

STÄUBLI NEWS

World Premiere of the new TP80 fast Picker



NEW

TP80 fast Picker

Next generation of 4 axis high-speed Pickers

Editorial

2012 starts with innovative power

Business in 2011 was characterized by continued positive sales for the robotics and automation sectors. In 2012, with the launch of a new generation of high-speed robot, the TP80 fast Picker, Stäubli sets a new benchmark in high-performance robotics. The TP80 sets itself apart from other solutions by implementing innovative concepts, unused up to now. Not only does it bring functional cycle time increases, it also features a long list of benefits when used with very high-speed machines for packaging, sorting or loading applications in practically all industrial sectors. This year when productivity improvements will be key to generate growth for companies, we believe the TP80 fast Picker is the best solution for added competitiveness.

Bernard Carera, Group Division Manager, Stäubli Robotics

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Superior performance powering competitive advantage.

Stäubli introduces innovative high-speed kinematics

The new TP80 fast Picker robot from Stäubli Robotics introduces innovative, high-speed four-axis kinematics for pick and place applications. This high-speed robot achieves peak rates of well over 200 picks per minute, making it the first choice for ultra-fast handling tasks.

With the TP80 fast Picker, Stäubli has effectively redefined the concept of high-speed robotics. The machine achieves well over 200 picks per minute when handling weights up to 100 grams. The fast Picker's performance declines only slightly at higher load levels up to a maximum of 1 kg. Under these conditions, the TP80 still scores well with results close to 200 picks per minute, even in continuous operation. This makes the four-axis robot a good choice for a wide variety of applications demanding parts transfer and precise positioning under severe cycle time conditions.



Electrical, pneumatic and I/O connectors are available on the tool flange with all cables running inside the arm.

"The market launch of the TP80 goes well beyond a simple product introduction. With its high-performance and easy integration, this high-speed machine will enable new and pioneering strategies for the automation of handling processes," remarked Bernard Carera, Group Division Manager.

Stäubli is focusing on use in the food, pharmaceutical and solar power industries, as well as applications in the automotive, electronics and plastics sectors. The range of potential applications also includes machine



tools, and the ingenuity of users and system integrators will undoubtedly unlock many other inventive applications.

New kinematics create new freedom

In addition to being the preferred unit in the aforementioned industries, the robot is expected to enable the implementation of new automation concepts, thanks to its superior design. Energy-efficient plants, compact layouts, lightweight station concepts with low resource impact, higher robot density in constrained spaces – with the creativity and innovation of plant engineers and system integrators, there are virtually no limits to what the Stäubli TP80 could do. With the TP80's new kinematics, pioneering concepts for manufacturing automation can now be put into practice without restrictions.

This new freedom in workstation design is primarily due to the easy, simple integration capability of the TP80, along with numerous additional advantages. "Our new fast Picker is much faster than many delta kinematics robots, but it does not require ultra-stable, heavy workstation structures. The TP80 is extremely compact and lightweight, and its low mass enables high-speed performance without creating unmanageable torque.

Weighing in at around 70 kg, the robot can be integrated remarkably quickly with little effort, and above all very cost-effectively," explained Gerald Vogt, R&D Manager at Stäubli Robotics.

Technical Specifications

Maximum payload	1 kg
Nominal payload	0.5 kg
Reach	800 mm
Repeatability	< ± 0.05 mm
Degrees of freedom	4
Cycle-time	
25-300-25 mm cycle:	up to (ppm = picks per minute)
0.1 kg load	200 ppm
0.5 kg load	185 ppm
1 kg load	170 ppm
50-700-50 mm cycle:	up to
0.1 kg load	110 ppm
0.5 kg load	105 ppm
1 kg load	95 ppm
Weight	71 kg
Cleanroom standard – ISO 14644-1 (version with optional bellows)	6/5
Protection class according to standard NF EN 60529	IP54 standard, IP65 with bellows
Attachment method	Wall

Exhibitions where the new TP80 will be showcased. To name a few:



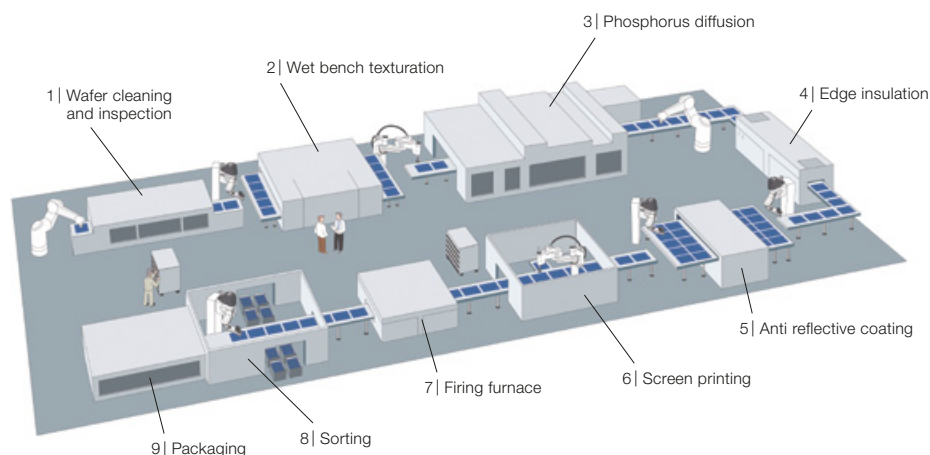
Hall E, Booth 3811



Booth E29 - 17



Hall 5A, Booth U68



Automated PV production line.

Fast, reliable and precise

The machine is also designed for consistent reliability and precision. The four-axis robot can service large workspaces with a diameter of 1.6 m, and it operates in the entire workspace with an impressive repeatability of just $< \pm 0.05$ mm.

The robot maintains its high precision even after many thousands of operating hours. The design of the kinematics system, with its especially rigid structure, virtually eliminates the kind of wear during continuous operation that can impair precision. In addition, all supply and media lines are routed inside the arm, putting a definitive end to trouble-prone external cables and lines.

Targeted Markets

Automotive and equipment manufacturers
Food
Medical, Pharma
Plastics
Machine Tools
Photovoltaics

The unusually slim forearm of the TP80 is another striking feature. It makes the fast Picker ideal for use in constrained spaces and allows it to reach into narrow machine openings. And with very well protected connections, the robot is well equipped to handle harsh environments involving dust and liquids. The TP80 fulfills the requirements for IP54 protection in the standard version, and can be upgraded to IP65 with optional covering and bellows.

A versatile unit for ultra-fast pick and place

In their efforts to maximize the scope of potential applications, the Stäubli designers devoted attention to everything, including



Extremely compact and light-weight design making it easier to integrate in a cell.

the interference contours of the arm – particularly in combination with image processing systems. Unlike delta kinematics robots, the arm of the TP80 does not block the field of view of the vision system. This avoids any form of impairment to static image processing systems, which are now mandatory for many handling tasks.

Like all Stäubli robots, the new TP80 works with the familiar CS8C controller, which has been widely accepted for many years. The data transmission rate between the PC and the amplifier unit is extremely fast thanks to the Stäubli Advanced Robot Control (STARC) architecture. Users find themselves on familiar ground when programming the unit. As usual with Stäubli, the TP80 can be operated in the accustomed manner using the universal VAL3 programming language. Attractive software tools with ready-made macros simplify the programming task, even for inexperienced users.

Stäubli has high expectations for the TP80, as confirmed by Manfred Hübschmann, General Manager of Stäubli Robotics in Germany. “With this innovative kinematics system and its enormous speed potential, we have the perfect solution for a wide range of handling applications in our product line. During the first six months of 2012, the TP80 will be presented worldwide to a broad spectrum of attendees at trade shows such as PV EXPO in Tokyo, MD&M in the U.S., CFIA and INDUSTRIE in Paris (France), ANUGA in Cologne (Germany) and AUTOMATICA in Munich (Germany). We are very interested in the reactions of these professionals.”

In any case, potential users should be pleased with the moderate price level, which in many cases makes the TP80 fast Picker not only the best option, but also the most cost-effective.



