COGNIBOTICS

Productivity by Accuracy

# Increase Operational Reliability in complex robot lines and applications

Operational reliability is essential in complex automated production, it **minimizes downtime and enables continuous production**. While industrial robots are renowned for their reliability, it is important to recognize that they are not immune to wear and incidents.

Implementing **inline robot health check and recovery solutions** is an effective approach to swiftly restore operations after occasional repairs, ensuring process accuracy, averting unforeseen malfunctions, and prolonging the lifespan of these machines.

By **investing in the upkeep** of industrial robots, manufacturers can continue to benefit from their efficiency, ultimately contributing to the overall success of their operations.

**Increased OEE**

**Lowered downtime**

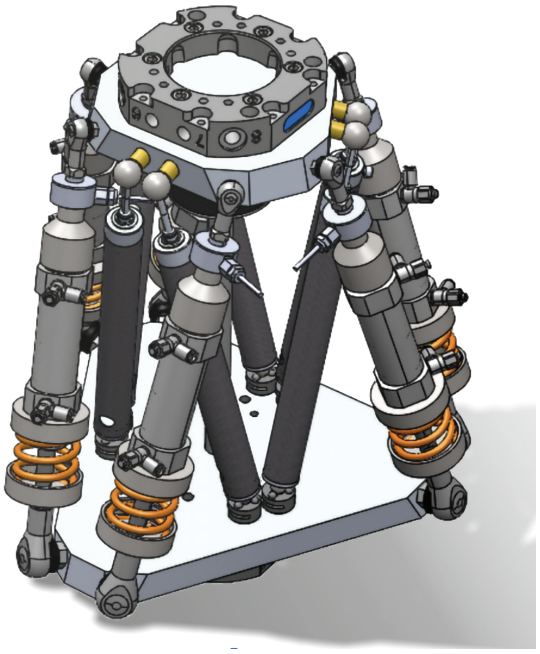
**Increased and maintained accuracy**

**Improved predictability**

## Introducing Cognibotics Flexclamp

**The ultimate solution for inline robot calibration and health diagnostics!**

Say goodbye to time-consuming program adaptations after repairs and enjoy online health checks for consistent robot accuracy.



# Inline Robot recovery and diagnostics

Despite regular robot maintenance, it is hard to detect problems before they occur and cause more costly production failures. **By integrating robot diagnostics in the production cell, robot component issues can be detected before they affect the process performance**.

Issues requiring service or repair risk modifying the robot motion, leading to time-consuming program adaptations. With Cognibotics **robot recovery tool Flexclamp**, the deviations are identified and automatically mitigated. Built-in reliability for consistent high-quality production.

The Flexclamp system offers a novel approach to **effortlessly monitor and restore robot calibration in the production line**. The innovative way of simultaneous measuring of positional and force data, delivers comprehensive data even in confined spaces. Swift setup and calibration, ensure rapid operational recovery.

**Are any of the following part of your company's operations?**

**High robot utilization**

**Downtime that directly impacts revenue**

**Extensive production lines with serial dependencies**

**If so, you can boost your competitiveness with Cognibotics robot accuracy addon.**

# Line integration via Robot System Products
# Automatic tool changers and tool stands

Using robot tool stands and tool changers from RSP makes Cognibotics robot recovery and diagnostics package **directly integrable** to your robot installation.

