

STÄUBLI AUTOMATICA 2014

Summer 2014



Photo: Messe München GmbH

Redefining Performance.

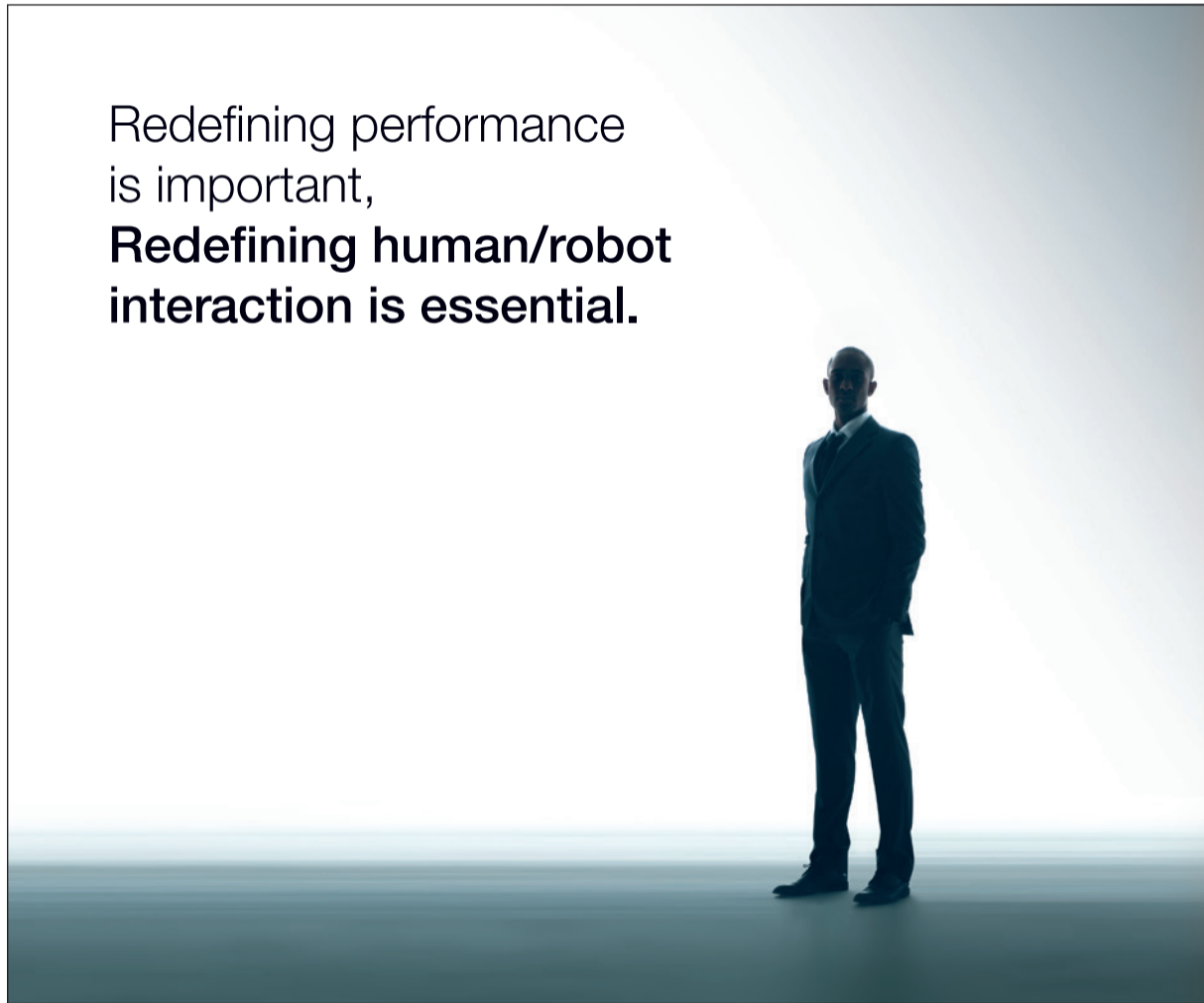
World Premieres at Automatica.



Meet the innovators

The Stäubli Robotics stand (308 in Hall B4) at Automatica in Munich will be laying on a technology spectacular of the first order. Never before have the robotics specialists unveiled so many new products at the same time. Visitors can expect to see new robots, new control systems, new software and new developments in abundance. Let yourself be inspired by our innovations and discover in person how these hi-tech developments can help you optimize your industrial processes.

