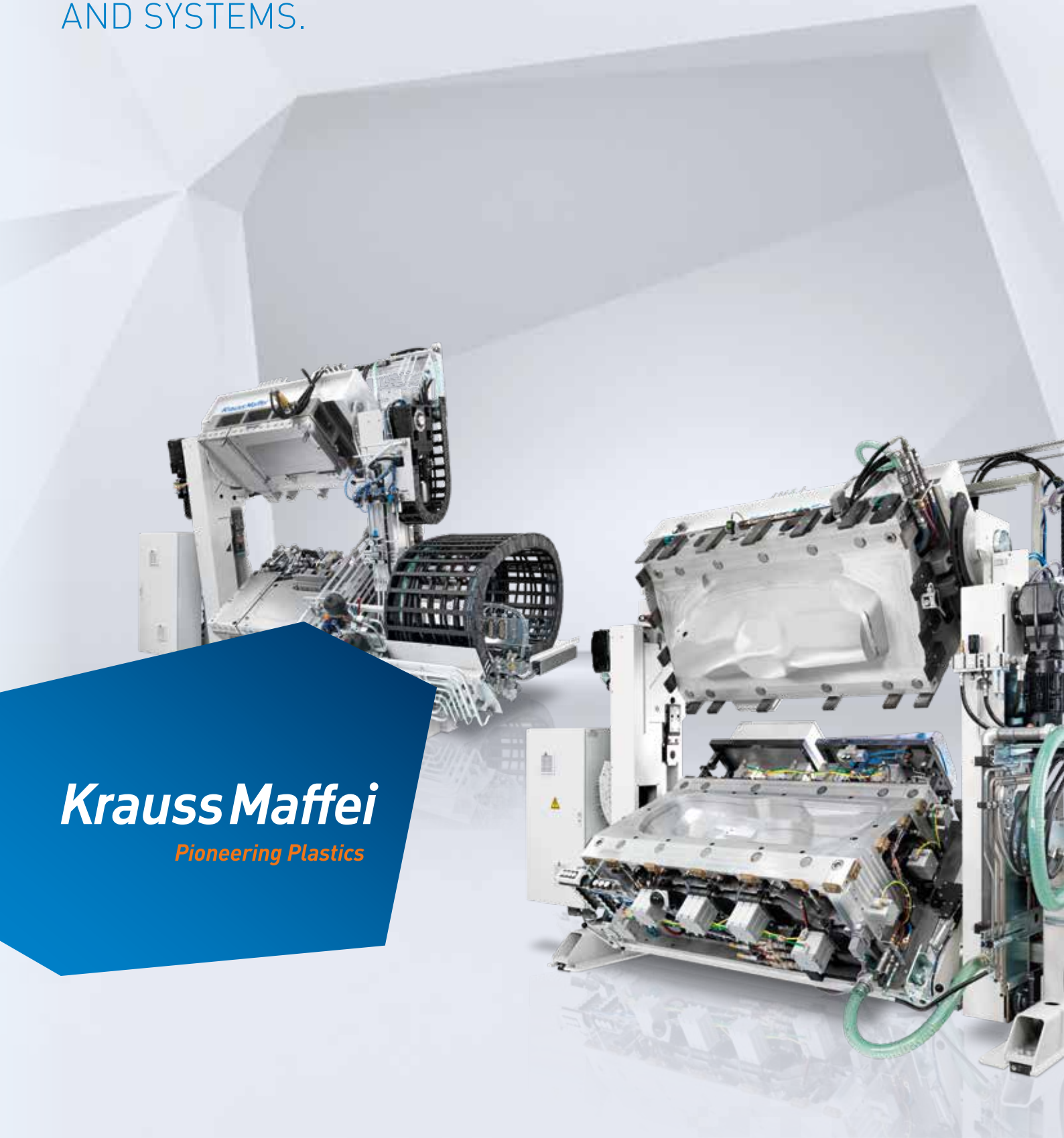
POWERFUL. RELIABLE. USER-FRIENDLY.

DISCOVER OUR MOLD CARRIERS AND SYSTEMS.



KraussMaffei

Pioneering Plastics

FACTS & FIGURES

AREAS OF APPLICATION FOR **THE MOLD CARRIERS**

Automotive industry

Automotive industry

Automotive industry

Commercial vehicles

Insulation/major appliances

Leisure/consumer products

Optimum quality for all PUR processing tasks

The requirements for modern mold carriers for PUR processing are diverse and complex. The range from KraussMaffei offers the right solution for all tasks. Machines and systems can be quickly adapted to customer-specific requirements, in terms of the application, production volumes and shot weight, at any time. Process-optimized and variable kinematics; molds that are easy to clean and add release agent to; high clamping force and optimal clamping force distribution are also powerful, reliable and robust design concepts for moving and turning the molds, which can be extremely heavy – these are the standards for design engineering. This ensures high positioning accuracy and reliability of all movement processes.

MOLD CARRIERS AND SYSTEMS
POWERFUL. RELIABLE. USER-FRIENDLY.

