

# STÄUBLI AUTOMATICA 2016



## The new world of robotics

**For Staubli Robotics, Automatica in Munich is the biggest event of 2016. "We have a completely new exhibitor concept which shines a spotlight not only on product development, but also on the whole new world of robotics," pledges Gerald Vogt, CEO of Staubli Robotics Germany and Deputy Group Division Manager. "For the first time ever, trade show visitors will discover for themselves the reality behind our philosophy of Man and Machine."**

Thanks to their pioneering safety features, the six-axis models of the TX2 series have all stages of man-machine interaction well and truly covered. There are a number of ways in which they can safely function alongside people, sharing workspaces in a scenario that for all intents and purposes amounts to working "hand in hand".

The TX2 series is just as suitable for high volume production with minimal variants as for small batch production with multiple variants. In Munich, Staubli will be

showcasing these machines operating as partners to a human workforce within a real Smart Factory environment, eventually proving that Industry 4.0, the Internet of Things (IoT) and human-robot interaction have finally arrived in actual practice.

Furthermore, the communicative capability of these new robots makes production processes more transparent and efficient. It allows users to remotely monitor the performance of their robots via smartphone or tablet. Data from the Industry 4.0-compatible

TX2 series can be downloaded at any time via appropriate apps. The new control system even includes a remote maintenance tool, permitting a robot health check from your office desk.

**Find out more in Munich, we look forward to seeing you there!**

**Your Staubli exhibition team**



TX2 CS9 SP2 Safety



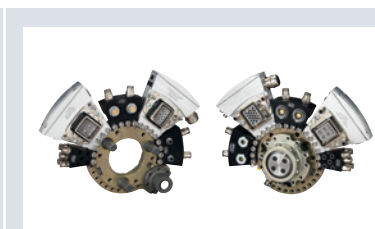
FAST picker TP80 he



TS80 ESD



TX60 stericlean



Robotic tool change systems

## Man and Machine

# A new era of robotics

**The world of robotics is changing. IoT, Industry 4.0, man-robot collaboration – what strategies and solutions is Stäubli deploying in response to these megatrends, and to what extent does the new generation of TX2 robots point the way to the future? Answers to these questions were provided by Simon Whitton, Marketing Manager Stäubli Robotics Division.**

**It was Stäubli who coined the term “Redefining Performance”. In the meantime, your market competitors have picked up on the concept. What exactly do you at Stäubli mean by this strategy?**

Whitton: Here at Stäubli, Redefining Performance is all about the process covering the ongoing systematic development of all robot series. The objectives are to drive innovation, to meet or even exceed customer requirements and to set the technological benchmark. The developers at Stäubli closely monitor the markets, act promptly on customer feedback and continuously improve our robots in all areas, including programming, technical performance and service. The daily redefinition of performance and the focus on ever higher quality and operating standards is aimed at ensuring that Stäubli customers can continue to rely on the best available robotic solutions for many years to come.

**Let’s take a look at the current TX2 series. What specific product benefits has Redefining Performance brought to the new robot series?**

Whitton: In fact, the TX2 series is a prime example of our all-embracing Redefining Performance strategy. While the predecessor series

has already been known as high-performance machines, these new six-axis robots have nonetheless succeeded in raising the bar in all respects. The TX2 robots are slightly lighter in weight, which makes them even more dynamic and energy efficient. Thanks to their more rigid structure, they even outperform their predecessors in terms of precision and tracking. However, the really outstanding aspect of these machines is the integration of safety features which make them ideally suited for different levels of man-robot interaction.

**But the TX2 models look like “normal” industrial robots and not like the archetypal collaborative robot ...**

Whitton: They not only look that way but actually are conventional industrial robots which tick all the boxes in both columns: they can handle classic robot applications as well as MRC scenarios. And that was precisely what we set out to achieve. We go our own way in man-robot interaction and have as a matter of policy not developed any costly special kinematics for purely MRC applications. In our opinion, this type of robot is subject to excessive restrictions on load and dynamics. We wanted to build a robot for every conceivable application. That is why we have adapted our standard robots to work with people while maintaining full capability. For this reason, we are confident that we will be exhibiting the world’s fastest Safe Robots at Automatica in Munich.