The biggest eye-opener of all is likely to be the TX2 series of Stäubli six-axis robots which are due to make their world debut in Munich. General Division manager Bernard Carera explains why the six-axis models of the current TX generation – widely regarded as the fastest and most precise range of robots in existence – are already making way for their successors: “With the new robots, we are underscoring what we mean by ‘redefining performance’. We are constantly developing our products with the aim of supplying customers with the best possible solutions. It is only logical, therefore, that we should



Redefining performance is important,
Redefining human/robot interaction is essential.

continue to refine our TX series and enhance its performance.”

The details of what the TX2 series is capable of will be revealed at Automatica. One thing is already clear – the six-axis robots surpass their predecessors in all relevant criteria. Lighter in weight, faster

and more energy efficient, they once again set the benchmark in robotics. They are accompanied by a newly developed control system that is easy to program and has been designed to open up new forms of human-machine cooperation whilst pioneering new safety features.

Find out more in Munich – we are looking forward to meeting you!

Your Stäubli exhibition team

Highlights



New TX2 robot series



New CS9 controller



New SP2 teach pendant



SRS 2013 software



TP80 Fast Picker

Hand in hand with the robot



CS9 robot controller, the next generation of controllers for the new TX2 robot range.

With the TX2 series and the CS9 controller, Stäubli Robotics has opened a new dimension in man/machine co-operation. Innovations with names such as Safe Speed, Safe Stop and Safe Zone herald a new robotic age. There is now nothing standing in the way of a full partnership between man and machine.

The latest technological developments – especially in the area of sensors and in mechatronics – mean that it is now at last possible to operate a robot without a protective barrier and thus to effect direct interaction between man and machine. At Automatica, Stäubli Robotics will unveil working man/machine solutions in the shape of the new TX2 series and the CS9 controller. A variety of integrated safety systems creates a hitherto unimaginable level of safety in robotics, providing reliable protection of people and

equipment against harm.

Safe Speed and Safe Stop for perfect interaction

The new Safe Speed and Safe Stop features allow unprecedented collaboration between man and machine without the need for a protective fence or other barrier mechanism. This is how Safe Speed works: the robot uses its integrated sensors to immediately detect when a person is approaching its work area and automatically reduces its speed to a safe level. The big advantage here is that the robot can continue to operate at low speed, does not immediately go into emergency stop procedure and therefore does not need to perform a subsequent time-consuming reboot.

If the operator of the robot gets too close, the Safe Stop function is activated. The robot then reduces its speed further or switches completely to safe mode. In

this case, all the vital functions of the robot are retained so that it can continue its work without rebooting once the operator has left the work area. These two groundbreaking features allow true collaboration between man and machine.

Safe production with Safe Zone

The TX2 series six-axis robot with its new CS9 controller is certified by the German technical inspection association (TÜV) and meets the stringent requirements of safety category SIL3-Pl. To ensure maximum safety, every movement of the robot is monitored by sensors. This involves logging the coordinates, speed and acceleration of the robot in real time. In the case of the TX2 series, Stäubli has opted for configurable secure I/O modules and access to real-time Ethernet fieldbus systems, thus guaranteeing maximum safety and compatibili-

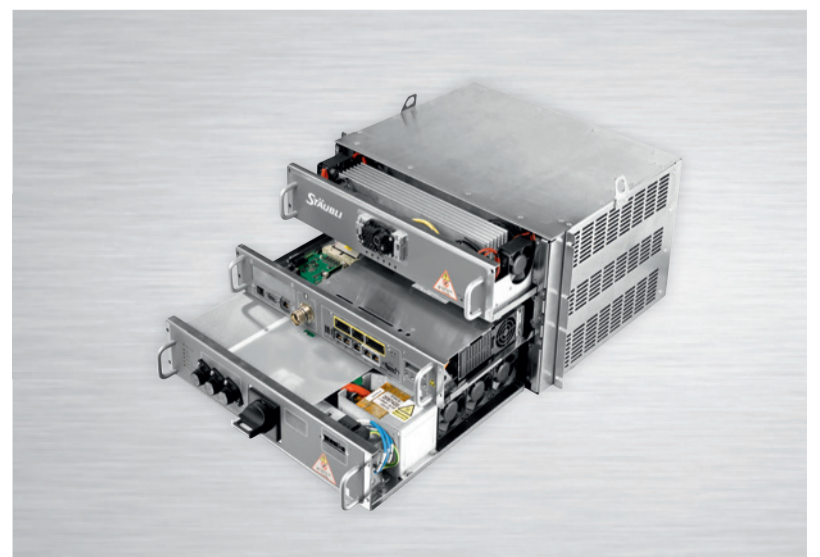
ty. The six-axis robots of the TX2 series have six digital safety encoders and an integrated safety board, both of which are TÜV certified. These comprehensive safety features ensure perfect protection for both the operator and the expensive process equipment.

