INDUSTRIAL ROBOTS

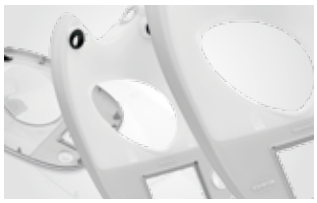
VERSATILE SOLUTIONS FOR PRODUCTIVE AUTOMATION.

KraussMaffei

Pioneering Plastics

FACTS & FIGURES

AREAS OF APPLICATION



Consumer goods

Packaging

Automotive

Medical/pharmaceutical

Electrical/electrical

Major appliances

Application areas	Insertion, demolding, machining, installing
Special features	Versatile, high rigidity, great degree of freedom, investment security, cleanroom-compliant
Working space	Ball
Payload	6 – 210 kg
Reach	700 – 3900 mm
Standard accessories	Quick changing units, conveyors, safety housings
Control system concept	Standalone with failsafe PLC for control of industrial robots and associated peripherals
Clamping force range	250 kN to 55,000 kN
Transfer variants	Standardized transfer direction for floor and bracket installation

VERSATILE TOOLS
FOR PRODUCTIVE AUTOMATION

KraussMaffei industrial robots implement complex demolding processes with a wide variety of grippers and freely programmable sequences of movements for wide swiveling ranges. Six axes enable enormous flexibility, even in spots where linear robots cannot be ideally used. Our industrial robots are the solution for comprehensive, individualized automation requirements. KraussMaffei creates customer-specific production cells with standard components – from pick and place to turnkey solutions.

Your advantages at a glance:

- Turnkey automation solutions from a single supplier
- Optimal positioning and space-saving installation types for injection molding machines
- Excellent operating concept
- Integration of various peripherals
- Flexible gripper solutions

TRANSPARENT TECHNOLOGY

TAKE A TOUR AROUND THE INDUSTRIAL ROBOT

Flexibility is critical
Space-optimized production units
or mobile assembly cells

Economical turnkey solutions
Sophisticated, advanced technology

One contact for injection molding machinery and automation
Fast, competent processing without
having to define interfaces

Proven energy supply and signal routing
Arm-mounted unit or gripper interface module

CE conformity
High degree of safety –
low costs

Safe home traverse
at the press of a button
No collision

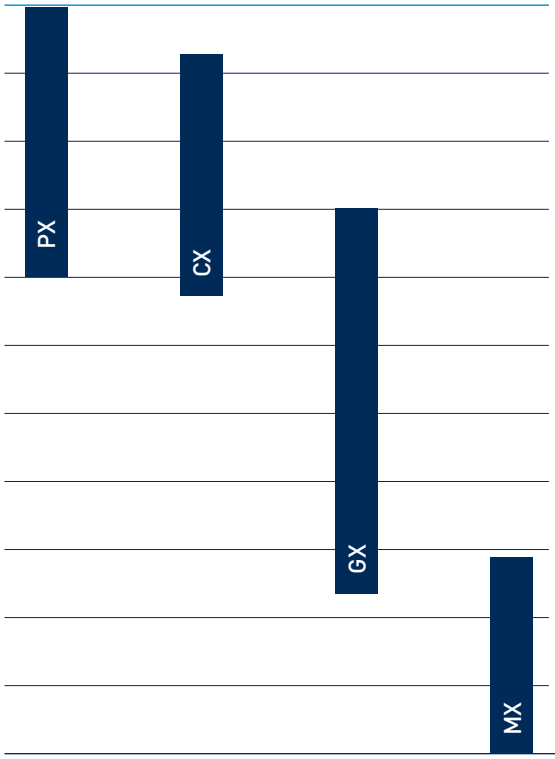
FLEXIBILITY IS CRITICAL
NO LIMITS FOR YOUR REQUIREMENTS

KraussMaffei provides you with space-optimized production units with the shortest return to service time, according to your requirements. Our industrial robots implement complex demolding processes with various gripper concepts through six axes, freely programmable sequences of movements and wide swiveling ranges.

