

What robotics can be



# Whitepaper Robot Neutrality



## Abstract

World Robotic Report has identified in their reports since 2019 till date that ease of integration and ease of programming are two major trends that will impact the robotic and automation industry. Furthermore, according to Mordor Intelligence, both the industrial robotics market and programmable automation controllers expect a CAGR of 13 percent and 15 percent in the next five years. In this paper, we shed insight onto the topic of Robot Neutrality which addresses these significant trends and how organizations can unleash the power of automation and actively take part in the developments and the market share.

## Introduction

Industrial robots were first introduced in manufacturing processes by the end of the 1970's. Since their introduction on the assembly lines, there were massive improvements in the hardware where the mechanics and control systems were developed. On the other hand, the way these robots are programmed underwent only minor changes.

The majority of the applications were still programmed manually until recent times. The introduction of collaborative robots and their approach to robot programming drove their market share and brought robotics closer to many new users. Due to this change and many other factors such as demographics and lack of workforce, even the more traditional players in robotics and automation industry have started different approaches and developments in the way robots and control systems are being programmed.

Due to the recent developments and significant trends in the market, there are three main ways the industrial robots are being programmed in the industry:

- [Teach Pendant Programming](#)
- [Physical Teaching](#)
- [Offline Programming Softwares](#)

Each of these methods has its own advantages and disadvantages.

On the other hand, a significant factor, namely interoperability, will greatly influence robotics and

industrial automation in the future. There had been enough examples in other major industries in the past such as the computer and telecom to name a couple. As the robotic adoption increases, interoperability amongst the individual systems will be much in focus. Currently, many organizations choose one robotic platform that covers the majority of their application areas. As the portfolios of the individual robot and automation system providers expand, the organizations have a tougher choice and often must compromise additional functionalities to reduce the complexity. The major complexity arises due to the communication between the systems and making them work seamlessly with each other. As a result, the organizations in the automation industries are highly segmented, limiting the potential of automation. With the customers' increasing needs, the manufacturers of automation systems will be forced to set standards and utilize architectures that are open as a result of facilitating interoperability across different platforms.

**How can interoperability between these different systems be achieved?** The keyword is Robot Neutrality – a new and innovative method that combines the existing ways to program industrial robots and control systems.

## What is Robot Neutrality

The term robot neutrality is coined with the intention to drive factory automation where the platform and manufacturer of the robot and control system play a minor role, and the decisions are based solely on the application and the best suitable system for the application. The core idea behind the term is to boost versatility. The factor of versatility has a higher significance than ever in the VUCA world, and the past few years made the industry realize that adapting faster is crucial to survive and thrive. In order to adapt, both reusability and reacting faster are important factors.

For the user, robot neutrality means manufacturer independence. A wide variety of control systems can be integrated with their respective process advantages. It is not necessary to build up or purchase expensive control-specific know-how in these areas. Thus, workers with little previous knowledge can program robots and controllers with the same elements, such as icons, without having specific knowledge in specific programming languages.

One major challenge for SMEs is high investment costs in automation systems with high payback times. This is mainly due to the project nature of many automation systems. fpt has set itself the goal of offering Plug and Play capable standard automation based on icon-based robot programming. The core of this product is to automate processes with technically defined and preconfigured automation components. The platform independent software forms the core of robot neutrality. The preconfigured plug and play components can be removed from or added to the system through a standardized hot connect interface between individual automation components.

Specifically using *FlexOP*, it is possible to combine the advantages of the two programming methods mentioned above: teach pendant programming and offline programming. The following section deals with the role *FlexOP* plays in achieving Robot Neutrality and simplifies robot installation and programming.



## How is it achieved

To achieve this shift, we have to change the approach towards automation from hardware-focused to software-focused. Classically the system integrators have a hardware-focused approach. They take components and equipment designed for a fixed use case, carefully stitch the pieces of equipment together, and write specific software for the task. In contrast, a software-focused approach takes standardized hardware blocks and reusable software packets, making it possible to configure the application instead of programming and have the possibility to reconfigure for other applications.

The software-focused approach gives the freedom of using Plug and Play components and reusing the equipment with all the flexibility. It also reduces the waste in the processes and makes this approach a sustainable one in the factory automation of the future.

The major leap in the awareness and recent developments in standardization across hardware, software, interfaces, and accessories boost the software-focused automation approach. It is also making it possible to reconfigure standard cells to perform various tasks ranging from pick and place to machine tending, assembly, sorting, and many more.

In Figure 1, a custom variant of *FlexOP* is shown, and the icon flow and parametrization of a robot. The *FlexOP* can be built in different variants to suit the customer-specific design aspects within that product organization fit.

*FlexOP* utilizes the advantages of recent developments in plug-and-play interfaces and empowers the users using a low code approach. By giving a unified visual approach to configuring and programming multiple automation platforms, users can configure their own applications. Using industry standards and specially composed iconography lets users intuitively program automation applications. Using the model-driven development methodologies, users can build complex applications based on pre-built modules along the *FlexOP*. The business advantage is enormous with this approach as it promotes collaboration and bridges both business and development departments. With this collaboration, the industry has repeatedly shown that the transformation of ideas into applications and the delivered value increases substantially.