At the Stäubli booth (Number 308 in Hall B4), trade visitors can see for themselves the possibilities that arise from these new robots with their innovative safety features.

Higher output within a smaller space

Complex gripper systems are among the most sensitive key elements in robot cells; in fact, they often require a five-figure investment. The Safe tool and Safe Zone functions allow an area around the end of arm tool to be precisely defined and continuously monitored. If an obstacle is detected within the specified safety zone, the robot stops automatically. Damage to expensive handling systems or process equipment is totally eliminated.

This comprehensive safety package and the absence of physical barriers result in one further decisive advantage: robot cells can be designed with a smaller footprint. The plant operator is able to significantly increase output per square meter of production area.



New CS9 redefining safety performance with drawers to be easily removed from the front.

New robot family with enhanced performance



TX2-40



TX2-60



TX2-90

When the Stäubli Robotics TX series made its debut at Automatica 2004, it effectively redefined the concept of performance in the six-axis range. Now, exactly ten years later, history is about to repeat itself as Stäubli presents the TX2

series, the successor generation that will once again set the benchmark in robotics.

The new generation of TX2 robots clearly surpasses the previous high-achieving series and sets unprecedented standards in

terms of performance. Stäubli Robotics General Manager Germany Manfred Hübschmann enthuses about the new six-axis robots: "The new machines are lighter in weight and therefore more dynamic and more energy efficient. Safety was a main criterion for the development team. In this regard, it has been possible to integrate pioneering safety features that present new scope for human-machine co-operation; the TX2 generation is opening up new areas in which man and machine will be able to work hand in hand in the future."

At first glance, the design of the robot embodies what Stäubli means by "Redefining Performance", namely the ongoing systematic development of a product with the aim of promoting innovation, exceeding prevailing standards and setting the technological benchmark. The new series clearly reveals the genetic make-up of its predecessor: the TX2 six-axis robots impress by virtue of their compact design and slender profile. These are the char-

acteristics that will keep the machines as the number one choice for applications where space is at a premium.

Performance and efficiency redefined

The enclosed structure of the robot series and its compliance with protection class IP65 (the wrist is actually IP67 compliant, i.e. waterproof) make the TX2 series ideal for use under demanding cleanroom and hygiene specifications and for applications in harsh environments, e.g. in combination with machine tools. All six-axis machines of the TX2 generation have vertical cable management and can be floor, wall or ceiling mounted.

Stäubli robots have always been known for their accuracy, a reputation that is further enhanced with the new TX2 series. The new six-axis models score high marks for repeatability, dynamism and speed, thus guaranteeing the delivery of very short cycle times. This unique level of performance is made possible by the high ri-

gidity of the enclosed mechanical construction and the proprietary compact direct-drive JCM® gear motors.

With the new Stäubli TX2 robots, Stäubli has launched a series that once again sets the standard. The six-axis machines will contribute to higher productivity and efficiency in a wide range of industries, both in standard applications as well as in sector-specific operations. Stäubli Robotics is already looking forward to presenting the new high-performance class to an expectant audience at Automatica.



The next generation of SP2 teach pendant offers an innovative color touch screen. Its interface has been especially made to make the interaction with the robot easier.

Redefining Performance or How robots are reinventing themselves

“Rediscover yourself every day and become even better”, a philosophy espoused by the esoterically inclined, is also the order of the day at Stäubli. Granted, the whole thing does not go by the official name of Self-discovery: we call it Redefining Performance. And it’s not really the robots that are reinventing themselves over and over again but rather the developers at the parent plant in Faverges who relieve them of this onerous task.



Fastest robot range of Robots available from Picker through Scara to 6-axis.

Here at Stäubli, we understand the concept of Redefining Performance to be a process that encompasses the continuous and systematic development of all

product groups. The objectives are to drive forward innovation, to satisfy or even exceed customer expectation and to set the industry benchmark. This unconditional commitment to maximum per-

formance has produced groundbreaking developments, including the world’s first robot for aseptic laboratory environments, the six-axis HE version for the food industry and our ultra-fast pick-

ers as well as many sector-specific robots tailored to the requirements of a wide variety of industries.

new six-axis TX2 generation will prove that the best can be made even better. It’s all a matter of definition.

Today, the Stäubli Robotics product range is acclaimed for outstanding quality, for maximum precision and safety, as well as for outstanding speed and dynamism. Redefining Performance means focusing on continuously increasing stringent standards of quality and service to ensure that Stäubli customers can rely on the best available robotic solutions now and in the future.



