Advancing with Technology ElektroPhysik

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Coating thickness measurement

MiniTest Series 700
MiniTest 720/730/740

- Increased measuring precision
  with innovative SIDSP® technology
  (Sensor-Integrated Digital Signal Processing)
- One system to cover a wide range of applications:
  up to 15 mm thickness – interchangeable F, N or FN sensors – for built-in or external probe use
- Convenient, error-free operation
  FN sensors automatically identify F (ferromagnetic) or N (nonmagnetic) substrates

SIDSP® technology – Brand new Worldwide

Intelligent, digital Coating Thickness Sensors

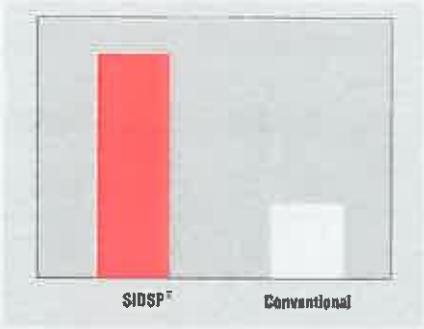
Analogue signal processing has served its time – digital signal processing is the future

What is SIDSP®?

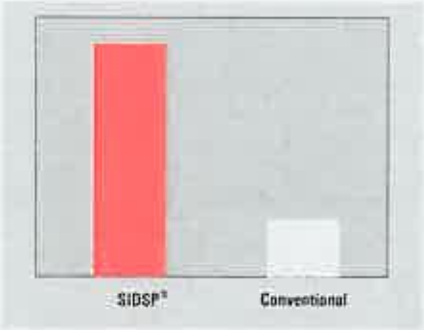
SIDSP® is a world wide leading technology for coating thickness sensors developed by ElektroPhysik. With this new technology, ElektroPhysik has set another new benchmark for innovative coating thickness measurement.
SIDSP® stands for Sensor-Integrated Digital Signal Processing – a technology where the signals are completely processed into digital form inside the sensor at the time and point of measurement. SIDSP® sensors are manufactured according to completely new state-of-the-art production techniques.

How does SIDSP® work?

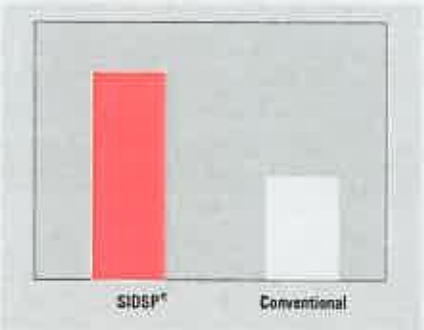
Unlike conventional techniques, the SIDSP® sensors create and control the excitation signals for the sensor head inside the sensor. The return signals are directly digitally converted and processed at a 32 bits accuracy to give you the complete coating thickness value. For this technique, highly sophisticated methods of digital signal processing are used as known from modern telecommunication technologies (mobile phone networks) such as digital filters, base band converting, averaging, stochastic analysis, etc. This enables ElektroPhysik to achieve a signal quality and precision unmatched so far with analogue signal processing. The thickness value is digitally transmitted via the sensor cable to the display unit.
Setting a new standard in coating thickness measurement, this technology offers decisive advantages and improvements compared to the commonly used analogue sensors.



Reproducibility



Temperature Stability



Adaptability

Why choosing SIDSP®?

SIDSP® sensors display extremely high interference immunity

Anything that has to do with measuring signals will be handled by SIDSP® in direct proximity to the sensor head. No more interference during transmission of the measuring signals via a sensor cable – because with SIDSP® there is no measuring signal transmission taking place via the sensor cable. The sensor cable only supplies power to the sensor and serves as a communication interface transmitting the coating thickness values to the display unit – in digital form. Even if your application requires an extremely long cable – no problem – the increased immunity to inference remains with long cable extensions.

SIDSP® – High stability of measuring signals

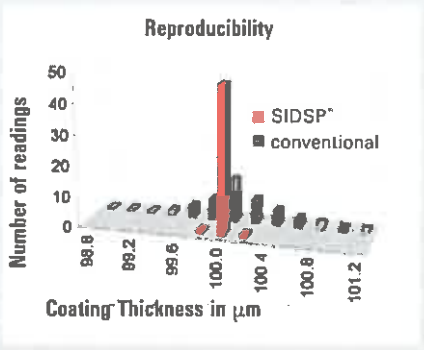
ElektroPhysik's SIDSP® sensors achieve a reproducibility that has been unmatched so far. This can be substantiated by placing the sensor on the same measuring spot several times and you will obtain exactly the same result, each time – another proof for the high performance of SIDSP® sensors.

