
KUKA

KUKA

KUKA new KR QUANTEC

The Robot.

flexible - economic - trustworthy

KUKA

Agenda

- **Overview**
- Market Requirements
- Advantages of the new Series
- TCO – Total Cost of Ownership
- Applications / References
- Technical Data
- Options
- Outlook and Timeline
- Appendix

Overview

Allrounder of the Next Generation within the high Payload Class

- ✓ The KR QUANTEC series is the **best-selling series** in the KUKA product family and has been delivered approx. **100,000 units** since 2010.
- ✓ This series is now being transferred to the **next generation**, based on the experience of the highly dynamic development of automation technology.
- ✓ Even in the next generation, the KR QUANTEC series offers the **largest payload and reach portfolio** of the high payload class on the market
- ✓ The new KR QUANTEC sets **standards in quality and reliability** for tomorrow's production landscape

Overview
Key Differentiators

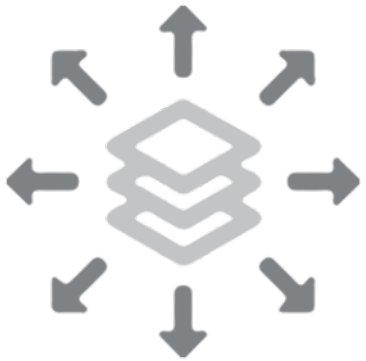
✓ Optimized Portfolio for **Best Delivery Time**; slim modular system and **Best-Fitting Robots**

✓ A **Maximum of Flexibility** (performance, robot variants, environment, maintenance etc.)

✓ **Low TCO** for best investment

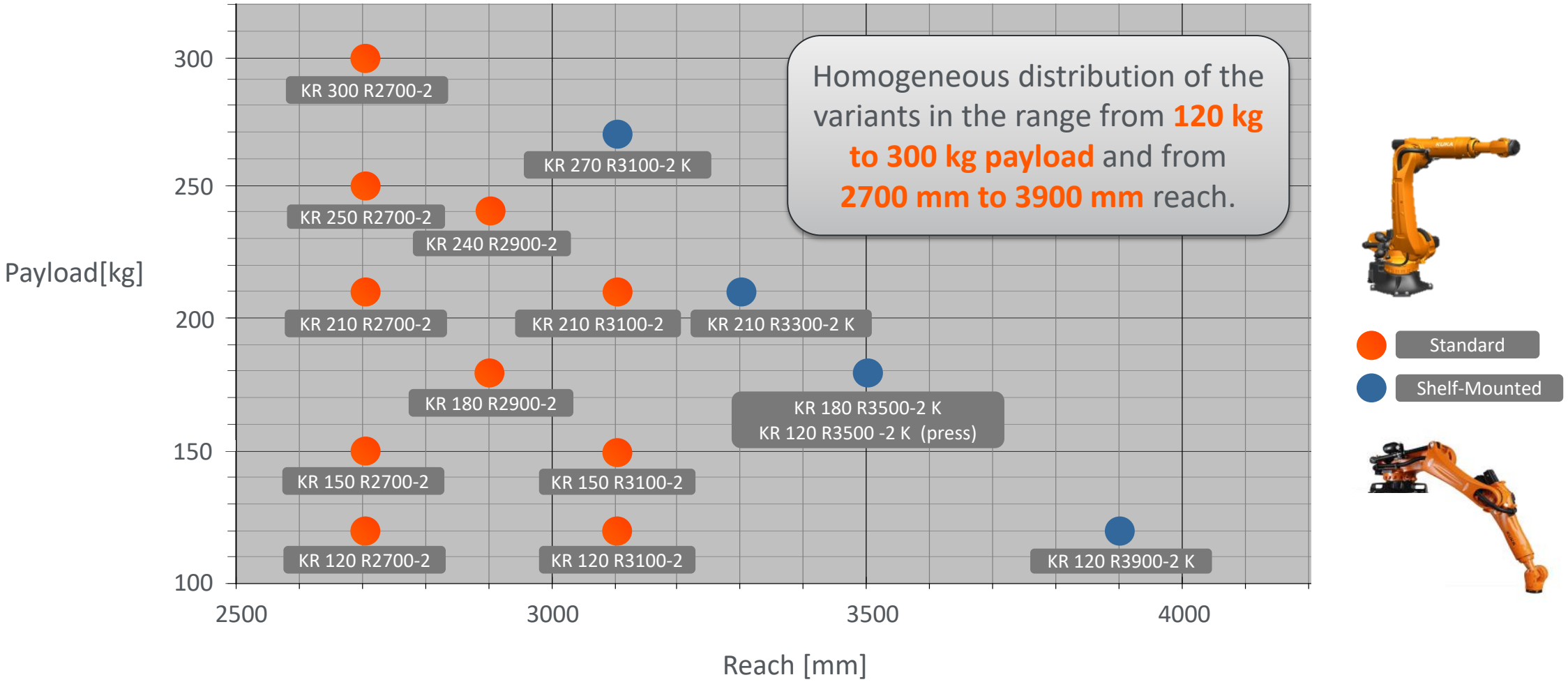
✓ New Motion Modes for **Adjustable Performance** and Motion Performance

✓ **Best in Class** due to sum of **Technical Features**



Overview

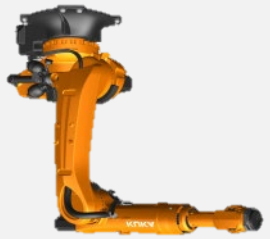
New KR QUANTEC Portfolio – Standard Variants



Overview

New KR QUANTEC Portfolio – Special Variants

- Ceiling variants
  - KR 300 R2700-2 C
  - KR 240 R2900-2 C
  - KR 250 R2700-2 C
  - KR 210 R3100-2 C
  - KR 180 R3500-2 K-C (120kg Press Linking)



- HA variants (High Accuracy)
  - Availability via software (see chapter „Motion Modes“)

- Foundry variants
  - KR 300 R2700-2
  - KR 240 R2900-2
  - KR 250 R2700-2
  - KR 210 R3100-2
  - KR 210 R2700-2
  - KR 180 R2900-2
  - KR 150 R2700-2
  - KR 150 R3100-2
  - KR 120 R2700-2
  - KR 120 R3100-2
  - KR 270 R3100-2 K
  - KR 210 R3300-2 K
  - KR 180 R3900-2 K
  - KR 120 R3500-2 K

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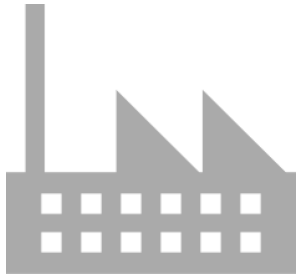
Market Requirements

The new KR QUANTEC – Productivity in its Purest Form

- ✓Optimum **delivery time**, local and global
- ✓Low **TCO** for **economical production**
- ✓Highest system availability
- ✓Flexibility in plant planning and implementation

