

Press Force Monitoring & Analysis

Harness Our 30+ Years of Expertise in Press Monitoring! Whether you're working with Hand, Pneumatic, Air-Over-Oil, or Hydraulic presses, our tailored monitoring solutions, equipped with state-of-the-art sensors and data analytics capabilities, are designed to bring precision and efficiency to your operations.

Elevate Your Assembly Line: Upgrade Your Press Fit Assembly Process

DIGIFORCE® - Precision Press Monitoring Solutions

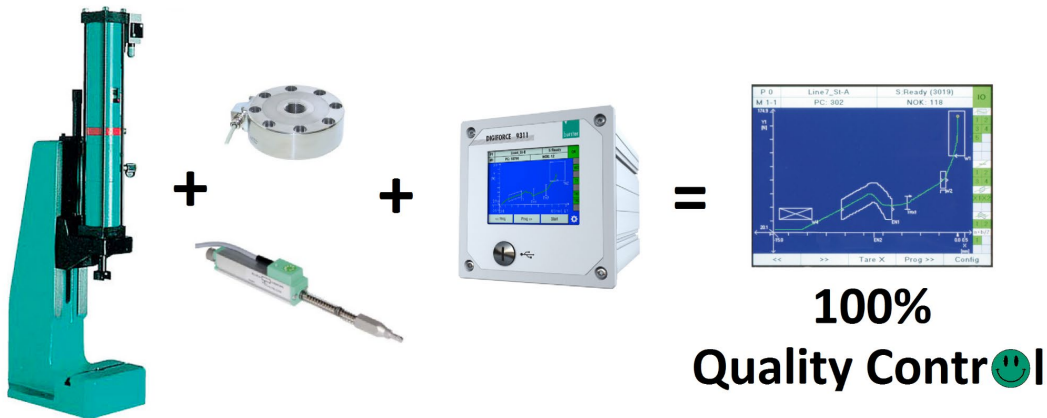
In the automated manufacturing world, quality control is paramount. Our extensive pressing operations experience, combined with a diverse range of sensors and tools, enables precise operation signature capture for definitive process pass/fail criteria. DIGIFORCE® systems offer evaluation tools for instant feedback to your PLC, distinguishing between optimal and inadequate signatures.



Turn Key Solutions: Sensors, Cables & Data Collection

In assembly processes, including welding, riveting, and press fitting, precision is key. Press fit assemblies utilize an interference fit, where one component slightly larger than its counterpart is inserted, creating a tight connection. Traditionally, the quality of this fit was tested by measuring the force needed to separate the parts. This method, while effective for overall process assessment, lacks the ability to evaluate the quality of individual components.

Measuring the "press in" force enables the complete verification of parts during assembly.



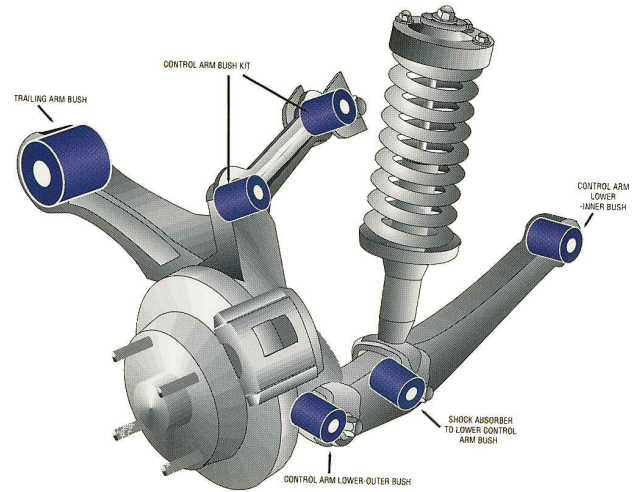
AGT offers tailored solutions aimed at monitoring the force versus displacement in pressing applications. A typical setup includes a load cell, sized for the application, and a displacement sensor to track the press operation's full travel. These sensors connect to an instrument that records measurements, plots them, and compares them to a predefined "good" signature.