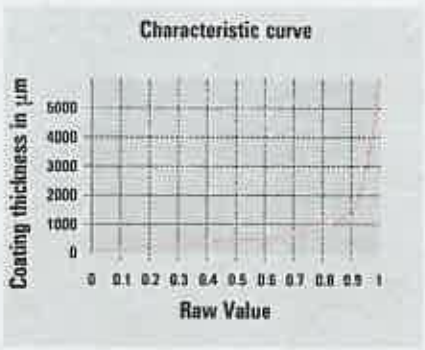
SIDSP® sensors' characteristic curves feature high accuracy

During the manufacturing process, ElektroPhysik's SIDSP® sensors go through a rigorous calibration procedure. Conventional analogue sensors are usually calibrated at only a few points on the characteristic curve. With SIDSP® sensors it's different: in a fully automatic procedure, the sensors are calibrated in as many as 50 points in order to eliminate even the slightest deviations from the ideal characteristic curve. The benefits from this is that the sensor's characteristic curve will be of perfect accuracy over the complete measuring range so as to reduce measuring errors to a minimum.

SIDSP® sensors are highly insensitive to changes in temperature

During the manufacturing process, each of the SIDSP® sensors are encoded with an individual temperature compensation, a procedure inconceivable for analogue sensors. As a result, changes in temperature will not influence the measurement, with SIDSP® sensors temperature related errors do not occur any more!





SIDSP® sensors provide excellent adaptability

Need to take a few quick spot measurements? Just activate the quick mode and the sensor will adapt to your specific task setting. Need to achieve the highest possible accuracy of measurement? No problem, just select the high precision mode and the gauge will adapt to it. Whether your requirements are to take single readings or make continuous measurements – make your choice – SIDSP® can do both!

SIDSP® N and FN sensors compensate for substrate conductivity

With ElektroPhysik's specific automatic compensation method, the SIDSP® eddy current sensors are applicable to a wide range of non-ferrous substrate materials with various conductivities such as copper, titanium, etc. without the need of recalibrating the gauge to the particular substrate.

SIDSP® sensors are wear-resistant

Harsh environments such as dust particles or contamination through paint require heavy duty sensor design. To provide the ultimate protection to your harsh environment demands, the MiniTest 700 series offers a special range of HD sensors. These heavy duty sensors feature a special grout sealing to protect the sensor electronics. An external spring mounting system is provided to ease sensor cleaning. For rough surfaces, a sensor type "F2 HD" can be supplied with a sensor pole specially adapted to rough surfaces.

SIDSP® – Future-oriented solutions

To meet customers' requirements, ElektroPhysik will continuously improve their SIDSP® technology. You can take advantage of this through free software update downloads from our homepage and you can bring your SIDSP® sensor always to the latest version.

Properties \ Sensor type	F1.5, N0.7, FN 1.5		F2 HD	F5, N2.5, FN5		FT5	F1.5-90, N07-90, FN 1.5-90	
	F	N	F	F	N	F	F	N
Measuring range	0...1.5 mm	0...0.7 mm	0...2 mm	0...5 mm	0...2.5 mm	0...15 mm	0...1.5 mm	0...0.7 mm
Typical field of application	small samples, thin coatings, use with measuring stand		rough surfaces	standard sensors for a wide field of applications		thick coatings	especially suitable for measurements in tubes and objects difficult to access	
Measuring principle	magnetic induction	eddy currents	magnetic induction	magnetic induction	eddy currents	magnetic induction	magnetic induction	eddy currents
Signal processing	sensor-integrated 32 bits signal processing (SIDSP®)							
Accuracy[1,5]	± (1 µm + 0.75 % of reading)		± (1.5 µm + 0.75 % of reading)			± (5 µm + 0.75 % of reading)	± (1 µm + 0.75 % of reading)	
Repeatability (standard deviation)[5]	± (0.5 µm + 0.5 % of reading)		± (0.8 µm + 0.5 % of reading)			± (2.5 µm + 0.5 % of reading)	± (0.5 µm + 0.5 % of reading)	
Low range resolution	0.05 µm		0.1 µm			1 µm	0.05 µm	
Minimum curvature radius convex[1,2]	1.0 mm		1.5 mm			5 mm	-	
Minimum curvature radius concave (external sensor without prism)[1,2]	7.5 mm		10 mm			25 mm	5 mm	
Minimum curvature radius concave (built-in sensor)[1,2]	30 mm		30 mm			30 mm	-	
Minimum measuring area[2,3]	Ø 5 mm		Ø 10 mm			Ø 25 mm	Ø 5 mm	
Minimum substrate thickness[1,2]	0.3 mm	40 µm	0.5 mm	0.5 mm	40 µm	1 mm	0.3 mm	40 µm
Measuring rate in continuous mode	20 readings per second							
Max. measuring rate in single readings mode	70 readings per minute[4]							

