

STÄUBLI FLASH

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Automatica 2012



Performance. Passion. Perfection.

Editorial



Automatica, here we come!

It's not long now until Automatica opens its doors to the public on 22nd May. Stäubli and Multi-Contact cordially invite you to AUTOMATICA 2012. For the first time the Stäubli Robotics and Connectors divisions are showcasing on a common booth together with the Group company

Multi-Contact their entire spectrum of cutting-edge product technologies. Outstanding electrical connectors, innovative coupling technology and robot tool changers, as well as a complete range of high-performance robots that not only demonstrate the excellence of the Stäubli Group but also emphasize the potential synergy effects, i.e. customers who use the full range of Stäubli technology benefit from automation solutions that are exemplary in terms of efficiency, return on investment and sustainability.

Manfred Hübschmann,
General Manager, Stäubli Robotics Germany



TP80 Fast Picker

**Ideal for ultrafast
pick & place applications**

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High-speed
machining robot



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Blue Competence

BLUECOMPETENCE

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Partner of the Engineering Industry
Sustainability Initiative

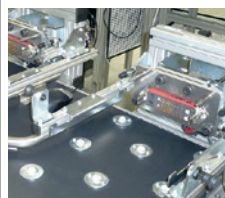
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Automatic
tool changers



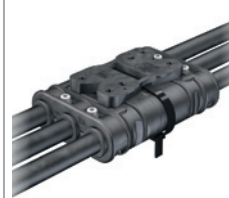
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measuring cell



TP80 setting new benchmark for ultrafast pick & place

Stäubli introduces innovative high-speed kinematics

Stäubli Robotics is introducing the TP80 Fast Picker, an ultrafast four axis new technology of high-speed Pickers for standard pick & place applications. This innovative series of high-speed Pickers deliver greater speeds of more than 200 picks per minute, and more flexibility at a lower cost to all markets.

This extremely rigid new robot represents the latest innovation – one that is more agile and lightweight while delivering extremely fast cycle times while maintaining high precision with homogenous repeatability “throughout the entire work envelope”. A simple base or wall mounting eliminates the need for a large, costly gantry, further enhancing the robot’s cost effectiveness and ease of integration. Additional advantages include a slim forearm for moving into slotted machine openings as well as harness and user lines feed-through the Z-axis that are all internal. Thus offering an alternative for numerous standard applications.

Machining robot for Composites

With its articulated RX170 hsm robot, Stäubli is writing a new chapter in the history of high-speed precision machining. For certain applications, this highly specialized robot is the ideal alternative to the machine tool – Stäubli has identified a whole series of operations such as milling, deburring, trimming, drilling and tapping.



RX170 hsm

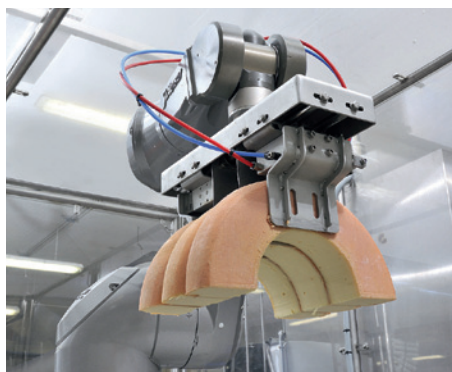
Thanks to the robot’s reach of 1,835 millimeters, even large work pieces are easy to process. When used in combination with a linear axis, workspace can be expanded



almost without limit – an advantage that opens up entirely new applications for the milling robot. Another point in its favor is that the RX170 hsm makes unproductive idle time for loading and unloading a thing of the past. Generally, multiple work stations will be positioned around the robot.

Six axis robots for Humid Environment applications & more

Stäubli will highlight its HE robot range (Humid Environment), from TX60 to TX200, designed for high-humidity production, wet spray and wash down areas. The HE robot is often used where cleaning routines require the highest standards of hygiene. It is hermetically sealed, IP 65/wrist joint even IP67, suggesting the possibility of submersion in liquid. Its exterior surfaces are specially treated to resist corrosion, and the components exposed to the most wear and tear are made of stainless steel.



TX200 he

Whether you are working in a humid/wet environment, immersion, or have high demands on hygiene – the TX he robot series

ranging from TX60 to TX200 are all ideally suited to work under these conditions.

