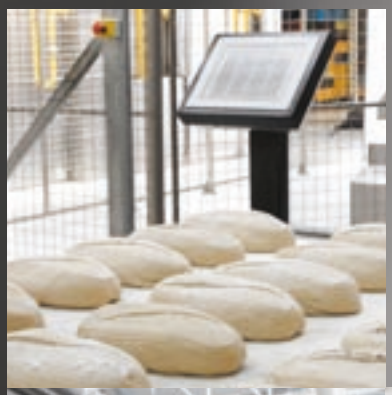
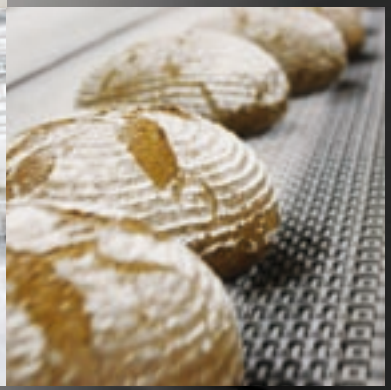
KORNFEIL

Deck Oven-Based Automated Lines

Multi control





Multi control

Innovative way to high-performance bread baking

Multi control lines are modern production lines for efficient and high-performance bread baking in deck ovens.

In it's own original way, the automated bread line brings together the advantages of automated operation with the production of high-quality delicious home-made bread and white bakery products.

The main objective of the Multi control design is to provide bakeries with fully automated lines that will secure efficient production of both a large series of one type of bread, as well as a wide range of traditional hand-crafted breads. Moreover, they allow you take advantage of a programme for producing white bakery products, rolls and kaiser rolls directly on the oven baking plates.

The baking process follows preset programmes while the control software completely takes over responsibility for production from you, thus ensuring continual product quality.

The Multi control design from Kornfeil, owing to the great variability of the production lines, can be used in all bakery categories ranging from small hand-craft ones to the largest ones with production exceeding 40 tons and 20 types of bread a day.

Low labour intensity, high-performance baking and handmade bread quality stand out as the basic characteristics of the Multi control solution.

Main advantages

- Efficient bread baking in deck ovens
- High-performance baking on a small surface
- Low energy consumption
- Utilization of waste heat
- Eco-friendly solution

Low energy intensity
The real consumption for baking 1000 kg of bread hovers around 34–40 m^3 of natural gas.

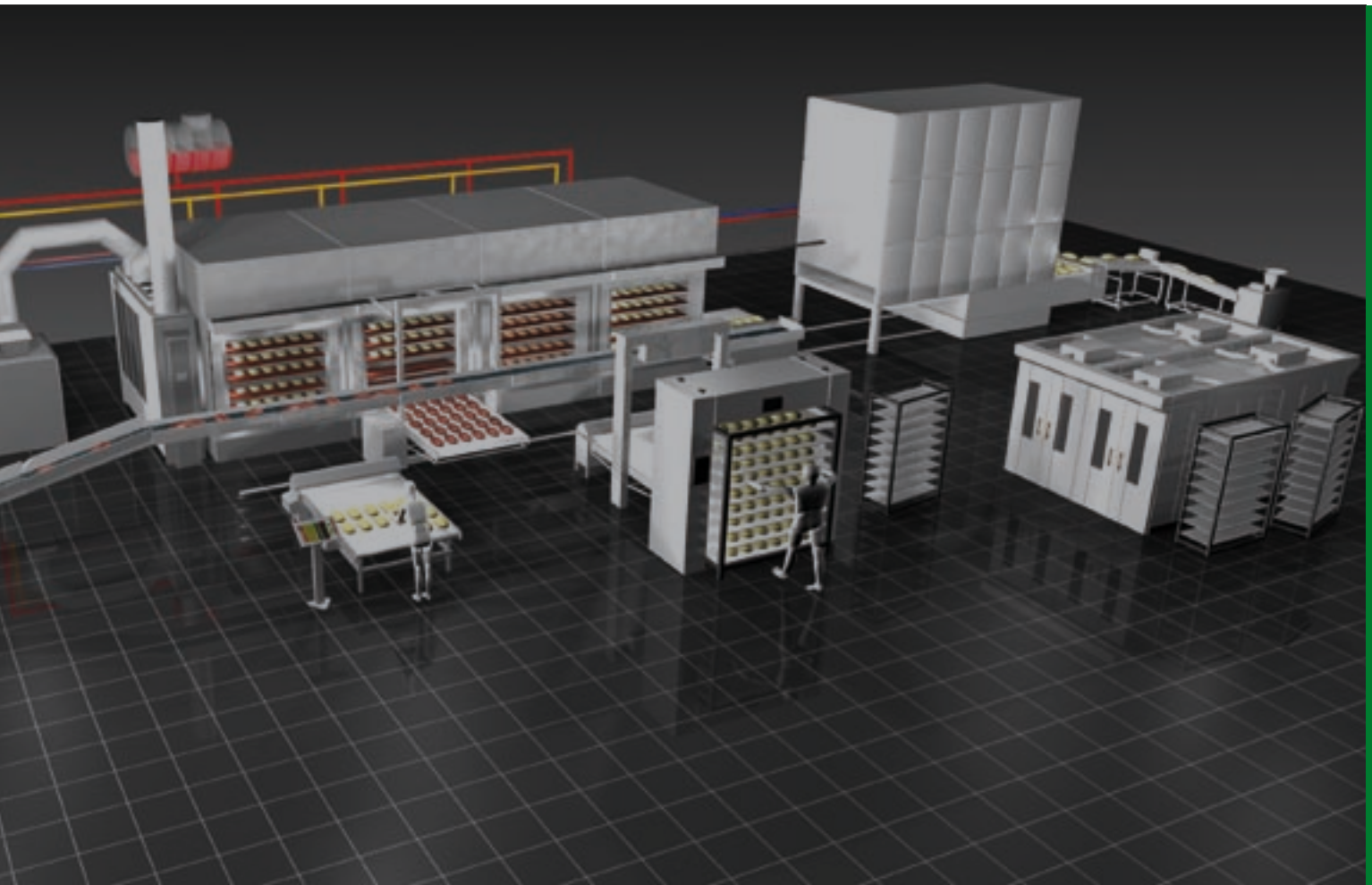
Eco-friendly utilization of waste energy
With an EcoBlock built in the production line, you will recover 20–22% of the input energy that can be used for heating proofers, water and the premises. At the same time, the EcoBlock contributes to environmental protection by significantly reducing CO_2 emissions and other pollutants.

Handmade bread quality with a prolonged shelf life
We remain faithful to traditional bread baking on heated ceramic plates using deck ovens with good thermal storage and optimal thermal flexibility. The technology allows us to use more water in the dough which results in more porous bread with a prolonged shelf life.