[1] with multi-point calibration
[2] if calibration is made close to the coating thickness to be expected
[3] if the precision stand is used
[4] if the "quick" filter has been selected
[5] according to DIN 55350 part 13

The MiniTest 700 Series with SIDSP®

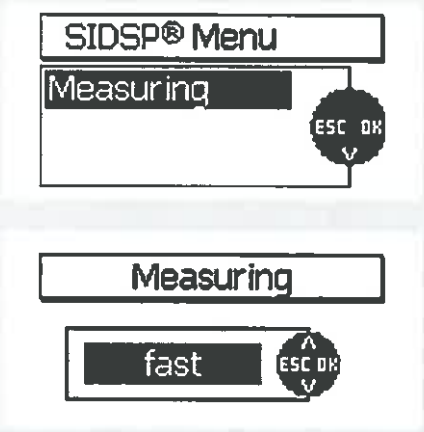
With the new MiniTest 700 product line, ElektroPhysik once again has strengthened its position as a leader in the global market of coating thickness measurement

With the new SIDSP® F-sensors for measurement on steel or N-sensors for measurement on non-ferrous substrates you can take advantage of the benefits of increased accuracy and reproducibility. The new MiniTest 700 gauges are the solution to all your coating thickness problems where a reliable finish and perfect product appearance play a major role for long-term value and success, e.g. in the automotive and shipbuilding industry, in steel- and bridge construction or in the electroplating industry, to name but a few industries.

Increased productivity with the measuring speed setting option

With MiniTest 700 you can react with ease to the changing requirements of coating thickness measurement. Whether your requirement involves taking many readings in a short time and a medium precision is sufficient or whether only a few readings suffice but with increased accuracy – just select the requested mode and the gauge adapts to your task setting to measure with utmost efficiency and optimum productivity.

To ensure you don't miss anything even in the quick mode of operation, the gauge alerts you in case of deviations from your set tolerance limits. Equipped with audible and visual alarms, the gauge indicates whether readings are within the limits (green LED) or whether they fall outside of the set limits (red LED).



Convenience and ease of use

The MiniTest 700 is ergonomically designed and its rounded shape allows the MiniTest gauge to fit perfectly into the palm of your hand. Designed for utmost flexibility for quality control and inspections, the sensor of the MiniTest 740 model can be easily converted from a built-in sensor into an external one. So even difficult to access areas can be reached without problems. The MiniTest 700 line is designed to meet all of your coating thickness testing requirements: Choose the MiniTest 720 if you prefer one hand operation with a built-in sensor. The model MiniTest 730 comes with an external sensor. All models are equipped with a large, easy-to-read and backlit display. To ensure maximum user flexibility, the display orientation can rotate by 180°, so readings will never be upside down.

Pre-set options that save you time and money

With ElektroPhysik's shape correction feature, all MiniTest 700 sensors perfectly compensate for irregular shaped surfaces. When you calibrate the gauge for zero on an uncoated sample, the whole measuring range will be calibrated for this specific shape and substrate material. To save you time and money, a large number of predefined calibration methods are available to adapt to a wide range of different surface conditions and accuracy requirements. You can use the factory set calibration, zero-, two-point and threepoint calibration. In addition, a specific calibration for roughness is also available taking into account various roughness grades. The automatic substrate identification feature of the FN sensors adds additional comfort by automatically identifying the substrate type thus avoiding possible operator errors.

To compete on a worldwide scale, the MiniTest 700 series comply to and support the following international standards:
SSPC-PA2, ISO, Swedish (SS 18 41 60), Australian (AS 3894.3), ISO 19840 and ASTM D 7091 (formerly D 1186 and D 1400).