HE-robot, resistant to detergents and water proof.

The most recent results of this development strategy are due to be unveiled at Automatica where the

Maximum performance with H1-lubricant

With immediate effect food oil of class NSF H1 is available for the Stäubli product range of 4- and 6-axis robots. The special feature: Stäubli Robotics do not revert to standard oils but utilize an oil, which was developed in close co-operation with a partner company. The advantage for the users: even with the H1-lubricant the robots can be operated at maximum performance and are not subject to any restrictions unlike some competitor facilities.

medical and pharmaceutical industry. Food oil needs to be used for all robot applications, when occasional contact with the product is technically unavoidable.

H1-lubricants are not only required for machines and facilities in the food and animal feed industry but also prove themselves in demanding applications in the

There are two good reasons why Stäubli invested a lot of time and efforts in the common development of the lubricant in cooperation with a partner company as Gerald Vogt, Head of R&D Robotics, says: “First of all we wanted to offer a H1 oil which meets the specific requirements of our patented Stäubli JCS reduction gear system and guarantees a maximum service life of the robots. Secondly the robot dynamics shouldn’t suffer from the H1 oil. After two years of endurance

tests in our laboratory we can assert that these objectives have been fully realized.”

The food oil in accord with NSF H1 is available for all Scara kinematics of the TS range, all six-axis robots of the TX range as well as for the RX160 and the TP80 Fast Picker.

NEW
All 4- and 6-axis robot series are now available with H1 lubricant.



Robotics: New, simple and efficient

Thanks to the new Robotics Suite from Stäubli, robot applications can be implemented more quickly, programming has been made easier and remote maintenance has become even more practical. This Windows-based software tool with its two modules – Development Studio and Maintenance Studio – makes the process of designing robot cells together with the commissioning and operation of an entire plant more efficient than ever.

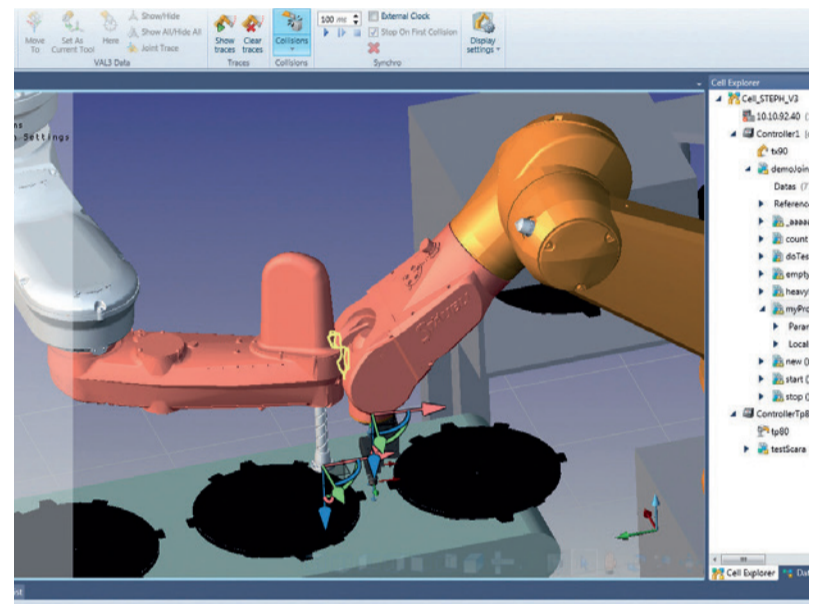
The developers of the software package focused not only on extending functionality but on the aspects of user friendliness and

simple, intuitive operation. These objectives have been perfectly realized in the current version of Robotics Suite for all user groups: plant operators, system integrators and equipment manufacturers.

SRS 2013 scores high marks for its new menu interface. Operation is straightforward and intuitive. The Development Studio module is the ideal application and simulation software. It includes all the important functions such as file transfer between PC and robot controller, automatic backups, visualization of the robot in its 3D environment and creation, execution or modification of VAL3 programs as well as other high-end

functionalities. The large number of enhancements and new features leads to significantly reduced development time in the generation of robot applications.

The second SRS module – Maintenance Studio – is used for remote maintenance of robots and impresses by virtue of its enhanced diagnosis functionalities. It allows the operator remote access to the robot controller, complete with 3D visualization. Maintenance Studio from Stäubli Robotics represents a major step forward in the area of robot service and upkeep. Users benefit from higher plant availability and significant improvements in productivity and efficiency.



