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Products and services
- Jointed-arm robots for payloads from 3 kg to 570 kg
- Linear traversing units for robots
- Special robot designs
- Robot controllers
- Control software
- Technological process software
- Customer support

www.kuka.com

An IWKA Group company

KUKA WORKING IDEAS

CONTROL AND SOFTWARE

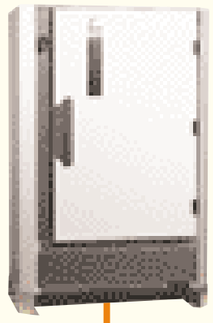
People have always striven for things which offer greater performance.
Like the KUKA PC-based controller and software.

KUKA WORKING IDEAS

People have always striven for things which offer greater performance. The KUKA PC-based controller fits the bill.

The microchip, invented in 1971, achieved a technological miracle. With its high storage capacity computers became smaller, less expensive, and more powerful. Today the goal is to achieve this miracle anew almost daily. And to constantly increase performance.

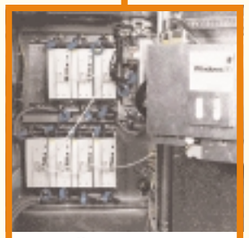
The KUKA PC-based controller and software achieve their own small technological miracles. They offer: 1. Performance and expansion over and above the basic control functions. 2. Open system for future developments and ease of integration in any network. 3. Recognized standards. 4. Special functions for increased productivity. 5. Built-in safety features for greater availability. 6. Input functions for faster programming. 7. Ready-made software packages. 8. Real-time capable simulations and offline programs with absolutely accurate data. But the greatest proof of the KR C2 controller's power and versatility is that it can also be used for other control tasks.



One remarkable feature of the KUKA KR C2 controller is its great versatility. It can be installed independently of the robot, as it contains no operator control elements other than the main power switch. Many customers even buy it separately. For control tasks of every kind.

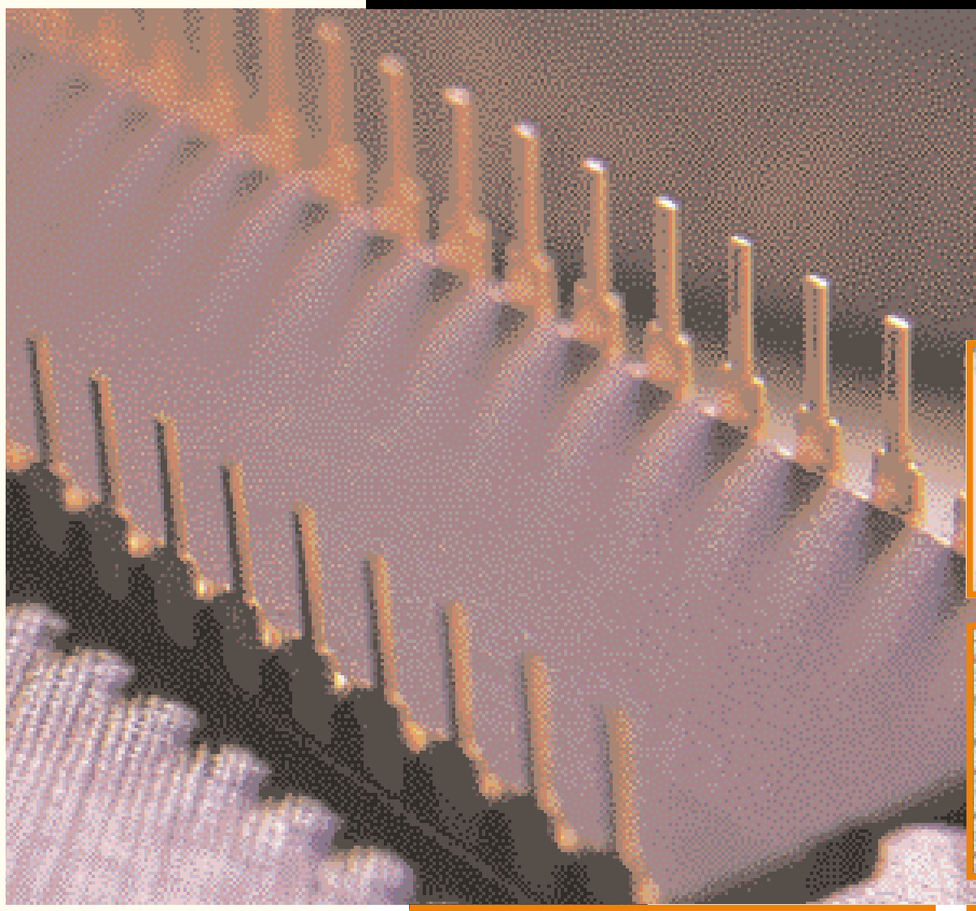
COMPACT CONTROL CABINET

With a footprint of about 0.3 square meters, the control cabinet requires very little space and can be installed side by side with other cabinets.

