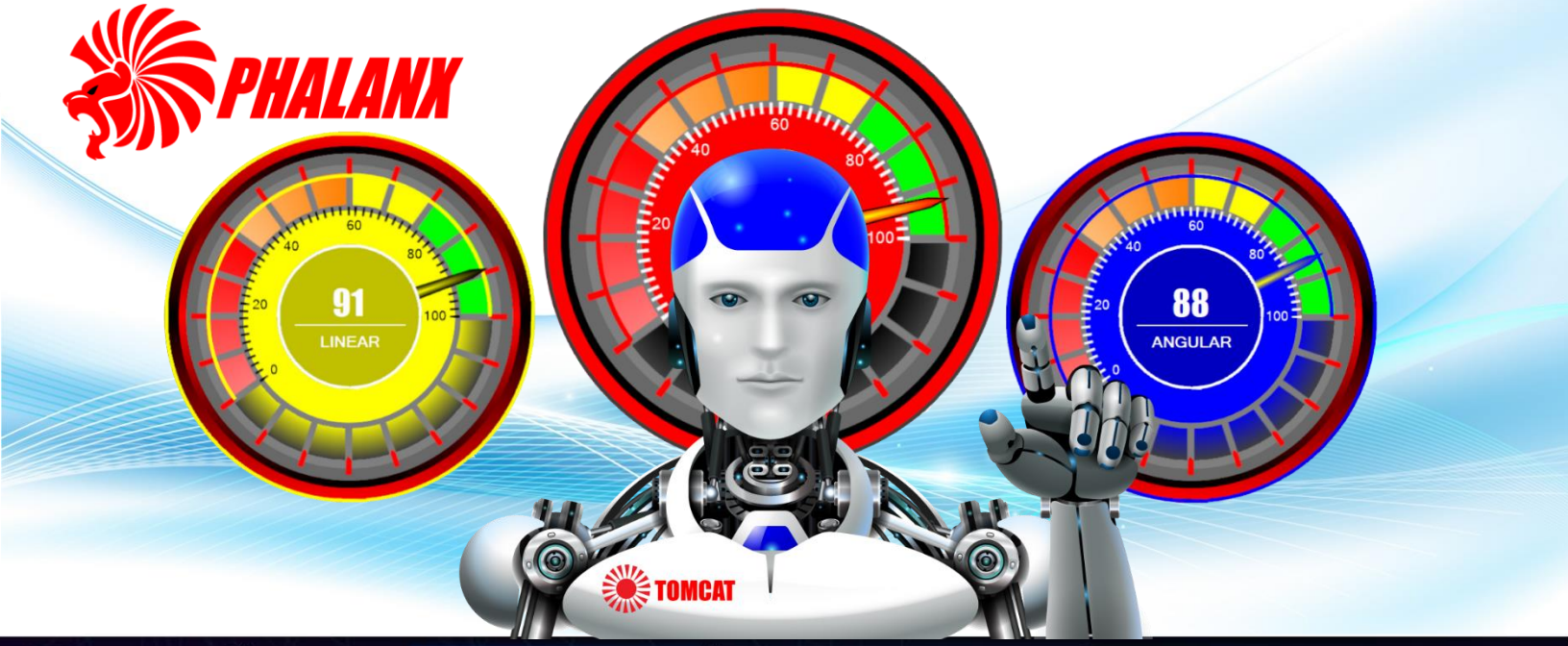
PHALANX



THE MACHINE GEOMETRY ERROR SYSTEM

TOMCAT
MACHINE PERFORMANCE

PHALANX SYSTEM DESCRIPTION

The Phalanx System is a machine geometry error assessment tool that uses embedded sensors to automatically compare machine axis orientations and baseline geometry errors at predetermined reference locations. The 2 versions of the Phalanx System are Standard and Professional.

The Phalanx System - Standard works by employing embedded sensors to the moving structures and to a limited number of stationary structures, and driving the machine to various “benchmark” points within the machine envelope for comparative readings to the last time the machine was at those exact locations. The sensors always stay fixed to the machine and are active at all times, eliminating the need and time to setup measurement equipment to measure machine axes independently. The purpose of this version of the Phalanx system is to offer end users with an economical product for effortlessly determining the geometric condition of a machine, while having the flexibility of upgrading to a comprehensive real-time monitoring system, the Phalanx System - Professional.

The Phalanx System - Professional contains the same type of hardware and similar software as the “standard” version, but with additional hardware and additional software features and algorithms. It offers a real-time monitoring of a machine’s geometric and alignment state simultaneously and holistically.