**What levels of man-robot interaction are the TX2 models suitable for?**

Whitton: The robots are basically suitable for all levels of man-robot interaction, for example, for oper-



ation without a safety barrier, for applications where human and machine share a workspace and for applications in which humans and robots collaborate. I am thinking here of applications in which the human worker hands parts to the





**How do these machines attain the requisite level of safety?**

Whitton: The six-axis robots have their own digital encoders – one per axis – and an integrated independent safety board. All accident prevention features comply with the stringent requirements of safety category SIL3/PLe. To ensure maximum safety, every movement of the robot is monitored by sensors. This involves logging the coordinates of the robot as well as its speed and acceleration in real time. With our TX2 and TX2touch robot series, we rely on configurable, secure I/O modules as well as real-time Ethernet fieldbus systems that guarantee maximum safety and compatibility.

**At least as important as MRC is the major issue of Industry 4.0. Are the new TX2 robots ready for future developments in this area?**

Whitton: The TX2 series supports all common communication standards and supplies relevant data in real time. The robots are thus compliant with all criteria for use in Industry 4.0 environments. Our six-axis machines already relay production data to IT systems further up the chain and thereby provide a basis for the networking of production with the digital world.

**So the robots are highly communicative. Can this data be used for mobile applications via smartphones, tablets etc.?**

Whitton: Of course. With the web server technology of our control system and corresponding apps, Stäubli customers can check up on their robots from anywhere in the world – whether by phone, tablet or laptop. We even sup-

ply a remote maintenance module as standard. This permits thorough health monitoring of our robots. Faults can then be fixed online by our Stäubli Service.

**Stäubli is the world's largest producer of special models for industry-specific robotic solutions. What TX2 special versions can we expect to see in the near future?**

Whitton: Because the TX2 series has the same enclosed design as its predecessor and also has the same advantages of build, there will certainly be more of these machines coming out in the special versions that we are well known for. We are gradually launching HE versions for humid environments, H1 oil versions for food and life science applications, Cleanroom, Stericlean, ESD, Plastics – the list goes on.



**“A new generation of robots is now making it possible for man and machine to work side by side, safely, while meeting manufacturers’ needs for increased productivity.”**

Simon Whitton  
Marketing Manager  
Stäubli Robotics



robot or receives them from it. Stäubli also offers solutions for direct collaboration with people, in other words applications in which humans and robots work together on a task.

TX2 – Redefining performance

# Revolution rather than evolution



1 TX2-40

2 TX2-60/TX2-60L

3 TX2-90/TX2-90L/TX2-90XL

4 SP2 control pendant

5 CS9 robot controller



**“We have adapted our standard TX2 series to work with people without compromising on performance. This is also why we are able to confidently present the world’s fastest Safe Robots.”**

Gerald Vogt  
CEO at Stäubli  
Robotics Germany  
and Deputy Group  
Division Manager

**The new TX2 series marks a step change for Stäubli. Over and above the all-round enhanced performance, it is the new safety features and concomitant opportunities for man-robot interaction that characterize the TX2 generation.**

The three model series – TX2-40, TX2-60 and TX2-90 – arrive on the scene with a number of innovations. These six-axis machines look more streamlined and dynamic while remaining faithful to the predecessor model series in terms of design. What remains is the compact build with now even slimmer contours. The robots are capable of handling loads of between two and 20 kilos with a reach of between 515 and 1,450 millimeters.

The new machines are more lightweight, rigid and strongly motorized, making them even more dynamic and – thanks to a number of updates – also more energy efficient. However, the real technological breakthrough is in terms of accident prevention. Stäubli Robotics has

succeeded in integrating pioneering safety features. With its TX2 series and CS9 safety control, the manufacturer has ushered in a new era in man-robot collaboration.

## Performance and efficiency redefined

Stäubli has gone down a different path than most other market competitors. Gerald Vogt, CEO at Stäubli Robotics Germany, explains: “We did not want to create expensive dedicated kinematics for purely MRC (Man-robot Collaboration) applications. Such robots are generally subject to excessive restrictions on load and dynamics. That’s why we have adapted our standard robots to work with people without compromising on performance and also why we are able to confidently present the world’s fastest Safe Robots.”

