

COMPACT 2-PLATEN MACHINES FOR THE BIG JOBS

MX injection molding machines

IN PARTNERSHIP WITH INDUSTRY

KraussMaffei is a premium partner for the plastics and rubber processing industries worldwide



Automotive



White Goods



Construction



Life Sciences



Electrical/Electronics

Whatever you aim to achieve in plastics or rubber processing, KraussMaffei is your partner. We are the only company with intensive expertise across the three main engineering fields. And we have a strong track record in integrating this expertise to develop new processes and systems.

Ready for any challenge

Our **Injection Molding Machinery Division** supplies machinery and systems from 35 to 4,000 tonnes for standard applications and for all processing variants, together with fully automated solutions. We have a strong customer base in all the relevant industries worldwide.

Our **Reaction Process Machinery Division** supplies machines and complete systems for processing polyurethanes and other reactive materials.

Completing our product portfolio, **Automotive Component Systems** supplies foam molds, cutters and routers. Our customer base is wide, with a focus on the automotive, construction and white appliances industries.

Our **Extrusion Technology Division** supplies machinery and systems for compounding, for pipe, profile and sheet extrusion, physical foaming, and the production of technical rubbers and intermediates for tire production. Machinery from the company's range – from single extruders to

complete extrusion lines – is used in many industries, including chemicals, pharmaceuticals, automotive, construction, furniture and packaging.

People for Plastics

We are the “people for plastics”. We are your partners from the first exploratory discussion, through development to commissioning, servicing and operating your system, and final disposal. At all times, you are assured of outstanding competence in planning and engineering, as well as reliable and fast spare parts, service and support.

Adding value for customers

We put our expertise to work for your success. With machine ranges engineered for modularity, we can deliver application-specific solutions based on our wide range of standard modules and specially engineered solutions. This strategy offers customers technical and cost advantages.

Close to customers around the world

As an international company, KraussMaffei has a presence in all the major markets for the plastics and rubber processing industries and employs around 3,000 people worldwide. Our sales and service network keeps us close to all our customers around the world.

MX injection molding machines for fast responses, fast cycles and high productivity



Packaging

KraussMaffei is among the market leaders in engineering large injection molding machines. The MX series is a systematic onward development of the highly successful MC series. MX machines are available in the clamp force range from 850 to 4000 t.

MX machines are engineered to deliver sustained performance under demanding conditions. They are compact, high-performance production systems, capable of delivering fast responses, fast cycles and high productivity. Versatile and modular they offer a wide range of configurations for optimized, application-specific solutions. Standard machines can be upgraded with minimal effort and adapted to any production conditions. Our product spectrum ranges from compact injection molding machines with basic automation to highly complex manufacturing cells and planning complete production plants.