Collision detection with highlighting of the colliding elements.

Open interface for external control

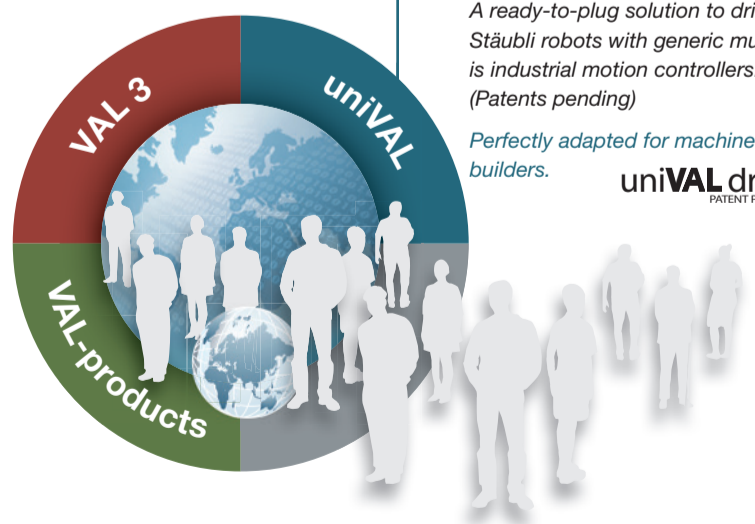
Many operators are already making intensive use of it – the ready-to-plug uniVAL drive software solution. This real-time interface enables machine and plant manufacturers to program robots supplied by Stäubli using their own controllers.

The software solution will be the subject of renewed attention at Automatica 2014. Stäubli Robotics General Manager Germany Manfred Hübschmann: “With uniVAL drive, we have equipped our robots for an even wider range of applications and we have accommodated the wishes of many users for an open interface to their controls. We are

very keen to inform OEM and machine manufacturers about the pioneering possibilities offered by uniVAL drive, and that’s precisely what we’ll be doing in Munich.”

With this real-time interface, customers can employ any Stäubli robot as a standard machine for tasks that involve handling, using their machine controls for programming and operating the robot. The advantages are obvious: Stäubli customers can use the universal programming and operating environment of their controller for operating their robots without having to trouble themselves with an unfamiliar programming interface.

System integrators and equipment manufacturers in various industries that already use uniVAL drive are enthusiastic about the possibilities of the tool. With this real-time tool, complete programming of plant and robot runs centrally through the motion controller of the system. The necessity for programmers to work with two different controllers – one for the robot and one for the system – has thus been consigned to history. uniVAL makes a significant contribution to the integration of powerful Stäubli machines so that the procedure is simple and easy as never before. This saves time, cost and effort.



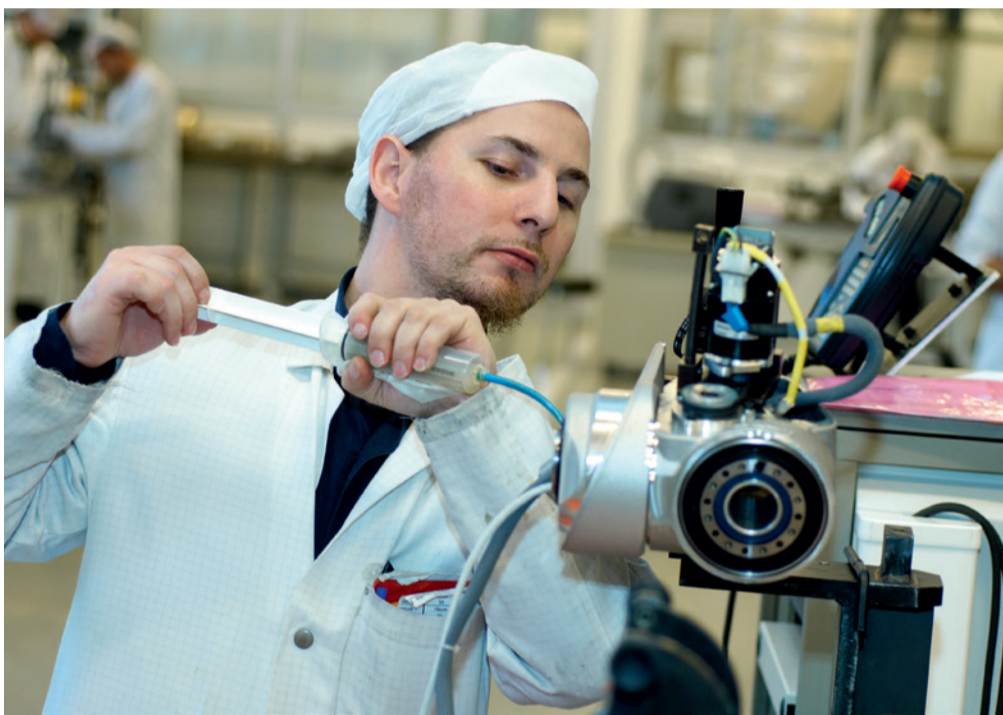
uniVAL drive

A ready-to-plug solution to drive Stäubli robots with generic multi-axis industrial motion controllers. (Patents pending)