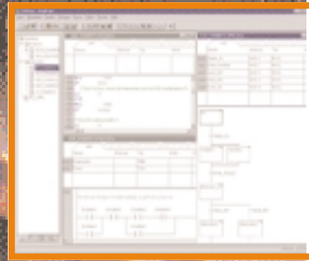


SERVICE-FRIENDLY

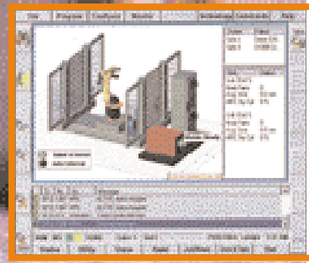
Integrated into the door the PC is easily accessible and facilitates the integrations of additional options.



Open for whatever developments the future holds. **No matter how quickly developments in processor and PC technology advance – with the KUKA KR C2 controller you'll always be able to keep up.**



Soft-SPS. **As well as the robot, the KUKA PC-based controller can take over the control of your entire production line – via an integrated Soft-SPS. You save on expensive hardware and are much more flexible.**



Production Screen. **You can use the KUKA Control Panel to carry out process visualization, control and monitoring for the robotic cell and production line. Make use, for example, of the OPC server integrated in the controller software.**

Remote diagnosis via the Internet. **KUKA builds robots which can be serviced and reprogrammed anywhere in the world via the Internet – without the need to call out a service technician. For greater availability and faster system integration.**

Real-time capable – even with Microsoft Windows®. **Enjoy the benefits of MS Windows® without relinquishing real-time capability in the controller. For KUKA is the only manufacturer also to offer the real-time expansion VxWorks as a single-processor solution.**

Open systems have always afforded people new freedoms.
Our controller has a good role-model.

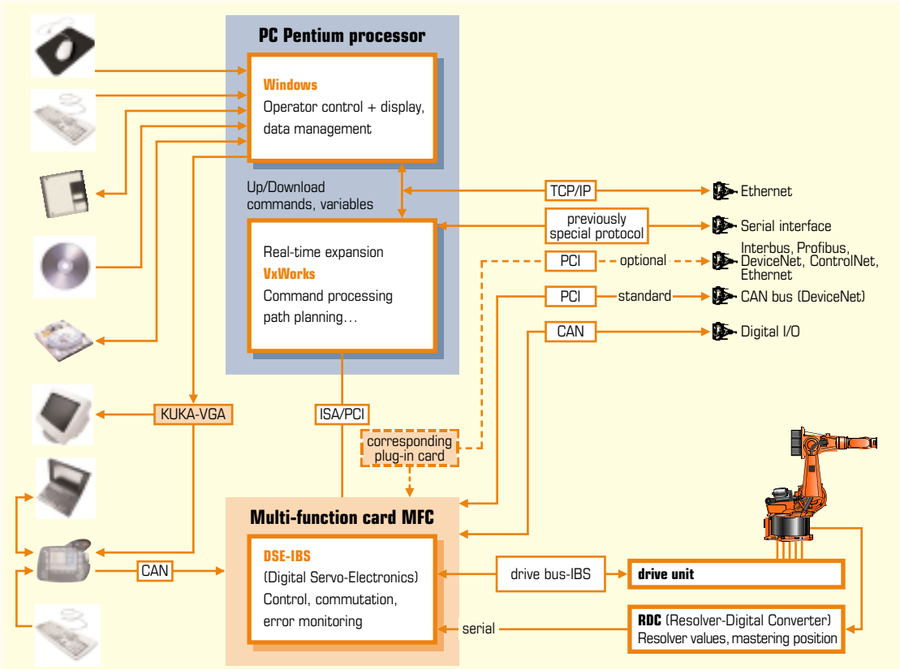
The first key was invented in Egypt about 2000 BC. Since then, security technology has developed ever further – as have the opening mechanisms. However, we had to wait until the 20th century for the key of keys: the skeleton key.

OPEN UP YOUR OPTIONS:

Guaranteed to fit your system. Being a PC-based controller, our system is compatible with our customers' PC environment. This allows optimal system integration and guarantees perfect integration into higher-level structures, e.g. via Ethernet.

Open for the integration of sensors. Using the open sensor interface, the KUKA KR C2 robot controller can integrate a wide range of the sensors on the market: e.g. Perceptron, ISRA, SBIB, Robotvision, SCOUT and Servo Robot. It is possible to change sensors online.

