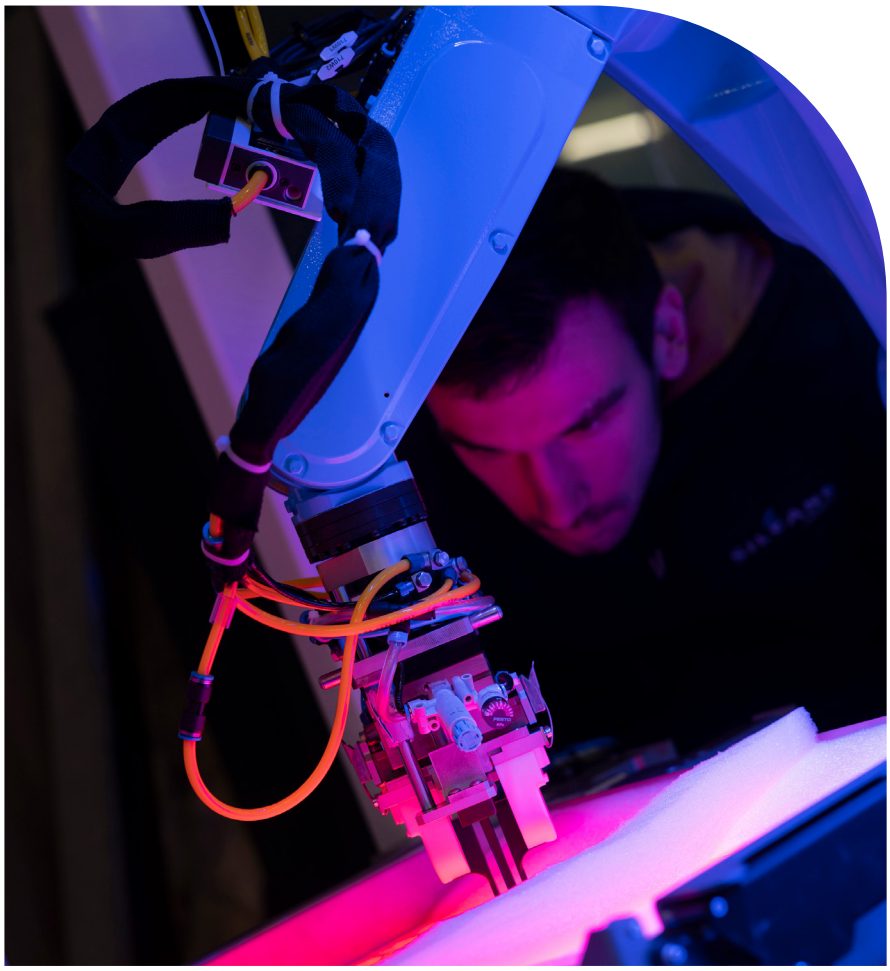
CASE STUDY

When robots start to feel: turning gripping into machine intelligence

Founded in 2002, the Siléane Group specialises in developing intelligent robotic solutions for industrial environments. By combining advanced robotics with vision systems, software, and artificial intelligence, Siléane helps manufacturers automate tasks once considered too complex or unpredictable for machines. This expertise is applied across fast-moving, highly-regulated sectors – including pharmaceuticals, food production, cosmetics, logistics, energy, and nuclear – where precision and reliability are critical.



Challenge

In a project for a global cosmetics manufacturer, Siléane faced a challenge at the heart of modern automation: ensuring that robotic gripping of lightweight, deformable parts was not just repeatable but verifiably correct in high-speed production environments – every single cycle.

Solution

Through close collaboration with Siléane, HBK accelerated the evolution of the PW22 into the PW22i by integrating IO-Link to meet real application needs. The upgraded, factory-calibrated smart load cells were embedded directly into the robotic gripper, delivering standardised, scalable, real-time gripping-force data while helping reduce integration and commissioning time.

Result

The outcome is a more reliable, intelligent, and scalable robotic system in which gripping becomes a controlled, measurable function – fully aligned with next-generation automation architectures.

From precise motion to reliable interaction

Industrial robots are exceptionally good at executing motion. They deliver speed, accuracy, and repeatability across countless applications, from pick-and-place to packaging and palletising. Yet when it comes to physical interaction – especially gripping – an important limitation remains.

In an application developed by Siléane for a major global cosmetics manufacturer, robots were required to handle lightweight, flexible, thermoformed trays with tight tolerances. The challenge wasn't moving the part, but whether it was correctly gripped. Partial contact risked product loss, imbalanced grip could deform the tray, and undetected failures could create downstream defects. Traditional validation methods based on position or binary detection offered little visibility into the true quality of contact.