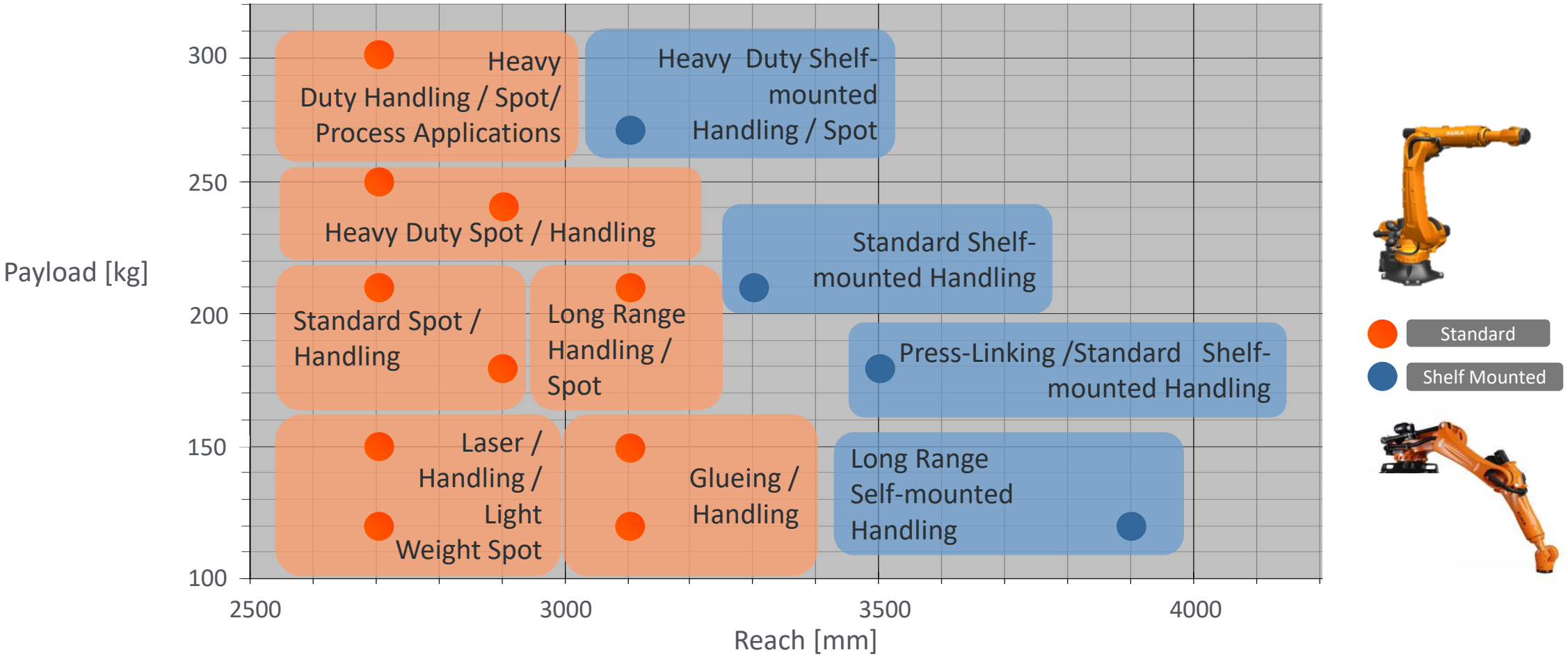
- ✓**Variable performance** for energy- or quantity-optimized production
- ✓Use of **mature technology** with process-optimal accuracy

The **new KR QUANTEC** adapts to tomorrow's market requirements already today



Market Requirements

Application-oriented Portfolio



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Advantages of the new Series

Evolution of Technology - Comparison to the previous Series

✓Optimized **Portfolio extended up to 300kg payload with 2700mm reach**

→ **Performance and flexibility**

✓**Extended permissible ambient conditions** (0° - 55° C // IP67 as standard on the wrist axes)

→ **Flexibility in use**

✓Consistently **enhanced transmission sealing technology**

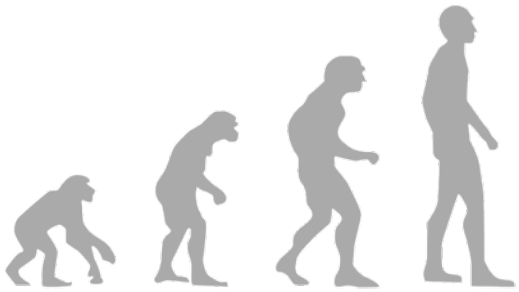
→ **Longer service life**

✓**Leaner interference contours** and reduced footprint (reduction of 10%)

→ **More flexible cell and system planning**

✓Consistently **further developed maintenance and service**

→ **Best in class maintenance**



Advantages of the new Series

Evolution of Technology - Comparison to the previous Series

✓**Optimized working area** in front of and behind the machine

→**Improved accessibility in various applications**

✓**Improved stopping distances** of the robot axes in the case of a stop

→ **More compact cell and system design**

✓**Consistently improved TCO** (Total Cost of Ownership)

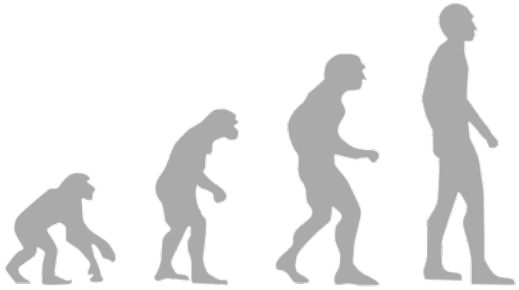
→**Lower running costs**

✓New **optional software Motion Modes** to convert standard machines into process machines

→ **Maximum flexibility with low robot diversity**

✓New **Energy Supply concept**

→ **Long service life and maximum availability**



Advantages of the new Series

Technical Details

Designed for **KRC4** und **KRC5**

- Optimized wrist (center of gravity, service life of energy supply system)
- Integrated A6 motor with external connection
- Minimized number of structural components
- Minimized number of gear boxes and motors (within the new portfolio)
- Reduced maintenance of the hollow shaft A1
- Compact basic axes for optimized interference contour
- High additional loads A1, A2 and A3
- A4 and A5 motors horizontal arrangement and slim A3 → optimized interfering contour
- Improved oil seals
- Retrofitable additional hard stops A1, A2 and A3
- Hydro-pneumatic Counterbalance system
- Removable forklift pockets
- New, smaller footprint

Advantages of the new Series

Comparison to the Competition - Fanuc

KUKA KR QUANTEC new vs. Fanuc R2000-iC

- ✓ **Optimum working envelope**, even with long arm and ceiling versions
- ✓ **Gear boxes easier to maintain** (oil instead of grease) or to replace
- ✓ Up to **60% better positioning behavior** (positioning time, overshoot)
- ✓ **10% larger working envelope** (axis 1, working area behind the machine)
- ✓ More **versatile portfolio** (variants, payload, reach)
- ✓ **Best in Class axis speeds**
- ✓ **Better operating conditions** (0 to 55°C)
- ✓ more than **10% shorter cycle times** possible
- ✓ more than **10% lower energy consumption**

Advantages of the new Series

Comparison to the Competition - ABB

KUKA KR QUANTEC new vs. ABB IRB 6700

- ✓ Up to **50% better positioning behavior** (positioning time)
- ✓ **10% larger working envelope** (axis 1, working area behind the machine)
- ✓ **More versatile portfolio** (console and ceiling variants, range)
- ✓ **Best in class axis speeds**
- ✓ **Better operating conditions** (0 - 55°C)
- ✓ **Slimmer design** (20% less interference contour in the hand)
- ✓ **Optional additional hard stops axis 1-3** (only A1 with ABB)

Advantages of the new Series

Comparison to the Competition - Yaskawa

KUKA KR QUANTEC new vs. Yaskawa GP225

- ✓ Up to **80% better positioning behavior** (positioning time)
- ✓ **Larger working envelope** (axis 1, working area below and behind the machine)
- ✓ **More versatile portfolio** (bracket and ceiling variants)
- ✓ **Best in Class axis speeds**
- ✓ **Better operating conditions** (0 - 55°C)
- ✓ **Optional additional stops axis 1-3** (only A1 with Yaskawa)

