

**KMC –
KUKA Motion Control**

**For everything that moves in automation:
PC-based KUKA Motion Control**



MORE INTELLIGENT AUTOMATION WITH THE ADVANTAGES OF THE FIELD APPROVED KUKA CONTROLLER.

The KUKA KR C2 controller is already regarded as a milestone in the history of control technology. It has proven itself to be particularly reliable, multifunctional and easy to use. So good, in fact, that our engineers felt that it would be a shame if it could only be used with KUKA robots. Consequently, the KUKA controller has been expanded for General Motion Control tasks and made available for everyone in the field of automation. The result is KUKA Motion Control, or KMC. In the future, you will only need to invest in a single, comprehensive hardware and software solution.



Many years of experience: the KUKA KR C2 controller.
Its hallmarks: standardized modules, reliability and safety that have been amply demonstrated in the automotive industry, ease of servicing and maintenance, and modular single or multiple axis technology.

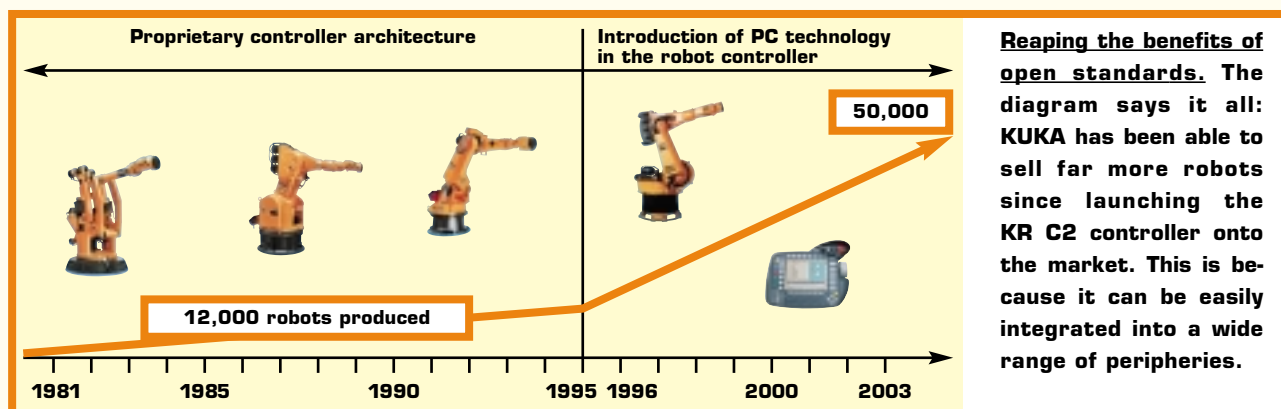
Advantages

- ▶ **PC-based controller: worldwide standard, openness, network capability**
- ▶ **Experience dating back to 1996: technological revolution in the world of robot control**
- ▶ **World leader in the field of PC-based industrial robots**
- ▶ **KUKA has many years of engineering experience and a wealth of expertise in this field**
- ▶ **The software is ideally suited to motions using space coordinates**
- ▶ **The controller takes over all robot control, motion control and sequence control functions**
- ▶ **Fully coordinated control system from a single provider**

Ever since 1996, KUKA has been renowned for the intelligence of its PC-based robot controller. With over 30,000 in use in the automotive industry alone, this speaks volumes about its productivity and reliability. Despite its open structure, the KUKA controller has so far only been available for use with KUKA robots. Now systems integrators and manufacturers of other manipulators and machines can also enjoy the benefits. From now on they can use the KUKA controller as an OEM product for any automation control tasks – be it as a robot controller or as a motion control unit.



Non-KUKA kinematic system with KUKA KMC2 controller. The beverage industry worldwide relies on palletizing systems; with the KUKA controller they can be made highly productive and flexible.

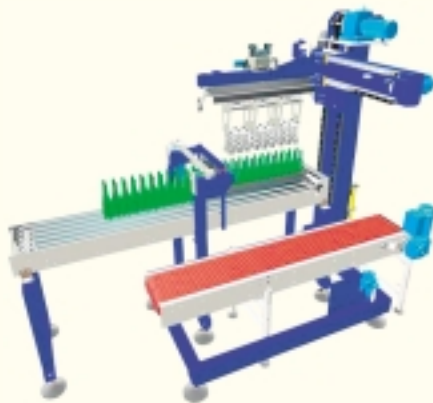


DISCOVER THE POSSIBILITIES.