This methodology applies across the spectrum, from assembling small plastic components in medical devices to fitting large bushings in industrial vehicles. The choice of load cells and displacement sensors varies, tailored to the specific forces and distances involved. Similarly, the instrument selection depends on the evaluation's complexity and the signature's intricacy.

[9311 Press Force Monitor instrument](#), [Force Sensors](#) and [Displacement Sensors](#).

Applications

- Suspension Bushings Insertion
- Pressing Dowel Pins in Transmissions
- Insertion of Bearings in Transmission Ring Gears
- Check Valves in Pump Housings
- Retaining Pins in Cam Shafts
- Hardware Clinching for Metal Fabrication
- Stamping, Bending, Flanging, Coining, & Hemming of Sheet Metal

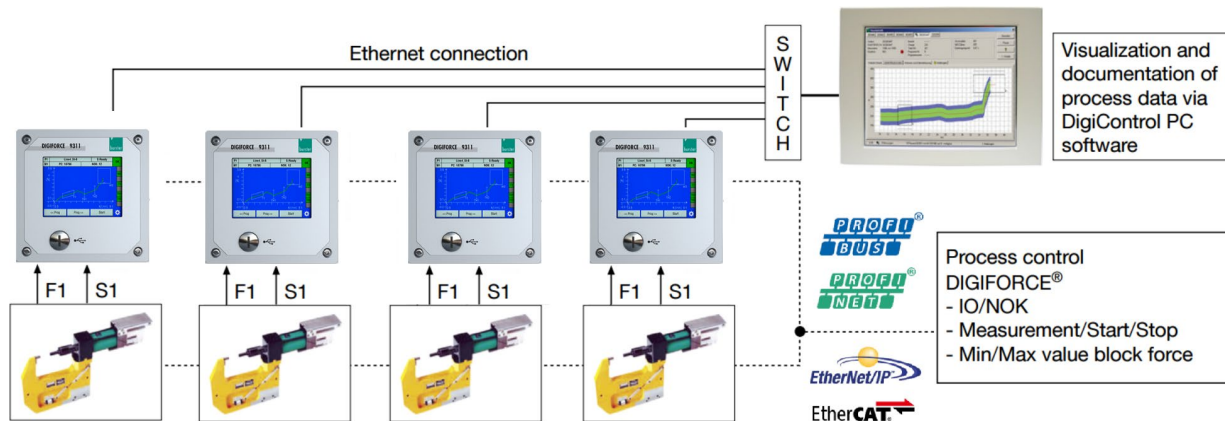


System Overview

A robust press force monitoring system includes:

- Precision Sensors
- Reliable Cables
- Sturdy Mounting Hardware
- Seamless PLC Interface
- Advanced Data Collection Software on an Industrial PC

Our solutions are scalable, from a single press station to a comprehensive network, with capabilities to connect via Ethernet TCP/IP to any network or PC. Beyond mere pass/fail reporting to the PLC, our systems offer part tracking capabilities, including Serial Numbers over the PLC Interface, ensuring a comprehensive overview and control of your assembly process.



Optimized Sensor Solutions for Precision Assembly

Unlock precise analysis with our premium sensor technology. Choosing the right sensors—critical for accuracy, range, and integration—is the first step toward data-driven success in assembly applications.



Explore our versatile load cell collection, engineered for easy integration with various press types, including hand-operated, pneumatic, air-over-oil, and hydraulic presses. Our range includes **Pancake**, **S-Type**, **Load Button**, **Fatigue-rated**, **Miniature**, and **Piezoelectric** sensors. Discover our high-performance load cells and enhance your assembly precision today by visiting our [Load Cell page](#).

For displacement sensing, our portfolio features reliable potentiometers and LVDTs, essential for monitoring press arm movement. For projects demanding unparalleled precision over vast distances, our Encoder solutions stand ready. Elevate your distance sensing capabilities by exploring our [Linear Displacement](#) page.