Heavy-duty basic units

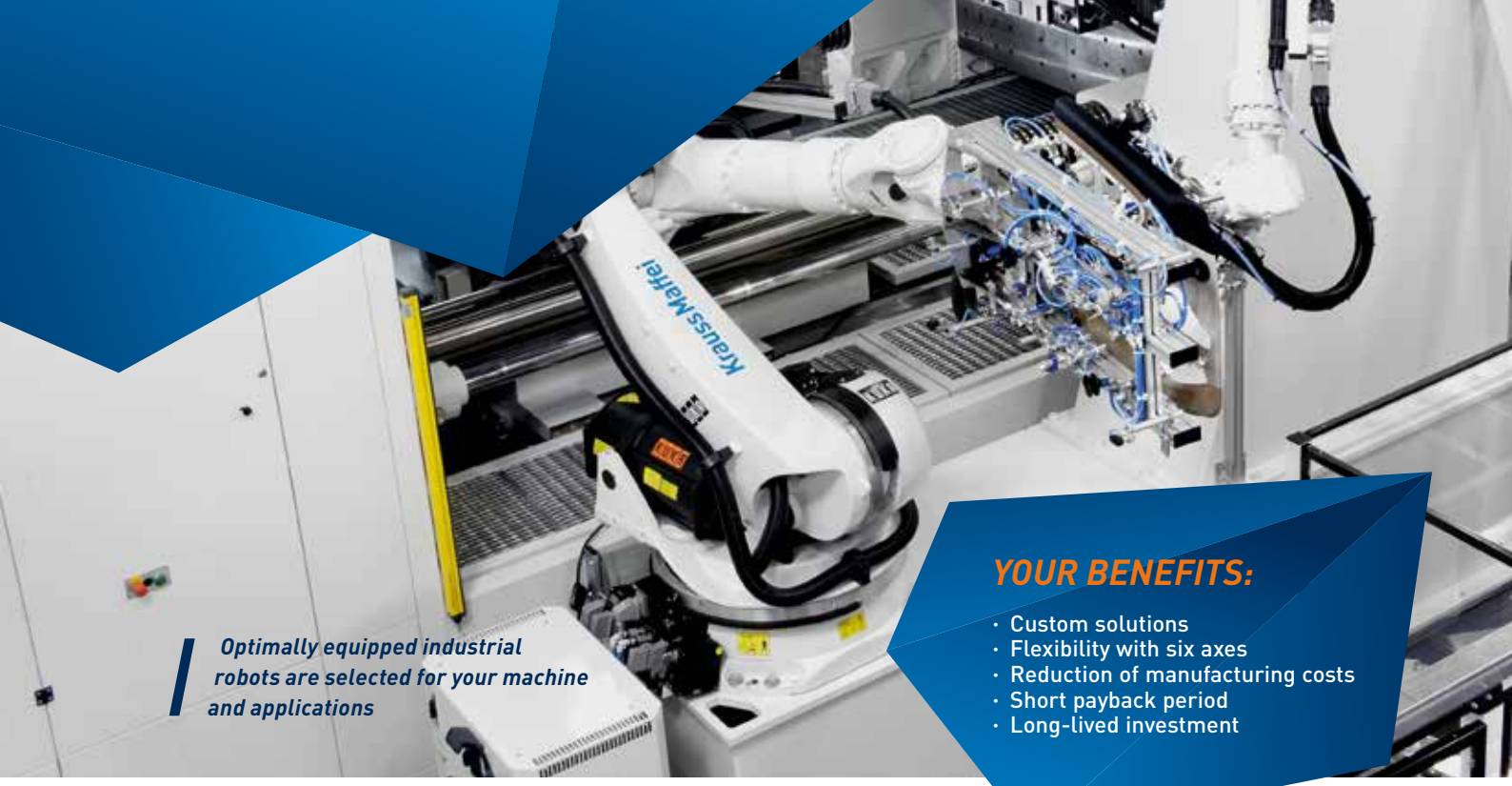
Industrial robots are designed for extreme ambient conditions and continuous operation – for example, when welding bodywork parts. When used in plastics processing, they come nowhere near their performance limits but rather distinguish themselves over a long operation period with the highest level of service. Highly dynamic servo drives and high-precision gearing, synchronized with an intelligent control system, provide for continuously high positioning accuracy.

