RACKMOUNT 16CH™

16-channel
potentiostat / galvanostat / impedance analyzer
in a standard 19” rack-ready enclosure

PalmSens

Rev. 05-2026-002

Contents

› See for more information:
www.palmsens.com/rm16ch

High-Capacity Networked Electrochemical Analyzer

The RackMount 16CH is a high-performance 16-channel potentiostat built on the industry-proven EmStat4 platform. Engineered for high-throughput electrochemical research, it delivers precise, simultaneous measurements across all channels without compromise. Equipped with an embedded Lablink controller, the RackMount 16CH manages, buffers, and stores every data point locally. Your experiments remain uninterrupted and your data stays safe.

Lablink

Powered by Lablink

The RackMount 16CH, powered by Lablink, controls your measurements internally and logs them directly to its onboard Solid State Drive (SSD).

- **Independent Operation:** Experiments run flawlessly without a PC connection.
- **Internal Logging:** Data is saved locally, eliminating the risk from software interruptions.
- **Seamless Recovery:** Simply reconnect to review and download your secured results.

Main Specifications

The RackMount 16CH hosts 16 individual EmStat4 LR potentiostat modules, each providing:

▪ potential range	±3 V
▪ max. compliance	±5 V
▪ current ranges	1 nA to 10 mA (8 ranges)
▪ max. current	±30 mA (per channel)
▪ electrode connections	16x WE, RE, CE and ground

See page 9 for detailed specifications.

Configurable

The RackMount 16CH is available with the following options:

- Galvanic Channel Isolation
- Capabilities for EIS up to 200 kHz

Desktop or Rack-Mount

Optimized for both 1U 19” rack-mount and desktop environments, the RackMount 16CH offers the flexibility your workspace demands.

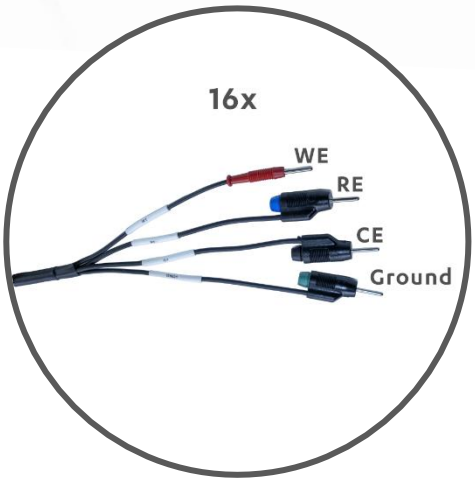
19” rack-ready version with mounting brackets

Desktop version with feet

16 Independent Channels

Each quad-cell connector interfaces with four independent electrochemical cells. Every channel features its own dedicated potentiostat with discrete Reference Electrode, Working Electrode, Counter Electrode, and ground connections for total isolation and control. Galvanic Isolation across the channels and hardware synchronization allow for using multiple Working Electrodes in the same cell.

Optional adapter for
4x Screen-Printed Electrodes



Standard 1-meter cell cables for connecting to 16 individual electrochemical cells

Status Information: LED indicators and Display

At a glance: Each channel of the RackMount 16CH has a status indicator LED, showing if channels are available or claimed by users or if a measurement is running. The RackMount 16CH display shows Lablink-related status information and the fan speed.

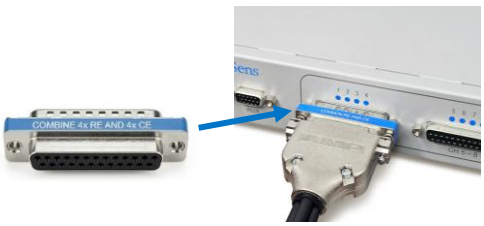
Automatic Droplet Detection

Instant-Start Sensing: Optimized for Screen-Printed Electrodes (SPEs), each channel can be configured via software to trigger measurements automatically upon droplet detection. This minimizes the delay between sample deposition and data acquisition, ensuring you capture the most time-sensitive electrochemical responses. It can also help streamline high-throughput workflows.

Channel Synchronization

Polypotentiostat: By enabling synchronization of channels and adjusting the setup of your cables, you can use the RackMount 16CH as a polypotentiostat. This means you can use multiple working electrodes, one counter and one reference electrode in the same cell at the same time. Your working electrodes all perform the exact same measurement.

Adapter for efficient wiring: Every RackMount 16CH includes four cell-connector adapters as standard. These DB25 interfaces internally bridge the Reference (RE) and Counter (CE) electrodes for each four-channel bank, eliminating the need to manually stack leads at the cell.