The six-axis machines of the TX2 series have a separate digital encoder for each axis and an integrated safety board. All accident prevention features comply with the stringent requirements

of safety category SIL3/PLe.

## Mechanical design without equal

On the mechanical side too, these robots are setting the benchmark. Thanks to their patented drive technology offering top performance in terms of precision, speed and availability, they are the first choice for all tasks subject to demanding cycle time criteria. With its enclosed structure and waterproof wrist, the TX2 series is ideal for use in clean room deployments as well as for applications in harsh environments. All six-axis units have optional vertical cable entry on the base of the robot and can be mounted on the floor, wall or ceiling.

“The TX2 series represents a new dimension in terms of quality, precision, dynamics and safety,” adds Vogt. “With their performance, the six-axis machines will contribute to greater productivity and efficiency in all areas of industry, including standard applications and MRC situations.”

- 1 Max. Payload 2,3 kg  
Reach 515 mm,  
Repeatability  $\pm 0,02$  mm
- 2 Max. Payload up to 9 kg  
Reach up to 920 mm  
Repeatability  $\pm 0,03$  mm
- 3 Max. Payload up to 20 kg  
Reach up to max. 1450 mm  
Repeatability  $\pm 0,04$  mm
- 4 Easier Man and Machine interaction,  
configurable “user home page” for quick  
information and shortcuts
- 5 CS9 Safety controller, fast diagnostics,  
quick service



Highspeed kinematics qualified for broader remit

# FAST picker range now extended

**Stäubli Robotics is demonstrating new variants of its FAST picker TP80 high-speed robot. The Robot is now available in Humid Environment (HE) specification as well as in a 200 mm Z stroke version.**

With these new variants, the specialist manufacturer has extended the capability of the FAST picker's revolutionary four-axis kinematics, which can work at more than 200 picks per minute. Stäubli is targeting the HE version of the FAST picker TP80 primarily at applications in the food industry. HE stands for Humid Environment and designates Stäubli models that have been specifically modified for use in production contexts where the atmosphere is moist or in areas subject to water spray. They are the natural choice for circumstances where the strictest hygienic standards apply and for conditions in which there is a daily routine of cleaning with detergents.

With the introduction of the HE variant, the TP80 is now perfectly suited to food applications. The four-axis model with its protected design is able to withstand the rigorous cleaning procedures of the food industry. At the same time, it can be lubricated with food grade oil Class NSF H1 without any loss of performance. In this combination, the FAST picker meets all the sophisticated requirements of customers in the food industry.

## 200 mm Z-stroke for more flexibility

For industrial applications which involve rapid transfer and sorting processes, the TP80 was previously subject to certain restrictions due to its maximum Z-stroke of 100 millimeters. But not anymore: the FAST picker can now be ordered with an



1 FAST picker TP80 he



optional 200 mm jt 3 axis. The other performance data remain unaffected: the four-axis model can operate across large work spaces with a diameter of 1.6 meters and has a repeatability rate that, in everyday practice, exceeds the factory specification of  $\pm 0.05$  millimeters. Thus high precision is guaranteed, even after many thousands of operating hours. Occurrences of wear and tear in continuous operation are eliminated in this kinematics type with its rigid structure. In addition, all utilities and media lines are routed