Industrial robots can demold components of any design appropriate to their type, even if they are large in volume, heavy or intricate. Even when fully extended, they retain their exceptional rigidity and can be manipulated at high speeds. Through careful product handling and precise post-mold processing of components, a higher and, above all, uniform component quality is achieved.



Clamping force	Robot type	
	IR	IR-S*
25		–
50		–
160		–
400		
500		
650		
850		
950		
1.500		
2.500		
4.000	–	

* IR-S shelf type (mounted on the bracket)



Optimally equipped industrial robots are selected for your machine and applications

YOUR BENEFITS:

- Custom solutions
- Flexibility with six axes
- Reduction of manufacturing costs
- Short payback period
- Long-lived investment

Multi-talented with six axes

With their reach, payload and kinematics (six axes move freely in space), industrial robots solve the most diverse tasks with ease. Even the expansion of technologies or fundamental changes to the production steps in a system are no problem when considering the reach and payload. Also when used in technical cleanrooms, industrial robots are optimally suited due to their design. Only a small cleanroom is needed, which reduces the maintenance and operating costs. For example, if six axes are not sufficient (for large machines, for example), then we connect additional linear axes on which the industrial robots can drive into the injection molding machine. What if there is only little space around the injection molding machine? Then we simply suspend our industrial robots from the ceiling.

Customer-specific system solutions

We know how the articulated arm kinematics can best be used, and we develop the best possible solution for you. The payload is less critical and the reach more important when selecting the robot devices. Hundreds of successfully implemented applications make us specialists in integration and after-sales service for industrial robots. This expertise will pay off for your company.

Cost-effective investment

As master of the injection molding process, the injection molding machine determines the cycle time. This means that highly economic performance depends on the efficient use of dead time. Industrial robots play their part. Their special kinematics are used for deflashing, flame treatment, mounting and much more. Their high levels of productivity lead to increased profitability. Downtime, which is close to zero, and higher output reduce manufacturing costs. That means higher robot investment costs can be quickly amortized through better use of downtime. In addition, complex, elaborate grippers are replaced by using robot kinematics.

Make targeted, full use of potential – not only with new machines

We automate standard new KraussMaffei injection molding machines with industrial robots. Due to our many years of automation experience in the plastics processing industry, we can offer you solutions for integrating industrial robots for older KraussMaffei machines or machines from other manufacturers at any time.

The right partner for every purpose

Depending on the specific application or individualized customer request, we choose the robot with the corresponding options for integration into the system. This ensures that the selected robot will be the best fit for the special features of your application. Our system partners are the renowned robot manufacturers Kuka, Motoman, ABB and Fanuc. Your benefit from this partnership is plain to see: you always enjoy the competent and direct support of your KraussMaffei contact person.

ASSEMBLY AND INSTALLATION
WE HAVE THE OPTIMUM SOLUTION

KraussMaffei provides you with four basic options to integrate the industrial robots perfectly into your specific production situation.

Space-saving production cell: shelf mounting
Our shelf-mounted (S) version industrial robot is usually installed on the fixed (mold) platen of the injection molding machine. This solution is used especially with big machines and for large-volume parts. Industrial robots are also installed on machines with limited access to the mold, as in the case of side-mounted mold change carriages that have dimensions that exceed the clearance between the tiebars.

