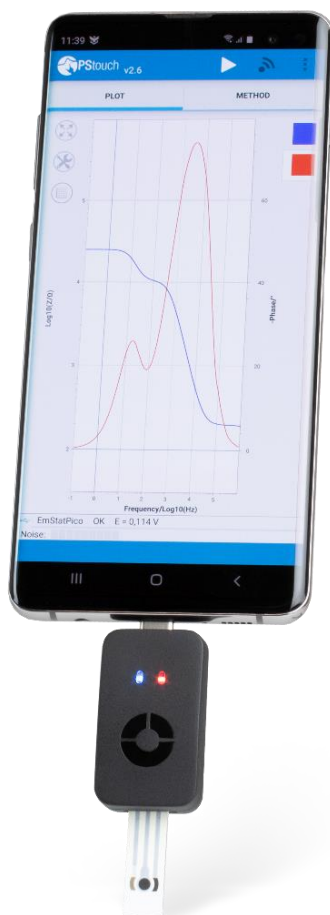


# sensit /SMART™



WITH INTEGRATED

**EmStat***pico*™  
Built with  ANALOG  
DEVICES

POTENTIOSTAT FOR  
SMARTPHONE AND TABLET

## Contents

Sensit Smart: with integrated EmStat Pico .....	2
Main specifications.....	2
Supported Techniques .....	3
Specifications .....	3
Included with Sensit Smart .....	6
PSTrace: research software for Windows .....	7
PStouch: App for Android .....	8
Build your own app or PC software .....	9
MethodSCRIPT™: EmStat Pico Scripting Language .....	9
Sensit Smart customization options for OEM .....	10

WITH INTEGRATED

**EmStat<sup>pico</sup>**  
 Built with  ANALOG  
 DEVICES



## Sensit Smart: with integrated EmStat Pico

The *Sensit Smart* is built around the EmStat Pico module.

The EmStat Pico is a joint development by PalmSens BV and Analog Devices Inc. PalmSens is known for introducing the first commercially available handheld potentiostat. Together with Analog Devices, PalmSens has developed the EmStat Pico: the world's smallest electrochemical interface module.

More information: [www.emstatpico.com](http://www.emstatpico.com)

## Main specifications

Power and communication: USB-C

Full dc-potential range: -1.7 V to +2 V

EIS frequency range: 0.016 Hz to 200 kHz

Current ranges: 100 nA to 5 mA (max  $\pm 3$  mA)

Current resolution: 0.006% (5.5 pA on 100 nA range)

Dimensions: 43 x 25 x 11 mm (excl. USB connector)

Weight: 10 g

## Compatible with most Screen Printed Electrodes / Sensors

Sensor pitch: 2.54 mm

Electrode connections: RE, WE, CE

Allowed sensor thickness: Between 0.1 mm and 0.8 mm

Maximum sensor width: 11 mm



## Supported Techniques

The following electrochemical techniques are supported by the Sensit Smart.

### Voltammetric techniques:

- Linear Sweep Voltammetry LSV
- Cyclic Voltammetry CV
- Square Wave Voltammetry SWV
- Differential Pulse Voltammetry DPV
- Normal Pulse Voltammetry NPV

*The above techniques can also be used for stripping voltammetry*

### Techniques as a function of time:

- Chronoamperometry CA
- Pulsed Amperometric Detection PAD
- Open Circuit Potentiometry OCP
- MultiStep Amperometry MA

### Electrochemical Impedance Spectroscopy:

- Scanning or fixed frequency mode EIS

## Specifications

The Sensit Smart works in three different modes;

**Low Speed mode:** for scan rates up to 1 V/s or a bandwidth of 100 Hz.

**High Speed mode:** for high scan rates and frequencies.

**Max Range mode:** a combination of the Low and High Speed modes for optimal dynamic dc-potential range

The optimal mode is automatically selected in PStace for Windows and PStouch for Android, based on the selected technique and parameters.

General	Low Speed mode	High Speed mode	Max Range mode
▪ Full dc-potential range	-1.2 to +2 V	-1.7 to +2 V	-1.7 to +2 V
▪ Dynamic dc-potential range <sup>1</sup>	2.2 V	1.2 V	2.6 V
▪ Compliance voltage	-2.0 to +2.3 V <sup>2</sup>		
▪ Maximum current	±3 mA		
▪ Max. acquisition rate (datapoints/s)	100	1000	100
▪ Supports FRA/EIS	NO	YES	NO

<sup>1</sup> The dynamic range is the range that can be covered during a single scan within the full potential range. For example; a linear scan can start at -1.5 V and end at 1.1 V or vice versa, covering 2.6 V dynamic range.