Hall 6.1, Booth E058 F059



Hall 14, Booth C15



October 28-31, 2012
McCormick Place
Chicago, Illinois USA

Booth N-4760

Packaging at Bayer Healthcare

Automated packing of parenterals in the pharmaceutical industry

Bayer Schering Pharma relies on Stäubli industrial robots for the automated packing of medicines. These robots enable uninterrupted production, and their rigid structure and high precision make them fit for the task. The new TX200 six-axis robot puts its heavy payload capability to good use in a packing line for pouches.

Bayer Schering Pharma is one of the largest pharmaceutical companies in the international arena. It has production sites in the U.S., Latin America, Asia and Europe, including several in Germany. In Leverkusen the company produces parenterals under strict hygienic conditions. Parenterals are medicines that are not intended to be taken orally, but instead intended for injection, infusion or implantation in the body. The liquids are first filled into primary packaging such as bottles, ampules or plastic pouches. After this the robots pack the medicines for further transport.

Since August 2009, a pair of Stäubli robots has been showing what they can do in two production lines for filling and packing pouches. These two machines – a RX160 and a TX200 – work hand in hand. The smaller RX160 is responsible for handling the pouches, while the larger TX200 transports empty trays and trays filled with pouches.

A cost-effective and compact solution

Klaus Radke Industrietechnik GmbH & Co. KG, located in Neuwied-Block, Germany, won the bid for the project engineering of this packing station. Manfred Broustin, Head of Process Control for Parenterals at Bayer Schering Pharma commented, "Radke implemented the specified concept using robots because that is their specialty. Other companies proposed gallery cranes or automated handling equipment for this



A RX160 and a TX200 work hand in hand.

task. We were also interested in this approach, but in the end we chose the robot solution because it needs the least space for the specified task and because it is the most cost-effective solution."

Another factor was that Stäubli's product portfolio includes robots that are ideal for use in packing stations. The RX160 and TX200 models feature fully enclosed construction, which makes them highly suitable for use in cleanrooms and also very easy to clean. The rigid structure of the robots also allows them to excel in dynamic tasks. "These units are an excellent choice for use in cleanrooms," says Broustin, "because their compact construction and smooth, closed surface structure give them the best cleaning characteristics of any units that we are aware of."

The TX200 heavy payload robot, which has been available since mid-2009, has an IP65 rating in the standard version. It also features pre-installed user interfaces, located on the front arm near the tool, as well as a CS8C HP controller, which was specifically developed for this robot. With a rated load capacity of 100 kg, the TX200 is particularly suitable for use in the pouch packing line. The trays being transported hold 24 pouches and are surrounded by a heavy steel frame.

The dead weight of the gripper must also be taken into account. The resulting total weight to be handled is around 30 kg.

A tong-like gripper is used for reliable transport. In combination with the robot's high rigidity, this allows the trays to be transported at the required speed.

The application in a nutshell

The process works as follows: The pouches to be packed are fed in on a belt in a series of individual compartments. There the RX160 removes three pouches at a time and places them in a tray. This is done eight times, with the result that a total of 24 positions on the tray are filled. The filled tray is placed on a turntable at the removal position, and a prepared empty tray is swung into the loading position.



TX200 robot handles the filled trays.

After this the fast TX200 removes the filled tray and places it on a stack of previously filled trays. On the return path it picks up an empty tray and places it in an empty location on the turntable to close the loop in a continuous process. A total of 14 trays are stacked together and then ejected from the station.

To avoid interrupting production when exchanging trays and allow the RX160 to place new pouches, the robot controller of the TX200 organizes all of the processes, from buffering the pouch feed to synchronizing all of the handling actions. This allows the trays to be exchanged without any forced breaks, so that the product can be processed continuously.

Tried and true technology

Automated bottle loading using a RX170 robot has been proving its worth at the Leverkusen plant for around 10 years. The robot picks up the bottles, travels over a defined route, and stacks them in wire mesh crates. The control program takes into account the fact that the number of packing levels depends on the height of the bottles being packed. This information is stored in the RX170 in the form of size-dependent parameters, and the program finds the right packing scheme for each bottle size. Here rubber suction cups ensure a reliable grip.



