Introduction

2.1 About this chapter

This chapter describes the principles, working actions, specifications and layout of the machine and basic principles of operation.

2.2 Functional description

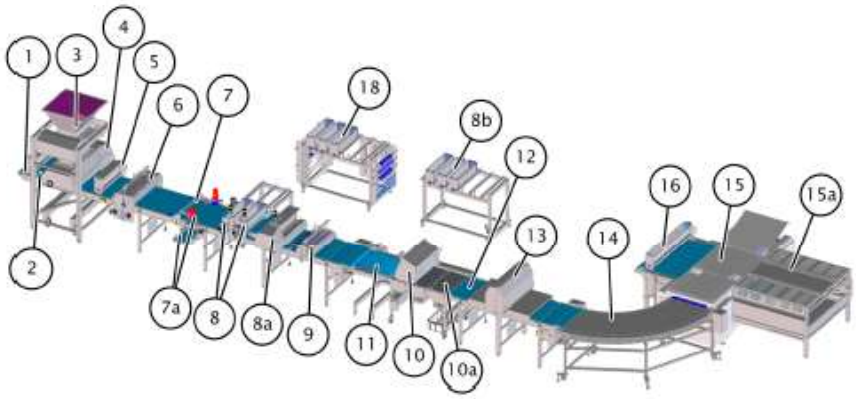
The oven unit is used to bake a various range of prepared dough products. At the beginning of the machine, the dough pieces are automatically transported into the oven. A transport system in the oven transports the dough pieces during the baking process. The speed of this transport system defines the baking time in the oven. When the products are baked, they are automatically transported out of the oven.

2.3 Machine structure

This machine line consists of:

- Base section 1
- Proofer
- Oven unit

Base section 1



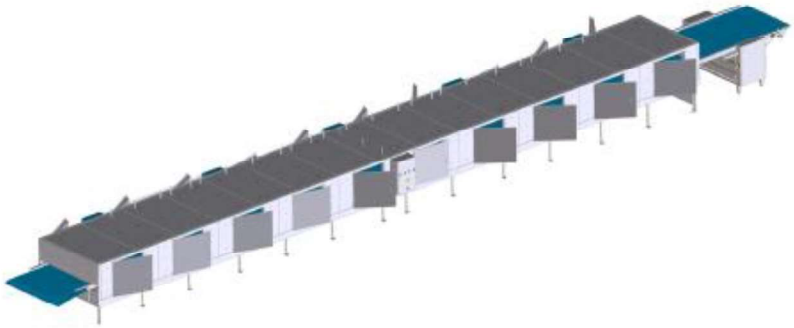
The Base section 1 consists of the following units:

Base section 1

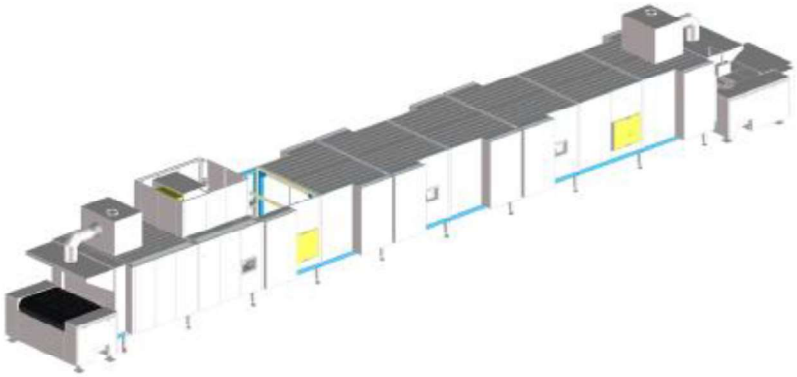
Pos. no.	Unit	Description
1	Flour duster	Flour duster to provide the conveyor belt or a dough sheet with a thin layer of flour. Refer to Flour duster.
2	Conveyor	The conveyor transports the dough slices to the production units. Refer to Main conveyor.
3	Chunker	Dough chunker to supply the dough pieces. Refer to Chunker.
4	Three roll dough extruder	Three roll dough extruder to create a smooth dough sheet. Refer to Three roll dough extruder.
5	Flour duster	Flour duster to provide the conveyor belt or a dough sheet with a thin layer of flour. Refer to Flour duster
6	Decoration unit	Main driven decoration unit for positioning a docking unit. The docking pins will provide the dough sheet with docking holes. A brush roll cleans the docking pins. Refer to Decoration unit.
7	Circular cutter	Unit with 2 collapsible rotary length cutters to cut the dough sheets on both sides. Refer to Circular cutter.
7a	Scrap removal system	Scrap removal system to feed the scrap via return and cross conveyor to the side of the production line. Refer to Scrap removal system.

