为获得更精确的零点。

基本操作：

- A. 对底部材料进行一次测量，屏幕显示一组数据，蜂鸣器发出“滴”提示音。
- B. 长按  键，屏幕主数据清零，蜂鸣器发出“滴”两声提示音，以完成校准。
- C. 重复A,B步骤，以获取更准确的校准数据。

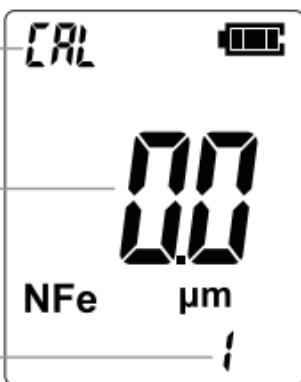
● 校准片校准

校准片校准通过用不同规格的校准片对底材进行多点校准，以保证仪器在不同特性的底材上测量时数据的正确性。

基本操作：

- A. 长按  键，屏幕左上角显示“CAL”，进入校准模式，见下图：

①校准模式



②校准点对应的厚度值

注：除零点外，其它点可以根据校准片厚度值调整数值

③校准点（共6个点）

1 (0μm)	2 (50μm)
3 (100μm)	4 (250μm)
5 (500μm)	6 (1000μm)

- B. 此时屏幕右下角显示“1”，主显示区显示校准厚度值“0.0”，表示校准零点。在磁性金属底材或者非磁性金属底材上测量一次，仪器发出“滴滴”两声，零点校准完成，仪器自动跳到下一个校准点。
- C. 此时屏幕右下角显示“2”，主显示区显示“50.0”（注：可能是45~55之间的某个值），表示校准50 μm 。把50 μm 校准片（可能是50 μm 上下的某个厚度值）垫到刚才校准零点用的底材上，先对比仪器校准值是否和校准片一致，如果不一致，可按  键或  键调整到同样数值后，再测量一次，50 μm 校准完成，并自动跳到下一个校准点。
- D. 参考上一步（C），继续校准3（100 μm ）、4（250 μm ）、5（500 μm ）、6（1000 μm ）。校准完第6点（1000 μm ），自动退出校准模式。
- E. 如果只想对某个点进行校准，可在校准模式下，按  键切换校准点。校准模式下，按  键退出校准模式。

注意：

- 1. 校准一个周期（6个点）只能使用同一种底材，中途更换底材可能导致数据不准确。
- 2. 校准非磁性底材（如铝片）的时候，要远离磁性材料（如铁片），否则可能导致数据不正确。

** 当退出校准模式时，仪器显示“Err”，代表校准数据有误。仪器校准数据会自动恢复上一次校准数据，请按  键返回主界面并选用符合标准的校准片和底材重新校准。

基本测量

● 单次测量

- A. 准备待测试件。
- B. 将仪器放置在空置的空间，远离金属材质开机。
- C. 开始测量：将仪器垂直轻压在待测量件上，蜂鸣器发出“滴”一声，并完成测量，仪器会把数据显示在主显示区，迅速把仪器移开待测件5cm以上，约1秒钟后便可进行下一次测量。

** 系统默认为单次测量

● 连续测量

开启方法：将仪器轻压在待测量件上不松开，短按  键，仪器左上角会显示“Scan”，进入连续扫描测量模式。只要把仪器轻压在待测量件上，数据就会不断更新。

关闭方法：将仪器轻压在待测量件上不松开，短按  键，仪器左上角“Scan”消失，退出连续扫描测量模式，进入单次测量模式。

存储/删除记录

● 存储记录

- A. 当用户确认数据是有效的，可短按  键保存。
- B. 当存储的数据大于30笔，仪器会提示“FUL”，表示存储记录已满。

● 查看记录

- A. 在主界面，短按  /  键进入存储模式，屏幕左上角显示 "REC"，主显示区显示当前记录号的数据，材质和单位。
- B. 按键  /  键能查看上一页记录/下一页记录。
- C. 直接测量或短按  键退出存储模式。
- D. 当仪器无存储记录时，短按  /  键无法进入查看记录模式。

