sigPOD PRESS

sciemetric

ASSEMBLY PRESS-FIT MONITORING SYSTEM

BENEFITS

- Enhanced defect detection
- Built-in diagnostics for press machinery
- Quicker setup and easier maintenance than competitive systems
- Lowest monitoring cost per ram in the industry
- Multiple channel system can monitor up to 4 rams
- Setup wizard allows configuration within minutes
- Collect, graphically view and analyze data from up to 4 rams simultaneously using intuitive, operator friendly interfaces
- Integrated touch screen option with easy machine mount and panel mount

FEATURES

Software
- Industry's best software for assembly and press-fit monitoring
- Exceptional color display, graphics, menu system, setup wizard

Packaging
- Compact industrial hardware can be installed in a panel cutout, DIN rail mounted or machine/wall/desktop mounted
- NEMA 12 (IP 67) models also available
- Modular terminal connector plugs for Analog and Digital I/O connections simplify installation and wiring

Quick and Easy Setup
- Out-of-the-box functionality in standalone or networked operation
- 32 model types
- Setup wizard makes it easy to configure in a matter of minutes
- Unmatched Data Collection
- Up to 8 analog channels, 16 bit A/D
- Up to 4 encoder input channels

Intuitive User Interface
- Simple and intuitive operator displays
- Touch screen navigation option
- Operator, engineer and supervisor accounts with password security

Multiple Data Views
- Status: see part test status (pass or fail)
- Curves: view data curves (e.g. Force vs. Distance) with overlaid limits
- Histogram: see Statistical Process Control (SPC) data for test cycle
- Trend: view trends from multiple tests
- History: review thousands of test cycles and part history records
- Limits: view current limits

Detailed Data Management and Reporting
- Local & remote storage of test results organized by model, part, ram, etc.
- SPC reporting
- Wide range of analysis features available
- Statistically learned test limits

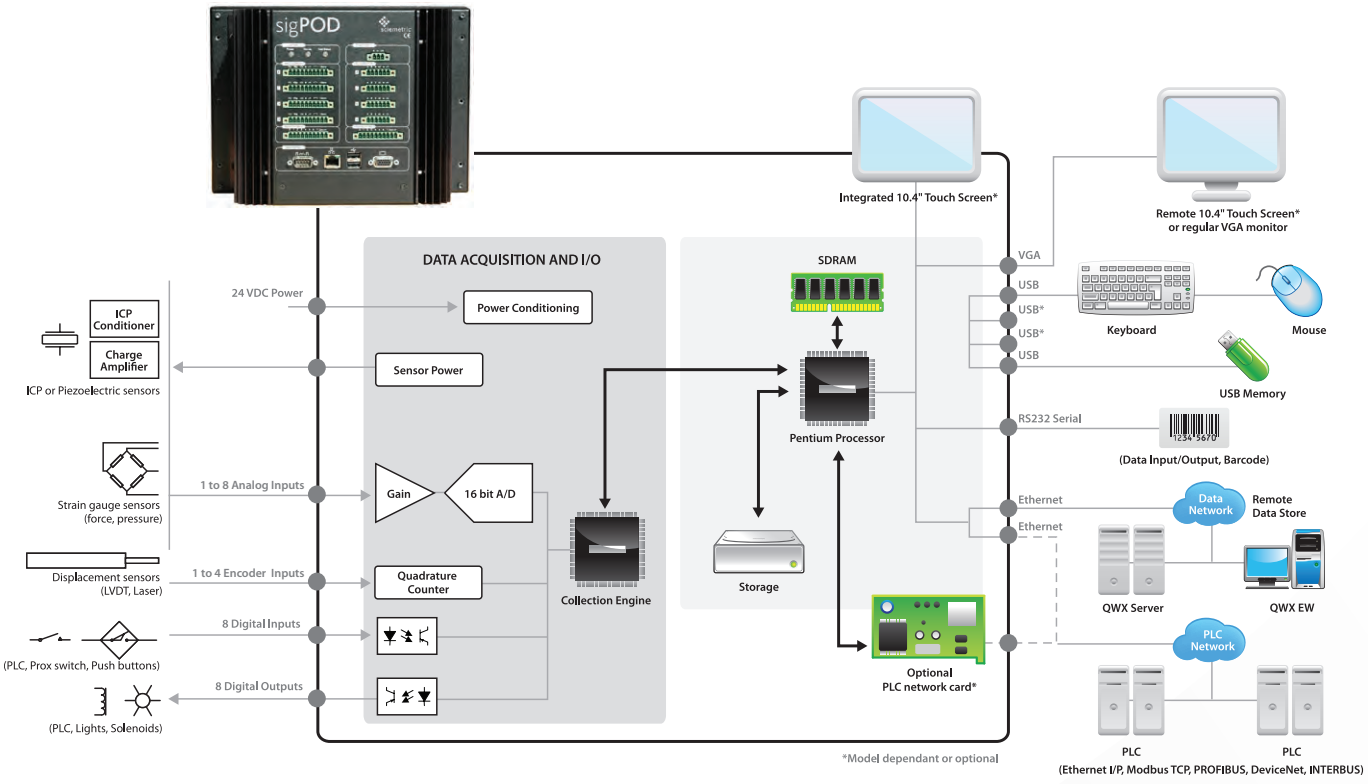
Connectivity
- Communication with station controller via discrete I/O
- Optional fieldbus support for communication through industry standard hardware (RS232, RS485, 10/100 BaseT) and protocols (PROFINET, Devicenet[1], PROFIBUS[1], EtherNet I/P, Modbus TCP)

