

Safe injection molding machines in the era of remote access

遠端連線整合時代：安全的射出成型機

The protective measures dictated by the COVID-19 pandemic force companies to limit the number of persons present on the production floor to an absolute minimum. To ensure fully automatic and efficient production in spite of this, an ideal solution is to combine a small number of workers on site with colleagues working from home offices via remote access to the machinery. More and more companies are discovering and increasingly using the option of accessing machines from outside the corporate premises. Many machine control systems, though, were not yet laid out for this type of utilization at the time they were developed and are consequently susceptible to malware infestation and misuse through cyber attacks.

COVID-19 新冠病毒的防護措施，迫使公司要求將生產人員數量限制在最低限度。儘管如此，為了確保全自動和高效的生產，理想的解決方案是將少量工人與通過遠端異地連線機器從家庭辦公室工作的同事相結合。越來越多的公司發現並且日與俱增地使用從公司場所外部連線機器。但是，許多機器控制系統在開發之時尚未針對這種用途進行佈局，因此很容易受到惡意軟件的侵擾和網絡攻擊的濫用。



Schematic representation of work cell shielding.
工作單元屏蔽的示意圖

However, the latest generation of WITTMANN BATTENFELD injection molding machines with **B8** control and **WITTMANN 4.0** option has been developed for safe remote access with the help of an optimized firewall and many extra safety features, and thus offers a high level of cyber security.

然而，最新一代的威猛巴頓菲爾注塑機已開發出具有 B8 控制和 WITTMANN 4.0 選配，借助優化的防火牆和許多其他安全功能來實現安全的遠端連線整合資訊，從而提供了高水平的網絡安全性。

The **WITTMANN 4.0** option extends the **UNILOG B8** machine control system by a separate production cell control system (the **WITTMANN 4.0 Router**), which performs various communication tasks as well as protective functions. One of these functions is the external firewall, which has been optimized for operation with injection molding machines.

WITTMANN 4.0 選配通過一個單獨的生產單元控制系統（**WITTMANN 4.0 路由器**）擴展了 **UNILOG B8** 機器控制系統，該系統執行各種通信任務以及保護功能。這些功能之一是外部防火牆，它已針對注塑機的運行進行了優化。

In this way, the **WITTMANN 4.0 Router** shields the machine's control system from the outside world. Unlike office PCs, injection molding machine control systems cannot normally be upgraded automatically to the latest operating system software and be equipped with the most recent security patches. An update would first have to go through an elaborate, time-consuming verification process carried out by the manufacturer. As a result, malware can in the meantime exploit security gaps in the operating systems of machine control systems which are already known but not yet closed. One possible scenario is the misuse of machine control systems for denial-of-service (DoS) attacks, which in the worst case will cause control system failure and thus production standstill.

威猛 4.0 路由器通過這種方式將機器的控制系統與外界隔離屏除威脅。與辦公室 PC 不同，注塑機控制系統通常不能自動升級到最新的操作系統軟件，並不能配備最新的安全補丁。更新首先必須經過製造商執行的詳盡、耗時的驗證過程。結果，惡意軟件同時可以利用機器控制系統的操作系統中已經存在但尚未關閉的安全漏洞。一種可能的情況是將機器控制系統濫用於拒絕服務（DoS）攻擊，這在最壞的情況下將導致控制系統故障，從而導致生產停頓。

The **WITTMANN 4.0 Firewall** has been optimized for the typical use of an injection molding production cell (restrictive firewall). As standard, virtually all ports are closed, which are not dedicated to essential external communication of the injection molding machine and the appliances connected with it. The expressly permitted communication processes are also subject to continuous plausibility testing (intrusion detection). If the communication volume exceeds the typical volume of data to be expected, this could point to a DoS attack, which is then stopped by immediate counteraction.