2 FAST picker TP80



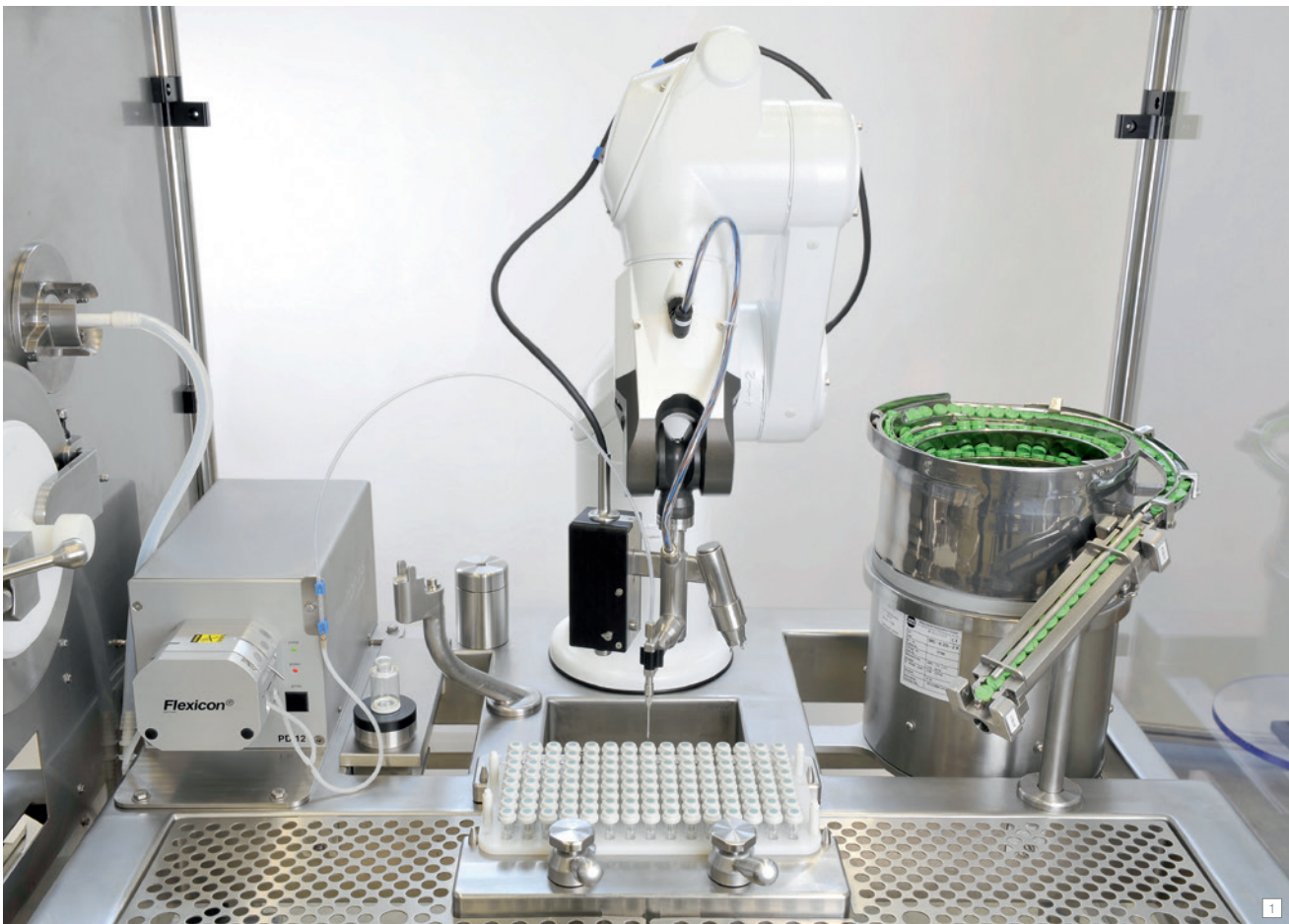
within the arm. The Fast picker has been systematically honed for reliability, accuracy and performance.

- 1 FAST picker TP80 in Humid Environment (HE) specification – alternatively it can be lubricated with food grade oil Class NSF H1 without any loss of performance. Enclosed structure, protective covers and bellows offering high protection of the sensitive pick area.
- 2 FAST picker TP80 – High-speed kinematics in a 200 mm Z stroke version.

FAST picker TP80 he  
**The world's only clean picker dedicated to handling operations of small parts (under 1 kg). It is particularly well suited for rapid transfer and sorting processes under strictest hygienic standards.**

Stäubli offers end to end solutions for sensitive industrial applications

# Robots for sensitive environments



Sensitive Environments  
Stäubli is the leader in designing industrial robots for sensitive environments. More than 25 years ago already, Stäubli cleanroom robots were first used in the manufacturing process of electronic chips. 10 years ago, after developing the first sterilizable robot worldwide, Stäubli successfully achieved the milestone of automating pharmaceutical processes.

**Medicine, pharmaceuticals, biotechnology, food, electronics, semiconductors, cleanrooms, laboratories – for all of these challenging industrial environments, Stäubli offers a complete range of suitable robots. At the same time, the specialist manufacturer is highly efficient in qualifying standard robots for industry-specific requirements.**

The current Stäubli robot line-up is aimed at all automation technology markets and includes high-speed SCARAs, the Stäubli FAST picker and 6 axis articulated models capable of handling loads ranging from 1.0 to 190 kilos. Thanks to their unique design features, the standard robots require relatively minor modifications to convert them for use in sensitive environments.