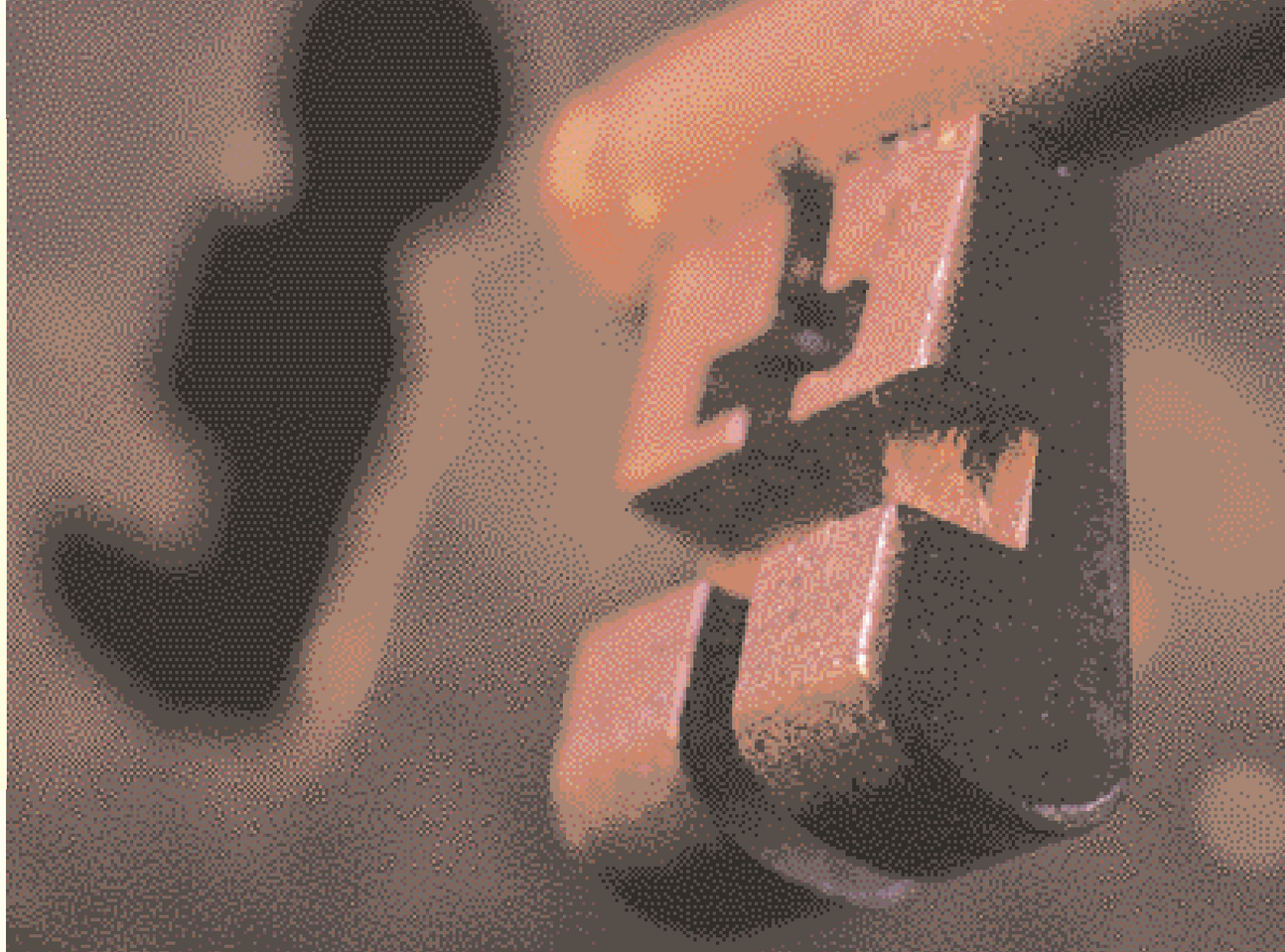
Open on all sides. The KR C2 robot controller can interface with all common bus systems and offers every possibility for expanding system functionality: from process visualization, through robot diagnostics, and robot periphery diagnostics (e.g. Interbus diagnostics with the original CMD tool), to generating your own production statistics.



With the KUKA robot controller, you can tap new potential. Because unlike closed control systems, the KUKA PC-based controller opens up new functions and freedoms in automation. What's more, with the open PC-based controller, you're on the right track for the future. You can participate in future development and can integrate our robot systems effortlessly into higher-level control structures. The integration of lower-level controllers, sensors and actuators is also guaranteed. The KUKA KR C2 robot controller is a key which fits all the doors to the world of automation.

Integration into any periphery. The KUKA robot controller can communicate with all common bus systems – or with higher-level control entities via the Ethernet connection.

Accurate positioning KUKA robots. Our robots are ideal: 1. for applications which require a high degree of precision, 2. for use as coordinate measurement instruments, 3. for offline programming and 4. for simulation.



People have always longed for comprehensibility and simplicity. Like the standards adopted by our PC-based controller.

Over 30 years ago, the first pictographic route-finding systems made orientation inside buildings easier. One of the best-known examples is the signposting system devised by the designer Otl Aicher which was installed at the Olympic Complex in Munich in 1972.

KUKA has followed one guiding principle for its controller and robot technology: that of simplicity. That is why KUKA is committed to standards which users will recognize from their own PC, e.g. the Windows graphic user interface. This is supported by freely configurable operator levels – the user interface can thus be optimally configured depending on the level of understanding and the task at hand. From menu and form-supported programming to text-based programming. In addition to this, KUKA offers the possibility of configuring user interfaces specially adapted to the needs of the user. Operators thus receive optimal guidance at all times and can reach their goal by the shortest route.