Applications
Designed to be used with any mechanical press:
- Hydraulic
- Servo
- Air pressure
- Air over oil

OVERVIEW

sigPOD Press is designed to monitor assembly press operations and provide real-time analysis of the data to identify defective parts, faulty press machinery, and out of control assembly processes. It measures force vs. time or force vs. distance signatures for each part cycle, and then analyzes the curve(s) in milliseconds to provide an instant pass/fail output for each press ram. Compatible with almost all load cell and distance sensors, sigPOD Press is available in single ram or multiple ram configurations, and can be networked together to provide higher level insight into assembly processes by collecting data across the entire assembly line. The standard sigPOD Press can support traditional hydraulic ram press systems, servo motor based presses, air pressure or air-over-oil systems, crimping machines, and almost any other mechanical operation that exhibits a force-distance signature.

sigPOD Press provides extensive hardware and software functions for part test, analysis and data connectivity:



UNMATCHED DEFECT DETECTION

At the heart of sigPOD Press is Sciemetric's Process Signature Verification (PSV), the most advanced yet easiest to use signature analysis technology available to monitor and control manufacturing processes. PSV is based on a scientific analysis of each press waveform, which dramatically improves the accuracy of defect detection resulting in reliable pass or fail decision making. The data collected by sigPOD Press also provides important information for reporting, analysis and yield improvement.

EASE OF SETUP

After a simple 15 minute setup, the sigPOD Press is ready to go. The first time you start up the sigPOD Press, the system begins the Setup Wizard which provides an automated step-by-step walk through to quickly configure the system to your needs. You can return to the Wizard at any time to make changes. For each step, the Wizard provides both a testing mode and an adjustment mode to ensure that the configuration exactly matches the individual ram characteristics of the press machines.

sigPOD Press supports handshaking with the press controller over industry standard networks (Fieldbus, Ethernet/IP). Press type (press to a hard stop or press to a preset depth) and Rapping operation are automatically managed during handshake. Handshake is configurable for both interlock and non-interlock mode, allowing sigPOD Press to work in environments where only minimal handshake information is available from the press controller.

MULTIPLE GRAPHICAL DATA VIEWS

The sigPOD Press screens display system information, show test results in tables and graphs, and provide icon-based buttons to navigate quickly and easily from one test and assembly monitoring function to another. The user level determines the information displayed and the menu choices available: sigPOD Press provides operator, engineer, and supervisor user accounts to control access to system critical functions such as calibration, limit management, and system maintenance.

Multiple ways to view the press data ensures that operators and engineers can immediately detect any problems and take action. sigPOD Press provides multiple 'features' that can be toggled as graphical overlays on the press data to highlight and track trends. Sample features include Insertion Force limits, Insertion Depth limits and Alignment Force. Features can be overlaid on to live data or on any previously collected historical data. During press operation, the operator can choose to graphically view only the current part being manufactured or a composite of all parts built during a production cycle.

