EmStat GO™

Tailored potentiostat for sensor applications

PalmSens

Rev.08-2022-004

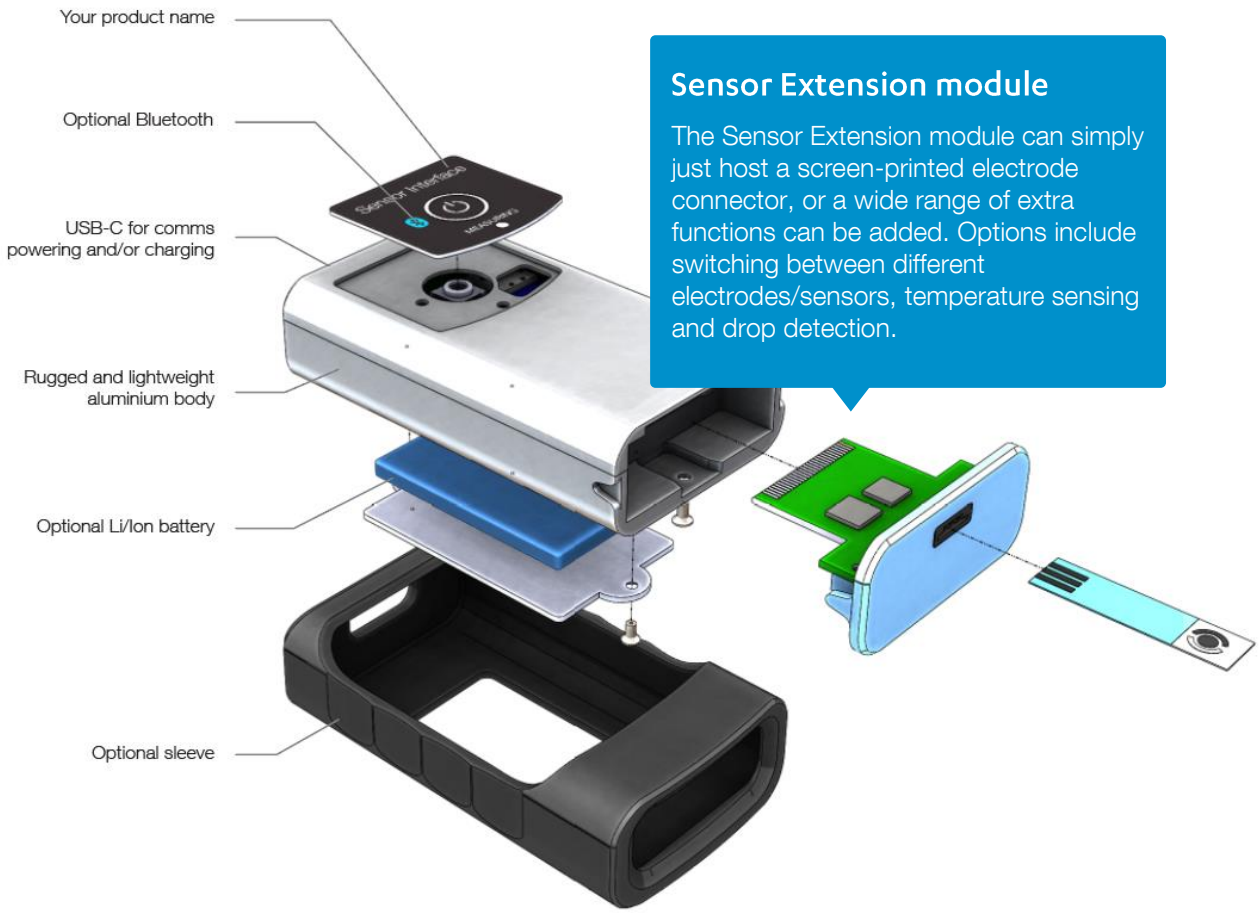
EmStat Go potentiostat

The EmStat Go is a battery or USB powered, handheld potentiostat which consists of a standard base unit and a customizable Sensor Extension module. The extension module can be equipped with one or more sensor (SPE) connectors, temperature sensor, or other interface units you require for your sensor application.

Drop Detection

The EmStat Go can be equipped with automatic drop detection to have a PC or mobile app start the measurement automatically as soon as the droplet is present.

The EmStat Go allows you to go to market as soon as your electrochemical sensor is ready for it.



Sensor Extension module

The Sensor Extension module can simply just host a screen-printed electrode connector, or a wide range of extra functions can be added. Options include switching between different electrodes/sensors, temperature sensing and drop detection.

Sleeves in any color

The sleeve can be produced in any color, to give the EmStat Go a unique appearance that matches your brand identity.