Globally recognized standards. **KUKA is firmly committed to PC-based controllers – a standard well-known throughout the world which needs no additional explanation. A decisive advantage, particularly for customers operating at a global level.**

Real-time capable operating system. **For path planning, integration of sensors, etc., KUKA implements VxWorks, guaranteeing reliable operation in real time. For operator control, display and data management, KUKA uses the Windows® operating system from market leader Microsoft.**

Recognized standards for experts. **Professional programmers benefit from the advantages of the KUKA software. They can build on what they already know; programming is significantly simplified and sped up through the use of predefined input forms.**

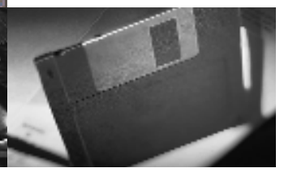
Special user interfaces for operators. **The possibility of configuring special user interfaces for ordinary operators makes KUKA robots extremely user-friendly. Anyone who can operate a PC can therefore also quickly operate a KUKA robot.**

Spare yourself complicated manuals. **People working with the KUKA PC-based controller don't need to look up every single operating procedure in a manual. The basics are easy to teach operating personnel and have been designed to facilitate learning.**

The hardware: **PC hardware on a single processor basis. With a latest-generation high-performance processor for two parallel operating systems.**

The brain: **also with recognized standards through PC technology. And with the multi-function card the PC becomes a robot controller.**

The operator control device: **KUKA Control Panel. Ergonomic hand programming unit with 8" color display, 6D mouse, softkeys and hardkeys.**



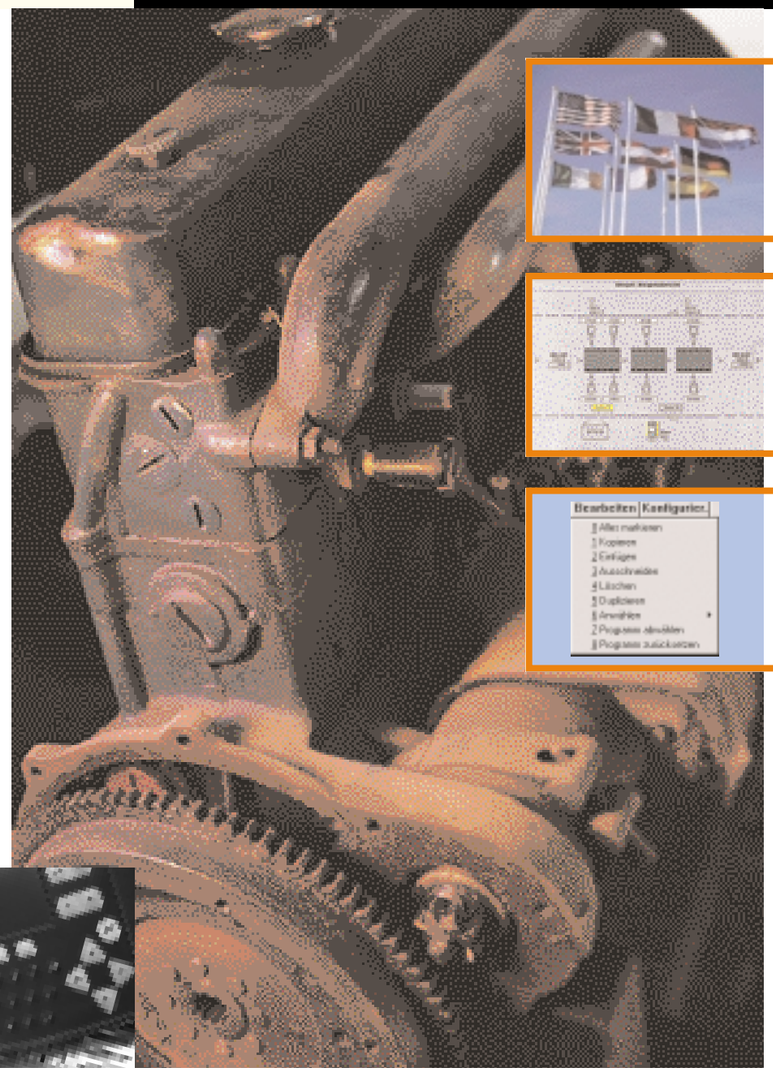
Standard data storage media: **3.5" floppy disk drive, CD ROM, hard drive. These guarantee a smooth transfer of data at any time.**

People have always aspired to greater speed.
Particularly where programming robots is concerned.

In order to achieve greater speeds than were possible with steam-driven engines, Carl Benz invented the gasoline engine in 1885. It achieved about 0.88 hp and reached 12 km/h. Since then, engines have become ever faster. The most powerful series-produced engine in the world today accelerates the McLaren F1 to 370 km/h.

to the control cabinet. All the necessary switches are integrated at the top of the KCP: for mode selection, drives, etc. Only the main power switch is located on the control cabinet.