TRANSPARENT TECHNOLOGY

Meet the machine: take a tour of an MX injection molding machine

Absolute platen parallelism
Longer mold life and
premium part quality

Proven 2-platen technology
High stiffness and space-saving
construction

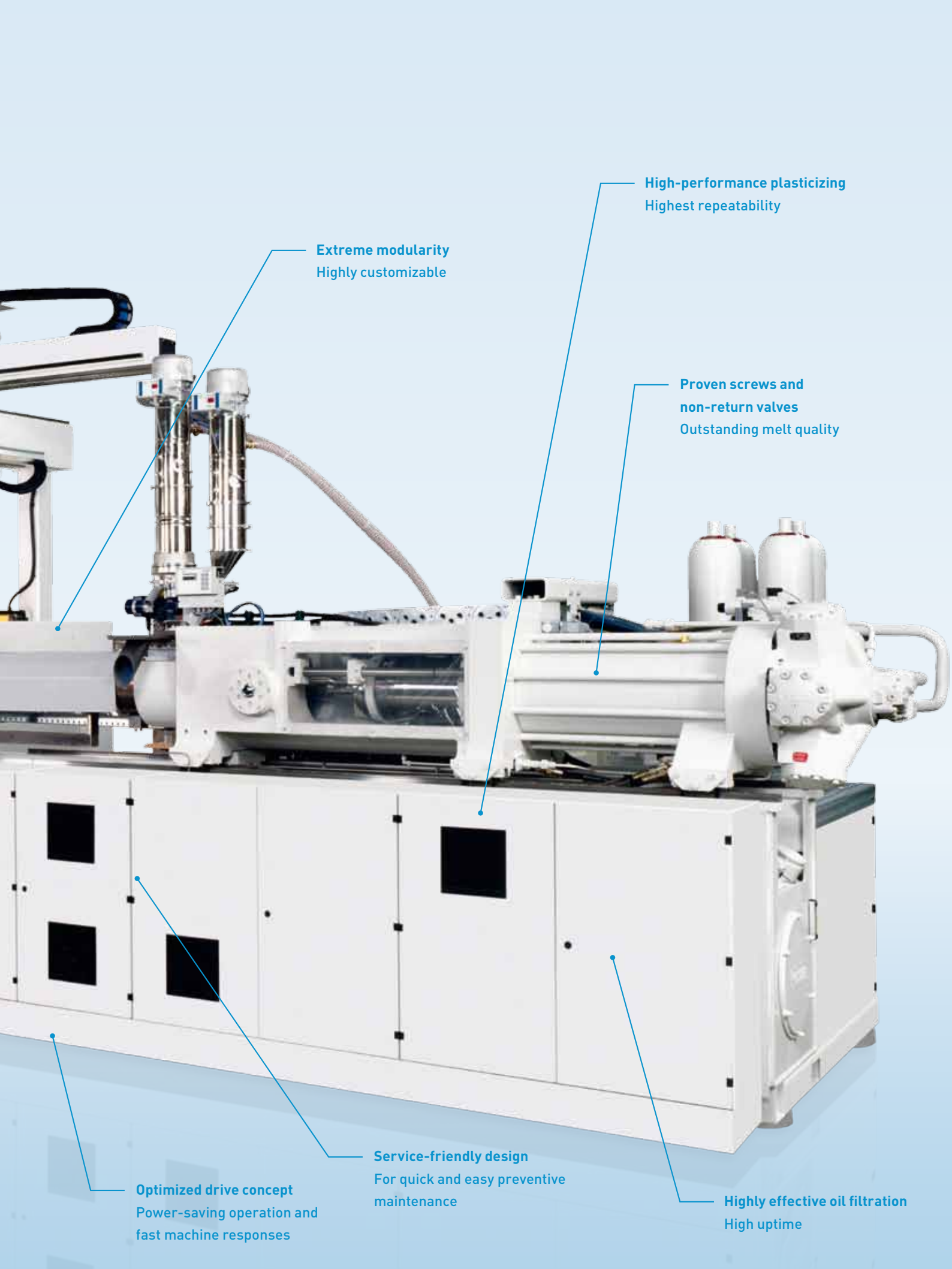
Outstanding machine dynamics
Highest productivity

User-friendly MC 5 control system
Lucid, error resistant, freely
programmable

Krauss Maffei

Krauss Maffei





Extreme modularity
Highly customizable

High-performance plasticizing
Highest repeatability

Proven screws and non-return valves
Outstanding melt quality

Optimized drive concept
Power-saving operation and fast machine responses

Service-friendly design
For quick and easy preventive maintenance

Highly effective oil filtration
High uptime

DESIGN BASICS

The MX series – setting new benchmarks for big injection molding machines

All the modules that make up an MX machine operate smoothly and efficiently together. Key elements are the 2-platen clamp, the injection unit and the hydraulic system. All MX machines operate under the operator-friendly MC 5 micro-processor control system. The process in progress is clearly visualized on the display screen, with the emphasis on essential information.

More productivity

The MX series is engineered to deliver sustained performance under demanding conditions. Fast responses and machine movements, an error-proof, easy-to-use control system and fast cycling – it all adds up to a higher yield of zero-defect parts. MX machines are among the fastest on the market in their class.

More reliability

The MX series is the outcome of systematic further development of the MC series, already tried and tested thousands of times in tough production situations. KraussMaffei designers and process engineers have not only boosted machine availability, they have also optimized the process for top product quality. The new MX machines combine high throughput with a very high yield of good parts. Rejects, waste and downstream costs are drastically reduced.