The following screen snapshots highlight the various views of sigPOD Press:

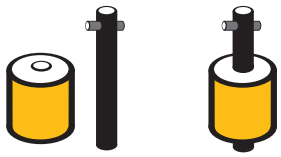
Defects Detected

Identify product abnormalities:

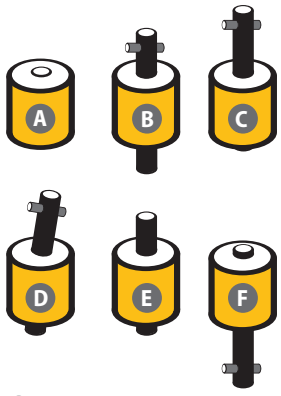
- Wrong orientation (e.g. backwards)
- Cracked parts
- Over or under size parts
- Tolerance stack-up
- Not fully inserted

Identify machining or process abnormalities:

- Bad machine alignment
- Improper lubrication
- Wrong ram speed (time based collections)
- Loose fixtures
- Damaged seals
- Low hydraulic pressure
- Binding



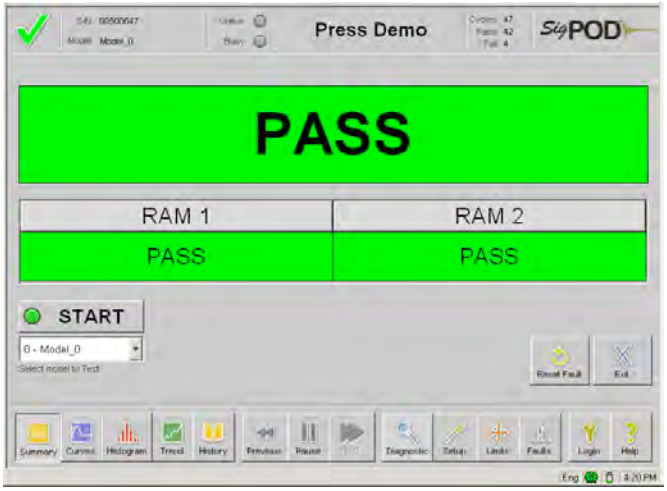
PARTS CORRECT ASSEMBLY



- A Missing part
- B Excessive distance
- C Insufficient distance
- D Incorrect insertion
- E Incorrect part
- F Incorrect orientation

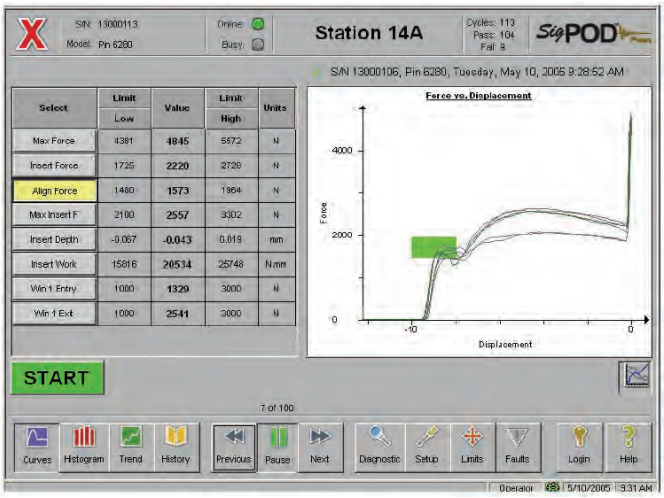
STATUS VIEW

High level status screen allows operator and supervisors to quickly assess the part test status. The top banner indicates the overall part status, serial number, model, key system outputs, and cycle statistics and is available on all screens. The overall test status and the status for each press ram are indicated with large status indicators. A system fault can be reset from this screen and with the right login access the user can exit the application.