Processes get faster and the demands greater – who is there ready to help you with new programming technology? KUKA Roboter GmbH. Because the KUKA Control Panel has everything you need to make programming quicker. From the 6D mouse to block functions which save you work when programming. Another “added value” is the possibility of using the KCP to visualize and control the entire production process. The Control Panel was designed to incorporate the latest advances in ergonomics and tested by the German technical inspectorate. As you can see, KUKA offers all you need for faster start-up and conversion.

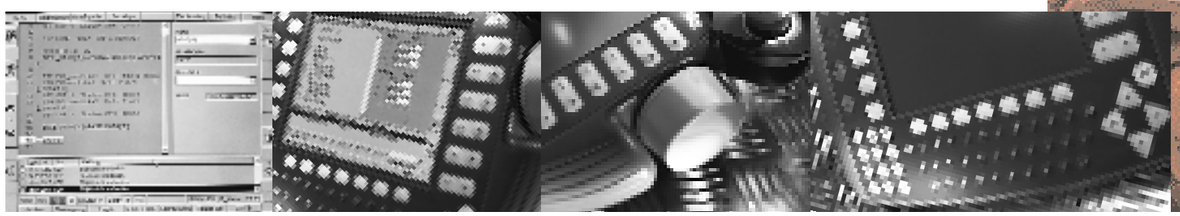


<u>Online selection of other languages.</u> The KUKA Control Panel speaks its programmer's language, be it Flemish, English, Russian or Chinese. Special feature: you can switch between these languages online. A KUKA Control Panel masters more than 10 languages.

<u>Customized process visualization.</u> In order to improve the visualization of production processes on the KCP, other tools (e.g. HMI) can also be used. This allows you to design, among other things, your own user interfaces for the entire process, which are ideally suited for operators with user-level knowledge only.

<u>Block functions, e.g. point mirroring, for greater speed.</u> Our “turbo functions” significantly reduce programming times. These include block functions, such as point mirroring and text editing functions (Select, Copy, Delete block), which simplify programming. You only need to transfer data that have already been entered.

Our turbo features:



<u>Predefined forms</u> for faster input of commands.

<u>Efficient operator guidance.</u> Windows with predefined input boxes.

<u>The 6D mouse.</u> Rapid teaching using just one operator control element.

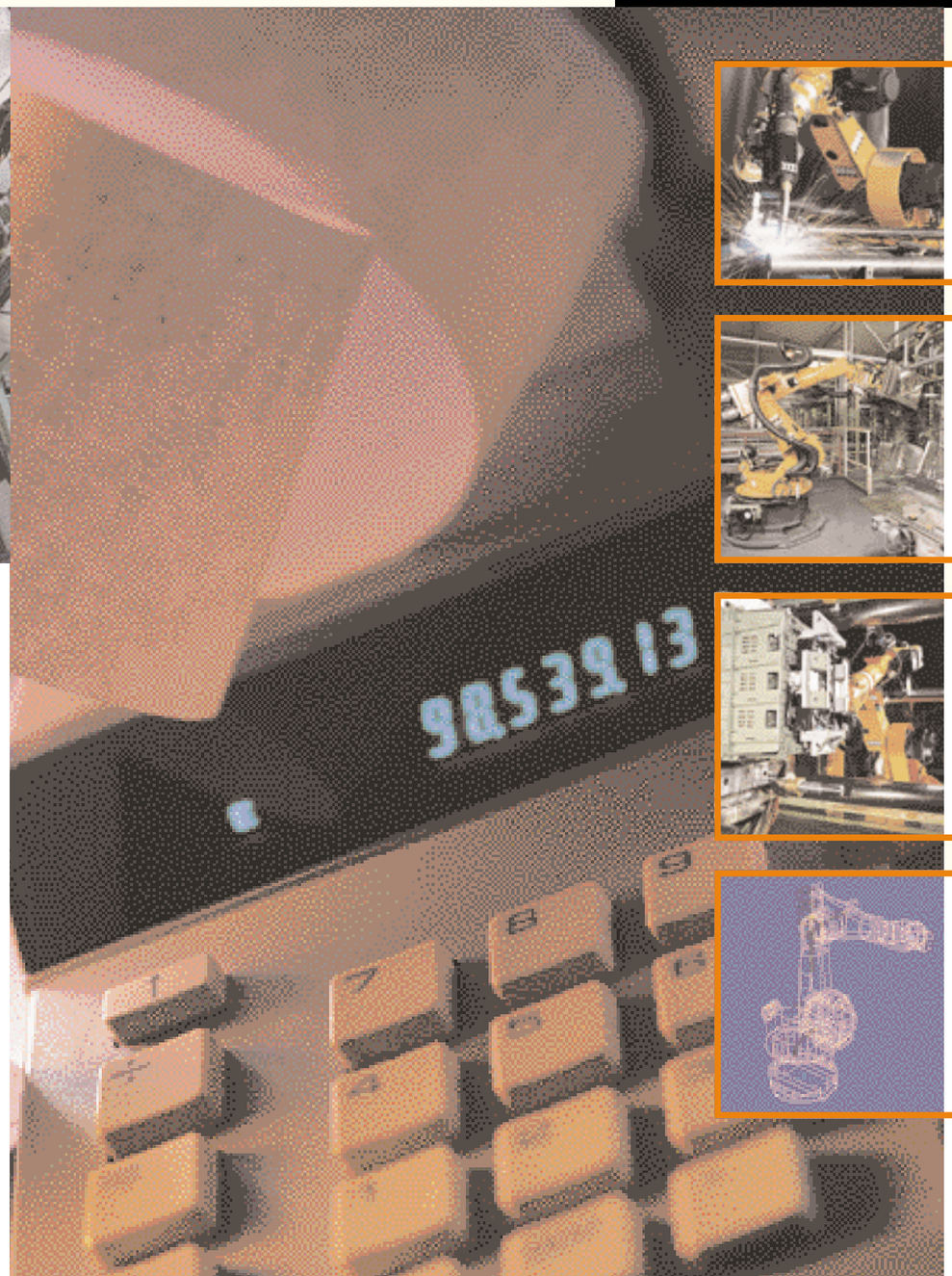
<u>Less is more:</u> Softkeys and clearly laid-out function blocks.

