sigPOD 1302

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AFFORDABLE PROCESS SIGNATURE VERIFICATION

HIGHLIGHTS

- Breakthrough combination of price, performance and functionality: Sciemetric's trademark process signature verification technology in industry's lowest cost, 2-channel process monitor
- Features high resolution, full color touch-screen display combined with easy-to-use graphical interface (also available without display)
- Flexible system can be quickly configured to monitor virtually any manufacturing process: press, torque, weld, crimp, dispense, sound and vibration, profiling, functional testing

BENEFITS

- Every unit comes pre-loaded with Sciemetric's industry-leading PSV™ technology for process signature analysis, providing the most accurate defect detection and monitoring possible
- Intuitive, point-and-click interface enables rapid setup with standard templates for common applications
- sigPOD versatility allows consolidation of monitoring infrastructure to a single product family across all applications — simplifies training, commissioning and management (i.e.: spares, repairs, maintenance)
- Multiple connectivity options simplify integration with station controllers and data networks
- Connection to manufacturing execution software and analytical databases such as Sciemetric's QualityWorX software enables remote monitoring of quality data

FEATURES

Quick and Easy Setup

- Universally applicable software pre-loaded with standard templates
- Custom applications quickly configured using menu-driven interface—no programming required!

Powerful Analysis Software

- Detailed waveform analysis with extensive library of processing options
- Comprehensive statistical toolset for SPC monitoring and control

Intuitive User Interface

- Large 8", high resolution, full color touch-screen display
- Easy-to-use graphical interface features simple and intuitive operator displays
- Common software and hardware platform provides unified look & feel across entire sigPOD family

Unmatched Data Collection

- 2 high speed 16 bit analog channels
- Built-in precision sensor excitation
- Encoder input for linear or rotary scales

Easy Mounting Options

- Compact industrial form factor is easily installed in a panel cut-out, DIN rail or machine/wall/desktop mounted
- Modular terminal connector plugs for analog and digital I/O connections simplify installation and wiring

Detailed Data Management

- Extensive graphing capabilities: waveforms, histograms, trend charts
- SPC analysis and reporting
- Statistically learned test limits
- Local and remote storage of results

Simple Connectivity

- Communication with station controller via discrete I/O, Ethernet/IP or Modbus TCP
- Ethernet 10/100 Base-T

TORQUE TO TURN

CRIMPING

SOUND & VIBRATION

WELD

DISPENSE MONITORING

PRESS FITTING

PROFILING

FUNCTIONAL TESTING

APPLICATION OVERVIEW

The sigPOD 1302 is a low cost, compact 2-channel monitoring solution suitable for a wide range of manufacturing processes, such as torque, press, weld, vibration, dispense, etc. Featuring Sciemetric's advanced PSV™ software for data collection and analysis, the sigPOD 1302 measures and analyses the data from an external sensor, determines pass/fail, provides local storage, and reports on the results.