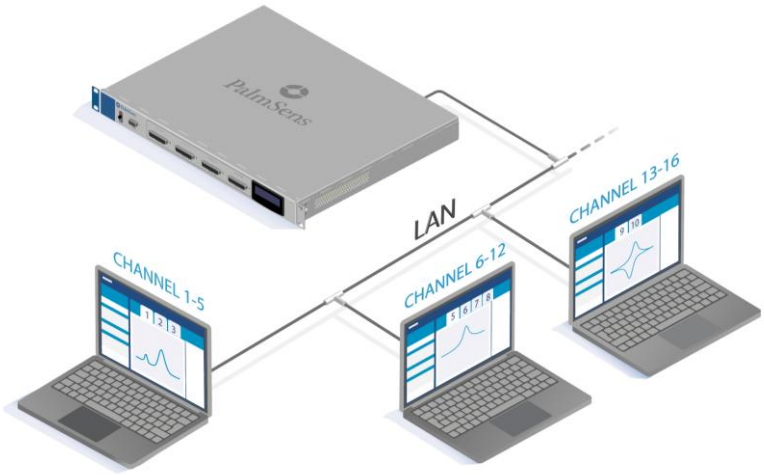
Daisy chaining: The link ports at the back of the instrument allow for daisy chaining multiple RackMount 16CH instruments for hardware synchronization across multiple instruments.

Lablink: Centralized Control and Data Management

The RackMount 16CH features an integrated **Lablink Hub**, transforming how your team monitors and manages electrochemical measurements across a Local Area Network (LAN).

Multi-User Collaboration

- **Shared Accessibility:** Multiple researchers can access the RackMount 16CH simultaneously from different workstations throughout the lab.
- **Flexible Control:** Claim specific channels or groups via a **standard web browser** or the PSTrace Xpress software.
- **Conflict Prevention:** Secure channel-locking ensures active measurements remain undisturbed by other users on the network.



Unmatched Experiment Reliability

- **Autonomous Execution:** Once started, the integrated controller manages the experiment independently, no continued dedicated host PC connection is required.
- **Fail-Safe Monitoring:** Experiments continue uninterrupted even if the software is closed or the network connection is lost.
- **Seamless Reconnection:** Log back in from any PC on the network to resume monitoring and retrieve data without a single gap in your results.

Robust Data Management

- **High-Capacity Storage:** Each RackMount 16CH is equipped with an internal **512 GB SSD**, ensuring ample space for long-term studies.
- **Local Data Security:** All measurement data, metadata, and methods are saved to the instrument.
- **Streamlined Workflow:** Browse, download, or load stored sessions directly into PSTrace Xpress as easily as accessing a local hard drive.

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

Supported Techniques

Hardware synchronization across channels

By enabling synchronization of channels and adjusting the setup of your cables, you can use the RackMount 16CH as a polypotentiostat. This means you can use multiple working electrodes, one counter and one reference electrode in the same cell at the same time. Your working electrodes all perform the exact same measurement.

The RackMount 16CH supports the following electrochemical techniques.

Voltammetric techniques

▪ Linear Sweep Voltammetry	LSV
▪ Cyclic Voltammetry	CV

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
▪ Pulsed Amperometric Detection	PAD

Galvanostatic techniques

▪ Linear Sweep Potentiometry	LSP
▪ Chronopotentiometry	CP
▪ MultiStep Potentiometry	MP
▪ Open Circuit Potentiometry	OCP

Other

▪ Mixed Mode	MM
▪ Potentiostatic Impedance spectroscopy at fixed frequency or frequency scan vs fixed potential, scanning potential or time	EIS
▪ Galvanostatic Impedance spectroscopy at fixed frequency or frequency scan vs fixed current, scanning current or time	GEIS

PSTrace Xpress™ simplifies multi-channel control and data management. See page 12 for details on workspaces and grouped measurements.

PSTrace XPRESS

Measurement Specifications

The following table shows limits for some technique-specific parameters.

