

Bluewrist Robot Calibration Capabilities

TCP Calibration

- Compatible with all industrial robot brands
- Contactless robotic tool calibration
- In-line automatic TCP update
- TCP calibration up to 6 dimensions
- Requires no prior knowledge of tool dimensions
- Precisely calibrates tools with physical and virtual center points
- Operates with measurement sensors (2D/3D laser, 3D camera) mounted on the end of robot or the floor

Joint/TCP Calibration

- Easily fits in cramped work spaces
- Contactless and easy-to-use and easy-to-recover
- Robot joint correction due to crash or actuators/encoders replacement
- Can be combined with TCP calibration to update the robot end tool
- Compatible with all industrial robot brands

ISO 9283 Test

- Positional and orientation accuracy and repeatability
- Distance accuracy and repeatability
- Multi-directional pose accuracy variation
- Drift of pose characteristics
- Position overshoot and stabilization time
- Path accuracy and repeatability
- Path accuracy on reorientation
- Cornering deviations
- Path velocity characteristics
- Minimum posing time
- Static compliance

User Frame Calibration

- Applicable for robot guidance, bin picking and ISO 9283 performance test
- Requires no initial user frame information
- Operates with measurement sensors (2D/3D laser, 3D camera) mounted on the end of the robot or the floor
- User frame calculation up to 6 dimensions
- Compatible with all industrial robot brands and most measurement systems

Volumetric Calibration

- Offline robot calibration technology for absolute accuracy
- Requires no certified artifacts
- Able to identify robot kinematic parameters, TCP, base, joint compliance and gravity effects
- Works with measurement sensors (2D/3D laser, 3D cameras) mounted on the end of the robot or the floor
- Compatible with all robot brands and most measurement systems

Temperature Calibration

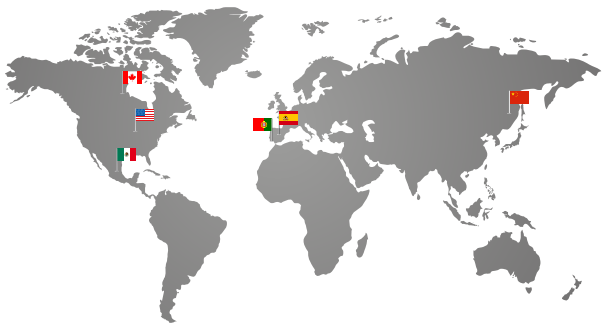
- In-line robot calibration technology
- Continuous robot accuracy monitoring within production line
- Minimizes robot downtime
- Compensates for deviations in robot parameters and TCP due to ambient temperature variation or actuator self-heating

Contact Bluewrist Today!

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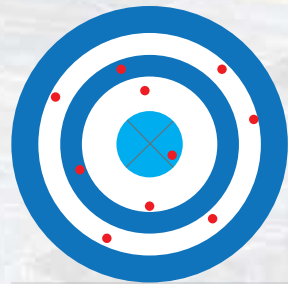
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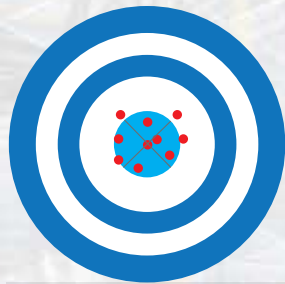


BLUEWRIST ROBOT CALIBRATION SOLUTIONS





Poor repeatability and poor accuracy



Poor repeatability and good accuracy



Good repeatability and poor accuracy



Good repeatability and good accuracy

The Rising Importance of Robot Calibration

As industrial robots become increasingly viable and popular in high precision applications such as welding, drilling, dispensing and guidance related assembly tasks, maintaining robot volumetric accuracy and drift are essential to ensuring final product quality and reliability in the production process.

Volumetric accuracy and repeatability is a measure of the robot's ability to move to a specified location with minimal deviation or variance. Through calibration, both absolute and volumetric accuracy can be improved to enhance process stability.