More flexibility

An MX machine is the right choice for a very wide range of applications – from simple, standard injection molding to highly complex processes. The basic version offers many outstanding features, for example, a new MX

machine is ready for integration in an existing processing line, using existing molds.

More modularity

KraussMaffei MX machines are as modular as they come. This means big benefits for our customers, for example, machine components can be swapped or upgraded quickly and easily. In an intensely competitive market, an easy upgrade path can make all the difference to your success. You can take advantage of a profitable new opportunity, knowing that a quick upgrade will bring your machine up to speed.

MX machines up to 1600 t are assembled in a synchronized flow assembly process.



Possible combinations of injection units and clamp units listing available screw diameters

| | SP 4300 | SP 6100 | SP 8100 | SP 12000 | SP 17200 | SP 24500 | SP 33000 | SP 55000 | SP 75000 |
|---------|-----------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| MX 850 | 80/90/100 | 85/95/105 | 95/105/115 | 105/120/135 | | | | | |
| MX 1000 | 80/90/100 | 85/95/105 | 95/105/115 | 105/120/135 | 120/135/150 | | | | |
| MX 1150 | 80/90/100 | 85/95/105 | 95/105/115 | 105/120/135 | 120/135/150 | | | | |
| MX 1300 | | 85/95/105 | 95/105/115 | 105/120/135 | 120/135/150 | 135/150/165 | | | |
| MX 1600 | | 85/95/105 | 95/105/115 | 105/120/135 | 120/135/150 | 135/150/165 | 160/175/195 | | |
| MX 2000 | | | 95/105/115 | 105/120/135 | 120/135/150 | 135/150/165 | 160/175/195 | | |
| MX 2300 | | | 95/105/115 | 105/120/135 | 120/135/150 | 135/150/165 | 160/175/195 | 185/205/220 | |
| MX 2700 | | | | 105/120/135 | 120/135/150 | 135/150/165 | 160/175/195 | 185/205/220 | |
| MX 3200 | | | | 105/120/135 | 120/135/150 | 135/150/165 | 160/175/195 | 185/205/220 | 215/230/245 |
| MX 4000 | | | | | 120/135/150 | 135/150/165 | 160/175/195 | 185/205/220 | 215/230/245 |



DETAILED PRODUCT INFORMATION

2-platen clamp unit: Compact, fast, low-maintenance

Compact and easy on the mould

The design of the mold fixing platens has been optimized using the Finite Element Method (FEM). This guarantees optimal application of force and minimal deformation, even for very large molds. The platens' rugged "box" construction ensures that there is no deflection even under load. This minimizes stress and wear on the mold and on moving mold parts.

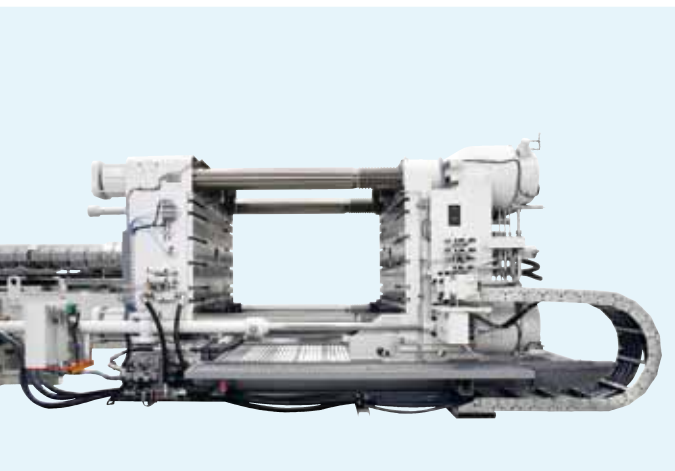
During travel, the moving platen is supported on the machine bed by large, solid-steel, adjustable sliding shoes, with tiebar support and lateral guidance. This design eliminates any tilting moment, because even when the clamp is fully open, the tiebars never run out of the bushings on the moving platen. Ample spacing between the guides guarantees that even the heaviest molds remain absolutely parallel throughout opening and closing.