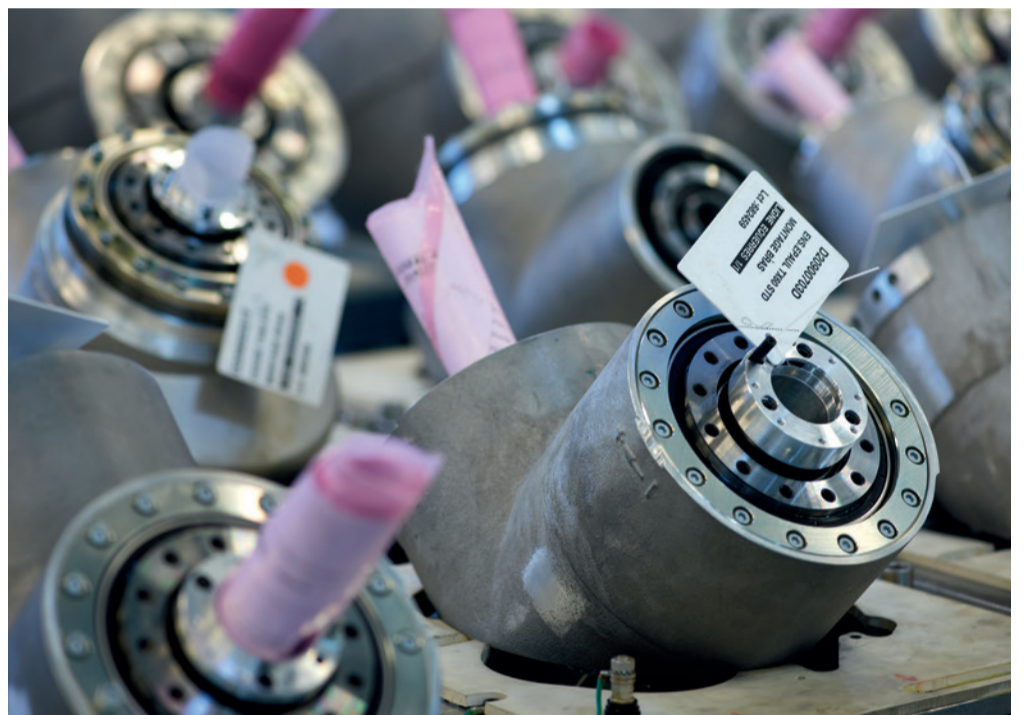
Perfectly adapted for machine builders.

uniVAL drive
PATENT PENDING

Stäubli Robotics opts for in-house gear production



A lot of expertise goes into the sensitive business of transmission assembly which is performed by hand at the Faverges main plant.



Stäubli is able to use its optimally sized gear unit for each articulated-arm robot series.

Drive technology is the key component for the performance of a robot. Nonetheless, many established manufacturers put their trust in standard off-the-peg transmission solutions. But there is one major exception: Stäubli develops and manufactures drive systems for its six-axis kinematics in-house, thus setting a benchmark in precision, dynamics and durability.

For Gerald Vogt, Head of Robot Development at Stäubli, drive technology is one of the core competencies in this industry: "Our six-axis robots are characterized by their compact enclosed design and at the same time set the benchmark in dynamics and precision. In the area of drive technology, this represents a huge challenge. Off-the-peg drive systems would quickly succumb under the temperature conditions that prevail at high load inside the enclosed casing. For that very reason, manufacturing our own

gearing is not a luxury for Stäubli but rather a factor that is critical to the successful performance of the robot."

Stäubli currently employs the innovative JCS/JCM® range of drives in axes 1 to 4 while gearing of a quite different design (also developed in-house) is fitted in the wrist axes. JCM®s are compact motor-gear units, but because of their size, they can only be used in axes 1 to 4. JCS stands for Joint Combiné Stäubli. This means that the transmission combines the functions of reduction gears and bearings in a small and rigid design, hence the use of the term "Combiné". Thanks to JCS, Stäubli was able to bring the first fully enclosed robot onto the market back in 1992. The gearbox design meant that the wiring could be threaded through the casing in a particularly elegant manner.