For situations where space is limited: Wall mounting
The wall-mounted (W) version is the optimal solution if only very limited room is available in your production space or if the space below the demolding position is needed for other processes. It is, for example, conceivable to install an additional packaging apparatus, securely and compactly housed in the area below the demolding position, which can have a different design depending on the article. In addition, this solution for integrating KraussMaffei industrial robots provides you with another decisive benefit: the special sequence of movements (swinging in from the side) significantly reduces cycle times.

When peripherals must be integrated: Floor mounting
The floor-mounted (F) version is the classic among all the various assembly options provided by the industrial robots from KraussMaffei. They are unique thanks to the industrial robot's large horizontal working radius. This makes it possible to integrate elaborate peripherals, such as additional installation or inspection stations. The enormous flexibility of the industrial robot can be used optimally in this case. A further bonus point is that this version can also be used with excellent results if a cleanroom application is necessary.

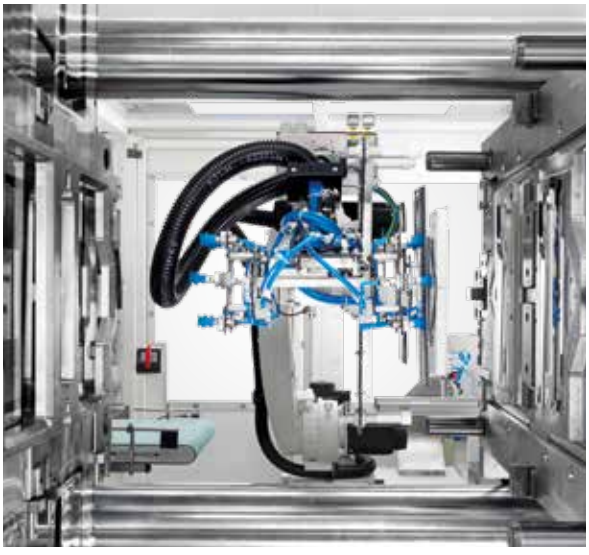
Cleanroom application with bracket installation

Precision grippers for the cleanroom

Bracket installation (IR-S) for the greatest possible reach and compact cell structure

The solution for complex demolding: integration into the injection molding machine

The integrated (I) version is the optimal alternative if the available machine installation space is limited, yet, at the same time, the demolding process is complex. Both of these requirements are fulfilled ideally with the integrated version whereby the machine's protective housing is expanded and the industrial robot is mechanically integrated. Cleanroom applications can thus be implemented both easily and cost-effectively. An additional advantage for you: the setup time is shortened to a minimum upon successful precommissioning by KraussMaffei.



Integrated robot for complex applications

YOUR BENEFITS:

- Optimum use of available space
- Integration of peripherals
- Reduction of cycle time
- Implementation of cleanroom applications

TECHNICAL AND ECONOMICAL ADVANTAGES ARE INCLUDED

The industrial robots from KraussMaffei provide you with various advantages: a simple operating and control concept and a uniform interface and CE conformity.