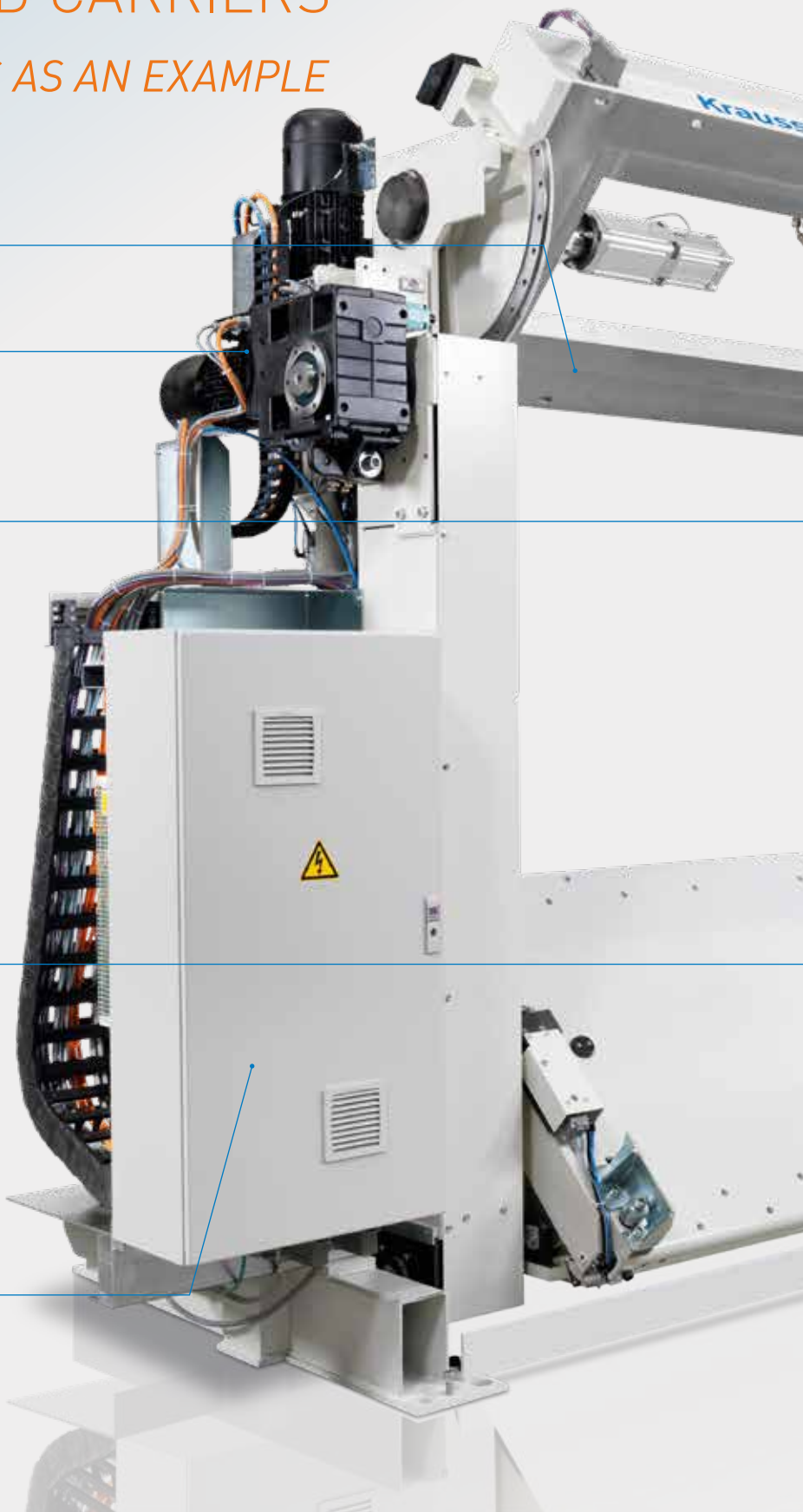
Our comprehensive range of mold carriers and systems makes KraussMaffei your expert partner for advanced PUR processing. Whether you make refrigerator doors or vehicle instrument panels, leisure products or wall cladding – whatever your special requirements and tasks, we can offer you a wide range of machine components that can be quickly and flexibly adapted to your individual needs at any time.

Your benefits at a glance

- Powerful, precise, user-friendly and reliable mold carriers
- Versatile system concepts for producing a wide variety of products and ensuring maximum cost-efficiency
- Comprehensive range of peripheral equipment and accessories
- Everything from a single supplier

TAKE A TOUR
IMPRESSIVE INSIGHTS INTO OUR MOLD CARRIERS

WITH THE EFT SERIES AS AN EXAMPLE



Electric motors carry out all tilting movements and parallel stroke

Proven, low-maintenance, highly dynamic chain drive

Quick clamping device for fastening the molds

Roller lift bars for fast, easy mold change

Switching cabinet installed in a fixed position on the mold carrier
with frequency converter complete with remote peripherals for connecting all the inputs and outputs of the mold-carrier valves

Pneumatic safety pegs

Standardized modular design
for easy access to the front and back

Internal piping for water, compressed air and vacuum

Pneumatic clamp force build-up
over the whole mold fixing platen via pressure pads

Mold carrier control unit
with hardware components for power supply, including Siemens control unit and interface to metering machine with integrated safety device

THE FTR SERIES –
EASY-TO-USE MOLD CARRIERS WITH A CONFIGURABLE MODULAR DESIGN

Versatile, powerful, robust, modular, multi-functional and easy to use – these are the key characteristics of FTR mold carriers from KraussMaffei.