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TCO - Total Cost of Ownership

Spare Parts and Maintenance

- ✓**Significantly improved MTBF** of the entire robot mechanics including energy supply system
- ✓**50% reduction in the number of main components** within the modular system KR QUANTEC
- ✓**Minimized maintenance** compared to the previous model
  - Oil change every 20.000h (only one type of oil, no grease - see competition)
  - visual inspection
  - Cyclic lubrication CBA bearings
  - No re-greasing of the cable set
  - No mandatory replacement of the cable harness (see competition)
  - No battery replacement on the robot
- ✓**Optimized MTTR times** through simplified component replacement (motors, gearboxes)

Best in Class

TCO - Total Cost of Ownership

Training, Installation, Energy Consumption

✓**Low training requirement**, since comparable technology to the predecessor series

✓**Simplified installation** due to fast adjustment and improved Work Visual

✓Measurements with **AIDA test programs** are still pending

✓Further significant energy savings are achieved together with the **KRC5** and **(V)KSS 8.7**

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Applications / References

Applications in General

- ✓**New energy supply concept** with improved accessibility for **simplified maintenance**
- ✓Application-oriented, **freely adjustable drive modes (Motion Modes)** for different requirements for path accuracy, speed, energy consumption etc. (from (V)KSS8.6)
- ✓Simple mounting of the tools due to **standardized mounting flanges**
- ✓**Extended mounting options** with screw-on surfaces for additional loads
- ✓**Special versions for special requirements** due to ambient conditions

Applications / References

Applications in General

✓Broad field of application in all market segments - From medical technology to foundry technology, the new KR QUANTEC series offers the ideal portfolio for **economical**, **efficient** and **high-quality** production.

Medical

Handling

Machining

Automotive

Foundry

...

Applications / References

Application Resistance Spot Welding

- ✓Perfectly matched **mechanical design** to the core technology of resistance spot welding thanks to the experience of over 50,000 spot welding robots
- ✓Support of all common **energy supply concepts** (electrical, pneumatic)
- ✓**Simplified engineering** even in complex situations due to leaner **interference contour**

Ready2 Packages are available as complete solutions:

- ✓ ready2_spot
- ✓ ready2_rivet

Applications / References

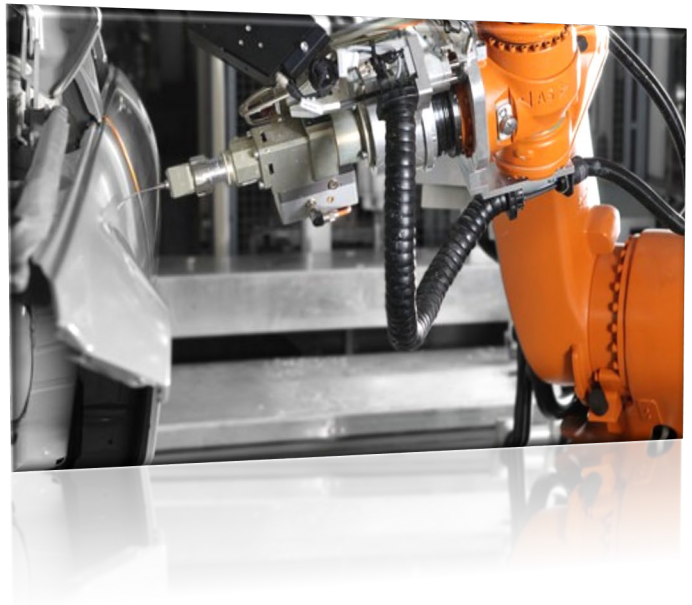
Application Handling / Loading and Unloading

- ✓**Simple installation** and maintenance of flexible gripper technology due to simplified EZ assembly and screw-on surfaces for all types of additional loads
- ✓**Switchability** between maximum speed in the empty run and maximum load at the load limit
- ✓**Clear and slim structure** for ideal accessibility
- ✓Best **positioning accuracy** in its class with optimum **cycle time** (more than **10% shorter cycle times** are possible, im comparison to todays series)

Applications / References

Example Path Application: Industrial Glueing

- ✓**Ideal product portfolio** for adhesive application thanks to models with **long ranges**
- ✓**Simple installation and maintenance** of the energy and material supply systems thanks to the new robot and EZ concept (high permissible additional loads, best accessibility, flexible screw-on surfaces)
- ✓Highest **process speeds** at maximum **path accuracy** achieved by Path Mode

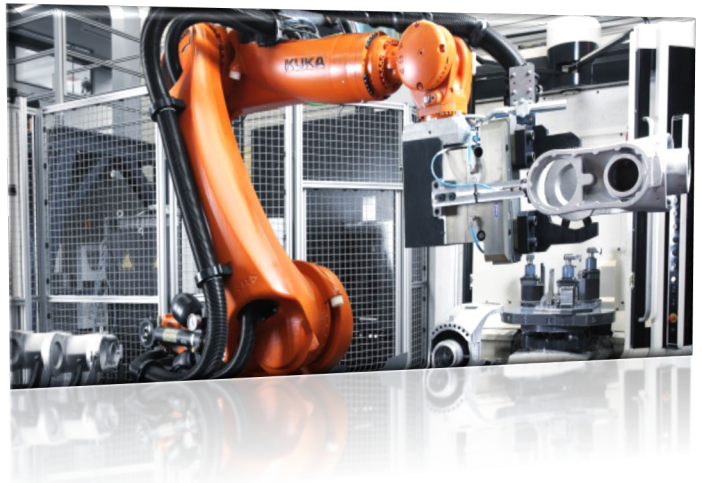


Applications / References

Other Joining Applications

✓The models of the new KR QUANTEC series represent a **new reference** for all other relevant **handling and joining applications** in the medium to high S.W.L. range, e.g.

- Stud Welding
- Flow Drilling Screwing
- Handling
- Riveting
- Clinching
- Hemming



✓Optimum Motion Modes can be selected for all applications to achieve **maximum cycle time** with **ideal process quality**