One thing has always counted for more than anything else in the world: money. That's why we have a technology that's calculated to be profitable.

People have been using calculation aids for thousands of years. Yet it wasn't until 1971 that the first practical, multi-functional calculator hit the market: the pocket calculator, made possible by the microchip with a large memory capacity in a minimal amount of space – a truly economical solution.

Today, anyone who wants to see profits increase needs economical solutions which save time, space and money. For this purpose KUKA has developed new software functions with which you can operate robots still more efficiently – and make your systems even more flexible. In addition to this, KUKA robots come with a velocity-optimized dynamic model. This automatically calculates the shortest cycle time and the optimal path accuracy. Anyone checking the arithmetic will discover accelerations up to 25 % higher than those with traditional systems.

Shorter cycle times using the dynamic model. KUKA robots offer a dynamic model in conjunction with the so-called higher motion profile. The dynamic model improves the acceleration capacity of the robot by about 25 %, thereby optimizing cycle times. Furthermore, the dynamic model adapts the motion of the robot to suit the load – with a significant effect on the service life of the robot.



Component location without camera: Touch Sense. Using the Touch Sense function, a KUKA robot fitted with the standard tool can locate components by itself – without the need for you to buy an additional sensor.

Greater flexibility with additional axes. In addition to the robot, the KR C2 can control up to 6 additional axes or traversing units – synchronously or asynchronously. This significantly increases the range of possible applications.

Access to moving components: Conveyor Tech. Conveyor Tech adapts the motion of the robot to that of assembly lines and conveyor belts. In this way, a robot can work on parts on a fast-moving conveyor or move them from one conveyor to another.

For semi-automated production: Detach Jog. Using the Detach Jog function, the external axes can be uncoupled from the robot while the robot is working on a part.

With Compliant Axis, robot axes can be "pushed away". The Compliant Axis function can be used to exert a defined pressure on workpieces or, for example, in press tending (for instance when parts are ejected from the press).

Instant robot exchange without time-consuming program correction. The unique EMT mastering of KUKA robots makes it easy to exchange robots of the same type – without time-consuming corrections to the programming.

Instead of weeks of stopped production – conversion in no time at all. The accurate positioning KUKA robots with precisely defined supply tubes make offline programming possible with minimal discrepancies between setpoint and actual values.

NEW FUNCTIONS CONSTANTLY ADDED

People fear nothing so much as defects.
That's why we've built in so many safety features.

