Sciemetric EDGE 421

125 kS/s 24-bit Analog In, 16-bit Analog Out Module

sciemetric
EDGE

Product Specifications

Simplify data acquisition with this universal sensor I/O module

The Sciemetric EDGE 421 is an ultra-compact data acquisition and control instrument that can work with virtually any type of sensor. Its advanced design simplifies the number of building blocks required for a large variety of applications. The all-in-one system contains its own processor as well as analog and digital functions in an ultra-compact form factor.

Highlights

- On board 32 bit processor with real time operating system
- Stand-alone operation for measurement, control, signature analysis and data storage
- ±1V to ±60V analog input ranges
- 24-bit A/D for high-resolution measurements
- 125 kS/s data collection
- 0-24 VDC, 0-100 mA analog output
- Constant current or constant voltage output
- Function generator (sine, square, ramp, etc.) or arbitrary waveform output
- Galvanically isolated analog I/O for ultimate noise suppression and elimination of ground loops
- Built-in anti-aliasing filter to ensure data integrity

Sciemetric EDGE 421

Compatible with many types of sensors

- Voltage powered transducer
- Voltage powered sensor with current signal (2-wire or 4-wire, 0 - 20 mA, 4 - 20 mA)
- IEPE (ICP™)* constant current source
- RTD (four-wire resistance measurement)
- Resistance (two-wire resistance measurement)
- Current with internal 250 Ω or external shunt resistor
- Bridge sensors

Applications:

- ✔ Discrete manufacturing
- ✔ Process monitoring
- ✔ Condition and machine monitoring
- ✔ Data acquisition and measurement

*ICP is a registered trademark of PCB Piezotronics*

The Sciemetric EDGE platform

Sciemetric EDGE is a universal industrial analytics platform to help you perfect your process in record time. This distributed data analytics system removes barriers to collecting data, driving productivity improvements and cost savings.

The platform performs digital signal processing and signature analysis to offer in-depth insight into the performance, reliability and repeatability of a broad range of applications. Processing, analytics and control functions are remotely configurable, giving you a centralized management of your distributed operations. It provides industrial operations with a sophisticated, exciting, new way to monitor a process, perform real-time pass/fail control, and gain the visibility needed to optimize and control the overall process.

Overview

The Sciemetric EDGE 421 consists of an analog input and output (I/O) section, a high-speed digital section, and an on-board processor. The analog I/O section is galvanically isolated from the rest of the system removing potential ground loops and allowing high-speed low-noise measurements on signals with high common-mode voltage.
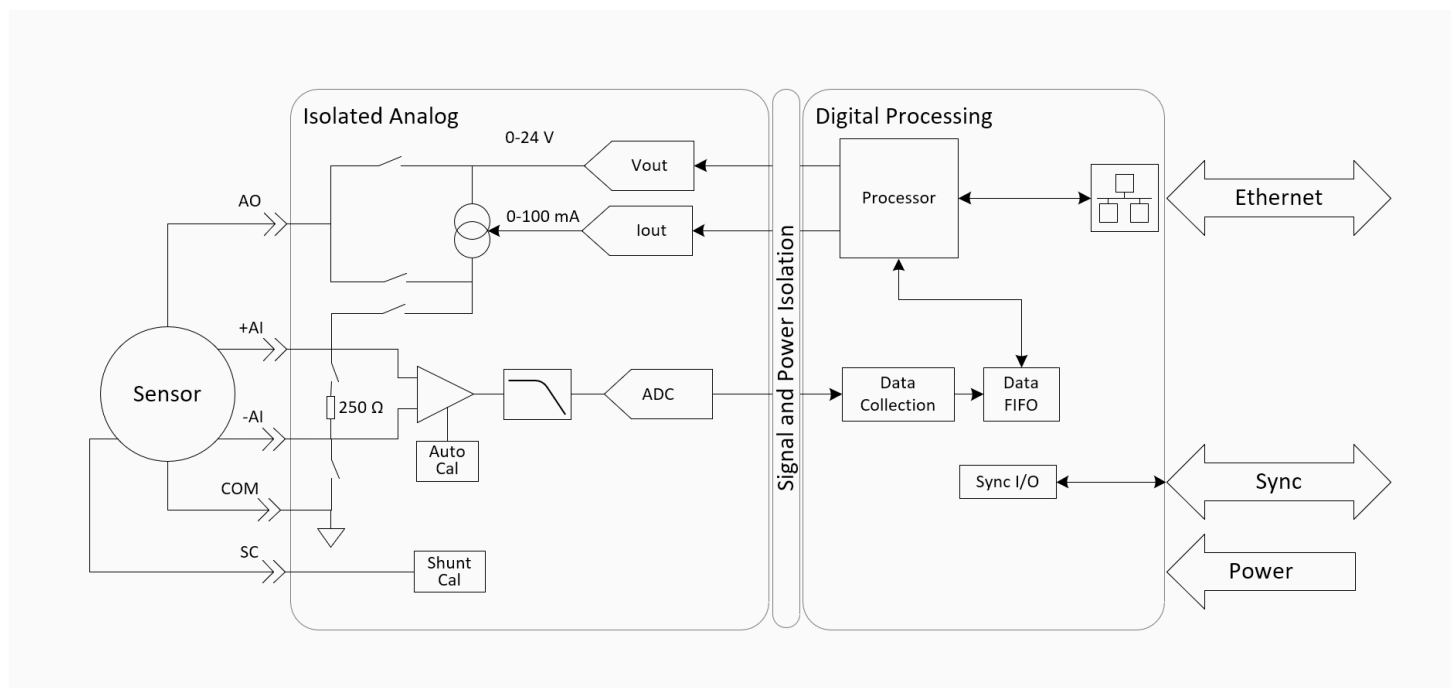
Technical Specifications

