

Electrochemical measurement system

HZ-7000 Series

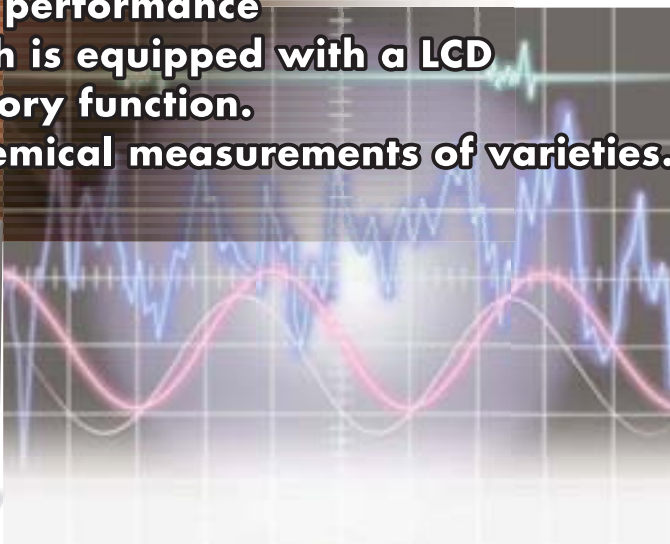
Cyclic Voltammetry
Linear Sweep Voltammetry
Chrono-Potentiometry
Chrono-Amperometry



HZ-7000 is a compact and high performance potentiostat / galvanostat which is equipped with a LCD monitor and includes data memory function. HZ-7000 can perform electrochemical measurements of varieties.



HAG1232mp



HAG1232m



■ Features

HZ-7000 is a compact and high performance potentiostat / galvanostat which is not only remote-controlled by PC via Ethernet but also capable of basic measurement in stand-alone mode.

HZ-7000 offers to various measurement techniques.

So it can be used widely, from basic research to applied research.

- HAG1232m : remote-control only
- HAG1232mP : remote-control / stand-alone

- Basic measurement can be performed in stand-alone mode. (OCP,LSV,CV,CA,CP,NPV,DPV,IR,SCV,OSWV)
- Saving the data and measurement condition to USB memory. And loading the measurement condition from USB memory.
- The potential of RE/CE and CE/WE is measured simultaneously.
- Minimum current range : 30nA ; capable of low current control and measurement
- Arbitrary waveform control up to 99steps.
- Function can be extended by adding option board. (bi-potentiostat,EIS,QCM,etc.)

■ Specification

Control output	Maximum output voltage	±12V
	Maximum current	±300mA
	Potential control range	±10V(±10V, -5V ~ +15V, 0V ~ +20V : with potential shift function) (*1)
	Potential control resolution	66μV(2Vrange)
	Current control resolution	0.004% of Full Scale Range
	Potential control accuracy	±0.05% of setting ±1mV
	Current control accuracy	±0.2% of Full Scale Range
	Response speed	< 2μsec
Potential/ Current measurement	Potential ranges	2V,10V,AUTO (±10V, -5V ~ +15V,0V ~ +20V : with potential shift function) (*1)
	Potential measurement accuracy	± 0.05% of reading ± 1 mV
	Potential measurement resolution	0.003% of Full Scale Range, Minimum 66μV(2Vrange)
	Current ranges	30nA ~ 300mA(8ranges),AUTO
	Current measurement accuracy	±0.2 % of Full Scale Range
	Current measurement resolution	0.004% of Full Scale Range,Minimum 1.1pA (30nA range)
	Input impedance	>1TΩ,
	Input bias current	<10pA
General	Data sampling interval	10μs ~ 1800s(There are some limitation depending on method)
	Dimensions	HAG1232mP : W260×H165×D342mm / HAG1232m : W260×H165×D335mm
	Weight	5.8kg
	Power requirements	AC100 ~ 240V, 70VA
	PC	WindowsXP Professional, Windows Vista Business, Windows 7 Professional (32bit)

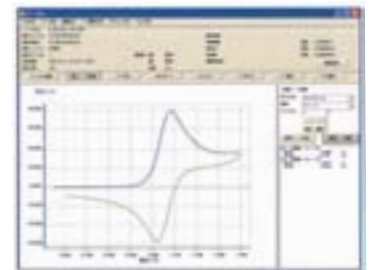
(*1) potential shift function is not available when HZAP3003 is connected

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■ Software

■ Measurement Software

Techniques implemented in basic software	remote	stand-alone	remarks
Open Circuit Potential - OCP (OCV)	○	○	—
Linear Sweep Voltammetry - LSV	○	○	—
Cyclic Voltammetry - CV	○	○	—
Chronoamperometry - CA	○	○	—
Chronopotentiometry - CP	○	○	—
Chronocoulometry - CC	○	○	—
Bulk Electrolysis - BE	○	○	—
IR drop Compensation - IR	○	○	—
Sine curve Voltammetry - SCV	○	—	○
Corrosion Potential - REST	○	—	○
Normal Pulse Voltammetry - NPV	○	○	—
Differential Pulse Voltammetry - DPV	○	○	—
Linear Sweep Stripping Voltammetry - LSSV	○	—	○
Differential Pulse Stripping Voltammetry - DPSV	○	—	○
Zero Resistance Ammeter - ZRA	○	○	—
Osteryoung Square Wave Voltammetry - OSWV	○	○	—
Charge Discharge Cycle - CDC (Max. 4 steps)	○	○	—
Potential Electrochemical Impedance Spectroscopy - PEIS	○	○	require FRA board
Galvano Electrochemical Impedance Spectroscopy - GEIS	○	○	require FRA board
Constant Voltage 8 steps	○	△ (4steps)	—
Constant Current 8 steps	○	△ (4steps)	—
Potential Arbitrary function	○	—	—
Galvano Arbitrary function	○	—	—