Specialists for medical & pharmaceutical markets

The 6-axis stericlean robot meets GMPs and specification till Grade A environment. With specialized lip seals, critical components made of stainless steel, and specific exterior surface make the stericlean ideally suited to work in production areas using vapor hydrogen peroxide (VHP). No other series-manufactured robot can make this claim – making it possible to automate filling processes under sterile conditions for the first time ever.



TX40 stericlean

Stäubli Robotics underscores its leading position in the medical and pharmaceutical market offering a fully specialized series of TX stericlean robots from TX40 to RX160 from 1.7 kg to 20 kg for nearly every imaginable application as lab automation, vial handling, cell culturing as well as aseptic filling of vials and syringes or hospital automation like drug preparation.

Blue Competence

Another big step toward greater sustainability

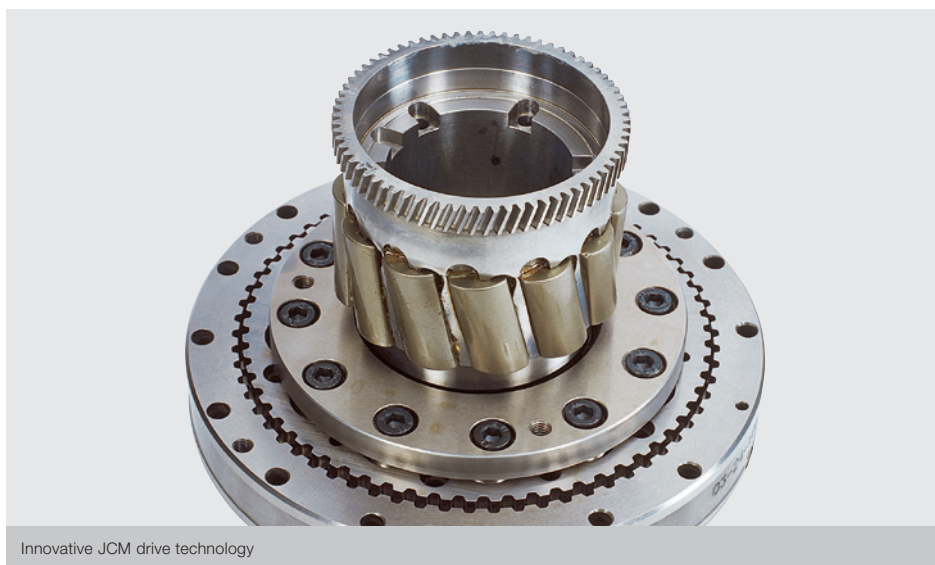
The energy efficiency of industrial robots is becoming a major concern as energy prices continue to rise. For many years, Stäubli has employed cutting-edge technology to ensure maximum performance and precision from its robots while setting new standards for sustainability.

The energy consumption of robots is currently generating a great deal of debate. However, Stäubli Robotics Germany Managing Director Manfred Hübschmann considers this is an extremely one-sided approach. "Sustainability is much more than low power consumption," said Hübschmann. "Sustainability begins with product quality. Technologies that facilitate lightweight construction and deliver improved control and drive systems not only lead to lower power consumption but, in the final analysis, produce high-performance robots that offer the shortest cycle times and the highest degree of accuracy. At the same time, they can significantly reduce maintenance costs and give exceptionally long service life. That is our understanding of what sustainability is all about here at Stäubli."

Since nearly all manufacturers rely on standard Japanese products for their robot drive components, the question arises as to whether and to what extent energy consumption can be varied. Hence Stäubli takes a very different approach to drive technology. Thanks to a high degree of development expertise at its headquarters in Faverges, France, the company has traditionally employed drive technology designed in-house. The immense effort and outlay is paying dividends: Stäubli is not dependent on standard components off the shelf and can install customized systems developed in-house, featuring top-quality performance, high durability, low maintenance and minimal energy consumption.

Superior drive technology

Superior JCM drive technology, used in the six axes of Stäubli's TX series, demonstrates exactly what this means in practice, offering a number of advantages. The most outstanding feature of this design is



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the integration of motor and gearbox in a single component. This solution results in a considerable improvement in efficiency and a significant reduction in energy consumption – as much as 20 % to 40 % compared to its predecessor, depending on the application and specific model. For the operator, this means a considerable reduction in energy costs.