威猛 4.0 防火牆針對注塑生產單元（限制性防火牆）的典型使用進行了優化。作為標準，實際上所有外線接口都是封閉的，並非專用於注塑機及其連接設備的必要外部通訊。明確允許的通信過程也要經過連續的真實性測試（入侵檢測）。如果通信量超出了預期的典型數據量，則可能指向 DoS 攻擊，然後立即採取抵制措施將其停止。

Another security aspect is the aggregation of the OPC-UA servers of the injection molding machine and the auxiliary appliances in the **WITTMANN 4.0 Router**. So, the communication between an external data client and the actual appliance or the injection molding machine within the production cell takes place exclusively via an aggregation server in the **WITTMANN 4.0 Router**. All requests from external clients are dealt with directly inside the router without being passed on to the physical appliances. This is a further security feature.

另一個安全方面是**威猛 4.0 路由器**中注塑機的 OPC-UA 伺服器 and 輔助設備的整合。因此，外部數據客戶端與生產單元內的實際設備或注塑機之間的通信僅通過**威猛 4.0 路由器**中的整合伺服器

進行。來自外部客戶端的所有請求都直接在路由器內部處理，而不會傳遞到物理設備。這是另一個安全功能。

The **WITTMANN 4.0 Router** is equipped with a secure boot process which allows automatic updating of the operating system as long as the respective update has a certificate from WITTMANN. This prevents the installation of fake updates in the hardware which could be capable of circumventing all kinds of security installations.

威猛 4.0 路由器配備了安全的啟動過程，只要相應的更新具有威猛的證書，就可以自動更新操作系統。這樣可以防止在硬件中安裝偽造的更新程序，而這些偽造的更新程序可能會規避各種安全性安裝程序。

It must be expected that machines will increasingly need to be accessible from outside in future. This makes it all the more important to have secure access to the entire production cells, such as the access provided by the WITTMANN BATTENFELD **UNILOG B8** control system in combination with the **WITTMANN 4.0 Router**.

必須預料，將來越來越需要從外部訪問機器。這使得對整個生產單元進行安全訪問變得更加重要，例如由威猛巴頓菲爾 **UNILOG B8** 控制系統與**威猛 4.0 路由器**結合提供的訪問權限。

The WITTMANN Group

The WITTMANN Group is a worldwide leader in the production of injection molding machines, robots and peripheral equipment for the plastics processing industry, headquartered in Vienna/Austria and consisting of two main divisions: WITTMANN BATTENFELD and WITTMANN. These two divisions jointly operate the companies of the WITTMANN Group with eight production plants in five countries. Additional sales and service companies are active in 34 facilities in important plastics markets around the world.

WITTMANN BATTENFELD pursues the further expansion of its market position as an injection molding machine manufacturer and specialist for state-of-the-art plastic processing technologies. As a supplier of comprehensive, modern machine technology in modular design, the company meets both present and future market demands for plastics injection molding equipment.

The WITTMANN product portfolio includes robots and automation systems, material handling systems, dryers, gravimetric and volumetric blenders, granulators, temperature controllers and chillers. With this diversified range of peripheral units, WITTMANN offers plastics processors solutions to cover all production requirements, ranging from independent production cells to integrated plant-wide systems.

The integration of these various segments under the umbrella of the WITTMANN Group has led to complete connectivity between the various product lines. This integration has greatly benefited plastics processing users, who are increasingly looking for seamless production, including automation and peripheral functions.

威猛集團是塑料行業中製造射出機、機械手和周邊設備的全球領航者。威猛集團總部設在維也納/奧地利，由兩個主要部門，威猛巴頓和威猛組成，他們共同經營集團旗下分公司，在全球 5 個國家設有 8 個生產工廠，其中超過 34 個直屬子公司位於世界各大塑料市場，並各自負責該區域的銷售及售後服務。

威猛巴頓致力於製造最先進的射出機和工藝技術的獨立市場增長，提供現代化和全面的機械模組化設計，滿足塑料射出成型的實際和未來要求。

威猛的產品系列包括機械手和自動化系統，中央供料系統，除濕乾燥機，秤重式和體積式的計量機，粉碎機，模具溫度控制器和冷卻器。憑藉這種全面的周邊設備，威猛可為塑料加工商提供涵蓋所有生產要求的解決方案，從自主工作單元到整個工廠範圍的系統。

在威猛集團的領導下，所有產品線連接為一體，提供塑料加工商在射出機、自動化和輔助設備的無縫接軌，為塑料加工廠帶來了益處，對加工機械與自動化和外圍設備的無縫集成日益增長。

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