High-productivity production of wide assortments
An ideal solution for midsized and large bakeries with outputs of 500 to 1800 kg per hour, including an option for large-scale production of bread and bakery products.

Low personnel intensity
The fully automated line produces high-quality bread with minimal labour.

Effective use of space
The resulting ratio values of production volume and the space reserved for the production line belong to the most impressive within the baking industry.

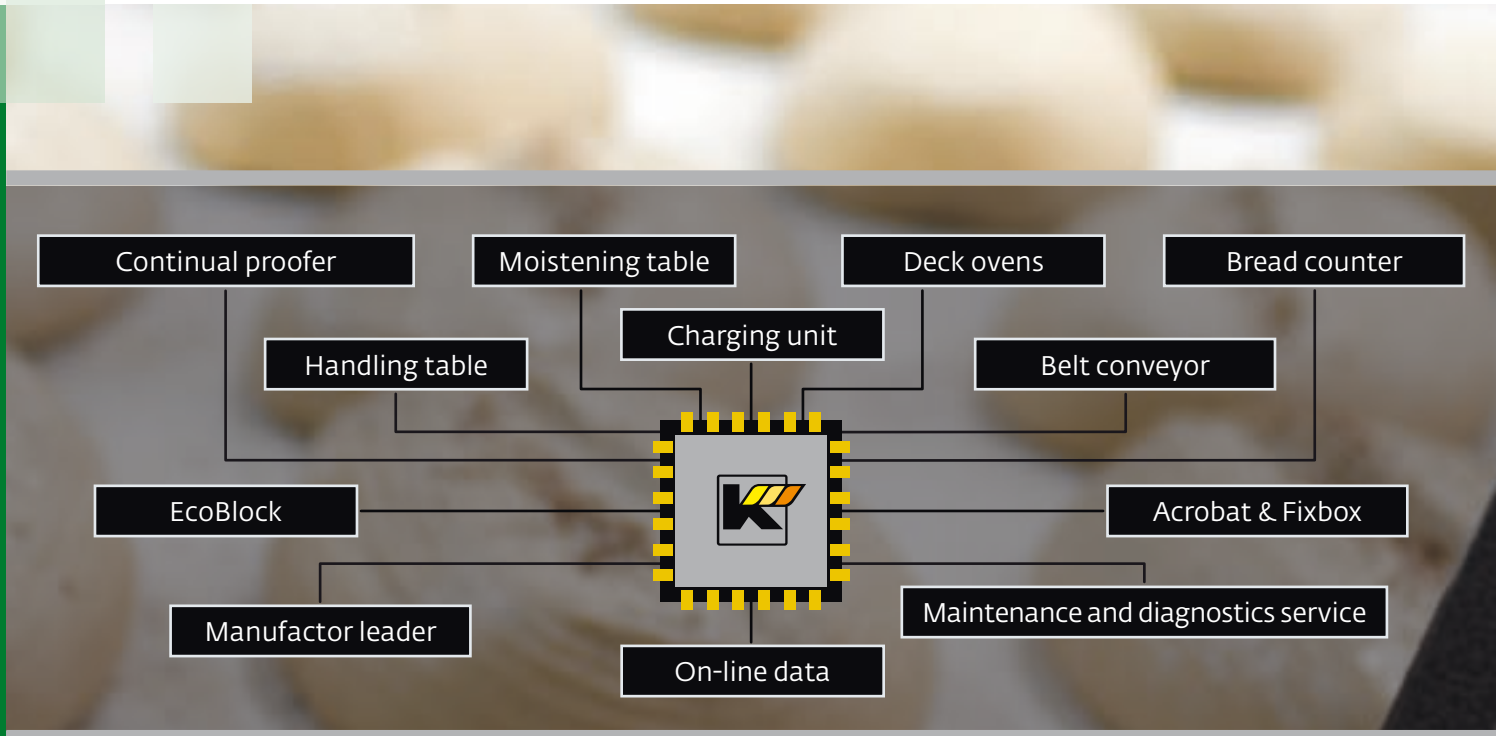


The Multi control control system as the highest degree of automation

Multi control, the ‘brain’ of the entire system

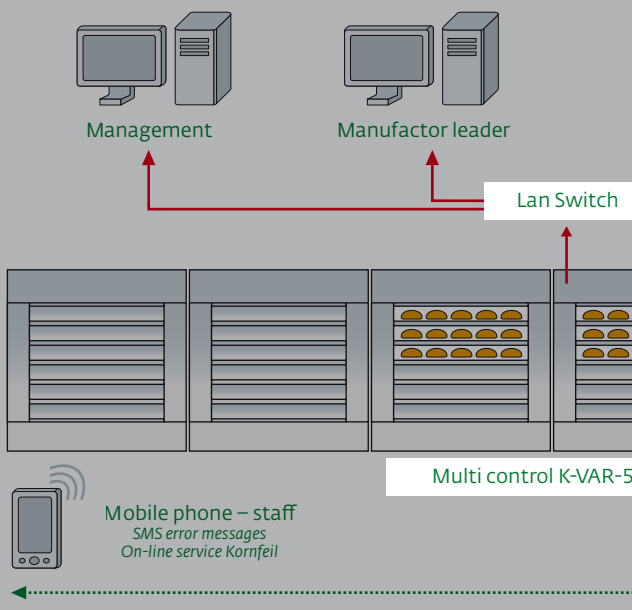
Multi control is at the peak automation level of bread making in deck ovens while maintaining the qualitative advantages of bread baking therein. A control system such as this is able to take over responsibility for the baking process itself while ensuring continual production quality.

The system operates and controls all components of the production line, i.e., ovens, proofers, Asistent charging machines, EcoBlocks and other peripheral equipment. The Multi control system designed for programmed baking in deck ovens makes provisions for all oven specifications. An individual baking programme, complete with a relevant temperature curve, steaming, draw off flaps and door opening, proceeds in every deck. It facilitates the efficient operation of burners, controlling their smooth performance and all oven functions in order to reach the highest quality of baked products.