The Systems use geometric, accuracy, and volumetric data that was taken prior to installation of the sensors. This is known as the characterization event, where the machine tool is measured and calibrated via traditional methods per ASME B5.54 and ISO 230 standards. The mounted sensors are affixed to the machine to look for change and update the machine geometry error profiles that were taken during the characterization event and are stored in the Phalanx System software algorithms specific to the machine tool.

Both Systems measure and computes the following using the updating method previously described:

1. Axis Roll, Pitch, Yaw errors
2. Axis Vertical and Horizontal Straightness errors
3. Axis accuracy errors
4. Volumetric accuracy errors

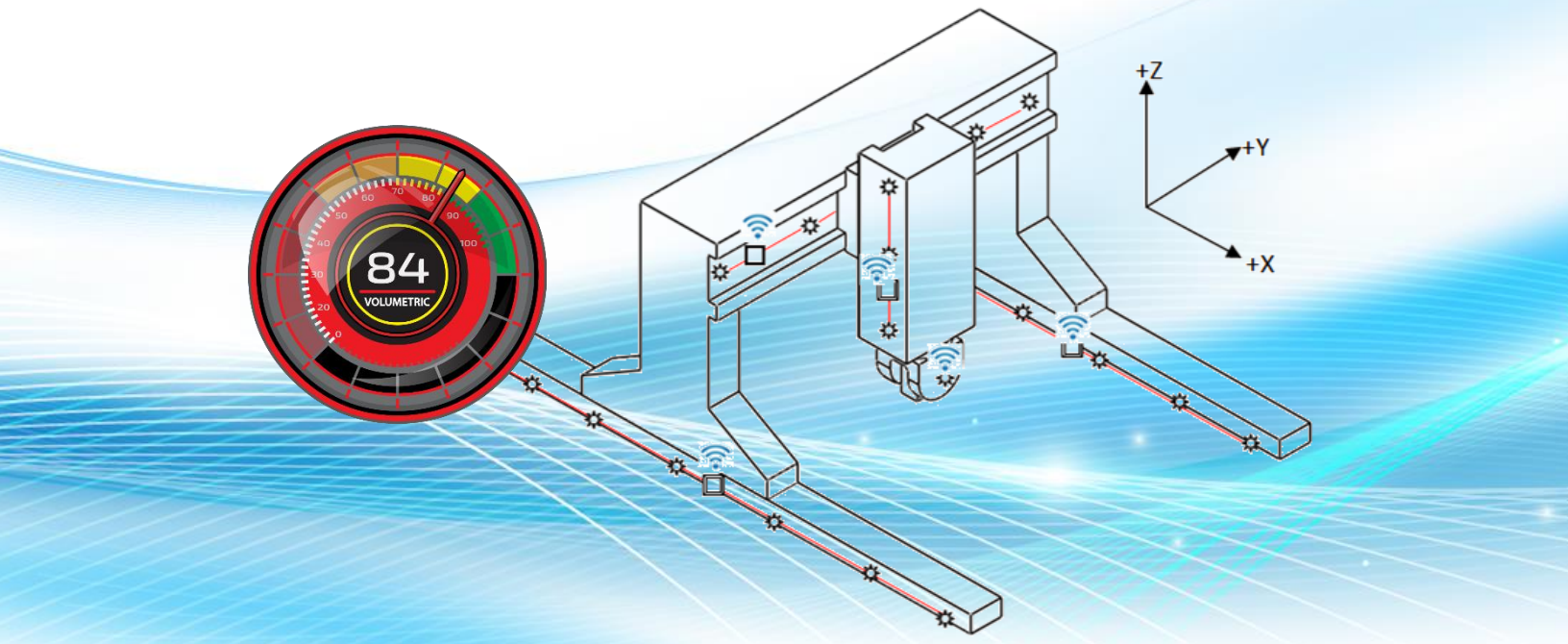
PHALANX SYSTEM DESCRIPTION (cont'd)

The highlights of the Phalanx System are:

1. Save time in determining if the machine is suitable for use after catastrophic events
2. Identify, configure, and implement an unlimited number of benchmark locations
3. Set ranges and tolerances for acceptable geometry results
4. Evaluate results via automatic and intuitive gauges and plots at the user interface
5. Trend data by extracting a history of results from the archived results
6. Implement seamlessly and daily as a machine check event that takes just minutes

Phalanx System implementation is as follows:

1. Pre-configure volumetric algorithm and design of instrumentation based on machine
2. Precision machine alignment (optional but recommended)
3. Siemens VCS license (if equipped), Fanuc additional compensation tables (if equipped)
4. Baseline geometry characterization measurement and Volumetric measurement
5. Install and preset instrumentation
6. Calibrate and benchmark System



PHALANX SYSTEM BENEFITS

PRODUCTION

- Confidence that the machine is in optimal condition to produce parts within tolerance.
- For better quality control, the System can be integrated as a machine calibration routine during the manufacturing process.
- Instant recognition of the machine accuracy performance is utilized to make proactive manufacturing decisions to maintain part quality.
- Versatility in critical machining decisions driven by machine geometry behavior data
- In the event of unplanned catastrophic events, the machine alignment status from the System determines if intervention is necessary.