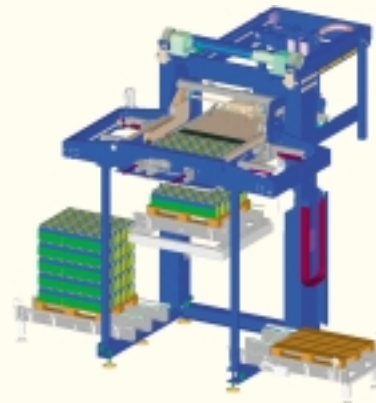
There are no limits to the uses of KUKA control technology.

It ensures greater performance in the most varied of applications.

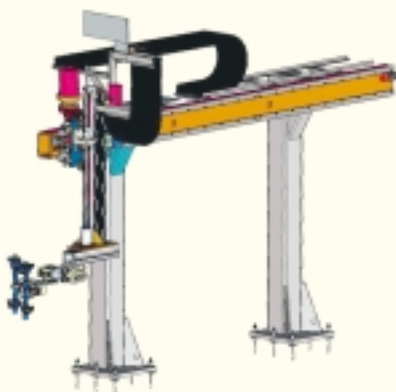
The proof: Here are just 4 of 444 possible applications.



Single column module packer. This packing machine can be used for packing and unpacking all manner of bottles and jars with a diameter of 70 mm to 105 mm. The packing of containers, such as plastic crates and collapsible cardboard boxes (with or without internal dividers), is also no problem.



Depalletizer/pushing device with pallet lift. This depalletizing machine is used to push layers of new glass containers away from pallets and remove the slipsheets/slip-on covers. The average hourly capacity is 300 to 400 layers.



Universal handling gantry. This is primarily used for linking machine tools. The mounted turnover-servogripper allows blanks and finished parts to be double-gripped, thus keeping unproductive time of the machines to a minimum. Smooth transitions between axis motions shorten cycle times, thus increasing the efficiency of the machines still further.



Cardboard box folder. The box folder aligns precut templates, folds in the bottom flaps and glues them in place. The machine dispatches the finished boxes upright and ready to be filled.

The KUKA controller can be used to control a wide range of kinematic systems and machines more intelligently than with conventional solutions. Irrespective of whether the individual axes are to be moved synchronously, asynchronously or pulsed, the KUKA controller is ideally suited to all your requirements. With KUKA's controller concept for all machine types, even more intelligent solutions can be developed. Your productivity increases, giving you an important competitive edge.



THESE TOOLS ENABLE YOU TO REACH YOUR GOALS MORE QUICKLY.

The hardware and software tools that come with KUKA controllers provide you with a unique range of special functions that have evolved from the harsh requirements of the automotive industry. The KUKA controller offers an acceleration model to reduce the strain on your robot and many other features that will help you in day-to-day operation. Further advantages, such as automatic restart after power failure, no deviation from path following “Emergency Stop”, approximate positioning and anti-collision functions, all serve to boost your productivity.

SIMPLER AND MORE INTUITIVE OPERATOR CONTROL: KUKA CONTROL PANEL (KCP)

6D mouse: convenient teaching using just one operator control element

Rapid programming using simple Windows operating platform

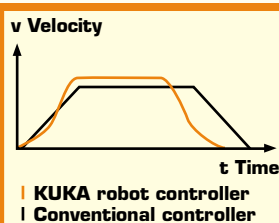
Template forms for quicker entry of commands



Block functions for shorter programming times

Softkeys and clearly laid-out function blocks

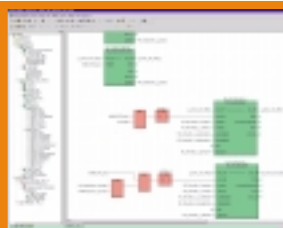
The tried-and-tested KUKA controller has everything you need. Application control is more time-optimized, operator control is simpler, and integration into higher-level structures runs more smoothly. There is also a range of functions designed to make your work easier. Not just for controlling your robots, but also for your complete production cells/lines. You can thus integrate visualization, programming and control of your entire production system. The KUKA controller allows you to standardize and simplify your control structures and to reduce planning and commissioning times and cycle times.