Advantages

- Perfect control over production no matter where you are
- Possibility of data retention to assess production efficiency
- On-line service for immediate problem diagnoses
- Easy evaluation of production output



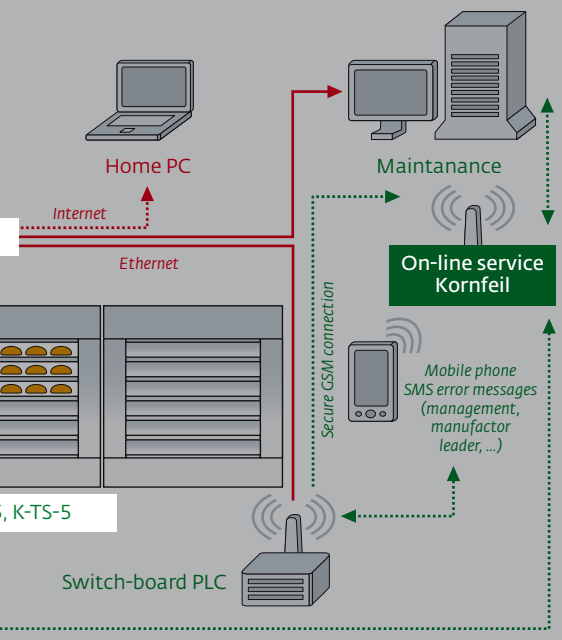
Baking process visualization

ŘBesides securing a continuous control over the production process, the control system also provides data analyses essential for improving the efficiency of bread and white bakery products production.

The line adjustment and operation is carried out by a production coordinator using the central control panel or the production engineer's computer. Owing to the incorporation of user's rights within the system, only authorised personnel are able to set and adjust baking parameters; others are allowed to only initialize baking programmes, and are unable to tamper with baking parameters.

Data transfer is carried out via the Ethernet Network. The equipment can be integrated within an existing company computer network, thereby facilitating the connection of the visualization system to local computers. The computer also monitors system malfunctions and notifies the user in case of a non-standard situation. Some of the other features of the system is the option to view, edit, print and back up baking programmes.

The visualization system also makes it possible to monitor and optimize all energy processes in the bakery. The baker can see where the heat accumulates, where it is utilized, whether there is any energy dissipation occurring. The remote access and visualization enable him to react flexibly to any changes within the system also during the course of seasons.



Technical service and technological assistance

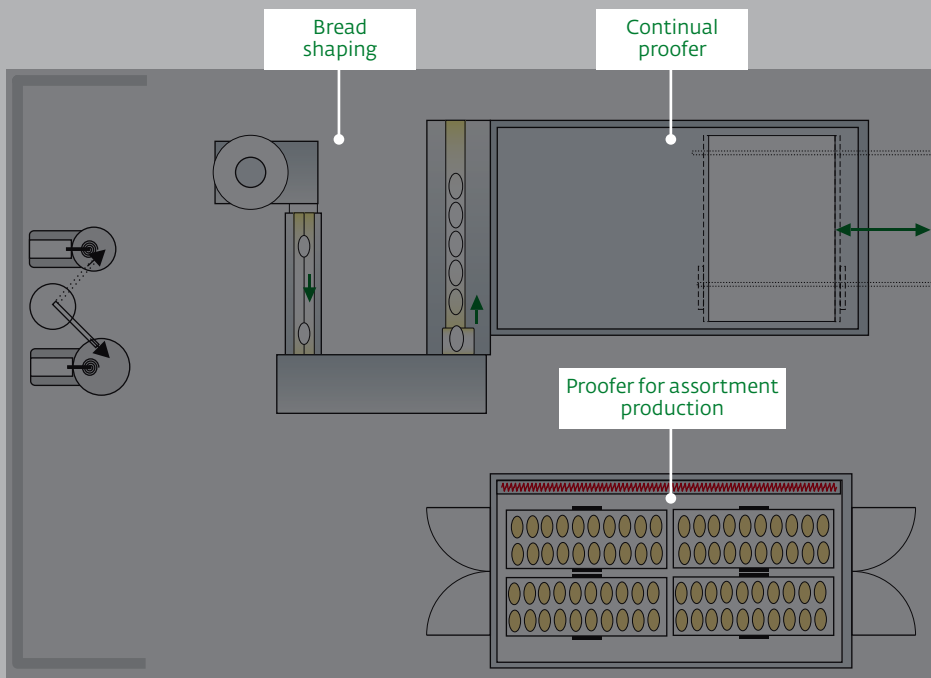
An On-line system provides a link between the bakery and the Kornfeil service and programming centre, offering immediate remote adjustments of values set for each line, baking programmes, as well as operative technical assistance when needed.

Deck oven-based automated lines

An efficient way of baking

Multi control production lines come in useful in all categories of the baking industry. The fully automated production process guarantees a high baking productivity while maintaining all the advantages of hand-crafted bread making.

Every component of the automated production line has a particular function, therefore the line set can be custom combined according to the customers' wishes and requirements.



The sample chart characterizes the fundamental options and principals of a line assembly on the basis of the deck ovens that we can provide for midsized and large bakeries. The lines can be assembled according to the type of entrance and proofing methods in the following versions.

- With a trolley proofer and manual dough unloading from baskets onto the feed table
- With a trolley proofer and Acrobat & Fixbox picking station for dough leavened without forms
- With a continual proofer for a maximum increase of the line output

Deck Ovens

The fundamental elements of each line are deck ovens using radiant heat. Thanks to the high heat accumulation in the baking plate, deck ovens are the best solution how to bake delicious, porous and high-quality bread. Basic types of deck ovens are distinguished according to the heat distribution system and the type of the heat transfer medium used.