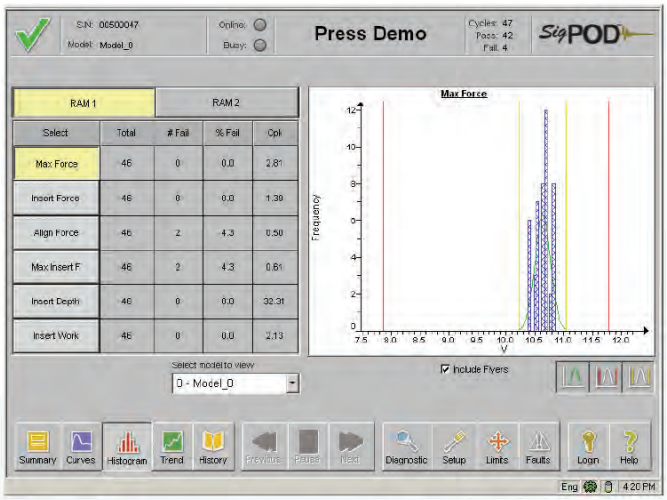
CURVES VIEW

Allows the user to review features and curve data for each press ram and provides a list of features with their limits, values, and units. The feature value and the exceeded limit are indicated in red if the feature failed for easy recognition of the failure condition. The current feature is highlighted in the feature list and the graph indicates the range and limits for that highlighted feature. The user can select the desired press ram above the feature table and view its features and curve. Data can be viewed as Force vs. displacement, Force vs. Time or Displacement vs. Time.



HISTOGRAM VIEW

Review of individual feature value distributions through a histogram view. Indicators for the nominal curve, specification limits, and control limits are selectable by the user. Histogram table indicates features with Statistical Process Control (SPC) statistics including total number of entries, number of failed parts, percentage of failed parts, and Cpk values.

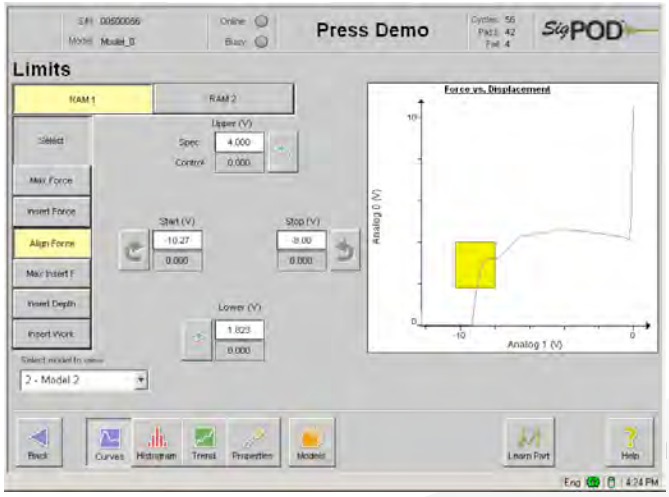


TREND VIEW

Review of trend data for each feature. Indication of nominal curve, specification limits, and control limits. Trend table indicates features with SPC statistics including total number of entries, number of failed parts, percentage of failed parts, and Cpk values.

HISTORY VIEW

Each test cycle results in a test record that includes feature values, limits and the collected curves. sigPOD Press can store thousands of these records locally for review purposes. When a test record is selected the curves screen is loaded with the selected test record data and placed in pause mode for review.



SETTING LIMITS

There are multiple views for viewing limits: curves, histogram, trend, properties, and models.

LOAD CELLS AND DISTANCE SENSORS

sigPOD press can work with almost any type of load cell and distance sensor available. It is recommended that all press-fit operations be characterized by measuring the complete force-distance signature since this results in greater reliability, but if this is not practical, sigPOD Press can also monitor force-time signatures.

Load Cells – sigPOD supports both unamplified and amplified strain gage sensors, normal DC voltage sensors, mA sensors, piezoelectric sensors, and more. For strain gages, sigPOD Press has a built-in instrumentation amplifier with precision DC excitation so wiring is very simple: just connect the 4 wires of the load cell directly to the POD and set the amplifier gain and calibration in software.

sigPOD Press also supports two types of piezo sensors: direct charge amplified load cells and ICP sensors. In both piezo cases, a compact signal conditioner is available which plugs into each sigPOD analog channel and provides a BNC connector ready for the sensor.

Distance Sensors – sigPOD Press can work with most displacement sensors including encoder type (linear or rotary), DC LVDTs, voltage potentiometers, mA output sensors, and more. If AC LVDTs are to be used, an external signal conditioner will be required.