User-friendly operating and control concept

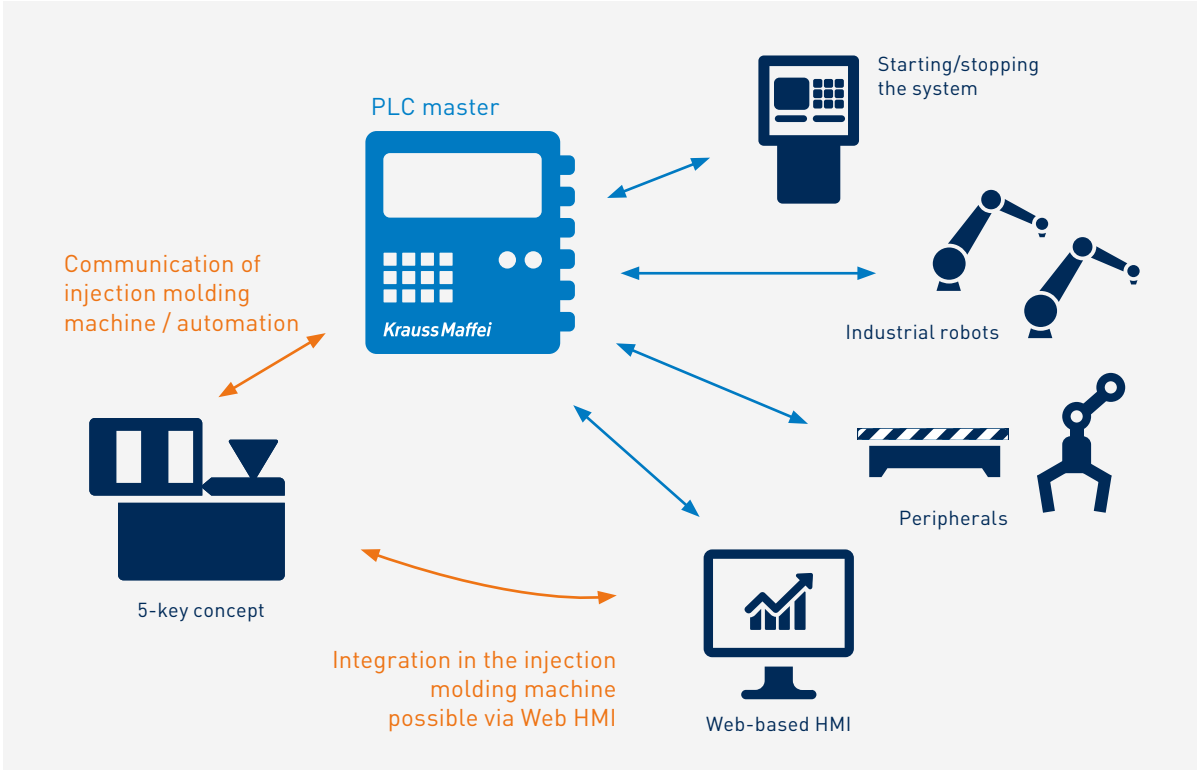
The Siemens control system (PLC) can be operated from the injection molding machines' operating panel because of the integration into the MC6 visualization system. The consistent configuration of the user interfaces ("look and feel") makes it easy for you to find your way around the user interface and access the relevant information quickly.

Comfort or Performance

There are two control concepts to choose from depending on the complexity of the application: The Comfort concept and the Performance concept. Simple peripherals are integrated with the Comfort concept. The Performance concept is used for more complex peripherals and multi-robot systems and is adapted on an order-specific basis. For all IR applications, a Siemens PLC and an operating panel are integrated.

Proven energy supply and signal routing for grippers

Inputs, outputs, monitoring functions and valves are required for the demolding, loading or assembly gripper control system. KraussMaffei provides you with various solution concepts: the arm-mounted unit and the gripper interface module. An arm-mounted unit can be used as the central supply for the valves and signals for grippers or peripherals. It can be implemented on every robot size because it is built on the third axis. It contains a power supply, a fieldbus system and a pneumatic line. For large robots, the arm-mounted unit is installed on the gripper intermediate group. A small hose package leads to the gripper and the singularity of the robot can be bypassed. The capabilities of the industrial robot can be expanded with the integrated demolding stroke and the larger reach of the robot.



Safe home traverse at the touch of a button

In automatic operation, we enable you to carry out the home traverse by pressing a key. In principle, there is a high danger of collision from the industrial robot's special kinematics. When the system is at a standstill, manual maneuvering poses the danger of collision. This must only be done by trained personnel. With our standard programming, industrial robots of the IR series can be driven into the safe home position by a simple press of a button on the operating panel.

