



ROBOTICS — CALIBRATION

The FARO Gage-PLUS Overcomes the Limitations of Fixed CMMs in Robot Calibration

PROBLEM:

Parallel Robotic Systems designs and produces high precision positioning systems for use in a wide variety of applications such as industrial, biomedical, simulation, and water jet cutting. Headquartered in Hampton, New Hampshire, PRSCO's (prSCO.com) 6-degree of freedom robots are based on a Stewart Platform or Hexapod (six-legged) system. This offers high load capacity and range of movement while maintaining a high degree of precision and repeatability. These devices are used to provide effective solutions to difficult motion problems, to eliminate errors in automated welding lines, and to advance testing in bio-mechanical research.

When building Hexapod robots, there are six spheres attached to the Hexapod's table and another six attached to its base. It is critical that PRSCO accurately locate each sphere's center. The distance of each sphere's center to a reference point and plane and the lengths of the struts that connect each sphere must be precisely measured.

Using a stationary coordinate measuring machine (CMM) provided accurate measurements, but acquiring one large enough for their needs wasn't economical. Some robots are so big, in fact, that even outside metrology services weren't an option because of limited local availability and the high cost of transportation. The bottom line: PRSCO couldn't qualify their robots' performance conveniently, efficiently, or economically using fixed CMMs.

SOLUTION:

The FARO Gage-PLUS proved to be the solution that gave PRSCO the features and benefits not found in fixed CMMs. The Gage provided the needed accuracy of up to .0002" (.005mm) – without the need for regular calibration as with fixed CMMs – and is much more efficient and user-friendly.

With the Gage, PRSCO can now see an actual representation of the behavior of their Hexapods' moving tables and can compare geometric characteristics between features. They use the Gage in their calibration phase and in their qualifying procedure, both of which are required for every robot.

ROI:

"Typically, it took about six hours to calibrate each robot using outside resources, including travel time," said Engineering Manager Andy Chui. "With the FARO Gage, this has been reduced to one hour and we can re-measure the parts anytime we want. In my opinion, the convenience is priceless when we must have something measured immediately."

On occasion, customers request robot re-calibration changes be made on-site at the last minute. Without the Gage, the entire robot would have to be removed from its mounting structure and sent to a CMM large enough to perform the measurement. The portable FARO Gage eliminates that burden.

Beyond the clear time savings gained, the FARO Gage-PLUS provides PRSCO with a recognized standard they use to qualify and present the accuracy performance of their products.



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