

UNIVERSAL. QUICK.
RELIABLE.

EXPERIENCE OUR LINEAR ROBOT
OF THE LRX/LRX-S SERIES

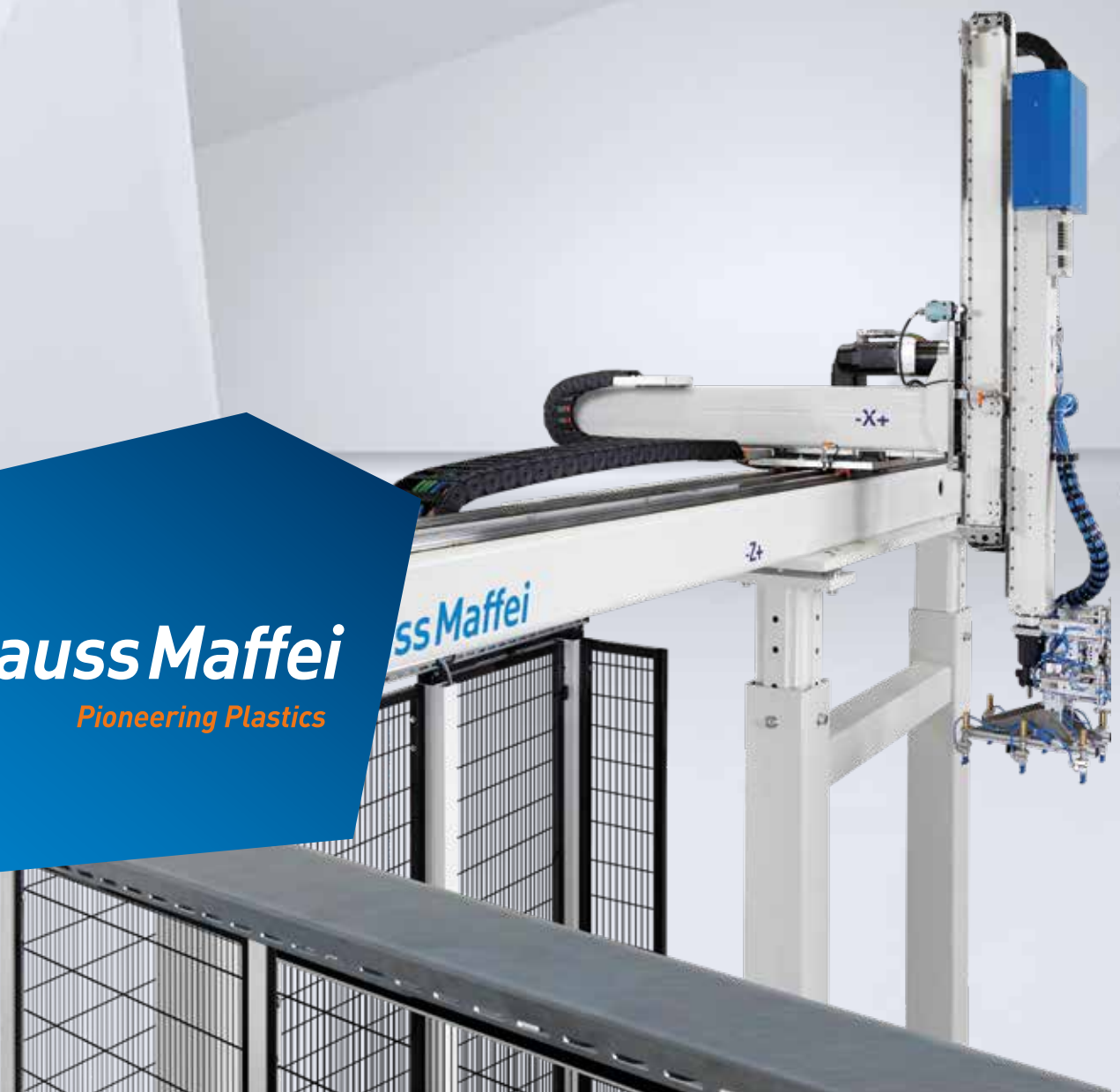
KraussMaffei

Pioneering Plastics

KraussMaffei

-X+

-Z+



APPLICATION AREAS OF THE LRX/LRX-S SERIES



Consumer goods



Packaging



Automotive



Medical/pharmaceutical



Electrical/electronics



Major appliances

Applications	Insertion, demolding, packaging
Special features	Speed, precision, durability, cost-efficiency
Working space	Cuboid-shaped room
Payload	5 – 100 kg
Axis combinations	Up to 500 different combinations
Standard accessories	Wrist axes, grippers, belt conveyors, safety housings
Control system concept	Integrated (LRX) or stand-alone (LRX-S)
Clamping force range	350 kN to 54,000 kN
Transfer variants	Non-operator side (standard), operator side, longitudinal discharge



LINEAR ROBOTS OF THE LRX/LRX-S SERIES

The linear robots in the LRX/LRX-S series can be used for all brands and manufacturers of injection molding machines. The cost-effective, compact basic equipment distinguishes itself thanks to its durable mechanical system and the quick and smooth commissioning. You will benefit from short cycle times and a high level of repeatability, self-explanatory programming and immediate production restart after the system has stopped.