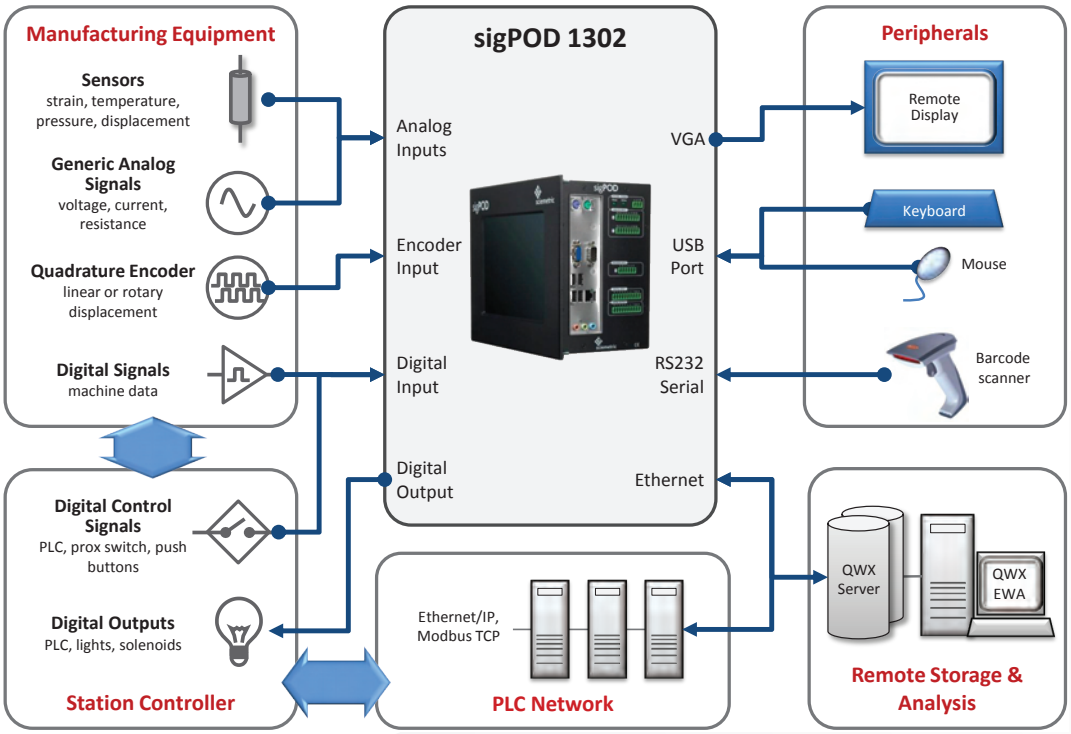
HARDWARE

A block diagram of how the sigPOD 1302 integrates into a production monitoring application is shown in figure 1 below. The sigPOD 1302 collects data from sensors that are integrated into the manufacturing station, monitoring parameters such as position, temperature, pressure, force, acceleration, etc. It can also monitor signals directly generated by the manufacturing equipment itself, such as voltage or current. Both analog channels offer the flexibility of accepting differential input signals and independently controlled measurement ranges, and feature a precision excitation source to power the sensor if necessary. An encoder input is provided to simultaneously measure angular or linear position, such as the rotary position of a crankshaft or linear displacement of a press ram. 8 digital I/Os are supplied, some of which are dedicated to handshaking communications with the station controller, with the remainder available for monitoring digital signals provided by the manufacturing hardware or other test equipment.

SOFTWARE

Once the process data has been collected, it can be stored, manipulated and analyzed by the powerful PSV™ software that comes with the 1302. This versatile software comes with templates for some common applications, such as Press, Torque and NVH (Noise, Vibration and Harshness) and can be quickly customized to suit virtually any process. Results can be instantly communicated to the station controller to provide go/no go feedback in a fully automated environment. Data can be viewed and manipulated directly at the stand on the high resolution touch-screen display, or uploaded via Ethernet to a data network for storage and analysis in an analytical database, such as Sciemetric's QualityWorX. This makes it possible to remotely monitor manufacturing and quality data from the desktop.

Figure 1: Schematic block diagram of system implementation



PSV — UNMATCHED DEFECT DETECTION

Sciemetric's PSV™ software provides the most powerful, flexible, easy-to-use technology for monitoring and controlling manufacturing processes. Based on a scientific analysis of the process waveform, it dramatically improves the accuracy of defect detection, resulting in reliable pass or fail decision making. In addition, the detailed data provides valuable information for reporting, defect analysis, and yield improvement.

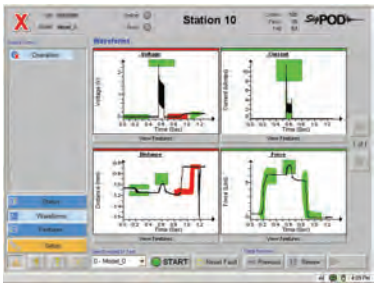
INTUITIVE INTERFACE

The sigPOD 1302 offers an intuitive, simple interface to allow the user to analyse and view test information. High level operator status screens allow operators to quickly assess the status of the manufacturing process, while more detailed results and graphs are available for engineers to 'drill down' right at the test station. Graphs can be made to full screen, panned and zoomed for more thorough analysis of the results. A simple backup and restore interface allows users to create system or data backups in seconds.