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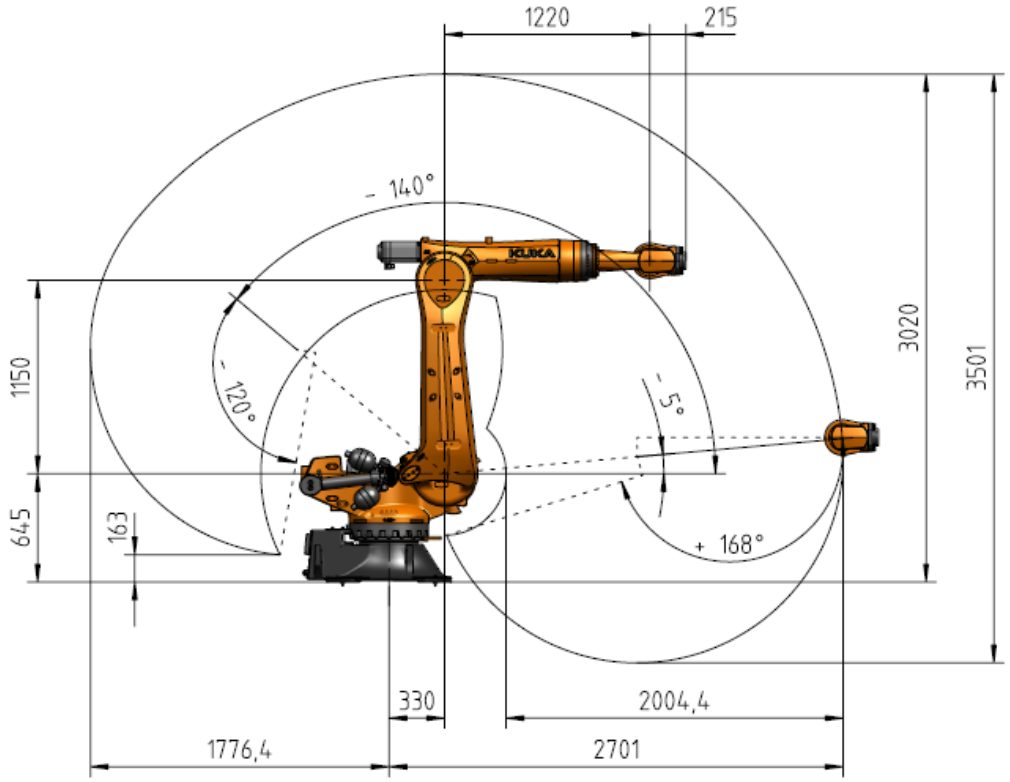
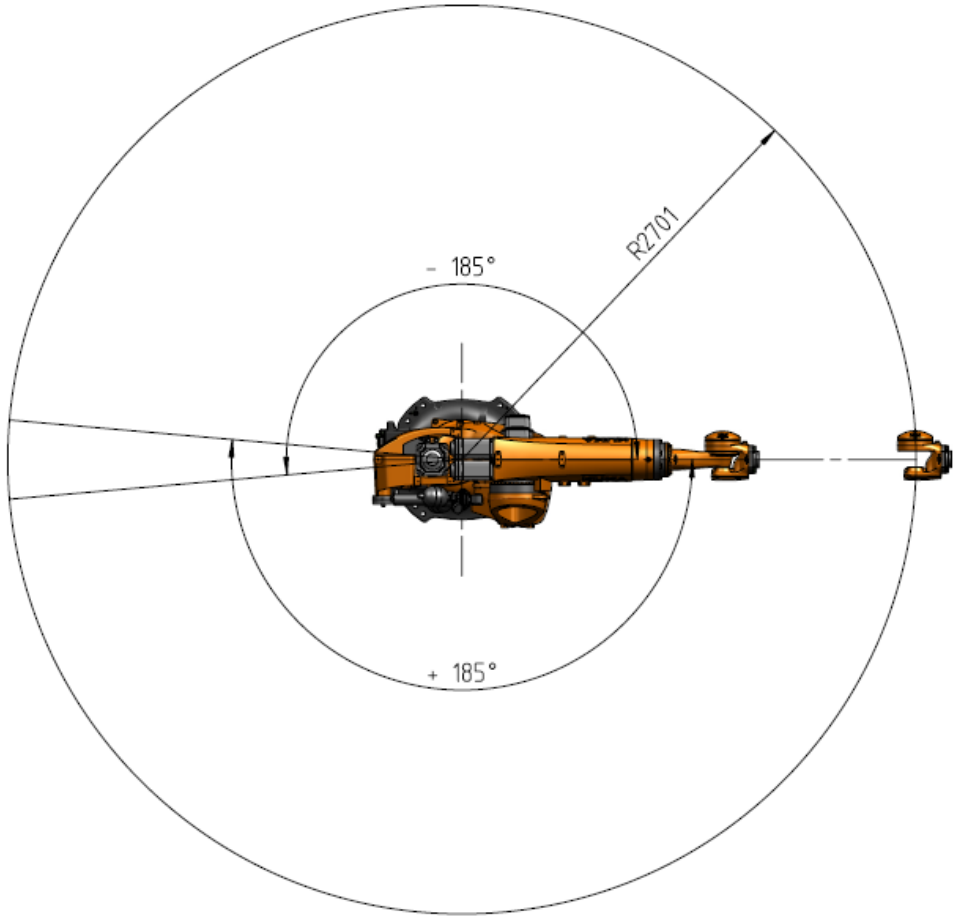
Technical Data
KR210 R2700-2

Technical Data	
Payload	210 kg
Reach	2701 mm
Additional Load A3	50 – 150 kg
Nominal Payload	260 kg
Position Accuracy	0,05 mm
Installation	Floor / Ceiling
Footprint	742x742mm
Number of Axes	6
Weight	1100 kg
MTBF	t.d.b.
Temperature Range	0°C – 55°C
Protection Class	Base Axes IP65 Wrist Axes IP67
Options	Hard Stops A1 - A3
Control Panel	SmartPad 2.0
Control Unit	KRC4 // KRC5* *from 2020

Technical Data

Working Envelope – KR210 R2700-2



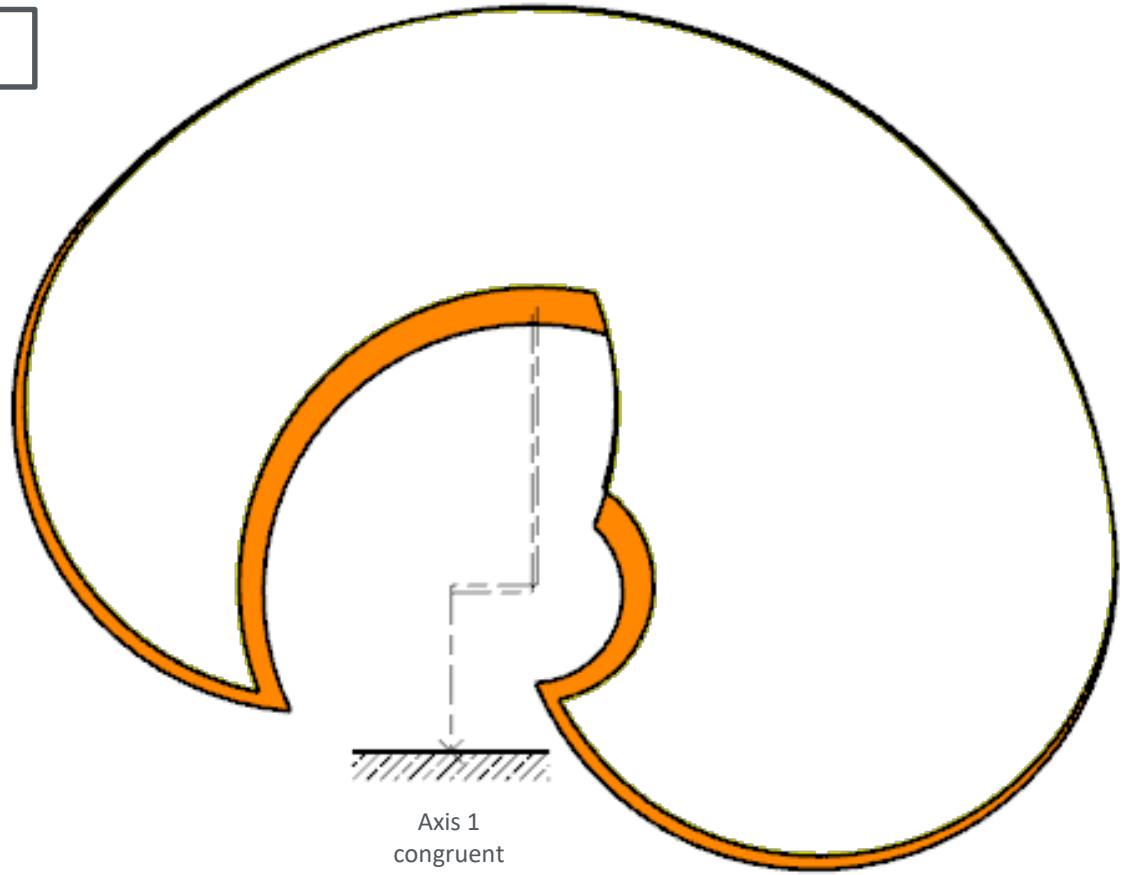


Technical Data

Working Envelope – compared to the Predecessor

KR 210 R2700 prime (todays version)

