MITSUBISHI ELECTRIC
Changes for the Better

Automating the World

FACTORY AUTOMATION

IKA Technology

Ingenieurwesen® Kontrolle Automatisierung

IKA Technology implements robot vision system to provide safety for employees and achieve time-savings.

Key points

- **The Challenge:** Automate a time-consuming and safety-lacking process
- **The Solution:** 4-axis robot with added vision and intelligence
- **The Result: Significant safety, cost savings, and time saving benefits**

THE CHALLENGE
Automate a time-consuming and safety-lacking process

Spectrometry is a micro-analytical technique used to identify and quantify compounds within molecules. These processes are usually associated with the food and beverage industry, water treatment, and environmental quality control.

However, IKA Technology, a Diamond Partner Systems Integrator of Mitsubishi Electric Automation, sought to automate tasks in the spectrometry process to measure the purity of metals.

The end-user, Helmut Fischer, sought a solution for their current, manual metal measurement process. According to Jose Antonio Diaz, Business Developer at Helmut Fischer, the manual nature of the process made it time-consuming to evaluate the pieces, and they could not assay the required volume of pieces entirely. In addition, requiring a worker to perform the process manually was potentially exposing them to harmful X-rays emitted by the measuring instrument. It was clear that an automated solution was required to ensure the safety of these tasks and that production rates would improve.

THE SOLUTION
4-axis robot with added vision and intelligence

IKA Technology decided to assemble a multidisciplinary team with experts in various areas and from various organizations to deliver the best solution to the end user.

They agreed that to achieve the intended goal, they must integrate a 4-axis robot, a vision system, a conveyor belt, and the instrument that will perform the spectrometry.

From that premise, Dr. Eduardo López, an expert in vision, proposed implementing a vision camera. This camera would analyze each piece of metal regardless of weight and/or size. This would allow the robot to place it in the precise location for the next step of the process, where measurement could be performed.

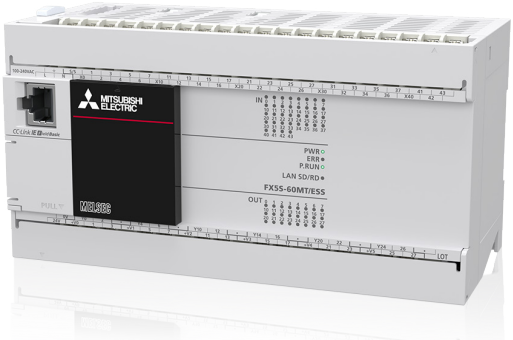
Jonathan Granados, a PLC and Robot Programming Engineer at IKA Technology determined that since the process is highly repetitive, the belt should not be in constant motion. A direct drive would increase energy consumption, so to save energy, Jonathan proposed using VFDs to modulate the speed and start/stop of the metals on the belt.

To meet the application's requirements, the team connected a SCARA-type robot, an Industrial PC that receives data from the vision system, microinverters, and low-voltage devices. For this, the team selected the iQ-F Series FX5U PLC from Mitsubishi Electric because it has straightforward discrete control, supports several simultaneous communications in different protocols, and can control multiple smart devices since all the cell's equipment responds to this master controller.

"A project of this nature requires high specialization in different areas such as robotics, machine vision, and material analysis. Mitsubishi Electric is the only brand that provides us with this level of integration."

– Dr. Víctor Eduardo López
Robotics and Vision Expert

The team then selected FR-D700 Series VFDs with vector control to enhance torque response and increase the motors' efficiency by incorporating optimum excitation control, which can result in up to 20% energy savings. Additionally, being compact, the VFDs have bookshelf mounting capability, reducing the total installation space within the cabinet, which will cut the overall cost of the installation.



Mitsubishi Electric motion and controls provide exceptional performance for cutting-edge motion applications.

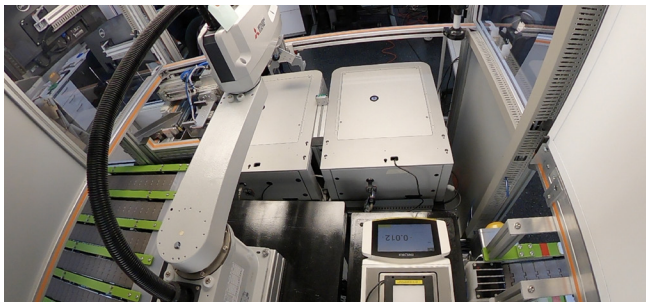
THE RESULT

Significant safety, cost savings, and time saving benefits

Metal pieces are placed randomly on sample racks and enter the process via the conveyor belt, where the inverters are responsible for modulating the required speed variations to manage energy consumption.

The robot then picks up the piece and places it under the vision device, which collects dimension and position data. Subsequently, the robot will place it on the measuring instrument, which will yield a result of GOOD (OK) or NOT GOOD (NG). The PLC will then instruct the robot whether this piece should proceed to the next stage of the process or be discarded. Finally, if the measurement result is good, the robot will place the piece on the final line of the process and pick up a new piece.

Through this process, the end user will obtain precise data about the purity of each piece in less time, saving energy and without the risk of exposing the operator to the X-rays that could have happened with the manual process.



"By choosing equipment that speaks the same communication language, you make the project's programming and implementation flow much more smooth."

– Jonathan Granados
IKA Technology

Learn more about


SCARA-type robot


FX5U PLC


FR-E800 and
FR-D700 Series inverters

Ingenieurwesen® Kontrolle Automatisierung
https://www.ika.technology

For more information or a free consultation with an automation engineer, please **CONTACT US.**

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