GENERAL

- Dimensions (HxWxD): 32 mm x 32 mm x 128 mm
- Connector: M12 5-pin A-code, max pin voltage 60 VDC, 48 VAC
- LED status indicator: Boot sequence, connection status, errors, etc.
- Internal Temperature: 0 °C to 70 °C
- Operating temperature: see carrier datasheet
- Humidity: 10 to 90% RH, non-condensing (IEC 60068-2-56)
- Shock: 150 m/s² (IEC 60068-2-27 table A.2)
- Vibration: IEC 60068-2-65 spectrum A.1 Category 3
- Ingress protection: IP65 when installed, IP20 otherwise
- Fastener screw torque: 2-4 in-lbs
- Pollution degree: 2 max
- Maximum altitude: 2000 m
- Weight: 126 g
- Approvals: CE, cNEMKOus

PROCESSOR

- CPU: 32 bit, 533 MHz
- Real Time Operating System: QNX™
- Storage: 512 MB SSD
- Memory: 512 MB DRAM
- Communications: EtherNet/IP (many types through optional gateway)
- Functions: Any Sciemetric EDGE application, measurement, control, signature analysis and data storage

ANALOG INPUT

- Channels: 1
- Isolation voltage: 60 V
- ADC resolution: 24-bit (± 8,388,608 counts)
- Max sample rate: 125 kS/s
- Input ranges (± FS): ± 60 V, ± 12 V, ± 5 V, ± 1 V
- Accuracy:
  - ±60V / ±12V Range: ±0.1% FS
  - ±5V / ±1V Range: ±0.05% FS
- Dynamic range (at 125 kS/s):
  - ±60V Range: 105 dB
  - ±12V Range: 100 dB
  - ±5V Range: 105 dB
  - ±1V Range: 95 dB
- Input impedance:
  - ±60V / ±12V Range: 2.15 M Ω DIFF, 1.08 MΩ SE
  - ±5V / ±1V Range: >100 M Ω
- Small signal bandwidth (-3 dB)
  - ±60V / ±12V Range: 34 kHz
  - ±5V / ±1V Range: 40 kHz
- CMRR (DC to 60 Hz): 80 dB
- Over voltage protection (TYP): ±75 V
- Pull-up current: see AO current spec
- Input S/W functions: Manchester data stream decoding with zero data value synchronization pulse
- Internal current shunt: 251.3 ± 0.5 Ω resistor for 4 - 20 mA

ANALOG OUTPUT

- Channels: 1
- Output range:
  - Voltage: 0 to 24 VDC
  - Current: 0 to 100 mA
- Default power on state: Off (current and voltage settings set to 0 on power cycle or disconnect)
- DAC resolution: 16-bit (65535 counts)
- Accuracy:
  - Voltage: ± 36 mV
  - Current: ± (40 µA + 0.5% of set point)
- Max output current: 100 mA DC
- Max output power: 1 W
- Short circuit protection: Continuous; 100 ms retry interval for up to 1 second before faulting
- Slew rate: ±1.15 V/µs minimum
- Output type: Voltage or constant current drive
- Output functions:
  - Application control
  - Synchronization bus input value from other modules
  - Function generator (sine, triangle, ramp, square, duty cycle, number of pulses, offset, peak to peak voltage)
- Max voltage setting: Can set max voltage allowed to protect devices
- Isolation voltage: 60 V