Multi-phase mold protection

The multi-phase mold protection mechanism can be precisely set to protect the mold against damage. This extends mold service life and helps to keep maintenance costs low – both these factors have a positive effect on manufacturing costs.

Flexibility for your production

The 2-platen clamp system with tiebars attached through the fixed platen offers scope for wide flexibility in processing techniques. This includes, for instance, profiting from the growing trend to compression molding techniques with back injection of decor or film inserts, or producing glazing panes or very large parts. The clamp design also makes MX machines ideal for processes that make very high demands on the machine in terms of platen parallelism, or special functions and different compression strokes. The MX series offers built-in growth potential.



Moving platen as a deep box structure for minimal deflection and optimal support for the mold



Massive, easily adjustable sliding shoe – laterally stabilized and centrally lubricated – for optimal platen parallelism



Moving platen as a rugged, FEM-optimized box structure

Low maintenance

Self-lubricating guide bushings and slides ensure long-term, reliable, low-maintenance operation.

Very fast locking/unlocking

When the mold is shut, the tiebars are locked in place behind the moving platen by the intermeshing elements of the mechanical locking system.

For mold opening, all four tiebars are unlocked simultaneously, allowing fast mold movement. The system has been designed for very fast locking/unlocking and precise positioning.



View inside a locking element



Locking element and clamp force cylinder for very fast machine movements

DETAILED PRODUCT INFORMATION

Injection unit: high-precision performance, wear resistant, minimal cleaning effort

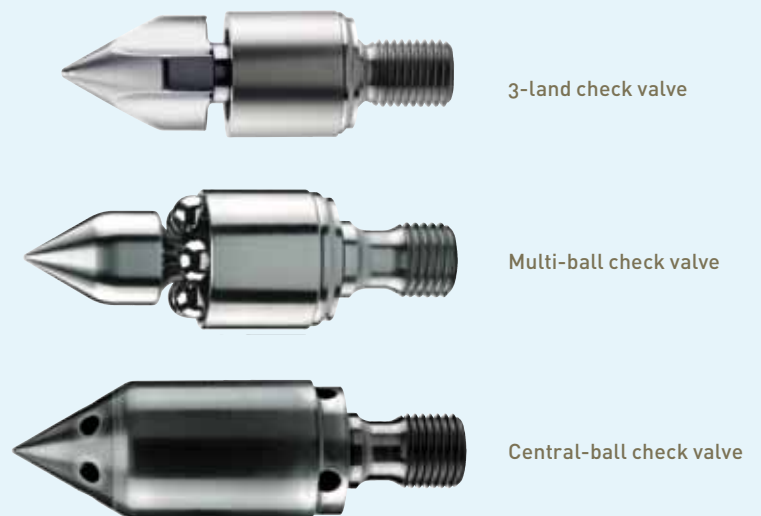
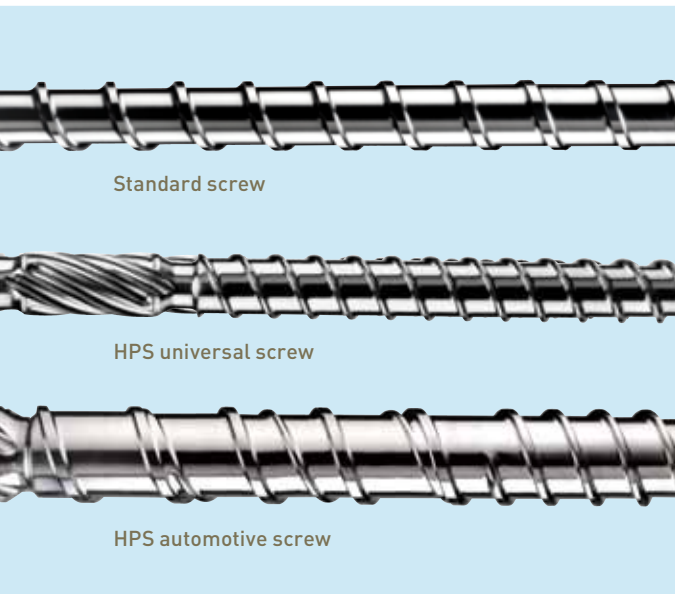
The MX series has the right injection unit and the optimal screw geometry for every production task. A tightly scaled choice of working capacities and screw diameters makes it possible to match injection unit performance to product requirements. This is the only machine series on the market offering so many clamp/injection unit combinations. Customers benefit from the best possible match to their application requirements.

