DIGITEX
INNOVATIVE SYSTEMS
Distributed System

xSense

EXTERNAL SENSORS DIGITIZER

OVERVIEW

xSense® is a flexible external sensors digitizer unit from Digitex Systems, designed to extend the capabilities of the Sentry System by integrating a wide variety of analog sensors. It enables engineers to capture additional structural and environmental parameters such as displacement, inclination, temperature, humidity, pressure, or wind, complementing accelerometer-based monitoring with broader insights into structural health.

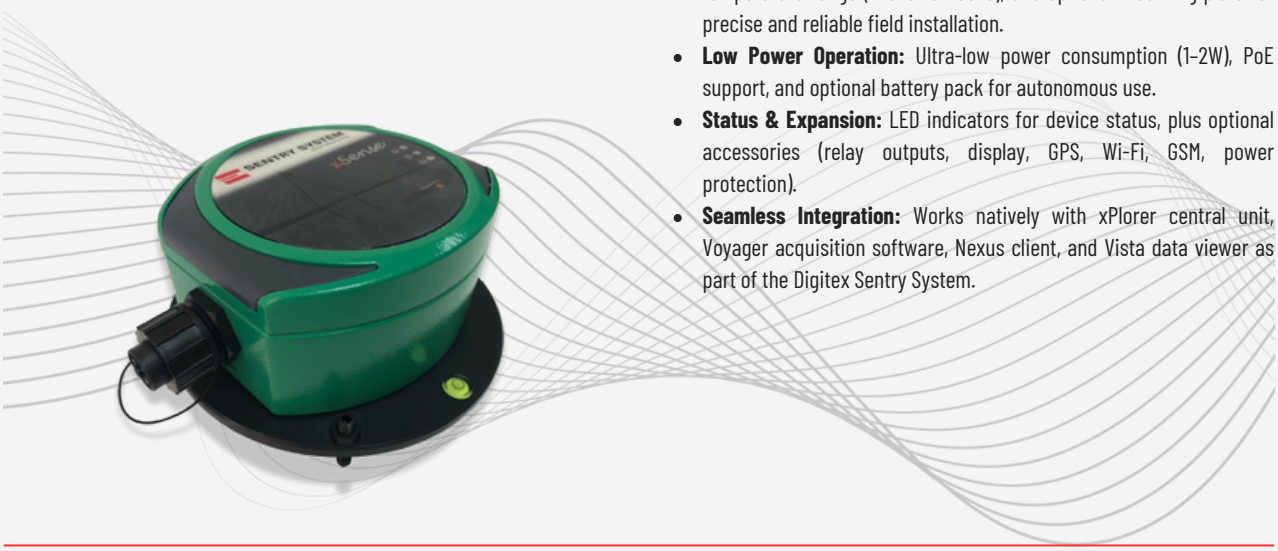
DESCRIPTION

xSense is built on a modular platform that supports different ADC options to accommodate various sensor types. Models include 16-bit ADCs with up to 16 channels, 24-bit ADCs with a mix of voltage and current inputs, and RTD-specific ADCs for temperature sensors (PT100/PT1000). This flexibility makes xSense a universal interface for connecting third-party sensors into Digitex SHM networks.

The unit provides Ethernet connectivity as standard, with optional Wi-Fi, DigiMESH®, and GSM/4G communication modules. Advanced Store&Forward® capability ensures no data is lost during connectivity disruptions, while proprietary Digitex compression and MiniSEED compatibility optimize bandwidth and storage. With GPS or DigiSync® time synchronization, xSense aligns seamlessly with other Sentry System devices, guaranteeing accurate and synchronized measurements across distributed networks.

APPLICATIONS

- Bridges and buildings – displacement, strain, inclination
- Environmental monitoring – temperature, humidity, wind speed and direction
- Pipelines – pressure, corrosion, soil interaction
- Industrial facilities and mines – blast monitoring, air overpressure
- Research projects – integration of custom third-party sensors



KEY FEATURES

- **Versatile Sensor Inputs:** Supports voltage, current, and RTD sensors, making it possible to integrate displacement, inclination, temperature, humidity, wind, pressure, corrosion, and many other analog sensors into SHM projects.
- **Flexible ADC Options:**
  - 16-bit ADC: up to 16 voltage channels (0–5V, 0–10V, ±5V, ±10V)
  - 24-bit ADC: 12 channels, including 4 current inputs (0/4–20mA)
  - RTD ADC: up to 4 channels for PT100/PT1000 temperature sensors
- **Signal Quality**: Built-in anti-aliasing filter, software-programmable input ranges (single-ended or differential), and precision digitization at the source to minimize noise.
- **Communication Options**: Standard Ethernet connectivity with optional Wi-Fi, DigiMESH®, or GSM/4G modules; supports simple CAT5e cabling or fully wireless setups.
- **Advanced Data Handling:** Store&Forward® buffers ensure no data loss during network outages; proprietary Digitex compression and MiniSEED support reduce bandwidth and storage requirements.
- **Configurable Sampling Rates:** User-selectable from 1 SPS to 1000 SPS, adaptable for both slow environmental monitoring and high-rate dynamic measurements.
- **Time Synchronization**: GPS or DigiSync® protocol guarantees sub-millisecond accuracy across all distributed Sentry System devices.
- **Local Storage:** Optional SD/eMMC card for standalone MiniSEED storage with triggered events and pre/post buffers.
- **Device Management:** Embedded web interface for configuration, live data charts, firmware updates (OTA), and file downloads.
- **Rugged Design:** Compact IP67 aluminum enclosure, wide operating temperature range (-40°C to +55°C), and optional mounting plate for precise and reliable field installation.
- **Low Power Operation:** Ultra-low power consumption (1–2W), PoE support, and optional battery pack for autonomous use.
- **Status & Expansion:** LED indicators for device status, plus optional accessories (relay outputs, display, GPS, Wi-Fi, GSM, power protection).
- **Seamless Integration:** Works natively with xPlorer central unit, Voyager acquisition software, Nexus client, and Vista data viewer as part of the Digitex Sentry System.