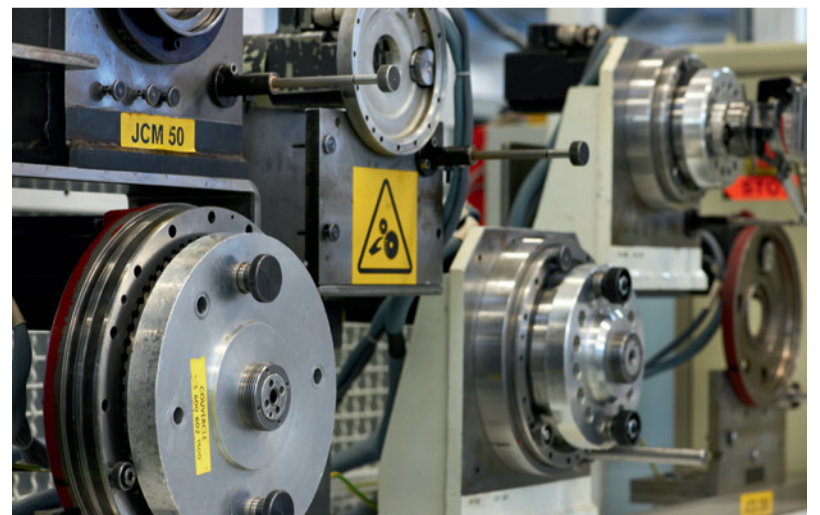
The JCM® drive incorporates JCS technology with the motor

directly integrated into the gearbox as a unit in an oil bath. Gerald Vogt sums up the advantages of JCM®: "This variant is characterized by a highly compact design combined with great performance. Other key advantages of this drive technology in addition to the functional integration of reduction gears, bearings and motor are the excellent linearity of the transmission, the absence of backlash and the durability which beats any other available gear for robotics out of sight." In contrast to standard gear units which have to make do with grease lubrication, Stäubli's own gear systems and motor gear units are completely immersed in an oil bath. The advantages of this are better cooling, longer life and also lower noise emission.

The availability of its own drive technology enables Stäubli to use the optimally sized gear for each individual articulated robot series. For this reason, failures due to under-sized drive technolo-

gy simply do not occur with the RX and TX series. On the contrary: Stäubli drive systems are good for 100,000 hours' use. At the same time, these gear units have been fine-tuned to deliver the shortest cycle times and maximum resistance to fatigue stress. Gerald Vogt: "We have optimized our drives systems not for specific measurement cycles and data sheet performance but for maxi-

imum output and precision over years of continuous operation."



Stäubli drives have been fine-tuned for shortest cycle times, high resistance to fatigue stress and maximum durability.

Stäubli Customer Service: Added value guaranteed

The reputation of Stäubli robots is based on maximum performance and long life. But just as important as the performance of the products is the quality of service offered. No matter what the circumstances or how exceptional the situation may be, Stäubli customers can rely on optimum support as well as availability of spare parts over the full life of the product.

In recent years, Stäubli Robotics has systematically expanded Customer Services to not only provide pioneering robotics solutions but also set standards in quality of support. The company now offers an all-embracing ser-

vice package which has customer satisfaction as its prime focus. The aim is not only to meet user expectations but to exceed them.

Customer Services is optimally structured with three main departments: Customer Support, After Sales Service and Training. The overarching objective is to create added value for customers. From the initial feasibility study to cycle time studies and process optimization, Stäubli Customer Support provides the best possible assistance to end users at every stage of a project.

After Sales Service looks after the large number of robots that have already gone into service.

The team works according to one strict principle: "Availability high – Response times down." Shortest response times and maximum availability of spare parts guarantee immediate assistance in an emergency. The third pillar of service is the comprehensive customer training program, thus ensuring that programming, operation and maintenance of the robots can be performed in-house by the customer's own welltrained personnel.

With its all-embracing service concept, Stäubli Robotics scores highly in terms of outstanding reliability of robots and systems whilst ensuring maximum performance.



Maintenance: making your robot investment pay off for years.

Pioneering solutions in the field of service robotics

3 – 6 June 2014
Hall A4, Booth 238
AUTOMATICA
OPTIMIZE YOUR PRODUCTION

At Automatica, Stäubli Robotics will also be emphasizing its leading position in the field of service robotics. Trade visitors can see for themselves the future-oriented solutions for this growing market at Stand 238 in Hall A4.

