

**KONIG**

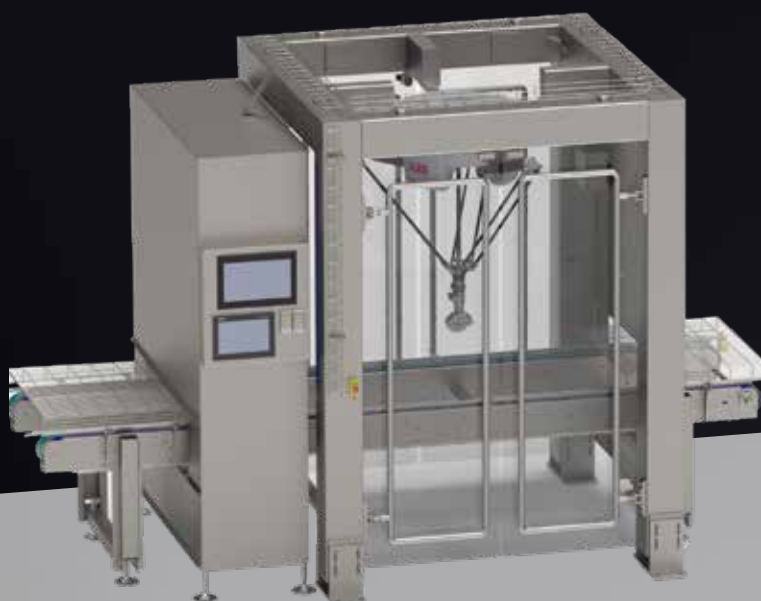
THE BAKER'S  
CROWN

## SCORING

ALL-IN-ONE

BREAD SCORING SYSTEM

## SCORING



# ADVANCED AND HIGHLY FLEXIBLE DOUGH SCORING

Decorative cuts on breads give a bakery's products a characteristic trademark and ensure that the baked goods look appealing. However, the cutting process has been complex so far and has used up a lot of time and personnel. In addition, when cutting manually, the quality is inconsistent and fluctuating.

To simplify and automate cutting technology for bakeries, Koenig has developed a unique solution for automa-

tion and gentle dough handling for efficient operation with the innovative bread scoring system. Highly sophisticated technology makes the scoring system one of the most advanced scoring systems on the market that simulates and even improves the skills of a master baker. With automated cutting and "artificial intelligence" functions, bakeries can save valuable resources, such as manpower and time and can achieve higher and more constant product quality.



## YOUR ADVANTAGES IN USING SCORING IN YOUR PRODUCTION



**Tailored scoring.** The system scans the product in 3 dimensions and adapts the user-defined scoring pattern to the length, width, height and shape of each product. For our scoring machines no product is equal to another, the score is adapted to each loaf individually. Regardless of its position on the board.



**Fastest scoring.** Thanks to the combination of the most advanced technologies, we achieve the highest possible scoring speeds without neglecting the durability of our system.



**3 scoring technologies in one machine and change of tools in less than 1 minute per robot.** Each machine is ready to incorporate rotary blades, water-jet tools and ultrasonic knives or blades, indifferently simply by changing the tool. Our three interchangeable scoring technologies can be incorporated (only one, two or all three) at any time.



**Artificial Intelligence.**

- Automatic product recognition
- Integrated self-learning system to ensure optimal cut over time
- Continuous monitoring of operation and prevention of down-times



**Intuitive graphic editor for setting a new cutting reference in just 5 minutes.** The unique graphic editor gives the user total freedom to generate an unlimited number of scoring patterns in an enormously simple way without stopping the machine.



**Prepared for INDUSTRY 4.0 automation.** For the integration/interaction of intelligent digital technologies in industrial processes.



**Designed for simple cleaning and maintenance.** The control system is installed completely outside the working area, where only robots and product/pan/board conveyor are placed and the structure is specially designed so as not to have any uncleanable spots.