! KUKA robot controller
! Conventional controller

Only from KUKA: time-optimized positioning at points. With KUKA, not only the programming, but also the motion profile is simply faster. The controller and software are geared towards

time-optimized positioning at points. This means more acceleration, shorter cycle times and motions that put less strain on your equipment.



Control molded to your needs: Soft PLC. In addition to common robot applications, the KUKA PC-based controller can also control your entire production cell – via an integrated Soft PLC.

You save on expensive hardware, simplify operator control and are more flexible.



Full range of motion control functions: MCFB. By expanding the controller to incorporate motion control function blocks, we have catered for every need. Functions such as electronic

line shafts, master-slave coupling and axis interpolation come as integral parts of the product, and run in parallel with the existing robot controller.



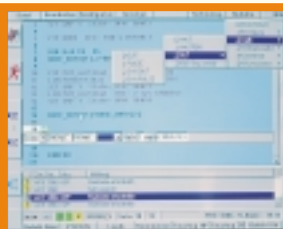
Verification of feasibility in advance: KUKA Sim. With the simulation software KUKA Sim, cells and lines can be planned and configured with true-to-life accuracy. By running your

application sequences in real time, your drafts and designs can be verified at an early stage. This shortens the time required for commissioning.



Making operator control easier: HMI Studio. Our HMI (human machine interface) software allows you to tailor your user interfaces and functions more closely to your

specific application. This makes not only your cell, but your entire production line more uniform, integrated and easier to operate. The OPC software interface takes care of data exchange between the HMI software and the Soft PLC.



While production is under way: offline programming with Office Lite. Convenient production programming using an office PC or laptop. KUKA offline programming works with abso-

lutely accurate data. This makes extremely short conversion times possible.

INTELLIGENCE WITH SYSTEM THE MODULAR SYSTEM FOR YOUR AUTOMATION REQUIREMENTS.

Do what you want with our modular system. Take as much or as little as you actually need. At the end of the day you will always have two advantages: lower costs and greater functionality. So, how much control technology do you need for your application?

MORE MODULARITY FOR YOUR APPLICATION

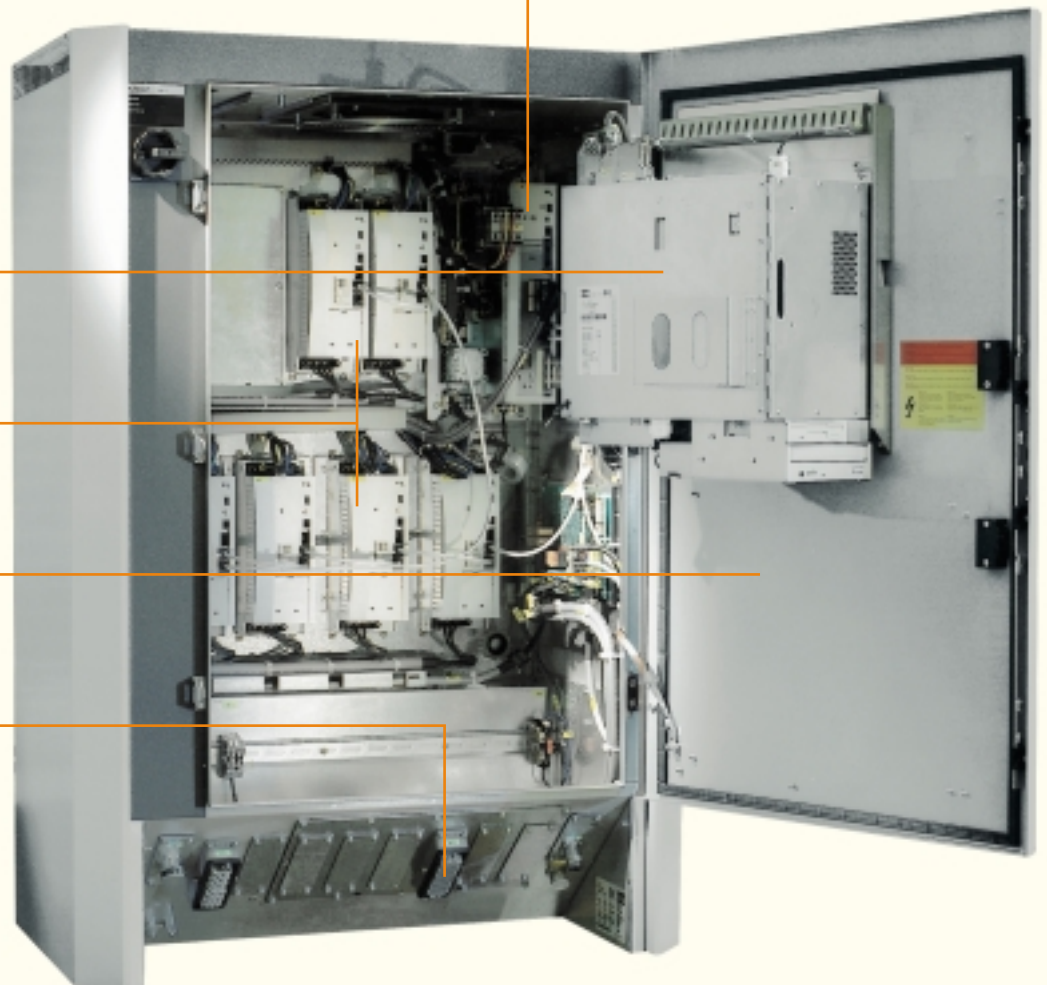
High-performance intermediate-circuit power supply