Pos. no.	Unit	Description
8	Universal strewing unit	Applicator to strew a strewing material on the product. 2 units in a row for different strewing material. Refer to Universal strewing unit.
8a	Powder sugar strewer	Applicator te strew powdered sugar on the product. Refer to Powder sugar strewer on page 79.
8b	Storage frame for removable hoppers	Mobile storage frame for maximum 5 strewing hoppers. Refer to Storage frame for removable hoppers.
9	Circular cutter unit	Unit with 21 collapsible rotary length cutter, to cut the dough sheet into strips. Refer to Circular cutter unit.
10	Egg yolk sprayer	Spray unit to spray egg yolk (or other glazing) on the products. The egg yolk sprayer is installed on a wire mesh conveyor (10a). Refer to Egg yolk sprayer.
11	Spreading conveyor	Cord conveyor to spread or convert the products (exchange parts). Refer to Spreading conveyor.
12	Main conveyor	The main conveyor transports the dough slices to the production units. Refer to Main conveyor .
13	Guillotine	The mechanically controlled guillotine is used for cutting the dough to a specific length. Refer to Guillotine.
14	90 degrees belt conveyor	90 degrees conveyor to transport the products 90 degrees from the incoming product flow. Refer to 90 degrees belt conveyor.
15	Double working retractor	The double working retractor receives the products in a continuous stream and puts them sideways in batches on the receiving belt of the merger. Refer to Double working retractor.
15a	Merger	The merger is used to create a continuous product stream from the delivered product batches. Refer to Merger.
16	Flour duster	Flour duster to provide the conveyor belt or a dough sheet with a thin layer of flour. Refer to Flour duster.
18	Trolley	Trolley for change parts (combined with storage frame 8b)

Proofer



Oven



2.3.1 Process

Snack base section:

The flour duster (1) spreads a rye layer on the conveyor belt (2). The chunker (3) of the stress free unit deposits the dough pieces for the snack bases on to the conveyor (2). The three roll dough extruder (4) reduce the thickness of the dough to 2 to 30 mm (adjustable). Then the second flour duster (5) spreads a rye layer on the upper side of the dough.

The dough is then transported to the decoration unit (6), that has docking pins tot make docking holes in the dough sheet. The unit has also a brush to clean the docking pins. A set of circular cutters (7) cuts the dough sheet to the correct width. The scrap is transported out of the production line by the scrap removal system (7a) and can be reused.

A set of two universal strewing units (8) strew up to three different kinds of seed on the dough sheet. The strew boxes are interchangeable and can be stored on a separate trolley (8a and 18) when they are not used. A powder sugar strewer (8b) strews powdered sugar on the product.

The dough sheet is then cut to strips by the circular cutter (9). The cutter has a roll with knifes that cut the sheet to a specific width. The unit has exchange parts for different widths, that can be stored on the trolley (18).

The spreading unit (11) creates space between the strips. It has tree exchange parts for different widths, that are stored on the trolley (18).

The dough strips are then transported to the egg yolk sprayer (10) that sprays egg yolk or another glazing on the decorated dough. The excess yolk drips trough the wire mesh conveyor (10a) on which the unit is installed.

The dough strips are then transported by a conveyor (12) to the guillotine (13) that cuts the strips into pieces with a certain length. The 90 degrees conveyor (14) transports the dough pieces to the double retracting conveyor (15) that puts the products sideways in batches on the receiving belt of the merger (15a). The merger also has a flour duster (16).

Proofing/resting conveyor:

The products are then transported to the proofing/resting conveyor, that provided rest for 20 minutes, before the products are transported to the oven.

Oven:

Finally, the product is backed in the oven.

2.3.2 Construction

The machine consists of units that are made out of stainless steel and other non-corrosive materials. Specific construction information of the units is described in chapter Description on page 57.

The machine line is equipped with a number of electrical cabinets. It is controlled by a PLC. Via an Ethernet connection, this PLC communicates with local control units controlling the sensors, valves, frequency inverters and the local panels. For details, see the electrical drawings.

2.3.3 Security

The security of the system is created through a balance between safety and workability: An optimal workable situation is created for the operating personnel but safety was kept in mind.