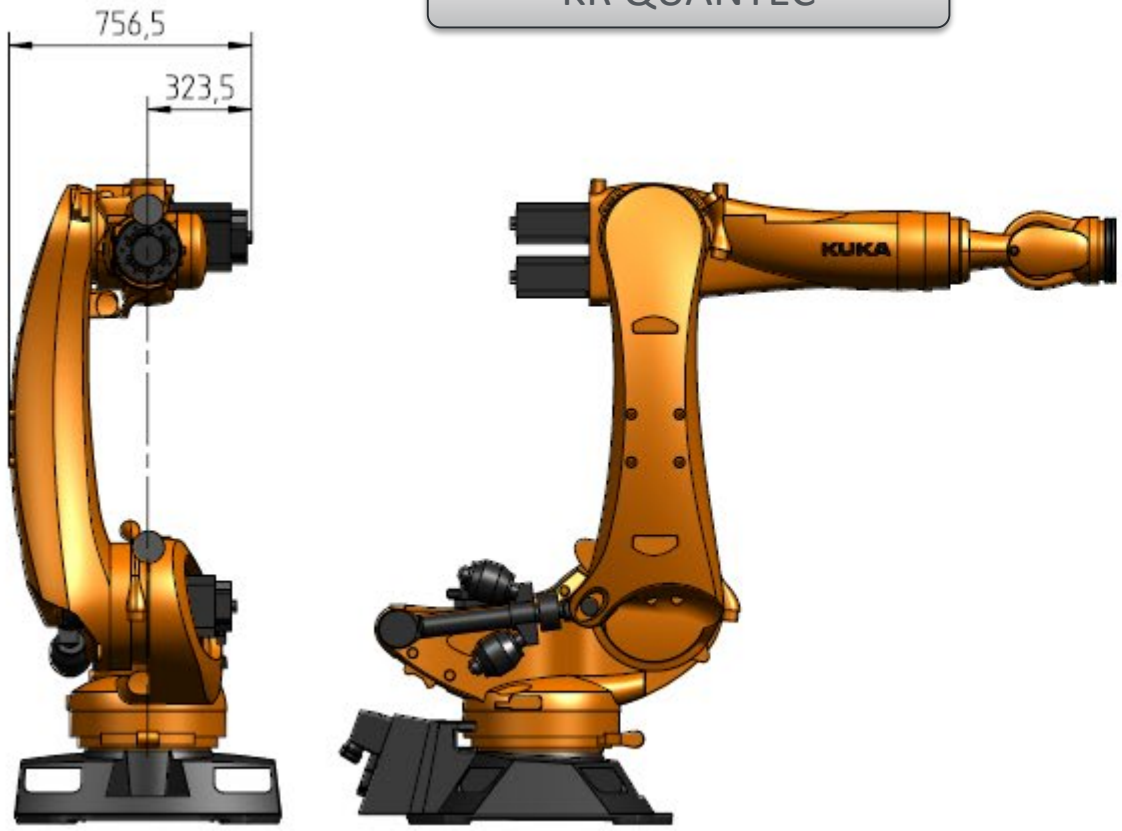
KR 210 R2700-2 (new)