# UNLIMITED PATTERNS – MAKE YOUR PRODUCT UNIQUE

There is an unlimited number of patterns. Whether “simple” cuts on baguettes, decorative cuts in “artisan” style or complex decorative patterns on bread loaves, the team of highly qualified professionals design the appropriate solution for bakeries of all sizes.



## THE RIGHT TOOL FOR YOUR COMPLETE PRODUCT RANGE

Excellent results in all types of dough: the blade manages to drag a thin layer of dough that covers the open cells of the loaf avoiding degassing. This is the reason why an optimum score is obtained even in doughs with high water content.

Soft Doughs

Soft Doughs

Hard Doughs



ROTARY BLADE



WATER JET



ULTRASONIC



# FOR BAKERIES OF DIFFERENT SIZES AIMING TO AUTOMATE THEIR PRODUCTION

The scoring system is designed for mid-size bakeries and industrial bakeries to support their production in automizing bread scoring. With this system, bakeries can compensate lack of personnel and achieve consistent product quality. The scoring unit helps to increase efficiency and improve product quality with automatized production.

## UNRIVALED PERFORMANCE AND VARIATIONS

### VERY HIGH PERFORMANCE AND CUSTOMIZED SOLUTIONS FOR EVERY NEED

The bread scoring system cuts bread with unrivaled performance for high-speed scoring: up to 12.000 scores per hour per robot (using a single cutting tool), a system can basically integrate an unlimited number of robots. If you would like to have 6 robots, the system achieves 72.000 cuts per hour. Even multiple cutting nozzles per tool are possible.

### THE SCORE IS ADAPTED TO EACH DOUGH PIECE

Thanks to the integrated vision system, the exact position of the loaf on the board is detected and the score is adapted to each loaf individually. Regardless of its position on the board.

### PRECISION AND SPEED

Bread Scoring Smart System cuts the dough with the precision and speed of expert hands. For this, it uses rotating blades, water-jet or ultrasonic tools handled by the robot, which allow numerous adjustments such as: cutting opening, depth and inclination of the blade.

### DIFFERENT TYPES OF INDUSTRIAL ROBOTS

The scoring system is available in different models to adapt to the productive capacity of our customers. Three different types of industrial robots can be used in the system: Delta, Scara or Arm robot. All models include a scanning unit, one or more cutting robots, a conveyor, an electrical cabinet and a CPU.



Delta version with 1 robot and rotary blade, water-jet and ultrasonic tools



Delta version with 3 robots and rotary blade, water-jet and ultrasonic tools



Scara version with 6 robots



Arm robot version with 12 nozzles for 12 simultaneous cuts

# ARTIFICIAL INTELLIGENCE FOR SIMPLE OPERATION AND HIGH QUALITY

## **AUTOMATIC PRODUCT RECOGNITION – NO PROGRAM CHANGES NECESSARY.**

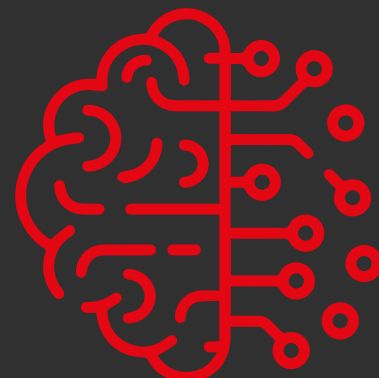
The system identifies which product is to be cut and automatically adapts the cutting pattern. The unit is completely automated and does not need to be stopped. So there is no downtime in between product changes, the system recognizes different products autonomously.

## **INTEGRATED SELF-LEARNING SYSTEM TO ENSURE THAT THE CUT FITS THE PRODUCT.**

Although product dimensions can vary along the hours, days, weeks or months (e.g. due to climate conditions in the bakery), the system is always vigilant, checking, correcting and ensuring the maximum scoring precision and speed.

## **CONTINUOUS MONITORING OF OPERATION AND PREVENTATION OF DOWN-TIMES**

The system continuously monitors the operation and prevents any accident which may cause unwanted downtimes.