Tilting design for excellent part quality

The proven swiveling design of our FTR mold carriers guarantees short process times and consistently high component quality. It enables fast clamping movements and high platen parallelism. The FTR mold carriers are readily accessible and can be operated conveniently and automated easily. Their clamping force and clamping-force distribution are a further sign of their quality. KraussMaffei's FTR mold carriers benefit from a well-engineered, solidly built design that ensures heavy molds are tilted safely. The strength-optimized frame structure and hydraulic locking device ensure an optimal force flow when closing the mold halves. The minimal warpage of the mold fixing platens even allows non-inherently rigid molds to be used. Quiet and hitch-less sequence of movements thanks to standard proportional hydraulic systems and specially adapted kinematics.

Versatile and cost-efficient...

FTR mold carriers can be accessed from almost every angle. This offers numerous advantages: It not only makes it possible to pour foam into the molds while they are open, but also allows molds to be changed quickly and easily. Even the fixed mixing head is easy to install. The versatility of FTR mold carriers means that they are suitable for a wide range of uses in many different technologies. They are designed to be used in TechCenters and can be integrated into a fully automated production line. The key feature that makes machines in the FTR series so flexible and cost-efficient is their modular design. Therefore, the FTR mold carrier can also be adapted to very specific customer requirements. Additionally, this concept offers the option of implementing auxiliary devices quickly and easily. The standard includes the lid swivel movement that is ergonomic for the operator. Optionally, the complete clamping unit can also be tilted to improve the

Mold carriers for car carpet production.

YOUR BENEFITS:

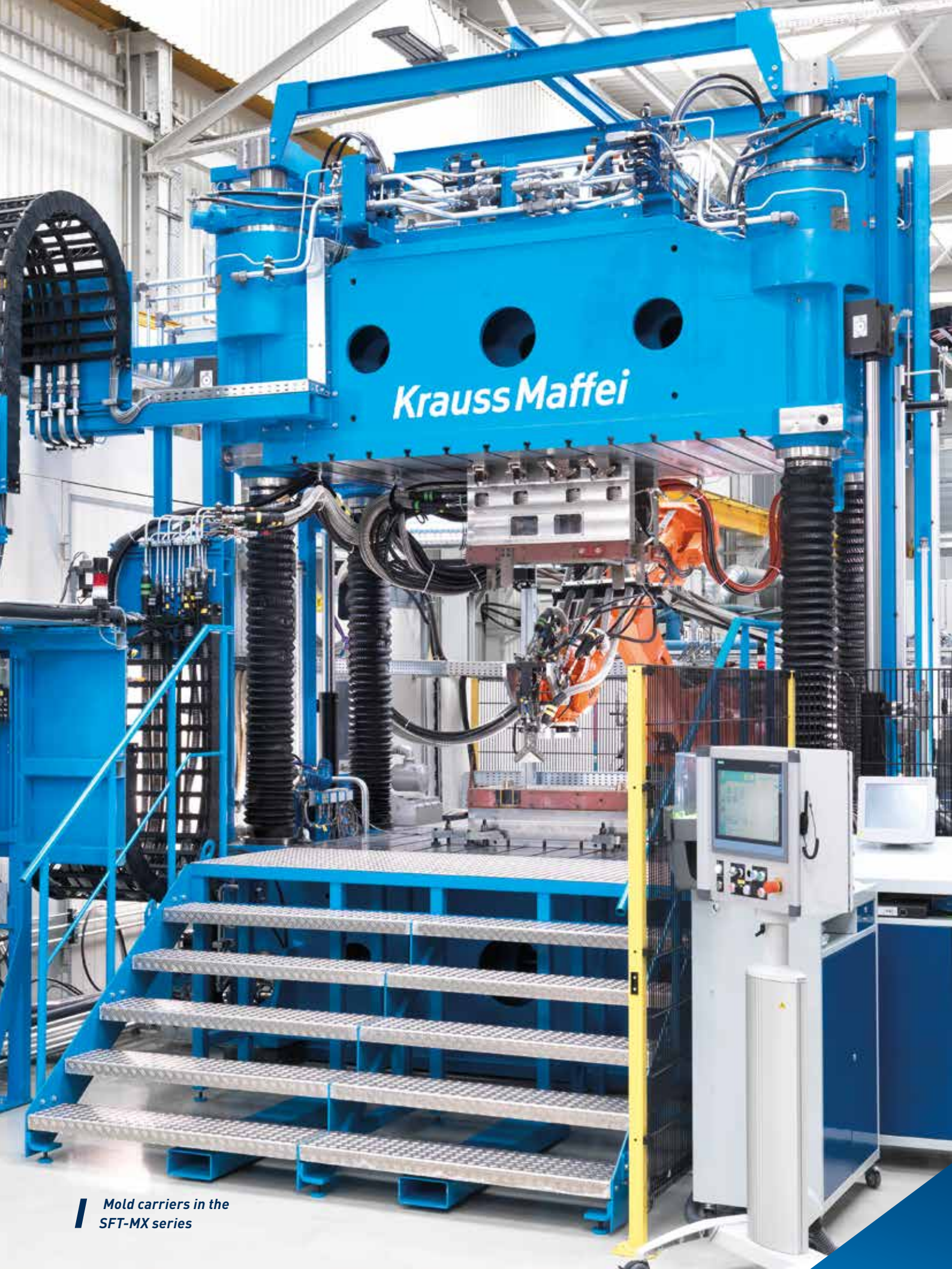
- Versatile thanks to modular design
- Well-engineered designs with solid structure for optimal power flow
- Accessible from almost every angle
- 90° foaming position for process optimization possible