VARIANT

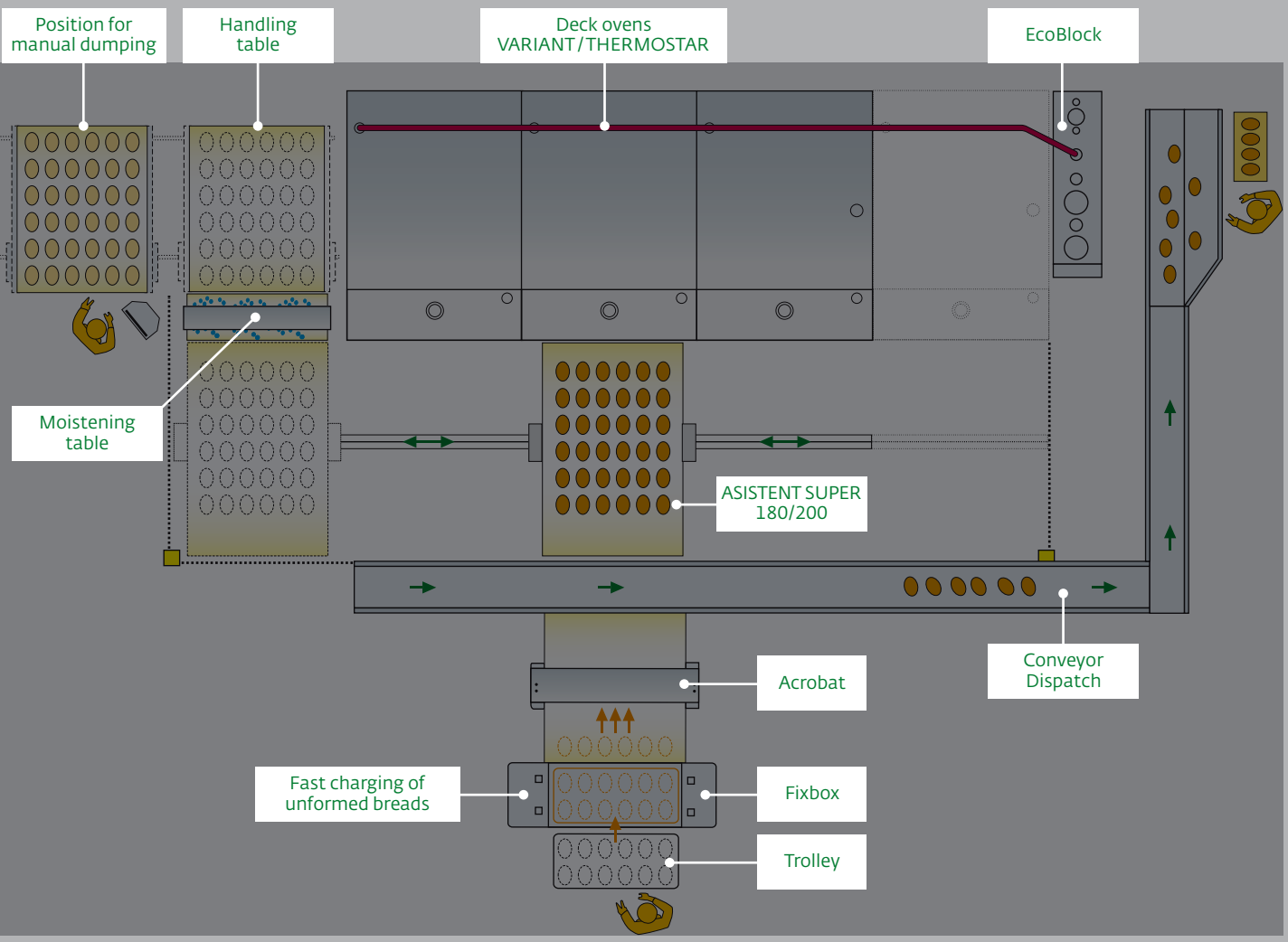
Cyclothermic deck ovens, with the baking surface size ranging from 18 to 31 m², work on a principle of hot air being circulated via channels under the baking plates hermetically separated from the baking chamber. The deck is heated both from top and bottom owing to the circulation. The heat medium used is either natural gas or heating oil.

THERMOSTAR

The heat transfer fluid used in thermal-oil deck ovens, with the baking surface size ranging from 18 to 58 m², is hot oil that is sent circulating via water radiators located just under baking plates. The ovens are distinguished by their ideal uniformity of baking. The energy transfer is more efficient with up to 10% lower consumption when compared to cyclothermic ovens. For a better use of space, thermal-oil ovens can be outfitted with a higher number of decks (9, 12 or 15). Natural gas or heating oil may be also used as the heat medium.

FORNATA

Electric deck ovens with a baking surface ranging from 15 to 22 m² are used in areas with limited availability of natural gas or where electricity is inexpensive.



Asistent charging device

The key component of the entire line

The Asistent is a charging device that is capable of servicing a number of deck ovens simultaneously. It facilitates both the loading and unloading of individual decks. It's operation is controlled via a computer system that maintains a perfect overview of the baking processes within individual decks. Based on a priority system, Asistent promptly decides whether to focus on dough charging or bread unloading.

For the reliable and safe operation of charging equipment and all line machinery, only top-quality production components supplied by reputable manufacturers, such as FESTO, NORD, HITACHI, etc., are used.

Based on the bakery size and the required output, two types of Asistent charging machines are available.

The Asistent SUPER COM

A charger designed for midsized bakeries, ideal for assorted bread baking, capable of loading 2–5 ovens with up to 28 decks with a baking output of up to 1000 kg of bread per hour.

Type	Work surface [mm]	Max. number of decks	Max. output [kg/h]	Power input [kW]
Asistent SUPER COM	1800 × 2000	7	1000	1,5
Asistent LINE	1800 × 2000	15	1400	4,0
Asistent LINE	1800 × 2400	15	1800	4,0

Technical solution

The dynamic control of carriages is accomplished via a set of frequency converters to ensure a high precision and speed of all integrated peripheral equipment of the production line.

The Asistant charging machine moves along ground tracks, its position being precisely monitored with a linear magnetic measuring system accurate to 0,1 mm. In order to operate a set of high-performance ovens, The Asistent is designed for horizontal travelling speed of up to 1,1 m/s and vertical speed of up to 0,5 m/s.

Automated deck cleaning

To ensure the perfect cleanliness of oven decks and continuous product quality, The Asistent is outfitted with an automated vacuum cleaning system. Decks are vacuum cleaned at every unloading to promptly prepare baking plates for another round of baking without time delays.

A high-performance vacuum with 7,5 kW input power services the entire deck. The location of the unit is custom designed – it can be installed either behind deck ovens, in a separate room or directly on the Asistent equipment. The sucked hot air is conducted out of the bakery to prevent a temperature rise inside.

The Asistent LINE

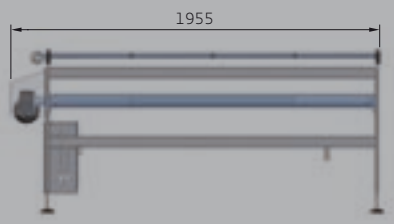
A charger for the highest baking output suitable, owing to its robust design, for 24-hour operation with an output of up to 1800 kg of bread per hour. It is capable of handling up to 6 ovens with up to 40 decks. To ensure a full automation of the line at high outputs, it is best to use a continual proofer with the possibility to produce primarily large series as well as a wide range of special breads.

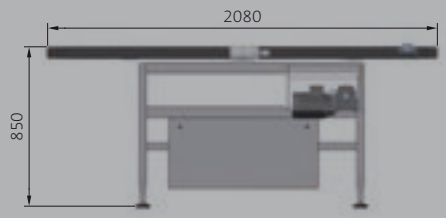
The Feed Table

An indispensable helper to every production line

Feed tables are multifunctional devices designed for the quick transfer of dough onto the Asistent charging machine with other functions, such as marking and automated sprinkling of salt, rye or sesame seeds on the dough pieces. They act as an intelligent and variable interlink for the maximum performance of the Asistent charging machines.