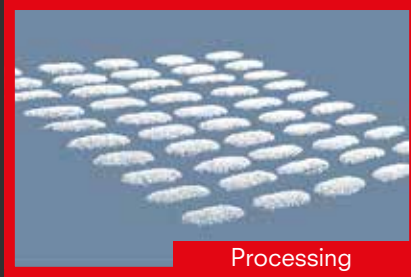


# WORKING PRINCIPLE

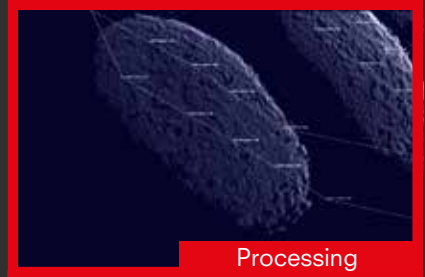
Tailored scoring and 3D vision system: The system scans the product in 3D and adapts the user-defined scoring pattern to the length, width, height and shape of each product. For the Scoring system, no product is equal to another and is analyzed individually. Thanks to the integrated vision system, the exact position of the loaf on the board is detected and the score is adapted to each loaf individually. Regardless of its position on the board.



3D Scanner



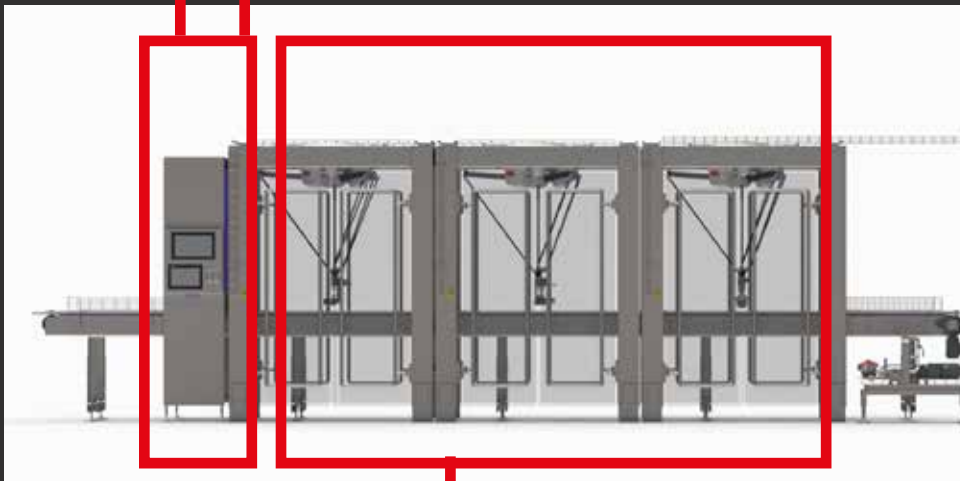
Processing



Processing

## PROCESSING

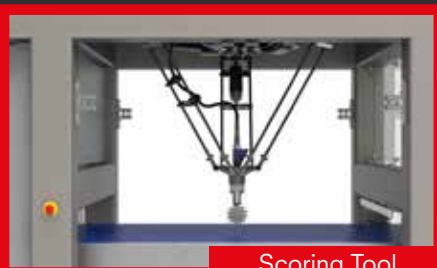
### SCAN UNIT



### SCORING UNIT



Robot



Scoring Tool

# WORKING PRINCIPLE



## 1 Aligning the score to the dough.

Taking the scanned tray as a reference, the system generates a unique and exclusive trajectory according to the position of each dough. Guaranteed that the loaves that are out of position are cut.

## 2 Improves the regularity of the loaves.

Taking the recipe created by the customer as a reference, the system adapts the cut to each loaf.

## 3 Get a handmade look (optional).

When the randomization algorithm is activated, the system slightly alters the cuts to achieve a more artisanal look.