Anlage	Baugruppen	<b>Roboter</b>	System		
<b>Roboter-Abläufe</b>	Roboter-parameter	Roboter-Infos	Teachen	Variablen	Überwachungen

**AUTO**

**RESET**

UP1

UP2

UP3

UP4

TEST

5

Positionieren auf einen Punkt

Kommentar	Ablage Förderband		
Verzögerung	<input type="text" value="0.0"/>	<input type="text" value="5.0"/>	s
Geschwindigkeit	<input type="text" value="50"/>	%	Bewegungstyp <input type="text" value="PTP"/>
Beschleunigung	<input type="text" value="20"/>	%	Überschleifen <input type="text" value="Inaktiv"/>
Punkt	<input type="text" value="Förderband"/>		

Kommentar [ 42 Zeichen ] = Ablage Förderband

Figure 1 Icon Programming approach of a Robot (Custom Variant)

## What factors play an essential role?

It is necessary to define interfaces that enable Plug and Play components to enable these developments. These interfaces have to be implemented on both the software and hardware sides. At the same time, it is crucial to have software interfaces that are defined and available openly so that many component manufacturers can use them to implement openness within their components. Therefore, the *FlexOP* Plattform supports multiple industry-standard interfaces

to integrate a broad spectrum of components. On the other side, the hardware interfaces are also necessary to achieve standardization, and the *FlexConnect* interface is the result of this necessity. The bus systems and the signals are predefined, and using the color coding, it is easier to connect components as a result enabling the Plug and Play production systems

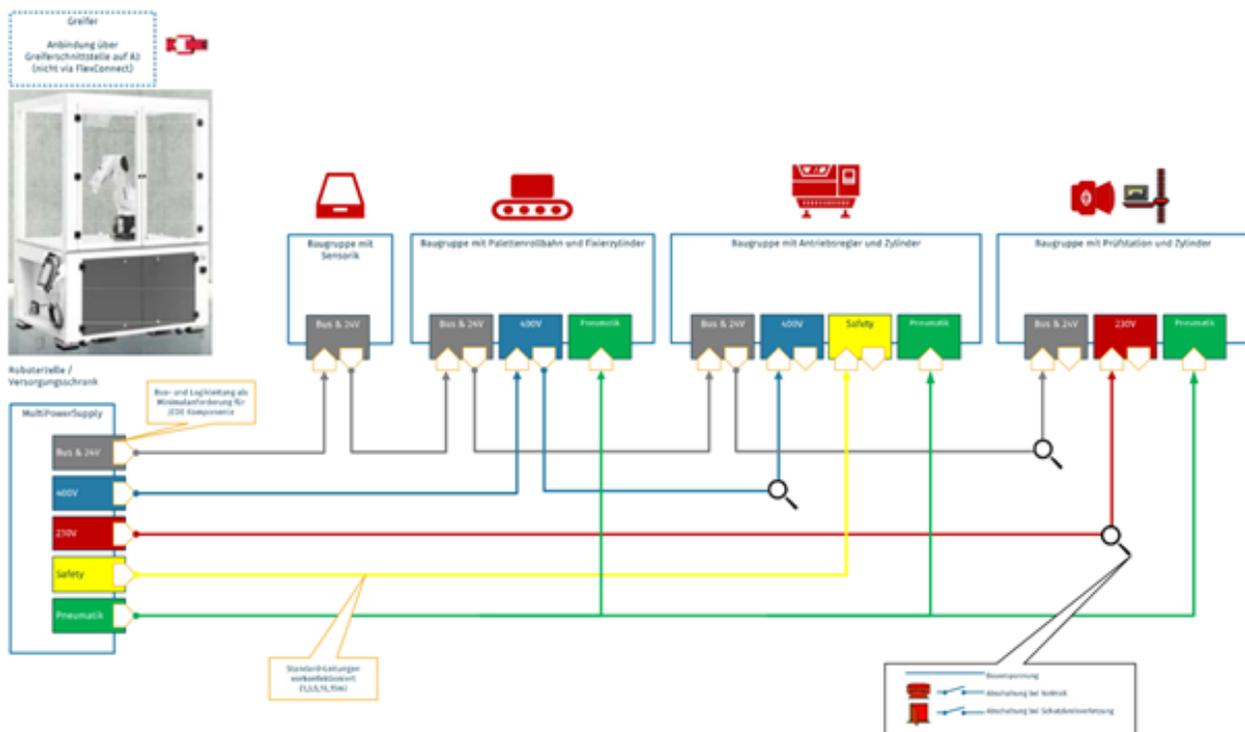


Figure 2 FlexConnect Interface for hardware compatibility

## Significance of Robot Neutrality and Easy Programming for the business

Robot Neutrality and Easy Programming have a high significance for the business. The main factor affecting the business results are described in the six following points:

- 1** Due to the lower entry barrier, the degree of automation is increased in organizations resulting in increased efficiency to integrate a broad spectrum of components. ✓
- 2** A significant reduction of time of around 40 percent to program a robot and automation component and a reduction of around 60 percent of standstill times of machines ✓
- 3** Empower your employees by giving them tools to react to the changing market demands and reach new goals ✓
- 4** Reduction of specialized personnel for programming automation systems, addressing the challenge of demographic change and the lack of specialized workforce ✓
- 5** Using solutions that are intelligent, flexible, and scalable will significantly drive the value generation across the entire organization ✓
- 6** Have the relevant data (Diagnostic, Operation, and Process Insight) always on hand in one place in order to make the right business decisions ✓

„Pure reason must  
never be victorious!“



Taking new paths, questioning established ideas, realising visions. With a combination of creative ingenuity and strong technical expertise we are repeatedly redefining **what robotics can be**. The result: automation systems that are far in advance of industrial digitisation – flexible, efficient, holistic. Our actions are admittedly not always reasonable – although our solutions are. Guaranteed.

40 years of high-tech and innovative spirit

Got interested?

The time is now to move on and accelerate your business. With FlexOP and fpt, you can take a proactive step to overcome the challenges of scaling your business and leapfrog the competition with a state-of-the-art factory. **For more information, please visit [www.fpt.de](http://www.fpt.de)**