This makes the equipment in the LRX/LRX-S series a reliable, universal solution for automated parts production for you too.

Your advantages at a glance:

- Cost-effective entry-level solutions
- Custom solutions for complex requirements
- Turnkey automation cells
- Increase the degrees of freedom through numerous wrist axis combinations
- Flexible gripper solutions
- Quick demolding times

A FASCINATING TOUR OF THE LRX/LRX-S SERIES

Economical servo-drive units

Quick acceleration and short cycle times

Simple operating concept

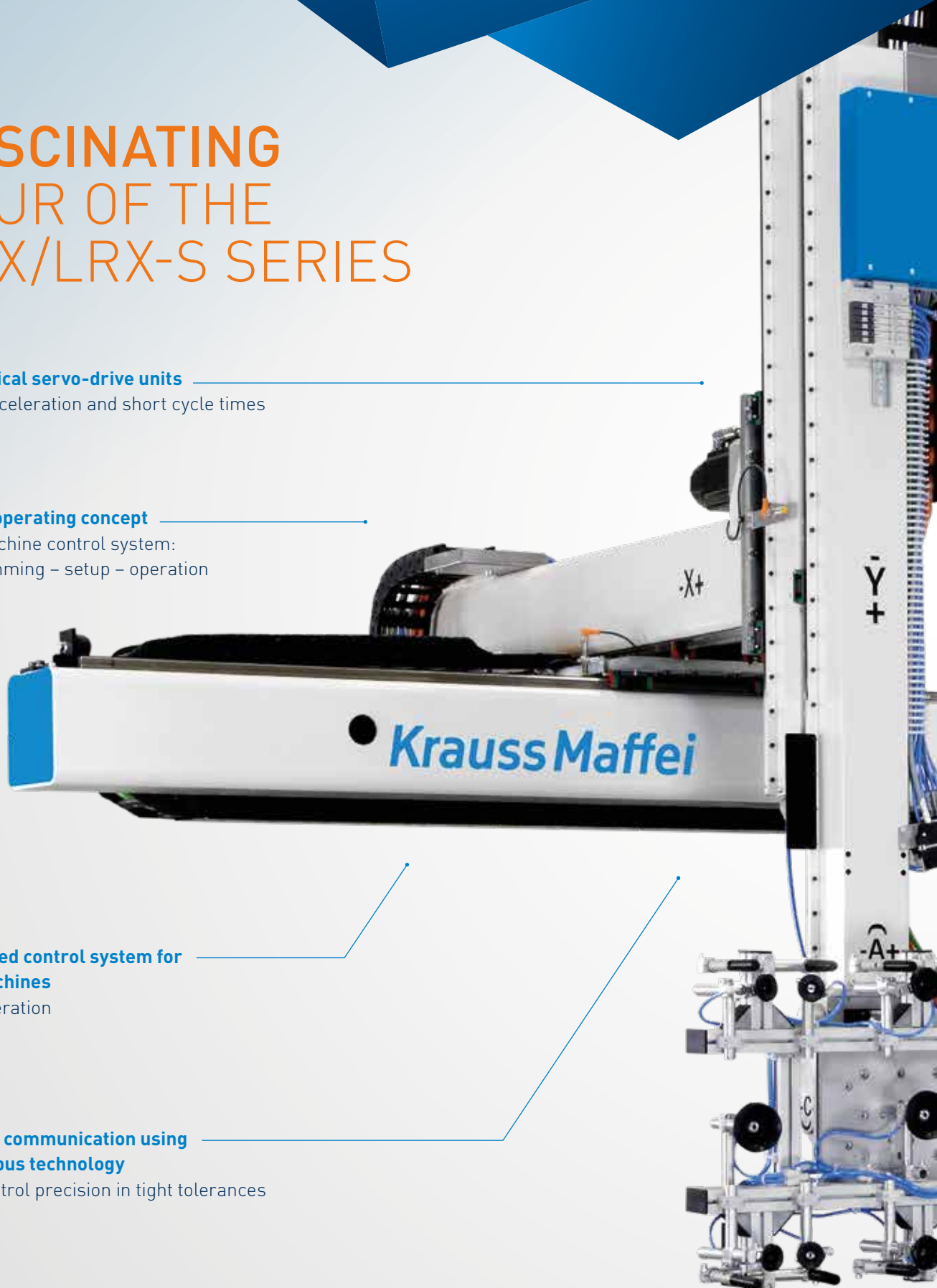
MC6 machine control system:
Programming – setup – operation