In Manfred Hübschmann's opinion, however, the main advantages lie in other areas: "The backlash-free JCM drive units set new standards for speed and accuracy. Our TX robots can execute more than 100 picks per minute. This level of performance leads to an increase in plant productivity, shorter run times, and a consequent saving across entire systems. A huge reduction in energy consumption per produced component is the end result – a potential bonus that far outweighs the optimized power consumption of the robot itself."

In addition, thanks to JCM's integrated drive design, service and maintenance costs are practically halved, giving an additional major cost saving. Furthermore, long maintenance intervals serve to pro-

tect the environment from pollution and conserve resources, because significantly less waste is generated. The use of wear-free gearboxes can considerably extend the robot's lifecycle without adversely affecting the machine's precision or performance.

Focus on lightweight construction and control technology

Of course, Stäubli has not been concentrating its efforts solely on advanced drive technology. Lightweight materials and controls also constitute a major focus, as Manfred Hübschmann reiterated. "With regard to the performance and efficiency of our high-speed robots, it is the total package that counts. Therefore lightweight materials and control technology plus other elements have a crucial role to play. We are currently working on promising developments in these areas."

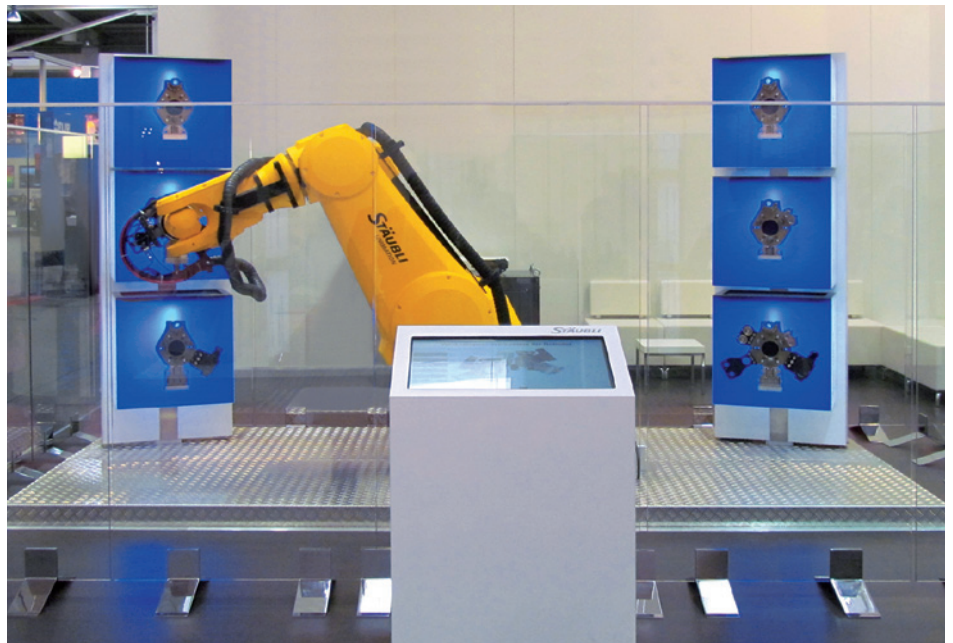
The introduction of a new generation of controllers with intelligent features will reduce the robot's energy consumption even further, but not without simultaneously increasing the dynamics. In terms of lightweight construction, the newly developed four-axis TP80 Fast Picker, with performance far in excess of 200 picks per minute, admirably demonstrates the benefits of reducing mass in motion where it counts. Further new developments to maximize efficiency are on the horizon.

Automatic tool changers for robots

Automatic tool changing systems transform industrial robots into universal all-rounders suited to a wide range of tasks. Stäubli Connectors demonstrates the versatility of its tool changers in an interesting demo at Automatica.

The demands made on automation solutions in terms of flexibility, efficiency and economy are constantly increasing. This also applies to robotic components. Capital-intensive products such as industrial robots have to justify a return on their investment, but that can only be achieved at maximum utilization. Increasingly complex tasks are being assigned to robots in order to prevent unproductive downtime.

For example, industrial robots are now taking on a broad range of tasks which would not be possible in many instances without the deployment of automatic tool changing systems. This neat solution enables the robot to select the correct end-effector for the task in hand, dramatically increasing its flexibility. Stäubli Connectors has a complete range of changers in its portfolio for virtually every application and payload. Stäubli has combined the know-how gained from over 50 years' experience in coupling and connection technology in these innovative products. In addition, the company has benefited from valuable



Interactive demo for exhibitions

synergies gained in close collaboration with the Stäubli Robotics Division and Multi-Contact. This has resulted in cutting-edge tool change systems with superior performance.