	Parameter	
All techniques (unless otherwise specified)	▪ Conditioning time	0 - 4000 s
	▪ Deposition time	0 - 4000 s
	▪ Equilibration time	0 - 4000 s
	▪ Step potential	0.100 mV - 250 mV
	▪ N data points	3 - 1,000,000
▪ NPV ▪ DPV	▪ Scan rate	0.1 mV/s (100 µV step) - 1 V/s (5 mV step)
	▪ Pulse time	0.4 ms - 300 ms
▪ SWV	▪ Frequency	1 Hz - 1250 Hz
▪ LSV ▪ CV	▪ Scan rate	0.01 mV/s (100 µV step) - 500 V/s (200 mV step)
▪ PAD	▪ Interval time	50 ms - 300 s
	▪ Pulse time	1 ms - 1 s
	▪ N data points	3 – 1,000,000 (> 100 days at 10 s interval)
▪ CA ▪ CP ▪ OCP	▪ Interval time	0.4 ms - 300 s
	▪ Run time	1 ms to > 1 year
▪ MM ▪ MA ▪ MP	▪ N cycles	1 - 20,000
	▪ N levels	1 - 255
	▪ Level switching overhead time	minimum ~1 ms (~100 ms with Hardware Sync.)
	▪ Interval time	0.4 ms - 300 s

System Specifications

General	
▪ dc-potential range	±3 V
▪ compliance voltage	±5 V
▪ maximum current	±30 mA
▪ max. data acquisition rate	1M samples/s
▪ control loop bandwidth (stability setting)	32 Hz, 320 Hz, 3.2 kHz, 30 kHz or 570 kHz
▪ current follower bandwidth	23 Hz (1 nA and 10 nA range), 2.3 kHz (100 nA and 1 µA range), 230 kHz (10 µA and 100 µA range), > 500 kHz (ranges 1 mA and higher)
▪ channel to channel isolation (for G.I. option)	≥ 1 GΩ // ≤ 10 nF

Potentiostat (controlled potential mode)	
▪ applied potential resolution	100 µV
▪ applied potential accuracy	≤ 0.2% ±1 mV offset
▪ current ranges	1 nA to 10 mA (8 ranges)
▪ measured current resolution	0.009% of range (92 fA on 1 nA range)
▪ measured current accuracy	< 0.2% of current ±20 pA ±0.2% of range

Galvanostat (controlled current mode)	
▪ current ranges	10 nA, 1 µA, 100 µA, 10 mA (4 ranges)
▪ applied dc-current	±3 * range
▪ applied dc-current resolution	0.01% of range
▪ applied dc-current accuracy	< 0.4% of current ±20 pA ±0.2% of range
▪ potential ranges	50 mV, 100 mV, 200 mV, 500 mv, 1 V
▪ measured dc-potential resolution	96 µV (1 V), 48 µV (500 mV), 19.2 µV (200 mV), 9.6 µV (100 mV), 4.8 µV (50 mV)
▪ measured dc-potential accuracy	≤ 0.2% potential, ±1 mV offset

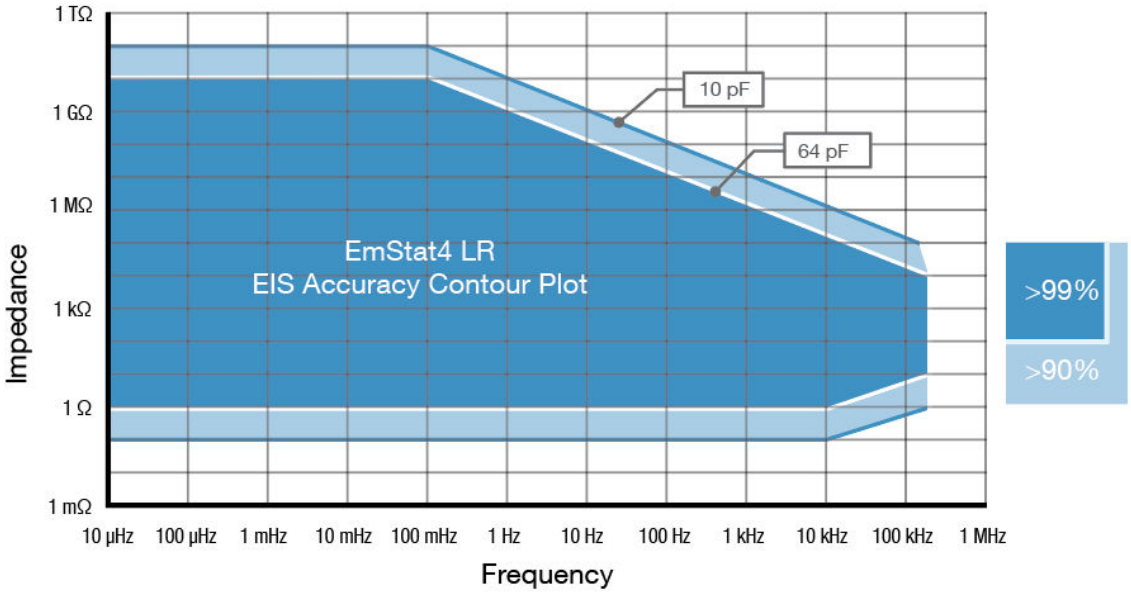
Optional: FRA / EIS (impedance measurements)	
▪ frequency range	10 µHz to 200 kHz
▪ ac-amplitude range	1 mV to 900 mV rms, or 2.5 V p-p