Factors Affecting Robot Accuracy



Robot Payload



Joint Friction



Temperature Change

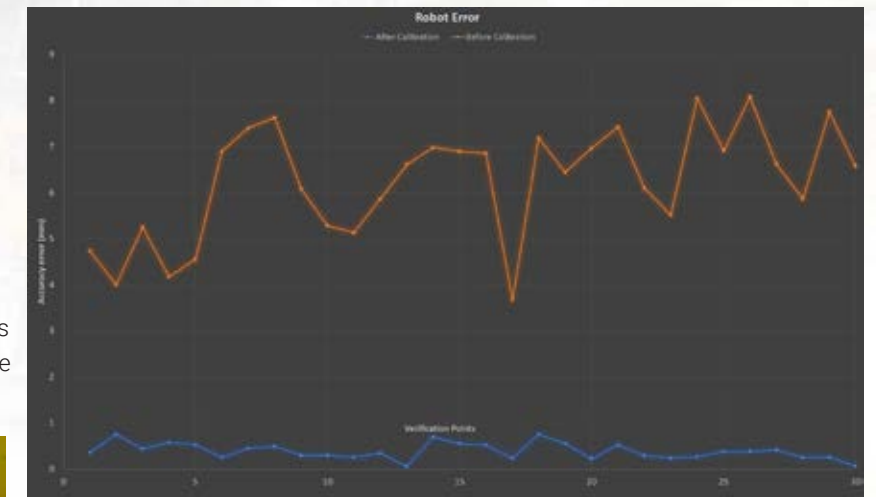
High accuracy is the most difficult to maintain in an inline production environment because many factors, such as temperature, joint friction, weight load, and the machining of robot links, may cause the robot to deviate from its desired preprogrammed pose. This deviation can lead to potential product quality issues and increase the costs associated with scrap parts.

The KinOptim Solution

KinOptim is a complete inline robot calibration software solution developed by Bluewrist to help improve and maintain robot accuracy in the production process. KinOptim automatically compensates for robot geometric parameters and updates them without user intervention. Our software also calculates and compensates for the robot user frame and tool frame as part of an automated robot monitoring and performance measurement suite.



In-line Temperature Calibration



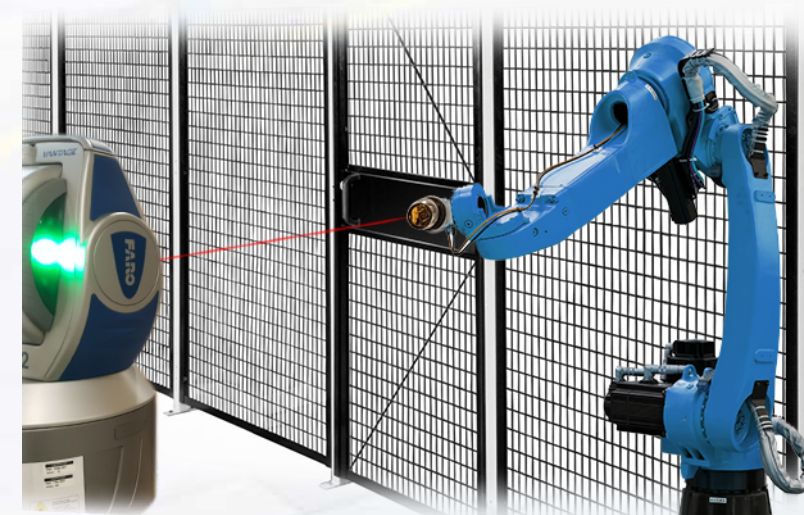
Pre and post calibration result of a popular collaborative robot

Volumetric & Temperature Calibration

- Minimizes variance caused by thermal expansion and contraction
- Inspection temperature compensation
- Continuous TCP calibration based on measurement results
- Requires no certified artifacts
- Uses many parameters, including robot D-H kinematic parameters, TCP, base and gravity effects
- Significantly improves of robot accuracy in off-line programming

ISO 9283 Robot Performance Analysis

- Full or partial tests to evaluate the static and dynamic characteristics of industrial robots using laser interferometry
- Determines performance characteristics of industrial robots such as accuracy, repeatability, overshoot, stabilization time, speed, cornering, warm-up drift, etc.
- Gains a better understanding of actual robot performance compared to specifications
- Provides easy and reliable data collection from robot and measurement systems and provides automatic ISO reporting



ISO 9283 Testing and Robot Volumetric Calibration