● 删除记录

删除单个数据：在查看记录模式下，短按  键，删除当前记录号数据。

删除全部数据：在查看记录模式下，长按  键，数据列表全部清空，蜂鸣器“滴滴滴”三声提示完成操作，返回主界面。

限值测量

限值测量可以设置仪器测量时报警值的上限和下限：当仪器测量值大于上限值，屏幕左上角会闪烁显示 "UP"；当仪器测量值小于下限值，屏幕左上角闪烁显示 "dn"；仪器还伴有声音警示，按任意键可退出警示状态。当测量值在设置范围内时，报警提示会自动清除。

**** 上下限设置范围为0~1999μm；**

上限值设置为1999μm时，关闭上限报警；

下限值设置为0μm时，关闭下限报警。

- A. 在主界面短按  键，进入上限设置界面，屏幕左上角闪烁显示 "UP"，主显示区显示当前设置值，通过  和  键可调整数值。
- B. 短按  键保存上限数据进入下限设置界面。
- C. 短按  键保存下限数据并返回主界面。

单位设置

本仪器提供2种测量单位 (μm , mil) 可供选择，用户可根据自己的要求，选择合适的测量单位。在主界面长按  键，可快速切换单位。

转换关系：

$$1\text{mil} = 25.4\mu\text{m};$$

$$1\mu\text{m} = 0.03937\text{mil};$$

自动关机

仪器提供自动关机功能，以节省能源。当仪器60秒内无任何操作时，仪器自动关机。

转屏

长按  键，可实现屏幕180度翻转。

技术参数

项目	SW-6310A
测量范围	磁性0~1700μm; 非磁性0~1700μm
分辨率	0.1μm @ (0~99.9μm); 1μm @ (100~1700μm)
示值误差	±(2+2%*H)μm @ (0~500μm) ±(2.5%*H)μm @ (500~1700μm)
最小测量区域	磁性25x25mm; 非磁性25x25mm
最小曲率	凸面5mm; 凹面30mm
最小底材厚度	磁性0.2mm; 非磁性0.05mm
显示屏	段码屏
数据存储	30组
电池规格	2x1.5V AAA电池
工作温湿度	0°C~50°C, 10%~80%RH
存储温湿度	-10°C~60°C, 10%~70%RH
外形尺寸	120x52x26mm

仪器日常保养

- 禁止将仪器长期放置在高温高湿的环境中储存，长期不使用仪器时，请把仪器装入布包盒，并存放在干爽阴凉处。
- 请保持仪器表面清洁，可用湿的软布擦拭表面灰尘，不可用带有腐蚀性洗液清洁仪器。

装箱清单

购买仪器时请按下列清单认真检查仪器所有附件是否完整？

项目	名称	单位	数量	备注
1	主机	台	1	
2	布包盒	个	1	
3	挂绳	条	1	
4	1.5V AAA电池	节	2	
5	说明书	本	1	
6	保修合格证	张	1	
7	彩盒	个	1	
8	铁基材	块	1	
9	铝基材	块	1	
10	校准片	片	5	
11	小PP盒	个	1	装基材与校准片

检验员：

日期：



USER INSTRUCTIONS

Please read this manual carefully before your first utilization

- 1>By any means, do not disassemble or repair the meter; reforming illegally is not allowed. Keep it properly away from children and irrelevant people.
- 2>Do not use it nearby planes or medical instruments which could be interfered by electromagnetic radiation of this meter. Do not use it in combustible, explosive places.
- 3>Do not throw away the battery at the end of its working life with the normal household waste, please dispose it by nation or local related laws and regulations.
- 4>The broken-down meter which is beyond the warranty time could be handed over to the company for repairing according to its charging standards.
- 5>The warranty service is not available for any of the below situations: disassembling the product by yourself; transportation damage; improper safekeeping; all kinds of wrong operations without looking over the manual and altering warranty card.
- 6>If there are any troubles on quality, or any doubts about utilization, please contact the local agent or us, we will solve it as soon as possible.

