

# SA Robot Calibration Appliance

Precision multi-zoned robot calibrations during real-time operations

Obtain improved accuracy from native robot programs without manual teaching poses.

SpatialAnalyzer Robot Calibration Appliance (SARCA) enables manufacturers to calibrate robot systems for executing repeatable, accurate processes by incorporating 3D or 6D measurements from metrology devices. This process converts nearly any industrial robot into a precision system.

In applications requiring modern metrology accuracies for robot automation, SARCA is the integrated solution making it possible.



## Benefits:

- Use an existing standard industrial robot for more accurate applications
- Zone-specific calibrations
- Calibrate and compensate different robot configurations
- Use native robot language
- Define and compensate the real kinematic model of a robot
- Use 3D or 6D SA metrology system
- Reduce the effect of joint backlash
- Characterize different tool offsets and apply the tool to the robot model
- Compensate different tool loads
- Compensate gravitational deflections due to elasticity

## SARCA Automation

A calibration program is written in the native robot control language. This program exercises each joint through a series of poses throughout the working volume of a given robot task. In each pose, a SpatialAnalyzer (SA) 3D or 6D metrology system precisely records the actual position of the end effector. In addition, the deviation between the recorded and programmed tool position and orientation is recorded for each pose within the calibration zone.

SARCA coordinates the actions of the robot and the metrology device connected to SA, the software recording the data and controlling the metrology device.

After capturing the poses, the robot program triggers the software to run a calibration using the compilation of pose measurements. Then, it solves for the adjusted kinematic robot model within your environment. This is saved as one of many possible calibrations and is deployed for accurate robot operations.



## Supported robots

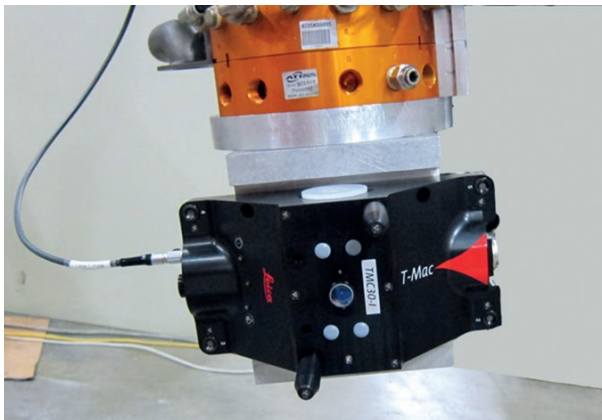
- ABB
- Comau
- Fanuc
- Kuka KR C2
- Kuka KR C4



## Production use

SARCA enables a given robot to have multiple calibrations, and incorporating these specialized calibrations for a particular task can significantly improve accuracy. SARCA uses the calibrated robot model to adjust the goal positions of the native robot code to achieve the highest accuracy.

Once calibration is complete, the metrology device is no longer required. The robot program can assert one of the saved calibrations for a task. When even higher accuracies are needed, SARCA's Move, Measure, Correct function integrates 3D/6D metrology systems to accurately position the robot in real time.



## Calibration reports

Create and review data for robot base offset, tool offset, Denavit & Hartenberg (D-H) parameters, stiffness coefficients, RMS & robustness, standard deviation, a complete set of acquired measurements, and more.

## Robots have always been repeatable. SARCA makes them accurate.

A robot should be calibrated in its dressed and loaded state in the production cell to achieve optimal consistent performance. SARCA offers a native robot programming language solution to step around the one kinematic model, resulting in a more accurate robot in the production cell.

SARCA and SA automate external metrology devices, like a laser tracker or photogrammetry system, providing precision for the calibration in the production cell. These accurate observations are used to solve for the robot's base position, internal kinematic model (D-H), deflection model, and tool offset. The solved offsets can then be used in production for a flexible solution for the highest accuracy tasks.