FLEXIBLE TEST SETUP

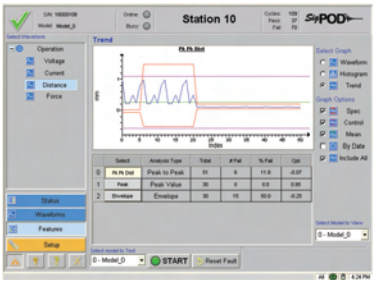
Each sigPOD 1302 comes with pre-programmed templates corresponding to some of the most common manufacturing applications, making setup quick and easy. The PSV™ software also offers an unmatched flexibility that can be tailored to virtually any process. It has the ability to store setups for up to 16 different models of the manufactured part, each of which can be customized to match the specific process parameters particular to that variant. For each model, up to 10 different operations

or steps can be monitored. For instance, a press system may require that the parts are measured before, during and after insertion in the press. PSV™ software could accommodate this by simply assigning a separate operation to each of the three measurements, acting as if it were three independent monitoring devices. Within each operation, PSV™ can support up to 10 waveform definitions, where sensor data is evaluated against time, position, or any other data that was captured during the process (eg: force vs. displacement or voltage vs. time).



POWERFUL PROCESSING AND ANALYTICS

Pre-processing can be applied to the collected sensor data to exploit or isolate pertinent features in the data. In all there are 18 analytical processes available, ranging from simple removal of a DC component or the application of high or low-pass filters, to derivatives, integrals, and FFT analysis. Up to 10 processes can be cascaded and applied to generate each waveform from sensor datasets, permitting isolation of the defect signature even in the most complex of circumstances. Specific features can then be extracted from the processed data for evaluating the quality of the manufacturing process. For instance, simple parameters such as min, max or mean values, or more complex parameters such as cusp value/location or total harmonic distortion, can all be automatically extracted from the waveform and tested against user-defined limits. In all there are 27 powerful feature checks available to evaluate the process data. In addition, envelopes can be generated from production curves to create a statistical template, against which a complex waveform can be evaluated quickly and easily. Finally, a unique feature allows the user to instantly view the results of new or updated algorithms using previously saved data. This streamlines the setup and commissioning process by eliminating the need for re-testing production parts to evaluate the outcome of process or limit changes.



DATA MANAGEMENT AND REPORTING

Comprehensive SPC reporting and plotting capabilities enable a user to easily track test results and make informed decisions. A unique feature allows test limits to be derived from the statistical control limits, allowing test limits to be learned statistically. Thousands of production cycles can be stored locally, providing traceability of recent production directly at the test station. Data can be reviewed even while continuing to monitor production. All data, including waveforms, can be uploaded to a remote storage and traceability solution such as Sciemetric's QualityWorX, which also provides detailed signature analysis in addition to extensive reporting and complete part traceability.

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TECHNICAL SPECIFICATIONS

Power
- **Supply Voltage:** 24 VDC (22 to 28 VDC)
- **Power Consumption:** 30 W maximum, 20 W typical

Processor
- **System Memory:** 1 GB RAM
- **Data Memory:** Min 40 GB HD
- **Ethernet:** 1
- **USB:** 4 Ports (V 2.0)
- **RS232:** 1
- **Monitor:** SVGA Connector
- **Keyboard/Mouse:** PS2

General
- **Operating Temperature:** 5 to 45 ˚C
- **Environment:**
  Model 1302 panel mounted: IP65 (NEMA 12)
  Model 1302 or 1302T not panel mounted: IP30
- **Paint Finish:** Black backed powder
- **Industrial Networks:** Ethernet/IP, Modbus TCP