Stäubli is reaping the benefits of having developed a proprietary patented drive technology for its six-axis robots rather than relying on standard transmission systems bought off the shelf. Thanks to their enclosed structure with all the cables routed internally, the robots are ideally equipped to cope with even the most extreme conditions. And Stäubli has achieved this not only with its smaller robots but also across the large six-axis models right up to the TX200 series.

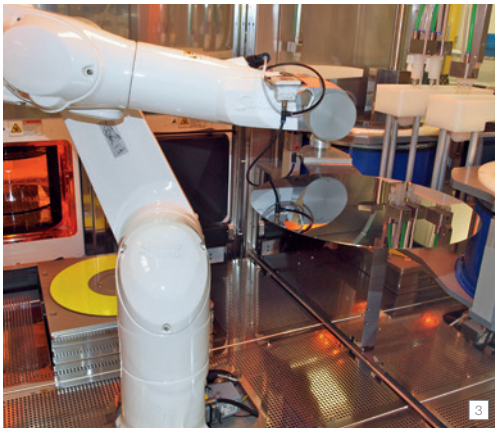
Gerald Vogt, CEO Stäubli Robotics Germany: “Because of their superior design, we can readily convert our basic robots and offer a variety of versions suited to different applications. Where conventional standard robots struggle to keep up, Stäubli machines cope with relative ease, which

also makes these special robots very attractive in terms of price.”

That explains why the manufacturer now offers the world’s widest range of robots in special versions and is the undisputed market leader in this segment. Additional product suffixes such as HE (Humid Environment), Cleanroom, Supercleanroom, ESD (Electrostatic Discharge) and Steri-clean designate the special versions which deliver the same high level of performance that has come to be expected of the standard models.

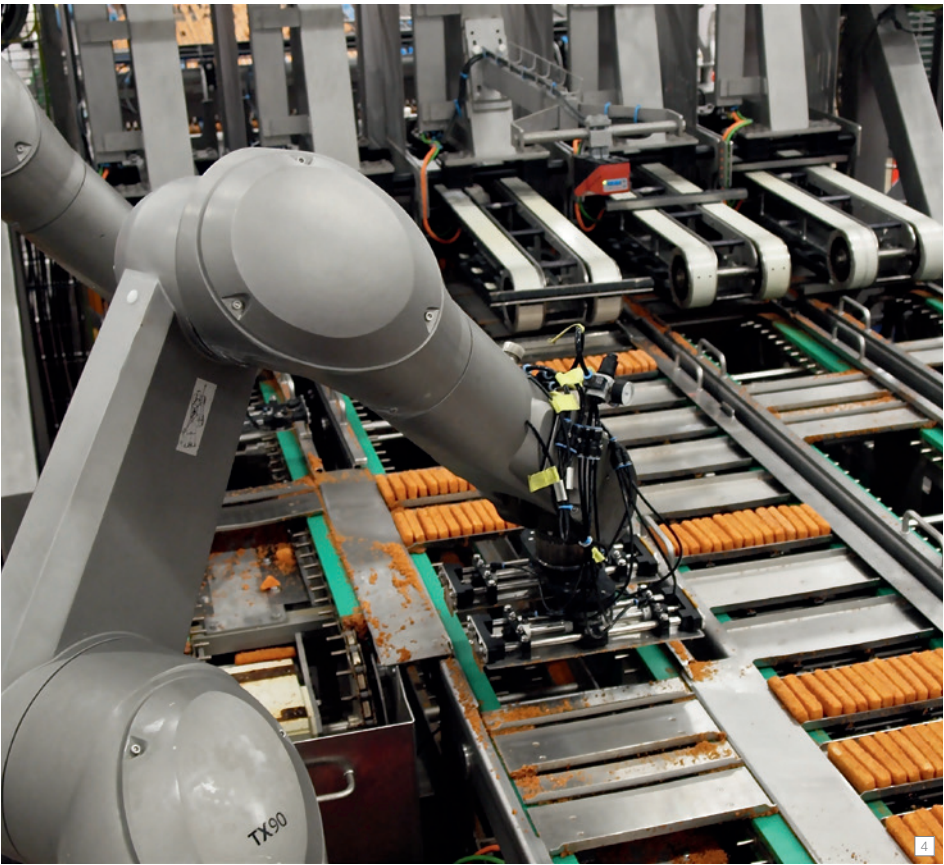
## Over 10 years experience as wet-room specialists