Siléane needed a way to guarantee confidence in every interaction – without slowing the process.

From motion control to measurement driven automation

Instead of adding external inspection steps or increasing system complexity, Siléane took a different approach: embedding measurement directly at the point of interaction between the robot and the product.

Partnering with HBK, they integrated PW22i smart load cells with IO-Link into the robotic gripper. Four PW22i load cells, one at each contact point, allowed the robot to operate not just on programmed motion, but on measured physical reality.

The goal extended beyond error detection. By capturing real force data at the source, Siléane aimed to validate grip quality, react instantly to deviations, and integrate seamlessly into modern automation architectures – all without introducing unnecessary layers of complexity.

By embedding sensing directly into the gripper, Siléane transformed robotic motion into measurable, validated interaction.

Why PW22i and IO-Link make the difference

The choice of sensing technology was central to the solution, and the close collaboration with Siléane directly accelerated the evolution of HBK's proven PW22 load cell into the PW22i. Building on a platform long established in demanding dynamic weighing applications such as checkweighing and high-speed filling, HBK integrated IO-Link as a natural extension of the PW22 – driven by real application needs for simplified machine integration, real-time data availability, and compatibility with modern automation architectures.

The underlying PW22 design already offered high mechanical stiffness, fast settling time, excellent repeatability, and integrated overload protection, making it ideal for robotic end-effectors operating under tight cycle times and dynamic loads. By extending this robust, field-proven technology with IO-Link connectivity, HBK created a standardised and scalable solution that not only fits seamlessly into modern machine architectures but also supports fast, consistent deployment across machines and installations.

With a single cable for both power and data, real-time measurement values, diagnostics, and parameters are now available in real time directly at PLC level. This evolution supports predictive monitoring, fast and repeatable OEM parameterisation, and consistent system behaviour across installations. As a result, the sensor becomes an active component of the control architecture, contributing directly to machine level decision making rather than acting as a passive measurement device. For Siléane, this meant simplified wiring, faster commissioning, and a scalable solution that could be standardised and replicated across machines with minimal effort, while demonstrating HBK's ability to adapt proven sensing technologies to emerging automation requirements.

HBK's PW22i smart load cells with IO-Link deliver standardised, real-time gripping-force data directly at the point of interaction.

Built for next-generation automation architectures

By embedding intelligence directly at the sensor level, the solution aligns closely with key trends in industrial automation. Measurement data becomes immediately usable at the point of interaction, enabling rapid response to physical events, more stable processes, and reduced reliance on centralised control logic.

At the same time, seamless IT/OT integration ensures that force data can be accessed and used across the automation stack – from PLC-level control to higher-level systems – not only for real-time decision-making, but also for diagnostics, optimisation, and longer-term performance analysis, turning gripping into a truly data-driven, controllable function.

As HBK Product Manager Weighing Technology, Simon Kleefeldt, explains:

> This project reflects a fundamental shift in automation: embedding intelligence at the sensor level, to build systems that are more reliable, more autonomous, and easier to deploy.

Seamless integration into the robotic cell

From implementation to operation, the solution was designed to be as straightforward as it was powerful. The sensing technology was mechanically integrated into the gripper, connected directly to the existing IO-Link and PLC architecture, and commissioned without the need for additional system layers.

Because the intelligence is embedded by design, the system delivers continuous validation without increased software complexity or maintenance overhead – a key factor for long-term reliability in production environments.

Measurable results, reliable performance

The impact of integrating PW22i load cells into the gripper was immediate. By validating grip quality in real time across all contact points, Siléane significantly improved operational reliability and reduced gripping errors without compromising throughput.

The simplified system architecture reduced cabling and components, shortened commissioning time, and improved repeatability across installations. For the end customer, this translated into higher yield, reduced scrap, and faster return on investment.

A blueprint for intelligent gripping

This project illustrates a broader evolution in industrial automation. Performance is no longer defined solely by mechanics or control logic, but by the ability to measure and understand physical interaction.

With the PW22i smart load cell, Siléane has demonstrated how embedding intelligence directly into the gripper enables more autonomous, resilient, and scalable robotic systems – where robots don't just move precisely, but interact intelligently.

Explore your applications

Discover how to integrate measurement intelligence into your robotic and automation systems.

Find out more about HBK's PW22i smart load cell

Talk to an HBK expert and transform your machines into intelligent, connected systems.