We have the right screw for the job in hand

Demands on plasticizing performance are escalating. There are several reasons for this: continuous increase in the volume of material to be plasticized, lower melt temperatures, demand for better homogenization, new processes that require a wider processing window, and new material formulations. Plasticizing units specified and engineered to take

account of these factors are more cost-effective. This is why KraussMaffei offers not only standard screws, but also special mixing screws and high performance screws (HPS-UN, HPS-AT). Work on new screw generations to meet continuously escalating application requirements is on-going. Most recently, we launched the HPX plasticizing system for extremely high throughput, with up to 30% better plasticizing performance.

In addition, KraussMaffei offers a wide spectrum of special screws and plasticizing units to optimize processing for special applications and for special formulations.





Hydraulic direct screw drive for highest repeatability and quality

High-precision injection units

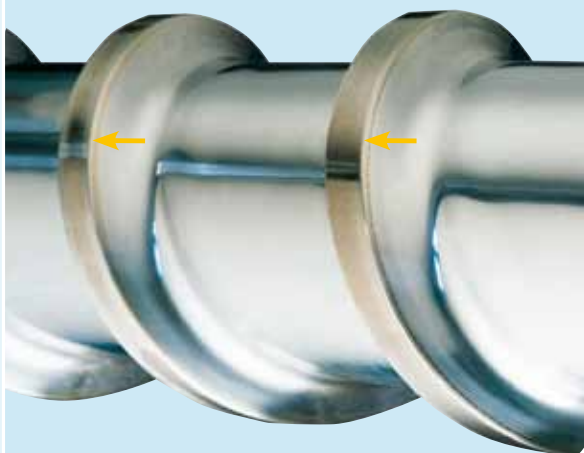
For plasticizing, a hydraulic drive for the rotational movement of the screw is standard. An electric drive is an option, if production considerations require plasticizing in parallel with other machine movements. Force is transferred directly to the screw via the injection piston, which is designed as a rotary piston. The forces act directly along the line of action and movement. Pressures and speeds are transferred with extremely low friction losses, making it possible to keep to very tight processing parameters. In particular, the machine's ability to adhere exactly to the holding-pressure profile with low back pressure plays a key role in achieving highest processing stability and product quality.

Enhanced wear protection

The main factors influencing wear on the screw, barrel and check valve are the material formulations being processed and the plasticizing rate. Additives used to improve processing stability, or to give the end product specific functional properties, cause wear through abrasion and/or corrosion in different ways. If the application demands it, KraussMaffei can supply specially wear-protected plasticizing units.

Wear is not only a factor in maintenance costs, it also affects processing stability and the recurring problem of products that are out of tolerance. Today's sophisticated processes are strongly affected by plasticizing unit wear, leading to unacceptable reject rates and production stoppages. Wear protection plays a decisive role in ensuring consistent product quality and predictable costing. KraussMaffei protects machine components against wear using materials and processes chosen to ensure long machine service life and highest product quality.

Surface treatment on a high-performance screw (the arrows mark the transition to the wear-protection layer)



Quick-release systems save time and costs

MX plasticizing units can be dismantled quickly and easily, eg, for cleaning or to swap screws. With the quick-release system, releasing the screw coupling and the barrel mounting takes a couple of minutes and the complete plasticizing unit can then be lifted out of the machine by a crane.

DETAILED PRODUCT INFORMATION

Hydraulics: precision control, fast response, flexible upgrades

Energy-saving pump drive

At each processing stage, the regenerative pump drive supplies precisely the oil volume necessary to generate the required pressure. Energy consumption is reduced to a minimum.