Industrial PC with high availability

Space for up to eight series 8 servo controllers, max. peak current 64 A

Space for user-specific equipment

Configurable connector panel



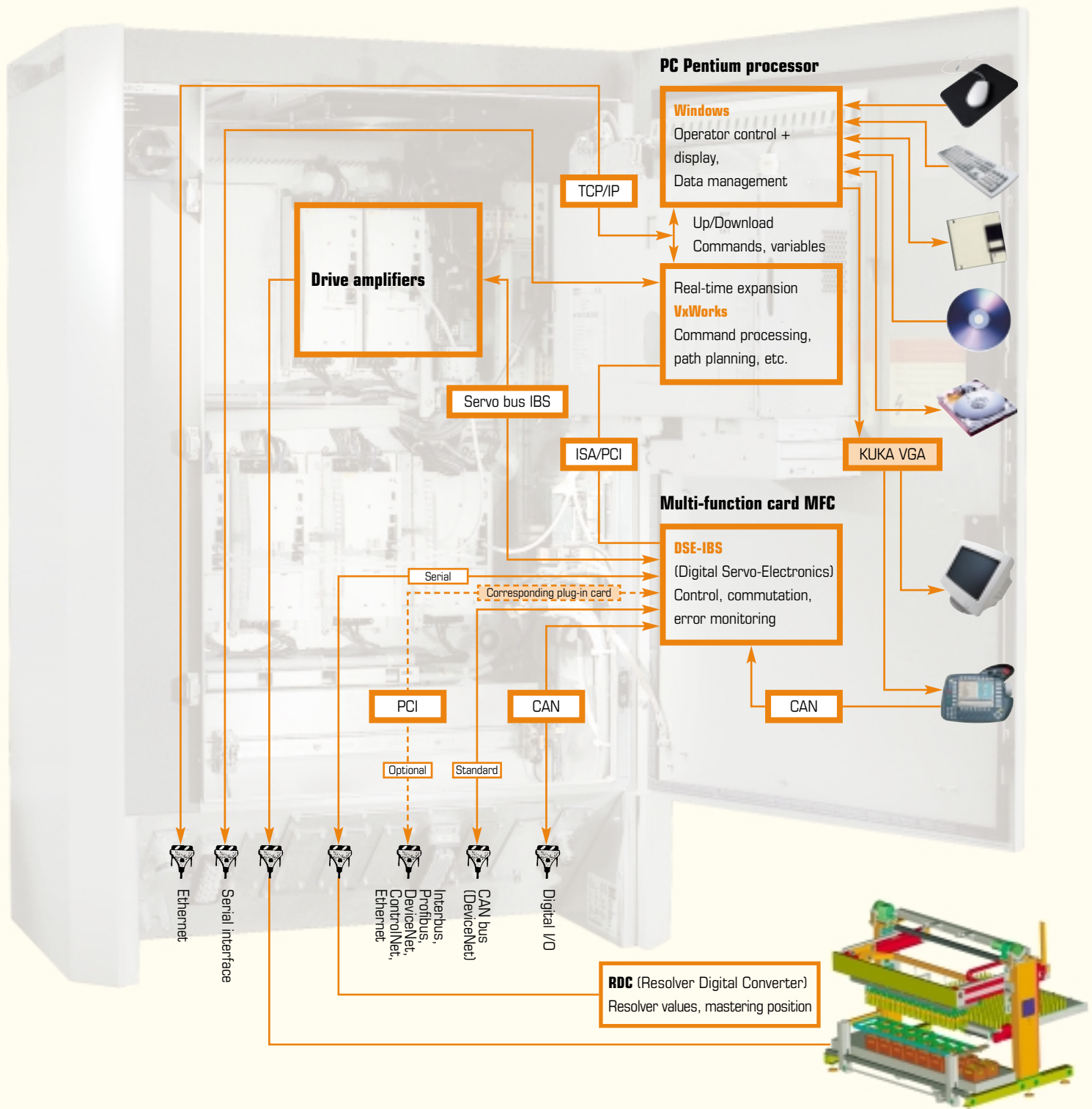
The KUKA control philosophy is based on a flexible and well-thought-out modular concept in which both the software and the hardware can be adapted to the requirements of your application. You only pay for what you actually get. And you only get what you actually need. If you require the complete system, you will receive a complete solution molded to your needs. If your system requirements are more modest, we leave out the modules that are not required. Items such as field bus interfaces, wiring and connector panel configuration are tailored to your requirements. That's how easy it is working with KUKA.