ECO function – speed adjustments outside of the mold

The ECO function enables the robot to adjust its traversing speed cyclically to the injection molding process. Simply pressing the Eco button selects the optimal machine setting for energy consumption. This reduces energy consumption and prevents wear.

This takes place outside the mold; inside the mold, the robot travels at its maximum speed.

Programmable safety system

With our simple-to-expand and programmable safety system, you remain flexible into the future as well. You can react individually to later changes or expansions of your automation cell.

Uniform interface

With the EPS connector, you have a uniform interface for grippers and peripherals. The pneumatic and electric supply for the components is guaranteed by this connector. It has a compact design and is available in various equipment variants. You profit additionally from fault prevention (poka yoke principle) and time savings.

CE conformity

Your safety is important to us. That is why our customers who buy complete systems get CE conformity. As early as the quotation phase, all systems are designed to be safety-compliant according to the applicable directives.

YOUR BENEFITS:

- Exemplary energy supply and signal routing
- Home traverse at the press of a button
- CE conformity
- Integration of peripherals is possible at any time

Arm-mounted unit for maximum convenience during production and maintenance

Increased flexibility in large machines with the gripper interface module

VERSATILE PERIPHERALS
FOR COMPLEX AUTOMATION SOLUTIONS

Wide variety of grippers
Whether simple grippers with standard components such as vacuum exhausters, parallel grippers, sprue gate grippers or complex inserting and demolding grippers, we have the perfect solution for you. Benefit from cost-effective solutions with high holding force for your special requirements.

Precise sorting and feeding units
Sorting and feeding units are necessary for insertion technology or subsequent processes. For such processes, the robot requires the components to be in an exact, aligned position. A further plus point: the peripherals can be included directly in the robot control system so that only one control unit is required.

Different drawer systems
They are used for providing parts, exporting QA components and for buffer storage. In addition to single and double drawers, a combination of drawers and chutes is a further equipment variant. Each drawer system can be equipped with a request and acknowledge button, as well as a protection guard.

Custom delivery systems
We can provide you with delivery systems such as belt conveyors, conveyors for different product types, roller conveyors and chain conveyors which are driven by motors or gravity. Depending on what your application is, we can create an optimum concept for you. Pallet cages, pallets, cardboard boxes and small load carriers with different designs (e.g., multi-track) can be conveyed to or from the processing line.

Depending on the application: the right camera systems and testing systems
We have the right solution to suit your requirements: Simple camera systems are used when it comes to measuring, checking and counting components with straightforward shapes. Configurable image processing systems check safety-relevant components and complex geometries, undertake checks that need to be documented and carry out highly accurate measurements at high checking speeds. A great number of the tests run simultaneously and require a great deal of lighting. Other checking systems, e.g., for pressure checking and short-circuit checking, are available on request and can be integrated into the production cell.

Complex automation solutions: integrating different kinematics and peripherals

YOUR BENEFITS:

- System solution from a single source
- Individual modular peripheral concepts
- Integrated complex peripherals
- Fast product change-over

ALMOST AUTOMATIC: PROJECT MANAGEMENT THROUGH PARTNERSHIP

WORKING TOGETHER TOWARDS SUCCESS IN JUST SEVEN STEPS

Step 1 Project meeting | **Step 2** Solutions | **Step 3** Layout design | **Step 4** Cycle time diagram | **Step 5** Simulations | **Step 6** Precom-missioning | **Step 7** Service

1. Detailed project meeting

We work together with you to appraise the current state of your production, discuss the pros and cons of existing production lines and concepts, and work out any potential improvements that could be made. In addition to this exchange of experience, we work with you to draw up an initial outline schedule for your planned project.

2. Drawing up different solution approaches

During the concept phase, we will outline various solutions for you and they will serve as the basis for any further meetings and discussions. We will illustrate different scenarios for you and visualize complex technical designs.