Fast response times

The pressure- and flow-regulated pumps achieve very fast response times. The hydraulic system with its mix of constant- and variable-delivery pumps reacts to calls for rapid changes in speed as effectively as to calls for very small changes in pressure, eg, during the holding-pressure phase.

Dependable control valves

All speed and pressure variables for controlling MX operation are entered as digital values. The electronically activated proportional valves, monitored by an additional internal control circuit, ensure high repeatability and maintain set values over long production runs. KraussMaffei is committed to supplying machines which meet your criteria for consistent production cycles and highest product quality.

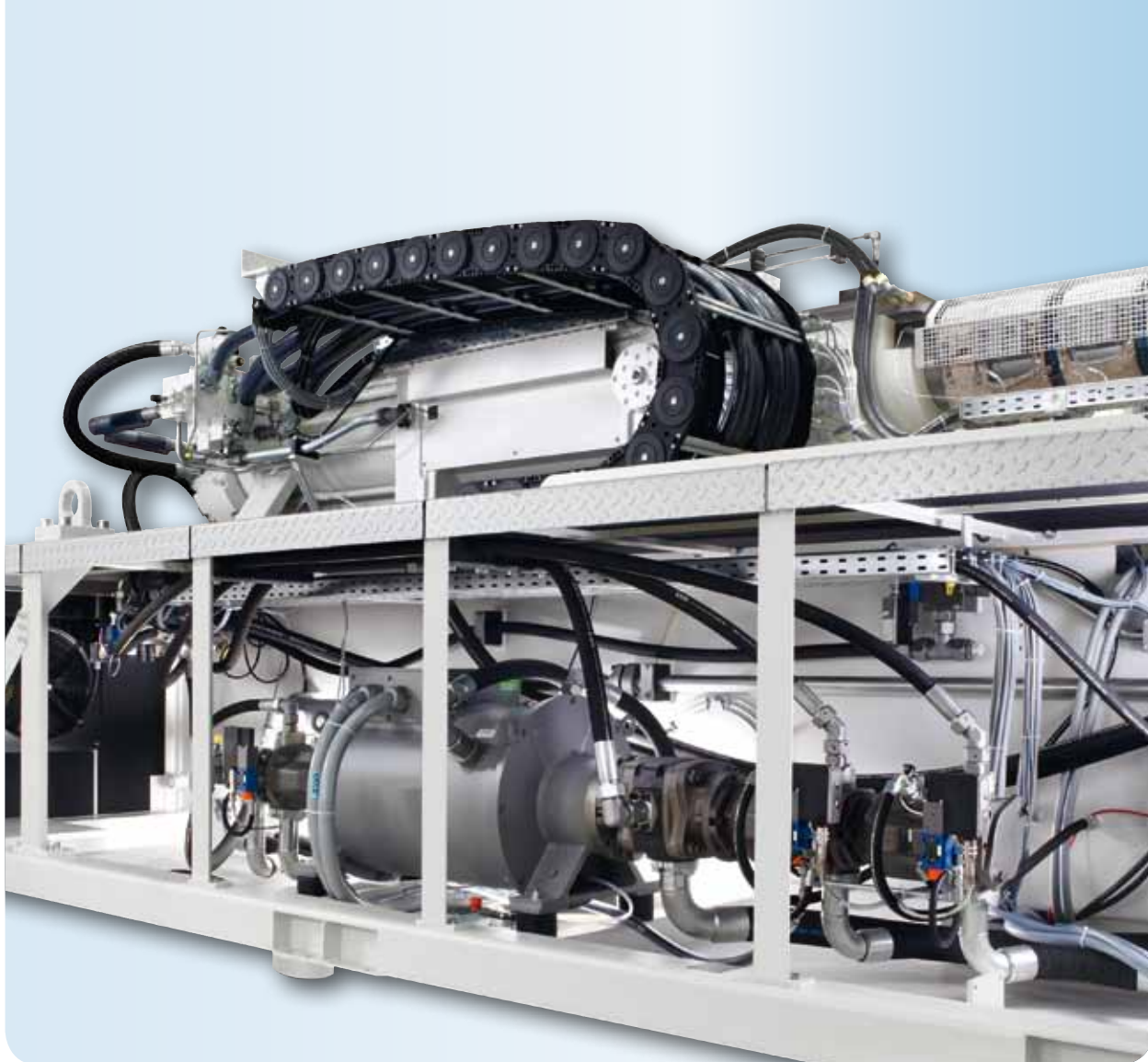
In addition to the variable pump drive, MX machines have a separate control valve, close to the consumer, for the injection and plasticizing process. Pressure and speed are closed-loop controlled for absolutely repeatable cycles.