MAINTENANCE

- The machine geometry outputs are straightforward which allow for more time fixing and less time diagnosing.
- Understand normal machine geometry and accuracy behavior over extended periods of time
- Evaluate the entire machine geometry data concurrently in order to develop the best plan and execute the decisions for correction.
- Configure the system by setting allowable machine geometry errors
- Drive machine alignment events with machine geometry data versus scheduling it on a timed basis.

OVERALL

The purpose of the System is to maximize productivity on all recipient machines plantwide by encouraging the use of automatic machine geometry data during the manufacturing process. The use of this data will drive the increase in throughput of quality parts and minimize machine down times. This revolutionary technology will become the industry standard in maximizing quality machine performance and maintenance efficiency. Tomcat Machine Performance LLC is the proud owner of this innovation and is the only company legally authorized to offer these Systems for sale.

PHALANX SYSTEM SOFTWARE

Software features a fully customizable and factory tailored USER INTERFACE

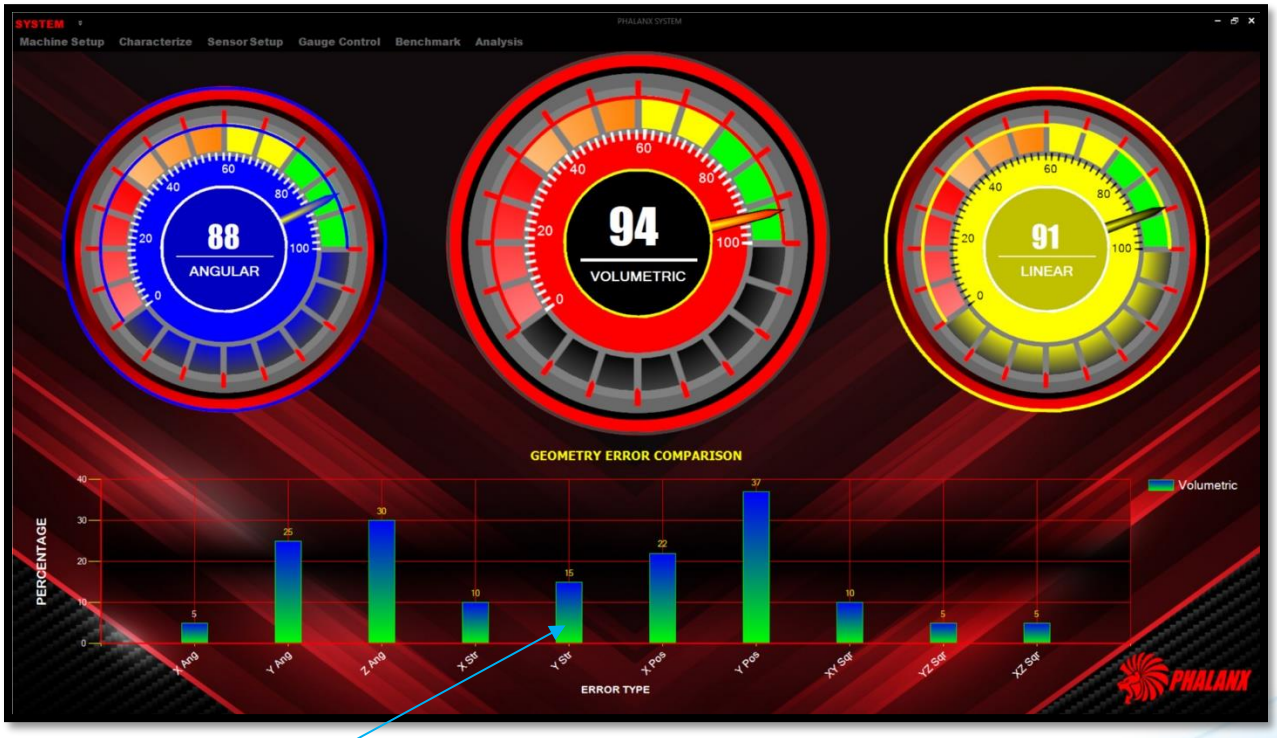
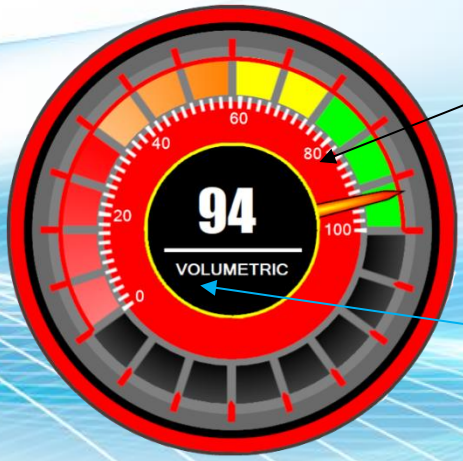