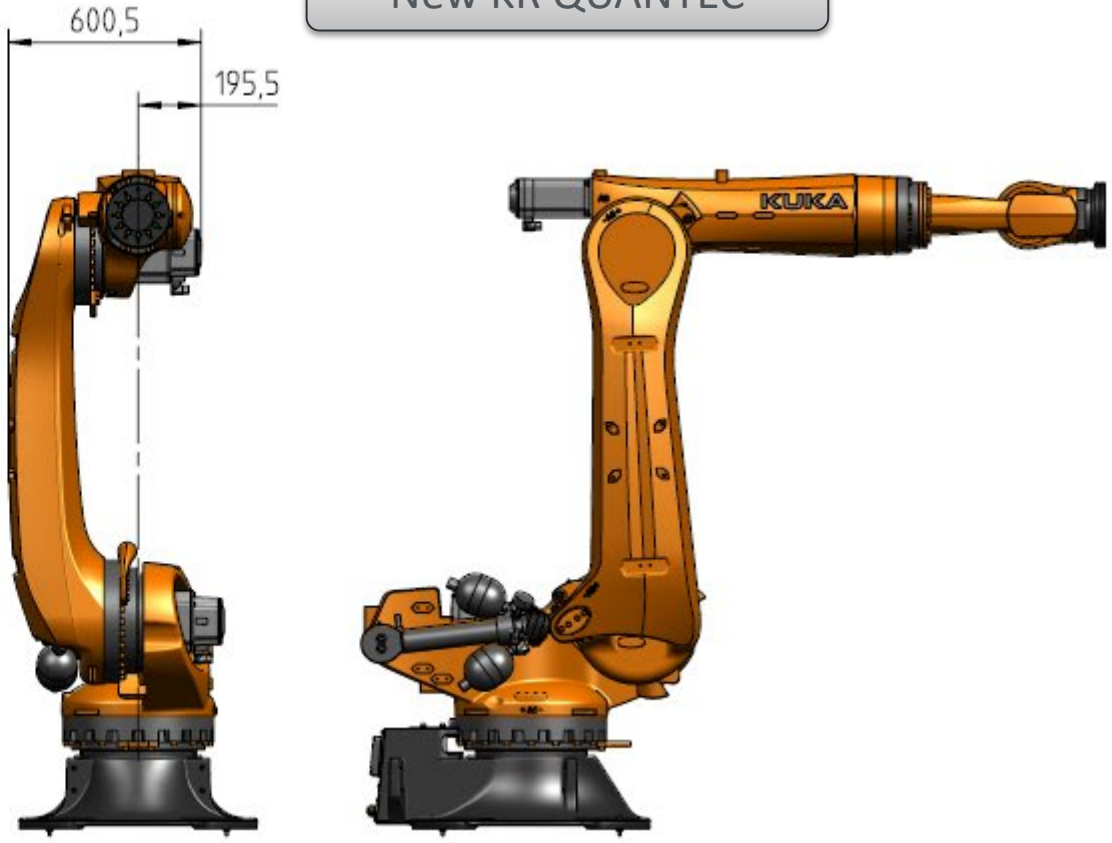
Technical Data

Interference Contour A3 - compared to its Predecessor

KR QUANTEC

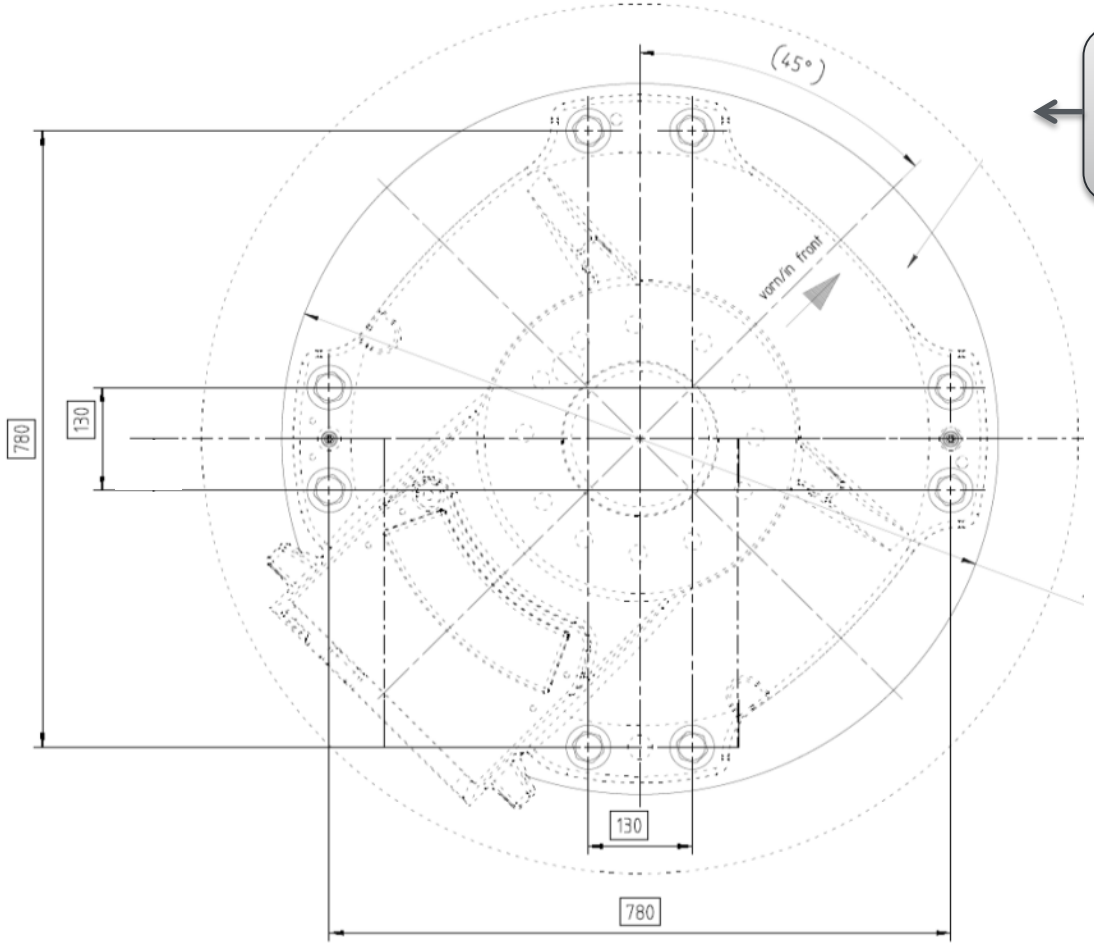


New KR QUANTEC



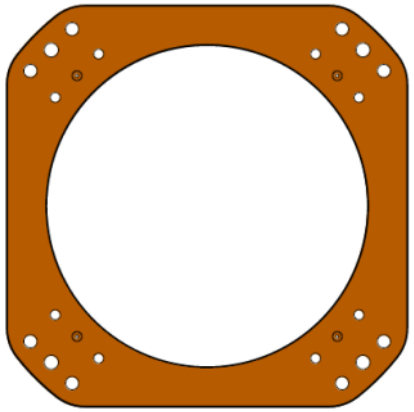
Technical Data

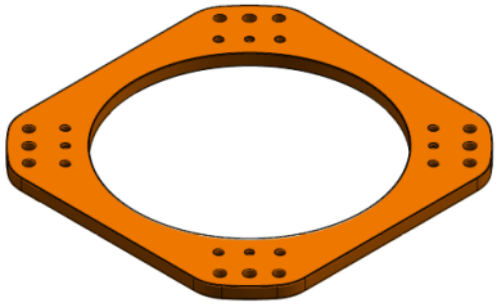
Foundation Drilling Pattern



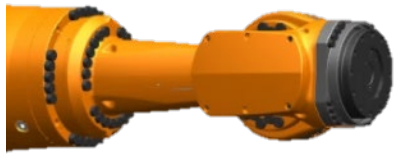
External dimensions 742x742mm (previously 830x830mm)
Foundation drilling pattern corner dimension 780mm (previously 934mm)

Adapter plate (optional) KR QUANTEC (todays version) on KR QUANTEC new





Technical Data
Wrist Types



Reach

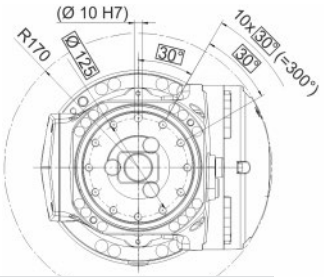
Payload	2700 mm	2900 mm	3100 mm
	300kg 1		
	250kg 1		
		240kg 1	
	210kg 2		210kg 1
		180kg 1	
	150kg 2		150kg 2
	120kg 2		120kg 2

1 big Wrist “ZH300”

pitch circle Ø 160mm,
11 screws,
internal Ø 100mm

2 small Wrist “ZH210”

pitch circle Teilkreis Ø 125mm
11 screws,
Internal Ø 80mm



example small wrist

Technical Data
Complete System

New KR QUANTEC

+

KRC4 ed15

oder

KRC5
(from 01.04.2020)

+

KSS 8.3/8.5

KSS 8.6

Incl. Motion Modes
(from 01.10.2019)

oder

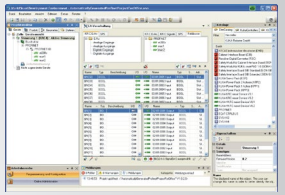
KSS 8.7

(from 01.04.2020)

+

Smartpad-2
(from 01.04.2019)

+



Work Visual
&
Tech Packages

Separate information on all these products is available from KUKA.

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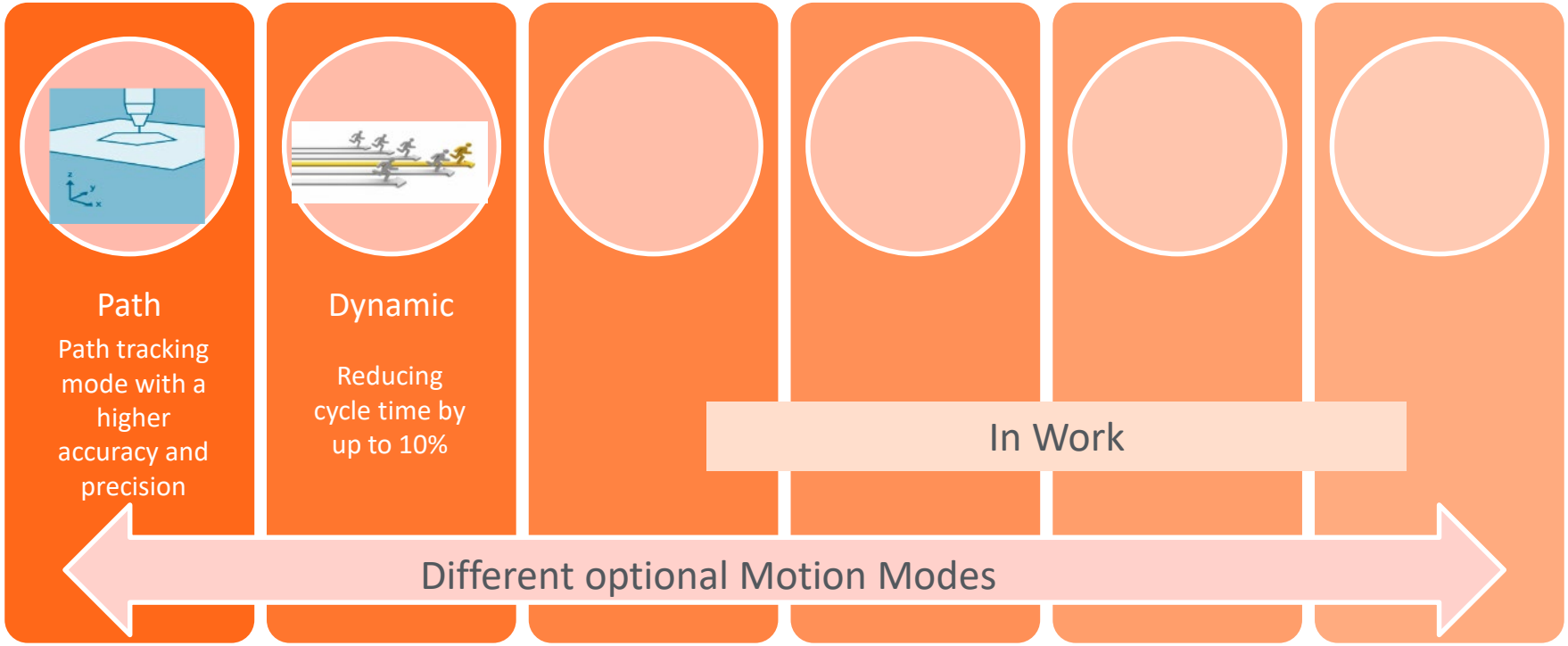
Options