Optional: GEIS (galvanostatic impedance measurements)	
▪ frequency range	10 µHz to 100 kHz
▪ ac-amplitude range	0.9 * range A rms

Electrometer	
▪ electrometer amplifier input	> 1 TΩ // 10 pF
▪ bandwidth	500 kHz

Other	
▪ electrode connections	16 x [WE, RE, CE, and ground, with 2 mm banana plugs]
▪ housing	Steel 19” housing: 44.4 x 33.5 x 4.4 cm (without front handles and feet) extra height with feet: 1.5 cm extra depth with handles: 4.0 cm
▪ temperature range	0 °C to +45 °C
▪ weight	4.5 kg
▪ communication	Ethernet (main) I2C for peripheral control (auxiliary)
▪ power	100-240 V, 9 W, 50-60 Hz
▪ internal storage space	512 GB SSD via internal Lablink module

EIS Accuracy Contour Plot



Note
The accuracy contour plots were determined under lab conditions using a standard 1-meter cell cable and should be used only for reference purposes. The true limits of an impedance measurement are influenced by all components in the system, e.g. cables, the environment, and the cell.

Standard RackMount 16CH Kit

A standard RackMount 16CH comes with:

- RackMount 16CH-ES4
- IEC C13 mains power cable
- 2-meter ethernet cable
- Hardware Sync Link cable
- 4x cell-connector adapters with internally connected REs and CEs
- 1x PalmSens Dummy Cell

Also included:

- PSTrace Xpress™ software for Windows (on USB drive)
- Manual (hard copy)
- Quick Start (hard copy)
- Calibration report for each channel (hard copy)

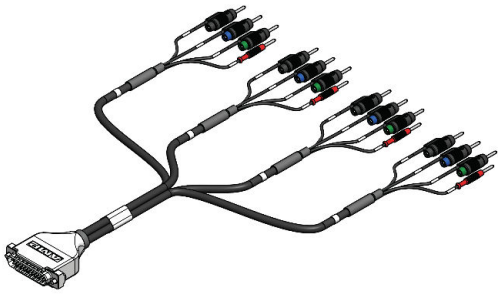
RackMount 16CH Accessories

Additional accessories may be purchased with the RackMount 16CH to support a wider range of experimental measurements and sensor configurations.

Adapter for Screen-Printed Electrodes

Designed for high-throughput screening, this four-in-one Screen-Printed Electrode (SPE) adapter allows for the simultaneous connection of four screen-printed electrodes to an individual bank of four RackMount 16CH channels. It provides a reliable interface for disposable sensors from various manufacturers, eliminating the need for complex manual wiring in rapid sensor validation or functionalization workflows.

Standard cell cables



(schematic representation, not to scale)

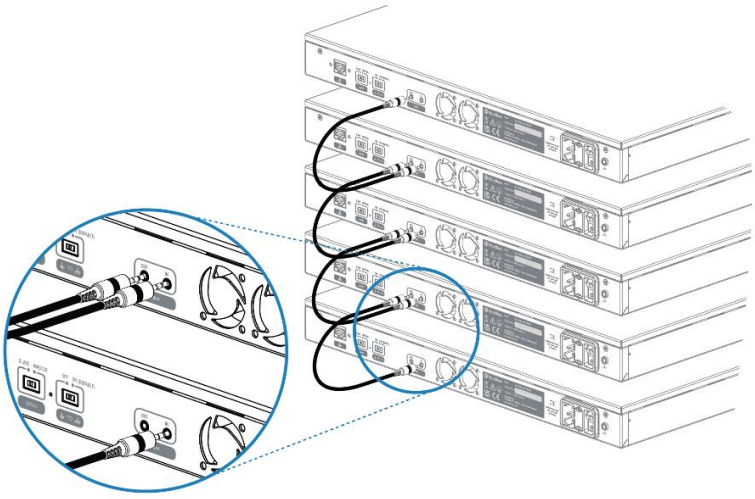
The four-in-one 1-meter cell cable provides a consolidated connection for four independent potentiostat channels. To ensure signal integrity, the main cable is double-shielded, while the separate end leads are individually shielded. The cable ends with labelled and color-coded 2 mm banana connectors, which are compatible with our optional crocodile clips. For versatility in cell setups, the banana connectors for the Reference Electrode, Counter Electrode and Sense are stackable.

