

## Metal detection

## Remote monitoring and control solutions for food safety

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**Introduction**

In the rapidly evolving landscape of the food industry, remote solutions for product inspection systems have emerged as vital tools for enhancing efficiency, accuracy, and safety. These solutions enable real-time monitoring and control of inspection equipment such as metal detectors, X-ray systems, and checkweighers remotely. By leveraging advanced communication protocols and secure remote access technologies, manufacturers can quickly identify and resolve issues, optimize maintenance schedules, and ensure compliance with regulatory standards.

**Customer benefits**

Product inspection remote control solutions offer several significant benefits, enhancing the efficiency and effectiveness of quality control processes. They enable real-time monitoring and control of inspection systems whether located in hard-to-access areas such as high pipelines or in spaces with minimal user access, and minimizing production downtime through quick identification and resolution of issues. These solutions support predictive maintenance by continuously tracking system performance, which helps prevent unexpected failures and extends equipment lifetime. Additionally, it facilitates quick and appropriate responses to alarms, while keeping records and live data easily accessible.

**Product inspection remote control options**

There are multiple options for product inspection systems that offer the convenience of remote control for many customers applications; this includes metal detectors, checkweighers, and X-ray inspection equipment. In this application note, we will explore two remote options for product inspection systems: Remote Hardware and Remote Access Solutions.

## Remote hardware solutions

Thermo Scientific remote hardware solutions are available for both metal detectors and checkweighers. A remote HMI controller is available for both the Sentinel and Apex metal detectors. The standard HMI controller is front and center of the metal detector; however, the remote HMI controller can be extended from the location of the metal detector, up to a distance of 30 meters. See Image 1 for the Sentinel option. Our Apex metal detector also offers a remote HMI controller for both the bulk system and the Rx system. See Image 2 for the Apex option.

Thermo Scientific™ Versa checkweighers also offer a solution using remote hardware. The Versa checkweigher has a remote cabinet option where the location of the cabinet can be extended up to 20 meters from the checkweigher system (Image 3).

## Remote software solution

If space is limited, a remote option is available for multiple Thermo Scientific product inspection systems. The Sentinel metal detectors utilize the Modbus communication protocol to provide remote access to data and control actions, such as statistical information, product selection, reject history, and inspection status. Similarly, the Versa Checkweigher can be controlled remotely using Modbus, allowing customers to obtain information like product setup, change active products, view ranges in weight for batches, and access statistical data without having to be physically in front of the checkweigher HMI.

Thermo Scientific™ NextGuard™ and Xpert™ X-ray systems also utilize the Modbus communication protocol for remote monitoring and control of the production line. This includes selecting recipes or products for testing, status of conveyor and X-ray, alarms present, and viewing reject history. However, due to safety regulations, activating the X-ray source must be done directly via the HMI on the system to ensure immediate and safe responses. As a result of utilizing the Modbus communication protocol, combo systems—combinations of either a metal detector or X-ray system with a checkweigher—offer the ease of expanded system monitoring as well as operation management. See Image 4 for an example of the information that can be gathered from remote access, such as the accepted product, rejected product, alarms, recipe currently running, and line speed of the live product being tested on the Sentinel HMI screen.

Setting up remote access also allows our technical support team the ability to remotely diagnose your system. Remote diagnostics are available on Sentinel metal detectors, NextGuard and Xpert X-ray systems, and the Versa family of checkweighers. This enables our technical support team to facilitate diagnosing the issue, potential repairs, minimize down time, and facilitates response time for on site service team.

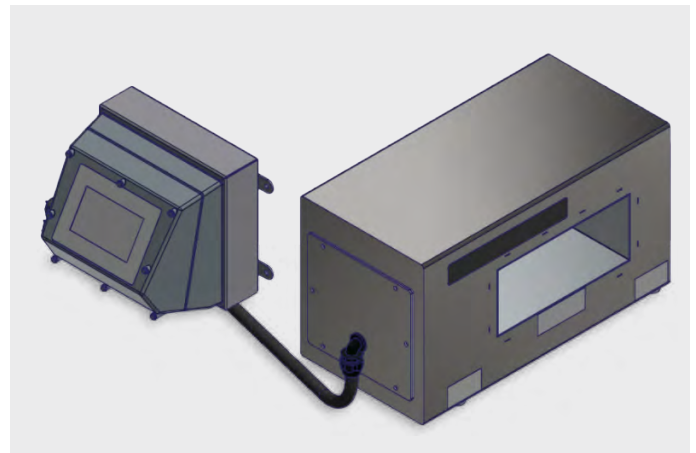


Image 1: Sentinel with remote control HMI.



Image 2: Apex with remote control HMI.



Image 3: Versa Checkweigher with remote cabinet.



Image 4: Sentinel HMI screen.

## Application examples

These solutions are suitable for any industry. Here, we will discuss the most common applications where these solutions are found. In the case of remote hardware solutions, it is quite common to be used in applications where the system is either positioned in a location that is not accessible (high off the ground) or in an area with limited space for the controller and the system, so a remote hardware option provides flexibility to the user. One common application is in bulk product inspection, such as grains, nuts, and raw materials before packaging. In these cases, the aperture of the metal detector is often mounted above the operator's eye level, typically due to pipeline location. A physical remote HMI allows the operator to access the display without needing to reorganize or add additional steps to access the unit, thus facilitating the task and ensuring safe monitoring of the products.

In addition to the previously mentioned applications, these solutions are commonly used for centralizing and standardizing data gathering. This improves data analysis and production processes by facilitating improvements such as determining weight differences, tracking reject rates, and monitoring batch variations—all from a single location. One example of this approach is a manufacturer using multiple checkweighers in their production line. By utilizing Modbus, they can gather information on their systems and recipes, as well as maintain a centralized location for data collection.

## Conclusion

Product inspection remote solutions offer substantial benefits by enhancing the efficiency and effectiveness of quality control processes through real-time monitoring and control from any location and minimizing production downtime. Thermo Fisher provides versatile remote options, including hardware solutions like extended HMI controllers for Sentinel and Apex metal detectors, and remote cabinet options for Versa checkweighers. These are complemented by remote access solutions using Modbus communication for comprehensive control and data access in Sentinel metal detectors, Versa checkweighers, and NextGuard and Xpert X-ray units, ensuring safety compliance. These solutions are particularly beneficial in challenging environments, such as drop-through and pipeline metal detector applications, and facilitate centralized data gathering for improved analysis and production processes. Overall, Thermo Fisher's remote solutions significantly enhance operational efficiency, product quality, and compliance, making them indispensable in modern quality control and product inspection.



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