Two innovative systems in particular promise to be crowd pullers, namely the high-performance camera robot from Camerobot Systems and the ARTAS robot system which is causing a minor revolution in the field of hair transplantation.

ARTAS is an FDA-approved system that allows medical specialists to use robot technology for minimally invasive hair transplants. The specifications with respect to reproducibility, precision and reliability could hardly be more stringent. No

wonder then that a high-precision six-axis Stäubli TX series robot is at the heart of the system. ARTAS is currently used by practitioners in the USA where it is delivering outstanding results. Patients benefit from treatment that is much faster and more accurate than a manual procedure and at the same time offers enhanced safety.

No less sensational will be the reception given to the innovative Camerobot Systems product developed for use in the broadcasting automation. The latest generation of studio robots that is employed in the new Studio C at SWR in Stuttgart meets the requirements of leading broadcasters for perfect recording technology, noise-free operation and exemplary cost efficiency.



Robots for broadcasting featuring new standards in studio automation.

Further Stäubli applications at Automatica 2014

Tool changers for robots

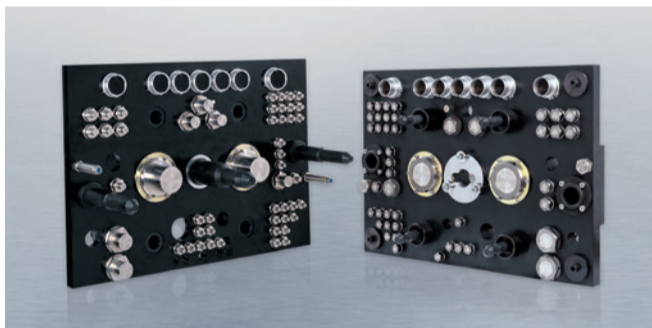
At Stand 308 in Hall B4, Stäubli Connectors will be presenting its new generation of tool change systems for robots, which meets the highest safety requirements. Other highlights include multi-connection systems for the simultaneous connection of energy and utility lines.

Automatic tool changers can significantly increase the productivity of a robot. A demo application allows visitors to see for themselves how the principle works and test the flexibility of the modular systems. A robot implements the commands given via touch screen and demonstrates the tool change in a confined space.



Tool changer MPS 630

A complete series of tool changers for different loads guarantees that the optimum solution is available for each and every application. Stäubli is the only supplier in the world to develop all of its modules in-house. The knowledge that goes into these products has been accumulated from over 50 years' experience in coupling and connection technology. These technologically advanced tool change systems set the industry benchmark and are mainly used in the automotive and aerospace sectors.



Multi coupling MCS

Complex interfaces for industrial applications

Modern machines with interchangeable modules, testing equipment, battery charging stations and robots with tool changers all have one thing in common: their interfaces need to operate reliably in harsh industrial environments and withstand rapid cycles of operation whilst remaining user-friendly and safe. They may have connections for power, signals and data, for thermocouples and optical fibers, and also for air or liquid.

The CombiTac modular connector system from Multi-Contact allows different contact modules to be combined in a unit assembly system. The result is a compact electrical connector or even a hybrid version with pneumatic or fluid couplings. Application-specific requirements can thus be realized with standard components.



The modular CombiTac connector from Multi-Contact.

The reduction to a single block for multiple connections facilitates handling, saves space and enhances safety. Fixed installation dimensions with variable placement simplify integration into a production facility.



An international group

Stäubli is a mechatronics solution provider with three dedicated divisions: Textile machinery, Connectors and Robotics. With a workforce of 4000, the company generates an annual turnover of some 1 billion Swiss francs. Originally founded in 1892 as a small workshop in Zurich-Horgen, today Stäubli is an international group with its head office in Pfäffikon, Switzerland.

CONNECTORS

As one of the leading manufacturers of quick connector systems for all types of fluids, gases and electrical power, Stäubli ensures that all products combine performance, quality, safety, dependability and durability.

ROBOTICS

Stäubli offers a comprehensive range of robots unrivaled in quality and performance. From small 4-axis Scaras to heavy-duty robots operating with payloads of over 190 kg, high productivity and precision solutions can be provided for most industries.

TEXTILE

Stäubli has been developing and producing high quality systems for the weaving industry since 1892. The Group provides innovative, technological solutions that satisfy our wide range of clients.

www.staubli.com

For further information:

www.staubli.com/contacts

Imprint:

Stäubli Tec-Systems GmbH Robotics
Theodor-Schmidt-Str. 19, 95448 Bayreuth, Deutschland
sales.robot.de@staubli.com, www.staubli.com

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