Modularity – the key to flexibility

The modular design of the tool changer with its variety of possible combinations means that the optimal configuration to meet the customer's specific requirements can be achieved. We invite you to experience for yourself the potential of this modularity on our stand at Automatica. Visitors to the trade show can select interactive application examples typical of the industry via a touch screen. A large Stäubli six-axis TX200 responds to every command, performing automatic tool changes in a confined space.

Systems developed by Stäubli can be easily adapted to changing conditions thanks to their modularity. Suitable modules are available for a variety of tasks and can be exchanged or integrated at any stage.

Stäubli is the only global supplier to design and manufacture all air, fluid and electrical components in-house. Hostile operating and environmental conditions demand the highest level of quality and application-specific expertise to ensure truly reliable operation.



Modular design of robot side



Modular design of tool side



Locking unit tool changer systems

Locking mechanism in a class of its own

The key module of any tool change system is the locking mechanism. It has to be absolutely secure and function in a speedy manner, even in the event of a power failure. The mechanism must reliably keep the dynamic forces that result from robotic movements under control and cope with tool geometries that normally require an expansive movement. Ever-increasing quality demands require the highest precision and reliability throughout the product lifecycle.

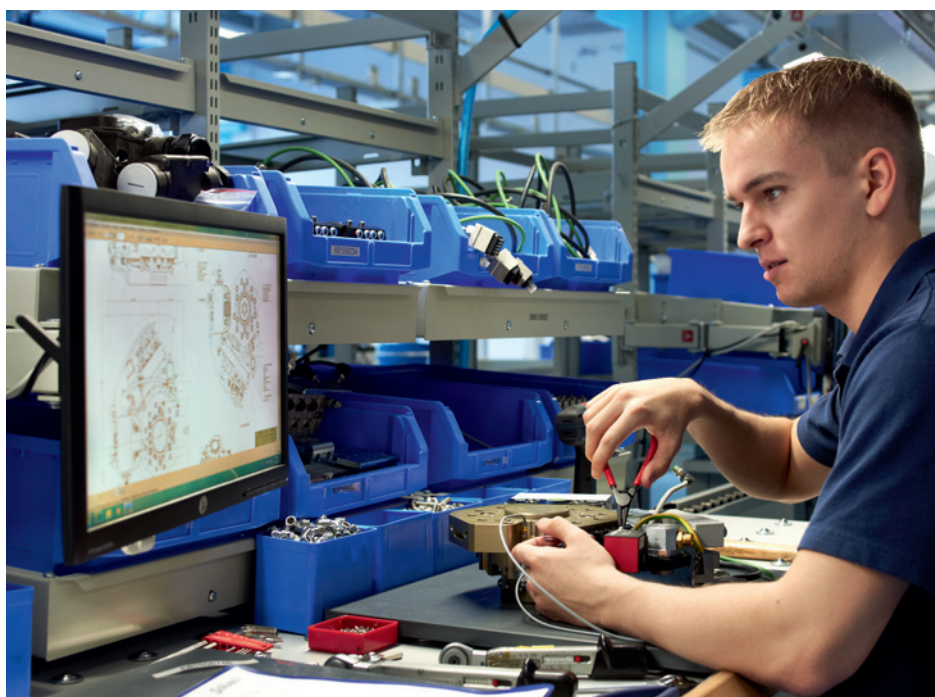
Special feature: Apart from a pneumatic locking mechanism, Stäubli has an electrically-operated variant in its portfolio. Naturally, both systems are capable of coupling one and the same end-effector. Consequently, solutions moving away from the use of very expensive energy in the form of compressed air and towards all-electric systems are now possible.

Complete package – a brilliant idea

In addition to marketing a large assortment of sophisticated components, Stäubli has a range of placement systems to complete its portfolio which, in conjunction with the safety systems usually installed, protect the user from causing damage in the event of an operating error when the locking mechanism inadvertently becomes deactivated. A “floating bush” made of ball bearings built into the robot’s place-

ment system allows for a generous tolerance range, thereby minimizing wear of the guide pads and the locking system with all its components.