<sup>2</sup> The compliance voltage is the maximum potential between Working and Counter electrode and depends on the selected mode.

Potentiostat (controlled potential mode)	Low Speed mode	High Speed mode	Max Range mode
▪ Applied dc-potential resolution	537 $\mu$ V	395 $\mu$ V	932 $\mu$ V
▪ Applied potential accuracy	< 0.2%	< 0.5%	< 0.5%
▪ Available current ranges	100 nA, 2 $\mu$ A, 4 $\mu$ A, 8 $\mu$ A, 16 $\mu$ A, 32 $\mu$ A, 63 $\mu$ A, 125 $\mu$ A, 250 $\mu$ A, 500 $\mu$ A, 1 mA, 5 mA	100 nA, 1 $\mu$ A, 6 $\mu$ A, 13 $\mu$ A, 25 $\mu$ A, 50 $\mu$ A, 100 $\mu$ A, 200 $\mu$ A, 1 mA, 5 mA	100 nA, 1 $\mu$ A, 6 $\mu$ A, 13 $\mu$ A, 25 $\mu$ A, 50 $\mu$ A, 100 $\mu$ A, 200 $\mu$ A, 1 mA, 5 mA
▪ Current accuracy	< 0.5 % for current ranges > 100 nA, < 2% for 100 nA current range	< 1% of the selected current range, < 2% for 100 nA current range	< 1% of the selected current range, < 2% for 100 nA current range
▪ Measured current resolution	0.006% of selected current range (5.5 pA on 100 nA range)		
▪ Measured potential resolution (for OCP)	56 $\mu$ V		

#### FRA / EIS (impedance measurements) in High Speed Mode only

▪ Frequency range	0.016 Hz to 200 kHz
▪ Ac-amplitude range	1 mV to 0.25 V rms, or 0.708 V peak-peak

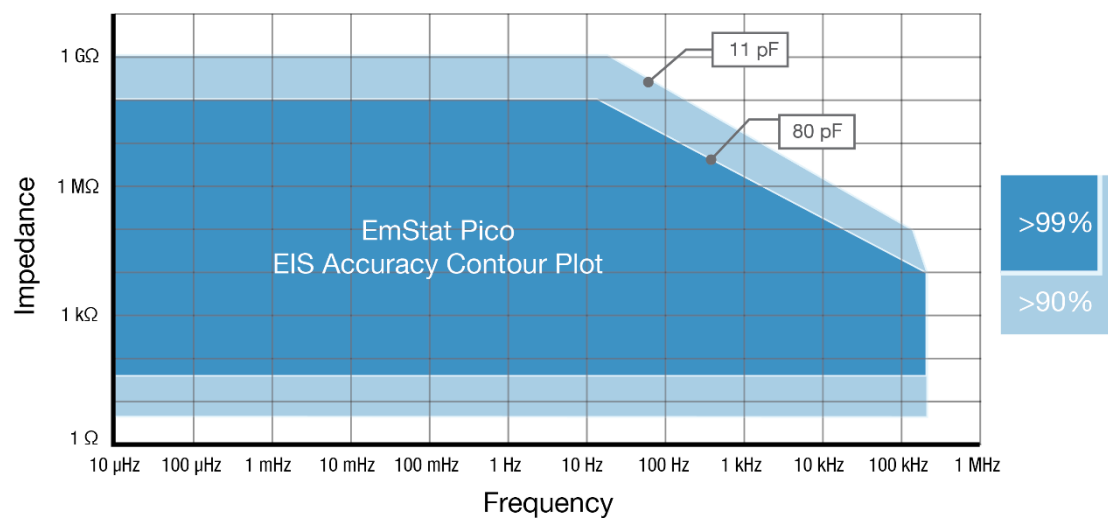
#### Electrometer

▪ Electrometer amplifier input	> 1 T $\Omega$ // 10 pF
▪ Bandwidth	250 kHz

#### Other

▪ Storage	4000 datapoints on-board
▪ Dimensions	43 x 25 x 11 mm (excl. USB connector)
▪ On-board temperature sensor	$\pm 0.25$ $^{\circ}$ C
▪ Operation temperature range	0 $^{\circ}$ C to +40 $^{\circ}$ C

## EIS Accuracy Contour Plot

**Note**

The accuracy contour plot was determined under lab conditions and should be used for reference purposes. Please note that the true limits of an impedance measurement are influenced by all components in the system, e.g. cables, the environment, and the cell.