**Professional casts quality
Quality accomplishes reputation**

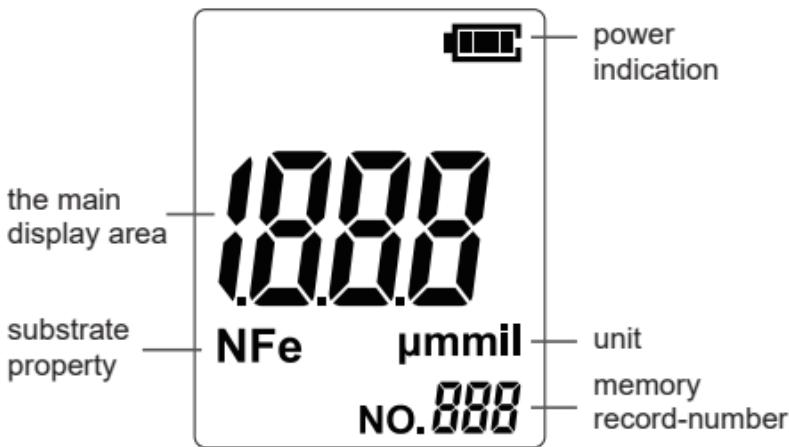
Introduction

- Based on the magnetism and the eddy current feature of metal substrate, the meter can distinguish the property of metal substrate precisely. With high-precise probe, the meter can accurately measure the non-magnetic coating thickness on magnetic substrate surface(like, the coating of painting, rubber and enamel, etc.), and the non-conducting coating thickness on non-magnetic metal substrate surface(like, the coating of painting, rubber, etc.).
- Researched with constant testing and improvement, the basic standard of complex environments of all kinds of major industries, the end comes to the final meter, it can measure the coating thickness accurately, rapidly and un-harmfully, suitable for all kinds of major industrial workshops, labs and outside environment.

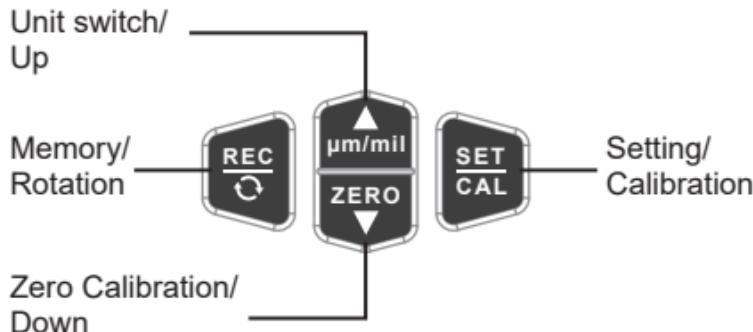
Features

- 2.0 inches large segment screen
- Rotatable display screen for different views of user during measuring of process.
- Simple operation, directly attach to the coating and on screen shows the property and thickness.
- Provide Zero and Multi-spots calibration, calibrating reliably and rapidly.
- Saving the measured datum up to 30 sets, power-off will not obliterate datum.
- Warning function of upper/lower limits
- Pressing for power-on, power-off automatically without any operations.
- Indication of lower power.

Functions introduction and keys



And Fe is for magnetic material, NFe is for non-magnetic material.



The home screen

On the home screen, no shows on the upper left corner.

	Short press to set the warning value of Upper limit " uP " or lower limit " dn "; Long press for calibrating mode; During measuring process, short press the key to switch between single measuring mode and continuous measuring mode.
	Short press to view the previous stored records; Long press to switch units between μm and mil.
	Short press to view the previous stored records; Long press to calibrate the zero-spot and save the current measured value as the thickness value of the zero-spot.
	Short press to save the current measured values; Long press to rotate the screen.