The end result only becomes apparent after a long period of use and impresses by being extremely reliable and versatile. Stäubli’s well-known quality is directly reflected in the final product.



Realisation of individual customer solutions: Production at unit Bayreuth

Modular connectors in automated testing systems guarantee quality

Top-quality consumer products must always conform to the highest standards. And this is a principle that also applies to technical accessories used in vehicles: customers spending a lot of money on a new car will not accept audio systems that suffer from quality defects – and rightly so.

The automotive industry imposes stringent demands on its suppliers in terms of product quality. In order to comply with these standards, Panasonic Automotive Systems Czech s.r.o., a well-known manufacturer of car audio systems, has automated testing of every unit. Modern test stations at the Pardubice production plant can reliably detect faults, ensuring that all car radios leaving the factory meet the required quality standards. Audio systems are subjected to 22 separate procedures during final testing. Each individual unit is docked to the testing stations and measured against a set of parameters.

High-quality contacts ensure consistent readings

The quality of electrical contacts plays an important role in systems that employ a high number of mating cycles. If, in the long term, contacts are not capable of withstanding the high stresses involved, then contact resistance increases, which adversely affects readings. Panasonic Czech Republic has installed Multi-Contact's CombiTac modular connector to handle electrical contacting at the plant. CombiTac uses high-quality MC Multilam electrical contact elements to ensure consistently low contact resistance values over long periods, despite the large number of docking cycles involved. Consistent, comparable results are thus ensured.



The CombiTac allows individual combination of various contact types.

Individual combinations of different contact types

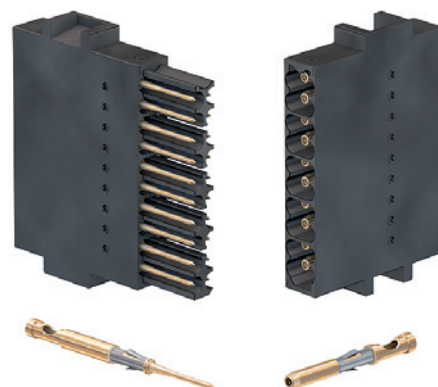
Another key advantage of CombiTac is that different modules can be combined in one compact contact connector tailored to the application. Panasonic uses different combinations of signal, power, fiber-optic and coaxial contacts in its testing stations. Space requirements are considerably reduced by using a modular plug connector.

Versatility

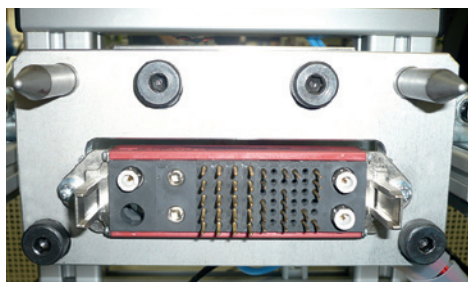
CombiTac is suitable for application in many different areas due to its modularity and the large number of possible combinations. Contacts for fiber-optic cable, data transfer, BUS systems, thermocouples and compressed air are also available in addition to the module types already mentioned. Special modules for high voltages (up to 5 kV) and currents (up to 300 A) extend the range of possible applications.

New 0.6 mm diameter signal module for high density

Multi-Contact has developed a new high density unit for signal transmission in applications requiring a maximum number of contacts in a small footprint as well as a high number of mating cycles. The individual contacts have a diameter of only 0.6 mm. These features make the connector extremely compact and cost-effective in maintenance.



The new Ø 0.6 mm signal module



Each of the 22 testing stations is equipped with an MC CombiTac.



An integrated protective shroud prevents damage to the contacts in unmated condition. Individual contacts can be readily attached or removed from the module for ease of installation and maintenance. The new signal contact module was first presented to the industry at the 2012 Hannover Trade Fair.