## 4 AI-supported production.

Thanks to Artificial Intelligence, the system continuously adapts to product variability over time while maintaining an optimal rate of speed/accuracy (Machine Learning and Closed Loop Control)

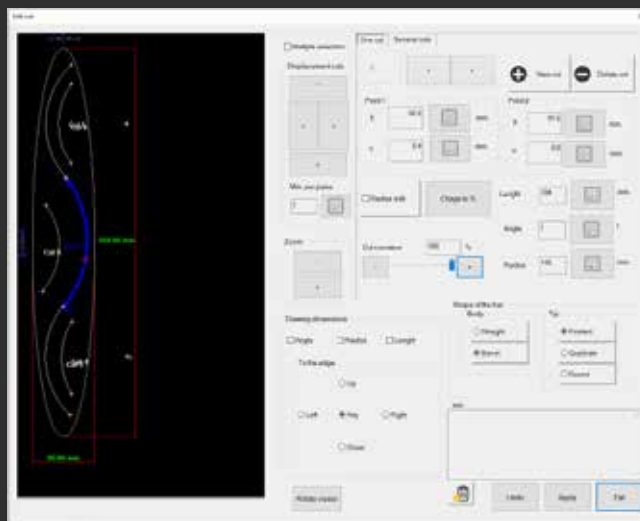
# SETTING NEW CUTTING REFERENCES IN JUST A FEW MINUTES

## INTUITIVE GRAPHIC EDITOR FOR SETTING A NEW CUTTING REFERENCE

### UNLIMITED VARIETY OF SCORES

Add or remove cuts.

Click and drag the scoring line.



# SCORING MODELS

## ARM ROBOT

SCORING TYPE	FOLLOWING THE PRODUCT SHAPE	NOT FOLLOWING THE PRODUCT SHAPE
	Cuts/hour per cutting tool	Cuts/hour per cutting tool
<b>Rotary Blade</b>	6.000	6.000
<b>Water-jet</b>	6.000	6.000
<b>Ultrasonic Blade</b>	n/a	6.000
<b>Ultrasonic Knife</b>	4.000	6.000

## DELTA ROBOT

SCORING TYPE	FOLLOWING THE PRODUCT SHAPE	NOT FOLLOWING THE PRODUCT SHAPE	M2	M3
	Cuts/hour per cutting tool	Cuts/hour per cutting tool		
<b>Rotary Blade</b>	12.000	12.000	x	x
<b>Water-jet</b>	12.000	12.000	x	x
<b>Ultrasonic Blade</b>	n/a	9.000		x
<b>Ultrasonic Knife</b>	9.000	9.000		x

## SCARA ROBOT

SCORING TYPE	FOLLOWING THE PRODUCT SHAPE	NOT FOLLOWING THE PRODUCT SHAPE
	Cuts/hour per cutting tool	Cuts/hour per cutting tool
<b>Rotary Blade</b>	5.000	5.000
<b>Water-jet</b>	5.000	10.000
<b>Ultrasonic Blade</b>	n/a	n/a
<b>Ultrasonic Knife</b>	n/a	n/a





ARM robot offers a compact and customized, multi-nozzle solution to your bakery which has no limitation in angle or width. A decentralized electrical cabinet and movable scanner complement this entry model.



With the DELTA robot we offer a pre-calibrated in-line solution up to 1.200 mm conveyer width. The integrated scanning unit as well as electrical cabinet provide little floor space. DELTA is optimized for high-performance mono lines.



Our SCARA robot is a customized solution with small footprint and meets exactly the requirements of your bakery. With its high-performing process, SCARA is flexible solution. It is ideal for conveyors larger than 1.200 mm.