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SPECIFICATIONS

Sensor

Type: External analog sensor interface supporting voltage-output, current-output, and resistive (RTD) transducer types.

Supported Sensors: Voltage, Current, RTD output

Digitizer

Channels: Up to 16 single-ended or 8 differential analog input channels, software/hardware configurable. Available in 16- or 24-bit resolution. (model dependent)

Resolution: 16-bit SAR or 24--bit Sigma-Delta ADC per channel (model dependent)

Models:
- Voltage-AD: 16-bit Ch: 8DIFF/16SE; 0-5, 0-10, ±5, ±10V;
- Voltage-AD: 24-bit Ch: 4DIFF/8SE; ±10V;
- Current-AD: 24-bit Ch: 4; 0-20mA, 4-20mA;
- RTD-AD: Ch: 4; PT100, PT1000

Sampling Rates: User-selectable from 1 to 1000 samples per second (SPS)

Anti-alias Filter: Integrated anti-aliasing filters

Digital Filter: Software-selectable Butterworth and Chebyshev types; per-channel configurable. (model dependent)

Trigger

Modes: Above Max, Under Min, Over Relative, Over Absolute

Pre-/Post-Event: User configurable

Configuration: Voting logic with user-defined weighting per channel

Interface

Connectivity: Ethernet (10/100 Base-T), Wi-Fi, DigiMESH®, GSM/4G (model dependent)

LED interface: Power, Streaming Type, State of Health, Battery Voltage, and Charging Status

Embedded Web server: Integrated HTTP interface for configuration, data retrieval, real-time visualization, and basic frequency analysis. Provides access to device logs, user actions, diagnostics.

Synchronization

Time Base: GPS-disciplined oscillator or DigiSync® network synchronization protocol

Accuracy: Sub-microsecond (GPS mode) or sub-millisecond (DigiSync® mode) timing precision across networks

Communications & Output

Data Modes: Continuous real-time streaming; user-configurable ON/OFF operation in standalone mode

Protocols: Embedded SeedLink protocol for data redundancy via Nexus application

Internal Storage: Optional 32 GB non-volatile SDHC card.

Operation Mode: Ring Buffer and Triggered Event modes; miniSEED format

Stream Compression DigiWLC®, miniSEED STEIM1 or Uncompressed

Data Reliability: Store&Forward® buffering - retains data during communication loss and automatically forwards upon link restoration, ensuring zero data loss

Power

Supply Voltage: 9 – 28 V DC (typ. 12 V) PoE compatible

Power Consumption: ~ 2.5 W (average)

Backup: Optional Li-Ion battery pack (~12 h autonomy)

Protection: Reverse voltage, over/under voltage, surge protection up to 2 kV DC (optional)

Physical

Dimensions: 130 × 120 × 65 mm (5.12 × 4.72 × 2.56 in)

Weight: 0.7 kg

Enclosure: Rugged coated aluminum housing, IP67 rated

Mounting: 4 × M5 threaded inserts; fasten with M5 screws.

Environmental

Operating Temp.: -20 °C to +60 °C

Humidity: 0 – 100 % RH (non-condensing)

Certification & Calibration

Standards: CE, RoHS, ISO9001, ISO14001

Calibration: Factory calibrated; individual calibration certificate included

Software Updates

Firmware: Over-the-air (OTA) updates via Voyager® or embedded HTTP server

AVAILABLE OPTIONS

SSWiFi: Wi-Fi Communication Module

SSGPS: GPS Module for time and data synchronization

SSGSM: 4G GSM module for streaming and/or SMS alarming

SSPW: Power protection module (2.25KV, 10-36V Input)

SSSDG: SD Memory Module (Non detachable 32GB SD card)

SSBAT: Battery option (12h autonomy)

SSDO: Digital Relay Outputs Module with ext. JB (4, NO/NC)

SSDSP: Informational display (2.8 Inch at the top)

SSPOE: Power Supply: 24VDC; 1A; 24W and POE Injector

BENEFITS

- Expands the range of measurable parameters in SHM projects
- Provides precise digitization at the sensor site, minimizing noise
- Offers flexible sensor connectivity with voltage, current, and RTD options
- Ensures reliable operation in harsh environments with IP67 housing
- Reduces complexity with Ethernet or wireless communication options
- Seamlessly integrates with Voyager, xPlorer, Nexus, and Observer software

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