- The encoder inputs can be configured to monitor a single phase pulse (counter mode), or a two phase A-B pulse to track direction (quadrature mode). Each encoder channel provides a 5 volt source to power the sensor, and has input overload protection to protect the channel from wiring faults or other failures. The encoder inputs can be used to measure linear displacement data such as with a SONY DL probe.

AUTOMATIC LIMIT MANAGEMENT & SPC

During installation, the Setup Wizard automatically 'learns' the initial press control limits and allows the operator to manually adjust them as needed. As production parts are measured, sigPOD Press continuously captures statistics and calculates the optimal test limits. When reviewing production details, the operator can then choose to enable these proposed control limits, ensuring that optimum yield is achieved. Advanced limit management results in fewer false failures than any other press-fit monitoring solution.

DATA COLLECTION, STORAGE AND TRANSFER

In standalone mode, sigPOD Press will reliably capture to local storage all part test data including model, part and press process signatures. When the local storage reaches a configurable threshold limit, the operator is notified (via screen alert and email) that data needs to be backed up. A one-button press backup will copy test data to USB key and clean the system for the next press operation.

Compatible with three main types of load cells:

- **Strain gage**
- **Piezo ICP**
- **Piezo charge amplifier**

HANDSHAKING & COMMUNICATION

SigPOD Press is equipped to communicate over simple discrete I/O, or as an option, with one of today's most common industry standard protocols. Multiple communication hardware options include RS232 serial and 10/100 Base T Ethernet, depending on hardware model.

Supported communication protocols include:

- Devicenet[1]
- Profibus[1]
- Interbus[1]
- Ethernet I/P

Serial numbers can be received via these interfaces so the test results can be made traceable. Numeric test results can also be transmitted via Ethernet I/P or serial output in simple ASCII format, allowing data integration with the most MES or ERP systems.

1 Selected fieldbus available on sigPOD 12xx systems only.

TECHNICAL SPECIFICATIONS

Power
- **Supply Voltage:** 24 VDC (18 VDC minimum, 36 VDC maximum)
- **Power Adapter Input:** 100 – 240 VAC RMS at 50Hz, 1.5 A
- **Power Consumption:** 48 W maximum, 30 W typical

Processor
- **System Memory:** 1 GB RAM
- **Data Memory:** 40 GB SDD minimum
- **Ethernet:** 1 or 2 (see chart)
- **USB:** 2
- **RS232:** 1
- **Monitor:** SVGA Connector
- **Keyboard/Mouse:** USB

General
- **Operating Temperature:** 5 to 40 ˚C (41 to 104 ˚F)
- **Operating Humidity:** 8% - 90%
- **Environment:** NEMA 12 (IP 52) Model 12xx only
- **Paint Finish:** Black backed powder

Press Configuration
- **Number of rams:** 1 to 4 simultaneous. Options available for more rams (e.g. 32 simultaneous)
- **Number of models:** Up to 32 unique press configurations
- **Ram displacement types:** Analog sensor, Digital encoder, Time
- **Force sensor:** Amplified (powered) or unamplified (not powered)
- **Models/recipes:** 32
- **Typical analysis time:** <100 ms (dependent upon complexity of analysis)
- **Response to trigger:** <50 ms

Learn Mode
- Automatic learning of Set Contact zone, Alignment Zone, Insertion Zone
- Graphically Adjust zones using left/right buttons
- Automatic learning of Limits: Max Force, Insert Force, Align Force, Insertion Force, Insertion Depth, Insertion Work
- Adjust Limits as needed after learn

Setup Check
- **Shunt calibration:** If enabled, set % Full Scale, Raw value (Volts) and Tolerance (% Full Scale)
- **Handshaking:**
  Press to hard stop, Press to preset depth, Ignore Rapping operation;
  Standard handshake (interlocked to PLC) or Minimized handshake (non-interlocked to PLC)
- **Handshake check**
- **Fieldbus interfaces:** PROFINET, PROFIBUS, DeviceNet, EtherNet/IP

SSR Inputs
- **Number of Channels:** 8
- **Characteristics:** optically isolated, common lead, bi-directional
- **Power states:** 16 VDC on, 8 VDC off