Manfred Broustin, Head of Process Control.

The robot places separator sheets between the individual layers. It uses the same gripper for both steps. After placing a separator sheet, it sets a new layer of bottles on top. A turntable buffer bridges all of the exchange



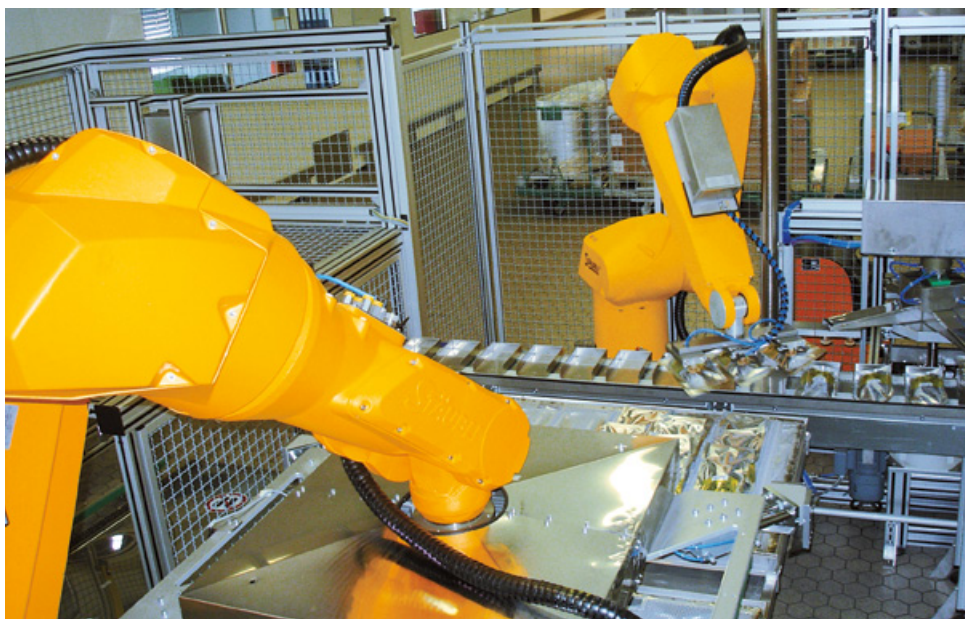
Automated bottle loading using a RX170 robot.

cycles occurring during the process. The RX170 does not take the bottles directly from the filling machine. They are first buffered on the turntable, and then the robot removes them from the turntable at a rate that is higher than the loading rate. This provides breaks that can be used for exchanging wire mesh crates or placing separator sheets, without any interruptions in production.

The objects must be presented to the Stäubli robot in a manner that allows it to pick them up easily. For this reason, the bottles are not placed on the conveyor belt at random, but are instead pre-sorted. They are guided to

a V-block, where the robot picks them up the same way each time. The RX170 control software and the feed belt controller are linked together to ensure that the robot always has the data it needs to know where the object is located.

Manfred Broustin is pleased with the Stäubli robots. The incidence of faults during the process has been virtually nil. In the words of the process control manager, "We are very happy with Stäubli's products. Fast delivery of spare parts and the repair service also work perfectly. We could hardly have found a better solution to our requirements."



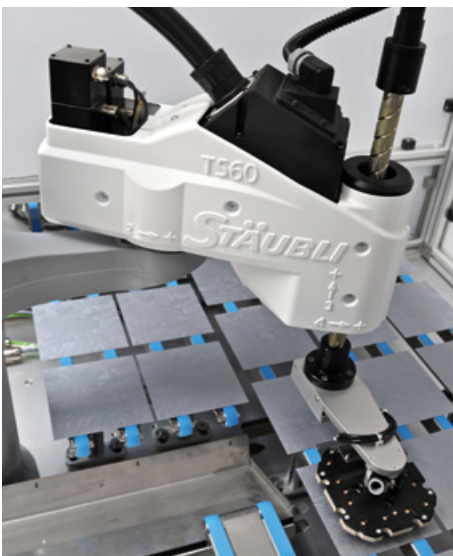
Two production lines for filling and packing.