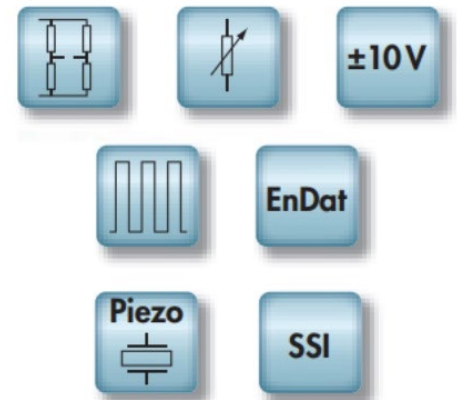
Amplification & Data Acquisition

Elevate your press monitoring with our integrated signal conditioning solutions, designed to capture and amplify the data from Strain Gauges, Piezoelectric Force

Sensors, Potentiometers, Voltage Output Sensors, SSI Serial, and Encoders. This flexibility ensures your monitoring system is perfectly suited to your operational needs.

Benefit from our advanced features, including 16-bit resolution and rapid scan rates up to 20 kHz, vital for high-stakes applications like stamping presses. Our systems deliver pristine, actionable data, enabling precise control and analysis.

Trigger active measurements based on displacement or load, facilitating synchronous X&Y pair measurements. Our real-time Switch Points feature informs the PLC of any deviations, ensuring optimal control and feedback mechanisms.



Cutting-Edge Evaluation Techniques

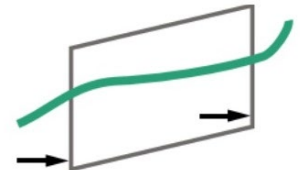
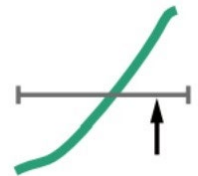
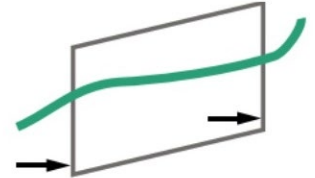
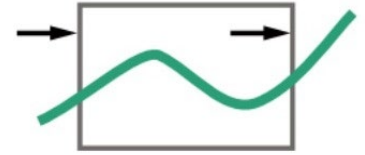
Following measurement, the evaluation phase uses DIGIFORCE® to compare the measurement curve against predefined criteria to distinguish between acceptable and defective parts. This immediate feedback, communicated via the Fieldbus interface to the PLC, ensures that only parts meeting specifications proceed in the process.

Given the inherent variability in press operations, even when parts are to specification, flexible evaluation tools are essential for assessing interference fits without incorrectly rejecting good parts.

DIGIFORCE® controllers offer various evaluation elements, including traditional windows, trapezoidal windows, dynamic thresholds, and tolerance envelopes, each with unique features like calculated values for peaks, troughs, and curve areas. These elements provide comprehensive analysis capabilities by allowing for complex mathematical operations.