Type	Width [mm]	Length [mm]	Height [mm]	Work surface dimensions [mm]	Power input [kW]
AS-01	1955	2080	850	1800 × 2000 (2400)	0,7
AS-02	1955	3490	920	1800 × 2000 (2400)	1,7
AS-03	2092	2080	953	1800 × 2000 (2400)	1,0



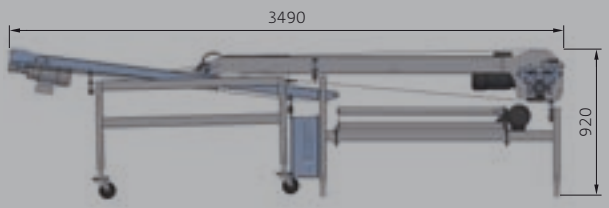


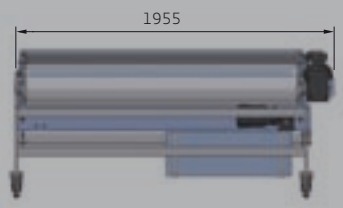
AS-01 Feed Table

Designed for manual unloading of dough from baskets. The dough is set on a feed table conveyor belt from where it is transferred onto a charging equipment in less then 10 seconds.

AS-02 Feed Table

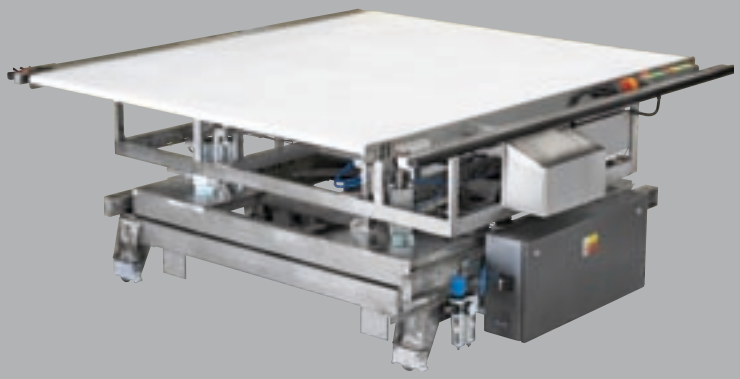
In combination with the AS-LIFT transfer table, the feed table comprises a unit for the very fast transfer of lightweight bakery products that are left to leaven on trolley trays. The trays with leavened dough are then placed on AS-LIFT and the dough is subsequently scooped up and transferred onto the charging equipment.

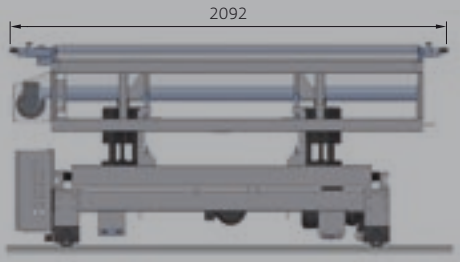


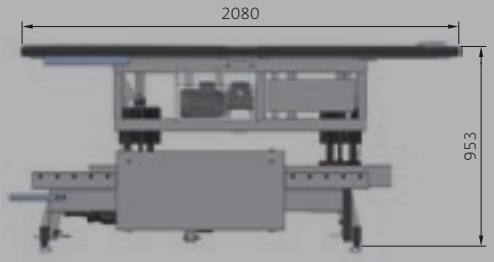


AS-03 Feed Table

Is designed primarily for transferring dough from continual proofers onto the Asistent charging equipment that in turn loads it into a deck oven. Thanks to the inter-stop feature, it can also be used for manual loading. The line thus integrates automated operation with an option for assorted production. For gentle handling of thin dough, the table is equipped with a pneumatic lifting system, raising the work surface, and a cross-travel carriage to meet all dispositional requirements of the bakery.







Proofer

An important line component for a good dough rise

Proofers are used to ensure the process of correct dough rising at an optimal temperature and humidity free of fluctuations. These conditions, contributing to the perfect shape and look of the bread are provided by proofers with controlled air-conditioning. Proofers are either equipped with a simple manual control or a programme operated control of the entire proofing process.

Continual proofers for a fully automated operation

The dough proofing process takes place in a fully automated programme controlled proofer with a continual entrance and a discontinuous exit onto the feed table.

The rye-wheat dough is leavened in baskets and the wheat dough in troughs, following a sequence of steps from dough shaping to charging it into deck ovens. Dough pieces are tipped out of the baskets very gently which makes it suitable also for thin rye-wheat dough. After the dough has risen, it is moved onto the feed table that functions as a link between the continual proofer and the Asistent charging machine that loads the dough directly on heated baking plates within 30 seconds, thereby ensuring a dough rise of even very thin dough with a higher water content.

- The proofer size and output are custom designed based on the required parameters and baking assortment
- The steam is utilized and proofers heated by waste heat from ovens
- DUO proofers enable alternating production of both oval and round bread in one automated line
- The proofer air-conditioning can be supplemented with cooling for regions with higher summer temperatures
- The equipment can be outfitted with a pasteurizing unit which eliminates the possible presence of mould and bacteria
- Proofers can be equipped with automated marking and scoring

Box and pass-through proofers for midsized bakeries and variable production

Trolleys are used in the proofing process with dough being placed either in baskets or on trays. Proofers are made of rustfree materials with a built-in option of programme control and a controlled temperature and humidity air-conditioning system.

Proofers are heated by the waste heat and the steam to provide humidity which is obtained from deck ovens. These proofers have a minimal energy consumption, saving tens of watts for the operation of circulating fans and controls. After proofing, the trolleys are transported to the feed table where the dough is manually tipped out of the baskets.

- Programmed control and operation
- Utilizing waste heat from ovens
- Utilizing the steam from deck ovens
- The option to use water sprinklers for moistening
- Adaptable solutions for space utilization

Acrobat & Fixbox

Fast and gentle loading of form-free dough

The Acrobat & Fixbox automated transfer station set is a super structural device used in Multi control bread lines. Dough is gently handled and scooped up using linens. The device thus enables the fast loading of form-free dough into deck ovens

Dough is manually set in special trolleys on cloth-covered trays and transferred into a box proofer. After proofing, the trolley is slid into the Acrobat & Fixbox transfer station which handles the remaining work and gently sets the dough in the oven.

The time between sliding the trolley into the transfer station, and setting the dough on a heated deck oven baking plate amounts to about 30 seconds. The dough can thus be very thin and contain more water, resulting in a very porous final product.

The Acrobat & Fixbox station is ideal for the form-free leavened bread weighing 300 g – 2500 g, wheat bread, cereal and rustic bred, ciabatta bread, Arabian bread and light-weigh bakery products up to 100 g.

Type	Tray dimensions [mm]	Number of trays [pcs]	Power input [kW]
Acrobat 180 / 200	1800 × 700	9–12	1,35
Acrobat 180 / 240	1800 × 800	9–12	1,35
Fixbox 180 / 70	1800 × 700	9–12	0,05
Fixbox 180 / 80	1800 × 800	9–12	0,05

Dampening Table

For a golden bread shine

The dampening table is a peripheral device of the production line moistening the dough before it is set in the deck oven. The table is located between the feed table and the charging device. Its functions are automatically controlled based on the dough movement through the production line.