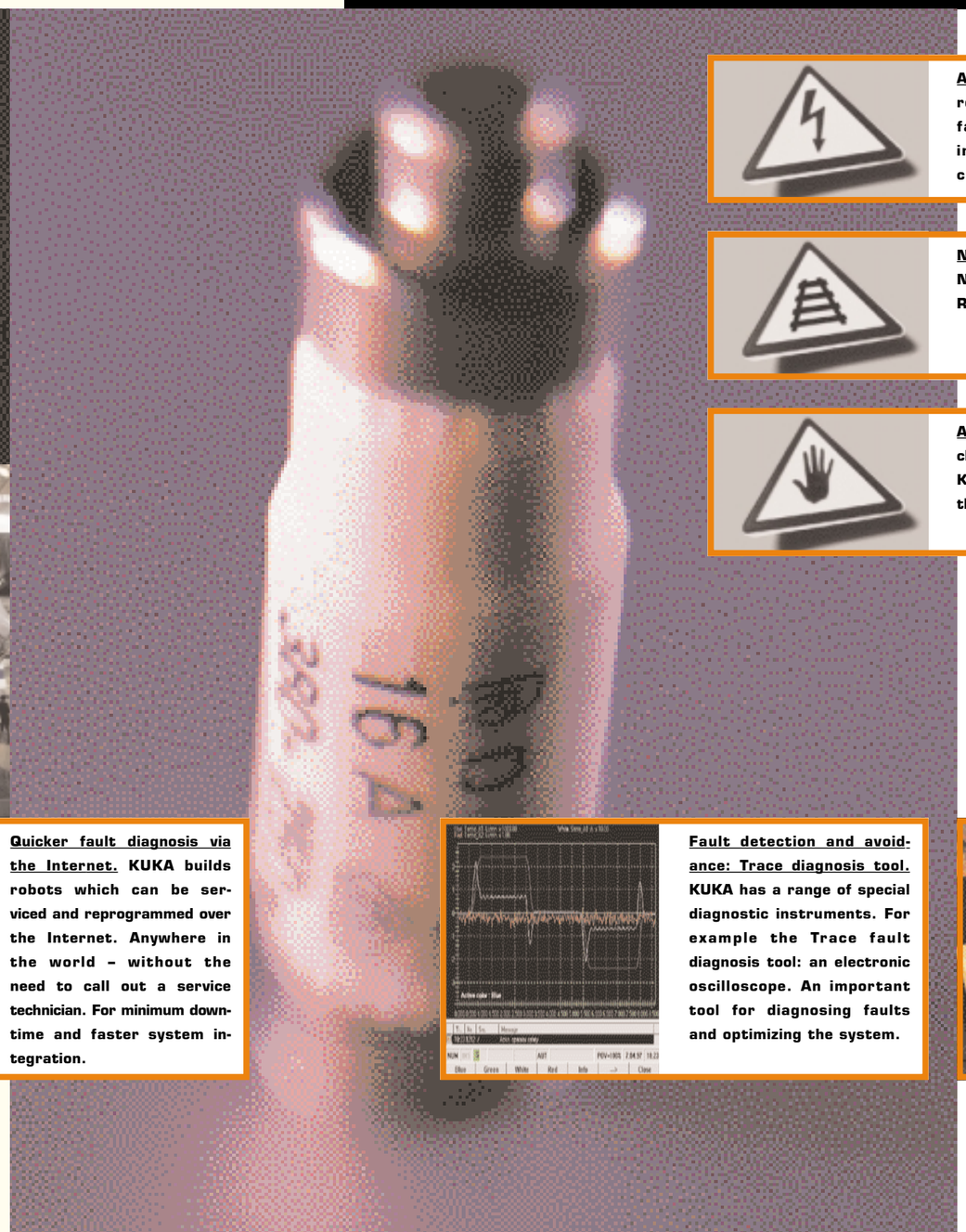
In the 1920s, household electrical appliances started to increase the number of fuses in people's homes. To be more precise: the blowout fuse. This comprises a sand-filled porcelain tube with a fine wire in the middle. This melts in the event of short circuits, lightning strikes and overloading.

Availability is money. In order to prevent frequent periods of downtime, KUKA robots are equipped with a proven operating system and a dynamic model. This protects the machine against all overloads which could occur in day-to-day use – except those arising as a result of serious operator errors. In order to restore the availability of KUKA robots quickly, should a fault nonetheless occur, our tried-and-tested diagnostic instruments are there to ensure a rapid restart of the system. Last but not least, the anti-collision function will stand you in good stead.

Protection against overloading. The dynamic model, which is virtually unrivaled in its field, optimizes robot motions with regard to the load. The one thing it cannot protect the robot from, however, is incorrect operation, e.g. if regulations are not observed.

Automatic payload recognition. KUKA robots adjust their movements according to the payload they are carrying. The center of mass and mass moment of inertia are calculated for each payload, protecting the robot from overloading. This leads to enhanced utilization of the robot in terms of maximum service life.

Quicker fault diagnosis via the Internet. KUKA builds robots which can be serviced and reprogrammed over the Internet. Anywhere in the world – without the need to call out a service technician. For minimum downtime and faster system integration.



Automatic restart after power failure. Whereas with other robots you need to re-enter the programs after a power failure, with KUKA robots you can resume production immediately. A decisive plus-point where availability is concerned.

No more path discrepancies following "Emergency Stop". Nothing on earth can throw a KUKA robot off track. Result: fewer parts rejected, increased productivity.

Anti-collision. Wherever the working environment of a robot changes, the risk of a collision cannot be 100% excluded. KUKA robots have a special device to protect against this: the robot stops immediately before serious damage can occur.

