



 **ii** feel you

KUKA



The LBR iiwa. A new era of sensitive robotics is beginning.

KUKA



ii am sensitive

Why the LBR iiwa is enabling innovative automation solutions.

6-11



ii am flexible

What a wide range of potential applications the LBR iiwa is opening up.

18-23



ii am safe

How the LBR iiwa is making human-robot collaboration safe.

12-17



ii am precise

How the LBR iiwa is mastering highly demanding tasks.

24-29



ii am sensitive

7

In all seven axes, the LBR iiwa has integrated torque sensors implemented, using safe technology.

0.47


The sensational payload-weight ratio of the LBR iiwa with a 14 kg payload is 0.47.



**Sensitive robotics -
A new era in industrial robotics
is beginning.**

40 years after the first industrial robot was used, KUKA is opening a new chapter in the history of industrial robotics with the LBR iiwa. "LBR" stands for "Leichtbauroboter" (German for lightweight robot), "iiwa" for "intelligent industrial work assistant".

As the first series-produced sensitive robot suitable for human-robot collaboration, the LBR iiwa is opening up new areas that were previously closed to automation.



The LBR iiwa is a work colleague –
completely safe, with a sensitive touch.

**Sense, detect, respond
according to the situation
and join parts intelligently.**

With its integrated torque sensors, the LBR iiwa enables the automation of delicate assembly tasks for force-controlled joining operations and process monitoring. The controller is optimized for this, simplifying the fast start-up of even complex applications. The robot becomes the third hand of the human operator.

**A revolution in robotics.
With a sensitive touch.**

The LBR iiwa has integrated, sensitive torque sensors in all seven axes. These endow the lightweight robot with contact detection capabilities and programmable compliance.

It masters force-controlled joining operations and continuous-path processes for which the position of the objects must be determined sensitively. It can also handle fragile and sensitive objects without damaging them. In many cases, the integrated sensitivity of the LBR iiwa allows the use of simpler and less expensive tools.

Green light for innovative automation solutions.

In today's manufacturing environment, the ever-increasing diversity of products and variants means that the utmost in flexibility and adaptability is required.

Furthermore, the phenomenon of an ageing workforce is making it necessary to come up with new answers in the field of automation. The LBR iiwa provides them. It is laying the foundation for innovative, future-proof production processes – more ergonomic, more efficient, more flexible, more cost-effective.

Protection of materials and machines.

Compliance of the LBR iiwa can be programmed individually for all joints and all Cartesian axes. The LBR iiwa is thus able to handle sensitive parts safely and assemble them by exerting exactly the right force, thereby avoiding rejects or costly collisions.

Agile due to lightweight construction and extremely short response times.

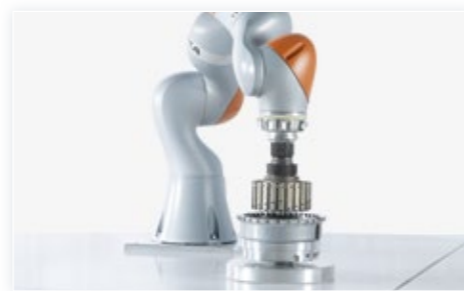
As a result of its advanced lightweight design, the LBR iiwa only has to move small masses. Combining this with high-performance servo control, it is able to follow contours quickly under force control.



INSERTING PLUGS: In the assembly of flexible automotive parts, the LBR iiwa performs non-ergonomic and monotonous tasks with the utmost reliability.



MASTERING NON-RIGID PARTS: Thanks to its highly responsive sensors, the LBR iiwa enables the automation of hose and cable assembly.



PRECISE ASSEMBLY: Using its sensors, the LBR iiwa is able to detect the correct installation position and to fit parts quickly and sensitively.



WITHOUT ADDITIONAL SENSORS: The LBR iiwa finds retaining rings by itself, even if they are not positioned precisely.

7 kg / 14 kg

The LBR iiwa lightweight robot is available in two variants: with a payload capacity of 7 or 14 kg. Its lightweight construction is the key to the sensitivity and responsiveness of the LBR iiwa.