● Measurement Settings

Reference electrode
Ag/AgCl

Sample

$1 \times 10^{-3} \text{ mol dm}^{-3} \text{ Ru}(\text{bpy})_3^{2+}$

Working electrode

Boron Doped Diamond electrode

Electrolyte Solution

$1 \text{ mol dm}^{-3} \text{ KCl}$

Sweep Rate

100 mV sec^{-1}

■ Analysis Software

Optional Techniques	remote	remarks
Tafel Plot - TAFEL	○	Corrosion Option
Electrochemical Potentiokinetic Reactivation - EPR	○	Corrosion Option
Pitting Potential - PITTING	○	Corrosion Option
Protection Potential - PROTEC	○	Corrosion Option
Anodic Polarization - AP	○	Corrosion Option
Repassivation Potential for Crevice - ER	○	ER Option

Features implemented in basic software	remote	stand-alone	remarks
Automatic Execution(Combination measurement)	○	—	—
Data saving to USB memory	—	○	—
Setting Upload from USB Memory (Only for Stand-Alone mode)	—	○	—
Bi-Potentiostat (max. 30 mA for Ring electrode)	○	○	require Additional PGS board
Rotating Disk Electrode control	○	○	require (HR300,HR500)
QCM control	○	○	require QCM board
AI,DIO (8 ch each) min. sampling rate : 100 ms	○	—	require AI, DIO cable (*2)

Main features
Data plotting and export
Text data export
Analysis features
Zoom in/Zoom out
display pointed data
display coordinate value
Coulomb value
Peak Finding
E 1/2
measurement length
processing features
smoothing
background subtraction
manual compensation
constant value compensation

(*2) AI cable and DIO cable are available for custom order. It is necessary to consult the specification.

Peripheral equipment (option)

- Adding functionality by inserting optional board to designated slot.(only one slot is available)
 - PGS board (HZA-PGS1) : Expand the HZ-7000 to bi-potentiostat
 - FRA board (HZA-FRA1) : capable of simultaneous EIS measurement of WE/RE and CE/RE
frequency range : 10 μ Hz - 500kHz
 - QCM board (HZA-QCM1) : for EQCM
minimum resolution : 0.1 Hz (at 10ms sampling)
available mass sensor : HQ-304,HQ-305,HQ-306, HQ-601DK,HQ-601PK
- Rotating disk electrode(HR-300,HR-500)
setting from PC : start, stop and rotation speed of the motor.
Rotating ring-disk electrode is also available by adding optional PGS board.



PGS Board



FRA Board

Specification

HZA-FRA1	
Frequency Range	10 μ Hz ~500kHz
Frequency resolution	10 μ Hz for under 1 Hz 0.01%/decade for over 1 Hz
Amplitude	1mVdc-p ~ 1Vdc-p 0.1% ~ 50% of the current range
Amplitude Resolution	1mV 0.1% of the current range

HZA-QCM1	
Frequency Range	1MHz ~ 20MHz
Gate Time	0.01s/0.1s/1s
Measurement resolution	0.1Hz/0.01Hz/0.001Hz (Gate Time 0.01s/0.1s/1s)
Input Signal	TTL
Input Impedance	767 Ω ±23 Ω
Power Supply for Cell (Oscillator)	DC+5V/30mA
Power Supply for Cell (Driver)	DC+5V/30mA

Boosters (Option)

Booster Specification

Category	Item	Specification		remarks
		HZAP3003	HZAP1230	
control output	maximum output voltage	±30V	±12V	
	maximum output current	±3A	±30A (*3)	(*3) ±20A when potential shift function is used.
	control potential	±10V	±10V, -5V ~ 15V, 0V ~ 20V	
	control potential resolution	0.06mV		at 2 V range
	control potential accuracy	±0.05% of setting ± 1mV		
Potential/ Current measurement	Input bias current	< 100 pA		
	input impedance	> 1 x 10 ¹¹ Ω	> 1 x 10 ¹⁰ Ω	
	measurement current range	3A,300mA,30mA,3mA, 300 μ A,30 μ A,3 μ A,AUTO	30A,3A,300mA,30mA, 3mA,300 μ A,30 μ A	AUTO + 7 ranges



HZAP3003

General Specification

Item	Specification		remarks
	HZAP3003	HZAP1230	
Dimension	W430×H224×D408mm	W430×H553×D600mm	Excluding connectors and casters
Weight	17kg	65kg	
Power voltage	AC90V ~ 264V	AC95V ~ 264V	
Power consumption	200VA	1300VA	
Operating temperature	0 $^{\circ}$ C ~ 40 $^{\circ}$ C		
Operating humidity	10%RH ~ 90%RH		No condensation
Accuracy guaranteed temperature range	23 $^{\circ}$ C±5 $^{\circ}$ C		



HZAP1230

Contents are subject to change without notice

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