SSR Outputs
- **Number of Channels:** 8
- **Characteristics:** SPST, optically isolated, normally open, bi-directional
- **Power states:** switch ±60 VDC or 40 VAC at 1A 16 VDC on, 8 VDC off

Analog Input
- **Number of Channels:** 2, 4
- **Input Ranges:** See model chart
- **Input Accuracy:**
  ±0.02% for ±1 V range and greater;
  ±0.05% for ranges less than 1 V
- **Resolution:** 16 bit A/D, ±32,768 counts
- **Maximum Sample Rate:** 10 kHz
- **Input Impedance:** 10 Gohms in parallel with 100 pF (820 Ohms no power)
- **Cross Talk:** 75 dB adjacent channels, 90 dB non-adjacent channels
- **CMRR:** (DC to 60 Hz)
  75 dB (Model 12xx)
  92 dB (Model 1302)
  100 dB (Model 1508)
- **Overload Protection:** ±25 V for up to 2 channels powered and ±15 V when off

Analog Excitation
- **Excitation Voltage:** +10 VDC
- **Maximum Current:** 100 mA per channel
- **Accuracy:** ±0.1 %
- **Maximum Noise:** 100 µV
- **Short Circuit Protection:** Continuous

Encoder Input
- **Number of Channels:** See model chart (2 or 4)
- **Sensors:** Rotary encoders and linear scales
- **Input Voltage:** 5 V TTL
- **Signal Type:** Quadrature or single phase
- **Max Input Frequency:** 10 MHz TTL, 50 kHz Open Collector
- **Counter:** 32 bit (±2 x 10^9 counts)
- **Input Protection:** +24 V or -18 V without damage
- **Sensor Power:** +5 VDC @ 150 mA, current limited

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 V
- **Switching speed:** 2 msec

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

SIGPOD PRESS MODELS

1202/04

NEW! 1302

1508

	1202/04	NEW! 1302	1508
Analog In	2 / 4	2	8
Analog Range	±10, 2, 0.1, 0.033 V	±10, 5, 1, 0.2 V	±10, 5, 2, 1, 0.5, 0.2, 0.1 V
Encoder In	2/4	1	2
Digital I/O	8 In / 8 Out	8 In / 8 Out	8 In / 8 Out
Processor	650 MHz	1.6 GHz	1.6 GHz
Memory	512 MB	1 GB	1 GB
HD	60 GB	40 GB	120 GB
USB	2 V1.0	4 V2.0	4 V2.0
Ethernet	1	1	2
Industrial Networks (optional)	Ethernet I/P Modbus TCP Profibus DeviceNet Interbus	Ethernet I/P Modbus TCP	Ethernet I/P Modbus TCP
Operating System	XP Embedded	XP Embedded	XP Embedded
Size Inch (mm)	7.5 x 9.66 x 4.2 (199 x 241 x 107)	8 x 4.5 x 8 (203 x 114 x 203)	8 x 6.5 x 8 (203 x 165 x 203)
NEMA 12 (IP 52)	✓	-	-

MOUNTING OPTIONS

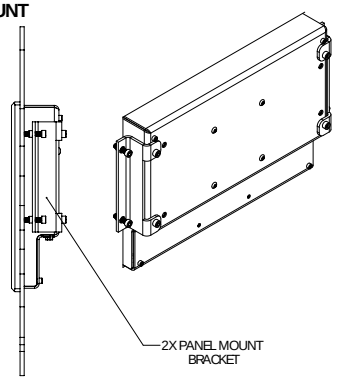
	1202/04	1302	1508	1608 Expander
MACHINE MOUNT	✓			
PANEL MOUNT	✓	✓		
WALL MOUNT		✓	✓	✓
DIN RAIL		✓	✓	✓

sigPOD offers a range of mounting options. See the following pages for more information.

