Absolute Accuracy Option

Ultimate precision in critical applications

Certain applications such as laser welding, machining or measuring tasks call for an even higher accuracy than the already high precision of a regular robot. The YASKAWA Absolute Accuracy is an advanced calibration method designed to maximize the precision of industrial and collaborative robots.

Perfect Precision for Digital Twins Simulate: Validate - Execute - with zero surprises

While robots in general show a high repeatability, the absolute accuracy especially before calibration can be higher by several orders of magnitude due to inherent mechanical tolerances and elasticities in the robot structure. The YASKAWA Absolute Accuracy Option results in an average absolute pose accuracy up to approximately 0.2 mm, depending on the size and type of robot.

This closes not only the accuracy gap between real robots in the factory and their digital twins for predictable robot installation and operational reliability. It also results in minimal production downtime due to fast replacement of robots.

Absolute Accuracy calibration method

Compensation of a robot's mechanical tolerances and structural elasticities under various loads is a complex problem and requires a suitable mathematical model. This model includes geometric (DH parameters) and elasticity compensation parameters (spring constants) which are determined by a corresponding measurement process during calibration. The YASKAWA Absolute Accuracy Option compensates positions internally in the controller, resulting in a significantly improved pose and path accuracy.

The newly calibrated accuracy and the individual compensation parameters are recorded and confirmed by a certificate. The Calibration is an additional option and takes place in our robot factory.

Supported controller generations:

YRC1000

YRC1000 micro

Absolute Accuracy Option

KEY BENEFITS

- Significantly increased pose accuracy up to approximately 0.2 mm*
- Minimizes the gap between the real robot and its digital twin
- Predictable and easy robot installation
- Fast replacement due to consistency between Absolute Accuracy calibrated robots
- Minimal production downtime
- Increased operational reliability and efficiency
- Consistent and accurate results in the application

* depending on robot size and type

TYPICAL APPLICATIONS PROFITING FROM ABSOLUTE ACCURACY OPTION:

- Applications with high path accuracy over long distances
- Applications where high distance accuracy is needed
- Laser welding
- Laser cutting
- Water-jet-cutting
- Offline teaching/programming
- Machining
- Measuring tasks
- General applications, especially if the robots positioning happens via external systems (e.g.: cameras, scanners, pre-processors)

TECHNICAL INFORMATION

	YRC1000	YRC1000micro
Supported hardware	Teach Pendant	Teach Pendant
Robot models	– All 6-axis-robots – Single robots & multirobot systems	– All 6-axis-robots – Single robots
Mounting types	Floor, Ceiling, Wall, Tilt	Floor, Ceiling, Wall, Tilt

DEMONSTRATION OF LINEARITY IMPROVEMENT

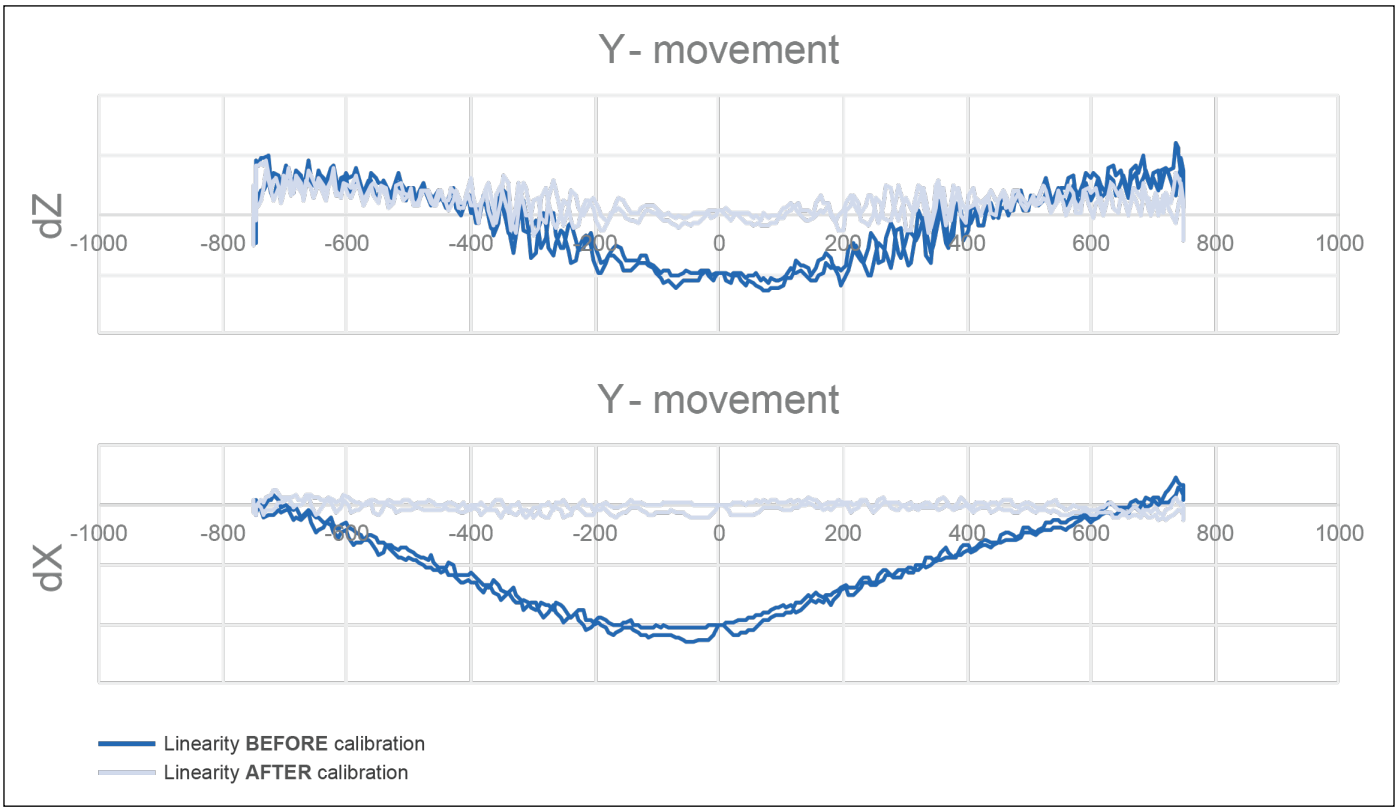

Illustration of the robot movement along the Y-axis, showing how the deviations occur in the Z and X directions. The dark blue graphs represent the linearity before calibration, the light blue graphs show the improved values after the Absolute Accuracy calibration (example HC10DTP).

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