Feeding table versions

Sprinkler dampening system

The dough is fog-moistened .

Brush dampening system

The dough dampening with a rotating brush imitates a baker's handwork by gently working flour into the dough. The resulting effect is a shiny, golden colour of bread and other bakery products.

Type	Work surface dimensions [mm]	Power input [kW]	Dimension (w × h × l) [mm]
VS500	1800 × 500	1,0	2240 × 1200 × 500
VS780	1800 × 780	1,0	2240 × 1200 × 790
VS1000	1800 × 1000	1,0	2240 × 1200 × 1000
ROTOkombi dampening brush unit	1800	1,2	2240 × 1250 × 500

Conveyors and expedition

Without the touch of a hand

Conveyor belt

The charging assistant unloads baked bread from the oven and transfers it onto a conveyor belt. The bread is than transported directly to the expedition without a touch of a hand. The conveyor belt operation is fully automated and perfectly synchronized with other components of the production line. The conveyer can rise, decline and curve as needed. The design is custom-tailored to the work space and customer's requirements.

Moistening conveyor

This is a component of the conveyor belt, moistening the bread after it is unloaded from the oven, which leaves the final product shiny with an improved crust consistency.

Spiral chute

A segment of conveyor systems makes it possible for the bread transport to drop from the headway height of the conveyor to the working position where the bread can be taken off the revolving table or the bread counter.

Bread counter

A device located at the end of the line with a built-in function for final product counting where the bread is gradually taken off. The count, with the type of assortment indicated, is then sent into the central database of the bakery. Finished bread rotates on the counter belts running in opposite directions to be eventually let out in a line at the exit. The gradual unloading process is monitored by an exit sensor. Based on the size of the deck baking surface in individual ovens, we differentiate between two basic counter types: KAL/R1 and KAL/R2.

Type	Work surface dimensions [mm]	Power input [kW]	Dimension (w × h× l) [mm]
KAL/R1	1800×1200	1,5	1567 × 900 × 4500
KAL/R2	1800×2400	1,5	1567 × 900 × 5500

Revolving table

This equipment located at the end of the line used for bread unloading is a more affordable equivalent of the bread counter, functioning on a revolving table principle with a batch capacity of one deck.

Unloading conveyor

Is a conveyor component with an independent drive and continuous speed regulation, used for bread unloading from the conveyor belt. This is the most space saving model.

EcoBlock

Cost-saving baking – green light to energy saving

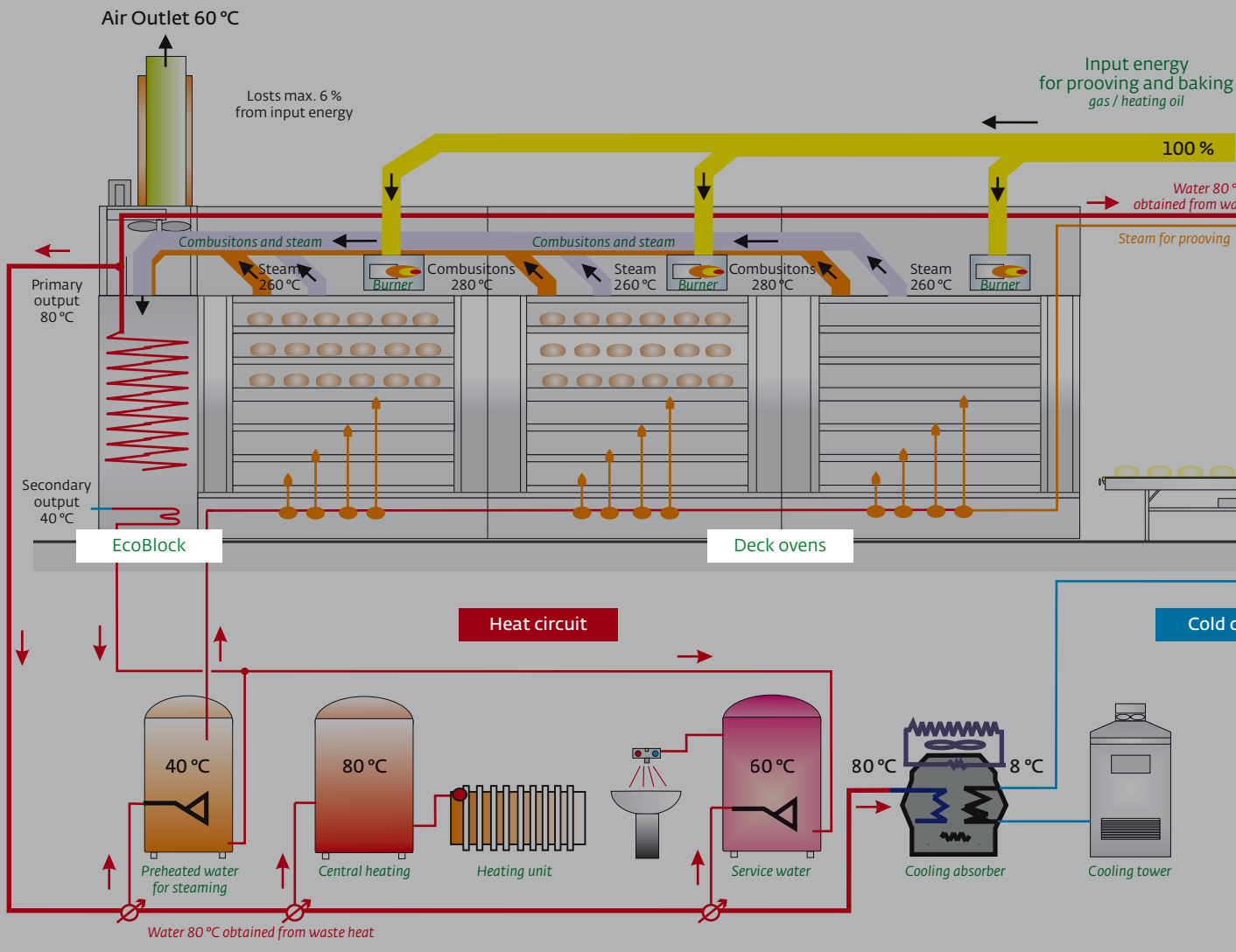
Kornfeil has 15 years of experience in utilizing waste heat from baking ovens in hundreds of bakeries across the whole of Europe owing to the unique EcoBlock device that combines a highly effective heat exchanger, processing waste heat from combustion gases and steam, with a filtering circuit wherein pollutants are reduced through a chemical process and watering down of combustion gases, eliminating all sulphuric and sulphurous substances, including soot.