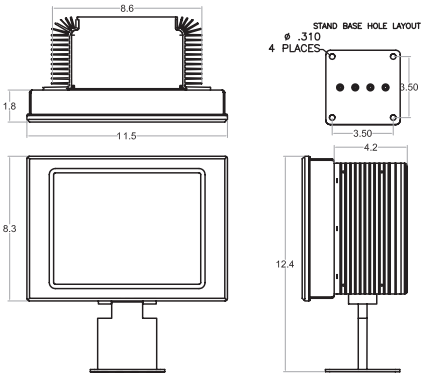
10.4" TOUCHSCREEN

12XX MODELS

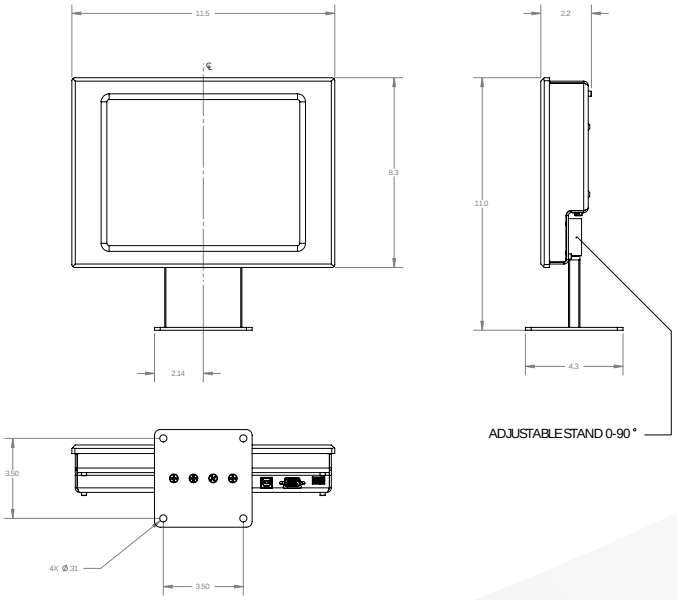
PANEL MOUNT



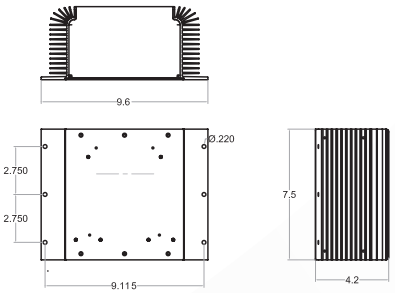
SIGPOD MACHINE MOUNT WITH DISPLAY



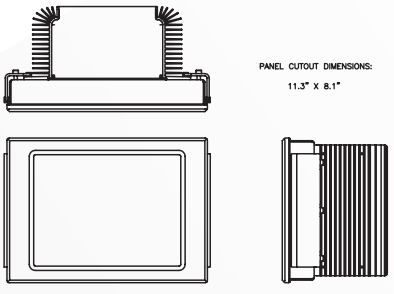
MACHINE MOUNT



SIGPOD MACHINE MOUNT WITHOUT DISPLAY



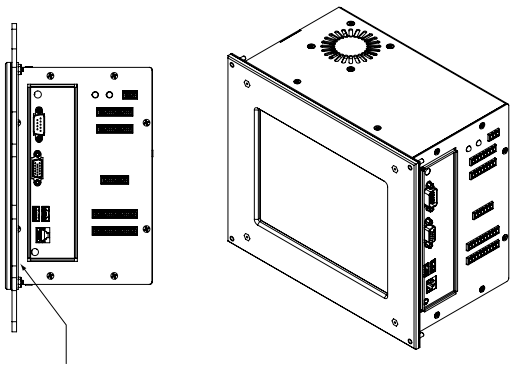
SIGPOD PANEL MOUNT



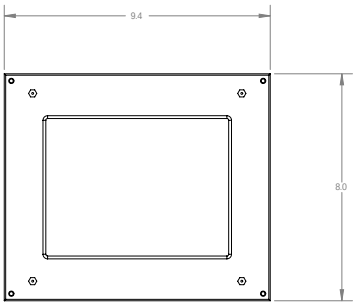
MOUNTING OPTIONS

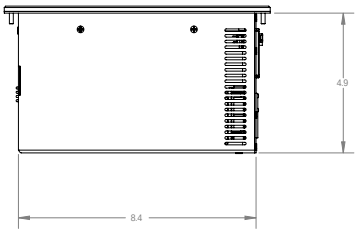
1302 AND 1608 MODELS

PANEL MOUNT (1302 with integrated monitor only)

