Wireless Temperature Sensor
Temperature Sensor One (TS1)

Features:
- Probe Range of -100°C to 200°C
- ± 1°C Error band
- Stainless Steel Construction
- Integrated Antenna
- Internal Battery

Compatibility:
- IEEE 802.15.4 Transceiver
- ISM 2.4 GHz Frequency
- ZigBee/IEEE 802.15.4 Compliant
- Hazardous Location Certified

Device Description
Measuring about 205 mm long, the patent-pending Electrochem TS1 is a compact, self-contained wireless temperature sensor. Highly accurate temperature measurements are transmitted wirelessly to a suitable base station such as the Electrochem BS1, and passed to a host system such as a PC or PLC. The internal battery powers the sensor for the entire calibration period of one year.

Advanced Sensing
Of the many detectors devised for temperature measurement, the configuration that offers the best stability with the lowest hysteresis, is one in which a platinum coil is supported inside the capillaries of a two or four-bore, high-purity alumina insulator. We utilize this wire-wound type, in which the platinum winding is supported by a high temperature alumina powder inside a ceramic tube. This construction provides a detector in which stability, interchangeability, and accuracy are the highest available for industrial and scientific applications.

Integrated Data Acquisition
Signals are amplified, digitized into 24-bit words and converted to units of measure at a rate of up to 480 readings per second. This is all accomplished using a precision mixed-signal microcontroller (MCU) which integrates an analog-to-digital converter (ADC) and a high-speed microcontroller. Accurate measurements are passed to the wireless subsection for transmission.

Cutting Edge ZigBee
Our ZigBee/IEEE 802.15.4 compliant wireless interface combines an ultra-low power RF transceiver with protocol software to form a transparent wireless communication solution that has self-organizing and self-healing properties. This configuration allows for ease of installation around obstructions, redundancy in communication paths, and longer range. The 2.4 GHz frequency band is suitable for worldwide use.

Capable Radio Hardware
The IEEE 802.15.4 Standard details the Physical Layer (PHY) and Medium Access Control (MAC) specifications, and offers the building blocks for different types of networking known as “star and cluster tree.” Network routing schemes are designed to ensure power conservation, and low latency through guaranteed time slots. Key features of the PHY include energy and link-quality detection, and clear channel assessment for improved coexistence with other wireless networks. The MAC specifies automatic packet acknowledgement, provides options for transmission in a range of pre-selected time intervals, and supports 128-bit AES security. The MAC and ZigBee application software is implemented in a code-efficient microcontroller that communicates digitally with the sensor data acquisition hardware.
Purchasing Information

TemperatureSensorOne ............................... TS1-LENGTH (Replace LENGTH with selection from below.)

Parts:
- Battery .......................................................... 100-200197
- Viton O-Ring-Size 012 .............................. 100-100116
- Viton O-Ring-Size 025 .............................. 100-100438

Accessories:
- Port Adapters
  - 1/4” NPTM to AS5202-04 .............................. 100-100426
  - 1/4” NPTF to AS5202-04 .............................. 100-100427
- Base Station One (USB) ............................. 100-100467FG
- Base Station One (RS-232) ......................... 100-100468FG
- Base Station One (NG) ............................... 100-100961*

For complete product specifications, pricing and accessory information:
Call (716) 759-5800 or visit www.ElectrochemSensing.com

*US Configuration Only

SPECIFICATIONS: Typical for 25°C unless otherwise specified.

PERFORMANCE
- Probe lengths ................................. 25.4 mm (-1), 50.8 mm (-2), custom lengths
- Error band .............................................. ±1°C
- Output format ............................... 32-bit floating point (IEEE754)
- Output rate .............................. up to 480 readings per second

ENVIRONMENTAL
- Operating temperature ............. -40°C to 85°C
- Probe temperature ...................... -100°C to 200°C
- Hazardous locations ................. Class I Division I
  - Groups A, B, C, D, T4

ELECTRICAL
- Battery
  - Type ................................................ Lithium thionyl chloride (Li/SOCI2)
  - Size ............................................... AA (1 required)
  - Voltage ......................................... 3.6 V
- Battery life
  - Standard range ........................... 1 year at 1 minute reporting
  - Extended range ...................... 3 months at 1 minute reporting
- Insulation resistance ................. >100 megohms @ 50 VDC

WIRELESS
- Range
  - Standard
    - Indoor/urban ............................ 30 m
    - Outdoor line-of-sight ... 100 m
  - Extended
    - Indoor/urban ......................... 100 m
    - Outdoor line-of-sight ... 1200 m
- Operating frequency ................ ISM 2.4 GHz
- Agency approvals
  - Standard
    - FCC Part 15.247 .................. OUR-XBEE
    - Industry Canada (IC) .... 4214A-XBEE
    - Europe .................................. ETSI
  - Extended
    - FCC Part 15.247 .................. OUR-XBEEPRO
    - Industry Canada (IC) .... 4214A-XBEEPRO
    - Europe .................................. ETSI

MECHANICAL
- Media ................................................ Gas, liquid
- Wetted parts material ............... 15-5 PH, 316L stainless steel
- Welds ............................................. None
- Port burst pressure ................... 40000 psi
- Port ............................................. AS4395E04 (mates with AS5202-04)
- Weight ......................................... 500 g

All dimensions are shown in millimeters.