Mold carriers in the FTR design for fiber composite parts

venting and reaction position. Additional features, such as core-pulls and ejectors, facilitate the manufacture of technically complex parts and allow parts to be released from the molds completely seamlessly.

... and for large tasks

KraussMaffei has developed a specific line of mold carriers for producing large-format, back-foamed, contoured parts such as carpeting for cars or materials and films with the potential to be subsequently compounded inside the mold. Ease of use and optimized material flow are the focal point of these designs too. For example, swiveling the upper mold fixing platen by 180° allows both mold fixing platens to be operated at the same time. This makes production of large-format parts more cost-effective.



Mold carriers in the SFT-MX series

FOUR-COLUMN DESIGN
SFT MOLD CARRIERS FOR EXTREMELY HEAVY MOLDS

KraussMaffei developed SFT series mold carriers specifically for the automotive industry and they are suitable for use with a wide range of materials and processes thanks to their extremely high holding forces and quick traversing times.

Four-column concept for extremely heavy molds

High positioning accuracy and bending stiffness are the distinctive features of the four-column concept. This allows extremely heavy molds for making bumpers, spoilers, bodywork parts or even a complete chassis to be used at clamping forces of up to 10,000 kN. This considerable holding force in the mold carrier system is made possible thanks to hydraulic locking cylinders over the entire press stroke. The use of differential cylinders ensures extremely short cycle times and very high speeds. At the same time, the SFT design concept from KraussMaffei guarantees a perfect power flow and a high level of stiffness (FEM-optimized).

Compact and easy to maintain: The SFT-MX series

The new SFT-MX has a particularly compact design. At a total height of under 5.5 m, it can even be installed in plants with low ceilings. It is also extremely easy to maintain: All hydraulic cylinders can be accessed quickly and easily, most of the hydraulic components are placed at ground level and wear parts have been reduced to a minimum. Depending on the requirements of the process, the MX series may optionally feature a force-travel-controlled compression function. Unevenly distributed compression forces in the mold are compensated for by a high-precision parallelism control acting on all four columns.

Ease of use and part quality in focus

The developers at KraussMaffei always pay attention to the interaction between ease of use and product quality when creating their mold carriers – and the SFT-MX series is no different. Free access to both mold clamping plates is ensured. This enables the mold to also be changed from the rear. Operating convenience is also increased by proportional hydraulics with variable delivery pumps for a gentle sequence of movements and an electronic position measuring system for all traversing and tilting movements. All production-specific settings can be entered via a control cabinet with a computer and large screen and the convenient operating height of the mold carrier ensures ergonomically correct work.

Additional equipment for even greater cost-efficiency

We offer numerous auxiliary equipment options to make the SFT mold carriers even more cost-effective and easier to use. For example, an automated mold change system ensures better handling of the molds, which weigh multiple tonnes. Complex contoured parts can be produced with the help of additional core-retraction and ejector functions.

YOUR BENEFITS:

- Short cycle times and very high speeds
- Perfect power flow and a high degree of stiffness
- Considerable locking forces and outstanding precision
- Very easy to use, option of extending with additional equipment
- Good ergonomics

FULLY ELECTRIC DRIVE CONCEPT

CLEAN AND EFFICIENT MOLD CARRIERS IN THE EFT SERIES

Electric mold carriers in KraussMaffei's EFT series were designed with advanced production methods in mind. The stiff design of their frames allows clamping units to be tilted even at high holding forces and with heavy molds.