IP54

The LBR iiwa is suitable for operation in normal machine environments and meets the requirements of protection rating IP54.

>30,000 h

The ultimate in high-tech: despite its lightweight design, the LBR iiwa robot is suitable for use in industrial applications. The mechanical system and cables are rated for at least 30,000 hours of operation.



ii am safe

**The LBR iiwa has a feel
for safe working.**

In all seven axes, the LBR iiwa has integrated torque sensors implemented, using safe technology. This is unique worldwide. They respond to the slightest of external forces and enable safe collision protection. In the case of unexpected contact, the LBR iiwa reduces its velocity in an instant, thereby limiting its kinetic energy to a level that precludes injuries.

As close as you can get to
unlimited productivity: the LBR iiwa.



The need for a safety fence is eliminated. So too are the associated high costs.

Where humans and robots collaborate safely, many safety precautions become superfluous. The LBR iiwa already incorporates all necessary measures in its HRC package. Additional costs that are normally required for safety equipment, circuitry and safety fences, and the associated space requirements, are eliminated.

At the same time, the LBR iiwa opens up entirely new automation solutions that were previously not possible due to safety requirements. Humans and robots can share the same workspace and optimally divide tasks between them. This makes it possible to dispense with expensive feed systems and production areas, for example.

Hand in hand for greater productivity.

Teaching by demonstration, the most intuitive form of programming, is now possible with the LBR iiwa. The operator guides the robot by hand to the desired positions, while the coordinates of points moved to on the path are saved in the robot program. Teaching is quick and easy and requires no programming knowledge. The conditions are thus perfect for cost-effective automation, even in the case of small batch sizes or large product variety.

Due to the wide range of safety functions, such as safe collision and force detection, safely reduced velocity and safe monitoring spaces of the LBR iiwa, in accordance with PL d, the system integrator is able to implement standard-compliant robot applications with HRC.

EN ISO 13849

The safety functions of the LBR iiwa meet the requirements of Performance Level "d" with structure category 3. Guaranteed.

**Intuitive operator control
by means of gestures.**

The safe torque sensors make it possible for the operator to influence and control the sequence of a robot application by means of simple gestures, such as touching the robot. Intuitively and without the need for additional control equipment.

**A new form
of safety.**

The housing of the LBR iiwa is made entirely of aluminum. This saves a great deal of weight and increases safety. Thanks to its streamlined design without edges, the LBR iiwa also eliminates all crushing and shearing hazards. This minimizes risks when working with humans.



FAST LEARNING: Teaching by manual guidance enables quick and easy programming, even by operators without programming knowledge.



FAST REACTION: In the case of a collision with an obstacle, the LBR iiwa immediately reduces its velocity and force.



SAFELY STREAMLINED: The streamlined form is designed for human-robot collaboration, completely without crushing and shearing hazards.