**THE MODULAR SYSTEM FOR YOUR AUTOMATION REQUIREMENTS:
ON REQUEST WE CAN SUPPLY THE COMPLETE SYSTEM**

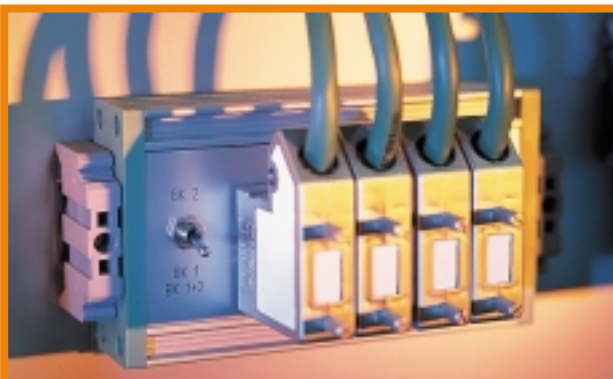


OPEN ON ALL SIDES.

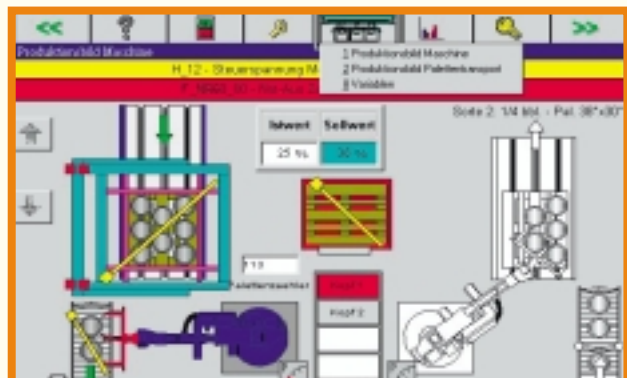
KUKA control technology makes it easy to control – and network – robots and other kinematic systems. Integration into higher-level control structures is also no problem. Here you can see at a glance what interfaces and other options are open for you.



KUKA Motion Control is a key which fits all the doors to the world of automation. It is thus bound to be suitable for your control system, too. Its open structure makes for optimal system integration. Thanks to standardized protocols, full use can also be made of the Ethernet. Even the integration of lower-level controllers, sensors and actuators is guaranteed. With KUKA Motion Control, exploit all the potential you need in order to enhance productivity and profitability!



Integration into any periphery. KUKA Motion Control comes with a CAN bus interface as standard. But it can also communicate with all other common bus systems – or even with higher-level control entities via the Ethernet connection.



The range of functions can be extended at any time. KUKA MC offers a whole range of expansion options: from process visualization, through system and periphery diagnostics (e.g. Interbus diagnostics with the original CMD tool), to generating your own production statistics.



KUKA partner concept. The close development and systems partnership we offer our customers in the field of control technology means that each party can concentrate on its particular areas of competence. You on your applications, KUKA on its control platform system expertise. The result: synergies for greater profitability.