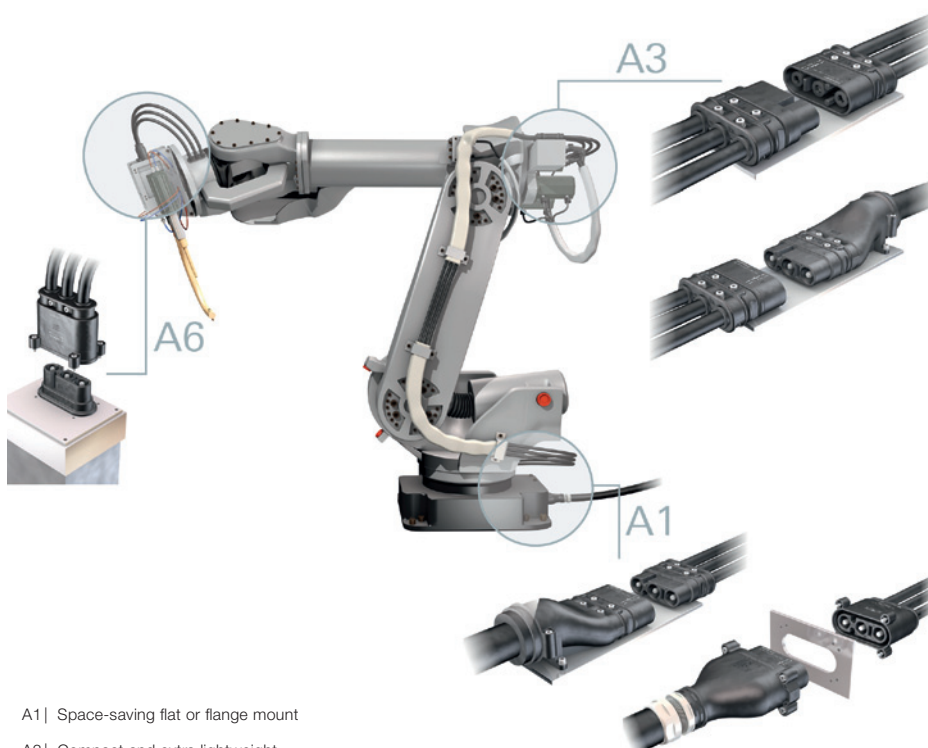
New industry standard for spot-welding robot dress packs: Half the size, extremely light, twice as fast!

RobiFix primary circuit connectors cut installation time by up to 50 percent, save space, reduce weight and are highly affordable. Working in conjunction with major robot and transformer manufacturers, Multi-Contact has brought out a novel method of connecting dress packs on welding robots – a new design featuring single-core, dual-insulated cable and compact housings.

Customer expectations of dress packs are high in terms of functionality and quality. Mounting space on the robot is limited, and maintenance work must be carried out in double-quick time. The highest demands are placed on materials, yet procurement costs must remain reasonable. The practice of dividing dress packs into several parts is becoming more commonplace, with the various sections now being joined by means of connectors in order to facilitate maintenance. Consequently, it is no longer necessary to replace the complete pack when damage occurs, but only the affected section. This approach saves time and money. Conventional connectors, however, take up a lot of space and require complex assembly procedures, often involving special tools. Speedy replacement of damaged units may not always prove possible in these circumstances.

Economic solution for welding robots

The RobiFix primary circuit connector provides an economic solution, from axis 1 (i.e. the robot base) up to axis 3, the interface between packs 1 and 2. Dress pack 2 runs from axis 3 to axis 6 and is usually exposed to greater wear in use. On axis 6, RobiFix also serves as a new standard port connector, fitting directly onto the welding transformer. RobiFix can be screwed directly onto the robot without requiring special tools, since the specially made cables can be quickly and easily fitted by hand. In case of damage, only the faulty cable needs to be replaced. This leads to a reduction in installation and maintenance costs. Long periods of downtime for costly repairs become a thing of the past. The high-quality contact system based on proven MC Multilam Technology is especially energy-efficient and durable thanks to its extremely low power loss.



A1 | Space-saving flat or flange mount

A3 | Compact and extra lightweight

A6 | Transformer connection

Compact primary circuit connector RobiFix for use on all relevant robot interfaces.

Compared to conventional connectors, the number of assembly parts and their size is halved by using RobiFix. Moreover, the weight of connectors is reduced by 40 percent.

Automatic tool changers are often used on robots that perform multiple welding tasks on car bodies, enabling the robot arm to use several different welding guns. Welding current, cooling circuits and pneumatics are fed via the tool changer along with the BUS data. In this instance, liner 2 (axis 3 to 6) comprised a special dress pack up until now.

User-friendly assembly

RobiFix can now also be used as the default connector on the modular power docking connector, feeding primary current to both robot and tool as standard.