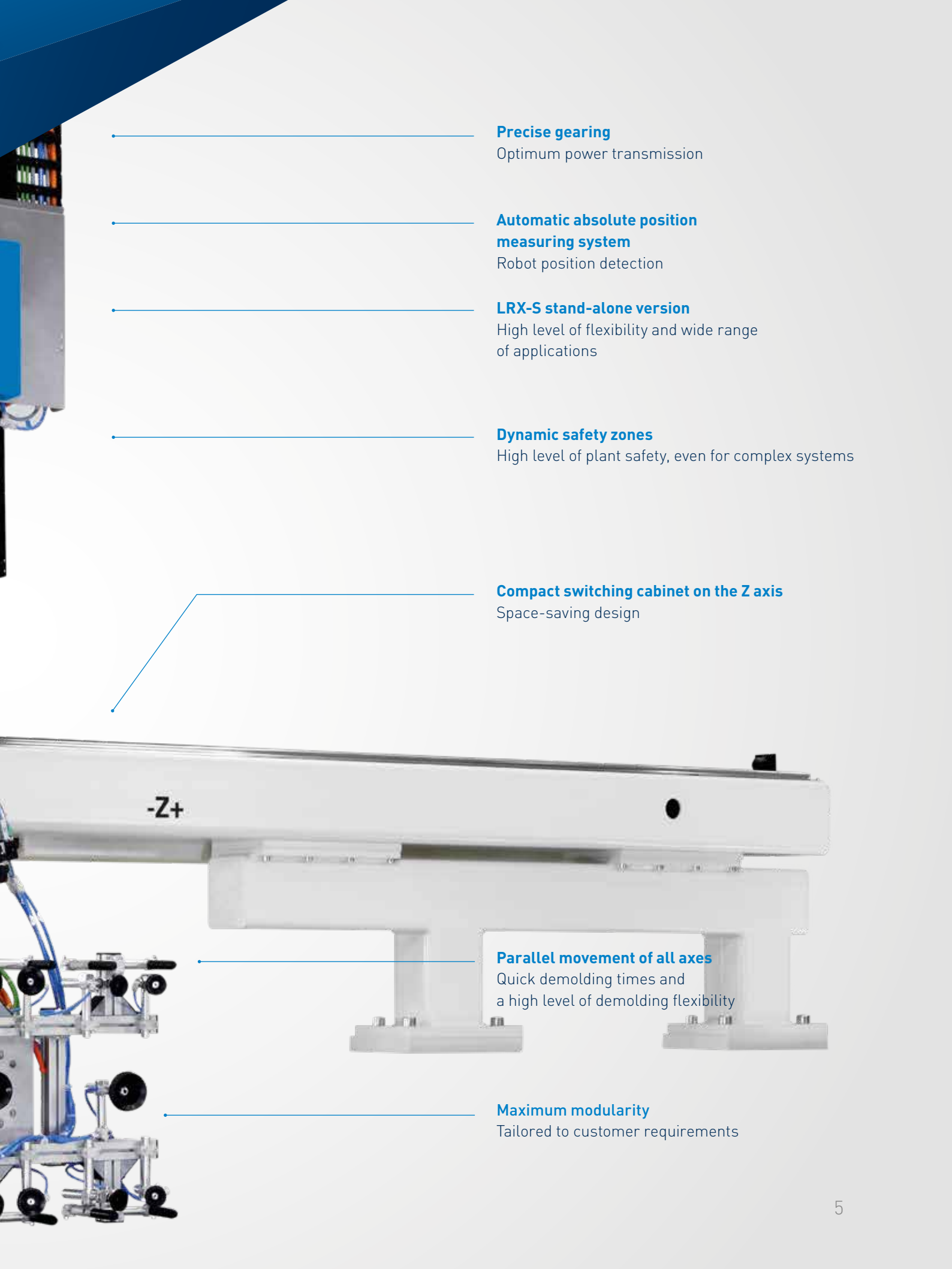
Integrated control system for LRX machines

Easy operation

Reliable communication using VARAN bus technology

High control precision in tight tolerances





Precise gearing

Optimum power transmission

Automatic absolute position measuring system

Robot position detection

LRX-S stand-alone version

High level of flexibility and wide range of applications

Dynamic safety zones

High level of plant safety, even for complex systems

Compact switching cabinet on the Z axis

Space-saving design

-Z+

Parallel movement of all axes

Quick demolding times and a high level of demolding flexibility

Maximum modularity

Tailored to customer requirements

FOR THE MOST VARIED OF TASKS IN THE INJECTION MOLDING PROCESS CUSTOMIZED AUTOMATION

Linear robots are equipped with three linear axes and up to three wrist axes, undertaking the most varied of tasks in the injection molding process.

Universal application

The linear robots in the LRX/LRX-S series from KraussMaffei distinguish themselves by their wide range of variants. They cover the clamping force range of 350 kN to 54,000 kN, and can be used universally for all types of injection molding machines – irrespective of brand or manufacturer.

thereby ensuring absolute safety. Robots of the LRX/LRX-S series are dynamic, fast and precise: demolding times under a second are possible with repeatability of +/- 0.1 mm.