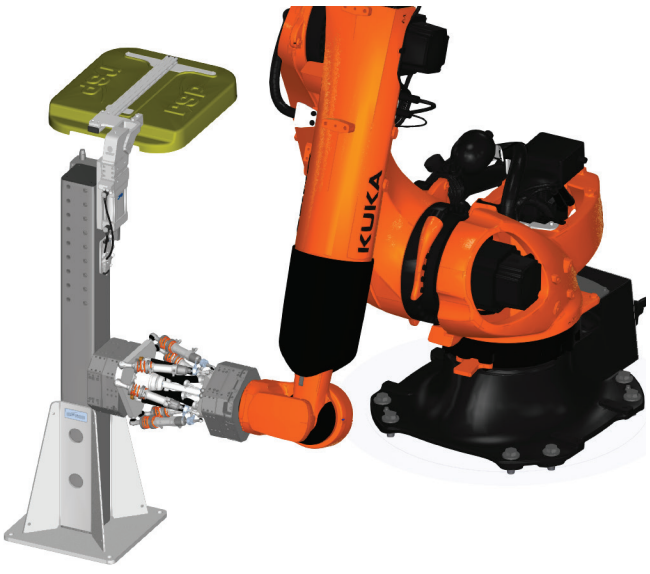
## Checking robot health

Based on our **patented technology clamping**, the robot joint health is directly evaluated through the robot's internal signals when docking to an integrated tool attachment point on the tool stand. This measure ensures early fault detection of the robot. Health checks are recommended at least on a monthly basis but are preferably optimized to the process and operational conditions.


## When repair is needed

For advanced diagnostics during service and recovery after repair, the flexclamp device is attached to the same built-in tool attachment used for the robot health check.

The automatic flexclamp procedure gives extended diagnostics data and reidentifies modified component data for a full recovery to initial performance.



# Elasto Kinematic modeling as core

Articulated robots are typically inaccurate due to mechanical imperfections combined with a structure where small errors add up, and a control system using a very simplified model of a robot as default.

**The unique competence of Cognibotics lies in the ability to create superior mathematical models to describe the imperfections and deflections in robot mechanics.**

Those models are a much better representation of the real robot and are usable within the real-time cycles of a robot controller.

Combined with Cognibotics patented methods to identify the necessary model parameters, this creates a baseline enabling world-class robot accuracy.

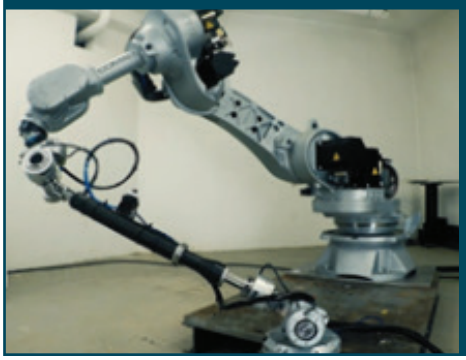
Elastic characteristics are a natural part of Cognibotics robot models. Accounting for elasticities means accuracy improvements by taking into account how the robot bends under various loads.

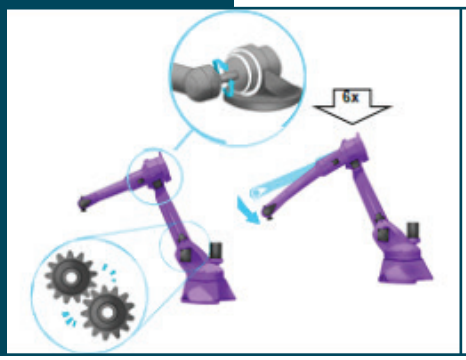
The result is load-independent accuracy even in stretched robot configurations.

By including potential servo-controlled external axes such as track motions or positioners in the modeling and motion compensation, one can enjoy the benefits of absolute accuracy also for the combined motion.

# Robot Calibration as Enabler

## At installation






## For all robot motions

**Robot Calibration** → Gives parametes to → **System Models** → Used by → **Motion Compensation**

To initiate and maintain the **connection between digital representation and the physical world**, the robot, and additional **servo-controlled axes must be calibrated**. **Cognibotics calibration package** includes equipment and software to efficiently measure and identify robot parameters to capture characteristics of physical robot individuals.

Use the **sensor system of your choice**, most commonly used third-party systems are supported.

For calibration of the robot itself, we also provide cost-efficient in-house solutions. Based on provided nominal information and a short initialization cycle, **Cognibotics measurement and identification unit takes care of both the generation and execution of the measurement sequence** as well as the data collection both from the robot and the sensor.

**Cognibotics identification routines** automatically calculate the unique parameters for your setup.

**Prepared for Cognibotics calibration equipment as well as commonly used laser trackers and optical CMM**

**Creaform C-track**

**Nikon / Krypton k600**

**Leica**

**Faro**

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