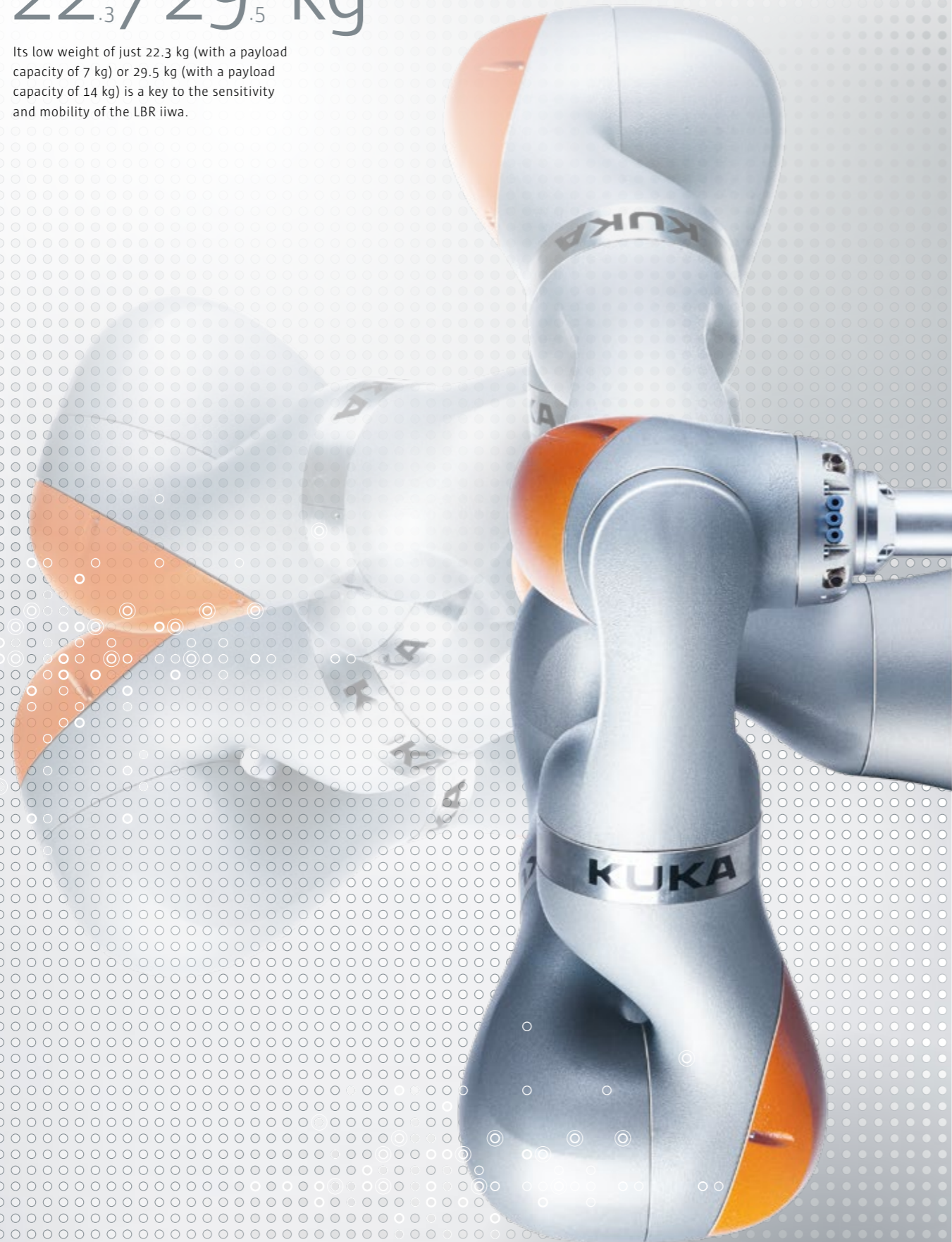
EXTREMELY SENSITIVE: High sensitivity is a prerequisite for the safety of humans and materials. The LBR iiwa is extremely responsive.



NO LIMITS: Safe human-robot collaboration makes new processes and applications possible, even in extremely confined spaces.

22.3 / 29.5 kg

Its low weight of just 22.3 kg (with a payload capacity of 7 kg) or 29.5 kg (with a payload capacity of 14 kg) is a key to the sensitivity and mobility of the LBR iiwa.



 ii am flexible

With the LBR iiwa, many paths lead to the goal.

The kinematic system of the LBR iiwa is based on the human arm. The position and orientation of the tool can thus be achieved with different axis positions. The LBR iiwa simply reaches round disruptive contours. In this way, work sequences can be programmed in an extremely space-saving manner.

Particularly in the case of confined and difficult installation situations in production systems, the LBR iiwa proves its worth as a highly flexible work assistant.

Java technology

The LBR iiwa controller exclusively uses Java technology for sequence programming – for maximum modularity, openness and simplicity.

136 mm

The LBR iiwa with a payload capacity of 7 kg has a footprint of just 136 mm in width, thereby simplifying integration of the robot into mobile solutions or existing systems.

The LBR iiwa is getting
robotics moving.

Seven axes for maximum versatility.