Digital Inputs
- **Number of Channels:** 8 with common return line
- **Polarity:** Bidirectional
- **Isolation Voltage:** ±120 V (Optically isolated)
- **Input current:** Less than 2.3 mA
- **Input for low state:** 8 VDC maximum
- **Input for high state:** 16 VDC minimum
- **Maximum input Voltage:** ±48 VDC
- **Switching speed:** 2 msec

Analog Input
- **Number of Channels:** 2
- **Input Ranges:**±10V, ±5V, ±1V, ±200 mV
- **Input Accuracy:**
  0.02% for 1 V range and higher, 0.05% for 200 mV range
- **Resolution:** 16 bit A/D, ±32,768 counts
- **Maximum Sample Rate:** 250 kS/s
- **Input Impedance:** 10 GΩ in parallel with 100 pF (820 Ω no power)
- **Small Signal Bandwidth:**
  700 kHz (no anti-aliasing filters)
- **Cross Talk:** 75 dB adjacent channels
- **CMRR:** 92 dB
- **Maximum working voltage:** ±11 VDC
- **Overload Protection:** ±25 V for one channel powered and ±15 V when off

Analog Excitation
- **Excitation Voltage:** +10 VDC
- **Maximum Current:** 100 mA per channel
- **Accuracy:** ±0.02 %
- **Maximum Noise:** 100 µV
- **Short Circuit Protection:** Continuous

Digital Outputs
- **Number of Channels:** 8 with common return line
- **Polarity:** Bidirectional
- **Isolation Voltage:** ±120 V (Optically isolated)
- **Switching Capability:** ±1 A @ ±48 VAC peak or DC
- **Contact Resistance:** > 100 MΩ off, <0.5 Ω on
- **Power On State:** All Off
- **Switching speed:** 8 msec

Encoder Input
- **Number of Channels:** 1
- **Sensors:** Rotary encoders and linear scales
- **Input Voltage:** 5 V TTL or OC (Open Collector)
- **Signal Type:** Quadrature or Single Phase
- **Max Frequency:**
  10 MHz TTL, 50 kHz Open Collector
- **Counter:** 32 bit (±2 x 10^9 counts)
- **Input Protection:** +24 VDC or -18 VDC without damage
- **Sensor Power:** +5 VDC @ 150 mA, current limited

Test
- **Models / Recipes:** 16
- **Operations per model:** 10
- **Waveforms per operation:** 10
- **Processes per Waveform:** 10
- **Features per waveform:** 10
- **Signal processes:** Band pass filter, clipper, derivative, extract, FFT, high pass filter, integral, knock detection, linear, low pass filter, min & max track, notch filter, pop noise filter, remove DC, remove idle data, remove reversed data, running RMS, smoother, Synchronous average and waveform math
- **Features:** area, envelope, mean, median, minimum value and location, peak value / location, peak to peak, peak/RMS, power sum, RMS, slope, total harmonic distortion, knee value / location, cusp value / location, number of points, rise / fall time, standard deviation, threshold count or crossing, waveform length, get Y at X

1302 MODELS

Model Number	**1302**	**1302T**
Part Number	10500-1302-0H00	10500-1302-TH00
Display	External optional	8″TFT, 800 x 600 pixels
Dimensions (H x W x D)	8″x 4.5″x 8″	8″x 9.4″x 5.2″

ABOUT SCIEMETRIC INSTRUMENTS

Since 1981, Sciemetric's process monitoring and quality management systems and software have enabled some of the world's leading automotive, medical and industrial manufacturers to gain visibility into and control over their manufacturing processes. On the production floor, Process Signature Verification (PSV™) technology provides the most accurate determination of process health and part quality while collecting all data. Manufacturing managers use Sciemetric's analytic tools to transform the data into actionable information to reduce costs, manage quality, and maximize yield while providing proof of process compliance and complete line-wide traceability.

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