Control valves close to consumers for a highly consistent and stable process.



Encapsulated hydraulic drive, soundproof housing



Easy and maintenance-friendly access to all hydraulic valves in the injection unit and clamp

Hydraulic components are linked to the central machine control system via advanced bus technology. This guarantees fast and reliable data processing and immunity to interference – internal or external. The result is outstanding product quality and high machine availability – the best route to a good return on your investment. MX machines are designed to be service- and repair-friendly; components can be replaced fast and easily, keeping stoppages and downtime to a minimum.

Effective noise reduction

There is a direct mechanical connection (no flexible elements) between the drive motor and the pump. The main benefits are fast response times and the elimination of wear parts. The compact drive/pump unit also does without an additional housing which would tend to transform vibrations into noise. The

oil-cooled drive motors have an additional sound-reducing effect. The drive unit itself is completely enclosed in a soundproof housing, which further reduces noise emissions. The actual noise emission is an operator-friendly 72 dBA.

Maintenance-friendly design

Housing sections can be removed individually and access to all hydraulic elements is fast and easy. This helps to reduce time and effort for maintenance and repairs.

Replacing MX machine components is fast, simple and cost-effective. This means that upgrading with plug&play modules puts you in a strong position to take advantage of future opportunities.

PRODUCTS AND APPLICATIONS

Versatile and adaptable – MX machines with an outstanding track record in many industries

MX machines feature compact design, impressive performance and unbeatable modular versatility.

Unique in their class

The MX series comprises injection molding machines from 850 to 4000 t. KraussMaffei offers an unsurpassed choice of clamp and injection unit combinations. This makes it possible to configure a machine that is ideally suited to all production requirements. As a KraussMaffei customer, you always get an application-specific machine. Operating within an optimized processing window is a

guarantee for highest productivity and top quality products.

Massive modularity

Over 150 possible configurations mean that you can be sure of an MX injection molding machine that's right for your project. For example, once you've opted for a 1600 t machine, there are 18 screw diameters to choose from.



Manufacturing cell with industrial robot to produce pipe connecting fittings, integrated customer packaging system

Applications across industry

With their engineering strengths and cost efficiencies, MX machines are the machine of choice for many applications in different industries, especially in the automotive industry. They are also used to manufacture storage and transport containers, housings for machines and power tools, furniture elements and electrical and electronic equipment.



Automotive

MX injection molding machines have the versatility to meet the diverse requirements of the automotive components industry, producing anything from door trim sections to boot lids and bumpers.



Storage and transport containers

Plastic containers are often the answer when it comes to safe storage and cost-effective transport of all sorts of products and commodities – and MX machines are ideal for making big containers.



Machinery and appliances

It's difficult to imagine today's machinery, appliances and power tools without plastic components – MX machines can be relied on to supply the specified quality.



Electrical/electronics

Plastic components are indispensable across the electrical and electronics industries – they can be mass produced at low unit cost on MX machines.

CUSTOMER BENEFITS

Huge benefits for productivity and low unit costs

Outstanding machines and competent support from our experts make KraussMaffei the right choice, if you are looking for a partner to get your projects moving fast and successfully. We can help your business to gain the competitive advantage that leads to sustained success. Put our expertise in system solutions and our experience in many reference projects to work for you.

Short cycle times

MX machines set new benchmarks for cycle-time reduction. Fast cycles increase productivity and reduce unit manufacturing costs. MX machines are among the fastest in their class.

