



What makes a new brush robot for rubber injection molding machines especially efficient, self-sufficient in terms of control technology and fit for condition monitoring?

# Burn Rubber

In rubber and silicone injection molding—unlike thermoplastic injection molding—the finished component usually leaves the mold but with a stripping or brushing device instead of an ejector. The Lower Austrian company Robotix Automatisierungstechnik has specialized in the development and production of such brush systems for automated, fast removal of elastic parts from the mold and for over a decade, has been a successful OEM partner for well-known injection molding machine builders. Besides customer-specific production, Robotix recently started with the distribution of the new »RB-800-S-CNC«

brush robot. Via the standardized Euromap67 interface, this fully automated unit can be coupled with injection molding machines of any maker and is suited not only for new installations but also for modernizing existing machines. To implement the project, the Salzburg automation manufacturer SIGMATEK was brought on board, who provided a complete electrical solution from a single source made up of control, servo drive and motors, operating device, visualization, connectivity, as well as a lot of applications know-how in plastics technology — automatic brush-wear monitoring included.

The managing partner of Robotix Automatisierungstechnik, Ing. Johannes Lemmel started 1997 as a sole proprietor. With his engineering company, he first offered planning and construction services, and quickly found his footing in special machine construction for the plastics industry. He soon recognized: "The high-performance serial injection molding machine is only one side of the solution. The adaptation to the customer-specific product using tailor-made gripping systems and periphery equipment such as cutting stations, separating or

The new, fully autonomous "RB-800-S-CNC" brush robot from Robotix Automatisierungstechnik is used for the quick removal of rubber and silicone injection molded components.

preparation systems increases the productivity. For this reason, finished complete solutions are in demand on the market", explains Johannes Lemmel the founding of Robotix Automatisierungstechnik in 2000. "At that time, we started developing and manufacturing turnkey systems. Today, we see ourselves as a partner for complete solutions in the automation industry with a focus on robot solutions. Whether medical technology, automotive or consumer products — our customer base is highly diverse." The first serial product was introduced around 10 years ago: Together with a renowned local rubber injection molding machine builder, Robotix developed a brush system to gently remove components from the mold. In the rubber and silicone industry, no ejector is used for the component and sprue removal. Instead, rotating brushes and cylinders are used. Since then, Robotix has served a niche market that is simply too small and therefore unattractive for other machine builders oriented toward higher volumes. "Rubber to plastic ratios are on the order of about 1:10 — this ratio is reflected from the raw material to the number of injection molding machine sold", explains Johannes Lemmel. "The niche is ideal for our company's size — also because the leading injection molding machine manufacturers are located in Austria and Germany."



### The Brush System

The Robotix brush system is available in different configurations—with up to 4 vertical axes depending on requirements and size of the injection molding machine. Whether straight strip or angled spiral brushes, rubber or silicone impact strips - the Klosterneuburg-based machine builder has the right solution for almost every elastomer product in its extensive modular brush head system for gentle and fast component removal. "The faster the finished component is removed from the tool, the quicker a new part can be produced—it's always about minimizing dead times" says Johannes Lemmel, pointing out the productivity potential. In the past, many brushing devices were driven pneumatically or hydraulically. In recent years, however, electric servo drives and energy efficiency have become more important. "To date, we've mainly delivered our brush robots to our OEM

partners for new customer-specific equipment", reports Johannes Lemmel further. "Among them are many well-known injection molding machine builders such as Maplan, Battenfeld, Engle and Arburg, to name just a few. We take part in their global sales and service networks, to deliver our solutions withing Europe, as well as in the USA and China." Through the continuing technical development of our brush system and most of all, thanks to higher efficiency of the electrical drives, retrofitting is an increasingly interesting topic for Robotix. "In addition to equipping new machines, we also want to focus on the retrofitting business", reveals Johan Lemmel. "For this purpose, however, it was necessary to further develop our brush robots into autonomous units in terms of control technology so they could be coupled over a standard interface - specifically via Euromap67 - to existing injection molding machines that provide this interface and, for example, replace an aging pneumatic solution." To date, Robotix has integrated their brush systems directly into the specific control architecture of the respective injection molding machine.

### The "Best" Partner Brought on Board

Johannes Lemmel was already familiar with the Salzburg automation provider, SIGMATEK and its capacity for innovation from his previous work at a manufacturer of robots »



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Ing. Johannes Lemmel,  
Managing Partner of Robotix  
Automatisierungstechnik.

and peripheral devices for injection molding machines. "In our opinion, we were able to win over the market leader in this area. SIGMATEK had exactly the right portfolio for our application and, above all, the know-how based on decades of experience in injection molding. For us, it was one-stop shopping: control, servo drives and motors, operating devices and visualization, including finished software components — all from one source. The wait for results was not long — together

as SIGMATEK is known in our industry for exactly this level of perfection."