YOUR BENEFITS:

- Standardized modular design ensures short assembly and commissioning times
- Easy to handle and highly flexible thanks to intelligent operating concept
- Robust, highly dynamic, low-maintenance electric drive units for parallel stroke
- No hydraulic components means machines are cleaner and easier to maintain
- Very good ergonomics

Modular design ensures good price-performance ratio

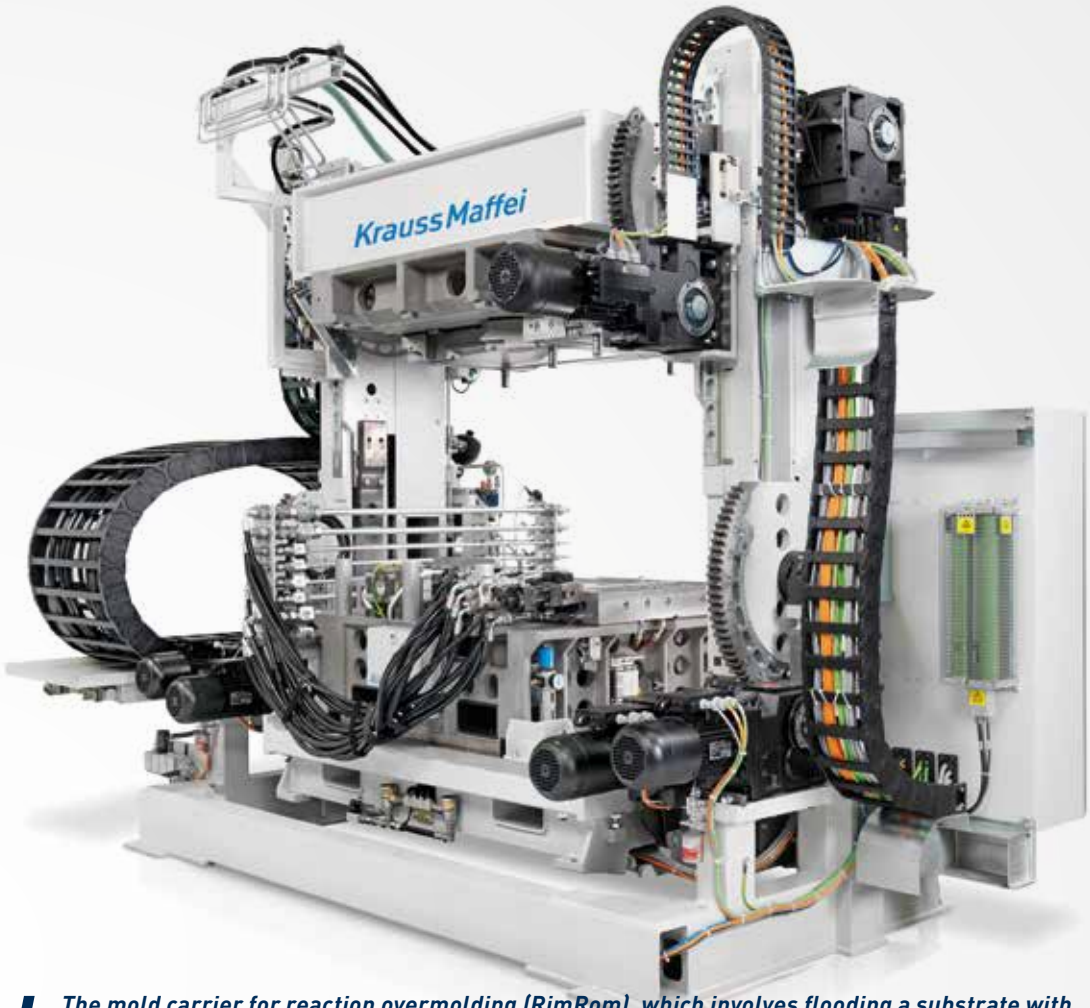
The design of the EFT series is based on standardized modules. This keeps investment costs low and delivery times short, while also allowing short assembly and commissioning times. The series is also extremely easy to handle and incredibly versatile: Users can program the movements and functions of the mold carriers and molds on the control cabinet with ease and without any prior knowledge of PLC programming.

Electric drive units are used to power all the movements of the EFT models. The fast, precise mold closing movements boost efficiency in production of PUR parts. Further advantages of the electric drive units are that they make very little noise and that they use very little energy, as power is only consumed when the mold carriers are moving.
By using electric components instead of hydraulic ones, users also benefit from machines that are cleaner and easier to maintain.

Clean and efficient: Mold carriers in the EFT series

Short cycle times with the EFT series

Electric mold carriers of the type EFT-P-20-11 are used, for example, for the back-foaming of instrument panels. The pneumatic clamp force builds up over the whole mold fixing platen via pressure pads. The distinguishing feature of EFT series mold carriers is their short cycle times, made possible thanks to quick, simultaneous traversing and tilting movements in combination with tower tilt. Operators benefit from easy access to the front and back of the molds with optimum user-friendliness. An optional swivel range (35° forwards, 35° backwards) for
optimum adjustment of the reaction position and operating ergonomics. The mold carriers get back in action quickly after changing from rotary table to stationary operation.