Modular design

The EmStat Go's modular design allows the Sensor Extension module to be easily replaced in the field. This enables your customers to upgrade the reader they already have without the need to send it back.

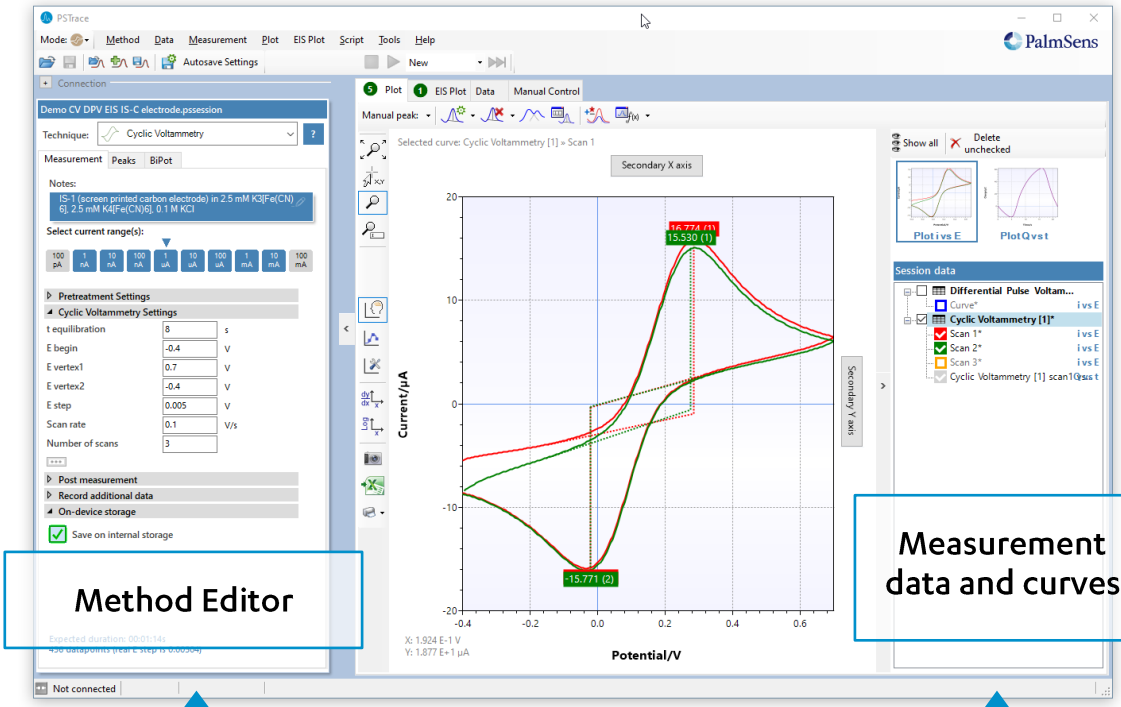
Optional battery for connecting via Bluetooth

A battery compartment for replaceable Li-Ion battery is optional.
A fully charged battery allows the EmStat Go to run >6h of continuous measurements.

Reduce your time-to-market

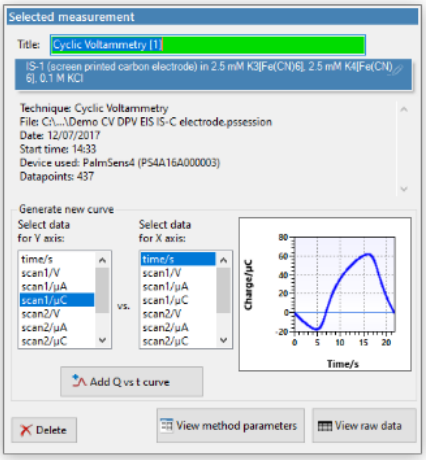
The EmStat Go can be used with our **PSTrace software** for generic research. As soon as you have found the optimal settings for your sensor application you can easily transfer them to an application optimized for use by the sensor end-user.

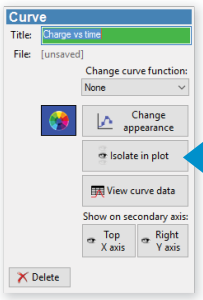
PSTrace 5



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

Switch between plots if curves with different units are available.