Perilous movements of the system are mostly protected with protective covers or safety doors, but there are exceptions. On a lot of places in the system it is possible to incur injuries.

Warning

The conveyors may suddenly start to run.

Read the general safety instructions in the safety chapter of this manual; see chapter Safety on page 35. If special safety instructions are valid for specific units of the machine line, these are described and explained in section Specific safety aspects of the machine line units, see "Specific safety aspects of the machine" on page 53.

The system is equipped with a number of emergency stop circuits, for example for the machine line and the oven. After pressing an emergency button in this circuit, the units of this emergency stop circuit will immediately stop.

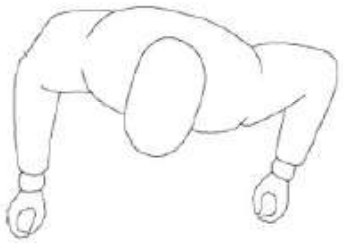
Danger

Notice that the systems which are not part of the Tromp delivery are NOT included in the emergency circuit of the Tromp system.

2.4 Working area

The workplace of the operator is a place near the control panel. In the project drawing (see drawings package) the workplace of the operator is indicated with the next figure.

Workplace operator



2.5 Operator interfaces

The machine line is controlled using a number of touch panels on different locations of the machine line.

- A main control panel to control the machine line.
- Unit control panels on some units to control specific functions for that unit.

During operation and maintenance, the operator or maintenance engineer uses specific menu screens.

2.6 Operator tasks

Typical operator tasks are:

- Starting-up of the machine.
- Loading programs.
- Filling flour dusters and depositors.
- Running production.
- Unloading products.
- Shutting down the machine.
- Performing operator related preventive maintenance.
- Cleaning the machine.
- Changing equipment to run another product.
- Troubleshooting.

2.7 Options

2.7.1 Oven unit

Available options:

- Bread sprinkler
- Moisture control
- Brush unit
- Scraper
- Plenum adjustment
- Correct conveyor movement detection
- Conveyor control
- Emergency motor with battery
- Greasing unit
- Chain lubricator
- Chain lubricator drop detection
- Cooling conveyor
- Humidity measurement
- LED illumination
- Convection
- Gap detection
- Energy management
- Service management
- Downtime registration
- Data logging
- Power supply garding

2.7.2 Flour duster

Available options:

- Mobile frame to make the flour duster interchangeable with other units or to move the flour duster to several positions on the line.

Flour duster mobile frame (example)

2.7.3 Three roll dough extruder

Available options:

- Level detection in the hopper to keep the volume in the hopper on a constant level.

2.7.4 Egg yolk sprayer

Available options:

- Cooling unit on the hopper.

2.7.5 Guillotine

Available option:

- Knife traveling moment.

2.7.6 Conveyor

Available options:

- Belt tracking device to steer the conveyor belt.

2.8 Specifications

2.8.1 Machine line specifications

Main specifications base/decoration line

Voltage	3x400V (50Hz) + 0 + Ground
Maximum voltage deviation	5 %
Standard	According EN 60204-1 4.3.1
Power supply	25 kVA
Nominal current	36 A
Main fuse	50 A
Electrical protection	IP54
Total air consumption	600 NL at 6 bar
Air connection	19 mm
Transport speed	1.95 - 1.98 m/min
Control side	Right
Internet	Yes

Specifications

Main specifications proofer

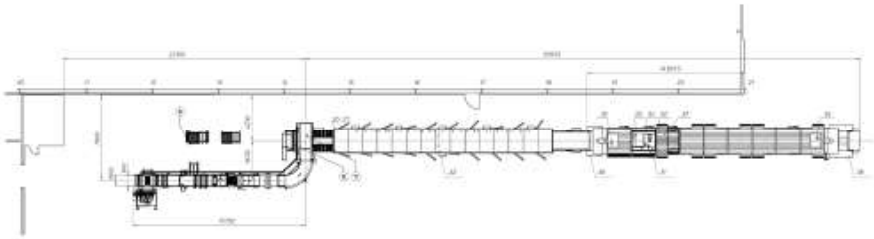
Voltage	3x400V (50Hz) + 0 + Ground
Standard	According EN 60204-1 4.3.1
Power supply	24 kVA
Total air consumption	375 NL/min at 6 bar
Control side	Outfeed right
Internet	Yes

