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Mitsubishi Electric Türkiye Drives Industrial Transformation with AI-Powered Robotic Manufacturing and Digital Factory Solutions

Necmi Ömerdedeoğlu, Robot Product Manager at Mitsubishi Electric Türkiye Factory Automation Systems, emphasizes that human–robot collaboration will play a pivotal role in the manufacturing models of the future, and notes that Mitsubishi Electric develops solutions that assume a critical role in driving this transformation.

1. **Could you share with our readers an overview of your organization in Türkiye, the solutions you offer, and your sales and after-sales services?**

Mitsubishi Electric is one of the world's leading companies, with more than 145.000 employees operating in over 120 countries across a wide range of fields including aerospace technologies, semiconductors, energy generation and distribution, communications and information technologies, consumer electronics, industrial automation, and building systems.

As Mitsubishi Electric Türkiye, we have been operating in Türkiye since 2012, carrying out activities in many areas such as factory automation, air conditioning systems, elevator and escalator systems, visual data systems, and power plants.

Today, manufacturers need to respond rapidly to fast-changing and increasing consumer demands, as well as to fluctuating and growing market requirements. Industrial technologies and automation systems play a critical role in ensuring that all production processes are carried out with minimal errors and deficiencies. As Mitsubishi Electric Factory Automation Systems, we bring together our innovative automation products, servisçe, and advanced technology solutions with manufacturers. By supporting them in completing their digital transformation journeys, we help them build the digital factories of the future today and gain a competitive edge in global markets.

2. **What are the latest technology trends in the manufacturing sector? How do you evaluate the role of automation applications and artificial intelligence in production?**

In today's world, decisions are made very quickly, and we expect all processes—from production to delivery—to progress at the same pace. Consumers increasingly demand personalized and customizable products and services, delivered as quickly as possible. Manufacturers therefore need to

respond rapidly to changing and growing consumer expectations and to volatile demand patterns. In this new industrial era, where digitalization and automation come to the forefront, traditional technologies are no longer sufficient to meet increasingly personalized consumer expectations.

The unprecedented challenges experienced over the past few years have pushed manufacturing companies worldwide to rethink how they can sustain their competitive advantages and maximize profitability. Facing numerous operational challenges, manufacturers are questioning how to transform their operations in order to meet customer demands and succeed in both today's and tomorrow's markets. The COVID-19 pandemic, which affected the world globally in recent years, played a major role in accelerating this transformation. Along with increased demand volatility and the emergence of new working models, including remote work, the trend toward smarter factories has gained significant momentum. We have observed that many companies, especially SMEs, recognized the importance and necessity of digital transformation during this period, leading to a substantial shift in perspective. Many industrial companies initiated their digital transformation journeys and experienced the productivity gains, quality improvements, and returns on investment brought by this transition. According to a Mitsubishi Electric study conducted in 2020*, 46.5% of companies using factory automation products—nearly one in two—accelerated their progress toward smarter factories.

In today's Industry 4.0 landscape, AI-supported industrial solutions and automation systems play a vital role in enabling flexible production and ensuring that all processes are carried out with minimal errors. The number of digital and smart factories—where robots and automation systems operate and smart objects communicate with each other—continues to increase every day. Supported by artificial intelligence and autonomous systems, factories gain the ability to adapt production lines more easily to personalized needs and challenging competitive market conditions. Manufacturers are encouraged to proactively adopt data-driven technologies such as data analytics, artificial intelligence (AI), and digital twins, which support digital transformation strategies and unlock significant opportunities for business intelligence.

3. What types of solutions do you offer within "robot-based production" projects to help factories achieve both high quality and efficiency while reducing costs?

At Mitsubishi Electric, one of our key priorities is supporting industrial production with artificial intelligence. Core automation solutions combined with AI, which enhance flexibility and profitability, help companies respond more quickly to today's dynamic environment, meet customer demands even in challenging periods, and sustain successful growth. As Mitsubishi Electric Factory Automation Systems, through our e-F@ctory manufacturing solution—which aims to increase efficiency across the entire production lifecycle from engineering and manufacturing to maintenance—and our proprietary MAISART technology (Mitsubishi Electric's AI creates the State-of-the-ART in technology), we enable companies to gain high value from artificial intelligence. The use of Mitsubishi Electric robots in production processes and assembly applications provides significant advantages in areas such as mechatronic systems, system design, fast changeovers, and human–robot interaction.

With the Mitsubishi Electric e-F@ctory concept, we offer a comprehensive solution platform consisting of both hardware and software that can be used throughout the entire value chain—from procurement and production to sales and after-sales processes. By enabling flexible production lines that can respond to changing consumer behavior, e-F@ctory allows companies to leverage data to produce faster, at lower cost, and with fewer defects. The ability to manufacture different products on the same line with minimal changes and effort significantly reduces production costs. Thanks to the e-F@ctory concept, which enables companies to build the digital factories of the future today, the platform can be easily adapted to a wide range of applications, including third-party products, machine

vision sensors, sensors, and pneumatic systems. Our e-F@ctory infrastructure enables production data generated within factories to be transferred to cloud systems and transformed into meaningful insights, while allowing all machines and systems on the production line to communicate over the internet—supporting higher speed, cost savings, quality, and productivity.

Easy coordination between robots, multiple robots controlled via a single controller using the iQ-R Platform, and robots that communicate with each other, wait for process sequences without entering each other's workspaces, and operate in tandem when required—all significantly simplify and accelerate production processes. Our AI-enabled robots come standard with advanced functions, predictive maintenance capabilities, and easy-to-use programming interfaces. With our collaborative robot MELFA ASSISTA, which complements the e-F@ctory concept, we further enhance human–robot interaction and enable hybrid production models. Thanks to open communication architectures, not only AI software running internally but also software developed on external platforms can exchange result data via 5G communication. The absence of communication limitations allows production models to be fully shaped according to user needs.

MAISART technology provides users with intelligent engineering tools that simplify new task definitions, as well as predictive maintenance functions to ensure continuous production. By enabling robot cells to be commissioned quickly and allowing rapid changeovers between products, MAISART contributes significantly to flexible manufacturing. The AI continuously evaluates component lifetime parameters based on the robot's real-time performance and actively adjusts the robot's software to achieve faster and more efficient operation. Mitsubishi Electric also enhances safety in human–robot interaction through its Melfa Safe Plus technology. When Melfa Safe Plus is used in industrial robots, sequential human–robot assembly scenarios can be created. Robots equipped with intelligent engineering tools analyze data from torque sensors to automatically adjust working parameters, calculate the fastest and least stressful way to perform tasks, and optimize operations accordingly. With automatic coordinate matching between machine vision sensors and robots, tasks that previously took 20 minutes can be completed in just one minute. Robots continuously monitor human access zones within the cell, limit their working areas, slow down by switching to torque mode, or move to standby positions as needed, and resume operation automatically once the human exits the workspace. This enables manufacturers to establish human–robot hybrid assembly stations and increase production flexibility. Within this concept, we also offer edge computing, data analytics, and cloud integration solutions that help manufacturing companies further differentiate themselves from competitors.

* Source: https://www.mitsubishielectric.com/fa/announce/pdf/news_20230518.pdf