Research at Scale: Creating Larger Potentiostat Arrays

The RackMount 16CH is designed for easy expansion, providing laboratories with the flexibility to increase their testing capacity at any time. Instruments can be acquired as standalone 16-channel systems and later integrated into much larger (synchronized) arrays as research requirements grow. This scalability is particularly effective in the rack-mounted configuration, where multiple units can be stacked to perform measurements across dozens or even hundreds of channels simultaneously. This allows for high-throughput parallel testing or complex multi-electrode experiments in a single electrochemical cell without timing offsets between the working electrodes.

Linking units to create such high-capacity arrays is a straightforward process using the hardware sync link cables, provided as standard. To establish the timing protocol, a physical slider switch is used to designate one instrument in the stack as the "Master". This hardware-level connection ensures that timing signals pass through the entire chain, initiating measurements across every active channel in the array at the exact same moment.

The expanded system is managed through a single user interface in PSTrace Xpress, which provides unified control over all grouped channels. While measurements are controlled as a single synchronized system, each RackMount 16CH utilizes its own integrated Lablink instrument server to execute measurements and store experimental data autonomously. This decentralized management ensures high-speed data acquisition and integrity are maintained regardless of the total overall channel count.

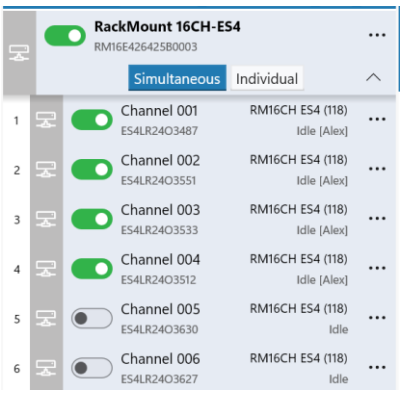


Note
While Galvanic Isolation (GI) provides the highest level of protection for complex multi-electrode research, it is not a requirement for expanding your channel count. Every RackMount 16CH features a dedicated chassis-to-ground switch on the rear panel. When stacking units that are not galvanically isolated, this hardware control allows you to disconnect the internal circuitry ground from the chassis, effectively preventing ground loops and ensuring signal integrity across the entire array

PSTrace Xpress: Software for Windows

The RackMount 16CH is compatible with PSTrace Xpress (version 1.9 and later), which can be installed from the USB drive supplied with the instrument or downloaded from the Windows Store.

PSTrace Xpress is engineered for high-capacity research environments, offering seamless integration with the **Lablink instrument server** to simplify complex hardware management and data collection.



Smart Connectivity & Control

- **Auto-Discovery:** Automatically scans your LAN to find and connect all available Lablink-powered instruments.
- **Centralized Interface:** Claim or release hardware channels remotely, ensuring smooth resource sharing across your entire team.
- **Custom Grouping:** Organize channels into specialized groups to run multiple measurements simultaneously or manage independent experimental streams.

Autonomous & Resilient Testing

- **Uninterrupted Execution:** Start a method and disconnect your PC; the RackMount 16CH continues the experiment autonomously.
- **Automatic Syncing:** Upon reconnection, the software syncs with the Lablink controller to retrieve buffered data, preventing any gaps in your records.

Advanced Analysis & Data Management

- **Integrated Tools:** Simplify interpretation with built-in **automatic peak search** and **equivalent circuit fitting.**
- **Seamless Storage:** Data, metadata, and methods are stored directly on the internal Lablink controller, browse them as easily as a local folder.
- **One-Click Export:** Instantly move your results into **Excel** for further processing.

Minimum System Requirements

- Windows 10 or 11
- 1 GHz or faster 64-bit (x64) processor
- 4 GB RAM
- Screen resolution of 1366 x 768 pixels

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

Software Development Tools For The RackMount 16CH

With our Software Development Tools for **Python** and **.NET** for the RackMount 16CH you can write your own software to control the instrument. Functions include:

- Discover RM16CH racks on your local network
- Control and run measurements on the channels
- Get real-time status updates from the channels
- List and retrieve measurements stored on the RM16CH

Code examples included

We provide code examples to jumpstart your development. This walkthrough demonstrates how to:

- **Auto-Discover:** Locate every Lablink device (incl. RackMount 16CH) currently active on your network.
- **Establish Connectivity:** Initialize a secure connection to your hardware.
- **Real-Time Execution:** Run measurements and stream live results directly to your application.
- **Post-Measurement Retrieval:** Download complete datasets from the instrument's internal storage once an experiment is finished.

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

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