Optimal system integration from a single source. The decisive factor for your automation solution is always the bottom line. In order to increase your profitability, with KUKA you receive the complete, pre-configured control system from a single provider.

THE LITTLE SISTER: KMC2-KDB BRINGS YOU POWER WHERE YOU NEED IT.

For certain automation tasks, where a compact controller is required, the KMC2's smaller sibling, the KMC2-KDB (KUKA Drive Box), may be the right choice. It can be installed directly in or on the machine and offers all the features of its larger counterpart.



KMC2-KDB



KUKA Drive Box (KDB)

Features of the KMC2-KDB

- ▶ Brings you power where you need it and reduces power dissipation
- ▶ Synchronized motion of external drives
- ▶ Minimum cabling required
- ▶ Small floor space requirements thanks to compact design
- ▶ More flexible field of applications
- ▶ Up to 5 servo controllers can be integrated
- ▶ Integration in or on the machine

The control system KMC2-KDB with KUKA Drive Box offers you the advantage of separate installation. The KMC2-KDB control unit remains near the user where it can be programmed most easily. The KUKA Drive Box, on the other hand, is ideally mounted on the machine, near the motors, or installed in the system to be controlled, thus saving space. In this way, installation work and power dissipation are kept to an absolute minimum. Installation of the Drive Box directly on a Cartesian gantry, so that it moves with the handling device, significantly reduces the number of cables in the energy supply chains.



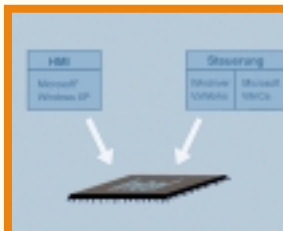
MODULAR AUTOMATION FOR MECHANICAL ENGINEERING.

Alongside robots, there is a large number of other machine types that cannot be operated optimally with a robot controller alone. For this reason, KUKA has expanded its control technology to include “Motion Control Function Blocks”.

MODULAR KUKA CONTROL SYSTEMS FOR MACHANICAL ENGINEERING



IPC. Use the same PCs for your control tasks as those that have proven their worth in series robot operation.



Windows real time expansion. The Windows real time expansion options – the technical basis of the success of KUKA robot controllers – can also be purchased separately.

We can currently supply VxWin (with VxWorks) and CeWin (with Windows CE).

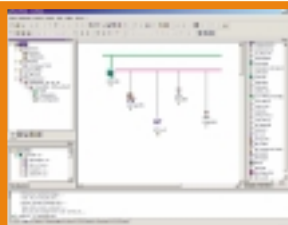


KMC system structure. The centerpiece of KMC is the tried-and-tested KUKA Soft PLC. The robot, motion control function blocks, field bus I/Os and human-machine interface are subsystems that are coordinated from the central Soft PLC. All in a single controller!



PLC/robot integration. The “robot” subsystem is connected to the Soft PLC running on the same controller via KUKA-specific PLC function blocks. The Soft PLC thus has direct access to robot

controller variables, and vice versa, without the inconvenience of external field buses. The Soft PLC can also analyze and acknowledge robot controller error messages.



Integration of Soft PLC/field bus I/Os. With KMC, the field bus I/Os can be controlled directly by the Soft PLC. For this purpose, interfaces are available for all common field buses.

The configuration and diagnosis of the field buses are fully integrated into the development environment of the Soft PLC.



Integration of drives via CALL-D. With KMC, the drives are controlled by the robot controller and the MCFBs via a standardized “CALL-D” interface. The axes can be assigned freely to the robot and the MCFBs.

The established KUKA Servo Drives are currently available, to be followed later by interfaces for servo buses such as Powerlink and SERCOS.