Lowest mold wear and low unit costs

The moving platen, constructed as a rigid box, provides optimal support for every size of mold. A wide processing window, flexibility and effective wear reduction measures help to increase productivity and reduce costs. Effective guide and support elements for the clamp ensure maximum platen parallelism and avoid wear and damage to molds and the machine. Precise and reliable hydraulic systems ensure stable processes over long production runs and increase system availability. The increased yield of good parts reduces unit costs.

Best melt quality and errorproof operation

Wear-protected plasticizing units with extremely long service lives ensure outstanding melt quality and long-term reproducibility. Maintaining consistently high yields of quality products supports your drive to control costs. The operator-friendly,

flexible MC 5 control system, also available as a touchscreen version, makes for easy and errorproof operation. Plug&play components mean upgrades and expansions are easy. Higher machine availability boosts productivity and reduces costs.

From entry-level machines to factory planning

As your system partner, KraussMaffei supplies solutions that match your requirements. Our product and service offering ranges from compact injection molding machines with basic automation, through complex manufacturing cells with post-mold processing, to planning complete factories. Our intensive know-how guarantees you planning certainty and on-time project completion to ensure fastest time to market for your new products. It could be a decisive factor in your competitive advantage in international markets.



Manufacturing cell for components for an upmarket limousine. Components are delivered absolutely on time thanks to optimal availability of the production machines. MX machines are right at the top when it comes to large-format injection molding.

MX benefits for you:

- Compact and rugged production system for sustained productivity
- Outstanding melt quality and absolute platen parallelism
- Fast cycles and high yield of good parts
- High production flexibility, versatile for different tasks
- Lowest mold wear and low-maintenance
- Modular engineering for easy conversions and upgrades



SERVICE WORLDWIDE

Service, support and spare parts – when you need them, where you need them

Rely on us for a fast and competent response to all your service needs anywhere in the world. Whatever you need – from troubleshooting and training to spares or repairs – we're on the job.

We're dedicated to supplying service quality on a par with the outstanding quality of our machines and systems. We offer far more than spare parts and hotlines. We'll work with you to choose the best and most cost-effective solution for your operation. We'll help you test new applications and we'll plan customized service packages.

All-round service

Our service offering is broad. We'll configure your system, install and commission it, train your staff, plan measures to minimize your downtime risk and maximize productivity, and carry out maintenance, repairs and upgrades. You'll find us fast, reliable and competent. Our hotline is manned by highly-trained and experienced service technicians. If necessary, we'll get a technician to you quickly. Remote diagnosis, interfacing directly with your machine's control system, can be a practical alternative. Spares for all important wear parts are available at short notice. We're continuously expanding our service network to speed up spare parts shipment. Talk to us about the right service solution for your business.

Customer trials and prototyping in our test lab

The Injection Molding Division operates a test lab fitted with the latest machinery and equipment. We can run trials, produce prototype parts and fine-tune processes on your behalf. We can work with you to test and evaluate processes, machines and equipment in order to identify the best approach for a particular project. Our highly-qualified application engineers are there to help you.

Training with high hands-on content

Courses are held in our lab and training centre, or, optionally, on your premises. We offer clearly-structured basic and advanced training in operation, process control and maintenance for KraussMaffei injection molding machinery. On request, we'll plan and hold special courses on topics of your choice. All participants spend a high proportion of their training working hands-on with original KraussMaffei machines. A well-structured training program produces skilled operators and technicians, which will positively impact your up-time and productivity.

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At your service worldwide



How to contact us

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Germany

KraussMaffei is a premium partner for the plastics and rubber processing industries worldwide. KraussMaffei machines and systems are used wherever plastics and rubber are converted into products. As a knowledge-driven technology company, we build on many decades of experience and a strong commitment to research and development.

The MX series is a systematic onward development of the highly successful MC series of big injection molding machines. The fastest machines of their size on the market, MX machines are available in the clamp force range from 850 to 4000 t. They are engineered to deliver sustained performance under demanding conditions. Versatile and modular, the MX series offers a wide choice of injection units for application-specific configurations. These are compact, high-performance machines, engineered for fast cycles, minimal mold wear, best melt quality, maximum platen parallelism and very low production costs.

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