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

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

› See for more information:
www.palmsens.com/pstrace

Supported Techniques

The EmStat Go supports the following electrochemical techniques:

		Module		
Voltammetric Techniques		**EmStat4M**	**EmStat3**	**EmStat Pico**
▪ Linear Sweep Voltammetry	LSV	✓	✓	✓
▪ Cyclic Voltammetry	CV	✓	✓	✓
▪ Fast Cyclic Voltammetry	FCV	✓	-	-
▪ AC Voltammetry	ACV	✓	-	-
Pulsed Techniques				
▪ Differential Pulse Voltammetry	DPV	✓	✓	✓
▪ Square Wave Voltammetry	SWV	✓	✓	✓
▪ Normal Pulse Voltammetry	NPV	✓	✓	✓
These methods can all be used in their stripping modes which are applied for (ultra-) trace analysis.				
Amperometric Techniques				
▪ Chronoamperometry	CA	✓	✓	✓
▪ Zero Resistance Amperometry	ZRA	✓	✓	✓
▪ Chronocoulometry	CC	✓	✓	✓
▪ MultiStep Amperometry	MA	✓	✓	✓
▪ Fast Amperometry	FA	✓	-	-
▪ Pulsed Amperometric Detection	PAD	✓	✓	✓
▪ Multiple-Pulse Amperometric Detection	MPAD	✓	✓	-
Galvanostatic Techniques				
▪ Linear Sweep Potentiometry	LSP	✓	-	-
▪ Chronopotentiometry	CP	✓	-	-
▪ MultiStep Potentiometry	MP	✓	-	-
▪ Open Circuit Potentiometry	OCP	✓	✓	✓
▪ Stripping Chronopotentiometry	SCP or PSA	✓	-	-
Other Techniques				
▪ Mixed Mode	MM	✓	✓*	-
▪ Potentiostatic Impedance Spectroscopy	EIS	✓	-	✓
▪ Galvanostatic Impedance Spectroscopy	GEIS	✓	-	-

✓ = *This technique will be enabled with the next software update*
* *Partially implemented, no galvanostatic stages available*

Where possible, the electrochemical techniques can be applied using **auto ranging** which means that the instrument automatically sets the optimal current range. The user can specify a highest and lowest current range in which the most appropriate range is selected automatically.

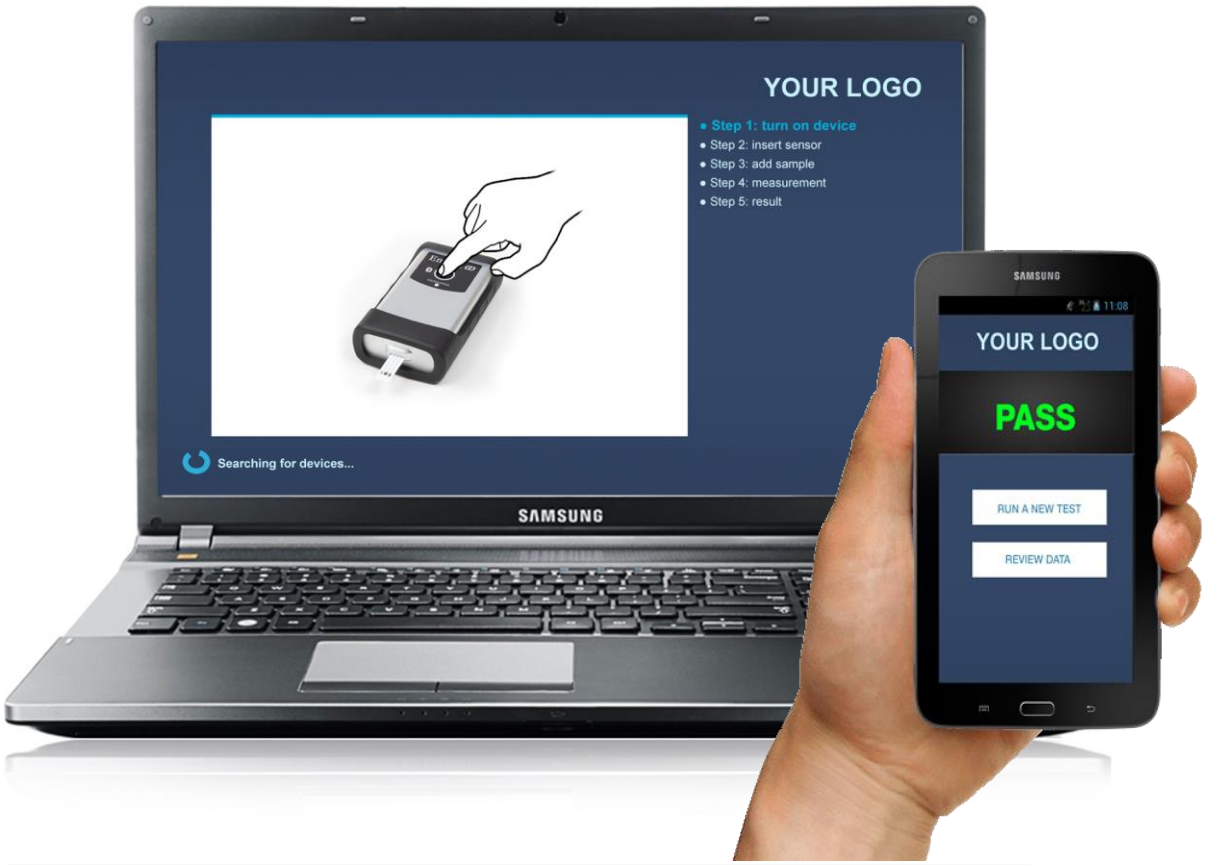
› See page 6 for system specifications.