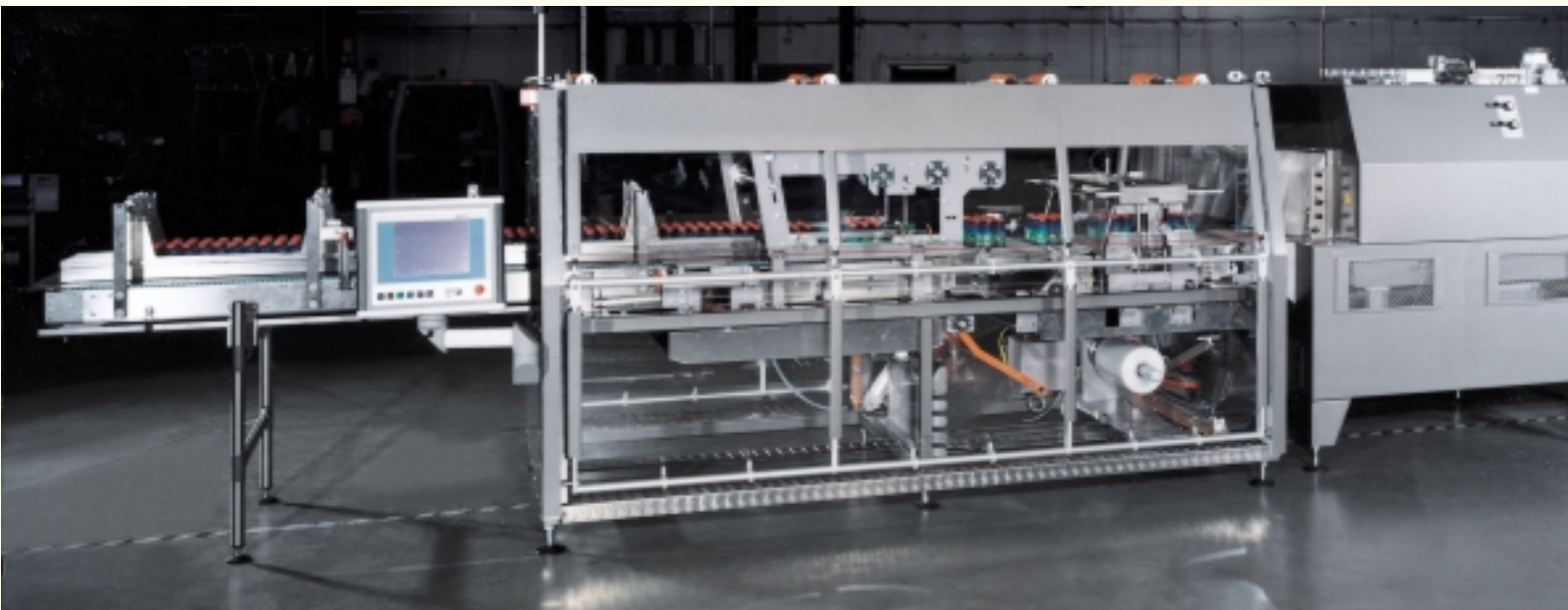
The new PLC-controlled motion control function blocks can be used either as a stand-alone system or, installed in the same KR C, in conjunction with the robot controller. The PLC can communicate internally with the robot controller for the purposes of exchanging variables and reacting to robot error messages with any operator actions that may be necessary. This is useful if the system is to display a user interface of its own (e.g. one created using HMI Studio) rather than the robot user interface.

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KMC-controlled X-Y-Z gantry with decentralized drives, implemented using KMC-KDB

KMC-IPC-based foil packaging machine using the electronic line shaft principle



CUSTOMER SUPPORT

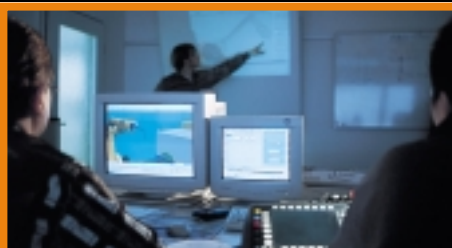
In addition to our robotic systems and control systems, we offer not only an extensive range of support services, but also robot rentals, used robots and spare parts.



The KUKA World Support Center is there to ensure that your projects run smoothly, from the planning phase through to production. Our technicians concentrate on your specific requirements and optimize the standard product to meet your needs.



As far as availability is concerned, with KUKA you are in good hands. From programming and system optimization to maintenance and immediate assistance – our specialists are at your disposal. Our qualified hotline employees are available round the clock to deal with all your questions!



KUKA robots and controllers can do anything – if you know how to use them. It is for this reason that we not only produce state-of-the-art technology, but also set quality standards in the field of training. We offer seminars worldwide, tailored to virtually all technology applications of the various target groups. For more information, e-mail us at college@kuka-roboter.de

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Spain, Sweden, Switzerland,
Taiwan, Thailand, UK, USA