High level of system functionality

The LRX/LRX-S series is based on the proven control system concept of KraussMaffei injection molding machines: easy to operate, program and control. Standardized safety technology and periphery components such as belt conveyors and safety housings are matched with the series,

YOUR BENEFITS:

- High level of productivity
- Wide range of variants
- Precise repeatability

Machine model	Lifting capacity of the LRX/LRX-S robots																																				
	< 5 kg	< 10 kg	< 15 kg	< 25 kg	< 35 kg	< 50 kg	< 100 kg																														
KM 35 CX																																					
KM 50 CX / PX																																					
KM 51 PX																																					
KM 65 CX																																					
KM 80 CX / PX																																					
KM 81 PX																																					
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KM 4000 MX																																					
Clamping force in kN	350	500	510	650	800	810	1,100	1,200	1,300	1,600	1,610	2,000	2,100	2,500	2,510	3,000	3,200	3,500	4,000	4,200	4,500	5,000	5,500	5,510	6,000	6,500	6,510	7,500	10,000	11,500	13,000	16,000	20,000	23,000	27,000	32,000	40,000

Key to linear robots: LRX = linear robot 50 = payload in N
1 = not for 901/1000 / 1100

KraussMaffei linear robots for the implementation of solutions ranging from pick & place to turnkey



PRODUCTIVE. INTUITIVE. COST-EFFECTIVE.

LRX EasyControl LINEAR ROBOTS

Automation is currently a critical factor for creating value in injection molding production. Fast, reliable component demolding lays the foundation for state-of-the-art systems to achieve high productivity and short cycle times.

The LRX EasyControl linear robots that we offer you are specifically designed for easy pick & place tasks. KraussMaffei machines and machines from other manufacturers benefit equally from this stand-alone concept. It allows you to make quick and cost-effective use of our extensive experience in process and production

optimization using linear robots. And you can be confident that the robots will live up to the KraussMaffei quality you are used to. The specially designed EasyControl system ensures a quick start-up and commissioning phase.

Sizes	LRX EasyControl 50, LRX EasyControl 100, other sizes up to LRX EasyControl 1000 in preparation
Applications	Simple pick & place automation tasks
Special features	Speed, precision, durability, cost-efficiency
Working space	Cuboid-shaped room
Payload	5 - 100 kg*
Wrist axes	Pneumatic and servomotor-controlled
Standard accessories	Wrist axes, conveyor belts, safety housing
Control system concept	EasyControl (look and feel similar to MC6)
Clamping force range	250 kN to 3,000 kN*
Transfer variants	Non-operator side

* depending on the size





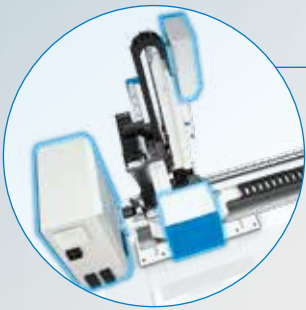
YOUR BENEFITS:

- KraussMaffei's "Made in Germany" production quality
- Attractive price/performance ratio
- Intuitive operation and programming in the KraussMaffei MC6 look and feel
- Easy expansion of functions
- Compatible with the MC6 control system
- Up to 30% faster start-up thanks to easy programming

A FASCINATING TOUR OF THE LRX EasyControl

A flexible stand-alone design for hardware and operation

As a stand-alone design, the LRX EasyControl robot can be adapted for use on all machines, regardless of manufacturer. We achieved this by modeling operation and control of the EasyControl system in line with the MC6 system. User interfaces have been adapted to the expertise of the users and make programming easier. LRX EasyControl – the reliable production partner.



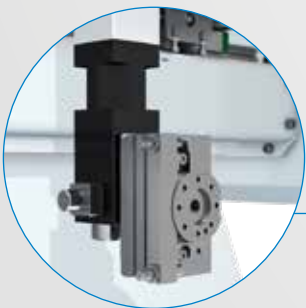
Ideal accessibility with the decentralized control cabinet concept

More freedom for maintenance and service in production. Protected against water and dirt particles with the protection rating IP54 and optimized heat dissipation due to active ventilation during operation.



Impressive precision with rack-and-pinion drive

Rack-and-pinion drive for high-precision robot positioning with fast movements in all axes.



Compact and light: the new wrist axes

Servo wrist axes optimized in terms of design and weight increase productivity by saving process times.





Fast and flexible with the central media portal
 Central media supply allows simple gripper change and provides modular expandability of gripper functions.