MiniTest 700: Advantages at a Glance

- Correct readings with interference free measurement with precise evaluation through SIDSP®
- Extended field of application through exchangeable sensors to cover different ranges up to 15 mm (600 mils) thickness (with MiniTest 740)
- High flexibility of use through versatile sensors (the MiniTest 740 sensor can be changed from built-in to external sensor on a lead)
- Automatic substrate identification with FN sensors accelerates measurements and helps avoiding operating errors
- Efficient temperature compensation eliminates errors caused by changes in temperature
- High precision characteristic curves achieved during the manufacturing process by calibrating up to 50 calibration points
- Large memory capacity for storing up to 100,000 readings in 10 and/or 100 batches
- Readings and statistical values can be called-up individually
- Large, easy-to-read backlit graphics display, with 180° rotatable display orientation
- Easy menu-guided operation, 25 menu languages are available
- Built-in IrDA port for infrared data transmission to printer or PC
- Future-proof through downloadable sensor and gauge software updates

Supply Schedule

Standard Supply Schedule

- Soft pouch with shoulder strap and belt clip
- MiniTest 720/730/740 (according to choice)
- SIDSP® sensor (according to choice)
- Calibration set with calibration standards and zero reference plate(s)
- Instructions manual in German, English, French and Spanish on CD
- 2 Mignon/AA batteries

Soft pouch

Gauge in rubber protection case

Recommended Accessories

- Measuring stand for F1.5/N0.7/FN 1.5 sensors
- Rubber protection case
- MSoft 7 Basic, data transfer software on CD-ROM
- MSoft 7 Professional, data evaluation software on CD-ROM
- MiniPrint 7000 data printer

MiniPrint 7000 data printer

Technical Specification

Technical Specifications		MiniTest 720	MiniTest 730	MiniTest 740
Sensor type:	– built-in sensor	●		
	– external sensor		●	
	– convertible from external to built-in sensor			●
Convertible sensors with measuring ranges up to 15 mm				●
Automatic substrate identification with FN sensors		●	●	●
Increased accuracy and reproducibility through sensor-integrated signal processing (SIDSP®)		●	●	●
High-accuracy sensor characteristics through up to 50 calibration points during the sensor manufacture		●	●	●
Individual temperature compensation		●	●	●
Number of memories		10	10	100
Total memory capacity		max. 10,000	max. 10,000	max. 100,000
User-definable memory arrangement according to batches		●	●	●
Batches include readings, a defined calibration mode, parameters and statistics calculated from batch readings		●	●	●
Statistical evaluation:	Number of readings	●	●	●
	Minimum, maximum, mean value	●	●	●
	Standard deviation	●	●	●
	Coefficient of variation	●	●	●
Single readings statistics:	Block value statistics (norm-conforming/user configurable)	●	●	●
	Stored readings and statistical values can be called separately	●	●	●
	Print-out of readings and statistics on MiniPrint 7000 data printer	●	●	●
	Transfer of readings and statistics to a PC	●	●	●
Calibration modes:	Factory calibration	●	●	●
	Zero-point, 2-points and 3-points calibration, calibration method "Rough"	●	●	●
	User-adjustable off-set value	●	●	●
	User-adjustable correction value for substrate roughness	●	●	●
International calibration procedures: ISO, SSPC, "Swedish", "Australian"		●	●	●
Monitoring of tolerances:	Visual and audible alarm in case of deviations	●	●	●
	Measuring system switchable from metric (µm, mm, cm) to imperial (mils, inch, thou)	●	●	●
Large graphical display, backlit, 180° rotatable		●	●	●
User-friendly menu-controlled operation in up to 25 languages		●	●	●
Sensor and gauge software updates available via download		●	●	●
Measuring rate/accuracy user adjustable to „standard, quick, high precision"		●	●	●
Continuous mode for quick identification of changes in thickness		●	●	●
Battery-saving mode with adjustable switch-off mode		●	●	●
Gauge housing protection type IP 40		●	●	●
Operating temperature –10°C ... 60°C		●	●	●
Storage temperature –20°C ... 70°C		●	●	●
Data port IrDA 1.0 (infrared)		●	●	●
Power supply 2 x AA (Mignon cells), rechargeable NiMH accu batteries type AA/HR6 (as an option)		●	●	●
Power source option adjustable to adapt to the corresponding working voltage		●	●	●
Norms and standards: DIN EN ISO 1461, 2064, 2178, 2360, 2808, 3882, 19840, ASTM B 244, B 499, D7091, E 376, AS 3894.3, SS 1841 60, SSPC-PA 2		●	●	●

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