Perfect energy system

The EcoBlock is an indispensable component of automated production lines because it is an ideal device for utilizing waste heat from combustion gases as well as the flue steam from deck ovens. The line is thus turned into a closed energy system with one flue with the output temperature of moist air up to 60 °C.

Of the most effective operation of bakery with

The best investment is an investment into cost



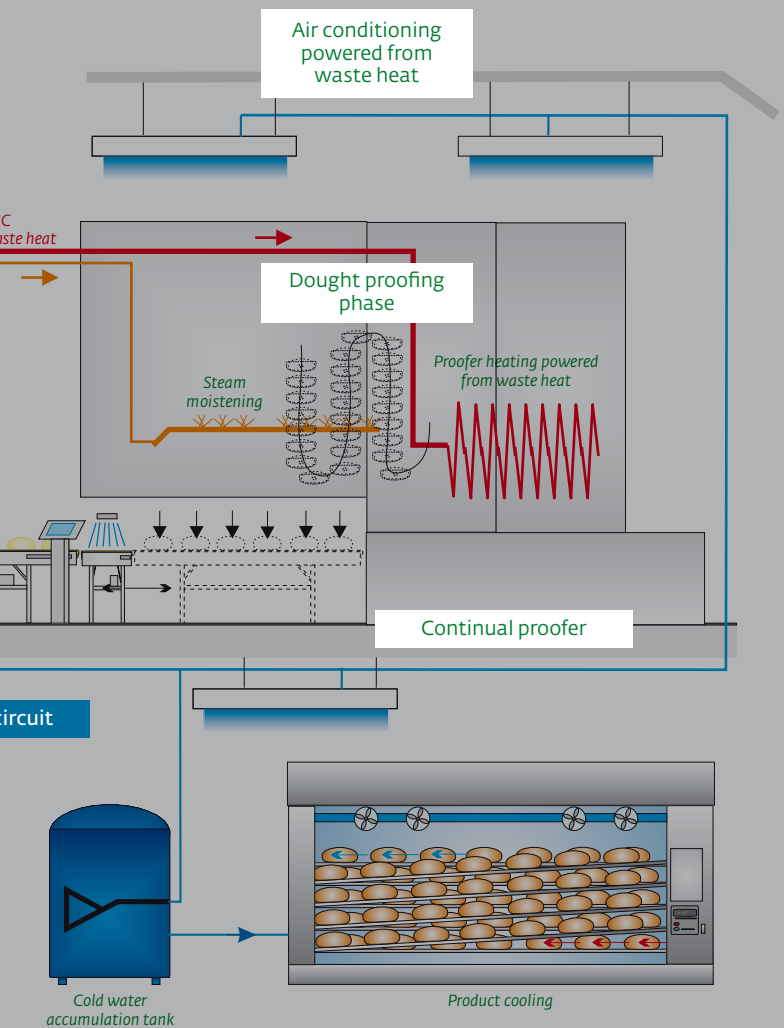
Cost saving and ecologic best resolution

EcoBlock offers big savings of input energies used to run the entire bakery, while significantly reducing CO_2 and NO_x emissions as a contribution to the environment conservation.

By integrating EcoBlock into the production line, the bakery is guaranteed to achieve maximum utilization of the input energy and the energy consumption is minimized to only the quantity needed for baking. By utilizing waste heat, the bakery obtains up to 22% of the input energy cost-free, ready for further use.

minimal energy losses

saving



All energy stays home

Ways to utilize the obtained energy

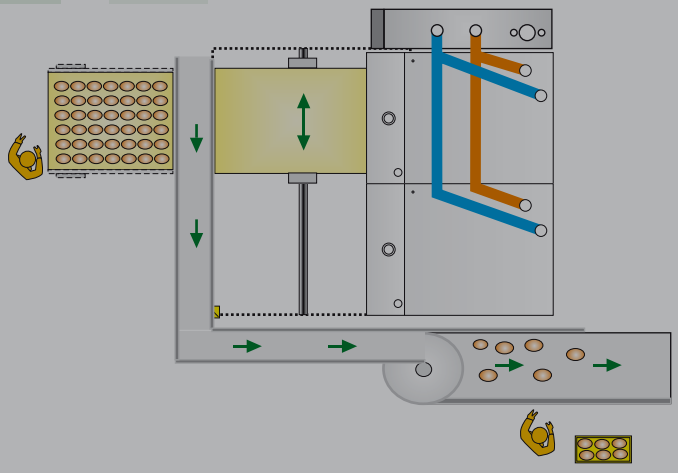
- Heating of proofers and bakery premises
- Heating service water and water for the crate washer
- Preheating feedwater for oven steaming
- Cooling of products and the production area through absorption refrigeration

Sample Sets of Multi control Production Lines

Choose best bet

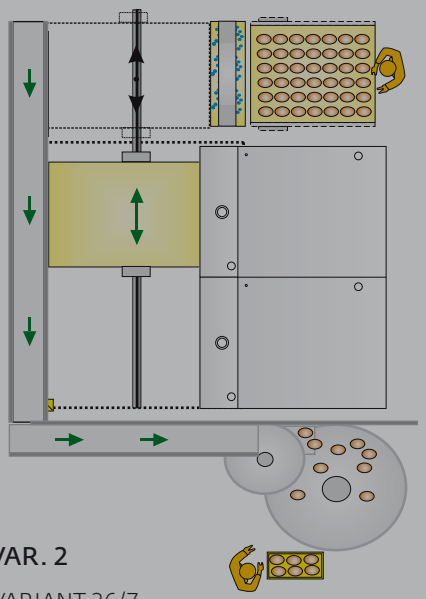
Sets for midsized bakeries

- Productive bread production for midsized bakeries with an output of 400–800 kg of bread per hour .
- The dough is leavened on trolleys placed in box proofers.
- The dough is tipped out from baskets on the feed table.
- Automatic picking of form-free dough.