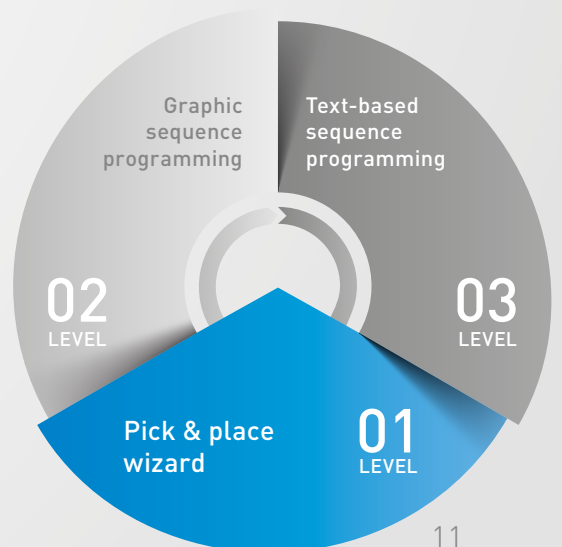
New concept for high degree of safety
 Fixed X axis provides clear access to plasticizing unit and material supplies.



Operation with the "convenience" factor
 EasyControl features interfaces based on the MC6 control system and has been adapted to the expertise of the user. As a result, it simplifies daily work and makes it easier to program new sequences.

EasyControl – intuitive operation and programming

The new control system conforms to the concept of the LRX EasyControl. The system features a handheld HMI to allow for fast start-up and easy operation. Depending on the task, programming can be done graphically or using a text editor.



EFFICIENT, COMPACT AND CUSTOMIZED THE RIGHT AUTOMATION SOLUTION FOR EVERY TASK

Whatever your production requirements are: The perfect interplay between the linear robot and injection molding machine makes the LRX/LRX-S series a technically and economically outstanding automation solution for your production as well.

Extreme flexibility thanks to over 500 axis combinations

The LRX/LRX-S series provides the right linear robot for every clamping force. The required axis lengths and wrist axes are preconfigured depending on requirements. A range of axis versions, axis extensions and wrist axis combinations in every size make the linear robots extremely agile.

YOUR BENEFITS:

- Varied axis combinations
- CE conformity
- Absolute position measuring system
- 5-button operating concept
- Automatic drive to home position



New, ergonomically optimized handheld pendant with touchscreen function for convenient programming of the linear robot

Cost-effective standard

The machines in the LRX series already provide, as standard, many varied features for smooth parts production. In addition to optimized axes for durable, accurate and continuous operation, an absolute position measuring system makes a quick and safe set-up mode easier for different applications.

Basic demolding tasks can be started immediately using a program. The servo float function makes gradual lowering of the torque movement possible, depending on a defined position, and thus safe set up for gentle demolding even for sensitive components

Automatic drive to home position makes it possible for the robot to safely travel from the mold or periphery at the press of a button. For follow-up processes, there is no need for cost-intensive, additional control units because stacking programs for stacking on pallets are already included as standard, and it is also possible to activate external peripherals.

CE conformity for three transfer variants

The LRX/LRX-S series is granted CE conformity in combination with an injection molding machine. Three different transfer variants are possible:

- Non-operator side (standard)
- Operator side
- Longitudinal discharge

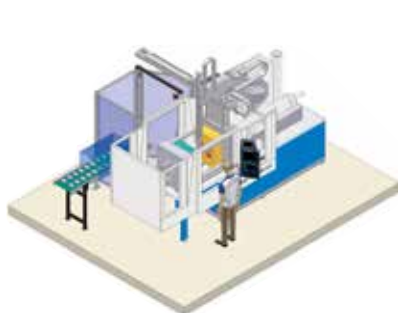
Longitudinal discharge offers an additional advantage. The floor space can be reduced by up to 3 m, which saves valuable production space. For low buildings, KraussMaffei can also provide linear automation in its low-building variant with standard telescopic Y axis. For injection molding machines produced by other manufacturers, the LRX-S stand-alone version from KraussMaffei is used.

The control system: Intelligent and integrated

The injection molding process and automation form one unit via the integrated control system with VARAN bus technology. Process data are available in real time. Programming and operation are easy and do not call for any in-depth programming knowledge.

To enable optimum teaching and ergonomic programming, all LRX/LRX-S machines have a handheld pendant with a touchscreen display. The operating steps are identical to the machine's operating panel. With the integrated solution, the entire production cell can be controlled via a common operating panel.

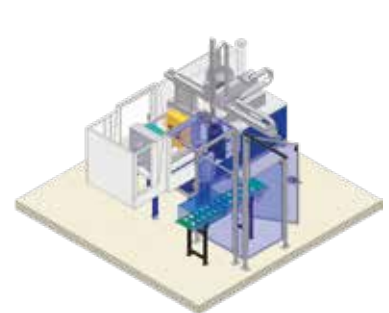
The machine and robot data are saved in one data record. This also ensures maximum data security and excellent operating convenience. 20 safety zones, of which 5 are dynamic, increase the efficiency of the control programs.



Transfer of the LRX to the non-operator side



A manufacturing cell with LRX longitudinal discharge



The LRX traverses the operator side (overhead safety guard)

KEEP ALL YOUR PRODUCTS UNDER CONTROL WITH GRIPPER SOLUTIONS – FOR EVERY TASK AND EVERY SECTOR

Thanks to many years of experience in system and gripper construction, KraussMaffei has automation expertise that goes well beyond purely standard tasks.