Motion Modes – Hardware becomes Software



The new KR QUANTEC runs in **Standard Mode without** Motion Modes,
with Motion Modes the standard machine becomes a **Process Machine**.

Options

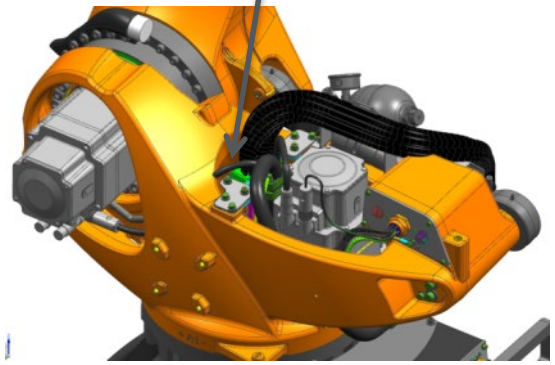
Energy Supply Systems

- ✓ **Simple replacement** or **simple retrofitting** of the basic and portable roof axis EZ
- ✓ **Savings on cable length** for economical installation
- ✓ Less wear for **longer service life**
- ✓ **Better interference contour** for improved simulation and more economical cell planning
- ✓ Improved **wear and jam protection** on axis 5

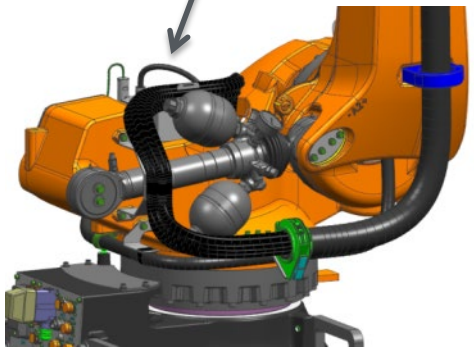
Options

Energy Supply Systems Axis 1 - Axis 3

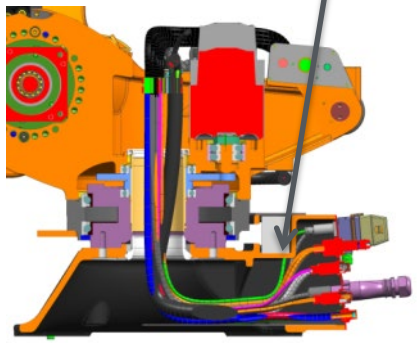
Brackets are bolted from above
→ **Simplification of assembly**