3. Layout design

All components are laid out in 2D or 3D. The layout is the basis for finding the best possible arrangement of the peripherals in the production cell, and helps with optimizing cycle time and floor space in order to integrate the system layout into your existing building layout in the best way possible.

4. Realistic cycle time diagram

The whole production process is visualized in order to simplify complex processes if necessary. The individual process steps are analyzed to optimize the main process steps and reduce the cycle time. This will provide you with a realistic estimate of the cycle time that is to be achieved.

5. Simulating the production process

The whole production process can be illustrated using 3D simulation. This will make it easy to spot critical procedures quickly, and the whole process can be improved even further if necessary.

6. Precommissioning

Precommissioning can take place at the TechCenter in Munich where you will once again have the opportunity to assess with us how the injection molding machine and automation system work together, and carry out a comparison with the technical specifications (cycle time – process – quality). Changes can be made before delivery so that you will not need to carry out any rework on site at your premises. Furthermore, you can tour the entire machine outfit, with its various applications and different robot types, at the TechCenter.

7. Comprehensive service

We are there for you even after the automation system has been delivered to you of course. We can provide you with various services for your machine or system. From commissioning your machine to individually agreed maintenance contracts and remote diagnostics. We are your single-source provider for servicing your injection molding system and automation.

YOUR BENEFITS:

- **Cooperation-based project support, documentation and specification**
- **Presentation of different concepts**
- **Layout design**
- **Overview of the planned production process**
- **Evaluation of the whole process**
- **On-site commissioning**
- **Technical changes at the supplier's site**
- **Global spare parts logistics**

OUR WORLDWIDE EXPERTISE IS YOUR ADVANTAGE
DIGITAL & SERVICE SOLUTIONS

With your KraussMaffei machine, you have chosen a product that delivers the highest levels of productivity and reliability. In addition to our range of machinery, KraussMaffei focuses on comprehensive and future-oriented solutions, innovative business models and an innovative portfolio of digital products.

Customer service at the touch of a button

The process of digital transformation is becoming faster and easier than ever for the customer. Our Digital & Service Solutions unit makes your production chain even more flexible and efficient with future-oriented solutions. KraussMaffei thus globally provides an all-inclusive customer service package and networks machines and processes with each other. Our global support offers a sound basis for your local long-term success.

Individual challenges in mechanical engineering call for intelligent solutions

With our services portfolio, we support you throughout your machine's lifecycle with a strong focus on your specific needs. In order to satisfy your wishes, we offer you a wide range of solutions in order to ensure maximum availability and optimum productivity of your machines.

Technology³ as a unique selling proposition

KraussMaffei is the only supplier in the world with a product range comprising the most important machine technologies for plastic and rubber processing: injection molding machinery, automation, reaction process machinery and extrusion technology. KraussMaffei is represented worldwide with more than 30 subsidiaries and over 10 production plants as well as about 570 commercial and service partners. Working together with our customers and partners, we are thus in a position to offer vast and unique expertise in the industry.

You can find further information at:
www.kraussmaffei.com

KRAUSSMAFFEI –
PIONEERING PLASTICS

Extensive expertise from a single supplier

KraussMaffei is one of the world's leading manufacturers of machinery and systems for producing and processing plastics and rubber. Our brand has been synonymous with cutting-edge technology for over 180 years. Our product range includes all technologies in injection molding, extrusion and reaction process machinery. KraussMaffei has a unique selling proposition in the industry as a result. By drawing on our proven innovative capacity, we can guarantee our customers sustained additional value over their entire value-adding chain through our standardized and individual product, process, digital and service solutions. The range of our products and services allows us to serve customers in many sectors including the automotive, packaging, medical and construction industries. We also supply manufacturers of electrical and electronic products and household appliances.

At your service all over the world

KraussMaffei is represented all over the world. Subsidiaries provide you with support in the countries shown in light blue. Our sales and service partners take care of you in the regions shown in white.

You can find all contact information at www.kraussmaffei.com

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