The view mode

On the home screen, short press the " uP " or " dn " key to enter the view mode, on the upper left corner shows "REC".

	Short press to delete the current set of datum; Long press to delete all datum with sounding "beep beep beep".
	Short press to turn page forward.
	Short press to turn page backward.
	Short press to exit this mode; Long press to rotate the screen.

The warning value setting of upper or lower limit

On the home screen, short press  key to set the upper or lower limit of warning value, on the upper left corner shows " <i>up</i> " or " <i>dn</i> ".	
	Short press to save and go to next.
	Short press to increase warning value by 1; Long press to increase in succession.
	Short press to decrease warning value by 1; Long press to decrease in succession.
	Short press to exit without saving; Long press to rotate the screen.

The calibrating mode

On the home screen, long press the  key to enter the calibrating mode, on the upper left corner shows " <i>CAL</i> ".	
	Short press to switch circularly calibrating spots and there six calibrating spots in all which are 1(0μm), 2(50μm), 3(100μm), 4(250μm), 5(500μm), 6(1000μm).
	Short press to increase thickness by 1.
	Short press to decrease thickness by 1.
	Short press to exit this mode; Long press to rotate the screen.

The battery installation and replacement

- Open the cover of batteries on the meter's back, put batteries in according to the batteries' polarity indication, then put the cover back.
- Only 1.5v AAA alkaline battery is allowed to use in this meter.
- Take the batteries out without utilization for a long time to prevent galvanic corrosion from the meter.

Attention:

- * If the power icon is  , it means the power is full, and the meter can work regularly and accurately. If the power icon is  , it means the power is low, please replace the batteries as soon as possible.
- * * In low-power condition, the measured datum could be wrong.

The meter's ON and OFF



Figure 1 Turning it on nearby the metal substrate is not the right way.



Figure 2 Turning it on away from the metal substrate is the right way.

The least 5cm is necessary distance between the meter and the metal substrate for turning the meter on, or the other way is to lift the meter away from the metal substrate quickly after turning the meter on.

The meter will sound the warning in succession "beep...beep...beep" if turning it on nearby the metal substrate. The operation of turn-on nearby the metal substrate could affect the meter's regular measuring, because the meter will go through the calibration balance the moment its turn-on.

The calibration

The meter is released with calibrated benchmark datum which is based on standard substrate(random iron and aluminum block). To the measuring of individual materials, please go through the Zero-spot calibration and calibration-film calibration over the to-be-tested substrate for accurate datum.

● Zero-spot calibration

This operation is to go through the zero calibration over the substrate's zero-spot and aimed to get the more accurate zero-spot.

Basic operations:

- Process single measuring over the substrate, a set of datum is showed on screen, the buzzer sound "beep".
- Long press the  key, the main data returns to zero on screen, and the buzzer sound "beep" twice, and the calibration is completed.
- Repeat the process A and B for more accurate calibrated datum.

- Calibration-film calibration

With different specification calibration-films, process multi-spots calibrations over the substrate to guarantee the validity of measured datum on different property substrates.

Basic operations:

A. Long press the  key, on the upper left corner of the screen shows "CRL", the meter is in calibration mode, see the figure below:

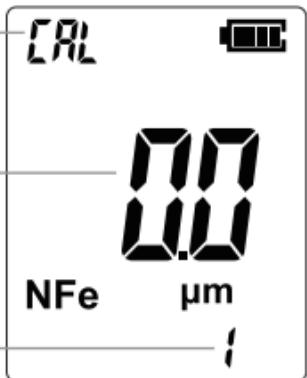
① calibration mode

② the corresponding thickness value of calibration spot

Attention: The thickness values of calibration spots, apart from the zero-spot, can be adjusted as a integral value according to the thickness value of calibration-film.

