

## 1. SI1280 ELECTROCHEMICAL MEASUREMENT UNIT SPECIFICATIONS

This specification covers both the SI1280A and the SI1280B. Where the performance differs the parameters relevant to the SI1280A are shown in brackets.

### 1.1. MEASUREMENT CONFIGURATION

Cell connections	2, 3 or 4 Terminal, all floating
Common mode voltage, LO to GND	10V
Working electrode	
current measurement resistor ( $R_m$ ) range	0.1 $\Omega$ to 1M $\Omega$ (1280A: 0.1 $\Omega$ to 100k $\Omega$ )
full scale current ranges	200nA to 2A (1280A: 2 $\mu$ A to 2A)
maximum resolution	1.0pA (1280A: 100pA)
limit of error	0.1% $\pm$ 0.05% of range
Counter electrode	
output voltage, wrt LO	> $\pm$ 20V
current, subject to thermal protection limits	2A (1280A: 1A)
slew rate, potentiostatic control	>10V/ $\mu$ s
output short-circuit protected	
Reference electrodes	
input impedance	>10G $\Omega$
capacitance	50pF
current	<1nA
maximum resolution	1 $\mu$ V
limit of error	0.1% $\pm$ 100 $\mu$ V
maximum voltage wrt GND	$\pm$ 10V peak
rejection, $f < 20$ kHz	70dB
Integration time	0.1 to 10 <sup>5</sup> s
Harmonics measured	first 8, up to maximum 20kHz
limits of error, relative to fundamental	
> 0.01 full scale	$\pm$ 0.2dB
> 0.001 full scale	$\pm$ 1dB

### 1.2. DC POLARISATION

DC polarisation	
voltage range	$\pm$ 14.5V (1280A: $\pm$ 12.8V)
limits of error	0.2% $\pm$ 200 $\mu$ V
V<3.2V	
V>3.2V	0.2% $\pm$ 2mV
maximum resolution	100 $\mu$ V
current range	$\pm$ 2A (1280A: $\pm$ 1A)
limit error	0.2% $\pm$ 0.1% of range
maximum resolution	100pA (1280A: $\pm$ 1nA)
DC sweep: analogue ramp	
ramp rate	10 $\mu$ V/s to 100V/s (1280A: 100 $\mu$ V to 100V/s)
minimum segment duration	10ms
minimum increment	5mV
DC sweep: stepped ramp	
minimum step height	5 $\mu$ V
minimum step duration	10ms
maximum step duration	10 <sup>5</sup> s
Bandwidth, 100 $\Omega$ resistive load, unity gain	>80kHz

**1.3. AC POLARISATION**

Waveform	sine, square, triangular
Frequency	
range	1mHz to 20kHz
maximum resolution	1 part in 4000
Amplitude	
ranges	0 to 10V peak, 10mV resolution 0 to 100mV peak, 100 $\mu$ V resolution
Distortion	<1%

**1.4. IMPEDANCE MEASUREMENT**

Limits of error (for a 25mV simulation of a unity gain cell with  $R_{\text{cell}} = R_m$ ) and no error due to reference electrode bandwidth. RE1 and RE2 capacitance must be corrected to obtain accuracy at high impedance.

$R_m$	Bandwidth			
	f<1kHz	f<3kHz	f<10kHz	f<20kHz
0.1 $\Omega$ to 10k $\Omega$	0.5%, 0.5°	1.5%, 1.5°	3%, 3°	3%, 3°
100k $\Omega$	0.5%, 0.5°	1.5%, 1.5°	3%, 3°	3%, 6°
1M $\Omega$ *	0.5%, 0.5°	not applicable	not applicable	not applicable

\*Applicable to 1280B only.

**1.5. IR COMPENSATION AND REAL PART CORRECTION**

Current interruption	
interruption time	26.6 $\mu$ s to 1.36ms
off: on range	1:1 to 1:255
Feedback compensation and real part correction	
range	0 to 1000% $R_m$
resolution	1% $R_m$
limit of error	
f < 1kHz	0.2% $\pm$ 1% $R_m$ , 0.2°
f > 1kHz	2% $\pm$ 1% $R_m$ , 2°

**1.6. BIAS REJECTION**

Voltage	
range	$\pm$ 14.5V (1280A: $\pm$ 12.8V)
limit of error	0.2% $\pm$ 10mV
resolution	5mV
Current	
ranges	200nA to 2A (1280A: 2 $\mu$ A to 1A)
limit of error	0.2% $\pm$ 1% of range
resolution	1% of range

**1.7. INTERFACE**

Parallel port	IEEE 488 (1978)
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**1.8. GENERAL**

Power supply, switch selectable	90-100V, 108-132V, 198-242V, 216-264V 48 to 65Hz 210VA
Consumption	
Temperature	
operating	0 to 50°C (32 to 122°F)
storage	-30 to 70°C (-22 to 158°F)
specification limits	10 to 30°C (50 to 86°F)
Humidity, non condensing	95% at 40°C
Vibration, tested to DEF STD 66/31	
operating	5-16Hz $\pm 0.1\text{mm}$ 16-30Hz $0.98\text{ms}^{-2}$
storage	5-13Hz $\pm 1.5\text{mm}$ 13-150Hz $9.8\text{ms}^{-2}$
Safety	
complies with	IEC 1010-1 (EN61010-1)
Electromagnetic Compatibility*	
complies with	EN50081-1 and EN50082-1

\* Applicable to 1280B only.

**Note:** High levels of radiated or conducted radio frequency interference, as defined in EN50082-1, may reduce the accuracy of low level measurements. (See Appendix A, Section 6. 1, in this manual.)

Dimensions	
height	140mm (5.5ins)
width	437mm (17.2ins)
depth	457mm (18ins)
weight	11.35kg (25lbs)

**1.9. ORDERING INFORMATION**

1280B Electrochemical Measurement Unit

Accessories included:

- test module
- hardware operating manual
- power cord
- spare fuses
- 4 leads, 1m long, BNC to 4mm

Options:

maintenance manual	(12806001)
rack mounting kit	(12801A)
carry case	(12802A)