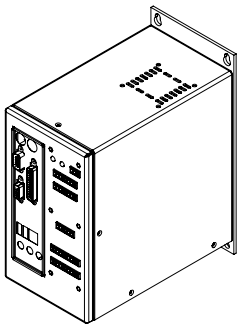


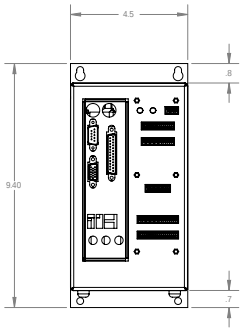
2X PANEL MOUNT BRACKET

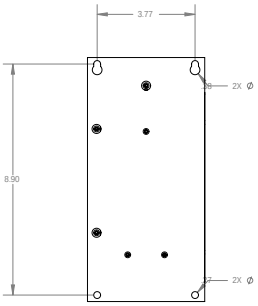




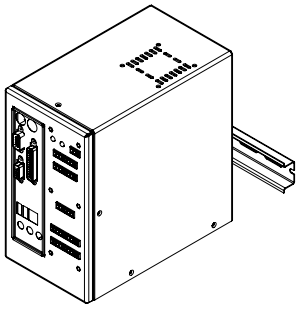
WALL MOUNT

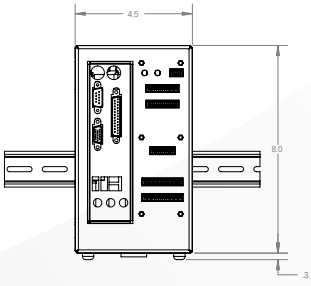


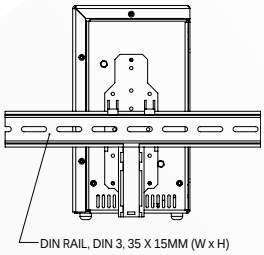




DIN RAIL MOUNT



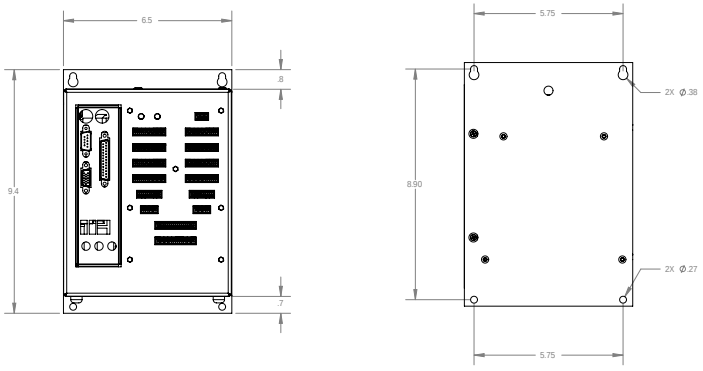


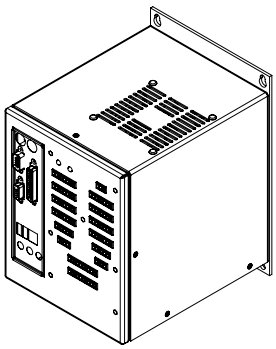


MOUNTING OPTIONS

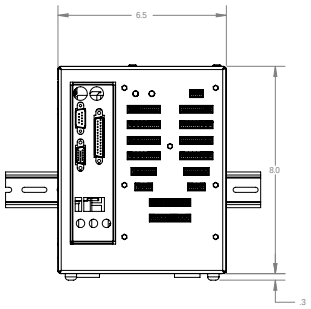
1508 MODELS

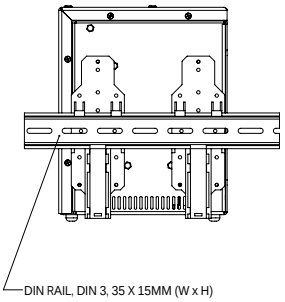
WALL MOUNT

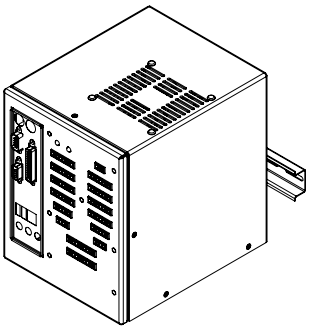




DIN RAIL MOUNT







ABOUT SCIEMETRIC

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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