Shorter cable way through the course about the CBS
→ **Less material input**

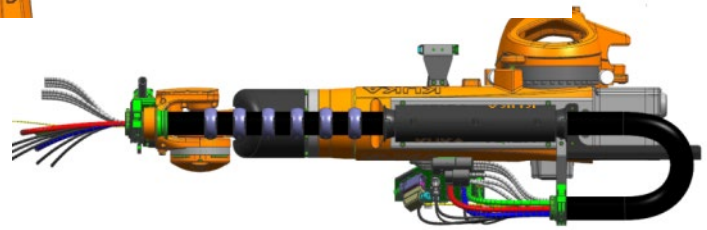


no more jam pieces behind the interface A1
→ **Simplification of Assembly**



Options

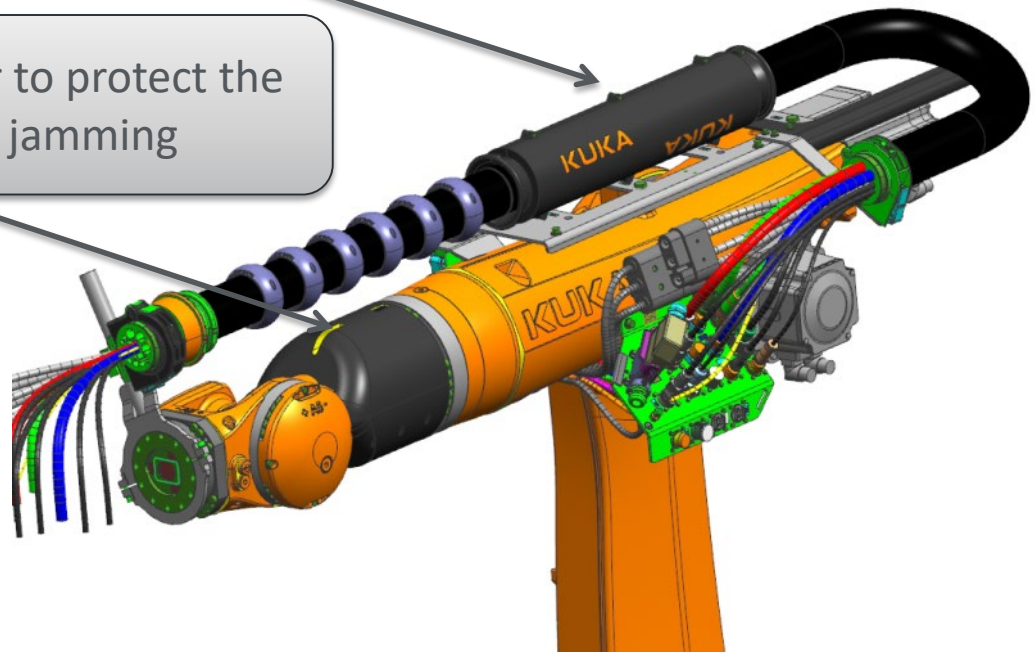
Energy Supply Systems Axis 3 - Axis 6



„K-Pipe“
Slim return system with
max. 450mm extension length

Improved cover to protect the
ES against jamming

Turning protectors with
color wear display

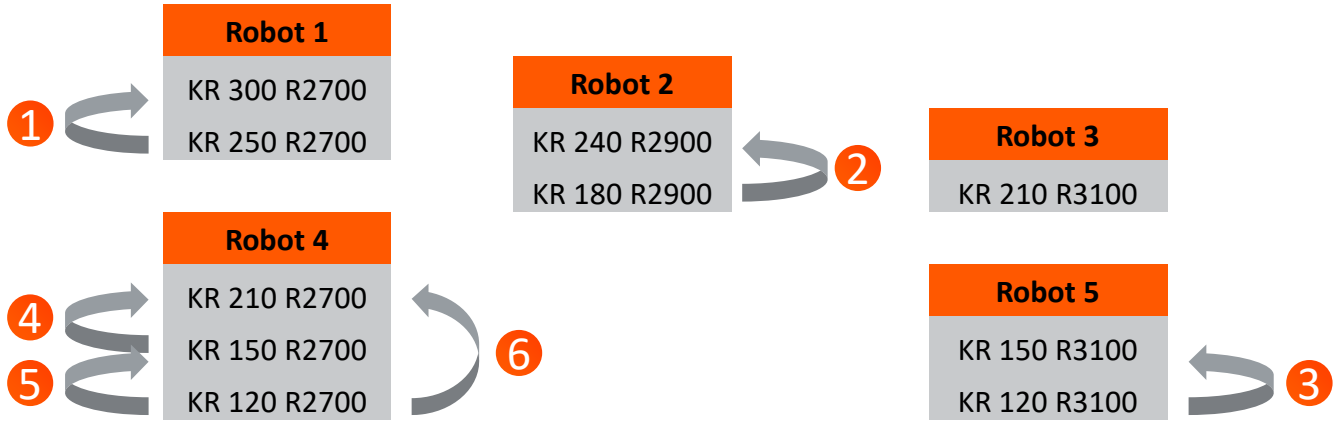


Options

Payload Upgrade in the Field

✓**KUKA Customer Service** offers the **payload upgrade*** of various KR QUANTEC types in the field

✓There are **six different upgrade options** available



* is only available to a limited extent for robots that are measured with absolute accuracy

Optionen

New KR QUANTEC Ready Packs

Priority delivery

- ✓Target: 4 weeks delivery time (EX Works)
- ✓Delivery time for larger quantities on request
- ✓Predefined robots for key applications

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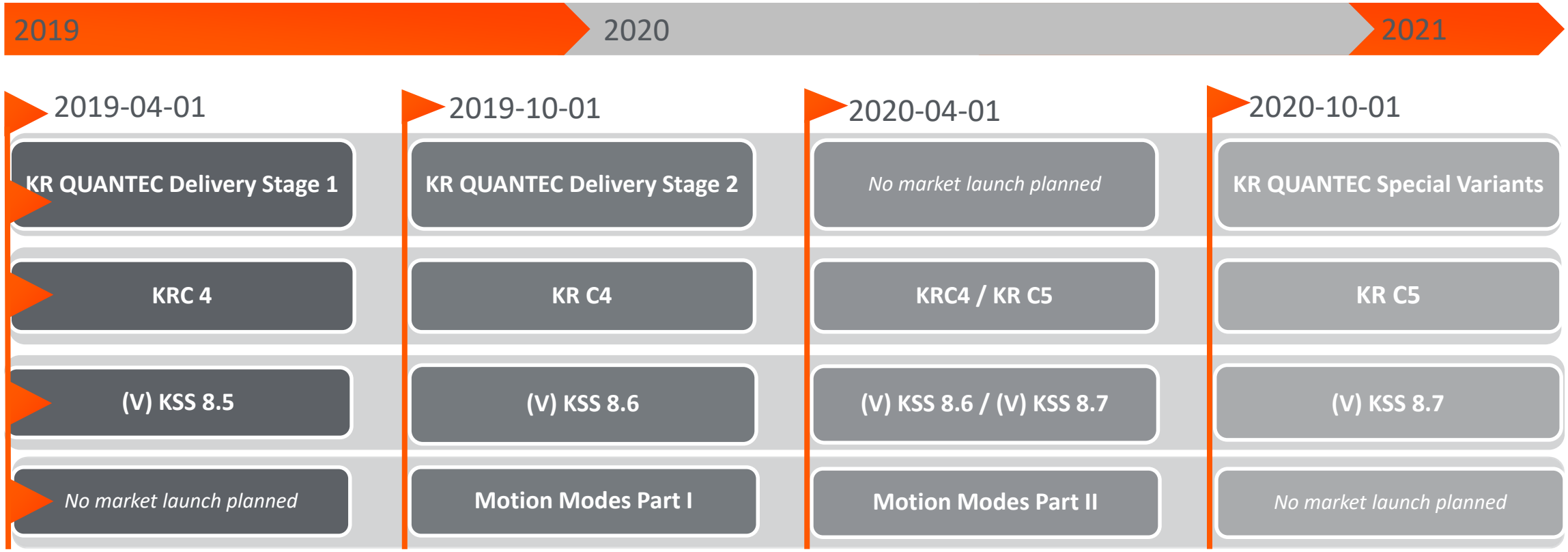
Timeline

Roadmap: Start of Delivery

Delivery Stage 1	Delivery Stage 2
KR 120 R2700-2	KR 180 R2900-2
KR 150 R2700-2	KR 210 R3100-2
KR 210 R2700-2	KR 240 R2900-2
KR 120 R3100-2	KR 250 R2700-2
KR 150 R3100-2	KR 300 R2700-2



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Appendix
Sales Arguments

Feature	Advantage	Benefit
• Optimized portfolio (custom-fit variants)	• Less variety of parts (spare parts)	• Shorter delivery time
• Best in Class Maintenance • Reduced energy consumption (KRC5) • Proven KR QUANTEC basic technology • Best in Class MTBF • improved gearbox seals	• Hardly any maintenance effort • Lower power costs • Reduced training and education requirements • Fewer defective parts in operation	• Lower TCO • Less downtimes
• KUKA as a valuable brand	• Good price/performance ratio	• Secure investment
• Reduced overtravel • Improved driving characteristics (Motion Modes) – Dynamic Mode – Path Mode – Further Modes in planning • High additional loads possible due to adapted robot structure • Large portfolio (Best in Class)	• Efficient cell layout • Shorter cycle times possible • More precise path planning possible • Even heavy process equipment can be mounted flexibly • Precisely fitting payload and reach • Identical technology from 120 to 300 kg payload	• More flexible system planning

Appendix
Sales Arguments

Feature	Advantage	Benefit
• Large portfolio • Precisely ranges • Many mounting points • Restrictable working areas • Enlarged working area • "Customized" Energy Supply System • Slim robot with reduced interference contour • Reduced footprint	• Suitable robot (ceiling, shelf, foundry) • Flexible cell planning • Flexible mounting options (add-on parts) • Efficient cell layout • Better accessibility • Everything from a single source (no extra service provider for energy supply systems) • Efficient cell layout	• Flexibility
• Optimized, lean portfolio	• Optimized delivery time	• On-schedule asset completion
• Optimized drive components (gearboxes & motors) • Dynamic Mode (option) • Enlarged working area	• Improved performance • Acceleration & final speed • Higher acceleration ramps • Better accessibility	• Low cycle time

Appendix
Sales Arguments

Feature	Advantage	Benefit
• New sealing technology on the gearboxes • Use of proven QUANTEC technology → additional improvements • Extended hand shaft → no EZ jamming • Improved Hydro-GWA • Significantly improved MTBF values → improved components	• Minimized oil leaks • 100,000 robots in the field • Less EZ-wear • Optimized service life of the GWA • Higher MTBF	• Less failures
• Path Mode (option) • Optimized hardware • Consistent improvement to QUANTEC-1 → experience, error evaluation • Improved sealing technology on gear boxes	• Increased accuracy • 100,000 systems in the field • Reliable system • Reduced oil leakages	• Quality (accuracy, failure, maintenance)

KUKA

Thank you for your attention.