Application example

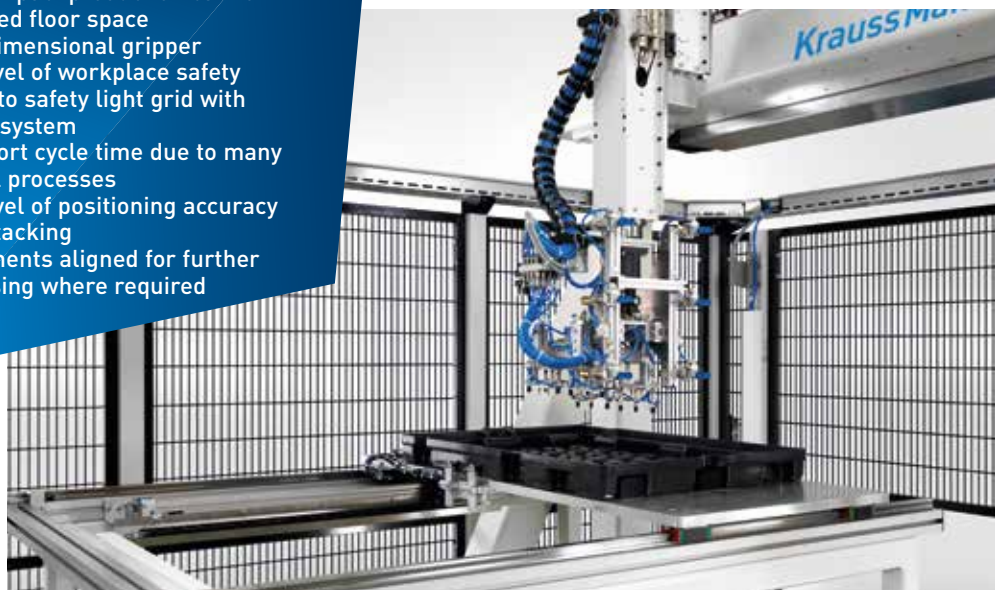
Full automation of a KM 230-t machine for demolding housings for interior lighting. There are three product variants with the same suction position and positioning hole in one 4-cavity mold. The vacuum circuits on the gripper must be monitored. The production parts are deposited in the workpiece rack provided. The workpiece racks must be palletized, and are then exported using a roller conveyor. Furthermore, an integrated belt conveyor for alternative transfer of the molded parts will be required.

The system solution

Demolding of the molded parts with linear robot LRX 250. When stacked, the molded parts are compacted in the gripper and then deposited in the workpiece racks provided. The gripper has different versions, each with different dimensions: for handling trays and for handling the components. The trays provided are transported using linear handling and then centered in relation to a shuttle table. There are separate chutes for good components and rejects. They remain quite flexible, and can stack the production components either in trays or pallet cages, or place the components on a belt conveyor. Both options are available to you.

YOUR BENEFITS:

- Flexible overall concept
- Very compact production cell for restricted floor space
- Multi-dimensional gripper
- High level of workplace safety thanks to safety light grid with muting system
- Very short cycle time due to many parallel processes
- High level of positioning accuracy when stacking
- Components aligned for further processing where required



*Custom demolding and gripper concepts:
A multi-dimensional gripper is being used in this illustration.*

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 for your special requirements.

Precise sorting and feeding units

Sorting and material feeding units are necessary for insertion technology or subsequent processes. For such processes, the robot requires the components to be in a repeatable, aligned position. A further plus: the peripherals can be integrated directly into the robot control system, so that only one control unit is required.

Different drawer systems

They are used for providing parts, exporting QS 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 is equipped with a request and acknowledge button, as well as a protection guard.

Quick SCARA robots

These are quick, compact, 4-axis relocating robots, which move payloads of 5-10 kg to the required position at high speed for a reach of 350-850 mm.

Custom delivery systems

We can provide you with standard 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 process.

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 geometry. 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