The mold carrier for reaction overmolding (RimRom), which involves flooding a substrate with an integral system, enables component supply from the frame directly to the platen.

Further options include a link guide and the upper mold fixing platen that can be tilted 180° (90° forwards and 90° backwards). This is ideally suited to installing a flame treatment device for the upper mold on the back of the mold carrier.

Mold carriers for large parts

The completely modular design also allows a variant to be configured that can pick up heavy molds with top halves weighing up to 1.5 t. These molds are used for producing truck parts.

EFT series for optimum productivity

One of many areas of application of the EFT series is the foaming of windows. Customers are also able to choose between various standard sizes and numerous special versions for other applications. Depending on the model, molds can be changed from both the front and the back. Options such as the pneumatically operated, automatic mold clamping and magnetic clamping platen system enable time-saving mold changes. External additional units specially adapted for the mold functions concerned add to the great flexibility.

For all mold carriers of the EFT series:

The clamping force is generated pneumatically over the entire mold fixing area. Electric drives allow very fast movements. Furthermore, the parallel movements ensure quicker traversing times. In all cases, the mold carriers of the EFT series are characterized by an excellent and user-friendly ergonomic design when the upper and lower mold halves are tilted.

SHUTTLE MOLD CARRIERS
DESIGNED WITH FLEXIBILITY IN MIND

Shuttle mold carriers are used especially in LFI applications. The large-format, contoured LFI parts – which are sturdy yet lightweight – can be used in applications such as making tractor roof modules, car radiator grills and components for interior trim. Using a double shuttle system allows different parts with different sizes to be produced at the same time.

Quick movements, short clamping times

Thanks to their high degree of stiffness and positioning accuracy, shuttle mold carriers are suitable for positive molds, LFI molds and molds that are not inherently rigid. The base frame incorporates linear guide rails and a gear rack, and the shuttle carriage is driven by a servo motor. The parallel stroke is guided by the integrated guide frame. The construction principle enables fast shuttle movements and short mold closing times. Furthermore, the top and bottom mold carrier platen can be swiveled.

Ergonomics and flexibility in focus

This concept boasts numerous advantages. The foaming robot has maximum freedom to move over the mold cavity. Ergonomics is a focus of the series. This is why all models have a low installation height, which offers easy access to the lower mold fixing area and means that the machine can be operated at ground level. No pits or foundations are required. This avoids clamping pressure on the floor of the plant, which in turn lengthens the service life of rollers and guide rails. Shuttle mold carriers can handle a variety of different mold heights and sizes, which can be adapted to suit customer-specific requirements. Numerous options for additional equipment offer further possibilities for individual customization.

YOUR BENEFITS:

- Different or different-sized parts can be made simultaneously
- Very flexible – can be adapted to individual requirements
- Good ergonomics and ease of use
- High degree of automation

Shuttle mold carrier for applications using composites

THE LARGEST DOUBLE SHUTTLE MOLD CARRIER FOR ROMEORIM

KraussMaffei has built the largest double-shuttle mold carrier to date for the American company RomeoRIM (Romeo, Michigan, USA), showcasing its expertise in innovative custom solutions.

Molds weighing up to 36 t are now possible

Boasting a platen measuring 3660 x 3660 mm, it can accommodate molds weighing in at up to 36 t. The mold carrier, which measures 22 x 5 x 9.5 m and has a clamping force of 400 t, is equipped with a double-shuttle system that conveys and then presses one of the two bottom mold halves alternately from either side into the centrally positioned mold clamping unit. While material is being poured into one mold for long fiber injection (LFI) and the reaction time is under way, the second part can be demolded in parallel and the mold prepared for the next process cycle. Thus, within a cycle time of 9 to 10 minutes per element, alternately one of the two elements for the complete roof module is formed. For precise part thicknesses and reproducible processes, the mold carrier is equipped with a hydraulic four-axis parallelism control, which ensures parallel closing of the molds even for asymmetric parts or off-center mold clamping.

Painting in the mold

It is therefore on this LFI system – the world's largest – that RomeoRIM produces a two-part roof for agricultural machinery based on a PUR glass-fiber mixture. The durable painted surface is fully automatically sprayed into the mold using the in-mold painting (IMP) process prior to commencement of the LFI process. Despite its impressive dimensions of around 2.5 x 2.1 m and an area of over 5 m², the two-part roof in its entirety weighs less than 23 kg and fulfills all the requirements in terms of flexibility, superior durability, low weight and cost-effective production. The option for integrating bumps and ribs at the rear also makes a contribution.

Two industrial robots, each of which is equipped with an LFI mixing head, are moved over the mold in parallel to pour in the LFI mixture. Beforehand, two additional industrial robots can be used to apply a layer of paint (in-mold painting) and a barrier layer to the bottom mold, which prevents the fibers from standing out on the visible side. Consequently, completely painted parts with excellent mechanical properties and premium quality surfaces are manufactured in a single pass.