The low weight of the sensitive LBR iiwa lightweight robot, its small footprint and enormous payload predestine it for mobile operation. Mounted on a carriage as a job-hopper, it can work in constantly changing locations depending on specific requirements – in collaboration with the human operator or alone. On arrival at its place of operation, it makes use of its integrated sensitivity to calibrate itself automatically and precisely.

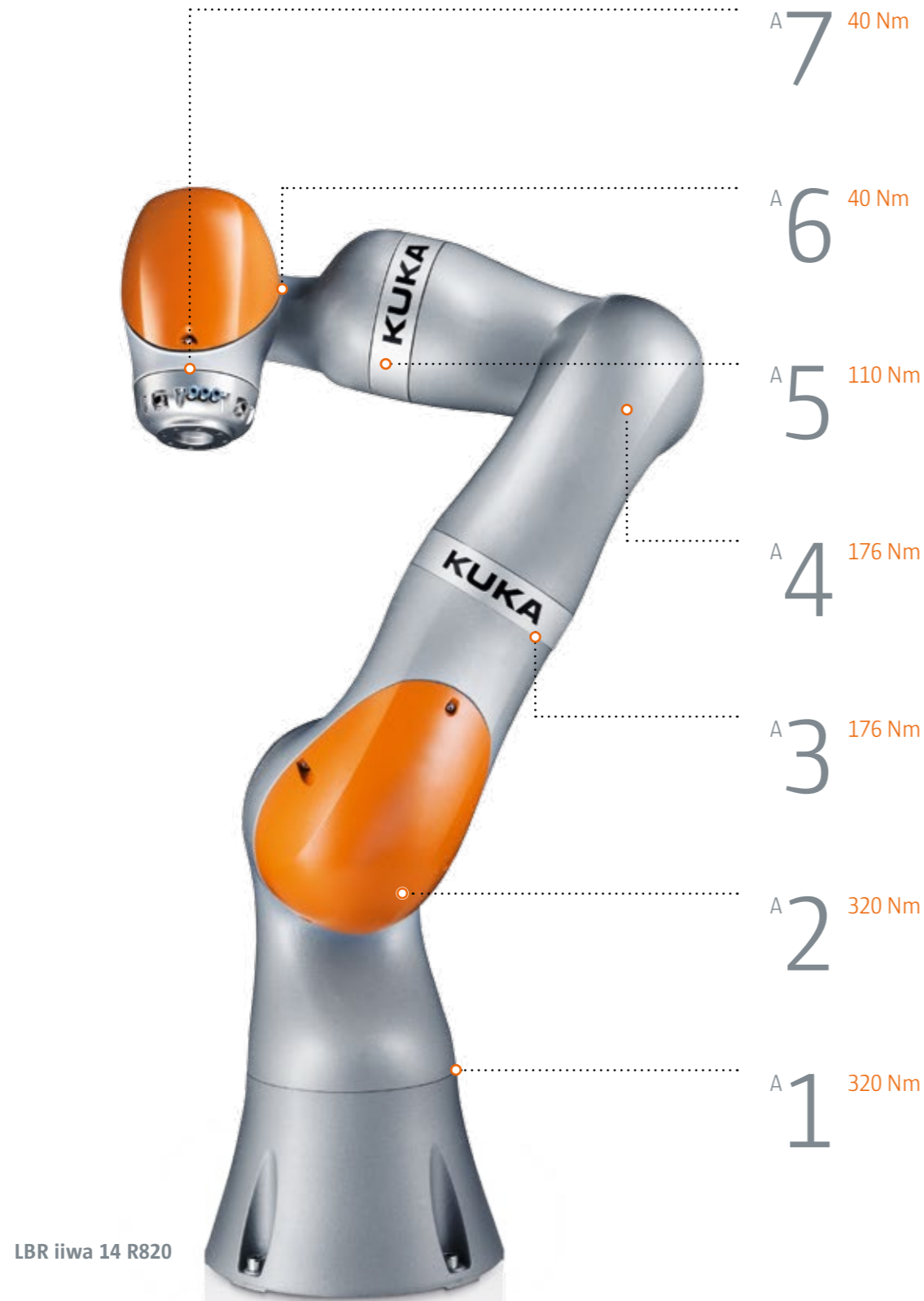


The LBR iiwa. One robot, three controller options.

