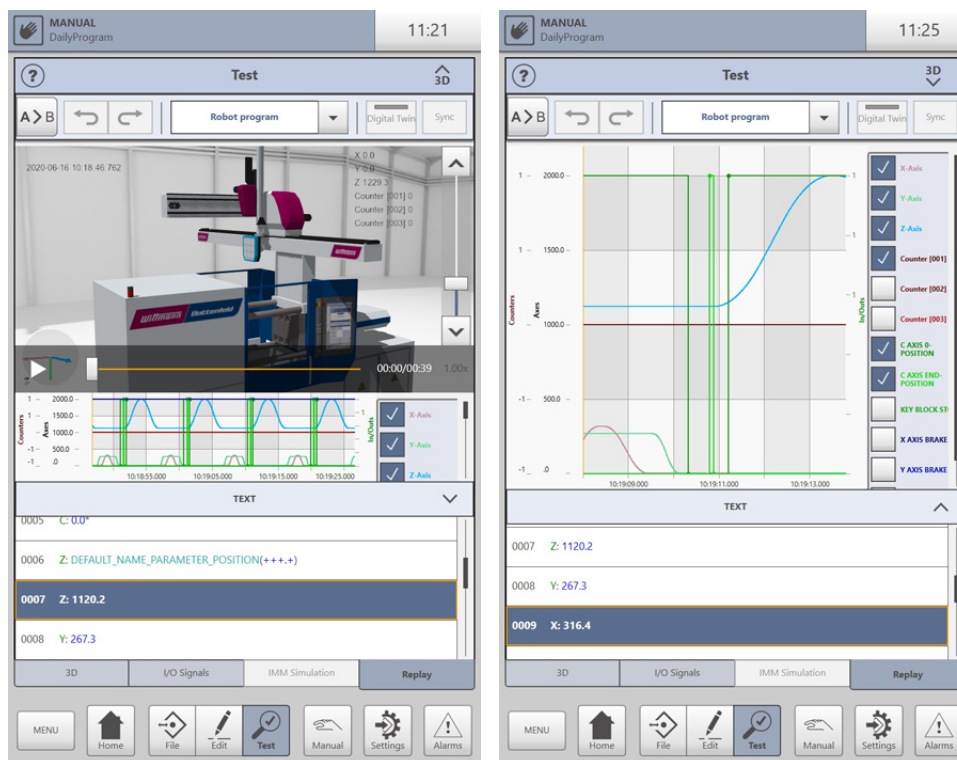


Video assistance system in WITTMANN robots with R9 control 威猛機械手臂 R9 控制器：視頻輔助系統

*In live sports broadcasts, slow motion replays of controversial or spectacular scenes have been common practice for a considerable time. Apart from the added entertainment value for spectators, such slow motion views also support correct decision-making by referees and can be used in training. This function is now also installed in WITTMANN robots with **R9** control systems.*

在現場體育節目中，有爭議或壯觀的場景通常使用慢動作回放，這是經常使用的方式並已成為慣例。除了為觀眾增加娛樂價值外，這種慢動作視圖還能支援裁判員做出正確的決策，並可以在訓練中使用。現在，R9 控制系統的威猛機器手臂也配置了此功能。



Visualizations of video assistant replay data on the R9 TeachBox.

視頻助手的可視化回放了 R9 手控器上的數據

The task of the robot's video assistant is performed by the digital twin, which is installed in every **R9** control system as standard. The digital twin is displayed directly on the **TeachBox** and can replay preceding sequences at any desired speed. As the digital twin has access to the configuration of the physical robot on which it is installed, it is familiar with that robot's equipment options and is able to visualize these appropriately.

機器手臂視頻助手的任務是由「數位雙胞胎 Digital Twin」執行的，作為標準配置安裝在每個 R9 控制系統中。「數位雙胞胎 Digital Twin」直接顯示在手控器上，並且可以以任何所需的速度重放之前的序列。由於「數位雙胞胎 Digital Twin」可以訪問其所安裝的物理機器手的配置，熟悉該機器手的設備選項，並能夠適當的可視化顯示這些選項。(備註: Digital Twin 也稱為數字映射，指在信息化平台內模擬物理實體、流程或者系統，類似實體系統在信息化平台中的雙胞胎。藉助於數字映射，可以在信息化平台上了解物理實體的狀態，甚至可以對物理實體裡面預定義的接口元件進行控制。)

As soon as the physical robot switches into the automatic operation mode, the twin records all changes in the positions of the individual axes, the entrance/exit points, the counters and all other values relevant for the operation of the appliance. All data are recorded with a precision of 4 ms and can be traced back into the past for up to 100 seconds. In this way it is possible to access the record for any desired point in time. Another vital fact is that the teach-commands executed are saved here, too.

當機器手切換到自動操作模式，「數位雙胞胎 Digital Twin」就會記錄單個軸的位置，入口/出口點，計數器以及與設備操作相關的所有其他值的所有變化。所有數據均以 4 毫秒的精度記錄，並且可以追溯到過去長達 100 秒。這樣，可以在任何所需的時間點回溯檢查記錄。另一個至關重要的事實是，執行的示教導命令也保存在此處。

An example of a practical application could be the standstill of a robot for unknown reasons – with the subsequent option to retrieve a visualization of the incident on the **TeachBox** for fault analysis. When the robot standstill occurs, the data recording is discontinued, and the preceding 100 seconds are now available for analysis. A time controller installed on the **TeachBox** makes it possible to define a point in time within the displayed sequence. This controller can be shifted in both directions as desired, in order to examine in detail and repeatedly critical changes of status which have occurred.

實際應用的一個範例可能是由於未知原因而使機器手停滯不前，即可在手控器上檢索事件的可视化圖以進行故障分析。當機器手停頓時，數據記錄將中斷，並且前面的 100 秒可用於分析。安裝在手控器上的時間控制器可以在顯示的順序內定義時間點。該控制器可以根據需要在兩個方向上移動，以便詳細檢查並反複檢查已發生的狀態的關鍵變化。

During the analysis, the physical robot could stay defective or out of function, since only the digital twin is moved on the **TeachBox**, and only its status changes are displayed.

在分析過程中，物理機器手可能會保持故障或無法正常工作，因為只有「數位雙胞胎 Digital Twin」在手控器上虛擬移動，並且只會顯示其狀態被更改。

The video assistant makes it much easier to detect causes of defects and supports the operator's efforts to prevent a repetition of similar incidents. Consequently, it contributes to increasing the uptime of every R9 robot – and thus the efficiency in production.

藉助視頻助手，可以更輕鬆地檢測出故障原因，並支持操作員為防止重複發生類似事件所做的努力。因此，它有助於增加每個 R9 機器手的正常運行時間，從而提高生產效率。

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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