Baumann Wet Bench Handling

Robot-manufactured cells for the photo-voltaic industry

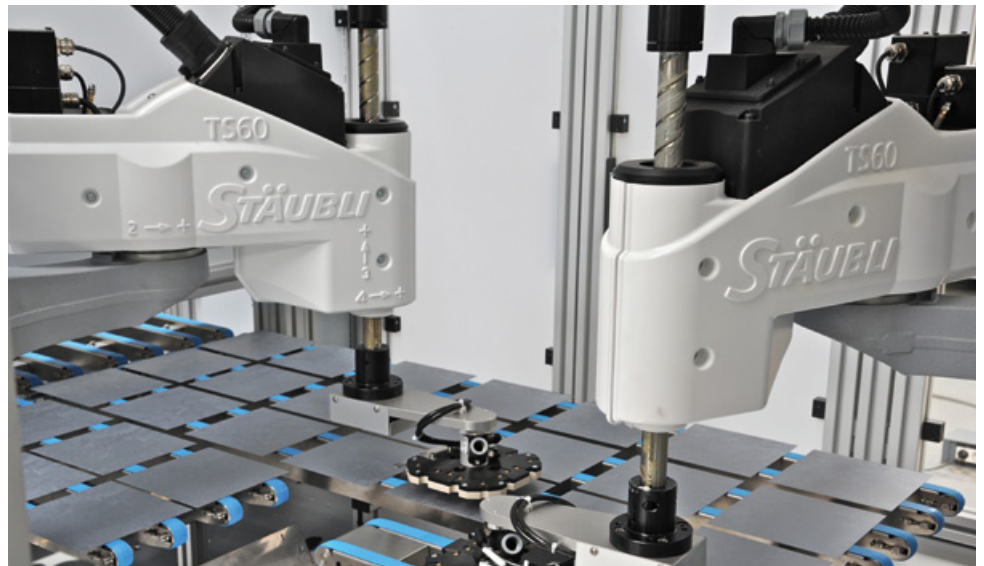
During the manufacture of solar cells, wafers go through a variety of wet chemical processes. The handling of these thin silicon wafers before and after the wet bench is done by robots. Here, requirements are clearly defined: the shortest cycle times with the lowest rate of breakage for this valuable throughput – a balancing act that can only really be achieved using automation at the very highest level.

The demands placed on automated handling in solar cell production push conventional solutions to their limits. Modern systems, which are primarily used in East Asia, are expected to achieve an output of 3,000 wafers an hour. At the same time, the ultra-thin silicon wafers must be handled with the utmost care, as each seemingly insignificant disruption in the motion sequences of the robots inevitably leads to breakage. This is not only expensive for the systems operator; it can also have negative repercussions for the systems manufacturer, who is normally expected to guarantee a breakage rate of less than 0.1 percent.



Precise handling of ultra-thin wafers.

Amberg-based systems integrator Baumann specializes in automated solutions for photovoltaics, offering standardized mod-



Perfect synchronization of the two Stäubli TS60 Scara robots.

ules for loading and unloading wet benches. Systems "Made in Germany" are in great demand in East Asia, where business in loading and unloading modules is booming. The reason for this is their impressive performance, which sets new standards in the decisive factors of cycle time, breakage rate and reliability. The core of these systems is high-speed SCARA robots made by Stäubli. The latest loading modules are using the new Stäubli TS60 SCARAs for the first time.

Baumann modules are designed for handling two different sizes of mono-crystalline and poly-crystalline wafers. The wafer's dimensions can be either 125 x 125 millimeters or 156 x 156 millimeters. Changing from one size to another takes a maximum of 10 minutes, thanks to sophisticated hardware and software solutions.

High-speed SCARAs replace delta kinematics

The wafers arrive at the loading modules via a single-track conveyor belt. Here, robots take the ultra-thin wafers and place them in precisely defined positions on the five roller tracks of the wet bench. In order to achieve the necessary cycle time – the system is designed for a maximum output of up to 3,000 wafers per hour – Baumann favors an unconventional solution. The Amberg automation specialists deliberately choose not to

use delta robots for this application, instead working with two very fast Stäubli TS60 SCARA robots.