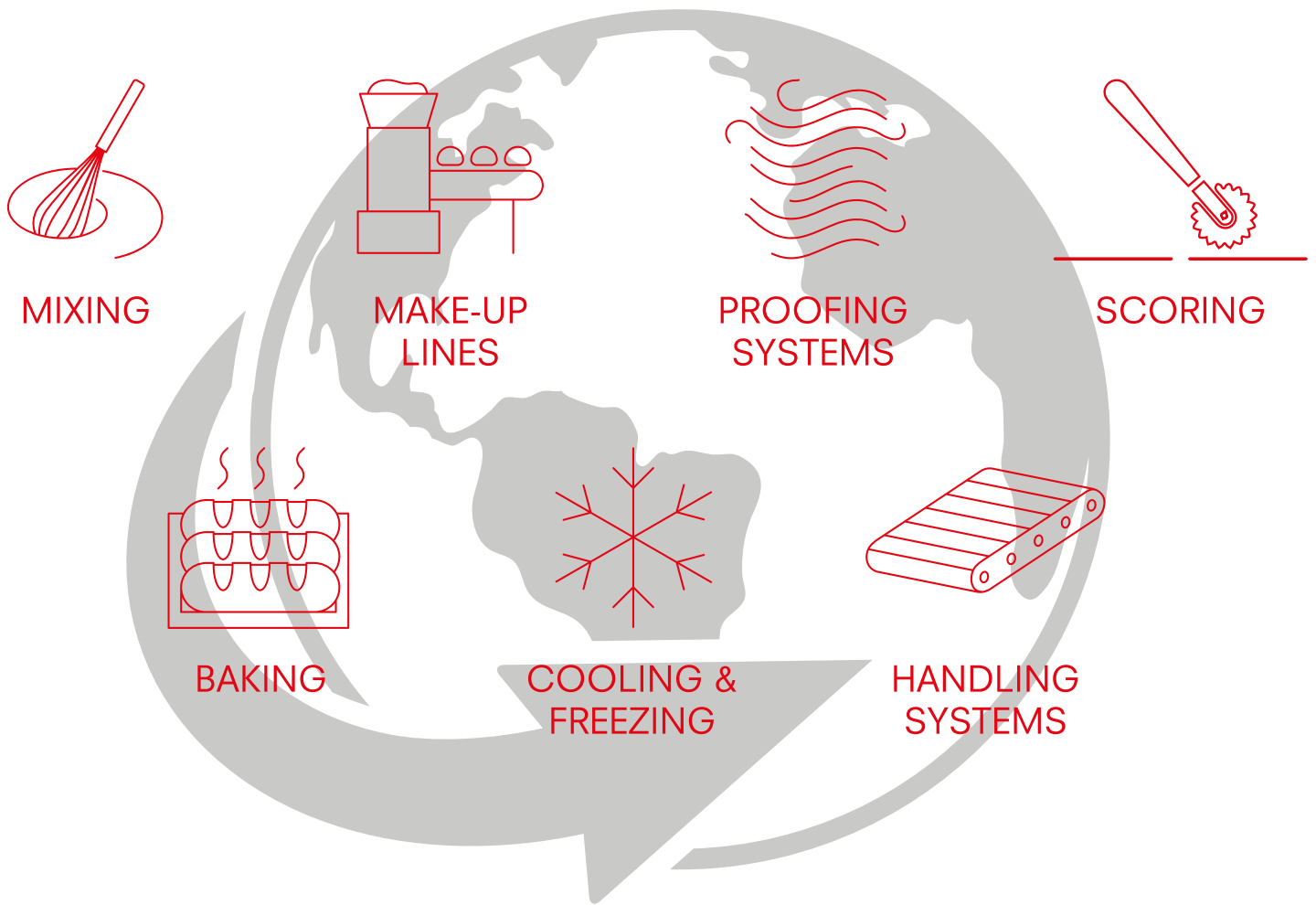
# SCORING AS PART OF COMPLETE BAKERY SOLUTIONS



We provide the Scoring unit as stand-alone unit in your existing production as well as in newly designed project solutions.

Our many years of experience and our highly qualified employees present you with tailor-made solutions with sophisticated technology for your turnkey projects. We only use outstanding partners for such projects, so that the success of your project is guaranteed.

We address your individual demands and offer you an all-inclusive package tailored to your wishes: from system planning to project management up to the installation, including training and subsequent service.





## **SERVICE & SPARE PARTS FROM THE MANUFACTURER!**

Every machine and system is tested with dough and run in before it leaves Koenig's premises. Our technicians have profound education and years of experience in bakery technology. They assemble the equipment at Koenig and then commission it at your site. And should a problem ever arise, our spare parts and service department is at your disposal.

Day and night. Worldwide.



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**KÖNIG**

QR code to product category "Scoring"

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