③ the calibration spot (six spots in all)

1 (0μm)	2 (50μm)	3 (100μm)
4 (250μm)	5 (500μm)	6 (1000μm)



B. At this moment, on the lower right corner of the screen shows "1", the main display area shows the standard thickness value which is "0.0", and it means the zero-spot is already calibrated. Measuring once over magnetic metal substrate or non magnetic, the meter sounds "beep" twice, then the zero-spot calibration is completed, and the meter goes to next calibration spot automatically.

C. At this moment, on the lower right corner of the screen shows "2", the main display area shows "50.0" (Attention: this value could be some one data from 45 to 55), and it means the second spot with 50 μm is already calibrated. Put the calibration-film with 50 μm thickness (the thickness could be around 50 μm) on the substrate which is used to calibrate the zero-spot previously, first compare the meter's reading with the calibration-film thickness, if it's inconsistent, then press the  key or  key to adjust the reading till it is same with the calibration-film thickness, then measure again to complete the 50 μm calibration, and the meter goes to next calibration spot automatically.

D. Refer to the previous step C, continue to calibrate the 3(100 μm), 4(250 μm), 5(500 μm), 6(1000 μm). After the sixth spot is calibrated, the meter exits the calibration mode automatically.

E. If just want to calibrate one of the six spots, then press the  key to switch the calibration spots in calibration mode. Press  key to exit the calibration mode.

Attention:

1. Only use same one substrate for calibrating the six spots which forms a period one by one, changing the substrate during this process could cause the wrong datum.
2. Calibrating the non magnetic materials(such as aluminium), keeping the magnetic materials away is necessary for right datum.

* * When exiting the calibration mode, on screen shows "Err" which means there are wrongs with the calibrated datum . The calibrated datum will be replaced by the previous calibrated datum automatically, please press  key to return to the home screen and choose eligible calibration-film and substrate to calibrate again.

Basic measurement

- Single measurement

- A. Prepare the sample to be tested.
- B. Place the meter in vacant space away from metal material for turn-on.
- C. Start to measure: Press slightly the meter vertically on the sample, the buzzer sounds "beep" once, the measurement is completed, on the main display area shows the result data, move the meter away from the sample over 5cm quickly, and process next measurement after 1 second.

* * The single measurement is the default measuring way of the meter .

- Continuous measurement

The way of unlocking: Press slightly the meter on the sample, and do not loose it, short press the  key, on the upper left corner of the screen shows "  ", the meter is in continuous measurement mode now. In this mode, just press slightly the meter on the sample, the reading will update itself automatically.

The way of locking: Press slightly the meter on the sample, and do not loose it, short press the  key, the icon "  " on the upper left corner disappears, the meter exits the continuous measurement mode and goes to the single measurement mode.

Memory/Delete record

- Memory

- A. Short press  to save the datum after affirming the validity of it.
- B. The meter will indicate "  " icon which means the capacity of memory is full when the stored datum are over 30 sets.

● View records

- A. On the home screen, short press the  or  key to enter the memory mode, on the upper left corner of the screen shows " REC ", on the main display area shows the reading, material property and unit of the current record number.
- B. Press the  or  key to view the last or next page record.
- C. Short press the  key or process measurement directly to exit the memory mode.
- D. Short-press the  or  key can not go to the memory mode if there are no stored records.

● Delete records

Delete single record: In view mode, short press the  key to delete the datum of the current record number.

Delete all records: In view mode, long press the  key to clear the all records, and the buzzer sounds "beep" third, then back to the home screen.

Limiting value measurement

The operation is for setting the upper and lower limit of the warning value. When the measured value is beyond the upper limit, on the upper left corner of the screen shows " *up* " ; when the measured value is below the lower limit, on the upper left corner of the screen shows " *dn* " ; and also with indicating sound, press any one of keys to exit the warning condition. When the measured value is at the range of limits, the warning indication disappears automatically.

