PGU 100-PCR

PGU 100-PCR

Overview

- Potentiostat, Galvanostat
- 10 current ranges to 100pA
- Max. ±12V / ±100mA
- Resolution 0,01pA (theoretical)
- Instruments for U and I
- nominal voltage generator internal and 2 nominal voltage inputs

Description

The potentiostat / galvanostat PGU 100-PCR can be used as a normal potentiostat / galvanostat and for the measurement of the electrochemical noise. In standard applications this device is characterized especially by the high input impedance of the reference electrode. The device has current ranges from 100mA to 100pA. Because the current proportional output signal has a maximum value of ±10V, this means a (theoretical) resolution of the current measurement in the lowest range of 0,01pA = 1mV.
The device is in its basic design a potentiostat / galvanostat with a high input impedance. The features of the measurement of the electrochemical noise are given to him by two additional slots, which are equipped with filters and amplifiers.
The first slot (U-noise-filter) is for the potential noise. It has a switchable amplifier with the factors x100, x500, x1000, x2000, x5000 and x10000. Furthermore it has a switchable Besselfilter with an upper limiting frequency of 1, 10, 40, 100, 200 and 500Hz. The lower limiting frequency is fixed set to 0,1Hz (by request also 0,01Hz). The noise potential can either be measured directly with the help of two electrodes via an input jack. But it can also be a "quite normal" standard measuring cell connected to the potentiostat. On the filter slot is a toggle switch that can be switched from external to internal. Thus, the noise potential is gripped directly from the potential output of the potentiostat (this is probably the easier option).
The second slot (I-noise-filter) is for the current noise. It has a switchable amplifier with the factors x10, x20, x50, x100, x200 und x500. Besides it has a switchable Besselfilter with an upper limiting frequency of 1, 10, 40, 100, 200 and 500Hz. The lower limiting frequency is fixed set to 0,1Hz (by request also 0,01Hz). The noise signal is gripped internally by the output of the ammeter. Thus, for the measurement of current noise a measuring cell with counter-, reference- and working electrode will be connected to the potentiostat. Both slots are yet equipped with a connectable blocking filter for the 50Hz mains frequency.
The device works either in mains or in battery operation.

Technical Details

Design	
Instrument for potential measurement	digital, 3½-digits, ±1999mV
Instrument output voltage Counter electrode measuring electrode	analoq display for the modulation voltage and as an indicator for the OCP = internal nominal voltage
Instrument for current measurement	analoq, 0 - ±100%, proportional to the selected I-range
Nominal voltage potentiostat	analoq, 0 - ±100%, proportional to the selected I-range
Nominal voltage galvanostat	see nominal voltage potentiostat
Current range	manually, 10 ranges
Working mode potentiostat / galvanostat	manually and automatic via external switch
OCP / closed circuit	manually and automatic via external switch
Recommend frequency range	0 to 2kHz (depending on the selected current range)
IR-drop compensation	yes
Polarization range	**Internal**
V-nominal for potential	±1000 mV and ± 2000mV
V-nominal for I-constant	±1000 mV
	Nominal voltage external
V-input	±10V, 2 BNC input connectors, work adding
I-input	±1V for maximum modulation, 2 BNC input connectors, work adding
	Outputs
V-output	±10V
I-output	±100mA max. as proportional voltage signal ±10V
In- / output resistance	
Internal resistance of current measurement	approximately$10^{-4}\Omega$
Input resistance of reference electrode	Approximately $10^{15}\Omega$
Input resistance for external nominal voltage	10kΩ (V- and I-input)
Rise speed / rise time	2.000V/sec. = 100µs/V
Current measurement	**Analog**
Current range	100mA to 100pA