User-friendliness in the spotlight

Despite its size, the mold carrier is easy to use. A swivel device for the movable upper platen also contributes to this. When the mold carrier is completely open, the swivel device along with the upper mold can be swiveled out by 90°. Moreover, in the areas in which paint fumes evaporate, the shuttle system is designed to be explosion-proof so that no problems arise there.

YOUR BENEFITS:

- Hydraulic four-axis parallelism control allows for reproducible processes
- Parts with excellent mechanical properties and premium-quality surfaces
- In-mold painting allows paint surface to be applied directly in the mold
- User-friendly despite enormous size

THE RIGHT CONCEPT FOR ANY TASK

Stationary systems are ideally suited for low production volumes

For customer-specific PUR processing methods that are optimized to suit the parts to be produced, KraussMaffei offers a choice of two system concepts – stationary and mobile systems – depending on the components, the variety of products to be manufactured, the production capacity and volume, as well as the manufacturing steps and times, and the required level of automation. With these, it is possible to produce a broad spectrum of parts for a wide range of industries using various different production processes. Both concepts offer flexibility in the implementation of customized solutions, transparency in production, reproducibility, top product quality and the highest possible level of automation.

STATIONARY SYSTEMS
EXPANDABLE MODULAR MANUFACTURING SOLUTIONS

A simple design that is easy to upgrade – KraussMaffei stationary systems.

They come into their own when the process requires fixed mixing heads on the mold and when the material is foamed in the closed mold, or the mold carriers are big and heavy and cannot be moved using conveyor systems. Depending on the product and the configuration of the molds, foam can therefore also be applied in stationary systems by means of a hand-held outrigger or a robot. For this purpose, each station is fitted with the necessary protective devices.

The molds and mold carriers in KraussMaffei's stationary systems are – as the name suggests – fixed in one place. All the steps of the entire cycle are carried out in these stations, in contrast to conveyor systems, where the molds are transported to each individual process step. Stationary systems allow you to reduce investment costs for low production volumes. In addition, you achieve streamlined logistics with separate provisions for each mold.

Mold carrier and mold for arm rests butterfly mold carrier for producing door panels (right)

YOUR BENEFITS:

- Simple design makes for easy upgrades
- Low production volumes require only relatively low investment costs
- Logistics are streamlined because separate provisions are made for each mold

SUCCESS ALL ROUND
ROBUST AND LOW-MAINTENANCE ROTARY TABLES

With its various different rotary table concepts, KraussMaffei offers you the optimal solution for your individual requirements. A number of different configurations are possible thanks to the integration of peripheral devices such as robots and extraction systems. The design is tailored to the customer's specifications.

Individual equipment configuration and high degree of safety

Rotary tables with a chain drive are designed for high payloads. The gear-driven version is suitable primarily for small diameters and small mold carrier and mold loads. Both of these models are robust and low-maintenance. The mold carriers can either be equipped with their own drive unit or be actuated by an external unit. Mold carrier and mold safety features are automatically switched off in the operating area.

Chain-driven rotary tables

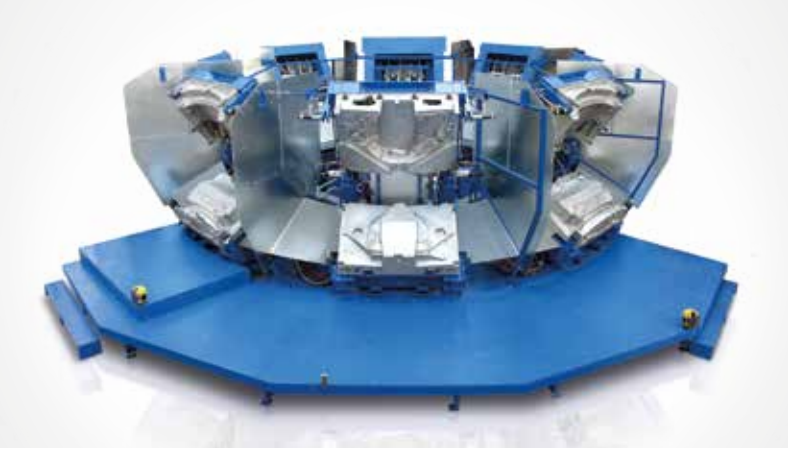
They are designed with welded steel structures and consist of standardized segments with cover plates. A wrap chain driven by a stationary station is fitted around the rotary table. Chain extension is compensated by an automatic clamping station. The incremental position measuring system positions the rotary table very precisely. A traveling apron for the operator can also be fitted to the segments. The fixing of the mold carriers can be adapted to meet your preferences. The mold carrier can be controlled from either a centralized or decentralized control unit.

Efficient media supply

A ring line is fitted to the rotary table to supply the individual segments with power, air, water, a vacuum or hydraulic oil. Media are fed via a slip ring element and a rotary transmission feedthrough, or via units traveling with the rotary table.