* * The setting range of limiting values is from 0 to 1999 μ m. When the upper limit is set to 1999 μ m, the upper limit alarm is closed. When the lower limit is set to 0 μ m, the lower limit alarm is closed.

- A. On the home screen, short press the  key for the upper limit setting interface, on the upper left corner of the screen shows " UP ", on the main display area shows the current set value which could be adjusted by the  key and  key.
- B. Short press the  key to save the upper limit and go to the lower limit setting interface.
- C. Short press the  key to save the lower limit and return to the home screen.

Unit setting

There are two alternative units, user can choose appropriate unit according to the demands.

On the home screen, long press the  key to switch the unit quickly.

The conversion relationship:

1mil=25.4 μ m;

1 μ m=0.03937mil;

Auto-OFF

The meter provides the function of Auto-OFF for saving power. The meter will turn itself off without any operations in 60 seconds.

The screen rotation

Long press the  key to turn the screen over at a full 180-degree.

Specifications

Items	SW-6310A
measuring range	magnetic material 0~1700 μ m; non magnetic material 0~1700 μ m
resolution	0.1 μ m @ (0~99.9 μ m); 1 μ m @ (100~1700 μ m)
indication error	$\pm(2+2\%*H)\mu$ m @ (0~500 μ m) $\pm(2.5\%*H)\mu$ m @ (500~1700 μ m)
min measuring area	magnetic material 25×25mm; non magnetic material 25×25mm
min curvature	convexity 5mm; concave 30mm
min substrate thickness	magnetic material 0.2mm; non magnetic material 0.05mm
screen	segment screen
memory	30 sets
battery specification	2×1.5V AAA
working temp and humidity	0°C~50°C, 10%~80%RH
storage temp and humidity	-10°C~60°C, 10%~70%RH
dimension	120x52x26mm

General maintenance

- Keeping in high temp and humidity environment in the long run is not allowed; please put it inside the box and keep the box in dry and cool place.
- Please keep the surface clean, wipe the dust with wet soft cloth, do not use corrosive cleaning fluid.