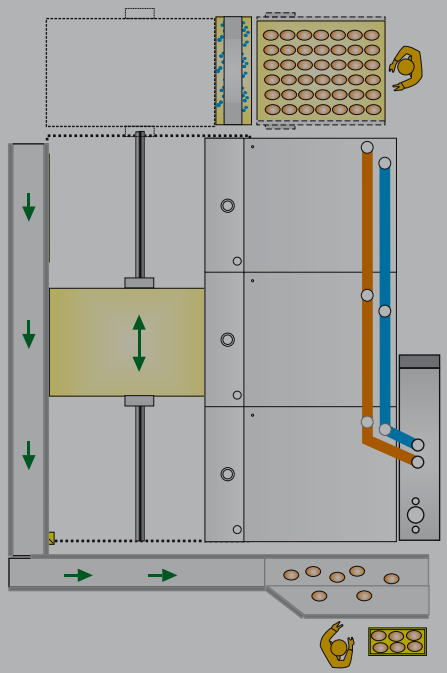
Set VAR. 1

• 2× VARIANT 22/6 • EcoBlock • Output 500 kg/hr



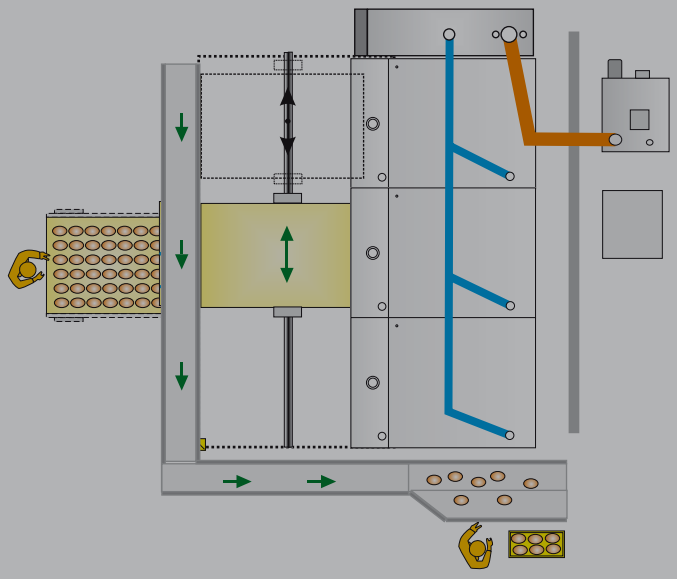
Set VAR. 2

• 2× VARIANT 26/7
• Output 600 kg/hr



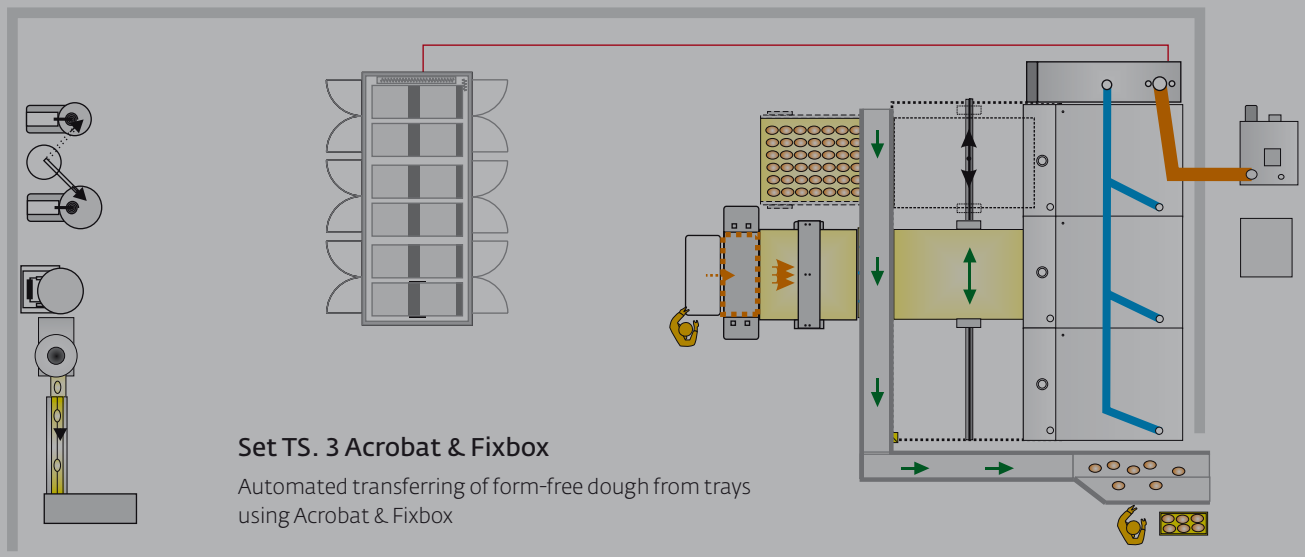
Set VAR. 3

• 3× VARIANT 22/6 • EcoBlock • Output 750 kg/hr



Set TS. 3

• 3× THERMOSTAR 26/7 • EcoBlock • Output 900 kg/hr

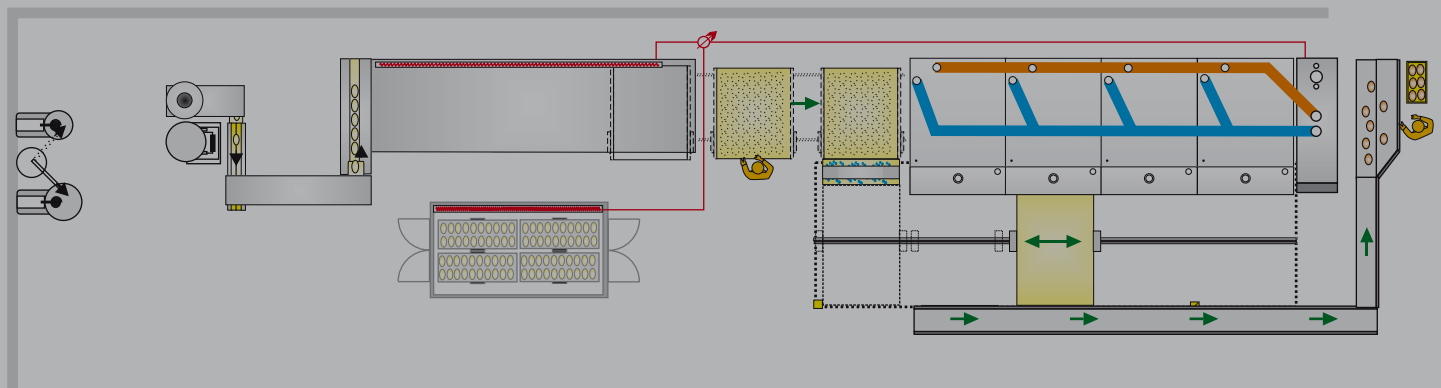


Set TS. 3 Acrobat & Fixbox

Automated transferring of form-free dough from trays using Acrobat & Fixbox

- 3× THERMOSTAR 22/6 • Acrobat & Fixbox
- EcoBlock • Output 750 kg/hr

For the highest baking outputs with a continual proofer – up to 1800 kg of bread/hr. The optimal choice for major bakeries focused on quality.



Set VAR. 4 KONT

Automated production line with a continual proofer and a box proofer for assorted bread

- 4× VARIANT 26/7 • EcoBlock • Output 1200 kg/hr

KORNFEIL spol. s r. o.
696 14 Čejč 66
Czech Republic
Phone: +420 518 309 611
Fax: +420 518 309 610
E-mail: kornfeil@kornfeil.cz
www.kornfeil.cz

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