Stäubli Robotics has systematically extended its range of HE-compatible models. The extreme conditions in the cleaning system can do no permanent damage to the



Stäubli 6-axis robots as well as the FAST picker TP80 which have been proofed against corrosion, acids and alkali, and which are heat resistant. Whether used for water jet cutting, for machining, or for industrial parts cleaning, the Stäubli HE models are in all cases the first choice. In the food industry, where stringent hygiene standards apply, Stäubli HE robots likewise represent the ideal solution. They





can easily be cleaned with detergents and hosed off with a water jet as part of the daily cleaning routine.

Cleanroom variants for all cleanroom classifications

The encapsulated Staubli six-axis machines cut a fine figure in cleanroom environments. The standard versions of the TX2 and RX series already conform to cleanroom class ISO 5. The optional Cleanroom variants are identified by the CR suffix, which signifies that they comply with the specification of cleanroom class ISO 4. On request, Staubli will take cleanroom

compatibility to the next level and deliver Supercleanroom versions that meet the stringent requirements of cleanroom class ISO 2.

Stericlean robots in an aseptic environment

With the development of the world's first Stericlean robot, Staubli has succeeded in automating aseptic processes in VHP (Vaporized Hydrogen Peroxide) environments. All six-axis TX/RX robot series are now available in Stericlean versions compliant with strict GMP (Good Manufacturing Practice) guidelines. Thanks to their special enclosed

design, the use of stainless steel in the manufacture of stressed parts and a unique surface coating, these sophisticated machines are able to work uninterrupted in aseptic production areas. This has constituted a breakthrough for robot-based automation in germ-free environments.





Protection against electrostatic discharge (ESD)

Staubli also provides a perfect remedy to electrostatic discharges, a problem which can be particularly disruptive in electronics manufacturing. All six-axis and SCARA kinematics are available as ESD versions

[from 10<sup>x</sup> to 10<sup>y</sup> (Ω/□)] offering optimum protection against the sudden discharge of static electricity.

"All these special designs are characterized by a clean, consistent performance that is in no way inferior to that of the equivalent standard robot," adds Vogt. "These dedicated models are just as precise, fast and reliable as our universal machines, delivering outstanding performance under extreme conditions without performance compromise, even when lubricated with food grade oil."

- 1 A TX60 stericlean is used for clinical drug trials inside an enclosed isolator to fill cytotoxic drugs and other highly effective products.
- 2 A ceiling mounted Staubli RX160 HE completely takes care of parts handling in a cleaning system. The extreme conditions can do no harm to the Staubli HE robots which have been proofed against corrosion, acids and alkalis.
- 3 The high-precision Staubli TX60L cleanroom robot ensures ultra-safe handling of wafers in the back-end area. A single wafer can be worth as much as 10,000 Euros.
- 4 The enclosed Staubli TX90L HE robot copes well with this crumbly product and the subsequent cleaning cycles.
- 5 ESD antistatic robots are used exclusively throughout the modular automation line of gear actuator modules made of high-performance plastic.

	Humid Environment	Cleanroom/Supercleanroom	Stericlean	ESD
				
Robot range	FAST picker TP80 he / TX200L he	TX60 cr / TX200 cr	TX40 scr / RX160 scr	TS80 ESD / TX90 ESD
Numbers of models	11 models	8 models	8 models	14 models
Payload	up to 150 kg	up to 34 kg	up to 34 kg	up to 150 kg
Reach	up to 2594 mm	up to 2010 mm	up to 2010 mm	up to 2594 mm