FIG. 1 – Screen of Default

After benchmark locations are re-measured, the full baseline data is auto-updated to provide a volumetric performance evaluation of machine error types.



Set 4 tolerance limits, each designated by a color

1 of 3 gauges for visual display

FIG. 2 – Customizable Gauge limits, Configure 4 tolerance limits

PHALANX SYSTEM SOFTWARE (cont'd)

Place company logo here. Each System is unique to each machine and to each end user

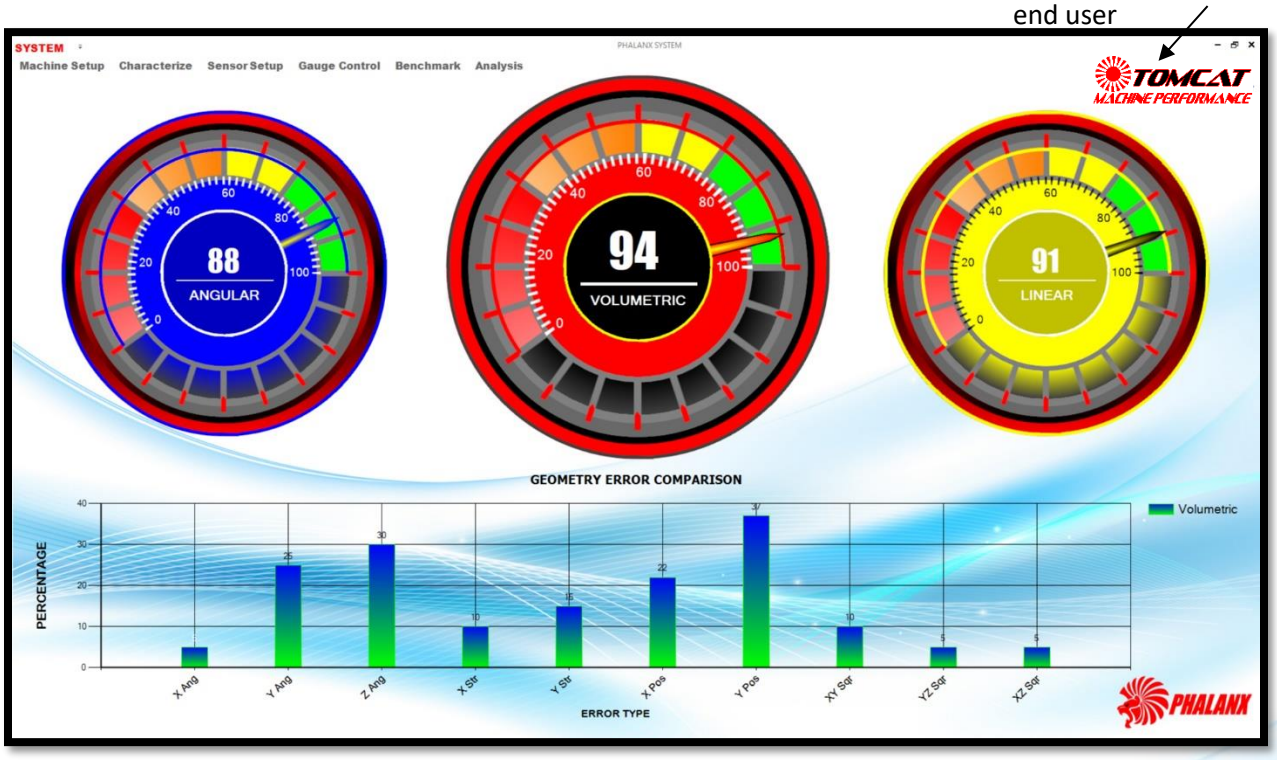


FIG. 2 – Screen of example END USER INTERFACE

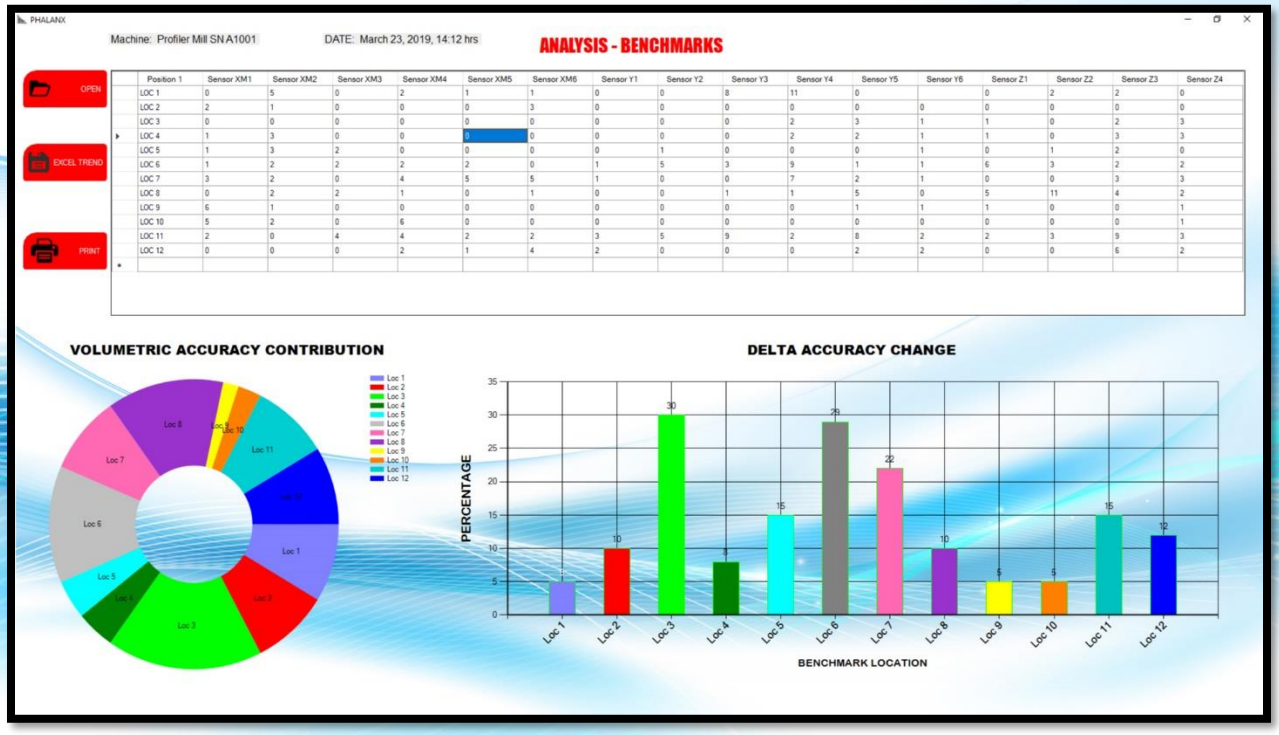


FIG. 3 – Screen of Analysis window. Archive, Export to Excel for trend history, or Print

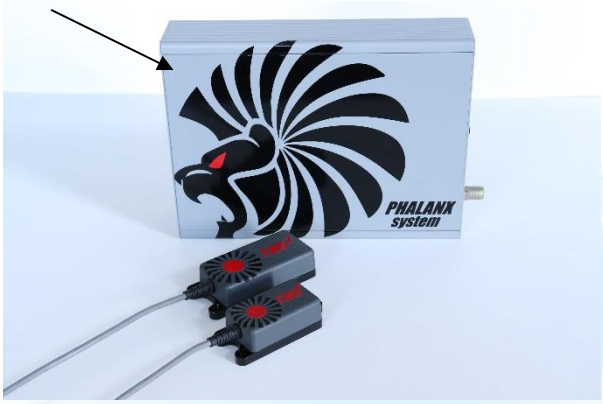
PHALANX SYSTEM HARDWARE

The System comes in 3 color profiles to match machinery or for customer preference

Custom built for industrial performance DAQs

IP67 rated small enclosure sensors

Each sensor is equipped with reliable Lemo connectors to DAQ



All in one Industrial PC pre-loaded with Phalanx software and configured for the target machine. All mounting hardware supplied

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