Custom software options

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

Using the PalmSens SDK for Xamarin you can create an Android (mobile) application for your EmStat Go. 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.



› See for more information:
www.palmsens.com/dev

Microsoft .NET · Xamarin · ARDUINO · MATLAB · C/C++ · Raspberry Pi

Full control with MethodSCRIPT™

The MethodSCRIPT™ scripting language is designed to integrate our OEM potentiostat (modules) effortlessly in your hardware setup or product.

No libraries needed

No DLLs or other type of code libraries are required for using MethodSCRIPT™

MethodSCRIPT™ allows developers to program a human-readable script directly into the potentiostat module. The simple script language allows for running all supported electrochemical techniques and makes it easy to combine different measurements and other tasks.

Code examples are available for:

- Android
- Arduino
- C/C++
- Python
- iOS
- and C#

More script features include:

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

MethodSCRIPT™

› See for more information:
www.palmsens.com/methodscript

System specifications

General

module	EmStat4 (LR)	EmStat3	EmStat Pico
▪ dc-potential range	±3.000 V	±3.000 V	-1.7 to +2 V
▪ compliance voltage	±5 V	±5 V	-2.0 to +2.3 V [1]
▪ max. measured current	±30 mA	±20 mA	±3 mA
▪ measured potential resolution	96 µV (gain 1) 48 µV (gain 2) 19.2 µV (gain 5) 9.6 µV (gain 10) 4.8 µV (gain 20)	1 mV	56 µV
▪ measured potential accuracy	≤ 0.2%, ±1 mV offset	≤ 0.1%, ±2 mV offset	≤ 0.1%, ±2 mV offset
▪ max. acquisition rate	1M samples/s	1000 samples/s	400k samples/s

Potentiostat
(controlled potential mode)

module	EmStat4 (LR)	EmStat3	EmStat Pico
▪ applied dc-potential resolution	100 µV	100 µV	537 µV
▪ applied potential accuracy	≤ 0.2%, ±1 mV offset	≤ 0.2%, ±2 mV offset	< 0.2% ±1 mV offset
▪ current ranges	1 nA to 10 mA, 8 ranges	1 nA to 10 mA, 8 ranges	100 nA to 5 mA 10 or 12 ranges [2]
▪ measured current accuracy	≤ 0.2% of current ±0.1% of range	≤ 1% at 1 nA ≤ 0.5% at 10 nA ≤ 0.2% at 100 nA to 100 µA ≤ 0.5% at 1 mA, 10 mA and 100 mA	< 1% of current ±0.1% of range
▪ measured current resolution	0.009% of CR 92 fA on lowest	0.1% of CR 1 pA on lowest	0.006% of CR 5.5 pA on lowest

[1] The compliance voltage is the maximum potential between Working and Counter electrode and depends on the selected mode.
[2] The number of ranges depend on the operating mode (see EmStat Pico product page for more details)

Electrometer

module	EmStat4 (LR)	EmStat3	EmStat Pico
▪ electrometer amplifier input	> 1 TΩ // 10 pF	> 100 GOhm // 4 pF	> 1 TΩ // 10 pF
▪ bandwidth	500 kHz	3.5 kHz	250 kHz

Other

▪ housing	118 x 69 x 33 mm aluminium body with silicone sleeve
▪ weight	~250 g (depending on configuration)
▪ power supply	battery or USB-powered
▪ communication	Bluetooth (dual mode) or USB
▪ digital and analog options for extension module	- analog input and output - 4 digital outputs, 1 digital input - 5 V output (max. 50 mA), digital and analog ground
▪ temperature range	0 °C to +40 °C
▪ battery life	>6 hours with cell on at 10 mA current (can be extended to >24 hours with external power bank) charging up to 80% takes approx. 3.5 hours a full charge takes approx. 5 hours

Please do not hesitate to contact PalmSens for more details:
info@palmsens.com

PalmSens BV
The Netherlands
www.palmsens.com