SHUNT CALIBRATION

- Contact: Solid state relay, connection to analog common
- Resistance: <3 Ω

INTERNAL CALIBRATION AND DIAGNOSTICS

- Internal measurements:
  - Module input power supply voltage and current
  - Processor supply voltage and current
  - Internal analog supply voltages
  - Internal temperature
- Internal input sources:
  - Ground
 - Precision voltage source

TRIGGERING

Start/End Trigger

- Sources: Immediate, any synchronization bus line, analog input
- Analog trigger range: Full scale of analog input range
- Analog deadband: 0 to full range of input; below trigger value for rising triggers and above trigger value for falling triggers
- Hold-off[1]: positive value
- Sampling offset: Negative values for pre-trigger and positive values for delays after triggering before sampling
- Automatic re-arm: Yes
- Max number of buffers: Total data in memory less than 10,000,000 samples
- Trigger input: Rising or falling edge, or both

[1] The trigger hold-off is the duration that the analog trigger must stay true before a trigger can be issued. The trigger point will be when the hold-off period has completed.

One Tool for Management, Setup and Analysis

Sciemetric Studio offers comprehensive capabilities for monitoring and control of industrial applications. Manage Sciemetric EDGE Systems through discovery, sensor calibration, application deployment, and software updates. Manage applications through configuration of tasks, features, parameters and variants. Leverage continuous improvement through data-driven insight with analytics such as feature, waveform and image trending, correlations and statistical reports.
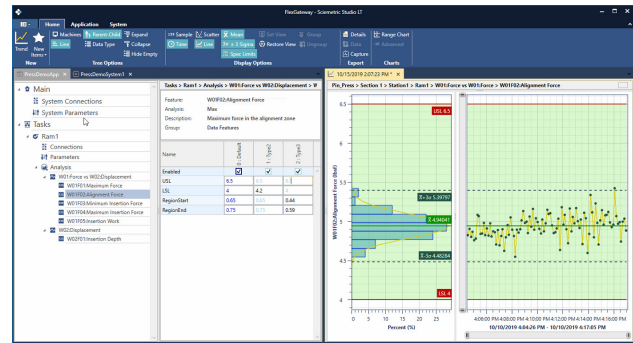
Mounting Information

The Sciemetric EDGE 421 must be installed in a 412 Dual Carrier. Please see the 412 datasheet for additional information and specifications.
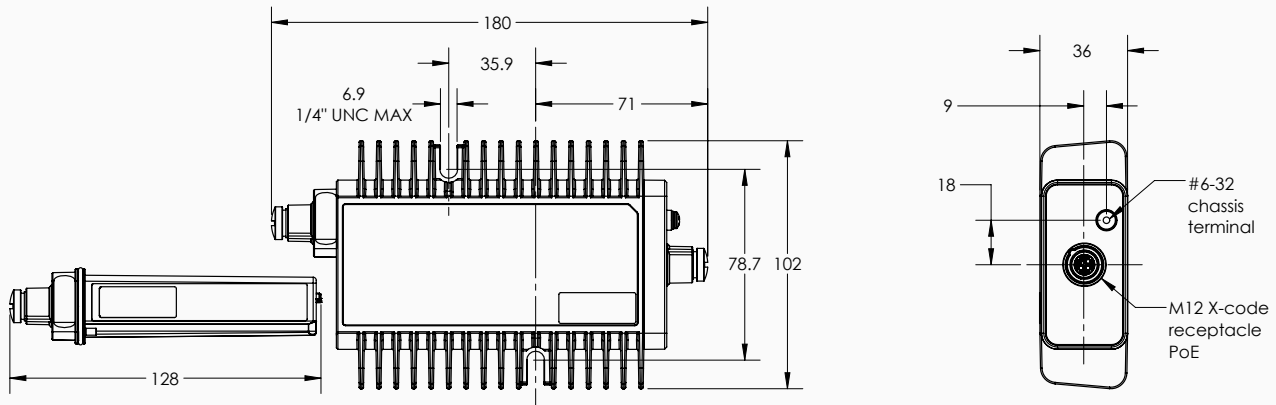
Ordering Information

Products

Item	Part number	
Sciemetric EDGE 421 module	**10400-0421-0M12**	

Accessories

Mounting

Refer to System 400 carrier datasheet(s) for mounting options	

Cables

Item	Part number	
M12 5-pin A-code to Pigtail – 2 m	**10400-AC0B-0002**	
M12 5-pin A-code to Pigtail – 5 m	**10400-AC0B-0005**	
M12 5-pin A-code to Pigtail – 10 m	**10400-AC0B-0010**	

Connectors

Item	Part number	
Male A-code 5-pin – M12 field wire-able	**10400-AX0A-MA05**	

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