### The Technology Package Used

At SIGMATEK, Robotix drew from a wealth of resources: The especially compact, modular "S-DIAS" control and I/O modules fit just as comfortably in the brush robot's stand as the multi-axis servo drive "DIAS Drive 300". "The servo is used in the cold plate model — the heat is dissipated over the base frame of the robot. For us, the fanless design is an advantage since aggressive vapors are sometimes generated during the removal of rubber and silicone components, which would clog the fan filters over time", describes Johannes Lemmel the application in detail. "In addition, we can build extremely compact and don't require a separate control cabinet. All SIGMATEK components are very robust and unaffected by vibration — although the PLC is located directly in the machine, which has long been commonplace with linear robots in injection molding." Communication with the control system of the respective injection molding machine is established over the standardized Euromap67 interface. The two-channel Safety emergency stop runs over the same interface, so that if an



The robust, compact and modular "S-DIAS" control and I/O modules from SIGMATEK fit directly in the brush robot stand.



The brush robot is operated via SIGMATEK's mobile operating panel "HGT 835" with an 8.4" touch screen in IP54 protection and Safety emergency stop switch. Its "EDGE2-Technology" processor also handles the visualization created with the all-in-one "Lasal" engineering system.

with the Upper Austrian system integrator Getronix, the automation solution was ready within a few weeks. The "RB-800-S CNC"—the product name of the new autonomous brush robot — has already been proving its suitability for daily use for several months at a pilot customer's." In terms of automation, everything worked right from the start - including the connection to the machine control system via the Euromap67 interface," says Johannes Lemmel, praising the combination of proven basic mechanical components with modern automation technology, and emphasizing that he feels confident in his choice of partner: "We expected nothing less,

emergency stop is triggered in the machine, the brush system is also shutdown safely. The brush robot can be operated via the mobile operating panel "HGT 835" with an 8.4" touch screen in IP54 protection. Its "EDGE2-Technology" processor also handles the visualization created with the all-in-one "Lasal" engineering system, as was all programming of the control system and drives. The compact drive system "DIAS Drive 300" is designed for controlling up to three axes — in this specific case, three servo motors are used: One motor moves the vertical axis, the two others are for the rotation of the brushes. "The very good servo properties, the high efficiency and low heat generation characterize the servo drive", confirms Johannes Lemmel. "The modern servo technology enables fast and precise movement, whereby shorter production times as well as more productivity are possible, and it is significantly more energy efficient than previous pneumatic solutions. For us, especially in the retrofitting business, those are decisive selling points." The sophisticated software allows product-specific programs (four standard templates) to be created and quickly loaded with a product change.

### Settings and Wear Monitoring

When installing a new brush tool, various basic parameters such as pressing force, speed, vertical speed are first set via the operating device based on previous values



The multi-axis "Dias-Drive 300" servo drive from SIGMATEK works as a cold plate variant without a fan. This not only saves installation space but also maintenance costs.

and then optimized for the respective product through empirical determination. The visualization shows the parameter changes and their effects directly — the PLC permanently stores the determined optimal tool settings. With pride, Johannes Lemmel points out a special feature in Condition Monitoring: The brushes are subject to wear, which can differ widely depending on the finished product and brush configuration. The lifespan of a brush varies accordingly – between a few weeks up to a year or longer. Thanks to the automatic brush-wear monitor implemented with the help of SIGMATEK, the approaching end of the brush’s lifecycle is promptly shown—the maintenance intervals can be optimized.” The solution functions via measurements of the motor torques, which change with increasing wear. Depending on the product, the customer can define a specific threshold value. If this value is reached, the control sends a warning message or shows it to the operator.



Through the visualization, all relevant brush tool parameters can be set, optimized and monitored during the active process.

## An Equal Partnership

The brush-wear monitor implemented is only one example of the diverse options that the sophisticated, modular systems architecture from SIGMATEK offers, as Johannes Lemmel summarizes: “Regardless of whether control, drives, visualization or the communication interface—with their comprehensive expertise in the plastics industry, SIGMATEK is simply the perfect partner for us. We met an extremely innovative and dedicated team - from the sales engineer Stefan Mingler to the individual application engineers from SIGMATEK, as well as the system integrator Getronix. We received top support in every respect. That's what I call a real all-round, carefree package.”

INFOLINKS: [www.sigmatek-automation.com](http://www.sigmatek-automation.com) | [www.robotix.at](http://www.robotix.at) | [www.getronix.at](http://www.getronix.at)