The advantages are obvious – standardization of dress packs, a time saving of up to 50 percent during installation, and a small

footprint. In addition, the number of packs required is reduced, since special assemblies are no longer necessary. The low material costs have a positive impact on the purchase price without compromising the quality of the materials used – all components are resistant to welding fumes and sparks.

The housing complies with IP67 protection standard and has been proofed against polarity reversal. There is an integrated strain relief (outer diameter of 11 to 17 mm) for individual cores. RobiFix is designed for 750V AC / 180A and cable cross-sections of 25, 35, 38 and 50 mm². Thanks to its high power density, RobiFix is also suitable for use with aluminum robot welding guns.

Battenberg

Setting global quality standards with the Rob6D

Manufacturing products of the same consistently high quality at every production site throughout the world is an ideal to which all OEMs aspire – but in practice, there tend to be major regional differences in quality.

Using a mobile robotic measuring module, it is now possible to trace the source of errors more quickly and implement global quality strategies. This breakthrough comes from Marburg, Germany-based robotic measuring specialist Battenberg in response to persistent requests from the automotive industry for viable solutions to conduct global quality testing under consistent conditions. Car manufacturers want to be able to test their quality specifications anywhere in the world using reliable measuring systems without having to depend on the dubious testing equipment found in many emerging economies.



Mobile robotic measuring cell

With the Rob6D, Battenberg offers a mobile measuring module with a precision robot that can conduct these measurements to exactly the same degree of precision anywhere in the world – whether in Wolfsburg, Detroit or Timbuktu. The Rob6D is designed for the flexible measurement of components formed from sheet metal or

plastic requiring precision of up to 100 micrometers. Typical applications include measuring automotive body parts such as doors, hoods and wings through to center consoles and cockpits. The Rob6D is also ideal for testing seats. It fits into a standard container, is simple to transport, and quick to set up and operate on site.

The TX90 measuring robot from Stäubli Robotics

The task of measuring is handled by the Stäubli TX90L robot. A stationary laser tracking system is used to achieve the level of absolute precision required. In conjunction with the exemplary real-time control of the robot and a multi-axis force/torque sensor, it is possible to position the six-axis robot within a range of a few micrometers and reliably maintain the margin of measurement uncertainty to less than 100 micrometers throughout the process.

While the robot's kinematics are controlled with near-micrometer accuracy by the laser tracker, its precision and motion control also play key roles. Ultimately, the mechanics of the robot must be capable of transforming the most intricate of commands from the laser tracker for precise mechanical positioning into micro-movements. Here, Stäubli's own JCM drive technology, in which the engine and gears constitute a single unit, has proven to be extremely accurate. It requires only very short control intervals before the robot reaches its measurement positions. This results in quick, reliable measuring.

**Stäubli –
fast moving technology
in three divisions**

■ ■ ■ TEXTILE

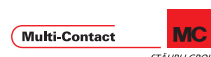
Stäubli was founded in 1892 as a small workshop in Horgen, near Zurich. Through its high quality products Stäubli became one of the world's leading manufacturers of textile machinery. Today the international Group's head office is located in Pfäffikon, Switzerland.

■ ■ ■ ROBOTICS

Stäubli Robots offers high productivity and precision, providing preferred solutions for many industries. The comprehensive product range includes small 4-axis SCARAs as well as heavy-duty robots operating with payloads of up to 250 kg. The range is completed by controllers, software, and professional applications of unrivalled quality and performance.

■ ■ ■ CONNECTORS

As a leading manufacturer of quick connector systems, Stäubli provides connection solutions for all types of fluids, gases, and electrical circuits. These standard or specialised products (single and multiple connectors, tool changers, quick-mould-change systems) combine performance, quality, safety, dependability, and durability.



About Stäubli

Stäubli is an innovative mechatronics solution provider with three dedicated divisions: Textile machinery, Connectors and Robotics. The Stäubli Group employs over 4,000 people and is active in major global markets. With its Multi-Contact,

Schönherr, and DEIMO brands, the Group maintains a presence in 25 countries through its sales and customer-service subsidiaries and is represented by agents in 50 further countries.

Multi-Contact, founded in Basle, Switzerland, in 1962, manufactures high quality electrical contact elements and connectors based on MC Multilam Technology for various industries. Next to a broad portfolio of standardized products, Multi-Contact is specialized in customized solutions. The company is represented worldwide by branch offices and production sites in Europe and overseas, and joined the Stäubli Group in 2002.