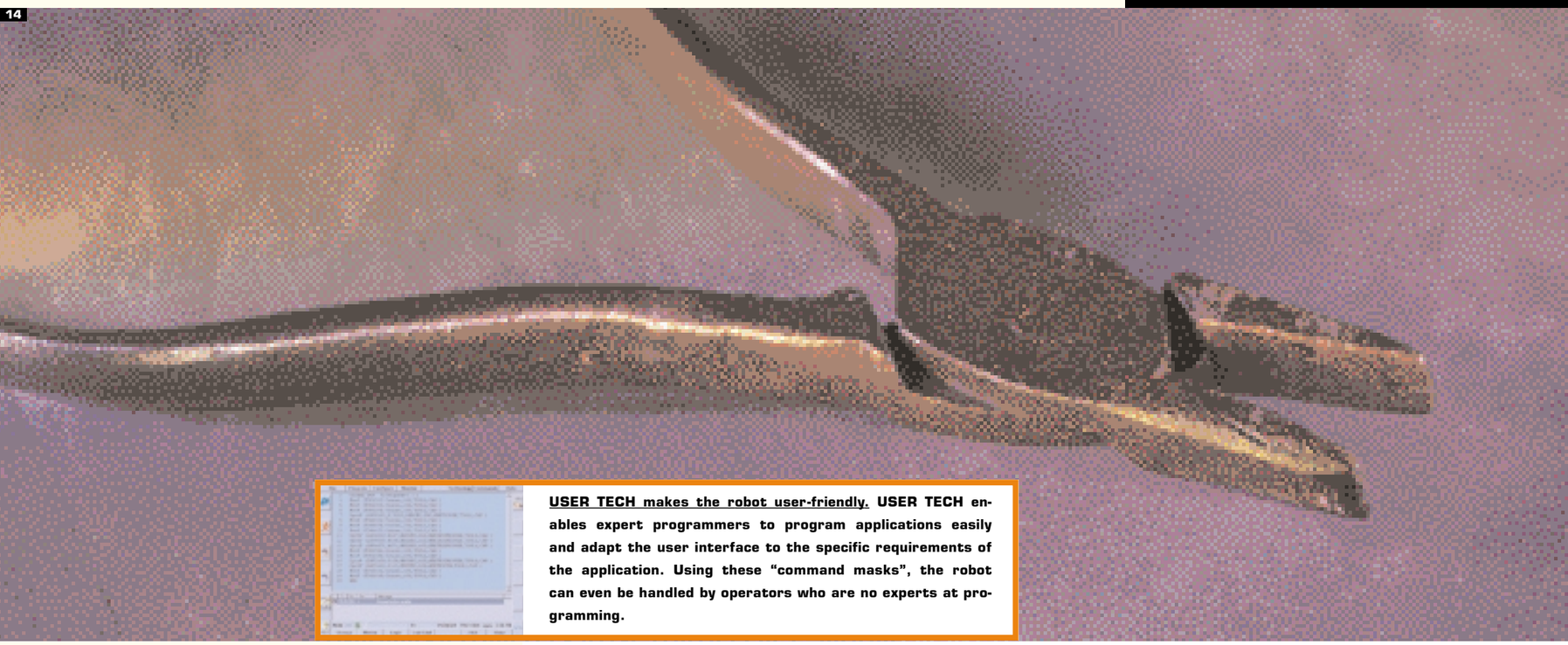
Fault detection and avoidance: Trace diagnosis tool. KUKA has a range of special diagnostic instruments. For example the Trace fault diagnosis tool: an electronic oscilloscope. An important tool for diagnosing faults and optimizing the system.

Machine status analysis: logbook. The event recorder built into every KUKA robot retains all the error messages and operator actions relating to program execution or robot motion. The logbook – ideal for diagnostics.

People prefer to work with simple tools.
Like our software tools, for example.

Pliers were invented over 3,000 years ago, simultaneously in a number of different places. Unlike earlier forms, the light handy pliers of today have a pivotal center and work on the lever principle. This makes it even easier to get a grip on things.

A robot programmer is only as quick and efficient as the tool with which he is working. That's why KUKA offers ready-made software packages for the most common robot applications in order to reduce the workload. This is achieved, for example, by helping to determine the most effective arrangement from all the possible options. Two other factors for greater efficiency are: the simulation program KUKA Sim and KR C Office for offline programming. KR C Office offers you the fully identical, complete office version of the KUKA PC-based controller. This makes planning and conversion possible in record time.



<u>Ready-made software packages for various applications:</u> arc welding (Arc Tech), spot welding (Spot Tech), handling (Gripper Tech), calibration (tool, coordinate system, additional axes), gaging without sensors.

<u>USER TECH makes the robot user-friendly.</u> USER TECH enables expert programmers to program applications easily and adapt the user interface to the specific requirements of the application. Using these "command masks", the robot can even be handled by operators who are no experts at programming.

<u>KR C Office: programming from the office without a break in production.</u> Using KUKA KR C Office, you can program robots even when the system is in operation. Production continues uninterrupted. KR C Office works with absolutely accurate data – even the robot's function packages are defined. This makes extremely short conversion times possible.

<u>KUKA Sim – realistic and cost-effective.</u> With the KUKA simulation program KUKA Sim, robotic cells can be planned and configured with true-to-life accuracy. The data are available in real time, i.e. more realistic, and can be coupled with other simulation programs (IGRIP, ROBCAD). A major advantage for start-up and planning!