Jörg Weigert, Project Manager at Baumann, sums up why they are using SCARAs. "We are absolutely convinced by the performance of the Stäubli SCARAs. The robots are fast, precise and extremely reliable, even when they are in constant use over a multi-year period. The SCARAs from Stäubli are simply unbeatable, particularly with regard to what really matters in these applications, namely robustness and reliability with minimum maintenance requirements."

Jörg Weigert sees a further plus point for using SCARAs in their simple integration into the slender Baumann modules. Because of the associated high levels of torque, delta kinematics would require the module to be constructed on a disproportionately larger scale. This would run contrary to the Baumann philosophy, which is to design systems to be as compact and reliable as possible.

In addition, this application requires the use of two robots, regardless of whether delta or SCARA kinematics apply, because of the conditions on the wet bench. The distances between the conveyor belt and the five roller tracks of the wet bench are simply too great to be serviced by one robot. By using two robots per module, the lower initial cost for the SCARAs represents a significant advantage. Baumann also uses robots from

Stäubli for the unloading module on the opposite side of the wet bench in order to guarantee absolute consistency throughout the automated process.

Perfect synchronization

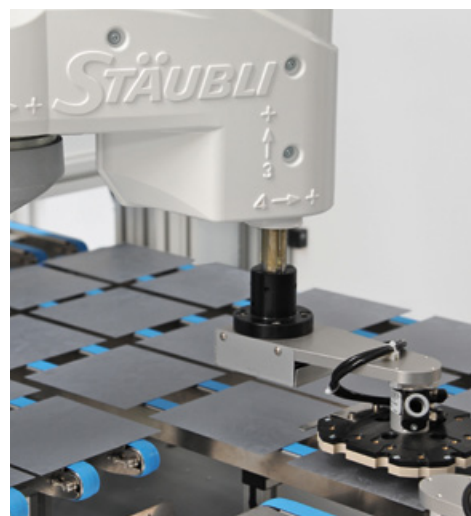
Baumann is especially proud of the perfect synchronization between the two robots and the speed of the conveyor belt. After all, the SCARAs take turns picking up from the same point on the conveyor line. They have been programmed in such a way as to make collisions impossible. Additional collision protection is not necessary. At the same time, the two robots must be perfectly synchronized with the speed of the conveyor belt. "Programming these tasks required considerable expertise on the part of our specialists. They found the multitude of options provided by the Stäubli CS8C controller and conveyor tracking very helpful."

Precise alignment of the micron-thin silicon wafers is essential when they are placed

on one of the five tracks of the wet bench. The two TS60s use their vacuum grippers to alternately pick up wafers from the single-track feed conveyor at incredibly high speeds. Immediately before this, an image processing camera positioned above the feeder belt captures the exact position of where the wafers are arriving, and transmits the coordinates within a few milliseconds to the robot controller. The robots are then charged with the task of accurately depositing their valuable load at an exact position on one of the five wet bench tracks.

The handling processes are steady and smooth, despite the high speeds involved. Refined programming together with specially developed gripper technology ensures that the breakage rate is often significantly lower than the manufacturer's guaranteed rate. "We know from our customers that the systems often work for several days at a time without a single wafer being broken," says Weigert.

The systems run 24 hours a day, seven days a week. "Under these conditions, we



High reliability at a simultaneously low maintenance.

have to guarantee an overall availability of 97 percent. This means that, for these modules, we have to use only the very best components that are available on the market. One such component is the Stäubli robot. Its performance and extremely long maintenance intervals have played a significant part in shaping the reputation of our modular cells," says a delighted Jörg Weigert.



Powering the future of your PV production.

www.staubli.com/robotics

Smart, smooth and safe.

Stäubli features a complete range of robotic solutions focusing on the specific needs of Photovoltaic production. Solutions that help reduce manufacturing costs while increasing throughput and quality. Stäubli robots are well distinguished for high reliability, precision, and dexterity that our customers have come to expect.

Stäubli – your innovative partner in photovoltaics.



ROBOTICS

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