Evaluation Elements Explained

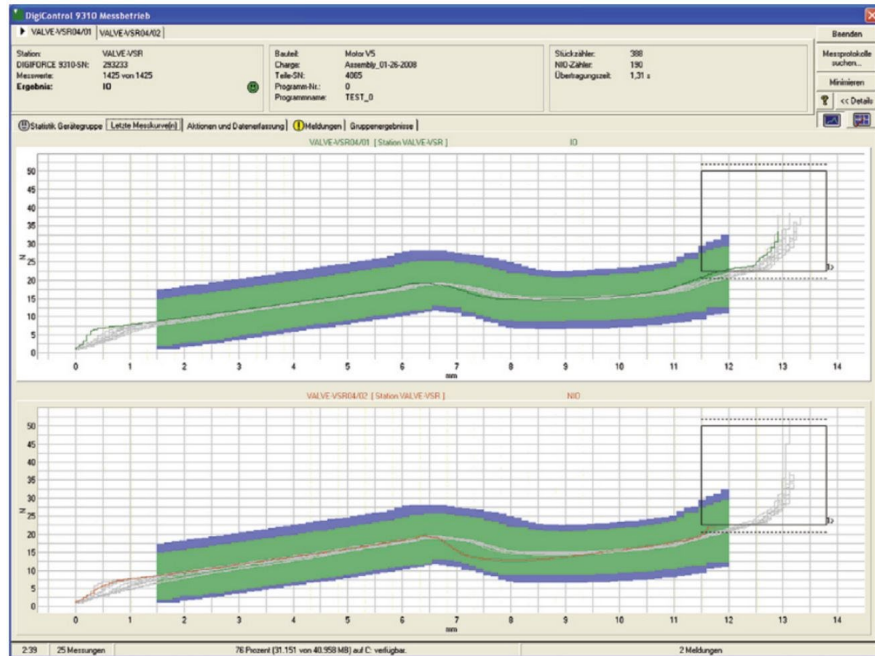
- **Traditional Windows:** These define how the curve should enter and exit, with customizable entry/exit points and the ability to enforce multiple entries. An "Online" feature updates the PLC instantly if the curve fails to comply.
- **Trapezoidal Windows:** Available in type-X and type-Y formats, these windows facilitate the setting of criteria for sloped curve sections.
- **Dynamic Thresholds:** Serving as a simple pass-through criterion, these can be adjusted for minimum and maximum values in both X and Y dimensions, ensuring specific force or depth requirements are met.
- **Tolerance Envelopes:** DIGIFORCE® controllers can define a tolerance envelope around a sample distribution of force curves, allowing for precise control over allowable deviations, crucial for fitting applications.



Automated Data Collection

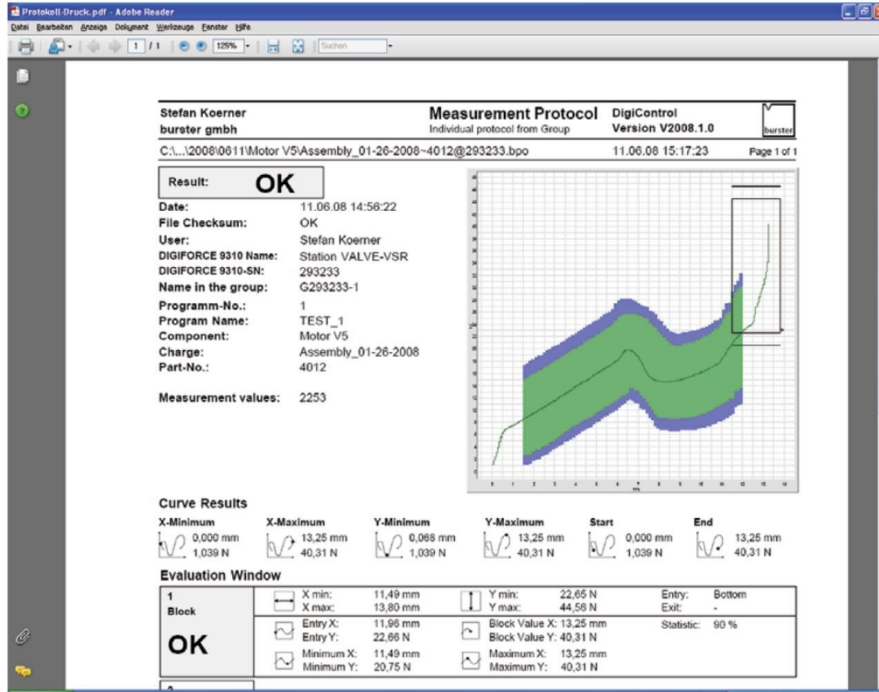
The same software that configures sensor calibration and triggering also handles data collection, providing a detailed display of measurement curves on any Windows-based PC. This system supports part tracking, timestamping, program backups, data retrieval,

and easy access to evaluation results, streamlining the data management process for multiple presses.



