



Case Study

Data Acquisition and Automated Optical Inspection in Metal Presses Manufacturing

(IPC974-519-FL & ICO300)

The IoT integration of Metal Presses

To upgrade the product quality and efficiency of metal presses manufacturing, IoT integration is an inevitable step, which includes data analytics and automated optical inspection (AOI). Acquiring and analyzing mass data can be a substantial assistance for manufacturing that help supervisor keep an eye on equipment management, status and production report, and error detection at a glance. With AOI, the workload can be lowered, and the defect can be uncovered more accurately.

Challenges

The Smart Presses Inspection Solution provided by the customer, Chin Fong Machine Industrial Co., Ltd requires a high-performance machine vision system and a DIN-rail IoT gateway to operate the AOI and integrate data in the metal presses manufacturing process. To prevent the light reflection from interfering with the inspection, the metal products need to be flipped at multiple angles to scrutinize if it's defective. This fine process is relatively difficult for the traditional way of naked-eye inspection to achieve high accuracy and efficiency. Therefore, optimizing both vision systems and AI software to obtain complete and correct inspection results is a top priority.



Main Requirements

High-performance vision system with Intel® Xeon® processor

- High-end computing power
- Flexible GPU, frame grabber, and NIC PCIe expansion support
- Supports mainstream camera interface
- Wide operating temperature
- Wide range power input
- Supports ASUS AI Software

Cost-effective IoT gateway with Intel® Atom® processor

- Wide operating temperature
- Wide range power input
- Rich I/O connectivity
- Compact size for limited spaces

Axiomtek's IoT Gateway and Edge Computer Assemble the Solution for Data Analysis and AOI

Axiomtek has proposed the industrial IoT gateway, the ICO300, for the resolution to acquire and integrate the data. Its rugged and DIN-rail design fits right with the power presses. The ICO300 is powered by the Intel® Atom® processor E3815 or E3827. It possesses great connectivity with four RS-232/422/485 ports, two isolated GbE LAN ports, two USB 2.0, an 8-bit DIO, and a VGA. The ICO300 has one PCI Express Mini Card slot and one SIM slot for wireless network connection to transmit data to the cloud and central management. In addition, it is also certified by Microsoft Azure, making the further analysis of big data more accessible. The ICO300 is able to function in a wide temperature range of -20°C to +70°C. There's a 12-24V DC supply with terminal block that supports overvoltage and reverse protection. The ultra-compact size also ensured the ICO300 fitted into the existing cabinet space.



To run the AOI system, Axiomtek proposes the industrial system, the IPC974-519-FL, which is powered by the Intel® Xeon® E3 v5 and Intel® Core™ processors. Its scalable CPUs, great expansion capability and modularized design make it a versatile choice to meet the requirements of many projects, such as machine vision, deep learning, and robotics. With two LAN ports and four USB 3.0 ports, it can connect to a wide range of cameras and sensors for use in AOI. The high-performance edge computer is highly customizable with its four high-speed and full-size PCIe/PCI slots to support the GigE Vision frame grabbers, motion controller cards, AI acceleration cards and data acquisition cards. It has an optional built-in power board which provides 300W power to add-in graphics card. The system can operate

under a wide operating temperature range of -10°C to $+70^{\circ}\text{C}$ and supports a wide 9V to 30V DC voltage. Its compact form factor is ideal for direct integration in space-constrained machine.

Application: The ICO300 is incorporated in the manufacturing process, while the IPC974-519-FL provides computing performance for inspection



The customer has integrated the ICO300 in the manufacturing phase of the metal press to collect immediate data to check up on the operation. Therefore, the overall production process and product quality are expected to be completely monitored and continually improved, raising the capacity utilization ratio. Then in the inspection phase, the IPC974-519-FL runs the AISVision, which is a smart visual software toolkit from ASUS. The system can trigger the networked camera for inspection to find defects like scratches or stains. By doing so, the inspection process is free from human error.

System Configurations: IPC974-519-FL and ICO300

IPC974-519-FL - System Configurations

- LGA1151 socket Intel® Xeon® E3 v5, 7th/6th gen Intel® Core™ & Celeron® processor, up to 80W
- Intel® C236/Q170 chipset
- Supports four PCI/PCIe slots for full-size add-in cards
- High-speed I/O interfaces on one side for easy installation

- System power on delay function
- -10°C to +70°C operating temperature range
- ECM BIOS setting
- Intel® RAID 0,1,5
- Supports NVIDIA® GPU (up to 300W TDP)
- Supports TPM 2.0 and Intel® AMT 11.0

ICO300 - System Configurations

- Cost-effective with fanless and cableless design
- Intel® Atom® processor E3815 or E3827
- 4 RS-232/422/485 ports
- 2 isolated 10/100/1000 Mbps Ethernet ports
- 1 DIO port
- 1 PCI Express Mini Card slot (3G/GPRS or Wi-Fi)
- 1 CompactFlash (or mSATA) and SATA SSD (or HDD)
- 12 to 24 VDC wide range power input
- Supports Windows® 10 IoT solution

*For detailed specifications, please visit www.axiomtek.com or go to Products > Systems & Platforms>Industrial System > for [IPC974-519-FL](#); go to Products > Systems & Platforms> Embedded System> DIN-rail Embedded System for [ICO300](#)

Why Axiomtek

Axiomtek's products meet the demand of the customer and become the pivotal parts of the smart presses inspection solution. The systems successfully lead the traditional press manufacturing to IoT integration.

“Leading the new era of manufacturing operation upgrading with AI technology, Chin Fong Machine is glad to work with Axiomtek to jointly release this complete AOI solution. To solve industry pain points, machine vision and edge computing are becoming increasingly important. The impressive embedded vision system products provided by Axiomtek greatly support our journey towards

Industry 4.0,” said a project manager of Chin Fong Machine Industrial Co., Ltd.

About Chin Fong Machine Industrial

Chin Fong is the biggest maker of the mechanical power presses in Taiwan, capable with the most powerful R&D ability; the worldwide service and sales net for the customer support are superior to the competitors, famous for offering the best quality products in the global press market. The road a company has to go to grow, has no end. Chin Fong has a vision to be a global player with our talent and professionalism. We know how to serve our customers better.

About Axiomtek Co., Ltd.

Axiomtek has experienced extraordinary growth in the past 30 years because of our people, our years of learning which resulted in our tremendous industry experience, and our desire to deliver well-rounded, easy-to-integrate solutions to our customers. These factors have influenced us to invest in a growing team of engineers including software, hardware, firmware, and application engineers. For the next few decades, our success will be determined by our ability to lead with unique technologies for AIoT and serve our key markets with innovatively-designed solution packages of hardware and software – coupled with unmatched engineering and value-added services that will help lessen the challenges faced by our systems integrator, OEM and ODM customers and prospects alike. We will continue to enlist more technology partners and increase collaborations with our growing ecosystem who are leaders in their fields. With such alliances, we will create synergy and better deliver solutions, value, and the expertise our customers need.

Axiomtek is a Member of the Intel IoT® Solutions Alliance. A global ecosystem of more than 800 industry leaders, the Alliance offers its members unique access to Intel technology, expertise, and go-to-market support—accelerating the deployment of best-in-class solutions.