Accuracy	0,3%, in the ranges 100nA / 10nA / 1nA = 1% in the ranges 100pA = 5%
I- output	10 ranges, 10000mV
Voltage measurement	**Analog**
V-output	±10V, 0,1%
Digital voltage meter	3½-digits, to ±1999mV, 0,25%
V-counter electrode-measuring electrode	±11V
Zero point stability	
At main power fluctuation of 10%	ca. 50µV
Ripple-noise	ca. 20µV (50Hz)
Drift	ca. 100µV/Tag; ca. 10µV/°C
Phase shift	n.a.
Log. Output	no
Autoranging	yes (in connection with a measuring setup)

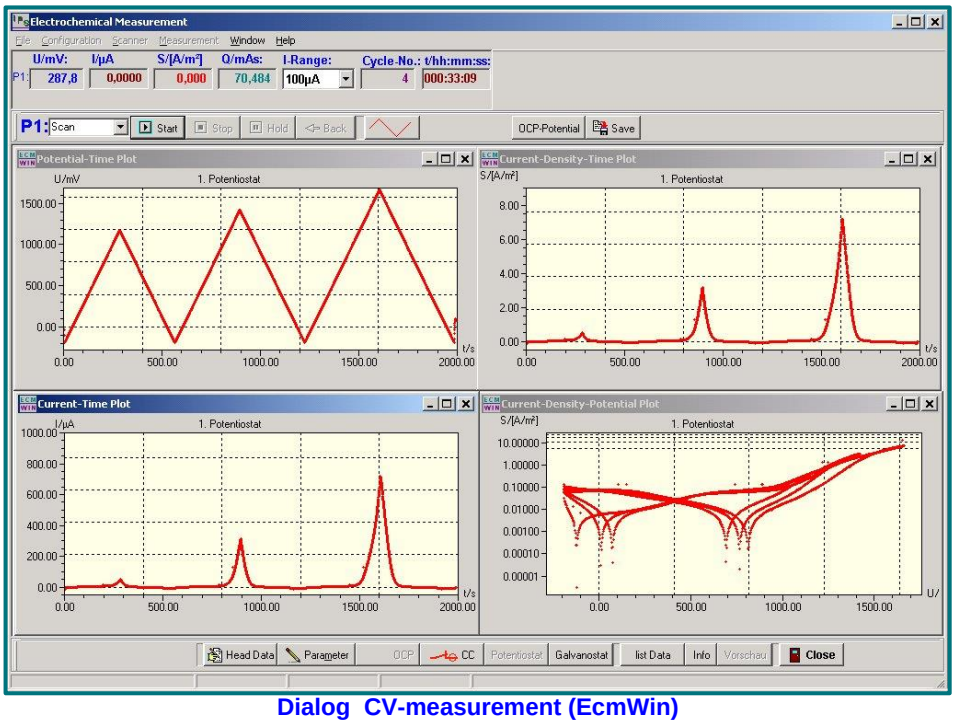
Connection

Special for the use in teaching mode, these devices give more information about the running processes. All events can read similar from the front panel of instrument and at the software window if this is in use.

The measurement can automate with our ***EcmWin*** software. Methods are:

- OCP
- Hold experiment
- Linear and cyclic Sweep (Potentiostat and Galvanostat)
- Puls measurement (Potentiostat and Galvanostat)
- Limit control for return or switch off on reaching a limit point.
- Measuring of electrochemical noise (it's depending on the hardware)
- Measuring at rotating disc or ring-disc electrodes (if available)
- Sequence measurement

The following picture shows a typical window with a CV measurement. All values are shown as digital meters with the correct units. On changing the current range, the unit will actualized in the display. To normalize the potential, a correction value can set, to calculate the current density, the size of the surface can entered. Additional to the digital meters, the values are displayed in a graphical display during the measurement. The scaling will set automatically during measurement.
The operation modes OCP/closed circuit or Potentiostat/Galvanostat can set manually or will set automatically as programmed during measurement.



Dialog CV-measurement (EcmWin)

All experiments can be performed with limit value monitoring. The recorded data is stored in ASCII format for further processing. The collection and storage of data runs at a maximum. 1000 values / sec per channel.

Evaluation of the standard measurement is performed using our ***EcmView*** software**.**