Effortless Report Creation

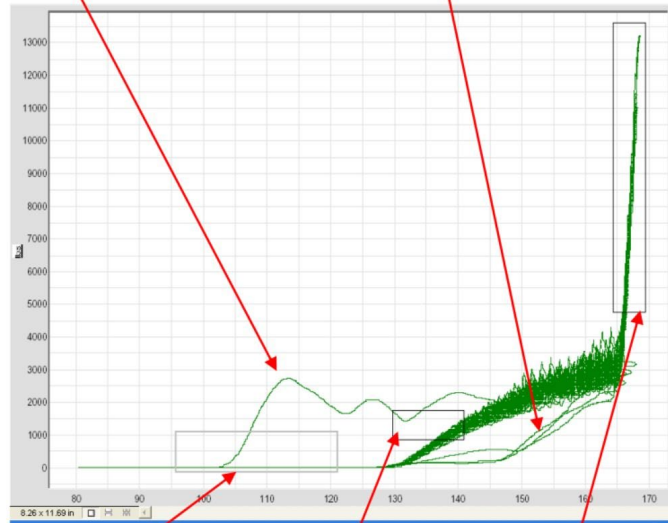
Our intuitive data review wizard simplifies navigating your historical data. It enables targeted searches by station, part number, serial number, date, time, and OK/NOK outcomes, facilitating swift data retrieval for analysis and reporting. Standard output options include Excel and PDF formats, streamlining the process of generating comprehensive reports with ease.



Case Study: Optimizing Bushing Press for Suspension Control Arms

A "Mis-aligned" Insertion Component, produces a Force vs Displacement Profile, that is distinctly different than that of the Acceptable Insertion Profiles

A large Outer Housing produces lower Insertion Forces than that of the Acceptable Insertion Profiles over a portion of the range of the Insertion Displacement .



Data Window #1
"On-Line" Immediate
Stop of Press Operation
Curve must enter at the
left and exit to the right

Data Window #2
"Pass Through"
Curve must enter at
the bottom and exits
to the right

Data Window #3
"Block or Final Force"
Curve must enter at
the bottom and must
not exit.

Exploring Solutions

Digital Indicators: A Basic Yet Selective Option

Digital indicators, while not commonly utilized, offer a straightforward method to monitor and record the peak force exerted by the load cell during assembly. This cost-effective solution is best suited for applications where the part does not bottom out, and the peak force accurately reflects the interference fit's efficacy. However, it does not account for the displacement at which this peak force occurs, limiting its applicability.

Forcemaster 9110: Tailored for Manual Operations

The Forcemaster 9110 system, an affordable two-channel solution, measures load versus displacement and compares the resulting signature against predefined "gates" and thresholds. Designed for press stations without a PLC, the 9110 model is particularly favored for manual hand press assemblies, providing operators with clear audible and visual pass/fail indicators. Program selection is facilitated by inserting cards equipped with chips, reminiscent of bank cards, allowing for a vast array of programming options.

Digiforce 9311: The Benchmark in Press Force Monitoring

Building on the success of the 9310 model, the Digiforce 9311 enhances performance with improved resolution, an expanded program library, automatic evaluation generation, and EthernetIP connectivity. Renowned for its user-friendly interface, including touch screen menus and a vivid display of the signature curve alongside process outcomes, the 9311 model sets the standard for press force monitoring. Stay tuned for upcoming details on this pivotal device.

Digiforce 9307: Advanced Features for Complex Measurements

The Digiforce 9307 instrument stands out with its superior A/D resolution and faster sampling rates, coupled with a broad range of sophisticated evaluation techniques. Unique in its capability to perform multiple "Y" measurements against a single "X" input, the 9307 excels in scenarios demanding higher measurement resolutions or dealing with complex signatures, offering unparalleled precision and flexibility.