In “Position controller” mode, the LBR iiwa acts conventionally and moves to the desired position with the programmed velocity.

In “Gravity compensation” mode, it proves its worth as a valuable work assistant. It compensates the weight of the load so precisely that it can be moved by exerting a minimum of external force.

In “Compliance controller” mode, the compliance of the LBR iiwa can be configured both translationally and rotationally for all axes separately, thus optimizing adaptation of the characteristics of the robot to the specific task. It is also possible to activate a defined force and superpose it on a motion.



7 axes

Thanks to its bionic kinematic system, based on the human arm, the LBR iiwa can always reach the desired position, even in confined and difficult installation situations.

The LBR iiwa also simplifies the periphery.

The more sensitive the robot is, the less complicated and more cost-effective the tools can be, and the lower the corresponding maintenance requirements. The required compliance is no longer implemented mechanically in the tool, but by the LBR iiwa itself. In this way, necessary adaptations to processes can be implemented quickly and flexibly by modifying parameters in the controller. This makes automation more cost-effective, particularly in production with small batch sizes.

Modular, open and easy to program.

For programming the robot sequence and integrating external sensors, the LBR iiwa makes consistent use of the possibilities offered by Java technology. Its strengths: worldwide distribution, high recognition level and rapid expandability by means of external libraries, some of which are available as free, open-source software. With the LBR iiwa, companies acquire tangibly greater flexibility for the planning and implementation of their automation processes.

The surroundings change. The performance remains the same.

A workpiece is not accurately positioned in the magazine; a sleeve is not accurately centered on a shaft. With its integrated sensors, the LBR iiwa can nonetheless pick them up and assemble them correctly without the need for expensive peripheral equipment.

During assembly, unlike with position-controlled robots, a force can be applied in order to fit workpieces as if by feel. Using the integrated sensors, the correct fit can be monitored by means of the force and position.



LEARNING MORE AT THE CLICK OF A MOUSE: When programming the LBR iiwa, it is possible to access libraries that are available worldwide, some at no cost.



FAST ORIENTATION: Even if parts have not been positioned accurately, the LBR iiwa can locate them, pick them up correctly and join them with the utmost precision.



WEIGHTLESS: In the controller mode "Gravity compensation", the LBR iiwa perfectly compensates the weight of workpieces, making it possible to handle them effortlessly.



**The intrinsic qualities of
the LBR iiwa automatically
ensure utmost precision.**

For precise calibration, conventional robots require external helpers. The LBR iiwa only needs itself. With its integrated mastering sensors, it is able to master itself automatically. This dispenses with the need for the Electronic Mastering Device, for example, and saves time.

The LBR iiwa takes a precise view of progress.



Lowest tolerances, high path accuracy.

All gear units of the LBR iiwa are systematically designed for precision and manufactured with extremely low tolerances. This results in a high repeatability of ± 0.1 mm. The uniquely smooth running of the LBR iiwa is achieved by taking the torque signals into consideration during path control.

This precision qualifies it for demanding assembly tasks which it is able to perform like no other industrial robot in the world.

Processes that can be traced in detail.

When the LBR iiwa carries out automation tasks, it can continuously record process parameters and forces in parallel.

Its precise work can thus be traced at all times without the need for time and cost-intensive external quality controls. This, in turn, makes automation processes significantly simpler and more flexible.



± 0.1 mm

The repeatability of the LBR iiwa is ± 0.1 mm. This makes it suitable for complex assembly tasks.

Precisely on track, even in the case of changing workpieces.

Thanks to its compliance, the LBR iiwa can trace and process irregular surfaces without the need to program the path precisely or position workpieces exactly. The robot sensitively and autonomously follows the contour without penetrating surfaces or losing contact.