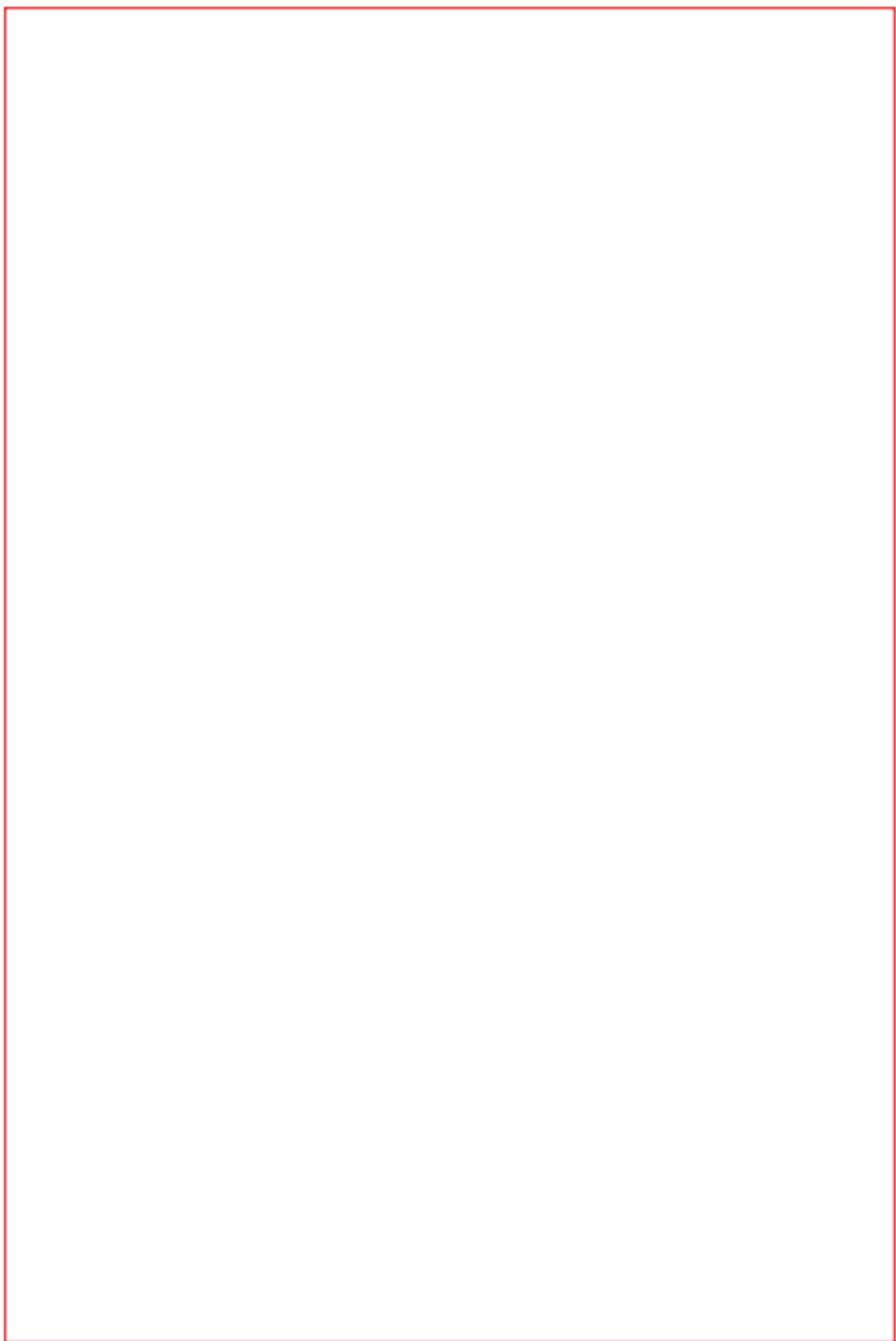
Detail packing list

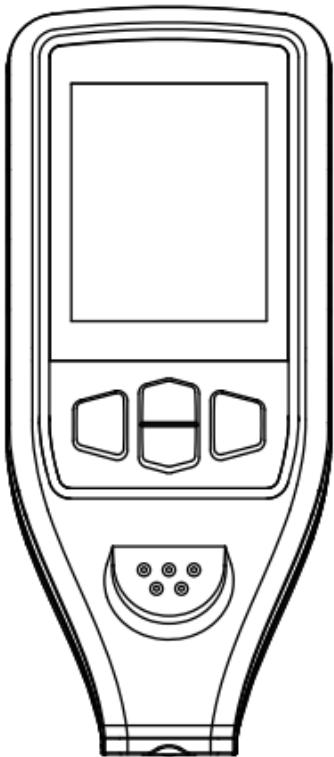
Please check if there are all appendixes according to the following list when purchase this meter.

Items	name	unit	quantity	remark
1	The Meter	PC	1	
2	Pouch	PC	1	
3	Sling	PC	1	
4	1.5V AAA Battery	PC	2	
5	The Manual	PC	1	
6	Color-box Package	PC	1	
7	Iron Substrate	PC	1	
8	Aluminium Substrate	PC	1	
9	Calibration Film	PC	5	
10	Small PP Box	PC	1	for storing the substrates and the calibration films

Inspector:

Date:





深达威科技(广东)股份有限公司
Sndway Technology (Guangdong) Co., LTD

地 址: 东莞市虎门镇虎门团结路58号深达威科技园
Add: Sndway Science & Technology Industrial Park, 58
Tuanjie Road, Humen 523930, Dongguan, China

全国咨询服务热线/Service Hotline: 400-125-6969

电 话/Tel: 0769-85265688

网 址/Web: www.sndway.com

邮 箱/E-mail: market@sndway.com