## Included with Sensit Smart



### The Sensit Smart comes with:

- Dummy Cell
- SPE to screw-terminal adapter
- USB-C Female to USB-A cable
- USB-C Female to Micro USB adapter
- USB-C port protector
- Quick Start
- Access to software on [my.palmsens.com](http://my.palmsens.com)
- 3-year warranty

## PSTrace: research software for Windows

PSTrace software for Windows is compatible with the Sensit Smart.

Select current ranges for auto ranging and the starting current range.

Switch between plots if curves with different units are available.

Method Editor

Plot

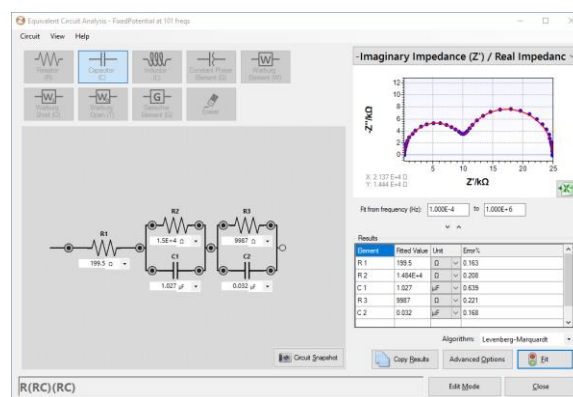
Measurement data and curves

Click on a measurement in the legend to see the available data and to generate more curves.

Click on a curve in the legend to change its title or appearance.

### Other functions in PSTrace 5

- Equivalent Circuit Fitting
- Scripting
- Open your data in Origin and Excel with one click of a button
- Save all available curves, measurement data and methods to a single file
- Direct feedback on method parameters
- Generate MethodSCRIPT™ for EmStat Pico



### Integration with third party software:

- Excel
- Origin
- Matlab
- ZView



### System requirements

Minimum PC requirements are:

- Windows Vista, 7, 8, or 10 (32-bit or 64-bit)
- 1 GHz or faster 32-bit (x86) or 64-bit (x64) processor
- 1 GB RAM (32-bit) or 2 GB RAM (64-bit)

For more information about software visit [www.palmsens.com/software](http://www.palmsens.com/software)



## PStouch: App for Android



PStouch for Android devices is compatible with the Sensit Smart.

PStouch features:

- Setting up and running measurements
- Loading and saving measured curves
- Analysing and manipulating peaks
- Sharing data directly via e-mail or Dropbox
- Concentration determination by means of Standard Addition or Calibration Curve
- Support for PalmSens accessories such as a Multiplexer or Stirrer

All method and curve files are fully compatible with PSTrace software for Windows. PStouch is designed for use with tablets and smartphones.

For more information about software visit [www.palmsens.com/software](http://www.palmsens.com/software)

## Build your own app or PC software

With the PalmSens SDKs you can develop user friendly software for use with Sensit Smart in a short amount of time.



Using the PalmSens SDK for Xamarin you can create an Android (mobile) application for your Sensit Smart. The SDK comes with working code examples which can be used as a basis for your application.

The PalmSens SDK for WinForms or WPF allows you to build a Windows application for either Bluetooth or USB connected devices.

## MethodSCRIPT™: EmStat Pico Scripting Language

The Sensit Smart is built around the EmStat Pico module. The EmStat Pico module works with the new MethodSCRIPT™ scripting language. This language allows developers to program a human-readable script directly into the Pico module. The simple script language allows for running electrochemical techniques supported by EmStat Pico and makes it easy to combine different measurements and other tasks.

More script features include:

- Use of variables
- (Nested) loops
- Logging results to an SD card
- Digital I/O for example for waiting for an external trigger
- Reading auxiliary values like pH or temperature
- Going to sleep or hibernate mode



## Sensit Smart customization options for OEM

The Sensit Smart can be re-branded for OEM purposes. Contact us about the possibilities.



Please don't hesitate to contact PalmSens BV for more details: [info@palmsens.com](mailto:info@palmsens.com)

**PalmSens BV**  
**The Netherlands**  
[www.palmsens.com](http://www.palmsens.com)

### **DISCLAIMER**

Changes in specifications and typing errors preserved. Every effort has been made to ensure the accuracy of this document. However, no rights can be claimed by the contents of this document.