The LBR iiwa automatically compensates for irregularities in the workpiece. Furthermore, a better cycle time is achieved because the motion to the point of contact can be carried out at a higher velocity than with conventional industrial robots.

Integrated media, perfected flange.

The LBR iiwa is the preferred assistant for complex assembly tasks and in confined installation situations. In order to avoid disruptive contours, all media are routed entirely internally through the robot arm – all the way from the base to the innovative flange. Only there, in the immediate vicinity of tools or mounted sensors, are the power and compressed air supply lines and field buses routed out of the robot.

The media flange is available in electric and pneumatic variants.

A7

The innovative media flange is integrated into axis A7. There are different variants available, depending on the media required.



PERFECT POSITIONING: With the LBR iiwa, assembly parts can be aligned and joined precisely without the need for additional sensors. One example is display glass assembly in the electronics sector.



EXACTLY THE RIGHT PART: Even if assembly parts are not precisely positioned in the magazine, the LBR iiwa can detect their position and assemble them perfectly.



PRECISE ASSEMBLY: In the assembly of torque converter transmissions, the LBR iiwa positions delicate converter blades with uncompromising precision, without the need for complex tools, external sensors or actuators.

The LBR iiwa.

Technology that is redefining robotics.

Control your future: KUKA Sunrise.

The basis for the innovative LBR iiwa robotics consists of the specially developed KUKA Sunrise control technology, the KUKA Sunrise Cabinet control hardware and the KUKA Sunrise.OS control software.

KUKA Sunrise Cabinet unites safety control, robot control, logic control and process control of the entire system. Its interfaces, scalability, performance and openness mean that there are virtually limitless automation possibilities. In the future, it will also be possible to control multiple lightweight robots with a single controller.

Programmed for success: KUKA Sunrise.Workbench.

The new KUKA Sunrise.Workbench engineering suite for programming, start-up and debugging. It makes operator control of the LBR iiwa more intuitive and user-friendly than ever before. Programmers receive active support, for example, from the integrated handbook, the auto-complete function and the highlighting of syntax and errors in the program code.

KUKA smartPAD with new user interface.

Just as intelligent as the way the LBR iiwa works is the way it can be operated. With the tried-and-tested KUKA smartPAD and its redesigned user interface. Tiles with self-explanatory icons lead intuitively to the desired functions, while colored status LEDs provide fast feedback about the current status of the robot station. More detailed information and problem solutions are never more than a few clicks away. Thanks to multiple visualization functions, the smartPAD simplifies work and boosts both safety and productivity.



	LBR iiwa 7 R800	LBR iiwa 14 R820
Rated payload	7 kg	14 kg
Number of axes	7	7
Wrist variant	In-line wrist	In-line wrist
Mounting flange A7	DIN ISO 9409-1-A50	DIN ISO 9409-1-A50
Installation position	any	any
Repeatability (ISO 9283)	±0.1 mm	±0.15 mm
Axis-specific torque accuracy (of maximum torque)	±2 %	±2 %
Weight	22.3 kg	29.5 kg
Protection rating of the robot	IP54	IP54



KUKA Sunrise Cabinet	
Processor	Quad-core processor
Hard drive	SSD
Interfaces	USB, EtherNet, DVI-I
Protection rating	IP20
Dimensions (DxWxH)	500 mm x 483 mm x 190 mm
Weight	23 kg

Power supply connection

Rated supply voltage	AC 110 V – 230 V
Permissible tolerance of rated voltage	±10 %
Mains frequency	50 Hz ± 1Hz oder 60 Hz ± 1Hz
Mains-side fusing	2 x 16 A slow-blowing

Details provided about the properties and usability of the products are purely for information purposes and do not constitute a guarantee of these characteristics. The extent of goods delivered and services performed is determined by the subject matter of the specific contract. No liability accepted for errors or omissions. Subject to technical alterations.

Enter a new era of sensitive robotics:

lbr-iiwa.com

Or contact us:

Phone +49 821 4533-0

KUKA