WizardX

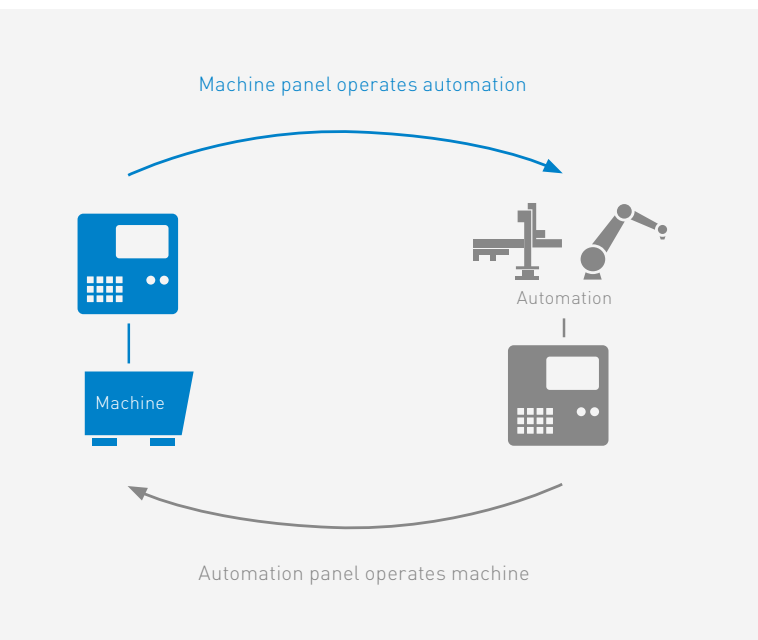
SMARTER PROGRAMMING AND OPERATION

The perfect symbiosis of machine and automation

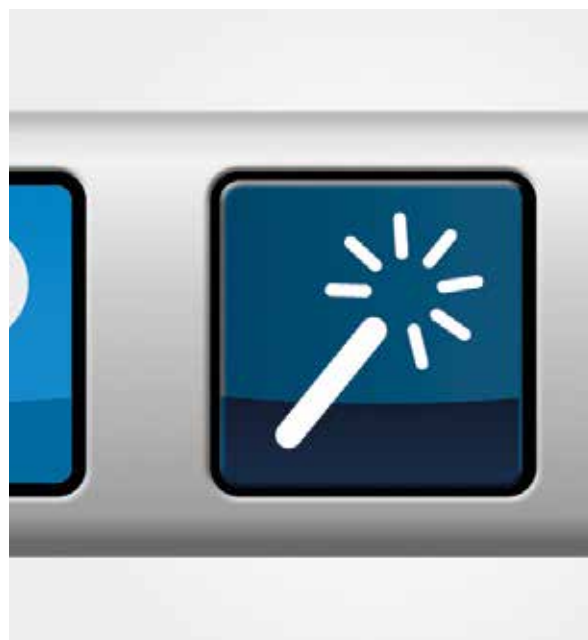
As a system partner, we supply the automation technology and machine as a fully integrated, overall concept. The machine and handling system form a functional unit. The joint control system allows both functional units to be managed on any operating panel: Automation technology and machine. The machine can be operated via the handheld pendant of the robot and vice versa.

No wizardry: the WizardX programming assistant

For linear robots from KraussMaffei, there is an online programming wizard called "WizardX", which is used in conjunction with the MC6 control system. This feature makes programming the robots magically simple. Thanks to intuitive operator guidance with visual representation, the WizardX is an effective aid for programming. Even beginners can create basic demolding processes within a very short space of time. The interactive communication between user and control system makes manual programming superfluous and eliminates programming errors.



Perfect symbiosis of machine and automation



*WizardX programming assistant:
Easy to recognize by the "magic wand symbol"*



Programming in just four steps

The programming process is displayed visually. Depending on the user level, the program can be edited and modified by the operator himself. In expert mode, the operator has the option to make individual adaptations and extensions to the basic programs. In this way, you save time and money and have reduced training expenses for both programmers and operators. You will also benefit from a smaller error rate.

YOUR BENEFITS:

- Smarter programming and operation with WizardX
- Prior programming knowledge is not essential
- Quick and easy basic programming for pick & place applications
- Error-free program generation
- Reduced training expenses

Step 1

Operator determines the flow diagram

Step 2

Operator configures individual stations

Step 3

Positions are taught

Step 4

Basic program generated: Program starts

MULTIPLE KINEMATICS FOR LINEAR ROBOTS

VERSATILE, CONVENIENT AND EASY TO OPERATE

Multiple kinematics offer you a host of benefits in the implementation of complex automation solutions such as the assignment of an associated production process to several robot axes. The MC6 control system manages the process and all moving axes are programmed and controlled centrally using a handheld pendant.

What are multiple kinematics?

The MC6 control system from KraussMaffei was further developed to enable central programming and control of linear robots with a maximum of 24 axes. The software allows the configuration of up to 4 kinematic units (robots), each with 6 axes. Multiple kinematics are the perfect starting point for the development of complex automation solutions used in production.

Extended options

A joint program editor is used to program all the robots. Program commands and parameters can be assigned to individual robots with minimum effort. A joint coordinate

system for all axes makes it easier to control specific robots in individual operating modes.

Multiple kinematics on LRX/LRX-S

The integrated LRX version offers the added convenience of alternate operation using the panel on the injection molding machine or the handheld pendant on the robot. The stand-alone version of the LRX-S is a self-sufficient, independent system that incorporates all the usual advantages of the MC6 control system. This version is used in all applications where integration in the injection molding machine is not an option.