Highly dynamic system

The chain-driven rotary tables enable high part production. The highly dynamic system allows for short rotary table travel times. These systems are flexible and offer 'cyclic', 'continuous' and 'continuous with foam stop' operating modes. The exchangeable roller guide is screwed onto the segment. The plastic or steel rollers are leveled and sprung for reduced wear. They are additionally fixed to the floor, which precludes the need for recesses. The drive unit and the center console with four-point mounting are also fixed to the floor and embedded in mortar.



Rotary table with chain drive

Rotary table with gear drive

YOUR BENEFITS:

- Position measuring systems provide accurate positioning
- Flexible thanks to three different modes of operation
- Stability is provided by the reliable four-point mounting and the fact that the system is fixed to the floor

Gear-driven cantilevered rotary tables

Gear-driven cantilevered rotary tables may either be designed as welded structures consisting of standardized segments, or they may have a spoked design. The drive is operated by a bevel gear motor which, mounted under the rotary table, engages directly with the external teeth of the center bearing. The mold carriers can be controlled centrally or locally. Like chain-driven rotary tables, gear-driven systems offer the following three operating modes: 'Cyclic', 'continuous' and 'continuous with foam stop'. A ring line for the media supply is installed on the rotary table for this drive variant as well. Mold carriers and molds can be attached horizontally and vertically as needed. The central gear drive and automatic lubrication significantly reduce maintenance requirements. The systems are made particularly compact by the central drive. An absolute position measuring system positions the rotary table very precisely.

MODULAR OVAL CONVEYOR SYSTEMS

FLEXIBLE AND EASY EXPANSION IN PRODUCTION

KraussMaffei offers modular oval conveyor systems for efficient production of very high volumes. The mold carriers are designed as cassettes and mounted on carriages conveyed by a chain. The chain is driven by a central station with a hydraulically pre-tensioned turn station.

Low maintenance and user-friendly

A reduction in the number of mold carrier drives makes the systems low-maintenance and, because they are easy to access, user-friendly too. The floor-level design makes it easier to use and improves the ergonomics. A small pitch allows high part production with low conveying speeds. With KraussMaffei's oval conveyor systems, the mold carriers may either be actuated by an external guide rail with a clamping station or by internal pneumatic or electric drive units. The closing station is available in various designs all ensuring that the mold carriers can be closed rapidly and independently of speed. When they are in the reaction zone, the mold carriers can also be individually tilted.

Easy to expand thanks to modular design

Because the oval consists of standardized modules, it can be expanded to meet the requirements of an increased production volume. External, high-precision foam and release agent robots are integrated into the plant. The optimized drive and guidance concept ensures that your system runs quietly. Systems can be designed to use any of several methods of mold carrier actuation, and the number of stations can be varied. Because the mold carriers close very quickly, up to 2 x 6 components can be processed with the appropriate foaming machines and mixing heads.

Optional highlight for maximum efficiency:

In systems with automatic mold-carrier changing, the mold carriers can be changed at full production speed.

YOUR BENEFITS:

- Autonomous operation thanks to on-board media supply
- Fast and independent mold carrier closing
- The system runs quietly thanks to the optimized drive and guidance concept
- Maximum efficiency with optional fully automatic mold carrier change without interrupting production

Oval conveyor systems provide high output:
The mold carriers are mounted on roller units and continuously conveyed by the central drive in the oval conveyor system. The number of stations, as well as the size and function of the mold carriers, is variable as desired. The automatic mold carrier change is optional.

COMPACT ALL-ROUNDERS
SELF-LOCKING MOLDS AND MOLD CARRIER DEVICES

Self-locking molds counteract the foam pressure to keep the mold closed and lock it. In recent years, they have become a permanent feature in KraussMaffei's product portfolio.

Space-saving alternatives

In the first instance, self-locking molds occupy less space and are more compact than the conventional combination of mold carrier and mold. Additionally, the clamping and locking components, as well as the steel structure, are specifically tailored to the mold, which often makes the complete system a better option. Moreover, the self-locking molds can be customized to suit the specific requirements set out by the customer, which might concern ergonomics for the operator or on-site conditions, for example. Another advantage is that fast, electric drive units can be used to open and close the mold, and to adjust the foam layers.

Suitable for various applications in the automotive industry

Usually included with the systems is a PLC control unit, which regulates essential functions and features of the mold, such as seals, splitters, vacuums, air cushions, ejectors, opening, closing, locking, safety pegs, safety scanners, etc. Self-locking molds are used primarily in the automotive construction industry, where they are predominantly employed in the production of parts to be fitted in the passenger compartment, such as armrests, door panels and instrument panels, or for manufacturing elements such as cable bushings for the engine bay.

YOUR BENEFITS:

- Occupy less space and are more compact than the conventional combination of mold carrier and mold
- Customized to suit the specific requirements set out by the customer
- Electric drive units can be used to open and close the mold and to adjust the foaming positions
- Specific tailoring to the mold often makes the complete system a better option

Self-locking mold with electrical clamping function

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

0.0 WE . 3rd edition 12/20. RPM 473 BR 07/2016 EN ··· Technical information subject to change ··· Printed in the Federal Republic of Germany.

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