



TBR4100/1025

Free Radical Analyzer



- Real-time detection with electrochemical microsensors
- Includes one temperature sensor, choice of two additional sensors (one for **TBR1025**) and a start-up kit.
- Wide dynamic range for detection
- Wide bandwidth for recording fast events
- Measure:
 - Nitric oxide from $< 0.3\text{nM}$ – $100\mu\text{M}$
 - Hydrogen peroxide $< 10\text{nM}$ – 100mM
 - Hydrogen sulfide
 - Glucose
 - Oxygen from 0.1–100%
- Isolated architecture allows simultaneous measurement of free radical and independent analog data (ECG, BP, etc.) data on any channel
- Benchtop or rack mounted

Free radical analyzers are available in two models:

- **TBR4100** is the four-channel model
- **TBR1025** is the one-channel model

The operation of the analyzers and specifications are exactly the same. Real-time detection and measurement of a variety of redox-reactive species is fast and easy using the electrochemical (amperometric) detection principle employed in the **TBR4100/1025**. These optically isolated free radical analyzers have ultra low noise. TBR4100 channels operate independently.

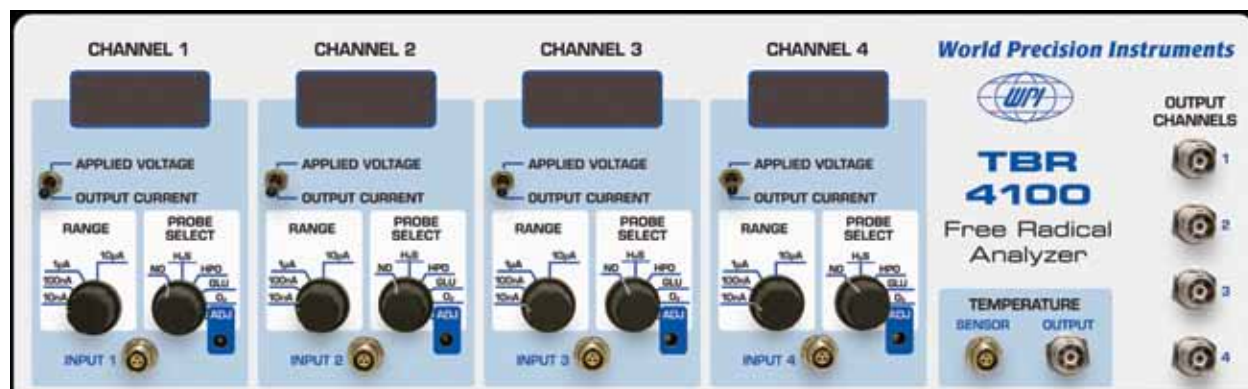
The **TBR4100/1025** is designed for use with WPI's wide range of nitric oxide, hydrogen peroxide, hydrogen sulfide and oxygen sensors. the **TBR4100** can measure four different species simultaneously in the same preparation.

Simply plug a sensor into any one of the input channels on the front panel and select the detection and acquisition parameters using the software. Poise voltage can be selected from a range of values tuned for optimal response from WPI sensors. An independent input port for real-time monitoring of temperature is also included.

The **TBR4100/1025** analyzer utilizes PC-based data acquisition via a Lab-Trax interface; data traces are displayed and recorded in real-time. Data can be viewed making adjustments to smoothing and filter settings without affecting the original stored raw data. In addition, the Lab-Trax T series data interface can also be used to simultaneously record other physiological data (ECG, HR, BP, etc.) to the same data record.



TBR4100



TBR4100/1025 SPECIFICATIONS

Power	100 ~ 240 VAC, 50-60 Hz, <15 W
Operating Temperature (ambient).....	0 - 50°C (32 - 122°F)
Operating Humidity (ambient).....	15 - 70% RH non-condensing
Warm up Time	<5 minutes
Dimensions	135 X 419 X 217 mm (5.25" X 16.5" X 8.16")
Weight.....	1.35 kg (3 lb)
Display Functions	18 mm (0.7") LCD readout, 4.5 digit Polarization Voltage (mV) Current input (nA, μ A)
Controls	Power (on/off) Current Input Range Polarization Voltage
Analog Output Range.....	+/- 10 V (continuous)
Analog Output Impedance	10 kohm
Channel to Channel Isolation.....	>10 Gohm
Channel to Output Isolation.....	>10 Gohm
Power Supply to AC Line Isolation.....	>100 Mohm
Analog Output Drift.....	<10 pA/h
Temperature Input	
Number of Channels.....	1
Sensing Element.....	Platinum RTD, 1000 Ohm
Range	0-100°C
Accuracy.....	+/- 1°C
Resolution.....	0.1°C
Analog Output.....	31.25 mV/°C (continuous)

Amperometric Input

Number of Amperometric Channels			
TBR4100.....	4		
TBR1025.....	1		
Signal Bandwidth.....	0-3 Hz		
Polarization Voltage (selectable via rotary switch)			
Nitric Oxide	865 mV		
Hydrogen Sulfide.....	150 mV		
Hydrogen Peroxide.....	450 mV		
Glucose.....	600 mV		
Oxygen	700 mV		
ADJ (user adjustable)	+/- 2500 mV		
Polarization Voltage Accuracy	+/- 5 mV		
Polarization Voltage Display Resolution	+/- 1mV		
Current measurement Performance			
Range	Analog Output	Noise @ 3Hz *	Noise @ 0.3 Hz *
+/- 10 nA	1 mV / 1 pA	< 1 pA	< 0.3 pA
+/- 100 nA	1 mV / 10pA	< 7 pA	< 3 pA
+/- 1 μ A	1 mV / 100pA	< 70 pA	< 30 pA
+/- 10 μ A	1 mV / 1 μ A	< 700 pA	< 300 pA

*Instrument performance is measured as the (max-min) over 20 seconds period with open input. Typical values are given at 3 Hz and 0.3 Hz bandwidth.

Typical sensor performance with TBR4100/1025

ISO-NOPF100 noise.....0.2 nM NO (<2 pA)**

**Sensor noise is measured as the (max-min) over a 20 second period with the sensor immersed in 0.1 M CuCl₂ solution.

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