Main specifications oven unit

Voltage	3x400V (50Hz) + 0 + Ground
Standard	According EN 60204-1 4.3.1
Power supply	23 kVA
Total air consumption	720 m^3/h
Control side	Outfeed right
Internet	Yes

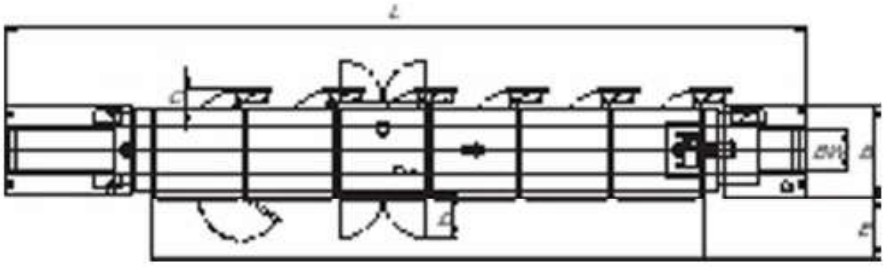
For complete and exact data, see the lay-out drawing, the electrical drawings and the machine tag of your system.

Machine dimensions - drawing 11006-PR-1-01-Rev-4



2.8.2 Oven unit

Multibake® floor lay-out



Explanation of dimensions

Symbol	Explanation	Value (mm)
B	Oven width	3140
BW	Transport belt width	1550
C	Extension of oven inspection ports	750
D	Extension of frame and tower inspection doors	N/A
E	Room needed for removal of burners or heating elements	1250
L	Oven length including infeed and outfeed modules	19,800

Note

Important remarks about the location of the Multibake®:

- Note the emergency exits and routes. The Multibake® should not block any route or door. Take care that signs indicating the escape routes are not hidden behind the tower.
- Note the accessibility of any fire extinguishers or first aid boxes when installing the Multibake®.
- Check if the emergency lighting is still sufficient if the Multibake® is installed.
- If necessary relocate smoke alarms to prevent unnecessary alarms when opening an oven door.

2.8.2.1 Basic module

Main specifications basic module

Height (mm)	1900
Width (mm)	3140
Length (mm)	2200
Tunnel height (mm)	high: 815 low: 750
Weight (kg)	1800

2.8.2.2 Infeed

Main specifications infeed

Height (mm)	+/- 1000
Width (mm)	2755
Length (mm) (steel belt, grid belt)	3060
Weight (kg), (steel belt, grid belt)	+/- 2000

2.8.2.3 Outfeed

Main specifications outfeed

Height (mm)	+/- 1000
Width (mm)	3070
Length (mm)	2100
Weight (kg)	+/- 2000

2.8.2.4 Head module infeed / outfeed

Main specifications head module infeed / outfeed

Height (mm)	1900
Width (mm)	2190
Width (mm)	2556
Length (mm)	1343
Weight (kg)	+/- 500

2.8.2.5 Emissions, etc.

Emissions

Emission	Description
Noise	The sound pressure level created by the Multibake® at the operator working place is below 80 dB(A), measured in accordance with ISO 3746-2010. The buzzer sound pressure level is 90 dB(A).
Vibration	No noticeable vibrations are emitted by the Multibake®. Vibration damping is not required.
Electromagnetic compatibility	The Multibake® electromagnetic compatibility corresponds to EEC Directive 2014/30/EU. - Electromagnetic radiation produced by the Multibake® is adequately shielded. - Immunity of the Multibake® against electromagnetic radiation is sufficient to meet with official requirements.
Light	There is no light emitted from the Multibake®.
Heat	The Multibake® outer surface temperature never exceeds the 47 °C (116.6 °F). The oven belt temperature can get up to 350 °C (662 °F)! Some parts (like the vapor exhaust hood) can get over 65 °C (149 °F). Safety decals will than be mounted.
Dust	The Multibake® emits no dust. The insulation is covered by the outer surface. The fans of the oven can circulate dust that already exists in the bakery. There is no risk for dust explosion (NEN-EN1839).
Vapour exhaust	The Multibake® pollution is low.
Smell / odor	Only a heated oven can have a smell. The most smell is due to the heating of the oven belt greasing or the product tray, product baking itself, etc. No bad ore annoying smell will occur by normal use of the oven.
Pollution	The Multibake® has a low amount of pollution. The amount of pollution highly depends on the product type. The vapor exhaust gasses do not contain a big amount of toxic gasses.