Easy identification of the active robot on operating screens

Integrated collision monitoring

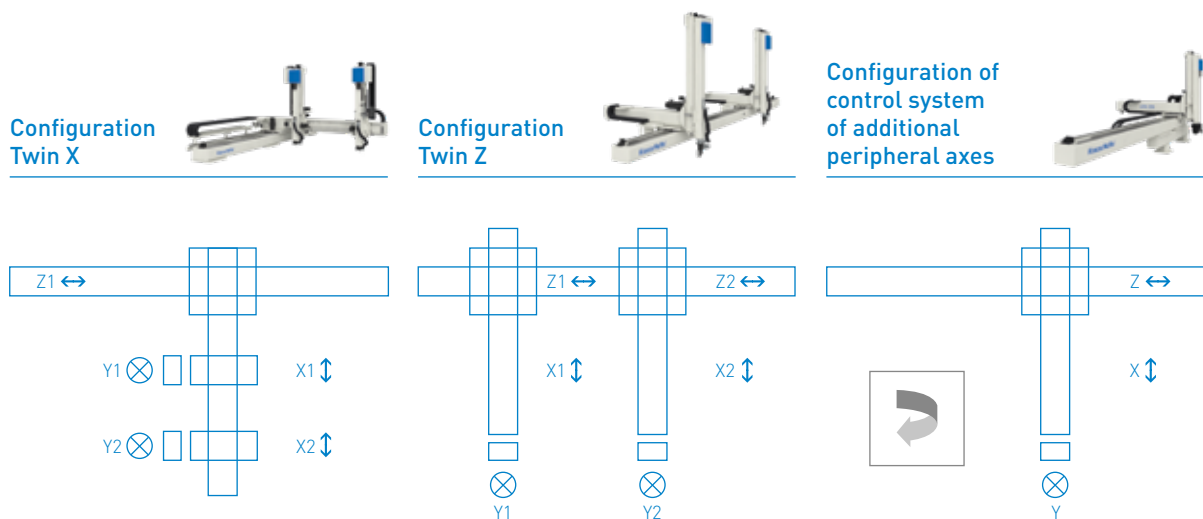
YOUR BENEFITS:

- Support of four robots, each with 6 axes (max. 24 axes)
- Central control of movements using the application program
- Central management of all peripheral signals
- Operating mode changed centrally
- Intelligent collision monitoring of mechanically linked axes

CUSTOMIZED APPLICATION

MULTIPLE KINEMATICS IN YOUR PRODUCTION

The possibilities for combining several axes can be extremely varied. The following case studies show several application options for multiple kinematics.



Feature

Mechanically linked Y-axes on a shared X-axis.

Application

Simultaneous demolding or placement process in the mold.

Benefits

- Save time when using a multi-daylight mold or TwinForm machines
- Efficient manufacturing of molds with demolding and insertion on both mold-halves within the same cycle
- High flexibility thanks to expanded options: assembly of removed parts, flipping over of articles or similar

Feature

Mechanically linked X-axes on a shared Z-axis.

Application

Transfer of components (handshake) during rapid component removal, stacking operations.

Benefits

- Space and time saved on automated units with overlapping motion ranges (robot installation in the longitudinal discharge)
- Save time when using a multi-daylight mold or TwinForm machines
- Process linking option: demolding, transfer, installation, stacking etc.

Feature

Additional axes (peripherals) for the standard robot.

Application

Use of turntables and stages.

Benefits

- Central control system also used for external axes from easy servo transfer units to completely driven peripheral stations (e.g., feed and separation)

SHORTER PROGRAMMING TIMES OFFLINE PROGRAMMING OF LINEAR ROBOTS

The LRX on PC software for programming linear robots reduces the setup time of the injection molding machines with new molds and applications.



For linear robots of the LRX/LRX-S type

Thanks to offline programming at a PC disconnected from the robot, a new program can be created locally or an existing program modified without disabling the system. The data are then simply transferred using a USB stick.

The easy and convenient operation of the MC6 user interface supports the operator in program creation. LRX on PC increases valuable production time.

System requirements:

- Windows 7 Service Pack 1
- Min. Intel® Celeron® G530T @ 2.00GHz
- Min. 2 GB RAM
- Min. 300 MByte of available hard disk space
- VGA graphics card with a resolution of at least 1024 x 768 pixels and 16-bit color
- Two available USB connections for data stick and license stick (dongle)

All advantages of the new MC6 control system are available offline



Familiar MC6 programming environment

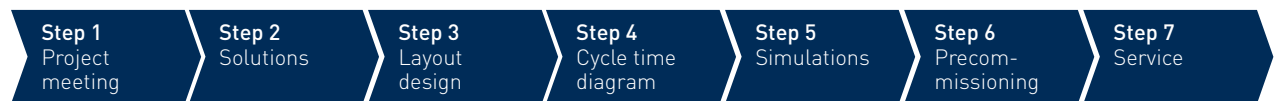


Error-free program creation using the WizardX programming wizard



Easily modify and expand existing product lines in the editor

ALMOST AUTOMATIC: PROJECT MANAGEMENT THROUGH PARTNERSHIP WORKING TOGETHER TOWARDS SUCCESS IN JUST SEVEN STEPS



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 resolution methods

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 installation areas 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 in 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 varied applications and different robot types, in 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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