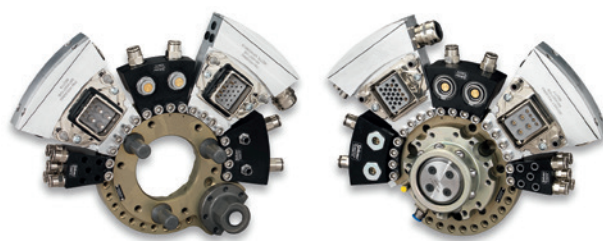
# Further Stäubli applications at Automatica 2016

## World premiere for robotic tool change systems

**Two compact fully automatic tool change systems, the MPS 130 and the MPS 260, celebrate their world premiere. With these two change systems for the medium payload segment, Stäubli Connectors rounds off the lower end of its existing series. The two new series are not only intended for applications in the automotive industry, but the advantages of the automatic gripper and tool changer should open up other markets. With the automatic tool changer, the application of robots can be significantly expanded and their efficiency and productivity increased.**

Stäubli Connectors has paid particular attention to a weight-optimised design of the new tool changer so that users don't have to invest in robots of the next highest payload category. Thus the weight of the MPS 130 is only 1.8 kg on the robot side and just 1.1 kg on the tool side. With the larger MPS 260, these values are 3.8 and 2.2 kg. Although the changer may be light, it is not short on strength and resilience. The MPS 260 impresses with a maximum load of 350 kg and a bending moment of 2,000 Nm. The smaller MPS 130 has a maximum load of 100 kg and a bending moment of 900 Nm.

As with the larger models, the two new additions meet the strictest safety requirements according to safety category 3, performance level d. The tool changers can be equipped with customised modules and components for media, data and electrical power transmission. To guarantee maximum reliability, Stäubli is the only manufacturer worldwide to develop and produce the complete changer single-handedly. The locking mechanism, the media module and the entire connection technology comes from a single source. The advantage is that all components are produced under an integrated quality management system in the highest production quality.



Change systems MPS 130 and MPS 260, medium payload range

## About us

Accelerating productivity through innovative mechatronics solutions

**Stäubli is a global mechatronics solution provider with three core activities: Textile, Connectors and Robotics. We are an international group based in Switzerland, with a presence in 25 countries. Our global workforce of more than 4,500 shares a commitment to partnering with customers in nearly every industry to provide comprehensive solutions with long-term support.**

### History and future

Founded in 1892 as a family-owned workshop on the bank of Lake Zürich, Stäubli is a pioneer in mechatronics, rooted in a proud heritage of quality craftsmanship. We are also a forward-thinking organization, on a continual quest for the next great innovation that will help our customers work more productively, efficiently, and sustainably.

### Global presence

- 12 industrial production sites, including Stäubli Group company Multi-Contact
- Presence in 25 countries through our sales and service subsidiaries, providing local support
- Agents in 50 countries

[www.staubli.com](http://www.staubli.com)

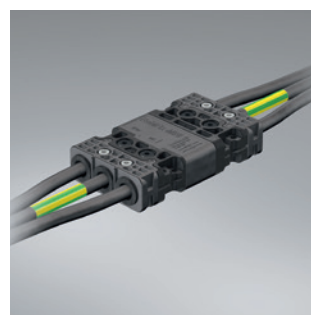
## Electrical contact solutions for automation

**Multi-Contact presents electrical connector systems for automation. The new primary circuit connector RobiFix-MINI with its compact, lightweight design is easily integrated into lightweight design concepts and can be installed even on small robot arms. RobiFix-MINI can be used both with traditional applications within a frequency range from 50 to 3000 Hz and with new, trendsetting welding technologies with frequencies of up to 10 kHz.**

The CombiTac modular connector system allows the combination of power (300 A), signal, data, fiber optics, pneumatic and fluid contacts in one single system, meeting the exact specifications of an application. The connectors are resistant to vibrations and are designed for up to 100,000 mating cycles in harsh industrial environments. The new 10-Gbit module for Ethernet communication complies with all CAT6A requirements.



The CombiTac modular connector system with the new 10-Gbit module.



The compact RobiFix-MINI connector for welding and lightweight applications.

Multi-Contact is specialized on connectors for high mating cycles, customer-specific contact solutions, assembled connectors and fully tested assemblies from one single source. Thanks to the proven MULTILAM technology, the connector systems guarantee reliable and long-lasting electrical connections.

For further information:

[www.staubli.com/contacts](http://www.staubli.com/contacts)



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